



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM Phone + Bluetooth & DTS/UNII a/b/g/n/ac + ANT

MODEL NUMBER: SM-G9098

FCC ID: A3LSMG9098

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

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

MODEL: SM-G9098

SERIAL NUMBER: FL-011-C (Radiated)
FL-011-D (Conducted)

DATE TESTED: JANUARY 7 - 23, 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:

Tested By:



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

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	20.71	117.76
2412 - 2462	802.11g	22.65	184.08
2412 - 2462	802.11n HT20	21.92	155.60
5745-5825	802.11a	19.95	98.86
5745-5825	802.11n HT20	20.09	102.09
5755-5795	802.11n HT40	18.76	75.16
5775	802.11ac HT80	18.85	76.74

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.41 dBi (2.4GHz) AND 1.68dBi (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
802.11ac HT80mode: MCS0

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	ETA-U90CBC	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

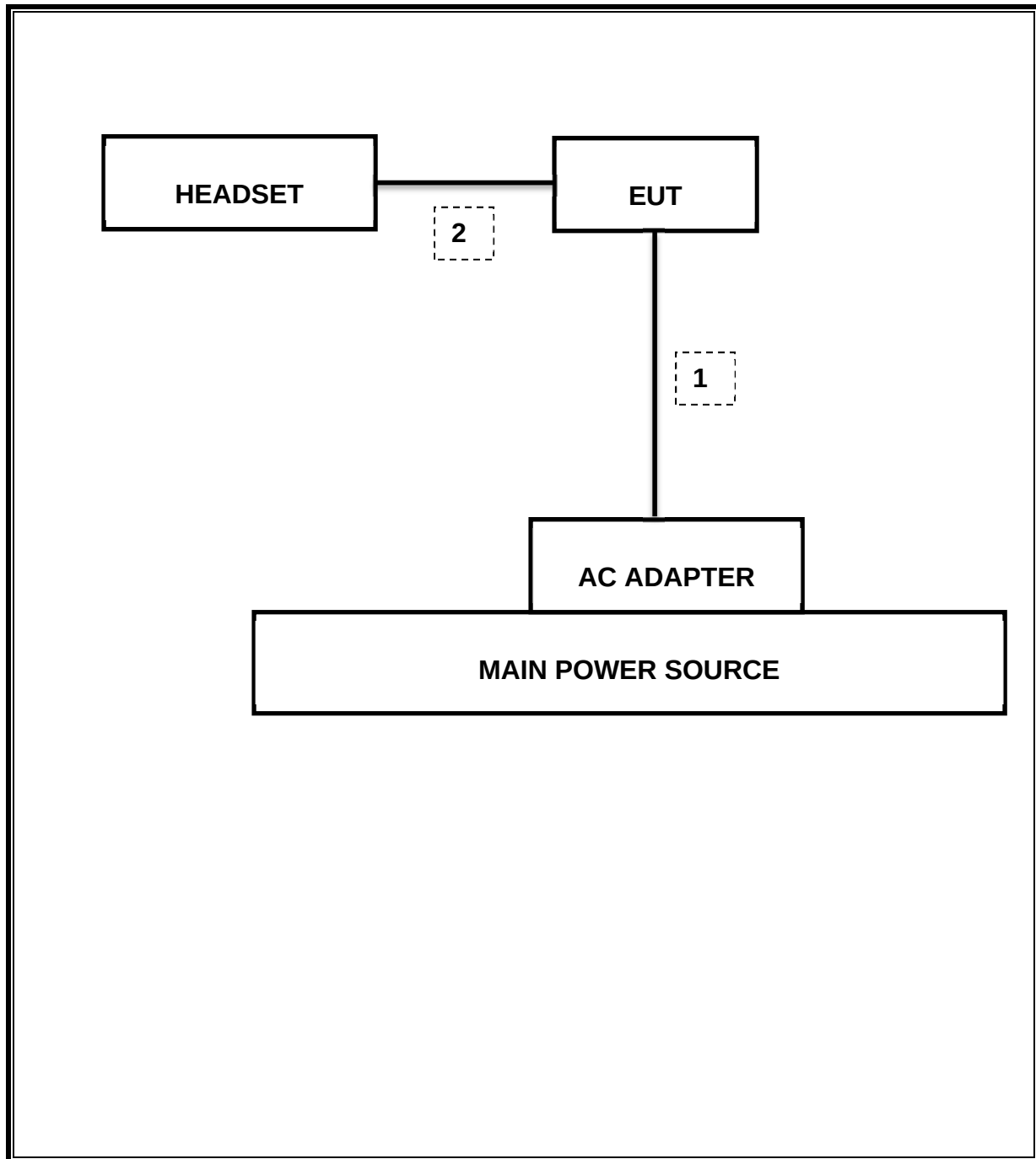
I/O CABLES

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.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

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

7. MEASUREMENT METHODS

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

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

8. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	12.00MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-30.13dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	22.65dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-4.55dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	38.33dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	46.712dBuV

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

RESULTS

9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	12.57	0.5
Mid	2437	12.60	0.5
High	2462	12.00	0.5
Worst		12.00	

9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.43	0.5
Mid	2437	16.45	0.5
High	2462	16.38	0.5
Worst		16.38	

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	17.62	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	16.500	0.5
High	5825	16.400	0.5
Worst		16.400	

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	17.650	0.5
Mid	5785	17.700	0.5
High	5825	17.700	0.5
Worst		17.650	

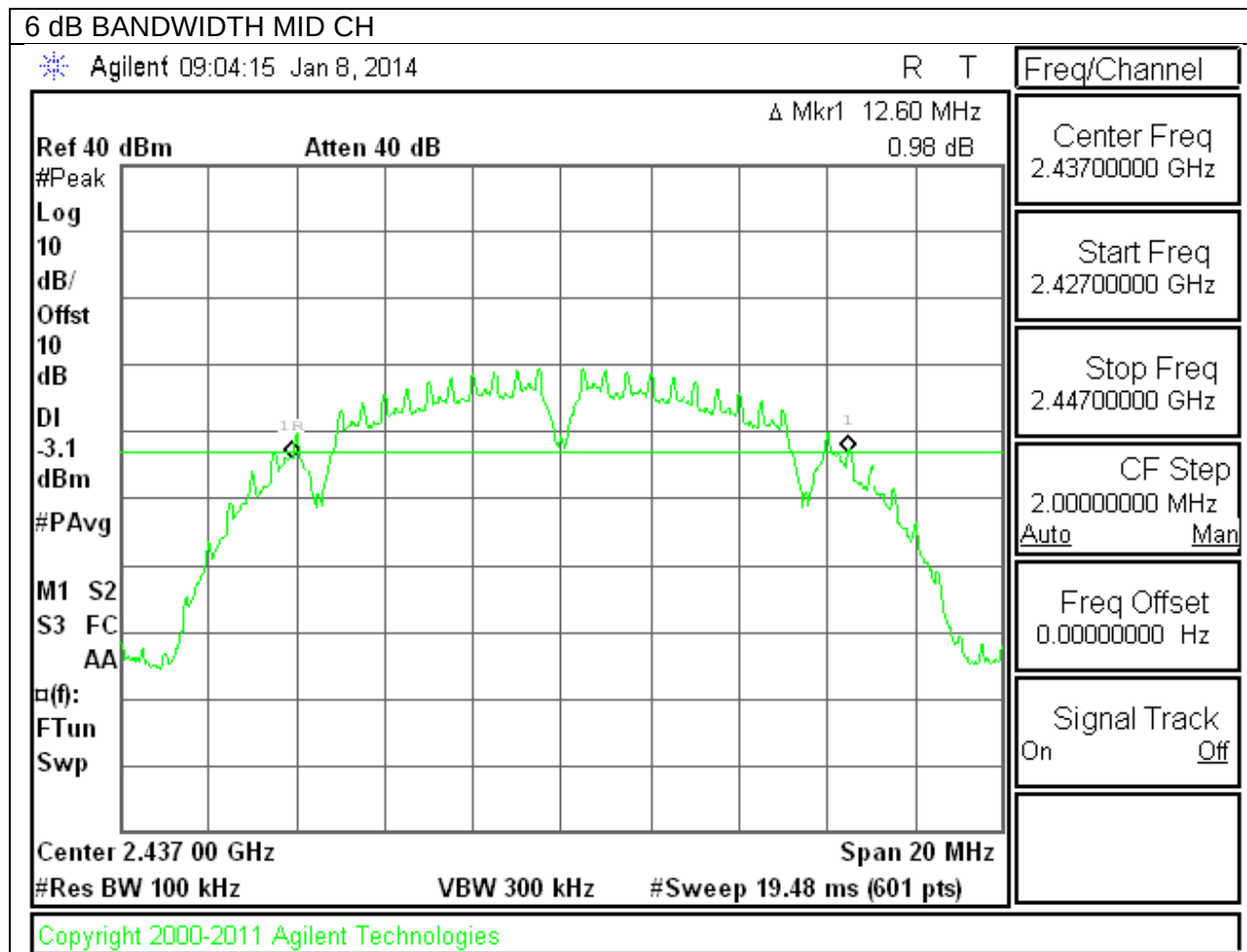
9.1.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

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

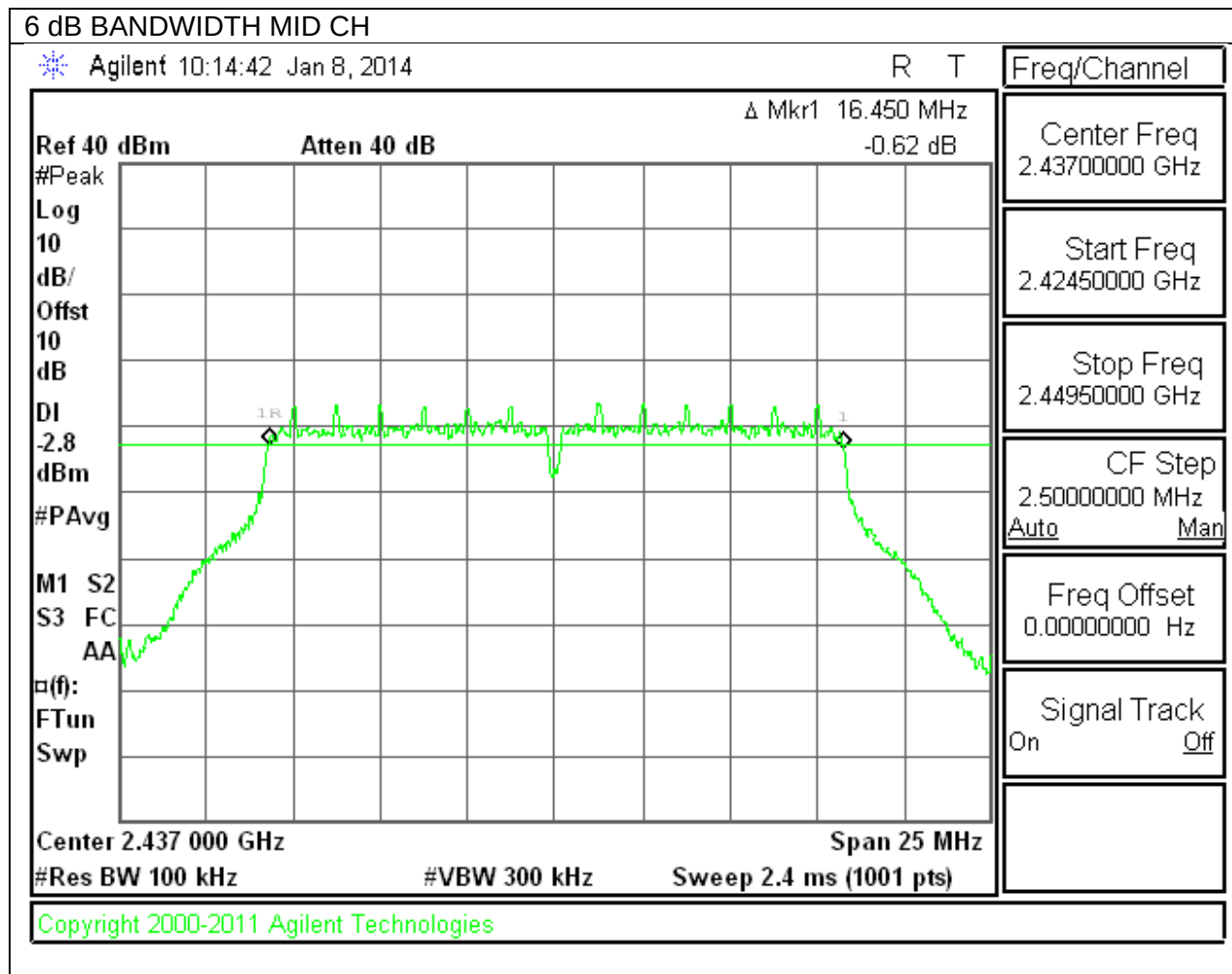
9.1.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5775	76.4	0.5
Worst		76.4	0.5

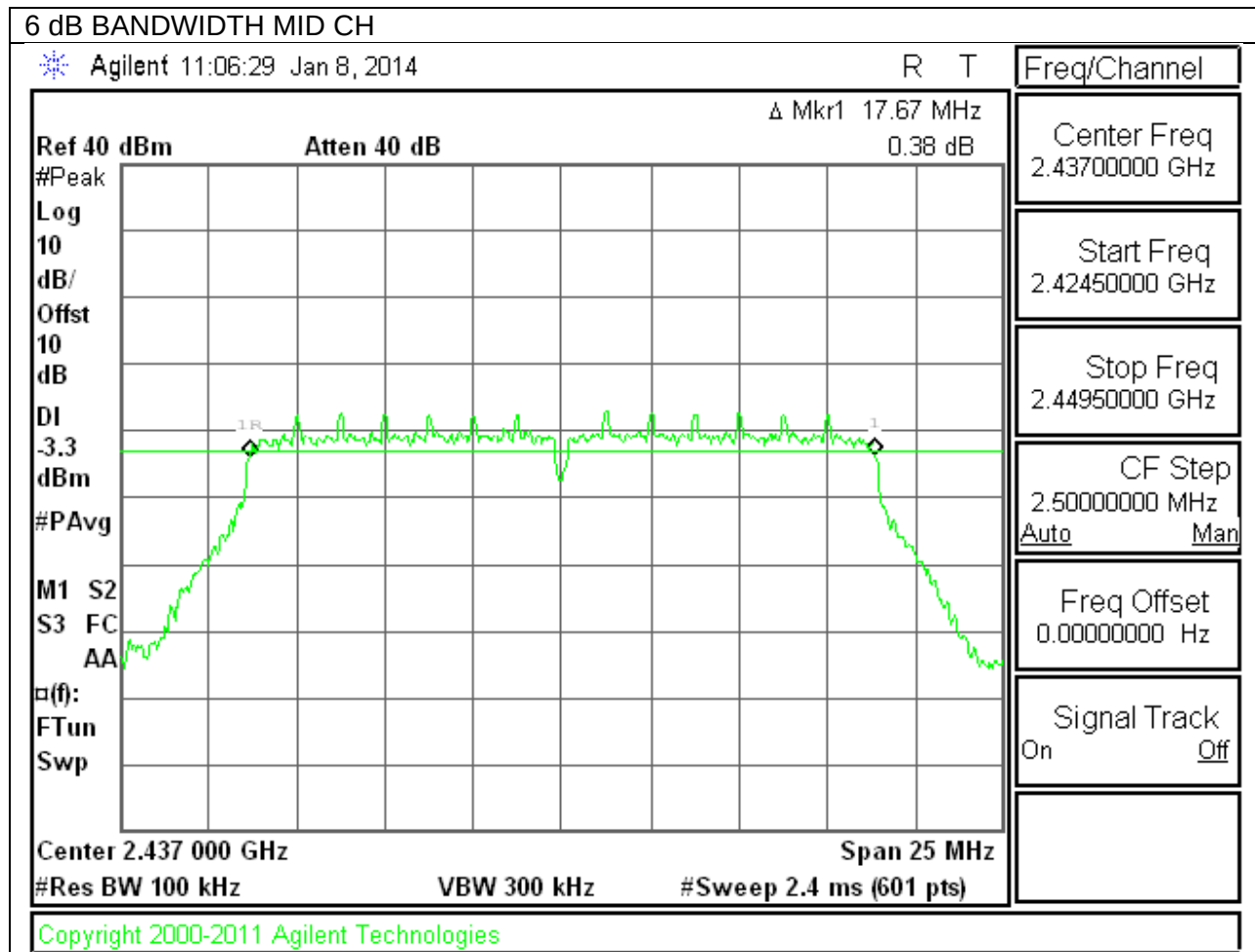
802.11b 6 dB BANDWIDTH



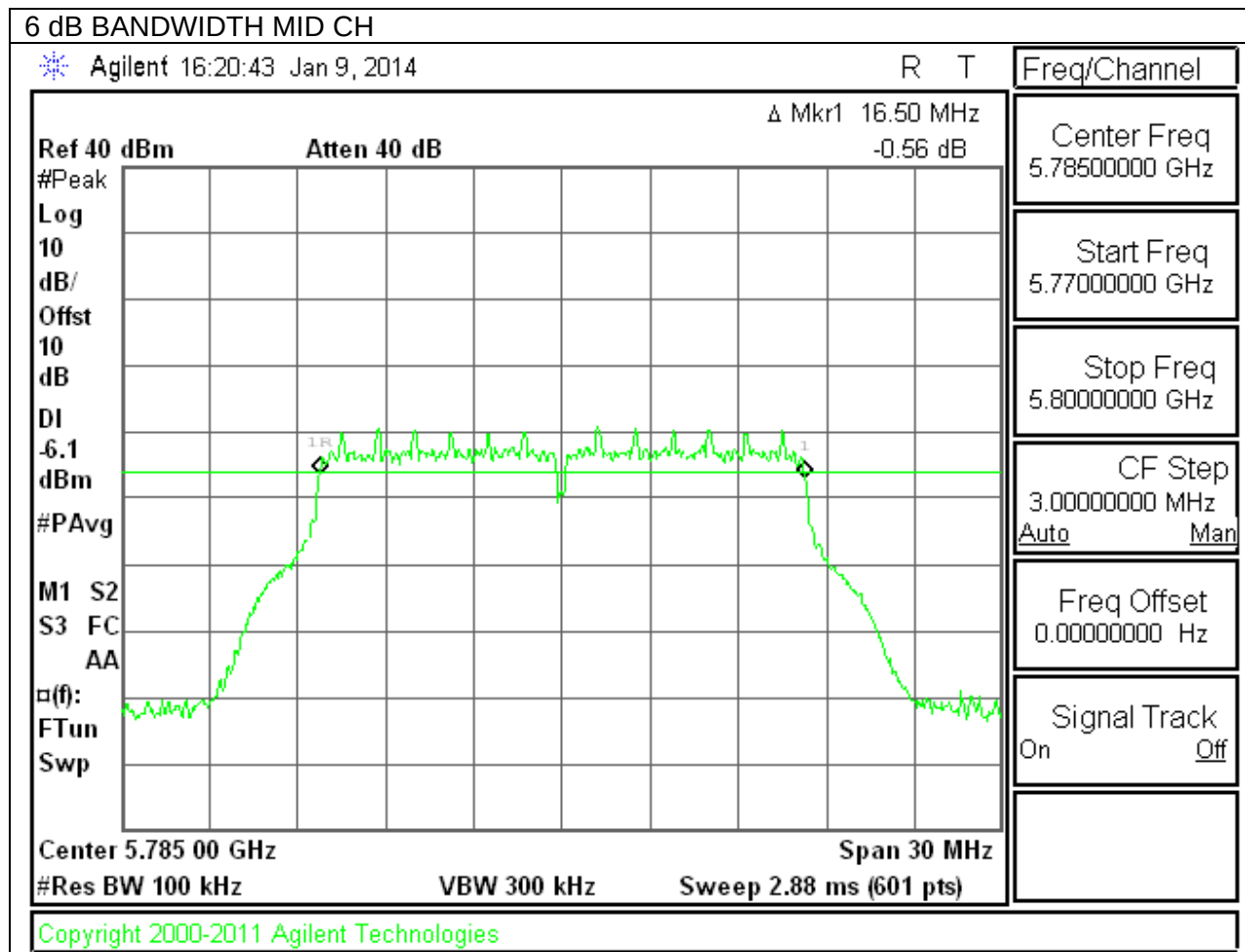
802.11g 6 dB BANDWIDTH



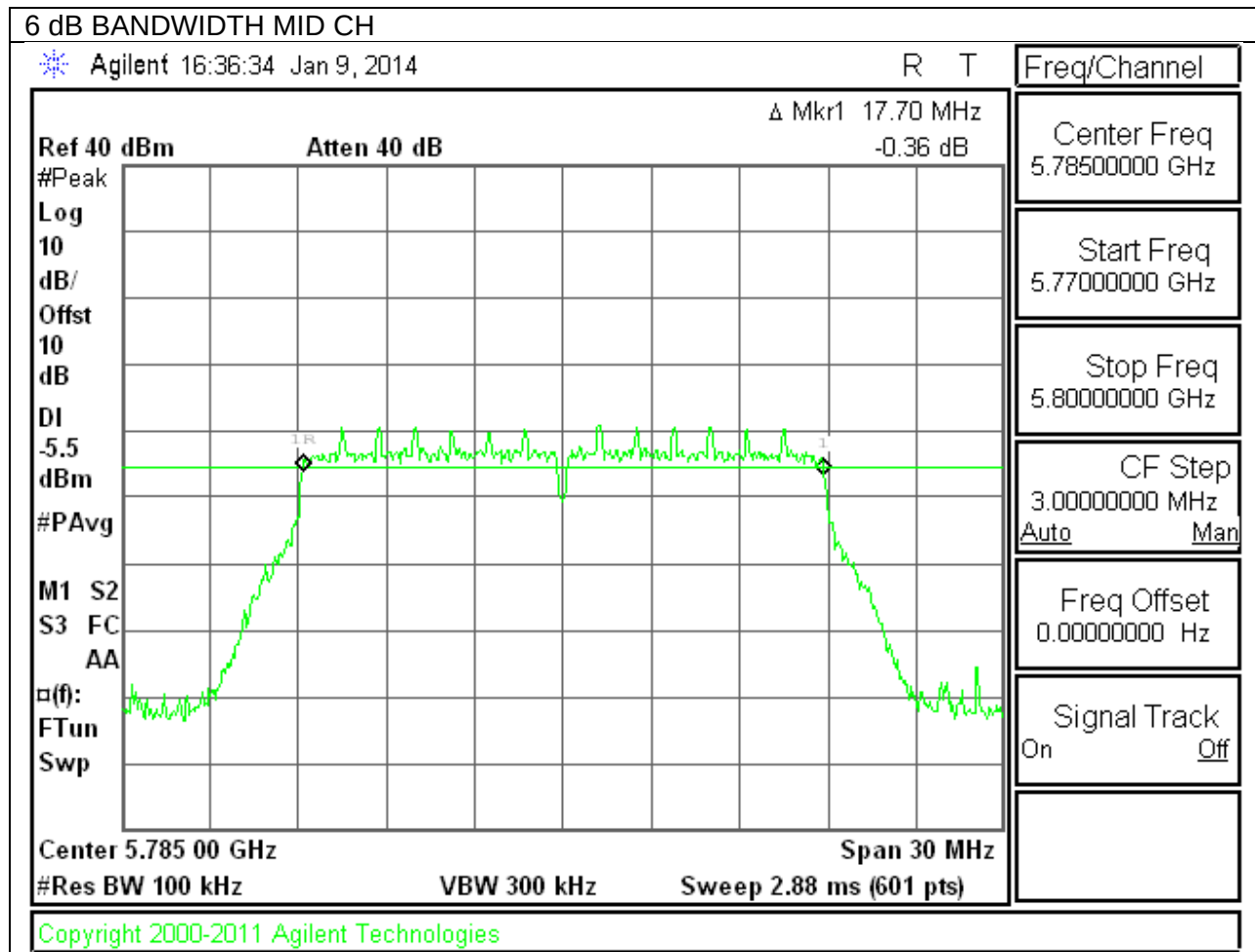
802.11n 6 dB BANDWIDTH



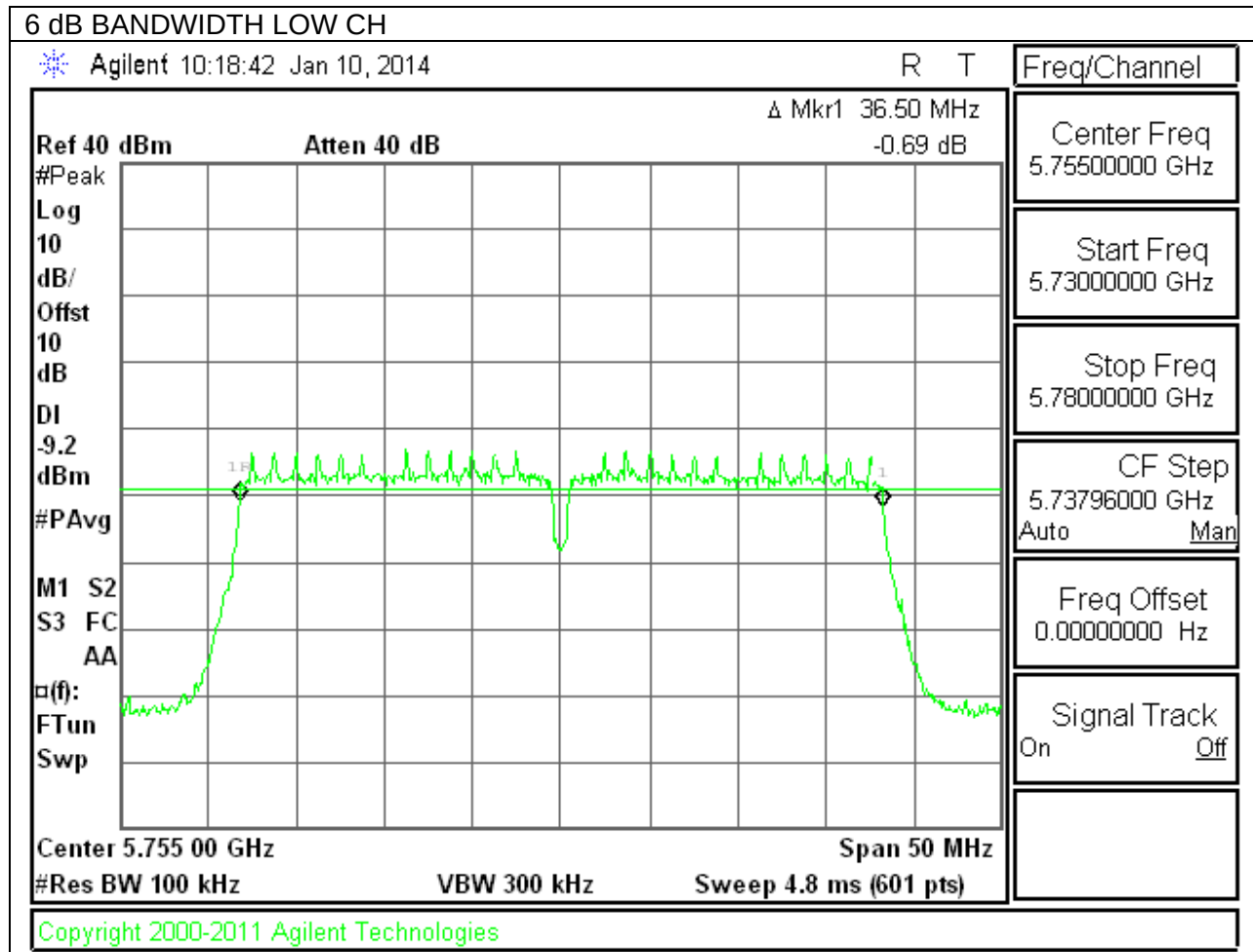
802.11a HT20 5.8GHz mode 6 dB BANDWIDTH



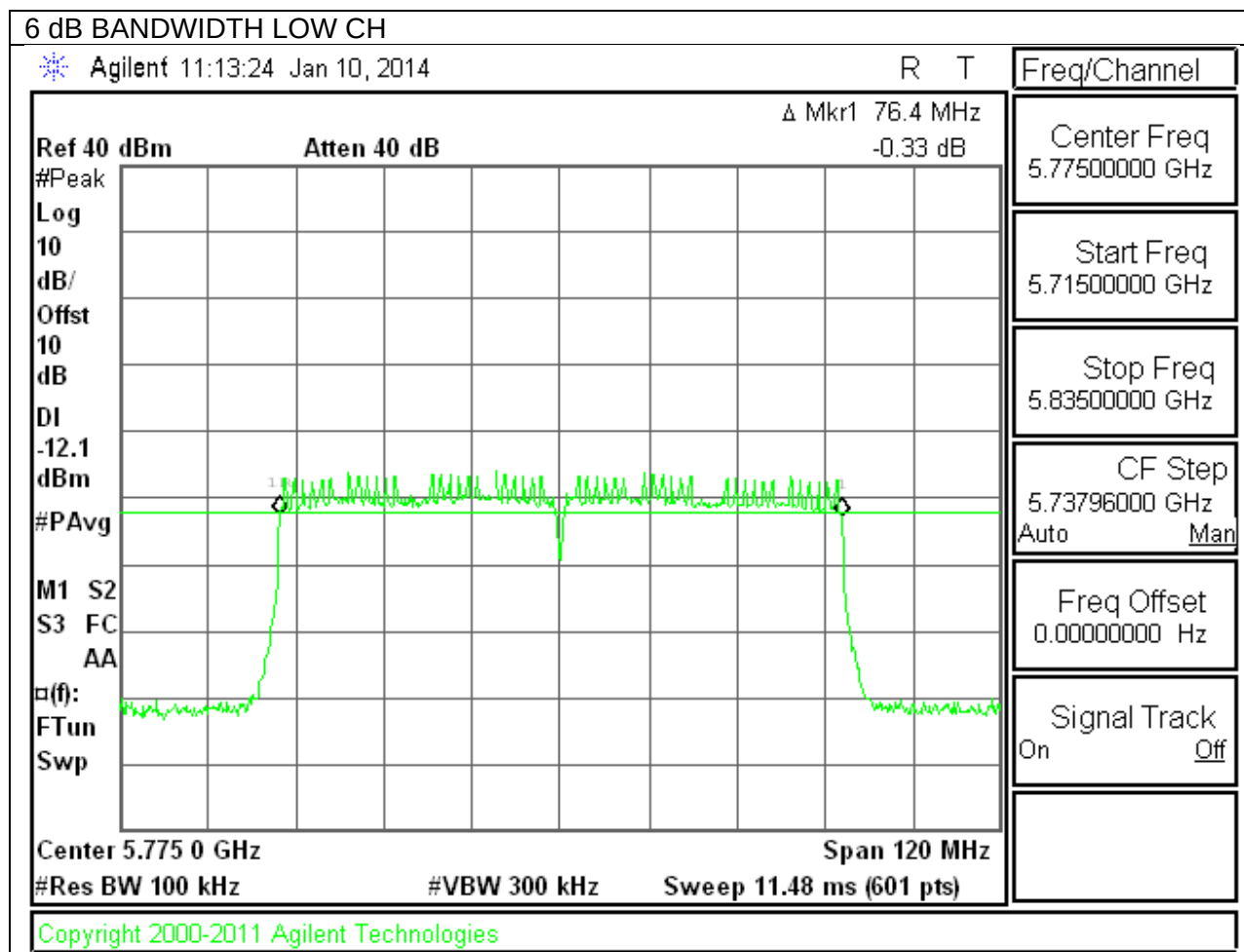
802.11n HT20 5.8GHz mode 6 dB BANDWIDTH



802.11n HT40 5.8GHz mode 6 dB BANDWIDTH



802.11ac HT80 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	13.27
Mid	2437	13.10
High	2462	13.23
Worst		13.27

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.66
Mid	2437	16.75
High	2462	16.58
Worst		16.75

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.78
Mid	2437	17.96
High	2462	17.73
Worst		17.96

9.2.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.814
Mid	5785	17.310
High	5825	17.434
Worst		17.814

9.2.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	18.350
Mid	5785	18.352
High	5825	18.328
Worst		18.352

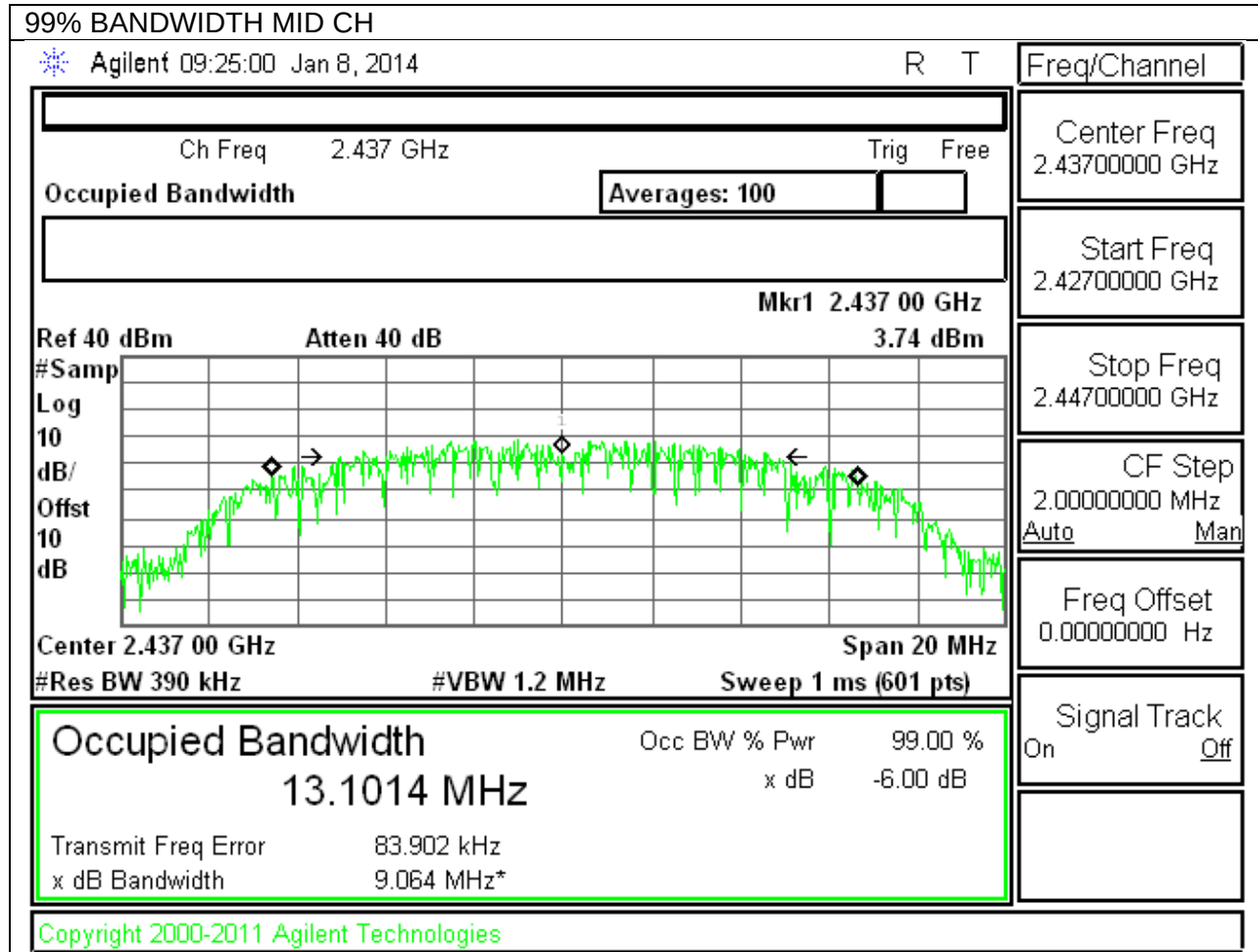
9.2.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.5
High	5795	36.4
Worst		36.5

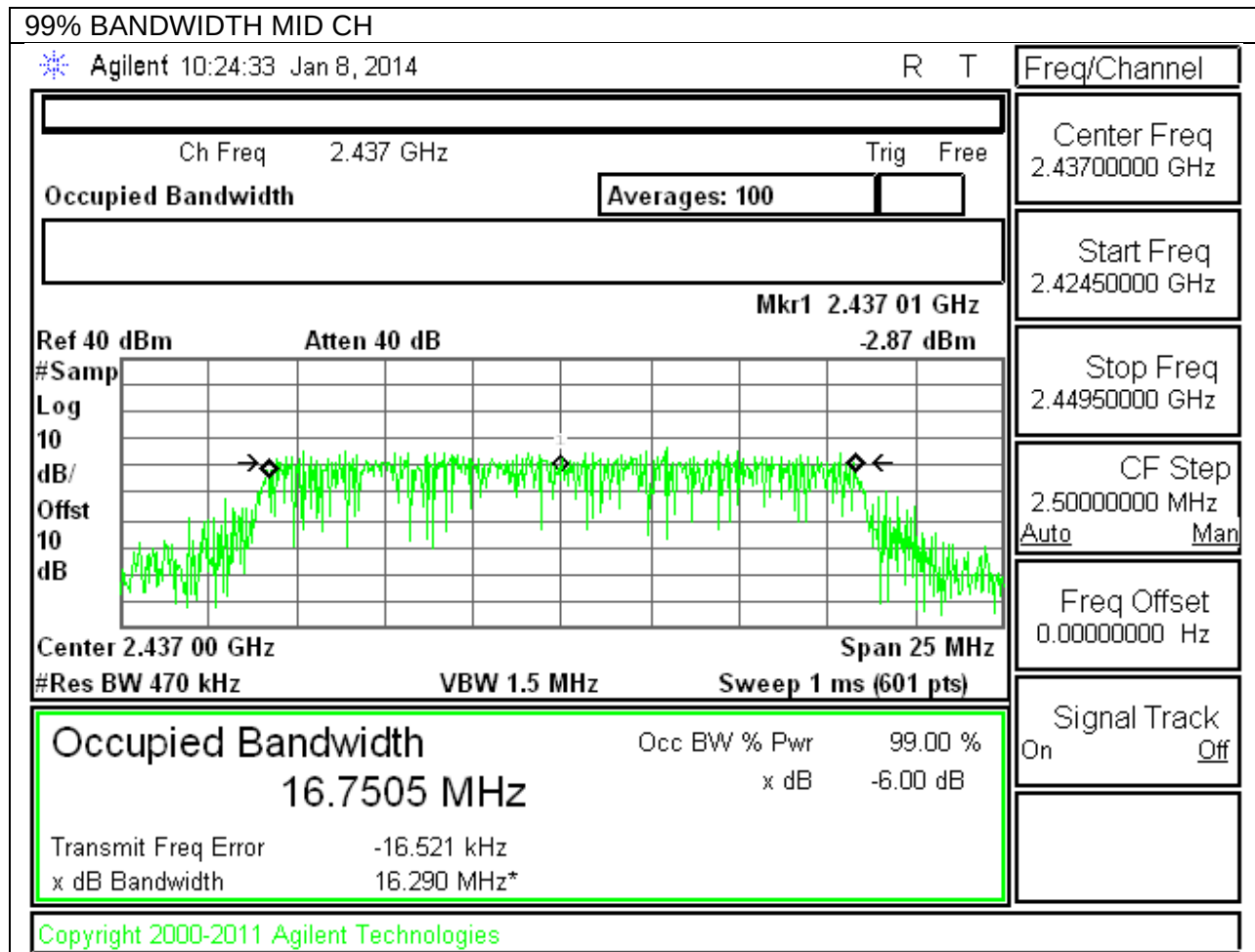
9.2.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5775	76.1
Worst		76.1

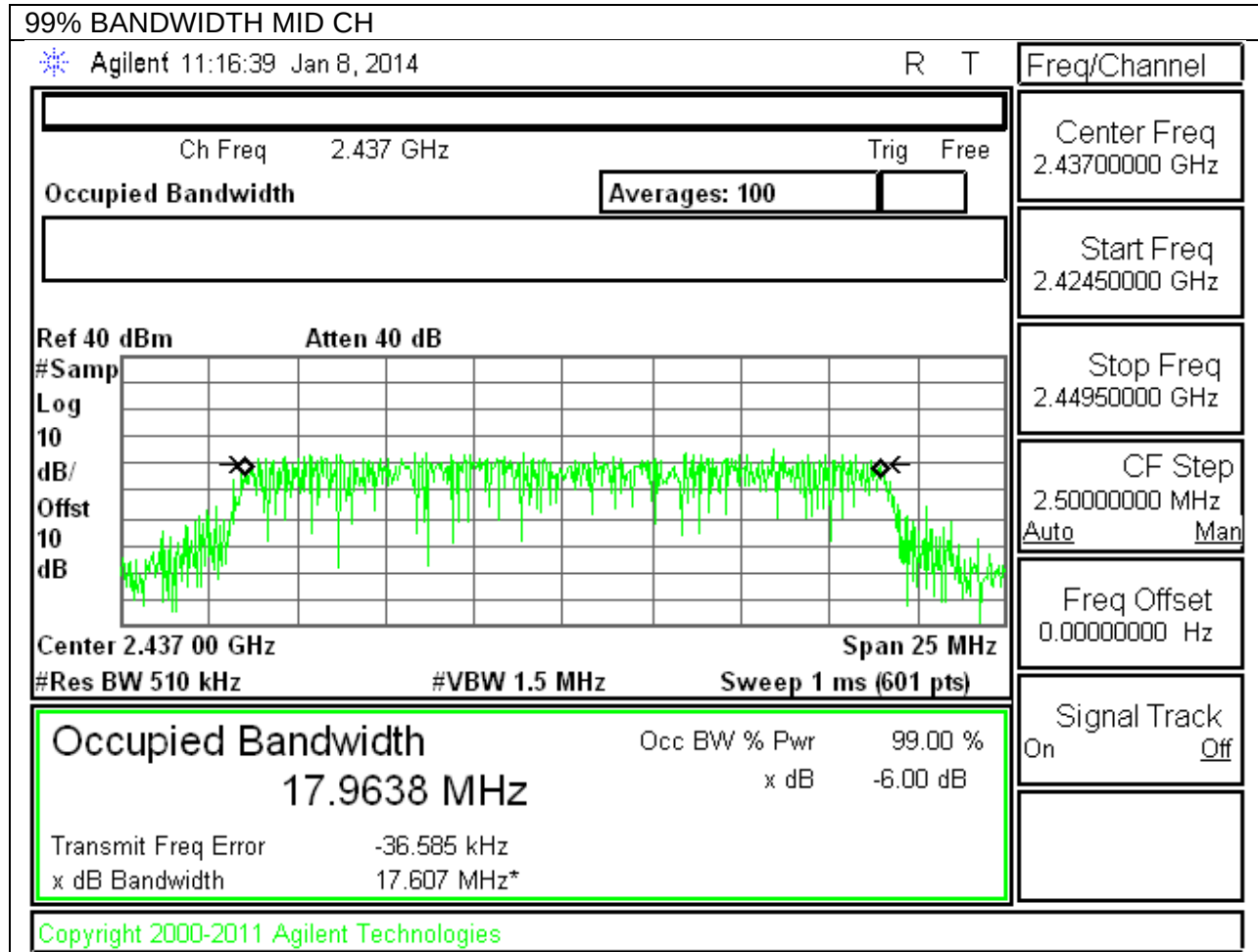
802.11b 99% BANDWIDTH



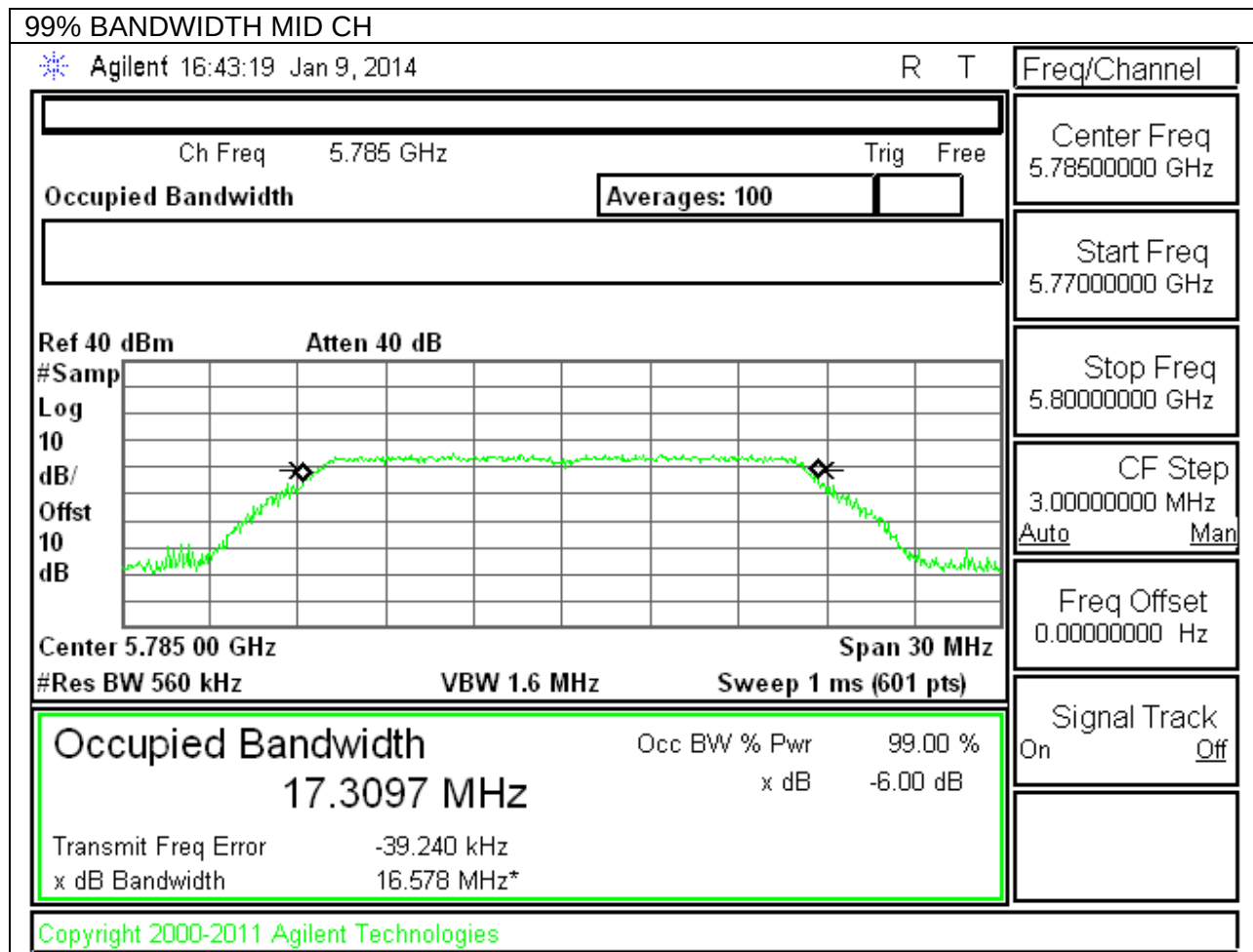
802.11g 99% BANDWIDTH



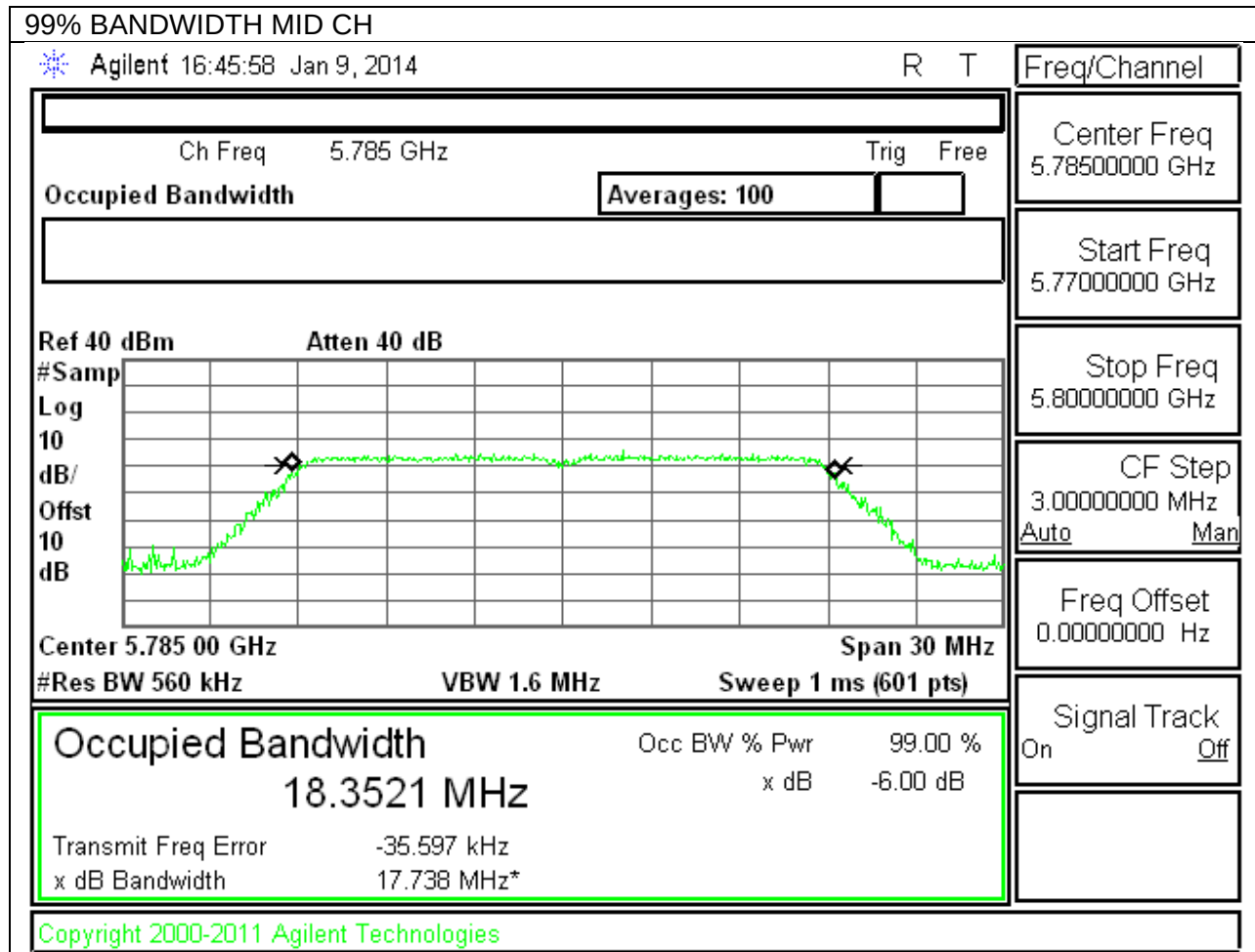
802.11n 99% BANDWIDTH



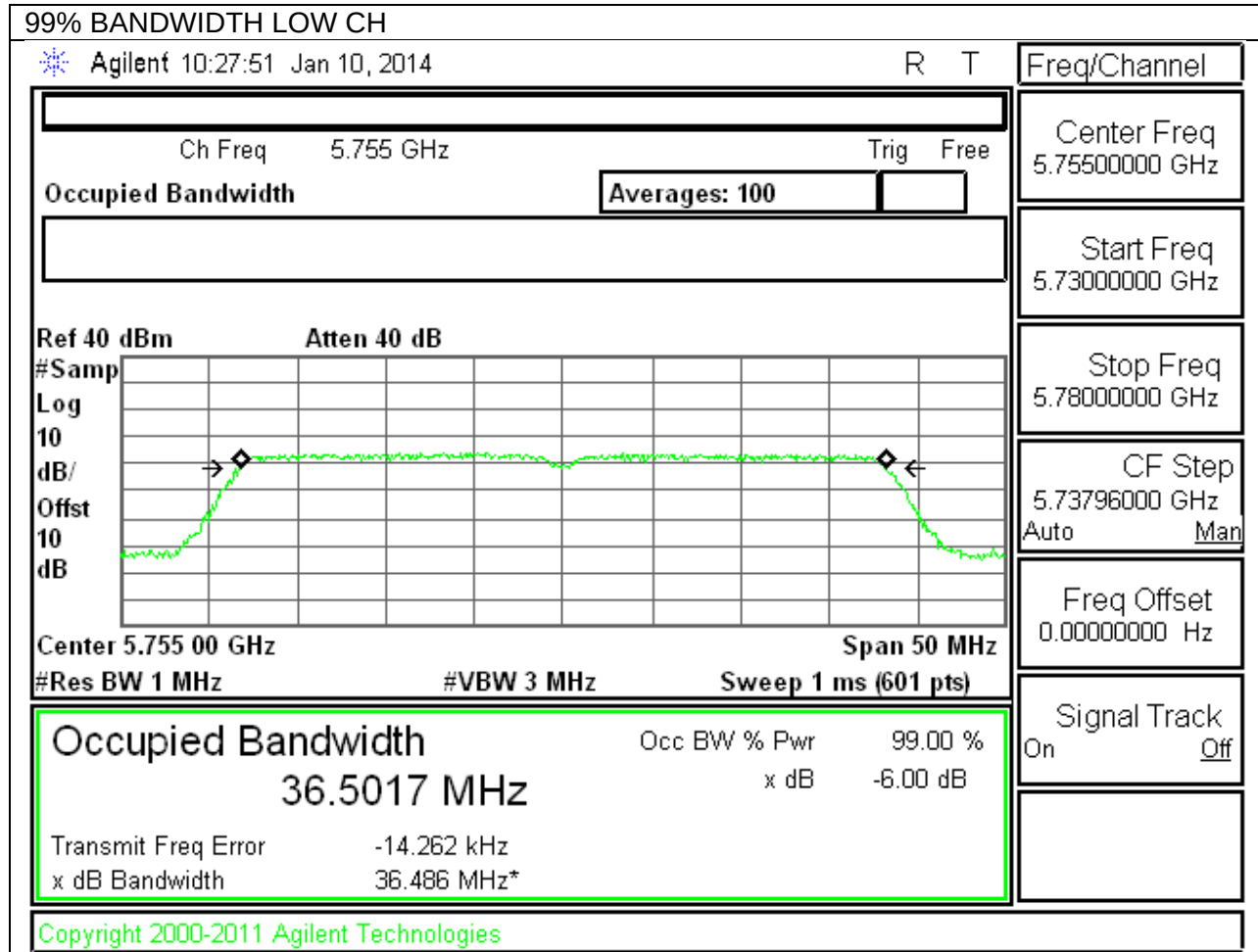
802.11a HT20 5.8GHz Mode 99% BANDWIDTH



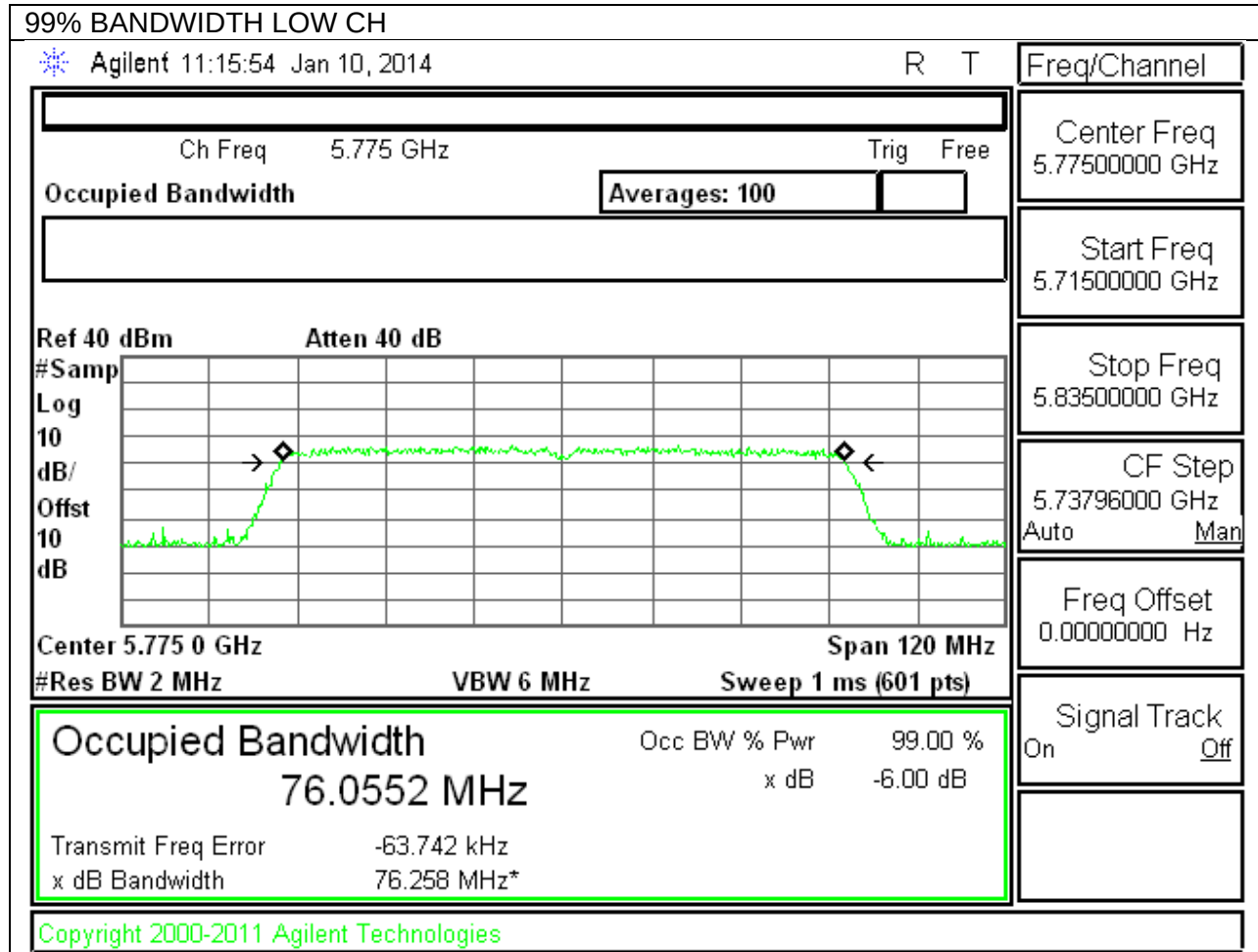
802.11n HT20 5.8GHz Mode 99% BANDWIDTH



802.11n HT40 5.8GHz Mode 99% BANDWIDTH



802.11ac HT80 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 0.2 dB (including 10 dB pad and 0.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	18.00
Mid	2437	18.10
High	2462	18.00
Worst		18.100

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	12.00
Mid	2437	12.00
High	2462	12.00
Worst		12.000

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	14.00
Mid	2437	14.00
High	2462	14.00
Worst		14.000

9.3.4. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	12.400
Mid	5785	12.300
High	5825	12.300
Worst		12.400

9.3.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5745	12.000
Mid	5785	12.000
High	5825	12.000
Worst		12.000

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

9.3.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	5775	11.0
Worst		11.0

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	-1.41	30.00	30	36	30.00
Mid	2437	-1.41	30.00	30	36	30.00
High	2462	-1.41	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	20.51	20.51	30.00	-9.49
Mid	2437	20.71	20.71	30.00	-9.29
High	2462	20.34	20.34	30.00	-9.66
Worst			20.71		

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	-1.41	30.00	30	36	30.00
Mid	2437	-1.41	30.00	30	36	30.00
High	2462	-1.41	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	22.65	22.65	30.00	-7.35
Mid	2437	22.46	22.46	30.00	-7.54
High	2462	22.23	22.23	30.00	-7.77
Worst			22.65		

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	-1.41	30.00	30	36	30.00
Mid	2437	-1.41	30.00	30	36	30.00
High	2462	-1.41	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	21.92	21.92	30.00	-8.08
Mid	2437	21.79	21.79	30.00	-8.21
High	2462	21.35	21.35	30.00	-8.65
Worst			21.92		

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	1.68	30.00	30	36	30.00
Mid	5785	1.68	30.00	30	36	30.00
High	5825	1.68	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	19.95	19.95	30.00	-10.05
Mid	5785	19.44	19.44	30.00	-10.56
High	5825	19.39	19.39	30.00	-10.61
Worst			19.95		

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	1.68	30.00	30	36	30.00
Mid	5785	1.68	30.00	30	36	30.00
High	5825	1.68	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	20.09	20.09	30.00	-9.91
Mid	5785	19.67	19.67	30.00	-10.33
High	5825	19.55	19.55	30.00	-10.45
Worst			20.09		

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	1.68	30.00	30	36	30.00
High	5795	1.68	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	18.76	18.76	30.00	-11.24
High	5795	18.63	18.63	30.00	-11.37
Worst			18.76		

9.4.7. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

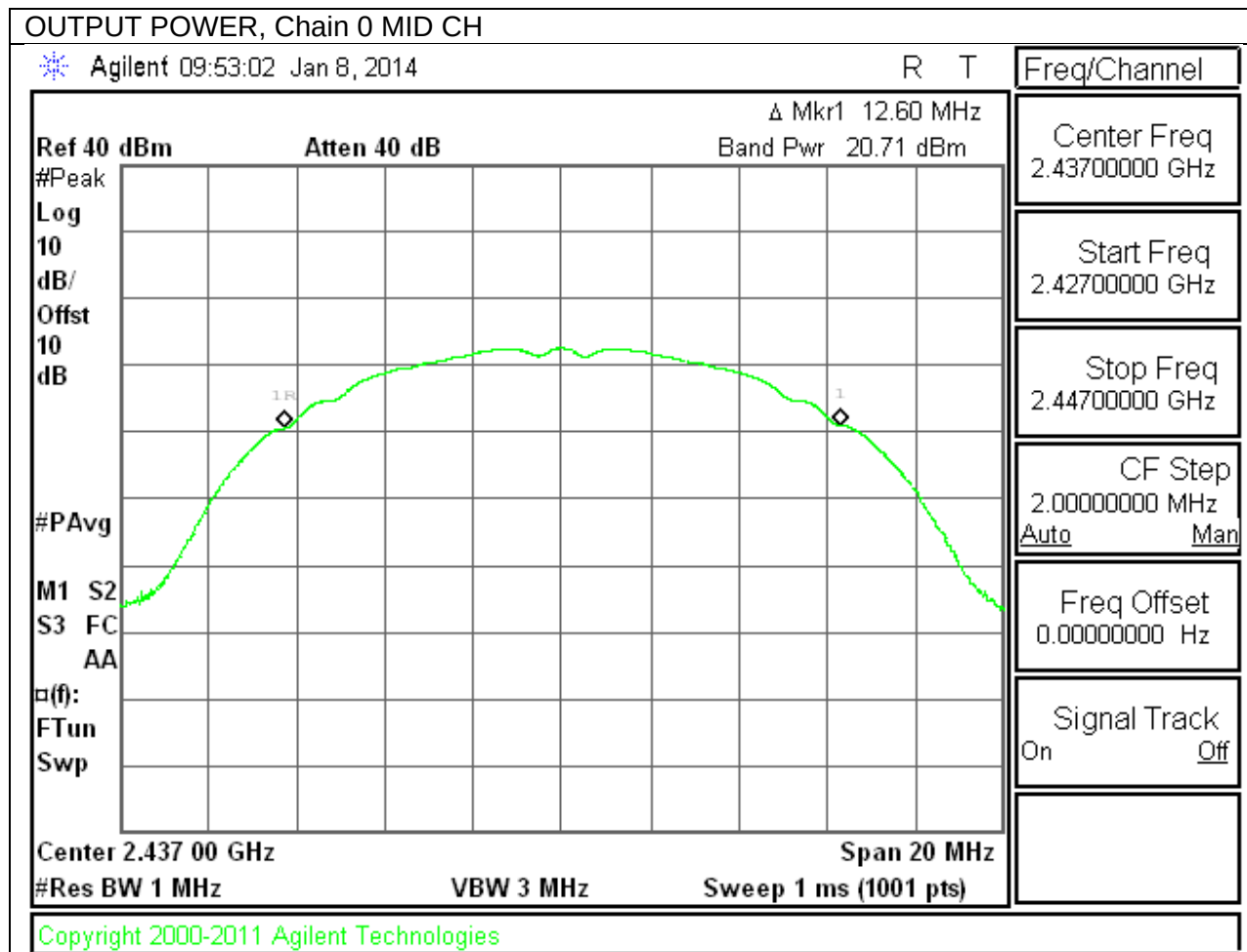
Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5775	1.68	30.00	30	36	30.00

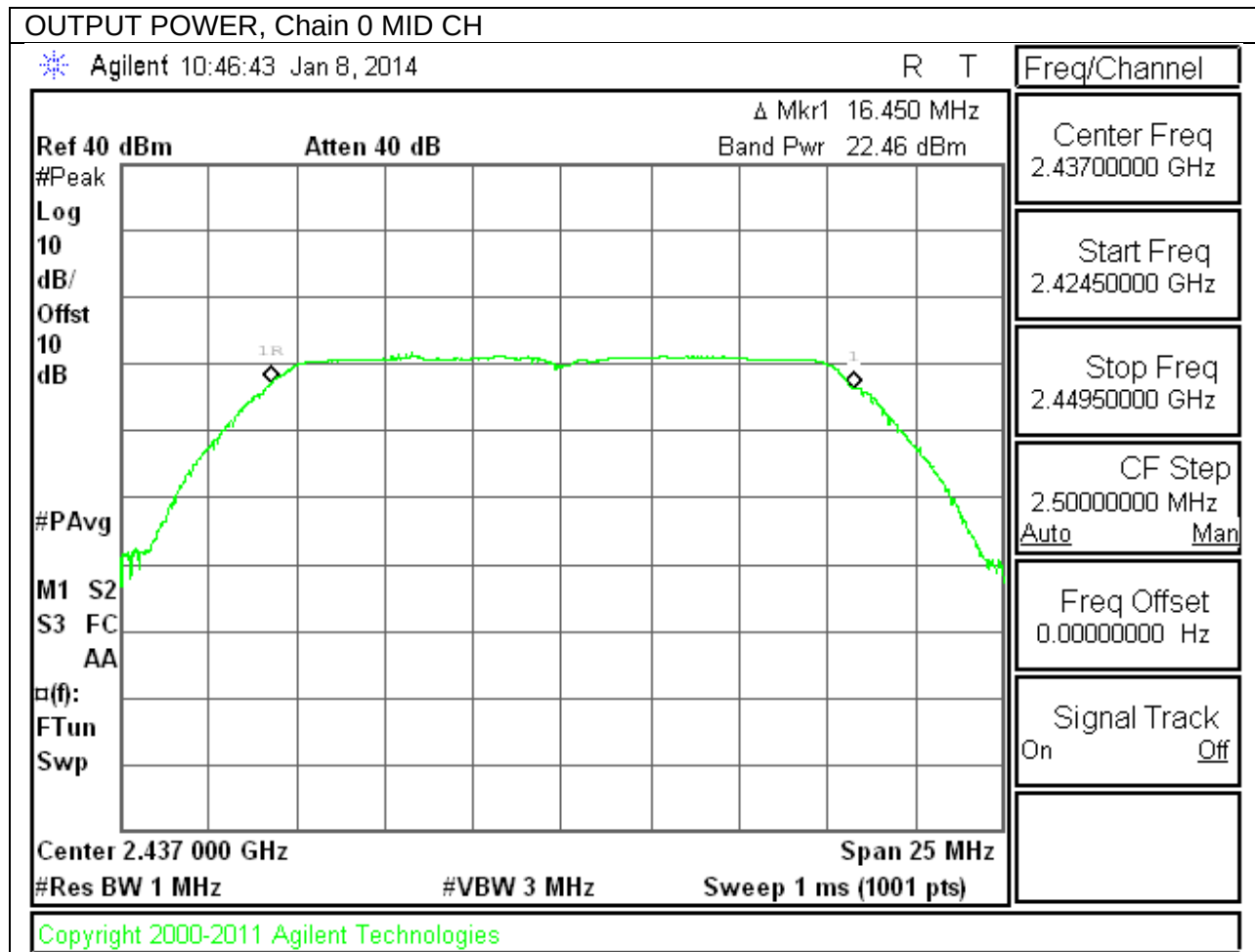
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5775	18.85	18.85	30.00	-11.15
Worst			18.85		

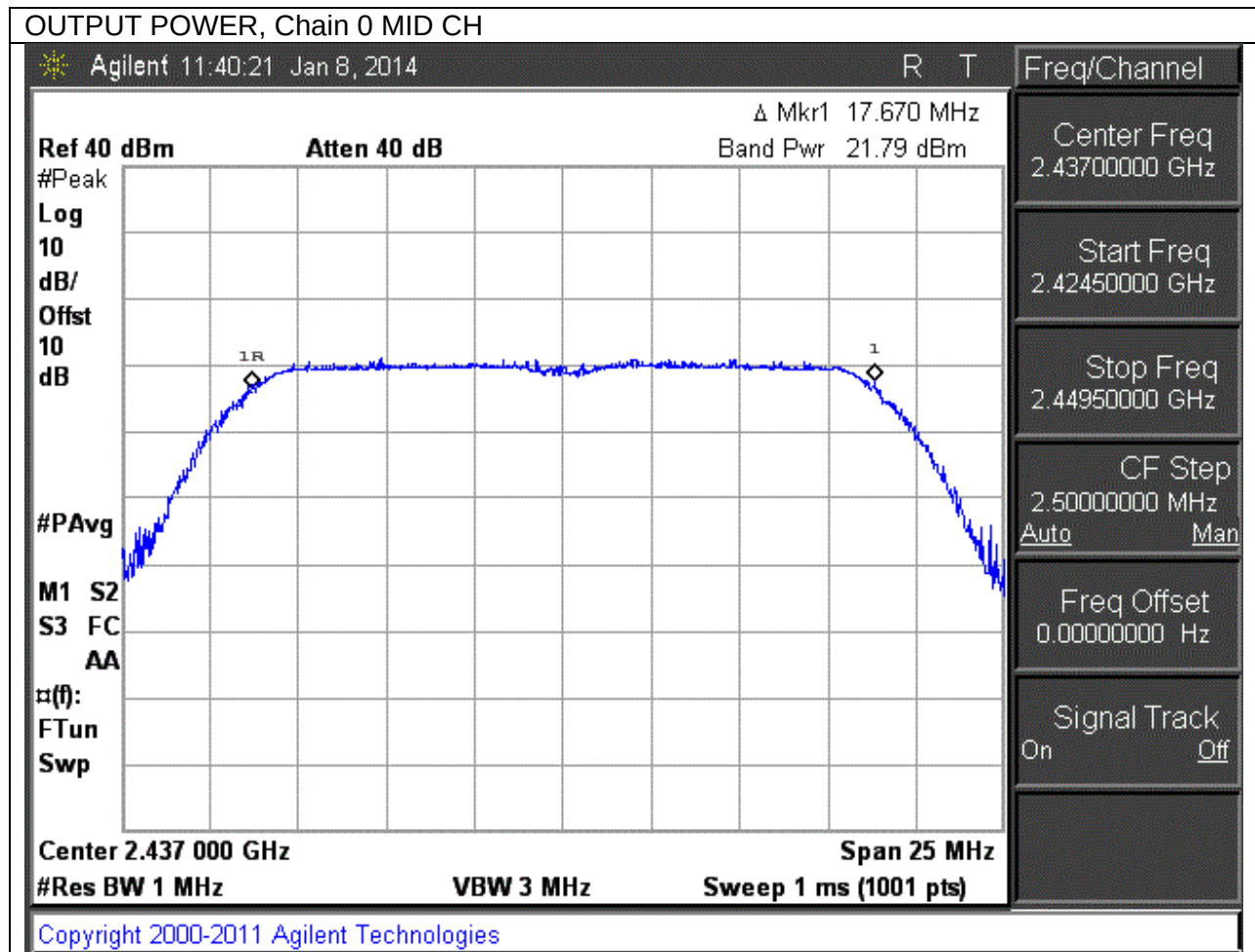
802.11b OUTPUT POWER, Chain 0



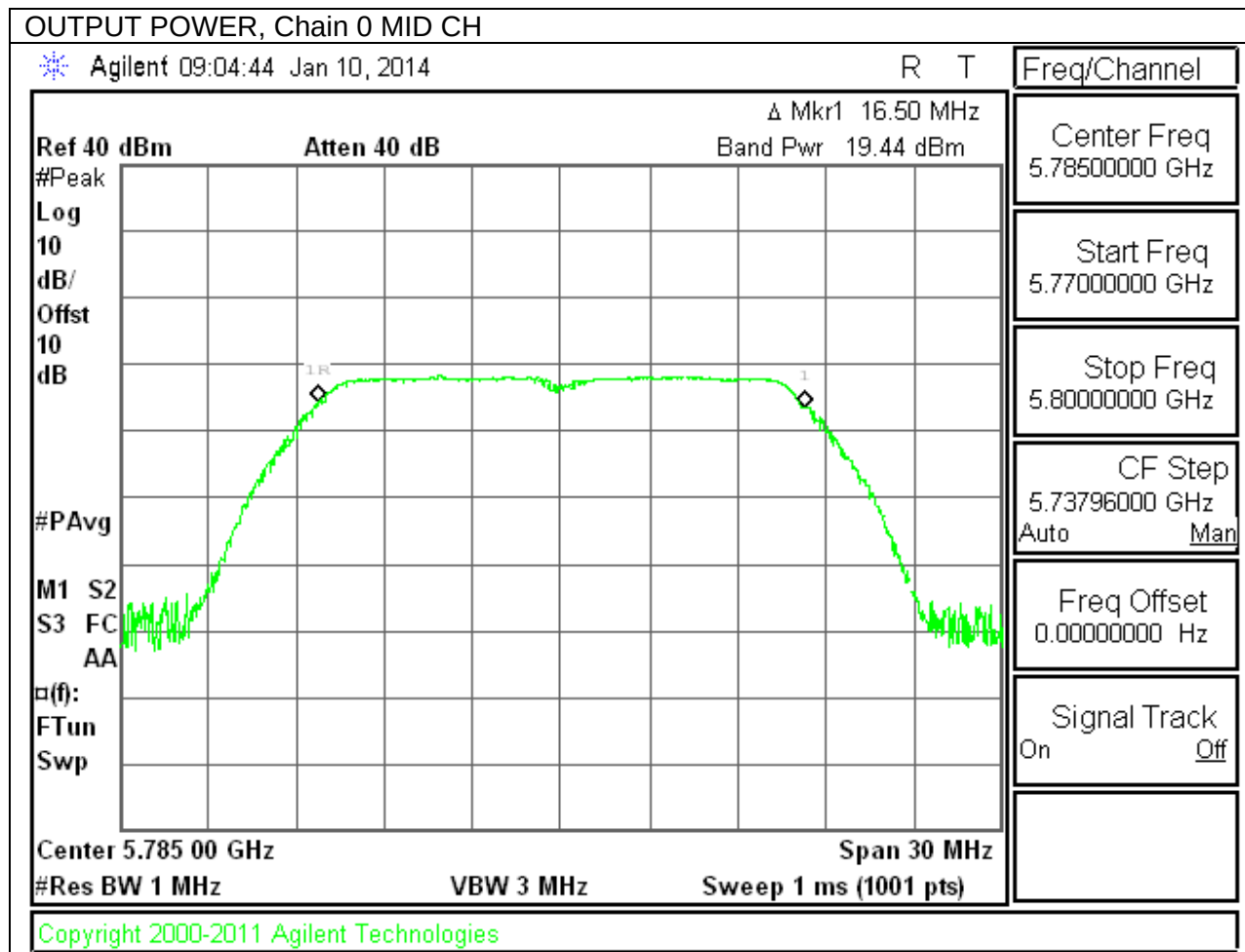
802.11g OUTPUT POWER, Chain 0



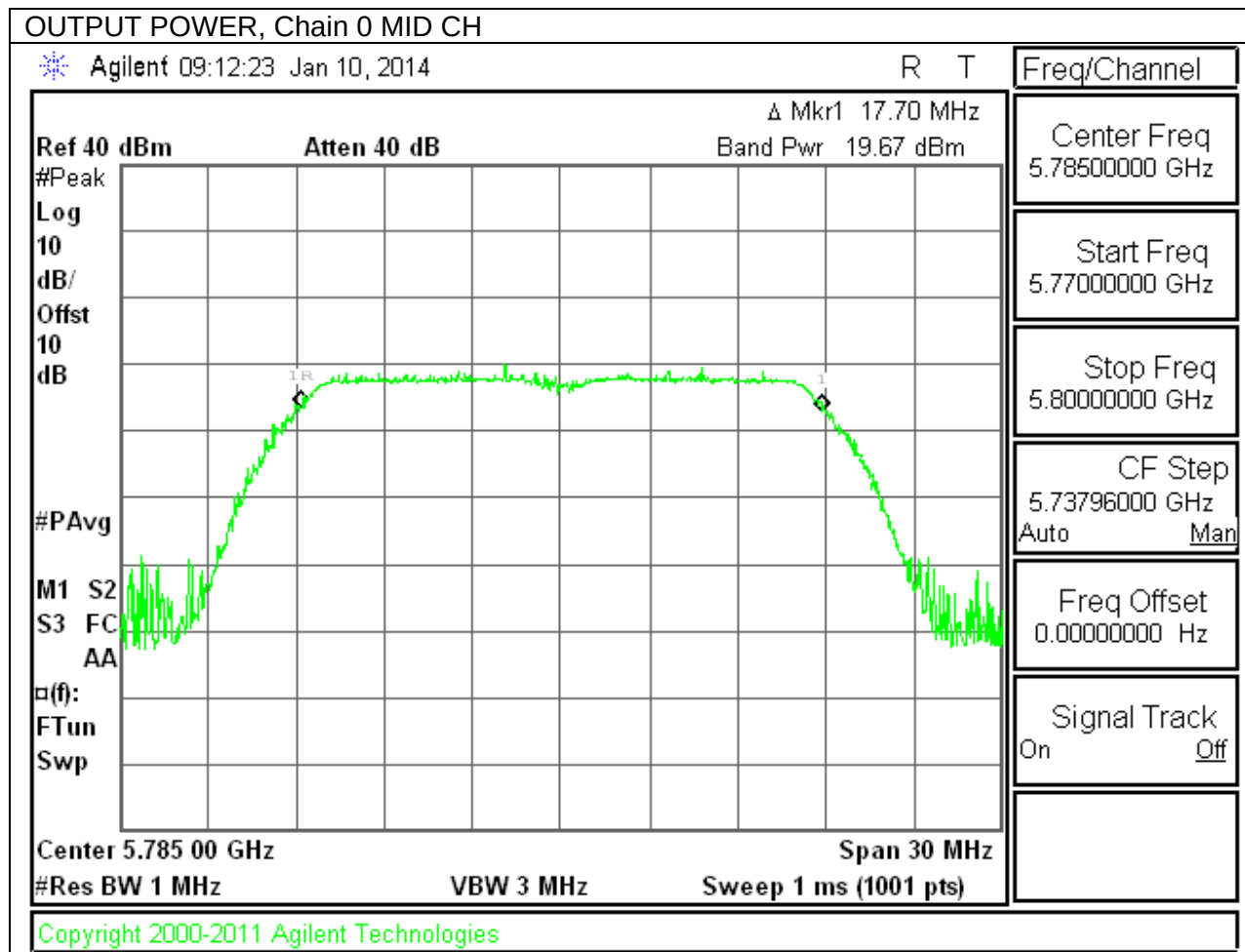
802.11n OUTPUT POWER, Chain 0



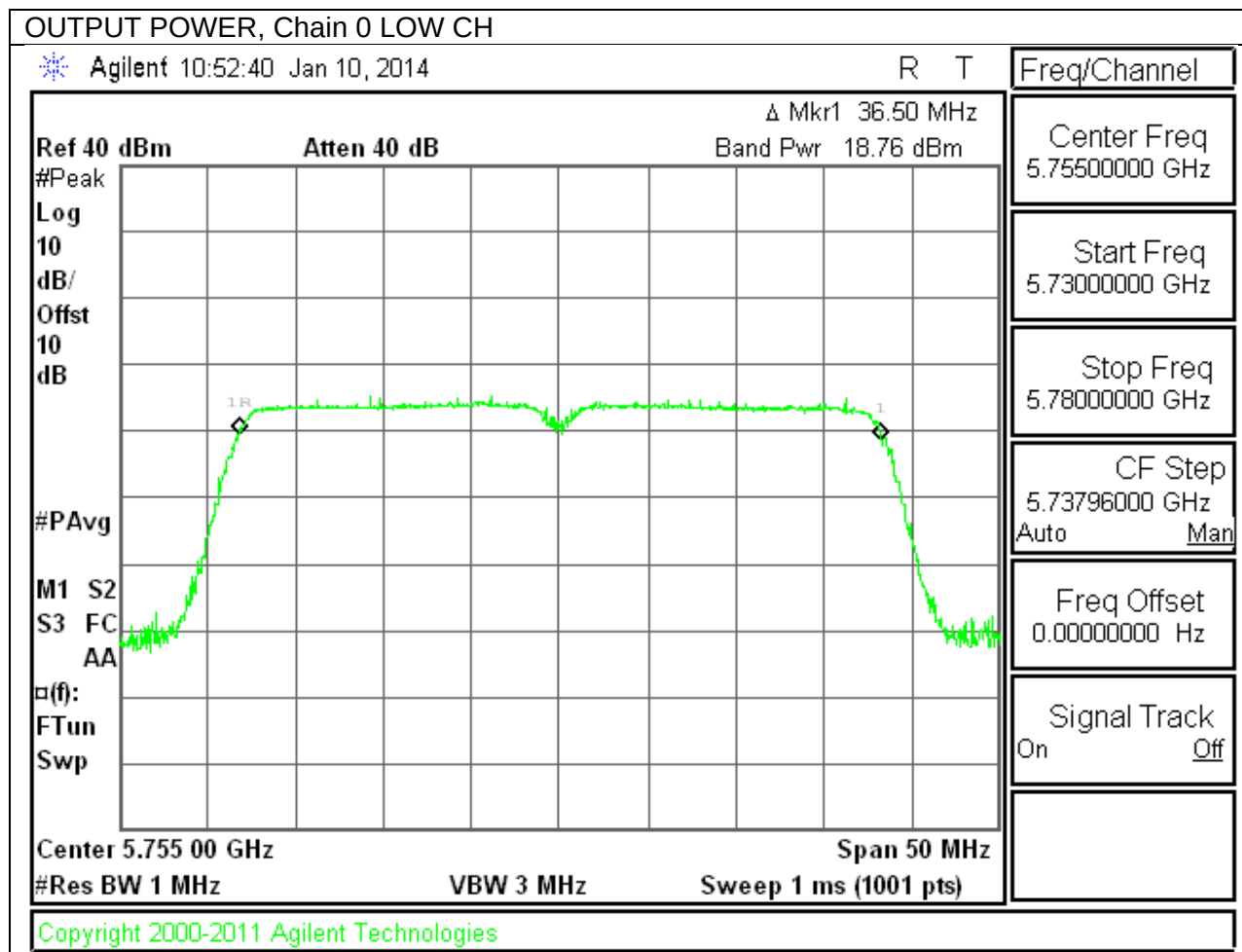
802.11a HT20 5.8GHz Mode OUTPUT POWER, Chain 0



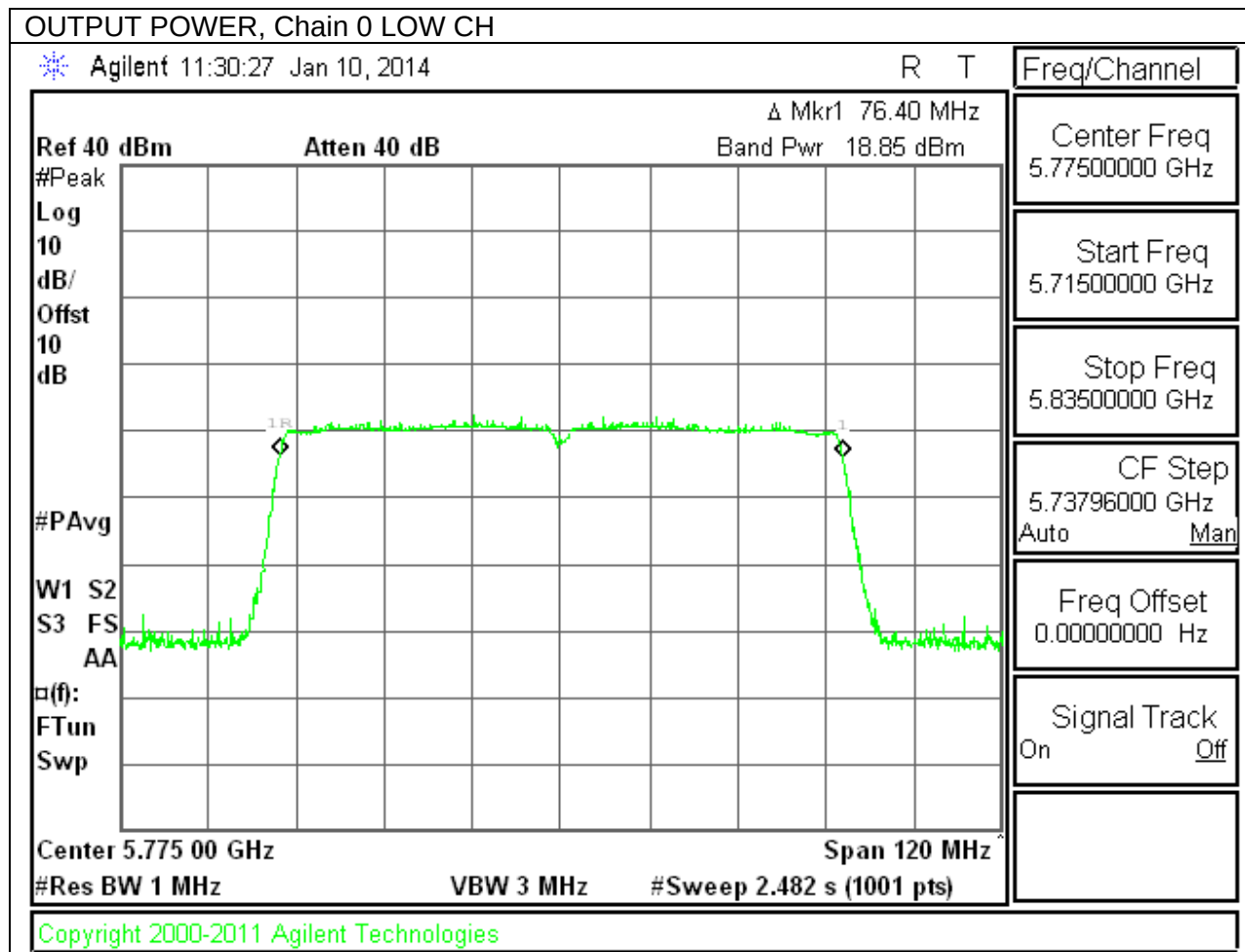
802.11n HT20 5.8GHz Mode OUTPUT POWER, Chain 0



802.11n HT40 5.8GHz Mode OUTPUT POWER, Chain 0



802.11ac HT80 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	-5.15	8.0	-13.2
Mid	2437	-4.82	8.0	-12.8
High	2462	-4.55	8.0	-12.6

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	-11.08	8.0	-19.1
Mid	2437	-10.50	8.0	-18.5
High	2462	-10.09	8.0	-18.1

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	-14.88	8.0	-22.9
Mid	2437	-10.34	8.0	-18.3
High	2462	-12.01	8.0	-20.0

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	-13.23	8.0	-21.2
Mid	5785	-16.36	8.0	-24.4
High	5825	-14.77	8.0	-22.8

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	-13.67	8.0	-21.7
Mid	5785	-14.78	8.0	-22.8
High	5825	-15.14	8.0	-23.1

9.5.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

PSD Results

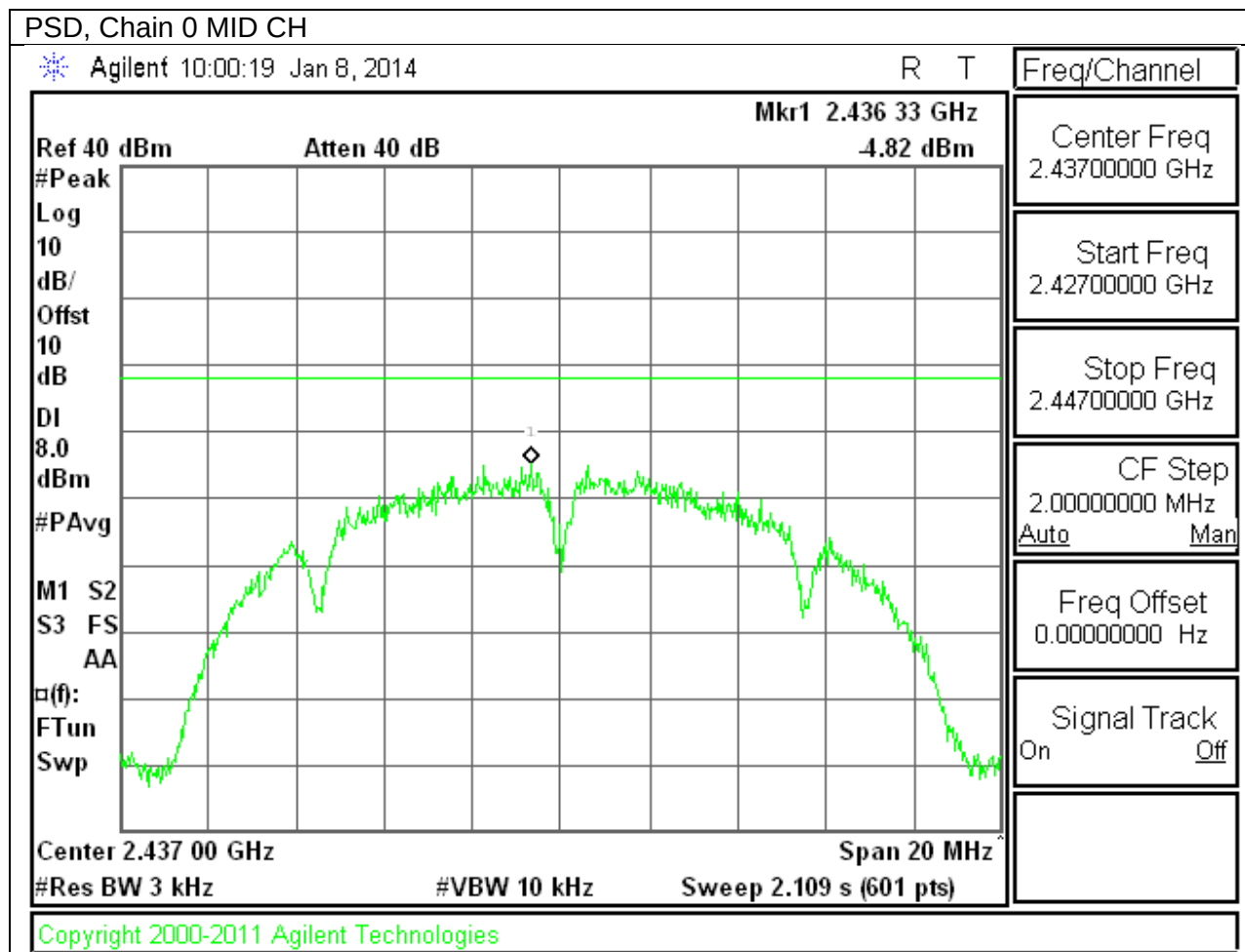
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-16.95	8.0	-25.0
High	5795	-18.65	8.0	-26.7

9.5.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

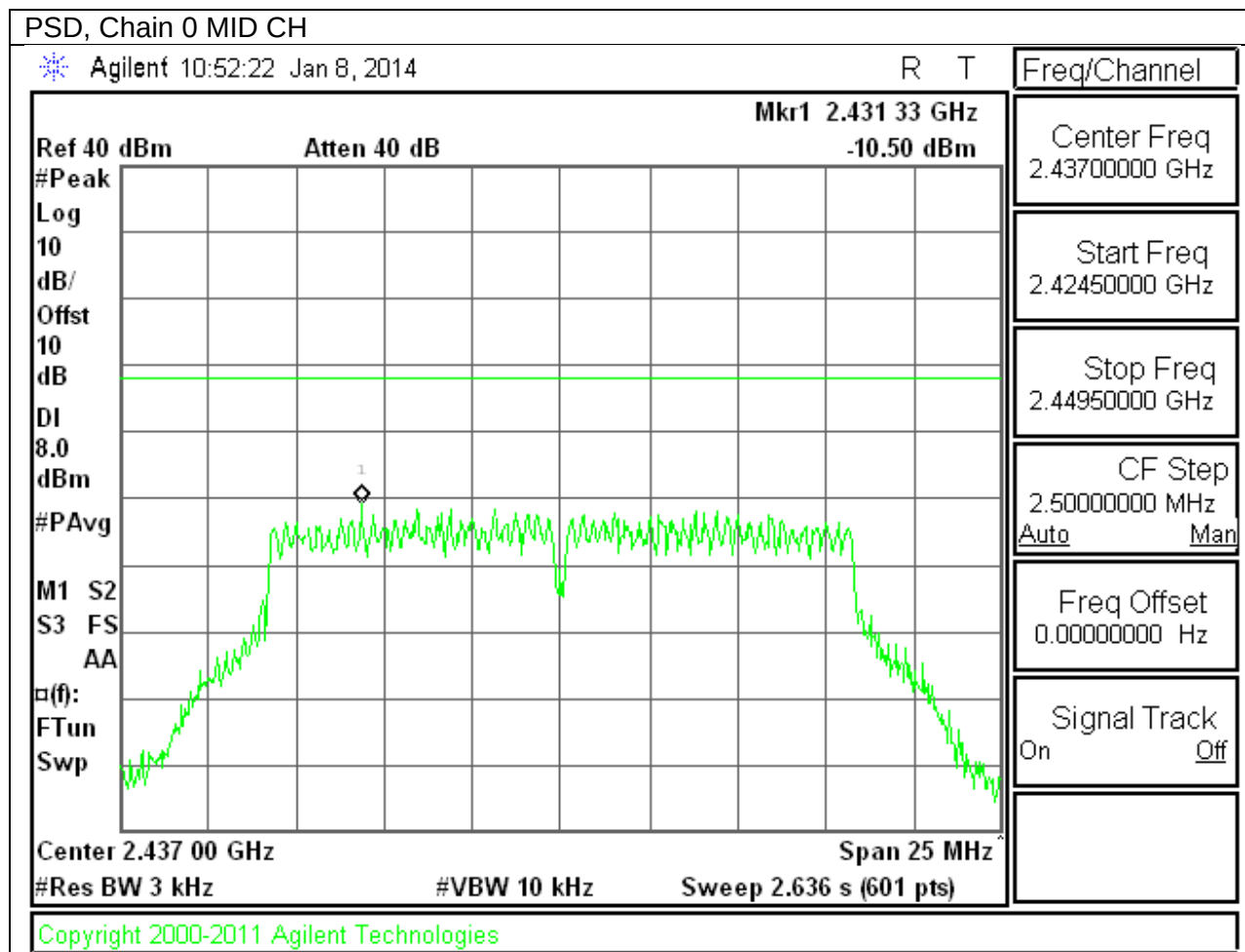
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	5775	-21.10	8.0	-29.1

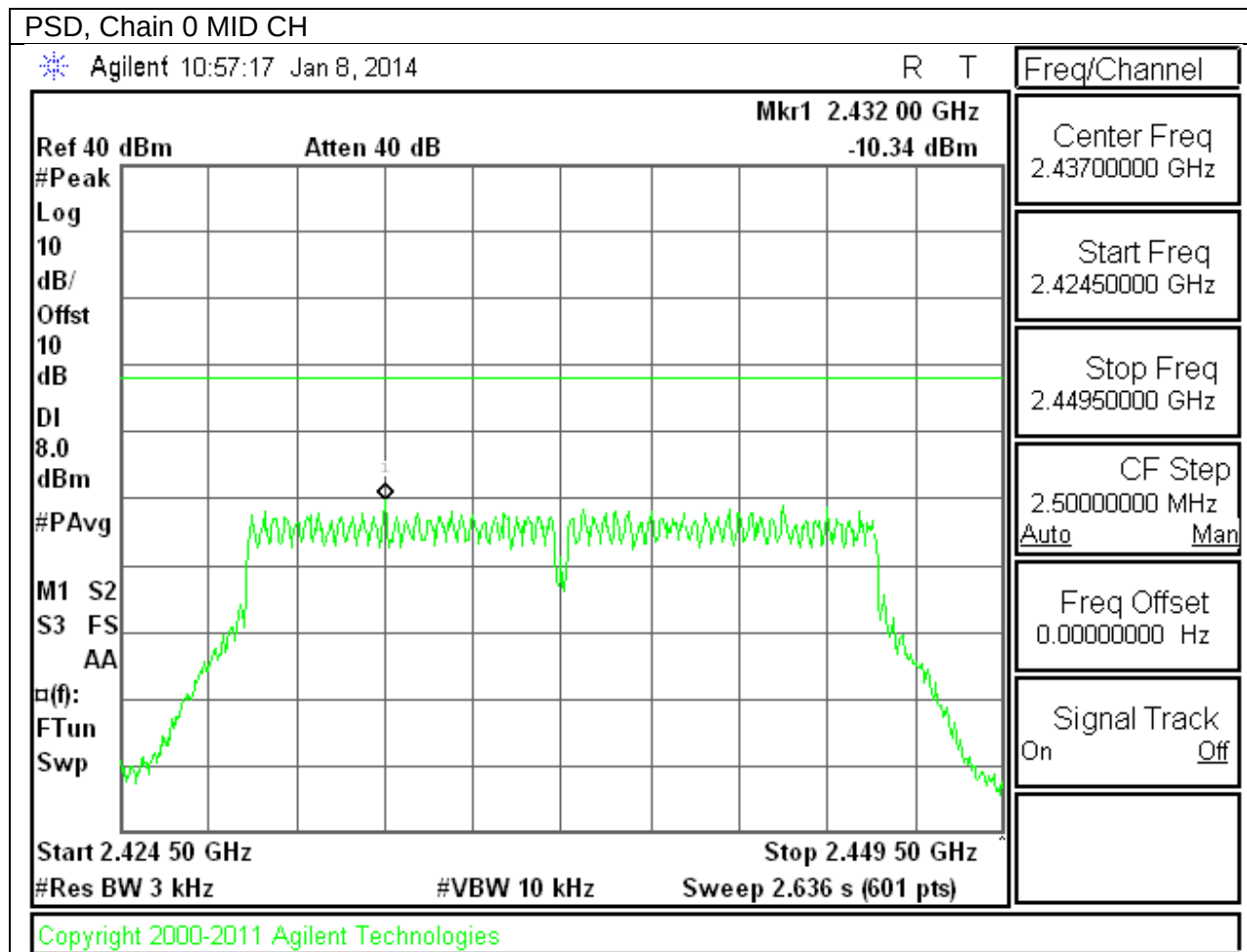
802.11b PSD, Chain 0



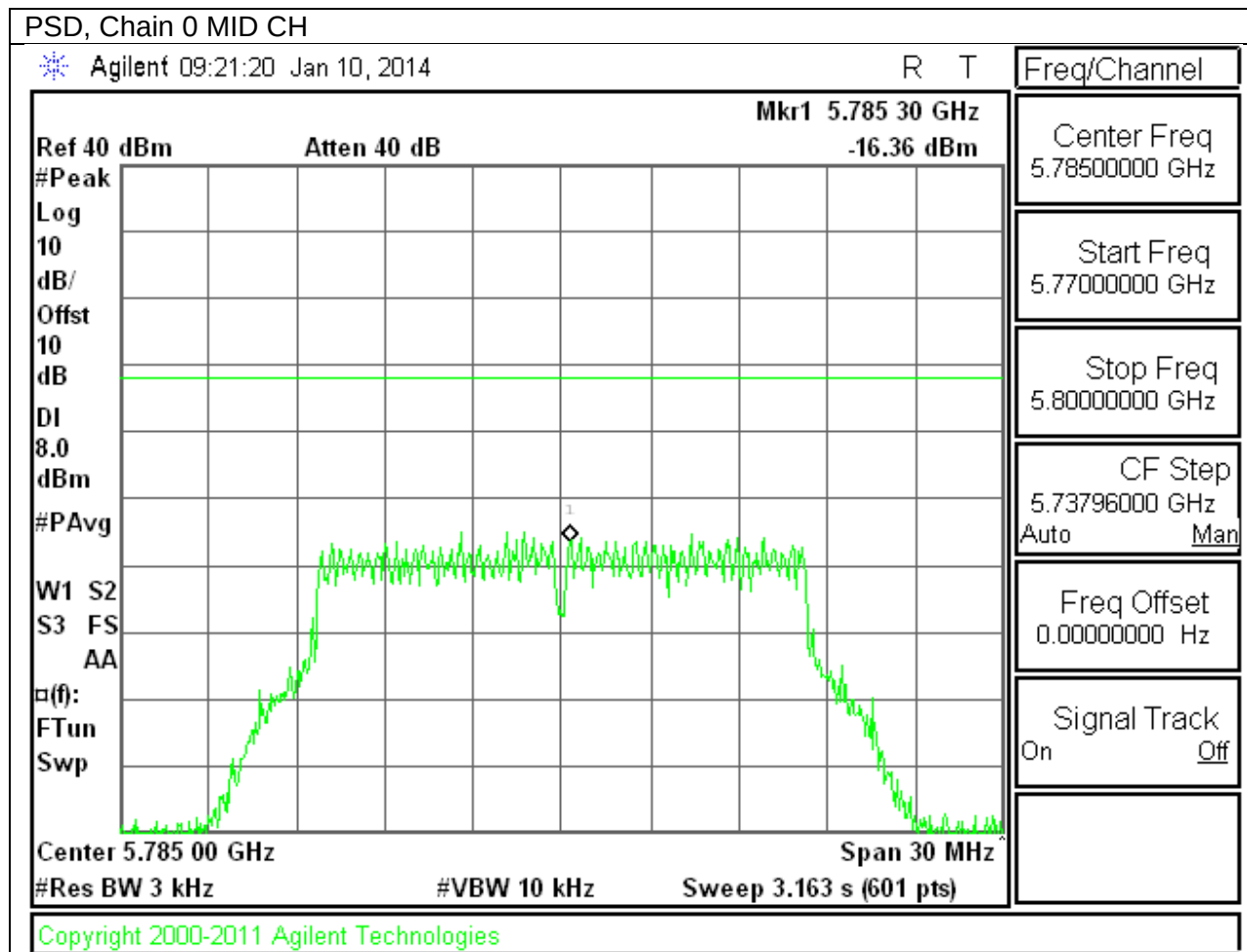
802.11g PSD, Chain 0



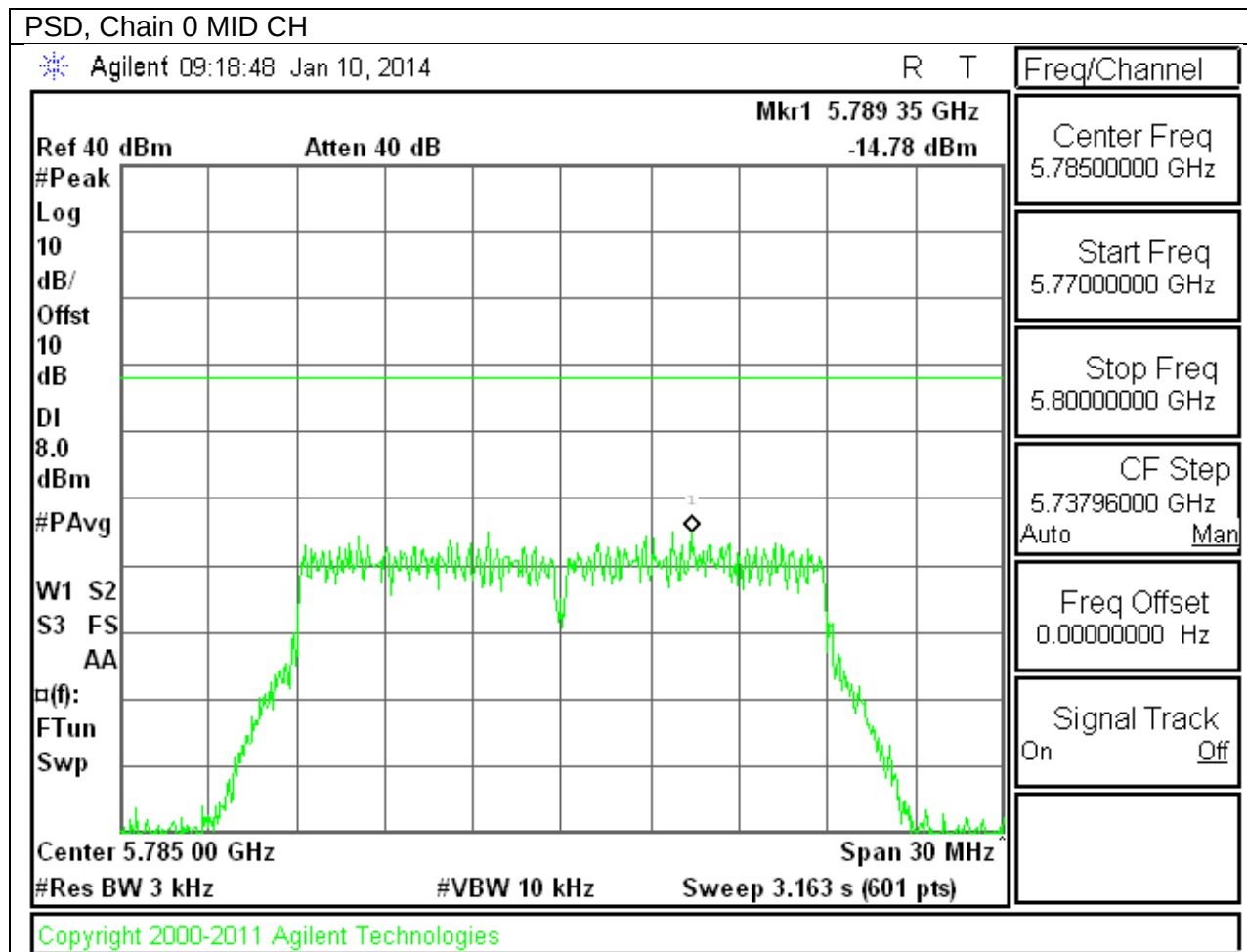
802.11n PSD, Chain 0



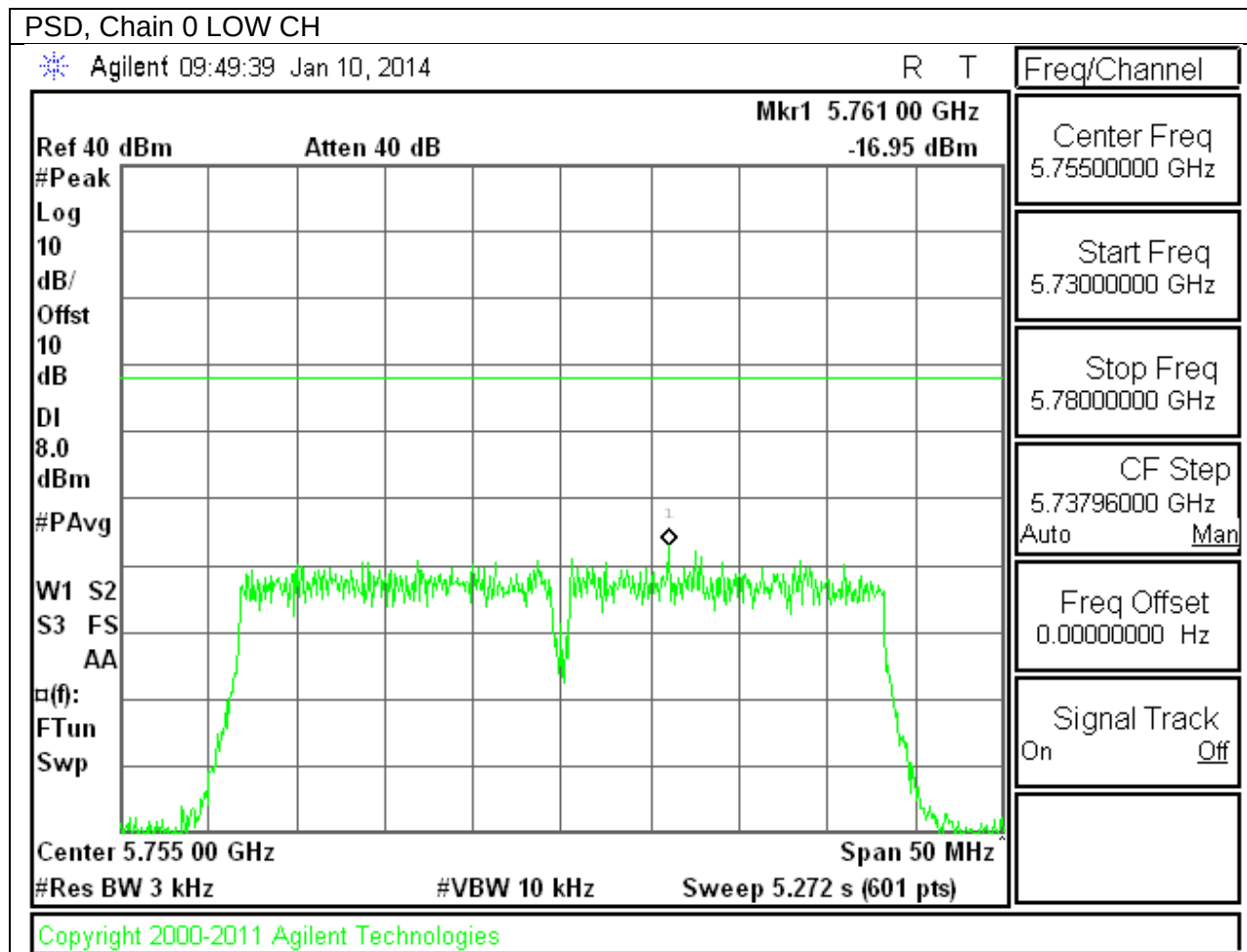
802.11a HT20 5.8GHz Mode PSD, Chain 0



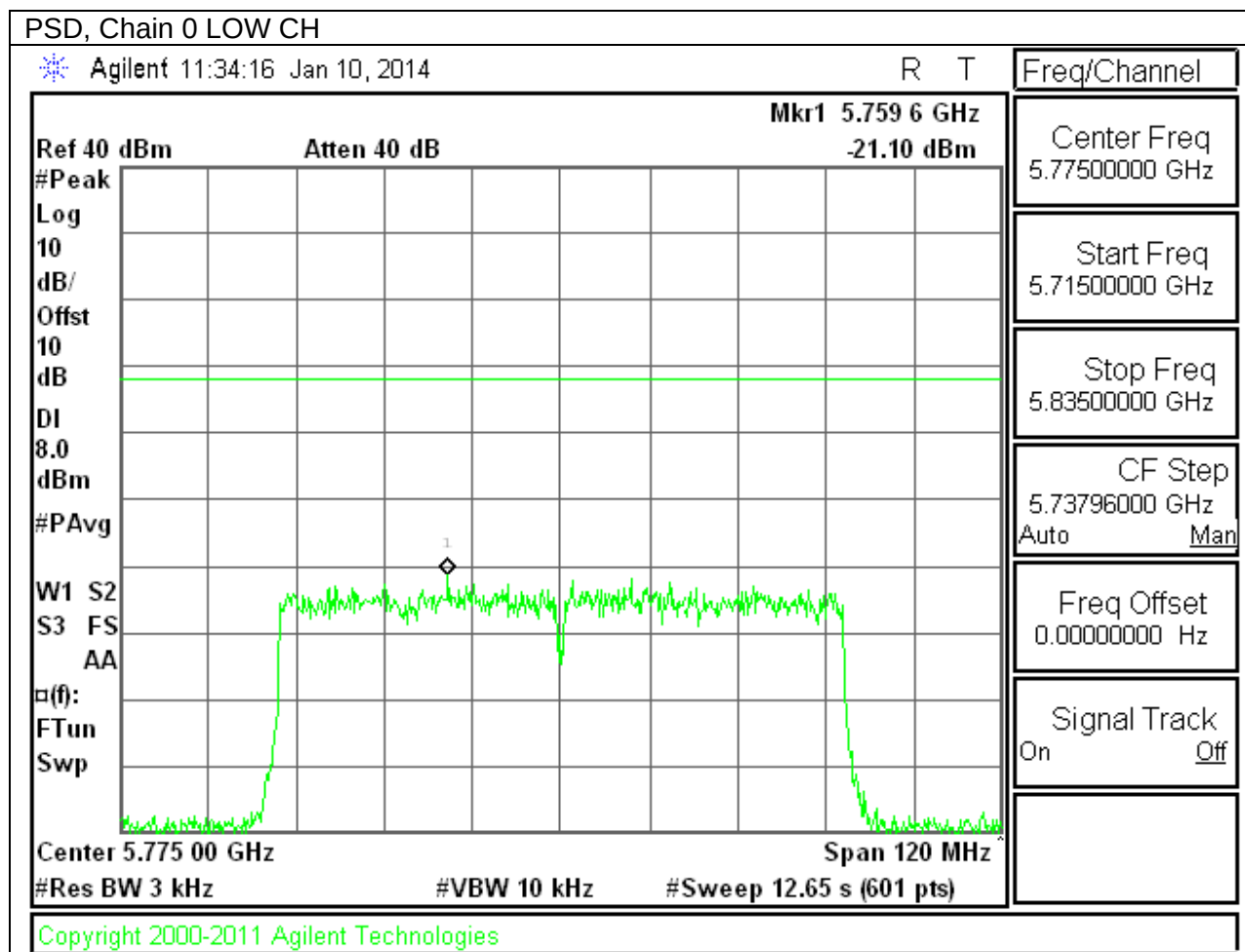
802.11n HT20 5.8GHz Mode PSD, Chain 0



802.11n HT40 5.8GHz Mode PSD, Chain 0



802.11ac HT80 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.

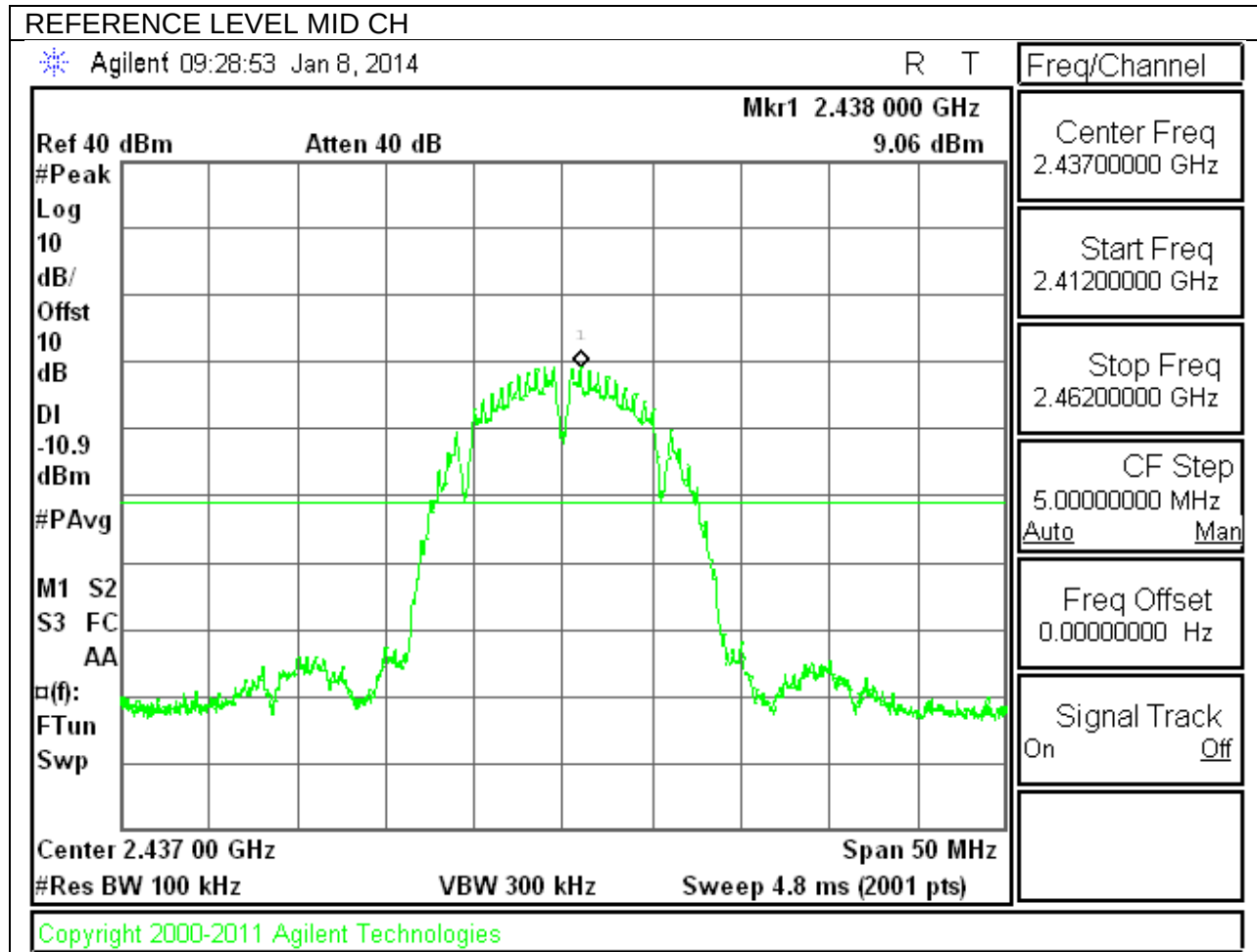
TEST PROCEDURE

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.

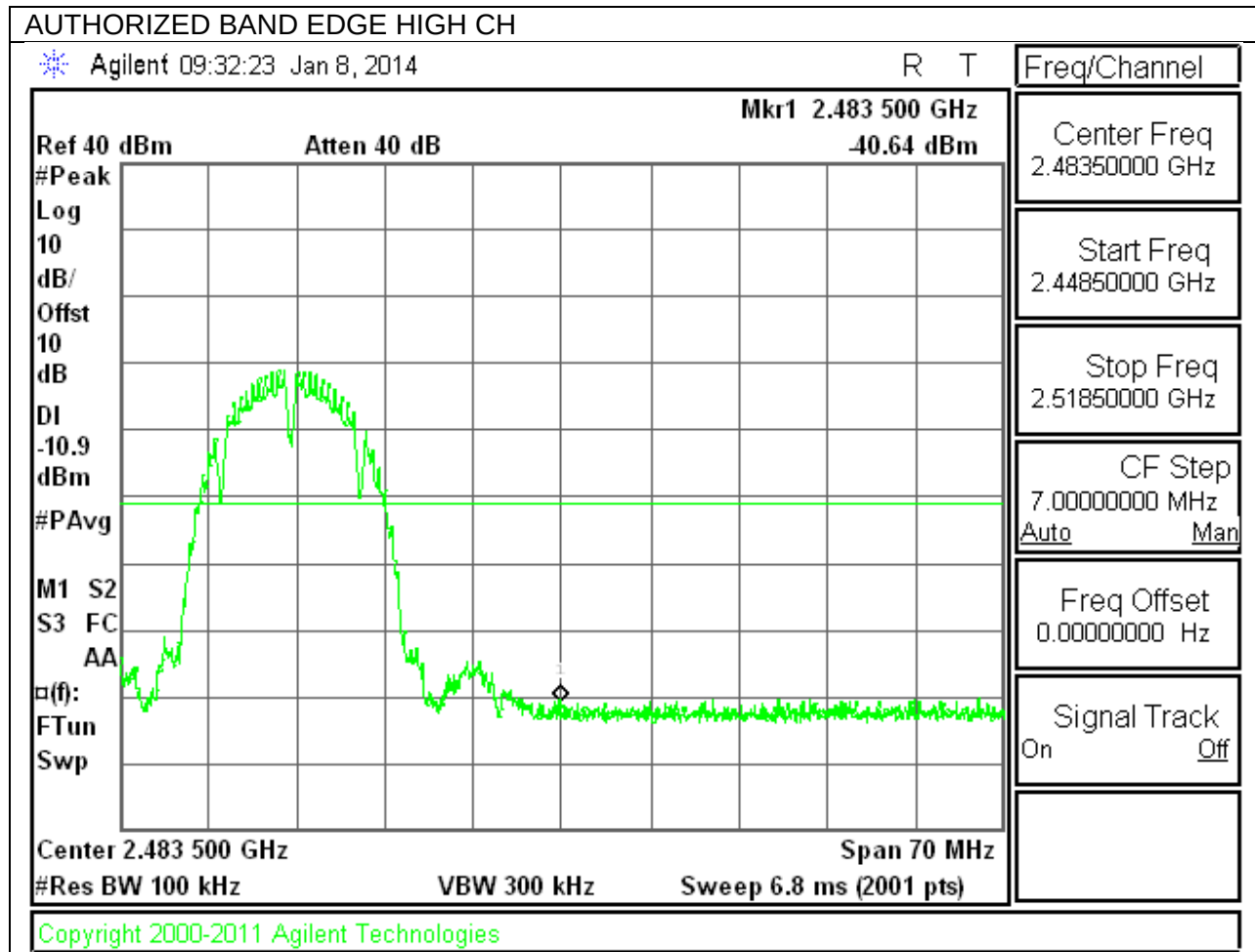
RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

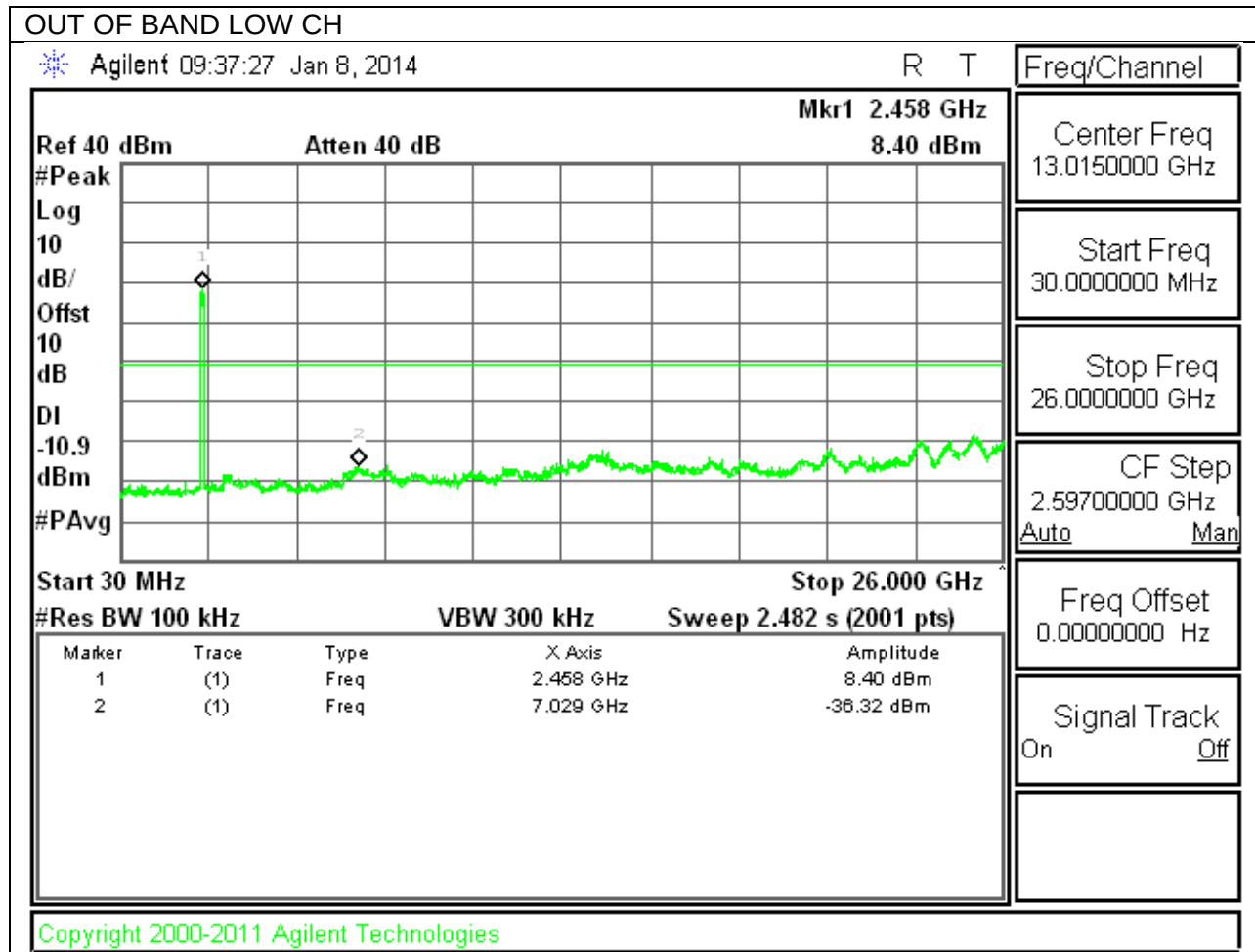
IN-BAND REFERENCE LEVEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS

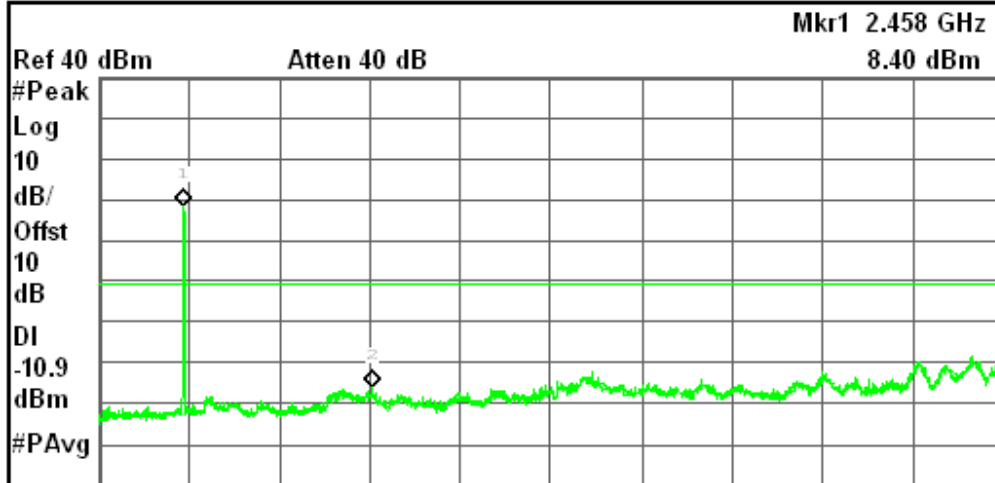


OUT OF BAND MID CH

Agilent 09:36:03 Jan 8, 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	2.458 GHz	8.40 dBm
2	(1)	Freq	7.873 GHz	-36.15 dBm

Signal Track
On Off

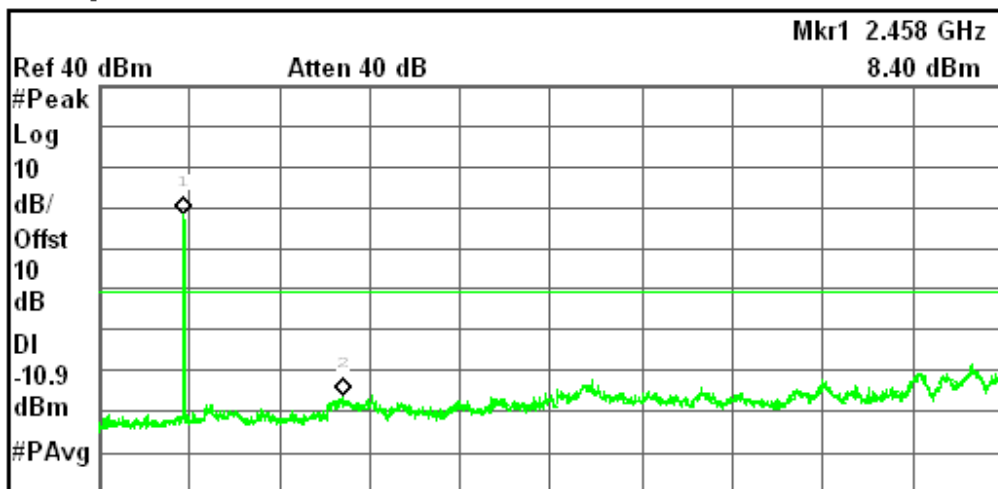
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OUT OF BAND HIGH CH

Agilent 09:35:02 Jan 8, 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

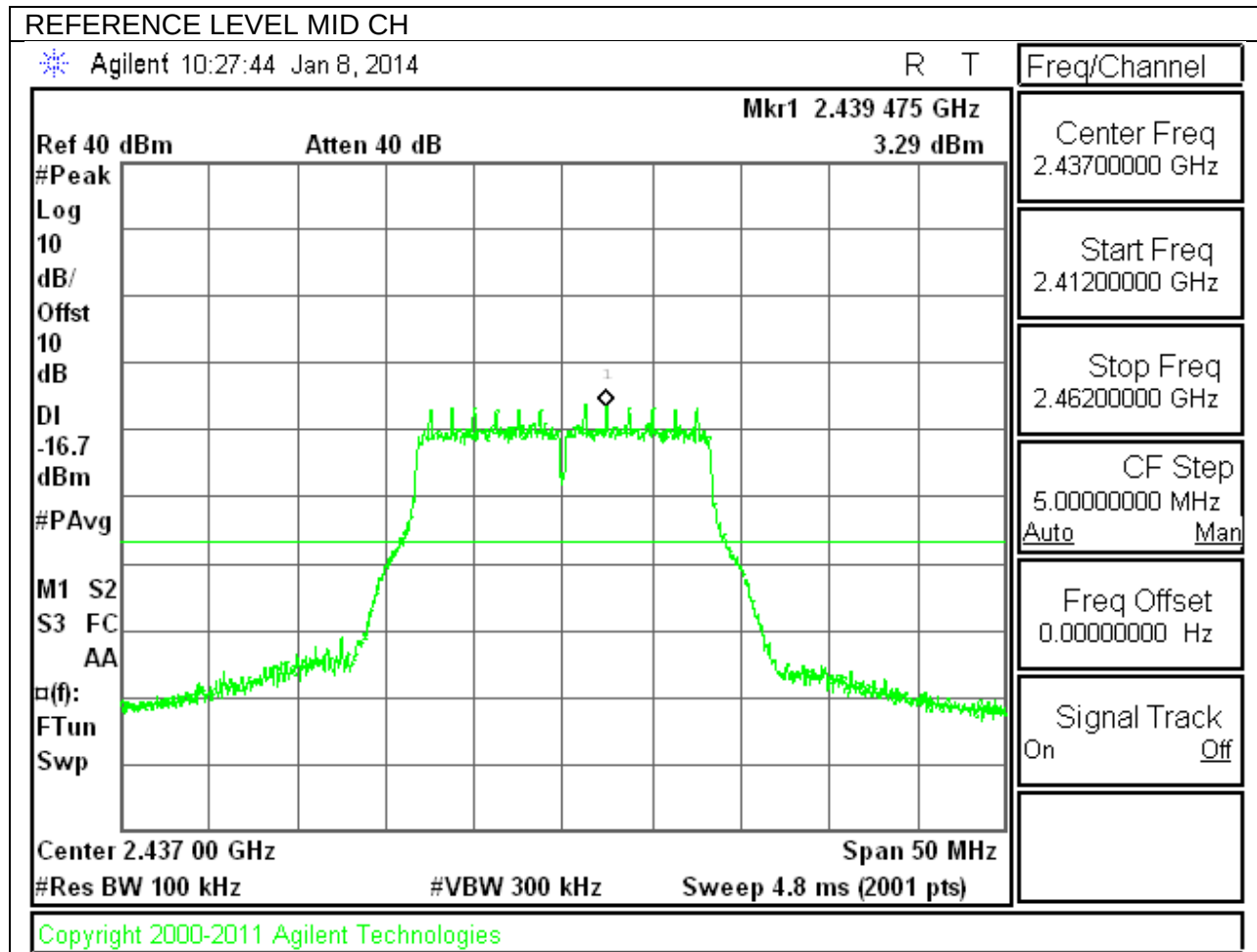
Start 30 MHz Stop 26.000 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.482 s (2001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.458 GHz	8.40 dBm
2	(1)	Freq	7.029 GHz	-36.32 dBm

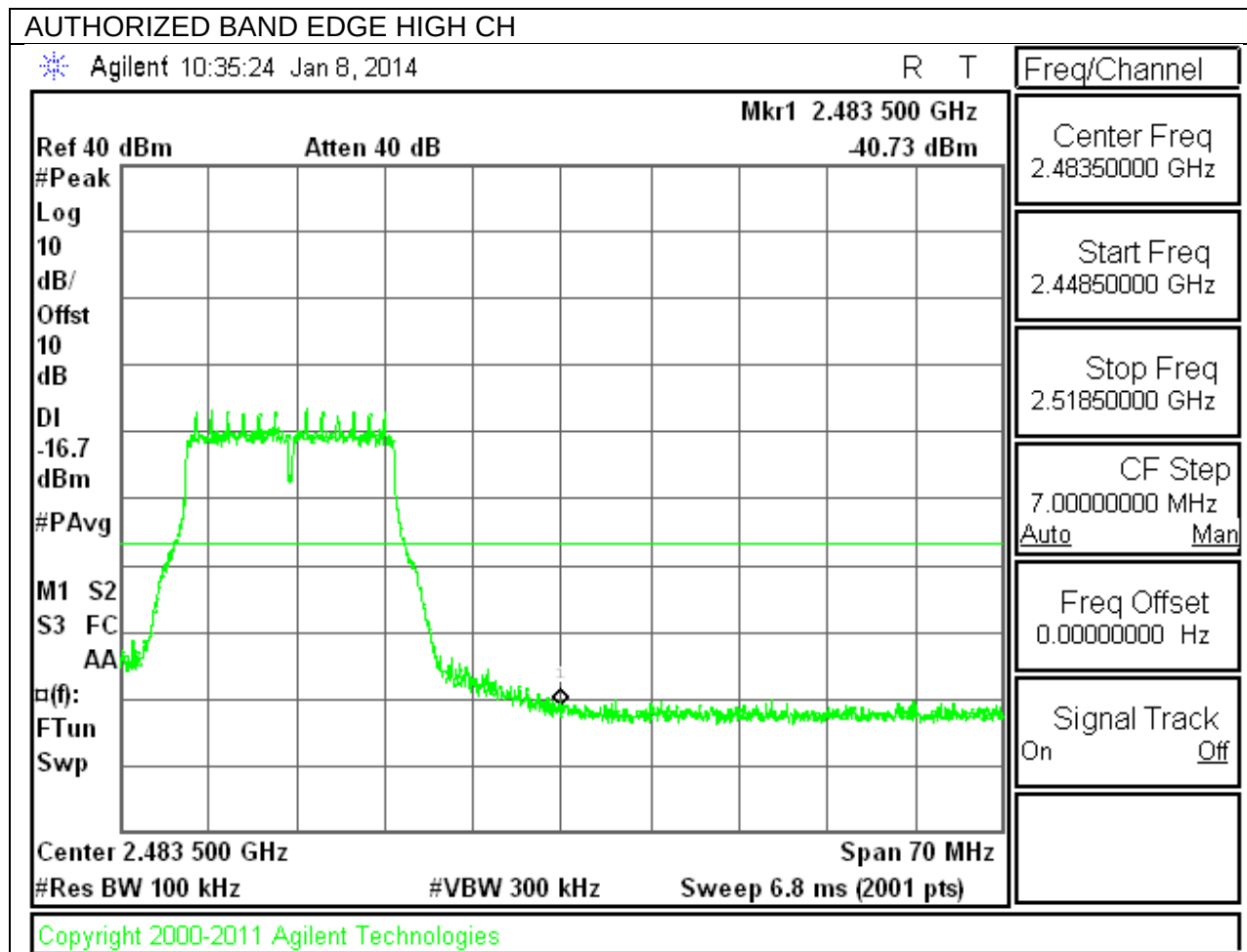
Copyright 2000-2011 Agilent Technologies

9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

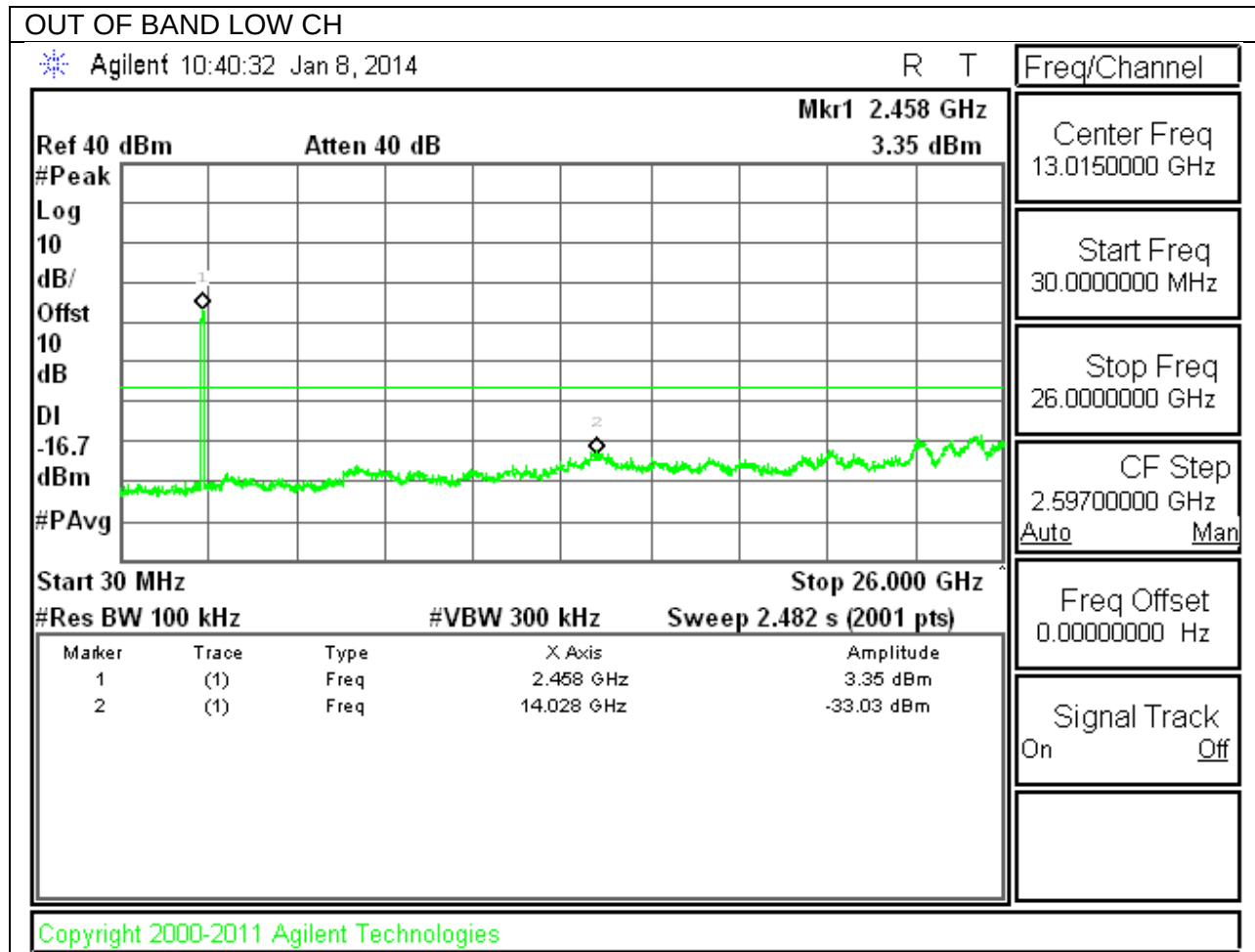
IN-BAND REFERENCE LEVEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS

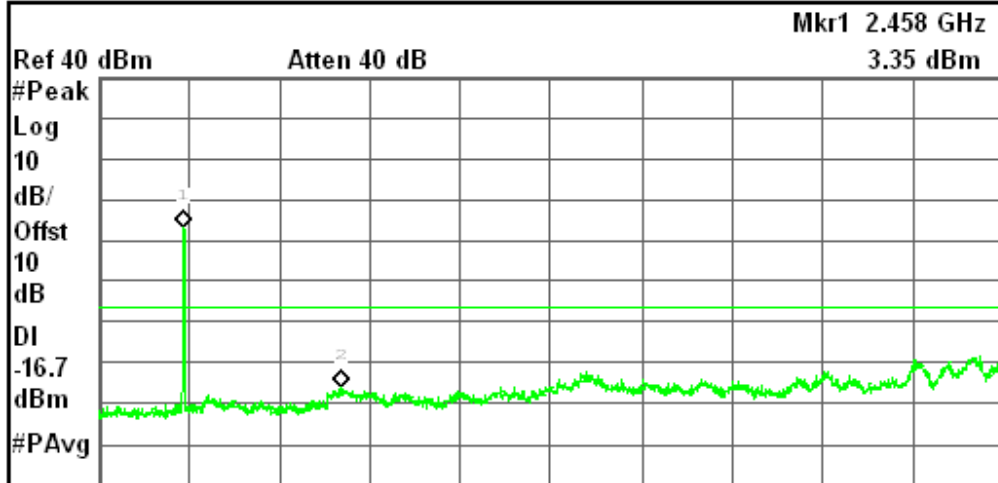


OUT OF BAND MID CH

Agilent 10:38:58 Jan 8, 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

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

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.458 GHz	3.35 dBm
2	(1)	Freq	6.990 GHz	-36.26 dBm

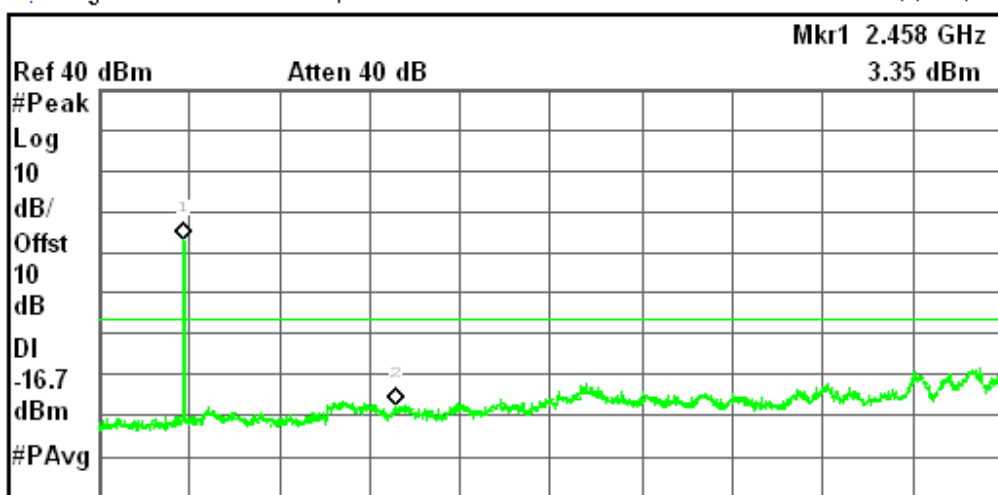
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OUT OF BAND HIGH CH

Agilent 10:38:00 Jan 8, 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
0.0000000 Hz

Signal Track
On Off

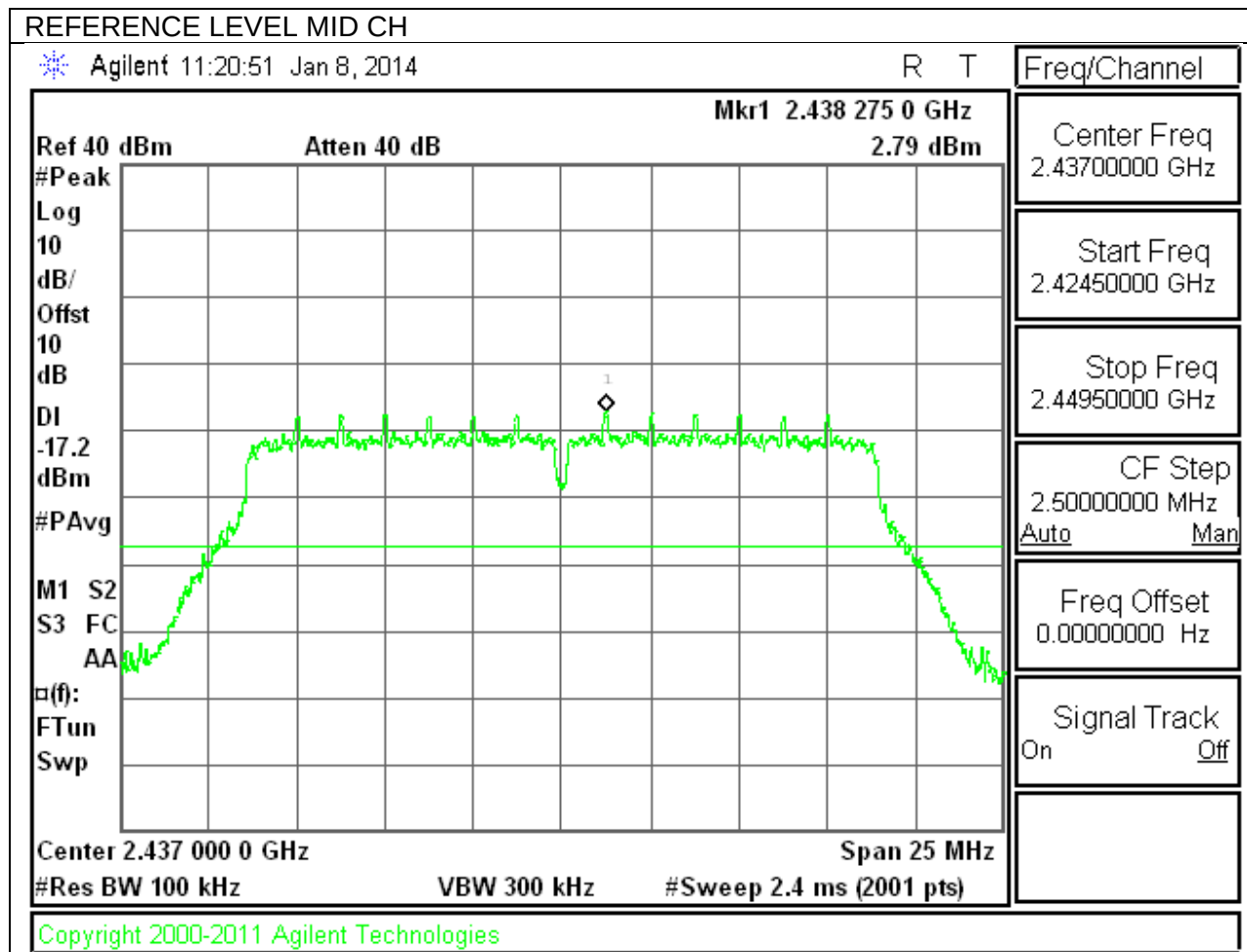
Start 30 MHz Stop 26.000 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.482 s (2001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.458 GHz	3.35 dBm
2	(1)	Freq	8.535 GHz	-37.56 dBm

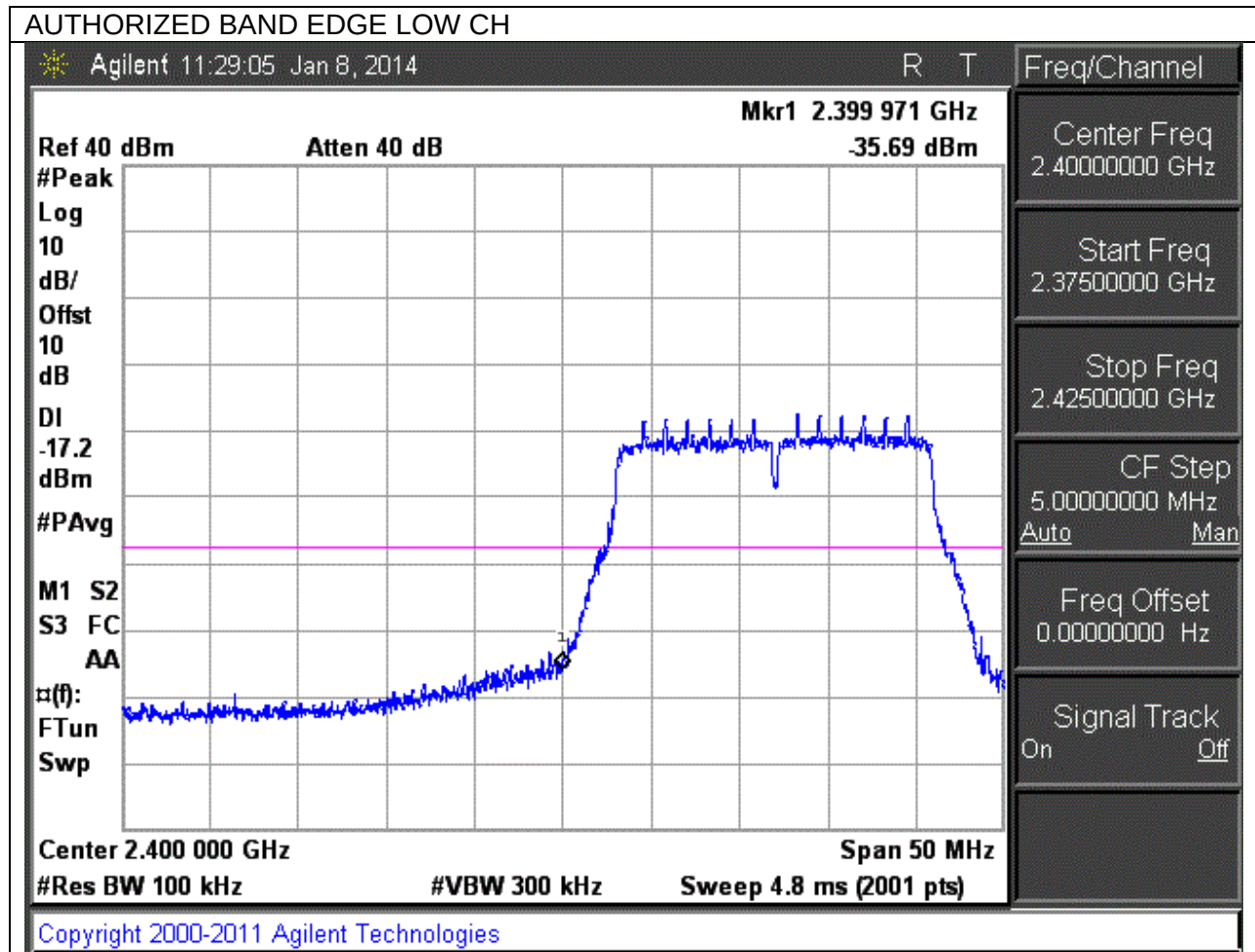
Copyright 2000-2011 Agilent Technologies

9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

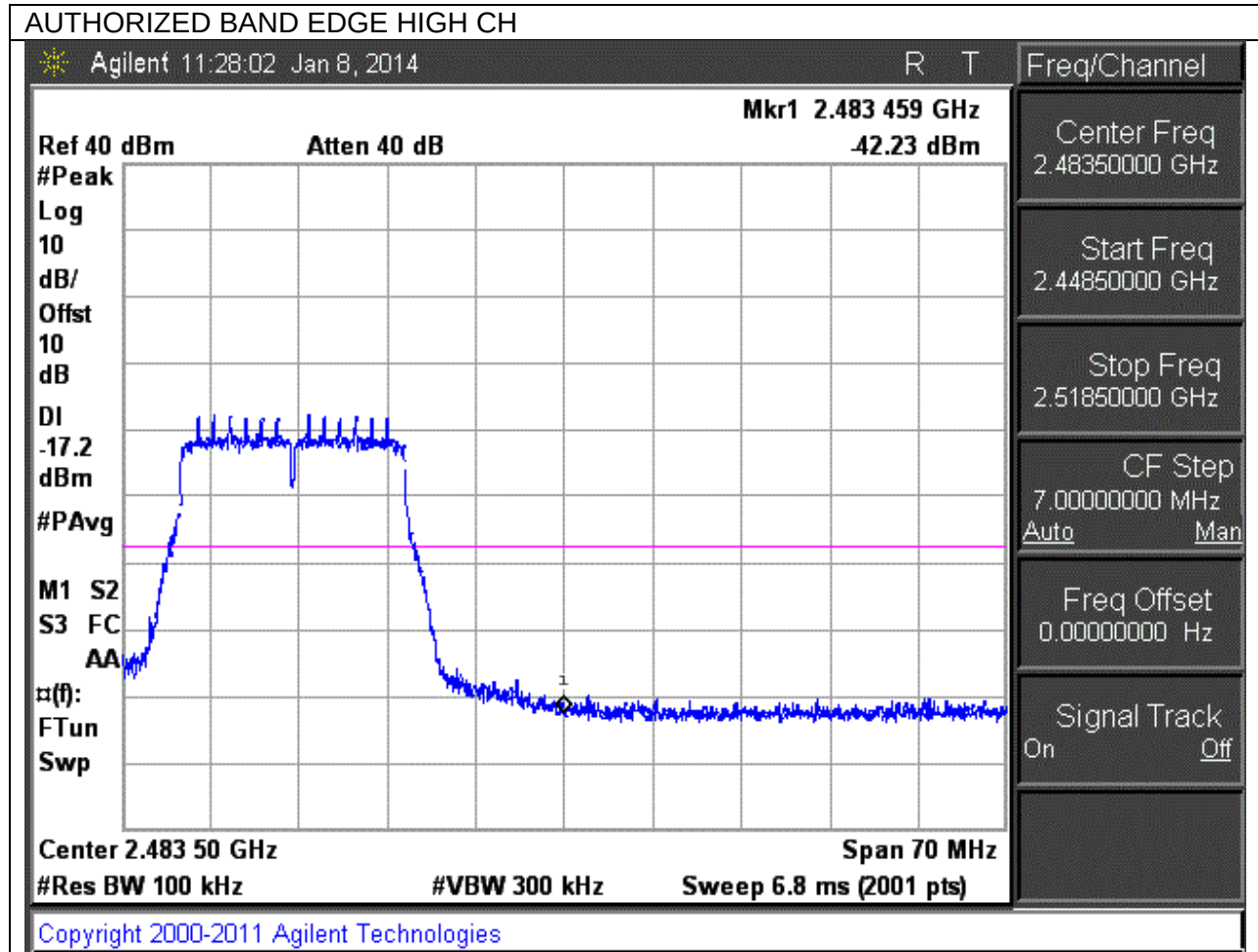
IN-BAND REFERENCE LEVEL



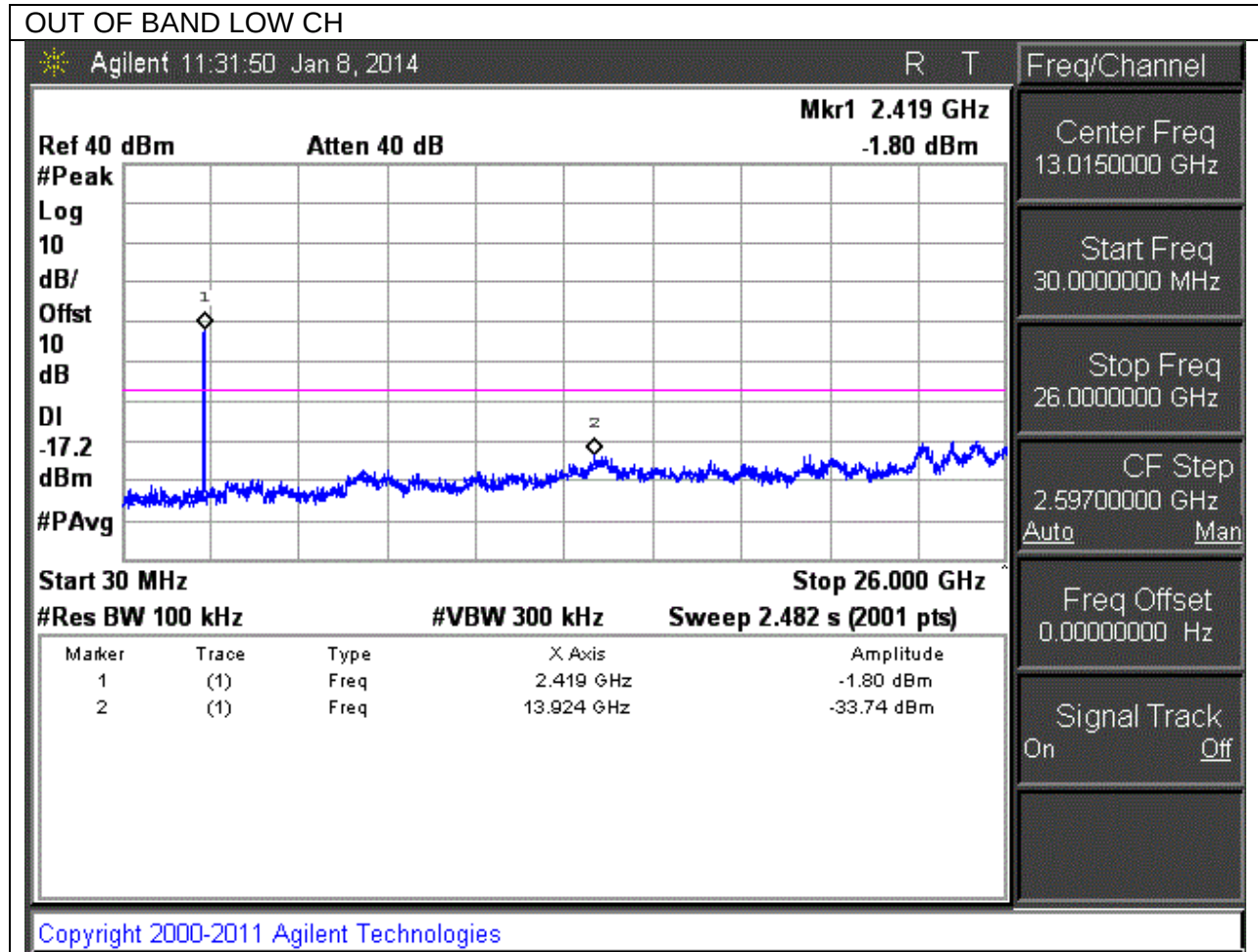
LOW CHANNEL BANDEDGE



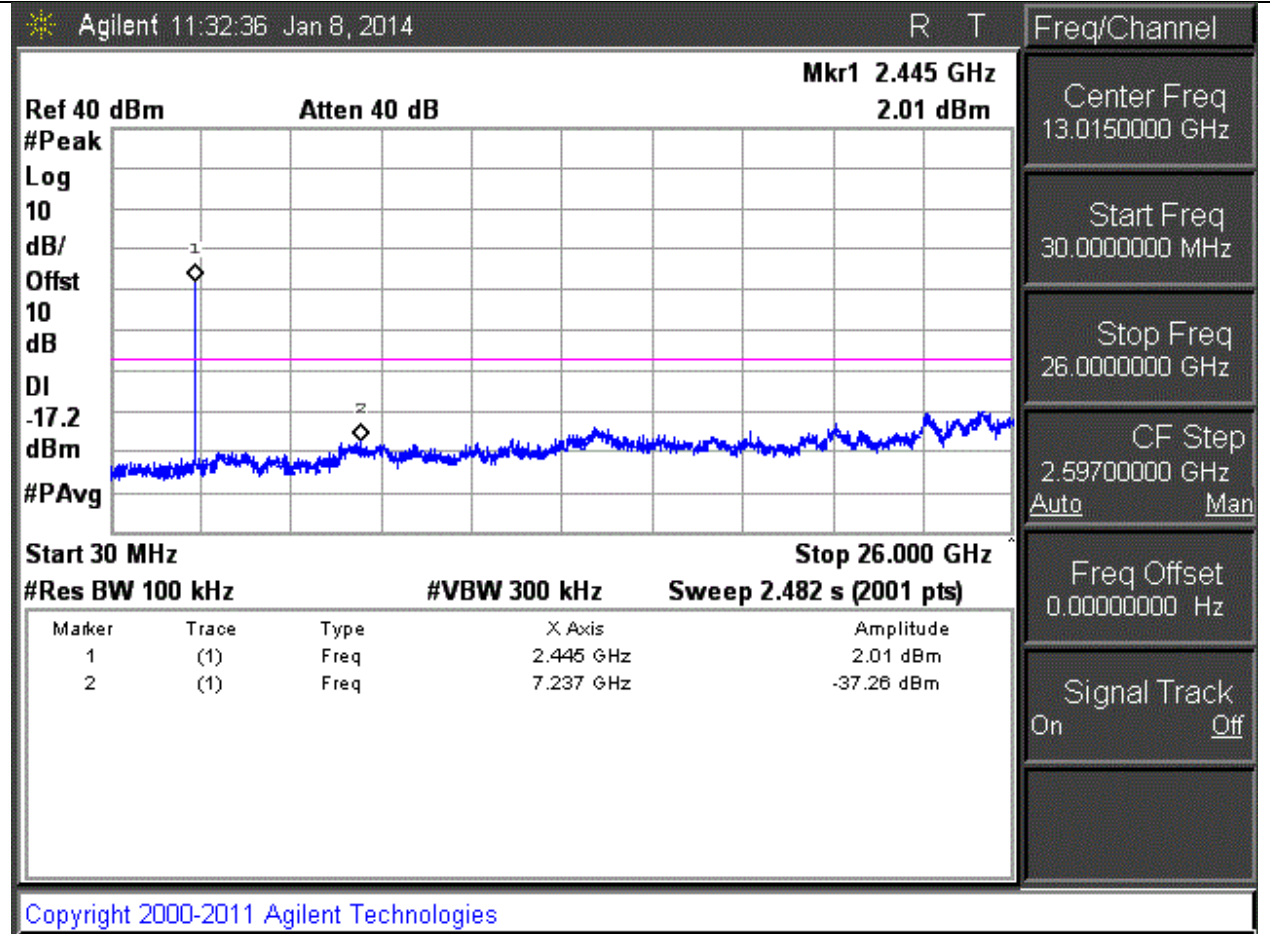
HIGH CHANNEL BANDEDGE



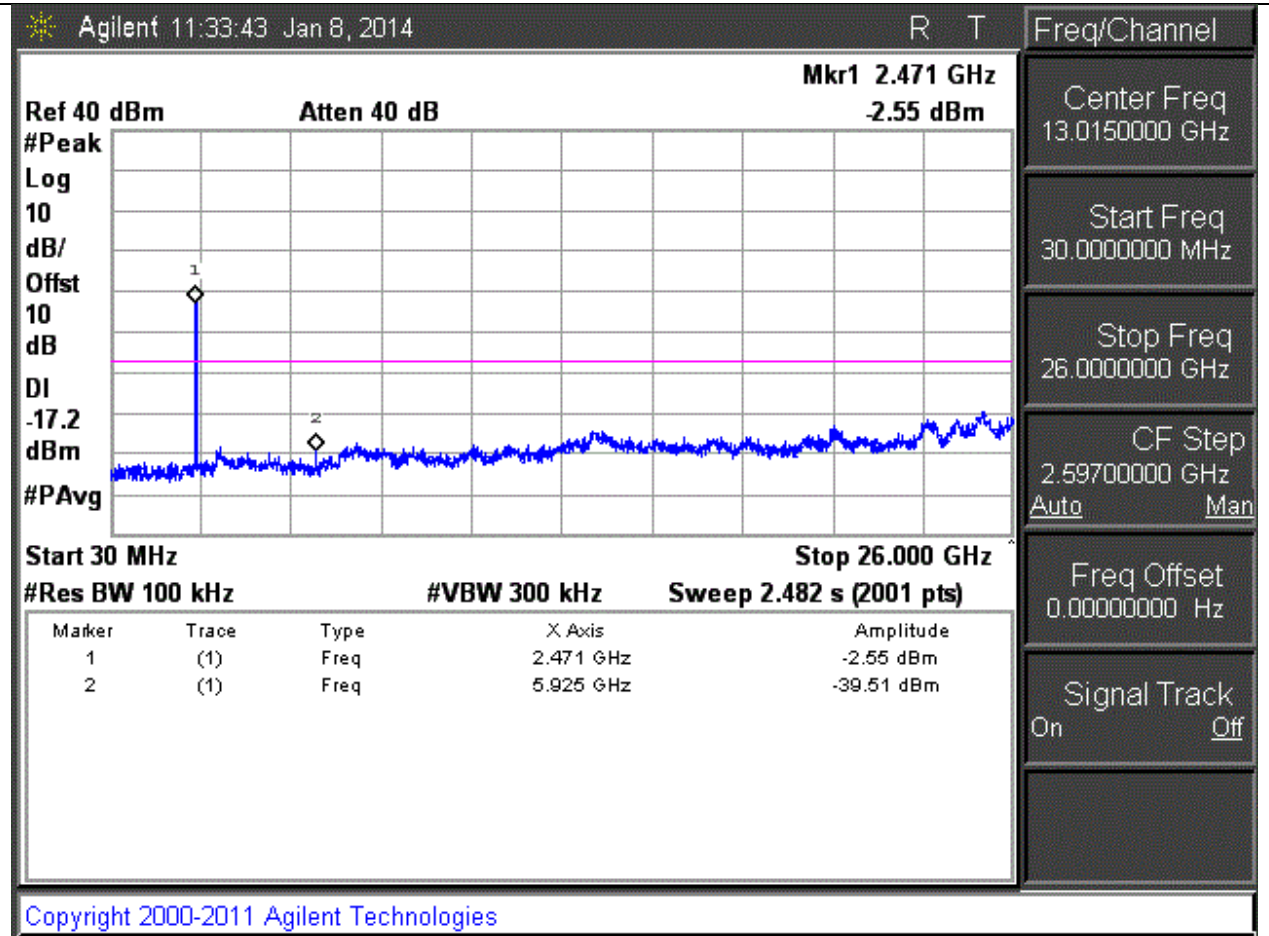
OUT-OF-BAND EMISSIONS



OUT OF BAND MID CH

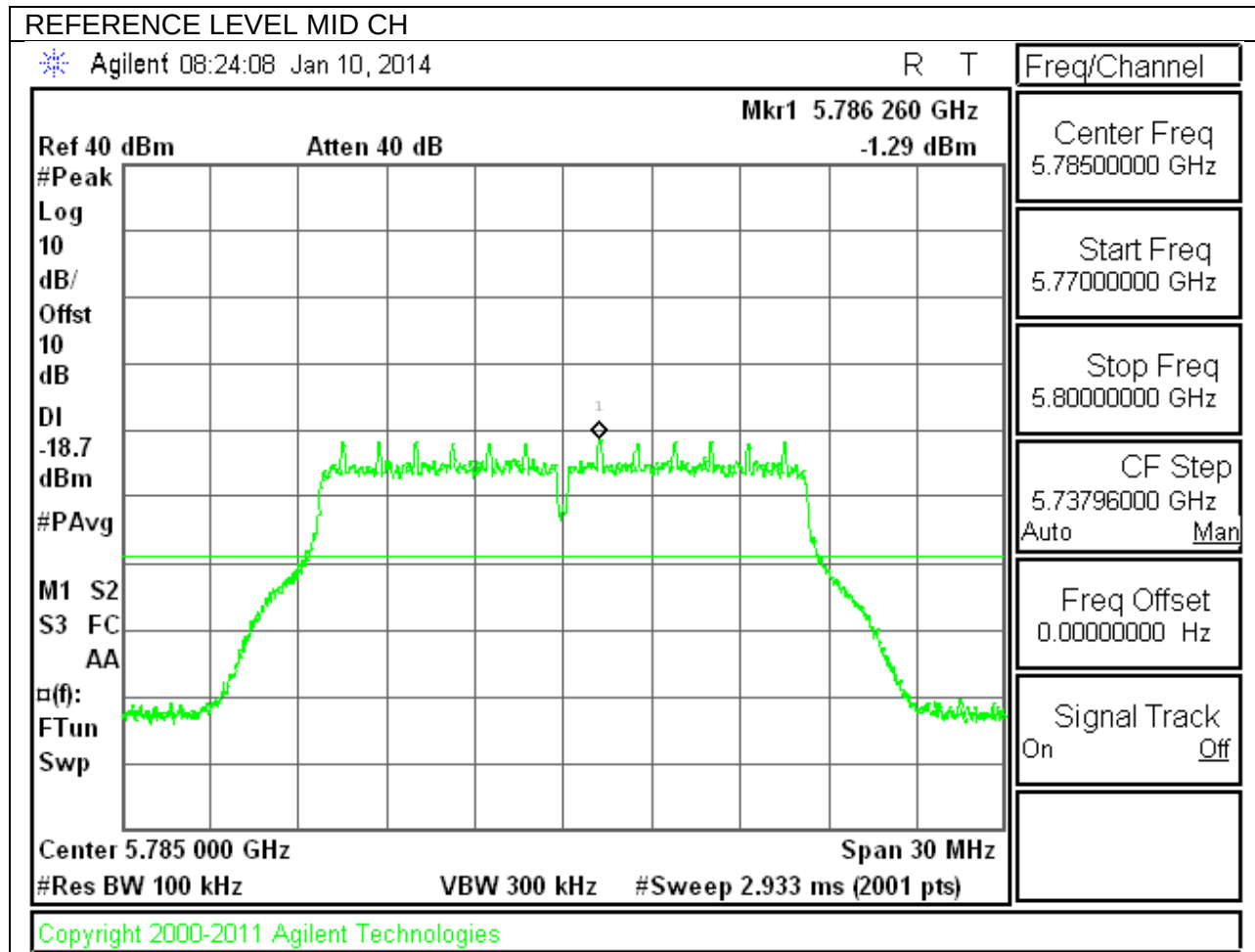


OUT OF BAND HIGH CH

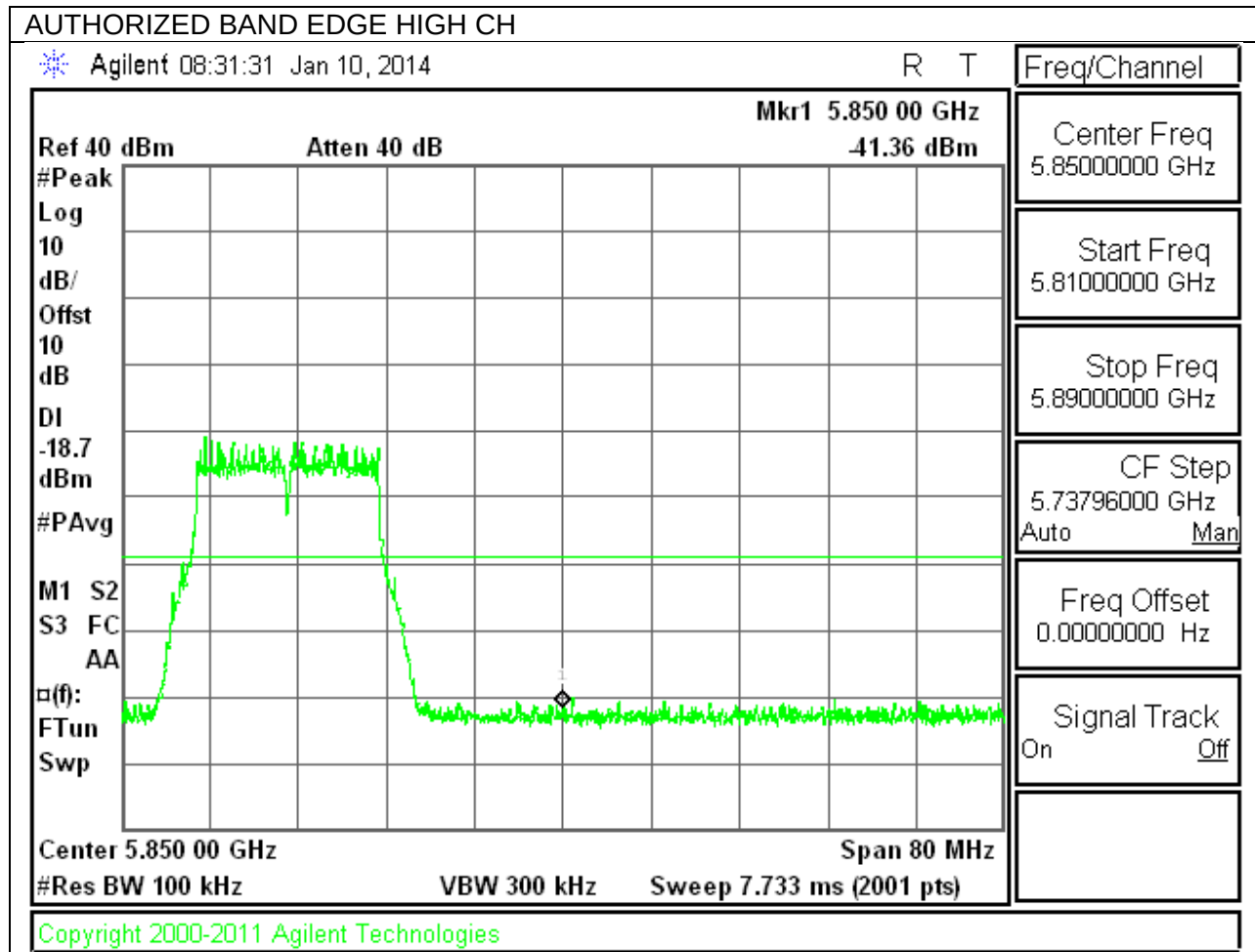


9.6.4. 802.11a MODE IN THE 5.8 GHz BAND

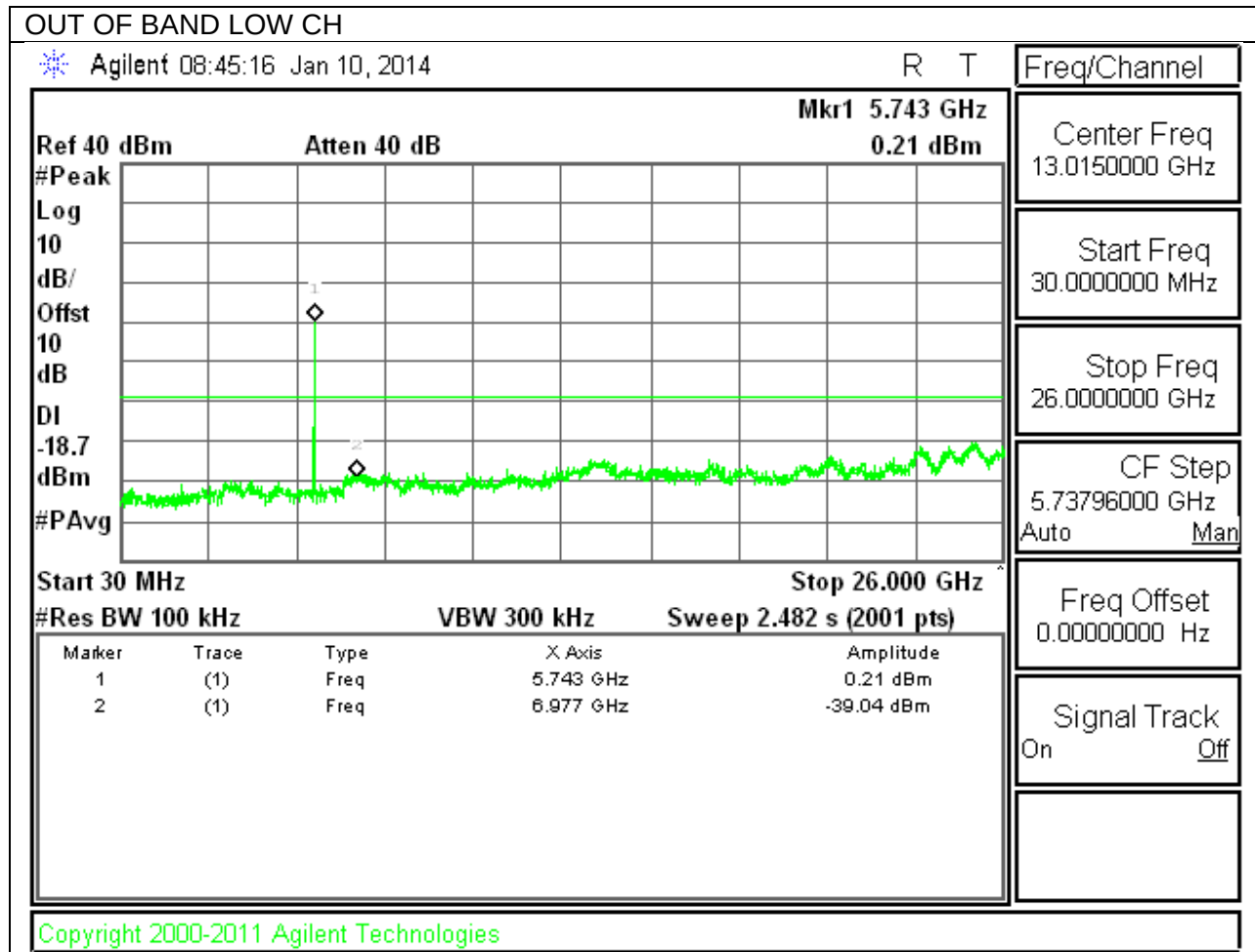
IN-BAND REFERENCE LEVEL

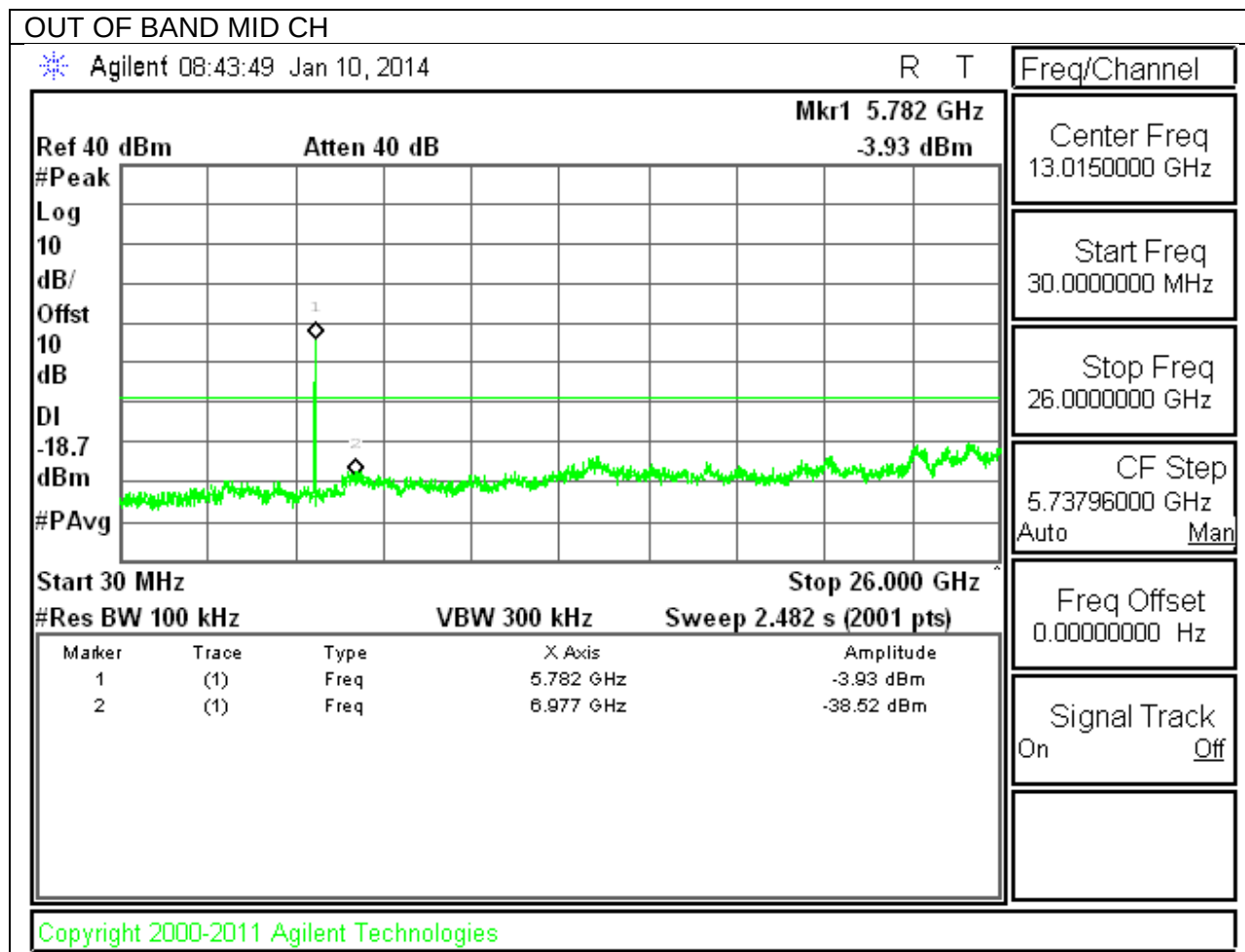


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



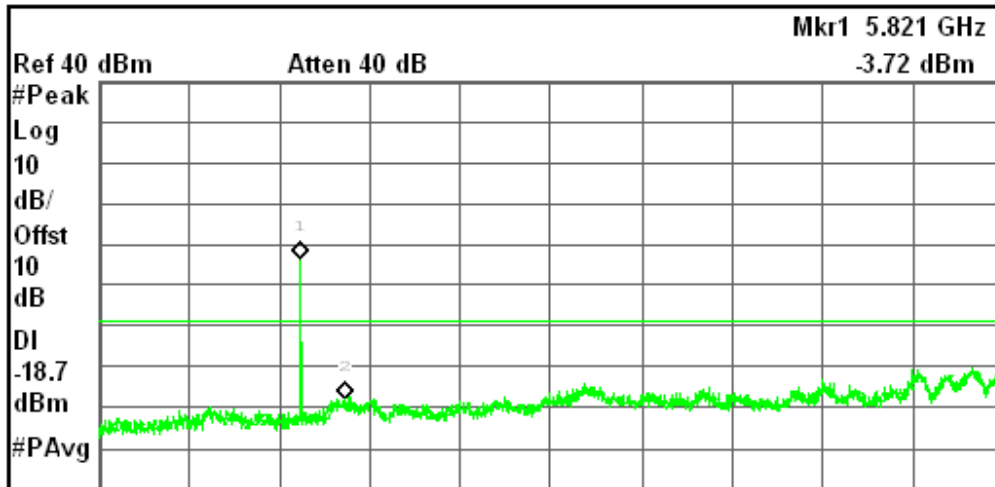


OUT OF BAND HIGH CH

Agilent 08:42:54 Jan 10, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
5.73796000 GHz
Auto Man

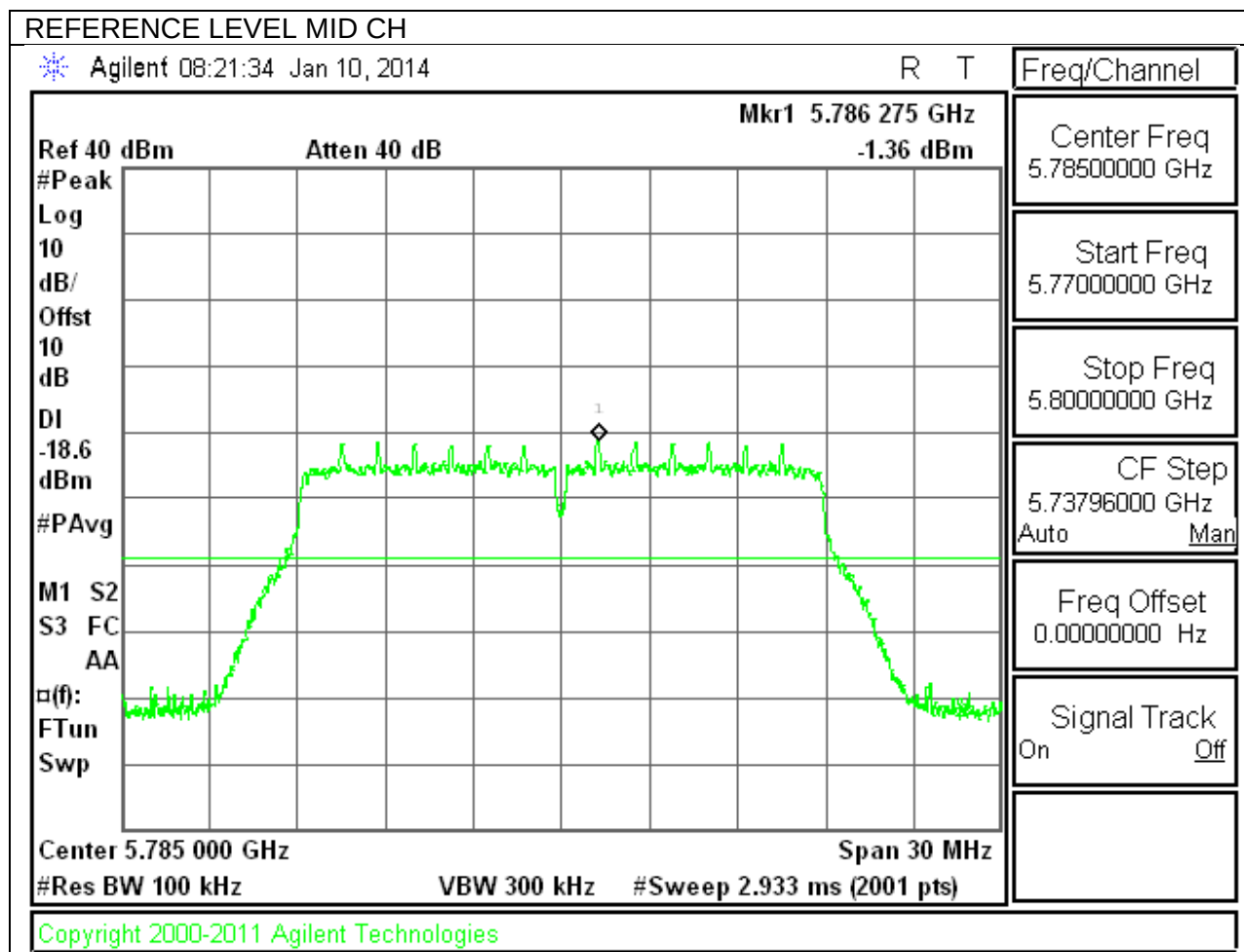
Freq Offset
0.0000000 Hz

Signal Track
On Off

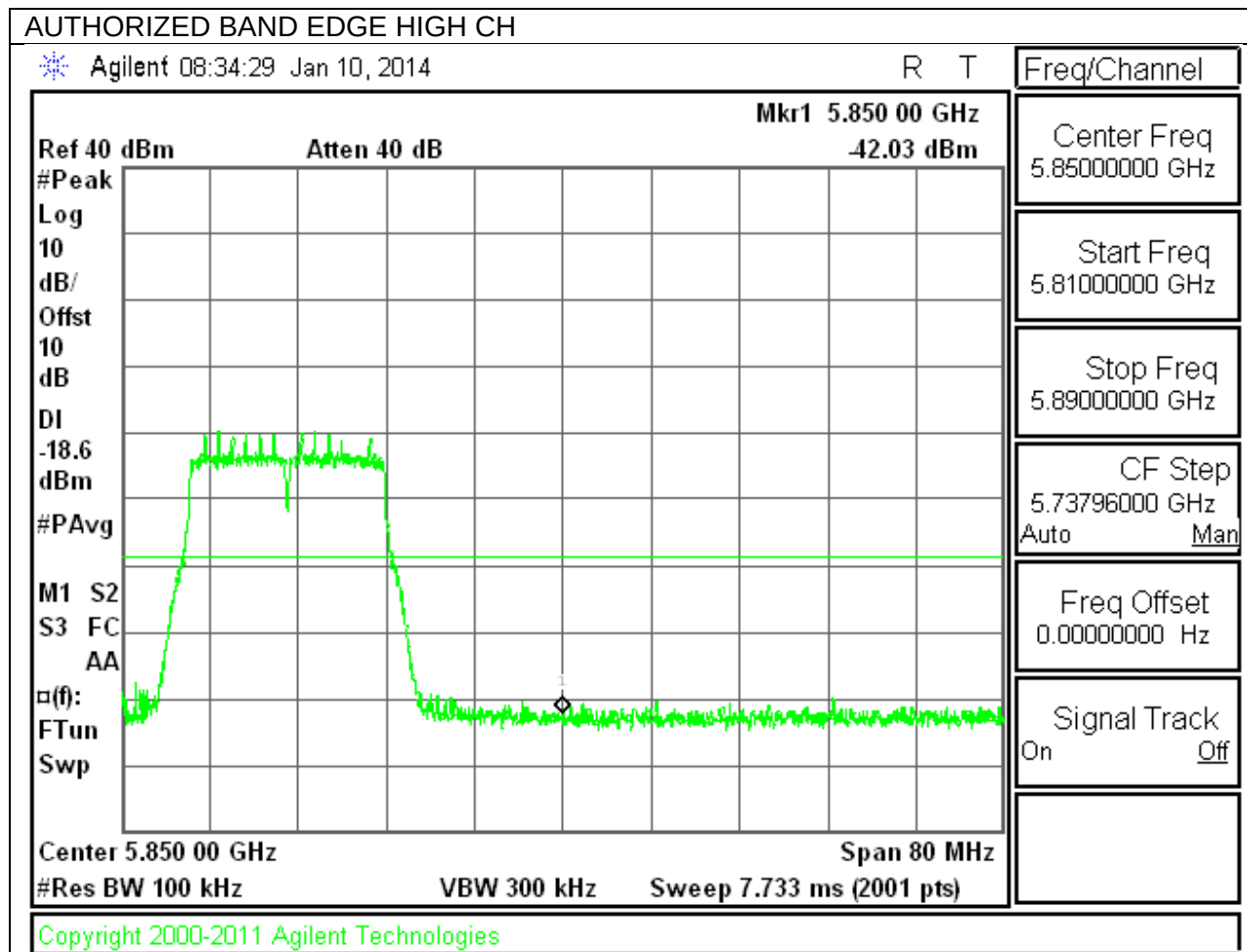
Copyright 2000-2011 Agilent Technologies

9.6.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

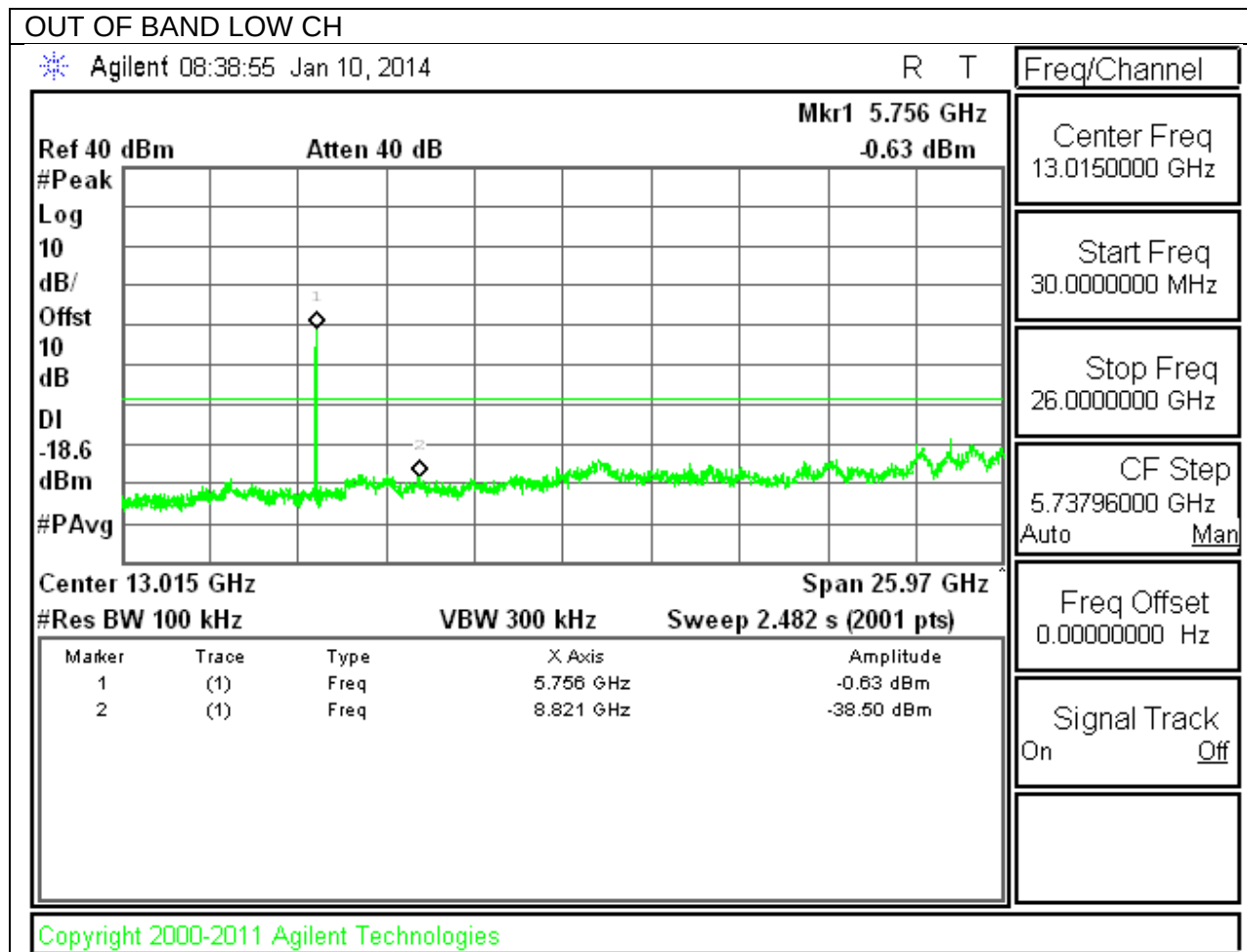
IN-BAND REFERENCE LEVEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS

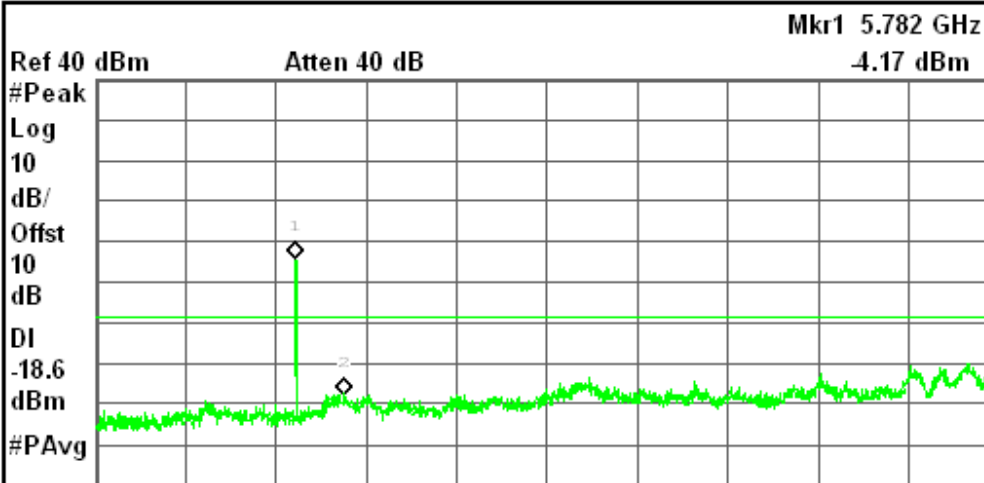


OUT OF BAND MID CH

Agilent 08:40:14 Jan 10, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
5.73796000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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OUT OF BAND HIGH CH

Agilent 08:41:15 Jan 10, 2014

R T

Freq/Channel

Ref 40 dBm

Atten 40 dB

Mkr1 5.821 GHz

-3.85 dBm

#Peak

Log

10

dB/

Offst

10

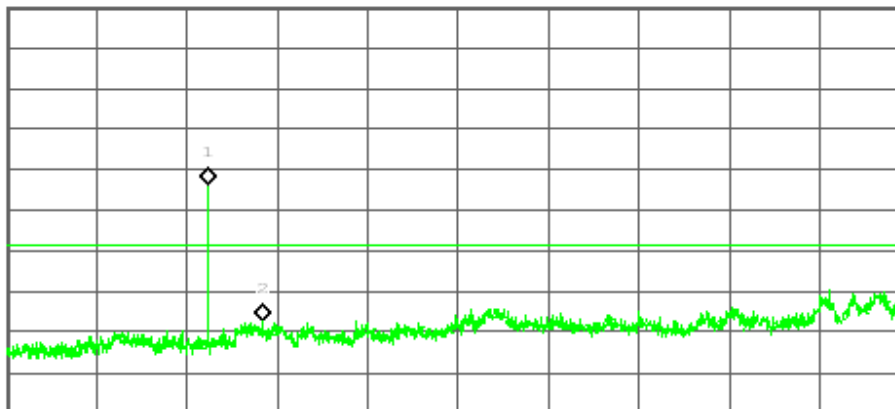
dB

DI

-18.6

dBm

#PAvg



Start 30 MHz

Stop 26.000 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 2.482 s (2001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.821 GHz	-3.85 dBm
2	(1)	Freq	7.405 GHz	-37.27 dBm

Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
5.73796000 GHz
Auto Man

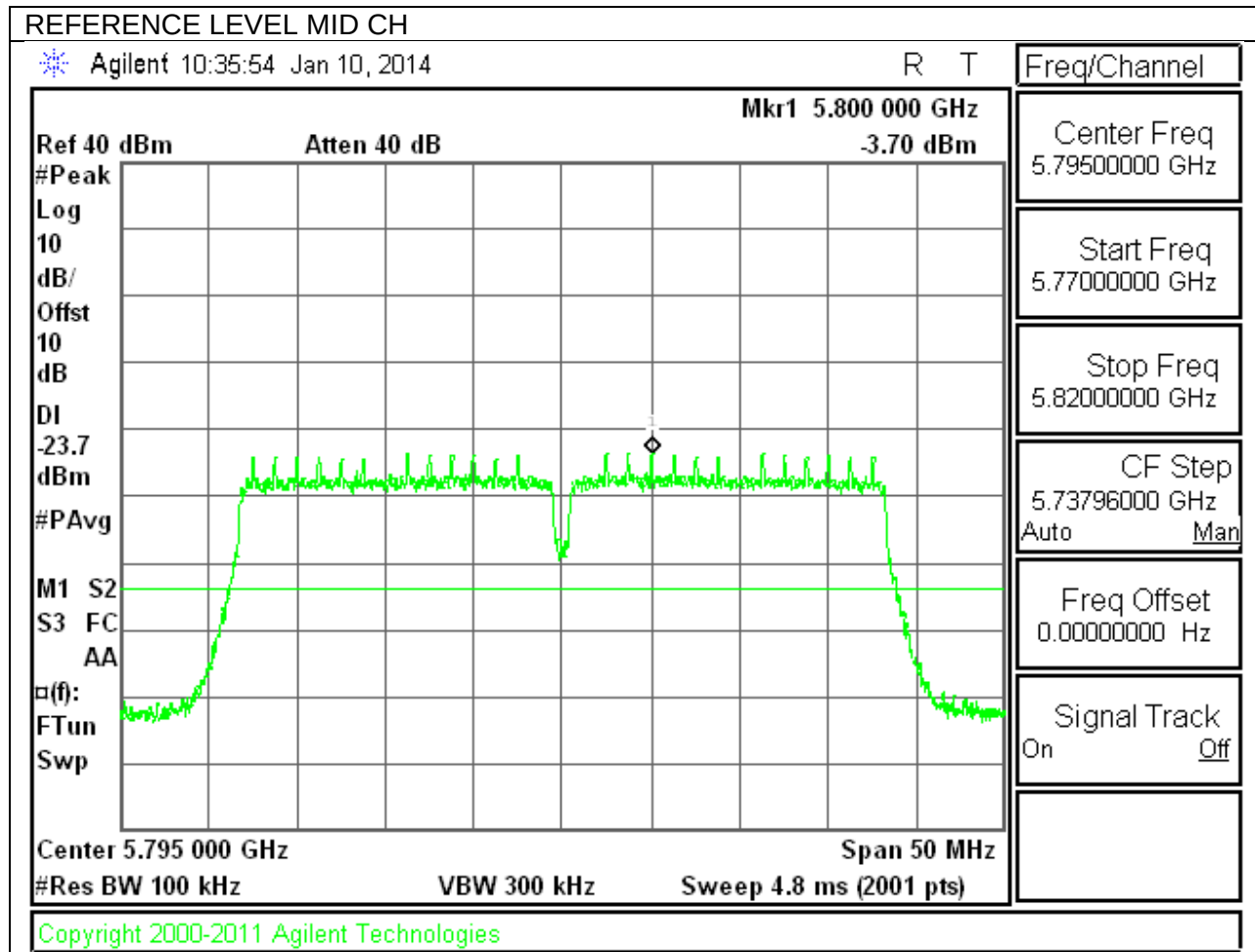
Freq Offset
0.0000000 Hz

Signal Track
On Off

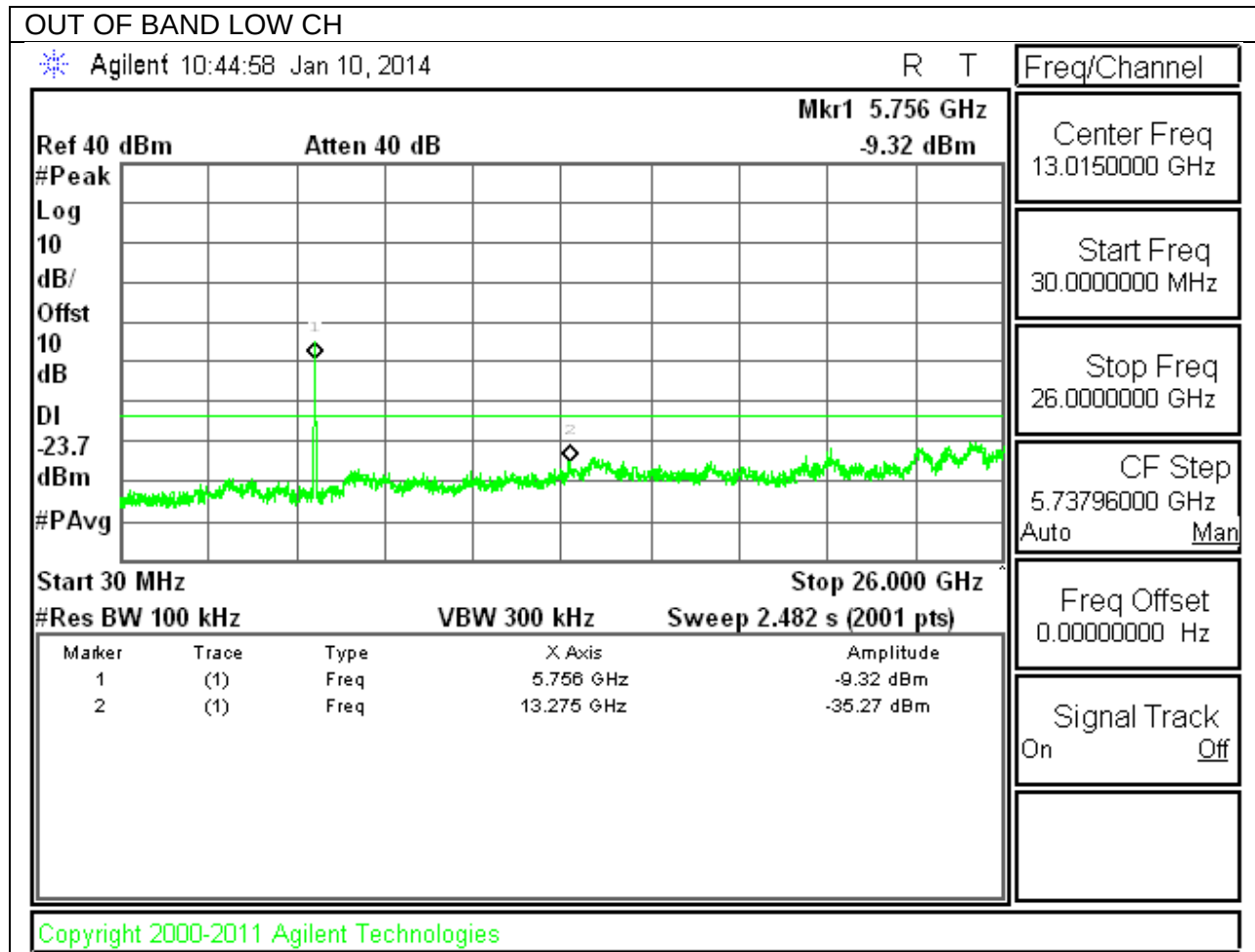
Copyright 2000-2011 Agilent Technologies

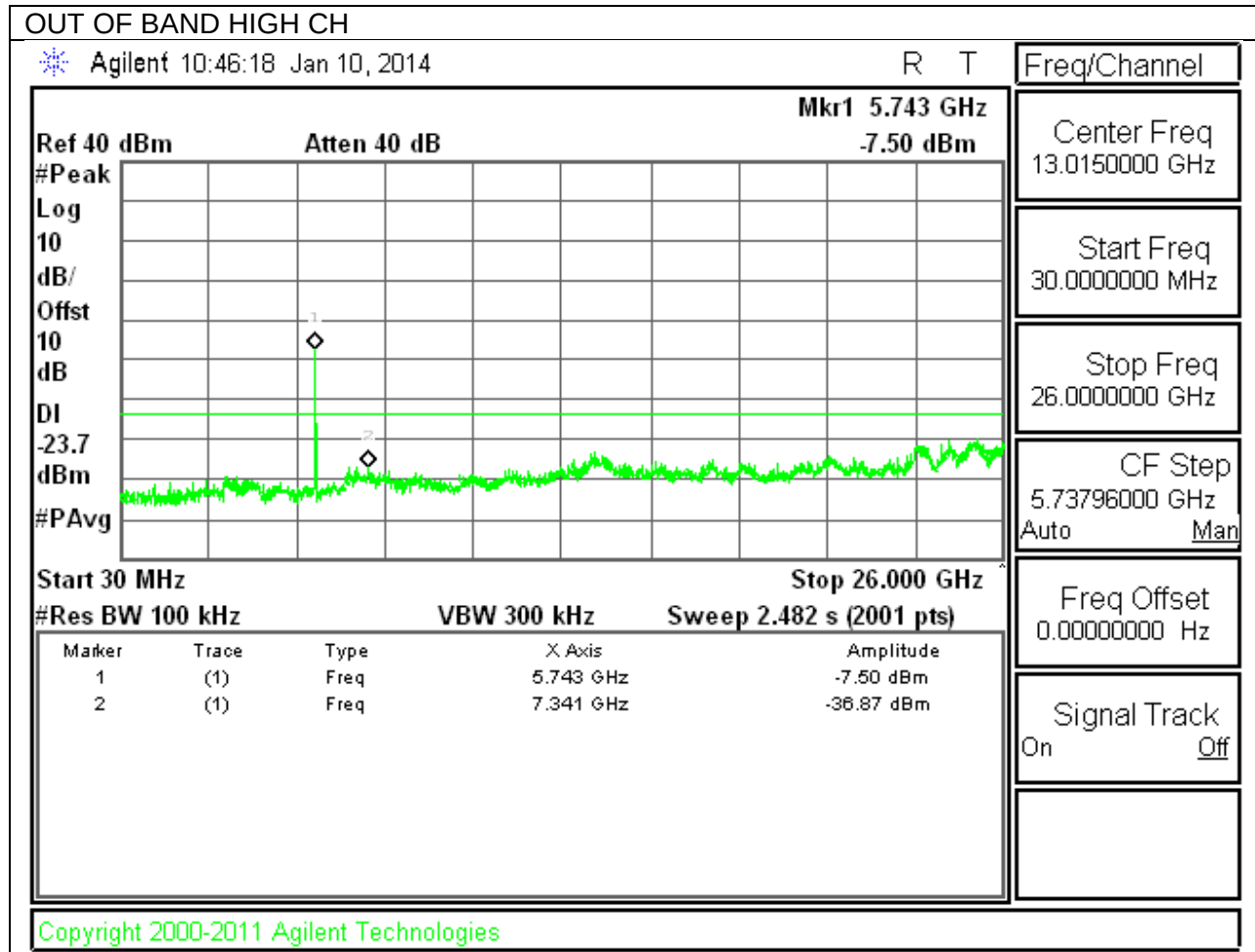
9.6.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

IN-BAND REFERENCE LEVEL



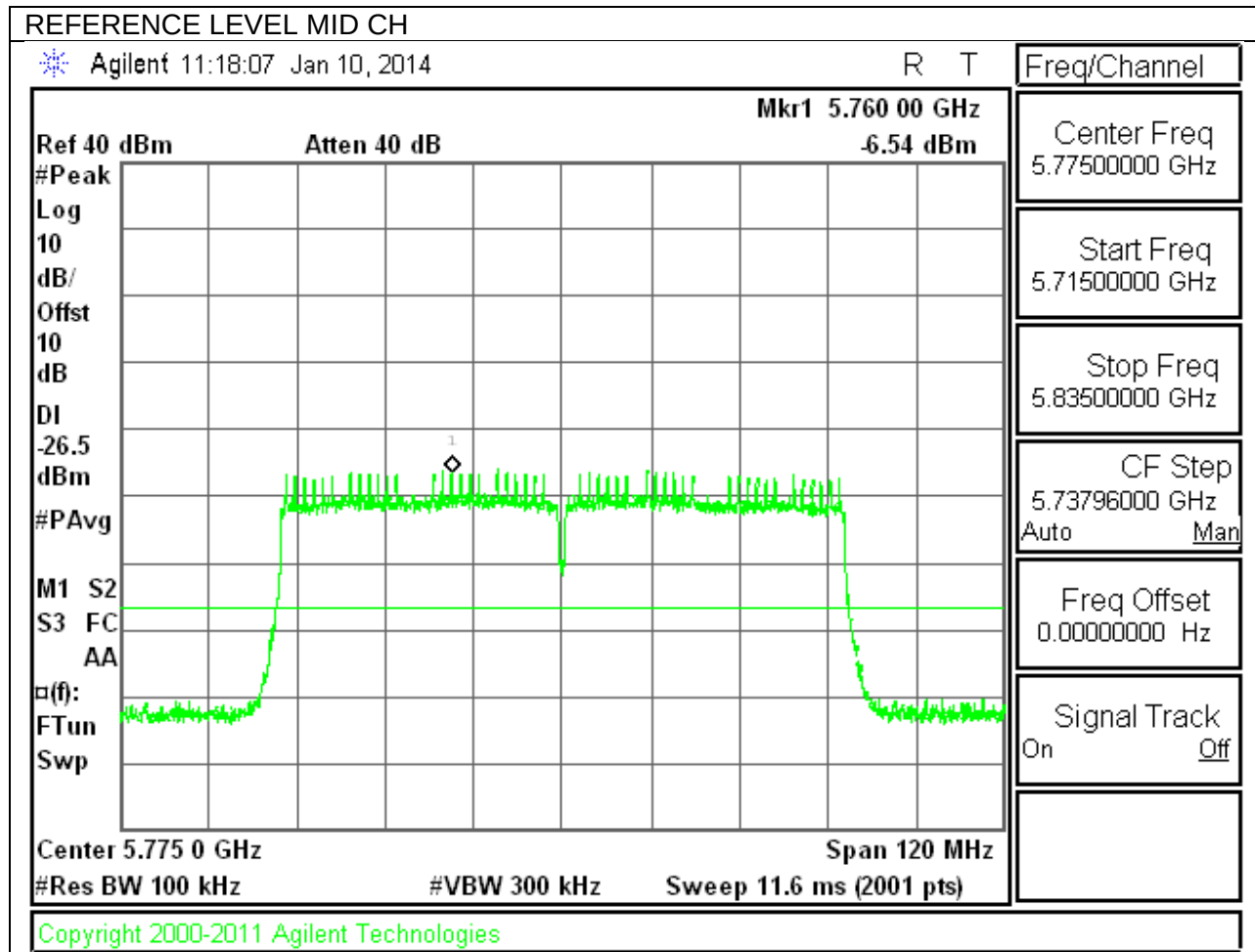
OUT-OF-BAND EMISSIONS



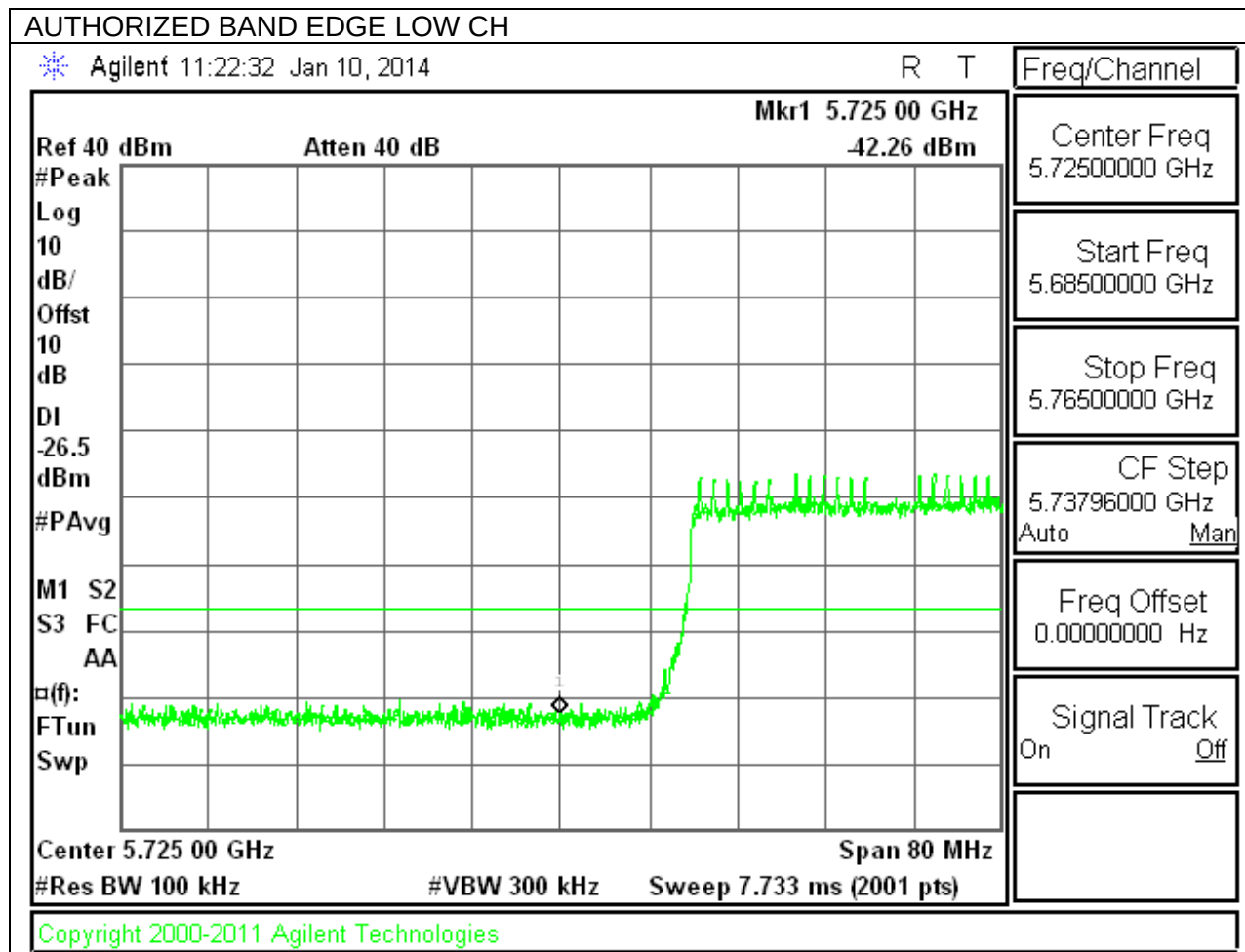


9.6.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

IN-BAND REFERENCE LEVEL



LOW CHANNEL BANDEDGE

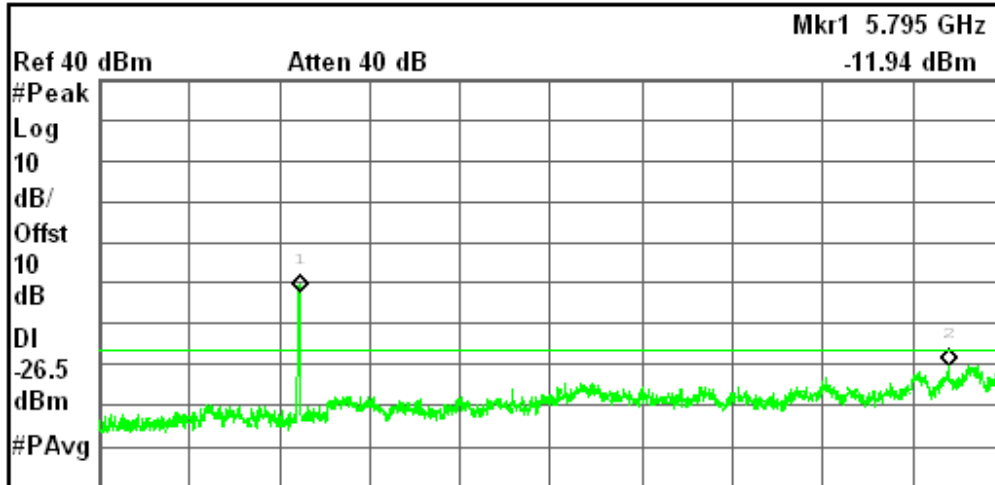


OUT OF BAND HIGH CH

Agilent 11:25:03 Jan 10, 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
5.73796000 GHz
Auto Man

Freq Offset
0.0000000 Hz

Signal Track
On Off

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

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.795 GHz	-11.94 dBm
2	(1)	Freq	24.416 GHz	-30.13 dBm

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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.

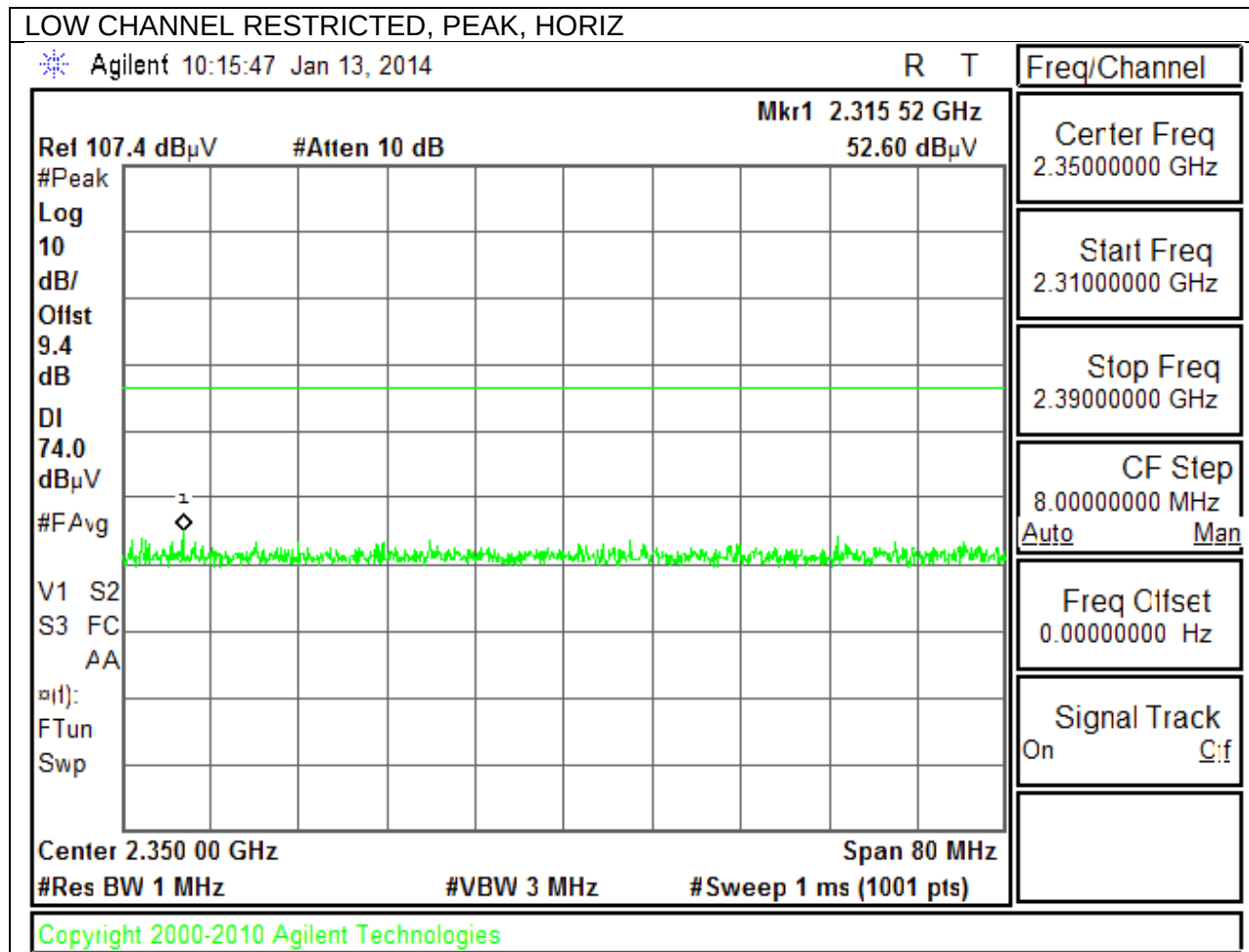
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= $10\log(1/x)$ For this sample B mode = 0dB (duty cycle >98%); G mode = 0.3dB; N mode = 0.3dB.

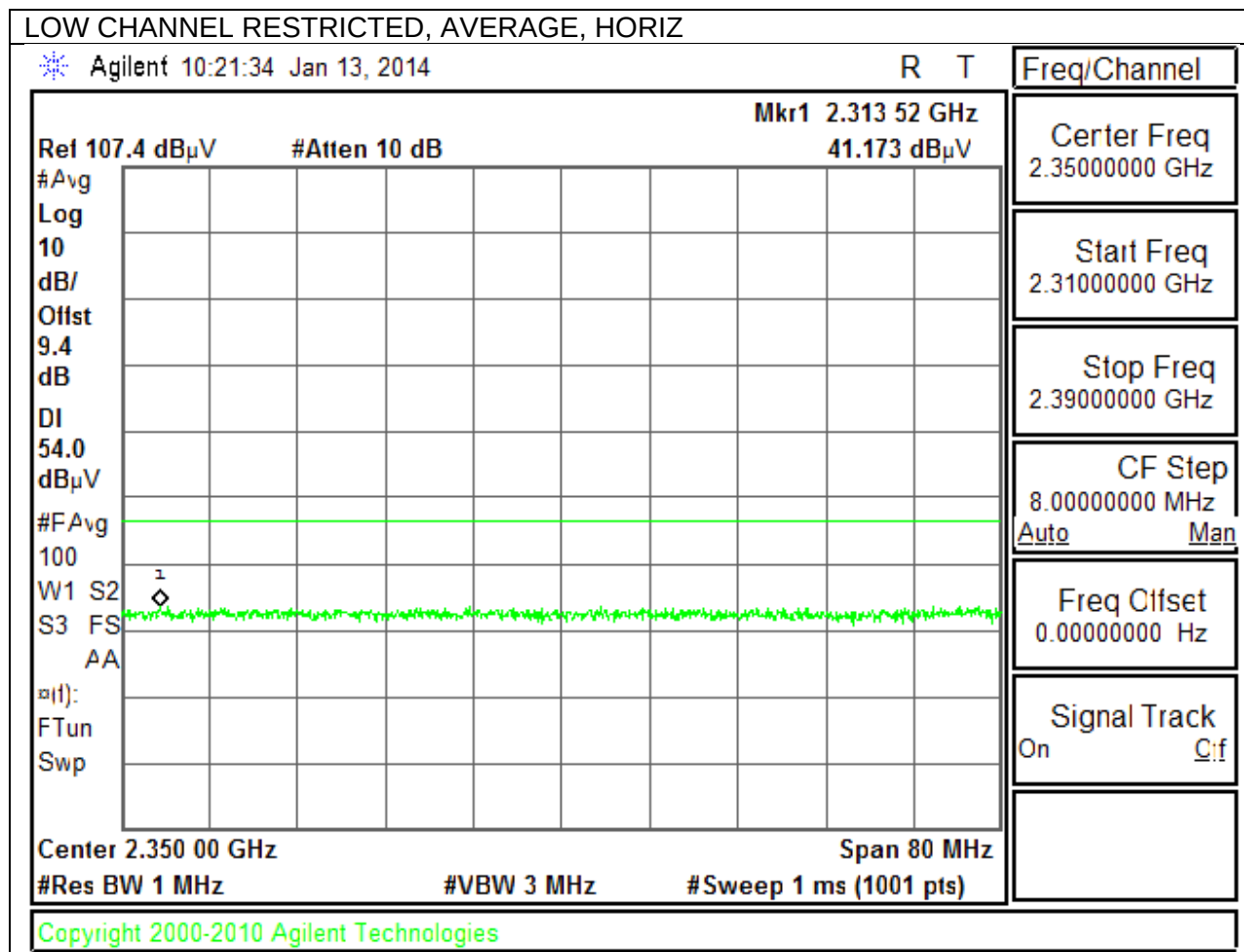
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

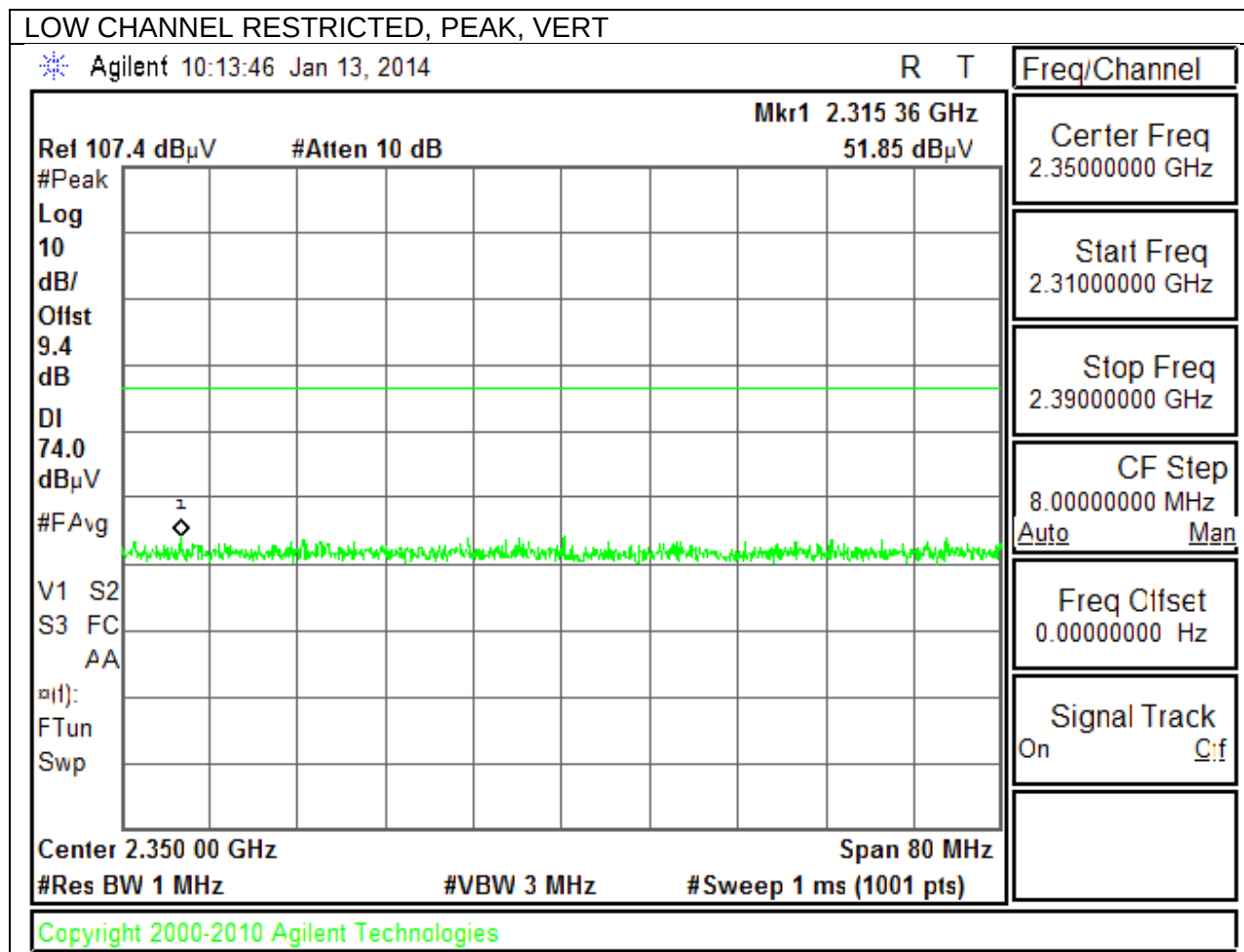
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

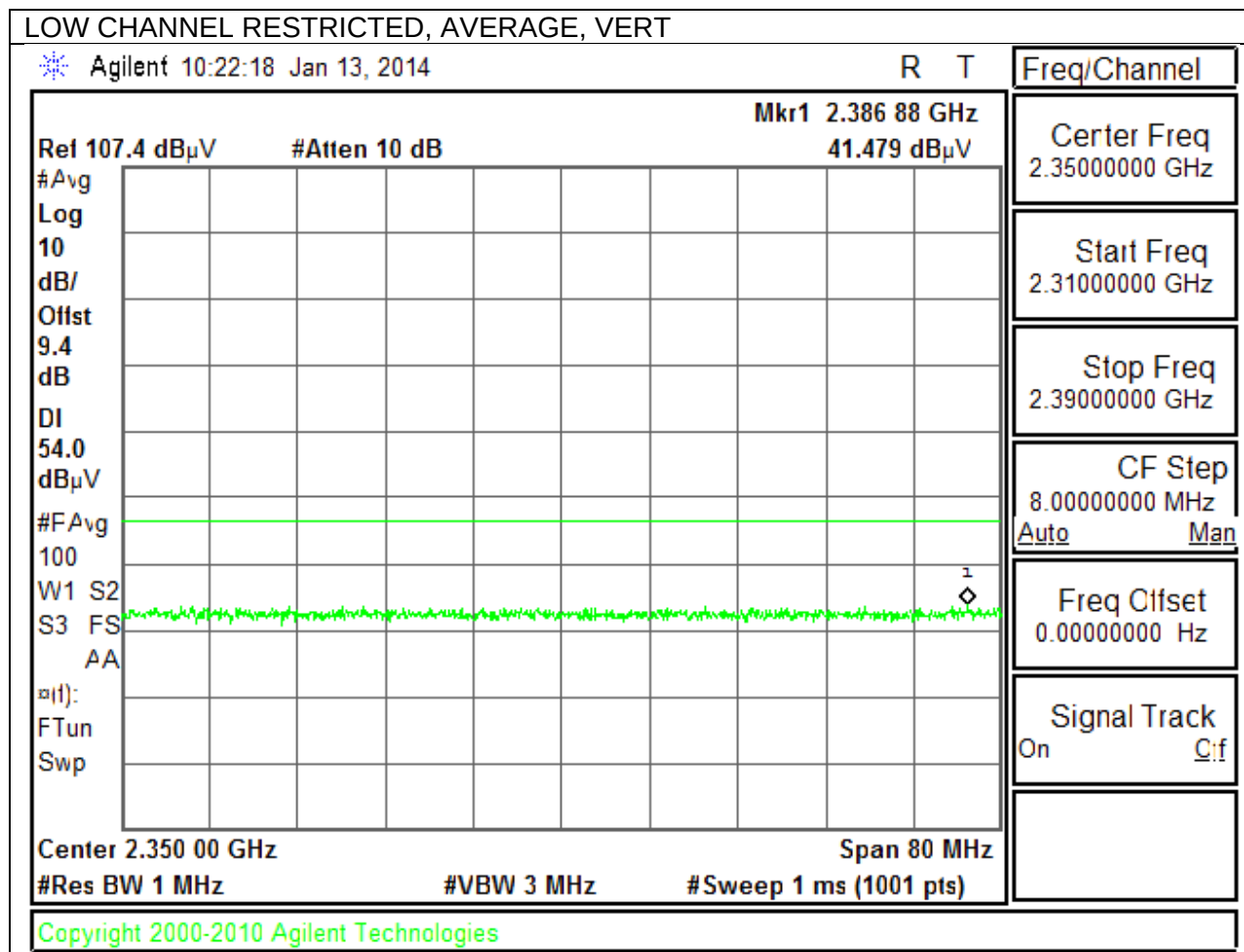
10.2. TRANSMITTER ABOVE 1 GHz

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

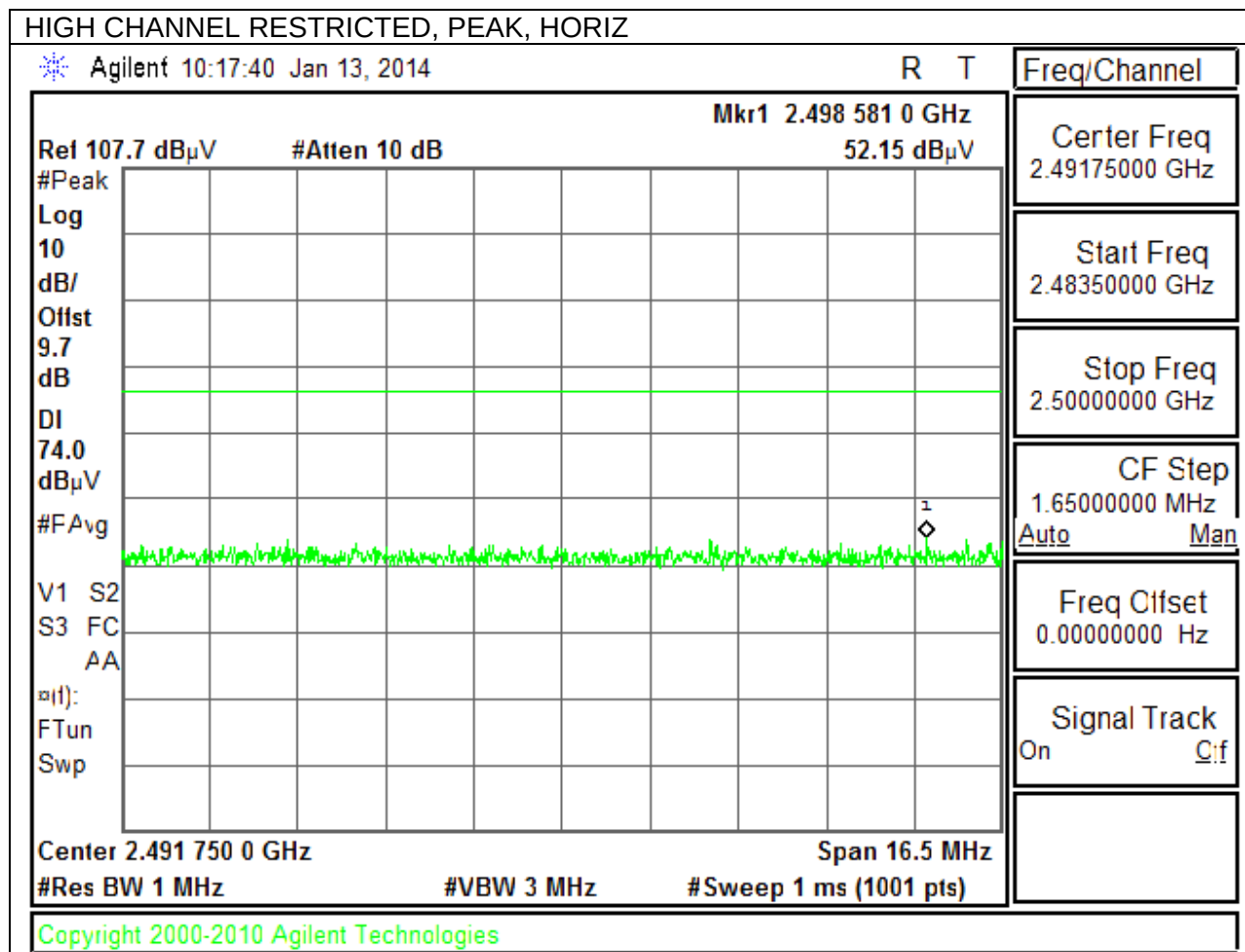


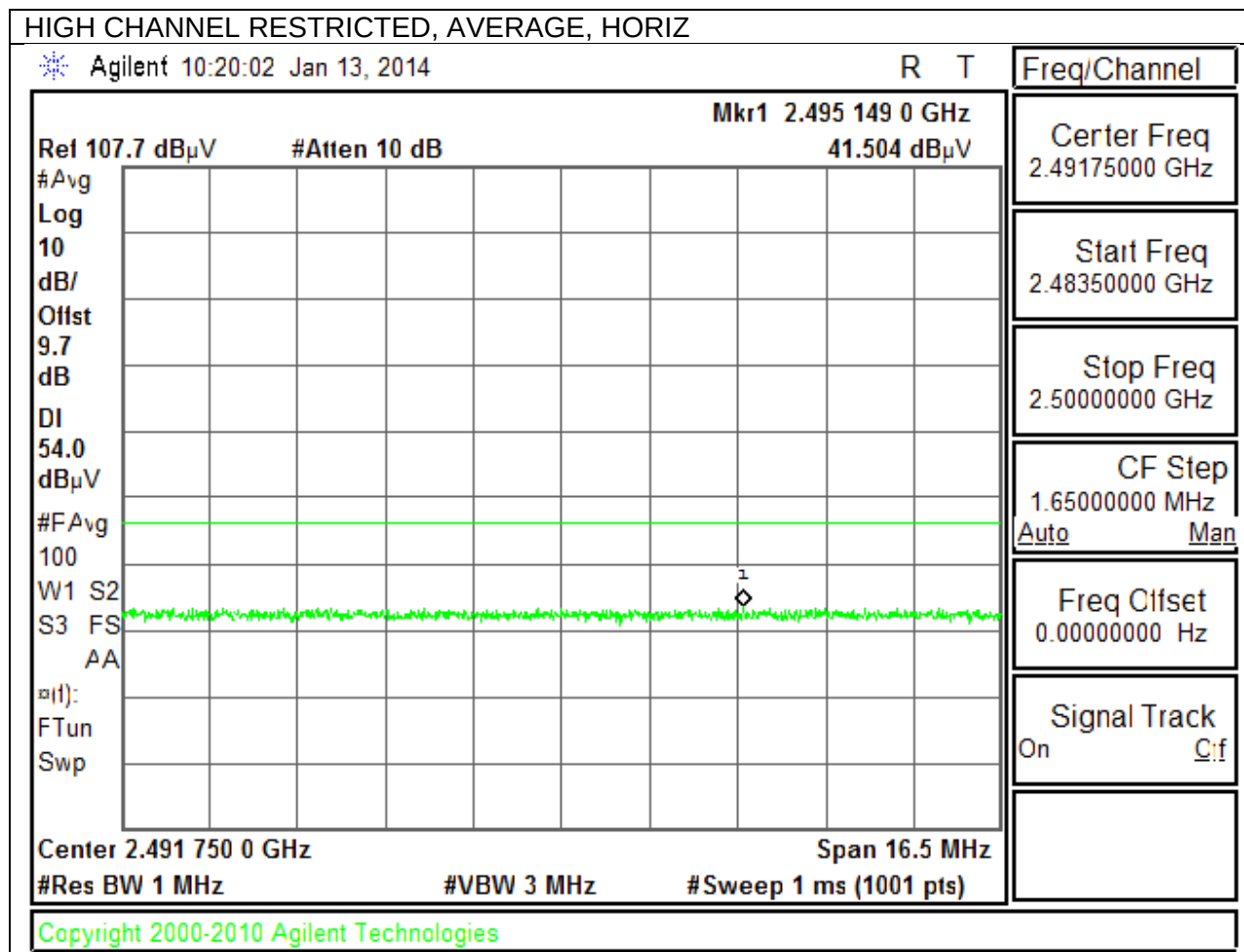


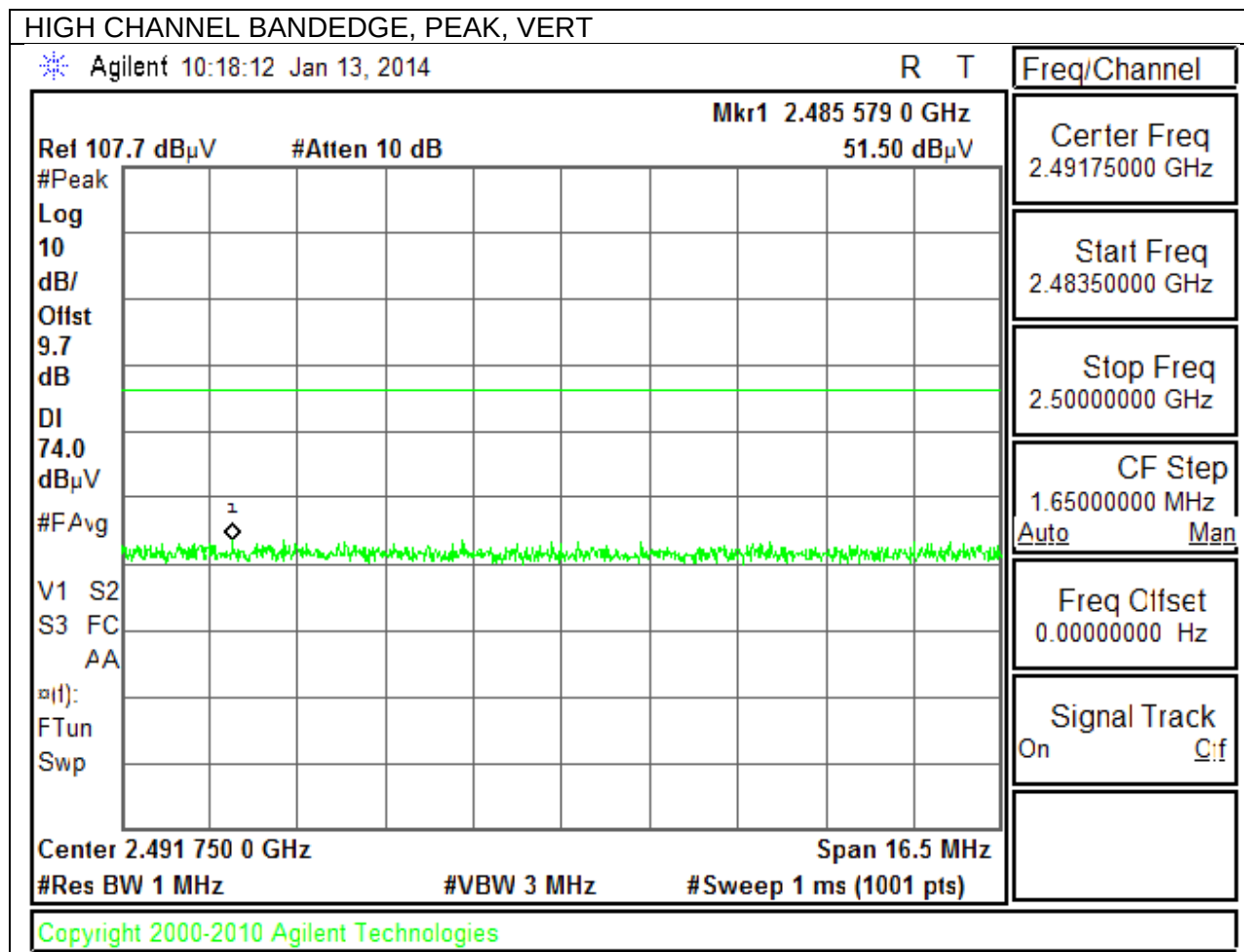


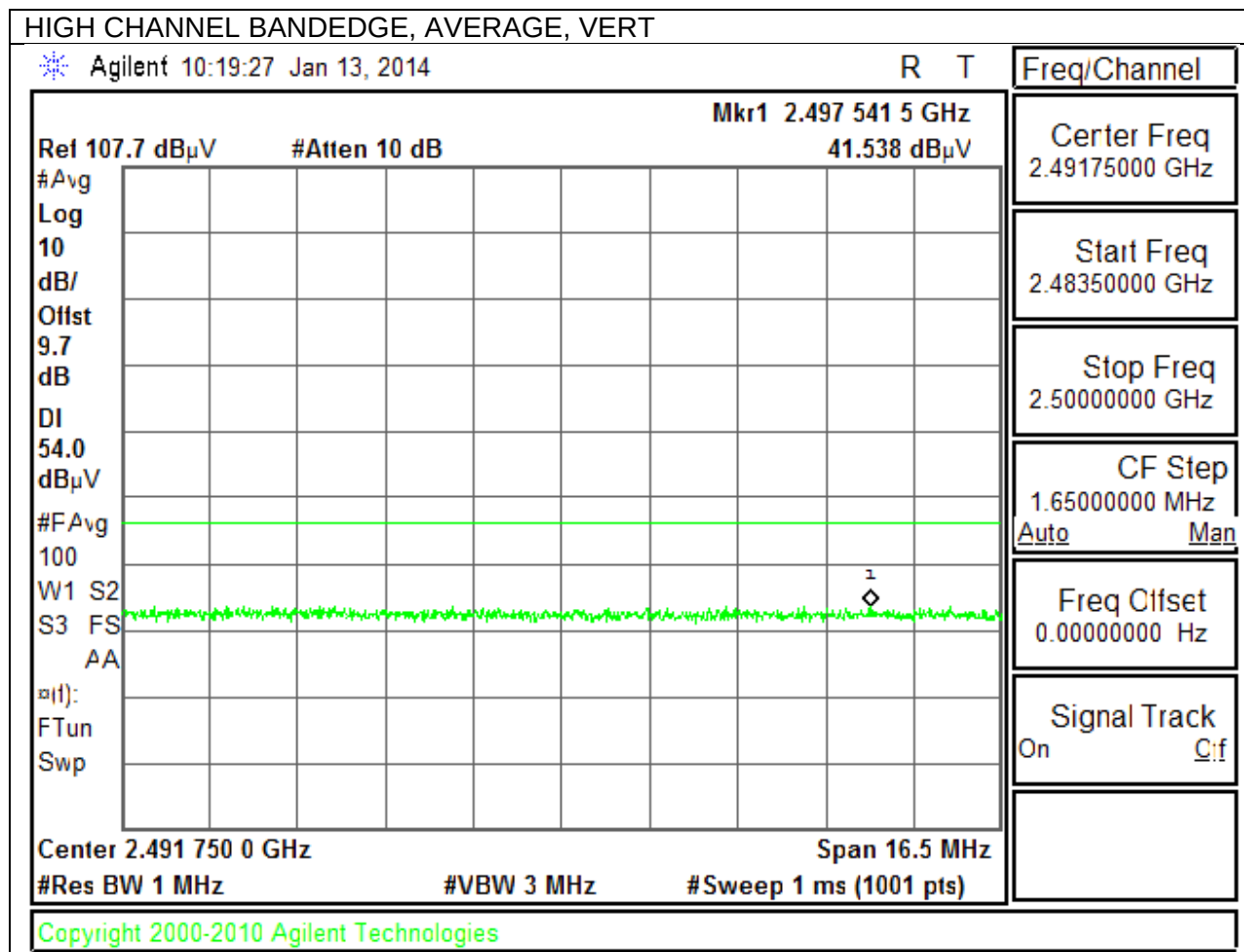


AUTHORIZED BANDEDGE (HIGH CHANNEL)



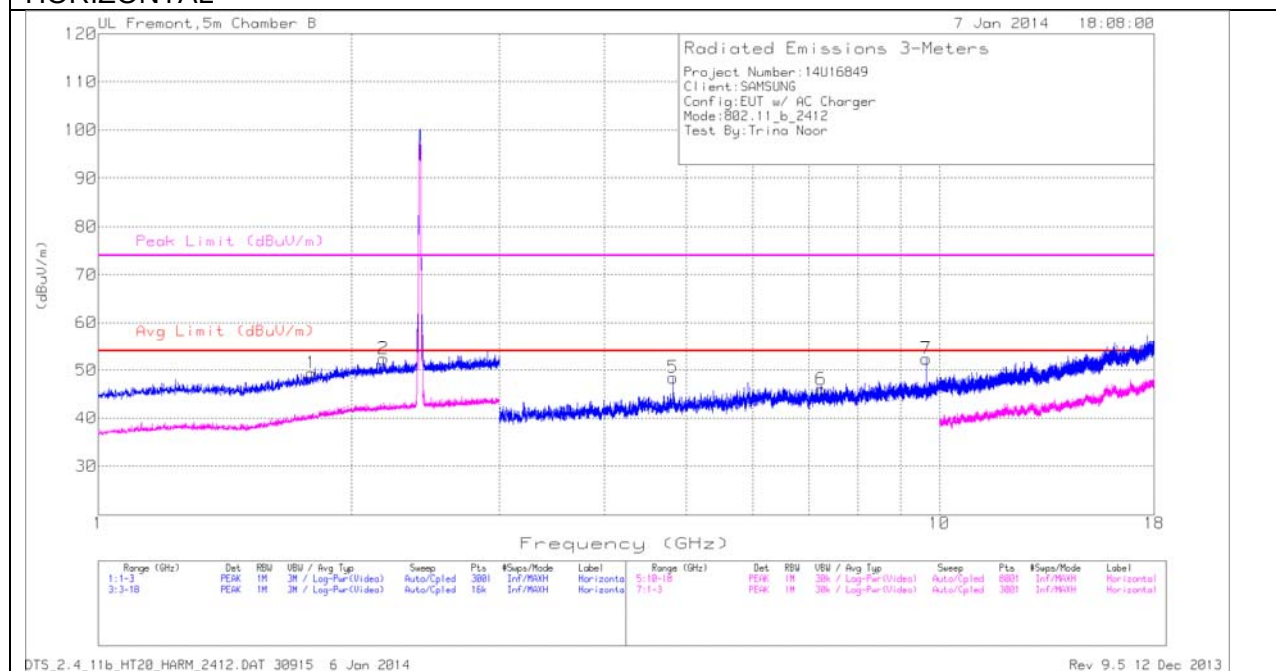






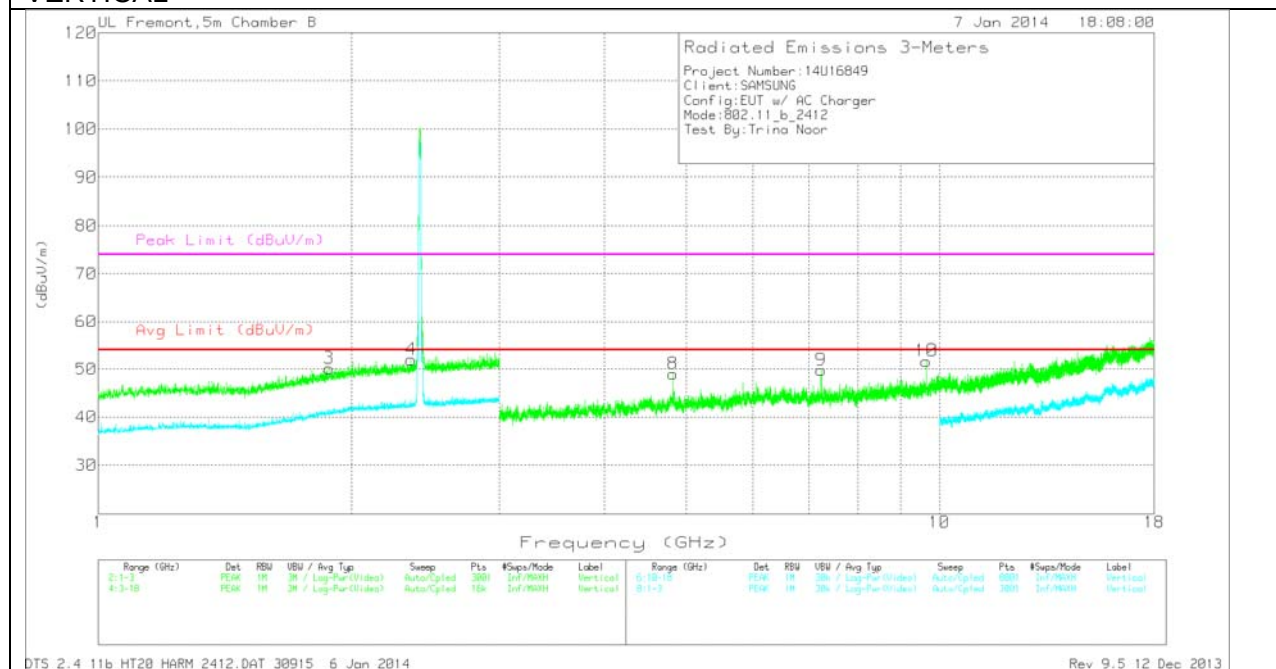
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



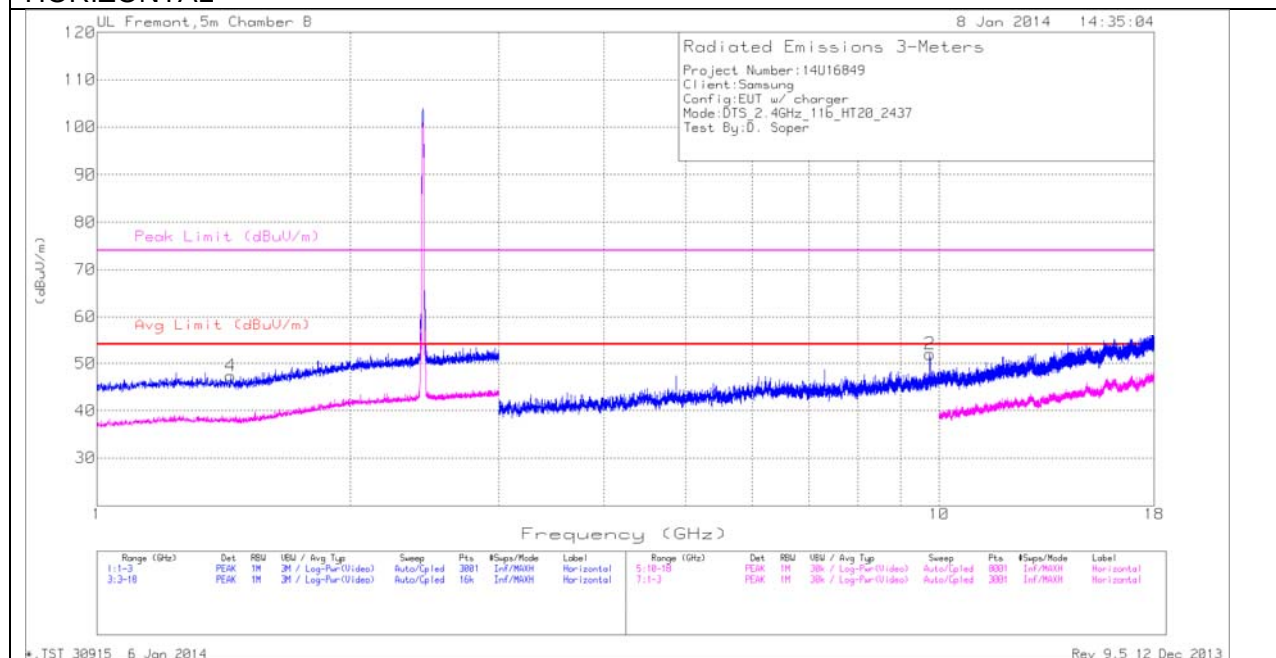
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	1.793	42.67	PK	30.4	-23.7	49.37	54	-4.63	74	-24.63	0-360	99	H
3	1.881	42.75	PK	31	-23.6	50.15	54	-3.85	74	-23.85	0-360	202	V
2	2.183	43.57	PK	32	-23.2	52.37	54	-1.63	74	-21.63	0-360	202	H
4	2.355	42.62	PK	32.3	-23	51.92	54	-2.08	74	-22.08	0-360	202	V
5	4.824	43.02	PK	34.7	-29.3	48.42	54	-5.58	74	-25.58	0-360	99	H
8	4.824	43.59	PK	34.7	-29.3	48.99	54	-5.01	74	-25.01	0-360	202	V
6	7.236	37.57	PK	35.8	-27.4	45.97	54	-8.03	74	-28.03	0-360	202	H
9	7.236	41.36	PK	35.8	-27.4	49.76	54	-4.24	74	-24.24	0-360	202	V
7	9.647	39.06	PK	37.4	-24.1	52.36	54	-1.64	74	-21.64	0-360	202	H
10	9.648	38.33	PK	37.4	-24.1	51.63	54	-2.37	74	-22.37	0-360	99	V

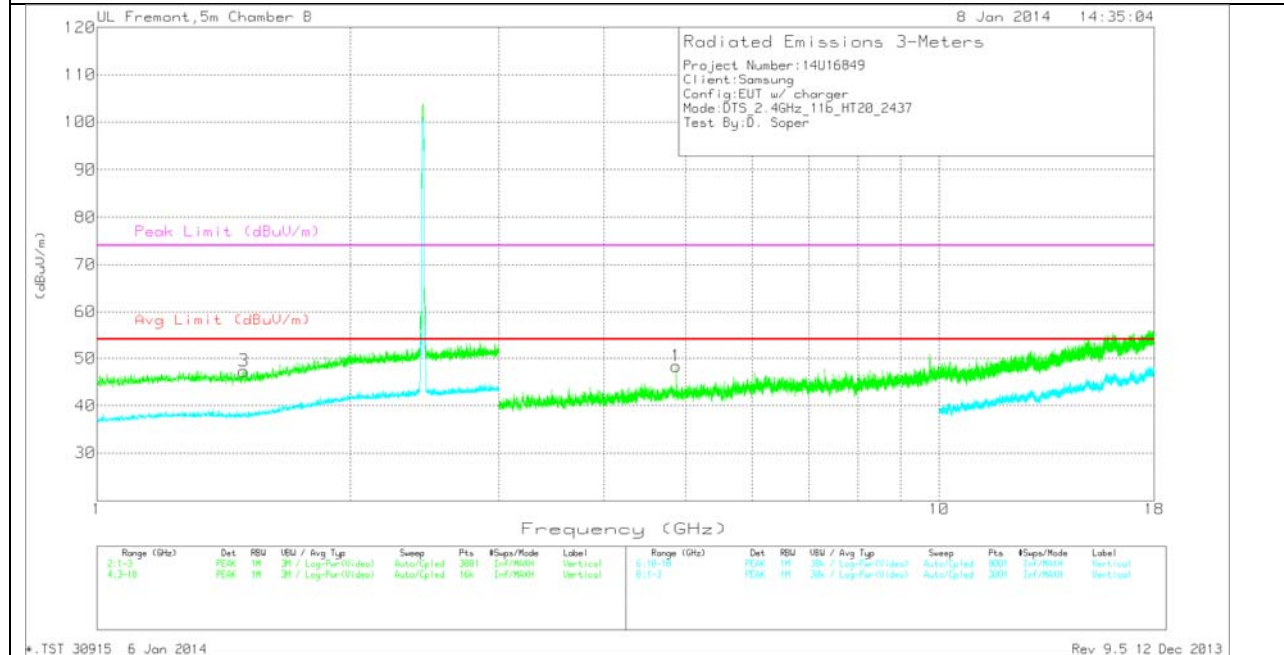
PK - Peak detector

MID CHANNEL HORIZONTAL



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

MID CHANNEL VERTICAL



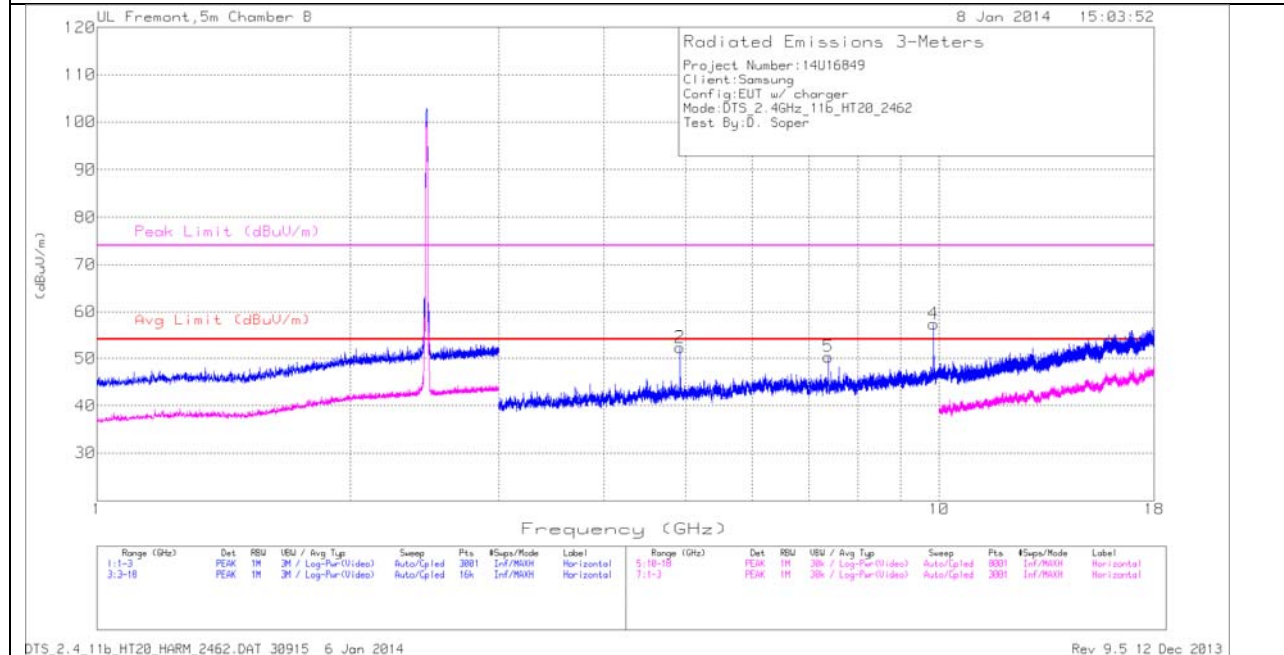
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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
4	1.441	43.33	PK	28.3	-24.3	47.33	54	-6.67	74	-26.67	0-360	201	H
3	1.494	43.3	PK	28.2	-24.2	47.3	54	-6.7	74	-26.7	0-360	99	V
1	4.874	44.24	PK	34.7	-30.6	48.34	54	-5.66	74	-25.66	0-360	202	V
2	9.748	38.65	PK	37.5	-24.2	51.95	54	-2.05	74	-22.05	0-360	202	H

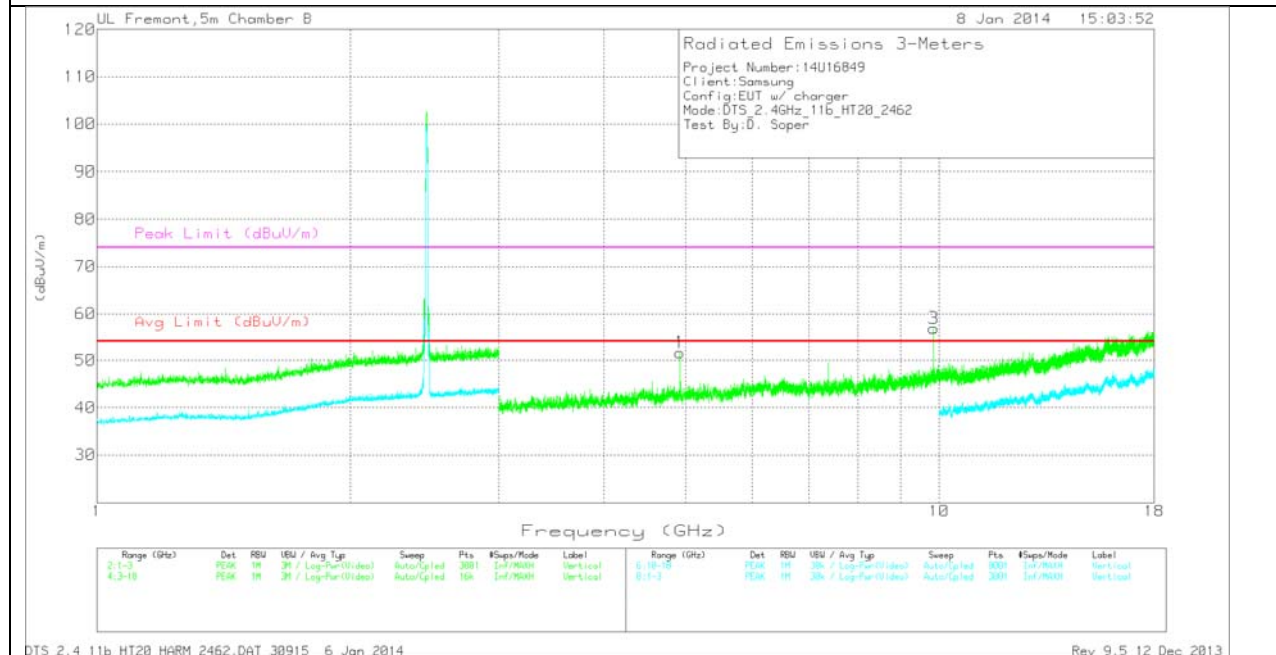
PK - Peak detector

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

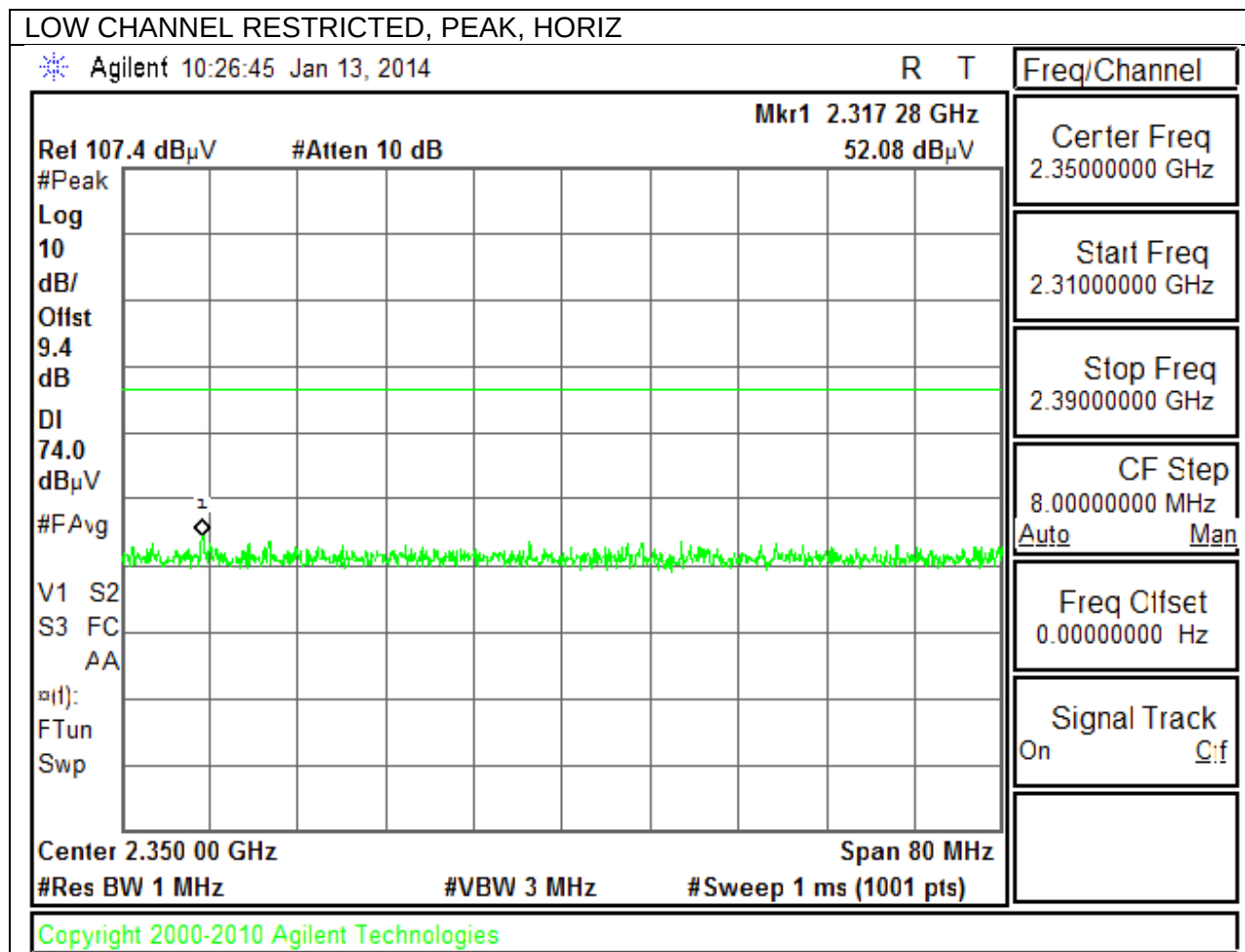
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	4.924	47.68	PK	34.6	-30.7	51.58	54	-2.42	74	-22.42	0-360	202	V
2	4.925	48.35	PK	34.6	-30.7	52.25	54	-1.75	74	-21.75	0-360	99	H
5	7.384	41.83	PK	35.9	-27.4	50.33	54	-3.67	74	-23.67	0-360	202	H
4	9.848	43.97	PK	37.6	-24.1	57.47			74	-16.53	0-360	202	H
3	9.848	43.38	PK	37.6	-24.1	56.88			74	-17.12	0-360	202	V

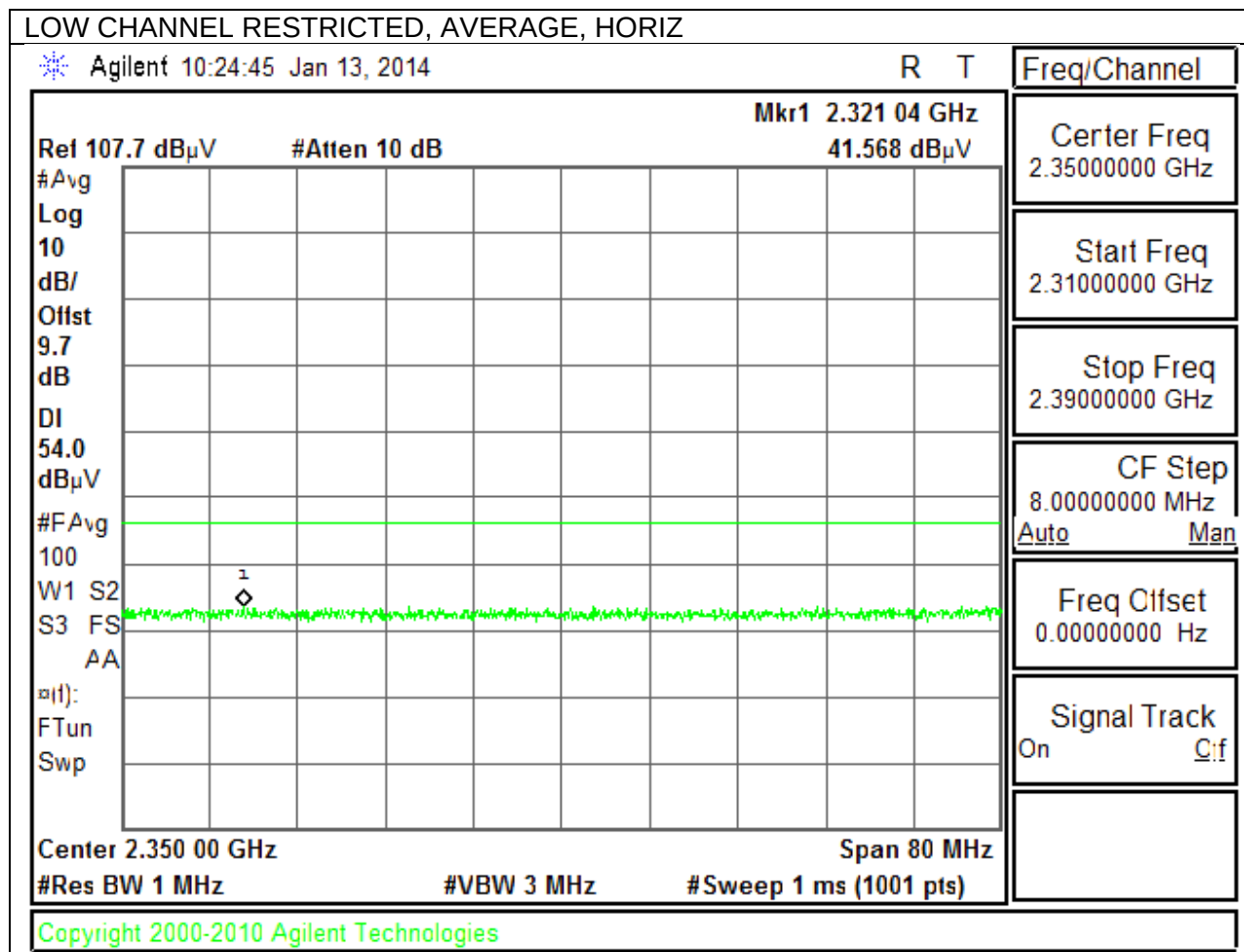
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAV1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAV1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

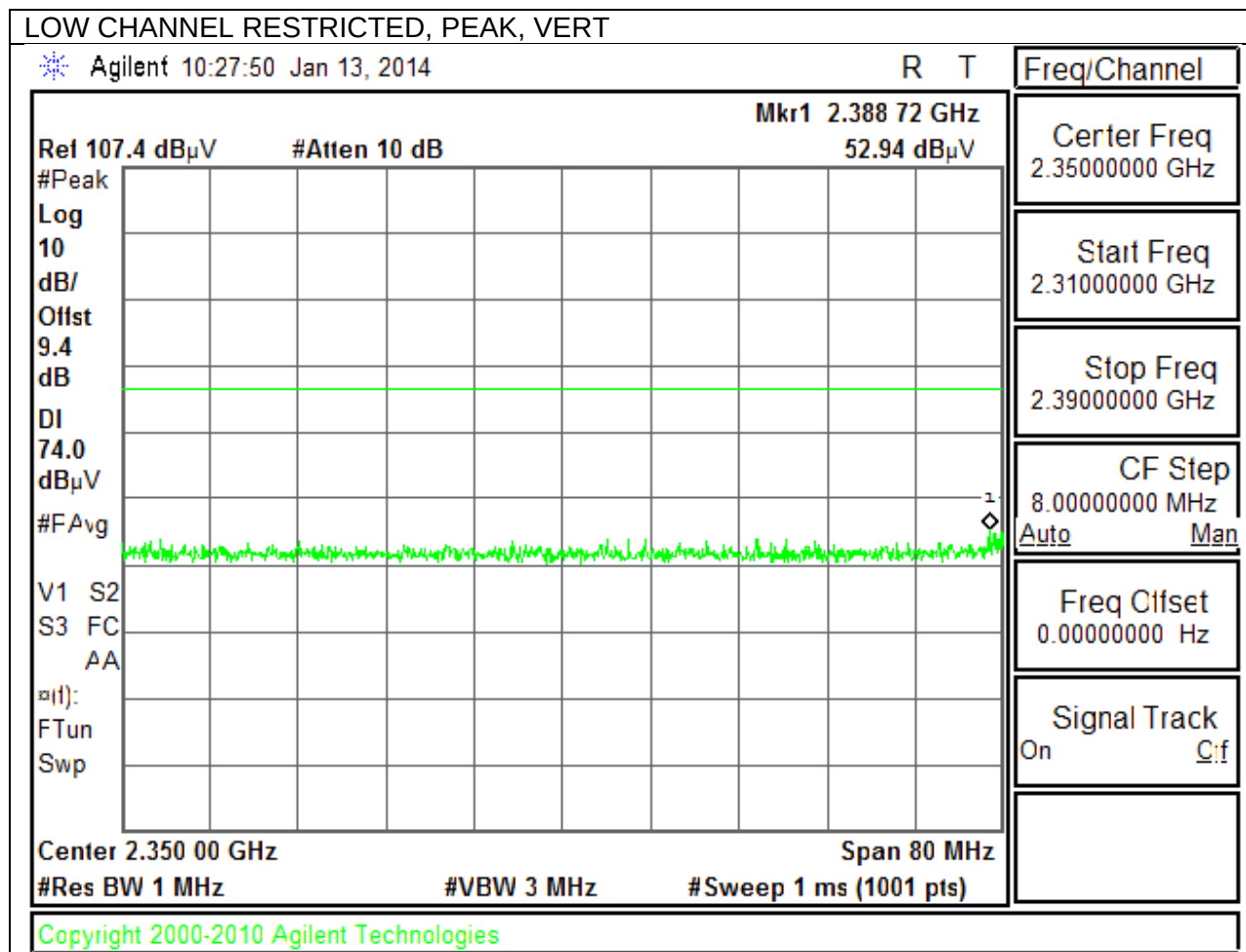
PK - Peak detector

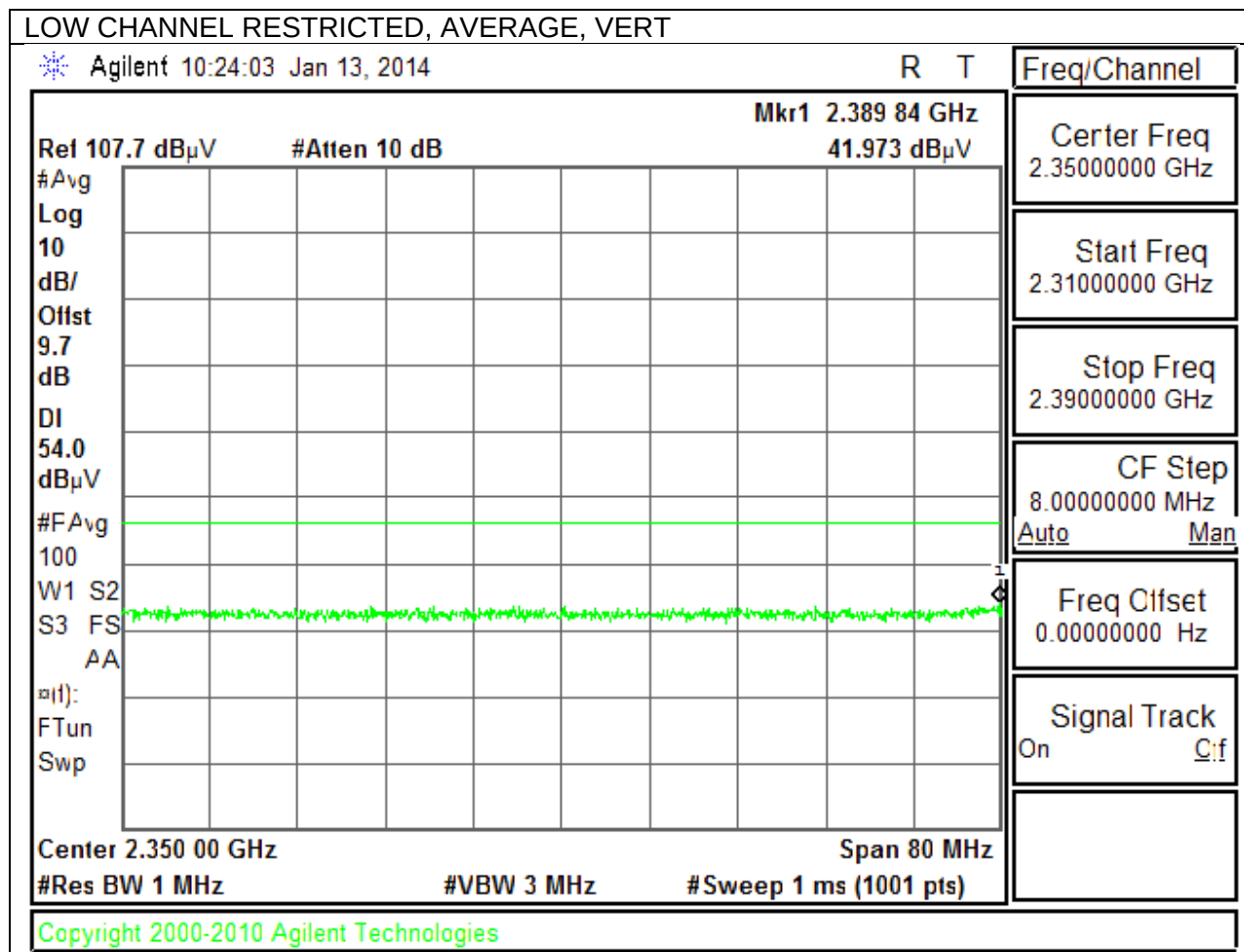
MAV1 - KDB558074 Option 1 Maximum RMS Average

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

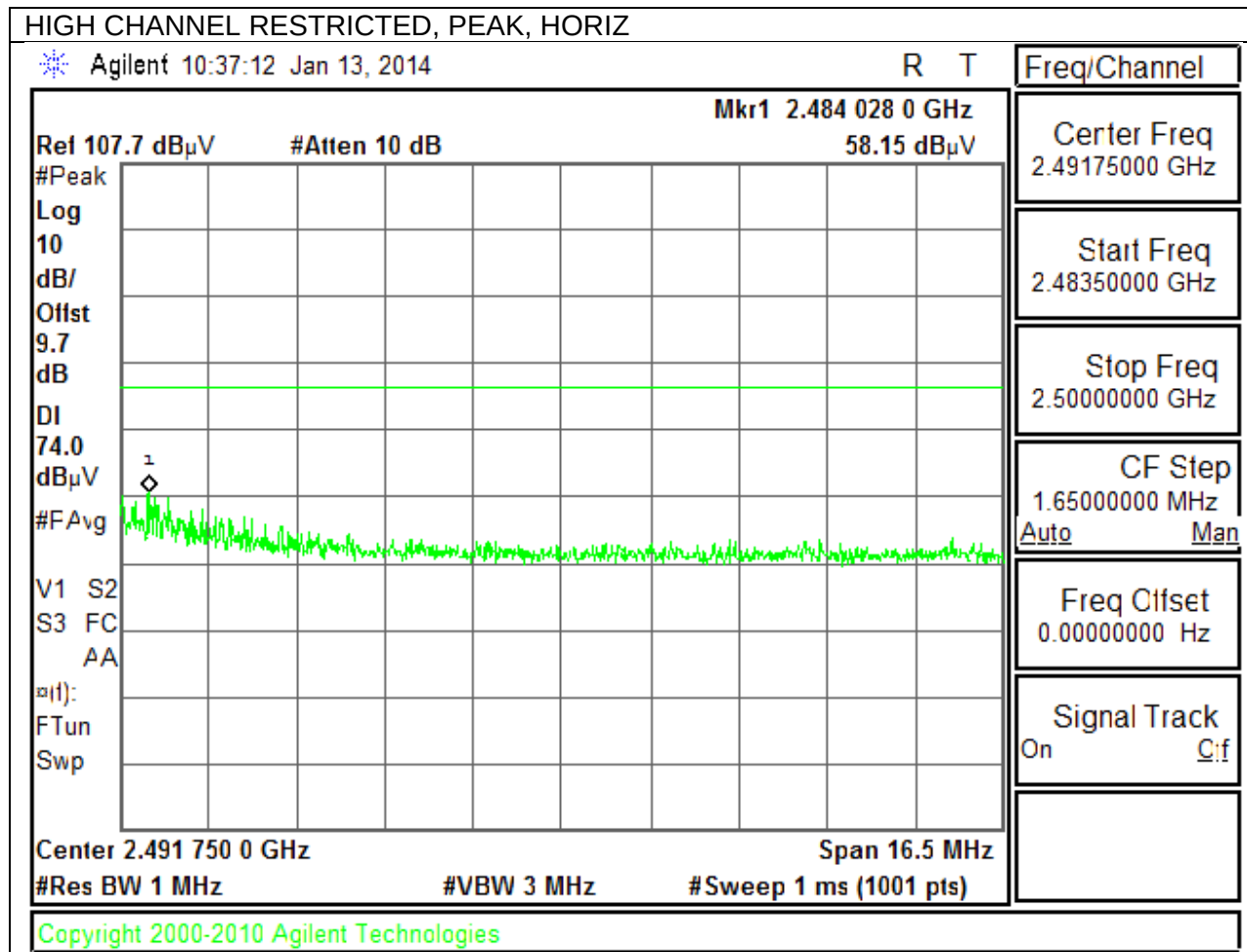


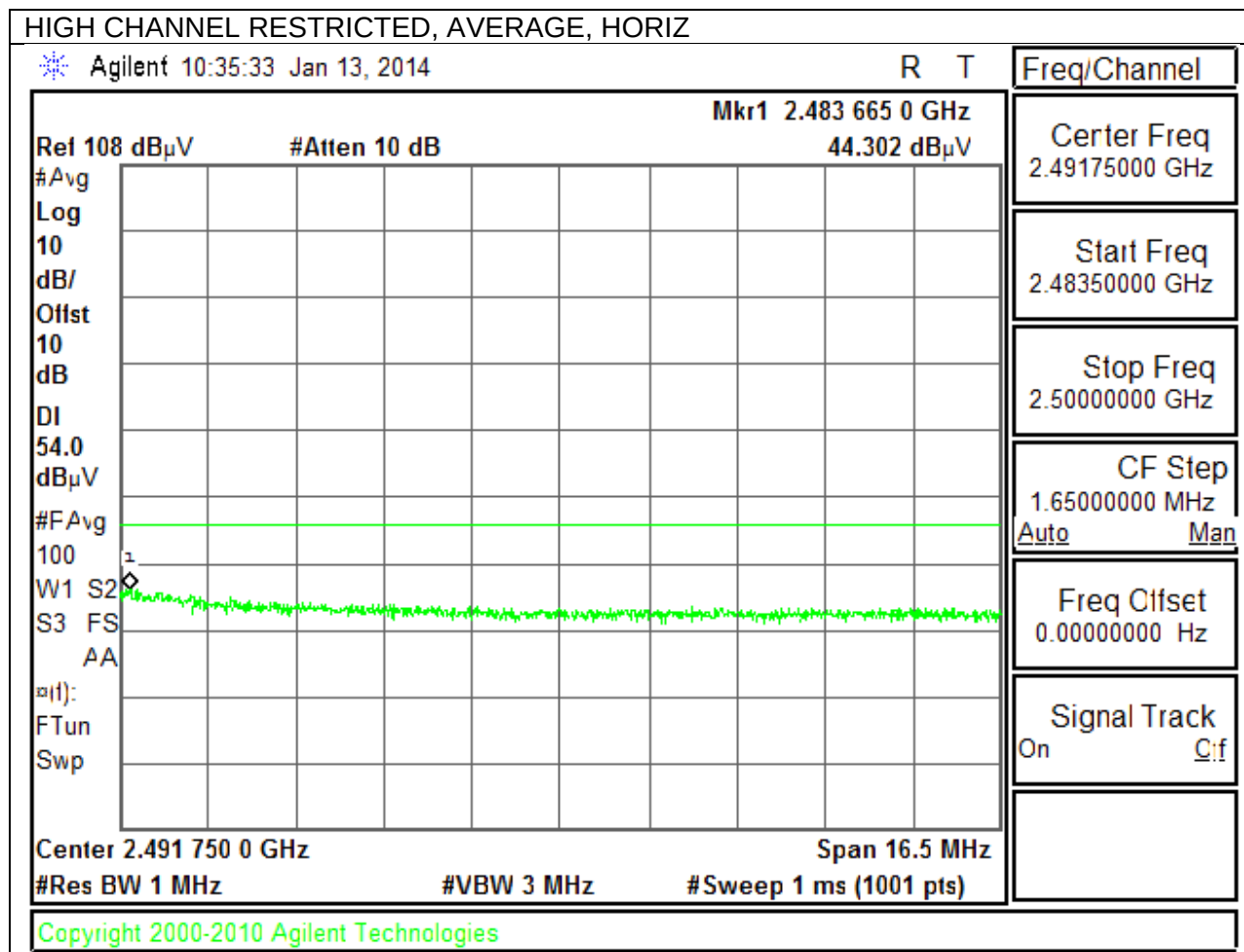


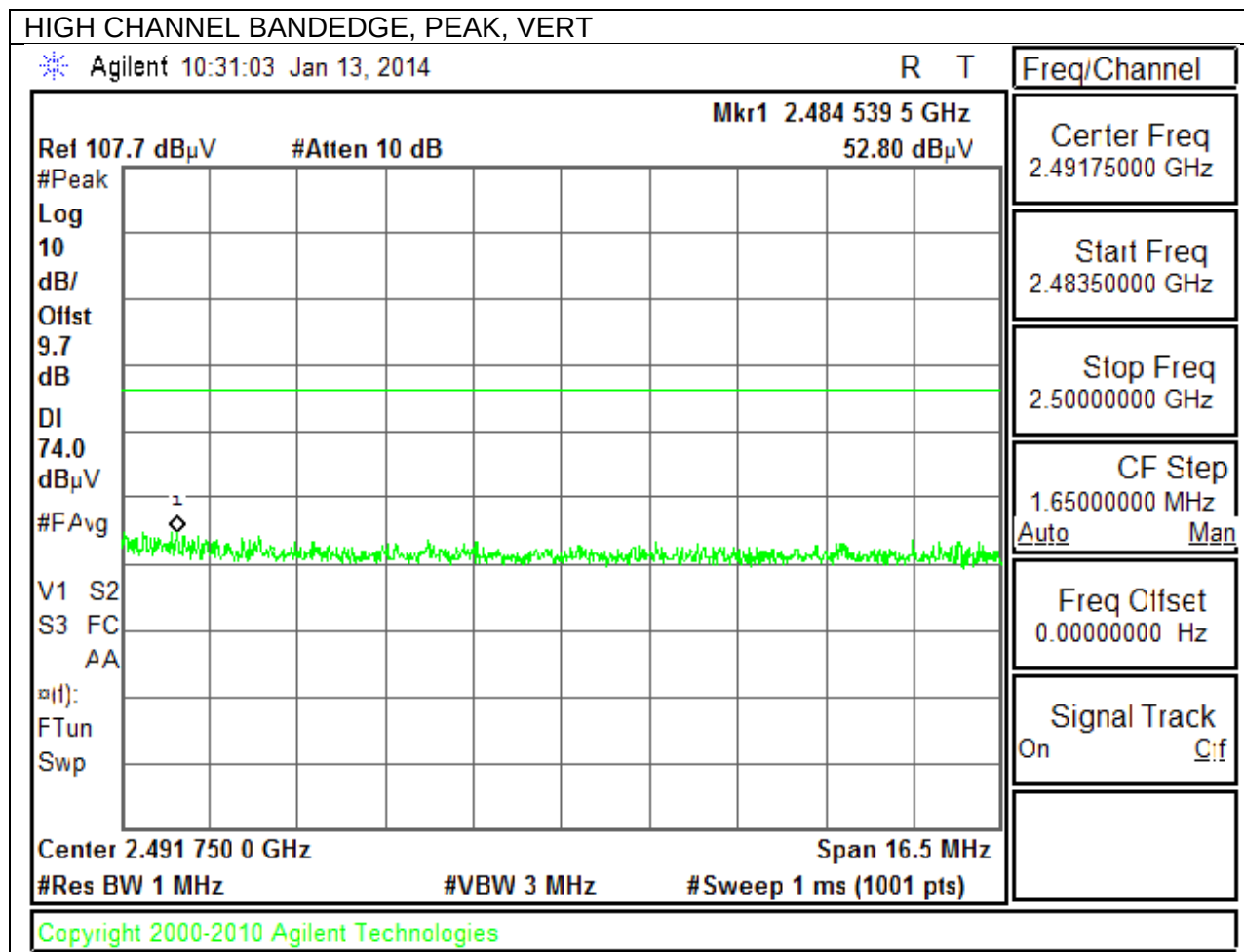


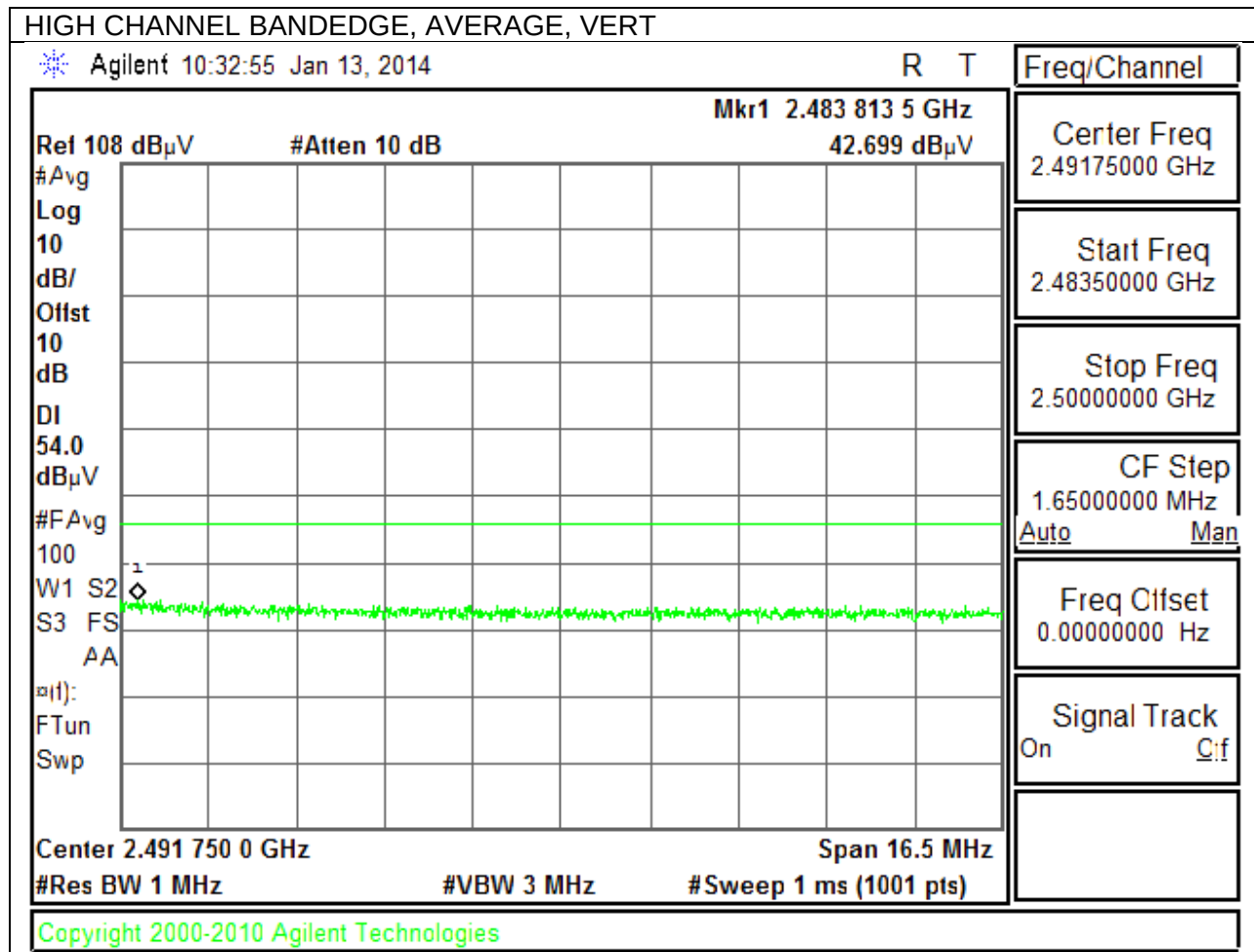


AUTHORIZED BANDEDGE (HIGH CHANNEL)



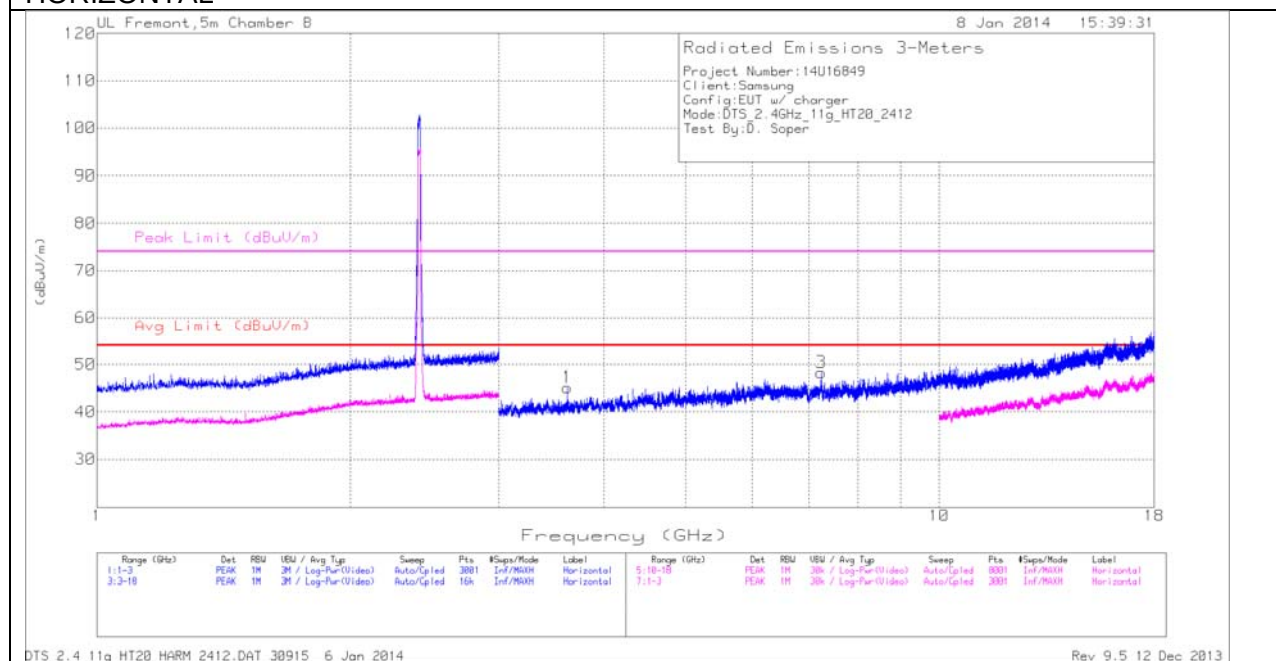






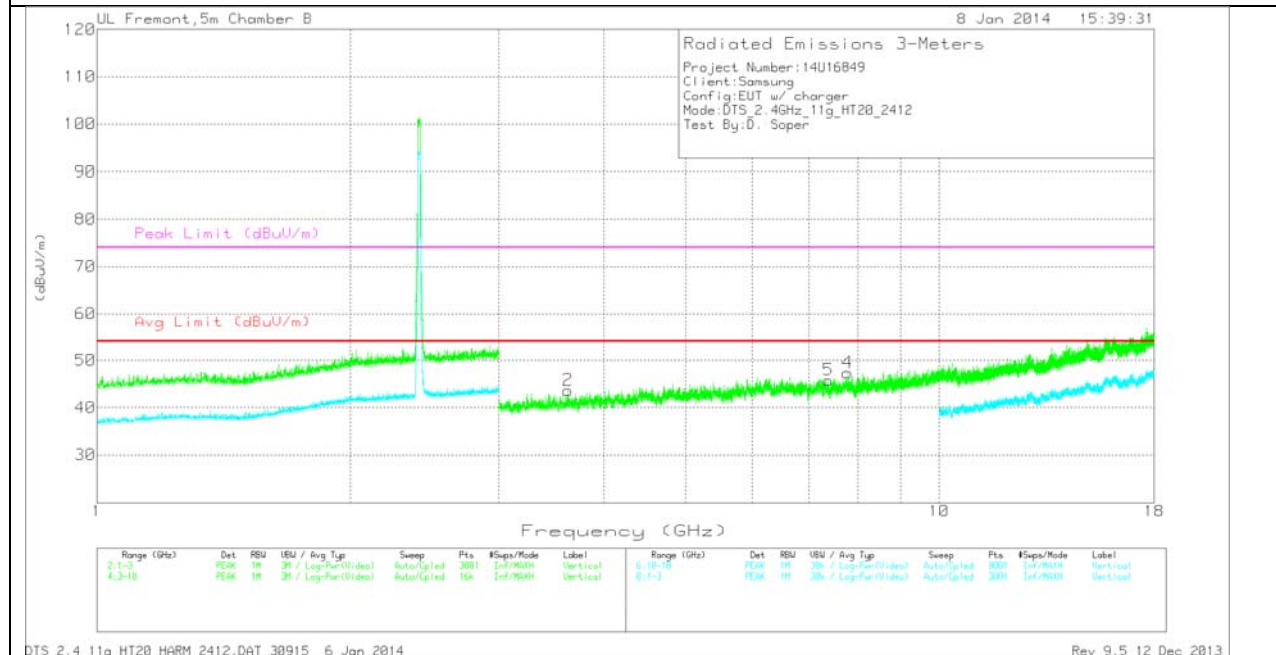
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

LOW CHANNEL DATA

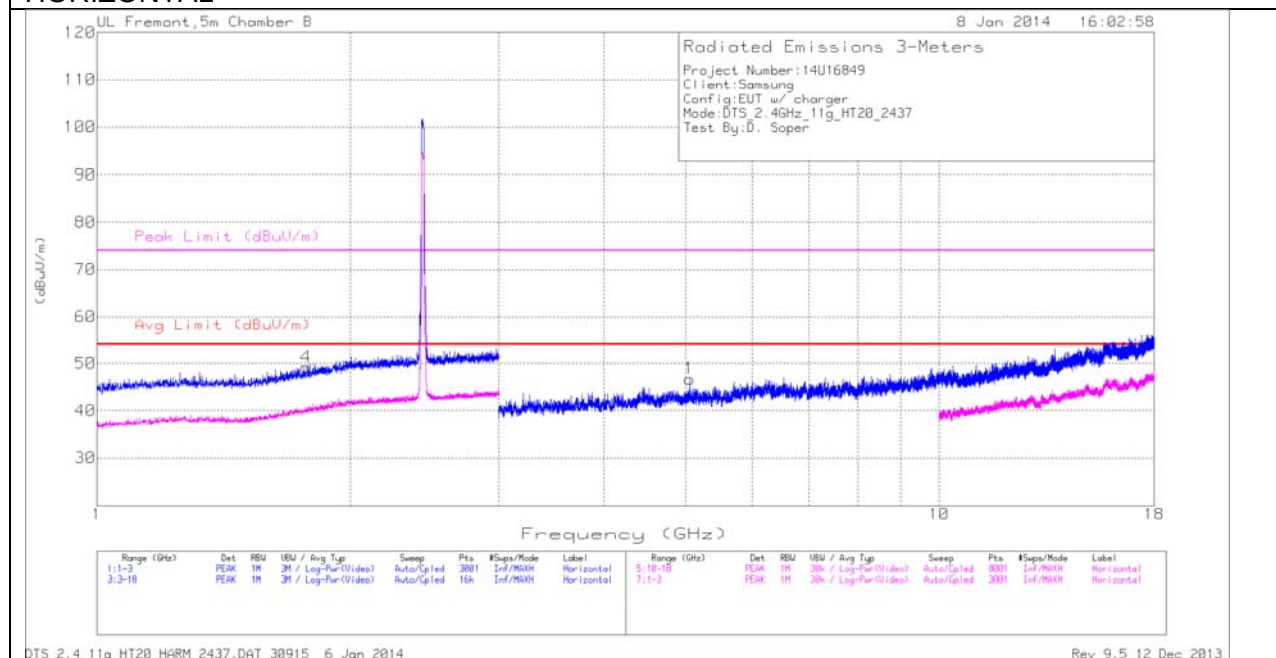
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F litr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.619	42.82	PK	33.5	-31.2	45.12	54	-8.88	74	-28.88	0-360	99	H
2	3.626	41.35	PK	33.5	-31.2	43.65	54	-10.35	74	-30.35	0-360	99	V
3	7.243	39.88	PK	35.8	-27.4	48.28	54	-5.72	74	-25.72	0-360	202	H
5	7.383	37.31	PK	35.9	-27.4	45.81	54	-8.19	74	-28.19	0-360	202	V
4	7.786	37.47	PK	36.2	-26.3	47.37	54	-6.63	74	-26.63	0-360	202	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAv1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAv1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

PK - Peak detector

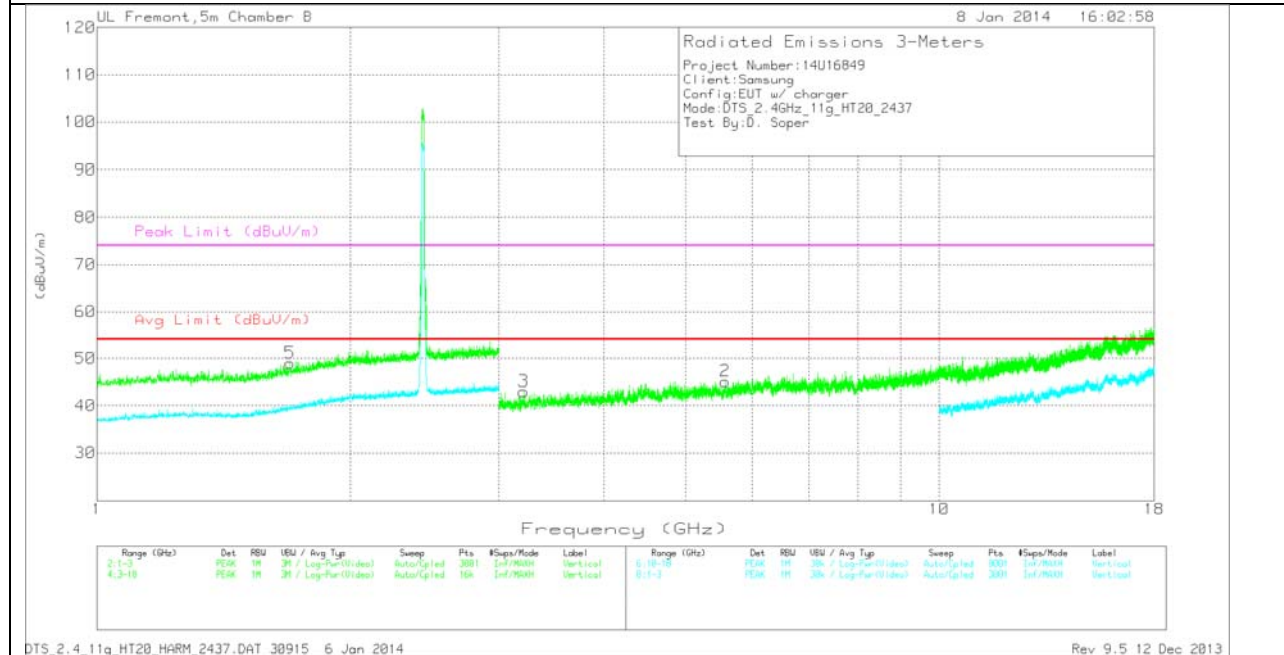
MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL HORIZONTAL



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

MID CHANNEL VERTICAL



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

MID CHANNEL DATA

Trace Markers

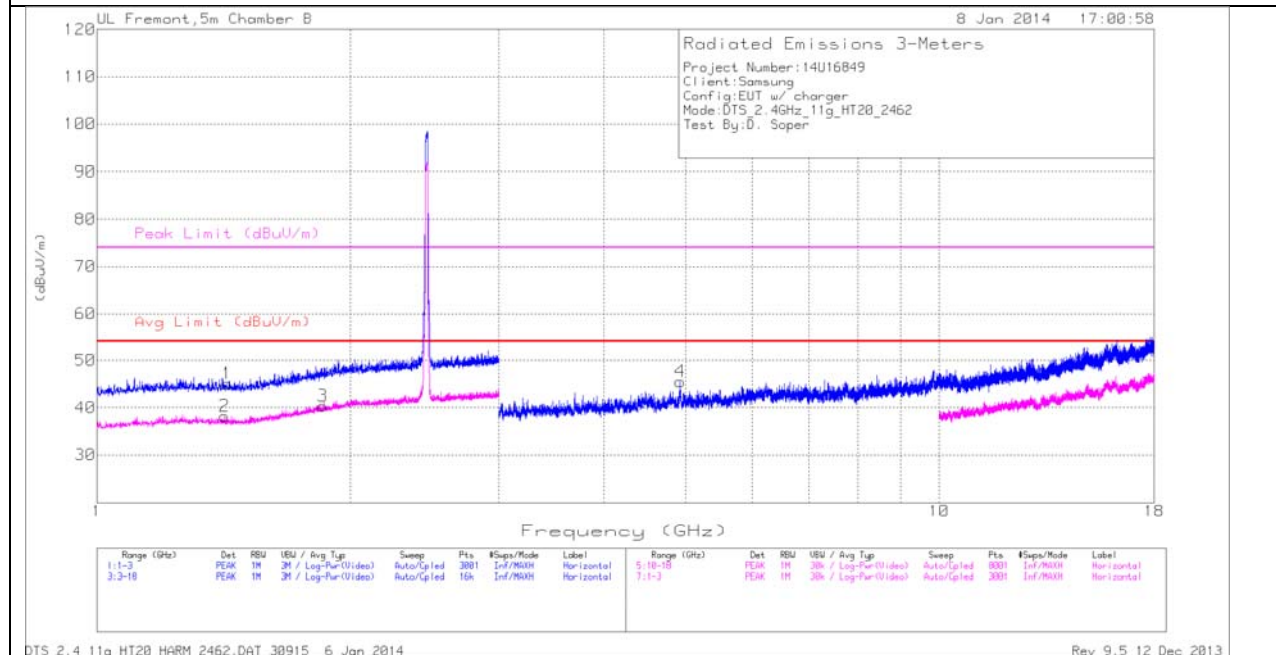
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.695	43.14	PK	29.7	-23.9	48.94	54	-5.06	74	-25.06	0-360	99	V
4	1.771	42.64	PK	30.2	-23.7	49.14	54	-4.86	74	-24.86	0-360	99	H
3	3.211	40.79	PK	33.3	-31.1	42.99	54	-11.01	74	-31.01	0-360	99	V
1	5.055	40.84	PK	34.7	-28.8	46.74	54	-7.26	74	-27.26	0-360	99	H
2	5.57	39.53	PK	35	-29.4	45.13	54	-8.87	74	-28.87	0-360	99	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAV1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAV1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

PK - Peak detector

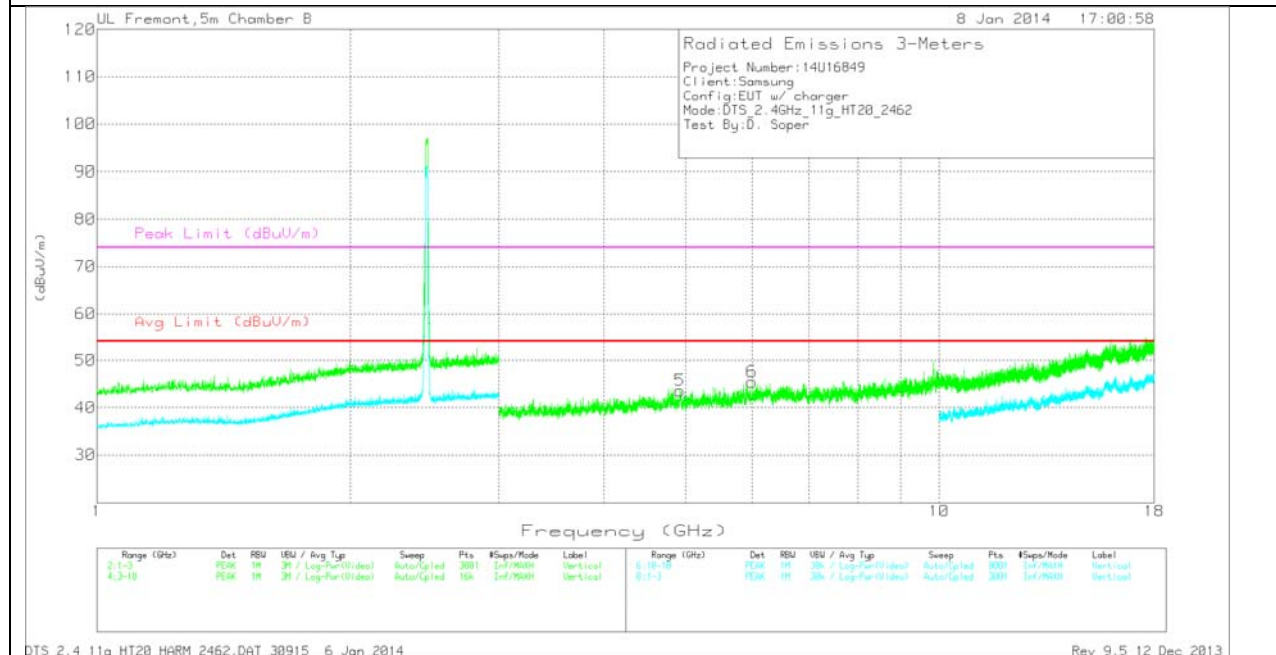
MAV1 - KDB558074 Option 1 Maximum RMS Average

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

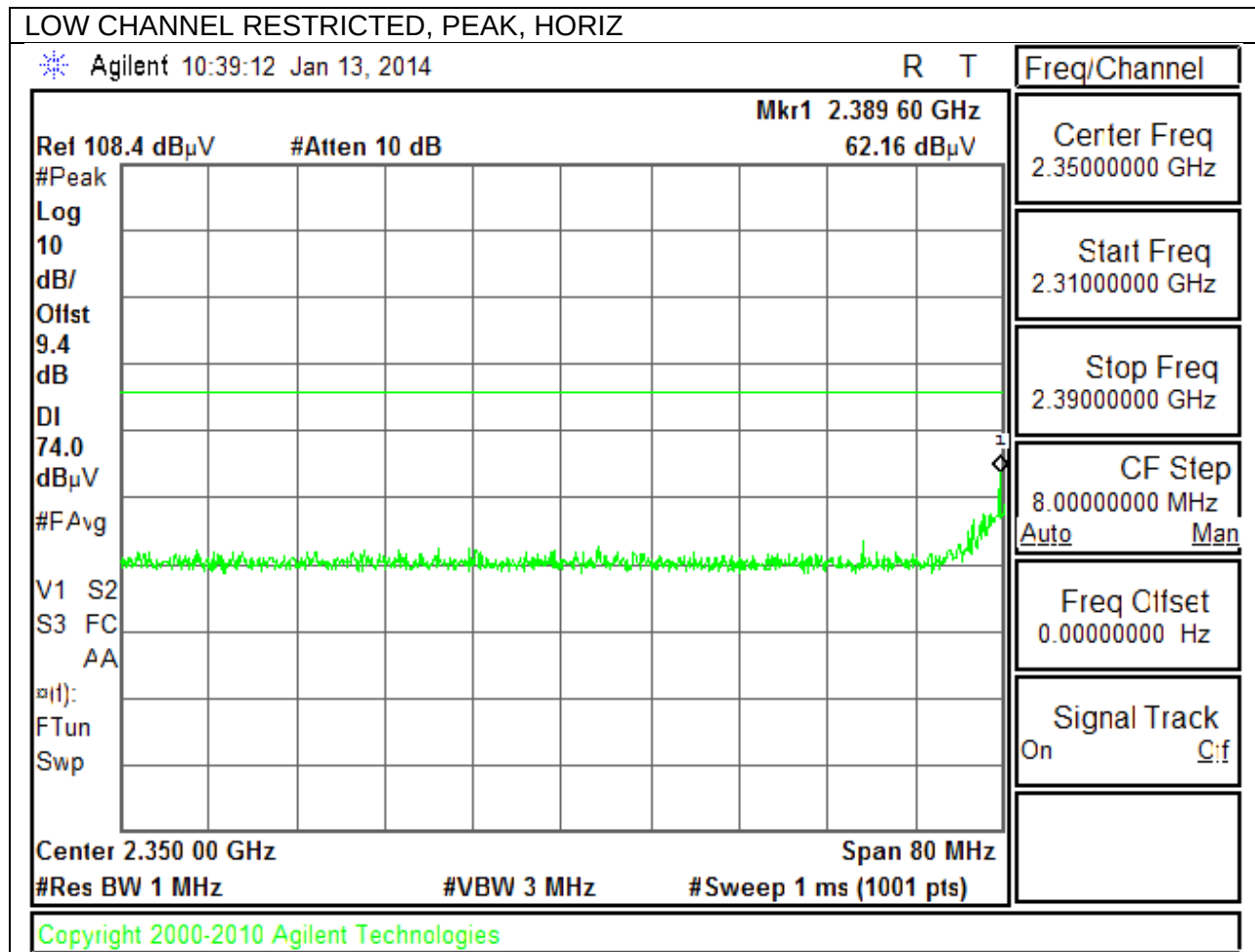
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	1.418	34.26	Avg	28.3	-24.4	38.16	54	-15.84	-	-	0-360	202	H
1	1.427	41.15	PK	28.3	-24.4	45.05	54	-8.95	74	-28.95	0-360	99	H
3	1.854	33.21	Avg	30.8	-23.7	40.31	54	-13.69	-	-	0-360	99	H
5	4.923	39.67	PK	34.6	-30.7	43.57	54	-10.43	74	-30.43	0-360	202	V
4	4.926	41.5	PK	34.6	-30.6	45.5	54	-8.5	74	-28.5	0-360	99	H
6	5.994	38.13	PK	35.9	-28.6	45.43	54	-8.57	74	-28.57	0-360	99	V

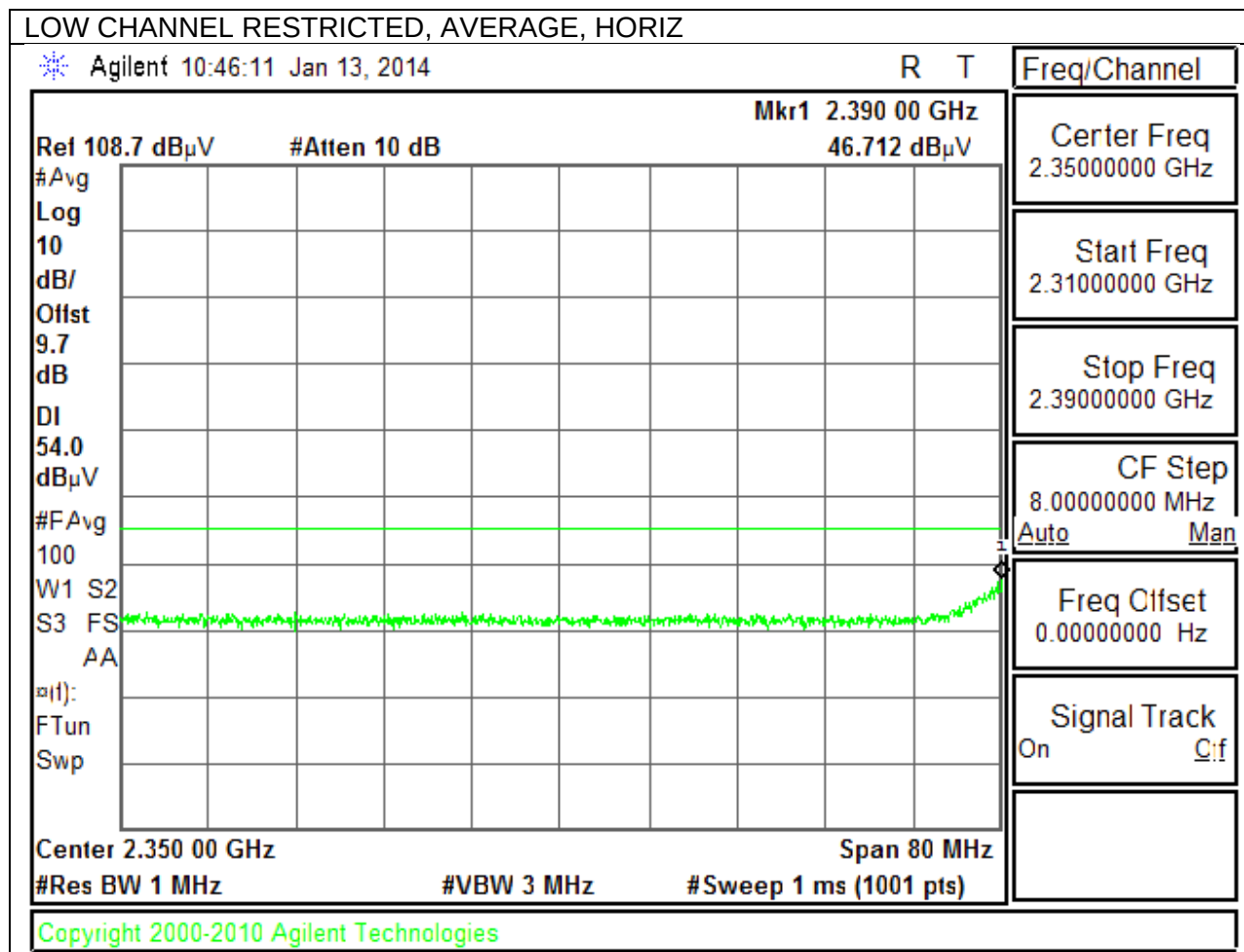
Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAV1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAV1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

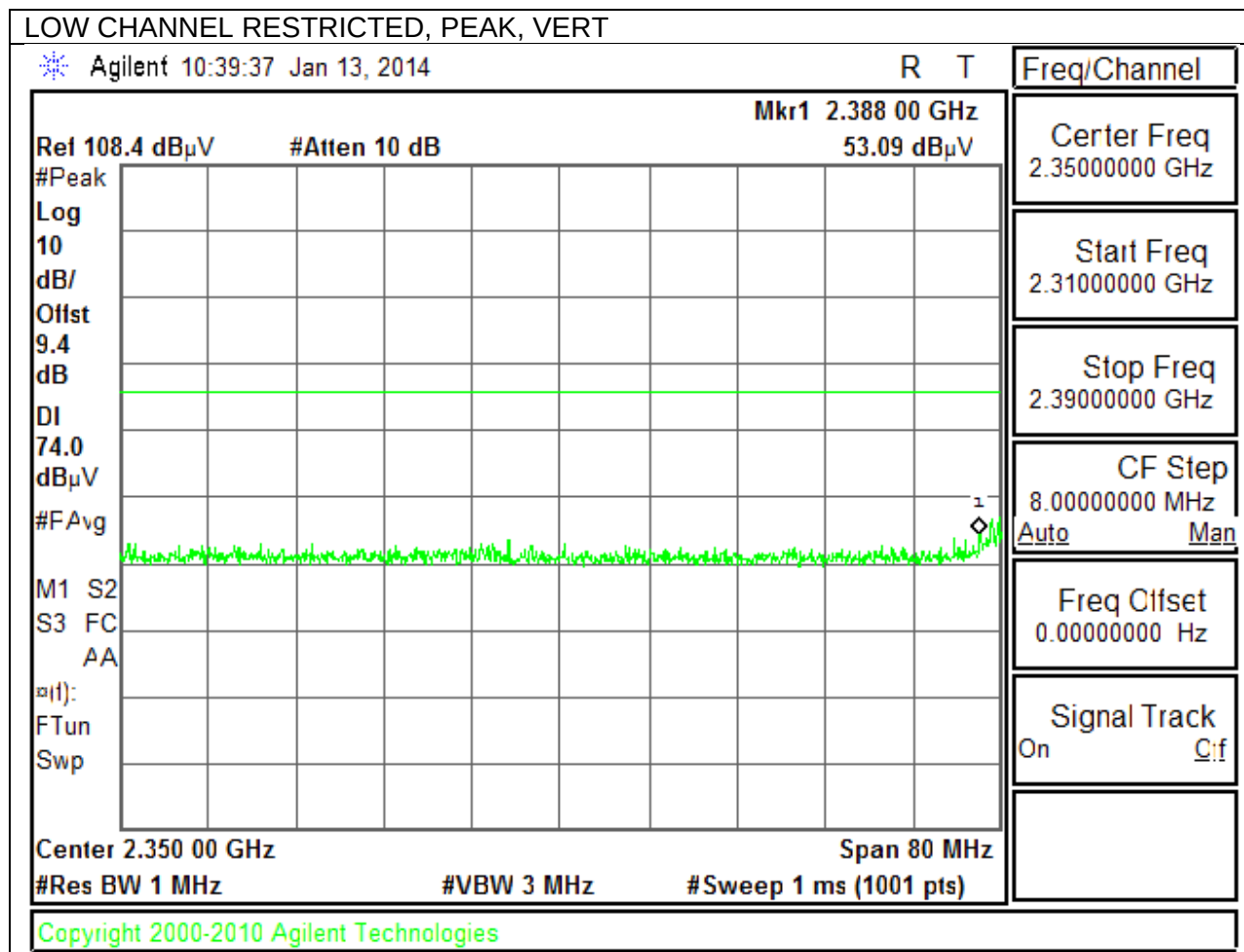
PK - Peak detector

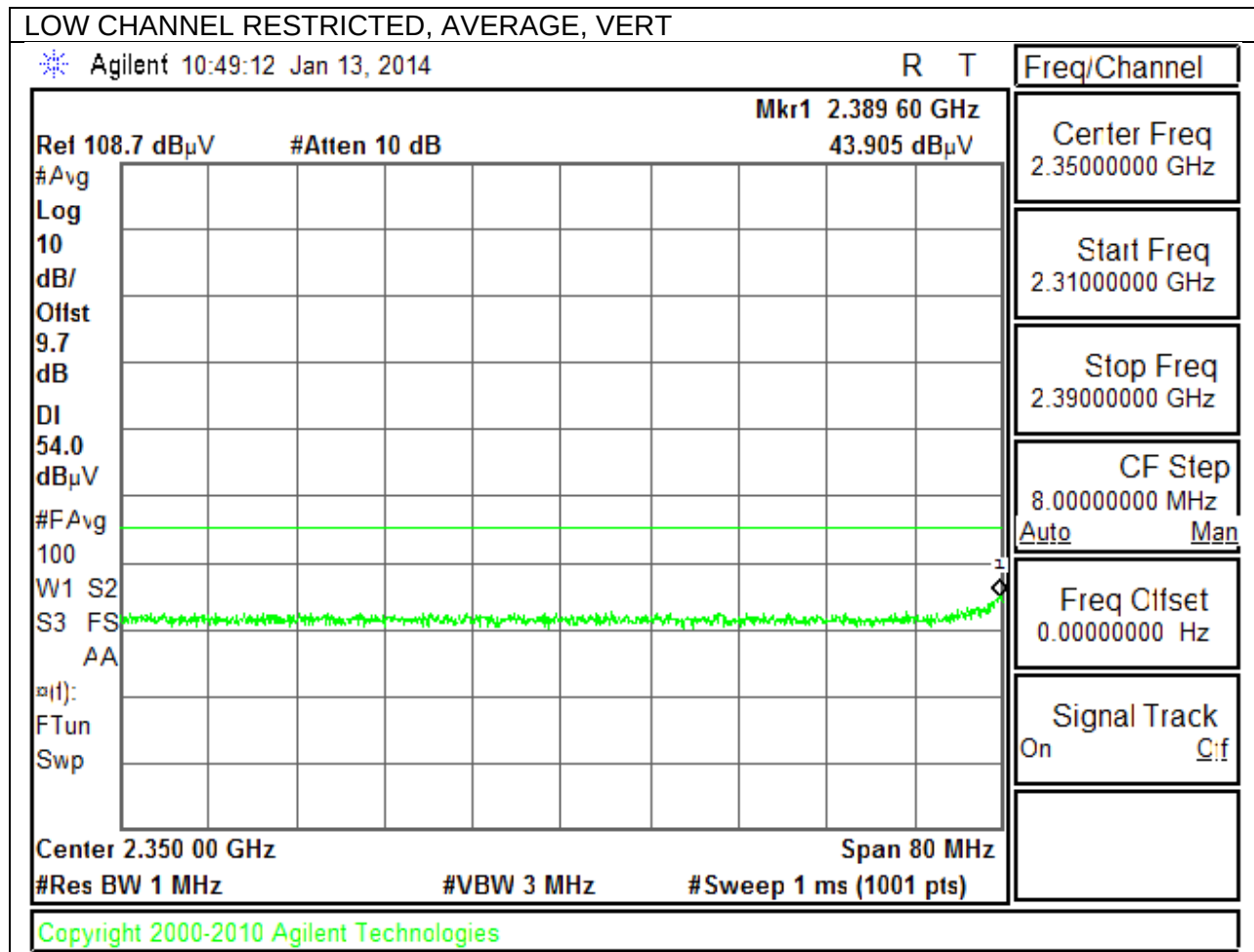
MAV1 - KDB558074 Option 1 Maximum RMS Average

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

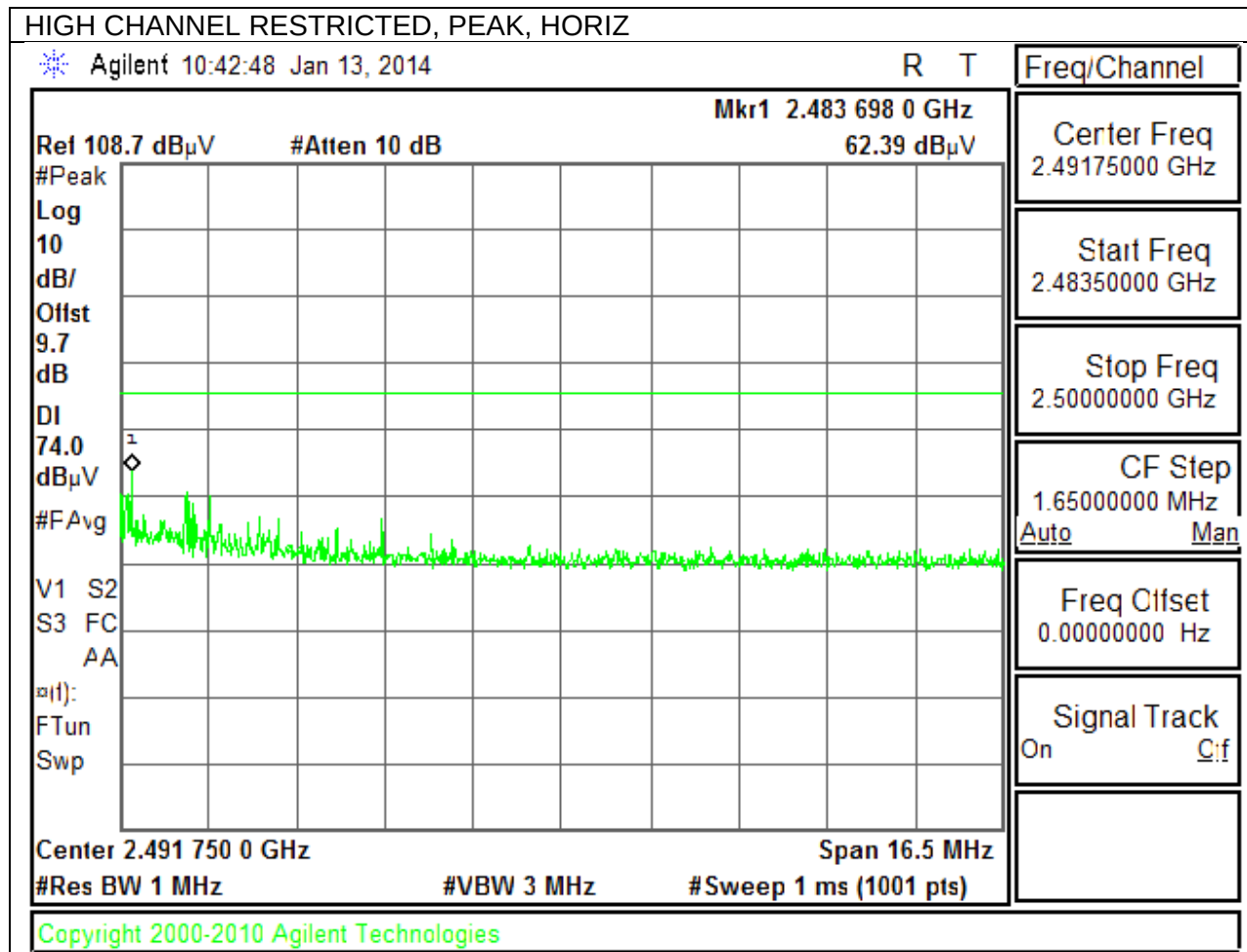


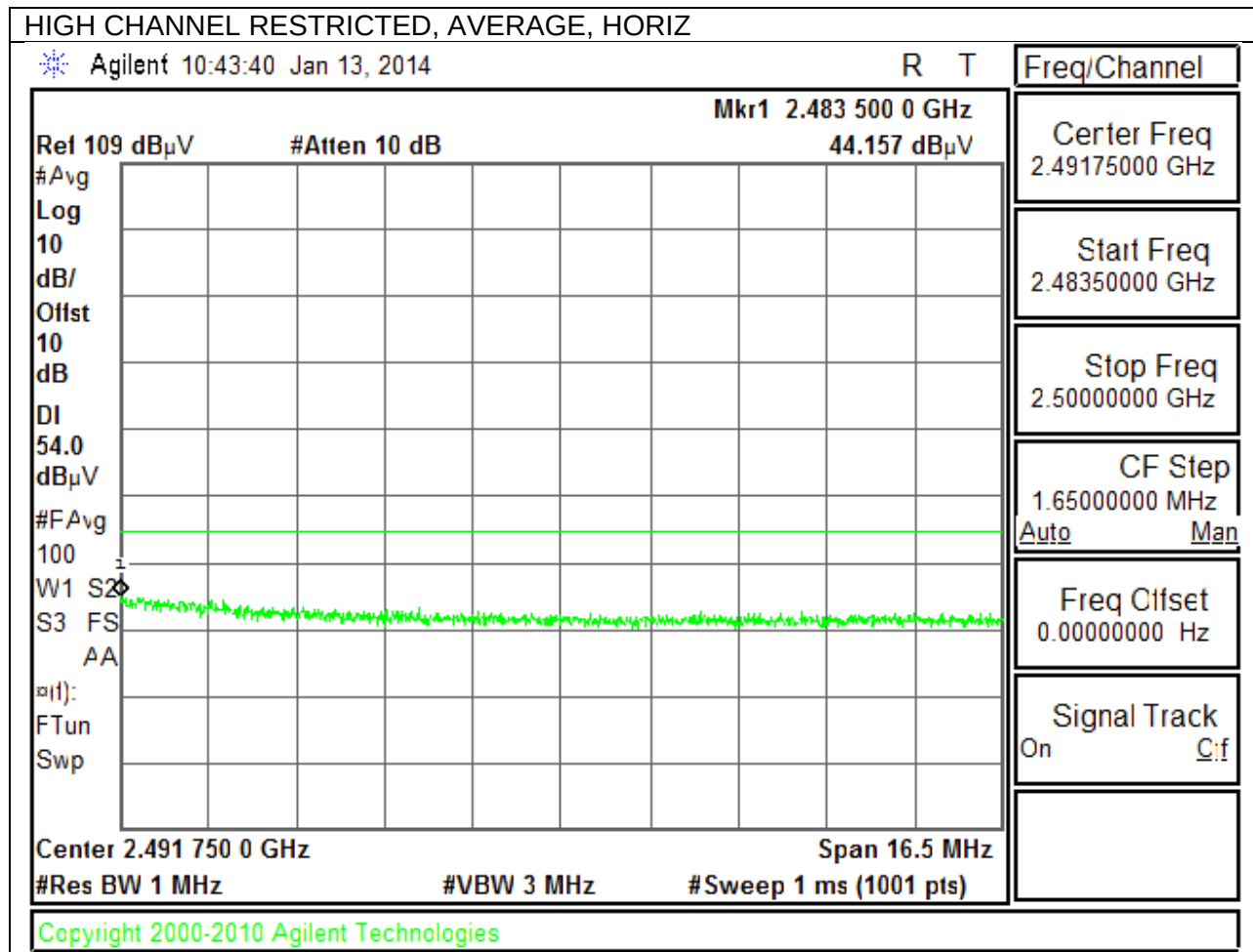


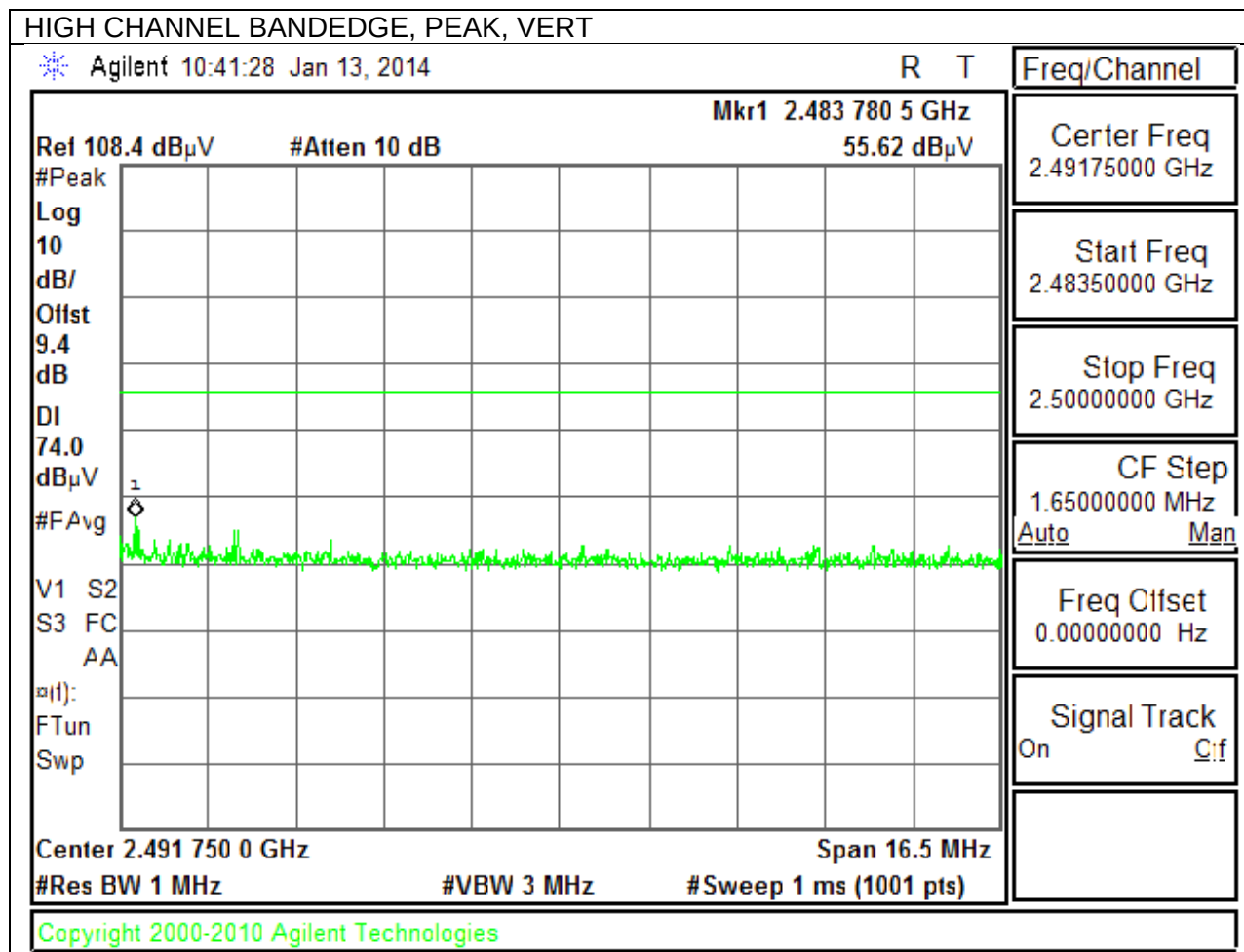


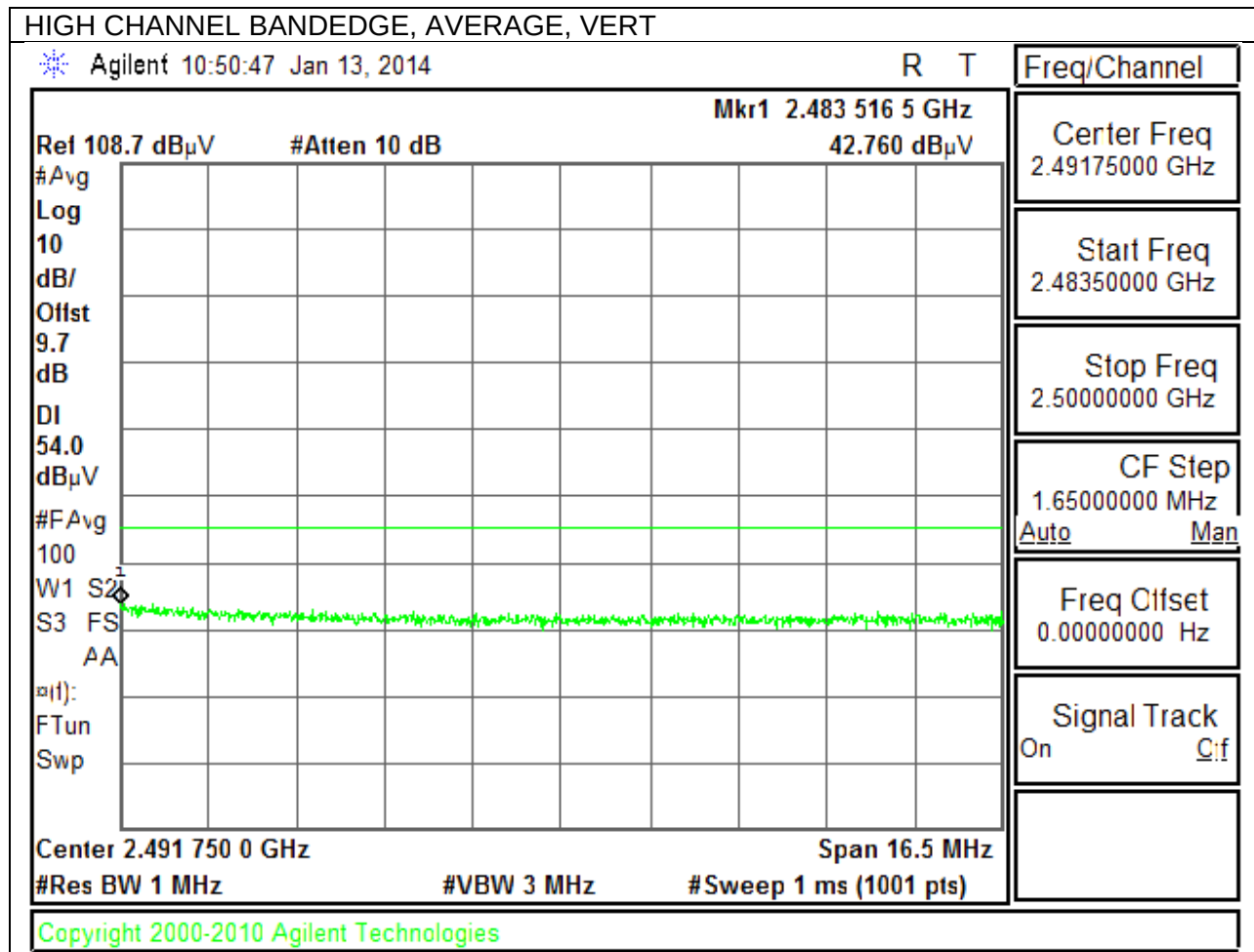


AUTHORIZED BANDEDGE (HIGH CHANNEL)



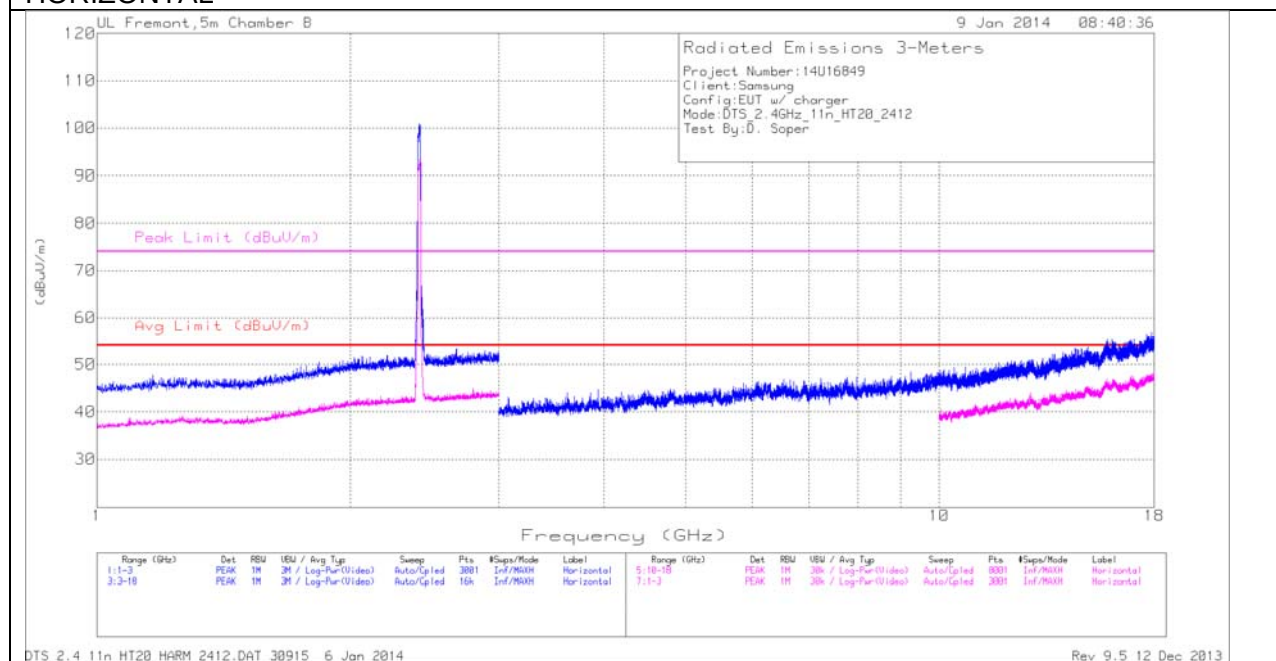






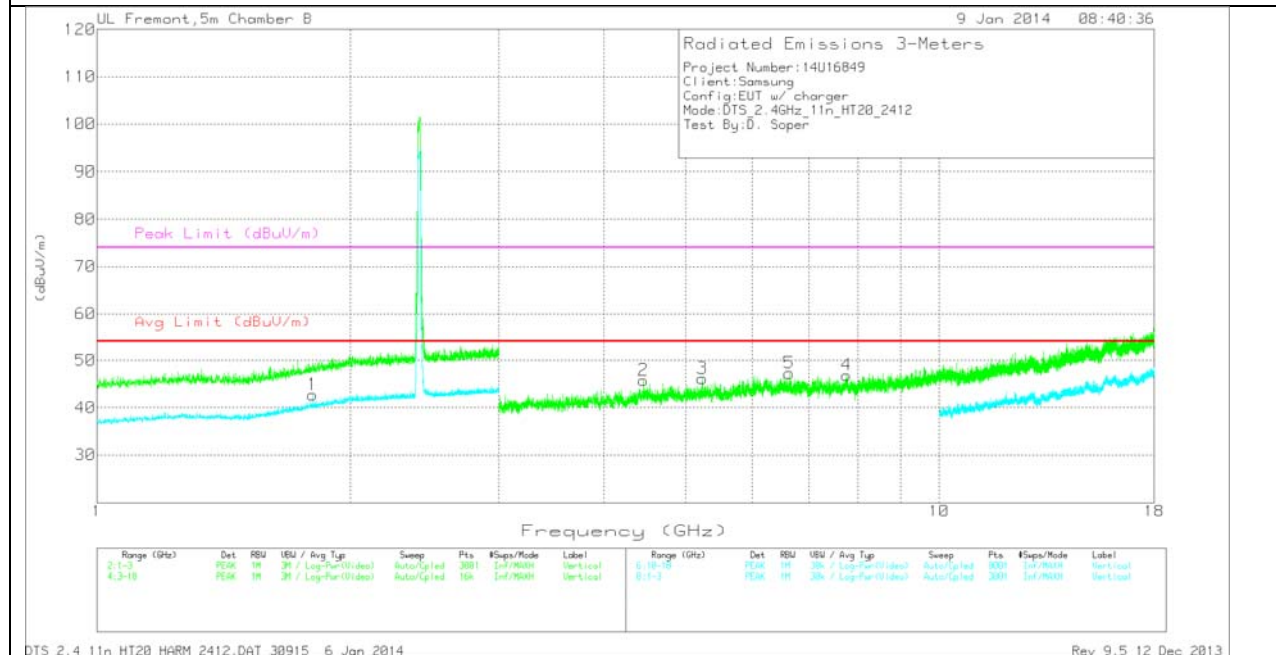
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



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

LOW CHANNEL VERTICAL



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

LOW CHANNEL DATA

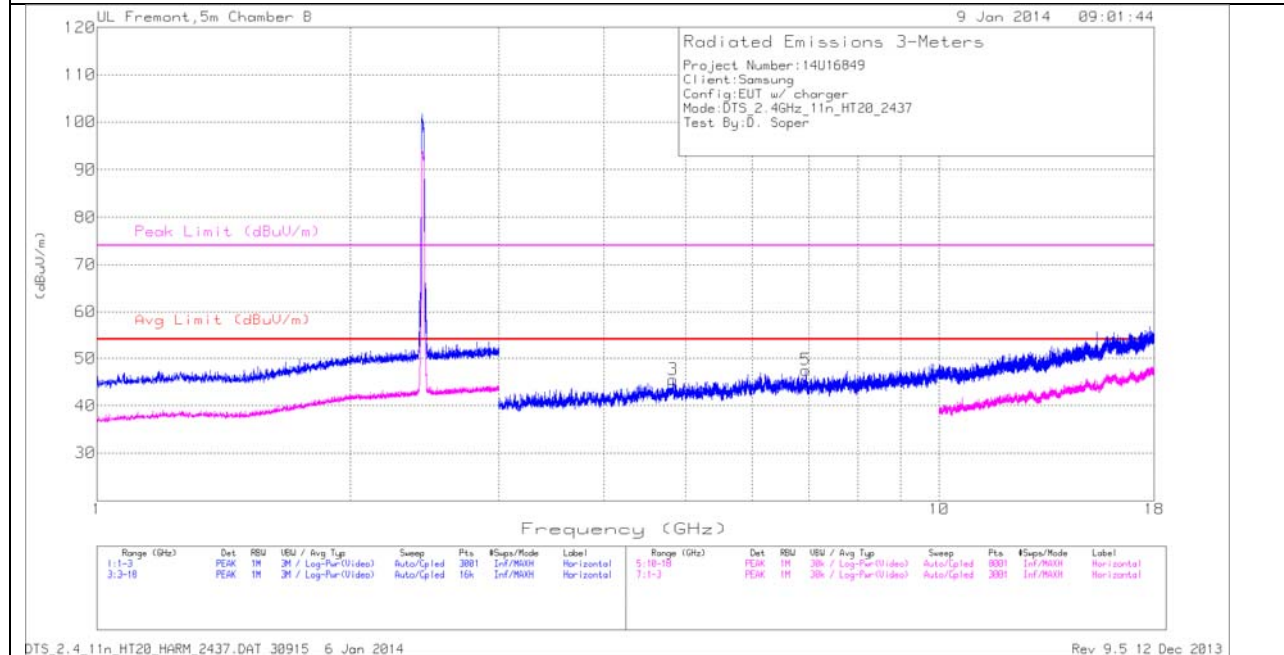
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.803	35.91	Avg	30.5	-23.7	42.71	54	-11.29	-	-	0-360	202	V
2	4.457	40.35	PK	34.4	-29	45.75	54	-8.25	74	-28.25	0-360	99	V
3	5.234	41.36	PK	34.9	-30.1	46.16	54	-7.84	74	-27.84	0-360	99	V
5	6.635	39.98	PK	35.8	-28.5	47.28	54	-6.72	74	-26.72	0-360	99	V
4	7.76	36.65	PK	36.2	-26	46.85	54	-7.15	74	-27.15	0-360	99	V

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAv1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAv1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

PK - Peak detector

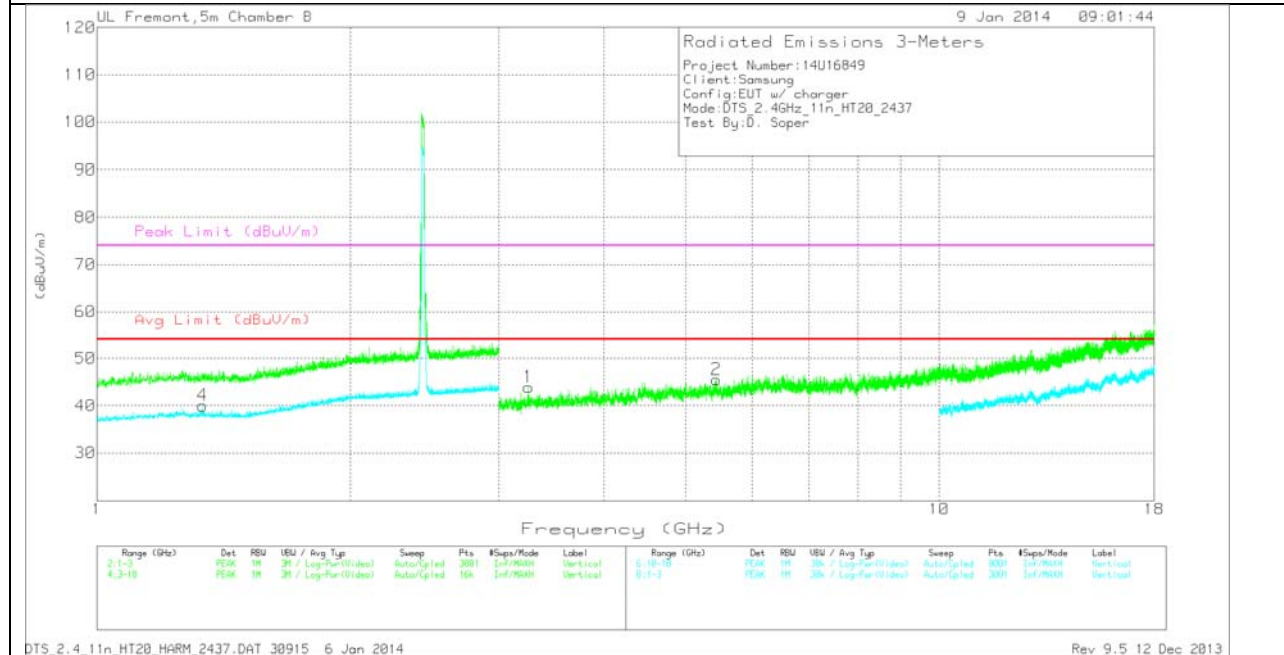
MAv1 - KDB558074 Option 1 Maximum RMS Average

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

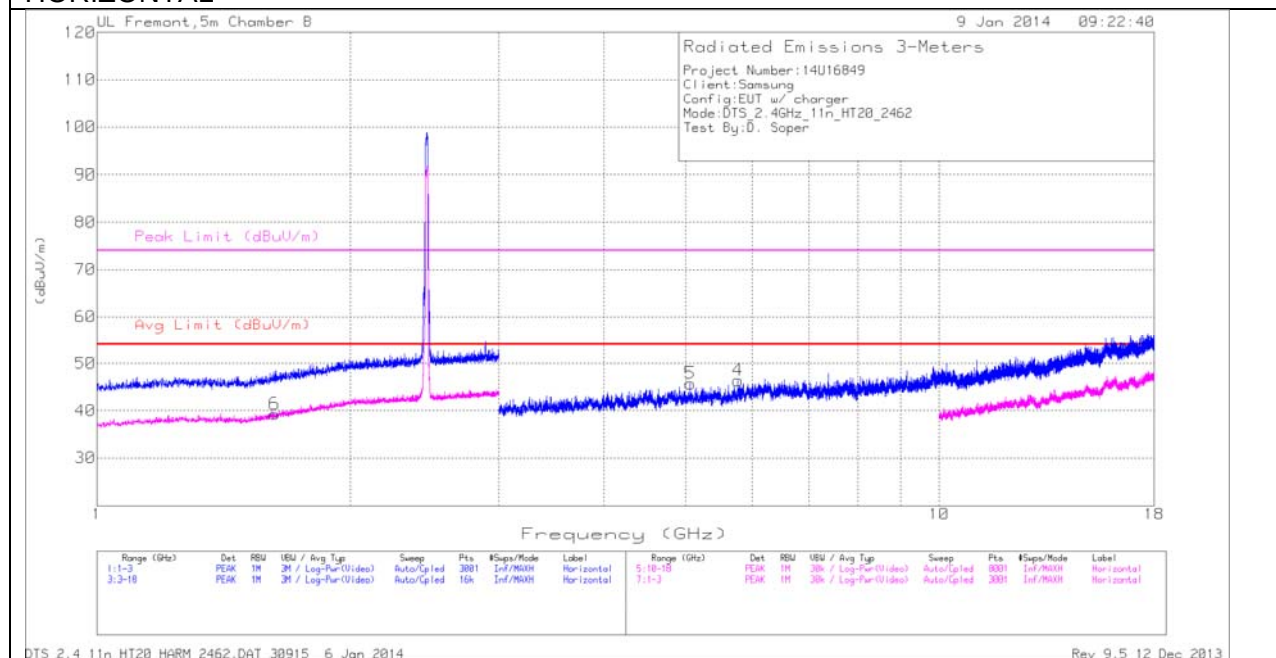
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.335	36.11	Avg	28.5	-24.6	40.01	54	-13.99	-	-	0-360	202	V
1	3.254	41.5	PK	33.3	-30.9	43.9	54	-10.1	74	-30.1	0-360	202	V
3	4.828	40.29	PK	34.7	-29.5	45.49	54	-8.51	74	-28.51	0-360	202	H
2	5.439	39.9	PK	34.9	-29.3	45.5	54	-8.5	74	-28.5	0-360	99	V
5	6.946	39.54	PK	35.9	-27.9	47.54	54	-6.46	74	-26.46	0-360	99	H

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAV1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAV1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

PK - Peak detector

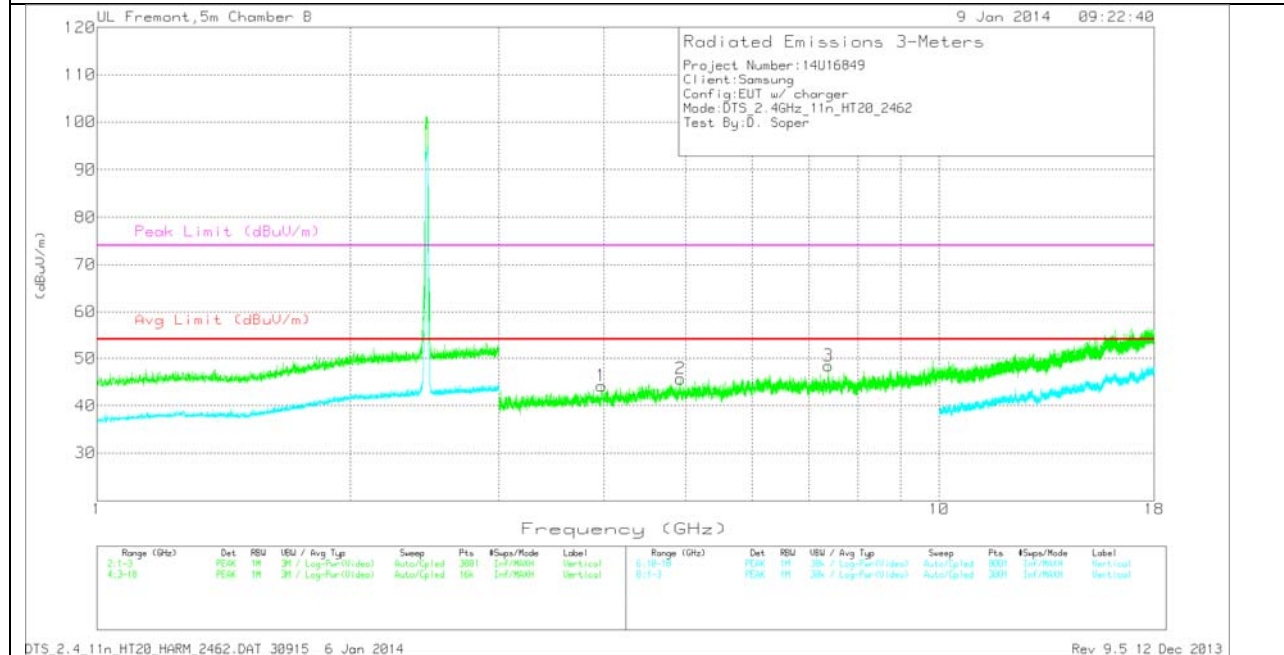
MAV1 - KDB558074 Option 1 Maximum RMS Average

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 T345 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	1.625	34.14	Avg	29.1	-24	39.24	54	-14.76	-	-	0-360	99	H
1	3.973	41.07	PK	33.9	-30.8	44.17	54	-9.83	74	-29.83	0-360	99	V
2	4.929	41.69	PK	34.6	-30.6	45.69	54	-8.31	74	-28.31	0-360	99	V
5	5.063	39.91	PK	34.7	-28.9	45.71	54	-8.29	74	-28.29	0-360	202	H
4	5.769	40.47	PK	35.3	-29.4	46.37	54	-7.63	74	-27.63	0-360	202	H
3	7.383	40.01	PK	35.9	-27.5	48.41	54	-5.59	74	-25.59	0-360	99	V

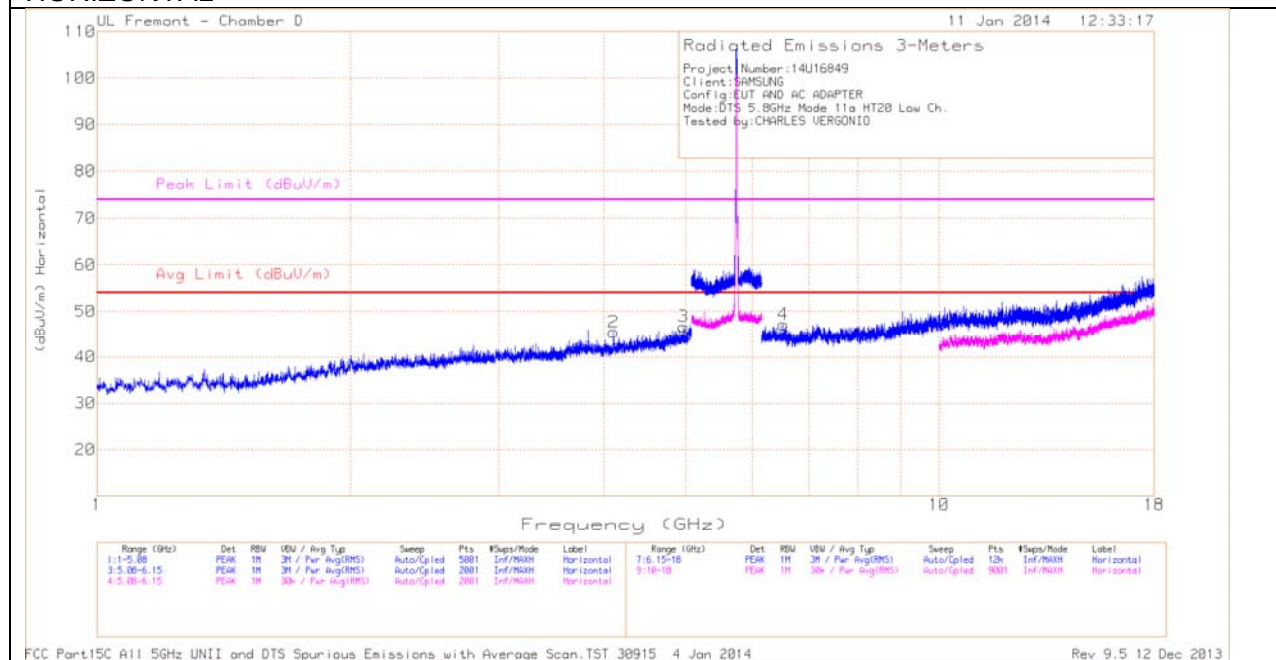
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.904	30.45	MAv1	34.6	-30.6	34.45	54	-19.55	74	-39.55	348	400	H
9.803	23.3	MAv1	37.6	-24	36.9	54	-17.1	74	-37.1	348	400	H

PK - Peak detector

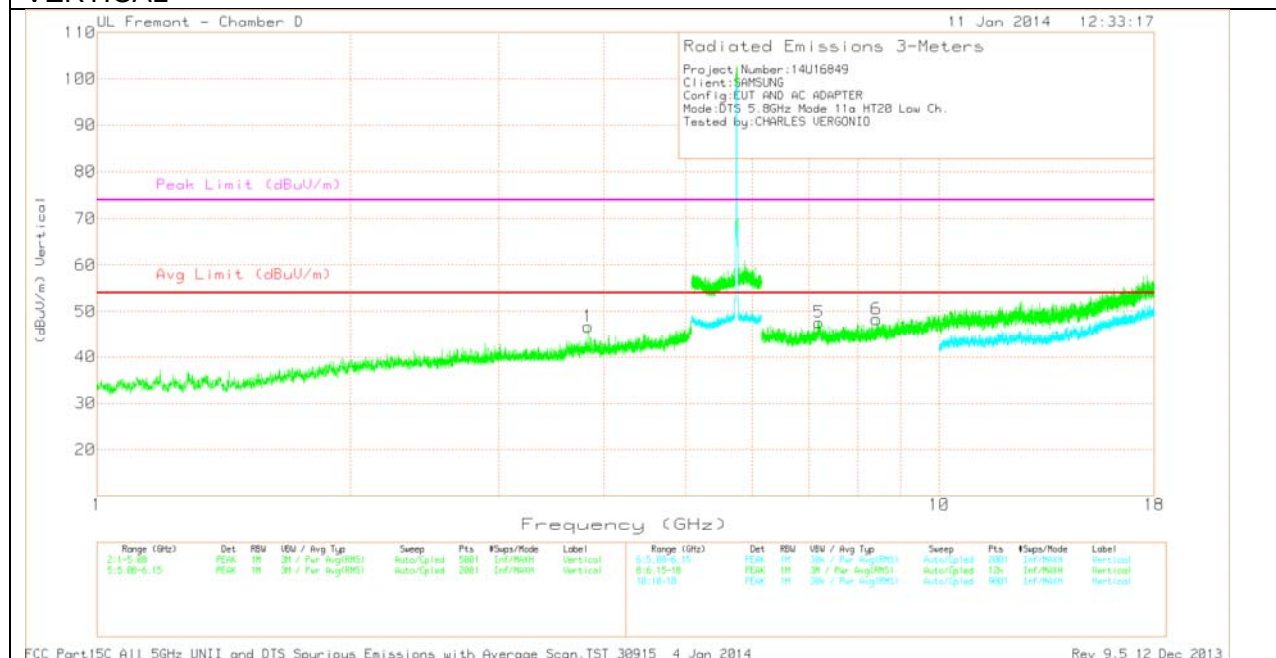
MAv1 - KDB558074 Option 1 Maximum RMS Average

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

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



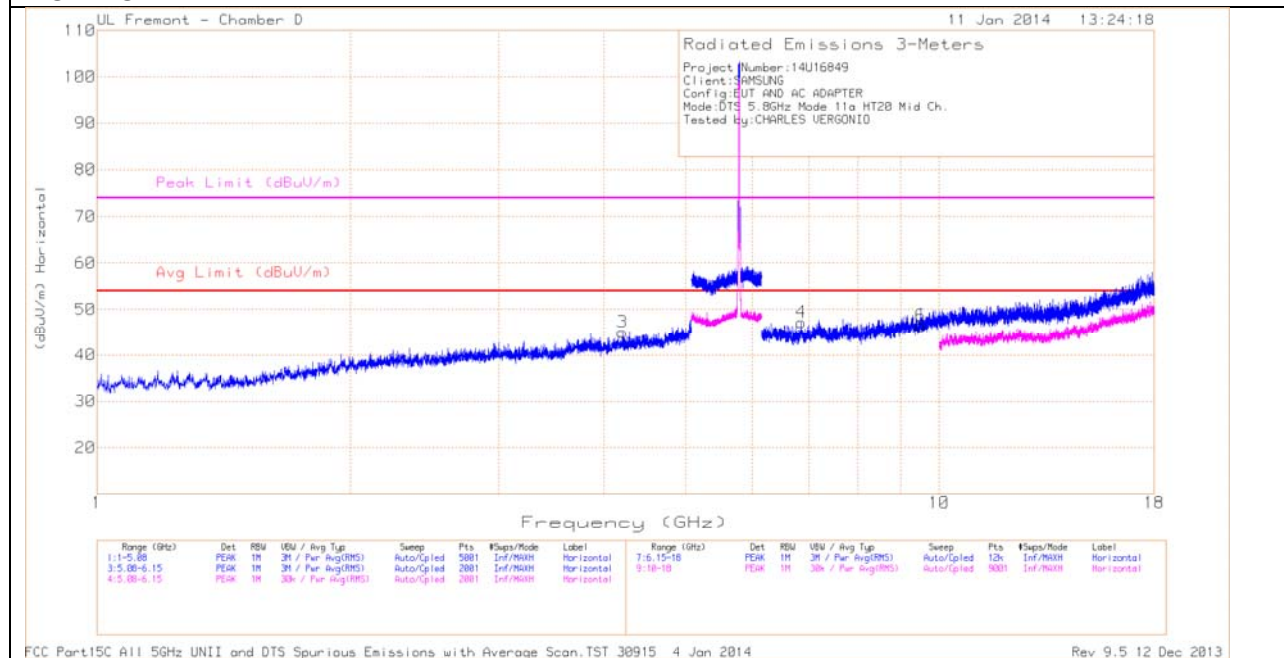
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.831	41.51	PK	33.8	-28.6	46.71	54	-7.29	74	-27.29	0-360	100	V
2	4.105	39.97	PK	33.8	-28.3	45.47	54	-8.53	74	-28.53	0-360	100	H
3	4.971	38.48	PK	34.3	-26.1	46.68	54	-7.32	74	-27.32	0-360	100	H

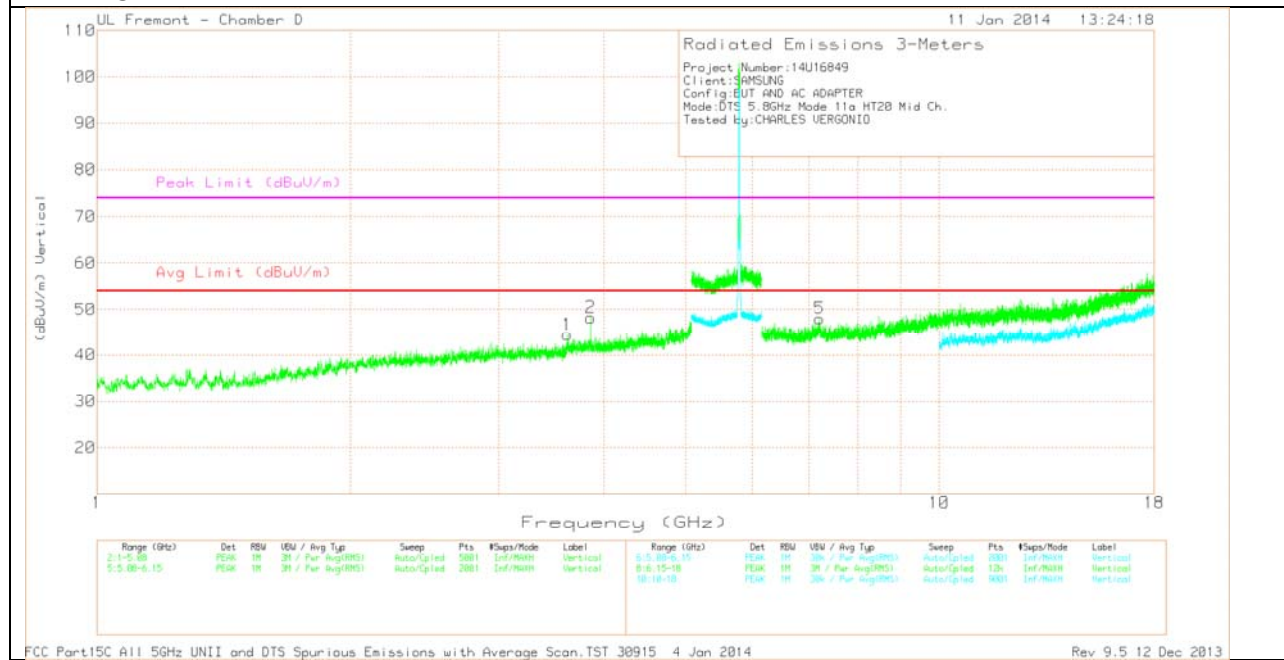
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.529	36.33	PK	35.8	-25	47.13	54	-6.87	74	-26.87	0-360	201	H
5	7.199	35.5	PK	35.9	-23.8	47.6	54	-6.4	74	-26.4	0-360	100	V
6	8.424	36.31	PK	36.1	-24.1	48.31	54	-5.69	74	-25.69	0-360	100	V

PK - Peak detector

MID CHANNEL HORIZONTAL



MID CHANNEL
VERTICAL



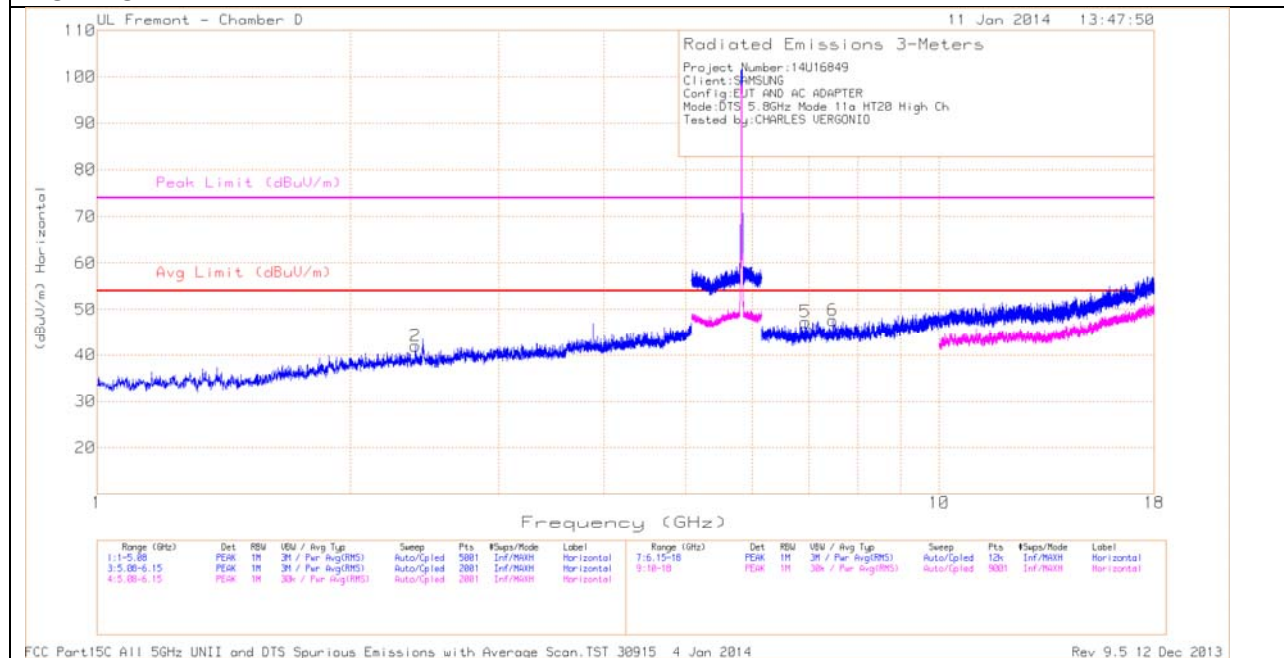
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.619	39.84	PK	33.5	-28.9	44.44	54	-9.56	74	-29.56	0-360	201	V
2	3.858	43.1	PK	33.8	-28.7	48.2	54	-5.8	74	-25.8	0-360	201	V
3	4.207	39.84	PK	33.9	-28.7	45.04	54	-8.96	74	-28.96	0-360	100	H

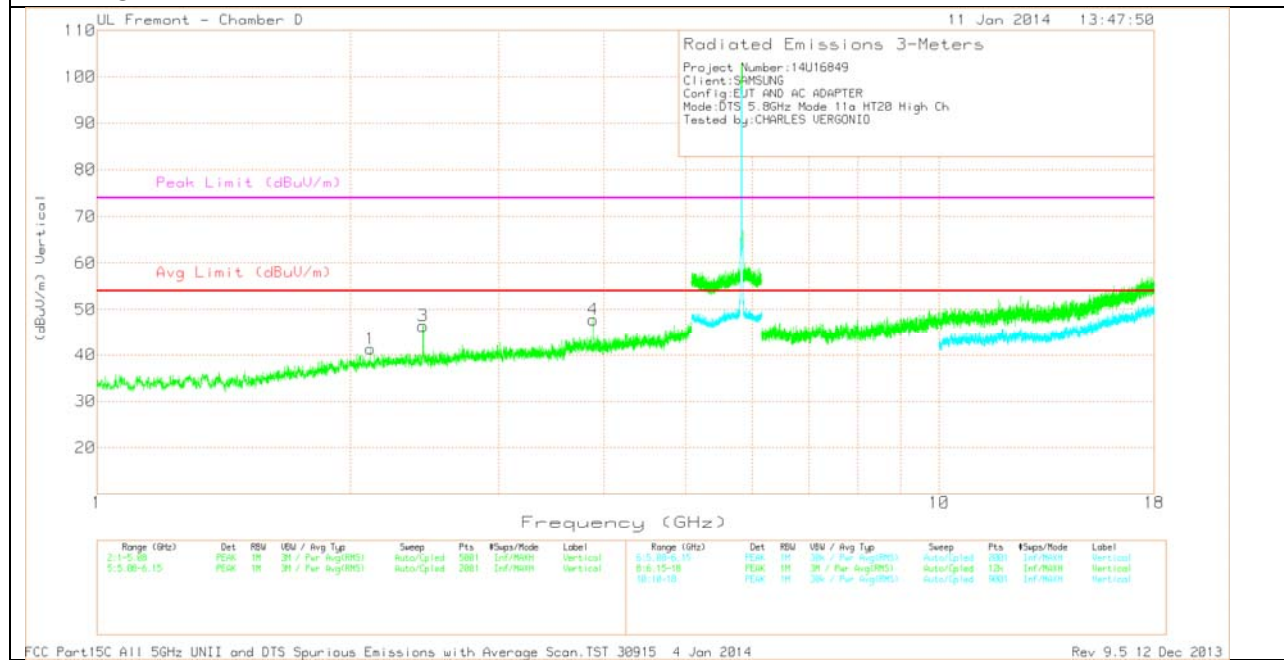
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.861	36.98	PK	35.8	-25.6	47.18	54	-6.82	74	-26.82	0-360	201	H
5	7.209	36.01	PK	35.9	-23.9	48.01	54	-5.99	74	-25.99	0-360	201	V
6	9.507	31.36	PK	37.2	-22.1	46.46	54	-7.54	74	-27.54	0-360	100	H

PK - Peak detector

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



HIGH CHANNEL DATA

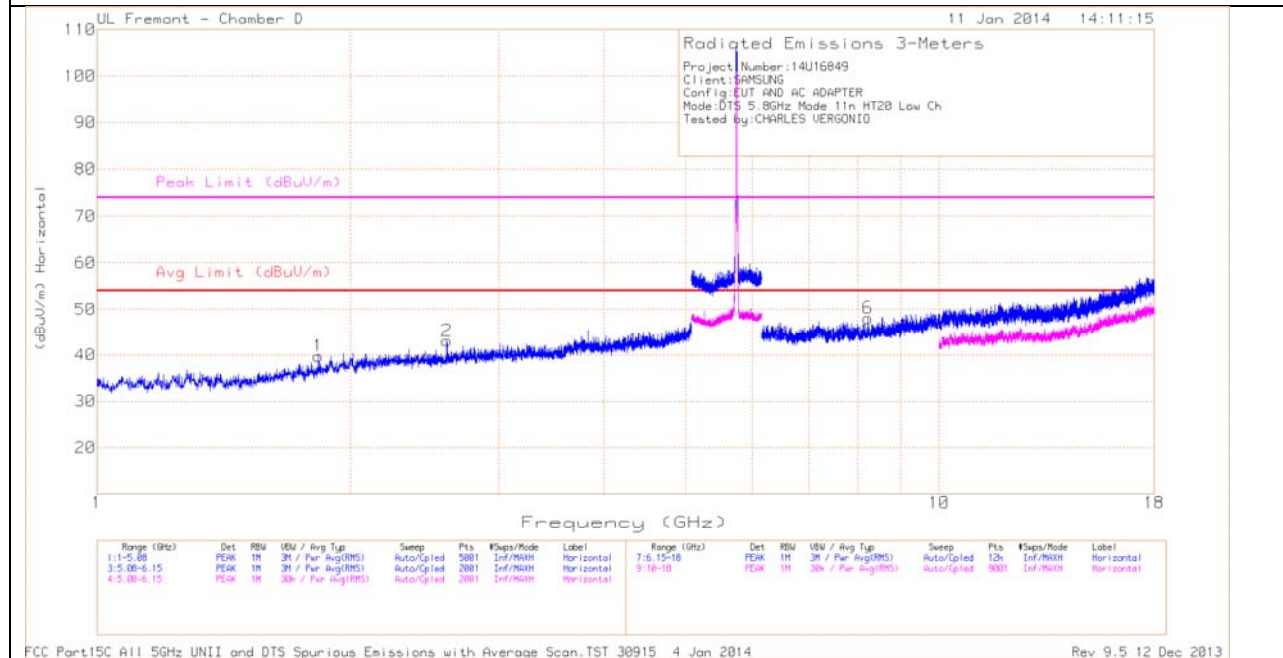
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.112	40.33	PK	32	-31	41.33	54	-12.67	74	-32.67	0-360	100	V
2	2.389	39.78	PK	32.4	-30.2	41.98	54	-12.02	74	-32.02	0-360	201	H
3	2.439	44.02	PK	32.4	-30	46.42	54	-7.58	74	-27.58	0-360	100	V
4	3.884	42.58	PK	33.8	-28.6	47.78	54	-6.22	74	-26.22	0-360	100	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	6.935	36.87	PK	35.8	-25.4	47.27	54	-6.73	74	-26.73	0-360	201	H
6	7.477	36.63	PK	35.9	-24.9	47.63	54	-6.37	74	-26.37	0-360	201	H

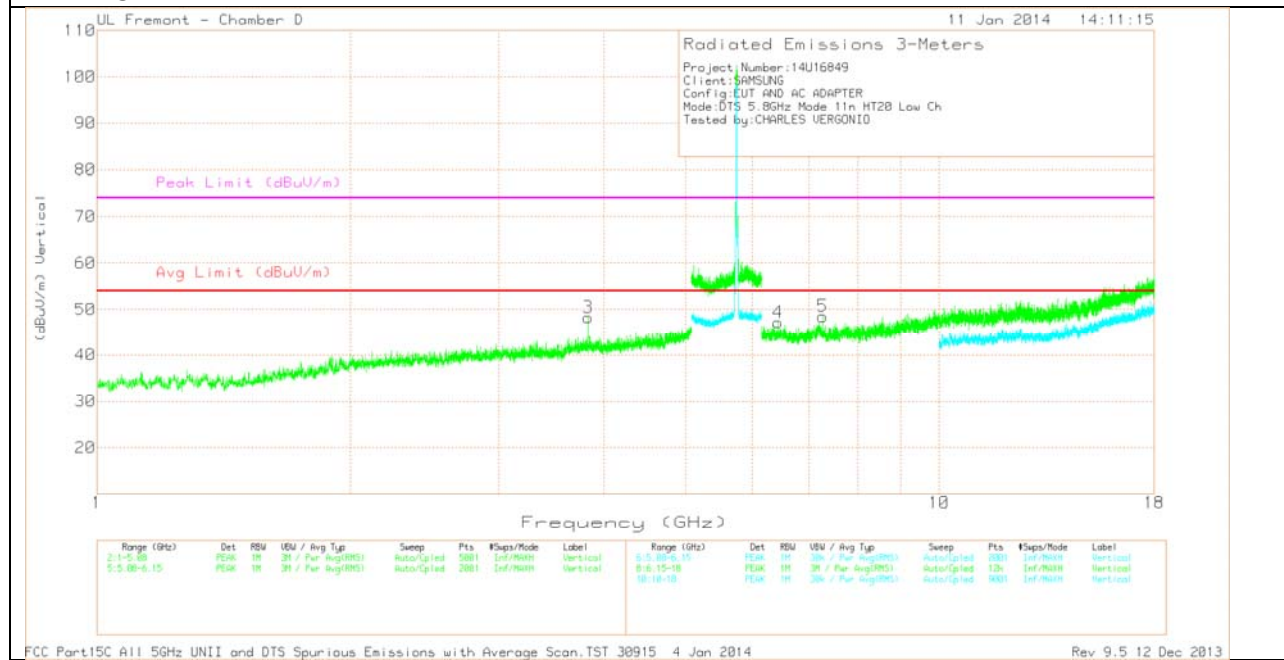
PK - Peak detector

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

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



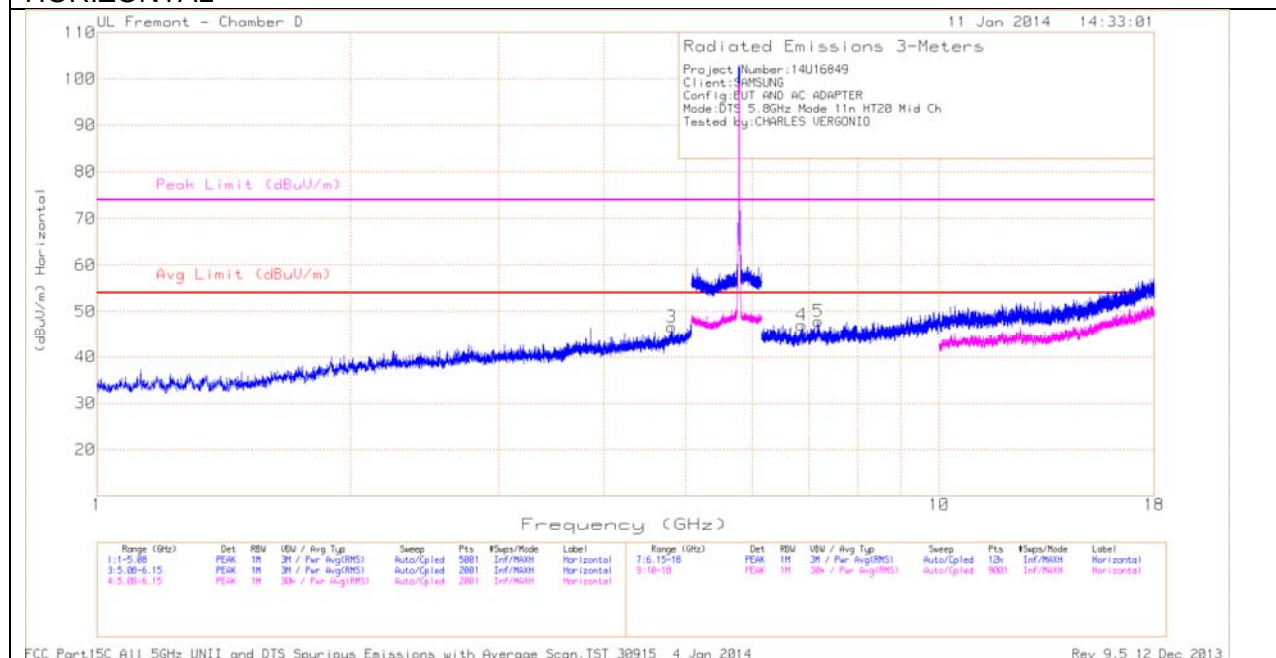
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.832	40.27	PK	30.6	-31.1	39.77	54	-14.23	74	-34.23	0-360	201	H
2	2.603	40.79	PK	32.6	-30.3	43.09	54	-10.91	74	-30.91	0-360	201	H
3	3.831	43.06	PK	33.8	-28.6	48.26	54	-5.74	74	-25.74	0-360	100	V

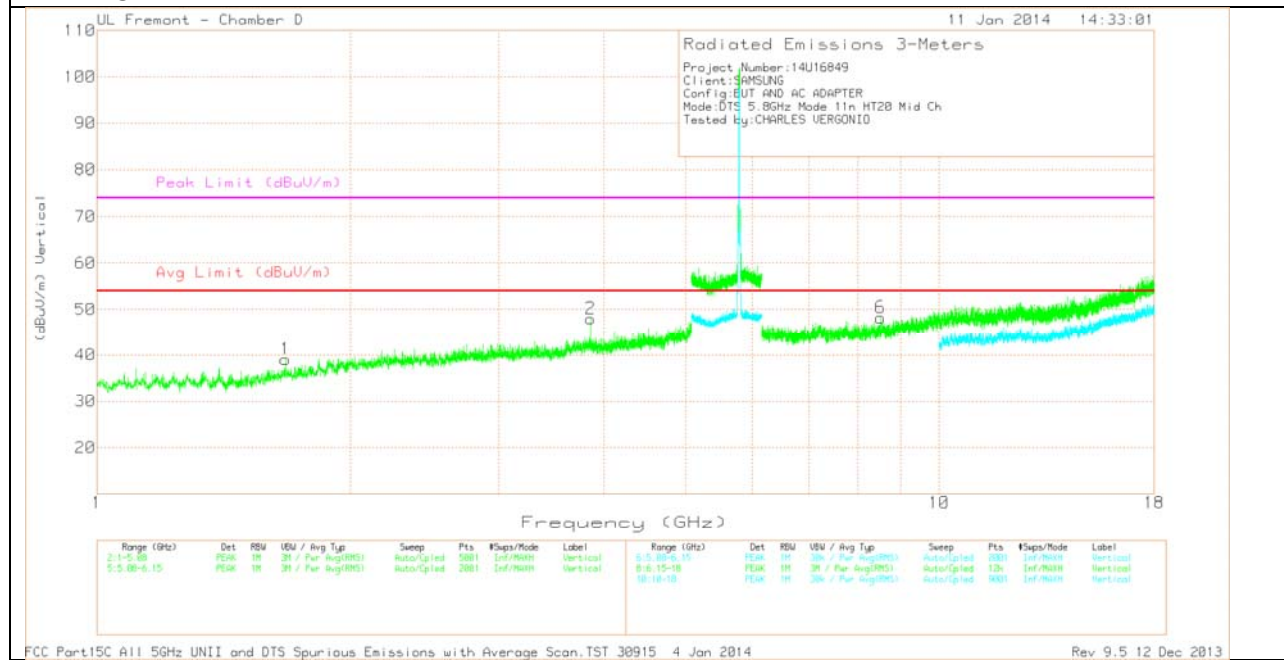
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.439	37.75	PK	35.8	-26.4	47.15	54	-6.85	74	-26.85	0-360	201	V
5	7.271	37.37	PK	35.9	-24.8	48.47	54	-5.53	74	-25.53	0-360	100	V
6	8.228	36.88	PK	36	-24.8	48.08	54	-5.92	74	-25.92	0-360	100	H

PK - Peak detector

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



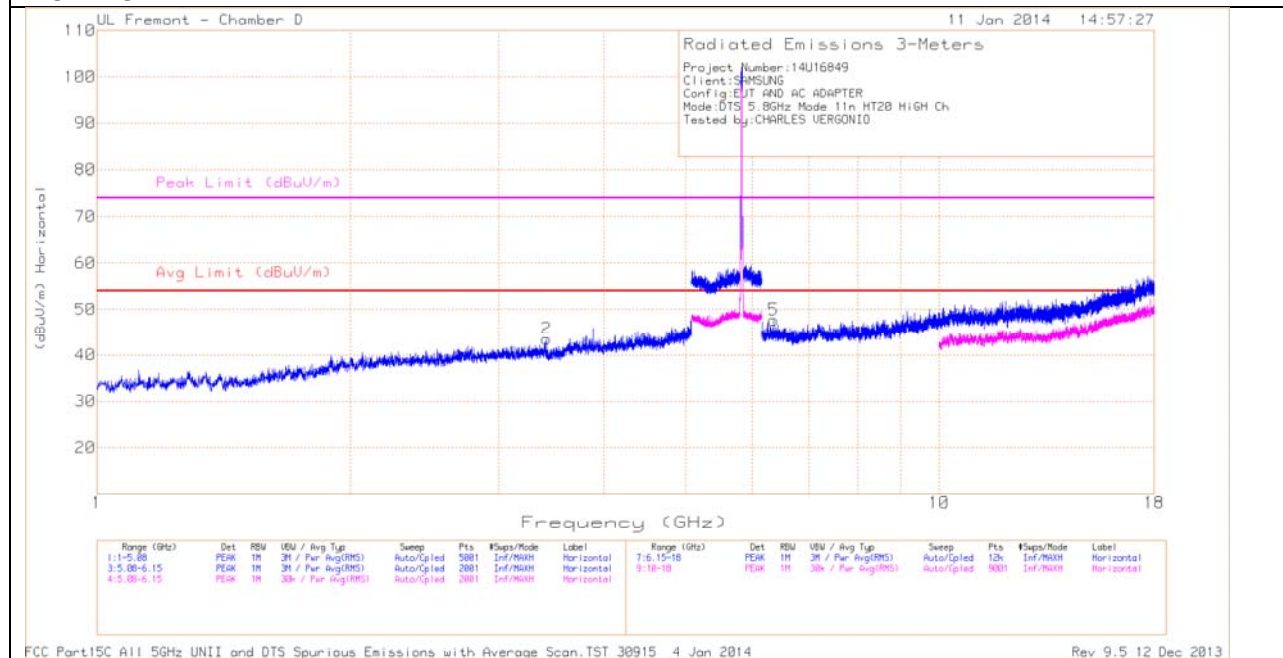
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.674	40.17	PK	29.5	-30.6	39.07	54	-14.93	74	-34.93	0-360	100	V
2	3.858	42.86	PK	33.8	-28.7	47.96	54	-6.04	74	-26.04	0-360	201	V
3	4.812	39.3	PK	34.4	-27.1	46.6	54	-7.4	74	-27.4	0-360	100	H

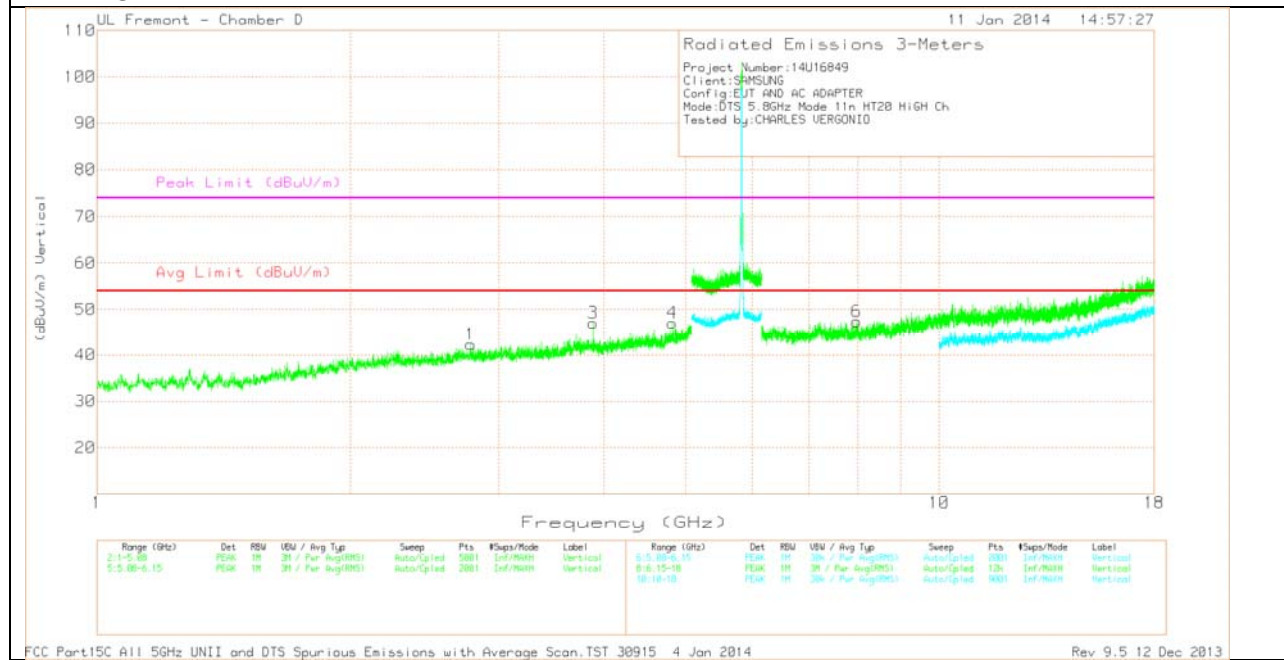
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.865	36.92	PK	35.8	-25.7	47.02	54	-6.98	74	-26.98	0-360	201	H
5	7.187	35.93	PK	35.9	-24	47.83	54	-6.17	74	-26.17	0-360	201	H
6	8.521	35.31	PK	36.2	-23.3	48.21	54	-5.79	74	-25.79	0-360	201	V

PK - Peak detector

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



HIGH CHANNEL DATA

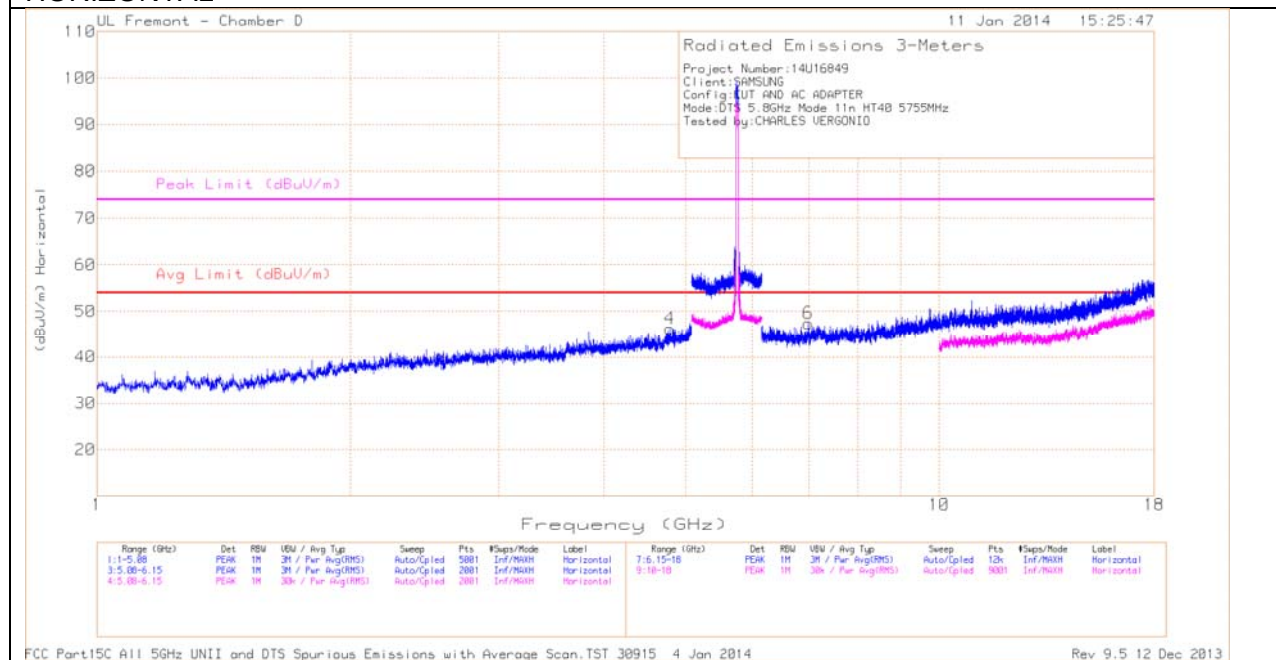
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.778	38.63	PK	32.9	-29.2	42.33	54	-11.67	74	-31.67	0-360	201	V
2	3.42	39.26	PK	33.3	-29	43.56	54	-10.44	74	-30.44	0-360	201	H
3	3.884	41.82	PK	33.8	-28.6	47.02	54	-6.98	74	-26.98	0-360	100	V
4	4.822	39.84	PK	34.4	-27.2	47.04	54	-6.96	74	-26.96	0-360	201	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	6.361	37.45	PK	35.9	-25.7	47.65	54	-6.35	74	-26.35	0-360	100	H
6	7.983	35.76	PK	36	-24.4	47.36	54	-6.64	74	-26.64	0-360	201	V

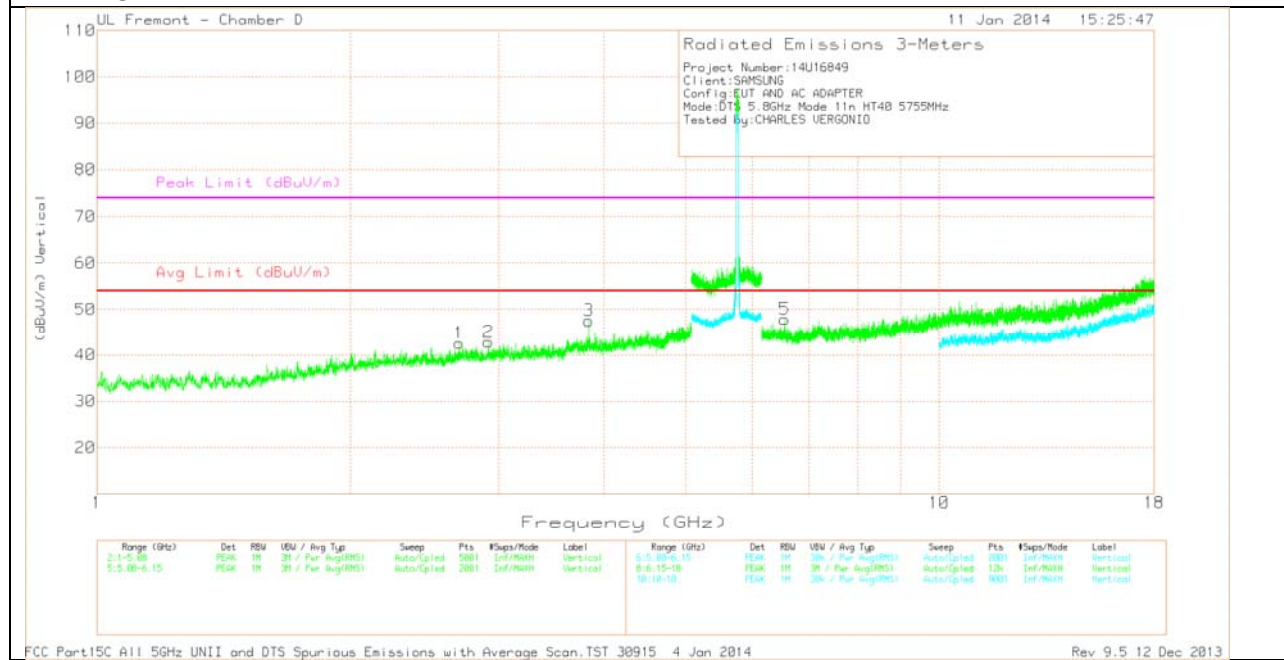
PK - Peak detector

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

LOW CHANNEL HORIZONTAL



LOW CHANNEL
VERTICAL



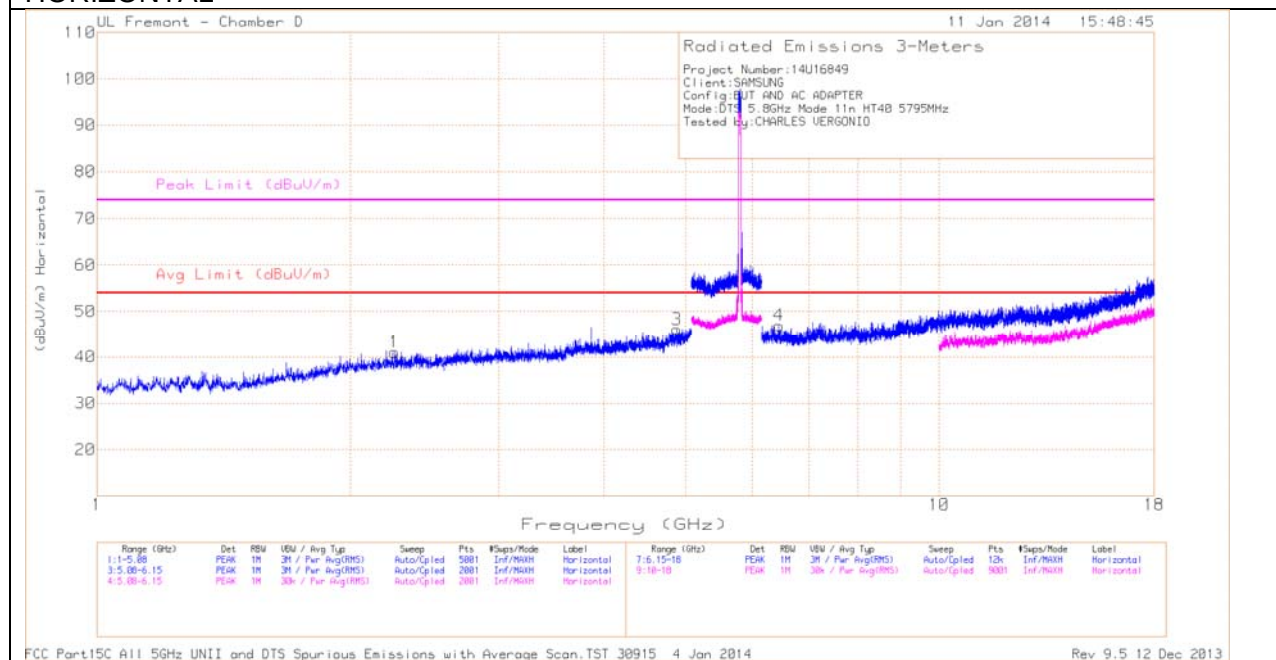
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.692	39.09	PK	32.8	-29.3	42.59	54	-11.41	74	-31.41	0-360	100	V
2	2.917	39.63	PK	33	-29.8	42.83	54	-11.17	74	-31.17	0-360	201	V
3	3.837	42.24	PK	33.8	-28.5	47.54	54	-6.46	74	-26.46	0-360	100	V
4	4.788	38.72	PK	34.4	-26.9	46.22	54	-7.78	74	-27.78	0-360	100	H

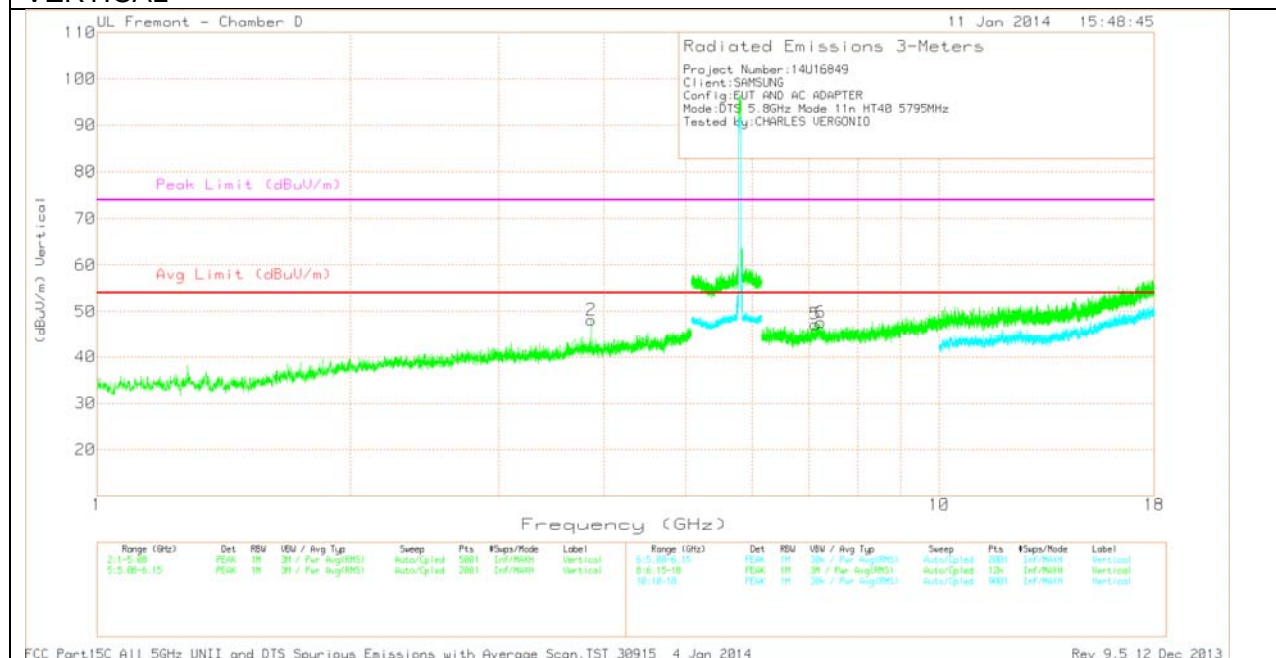
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	6.554	37.36	PK	35.8	-25.3	47.86	54	-6.14	74	-26.14	0-360	201	V
6	6.993	37.28	PK	35.9	-25.8	47.38	54	-6.62	74	-26.62	0-360	100	H

PK - Peak detector

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



HIGH CHANNEL DATA

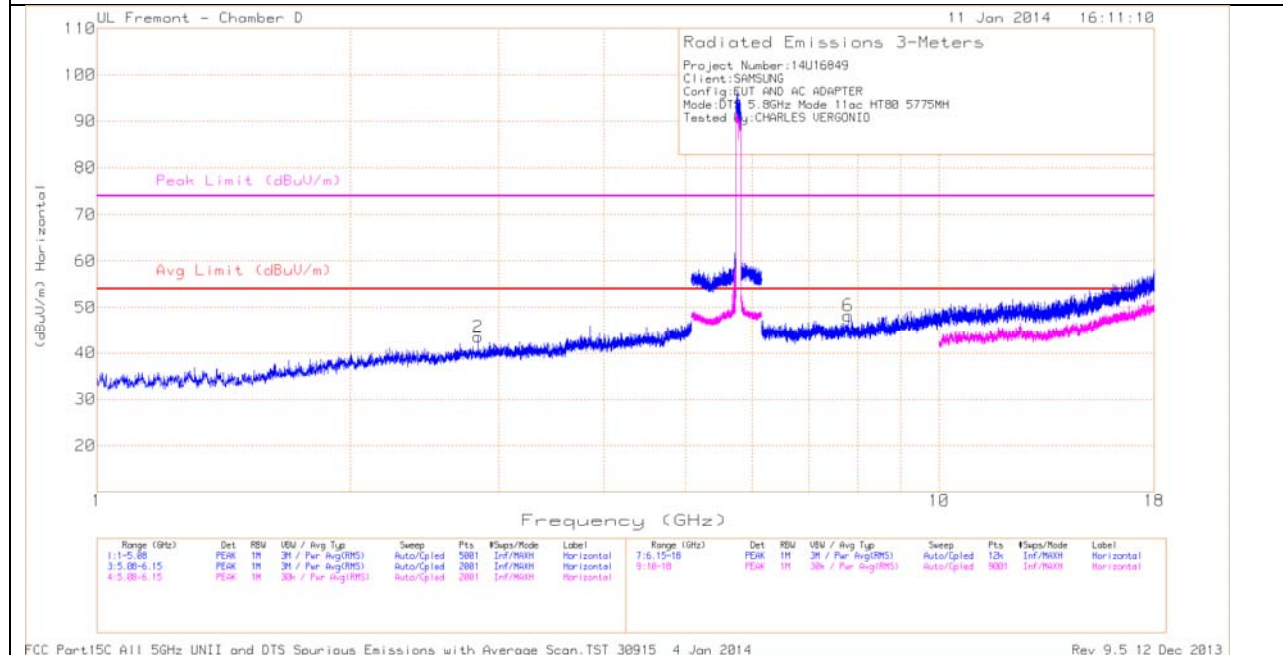
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.255	38.9	PK	32.4	-30.3	41	54	-13	74	-33	0-360	100	H
2	3.864	42.91	PK	33.8	-28.6	48.11	54	-5.89	74	-25.89	0-360	100	V
3	4.88	38.83	PK	34.3	-27.1	46.03	54	-7.97	74	-27.97	0-360	201	H

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.451	37.75	PK	35.8	-26.6	46.95	54	-7.05	74	-27.05	0-360	201	H
5	7.129	35.92	PK	35.9	-24.6	47.22	54	-6.78	74	-26.78	0-360	100	V
6	7.235	35.84	PK	35.9	-24.1	47.64	54	-6.36	74	-26.36	0-360	201	V

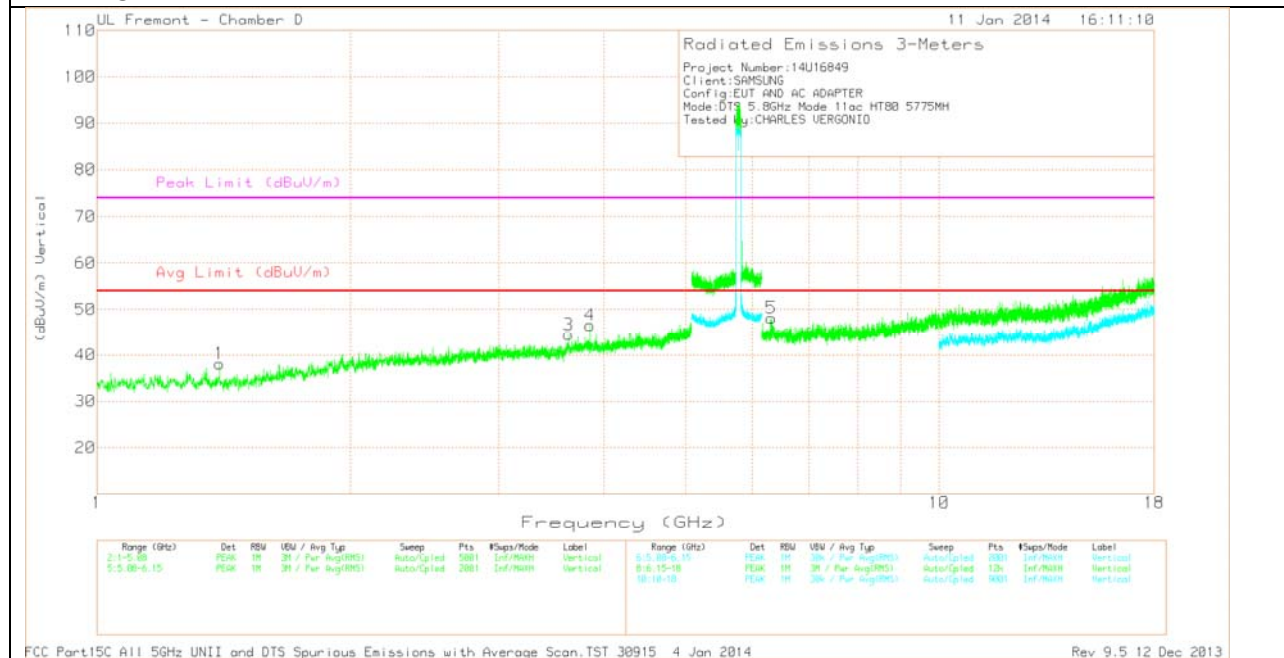
PK - Peak detector

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

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



LOW CHANNEL DATA

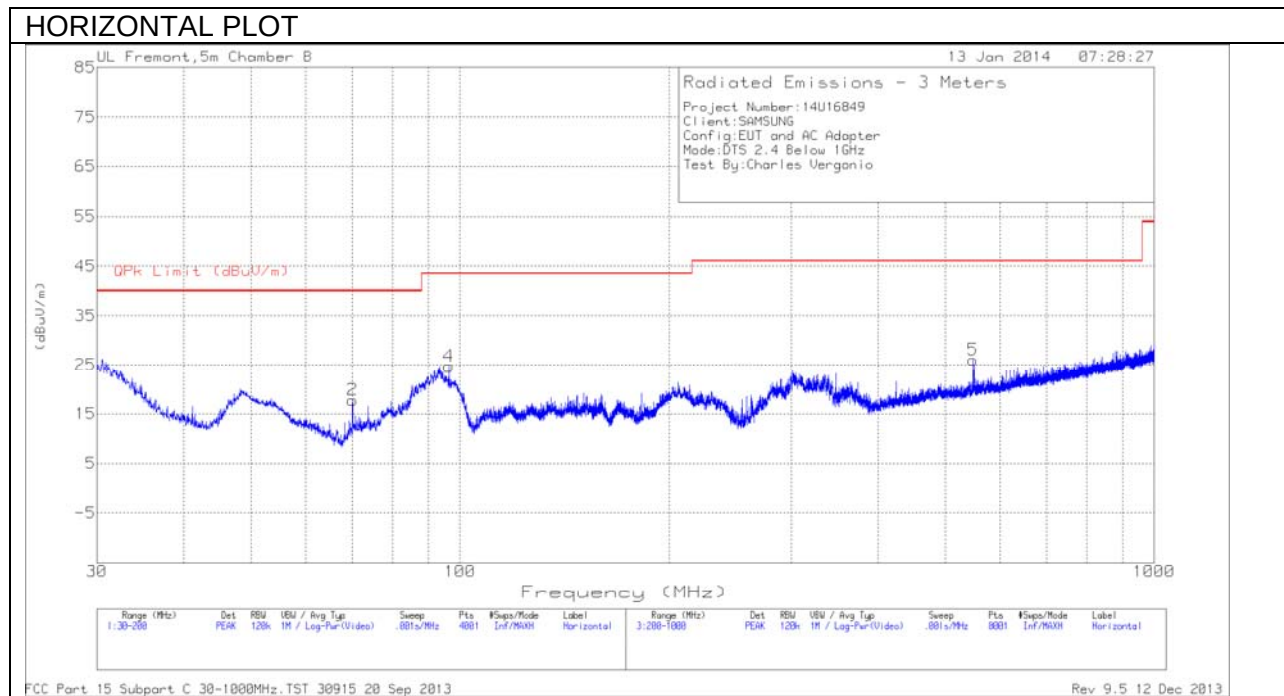
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/5 GHz LPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.398	41.07	PK	28.4	-31.4	38.07	54	-15.93	74	-35.93	0-360	201	V
2	2.834	40.31	PK	33	-29.8	43.51	54	-10.49	74	-30.49	0-360	100	H
3	3.63	39.63	PK	33.6	-28.8	44.43	54	-9.57	74	-29.57	0-360	201	V
4	3.851	41.45	PK	33.8	-28.7	46.55	54	-7.45	74	-27.45	0-360	100	V

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/6 GHz HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	6.32	37.99	PK	35.9	-25.8	48.09	54	-5.91	74	-25.91	0-360	201	V
6	7.799	36.6	PK	36.1	-24.5	48.2	54	-5.8	74	-25.8	0-360	100	H

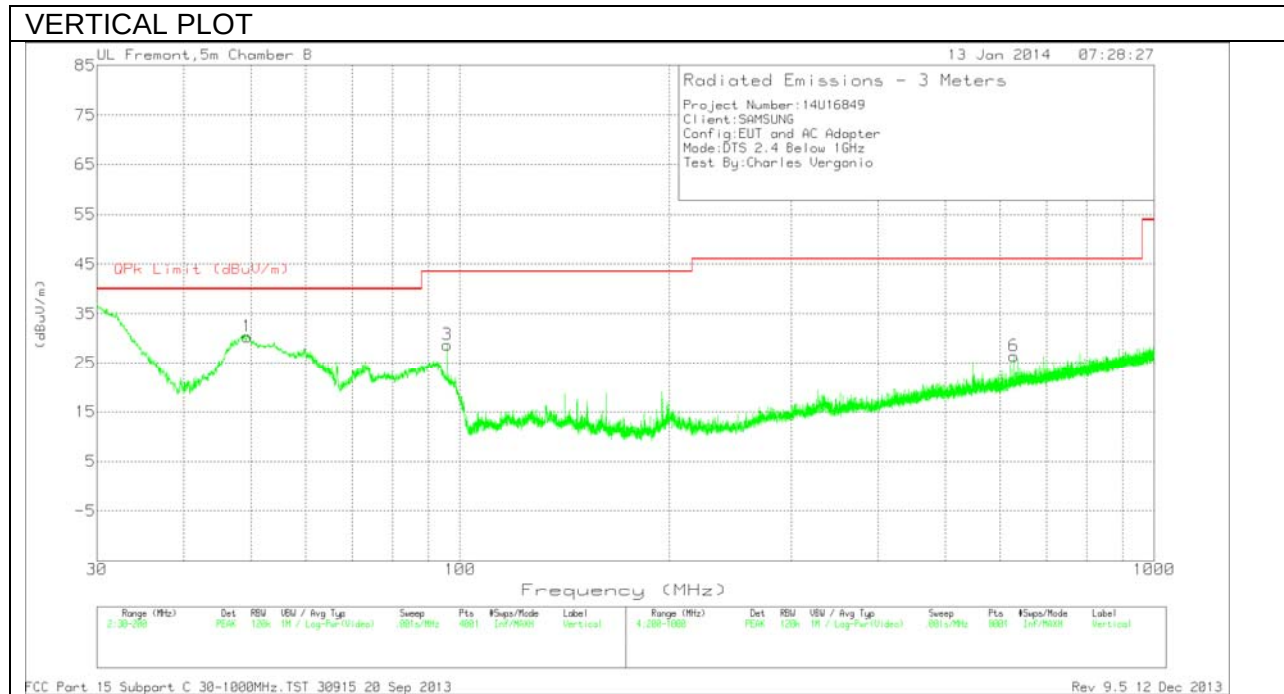
PK - Peak detector

10.3. WORST-CASE BELOW 1 GHz

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



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



Below 1G Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	49.38	51.18	PK	7.8	-28.6	30.38	40	-9.62	0-360	101	V
2	70.035	38.3	PK	7.9	-28.4	17.8	40	-22.2	0-360	100	H
3	95.875	47.92	PK	8.9	-28.1	28.72	43.52	-14.8	0-360	101	V
4	96.385	43.79	PK	9	-28.1	24.69	43.52	-18.83	0-360	300	H
5	548	33.33	PK	18.3	-25.6	26.03	46.02	-19.99	0-360	101	H
6	628	32.42	PK	19.3	-25.3	26.42	46.02	-19.6	0-360	200	V

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.

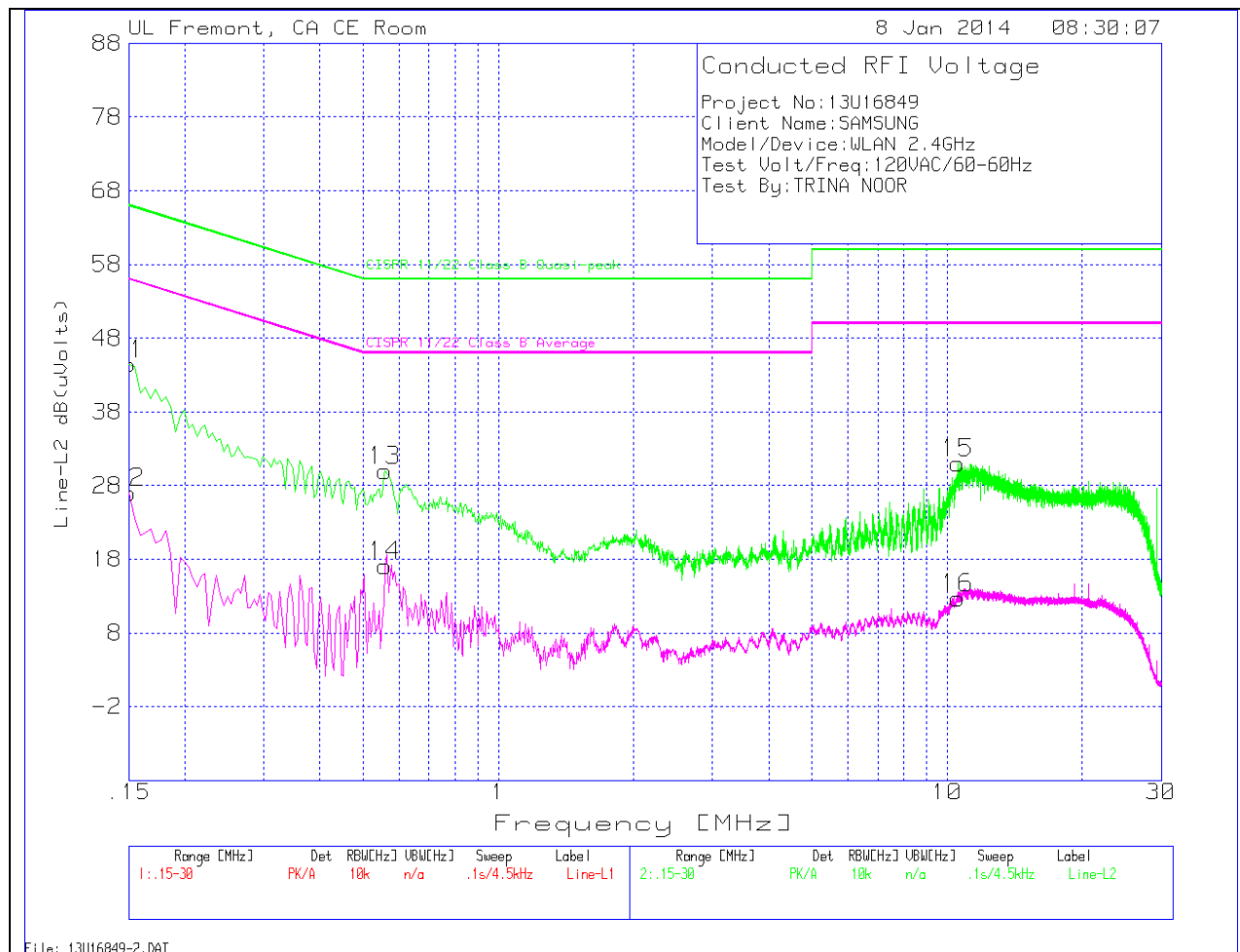
Line conducted data is recorded for both NEUTRAL and HOT lines.

LINE 1 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.1545	51.72	PK	.1	0	51.82	65.8	-13.98	-	-
2	.1545	38.23	Av	.1	0	38.33	-	-	55.8	-17.47
3	.5775	33.25	PK	.1	0	33.35	56	-22.65	-	-
4	.5775	23.2	Av	.1	0	23.3	-	-	46	-22.7
5	3.075	32.02	PK	.1	.1	32.22	56	-23.78	-	-
6	3.075	9.65	Av	.1	.1	9.85	-	-	46	-36.15
7	10.0455	34.48	PK	.1	.2	34.78	60	-25.22	-	-
8	10.0455	19.73	Av	.1	.2	20.03	-	-	50	-29.97
9	25.197	32.36	PK	.4	.3	33.06	60	-26.94	-	-
10	25.197	18.63	Av	.4	.3	19.33	-	-	50	-30.67

LINE 2 RESULTS



LINE 2 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi- peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
11	.15	44.38	PK	.1	0	44.48	66	-21.52	-	-
12	.15	26.92	Av	.1	0	27.02	-	-	56	-28.98
13	.5595	29.84	PK	.1	0	29.94	56	-26.06	-	-
14	.5595	16.96	Av	.1	0	17.06	-	-	46	-28.94
15	10.5405	30.73	PK	.1	.2	31.03	60	-28.97	-	-
16	10.5405	12.44	Av	.1	.2	12.74	-	-	50	-37.26

PK - Peak detector

Av - average detection