



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-G3858

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA Phone + Bluetooth & WLAN 2.4GHz b/g/n

MODEL: SM-G3858

SERIAL NUMBER: FL-046-D (Conducted), 1819146 (Radiated)

DATE TESTED: FEBRUARY 11- MARCH 6, 2014

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

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

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

Approved & Released

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2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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 & WLAN 2.4GHz b/g/n

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	19.34	85.90
2412 - 2462	802.11g	22.85	192.75
2412 - 2462	802.11n HT20	21.19	131.52

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -0.39 dBi.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	ETA0U82CBC	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

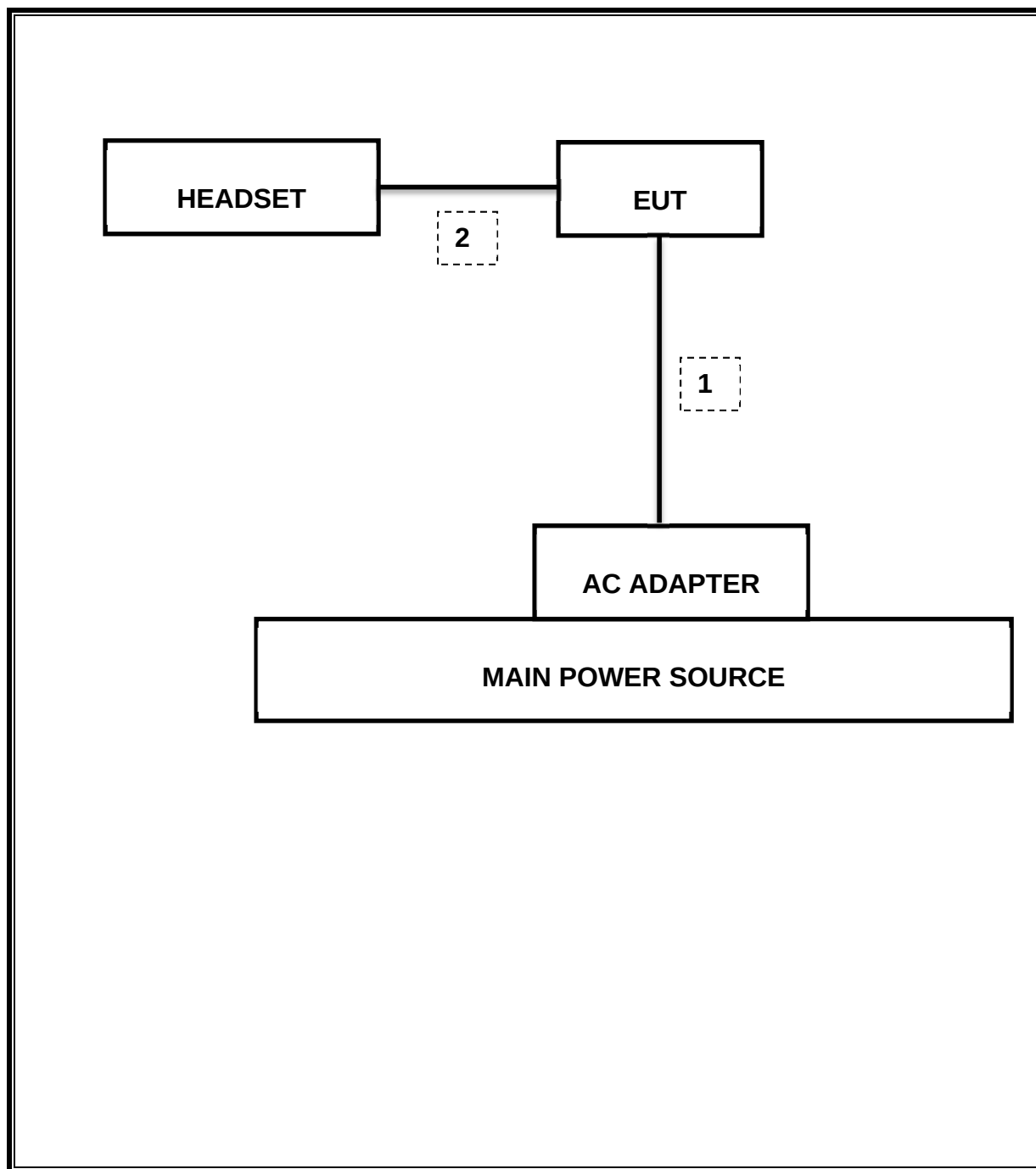
I/O CABLES

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

7. MEASUREMENT METHODS

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

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

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

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	-33.84dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	22.85dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-10.03dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	53.95dBuV/m
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	53.606dBuV/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	10.13	0.5
High	2462	10.13	0.5
Worst		10.13	

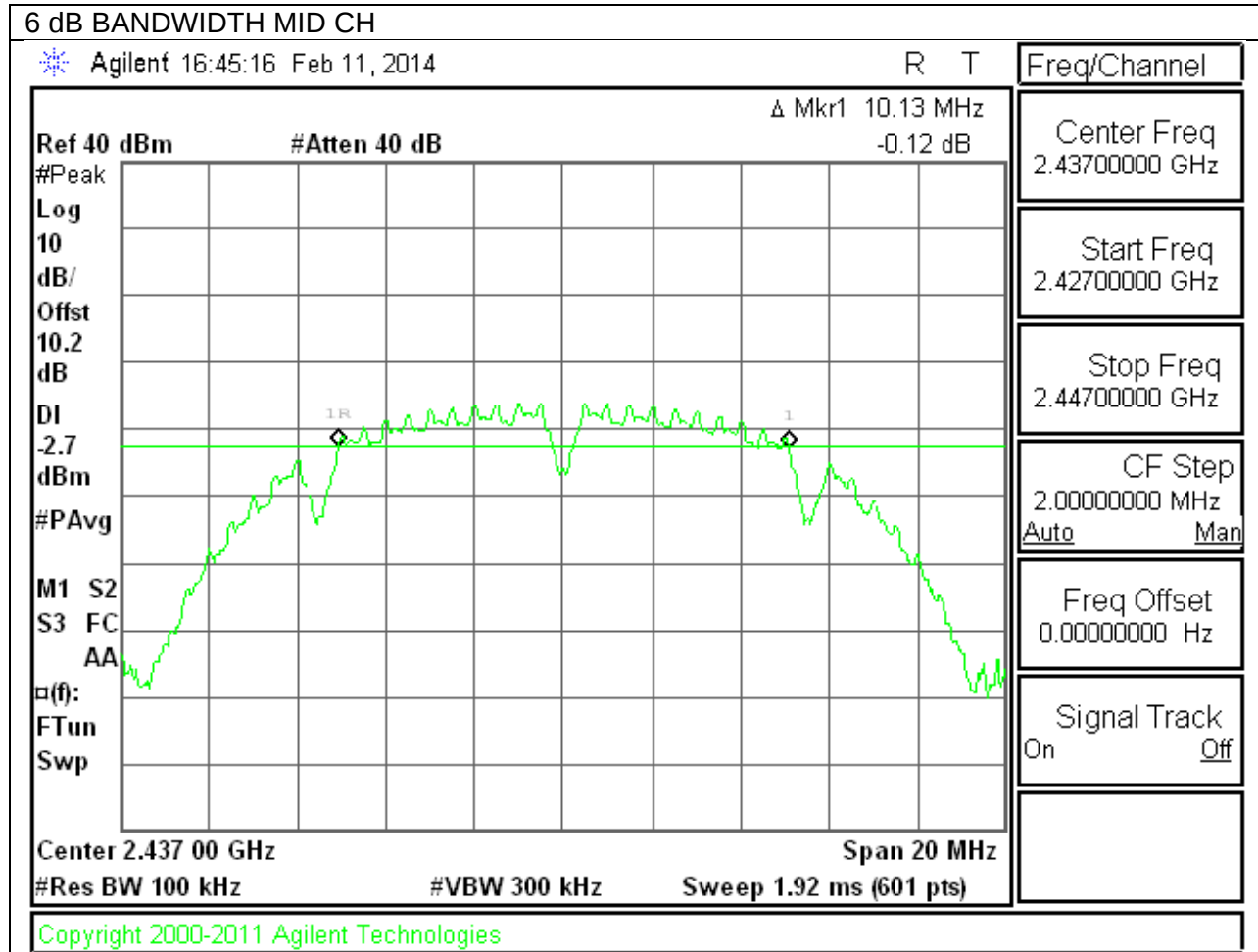
9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.50	0.5
Mid	2437	16.50	0.5
High	2462	16.54	0.5
Worst		16.50	

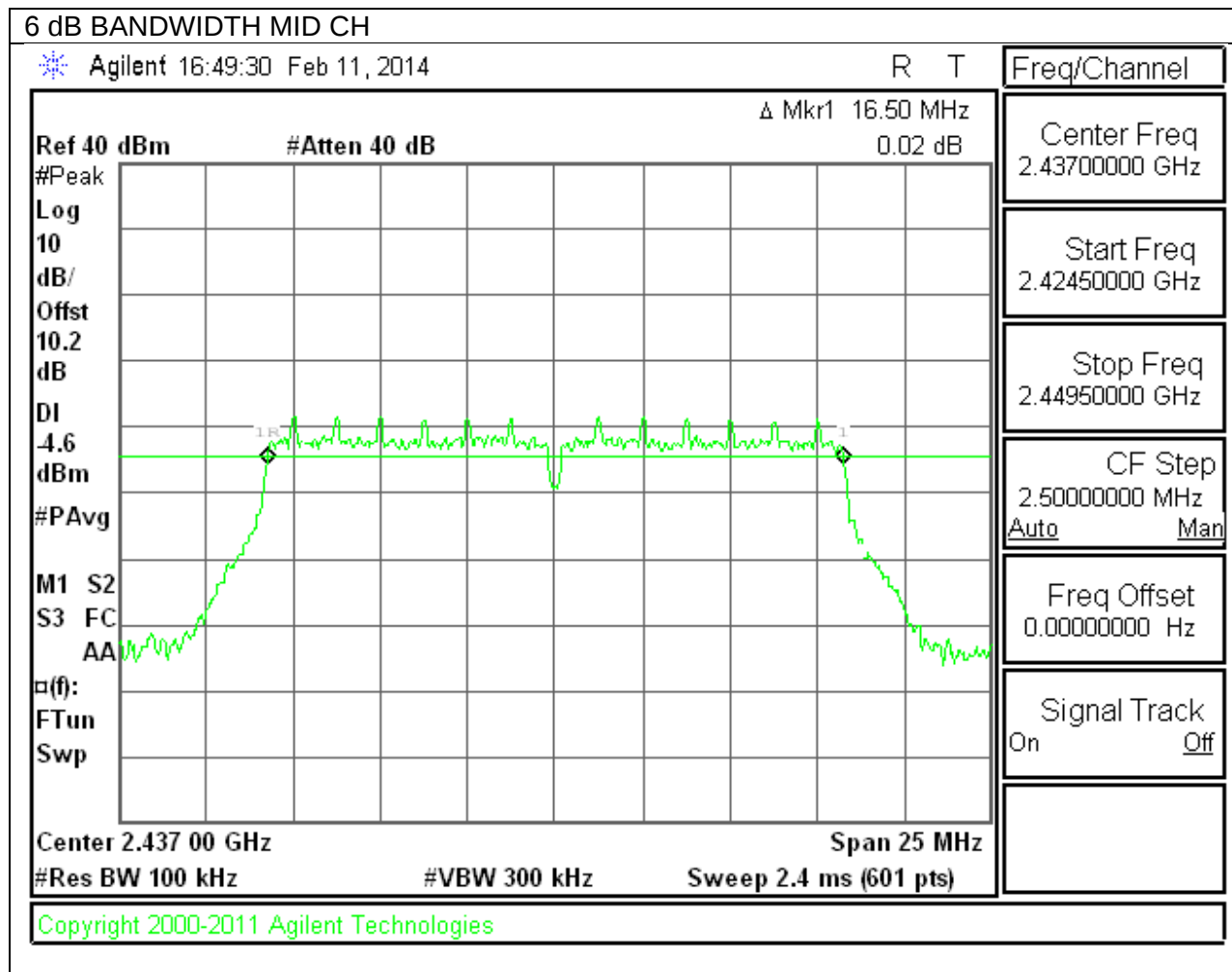
9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.67	0.5
Mid	2437	17.75	0.5
High	2462	17.79	0.5
Worst		17.67	

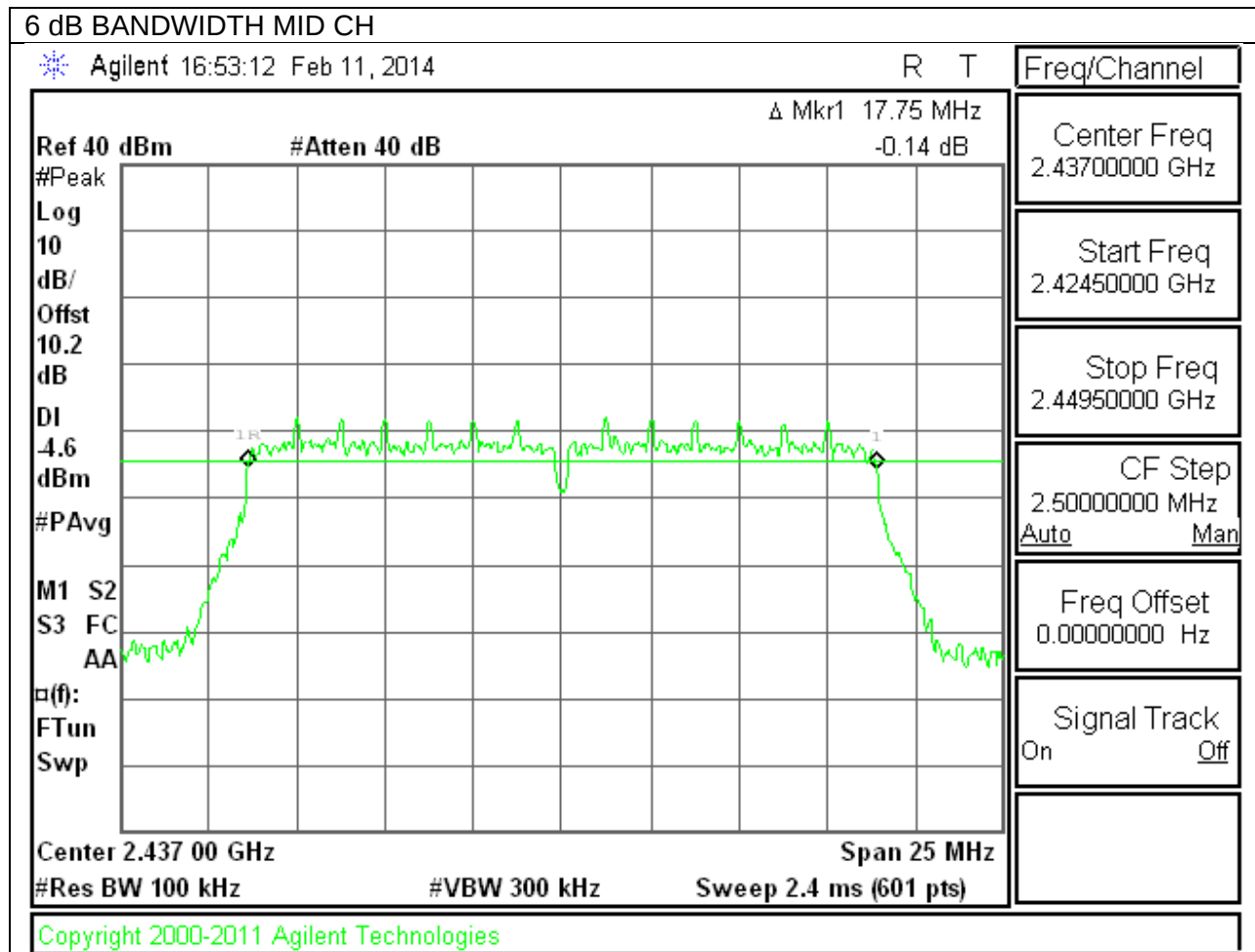
802.11b 6 dB BANDWIDTH



802.11g 6 dB BANDWIDTH



802.11n 6 dB BANDWIDTH



9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.29
Mid	2437	13.26
High	2462	13.27
Worst		13.29

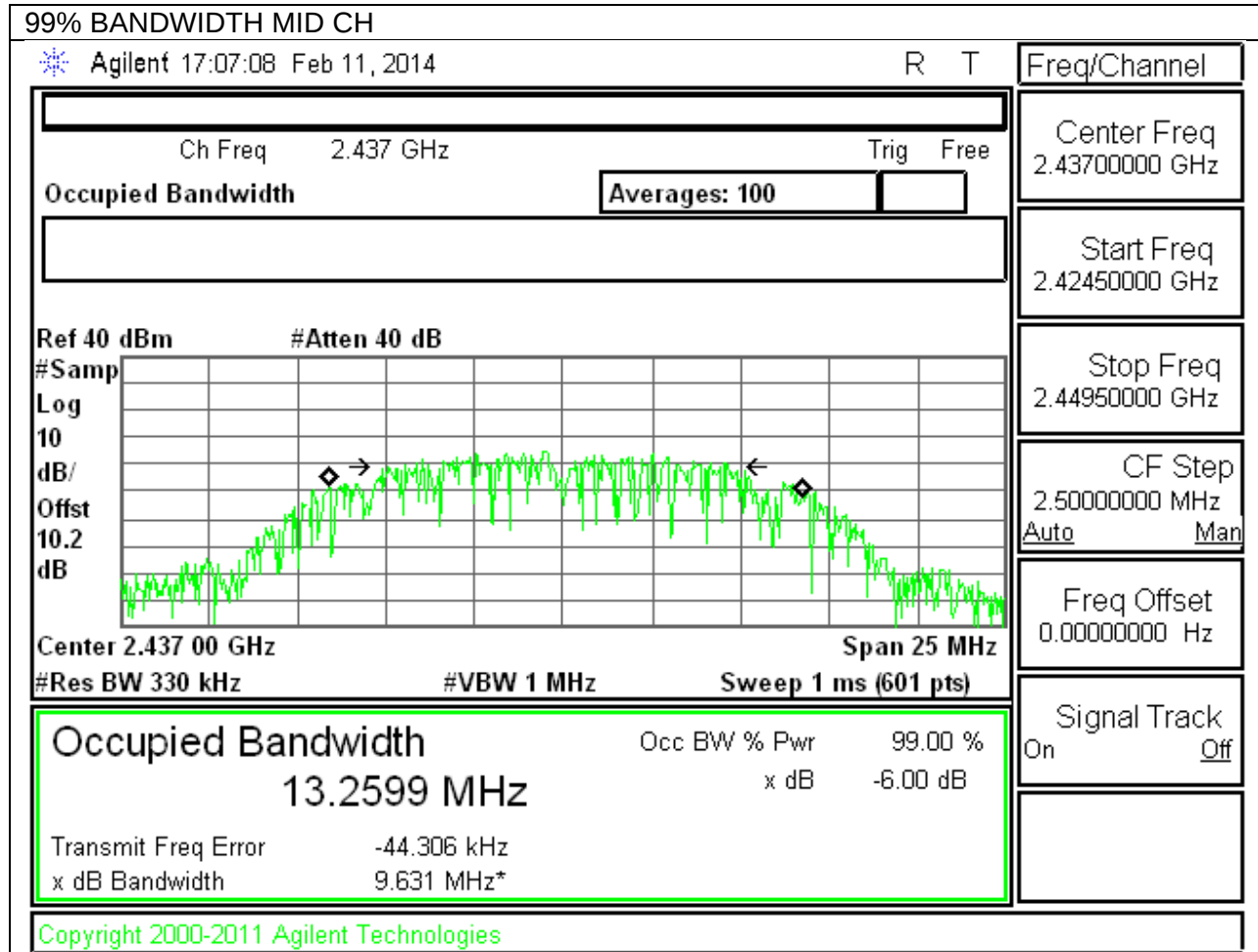
9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.61
Mid	2437	16.60
High	2462	16.60
Worst		16.61

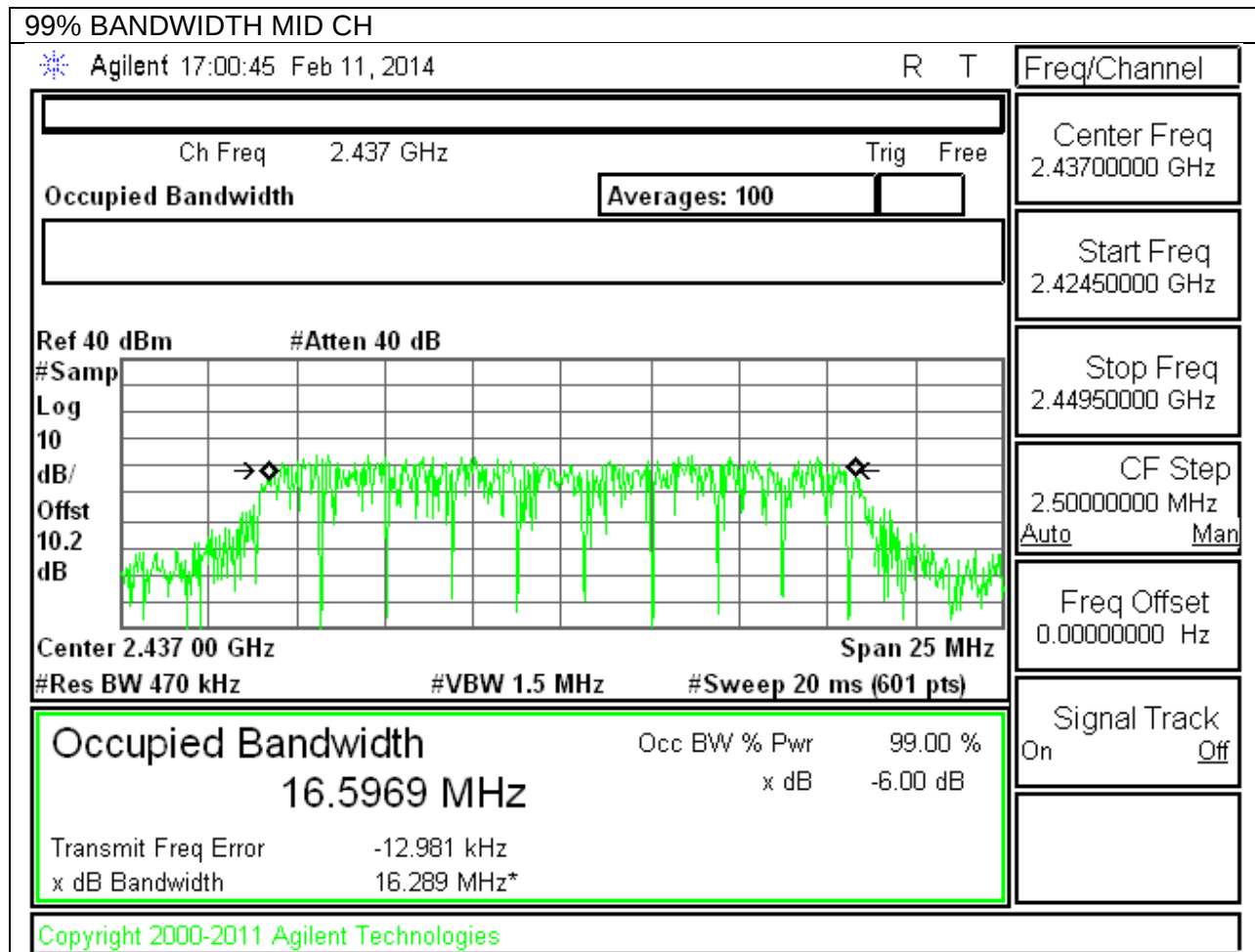
9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.82
Mid	2437	17.72
High	2462	17.68
Worst		17.82

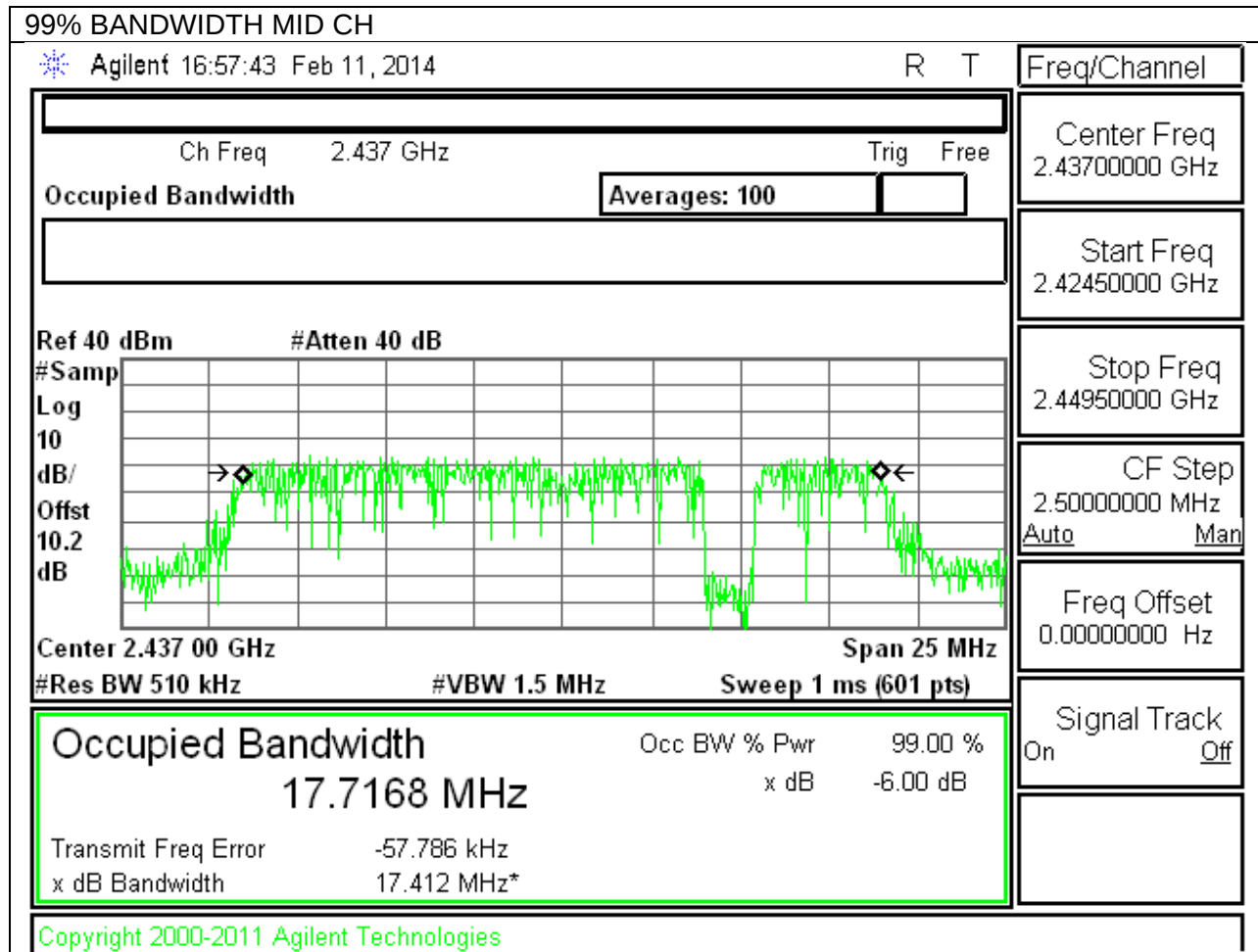
802.11b 99% BANDWIDTH



802.11g 99% BANDWIDTH



802.11n 99% BANDWIDTH



9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.2 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	16.00
Mid	2437	15.95
High	2462	16.12
Worst		16.120

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	14.19
Mid	2437	14.15
High	2462	14.43
Worst		14.430

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	12.50
Mid	2437	12.48
High	2462	12.44
Worst		12.500

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	-0.39	30.00	30	36	30.00
Mid	2437	-0.39	30.00	30	36	30.00
High	2462	-0.39	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.01	19.01	30.00	-10.99
Mid	2437	19.23	19.23	30.00	-10.77
High	2462	19.34	19.34	30.00	-10.66
Worst			19.34		

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	-0.39	30.00	30	36	30.00
Mid	2437	-0.39	30.00	30	36	30.00
High	2462	-0.39	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	22.85	22.85	30.00	-7.15
Mid	2437	22.83	22.83	30.00	-7.17
High	2462	22.64	22.64	30.00	-7.36
Worst			22.85		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

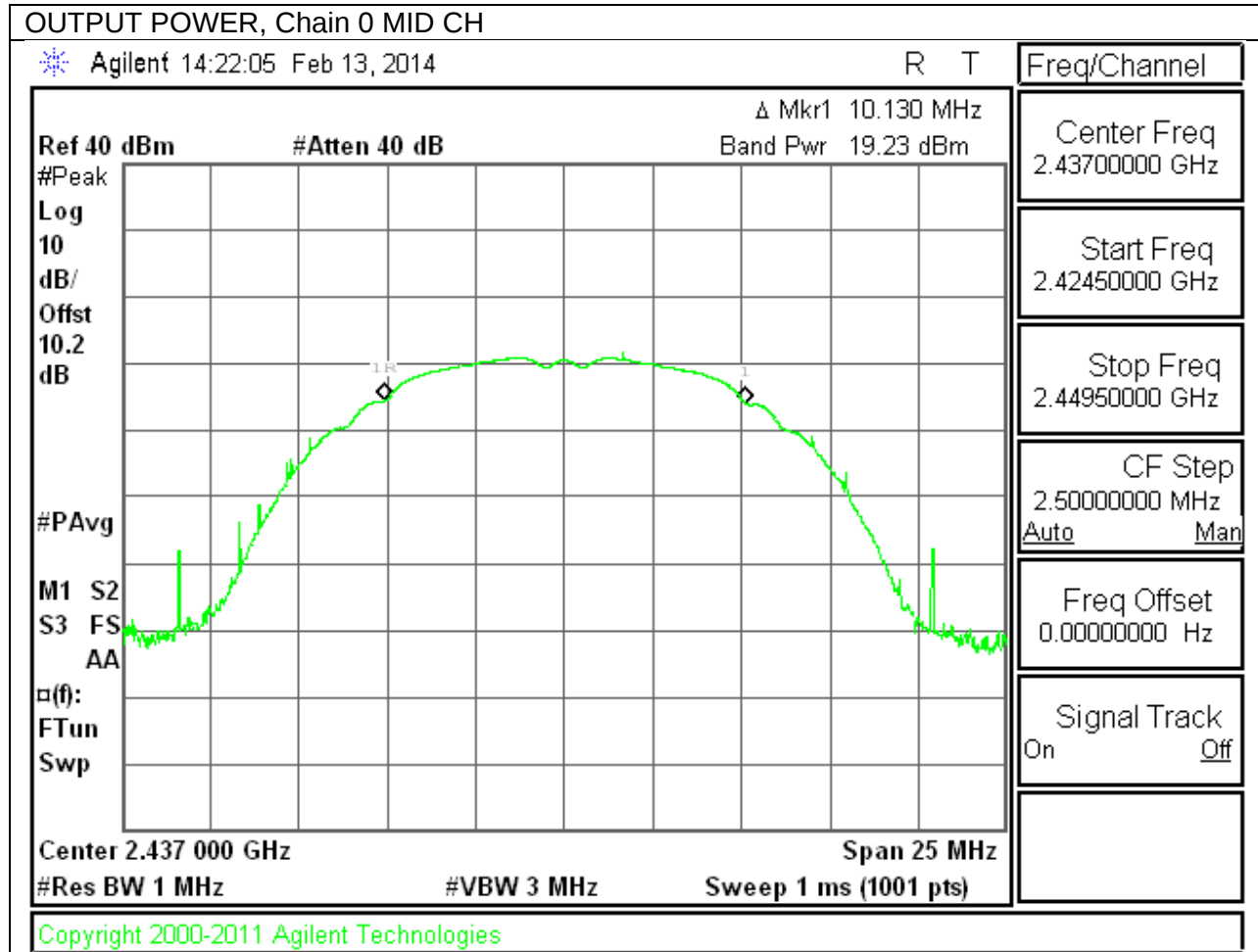
Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-0.39	30.00	30	36	30.00
Mid	2437	-0.39	30.00	30	36	30.00
High	2462	-0.39	30.00	30	36	30.00

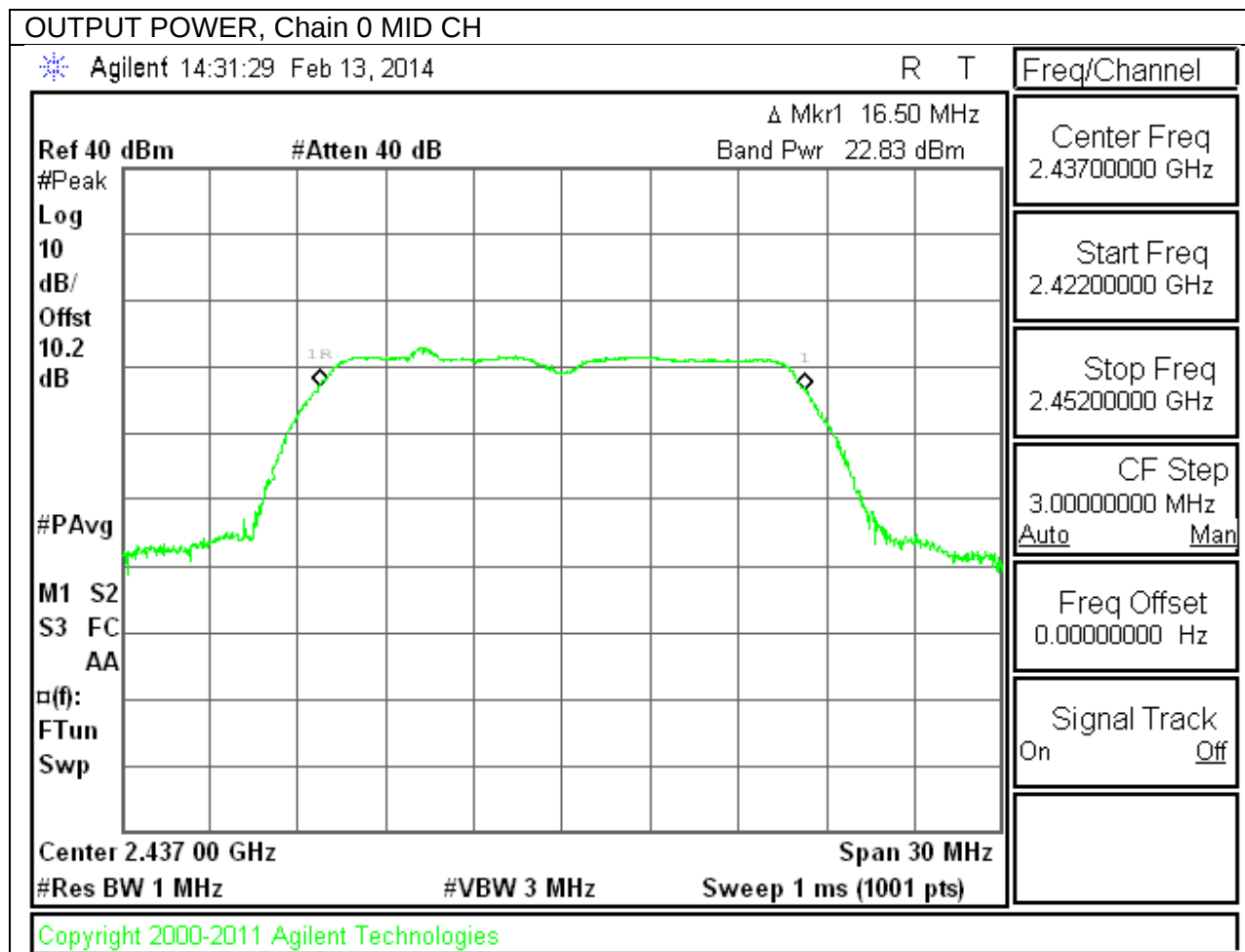
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.08	21.08	30.00	-8.92
Mid	2437	21.03	21.03	30.00	-8.97
High	2462	21.19	21.19	30.00	-8.81
Worst			21.19		

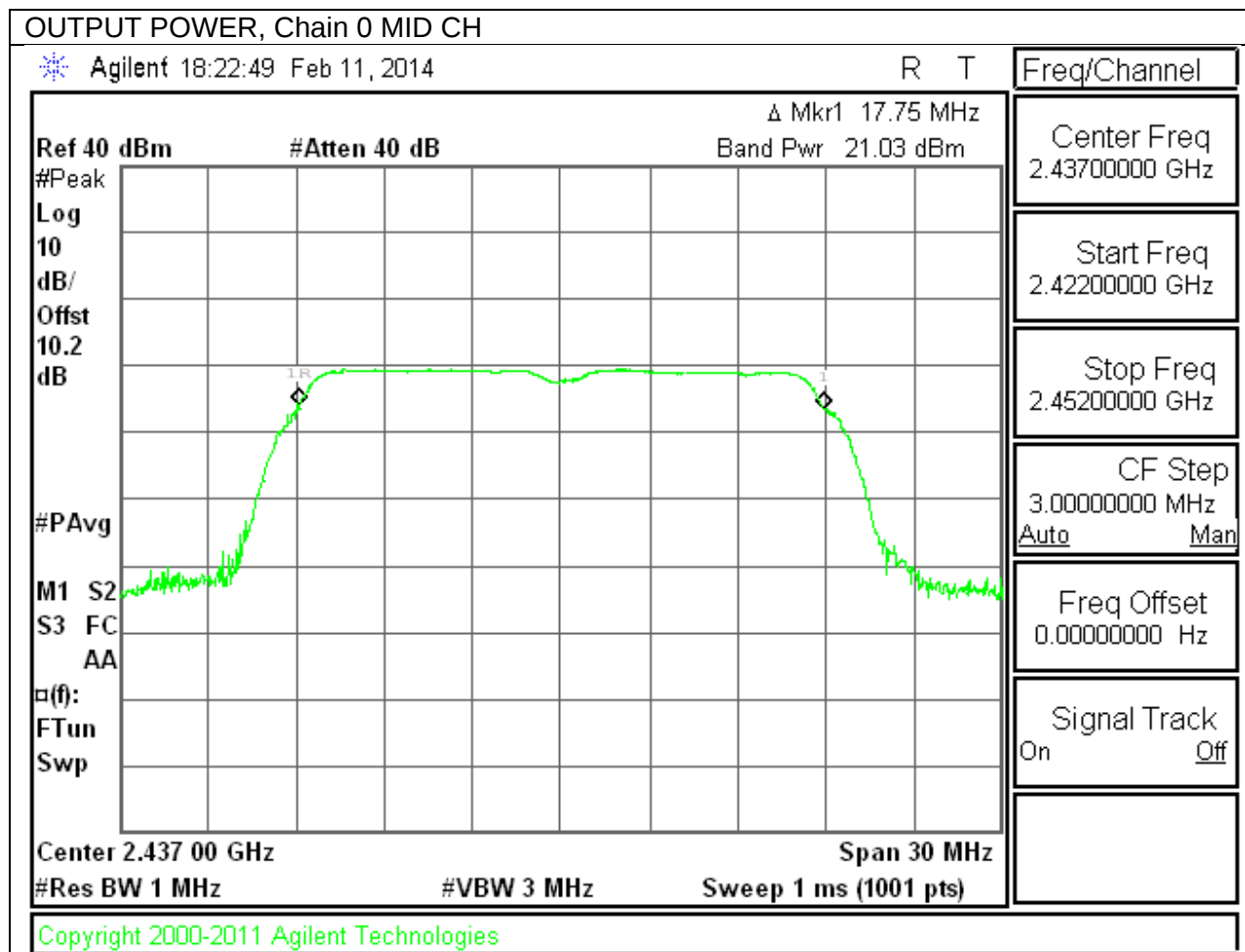
802.11b OUTPUT POWER, Chain 0



802.11g OUTPUT POWER, Chain 0



802.11n OUTPUT POWER, Chain 0



9.5. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

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

RESULTS

9.5.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.44	8.0	-18.4
Mid	2437	-10.03	8.0	-18.0
High	2462	-10.29	8.0	-18.3

9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

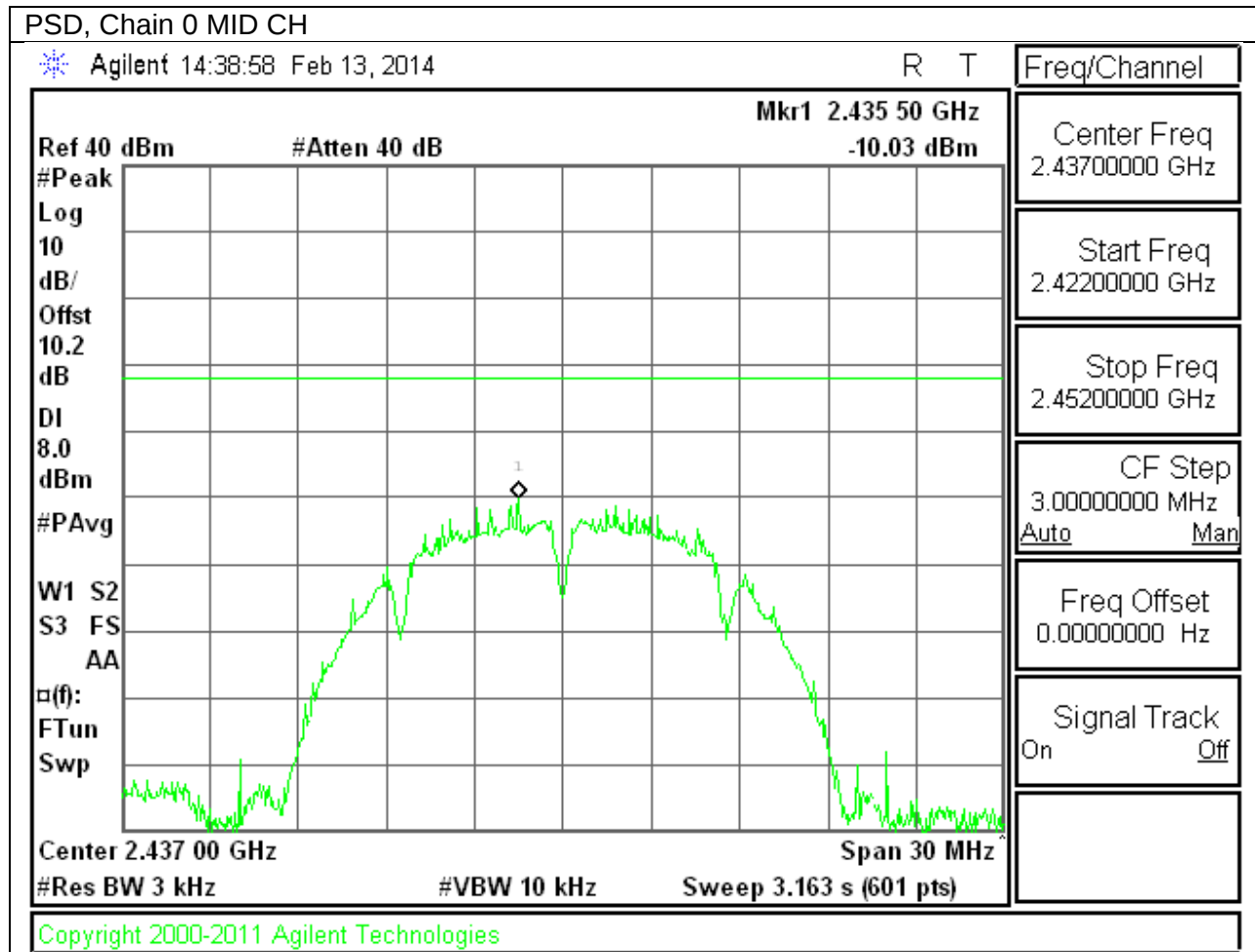
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-13.78	8.0	-21.8
Mid	2437	-13.46	8.0	-21.5
High	2462	-15.11	8.0	-23.1

9.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

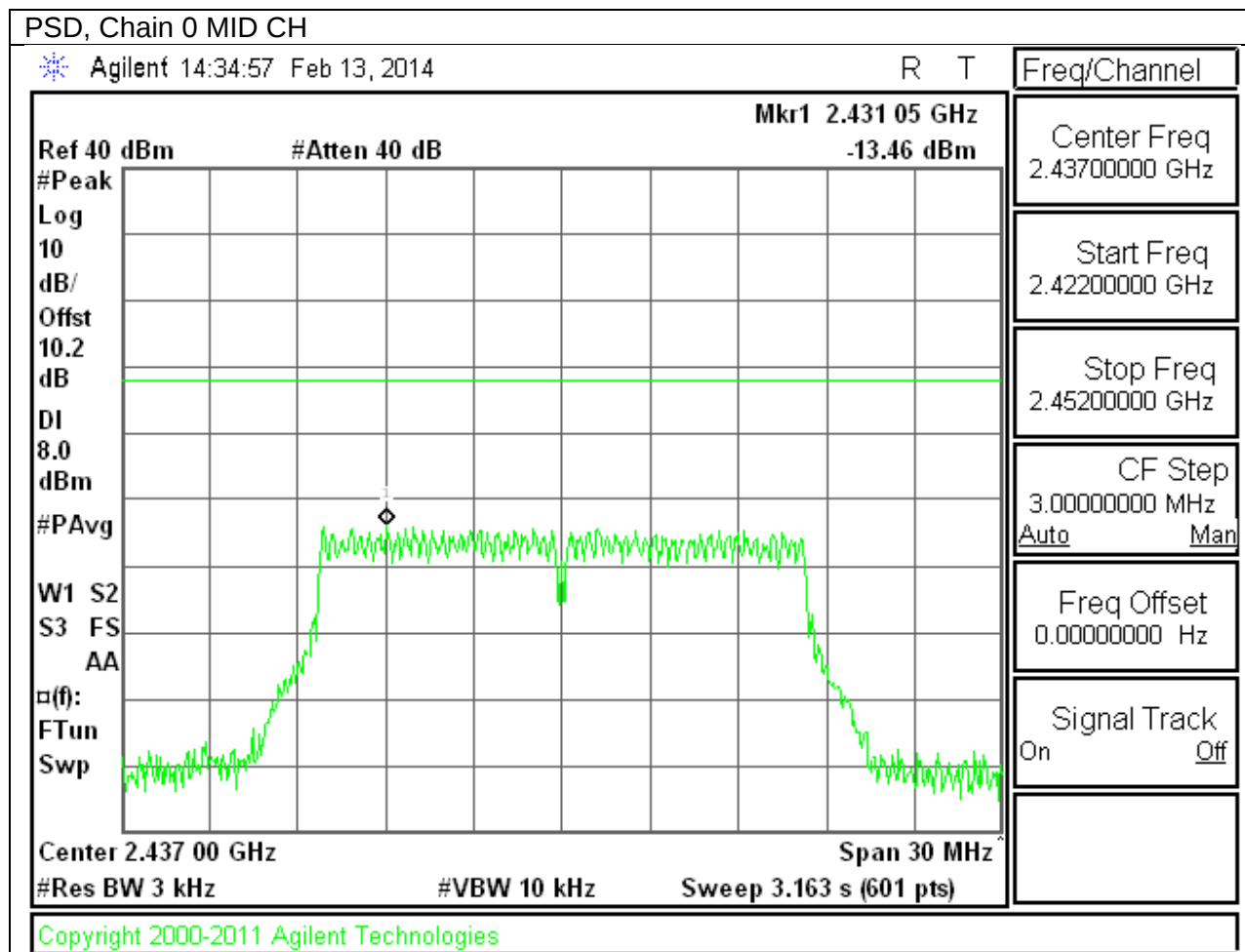
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-14.64	8.0	-22.6
Mid	2437	-14.60	8.0	-22.6
High	2462	-14.63	8.0	-22.6

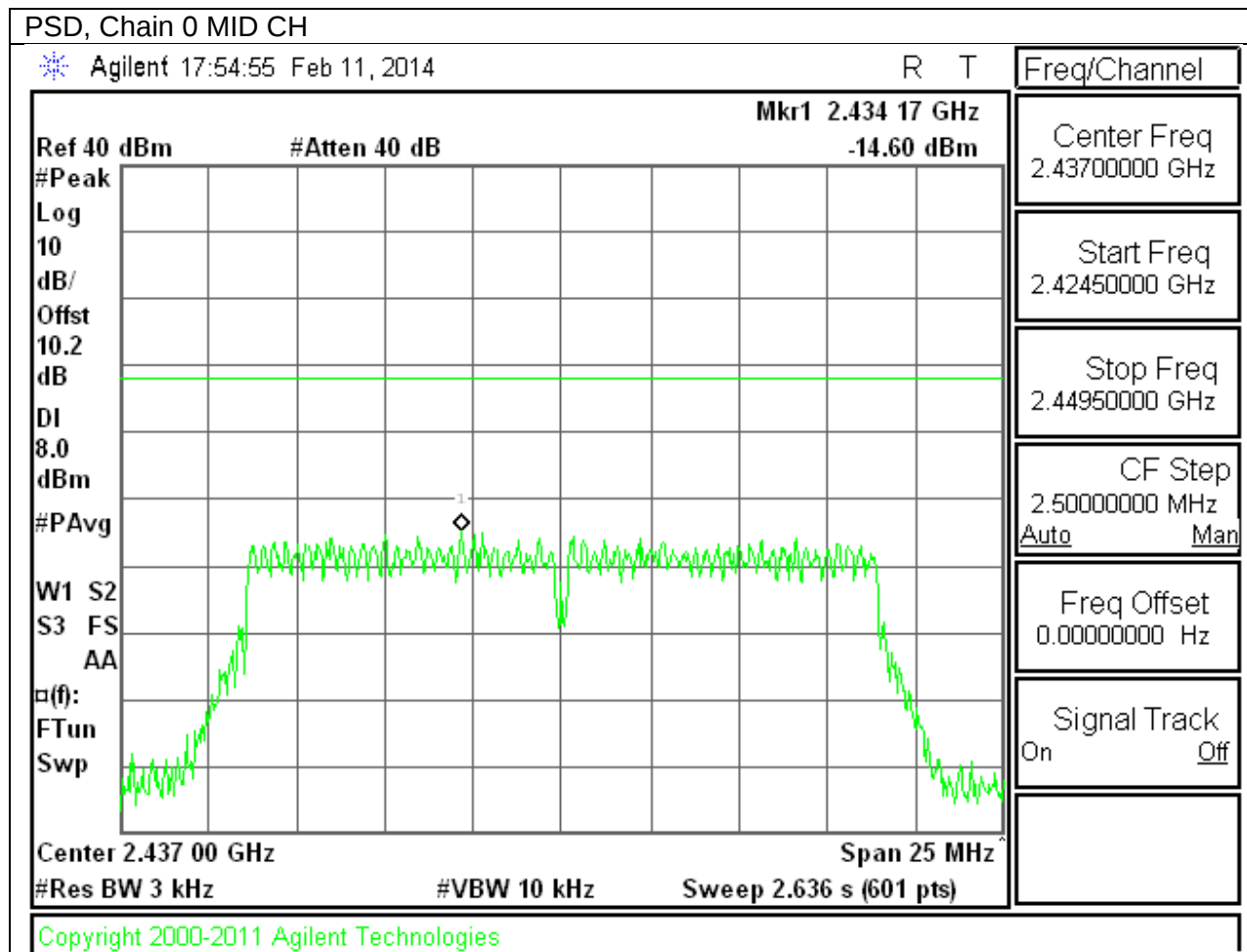
802.11b PSD, Chain 0



802.11g PSD, Chain 0



802.11n PSD, Chain 0



9.6. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

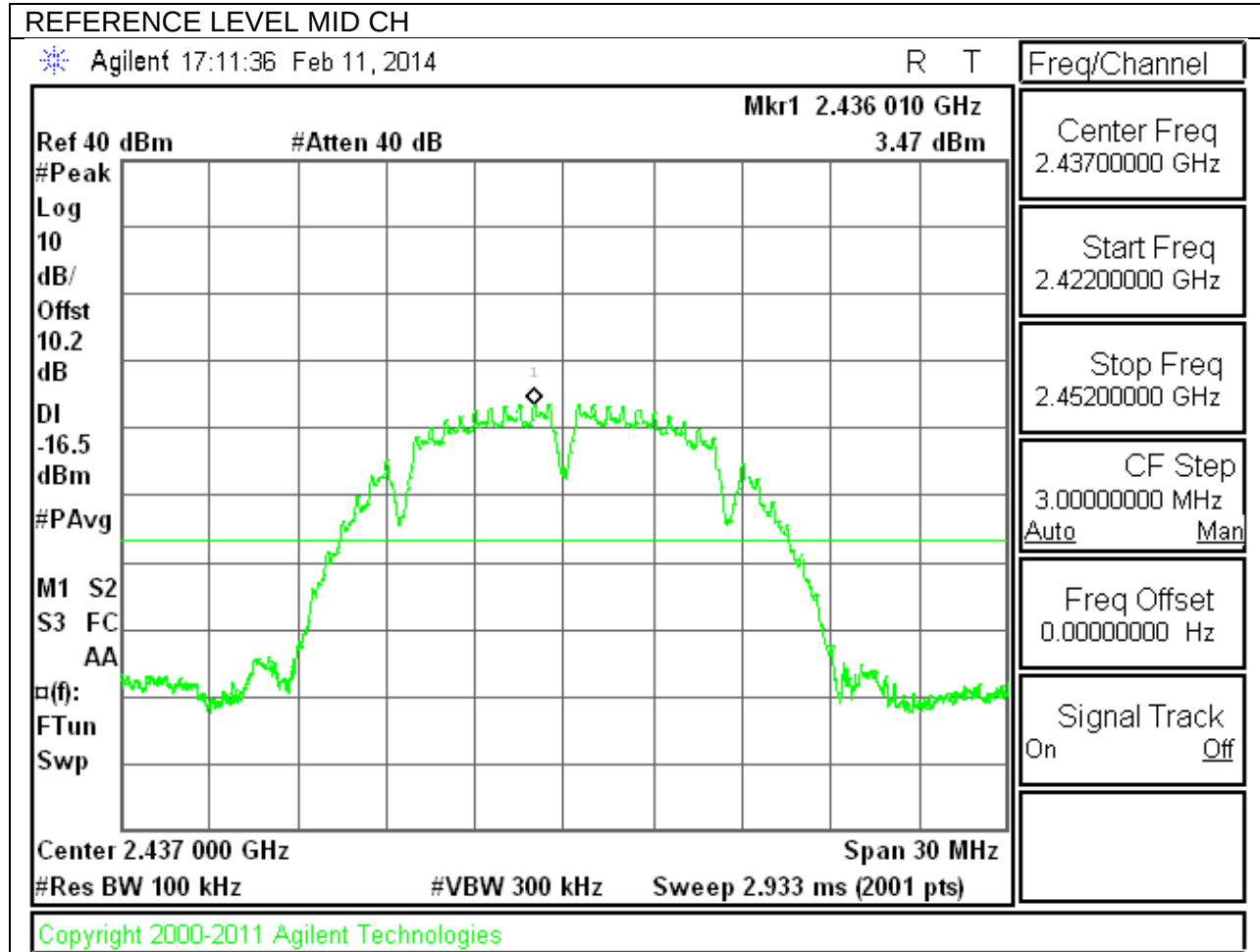
TEST PROCEDURE

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

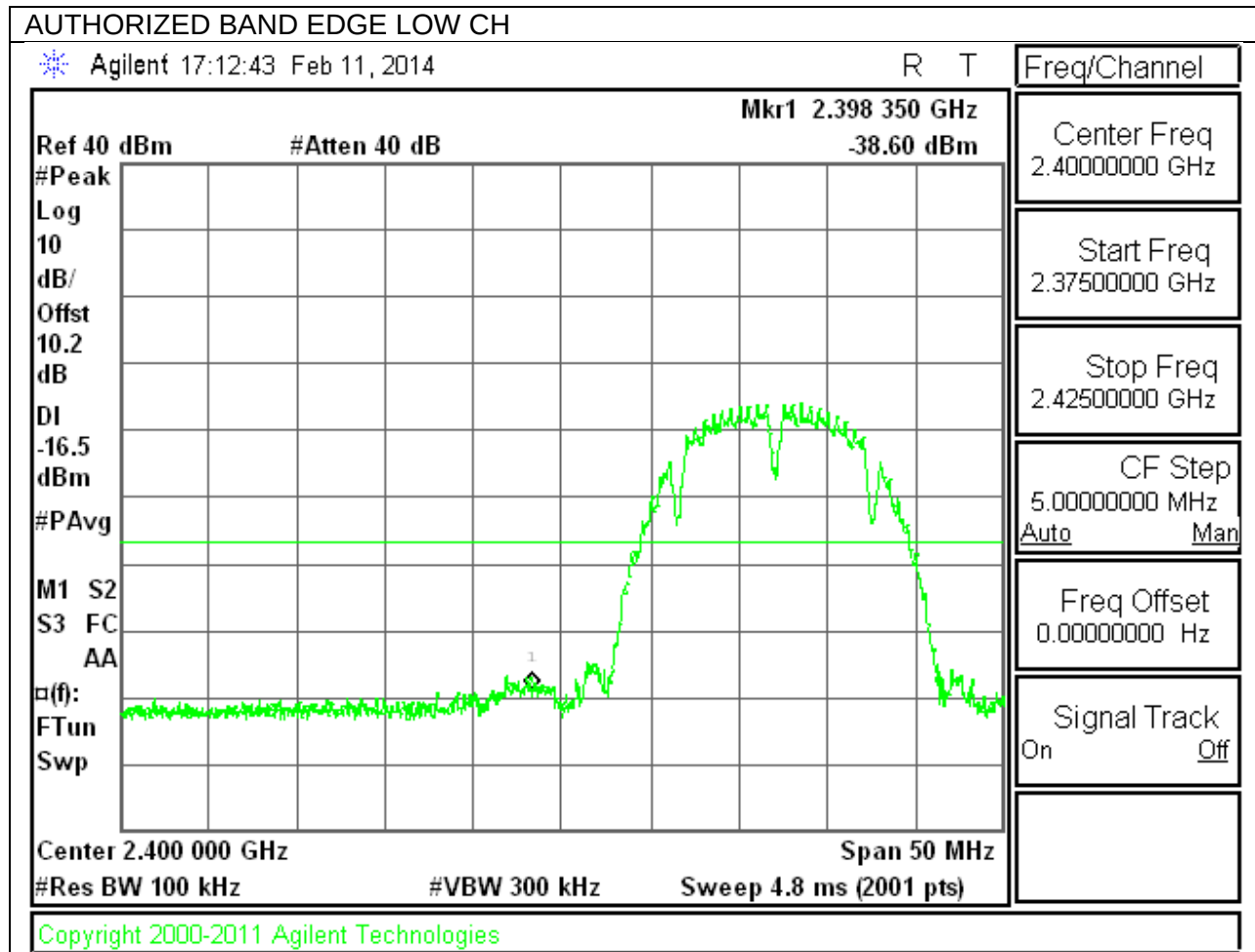
RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

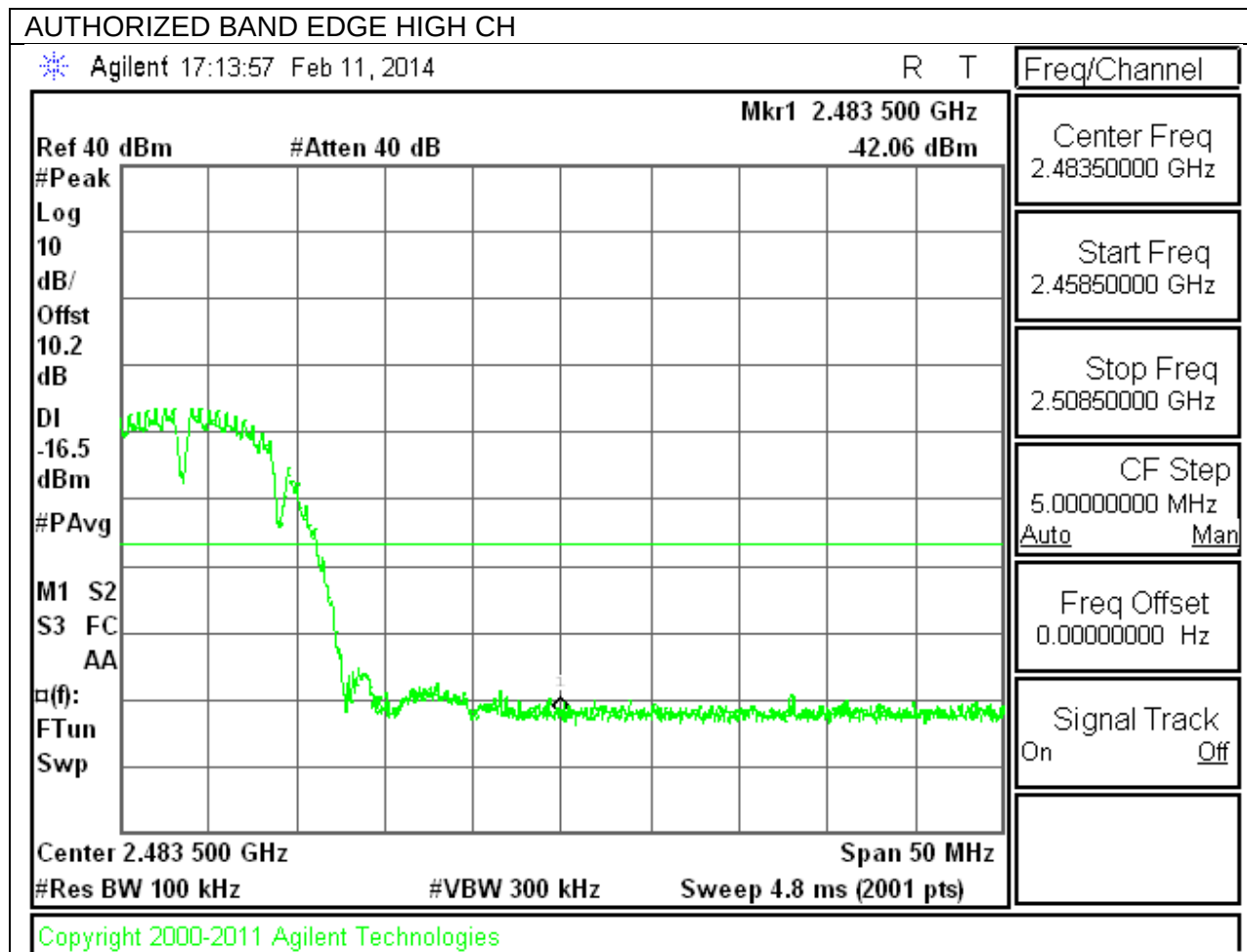
IN-BAND REFERENCE LEVEL



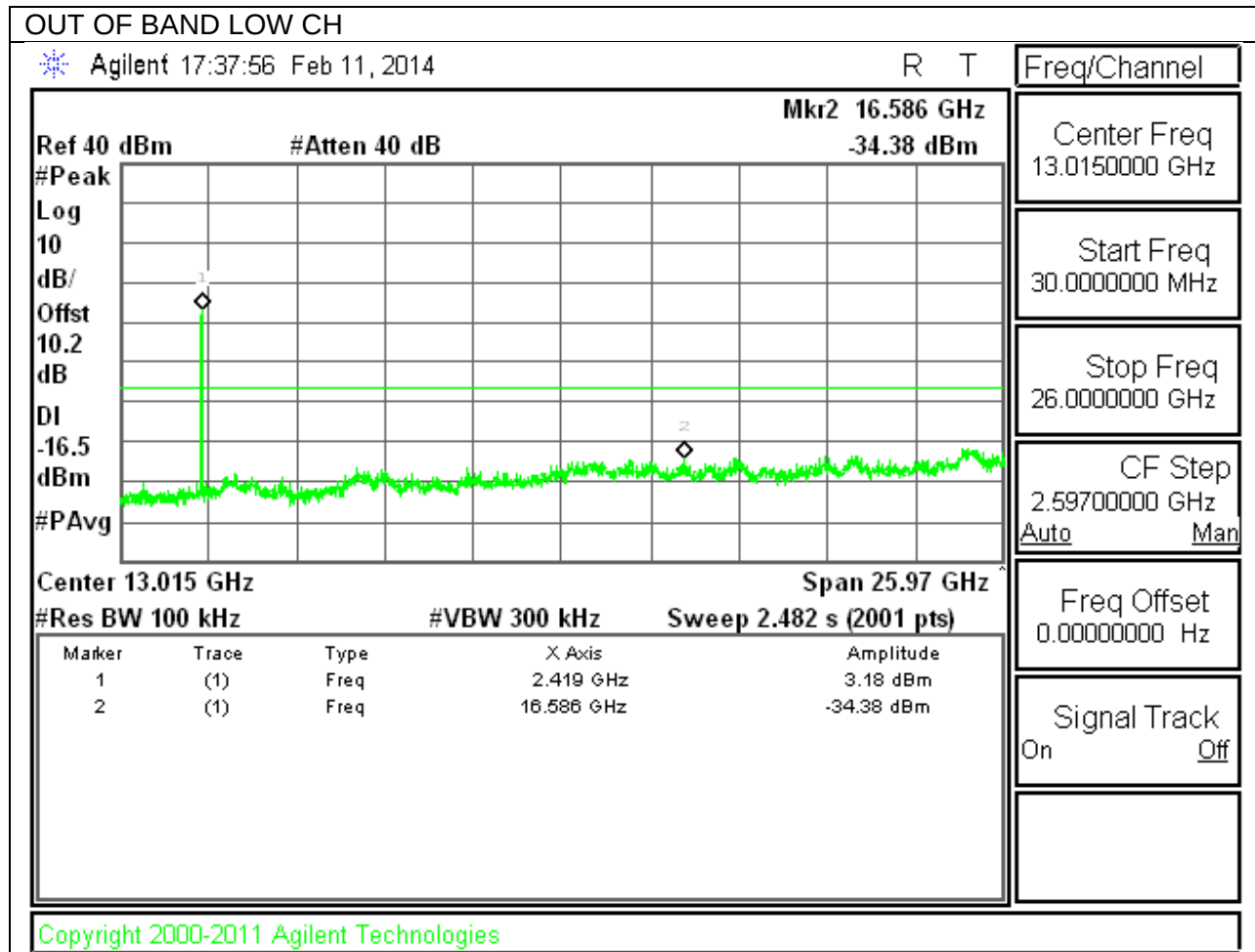
LOW CHANNEL BANDEDGE

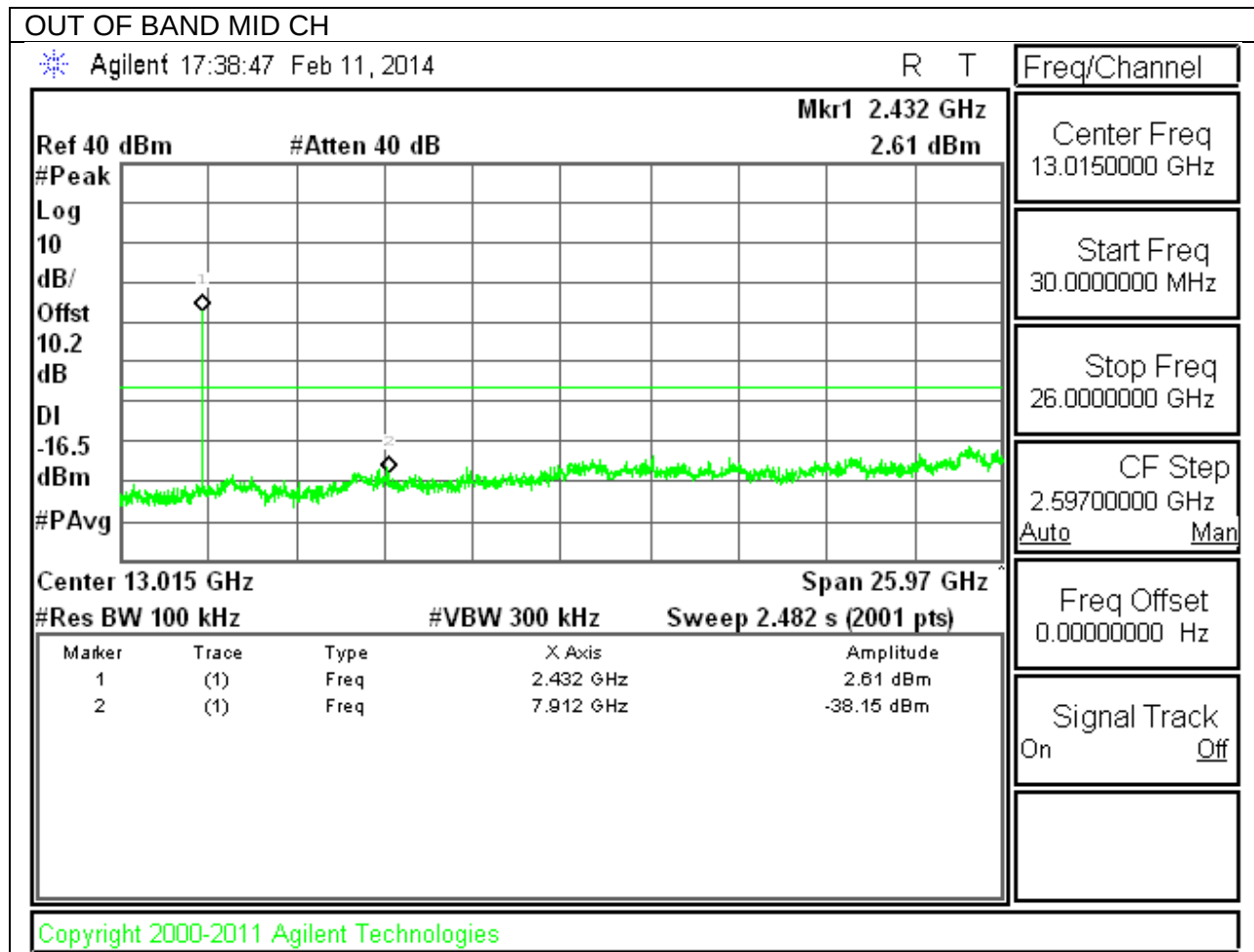


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



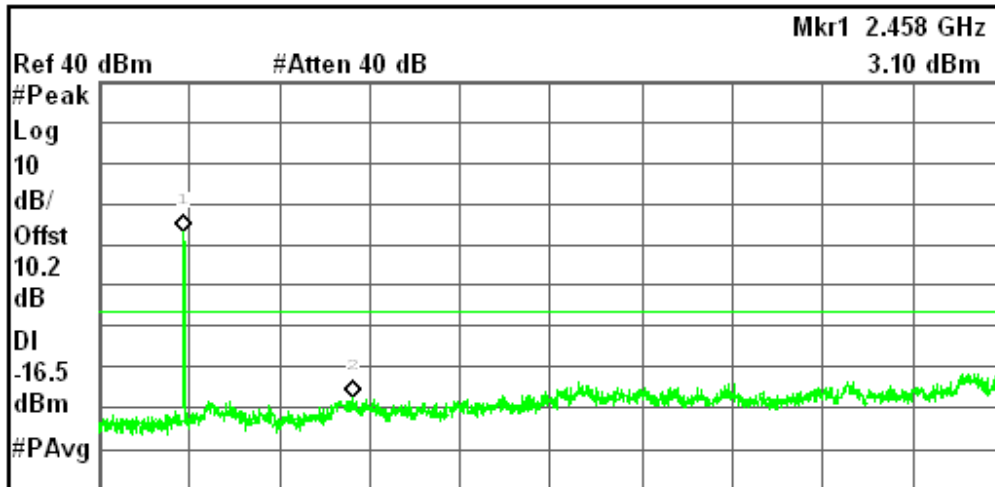


OUT OF BAND HIGH CH

Agilent 17:39:38 Feb 11, 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

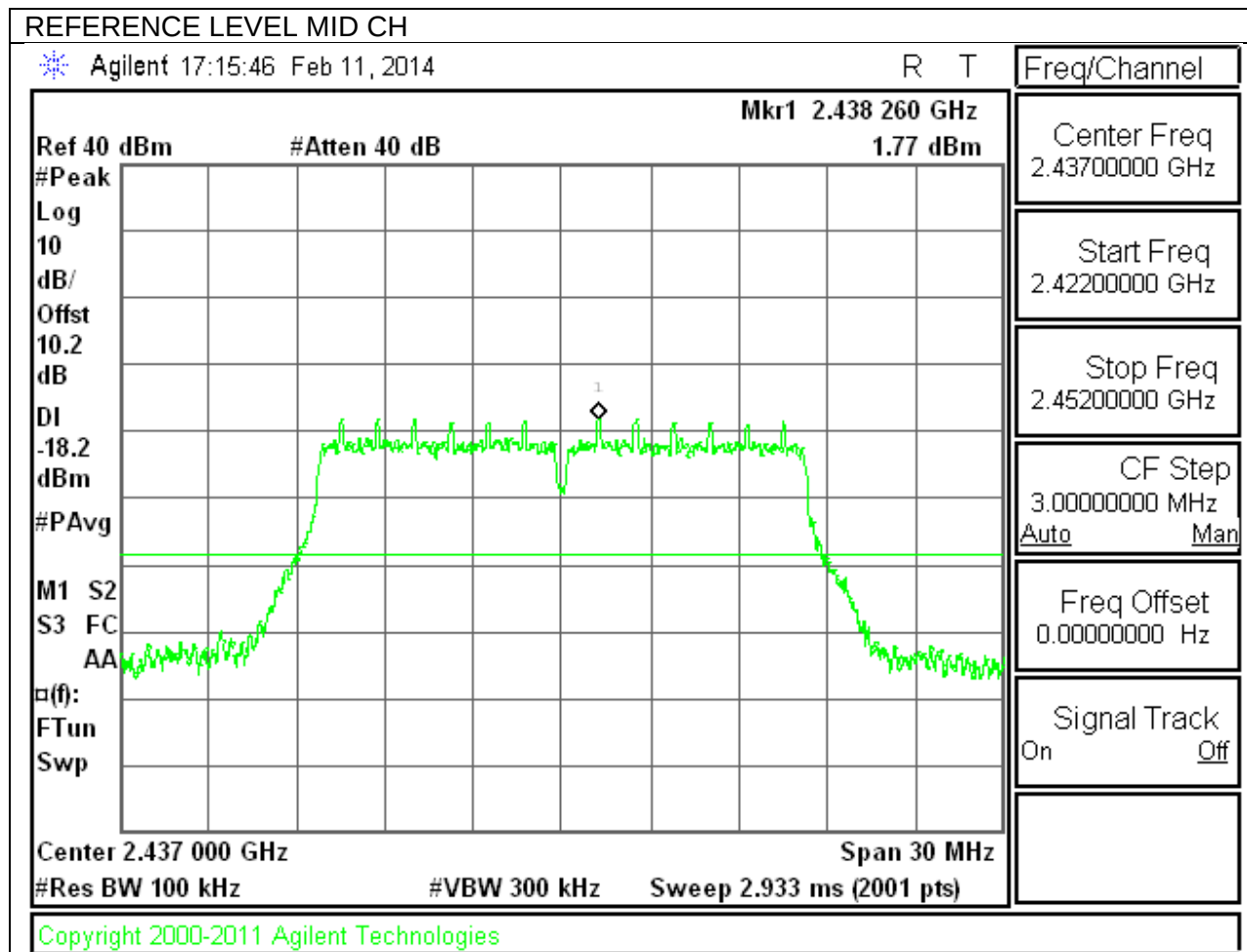
Freq Offset
0.00000000 Hz

Signal Track
On Off

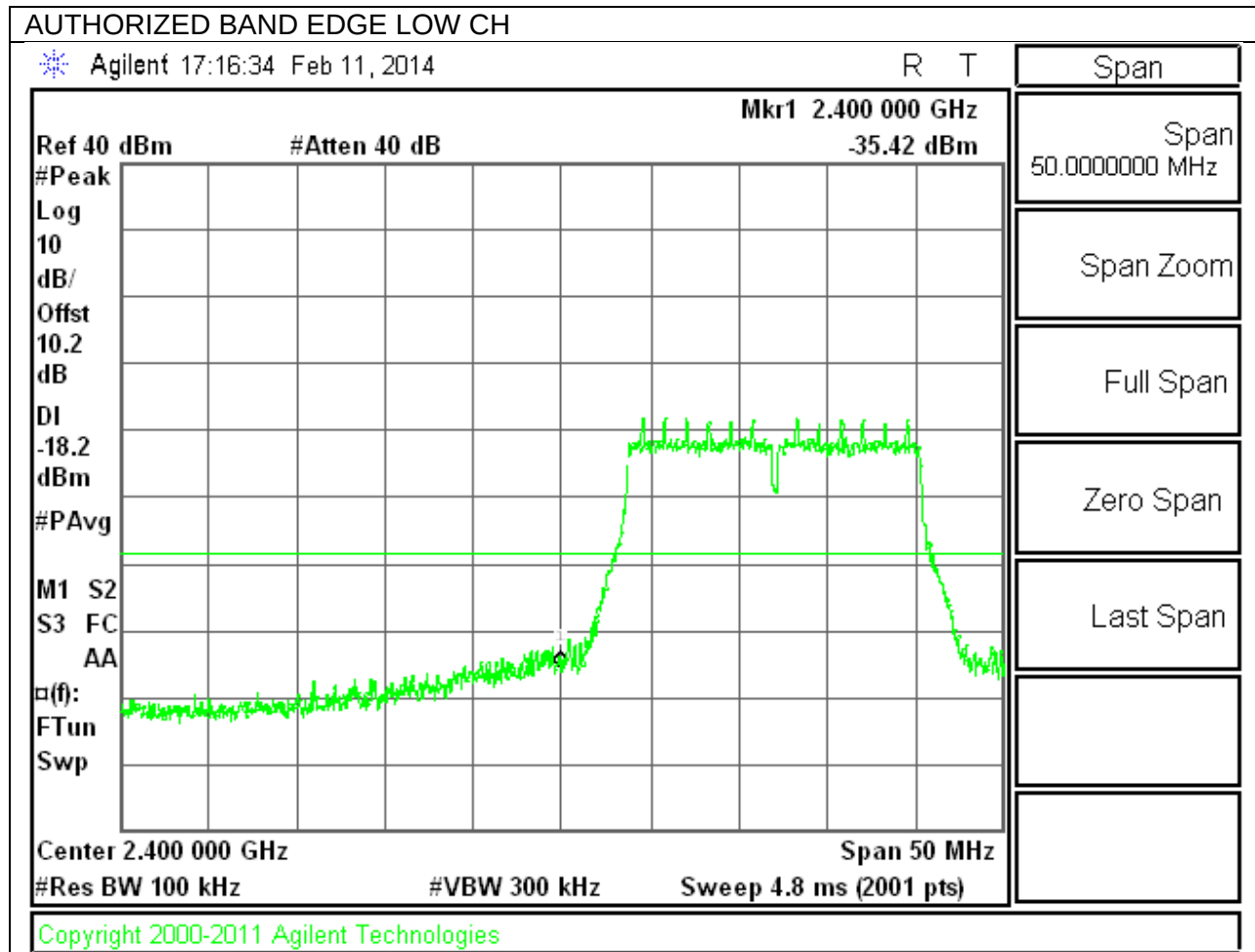
Copyright 2000-2011 Agilent Technologies

9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

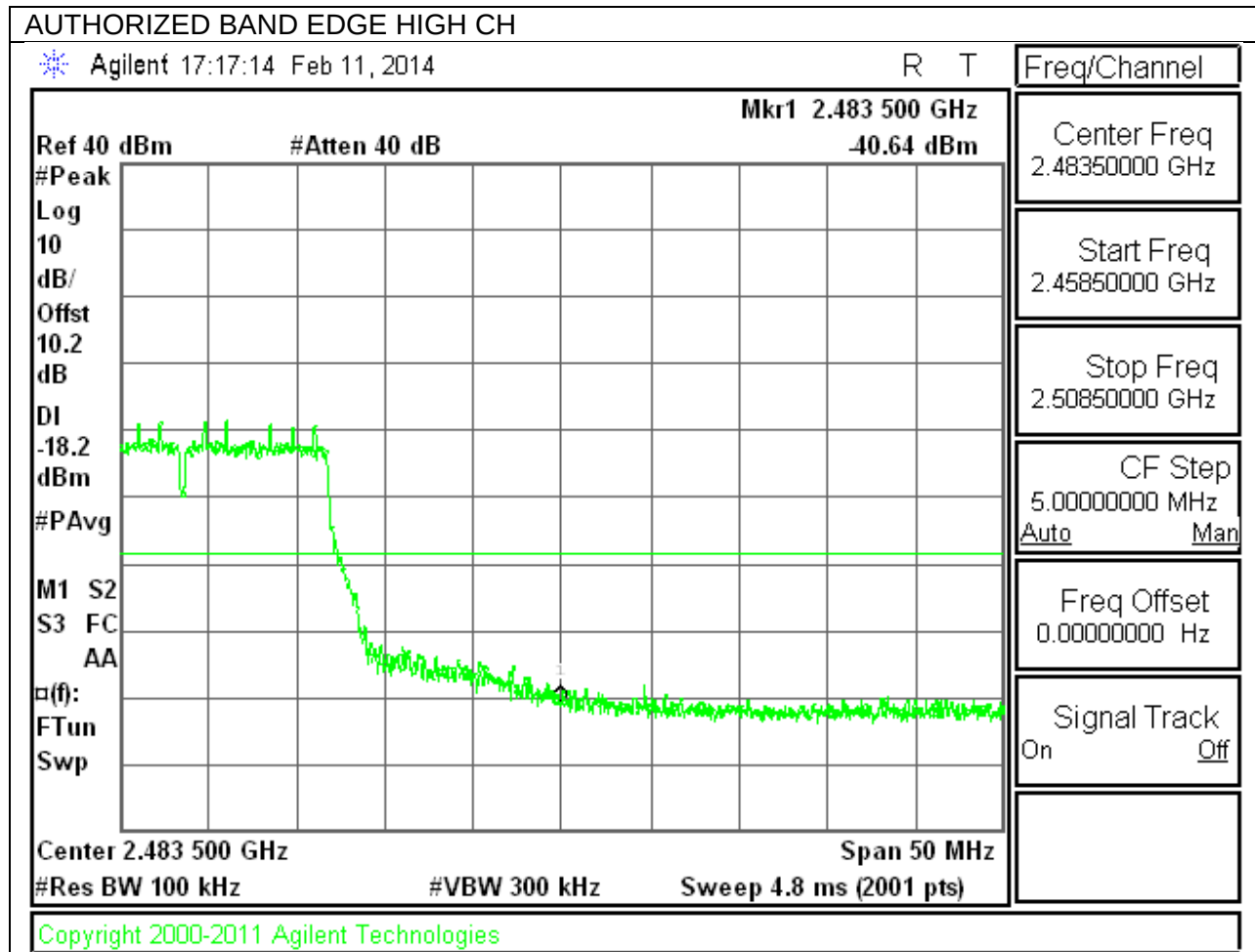
IN-BAND REFERENCE LEVEL



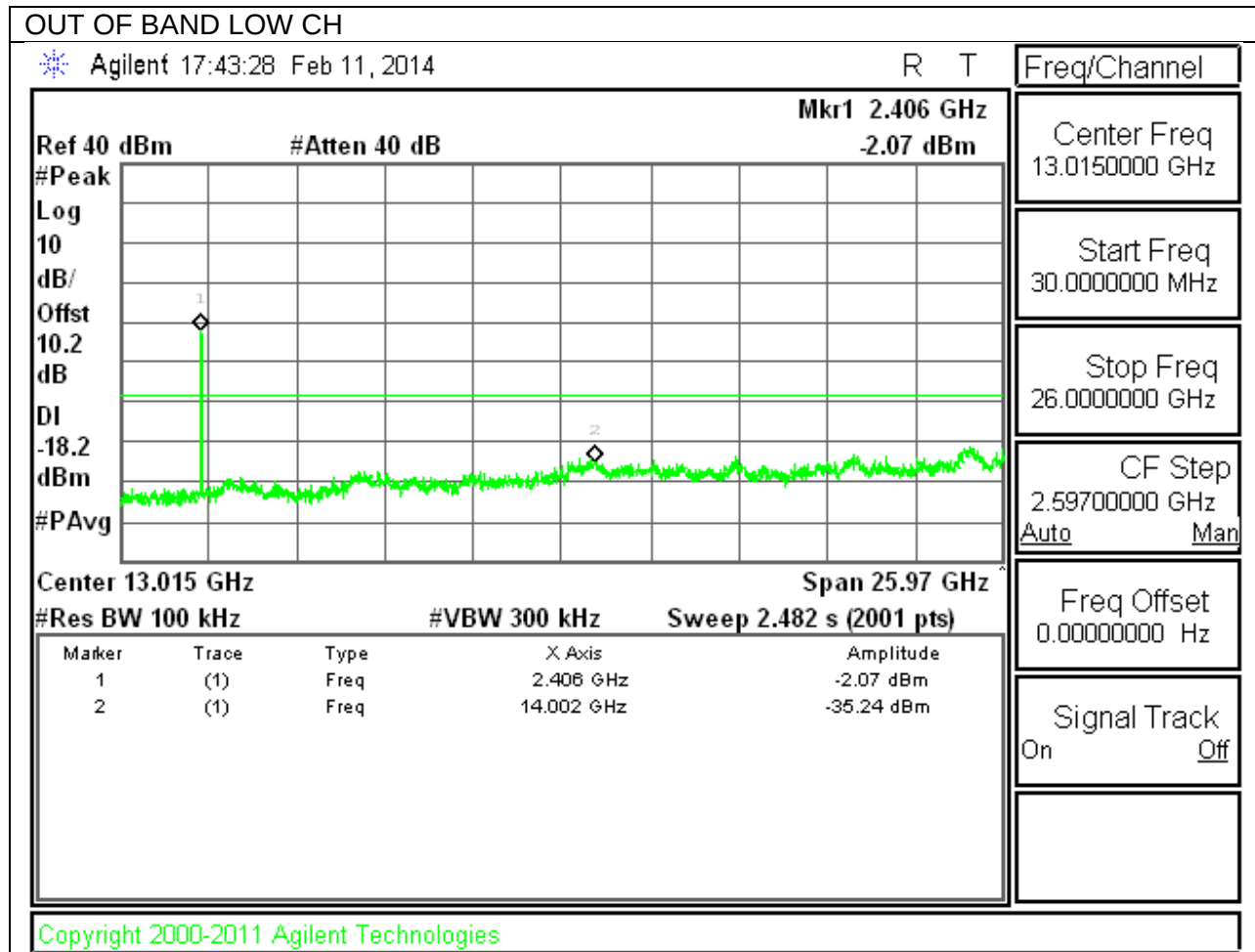
LOW CHANNEL BANDEDGE

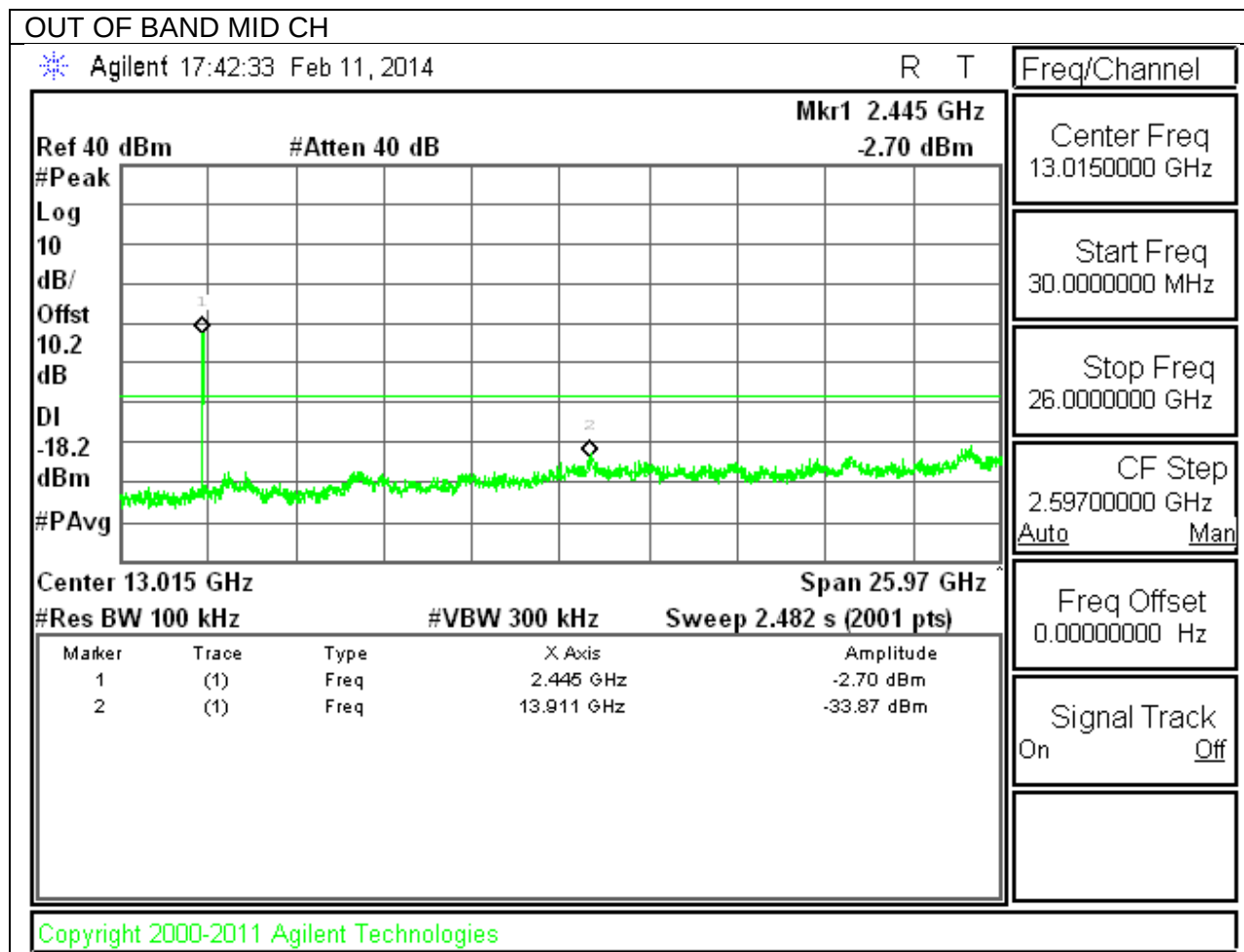


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



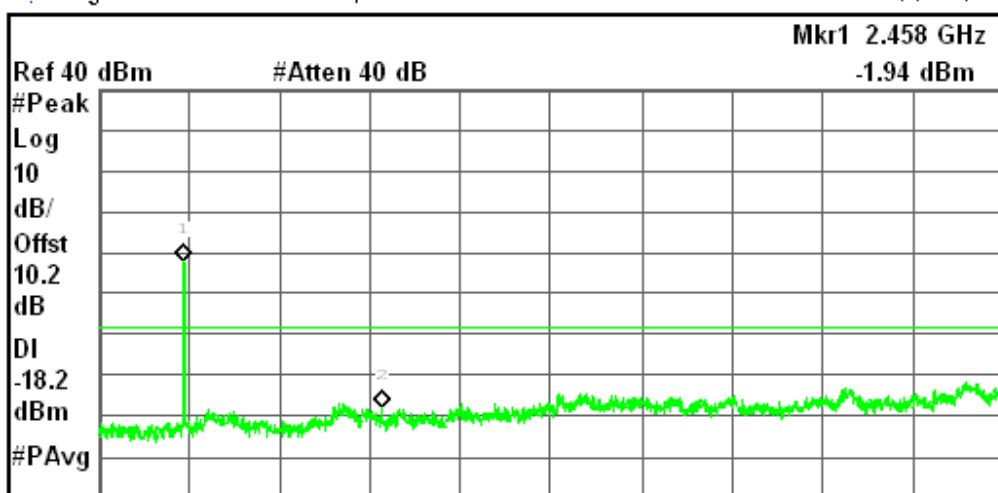


OUT OF BAND HIGH CH

Agilent 17:41:22 Feb 11, 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

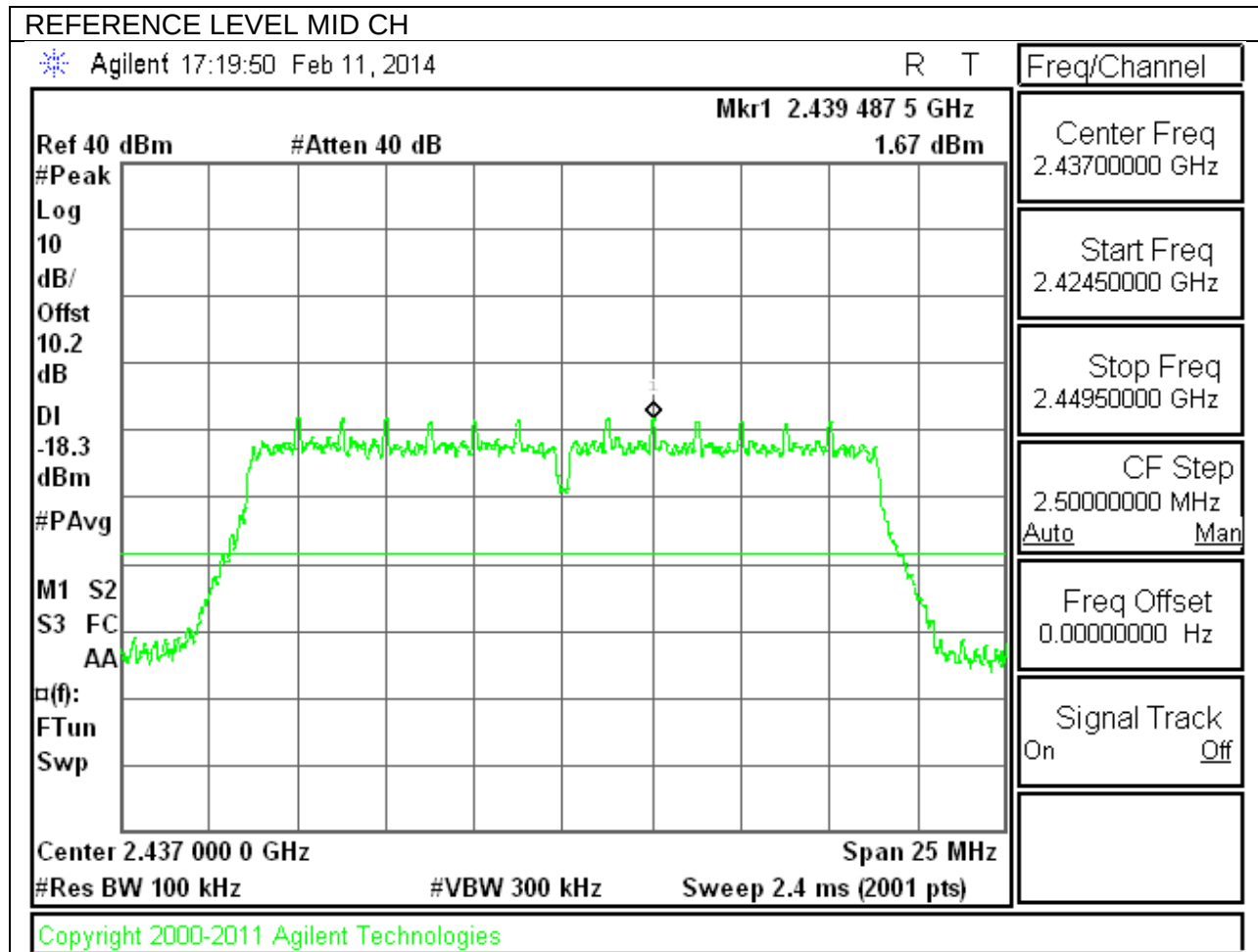
Freq Offset
0.00000000 Hz

Signal Track
On Off

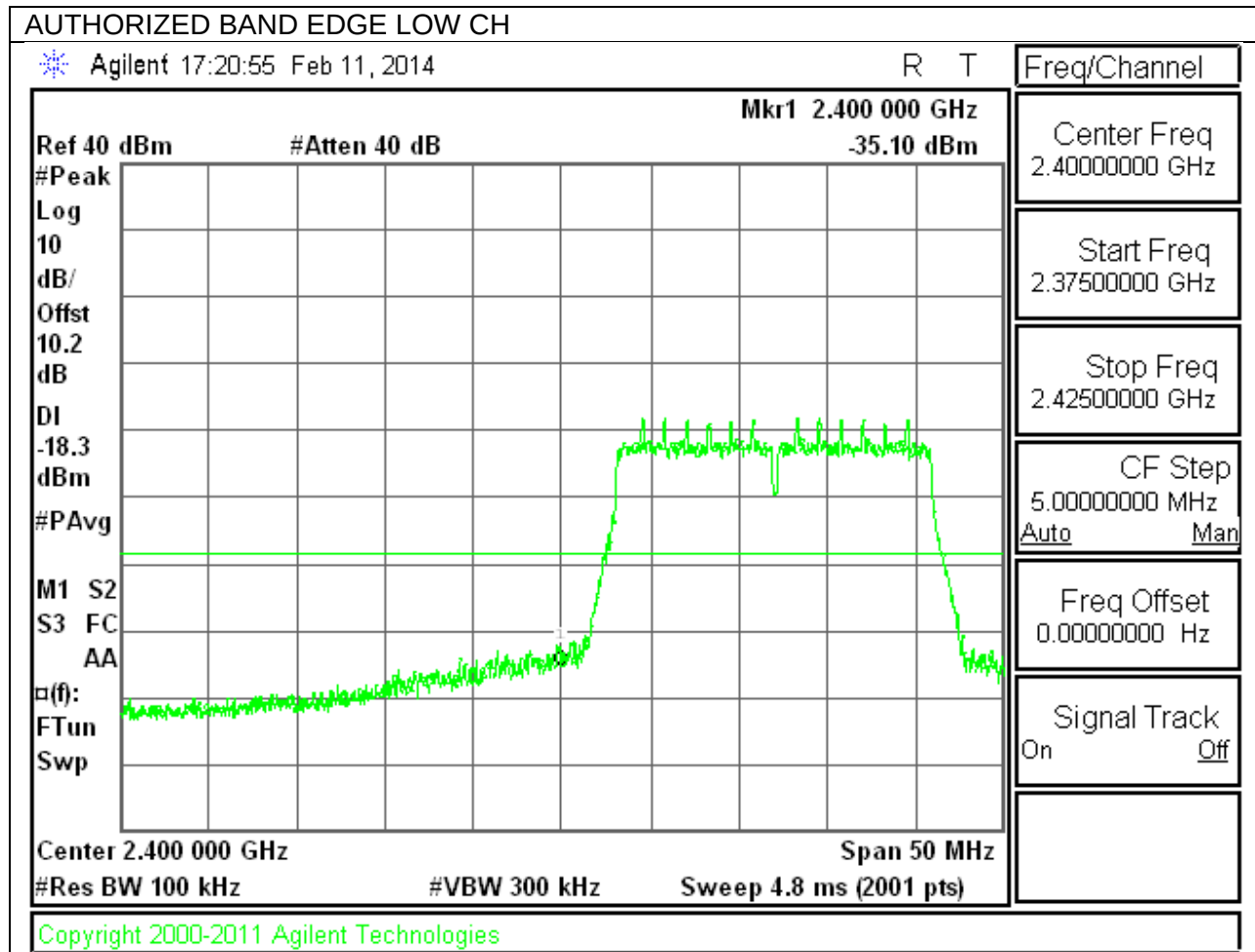
Copyright 2000-2011 Agilent Technologies

9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

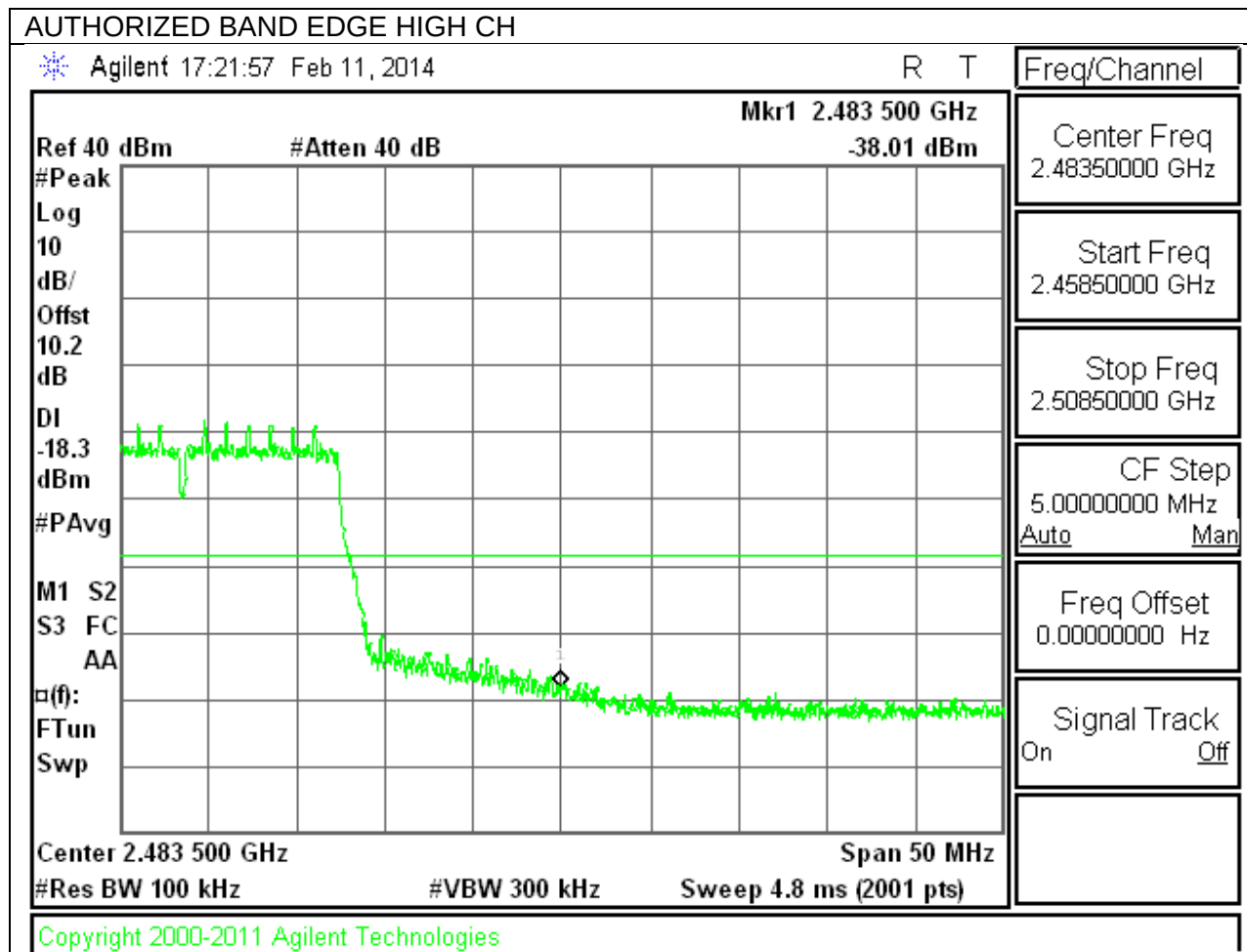
IN-BAND REFERENCE LEVEL



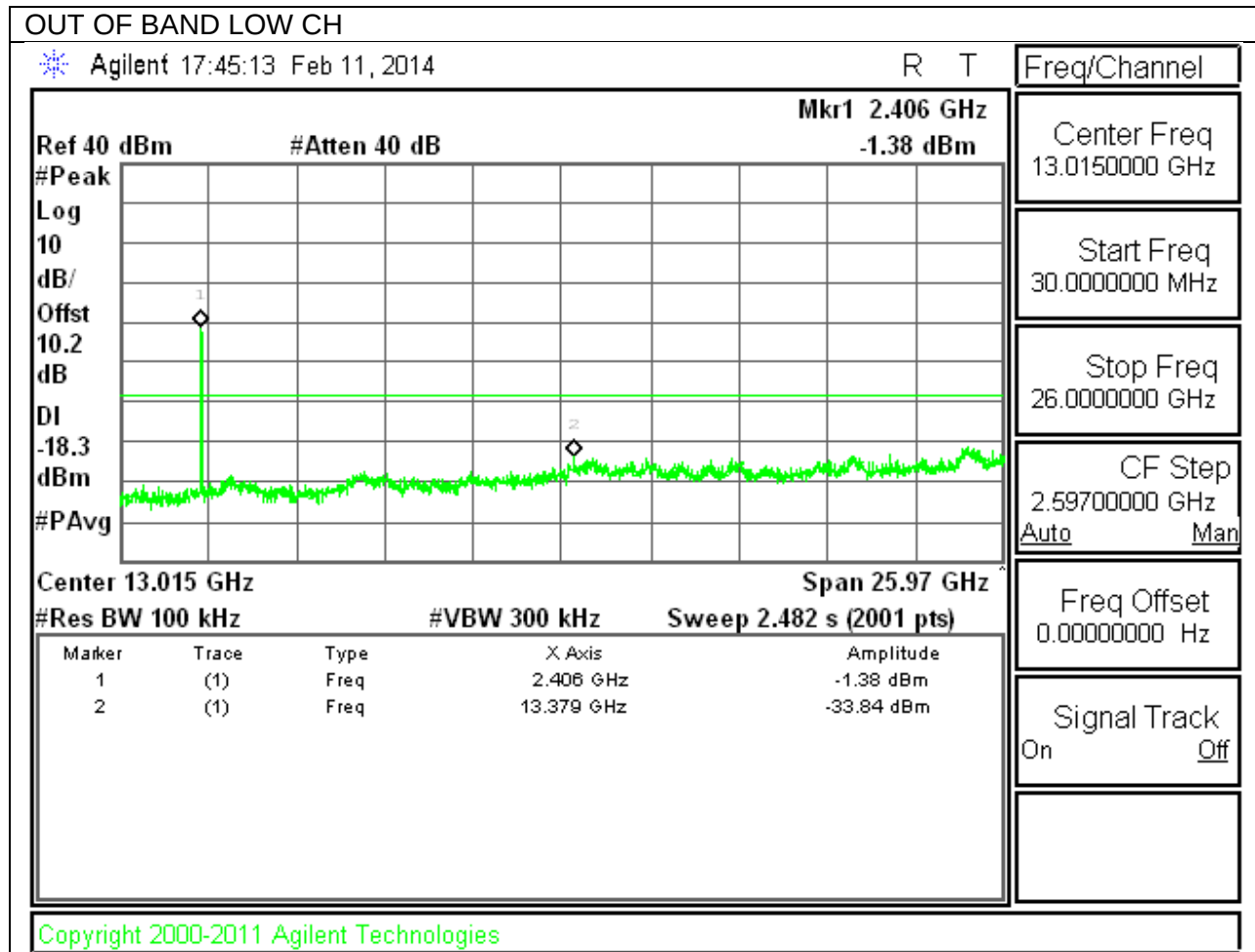
LOW CHANNEL BANDEDGE

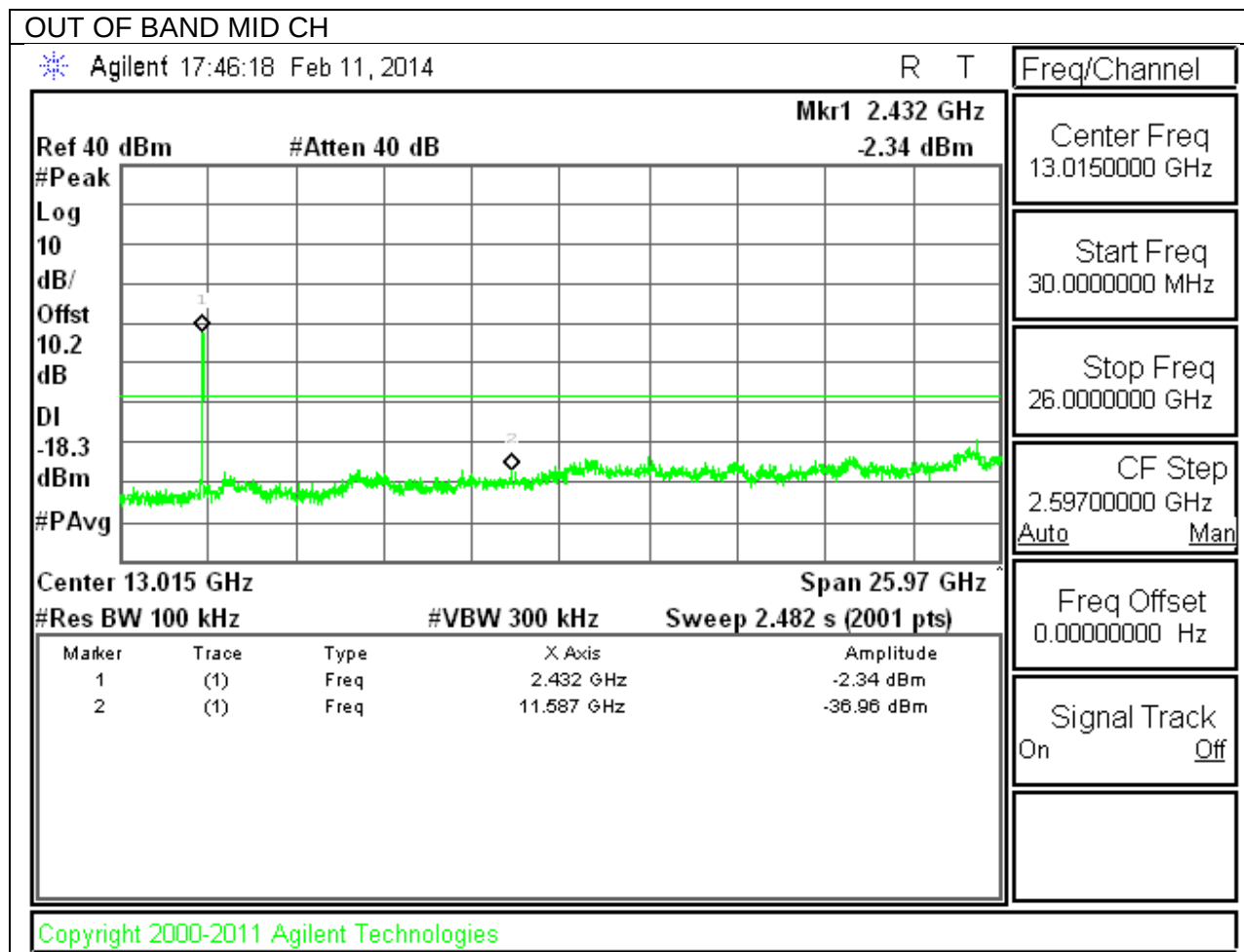


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



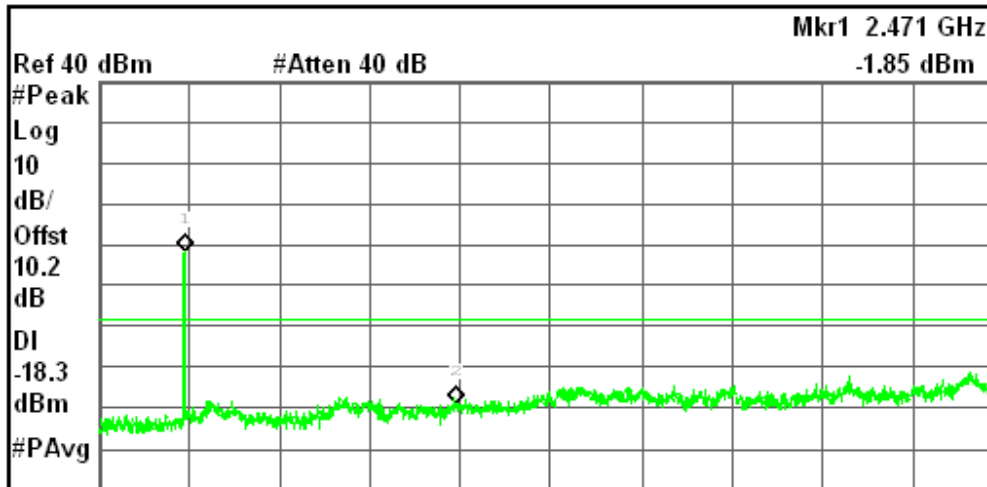


OUT OF BAND HIGH CH

Agilent 17:47:12 Feb 11, 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

Copyright 2000-2011 Agilent Technologies

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.

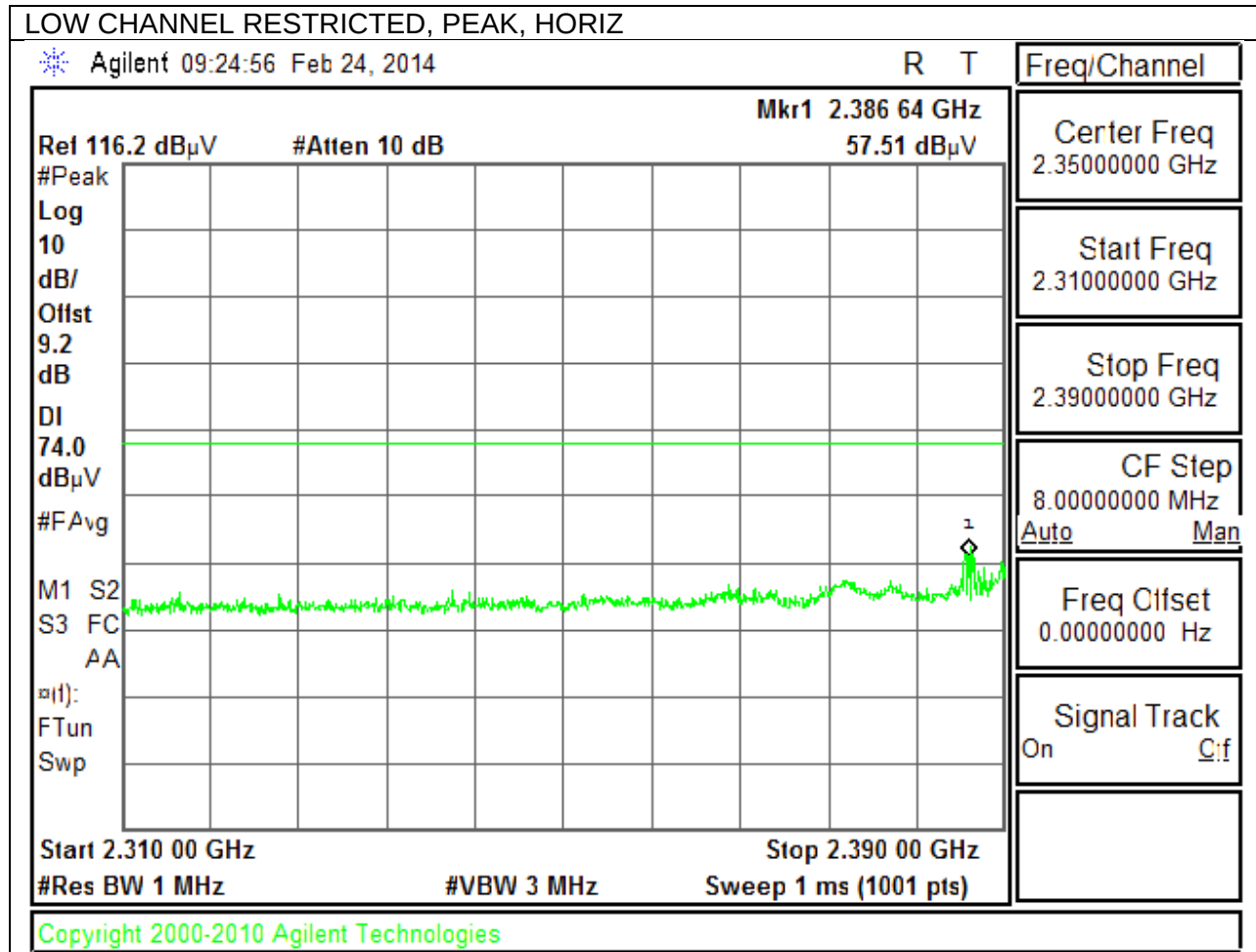
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= $10\log(1/x)$ For this sample B mode = 0dB (duty cycle >98%); G mode = 0.2dB; N mode = 0.2dB.

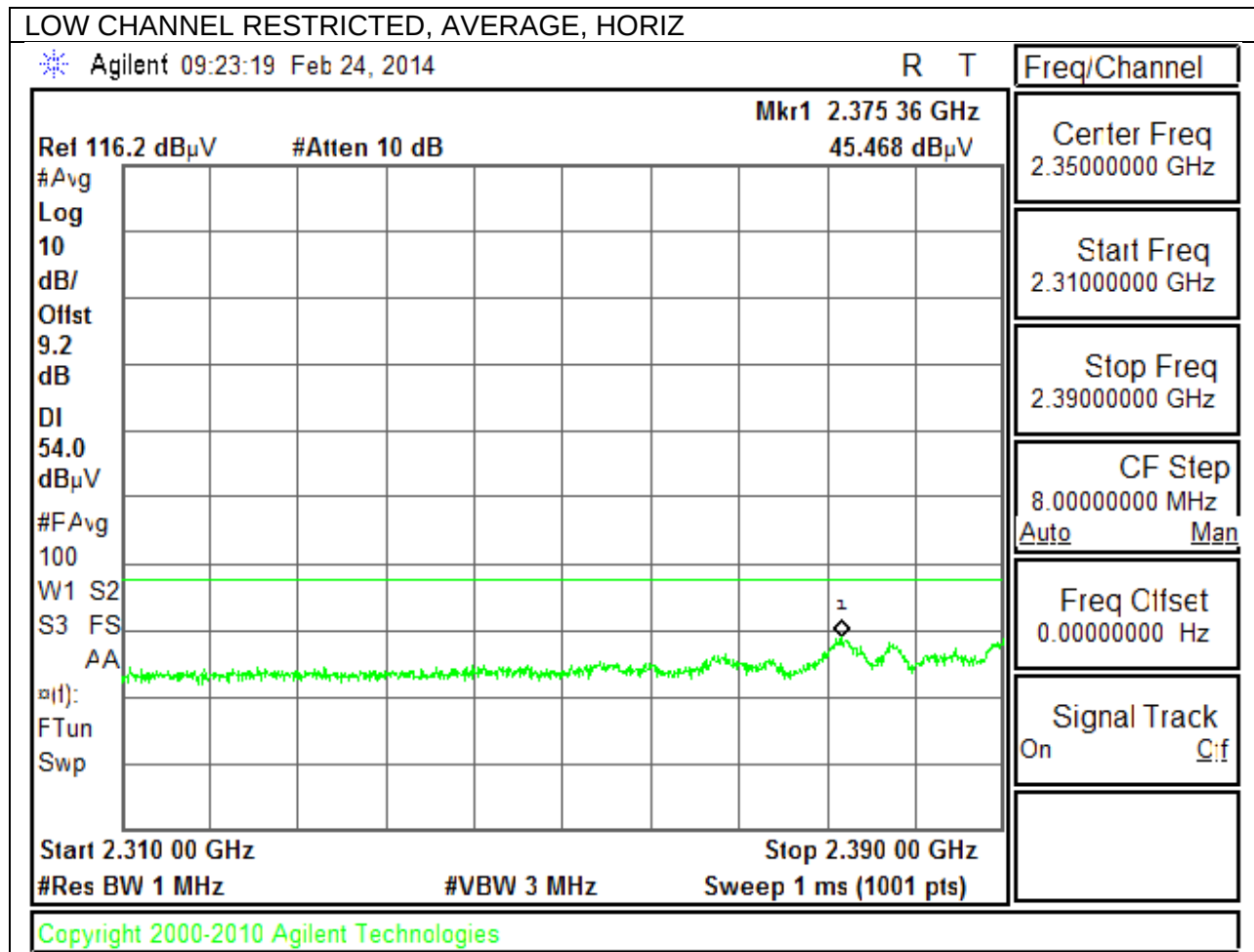
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

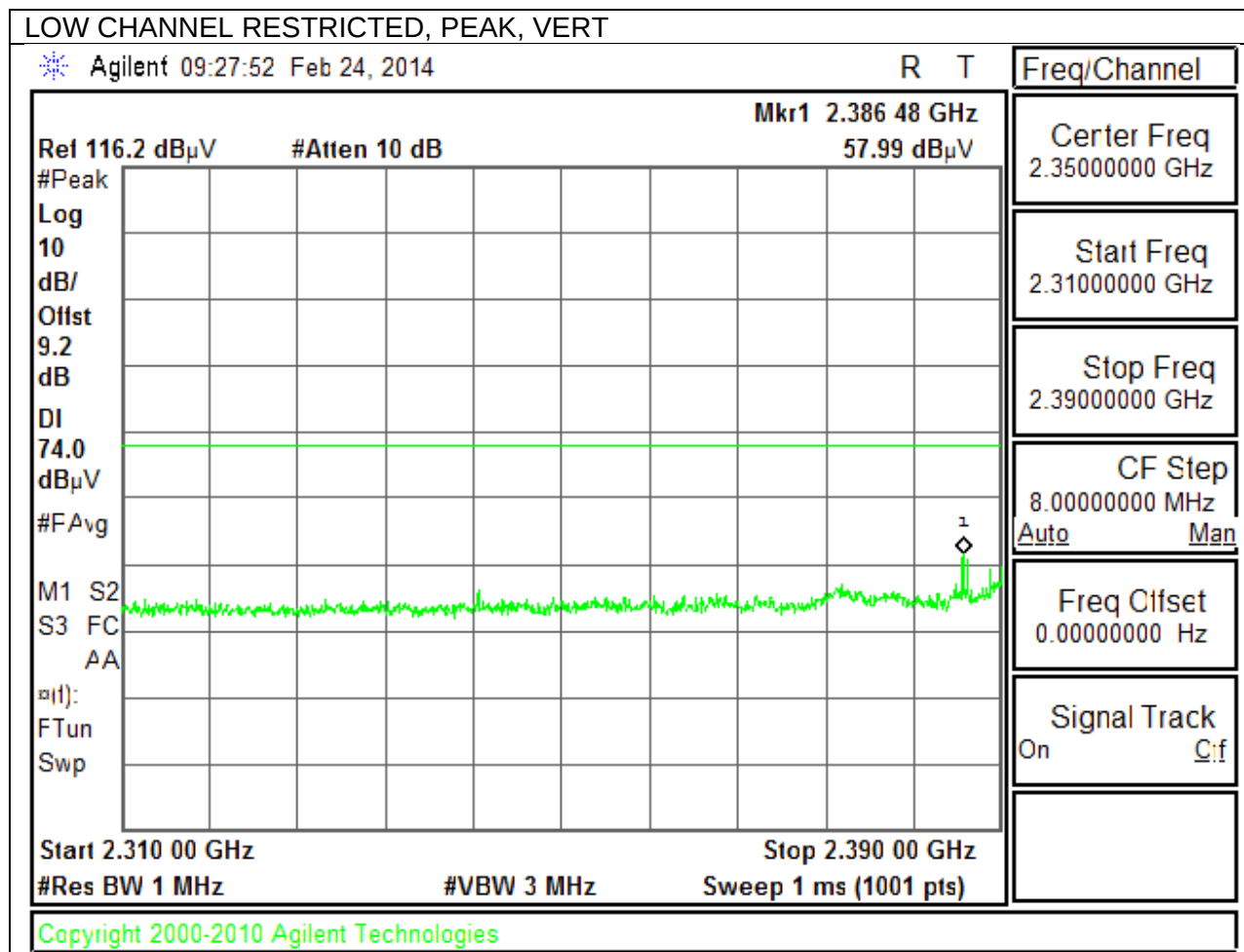
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

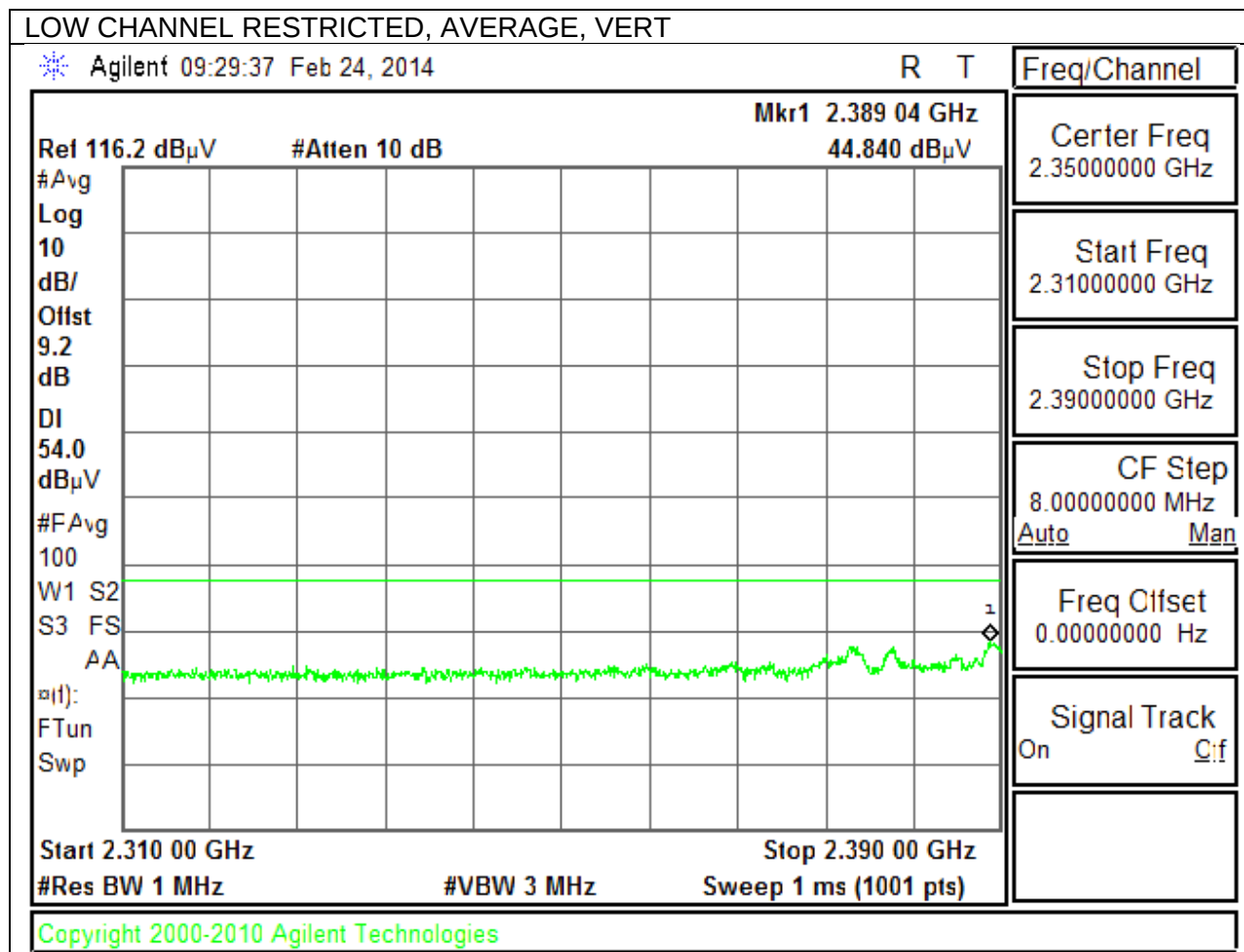
10.2. TRANSMITTER ABOVE 1 GHz

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

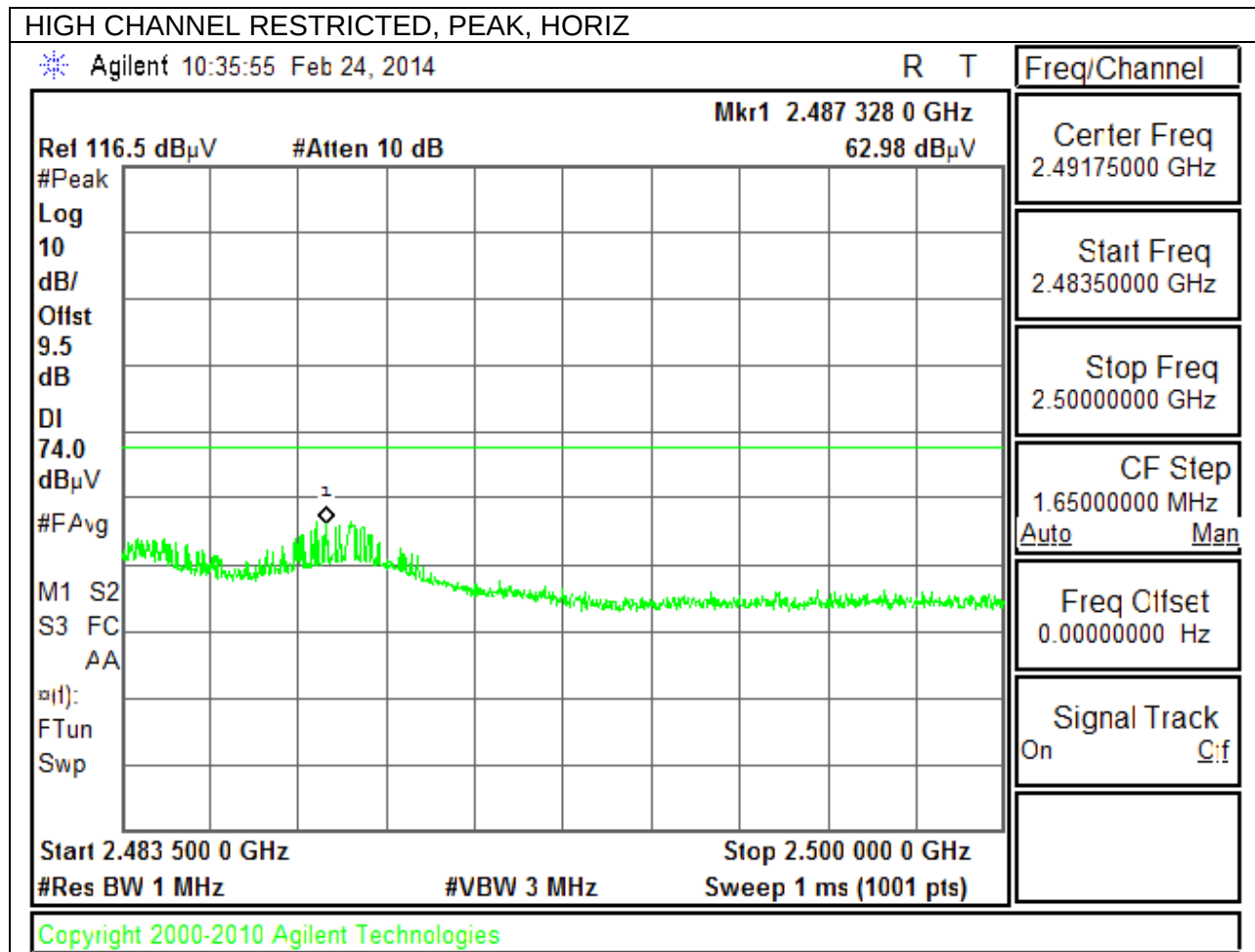


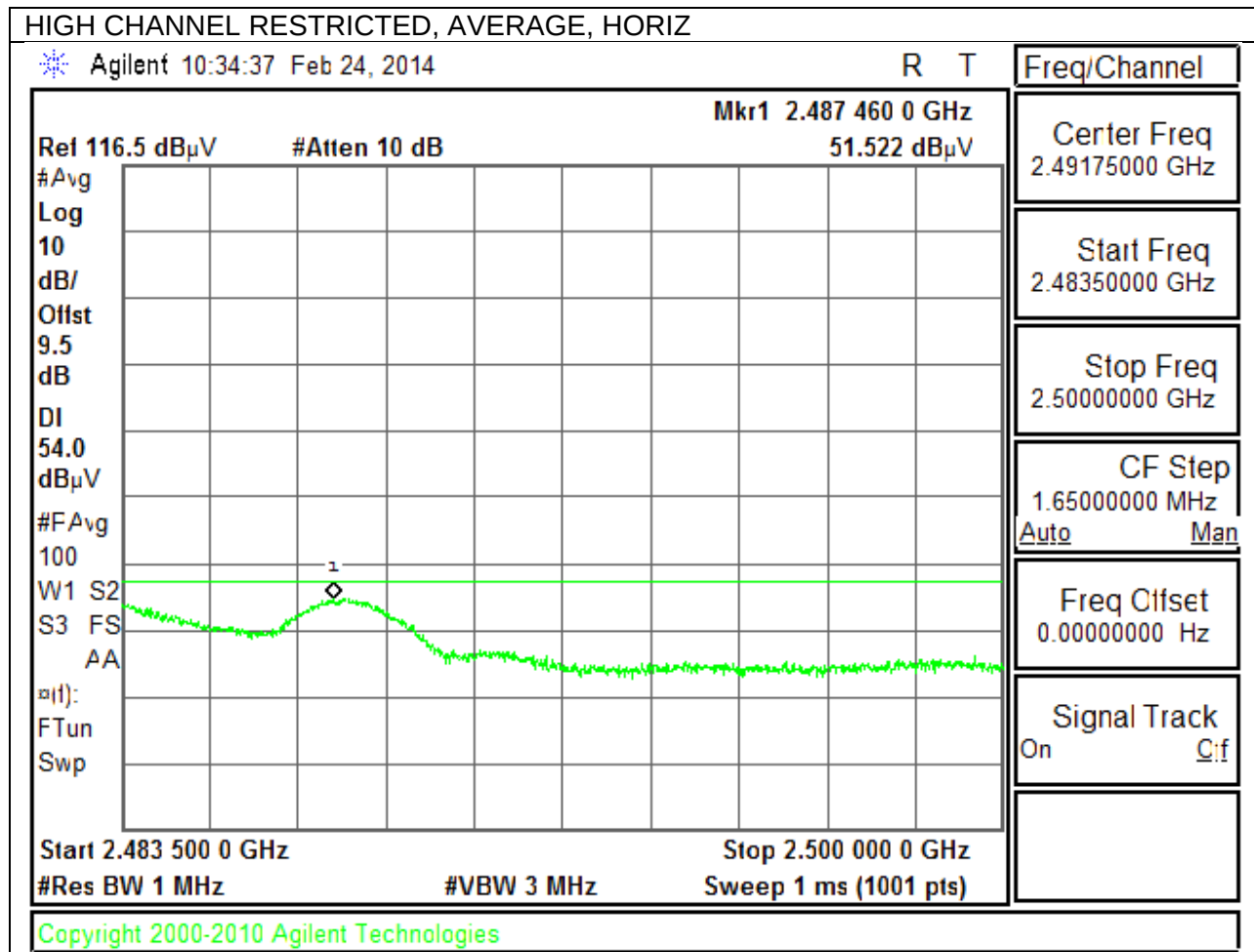


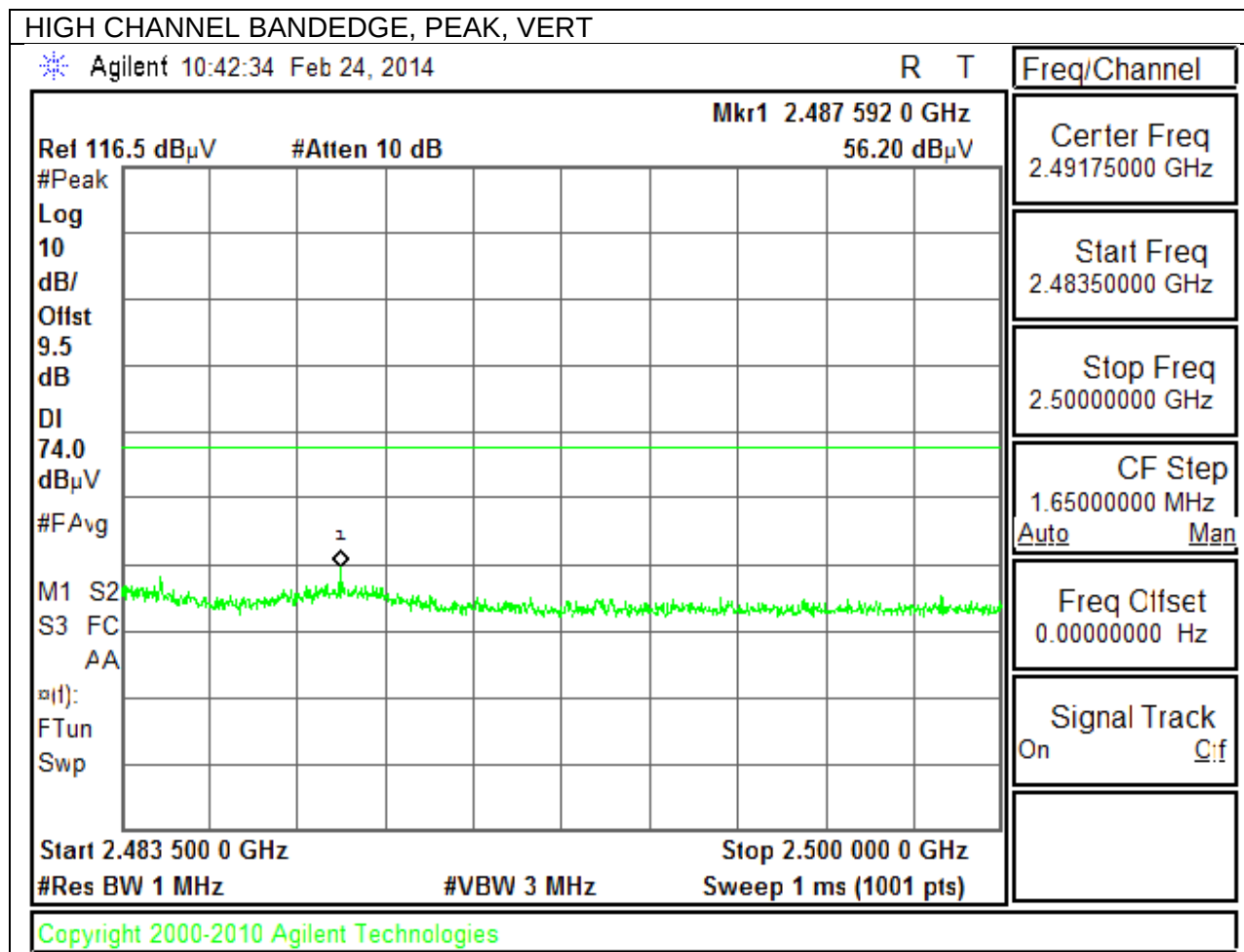


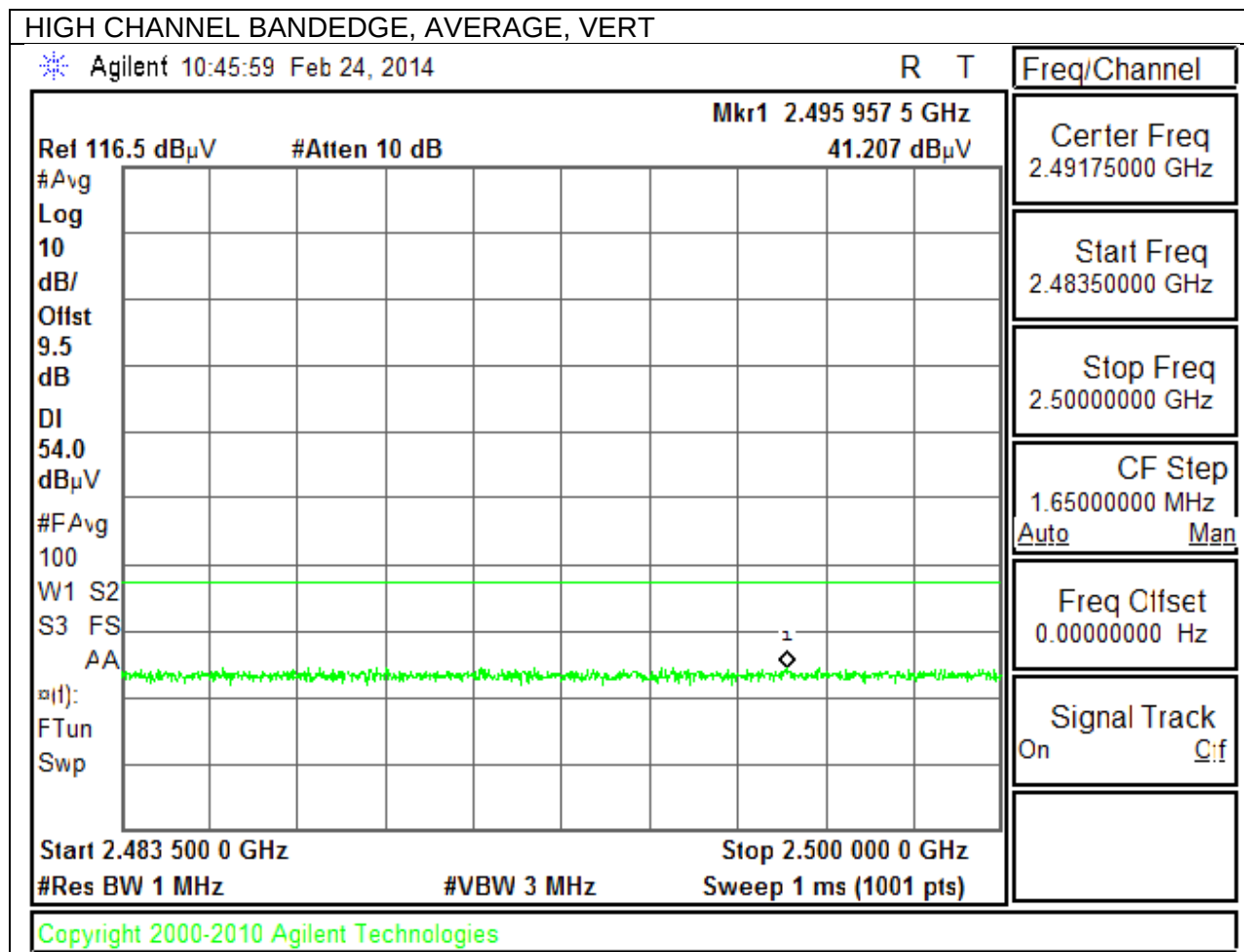


AUTHORIZED BANDEDGE (HIGH CHANNEL)



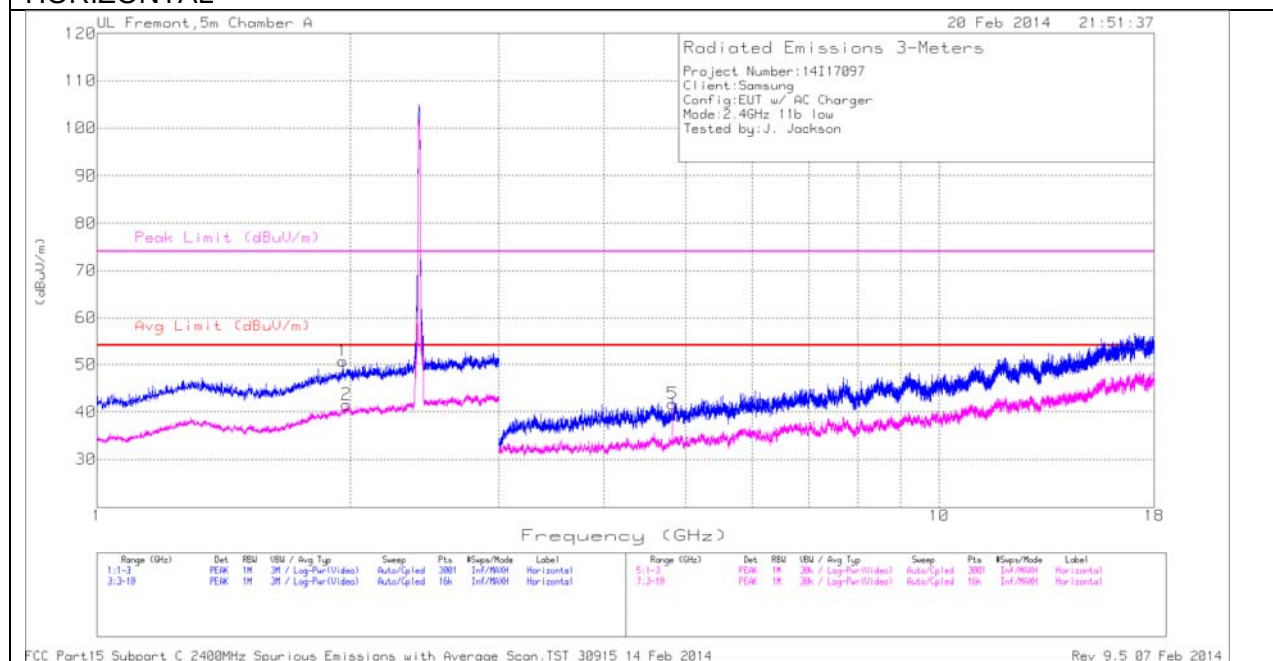






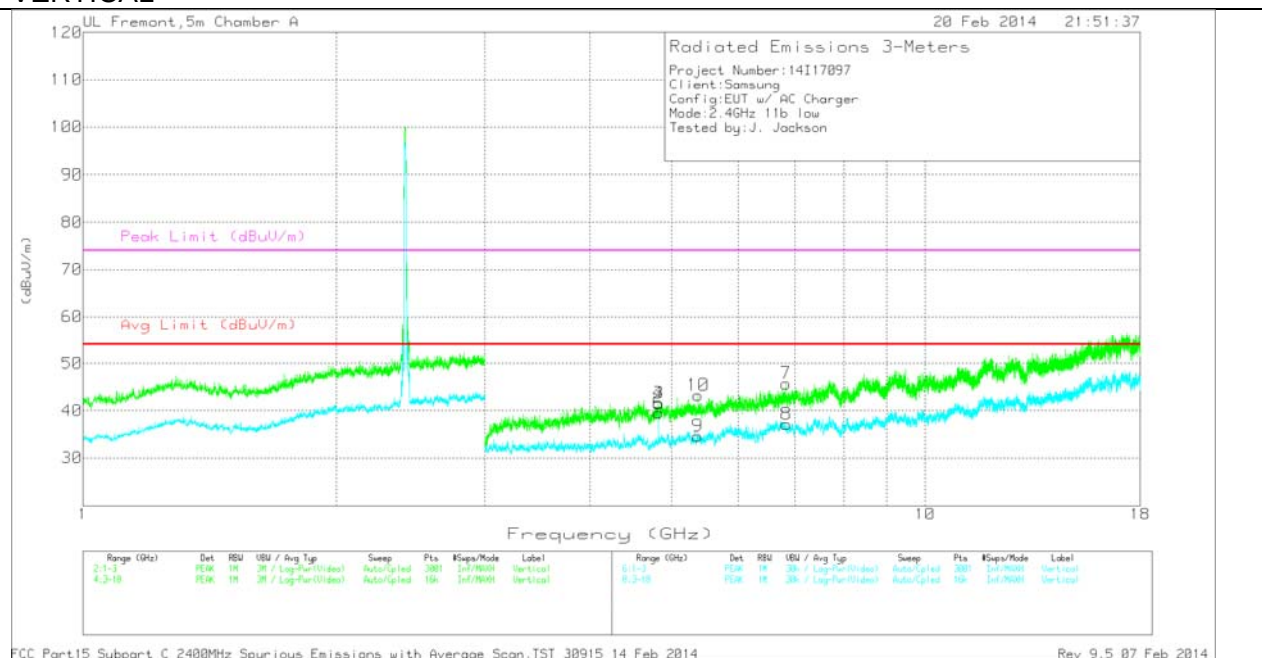
HARMONICS AND SPURIOUS EMISSIONS

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.

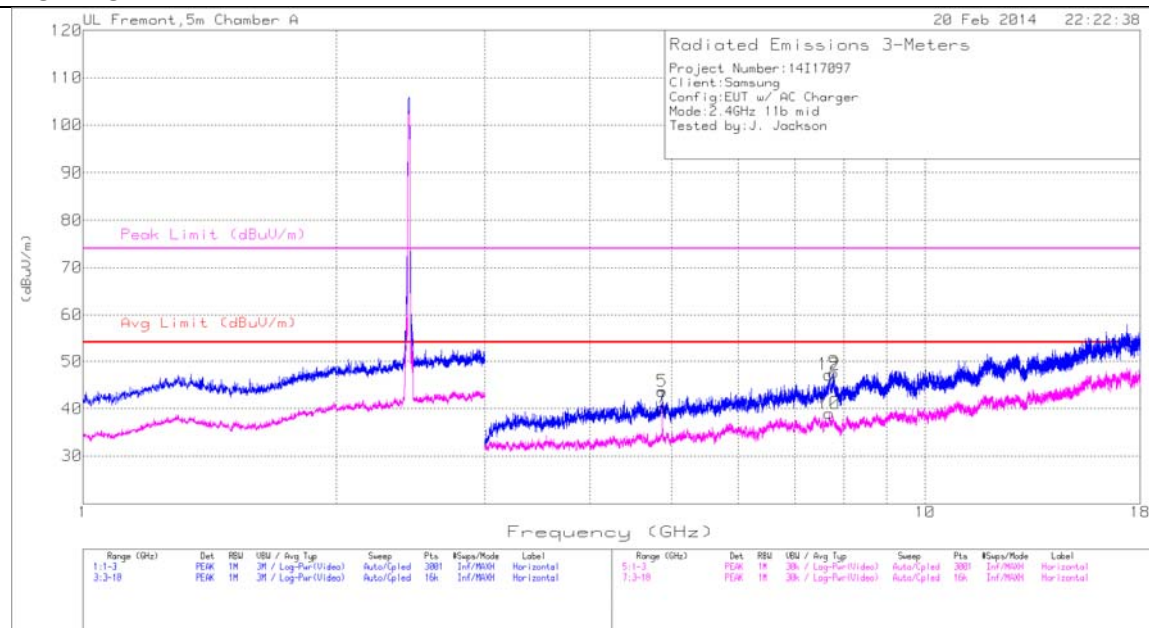
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.824	36.95	PK	34	-29.4	41.55	54	-12.45	74	-32.45	0-360	100	V
4	* 4.824	36.95	PK	34	-29.4	41.55	54	-12.45	74	-32.45	0-360	100	V
10	* 5.374	38.32	PK	34.6	-29.7	43.22	54	-10.78	74	-30.78	0-360	200	V
5	* 4.824	37.09	Avg	34	-29.4	41.69	54	-12.31	-	-	0-360	200	H
6	* 4.824	34.9	Avg	34	-29.4	39.5	54	-14.5	-	-	0-360	101	V
9	* 5.371	29.7	Avg	34.6	-29.7	34.6	54	-19.4	-	-	0-360	200	V
1	1.959	44.21	PK	31.5	-25	50.71	-	-	-	-	0-360	200	H
2	1.979	34.71	Avg	31.5	-24.7	41.51	-	-	-	-	0-360	100	H
7	6.834	37.7	PK	35.6	-27.6	45.7	-	-	-	-	0-360	200	V
8	6.843	29.02	Avg	35.6	-27.5	37.12	-	-	-	-	0-360	101	V

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

PK - Peak detector

MID CHANNEL HORIZONTAL

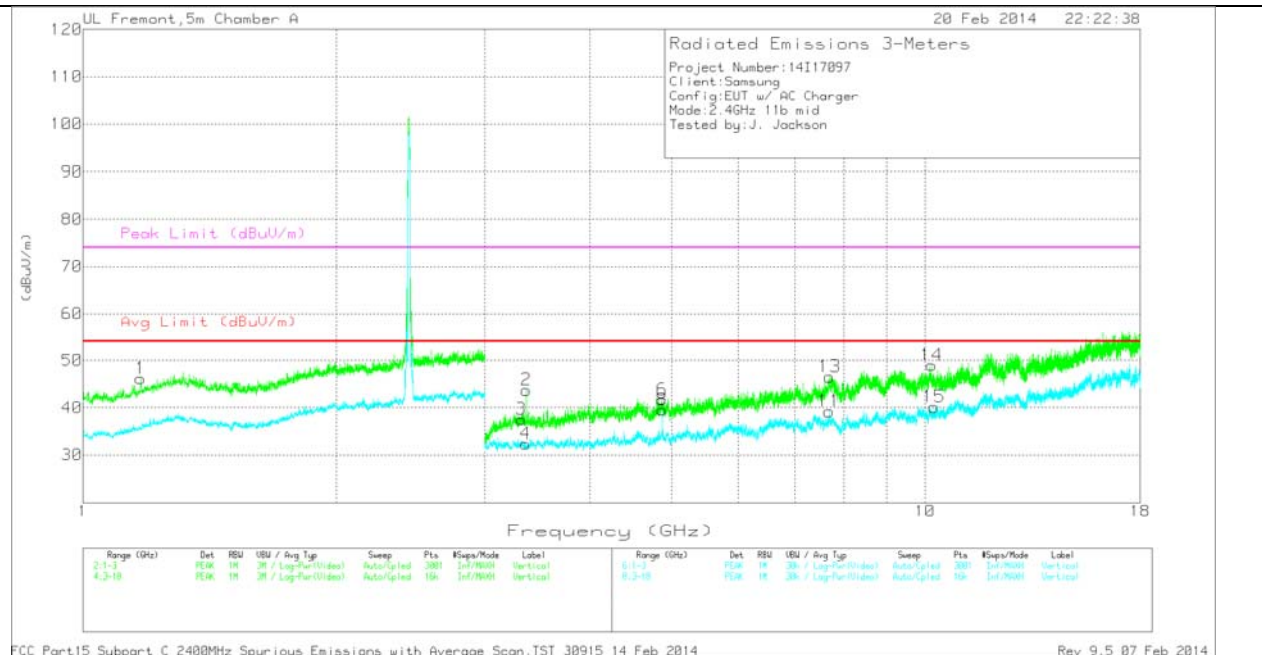


FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 14 Feb 2014

Rev 9.5 07 Feb 2014

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.

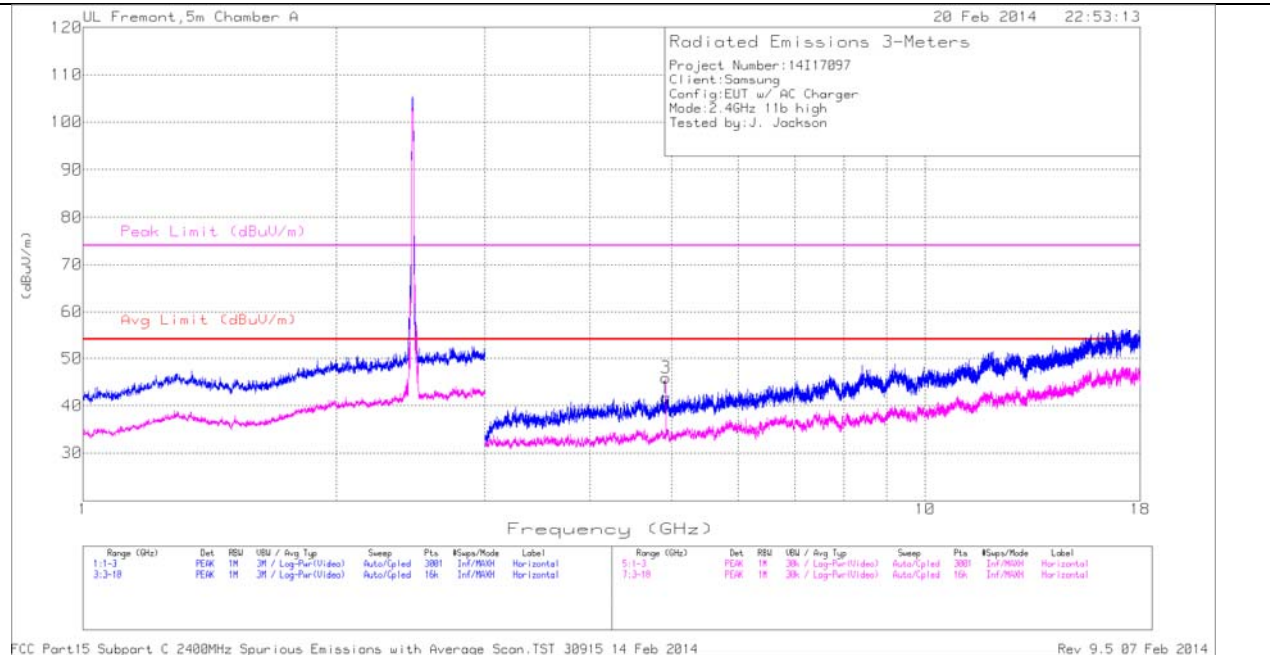
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.171	44.94	PK	28.6	-27.4	46.14	54	-7.86	74	-27.86	0-360	201	V
5	* 4.874	37.92	PK	34	-28.3	43.62	54	-10.38	74	-30.38	0-360	200	H
12	* 7.691	36.09	PK	35.8	-24.7	47.19	54	-6.81	74	-26.81	0-360	100	H
6	* 4.874	35.95	PK	34	-28.3	41.65	54	-12.35	74	-32.35	0-360	101	V
13	* 7.698	35.52	PK	35.8	-24.8	46.52	54	-7.48	74	-27.48	0-360	200	V
7	* 4.874	34.47	Avg	34	-28.3	40.17	54	-13.83	-	-	0-360	101	H
10	* 7.693	27.7	Avg	35.8	-24.5	39	54	-15	-	-	0-360	101	H
4	* 3.356	30.35	Avg	32.9	-30.9	32.35	54	-21.65	-	-	0-360	100	V
8	* 4.874	33.84	Avg	34	-28.3	39.54	54	-14.46	-	-	0-360	100	V
11	* 7.692	28.01	Avg	35.8	-24.6	39.21	54	-14.79	-	-	0-360	200	V
3	3.313	35.34	PK	32.9	-30.7	37.54	-	-	-	-	0-360	200	V
2	3.359	41.62	PK	32.9	-30.8	43.72	-	-	-	-	0-360	101	V
9	7.788	37.43	PK	35.8	-25.6	47.63	-	-	-	-	0-360	200	H
14	10.174	35.13	PK	37	-23.2	48.93	-	-	-	-	0-360	200	V
15	10.243	25.74	Avg	37.1	-22.7	40.14	-	-	-	-	0-360	200	V

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

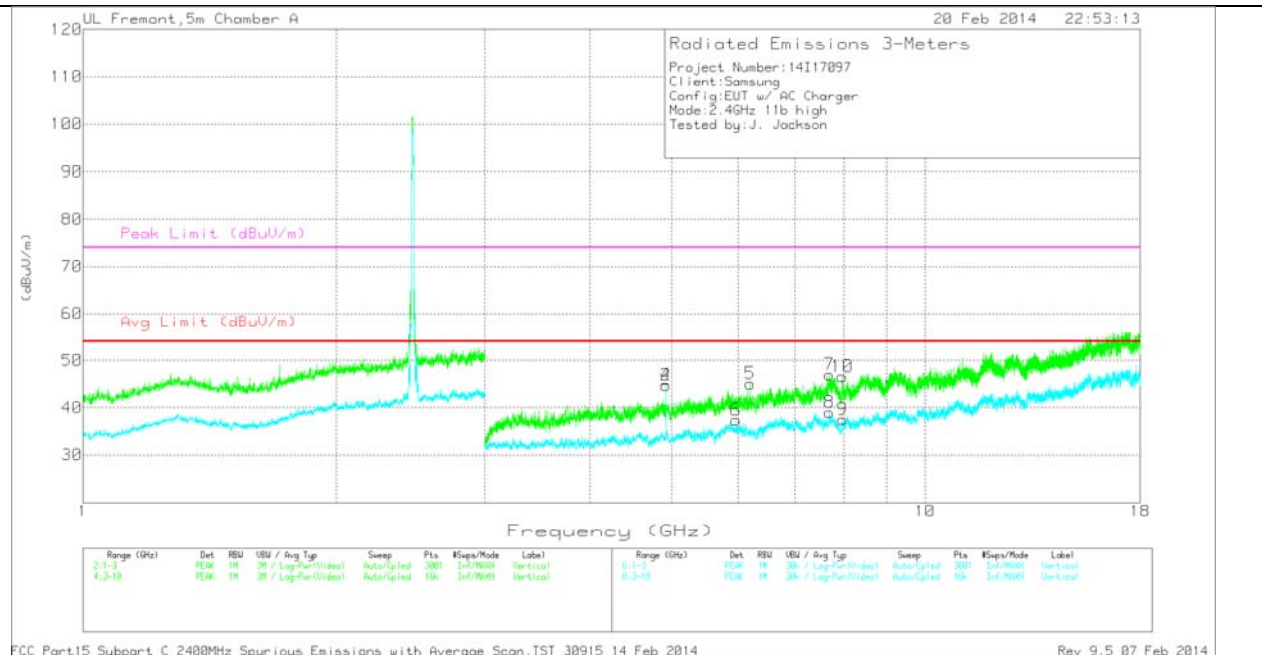
PK - Peak detector

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.

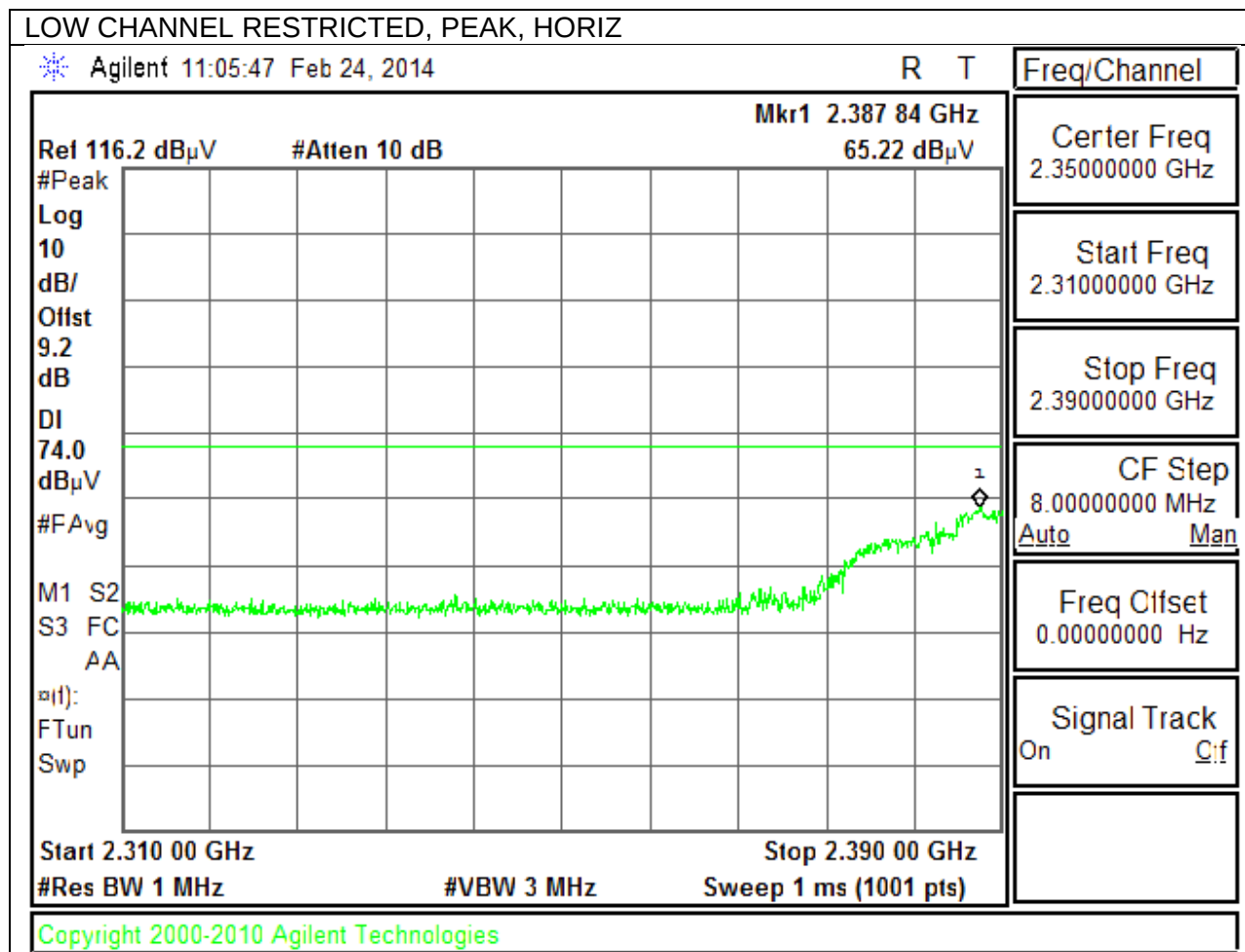
HIGH CHANNEL DATA

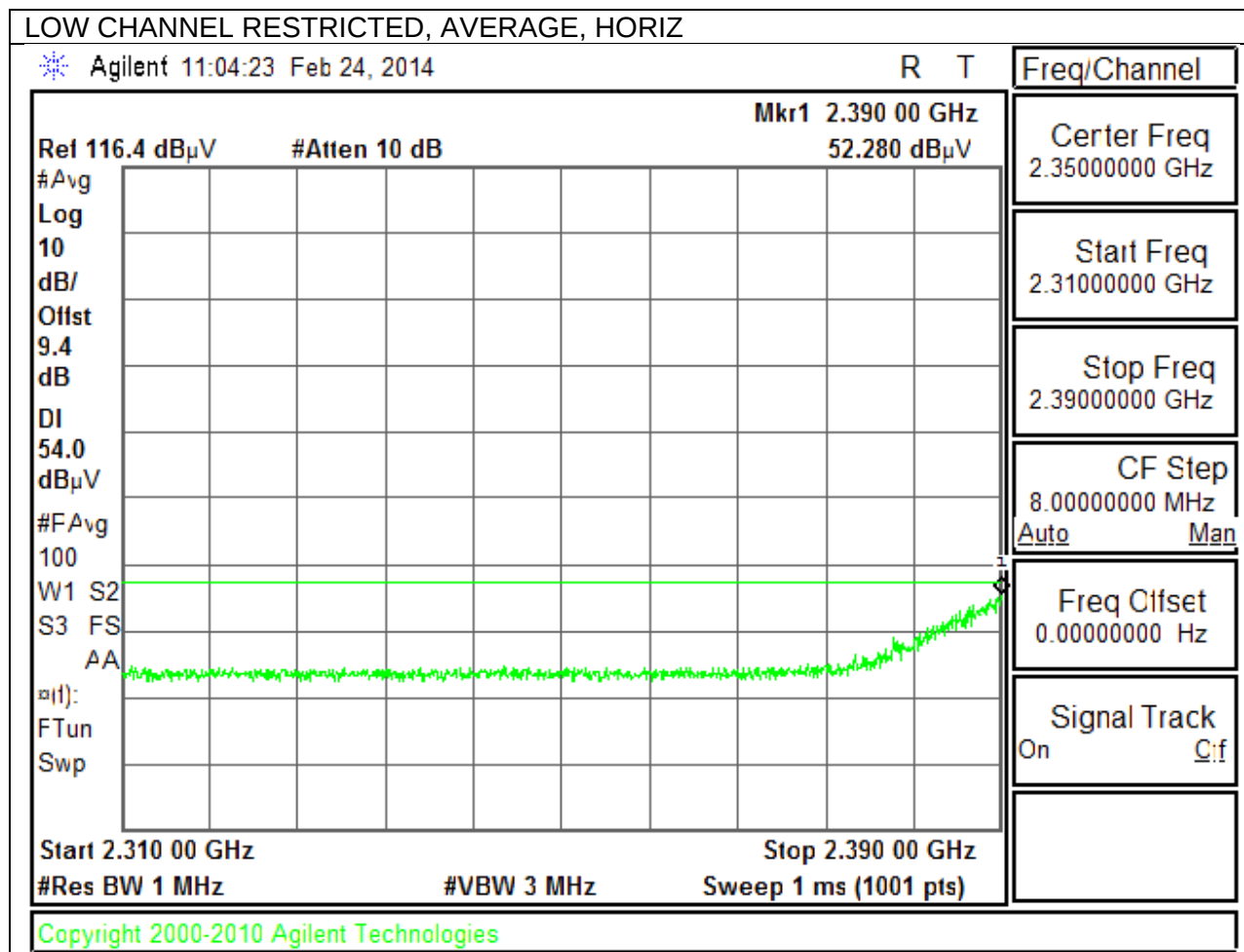
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.924	36.63	PK	34	-29	41.63	54	-12.37	74	-32.37	0-360	200	H
2	* 4.924	39.73	PK	34	-29	44.73	54	-9.27	74	-29.27	0-360	100	V
7	* 7.694	35.6	PK	35.8	-24.4	47	54	-7	74	-27	0-360	201	V
3	* 4.924	40.9	Avg	34	-29	45.9	54	-8.1	-	-	0-360	101	H
4	* 4.924	39.79	Avg	34	-29	44.79	54	-9.21	-	-	0-360	101	V
8	* 7.695	27.69	Avg	35.8	-24.5	38.99	54	-15.01	-	-	0-360	101	V
6	5.961	30.98	Avg	35.2	-28.8	37.38	-	-	-	-	0-360	101	V
5	6.199	37.66	PK	35.3	-27.9	45.06	-	-	-	-	0-360	201	V
10	7.972	36.37	PK	35.7	-25.5	46.57	-	-	-	-	0-360	201	V
9	7.979	27.23	Avg	35.7	-25.4	37.53	-	-	-	-	0-360	101	V

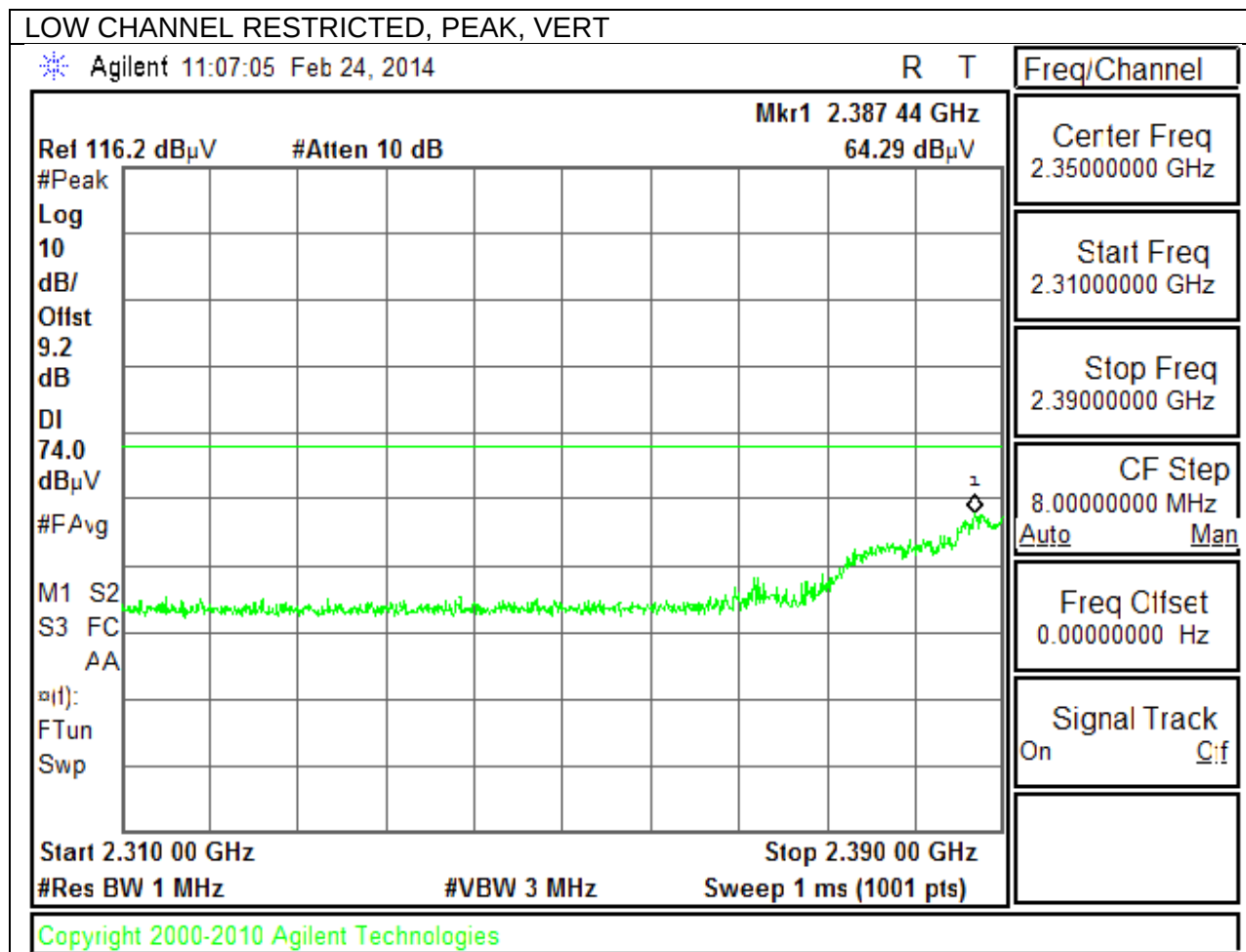
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

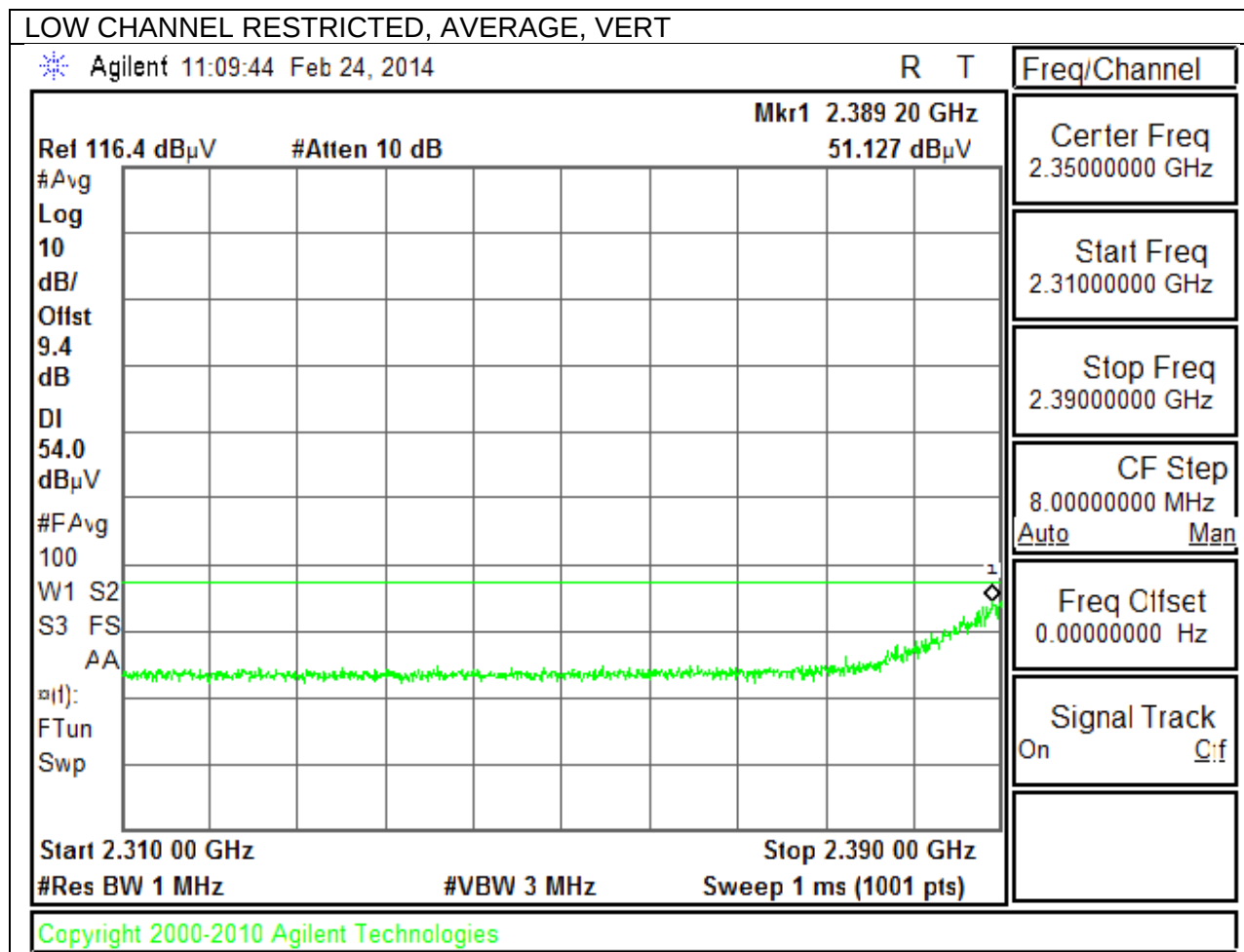
PK - Peak detector

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

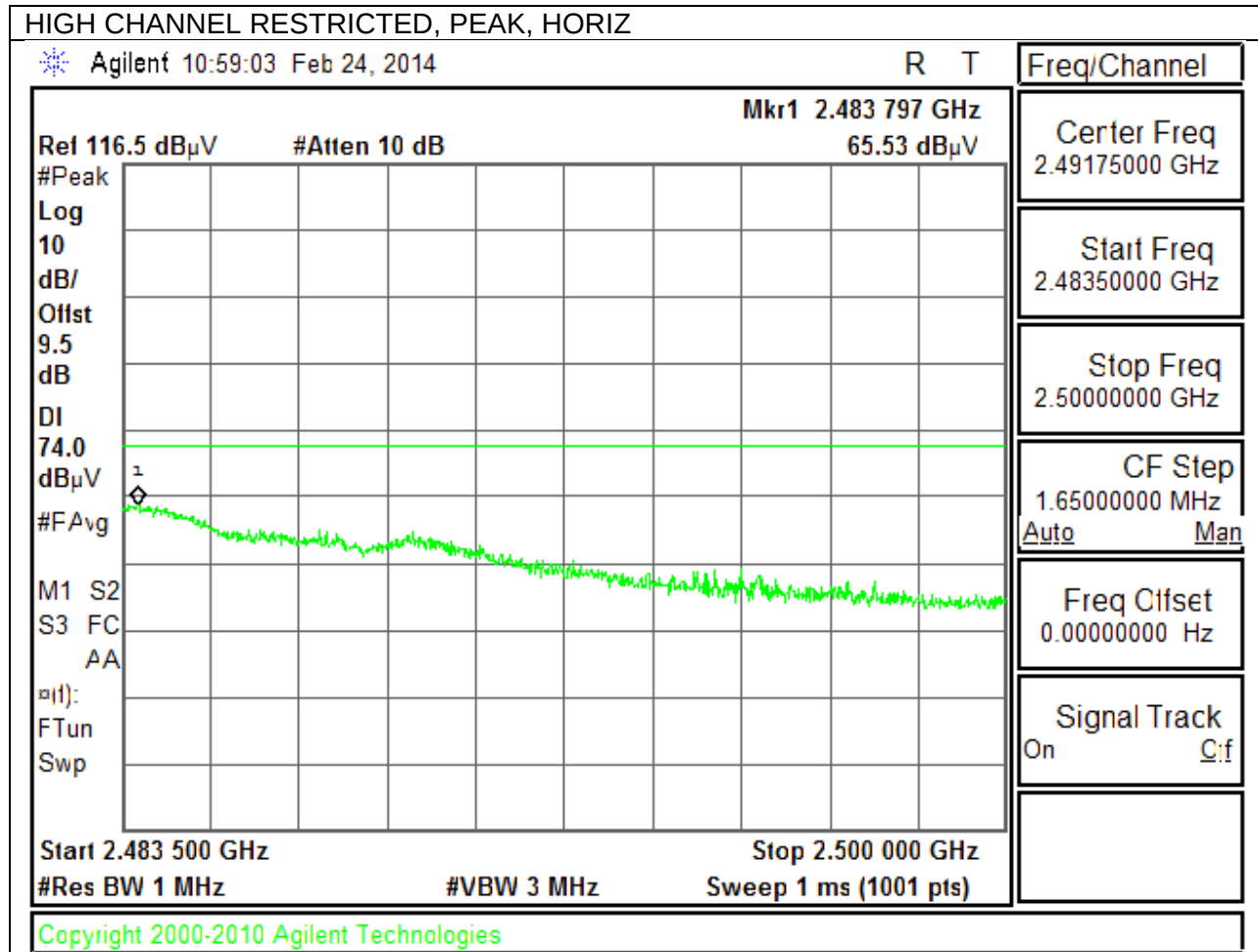


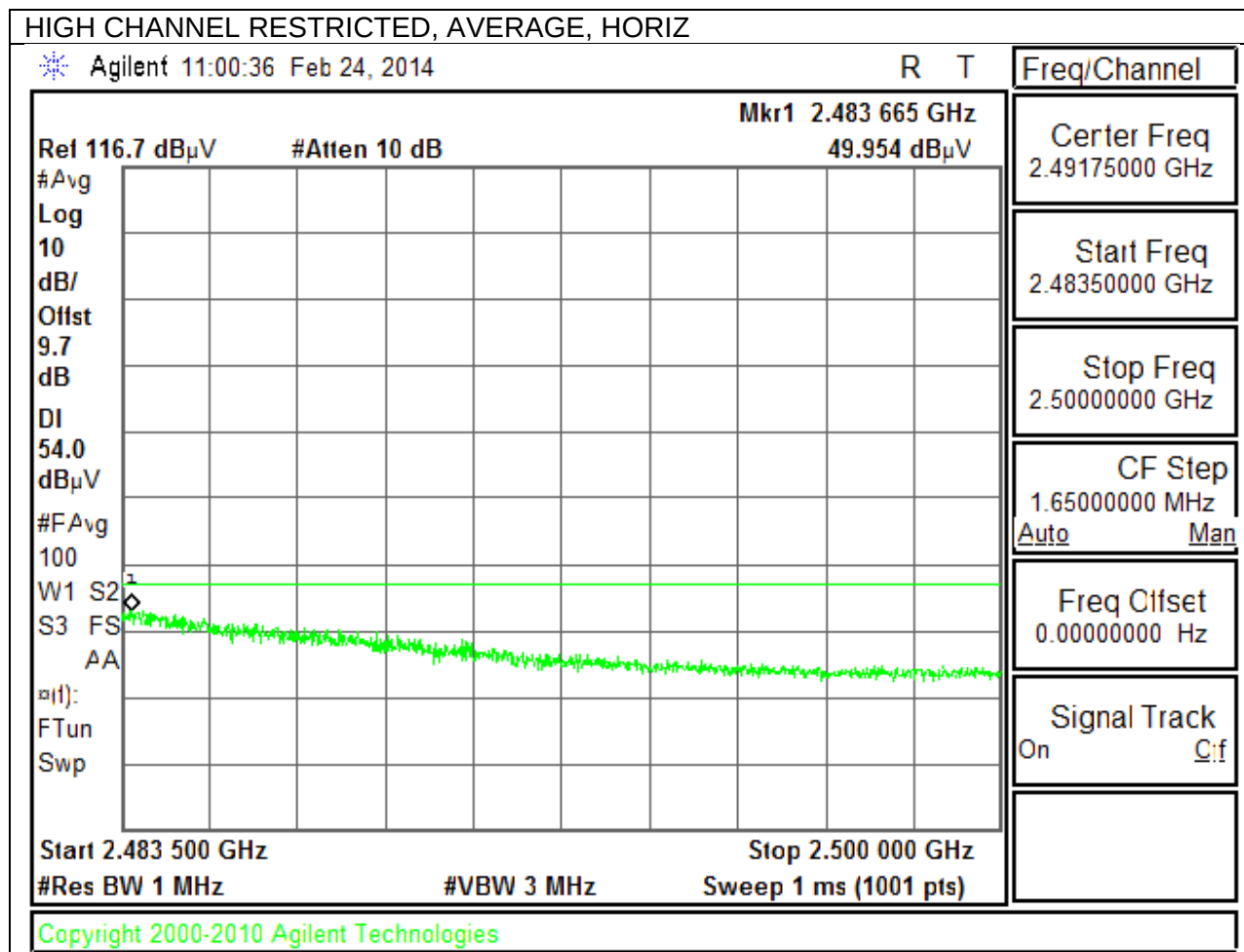


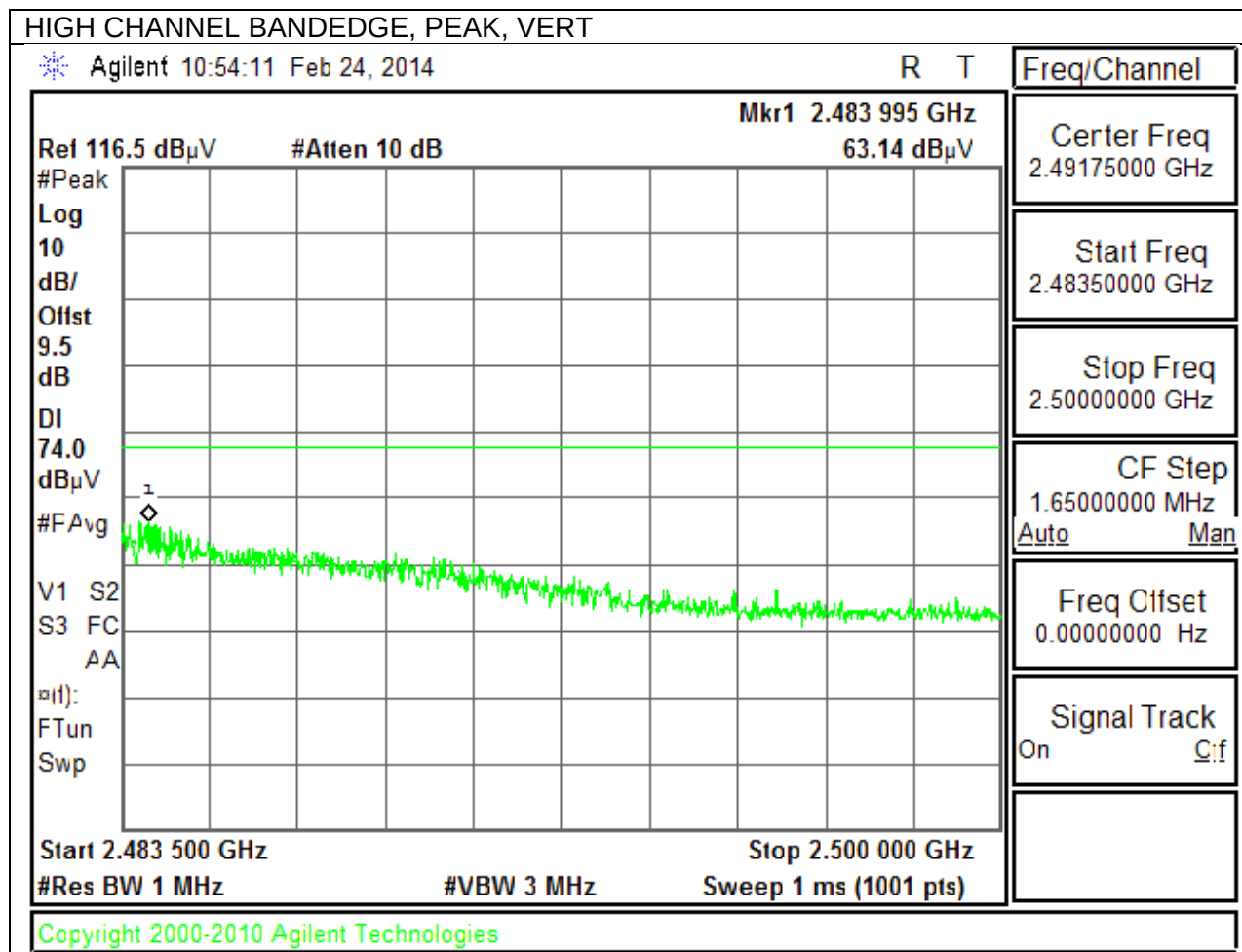


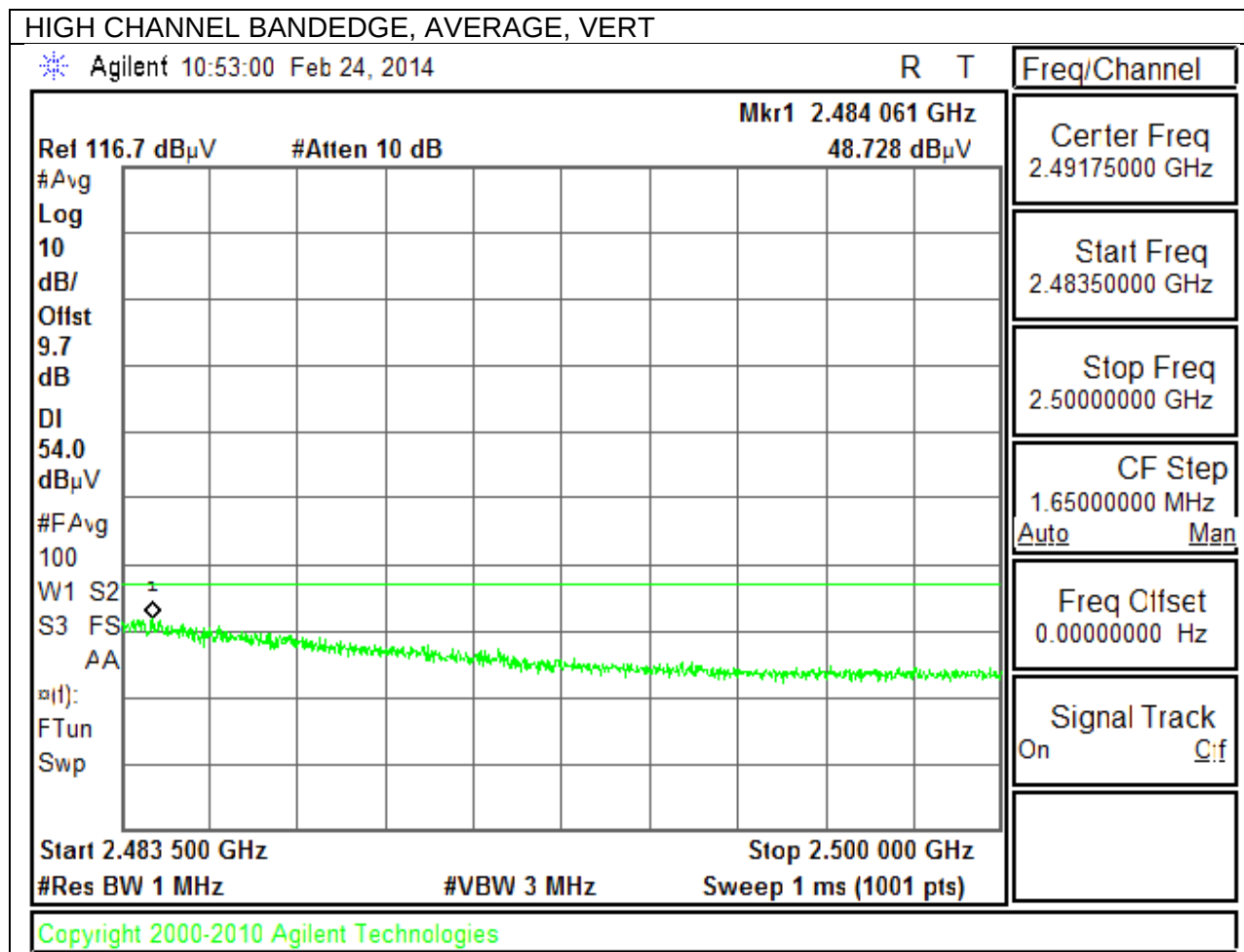


AUTHORIZED BANDEDGE (HIGH CHANNEL)

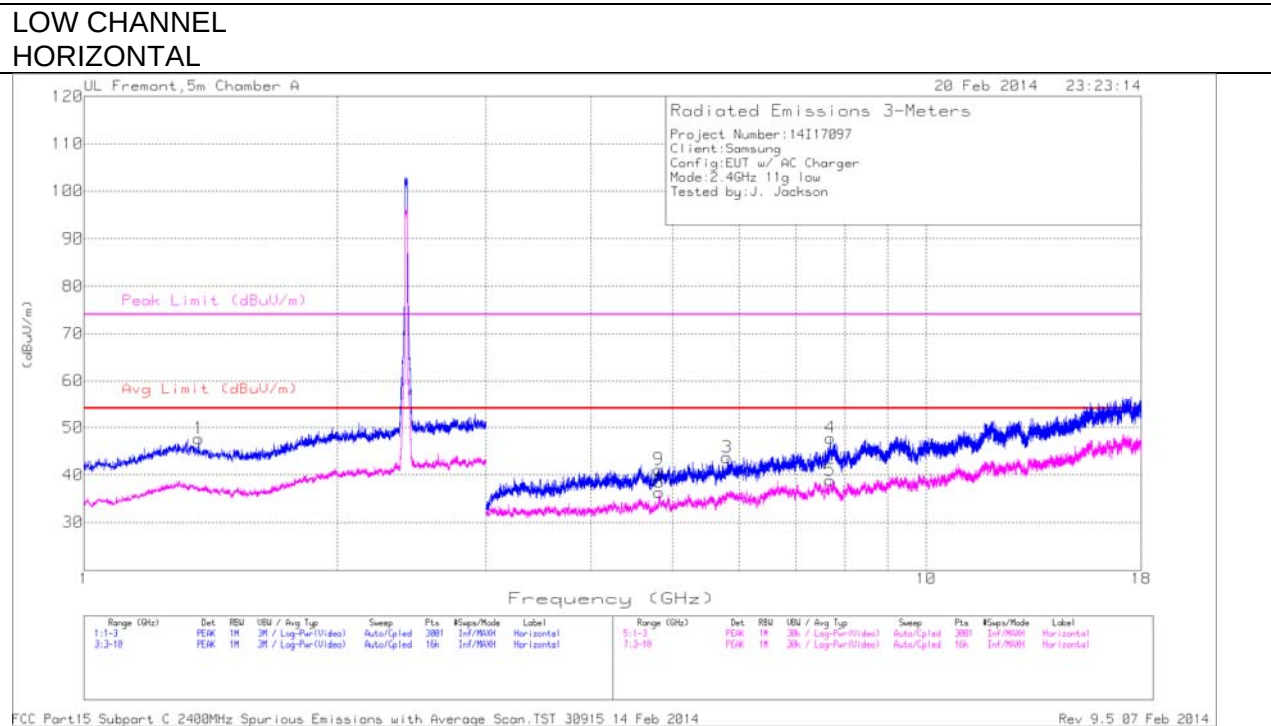






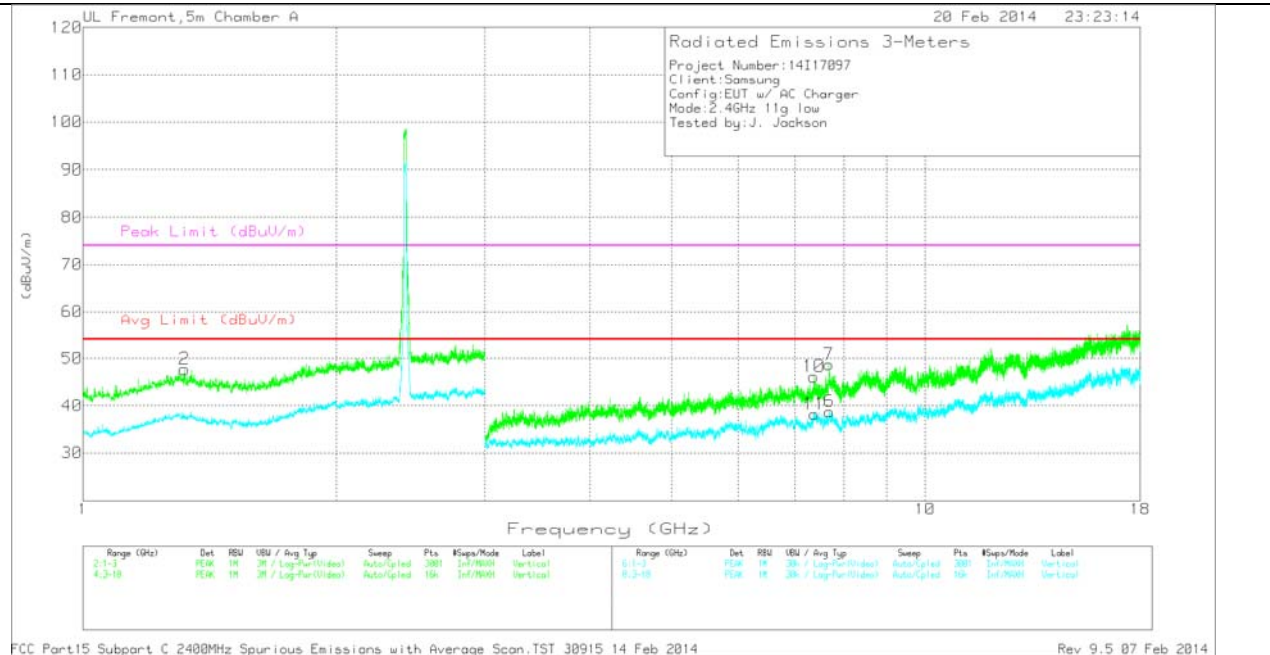


HARMONICS AND SPURIOUS EMISSIONS



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 T119 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.369	44.83	PK	29.5	-26.7	47.63	54	-6.37	74	-26.37	0-360	200	H
2	* 1.32	44.39	PK	30	-26.7	47.69	54	-6.31	74	-26.31	0-360	200	V
4	* 7.695	36.49	PK	35.8	-24.5	47.79	54	-6.21	74	-26.21	0-360	100	H
9	* 4.814	36.73	PK	34	-29.6	41.13	54	-12.87	74	-32.87	0-360	200	H
7	* 7.687	37.87	PK	35.8	-25	48.67	54	-5.33	74	-25.33	0-360	200	V
10	* 7.374	35.02	PK	35.6	-24.5	46.12	54	-7.88	74	-27.88	0-360	101	V
5	* 7.693	27.53	Avg	35.8	-24.5	38.83	54	-15.17	-	-	0-360	200	H
8	* 4.818	31.82	Avg	34	-29.5	36.32	54	-17.68	-	-	0-360	200	H
6	* 7.695	27.45	Avg	35.8	-24.5	38.75	54	-15.25	-	-	0-360	200	V
11	* 7.387	26.79	Avg	35.7	-24.3	38.19	54	-15.81	-	-	0-360	100	V
3	5.802	37.69	PK	34.9	-28.9	43.69	-	-	-	-	0-360	100	H

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

PK - Peak detector

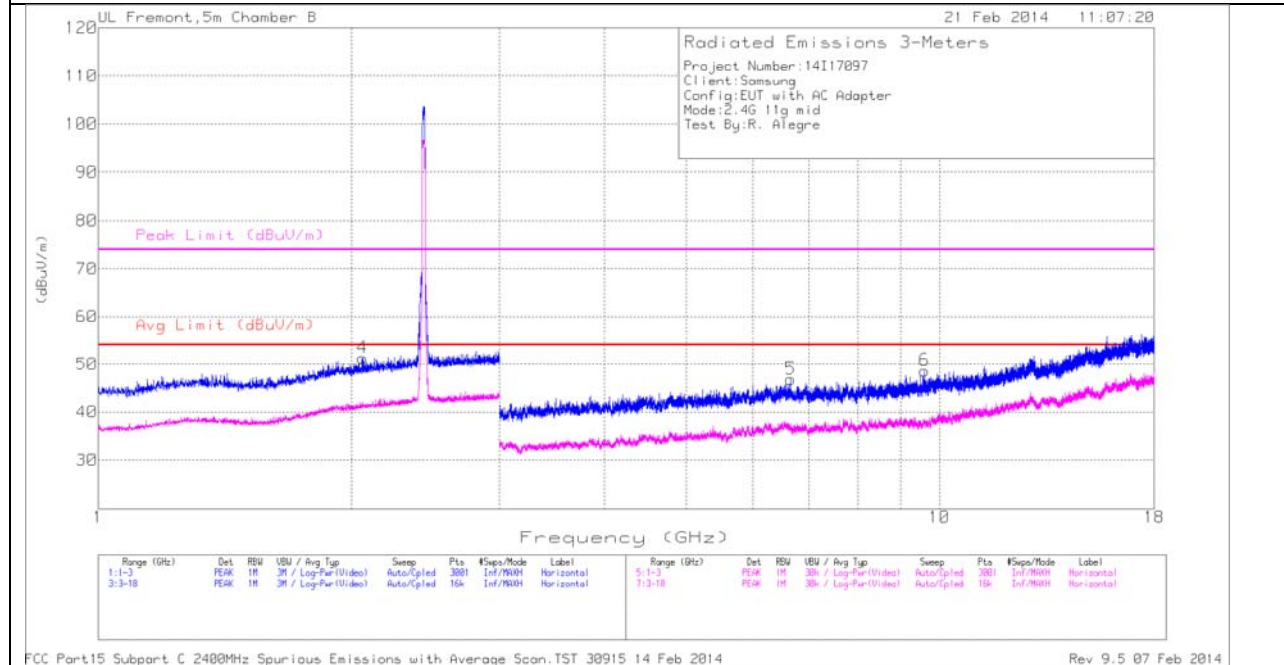
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.695	36.29	PK2	35.8	-24.6	47.49	54	-6.51	74	-26.51	167	103	V
* 7.691	26.55	MAv1	35.8	-24.7	37.65	54	-16.35	-	-	167	103	V

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

PK2 - KDB558074 Method: Maximum Peak

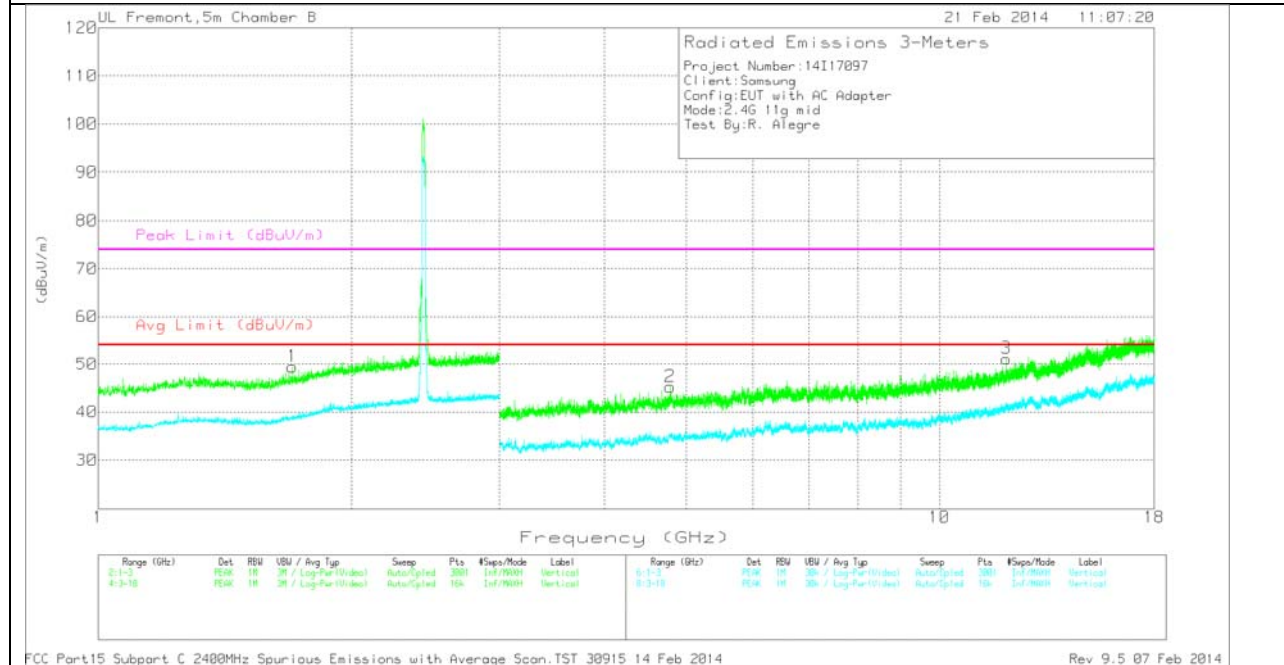
MAv1 - KDB558074 Option 1 Maximum RMS Average

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.

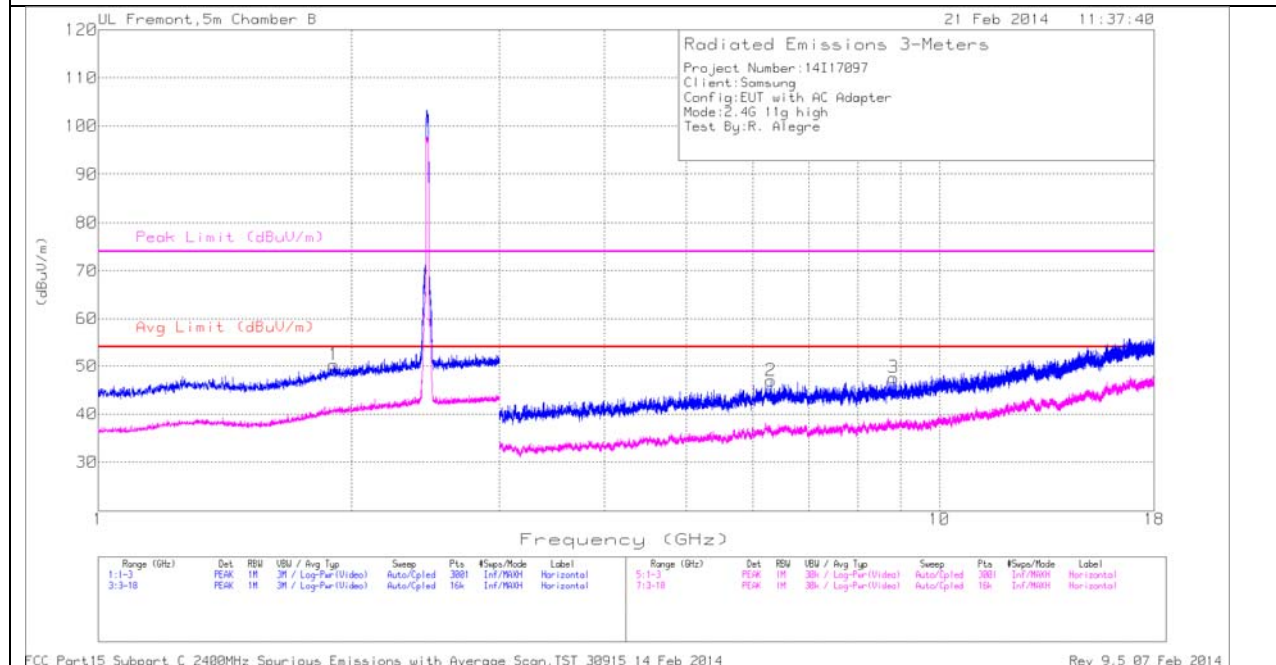
MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.702	44.23	PK	29	-23.8	49.43	54	-4.57	74	-24.57	0-360	99	V
2	* 4.788	39.96	PK	34.2	-28.9	45.26	54	-8.74	74	-28.74	0-360	99	V
3	* 12.011	34.62	PK	38.8	-22.3	51.12	54	-2.88	74	-22.88	0-360	202	V
4	2.062	43.44	PK	31.3	-23.5	51.24	-	-	-	-	0-360	202	H
5	6.654	39.95	PK	35.6	-28.7	46.85	-	-	-	-	0-360	202	H
6	9.602	36.11	PK	36.7	-24.2	48.61	-	-	-	-	0-360	202	H

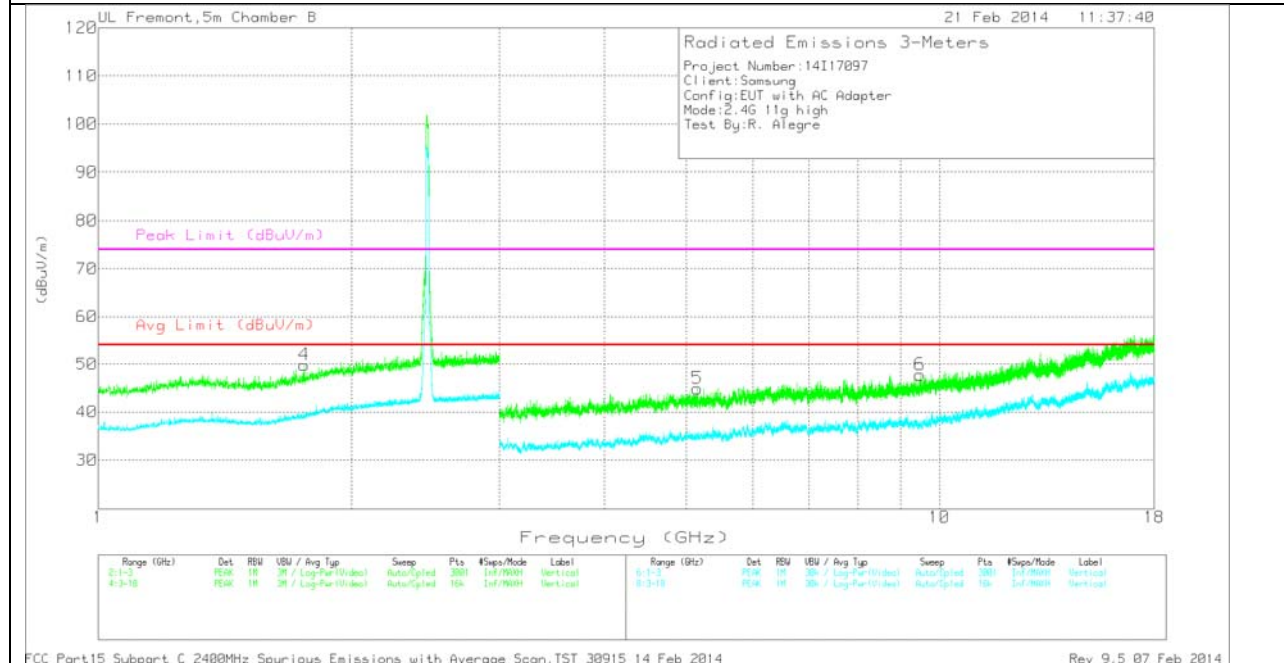
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

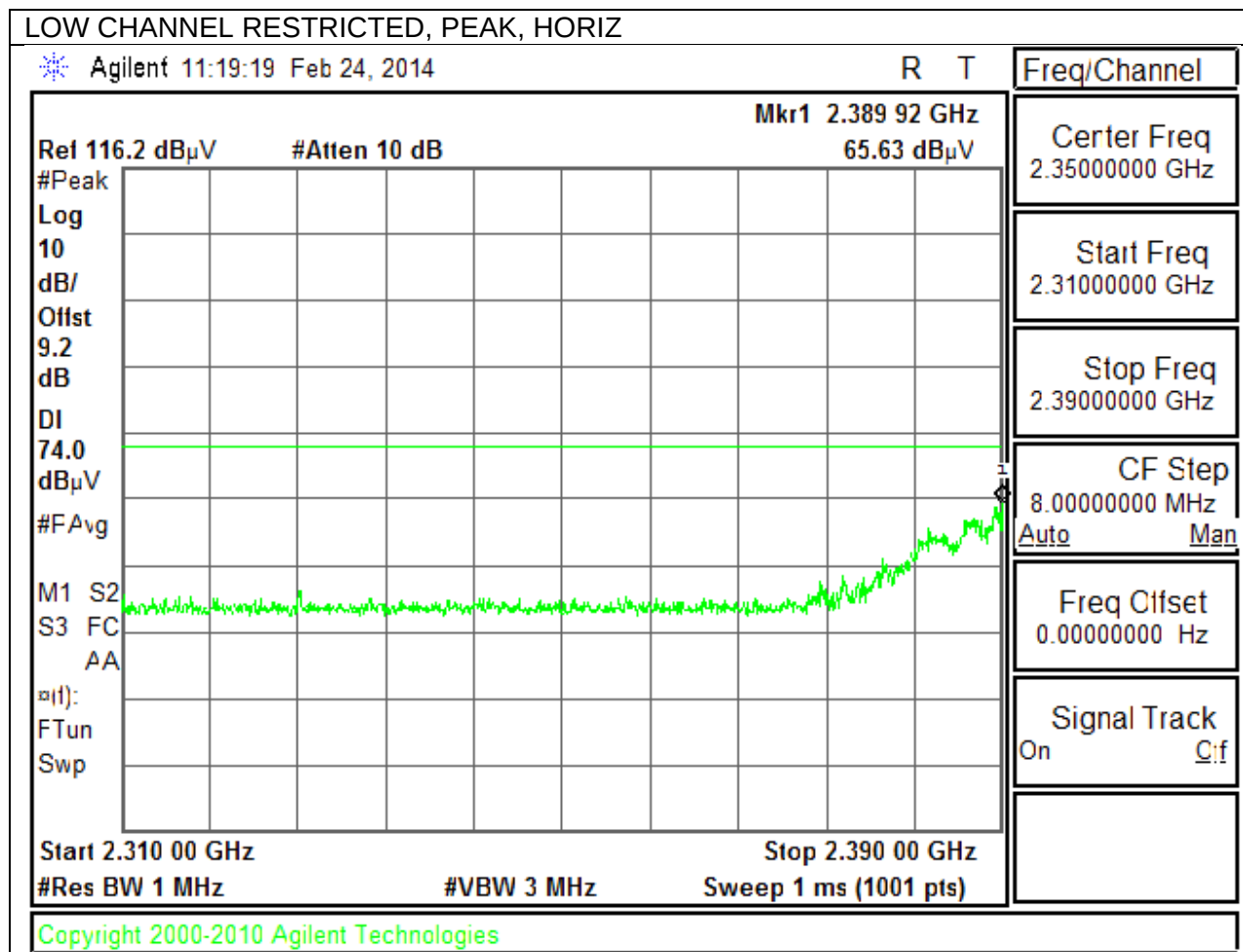
HIGH CHANNEL DATA

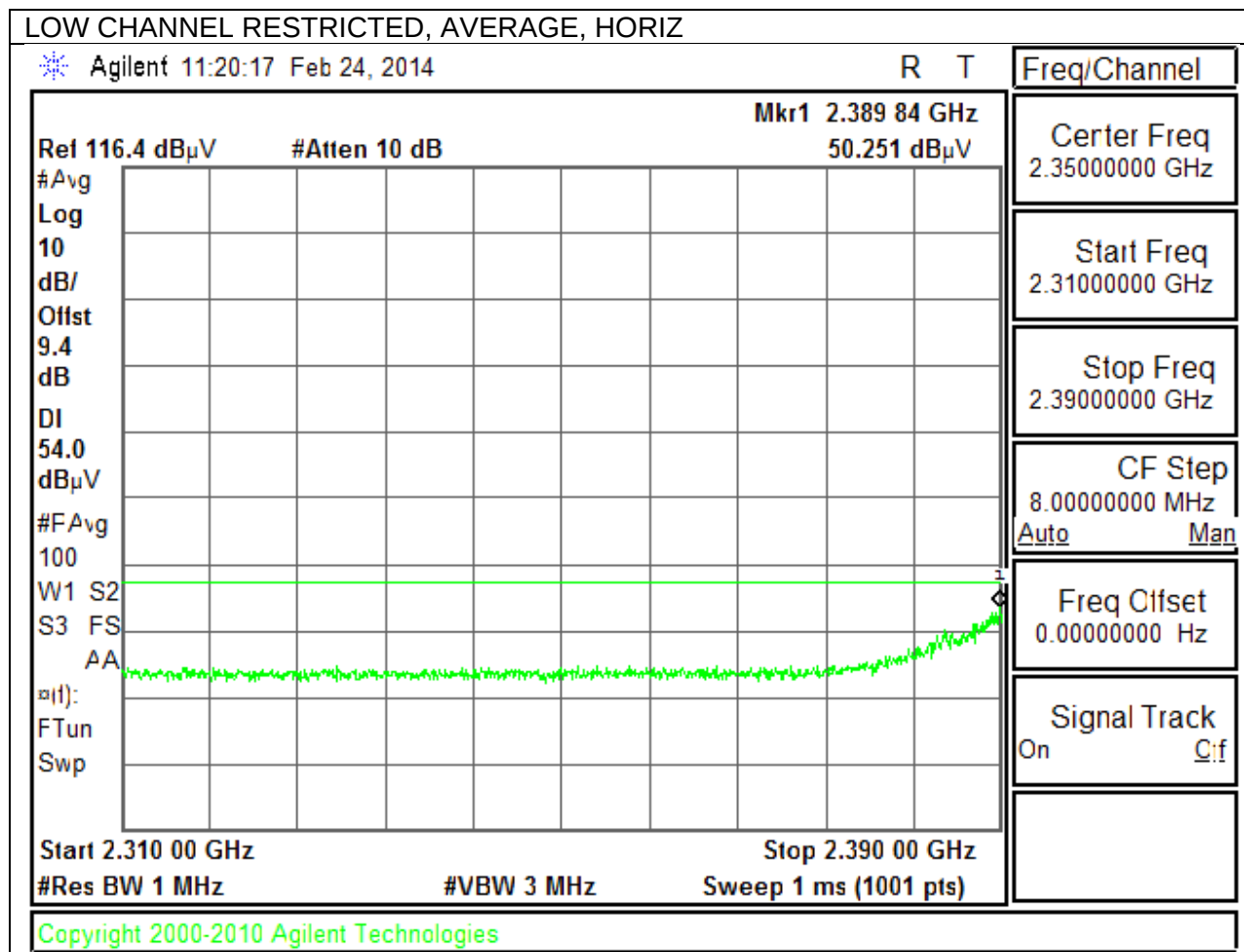
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 9.479	36.06	PK	36.6	-24.9	47.76	54	-6.24	74	-26.24	0-360	202	V
4	1.758	44.1	PK	29.5	-23.8	49.8	-	-	-	-	0-360	202	V
1	1.906	42.93	PK	30.9	-23.6	50.23	-	-	-	-	0-360	202	H
5	5.154	40.31	PK	34.3	-29.7	44.91	-	-	-	-	0-360	99	V
2	6.307	39.76	PK	35.6	-28.4	46.96	-	-	-	-	0-360	99	H
3	8.82	37.38	PK	36.1	-25.9	47.58	-	-	-	-	0-360	99	H

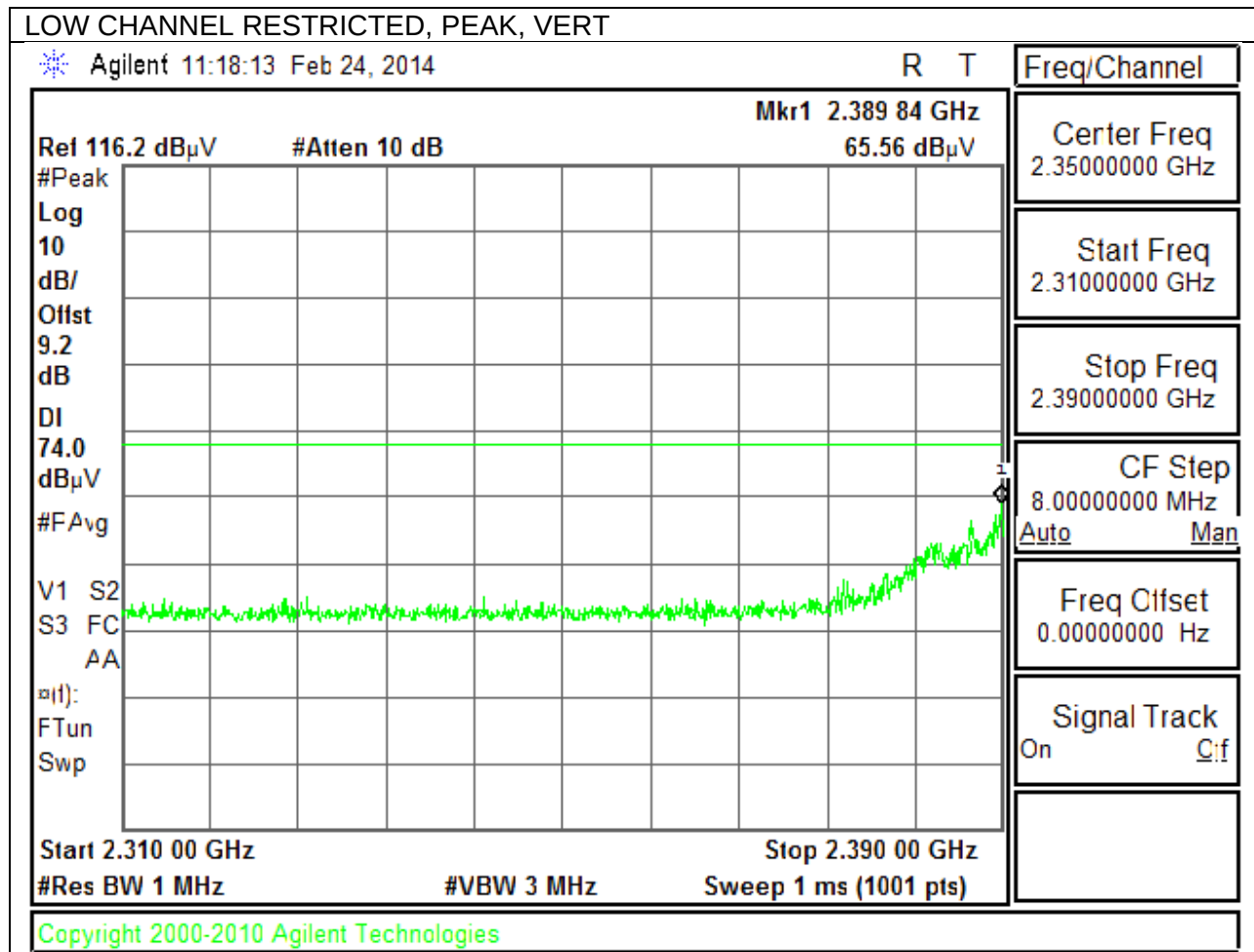
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

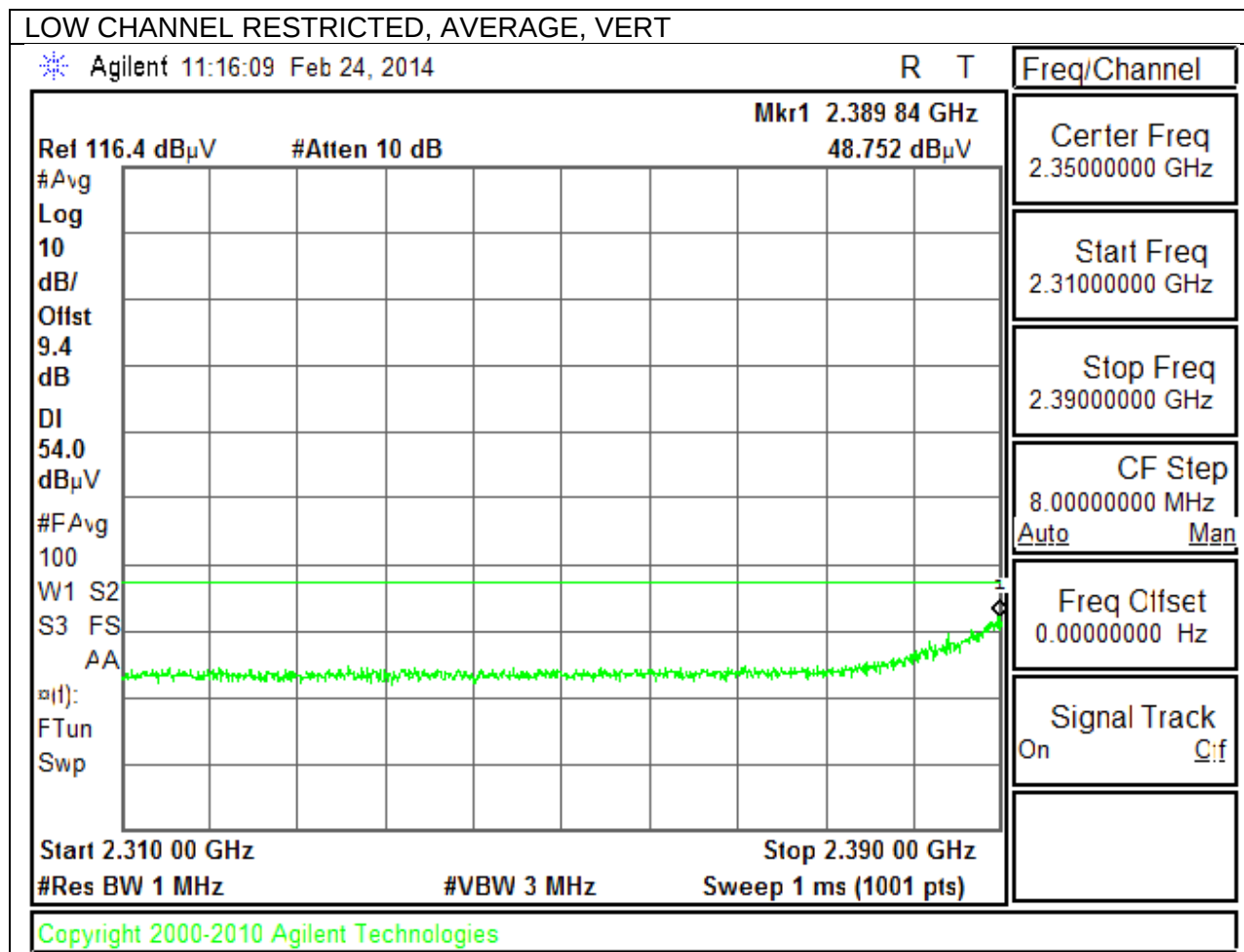
PK - Peak detector

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

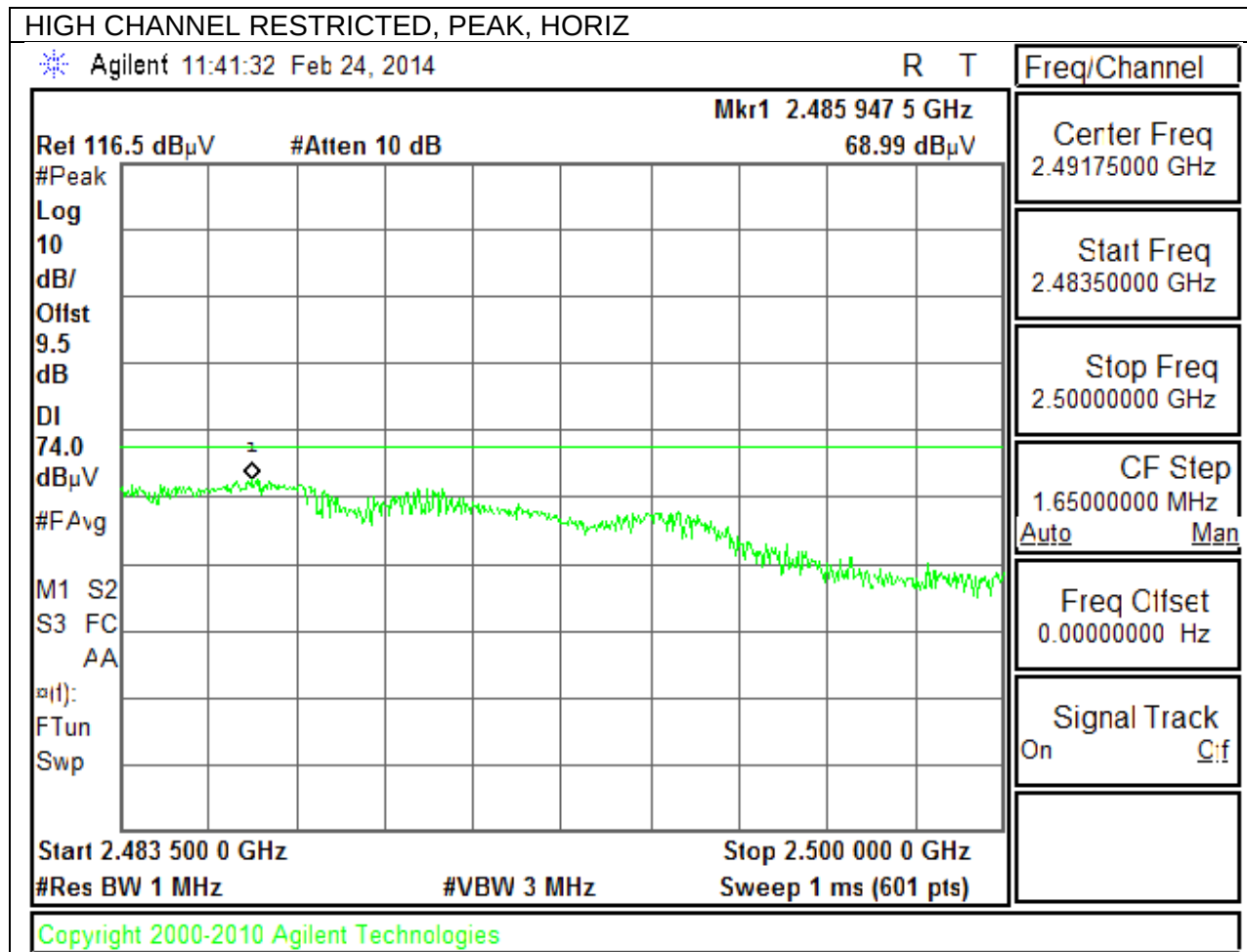


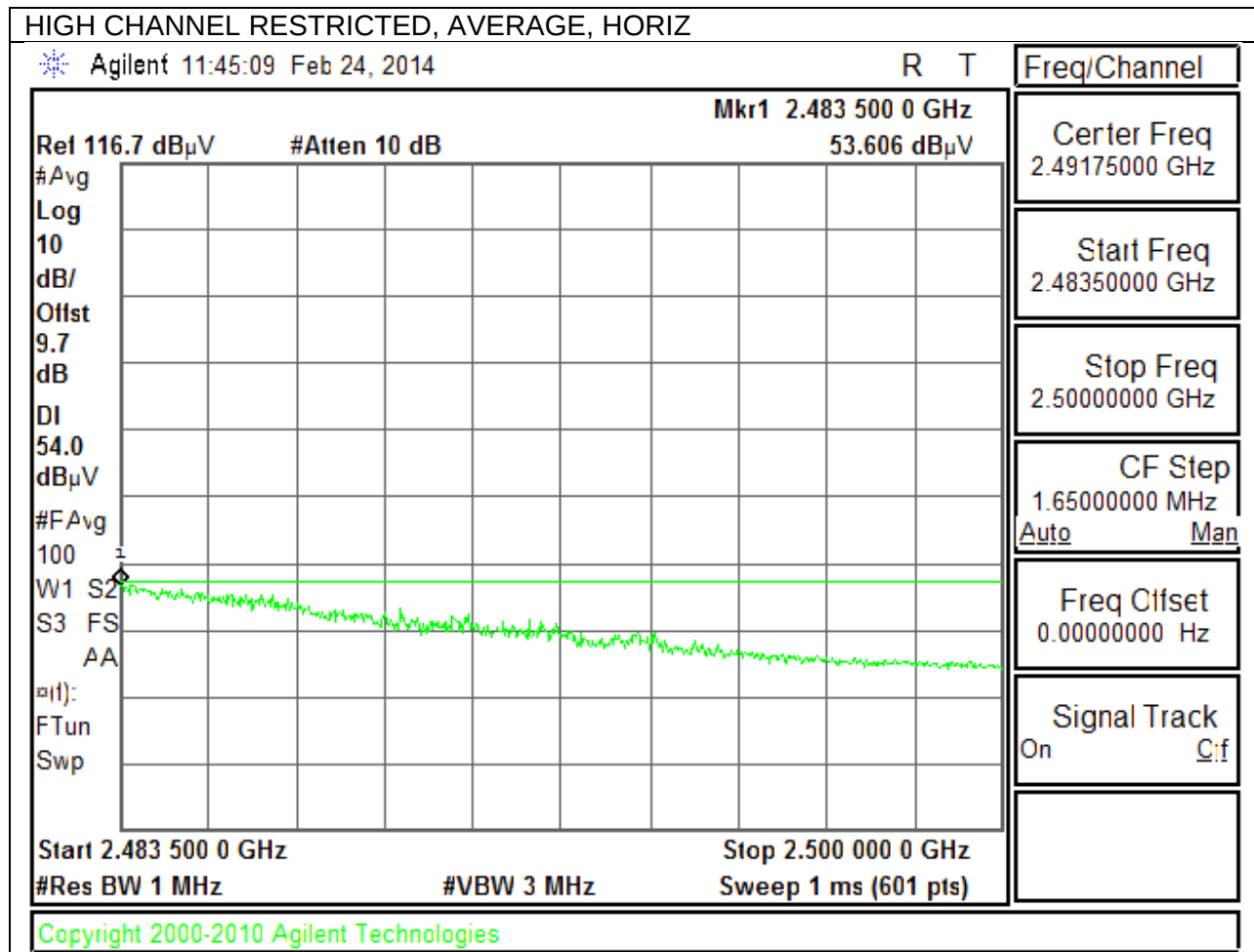


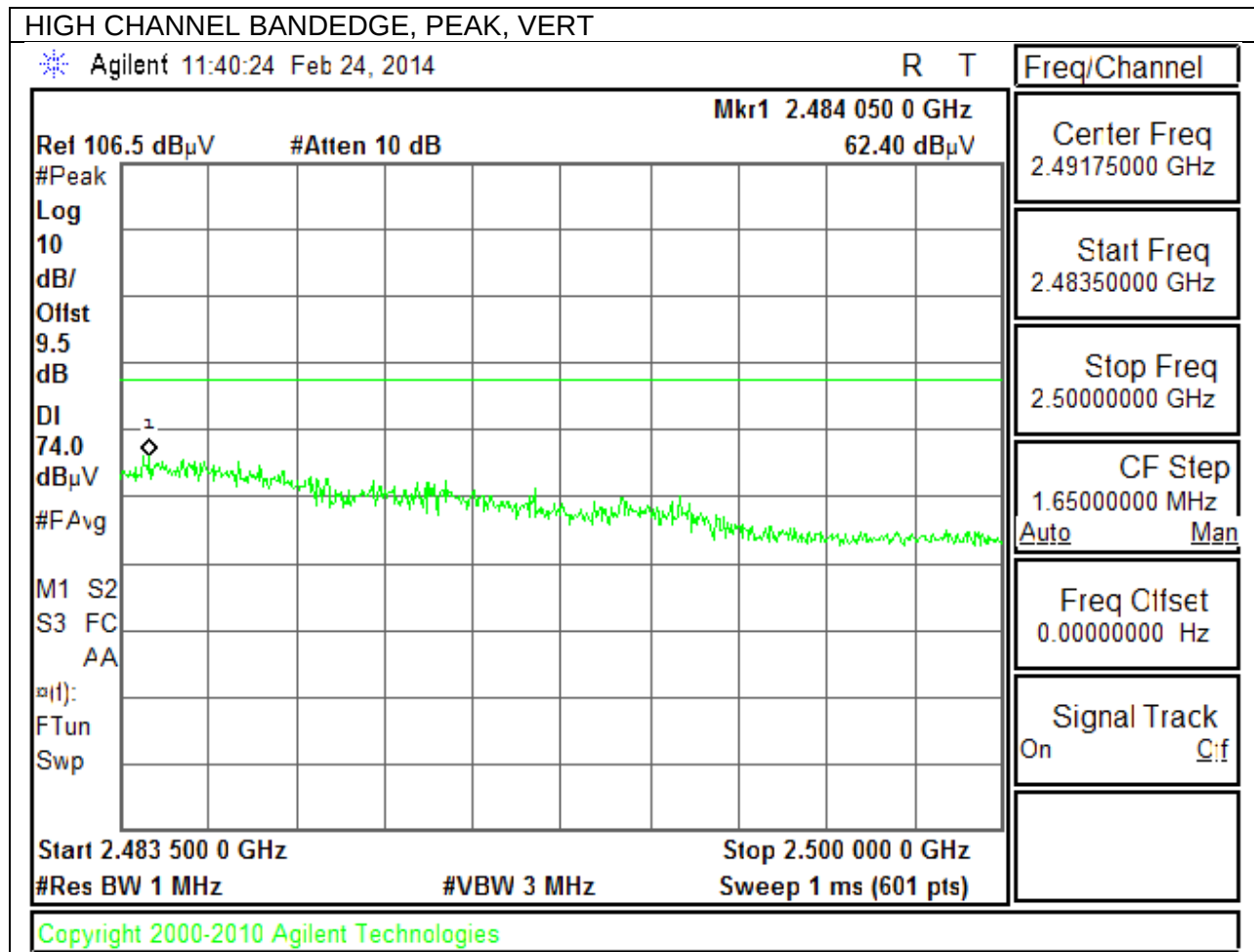


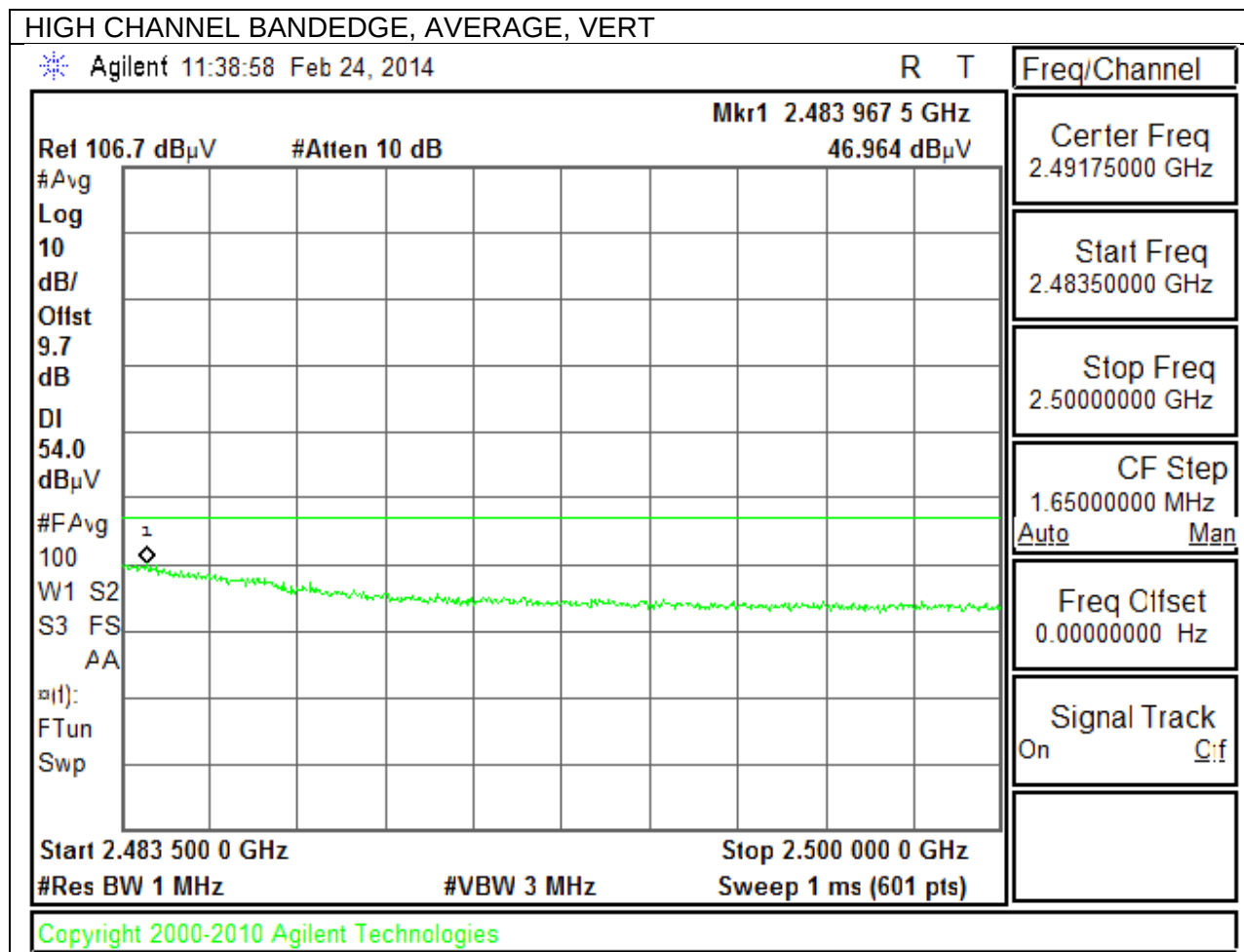


AUTHORIZED BANDEDGE (HIGH CHANNEL)



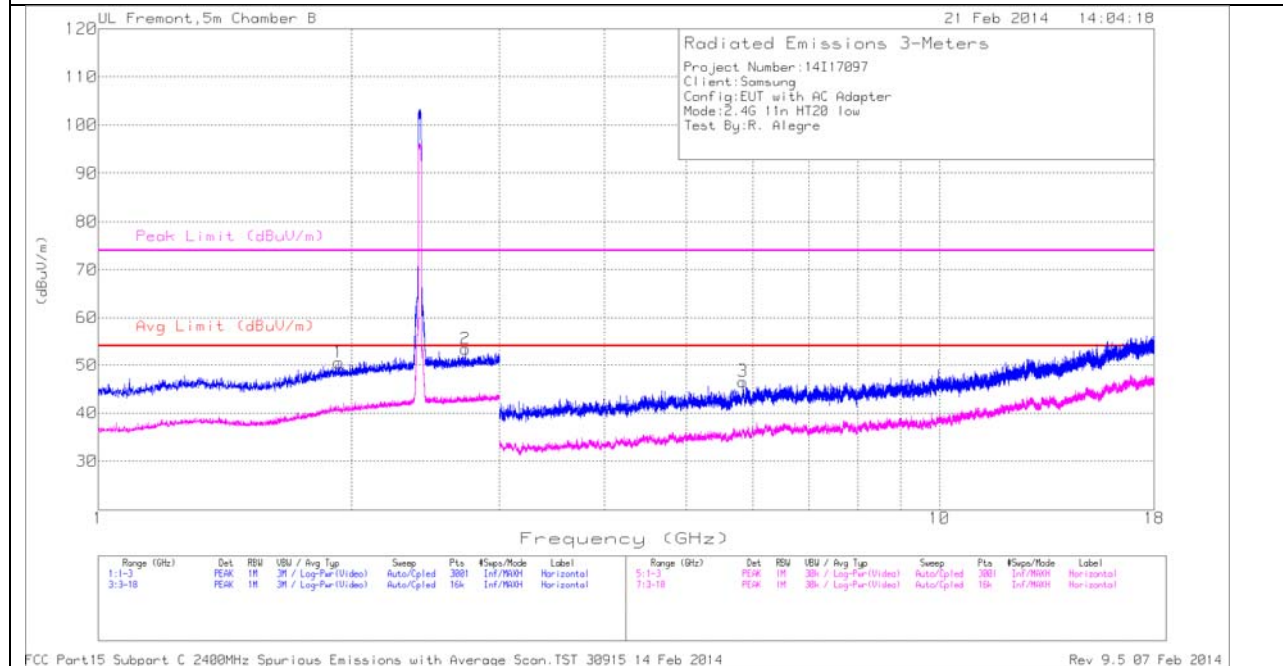






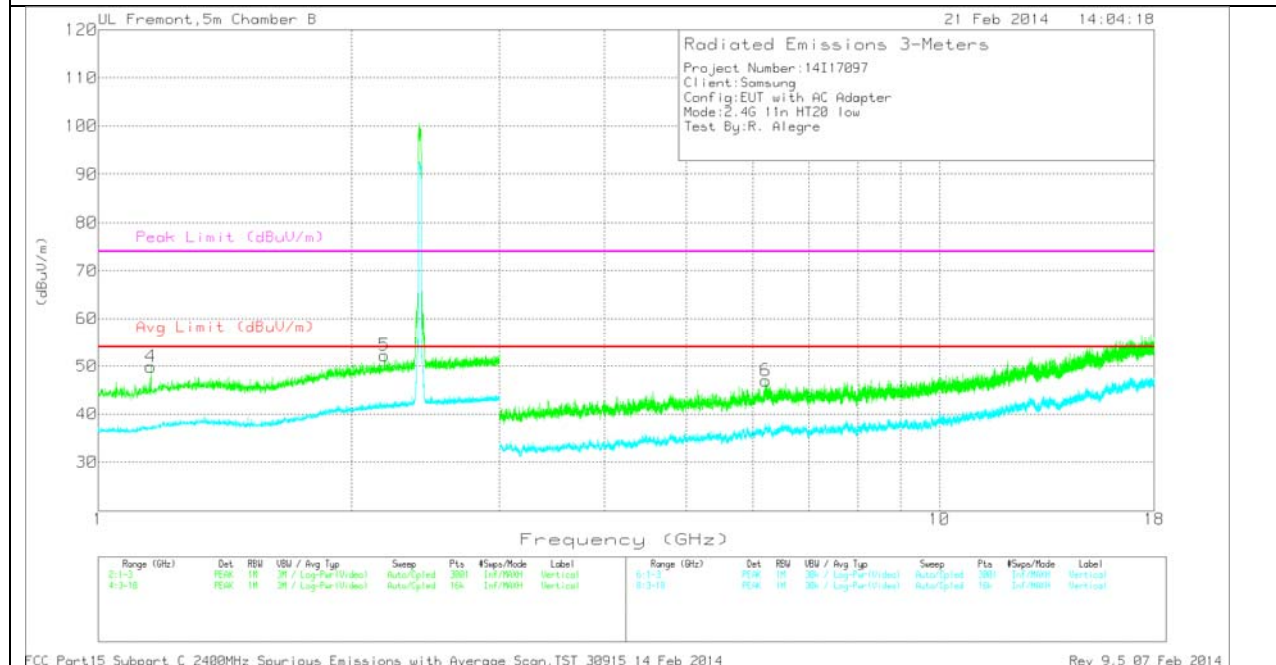
HARMONICS AND SPURIOUS EMISSIONS

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 T344 (dB/m)	Amp/Cbl/F ltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.734	43.5	PK	32.4	-22.5	53.4	54	-6	74	-20.6	0-360	201	H
4	* 1.155	46.85	PK	27.7	-24.7	49.85	54	-4.15	74	-24.15	0-360	99	V
1	1.932	43.23	PK	30.9	-23.6	50.53	-	-	-	-	0-360	99	H
5	2.189	43.83	PK	31.6	-23.2	52.23	-	-	-	-	0-360	202	V
3	5.84	40.75	PK	35	-29.2	46.55	-	-	-	-	0-360	99	H
6	6.215	39.26	PK	35.5	-27.8	46.96	-	-	-	-	0-360	99	V

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

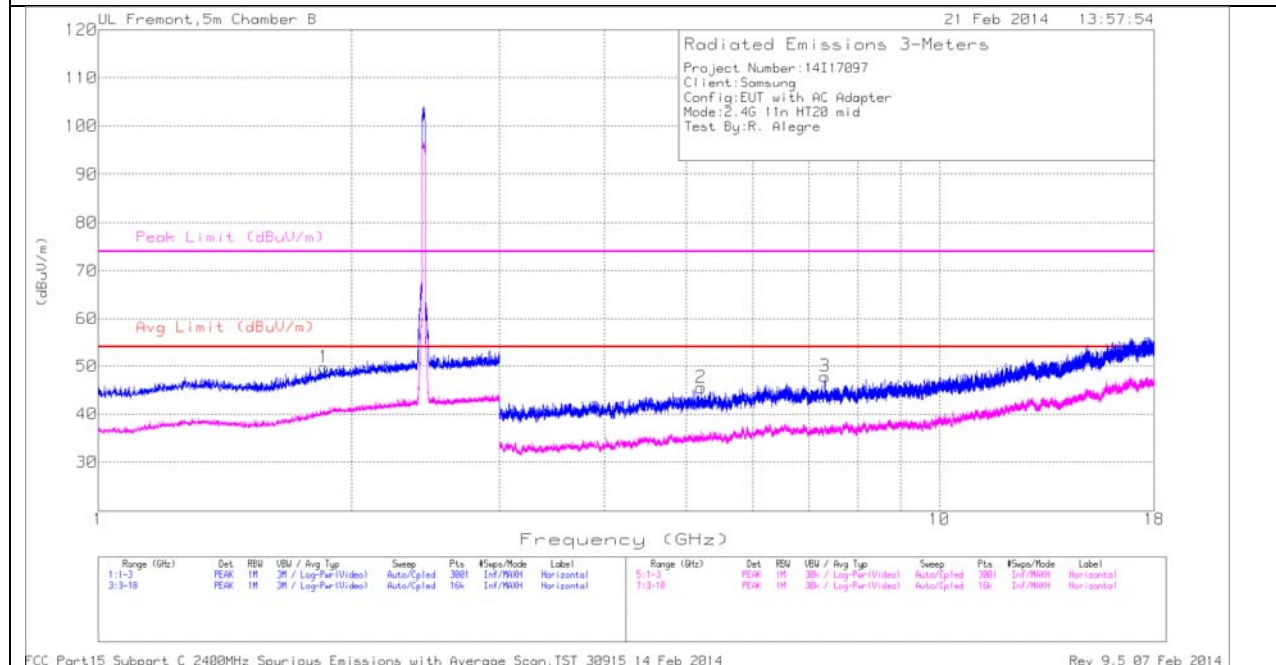
PK - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/ Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.737	31.64	MAv1	32.4	-22.5	41.54	54	-12.46	-	-	269	166	H

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

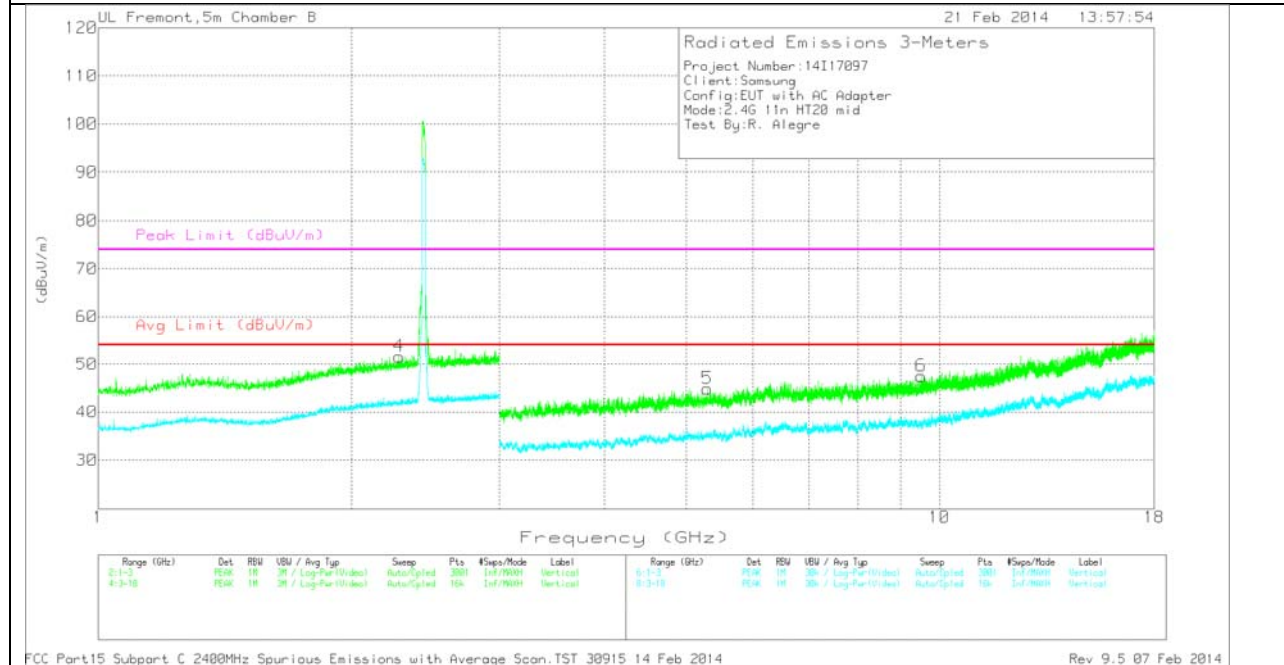
MAv1 - KDB558074 Option 1 Maximum RMS Average

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.

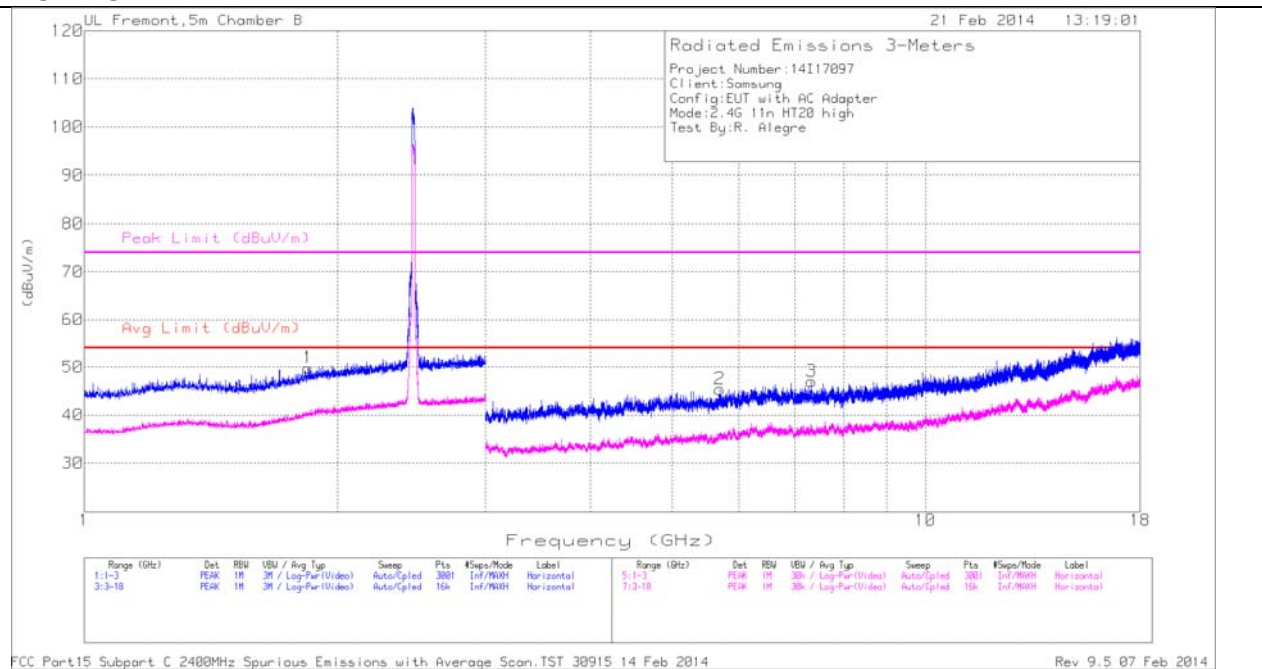
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.279	42.87	PK	31.8	-23.1	51.57	54	-2.43	74	-22.43	0-360	99	V
3	* 7.309	39.84	PK	35.7	-27.7	47.84	54	-6.16	74	-26.16	0-360	99	H
1	1.857	43	PK	30.4	-23.7	49.7	-	-	-	-	0-360	99	H
2	5.21	41.33	PK	34.4	-30.2	45.53	-	-	-	-	0-360	99	H
5	5.299	39.36	PK	34.4	-28.9	44.86	-	-	-	-	0-360	202	V
6	9.511	35.52	PK	36.6	-24.6	47.52	-	-	-	-	0-360	202	V

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

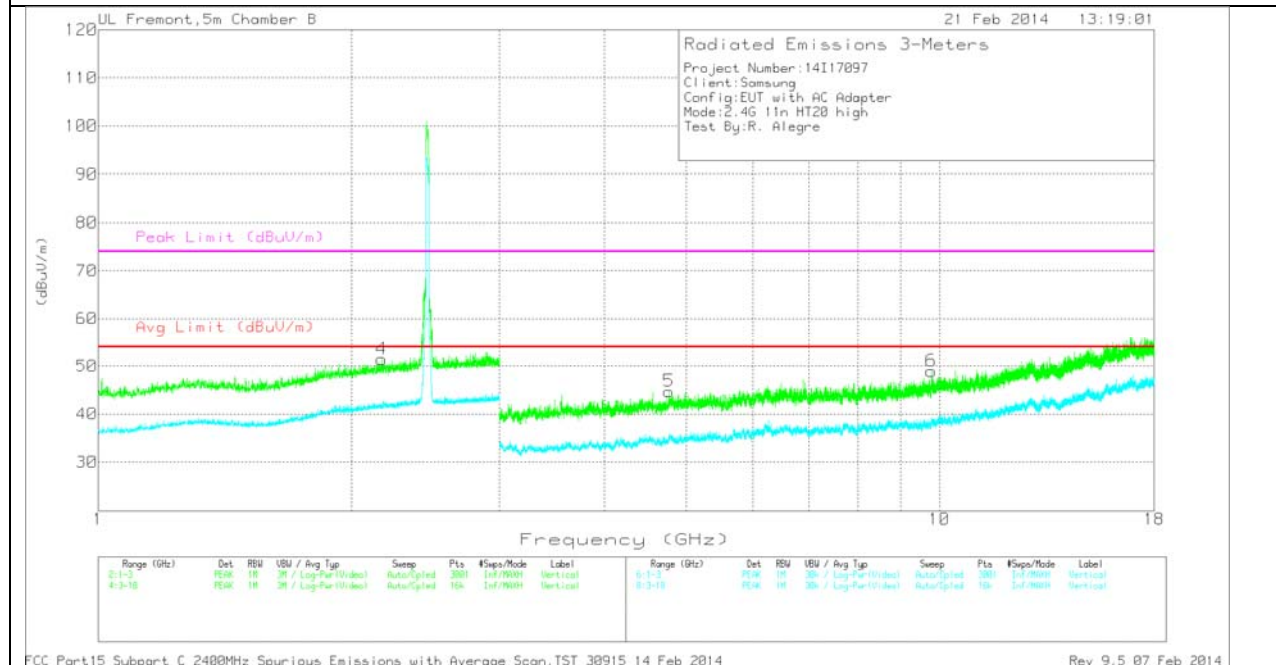
PK - Peak detector

HIGH CHANNEL HORIZONTAL



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

HIGH CHANNEL VERTICAL



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

HIGH CHANNEL DATA

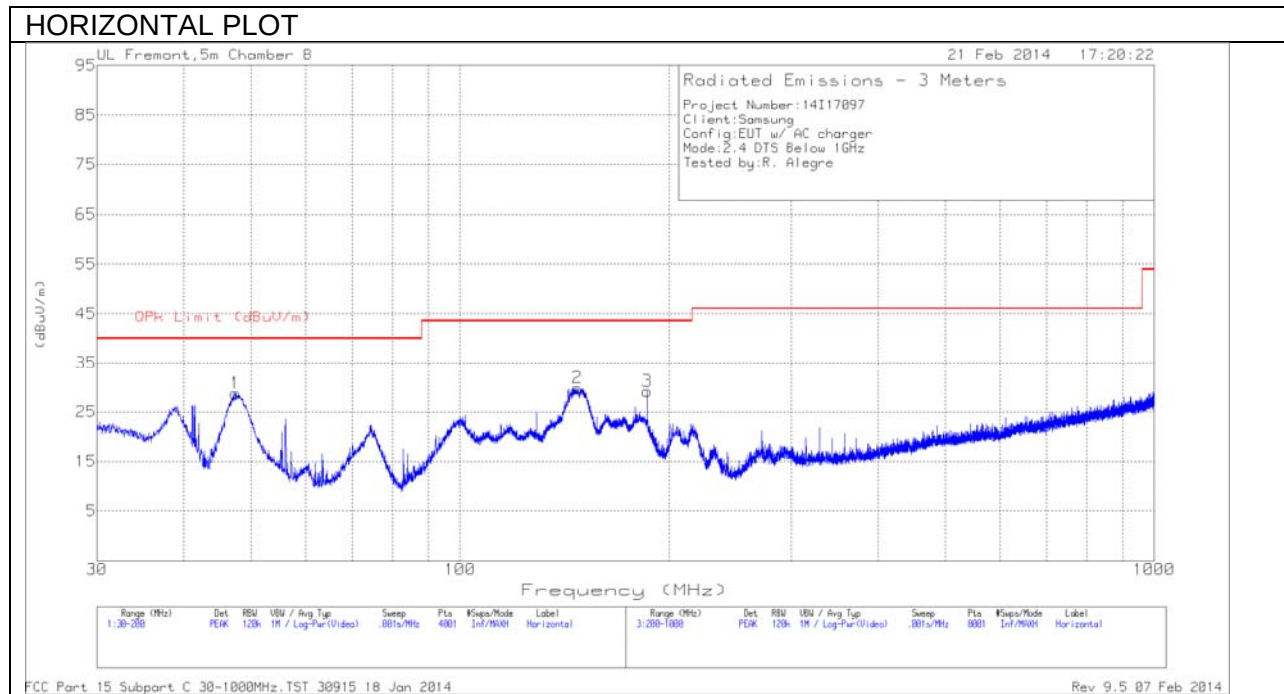
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/F lter/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 7.321	39.03	PK	35.7	-27.7	47.03	54	-6.97	74	-26.97	0-360	202	H
5	* 4.771	39.89	PK	34.2	-29.4	44.69	54	-9.31	74	-29.31	0-360	99	V
1	1.847	43.11	PK	30.3	-23.6	49.81	-	-	-	-	0-360	99	H
4	2.173	43.02	PK	31.6	-23.2	51.42	-	-	-	-	0-360	202	V
2	5.698	39.48	PK	34.7	-28.8	45.38	-	-	-	-	0-360	99	H
6	9.782	35.53	PK	37	-23.6	48.93	-	-	-	-	0-360	99	V

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

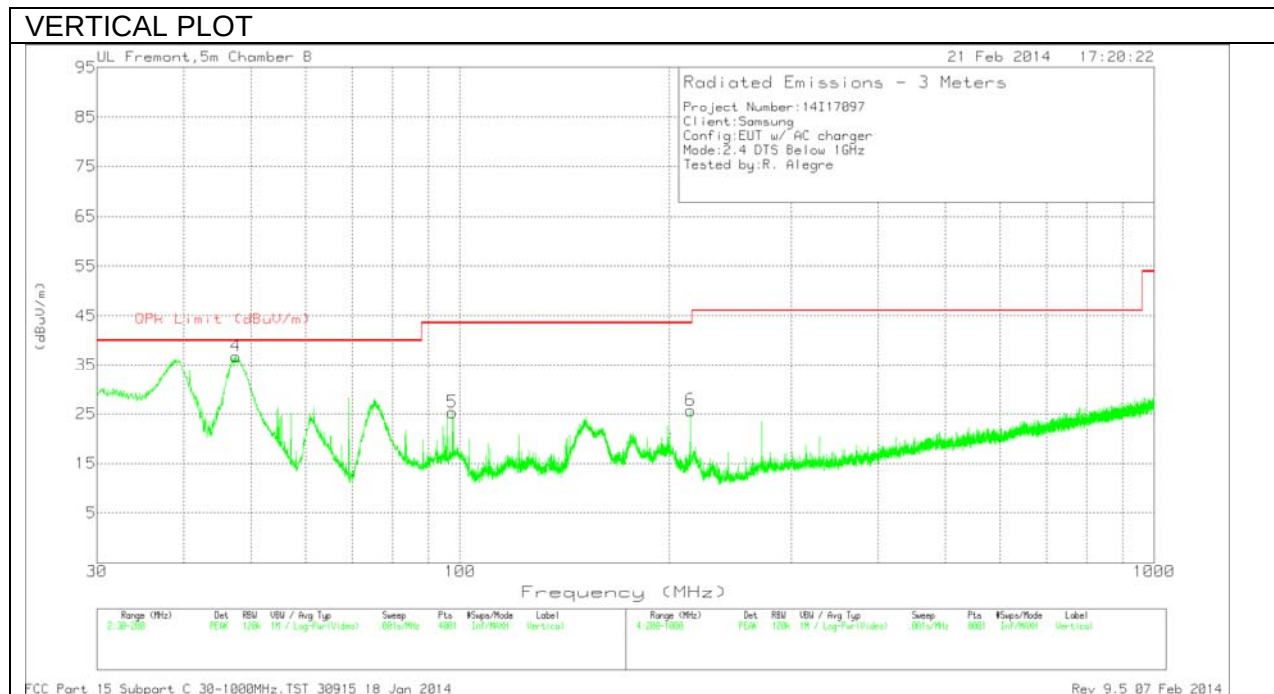
PK - Peak detector

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 (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.51	48.62	PK	8.7	-28.6	28.72	40	-11.28	0-360	400	H
4	47.5525	56.72	PK	8.7	-28.6	36.82	40	-3.18	0-360	101	V
5	97.5325	44.1	PK	9.3	-28.1	25.3	43.5	-18.2	0-360	101	V
2	147.555	44.93	PK	12.4	-27.5	29.83	43.5	-13.67	0-360	200	H
3	186.145	45.27	PK	11	-27.1	29.17	46.5	-17.33	0-360	100	H
6	214.8	42	PK	10.5	-26.8	25.7	46.5	-20.8	0-360	200	V

PK - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	.15	48.94	PK	1.4	0	50.34	66	-15.66	-	-
2	.15	28.93	Av	1.4	0	30.33	-	-	56	-25.67
3	.186	47.42	PK	1	0	48.42	64.2	-15.78	-	-
4	.186	33.6	Av	1	0	34.6	-	-	54.2	-19.6
5	.6135	44.63	PK	.3	0	44.93	56	-11.07	-	-
6	.6135	31.5	Av	.3	0	31.8	-	-	46	-14.2
13	.8025	38.48	PK	.3	0	38.78	56	-17.22	-	-
14	.8025	22.21	Av	.3	0	22.51	-	-	46	-23.49
7	2.5935	46.25	PK	.2	.1	46.55	56	-9.45	-	-
8	2.5935	31.01	Av	.2	.1	31.31	-	-	46	-14.69
9	6.1215	50.62	PK	.2	.1	50.92	60	-9.08	-	-
10	6.1215	28.28	Av	.2	.1	28.58	-	-	50	-21.42
11	21.8445	49.25	PK	.3	.2	49.75	60	-10.25	-	-
12	21.8445	32.12	Av	.3	.2	32.62	-	-	50	-17.38

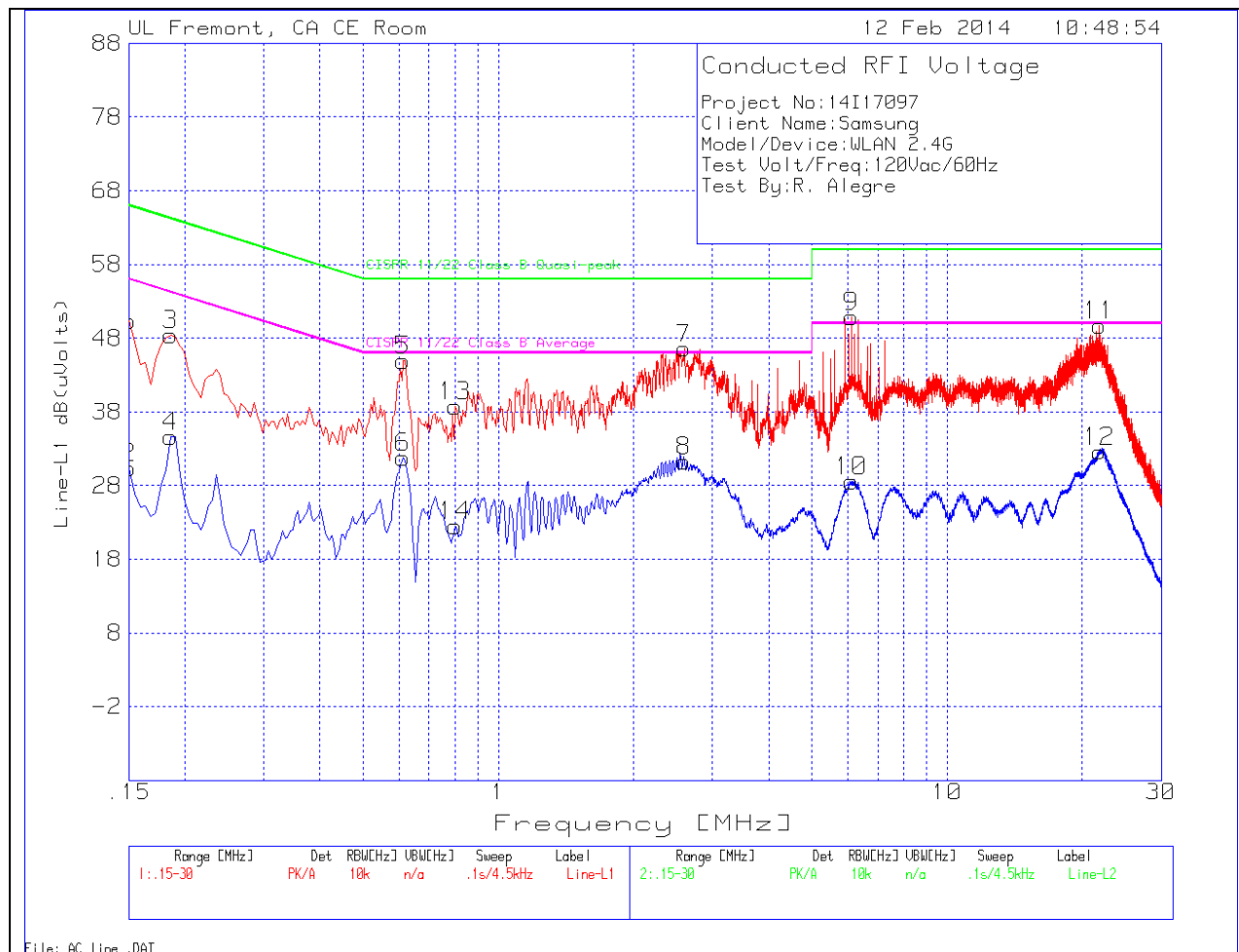
Line-L2 .15 - 30MHz

Trace Markers										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
15	.1815	39.5	PK	1.2	0	40.7	64.4	-23.7	-	-
16	.1815	26.87	Av	1.2	0	28.07	-	-	54.4	-26.33
17	.618	41.48	PK	.3	0	41.78	56	-14.22	-	-
18	.618	26.54	Av	.3	0	26.84	-	-	46	-19.16
19	2.5305	41.36	PK	.2	.1	41.66	56	-14.34	-	-
20	2.5305	27.82	Av	.2	.1	28.12	-	-	46	-17.88
21	6.099	39.41	PK	.2	.1	39.71	60	-20.29	-	-
22	6.099	24.66	Av	.2	.1	24.96	-	-	50	-25.04
23	21.948	53.45	PK	.3	.2	53.95	60	-6.05	-	-
24	21.948	34.06	Av	.3	.2	34.56	-	-	50	-15.44

PK - Peak detector

Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS

