FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-N7505

FCC ID: A3LSMN7505

REPORT NUMBER: 13U16698-4

ISSUE DATE: JANUARY 6, 2014

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

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

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	1/6/14	Initial Issue	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:	**802.11a/b/g/n (HT20+HT40) + ac(HT80) BT4.0 (LE) + Basic + EDR +HS; GSM/WCDMA850/1900 + EGPRS; NFC BAR PHONE**
MODEL:	**SM-N7505**
SERIAL NUMBER:	**R31DB1SV13P**
DATE TESTED:	**DECEMBER 11, 2013 – January 6, 2014**

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

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

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

Approved & Released
For UL Verification Services Inc. By:

PHILIP KIM
WiSE PROGRAM MANAGER
UL Verification Services Inc.

Tested By:

CHARLES VERGONIO
WiSE LAB TECHNICIAN
UL Verification Services Inc.

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, RSS-GEN Issue 3, and RSS-210 Issue 8.

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/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac, NFC & ANT

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	19.98	99.54
2412 - 2462	802.11g	22.44	175.39
2412 - 2462	802.11n HT20	21.63	145.55
5745-5825	802.11a	22.39	173.38
5745-5825	802.11n HT20	22.33	171.00
5755-5795	802.11n HT40	21.48	140.60
5775	802.11n HT80	20	100.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.51 dBi (2.4GHz) and 0.01 dBi (5.8GHz).

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 Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

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

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac HT80mode: MCS0

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	SM-N7505	FK-383-A	N/A
Earphone	Samsung	Samsung	N/A	N/A

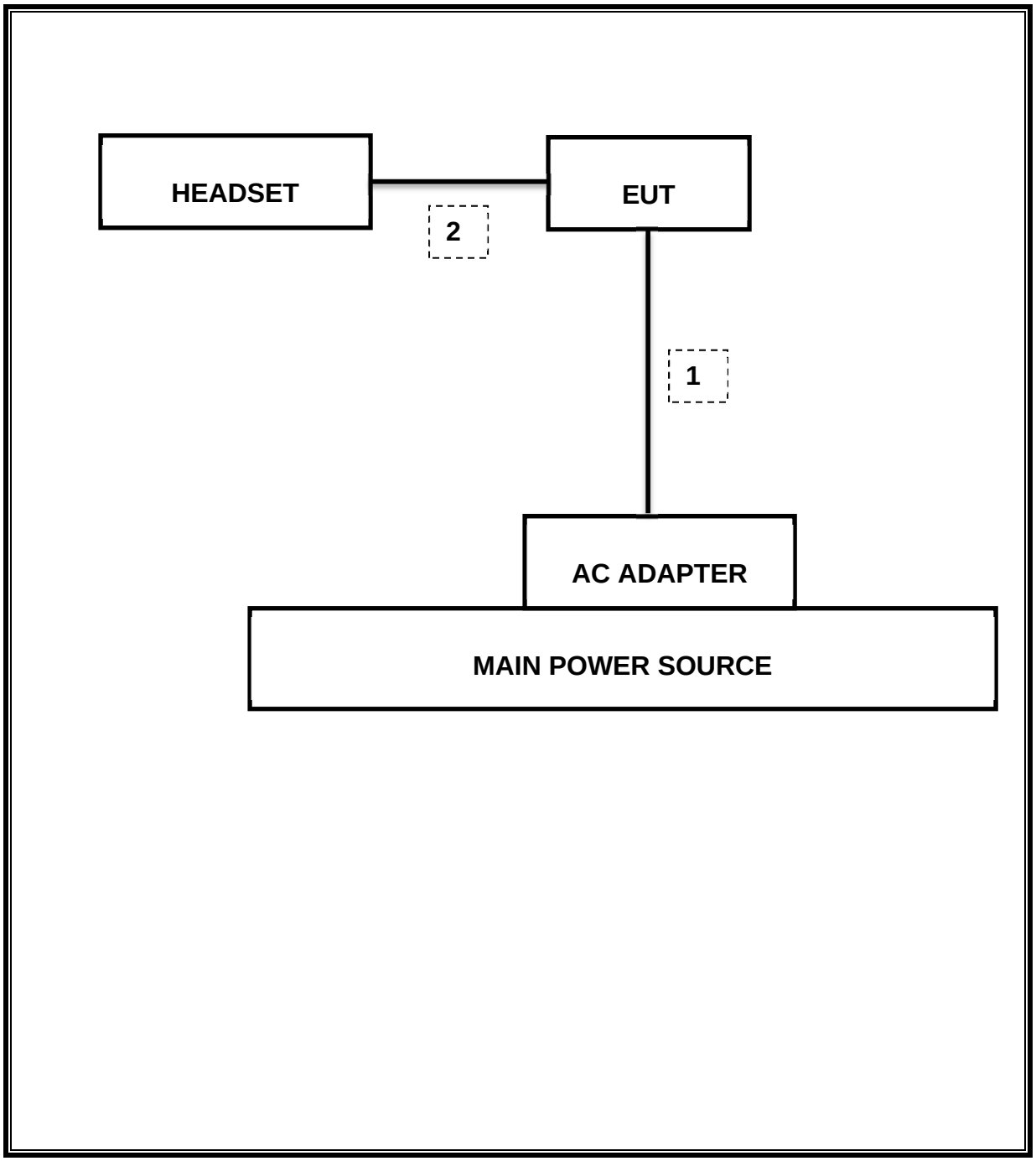
I/O CABLES

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	1m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/13	08/14/14
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/13	12/11/14
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/13	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/13	01/16/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/13	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/13	10/21/14
PXA SIGNAL ANALYZER	Agilent / HP	N9030A	N/A		05/09/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/13	08/08/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/13	01/14/14
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2013	12/13/2014

7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r01:Measurement Procedure PK2 is used for power and PKPSD is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

8. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	9.13MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-36.02dBc
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	22.44dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-4.48dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	32.45dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	41.605dBuV

9. ANTENNA PORT TEST RESULTS

9.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.58	0.5
Mid	2437	10.03	0.5
High	2462	9.13	0.5
Worst		9.13	

9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.21	0.5
Mid	2437	16.38	0.5
High	2462	16.42	0.5
Worst		16.21	

9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.21	0.5
Mid	2437	17.62	0.5
High	2462	17.62	0.5
Worst		17.21	

9.1.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.46	0.5
Mid	5785	16.46	0.5
High	5825	16.50	0.5
Worst		16.46	

9.1.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.71	0.5
Mid	5785	17.62	0.5
High	5825	17.71	0.5
Worst		17.62	

9.1.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

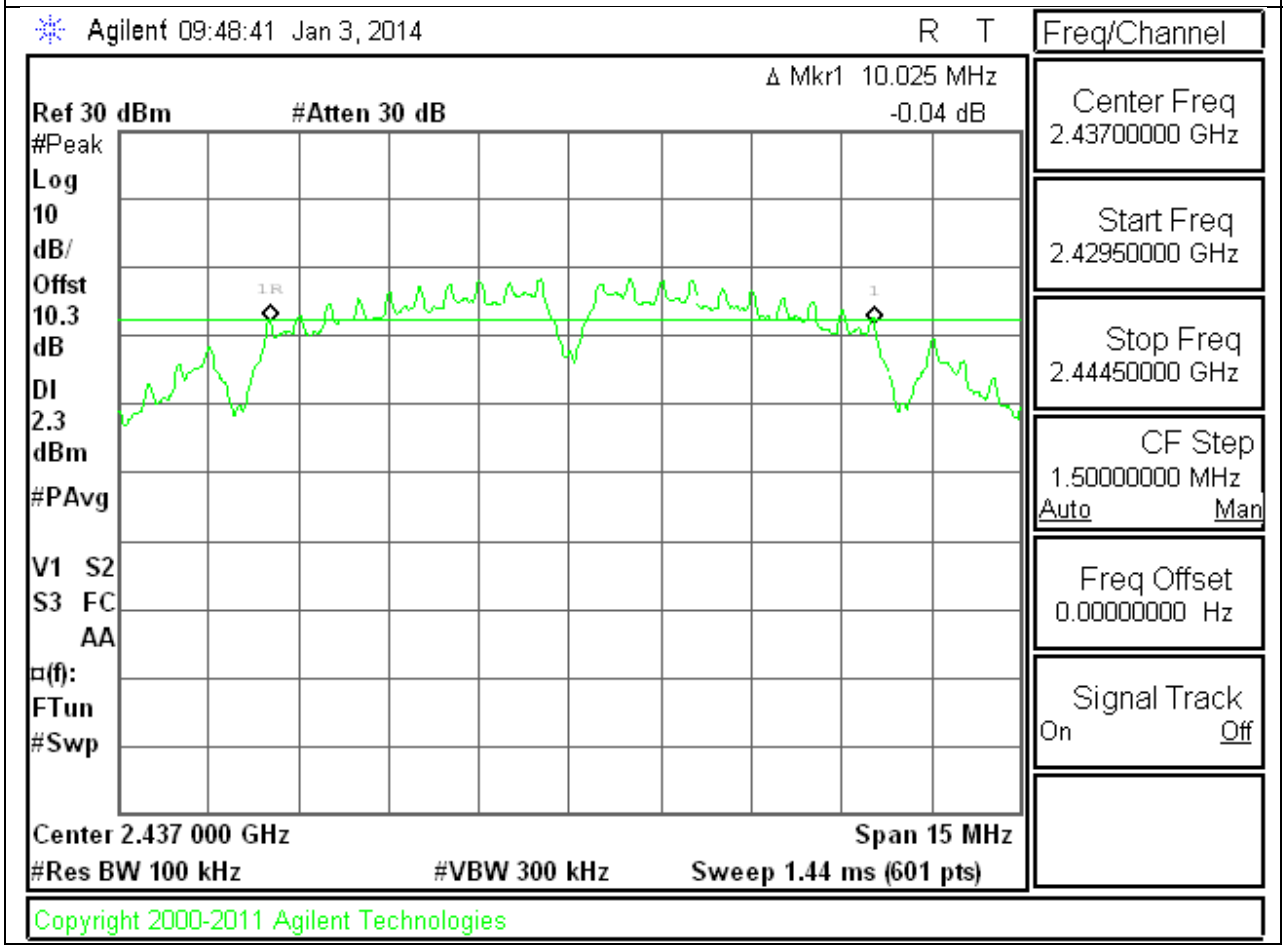
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	36.50	0.5
High	5795	36.42	0.5
Worst		36.42	0.5

9.1.7. 802.11n HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5775	76.28	0.5
Worst		76.28	0.5

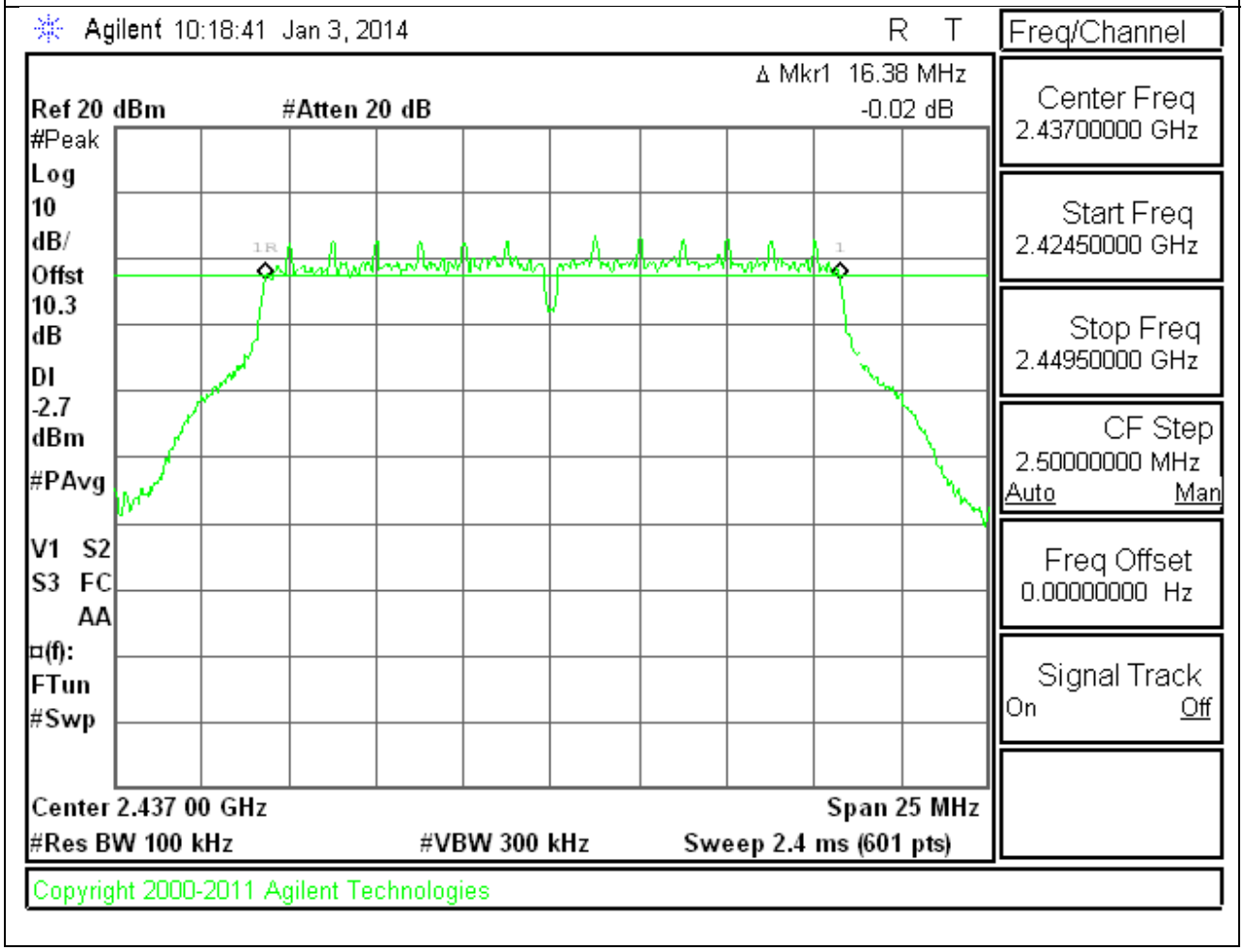
802.11b 2.4GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



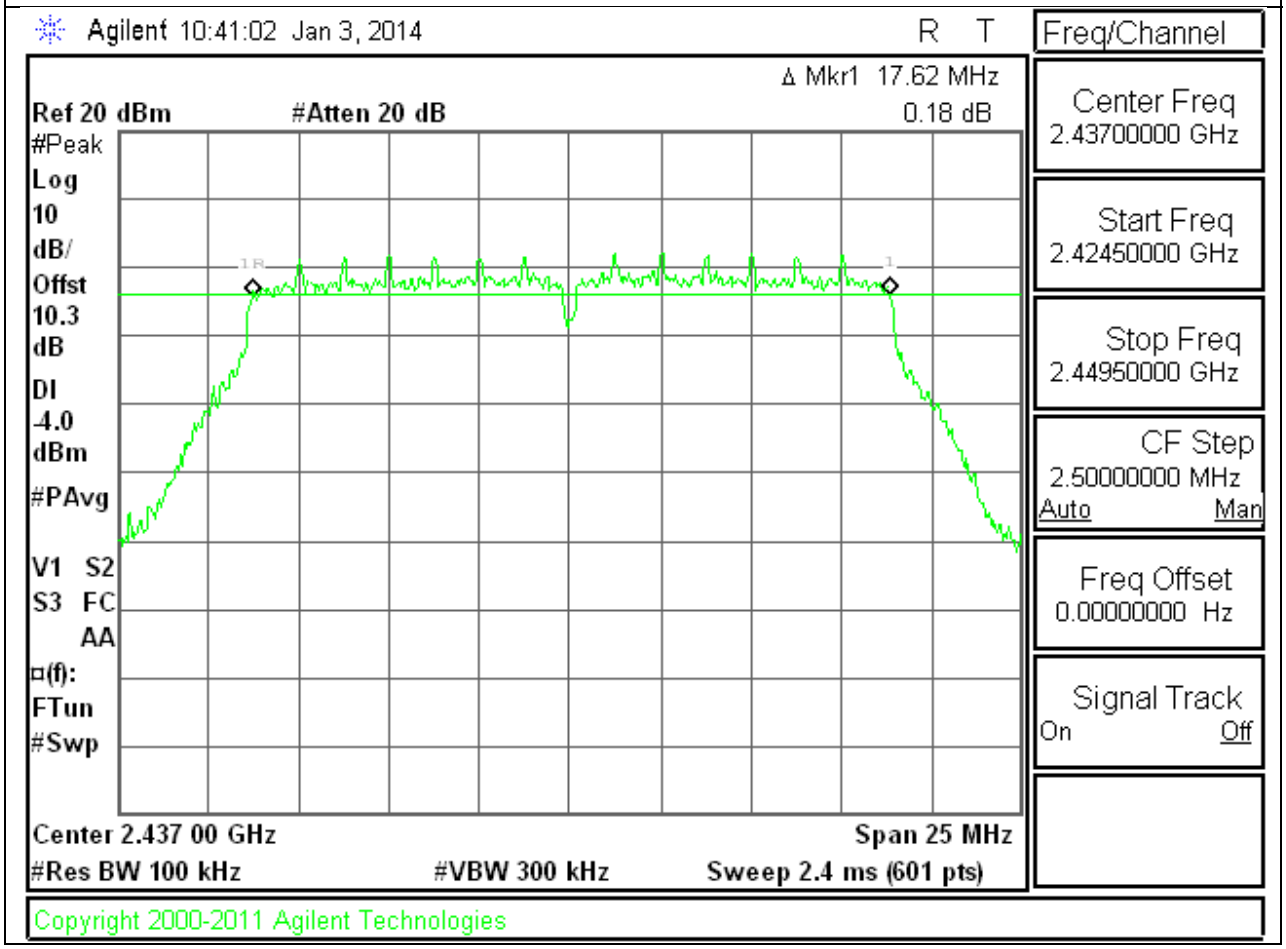
802.11g 2.4GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



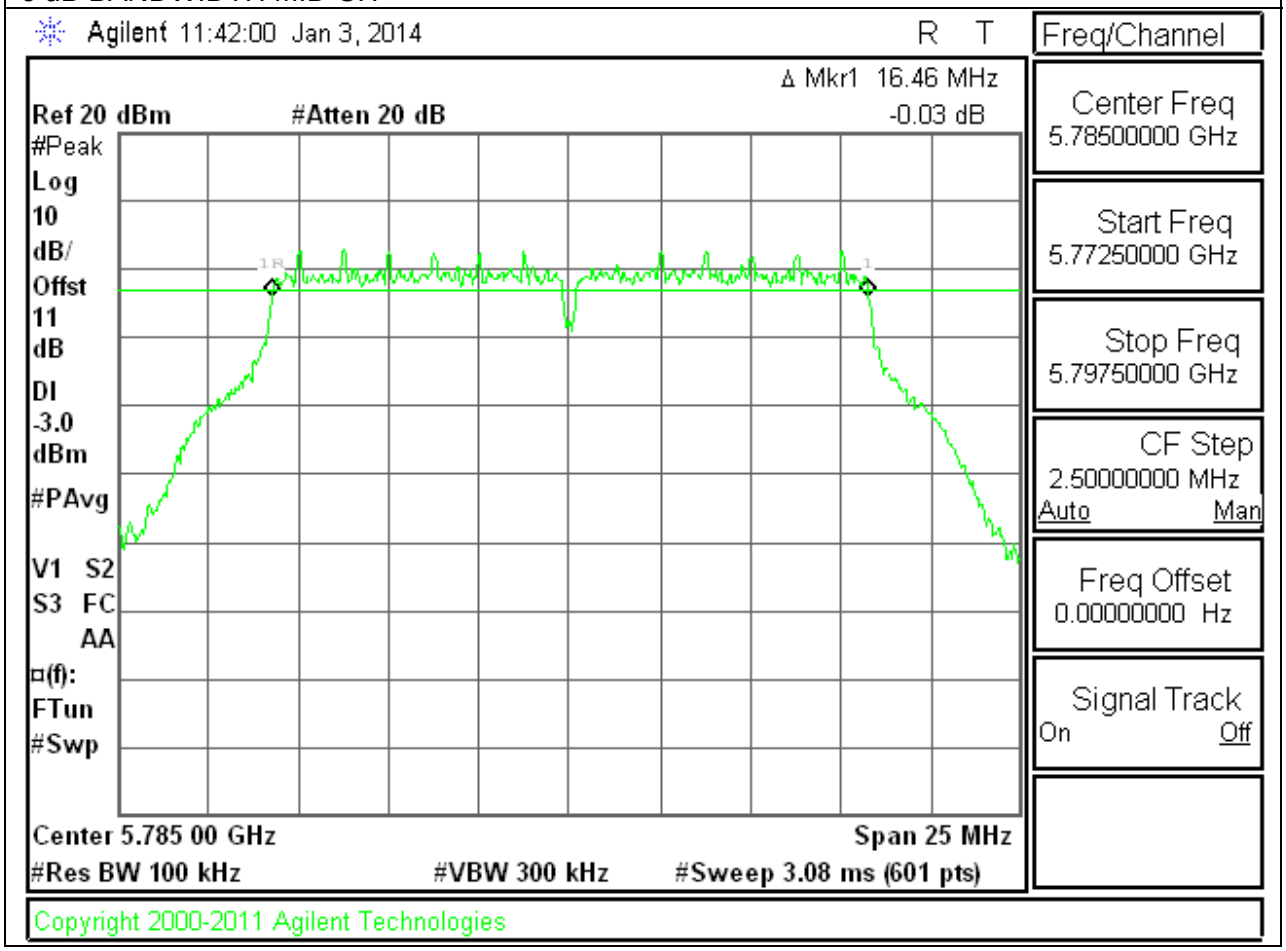
802.11n 2.4GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



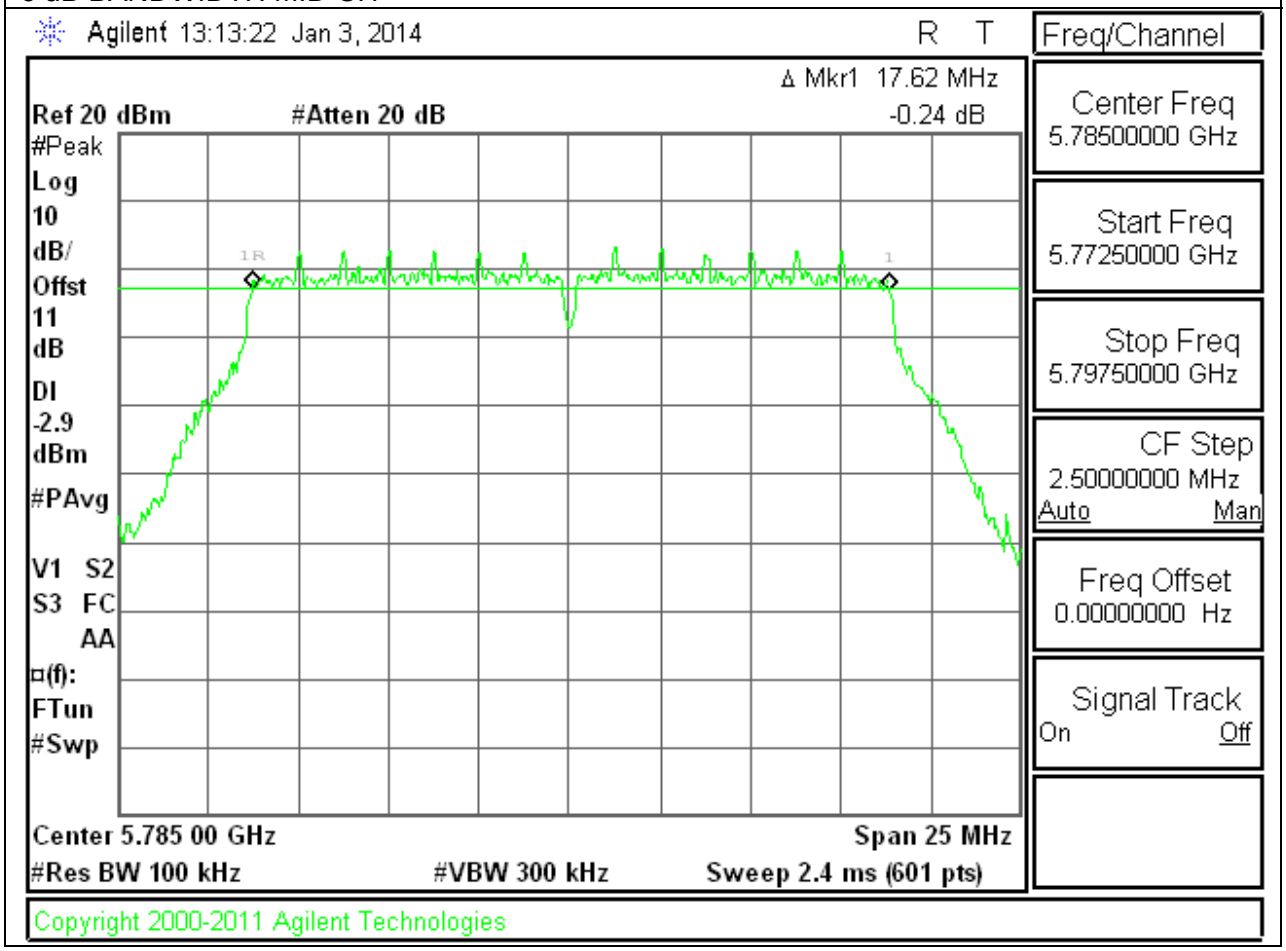
802.11a 5.8GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



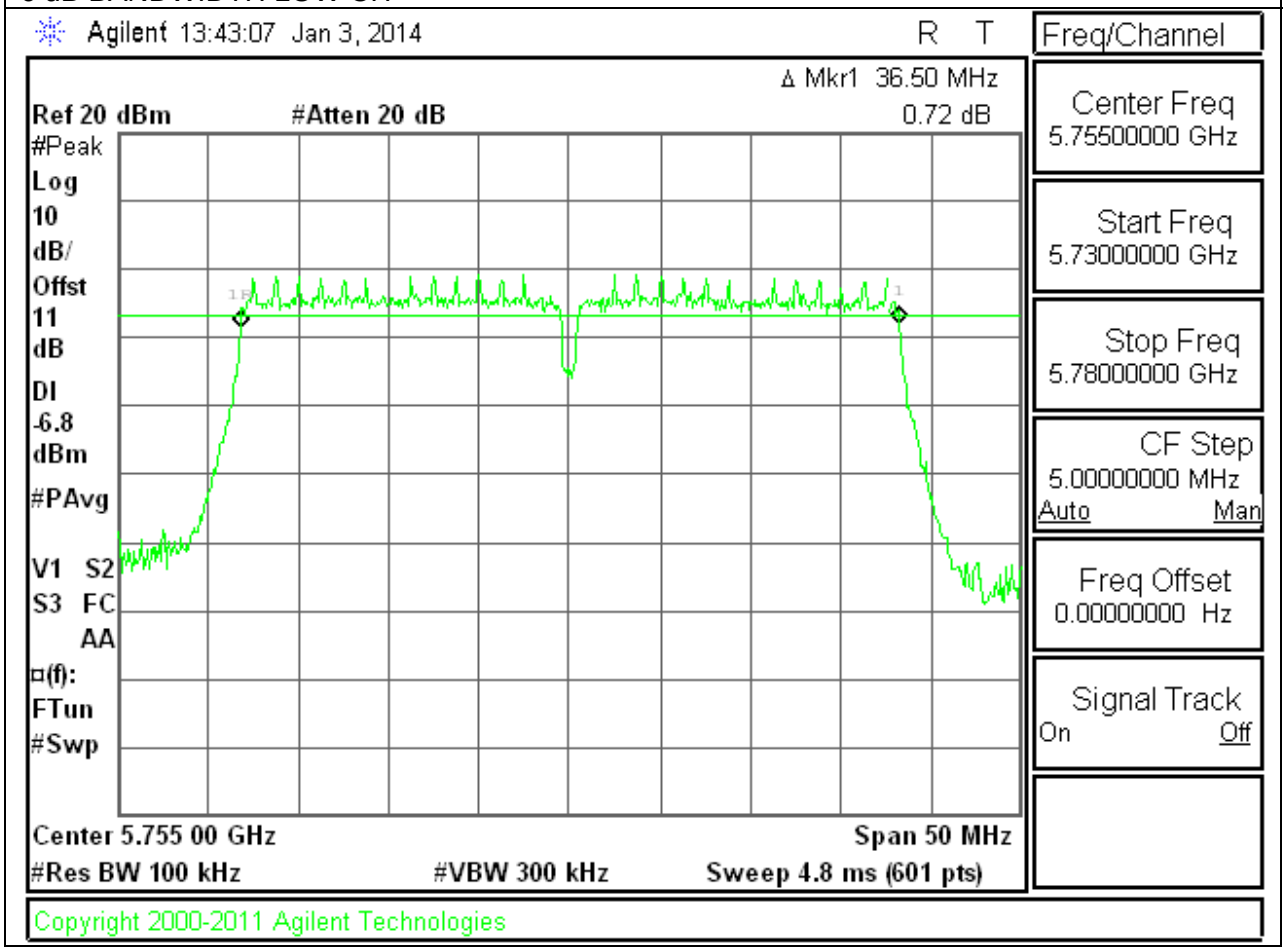
802.11n 5.8GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



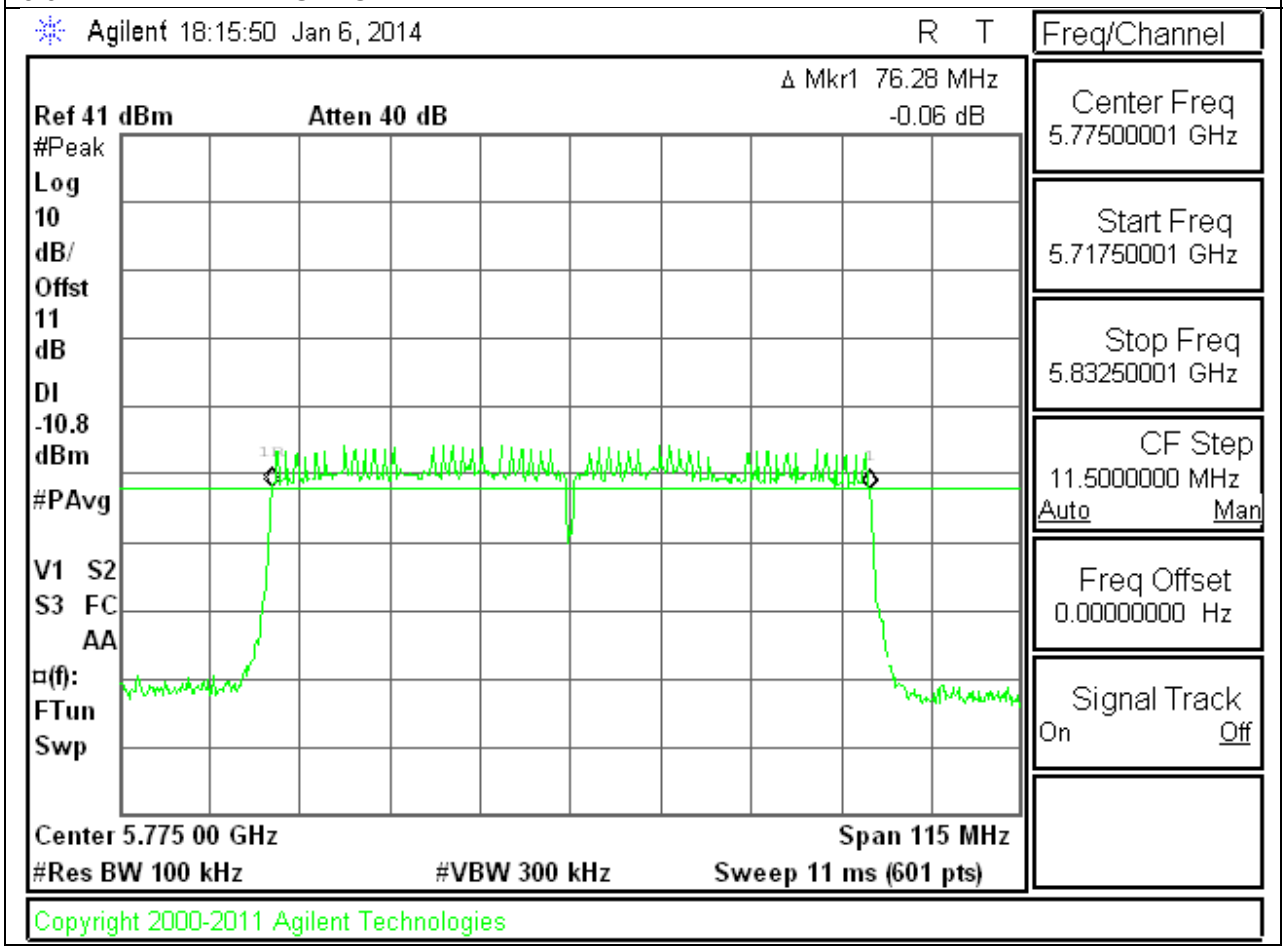
802.11n HT40 5.8GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



802.11ac HT80 5.8GHz Band 6 dB BANDWIDTH

6 dB BANDWIDTH LOW CH



9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.98
Mid	2437	12.96
High	2462	13.02
Worst		13.02

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.26
Mid	2437	16.26
High	2462	16.37
Worst		16.37

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.41
Mid	2437	17.36
High	2462	17.36
Worst		17.41

9.2.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.35
Mid	5785	16.36
High	5825	16.37
Worst		16.37

9.2.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.50
Mid	5785	17.23
High	5825	17.45
Worst		17.50

9.2.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

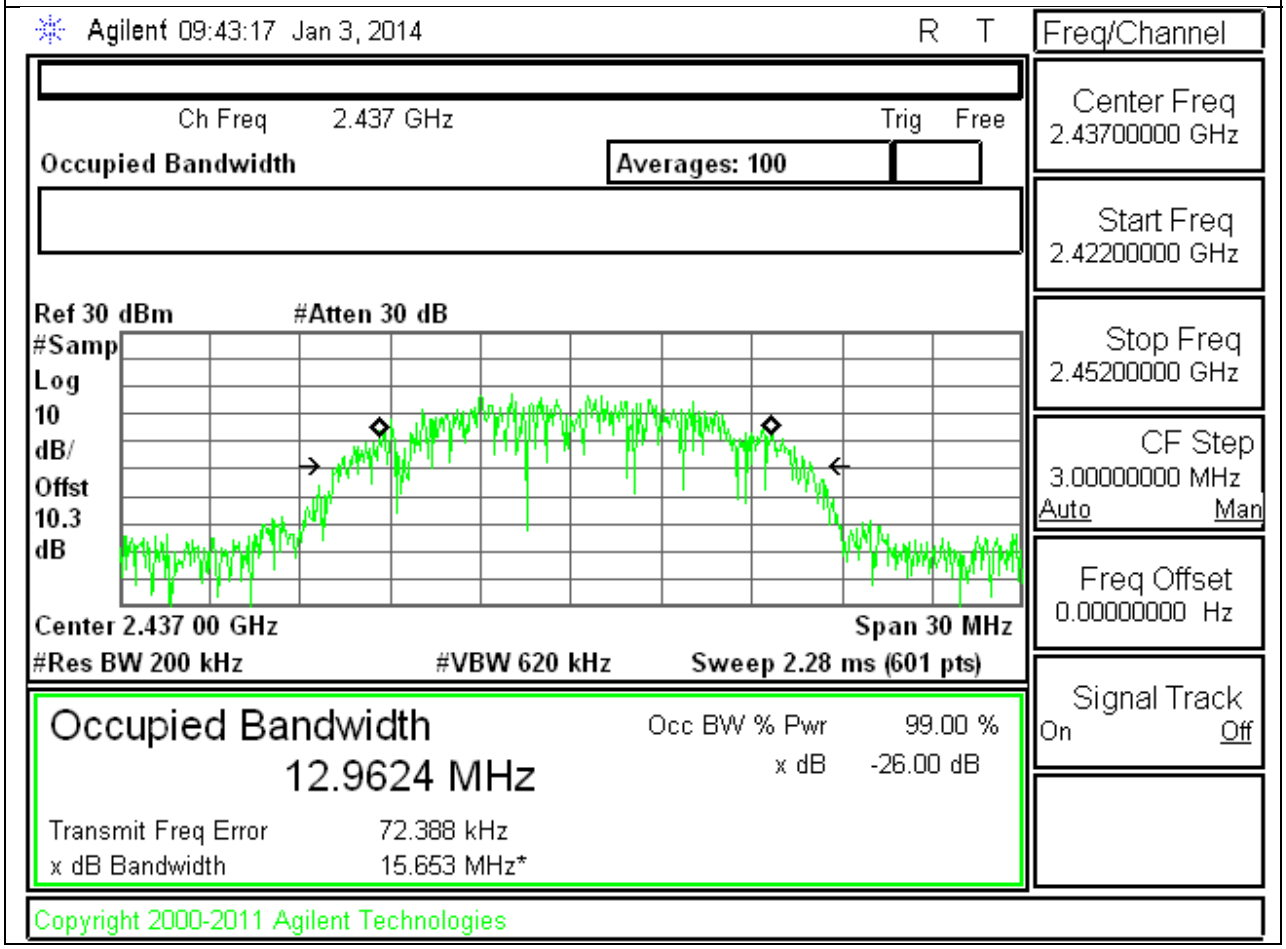
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	35.62
High	5795	35.61
Worst		35.62

9.2.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5775	75.33
Worst		75.33

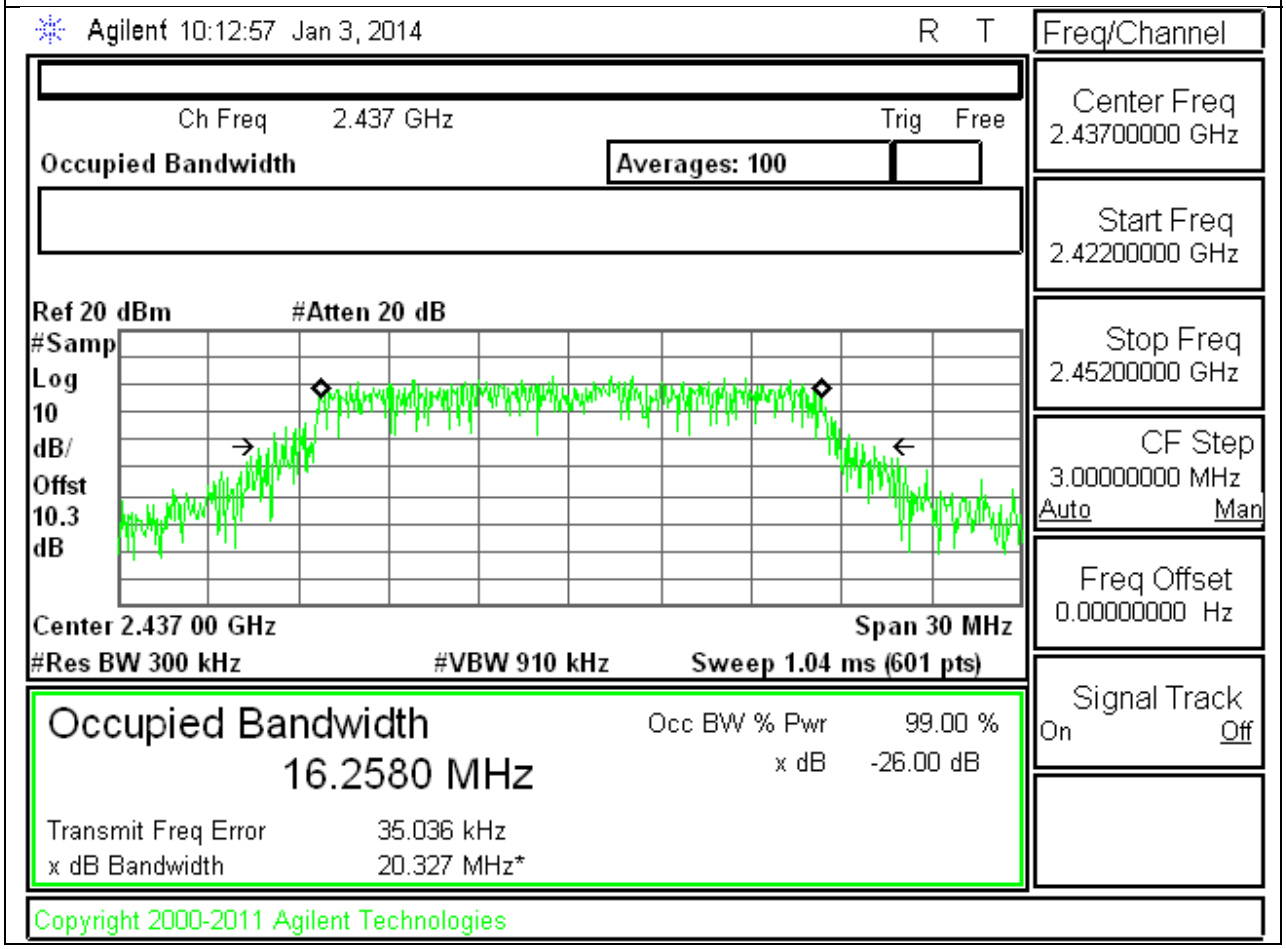
802.11b 99% BANDWIDTH

99% BANDWIDTH MID CH



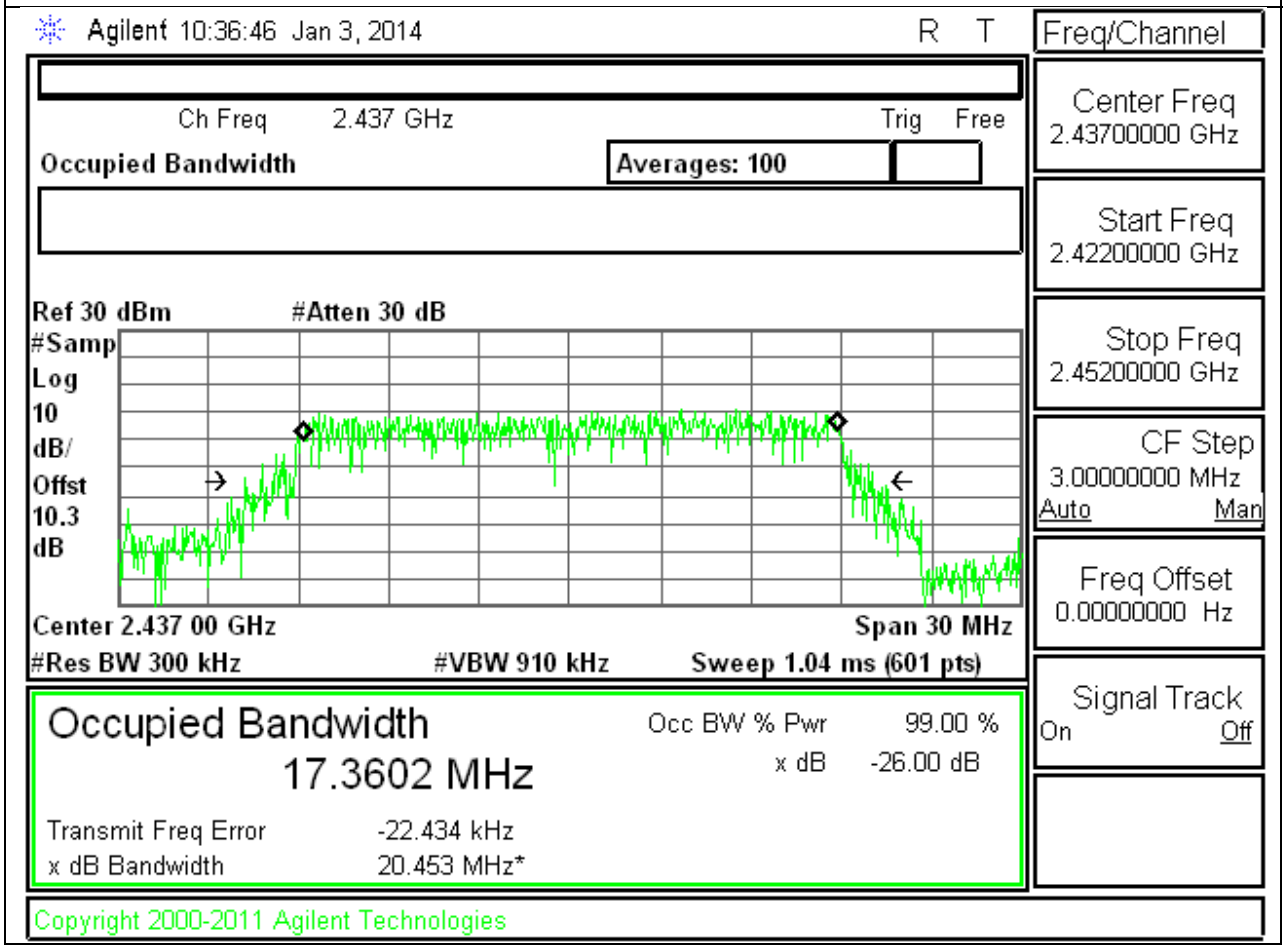
802.11g 99% BANDWIDTH

99% BANDWIDTH MID CH



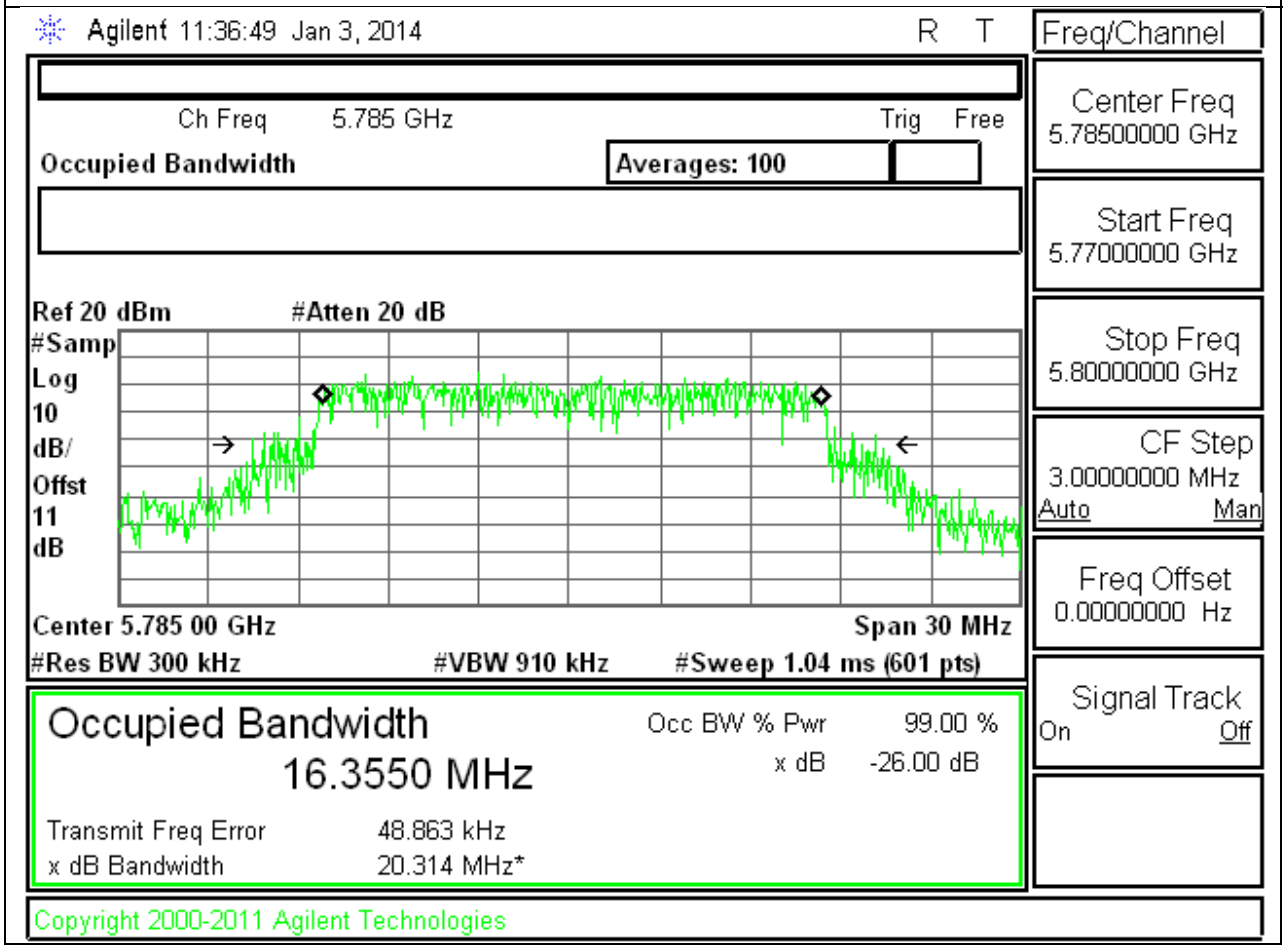
802.11n 99% BANDWIDTH

99% BANDWIDTH MID CH



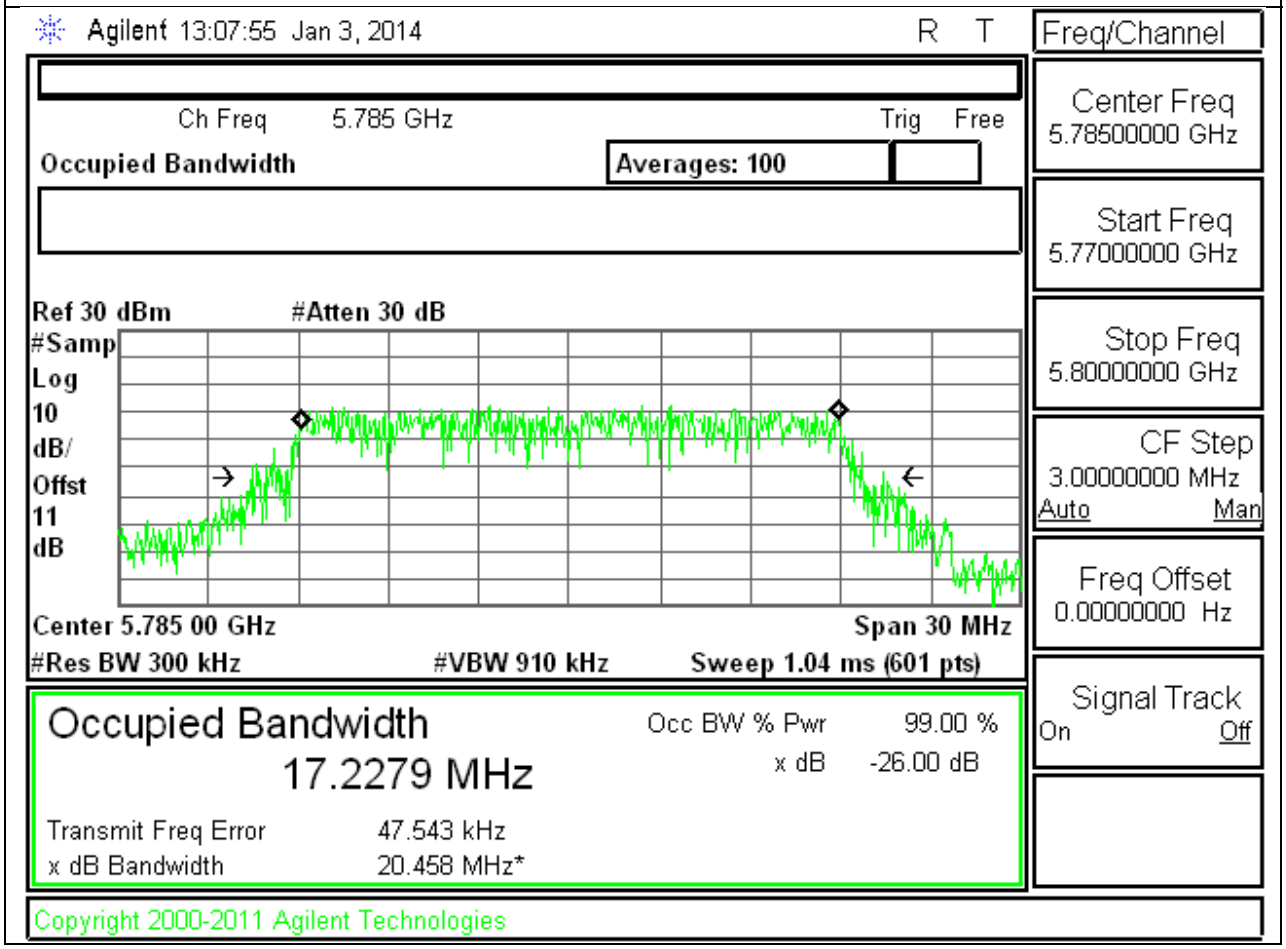
802.11a 5.8GHz Band 99% BANDWIDTH

99% BANDWIDTH MID CH



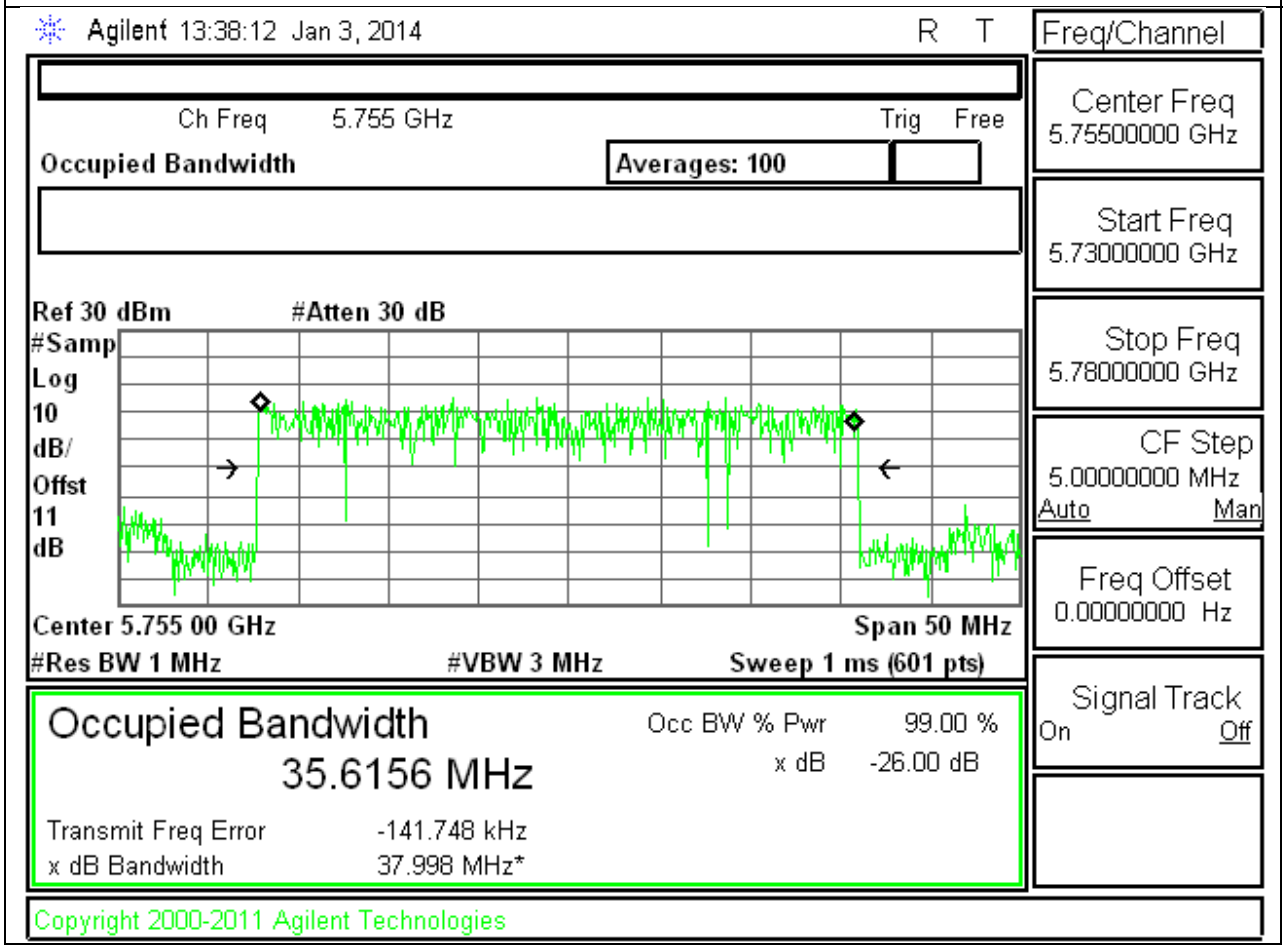
802.11n HT20 5.8GHz Band 99% BANDWIDTH

99% BANDWIDTH MID CH



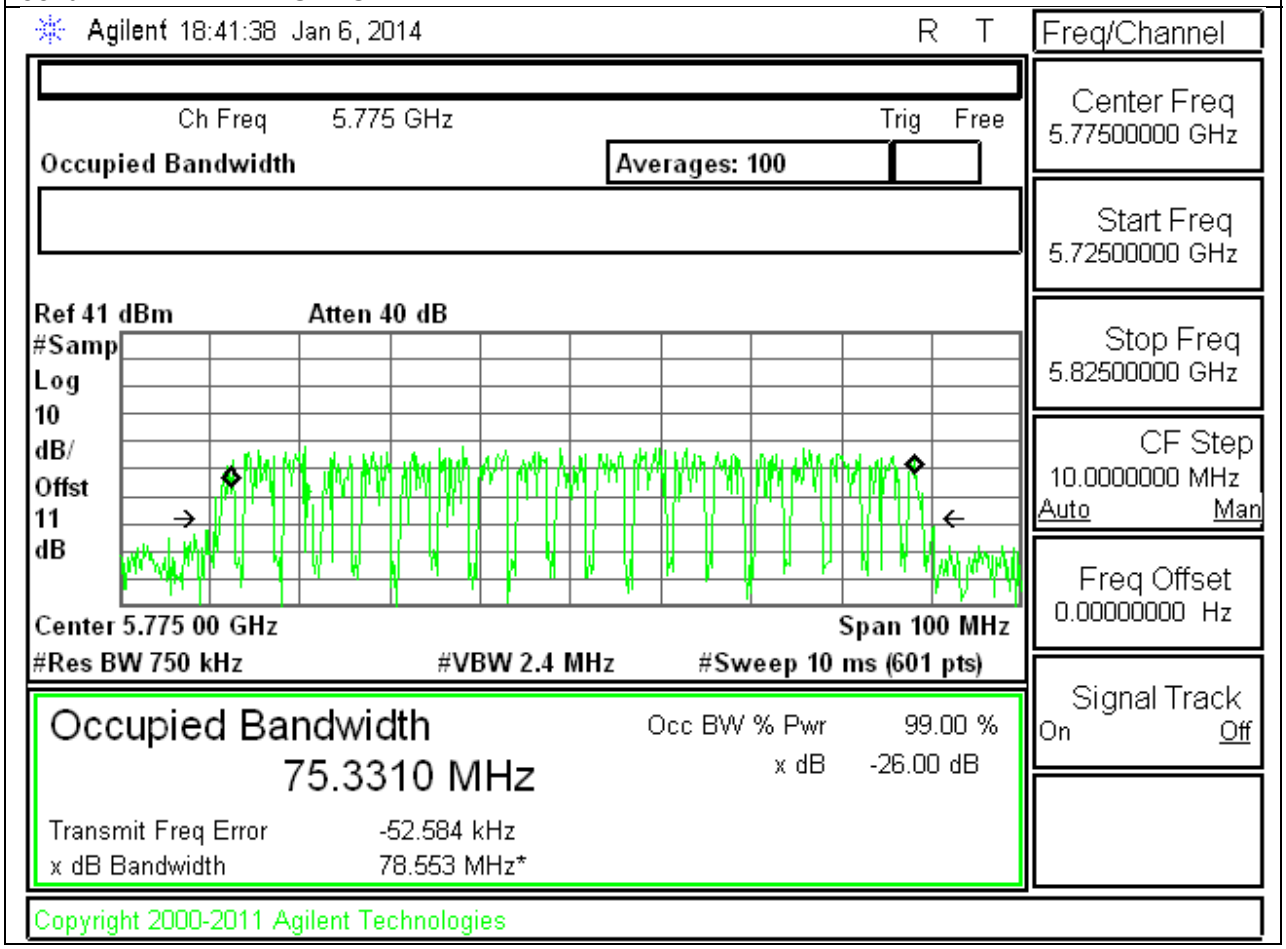
802.11n HT40 5.8GHz Band 99% BANDWIDTH

99% BANDWIDTH LOW CH



802.11ac HT80 5.8GHz Band 99% BANDWIDTH

99% BANDWIDTH LOW CH



9.3. 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 0.2 dB (including 10 dB pad and 0.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	17.20
Mid	2437	17.50
High	2462	17.50
Worst		17.500

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	14.00
Mid	2437	14.20
High	2462	14.30
Worst		14.300

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.20
Mid	2437	13.10
High	2462	13.00
Worst		13.200

9.3.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	13.400
Mid	5785	13.400
High	5825	13.500
Worst		13.500

9.3.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	13.300
Mid	5785	13.300
High	5825	13.400
Worst		13.400

9.3.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5755	12.3
High	5795	12.4
Worst		12.4

9.3.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5775	11.1
Worst		11.1

9.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

RESULTS

9.4.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.51	30.00	30	36	30.00
Mid	2437	-1.51	30.00	30	36	30.00
High	2462	-1.51	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.98	19.98	30.00	-10.02
Mid	2437	19.65	19.65	30.00	-10.35
High	2462	19.35	19.35	30.00	-10.65
Worst			19.98		

9.4.2. 802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.51	30.00	30	36	30.00
Mid	2437	-1.51	30.00	30	36	30.00
High	2462	-1.51	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.97	21.97	30.00	-8.03
Mid	2437	21.86	21.86	30.00	-8.14
High	2462	22.44	22.44	30.00	-7.56
Worst			22.44		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.51	30.00	30	36	30.00
Mid	2437	-1.51	30.00	30	36	30.00
High	2462	-1.51	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.07	21.07	30.00	-8.93
Mid	2437	20.93	20.93	30.00	-9.07
High	2462	21.63	21.63	30.00	-8.37
Worst			21.63		

9.4.4. 802.11a MODE IN THE 5.8 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	0.01	30.00	30	36	30.00
Mid	5785	0.01	30.00	30	36	30.00
High	5825	0.01	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5745	22.39	22.39	30.00	-7.61
Mid	5785	22.17	22.17	30.00	-7.83
High	5825	22.36	22.36	30.00	-7.64
Worst			22.39		

9.4.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	0.01	30.00	30	36	30.00
Mid	5785	0.01	30.00	30	36	30.00
High	5825	0.01	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5745	22.33	22.33	30.00	-7.67
Mid	5785	21.96	21.96	30.00	-8.04
High	5825	22.24	22.24	30.00	-7.76
Worst			22.33		

9.4.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5755	0.01	30.00	30	36	30.00
High	5795	0.01	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5755	21.30	21.30	30.00	-8.70
High	5795	21.48	21.48	30.00	-8.52
Worst			21.48		

9.4.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Limits

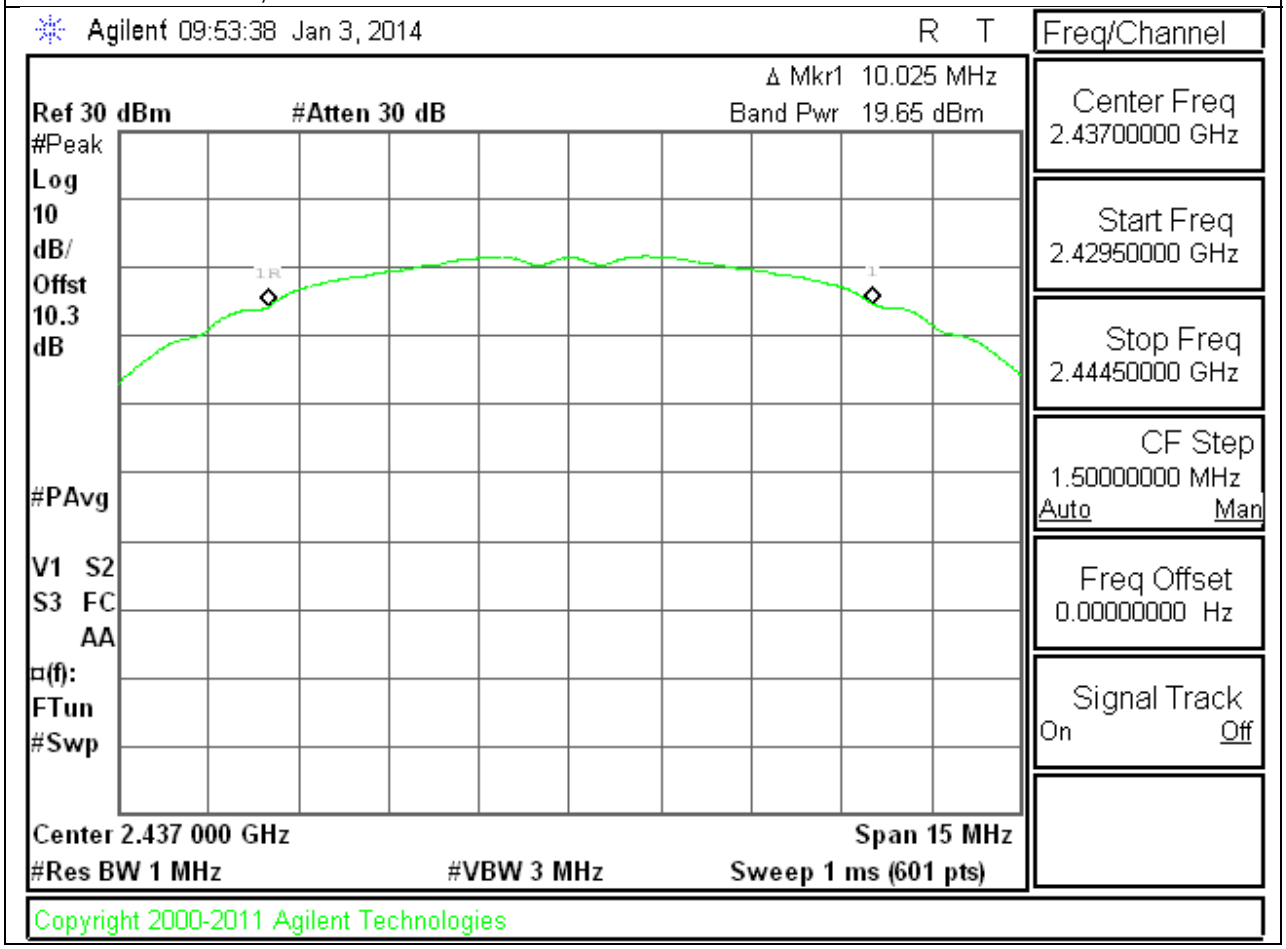
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5775	0.01	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5775	20.00	20.00	30.00	-10.00
Worst			20.00		

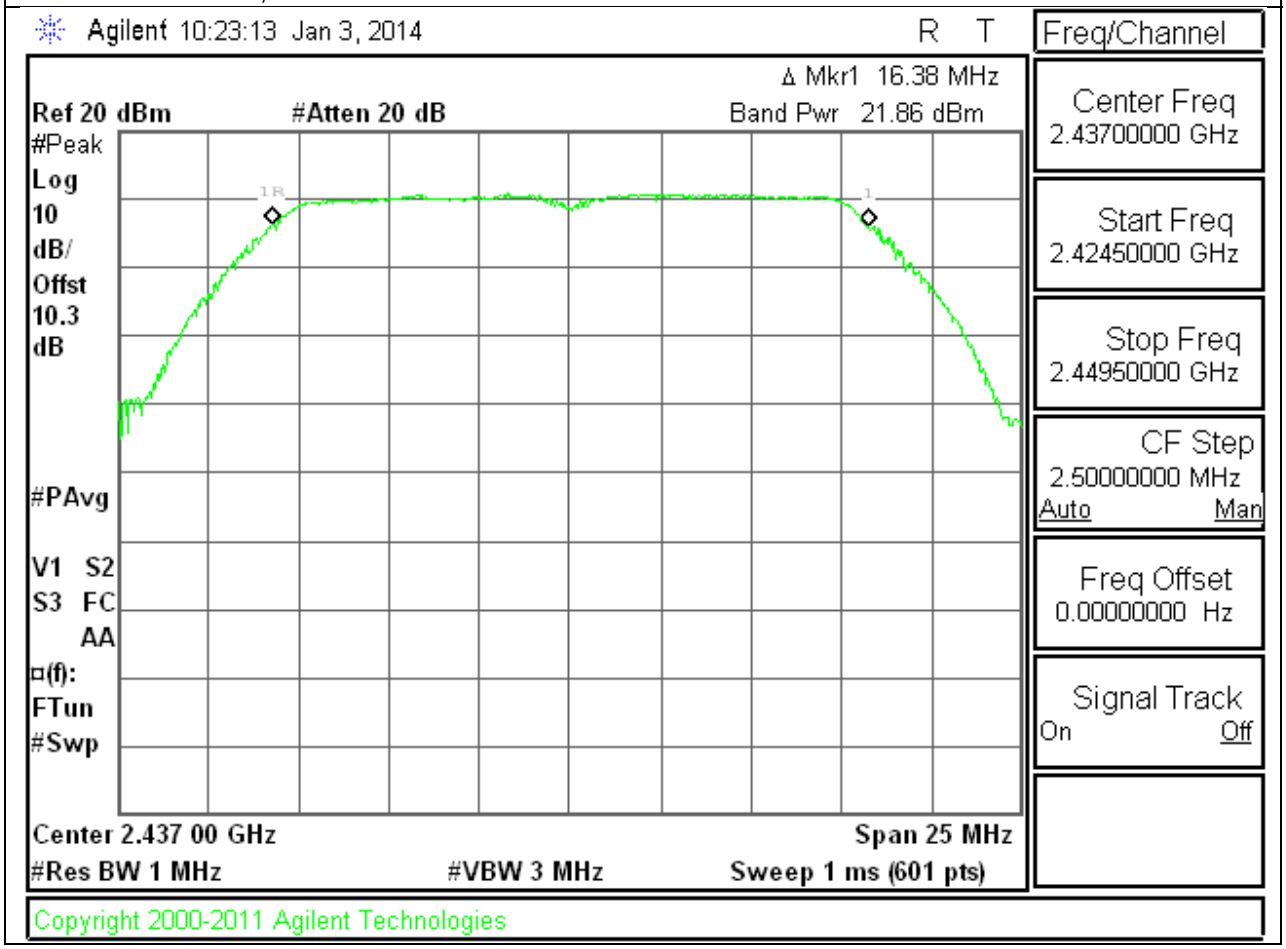
802.11b OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



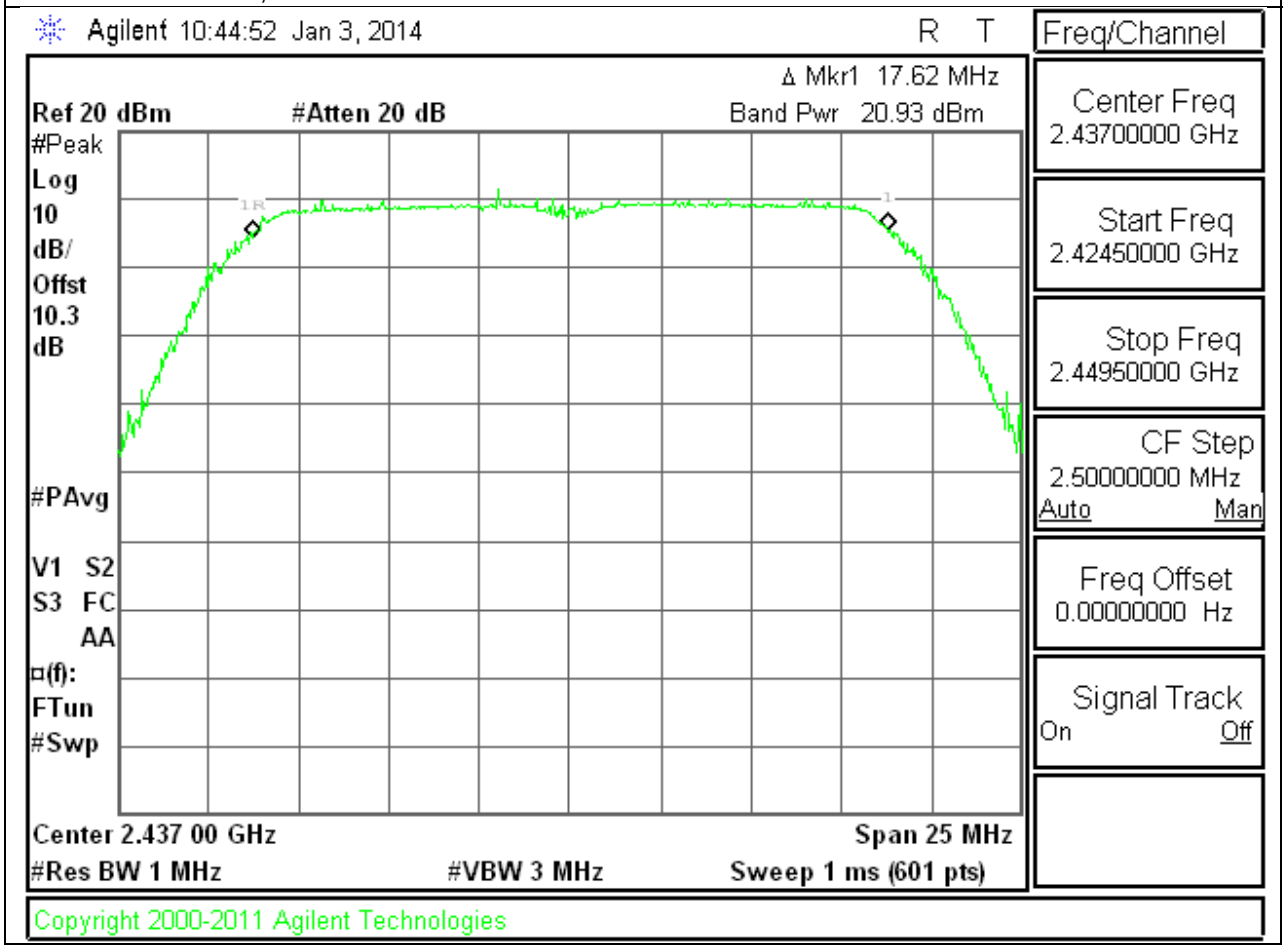
802.11g OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



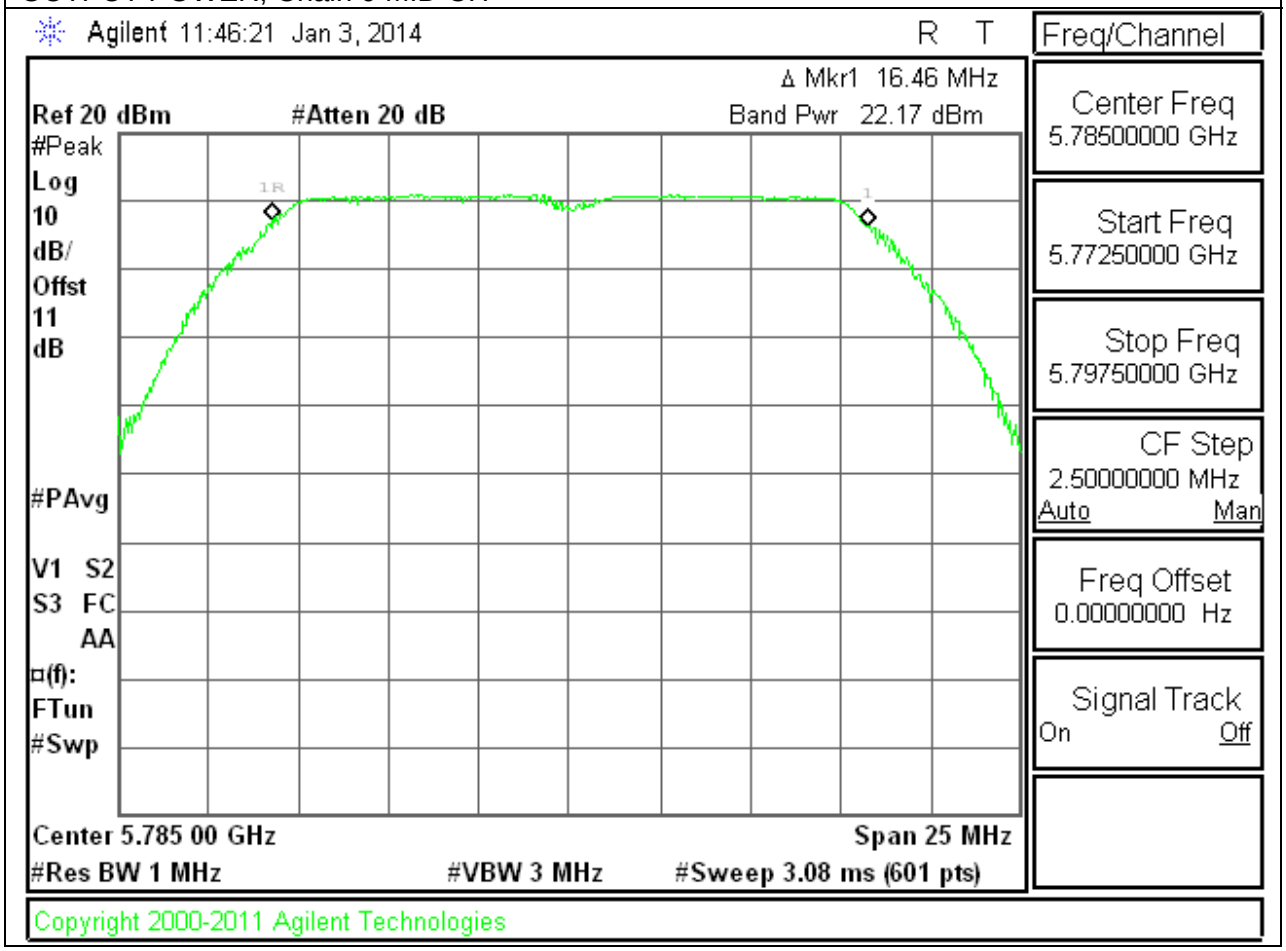
802.11n OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



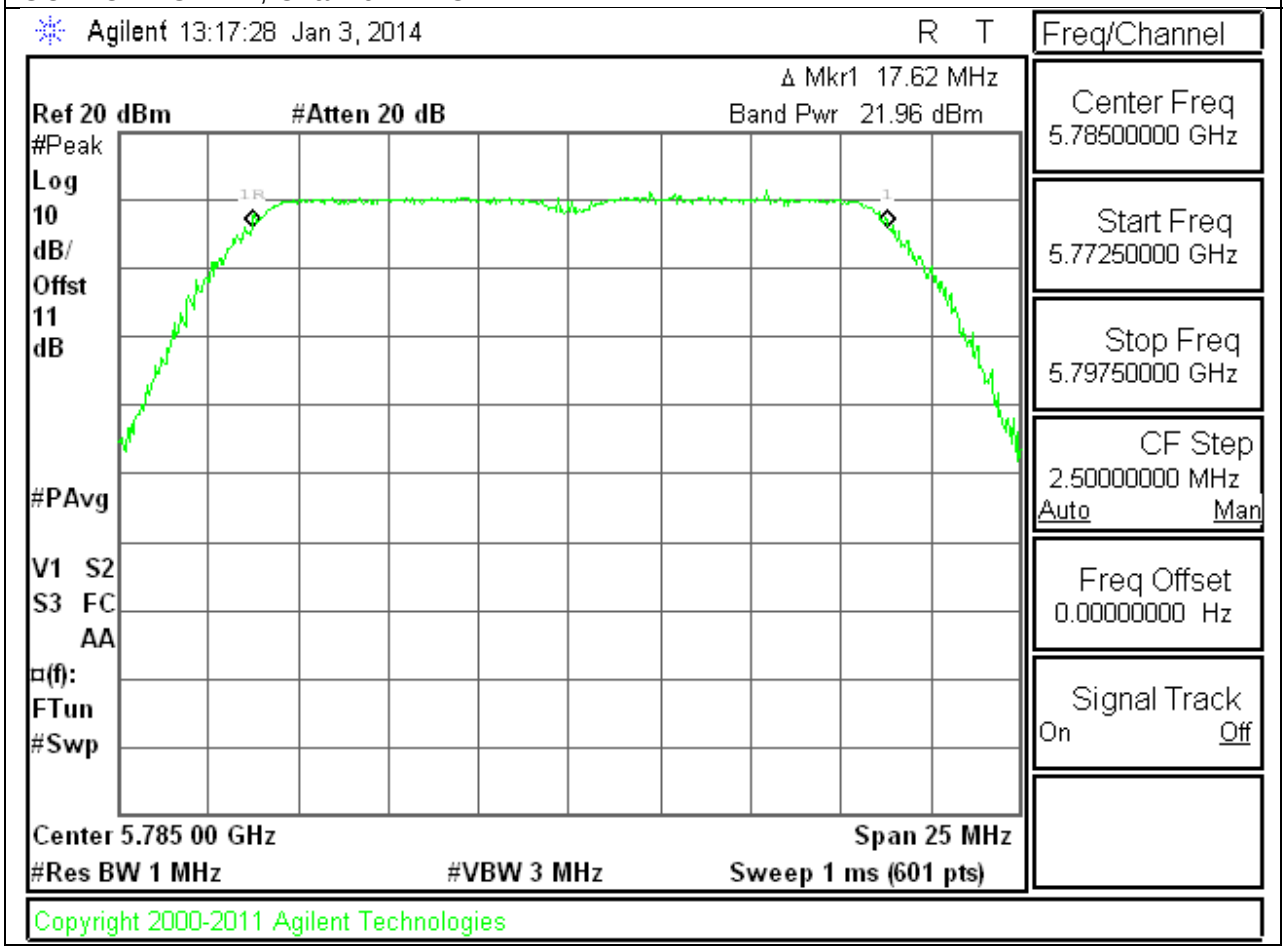
802.11a HT20 5.8GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



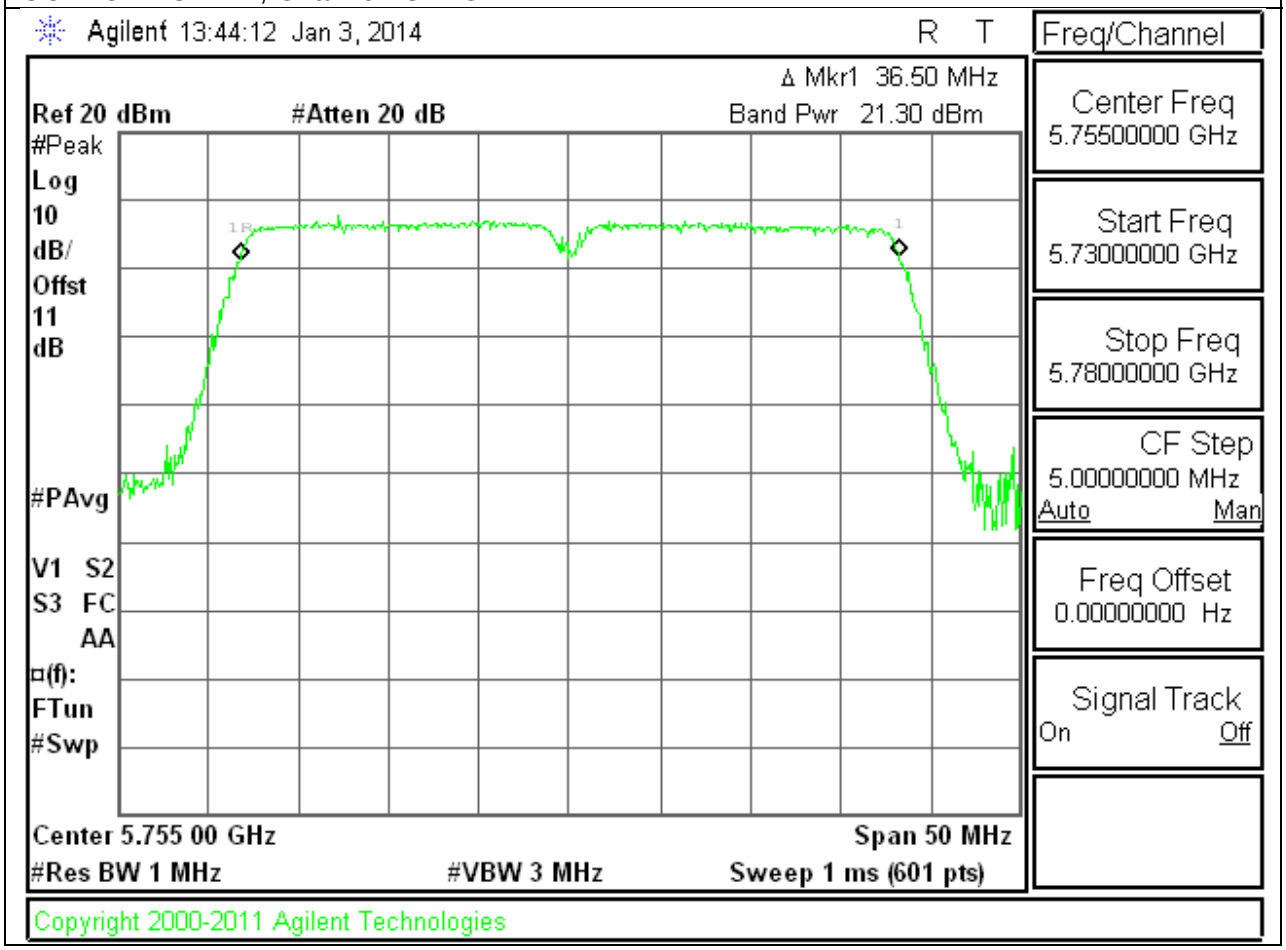
802.11n HT20 5.8GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



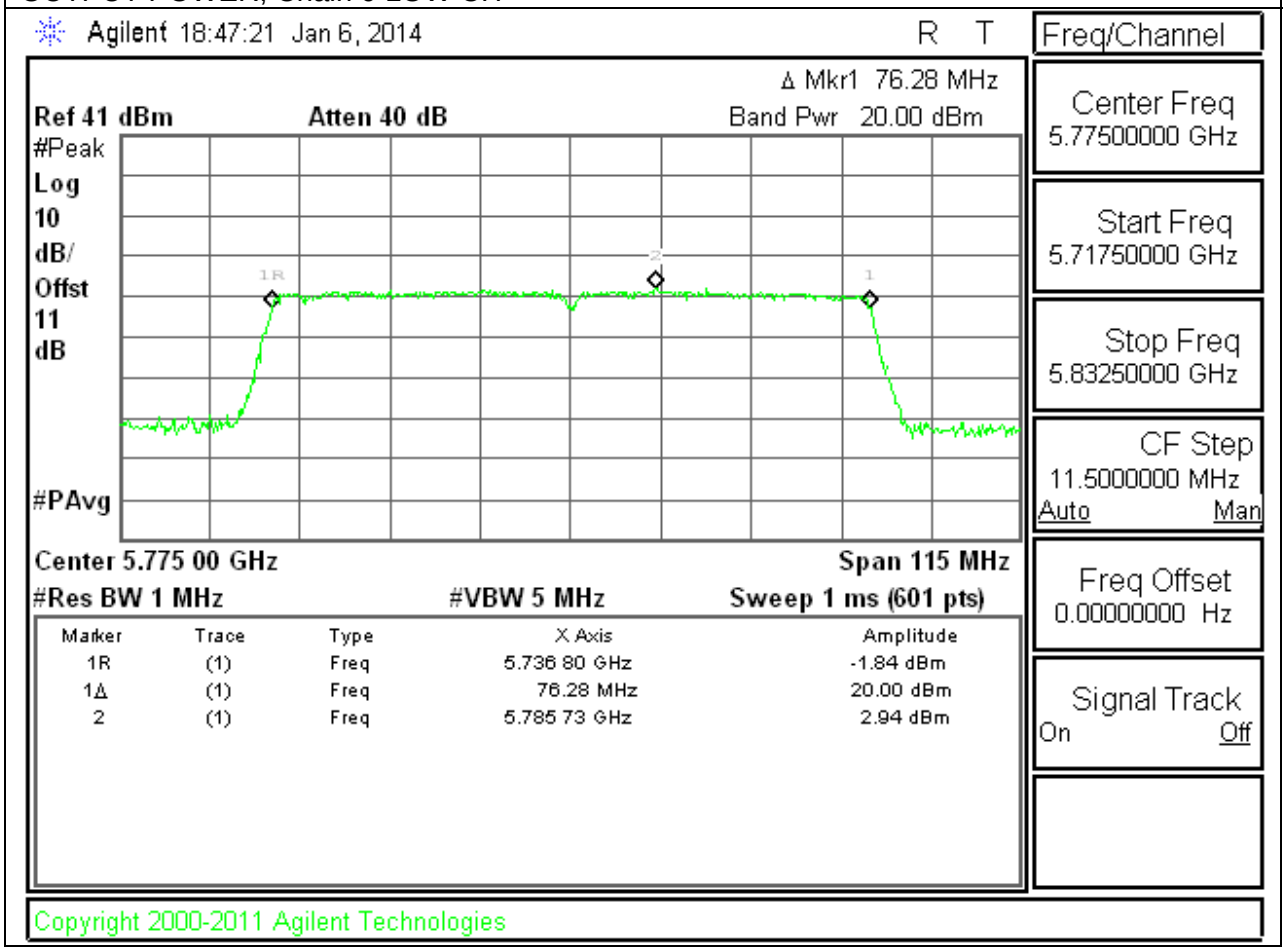
802.11n HT40 5.8GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 LOW CH



802.11ac HT80 5.8GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 LOW CH



9.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

9.5.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-4.48	8.0	-12.5
Mid	2437	-5.42	8.0	-13.4
High	2462	-6.43	8.0	-14.4

9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.84	8.0	-18.8
Mid	2437	-11.54	8.0	-19.5
High	2462	-9.70	8.0	-17.7

9.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.56	8.0	-19.6
Mid	2437	-12.33	8.0	-20.3
High	2462	-11.72	8.0	-19.7

9.5.4. 802.11a MODE IN THE 5.8 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-10.32	8.0	-18.3
Mid	5785	-9.90	8.0	-17.9
High	5825	-11.06	8.0	-19.1

9.5.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-10.50	8.0	-18.5
Mid	5785	-11.38	8.0	-19.4
High	5825	-10.27	8.0	-18.3

9.5.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-14.44	8.0	-22.4
High	5795	-14.47	8.0	-22.5

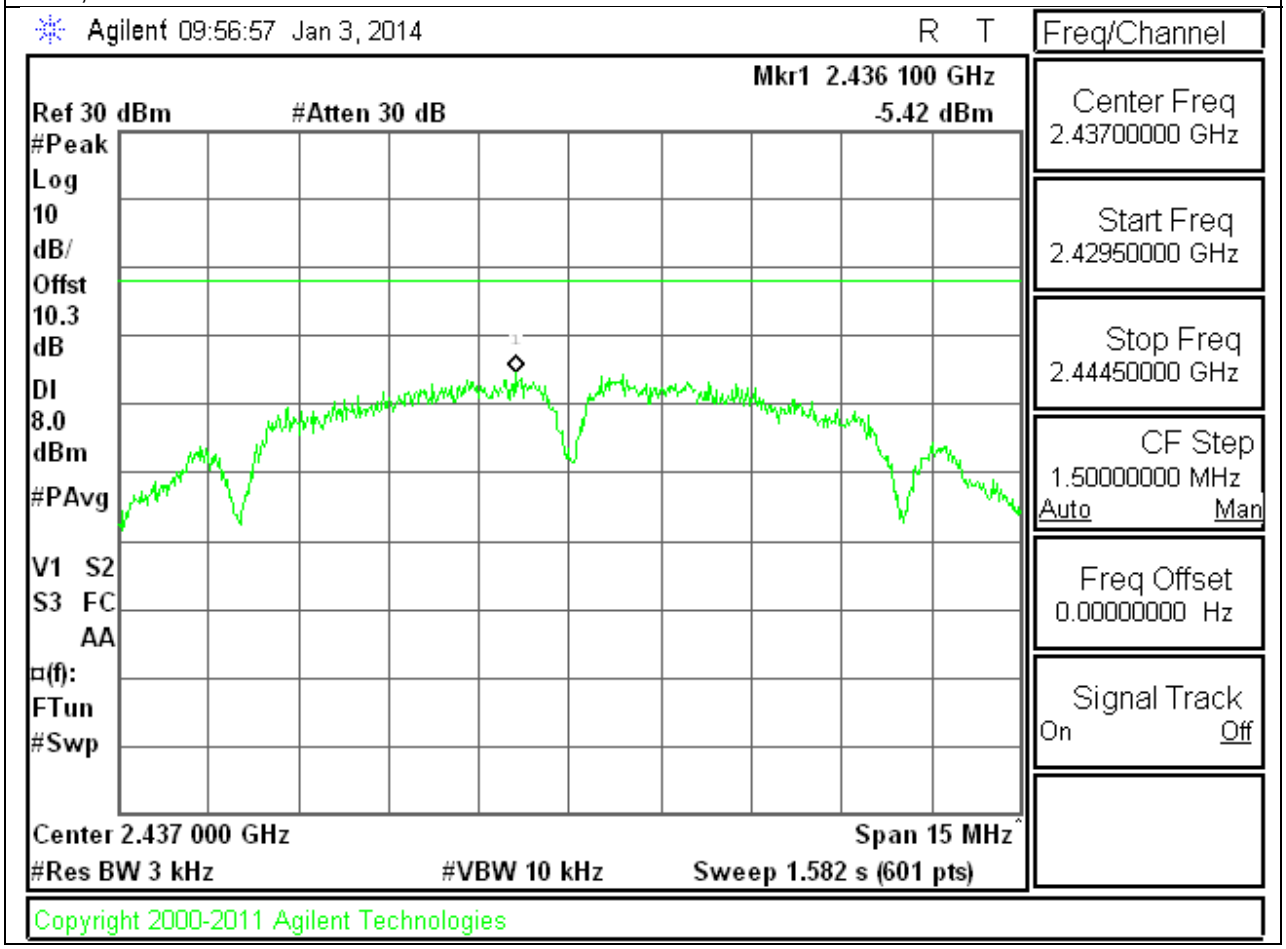
9.5.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5775	-19.31	8.0	-27.3

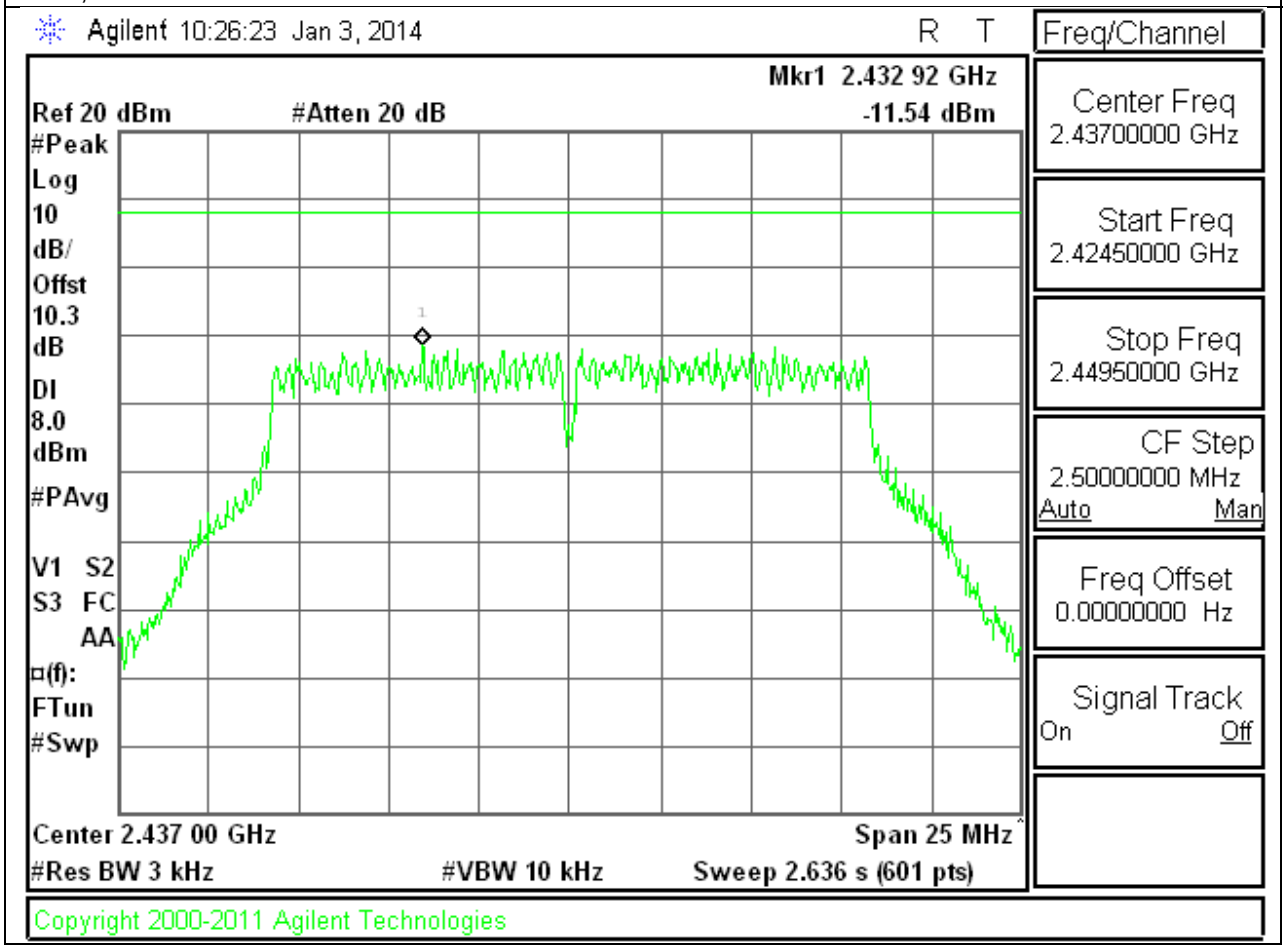
802.11b PSD, Chain 0

PSD, Chain 0 MID CH



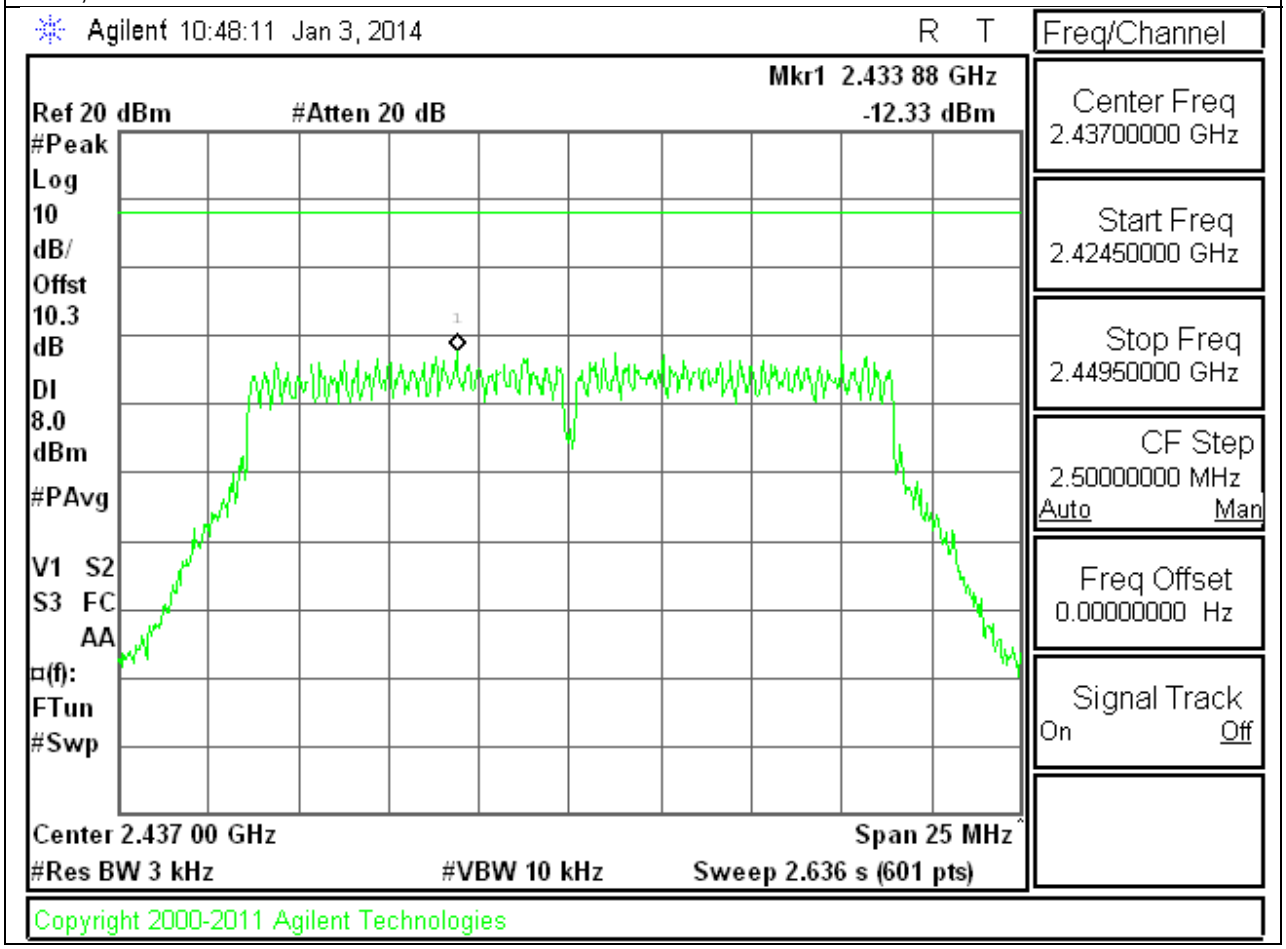
802.11g PSD, Chain 0

PSD, Chain 0 MID CH



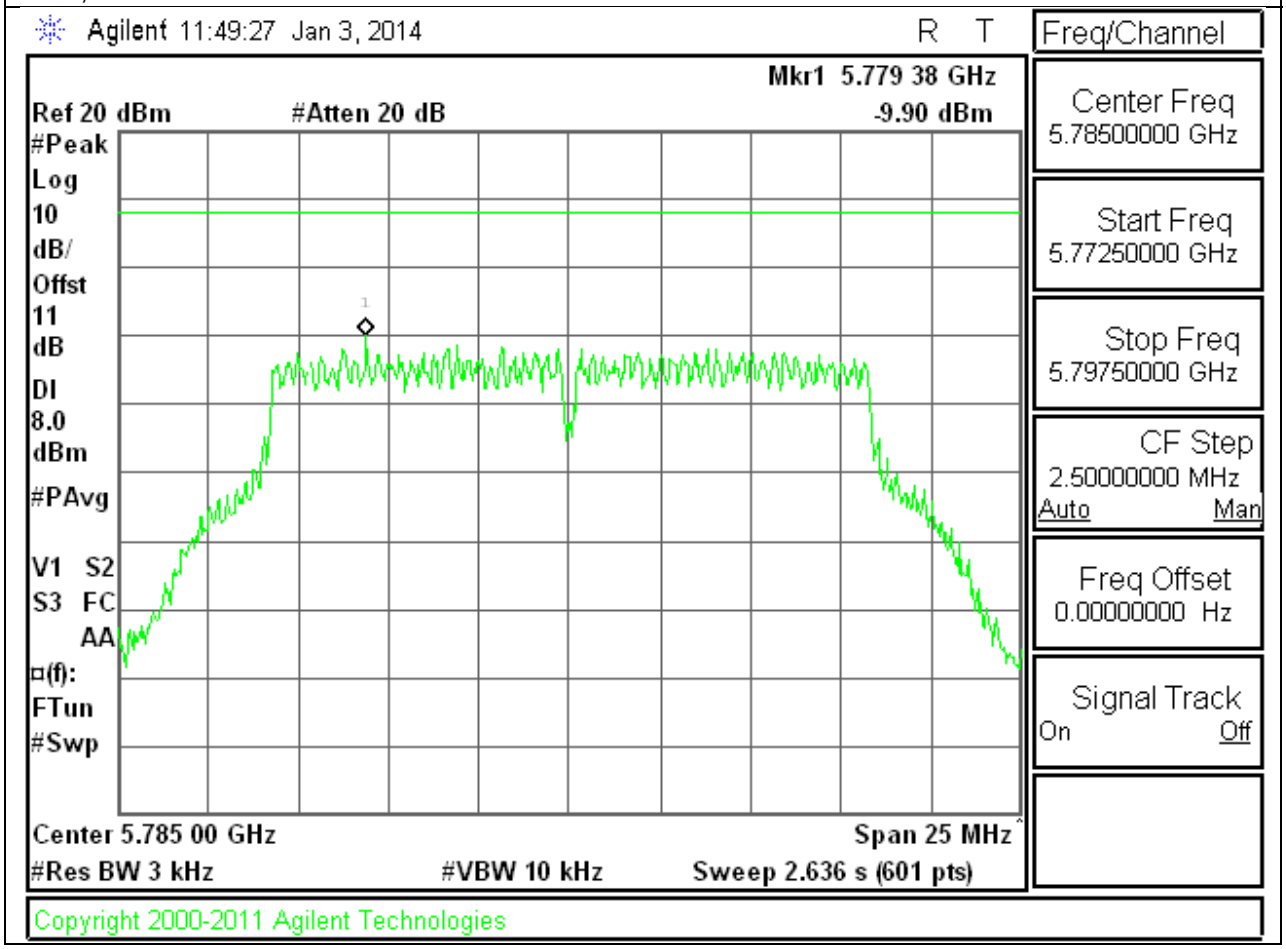
802.11n PSD, Chain 0

PSD, Chain 0 MID CH



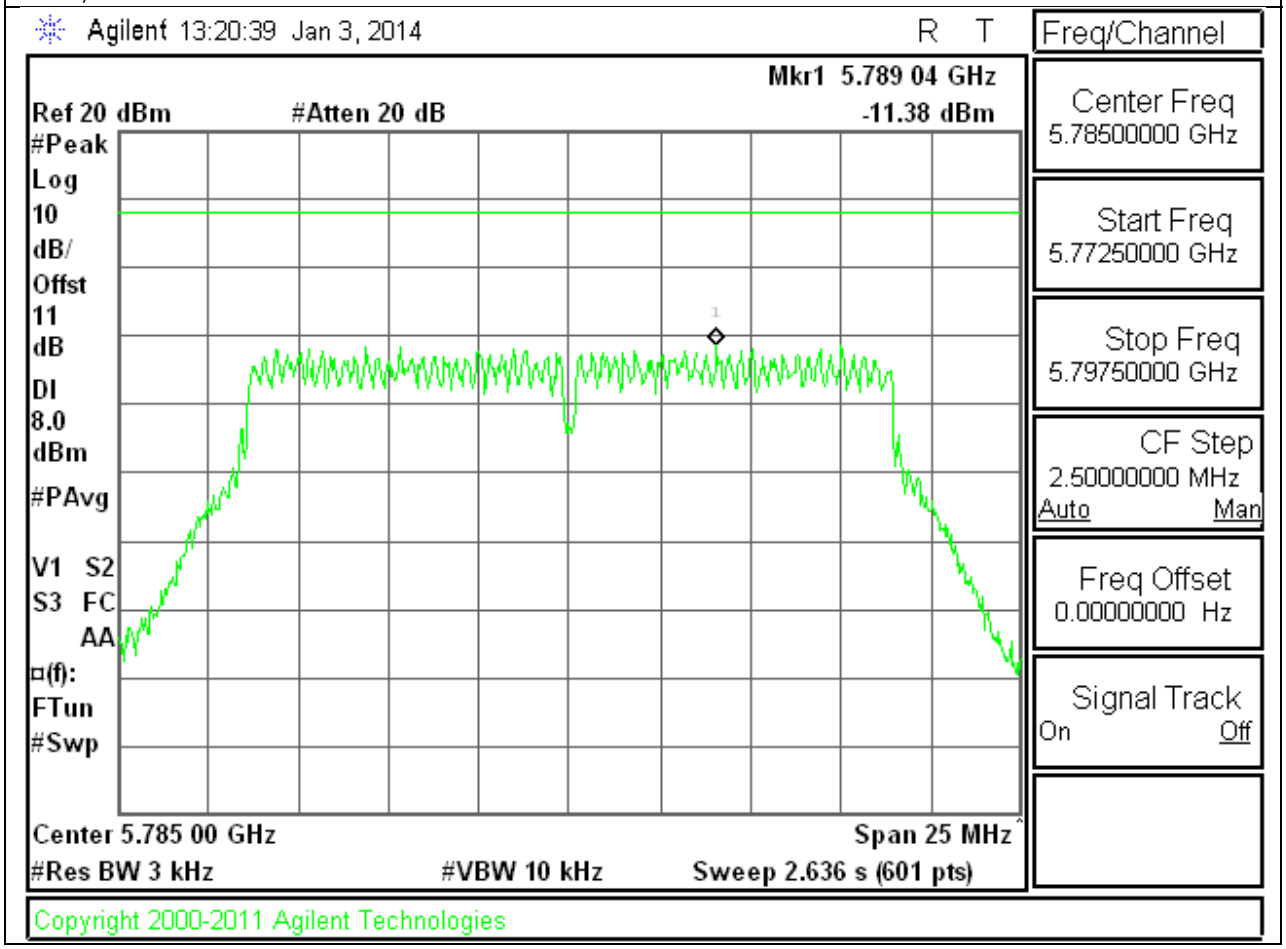
802.11a HT20 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



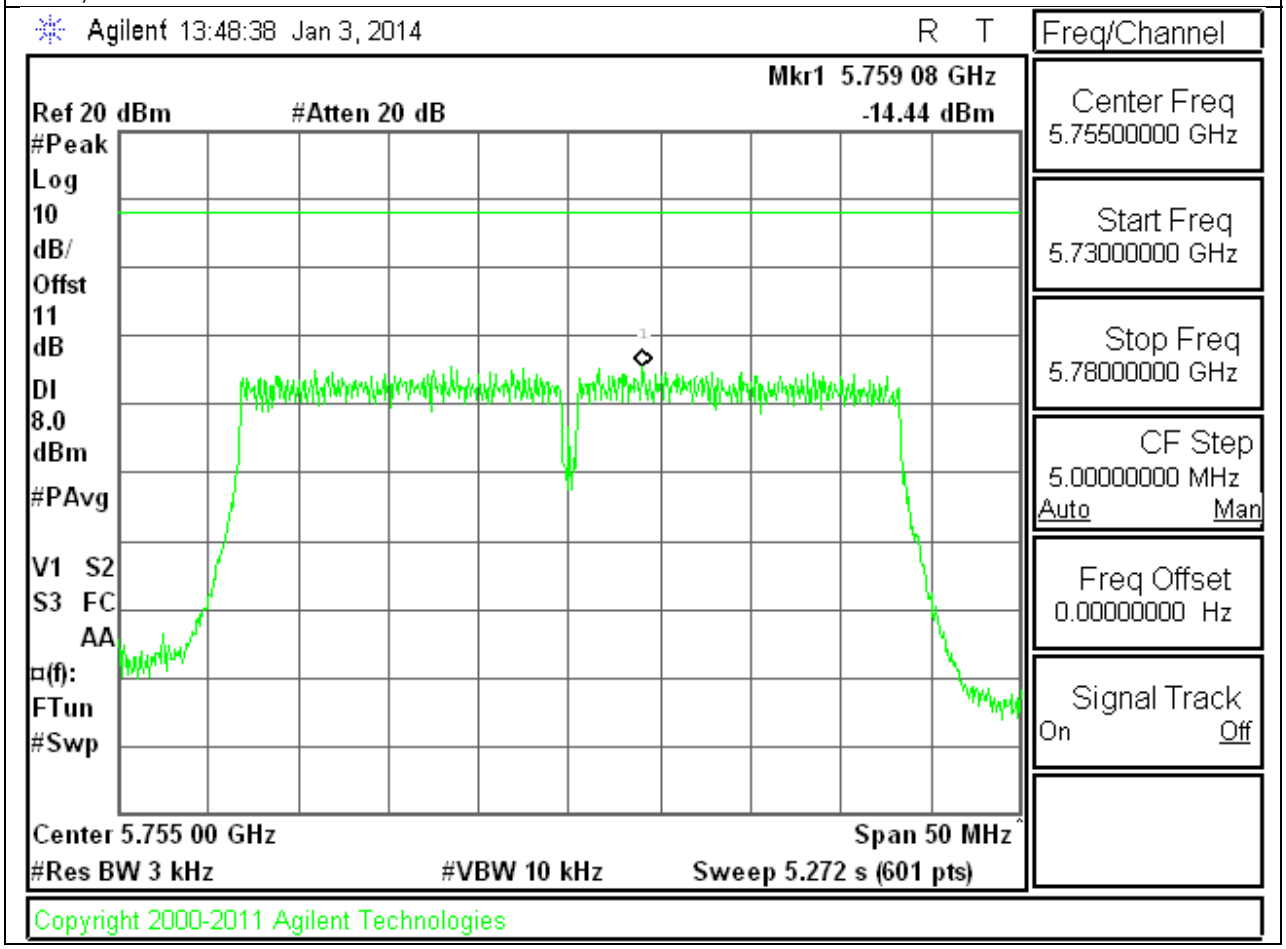
802.11n HT20 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



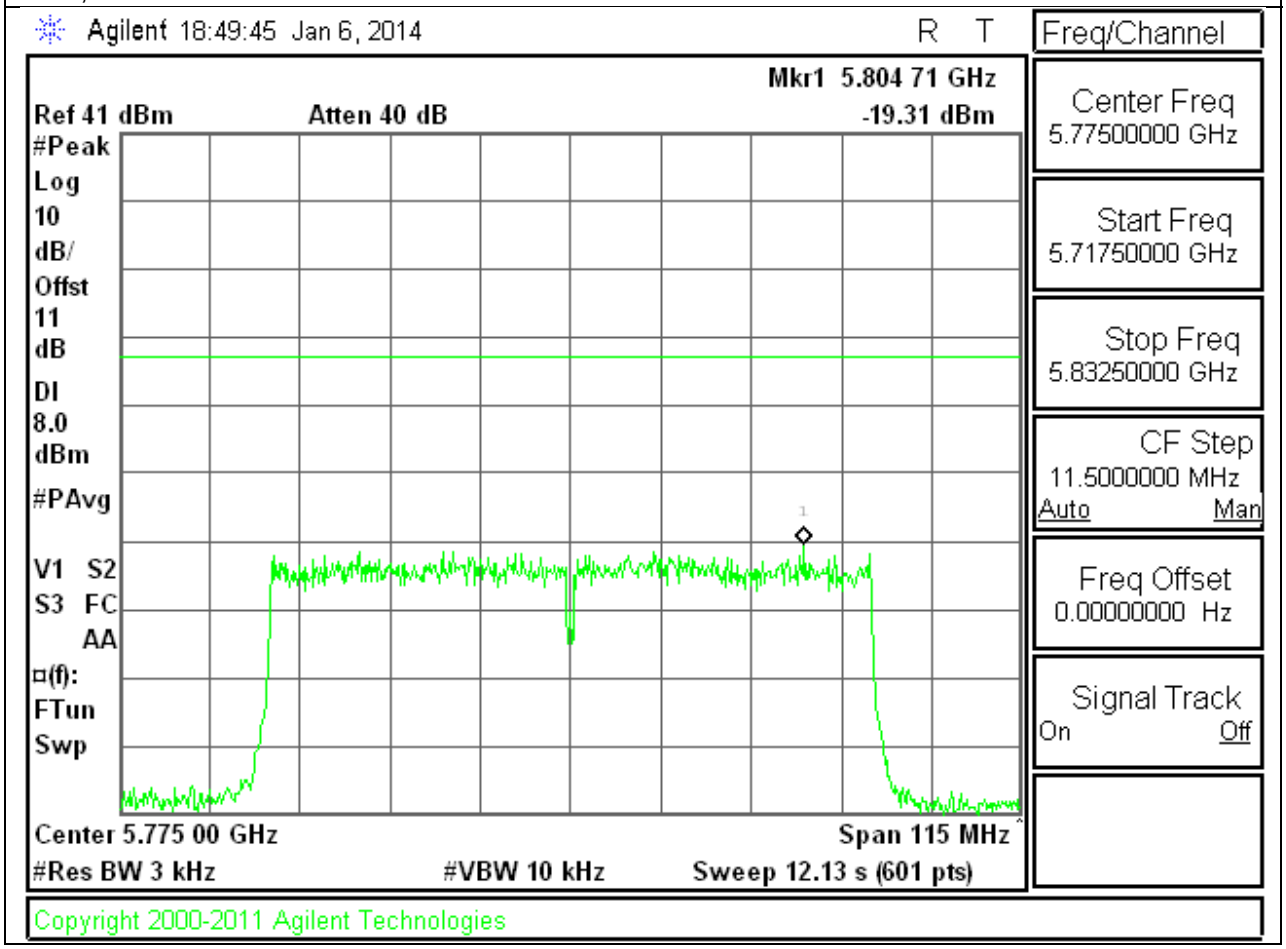
802.11n HT40 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



802.11ac HT80 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



9.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

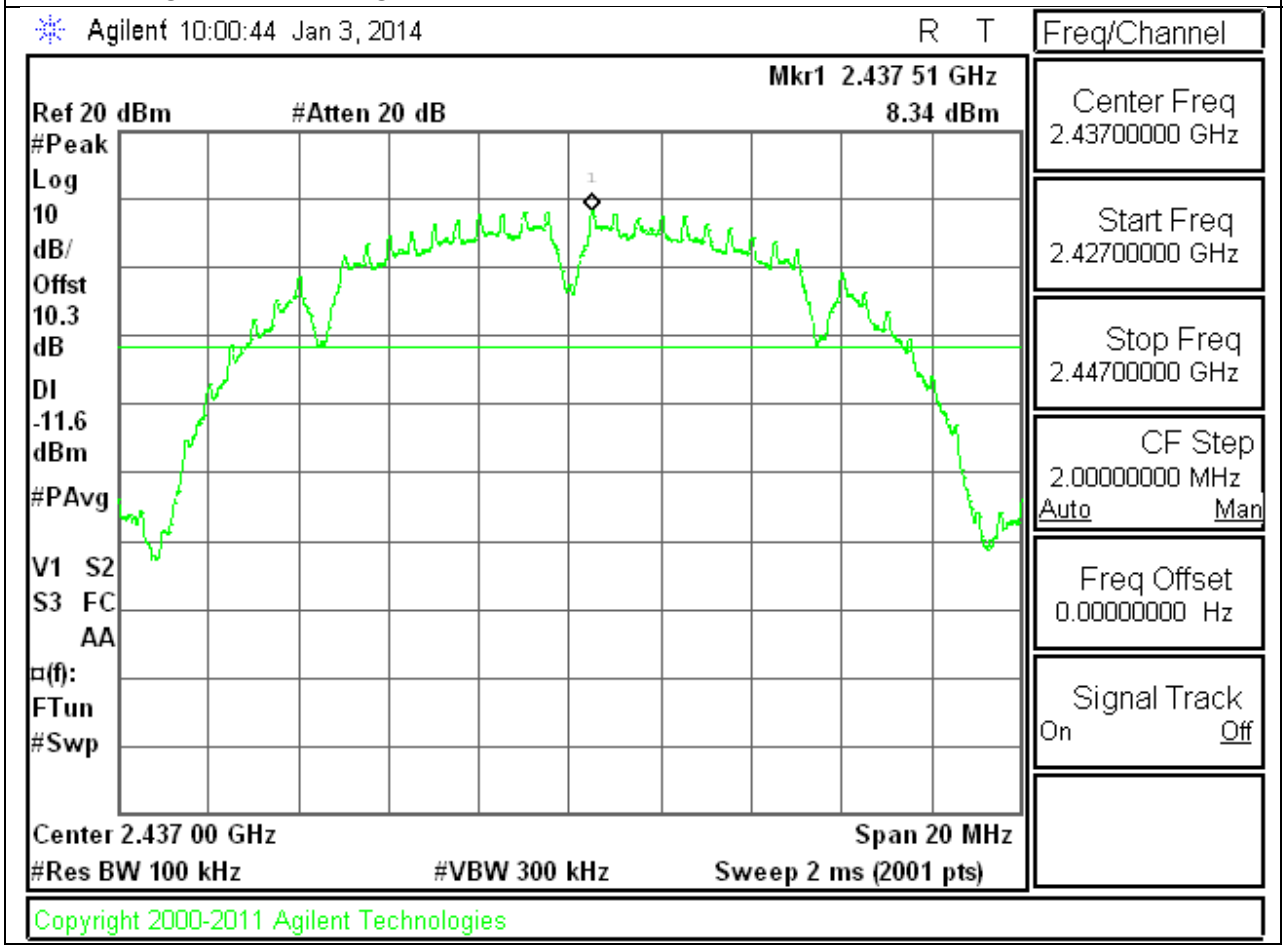
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

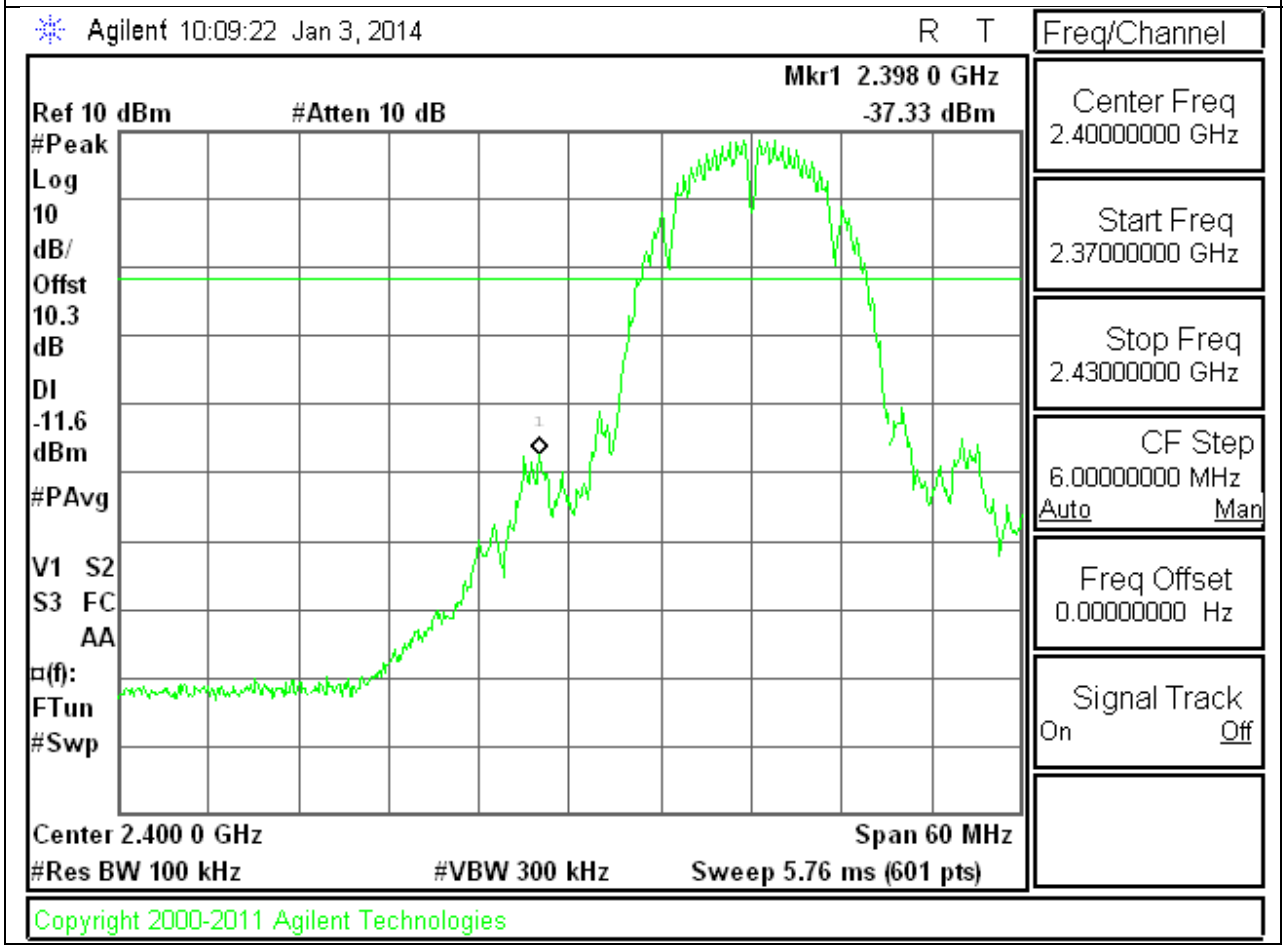
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



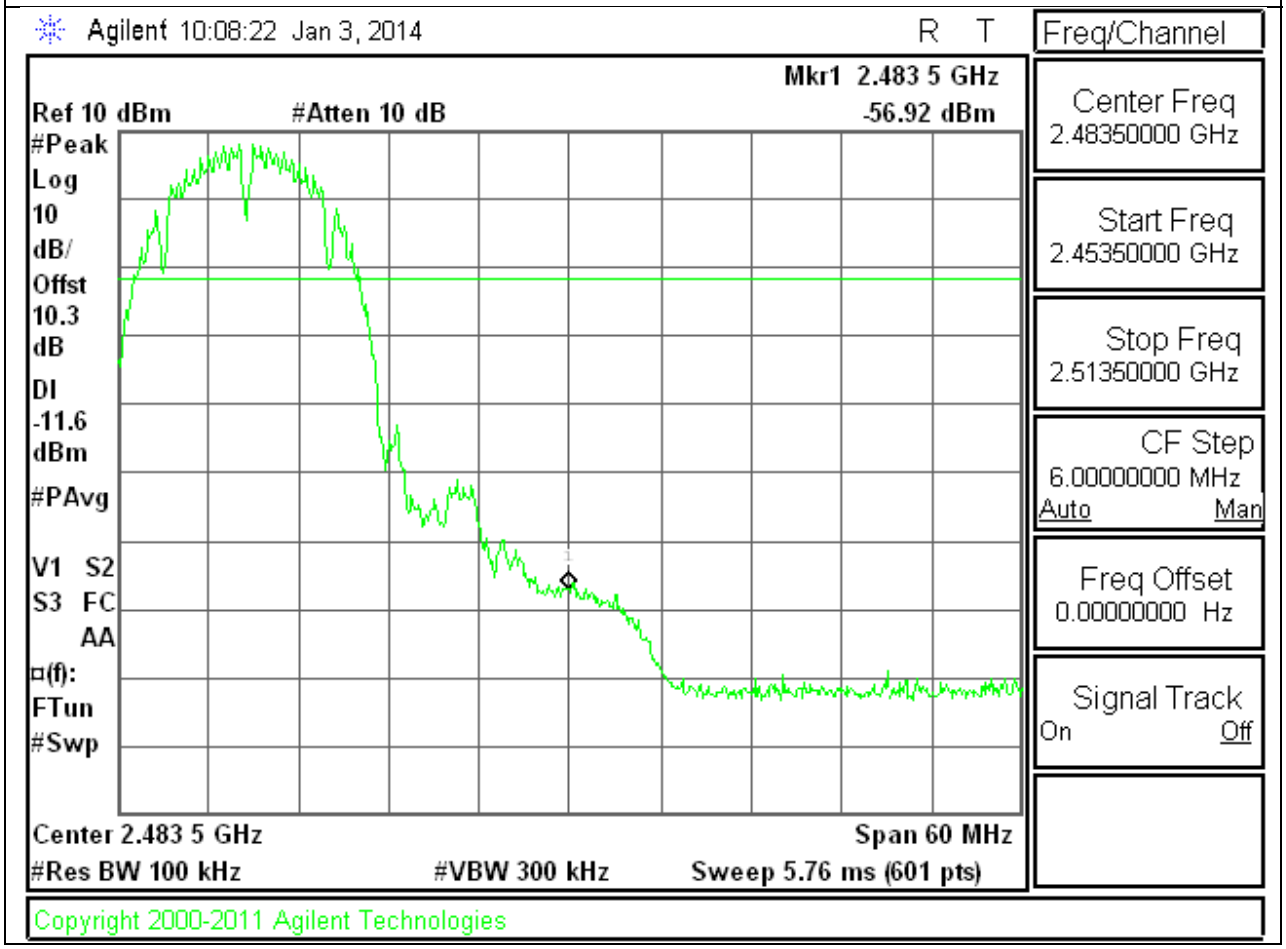
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



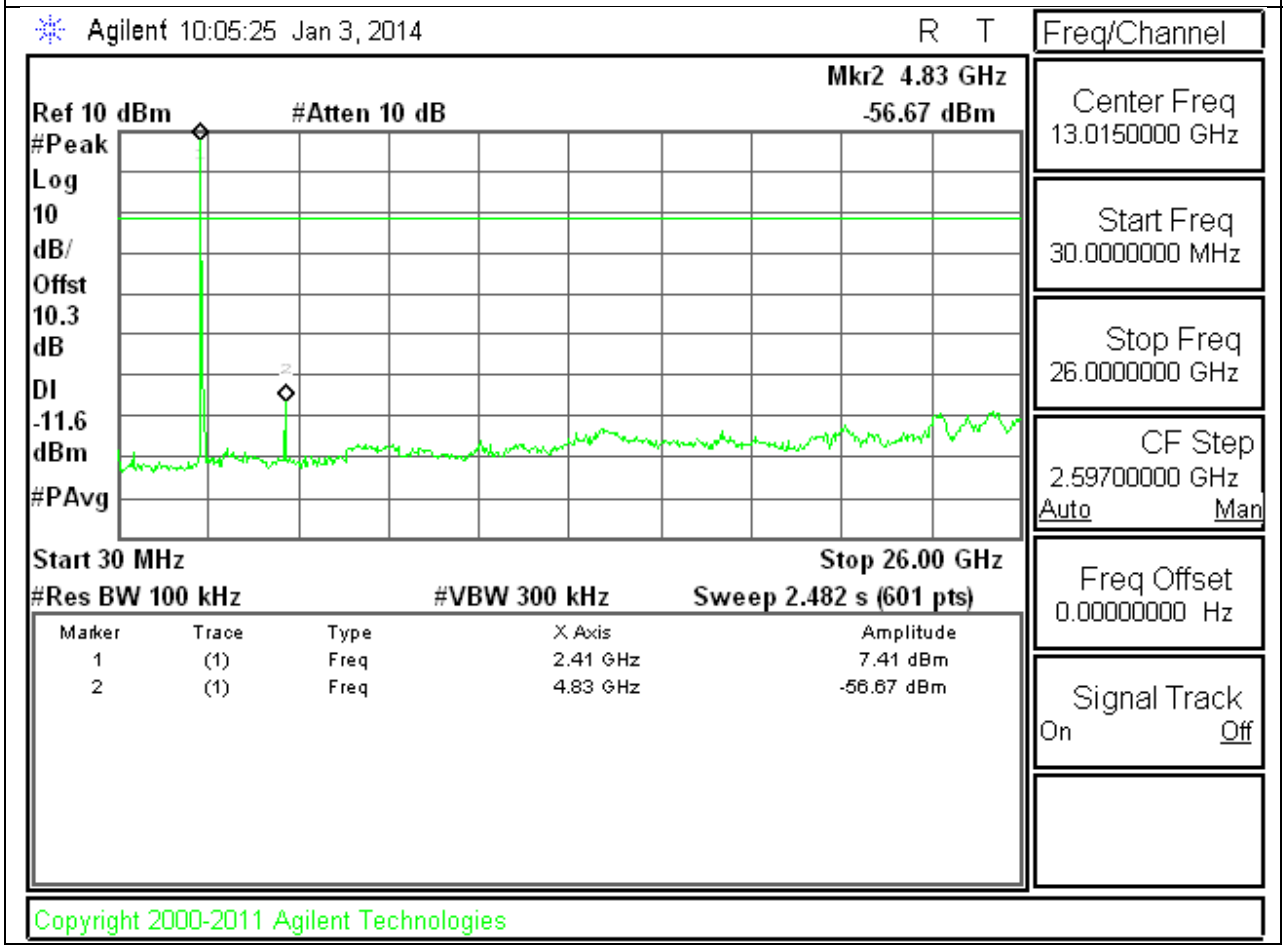
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

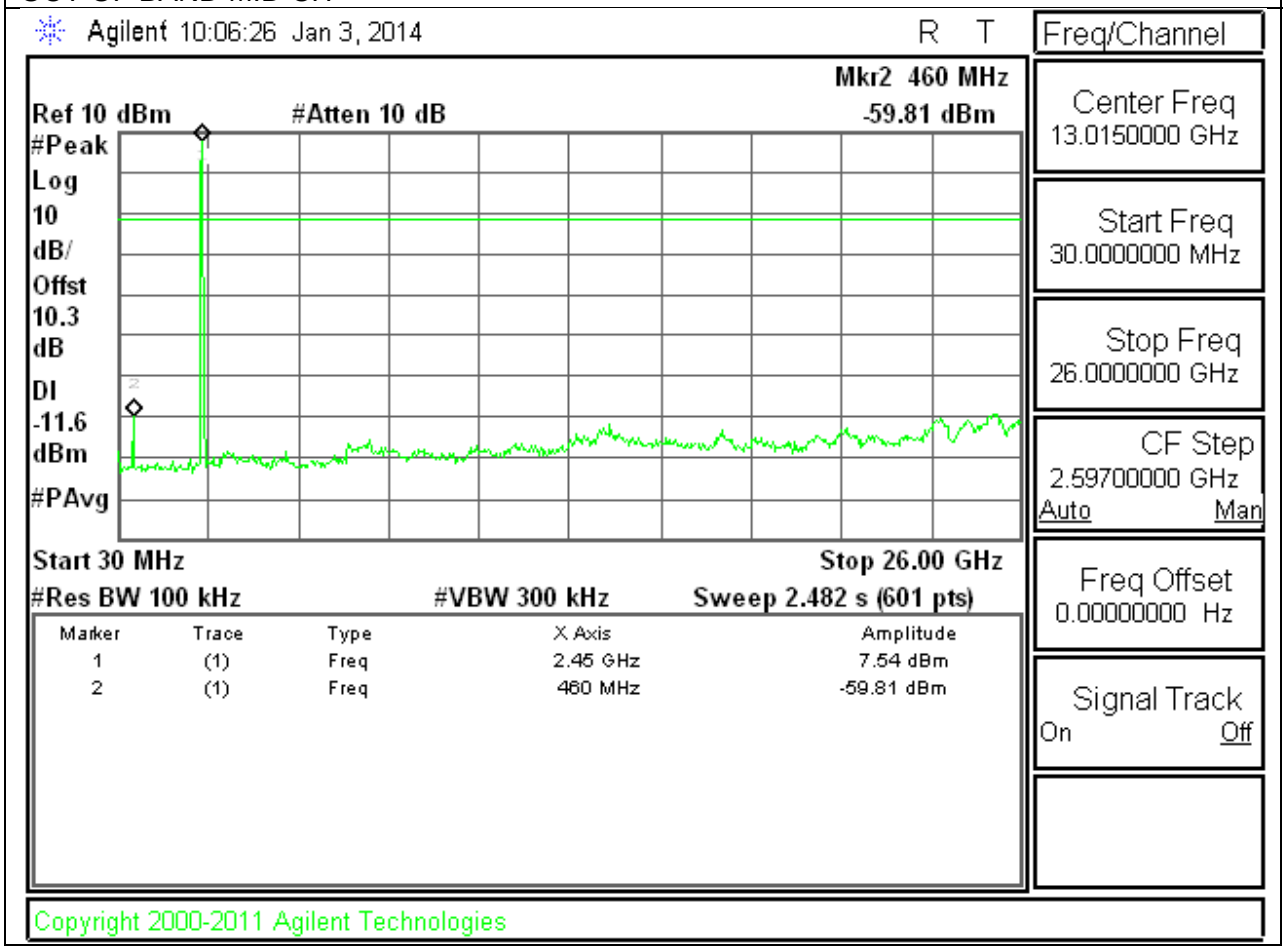


OUT-OF-BAND EMISSIONS

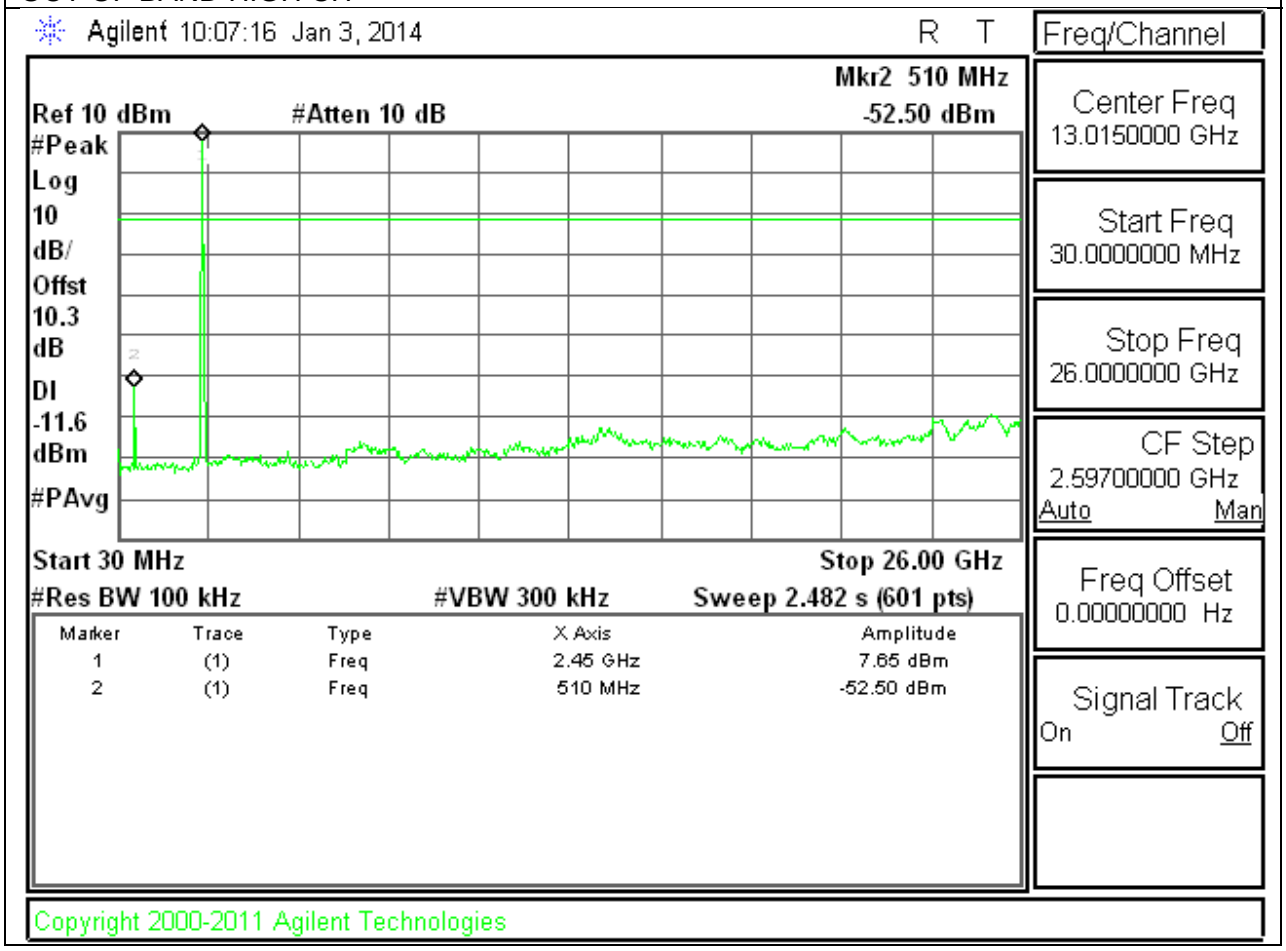
OUT OF BAND LOW CH



OUT OF BAND MID CH



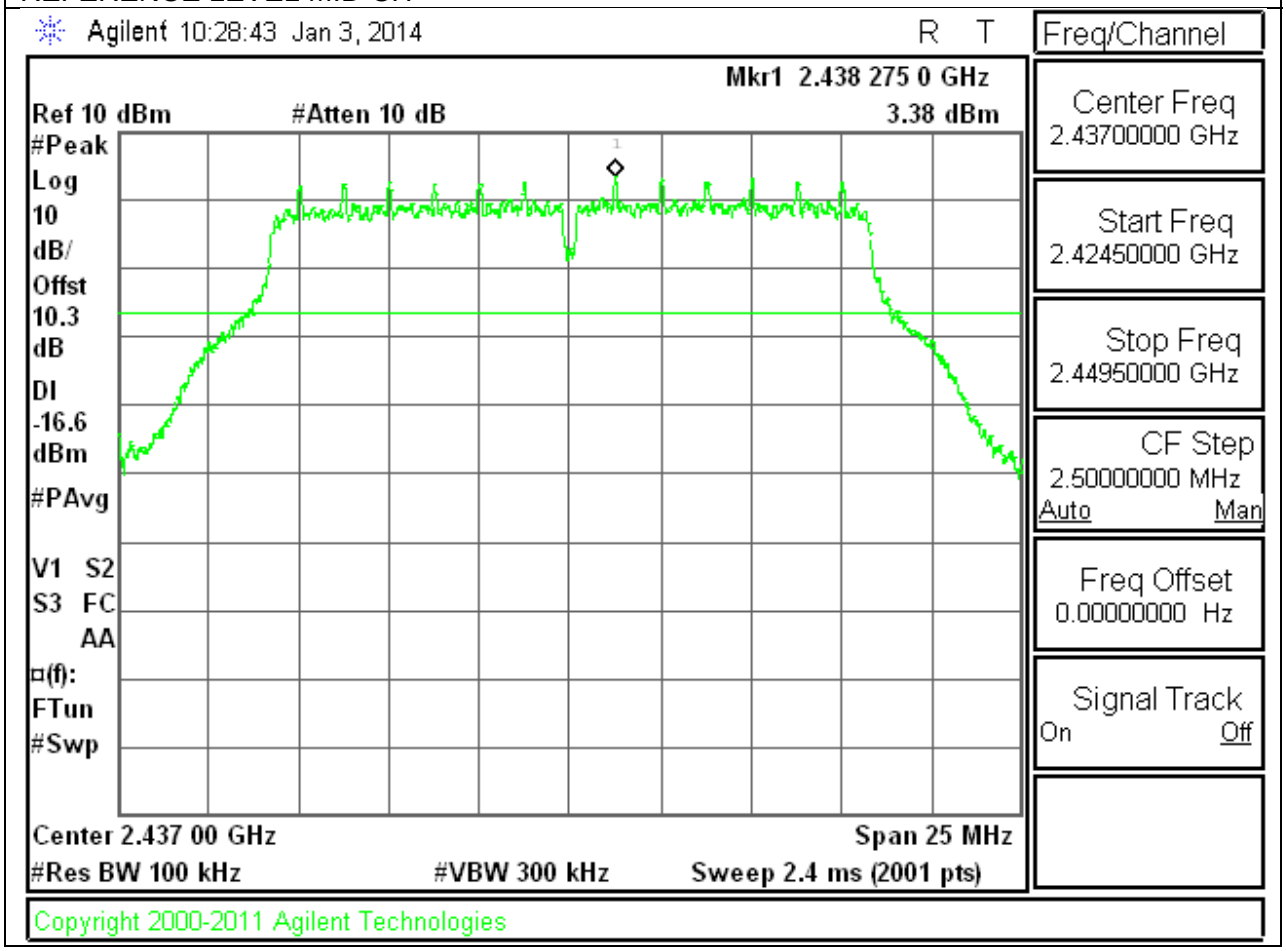
OUT OF BAND HIGH CH



9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

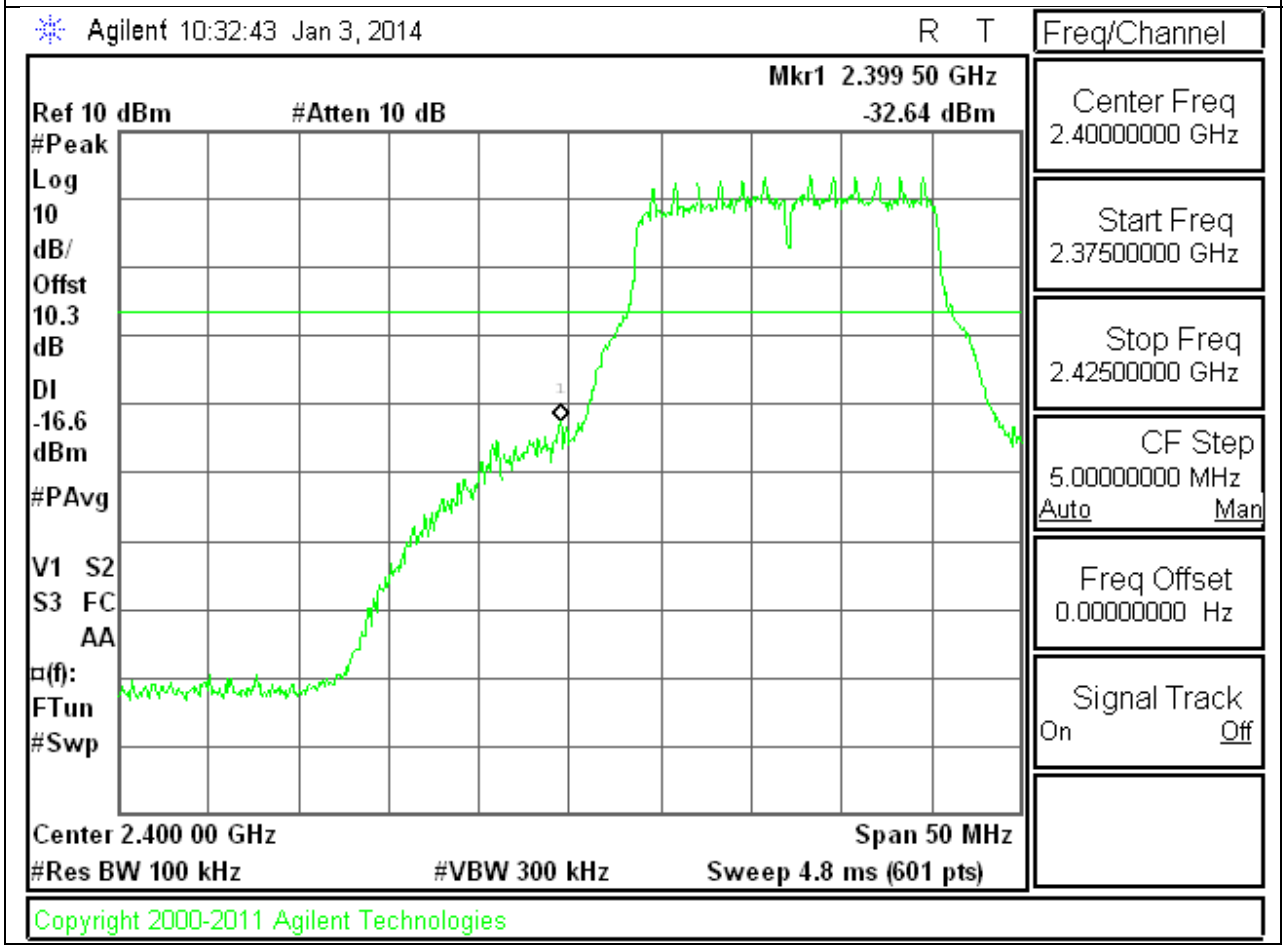
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



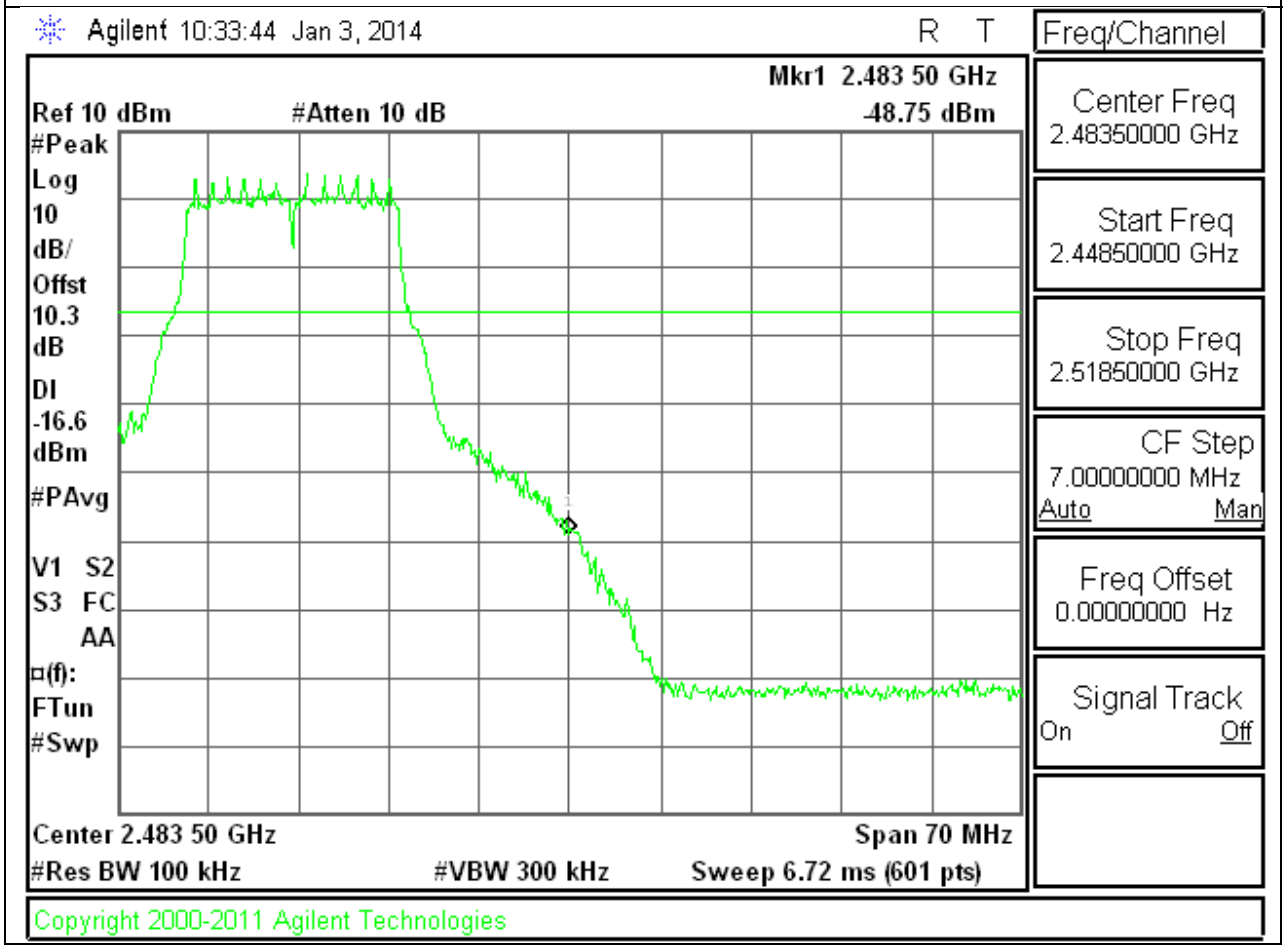
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



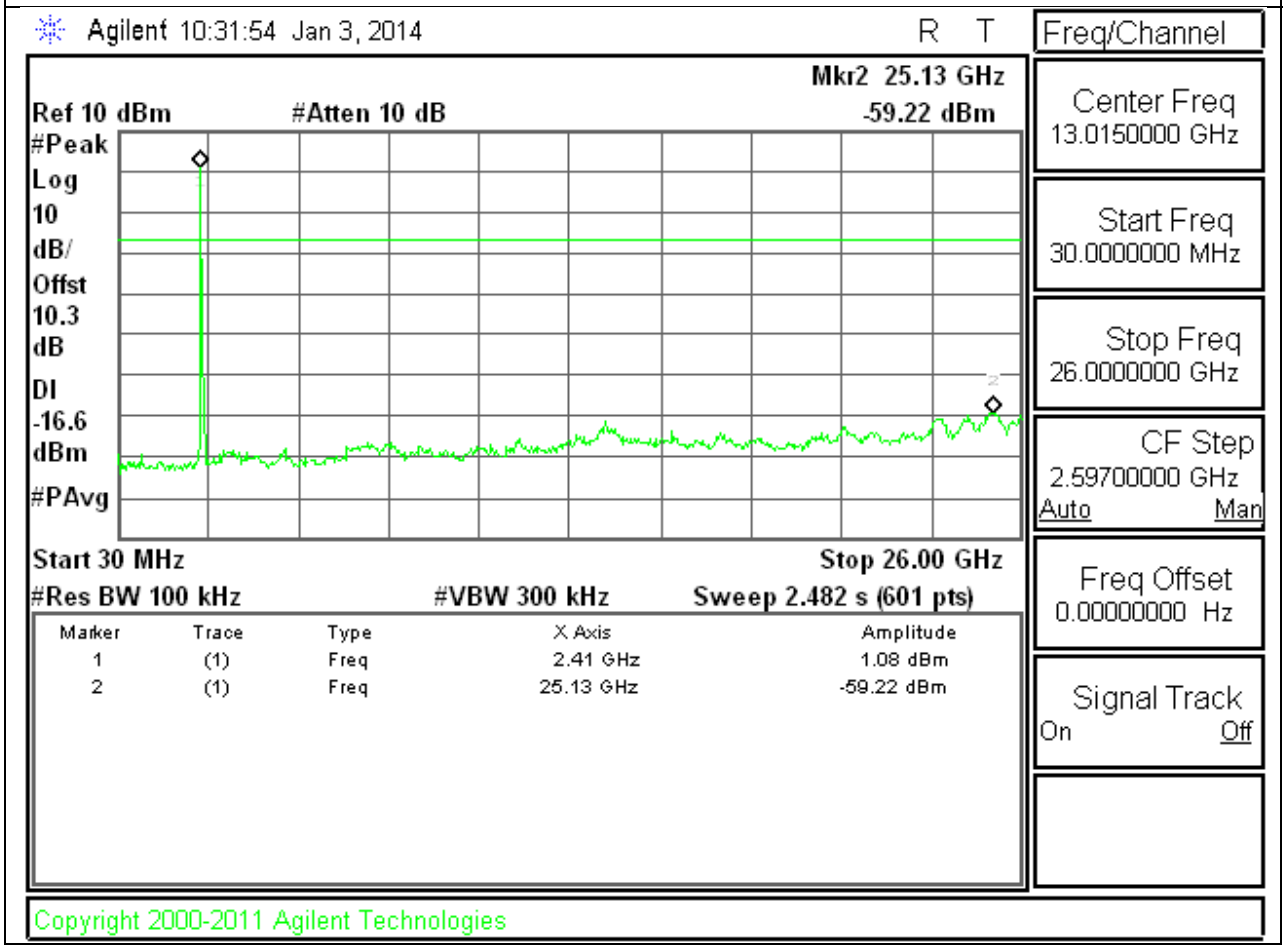
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

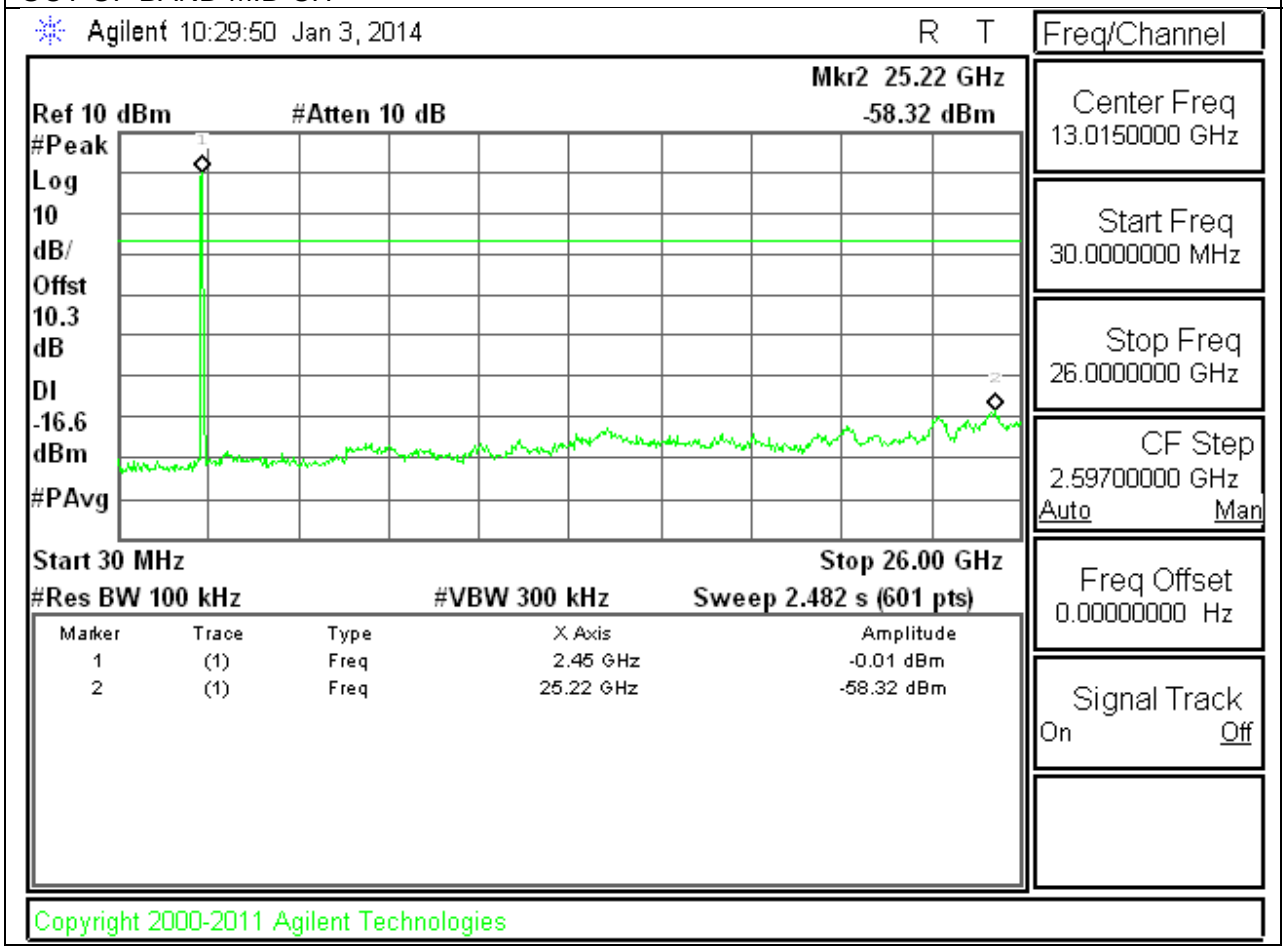


OUT-OF-BAND EMISSIONS

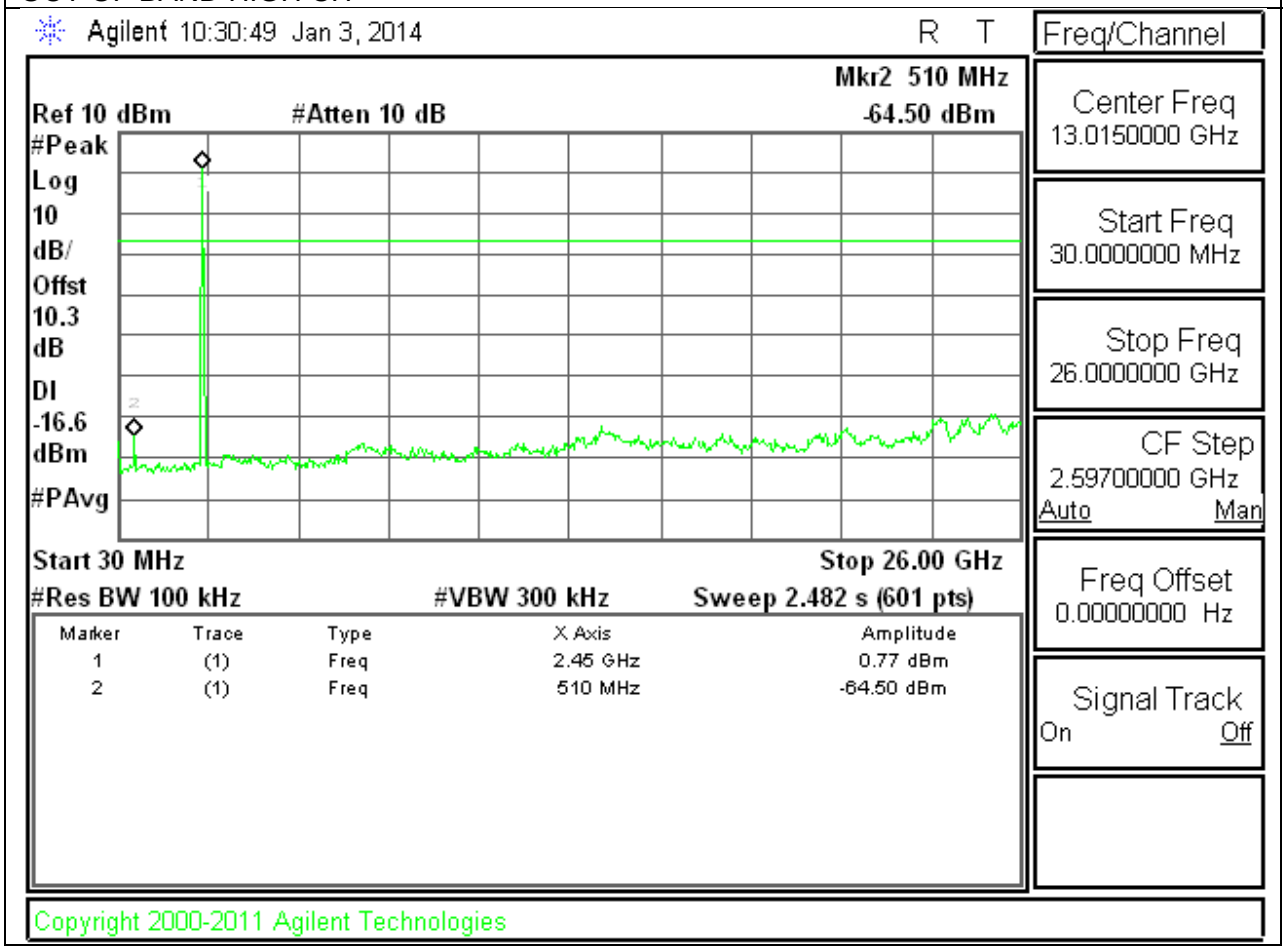
OUT OF BAND LOW CH



OUT OF BAND MID CH



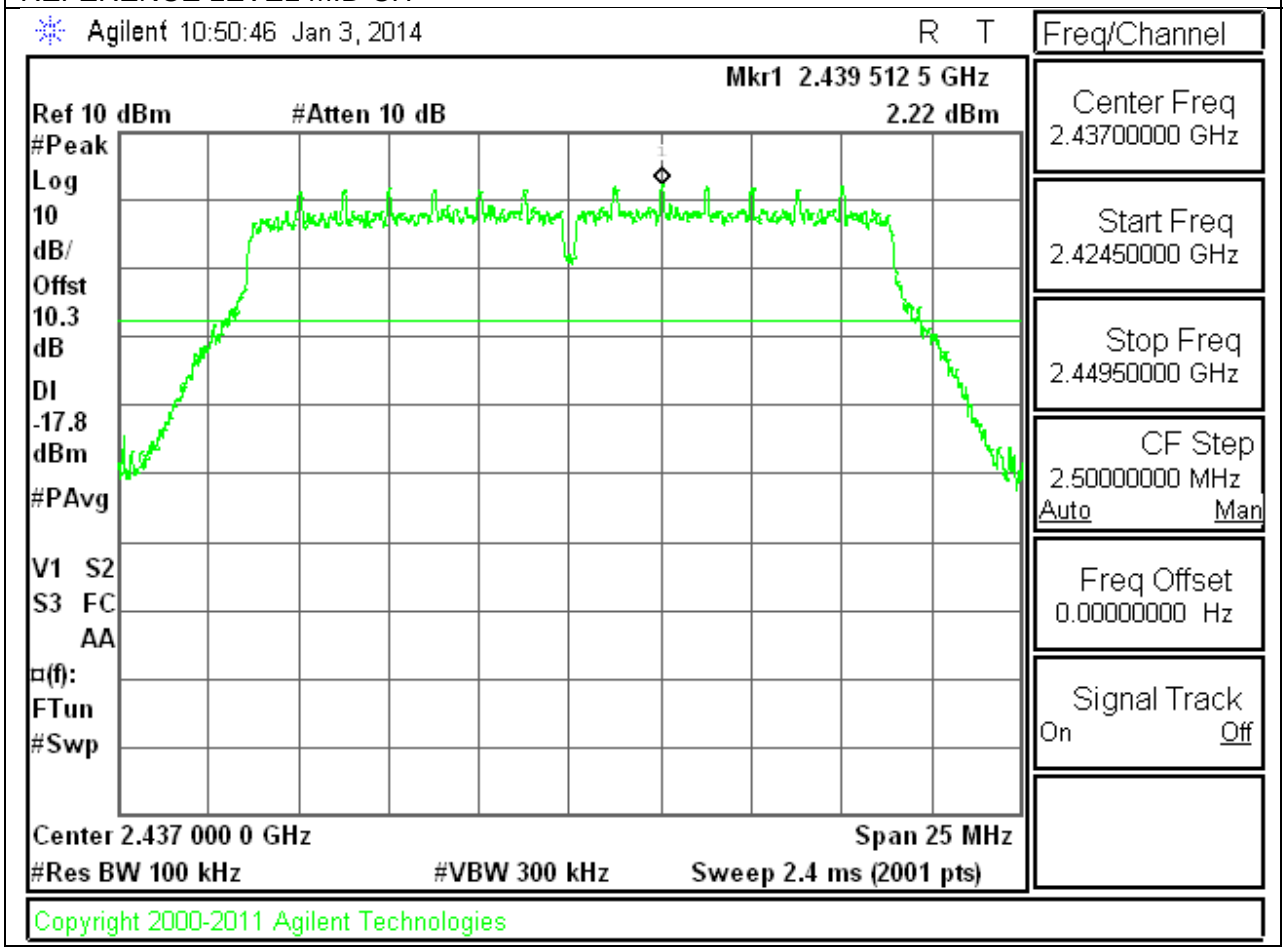
OUT OF BAND HIGH CH



9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

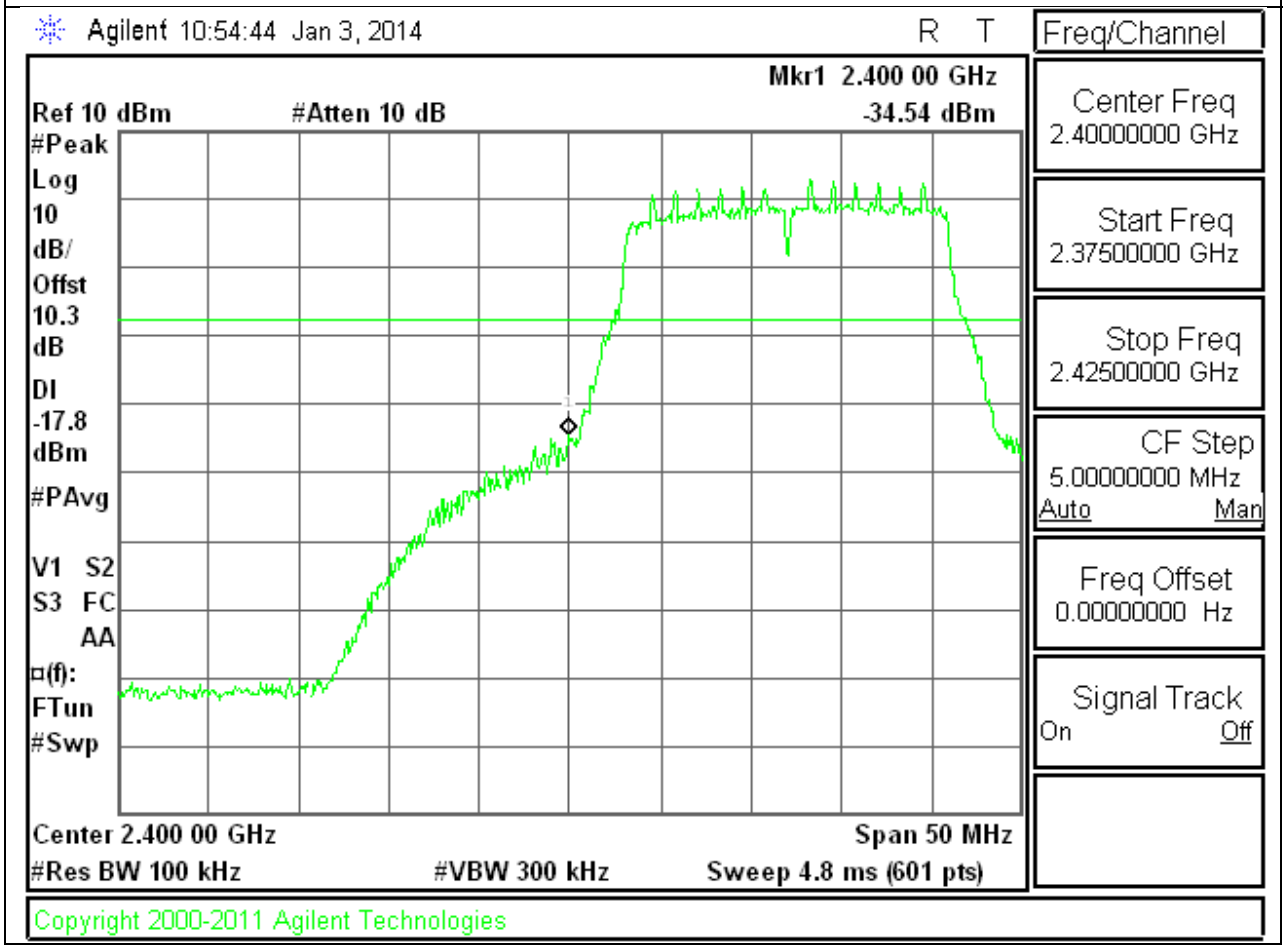
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



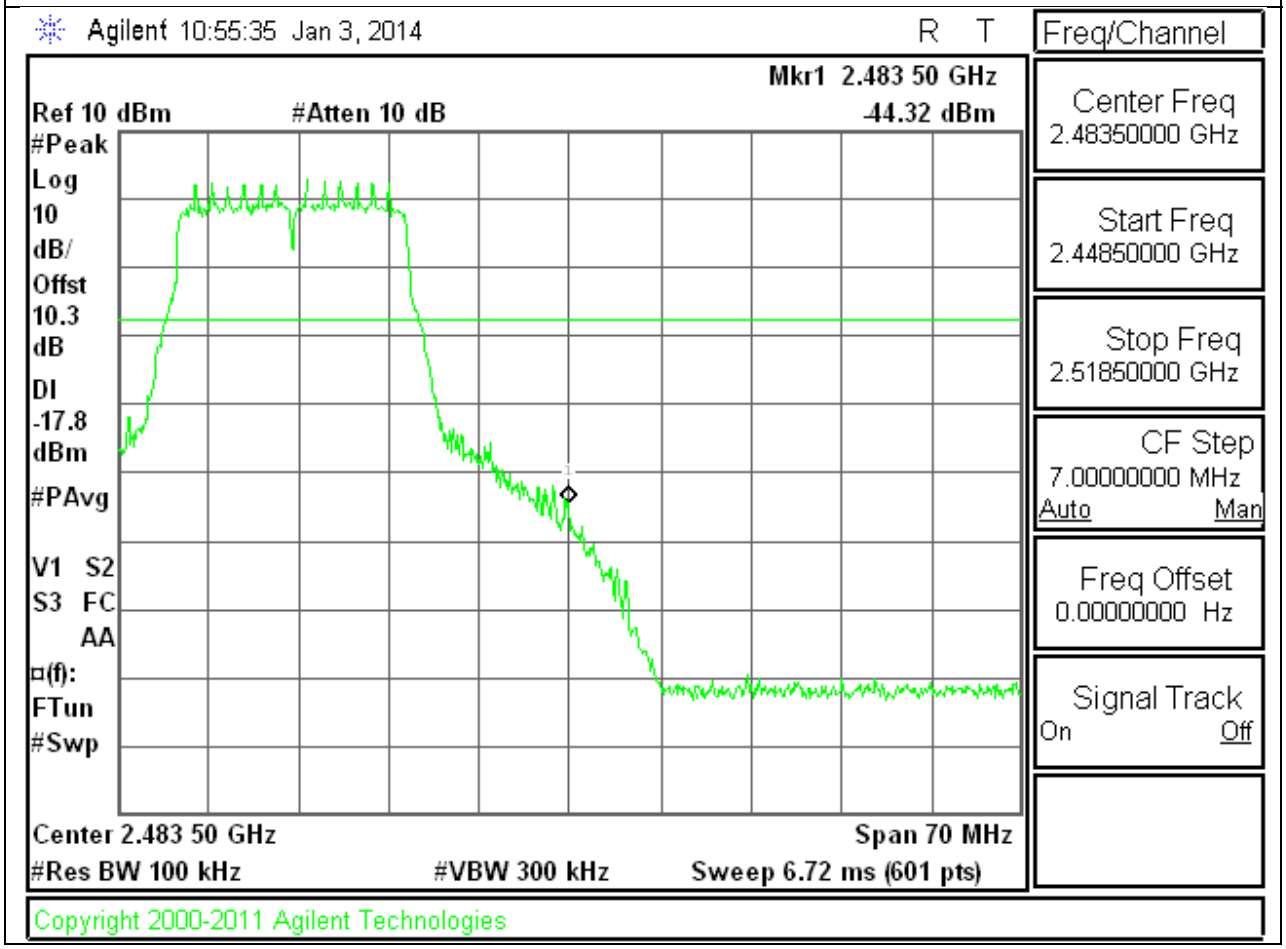
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



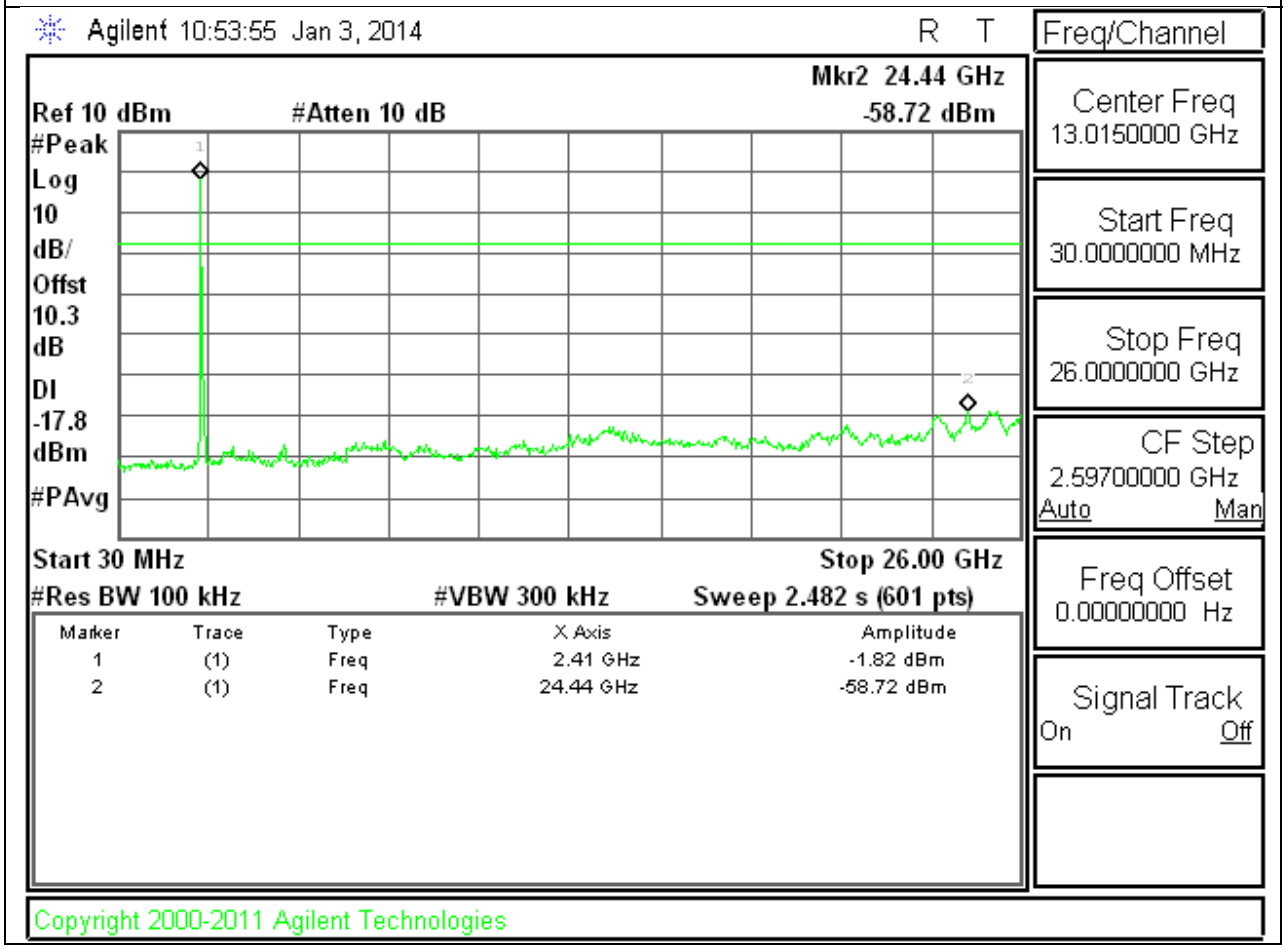
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

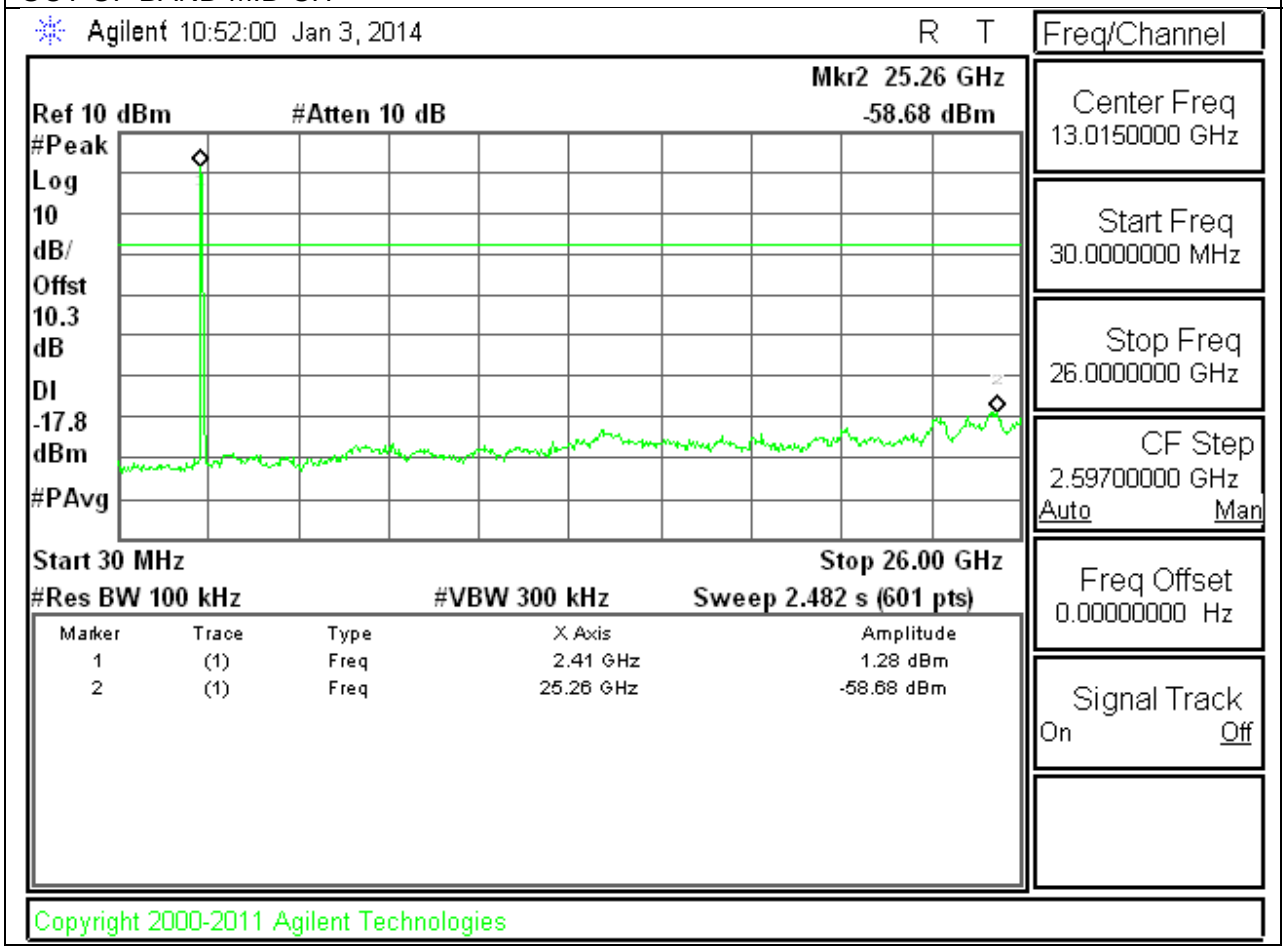


OUT-OF-BAND EMISSIONS

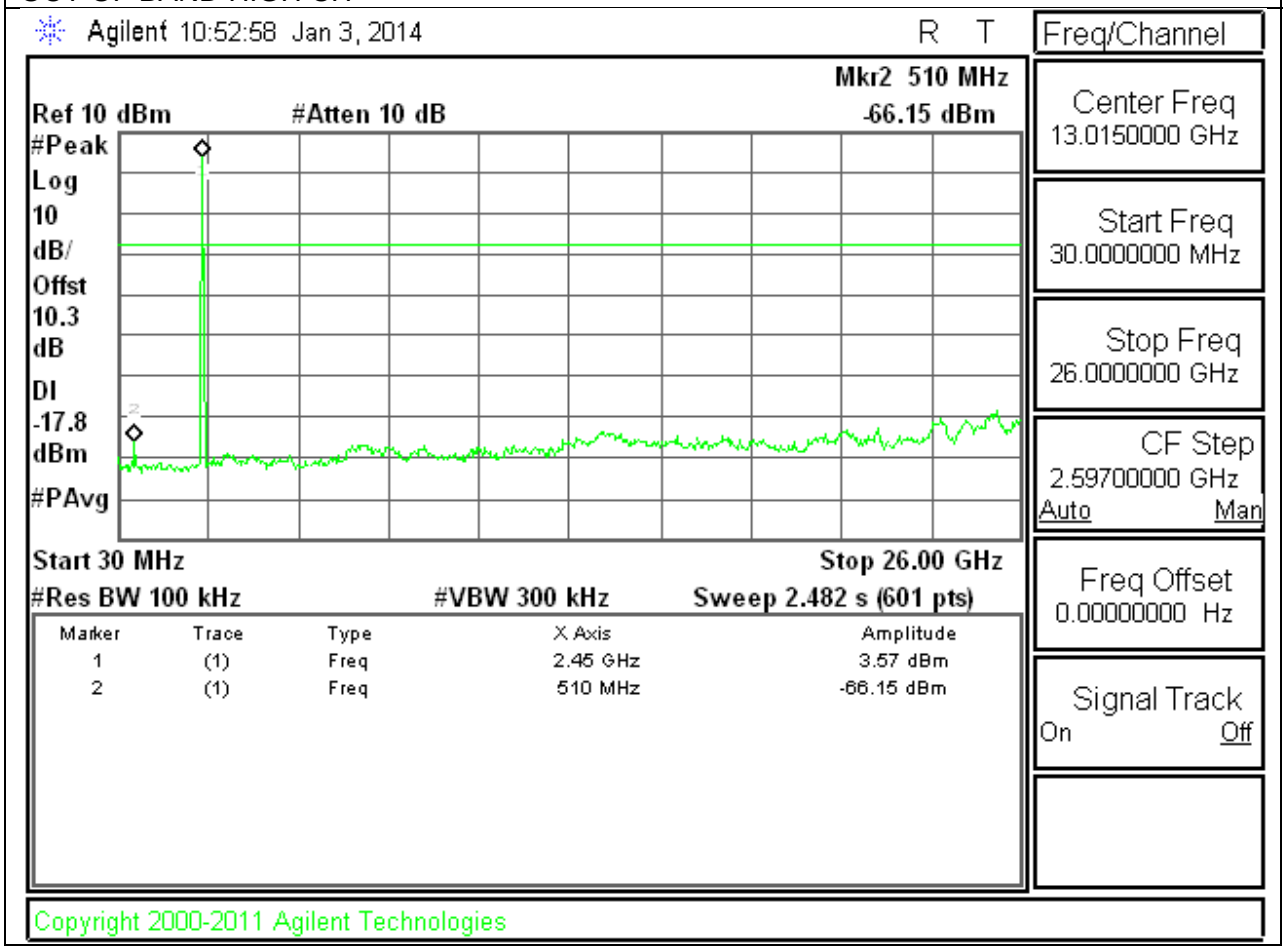
OUT OF BAND LOW CH



OUT OF BAND MID CH



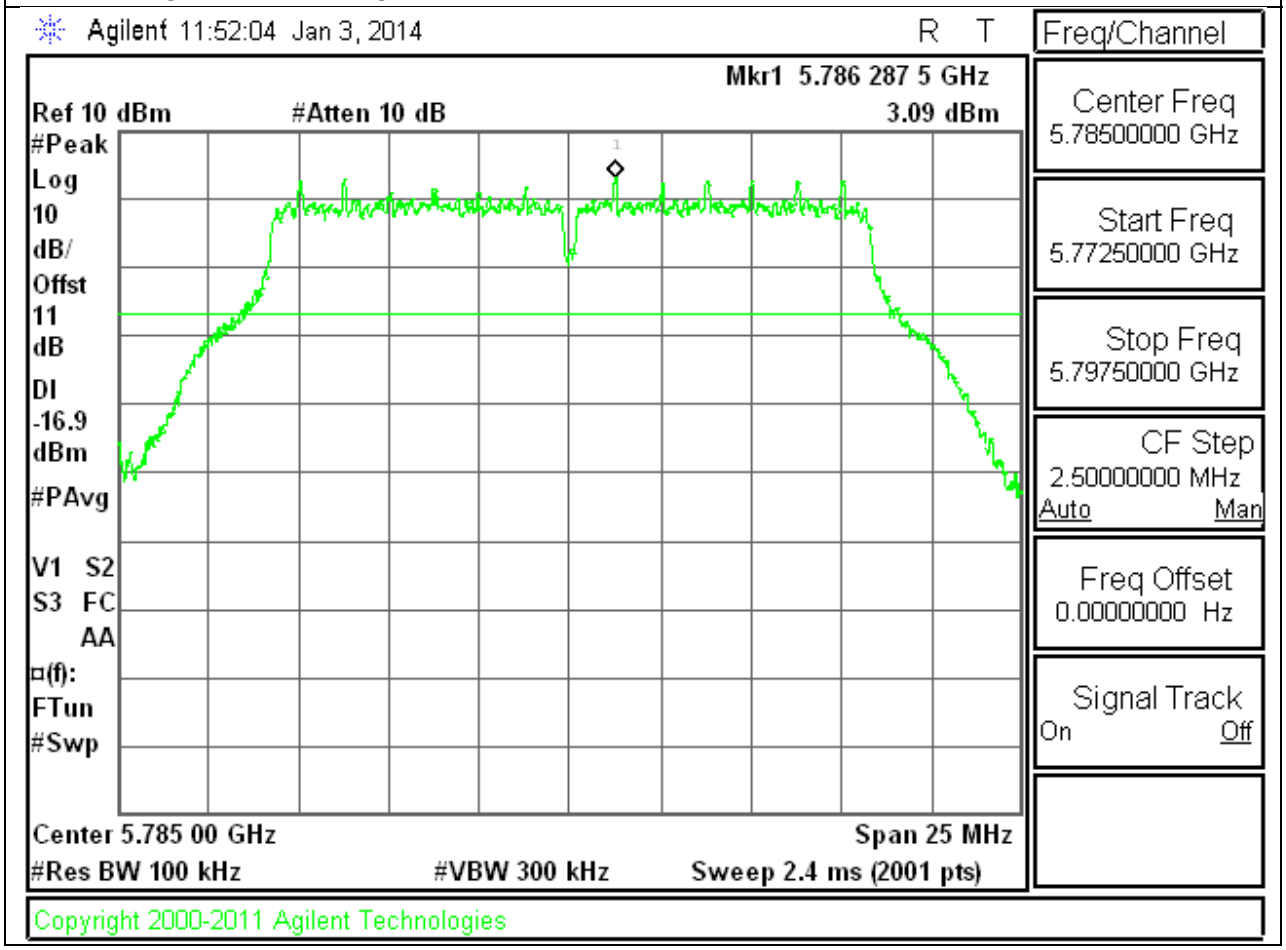
OUT OF BAND HIGH CH



9.6.4. 802.11a MODE IN THE 5.8 GHz BAND

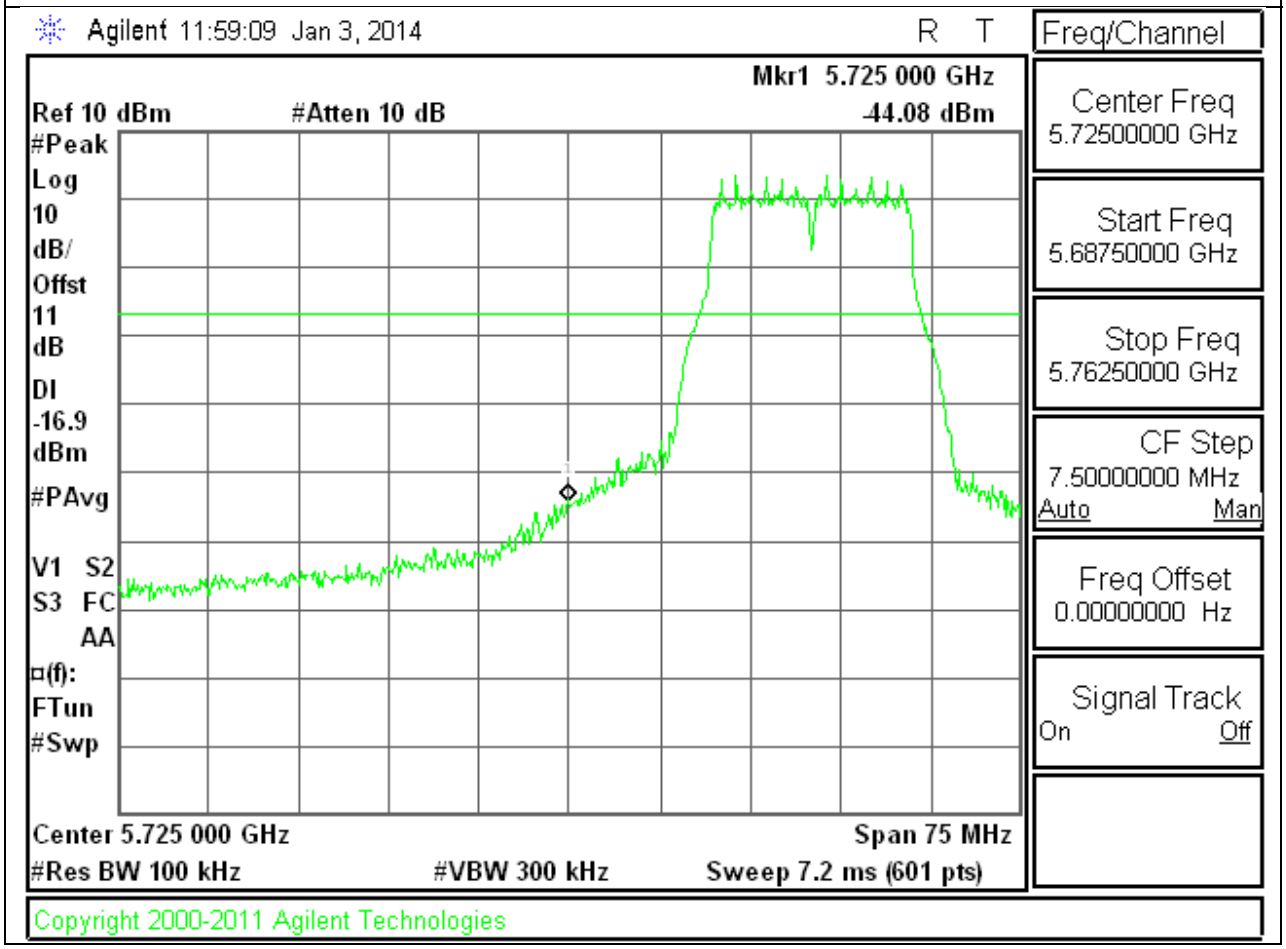
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



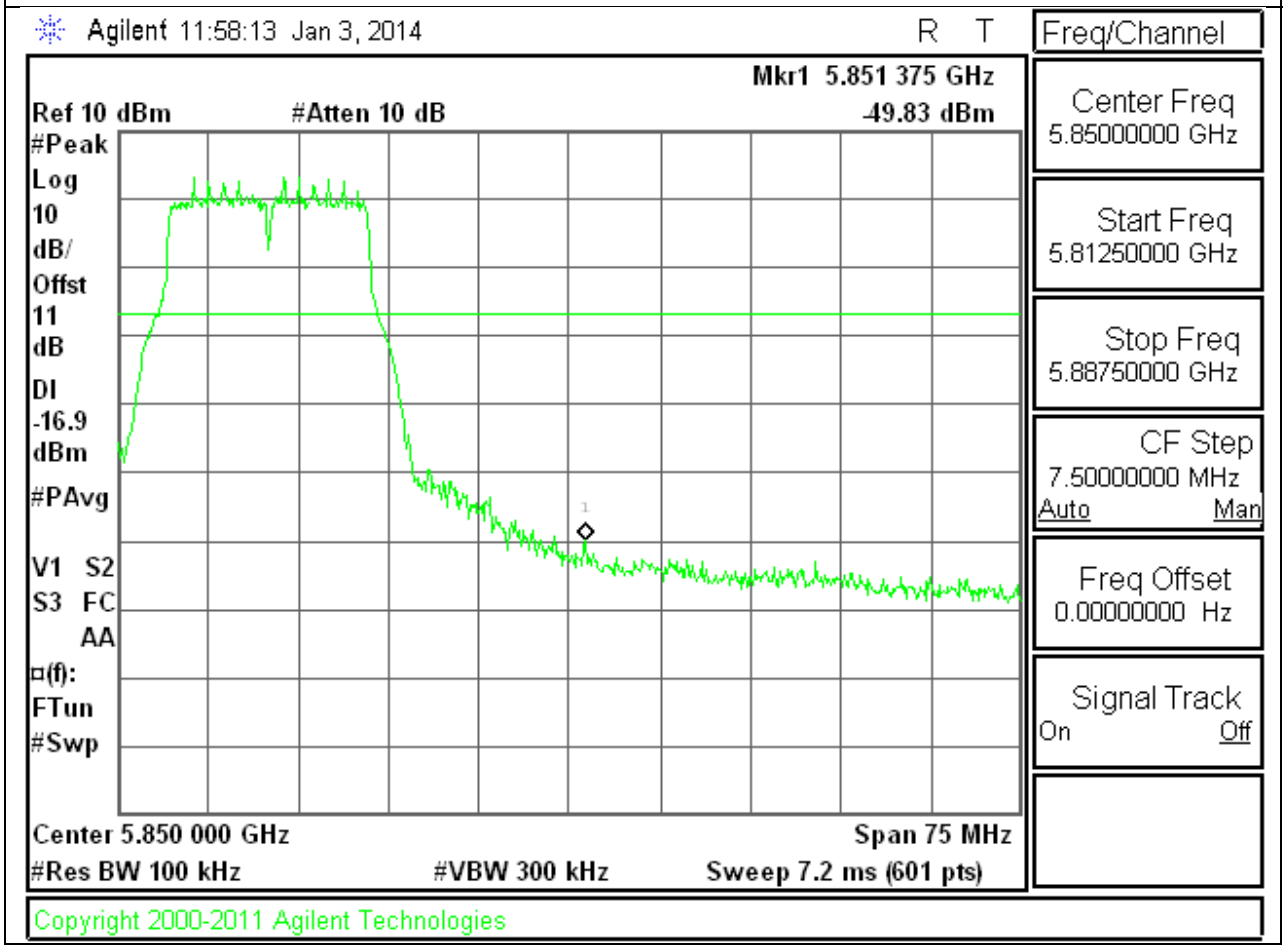
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



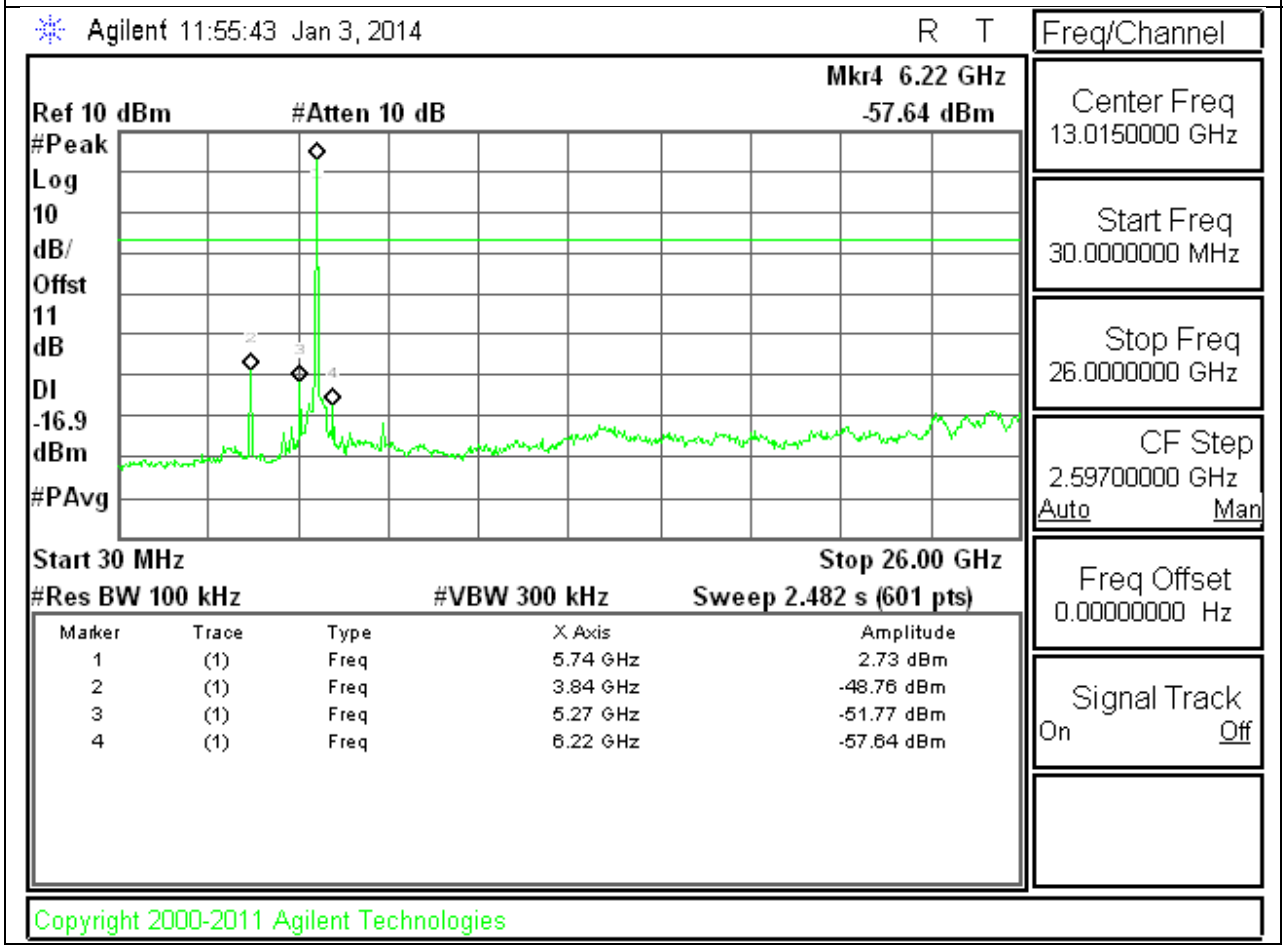
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

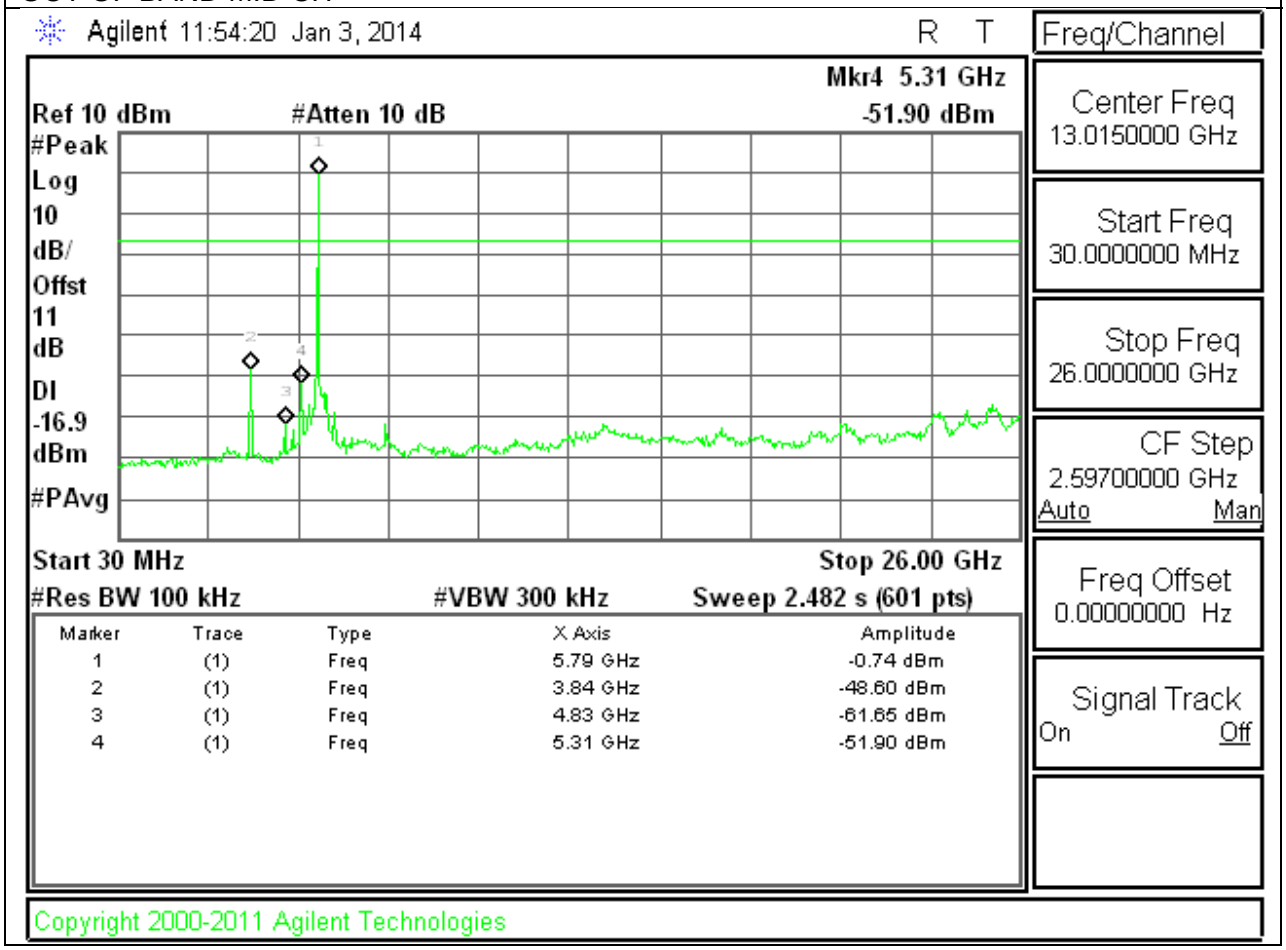


OUT-OF-BAND EMISSIONS

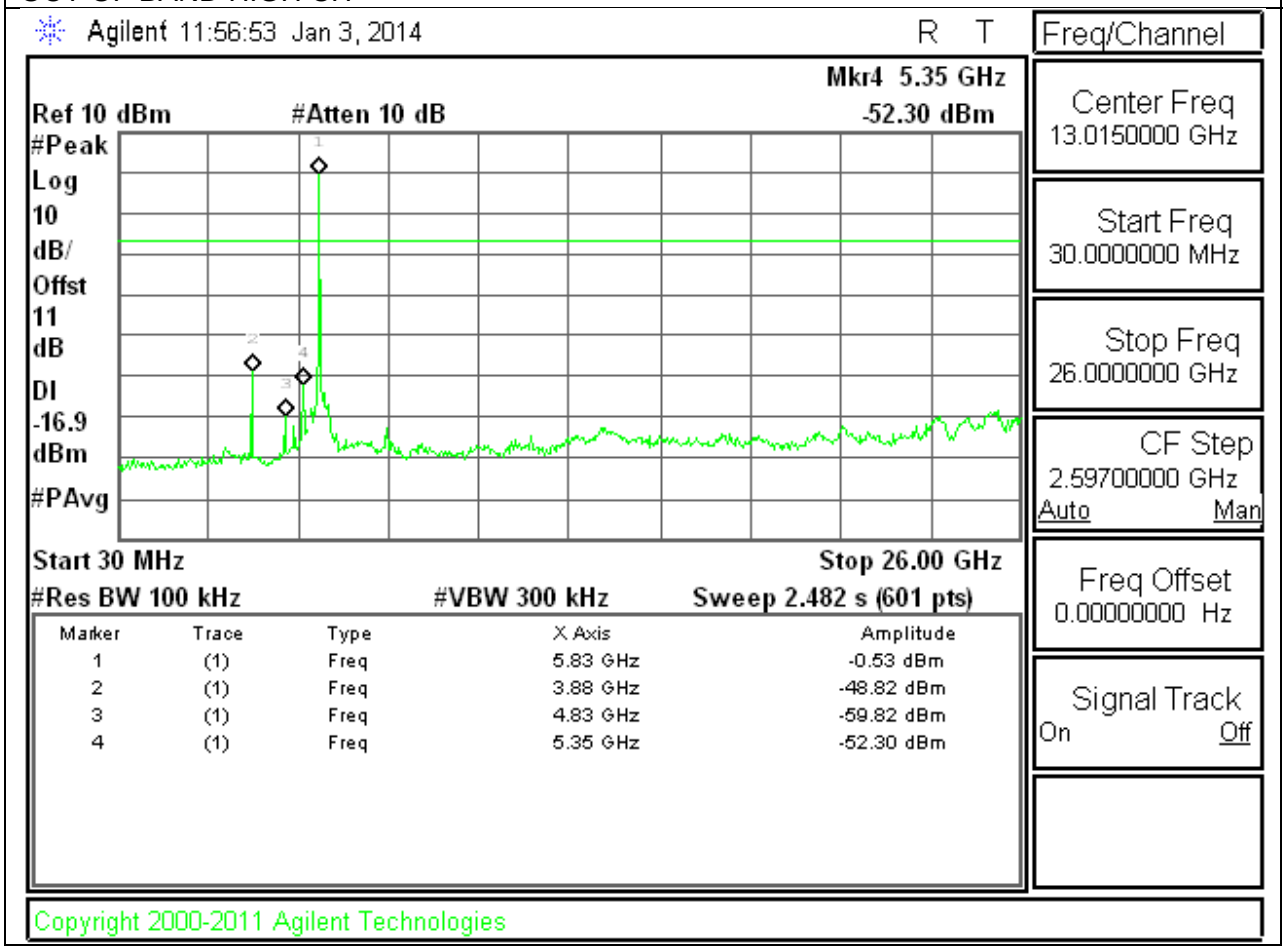
OUT OF BAND LOW CH



OUT OF BAND MID CH



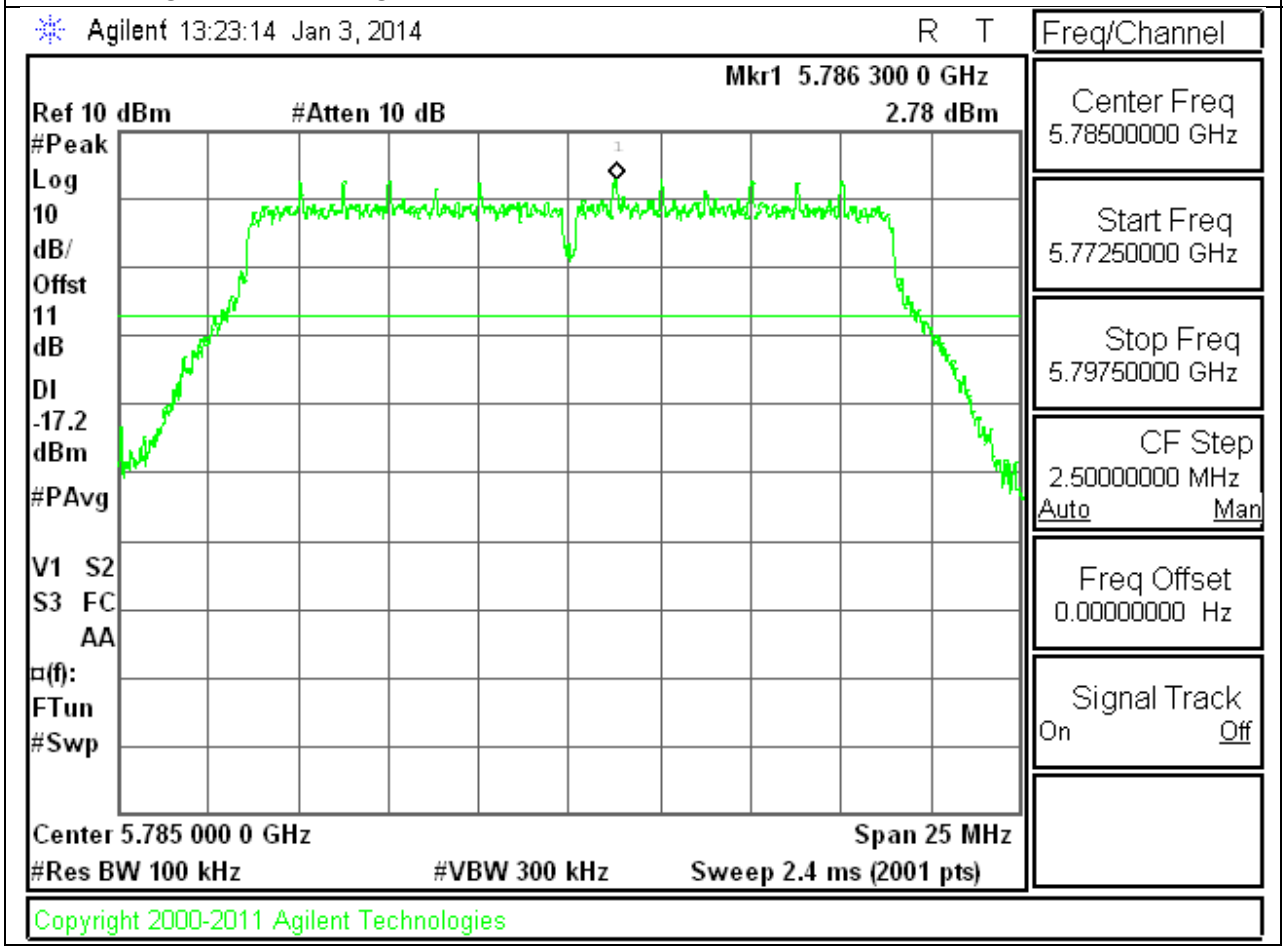
OUT OF BAND HIGH CH



9.6.5. 802.11n MODE IN THE 5.8 GHz BAND

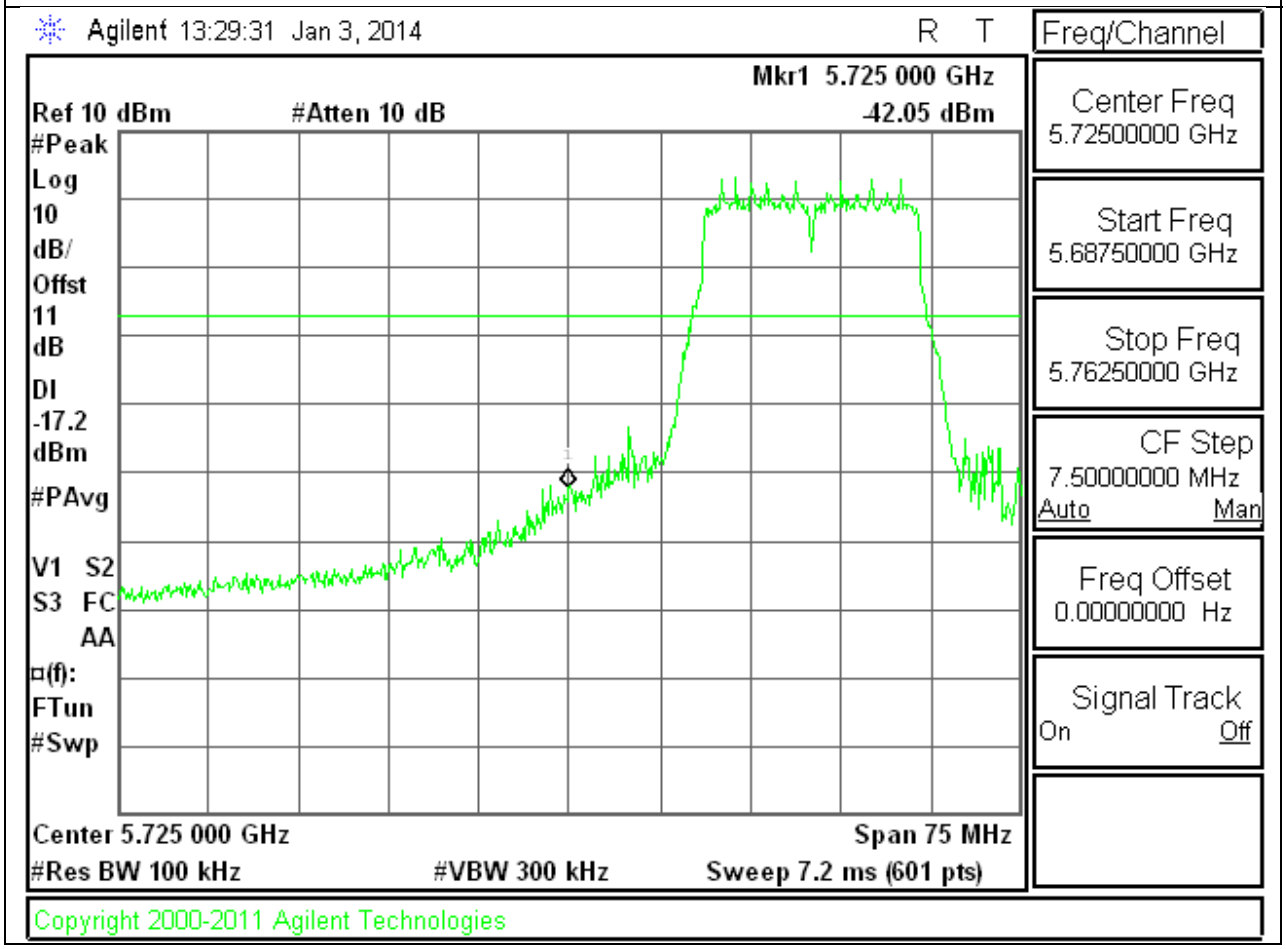
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



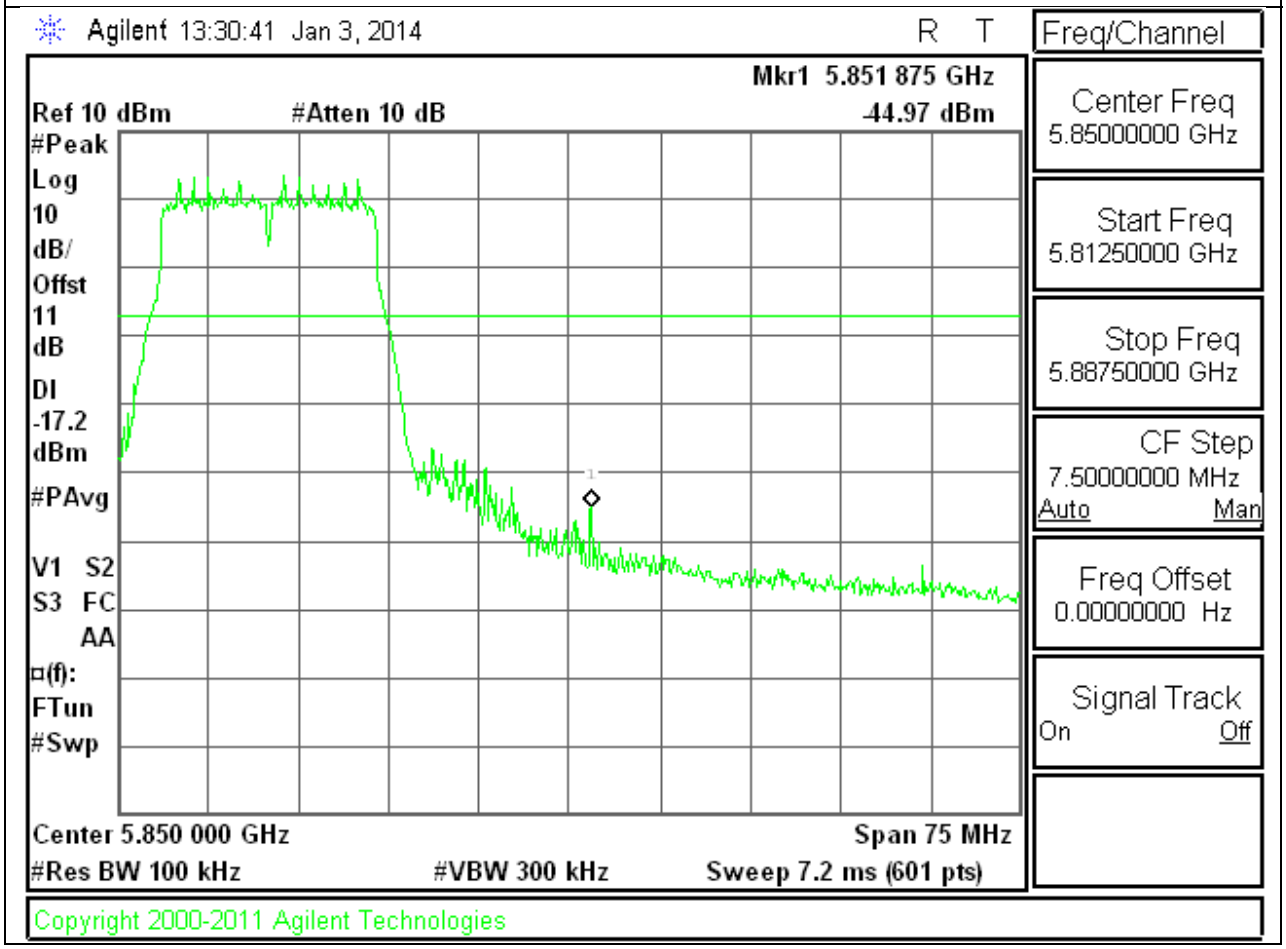
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



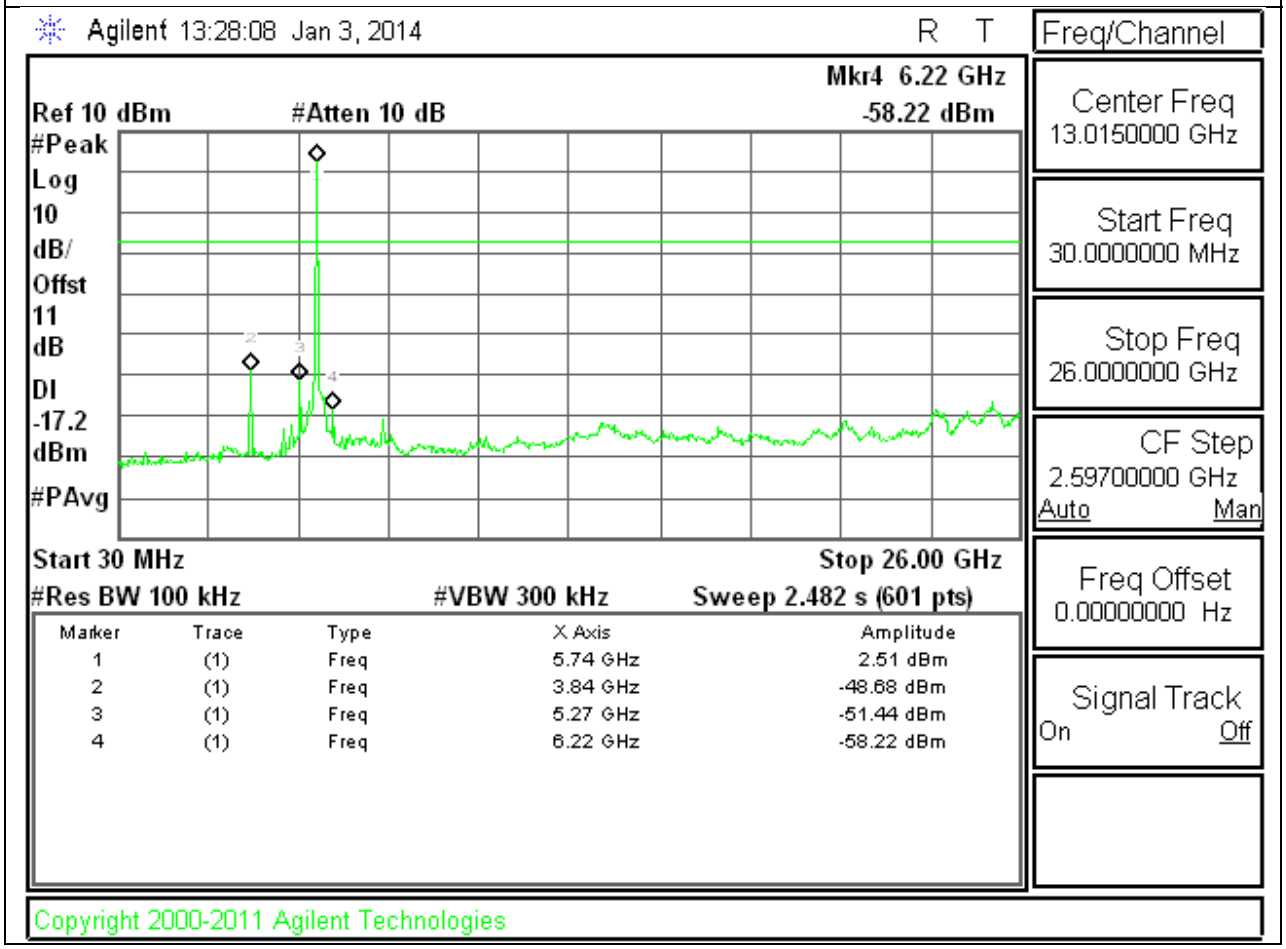
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

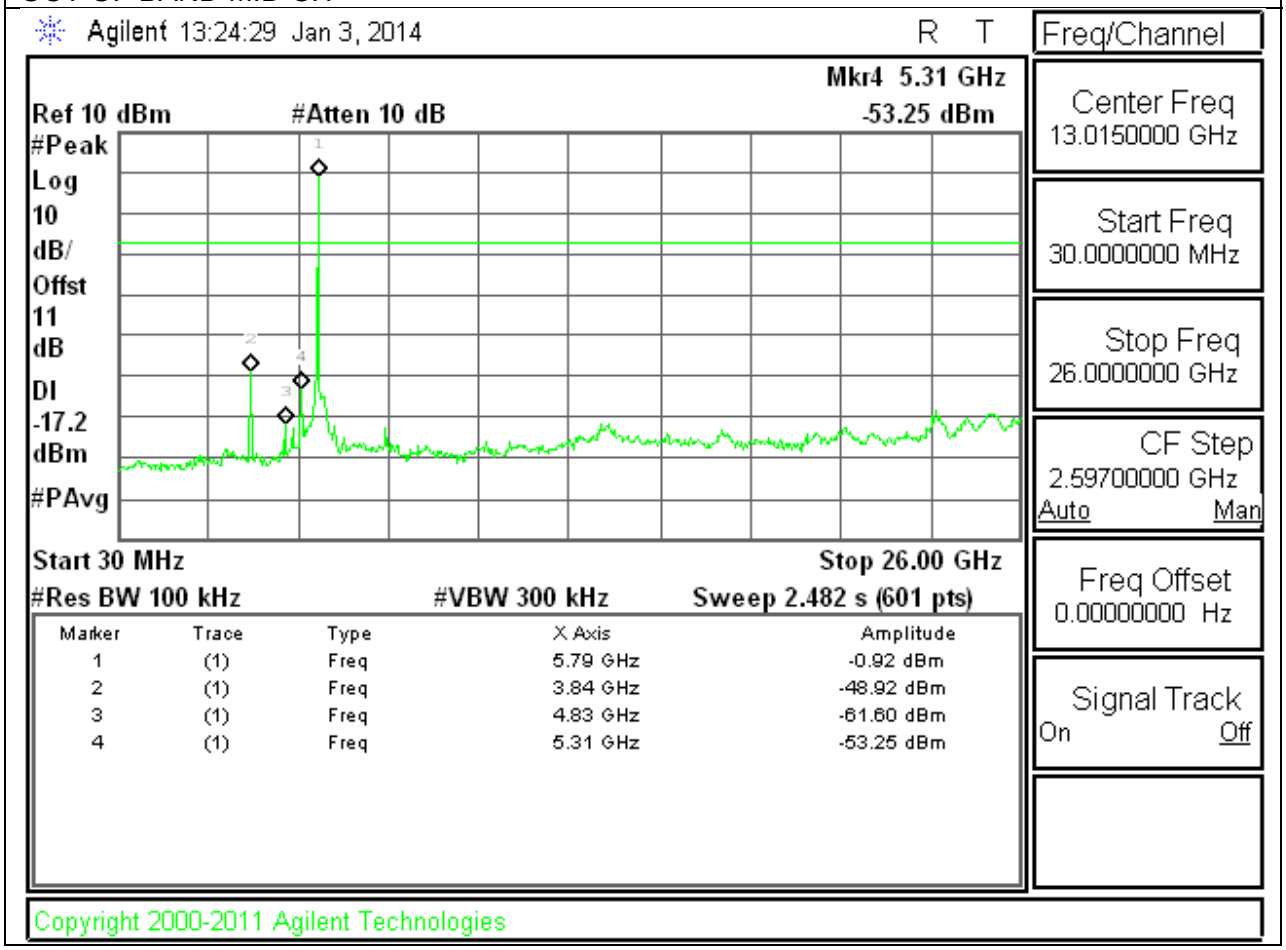


OUT-OF-BAND EMISSIONS

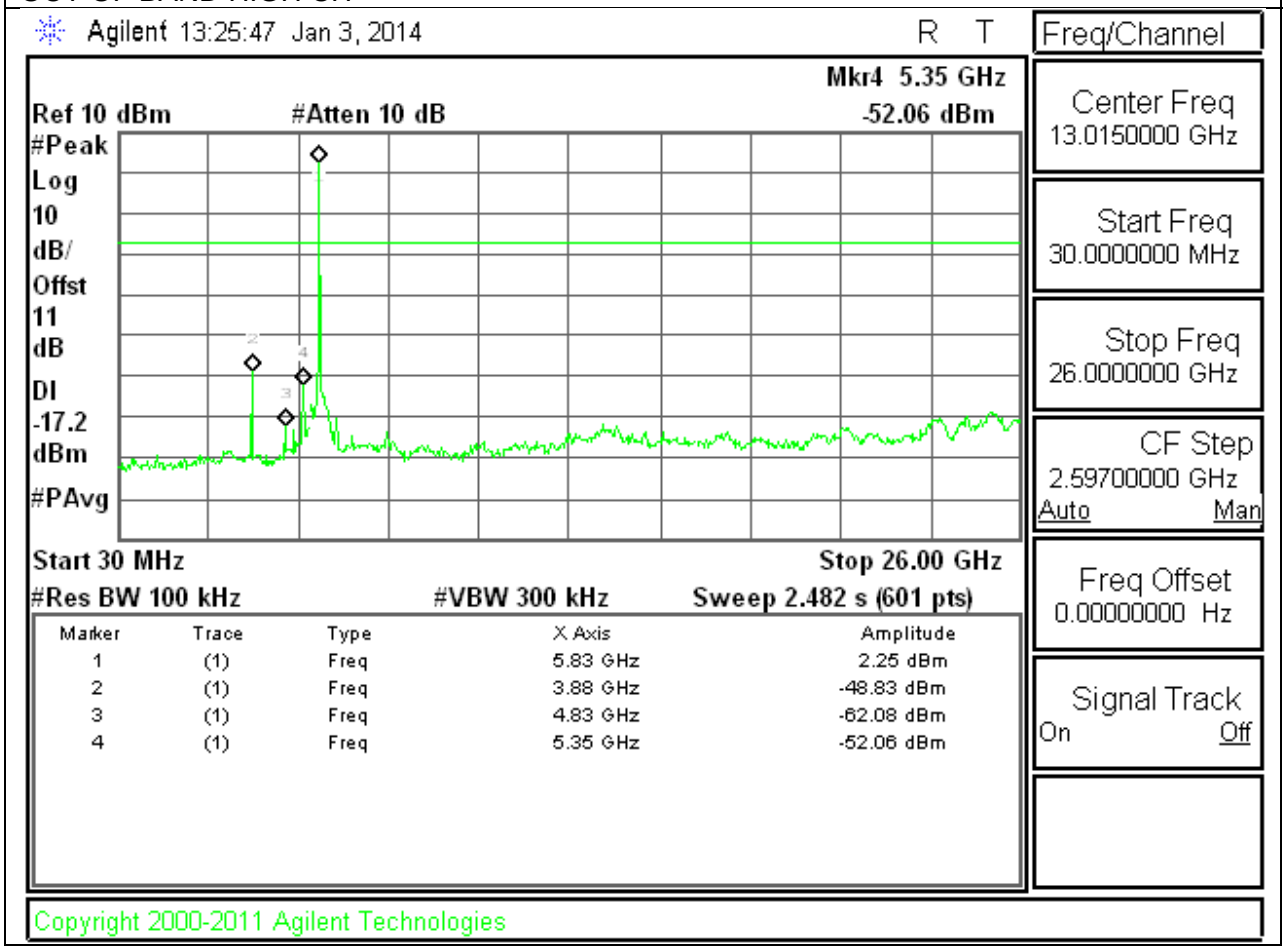
OUT OF BAND LOW CH



OUT OF BAND MID CH



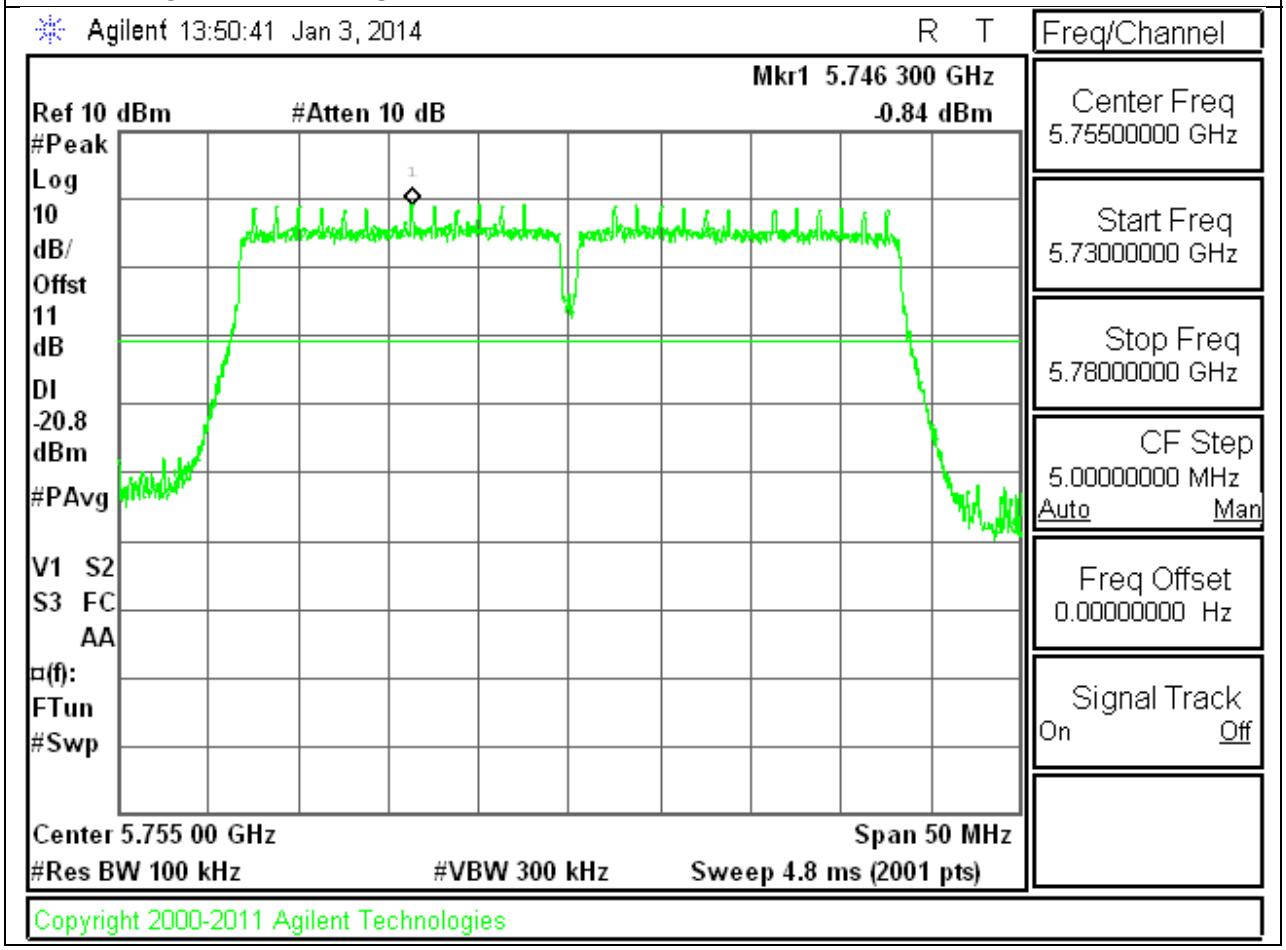
OUT OF BAND HIGH CH



9.6.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

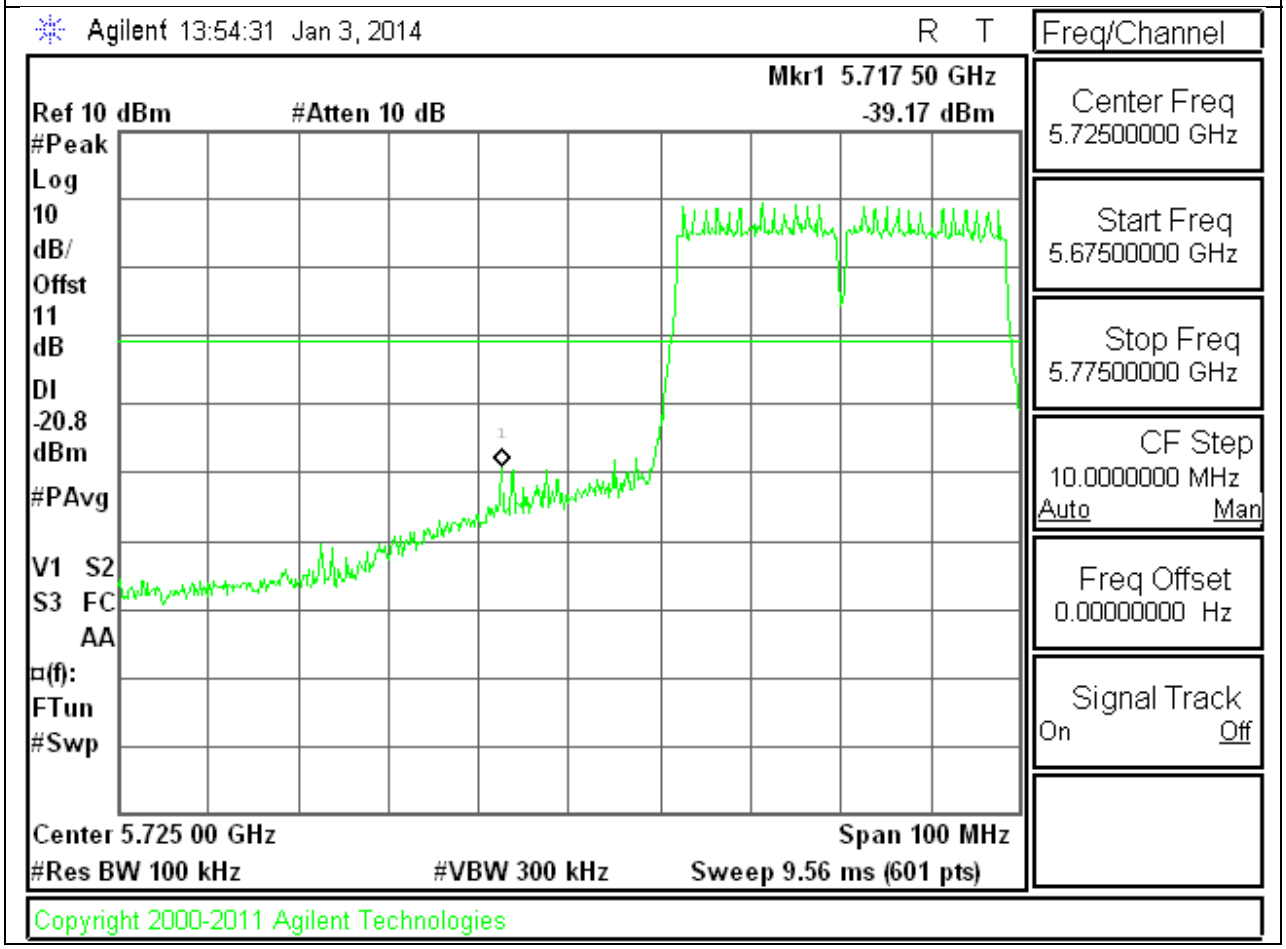
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



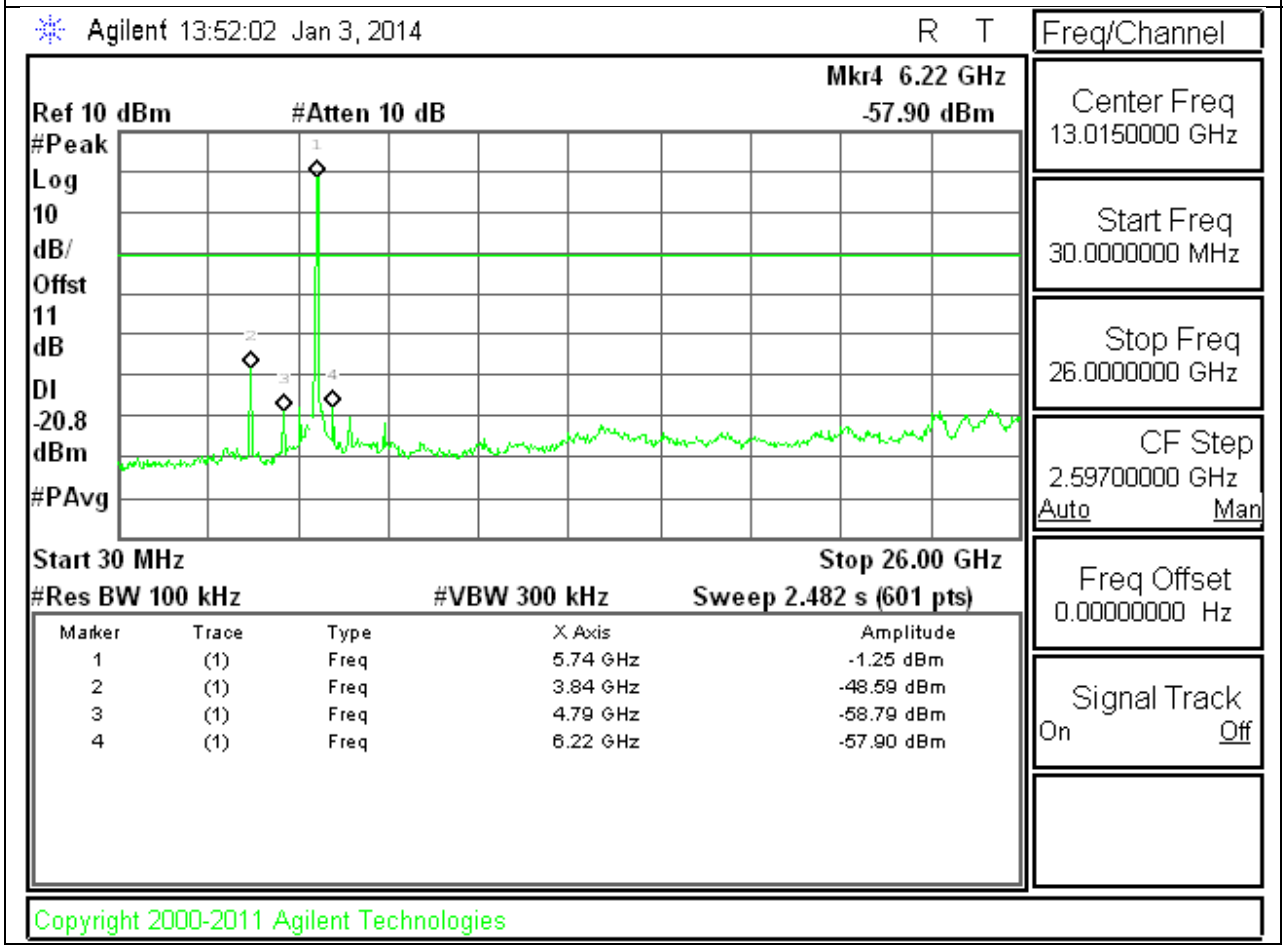
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH

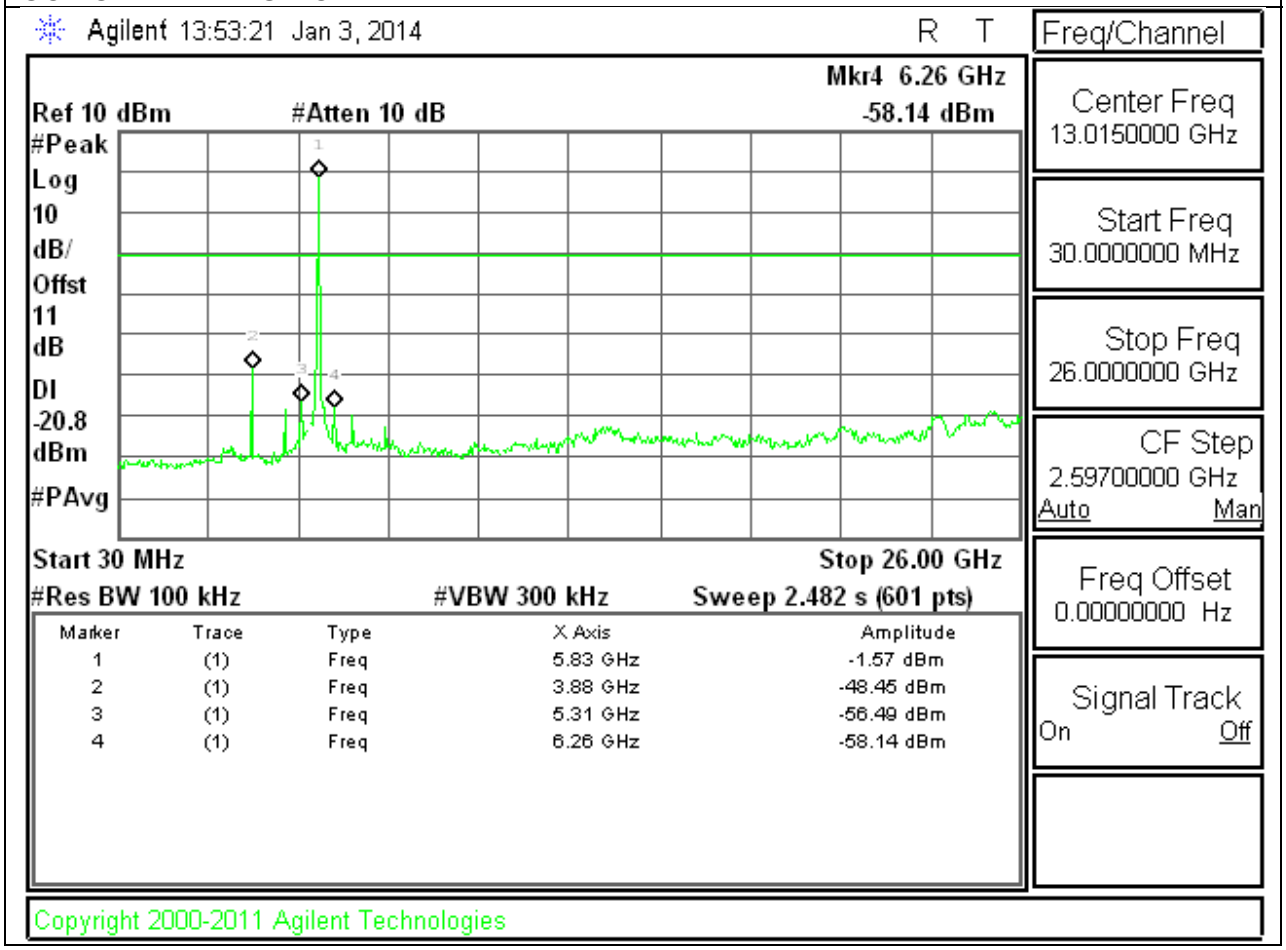


OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



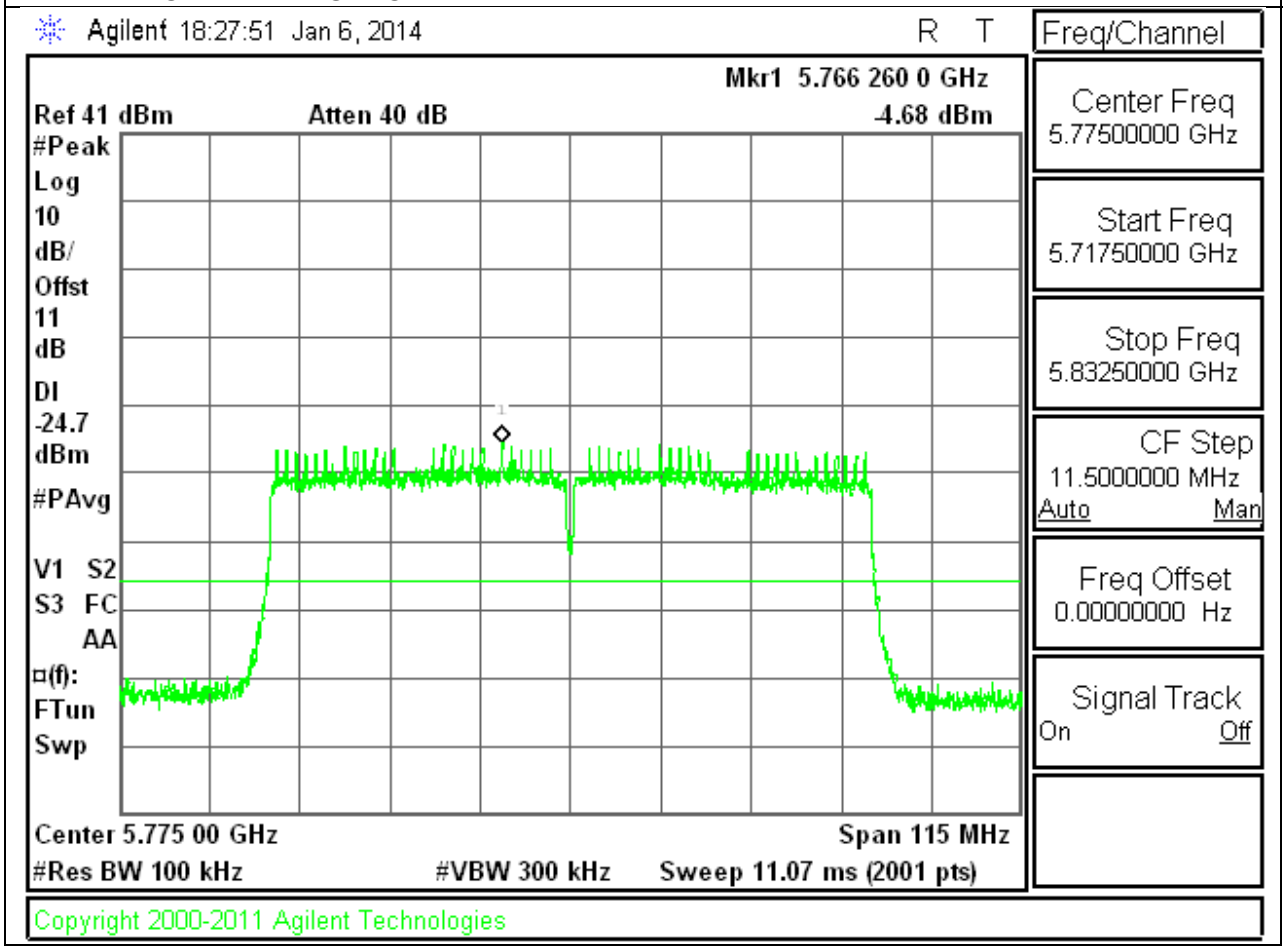
OUT OF BAND HIGH CH



9.6.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

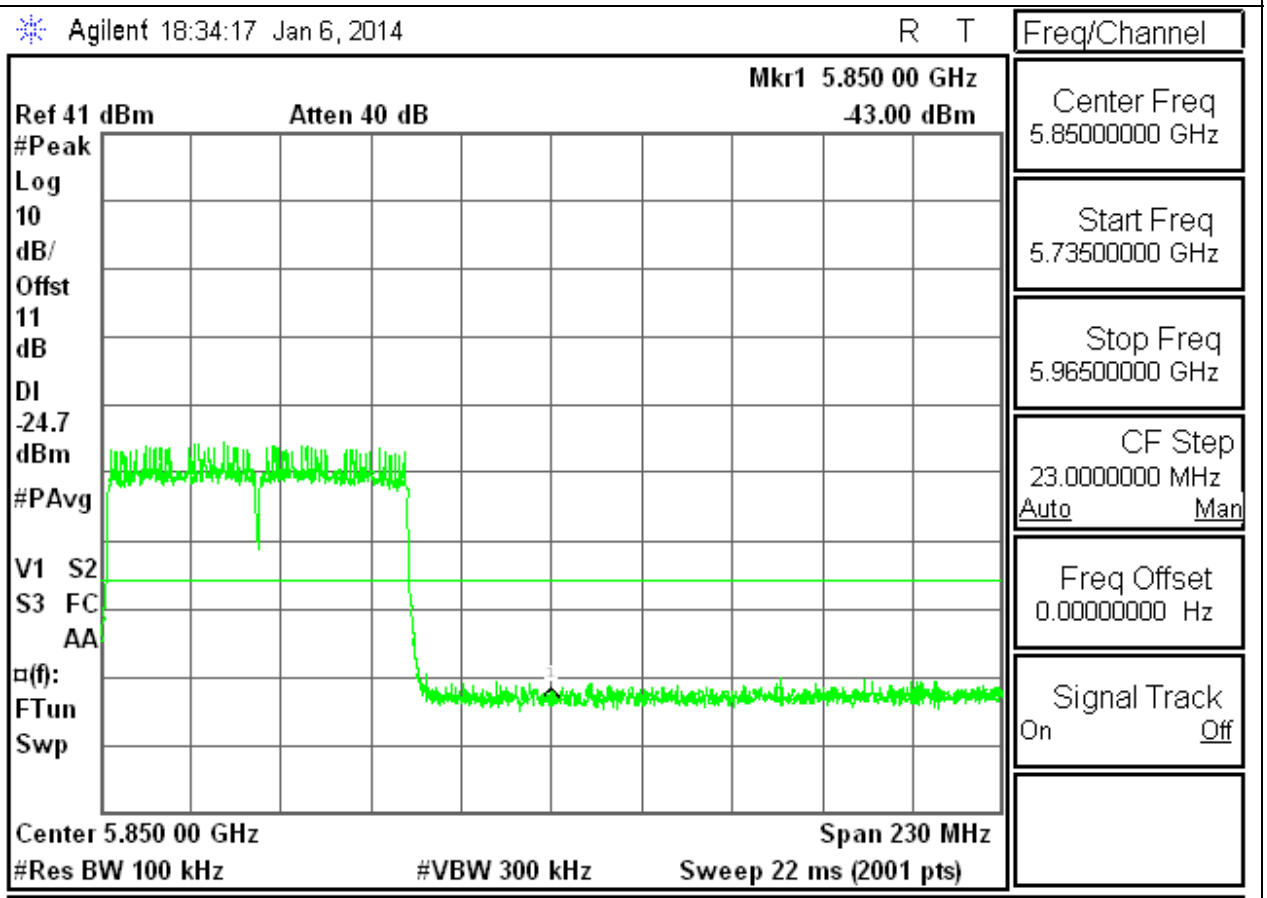
IN-BAND REFERENCE LEVEL

REFERENCE LEVEL LOW CH



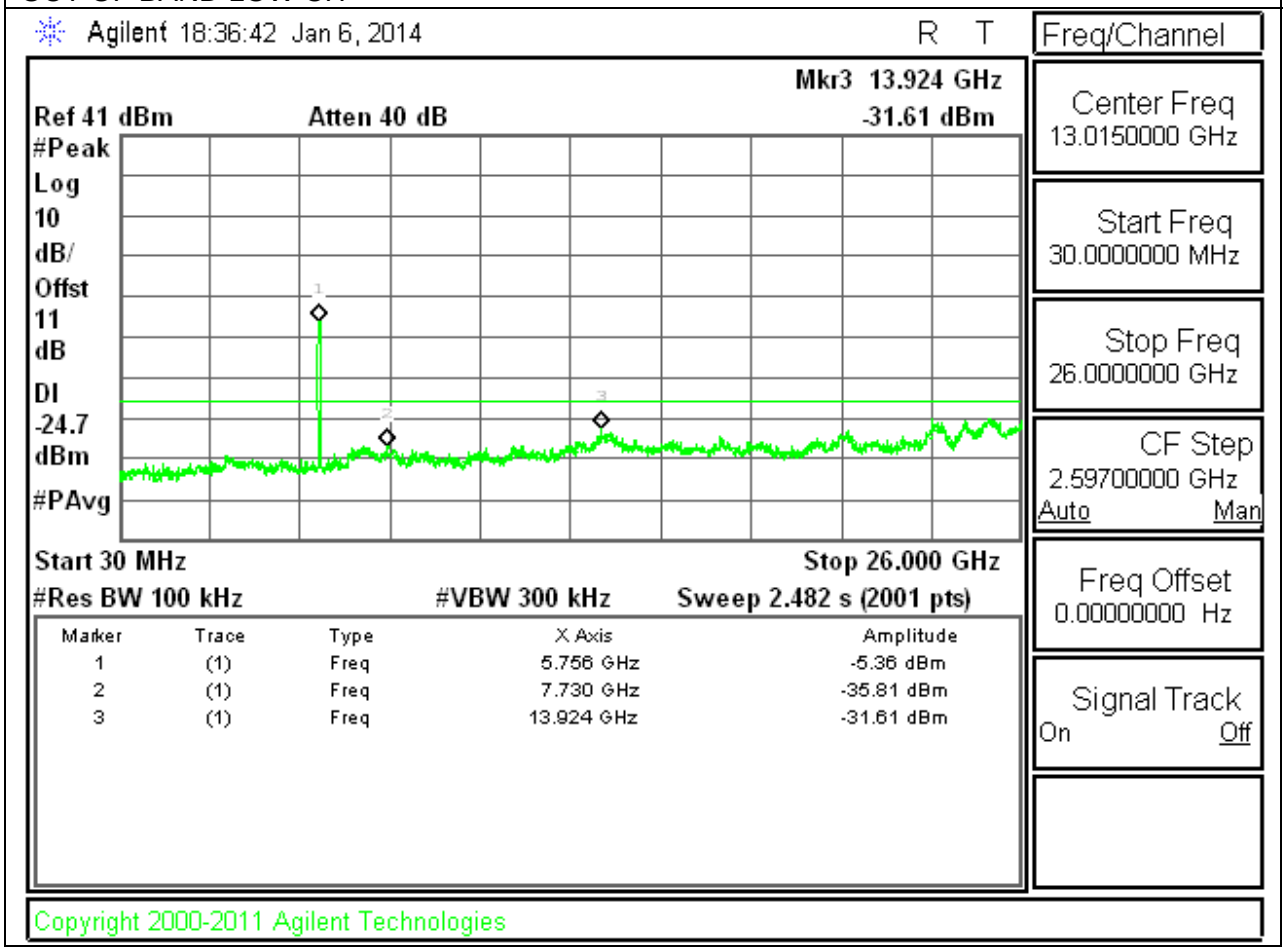
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= 10log (1/x) For this sample B mode = 0.3dB; G mode = 0.3dB; N mode = 0.32dB.

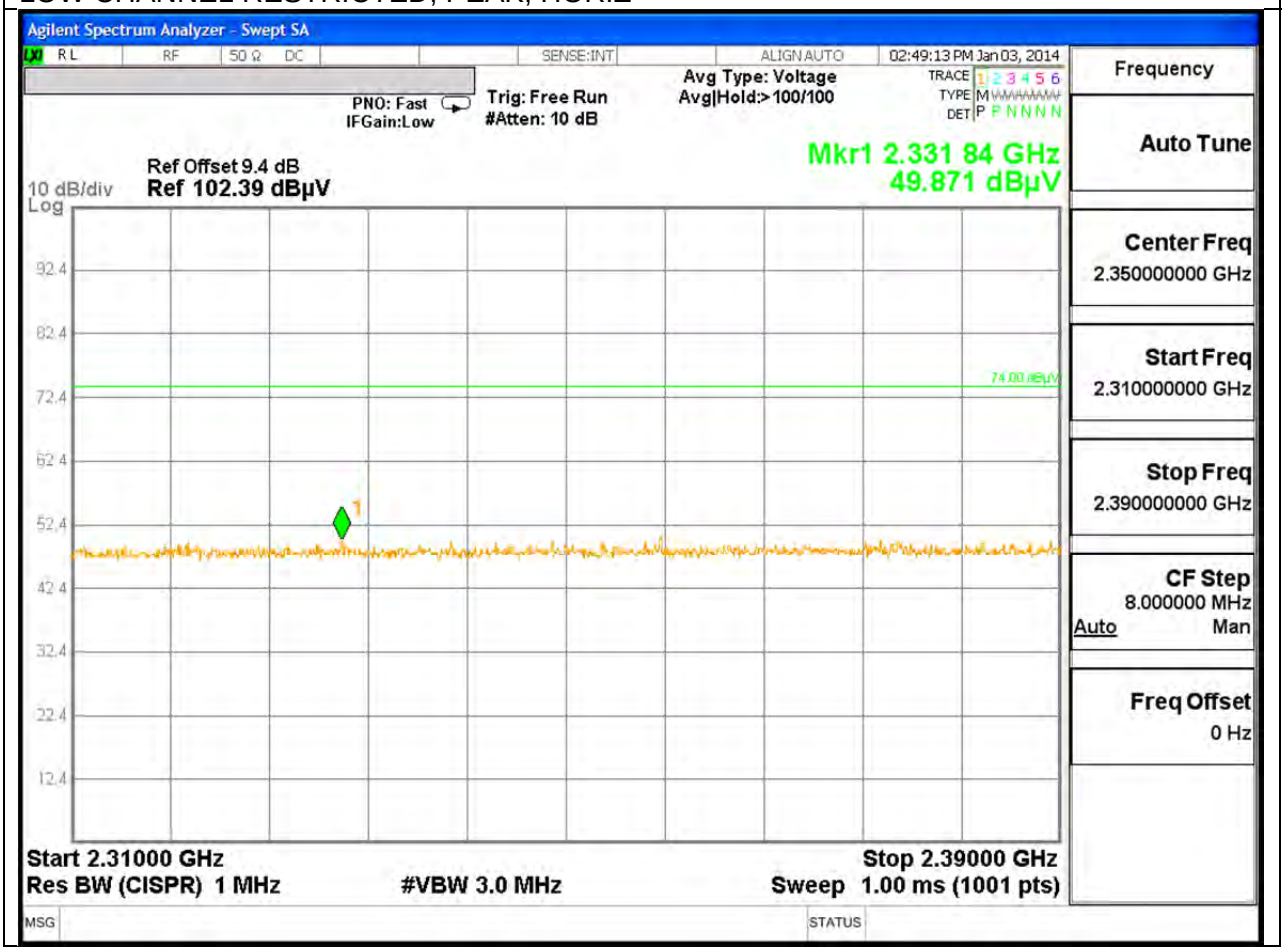
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

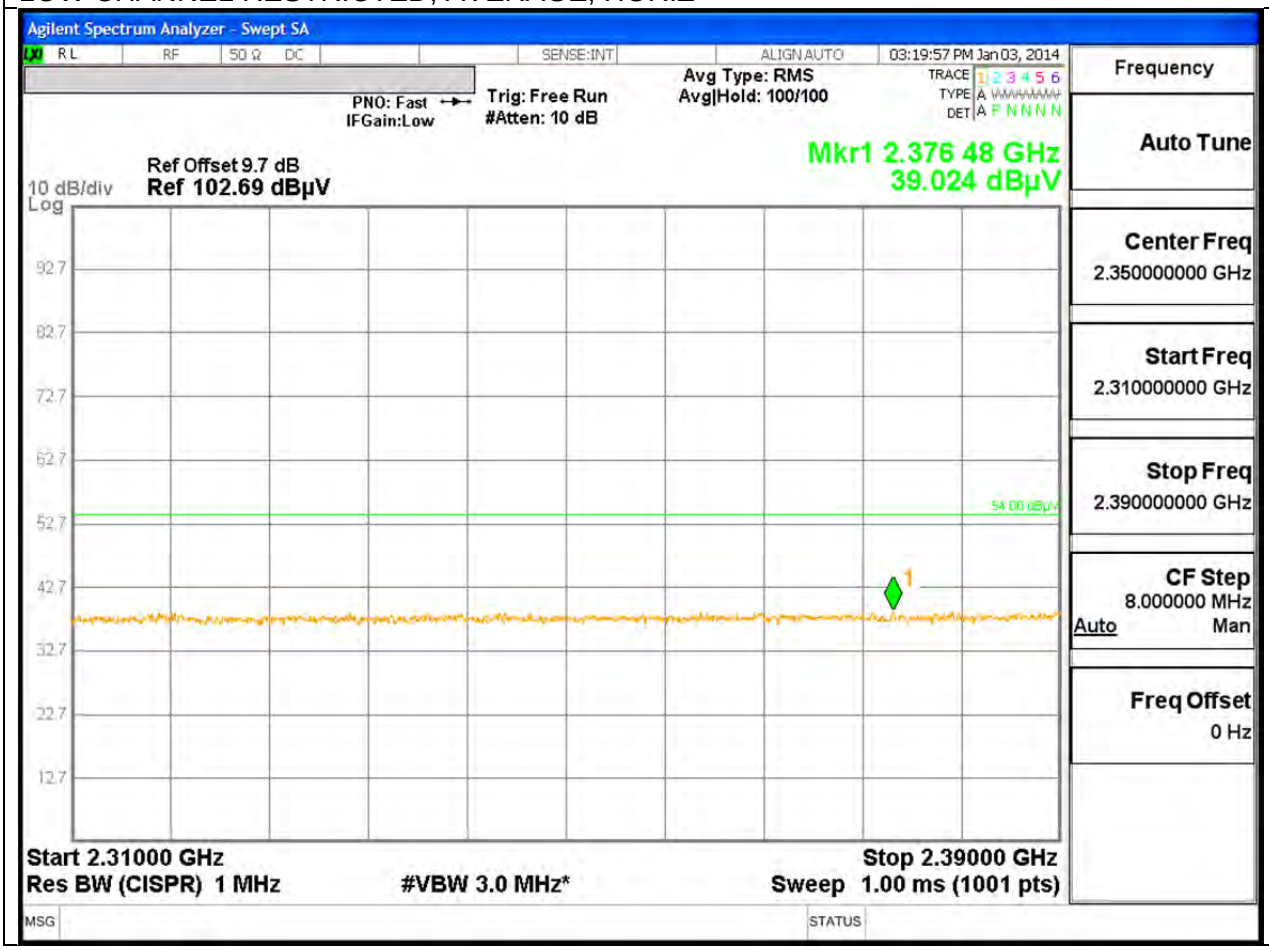
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

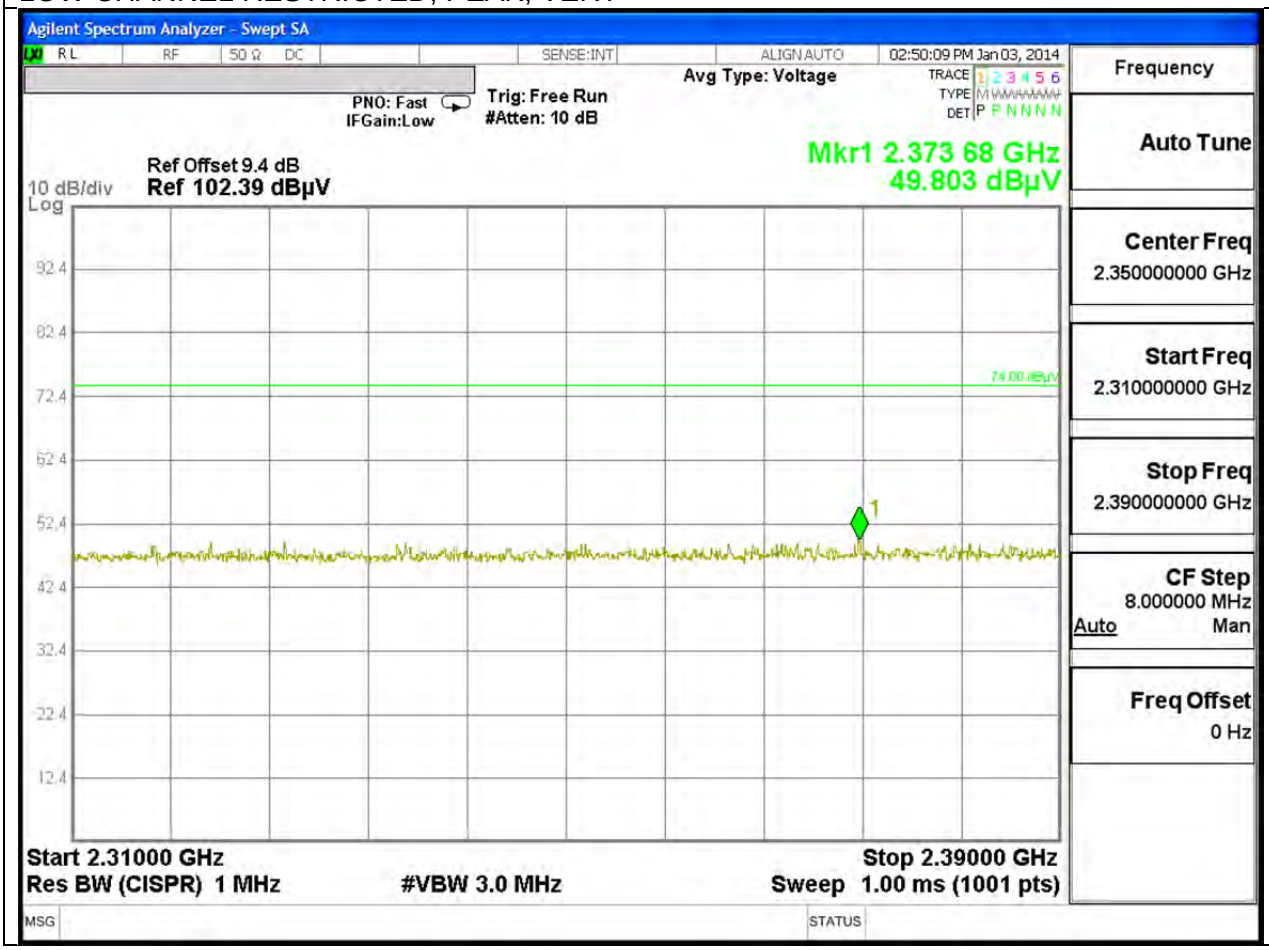
LOW CHANNEL RESTRICTED, PEAK, HORIZ



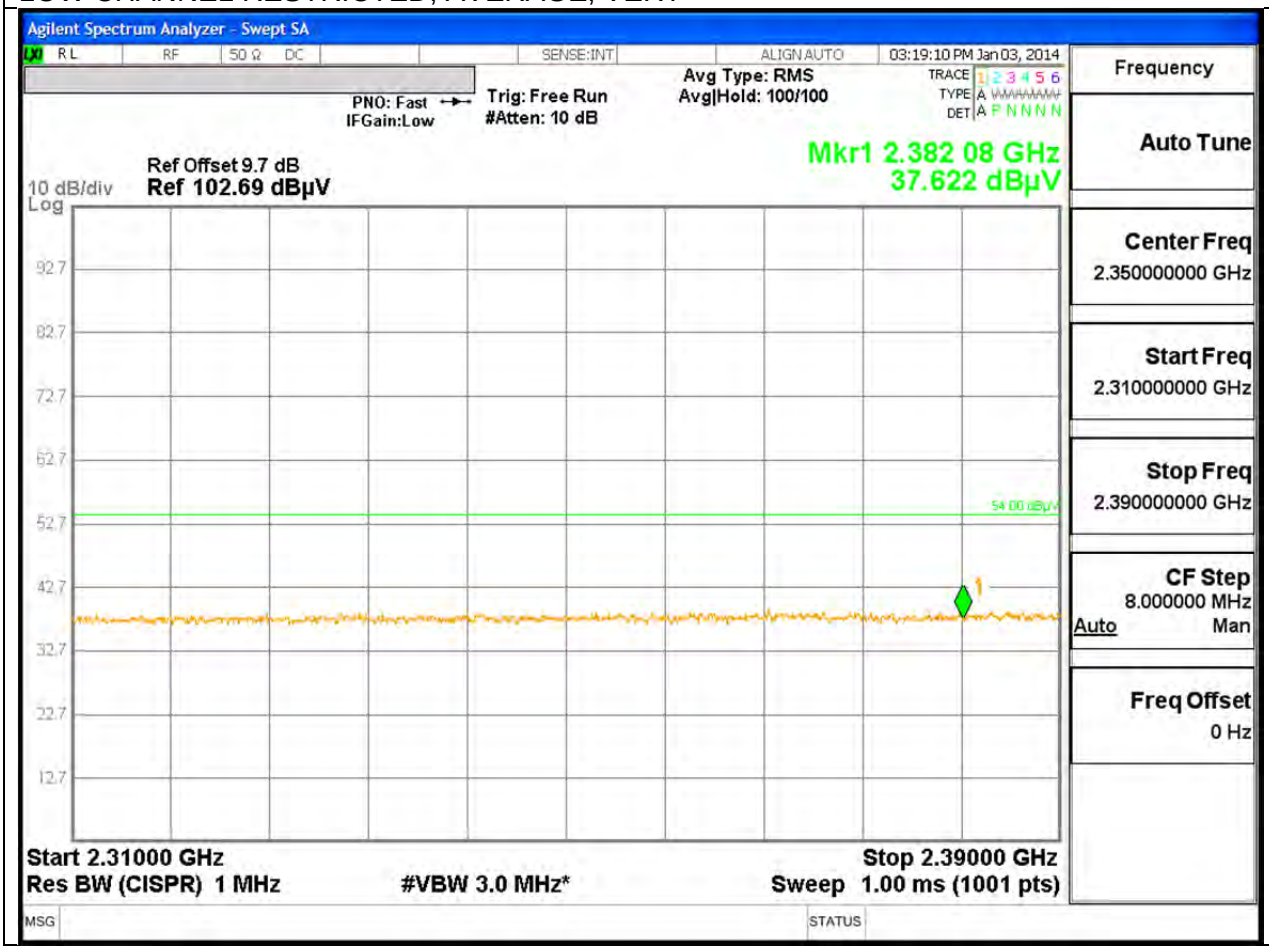
LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



LOW CHANNEL RESTRICTED, PEAK, VERT

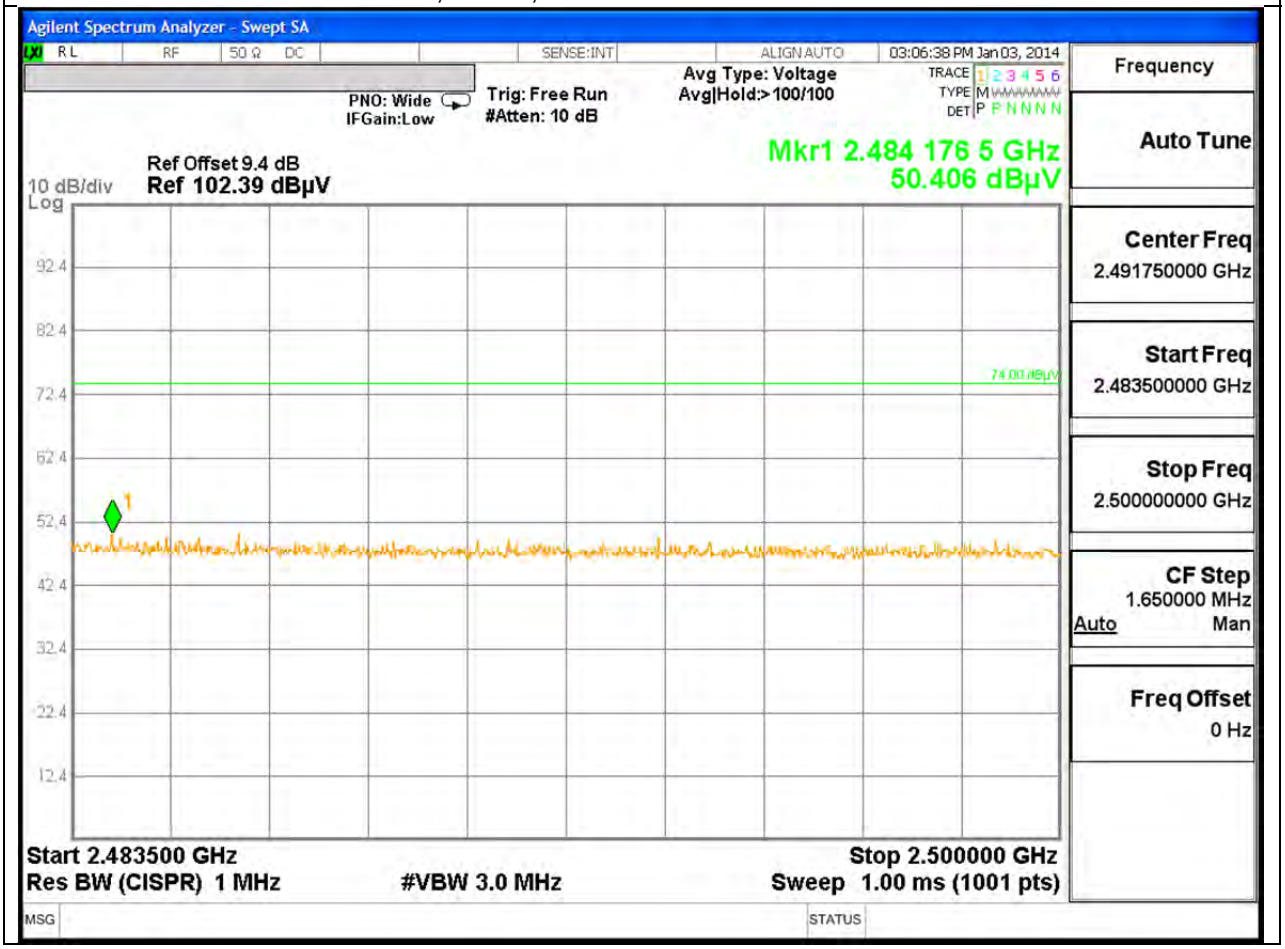


LOW CHANNEL RESTRICTED, AVERAGE, VERT

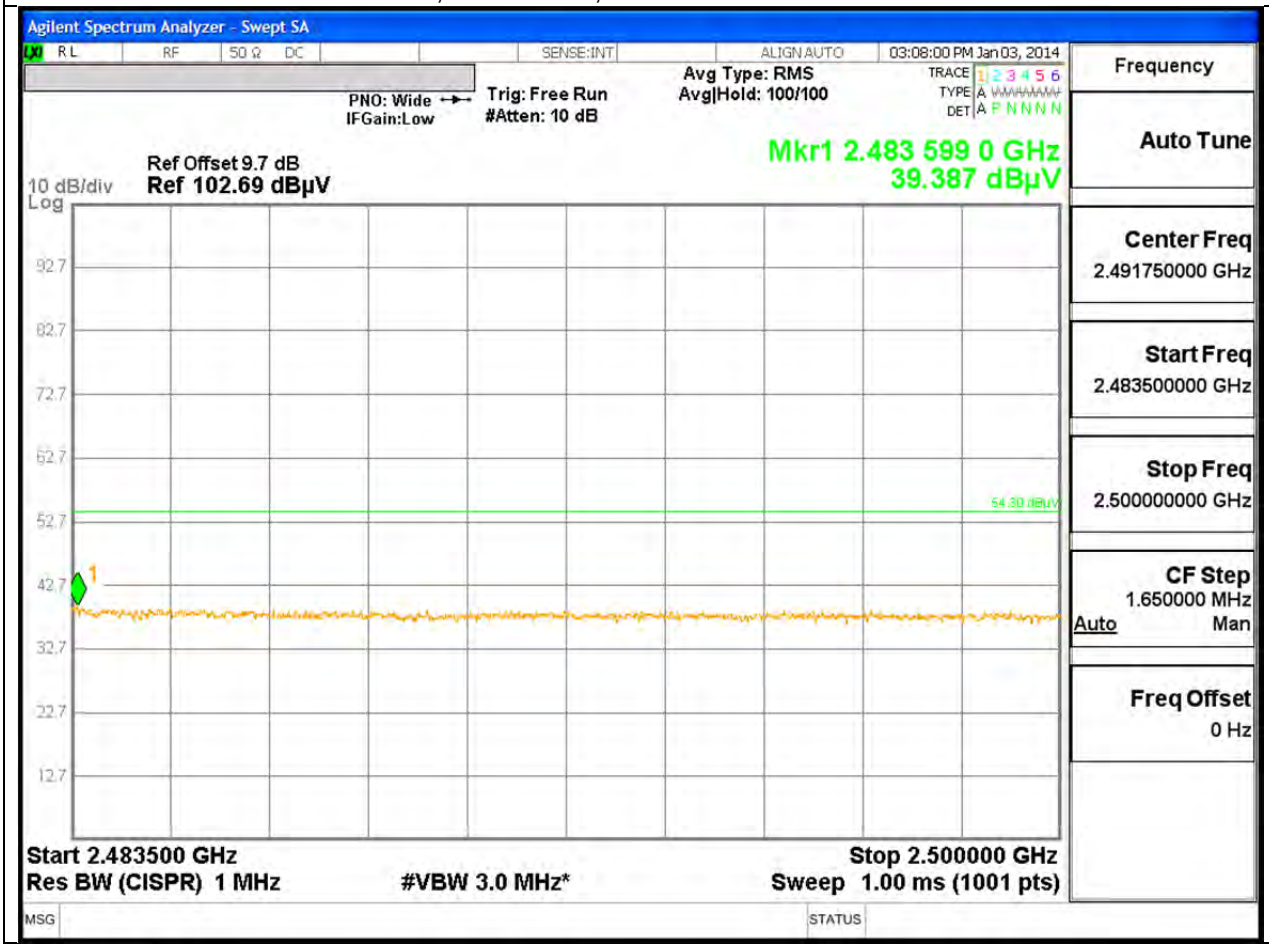


AUTHORIZED BANDEDGE (HIGH CHANNEL)

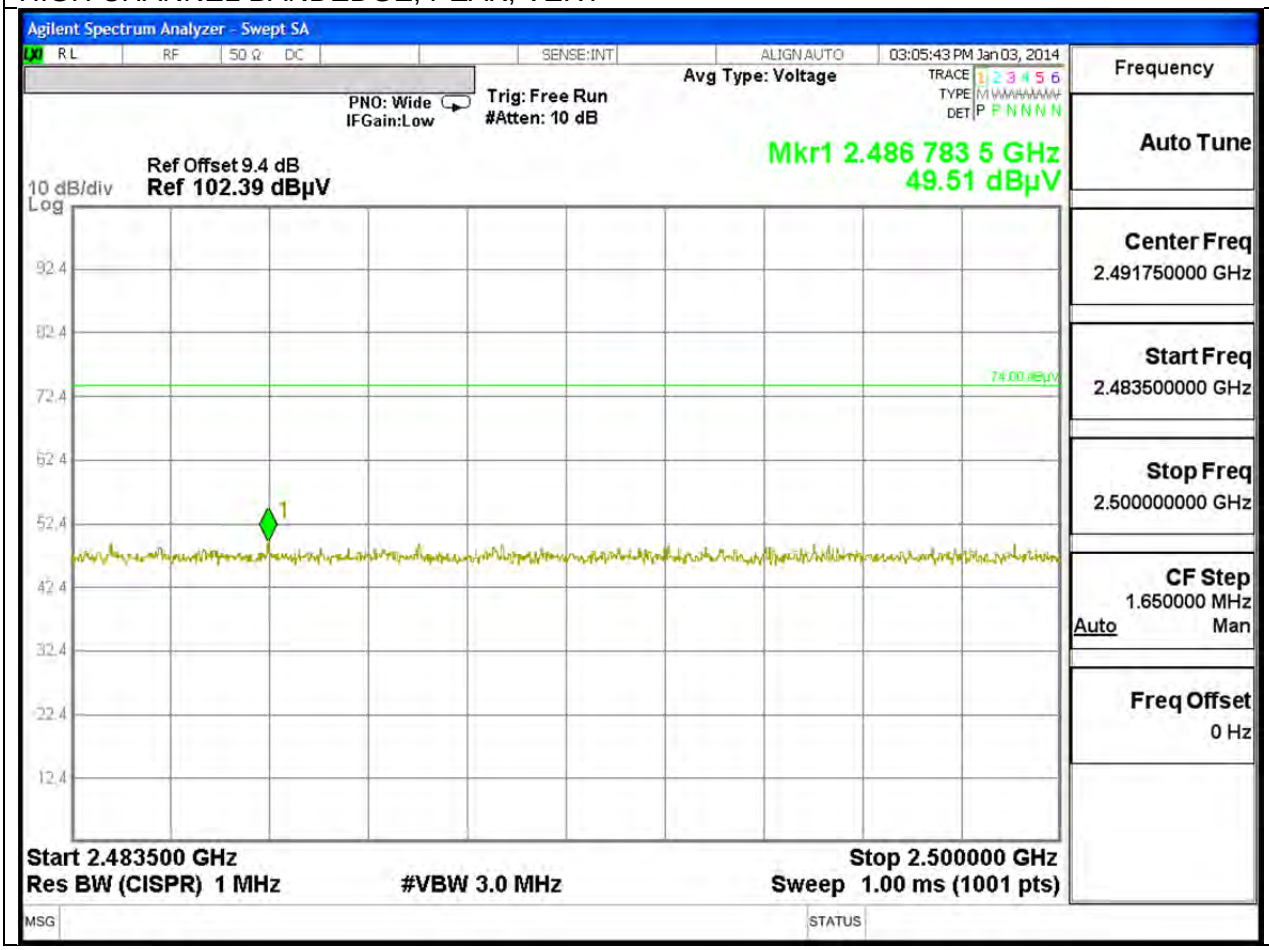
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



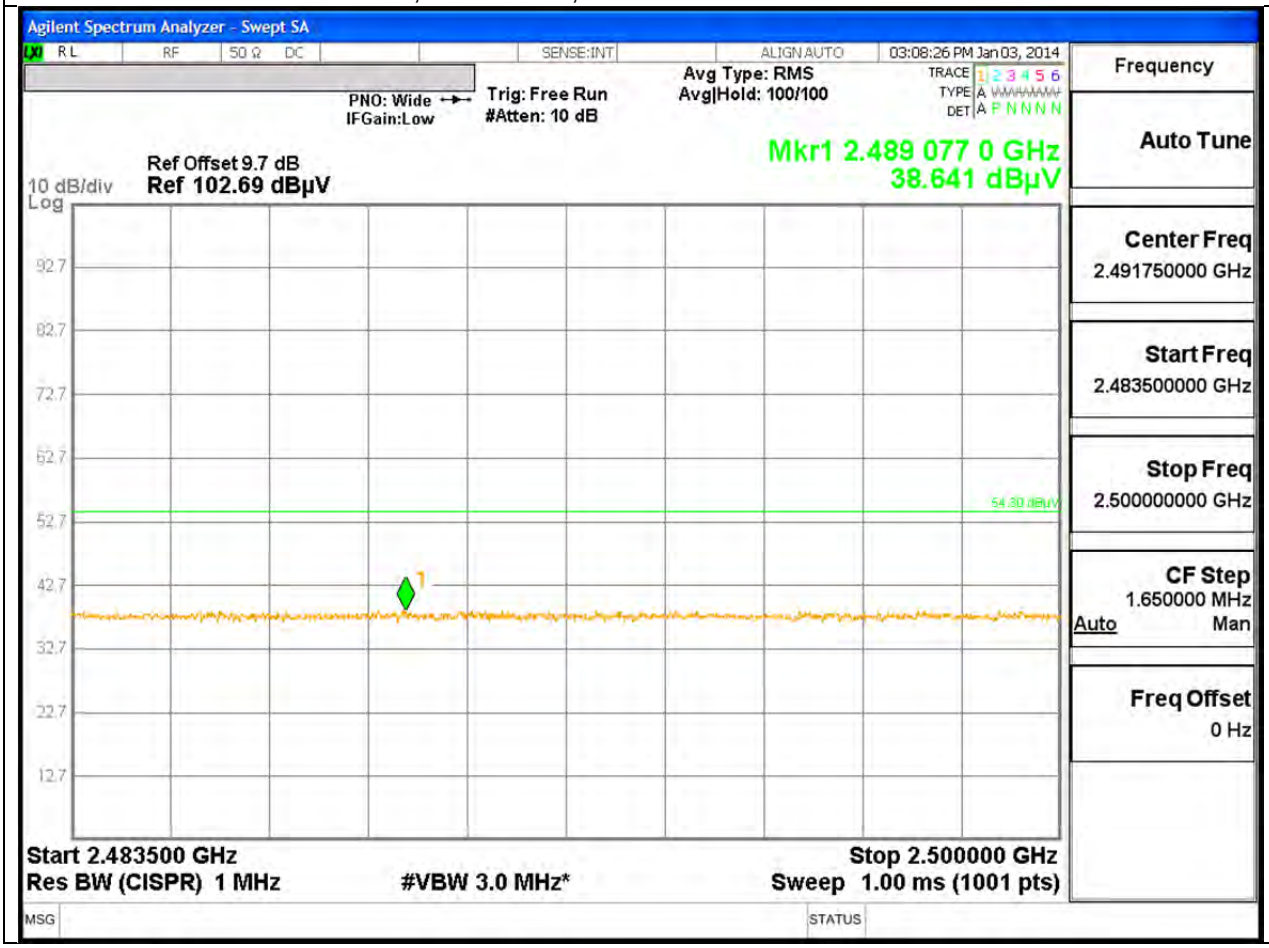
HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



HIGH CHANNEL BANDEDGE, PEAK, VERT

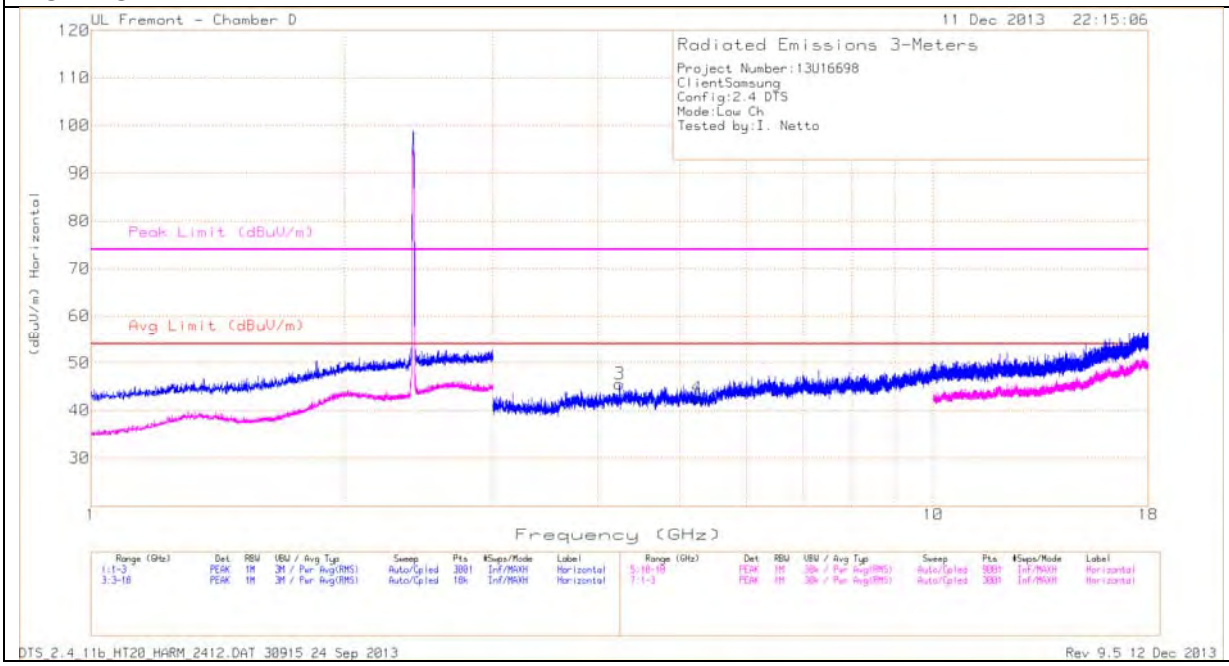


HIGH CHANNEL BANDEDGE, AVERAGE, VERT



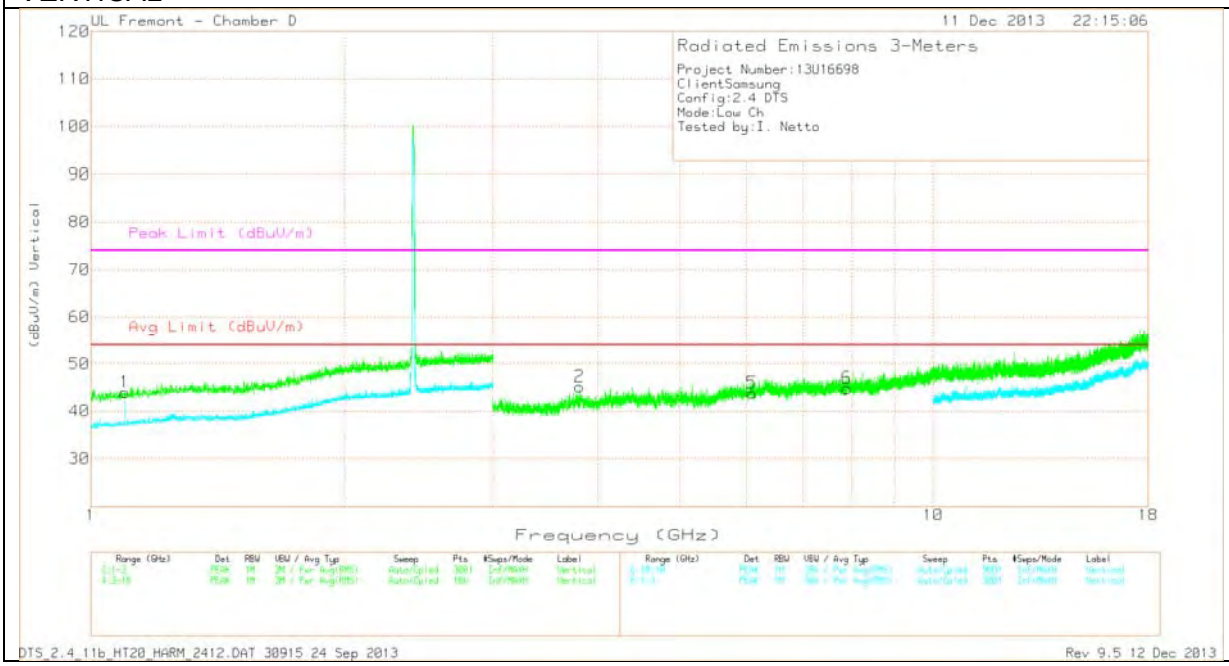
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

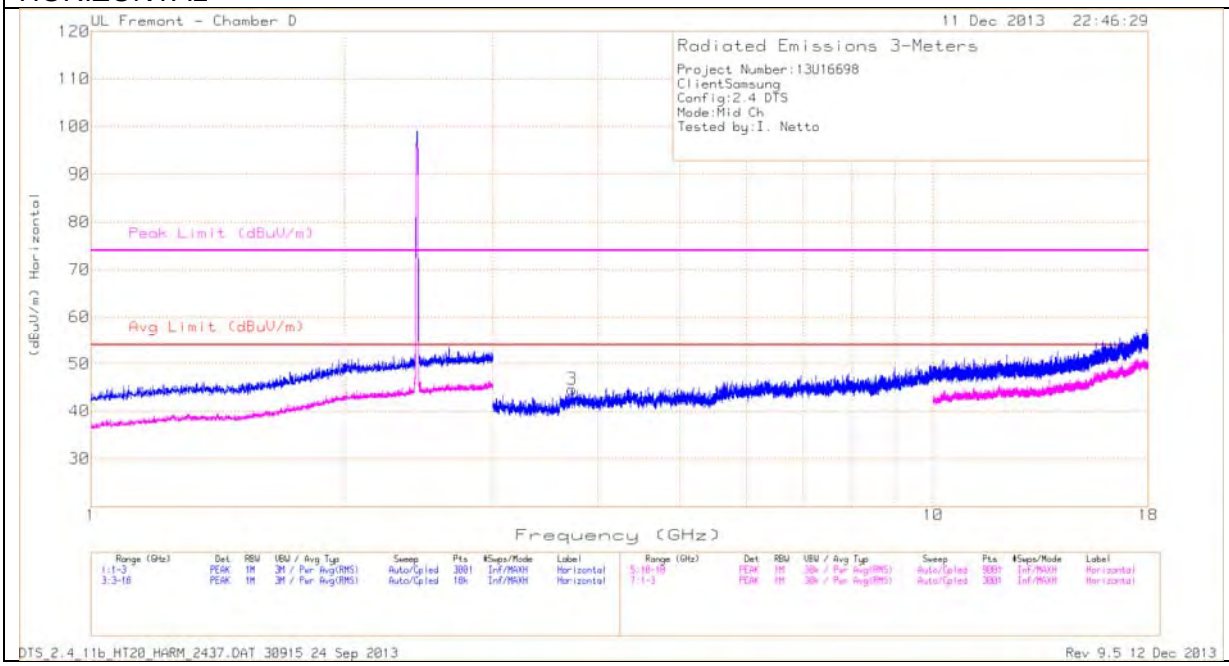
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/10dB Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.097	43.44	PK	28.5	-28	43.94	53.97	-10.03	74	-30.06	0-360	200	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	3.802	42.75	PK	33.7	-31.3	45.15	53.97	-8.82	74	-28.85	0-360	199	V
3	4.241	43.21	PK	34	-31.7	45.51	53.97	-8.46	74	-28.49	0-360	199	H
4	5.244	38.67	PK	34.7	-30.7	42.67	53.97	-11.3	74	-31.33	0-360	199	H
5	6.091	37.32	PK	35.8	-29.3	43.82	53.97	-10.15	74	-30.18	0-360	100	V
6	7.897	36.12	PK	36.2	-27.5	44.82	53.97	-9.15	74	-29.18	0-360	199	V

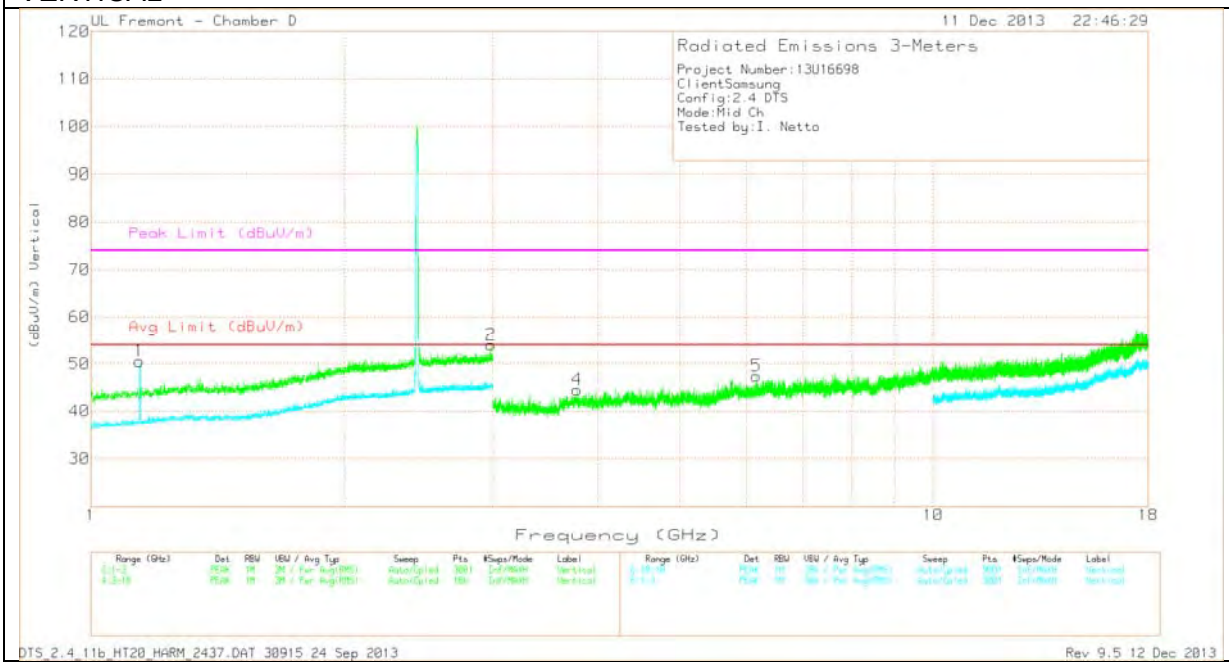
PK - Peak detector

MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

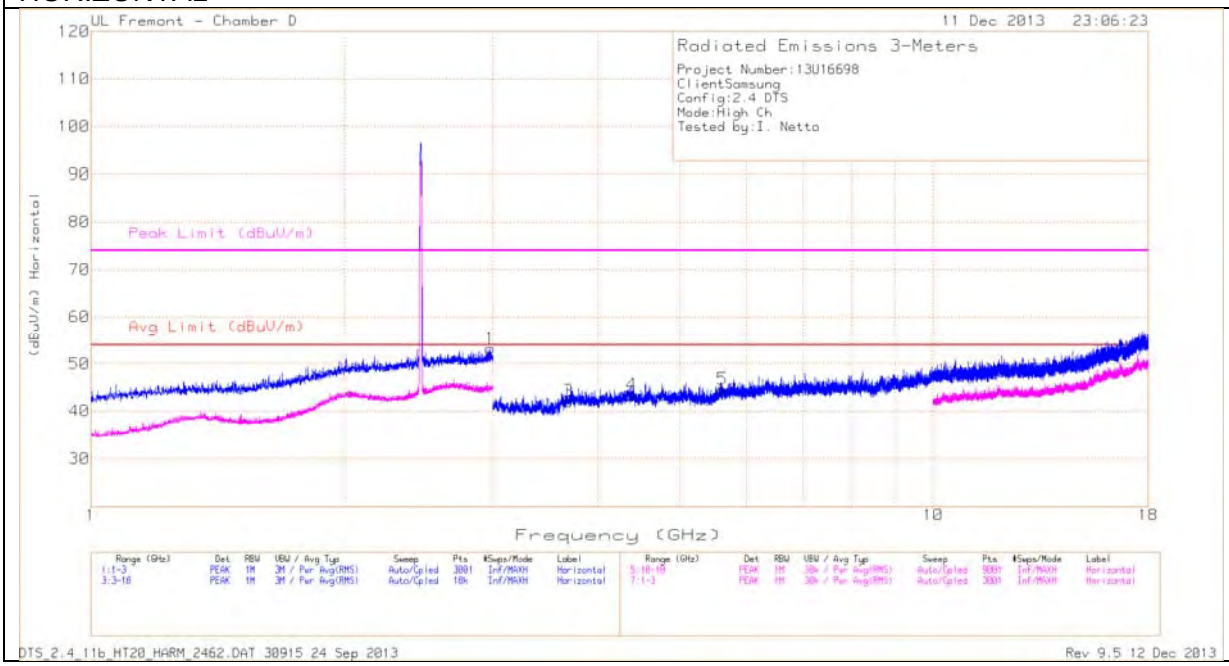
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/10dB Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.142	49.73	Avg	28.7	-27.9	50.53	53.97	-3.44	74	-23.47	0-360	100	V
2	2.983	44.7	PK	33.2	-23.9	54			74	-20	0-360	100	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	3.724	42.21	PK	33.6	-31.2	44.61	53.97	-9.36	74	-29.39	0-360	100	H
4	3.776	41.79	PK	33.7	-31	44.49	53.97	-9.48	74	-29.51	0-360	199	V
5	6.165	41.97	PK	35.9	-30.5	47.37	53.97	-6.6	74	-26.63	0-360	199	V

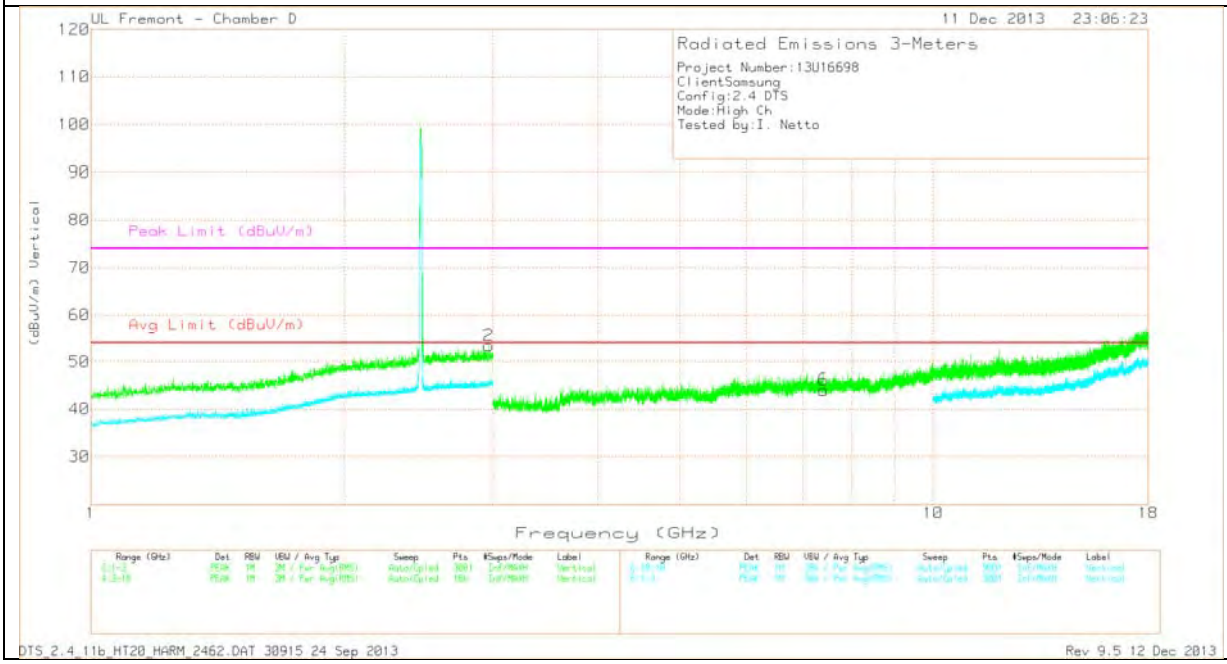
PK - Peak detector

HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

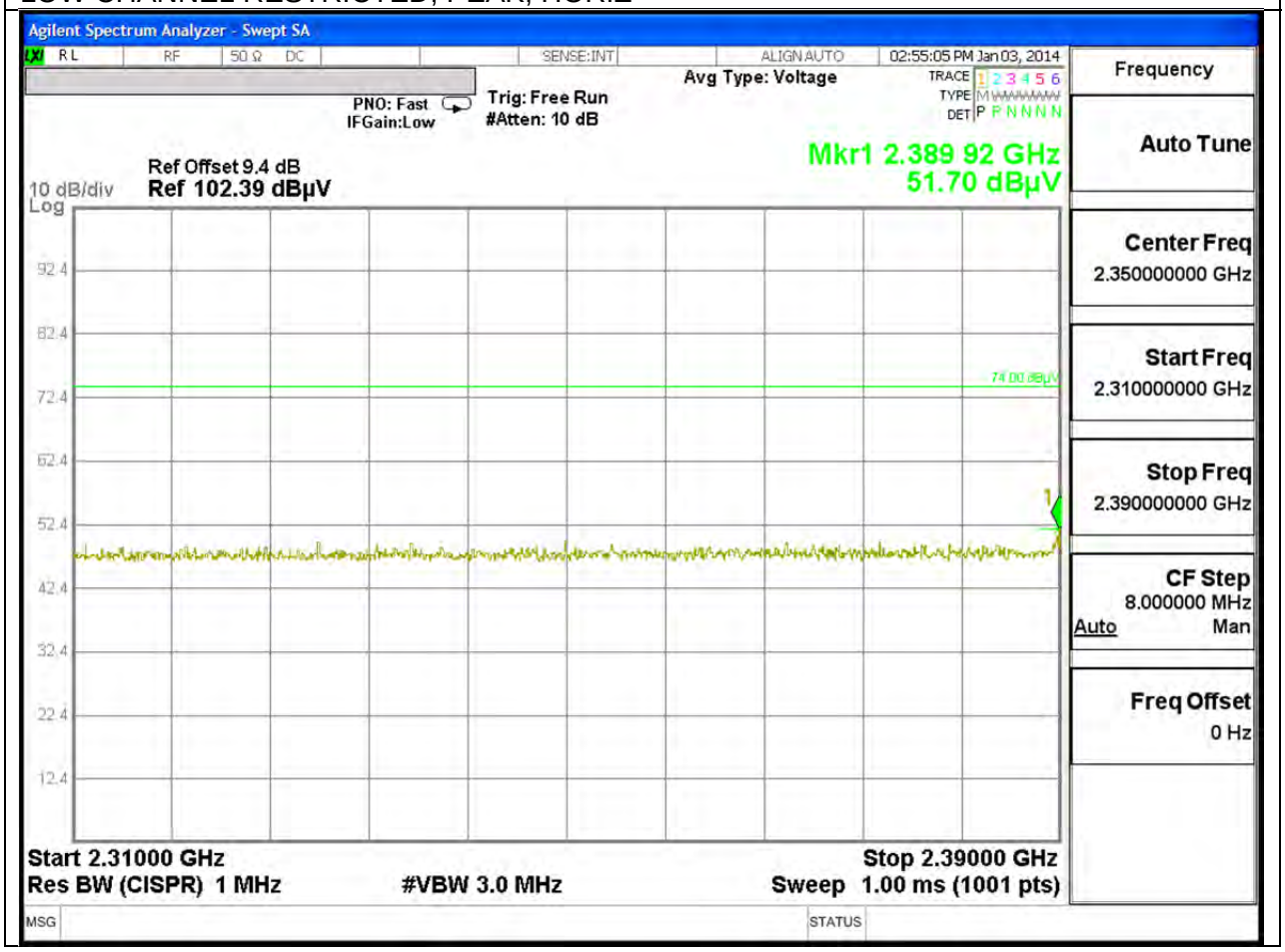
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/10dB Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.967	44.23	PK	33.2	-24	53.43	53.97	-.54	74	-20.57	0-360	199	V
1	2.98	43.88	PK	33.2	-23.9	53.18	53.97	-.79	74	-20.82	0-360	199	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/3 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	3.687	39.94	PK	33.5	-31.4	42.04	53.97	-11.93	74	-31.96	0-360	199	H
4	4.387	39.67	PK	34.2	-30.5	43.37	53.97	-10.6	74	-30.63	0-360	100	H
5	5.619	39.6	PK	35.1	-30.1	44.6	53.97	-9.37	74	-29.4	0-360	100	H
6	7.411	35.82	PK	36.1	-27.9	44.02	53.97	-9.95	74	-29.98	0-360	199	V

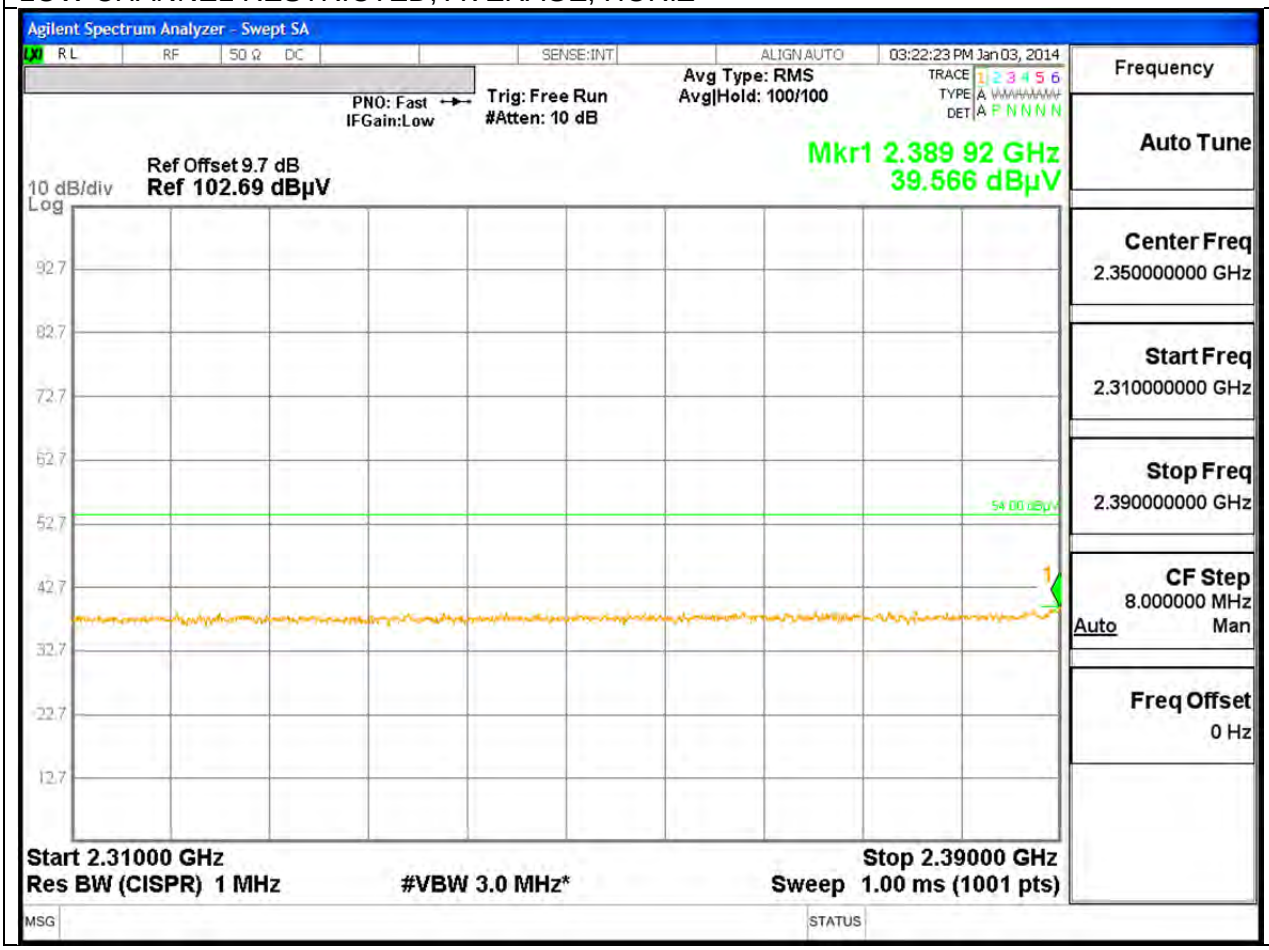
PK - Peak detector

10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

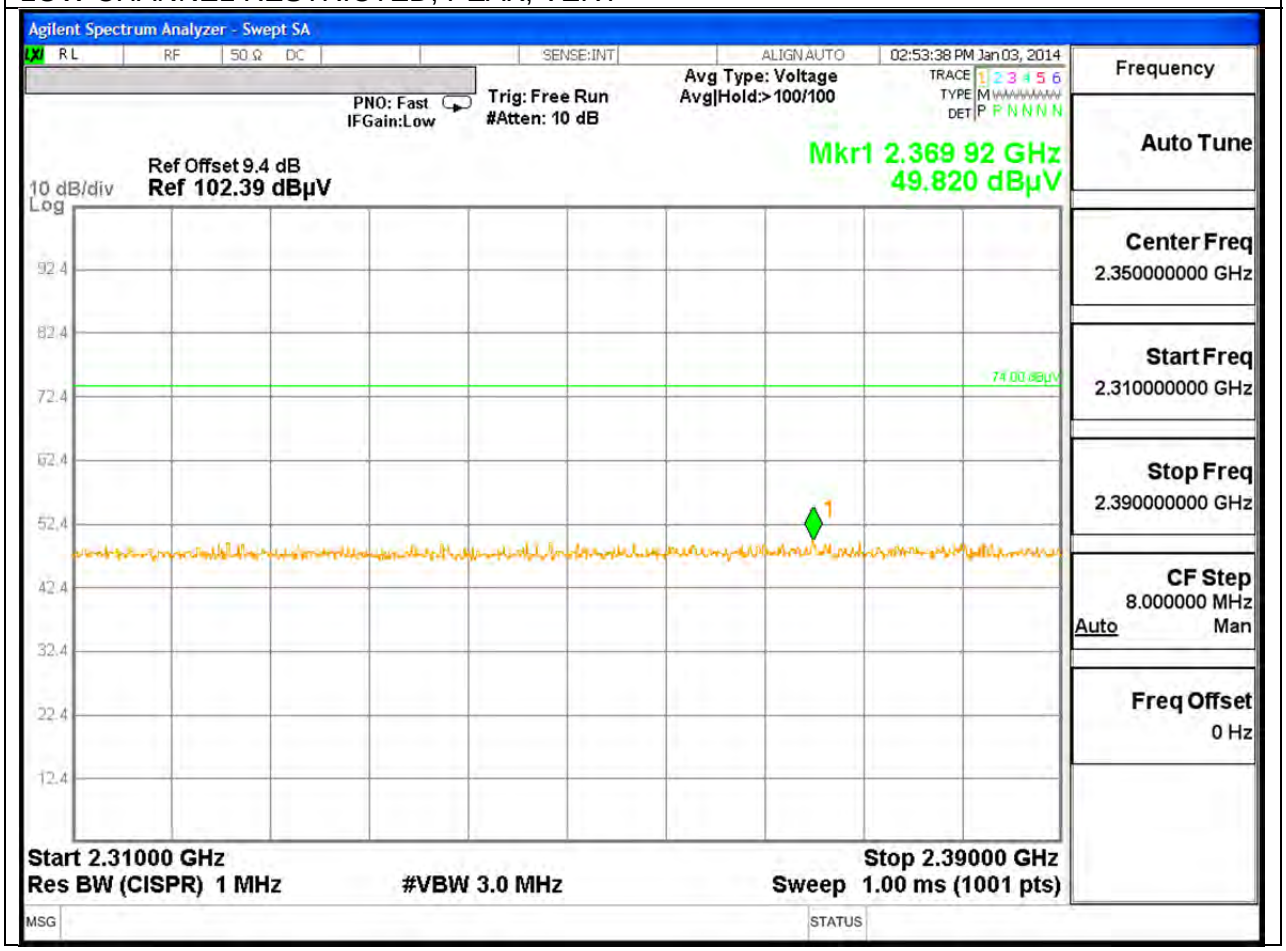
LOW CHANNEL RESTRICTED, PEAK, HORIZ



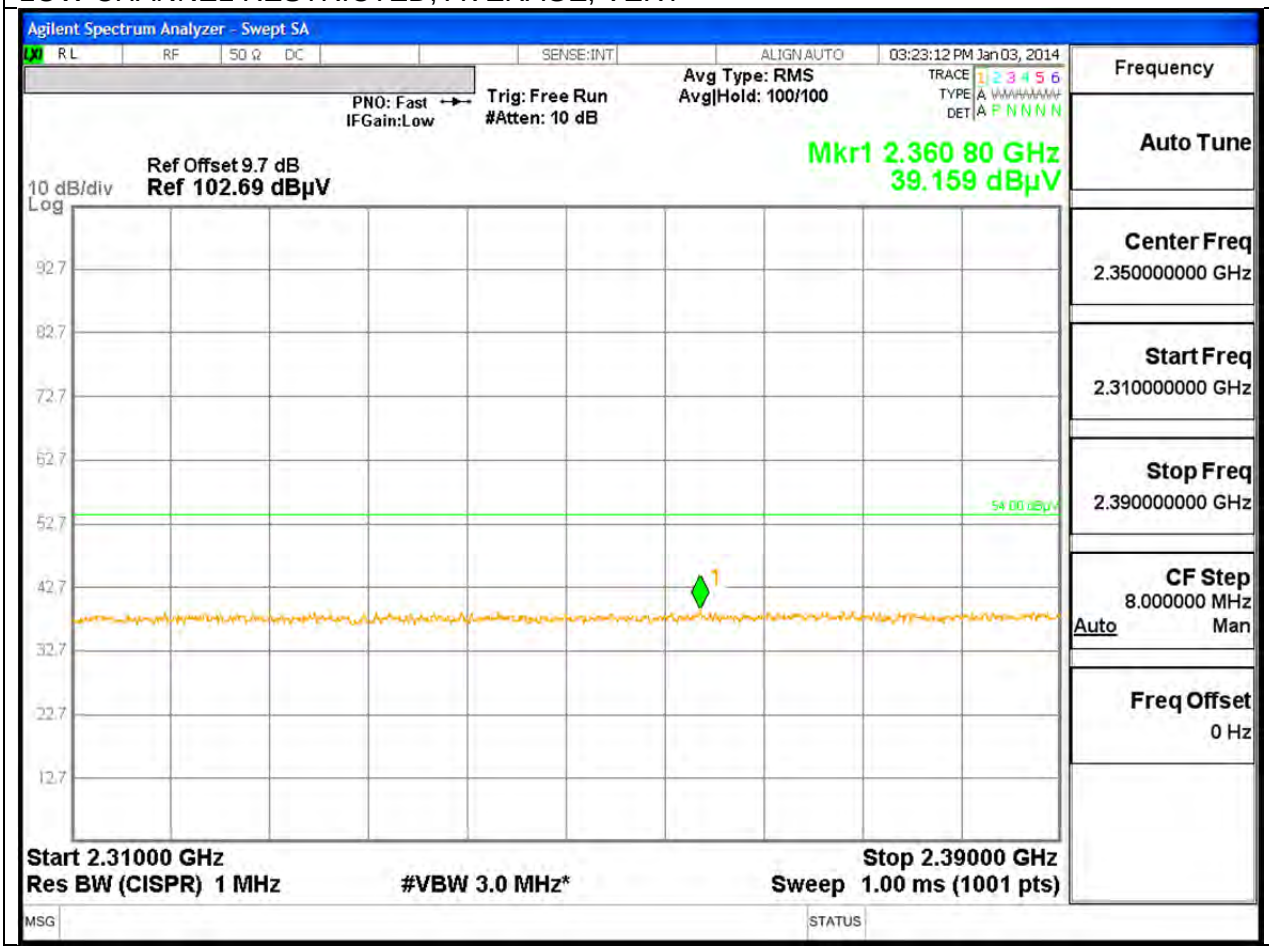
LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



LOW CHANNEL RESTRICTED, PEAK, VERT

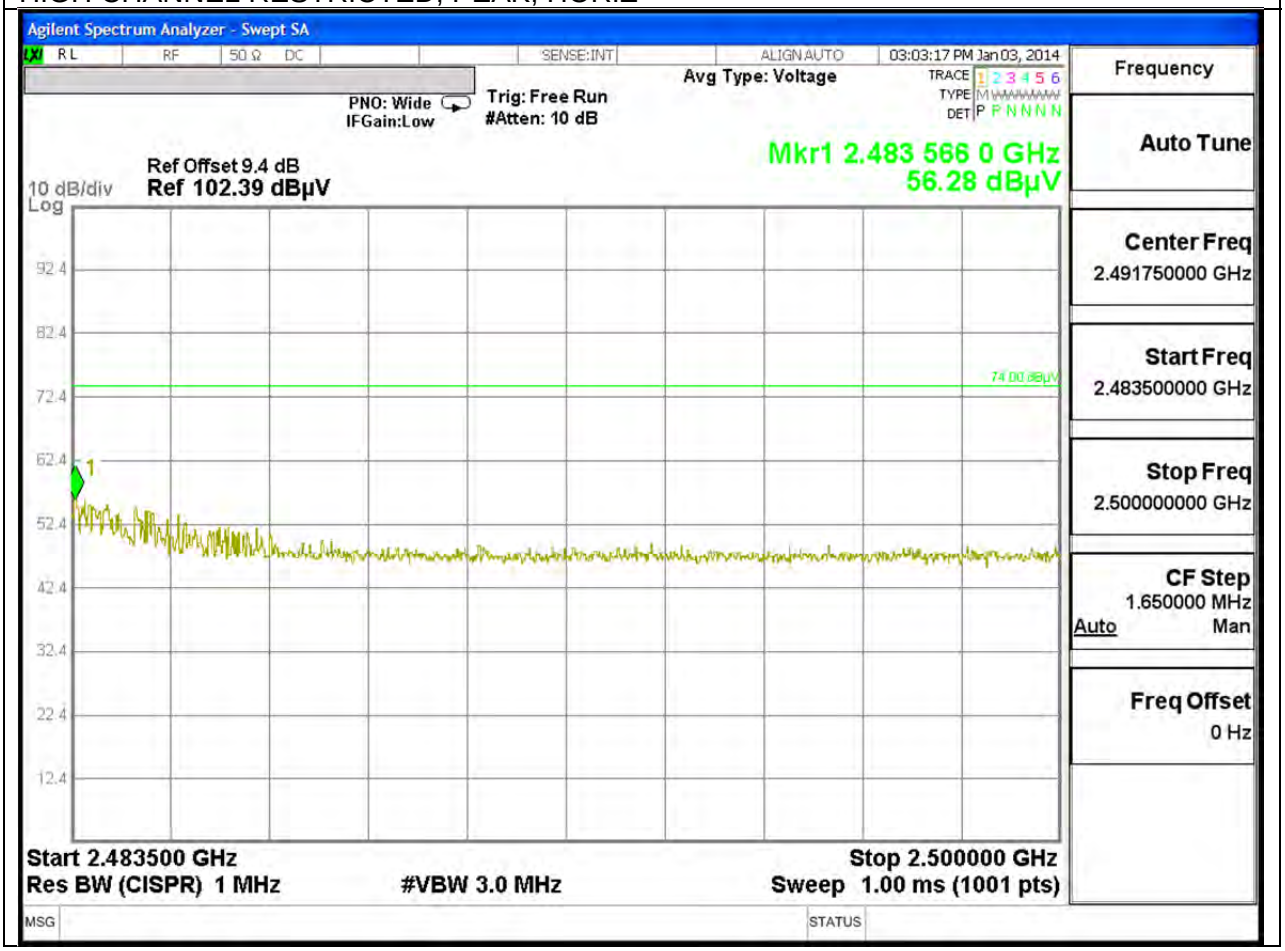


LOW CHANNEL RESTRICTED, AVERAGE, VERT

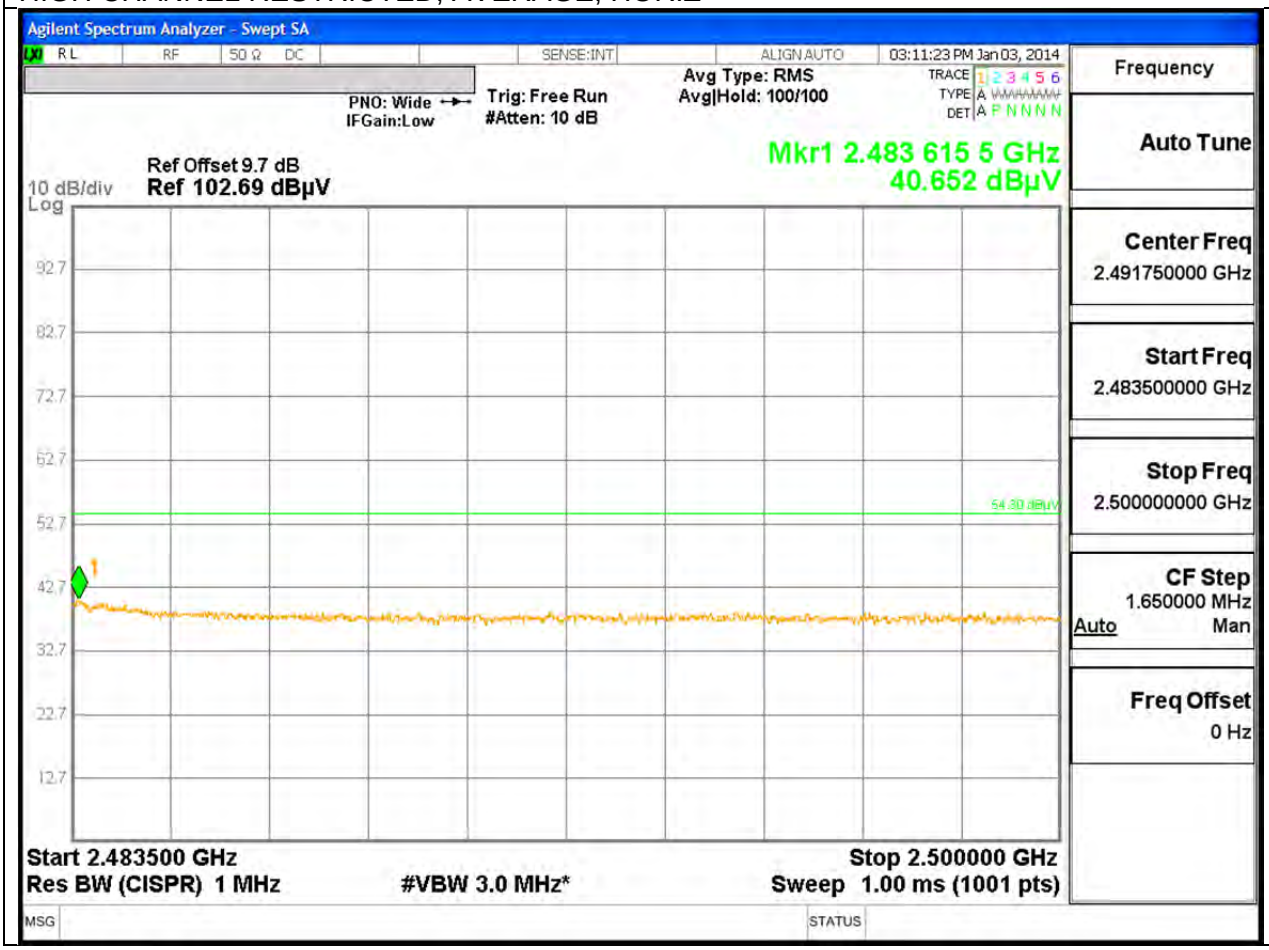


AUTHORIZED BANDEDGE (HIGH CHANNEL)

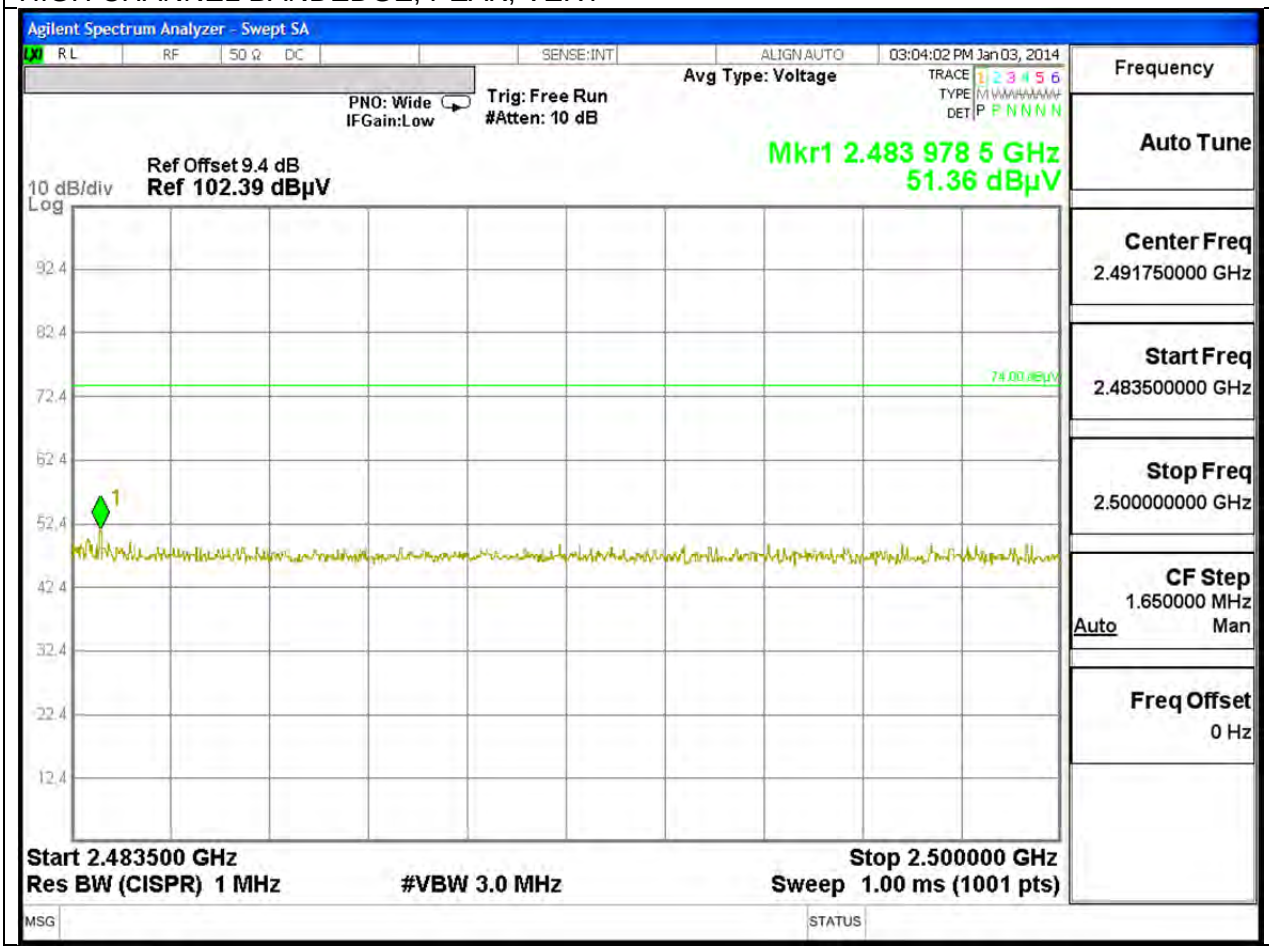
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



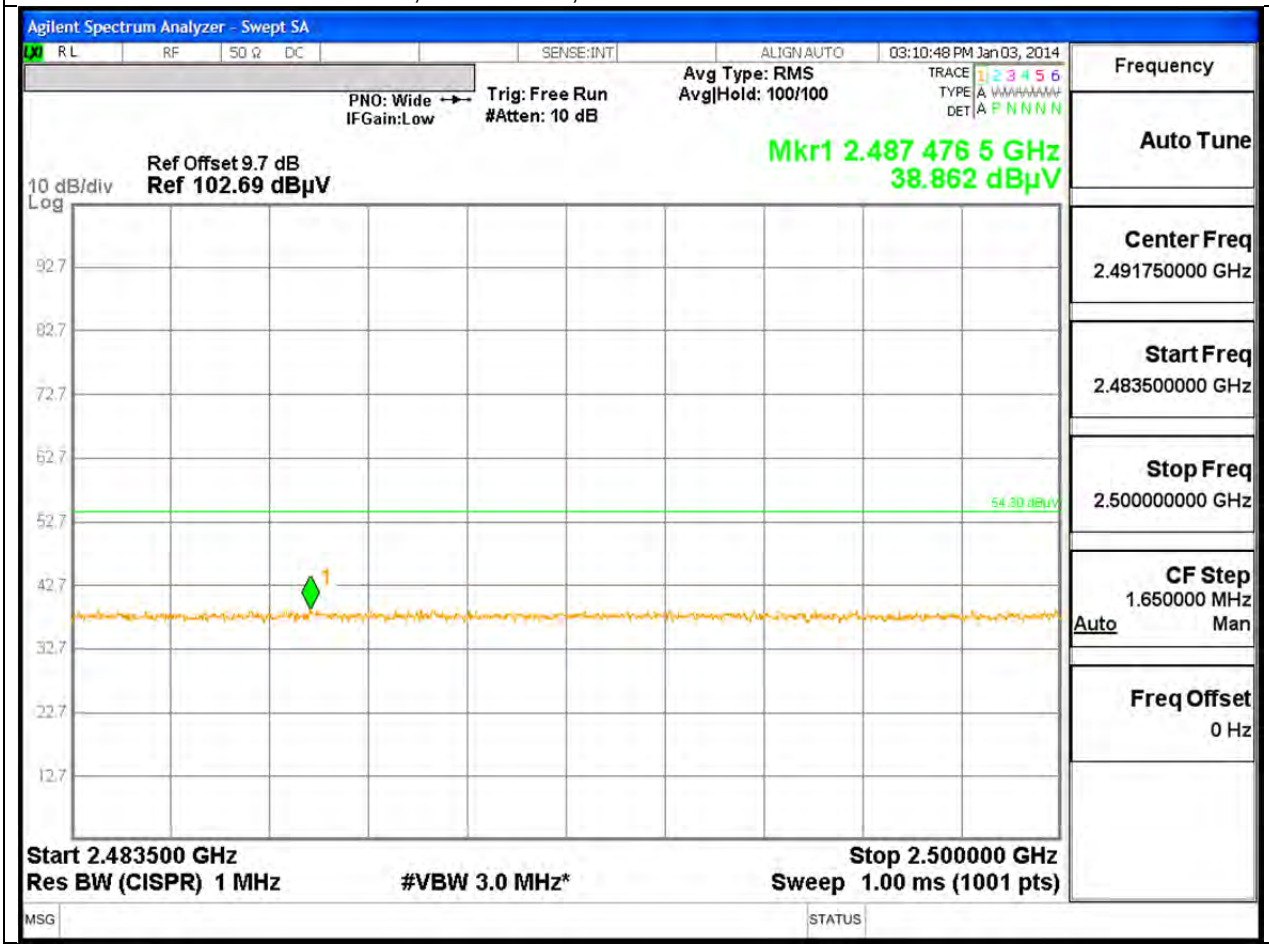
HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



HIGH CHANNEL BANDEDGE, PEAK, VERT

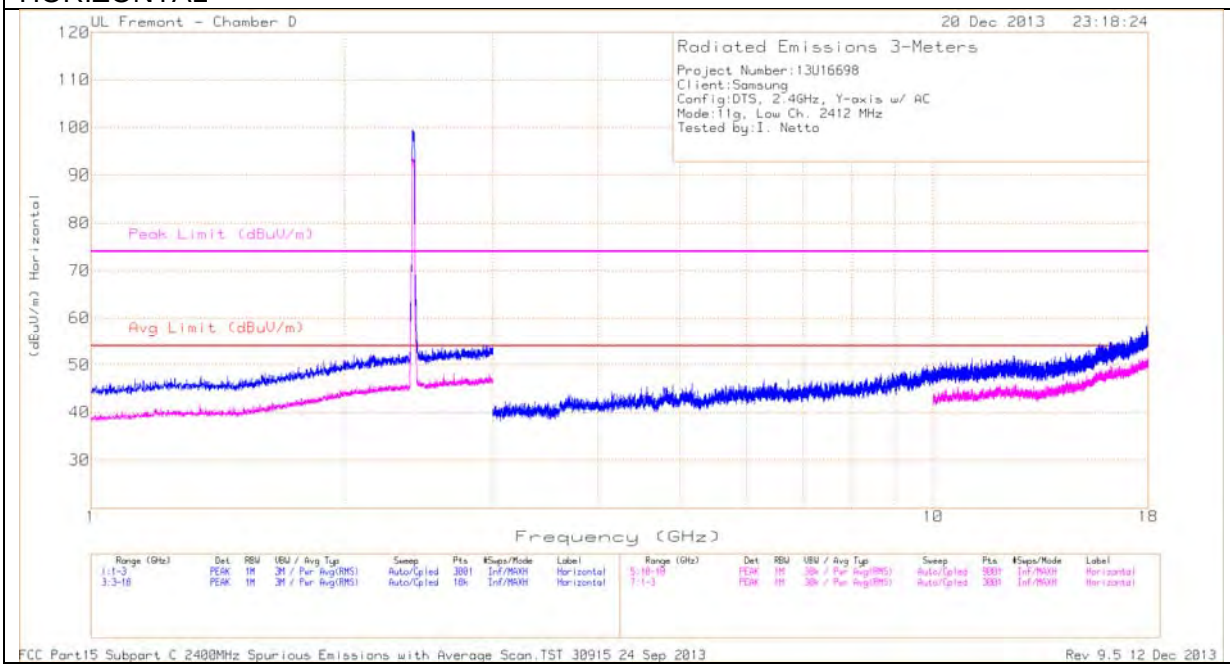


HIGH CHANNEL BANDEDGE, AVERAGE, VERT



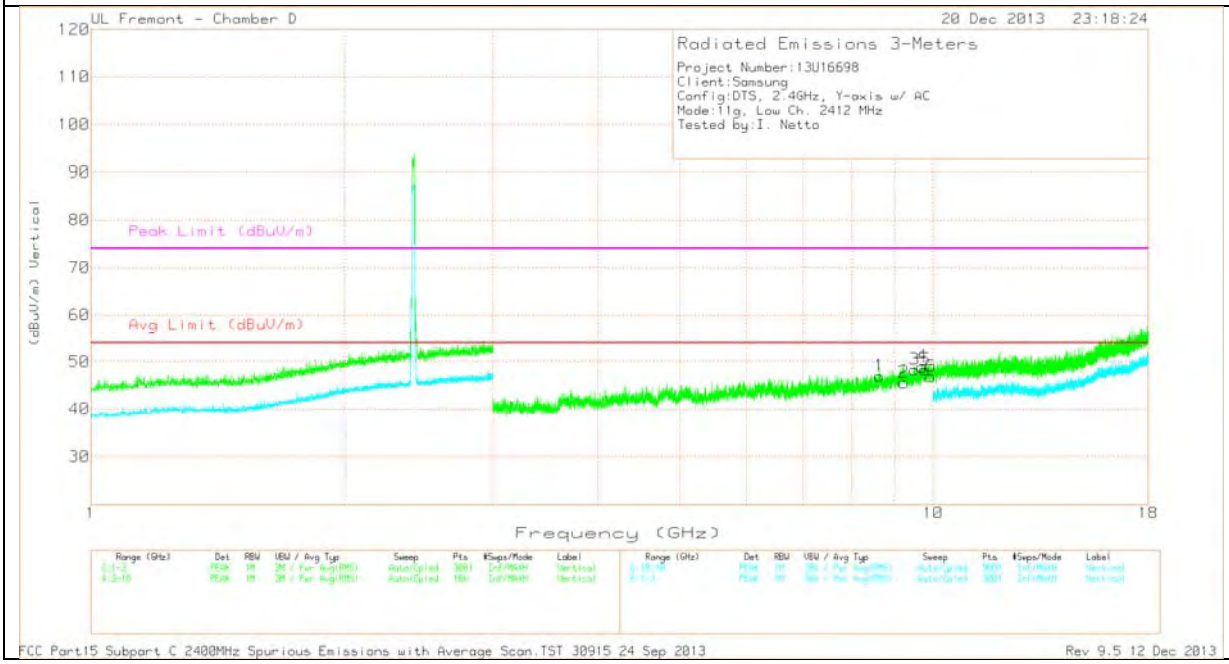
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

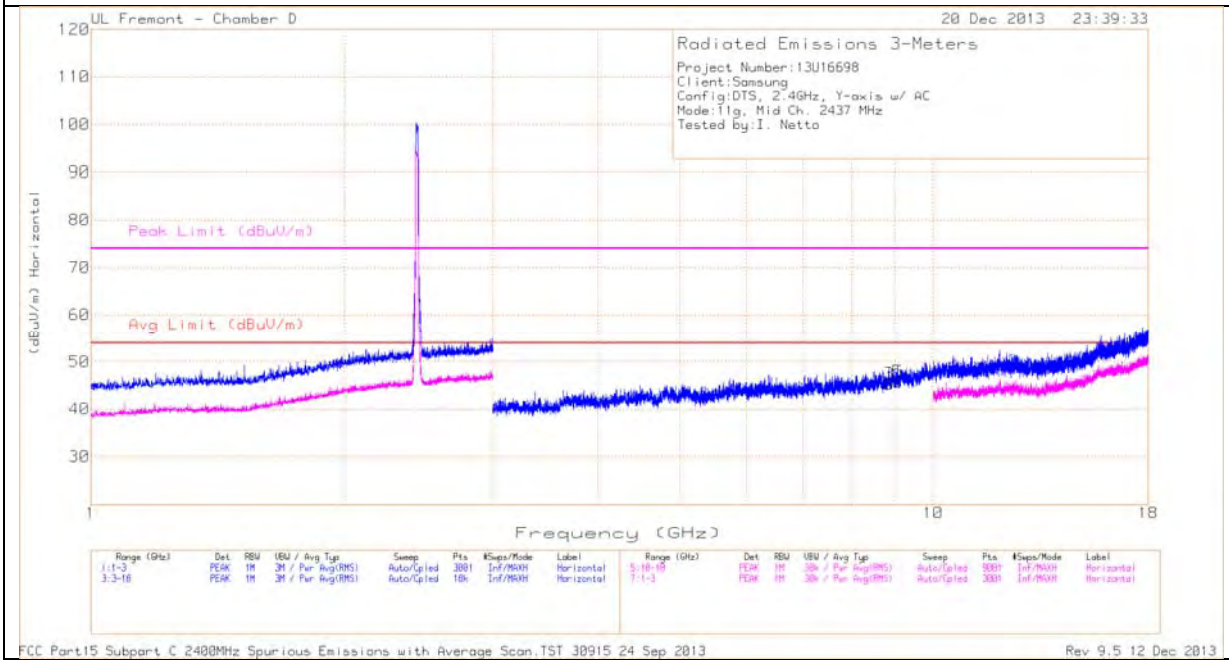
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.636	33.46	PK	36.3	-22.8	46.96	53.97	-7.01	74	-27.04	0-360	201	V
2	9.23	30.32	PK	36.9	-21.6	45.62	53.97	-8.35	74	-28.38	0-360	100	V
3	9.498	33.35	PK	37.2	-22.2	48.35	53.97	-5.62	74	-25.65	0-360	201	V
4	9.701	33.52	PK	37.4	-22	48.92	53.97	-5.05	74	-25.08	0-360	201	V
5	9.785	32.39	PK	37.5	-21.6	48.29	53.97	-5.68	74	-25.71	0-360	201	V
6	9.935	31.62	PK	37.8	-22.5	46.92	53.97	-7.05	74	-27.08	0-360	100	V

PK - Peak detector

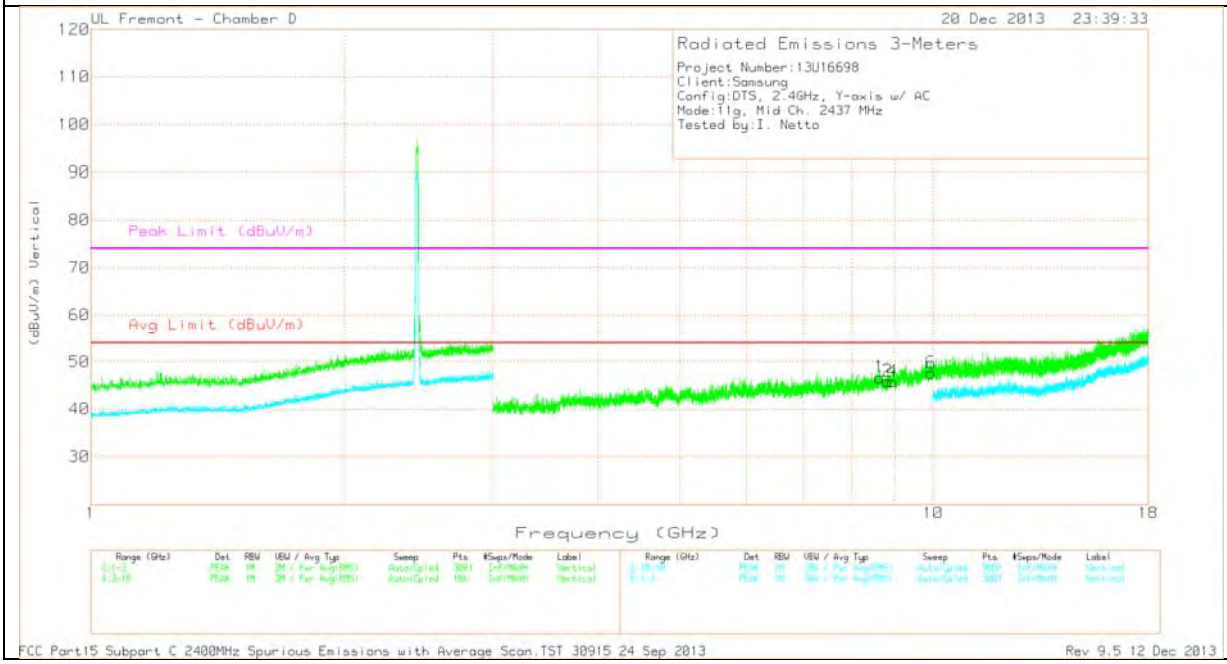
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 24 Sep 2013 Rev 9.5 12 Dec 2013

MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

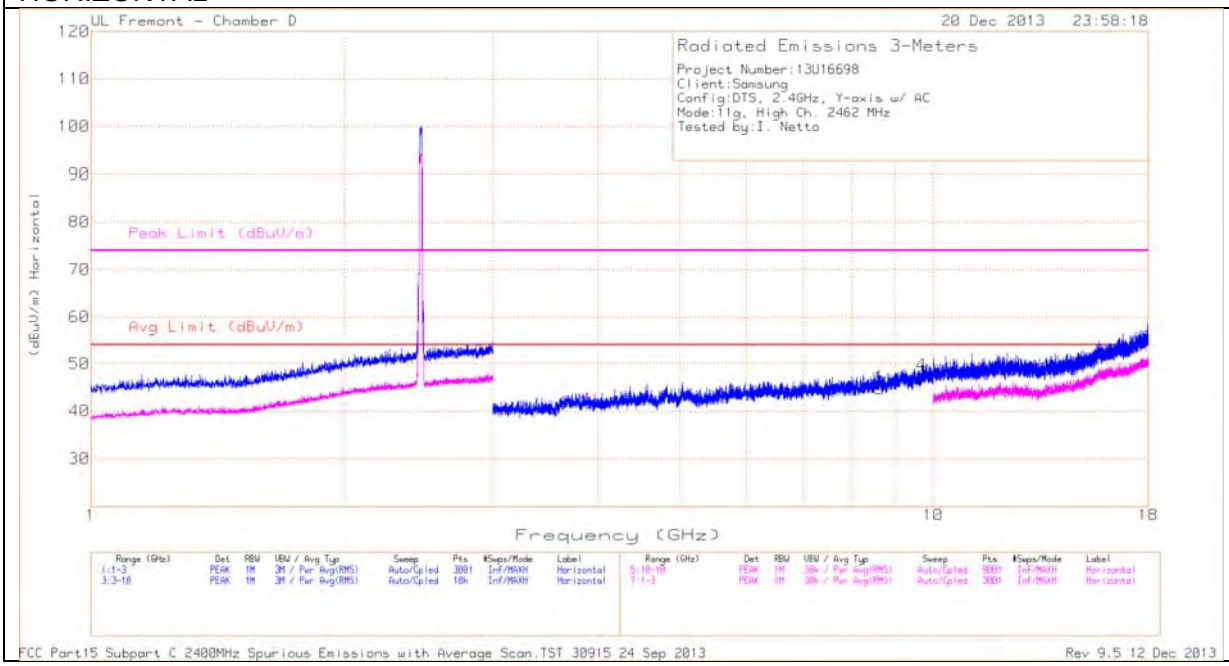
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.636	33.19	PK	36.3	-22.8	46.69	53.97	-7.28	74	-27.31	0-360	201	V
2	8.831	33.09	PK	36.5	-23.7	45.89	53.97	-8.08	74	-28.11	0-360	201	V
3	8.866	32.29	PK	36.5	-23.5	45.29	53.97	-8.68	74	-28.71	0-360	201	H
4	8.948	32.34	PK	36.6	-23.1	45.84	53.97	-8.13	74	-28.16	0-360	100	V
5	9.078	32.63	PK	36.8	-23.7	45.73	53.97	-8.24	74	-28.27	0-360	201	H
6	9.943	32.01	PK	37.8	-22.2	47.61	53.97	-6.36	74	-26.39	0-360	201	V

PK - Peak detector

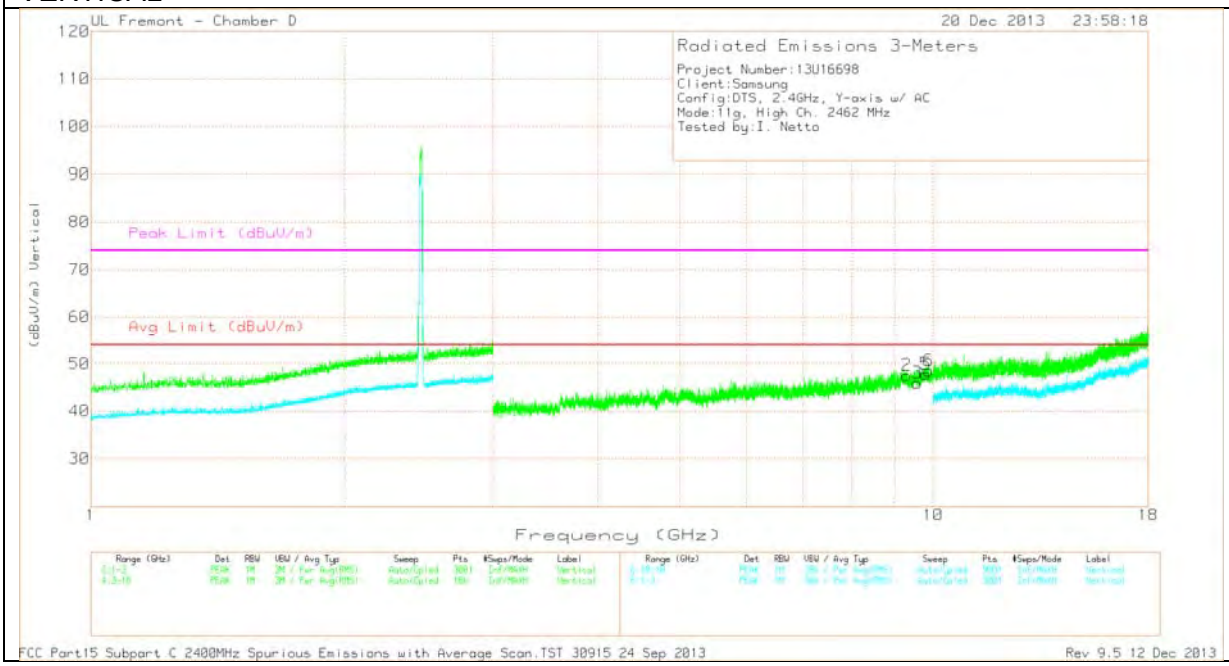
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 24 Sep 2013 Rev 9.5 12 Dec 2013

HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

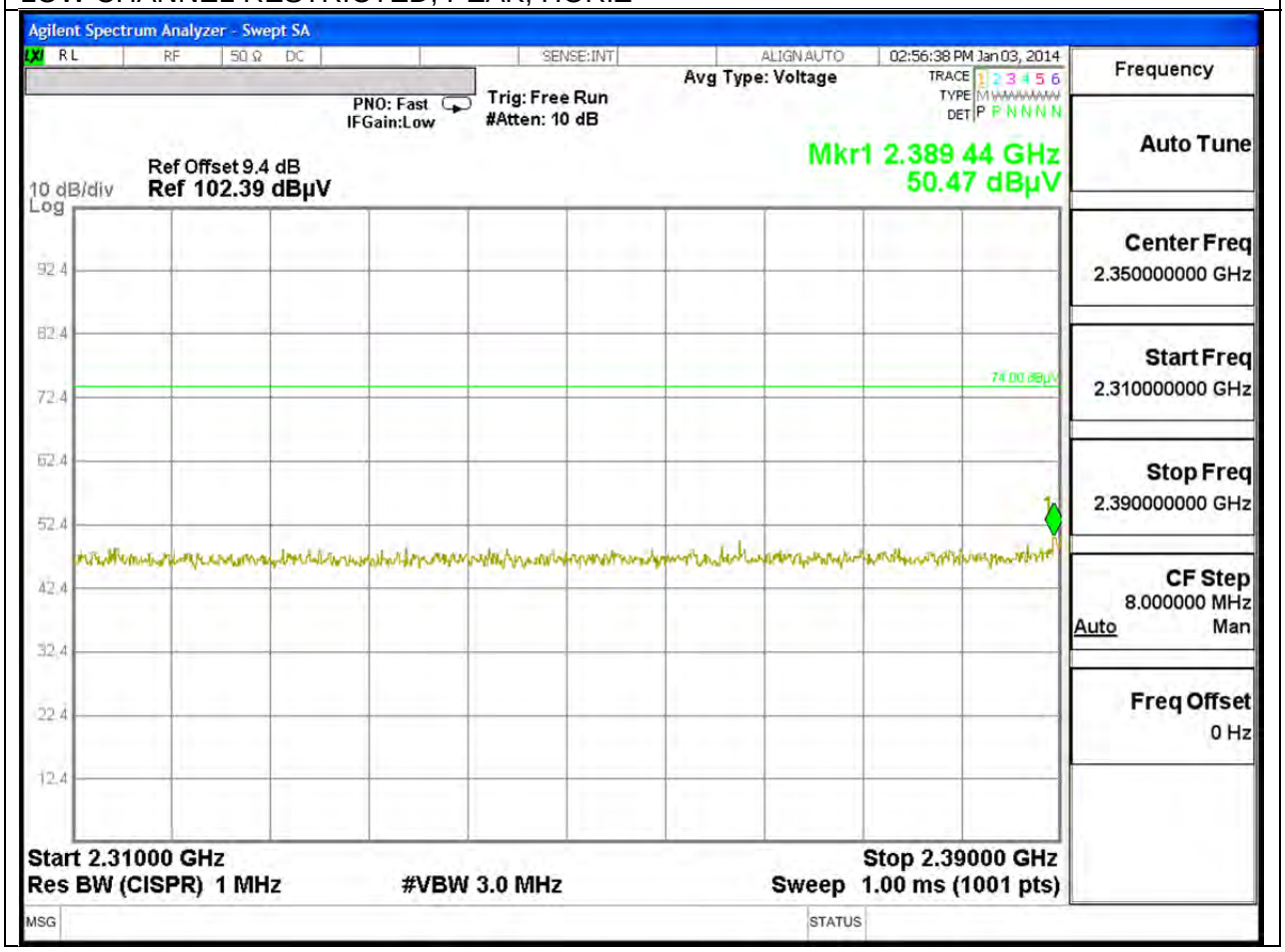
HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.627	31.52	PK	36.3	-23	44.82	53.97	-9.15	74	-29.18	0-360	201	H
2	9.296	33.21	PK	37	-22.7	47.51	53.97	-6.46	74	-26.49	0-360	100	V
3	9.58	31.31	PK	37.3	-22.7	45.91	53.97	-8.06	74	-28.09	0-360	201	V
4	9.697	32.06	PK	37.4	-22	47.46	53.97	-6.51	74	-26.54	0-360	100	H
5	9.801	31.76	PK	37.5	-21.5	47.76	53.97	-6.21	74	-26.24	0-360	201	V
6	9.88	32.6	PK	37.7	-21.8	48.5	53.97	-5.47	74	-25.5	0-360	100	V

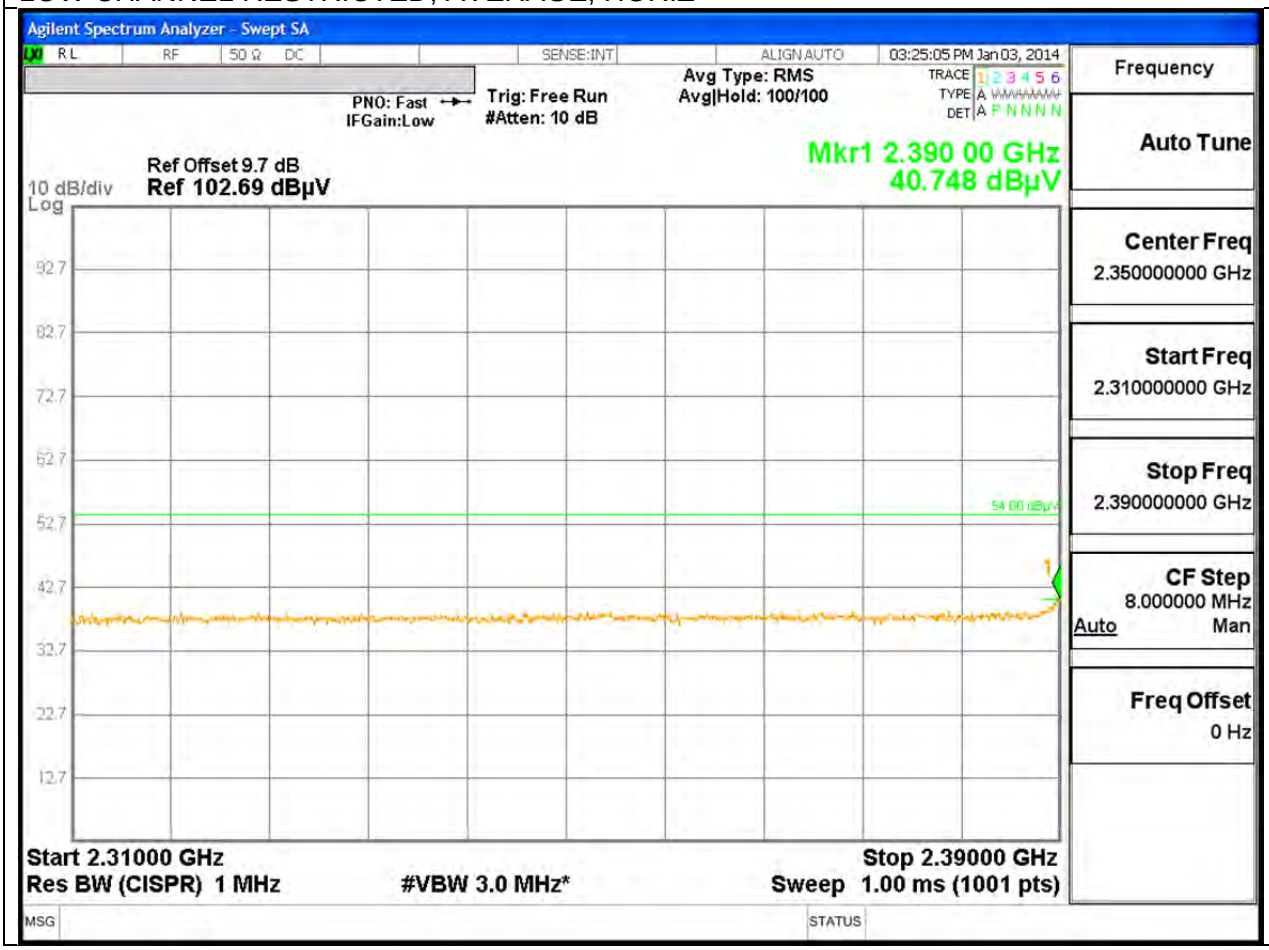
PK - Peak detector

10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

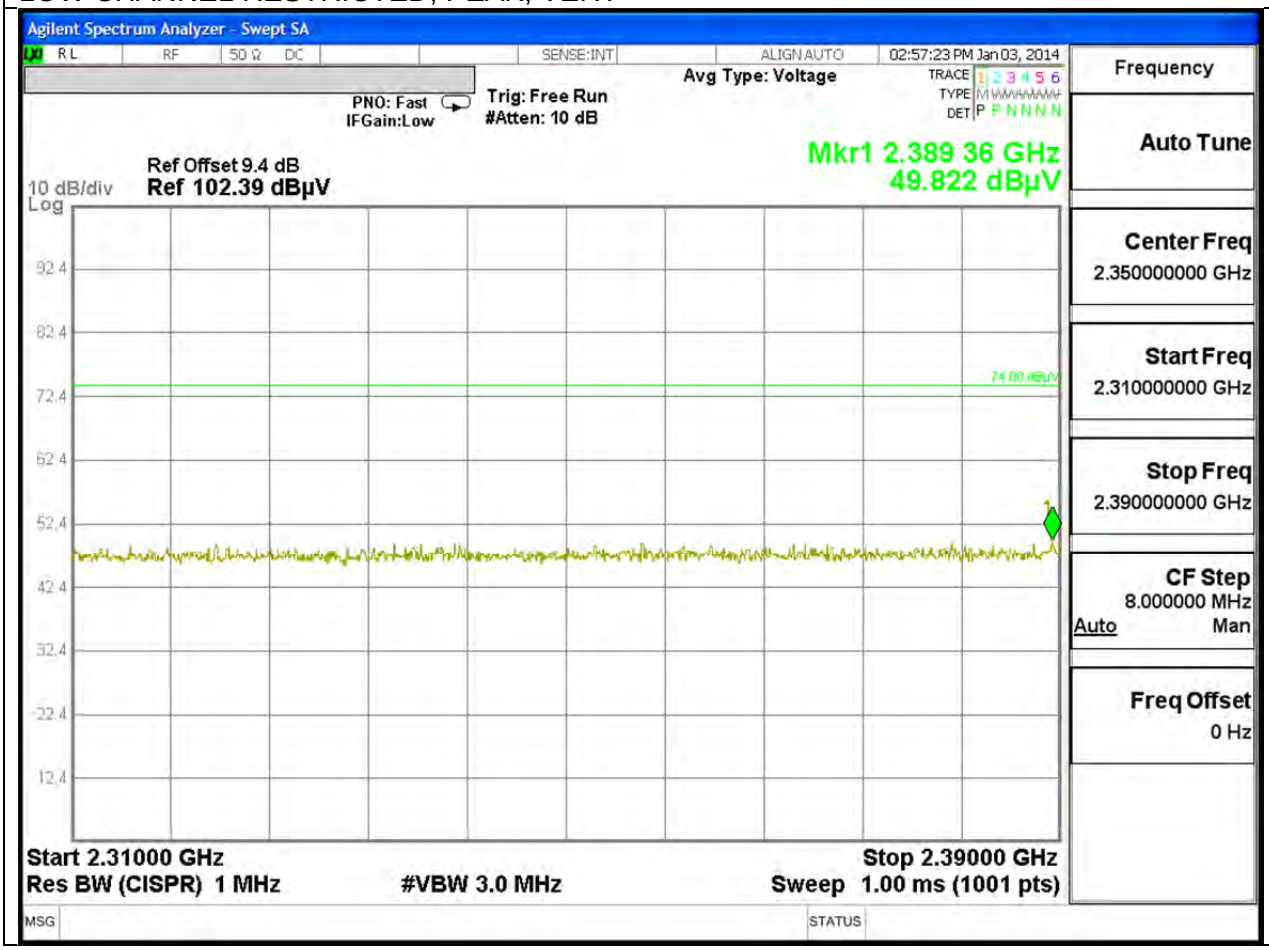
LOW CHANNEL RESTRICTED, PEAK, HORIZ



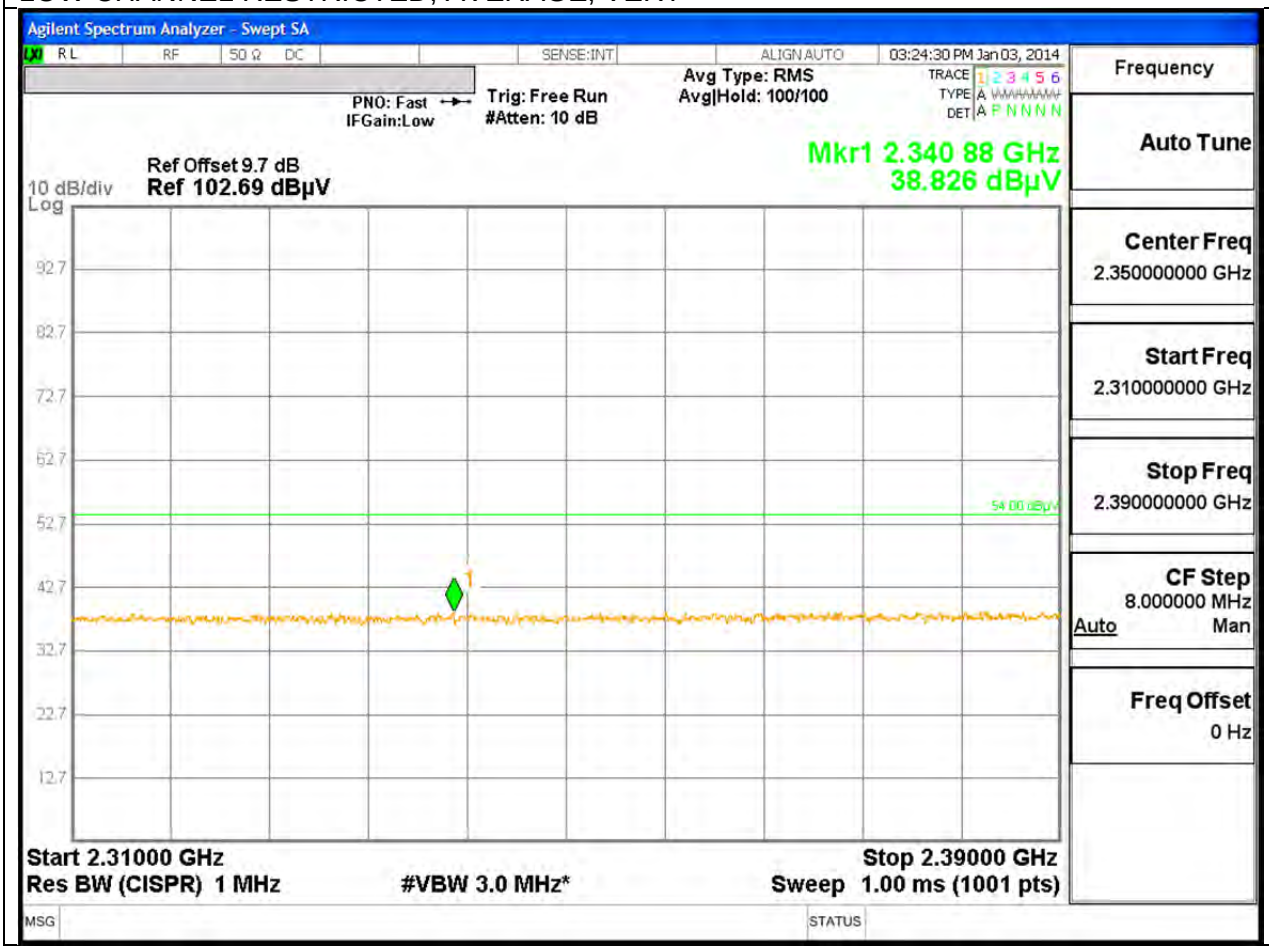
LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



LOW CHANNEL RESTRICTED, PEAK, VERT

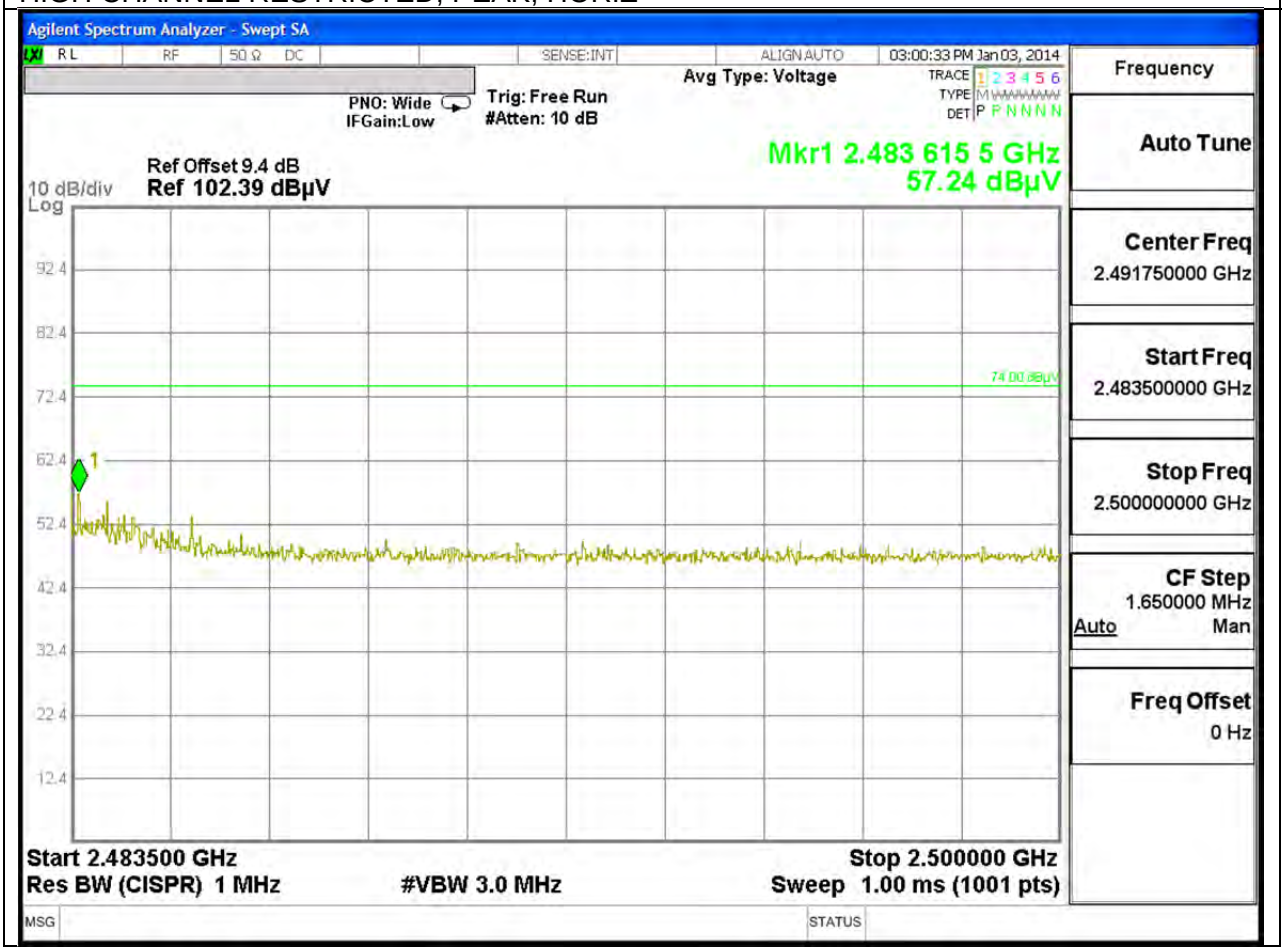


LOW CHANNEL RESTRICTED, AVERAGE, VERT

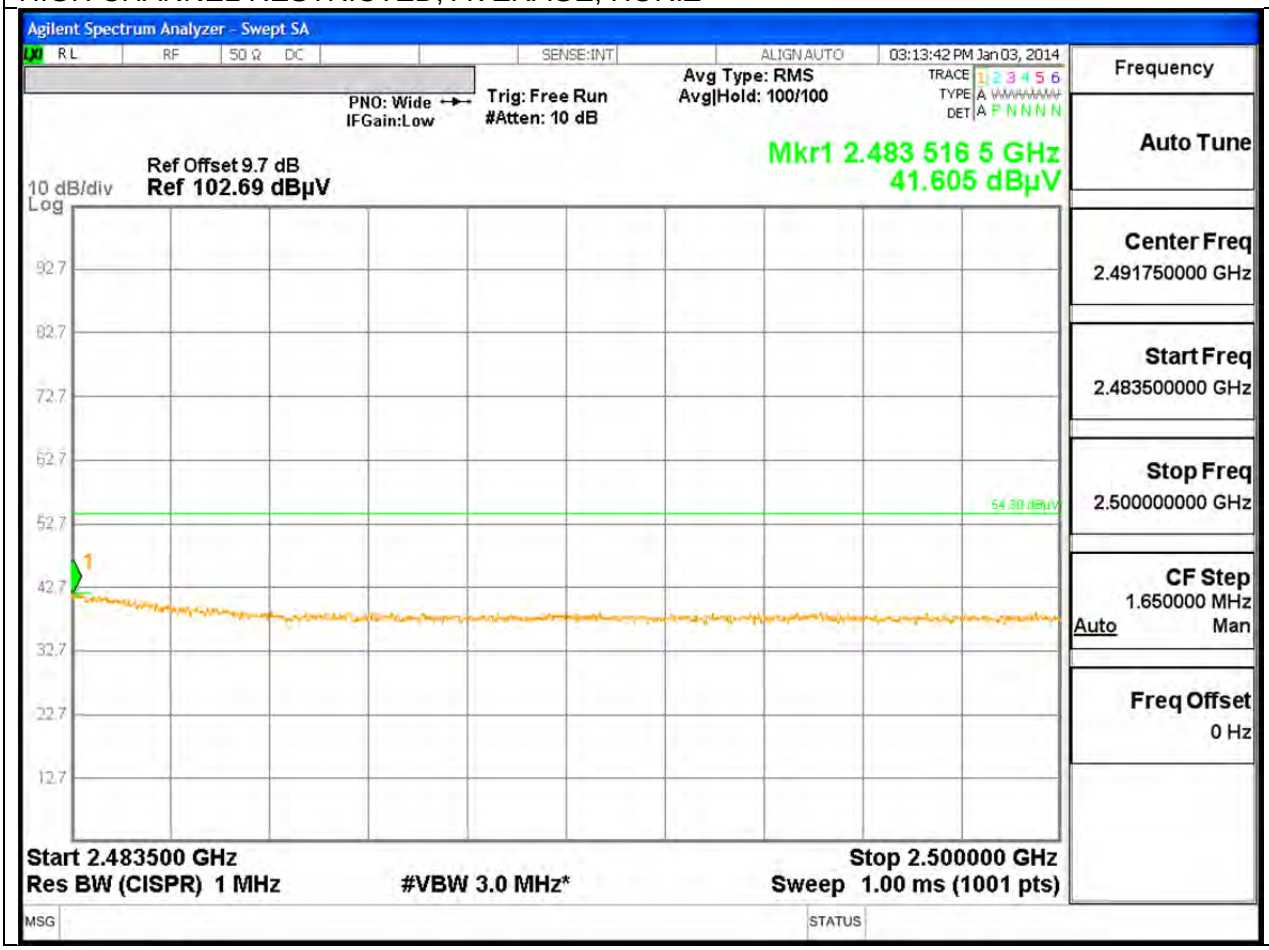


AUTHORIZED BANDEDGE (HIGH CHANNEL)

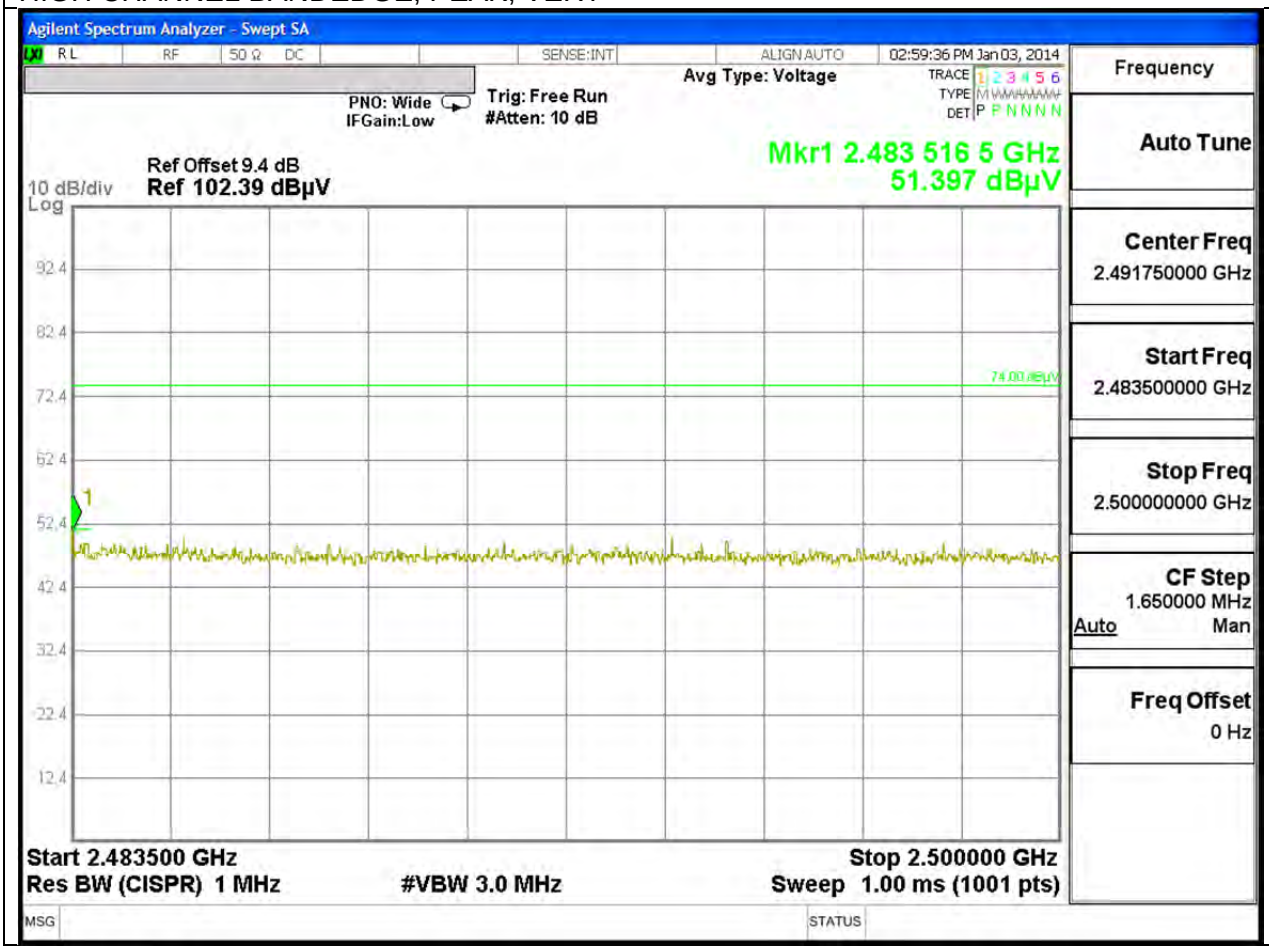
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



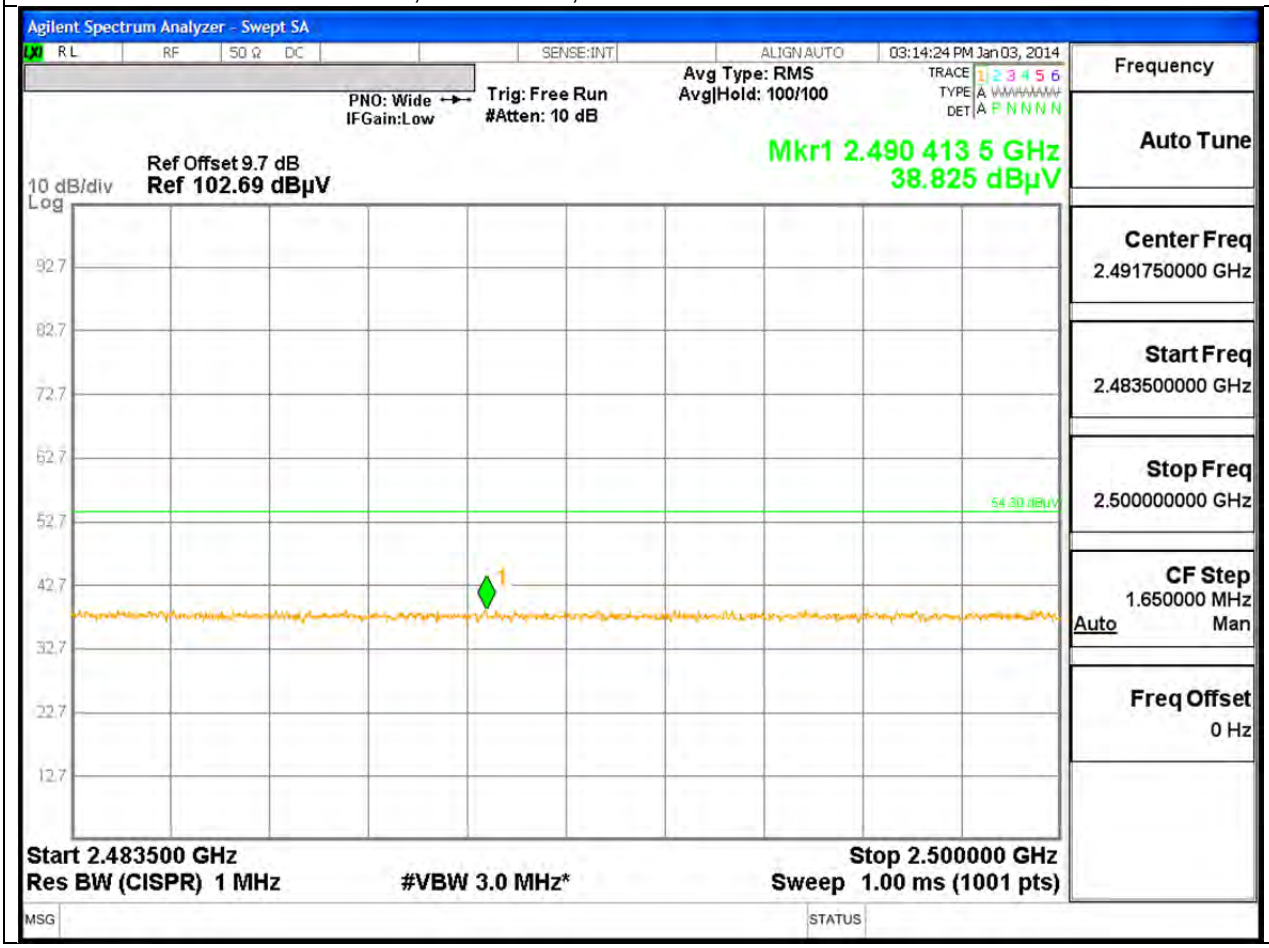
HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



HIGH CHANNEL BANDEDGE, PEAK, VERT

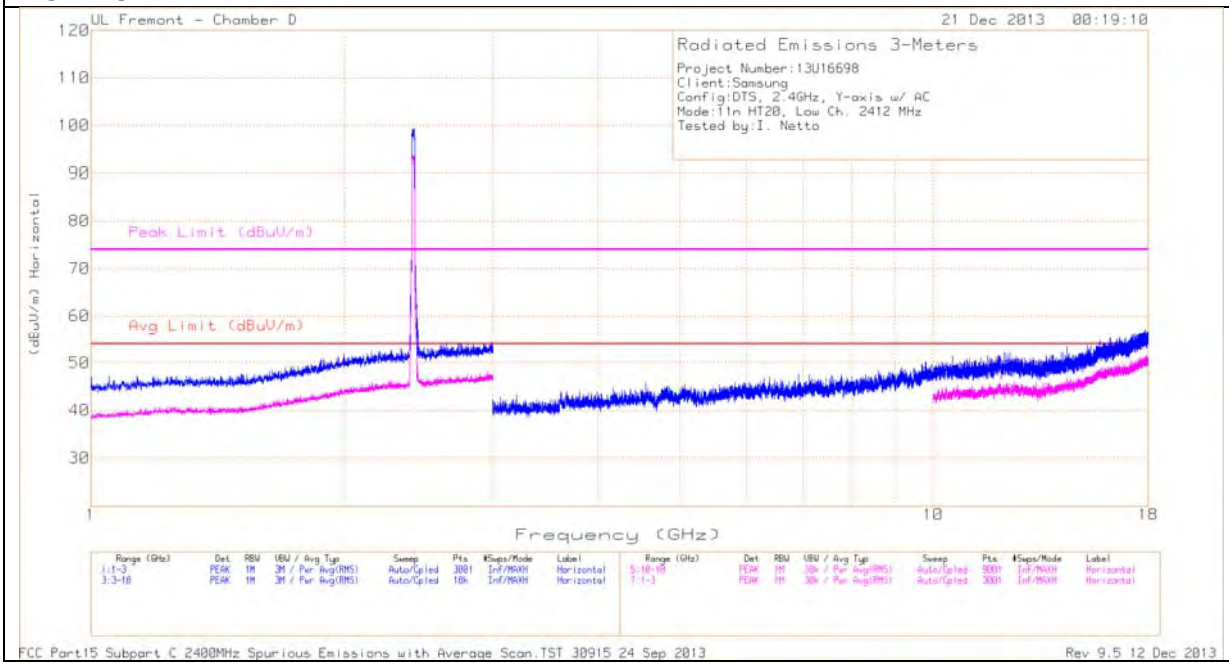


HIGH CHANNEL BANDEDGE, AVERAGE, VERT



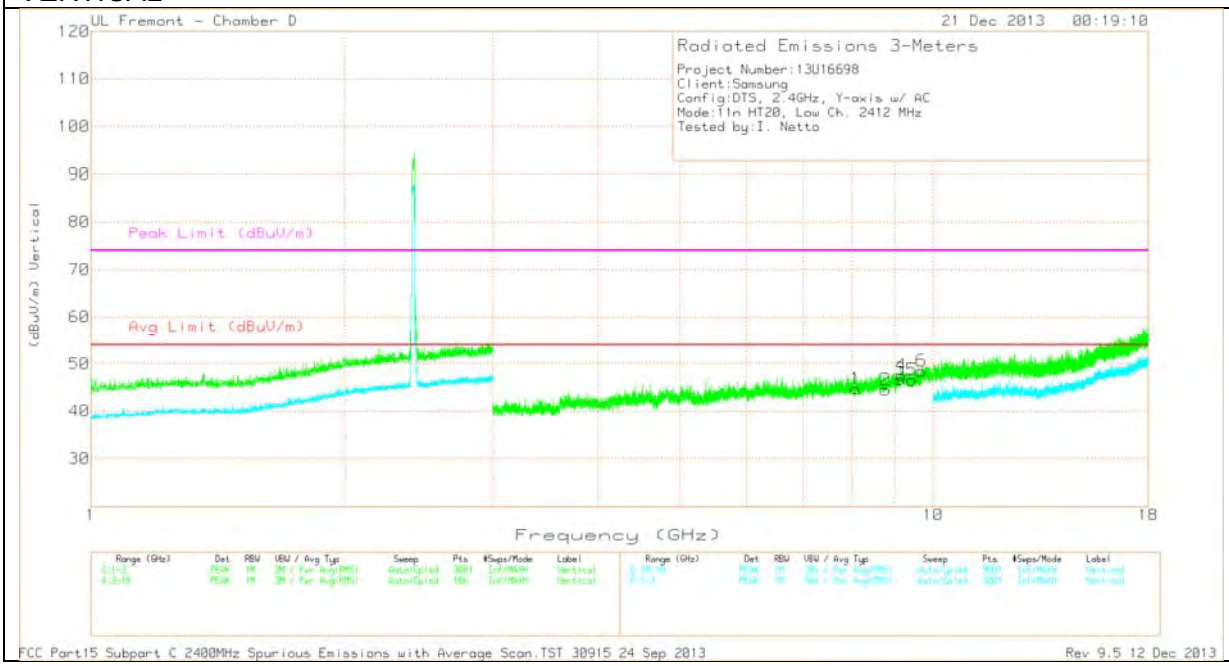
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL
VERTICAL



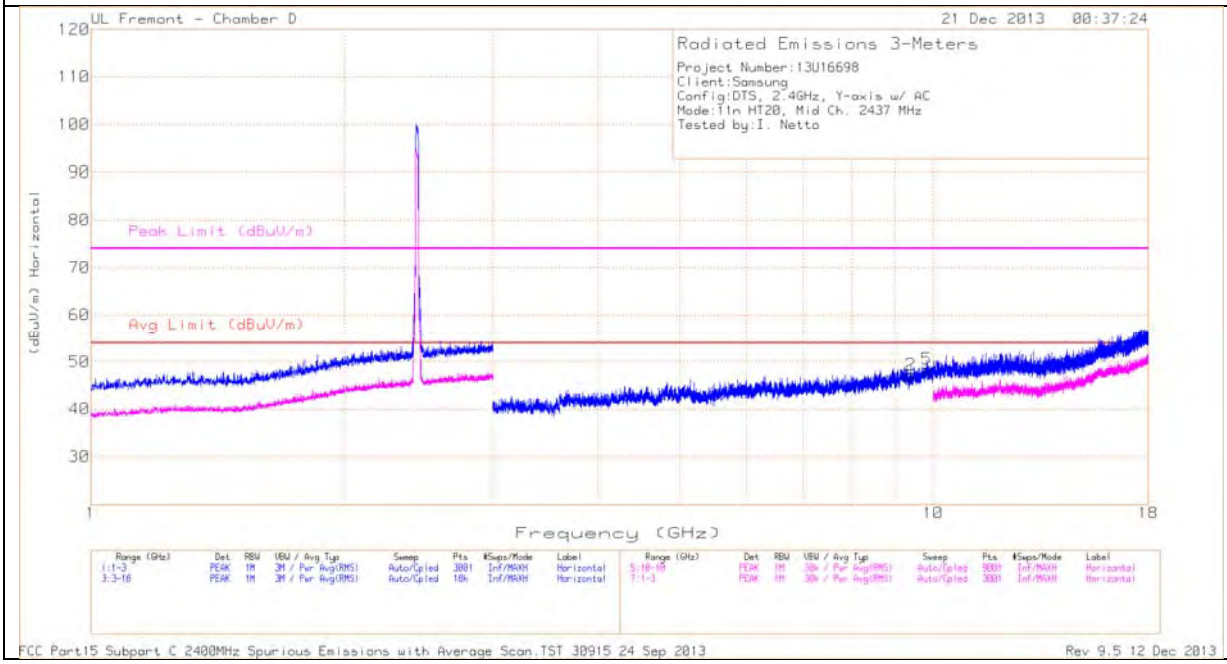
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.088	33.65	PK	36	-24.9	44.75	53.97	-9.22	74	-29.25	0-360	201	V
2	8.78	32.36	PK	36.4	-24.3	44.46	53.97	-9.51	74	-29.54	0-360	201	V
3	9.144	31.9	PK	36.8	-22	46.7	53.97	-7.27	74	-27.3	0-360	201	V
4	9.173	32.61	PK	36.8	-21.9	47.51	53.97	-6.46	74	-26.49	0-360	201	V
5	9.437	32.35	PK	37.1	-22.9	46.55	53.97	-7.42	74	-27.45	0-360	100	V
6	9.682	33.33	PK	37.3	-22.2	48.43	53.97	-5.54	74	-25.57	0-360	100	V

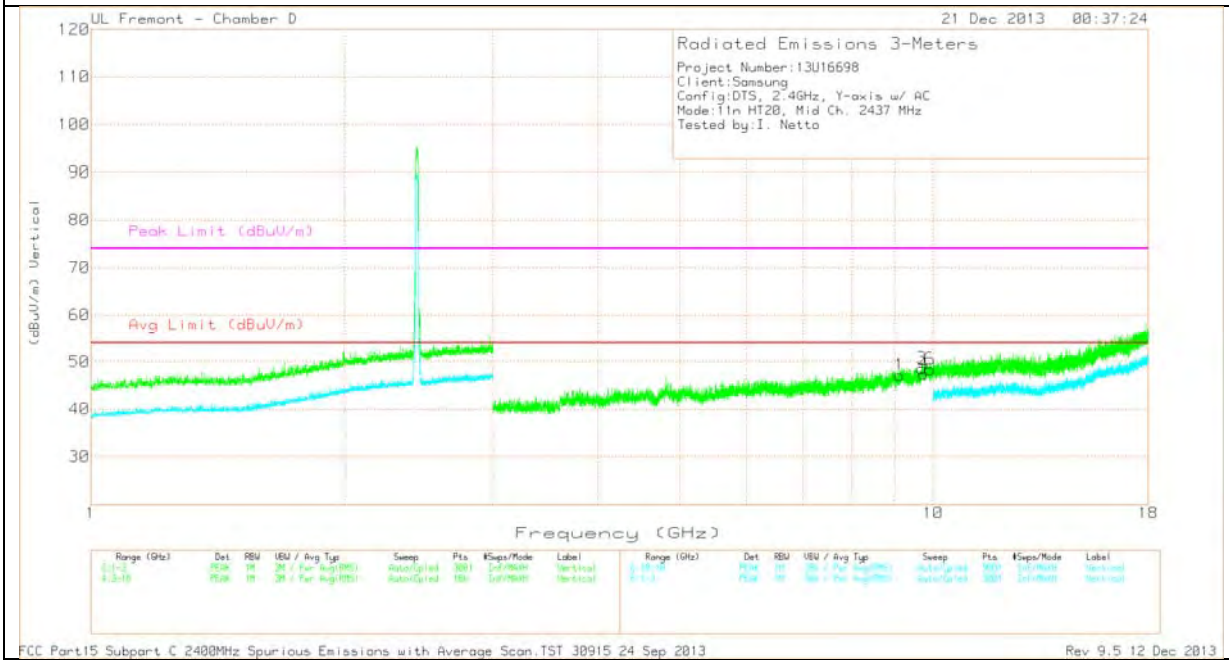
PK - Peak detector

MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL
VERTICAL



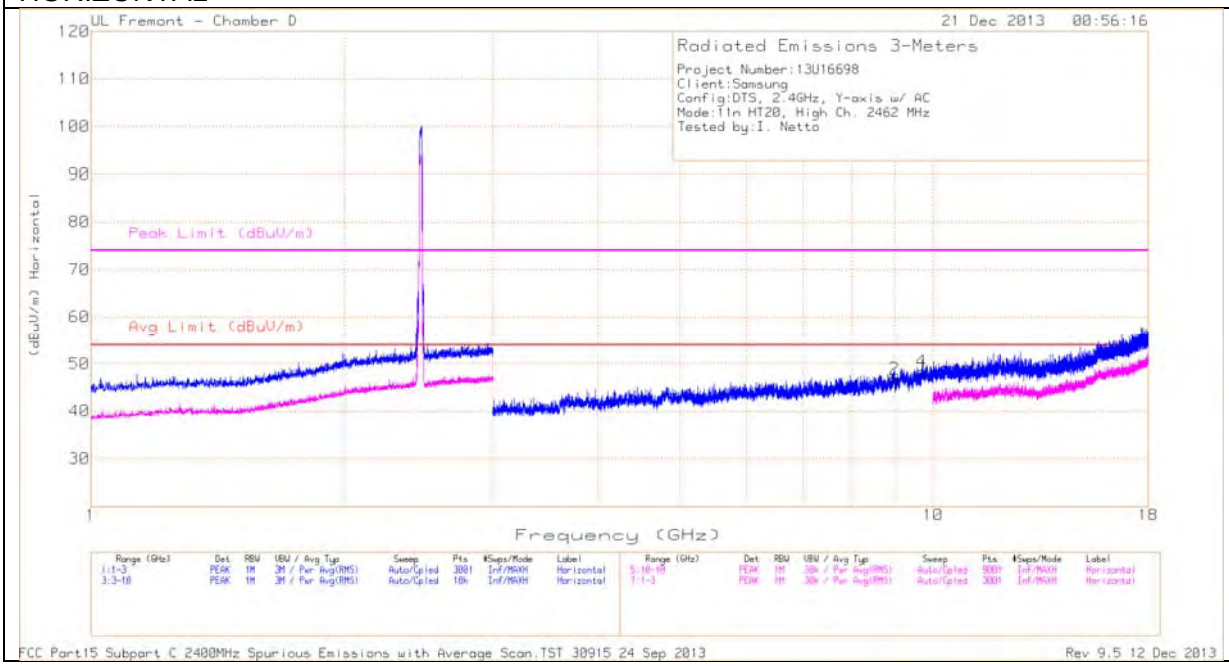
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	9.123	33.05	PK	36.8	-22.7	47.15	53.97	-6.82	74	-26.85	0-360	201	V
2	9.405	33.08	PK	37.1	-23	47.18	53.97	-6.79	74	-26.82	0-360	201	H
3	9.689	33.26	PK	37.4	-22.1	48.56	53.97	-5.41	74	-25.44	0-360	201	V
4	9.745	31.81	PK	37.4	-21.8	47.41	53.97	-6.56	74	-26.59	0-360	100	V
5	9.828	32.64	PK	37.6	-21.9	48.34	53.97	-5.63	74	-25.66	0-360	100	H
6	9.915	32.69	PK	37.7	-22	48.39	53.97	-5.58	74	-25.61	0-360	201	V

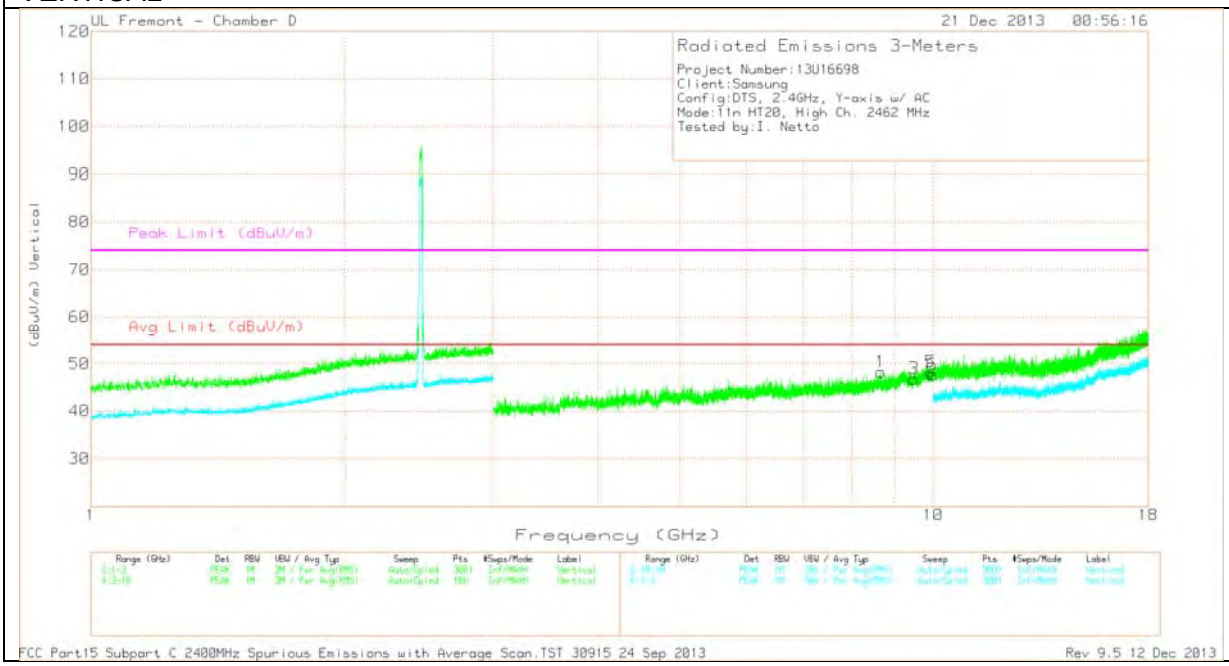
PK - Peak detector

HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL
VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

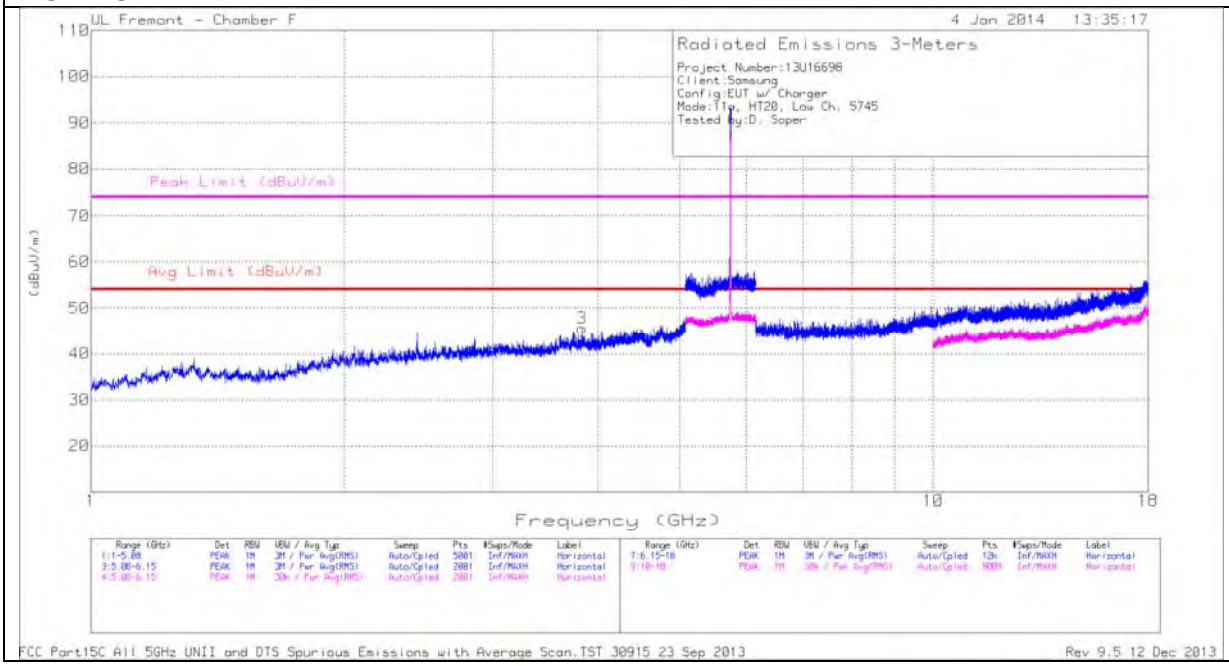
HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fltr/Pad	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	8.664	34.54	PK	36.3	-22.6	48.24	53.97	-5.73	74	-25.76	0-360	100	V
2	9.005	33.31	PK	36.7	-23.3	46.71	53.97	-7.26	74	-27.29	0-360	100	H
3	9.483	31.71	PK	37.2	-22.1	46.81	53.97	-7.16	74	-27.19	0-360	201	V
4	9.697	32.9	PK	37.4	-22	48.3	53.97	-5.67	74	-25.7	0-360	100	H
5	9.925	32.43	PK	37.7	-21.9	48.23	53.97	-5.74	74	-25.77	0-360	201	V
6	9.978	31.61	PK	37.9	-21.8	47.71	53.97	-6.26	74	-26.29	0-360	201	V

PK - Peak detector

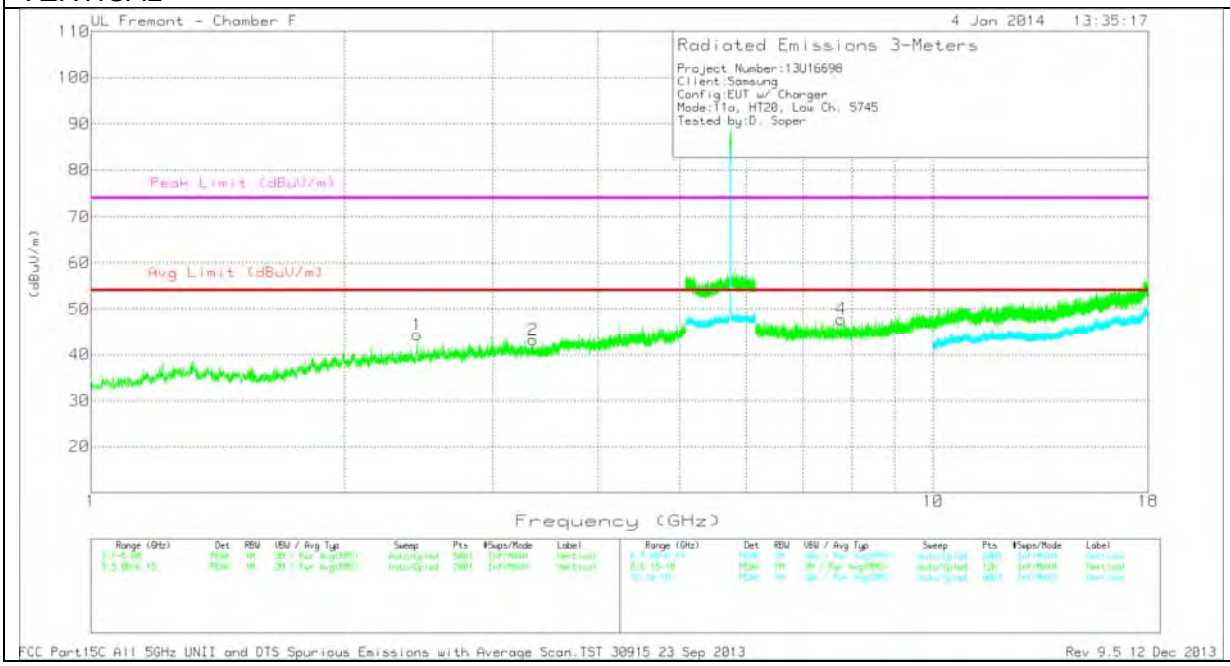
10.2.4. TX ABOVE 1 GHz 802.11a HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

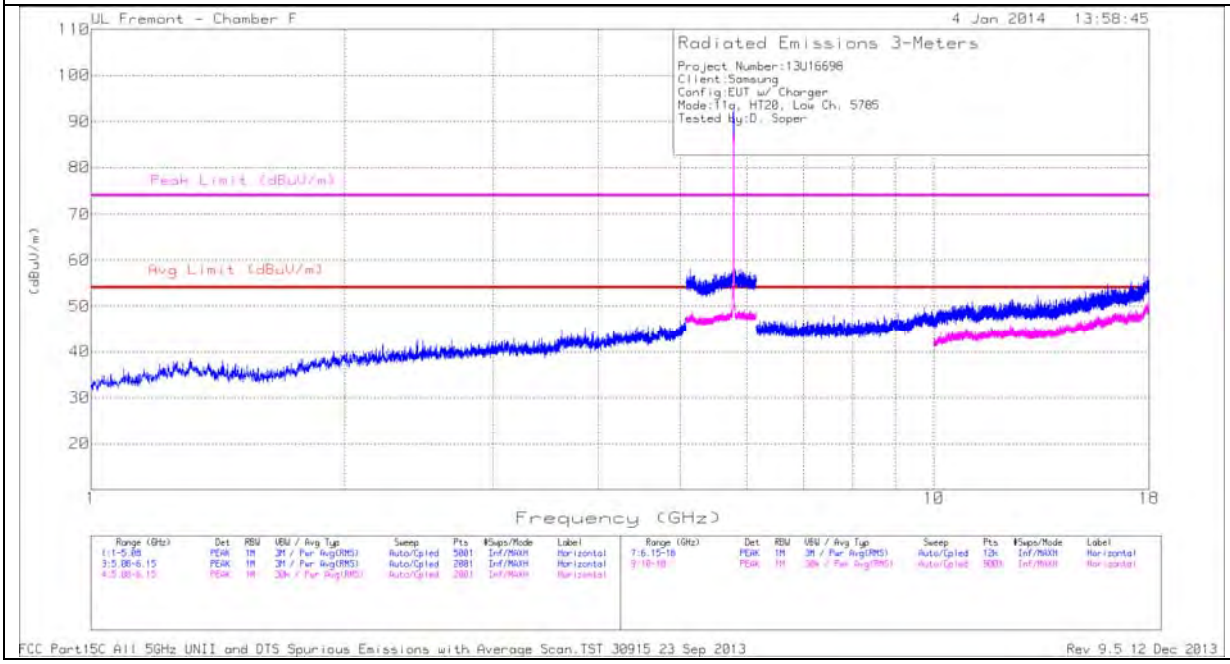
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.441	42.78	PK	32.3	-30.7	44.38	53.97	-9.59	74	-29.62	0-360	201	V
2	3.348	39.83	PK	33	-29.6	43.23	53.97	-10.74	74	-30.77	0-360	101	V
3	3.831	41.08	PK	33.6	-29.1	45.58	53.97	-8.39	74	-28.42	0-360	199	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.778	37.61	PK	35.9	-25.7	47.81	53.97	-6.16	74	-26.19	0-360	101	V

PK - Peak detector

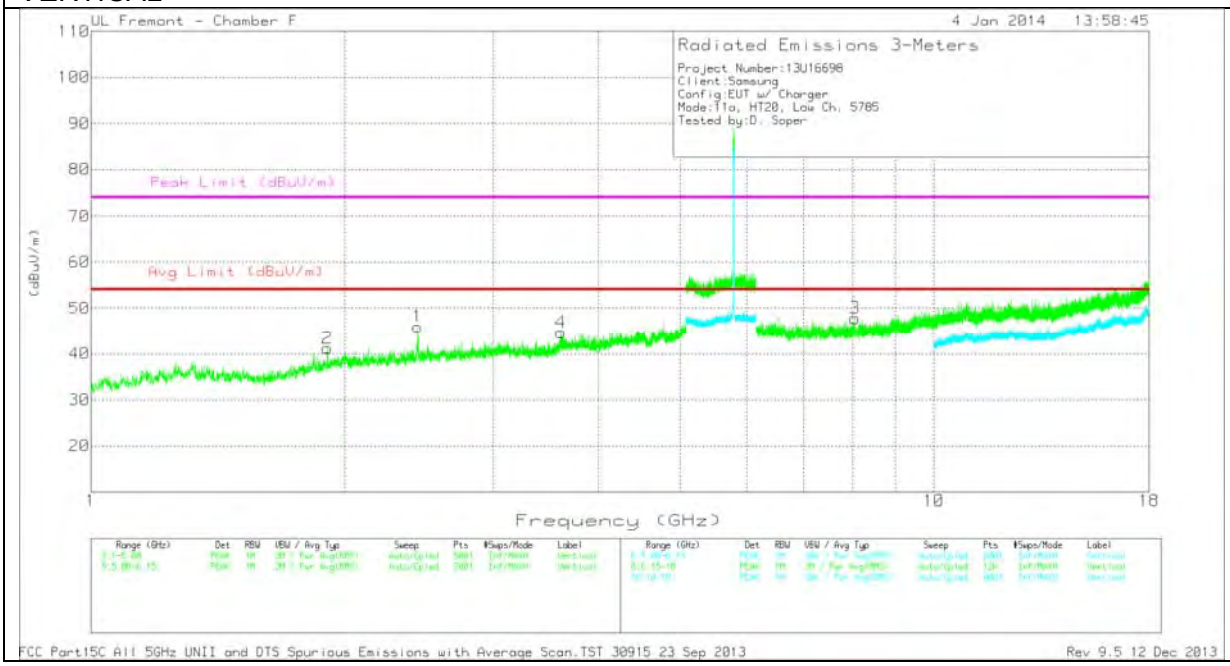
MID CHANNEL

MID CHANNEL HORIZONTAL



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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

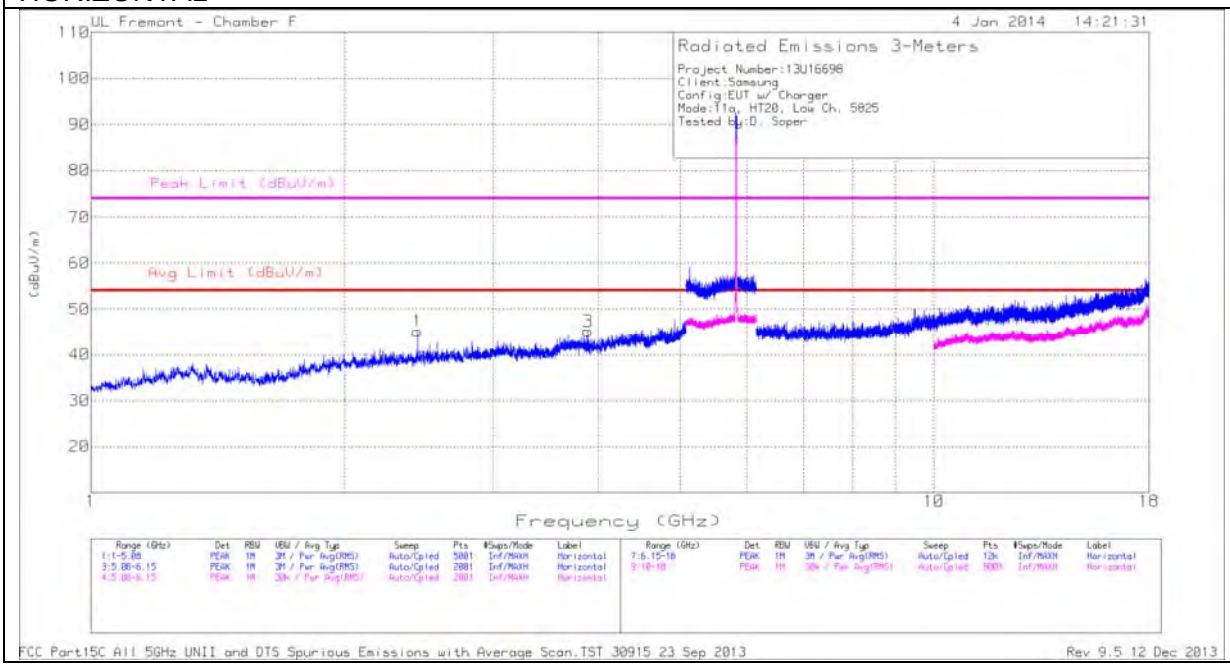
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	1.907	41.19	PK	31.2	-31.2	41.19	53.97	-12.78	74	-32.81	0-360	101	V
1	2.441	44.38	PK	32.3	-30.7	45.98	53.97	-7.99	74	-28.02	0-360	202	V
4	3.61	40.29	PK	33.7	-29.3	44.69	53.97	-9.28	74	-29.31	0-360	101	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	8.059	37.2	PK	36	-25.4	47.8	53.97	-6.17	74	-26.2	0-360	101	V

PK - Peak detector

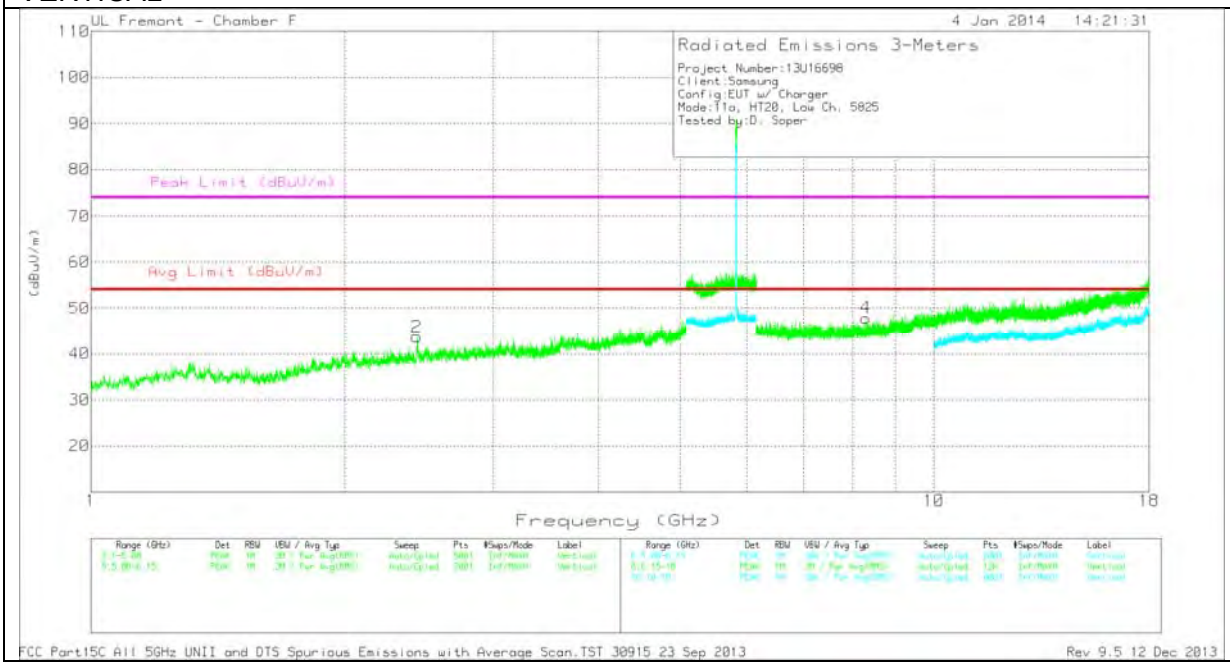
HIGH CHANNEL

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL
VERTICAL



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

HIGH CHANNEL DATA

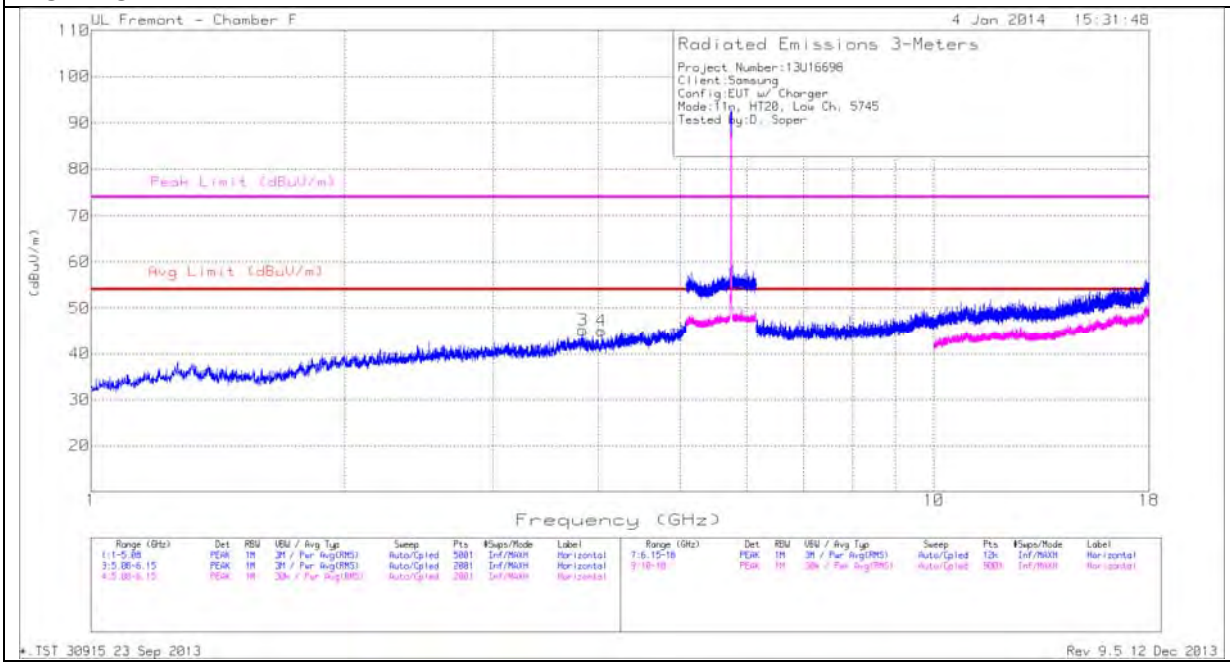
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.435	42.11	PK	32.3	-30.7	43.71	53.97	-10.26	74	-30.29	0-360	201	V
1	2.439	43.57	PK	32.3	-30.7	45.17	53.97	-8.8	74	-28.83	0-360	200	H
3	3.885	40.93	PK	33.5	-29.3	45.13	53.97	-8.84	74	-28.87	0-360	200	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	8.301	36.88	PK	36	-25	47.88	53.97	-6.09	74	-26.12	0-360	101	V

PK - Peak detector

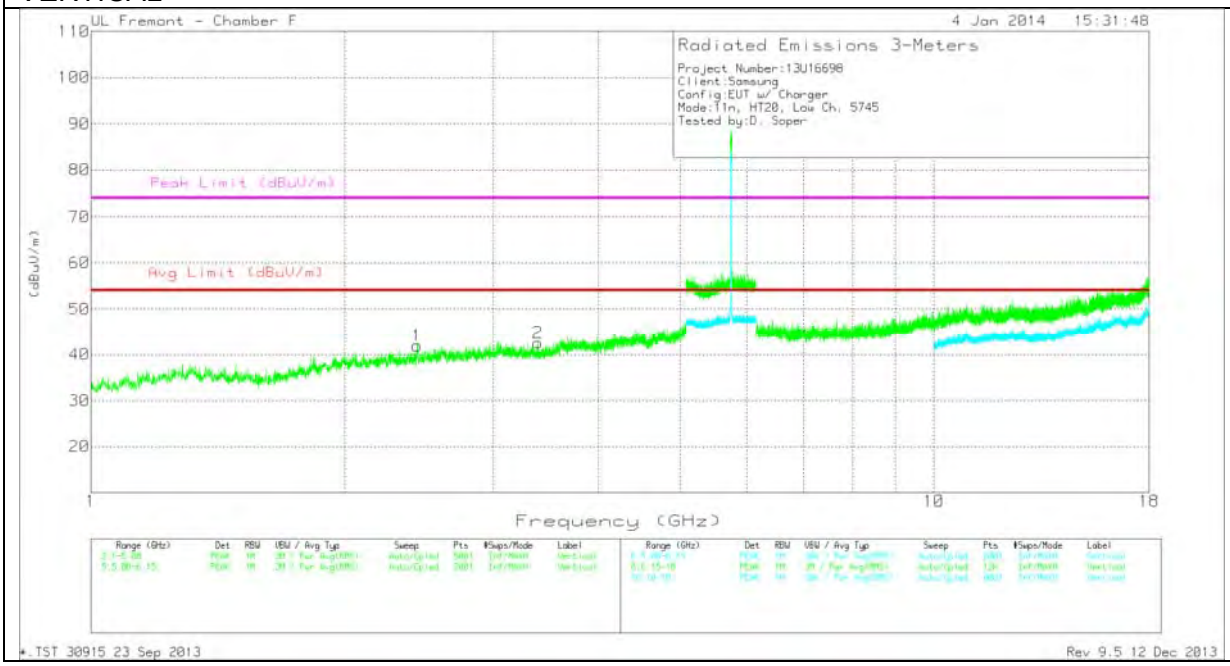
10.2.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

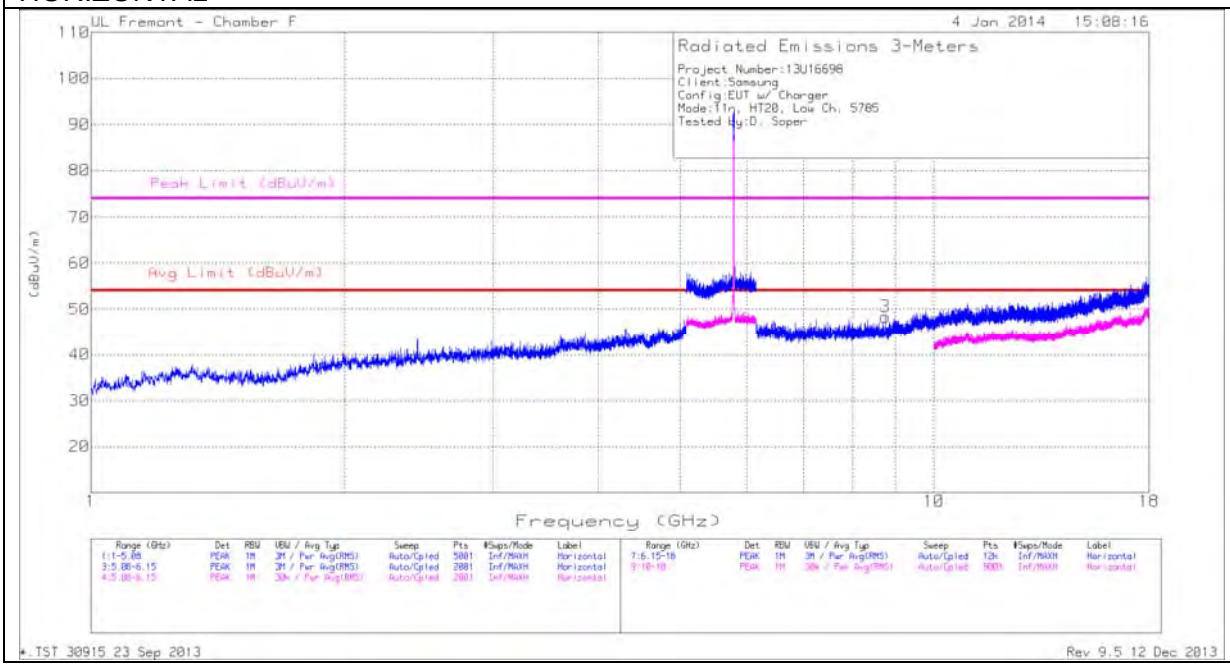
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.436	40.36	PK	32.3	-30.7	41.96	53.97	-12.01	74	-32.04	0-360	101	V
2	3.389	38.96	PK	33	-29.4	42.56	53.97	-11.41	74	-31.44	0-360	101	V
3	3.832	40.8	PK	33.5	-29.1	45.2	53.97	-8.77	74	-28.8	0-360	101	H
4	4.032	39.93	PK	33.4	-28.3	45.03	53.97	-8.94	74	-28.97	0-360	199	H

PK - Peak detector

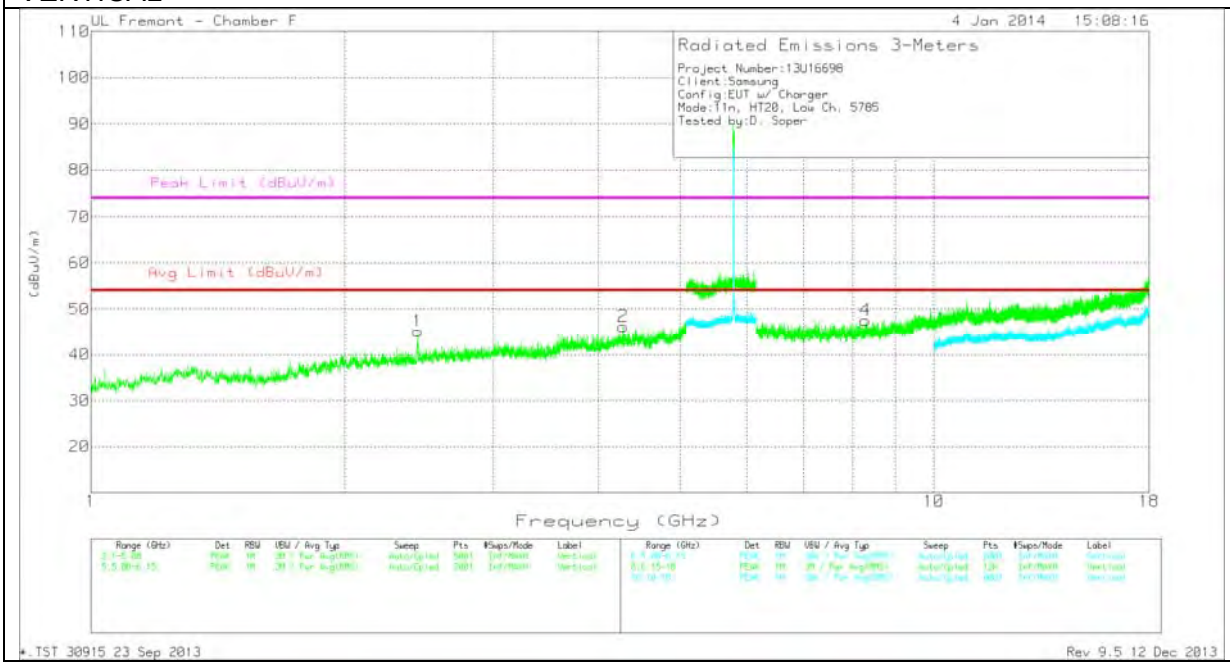
MID CHANNEL

MID CHANNEL
HORIZONTAL



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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

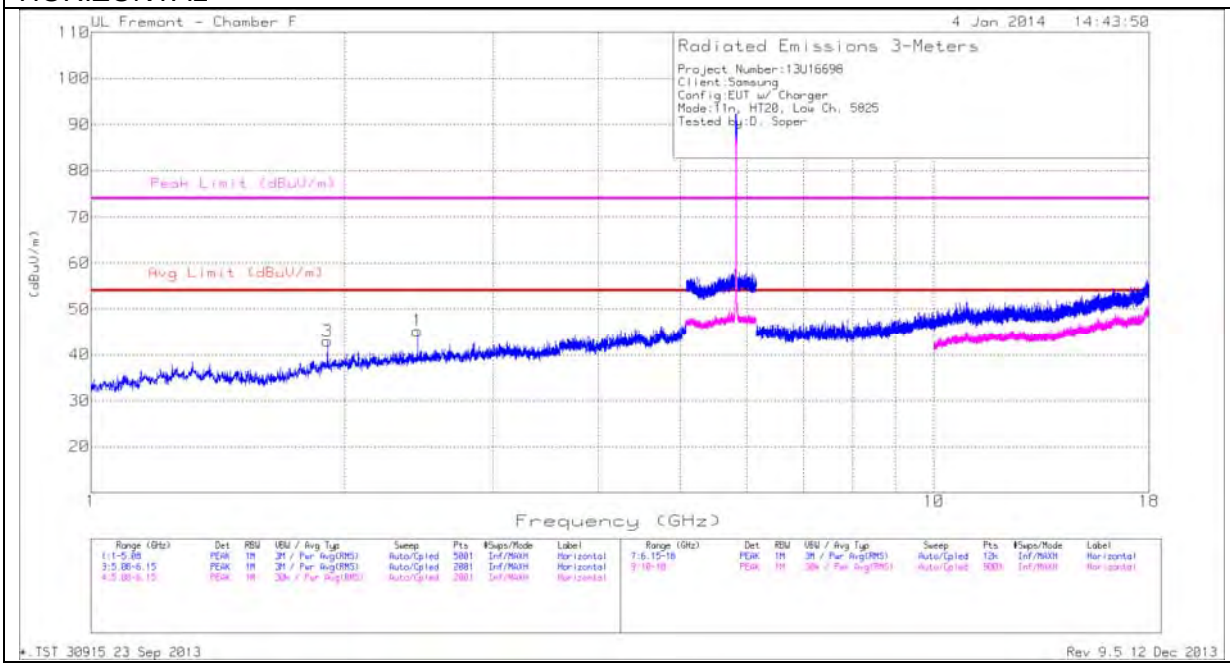
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.442	43.58	PK	32.3	-30.7	45.18	53.97	-8.79	74	-28.82	0-360	201	V
2	4.278	40.64	PK	33.5	-27.9	46.24	53.97	-7.73	74	-27.76	0-360	201	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	8.297	36.59	PK	36	-25	47.59	53.97	-6.38	74	-26.41	0-360	101	V
3	8.756	36.76	PK	36.2	-24.6	48.36	53.97	-5.61	74	-25.64	0-360	101	H

PK - Peak detector

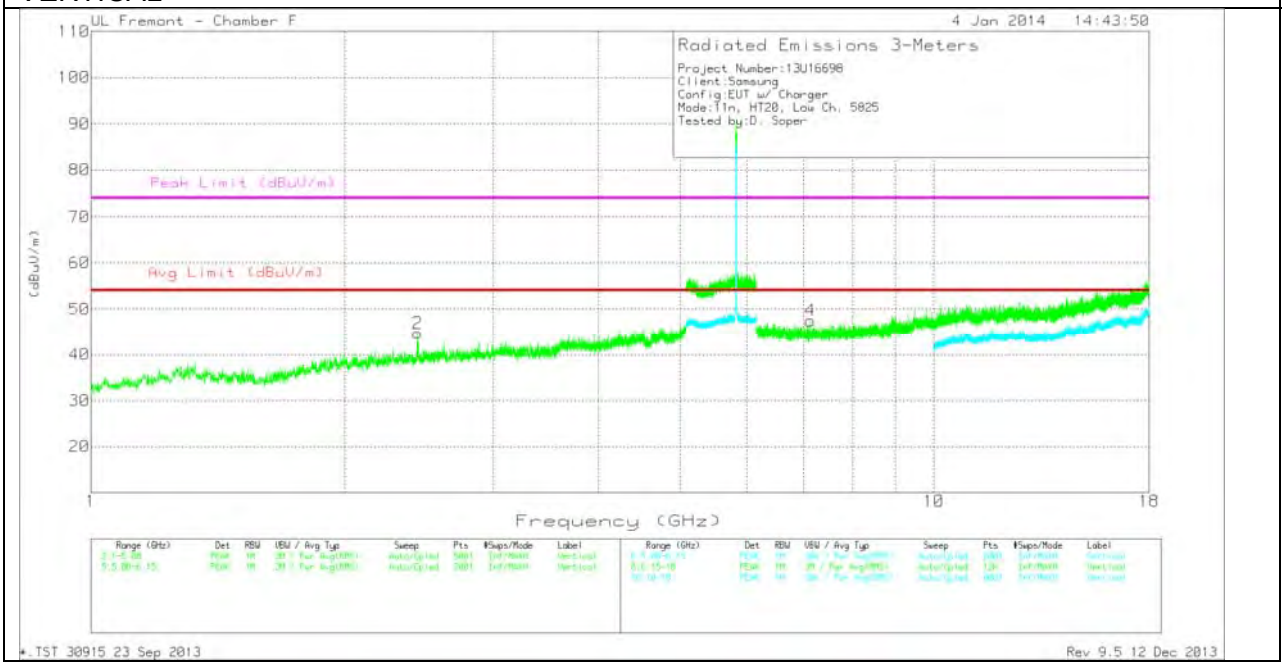
HIGH CHANNEL

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL
VERTICAL



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

HIGH CHANNEL DATA

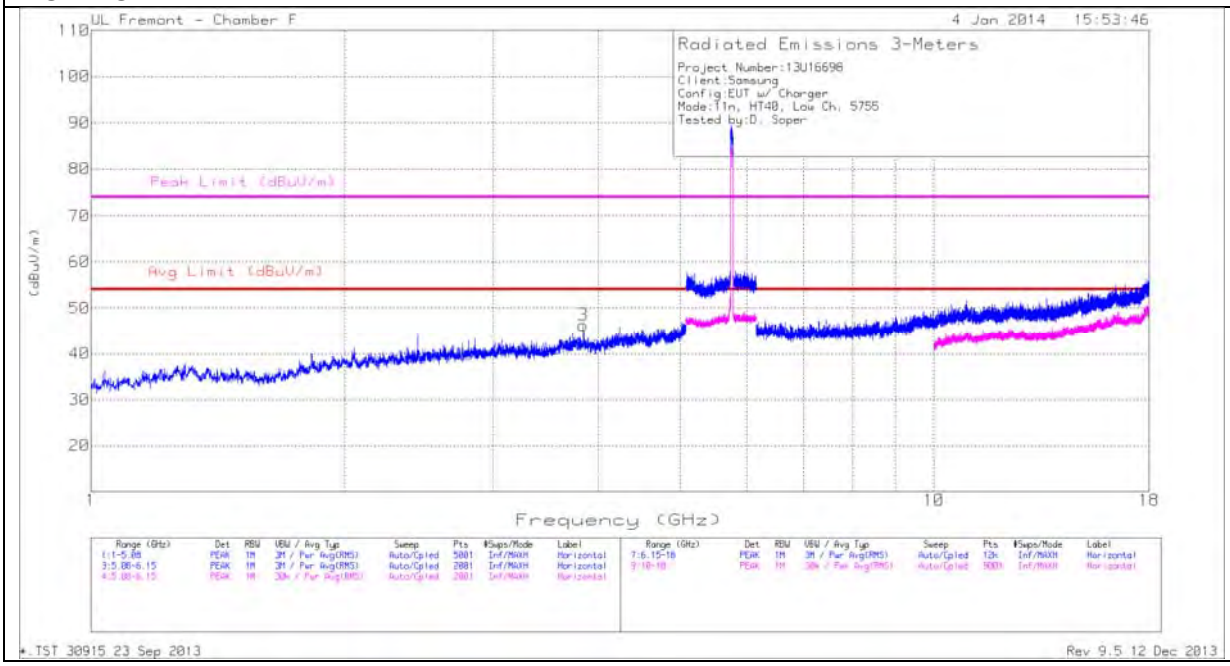
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	1.907	42.96	PK	31.2	-31.2	42.96	53.97	-11.01	74	-31.04	0-360	101	H
1	2.439	43.63	PK	32.3	-30.7	45.23	53.97	-8.74	74	-28.77	0-360	200	H
2	2.441	43.1	PK	32.3	-30.7	44.7	53.97	-9.27	74	-29.3	0-360	201	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.139	38.61	PK	35.7	-26.8	47.51	53.97	-6.46	74	-26.49	0-360	201	V

PK - Peak detector

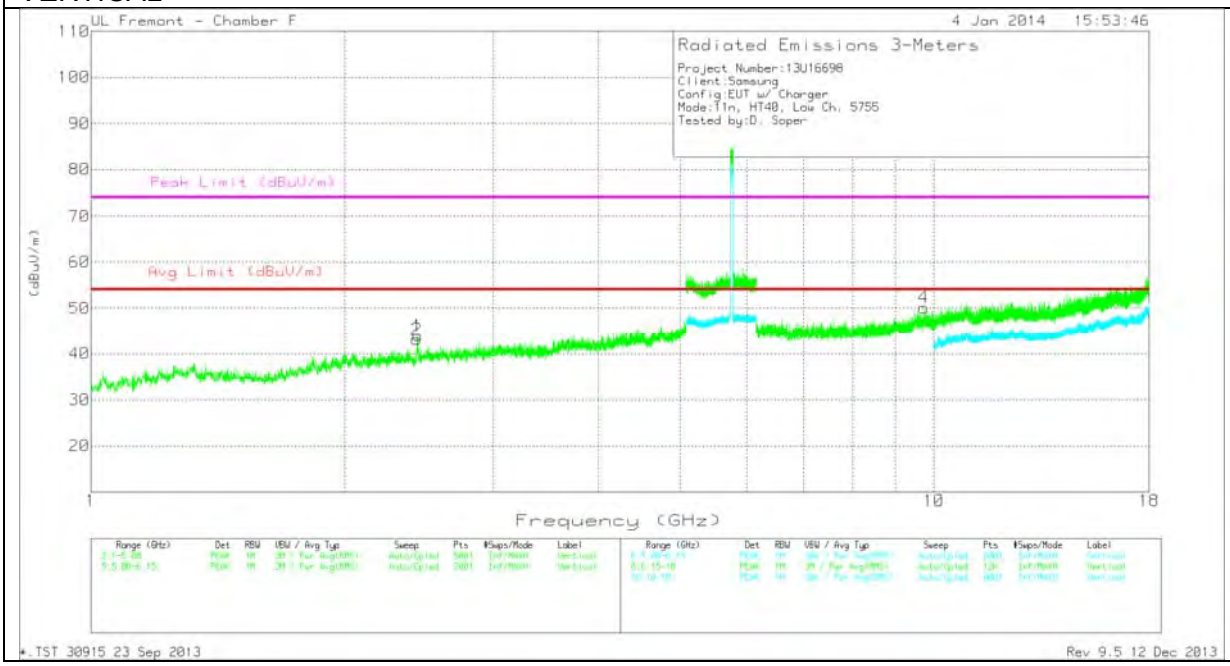
10.2.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

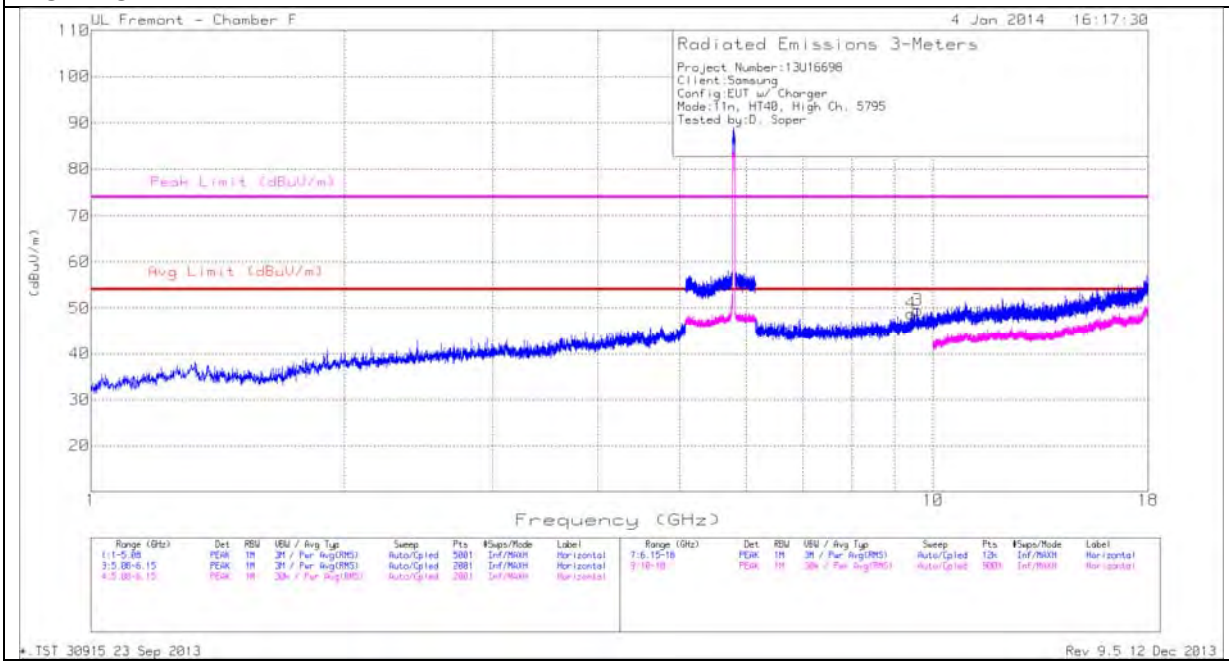
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.435	41.49	PK	32.3	-30.7	43.09	53.97	-10.88	74	-30.91	0-360	201	V
1	2.44	42.32	PK	32.3	-30.7	43.92	53.97	-10.05	74	-30.08	0-360	201	V
3	3.837	41.81	PK	33.5	-29	46.31	53.97	-7.66	74	-27.69	0-360	101	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.726	35.63	PK	37.4	-22.9	50.13	53.97	-3.84	74	-23.87	0-360	101	V

PK - Peak detector

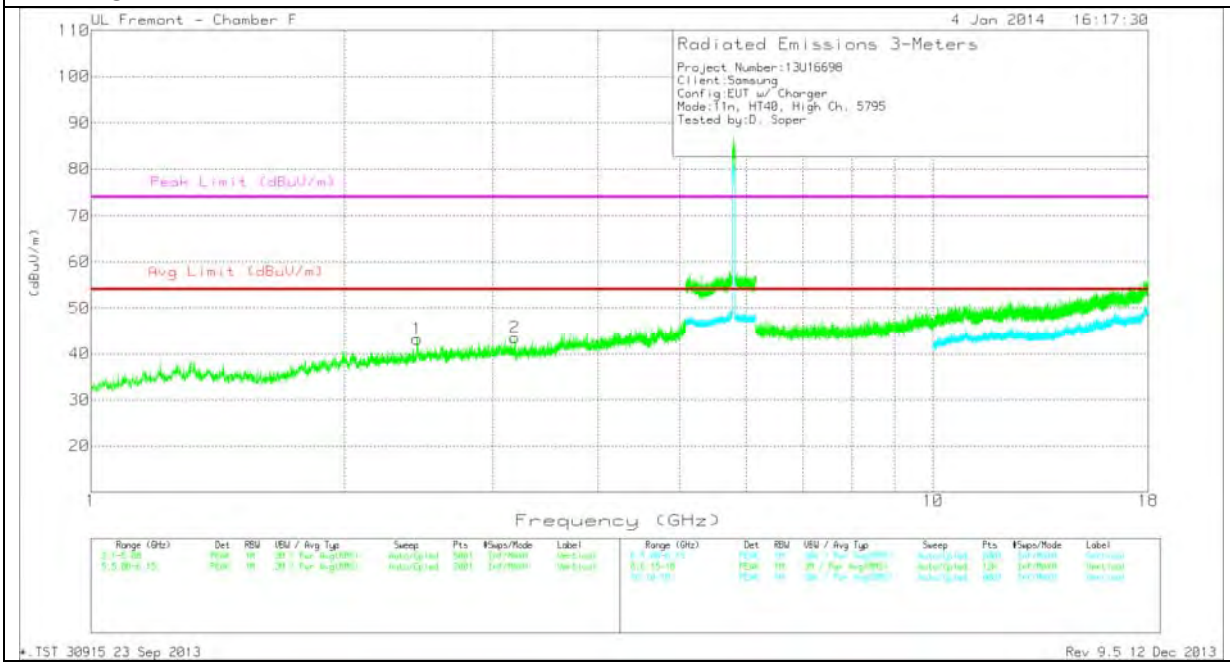
HIGH CHANNEL

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL
VERTICAL



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

HIGH CHANNEL DATA

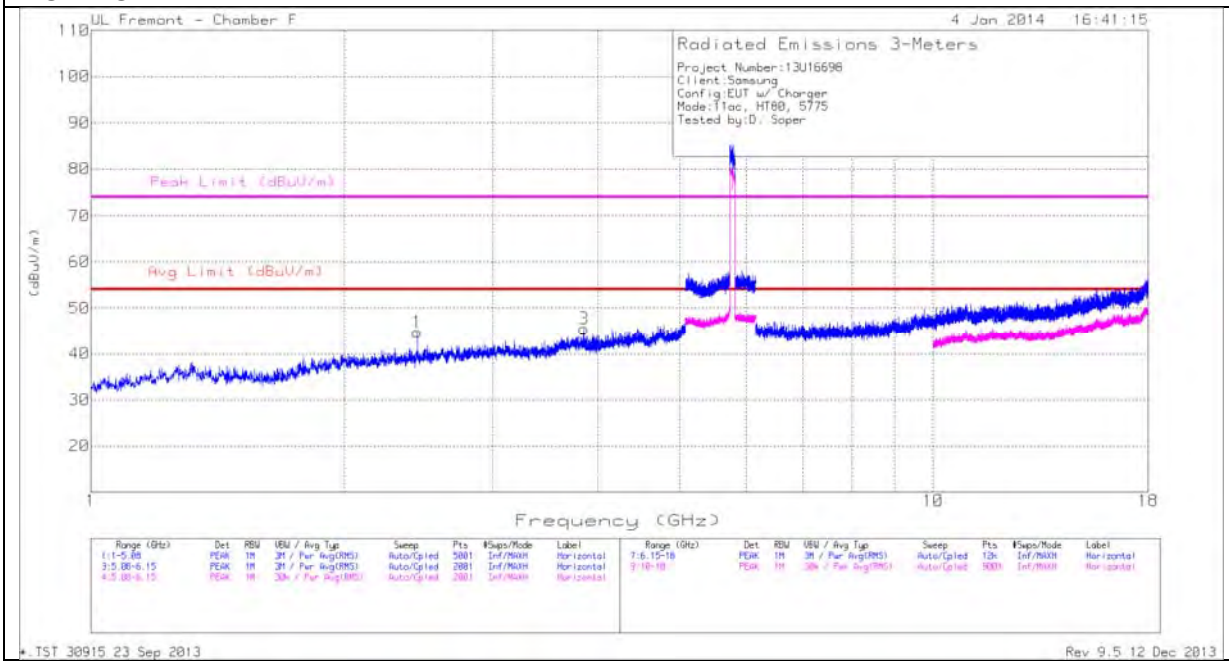
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.439	41.6	PK	32.3	-30.7	43.2	53.97	-10.77	74	-30.8	0-360	201	V
2	3.187	40.34	PK	33.2	-30	43.54	53.97	-10.43	74	-30.46	0-360	201	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.414	35.66	PK	36.9	-23.7	48.86	53.97	-5.11	74	-25.14	0-360	199	H
3	9.582	35.35	PK	37.2	-23	49.55	53.97	-4.42	74	-24.45	0-360	101	H

PK - Peak detector

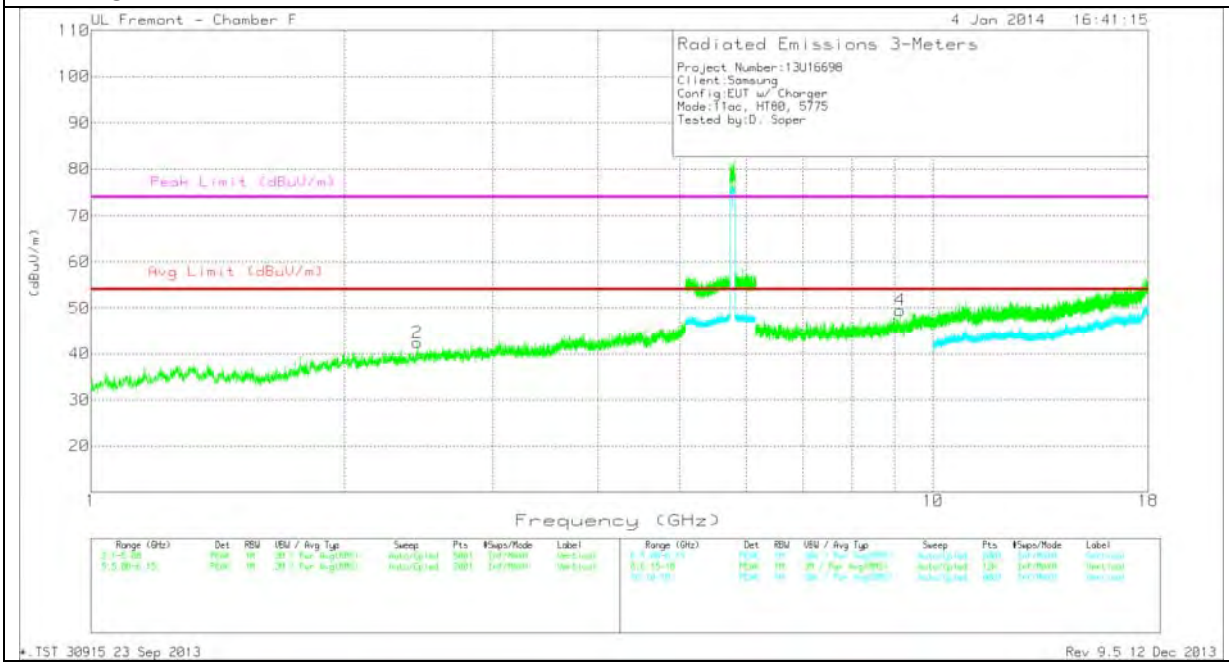
10.2.7. TX ABOVE 1 GHz 802.11ac HT80 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.44	43.12	PK	32.3	-30.7	44.72	53.97	-9.25	74	-29.28	0-360	200	H
2	2.441	40.84	PK	32.3	-30.7	42.44	53.97	-11.53	74	-31.56	0-360	201	V
3	3.85	41.09	PK	33.5	-29.1	45.49	53.97	-8.48	74	-28.51	0-360	200	H

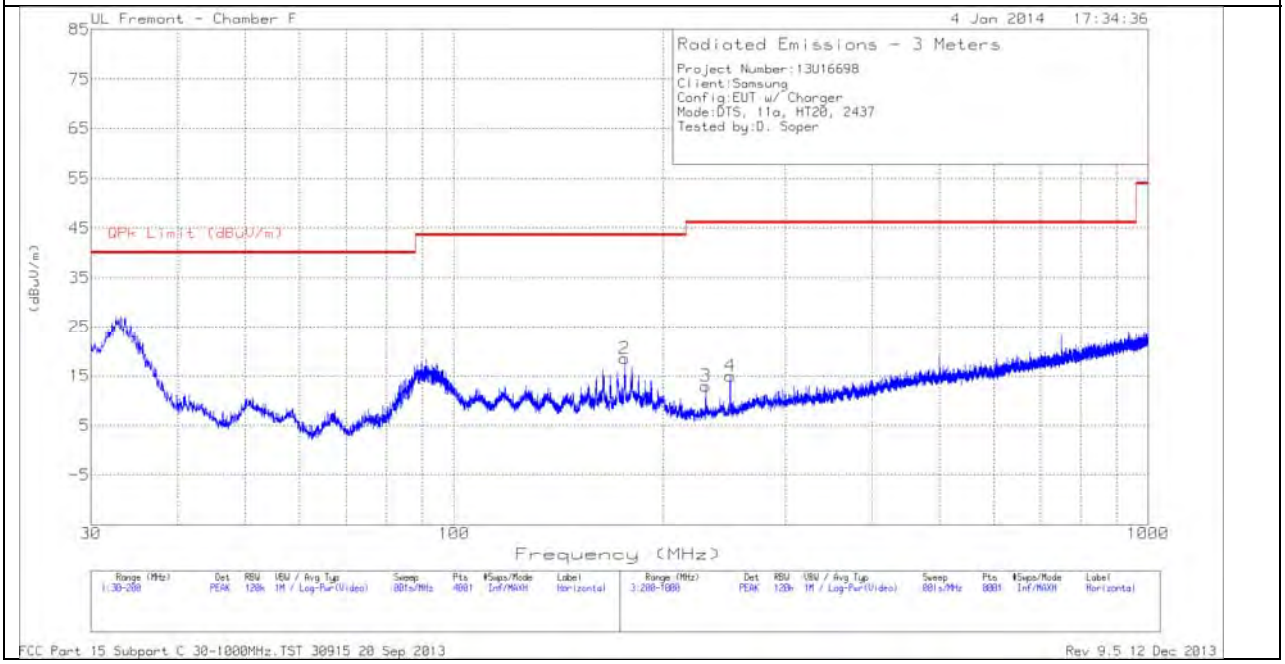
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.136	36.85	PK	36.5	-23.8	49.55	53.97	-4.42	74	-24.45	0-360	201	V

PK - Peak detector

10.3. WORST-CASE BELOW 1 GHz

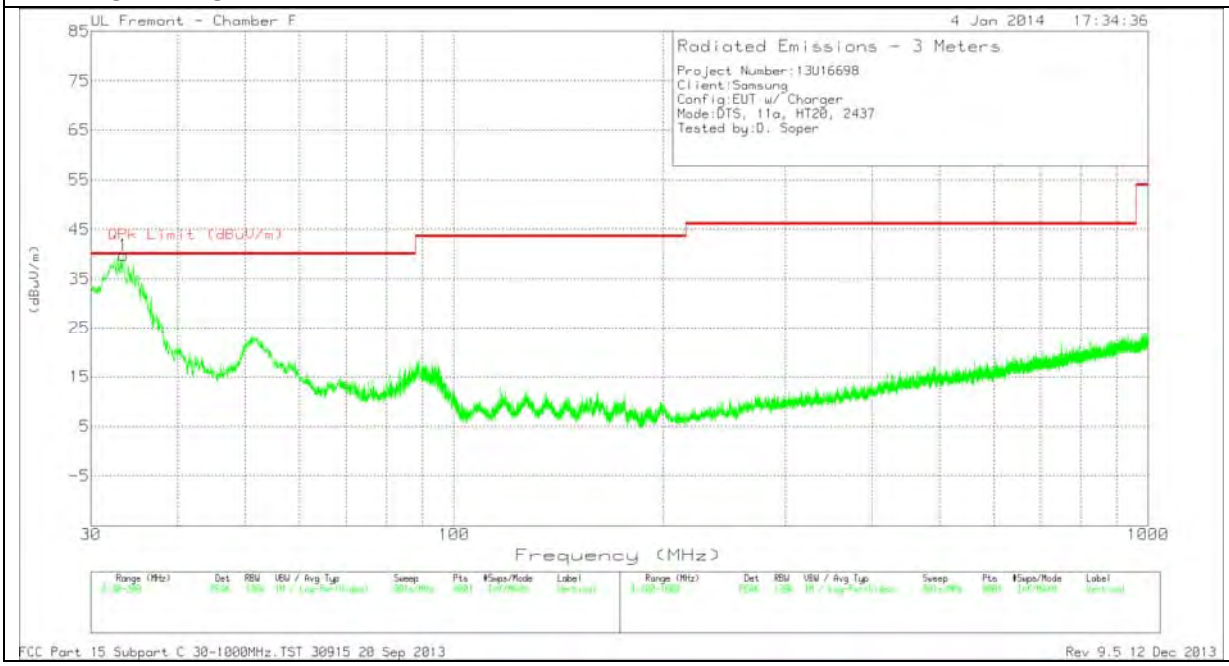
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



Below 1G 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	33.4425	53.04	PK	18.8	-32.1	39.74	40	-.26	0-360	100	V
2	176.1575	38.3	PK	11.4	-31.2	18.5	43.52	-25.02	0-360	201	H
3	230.5	32.76	PK	11.2	-31	12.96	46.02	-33.06	0-360	201	H
4	250	34.27	PK	11.6	-30.9	14.97	46.02	-31.05	0-360	100	H

PK - Peak detector

11. 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

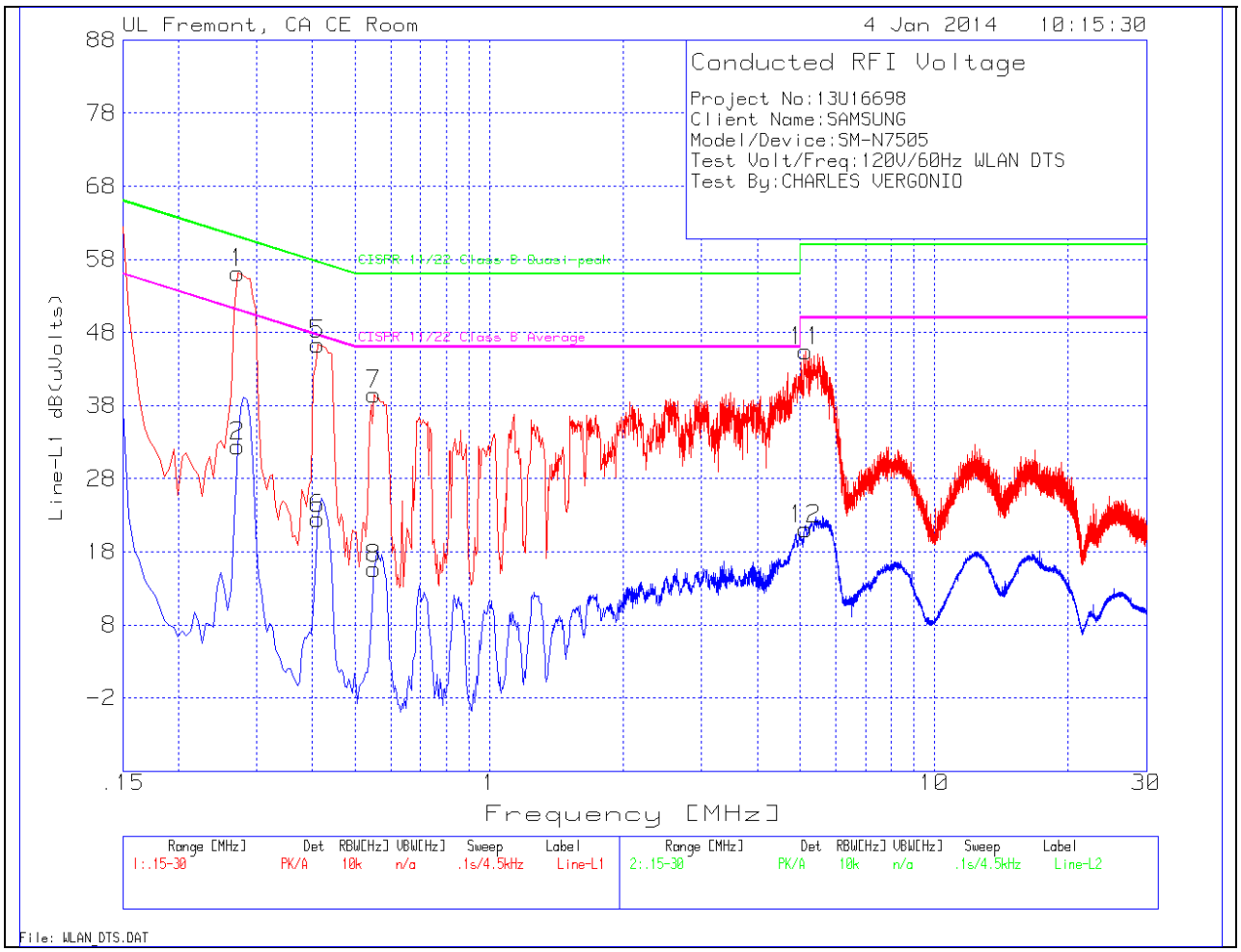
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4 2009.

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

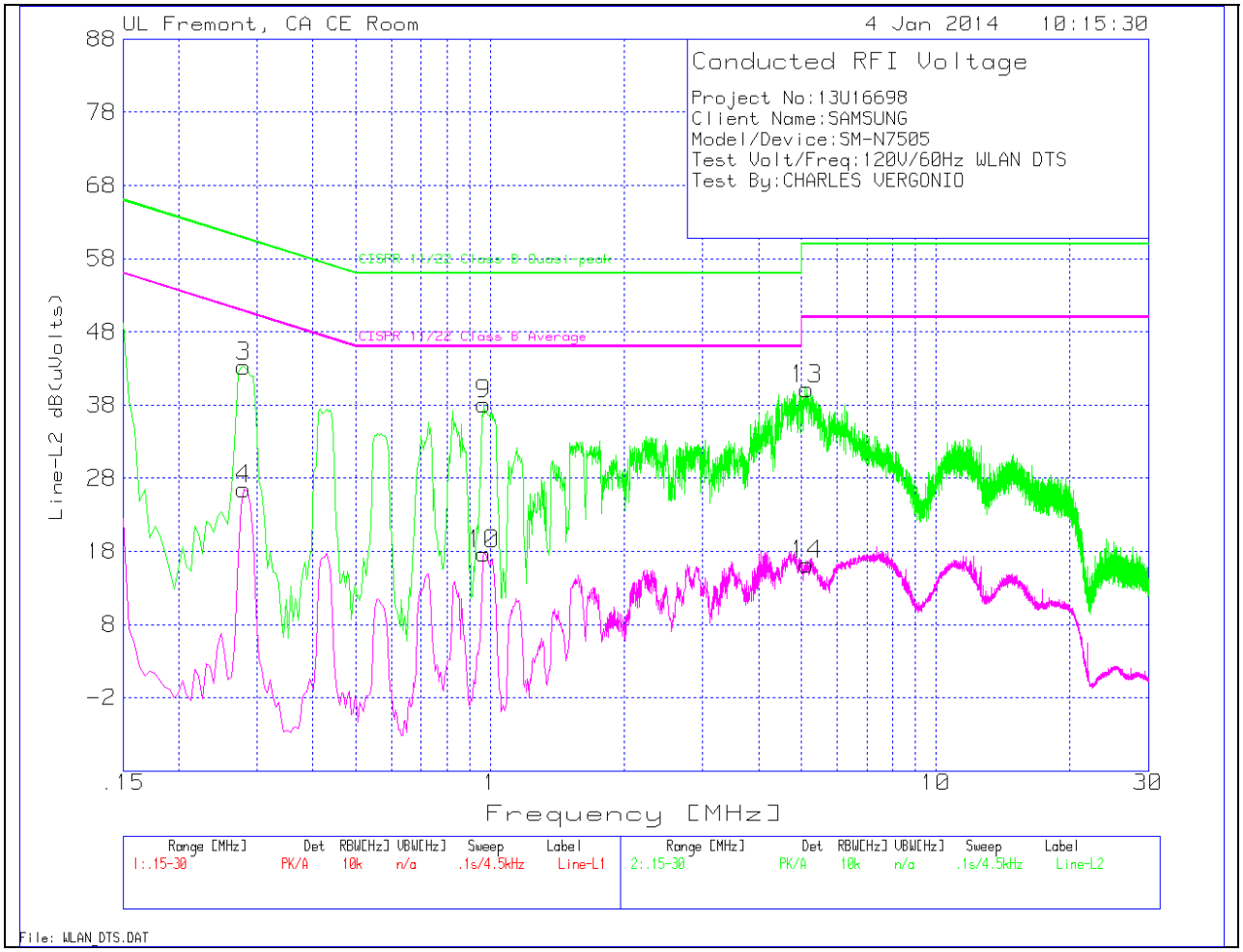


LINE 1 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.2715	56.04	PK	.1	0	56.14	61.1	-4.96	-	-
2	.2715	32.35	Av	.1	0	32.45	-	-	51.1	-18.65
5	.411	46.25	PK	.1	0	46.35	57.6	-11.25	-	-
6	.411	22.44	Av	.1	0	22.54	-	-	47.6	-25.06
7	.5505	39.42	PK	.1	0	39.52	56	-16.48	-	-
8	.5505	15.63	Av	.1	0	15.73	-	-	46	-30.27
11	5.145	45.3	PK	.1	.1	45.5	60	-14.5	-	-
12	5.145	20.93	Av	.1	.1	21.13	-	-	50	-28.87

LINE 2



LINE 2 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
3	.2805	43.14	PK	.1	0	43.24	60.8	-17.56	-	-
4	.2805	26.46	Av	.1	0	26.56	-	-	50.8	-24.24
9	.969	38.01	PK	.1	0	38.11	56	-17.89	-	-
10	.969	17.57	Av	.1	0	17.67	-	-	46	-28.33
13	5.127	39.91	PK	.1	.1	40.11	60	-19.89	-	-
14	5.127	15.97	Av	.1	.1	16.17	-	-	50	-33.83

PK - Peak detector

Av - average detection