FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA Phone + Bluetooth & DTS/UNII a/b/g/n, ANT & NFC

MODEL NUMBER: SM-N7508V

FCC ID: A3LSMN7508V

REPORT NUMBER: 14U16931-5, Revision A

ISSUE DATE: February 21, 2014

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

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	01/31/14	Initial Issue	P. Kim
A	2/21/14	Updated page 14 table	P. Kim

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: GSM/WCDMA Phone + Bluetooth & DTS/UNII a/b/g/n, ANT & NFC

MODEL: SM-N7508V

SERIAL NUMBER: FL-012-D (CONDUCTED)
FL-012-A (RADIATED**)**

DATE TESTED: JANUARY 22-31, 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:

STEVEN TRAN
Wise LAB TECHNICIAN
UL Verification Services Inc.

2. TEST METHODOLOGY

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

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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

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	14.304	26.94
5180-5240	802.11n HT20	13.48	22.28
5190-5230	802.11n HT40	13.19	20.84
5260-5320	802.11a	14	25.12
5260-5320	802.11n HT20	13.12	20.51
5270-5310	802.11n HT40	12.94	19.68
5500-5700	802.11a	14.31	26.98
5500-5700	802.11n HT20	13.23	21.04
5510-5670	802.11n HT40	13.53	22.54

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -4.94 (5.2GHz), -2.94 (5.3GHz) and -2.84 (5.5GHz) dBi.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	EP-TA10CBC	N/A	N/A
Earphone	Samsung	N/A	N/A	N/A

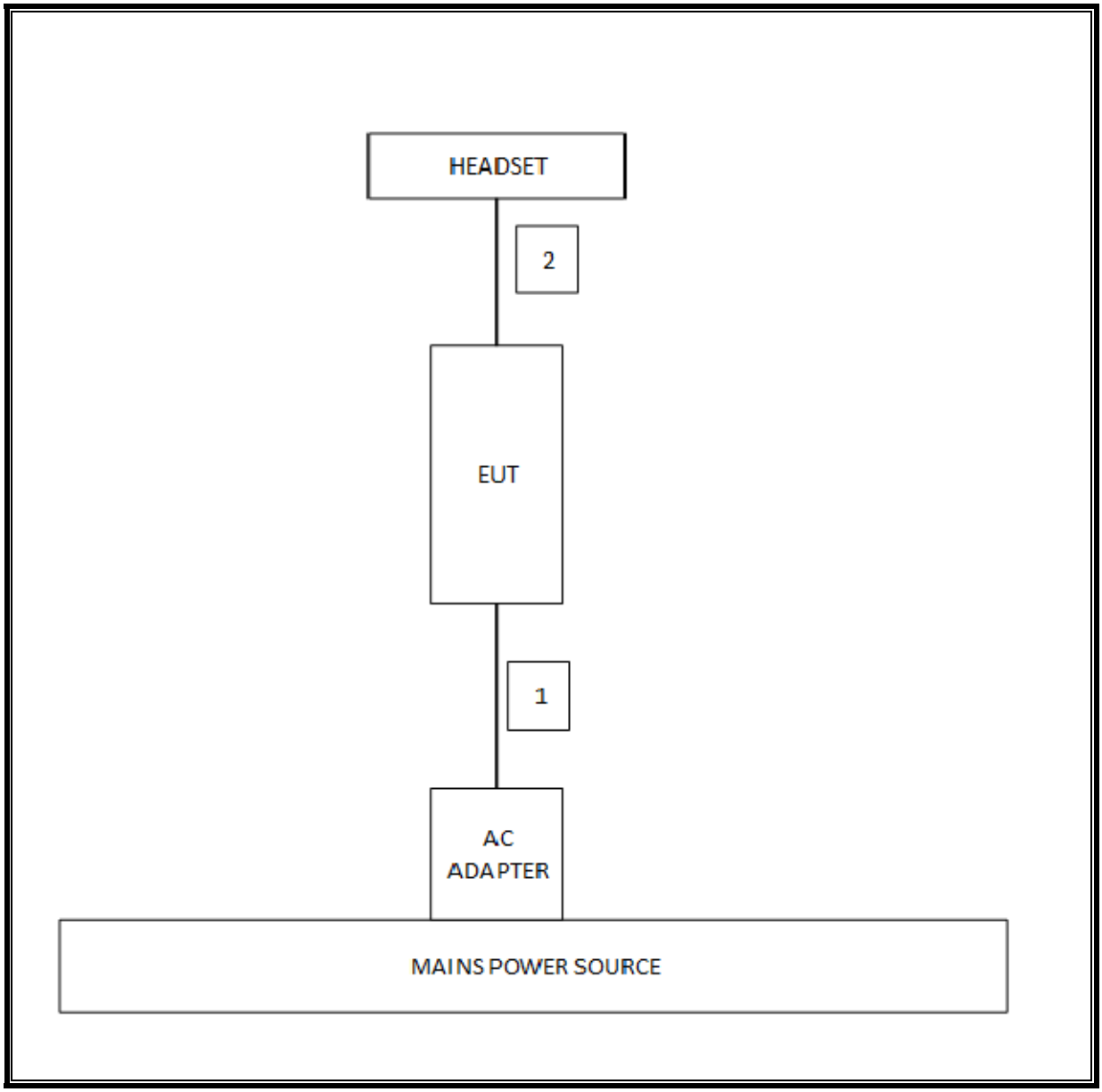
I/O CABLES

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.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal 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	1/28/2015
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

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	46.4MHz
15.407 (a)(1)	TX Cond. Power 5.15-2.25	<17dBm or 4+10Log(OBW)		Pass	14.304dBm
15.407 (a)(2)	TX Cond. Power 5.25-5.35 & 5.47-5.725	<24dBm or 11+10Log(OBW)		Pass	14.31dBm
15.407 (a)(5)	PSD	<8dBm		Pass	3.01dBm
15.407 (a)(6)	Peak Excursion Ratio	13dB		Pass	8.43dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Radiated	Pass	31.05dBuVm
15.407 (b) & 15.209	Radiated Spurious Emission	< 54dBuV/m		Pass	46.58dBuVm
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Radiated / Condcuted	Pass	N/A

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

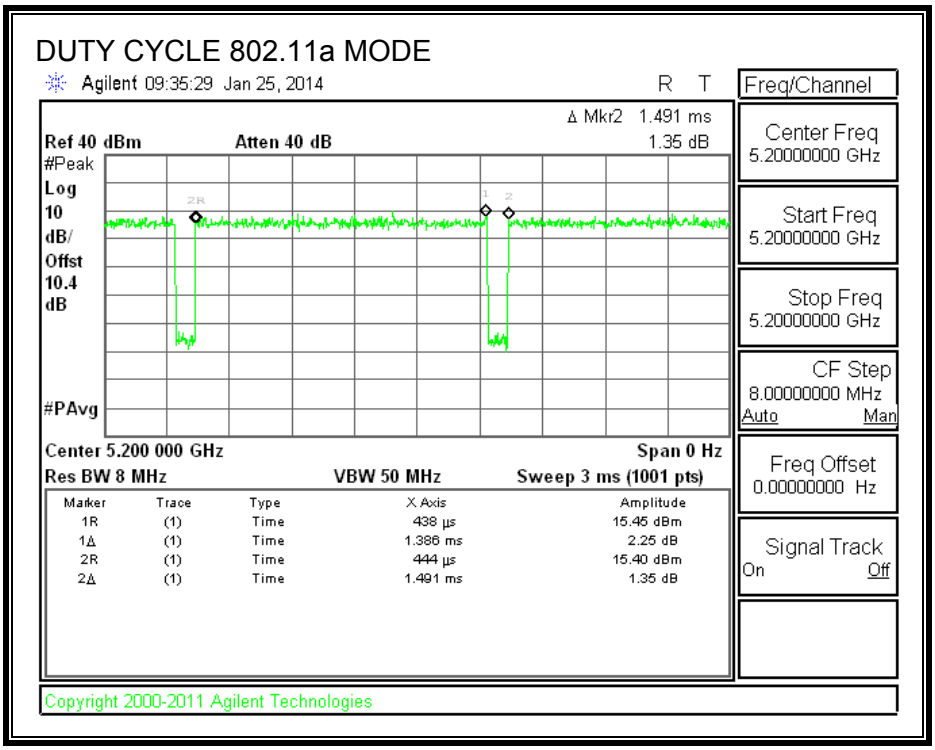
KDB 789033 Zero-Span Spectrum Analyzer Method.

8.1. ON TIME AND DUTY CYCLE RESULTS

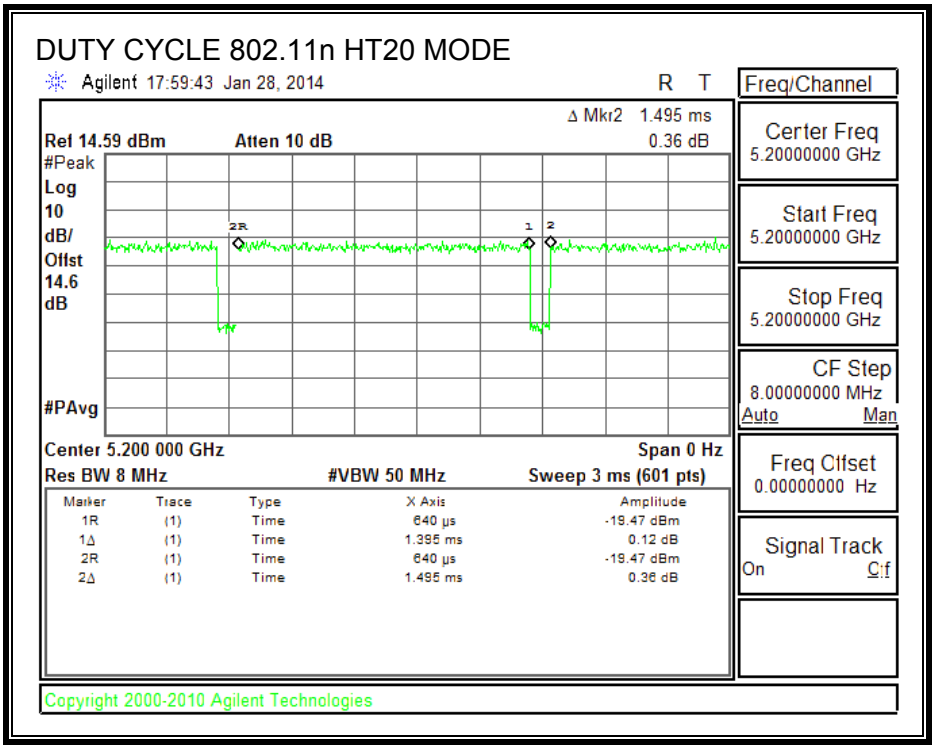
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.39	1.49	0.929	92.9%	0.32	0.722
802.11N HT20	1.40	1.50	0.933	93.3%	0.30	0.717
802.11N HT40	0.63	0.73	0.856	85.6%	0.67	1.600

8.2. DUTY CYCLE PLOTS

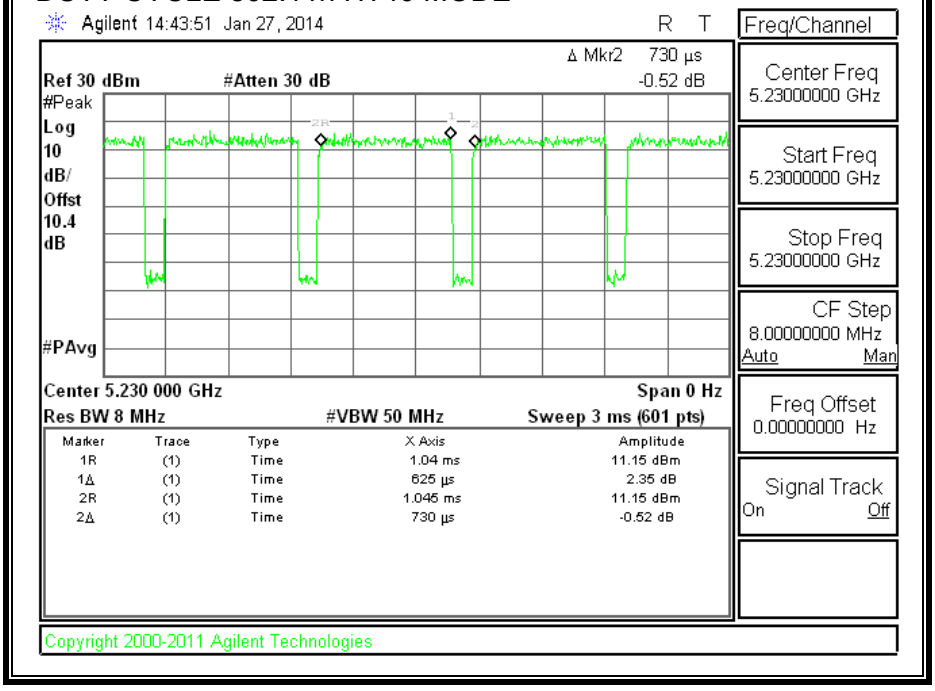
DUTY CYCLE 802.11a MODE



DUTY CYCLE 802.11n HT20 MODE



DUTY CYCLE 802.11n HT40 MODE



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.

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	24.69
Mid	5200	26.04
High	5240	25.14
Worst		26.04

10.1.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	24.00
Mid	5200	23.50
High	5240	23.30
Worst		24.00

10.1.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190.00	46.40
Mid	5230.00	44.80
Worst		46.40

10.1.1. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	23.40
Mid	5300	23.05
High	5320	25.25
Worst		25.25

10.1.1. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	23.60
Mid	5300	23.10
High	5320	22.80
Worst		23.60

10.1.2. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	43.7
Mid	5310	44.3
Worst		44.3

10.1.3. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	24.15
Mid	5580	25.55
High	5700	25.65
Worst		25.65

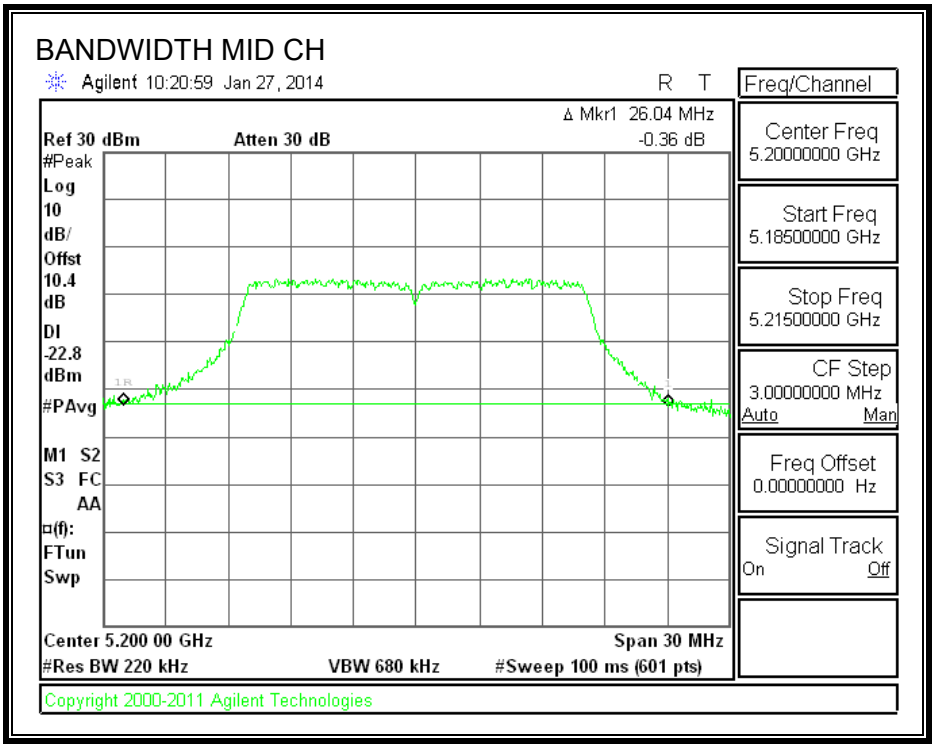
10.1.4. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	22.90
Mid	5580	23.55
High	5700	24.30
Worst		24.30

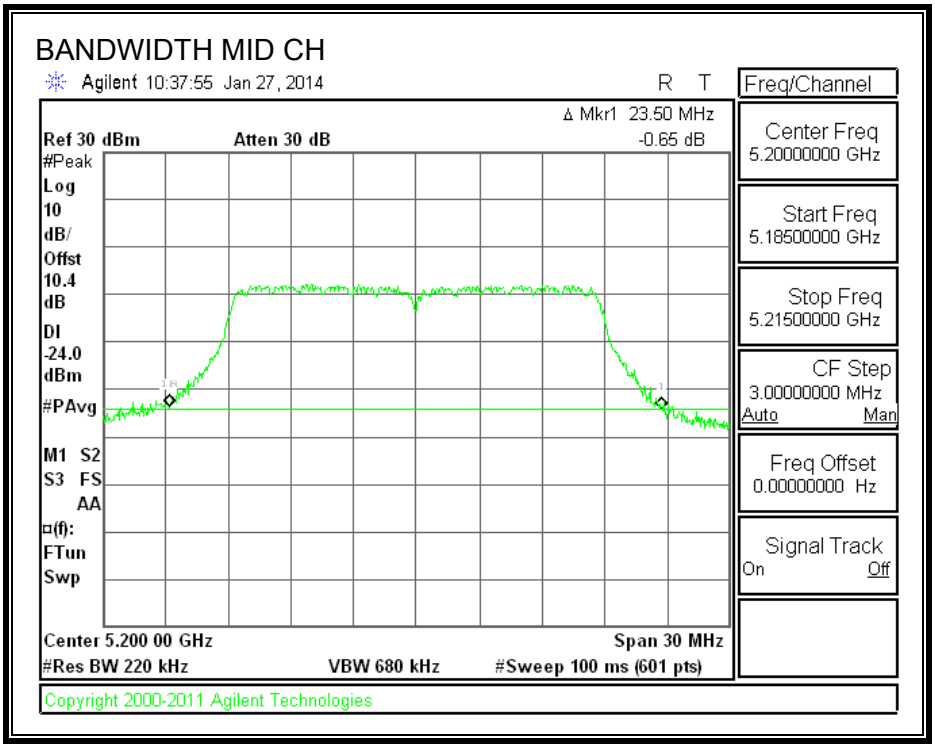
10.1.5. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	43.0
Mid	5550	43.2
High	5670	44.2
Worst		44.2

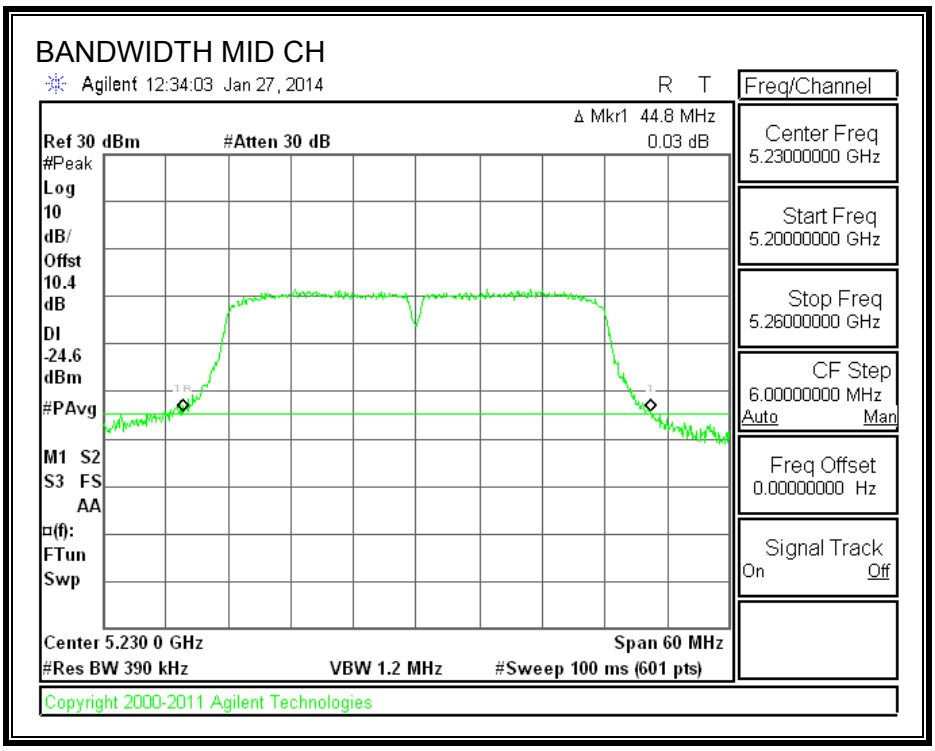
802.11a 5.2G 26 dB BANDWIDTH



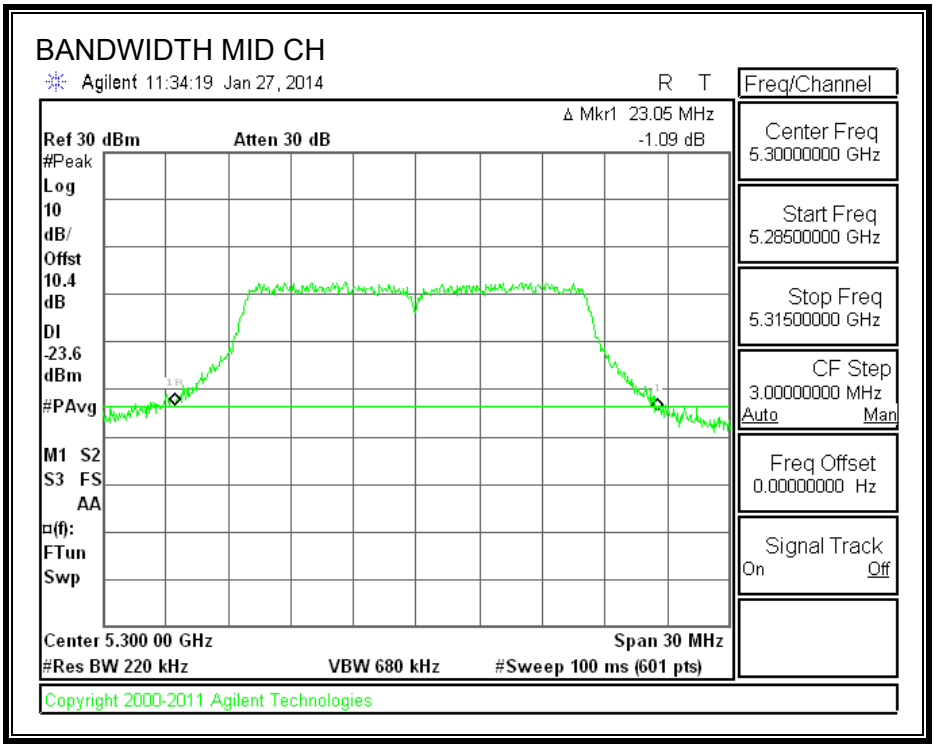
802.11n HT20 5.2G 26 dB BANDWIDTH



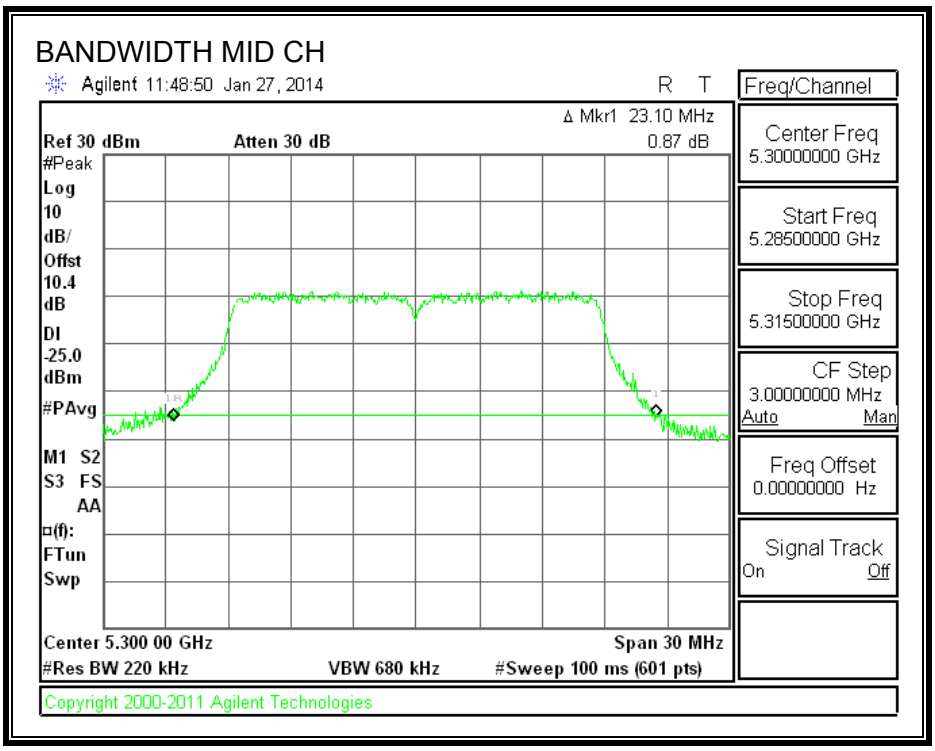
802.11n HT40 5.2G 26 dB BANDWIDTH



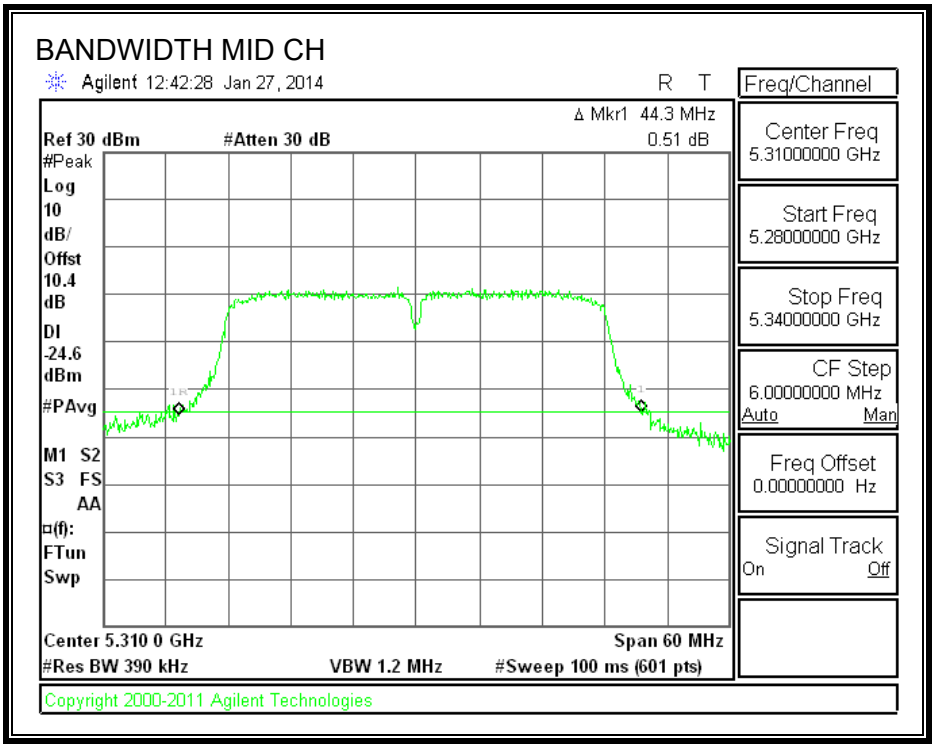
802.11a 5.3G 26 dB BANDWIDTH



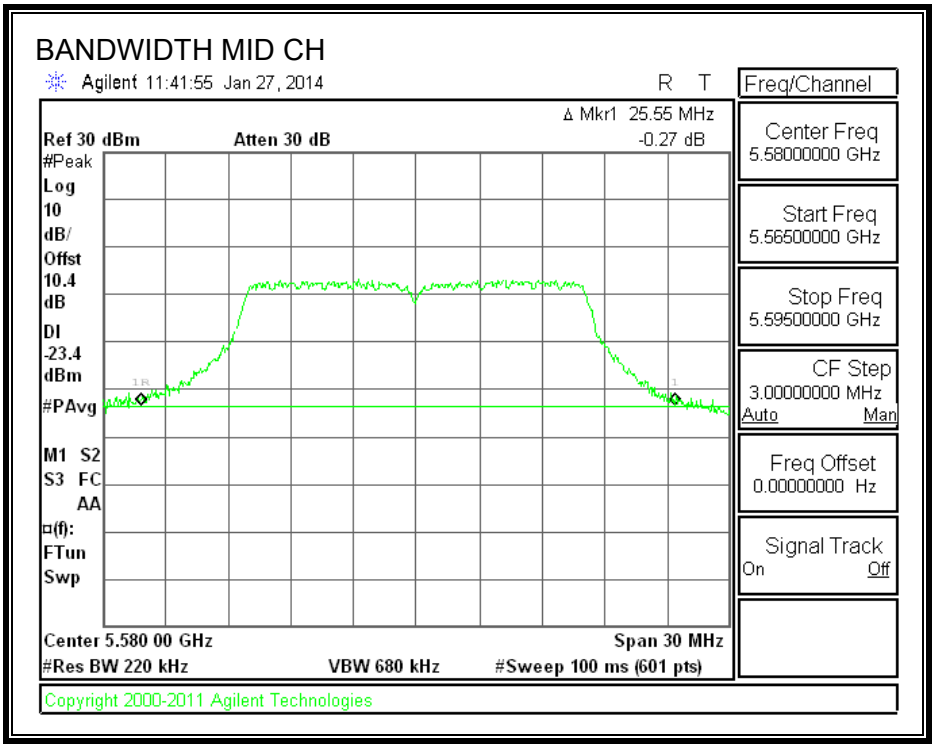
802.11n HT20 5.3G 26 dB BANDWIDTH



802.11n HT40 5.3G 26 dB BANDWIDTH



802.11a 5.5G 26 dB BANDWIDTH



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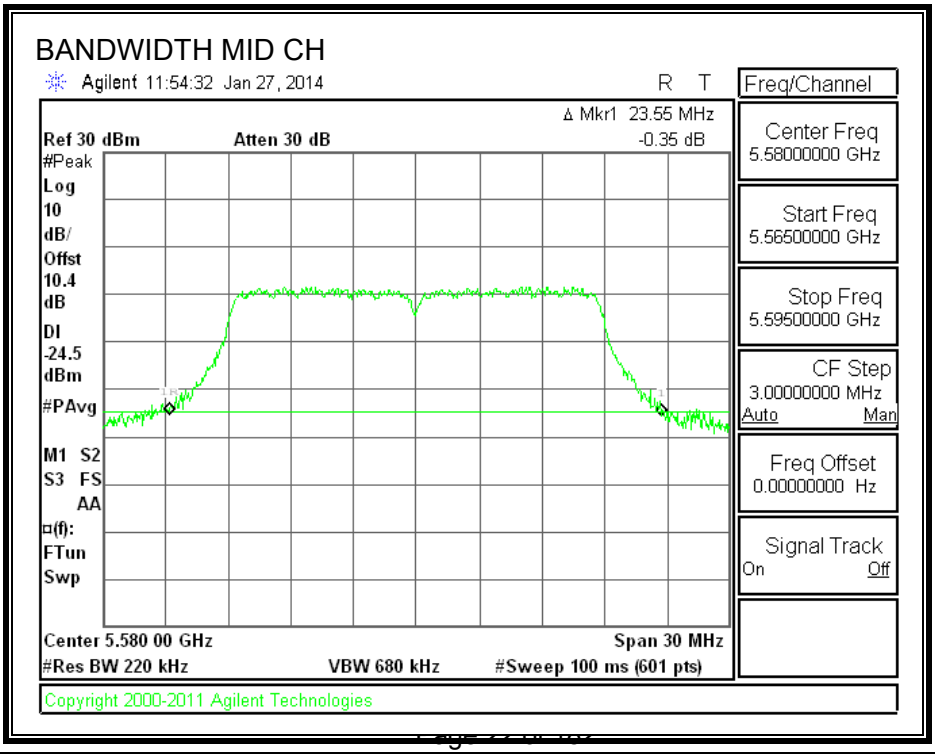
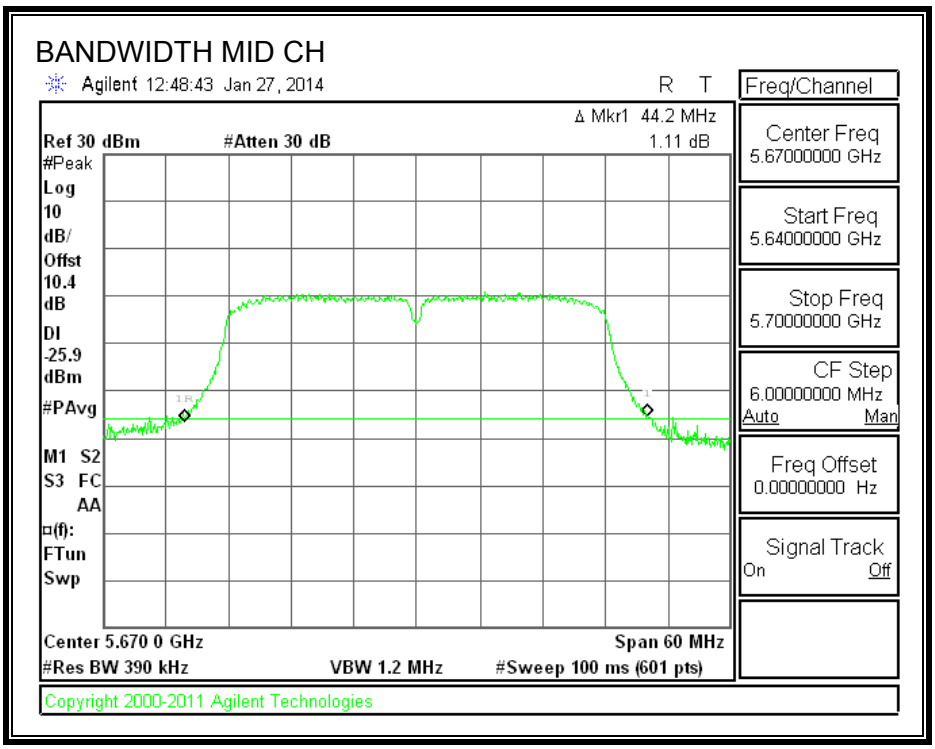


802.11n HT40_5.5G 26 dB BANDWIDTH



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	16.77
Mid	5200	16.77
High	5240	16.77
Worst		16.77

10.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	17.90
Mid	5200	17.90
High	5240	17.88
Worst		17.90

10.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.22
Mid	5230	36.24
Worst		36.24

10.2.4. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	16.76
Mid	5300	16.75
High	5320	16.77
Worst		16.77

10.2.5.802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	17.90
Mid	5300	17.90
High	5320	17.89
Worst		17.90

10.2.6.802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.20
High	5310	36.21
Worst		36.21

10.2.7.802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	16.76
Mid	5580	16.77
High	5700	16.82
Worst		16.820

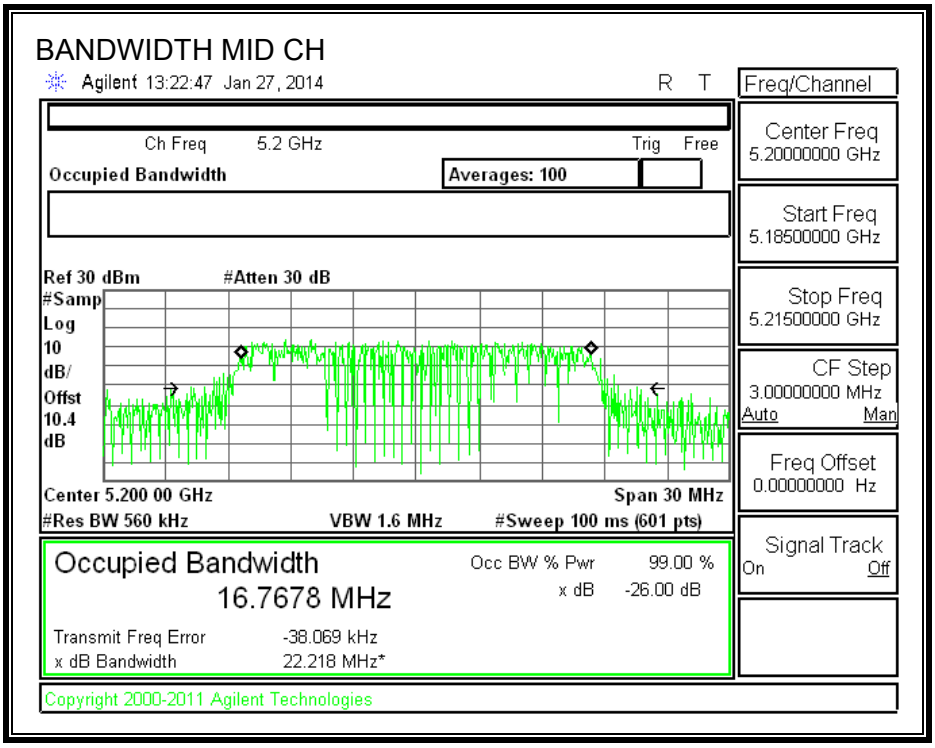
10.2.8.802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.88
Mid	5580	17.89
High	5700	17.93
Worst		17.930

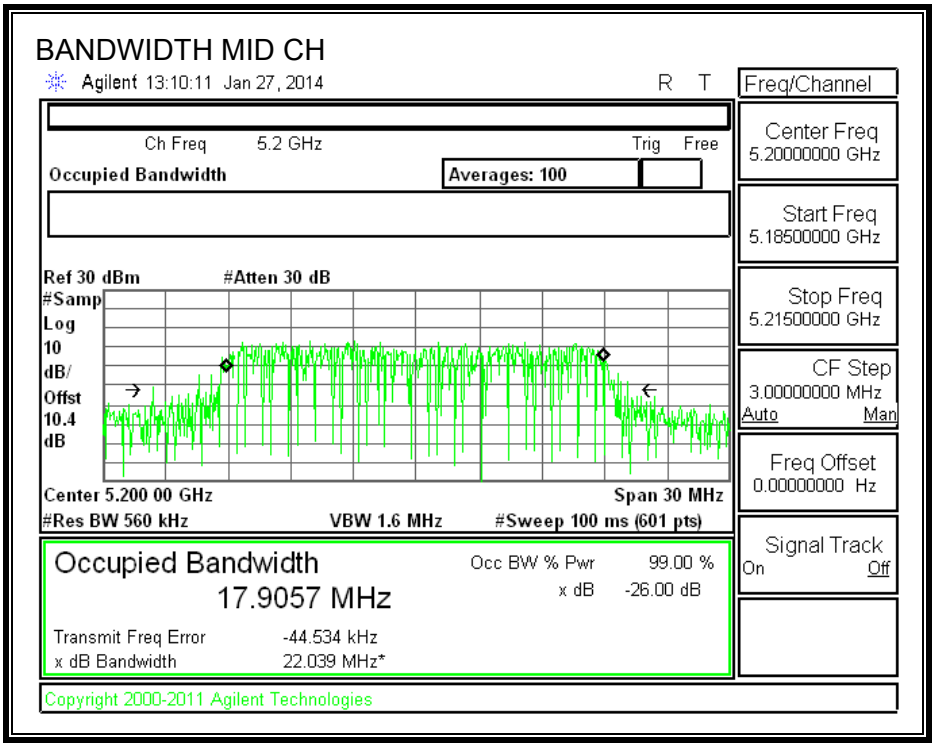
10.2.9.802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.22
Mid	5550	36.20
High	5670	36.21
Worst		36.22

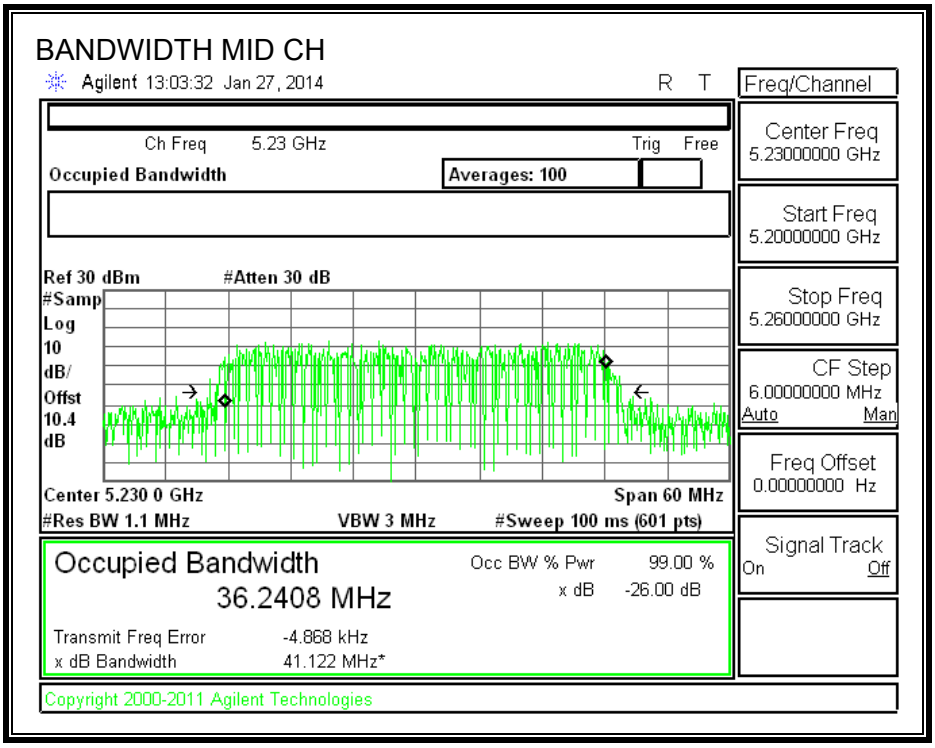
802.11a 5.2G 99% BANDWIDTH



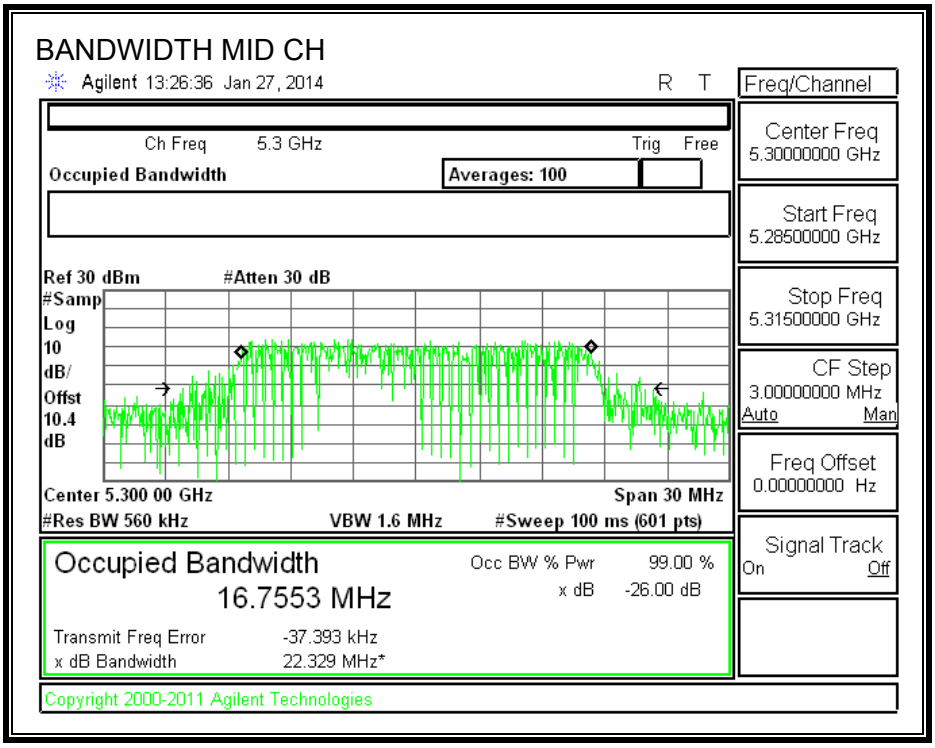
802.11n HT20 5.2G 99% BANDWIDTH



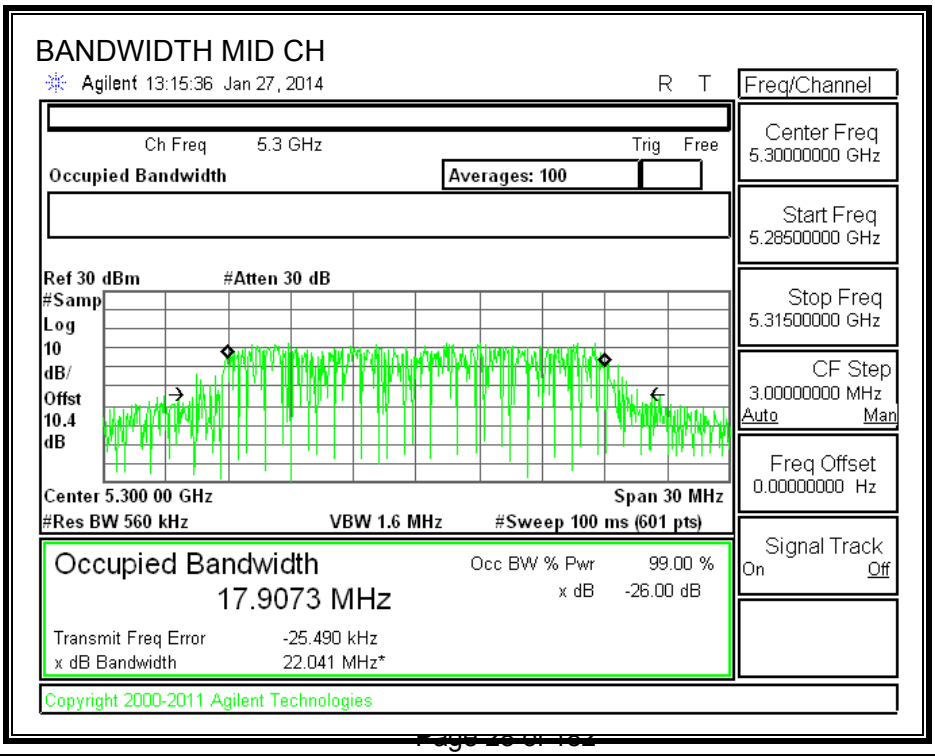
802.11n HT40 5.2G 99% BANDWIDTH



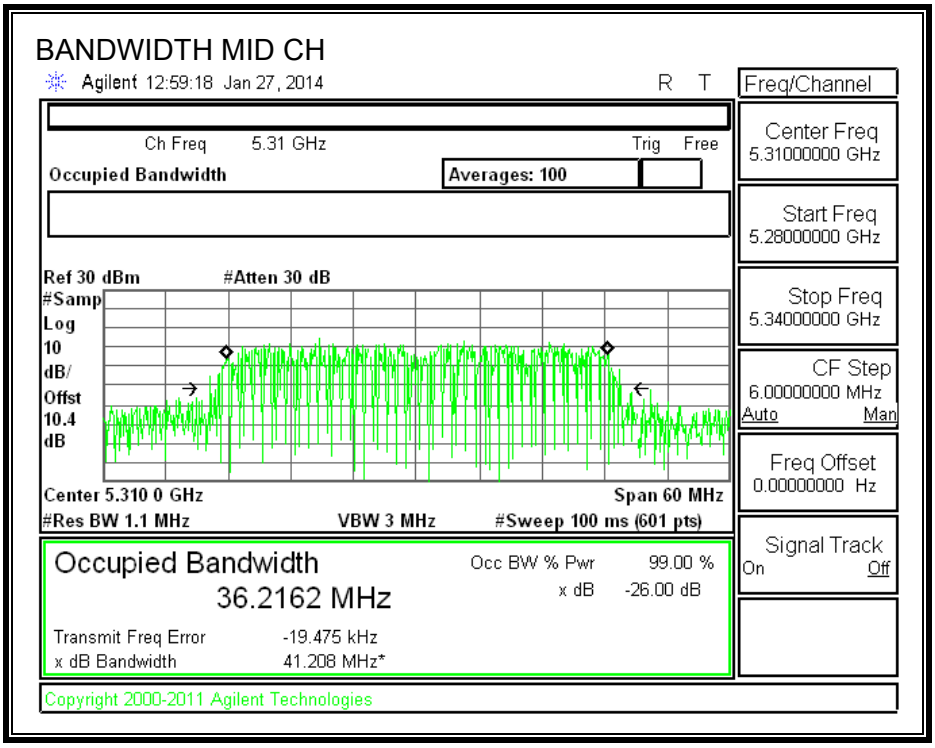
802.11a 5.3G 99% BANDWIDTH



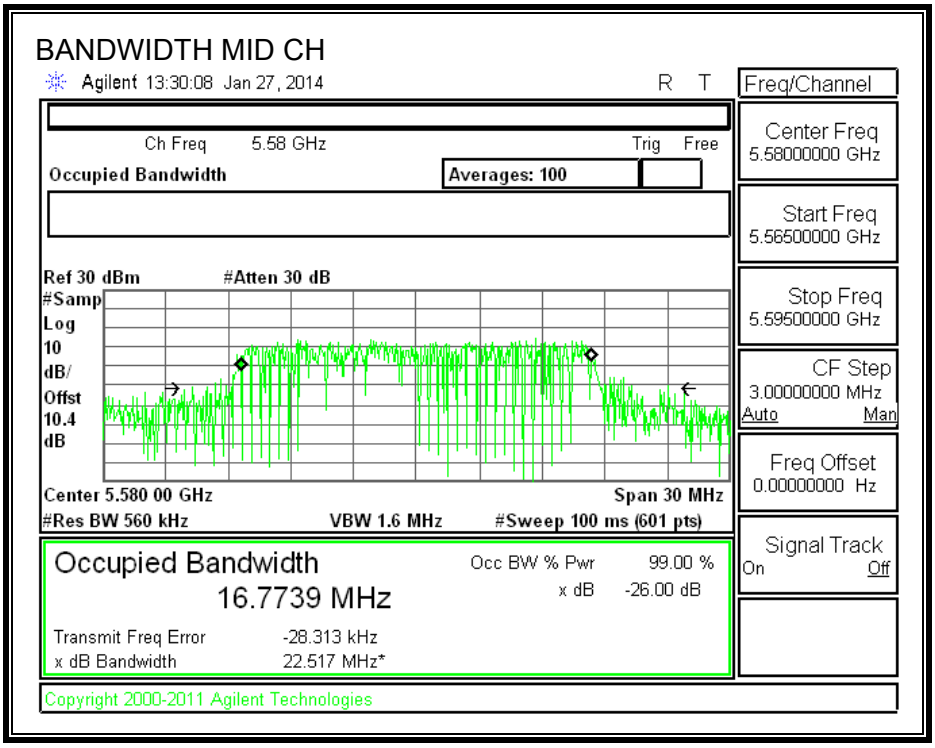
802.11n HT20 5.3G 99% BANDWIDTH



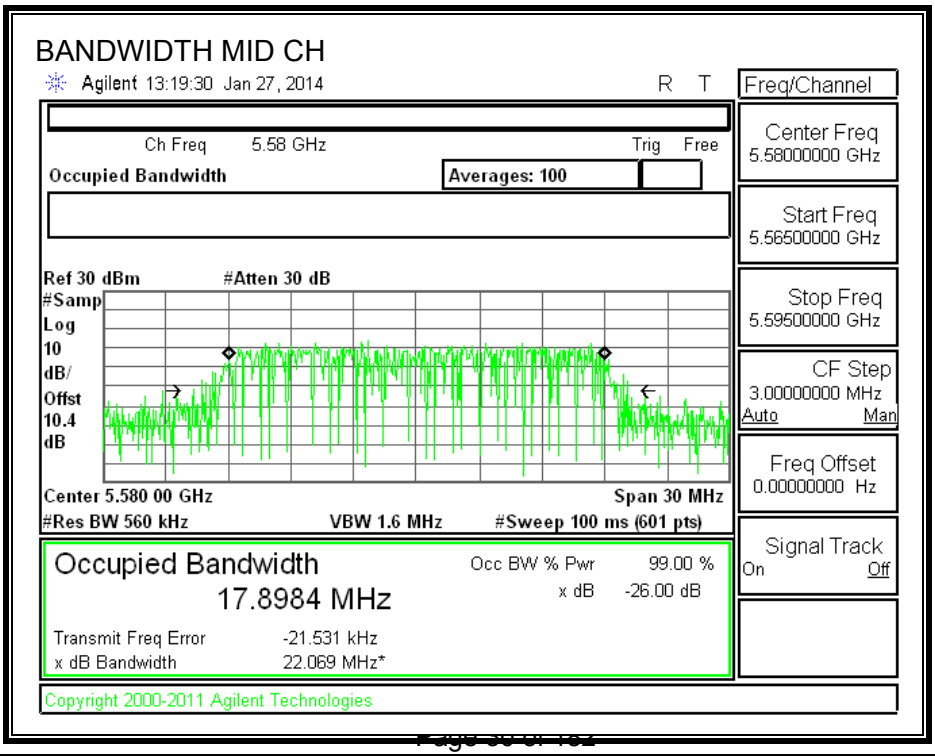
802.11n HT40 5.3G 99% BANDWIDTH



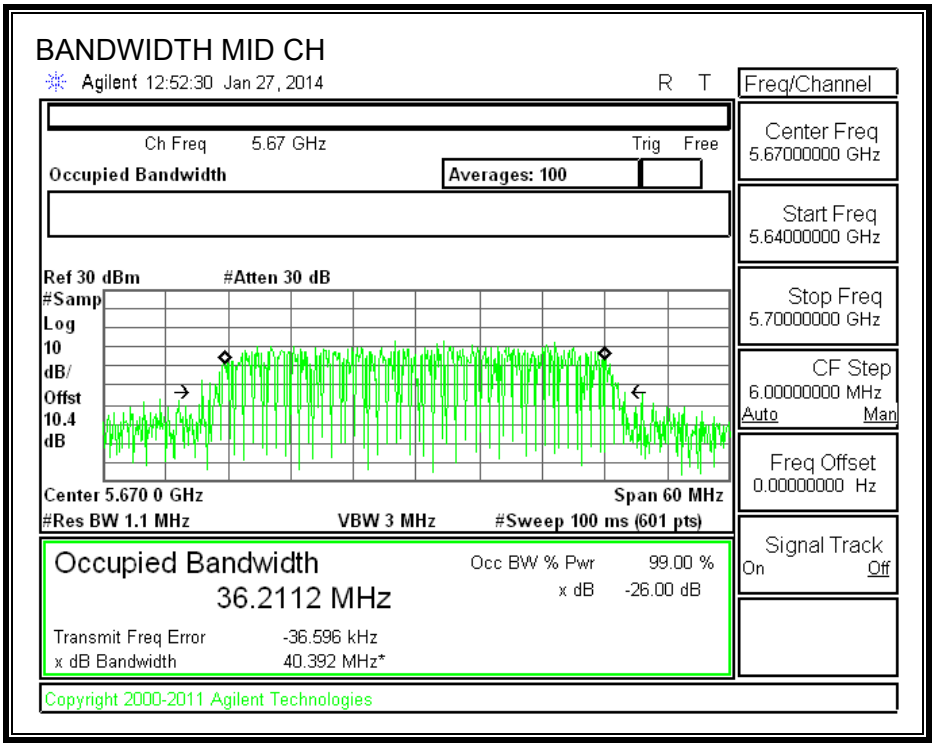
802.11a 5.5G 99% BANDWIDTH



802.11n HT20 5.5G 99% BANDWIDTH



802.11n HT40 5.5G 99% BANDWIDTH



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	13.00
Mid	5200	12.90
High	5240	12.90
Worst		13.00

10.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5180	12.20
Mid	5200	12.10
High	5240	12.30
Worst		12.30

10.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5190	12.10
Mid	5230	11.80
Worst		12.10

10.3.4. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5260	12.50
Mid	5300	12.60
High	5320	12.00
Worst		12.60

10.3.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5260	11.70
Mid	5300	11.80
High	5320	12.00
Worst		12.00

10.3.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Mid	5270	11.6
High	5310	11.2
Worst		11.6

10.3.7. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5500	12.60
Mid	5580	12.70
High	5700	13.30
Worst		13.30

10.3.8. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5500	11.60
Mid	5580	11.60
High	5700	12.20
Worst		12.20

10.3.9. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5510	12.10
Mid	5550	12.10
High	5670	11.70
Worst		12.1

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

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	24.69	16.77	-4.94
Mid	5200	26.04	16.77	-4.94
High	5240	25.14	16.77	-4.94

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	22.25	27.19	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.24	27.18	17.00	4.00	10.00	4.00
High	5240	17.00	22.24	27.18	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	13.787	14.107	17.00	-2.89
Mid	5200	13.651	13.971	17.00	-3.03
High	5240	13.984	14.304	17.00	-2.70

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	2.630	2.95	4.00	-1.05
Mid	5200	2.520	2.84	4.00	-1.16
High	5240	2.690	3.01	4.00	-0.99

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	24.00	17.90	-4.94
Mid	5200	23.50	17.90	-4.94
High	5240	23.30	17.88	-4.94

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	22.53	27.47	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.53	27.47	17.00	4.00	10.00	4.00
High	5240	17.00	22.52	27.46	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	0.30	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	12.90	13.20	17.00	-3.80
Mid	5200	12.76	13.06	17.00	-3.94
High	5240	13.18	13.48	17.00	-3.52

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	1.45	1.75	4.00	-2.25
Mid	5200	1.07	1.37	4.00	-2.63
High	5240	1.76	2.06	4.00	-1.94

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	46.40	36.219	-4.94
Mid	5230	44.80	36.240	-4.94

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	27.94	17.00	4.00	10.00	4.00
Mid	5230	17.00	23.00	27.94	17.00	4.00	10.00	4.00
Duty Cycle CF (dB)		0.67	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	12.46	13.13	17.00	-3.87
Mid	5230	12.52	13.19	17.00	-3.81

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	-1.84	-1.17	4.00	-5.17
Mid	5230	-1.86	-1.19	4.00	-5.19

10.4.4. 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	23.40	16.76	-2.94
Mid	5300	23.05	16.75	-2.94
High	5320	25.25	16.77	-2.94

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	23.24	29.24	23.24	11.00	11.00	11.00
Mid	5300	24.00	23.24	29.24	23.24	11.00	11.00	11.00
High	5320	24.00	23.25	29.25	23.25	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	13.61	13.93	23.24	-9.31
Mid	5300	13.68	14.00	23.24	-9.24
High	5320	13.08	13.40	23.25	-9.84

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	2.33	2.65	11.00	-8.35
Mid	5300	2.50	2.82	11.00	-8.18
High	5320	1.80	2.12	11.00	-8.88

10.4.5. 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	23.60	17.90	-2.94
Mid	5300	23.10	17.90	-2.94
High	5320	22.80	17.89	-2.94

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	23.53	29.53	23.53	11.00	11.00	11.00
Mid	5300	24.00	23.53	29.53	23.53	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)	0.30	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	12.70	13.00	23.53	-10.53
Mid	5300	12.82	13.12	23.53	-10.41
High	5320	12.20	12.50	23.53	-11.02

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	1.45	1.75	11.00	-9.25
Mid	5300	1.54	1.84	11.00	-9.16
High	5320	0.70	1.00	11.00	-10.00

10.4.6. 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	43.7	36.2	-2.94
High	5310	44.3	36.2	-2.94

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	25.94	17.00	4.00	10.00	4.00
High	5310	17.00	23.00	25.94	17.00	4.00	10.00	4.00
Duty Cycle CF (dB)		0.67	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	12.27	12.94	17.00	-4.06
High	5310	11.94	12.61	17.00	-4.39

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5270	-2.01	-1.34	4.00	-5.34
High	5310	-2.34	-1.67	4.00	-5.67

10.4.7.802.11a 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	24.15	16.76	-2.84
Mid	5580	25.55	16.77	-2.84
High	5700	25.65	16.82	-2.84

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	23.24	29.24	23.24	11.00	11.00	11.00
Mid	5580	24.00	23.25	29.25	23.25	11.00	11.00	11.00
High	5700	24.00	23.26	29.26	23.26	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	13.49	13.81	23.24	-9.43
Mid	5580	12.79	13.11	23.25	-10.13
High	5700	13.99	14.31	23.26	-8.95

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	2.44	2.76	11.00	-8.24
Mid	5580	1.50	1.82	11.00	-9.18
High	5700	2.60	2.92	11.00	-8.08

10.4.8.802.11n 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	22.90	17.88	-2.84
Mid	5580	23.55	17.89	-2.84
High	5700	24.30	17.93	-2.84

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	23.52	29.52	23.52	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	23.54	29.54	23.54	11.00	11.00	11.00

Duty Cycle CF (dB)	0.30	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	12.41	12.71	23.52	-10.82
Mid	5580	11.67	11.97	23.53	-11.56
High	5700	12.93	13.23	23.54	-10.31

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	0.87	1.17	11.00	-9.83
Mid	5580	0.16	0.46	11.00	-10.54
High	5700	1.26	1.56	11.00	-9.44

10.4.9. 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	43.0	36.2	-2.84
Mid	5550	43.2	36.2	-2.84
High	5670	44.2	36.2	-2.84

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)	0.67	Included in Calculations of Corr'd Power & PPSD

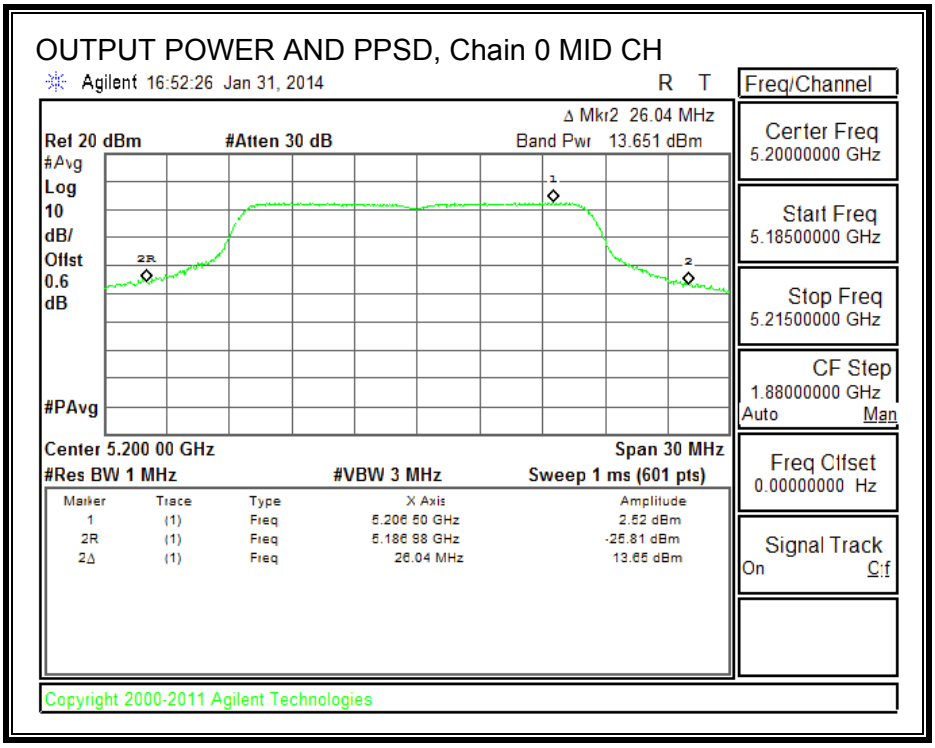
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.53	13.20	24.00	-10.80
Mid	5550	12.86	13.53	24.00	-10.47
High	5670	12.19	12.86	24.00	-11.14

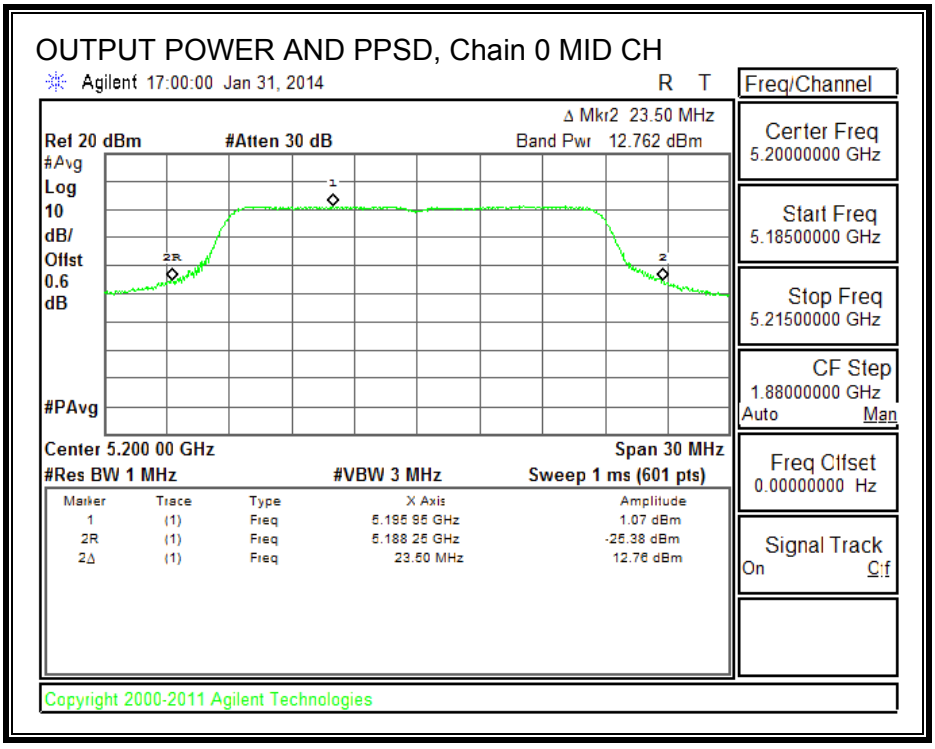
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	-1.88	-1.21	11.00	-12.21
Mid	5550	-1.64	-0.97	11.00	-11.97
High	5670	-1.86	-1.19	11.00	-12.19

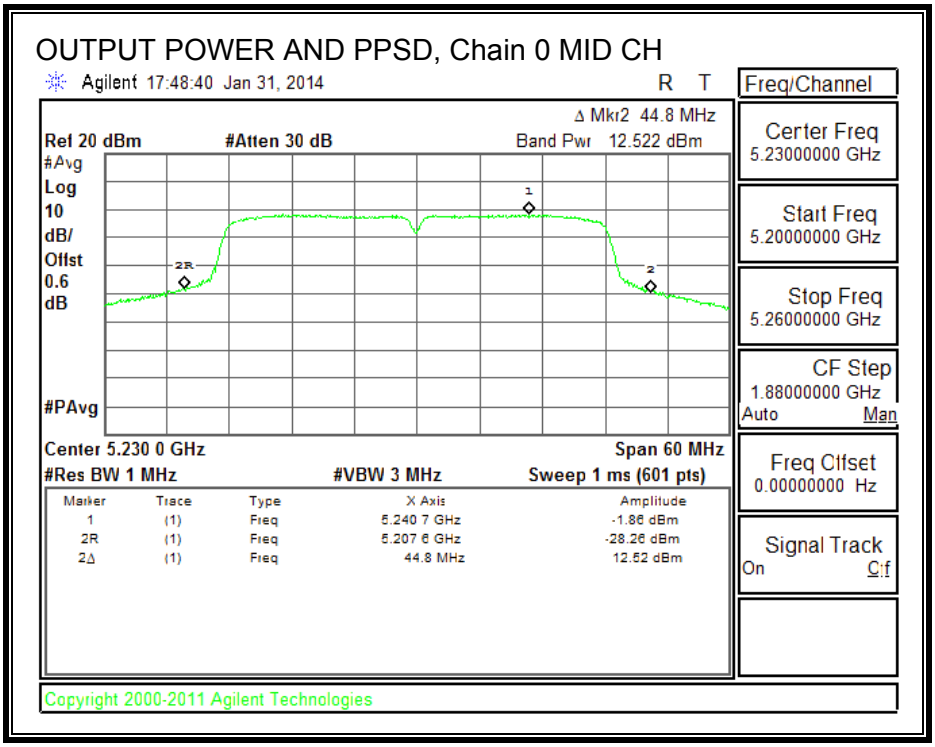
802.11a 5.2G OUTPUT POWER AND PPSD, Chain 0



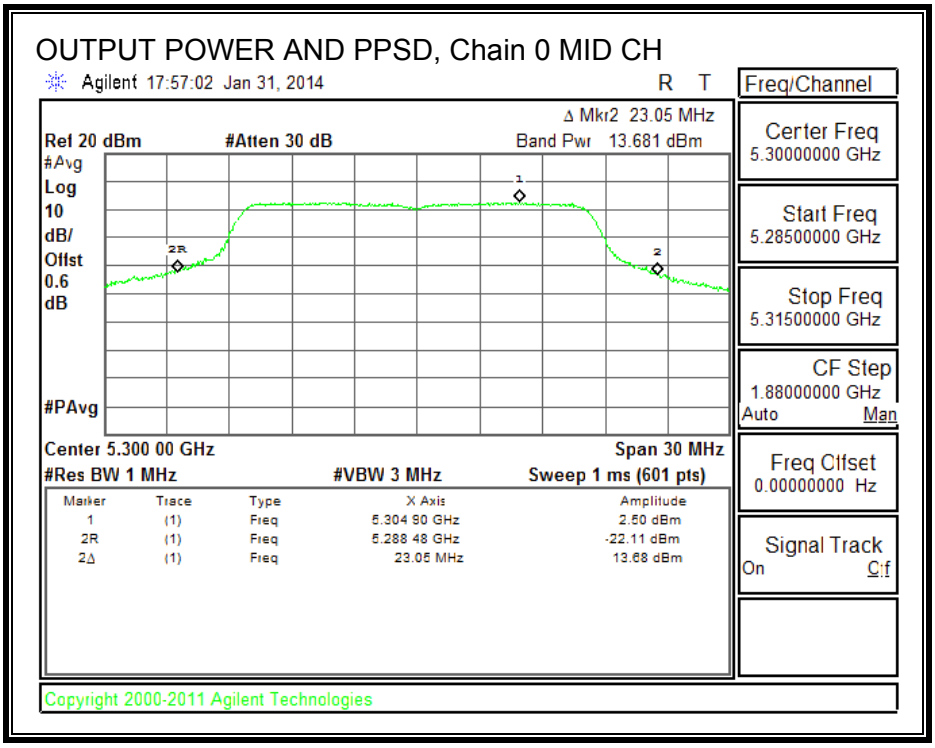
802.11n HT20 5.2G OUTPUT POWER AND PPSD, Chain 0



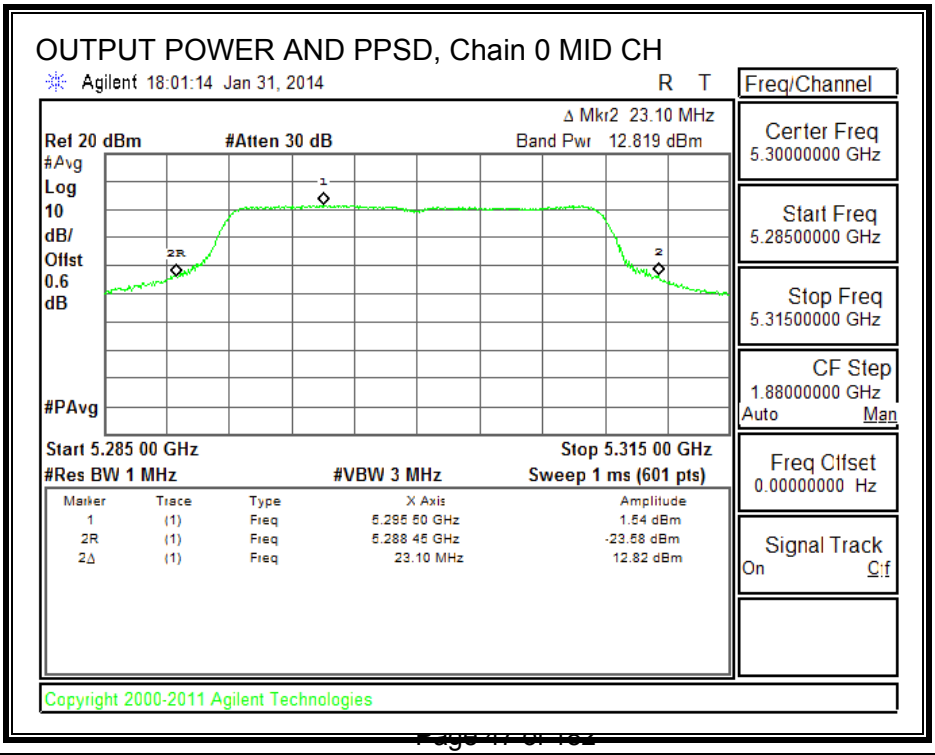
802.11n HT40 5.2G OUTPUT POWER AND PPSD, Chain 0



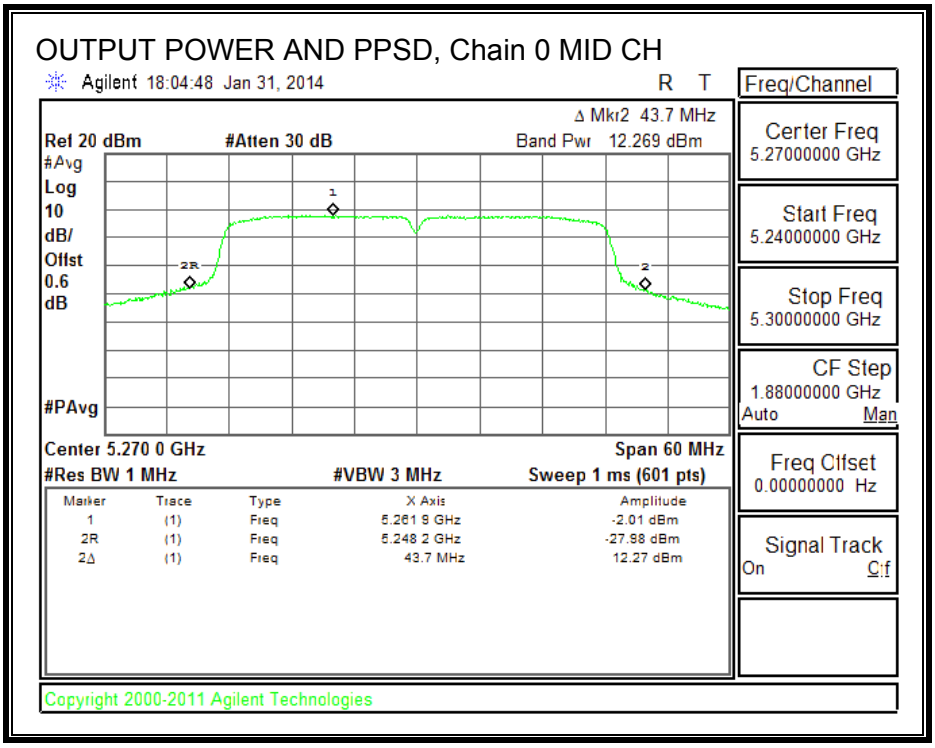
802.11a 5.3G OUTPUT POWER AND PPSD, Chain 0



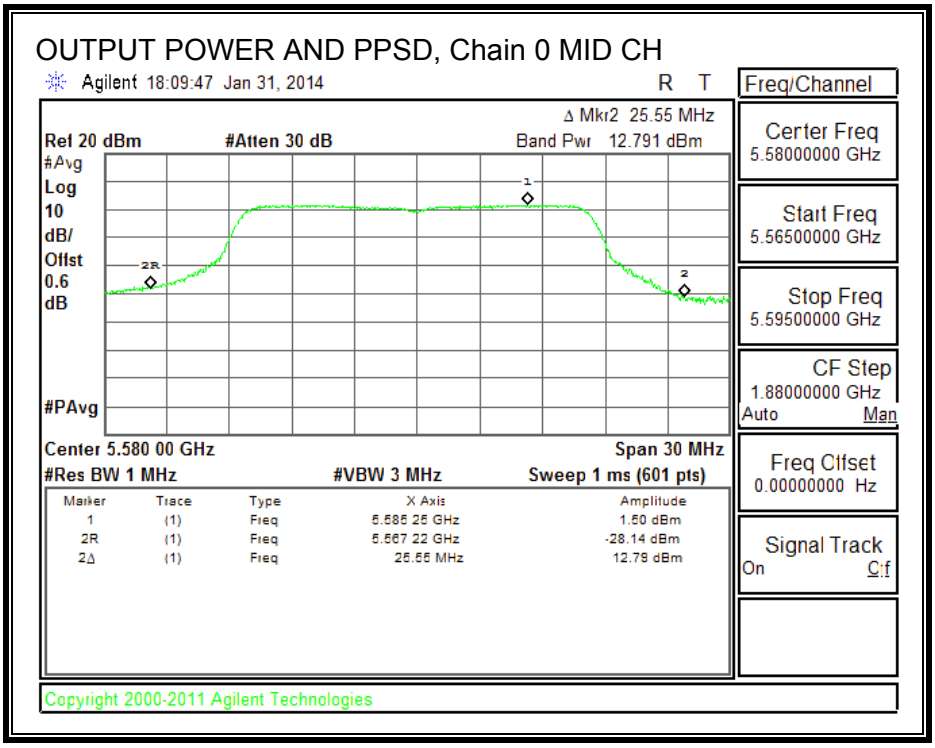
802.11n HT20 5.3G OUTPUT POWER AND PPSD, Chain 0



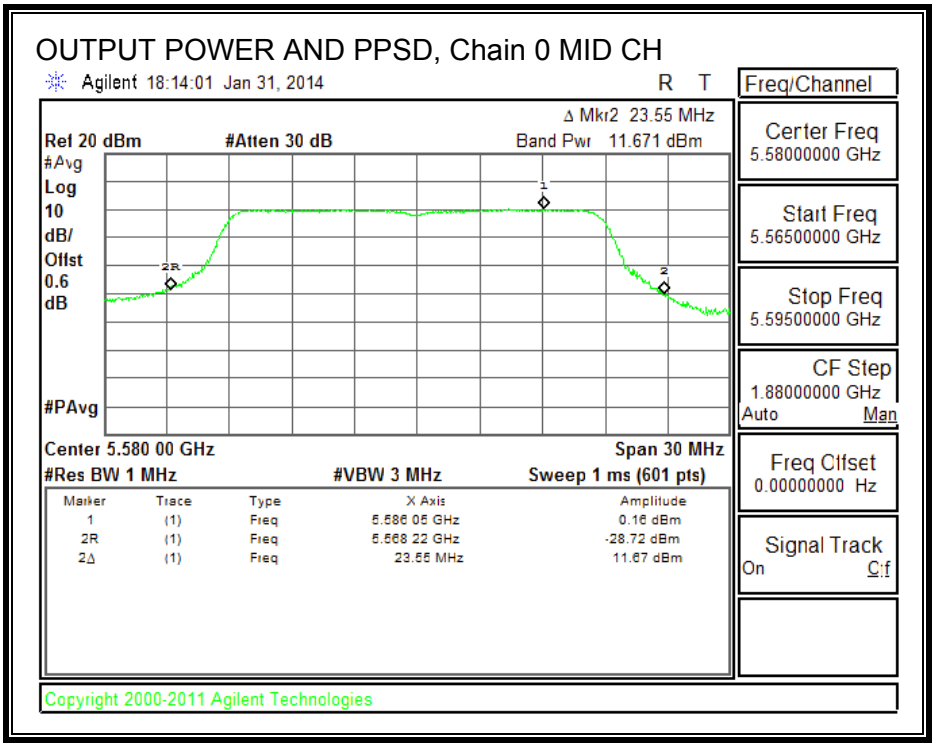
802.11n HT40 5.3G OUTPUT POWER AND PPSD, Chain 0



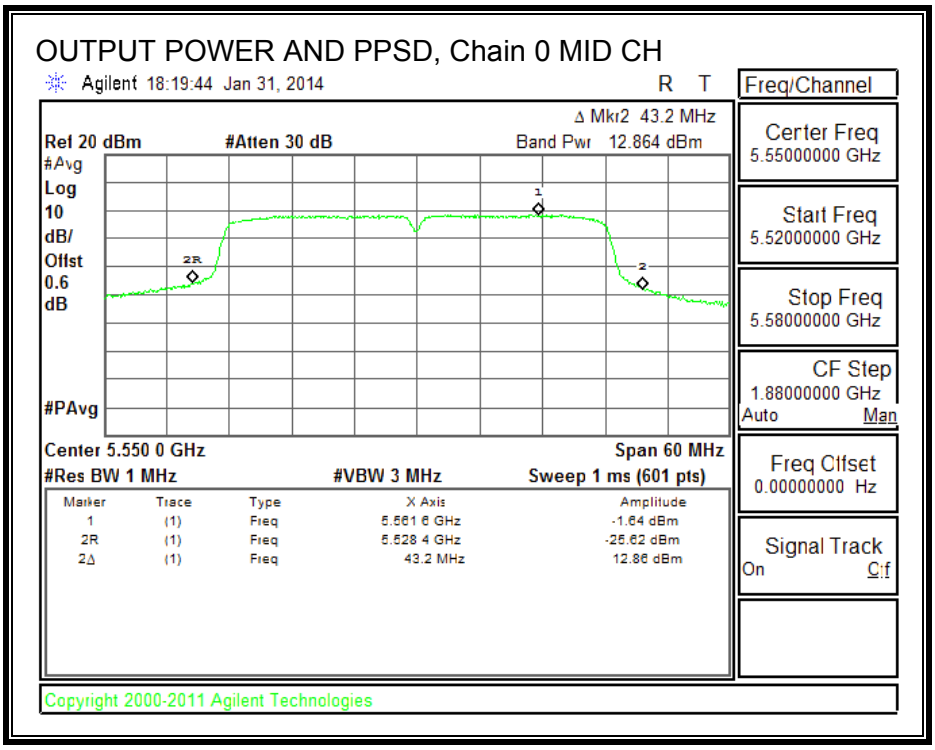
802.11a 5.5G OUTPUT POWER AND PPSD, Chain 0



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



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



10.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

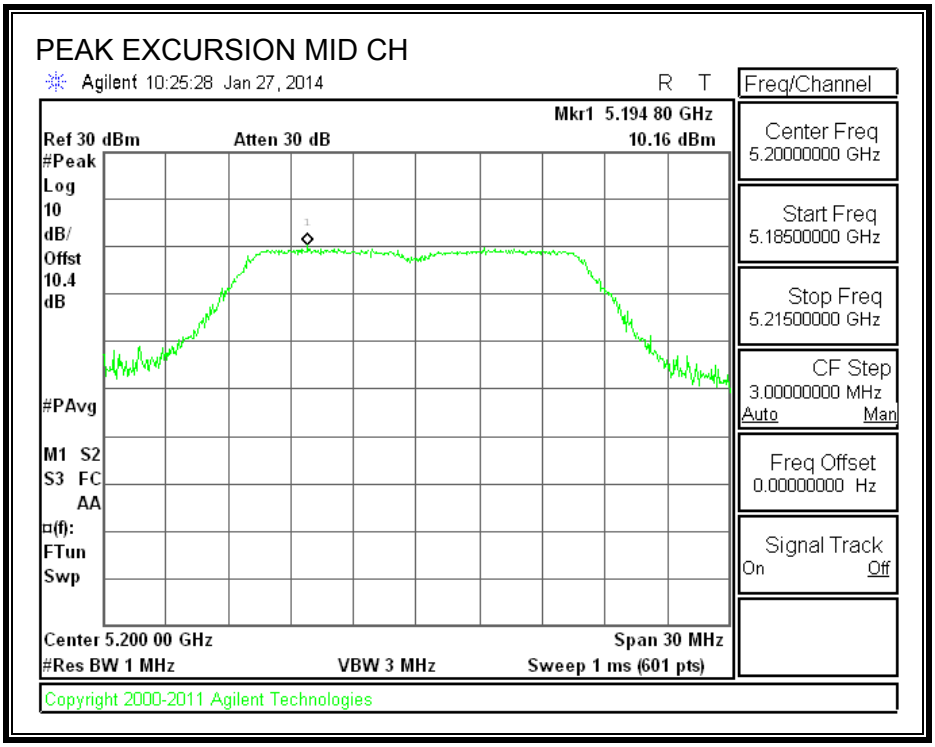
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

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	10.160	2.69	0.32	7.15	13	-5.85

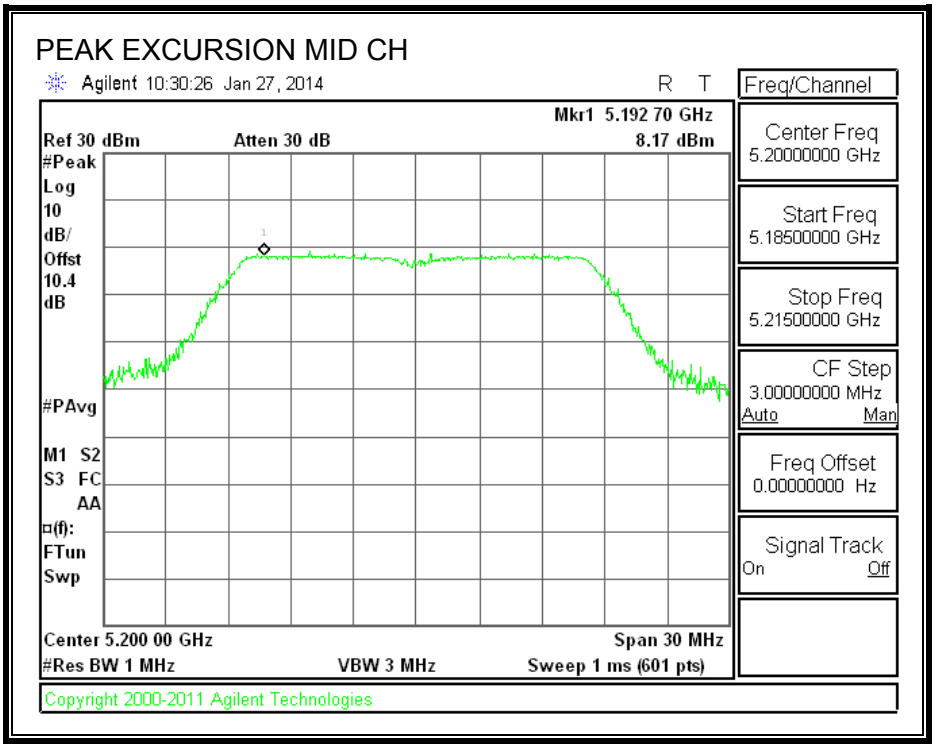
PEAK EXCURSION



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	8.170	1.76	0.30	6.11	13	-6.89

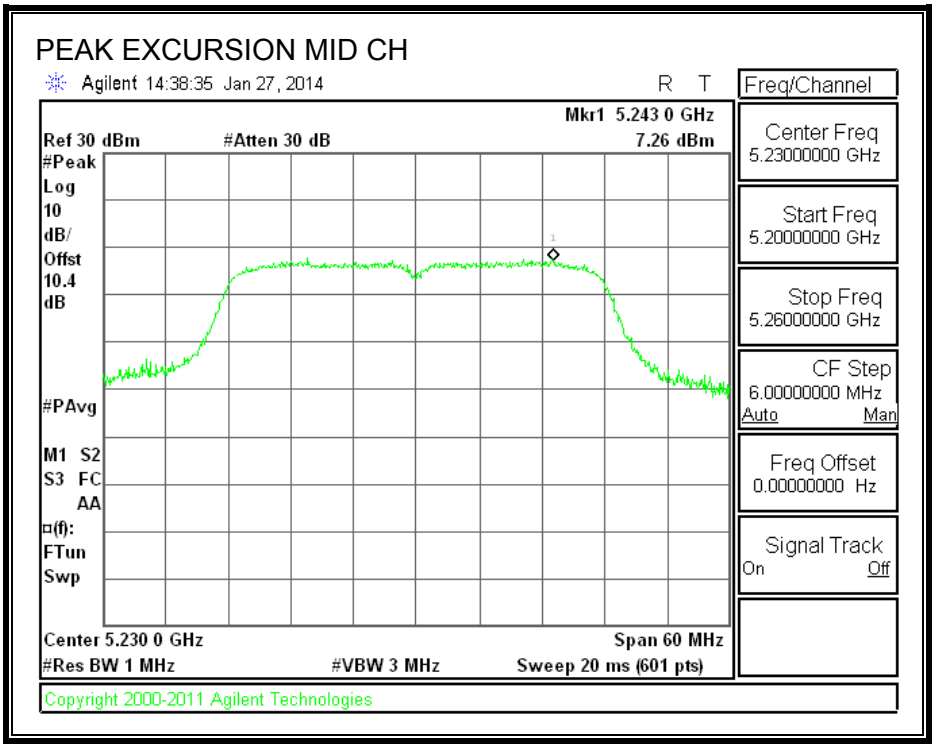
PEAK EXCURSION



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)
Mid	5230	7.260	-1.84	0.67	8.43	13	-4.57

PEAK EXCURSION



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.

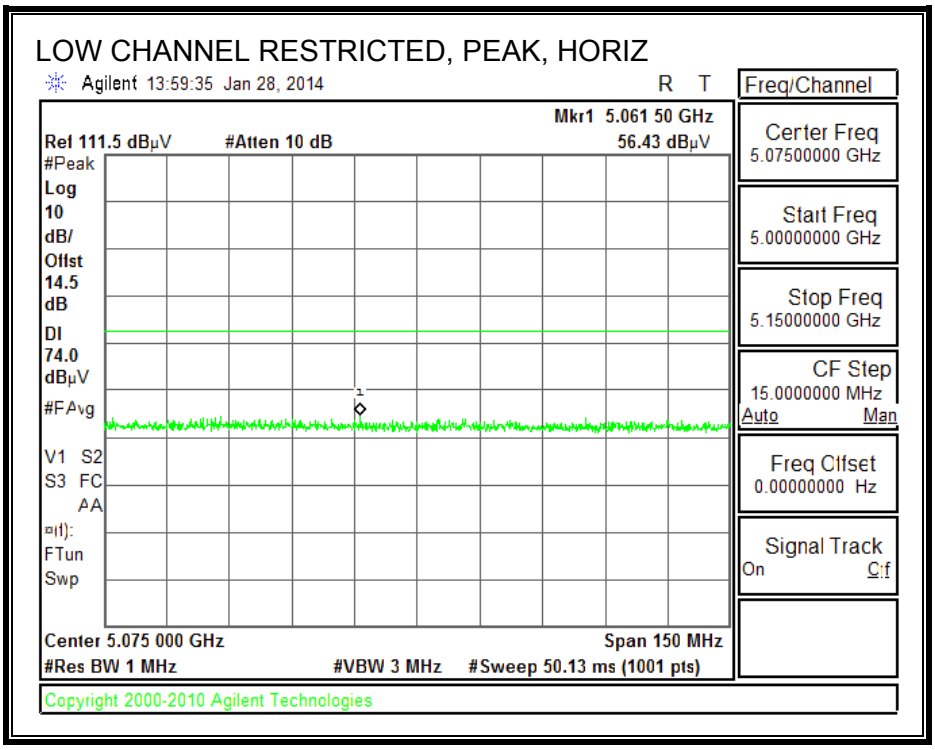
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

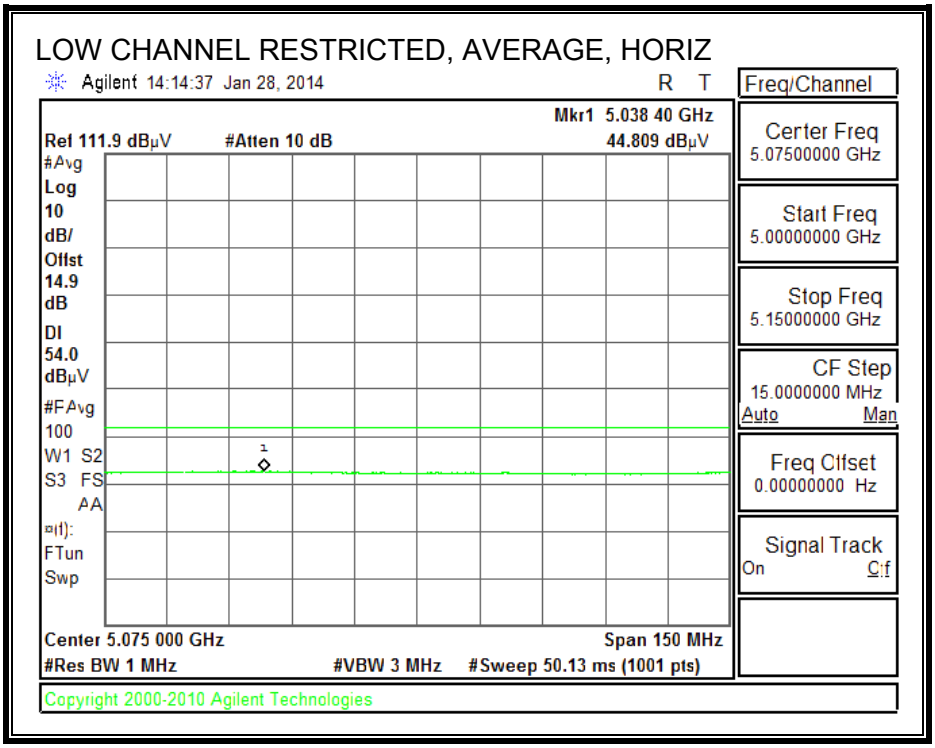
Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

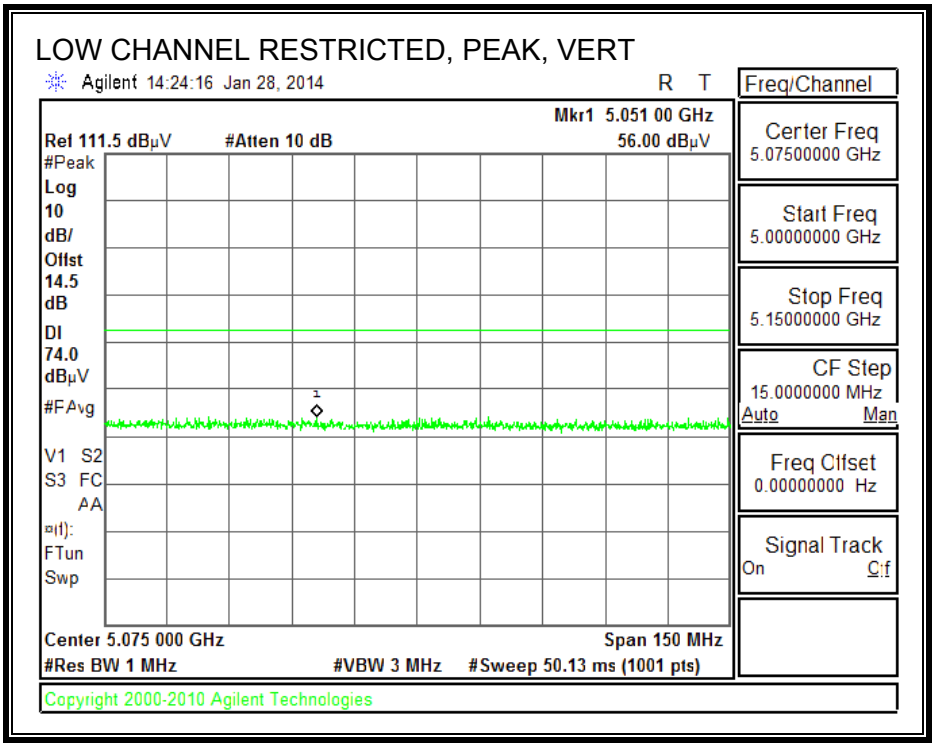
11.1. 5.2 GHz

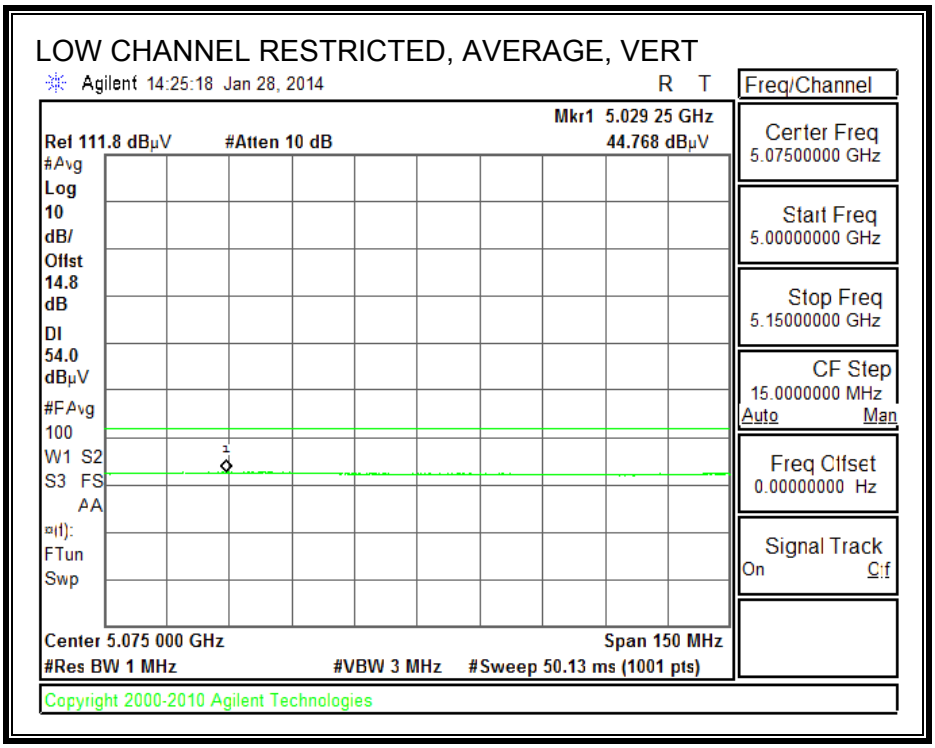
11.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



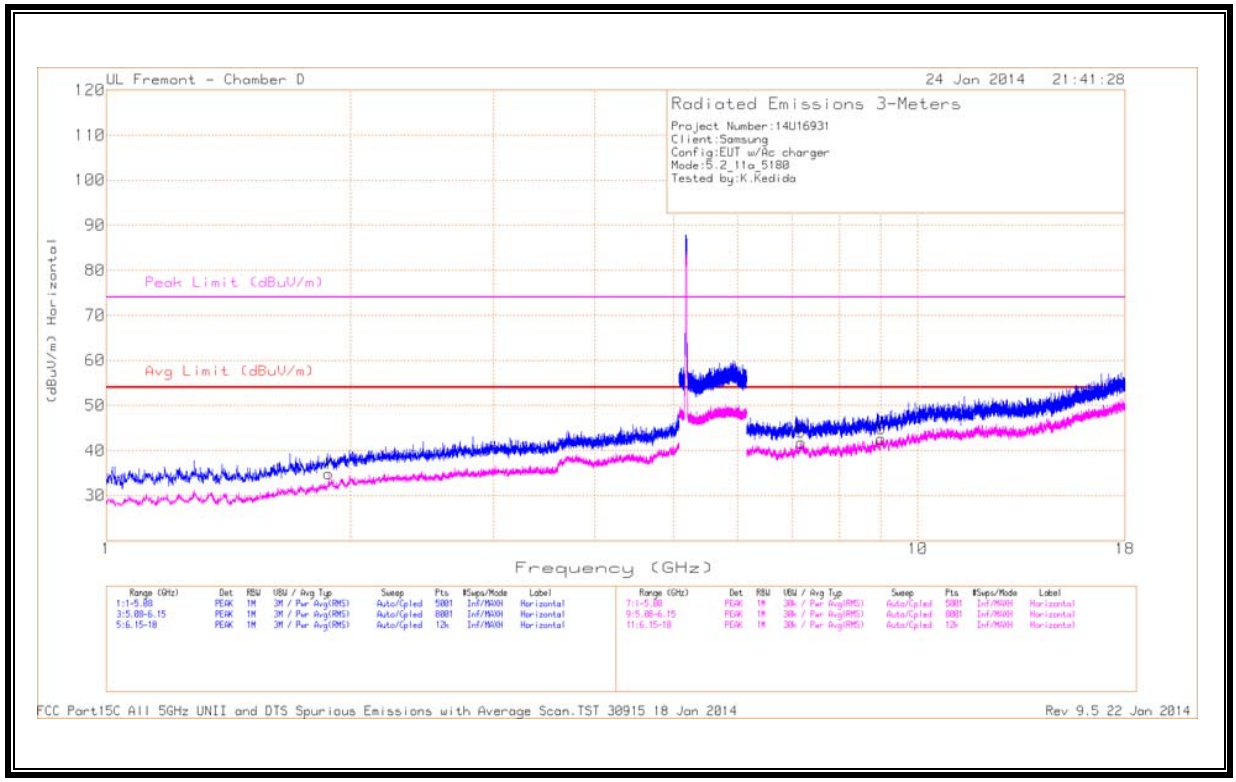




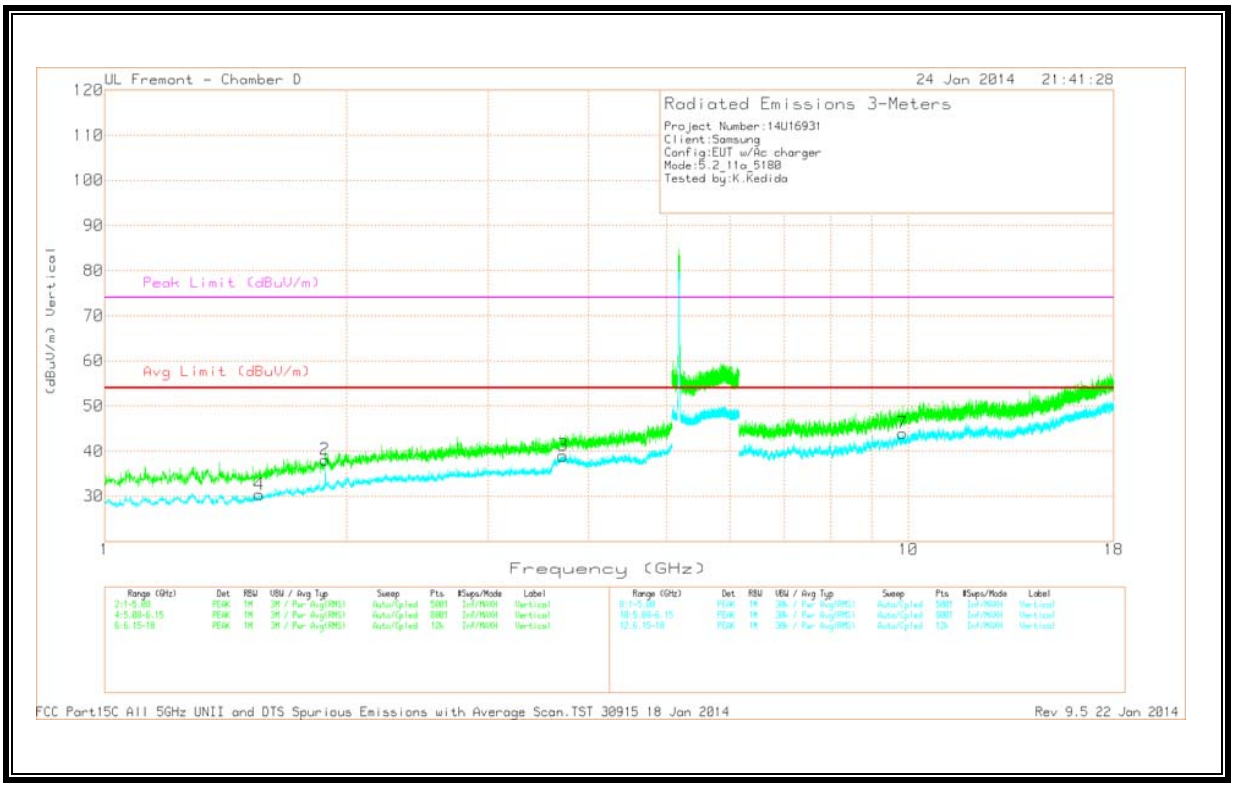


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



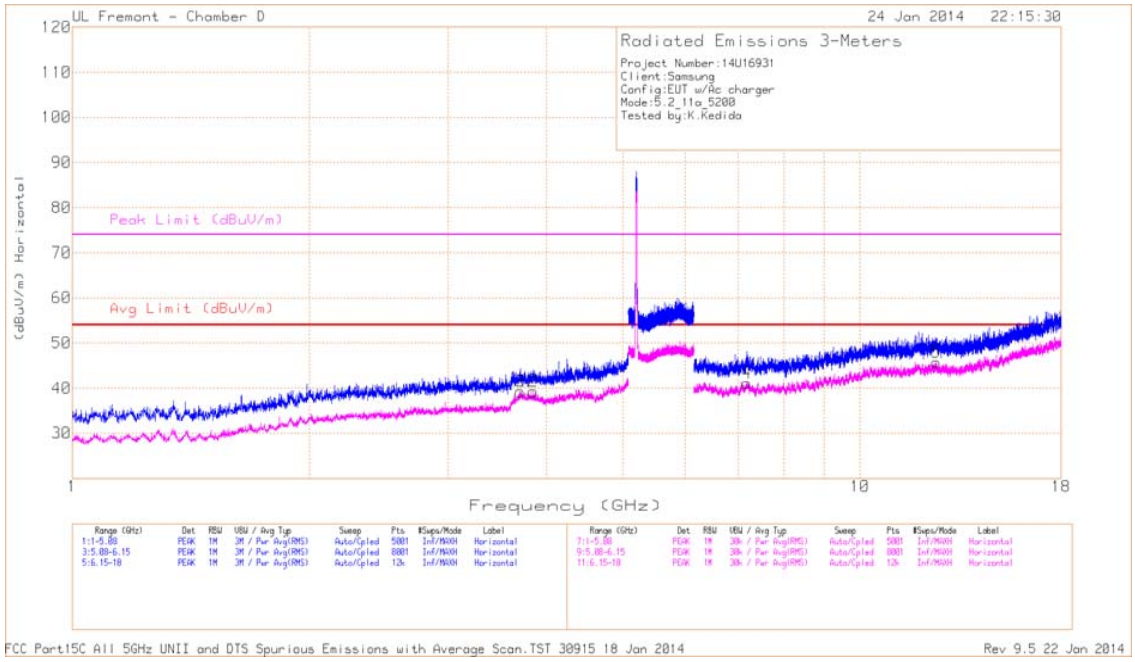
VERTICAL



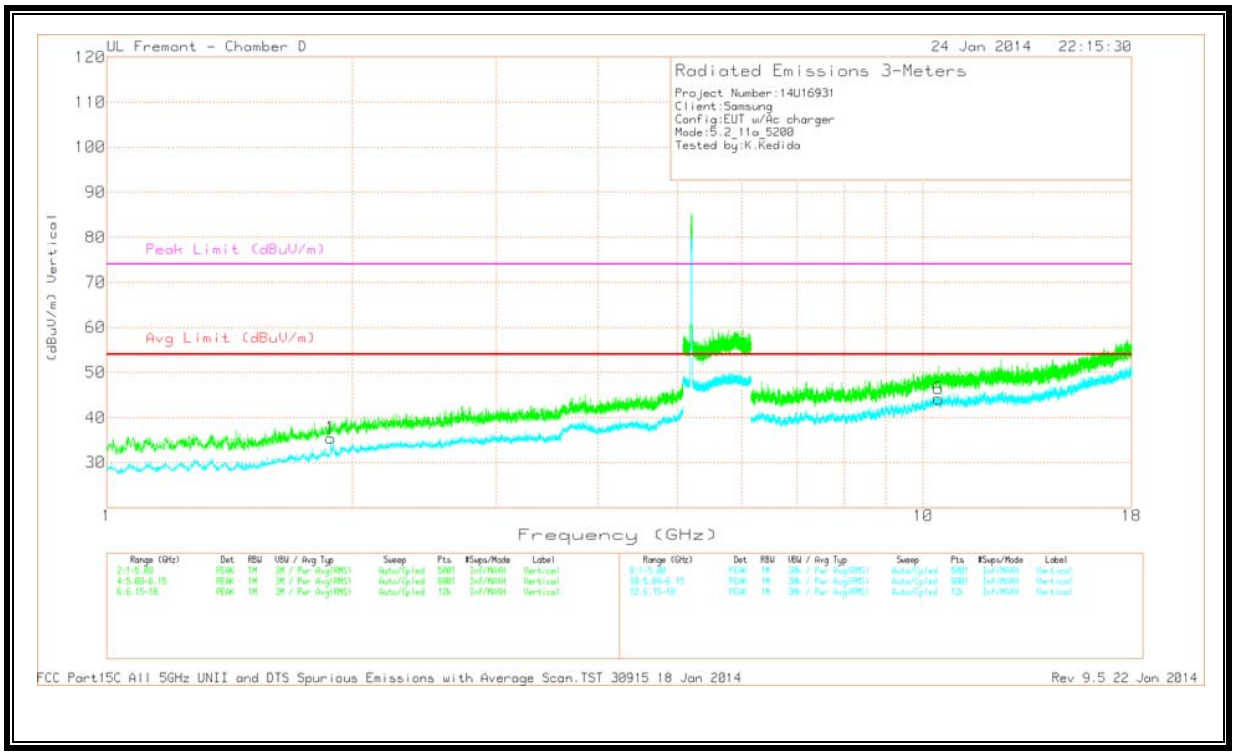
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.557	33.18	Avg	28.6	-31.4	30.38	54	-23.62	-	-	0-360	100	V
1	1.88	34.54	Avg	30.9	-30.6	34.84	54	-19.16	-	-	0-360	201	H
2	1.88	37.8	Avg	30.9	-30.6	38.1	54	-15.9	-	-	0-360	100	V
3	3.716	33.9	Avg	33.7	-28.6	39	54	-15	-	-	0-360	100	V
5	7.183	29.99	Avg	35.9	-24.1	41.79	54	-12.21	-	-	0-360	100	H
6	9.016	29.11	Avg	36.7	-23.2	42.61	54	-11.39	-	-	0-360	201	H
7	9.833	28.47	Avg	37.6	-22.1	43.97	54	-10.03	-	-	0-360	100	V

MID CHANNEL
HORIZONTAL



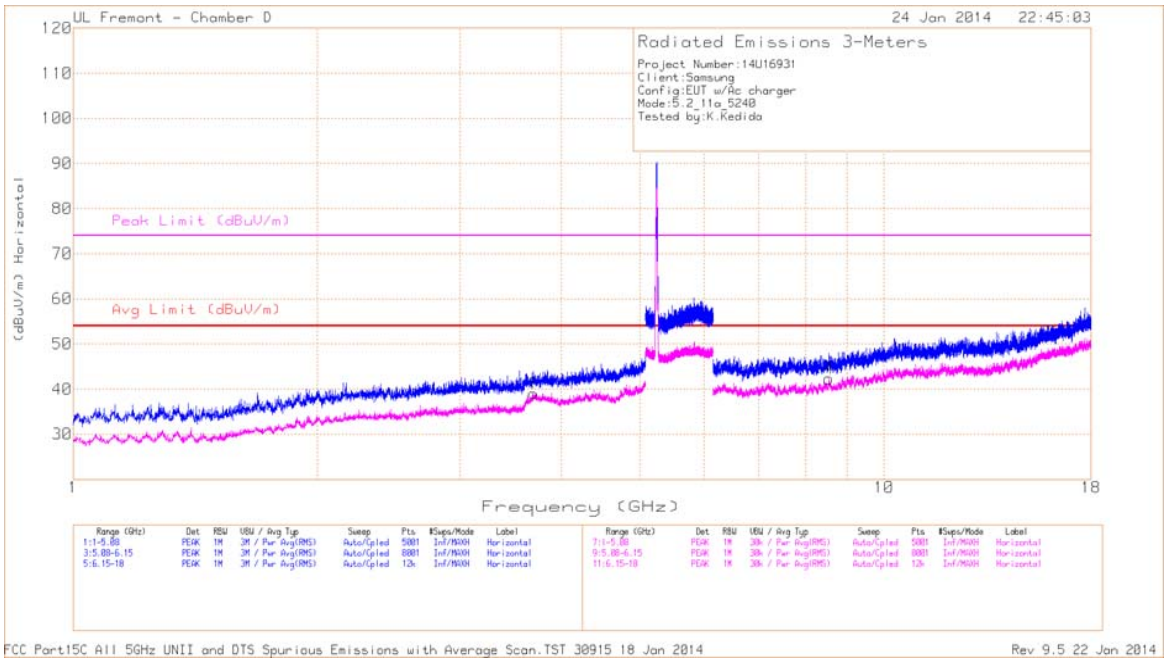
VERTICAL



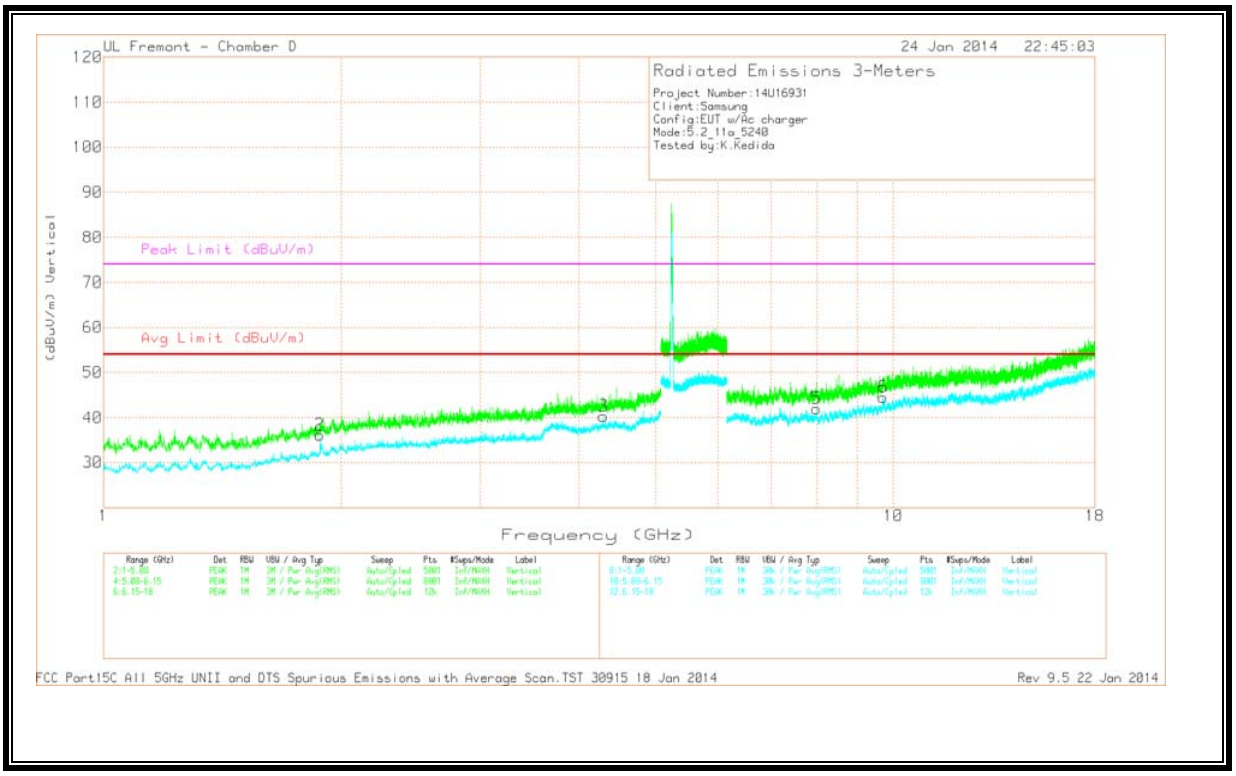
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.88	35.13	Avg	30.9	-30.6	35.43	54	-18.57	-	-	0-360	100	V
3	3.703	34.05	Avg	33.7	-28.5	39.25	54	-14.75	-	-	0-360	100	H
2	3.845	34.19	Avg	33.8	-28.7	39.29	54	-14.71	-	-	0-360	100	H
4	7.184	29.34	Avg	35.9	-24.1	41.14	54	-12.86	-	-	0-360	201	H
6	10.442	27.34	Avg	38.3	-21.5	44.14	54	-9.86	-	-	0-360	201	V
5	12.501	27.81	Avg	39.2	-21.3	45.71	54	-8.29	-	-	0-360	100	H

HIGH CHANNEL
HORIZONTAL



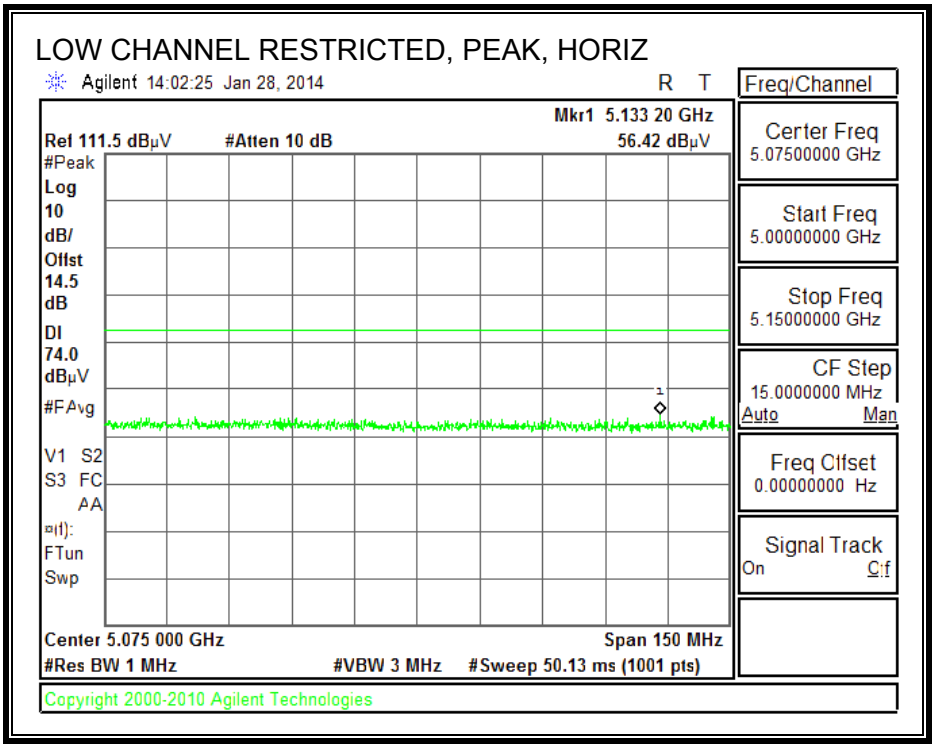
VERTICAL

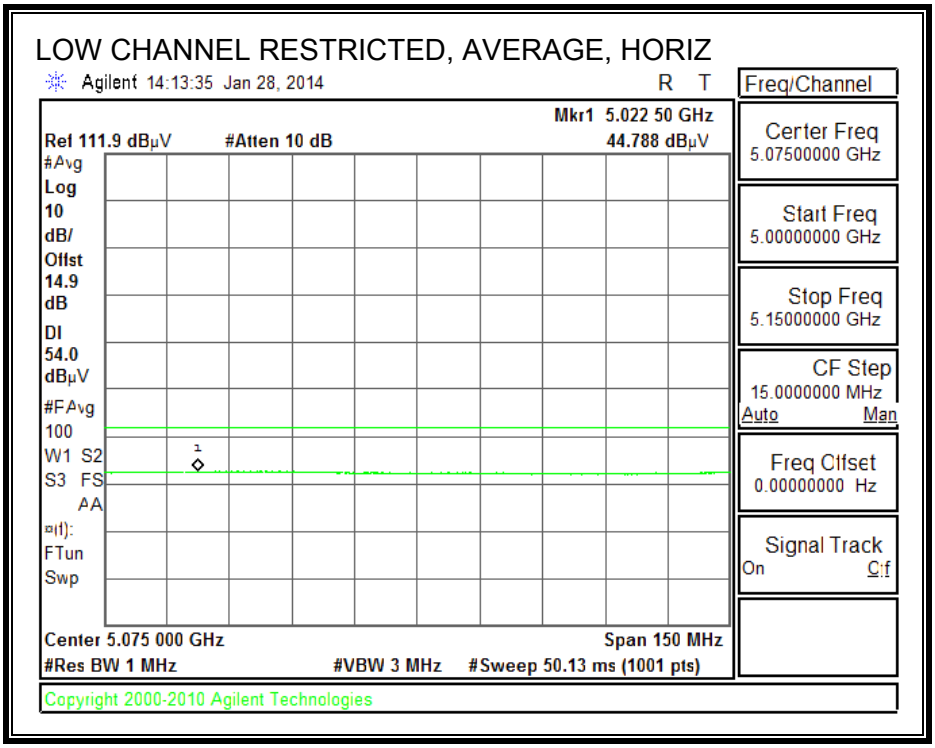


HIGH CHANNEL DATA

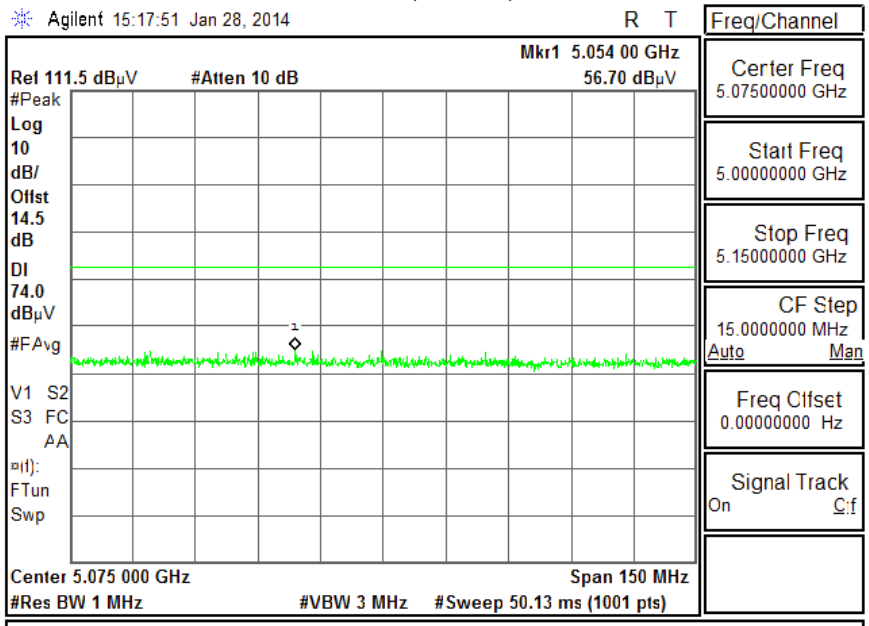
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	1.88	35.82	Avg	30.9	-30.6	36.12	54	-17.88	-	-	0-360	201	V
1	3.695	33.94	Avg	33.7	-28.6	39.04	54	-14.96	-	-	0-360	201	H
3	4.295	33.97	Avg	34	-27.7	40.27	54	-13.73	-	-	0-360	100	V
5	7.991	30.38	Avg	36	-24.4	41.98	54	-12.02	-	-	0-360	100	V
4	8.547	29.13	Avg	36.2	-23	42.33	54	-11.67	-	-	0-360	100	H
6	9.713	28.63	Avg	37.4	-21.5	44.53	54	-9.47	-	-	0-360	100	V

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

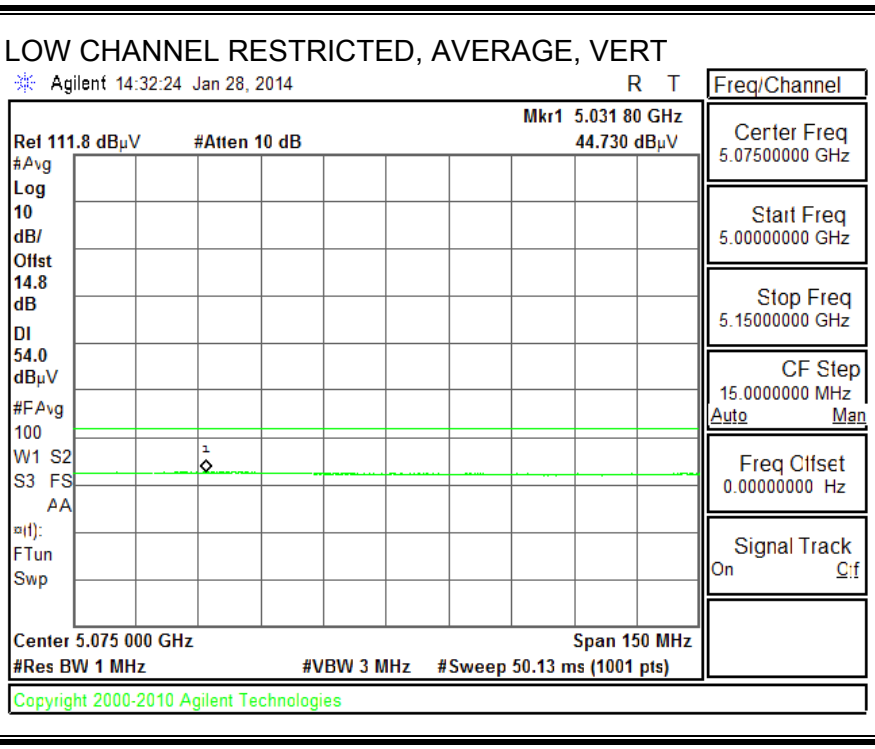




LOW CHANNEL RESTRICTED, PEAK, VERT

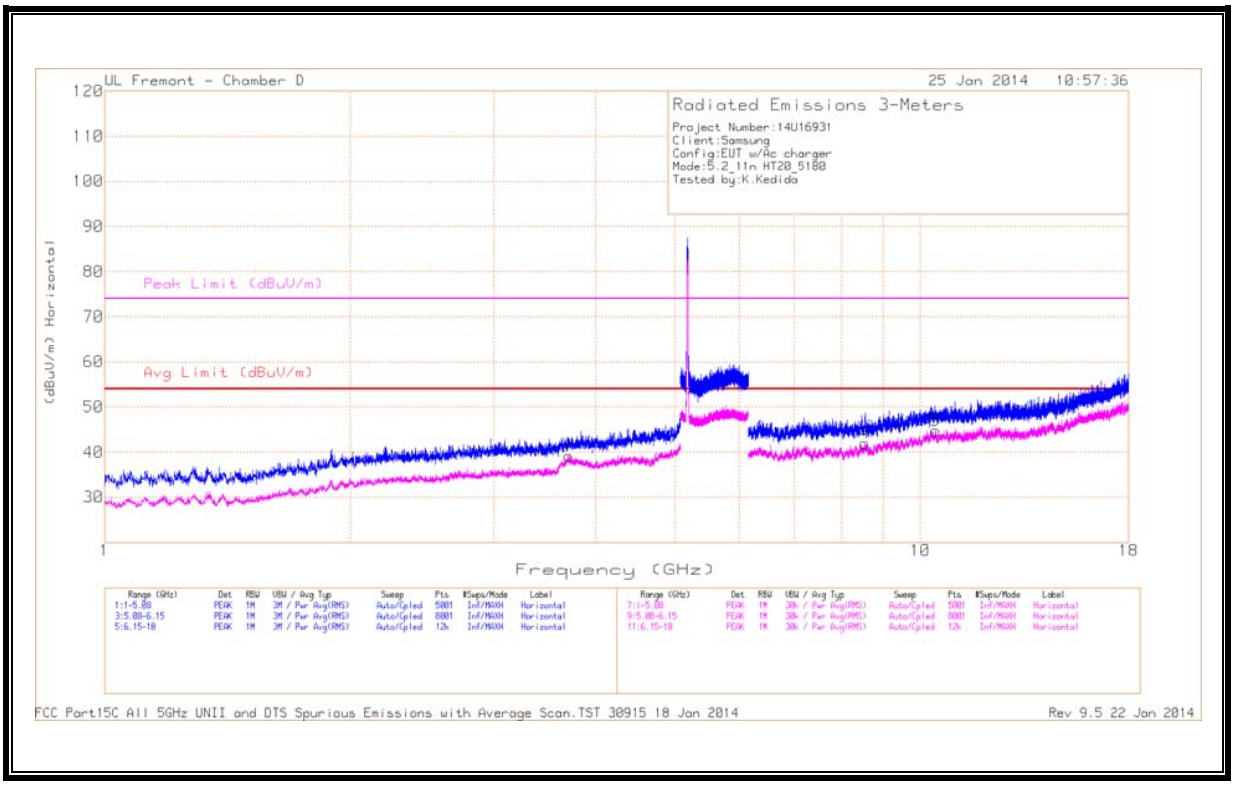


LOW CHANNEL RESTRICTED, AVERAGE, VERT

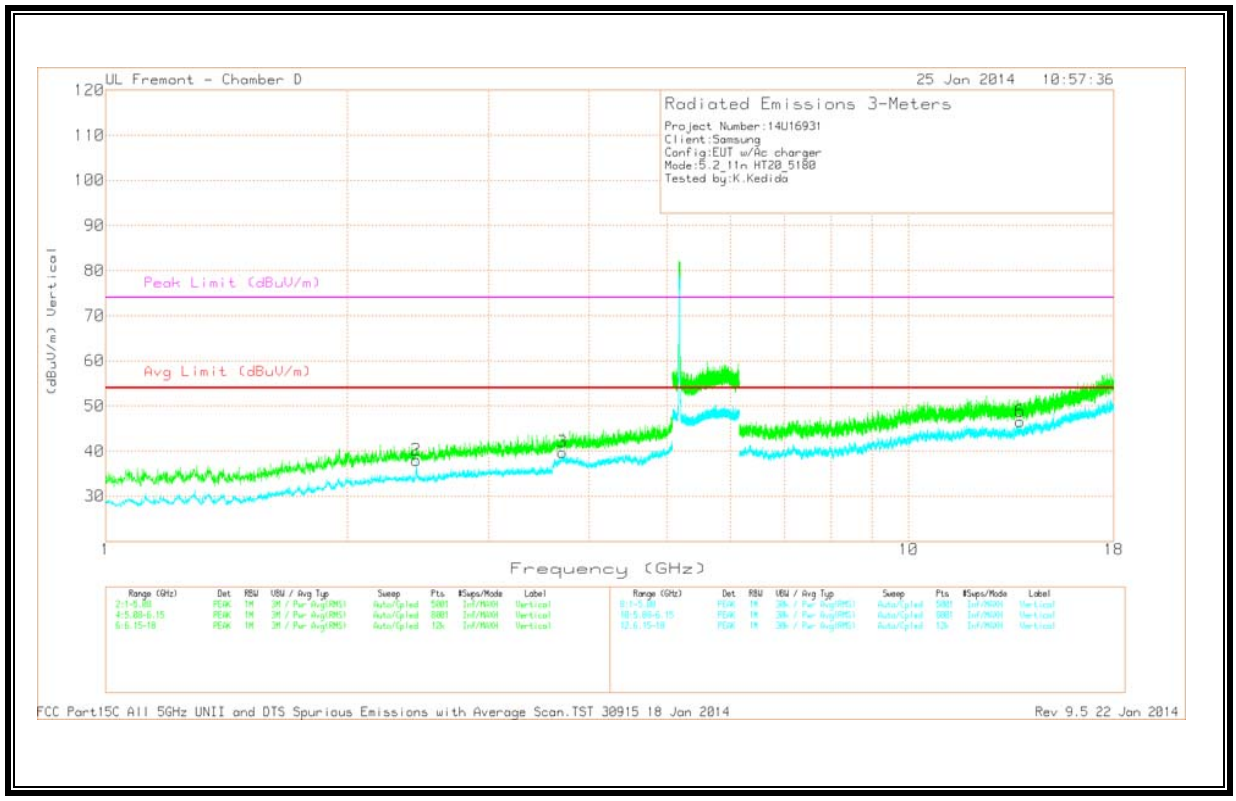


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



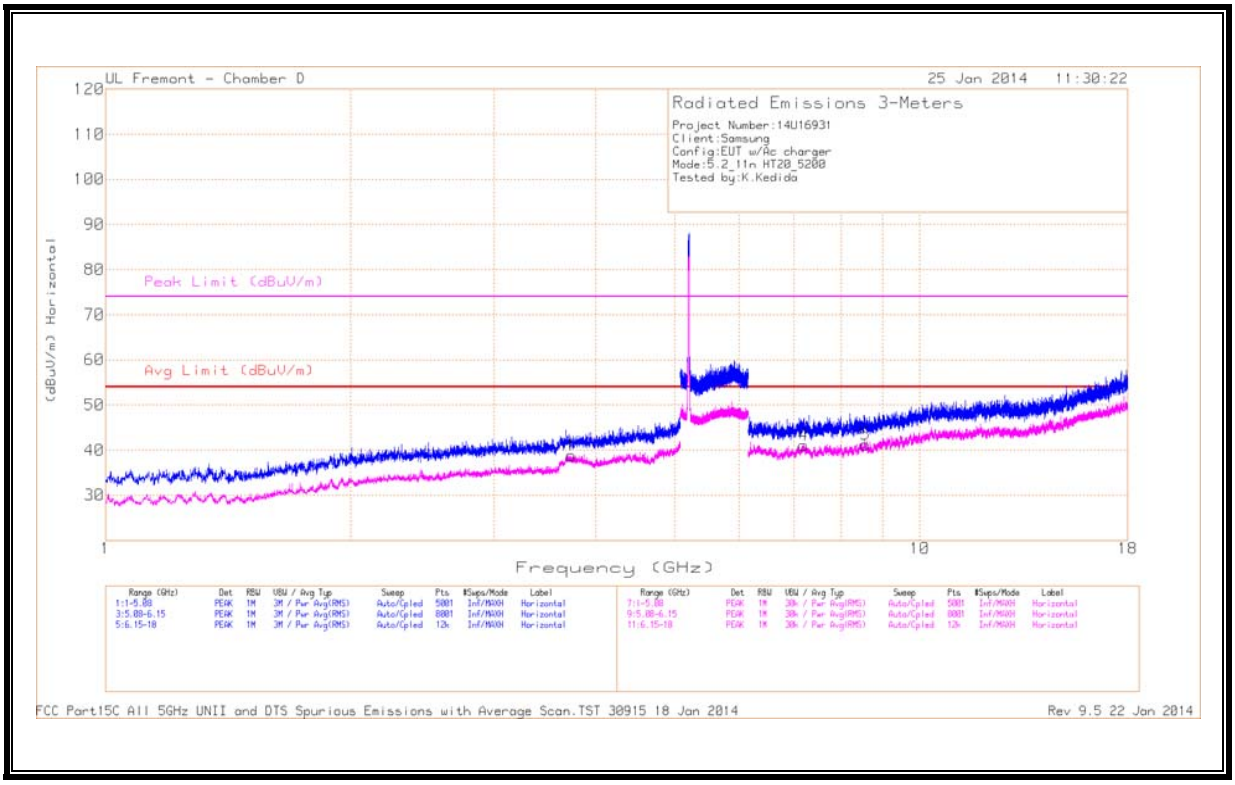
VERTICAL



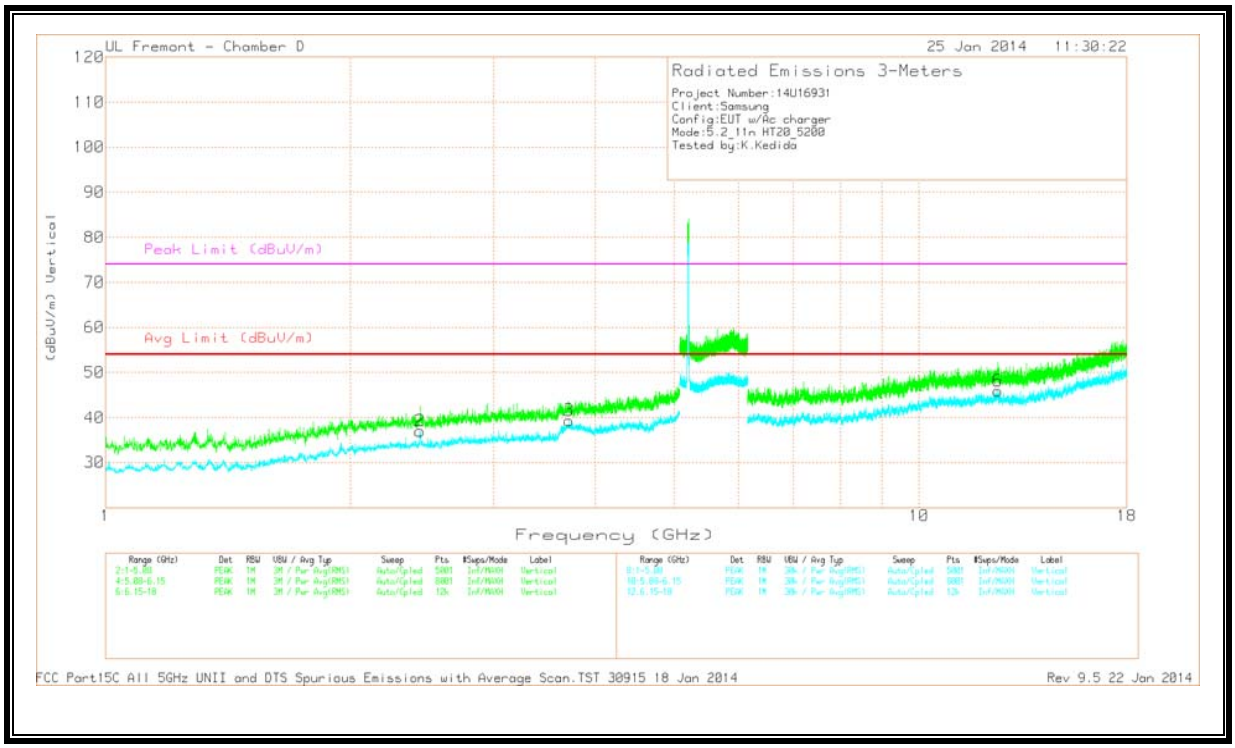
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.436	35.69	Avg	32.4	-30.1	37.99	54	-16.01	-	-	0-360	100	V
1	3.706	34.03	Avg	33.7	-28.5	39.23	54	-14.77	-	-	0-360	100	H
3	3.707	34.47	Avg	33.7	-28.4	39.77	54	-14.23	-	-	0-360	201	V
4	8.548	28.74	Avg	36.2	-23	41.94	54	-12.06	-	-	0-360	100	H
5	10.441	27.92	Avg	38.3	-21.5	44.72	54	-9.28	-	-	0-360	100	H
6	13.76	30.18	Avg	39.2	-22.8	46.58	54	-7.42	-	-	0-360	201	V

MID CHANNEL
HORIZONTAL



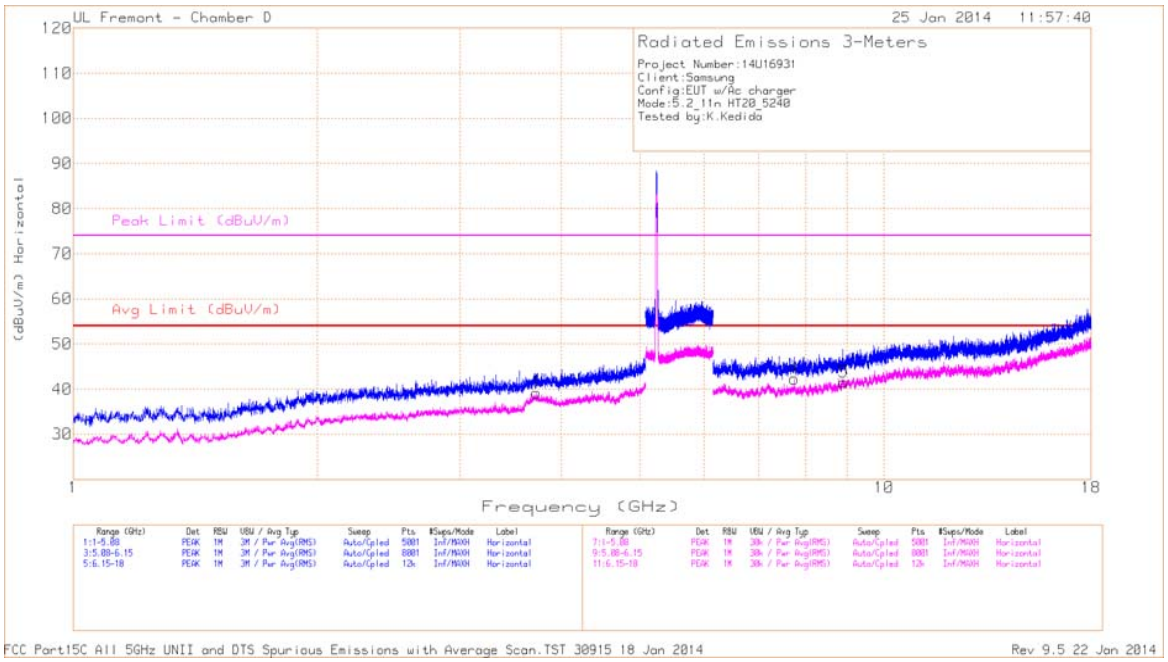
VERTICAL



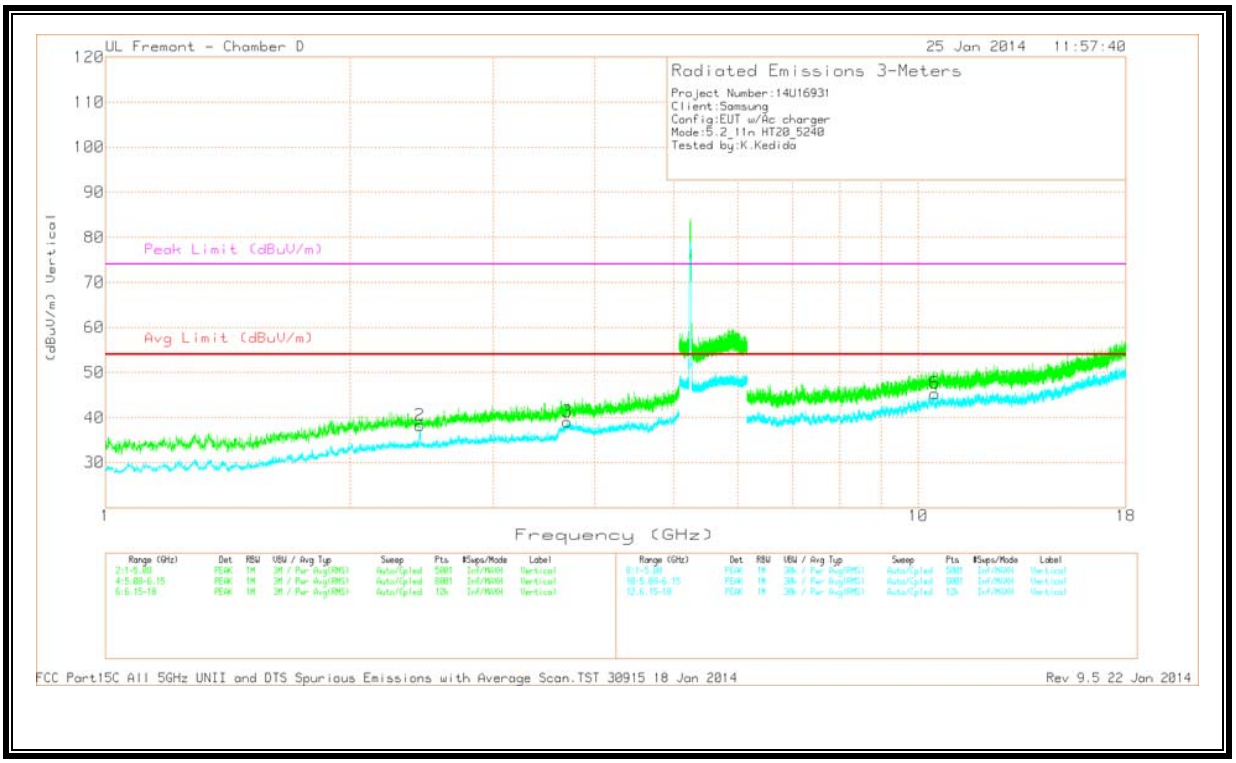
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.435	34.72	Avg	32.4	-30.1	37.02	54	-16.98	-	-	0-360	100	V
3	3.712	34.13	Avg	33.7	-28.5	39.33	54	-14.67	-	-	0-360	100	V
1	3.732	33.74	Avg	33.8	-28.7	38.84	54	-15.16	-	-	0-360	100	H
4	7.2	28.98	Avg	35.9	-23.8	41.08	54	-12.92	-	-	0-360	201	H
5	8.575	28.32	Avg	36.3	-23.4	41.22	54	-12.78	-	-	0-360	100	H
6	12.504	28	Avg	39.2	-21.3	45.9	54	-8.1	-	-	0-360	201	V

HIGH CHANNEL
HORIZONTAL



VERTICAL

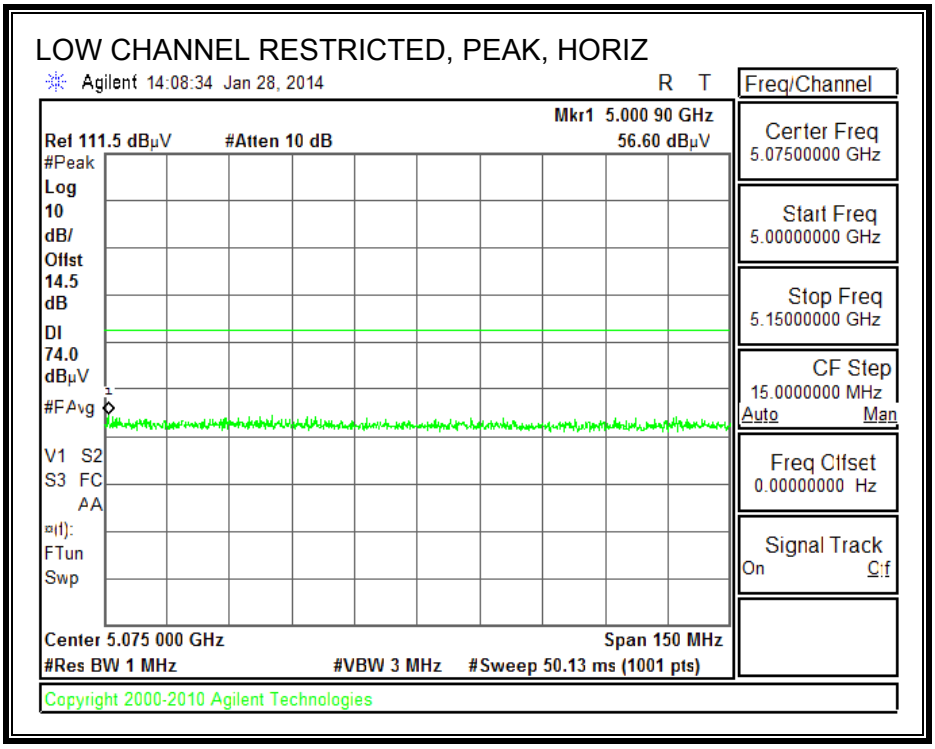


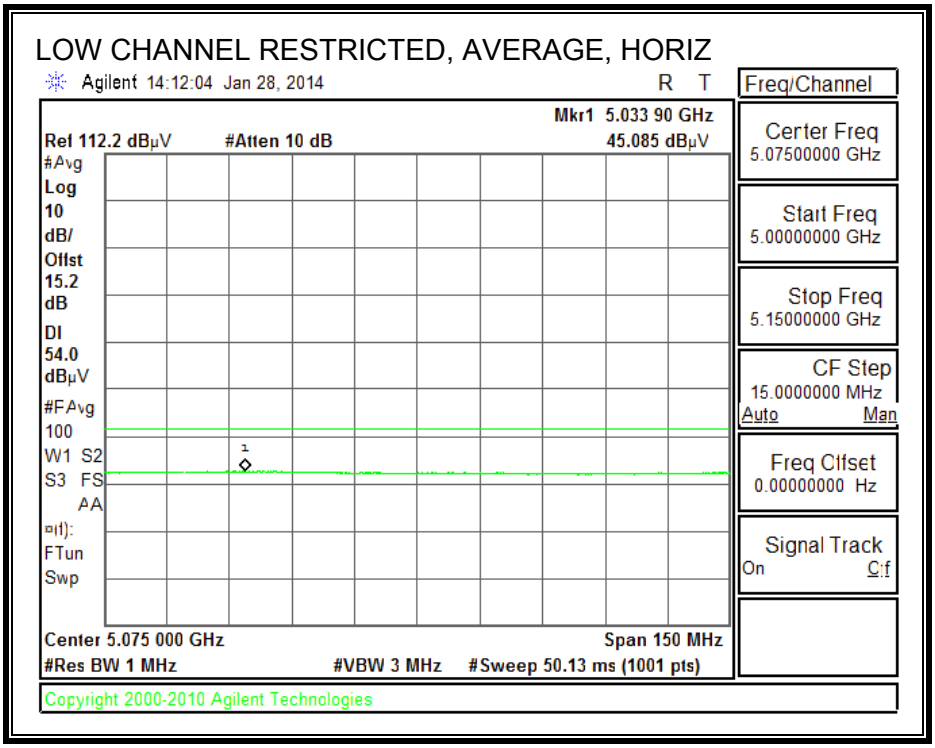
HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.436	35.97	Avg	32.4	-30.1	38.27	54	-15.73	-	-	0-360	100	V
3	3.702	33.86	Avg	33.7	-28.5	39.06	54	-14.94	-	-	0-360	100	V
1	3.726	34.06	Avg	33.8	-28.7	39.16	54	-14.84	-	-	0-360	100	H
4	7.75	30.21	Avg	36.1	-24	42.31	54	-11.69	-	-	0-360	201	H
5	8.919	28.77	Avg	36.6	-23.8	41.57	54	-12.43	-	-	0-360	100	H
6	10.48	28.77	Avg	38.3	-21.7	45.37	54	-8.63	-	-	0-360	100	V

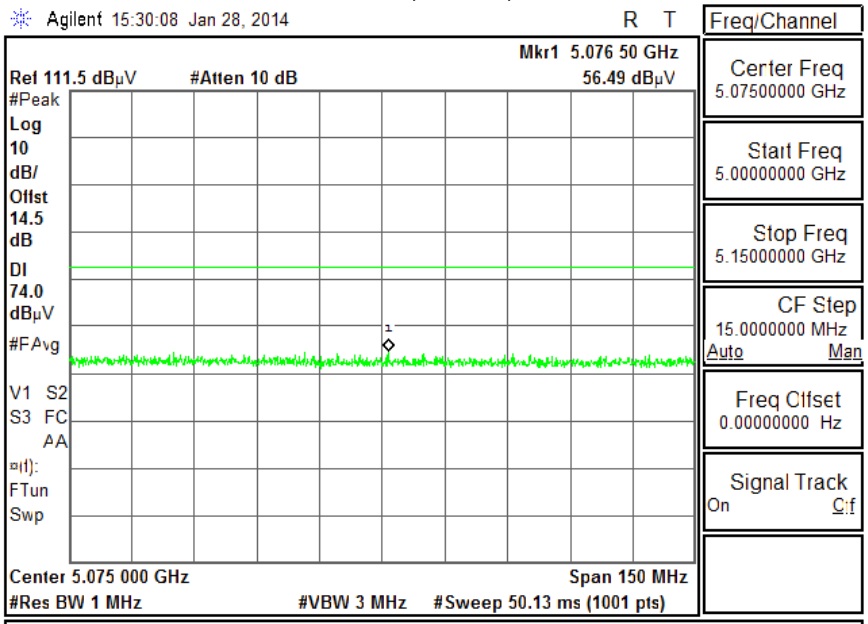
11.1.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

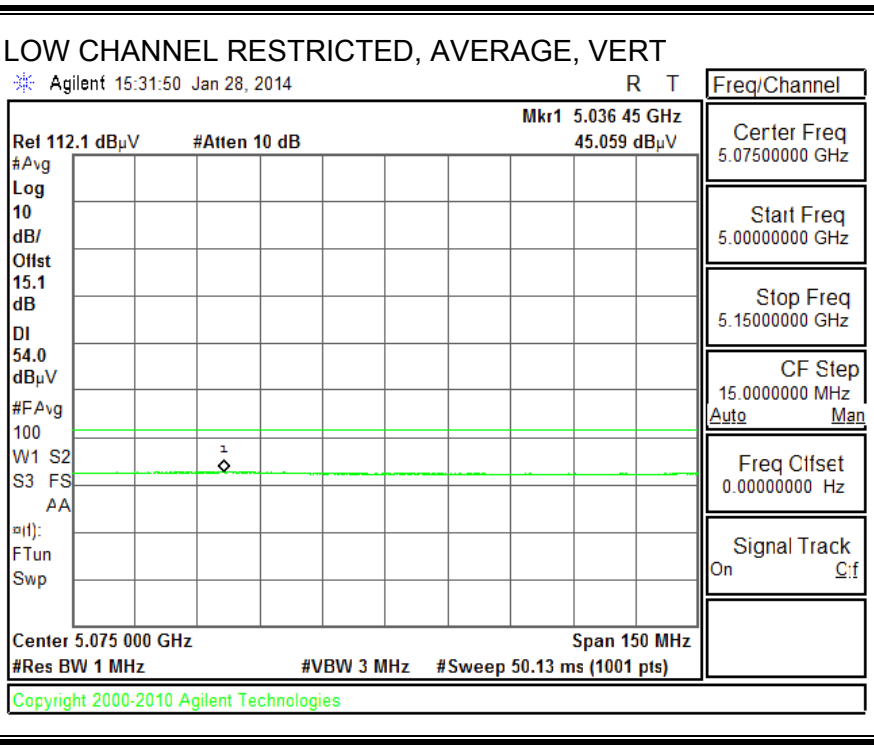




LOW CHANNEL RESTRICTED, PEAK, VERT

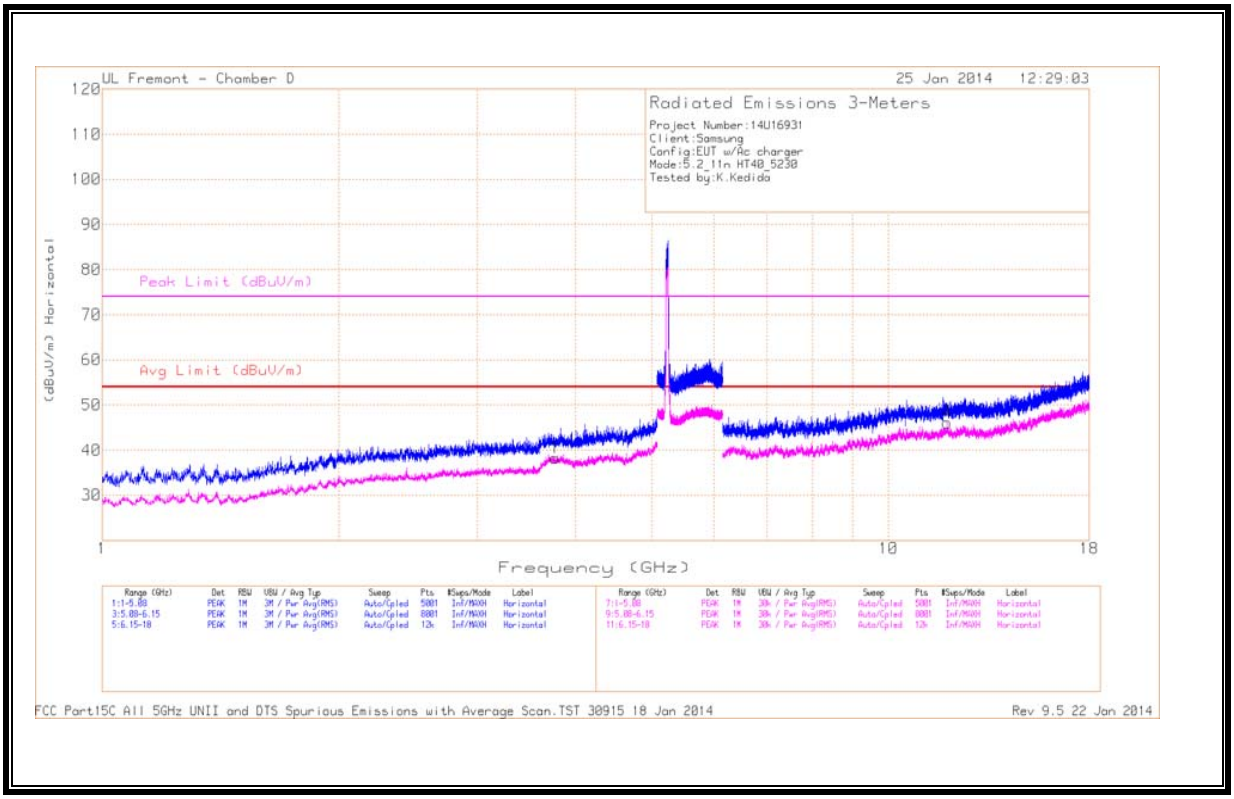


LOW CHANNEL RESTRICTED, AVERAGE, VERT

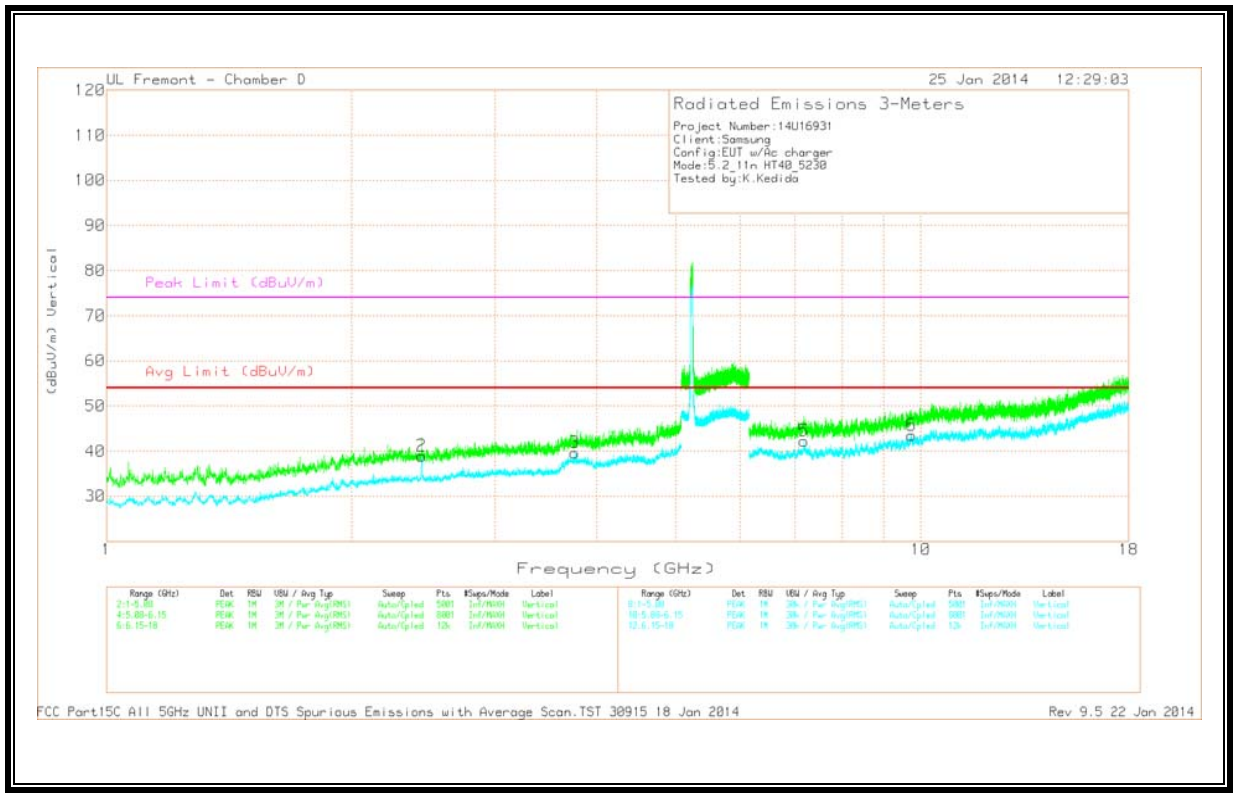


HARMONICS AND SPURIOUS EMISSIONS

HORIZONTAL



VERTICAL



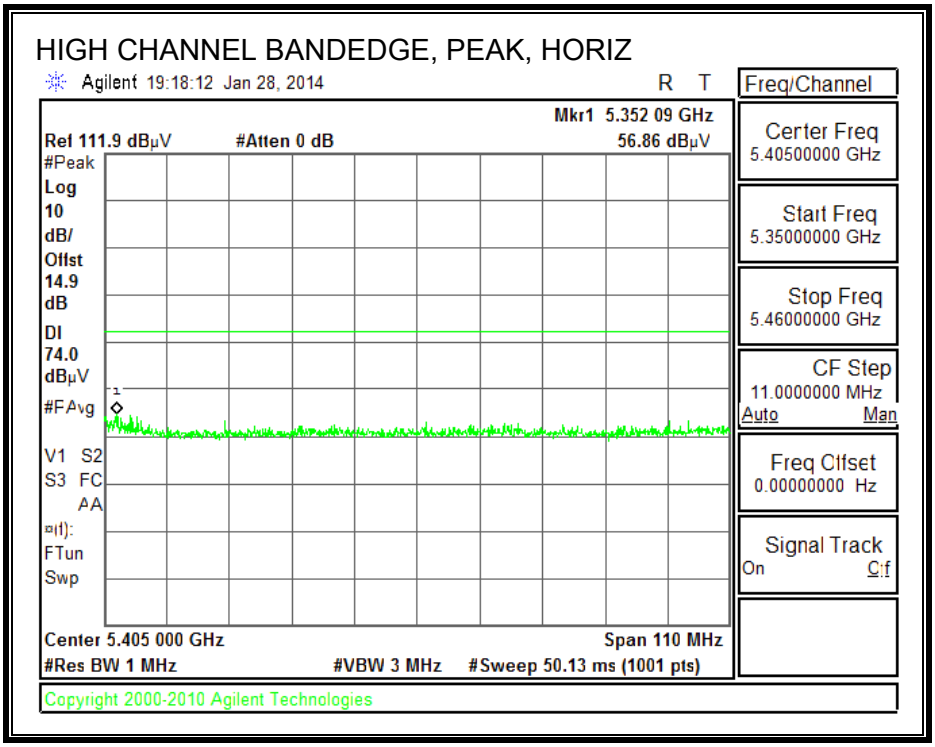
LOW CHANNEL DATA

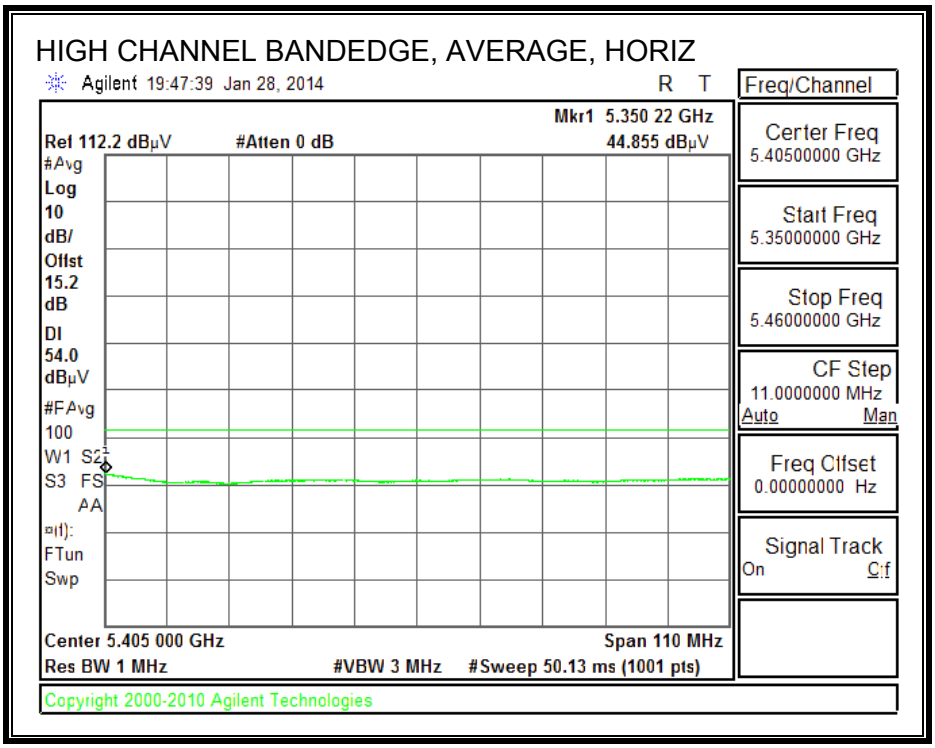
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.436	36.6	Avg	32.4	-30.1	38.9	54	-15.1	-	-	0-360	201	V
3	3.757	34.54	Avg	33.8	-28.7	39.64	54	-14.36	-	-	0-360	201	V
1	3.768	33.14	Avg	33.8	-28.7	38.24	54	-15.76	-	-	0-360	100	H
5	7.186	30.32	Avg	35.9	-24	42.22	54	-11.78	-	-	0-360	201	V
6	9.737	27.52	Avg	37.4	-21.4	43.52	54	-10.48	-	-	0-360	100	V
4	11.871	28.4	Avg	39	-21.3	46.1	54	-7.9	-	-	0-360	201	H

11.2. 5.3 GHz

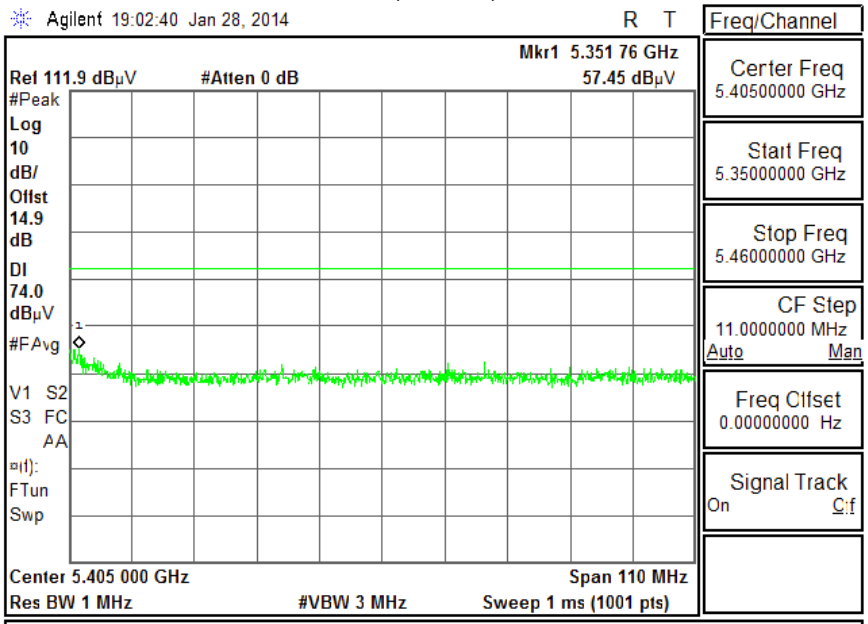
11.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

AUTHORIZED BANDEDGE (HIGH CHANNEL)

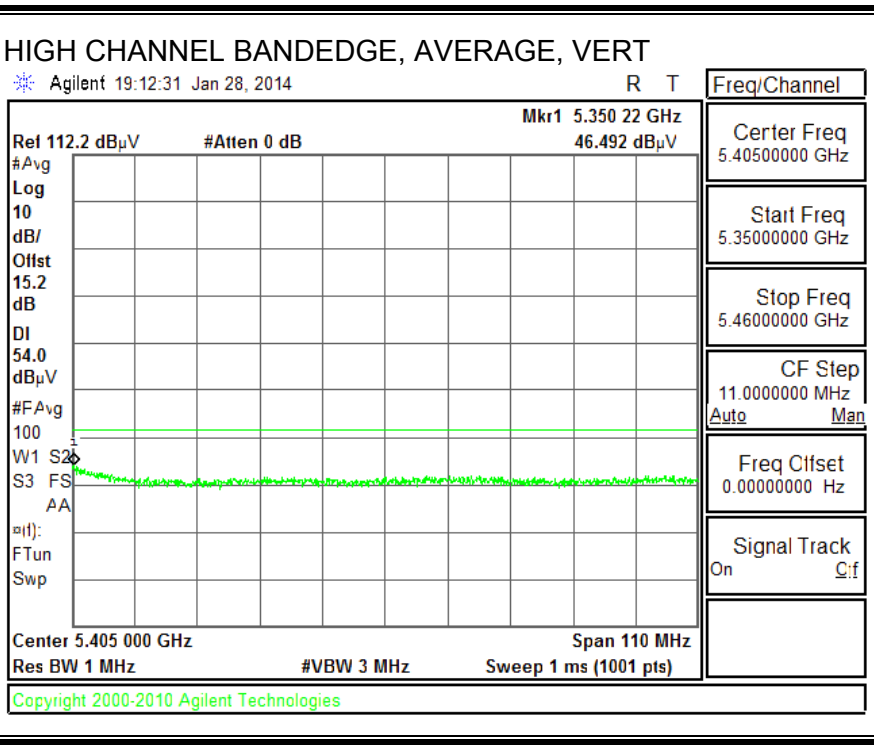




HIGH CHANNEL BANDEDGE, PEAK, VERT

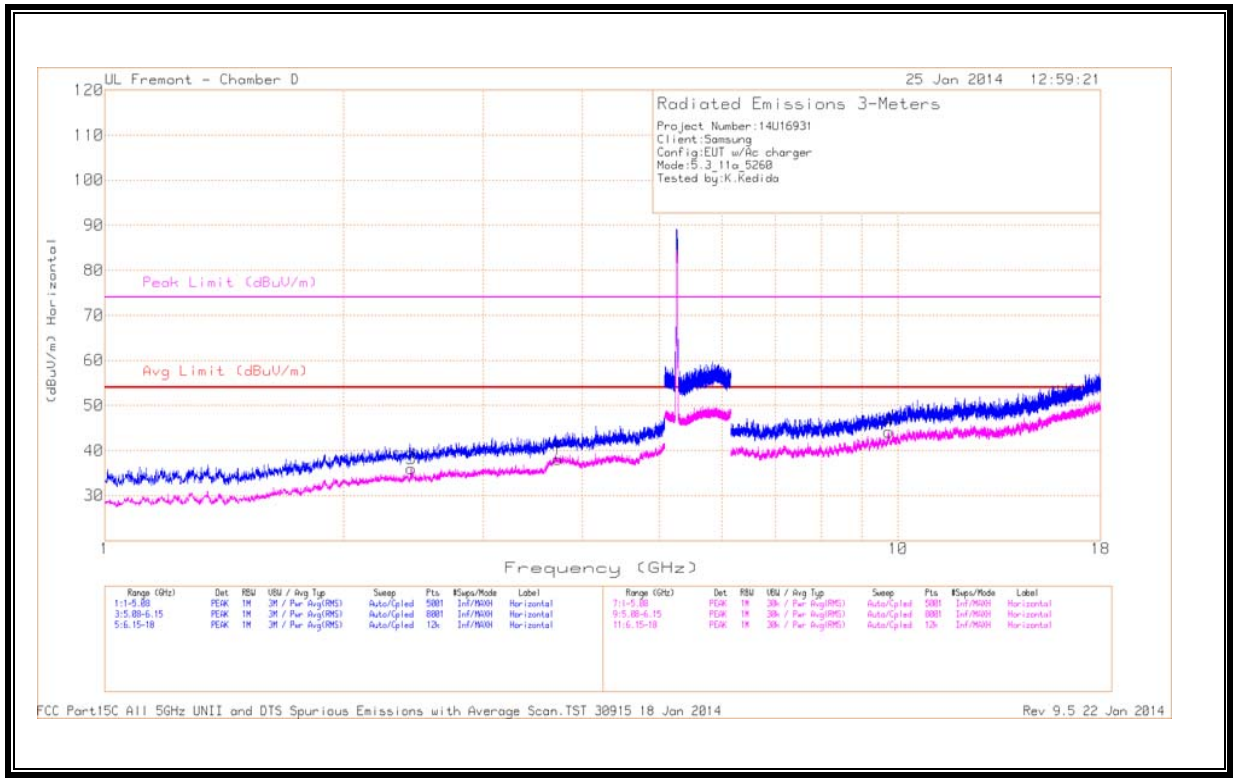


HIGH CHANNEL BANDEDGE, AVERAGE, VERT

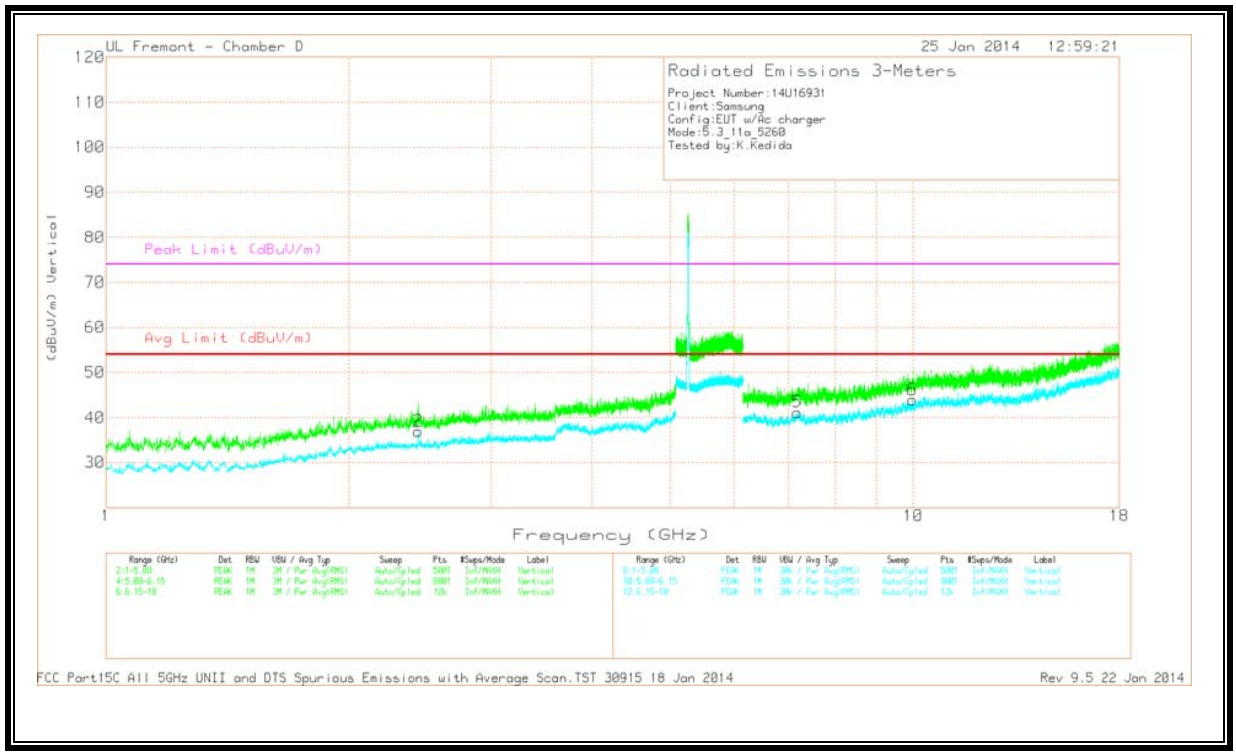


11.2.2.HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



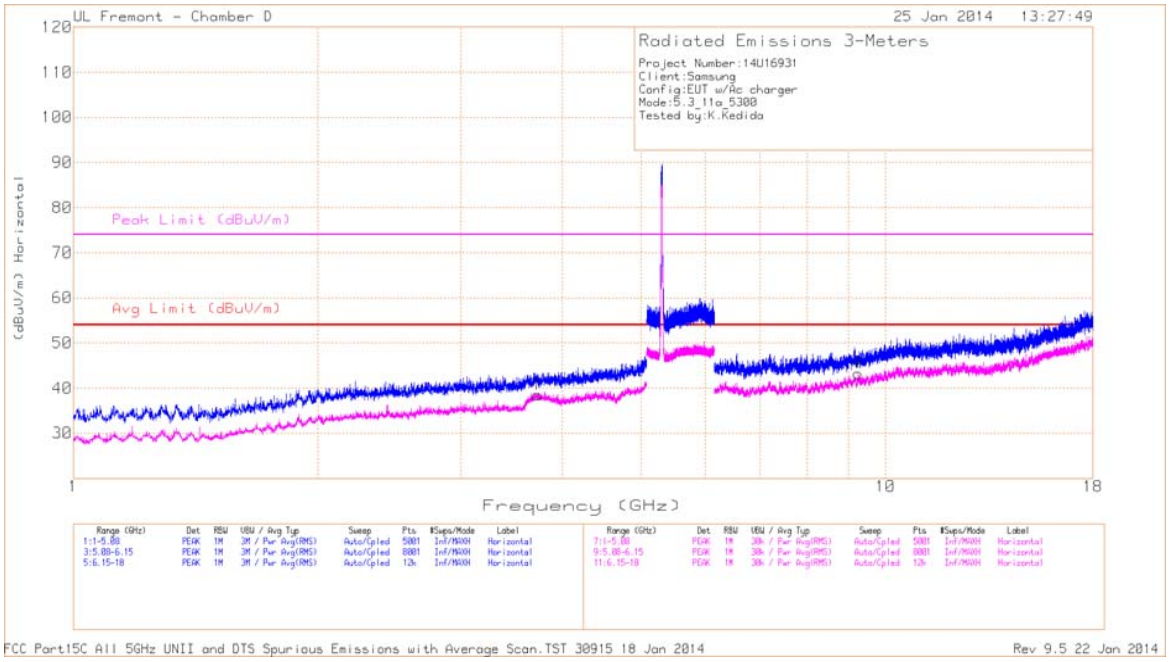
VERTICAL



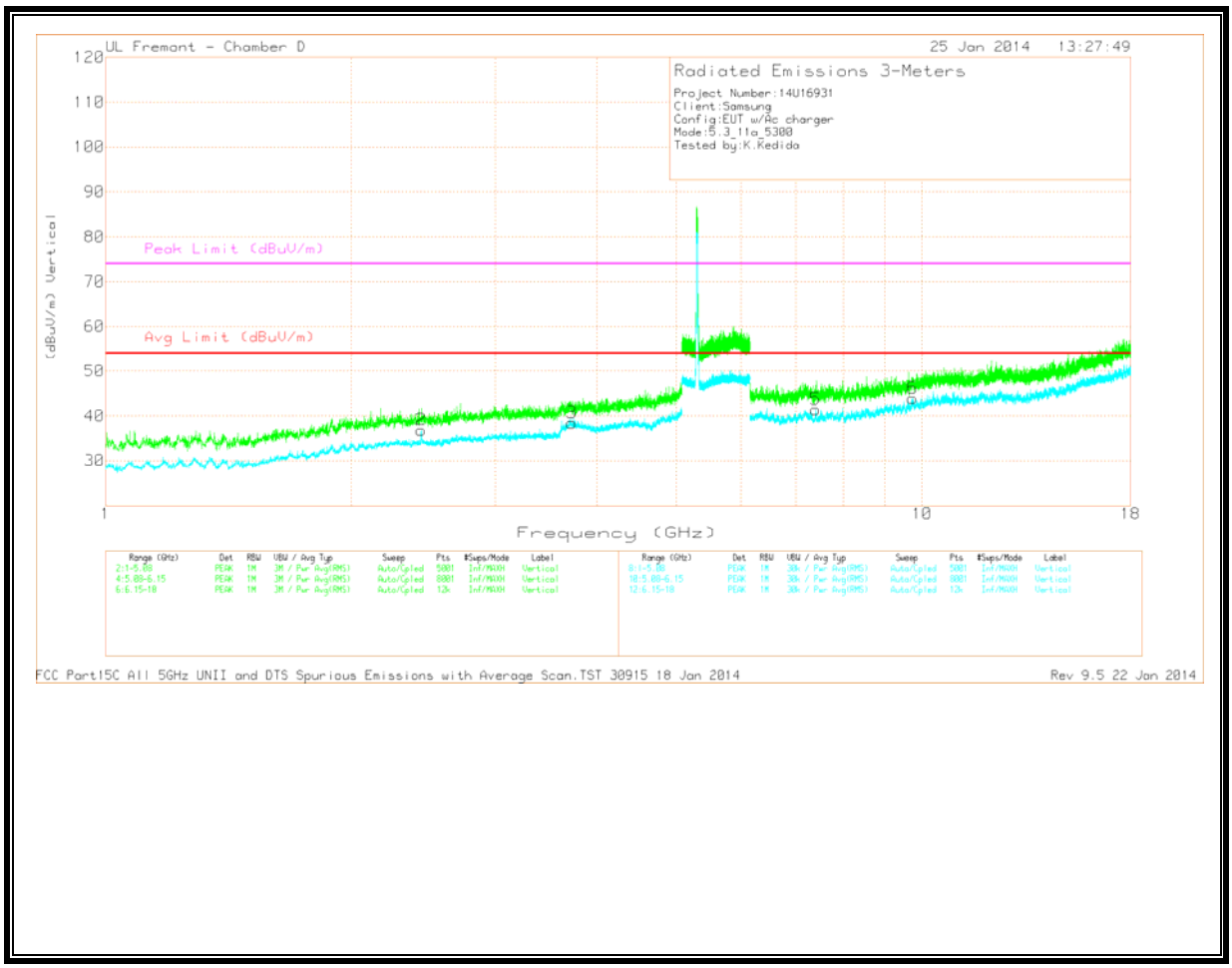
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	2.434	33.66	Avg	32.4	-30.1	35.96	54	-18.04	-	-	0-360	201	H
2	2.437	34.66	Avg	32.4	-30.1	36.96	54	-17.04	-	-	0-360	100	V
1	3.725	33.08	Avg	33.7	-28.7	38.08	54	-15.92	-	-	0-360	201	H
5	7.189	29.17	Avg	35.9	-23.9	41.17	54	-12.83	-	-	0-360	201	V
4	9.731	28.07	Avg	37.4	-21.3	44.17	54	-9.83	-	-	0-360	201	H
6	9.978	27.73	Avg	37.9	-21.7	43.93	54	-10.07	-	-	0-360	100	V

MID CHANNEL
HORIZONTAL



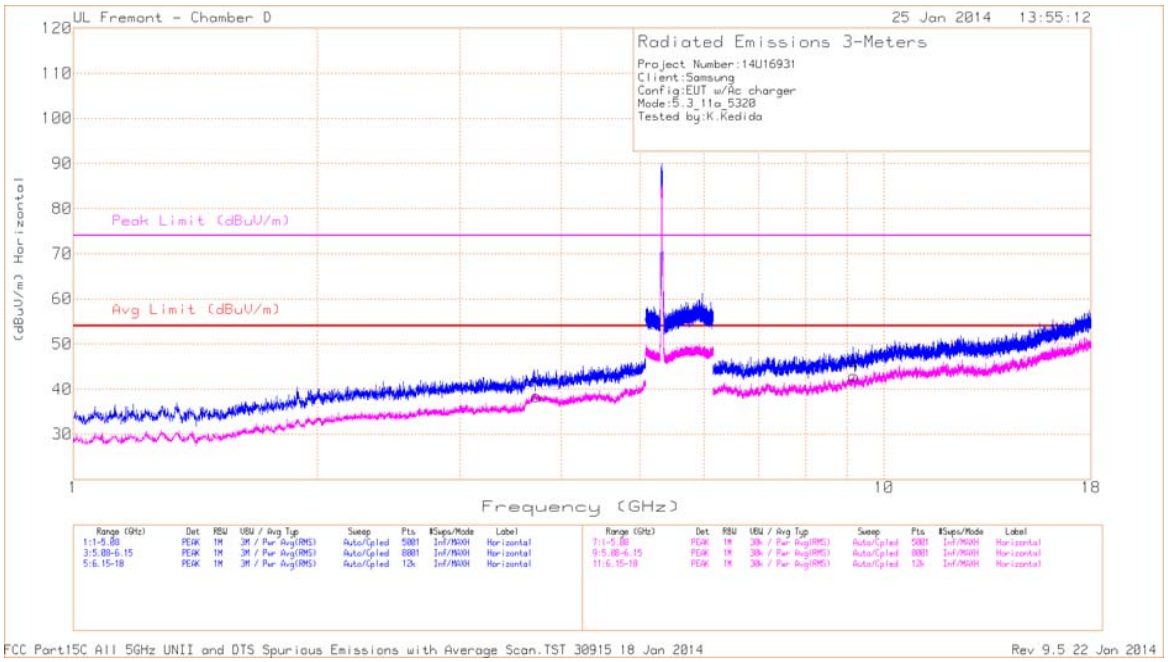
VERTICAL



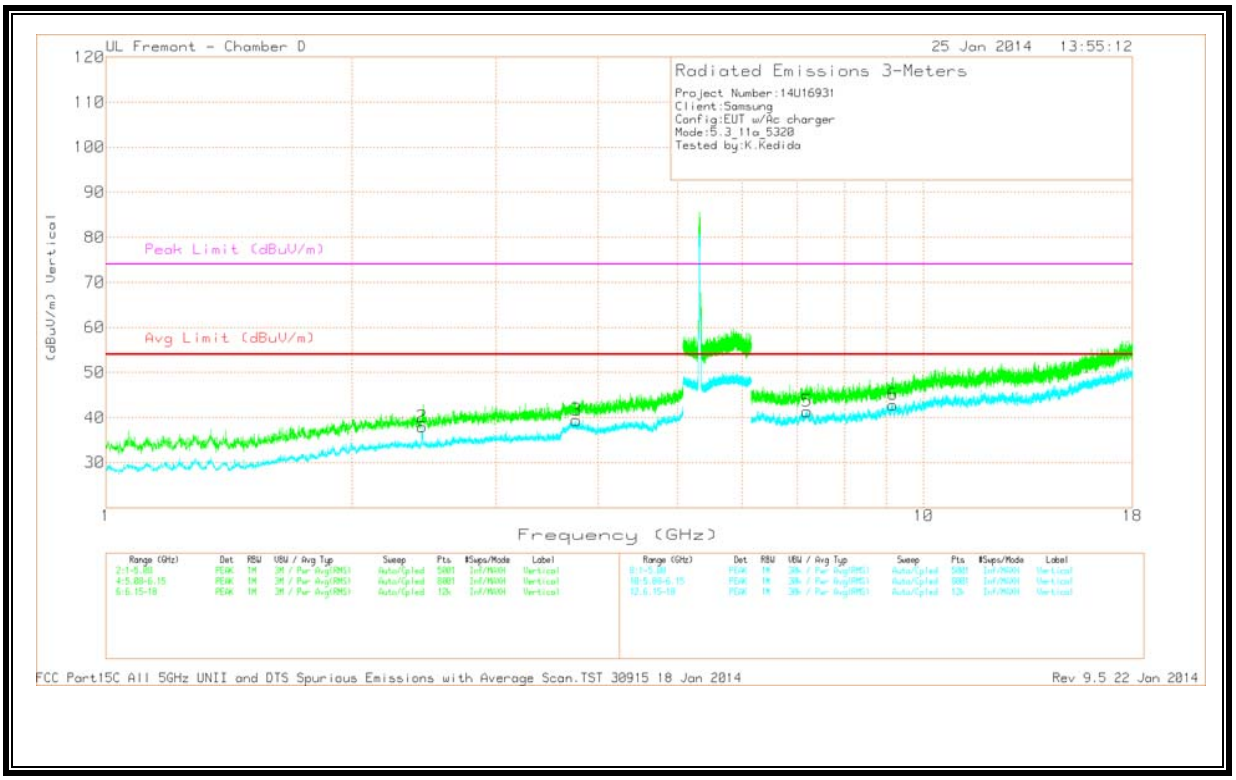
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.435	34.55	Avg	32.4	-30.1	36.85	54	-17.15	-	-	0-360	100	V
3	3.722	33.43	Avg	33.7	-28.7	38.43	54	-15.57	-	-	0-360	100	V
1	3.728	33.43	Avg	33.8	-28.7	38.53	54	-15.47	-	-	0-360	201	H
5	7.406	30.6	Avg	35.9	-25.1	41.4	54	-12.6	-	-	0-360	100	V
4	9.254	28.87	Avg	36.9	-22.5	43.27	54	-10.73	-	-	0-360	201	H
6	9.732	27.81	Avg	37.4	-21.3	43.91	54	-10.09	-	-	0-360	201	V

HIGH CHANNEL
HORIZONTAL



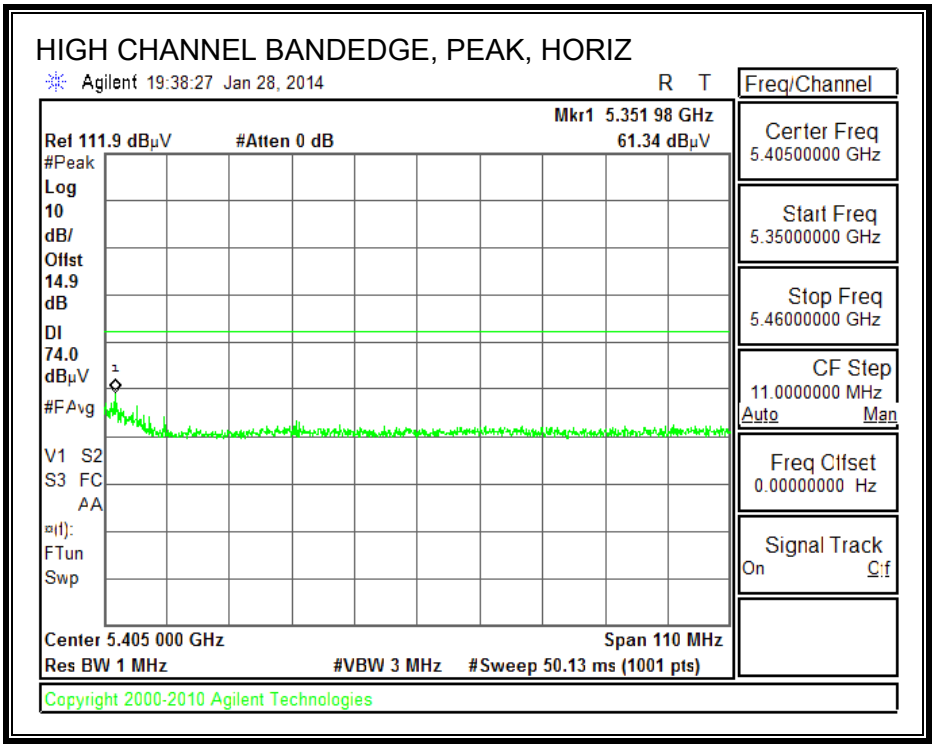
VERTICAL

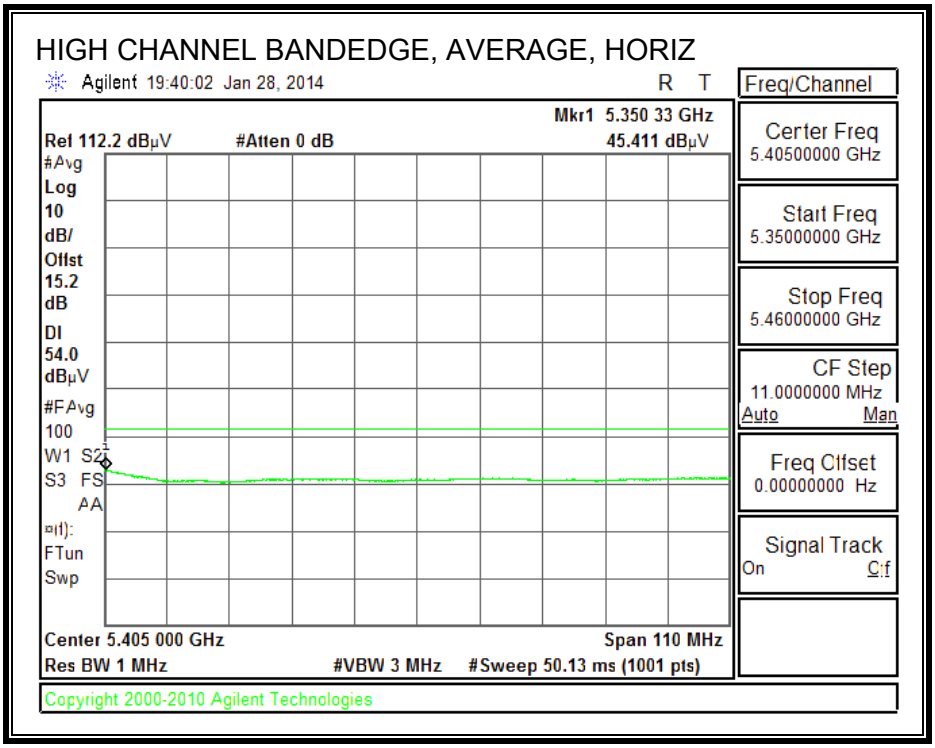


HIGH CHANNEL DATA

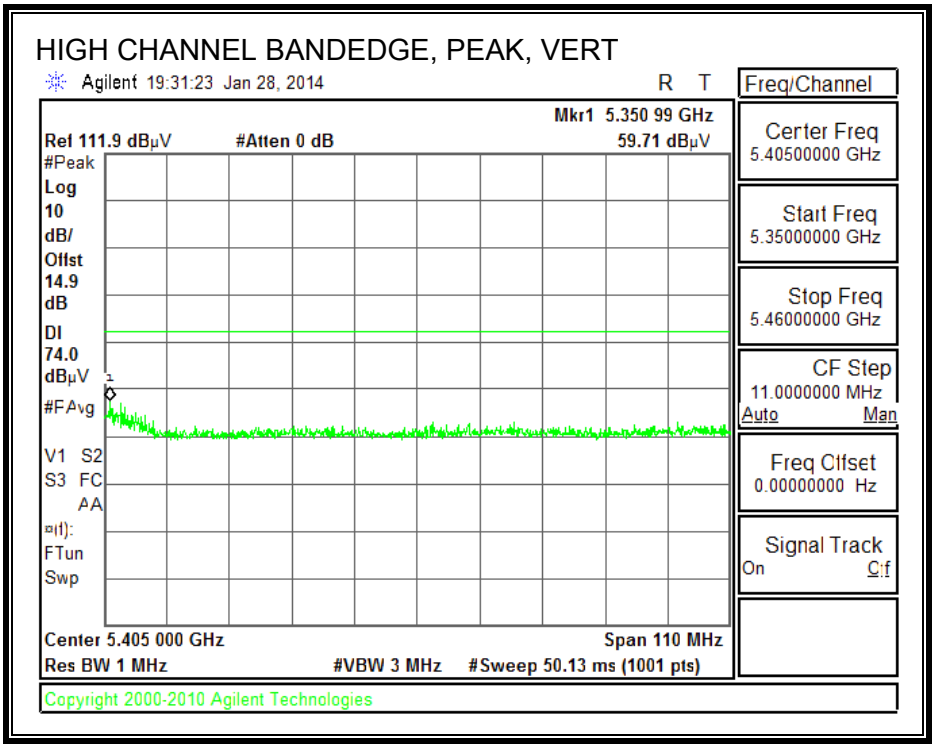
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.436	35.64	Avg	32.4	-30.1	37.94	54	-16.06	-	-	0-360	100	V
1	3.728	33.34	Avg	33.8	-28.7	38.44	54	-15.56	-	-	0-360	201	H
3	3.76	34.3	Avg	33.8	-28.7	39.4	54	-14.6	-	-	0-360	100	V
5	7.202	29.25	Avg	35.9	-23.8	41.35	54	-12.65	-	-	0-360	201	V
6	9.171	28.06	Avg	36.8	-22	42.86	54	-11.14	-	-	0-360	100	V
4	9.18	28.35	Avg	36.8	-22.2	42.95	54	-11.05	-	-	0-360	201	H

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

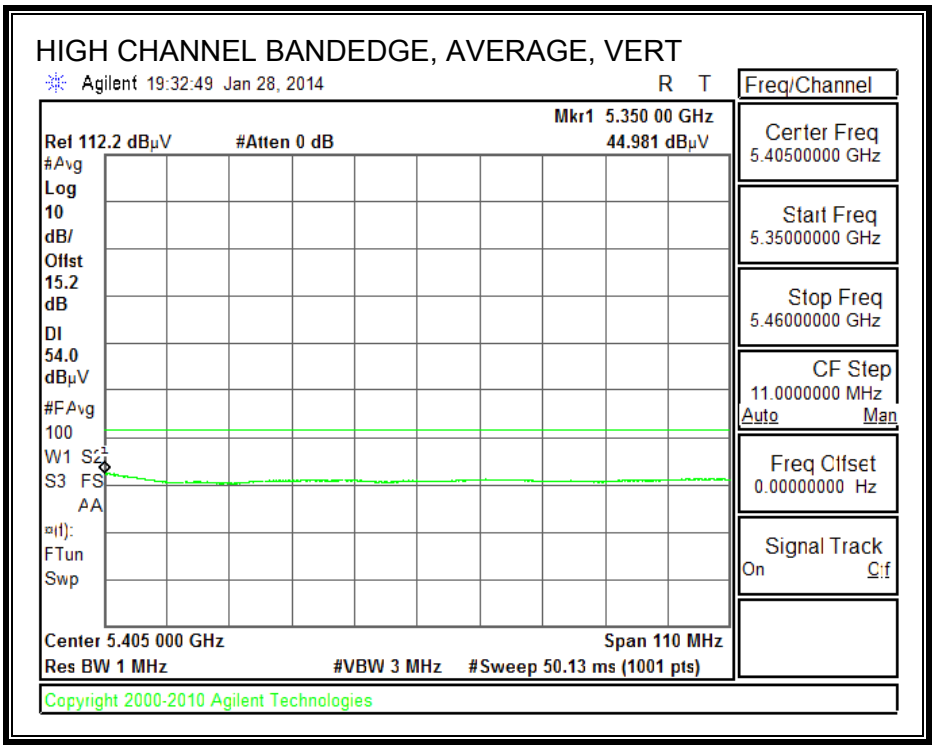




HIGH CHANNEL BANDEDGE, PEAK, VERT

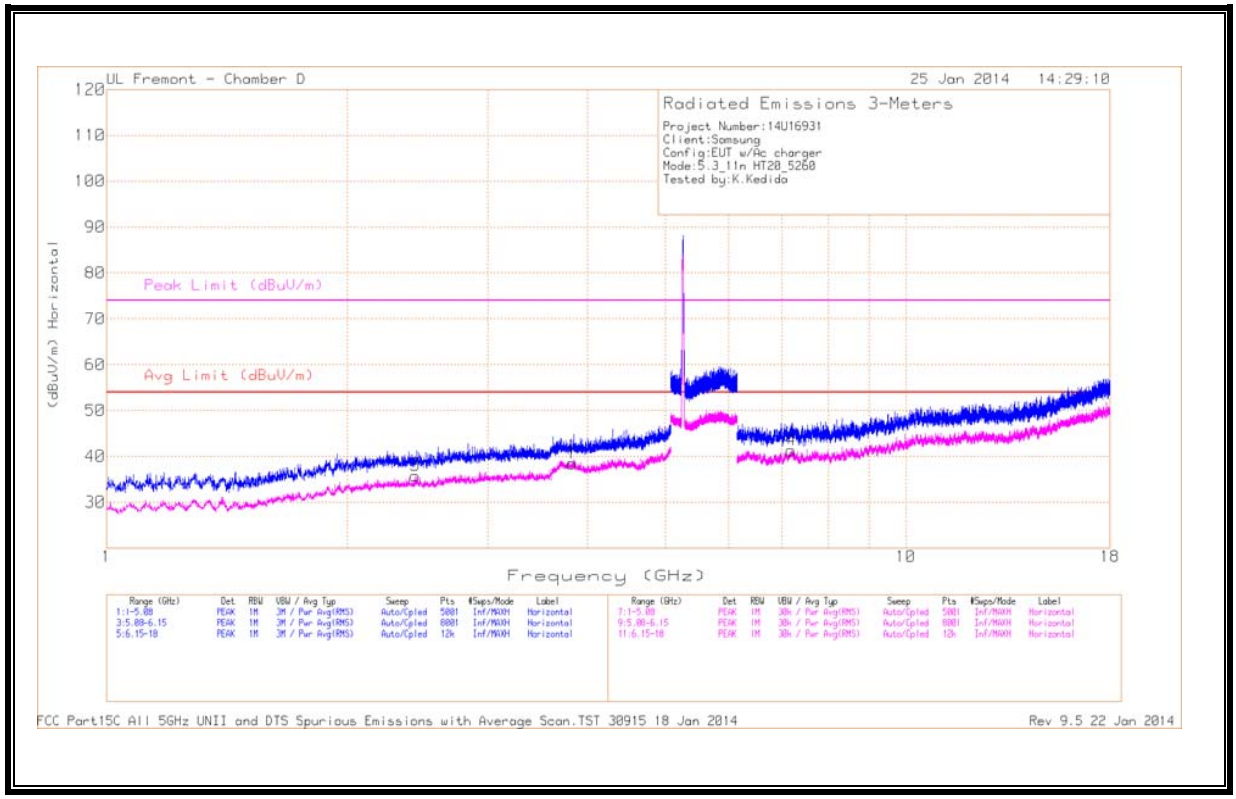


HIGH CHANNEL BANDEDGE, AVERAGE, VERT

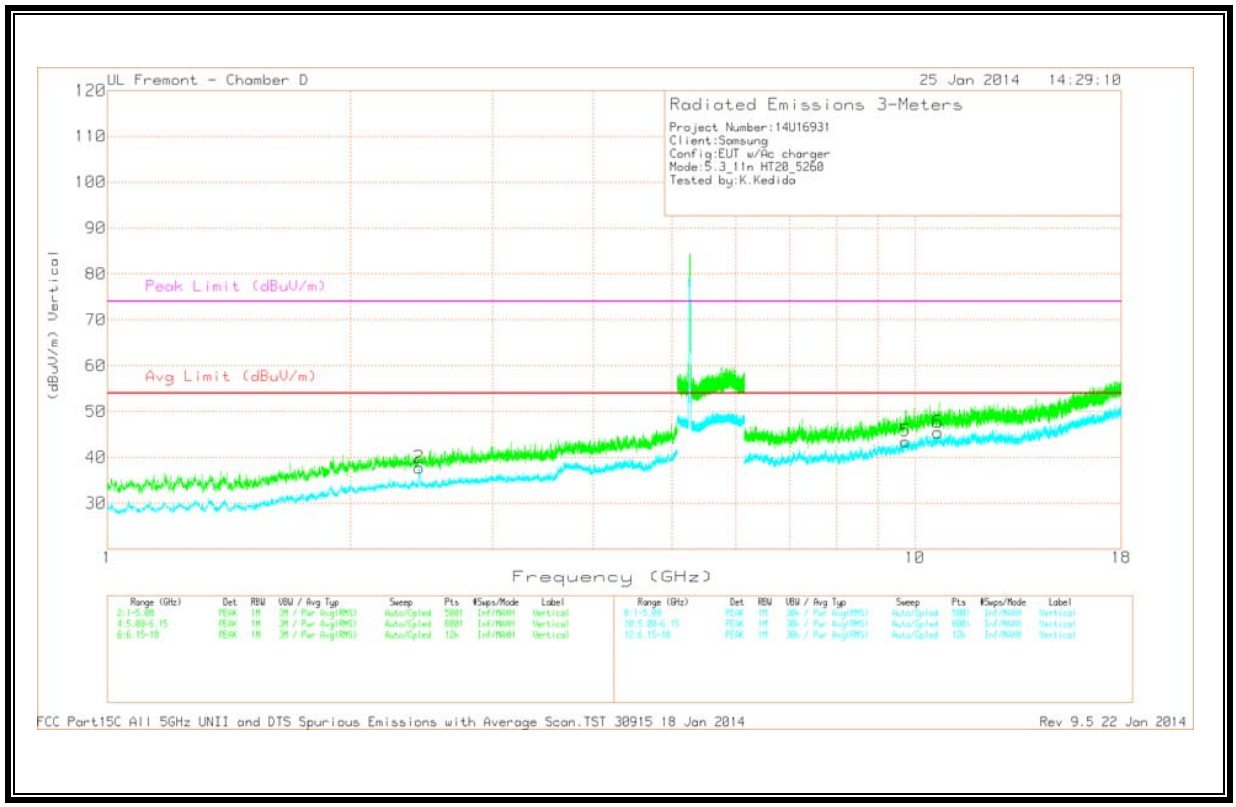


11.2.4. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



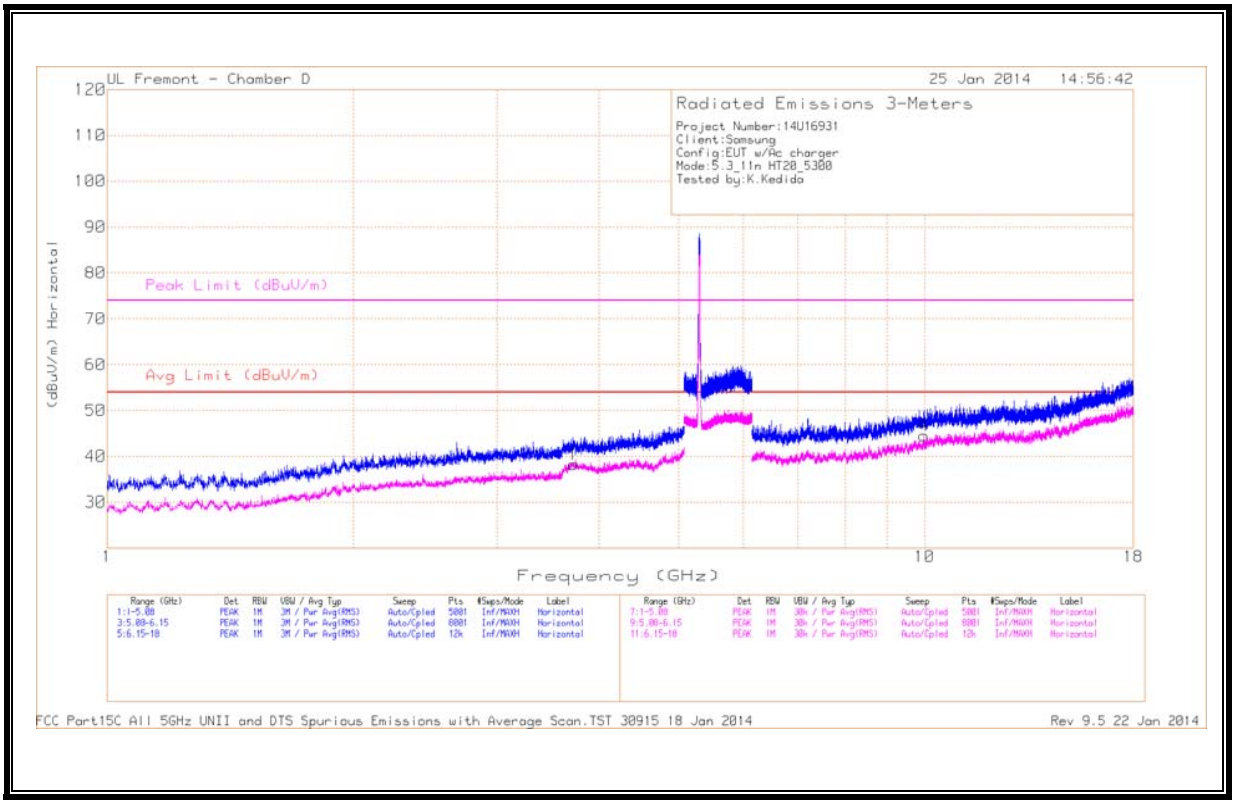
VERTICAL



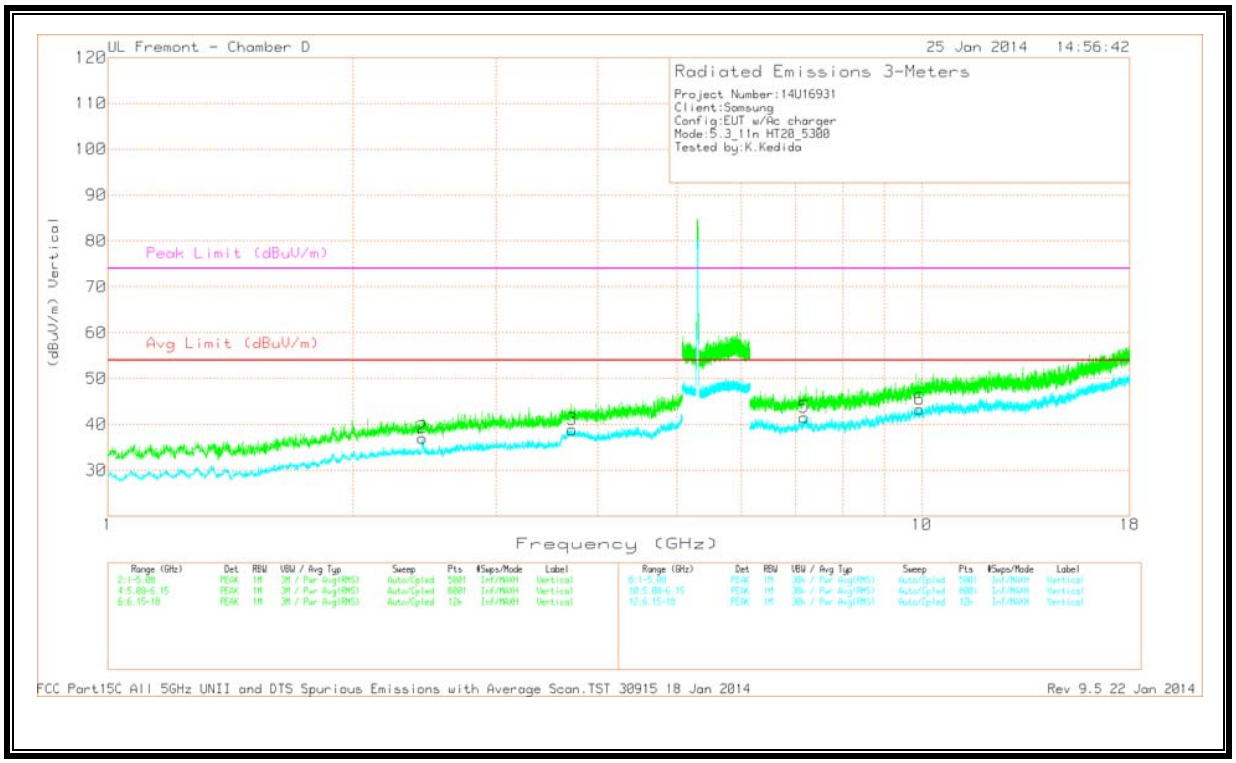
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.433	35.48	Avg	32.4	-30.1	37.78	54	-16.22	-	-	0-360	100	V
3	2.434	33.5	Avg	32.4	-30.1	35.8	54	-18.2	-	-	0-360	201	H
1	3.822	33.32	Avg	33.8	-28.7	38.42	54	-15.58	-	-	0-360	100	H
4	7.187	29.41	Avg	35.9	-24	41.31	54	-12.69	-	-	0-360	100	H
5	9.733	27.36	Avg	37.4	-21.3	43.46	54	-10.54	-	-	0-360	201	V
6	10.676	28.56	Avg	38.4	-21.5	45.46	54	-8.54	-	-	0-360	201	V

MID CHANNEL
HORIZONTAL



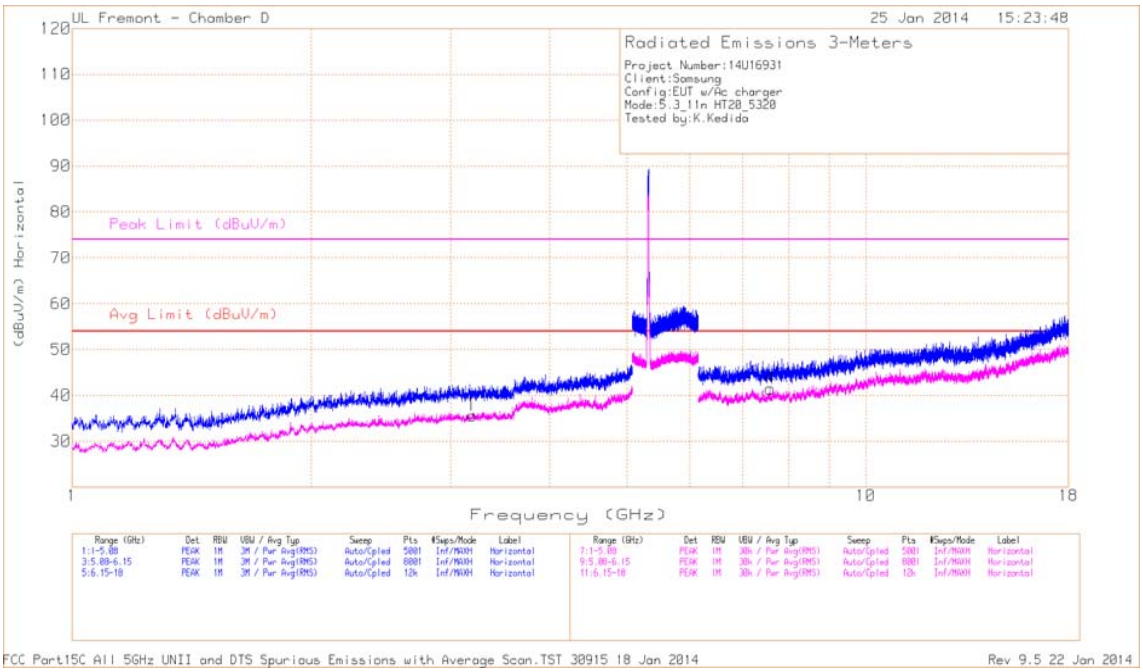
VERTICAL



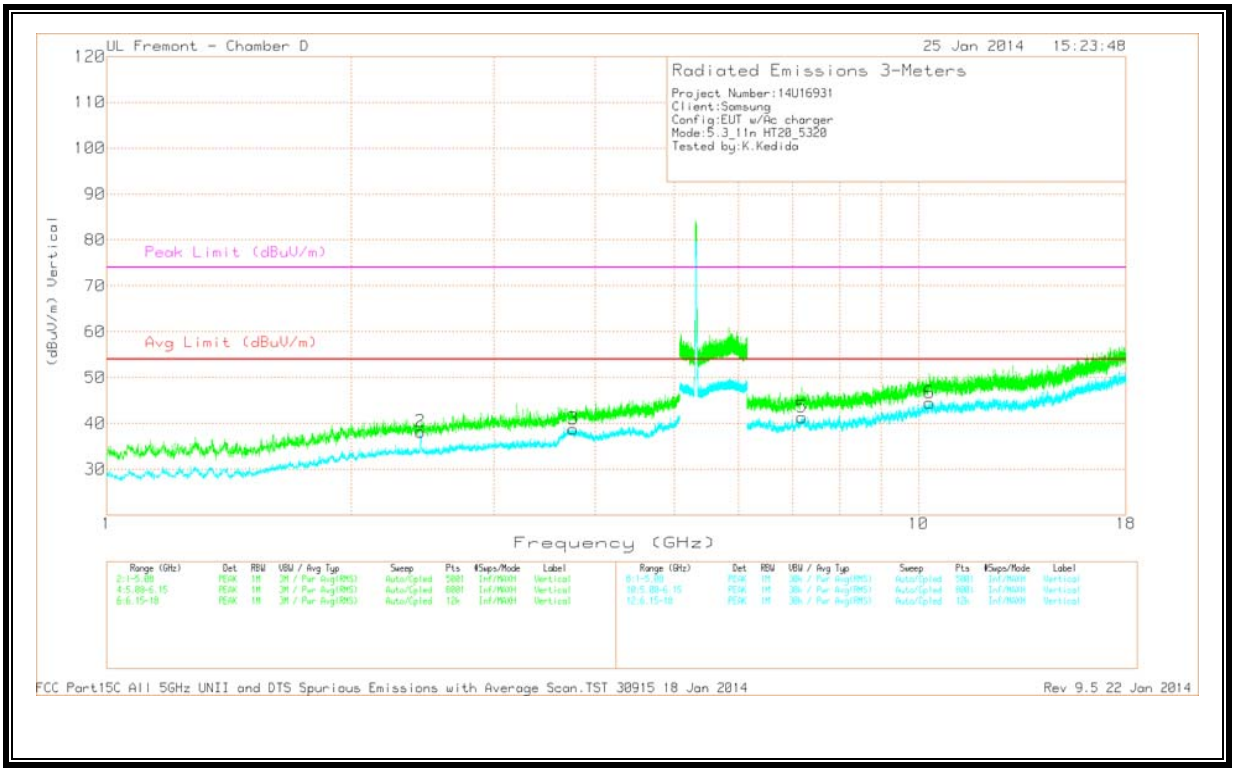
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.435	34.73	Avg	32.4	-30.1	37.03	54	-16.97	-	-	0-360	100	V
3	3.719	33.8	Avg	33.7	-28.6	38.9	54	-15.1	-	-	0-360	100	V
1	3.723	33.23	Avg	33.7	-28.7	38.23	54	-15.77	-	-	0-360	100	H
5	7.177	29.81	Avg	35.9	-24.2	41.51	54	-12.49	-	-	0-360	100	V
6	9.94	27.31	Avg	37.8	-21.8	43.31	54	-10.69	-	-	0-360	201	V
4	9.977	28.36	Avg	37.9	-21.7	44.56	54	-9.44	-	-	0-360	201	H

HIGH CHANNEL
HORIZONTAL



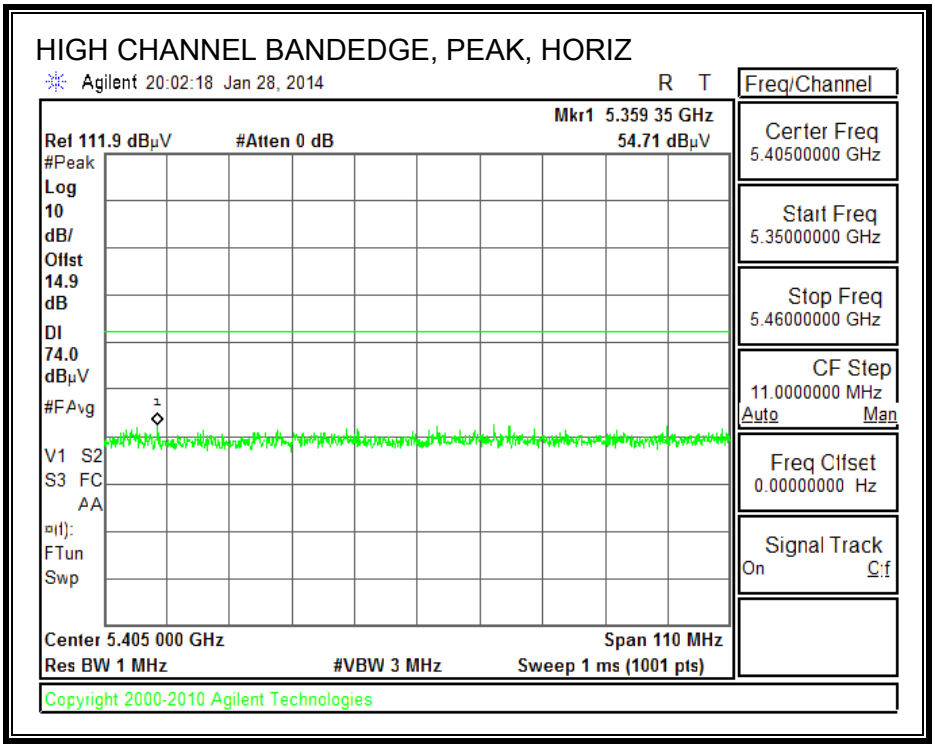
VERTICAL

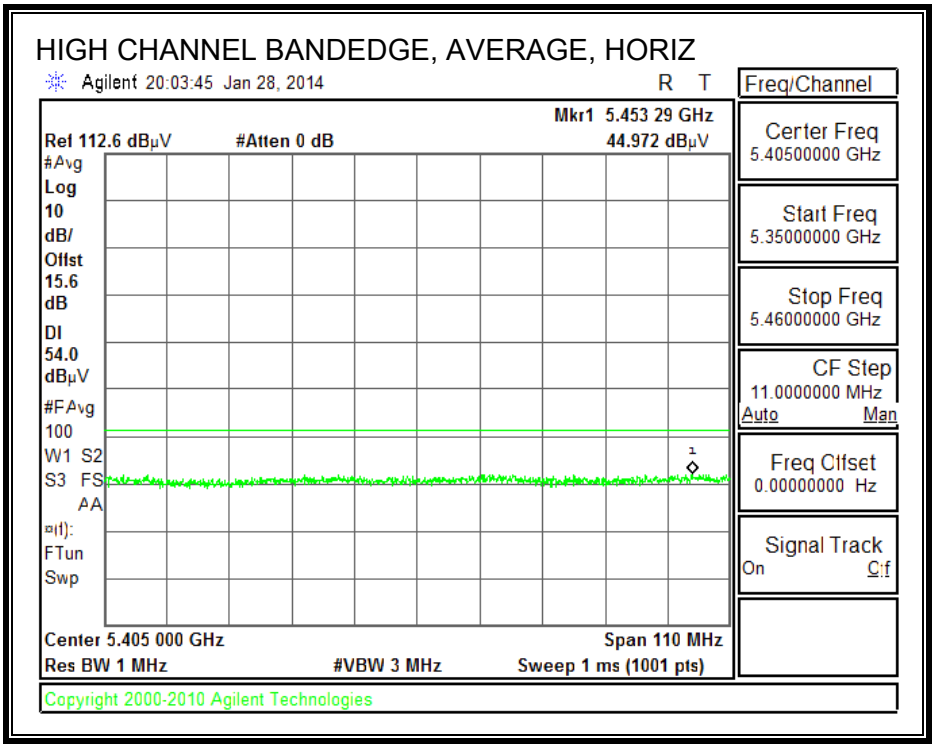


HIGH CHANNEL DATA

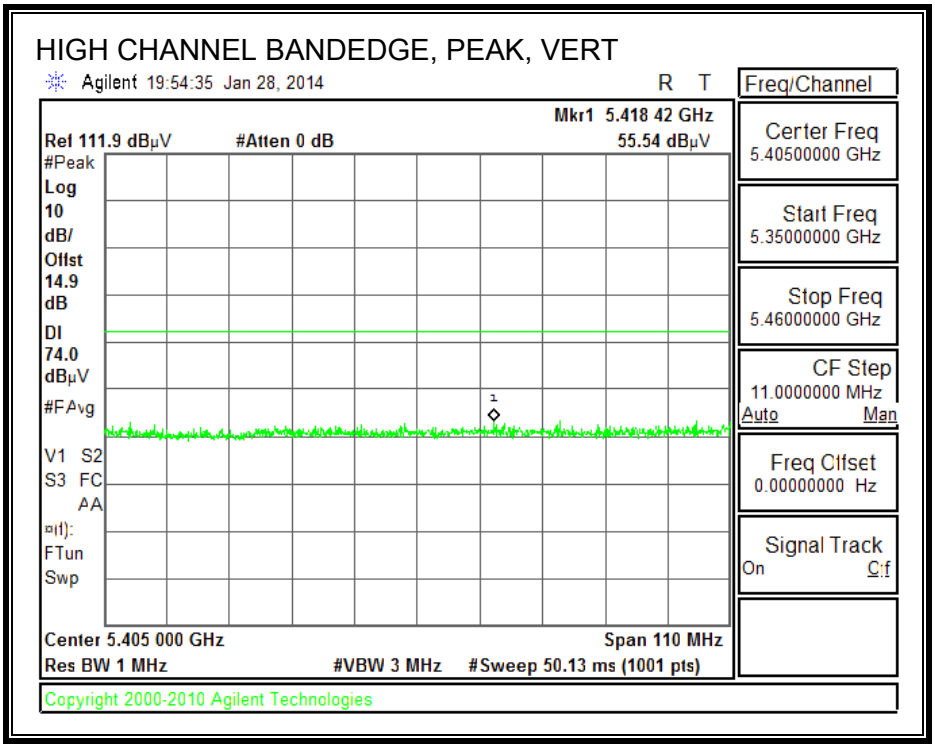
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.436	35.89	Avg	32.4	-30.1	38.19	54	-15.81	-	-	0-360	100	V
1	3.192	31.99	Avg	33.3	-29.7	35.59	54	-18.41	-	-	0-360	201	H
3	3.756	33.68	Avg	33.8	-28.7	38.78	54	-15.22	-	-	0-360	100	V
5	7.187	29.43	Avg	35.9	-24	41.33	54	-12.67	-	-	0-360	100	V
4	7.577	30.79	Avg	36	-25.3	41.49	54	-12.51	-	-	0-360	201	H
6	10.314	27.57	Avg	38.2	-21.3	44.47	54	-9.53	-	-	0-360	100	V

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

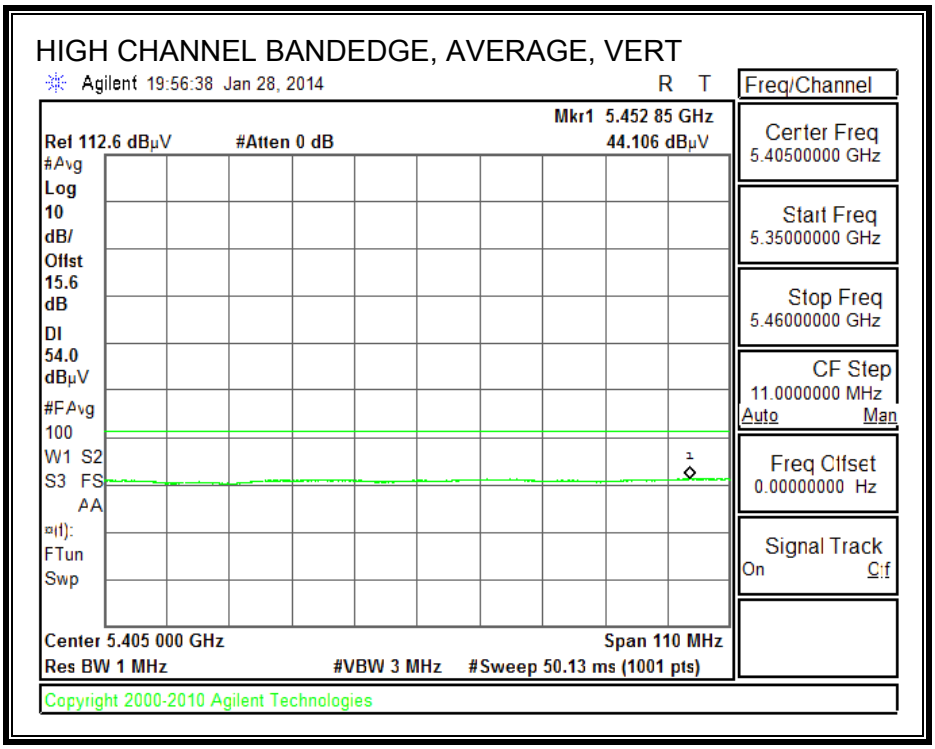




HIGH CHANNEL BANDEDGE, PEAK, VERT

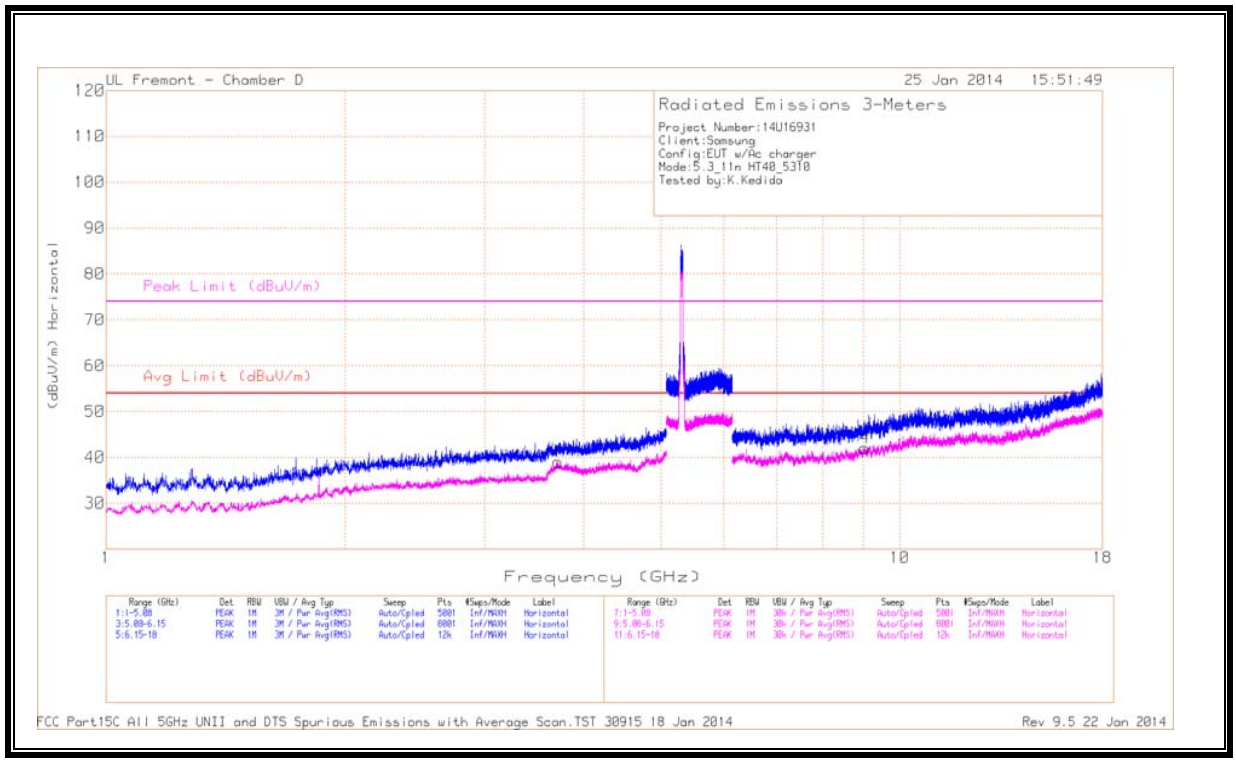


HIGH CHANNEL BANDEDGE, AVERAGE, VERT

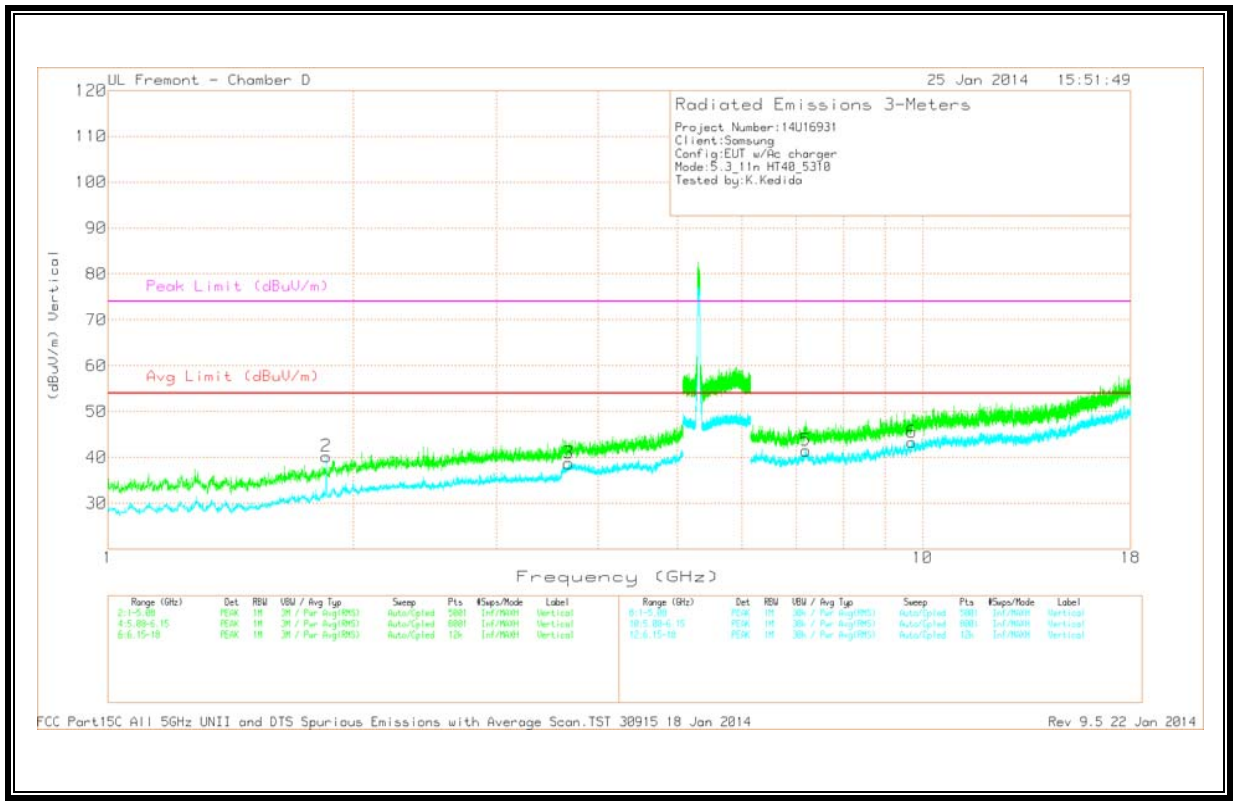


11.2.6. HARMONICS AND SPURIOUS EMISSIONS

HORIZONTAL



VERTICAL



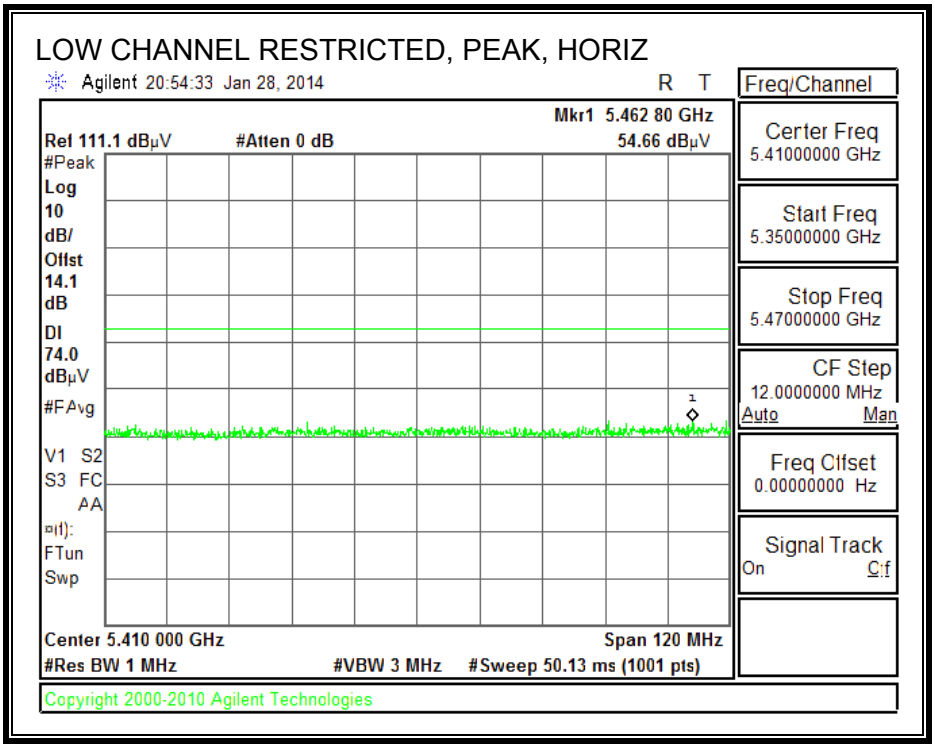
LOW CHANNEL DATA

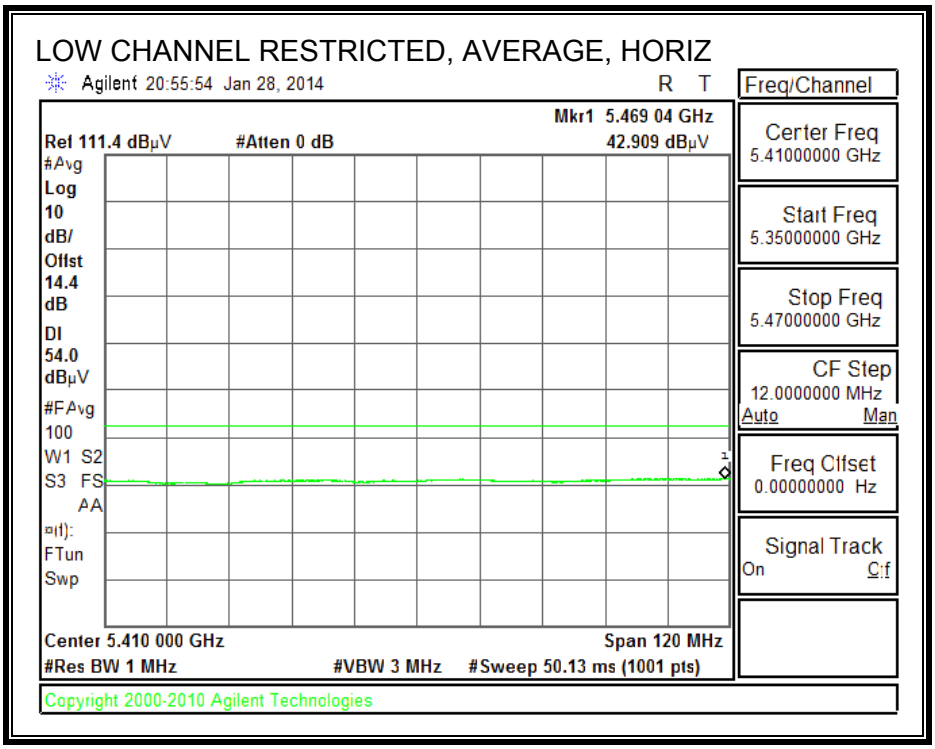
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	1.855	40.28	Avg	30.7	-30.8	40.18	54	-13.82	-	-	0-360	201	V
3	3.679	33.51	Avg	33.7	-28.5	38.71	54	-15.29	-	-	0-360	100	V
1	3.71	33.73	Avg	33.7	-28.4	39.03	54	-14.97	-	-	0-360	100	H
5	7.19	29.5	Avg	35.9	-23.9	41.5	54	-12.5	-	-	0-360	201	V
4	9.037	28.24	Avg	36.7	-22.9	42.04	54	-11.96	-	-	0-360	201	H
6	9.704	27.81	Avg	37.4	-21.9	43.31	54	-10.69	-	-	0-360	201	V

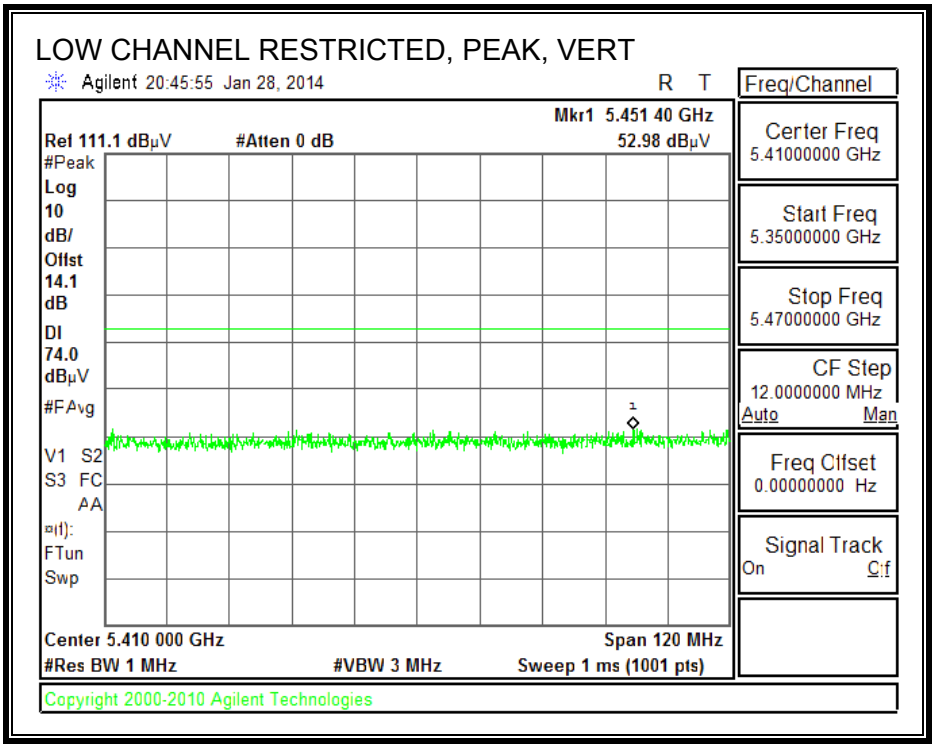
11.3. 5.5-5.6 GHz

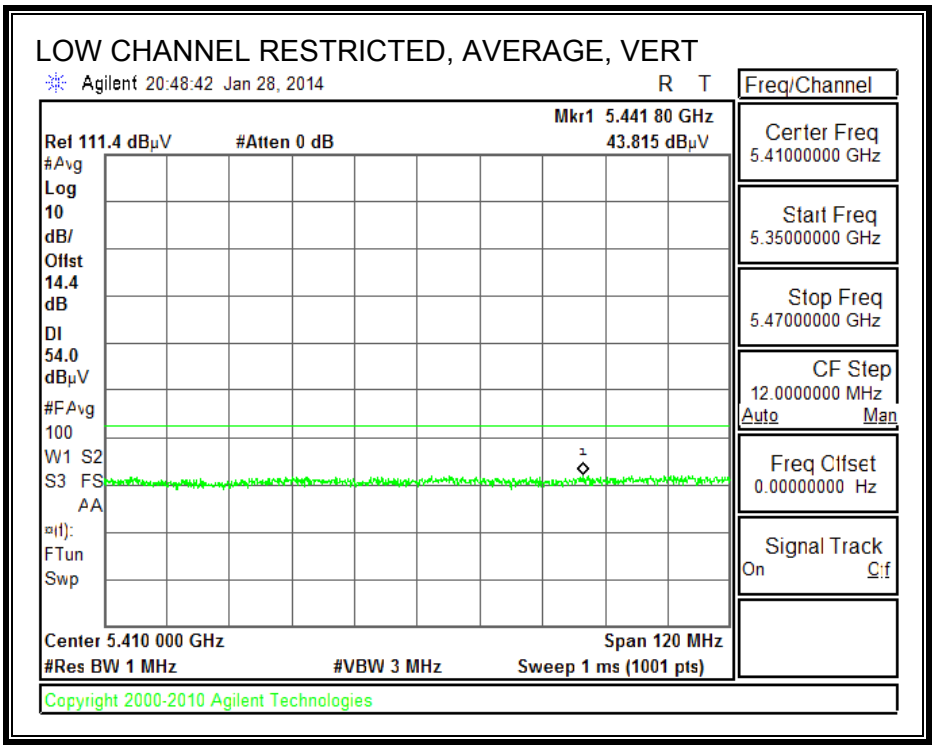
11.3.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.5 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

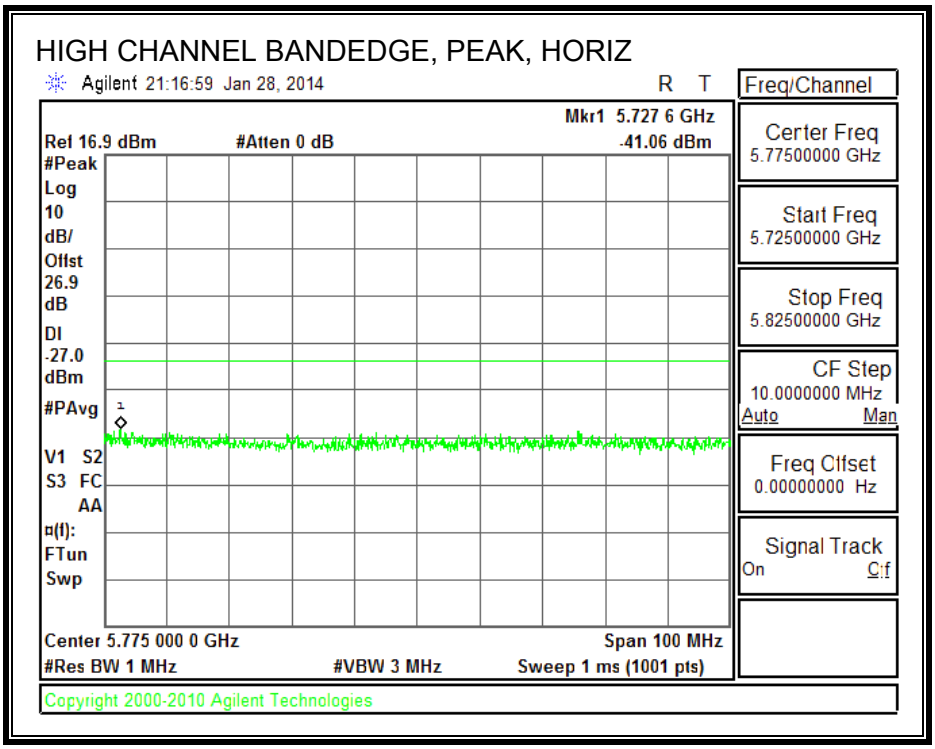


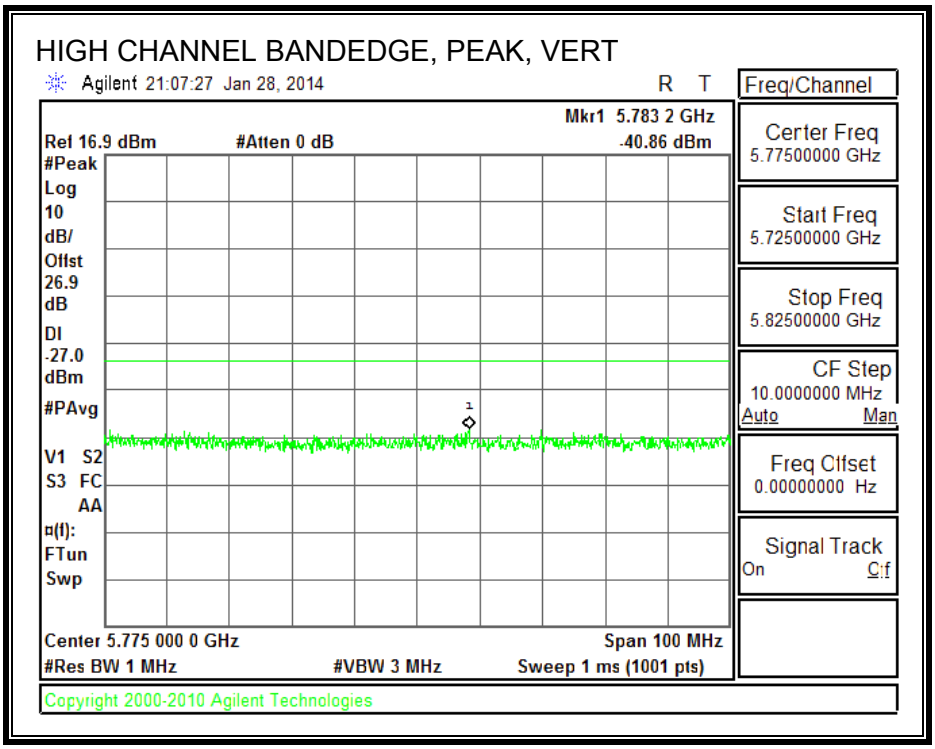






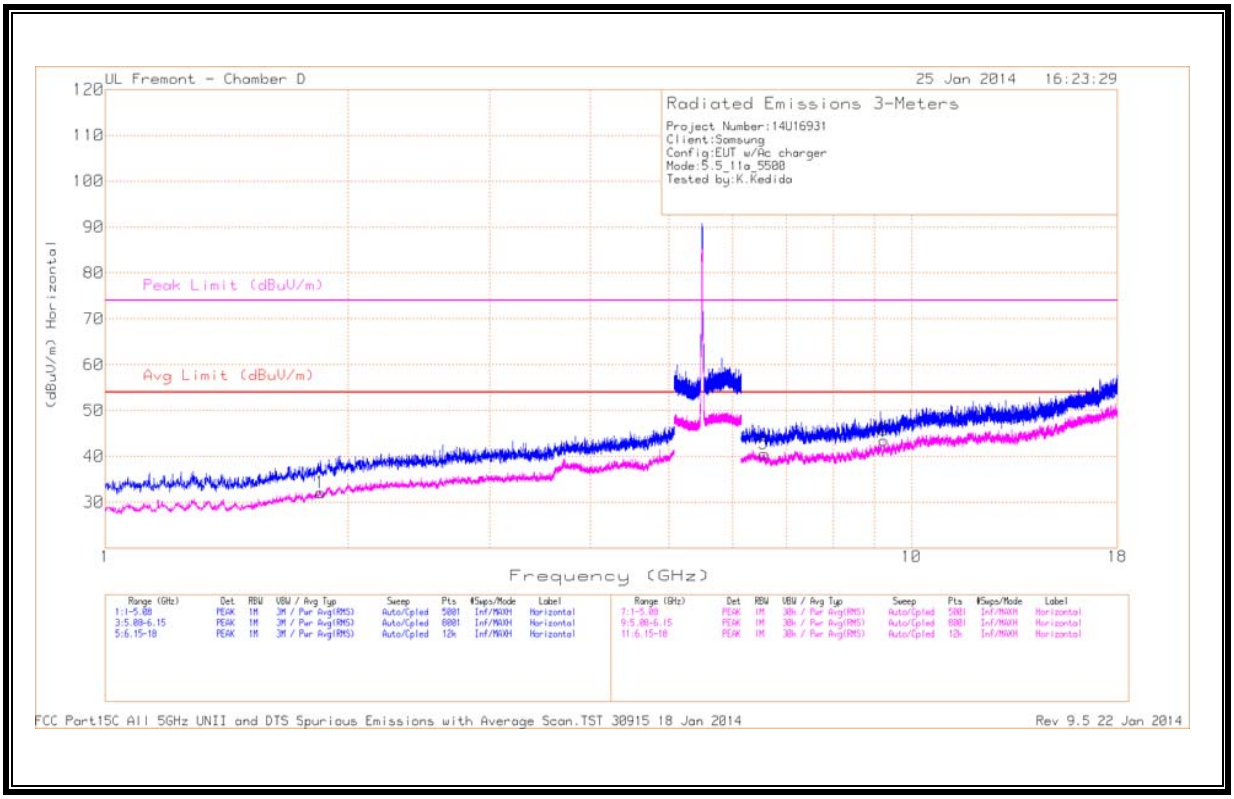
AUTHORIZED BANDEDGE (HIGH CHANNEL)



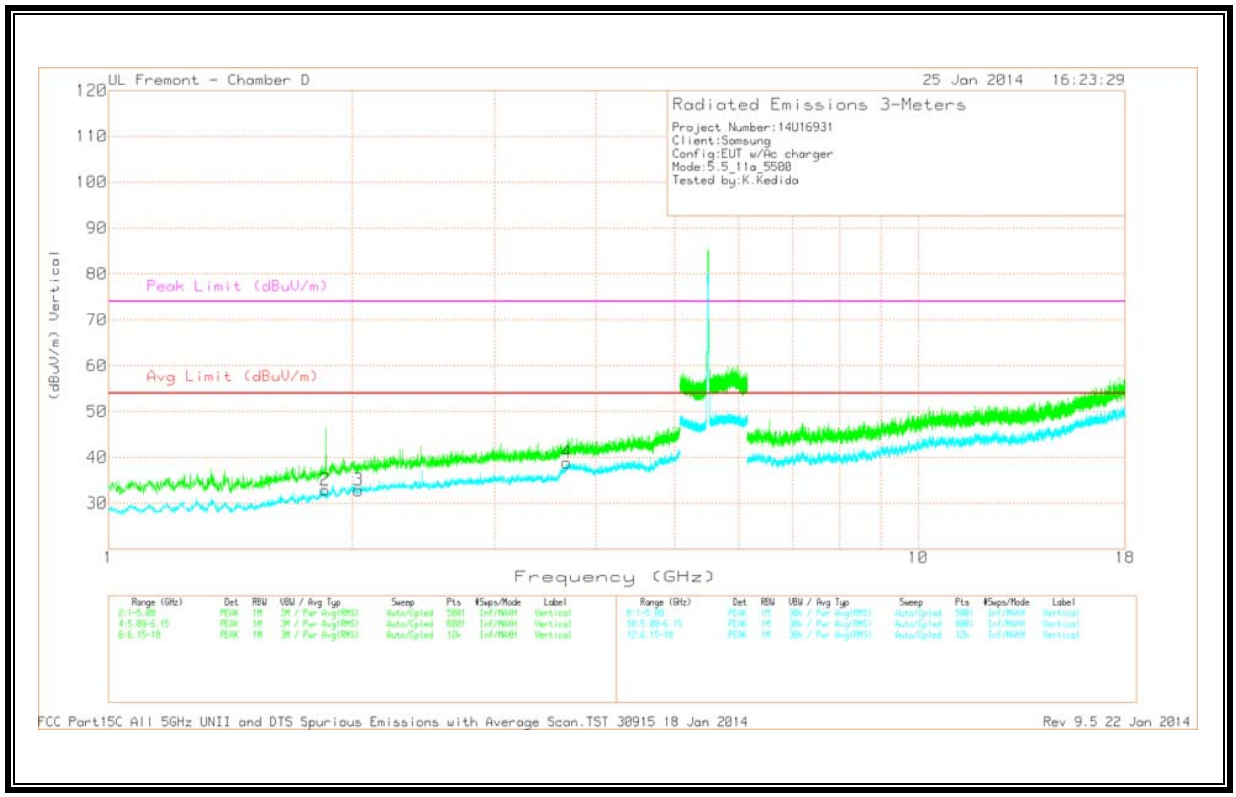


11.3.2.HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



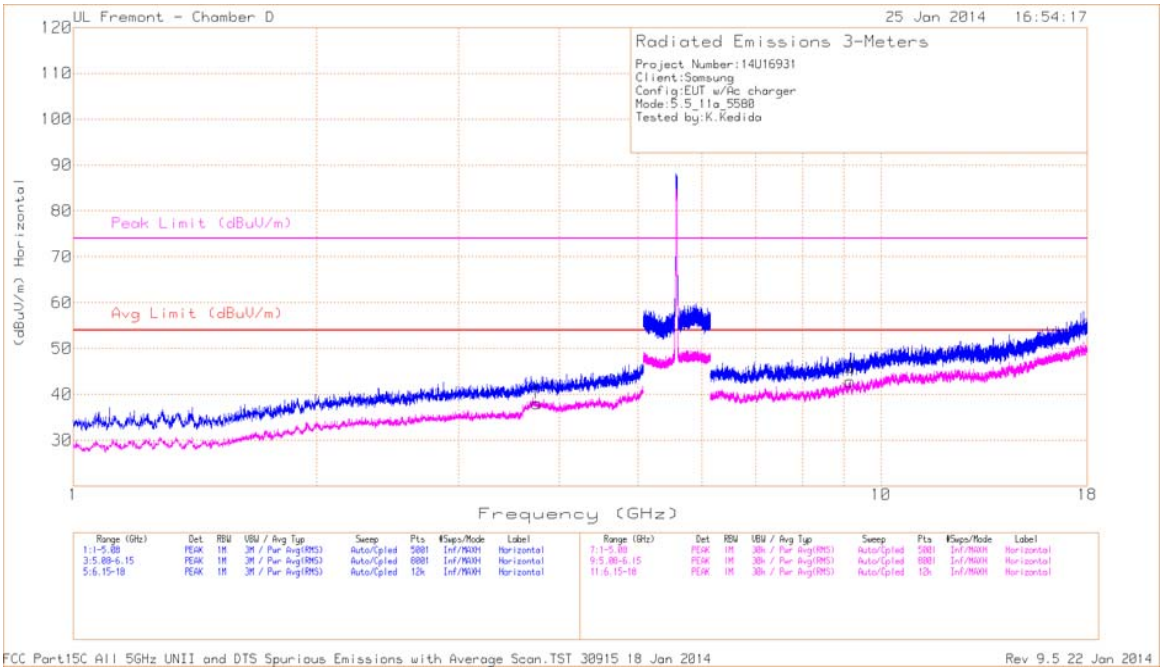
VERTICAL



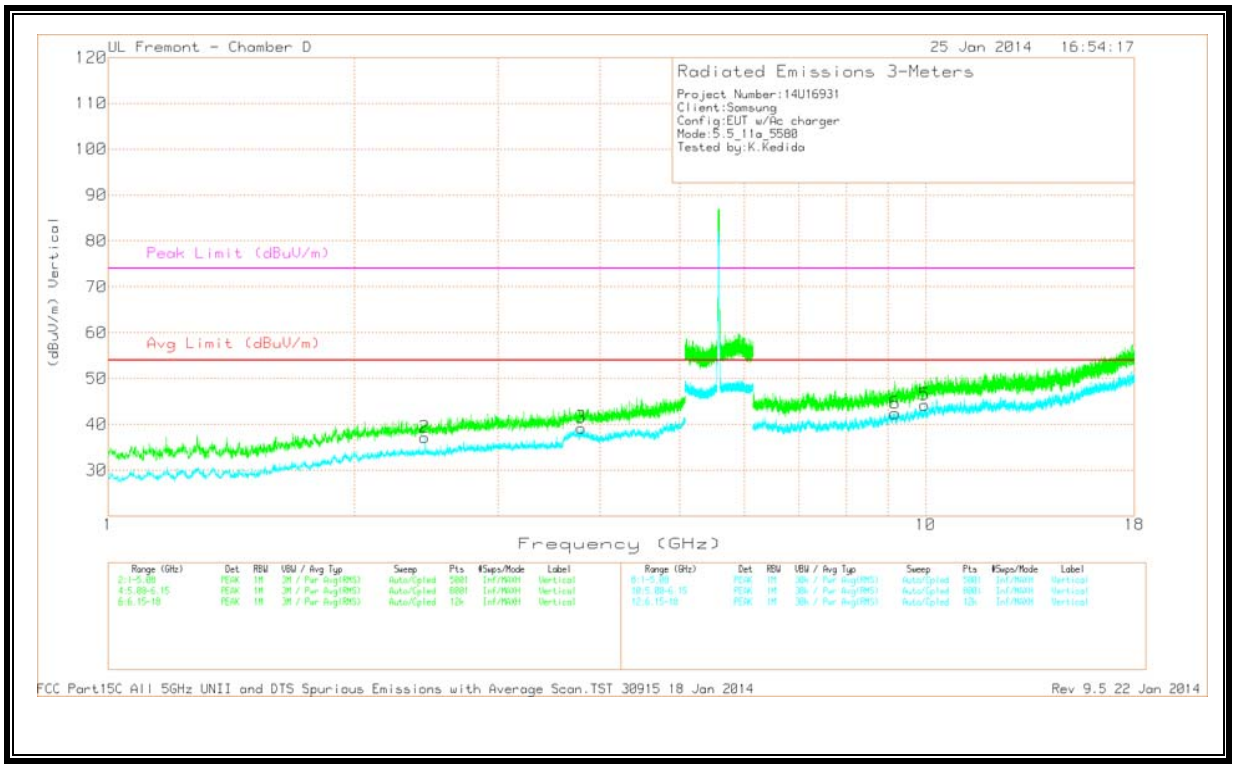
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.85	32.26	Avg	30.7	-30.9	32.06	54	-21.94	-	-	0-360	201	H
2	1.853	32.98	Avg	30.7	-30.8	32.88	54	-21.12	-	-	0-360	201	V
3	2.036	31.74	Avg	31.8	-30.7	32.84	54	-21.16	-	-	0-360	100	V
4	3.682	33.66	Avg	33.7	-28.5	38.86	54	-15.14	-	-	0-360	100	V
5	6.567	30.06	Avg	35.8	-25.3	40.56	54	-13.44	-	-	0-360	100	H
6	9.248	29.09	Avg	36.9	-22.5	43.49	54	-10.51	-	-	0-360	201	H

MID CHANNEL
HORIZONTAL



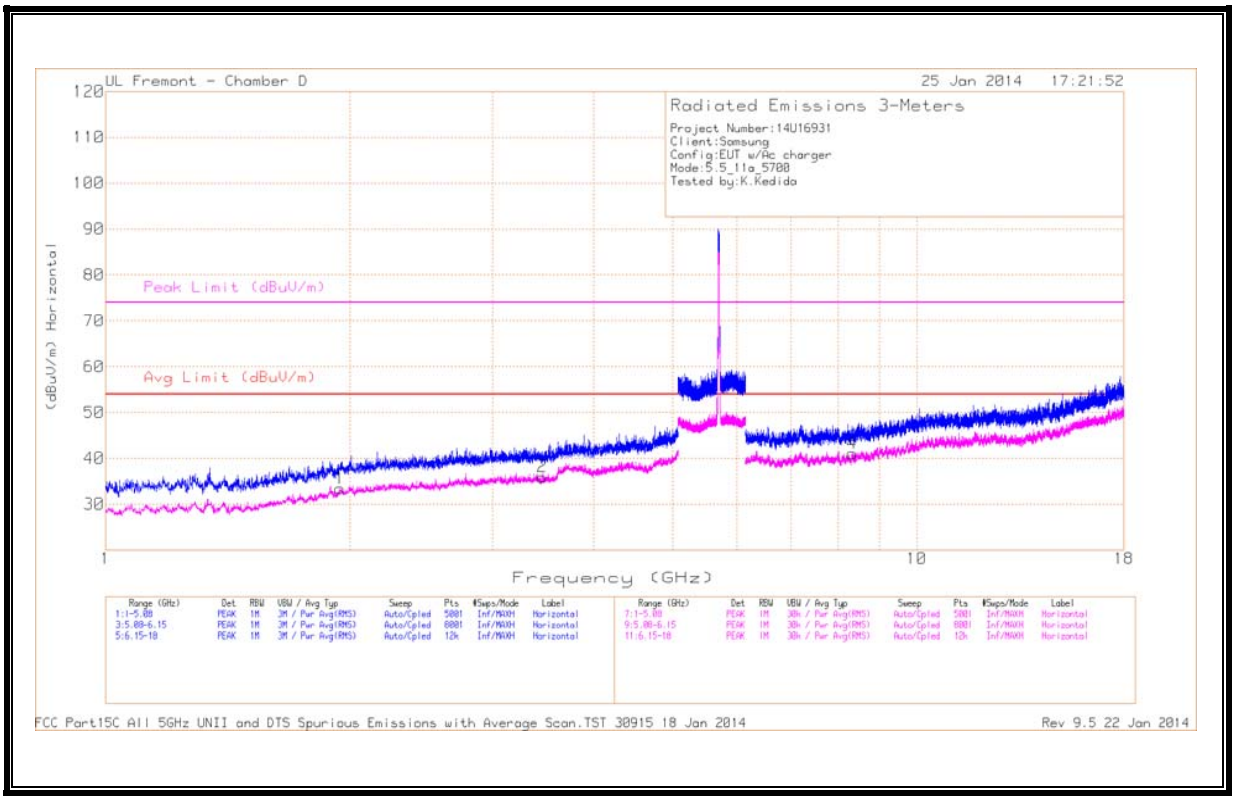
VERTICAL



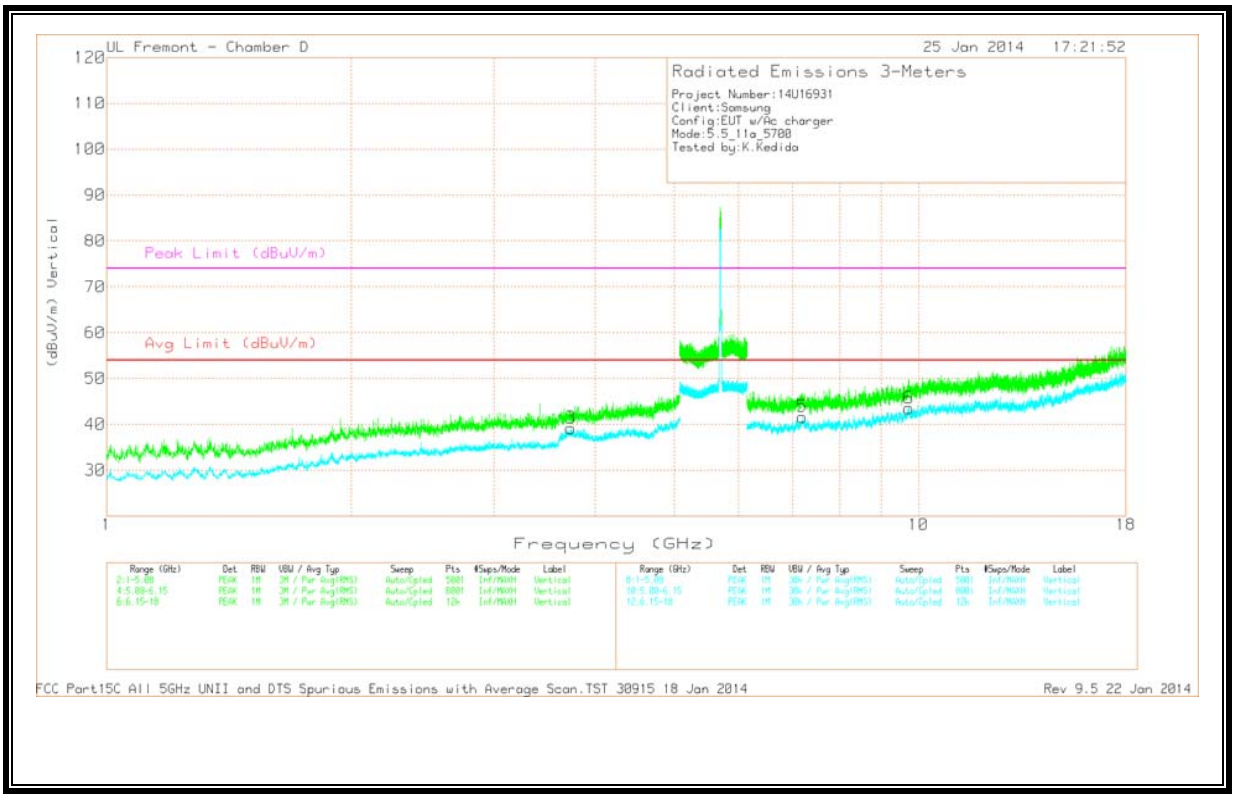
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.439	34.74	Avg	32.4	-30	37.14	54	-16.86	-	-	0-360	100	V
1	3.747	32.91	Avg	33.8	-28.7	38.01	54	-15.99	-	-	0-360	201	H
3	3.792	34.34	Avg	33.8	-28.9	39.24	54	-14.76	-	-	0-360	100	V
4	9.163	28.44	Avg	36.8	-22.4	42.84	54	-11.16	-	-	0-360	201	H
6	9.178	27.82	Avg	36.8	-22.2	42.42	54	-11.58	-	-	0-360	201	V
5	9.976	28.04	Avg	37.9	-21.7	44.24	54	-9.76	-	-	0-360	100	V

HIGH CHANNEL
HORIZONTAL



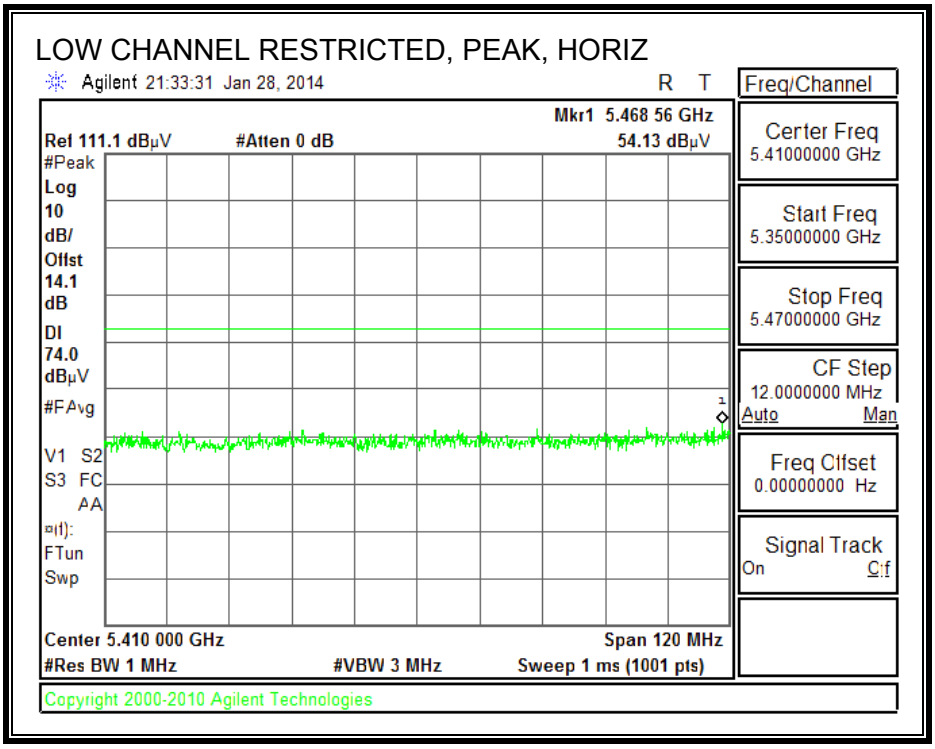
VERTICAL

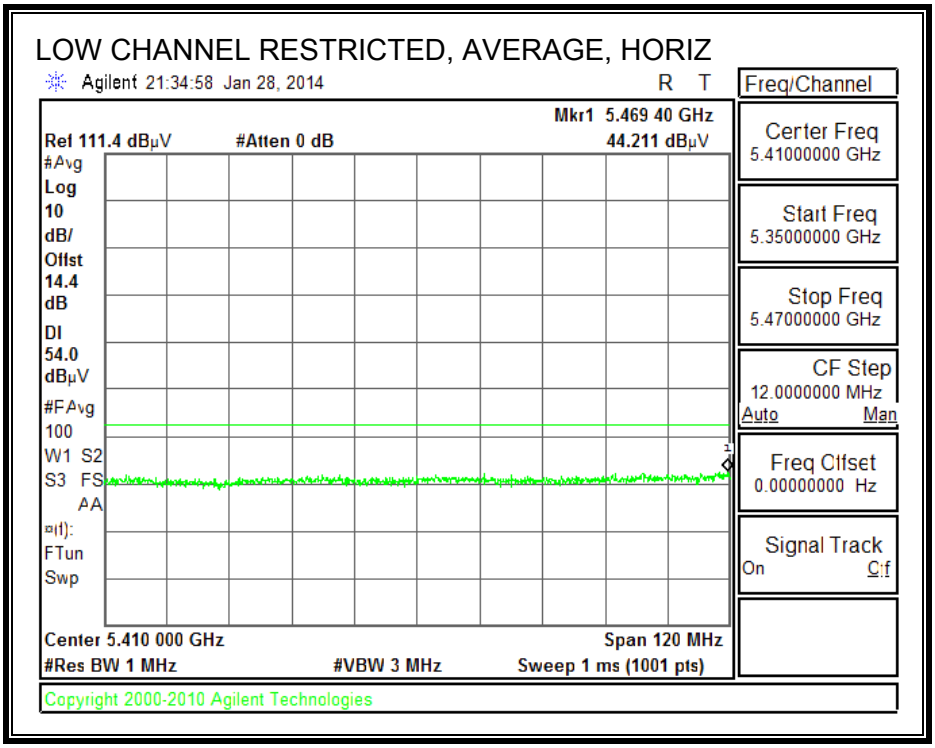


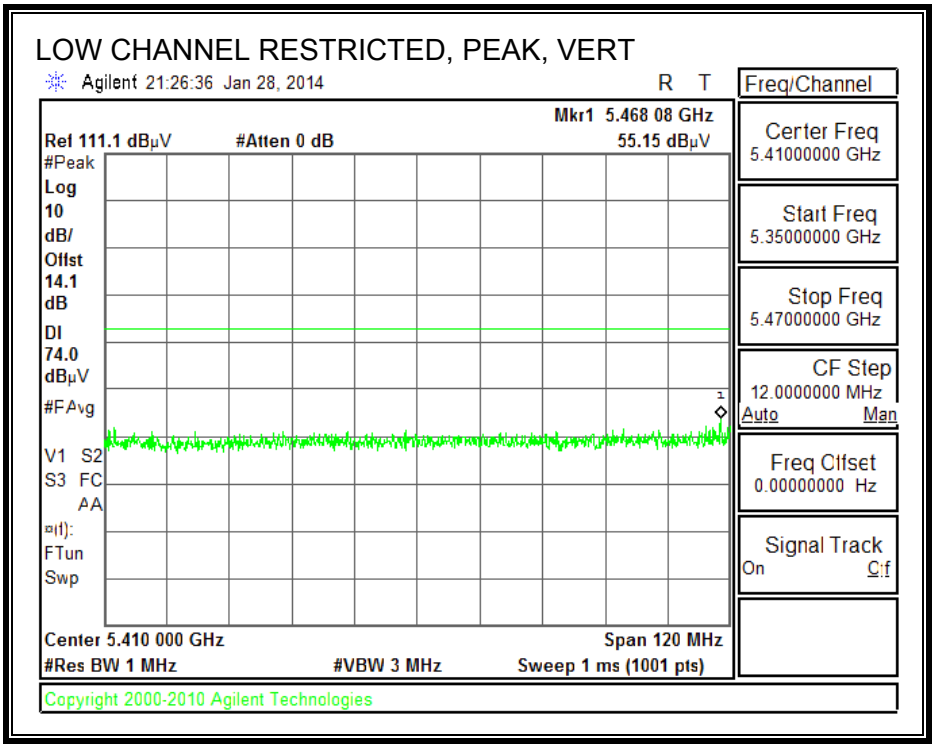
HIGH CHANNEL DATA

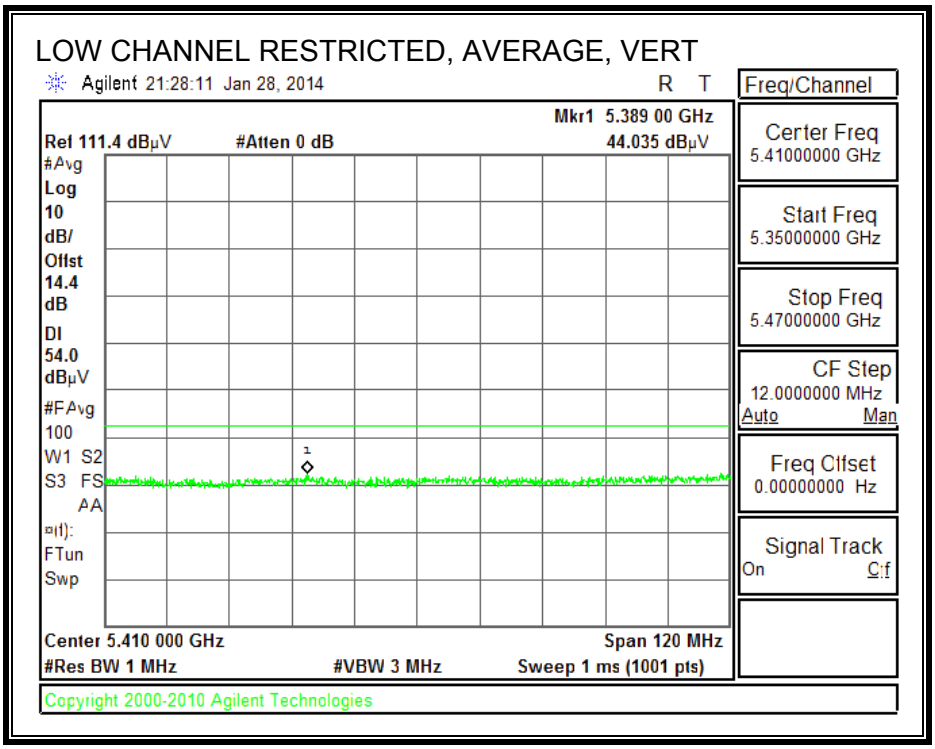
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.947	32.62	Avg	31.3	-30.5	33.42	54	-20.58	-	-	0-360	100	H
2	3.454	31.73	Avg	33.3	-29.1	35.93	54	-18.07	-	-	0-360	201	H
3	3.73	34.04	Avg	33.8	-28.7	39.14	54	-14.86	-	-	0-360	100	V
5	7.194	29.53	Avg	35.9	-23.8	41.63	54	-12.37	-	-	0-360	201	V
4	8.327	29.05	Avg	36.1	-24.1	41.05	54	-12.95	-	-	0-360	201	H
6	9.727	27.4	Avg	37.4	-21.3	43.5	54	-10.5	-	-	0-360	201	V

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

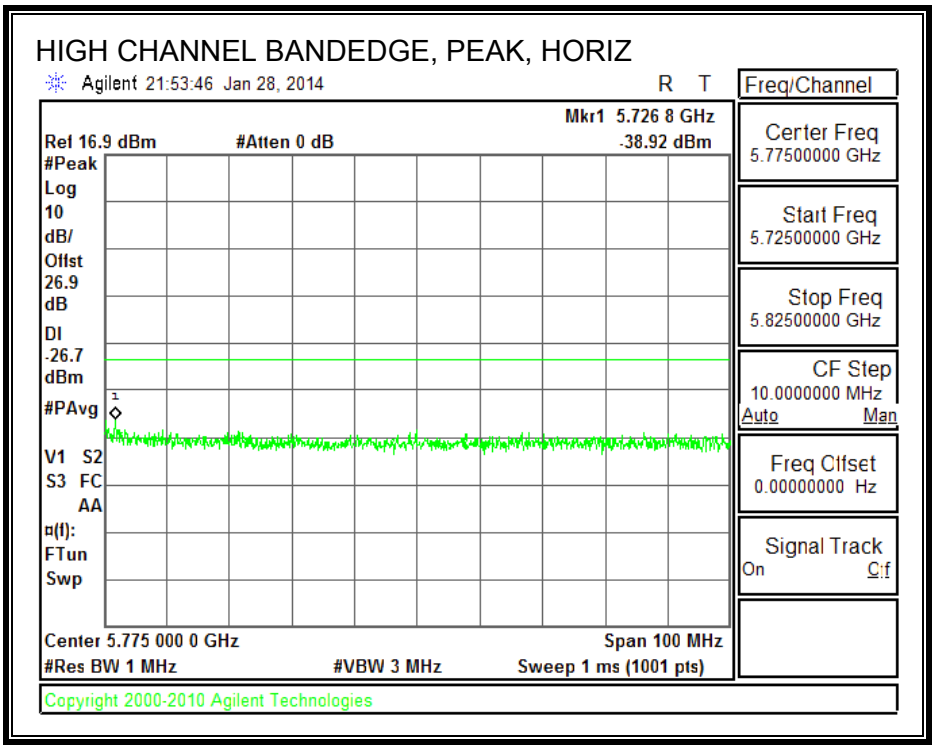


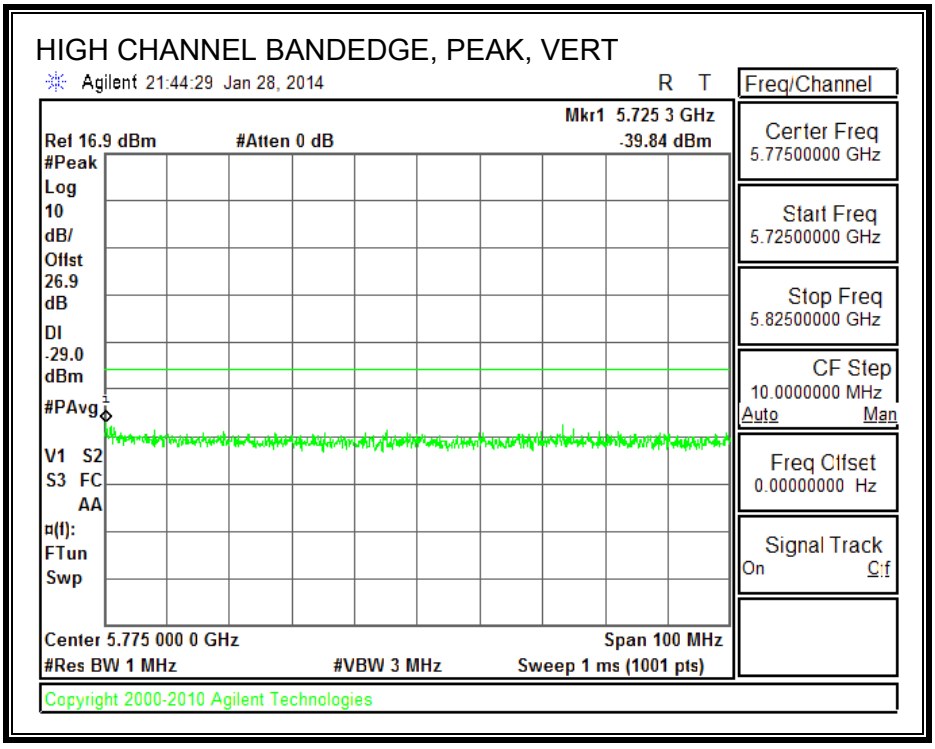






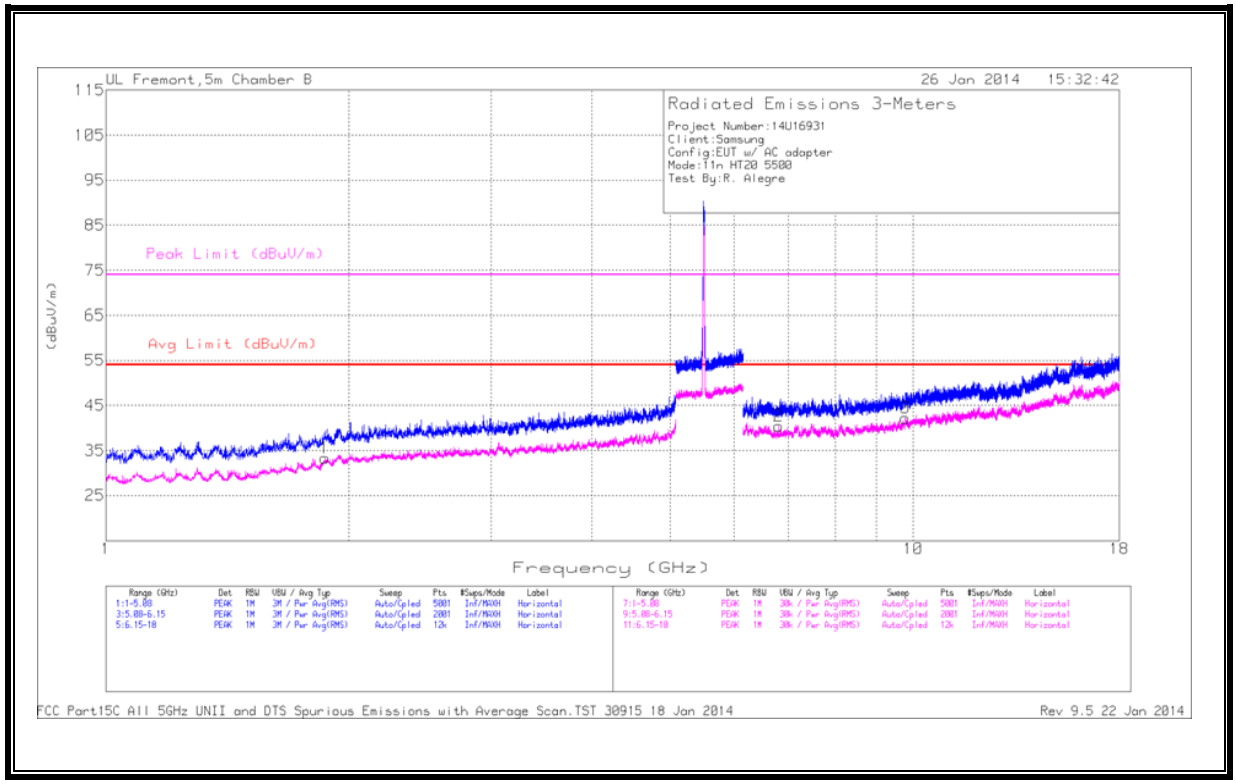
AUTHORIZED BANDEDGE (HIGH CHANNEL)



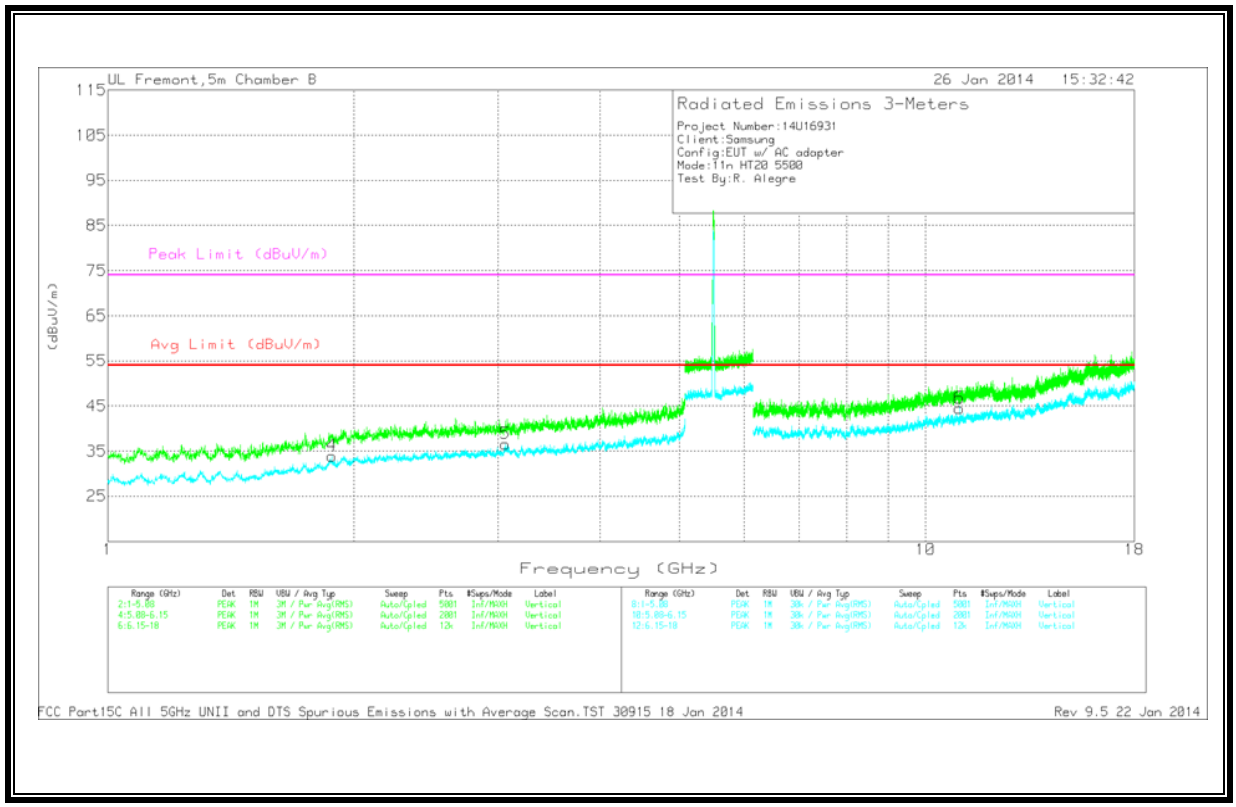


11.3.4. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



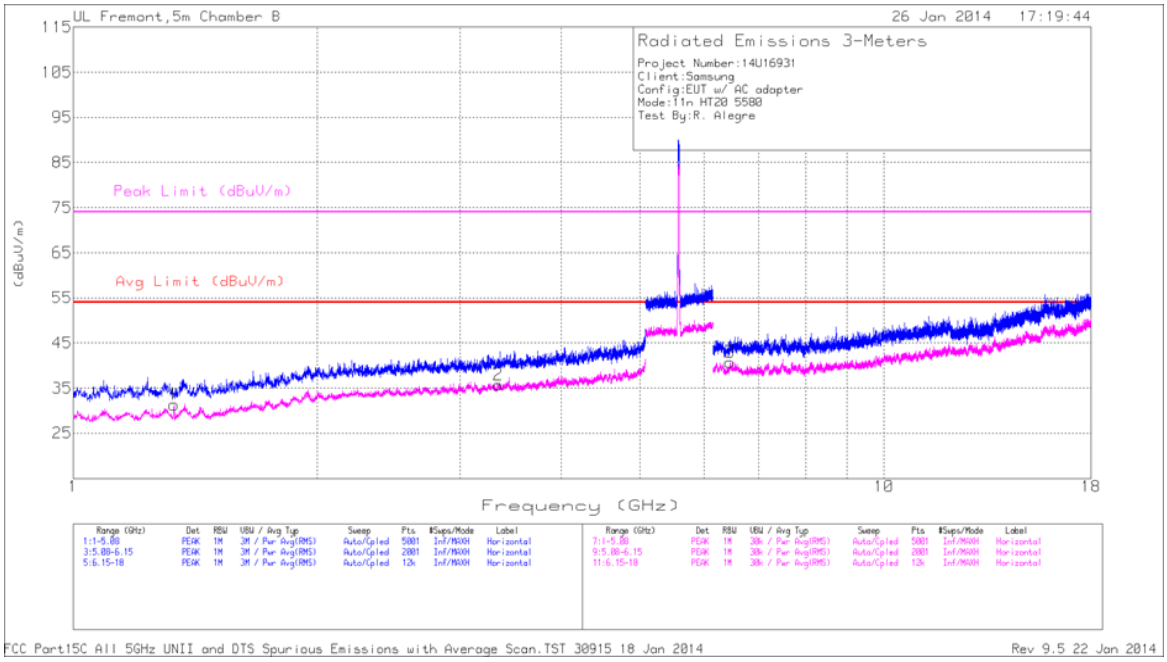
VERTICAL



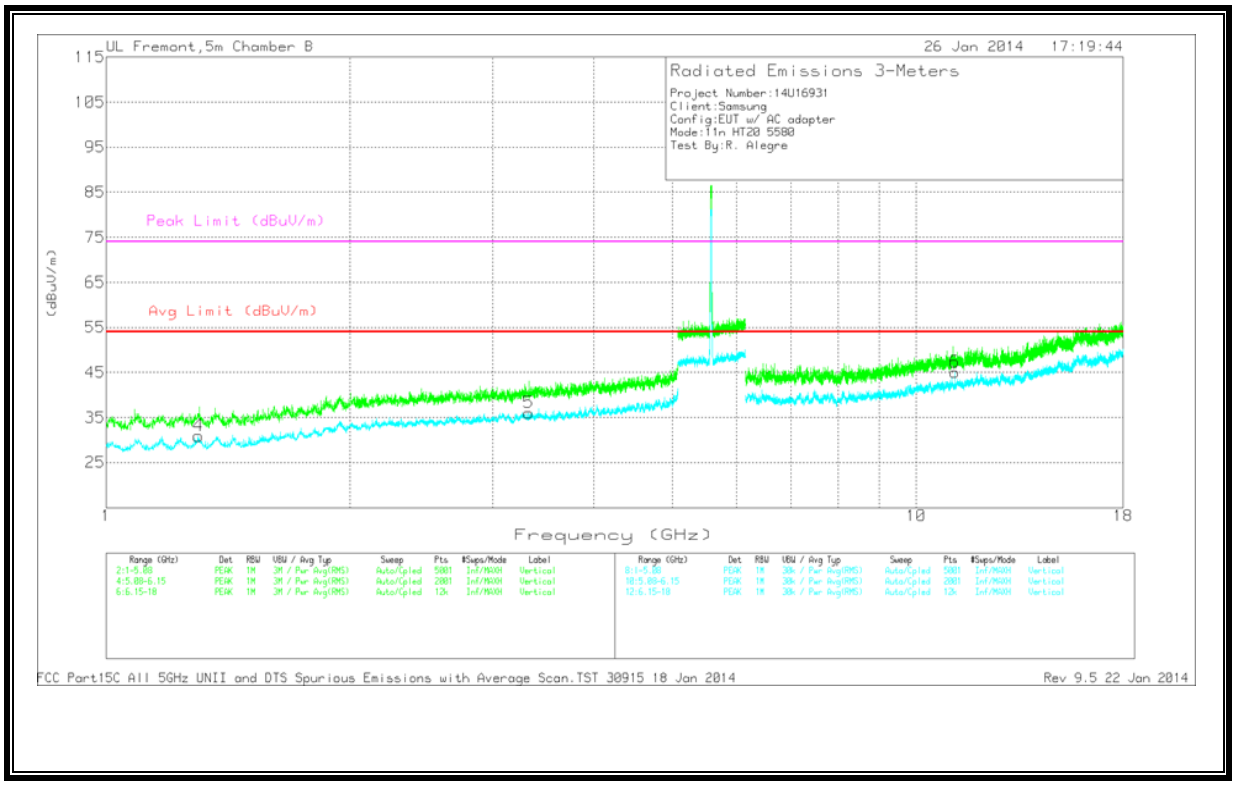
LOW CHANNEL DATA

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
1	1.867	35.53	Avg	30.9	-33.1	33.33	54	-20.67	-	-	0-360	202	H
4	1.879	35.93	Avg	31	-33	33.93	54	-20.07	-	-	0-360	99	V
5	3.062	35.68	Avg	33.1	-32.2	36.58	54	-17.42	-	-	0-360	99	V
2	6.815	33.25	Avg	35.8	-28.6	40.45	54	-13.55	-	-	0-360	99	H
3	9.776	28.1	Avg	37.5	-23.4	42.2	54	-11.8	-	-	0-360	201	H
6	10.999	29.52	Avg	38.3	-23.3	44.52	54	-9.48	-	-	0-360	202	V

MID CHANNEL
HORIZONTAL



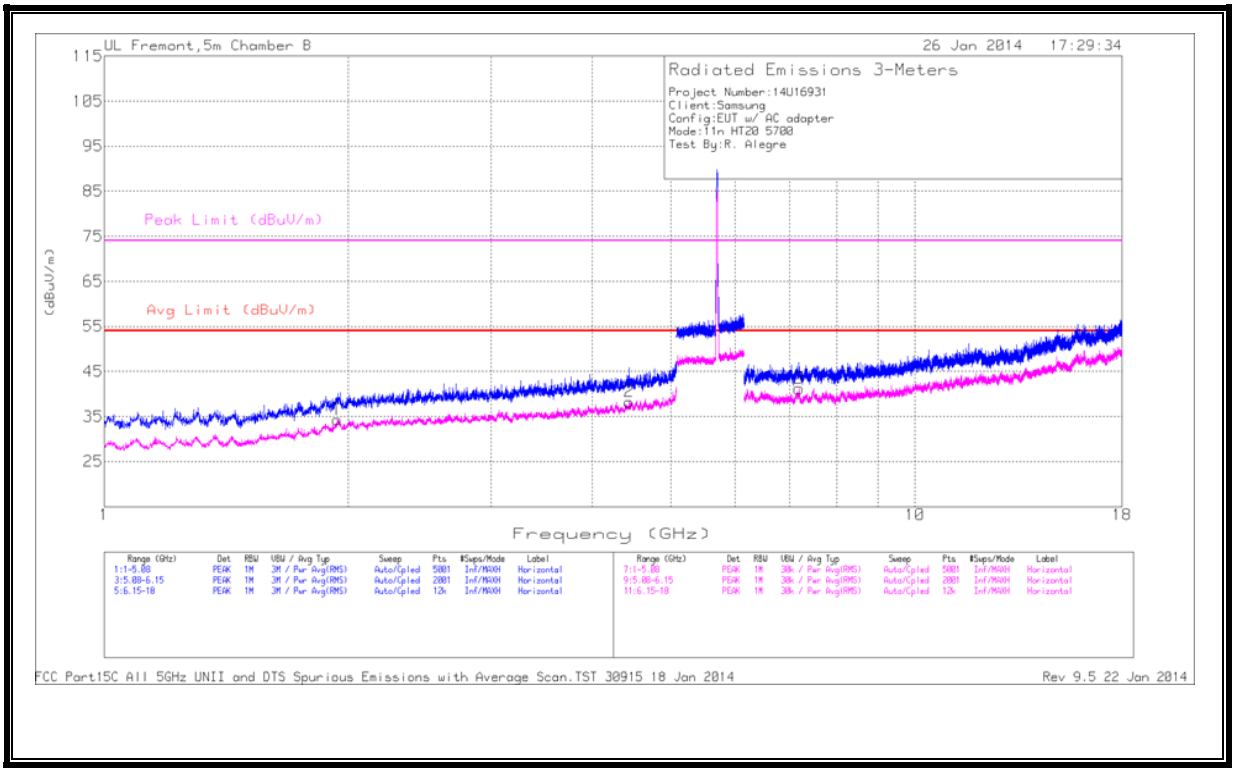
VERTICAL



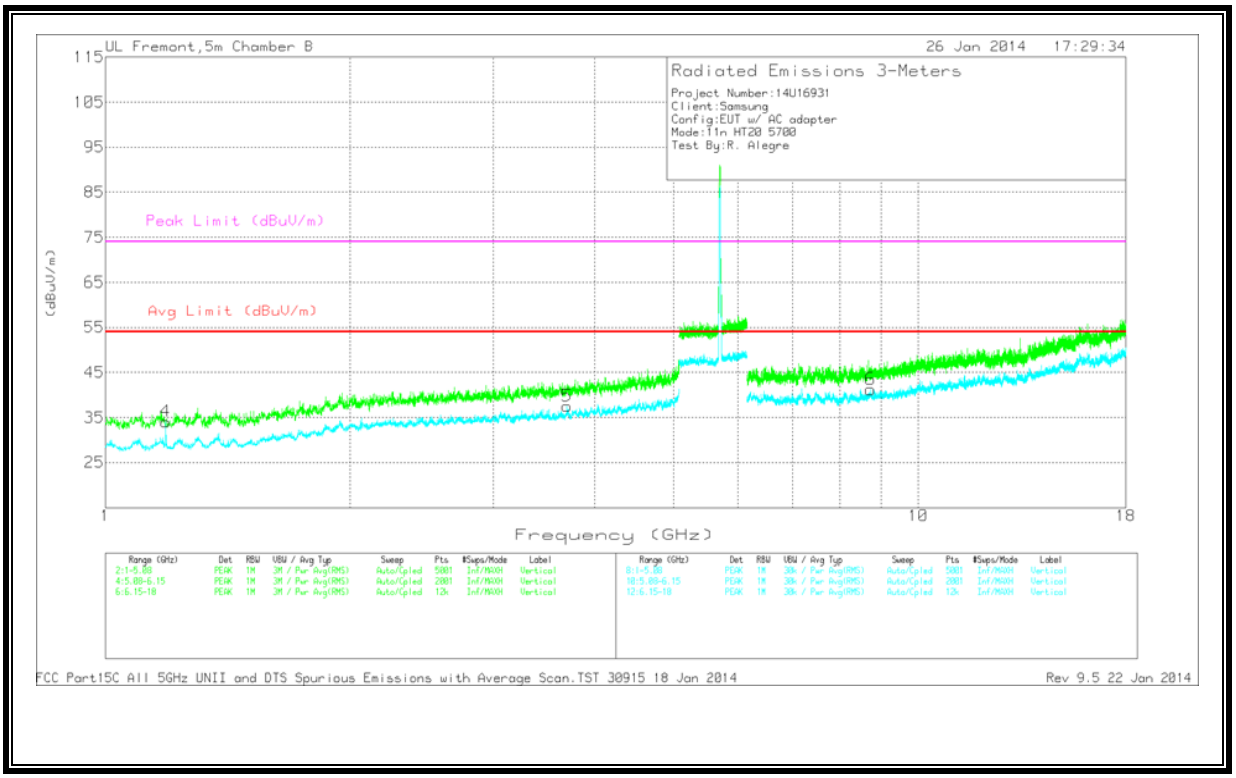
MID CHANNEL DATA

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	1.299	36.63	Avg	28.5	-34.2	30.93	54	-23.07	-	-	0-360	99	V
1	1.331	36.93	Avg	28.5	-34.1	31.33	54	-22.67	-	-	0-360	99	H
5	3.324	34.75	Avg	33.3	-32	36.05	54	-17.95	-	-	0-360	202	V
2	3.344	34.01	Avg	33.3	-31.6	35.71	54	-18.29	-	-	0-360	99	H
3	6.455	33.62	Avg	35.9	-28.8	40.72	54	-13.28	-	-	0-360	201	H
6	11.159	29.98	Avg	38.4	-23.3	45.08	54	-8.92	-	-	0-360	202	V

HIGH CHANNEL
HORIZONTAL



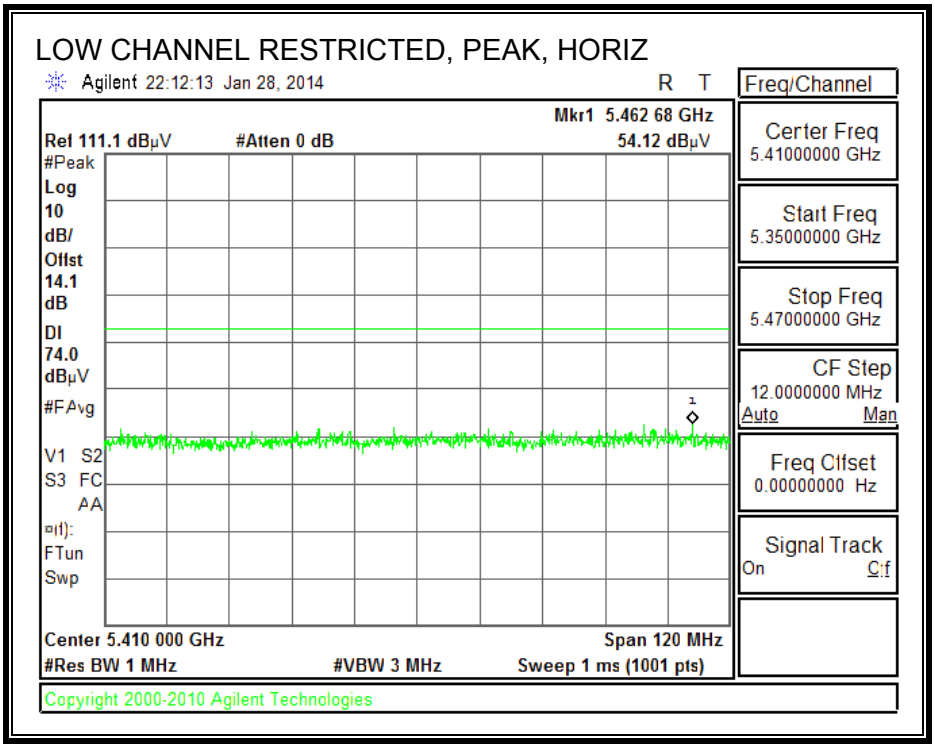
VERTICAL

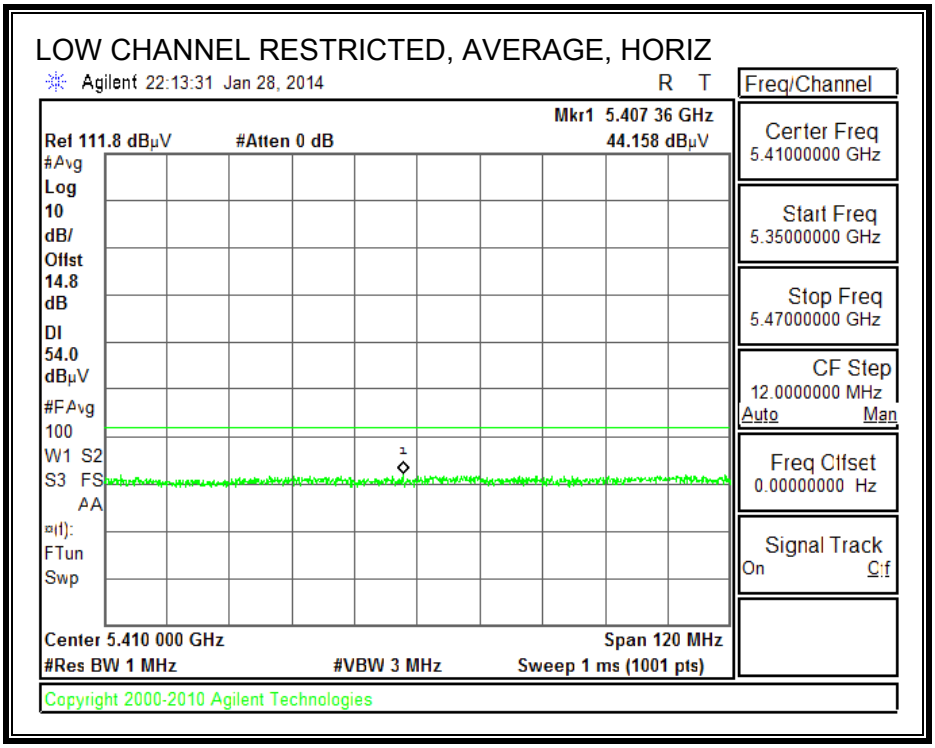


HIGH CHANNEL DATA

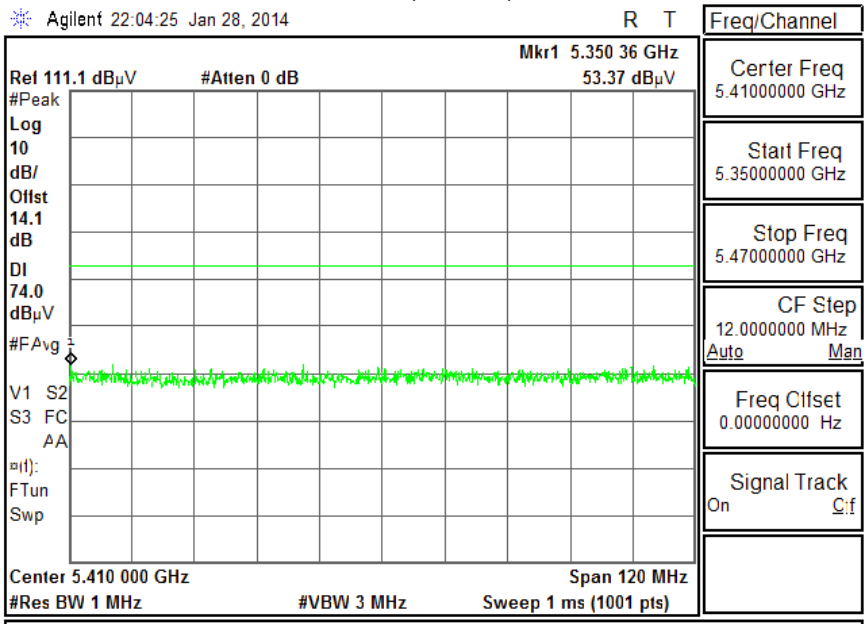
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.186	40.5	Avg	28.3	-34.7	34.1	54	-19.9	-	-	0-360	203	V
1	1.939	35.43	Avg	31.4	-32.5	34.33	54	-19.67	-	-	0-360	202	H
5	3.696	35	Avg	33.7	-31.2	37.5	54	-16.5	-	-	0-360	99	V
2	4.44	33.27	Avg	34.4	-29.4	38.27	54	-15.73	-	-	0-360	202	H
3	7.192	31.93	Avg	35.8	-26.5	41.23	54	-12.77	-	-	0-360	99	H
6	8.735	30.53	Avg	36.4	-25.7	41.23	54	-12.77	-	-	0-360	99	V

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

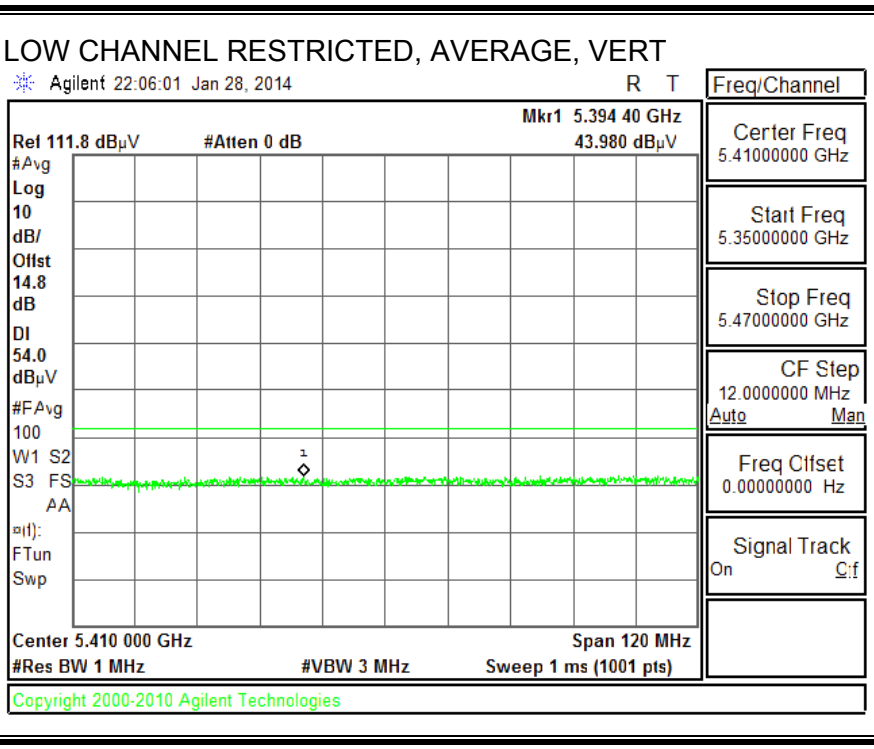




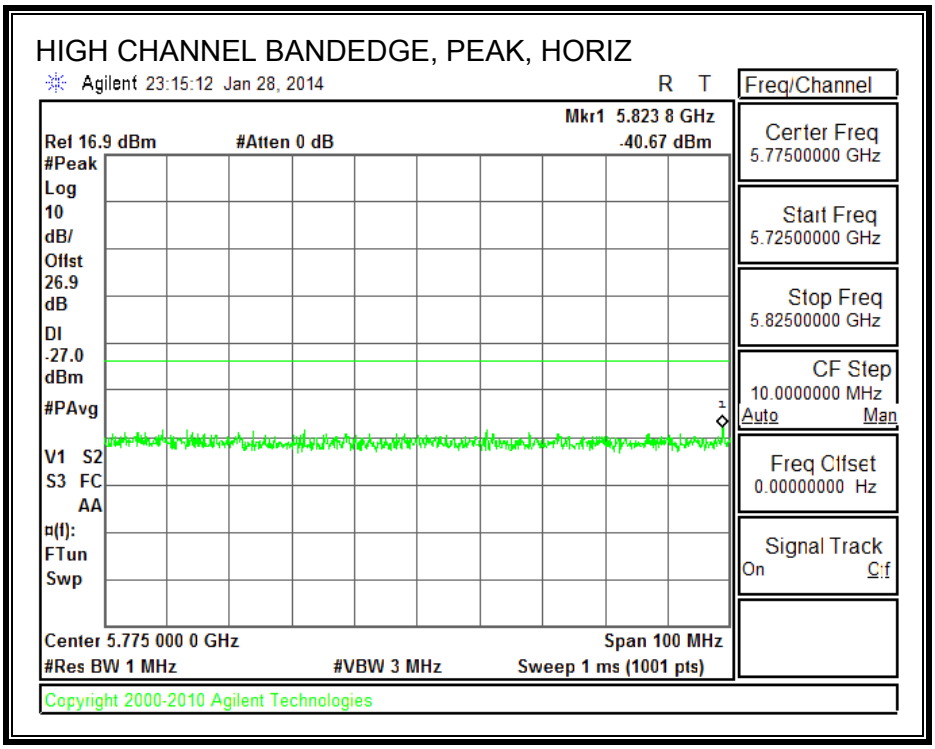
LOW CHANNEL RESTRICTED, PEAK, VERT

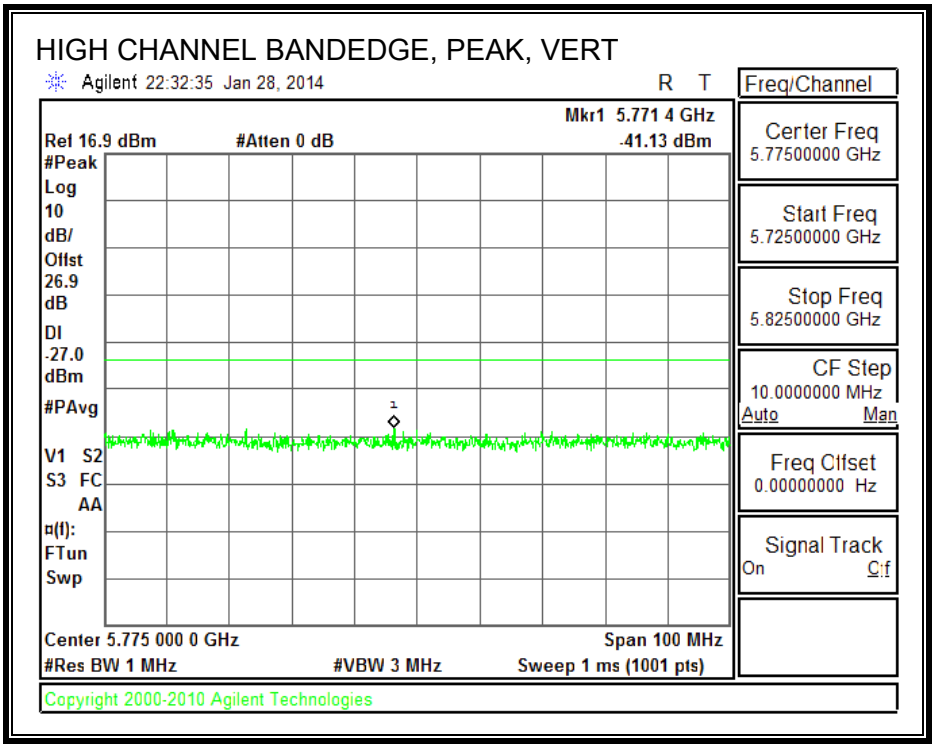


LOW CHANNEL RESTRICTED, AVERAGE, VERT



AUTHORIZED BANDEDGE (HIGH CHANNEL)

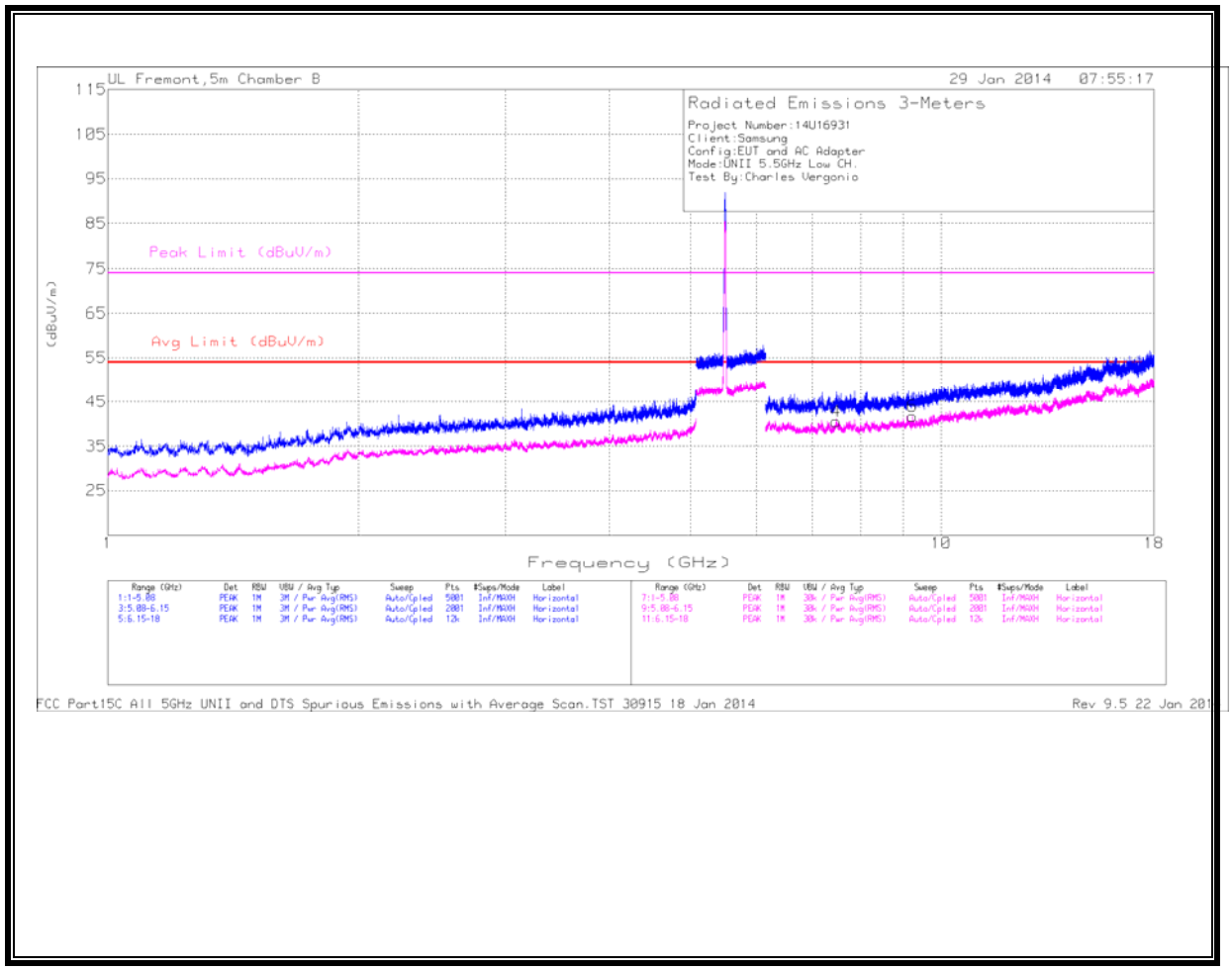




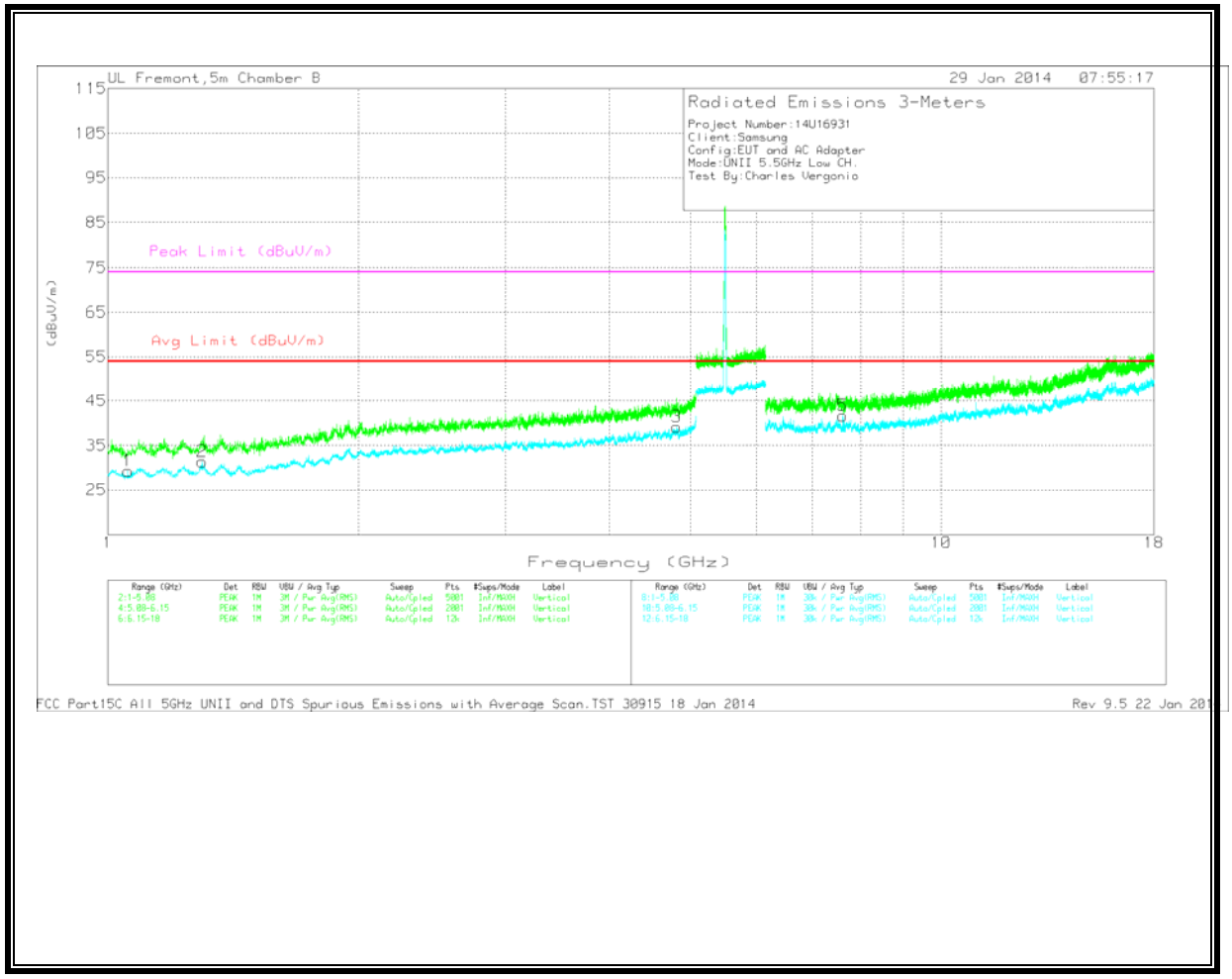
11.3.6.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL



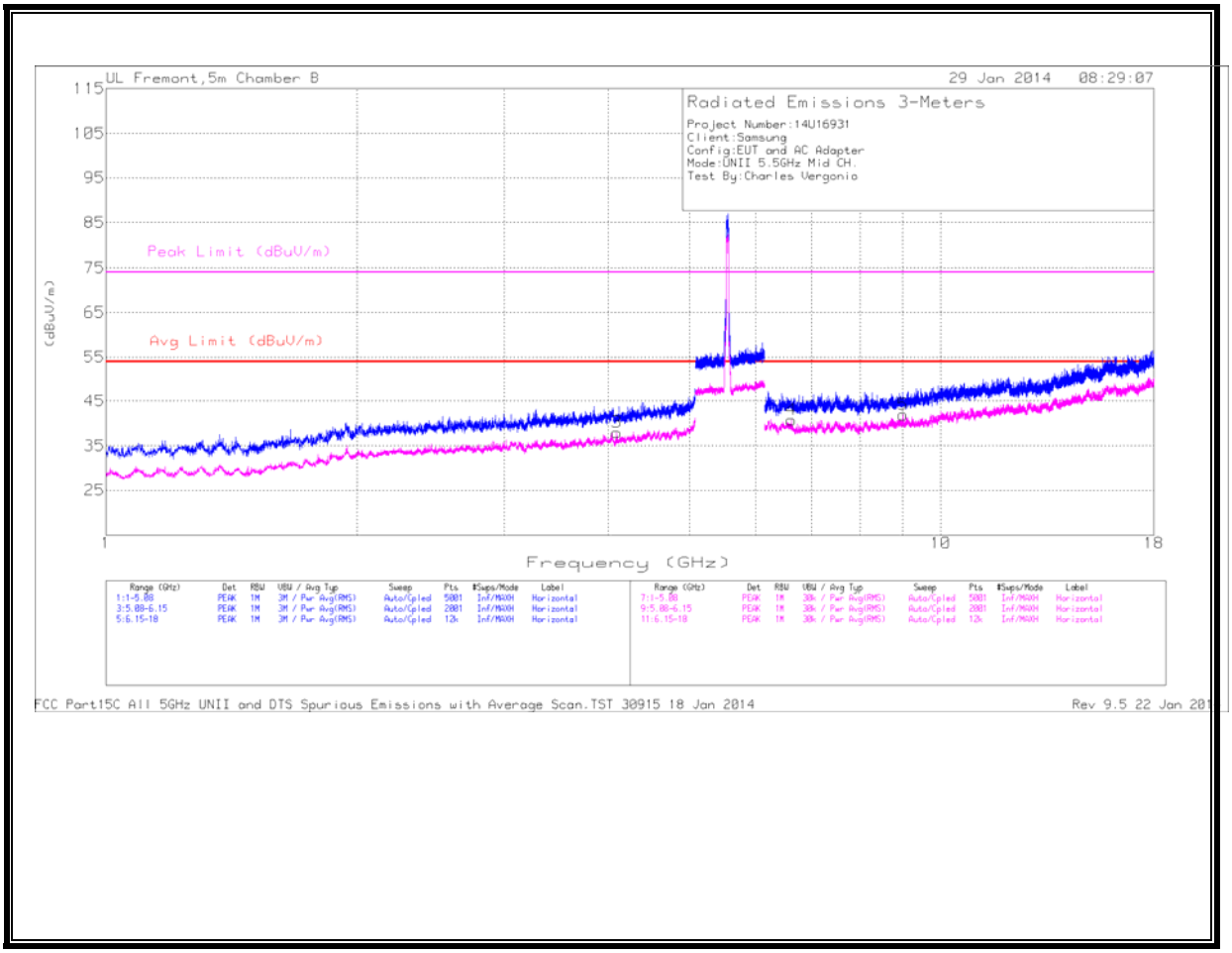
LOW CHANNEL DATA

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
1	* 1.057	35.96	Avg	27.7	-34.4	29.26	54	-24.74	-	-	0-360	202	V
2	* 1.298	37.06	Avg	28.5	-34.2	31.36	54	-22.64	-	-	0-360	202	V
3	* 4.816	33.84	Avg	34.7	-29.4	39.14	54	-14.86	-	-	0-360	99	V
4	* 7.479	30.62	Avg	36	-26.1	40.52	54	-13.48	-	-	0-360	201	H
5	* 7.62	33.08	Avg	36.1	-27.5	41.68	54	-12.32	-	-	0-360	202	V
6	9.233	29.93	Avg	36.9	-25.1	41.73	54	-12.27	-	-	0-360	99	H

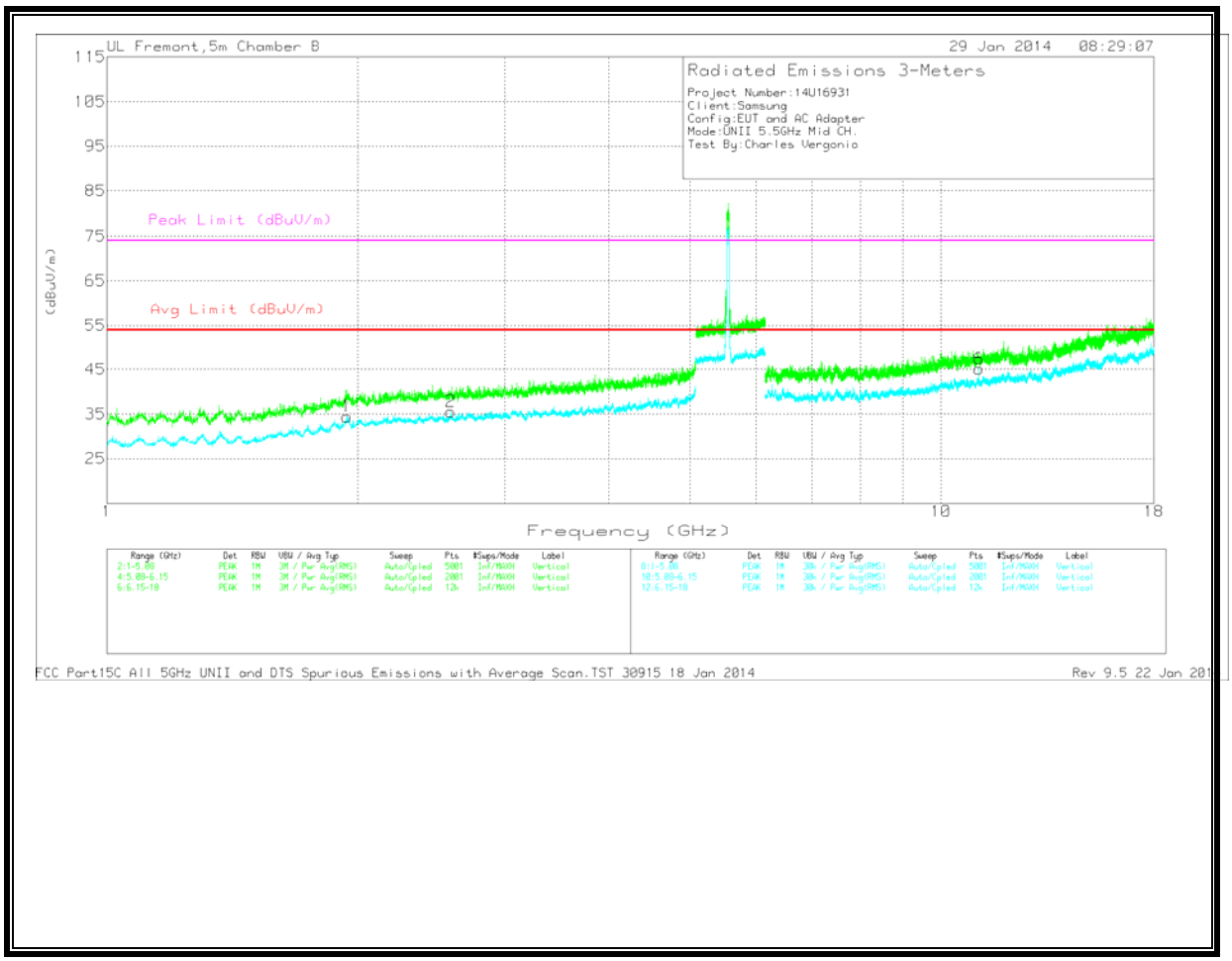
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

MID CHANNEL
HORIZONTAL



VERTICAL



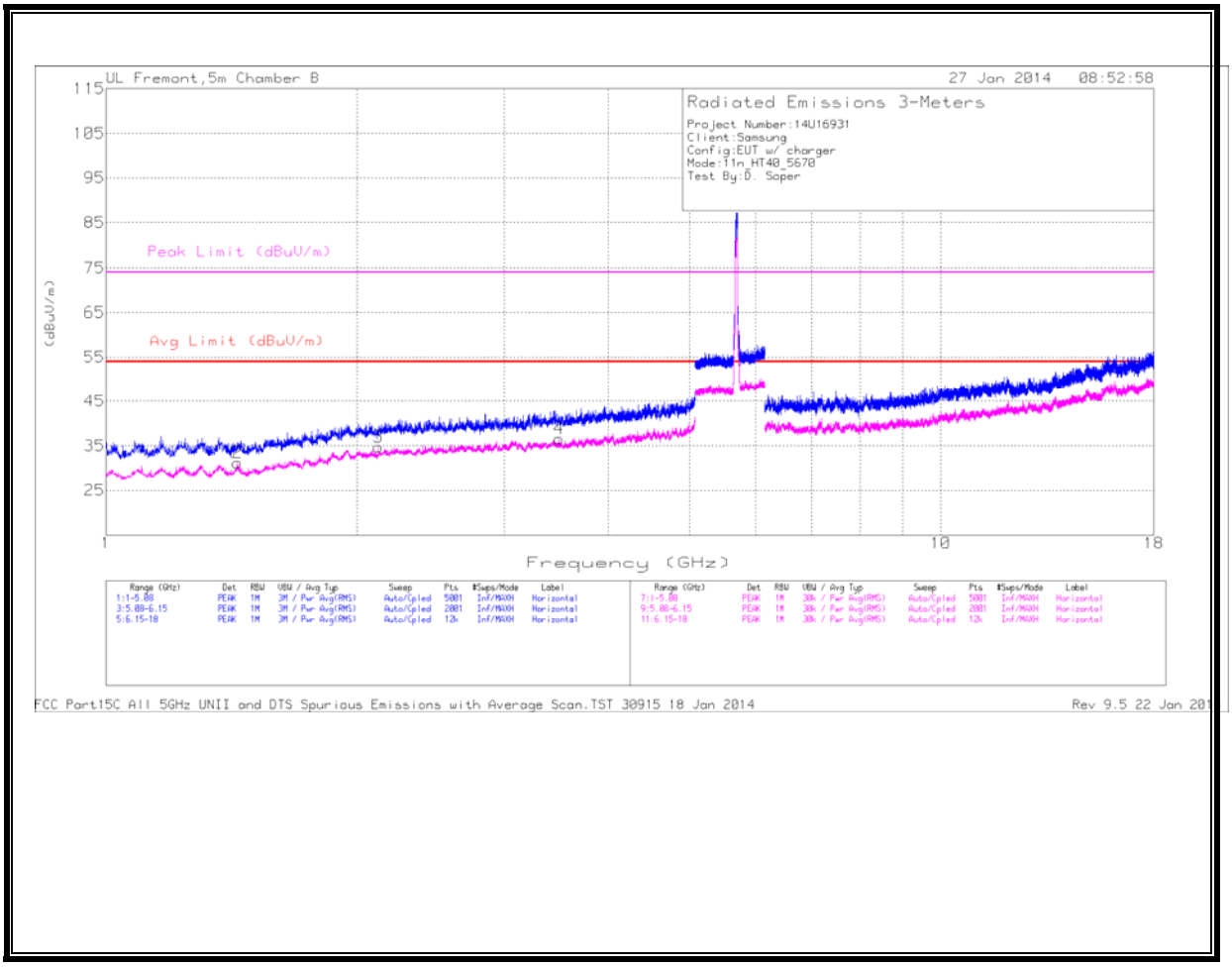
MID CHANNEL DATA

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
3	* 4.09	34.69	Avg	34	-30.7	37.99	54	-16.01	-	-	0-360	99	H
5	* 9.013	30.72	Avg	36.8	-25.6	41.92	54	-12.08	-	-	0-360	99	H
6	* 11.1	30.34	Avg	38.4	-23.6	45.14	54	-8.86	-	-	0-360	202	V
1	1.94	35.53	Avg	31.4	-32.5	34.43	54	-19.57	-	-	0-360	99	V
2	2.582	35.73	Avg	32.6	-32.8	35.53	54	-18.47	-	-	0-360	99	V
4	6.622	32.98	Avg	35.9	-28.1	40.78	54	-13.22	-	-	0-360	99	H

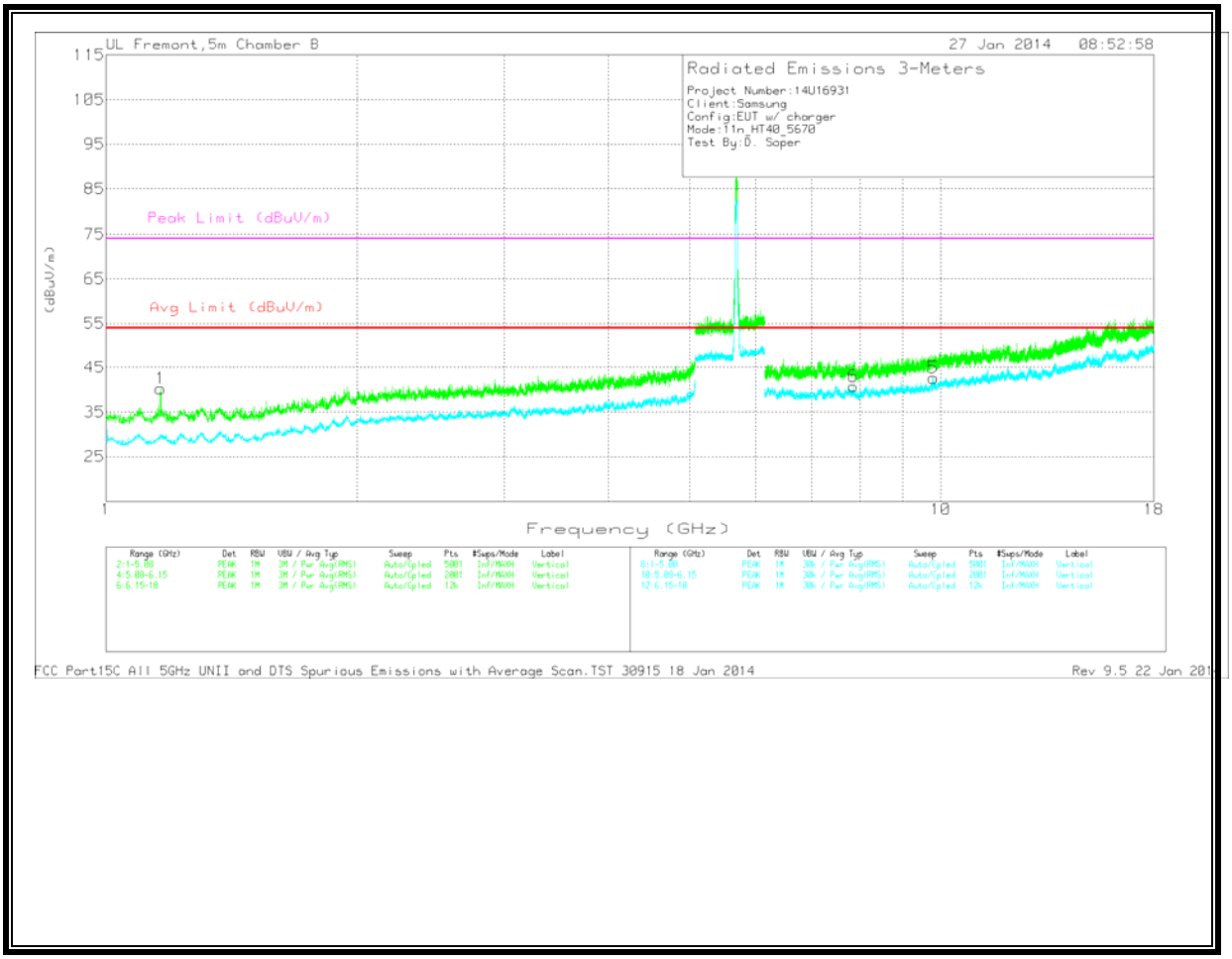
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

HIGH CHANNEL
HORIZONTAL



VERTICAL



HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.162	46.74	PK	28.2	-34.7	0	40.24	54	-13.76	74	-33.76	0-360	202	V
2	* 1.437	36.9	Avg	28.3	-34	0	31.2	54	-22.8	-	-	0-360	202	H
3	2.12	36.14	Avg	31.9	-33.3	0	34.74	54	-19.26	-	-	0-360	99	H
4	3.489	35.16	Avg	33.2	-31.8	0	36.56	54	-17.44	-	-	0-360	99	H
6	7.855	32.06	Avg	36.2	-27.5	0	40.76	54	-13.24	-	-	0-360	202	V
5	9.798	28.94	Avg	37.6	-23.9	0	42.64	54	-11.36	-	-	0-360	99	V

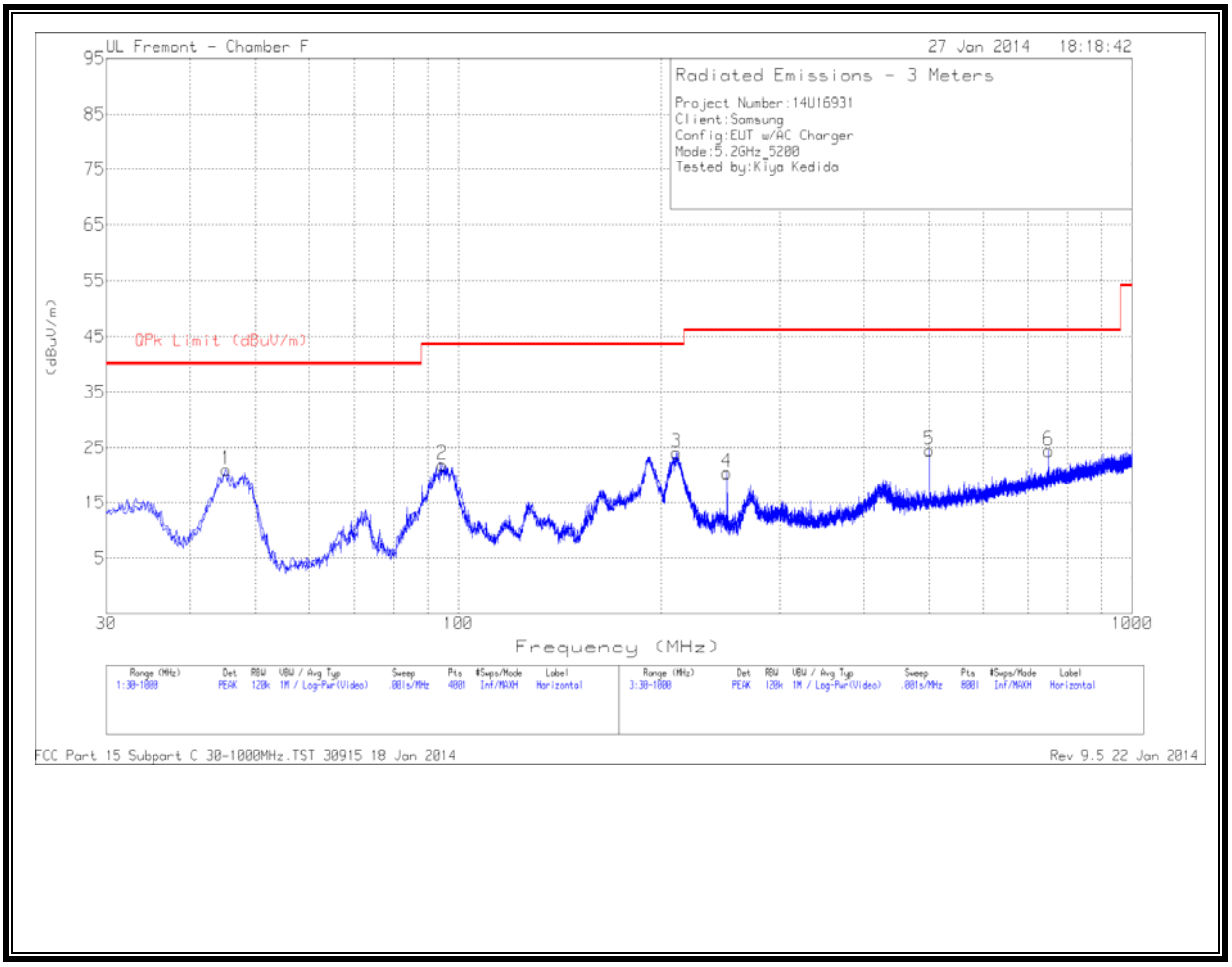
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

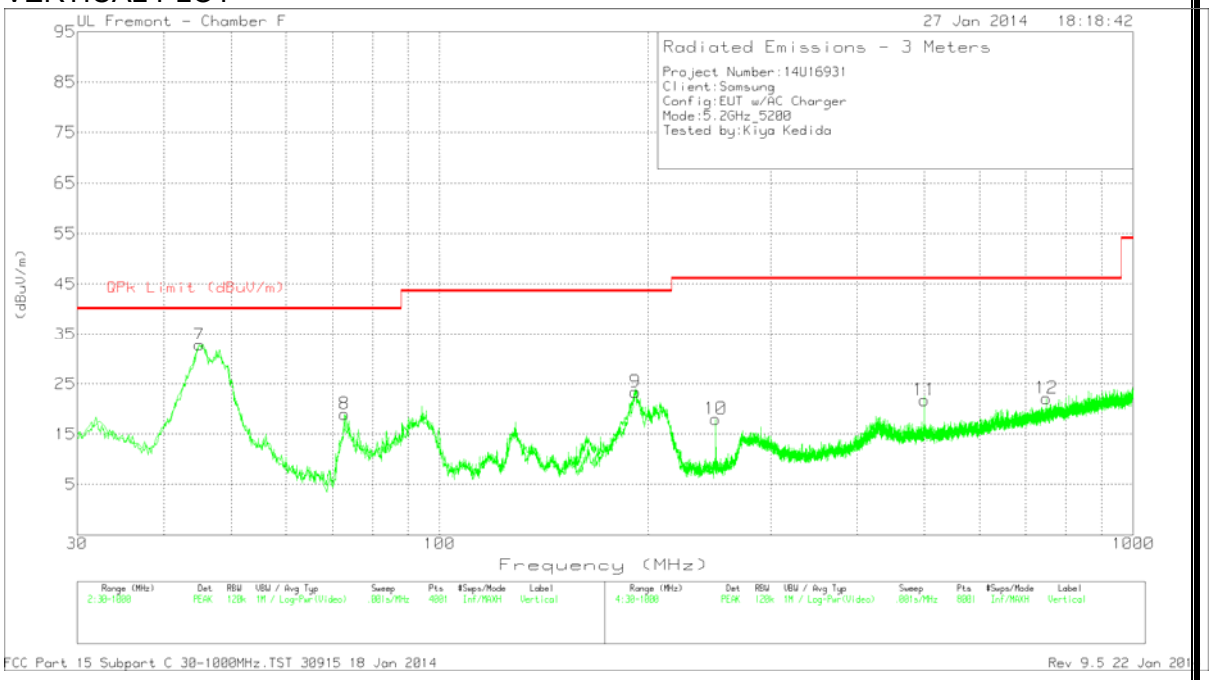
12. WORST-CASE BELOW 1 GHz (in the 5.3 GHz Band)

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



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

VERTICAL PLOT



Worst Case Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	45.2775	42.27	PK	10.2	-31.4	21.07	40	-18.93	0-360	400	H
2	94.505	44.86	PK	8.9	-31.8	21.96	43.52	-21.56	0-360	300	H
3	210.6625	44.61	PK	10.4	-30.9	24.11	43.52	-19.41	0-360	101	H
7	45.035	53.69	PK	10.4	-31.3	32.79	40	-7.21	0-360	100	V
8	72.9225	41.97	PK	8.1	-31.1	18.97	40	-21.03	0-360	100	V
9	191.505	42.9	PK	11.5	-31	23.4	43.52	-20.12	0-360	100	V
4	249.9475	39.91	PK	11.6	-31	20.51	46.02	-25.51	0-360	100	H
5	499.965	36.95	PK	17.6	-30	24.55	46.02	-21.47	0-360	200	H
6	749.9825	33.18	PK	20.7	-29.4	24.48	46.02	-21.54	0-360	200	H
10	249.9475	37.37	PK	11.6	-31	17.97	46.02	-28.05	0-360	200	V
11	499.965	34.17	PK	17.6	-30	21.77	46.02	-24.25	0-360	100	V
12	749.8613	30.79	PK	20.7	-29.4	22.09	46.02	-23.93	0-360	200	V

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

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

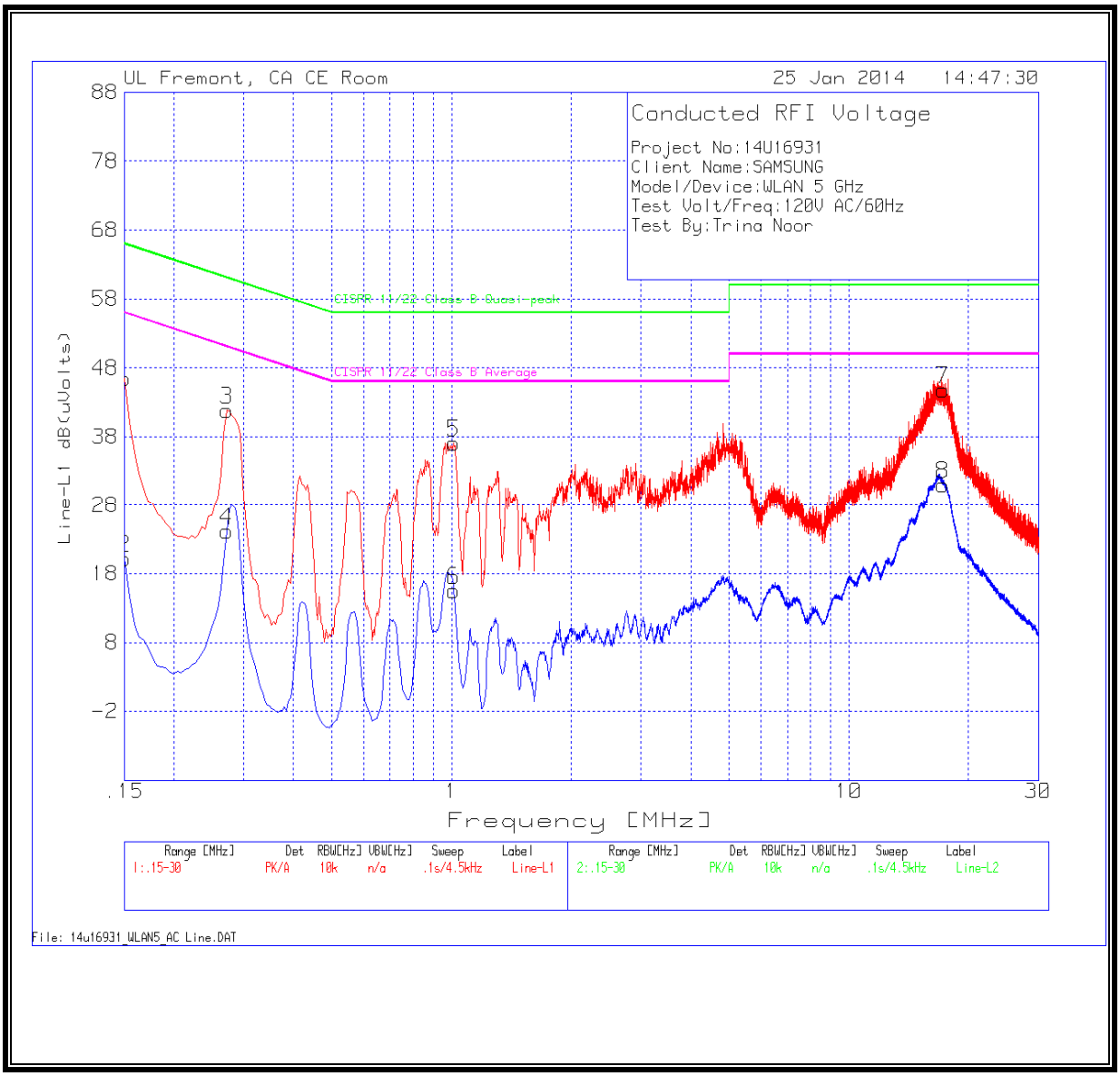
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.15	46.36	PK	.1	0	46.46	66	-19.54	-	-
2	.15	20.07	Av	.1	0	20.17	-	-	56	-35.83
3	.2715	41.75	PK	.1	0	41.85	61.1	-19.25	-	-
4	.2715	24.04	Av	.1	0	24.14	-	-	51.1	-26.96
5	1.014	36.92	PK	.1	0	37.02	56	-18.98	-	-
6	1.014	15.5	Av	.1	0	15.6	-	-	46	-30.4
7	17.2635	44.39	PK	.2	.2	44.79	60	-15.21	-	-
8	17.2635	30.65	Av	.2	.2	31.05	-	-	50	-18.95

Line-L2 .15 - 30MHz

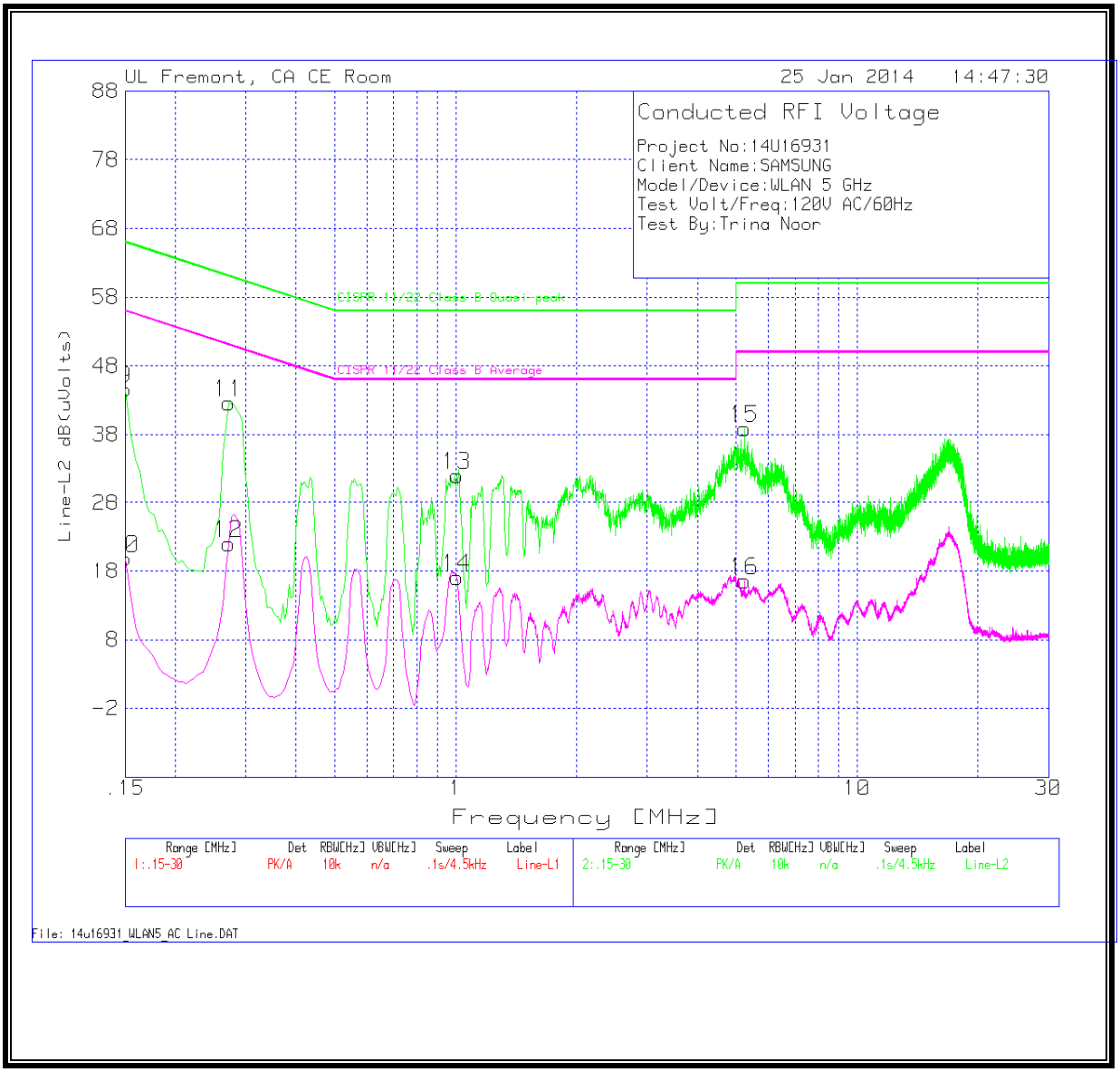
Trace Markers

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	.15	44.51	PK	.1	0	44.61	66	-21.39	-	-
10	.15	19.76	Av	.1	0	19.86	-	-	56	-36.14
11	.2715	42.54	PK	.1	0	42.64	61.1	-18.46	-	-
12	.2715	21.9	Av	.1	0	22	-	-	51.1	-29.1
13	1.005	31.93	PK	.1	0	32.03	56	-23.97	-	-
14	1.005	17.03	Av	.1	0	17.13	-	-	46	-28.87
15	5.235	38.63	PK	.1	.1	38.83	60	-21.17	-	-
16	5.235	16.39	Av	.1	.1	16.59	-	-	50	-33.41

LINE 1 RESULTS



LINE 2 RESULTS



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".

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

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

Table 2: Applicability of DFS requirements during normal operation

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

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

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

Table 4: DFS Response requirement values

Parameter	Value
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

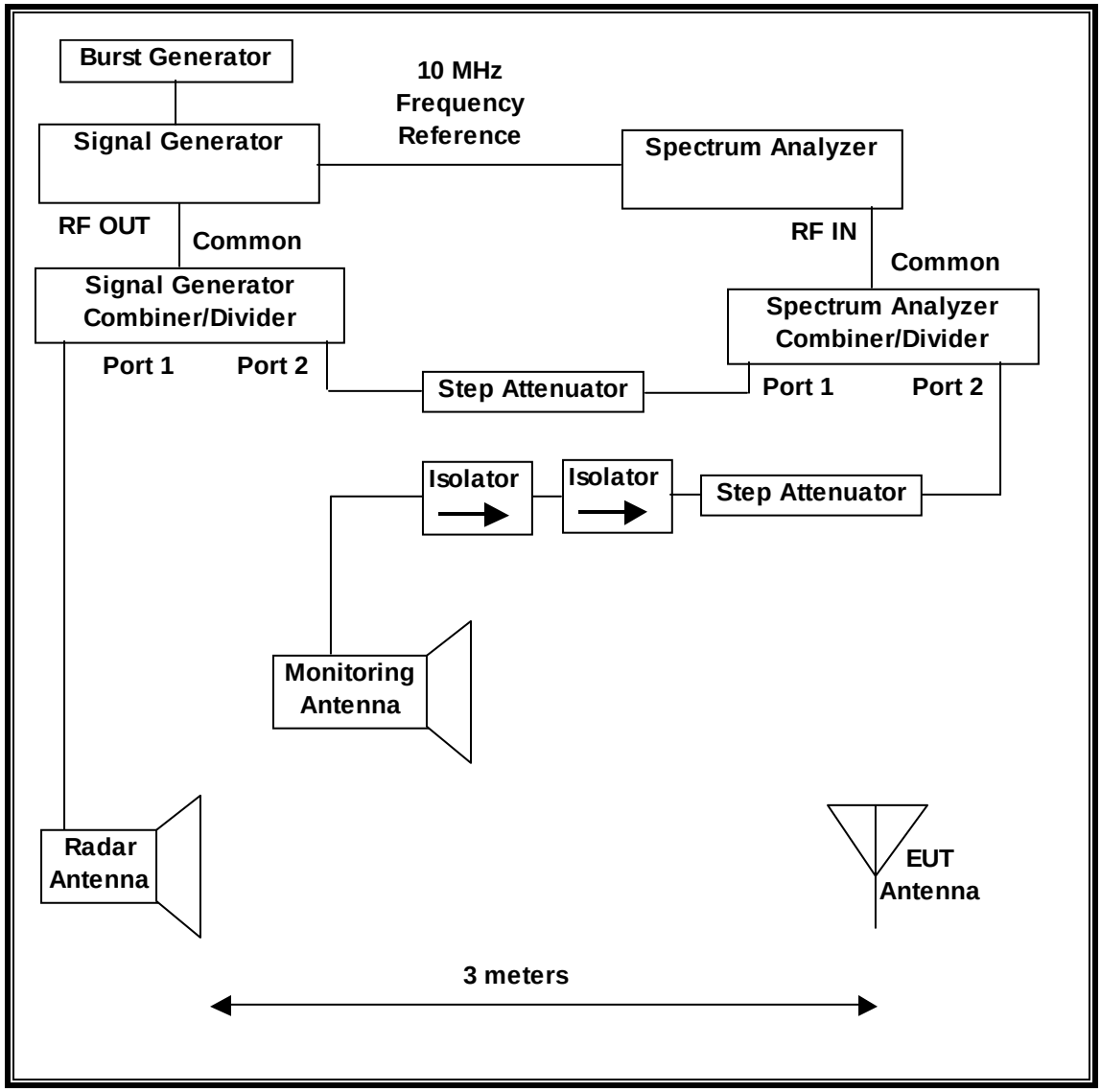
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

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

14.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



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.

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.

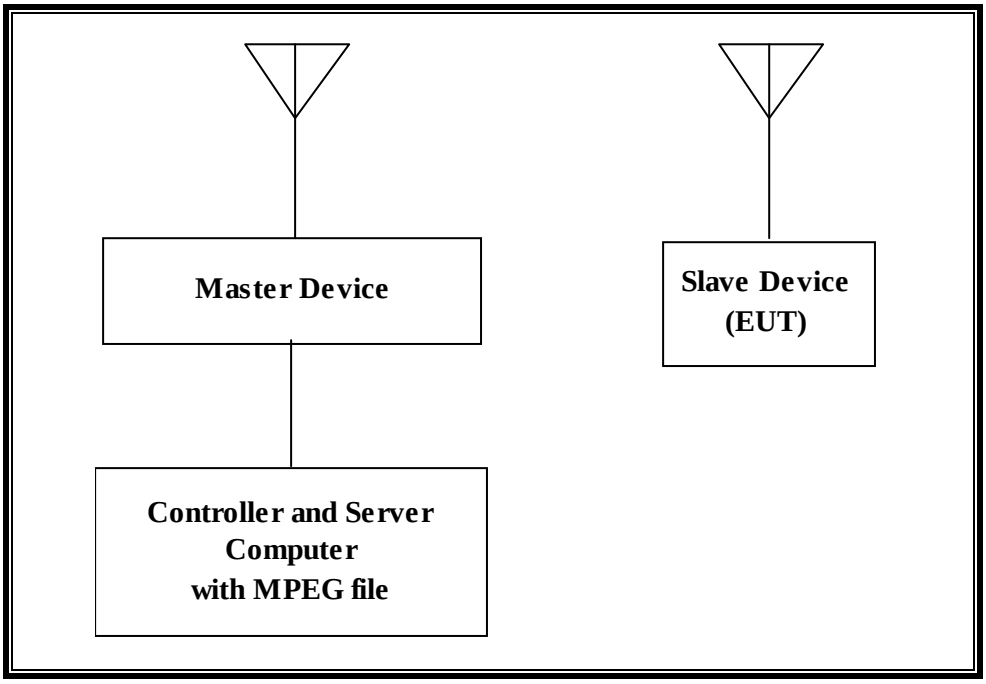
TEST AND MEASUREMENT EQUIPMENT

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

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

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

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 11.16 dBm EIRP in the 5250-5350 MHz band and 11.47 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of -2.84 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 N7508V.001.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

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.

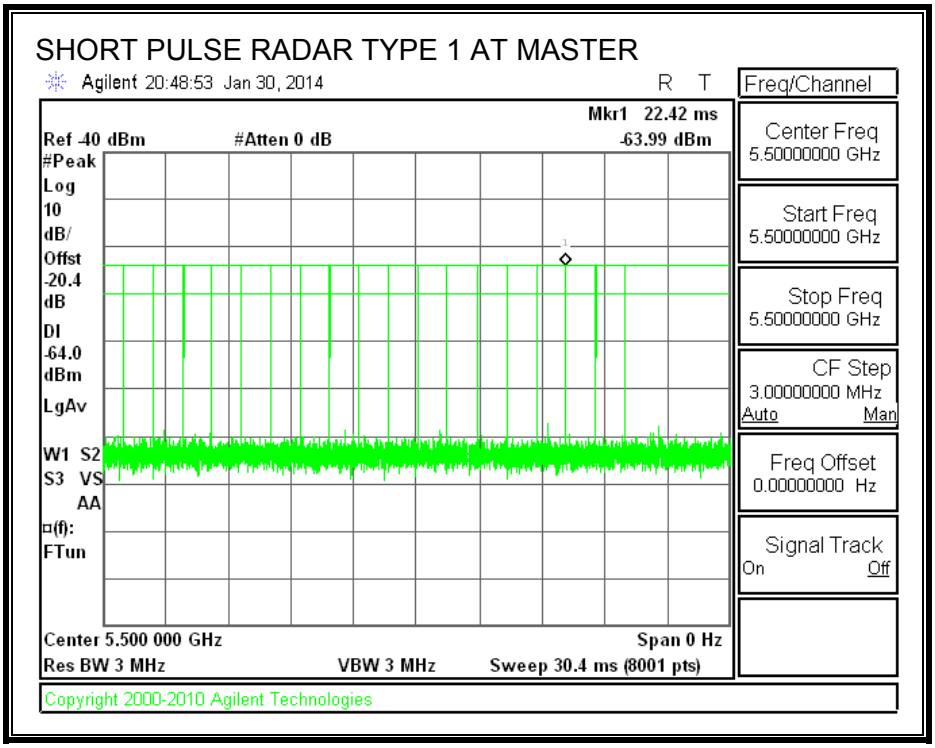
14.2. RESULTS FOR 20 MHz BANDWIDTH

14.2.1. TEST CHANNEL

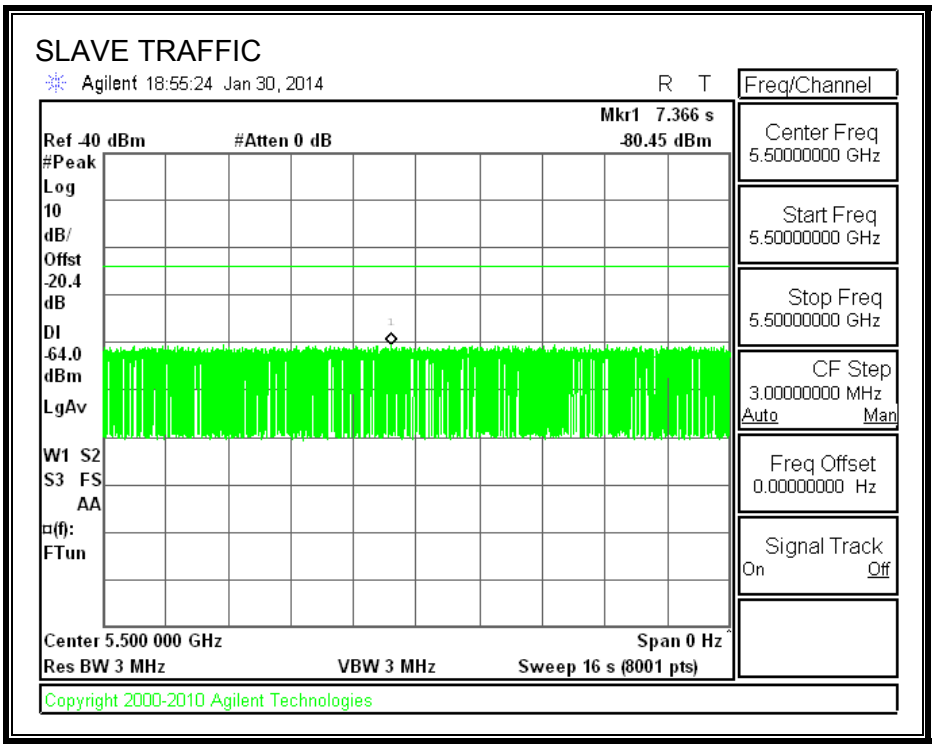
All tests were performed at a channel center frequency of 5500 MHz.

14.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



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)

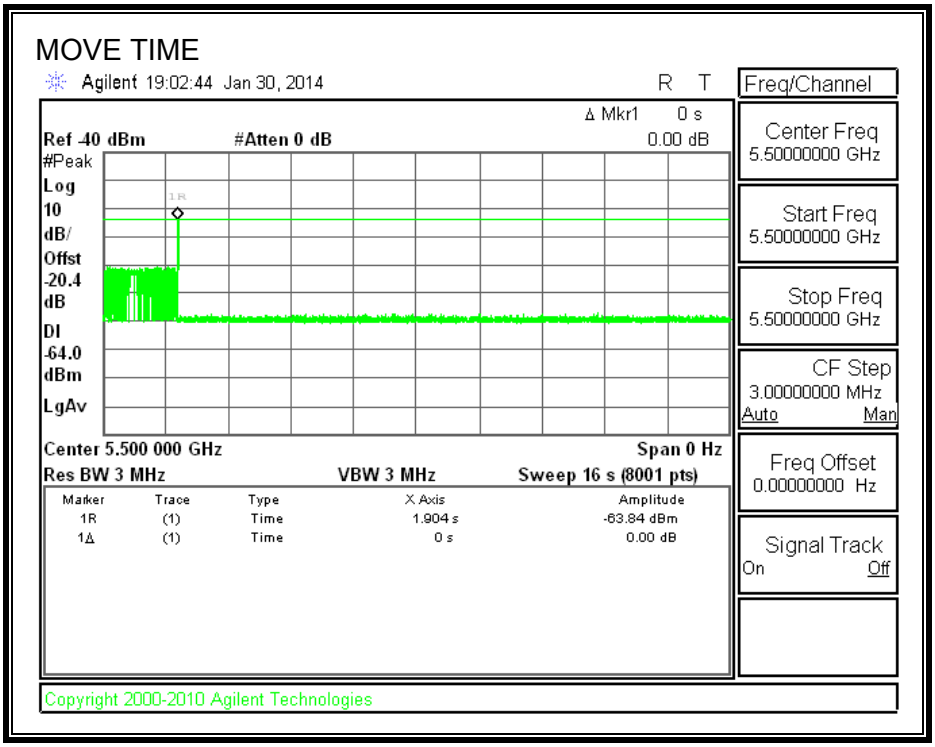
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

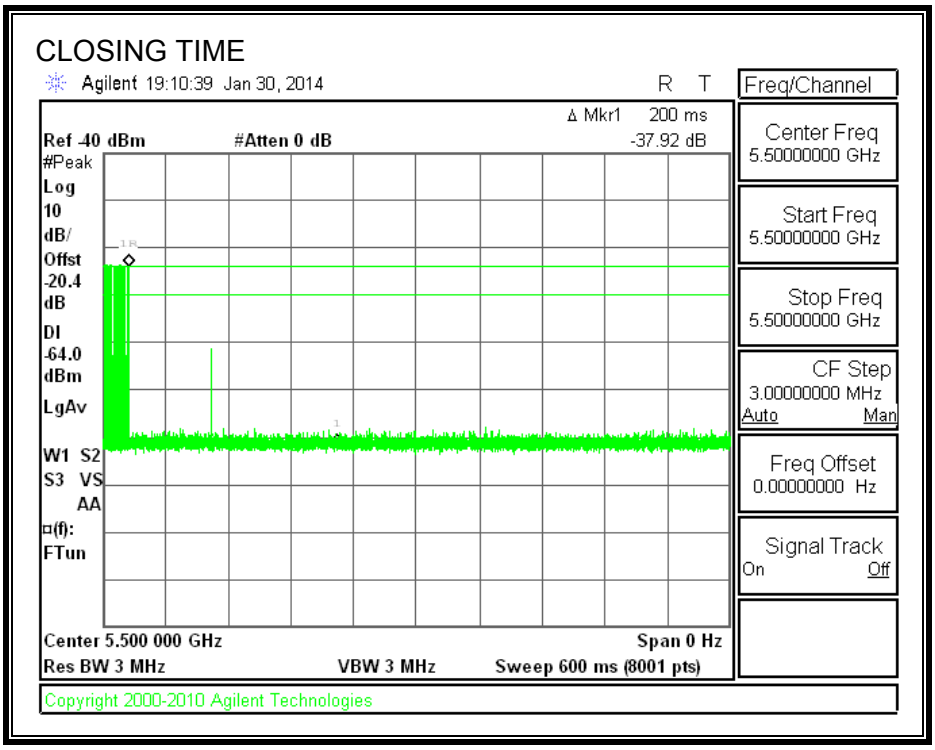
Channel Move Time (sec)	Limit (sec)
0.0	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60

MOVE TIME



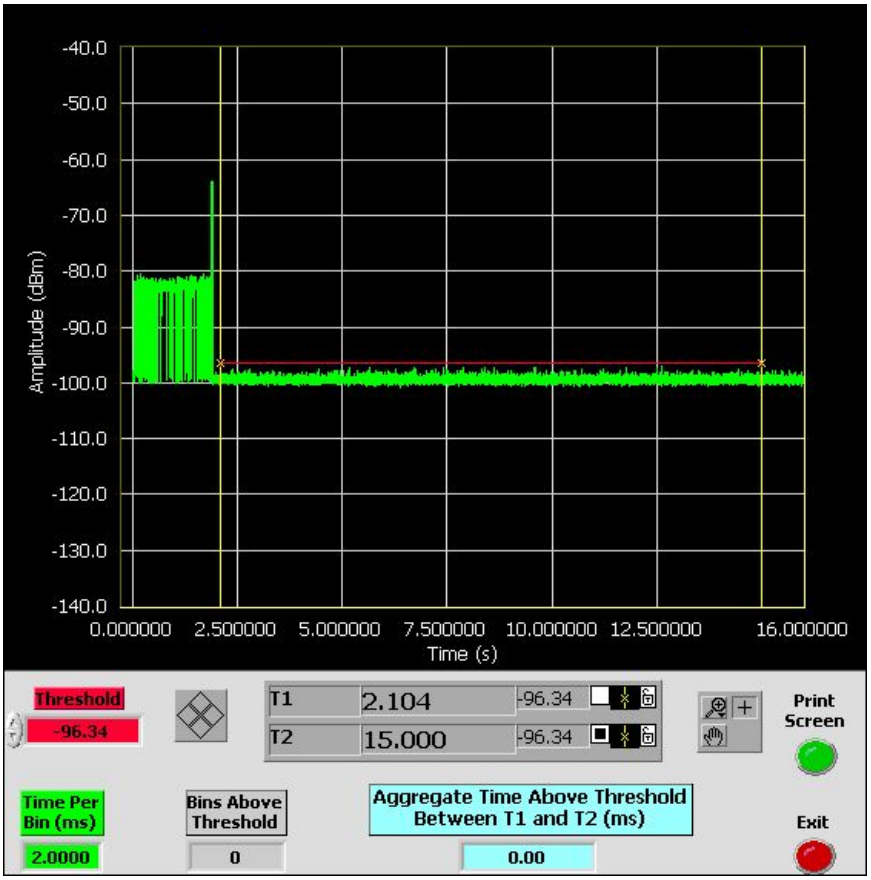
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



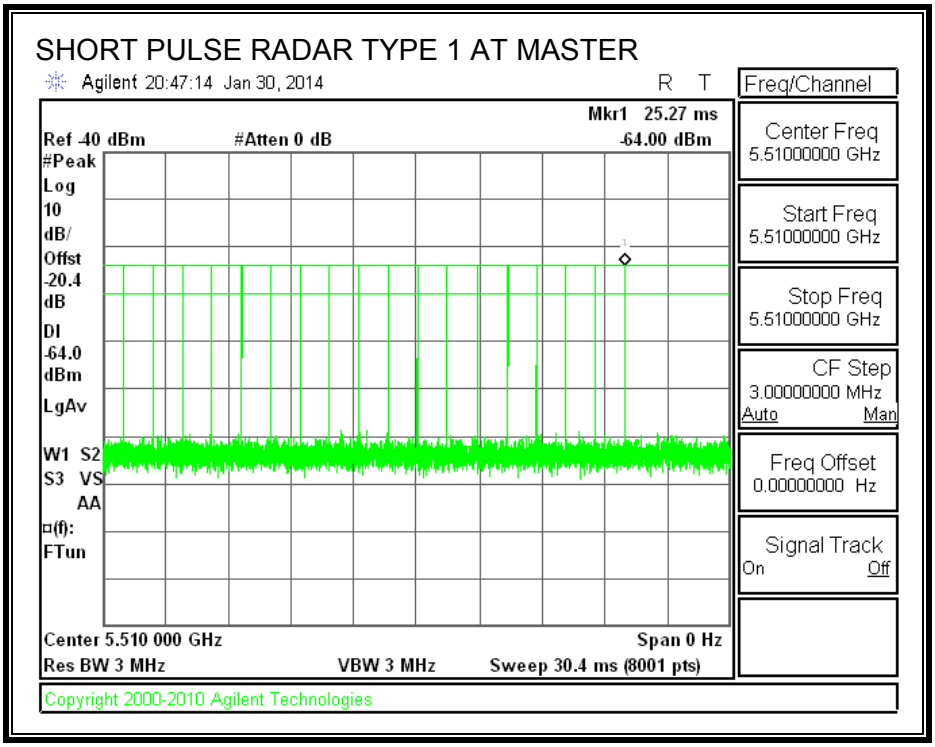
14.3. RESULTS FOR 40 MHz BANDWIDTH

14.3.1. TEST CHANNEL

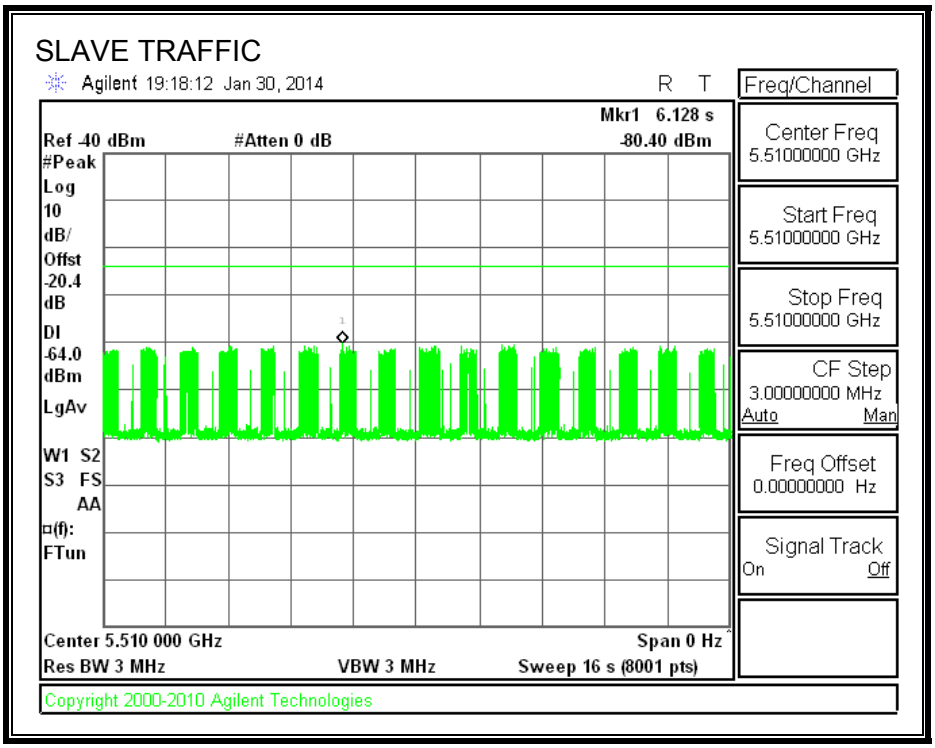
All tests were performed at a channel center frequency of 5510 MHz.

14.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



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)

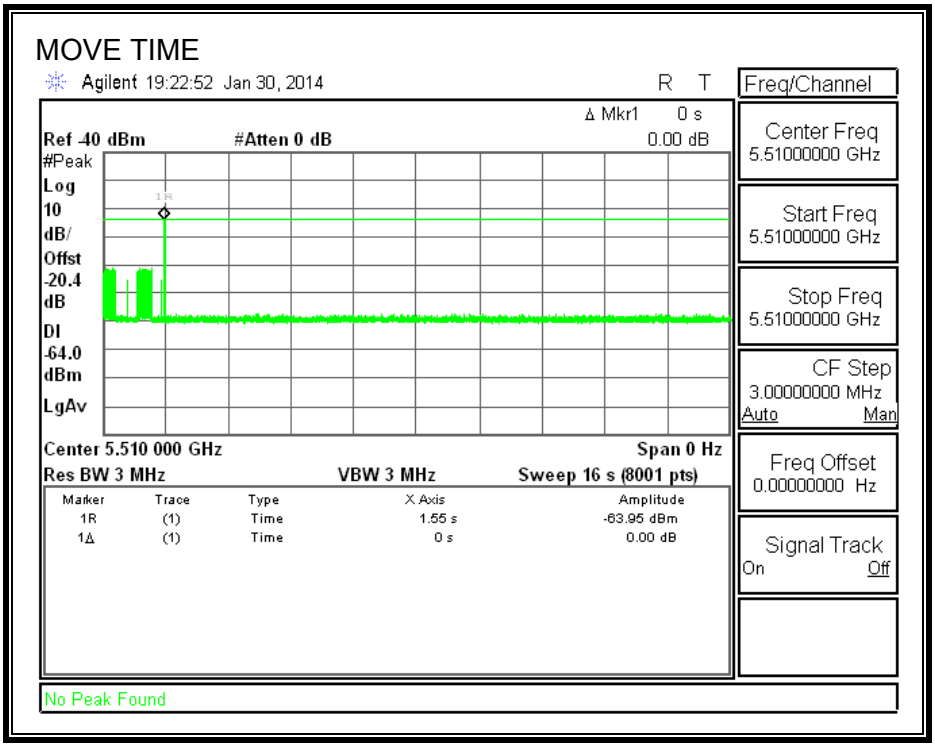
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

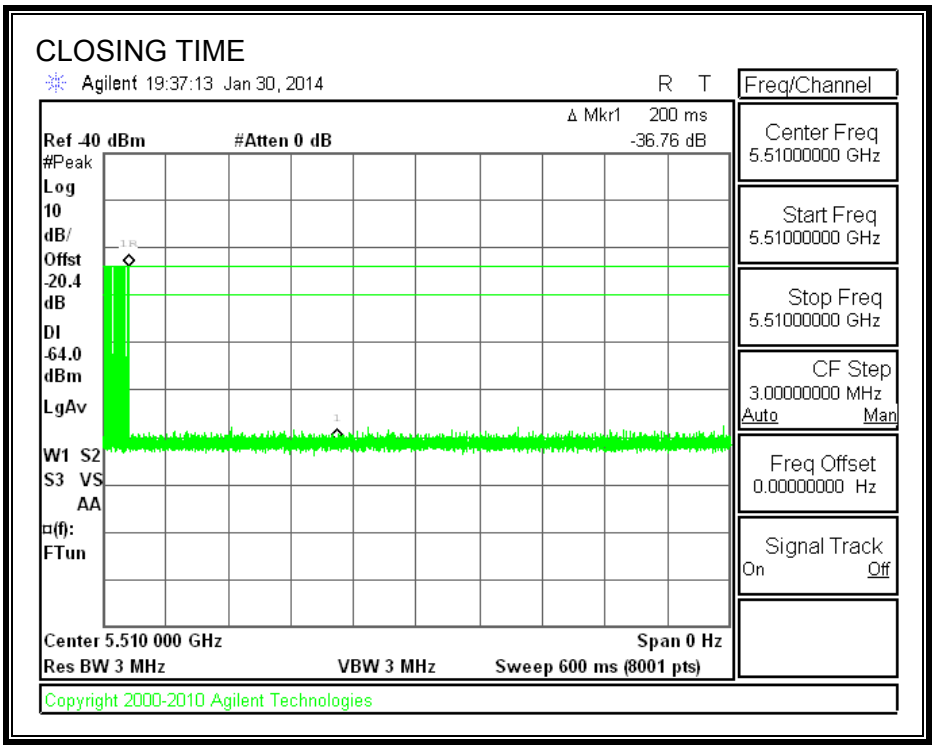
Channel Move Time (sec)	Limit (sec)
0.0	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60

MOVE TIME



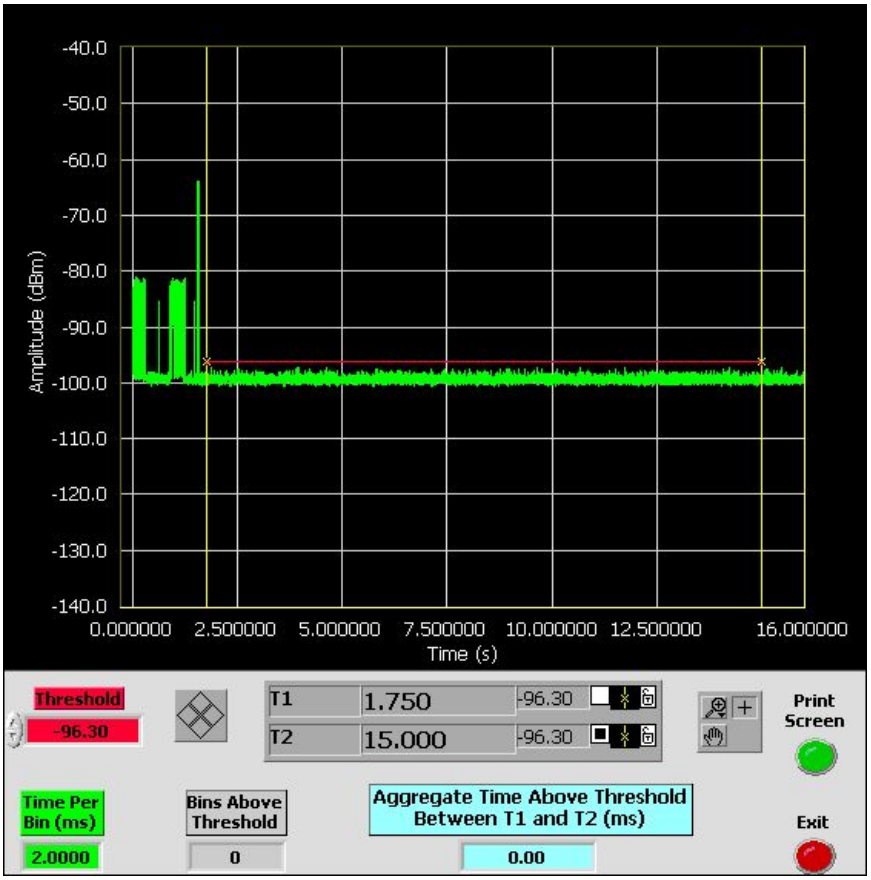
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



14.3.5. NON-OCCUPANCY PERIOD

RESULTS

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