FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-C1158

FCC ID: A3LSMC1158

REPORT NUMBER: 14U17495-4

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

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

NVLAP LAB CODE 200065-0

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**SAMSUNG ELECTRONICS CO., LTD.**
EUT DESCRIPTION:	**GSM/WCDMA Phone + Bluetooth & DTS/UNII a/b/g/n + NFC**
MODEL:	**SM-C1158**
SERIAL NUMBER:	**FL-032-V (Conducted), FL-032-S (Radiated)**
DATE TESTED:	**FEBRUARY 25 – MARCH 24, 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
CONSUMER TECHNOLOGY DIVISION
PROGRAM MANAGER
UL Verification Services Inc.

Tested By:

STEVEN TRAN
CONSUMER TECHNOLOGY DIVISION
LAB TECHNICIAN
UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.4-2009

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	20.07	101.62
2412 - 2462	802.11g	21.45	139.64
2412 - 2462	802.11n HT20	20.31	107.40
5745-5825	802.11a	21.96	157.04
5745-5825	802.11n HT20	19.94	98.63
5755-5795	802.11n HT40	18.82	76.21

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.4 dBi for 2.4GHz and -0.88 for 5.8GHz.

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5.4. WORST-CASE CONFIGURATION AND MODE

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

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

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	EP-TA50EWE	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

I/O CABLES

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

TEST SETUP

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

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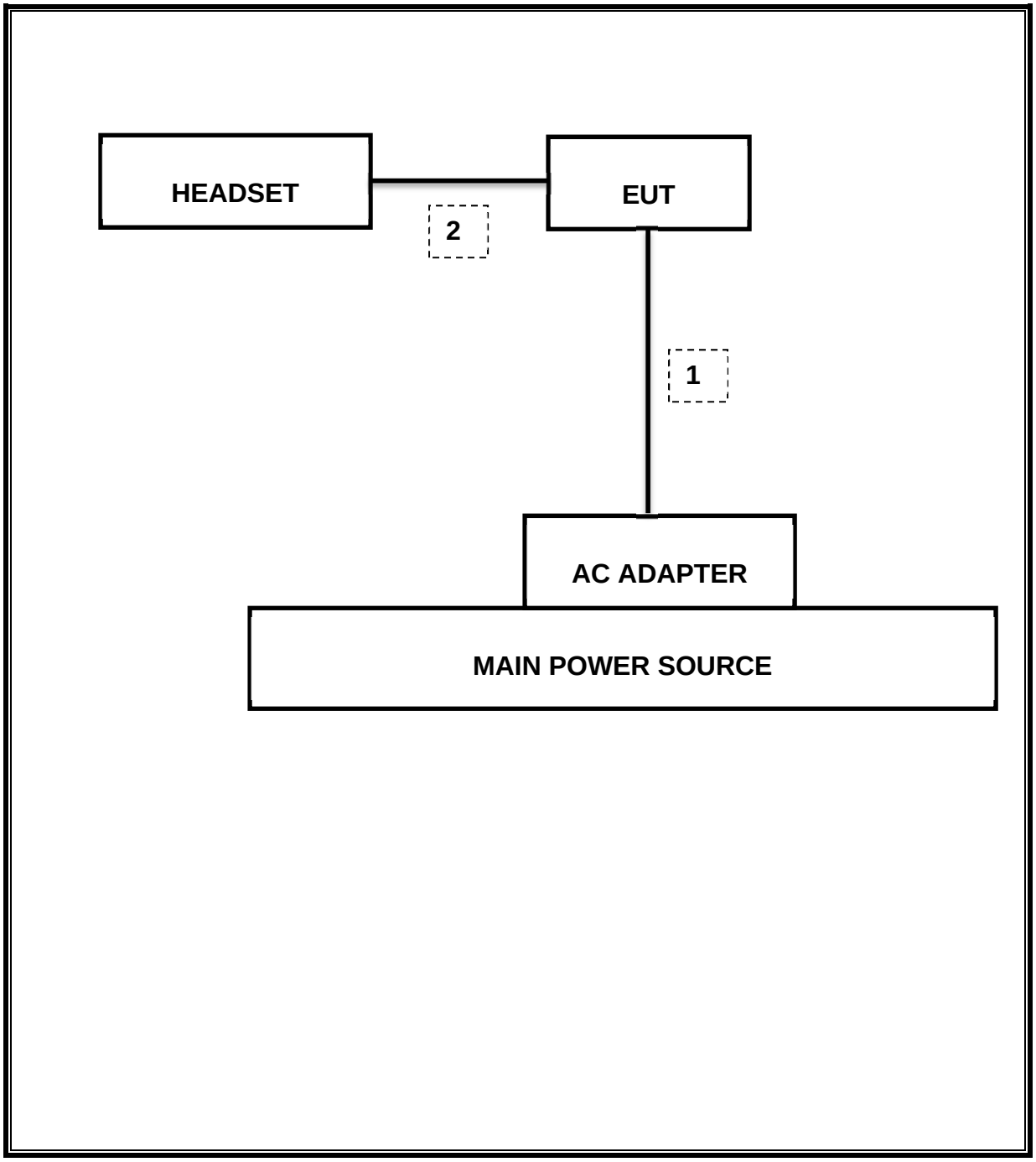
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
Spectrum Analyzer,9KHz-40GHz	HP	8564E	C00986	04/01/14
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/13/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/15
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/14
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/14
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/14
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/14
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00351	06/27/14
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/14
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/14
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/14
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/14

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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.

Band edge emissions within Restricted Bands are measured using RMS with duty cycle factor offset method.

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8. SUMMARY TABLE

The model FCC ID: A3LSMC1158 shares the same enclosure and circuit board as mode FCC ID: A3LSMC115. The WLAN/Bluetooth/NFC circuitry and layout, including antenna, are almost identical between the two units. The WLAN/Bluetooth antenna and surrounding circuitry is the same between these two units.

After confirming through preliminary radiated emissions that the performance of the A3LSMC1158 WLAN remains representative of this model (FCC ID A3LSM C115) test data for FCC ID: A3LSM C115 is being submitted for this application.

Radiated emissions were fully re-evaluated against 15B requirements for digital devices and results indicated no significant differences between the two versions. Other differences between the two FCC IDs are in the WWAN RF Transceiver, connectivity part, components and placement. WWAN SAR and EMC has been fully retested for FCC ID: A3LSMC1158.

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	9.10 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-27.93 dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	21.96dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-4.07 dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	52.71 dBuV
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	51.31 dBuV/m

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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

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9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.10	0.5
Mid	2437	9.11	0.5
High	2462	9.12	0.5
Worst		9.10	

9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.57	0.5
Mid	2437	16.48	0.5
High	2462	16.48	0.5
Worst		16.48	

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	17.79	0.5
Mid	2437	17.73	0.5
High	2462	17.70	0.5
Worst		17.70	

9.1.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.300	0.5
Mid	5785	16.300	0.5
High	5825	16.300	0.5
Worst		16.300	

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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	17.500	0.5
Mid	5785	17.500	0.5
High	5825	17.550	0.5
Worst		17.500	

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	36.5	0.5
High	5795	36.5	0.5
Worst		36.5	0.5

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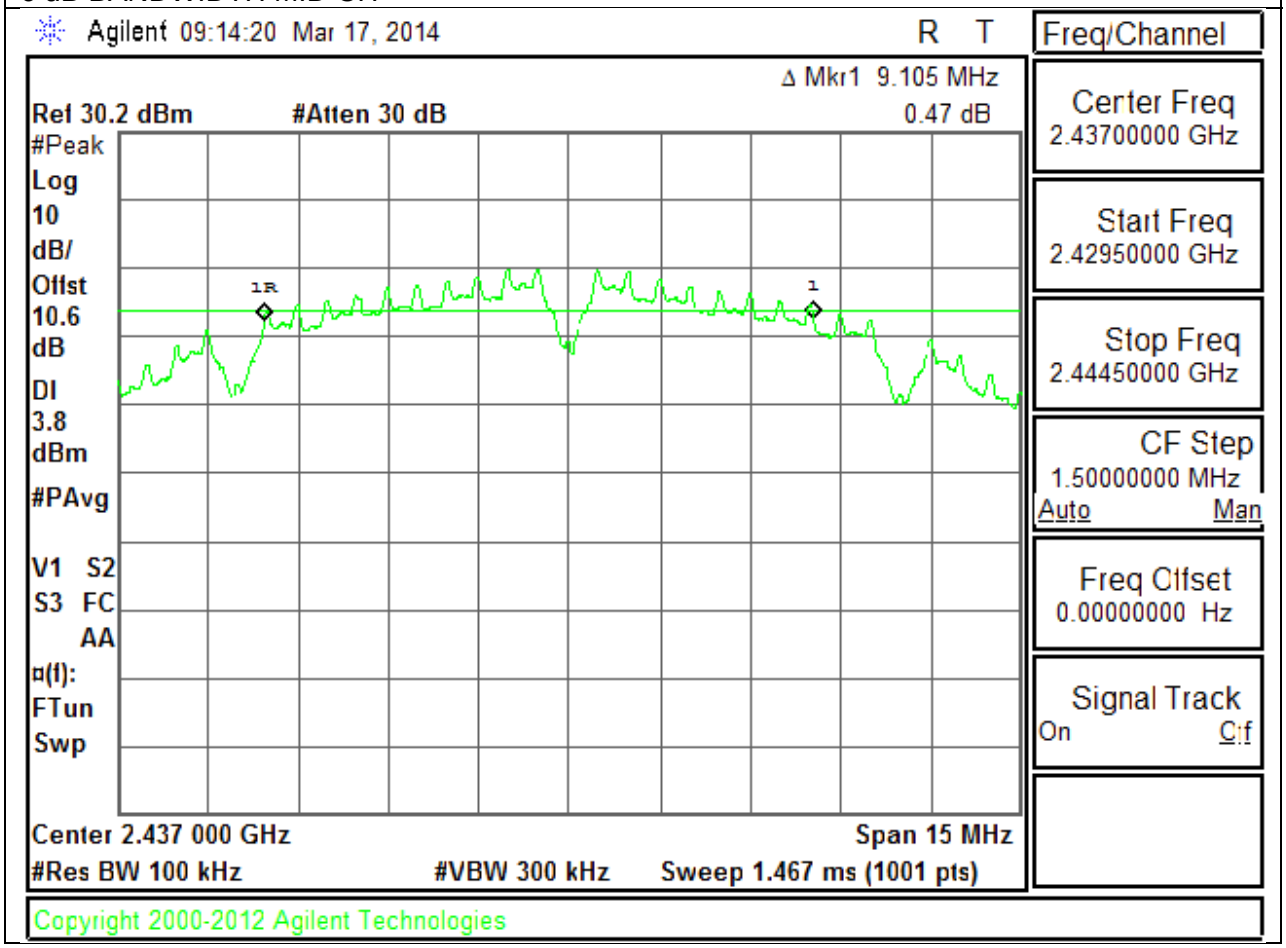
802.11b 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



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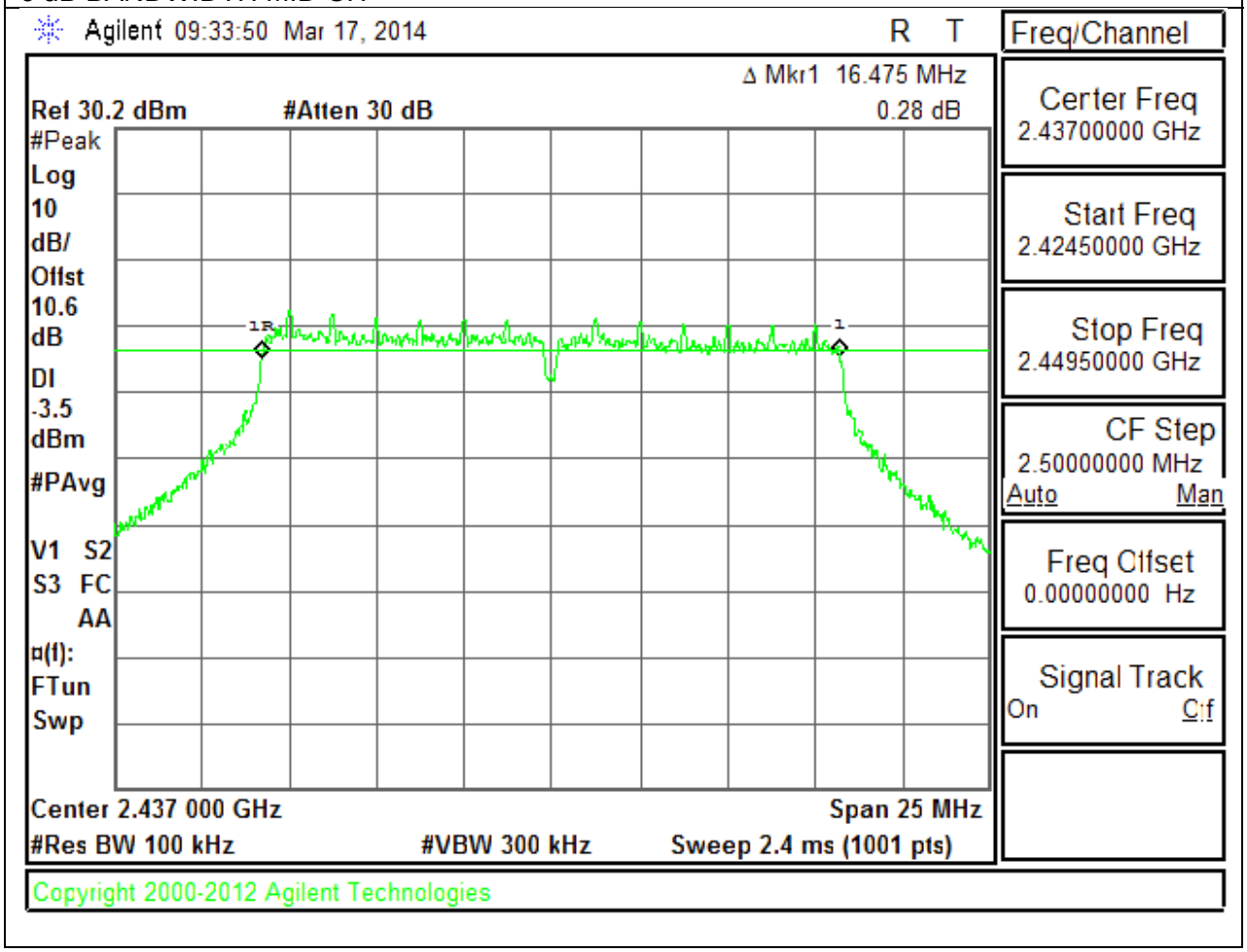
802.11g 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



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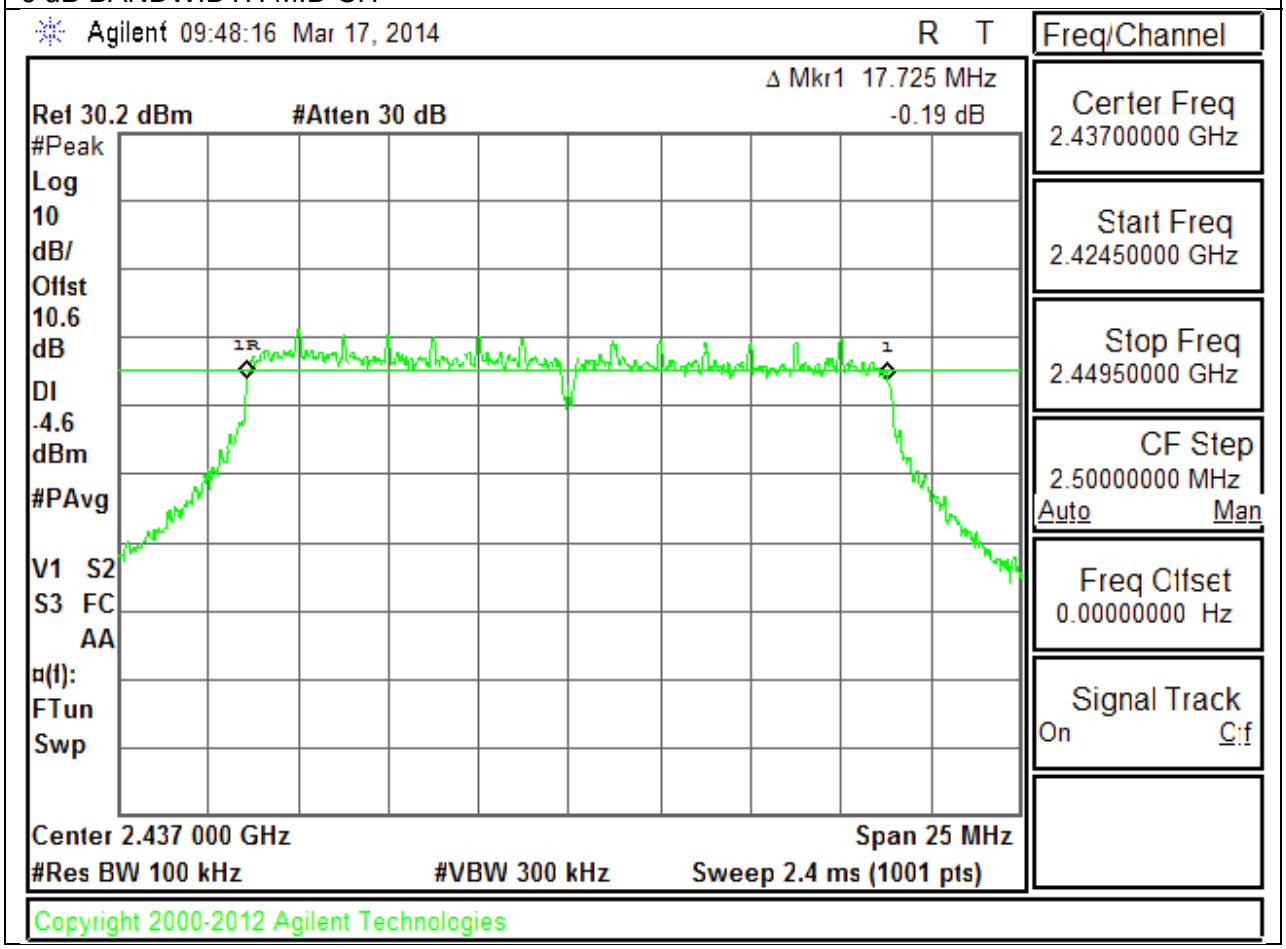
802.11n 6 dB BANDWIDTH

6 dB BANDWIDTH MID CH



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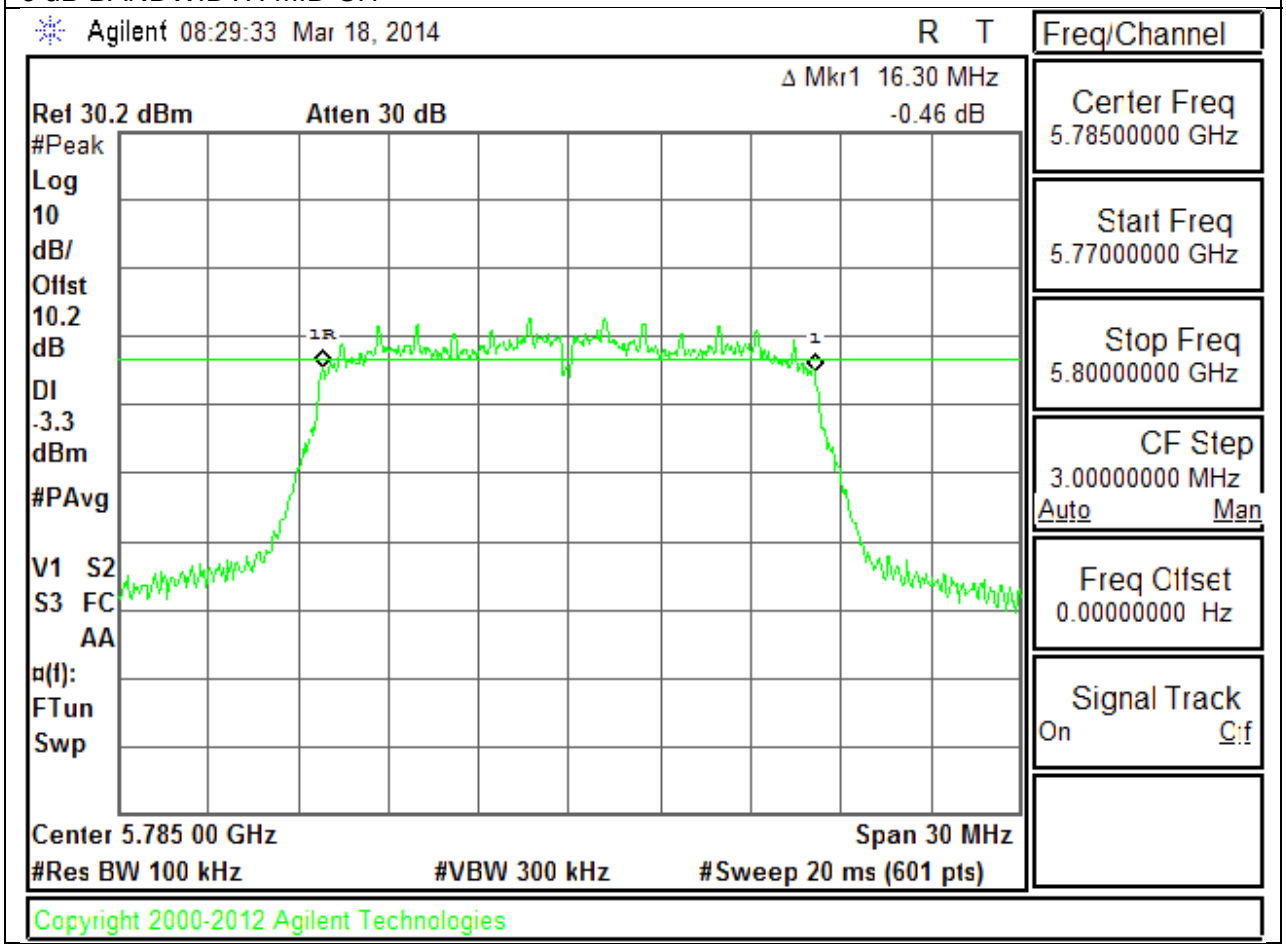
802.11a 6 dB BANDWIDTH 5.8GHz

6 dB BANDWIDTH MID CH



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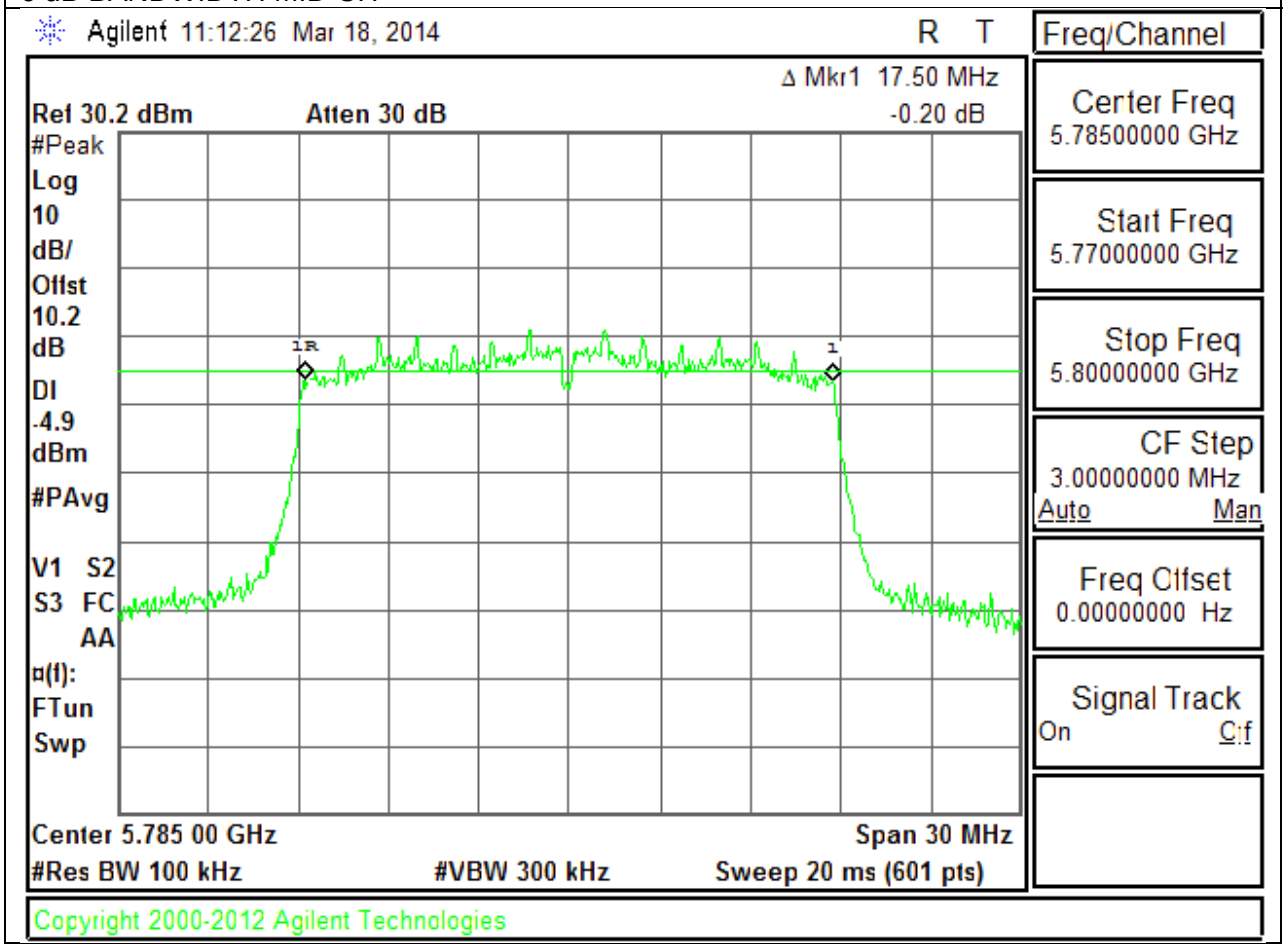
802.11n HT20 6 dB BANDWIDTH 5.8GHz

6 dB BANDWIDTH MID CH



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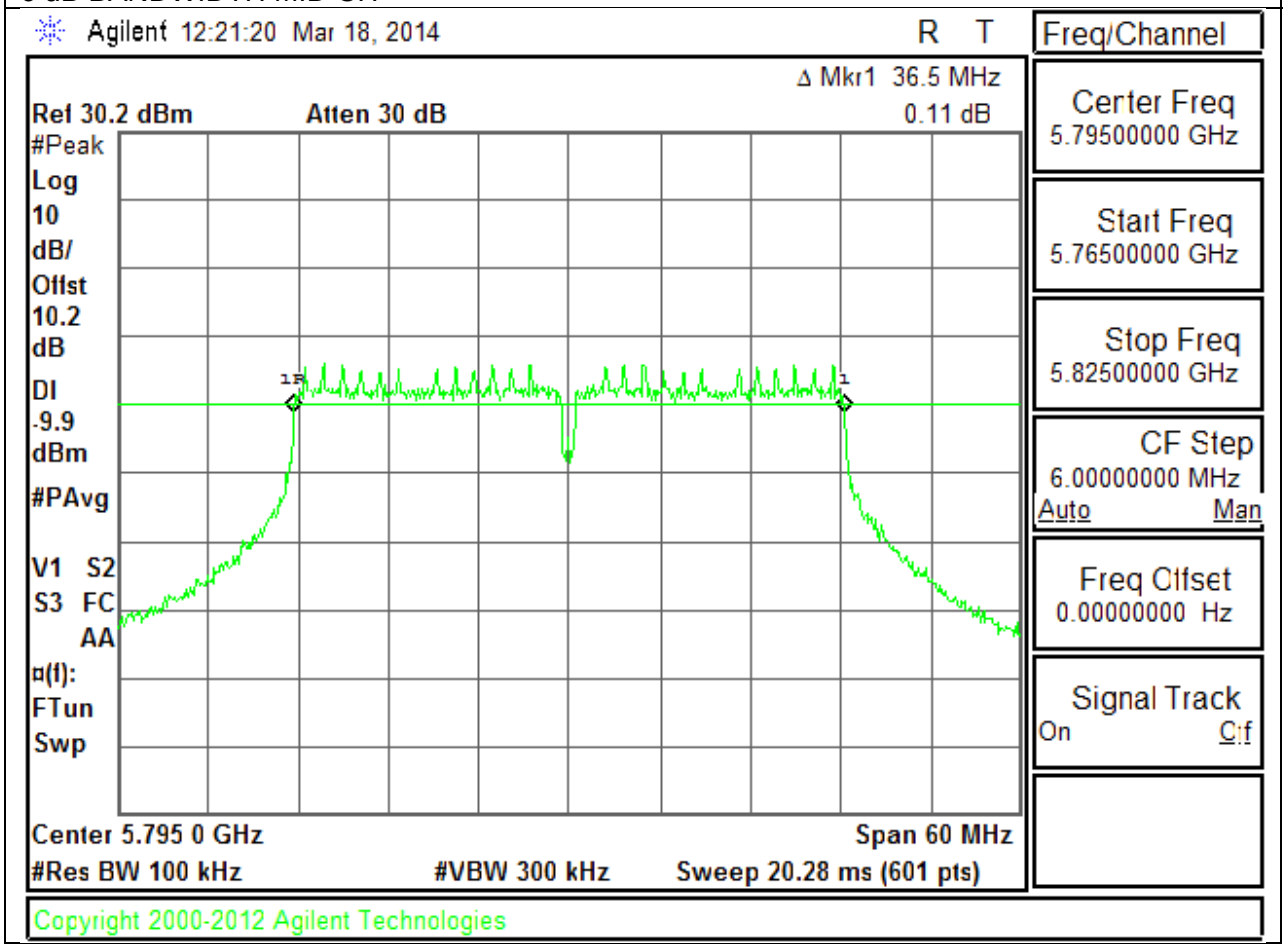
802.11n HT40 6 dB BANDWIDTH 5.8GHz

6 dB BANDWIDTH MID CH



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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	13.63
Mid	2437	13.66
High	2462	13.52
Worst		13.66

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.47
Mid	2437	16.51
High	2462	16.41
Worst		16.51

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	17.54
High	2462	17.54
Worst		17.60

9.2.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.330
Mid	5785	16.354
High	5825	16.345
Worst		16.354

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9.2.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.515
Mid	5785	17.523
High	5825	17.478
Worst		17.523

9.2.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.6
High	5795	36.6
Worst		36.6

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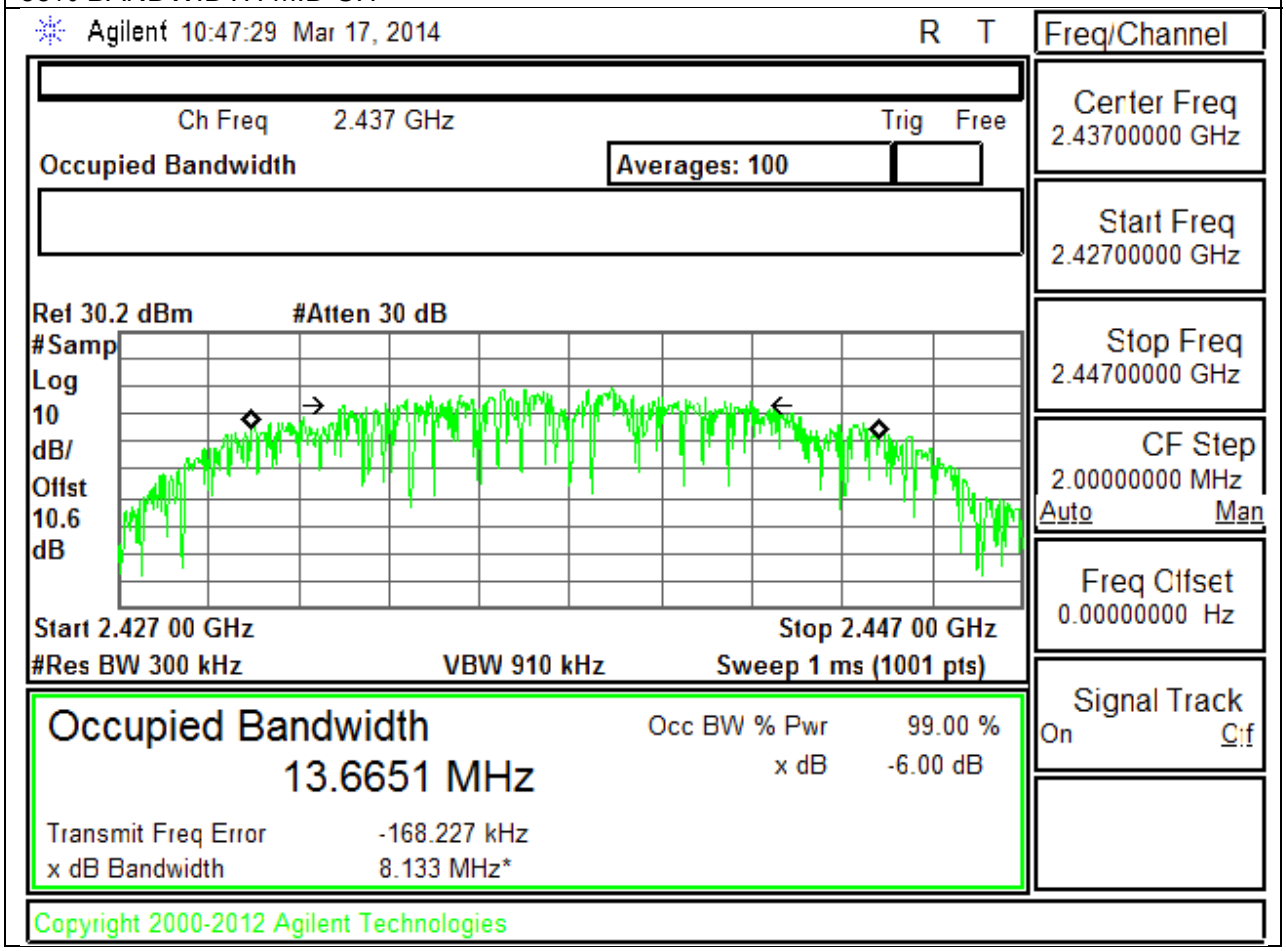
802.11b 99% BANDWIDTH

99% BANDWIDTH MID CH



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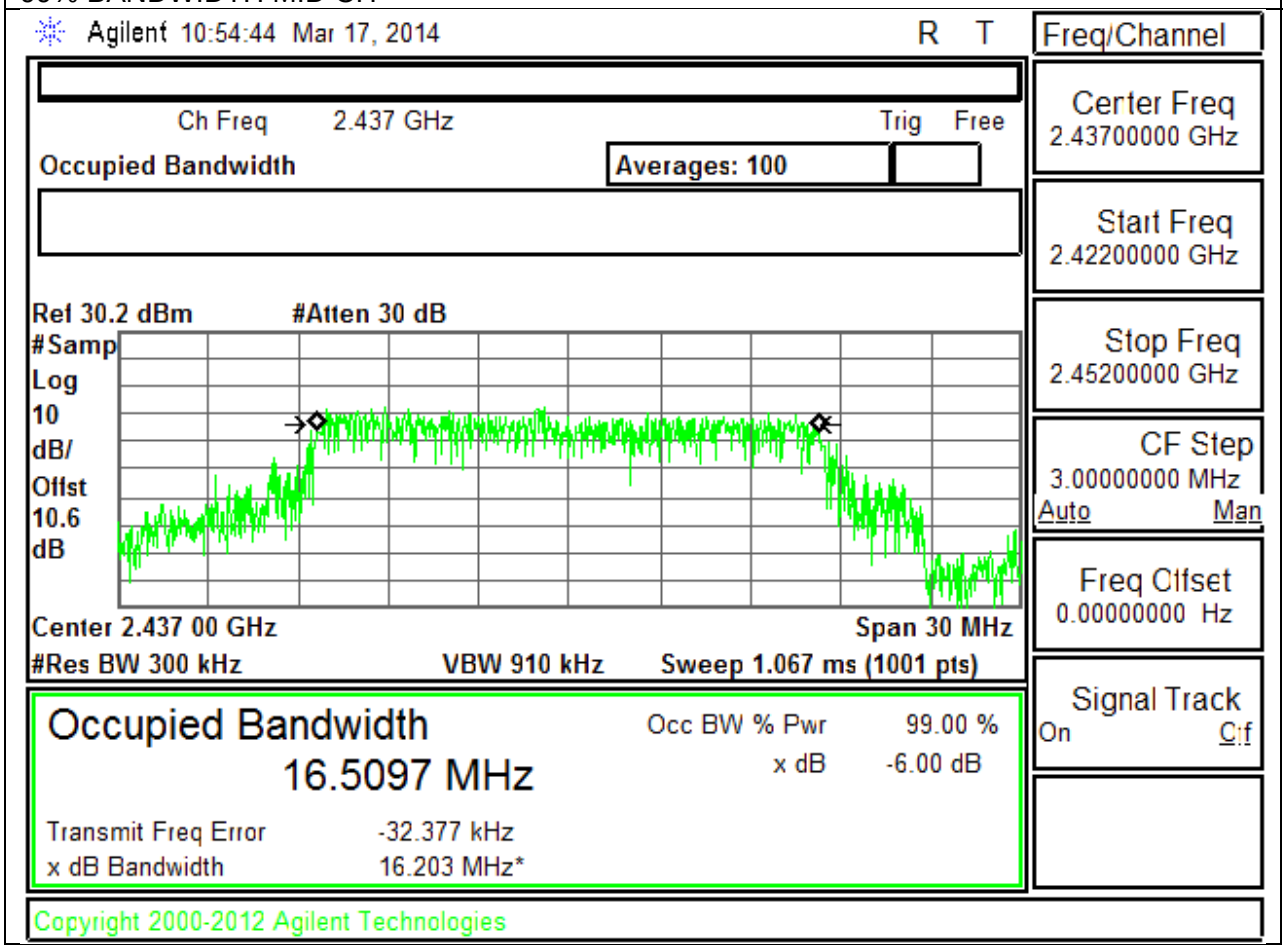
802.11g 99% BANDWIDTH

99% BANDWIDTH MID CH



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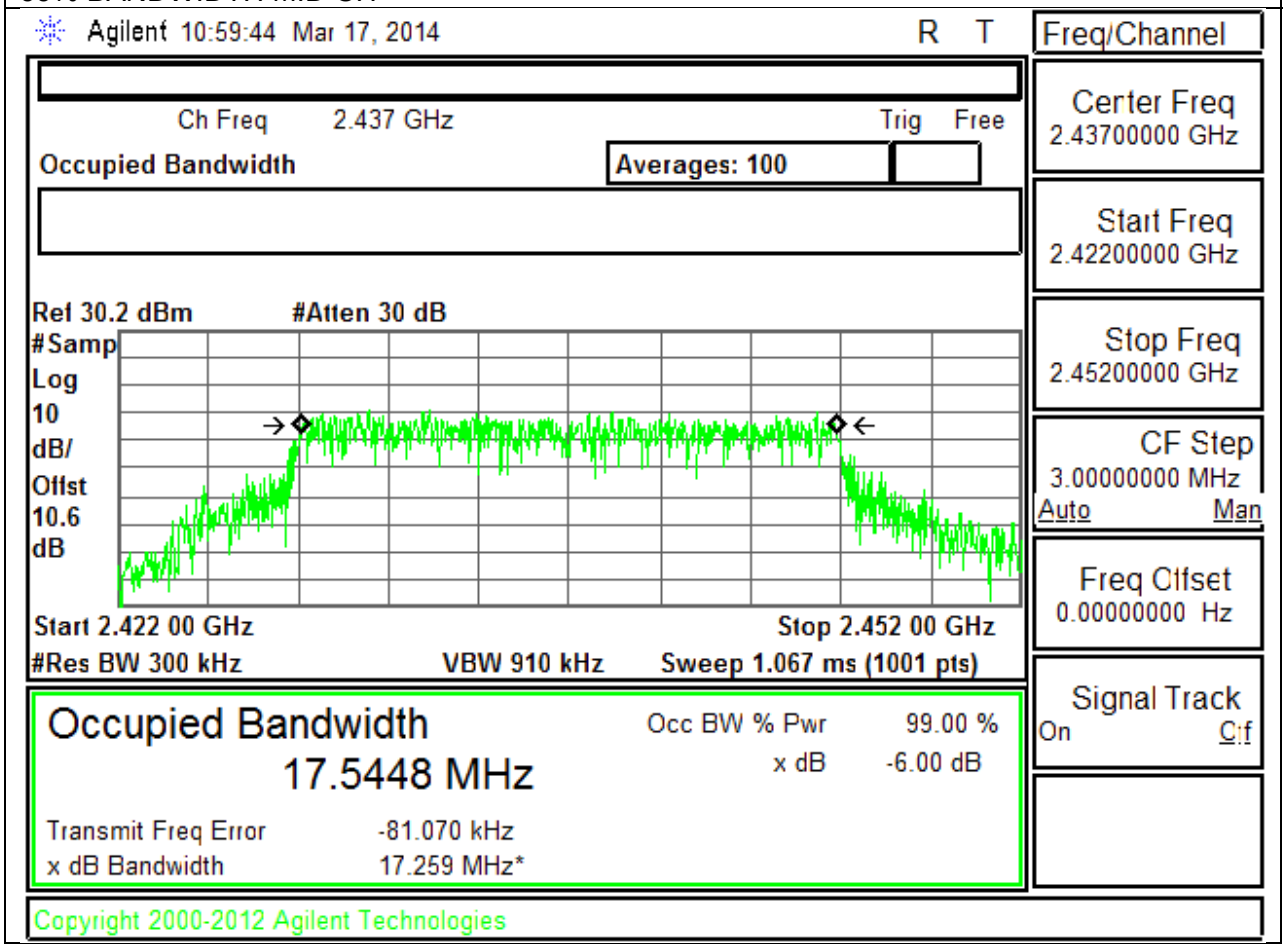
802.11n 99% BANDWIDTH

99% BANDWIDTH MID CH



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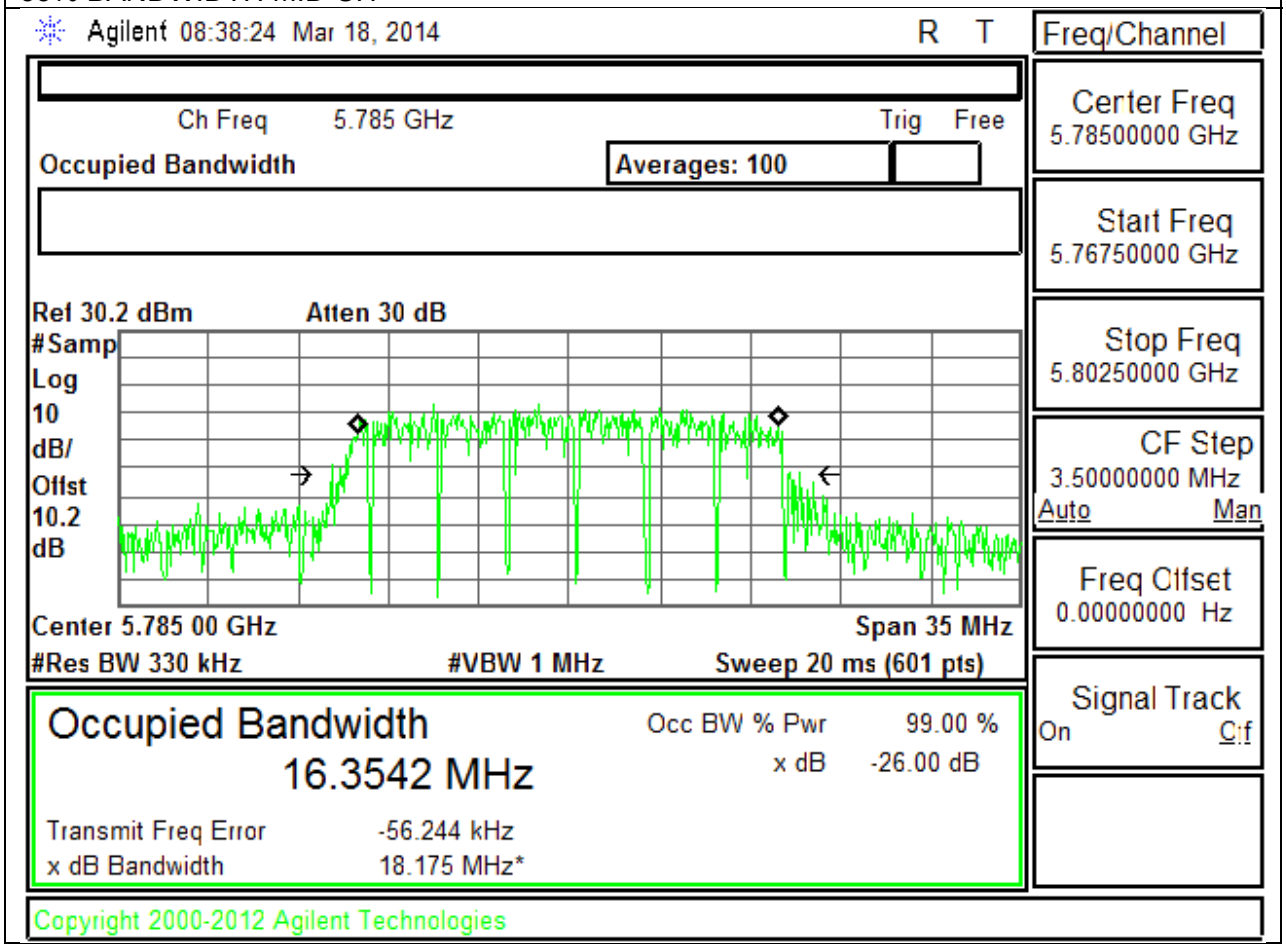
802.11a 5.8GHz 99% BANDWIDTH

99% BANDWIDTH MID CH



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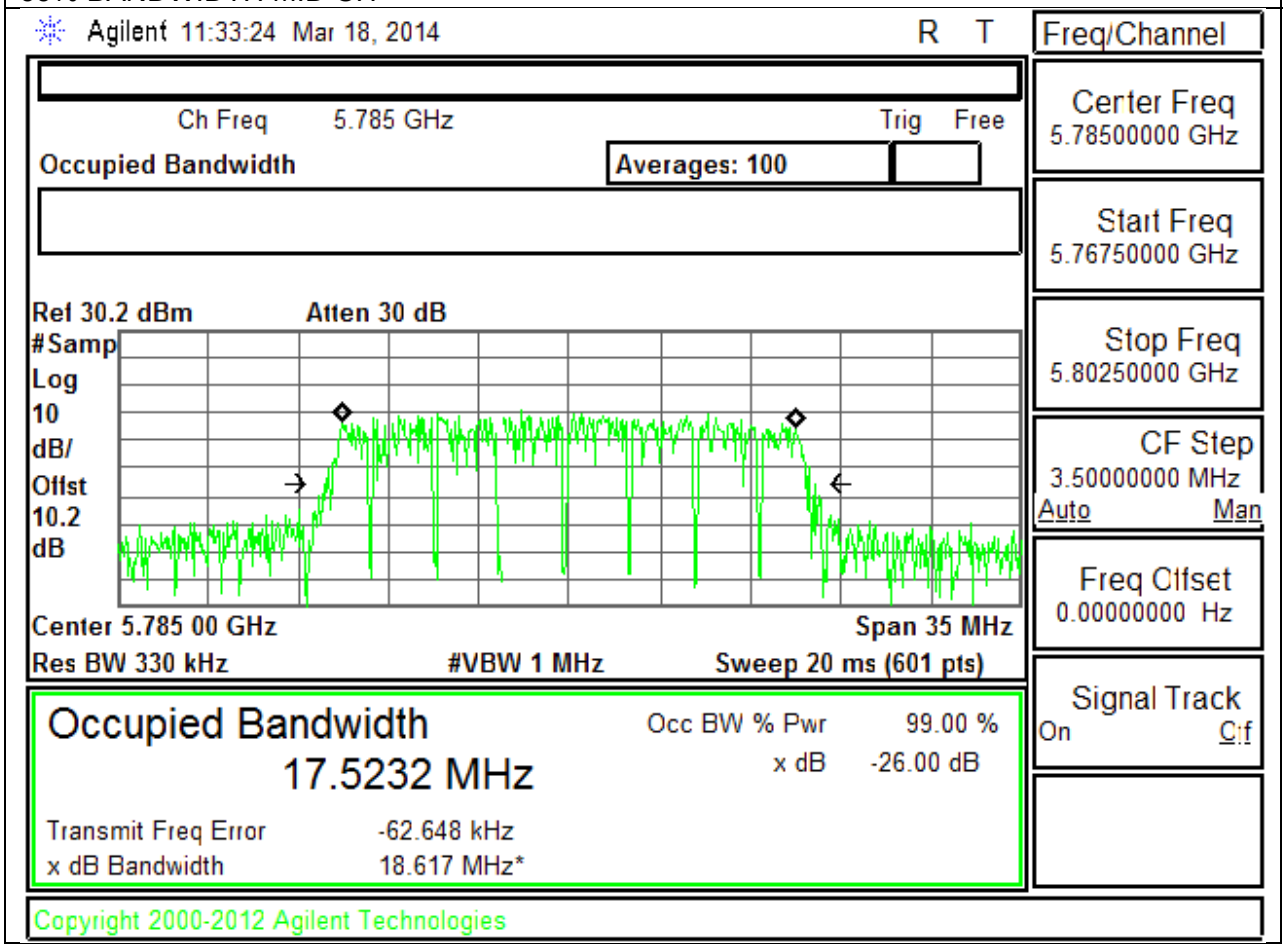
802.11n HT20 5.8GHz 99% BANDWIDTH

99% BANDWIDTH MID CH



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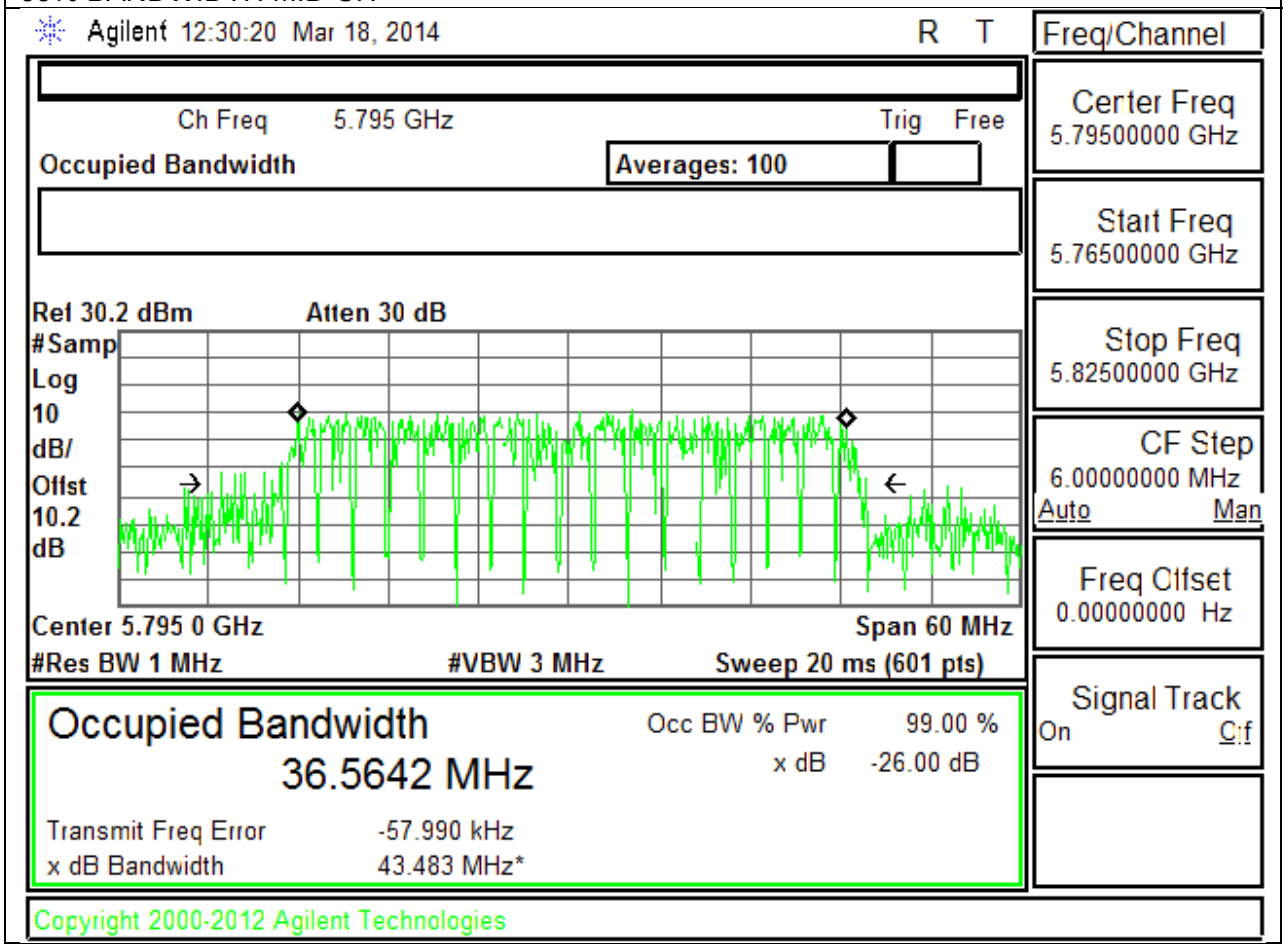
802.11n HT40 5.8GHz 99% BANDWIDTH

99% BANDWIDTH MID CH



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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

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9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	16.90
Mid	2437	17.10
High	2462	17.20
Worst		17.200

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.20
Mid	2437	12.50
High	2462	13.40
Worst		13.400

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	12.20
Mid	2437	11.40
High	2462	12.30
Worst		12.300

9.3.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	13.500
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	12.500
Mid	5785	12.500
High	5825	12.500
Worst		12.500

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9.3.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5755	11.0
High	5795	11.0
Worst		11.0

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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.

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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	-1.40	30.00	30	36	30.00
Mid	2437	-1.40	30.00	30	36	30.00
High	2462	-1.40	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	19.66	19.66	30.00	-10.34
Mid	2437	20.07	20.07	30.00	-9.93
High	2462	19.84	19.84	30.00	-10.16
Worst			20.07		

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	-1.40	30.00	30	36	30.00
Mid	2437	-1.40	30.00	30	36	30.00
High	2462	-1.40	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	21.16	21.16	30.00	-8.84
Mid	2437	20.46	20.46	30.00	-9.54
High	2462	21.45	21.45	30.00	-8.55
Worst			21.45		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

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Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.40	30.00	30	36	30.00
Mid	2437	-1.40	30.00	30	36	30.00
High	2462	-1.40	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	20.31	20.31	30.00	-9.69
Mid	2437	19.38	19.38	30.00	-10.62
High	2462	20.14	20.14	30.00	-9.86
Worst			20.31		

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	-0.88	30.00	30	36	30.00
Mid	5785	-0.88	30.00	30	36	30.00
High	5825	-0.88	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	21.92	21.92	30.00	-8.08
Mid	5785	21.59	21.59	30.00	-8.41
High	5825	21.96	21.96	30.00	-8.04
Worst			21.96		

9.4.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

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Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	-0.88	30.00	30	36	30.00
Mid	5785	-0.88	30.00	30	36	30.00
High	5825	-0.88	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	19.84	19.84	30.00	-10.16
Mid	5785	19.79	19.79	30.00	-10.21
High	5825	19.94	19.94	30.00	-10.06
Worst			19.94		

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	-0.88	30.00	30	36	30.00
High	5795	-0.88	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	18.74	18.74	30.00	-11.26
High	5795	18.82	18.82	30.00	-11.18
Worst			18.82		

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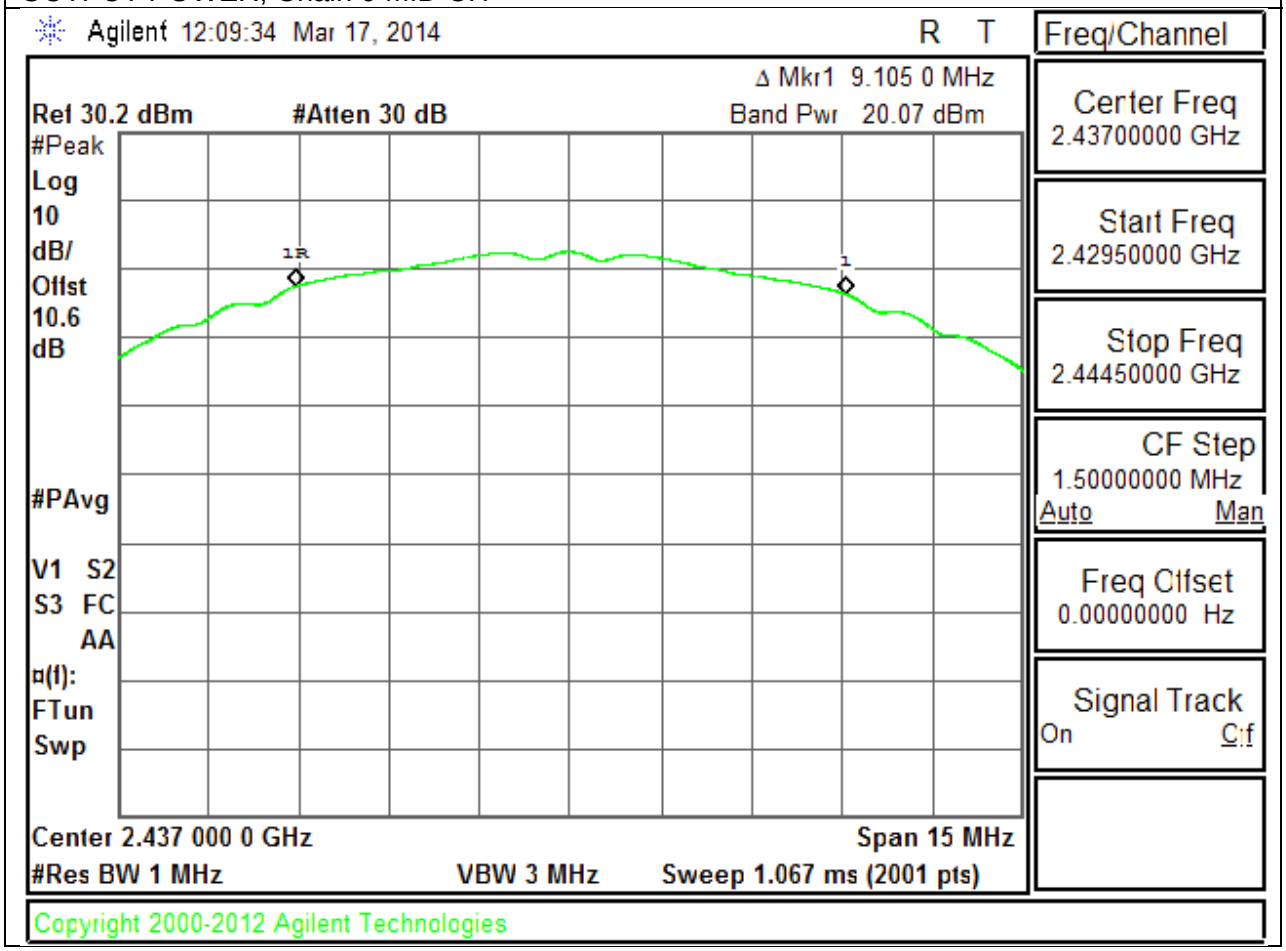
802.11b OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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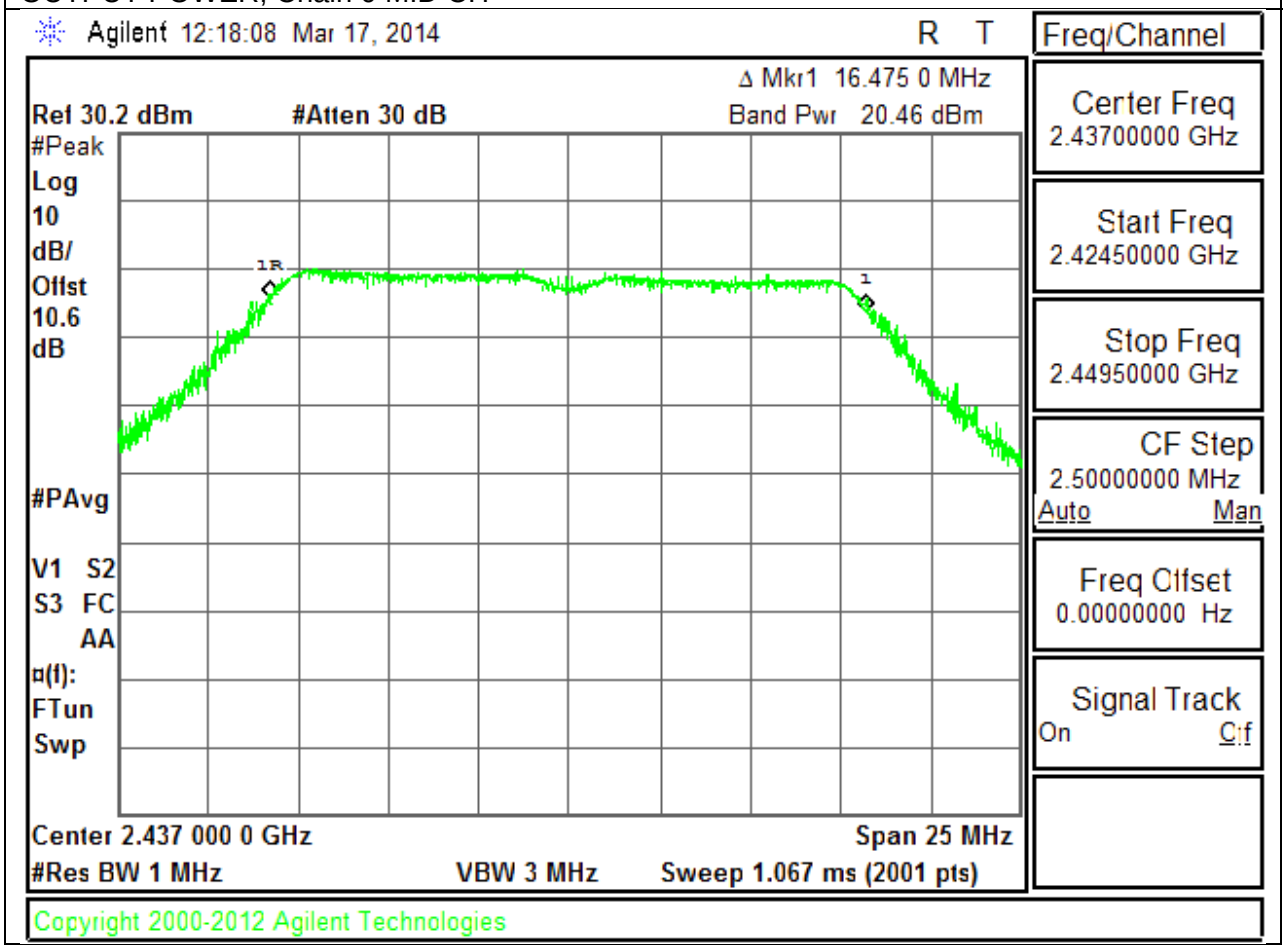
802.11g OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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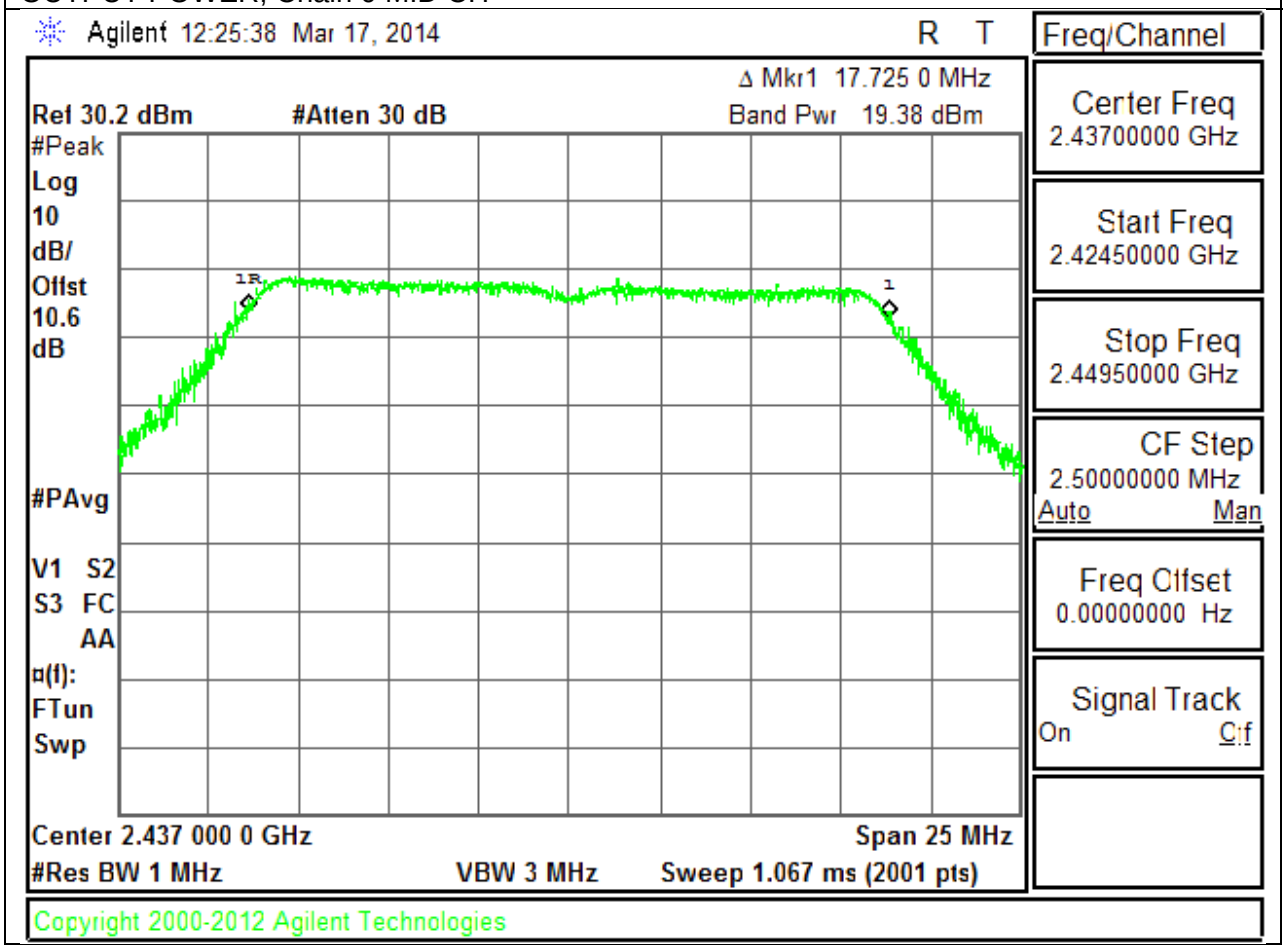
802.11n OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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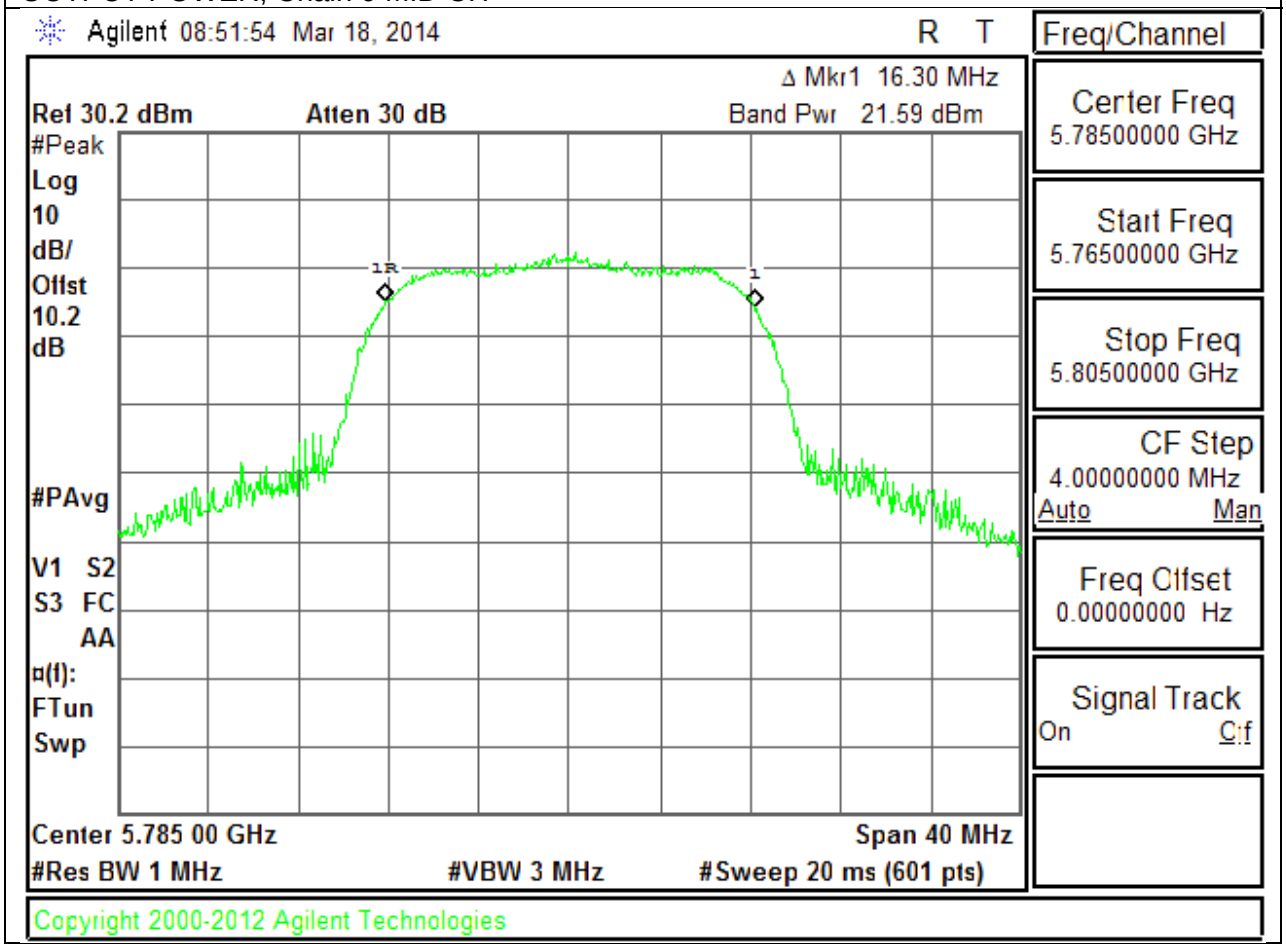
802.11a 5.8 GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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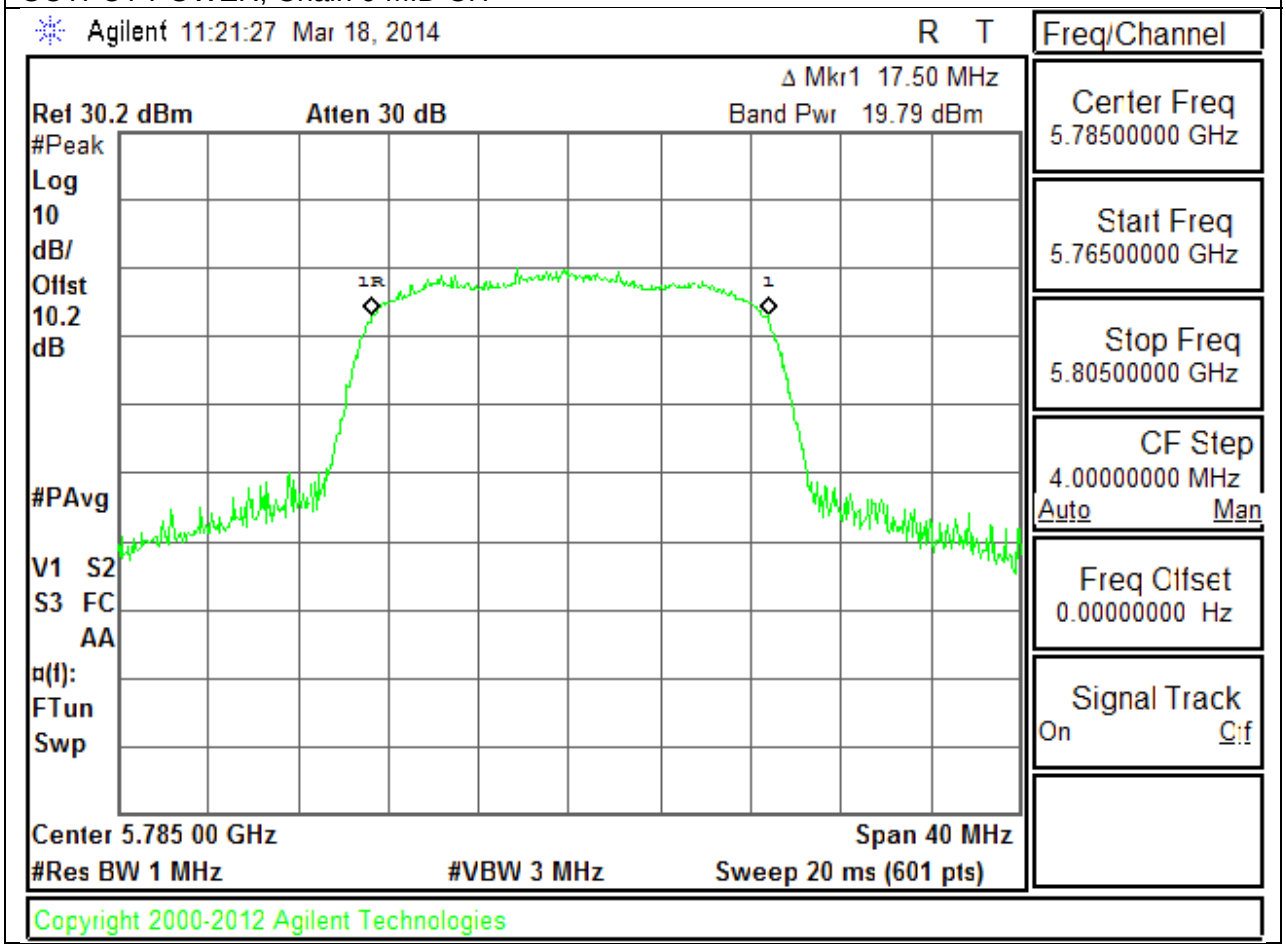
802.11n HT20 5.8 GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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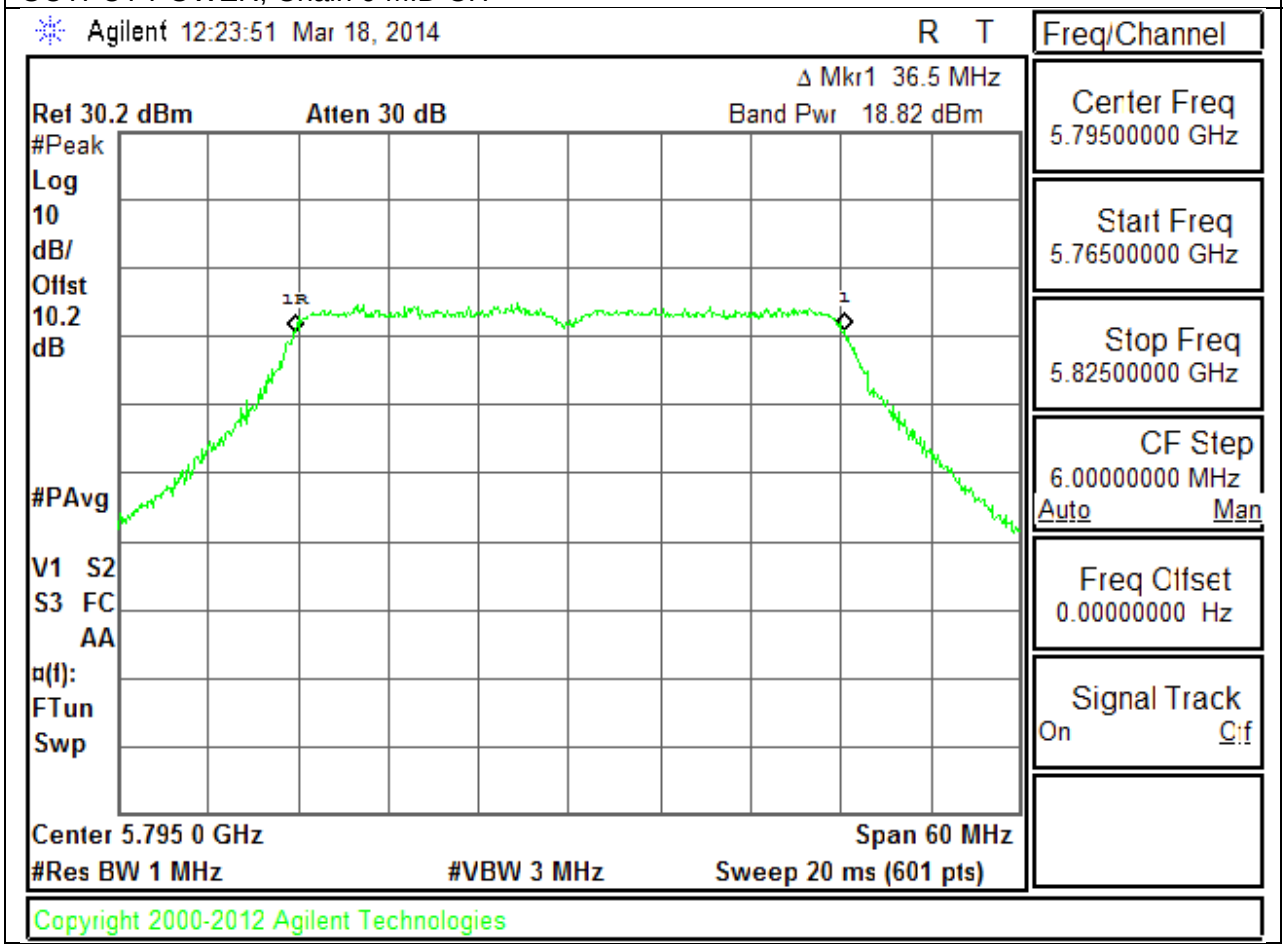
802.11n HT40 5.8 GHz OUTPUT POWER, Chain 0

OUTPUT POWER, Chain 0 MID CH



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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	-5.14	8.0	-13.1
Mid	2437	-4.07	8.0	-12.1
High	2462	-5.54	8.0	-13.5

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	-11.00	8.0	-19.0
Mid	2437	-12.81	8.0	-20.8
High	2462	-11.32	8.0	-19.3

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	-12.30	8.0	-20.3
Mid	2437	-12.86	8.0	-20.9
High	2462	-11.33	8.0	-19.3

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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	-10.63	8.0	-18.6
Mid	5785	-10.15	8.0	-18.2
High	5825	-10.75	8.0	-18.8

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	-12.67	8.0	-20.7
Mid	5785	-13.01	8.0	-21.0
High	5825	-12.69	8.0	-20.7

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	-18.42	8.0	-26.4
High	5795	-17.95	8.0	-26.0

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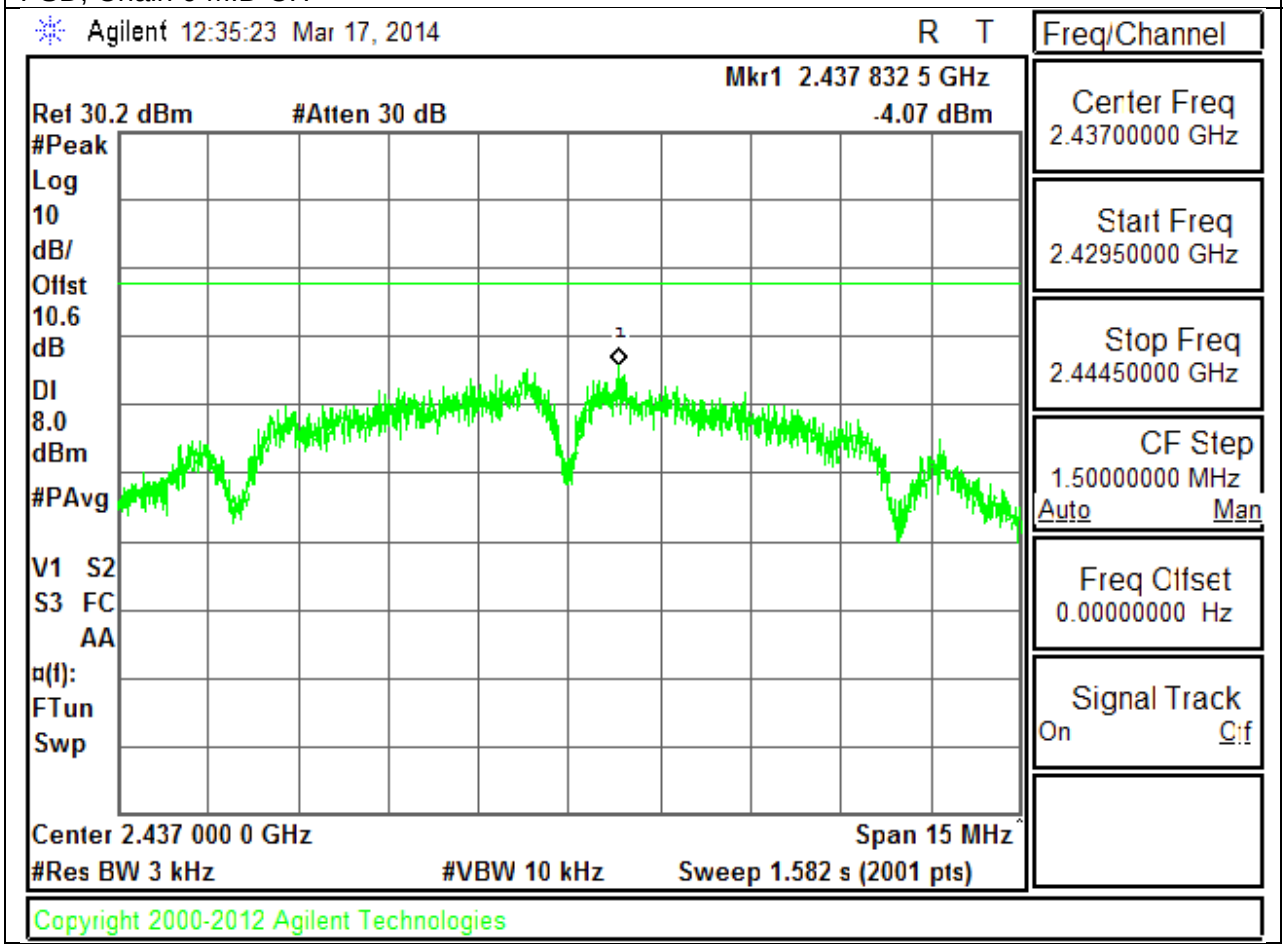
802.11b PSD, Chain 0

PSD, Chain 0 MID CH



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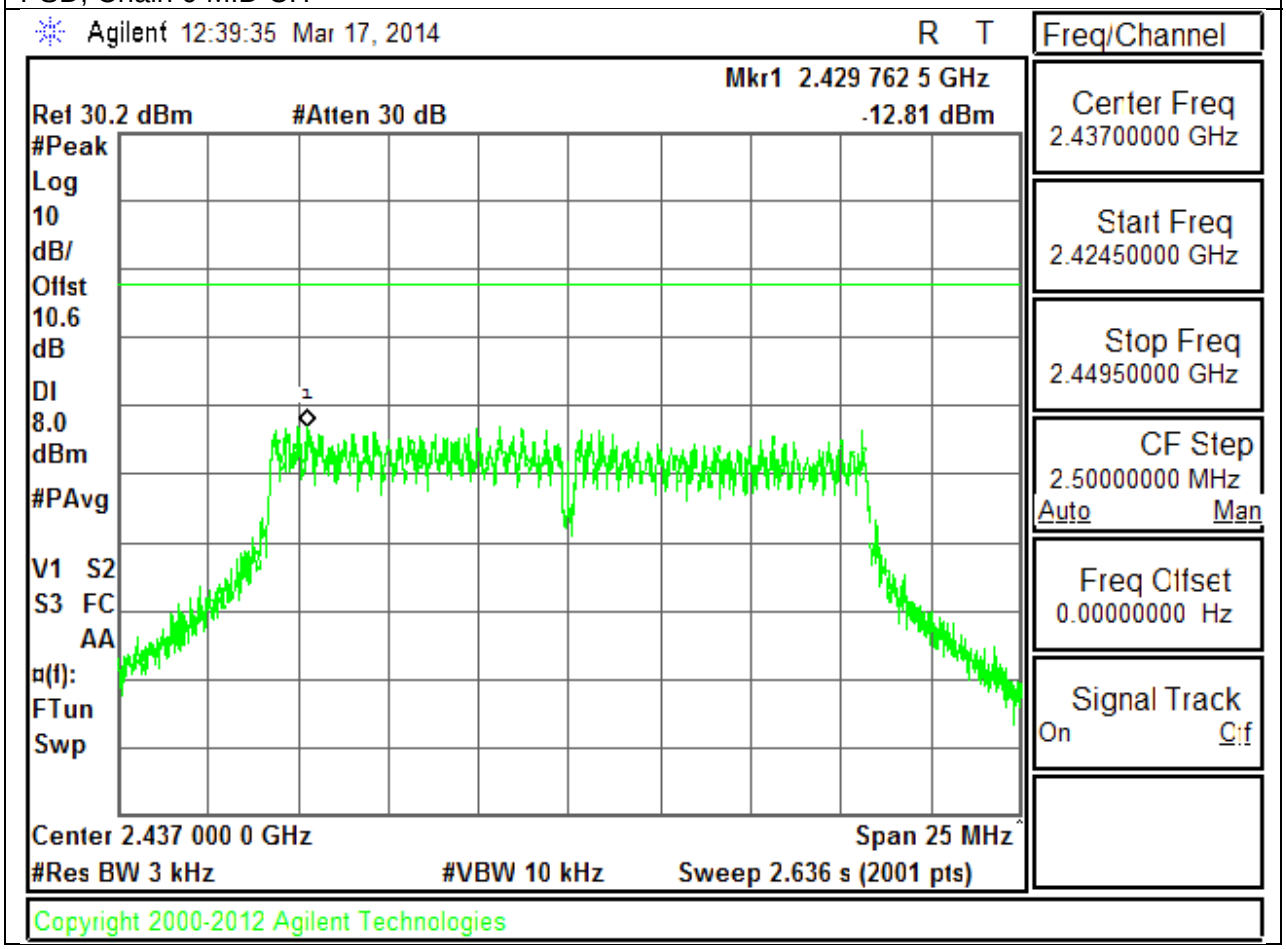
802.11g PSD, Chain 0

PSD, Chain 0 MID CH



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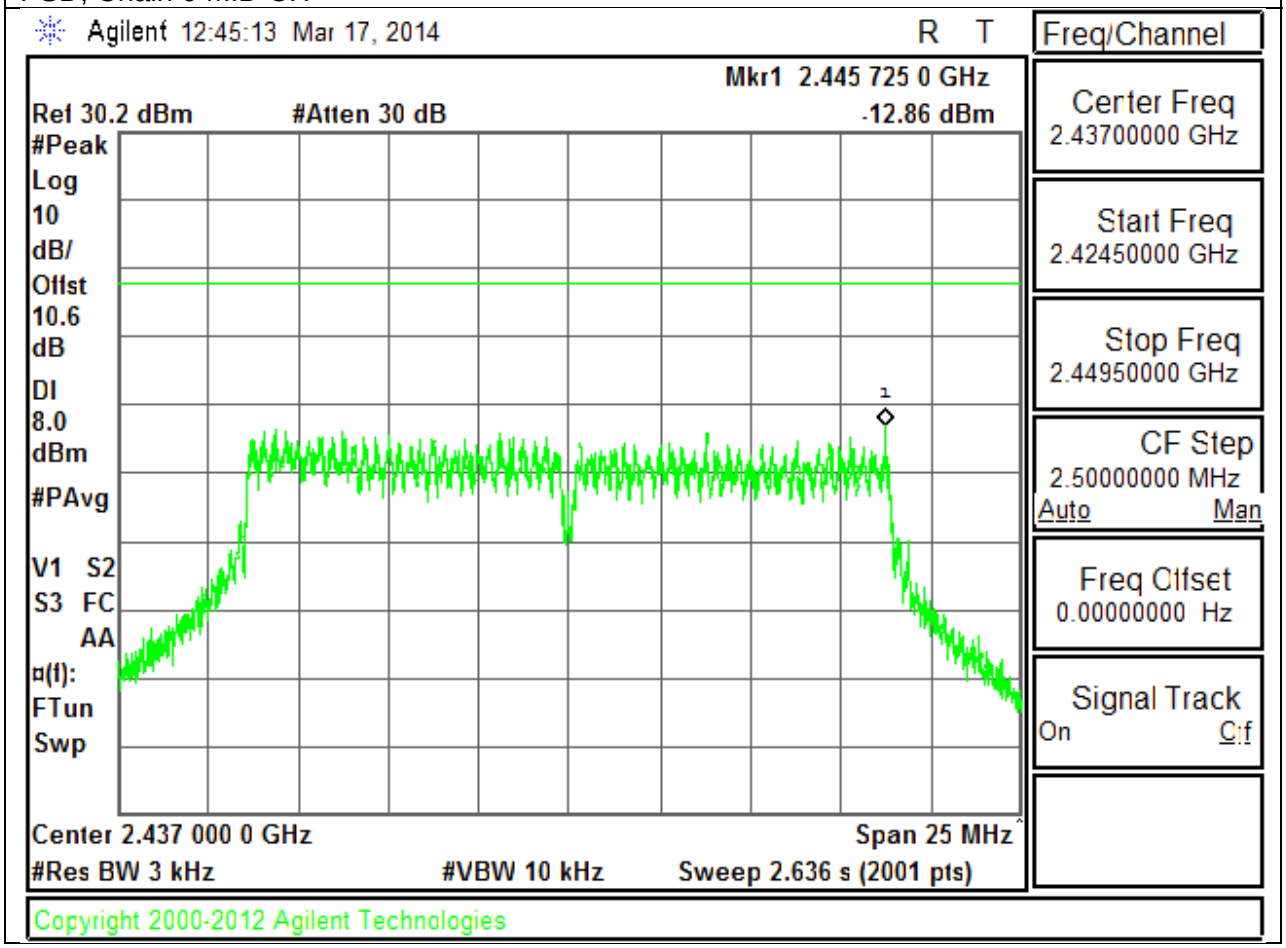
802.11n PSD, Chain 0

PSD, Chain 0 MID CH



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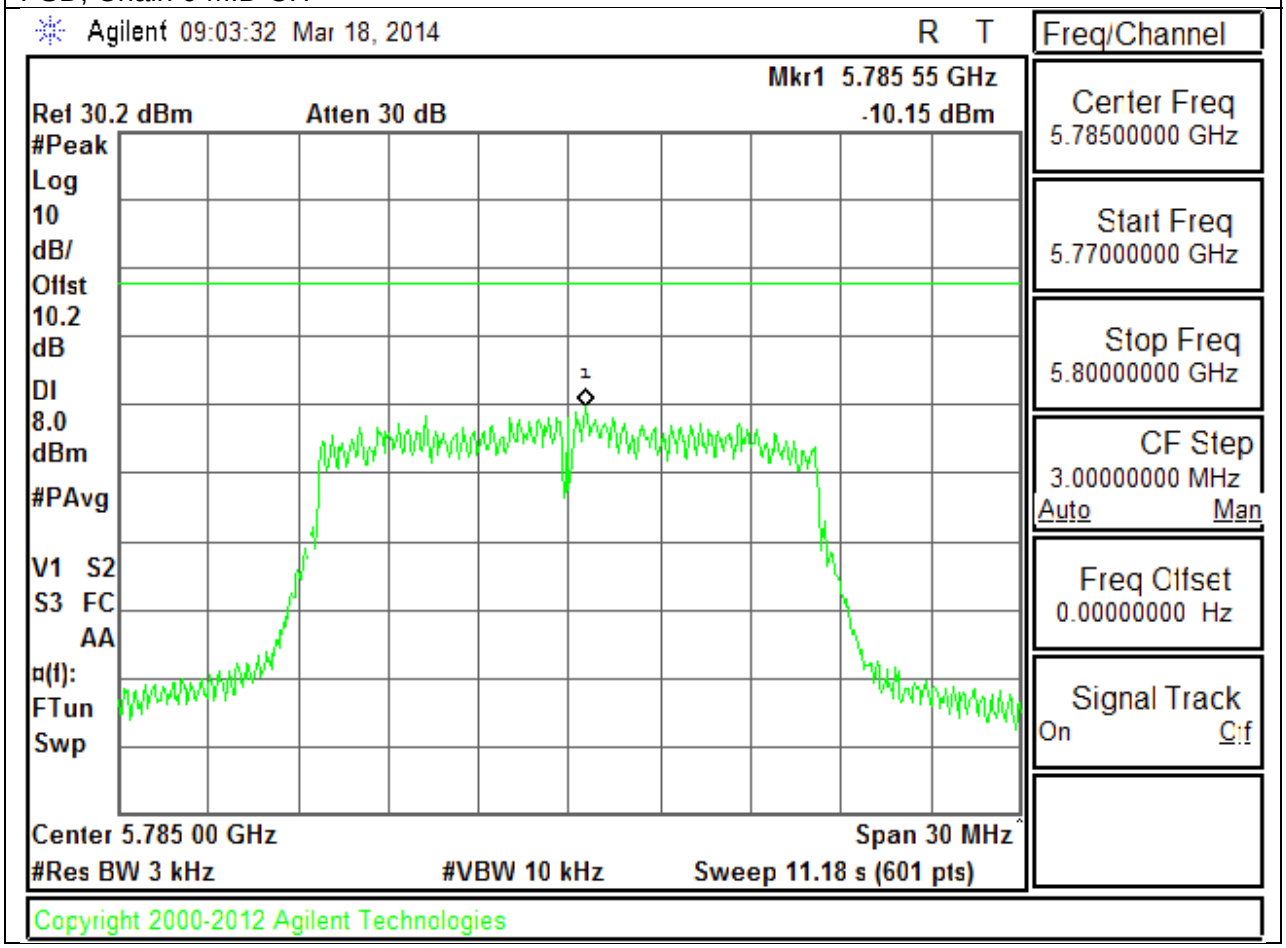
802.11a 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



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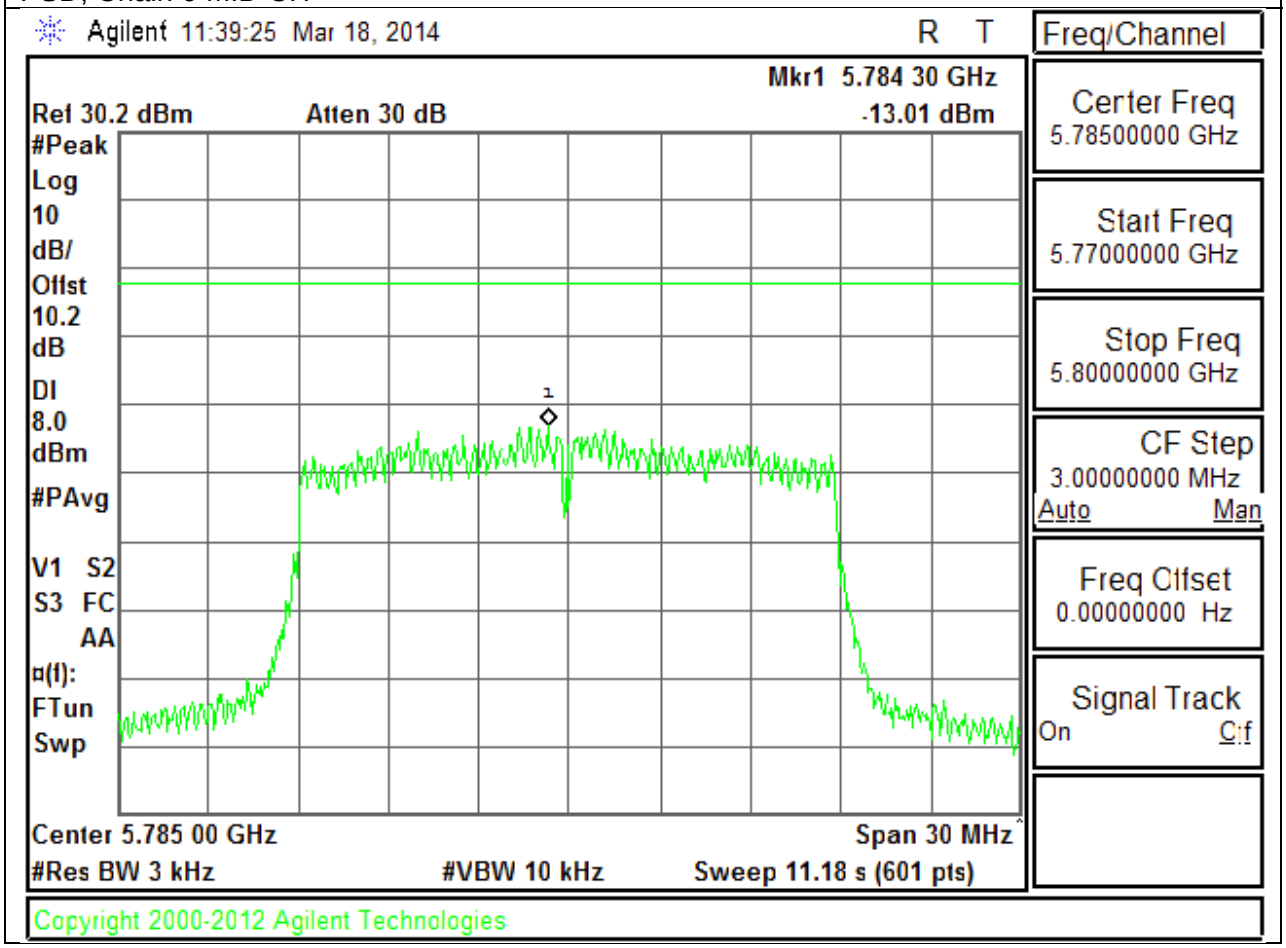
802.11n HT20 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



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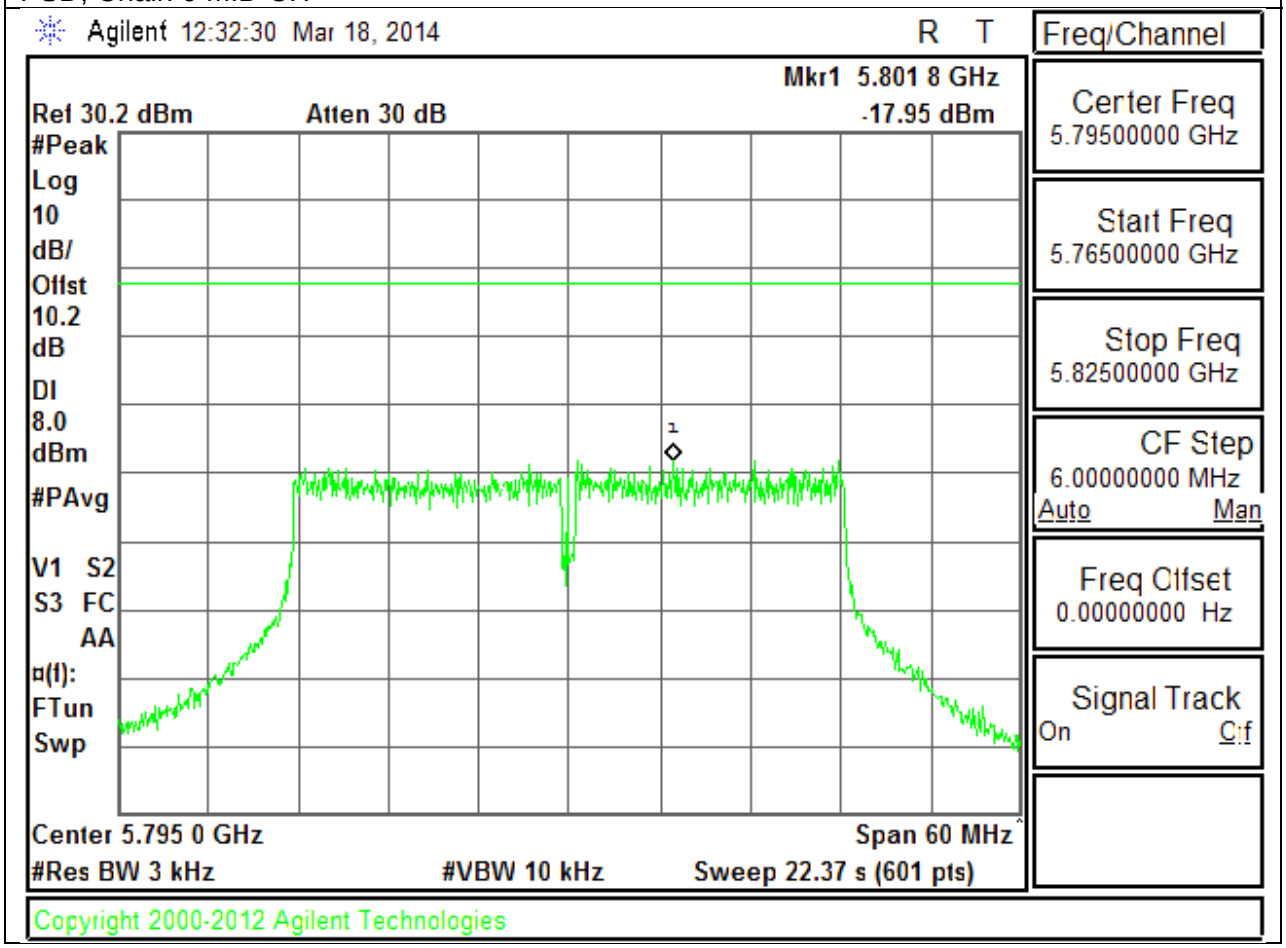
802.11n HT40 5.8GHz PSD, Chain 0

PSD, Chain 0 MID CH



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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.

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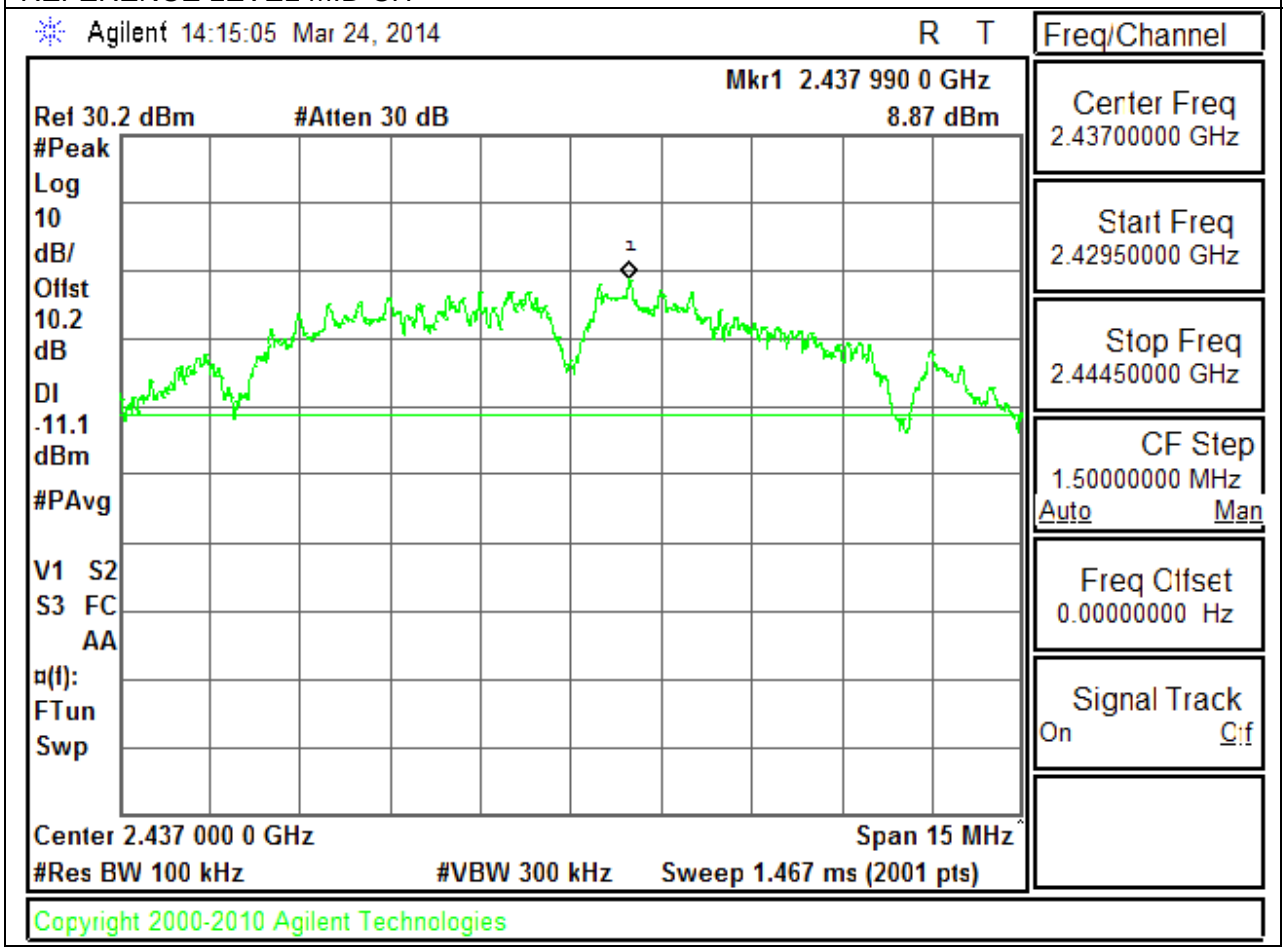
RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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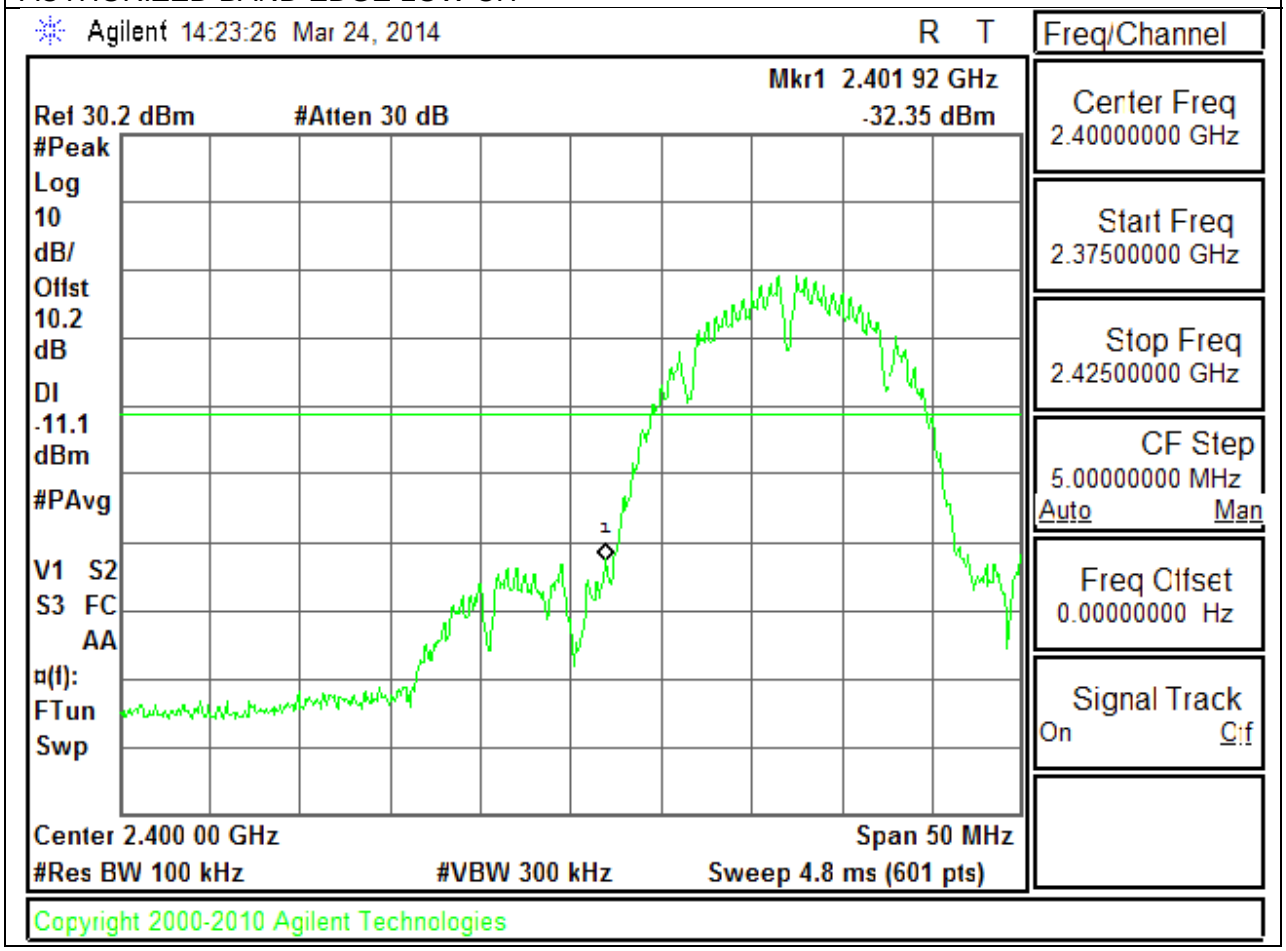
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



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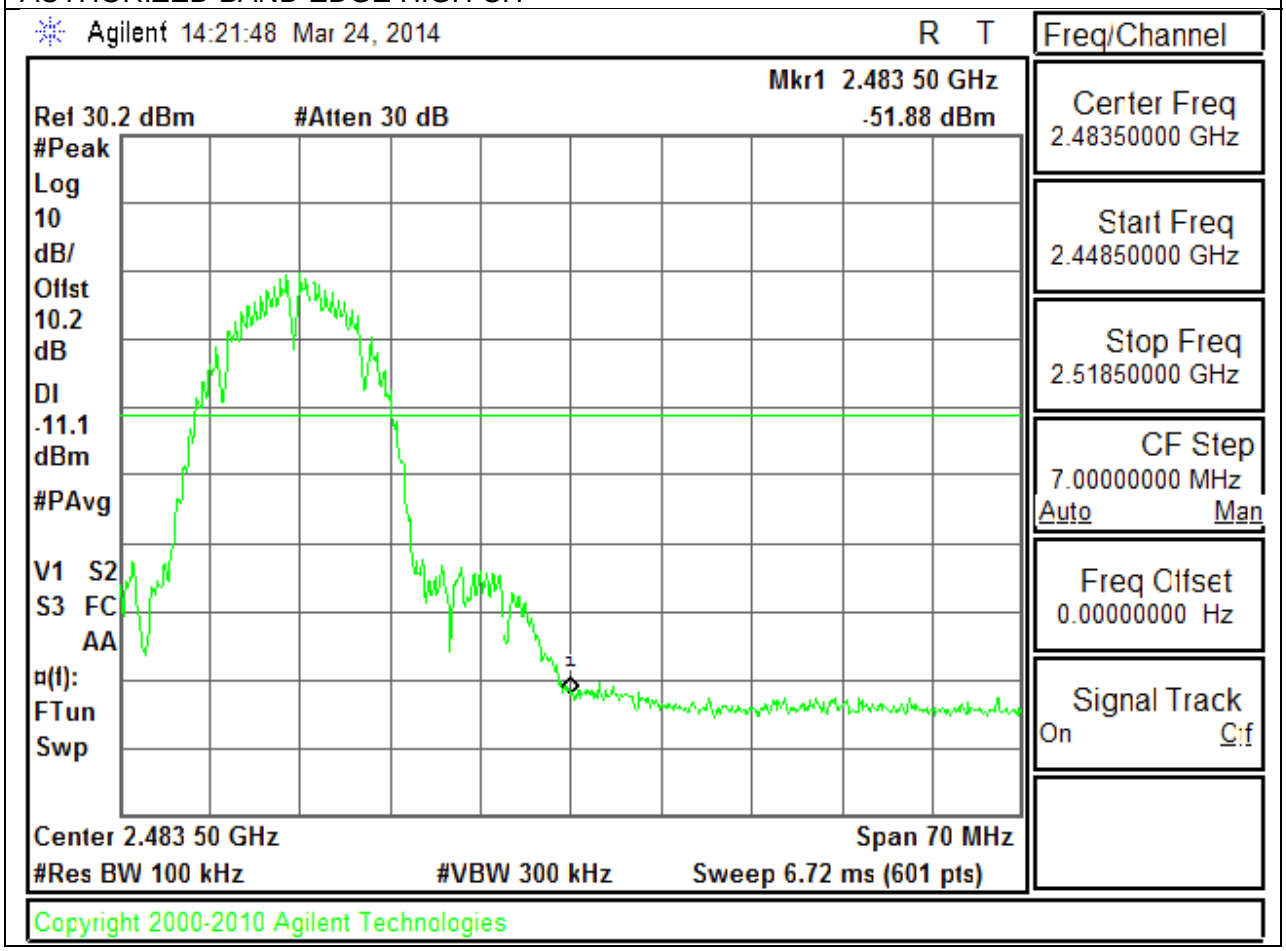
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



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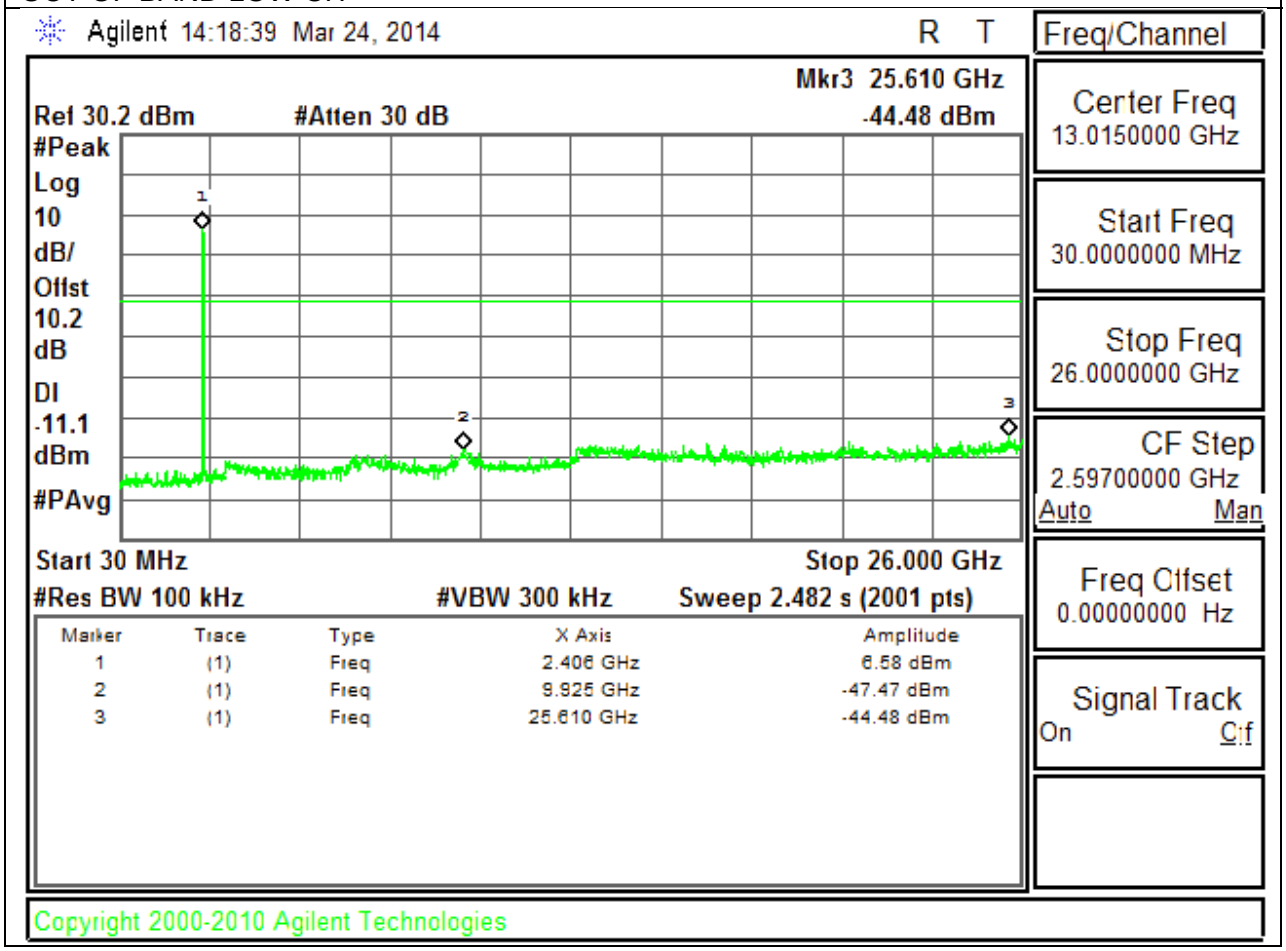
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND MID CH

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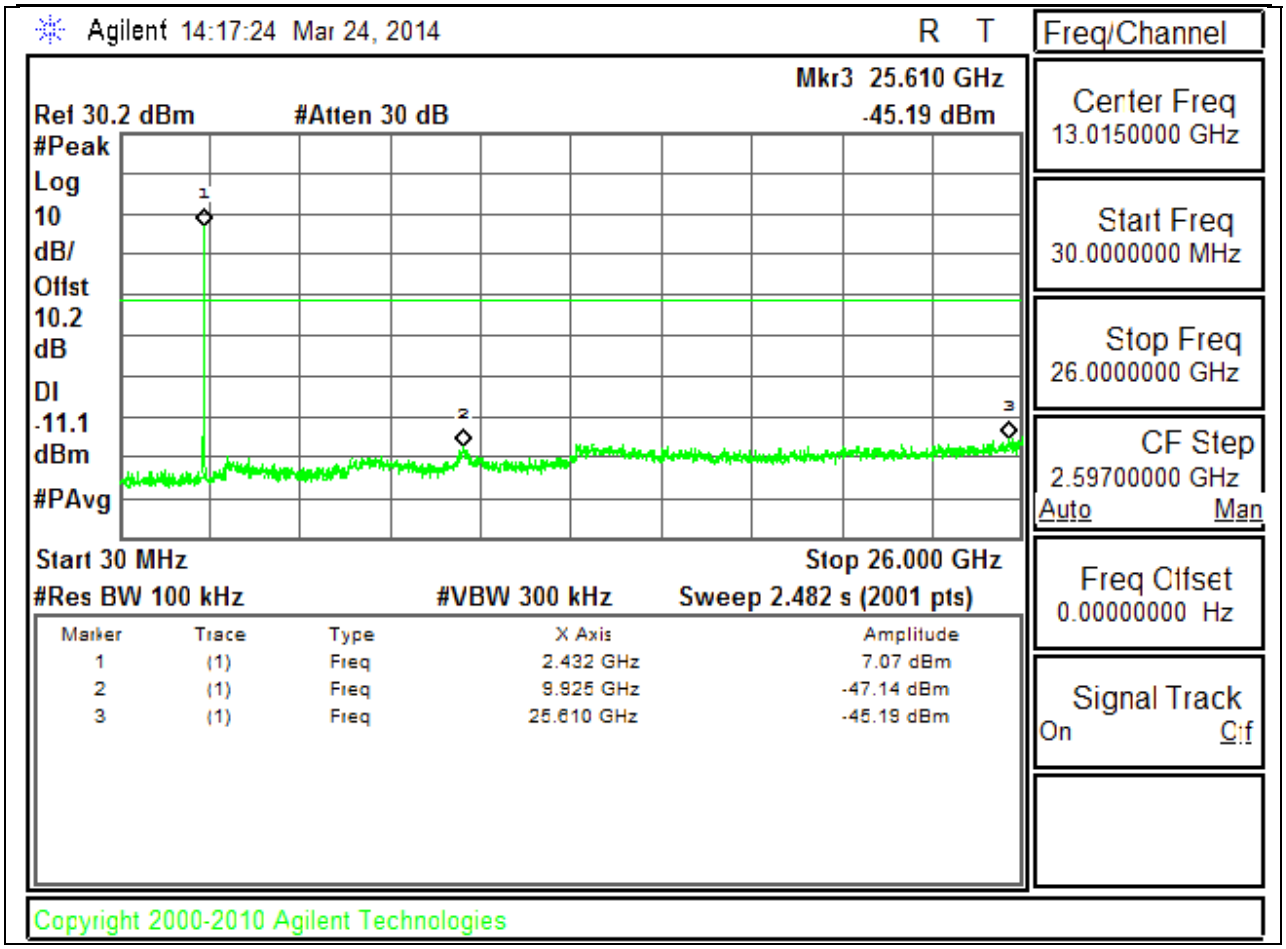

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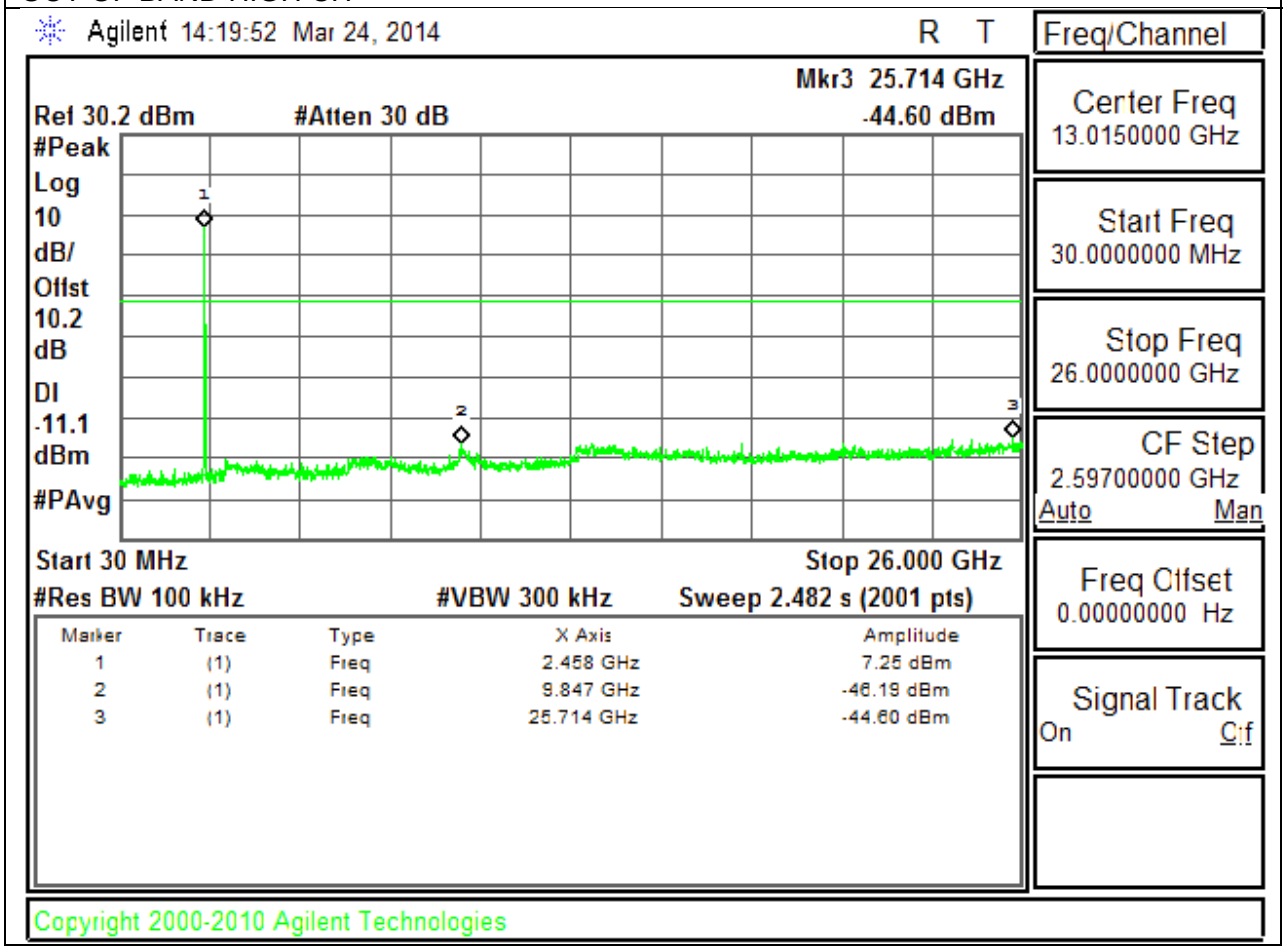
OUT OF BAND HIGH CH



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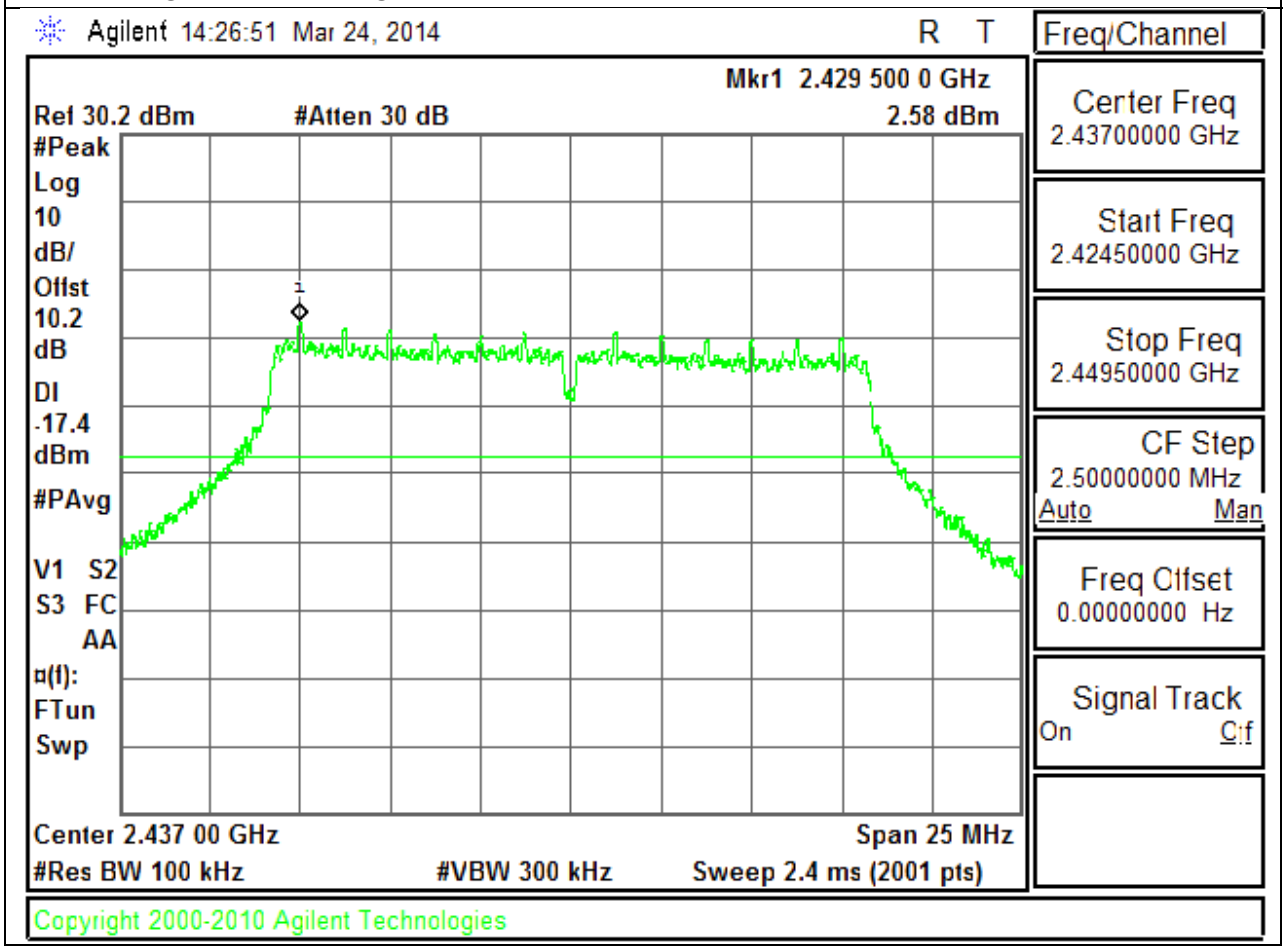
9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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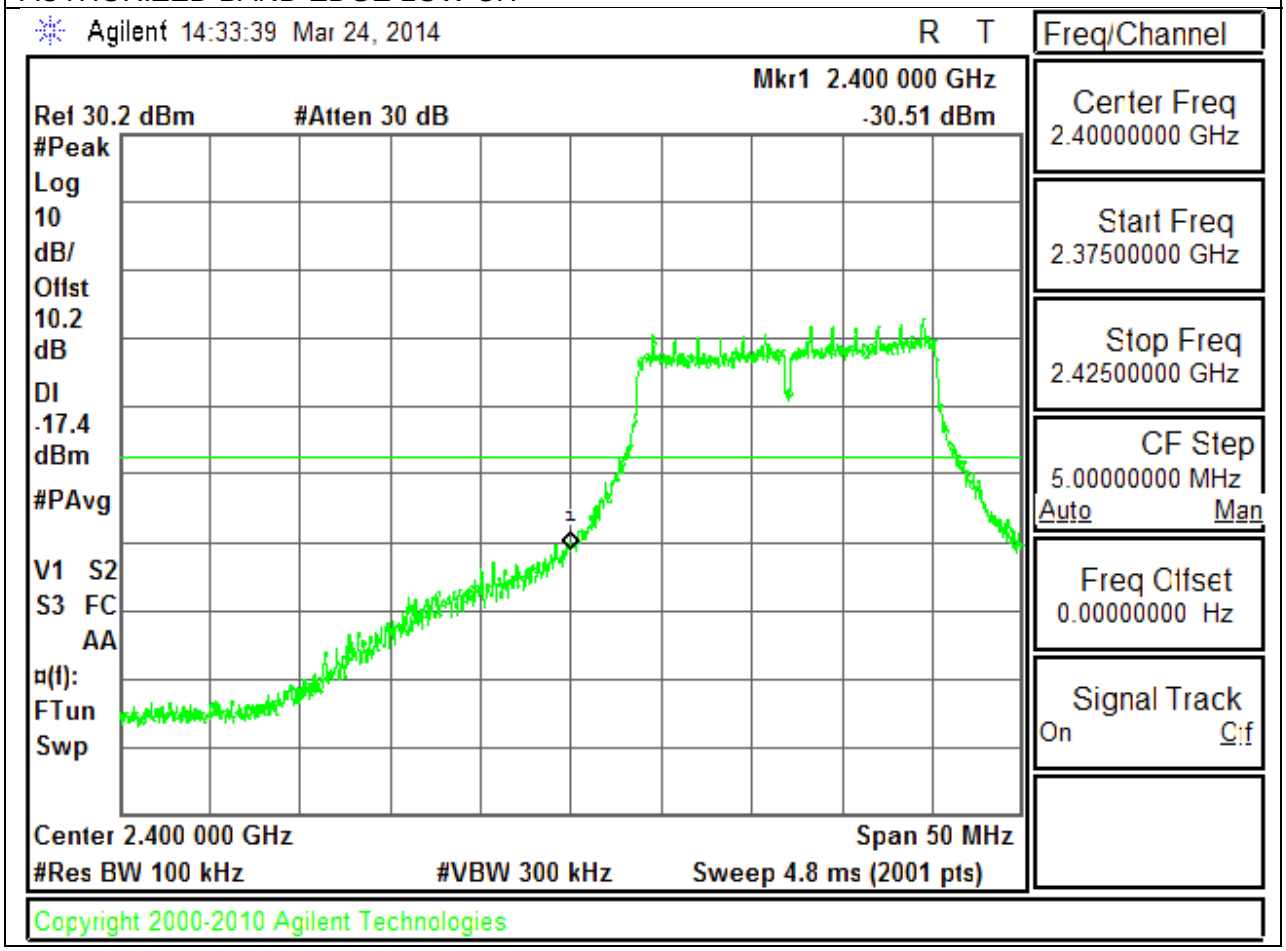
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



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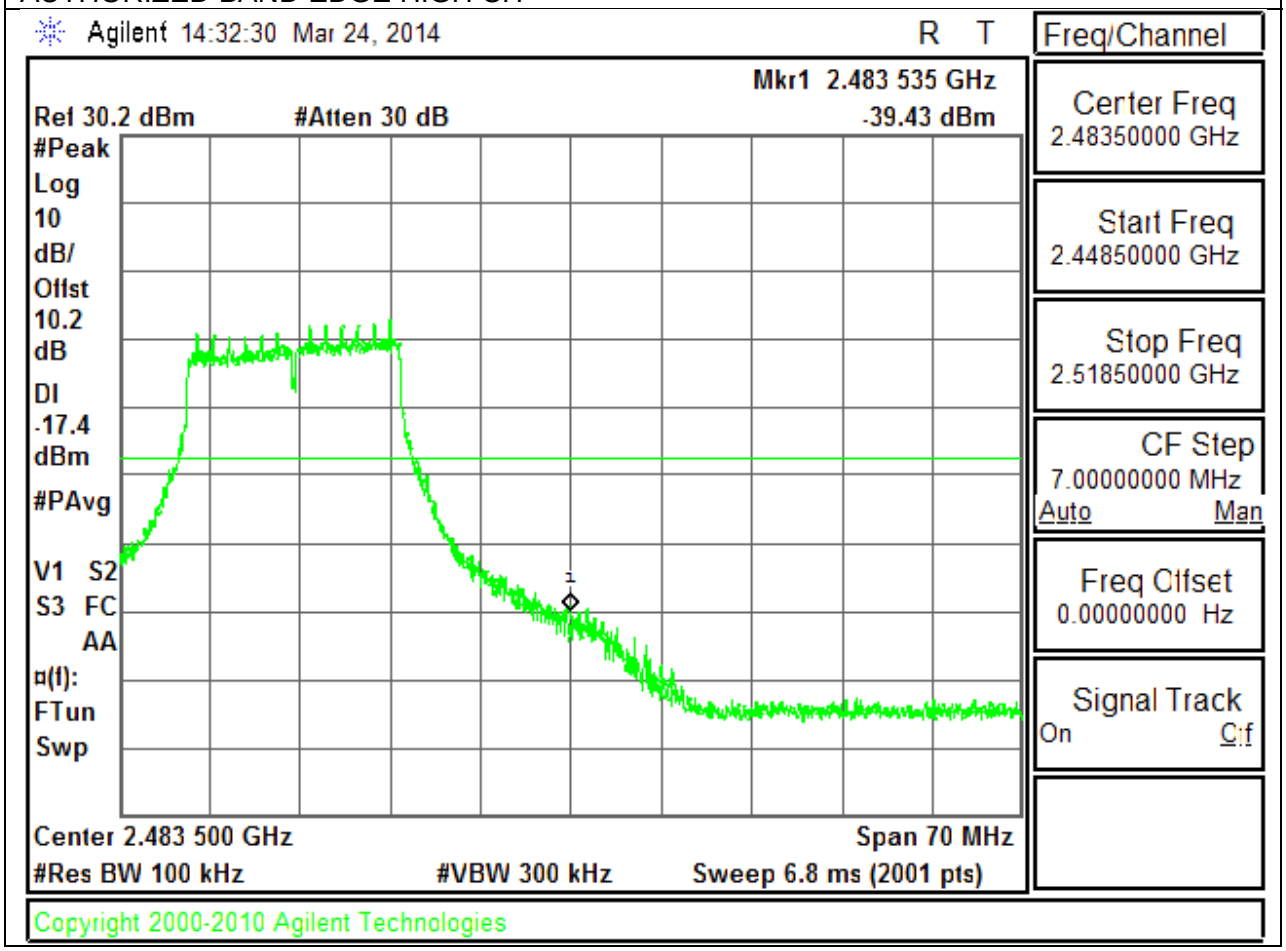
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



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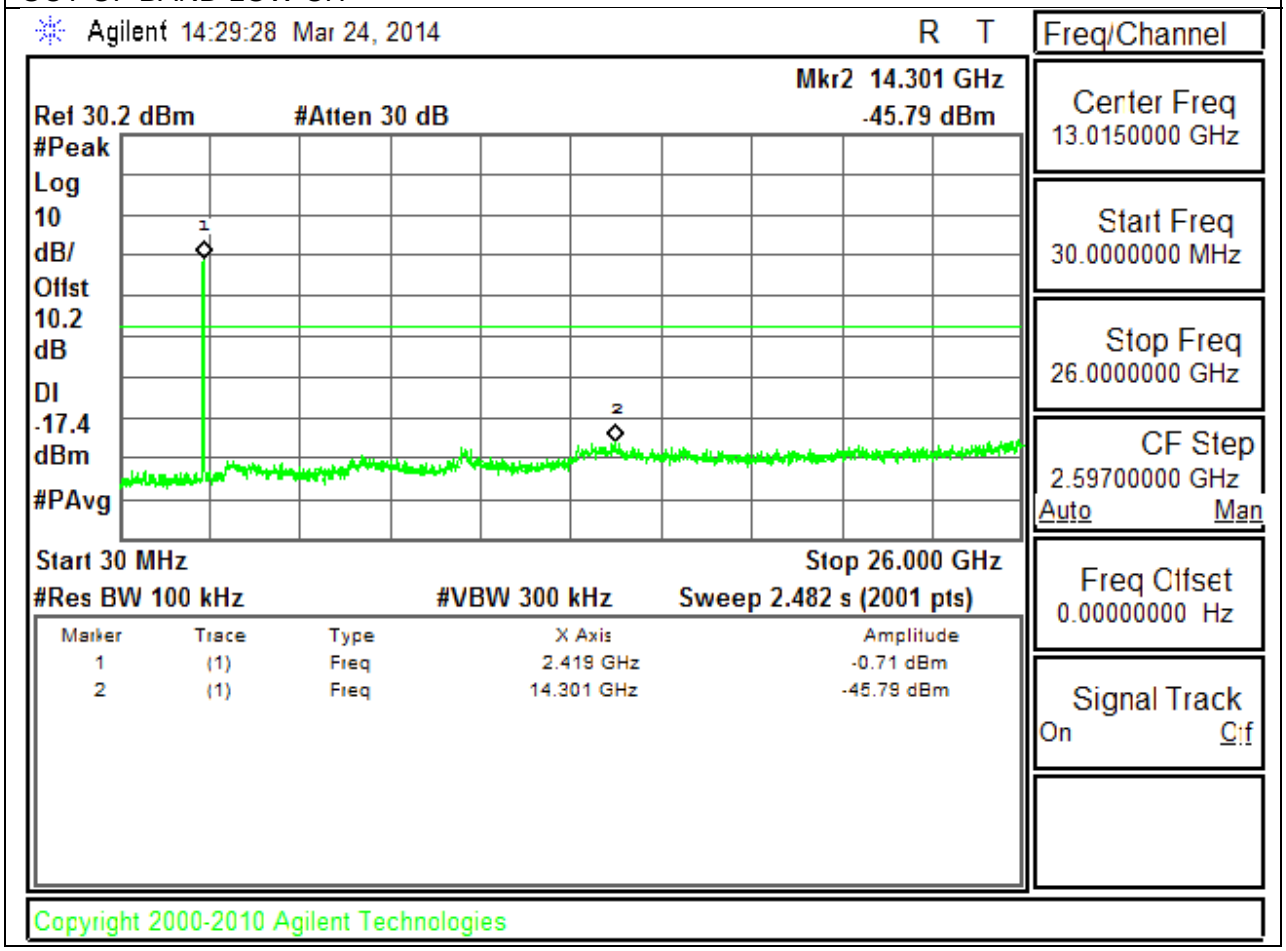
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND MID CH

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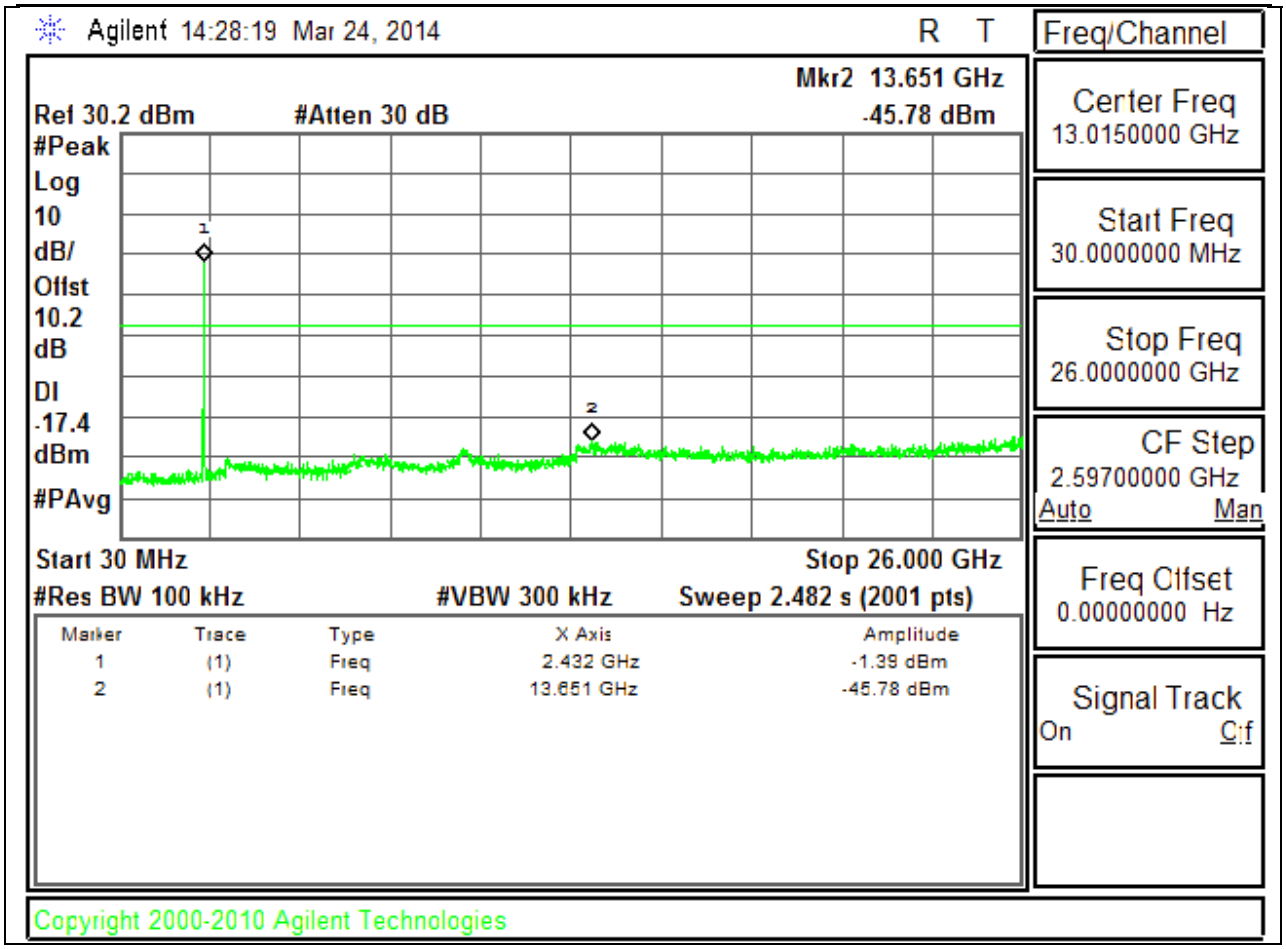

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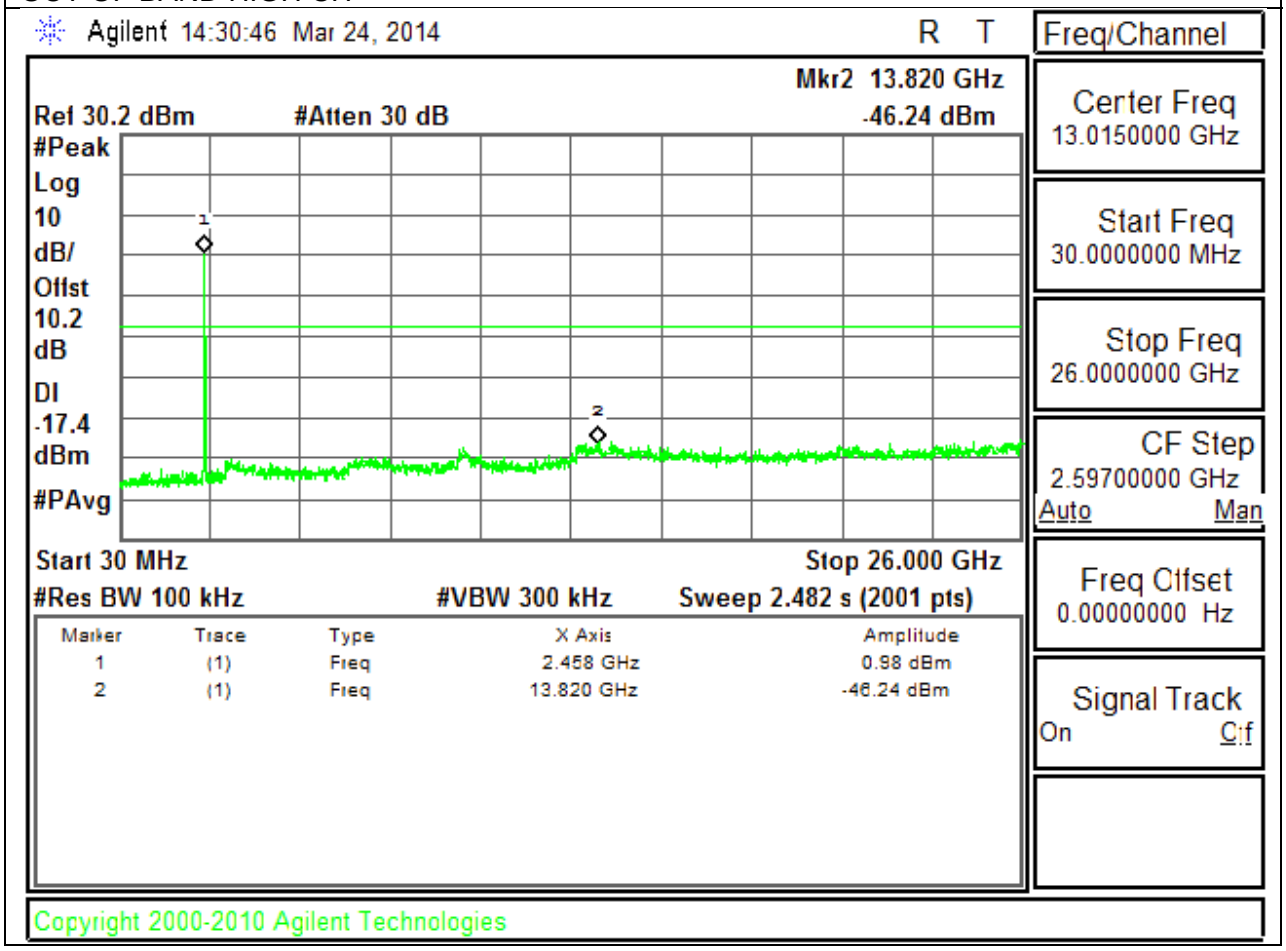
OUT OF BAND HIGH CH



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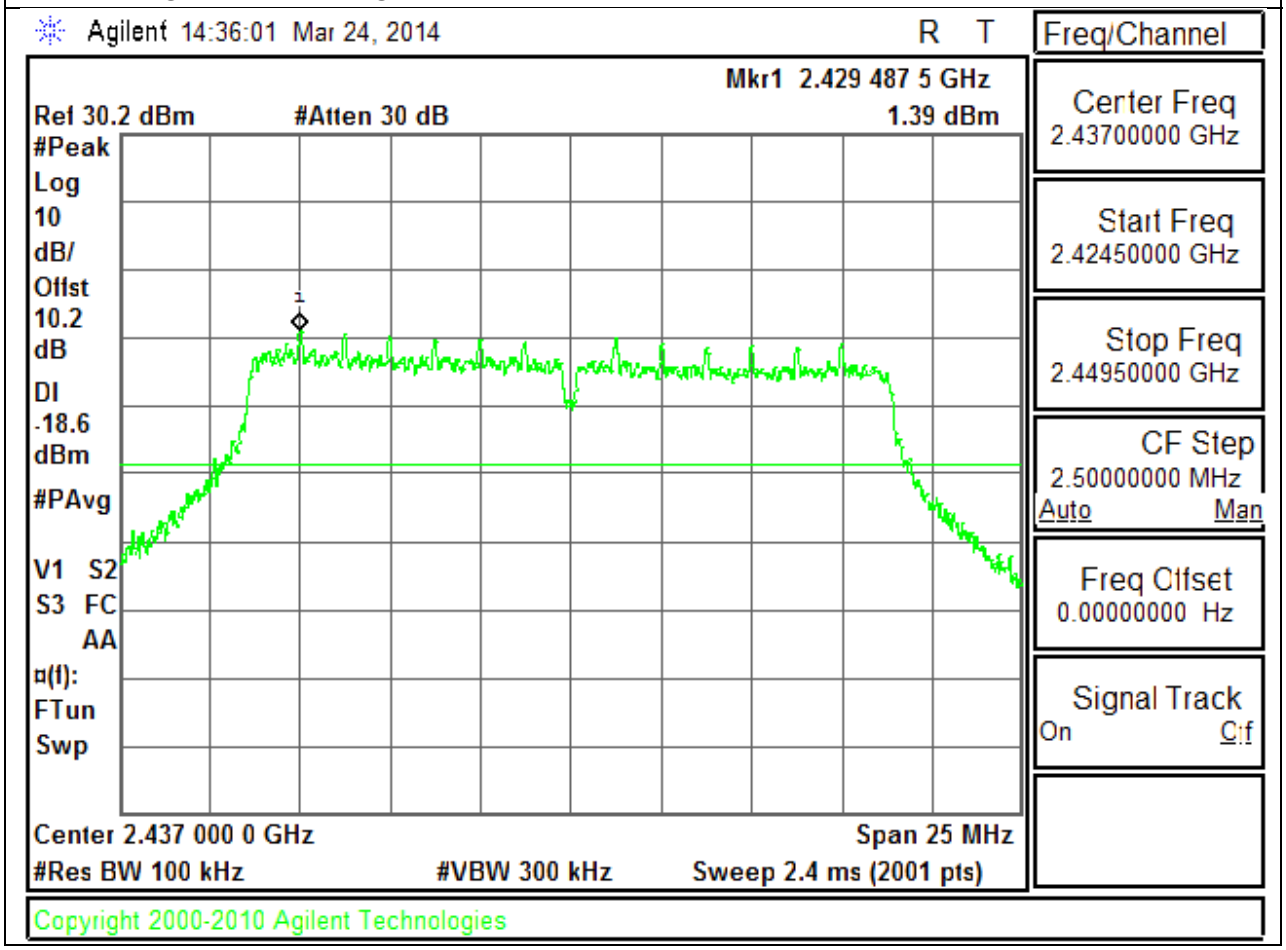
9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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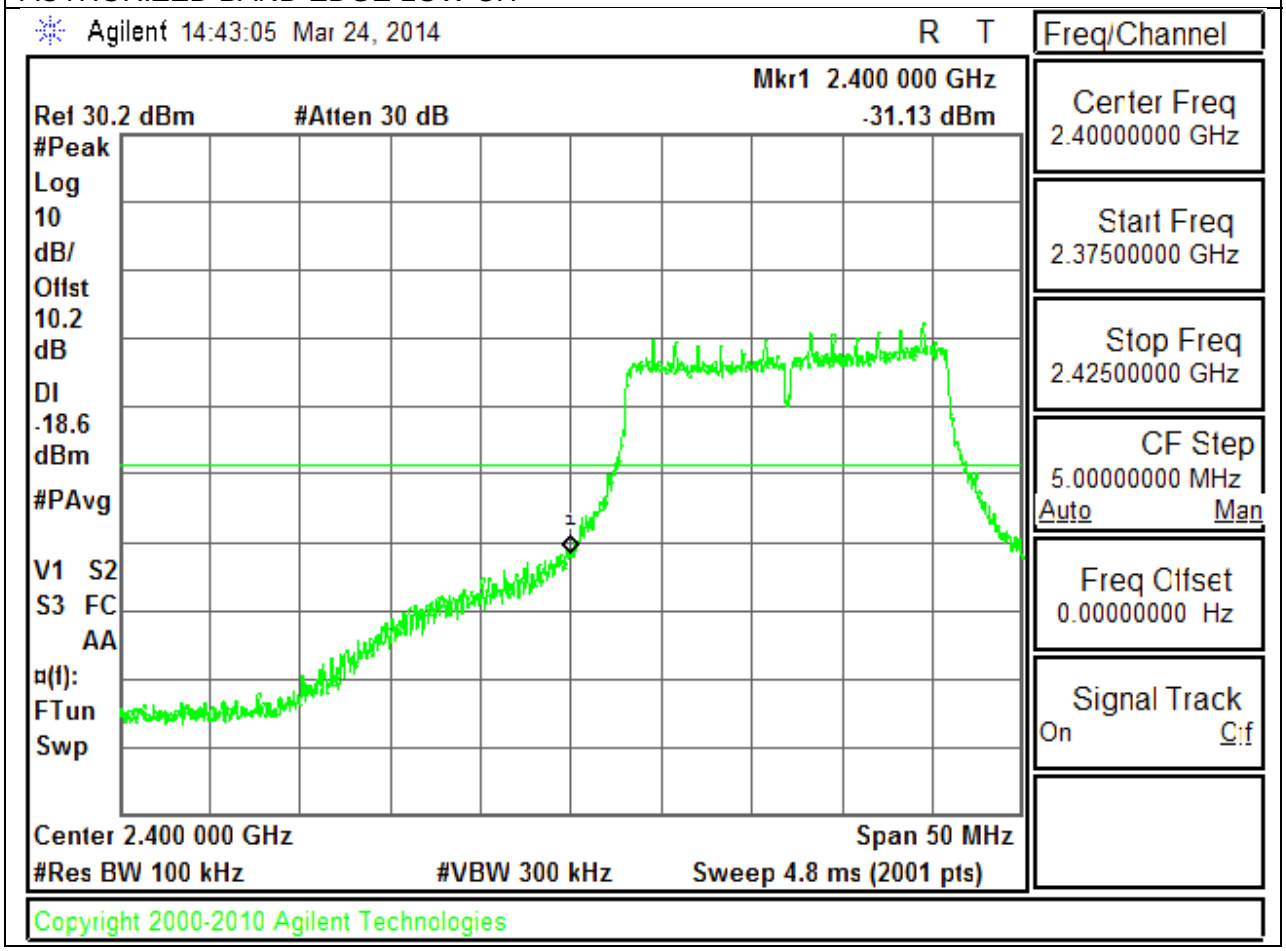
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



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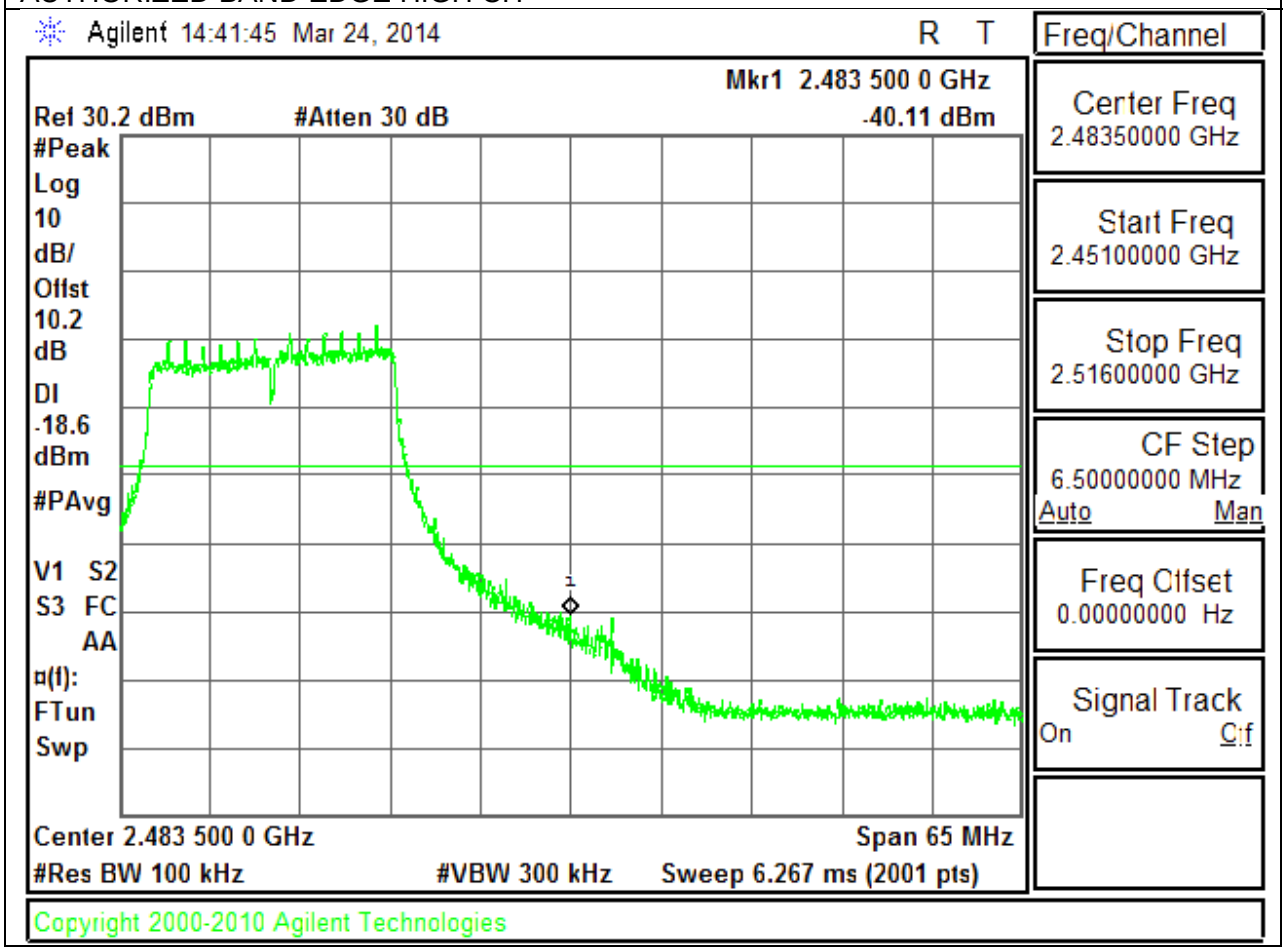
HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH



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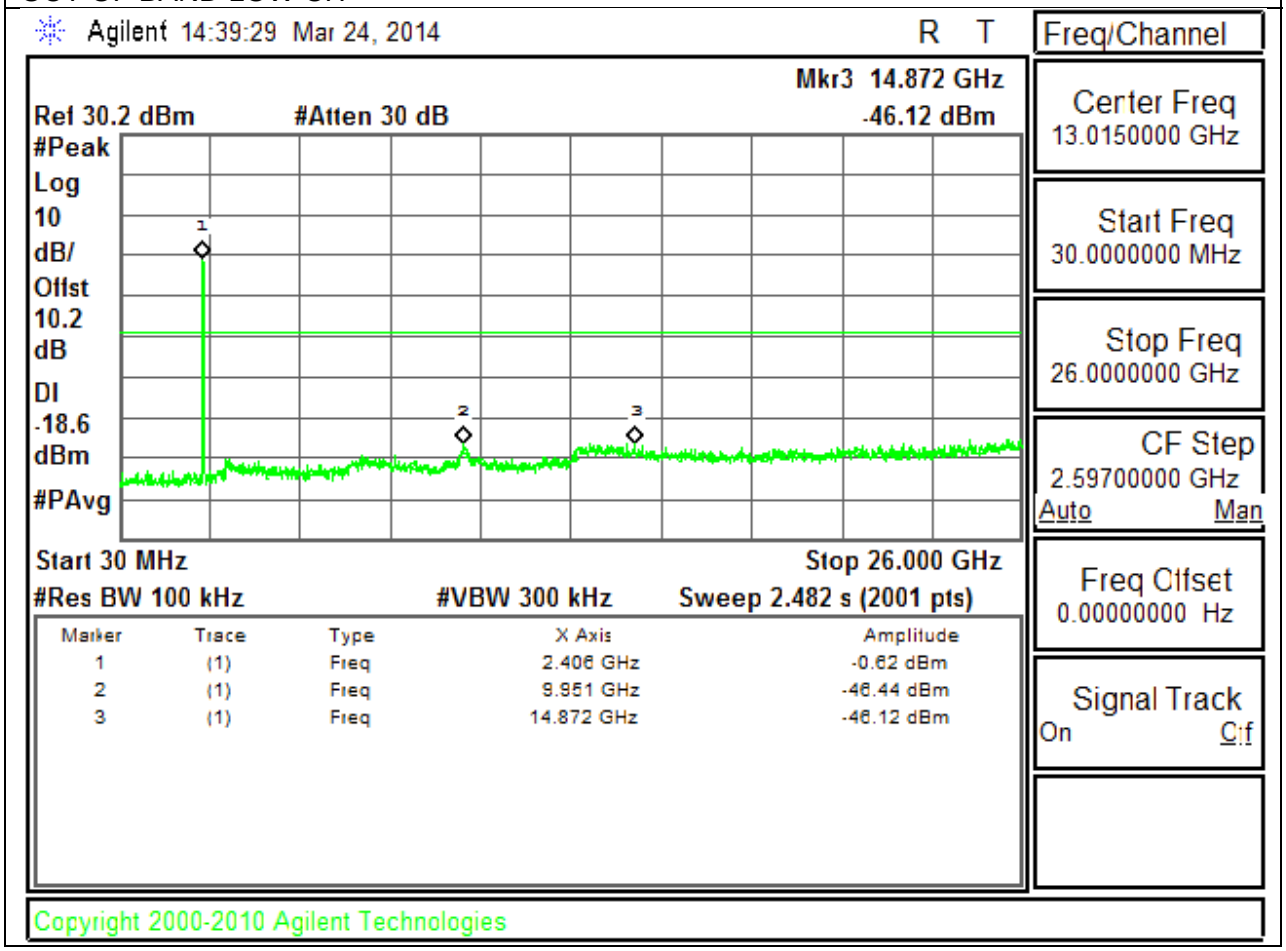
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND MID CH

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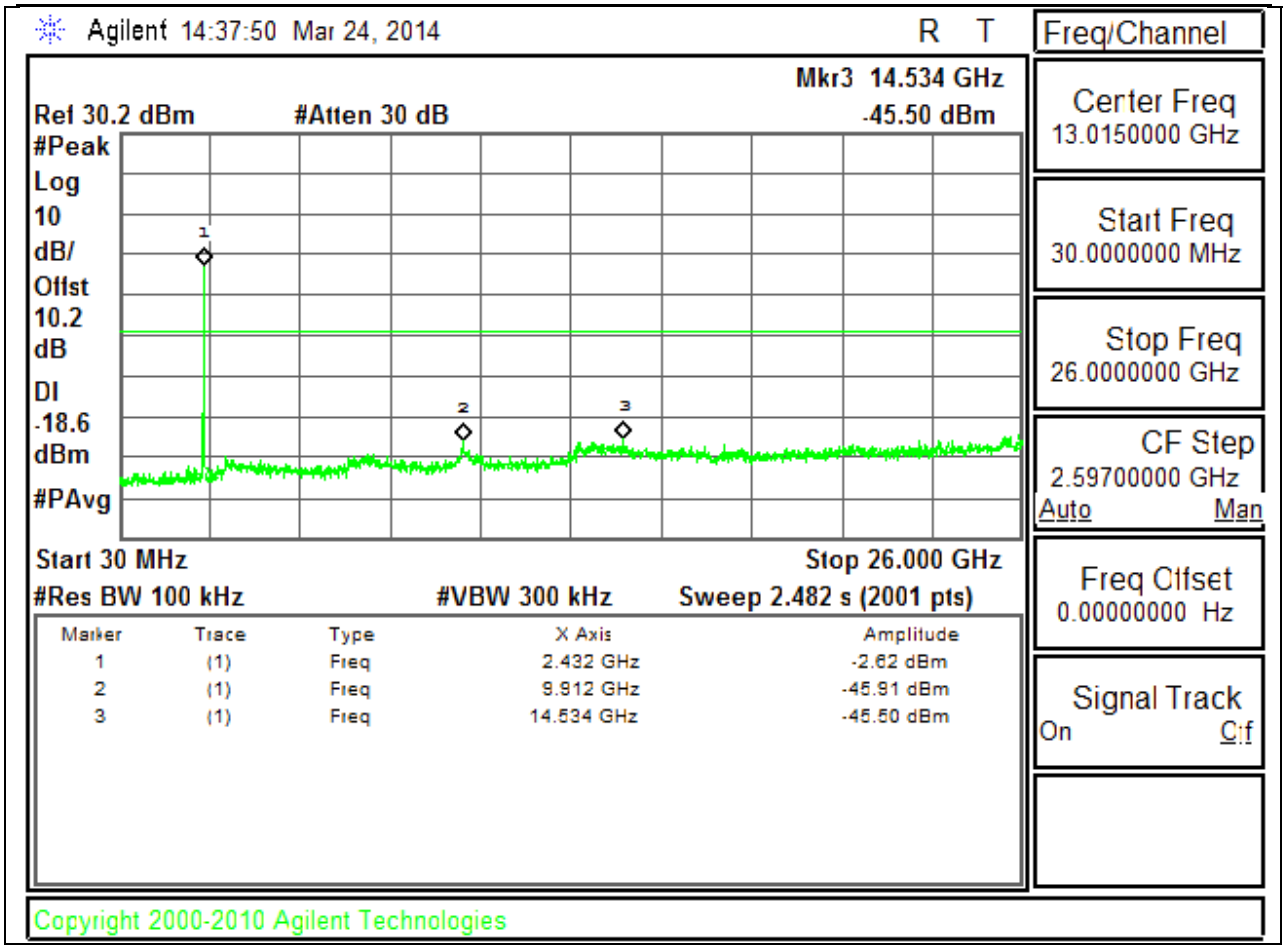

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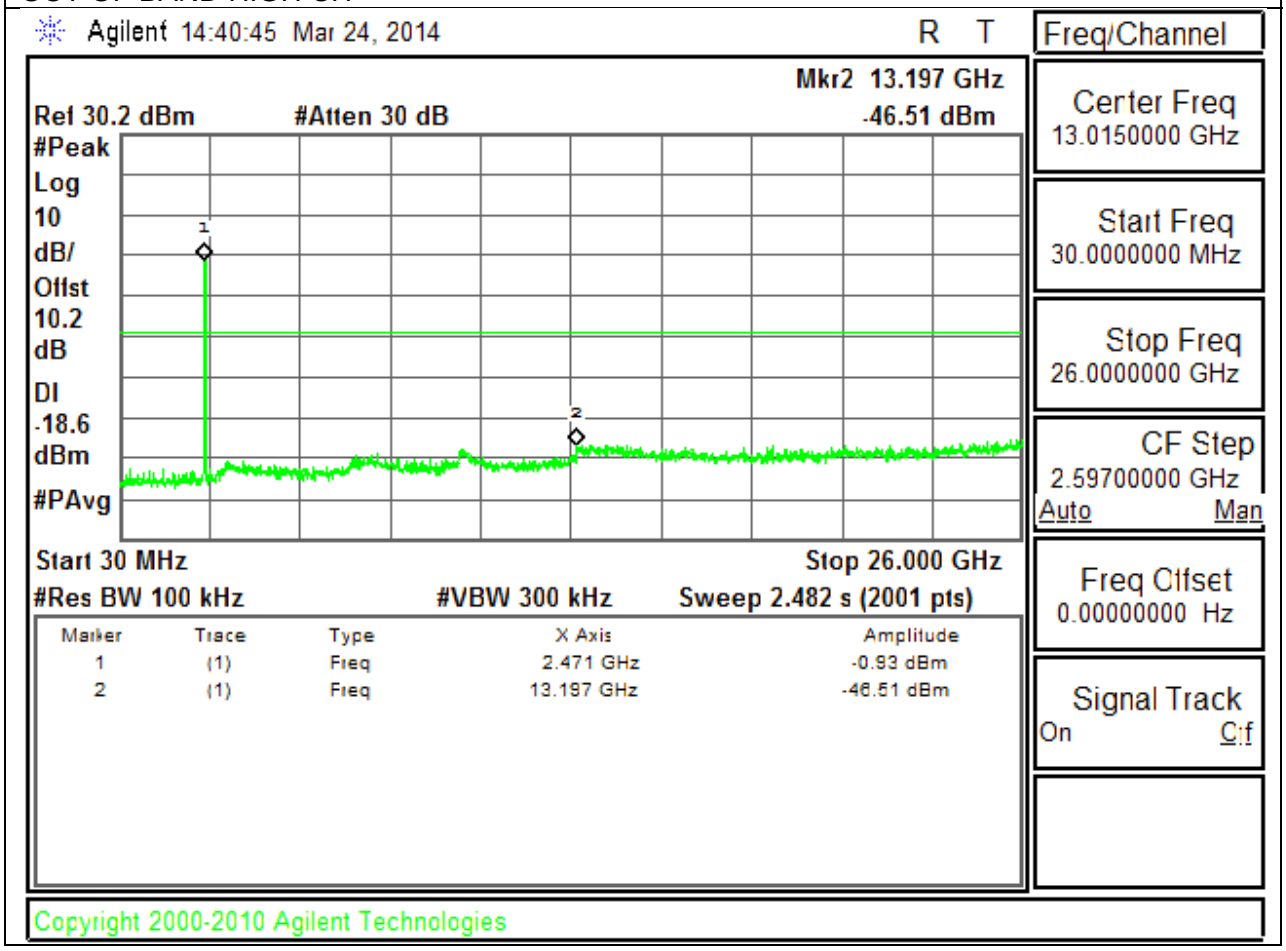
OUT OF BAND HIGH CH



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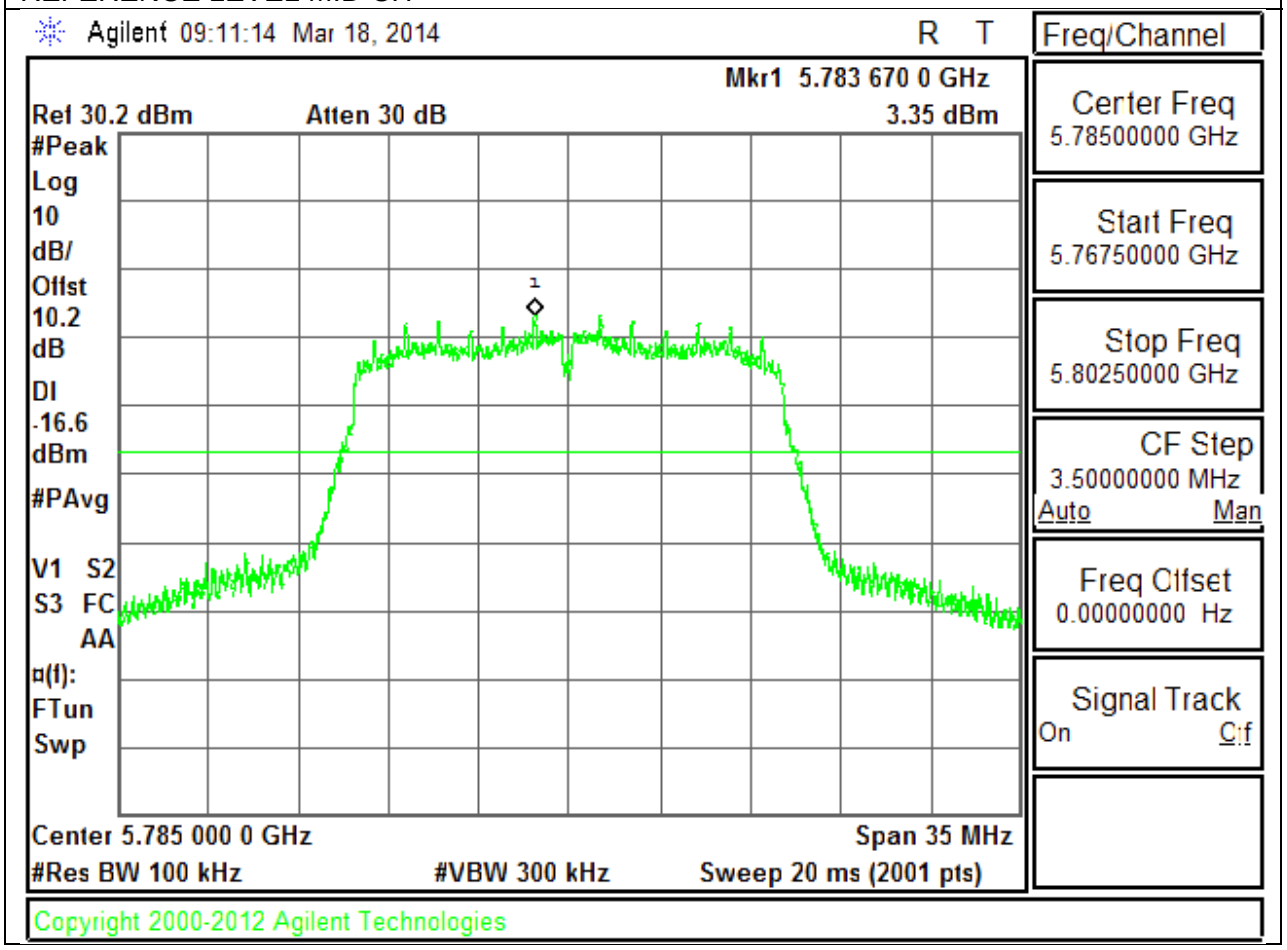
9.6.4. 802.11a MODE IN THE 5.8 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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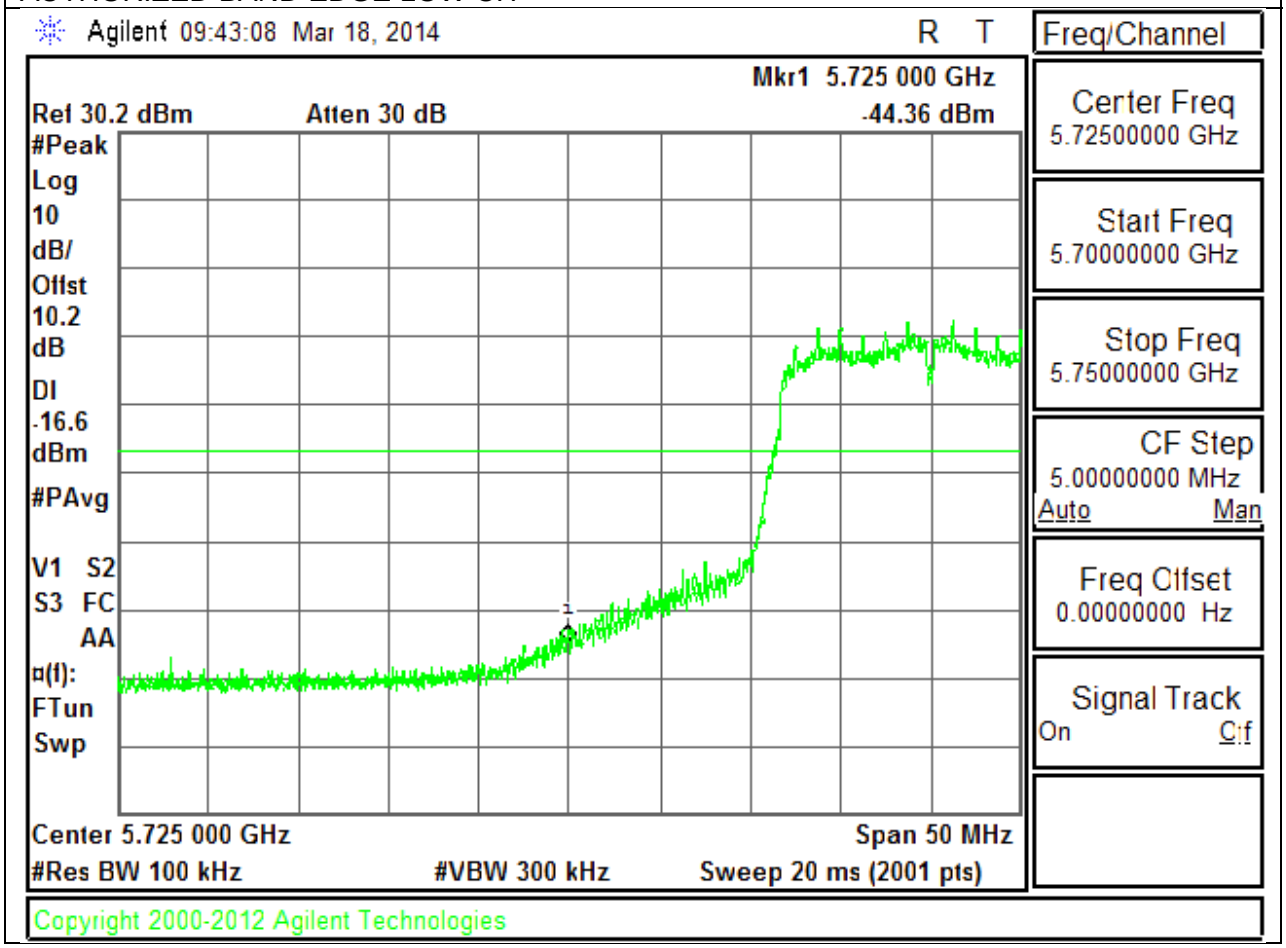
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

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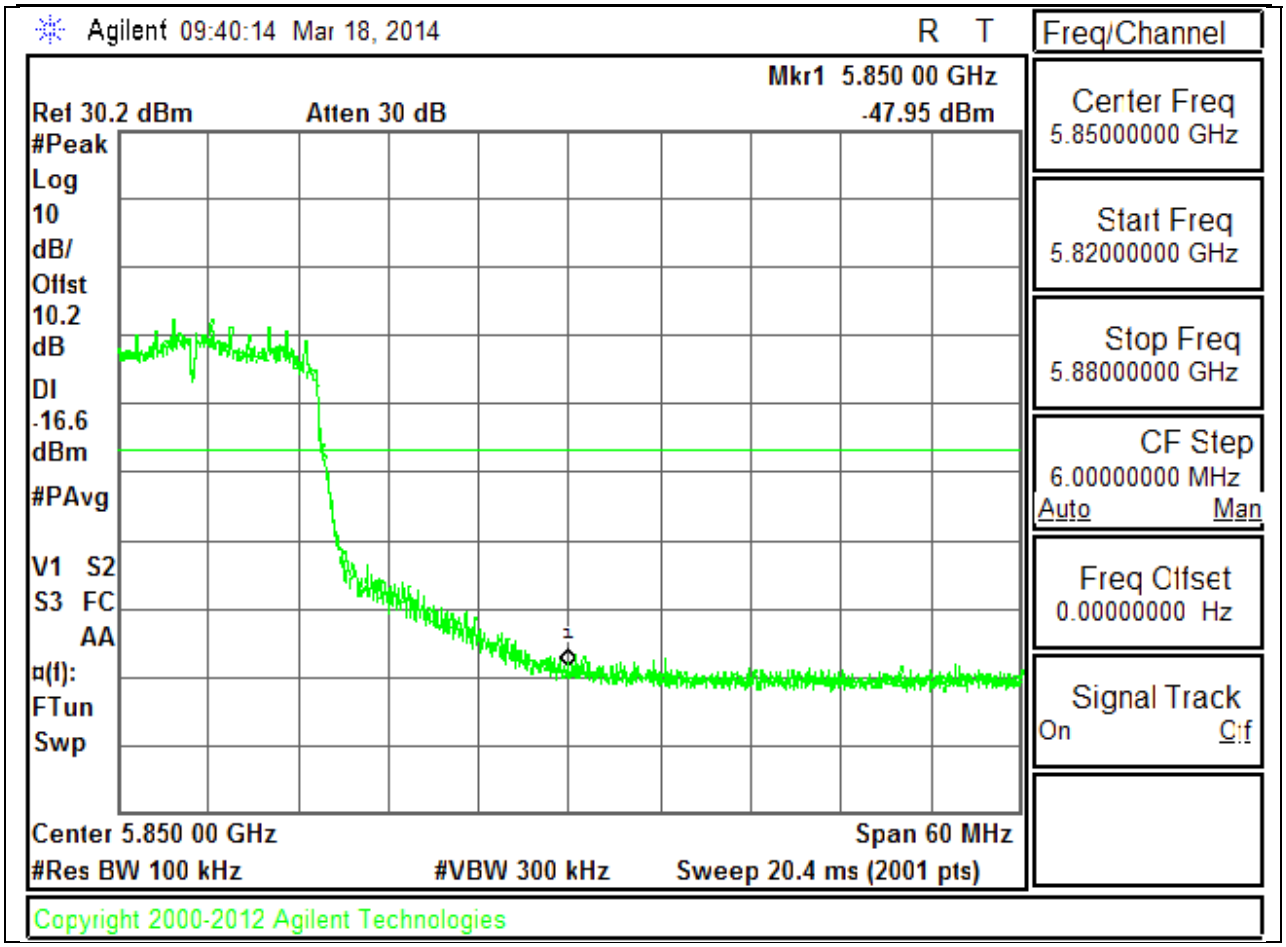

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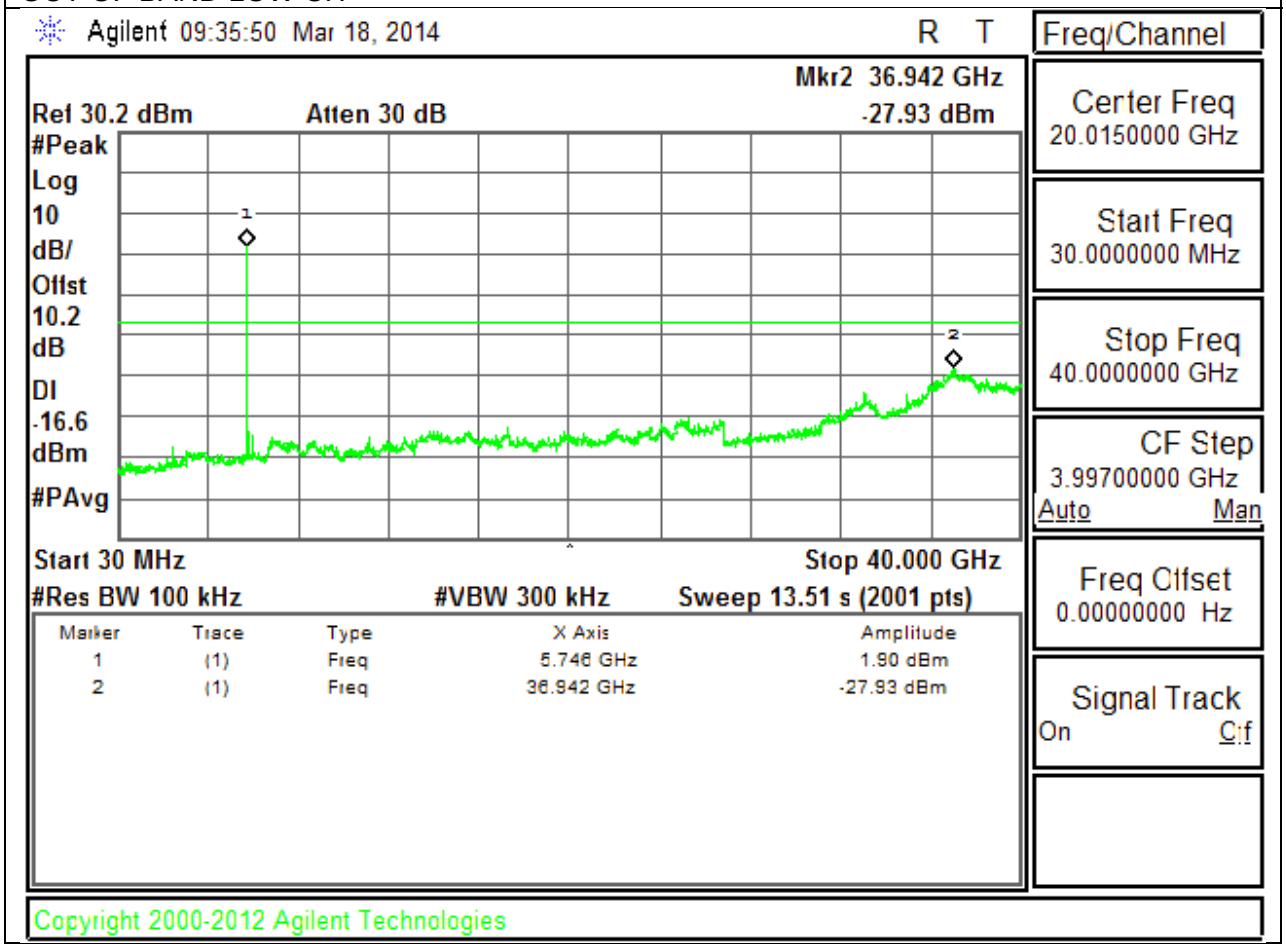
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND MID CH

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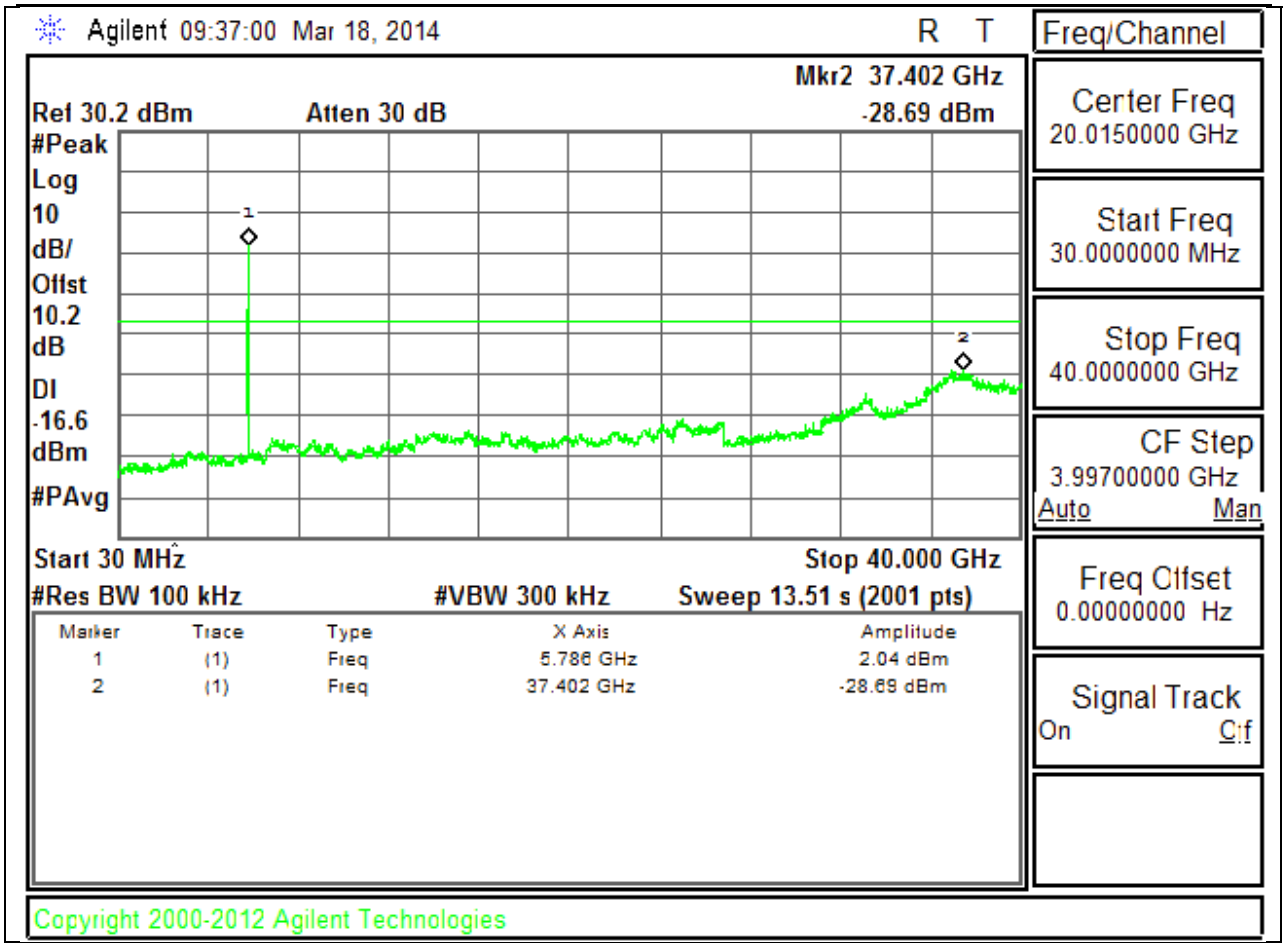

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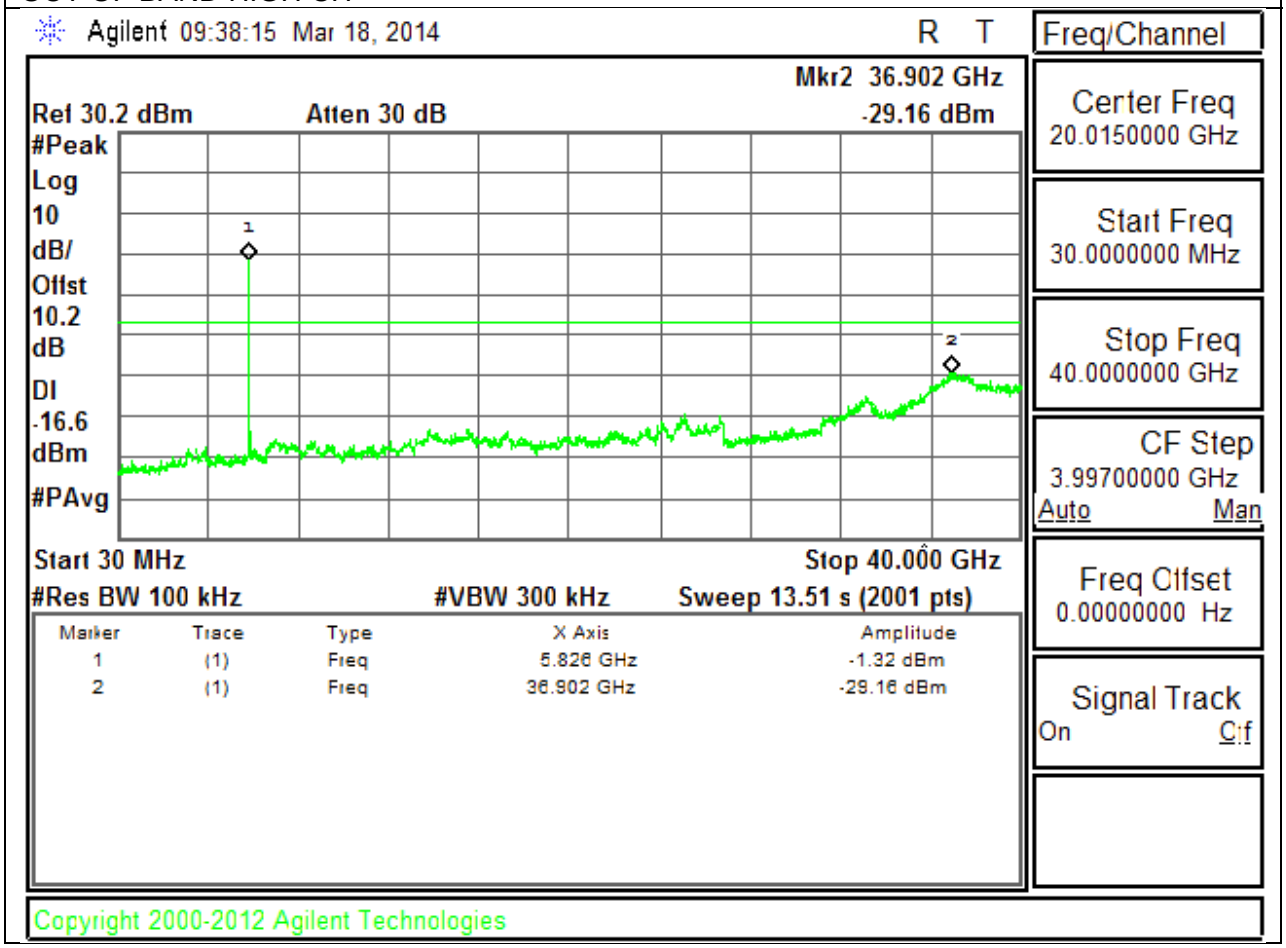
OUT OF BAND HIGH CH



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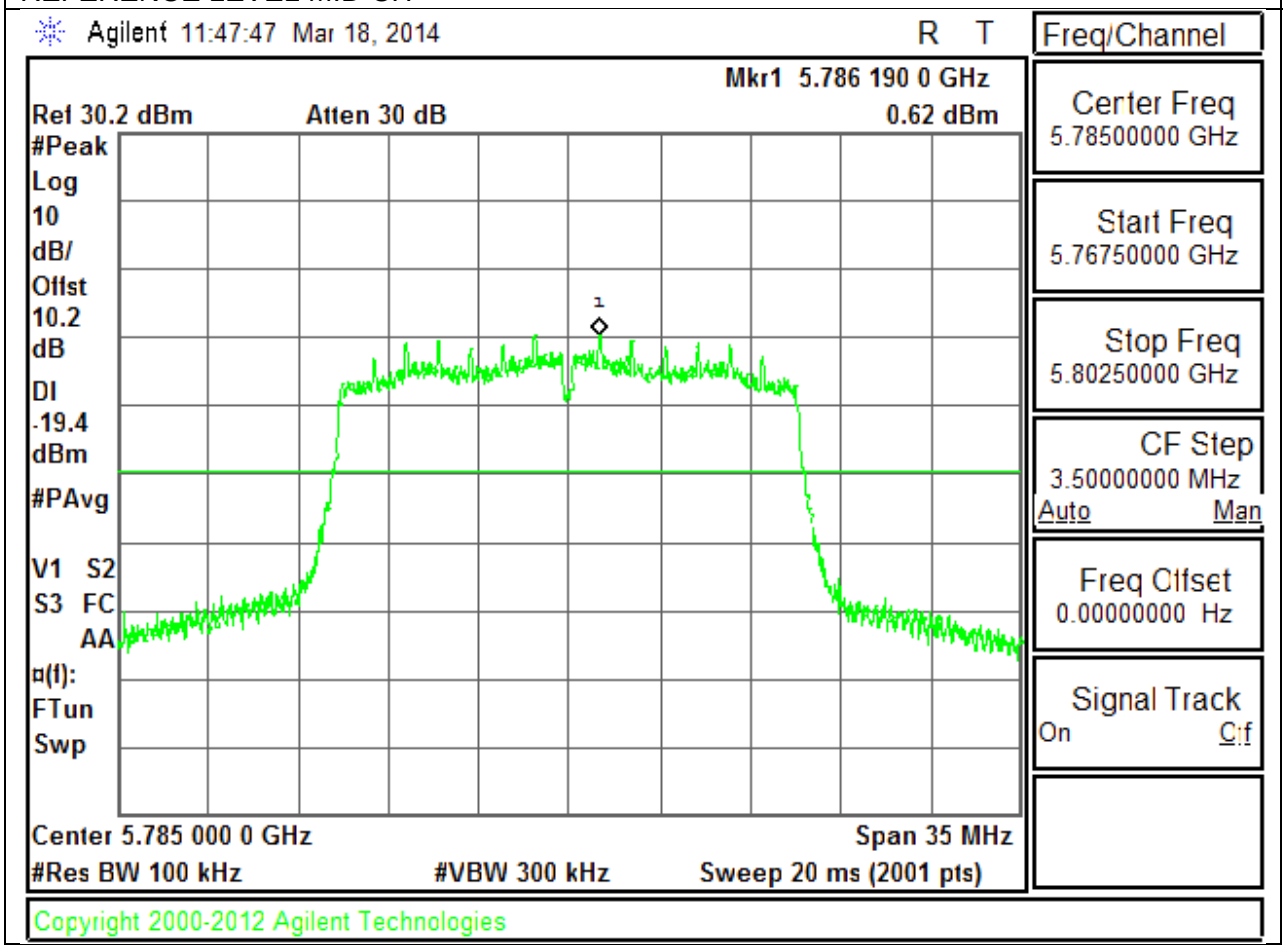
9.6.5. 802.11n MODE IN THE 5.8 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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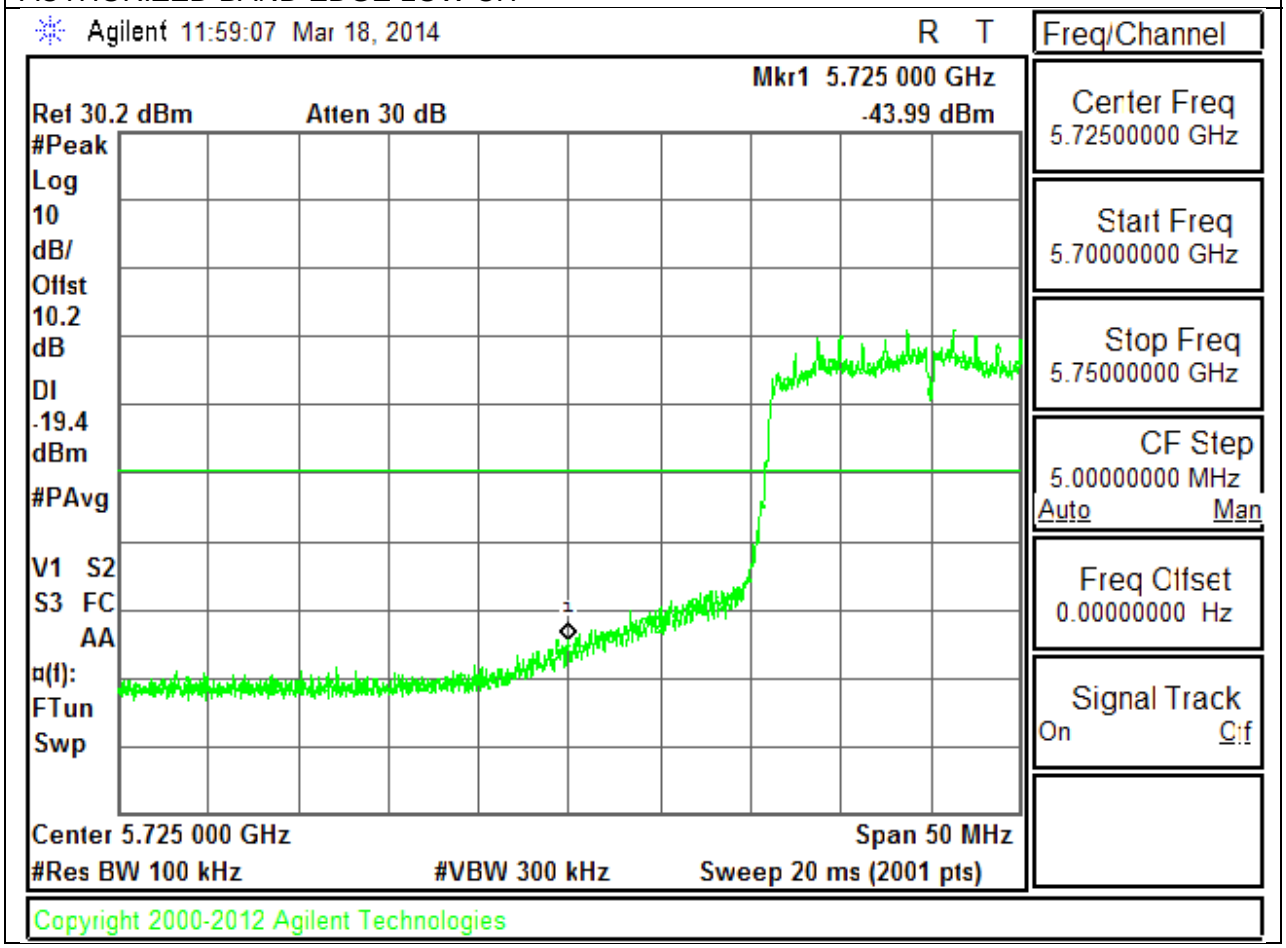
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

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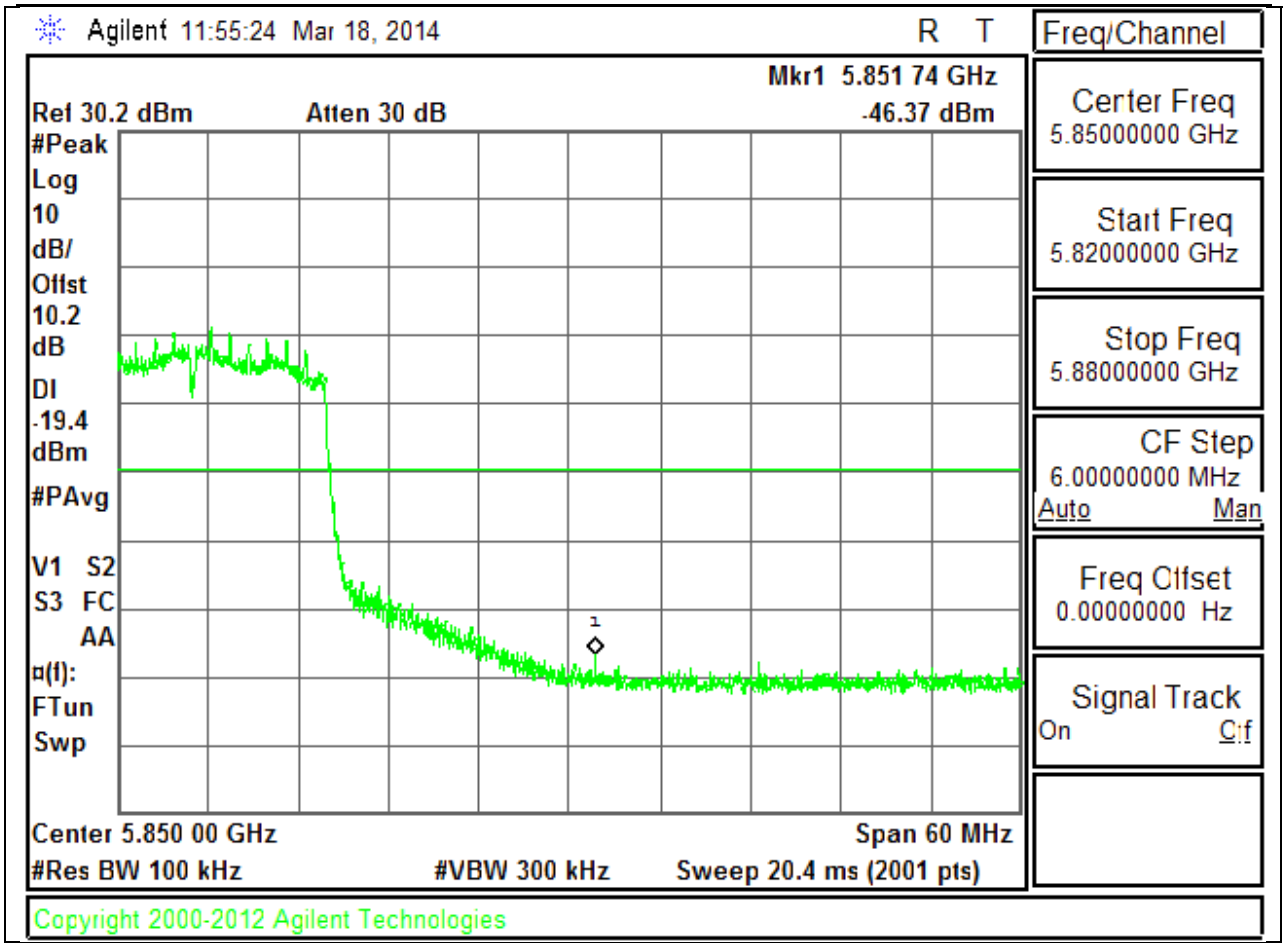

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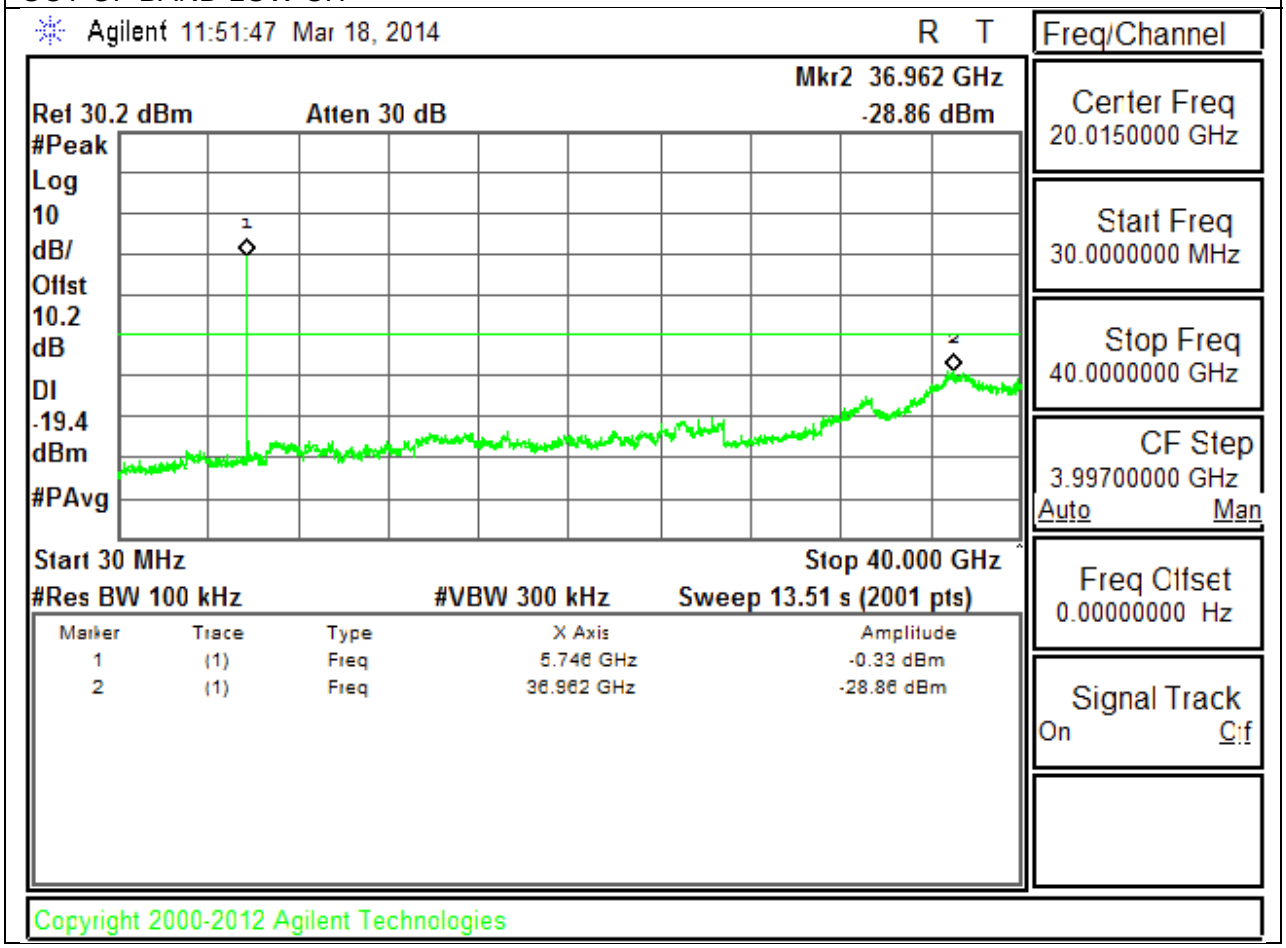
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND MID CH

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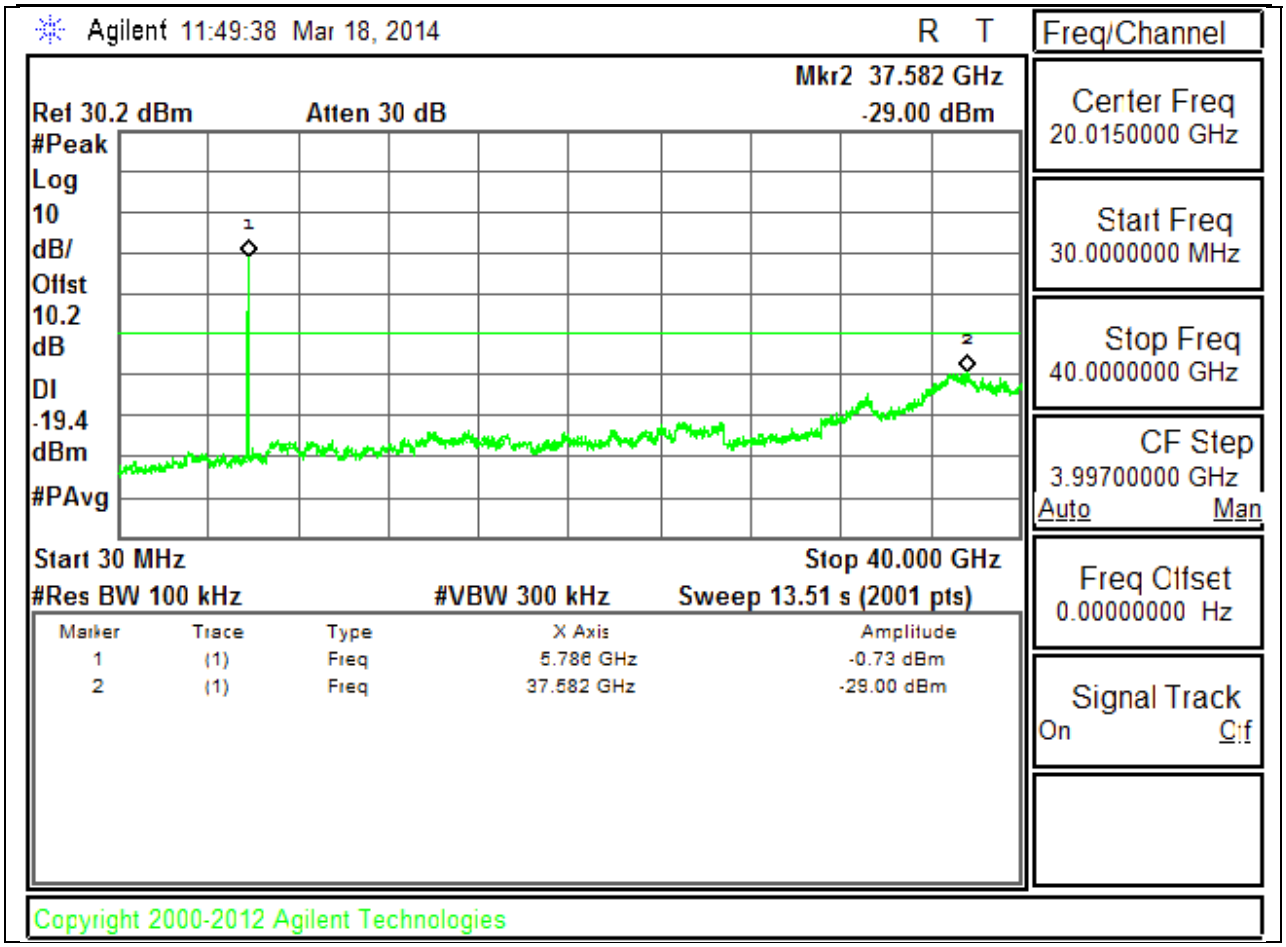

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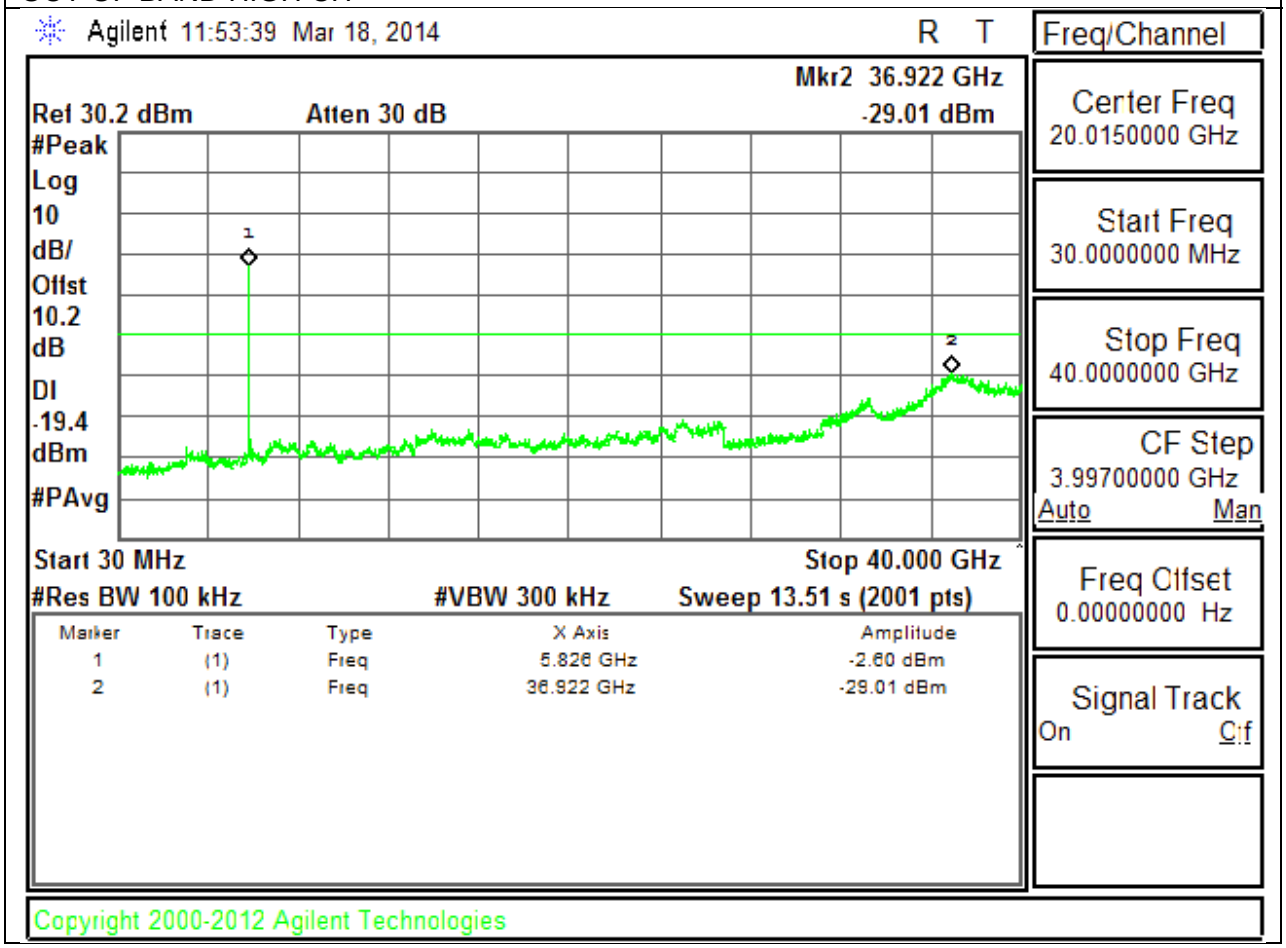
OUT OF BAND HIGH CH



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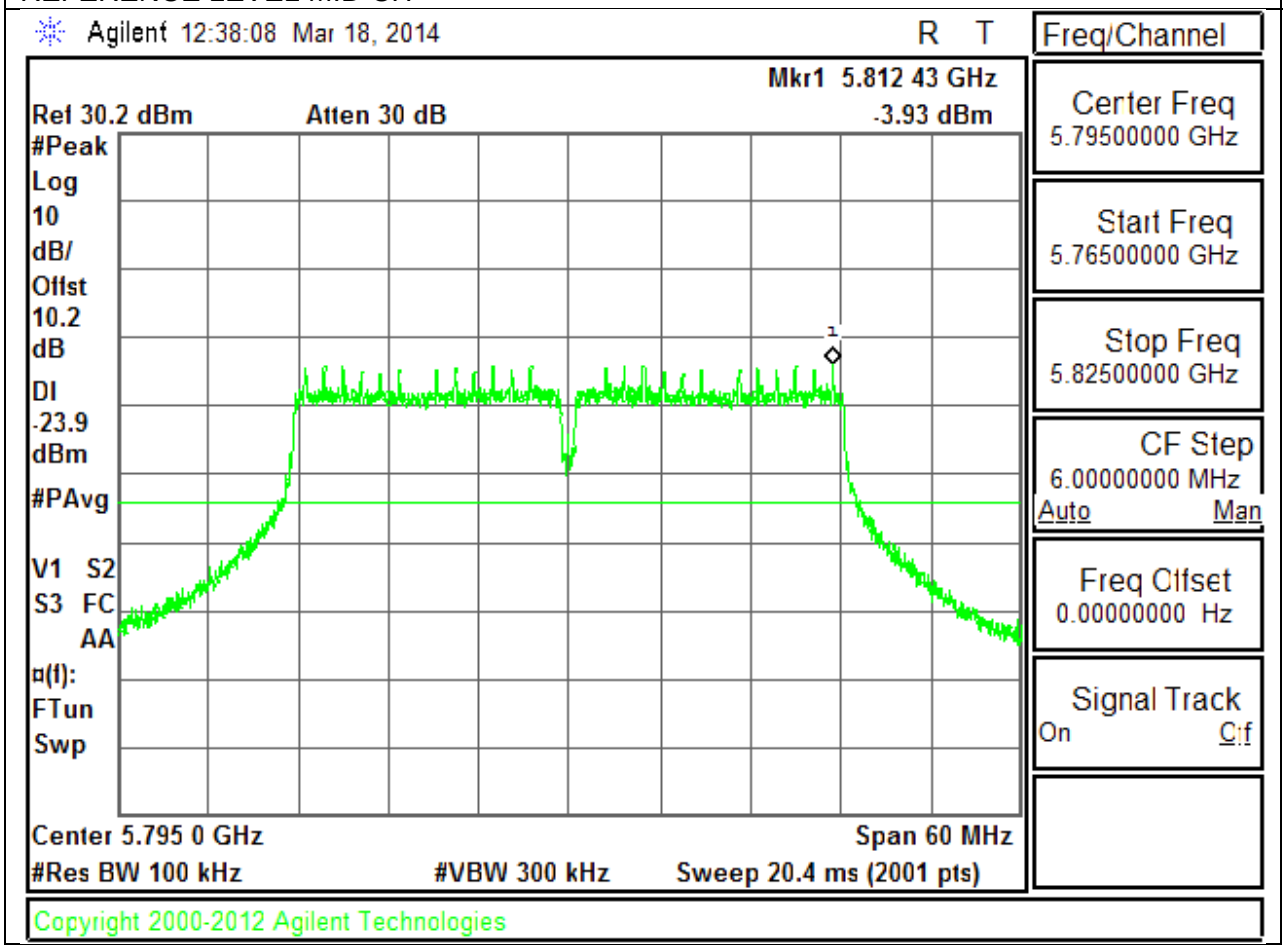
9.6.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH



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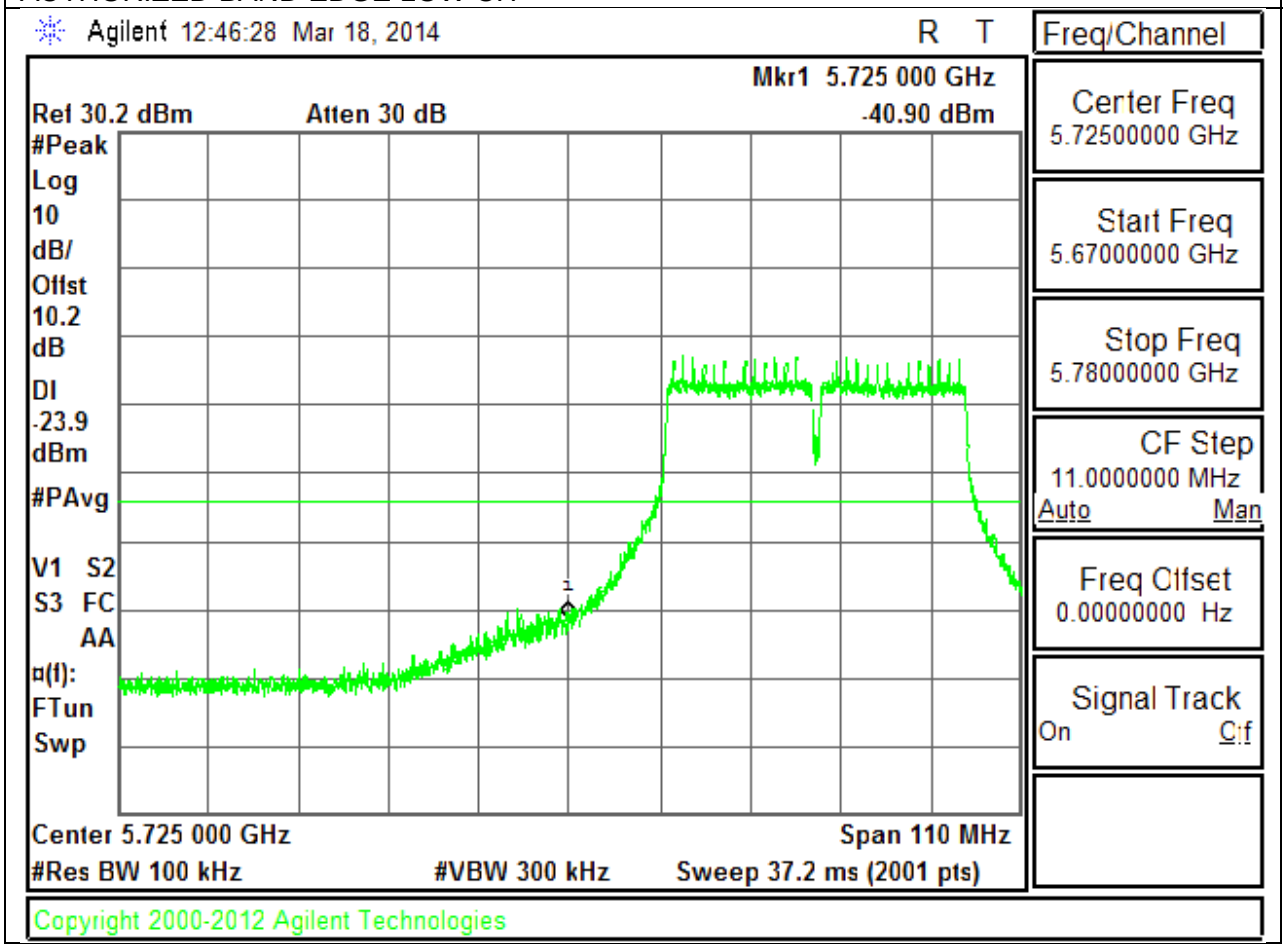
LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH



HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

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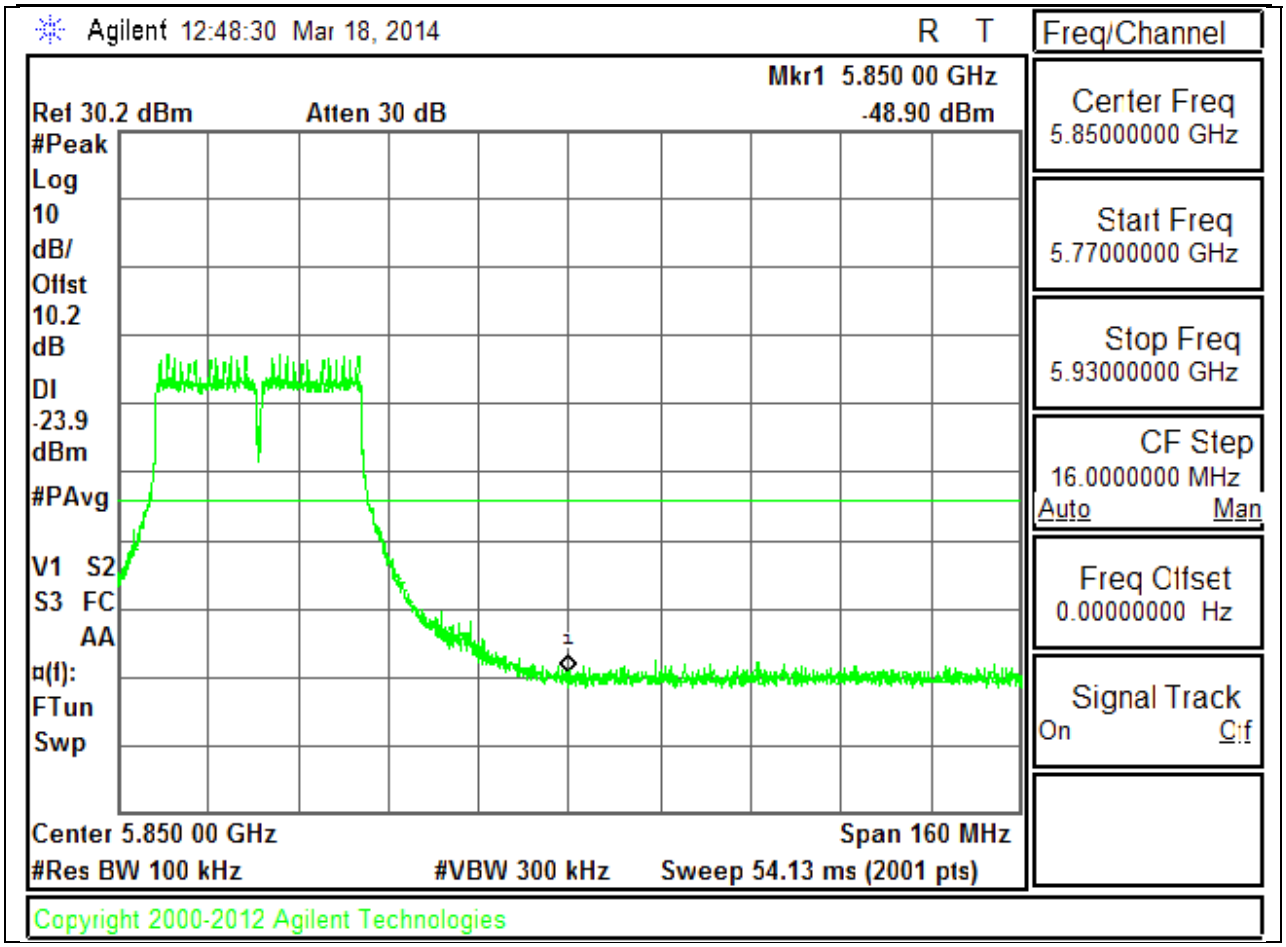

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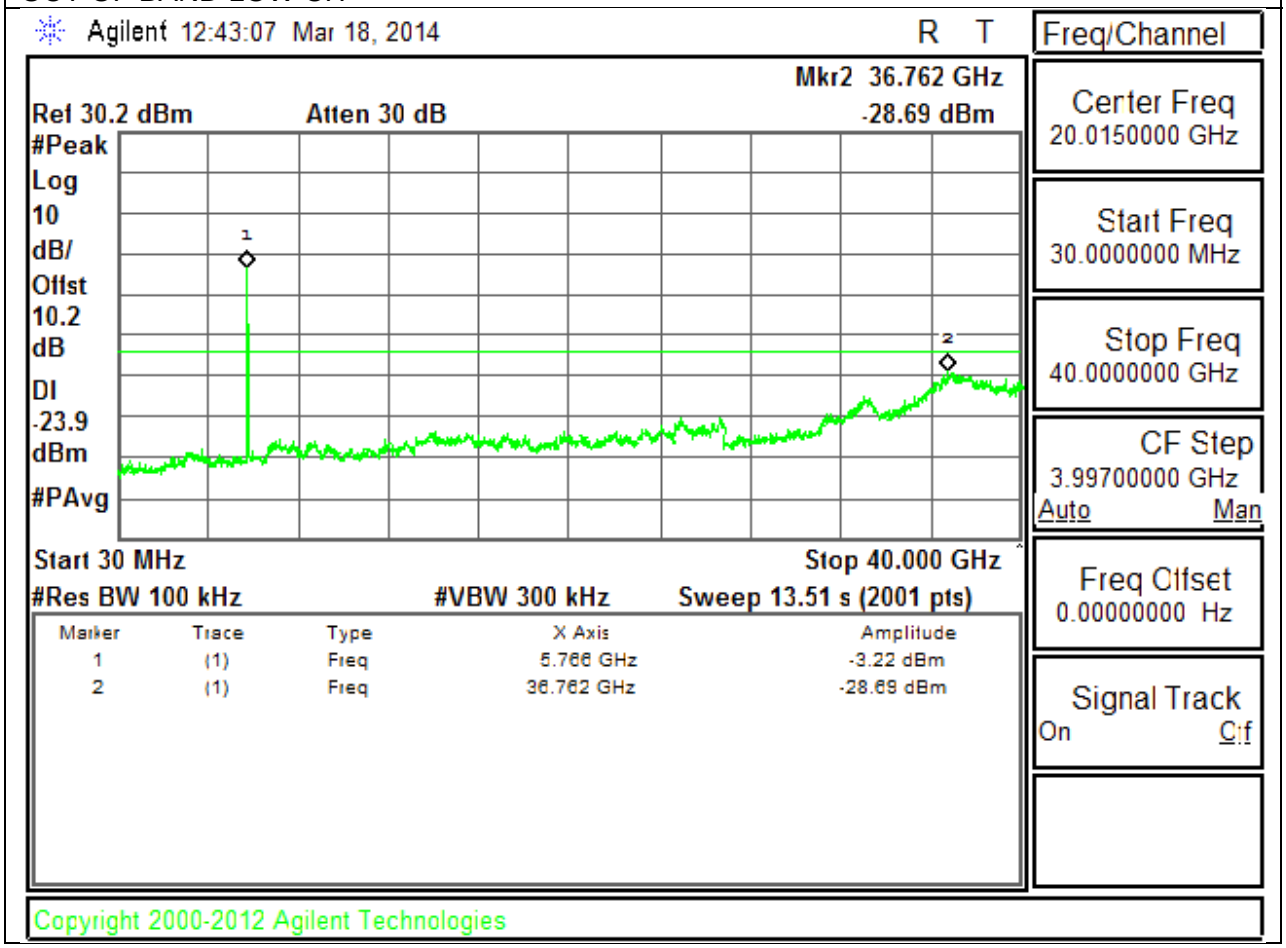
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



OUT OF BAND HIGH CH

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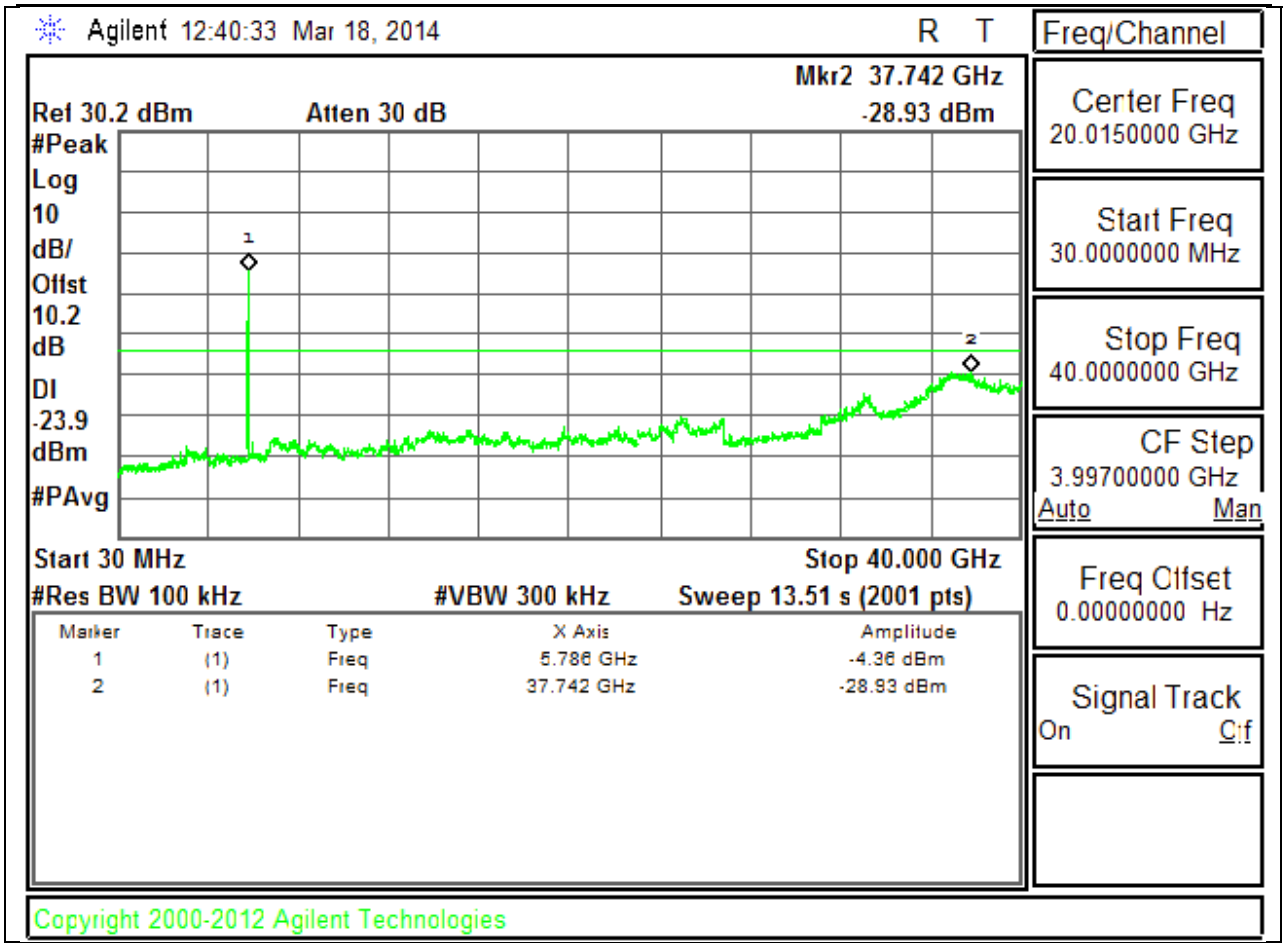

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10. RADIATED TEST RESULTS

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 = 0dB (duty cycle >98%); 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.

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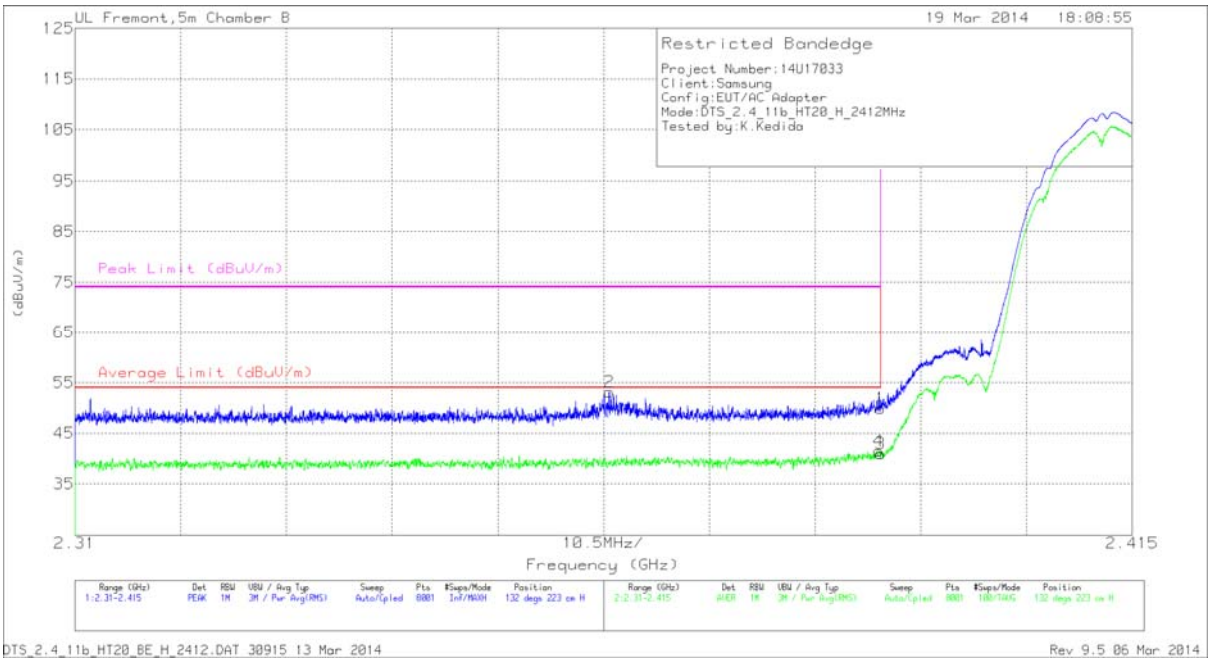
10.2. TRANSMITTER ABOVE 1 GHz

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



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.74	PK	32.1	-22.9	49.94	-	-	74	-24.06	132	223	H
2	* 2.363	44.07	PK	32	-22.9	53.17	-	-	74	-20.83	132	223	H
3	* 2.39	31.8	RMS	32.1	-22.9	41	54	-13	-	-	132	223	H
4	* 2.39	32.28	RMS	32.1	-22.9	41.48	54	-12.52	-	-	132	223	H

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

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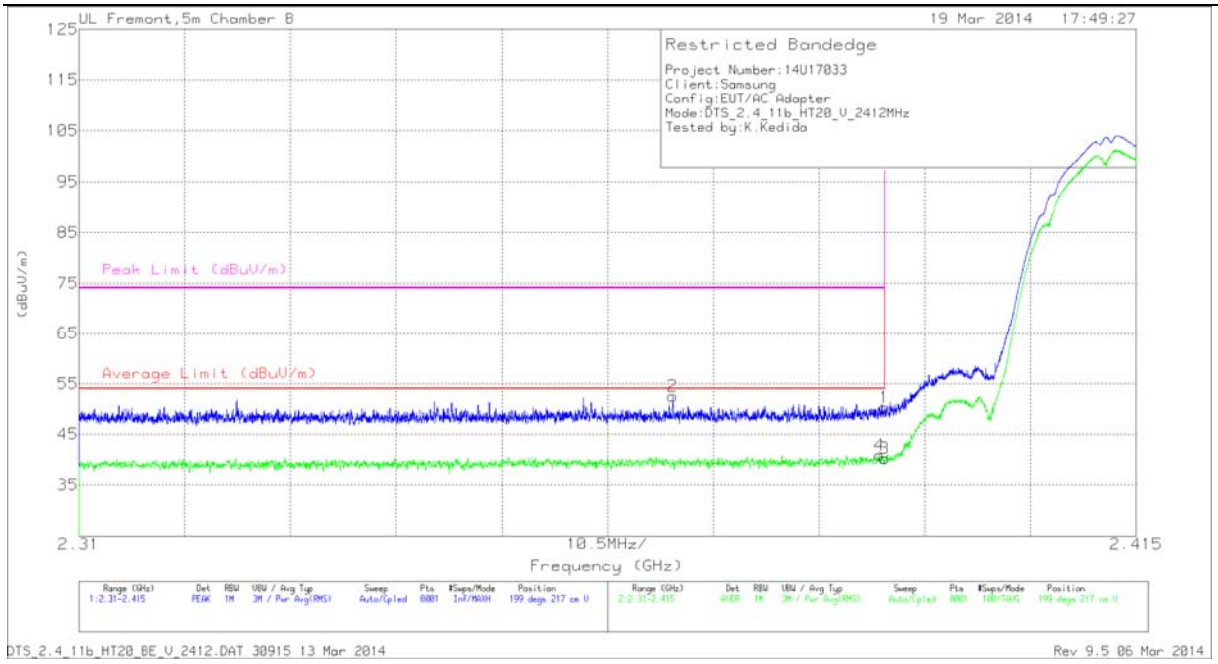

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.14	PK	32.1	-22.9	0	50.34	-	-	74	-23.66	199	217	V
2	* 2.369	43.29	PK	32	-22.8	0	52.49	-	-	74	-21.51	199	217	V
3	* 2.39	31.07	RMS	32.1	-22.9	0	40.27	54	-13.73	-	-	199	217	V
4	* 2.389	31.62	RMS	32.1	-22.9	0	40.82	54	-13.18	-	-	199	217	V

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

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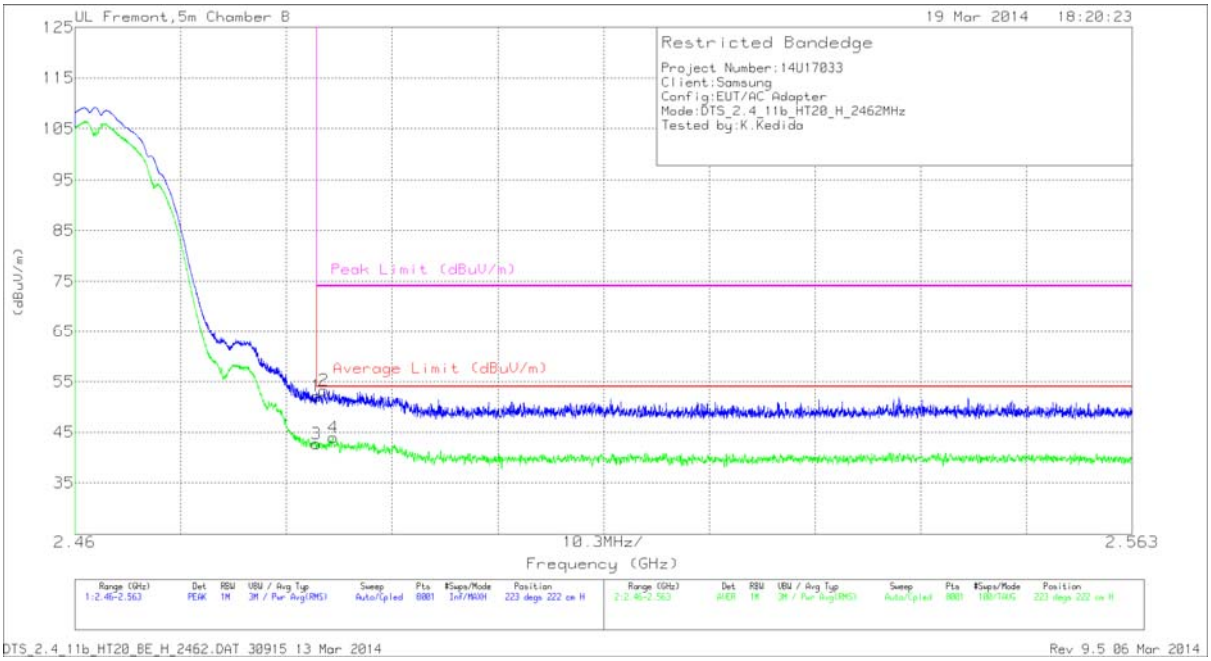
AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Ant Gain [dBi]	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.36	PK	32.4	-22.6	0	52.16	-	-	74	-21.84	223	222	H
2	* 2.484	43.49	PK	32.4	-22.6	0	53.29	-	-	74	-20.71	223	222	H
3	* 2.484	32.96	RMS	32.4	-22.6	0	42.76	54	-11.24	-	-	223	222	H
4	* 2.485	34.13	RMS	32.4	-22.6	0	43.93	54	-10.07	-	-	223	222	H

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

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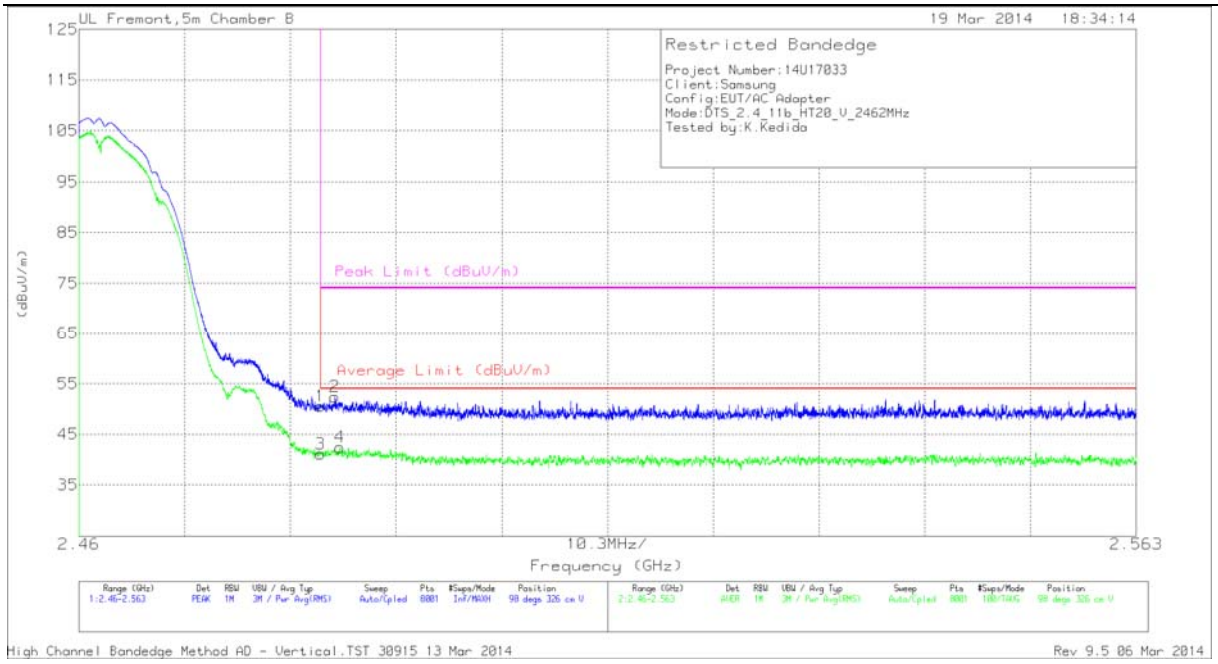

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.7	PK	32.4	-22.6	50.5	-	-	74	-23.5	98	326	V
2	* 2.485	42.63	PK	32.4	-22.6	52.43	-	-	74	-21.57	98	326	V
3	* 2.484	31.31	RMS	32.4	-22.6	41.11	54	-12.89	-	-	98	326	V
4	* 2.485	32.61	RMS	32.4	-22.6	42.41	54	-11.59	-	-	98	326	V

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

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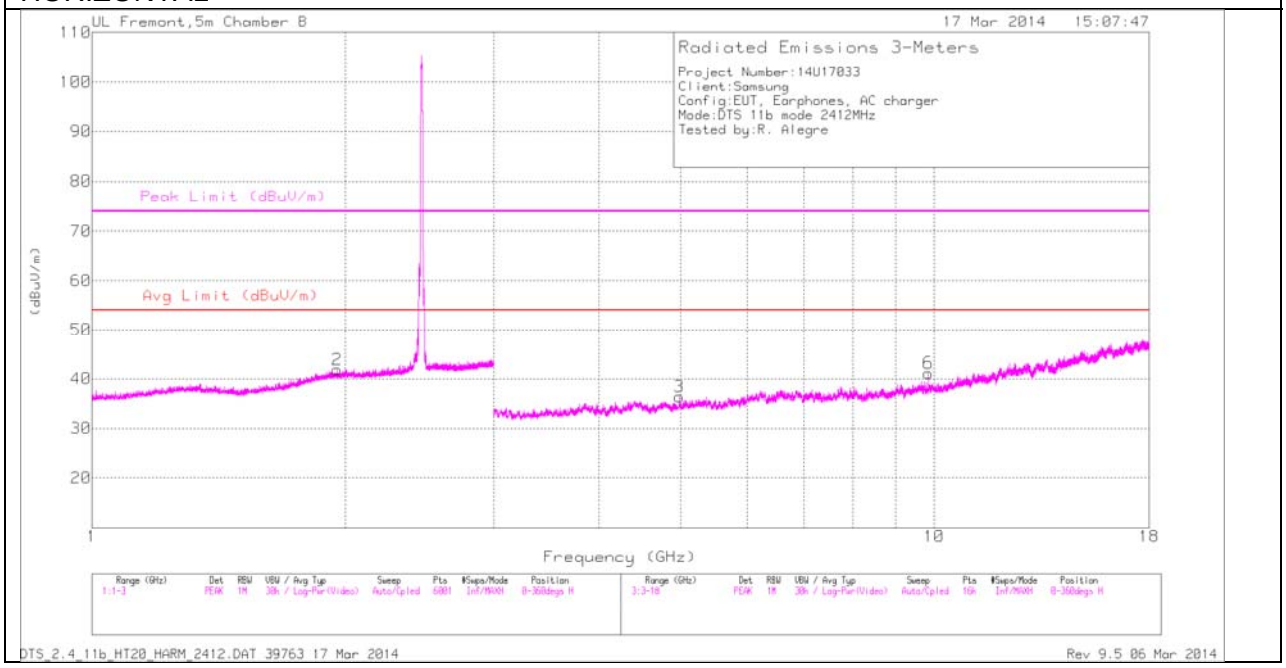
HARMONICS AND SPURIOUS EMISSIONS

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.

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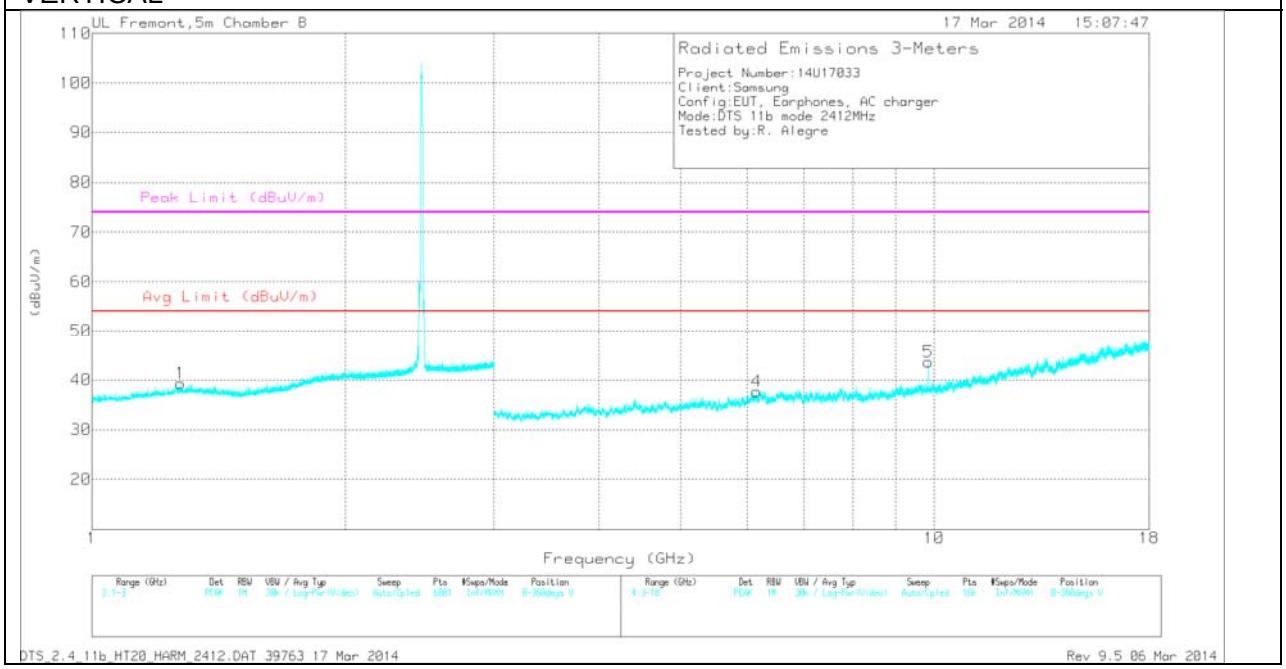
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.275	35.2	PK	28.7	-24.6	39.3	54	-14.7	74	-34.7	0-360	202	V
3	* 4.982	31.97	PK	34.2	-29.8	36.37	54	-17.63	74	-37.63	0-360	202	H
2	1.953	34.31	PK	31.2	-23.6	41.91	54	-12.09	74	-32.09	0-360	99	H
4	6.151	31.2	PK	35.4	-28.9	37.7	54	-16.3	74	-36.3	0-360	99	V
6	9.847	28.27	PK	37	-24.1	41.17	54	-12.83	74	-32.83	0-360	202	H
5	9.847	30.78	PK	37	-24.1	43.68	54	-10.32	74	-30.32	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.268	30.97	PK2	28.6	-24.6	34.97	54	-19.03	74	-39.03	359	100	V
* 4.98	13.7	PK2	34.2	-29.8	18.1	54	-35.9	74	-55.9	359	100	H
6.151	30.62	PK2	33.7	-31.2	33.12	54	-20.88	74	-40.88	78	100	V
1.952	29.86	PK2	31.2	-23.6	37.46	54	-16.54	74	-36.54	359	100	H
9.848	37.03	PK2	37	-24.1	49.93	54	-4.07	74	-24.07	180	177	V
9.848	29.27	MAv1	37	-24.1	42.17	54	-11.83	74	-31.83	180	177	V
9.848	36.88	PK2	37	-24.1	49.78	54	-4.22	74	-24.22	33	228	H
9.848	30.71	MAv1	37	-24.1	43.61	54	-10.39	74	-30.39	33	228	H

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

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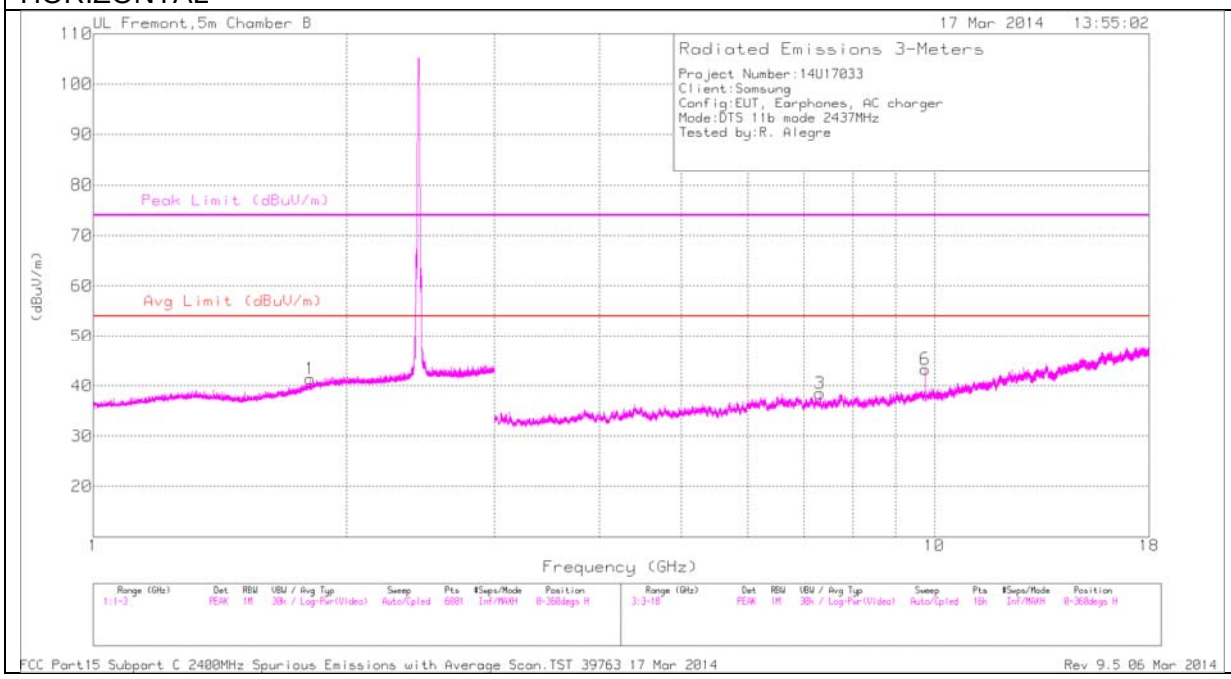
MID CHANNEL
HORIZONTAL



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

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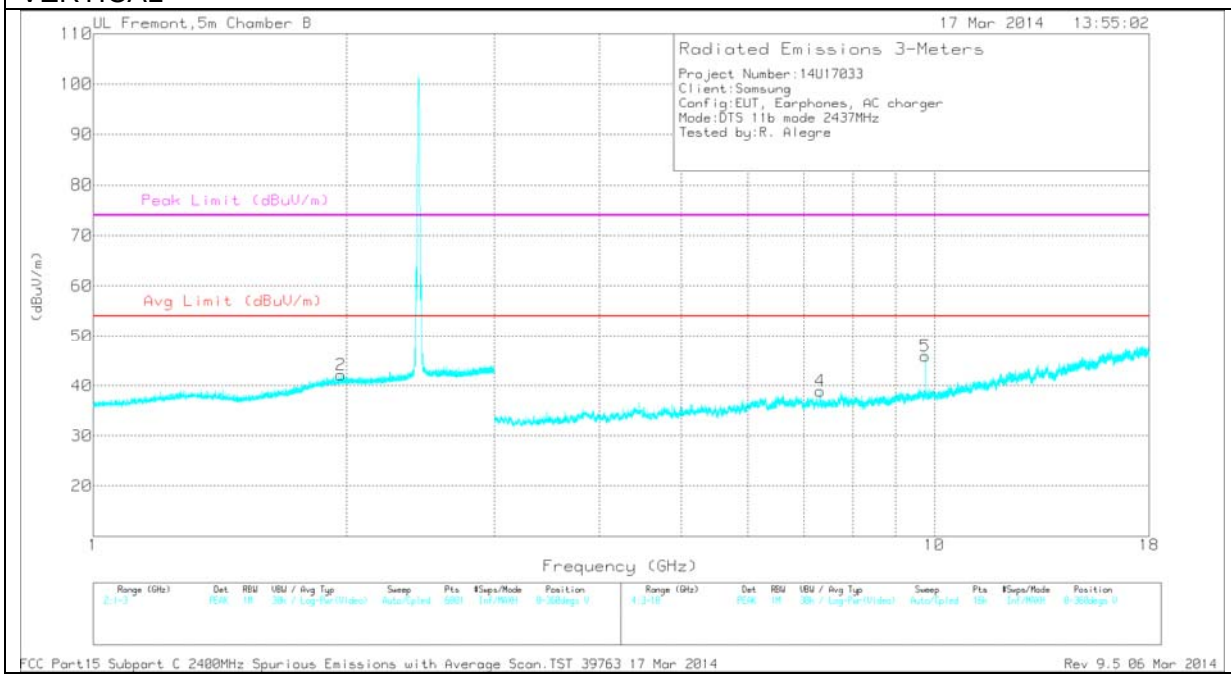
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 7.309	30.59	PK	35.6	-27.7	38.49	54	-15.51	74	-35.51	0-360	202	H
4	* 7.311	31.02	PK	35.6	-27.7	38.92	54	-15.08	74	-35.08	0-360	202	V
1	1.812	34.8	PK	30.3	-23.7	41.4	54	-12.6	74	-32.6	0-360	202	H
2	1.971	34.34	PK	31.3	-23.5	42.14	54	-11.76	74	-31.86	0-360	99	V
6	9.748	30.59	PK	36.9	-24.2	43.29	54	-10.71	74	-30.71	0-360	99	H
5	9.748	33.23	PK	36.9	-24.2	45.93	54	-8.07	74	-28.07	0-360	202	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.812	34.8	PK2	30.3	-23.7	42.41	54	-11.59	74	-31.59	360	202	H
1.974	35.27	PK2	31.3	-23.5	43.07	54	-10.93	74	-30.93	319	111	V
* 7.311	31.02	PK2	35.6	-27.7	39.62	54	-15.08	74	-34.38	360	202	V
9.748	37.24	PK2	36.9	-24.2	49.94	54	-4.06	74	-24.06	65	260	V
* 7.309	30.59	PK2	35.6	-27.7	39.38	54	-14.62	74	-34.62	360	202	H
9.748	29.65	MAv1	36.9	-24.2	42.35	54	-11.65	74	-31.65	65	260	V
9.775	34.63	PK2	36.9	-23.8	47.73	54	-6.27	74	-26.27	294	378	H
9.786	24.71	MAv1	36.9	-23.5	38.11	54	-15.89	74	-35.89	294	378	H

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

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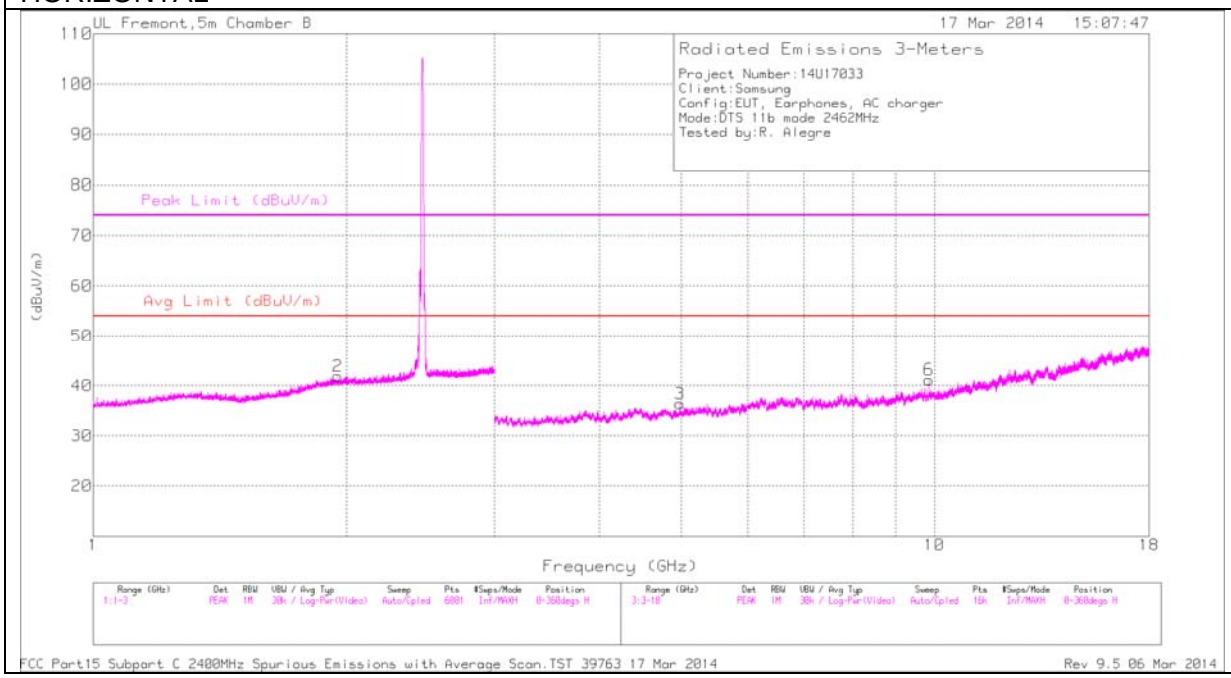
HIGH CHANNEL
HORIZONTAL



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

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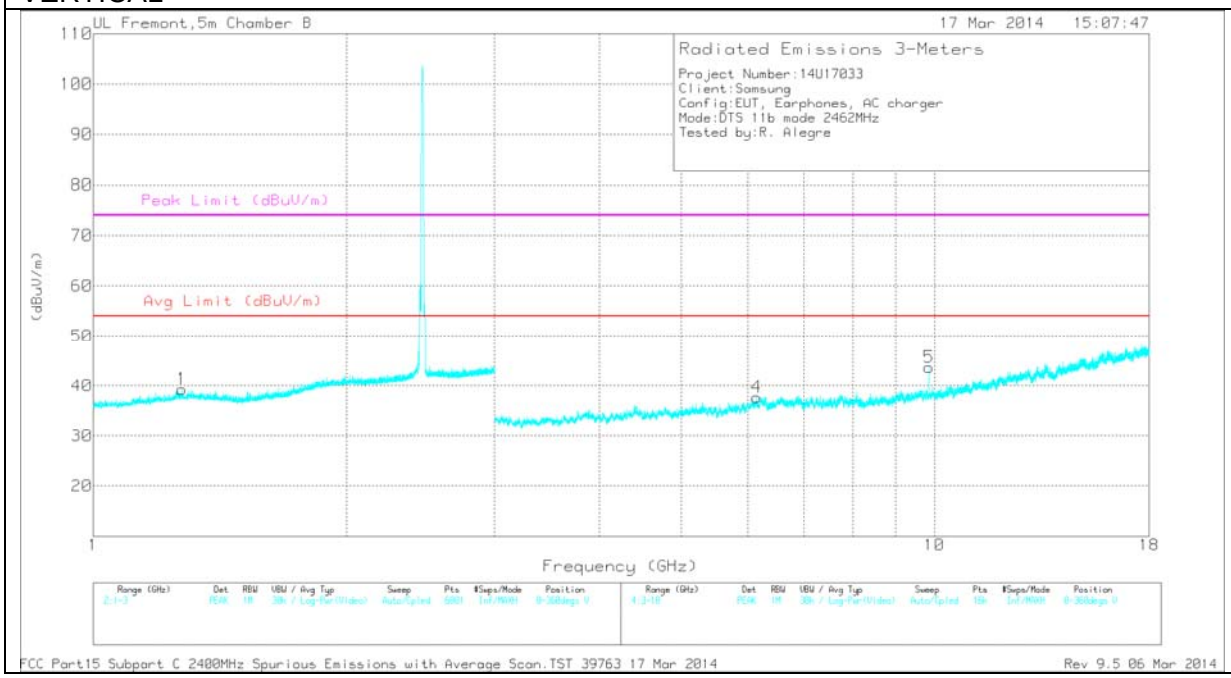
HIGH CHANNEL
VERTICAL



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

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.275	35.2	PK	28.7	-24.6	39.3	54	-14.7	74	-34.7	0-360	202	V
3	* 4.982	31.97	PK	34.2	-29.8	36.37	54	-17.63	74	-37.63	0-360	202	H
2	1.953	34.31	PK	31.2	-23.6	41.91	54	-12.09	74	-32.09	0-360	99	H
4	6.151	31.2	PK	35.4	-28.9	37.7	54	-16.3	74	-36.3	0-360	99	V
6	9.847	28.27	PK	37	-24.1	41.17	54	-12.83	74	-32.83	0-360	202	H
5	9.847	30.78	PK	37	-24.1	43.68	54	-10.32	74	-30.32	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.268	30.97	PK2	28.6	-24.6	34.97	54	-19.03	74	-39.03	359	100	H
* 4.98	13.7	PK2	34.2	-29.8	36.98	54	-35.9	74	-37.02	359	100	H
1.952	29.86	PK2	31.2	-23.6	37.46	54	-16.54	74	-36.54	359	100	H
3.174	29.72	PK2	32.8	-31.3	31.22	54	-22.78	74	-42.78	359	100	V
9.848	37.03	PK2	37	-24.1	49.93	54	-4.07	74	-24.07	180	177	V
9.848	29.27	MAv1	37	-24.1	42.17	54	-11.83	74	-31.83	180	177	V
9.848	36.88	PK2	37	-24.1	49.78	54	-4.22	74	-24.22	33	228	H
9.848	30.71	MAv1	37	-24.1	43.61	54	-10.39	74	-30.39	33	228	H

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

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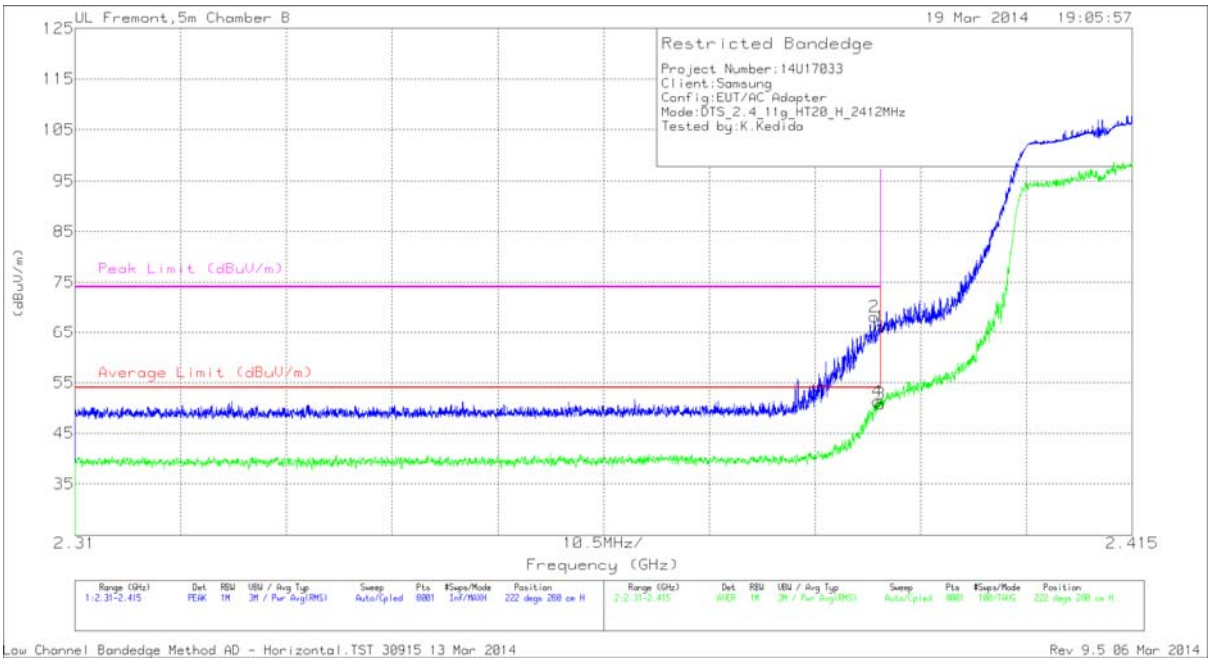
10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	57.04	PK	32.1	-22.9	0	66.24	-	-	74	-7.76	222	280	H
2	* 2.389	59	PK	32.1	-22.9	0	68.2	-	-	74	-5.8	222	280	H
3	* 2.39	41.32	RMS	32.1	-22.9	.3	50.82	54	-3.18	-	-	222	280	H
4	* 2.39	41.81	RMS	32.1	-22.9	.3	51.31	54	-2.69	-	-	222	280	H

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

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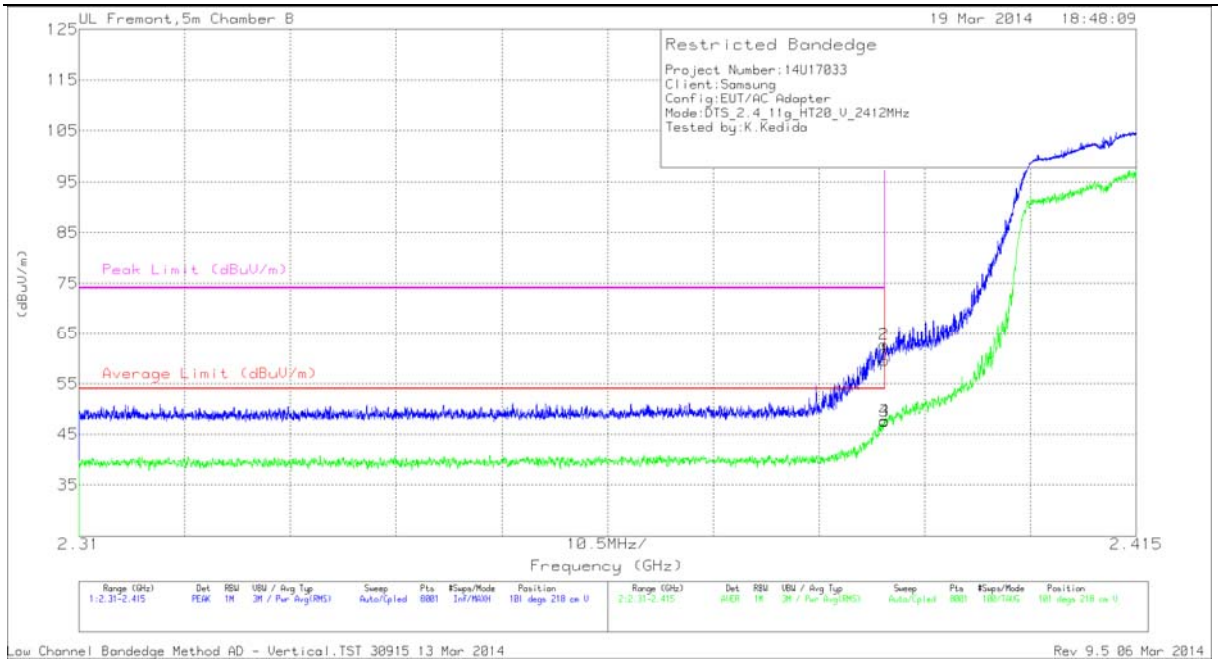

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	50.41	PK	32.1	-22.9	0	59.61	-	-	74	-14.39	101	218	V
2	* 2.39	53.57	PK	32.1	-22.9	0	62.77	-	-	74	-11.23	101	218	V
3	* 2.39	38.04	RMS	32.1	-22.9	.3	47.54	54	-6.46	-	-	101	218	V
4	* 2.39	38.15	RMS	32.1	-22.9	.3	47.65	54	-6.35	-	-	101	218	V

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

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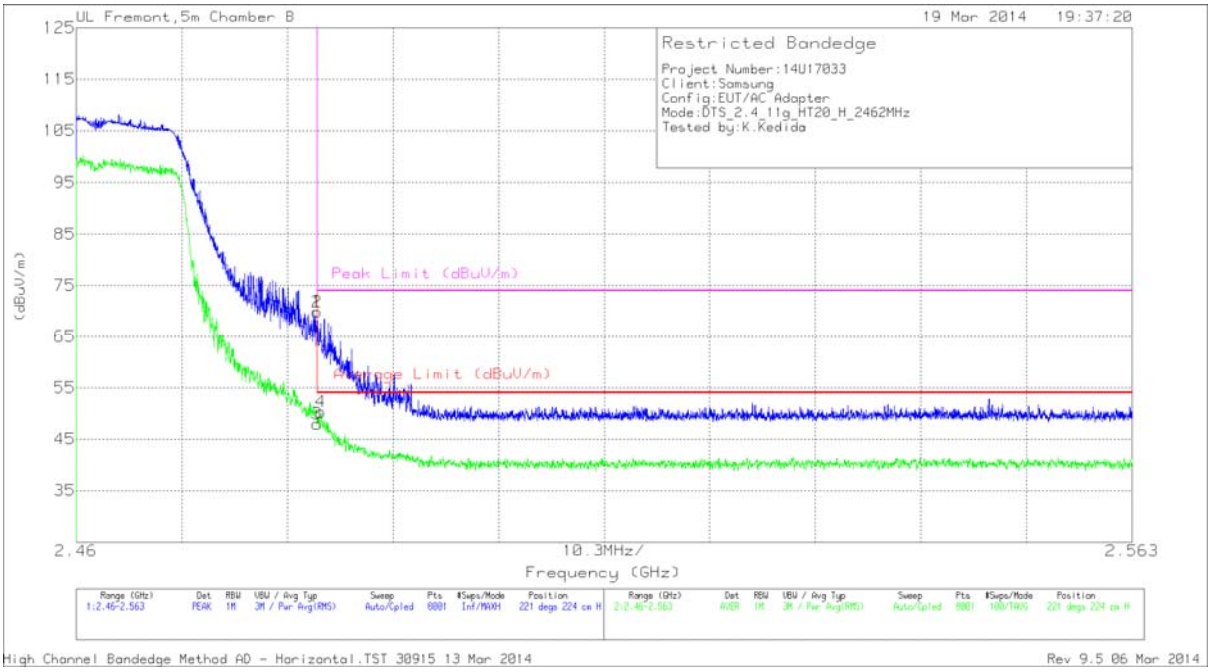
AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	60.04	PK	32.4	-22.6	0	69.84	-	-	74	-4.16	221	224	H
2	* 2.484	60.04	PK	32.4	-22.6	0	69.84	-	-	74	-4.16	221	224	H
3	* 2.484	37.86	RMS	32.4	-22.6	.3	47.96	54	-6.04	-	-	221	224	H
4	* 2.484	40.17	RMS	32.4	-22.6	.3	50.27	54	-3.73	-	-	221	224	H

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

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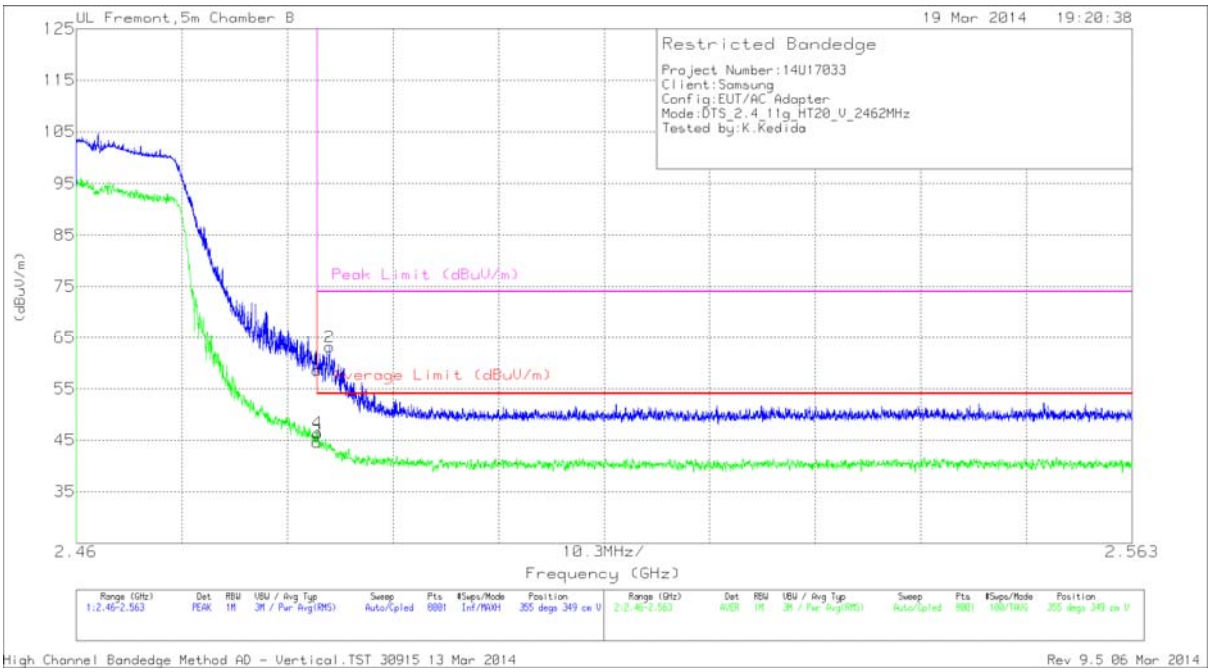

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.86	PK	32.4	-22.6	0	58.66	-	-	74	-15.34	355	349	V
2	* 2.485	53.34	PK	32.4	-22.6	0	63.14	-	-	74	-10.86	355	349	V
3	* 2.484	34.52	RMS	32.4	-22.6	.3	44.62	54	-9.38	-	-	355	349	V
4	* 2.484	36.23	RMS	32.4	-22.6	.3	46.33	54	-7.67	-	-	355	349	V

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

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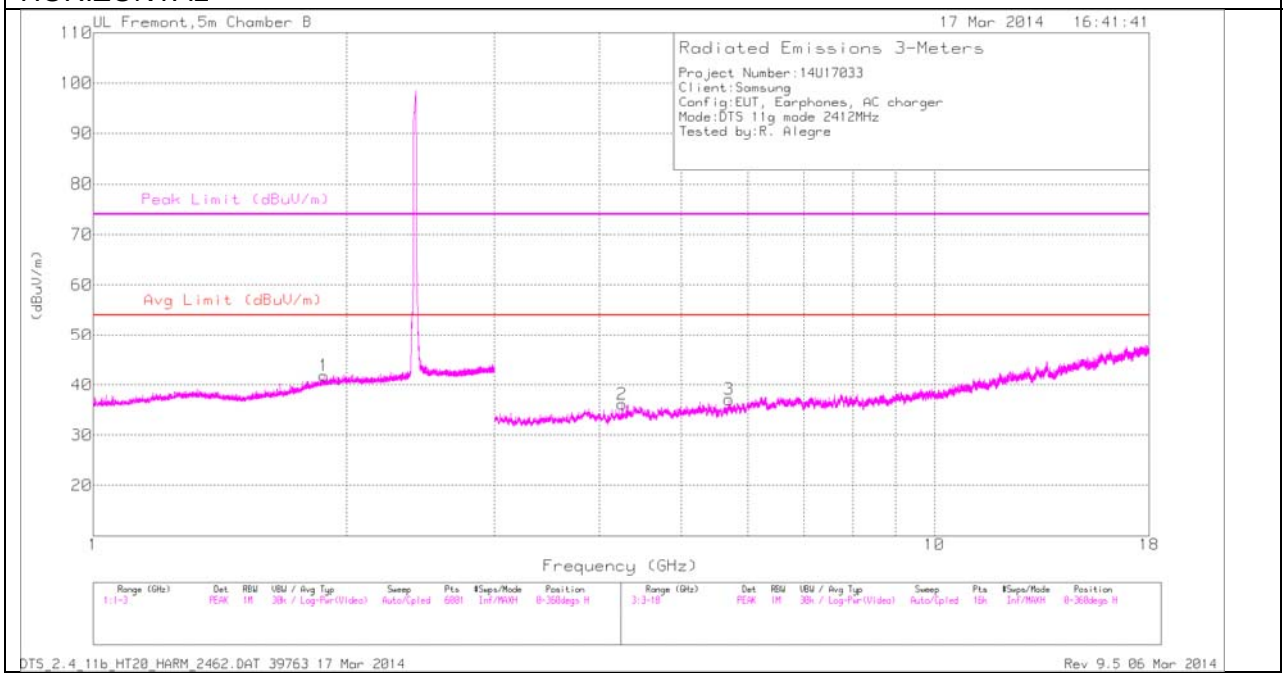
HARMONICS AND SPURIOUS EMISSIONS

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.

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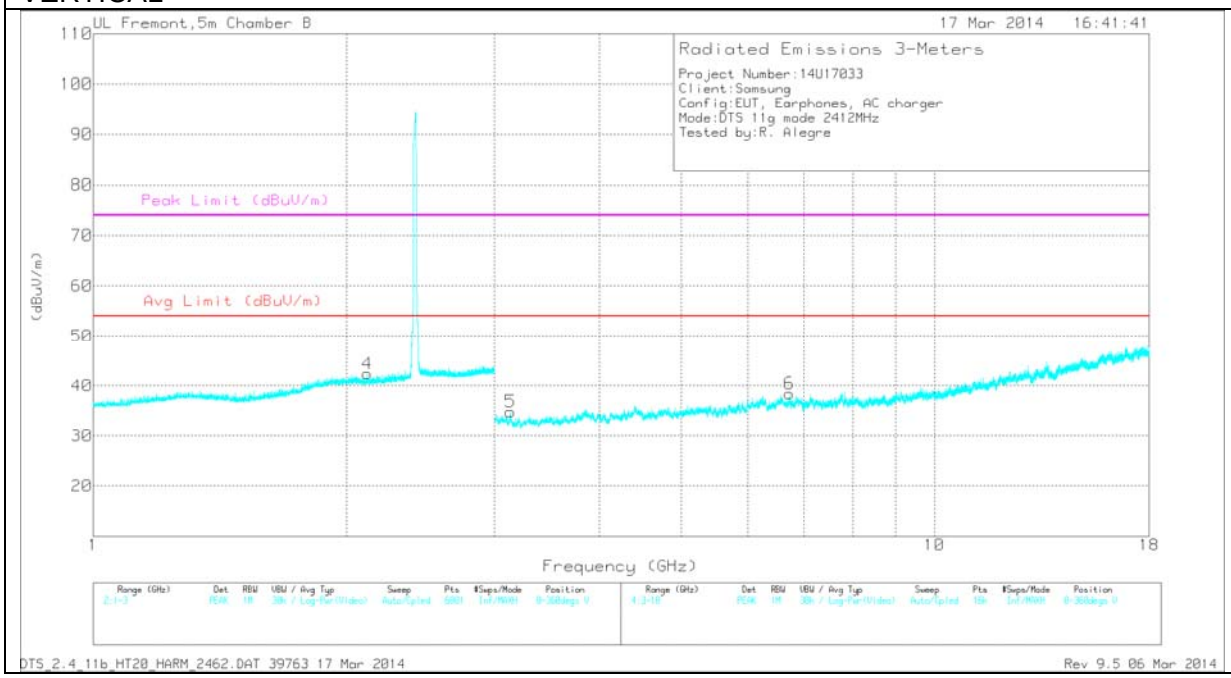
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.256	33.32	PK	33.6	-30.8	0	36.12	54	-17.88	74	-37.88	0-360	99	H
1	1.88	34.49	PK	30.9	-23.6	0	41.79	54	-12.21	74	-32.21	0-360	99	H
4	2.119	34.41	PK	31.3	-23.3	0	42.41	54	-11.59	74	-31.59	0-360	202	V
5	3.134	33.42	PK	32.8	-31.4	0	34.82	54	-19.18	74	-39.18	0-360	202	V
3	5.7	31.5	PK	34.5	-28.9	0	37.1	54	-16.9	74	-36.9	0-360	201	H
6	6.721	31.53	PK	35.7	-28.8	0	38.43	54	-15.57	74	-35.57	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.257	33.53	PK2	33.6	-30.9	0	36.23	54	-17.77	74	-37.77	359	100	H
1.88	34.91	PK2	30.9	-23.6	0	42.21	54	-11.79	74	-31.79	359	100	H
2.12	27.2	PK2	31.3	-23.3	0	35.2	54	-18.8	74	-38.8	359	100	V
3.134	27.36	PK2	32.8	-31.4	0	28.76	54	-25.24	74	-45.24	359	100	H
5.699	21.57	PK2	34.5	-28.8	0	27.27	54	-26.73	74	-46.73	359	100	H
6.725	32.98	PK2	35.7	-28.7	0	39.98	54	-14.02	74	-34.02	359	100	V

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

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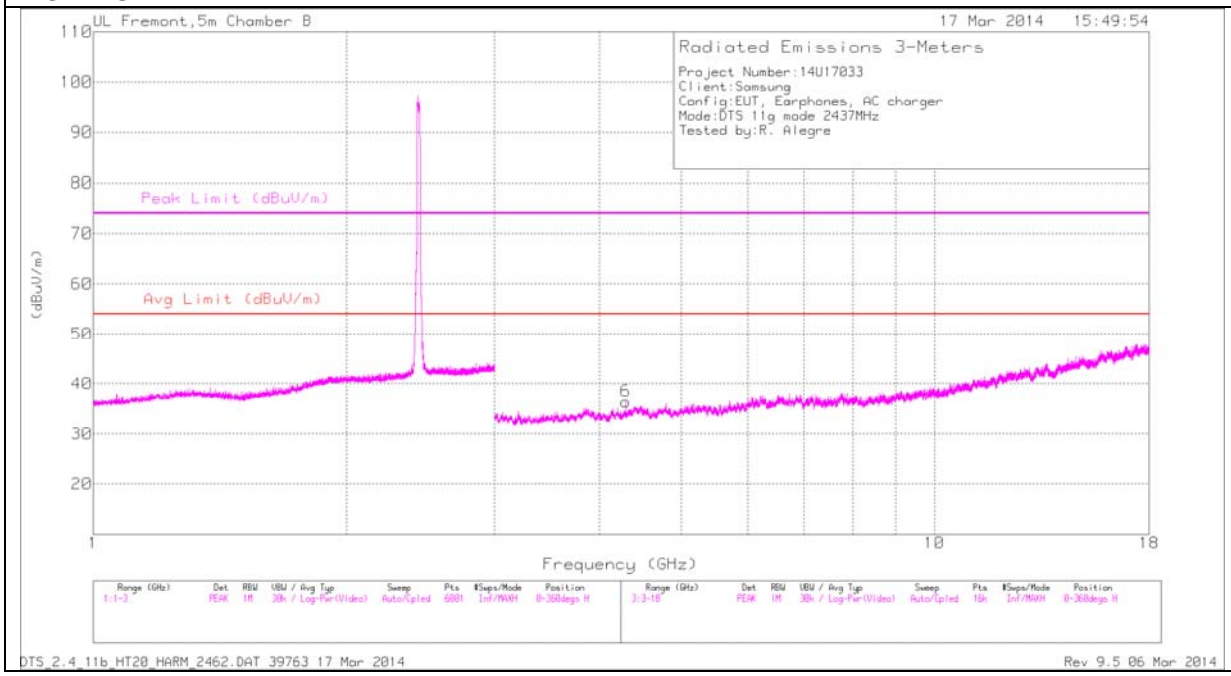
MID CHANNEL
HORIZONTAL



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

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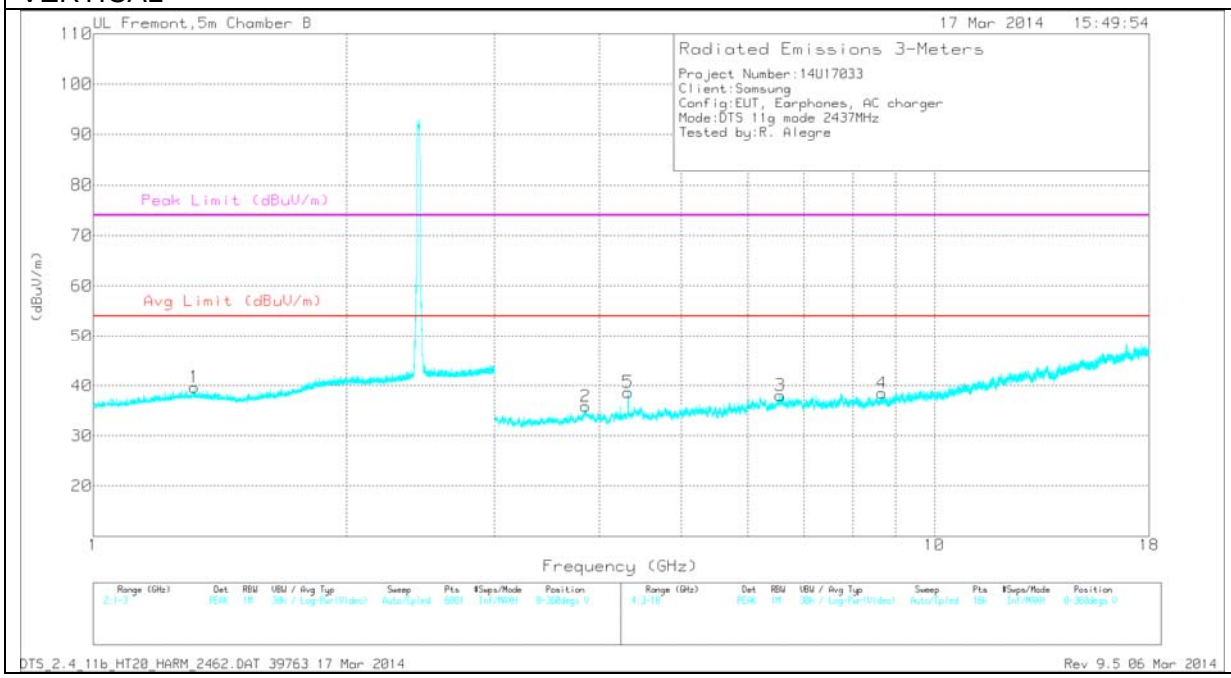
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.319	35.48	PK	28.8	-24.6	39.68	54	-14.32	74	-34.32	0-360	99	V
6	* 4.299	33.97	PK	33.7	-31.2	36.47	54	-17.53	74	-37.53	0-360	202	H
2	* 3.849	32.39	PK	33.7	-30.2	35.89	54	-18.11	74	-38.11	0-360	202	V
5	* 4.324	36	PK	33.7	-31	38.7	54	-15.3	74	-35.3	0-360	99	V
3	6.558	29.58	PK	35.7	-27.2	38.08	54	-15.92	74	-35.92	0-360	202	V
4	8.66	28.52	PK	35.9	-25.9	38.52	54	-15.48	74	-35.48	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.319	32.52	PK2	28.8	-24.6	36.72	54	-17.28	74	-37.28	1	100	V
* 4.299	40.11	PK2	33.7	-31.2	42.61	54	-11.39	74	-31.39	347	377	H
* 4.3	30.58	MAv1	33.7	-31.2	33.08	54	-20.92	74	-40.92	347	377	H
* 3.849	31.45	PK2	33.7	-30.2	34.95	54	-19.05	74	-39.05	1	100	V
* 4.324	40.86	PK2	33.7	-31	43.56	54	-10.44	74	-30.44	244	134	V
* 4.325	30.6	MAv1	33.7	-30.9	33.4	54	-20.6	74	-40.6	244	134	V
6.557	18.31	PK2	35.7	-27.2	26.81	54	-27.19	74	-47.19	1	100	V
6.557	22.47	PK2	35.7	-27.2	30.97	54	-23.03	74	-43.03	1	100	V
8.661	22.26	PK2	35.9	-25.9	32.26	54	-21.74	74	-41.74	1	100	V

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

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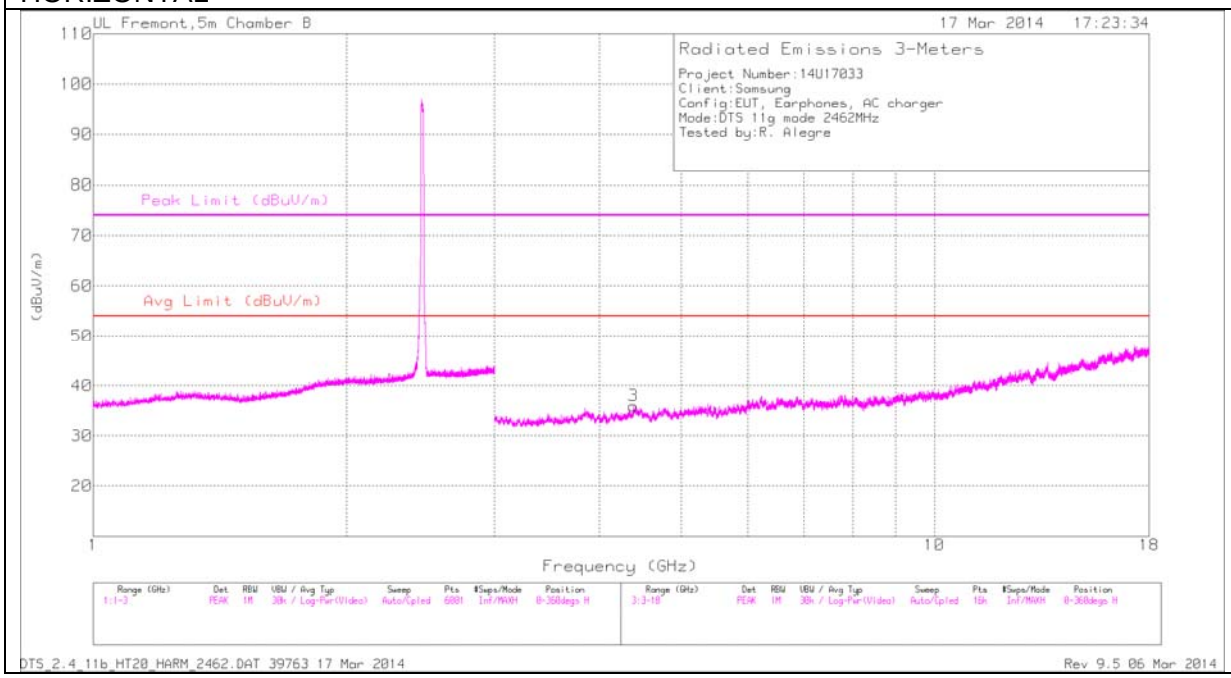
HIGH CHANNEL
HORIZONTAL



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

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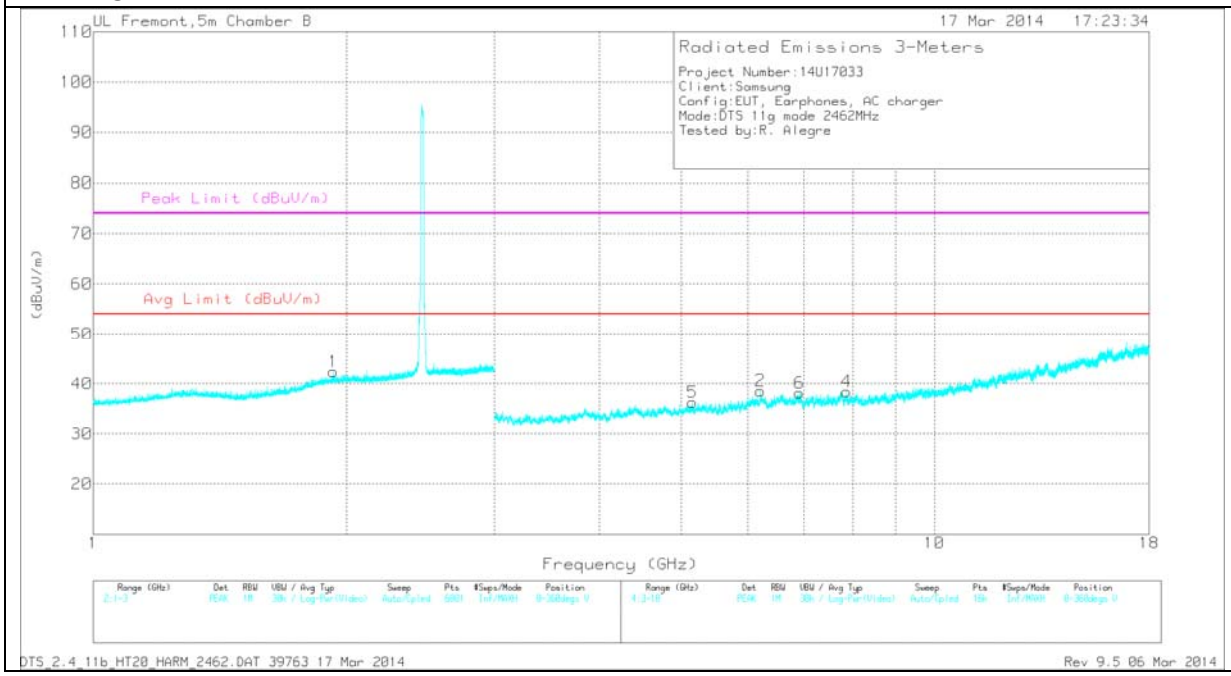
HIGH CHANNEL
VERTICAL



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

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.39	32.37	PK	33.8	-30.2	0	35.97	54	-18.03	74	-38.03	0-360	99	H
1	1.932	34.77	PK	31.2	-23.6	0	42.37	54	-11.63	74	-31.63	0-360	99	V
5	5.158	31.67	PK	34.3	-29.7	0	36.27	54	-17.73	74	-37.73	0-360	202	V
2	6.214	30.96	PK	35.4	-27.8	0	38.56	54	-15.44	74	-35.44	0-360	99	V
6	6.909	29.72	PK	35.6	-27.2	0	38.12	54	-15.88	74	-35.88	0-360	99	V
4	7.863	29.83	PK	35.7	-27.1	0	38.43	54	-15.57	74	-35.57	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.55	28.21	PK2	33	-31.2	0	30.01	54	-23.99	74	-43.99	359	100	H
* 4.386	27.53	PK2	33.8	-30.4	0	30.93	54	-23.07	74	-43.07	359	100	H
1.926	27.05	PK2	31.1	-23.6	0	34.55	54	-19.45	74	-39.45	359	100	V
5.159	22.22	PK2	34.3	-29.8	0	26.72	54	-27.28	74	-47.28	359	100	V
6.213	30.74	PK2	35.4	-27.8	0	38.34	54	-15.66	74	-35.66	359	100	V
6.909	17.31	PK2	35.6	-27.2	0	25.71	54	-28.29	74	-48.29	359	100	V
7.862	24.39	PK2	35.7	-27.1	0	32.99	54	-21.01	74	-41.01	359	100	V

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

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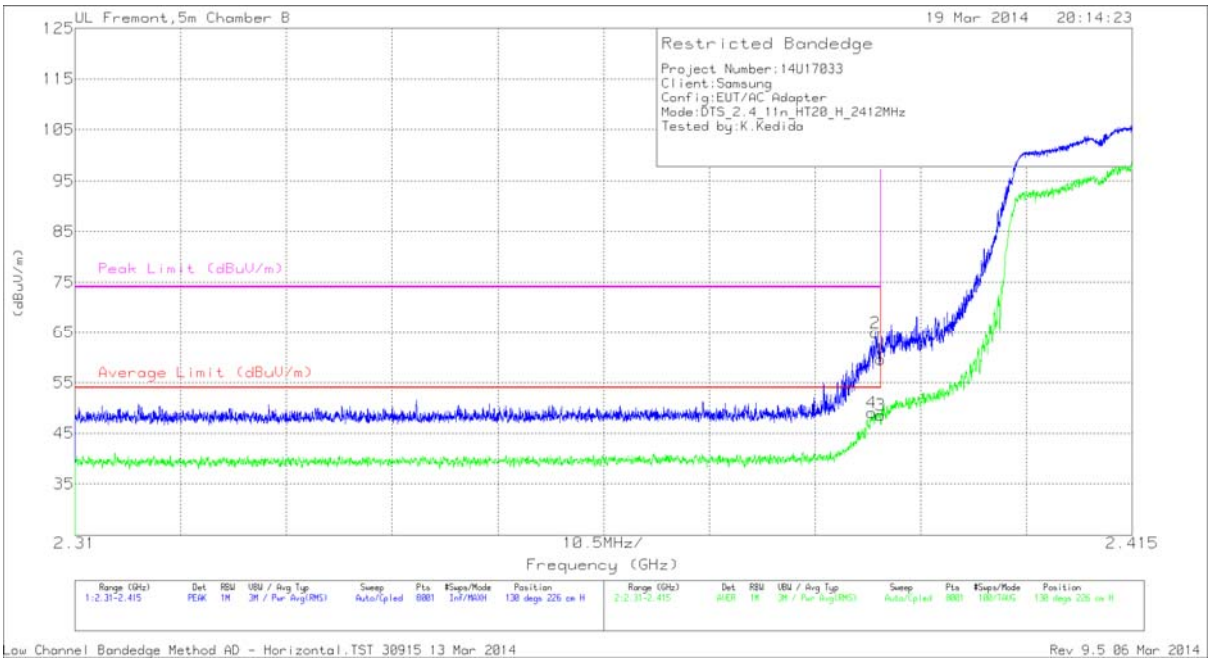
10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	50.46	PK	32.1	-22.9	0	59.66	-	-	74	-14.34	130	226	H
2	* 2.389	55.71	PK	32.1	-22.9	0	64.91	-	-	74	-9.09	130	226	H
3	* 2.39	39.02	RMS	32.1	-22.9	.3	48.52	54	-5.48	-	-	130	226	H
4	* 2.389	39.58	RMS	32.1	-22.9	.3	49.08	54	-4.92	-	-	130	226	H

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

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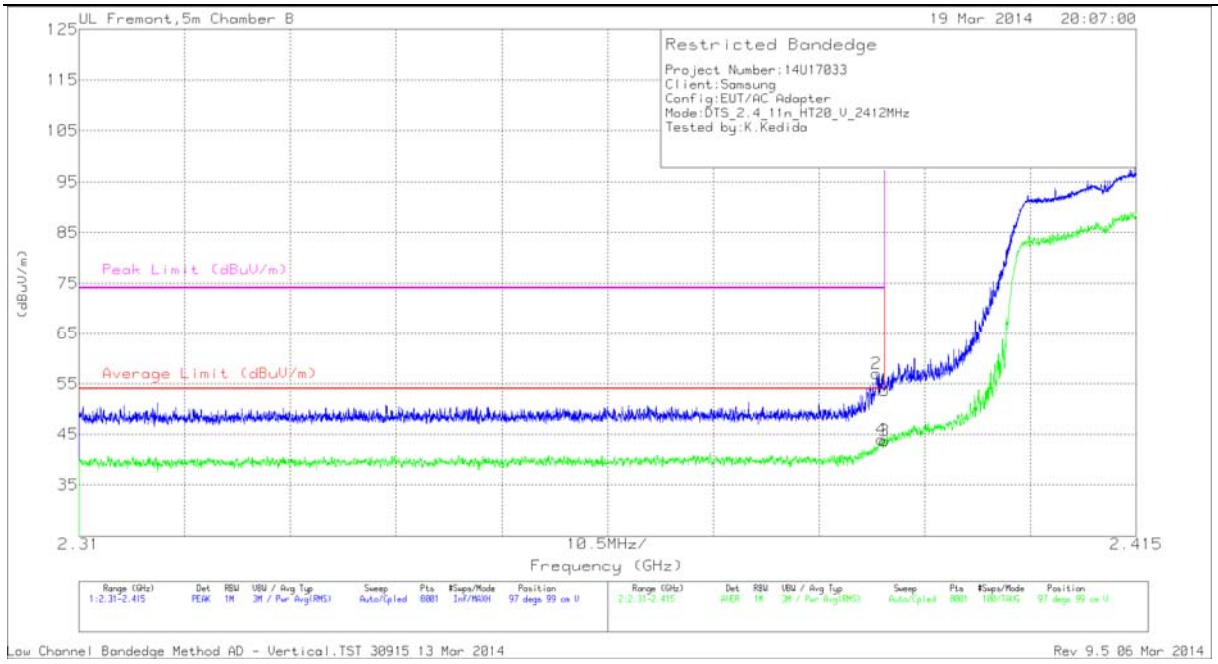

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.51	PK	32.1	-22.9	0	53.71	-	-	74	-20.29	97	99	V
2	* 2.389	47.81	PK	32.1	-22.9	0	57.01	-	-	74	-16.99	97	99	V
3	* 2.39	34.2	RMS	32.1	-22.9	.3	43.7	54	-10.3	-	-	97	99	V
4	* 2.39	34.5	RMS	32.1	-22.9	.3	44	54	-10	-	-	97	99	V

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

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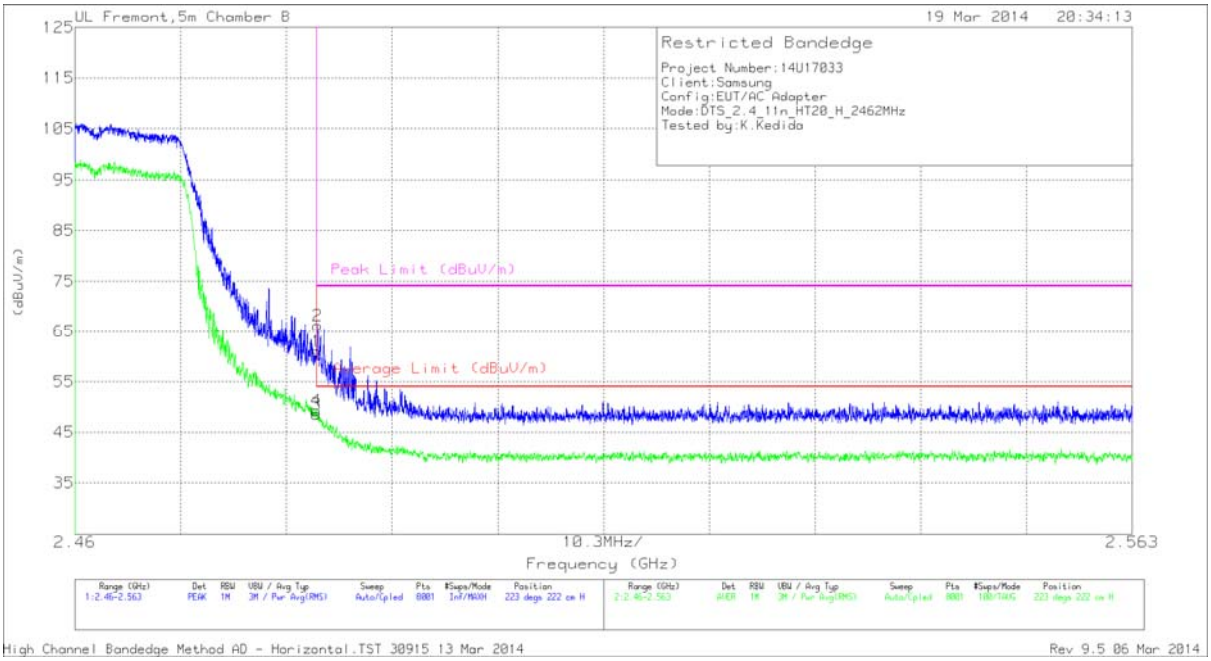
AUTHORIZED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	51.13	PK	32.4	-22.6	0	60.93	-	-	74	-13.07	223	222	H
2	* 2.484	56.39	PK	32.4	-22.6	0	66.19	-	-	74	-7.81	223	222	H
3	* 2.484	38.44	RMS	32.4	-22.6	.3	48.54	54	-5.46	-	-	223	222	H
4	* 2.484	39.25	RMS	32.4	-22.6	.3	49.35	54	-4.65	-	-	223	222	H

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

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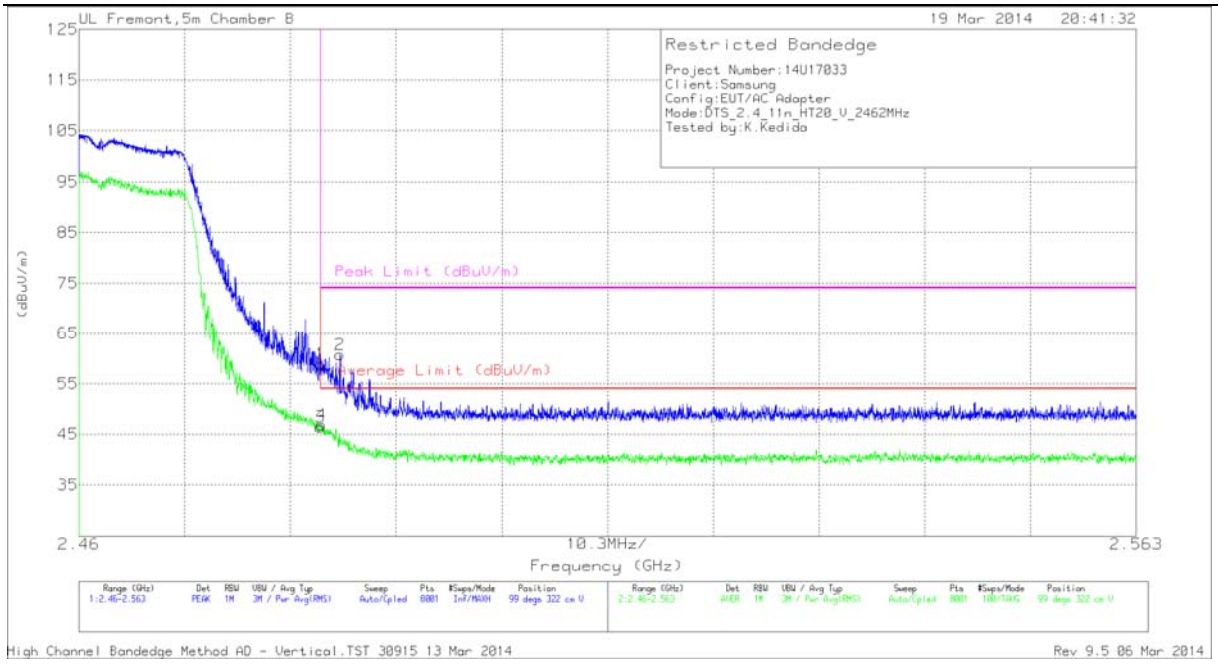

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	49.08	PK	32.4	-22.6	0	58.88	-	-	74	-15.12	99	322	V
2	* 2.485	50.92	PK	32.4	-22.6	0	60.72	-	-	74	-13.28	99	322	V
3	* 2.484	36.29	RMS	32.4	-22.6	.3	46.39	54	-7.61	-	-	99	322	V
4	* 2.484	36.69	RMS	32.4	-22.6	.3	46.79	54	-7.21	-	-	99	322	V

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

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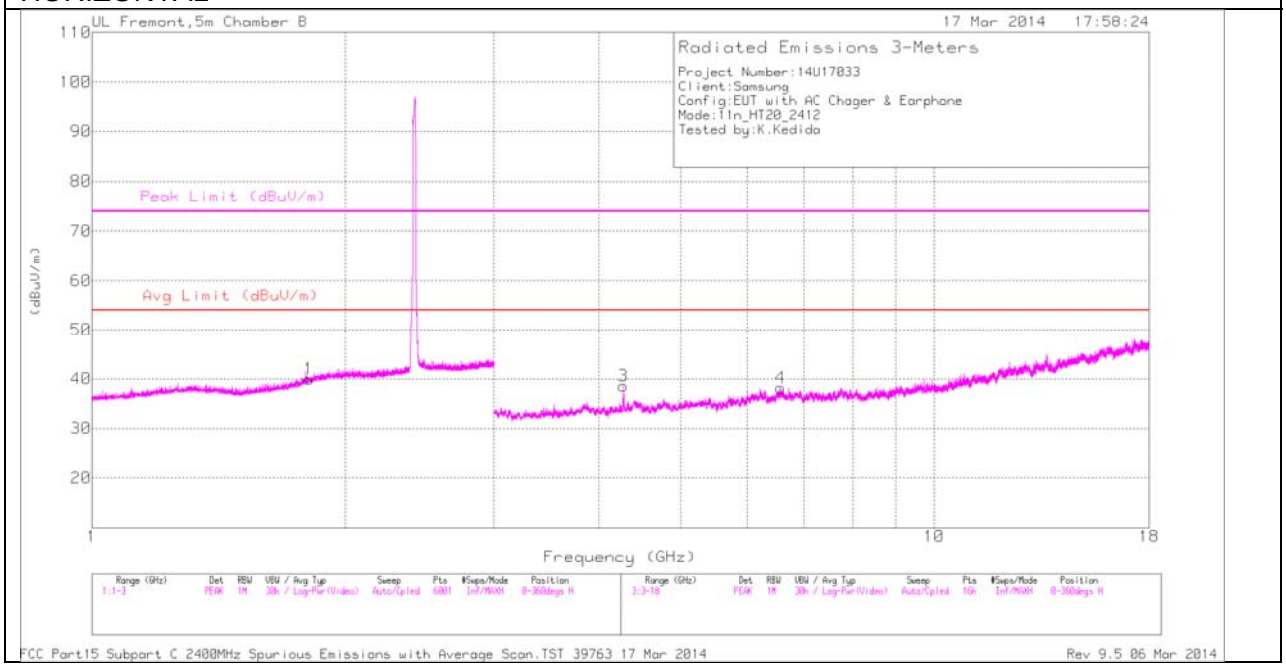
HARMONICS AND SPURIOUS EMISSIONS

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.

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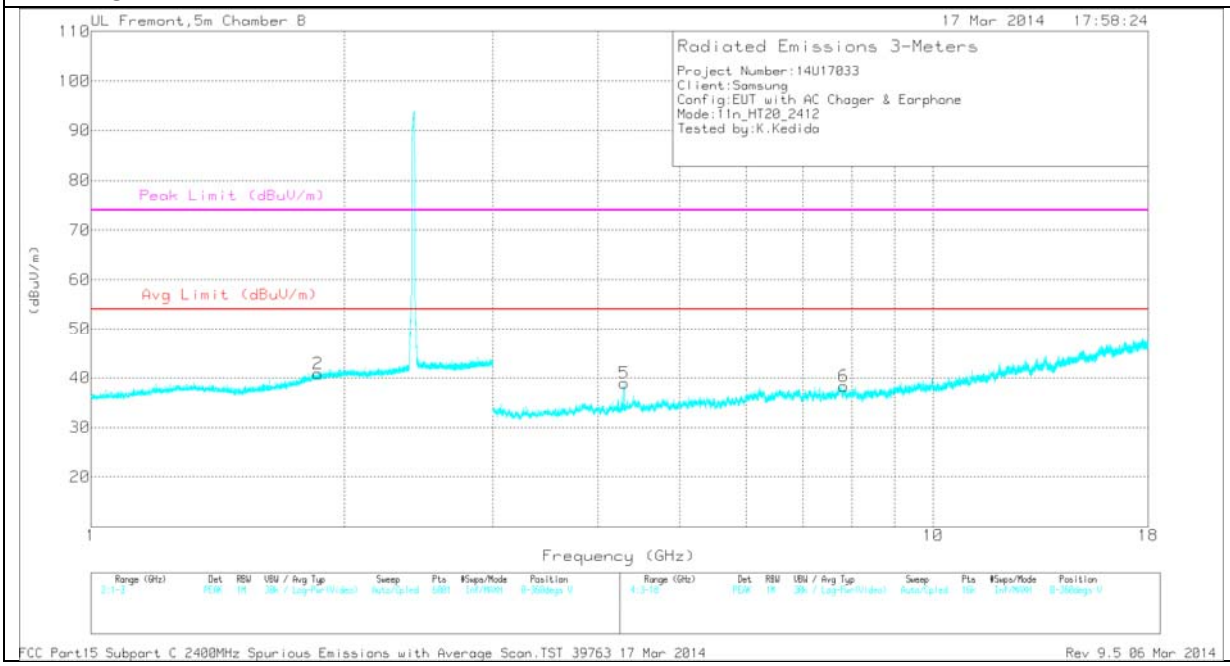
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.276	35.9	PK	33.7	-31	38.6	54	-15.4	74	-35.4	0-360	202	H
5	* 4.299	36.48	PK	33.7	-31.2	38.98	54	-15.02	74	-35.02	0-360	99	V
1	1.81	33.4	PK	30.3	-23.7	40	54	-14	74	-34	0-360	99	H
2	1.86	33.91	PK	30.7	-23.7	40.91	54	-13.09	74	-33.09	0-360	202	V
4	6.574	30	PK	35.7	-27.5	38.2	54	-15.8	74	-35.8	0-360	99	H
6	7.827	29.47	PK	35.7	-26.8	38.37	54	-15.63	74	-35.63	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.277	40.57	PK2	33.7	-31	43.27	54	-10.73	74	-30.73	307	205	H
* 4.274	30.77	MAv1	33.7	-31	33.47	54	-20.53	74	-40.53	307	205	H
* 4.301	30.62	MAv1	33.7	-31.2	33.12	54	-20.88	74	-40.88	78	112	V
* 4.299	41.29	PK2	33.7	-31.2	43.79	54	-10.21	74	-30.21	78	112	V
1.812	31.15	PK2	30.3	-23.7	37.75	54	-16.25	74	-36.25	307	205	V
6.576	31.82	PK2	35.7	-27.6	39.92	54	-14.08	74	-34.08	307	205	H
7.823	37.69	PK2	35.7	-26.7	46.69	54	-7.31	74	-27.31	178	357	V
7.831	37.7	PK2	35.7	-26.9	46.5	54	-7.5	74	-27.5	307	205	V

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

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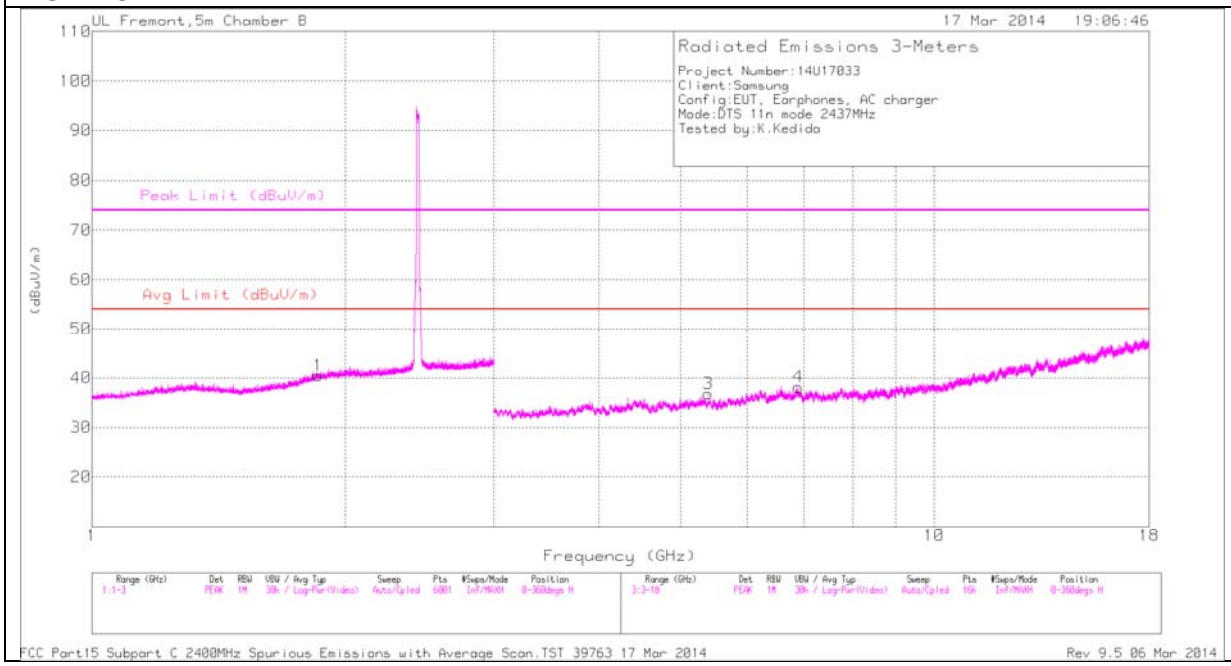
MID CHANNEL
HORIZONTAL



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

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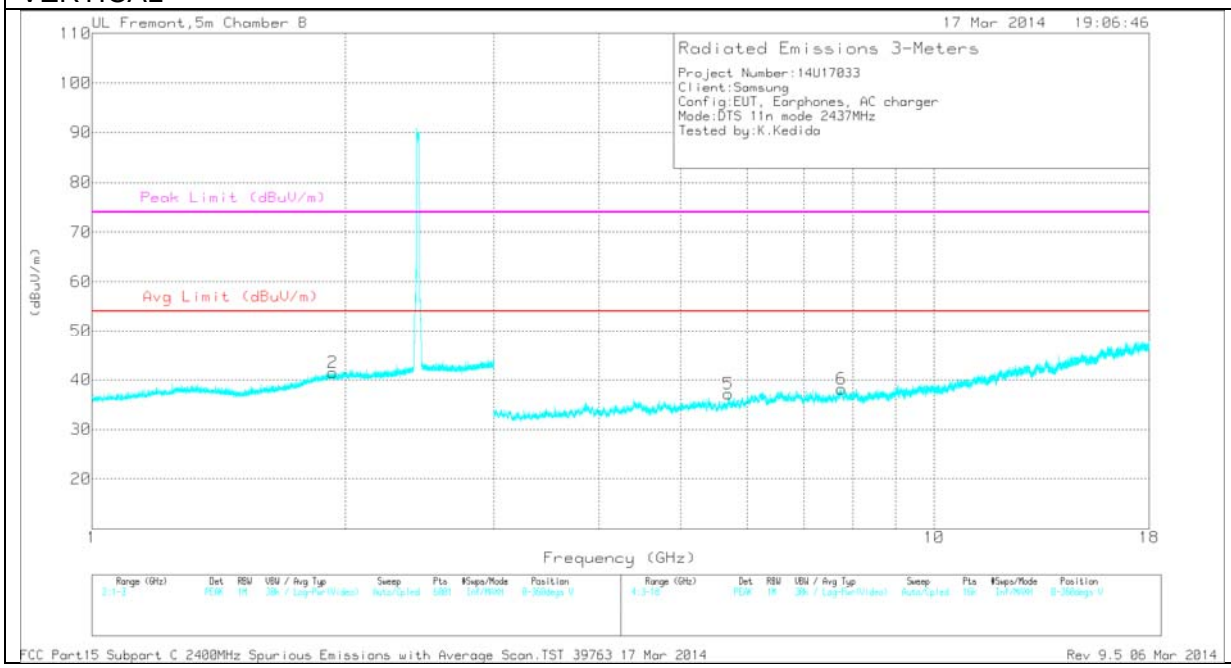
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 5.389	30.8	PK	34.5	-28.5	36.8	54	-17.2	74	-37.2	0-360	202	H
1	1.857	33.49	PK	30.7	-23.7	40.49	54	-13.51	74	-33.51	0-360	99	H
2	1.931	33.85	PK	31.2	-23.6	41.45	54	-12.55	74	-32.55	0-360	202	V
5	5.695	31.53	PK	34.5	-28.8	37.23	54	-16.77	74	-36.77	0-360	202	V
4	6.897	29.93	PK	35.6	-27.4	38.13	54	-15.87	74	-35.87	0-360	99	H
6	7.759	28.59	PK	35.7	-26.1	38.19	54	-15.81	74	-35.81	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5.392	39.16	PK2	34.5	-28.6	45.06	54	-8.94	74	-28.94	1	100	H
1.858	42.27	PK2	30.7	-23.7	49.27	54	-4.73	74	-24.73	1	100	H
1.93	42.91	PK2	31.2	-23.6	50.51	54	-3.49	74	-23.49	1	100	V
5.696	39.14	PK2	34.5	-28.8	44.84	54	-9.16	74	-29.16	1	100	V
6.9	25.27	PK2	35.6	-27.3	33.57	54	-20.43	74	-40.43	1	100	H
7.757	37.5	PK2	35.7	-26.1	47.1	54	-6.9	74	-26.9	1	100	V

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

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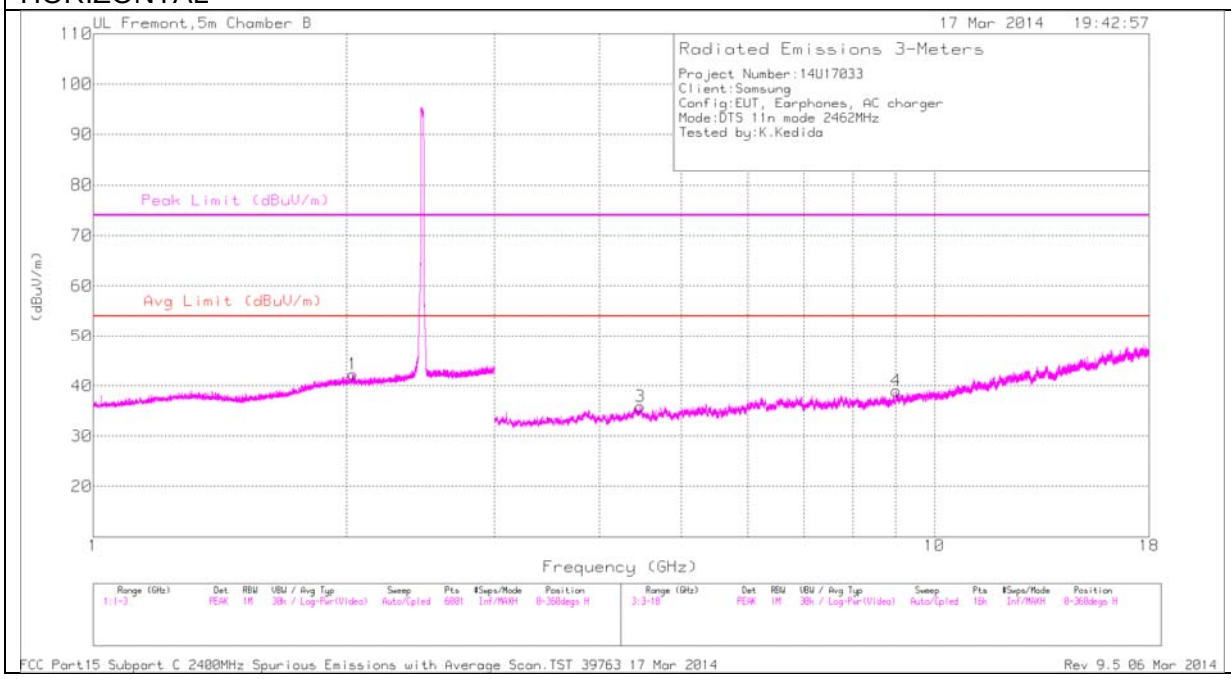
HIGH CHANNEL
HORIZONTAL



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

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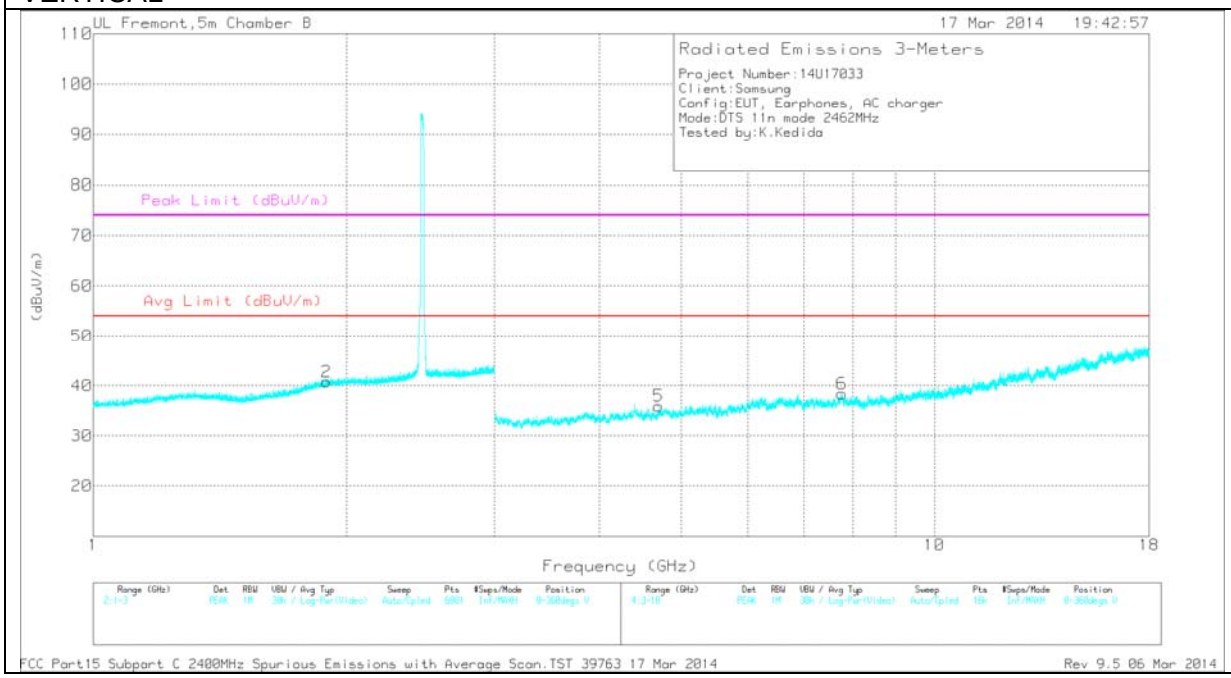
HIGH CHANNEL
VERTICAL



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

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 9.013	27.67	PK	36.2	-24.9	38.97	54	-15.03	74	-35.03	0-360	202	H
5	* 4.701	31.53	PK	34.2	-29.8	35.93	54	-18.07	74	-38.07	0-360	99	V
2	1.895	33.38	PK	31	-23.6	40.78	54	-13.22	74	-33.22	0-360	202	V
1	2.035	34.49	PK	31.3	-23.5	42.29	54	-11.71	74	-31.71	0-360	99	H
3	4.472	31.01	PK	34	-29.1	35.91	54	-18.09	74	-38.09	0-360	202	H
6	7.762	28.69	PK	35.7	-26	38.39	54	-15.61	74	-35.61	0-360	202	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 9.012	35.31	PK2	36.2	-24.8	46.71	54	-7.29	74	-27.29	1	100	H
* 4.699	39.42	PK2	34.2	-29.8	43.82	54	-10.18	74	-30.18	1	100	V
1.897	42.98	PK2	31	-23.6	50.38	54	-3.62	74	-23.62	1	100	V
2.03	42.59	PK2	31.3	-23.5	50.39	54	-3.61	74	-23.61	1	100	H
4.469	38.95	PK2	33.9	-29.1	43.75	54	-10.25	74	-30.25	1	100	H
7.763	37.06	PK2	35.7	-26	46.76	54	-7.24	74	-27.24	1	100	V

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

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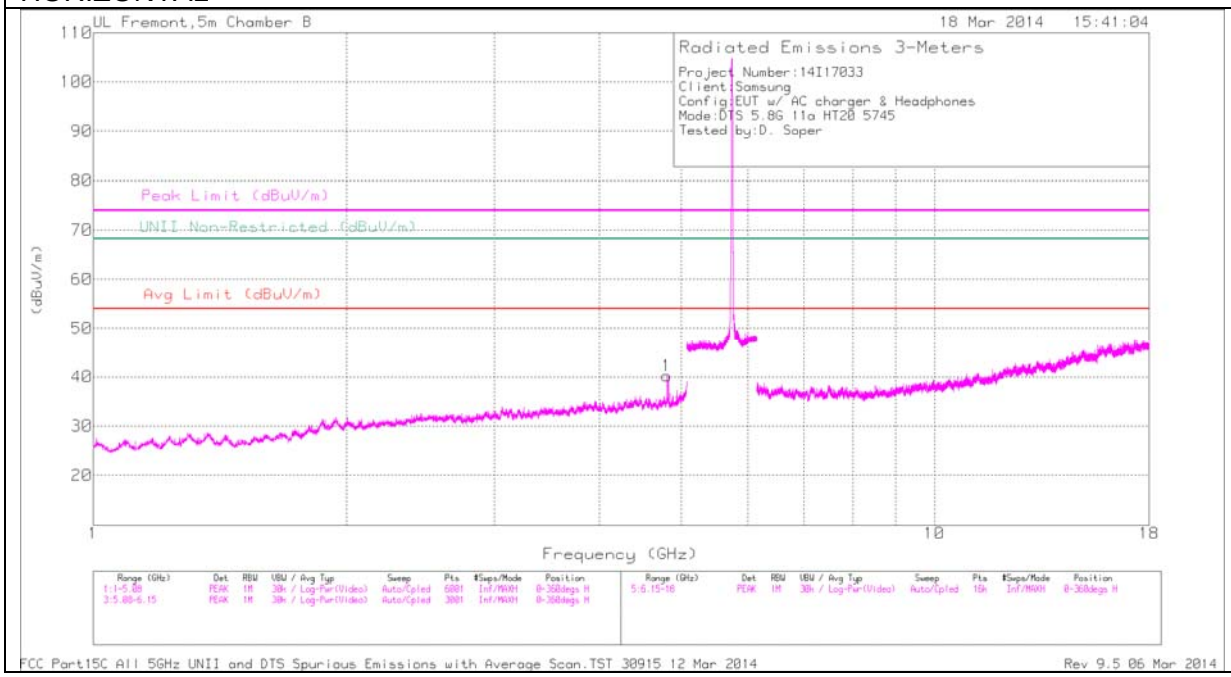
10.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

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.

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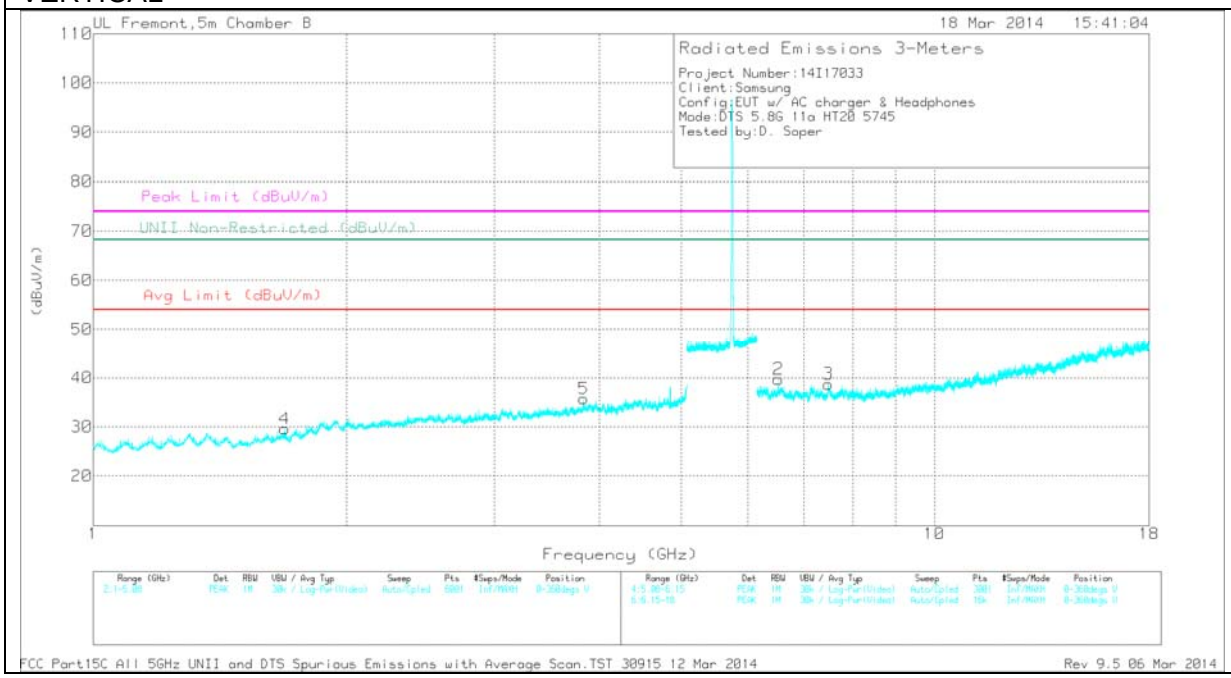
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.808	35.32	PK	34.2	-29.3	0	40.22	54	-13.78	74	-33.78	54	-13.78	0-360	202	H
4	* 1.69	33.91	PK	29	-33.3	0	29.61	54	-24.39	74	-44.39	54	-24.39	0-360	202	V
5	* 3.83	33.01	PK	33.7	-31	0	35.71	54	-18.29	74	-38.29	54	-18.29	0-360	202	V
3	* 7.485	29.02	PK	35.6	-25.9	0	38.72	54	-15.28	74	-35.28	54	-15.28	0-360	202	V
2	6.524	31.62	PK	35.7	-27.6	0	39.72	54	-14.28	74	-34.28	54	-14.28	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.829	40.36	PK2	34.2	-30	0	44.56	54	54	-9.44	74	-29.44	54	177	372	H
* 4.829	29.7	MAv 1	34.2	-30	.3	34.2	54	54	-19.8	74	-39.8	54	177	372	H

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

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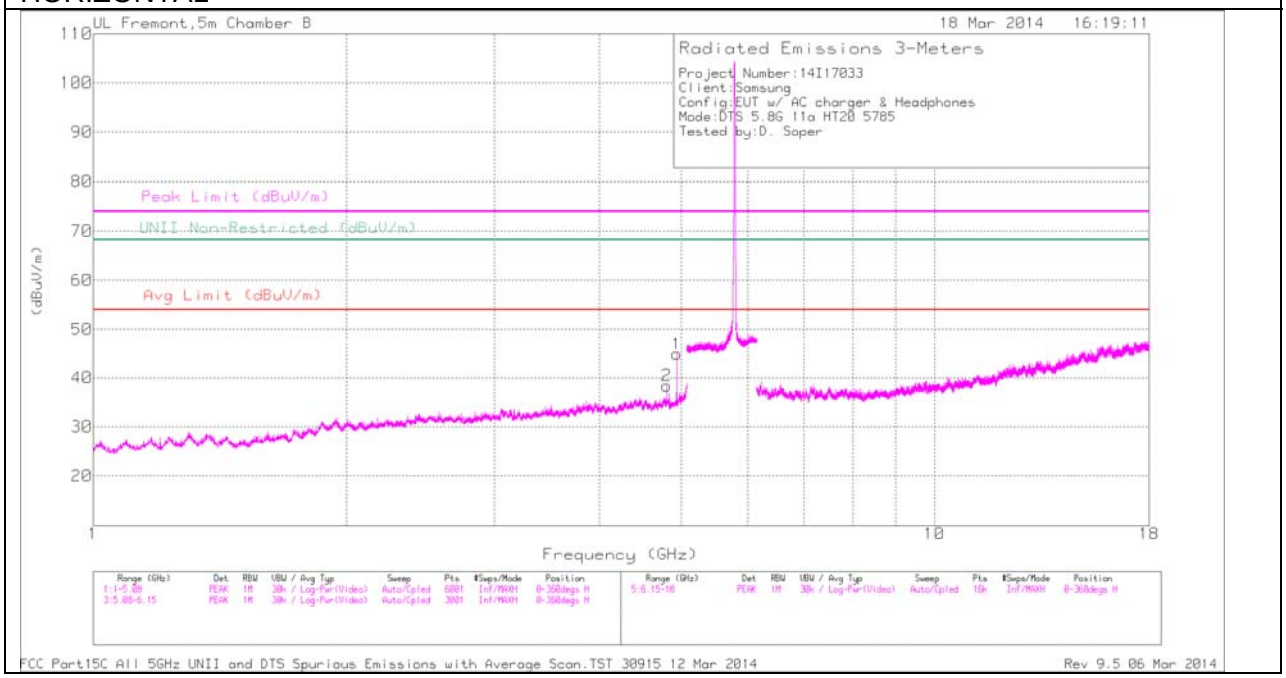
MID CHANNEL
HORIZONTAL



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

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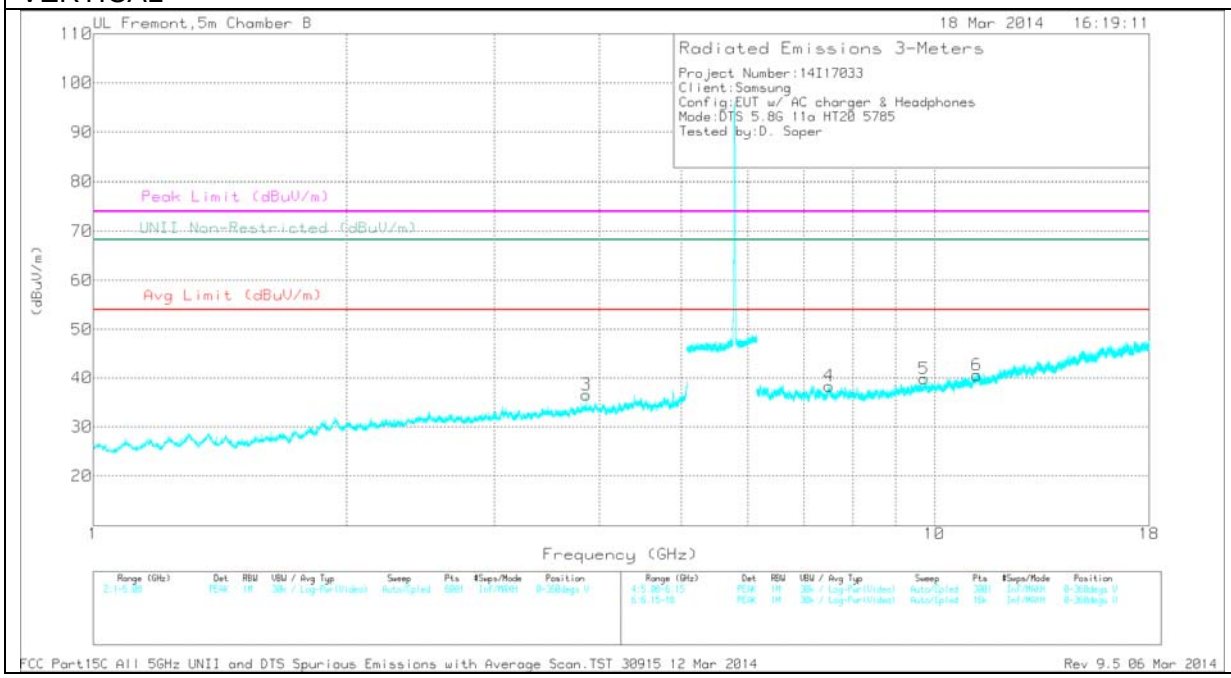
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.804	33.39	PK	34.2	-29.2	0	38.39	54	-15.61	74	-35.61	-	-	0-360	99	H
3	* 3.857	34.25	PK	33.7	-31.4	0	36.55	54	-17.45	74	-37.45	-	-	0-360	202	V
4	* 7.495	28.54	PK	35.6	-25.8	0	38.34	54	-15.66	74	-35.66	-	-	0-360	202	V
6	* 11.223	25.04	PK	37.9	-22.4	0	40.54	54	-13.46	74	-33.46	-	-	0-360	99	V
5	9.724	26.62	PK	36.9	-23.7	0	39.82	-	-	-	-	68.2	-28.38	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.898	40.3	PK2	34.2	-29.5	0	45	54	-9	74	-29	-	-	329	296	H
* 4.87	30.27	MAv 1	34.2	-30.2	.3	34.57	54	-19.43	-	-	-	-	329	296	H

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

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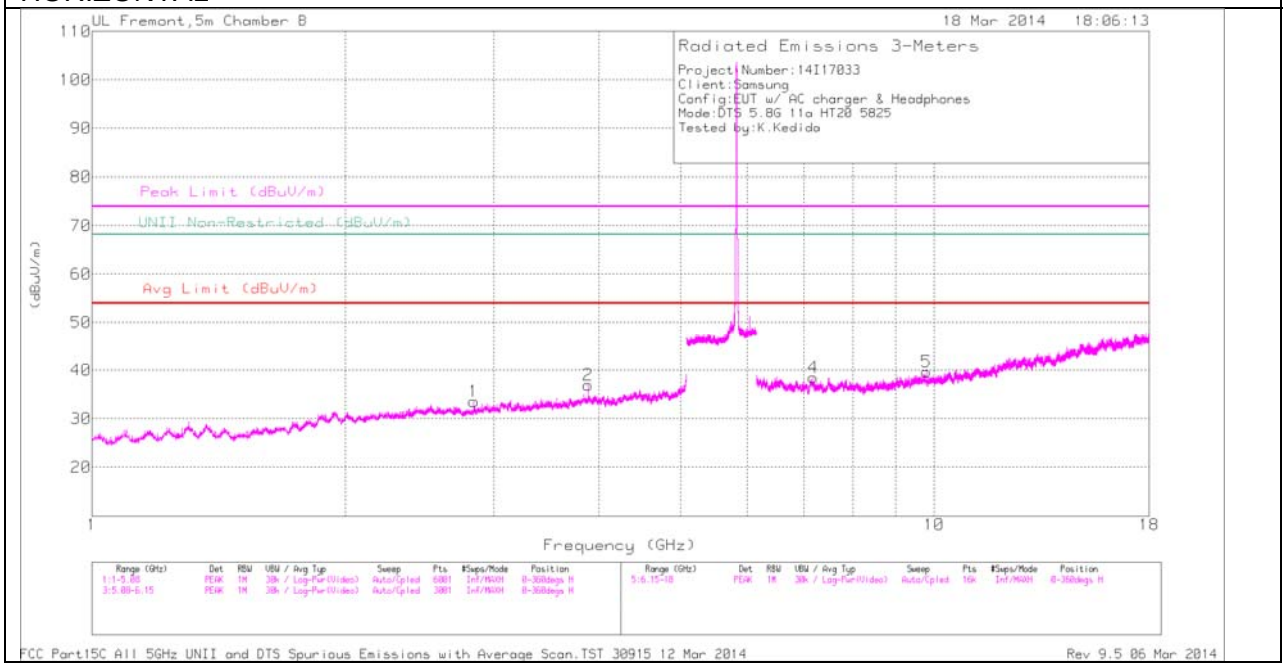
HIGH CHANNEL
HORIZONTAL



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

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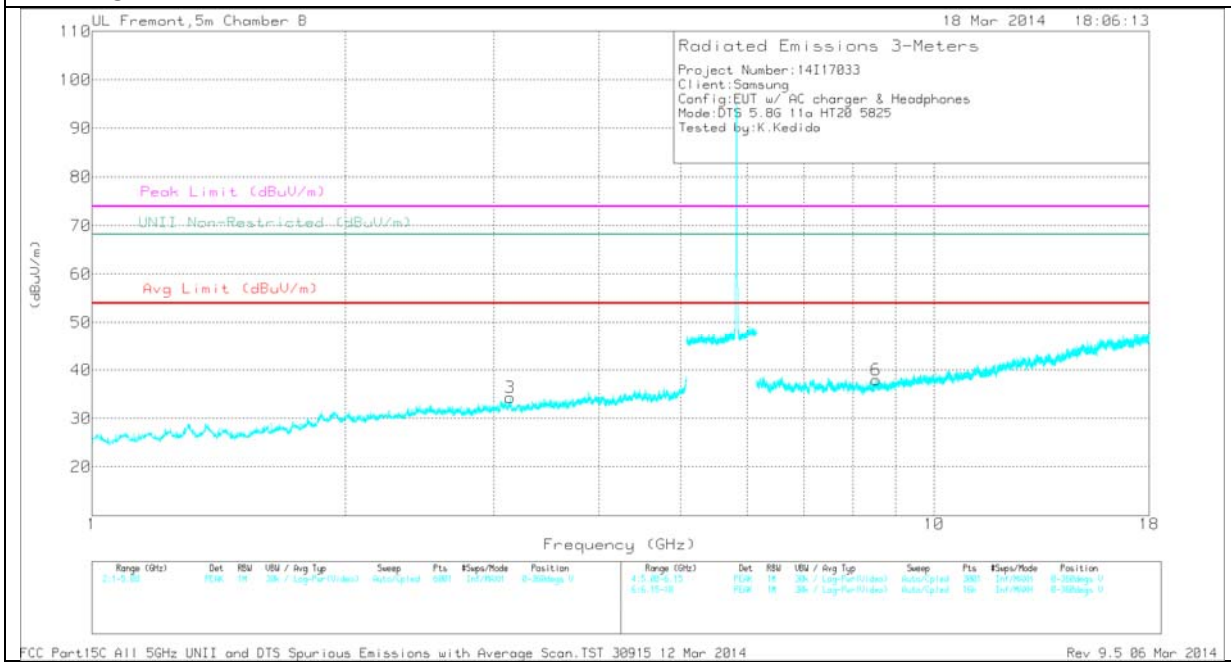
HIGH CHANNEL
VERTICAL



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

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.841	33.49	PK	32.5	-32.4	33.59	54	-20.41	74	-40.41	-	-	0-360	99	H
2	* 3.883	34.78	PK	33.8	-31.7	36.88	54	-17.12	74	-37.12	-	-	0-360	99	H
3	3.136	33.47	PK	32.8	-31.9	34.37	54	-19.63	74	-39.63	68.2	-33.83	0-360	99	V
4	7.183	29.34	PK	35.6	-26.5	38.44	54	-15.56	74	-35.56	68.2	-29.76	0-360	99	H
6	8.529	28.46	PK	35.8	-26.3	37.96	54	-16.04	74	-36.04	68.2	-30.24	0-360	202	V
5	9.785	26.15	PK	36.9	-23.4	39.65	54	-14.35	74	-34.35	68.2	-28.55	0-360	99	H

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.84	40.77	PK2	32.4	-32.4	40.77	54	-13.23	74	-33.23	-	-	360	100	H
* 3.884	43.06	PK2	33.8	-31.7	45.16	54	-8.84	74	-28.84	-	-	71	235	H
* 3.883	35.03	MAv1	33.8	-31.7	37.13	54	-16.87	74	-36.87	-	-	71	235	H
3.133	40.56	PK2	32.8	-31.9	41.46	54	-12.54	74	-32.54	68.2	-26.74	71	235	V
7.184	38.4	PK2	35.6	-26.5	47.5	54	-6.5	74	-26.5	68.2	-20.7	71	235	H
8.529	36.86	PK2	35.8	-26.3	46.36	54	-7.64	74	-27.64	68.2	-21.84	71	235	V
9.784	35.28	PK2	36.9	-23.4	48.78	54	-5.22	74	-25.22	68.2	-19.42	71	235	H

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

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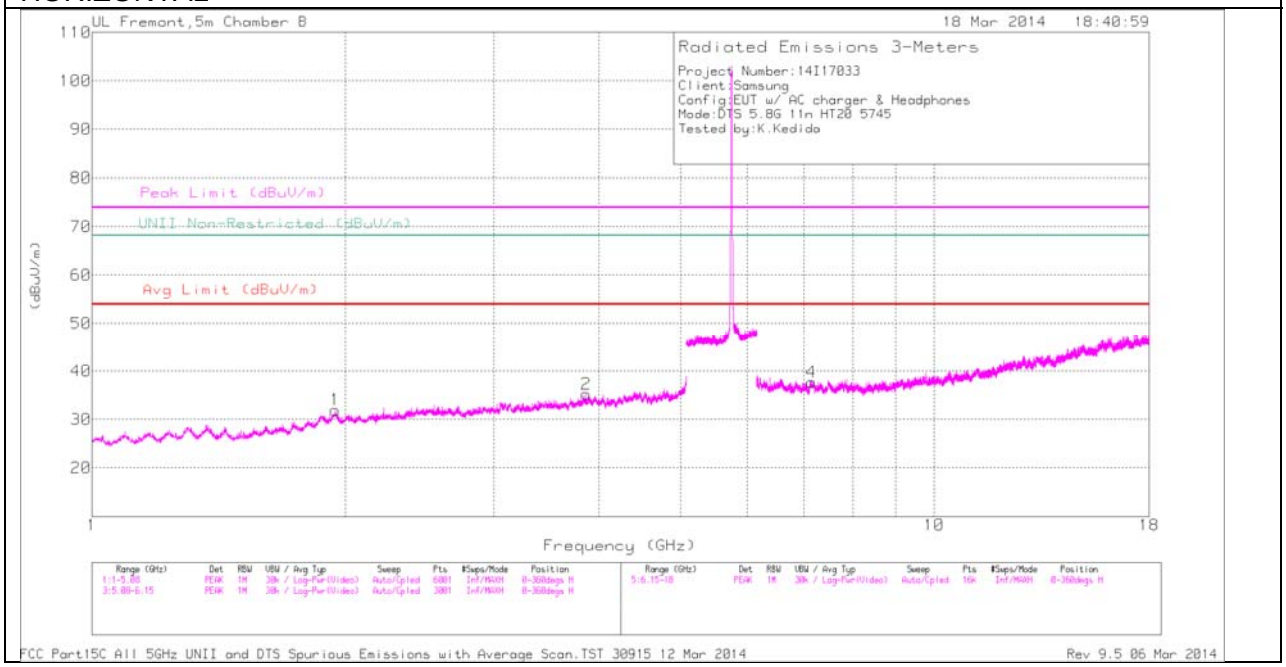
10.2.1. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

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.

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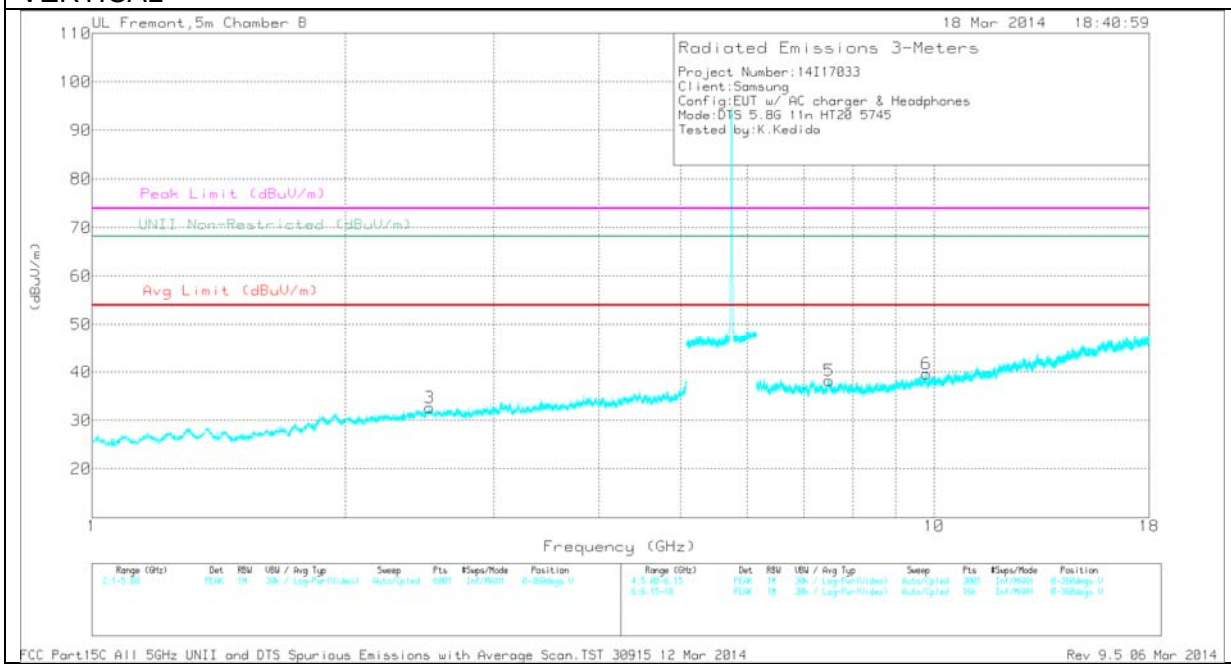
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 3.861	33.1	PK	33.7	-31.5	35.3	54	-18.7	74	-38.7	-	-	0-360	202	H
5	* 7.496	28.42	PK	35.6	-25.8	38.22	54	-15.78	74	-35.78	-	-	0-360	99	V
1	1.946	33.24	PK	31.2	-32.5	31.94	-	-	-	-	68.2	-36.26	0-360	202	H
3	2.518	32.68	PK	32.5	-32.5	32.68	-	-	-	-	68.2	-35.52	0-360	99	V
4	7.151	29.38	PK	35.6	-27.3	37.68	-	-	-	-	68.2	-30.52	0-360	99	H
6	9.783	26.15	PK	36.9	-23.4	39.65	-	-	-	-	68.2	-28.55	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.862	41.33	PK 2	33.7	-31.5	43.53	54	-10.47	74	-30.47	-	-	1	100	H
* 7.494	36.86	PK 2	35.6	-25.7	46.76	54	-7.24	74	-27.24	-	-	1	100	V
1.946	41.58	PK 2	31.2	-32.5	40.28	-	-	-	-	68.2	-27.92	1	100	H
2.519	41.67	PK 2	32.5	-32.5	41.67	-	-	-	-	68.2	-26.53	1	100	V
7.15	38.53	PK 2	35.6	-27.3	46.83	-	-	-	-	68.2	-21.37	1	100	H
9.784	34.89	PK 2	36.9	-23.4	48.39	-	-	-	-	68.2	-19.81	1	100	V

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

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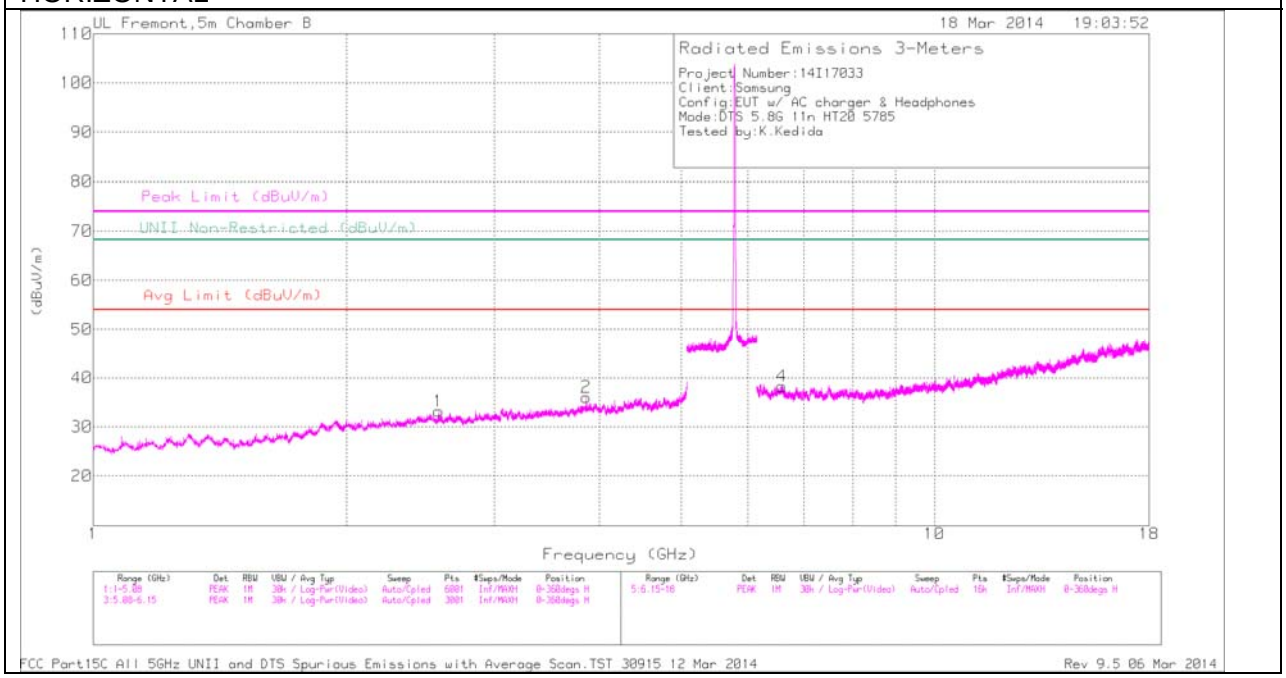
MID CHANNEL
HORIZONTAL



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

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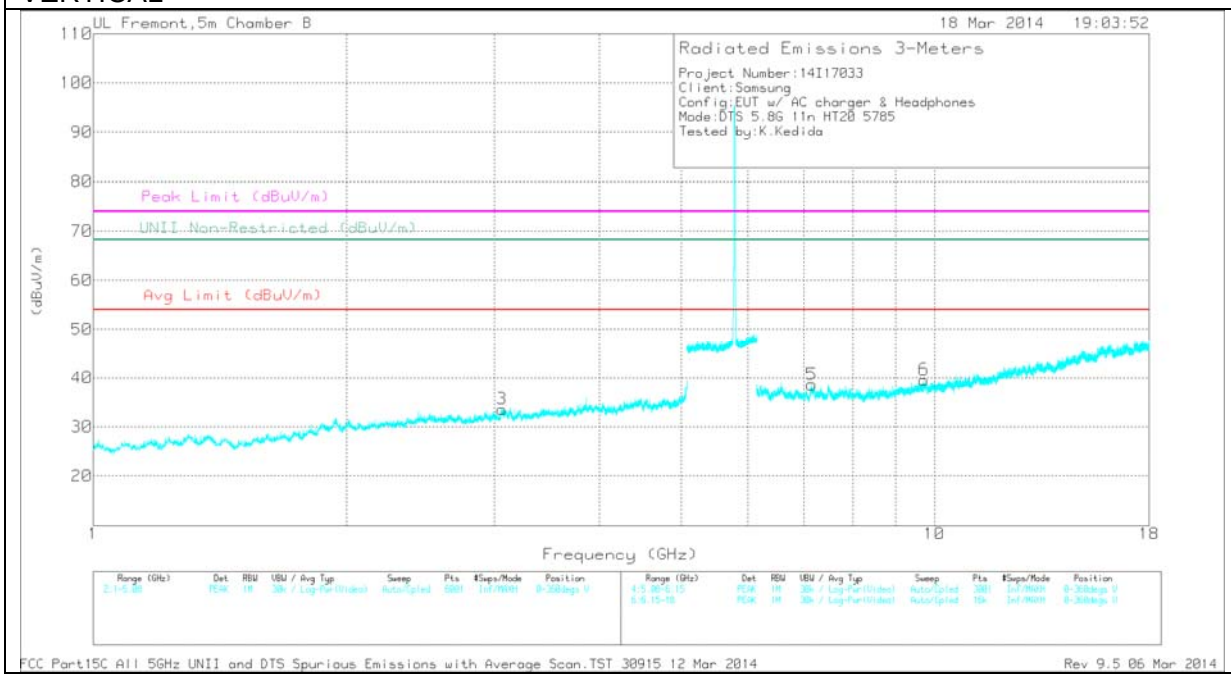
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 3.857	33.75	PK	33.7	-31.4	36.05	54	-17.95	74	-37.95	-	-	0-360	99	H
1	2.576	33.57	PK	32.5	-32.9	33.17	-	-	-	-	68.2	-35.03	0-360	202	H
3	3.062	33.03	PK	32.8	-32.2	33.63	-	-	-	-	68.2	-34.57	0-360	202	V
4	6.582	29.95	PK	35.7	-27.4	38.25	-	-	-	-	68.2	-29.95	0-360	99	H
5	7.147	30.33	PK	35.6	-27.3	38.63	-	-	-	-	68.2	-29.57	0-360	99	V
6	9.714	26.42	PK	36.9	-23.7	39.62	-	-	-	-	68.2	-28.58	0-360	202	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.857	42.33	PK 2	33.7	-31.5	44.53	54	-9.47	74	-29.47	-	-	1	100	H
2.575	41.32	PK 2	32.5	-32.9	40.92	-	-	-	-	68.2	-27.28	1	100	H
3.064	41.47	PK 2	32.8	-32.2	42.07	-	-	-	-	68.2	-26.13	1	100	V
6.584	38.34	PK 2	35.7	-27.4	46.64	-	-	-	-	68.2	-21.56	1	100	H
7.146	39.07	PK 2	35.6	-27.3	47.37	-	-	-	-	68.2	-20.83	1	100	V
9.712	34.23	PK 2	36.9	-23.7	47.43	-	-	-	-	68.2	-20.77	1	100	V

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

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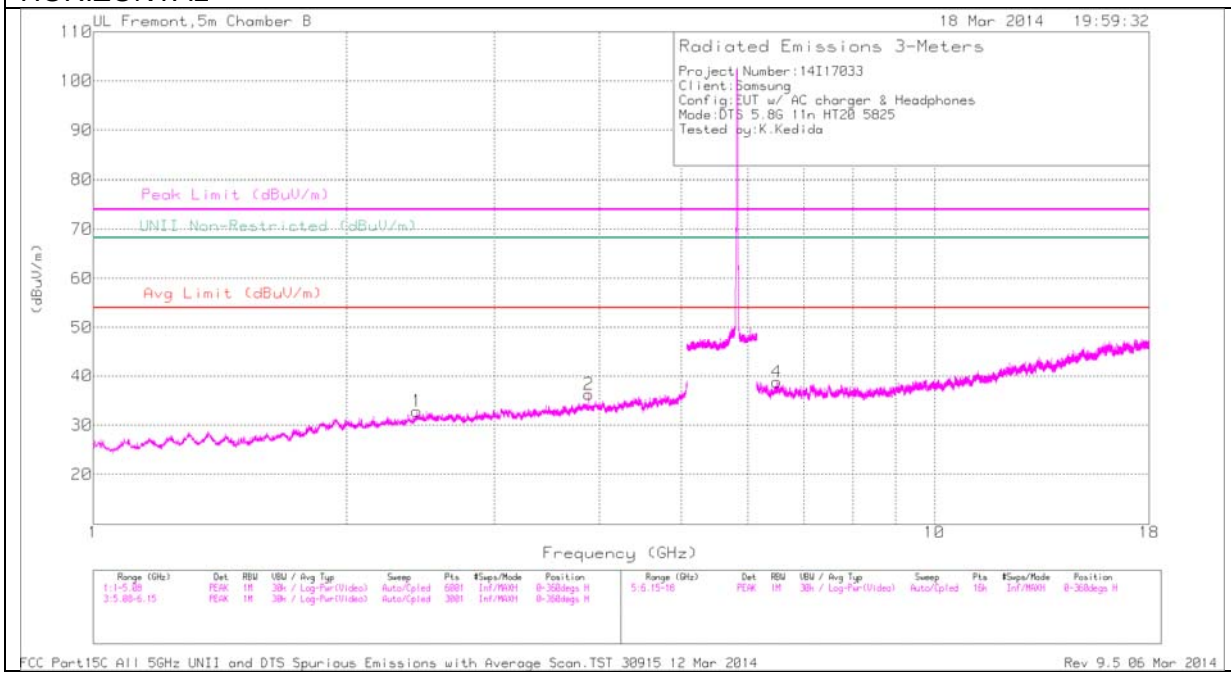
HIGH CHANNEL
HORIZONTAL



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

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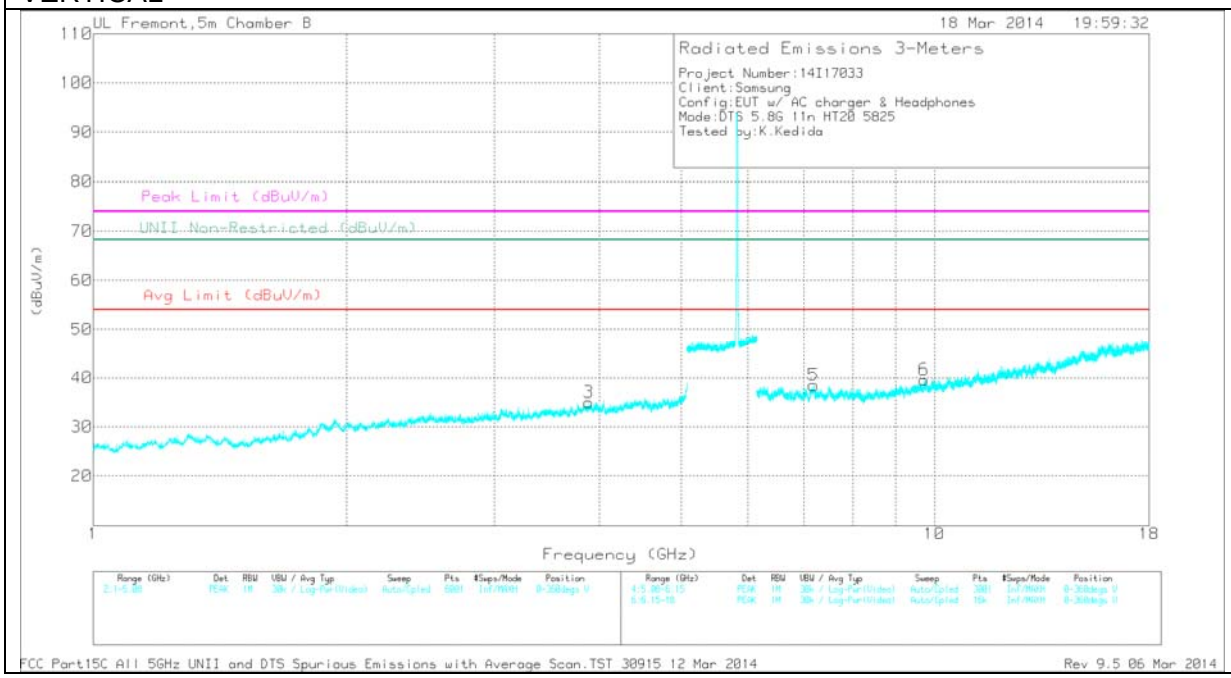
HIGH CHANNEL
VERTICAL



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

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HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 3.883	34.18	PK	33.8	-31.7	36.28	54	-17.72	74	-37.72	-	-	0-360	202	H
3	* 3.883	32.91	PK	33.8	-31.7	35.01	54	-18.99	74	-38.99	-	-	0-360	99	V
1	2.425	32.73	PK	32.2	-32.1	32.83	-	-	-	-	68.2	-35.37	0-360	202	H
4	6.5	31.57	PK	35.7	-28.5	38.77	-	-	-	-	68.2	-29.43	0-360	99	H
5	7.185	29.5	PK	35.5	-26.5	38.5	-	-	-	-	68.2	-29.7	0-360	99	V
6	9.724	26.41	PK	36.9	-23.7	39.61	-	-	-	-	68.2	-28.59	0-360	99	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.883	41.35	PK 2	33.8	-31.7	43.45	54	-10.55	74	-30.55	-	-	1	202	H
* 3.883	41.29	PK 2	33.8	-31.7	43.39	54	-10.61	74	-30.61	-	-	1	202	V
2.424	40.51	PK 2	32.2	-32.1	40.61	-	-	-	-	68.2	-27.59	1	202	H
6.499	39.54	PK 2	35.7	-28.5	46.74	-	-	-	-	68.2	-21.46	1	202	H
7.184	39.2	PK 2	35.6	-26.5	48.3	-	-	-	-	68.2	-19.9	1	202	V
9.723	34.76	PK 2	36.9	-23.7	47.96	-	-	-	-	68.2	-20.24	1	202	V

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

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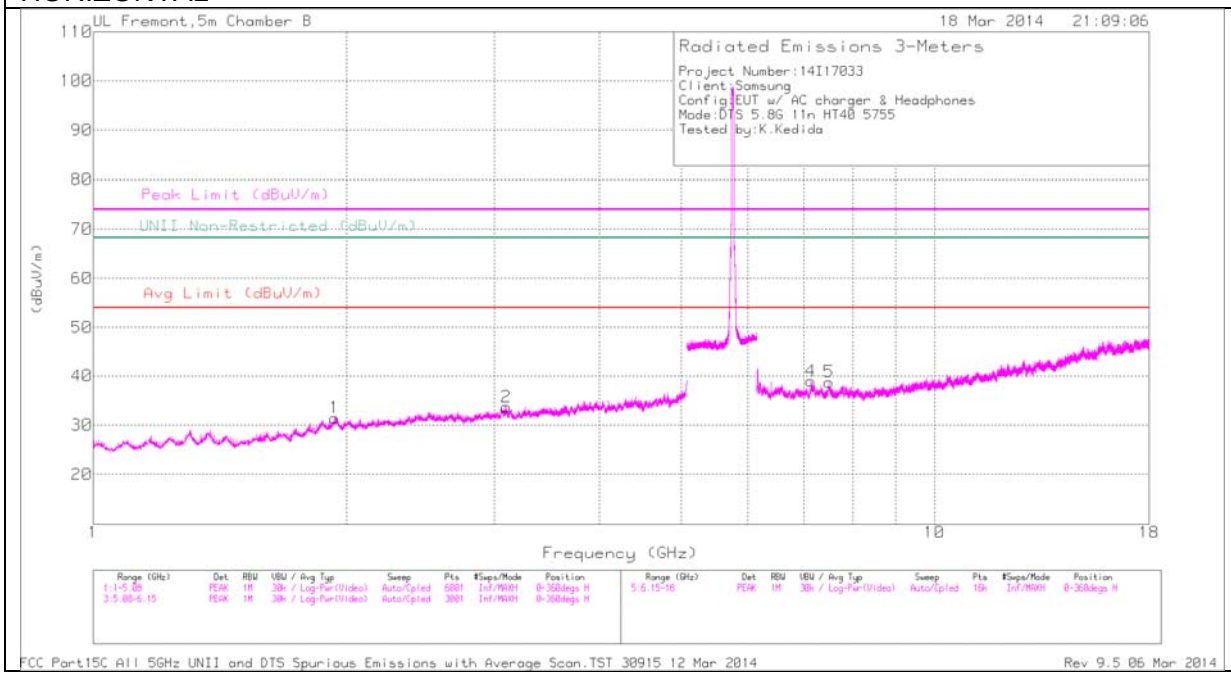
10.2.1. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS

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.

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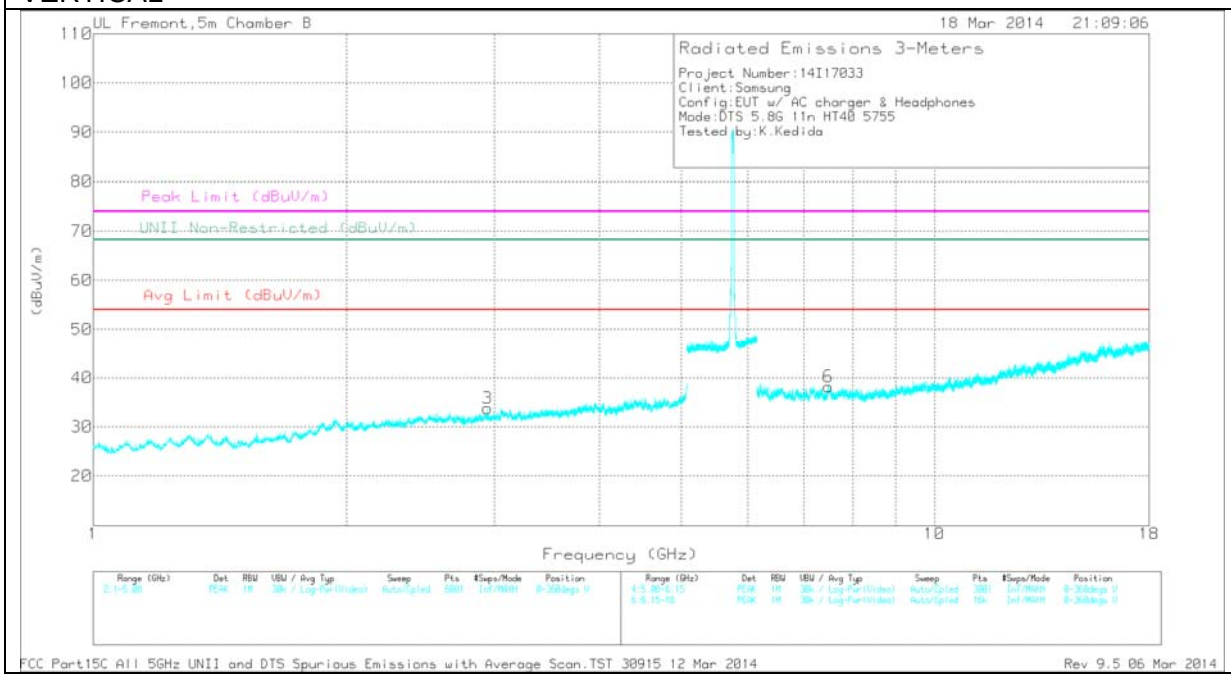
LOW CHANNEL
VERTICAL



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

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 7.492	28.84	PK	35.6	-25.7	38.74	54	-15.26	74	-35.26	-	-	0-360	99	H
6	* 7.483	28.59	PK	35.6	-26	38.19	54	-15.81	74	-35.81	-	-	0-360	202	V
1	1.938	32.86	PK	31.2	-32.6	31.46	-	-	-	-	68.2	-36.74	0-360	99	H
3	2.944	32.79	PK	32.7	-31.7	33.79	-	-	-	-	68.2	-34.41	0-360	99	V
2	3.099	32.81	PK	32.9	-32	33.71	-	-	-	-	68.2	-34.49	0-360	202	H
4	7.133	31.04	PK	35.6	-27.7	38.94	-	-	-	-	68.2	-29.26	0-360	99	H

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.491	37.59	PK 2	35.6	-25.7	47.49	54	-6.51	74	-26.51	-	-	360	202	H
* 7.484	37.51	PK 2	35.6	-25.9	47.21	54	-6.79	74	-26.79	-	-	360	202	V
1.937	42.09	PK 2	31.2	-32.6	40.69	-	-	-	-	68.2	-27.51	360	202	H
2.945	40.13	PK 2	32.7	-31.7	41.13	-	-	-	-	68.2	-27.07	360	202	V
3.099	41.63	PK 2	32.9	-32	42.53	-	-	-	-	68.2	-25.67	360	202	H
7.132	38.68	PK 2	35.6	-27.8	46.48	-	-	-	-	68.2	-21.72	360	202	H

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

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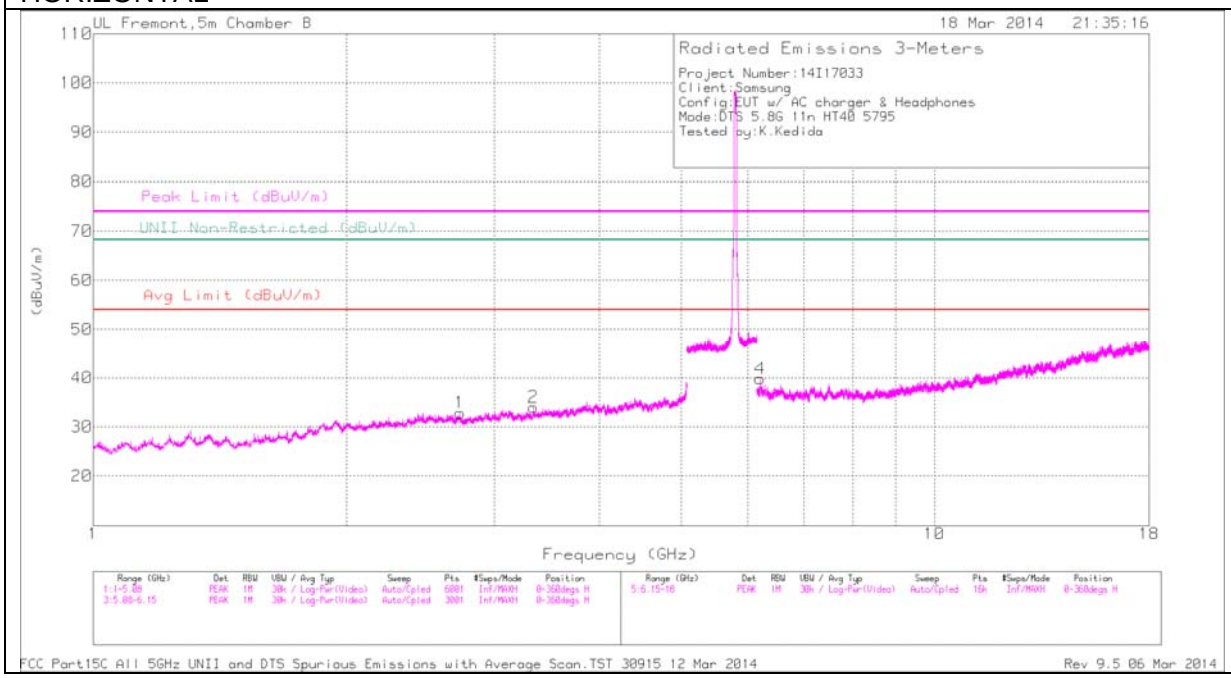
MID CHANNEL
HORIZONTAL



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

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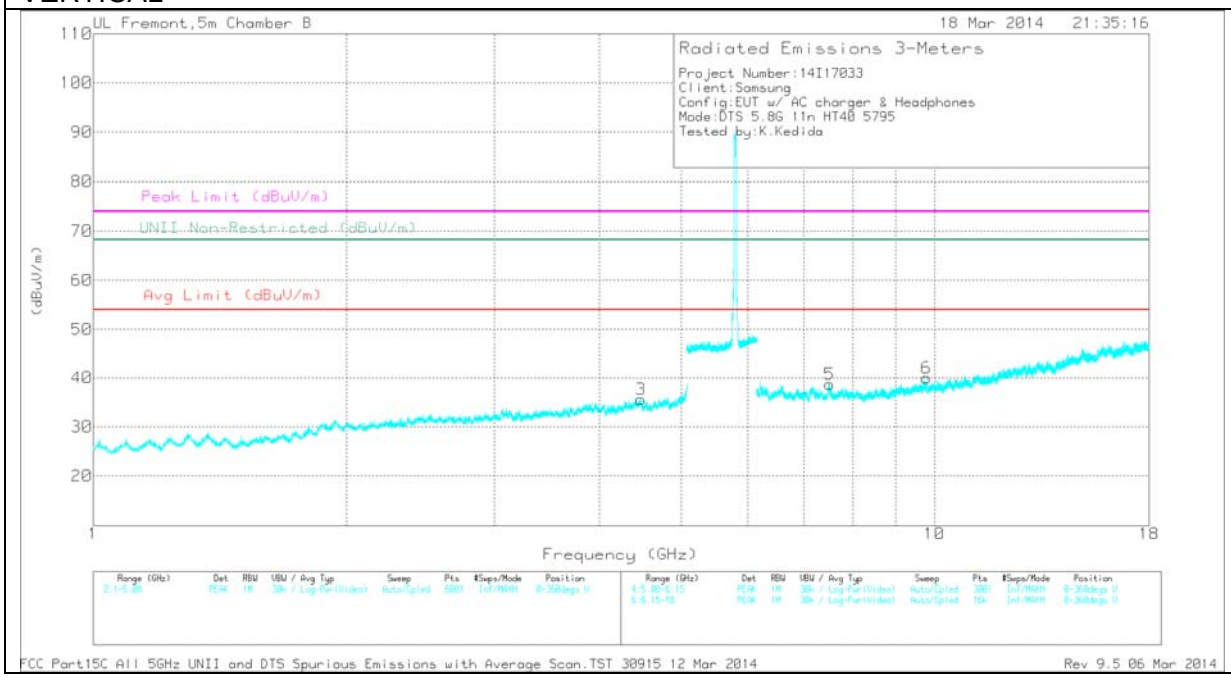
MID CHANNEL
VERTICAL



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

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.731	32.67	PK	32.2	-32	32.87	54	-21.13	74	-41.13	-	-	0-360	201	H
2	* 3.336	32.99	PK	32.8	-31.8	33.99	54	-20.01	74	-40.01	-	-	0-360	201	H
5	* 7.505	29.18	PK	35.6	-26.1	38.68	54	-15.32	74	-35.32	-	-	0-360	202	V
3	4.481	31.41	PK	34	-29.8	35.61	-	-	-	-	68.2	-32.59	0-360	99	V
4	6.207	32	PK	35.4	-27.6	39.8	-	-	-	-	68.2	-28.4	0-360	99	H
6	9.78	26.43	PK	36.9	-23.4	39.93	-	-	-	-	68.2	-28.27	0-360	202	V

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

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.73	41.65	PK 2	32.2	-32	41.85	54	-12.15	74	-32.15	-	-	360	202	H
* 3.335	40.91	PK 2	32.8	-31.8	41.91	54	-12.09	74	-32.09	-	-	360	202	H
* 7.505	37.06	PK 2	35.6	-26.1	46.56	54	-7.44	74	-27.44	-	-	360	202	V
4.479	39.79	PK 2	34	-29.7	44.09	-	-	-	-	68.2	-24.11	360	202	V
6.207	41.79	PK 2	35.4	-27.6	49.59	-	-	-	-	68.2	-18.61	360	202	H
9.779	35.22	PK 2	36.9	-23.4	48.72	-	-	-	-	68.2	-19.48	360	202	V

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

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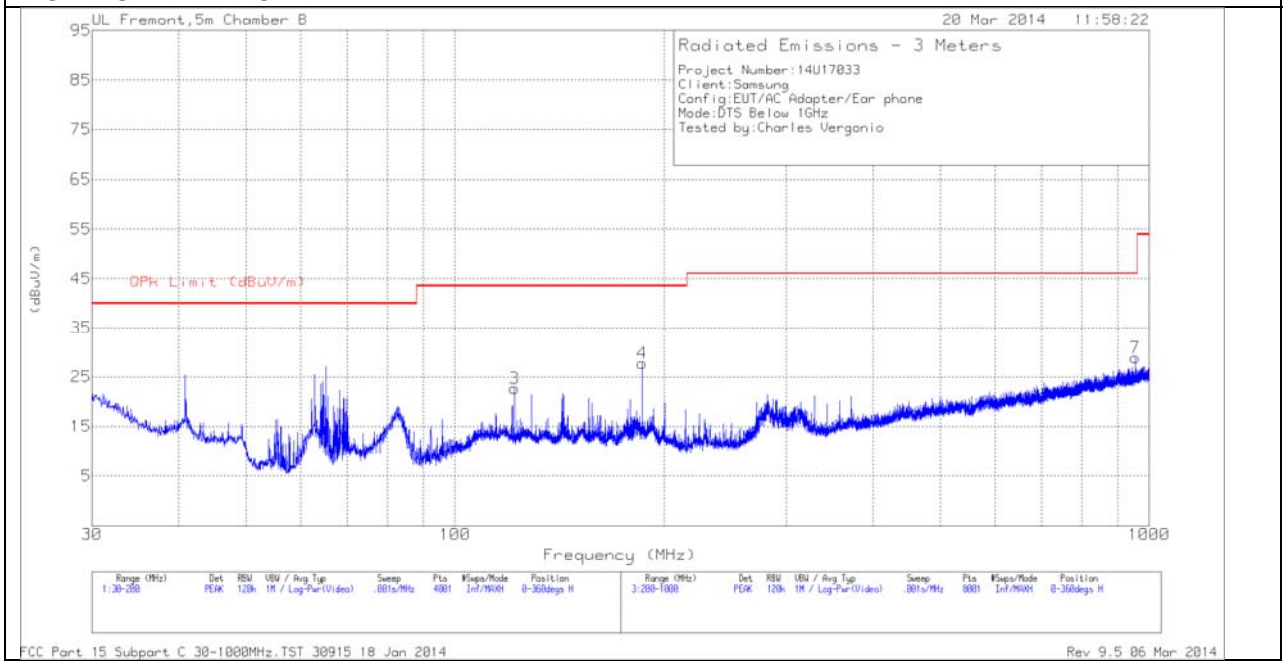
10.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



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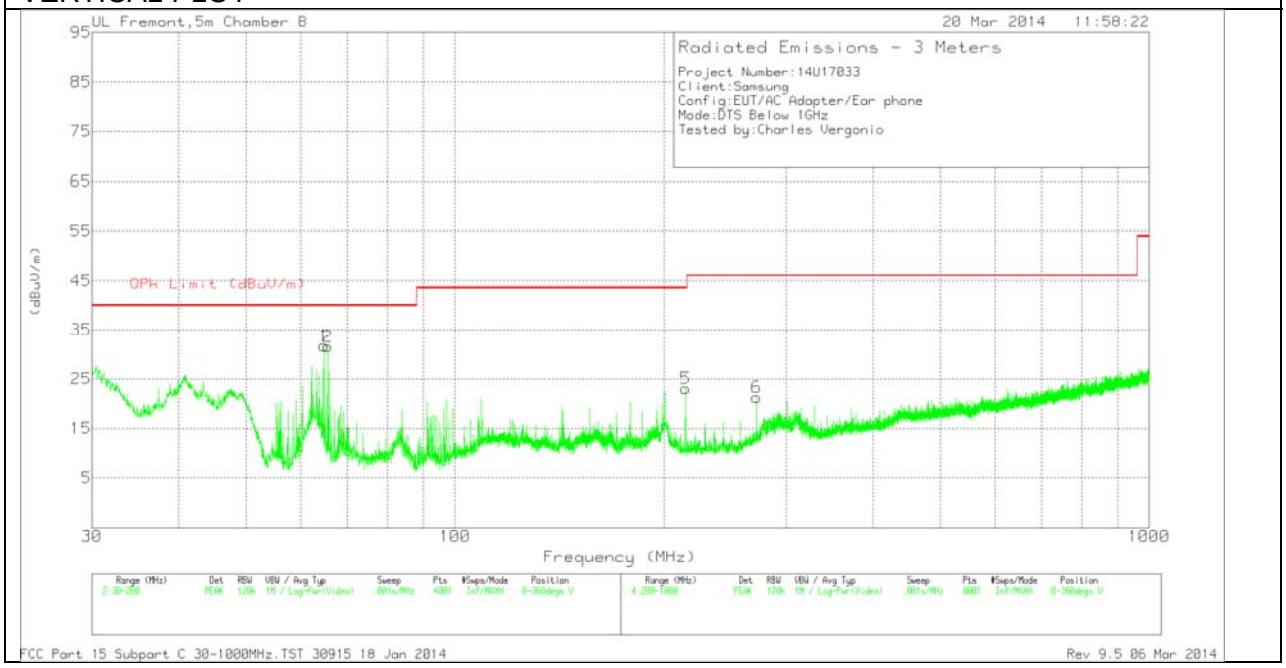
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



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Below 1G Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 121.885	36.74	PK	13.7	-27.8	22.64	-	-	0-360	400	H
6	* 272.1	34.59	PK	13	-26.3	21.29	-	-	0-360	200	V
1	64.7225	52.46	PK	7.8	-28.5	31.76	-	-	0-360	101	V
2	65.53	52.22	PK	7.9	-28.5	31.62	-	-	0-360	101	V
4	186.145	43.58	PK	11.3	-27.1	27.78	-	-	0-360	100	H
5	214.8	39.52	PK	10.4	-26.8	23.12	-	-	0-360	200	V
7	955.6	29.42	PK	22.2	-22.7	28.92	-	-	0-360	300	H

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

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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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
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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)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
1	.249	52.01	PK	.7	0	52.71	61.8	-9.09	-	-
2	.249	32.91	Av	.7	0	33.61	-	-	51.8	-18.19
3	.582	45.97	PK	.3	0	46.27	56	-9.73	-	-
4	.582	31.09	Av	.3	0	31.39	-	-	46	-14.61
5	1.563	39.79	PK	.2	.1	40.09	56	-15.91	-	-
6	1.563	23.68	Av	.2	.1	23.98	-	-	46	-22.02
7	10.5495	48.07	PK	.2	.2	48.47	60	-11.53	-	-
8	10.5495	32.88	Av	.2	.2	33.28	-	-	50	-16.72

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)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
9	.249	44.58	PK	.7	0	45.28	61.8	-16.52	-	-
10	.249	21.15	Av	.7	0	21.85	-	-	51.8	-29.95
11	.5595	40.45	PK	.3	0	40.75	56	-15.25	-	-
12	.5595	24.36	Av	.3	0	24.66	-	-	46	-21.34
13	1.5315	34.88	PK	.2	.1	35.18	56	-20.82	-	-
14	1.5315	16.9	Av	.2	.1	17.2	-	-	46	-28.8
15	10.5315	44.04	PK	.2	.2	44.44	60	-15.56	-	-
16	10.5315	27.64	Av	.2	.2	28.04	-	-	50	-21.96

PK - Peak detector
Av - average detection

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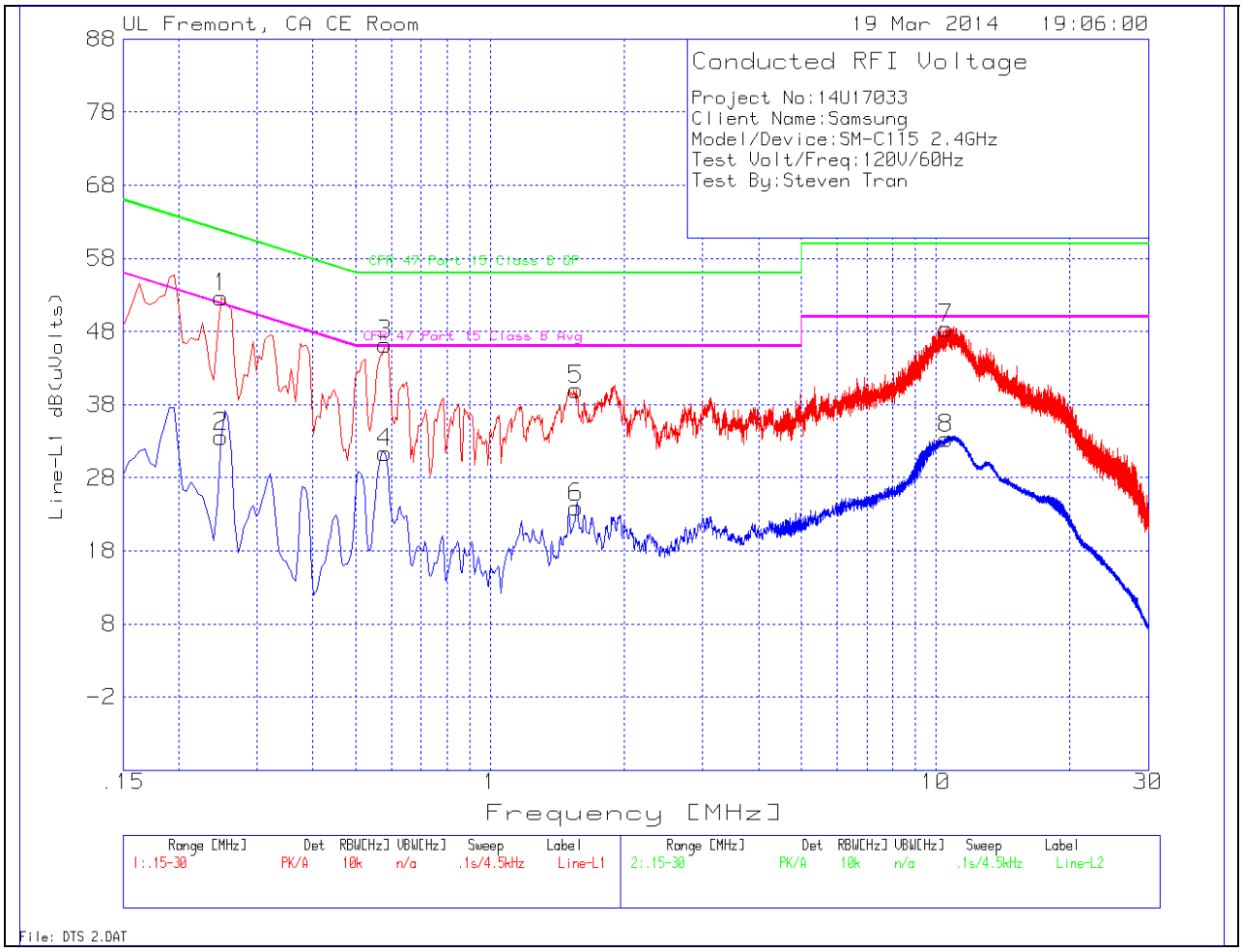
LINE 1 RESULTS



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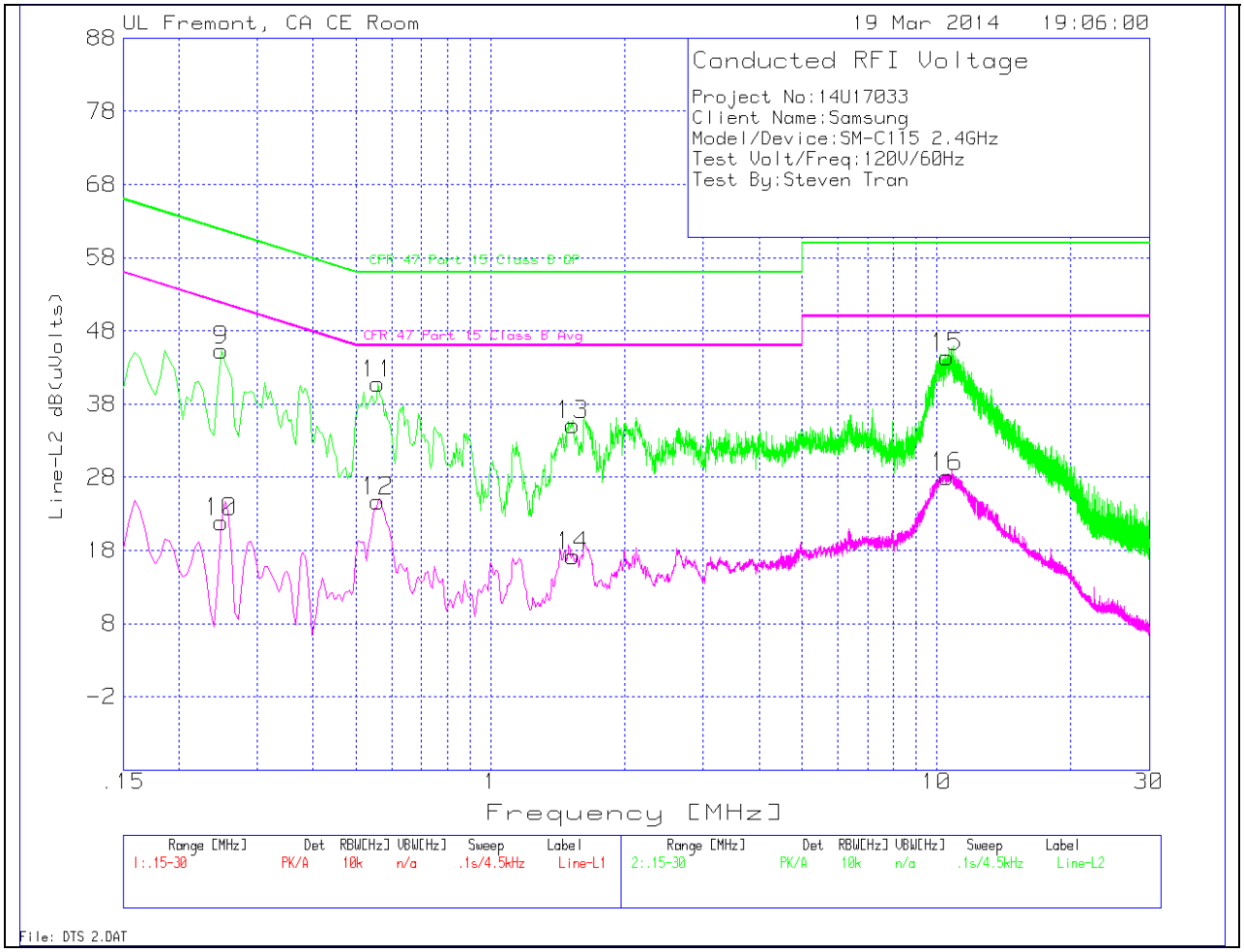
LINE 2 RESULTS



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