



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

**FOR
GSM Phone + Bluetooth &
WLAN 2.4GHz b/g/n**

MODEL NUMBER: SM-G3502C

REPORT NUMBER: 13I16469-4 Rev A

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**Prepared for
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416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA**

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/25/13	Initial Issue	P. Kim
A	12/4/13	Updated 6dB table in section 9.1; average power in section 9.3	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: 802.11 B/G/N 1X1 HT20, + BT4.0 + GSM1900 BAR PHONE

MODEL: SM-G3502C

SERIAL NUMBER: CD837435, CD8c7444, 3661541c

DATE TESTED: November 7 - 25, 2013

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:

Tested By:



PHILIP KIM
WISE PROGRAM MANAGER
UL Verification Services Inc.



Kiya Kedida
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:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM Phone with Bluetooth and WLAN 2.4G capability.

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	20.79	119.95
2412 - 2462	802.11g	24.81	302.69
2412 - 2462	802.11n HT20	23.22	209.89

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 2.3 dBi.

5.4. SOFTWARE AND FIRMWARE

Software version was cs02ve3gzc-eng 4.3 JLS36C.

The firmware used was G3502CZCEAMK2a & G3502CZCUAMK5.

5.5. 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 Z orientation.

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

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	ETAOU42CBC	GB4943.1-2011	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

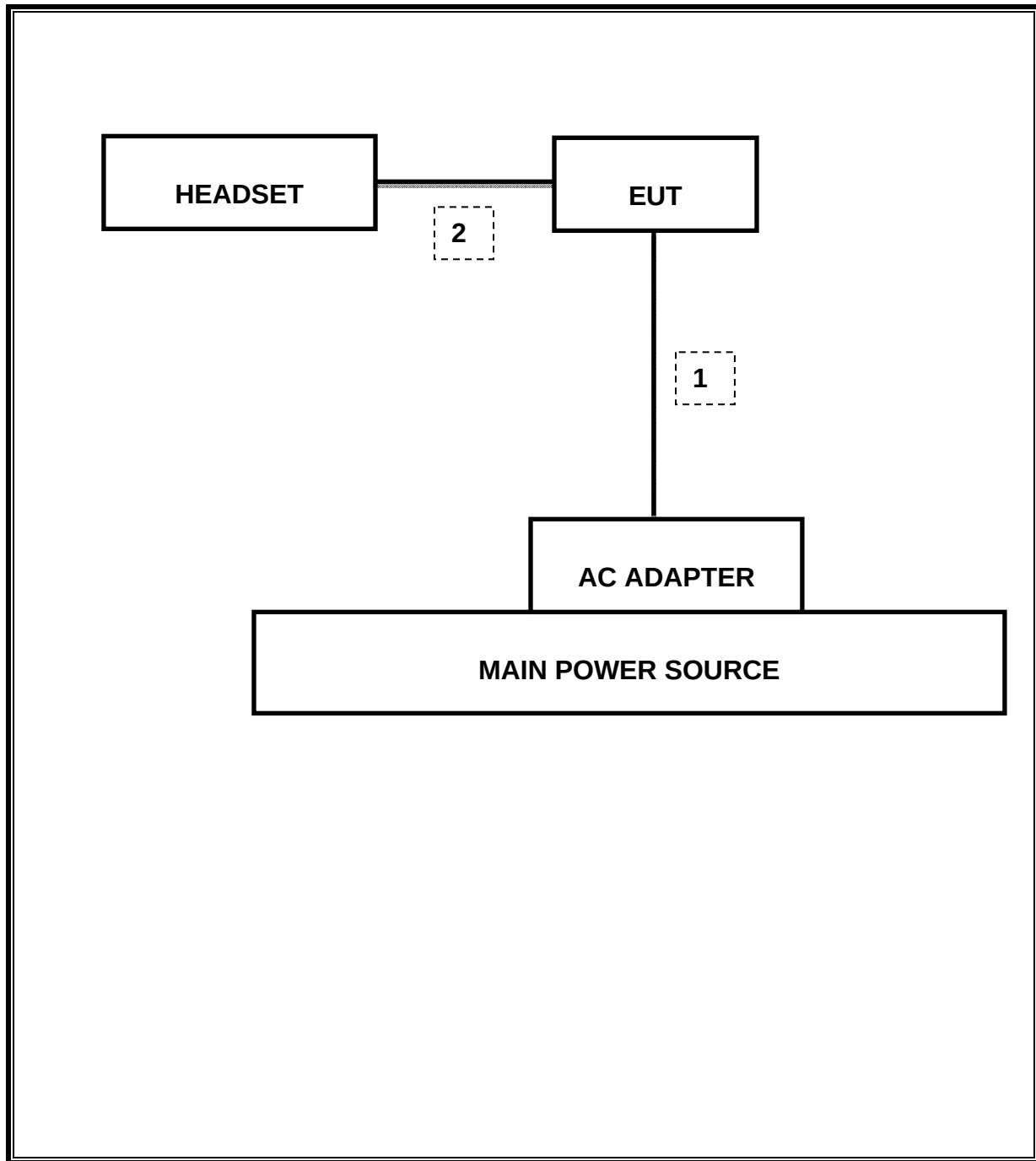
I/O CABLES

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	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	12/11/12	12/11/13
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	F00167	03/23/13	03/23/14
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

7. MEASUREMENT METHODS

KDB 558074 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	7.2MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-37.75dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	24.81dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-2.94dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	48.85dBuV
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	47.05dBuV

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 DTS Meas Guidance 8.0: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW $\geq 3 \times$ 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	8.05	0.5
Mid	2437	7.20	0.5
High	2462	7.55	0.5
Worst		7.20	

9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

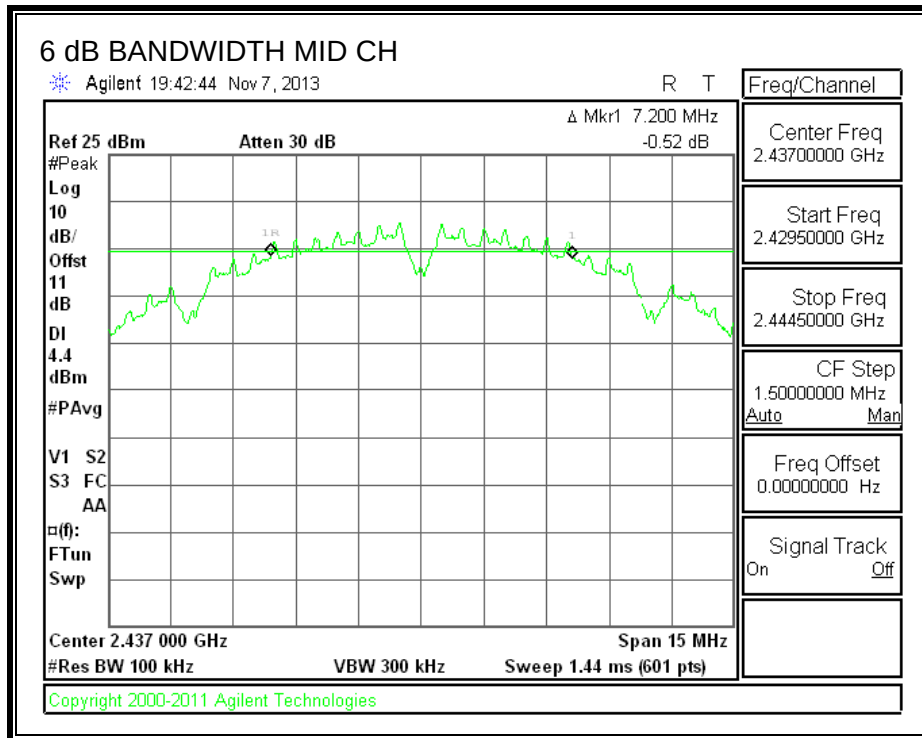
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.40	0.5
Mid	2437	16.47	0.5
High	2462	16.43	0.5
Worst		16.40	

9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

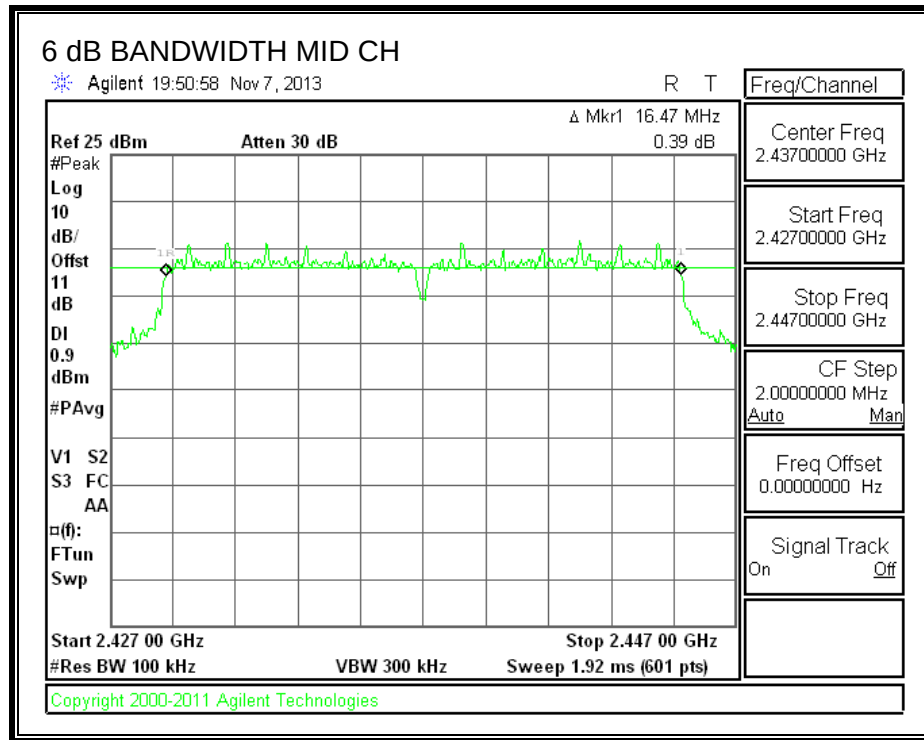
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.69	0.5
Mid	2437	17.58	0.5
High	2462	16.79	0.5
Worst		16.79	

802.11b 6 dB BANDWIDTH

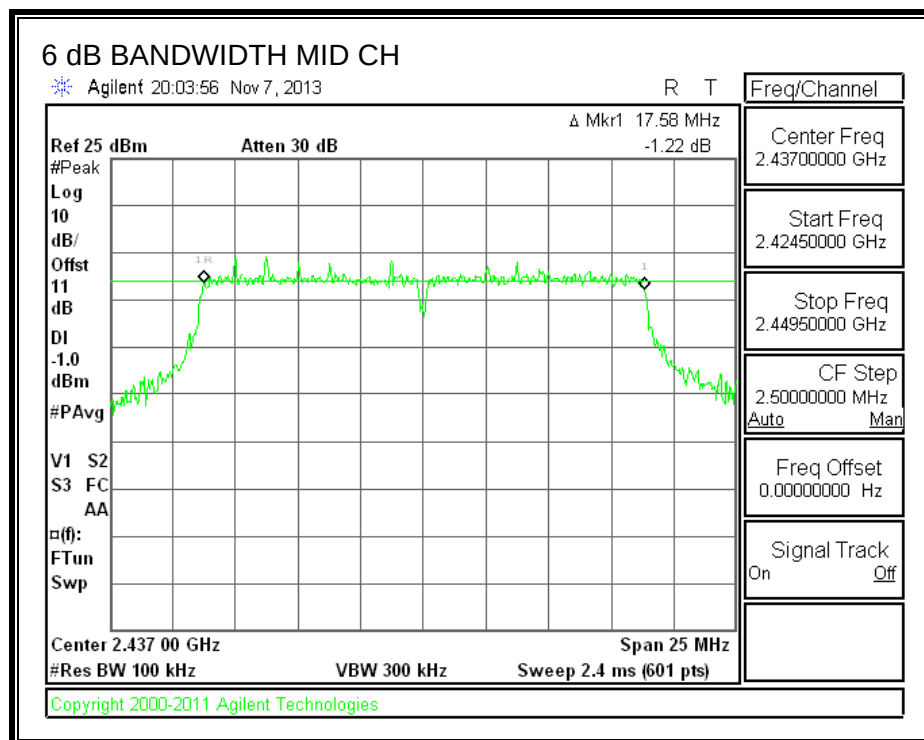
2.4GHz 802.11b 6 dB BANDWIDTH



2.4GHz 802.11g 6 dB BANDWIDTH



2.4 GHz 802.11n 6 dB BANDWIDTH



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	12.72
Mid	2437	12.89
High	2462	13.10
Worst		13.10

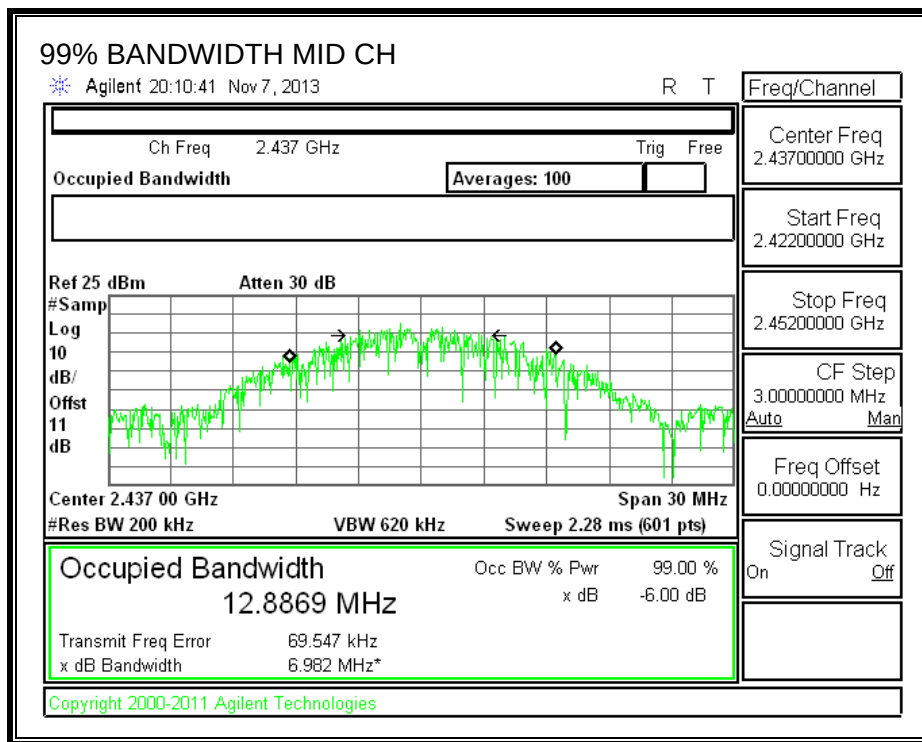
9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.42
Mid	2437	16.51
High	2462	16.63
Worst		16.63

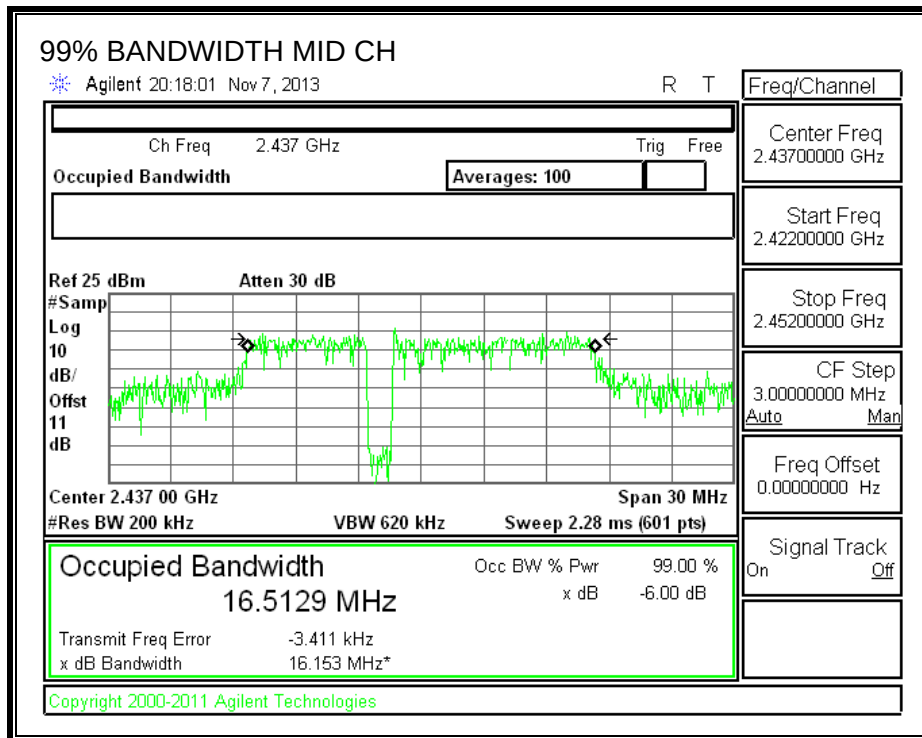
9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.60
Mid	2437	17.56
High	2462	17.67
Worst		17.67

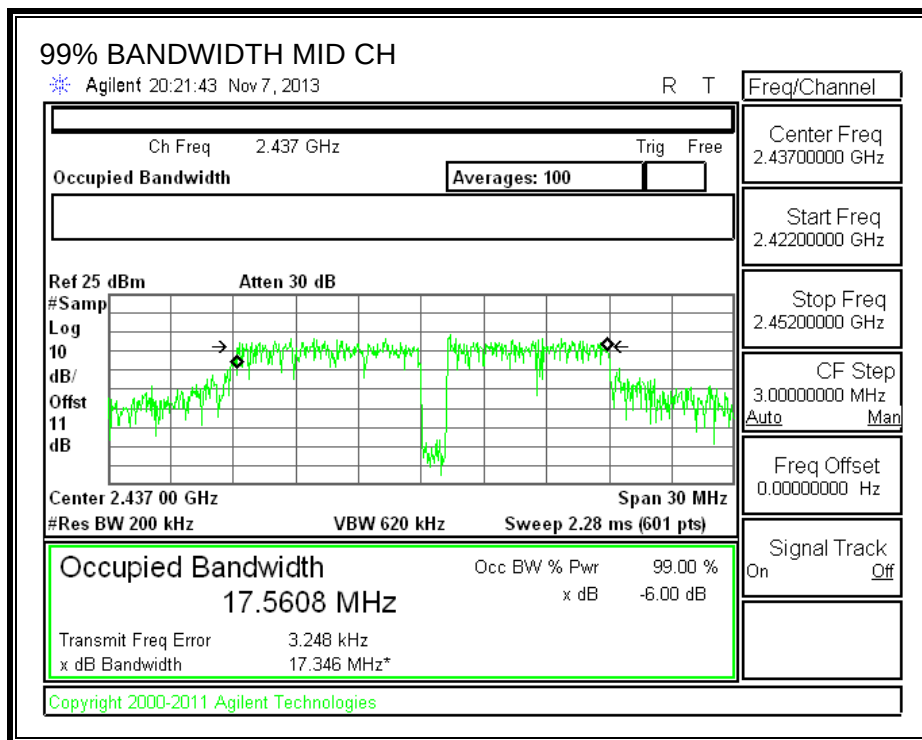
2.4 GHz 802.11b 99% BANDWIDTH



2.4 GHz 802.11g 99% BANDWIDTH



2.4 GHz 802.11n 99% BANDWIDTH



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 10 dB 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	16.8
Mid	2437	16.8
High	2462	16.5
Worst		16.8

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	14.5
Mid	2437	14.3
High	2462	14.2
Worst		14.5

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	11.7
Mid	2437	11.6
High	2462	11.5
Worst		11.7

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	-5.80	30.00	30	36	30.00
Mid	2437	-5.80	30.00	30	36	30.00
High	2462	-5.80	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	20.79	20.79	30.00	-9.21
Mid	2437	20.31	20.31	30.00	-9.69
High	2462	20.18	20.18	30.00	-9.82
Worst			20.79		

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	-5.80	30.00	30	36	30.00
Mid	2437	-5.80	30.00	30	36	30.00
High	2462	-5.80	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	24.81	24.81	30.00	-5.19
Mid	2437	24.63	24.63	30.00	-5.37
High	2462	24.40	24.40	30.00	-5.60
Worst			24.81		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

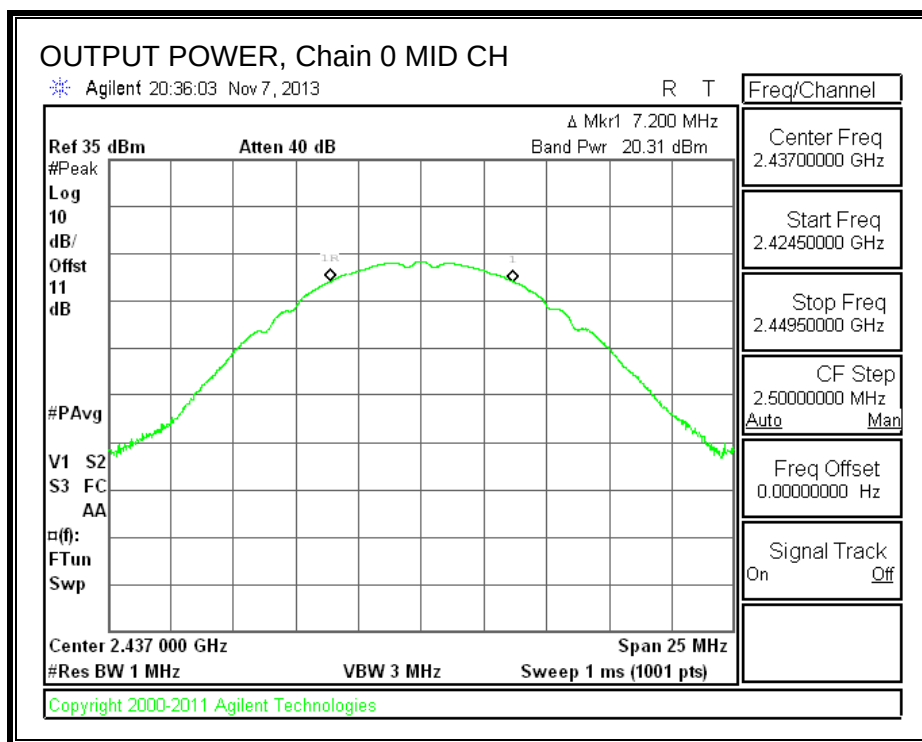
Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-5.80	30.00	30	36	30.00
Mid	2437	-5.80	30.00	30	36	30.00
High	2462	-5.80	30.00	30	36	30.00

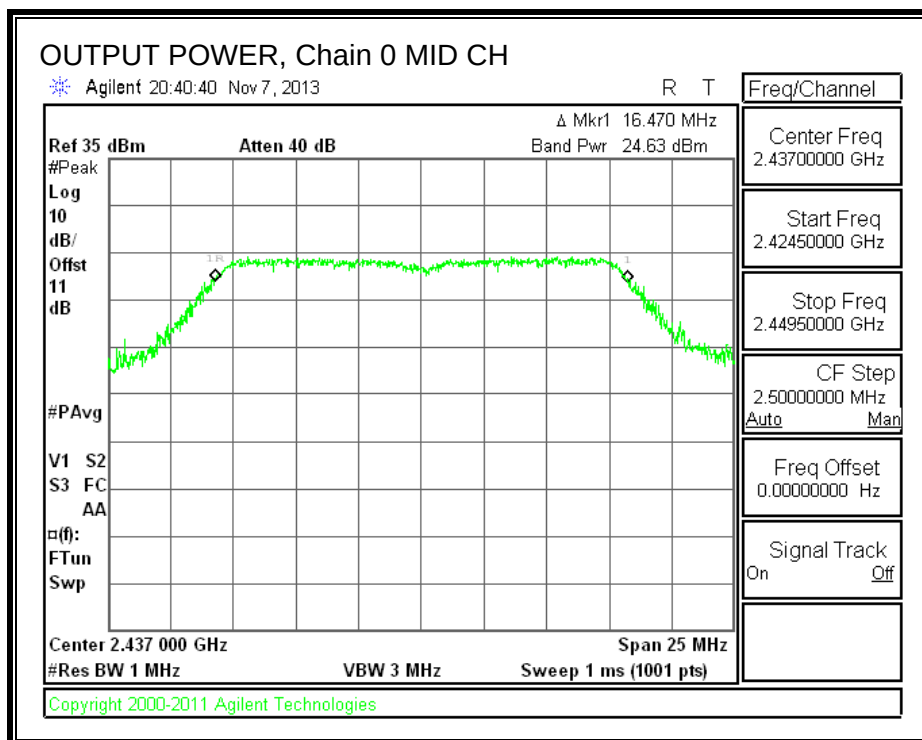
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	23.22	23.22	30.00	-6.78
Mid	2437	23.00	23.00	30.00	-7.00
High	2462	22.76	22.76	30.00	-7.24
Worst			23.22		

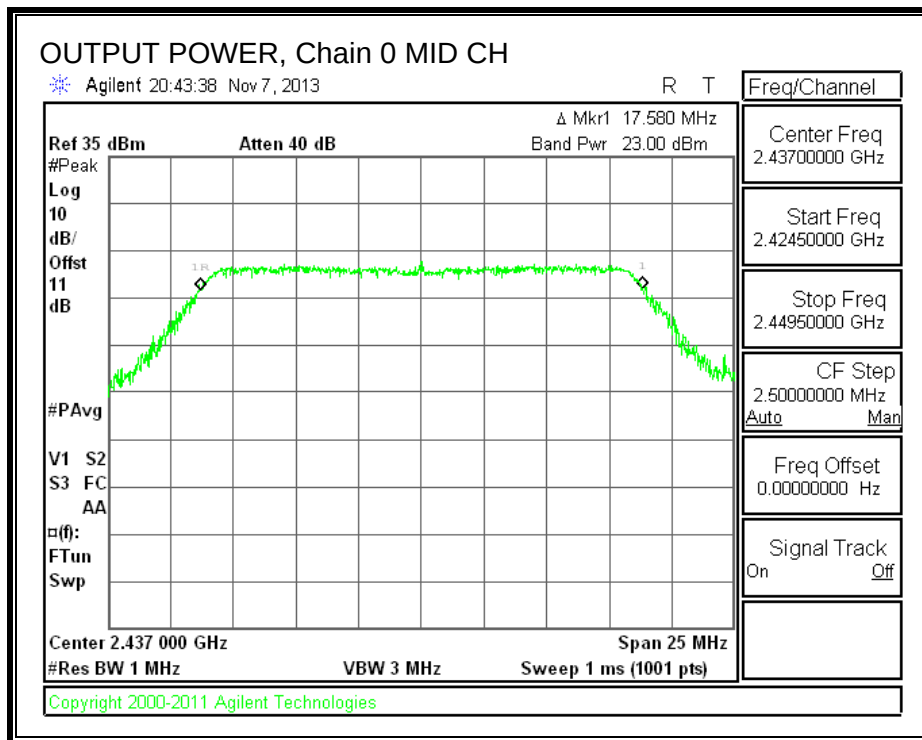
2.4 GHz 802.11b OUTPUT POWER, Chain 0



2.4 GHz 802.11g OUTPUT POWER, Chain 0



2.4 GHz 802.11n OUTPUT POWER, Chain 0



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	-2.94	8.0	-10.9
Mid	2437	-4.04	8.0	-12.0
High	2462	-5.27	8.0	-13.3

9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

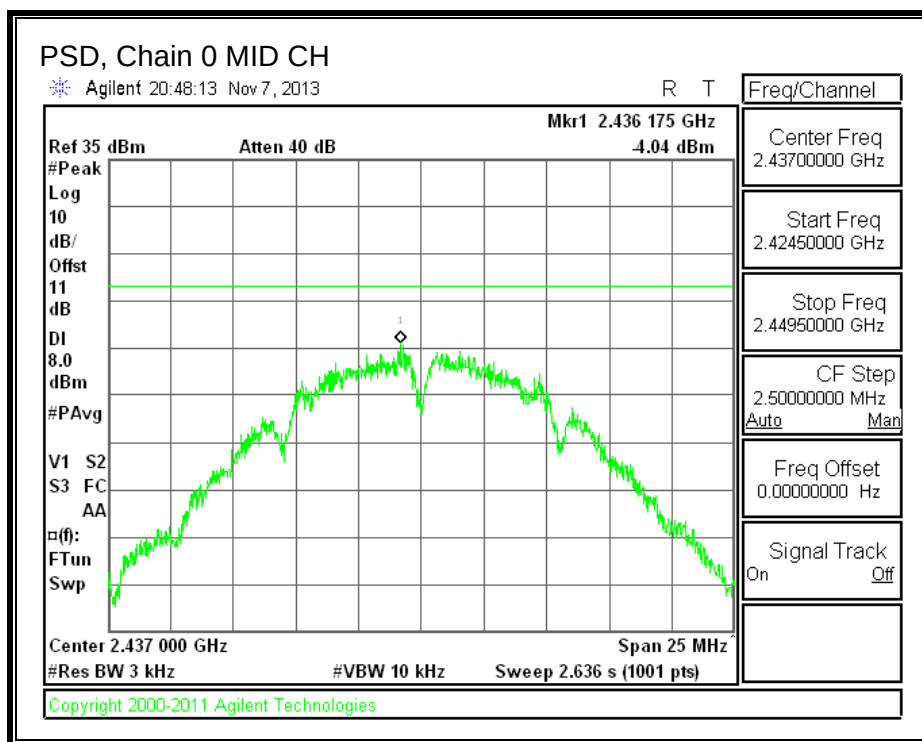
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-7.73	8.0	-15.7
Mid	2437	-8.03	8.0	-16.0
High	2462	-7.81	8.0	-15.8

9.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

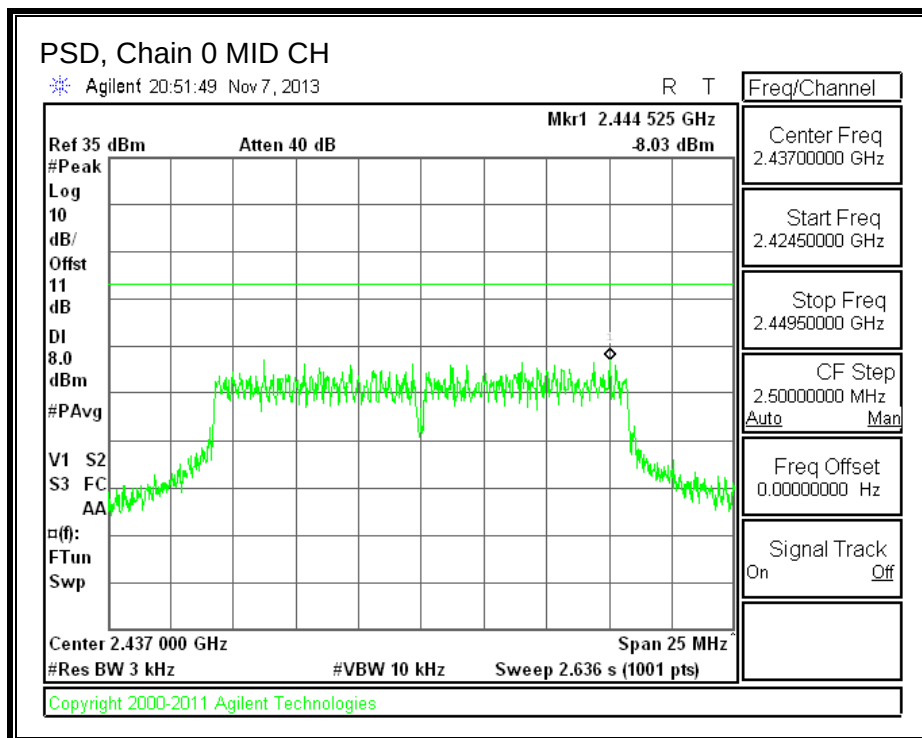
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.06	8.0	-18.1
Mid	2437	-10.49	8.0	-18.5
High	2462	-10.95	8.0	-19.0

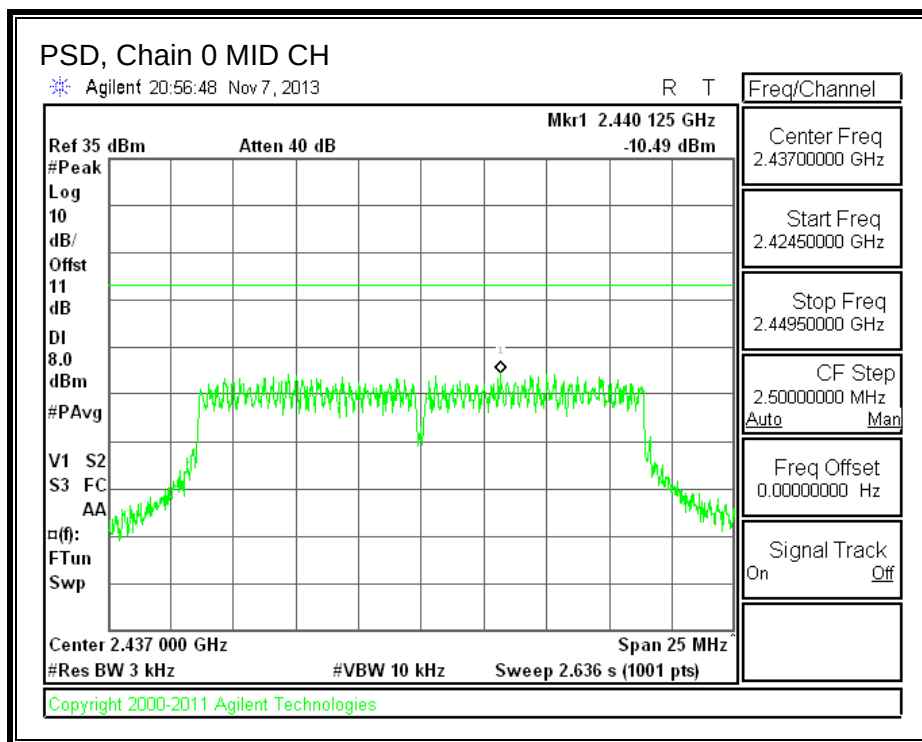
2.4GHz 802.11b PSD, Chain 0



2.4GHz 802.11g PSD, Chain 0



2.4GHz 802.11n PSD, Chain 0



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.

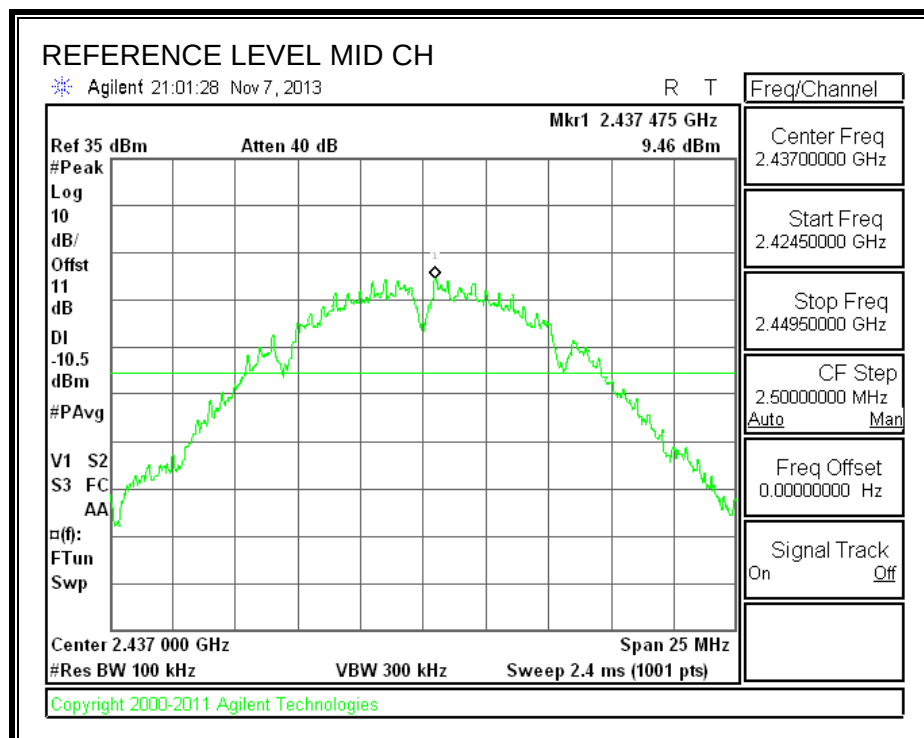
TEST PROCEDURE

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.

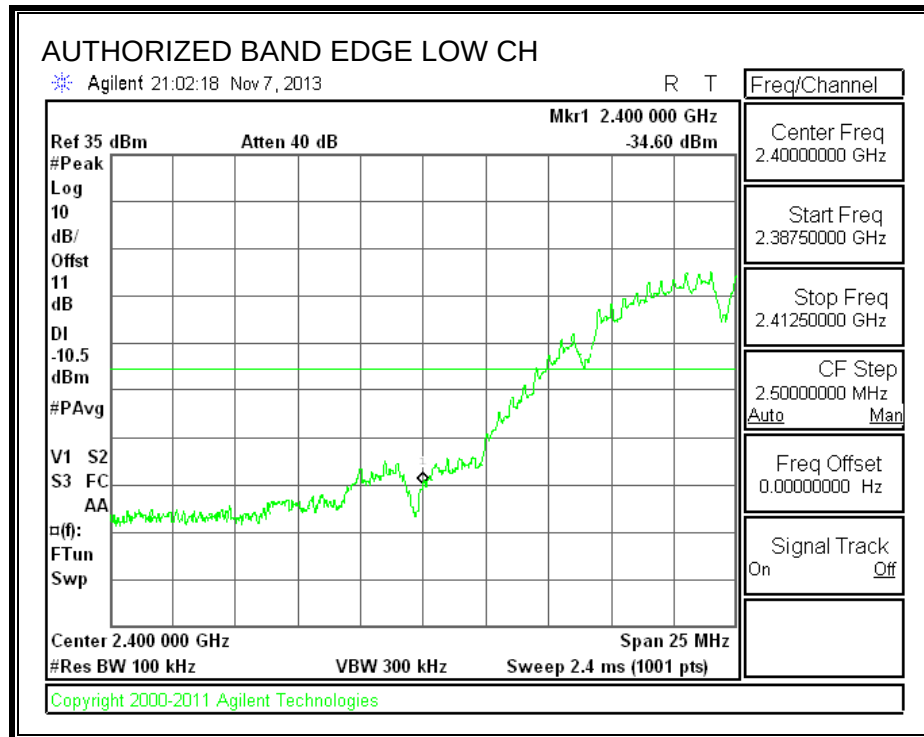
RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

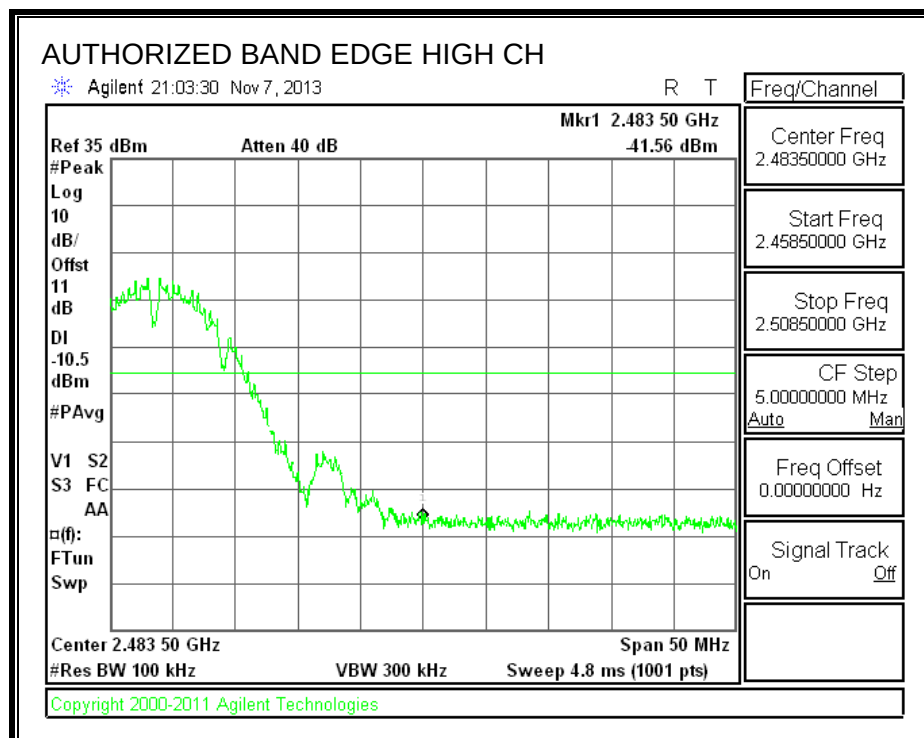
IN-BAND REFERENCE LEVEL



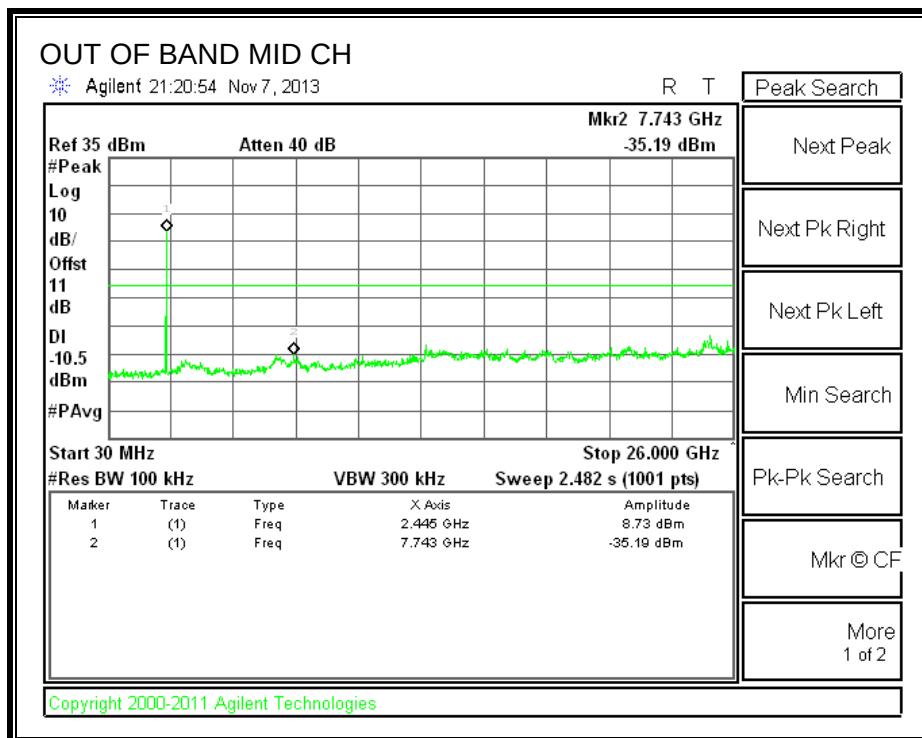
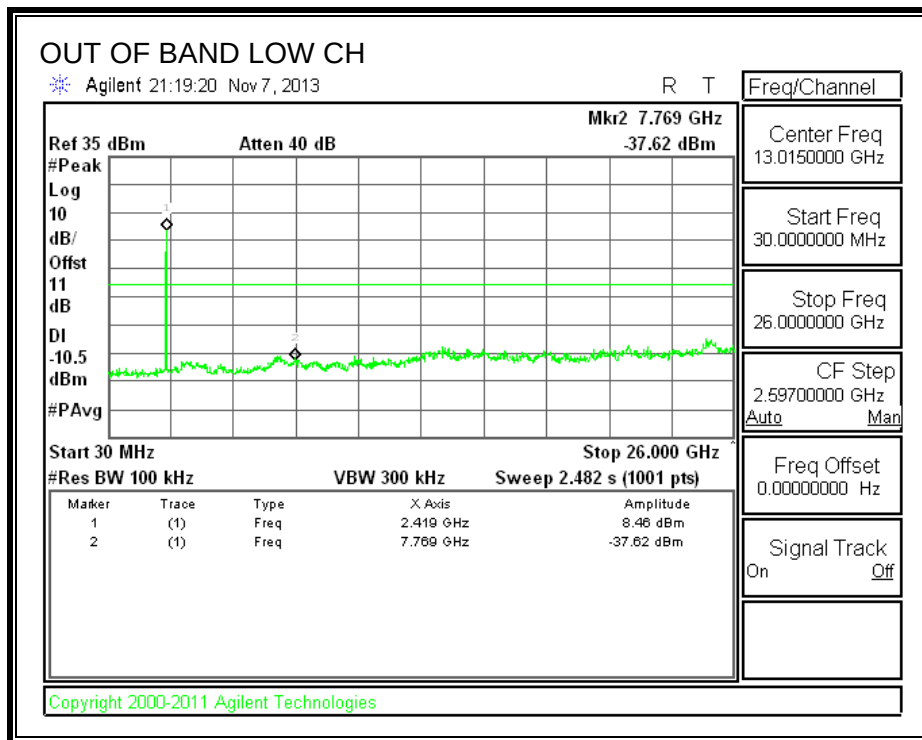
LOW CHANNEL BANDEDGE

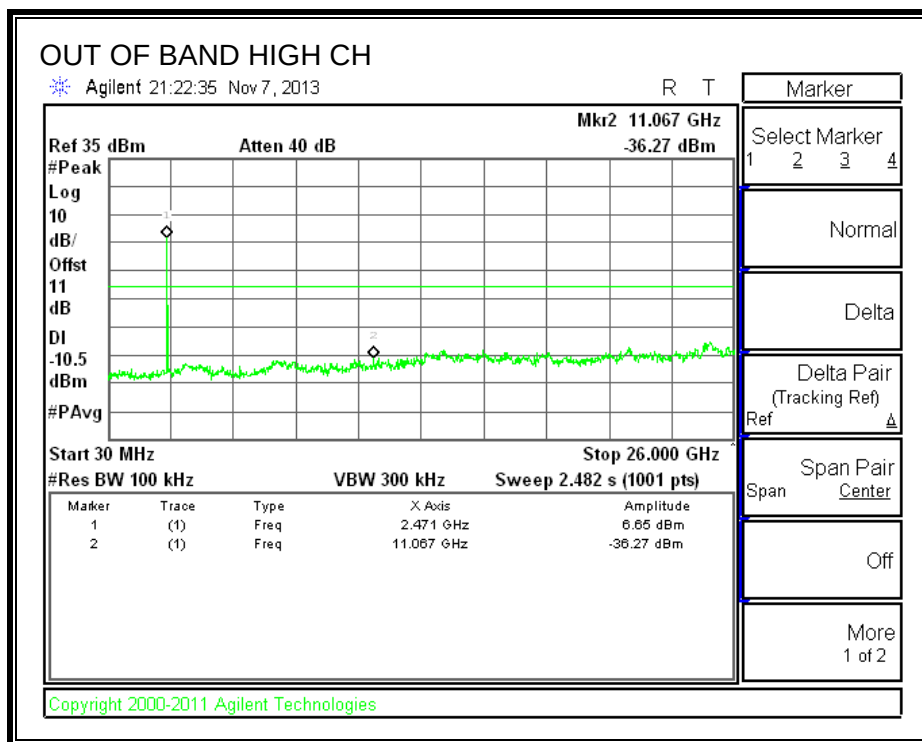


HIGH CHANNEL BANDEDGE



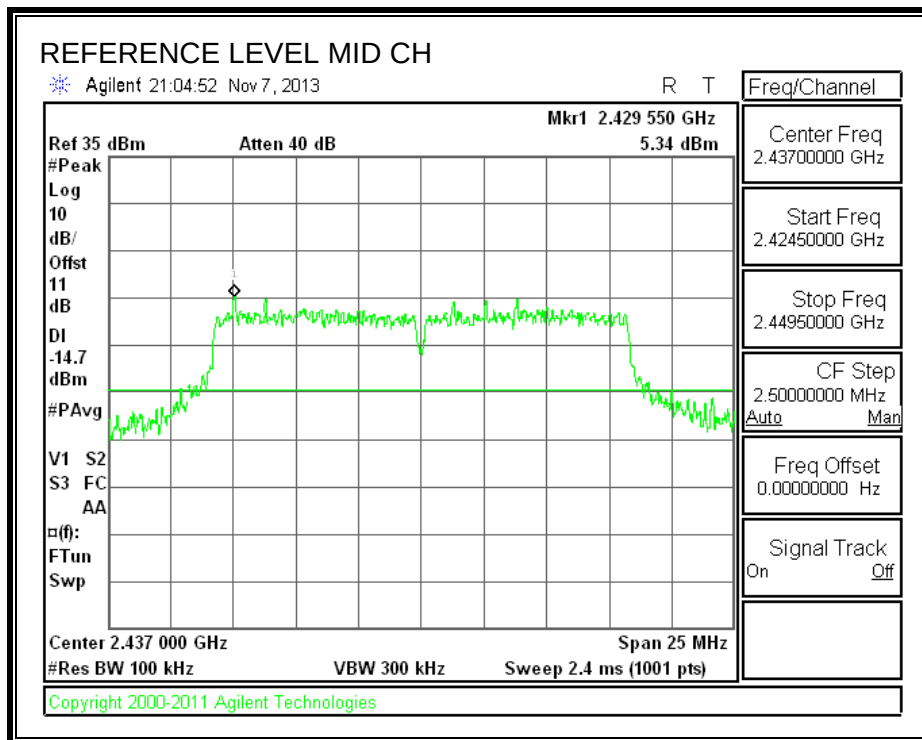
OUT-OF-BAND EMISSIONS



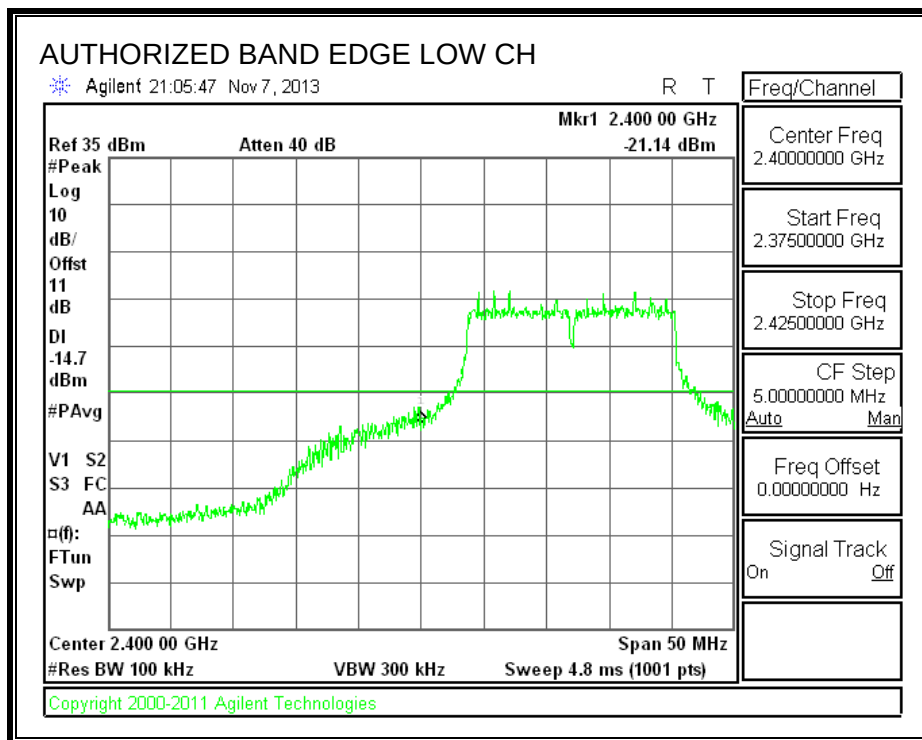


9.6.1. 802.11g MODE IN THE 2.4 GHz BAND

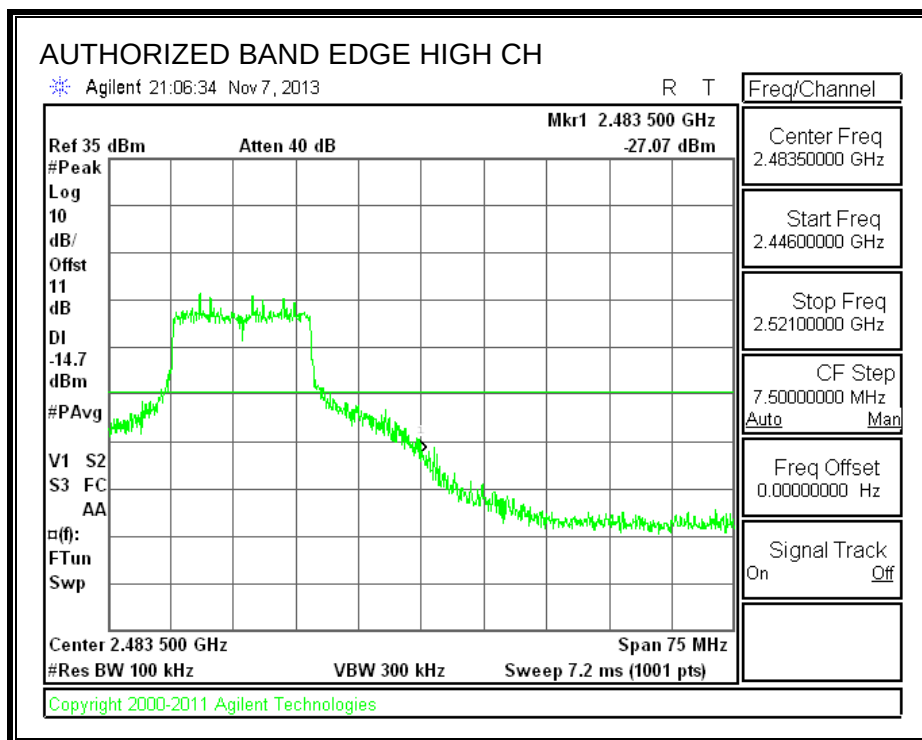
IN-BAND REFERENCE LEVEL



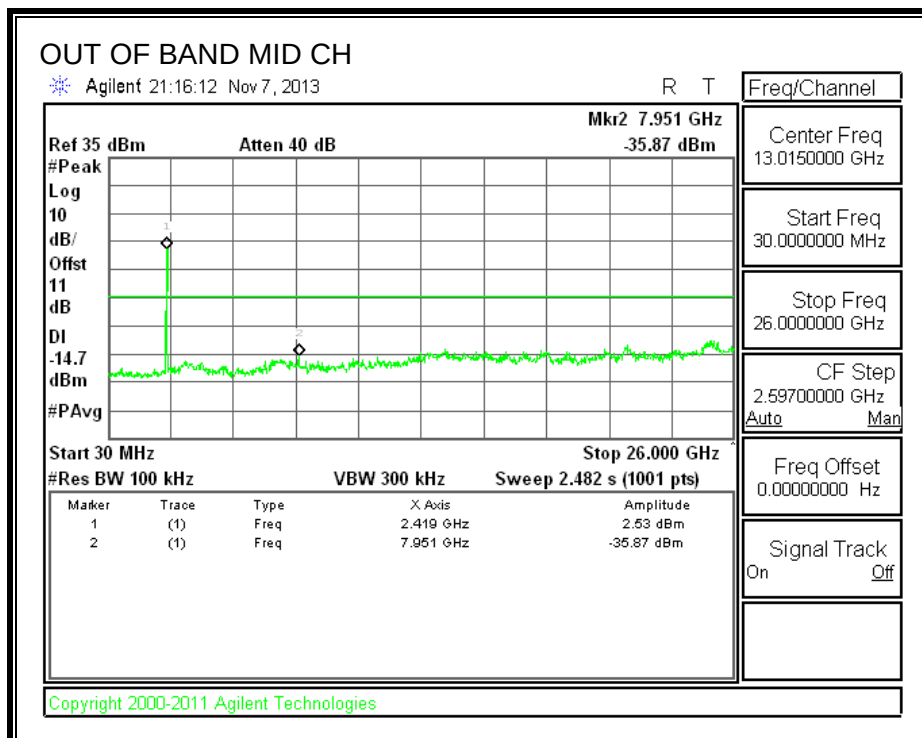
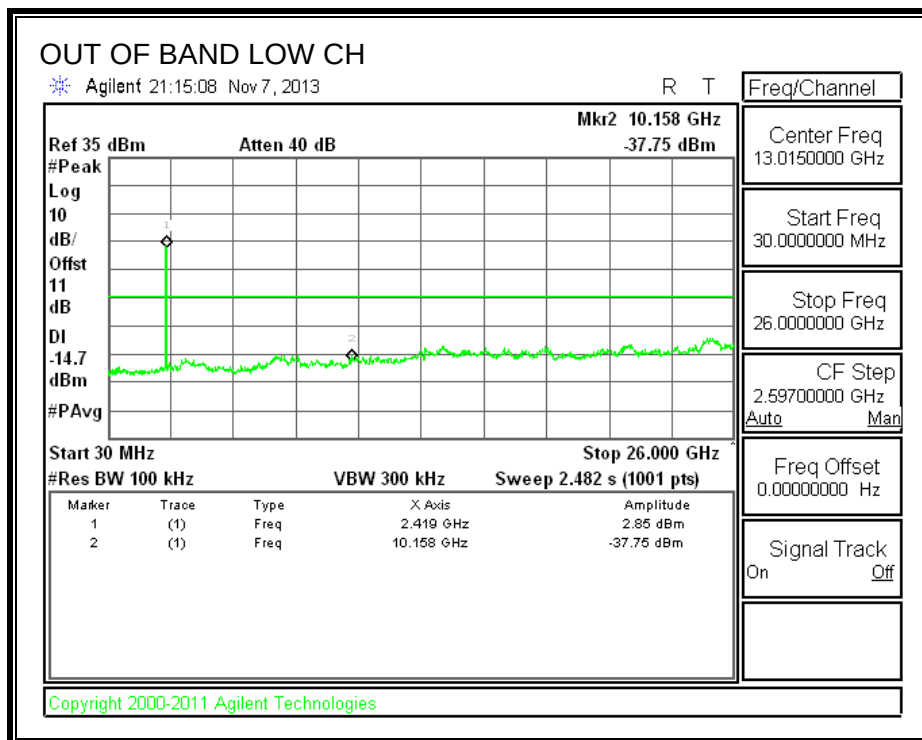
LOW CHANNEL BANDEDGE

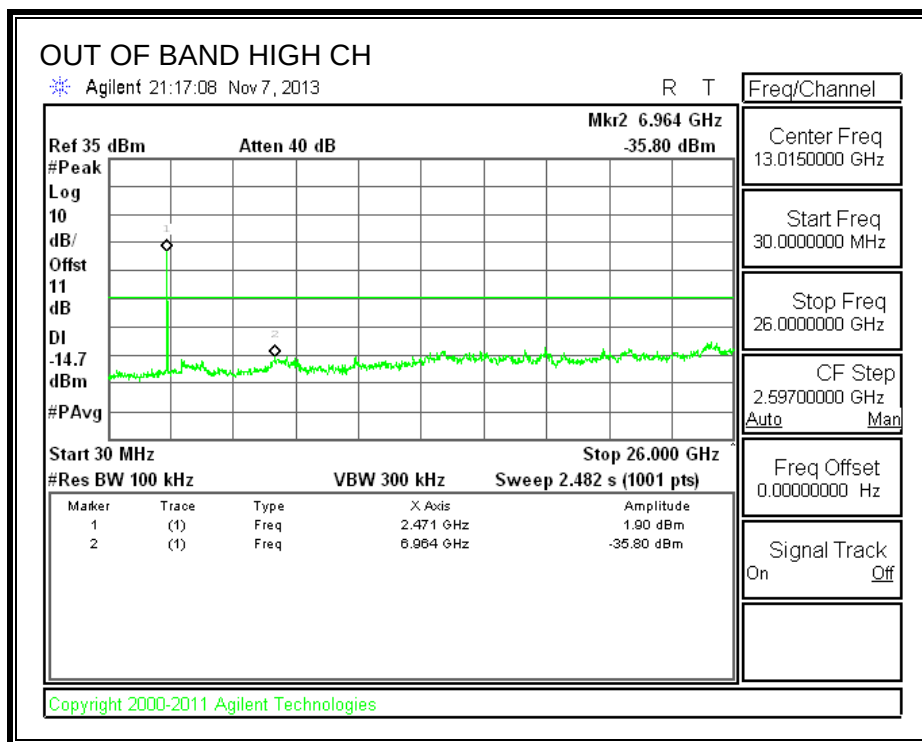


HIGH CHANNEL BANDEDGE



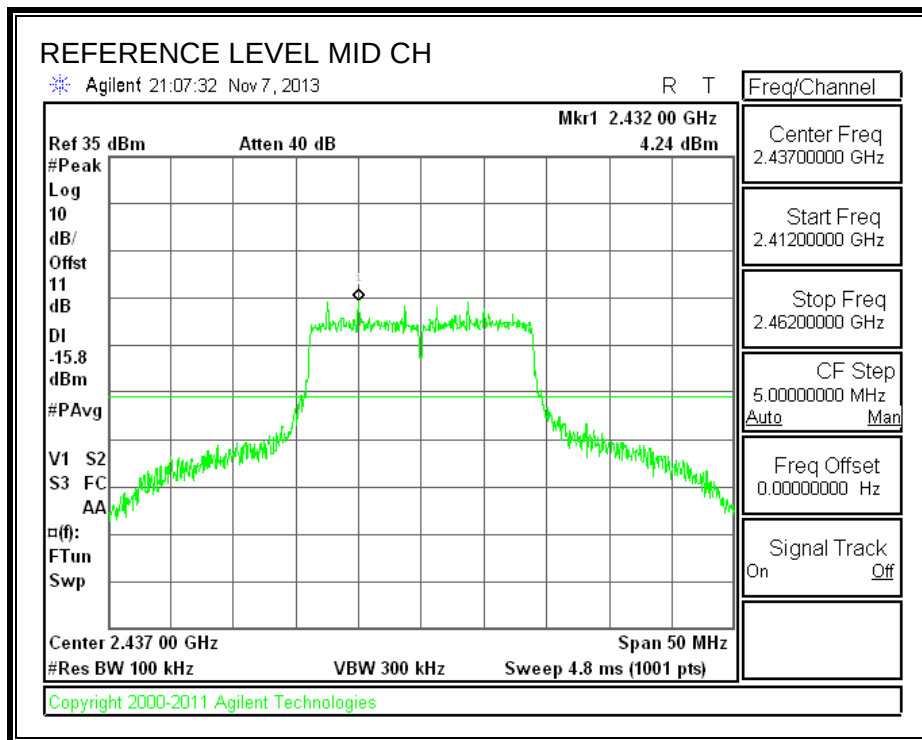
OUT-OF-BAND EMISSIONS



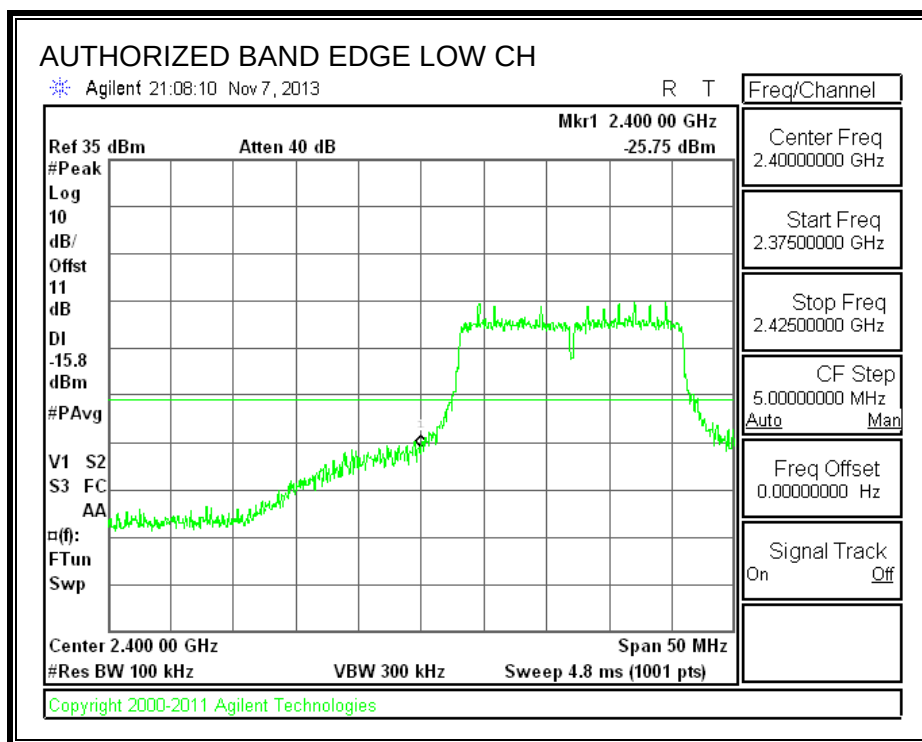


9.6.2. 802.11n MODE IN THE 2.4 GHz BAND

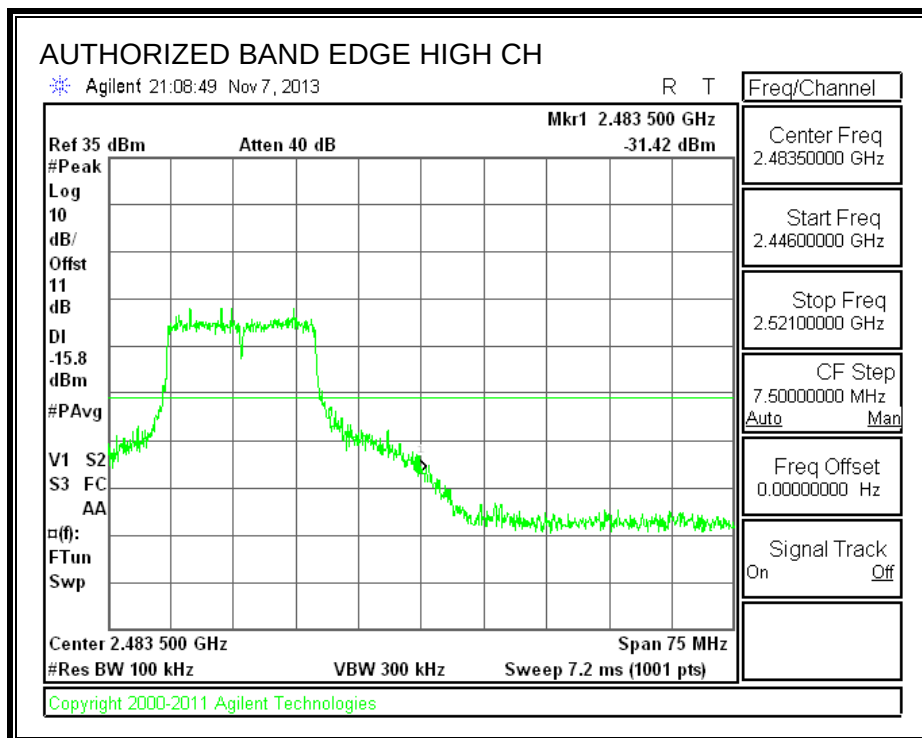
IN-BAND REFERENCE LEVEL



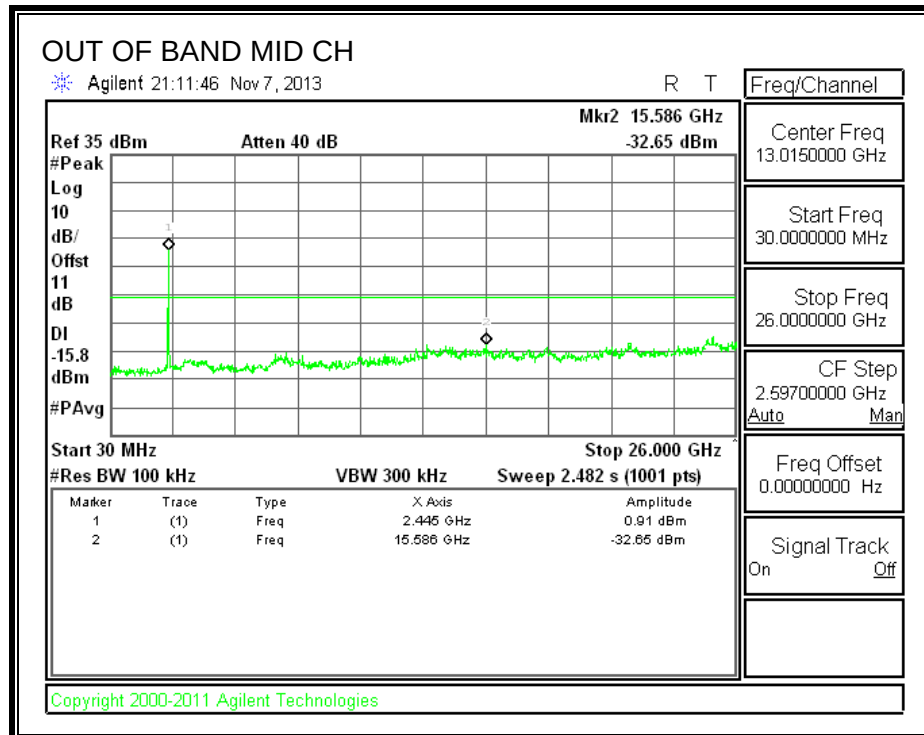
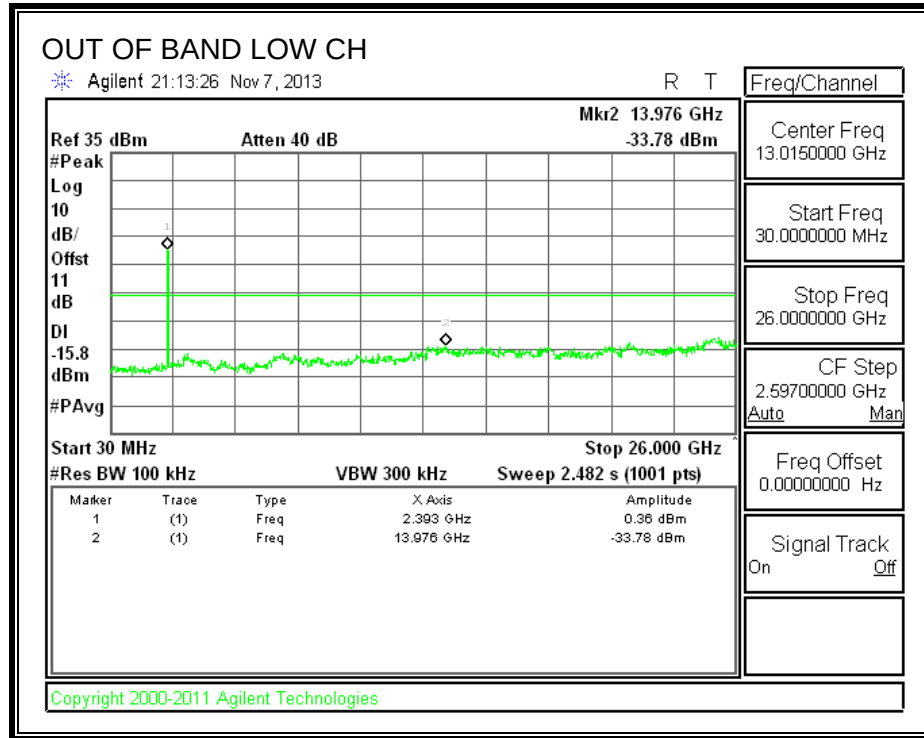
LOW CHANNEL BANDEDGE

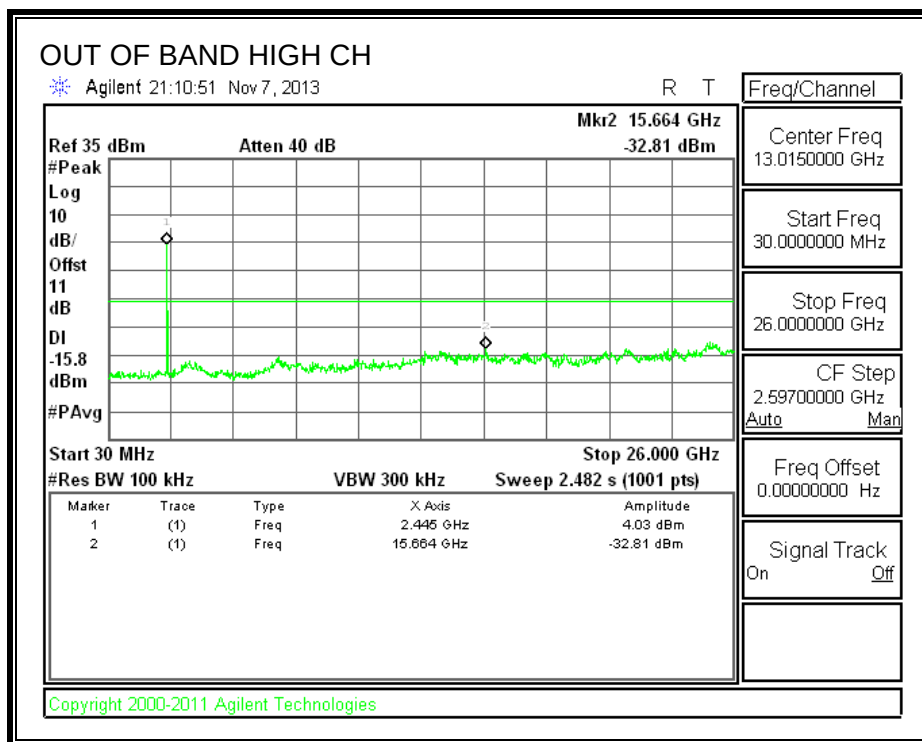


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS





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.

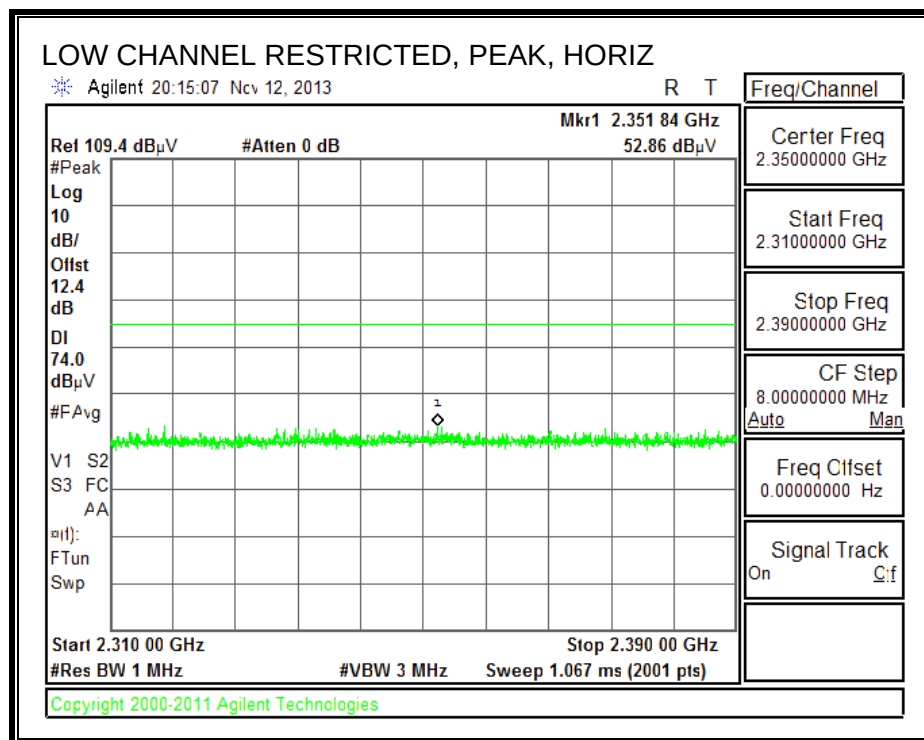
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= $10\log(1/x)$ For this sample B mode = 0dB (>98% duty cycle); G mode = 0.3dB; N mode = 0.3dB.

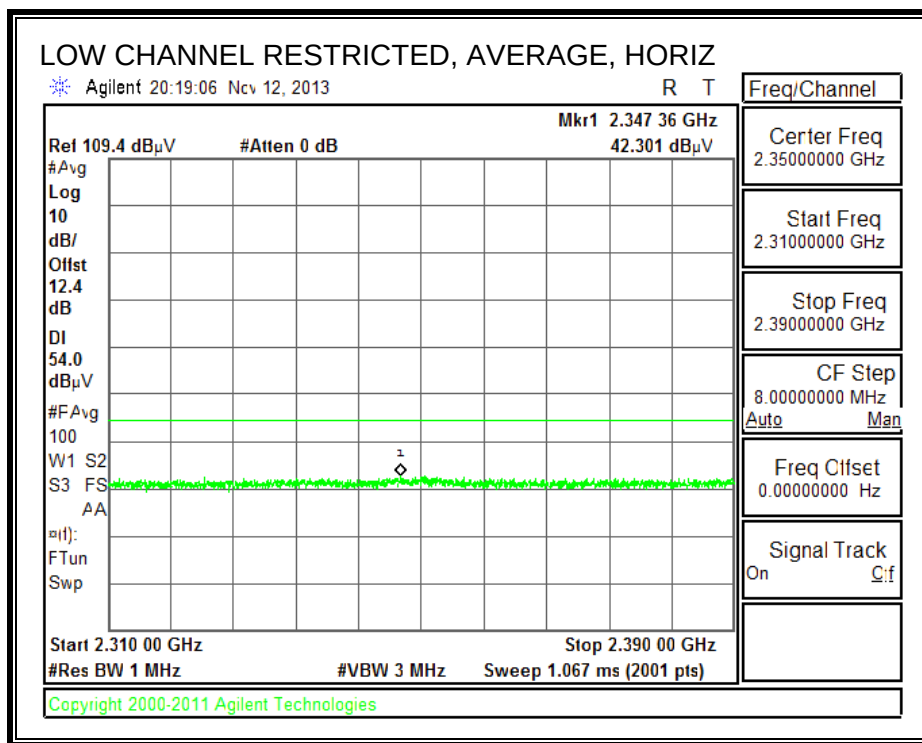
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

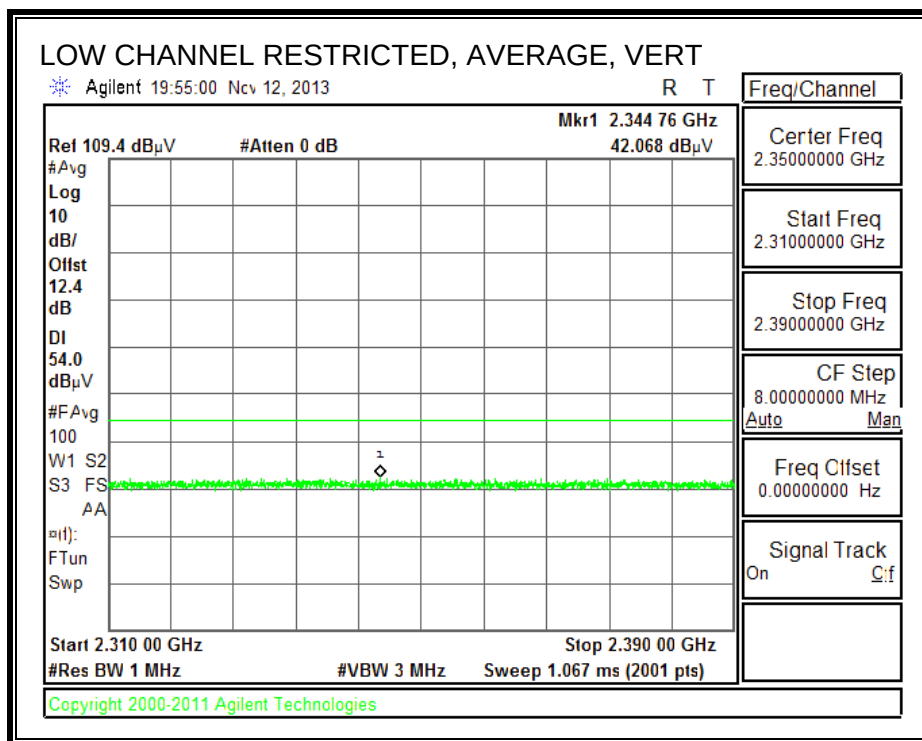
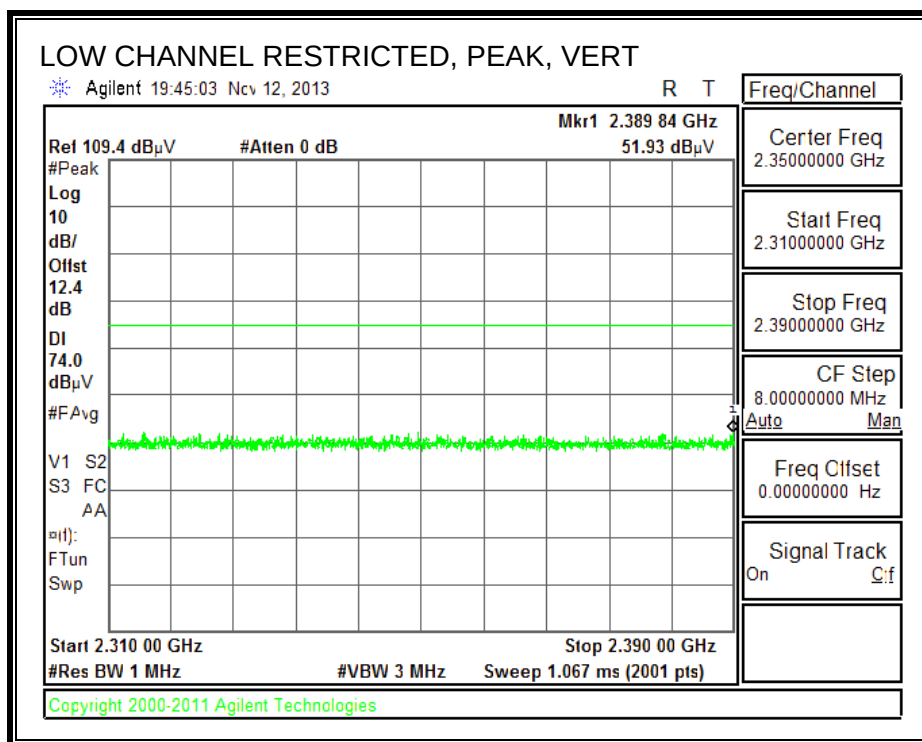
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

10.2. TRANSMITTER ABOVE 1 GHz

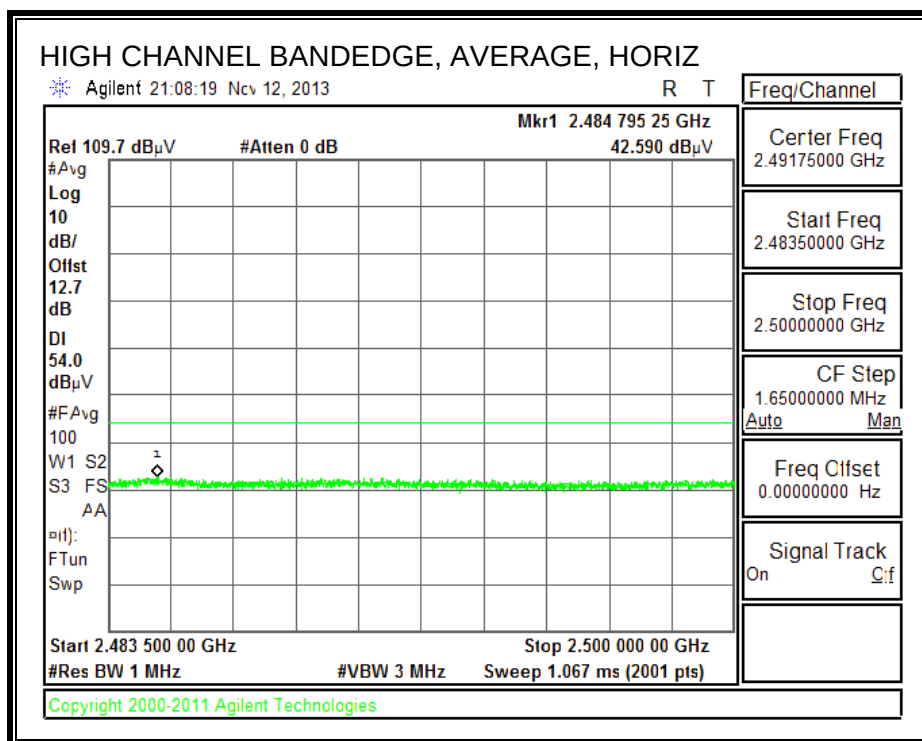
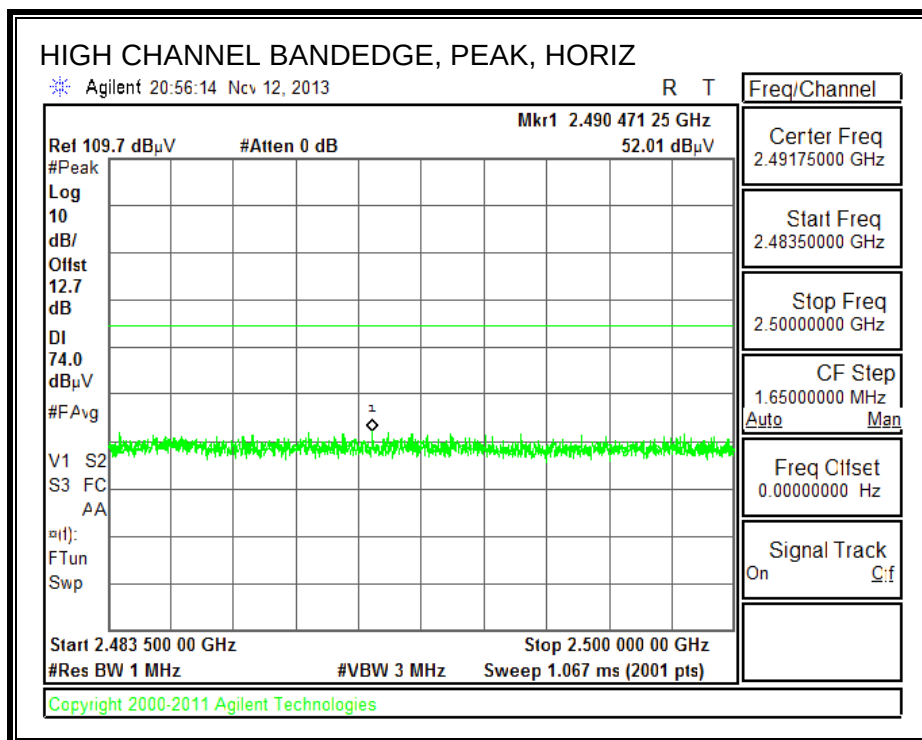
10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

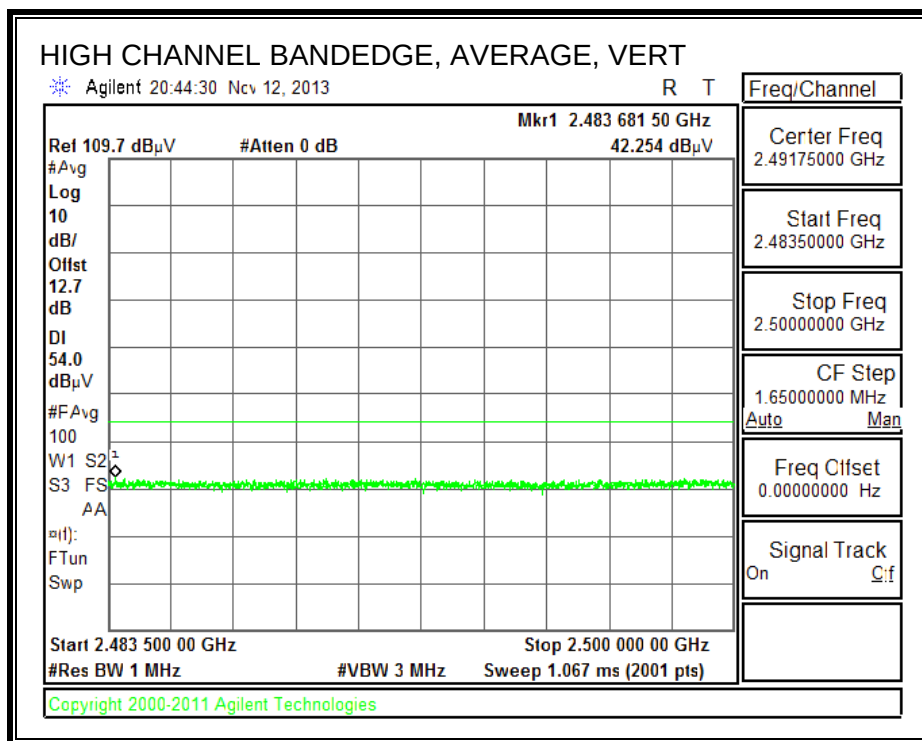
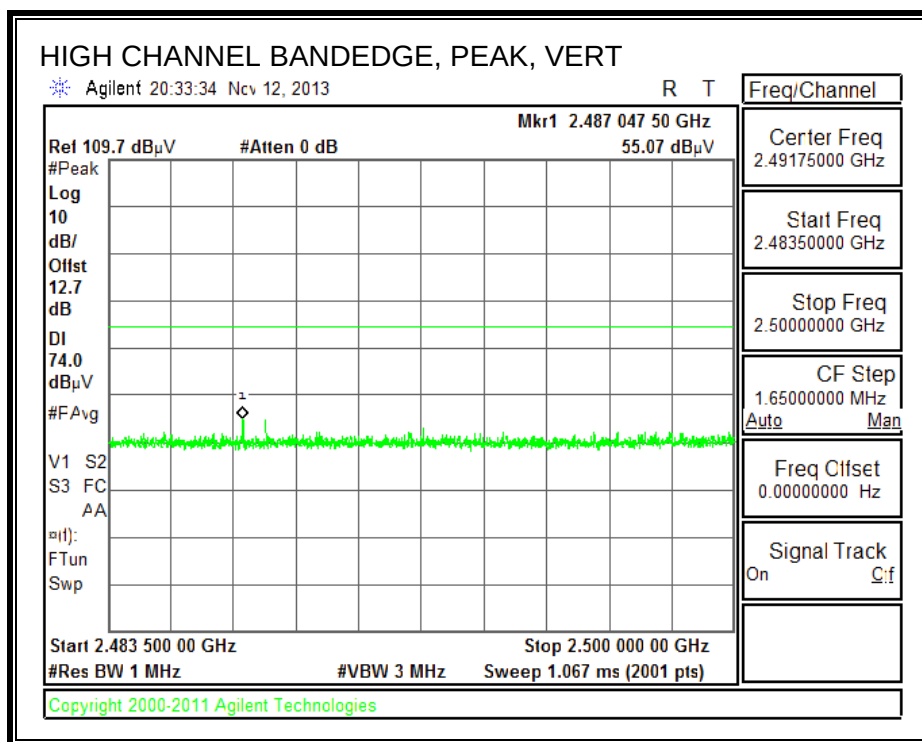






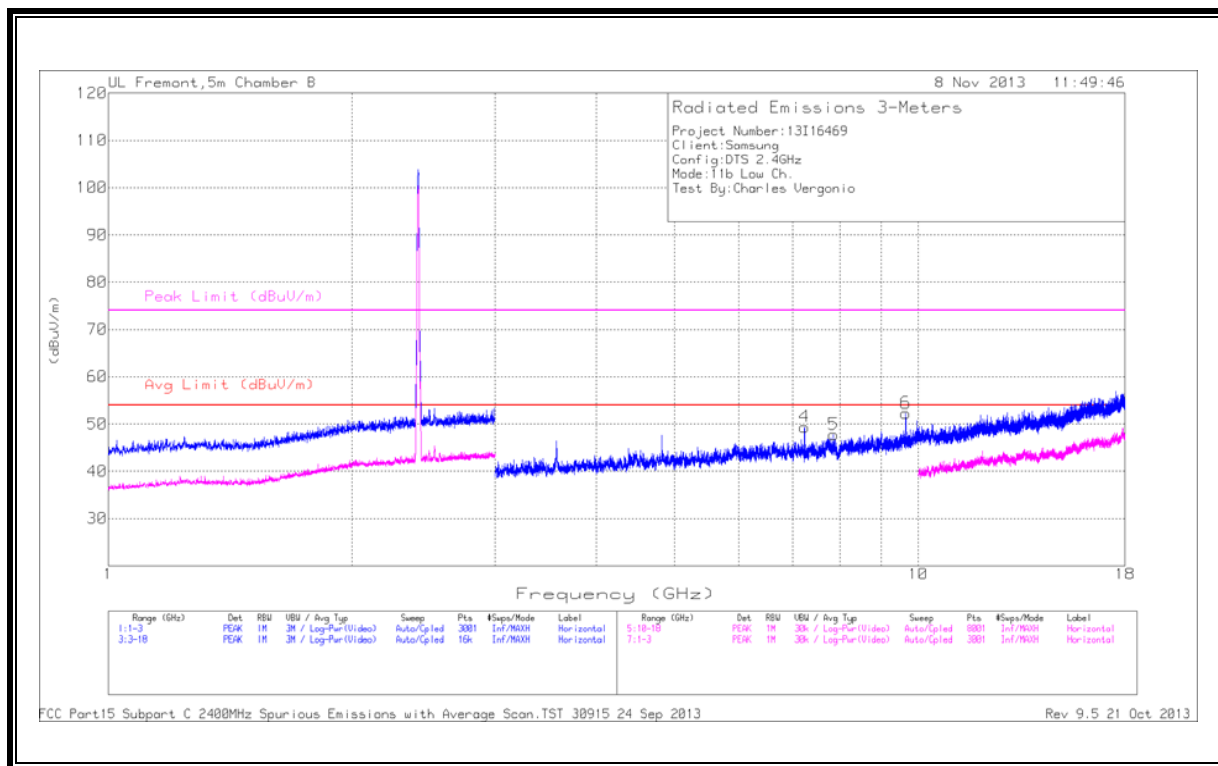
AUTHORIZED BANDEDGE (HIGH CHANNEL)



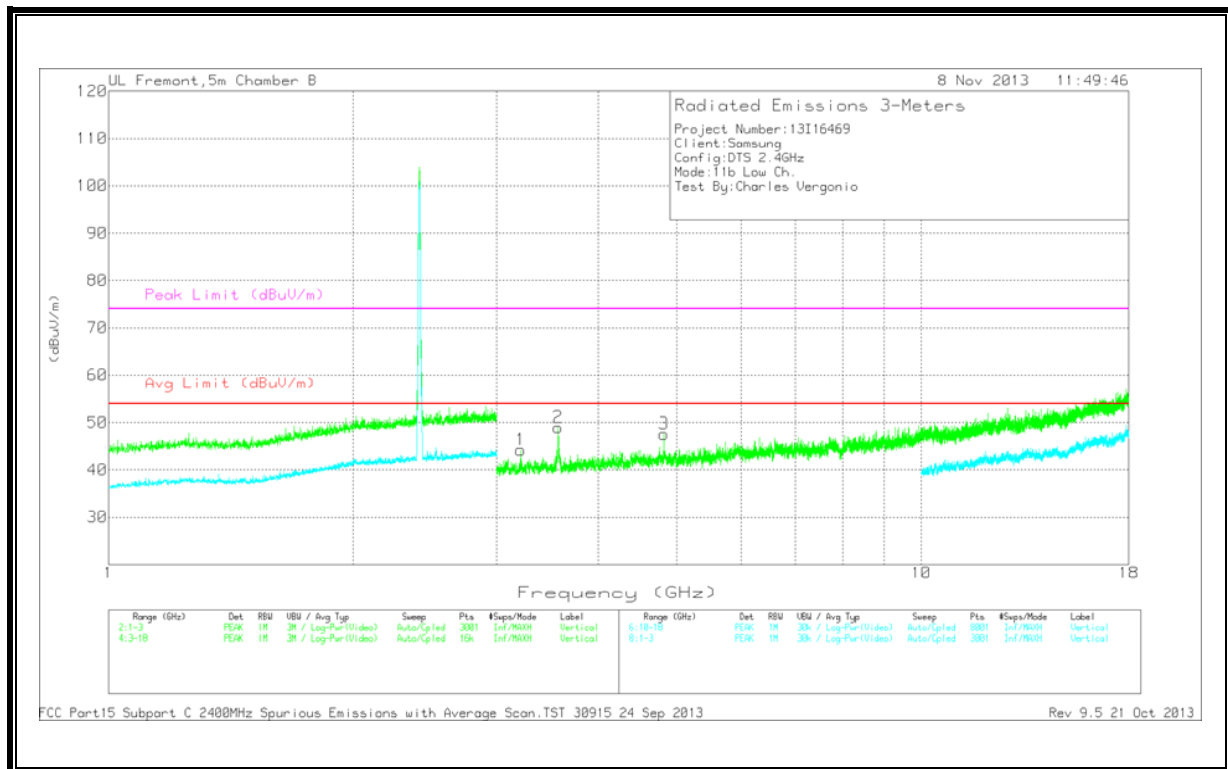


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL



LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.236	40.8	PK	35.8	-27.2	49.4	53.97	-4.57	74	-24.6	0-360	201	H
5	7.859	38.86	PK	36.2	-27.3	47.76	53.97	-6.21	74	-26.24	0-360	99	H
6	9.647	39.16	PK	37.4	-24.3	52.26	53.97	-1.71	74	-21.74	0-360	99	H
1	3.214	42.52	PK	33.3	-31.6	44.22	53.97	-9.75	74	-29.78	0-360	99	V
2	3.574	47.27	PK	33.4	-31.7	48.97	53.97	-5	74	-25.03	0-360	202	V
3	4.823	42.86	PK	34.7	-30	47.56	53.97	-6.41	74	-26.44	0-360	202	V

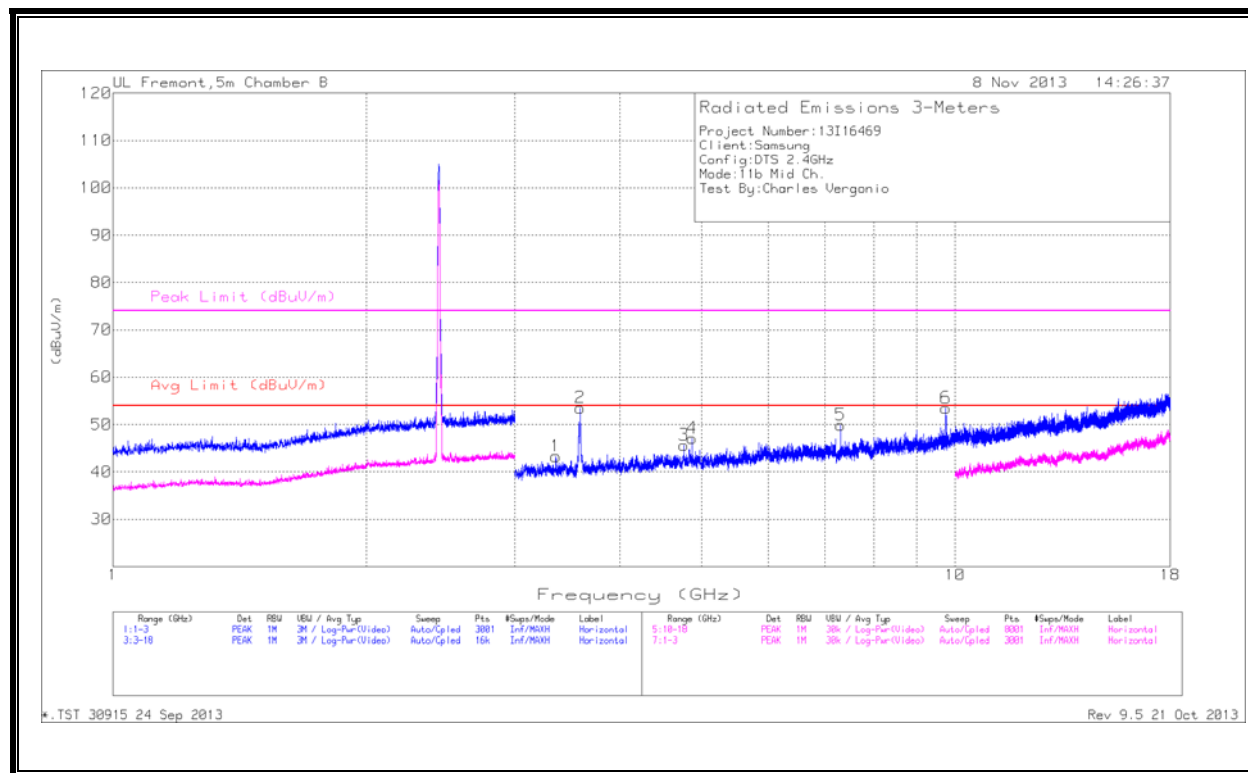
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.237	27.21	MAV1	35.8	-27.2	35.81	53.97	-18.16	74	-38.19	0	116	H
9.652	24.93	MAV1	37.4	-24.3	38.03	53.97	-15.94	74	-35.97	351	241	H
3.573	30.71	MAV1	33.4	-31.7	32.41	53.97	-21.56	74	-41.59	350	187	V

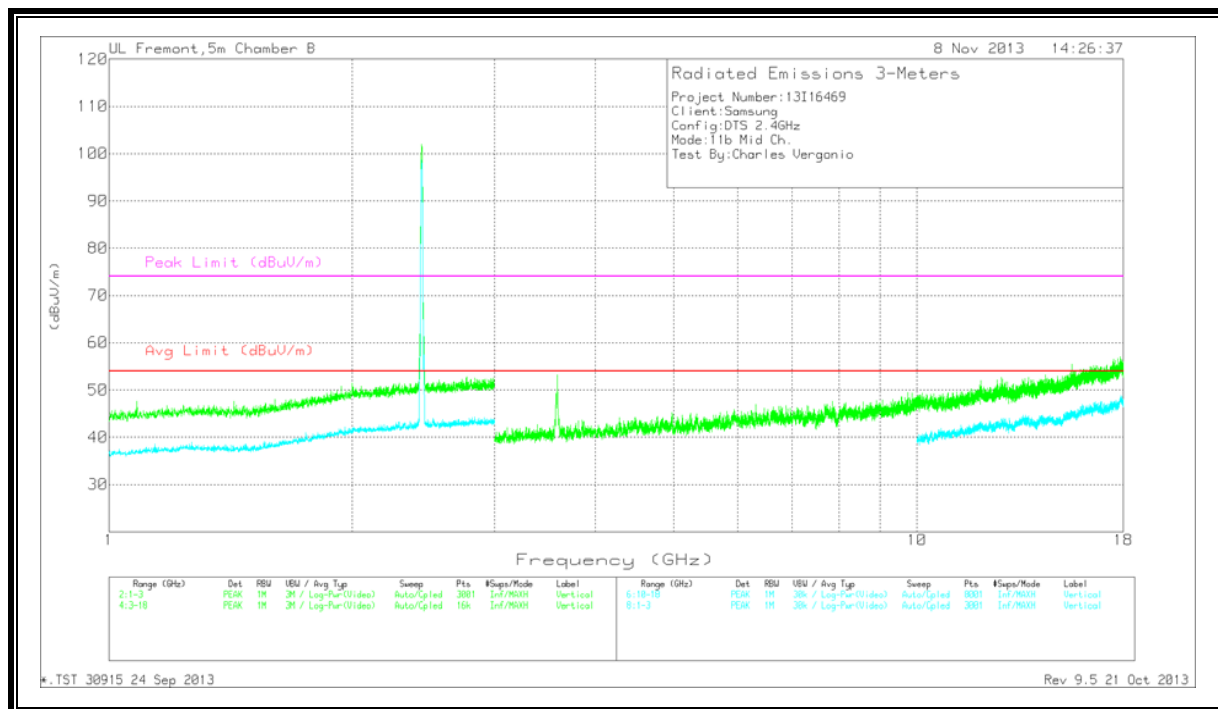
PK - Peak detector

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

MID CHANNEL
HORIZONTAL



VERTICAL



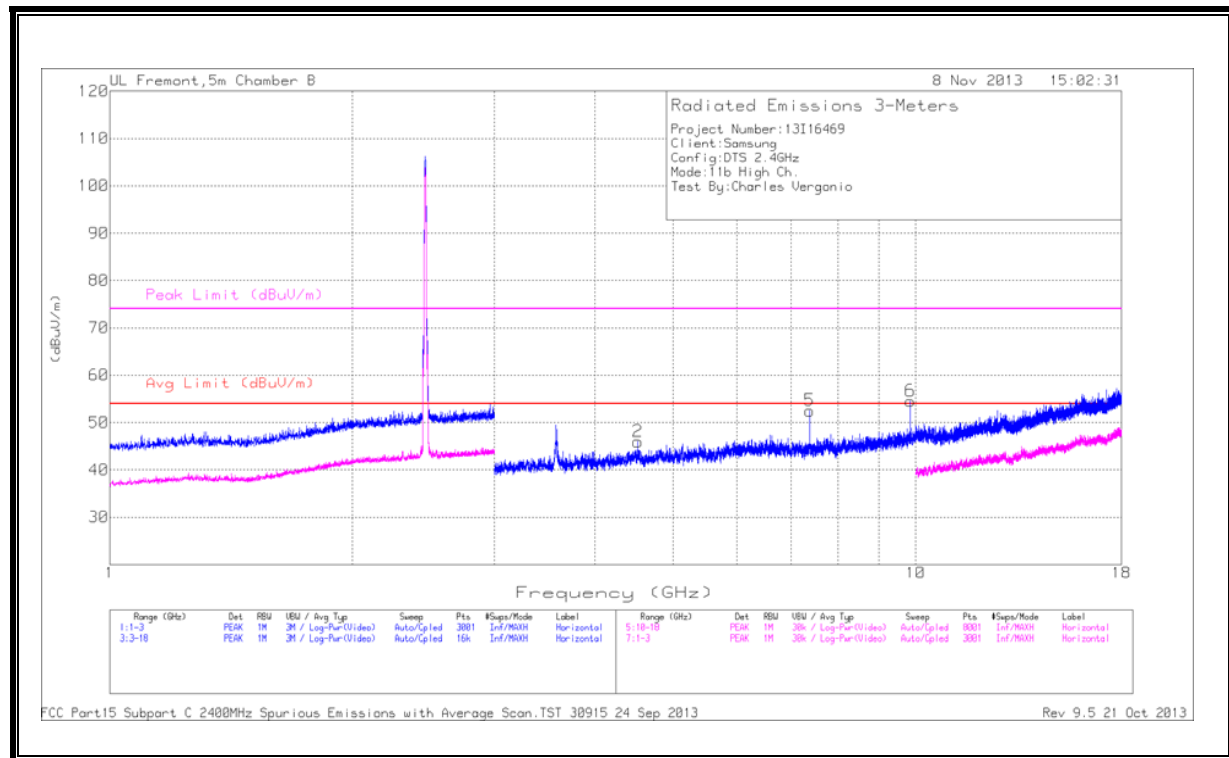
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.357	42.09	PK	33.3	-32.1	43.29	53.97	-10.68	74	-30.71	0-360	99	H
2	3.587	51.73	PK	33.4	-31.6	53.53	53.97	-.44	74	-20.47	0-360	201	H
3	4.762	40.41	PK	34.7	-29.5	45.61	53.97	-8.36	74	-28.39	0-360	201	H
4	4.874	43.37	PK	34.7	-31	47.07	53.97	-6.9	74	-26.93	0-360	99	H
5	7.31	42.17	PK	35.8	-28.1	49.87	53.97	-4.1	74	-24.13	0-360	99	H
6	9.748	40.05	PK	37.5	-24.1	53.45	53.97	-.52	74	-20.55	0-360	99	H

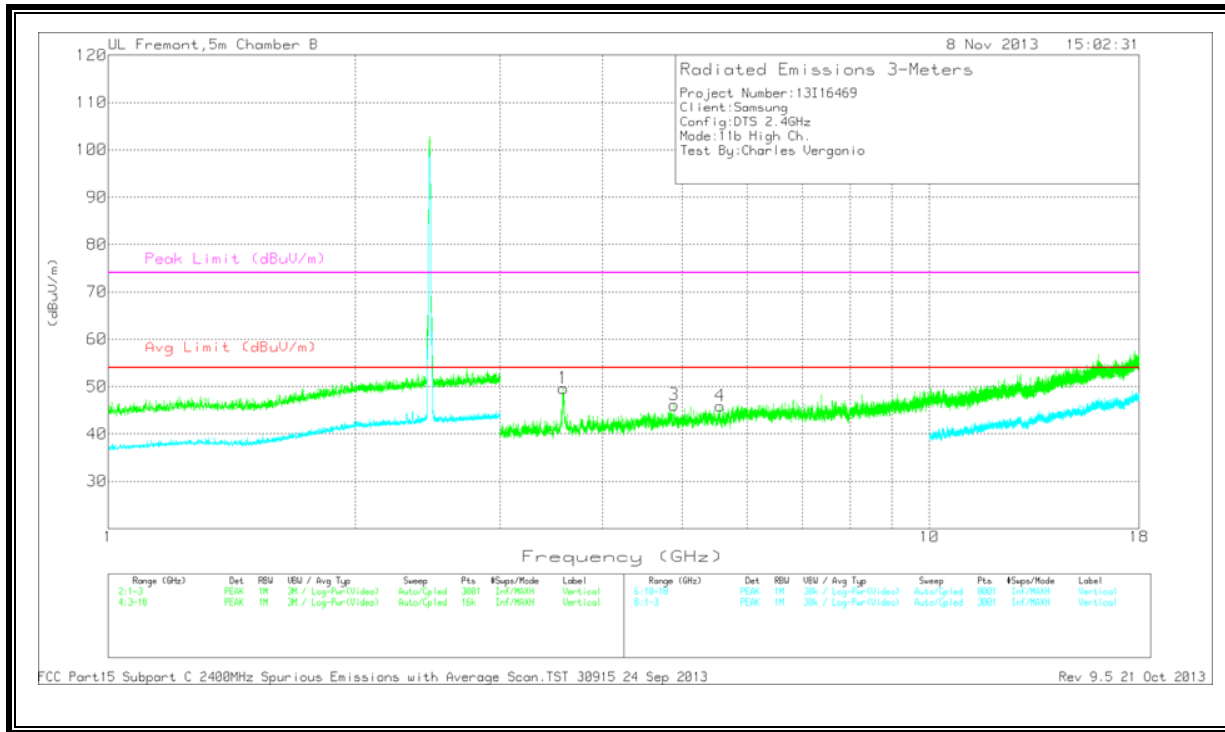
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.585	45.36	MAv1	33.4	-31.7	47.06	53.97	-6.91	74	-26.94	307	119	H
7.31	36.15	MAv1	35.8	-28.1	43.85	53.97	-10.12	74	-30.15	157	179	H
9.748	30.48	MAv1	37.5	-24.1	43.88	53.97	-10.09	74	-30.12	3	343	H

HIGH CHANNEL
HORIZONTAL



VERTICAL



HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	4.52	40.67	PK	34.5	-29.2	45.97	53.97	-8	74	-28.03	0-360	99	H
5	7.387	43.98	PK	35.9	-27.4	52.48	53.97	-1.49	74	-21.52	0-360	201	H
6	9.848	41.03	PK	37.6	-24.1	54.53			74	-19.47	0-360	201	H
1	3.583	47.5	PK	33.4	-31.3	49.6	53.97	-4.37	74	-24.4	0-360	99	V
3	4.89	42.12	PK	34.6	-30.6	46.12	53.97	-7.85	74	-27.88	0-360	99	V
4	5.564	40.31	PK	35	-29.4	45.91	53.97	-8.06	74	-28.09	0-360	202	V

Radiated Emissions

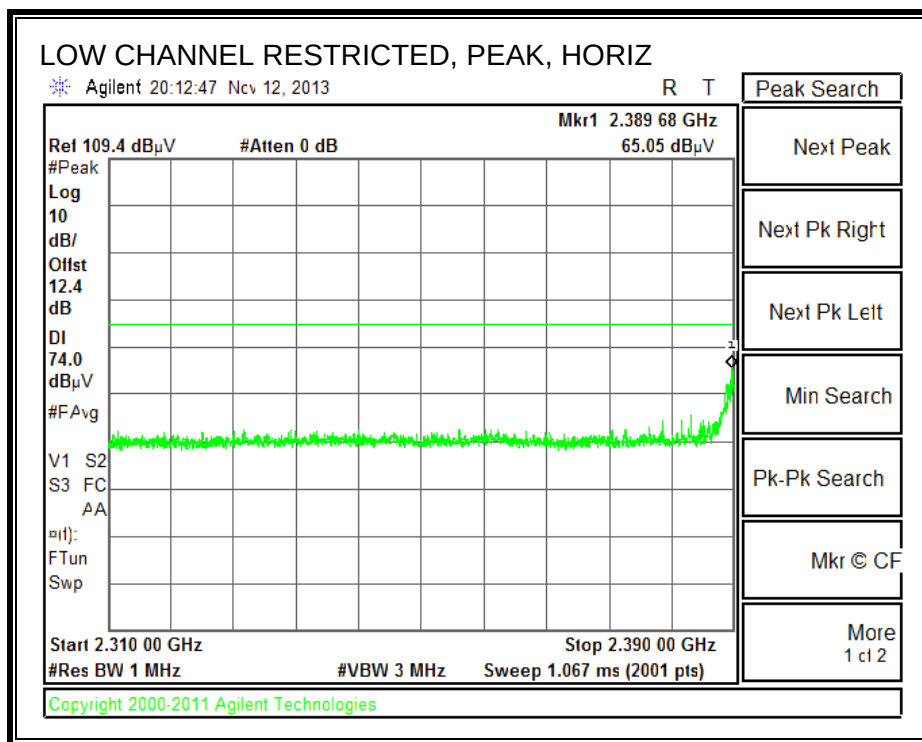
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.385	40.46	MAv1	35.9	-27.4	48.96	53.97	-5.01	74	-25.04	130	146	H
9.848	39.13	MAv1	37.6	-24.1	52.63	53.97	-1.34	74	-21.37	198	172	H
3.587	39.11	MAv1	33.4	-31.2	41.31	53.97	-12.66	74	-32.69	255	192	V

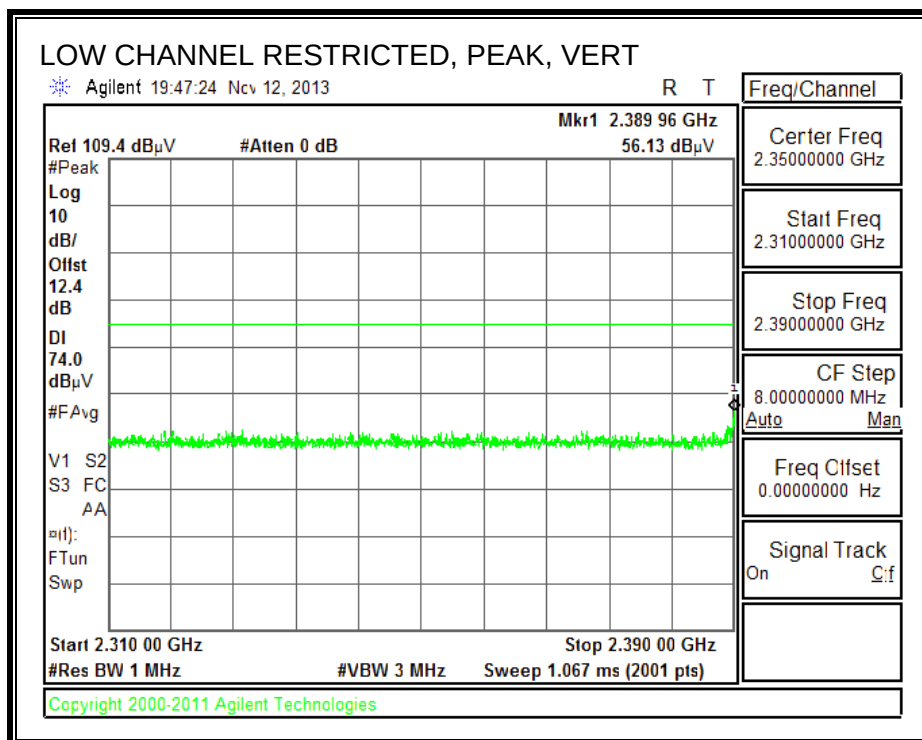
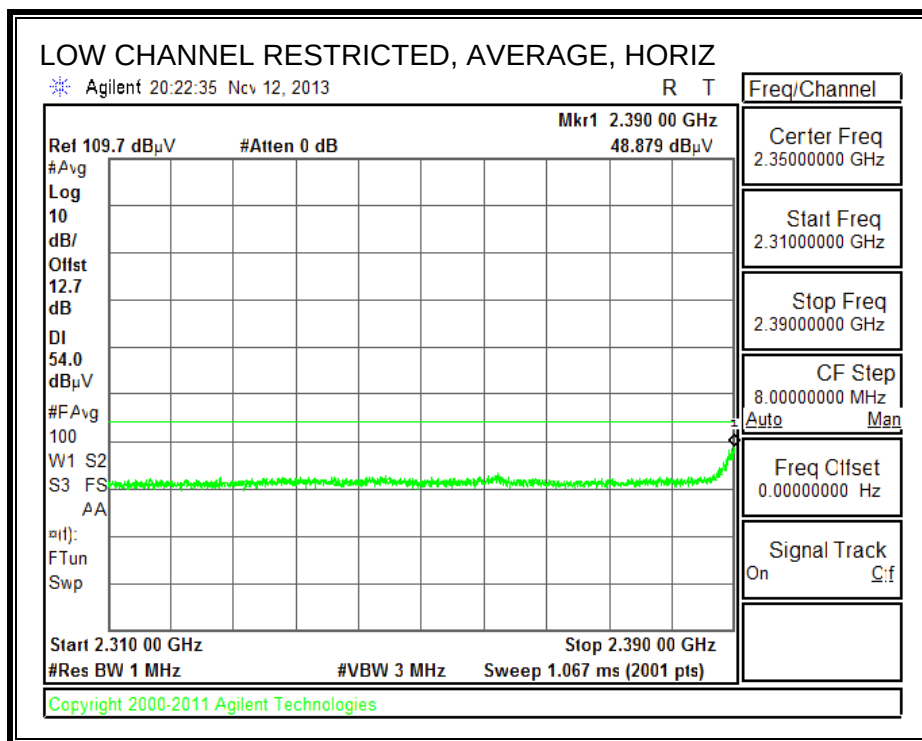
PK - Peak detector

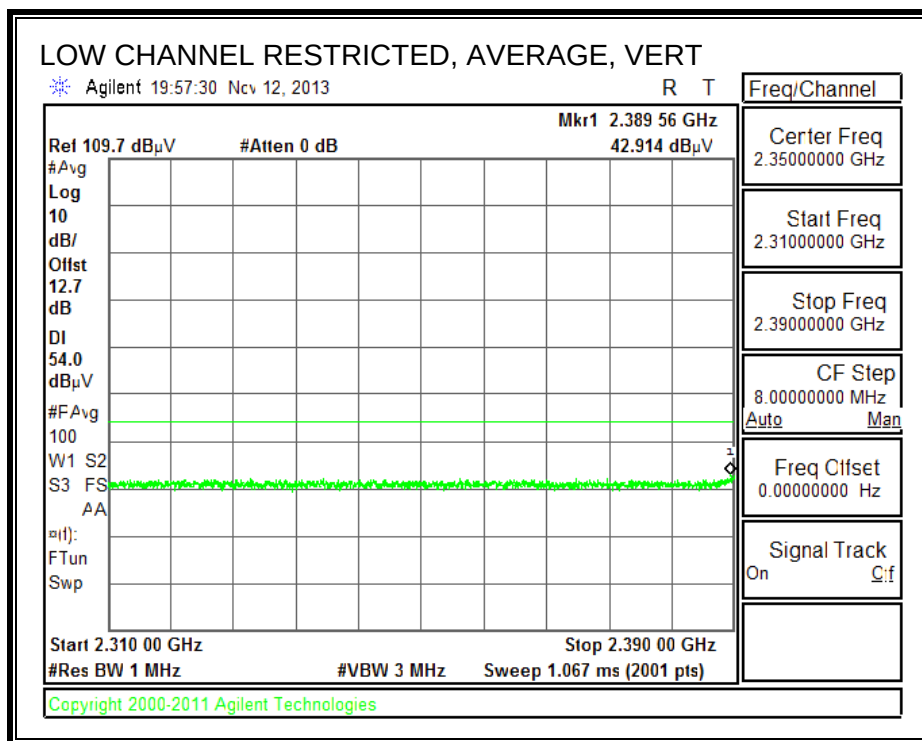
10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

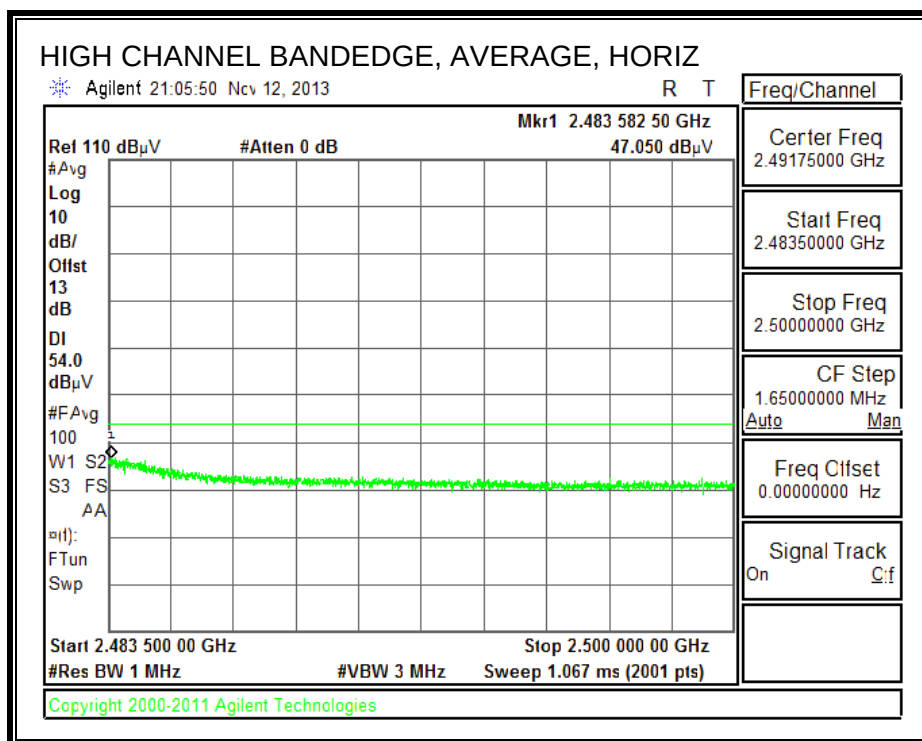
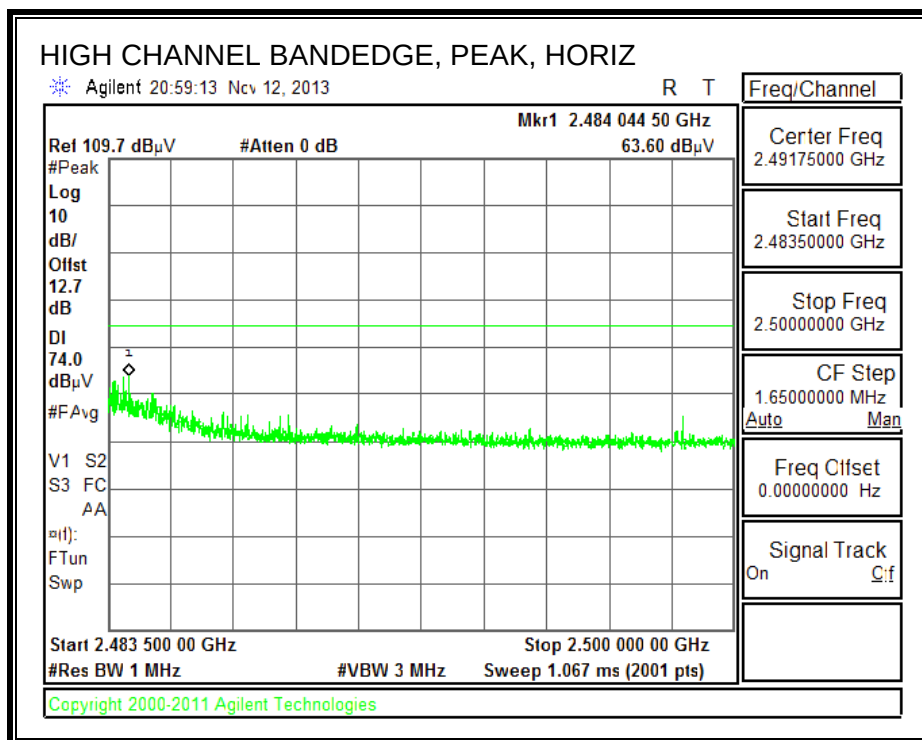
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

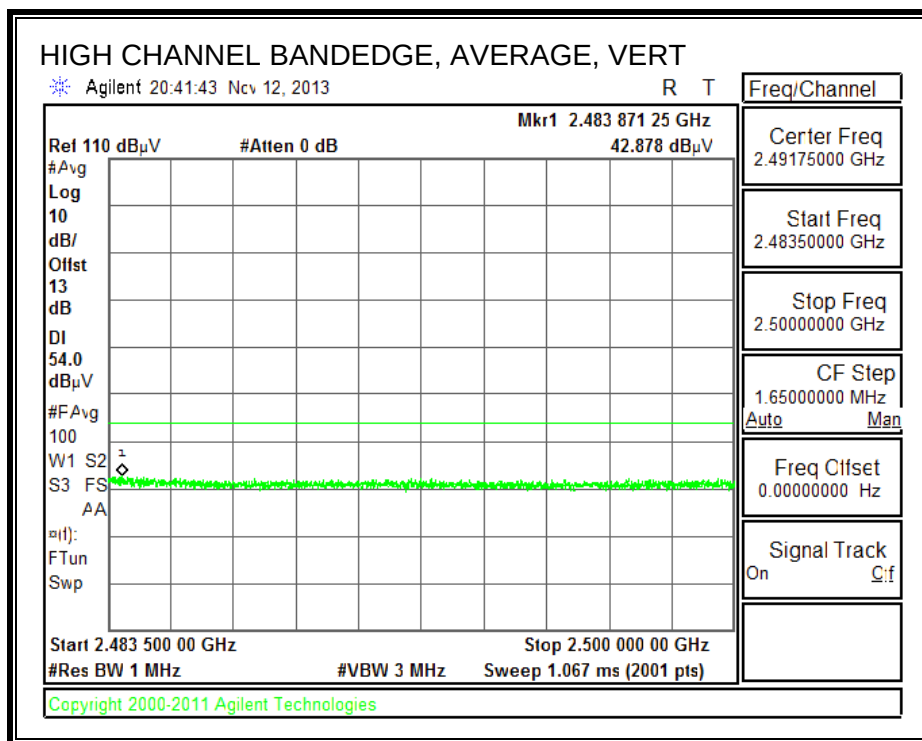
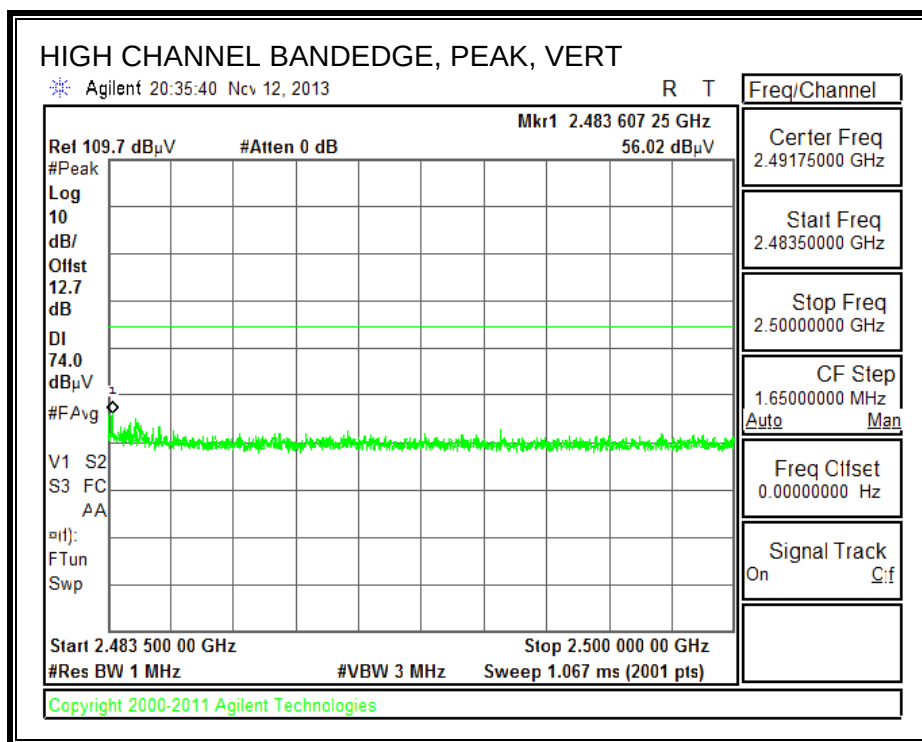






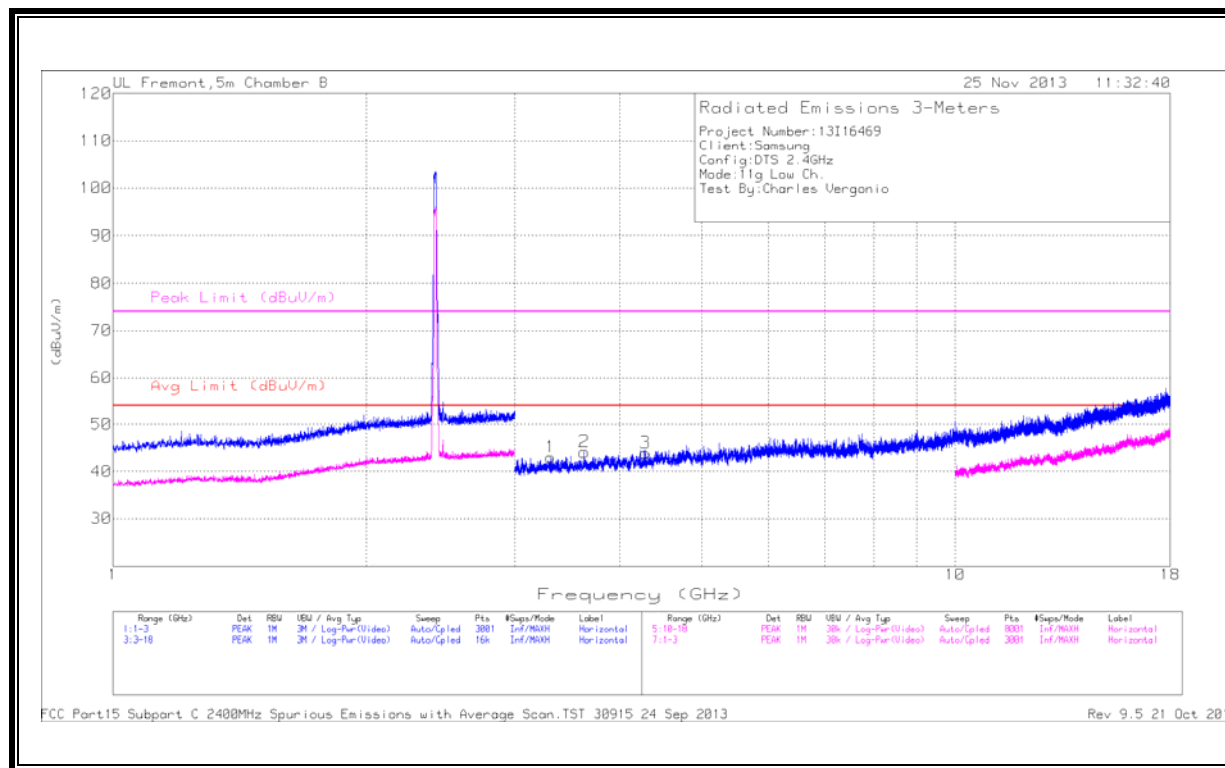
AUTHORIZED BANDEDGE (HIGH CHANNEL)



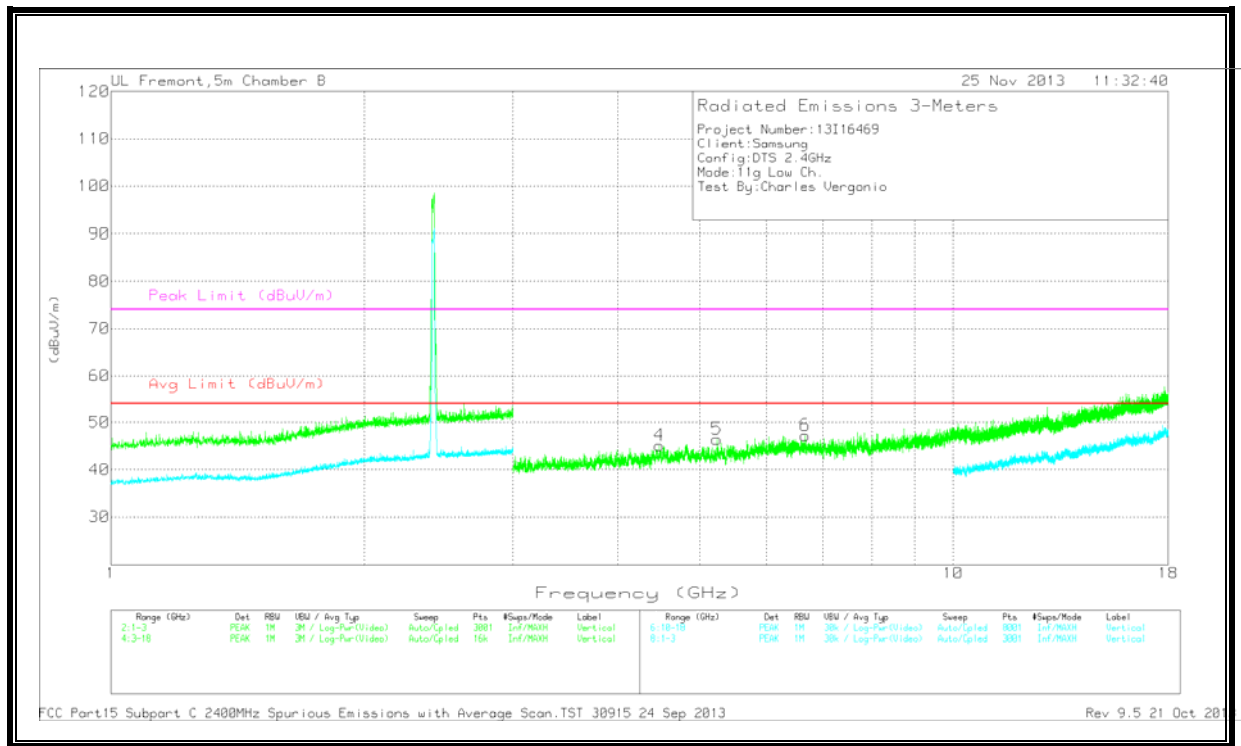


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL

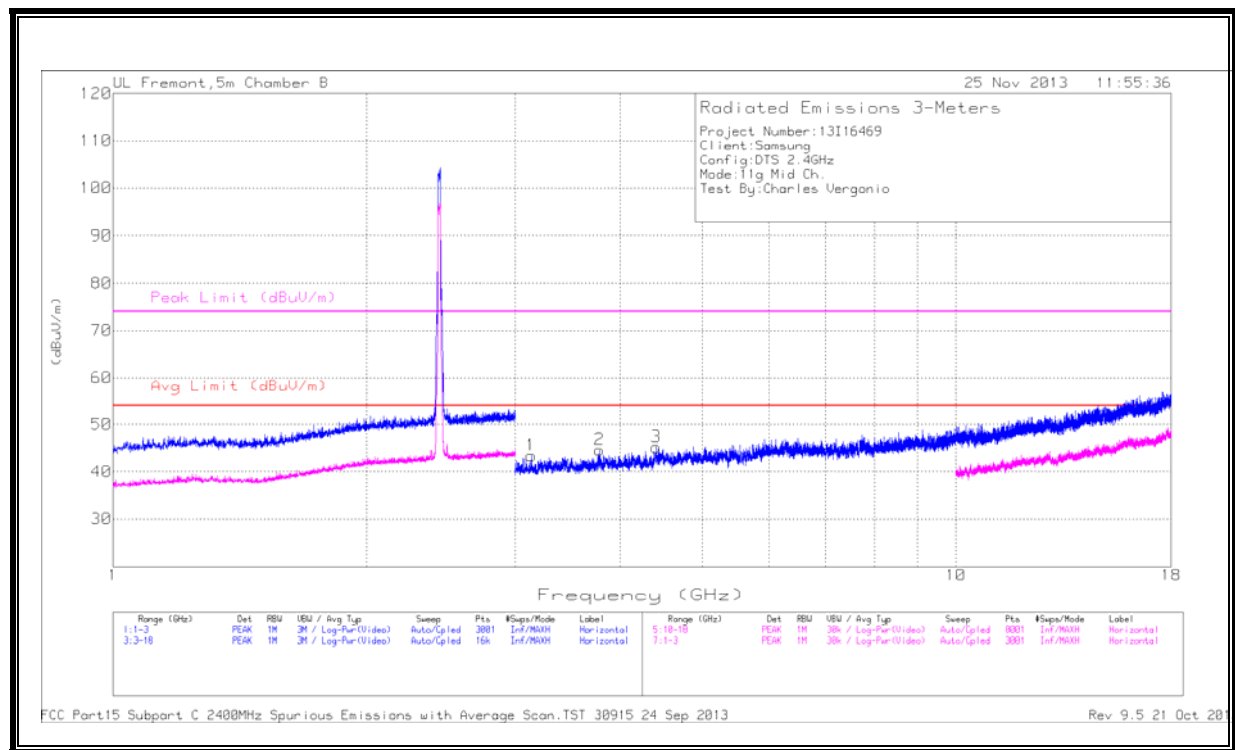


LOW CHANNEL DATA

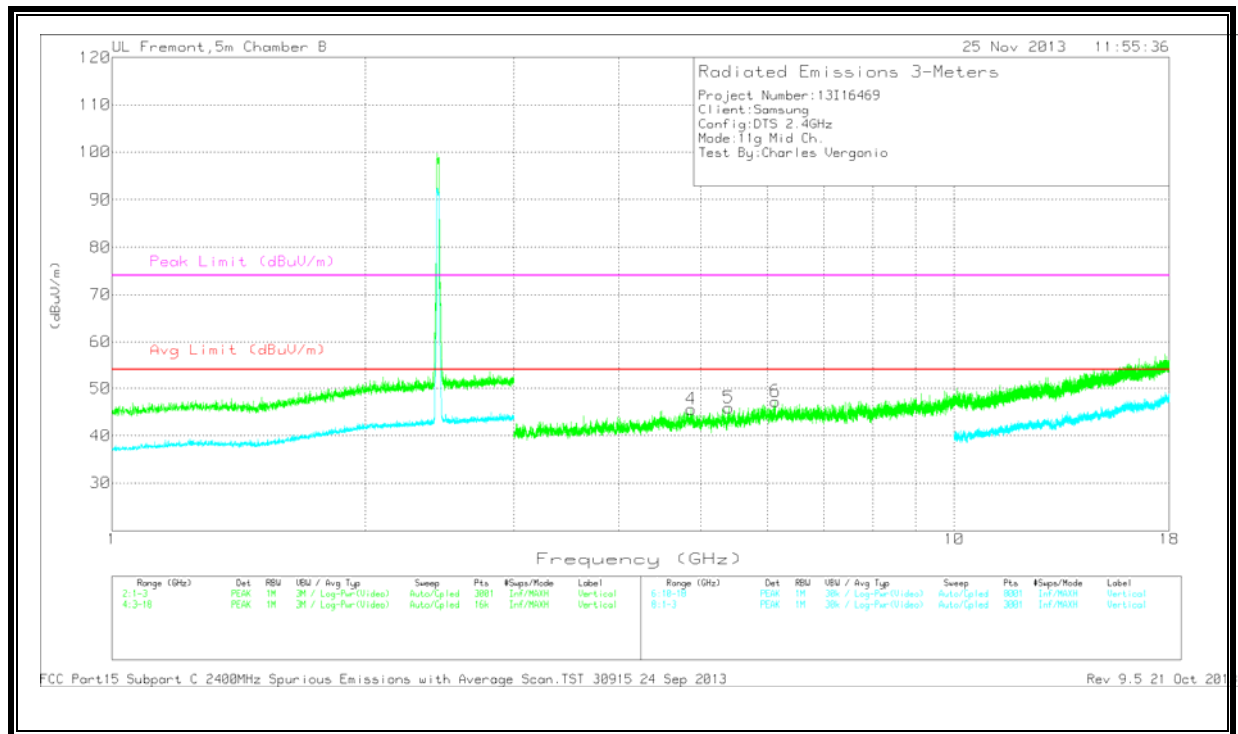
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.31	41.12	PK	33.3	-31.4	43.02	53.97	-10.95	74	-30.98	0-360	201	H
2	3.627	41.82	PK	33.5	-31.2	44.12	53.97	-9.85	74	-29.88	0-360	201	H
3	4.286	40.71	PK	34.2	-31	43.91	53.97	-10.06	74	-30.09	0-360	201	H
4	4.477	39.7	PK	34.5	-29.1	45.1	53.97	-8.87	74	-28.9	0-360	99	V
5	5.242	41.43	PK	34.9	-29.9	46.43	53.97	-7.54	74	-27.57	0-360	202	V
6	6.671	40.41	PK	35.8	-29	47.21	53.97	-6.76	74	-26.79	0-360	99	V

PK - Peak detector

MID CHANNEL
HORIZONTAL



VERTICAL

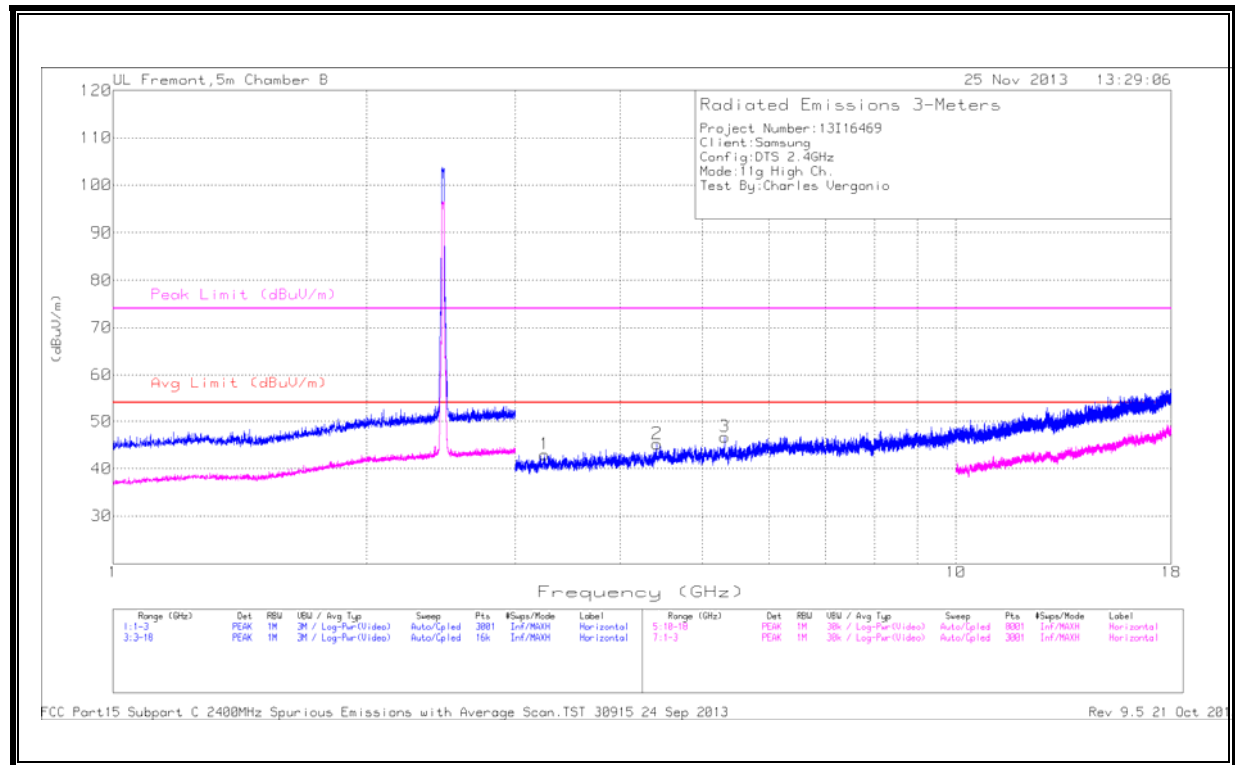


MID CHANNEL DATA

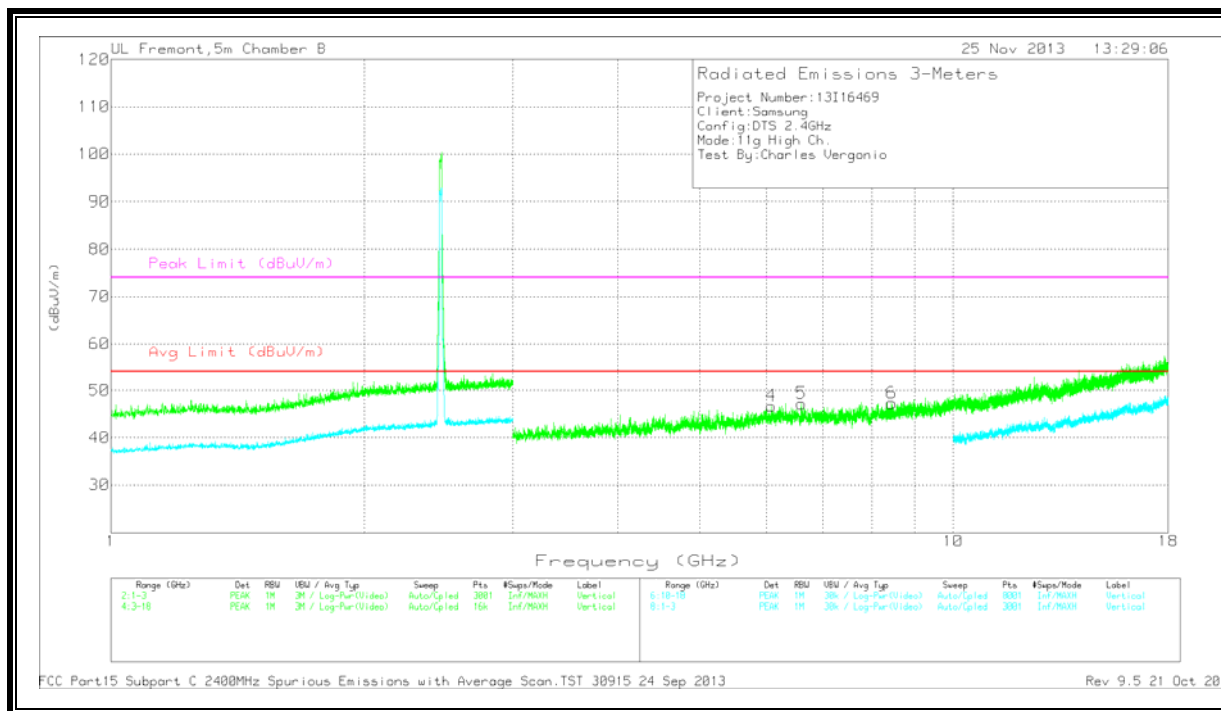
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.134	41.61	PK	33.2	-31.4	43.41	53.97	-10.56	74	-30.59	0-360	201	H
2	3.777	41.89	PK	33.8	-31.1	44.59	53.97	-9.38	74	-29.41	0-360	99	H
3	4.408	40.47	PK	34.4	-29.7	45.17	53.97	-8.8	74	-28.83	0-360	201	H
4	4.872	41.48	PK	34.7	-30.6	45.58	53.97	-8.39	74	-28.42	0-360	202	V
5	5.397	39.71	PK	34.9	-28.7	45.91	53.97	-8.06	74	-28.09	0-360	99	V
6	6.136	40.32	PK	36	-29.1	47.22	53.97	-6.75	74	-26.78	0-360	202	V

PK - Peak detector

HIGH CHANNEL
HORIZONTAL



VERTICAL



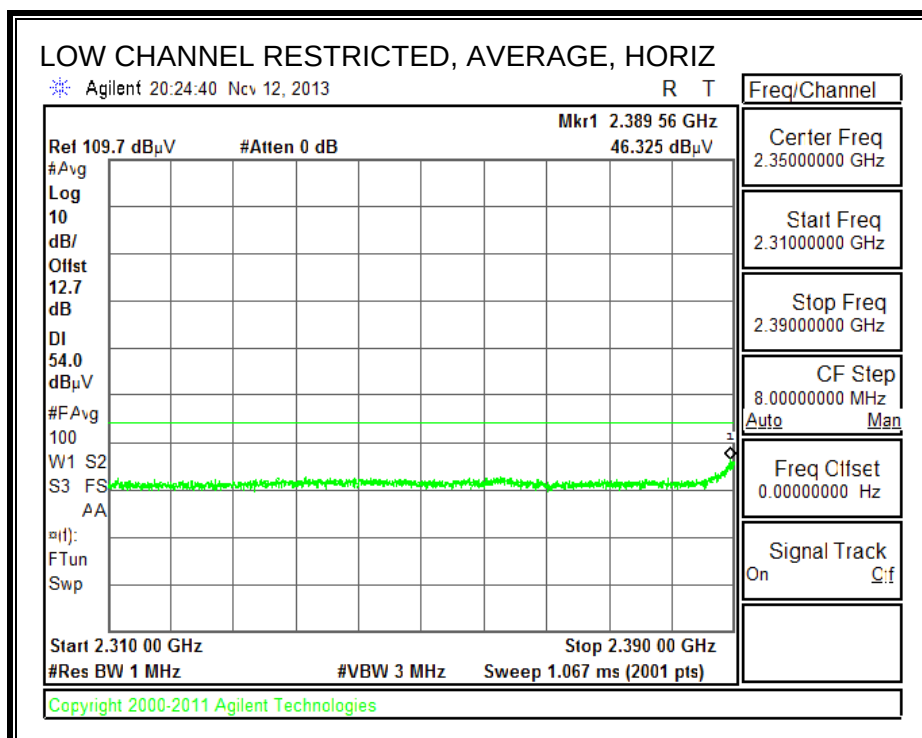
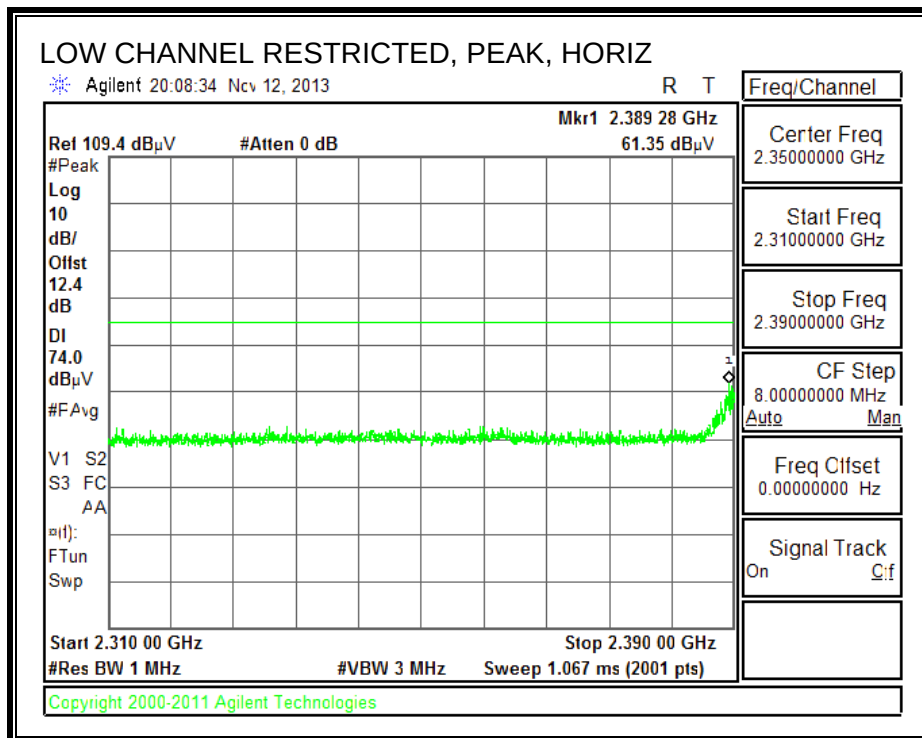
HIGH CHANNEL DATA

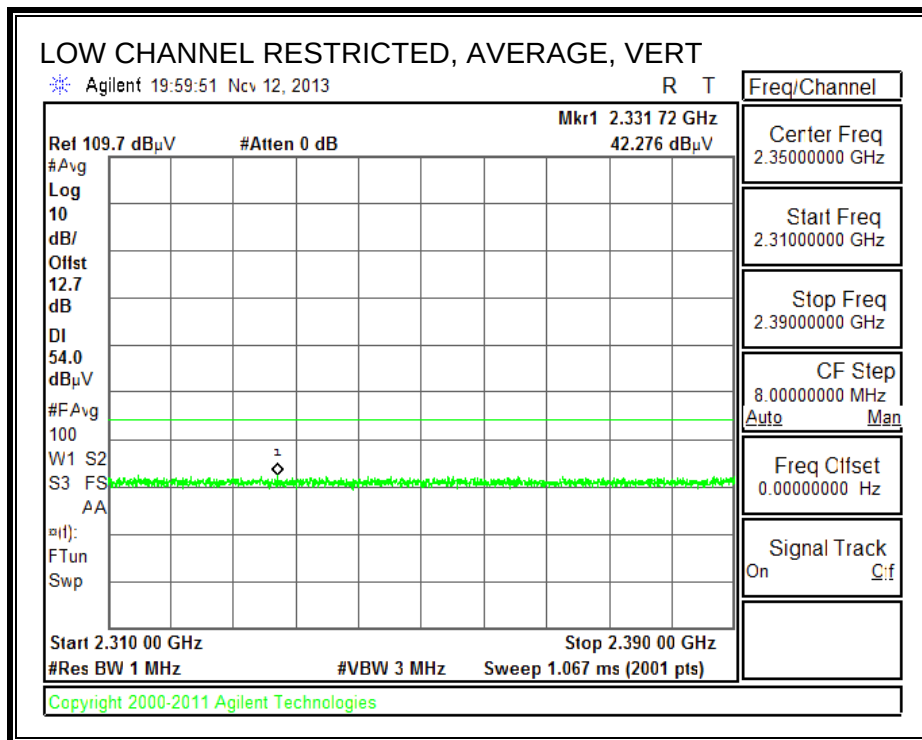
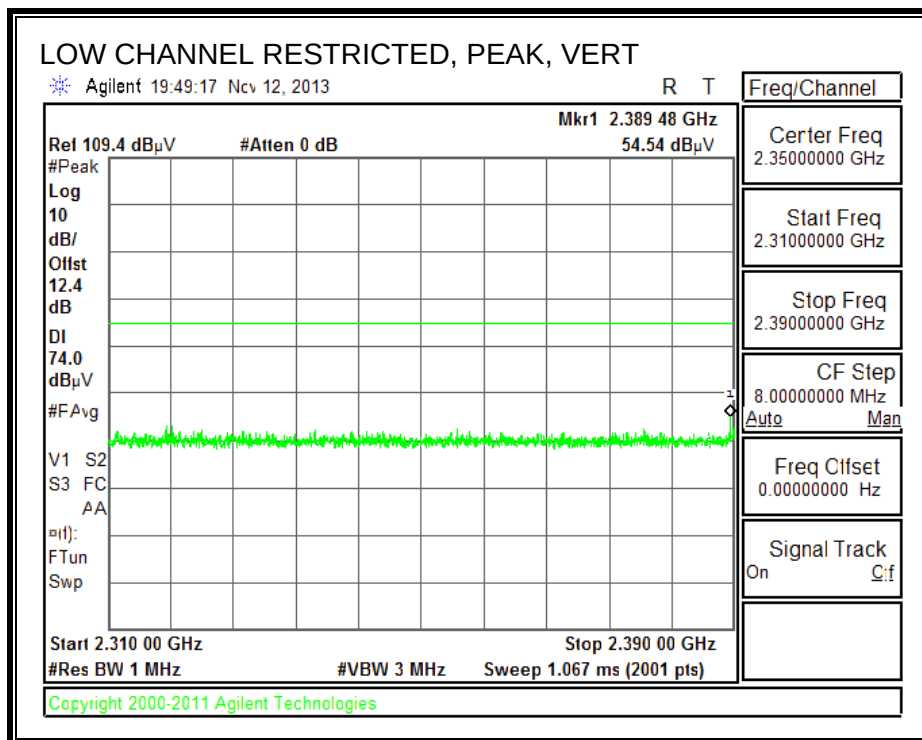
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.251	40.61	PK	33.3	-30.9	43.01	53.97	-10.96	74	-30.99	0-360	201	H
2	4.419	40.32	PK	34.4	-29.5	45.22	53.97	-8.75	74	-28.78	0-360	201	H
3	5.32	40.62	PK	34.9	-28.8	46.72	53.97	-7.25	74	-27.28	0-360	99	H
4	6.082	39.91	PK	35.9	-29.1	46.71	53.97	-7.26	74	-27.29	0-360	99	V
5	6.604	38.89	PK	35.9	-27.6	47.19	53.97	-6.78	74	-26.81	0-360	202	V
6	8.45	36.79	PK	36.2	-25.7	47.29	53.97	-6.68	74	-26.71	0-360	99	V

PK - Peak detector

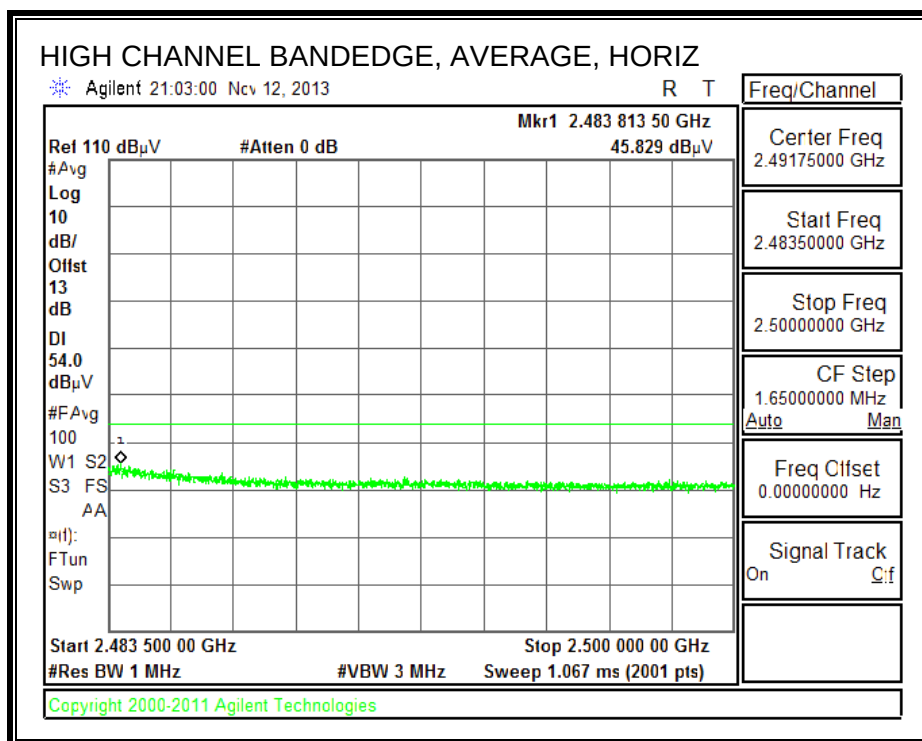
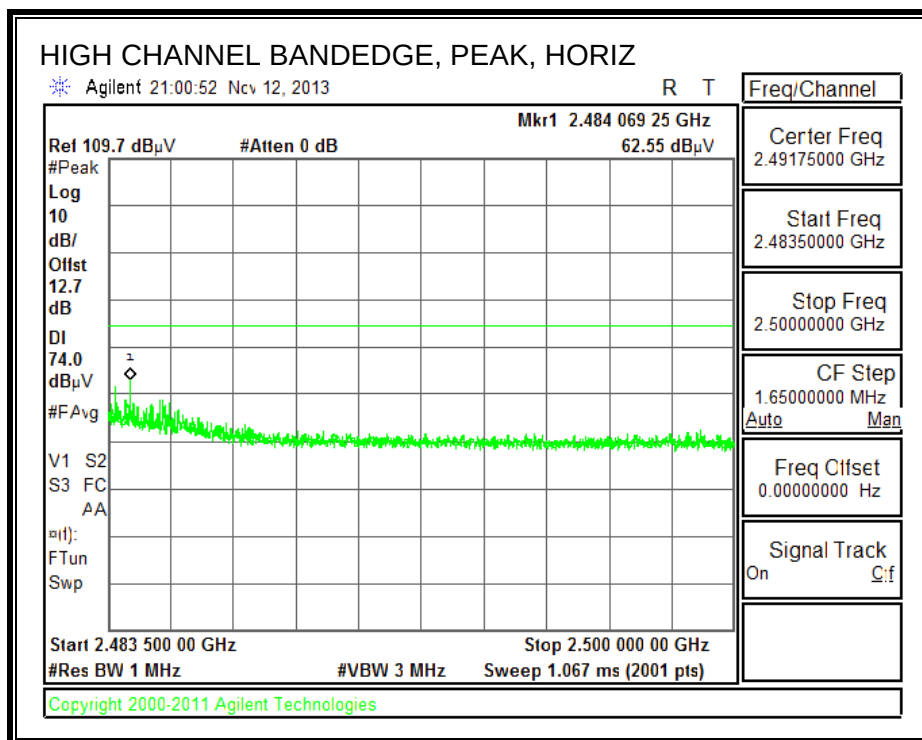
10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

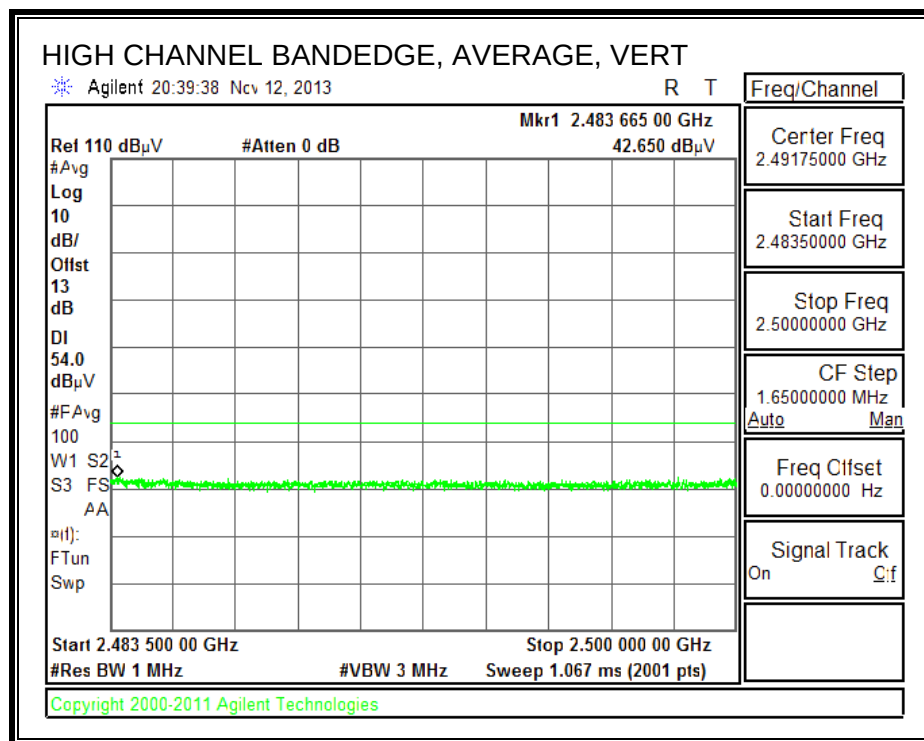
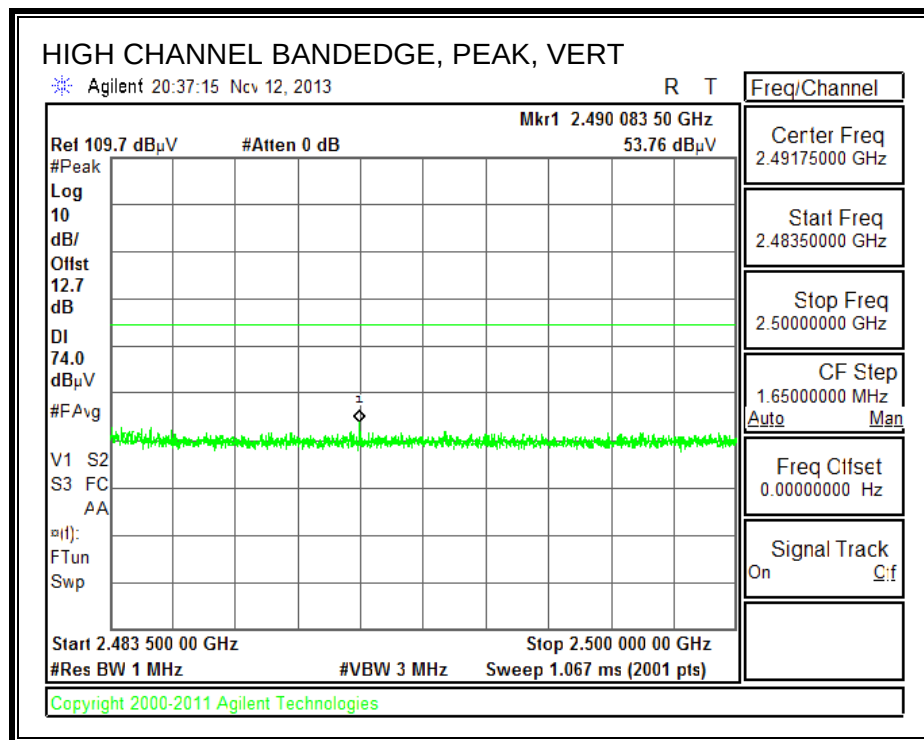
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.





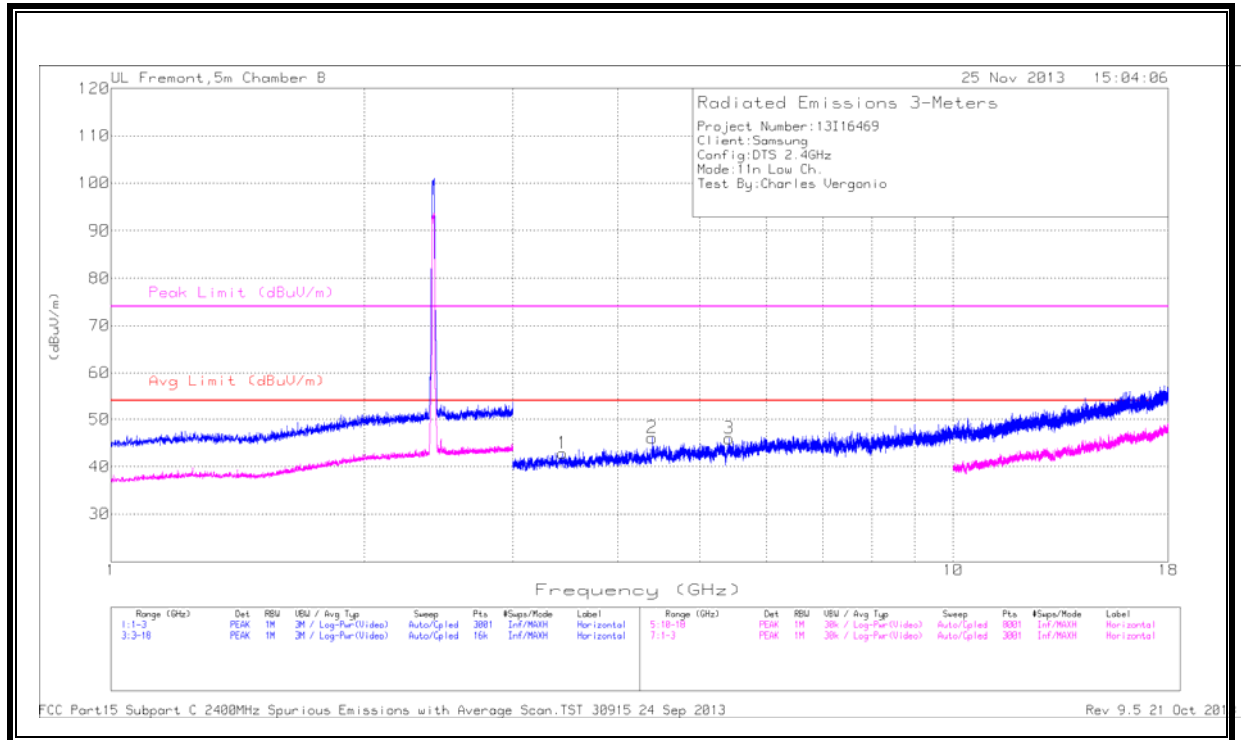
AUTHORIZED BANDEDGE (HIGH CHANNEL)



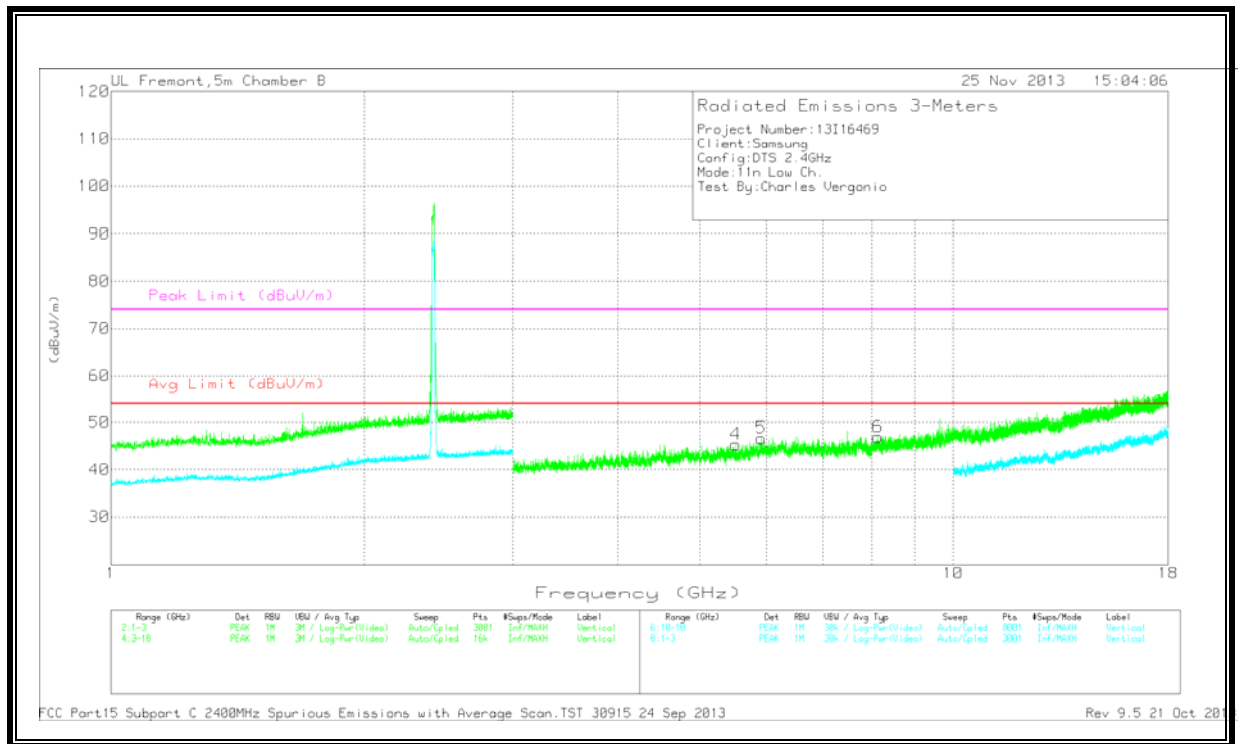


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
HORIZONTAL



VERTICAL

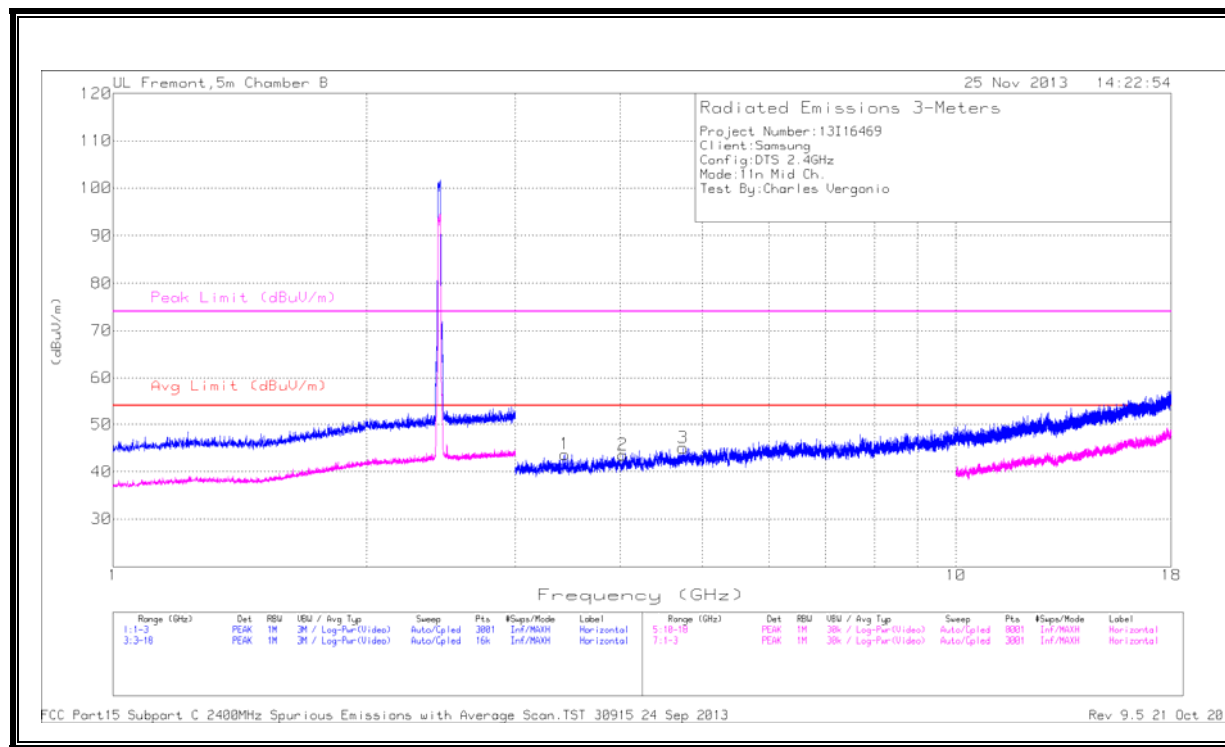


LOW CHANNEL DATA

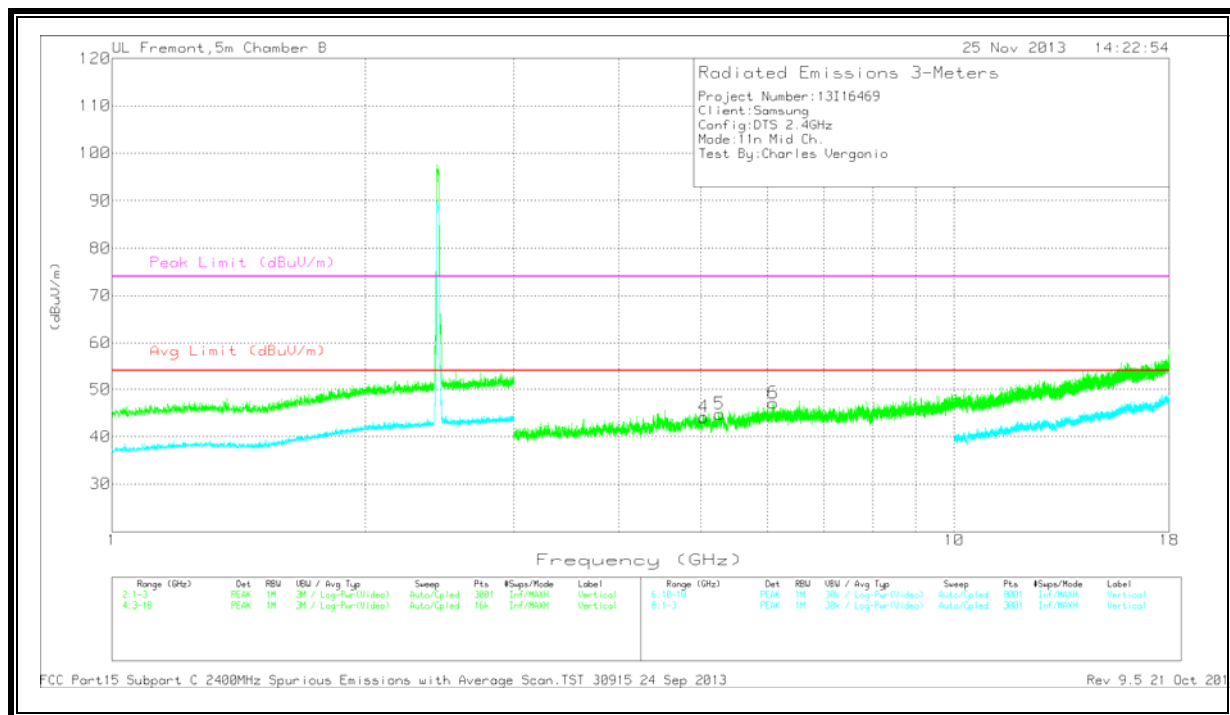
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.436	40.75	PK	33.2	-31.1	42.85	53.97	-11.12	74	-31.15	0-360	99	H
2	4.392	41.91	PK	34.3	-30.1	46.11	53.97	-7.86	74	-27.89	0-360	201	H
3	5.421	40.17	PK	34.9	-29.1	45.97	53.97	-8	74	-28.03	0-360	201	H
4	5.52	40.52	PK	34.9	-30.1	45.32	53.97	-8.65	74	-28.68	0-360	99	V
5	5.915	39.36	PK	35.7	-28.4	46.66	53.97	-7.31	74	-27.34	0-360	99	V
6	8.138	37.19	PK	36.1	-26.4	46.89	53.97	-7.08	74	-27.11	0-360	99	V

PK - Peak detector

MID CHANNEL
HORIZONTAL



VERTICAL

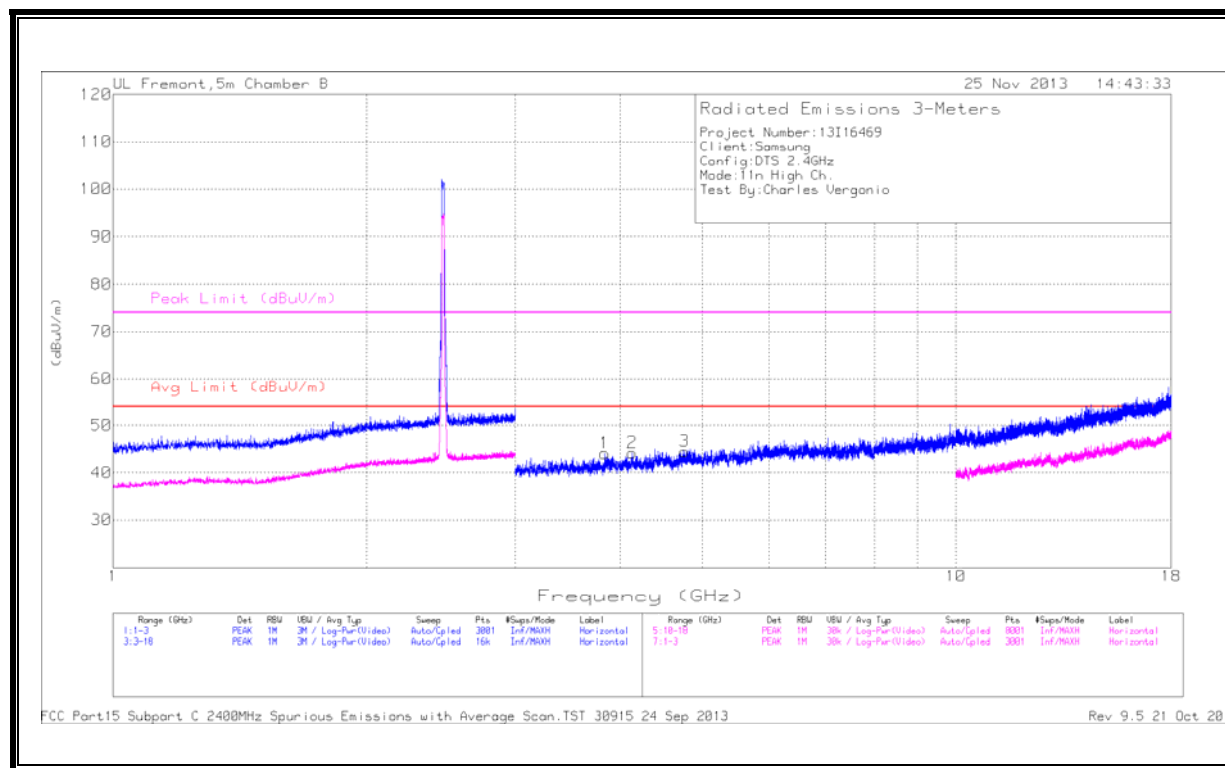


MID CHANNEL DATA

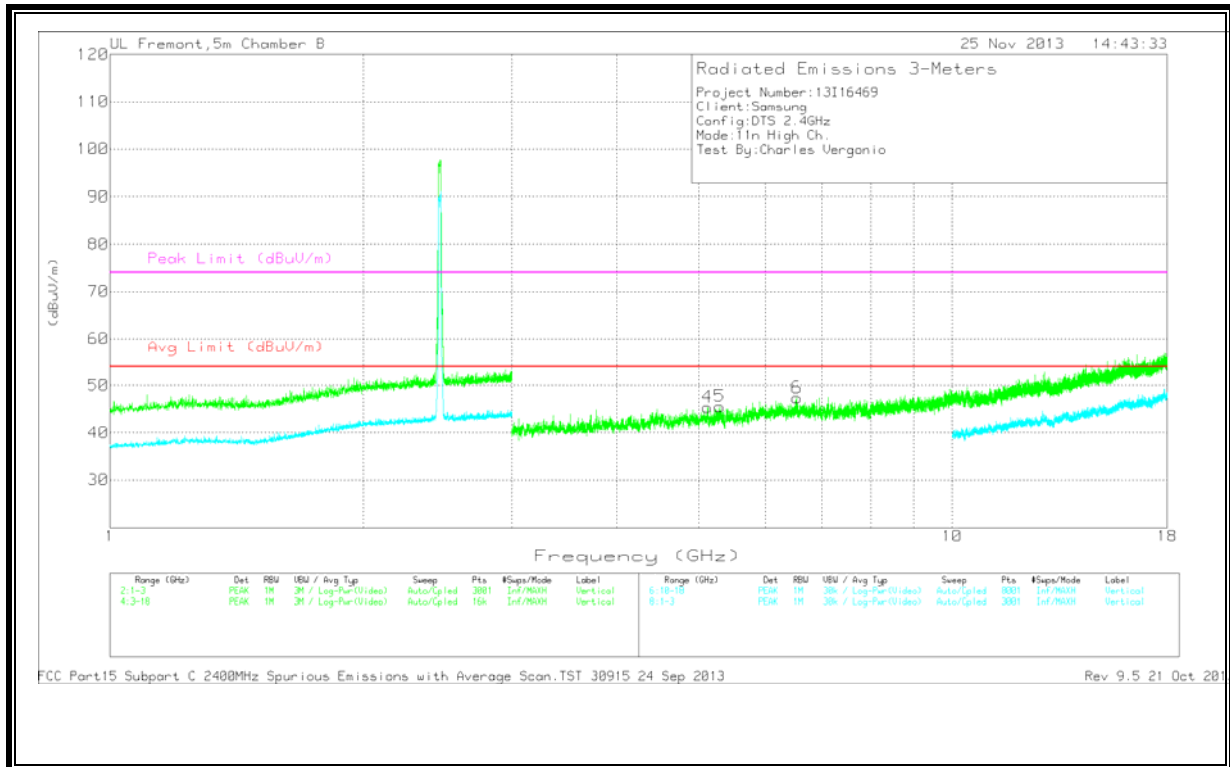
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.435	41.57	PK	33.2	-31.1	43.67	53.97	-10.3	74	-30.33	0-360	99	H
2	4.026	40.72	PK	33.9	-31.1	43.52	53.97	-10.45	74	-30.48	0-360	201	H
3	4.745	39.52	PK	34.7	-29.2	45.02	53.97	-8.95	74	-28.98	0-360	99	H
4	5.045	38.13	PK	34.7	-28.7	44.13	53.97	-9.84	74	-29.87	0-360	99	V
5	5.266	39.68	PK	34.9	-29.8	44.78	53.97	-9.19	74	-29.22	0-360	202	V
6	6.097	40.37	PK	35.9	-29.2	47.07	53.97	-6.9	74	-26.93	0-360	99	V

PK - Peak detector

HIGH CHANNEL
HORIZONTAL



VERTICAL



HIGH CHANNEL DATA

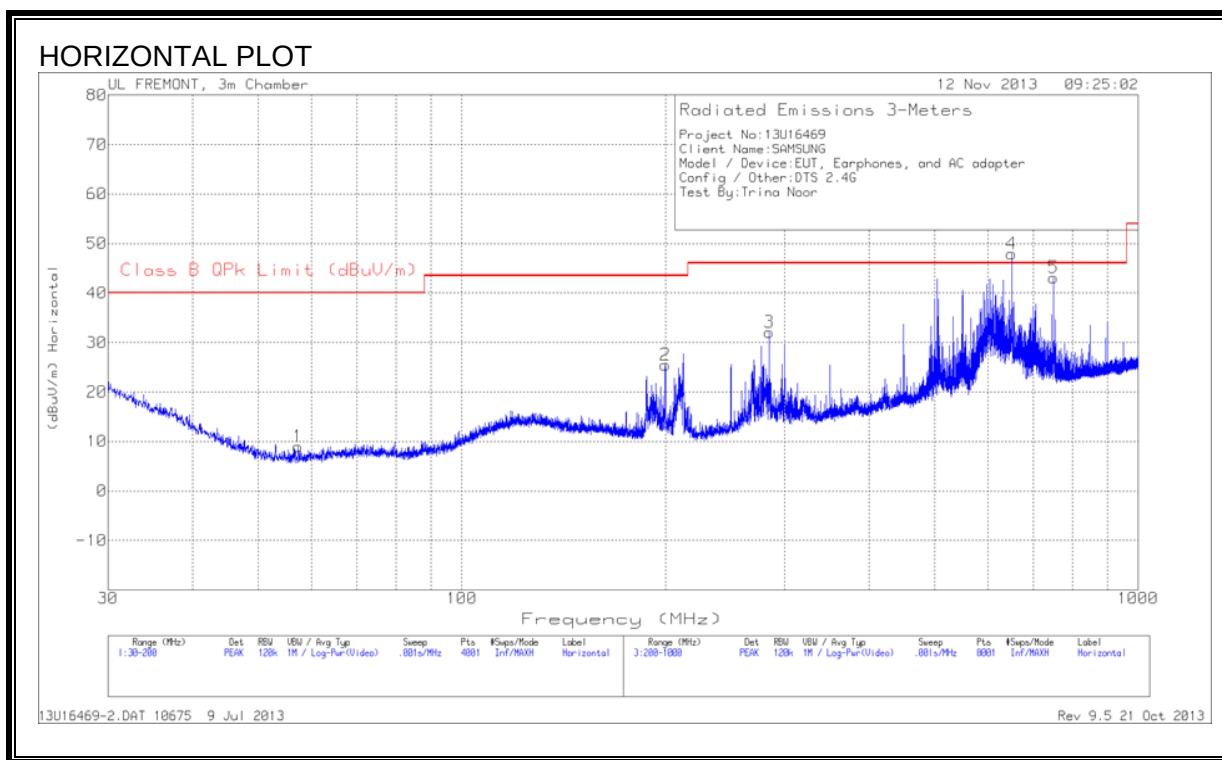
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.832	40.59	PK	33.8	-30.3	44.09	53.97	-9.88	74	-29.91	0-360	201	H
2	4.131	40.05	PK	34	-29.9	44.15	53.97	-9.82	74	-29.85	0-360	201	H
3	4.763	39.37	PK	34.7	-29.6	44.47	53.97	-9.5	74	-29.53	0-360	201	H
4	5.123	39.57	PK	34.7	-28.9	45.37	53.97	-8.6	74	-28.63	0-360	202	V
5	5.296	39.62	PK	34.9	-29	45.52	53.97	-8.45	74	-28.48	0-360	202	V
6	6.541	38.93	PK	35.9	-27.5	47.33	53.97	-6.64	74	-26.67	0-360	99	V

PK - Peak detector

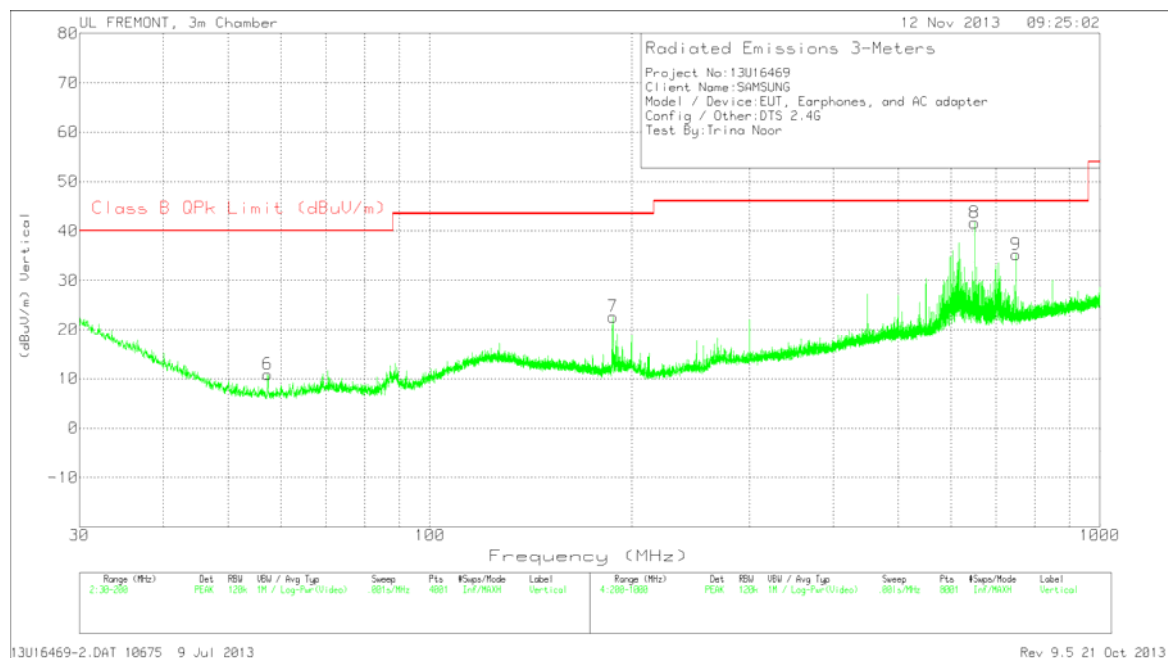
10.3. WORST-CASE BELOW 1 GHz

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

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION



VERTICAL PLOT



Below 1G Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	57.285	29.23	PK	6.9	-27.2	8.93	40	-31.07	0-360	99	H
2	199.9575	39.03	PK	12.3	-25.9	25.43	43.52	-18.09	0-360	99	H
6	57.285	31.21	PK	6.9	-27.2	10.91	40	-29.09	0-360	99	V
7	187.59	37.72	PK	10.9	-26	22.62	43.52	-20.9	0-360	99	V
3	284.8	43.95	PK	13.3	-25.2	32.05	46.02	-13.97	0-360	99	H
5	750	47.3	PK	20.6	-24.8	43.1	46.02	-2.92	0-360	99	H
8	650	47.15	PK	19.8	-25.3	41.65	46.02	-4.37	0-360	99	V
9	750	39.42	PK	20.6	-24.8	35.22	46.02	-10.8	0-360	99	V

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
116.0451	22.79	QP	13.5	-26.6	9.69	43.52	-33.83	29	222	H
750	49.74	QP	18.3	-25.6	42.44	46.02	-3.58	171	148	H
650	50.86	QP	18.3	-25.6	43.56	46.02	-2.46	116	145	H

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-L1 .15 - 30MHz

Trace Markers

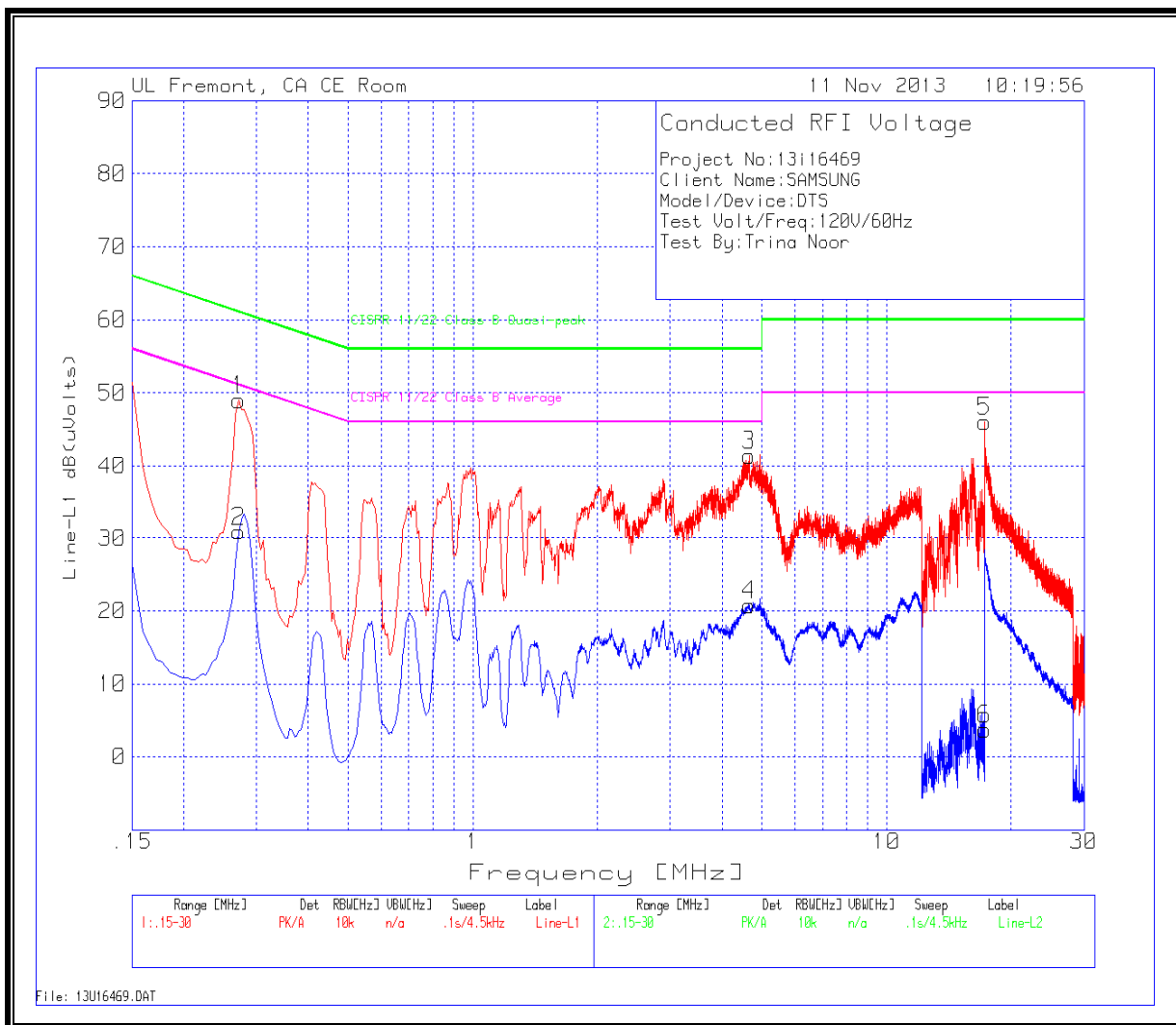
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.2715	48.85	PK	.1	0	48.95	61.1	-12.15	-	-
2	.2715	30.9	Av	.1	0	31	-	-	51.1	-20.1
3	4.65	41.17	PK	.1	.1	41.37	56	-14.63	-	-
4	4.65	20.57	Av	.1	.1	20.77	-	-	46	-25.23
5	17.2365	45.66	PK	.2	.2	46.06	60	-13.94	-	-
6	17.2365	3.37	Av	.2	.2	3.77	-	-	50	-46.23

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)
7	.2715	38.35	PK	.1	0	38.45	61.1	-22.65	-	-
8	.2715	.33	Av	.1	0	.43	-	-	51.1	-50.67
9	4.7535	38.27	PK	.1	.1	38.47	56	-17.53	-	-
10	4.7535	19.78	Av	.1	.1	19.98	-	-	46	-26.02
11	15.9675	42.36	PK	.2	.2	42.76	60	-17.24	-	-
12	15.9675	24.69	Av	.2	.2	25.09	-	-	50	-24.91

LINE 1 RESULTS



LINE 2 RESULTS

