



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-N7508V

FCC ID: A3LSMN7508V

REPORT NUMBER: 14U16931-4, Revision A

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Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	2/6/14	Initial Issue	P. Kim
A	2/19/14	Updated EUT description	P. Kim

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1. ATTESTATION OF TEST RESULTS

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

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

MODEL: SM-N7508V

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

DATE TESTED: JANUARY 22- FEBRUARY 6, 2014

STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

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

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

Approved & Released
For UL Verification Services Inc. By:

Tested By:



PHILIP KIM
WISE PROGRAM MANAGER
UL Verification Services Inc.

CHARLES VERGONIO
WISE LAB TECHNICIAN
UL Verification Services Inc.

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	18.83	76.38
2412 - 2462	802.11g	21.82	152.05
2412 - 2462	802.11n HT20	21.8	151.36
5745-5825	802.11a	20.72	118.03
5745-5825	802.11n HT20	19.86	96.83
5755-5795	802.11n HT40	19.09	81.10

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.54 dBi for 2.4GHz and -2.84 for 5GHz.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	EP-TA11KWK	SE1D805AS/B-E	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

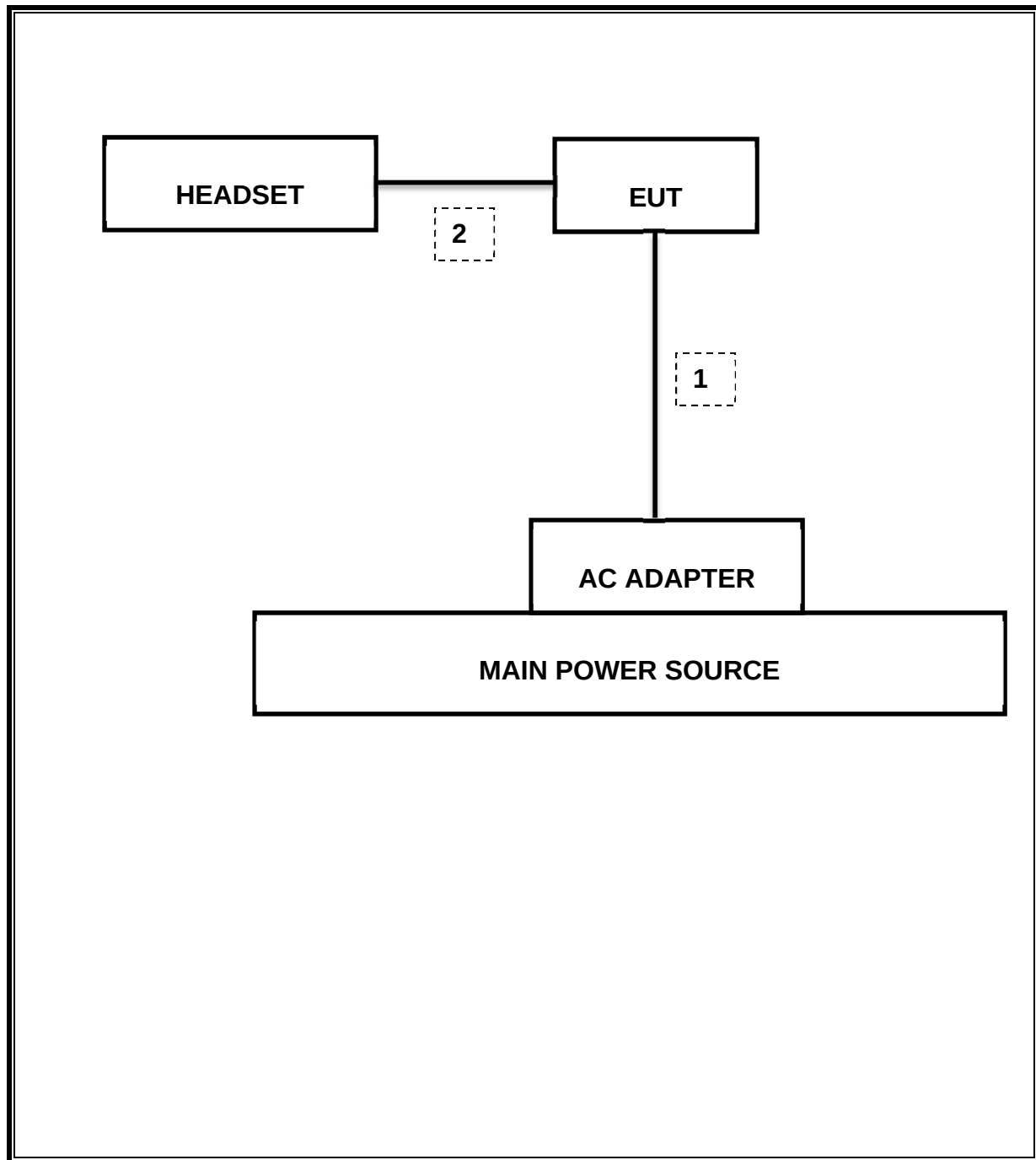
I/O CABLES

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

TEST SETUP

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

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/13	08/14/14
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/13	12/11/14
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/13	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/14	01/16/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/13	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/13	10/21/14
PXA SIGNAL ANALYZER	Agilent / HP	N9030A	N/A		05/09/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/13	08/08/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14	01/14/15
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/2013	12/13/2014
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/2013	12/13/2014

7. MEASUREMENT METHODS

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

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

8. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	10.13MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-27.68dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	21.82dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-4.04dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	54.81dBuV/m
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	47.88dBuV/m

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 to 100KHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.13	0.5
Mid	2437	10.17	0.5
High	2462	10.13	0.5
Worst		10.13	

9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.42	0.5
Mid	2437	16.54	0.5
High	2462	16.46	0.5
Worst		16.42	

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	17.67	0.5
Mid	2437	17.67	0.5
High	2462	17.62	0.5
Worst		17.62	

9.1.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.450	0.5
Mid	5785	16.550	0.5
High	5825	16.550	0.5
Worst		16.450	

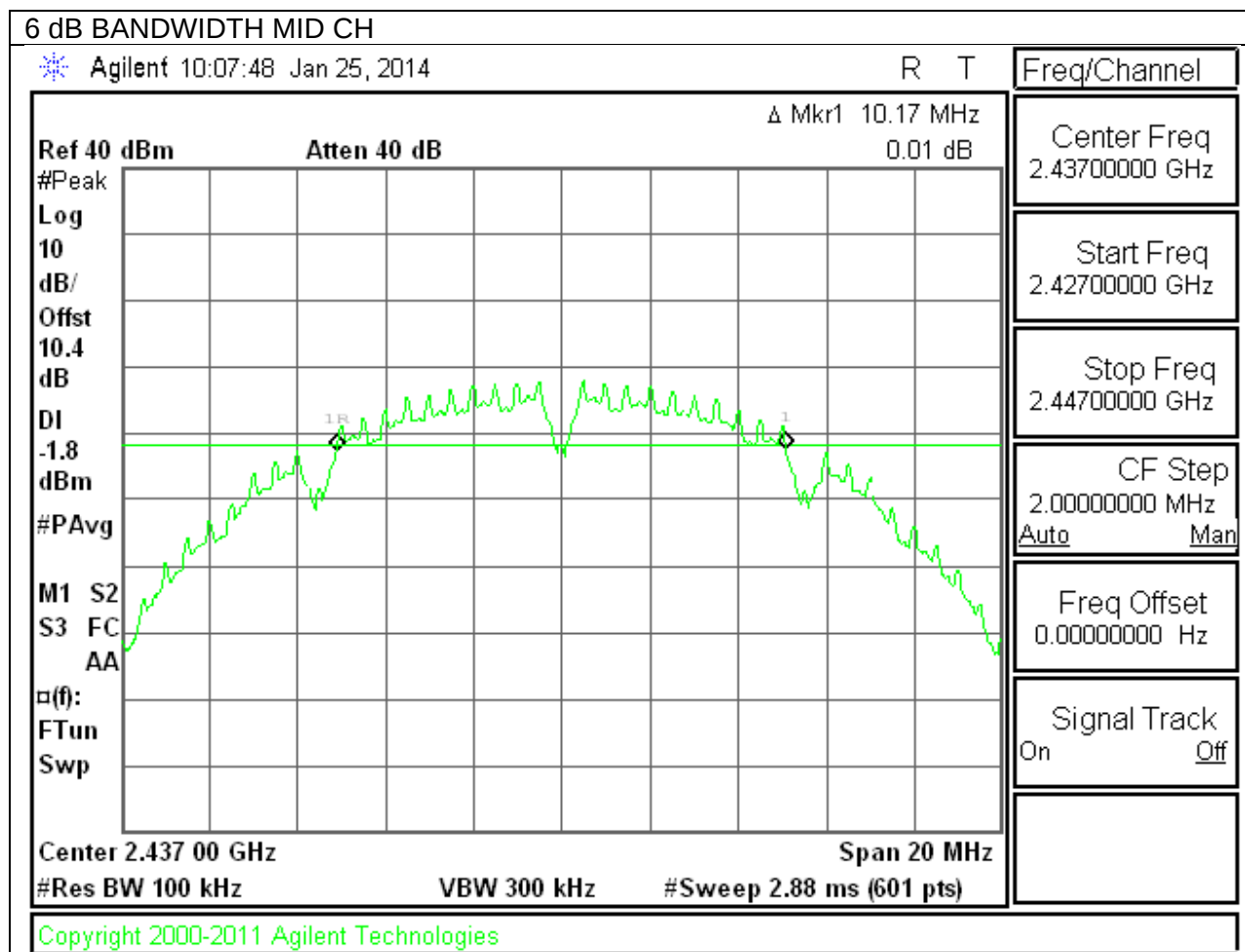
9.1.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.500	0.5
Mid	5785	17.650	0.5
High	5825	17.650	0.5
Worst		17.500	

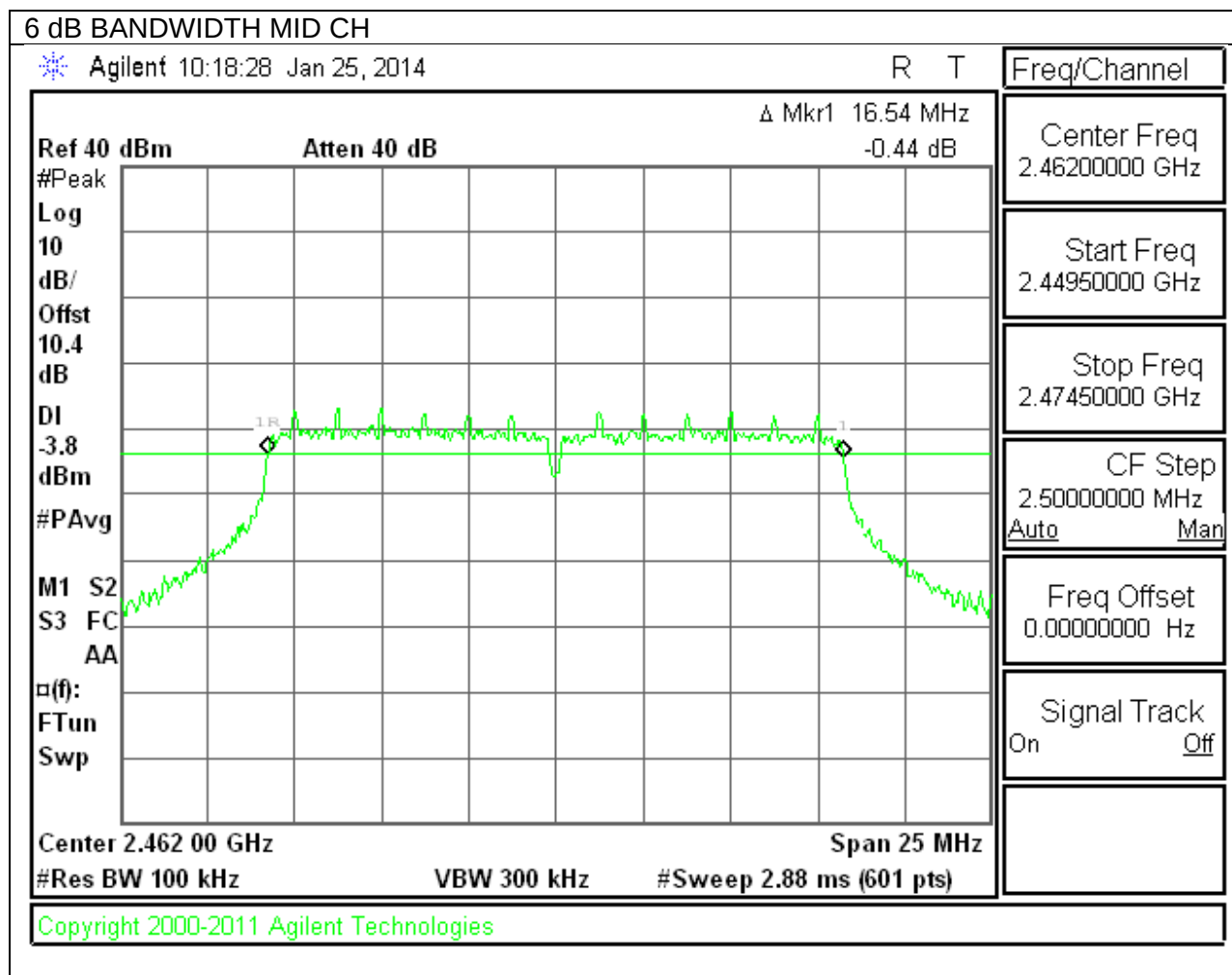
9.1.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.8	0.5
High	5795	35.6	0.5
Worst		35.6	0.5

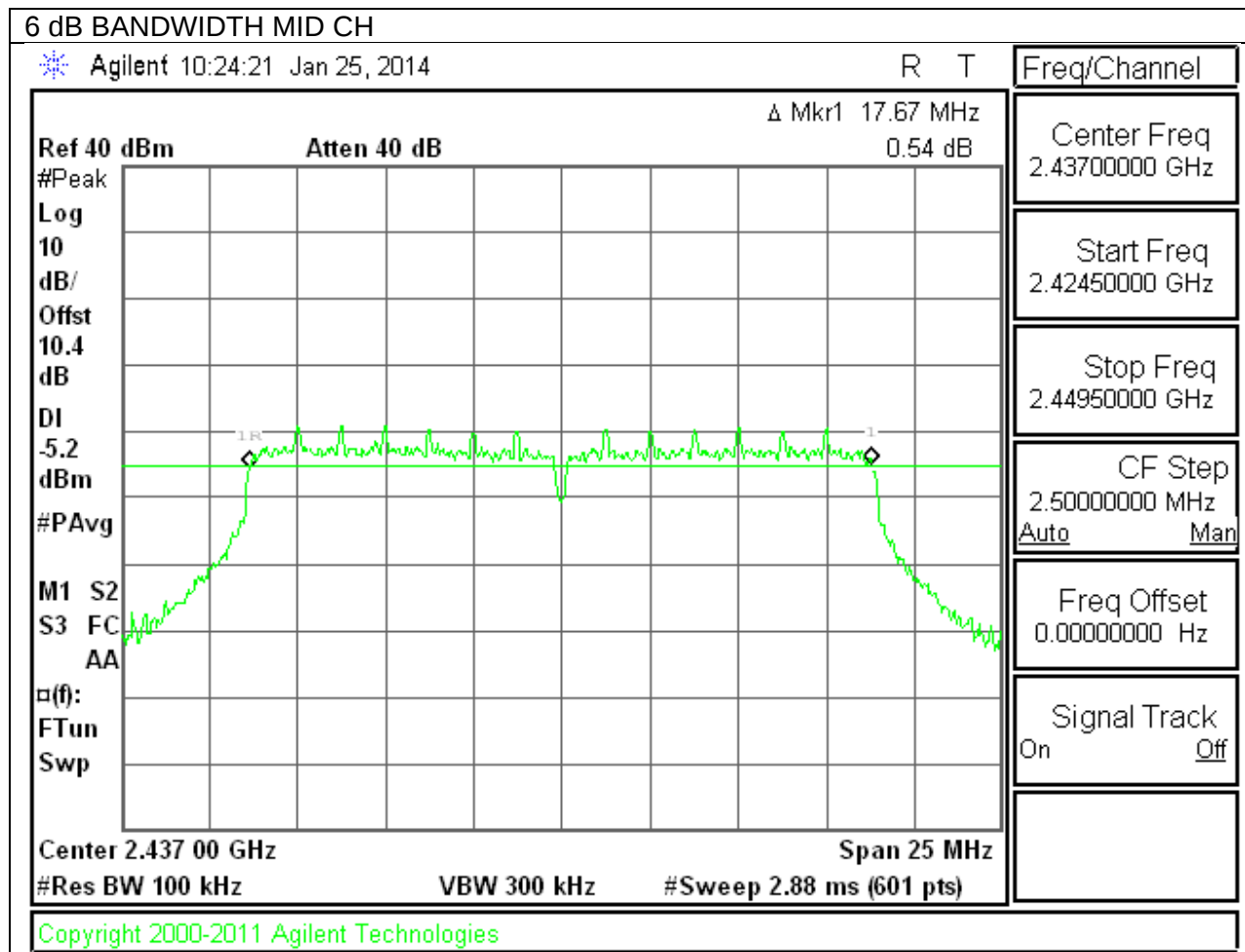
802.11b 6 dB BANDWIDTH



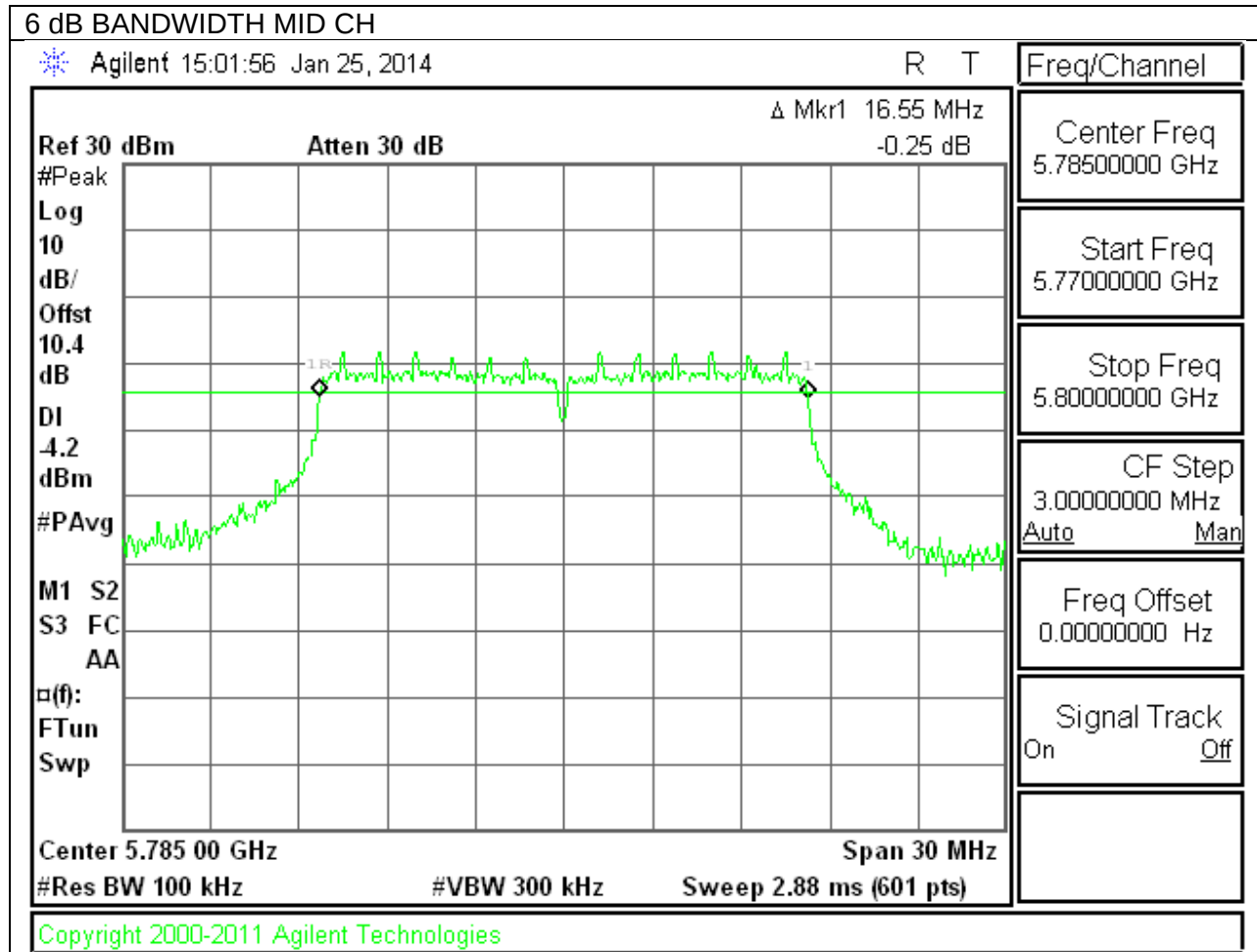
802.11g 6 dB BANDWIDTH



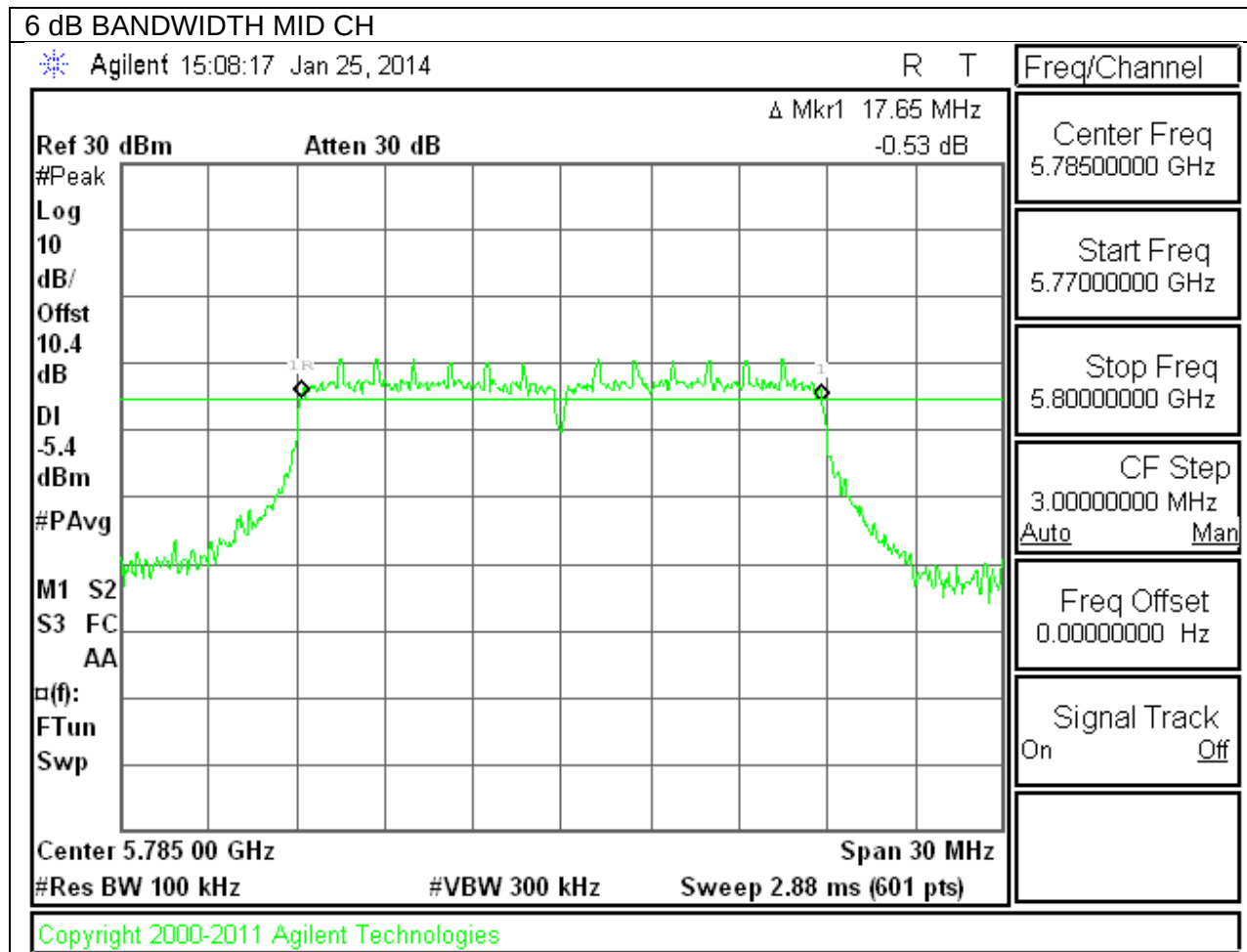
802.11n 6 dB BANDWIDTH



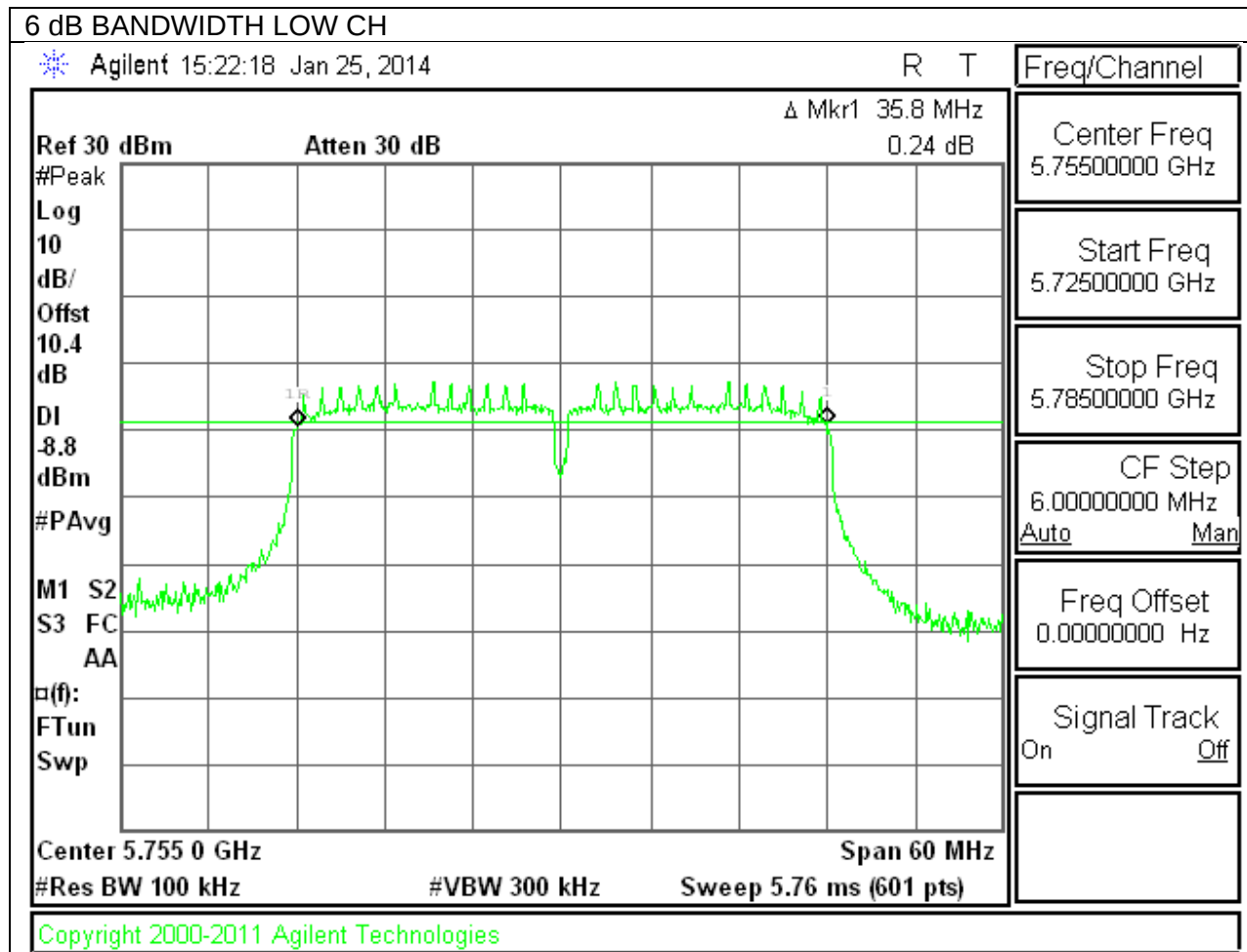
802.11a HT20 5.8GHz mode 6 dB BANDWIDTH



802.11n HT20 5.8GHz mode 6 dB BANDWIDTH



802.11n HT40 5.8GHz mode 6 dB BANDWIDTH



9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.43
Mid	2437	13.50
High	2462	13.44
Worst		13.50

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.61
Mid	2437	16.57
High	2462	16.47
Worst		16.61

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.64
Mid	2437	17.70
High	2462	17.69
Worst		17.70

9.2.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.607
Mid	5785	16.695
High	5825	16.694
Worst		16.695

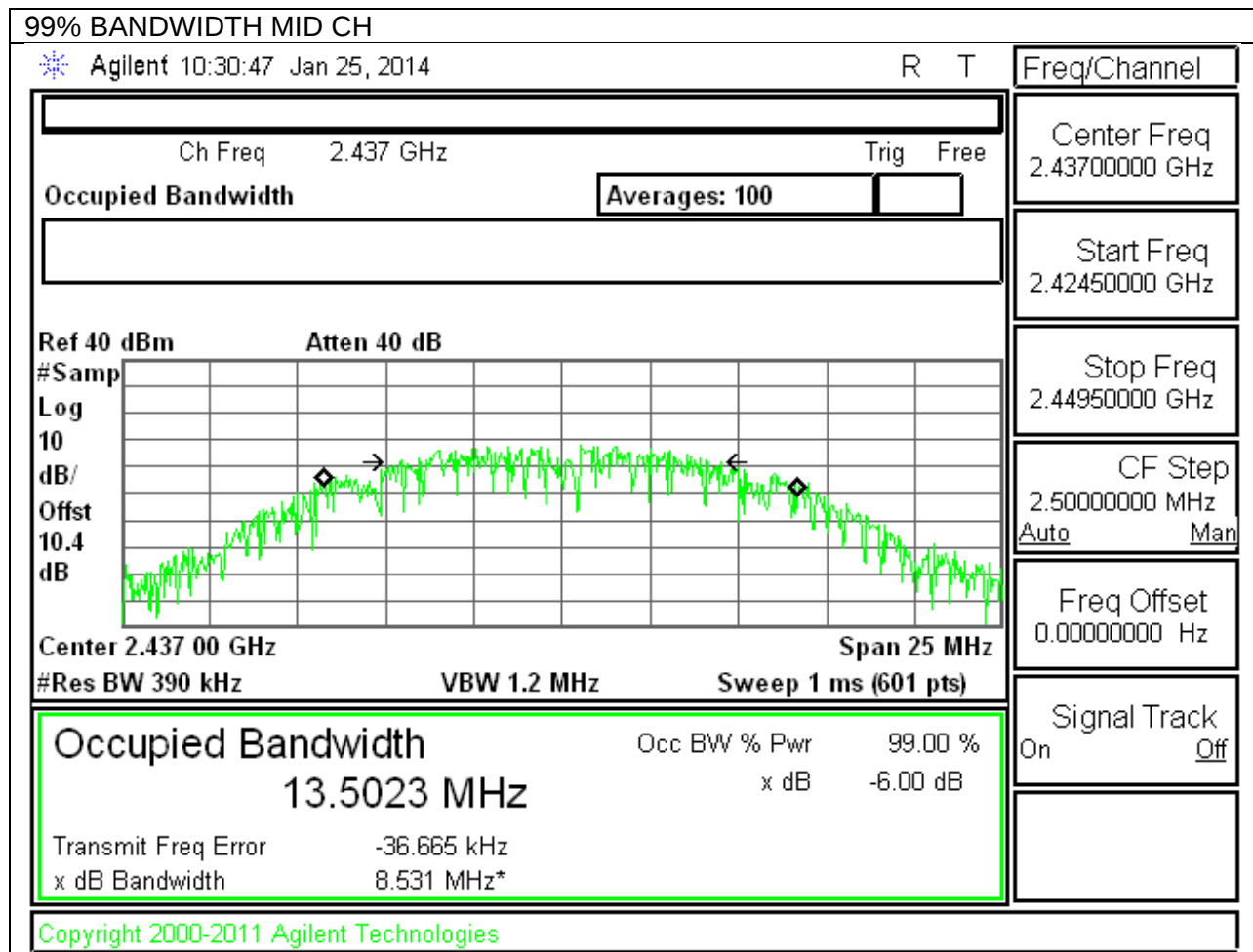
9.2.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.855
Mid	5785	17.865
High	5825	17.857
Worst		17.865

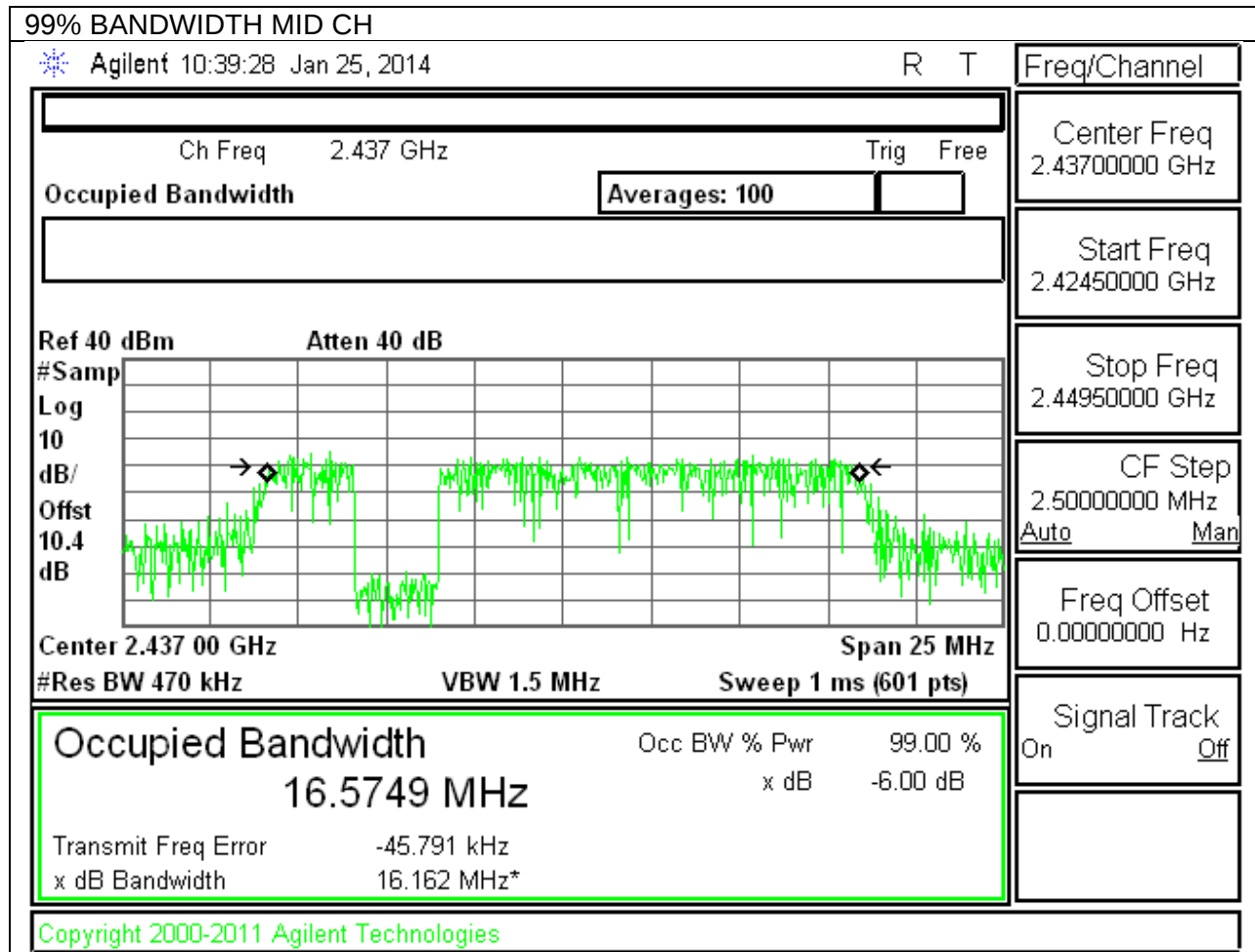
9.2.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	35.9
High	5795	35.9
Worst		35.9

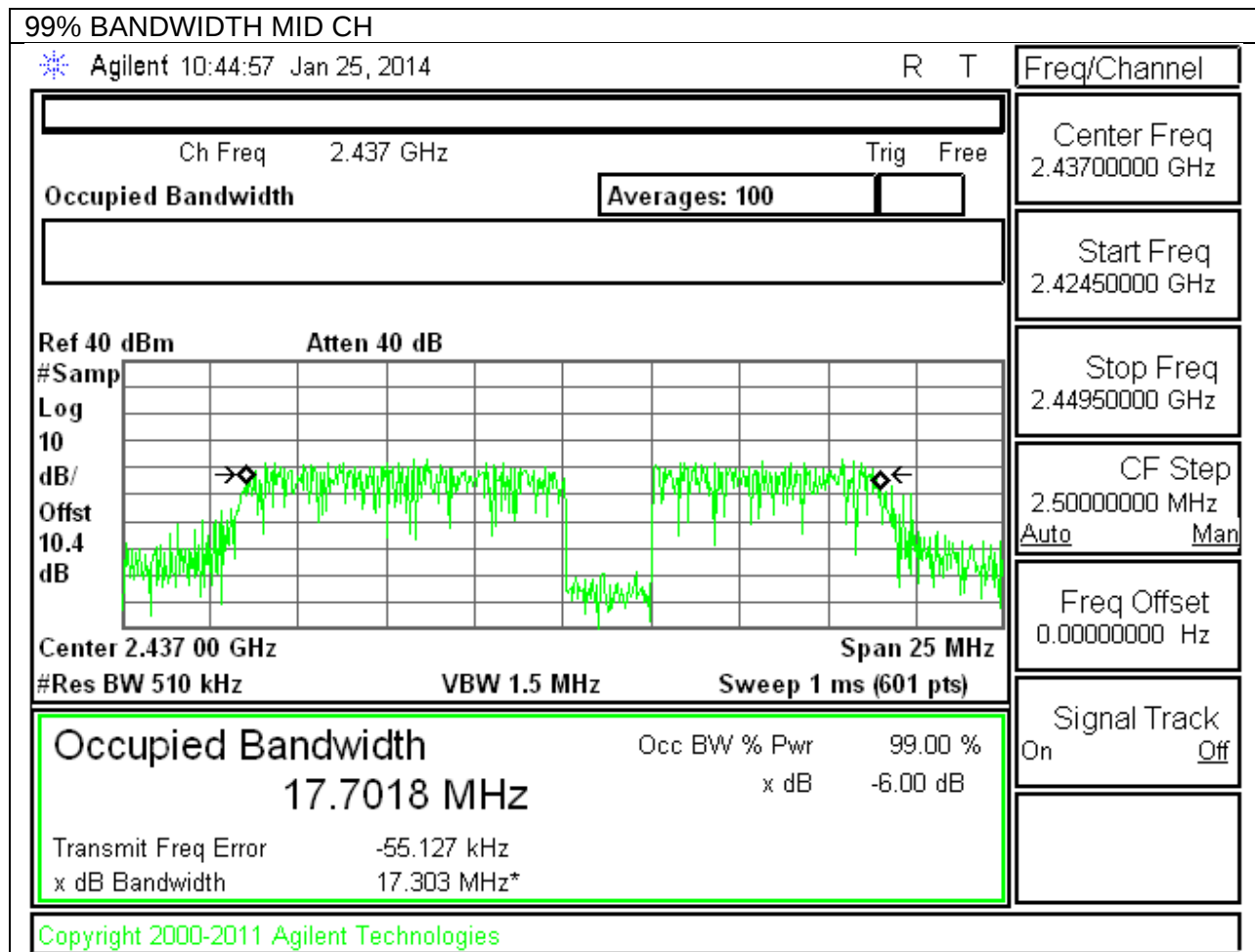
802.11b 99% BANDWIDTH



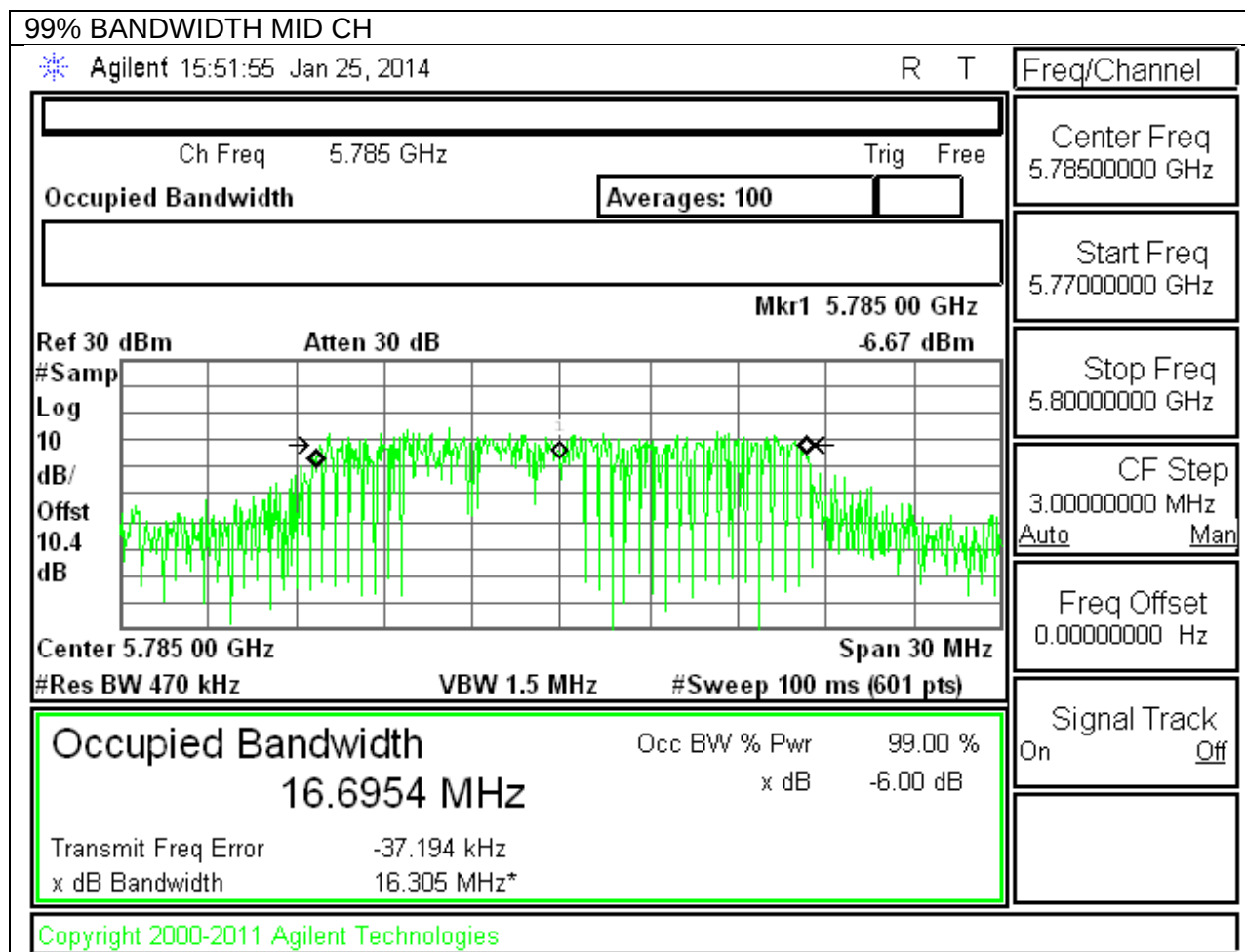
802.11g 99% BANDWIDTH



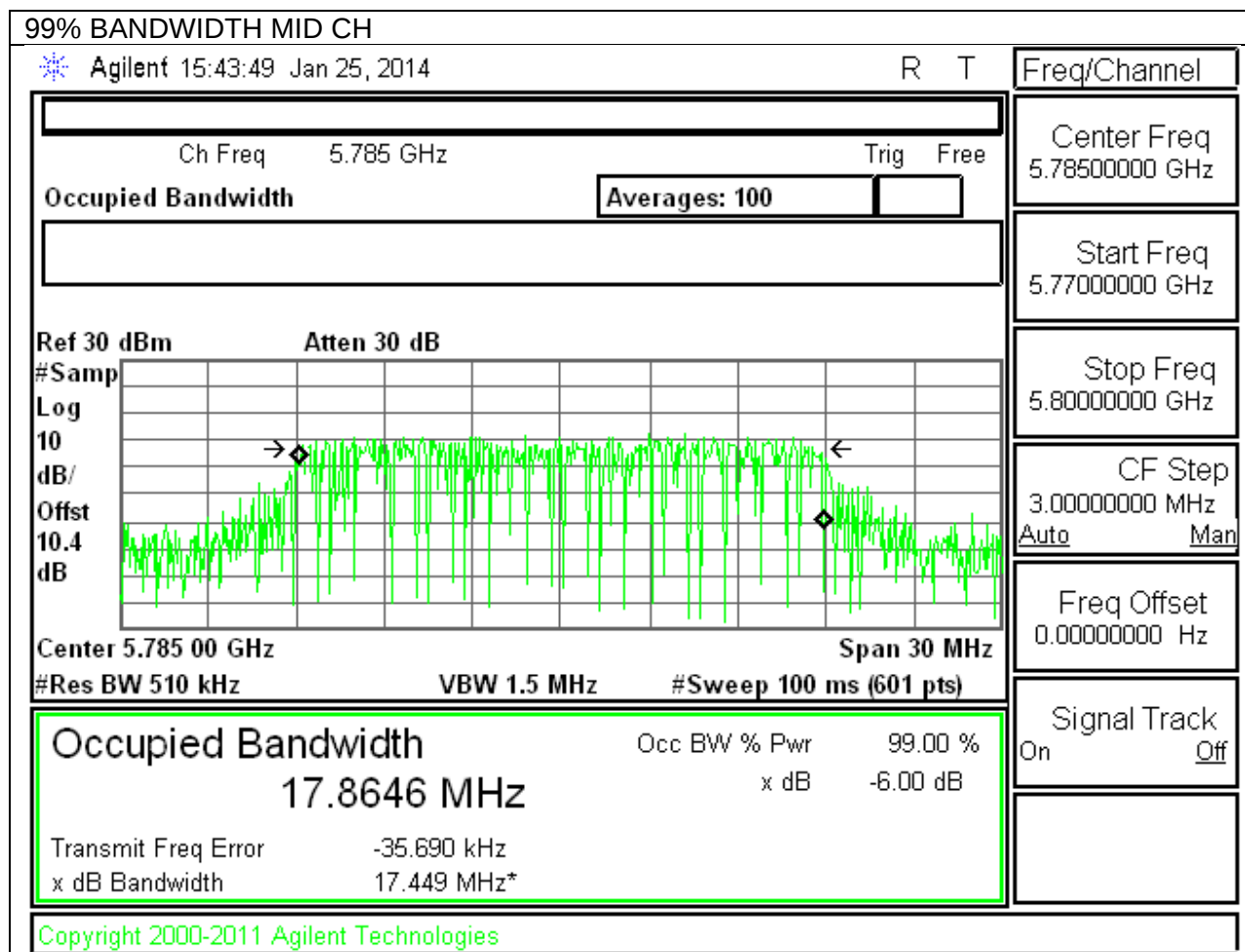
802.11n 99% BANDWIDTH



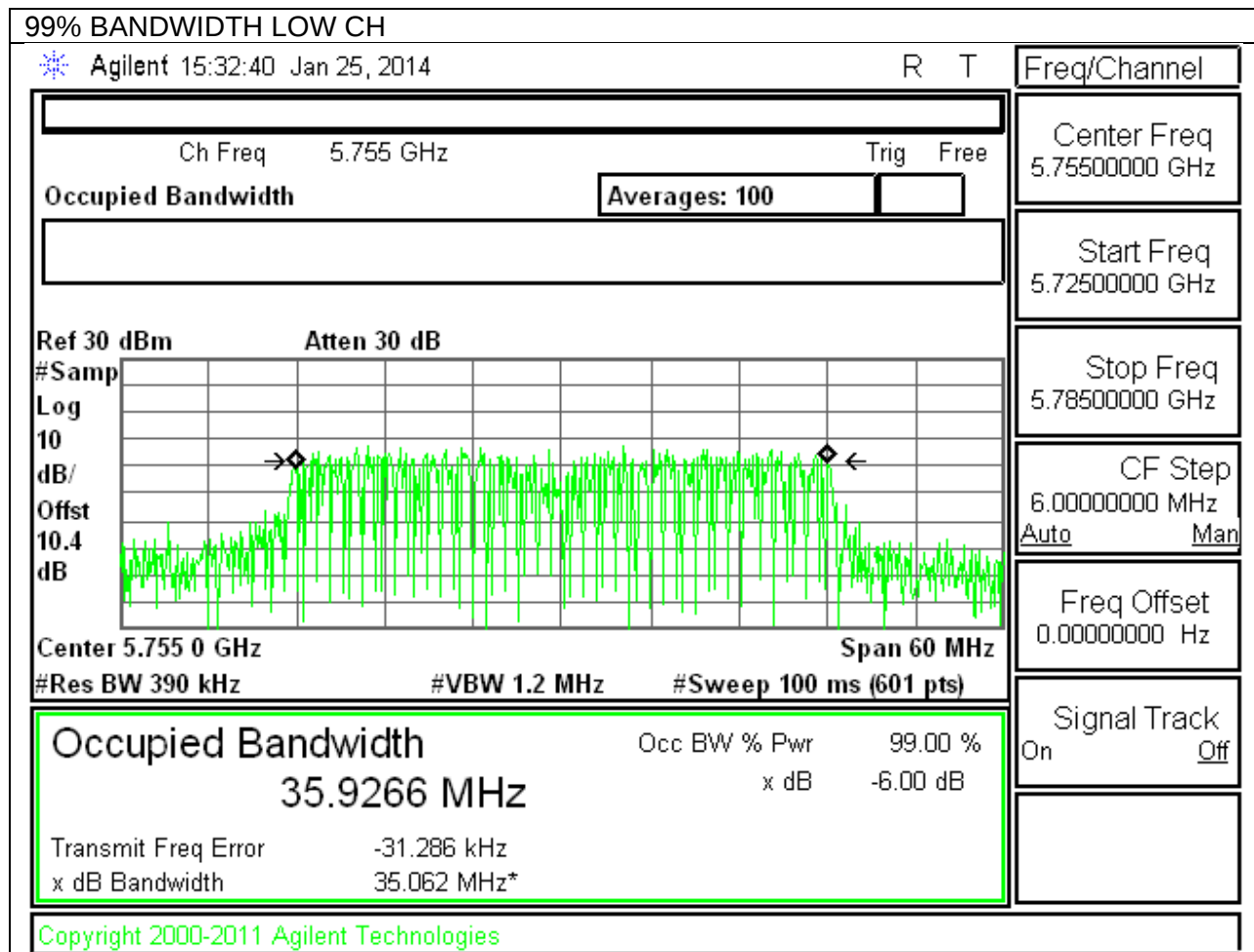
802.11a HT20 5.8GHz mode 99% BANDWIDTH



802.11n HT20 5.8GHz mode 99% BANDWIDTH



802.11n HT40 5.8GHz mode 99% BANDWIDTH



9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.2 dB (including 10 dB pad and 0.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	17.20
Mid	2437	17.40
High	2462	16.80
Worst		17.400

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.90
Mid	2437	14.10
High	2462	14.10
Worst		14.100

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.20
Mid	2437	13.20
High	2462	12.80
Worst		13.200

9.3.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	12.600
Mid	5785	13.300
High	5825	13.100
Worst		13.300

9.3.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	12.200
Mid	5785	12.200
High	5825	11.800
Worst		12.200

9.3.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5755	11.5
High	5795	11.6
Worst		11.6

9.4. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

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

DIRECTIONAL ANTENNA GAIN

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

RESULTS

9.4.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.54	30.00	30	36	30.00
Mid	2437	-1.54	30.00	30	36	30.00
High	2462	-1.54	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	18.42	18.42	30.00	-11.58
Mid	2437	18.83	18.83	30.00	-11.17
High	2462	18.66	18.66	30.00	-11.34
Worst			18.83		

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	-1.54	30.00	30	36	30.00
Mid	2437	-1.54	30.00	30	36	30.00
High	2462	-1.54	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	21.66	21.66	30.00	-8.34
Mid	2437	21.62	21.62	30.00	-8.38
High	2462	21.82	21.82	30.00	-8.18
Worst			21.82		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.54	30.00	30	36	30.00
Mid	2437	-1.54	30.00	30	36	30.00
High	2462	-1.54	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	21.06	21.06	30.00	-8.94
Mid	2437	20.75	20.75	30.00	-9.25
High	2462	21.80	21.80	30.00	-8.20
Worst			21.80		

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	-2.84	30.00	30	36	30.00
Mid	5785	-2.84	30.00	30	36	30.00
High	5825	-2.84	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	20.53	20.53	30.00	-9.47
Mid	5785	20.52	20.52	30.00	-9.48
High	5825	20.72	20.72	30.00	-9.28
Worst			20.72		

9.4.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5745	-2.84	30.00	30	36	30.00
Mid	5785	-2.84	30.00	30	36	30.00
High	5825	-2.84	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	19.78	19.78	30.00	-10.22
Mid	5785	19.58	19.58	30.00	-10.42
High	5825	19.86	19.86	30.00	-10.14
Worst			19.86		

9.4.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

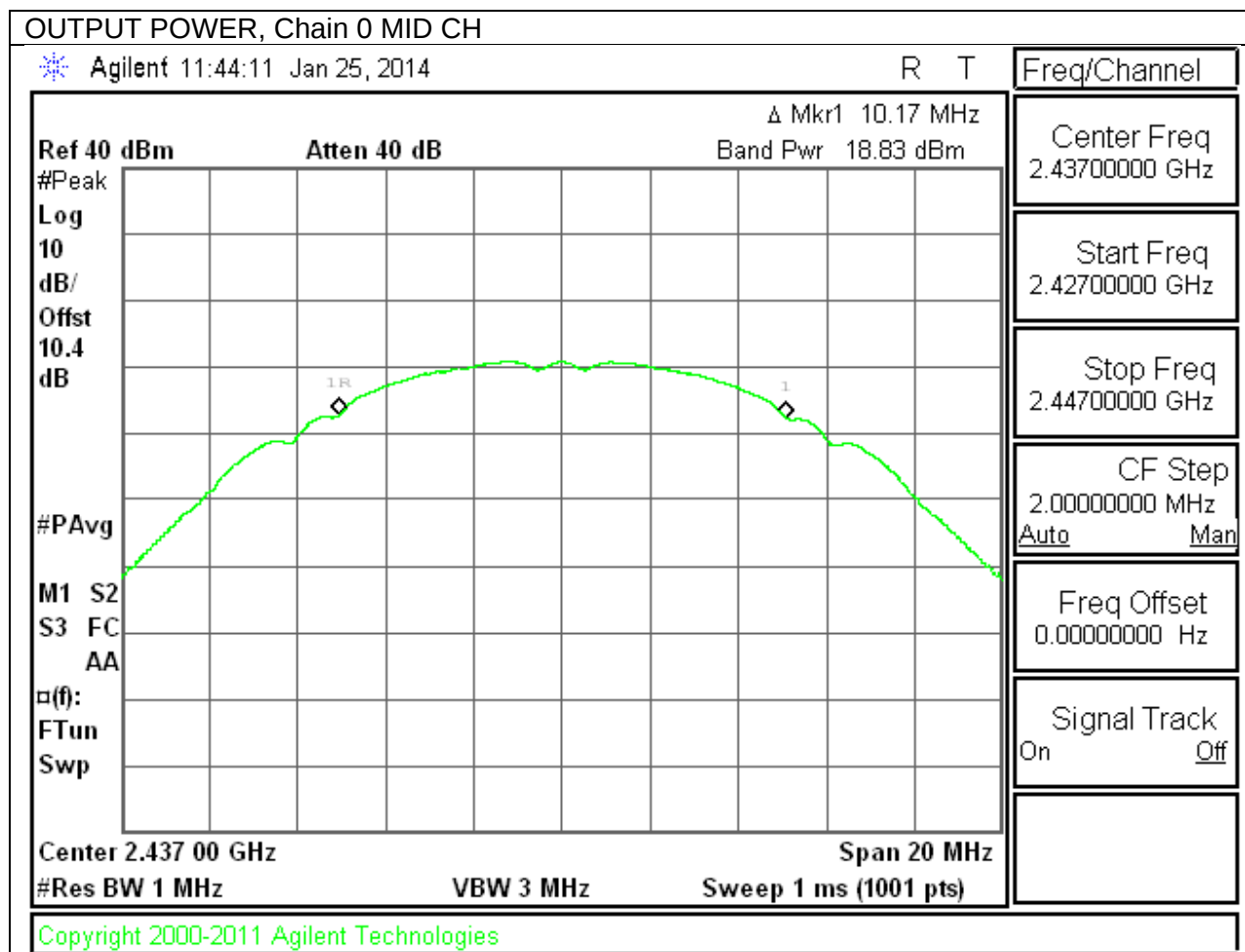
Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5755	-2.84	30.00	30	36	30.00
High	5795	-2.84	30.00	30	36	30.00

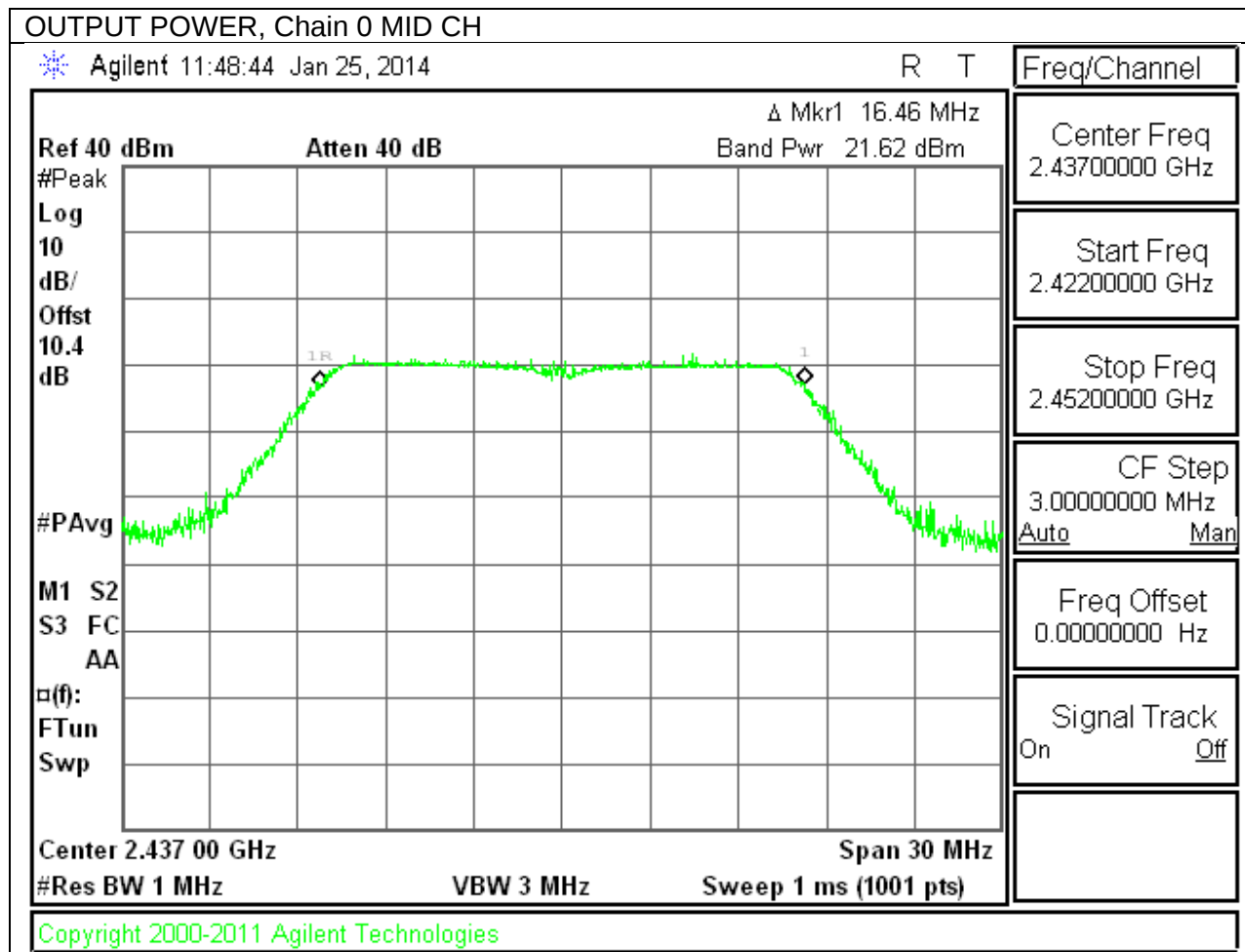
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5755	19.03	19.03	30.00	-10.97
High	5795	19.09	19.09	30.00	-10.91
Worst			19.09		

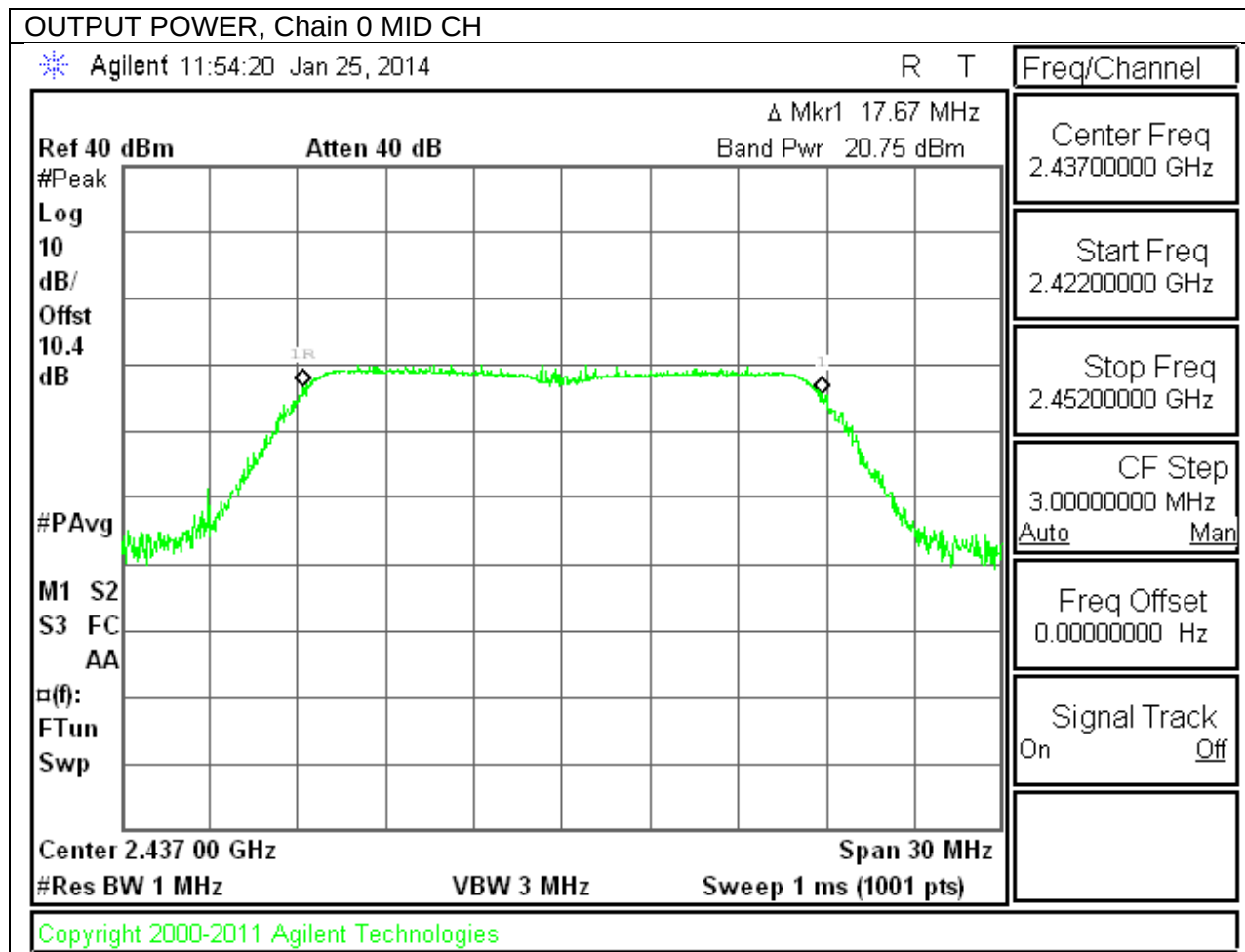
802.11b OUTPUT POWER, Chain 0



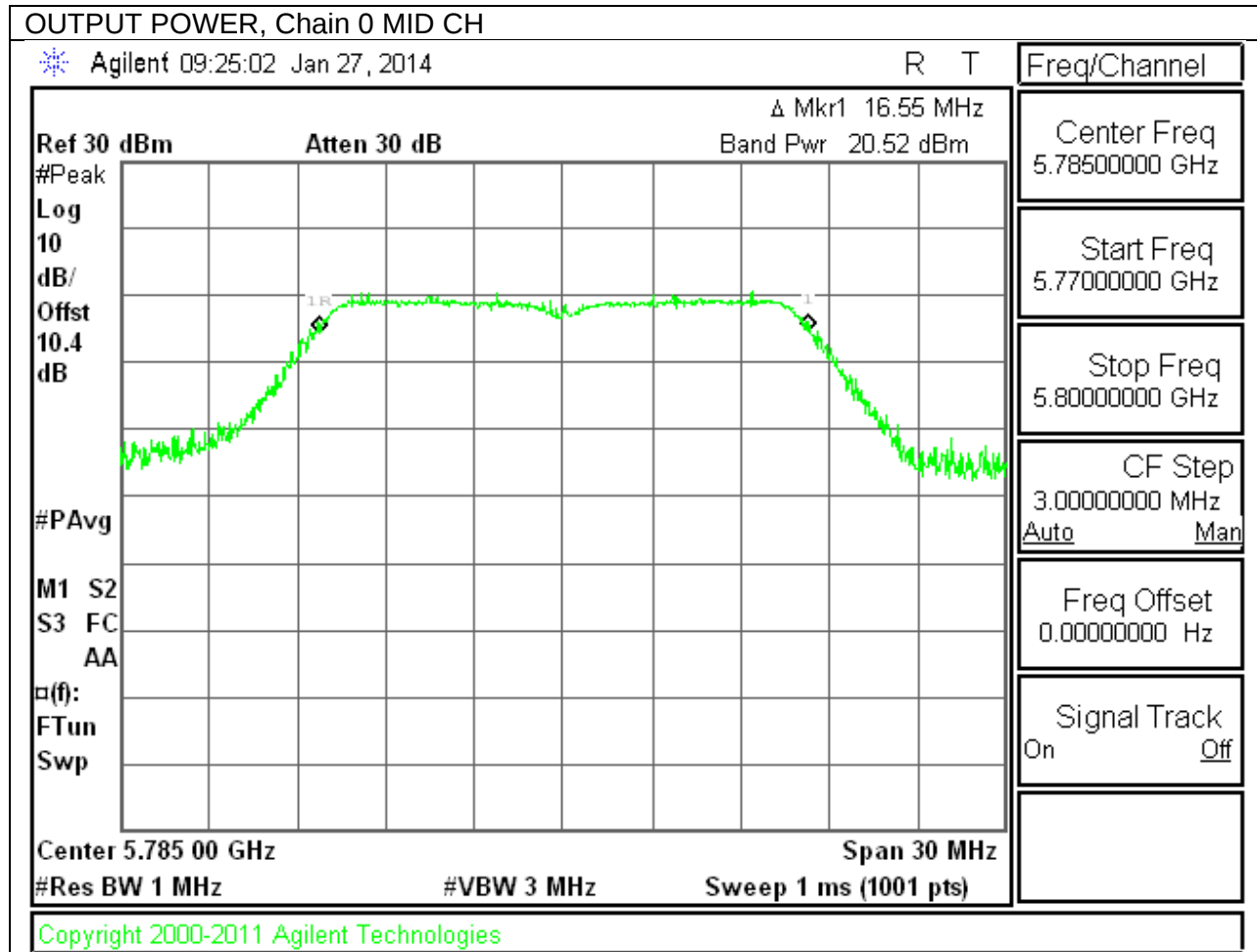
802.11g OUTPUT POWER, Chain 0



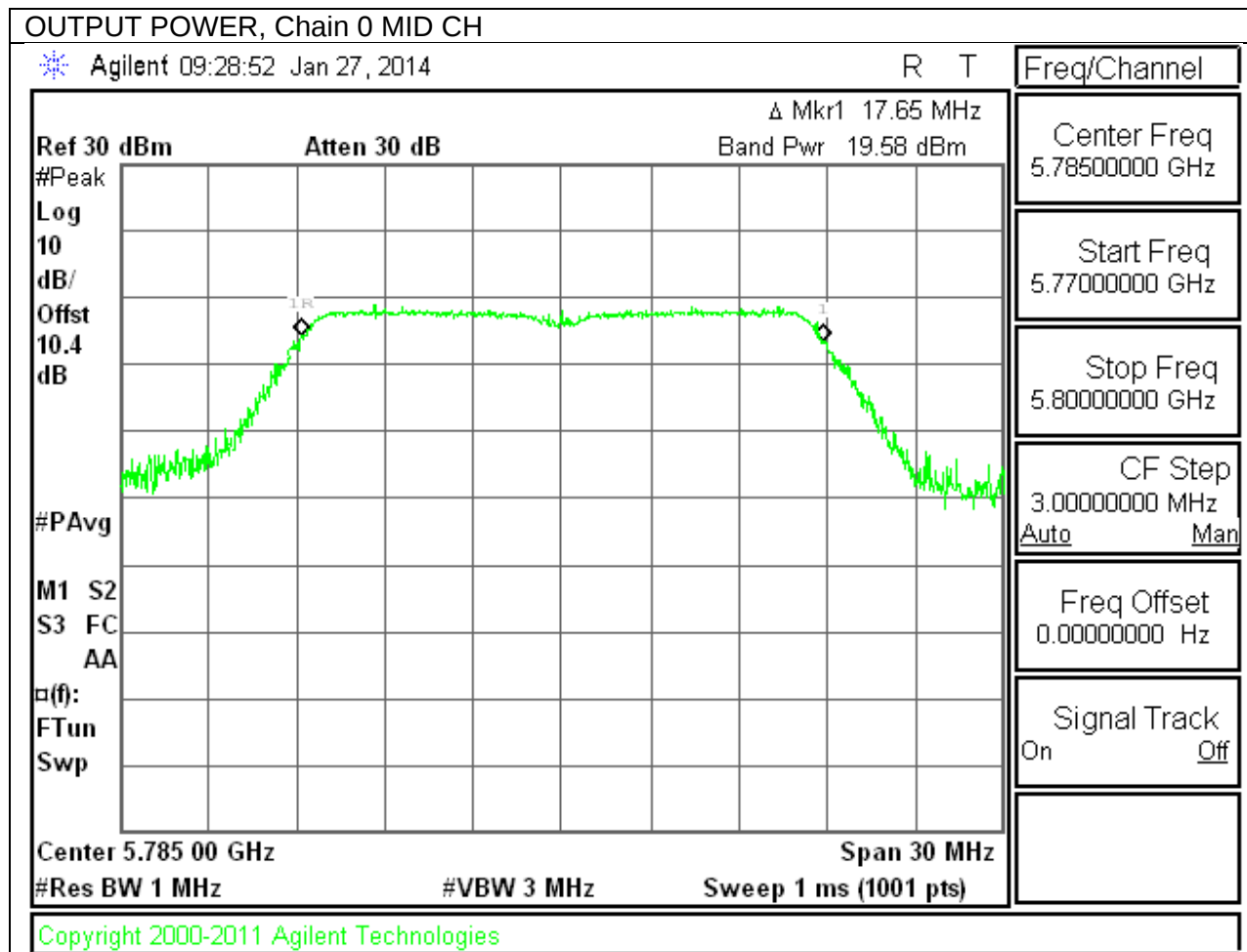
802.11n OUTPUT POWER, Chain 0



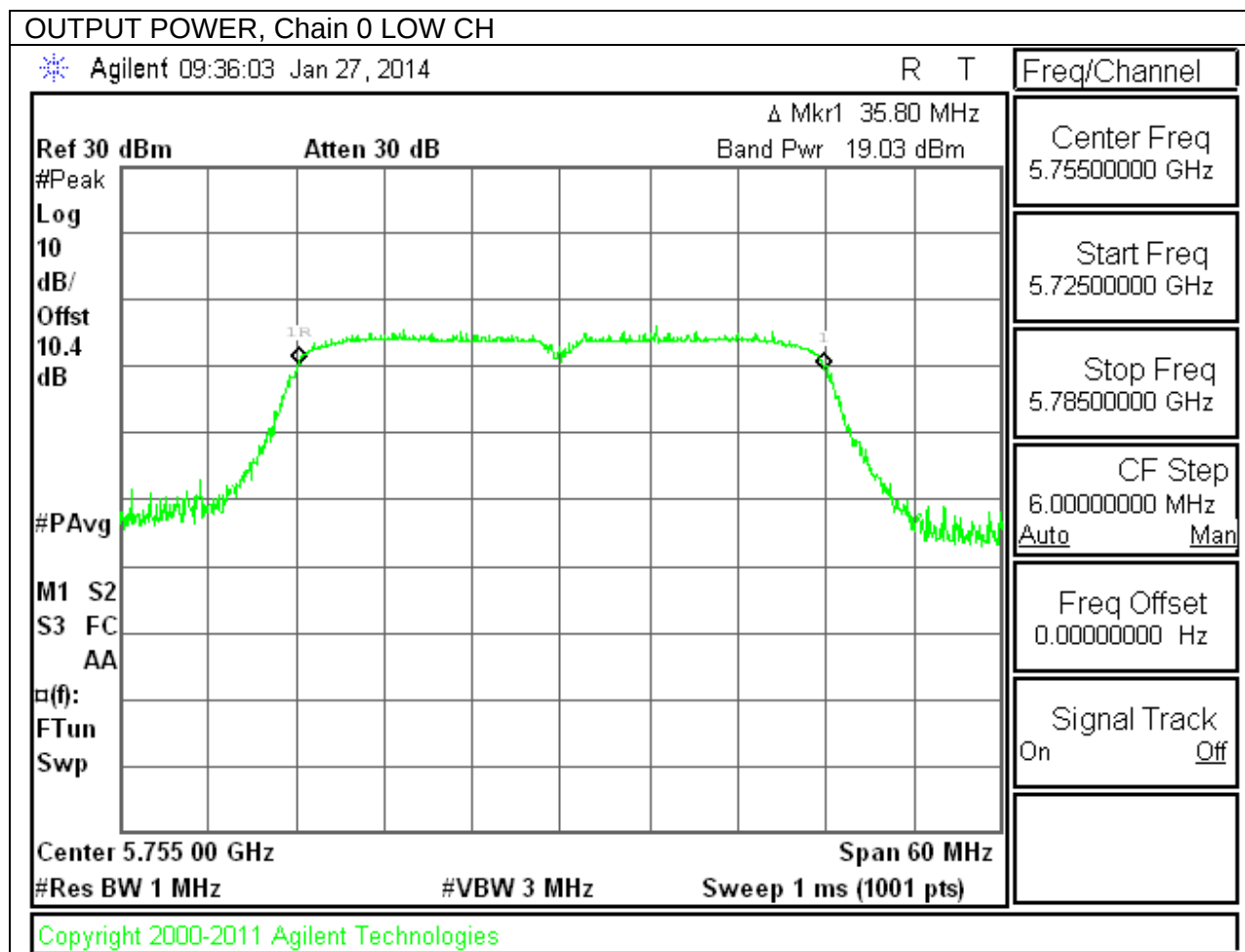
802.11a HT20 5.8GHz mode OUTPUT POWER, Chain 0



802.11n HT20 5.8GHz mode OUTPUT POWER, Chain 0



802.11n HT40 5.8GHz mode OUTPUT POWER, Chain 0



9.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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

RESULTS

9.5.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.73	8.0	-14.7
Mid	2437	-6.71	8.0	-14.7
High	2462	-4.40	8.0	-12.4

9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.62	8.0	-19.6
Mid	2437	-12.31	8.0	-20.3
High	2462	-10.94	8.0	-18.9

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	-12.65	8.0	-20.7
Mid	2437	-13.04	8.0	-21.0
High	2462	-11.88	8.0	-19.9

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	-13.49	8.0	-21.5
Mid	5785	-11.74	8.0	-19.7
High	5825	-11.17	8.0	-19.2

9.5.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

PSD Results

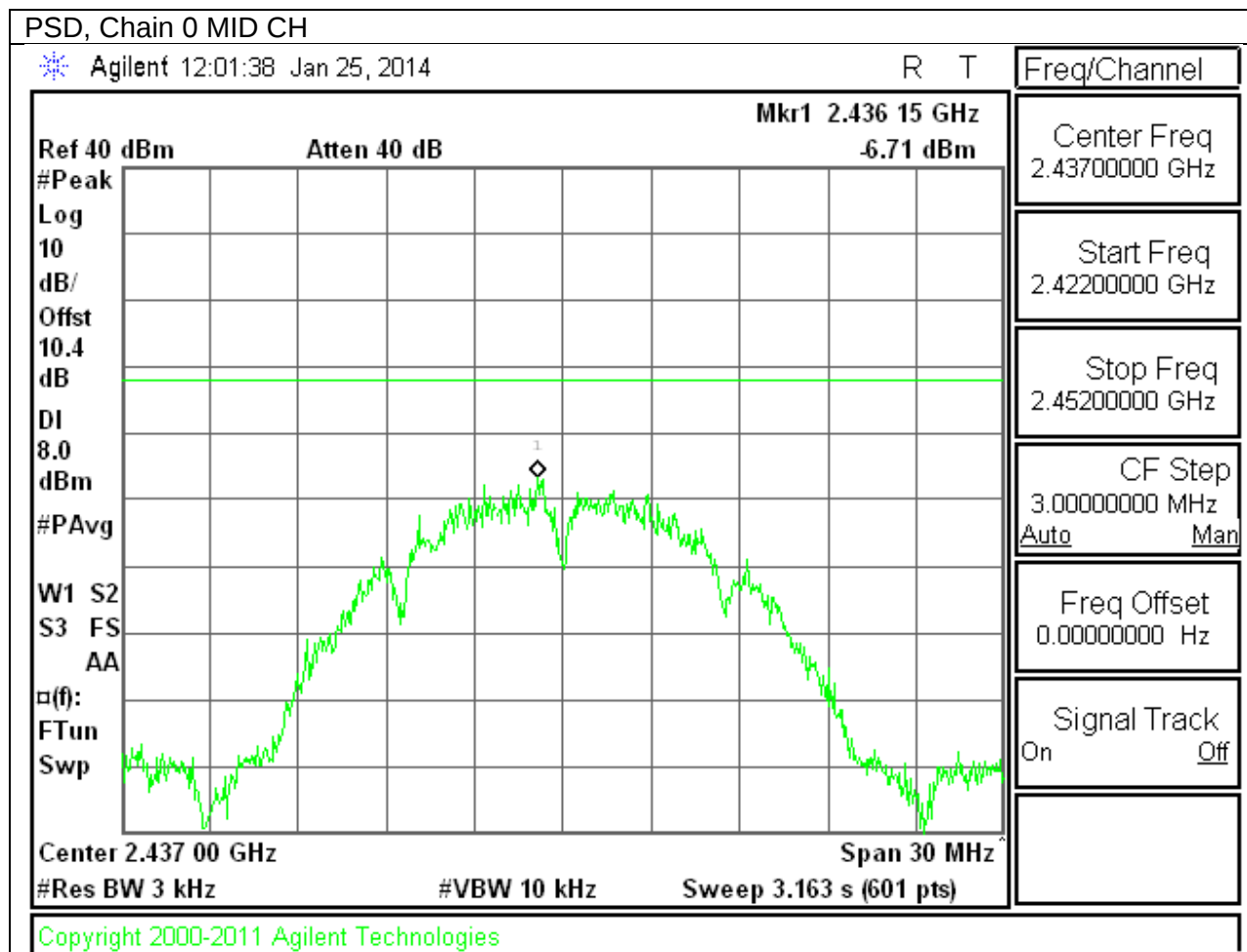
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-14.72	8.0	-22.7
Mid	5785	-13.84	8.0	-21.8
High	5825	-14.43	8.0	-22.4

9.5.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

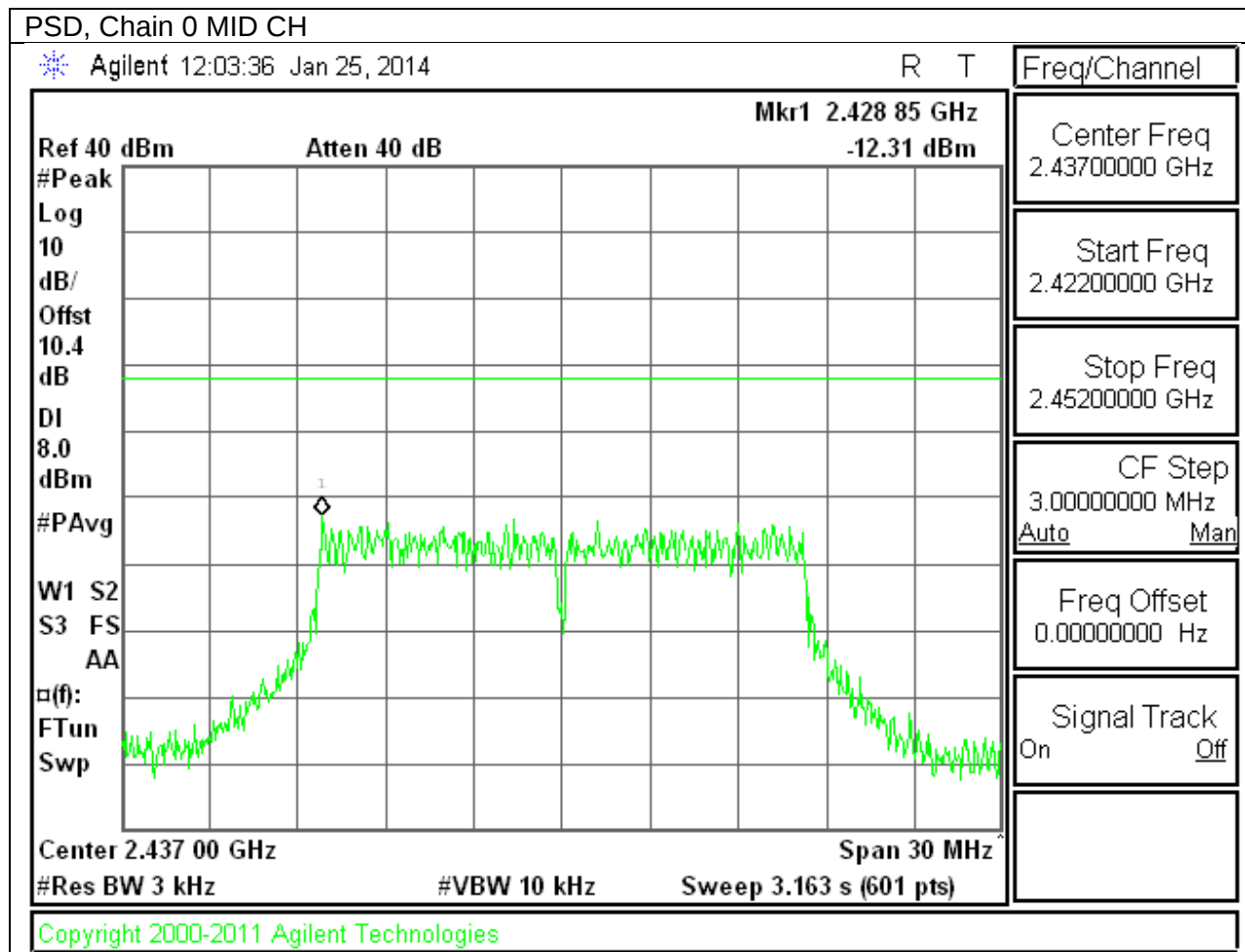
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-22.51	8.0	-30.5
High	5795	-18.63	8.0	-26.6

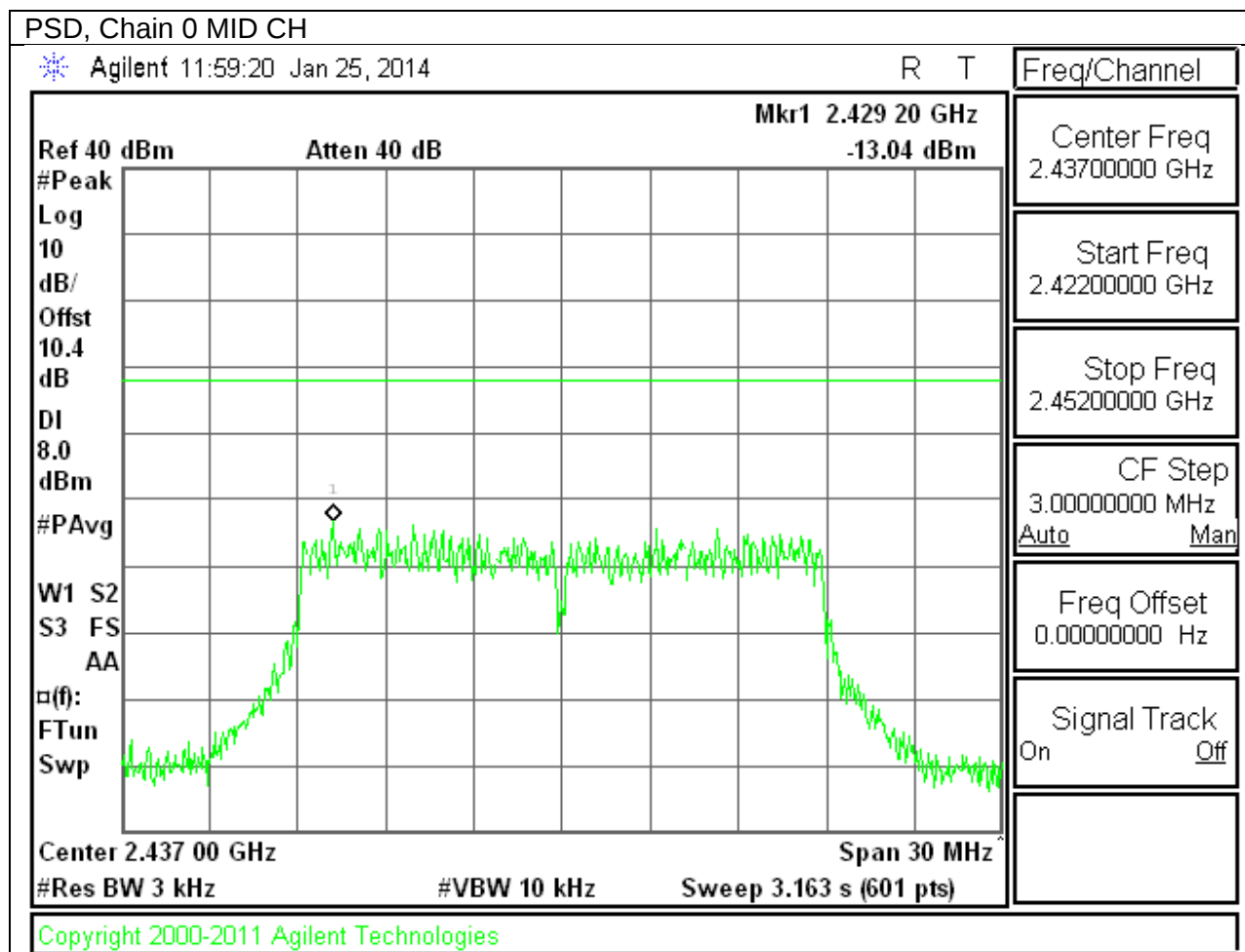
802.11b PSD, Chain 0



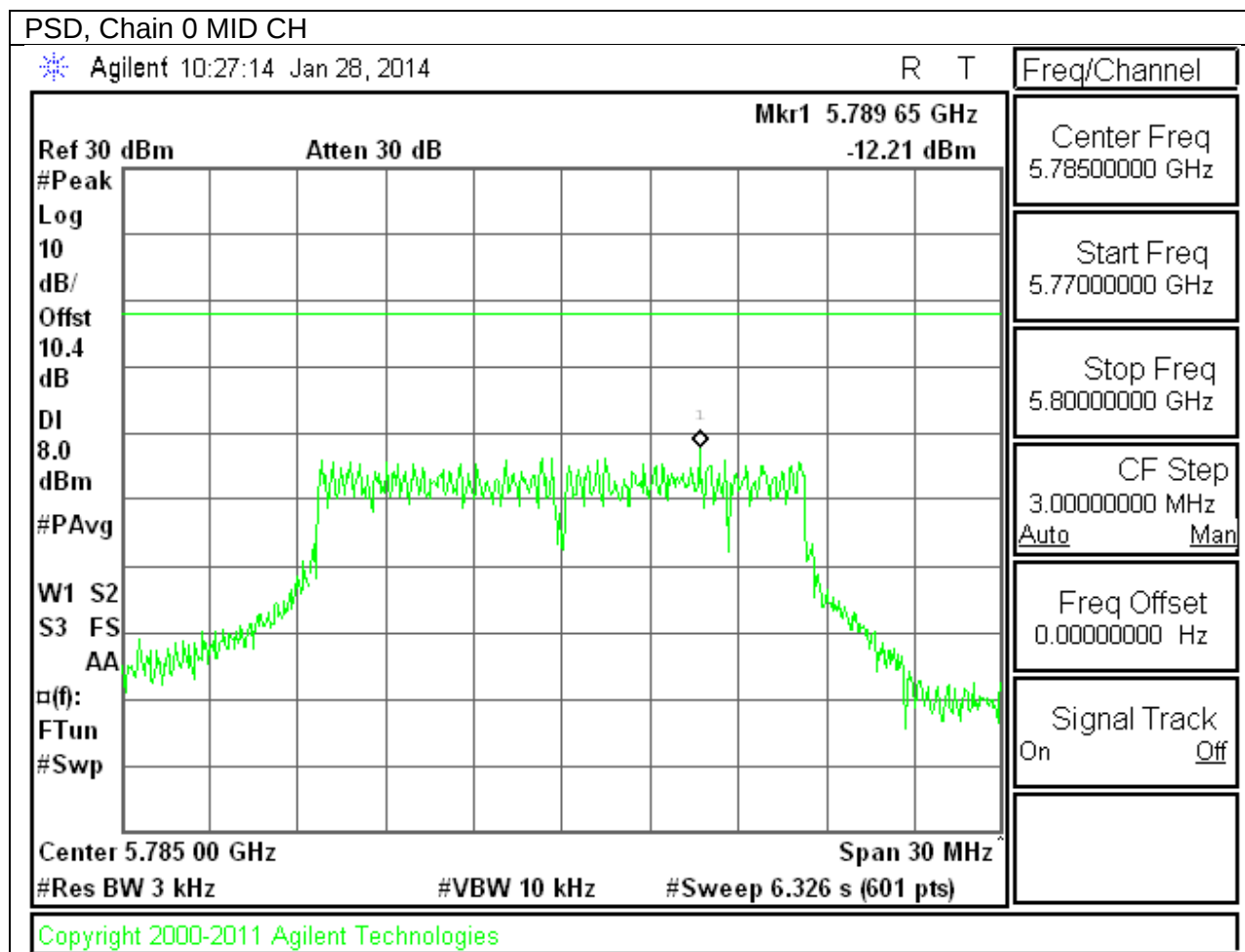
802.11g PSD, Chain 0



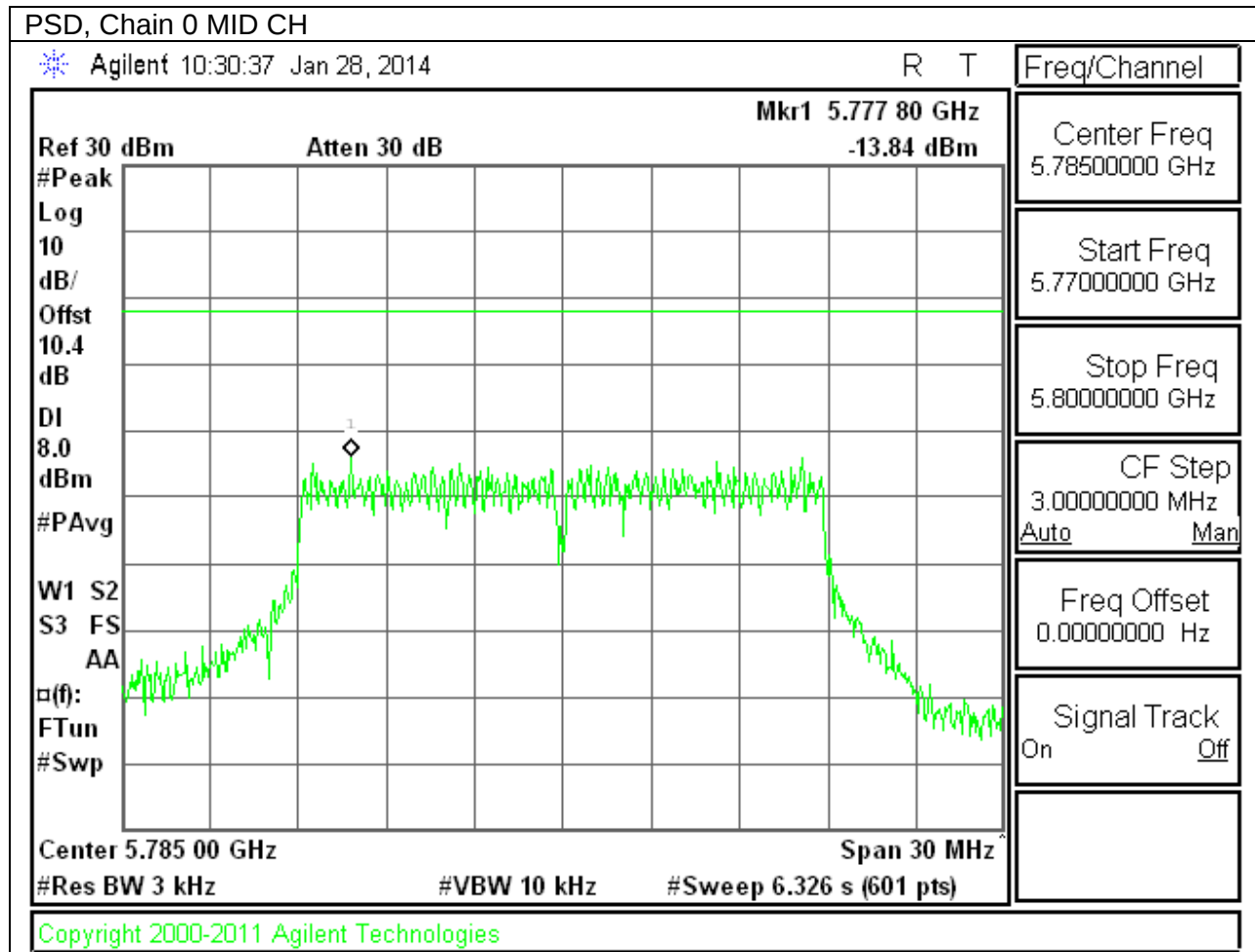
802.11n PSD, Chain 0



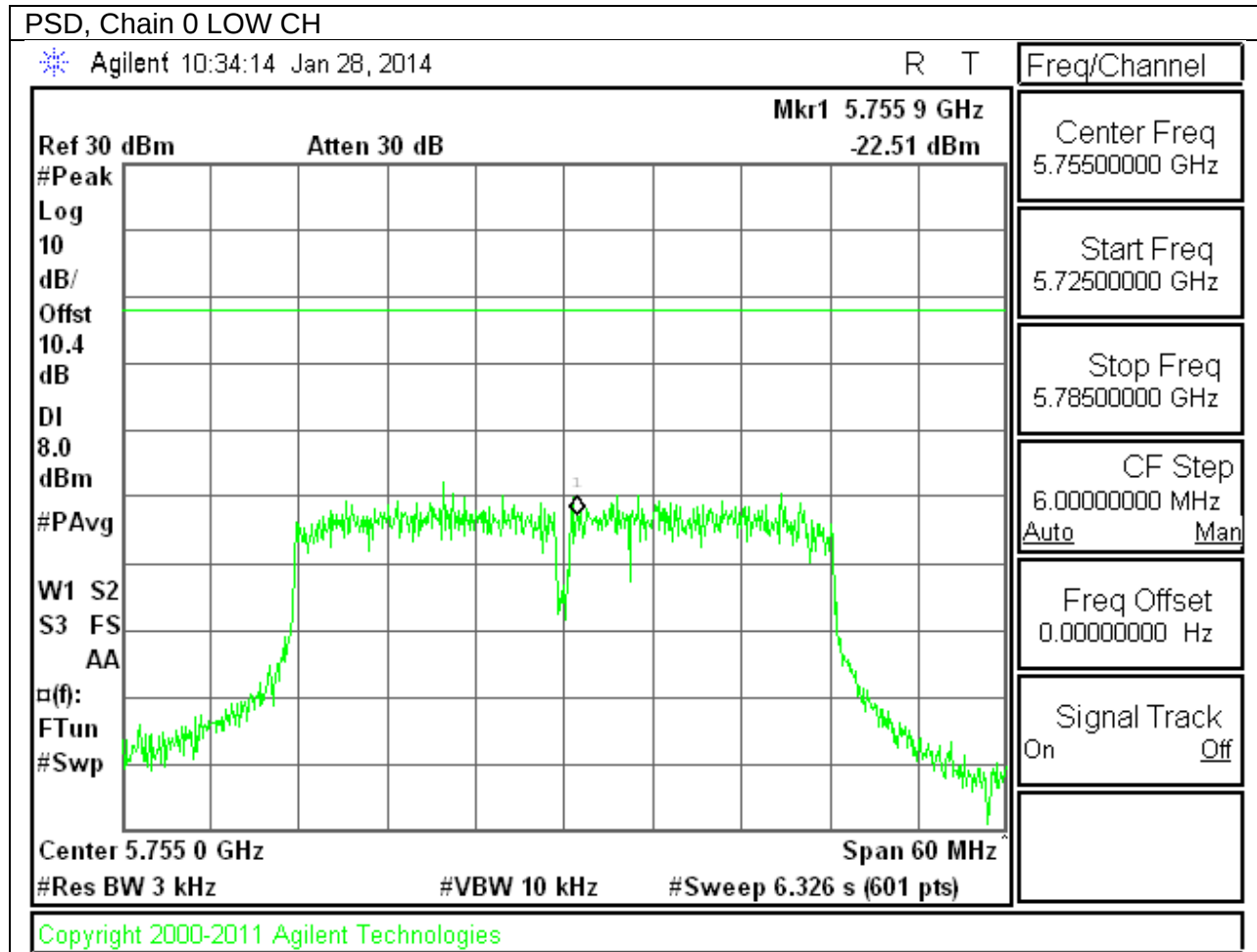
802.11a HT20 5.8GHz mode PSD, Chain 0



802.11n HT20 5.8GHz mode PSD, Chain 0



802.11n HT40 5.8GHz mode PSD, Chain 0



9.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

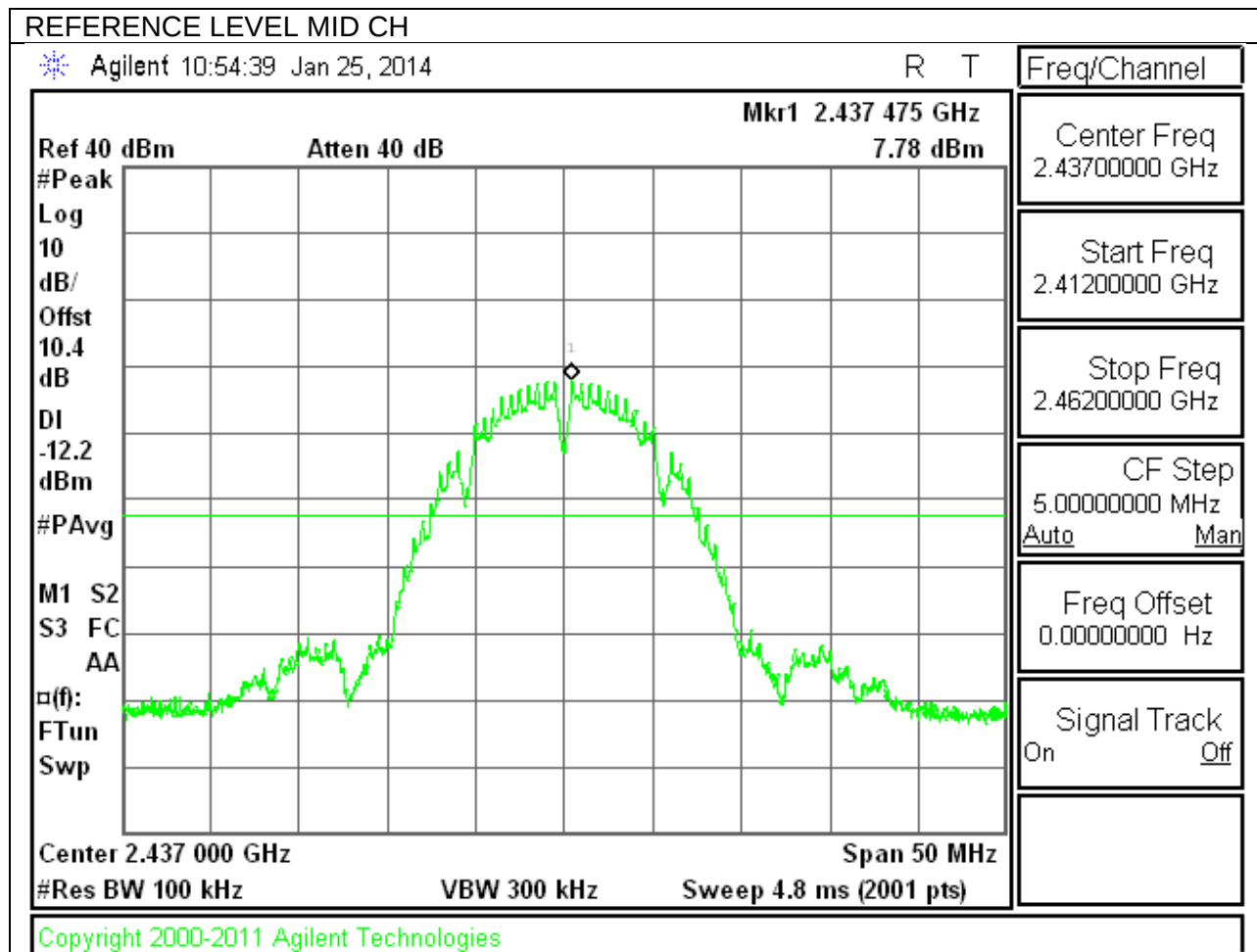
TEST PROCEDURE

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

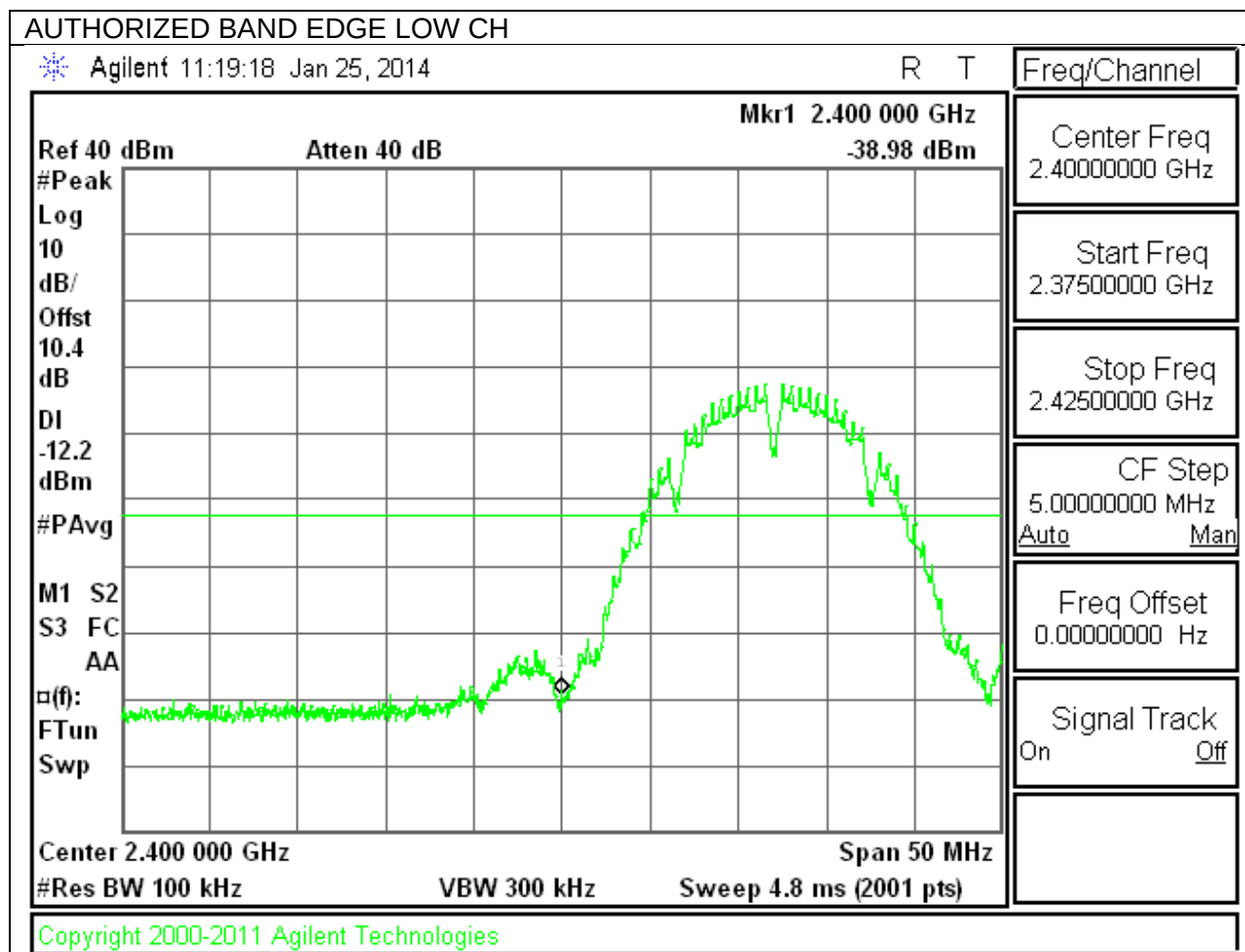
RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

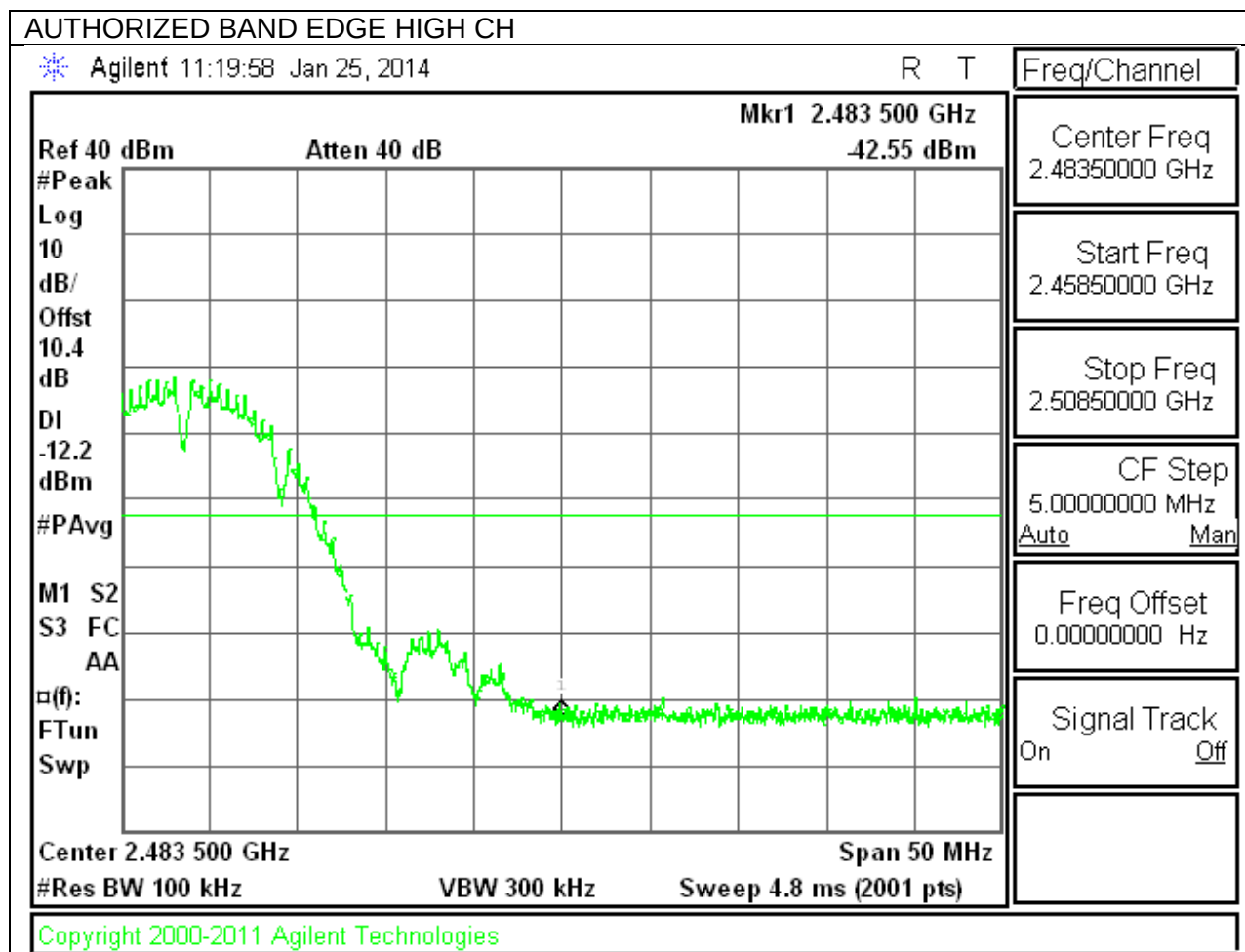
IN-BAND REFERENCE LEVEL



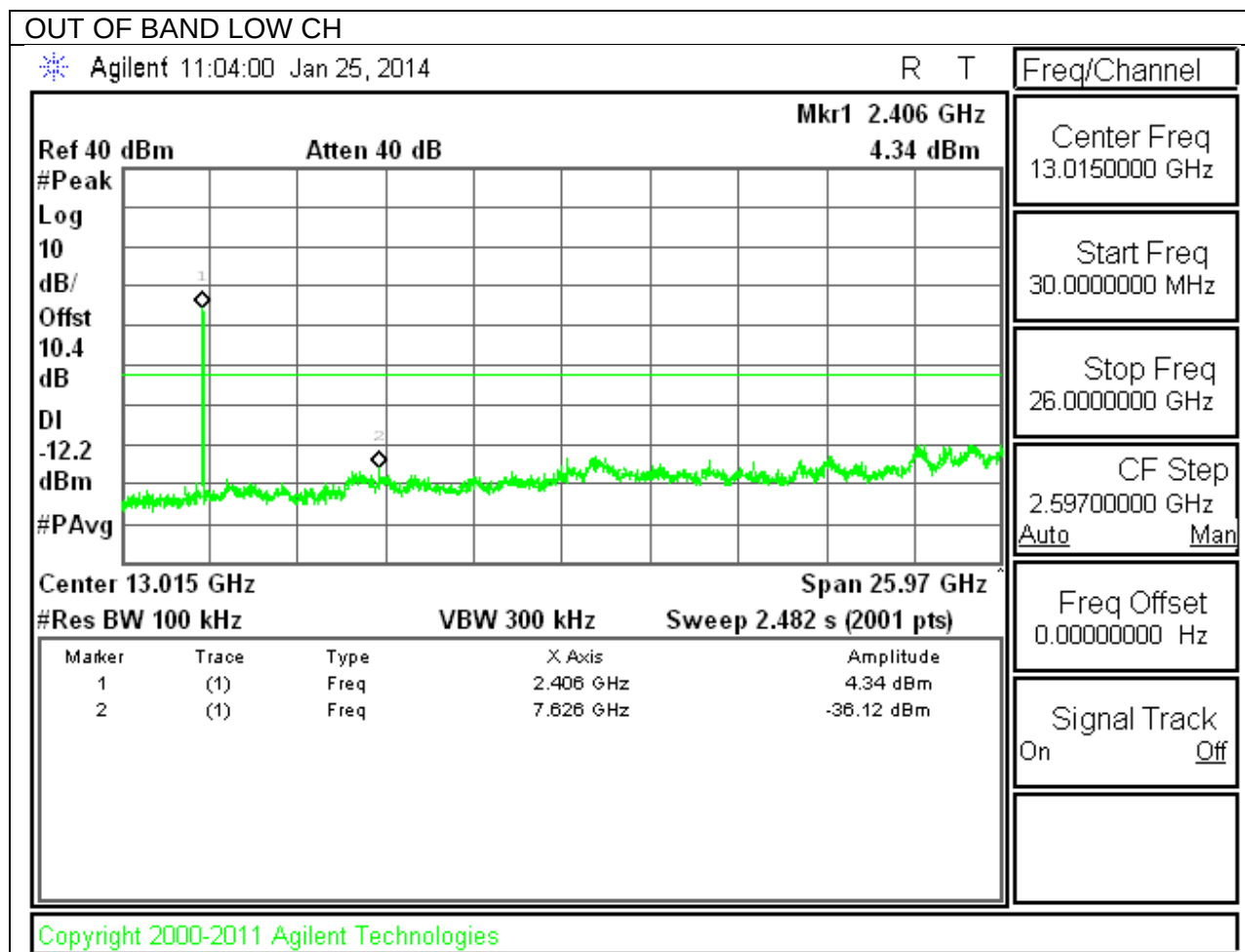
LOW CHANNEL BANDEDGE

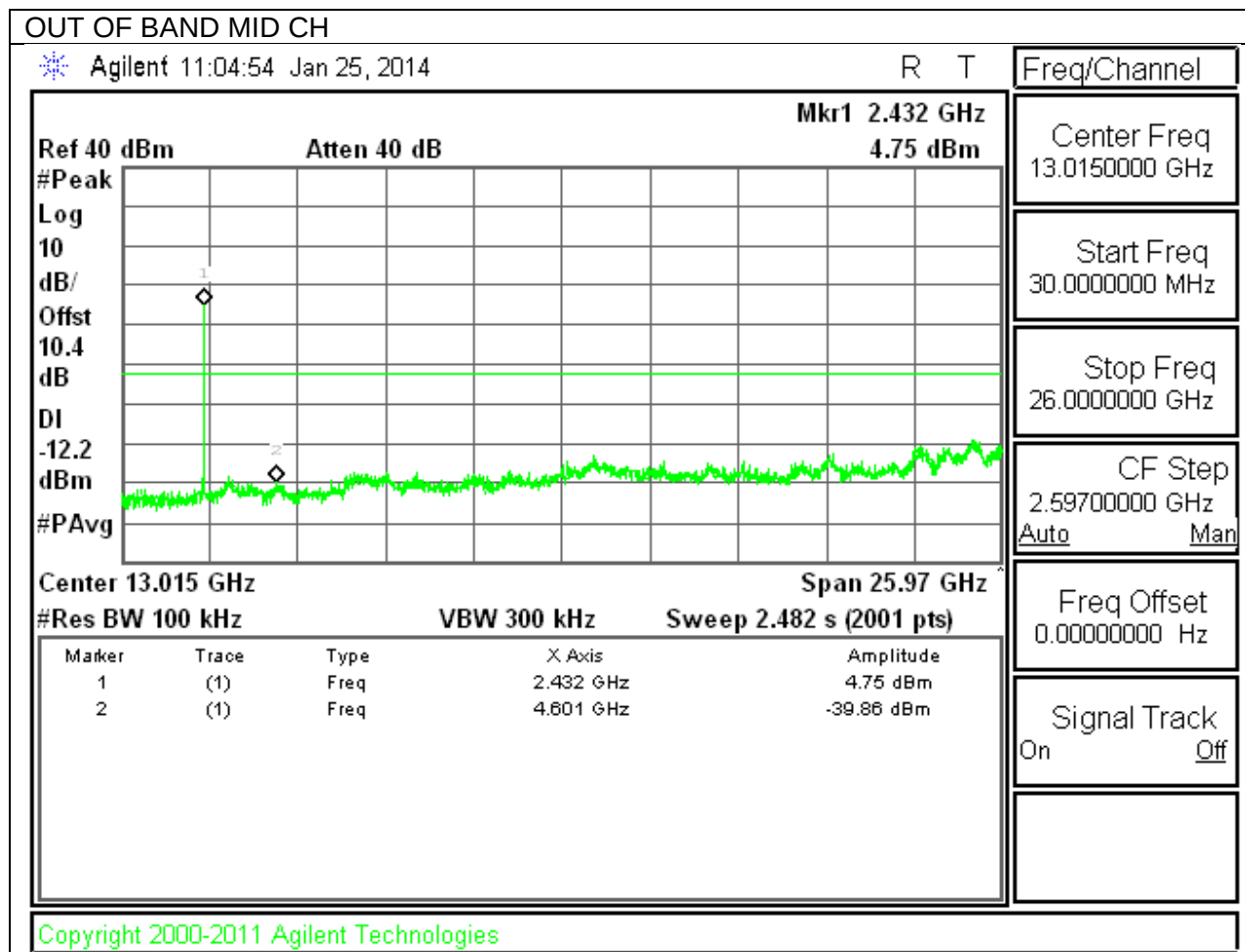


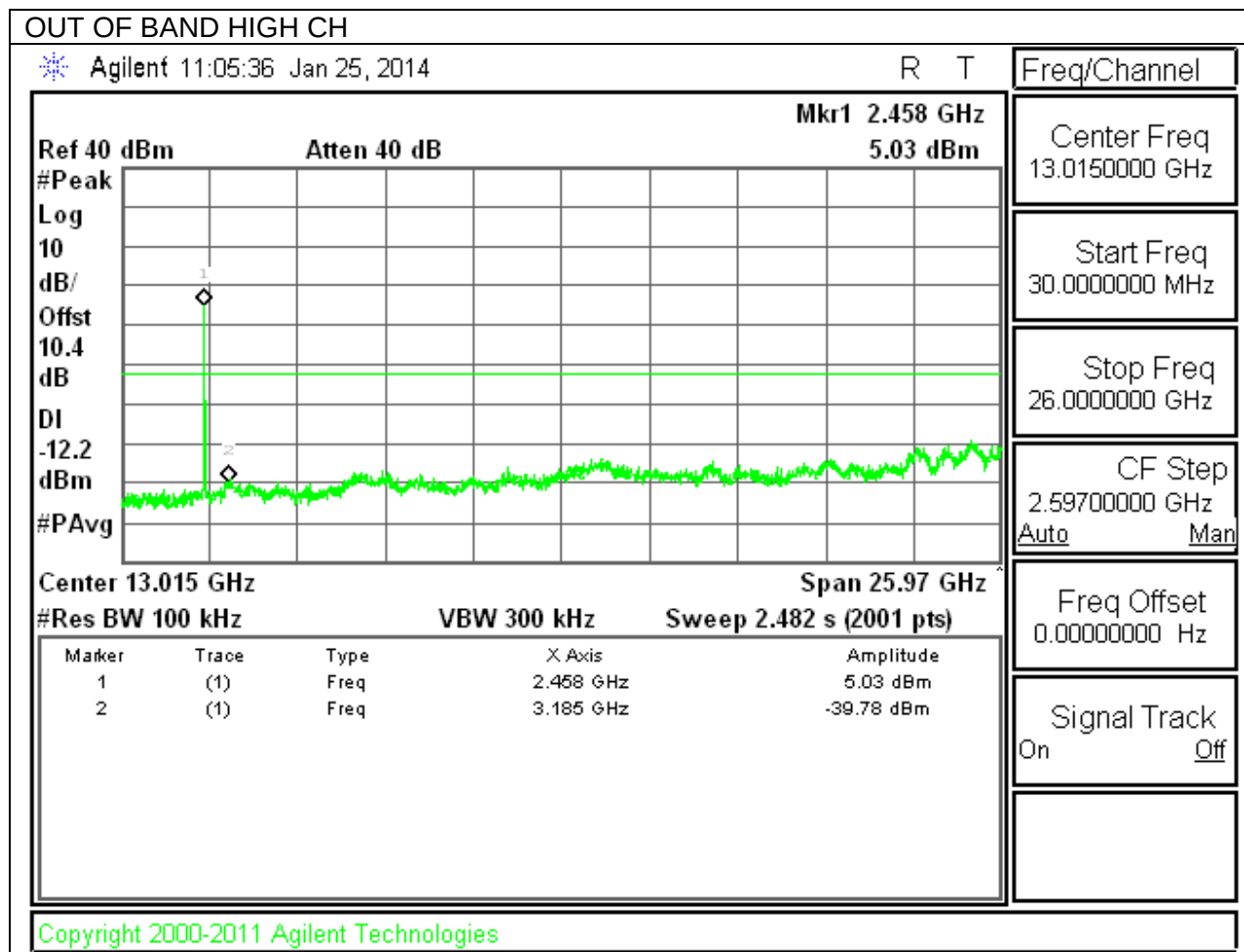
HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS

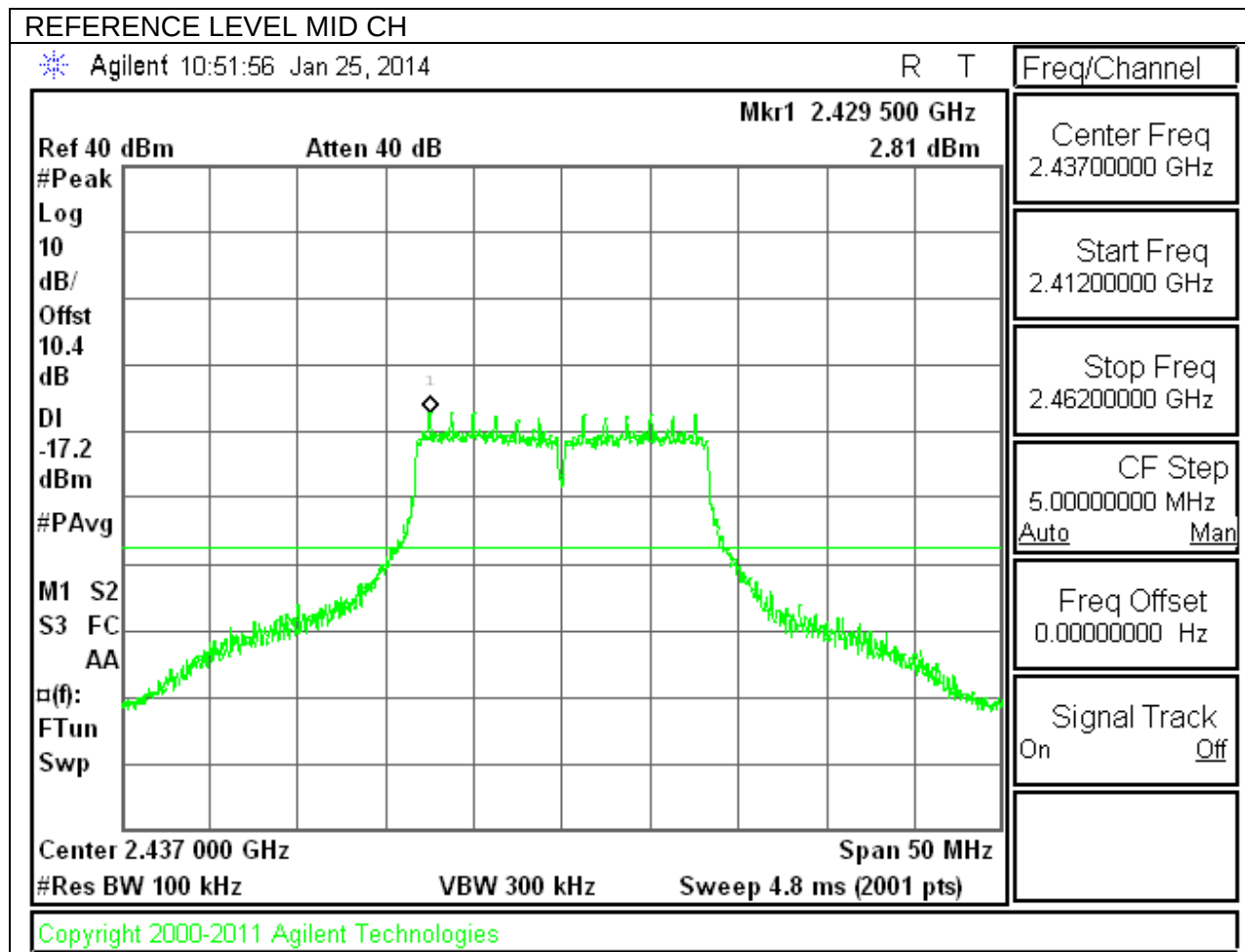




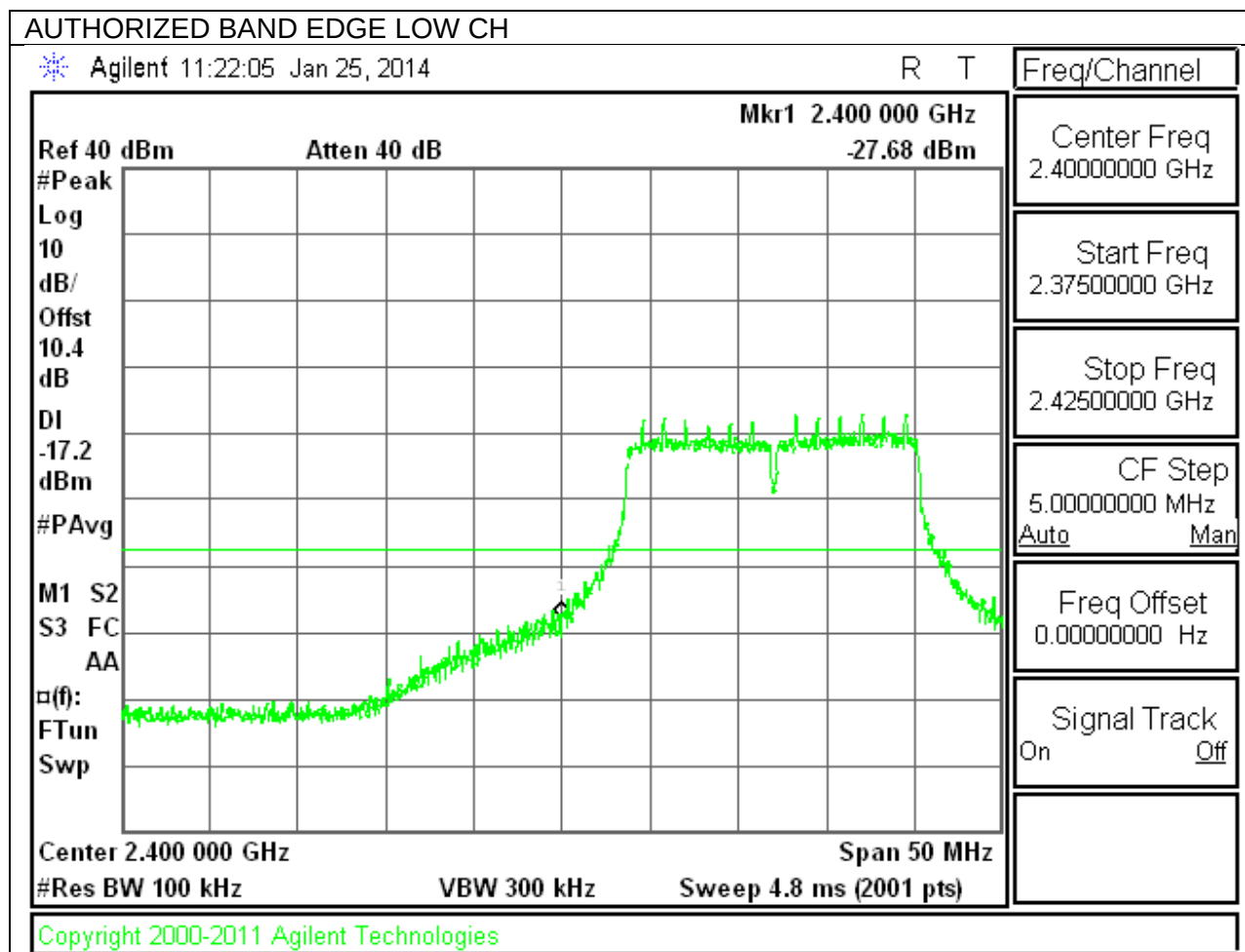


9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

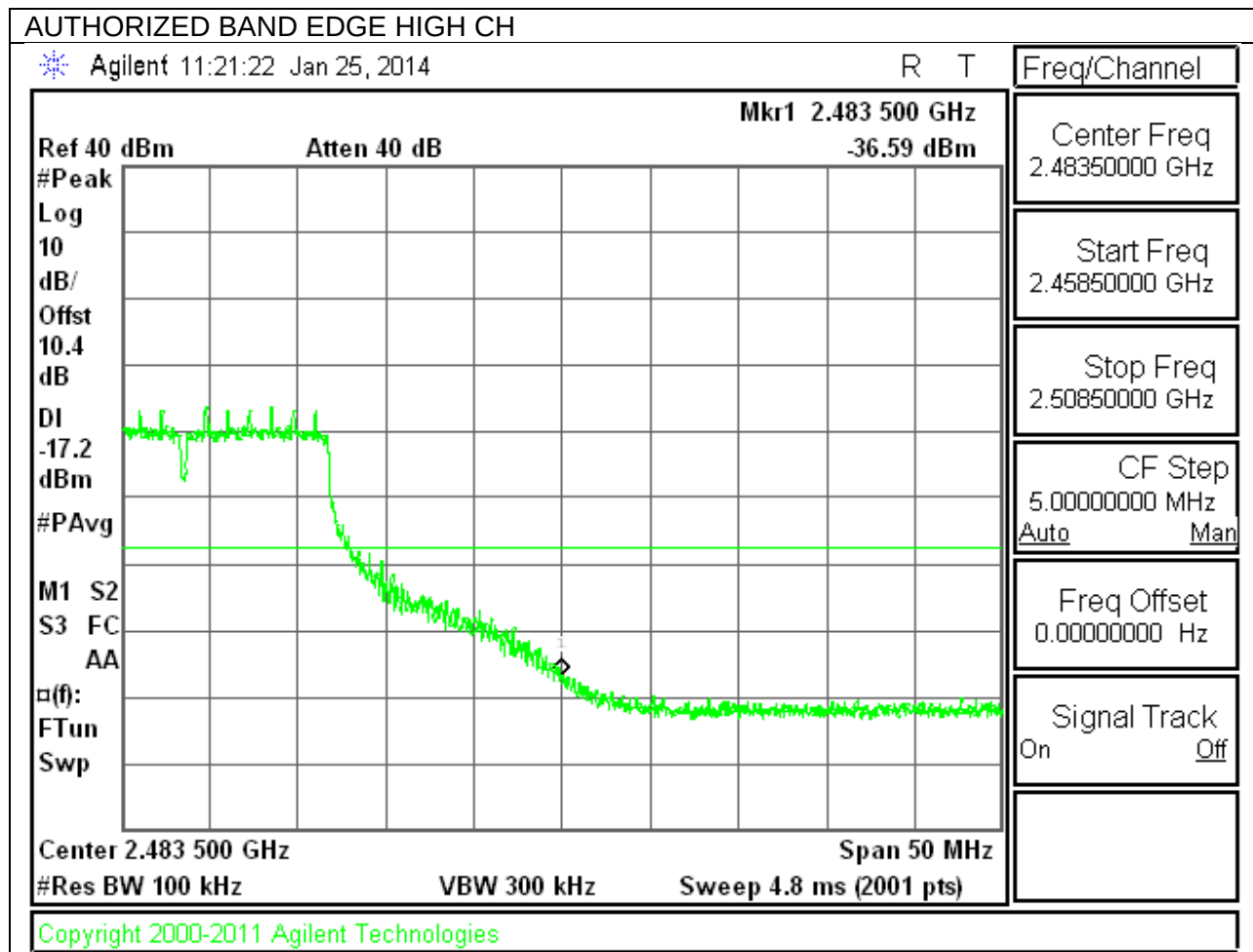
IN-BAND REFERENCE LEVEL



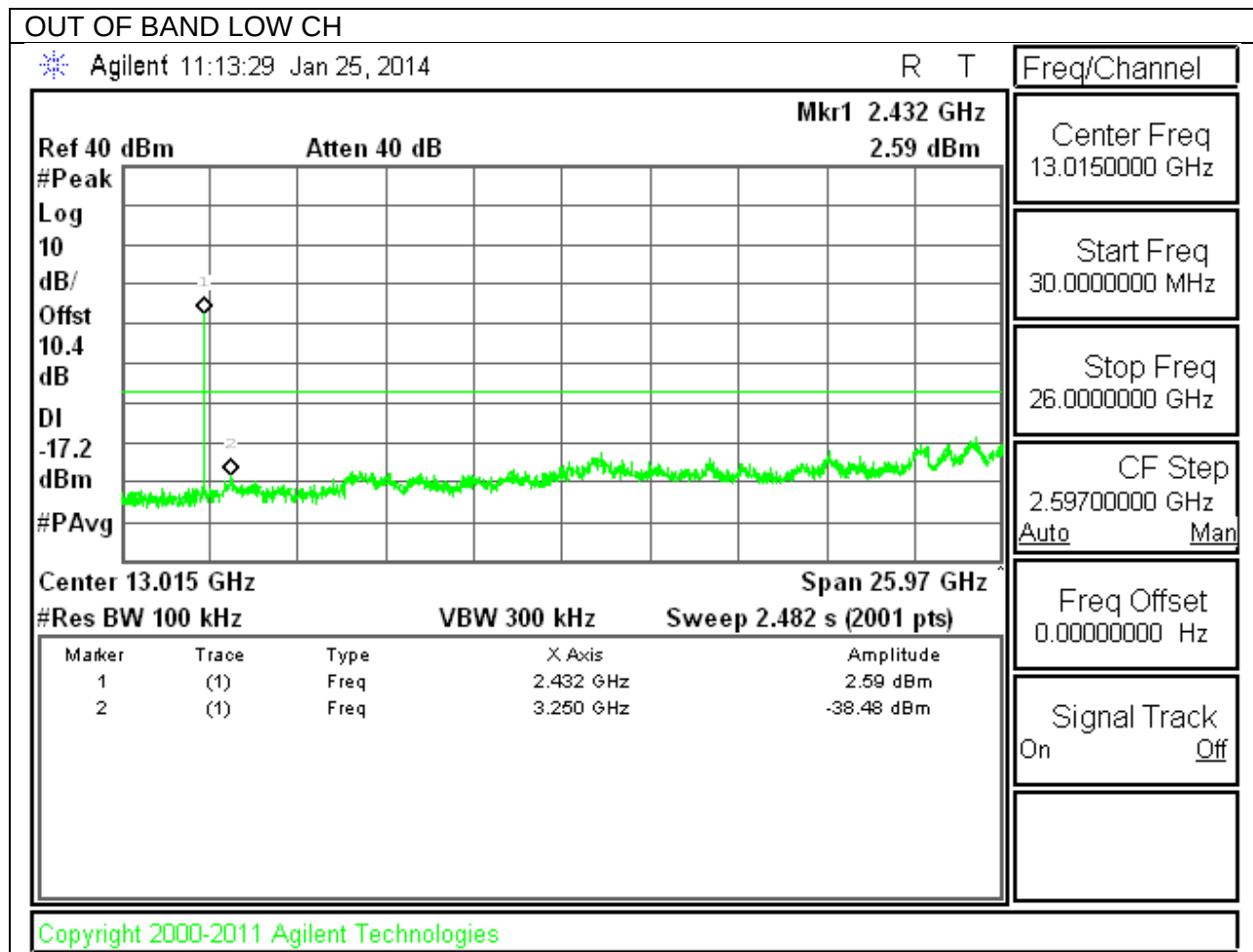
LOW CHANNEL BANDEDGE

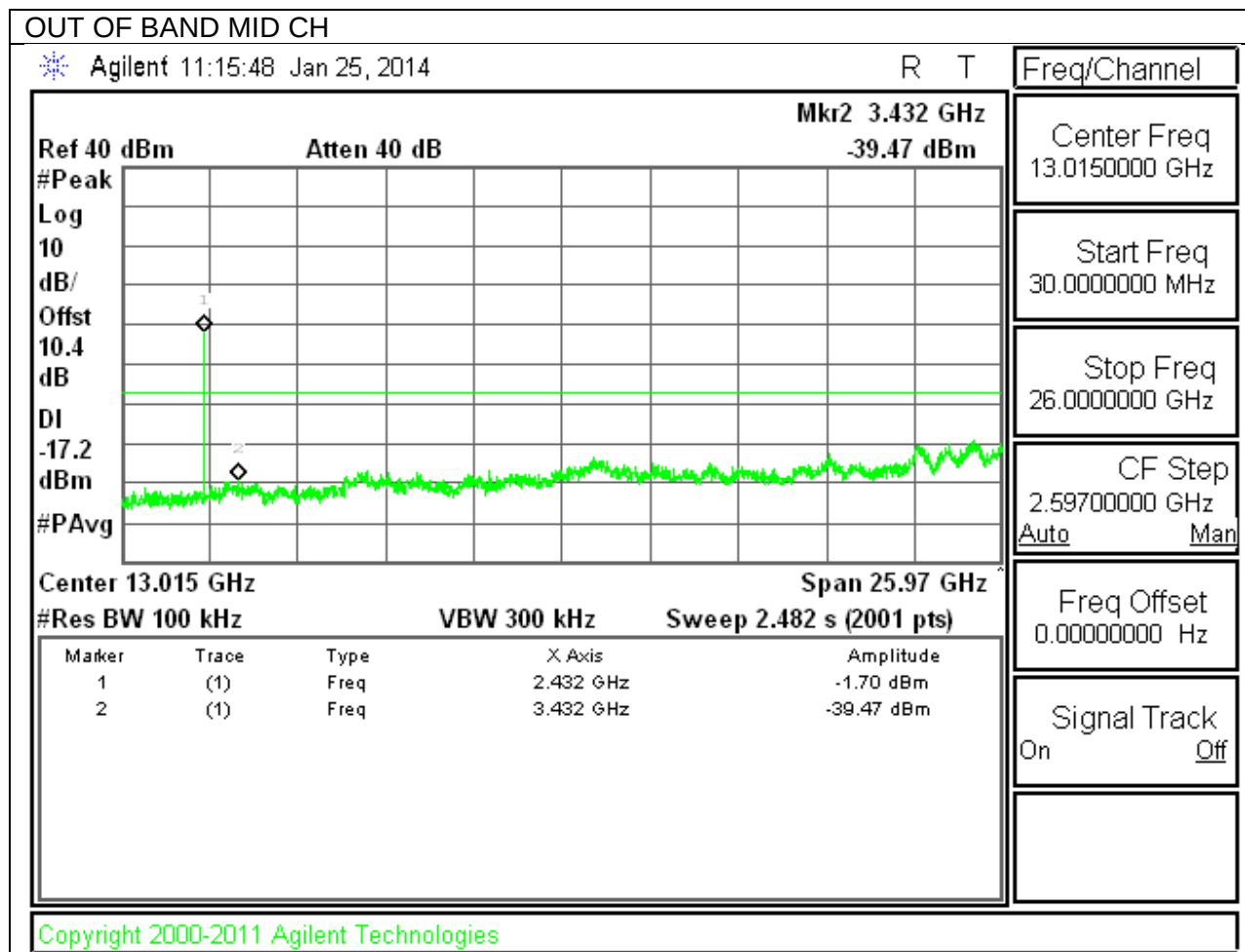


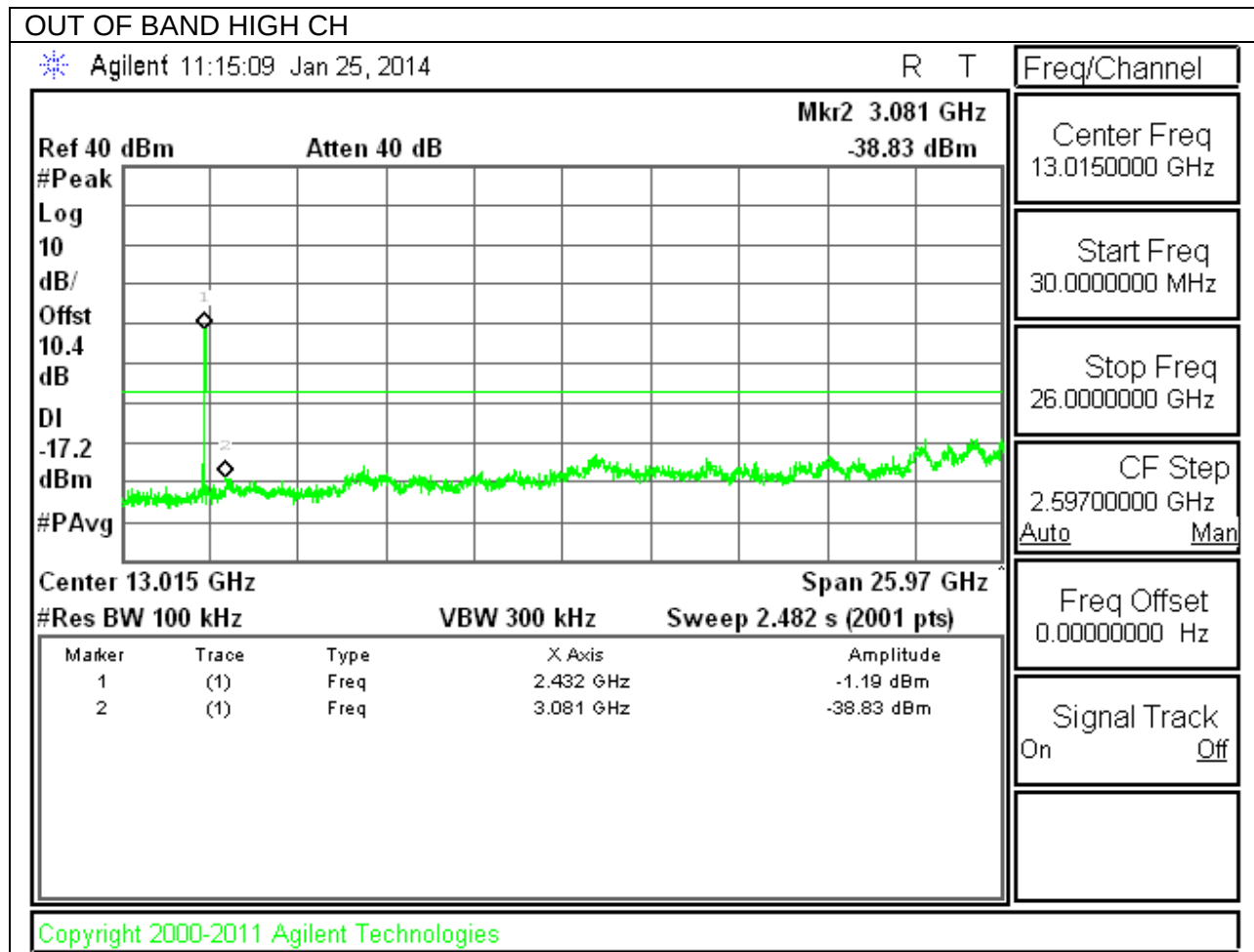
HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS

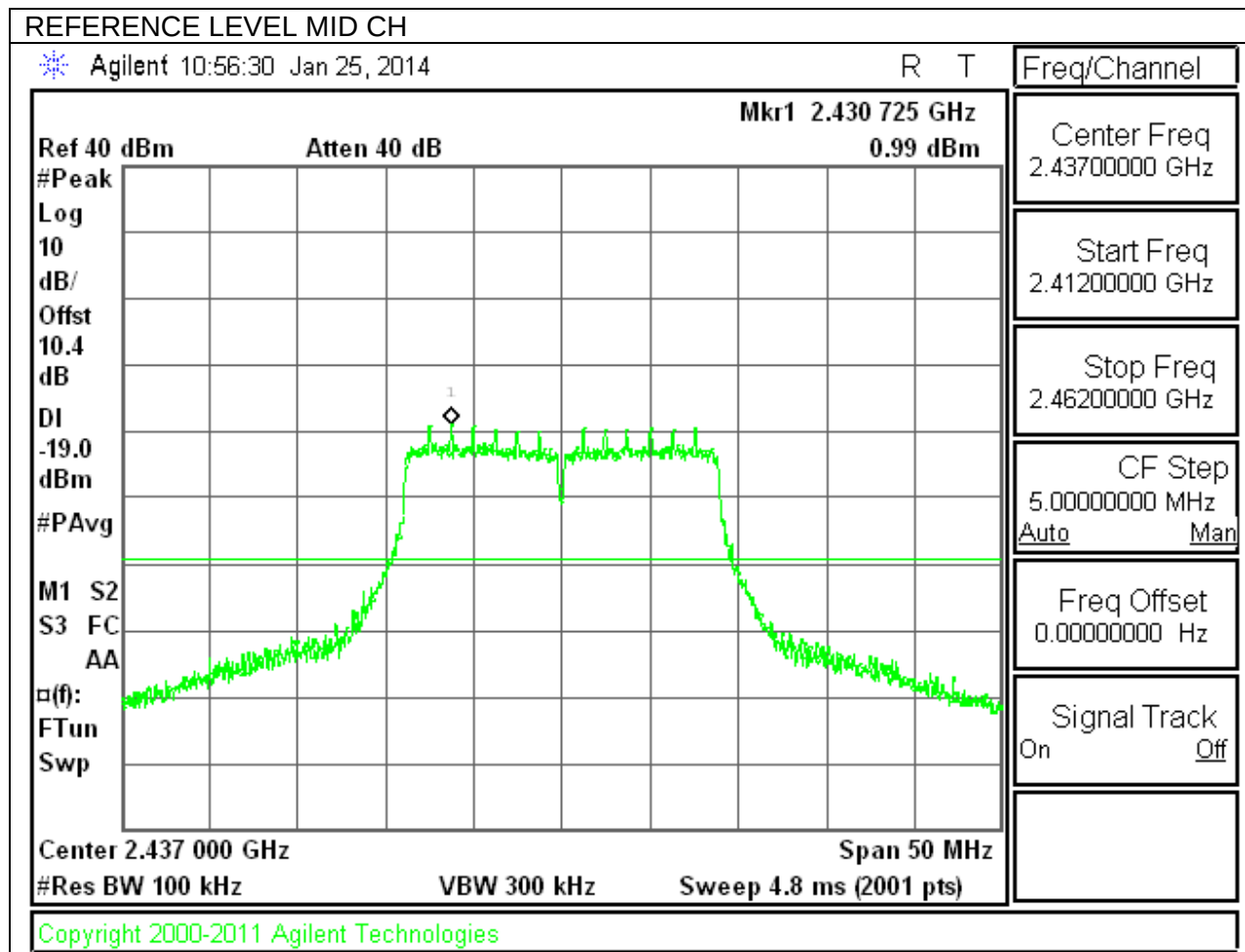




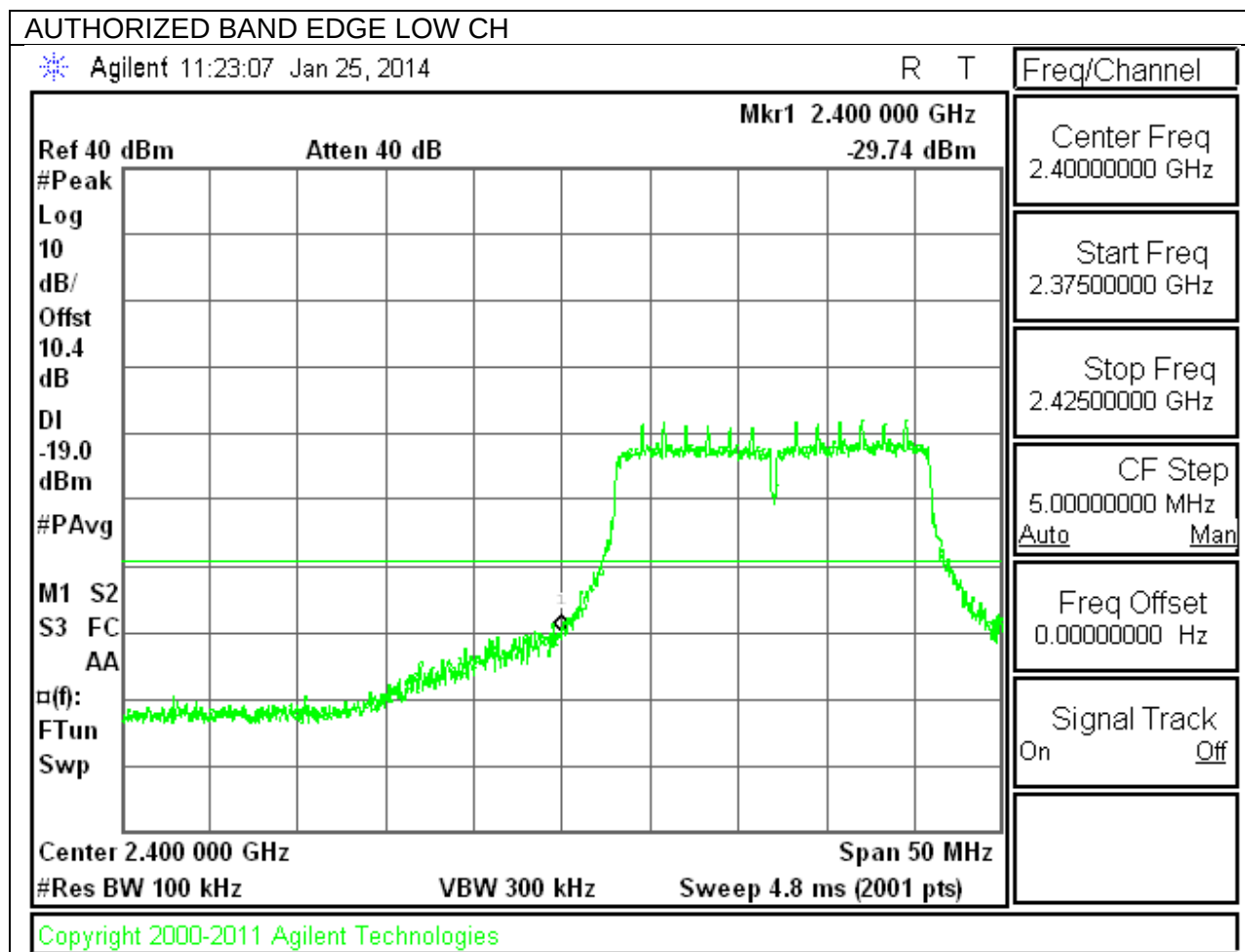


9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

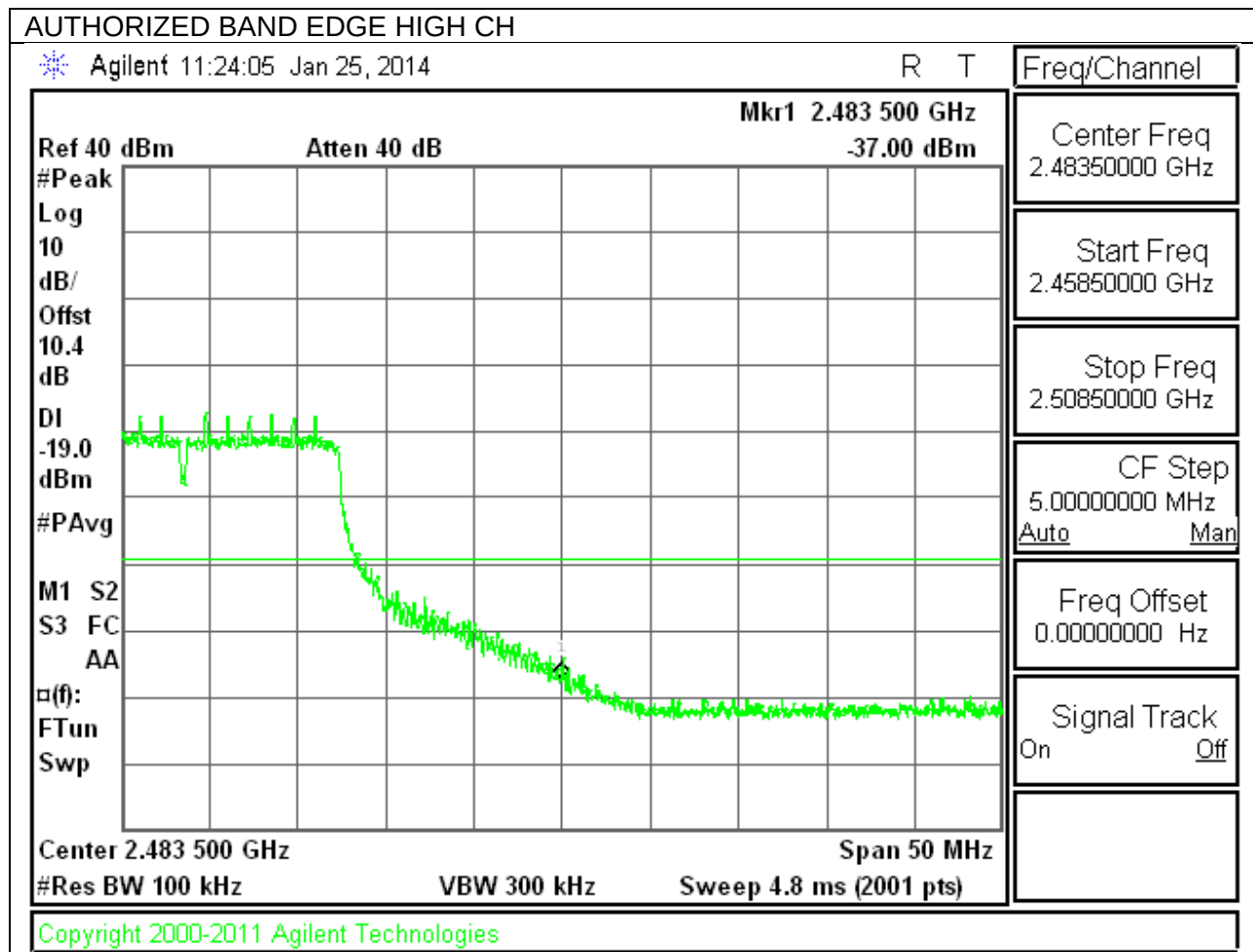
IN-BAND REFERENCE LEVEL



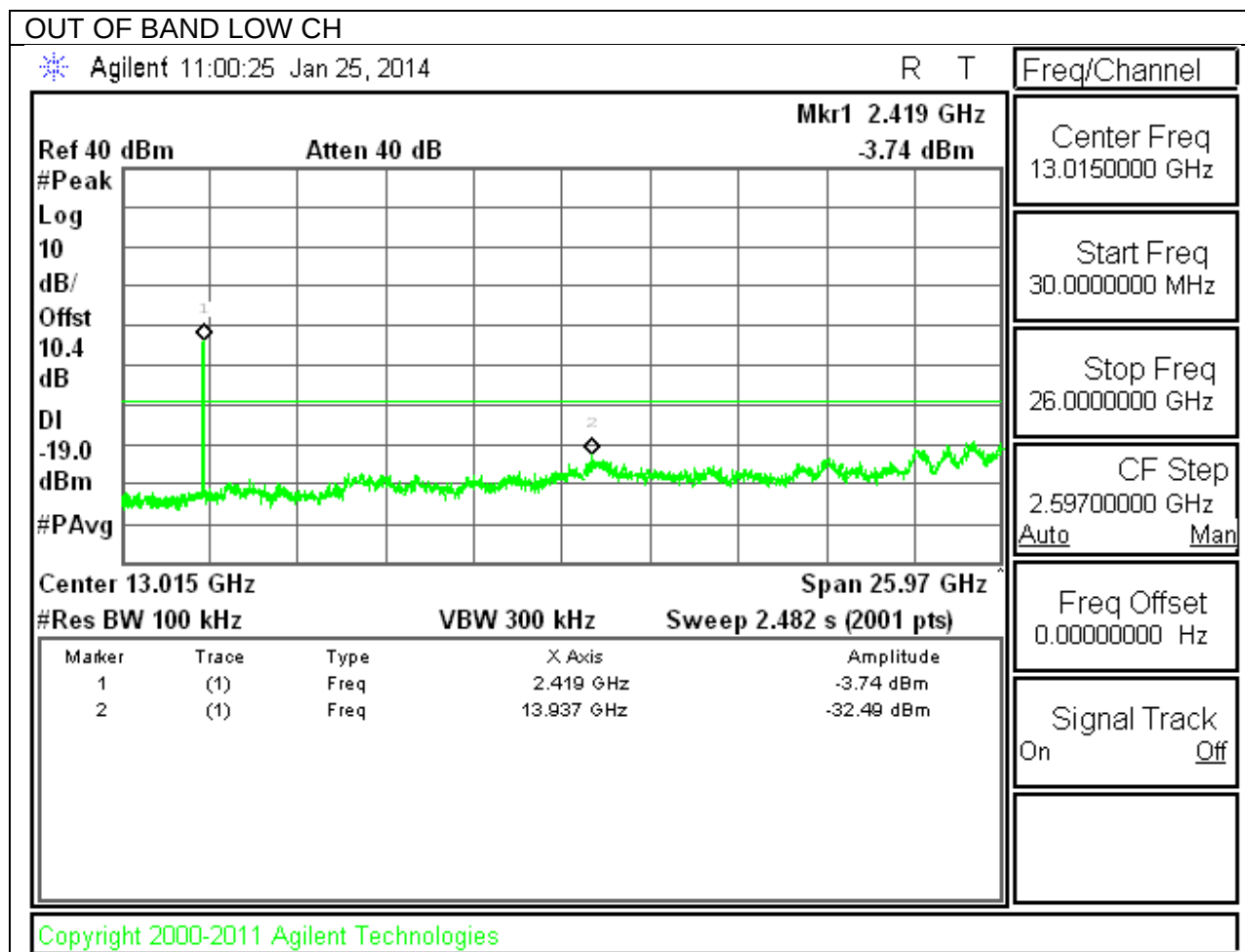
LOW CHANNEL BANDEDGE

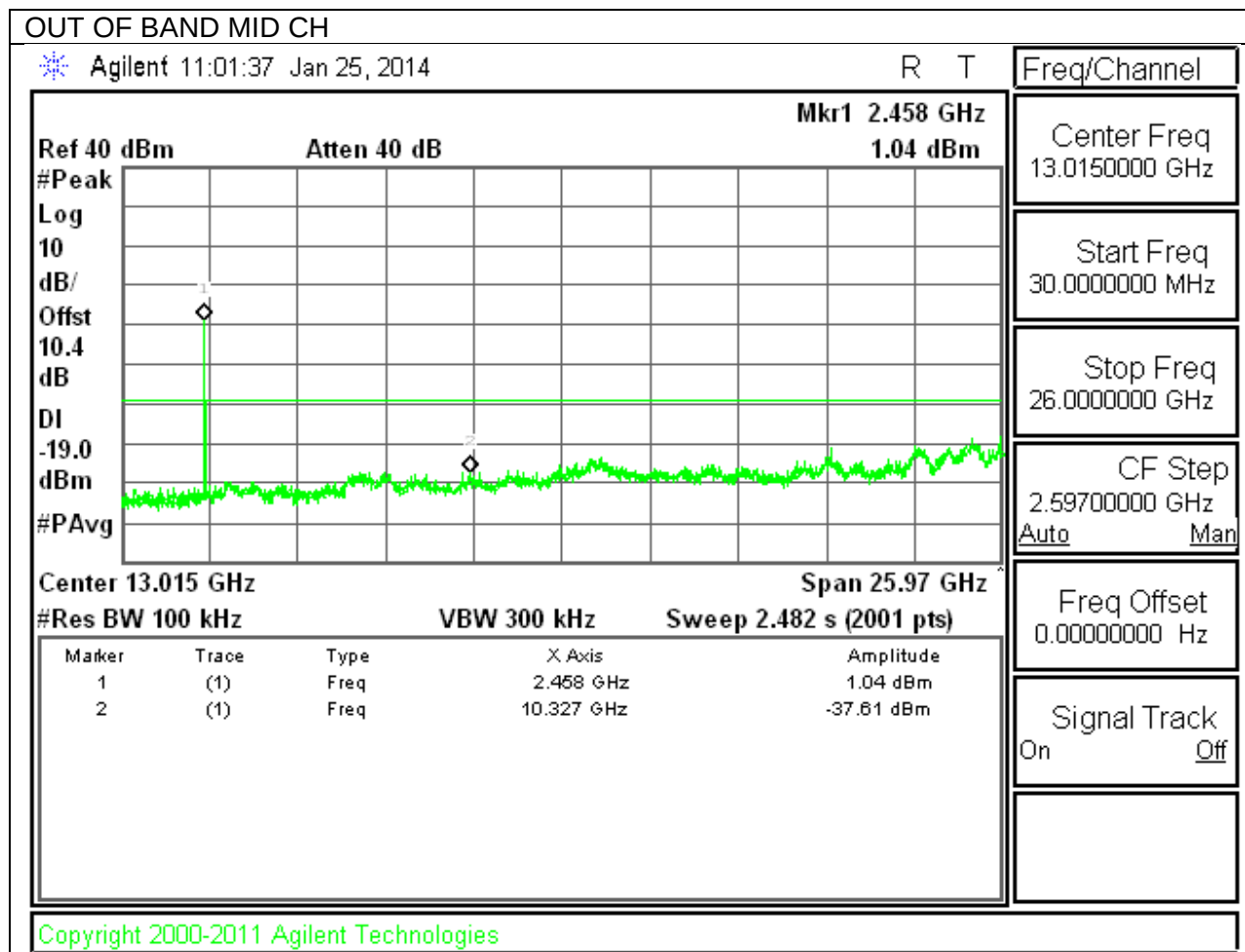


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



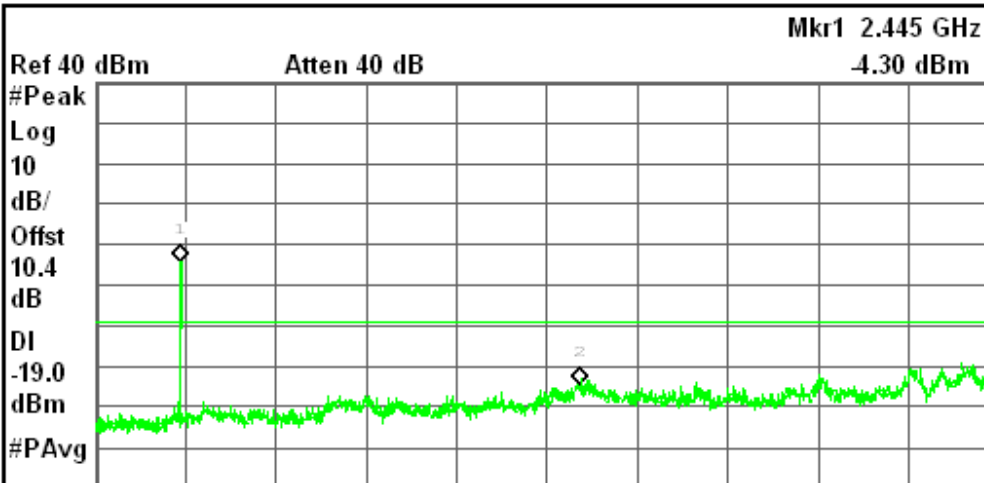


OUT OF BAND HIGH CH

Agilent 10:58:33 Jan 25, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

Freq Offset
0.00000000 Hz

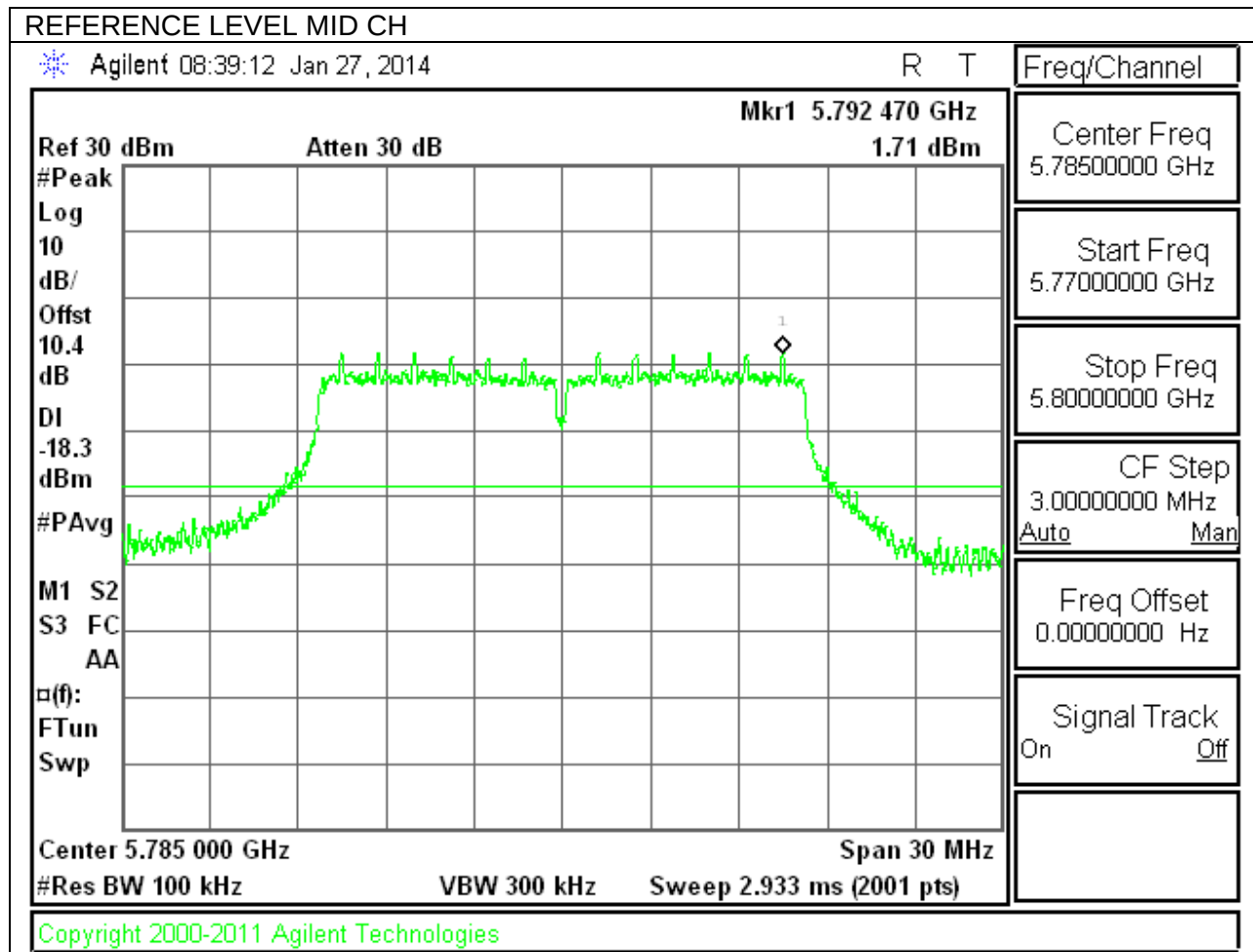
Signal Track
On Off

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.445 GHz	-4.30 dBm
2	(1)	Freq	13.976 GHz	-34.76 dBm

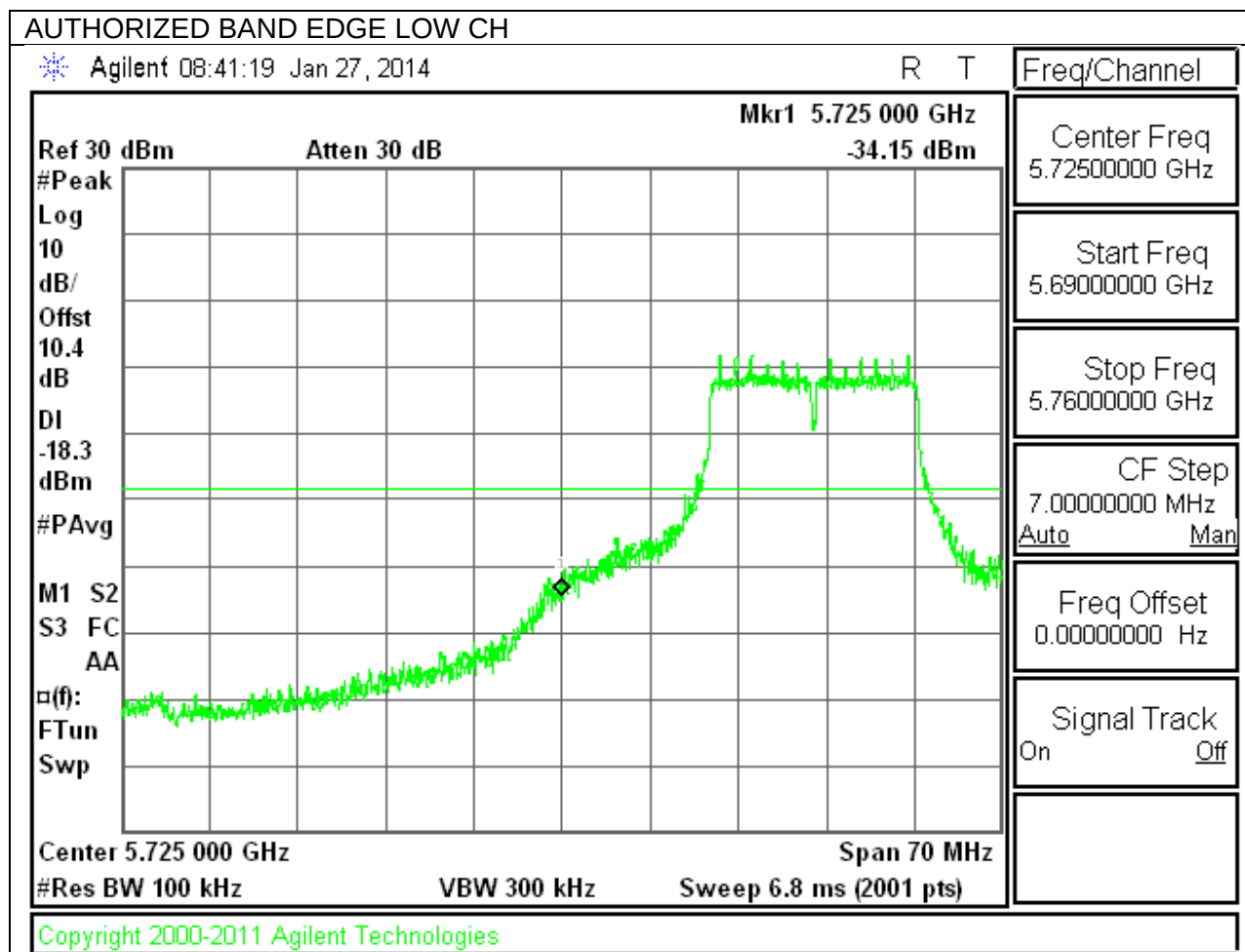
Copyright 2000-2011 Agilent Technologies

9.6.4. 802.11a MODE IN THE 5.8 GHz BAND

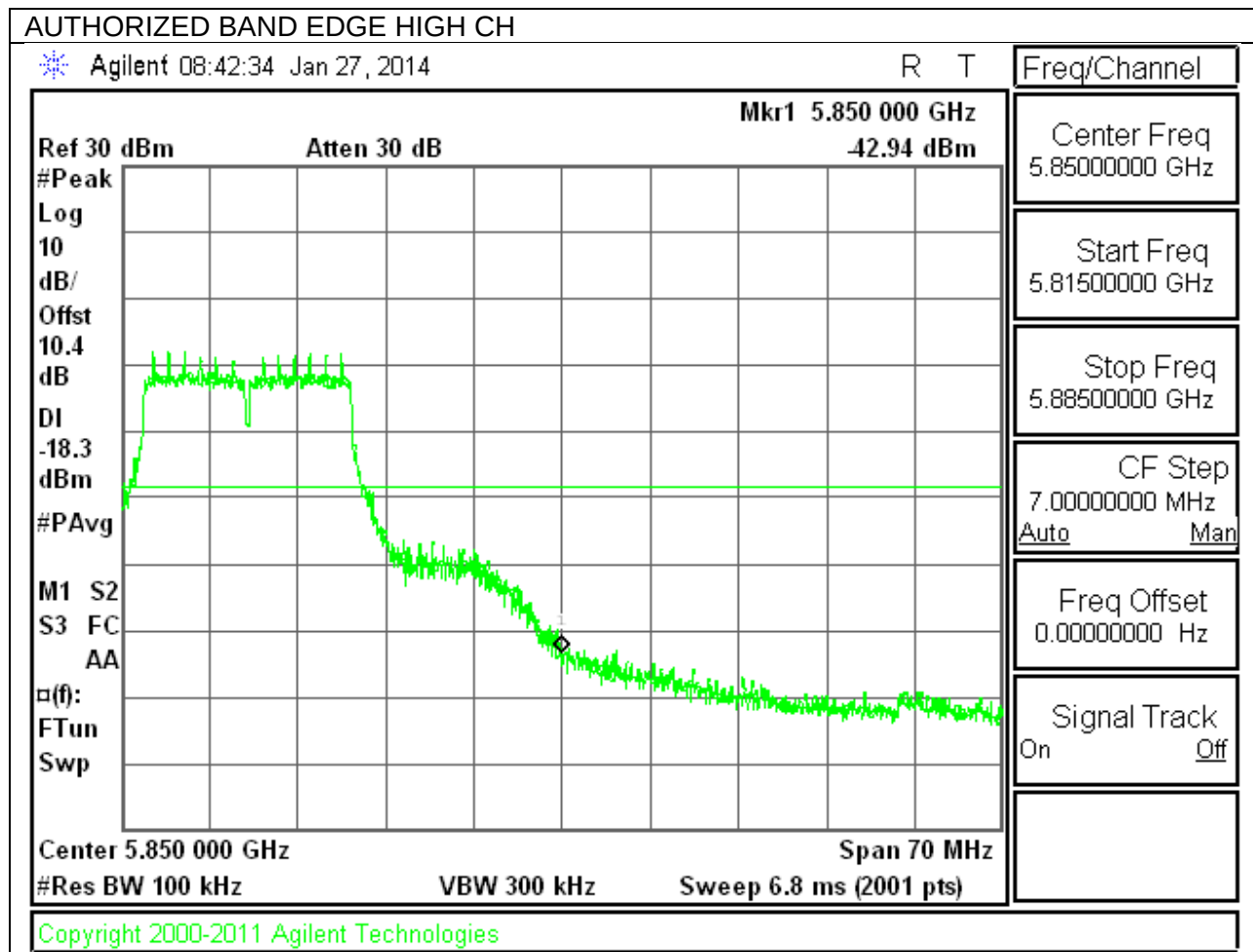
IN-BAND REFERENCE LEVEL



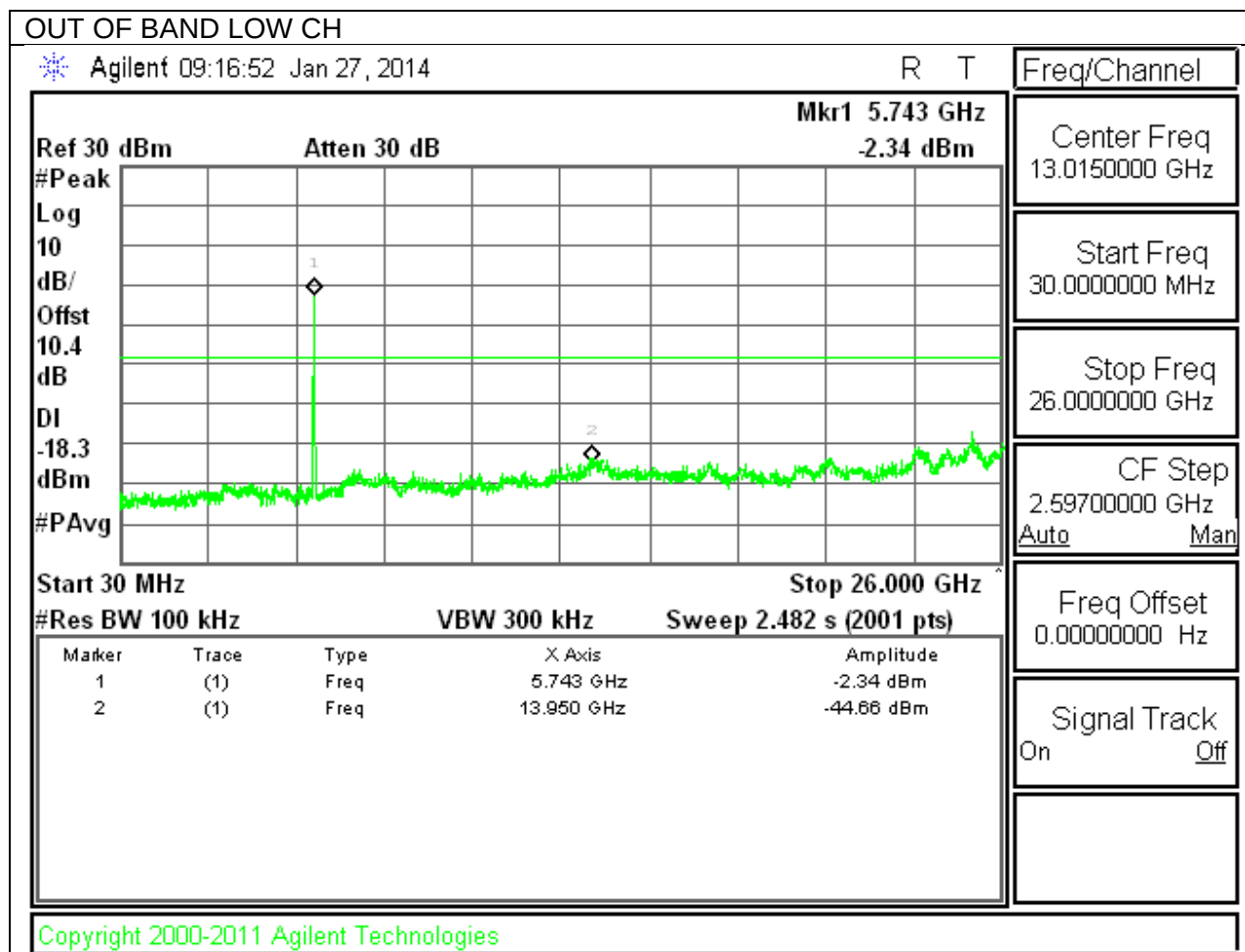
LOW CHANNEL BANDEDGE

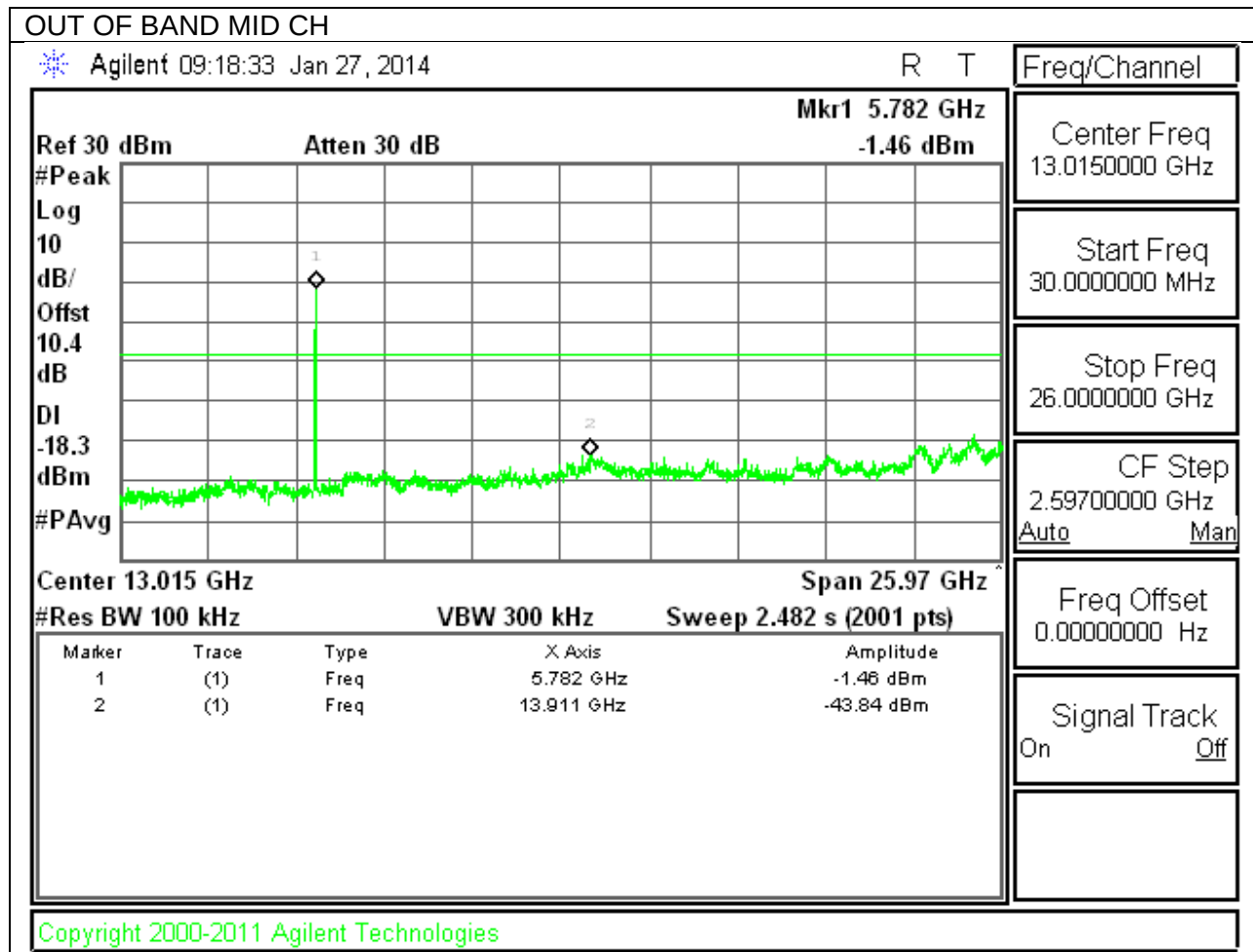


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



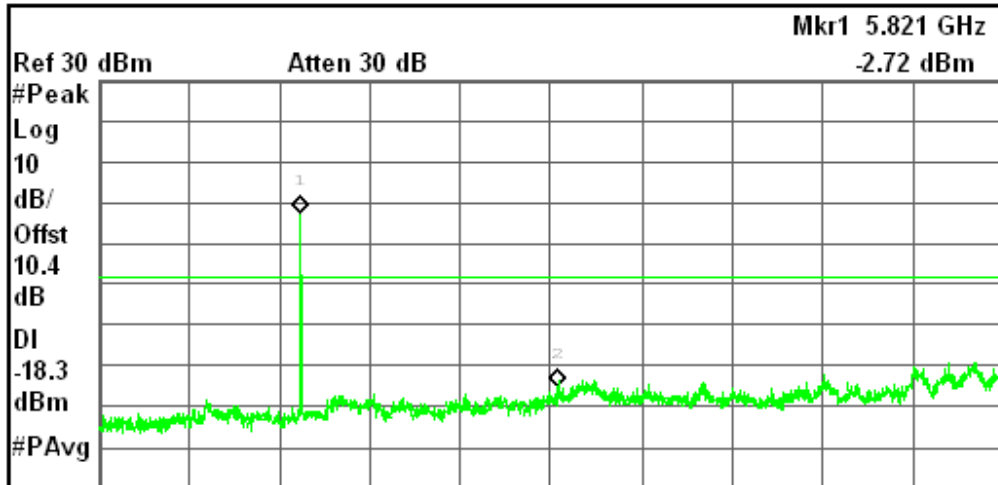


OUT OF BAND HIGH CH

Agilent 09:19:45 Jan 27, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

Start 30 MHz Stop 26.000 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.482 s (2001 pts)

Freq Offset
0.00000000 Hz

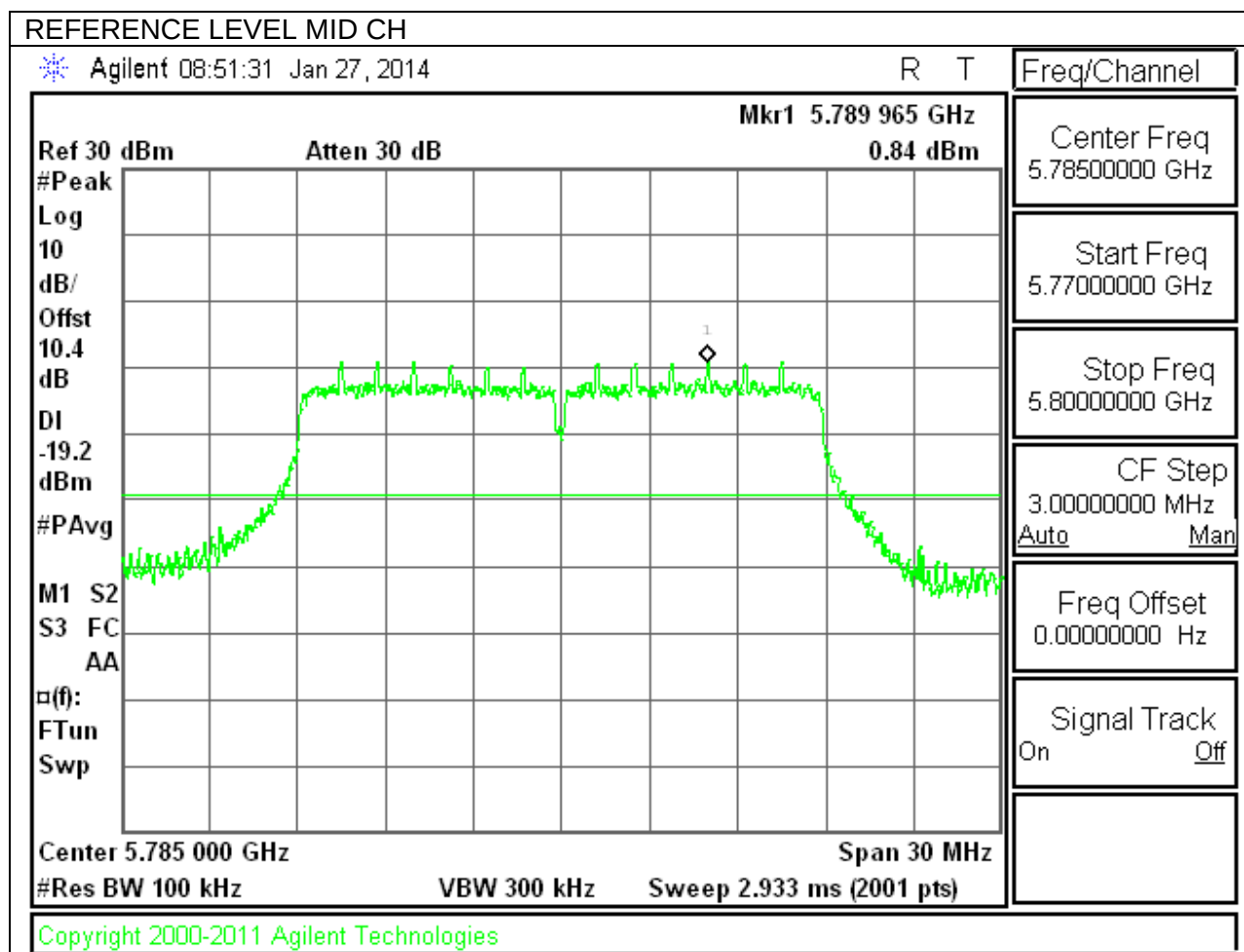
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.821 GHz	-2.72 dBm
2	(1)	Freq	13.223 GHz	-45.04 dBm

Signal Track
On Off

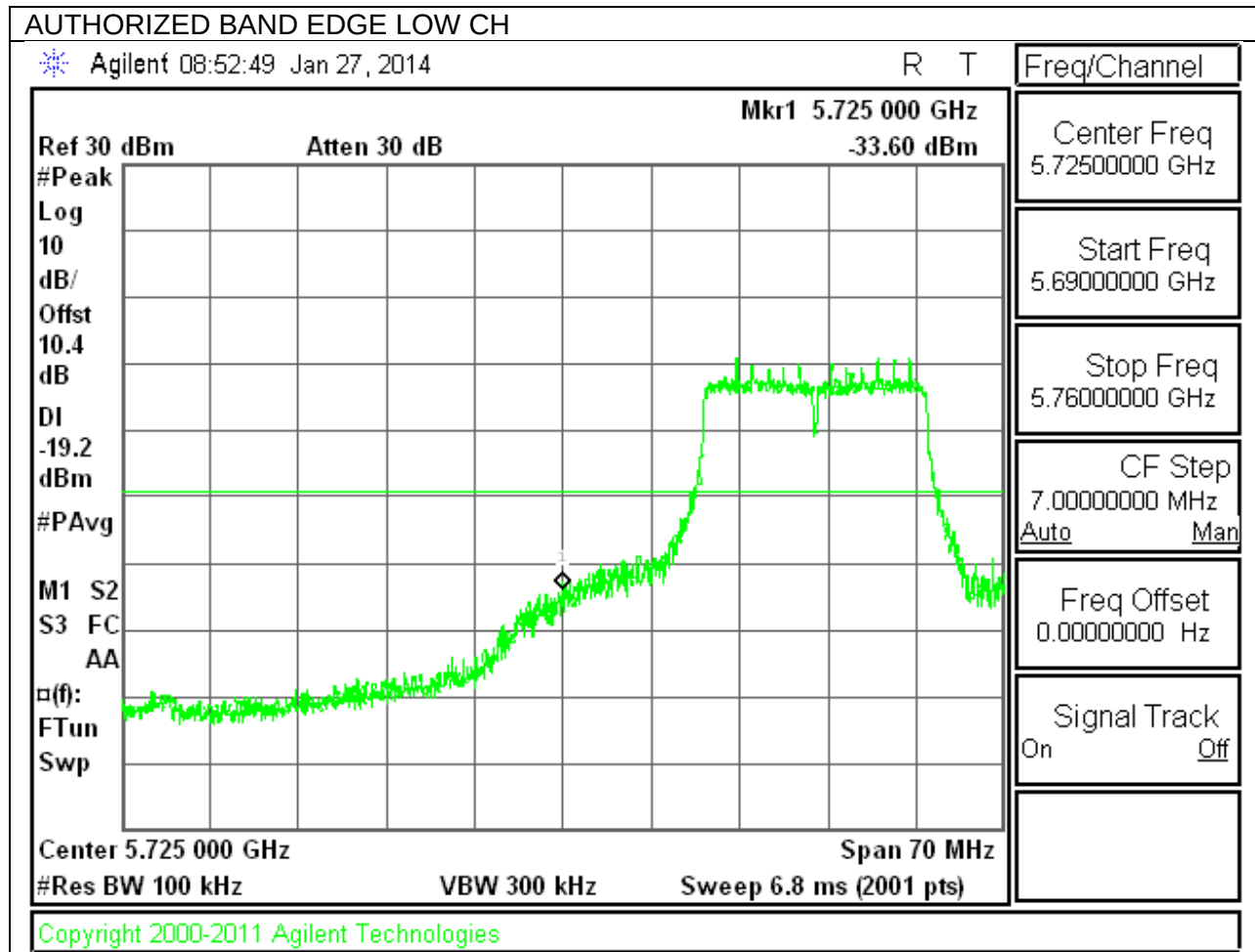
Copyright 2000-2011 Agilent Technologies

9.6.5. 802.11n MODE IN THE 5.8 GHz BAND

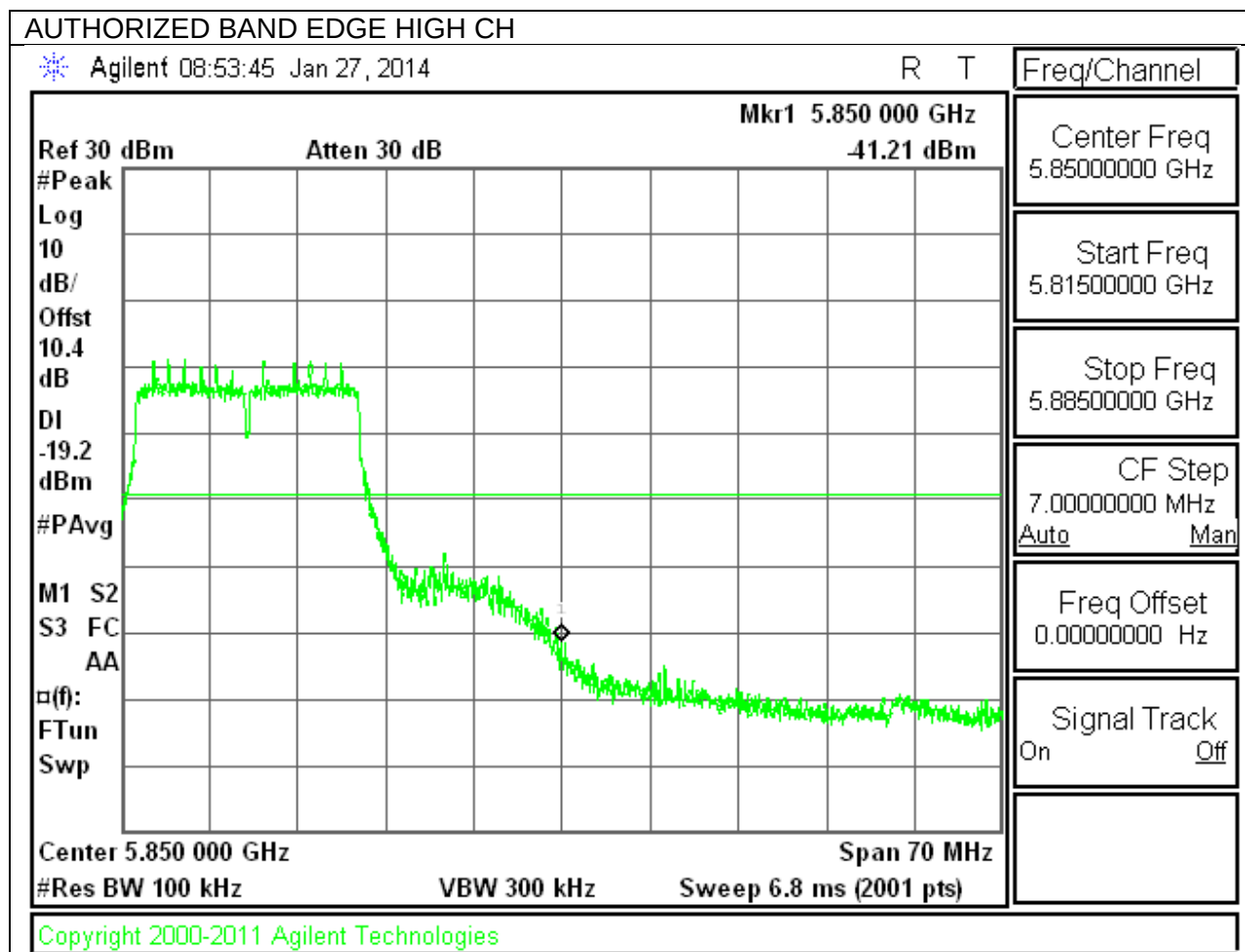
IN-BAND REFERENCE LEVEL



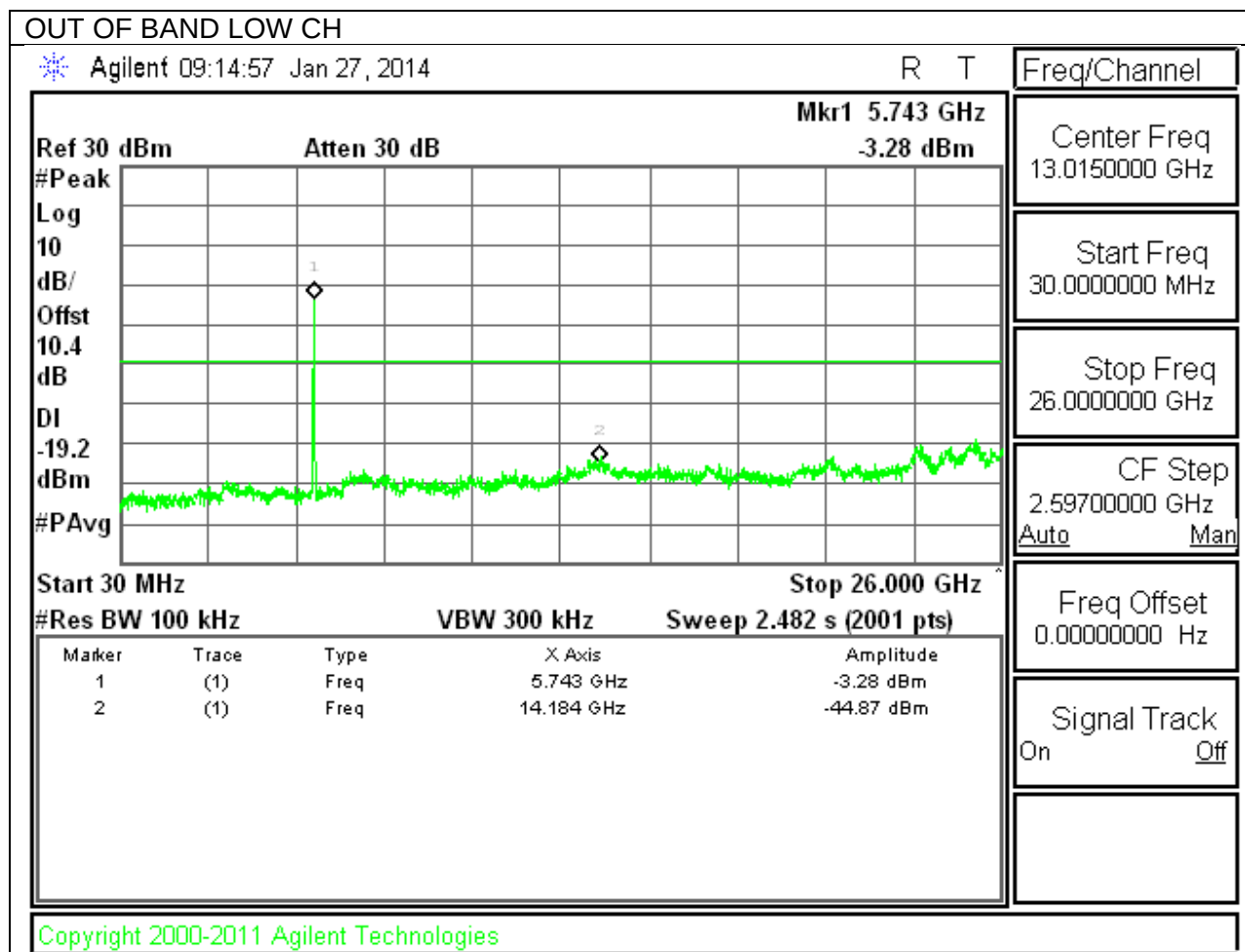
LOW CHANNEL BANDEDGE

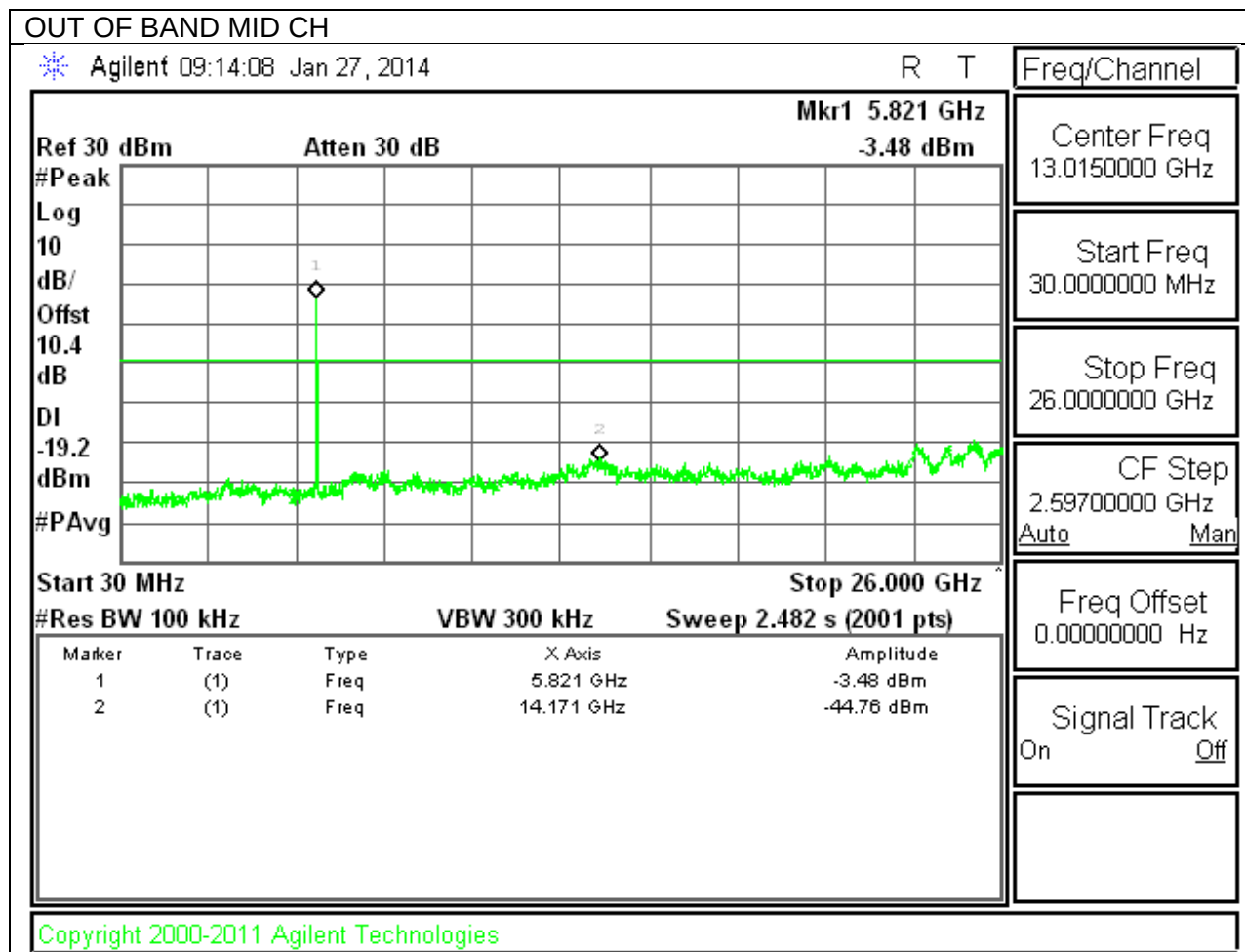


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



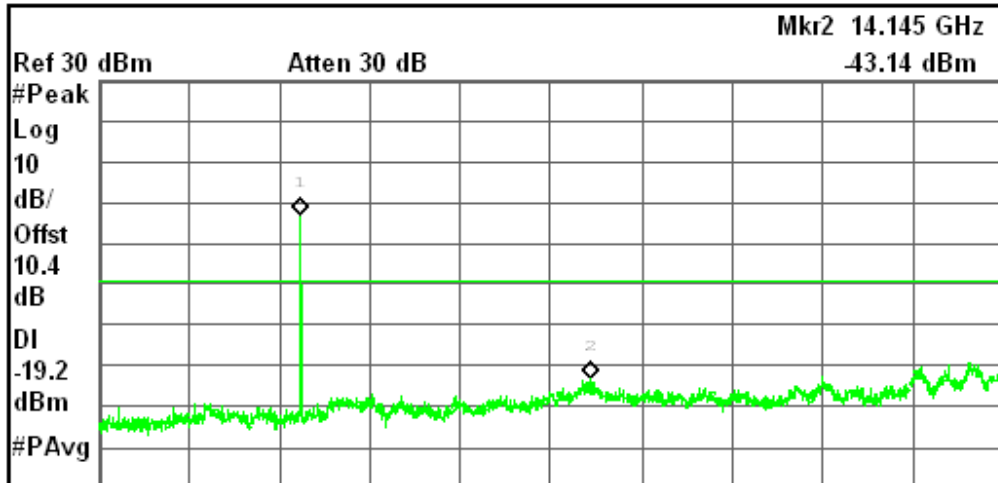


OUT OF BAND HIGH CH

Agilent 09:13:02 Jan 27, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

Freq Offset
0.00000000 Hz

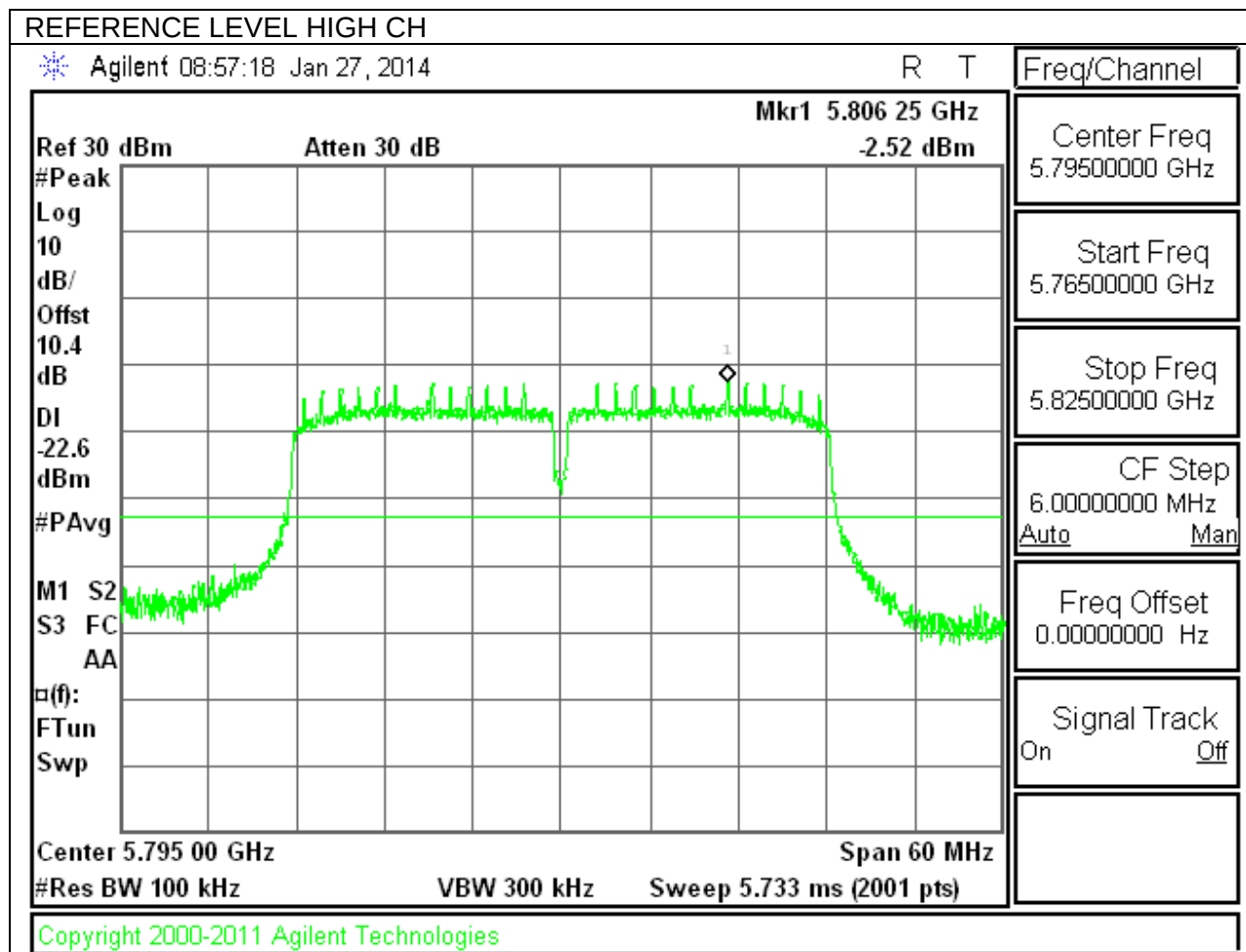
Signal Track
On Off

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.821 GHz	-2.98 dBm
2	(1)	Freq	14.145 GHz	-43.14 dBm

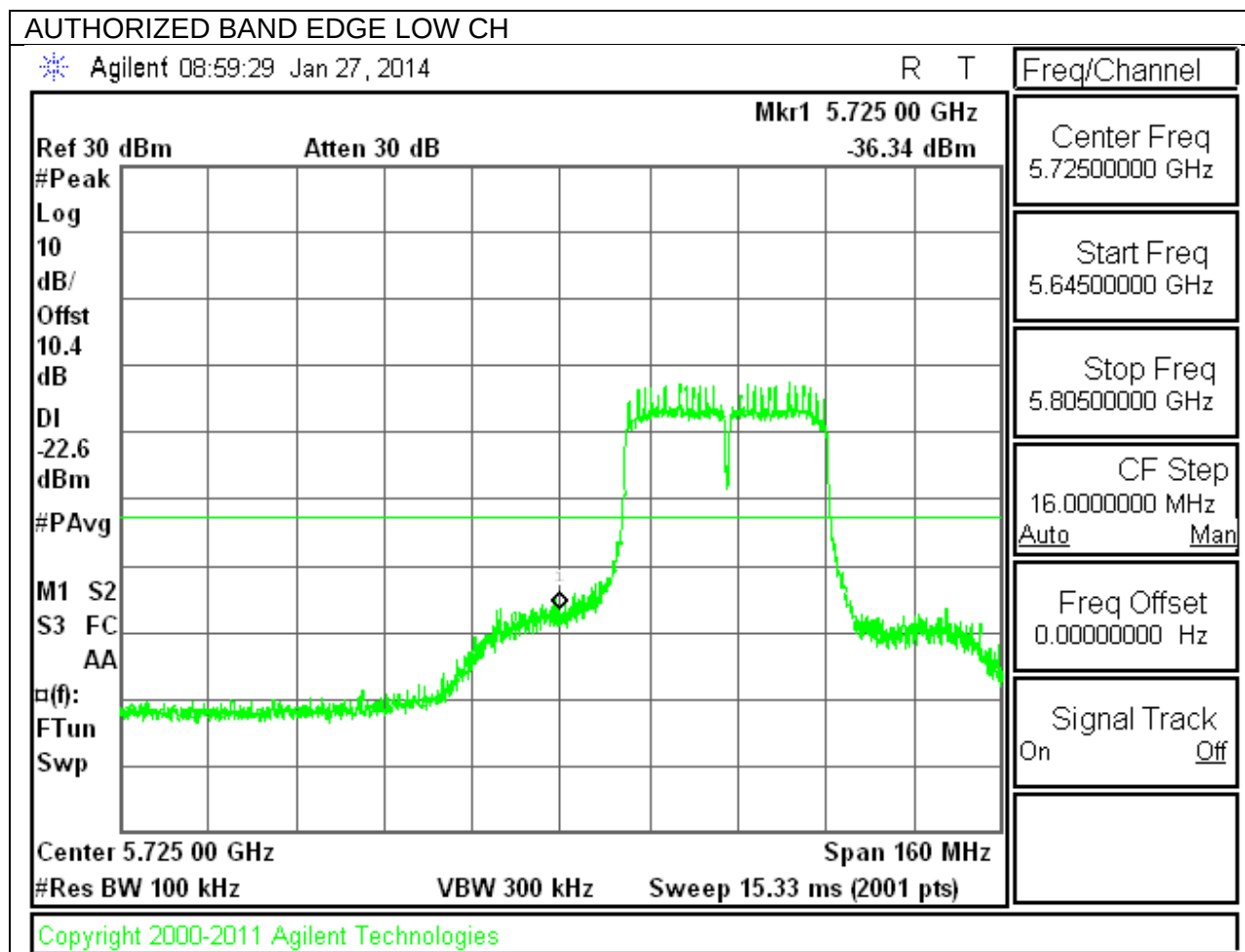
Copyright 2000-2011 Agilent Technologies

9.6.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

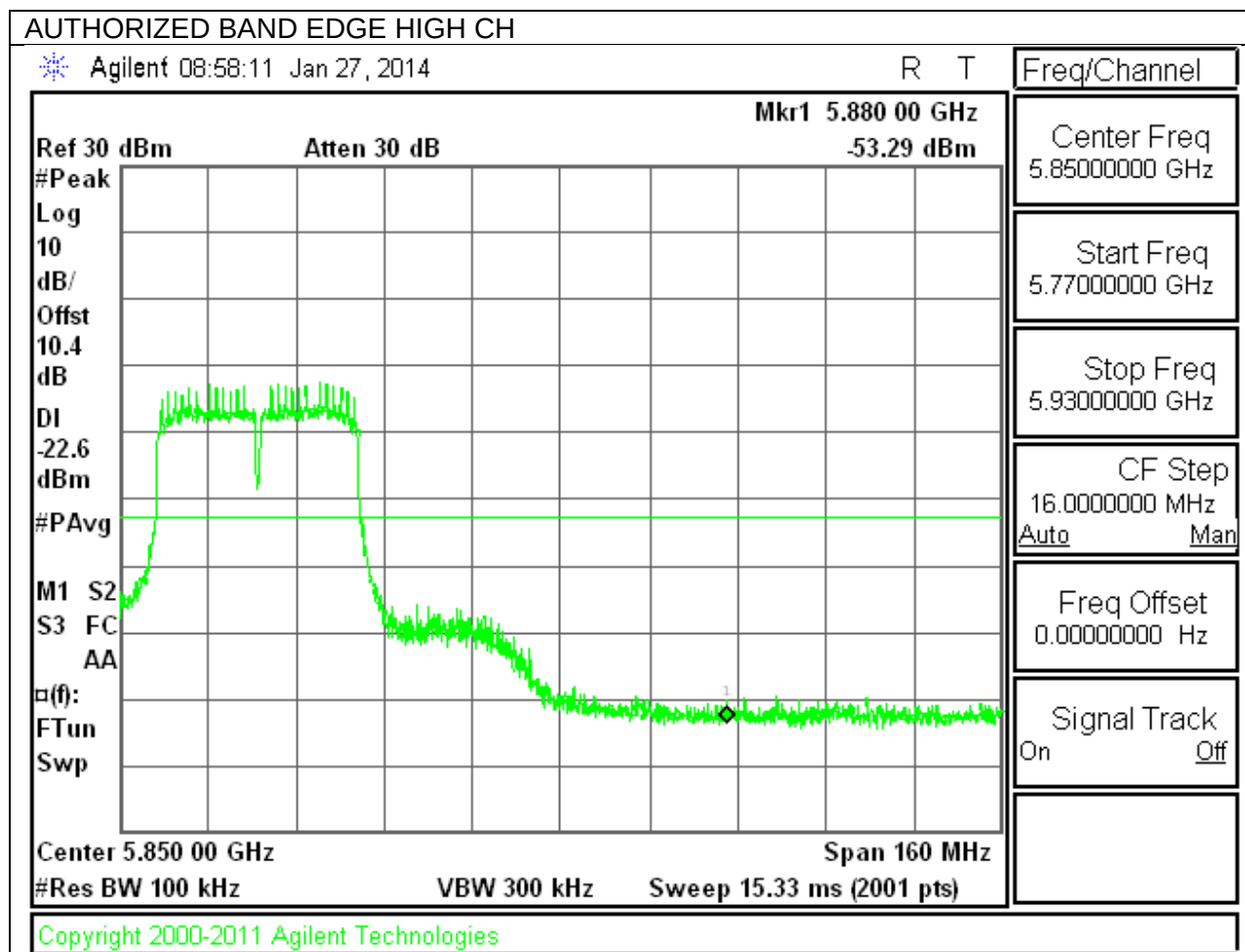
IN-BAND REFERENCE LEVEL



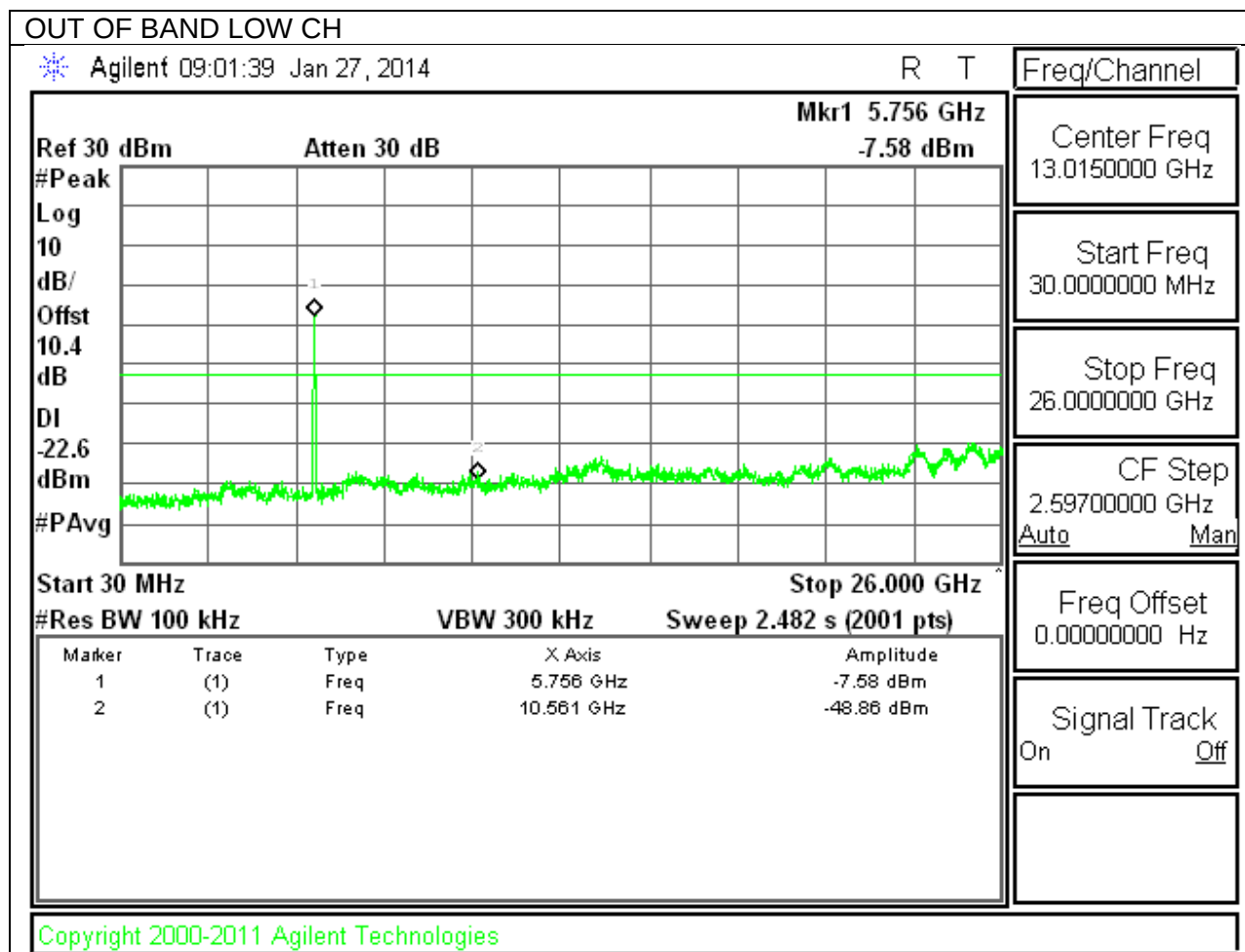
LOW CHANNEL BANDEDGE

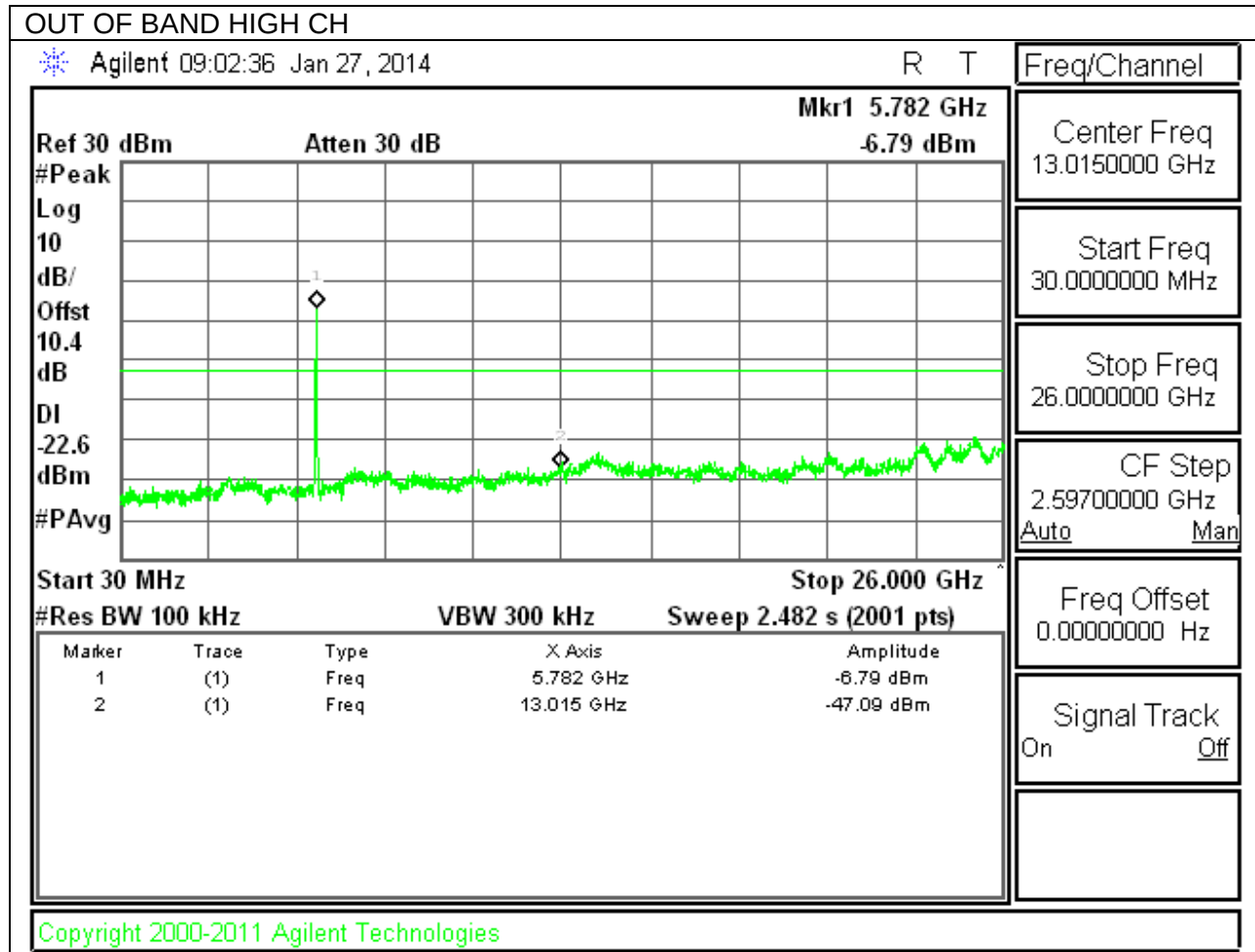


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS





10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

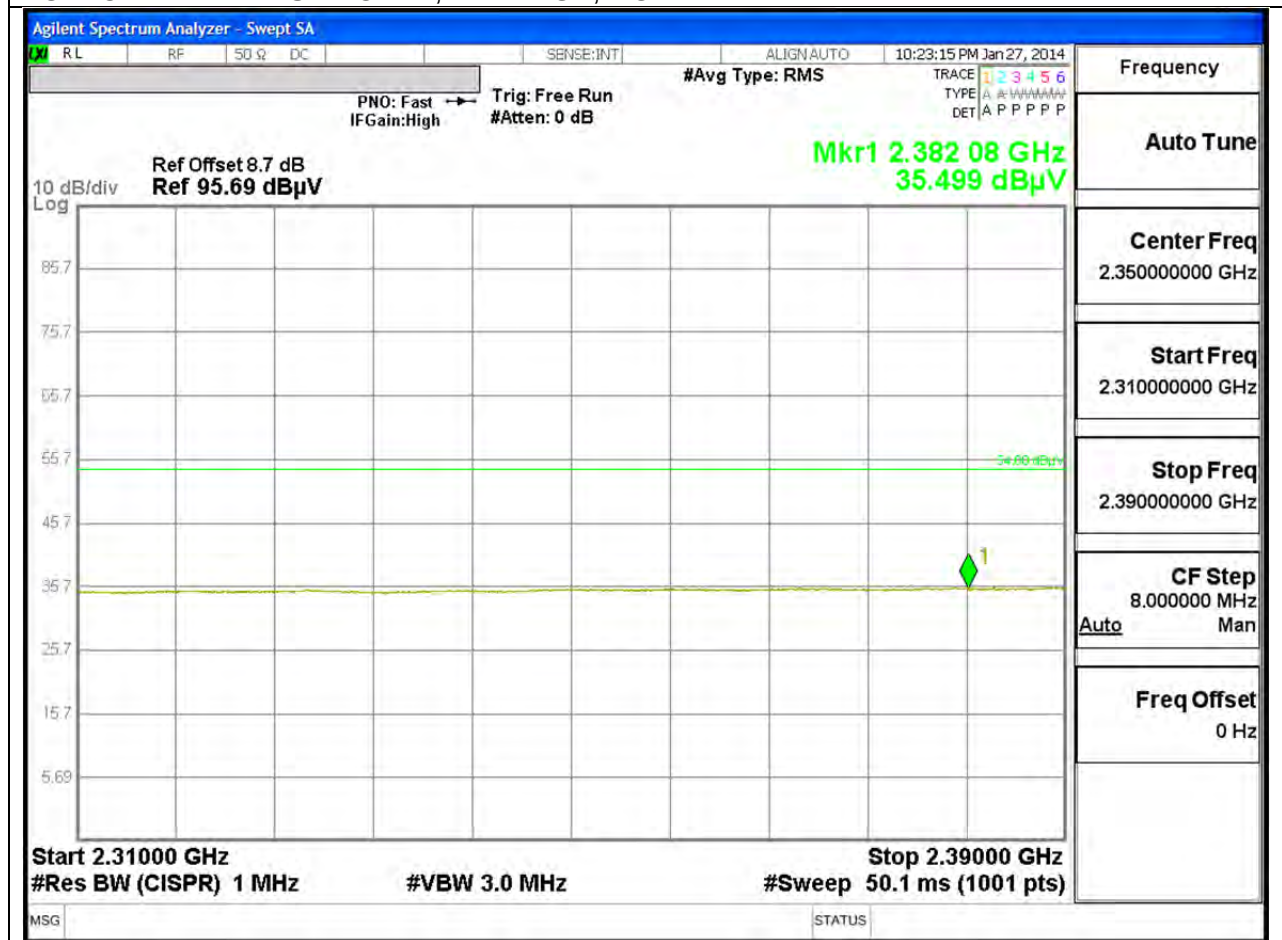
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

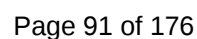
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= $10\log(1/x)$ For this sample B mode = 0dB (duty cycle >98%); G mode = 0.3dB; N mode = 0.32dB.

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

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

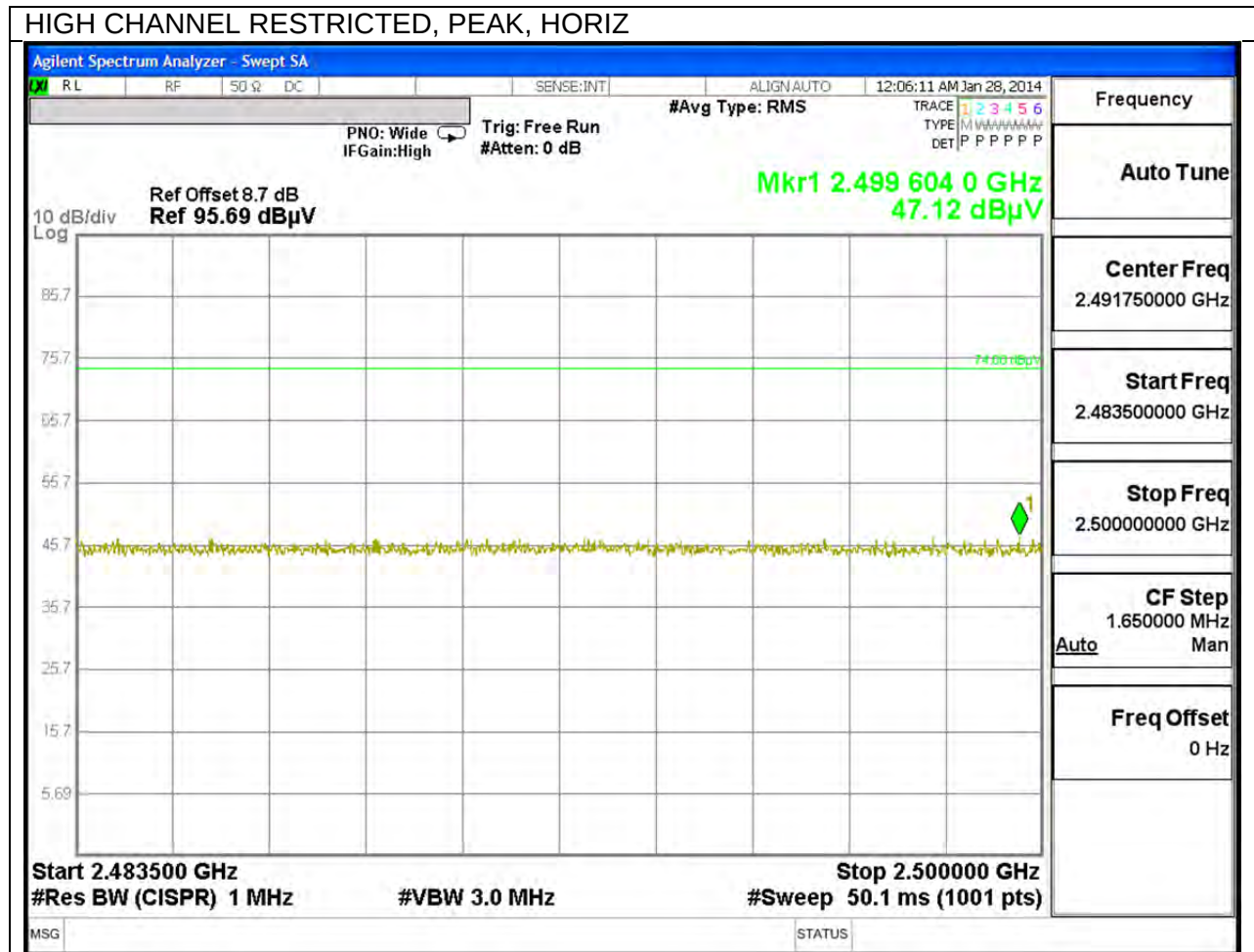
LOW CHANNEL RESTRICTED, AVERAGE, HORIZ







AUTHORIZED BANDEDGE (HIGH CHANNEL)



Agilent Spectrum Analyzer - Swept SA

RL RF SO Q DC SENSE:INT ALIGN:AUTO 10:52:15 PM Jan 27, 2014

PNO: Wide → Trig: Free Run
IFGain: High #Atten: 0 dB

#Avg Type: RMS
Avg|Hold: 100/100

Mkr1 2.491 733 5 GHz
35.821 dBμV

Ref Offset 9.3 dB
Ref 96.29 dBμV

10 dB/div
Log

Start 2.483500 GHz
#Res BW (CISPR) 1 MHz

#VBW 3.0 MHz*

Stop 2.500000 GHz
#Sweep 50.1 ms (1001 pts)

Frequency

Auto Tune

Center Freq
2.491750000 GHz

Start Freq
2.483500000 GHz

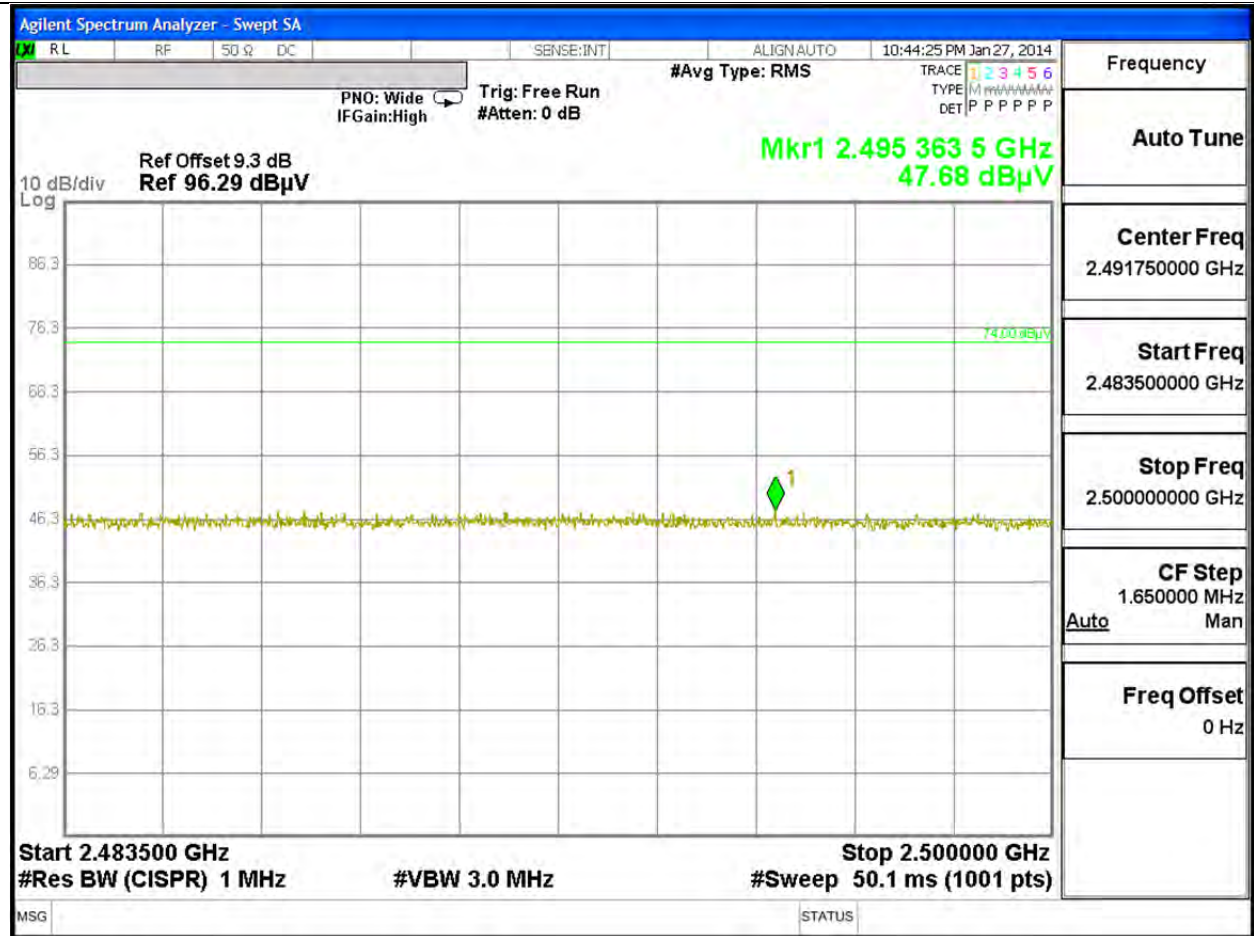
Stop Freq
2.500000000 GHz

CF Step
1.650000 MHz
Man

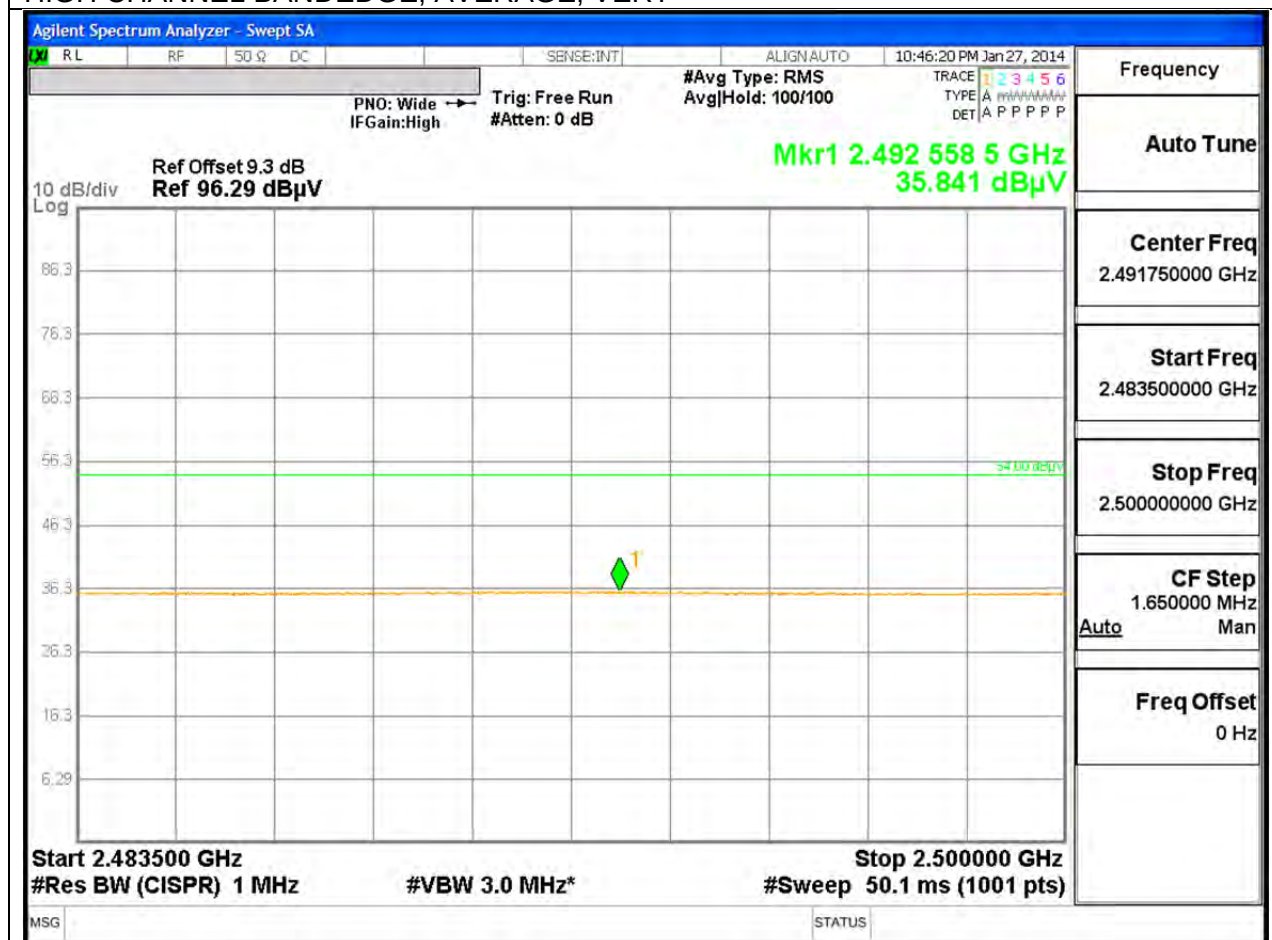
Freq Offset
0 Hz

MSG STATUS

HIGH CHANNEL BANDEDGE, PEAK, VERT

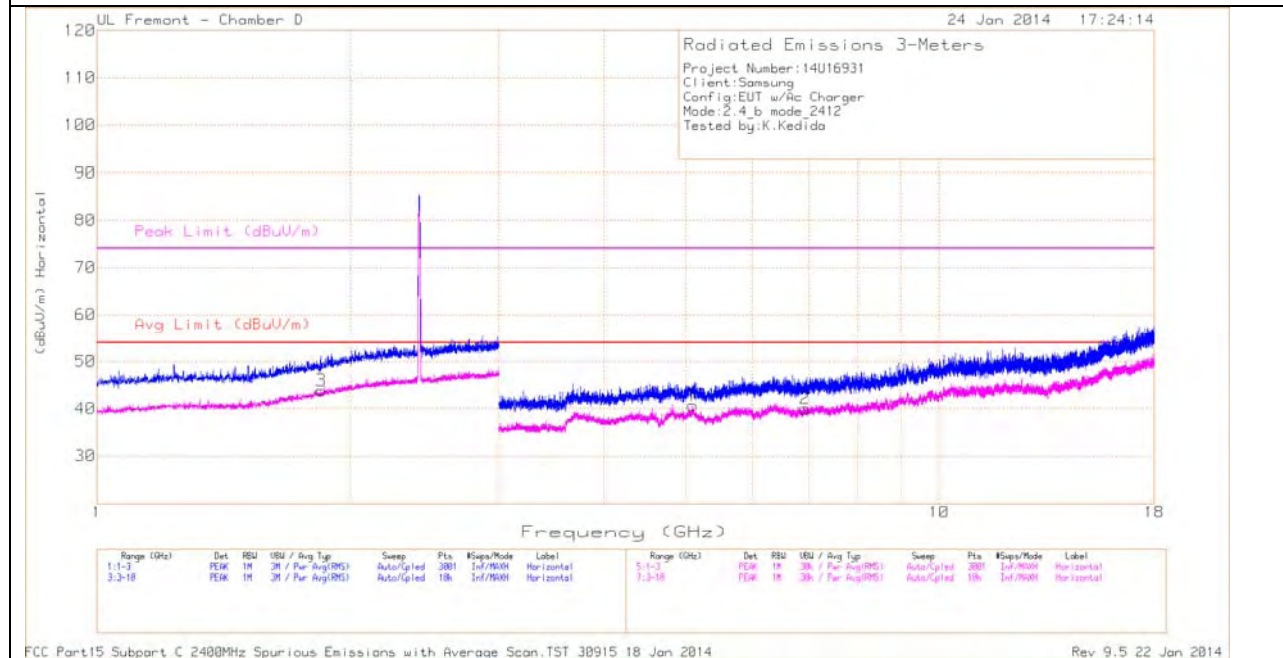


HIGH CHANNEL BANDEDGE, AVERAGE, VERT



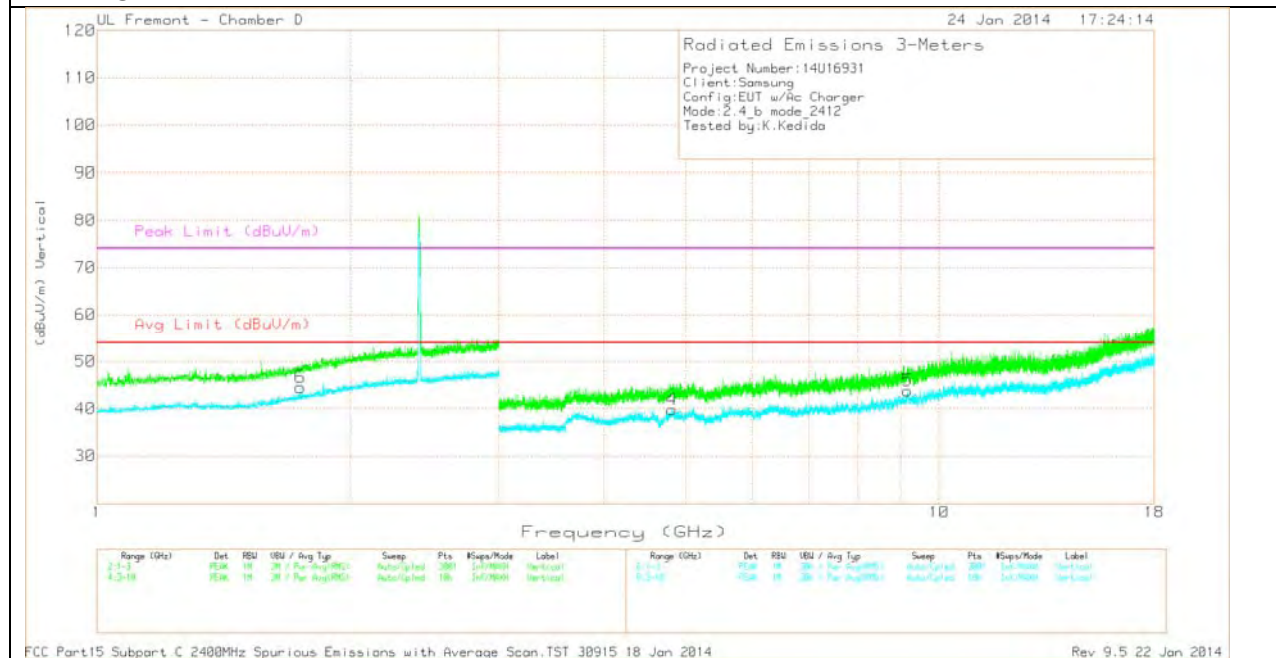
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

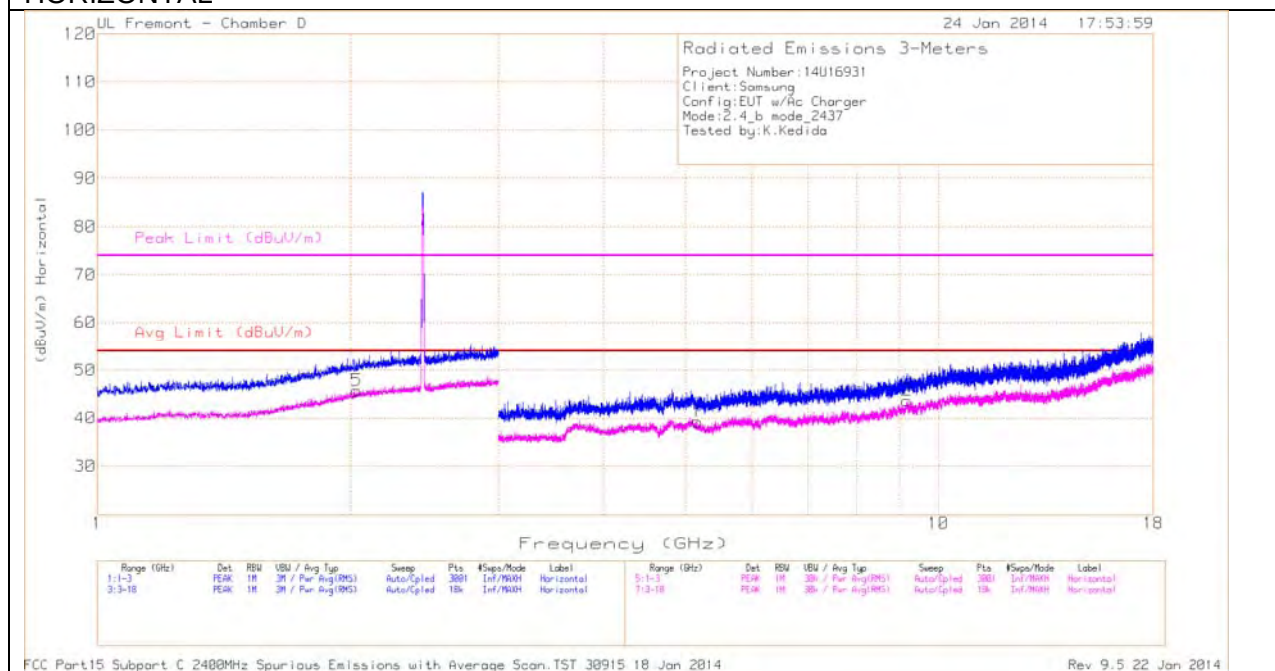
LOW CHANNEL DATA

Marker	Frequenc y (GHz)	Meter Readin g (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	1.744	35.93	Avg	30	-21.4	44.53	53.97	-9.44	-	-	0-360	201	V
3	1.845	34.46	Avg	30.6	-21.3	43.76	53.97	-10.21	-	-	0-360	201	H
4	4.817	32.17	Avg	34.4	-26.8	39.77	53.97	-14.2	-	-	0-360	100	V
1	5.097	32.18	Avg	34.5	-26	40.68	53.97	-13.29	-	-	0-360	201	H
2	6.932	29.81	Avg	35.8	-25.6	40.01	53.97	-13.96	-	-	0-360	201	H
5	9.173	28.26	Avg	36.8	-21.3	43.76	53.97	-10.21	-	-	0-360	100	V

Avg - Video bandwidth < Resolution bandwidth

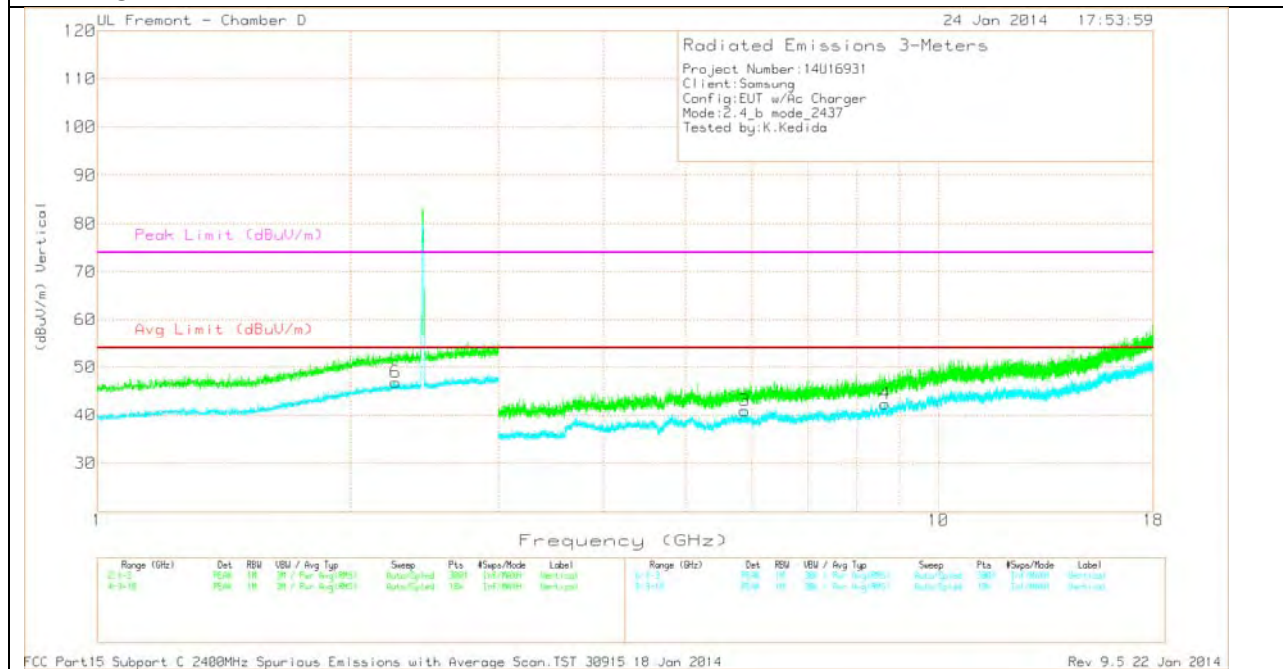
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev

MID CHANNEL HORIZONTAL



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

MID CHANNEL
VERTICAL



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

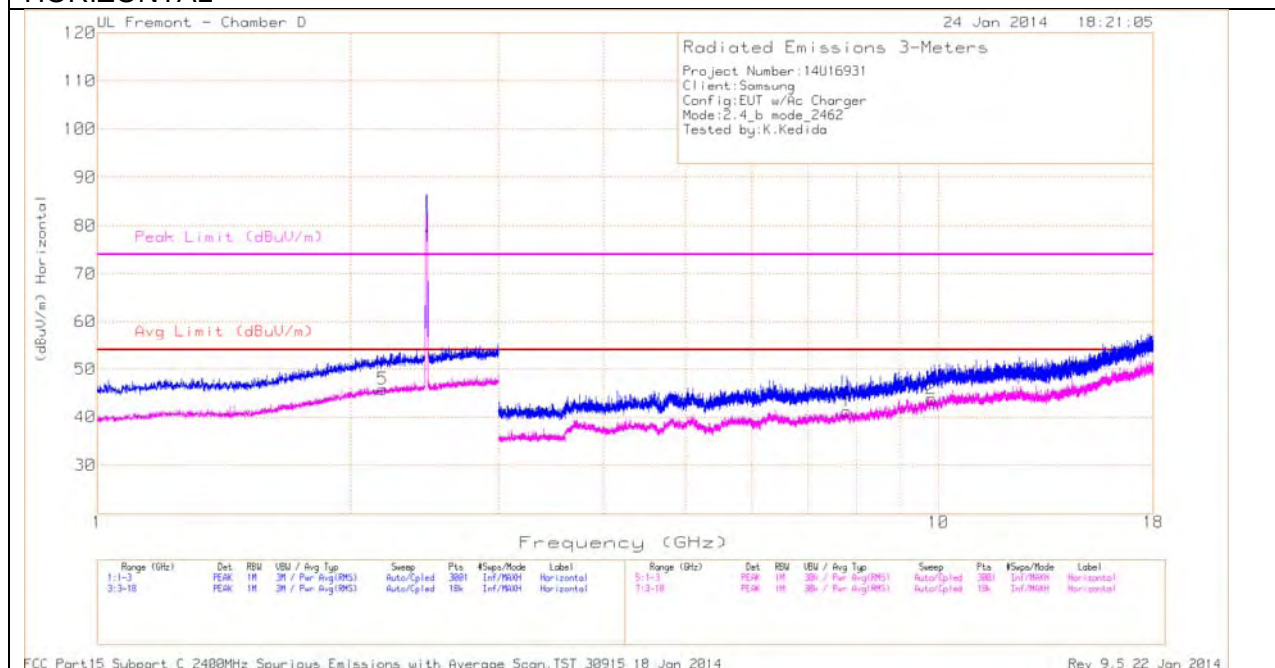
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	2.035	35	Avg	31.8	-21.1	45.7	53.97	-8.27	-	-	0-360	201	H
6	2.263	35.2	Avg	32.4	-20.8	46.8	53.97	-7.17	-	-	0-360	201	V
1	5.17	31.97	Avg	34.6	-27.3	39.27	53.97	-14.7	-	-	0-360	100	H
3	5.884	31.89	Avg	35.5	-26.5	40.89	53.97	-13.08	-	-	0-360	201	V
4	8.646	28.21	Avg	36.3	-22.2	42.31	53.97	-11.66	-	-	0-360	100	V
2	9.178	28.15	Avg	36.8	-21.3	43.65	53.97	-10.32	-	-	0-360	100	H

Avg - Video bandwidth < Resolution bandwidth

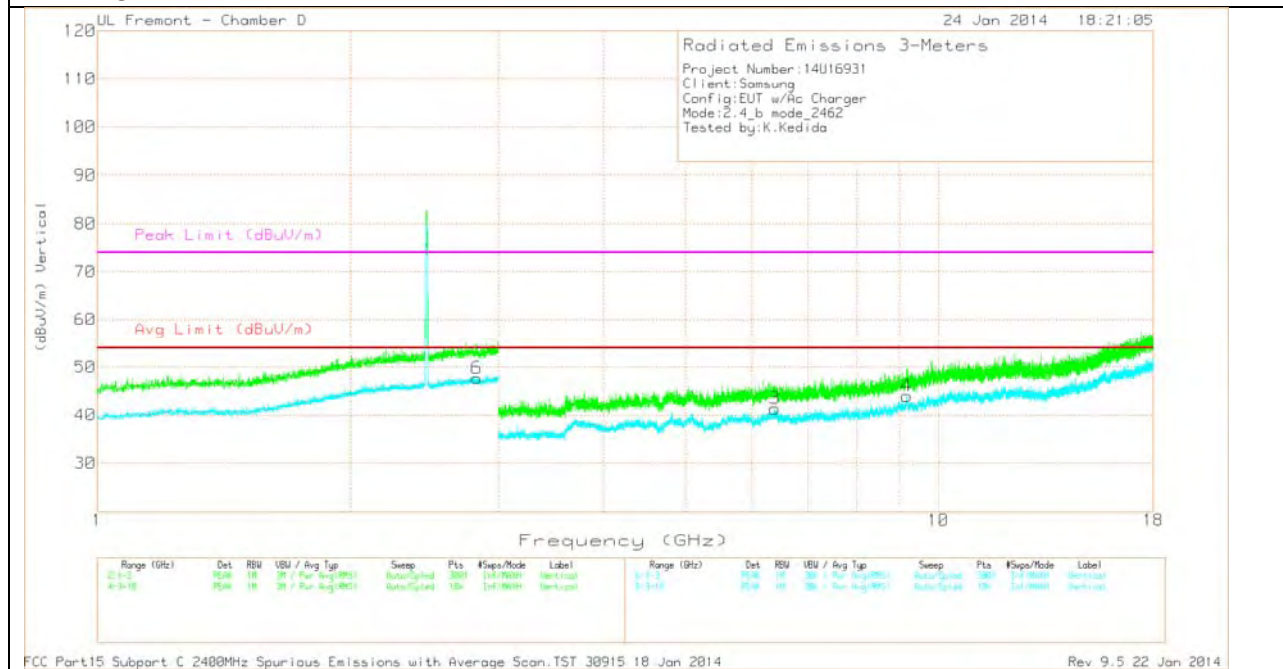
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

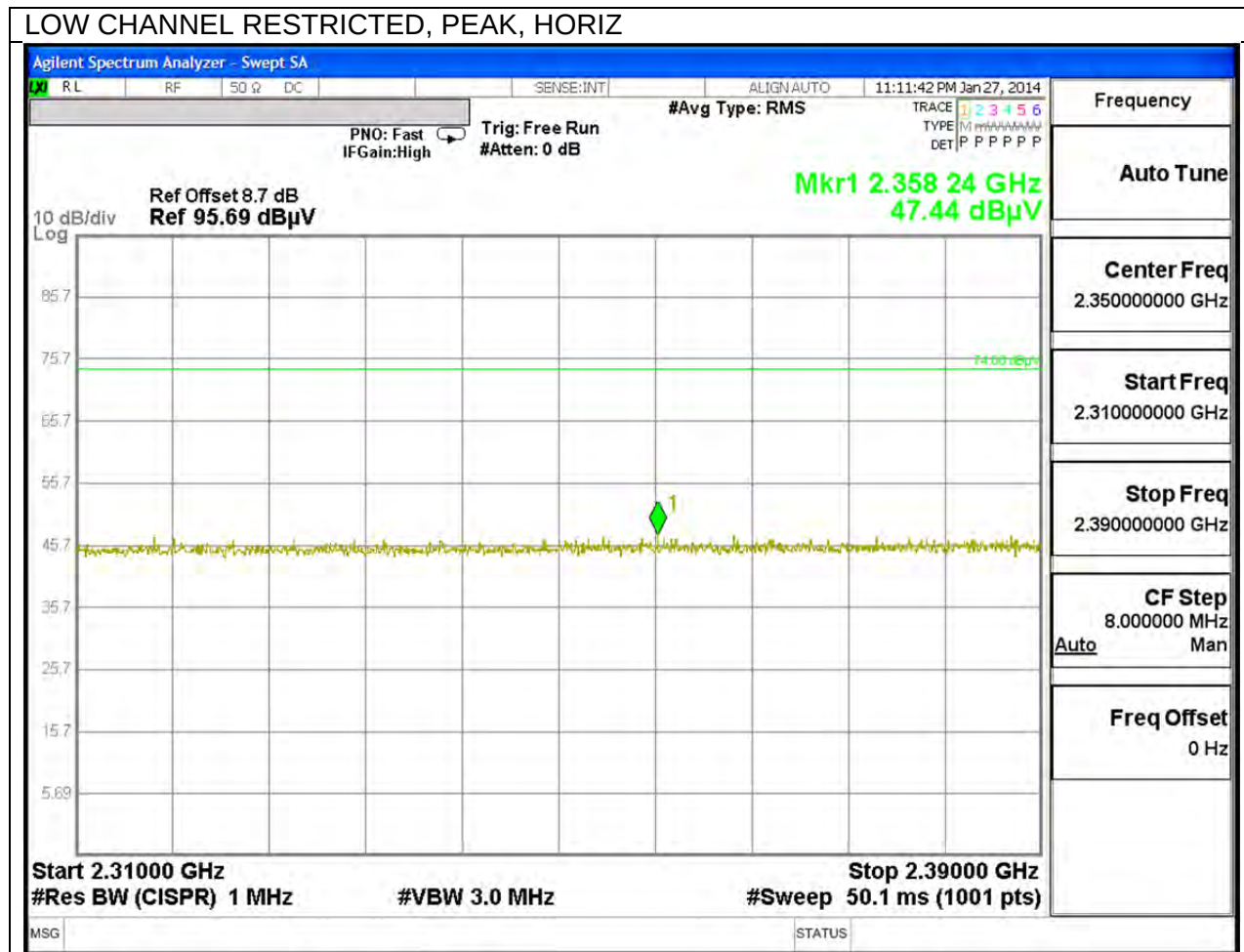
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 2.826	34.47	Avg	33	-19.8	47.67	53.97	-6.3	-	-	0-360	201	V
4	* 9.171	28.45	Avg	36.8	-21.3	43.95	53.97	-10.02	-	-	0-360	100	V
5	2.185	34.4	Avg	32.2	-20.8	45.8	53.97	-8.17	-	-	0-360	100	H
3	6.395	31.55	Avg	35.9	-26.1	41.35	53.97	-12.62	-	-	0-360	201	V
1	7.785	29.31	Avg	36.1	-24.2	41.21	53.97	-12.76	-	-	0-360	100	H
2	9.811	27.91	Avg	37.5	-21.6	43.81	53.97	-10.16	-	-	0-360	201	H

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

Avg - Video bandwidth < Resolution bandwidth

FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

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



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN:AUTO 11:25:35 PM Jan 27, 2014

PNO: Fast Trg: Free Run
IFGain: High #Atten: 0 dB

#Avg Type: RMS Avg|Hold: 100/100

Mkr1 2.380 64 GHz
35.827 dBμV

Ref Offset 9 dB
Ref 95.99 dBμV

10 dB/div Log

Start 2.31000 GHz Stop 2.39000 GHz
#Res BW (CISPR) 1 MHz #VBW 3.0 MHz* #Sweep 50.1 ms (1001 pts)

Frequency	
Auto Tune	
Center Freq	2.350000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.390000000 GHz
CF Step	8.000000 MHz
Auto	Man
Freq Offset	0 Hz

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN: AUTO 11:20:57 PM Jan 27, 2014

PNO: Fast IF Gain: High Trig: Free Run #Atten: 0 dB #Avg Type: RMS AvgHold: > 1/1

TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P P P P P P

Ref Offset 8.7 dB Ref 95.69 dB μ V

Mkr1 2.389 20 GHz 47.684 dB μ V

10 dB/div Log

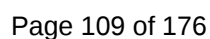
85.7 75.7 65.7 55.7 45.7 35.7 25.7 15.7 5.69

74.60 dB μ V

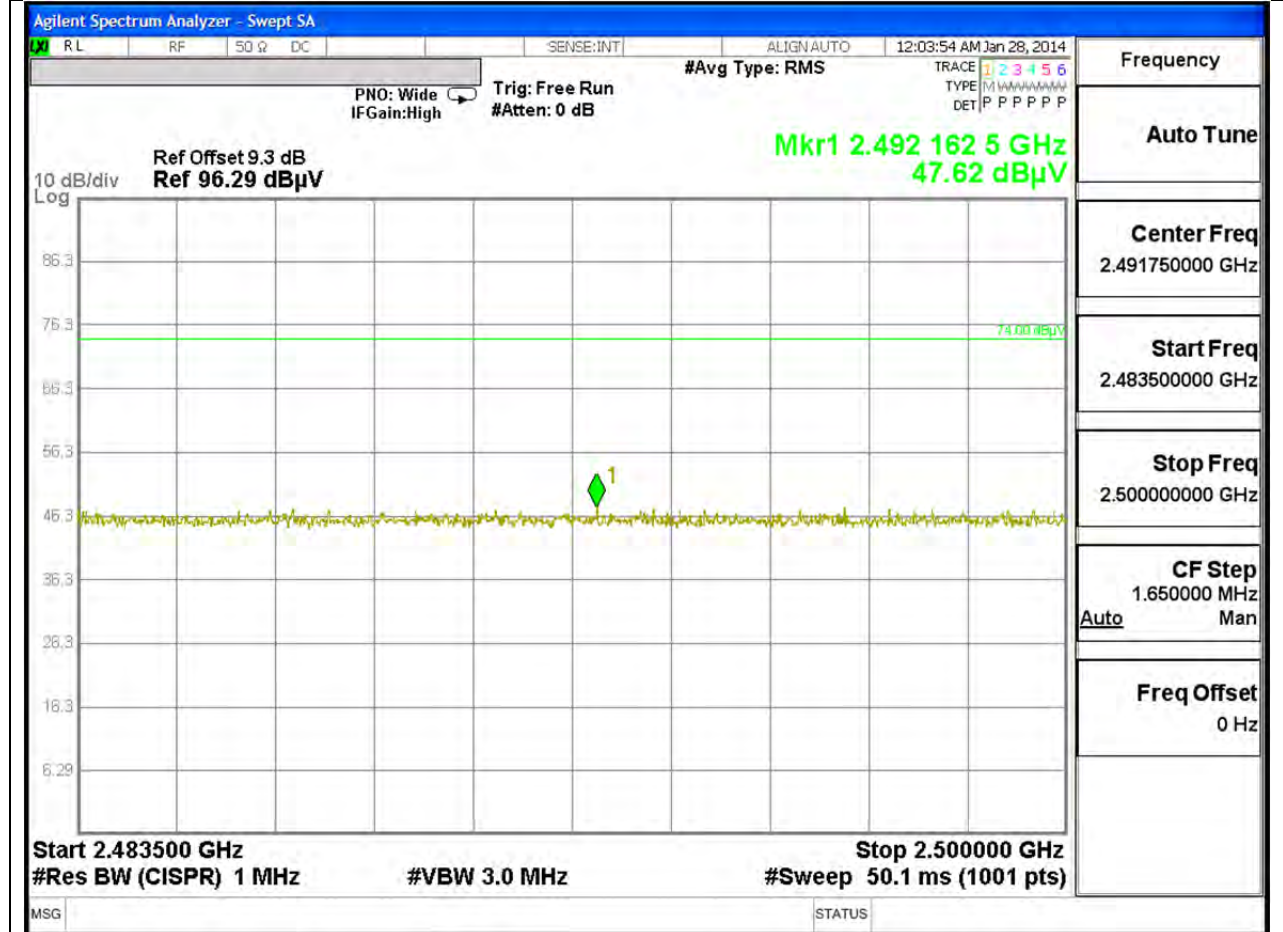
Start 2.31000 GHz #Res BW (CISPR) 1 MHz #VBW 3.0 MHz Stop 2.39000 GHz #Sweep 50.1 ms (1001 pts)

Frequency Auto Tune Center Freq 2.350000000 GHz Start Freq 2.310000000 GHz Stop Freq 2.390000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz

MSG STATUS



HIGH CHANNEL RESTRICTED, PEAK, HORIZ



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SBVSE:INT ALIGN: AUTO 11:58:04 PM Jan 27, 2014

PN0: Wide → Trg: Free Run
IFGain: High #Atten: 0 dB

#Avg Type: RMS
Avg/Hold: 100/100

TRACE 1 2 3 4 5 6
TYPE A
DET A P P P P P

Ref Offset 9.6 dB
Ref 96.59 dBμV

Mkr1 2.491 733 5 GHz
36.054 dBμV

10 dB/div
Log

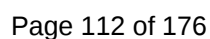
Start 2.483500 GHz
#Res BW (CISPR) 1 MHz

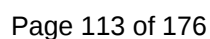
#VBW 3.0 MHz*

Stop 2.500000 GHz
#Sweep 50.1 ms (1001 pts)

MSG STATUS

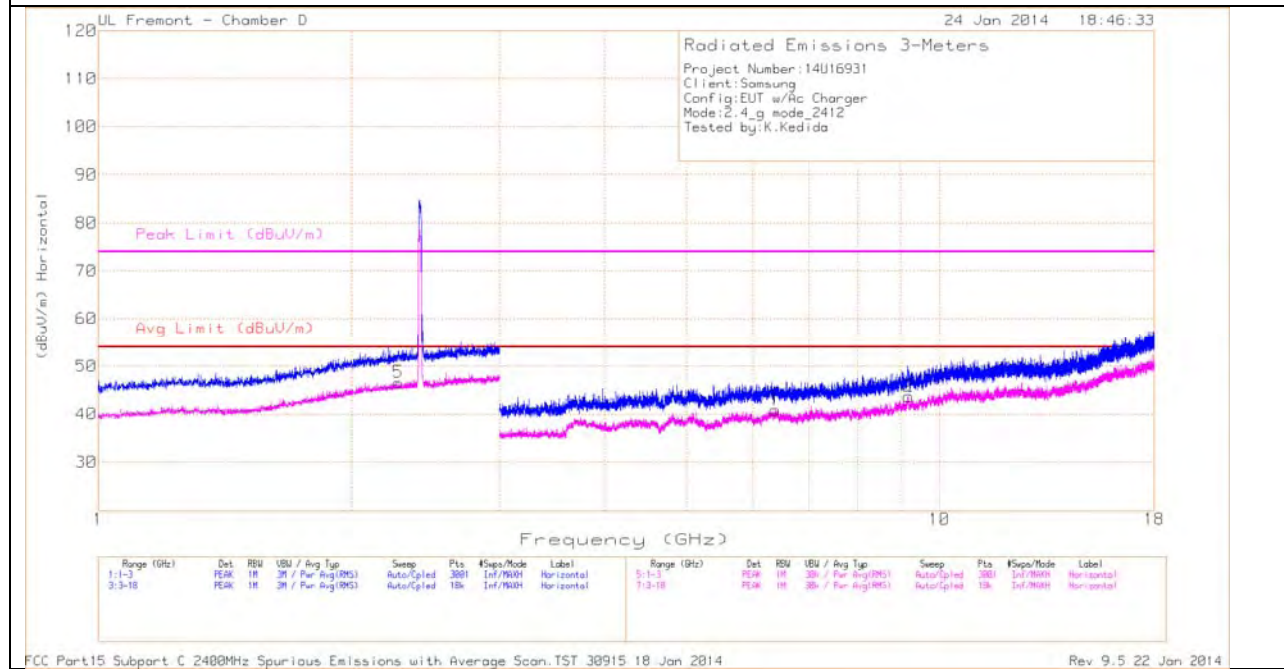
Start	Stop	Freq Offset
2.483500000 GHz	2.500000000 GHz	0 Hz





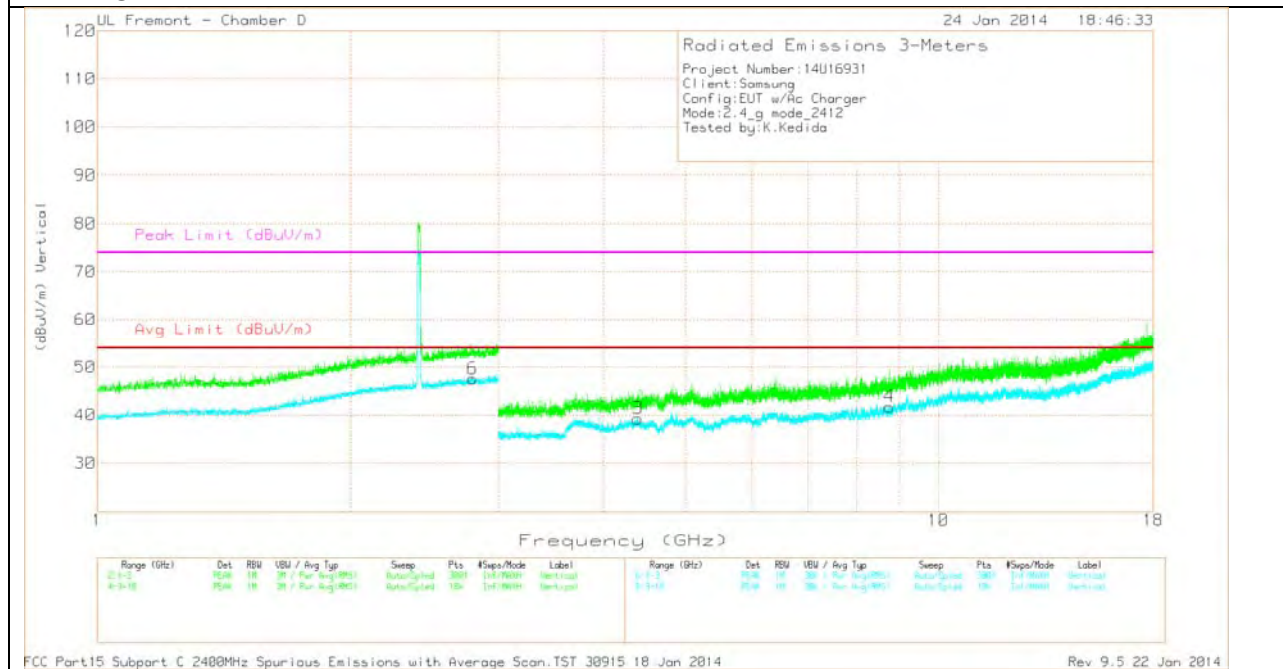
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

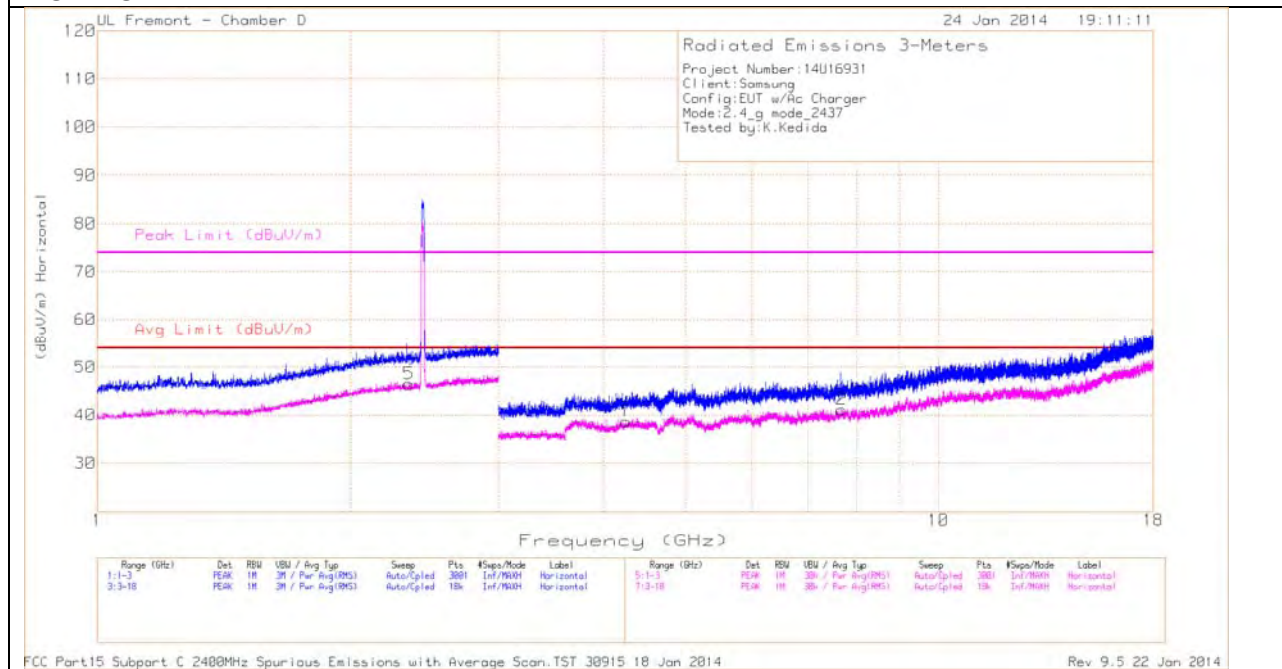
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 2.274	34.84	Avg	32.4	-20.7	46.54	53.97	-7.43	-	-	0-360	100	H
6	* 2.795	34.64	Avg	32.9	-20	47.54	53.97	-6.43	-	-	0-360	100	V
2	* 9.188	27.98	Avg	36.9	-21.2	43.68	53.97	-10.29	-	-	0-360	201	H
3	* 4.391	33.09	Avg	34.1	-27.9	39.29	53.97	-14.68	-	-	0-360	201	V
1	6.38	31.13	Avg	35.9	-26.2	40.83	53.97	-13.14	-	-	0-360	100	H
4	8.743	28.81	Avg	36.4	-23.5	41.71	53.97	-12.26	-	-	0-360	100	V

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

Avg - Video bandwidth < Resolution bandwidth

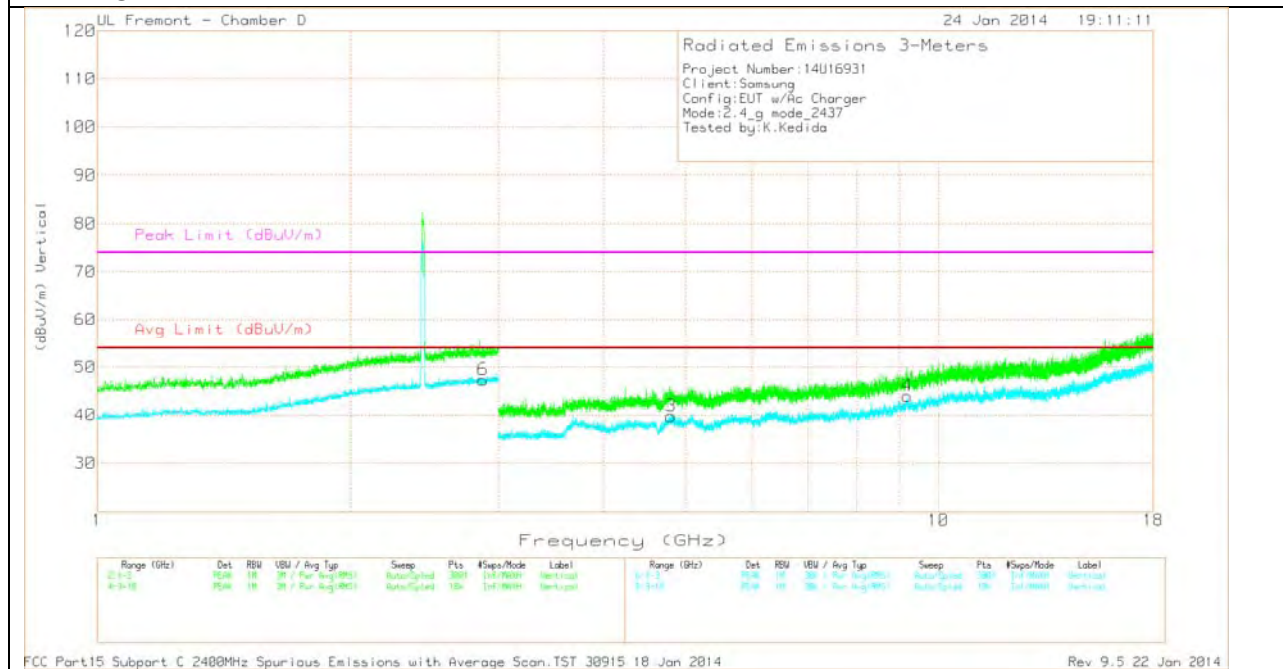
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
2014 Rev 9.5 22 Jan 2014

MID CHANNEL
HORIZONTAL



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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

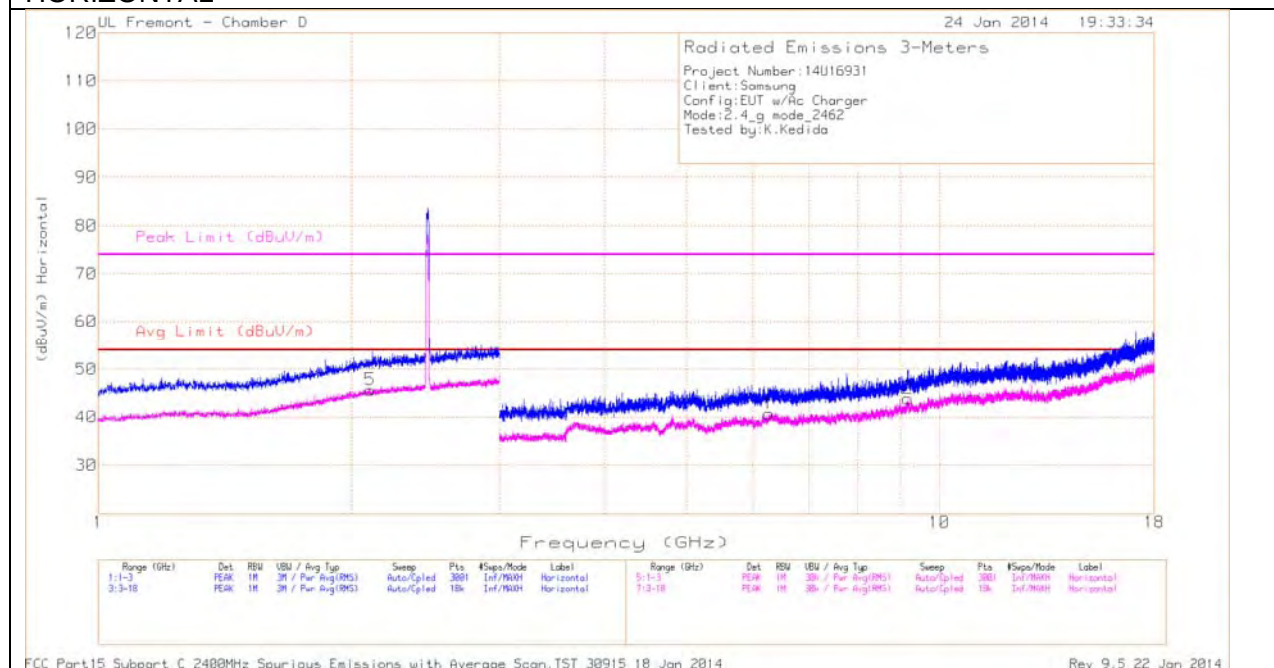
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degr)	Height (cm)	Polarity
5	* 2.347	34.88	Avg	32.4	-20.8	46.48	53.97	-7.49	-	-	0-360	100	H
6	* 2.877	34.41	Avg	33	-20.1	47.31	53.97	-6.66	-	-	0-360	201	V
1	* 4.249	32.68	Avg	33.9	-27.9	38.68	53.97	-15.29	-	-	0-360	100	H
2	* 7.675	30.07	Avg	36	-24.9	41.17	53.97	-12.8	-	-	0-360	100	H
3	* 4.814	32.17	Avg	34.4	-26.8	39.77	53.97	-14.2	-	-	0-360	100	V
4	* 9.184	28.37	Avg	36.8	-21.2	43.97	53.97	-10	-	-	0-360	100	V

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

Avg - Video bandwidth < Resolution bandwidth

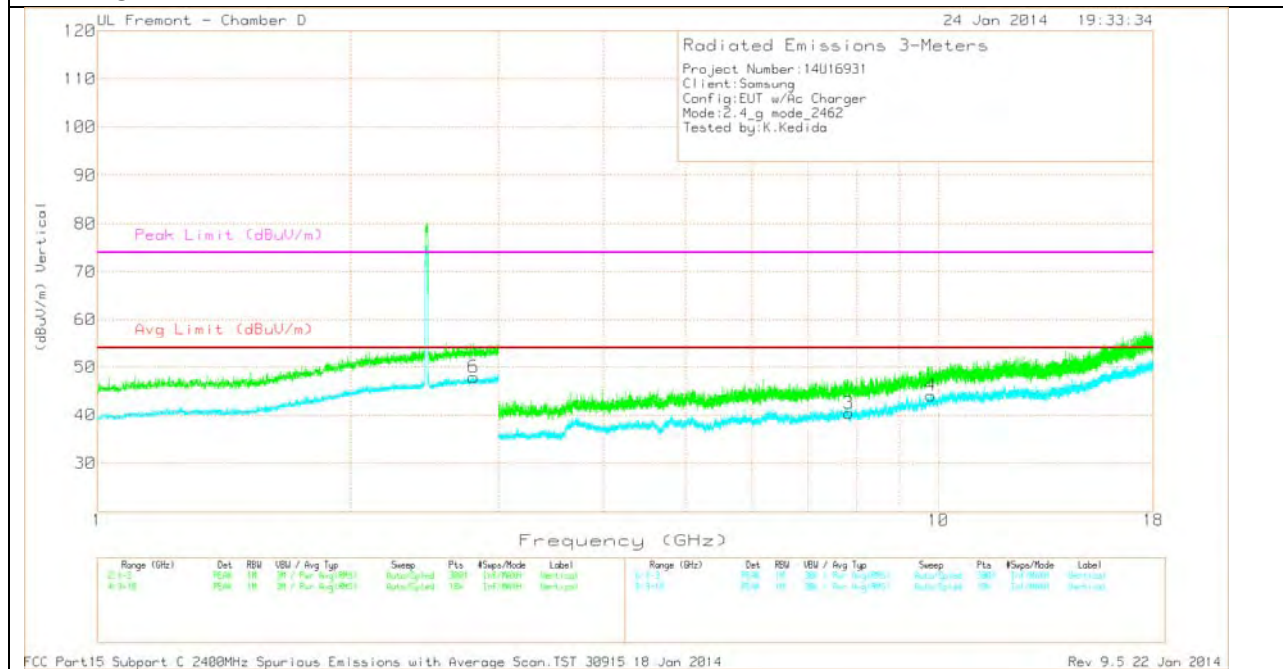
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL
HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

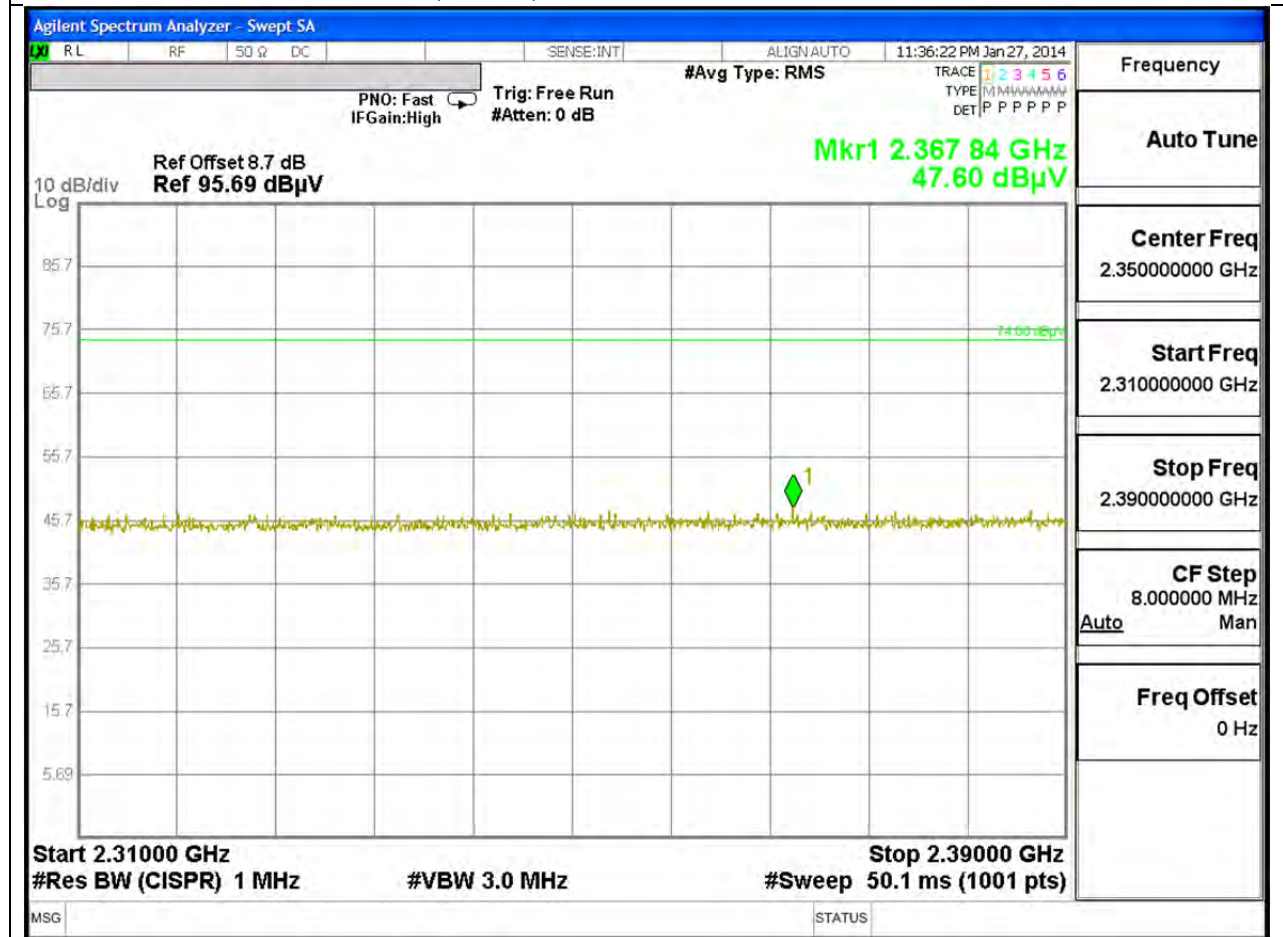
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 2.802	35.08	Avg	32.9	-20.1	47.88	53.97	-6.09	-	-	0-360	201	V
2	* 9.175	28.34	Avg	36.8	-21.3	43.84	53.97	-10.13	-	-	0-360	100	H
5	2.106	34.61	Avg	32	-21	45.61	53.97	-8.36	-	-	0-360	100	H
1	6.271	30.89	Avg	36	-26.2	40.69	53.97	-13.28	-	-	0-360	201	H
3	7.824	28.36	Avg	36.1	-24.1	40.36	53.97	-13.61	-	-	0-360	201	V
4	9.795	27.94	Avg	37.5	-21.4	44.04	53.97	-9.93	-	-	0-360	100	V

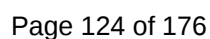
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

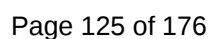
Avg - Video bandwidth < Resolution bandwidth

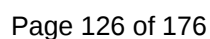
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
2014 Rev 9.5 22 Jan 2014

LOW CHANNEL RESTRICTED, PEAK, HORIZ

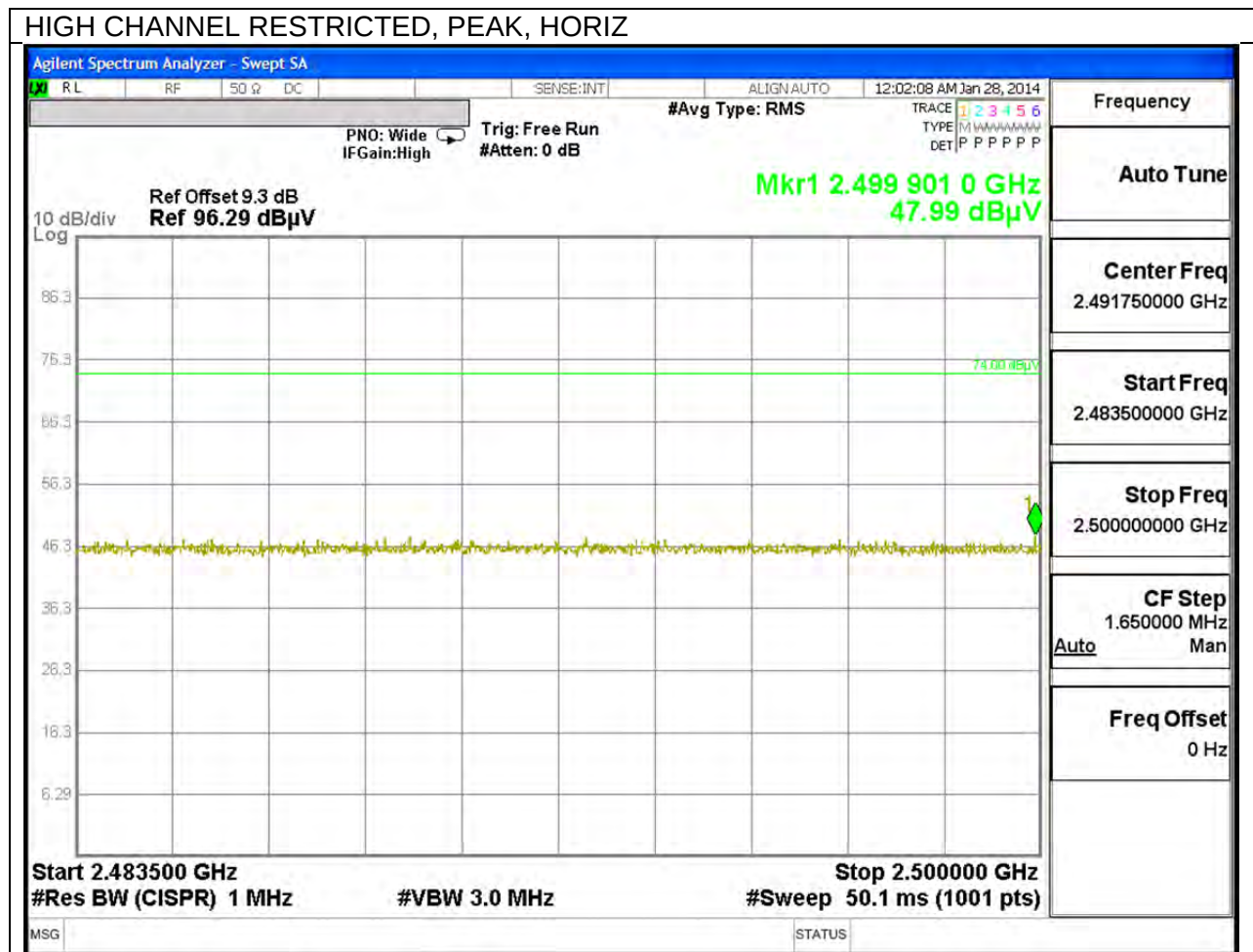




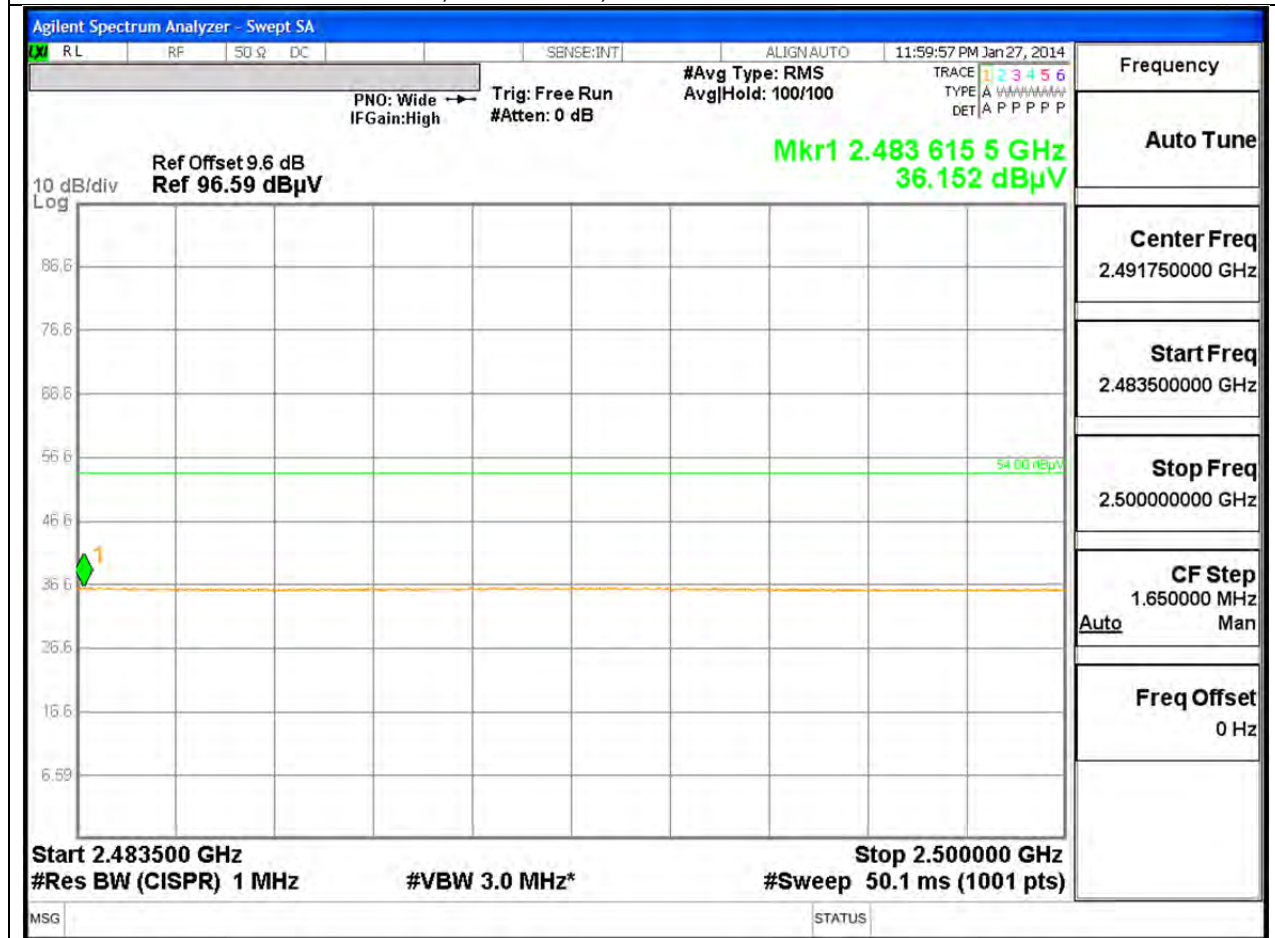




AUTHORIZED BANDEDGE (HIGH CHANNEL)



HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN: AUTO 12:19:23 AM Jan 28, 2014

#Avg Type: RMS

TRACE 1 2 3 4 5 6
TYPE M M M M M M M M
DET P P P P P P

PNO: Wide IF Gain: High Trig: Free Run #Atten: 0 dB

Ref Offset 9.3 dB Ref 96.29 dBμV

Mkr1 2.490 859 0 GHz 47.666 dBμV

10 dB/div Log

86.3
76.3
66.3
56.3
46.3
36.3
26.3
16.3
6.29

74.00 dBμV

1

Start 2.483500 GHz #Res BW (CISPR) 1 MHz #VBW 3.0 MHz Stop 2.500000 GHz #Sweep 50.1 ms (1001 pts)

MSG STATUS

Frequency

Auto Tune

Center Freq 2.491750000 GHz

Start Freq 2.483500000 GHz

Stop Freq 2.500000000 GHz

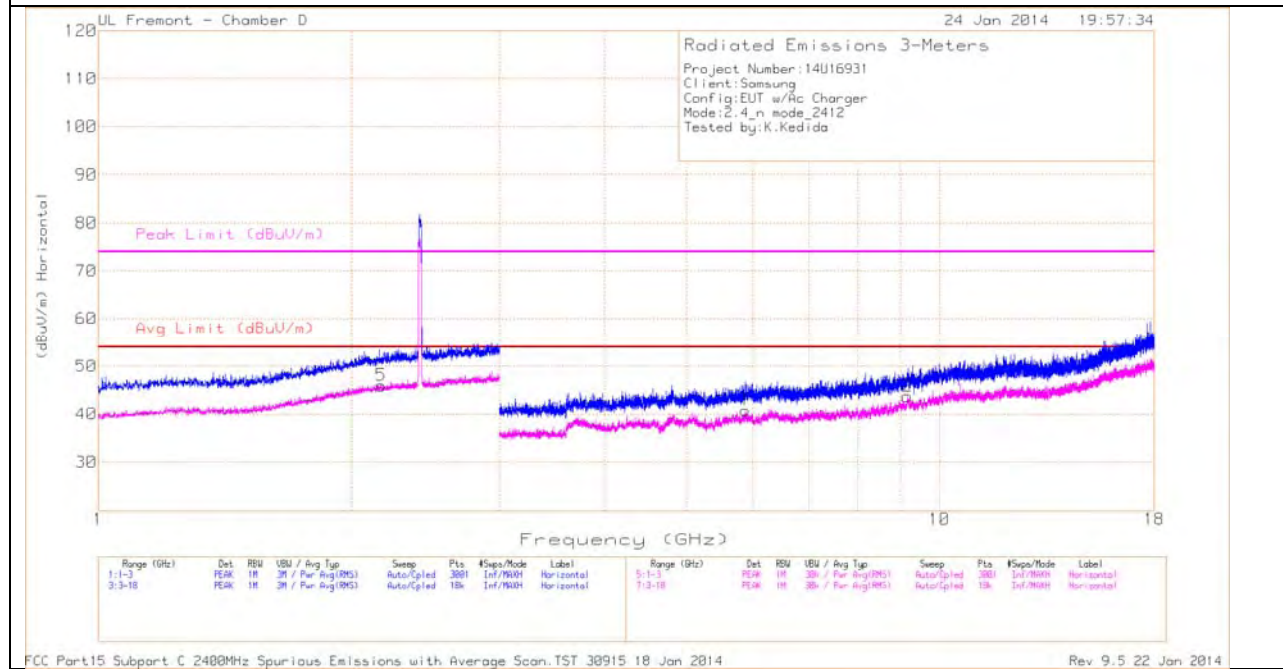
CF Step 1.650000 MHz Auto Man

Freq Offset 0 Hz

[illegible]

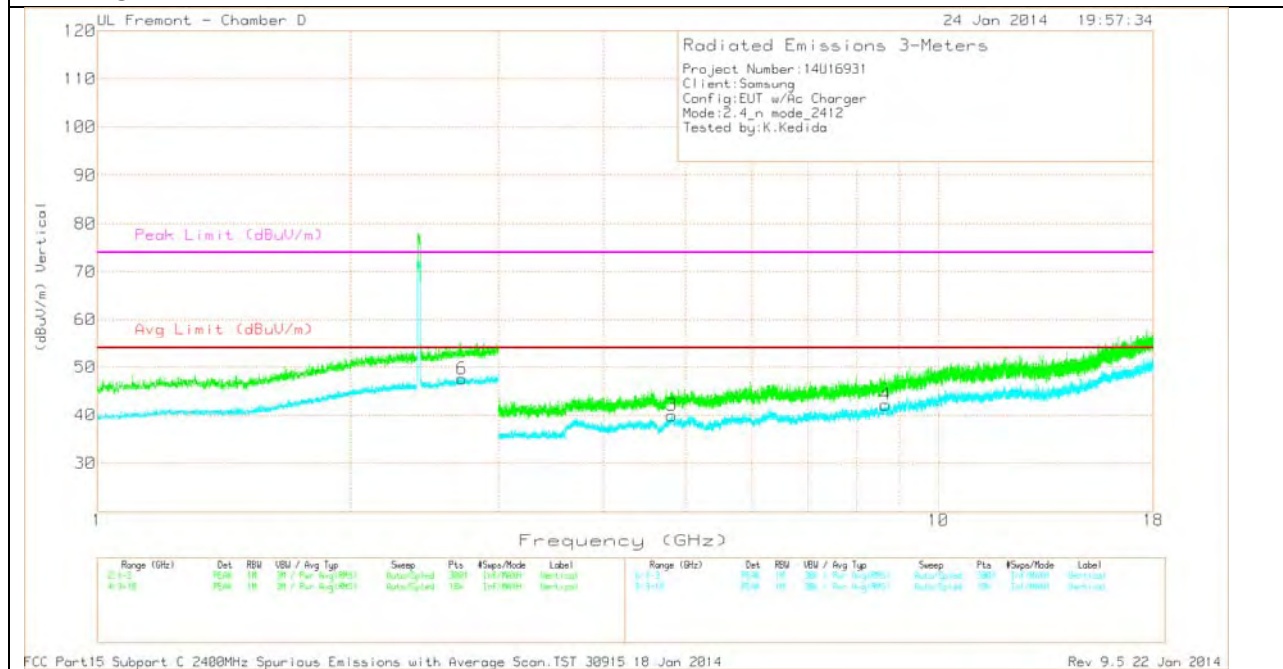
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

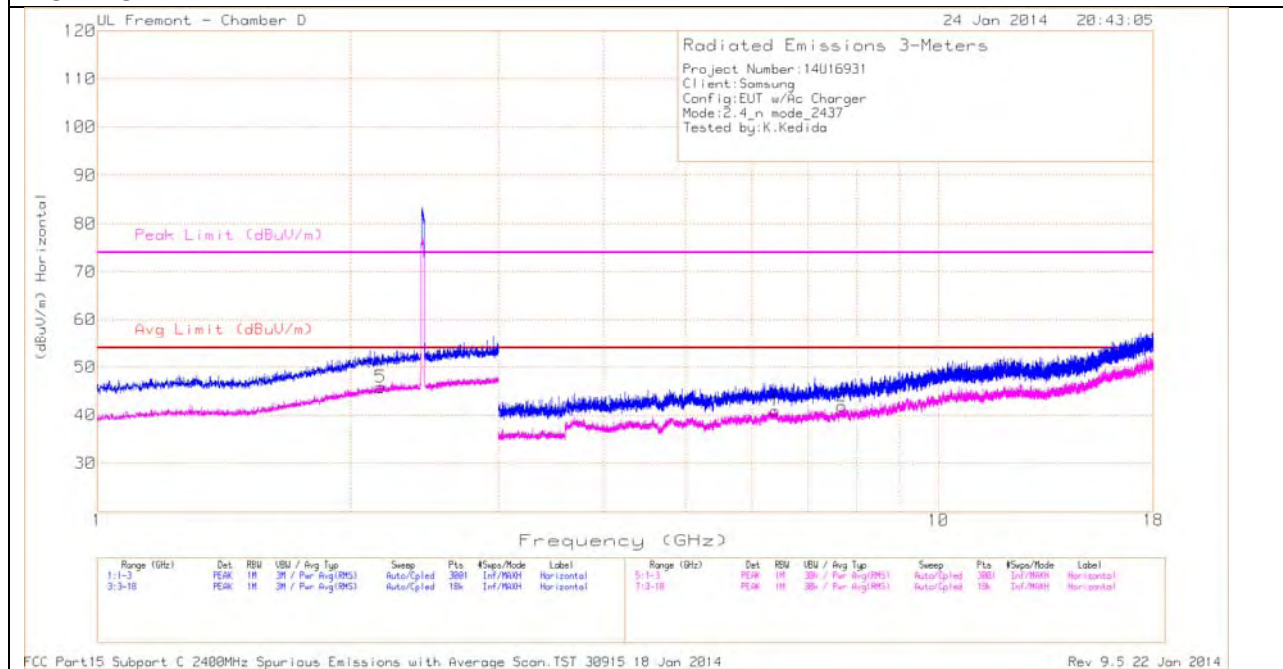
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 2.715	35.14	Avg	32.8	-20.4	47.54	53.97	-6.43	-	-	0-360	100	V
2	* 9.158	28.92	Avg	36.8	-22	43.72	53.97	-10.25	-	-	0-360	201	H
3	* 4.822	32.23	Avg	34.4	-26.7	39.93	53.97	-14.04	-	-	0-360	100	V
5	2.17	34.54	Avg	32.2	-20.8	45.94	53.97	-8.03	-	-	0-360	100	H
1	5.88	31.86	Avg	35.5	-26.6	40.76	53.97	-13.21	-	-	0-360	100	H
4	8.651	28.03	Avg	36.3	-22.2	42.13	53.97	-11.84	-	-	0-360	201	V

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

Avg - Video bandwidth < Resolution bandwidth

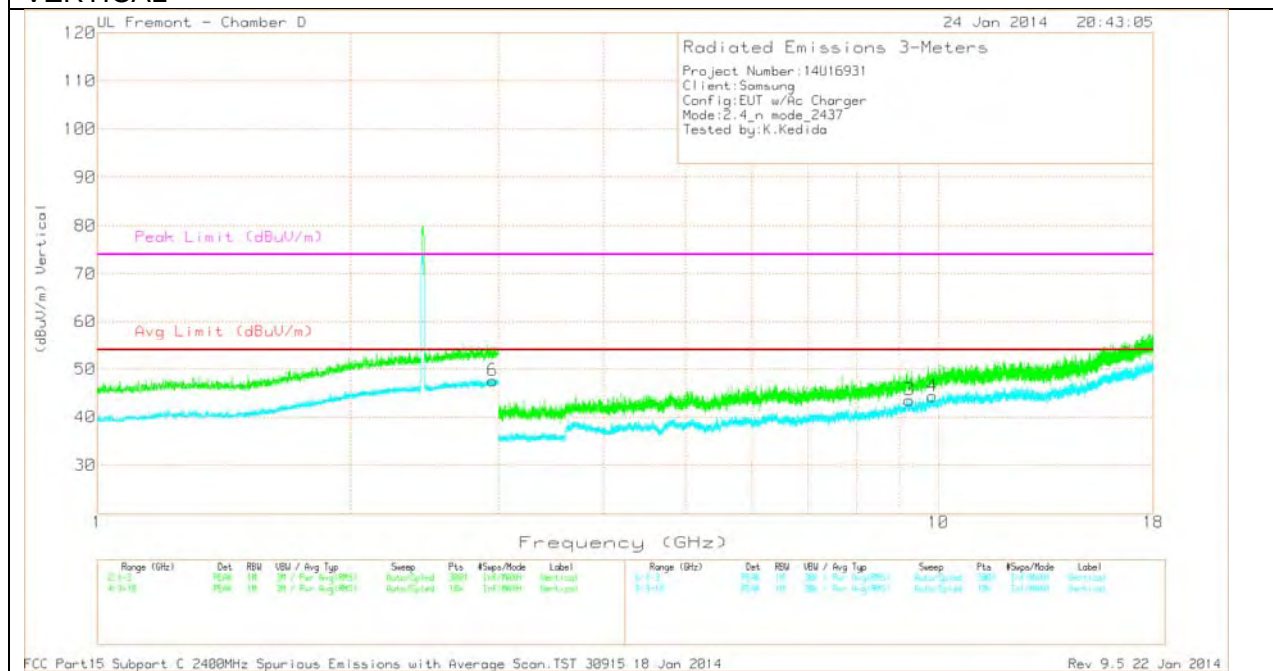
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
2014 Rev 9.5 22 Jan 2014

MID CHANNEL
HORIZONTAL



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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

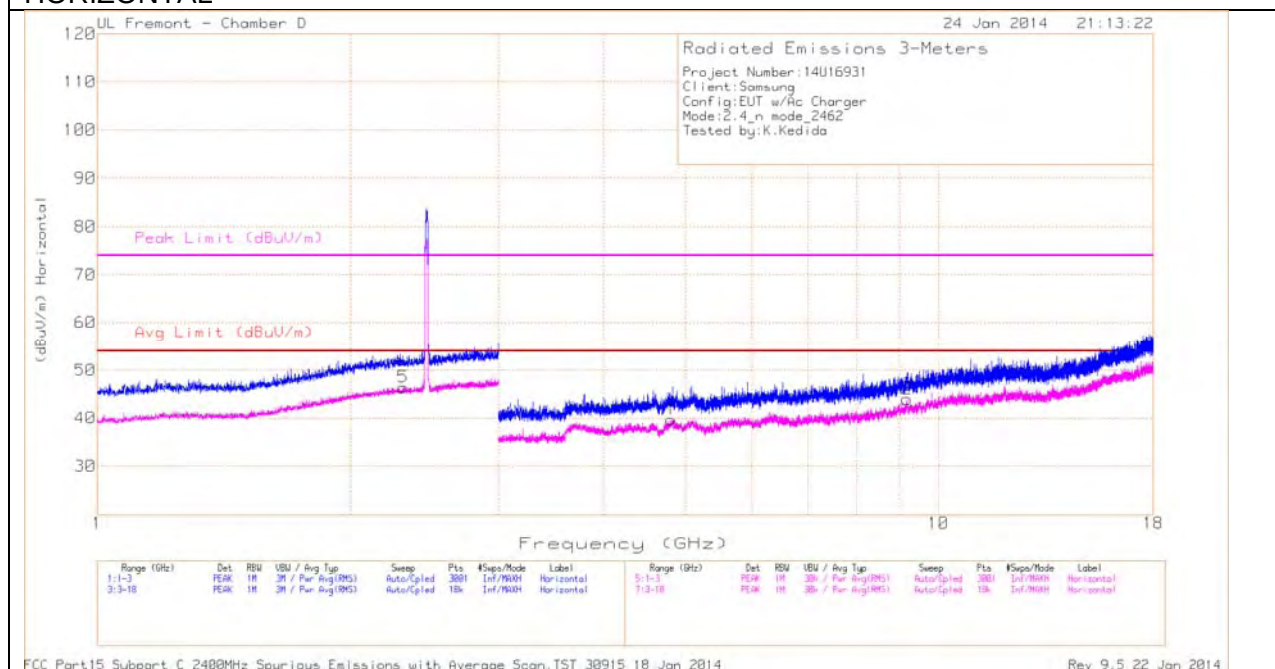
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 7.676	30.78	Avg	36	-24.9	41.88	53.97	-12.09	-	-	0-360	201	H
5	2.173	34.42	Avg	32.2	-20.8	45.82	53.97	-8.15	-	-	0-360	201	H
6	2.954	34.47	Avg	33.1	-20	47.57	53.97	-6.4	-	-	0-360	201	V
1	6.398	31.11	Avg	35.9	-26.1	40.91	53.97	-13.06	-	-	0-360	201	H
3	9.24	27.94	Avg	36.9	-21.3	43.54	53.97	-10.43	-	-	0-360	201	V
4	9.837	27.75	Avg	37.6	-21	44.35	53.97	-9.62	-	-	0-360	201	V

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

Avg - Video bandwidth < Resolution bandwidth

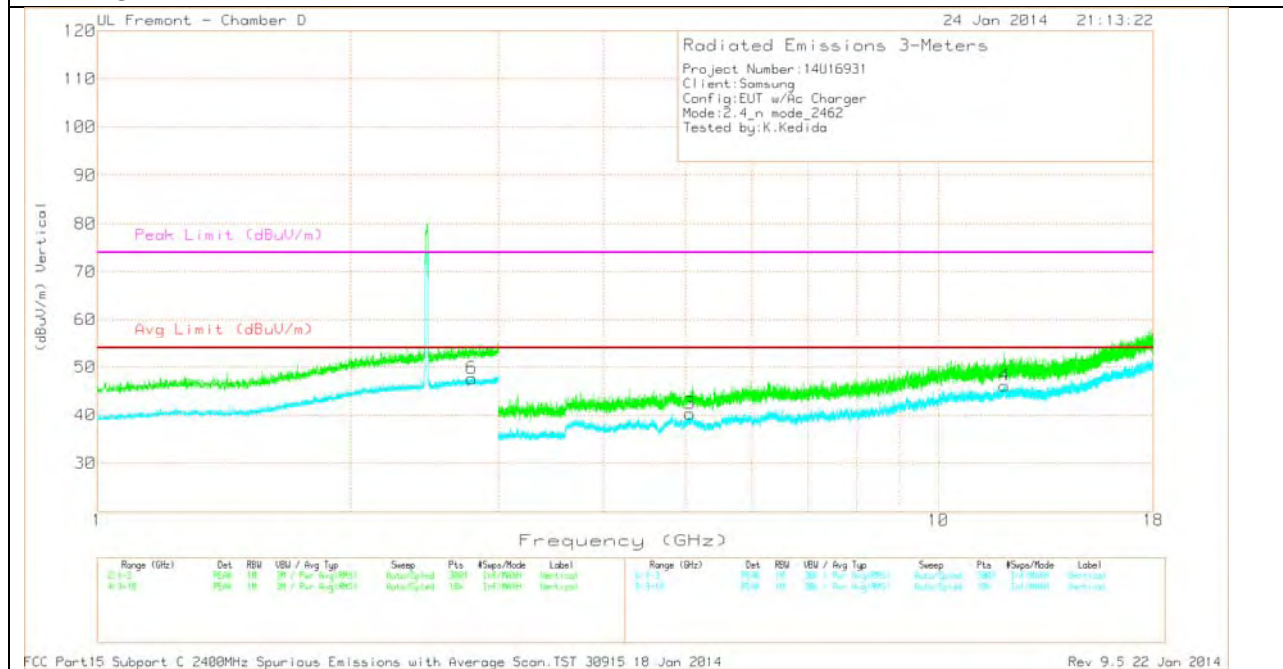
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL HORIZONTAL



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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.

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 2.311	34.68	Avg	32.4	-20.7	46.38	53.97	-7.59	-	-	0-360	100	H
6	* 2.787	34.65	Avg	32.9	-19.9	47.65	53.97	-6.32	-	-	0-360	201	V
1	* 4.812	32.22	Avg	34.4	-26.9	39.72	53.97	-14.25	-	-	0-360	201	H
2	* 9.179	28.48	Avg	36.8	-21.3	43.98	53.97	-9.99	-	-	0-360	100	H
3	* 5.065	32.42	Avg	34.4	-26.5	40.32	53.97	-13.65	-	-	0-360	201	V
4	* 11.978	27.62	Avg	39.2	-20.7	46.12	53.97	-7.85	-	-	0-360	100	V

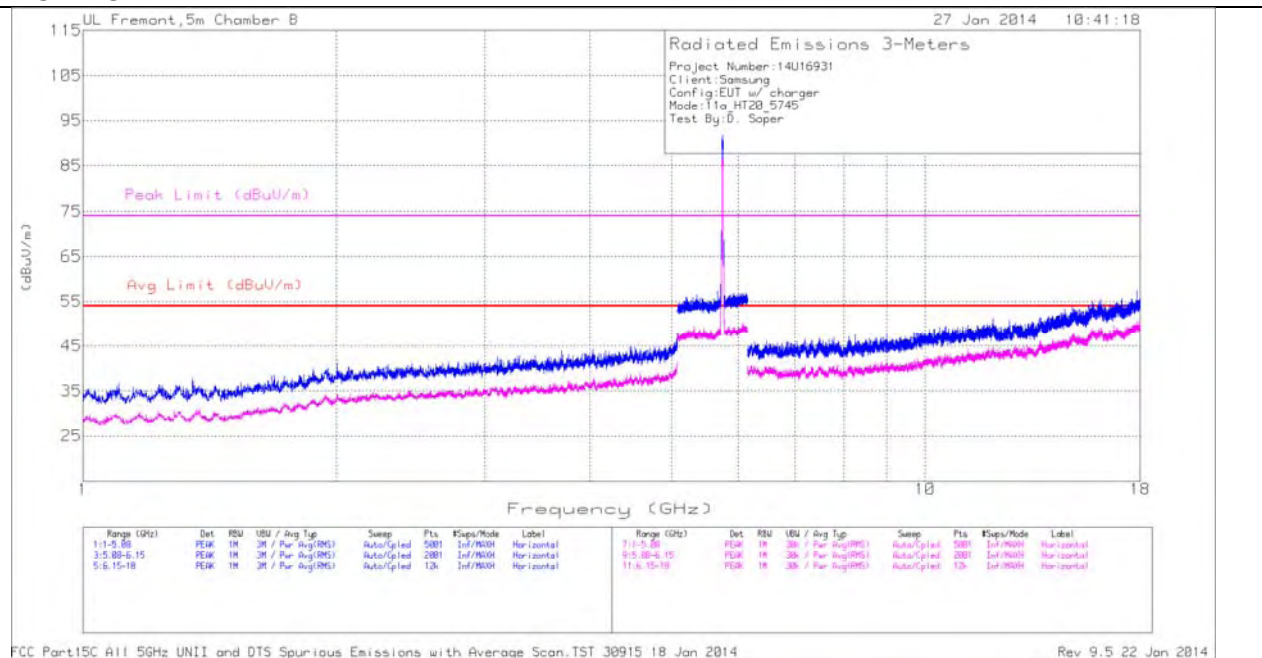
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

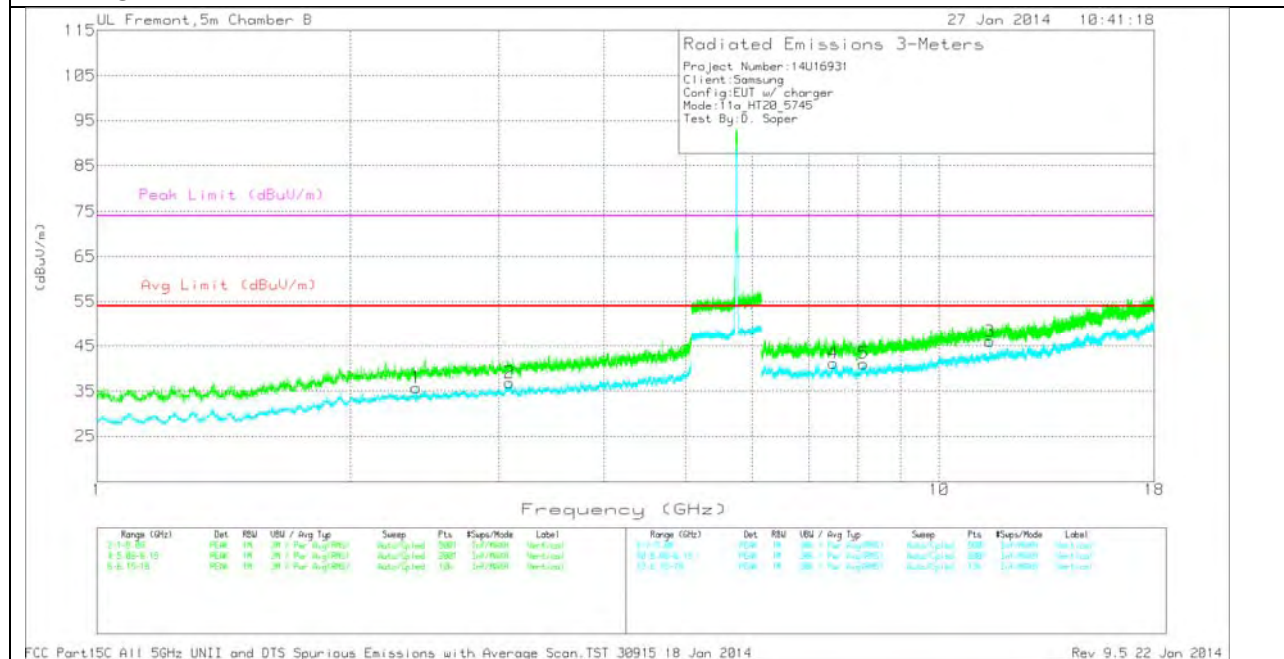
10.2.1. TX ABOVE 1 GHz 802.11a HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL)

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

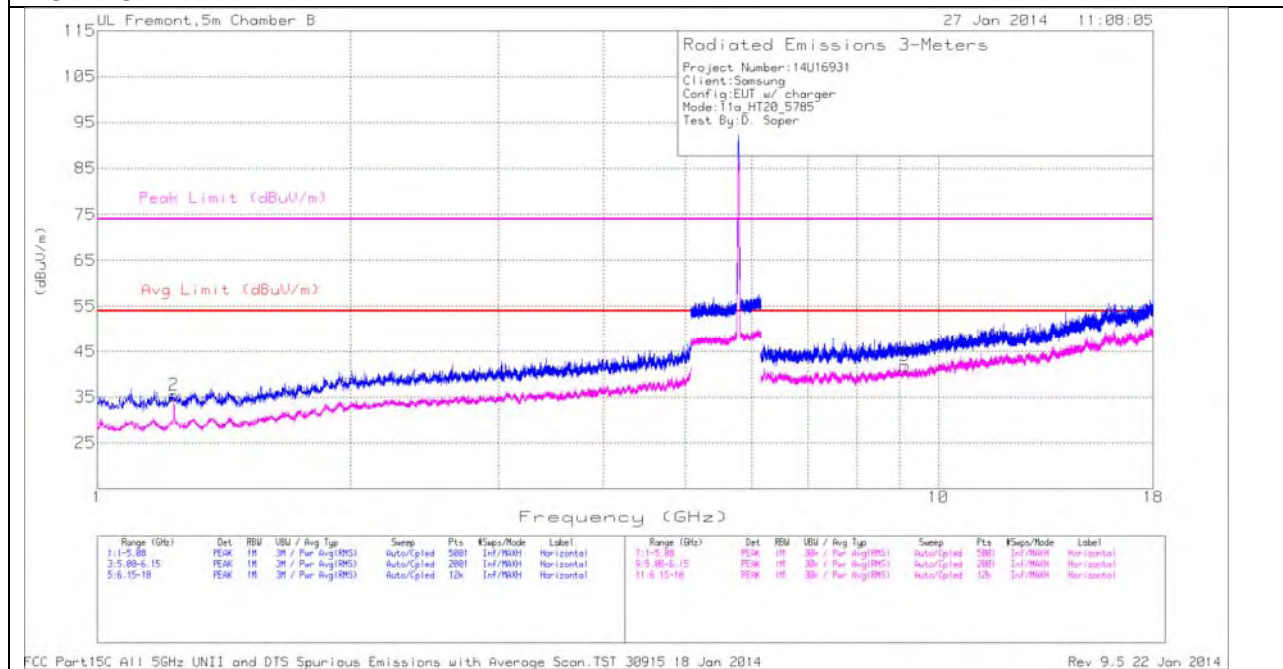
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 11.49	30.34	Avg	38.7	-23	0	46.04	54	-7.96	-	-	0-360	99	V
4	* 7.49	30.83	Avg	36	-25.7	0	41.13	54	-12.87	-	-	0-360	202	V
5	* 8.135	31.57	Avg	36.1	-26.6	0	41.07	54	-12.93	-	-	0-360	99	V
1	2.394	36.33	Avg	32.3	-32.9	0	35.73	54	-18.27	-	-	0-360	202	V
2	3.088	35.54	Avg	33.2	-31.9	0	36.84	54	-17.16	-	-	0-360	99	V

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

Avg - Video bandwidth < Resolution bandwidth

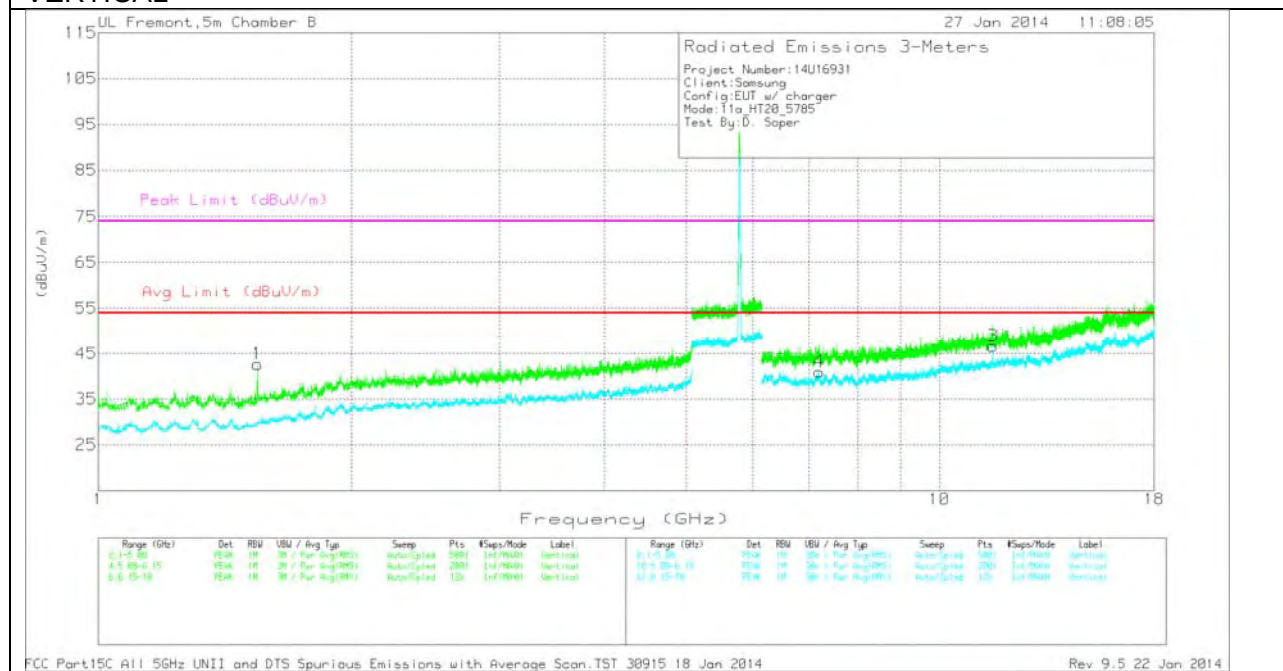
FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
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MID CHANNEL
HORIZONTAL



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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filt r/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.548	48.01	PK	28.6	-34	0	42.61	54	-11.39	74	-31.39	0-360	99	V
2	* 1.234	41.61	Avg	28.5	-34.7	0	35.41	54	-18.59	-	-	0-360	202	H
5	* 9.13	29.95	Avg	36.9	-25	0	41.85	54	-12.15	-	-	0-360	99	H
3	* 11.57	30.64	Avg	38.8	-22.8	0	46.64	54	-7.36	-	-	0-360	202	V
4	7.195	31.6	Avg	35.8	-26.5	0	40.9	54	-13.1	-	-	0-360	99	V

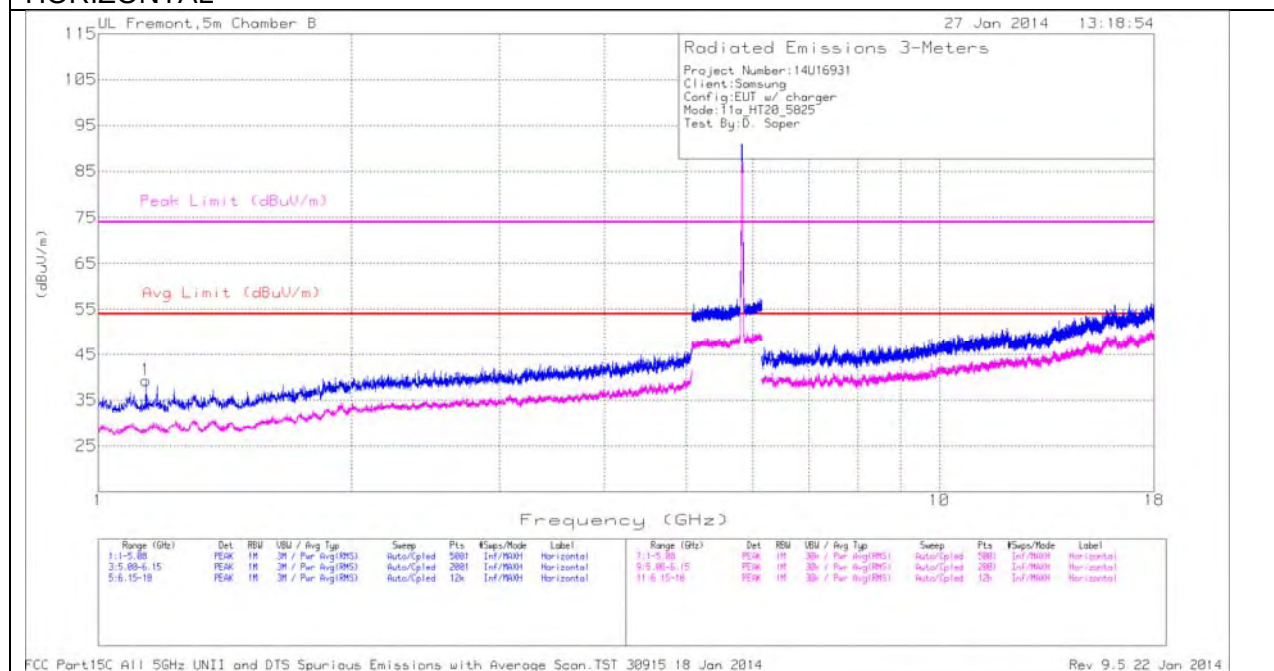
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

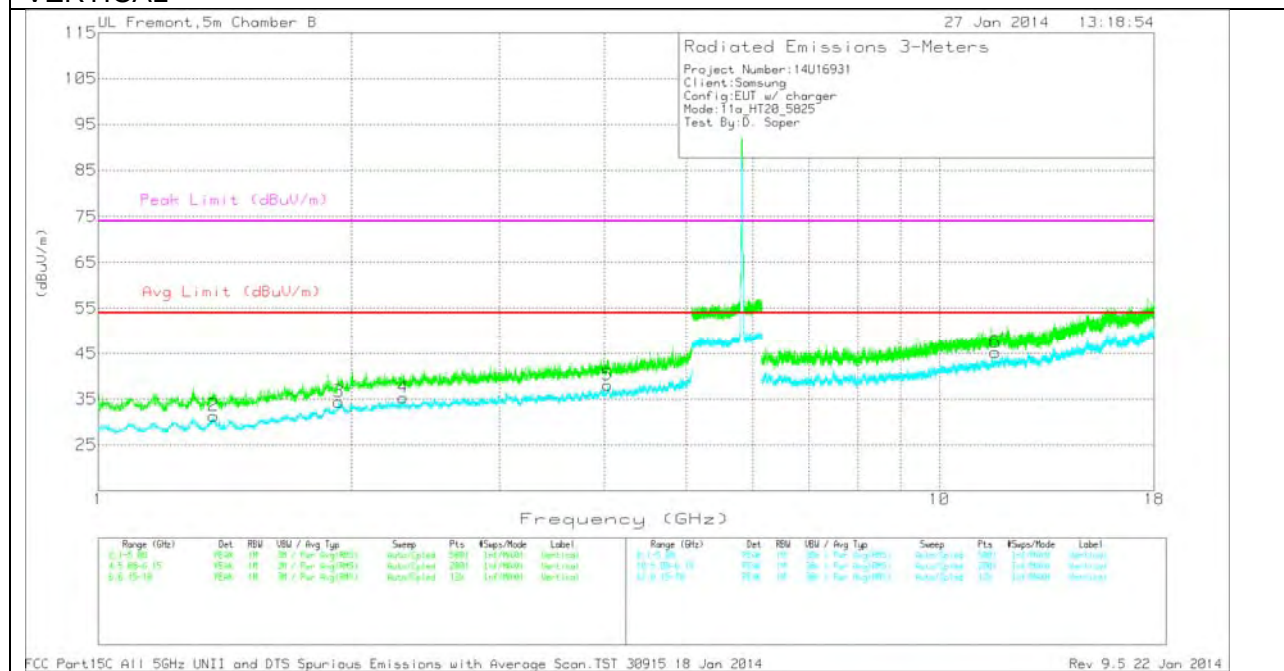
FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
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HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*1.14	45.49	PK	28.1	-34.3	0	39.29	54	-14.71	74	-34.71	0-360	99	H
2	*1.371	36.74	Avg	28.4	-33.8	0	31.34	54	-22.66	-	-	0-360	99	V
5	*4.033	34.24	Avg	33.9	-30.1	0	38.04	54	-15.96	-	-	0-360	99	V
6	*11.65	29.45	Avg	38.9	-23.1	0	45.25	54	-8.75	-	-	0-360	99	V
3	1.933	35.7	Avg	31.3	-32.6	0	34.4	54	-19.6	-	-	0-360	99	V
4	2.305	36.1	Avg	32.2	-33	0	35.3	54	-18.7	-	-	0-360	99	V

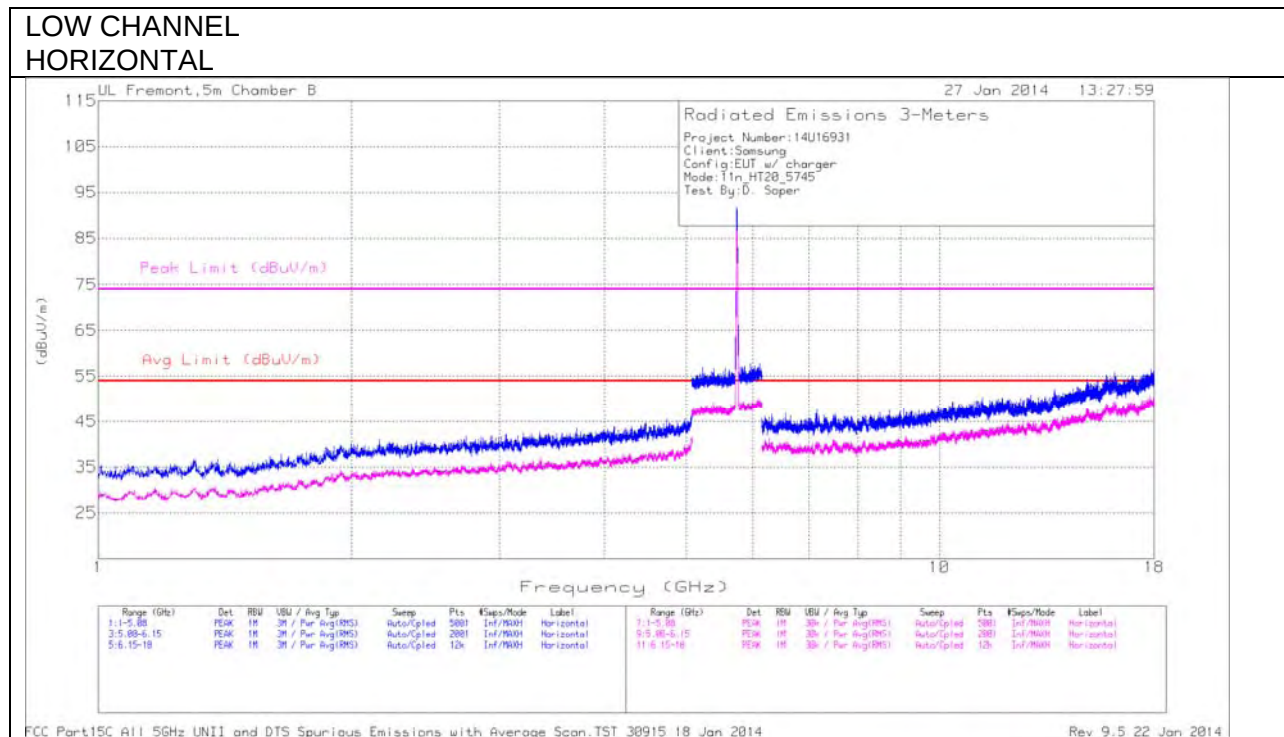
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

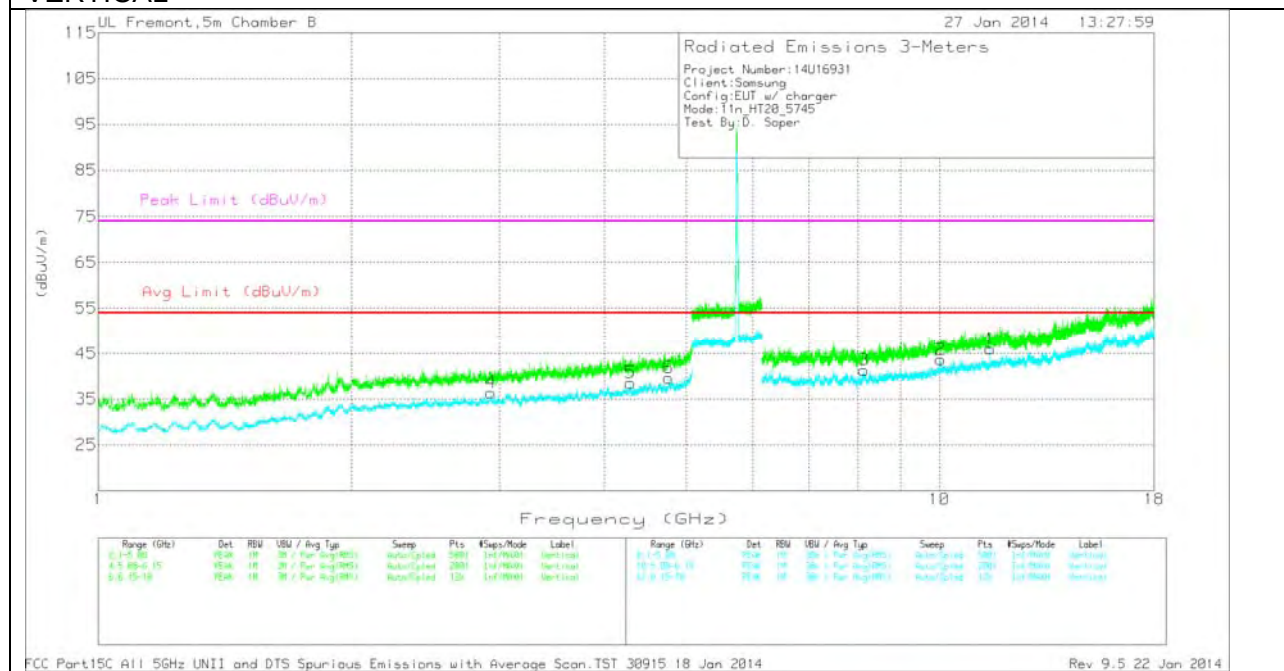
FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
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10.2.1. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.8 GHz BAND HARMONICS AND SPURIOUS EMISSIONS



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

LOW CHANNEL
VERTICAL



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

LOW CHANNEL DATA

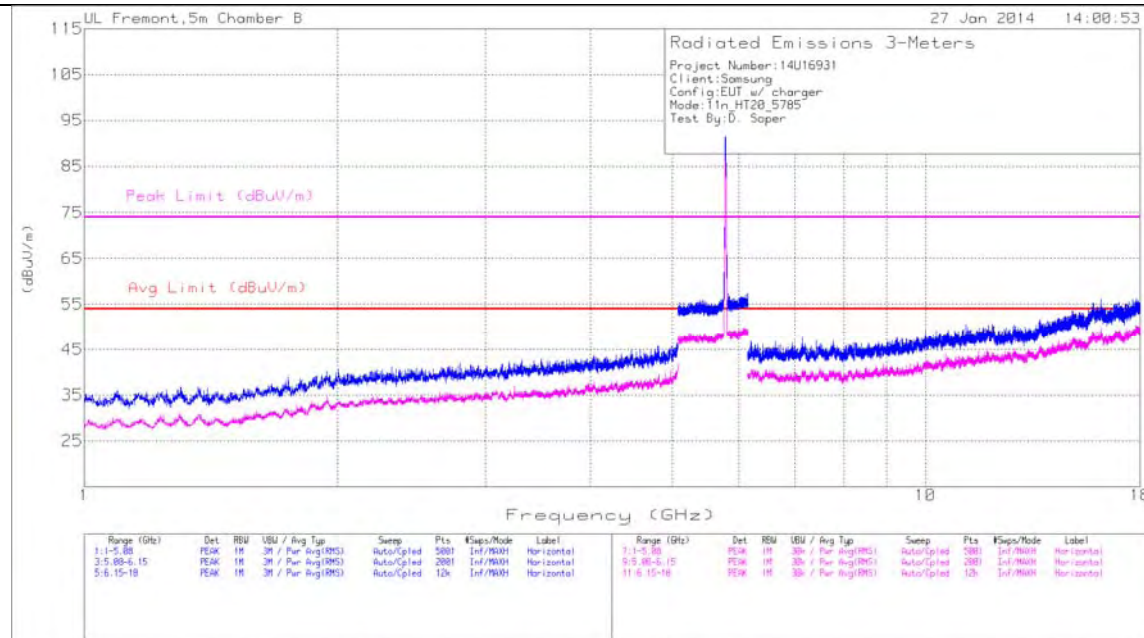
Marker	Frequenc y (GHz)	Meter Readin g (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filt r/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.293	34.43	Avg	34.2	-30.1	0	38.53	54	-15.47	-	-	0-360	99	V
6	* 4.767	34.3	Avg	34.7	-29.4	0	39.6	54	-14.4	-	-	0-360	202	V
1	* 11.49	30.28	Avg	38.7	-23	0	45.98	54	-8.02	-	-	0-360	202	V
3	* 8.138	31.83	Avg	36.1	-26.6	0	41.33	54	-12.67	-	-	0-360	202	V
4	2.931	35.08	Avg	33	-31.7	0	36.38	54	-17.62	-	-	0-360	99	V
2	10.031	29.76	Avg	37.8	-23.9	0	43.66	54	-10.34	-	-	0-360	99	V

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

Avg - Video bandwidth < Resolution bandwidth

FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
Jan 2014 Rev 9.5 22 Jan 2014

MID CHANNEL
HORIZONTAL

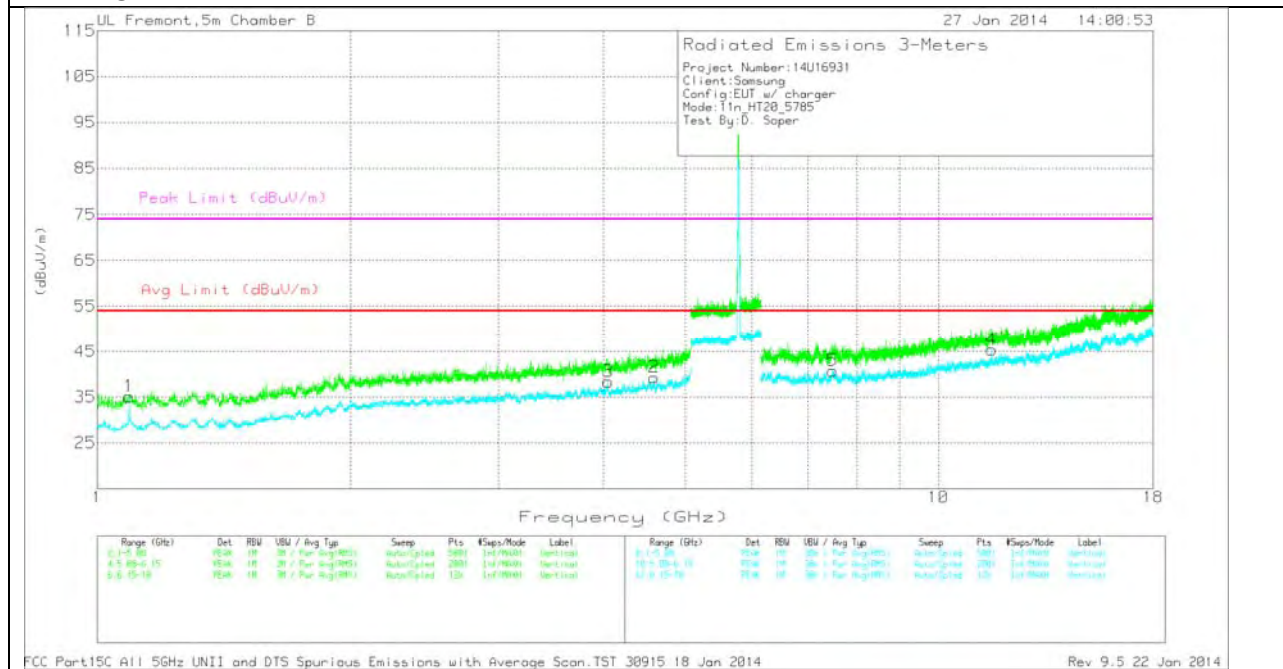


FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18 Jan 2014

Rev 9.5 22 Jan 2014

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

MID CHANNEL
VERTICAL



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

MID CHANNEL DATA

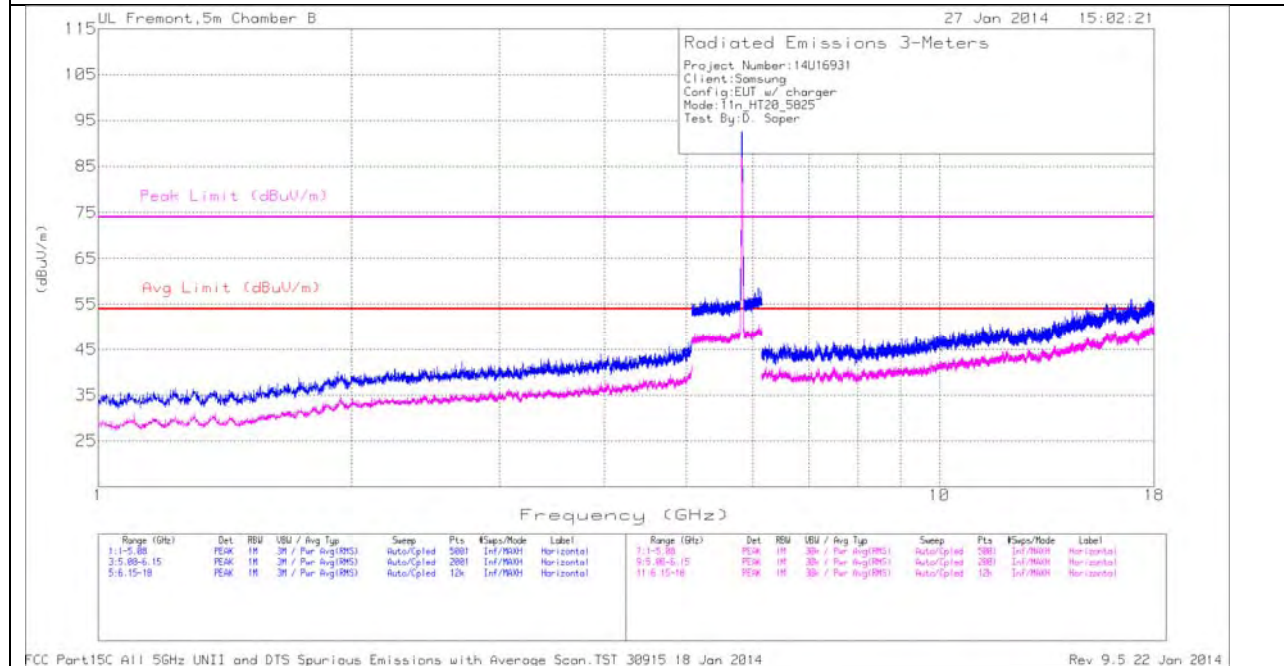
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.091	41.69	Avg	27.8	-34.4	0	35.09	54	-18.91	-	-	0-360	202	V
2	* 4.593	34.79	Avg	34.6	-30.1	0	39.29	54	-14.71	-	-	0-360	99	V
3	* 4.049	34.31	Avg	33.9	-29.8	0	38.41	54	-15.59	-	-	0-360	202	V
4	* 11.57	29.4	Avg	38.8	-22.8	0	45.4	54	-8.6	-	-	0-360	203	V
5	* 7.486	30.6	Avg	36	-25.9	0	40.7	54	-13.3	-	-	0-360	203	V

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

Avg - Video bandwidth < Resolution bandwidth

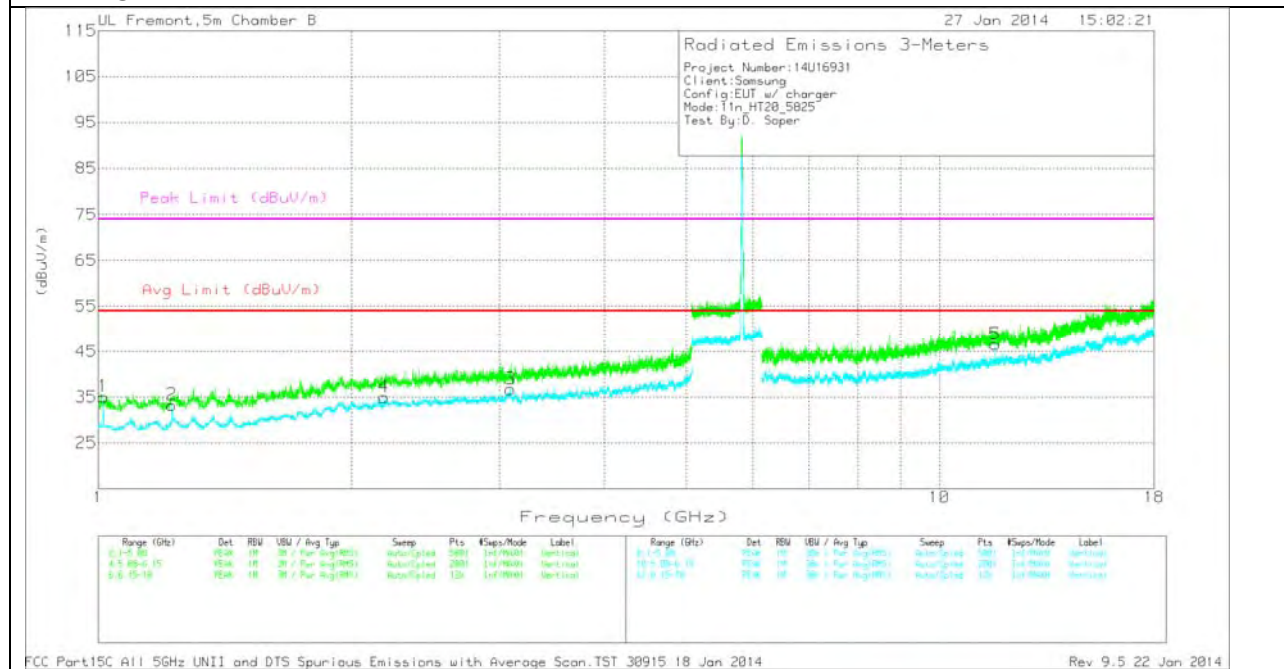
FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
Jan 2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dBm)	Amp/Cbl/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.015	42.16	Avg	27.5	-34.6	0	35.06	54	-18.94	-	-	0-360	202	V
2	* 1.224	39.47	Avg	28.5	-34.7	0	33.27	54	-20.73	-	-	0-360	202	V
5	* 11.65	30.78	Avg	38.9	-23.1	0	46.58	54	-7.42	-	-	0-360	202	V
4	2.186	35.49	Avg	32	-32.5	0	34.99	54	-19.01	-	-	0-360	202	V
3	3.092	35.42	Avg	33.2	-31.9	0	36.72	54	-17.28	-	-	0-360	99	V

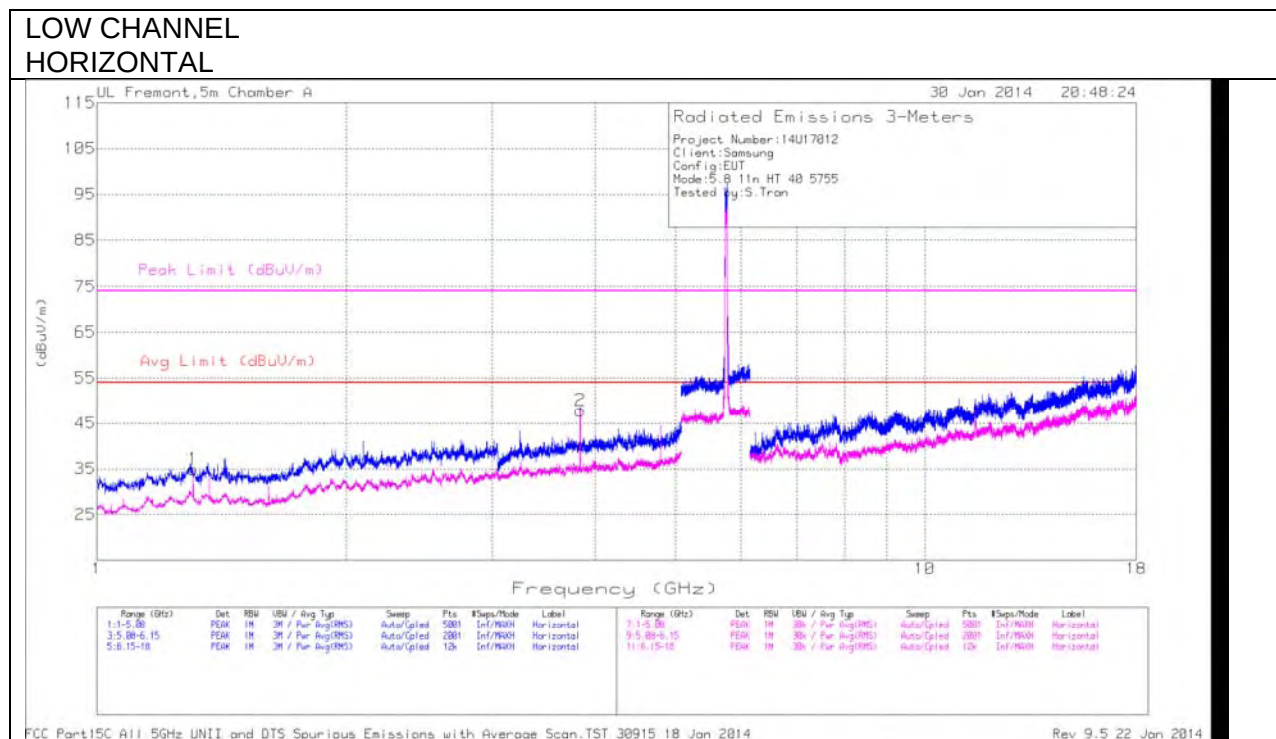
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18

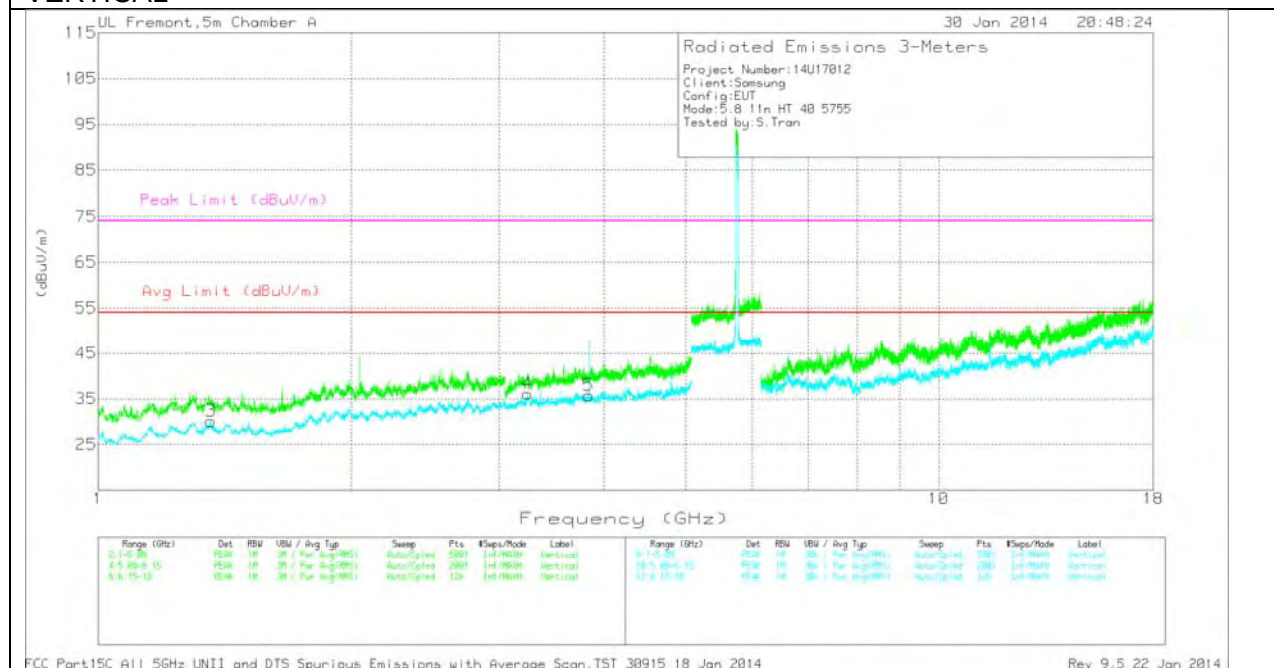
Jan 2014 Rev 9.5 22 Jan 2014

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



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

LOW CHANNEL
VERTICAL



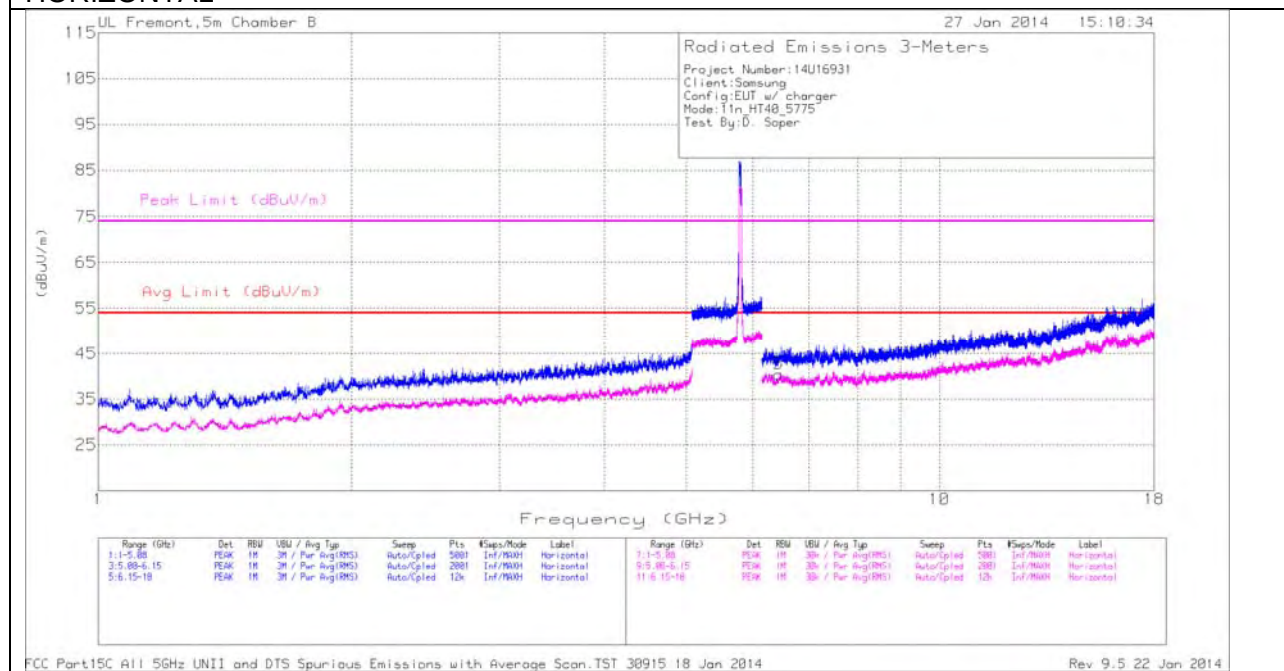
Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.307	41.71	Avg	30.3	-37.1	34.91	54	-19.09	-	-	0-360	200	H
3	1.362	36.92	Avg	30	-36.8	30.12	54	-23.88	-	-	0-360	201	V
4	3.242	34.43	Avg	33.3	-31.7	36.03	54	-17.97	-	-	0-360	101	V
5	3.833	33.19	Avg	33.6	-31.1	35.69	54	-18.31	-	-	0-360	201	V
2	3.836	45.12	Avg	33.6	-30.9	47.82	54	-6.18	-	-	0-360	200	H

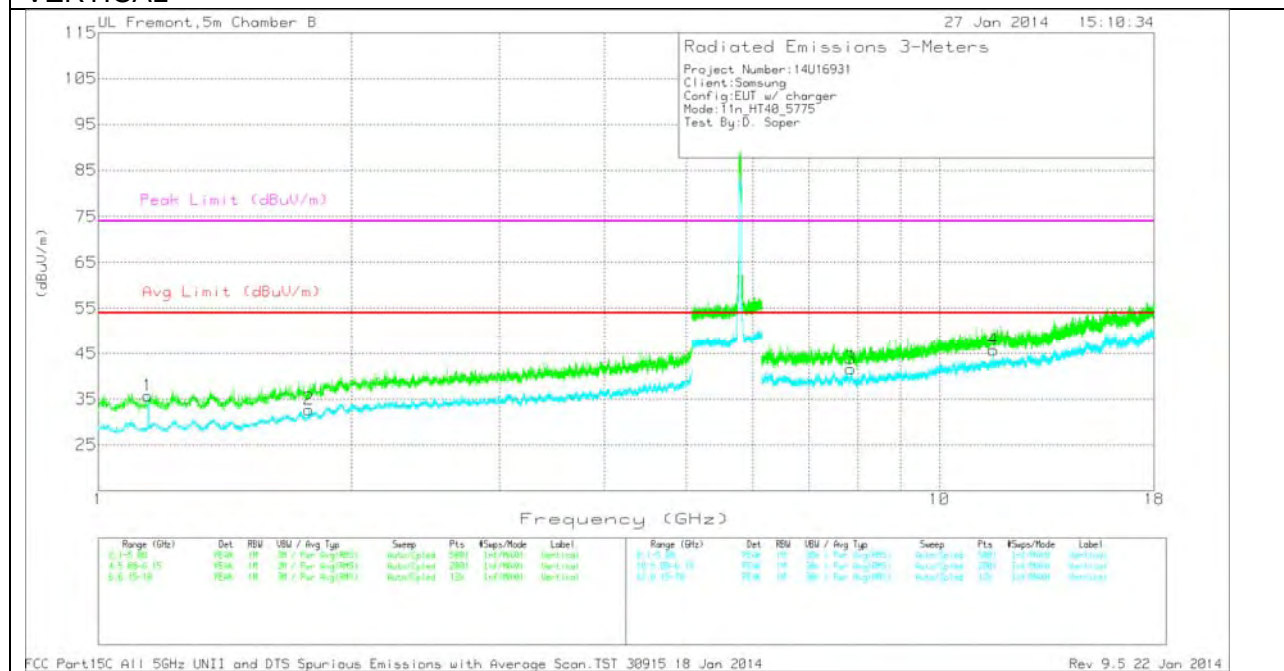
Avg - Video bandwidth < Resolution bandwidth

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL
VERTICAL



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

HIGH CHANNEL DATA

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.146	42.01	Avg	28.1	-34.4	0	35.71	54	-18.29	-	-	0-360	202	V
4	* 11.59	29.86	Avg	38.8	-22.9	0	45.76	54	-8.24	-	-	0-360	202	V
2	1.781	36.22	Avg	30.3	-33.8	0	32.72	54	-21.28	-	-	0-360	99	V
5	6.441	33.48	Avg	35.9	-29	0	40.38	54	-13.62	-	-	0-360	202	H
3	7.844	32.63	Avg	36.2	-27.2	0	41.63	54	-12.37	-	-	0-360	99	V

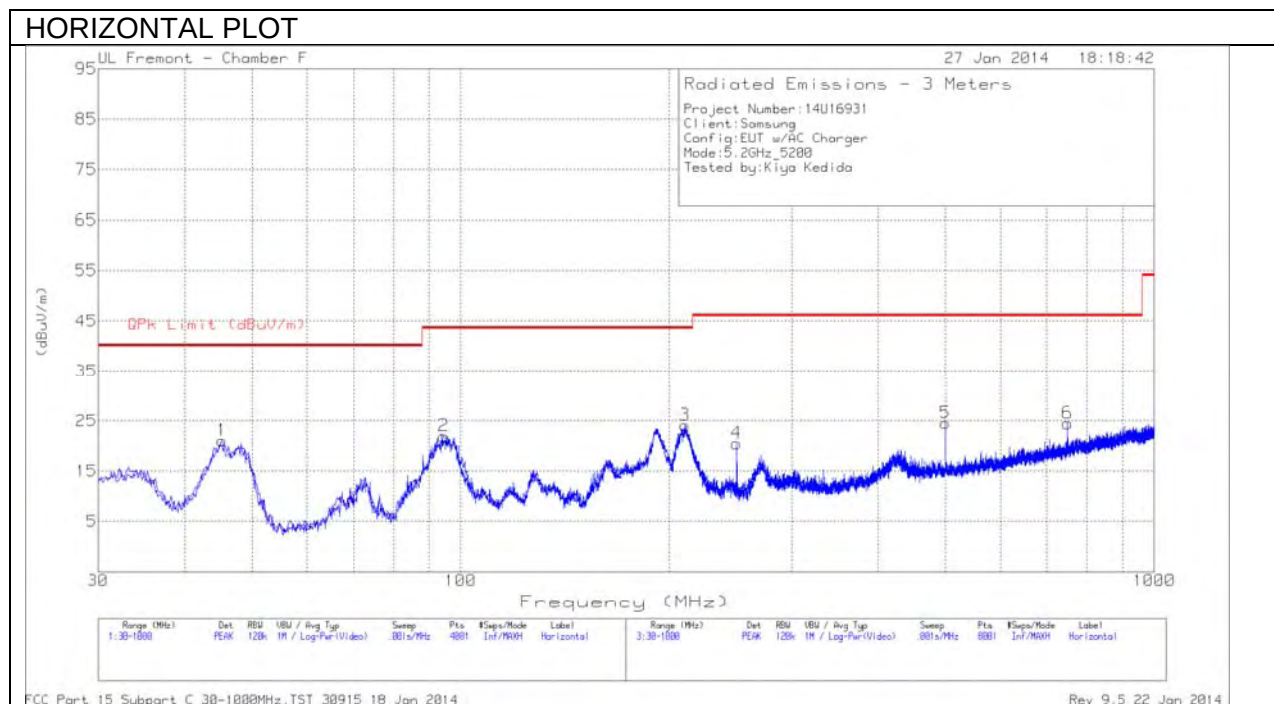
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

FCC Part15C All 5GHz UNII and DTS Spurious Emissions with Average Scan.TST 30915 18
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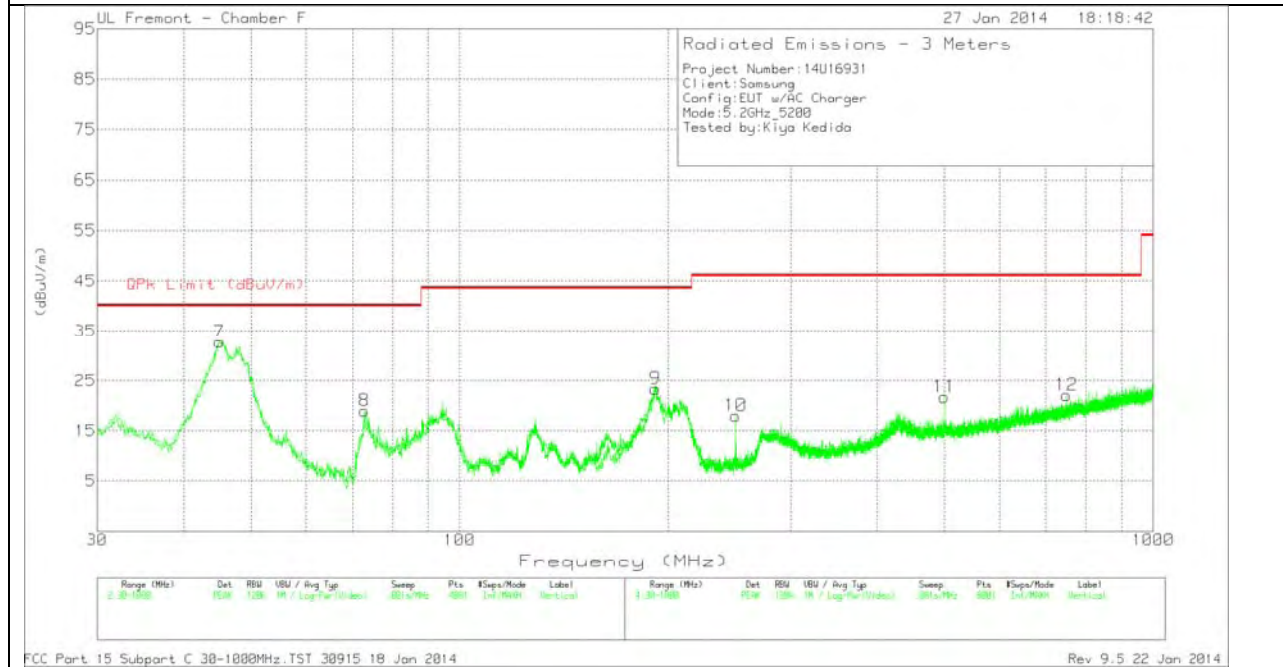
10.3. WORST-CASE BELOW 1 GHz

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



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

VERTICAL PLOT



Below 1G Data

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

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

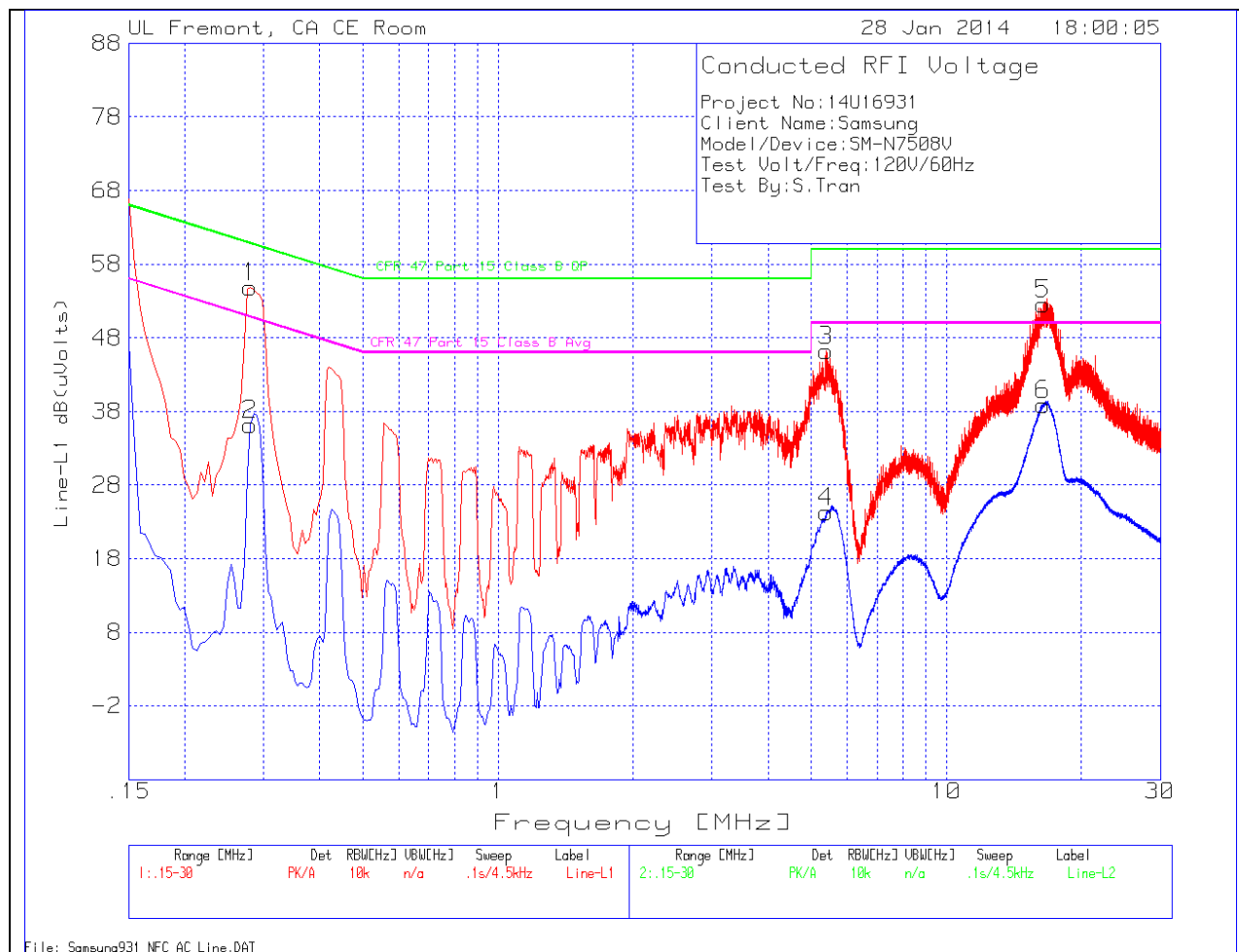
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4 2009.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

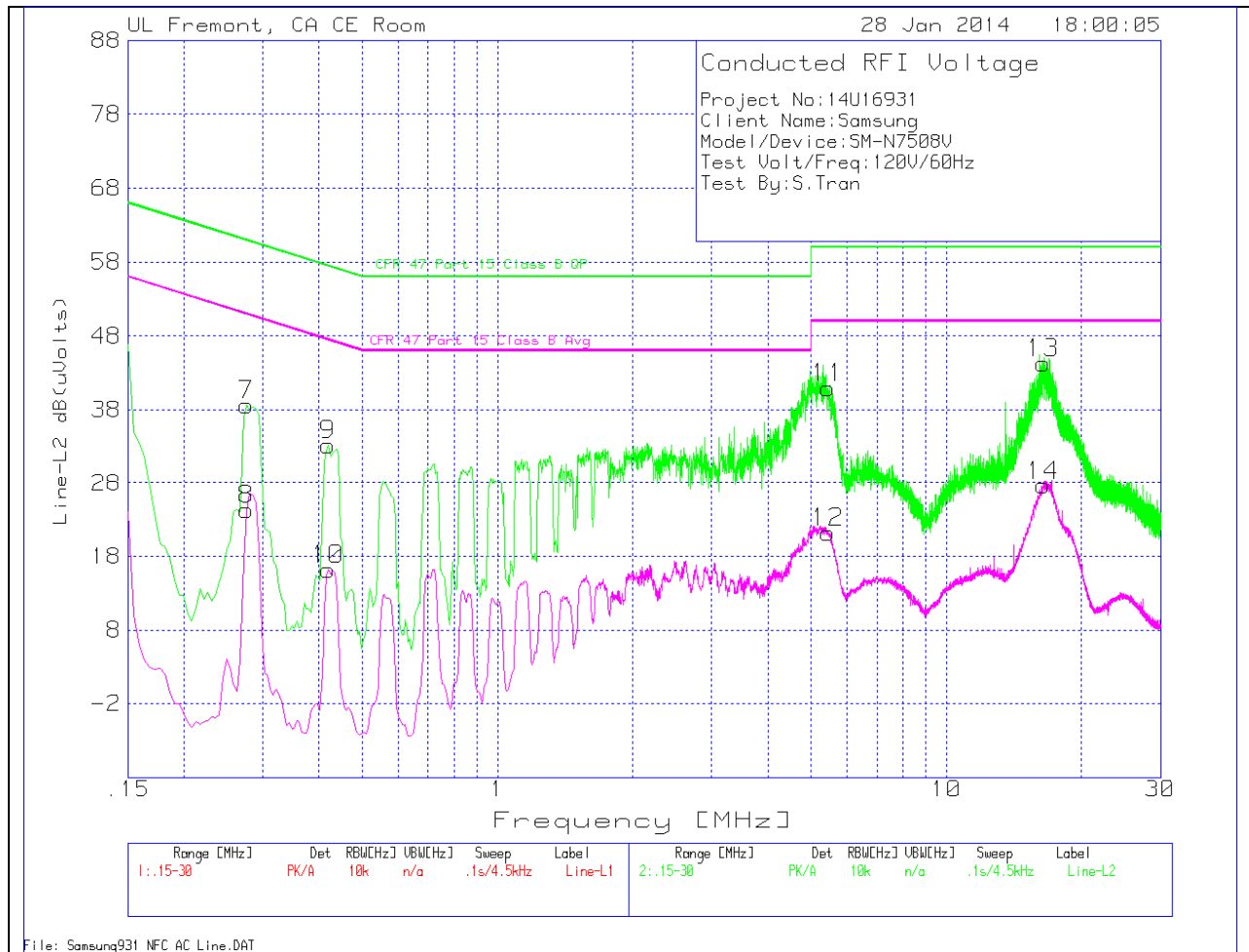
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

LINE 1 RESULTS



LINE 2 RESULTS



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	.2805	54.21	PK	.6	0	54.81	60.8	-5.99	-	-
2	.2805	35.52	Av	.6	0	36.12	-	-	50.8	-14.68
3	5.406	45.88	PK	.2	.1	46.18	60	-13.82	-	-
4	5.406	23.99	Av	.2	.1	24.29	-	-	50	-25.71
5	16.4445	52.03	PK	.3	.2	52.53	60	-7.47	-	-
6	16.4445	38.34	Av	.3	.2	38.84	-	-	50	-11.16

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)
7	.276	37.91	PK	.7	0	38.61	60.9	-22.29	-	-
8	.276	23.57	Av	.7	0	24.27	-	-	50.9	-26.63
9	.42	32.77	PK	.4	0	33.17	57.4	-24.23	-	-
10	.42	15.74	Av	.4	0	16.14	-	-	47.4	-31.26
11	5.4375	40.66	PK	.2	.1	40.96	60	-19.04	-	-
12	5.4375	20.91	Av	.2	.1	21.21	-	-	50	-28.79
13	16.4175	43.8	PK	.3	.2	44.3	60	-15.7	-	-
14	16.4175	27.11	Av	.3	.2	27.61	-	-	50	-22.39