

FCC RF Test Report

Product Name: WCDMA Digital Mobile Phone

Product Model: HUAWEI W2-U051

Report Number: SYBH(Z-RF)012082013-2002

FCC ID: QISW2-U051

Reliability Laboratory of Huawei Technologies Co., Ltd.

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District,
Shenzhen, 518129, P.R.C

Tel: +86 755 28780808 Fax: +86 755 89652518



Notice

1. The laboratory has Passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1 and 6369A-3.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.



Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
 Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt Sample: 2013-08-20
Start Date of Test: 2013-08-22
End Date of Test: 2013-08-30

Test Result: Pass

Approved by Senior Engineer:	2013-09-12	Dai Linjun	
	Date	Name	Signature

Prepared by:	2013-09-12	Zhu Mingjing	
	Date	Name	Signature



Modification Record

No.	Last Report No.	Modification Description
		First Report



CONTENT

1 General Information6

1.1 Applied Standard.....6

1.2 Test Location.....6

1.3 Test Environment Condition.....6

2 Test Summary7

3 Description of the Equipment under Test (EUT)8

3.1 General Description8

3.2 EUT Identity8

3.3 Technical Description.....8

4 General Test Conditions / Configurations 10

4.1 Test Modes 10

4.2 EUT Configurations..... 11

4.3 Test Environments 12

4.4 Antenna requirements..... 12

4.5 Description of tests..... 13

4.6 Test Setups..... 16

4.7 Test Conditions 19

5 Main Test Instruments21



1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J 2012
47 CFR FCC Part 15, Subpart C 2012

Test Method: FCC KDB 558074 D01 DTS Meas Guidance v03r01
ANSI C63.10-2009, American National Standard for Testing Unlicensed
Wireless Devices.

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.3 Test Environment Condition

Ambient Temperature: 19.5to 25 °C
Ambient Relative Humidity: 40 to 55 %
Atmospheric Pressure: Not applicable



2 Test Summary

Test Item	FCC Part No.	Requirements	Test Result	Verdict (NOTE 2)
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz	Appendix A	Pass
Maximum Peak Conducted Output Power	15.247(b)(3)	For directional gain: < 30 dBm – (G[dBi] – 6 [dB]), peak; Otherwise: < 30 dBm, peak.	Appendix B	Pass
Average Power	---	NONE; reporting purposes only	Appendix C	---
Maximum Power Spectral Density Level	15.247(e)	For directional gain: < 8 dBm/3 kHz – (G[dBi] – 6 [dB]), peak. Otherwise: < 8 dBm/3 kHz, peak.	Appendix D	Pass
Band Edges Compliance	15.247(d)	< -20 dBm/100 kHz if total peak power ≤ power limit.	Appendix E	Pass
Unwanted Emissions into Non-Restricted Frequency Bands			Appendix F	Pass
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	FCC Part 15.209 field strength limit;	Appendix G	Pass
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	Appendix H	Pass
NOTE 1: According to KDB 558074, antenna-port conducted measurements are acceptable as an alternative to radiated measurements for demonstrating compliance to the limits in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions will also be required.				



3 Description of the Equipment under Test (EUT)

3.1 General Description

HUAWEI W2-U051 is a smart phone developed by HUAWEI. It is based on Windows Phone 8 Operating System. It supports GSM 850/900/1800/1900 MHz, WCDMA 850/1900/2100 MHz frequency bands. The Mobile Phone implements such functions as RF signal receiving/transmitting, UMTS and GSM protocol processing, voice, video, MMS service, GPS etc. Externally it provides micro SD card interface, earphone port (to provide voice service). It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

3.2.1 Board

Board		
Software Version	Hardware Version	Description
W2_U051_V100R001C00B001	HD1W2M Ver.A	Main Board

3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-050100U2W	Huawei Technologies Co., Ltd.	Input Voltage : 100-240V1 ~50/60Hz, 0.5A MAX
Rechargeable Li-ion	HB4W1H	Huawei Technologies Co., Ltd.	Rated capacity: 1750mAh Nominal Voltage: +3.7V

3.3 Technical Description

Characteristics	Description	
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11b (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11g (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11n (20 MHz channel bandwidth)	
TX/RX Operating Range	2412-2462 MHz band	$f_c = 2407 \text{ MHz} + N * 5 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 1 to 11 for the 20 MHz



Characteristics	Description		
		channel bandwidth	
Data Rate	802.11b	1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps	
	802.11g	6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps	
	802.11n (SISO)	MCS 0 to MCS 7	
Modulation Type	DBPSK/DQPSK/CCK (DSSS), BPSK/QPSK/16QAM/64QAM (OFDM).		
Emission Designator	9M57G1D (for 802.11b mode), 16M6G7D (for 802.11g mod), 17M8G7D (for 802.11n mode)		
TX Power Control	<input checked="" type="checkbox"/> Supported, <input type="checkbox"/> Not Supported		
Standby Mode	<input type="checkbox"/> Supported, <input checked="" type="checkbox"/> Not Supported		
Equipment Type	<input type="checkbox"/> Stand-alone equipment, <input type="checkbox"/> Plug-in radio device, <input checked="" type="checkbox"/> Combined equipment		
Antenna	Description	Isotropic Antenna	
	Type	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated	
	Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3	
	Smart System	<input checked="" type="checkbox"/> SISO (for 802.11b/g/n), <input type="checkbox"/> MIMO (for 802.11n): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11b/g) : Tx & Rx	
	Gain	0 dBi (per antenna port, max.)	
	Remark	When the EUT is put into service, the practical maximum antenna gain should NOT exceed the value as described above.	
Power Supply	Type	<input checked="" type="checkbox"/> AC/DC Adapter	<input type="checkbox"/> PoE:
			<input type="checkbox"/> Other:



4 General Test Conditions / Configurations

4.1 Test Modes

NOTE: Worst cases for each IEEE 802.11 mode are selected to perform tests (We test all the mode, but only show the worst data).

Test Mode	Test Modes Description
11B	IEEE 802.11b with data rate of 1 Mbps using SISO mode.
11G	IEEE 802.11g with data rate of 6 Mbps using SISO mode.
11N20	IEEE 802.11n with data date of MCS0 and bandwidth of 20 MHz using SISO mode.
11x_RX	Continues Receiving mode (if supported).



4.2 EUT Configurations

4.2.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, <ul style="list-style-type: none">- All TX tests are performed at all TX antenna ports of the EUT, and- All RX tests are performed at all RX antenna ports of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

4.2.2 Customized Configurations

Test Mode	RF Ch.	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Conf., per Port
11B	L	Ant 1	Ch No. 1 / 2412 MHz	---	20	13.5
11B	M	Ant 1	Ch No. 6 / 2437 MHz	---	20	13.5
11B	H	Ant 1	Ch No. 11 / 2462 MHz	---	20	13.5
11G	L	Ant 1	Ch No. 1 / 2412 MHz	---	20	12
11G	M	Ant 1	Ch No. 6 / 2437 MHz	---	20	12
11G	H	Ant 1	Ch No. 11 / 2462 MHz	---	20	12
11N20	L	Ant 1	Ch No. 1 / 2412 MHz	---	20	10
11N20	M	Ant 1	Ch No. 6 / 2437 MHz	---	20	10
11N20	H	Ant 1	Ch No. 11 / 2462 MHz	---	20	10



4.3 Test Environments

NOTE: The values used in the test report may be stringent than the declared.

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
NTNV	Ambient	3.7 VDC	Ambient

4.4 Antenna requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

The antennas of the **WCDMA Digital Mobile Phone** are **permanently attached**.
There are no provisions for connection to an external antenna.

Conclusion:

The **WCDMA Digital Mobile Phone FCC ID: QISW2-U051** unit complies with the requirement of §15.203.

Ch. Frequency (MHz)

Ch.	Frequency (MHz)
01	2412
.	.
.	.
06	2437
.	.
.	.
11	2462

Frequency/ Channel Operations



4.5 Description of tests

4.5.1 Bandwidth measurement

- (a) Connect EUT test port to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz, then set the measured frequency number and test the bandwidth with spectrum analyzer.

4.5.2 Peak output power

- (a) Connect EUT test port to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

4.5.3 Average power

- (a) Connect EUT test port to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the average power separately.

4.5.4 Band edge spurious emission

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.

4.5.5 Conducted RF spurious

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted spurious separately.

4.5.6 Power spectral density

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted power spectral density.

4.5.7 Radiated spurious emission & spurious in restricted band

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2009. The Radiated Disturbance measurements were made using a Rohde and Schwarz Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using a Quasi-Peak Detector below 1GHz, Peak Detector and AV Detector



above 1GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, and the azimuth range of turntable was 0° to 360°. The receive antenna has two polarizations V and H.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other nonmetallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized.

The EUT communicates with the BTS simulator through Air interface. The EUT operated on the typical channel.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz

Measurement bandwidth: 1000 MHz – 10th Carrier Frequency: 1 MHz

According FCC PART 15.205, the restricted bands as below:

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41.			

¹Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
²Above 38.6

4.5.8 Conducted Emission at Power Port

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2009.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT communicates with the BTS simulator through Air interface, the BTS simulator controls the Wireless Modem to transmitter the maximum power which defined in specification of product. The Wireless Modem operated on the typical channel.

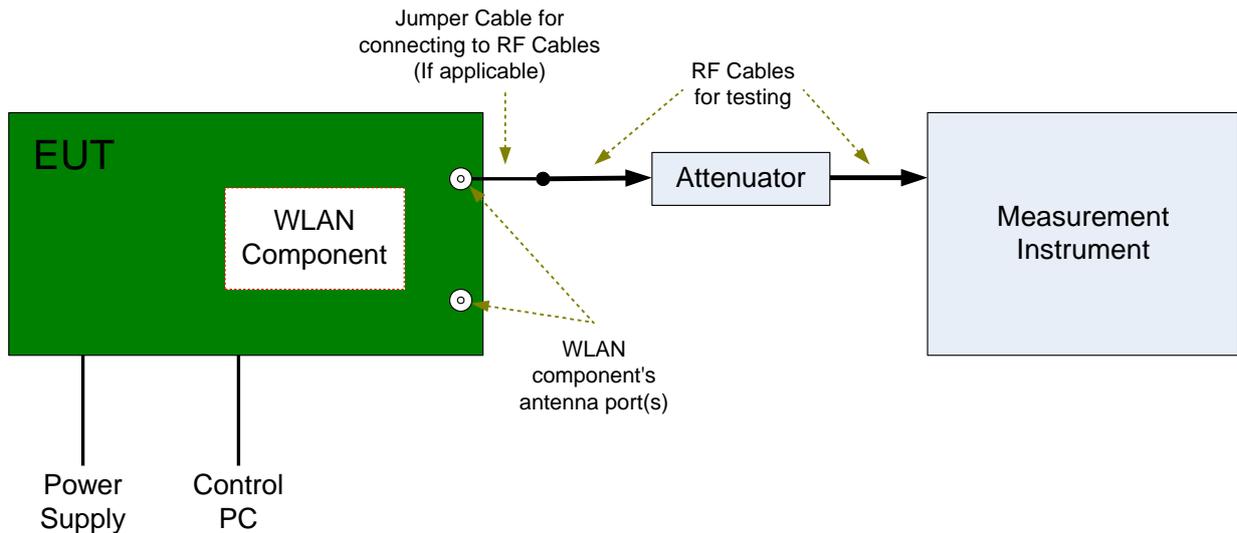


Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

4.6 Test Setups

4.6.1 Test Setup 1

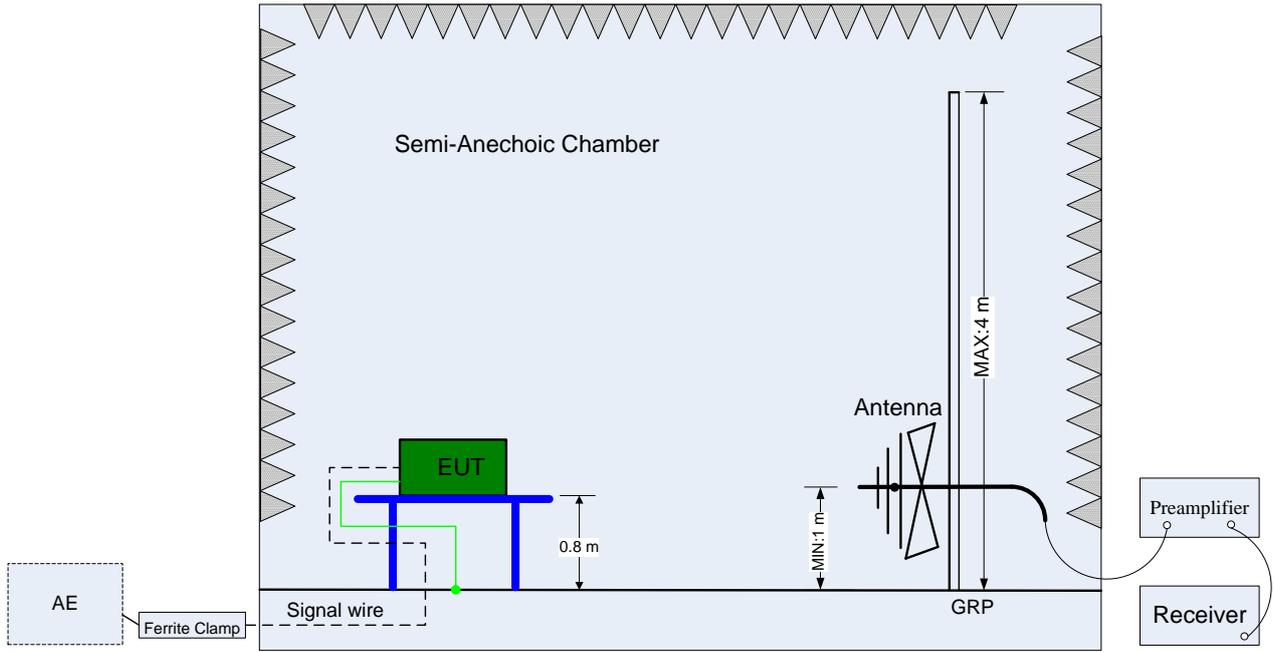
The WLAN component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



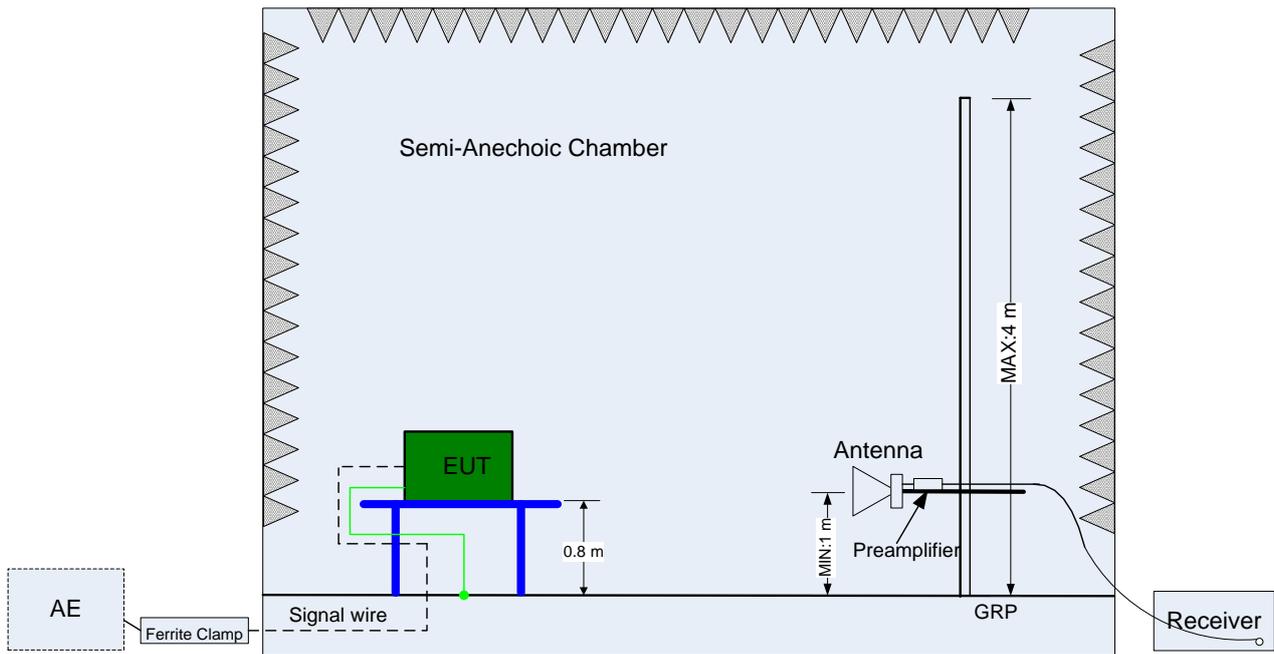
4.6.2 Test Setup 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4-2009. The test distance is 3m. The setup is according to ANSI C63.4-2009.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



(Below 1 GHz)

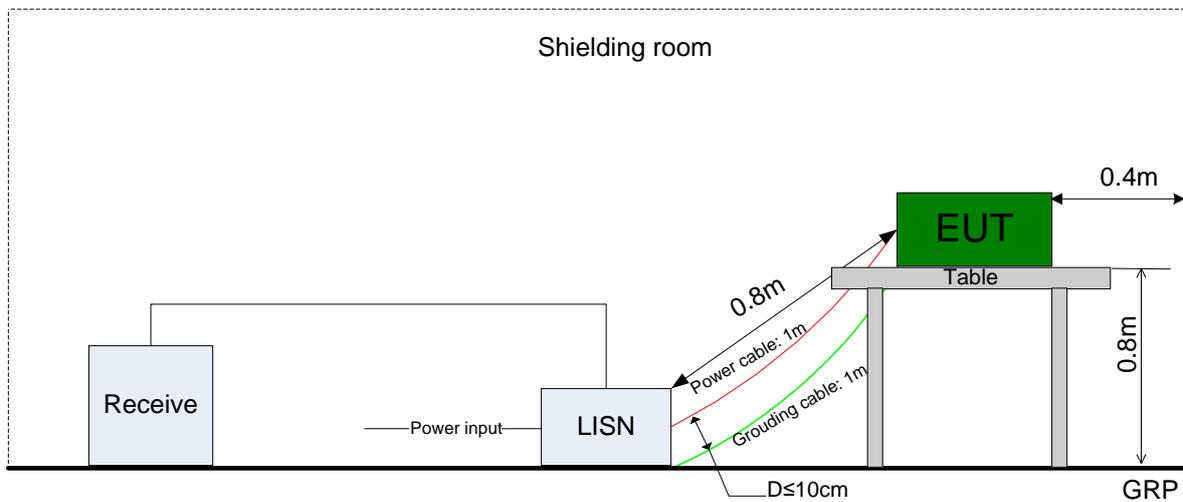


(Above 1 GHz)

4.6.3 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



**4.7 Test Conditions**

Test Case	Test Conditions	
	Configuration	Description
DTS (6 dB) Bandwidth	Measurement Method	FCC KDB 558074 §8.2 Option 2.
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H
Occupied Bandwidth (Only for IC requirement)	Measurement Method	RSS-Gen, 4.6.1.
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H
Maximum Peak Conducted Output Power	Measurement Method	FCC KDB 558074 §9.1 .2 (integrated band power method).
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H
Maximum Power Spectral Density Level	Measurement Method	FCC KDB 558074 §10.2 (peak PSD).
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H
Band Edges Compliance	Measurement Method	FCC KDB 558074 §13.0.
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_H 11G_L, 11G_H 11N20_L, 11 N20_H
Unwanted Emissions into Non-Restricted Frequency Bands	Measurement Method	FCC KDB 558074 §11.0
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H
Unwanted Emissions into	Measurement Method	ANSI C63.10; FCC KDB 558074 §12.1, Radiated
	Test Environment	NTNV



Test Case	Test Conditions	
	Configuration	Description
Restricted Frequency Bands (Radiated)	Test Setup	Test Setup 2
	EUT Placement	<input type="checkbox"/> Flatwise, <input type="checkbox"/> Upright, <input type="checkbox"/> Hung
	EUT Configuration	(1) 30 MHz to 1 GHz: 11B_L (Worst Conf.). (2) 1 GHz to 3 GHz: 11B_L, 11B_H 11G_L, 11G_H 11N20_L, 11 N20_H (3) 3 GHz to 18 GHz: 11B_L (Worse Conf.), 11B_H (Worse Conf.). (4) 18 GHz to 26.5 GHz: 11B_L (Worse Conf.), 11B_H (Worse Conf.).
AC Power Line Conducted Emissions	Measurement Method	AC mains conducted.
	Test Environment	NTNV
	Test Setup	Test Setup 3
	EUT Configuration	11B_L(Worst Conf.).



5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	1288003	2012-11-19	2014-11-18
Spectrum Analyzer	Agilent	E4440A	MY48250119	2013-08-09	2014-08-08
Signal Analyzer	R&S	FSQ31	200021	2012-11-09	2013-11-08
Spectrum Analyzer	Agilent	N9030A	MY49431698	2012-11-09	2013-11-08
Temperature Chamber	WEISS	WKL64	56246002940010	2013-01-29	2014-01-28
Signal generator	Agilent	E8257D	MY49281095	2012-09-14	2013-09-13
Spectrum analyzer	R&S	FSU3	200474	2013-01-29	2014-01-28
Test receiver	R&S	ESU26	100150	2013-05-15	2014-05-14
Spectrum analyzer	R&S	FSU43	100144	2013-01-29	2014-01-28
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2013-02-02	2014-02-01
Trilog Broadband Antenna (30M~3GHz)	SCHWARZB ECK	VULB 9163	9163-521	2011-12-09	2013-12-08
Pyramidal Horn Antenna(18GHz-26-5GHz)	ETS-Lindgren	3160-09	00091989	2011-10-20	2013-10-19
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100262	2013-03-23	2015-03-22
Artificial Mains Network	ENV4200	100134	R&S	2013-01-28	2014-01-28
Artificial Mains Network	ENV216	100382	R&S	2013-01-28	2014-01-28

END



Appendix for Test report

Appendix A: DTS (6 dB) Bandwidth

In this document, the "DTS6dBBW" refers to the measured "DTS (6 dB) Bandwidth" value. In this Appendix, the "fc(DTS6dBBW)" refers to the centre of the measured "DTS6dBBW". The introduction of the "fc(DTS6dBBW)" is due to that other measurements use it as the spectrum analyzer setting.

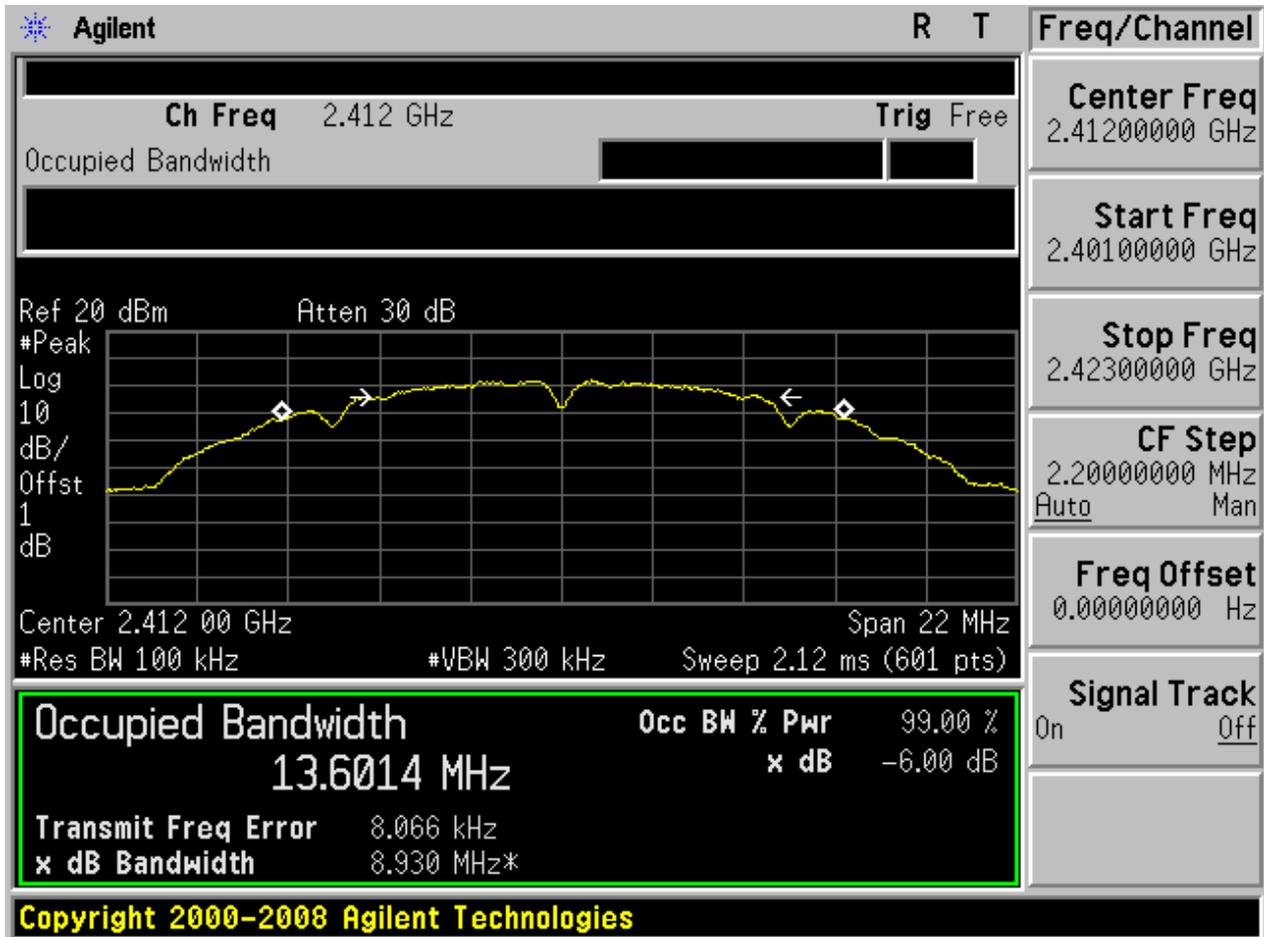
For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and used as respective results for each chain.

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	DTS6dBBW[MHz]	Verdict
11B	L	2412	8.93	pass
11B	M	2437	8.75	pass
11B	H	2462	8.18	pass
11G	L	2412	16.57	pass
11G	M	2437	16.57	pass
11G	H	2462	16.57	pass
11N20	L	2412	17.80	pass
11N20	M	2437	17.81	pass
11N20	H	2462	17.82	pass

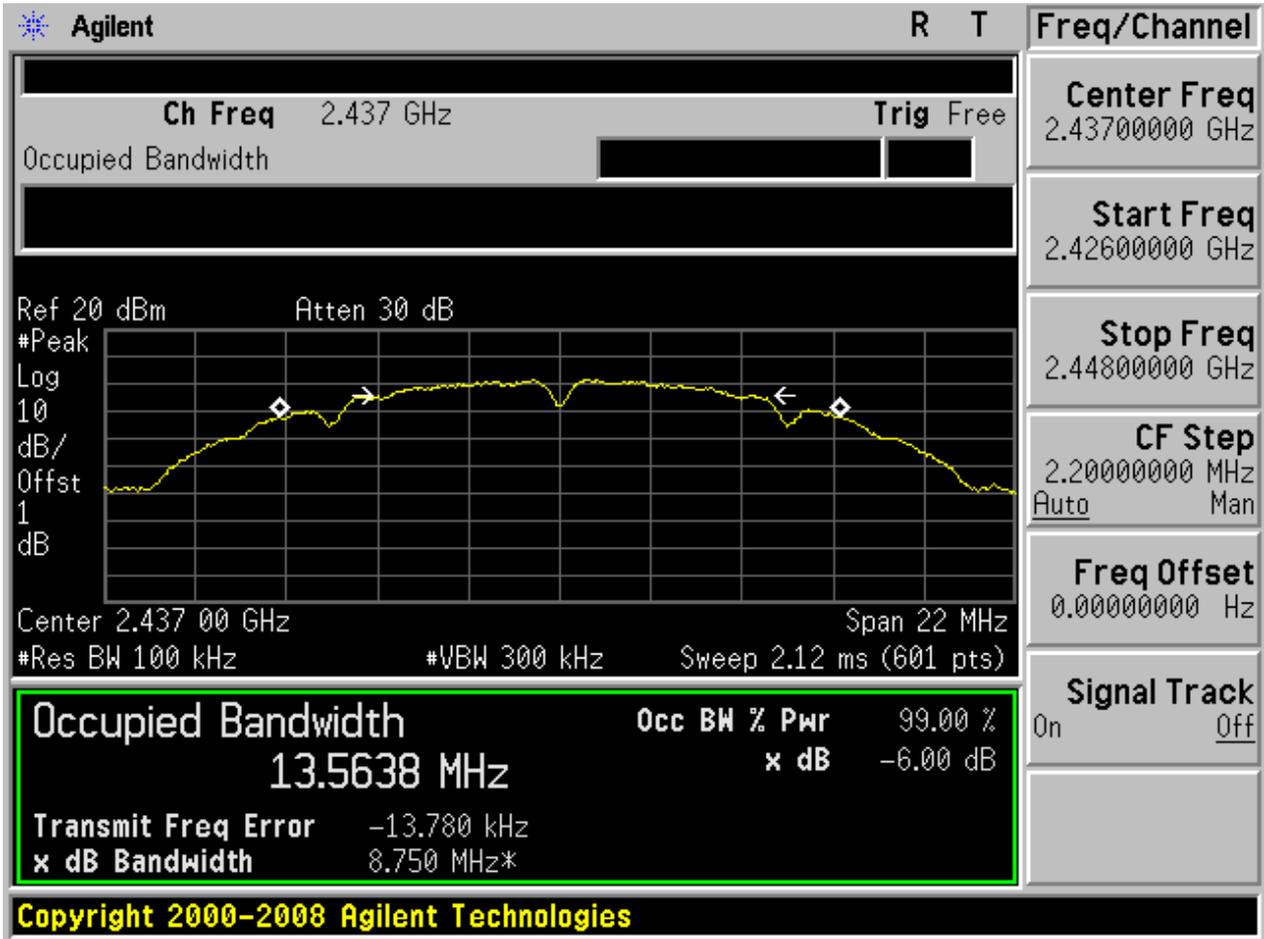
Part II - Test Plots

2.1 11B_L



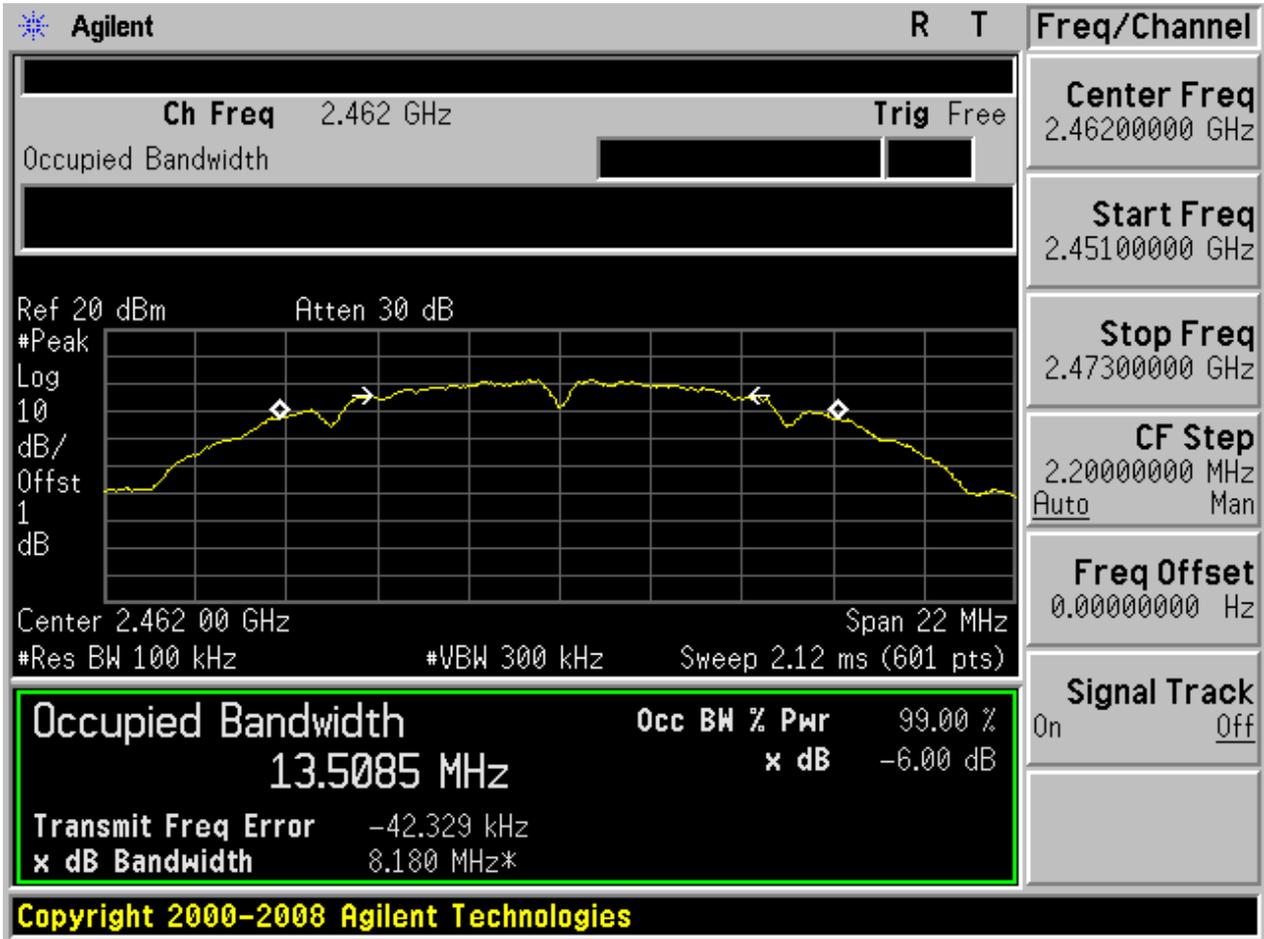


2.2 11B_M



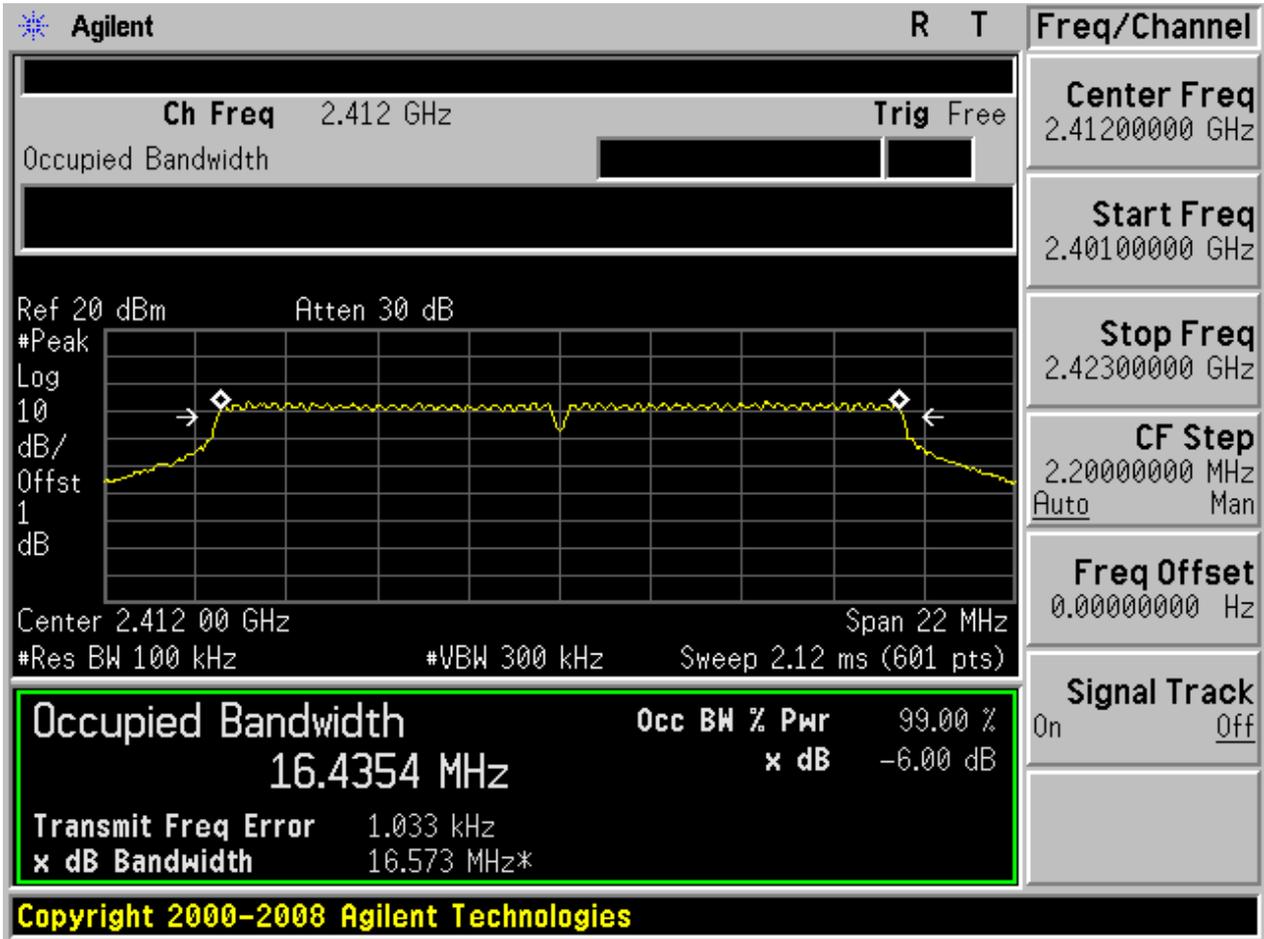


2.3 11B_H



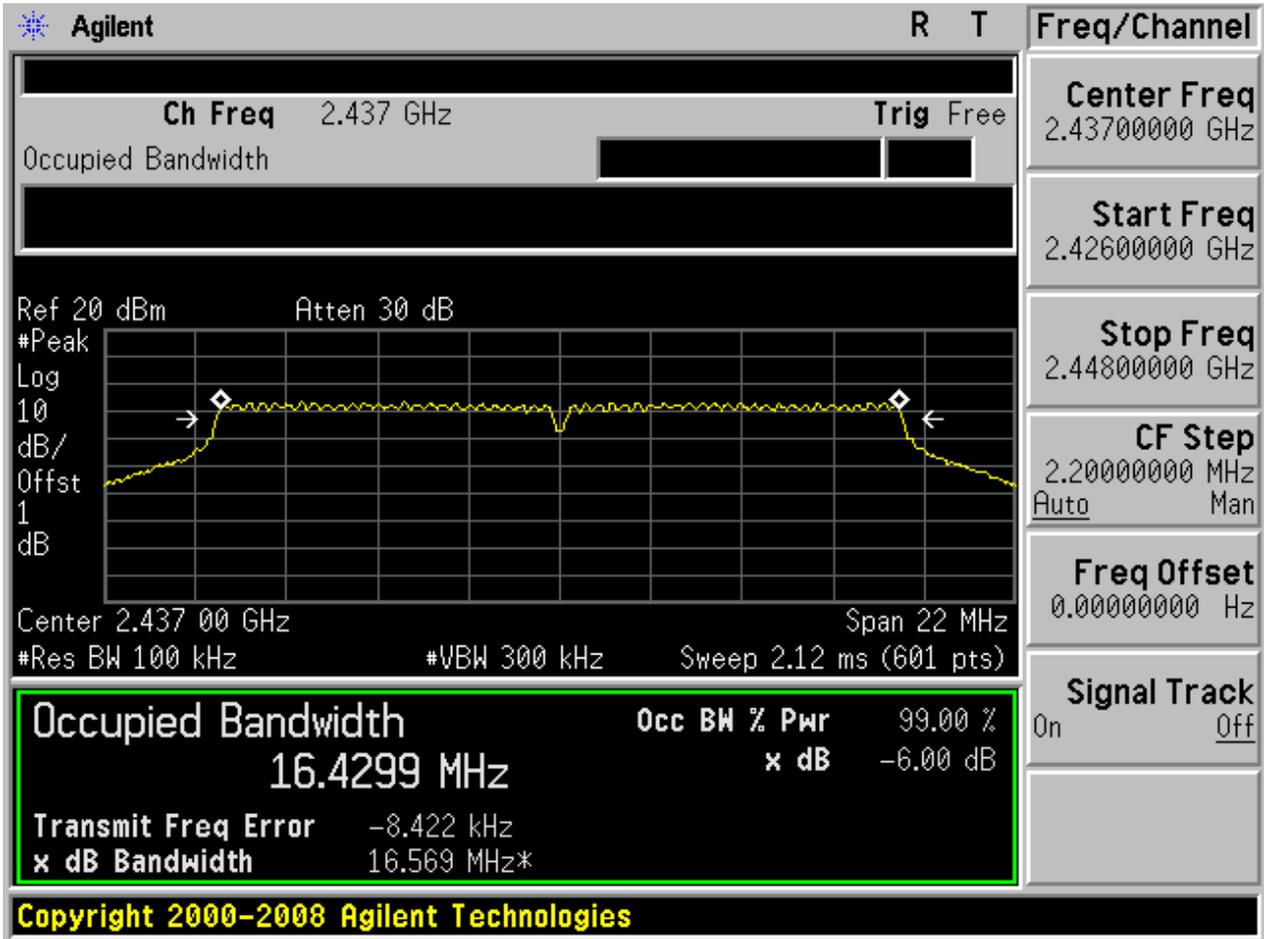


2.4 11G_L



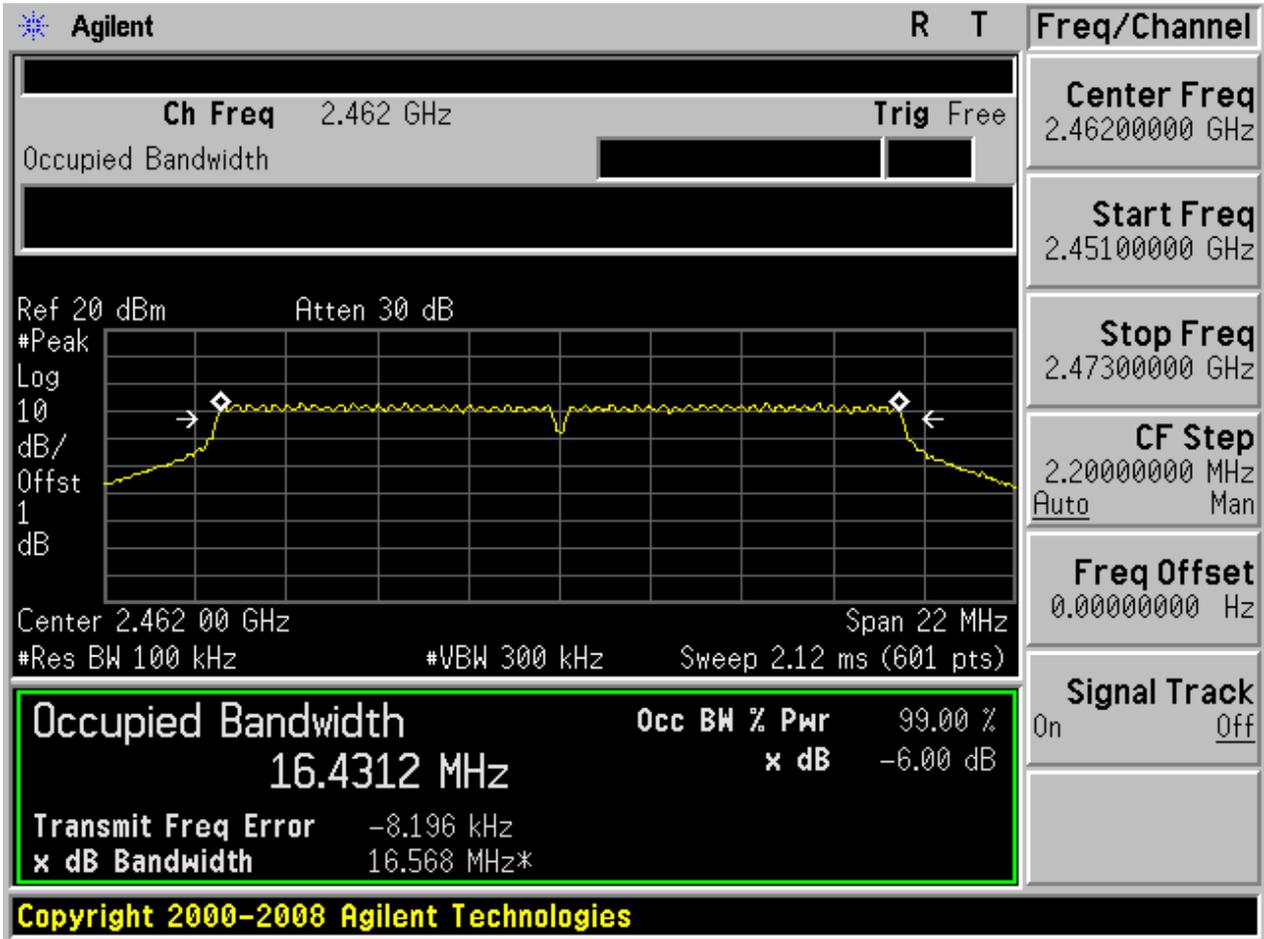


2.5 11G_M



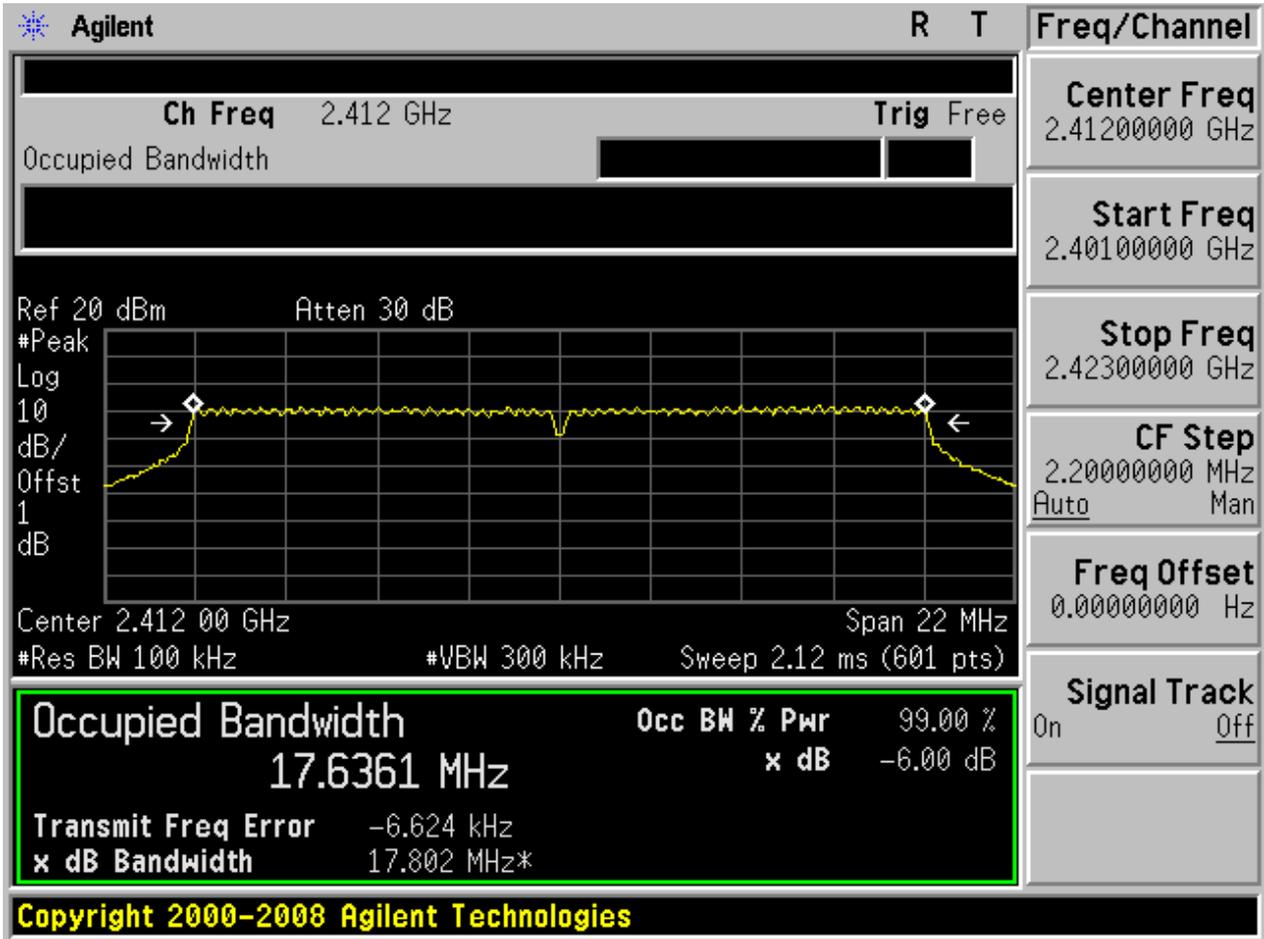


2.6 11G_H



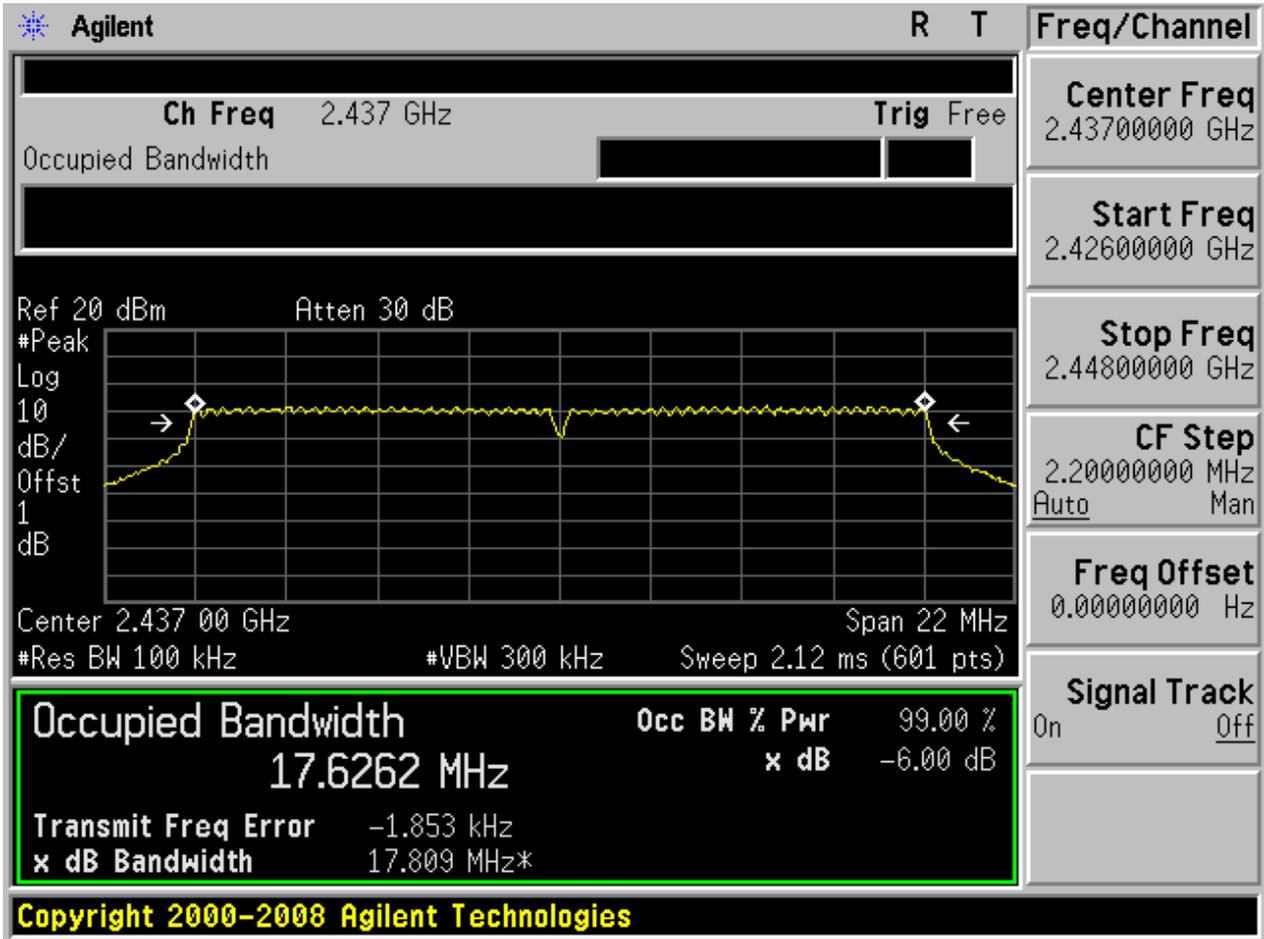


2.7 11N20_L



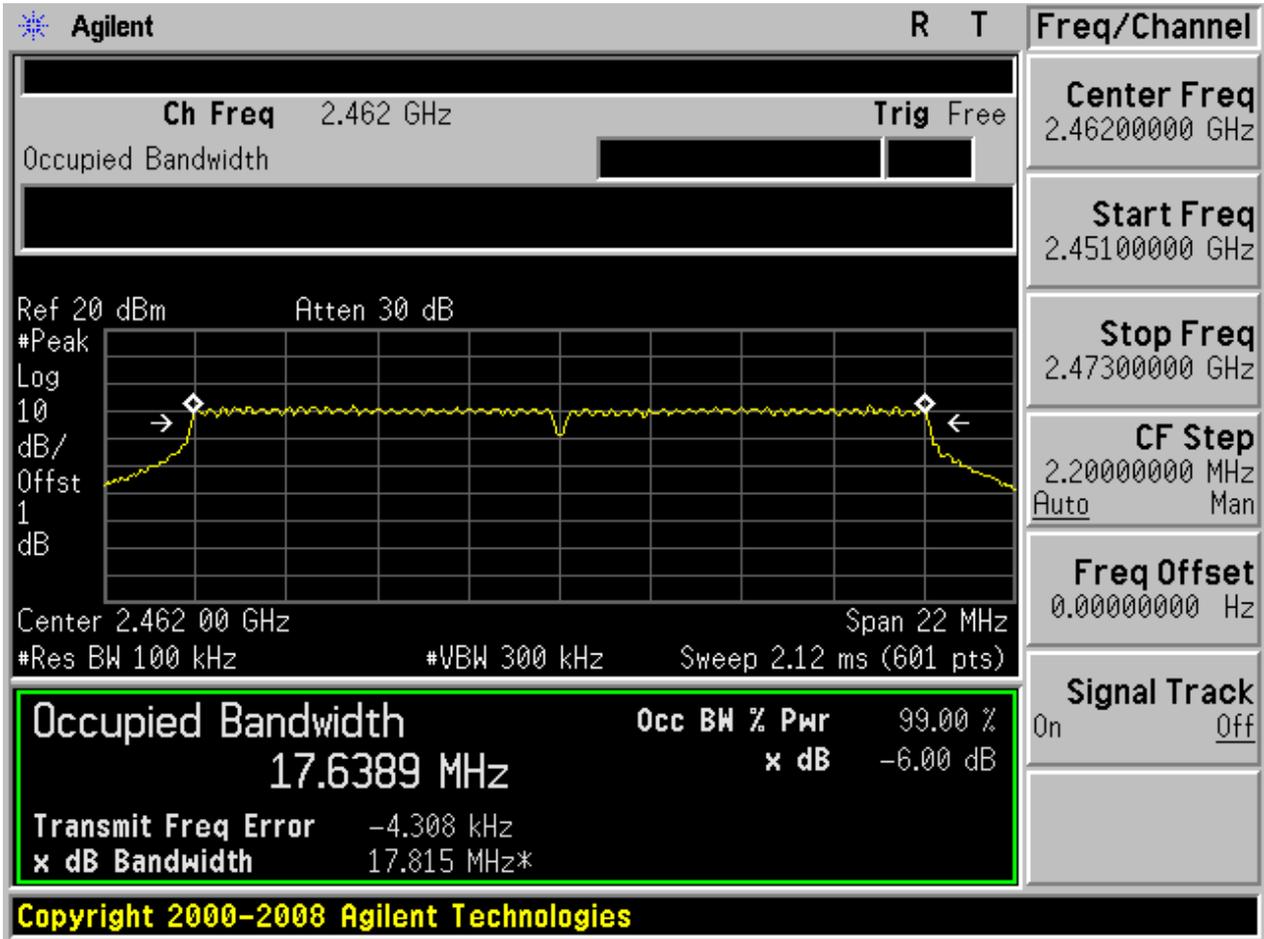


2.8 11N20_M





2.9 11N20_H





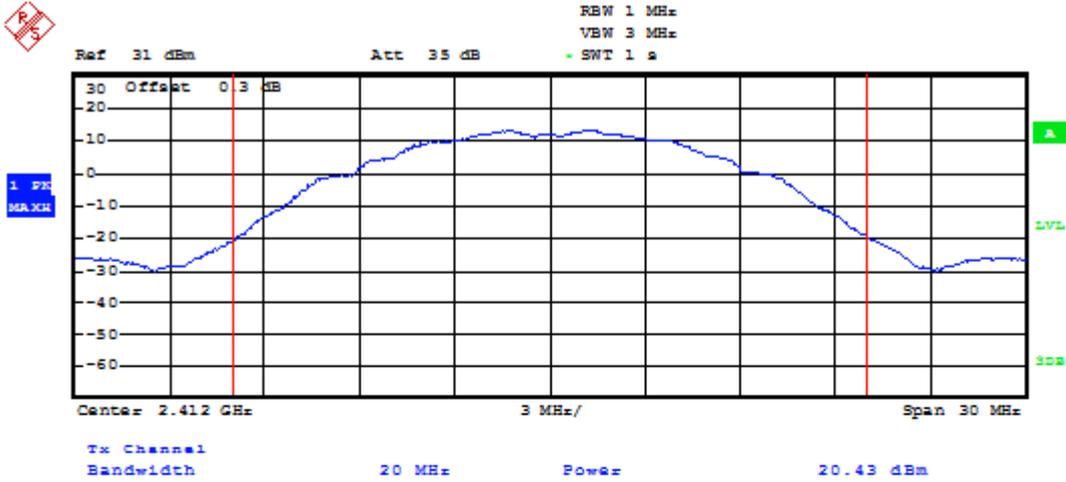
Appendix B: Maximum Peak Conducted Output Power

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Meas. Level (Cond.) [dBm]	Verdict
11B	L	2412	20.43	pass
11B	M	2437	20.13	pass
11B	H	2462	19.82	pass
11G	L	2412	20.23	pass
11G	M	2437	20.45	pass
11G	H	2462	20.18	pass
11N20	L	2412	19.33	pass
11N20	M	2437	19.24	pass
11N20	H	2462	19.18	pass

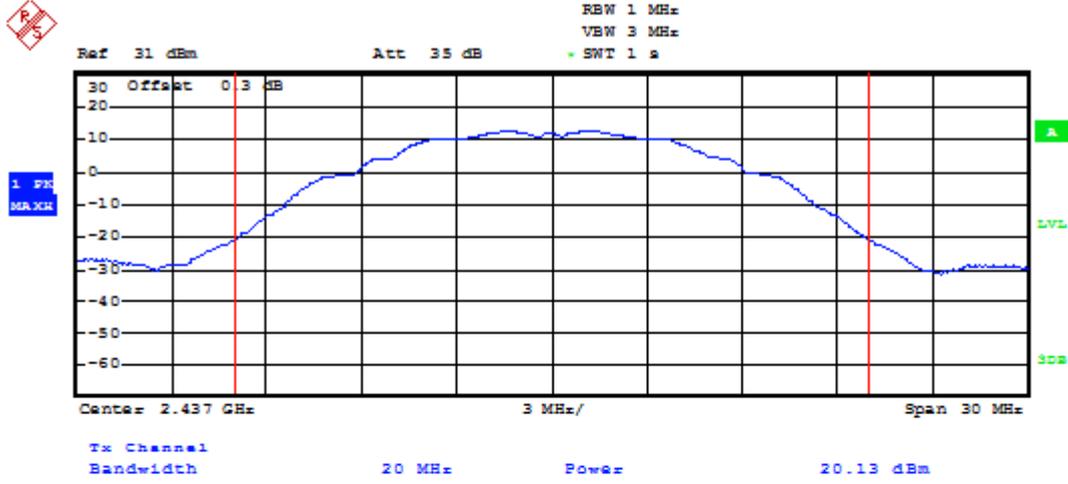
Part II - Test Plots

2.1 11B_L



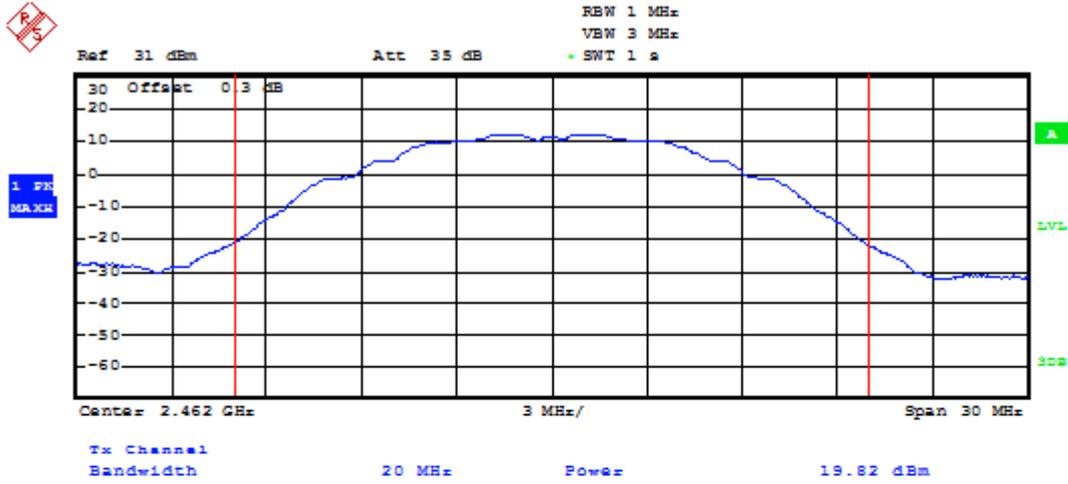
Date: 23. SEP. 2013 11:20:45

2.1 11B_M



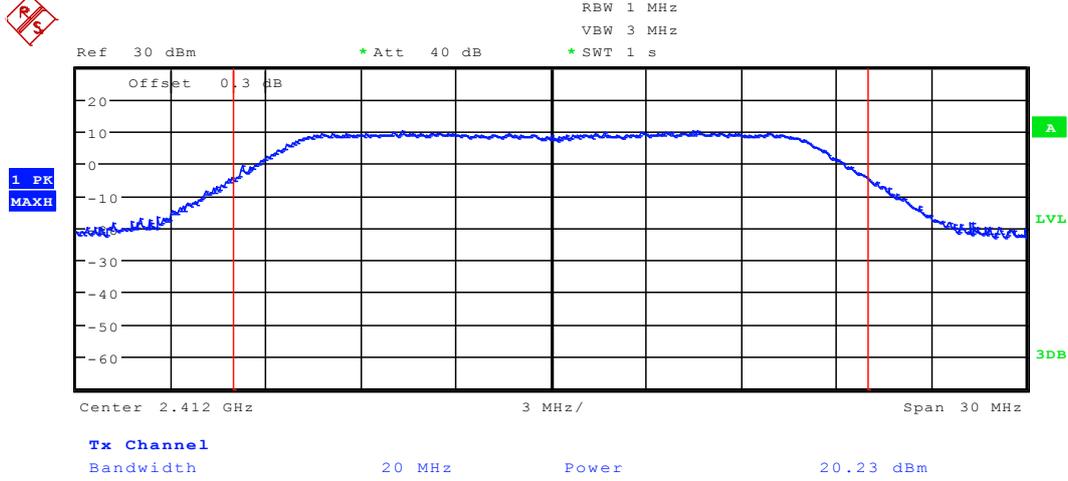
Date: 23.SEP.2013 11:22:28

2.1 11B_H



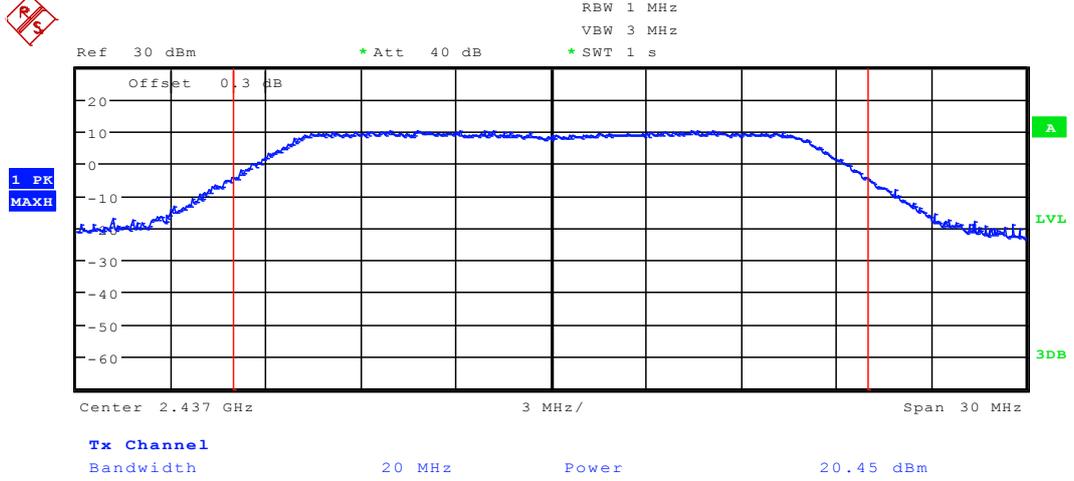
Date: 23.SEP.2013 11:24:08

2.1 11G_L



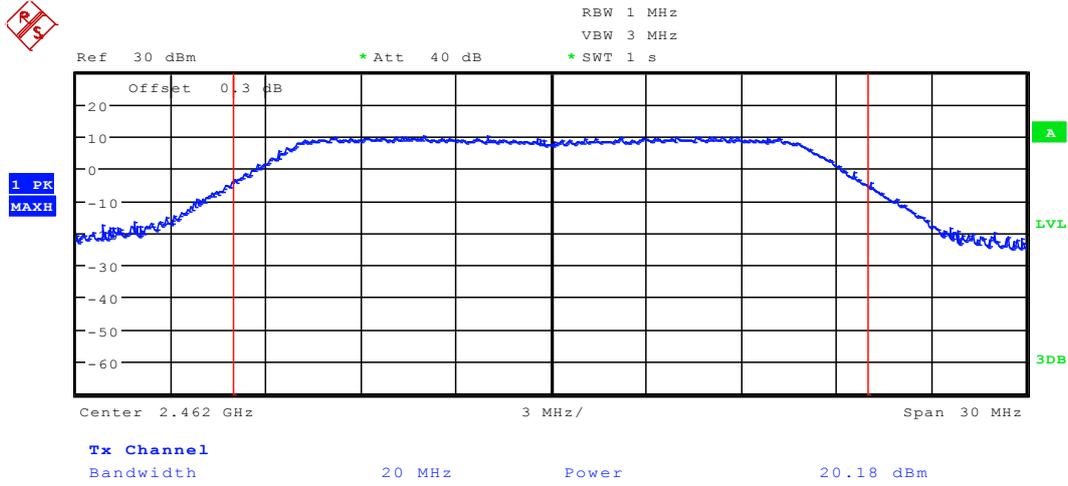
Date: 11.SEP.2013 19:39:56

2.1 11G_M



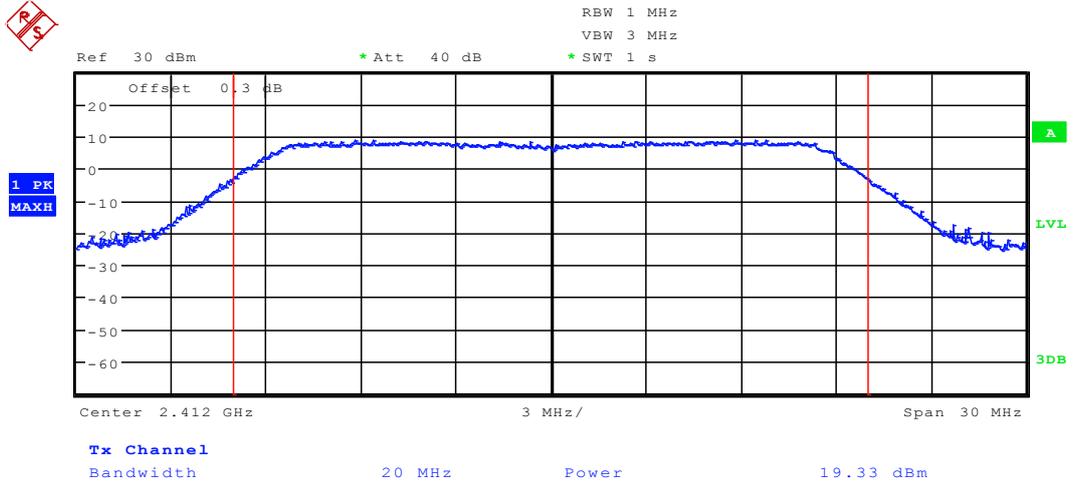
Date: 11.SEP.2013 19:40:27

2.1 11G_H



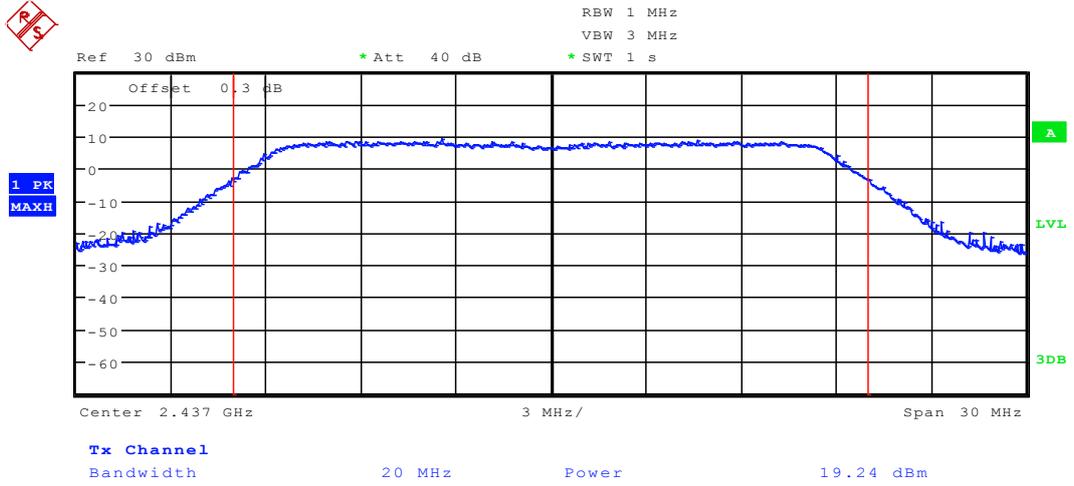
Date: 11.SEP.2013 19:40:59

2.1 11N_L



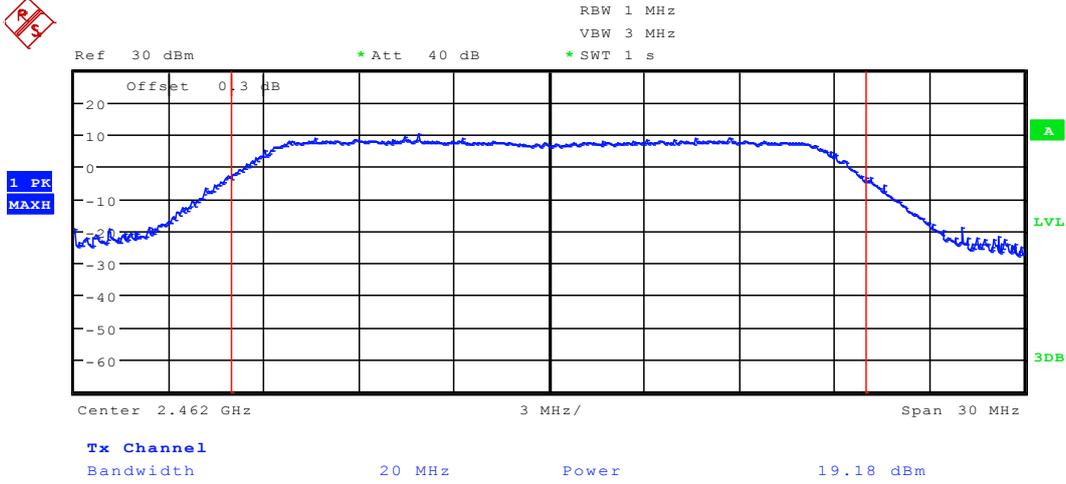
Date: 11.SEP.2013 19:42:02

2.1 11N_M



Date: 11.SEP.2013 19:42:29

2.1 11N_H



Date: 11.SEP.2013 19:42:52

Appendix C: Average Power

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Average Power(dBm)
11B	L	2412	16.1
11B	M	2437	15.71
11B	H	2462	15.48
11G	L	2412	10.05
11G	M	2437	10.18
11G	H	2462	9.97
11N20	L	2412	9.24
11N20	M	2437	9.36
11N20	H	2462	9.12

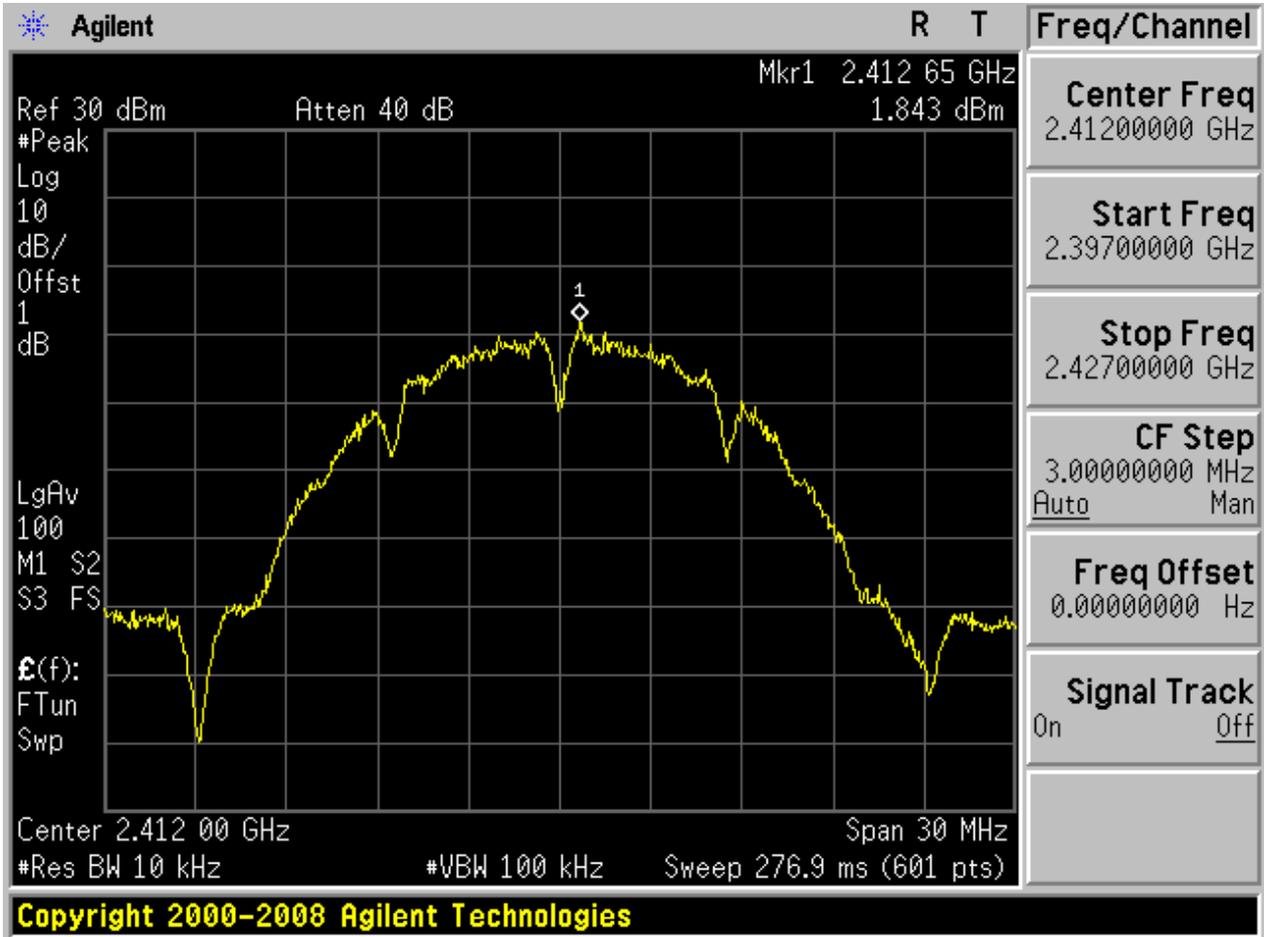
Appendix D: Maximum Power Spectral Density Level

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	PD[MHz]	Verdict
11B	L	2412	1.84	pass
11B	M	2437	0.49	pass
11B	H	2462	1.23	pass
11G	L	2412	-6.52	pass
11G	M	2437	-6.59	pass
11G	H	2462	-6.38	pass
11N20	L	2412	-8.06	pass
11N20	M	2437	-8.53	pass
11N20	H	2462	-8.92	pass

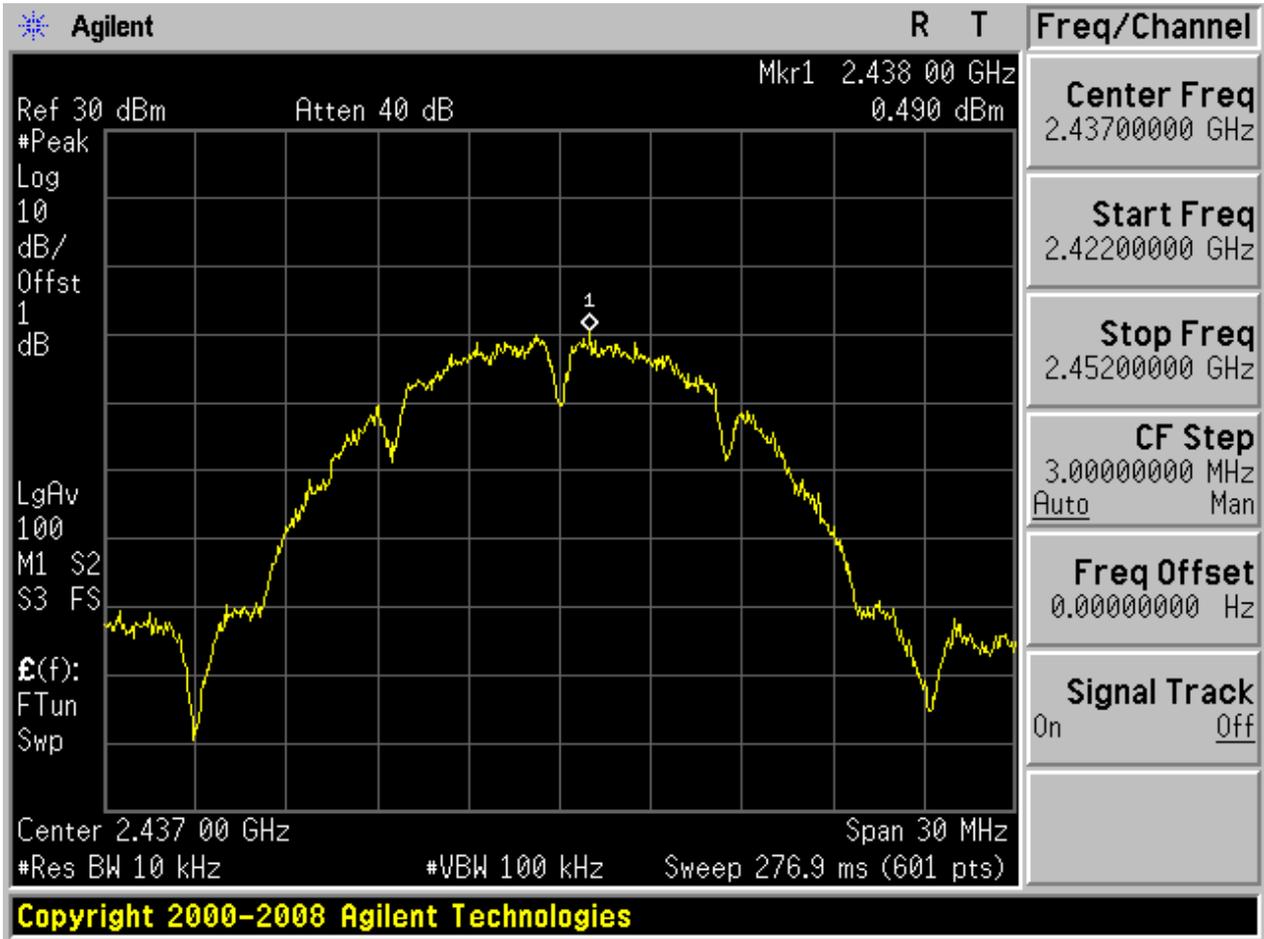
Part II - Test Plots

2.1 11B_L

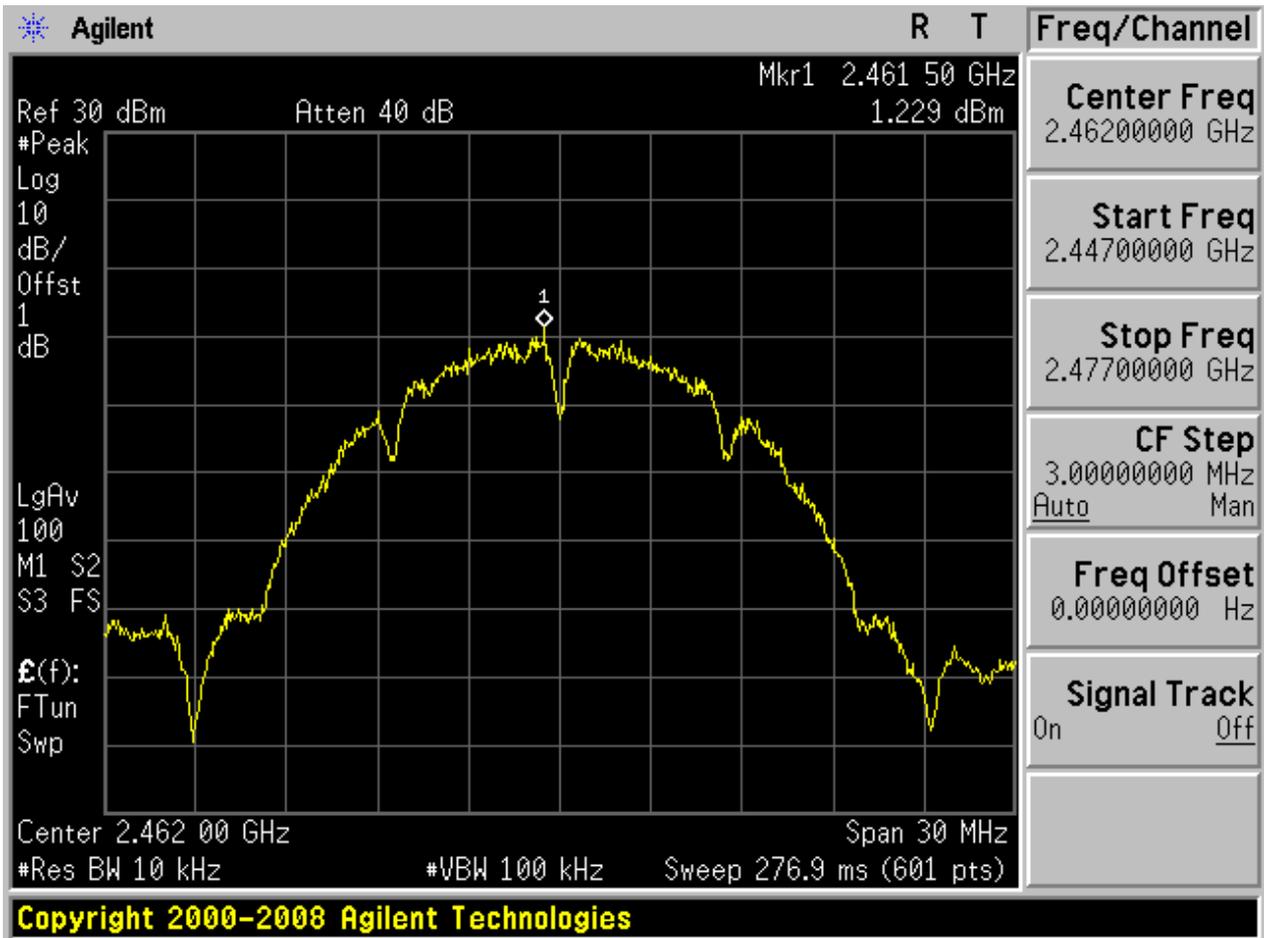




2.2 11B_M

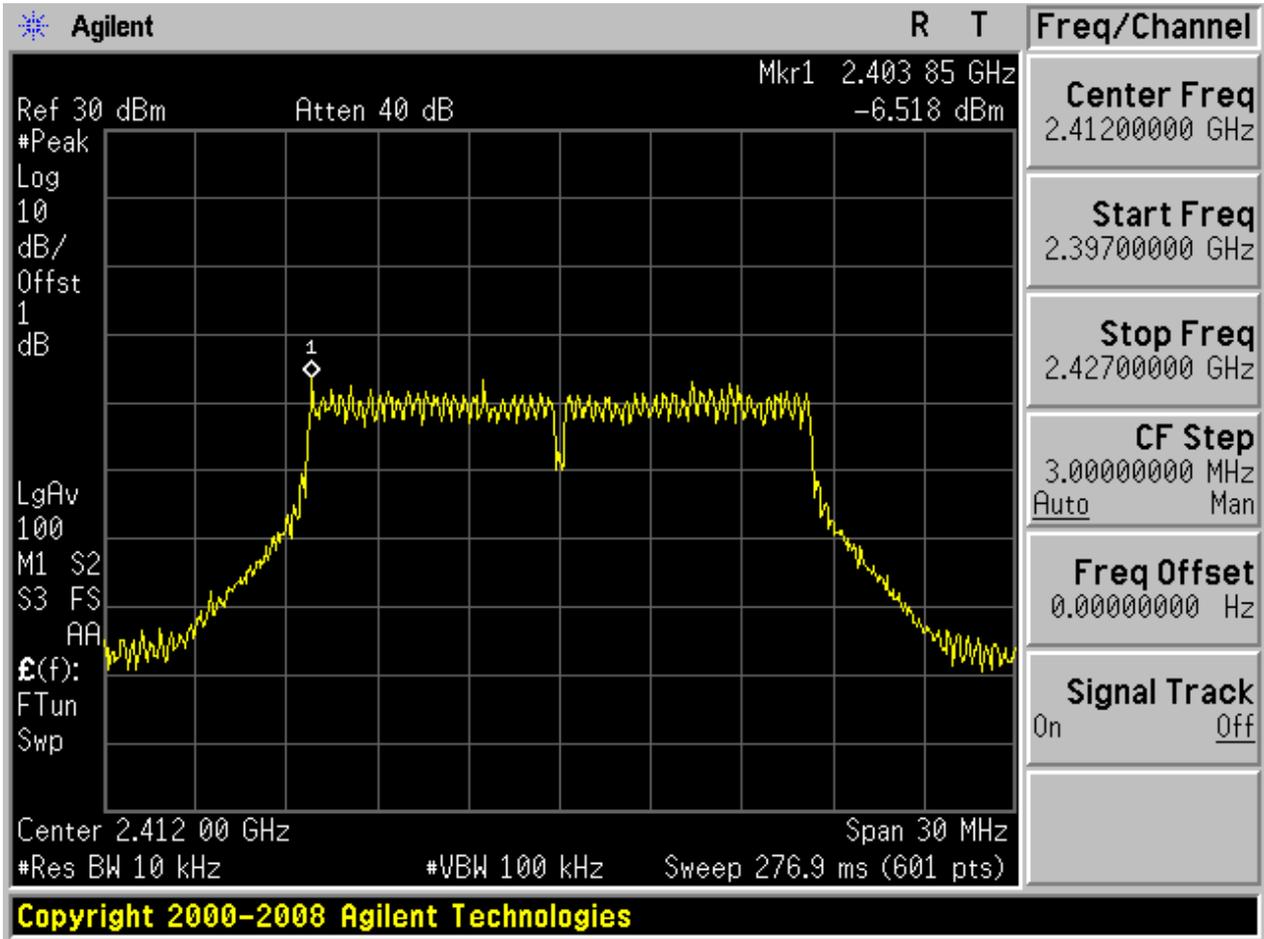


2.3 11B_H



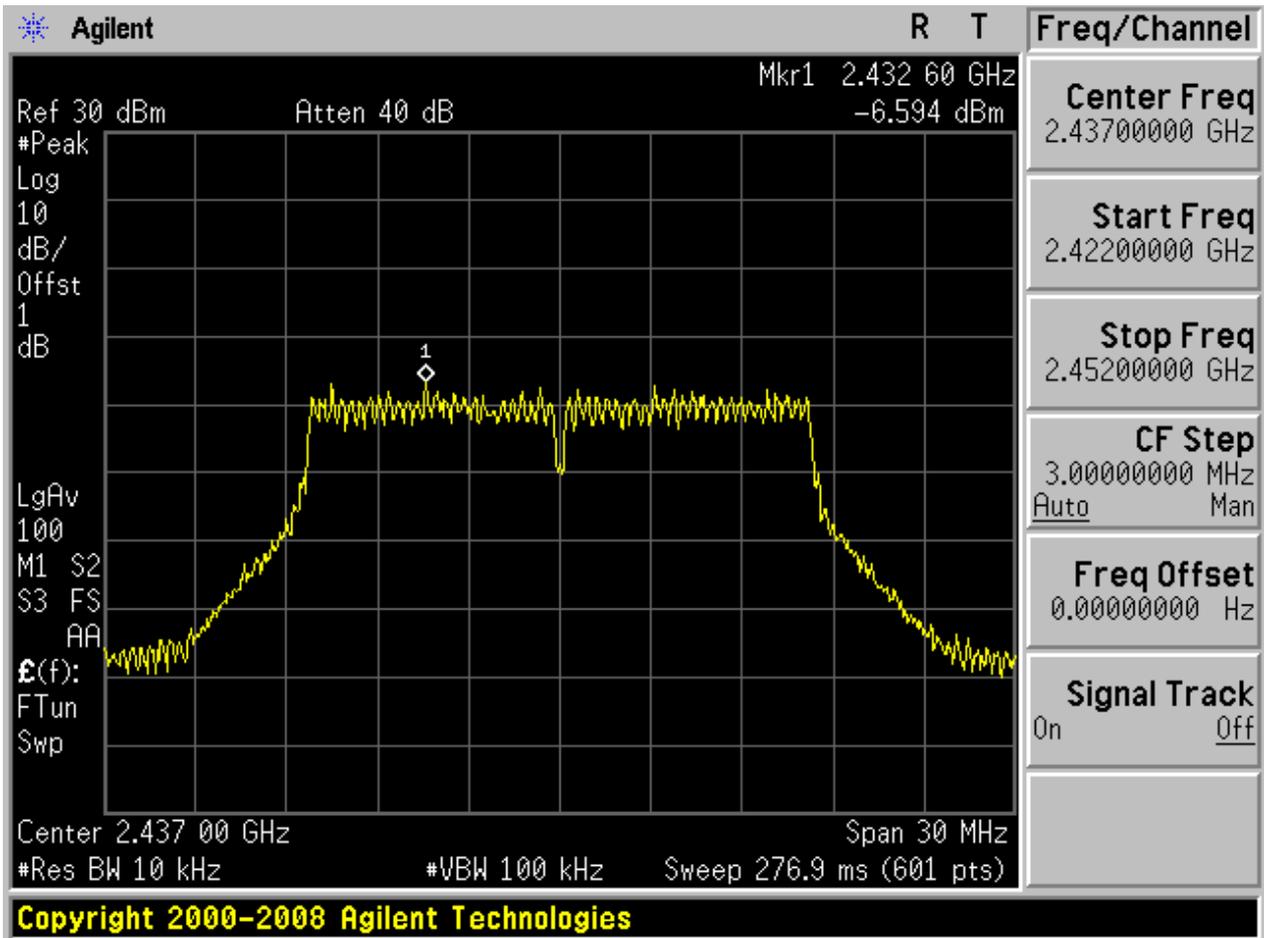


2.4 11G_L



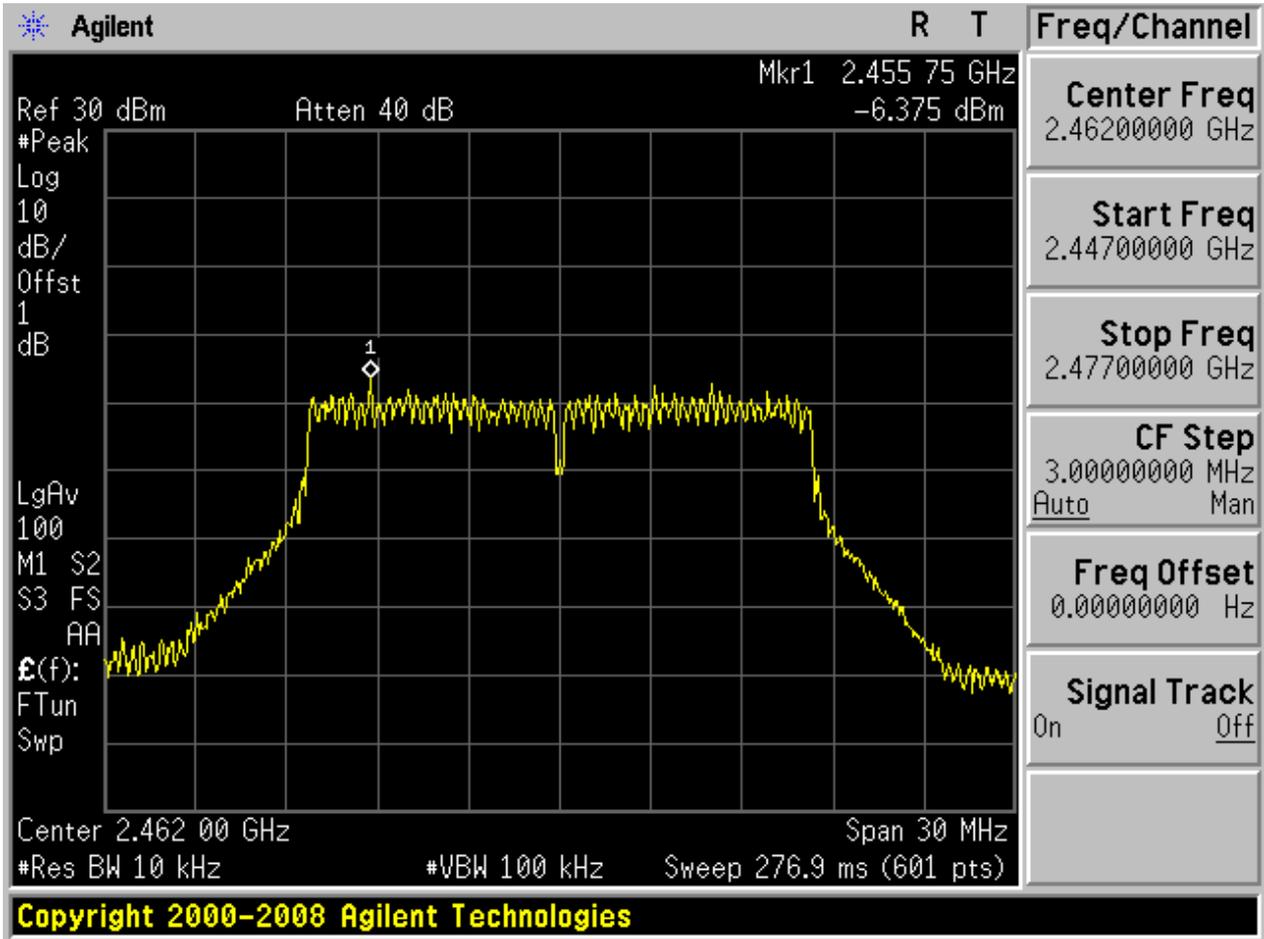


2.5 11G_M

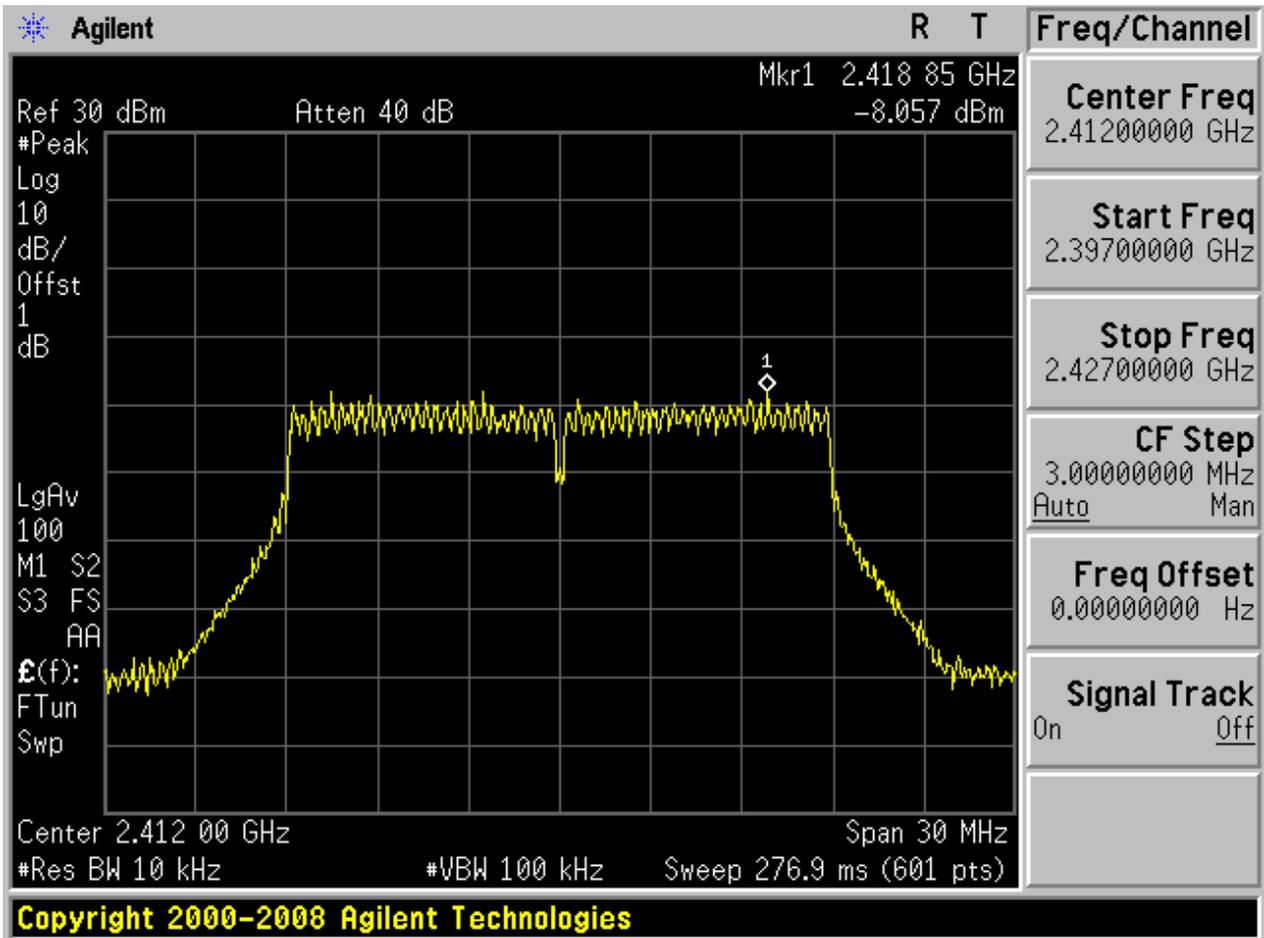




2.6 11G_H

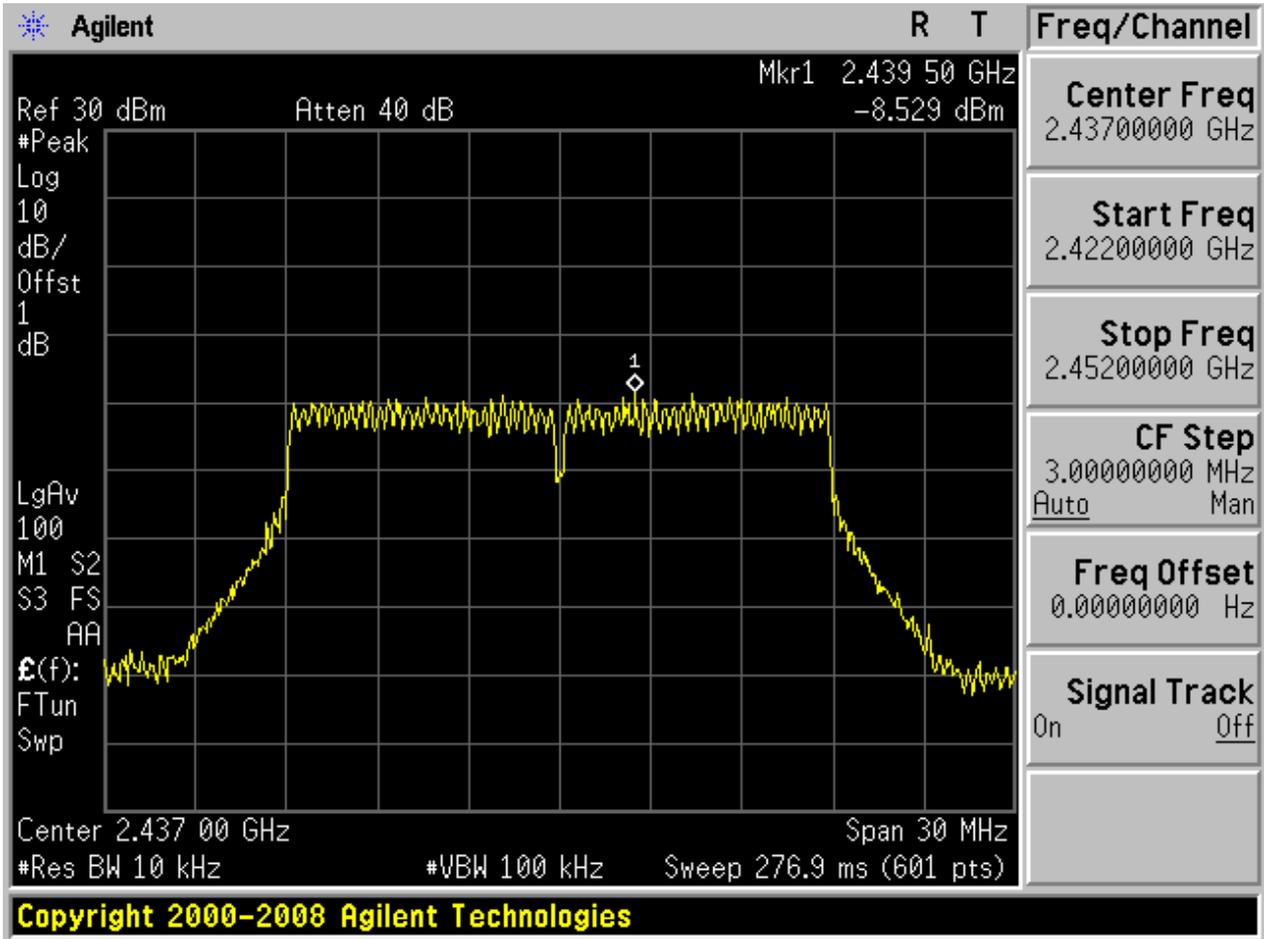


2.7 11N20_L



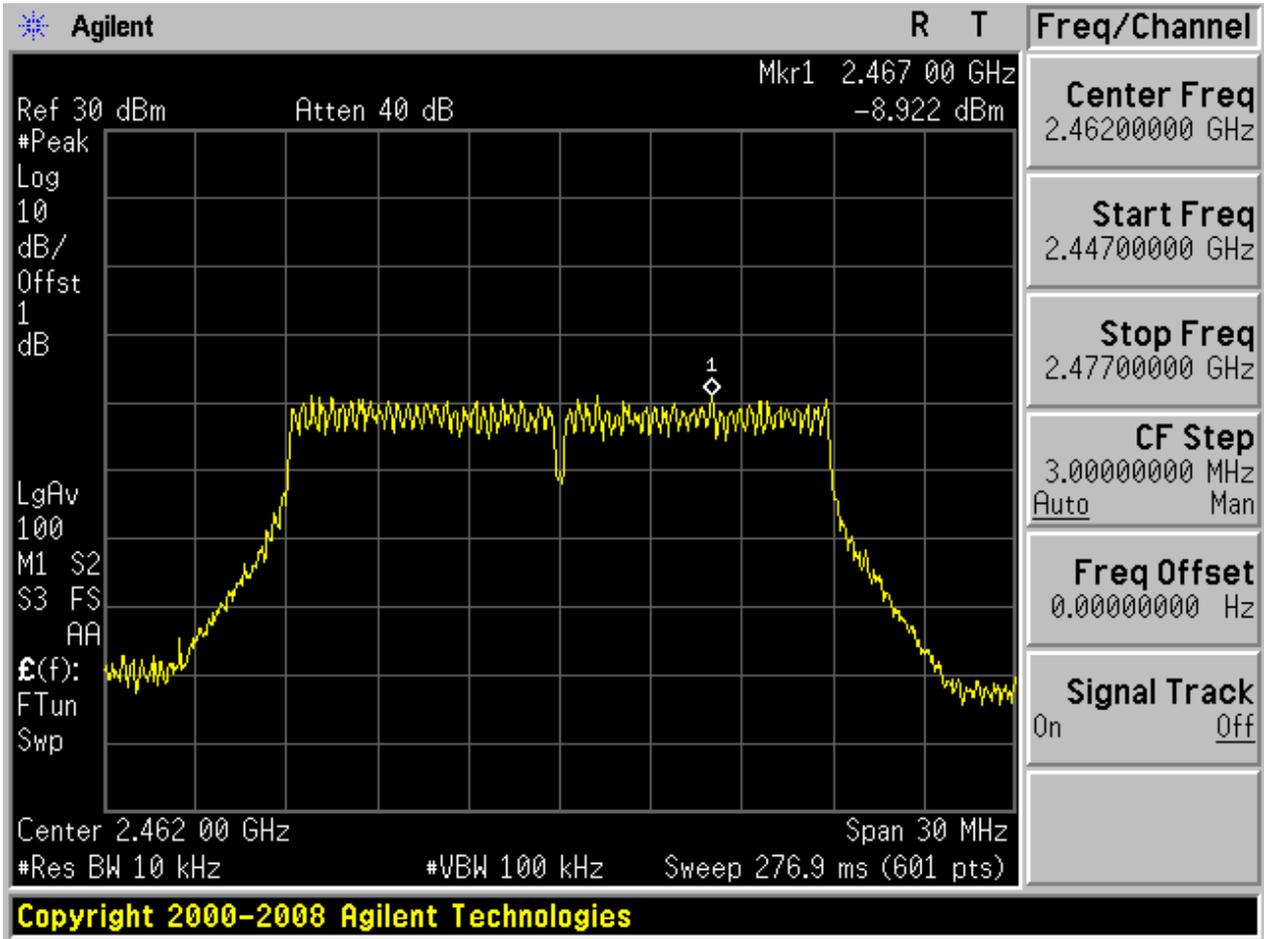


2.8 11N20_M





2.9 11N20_H



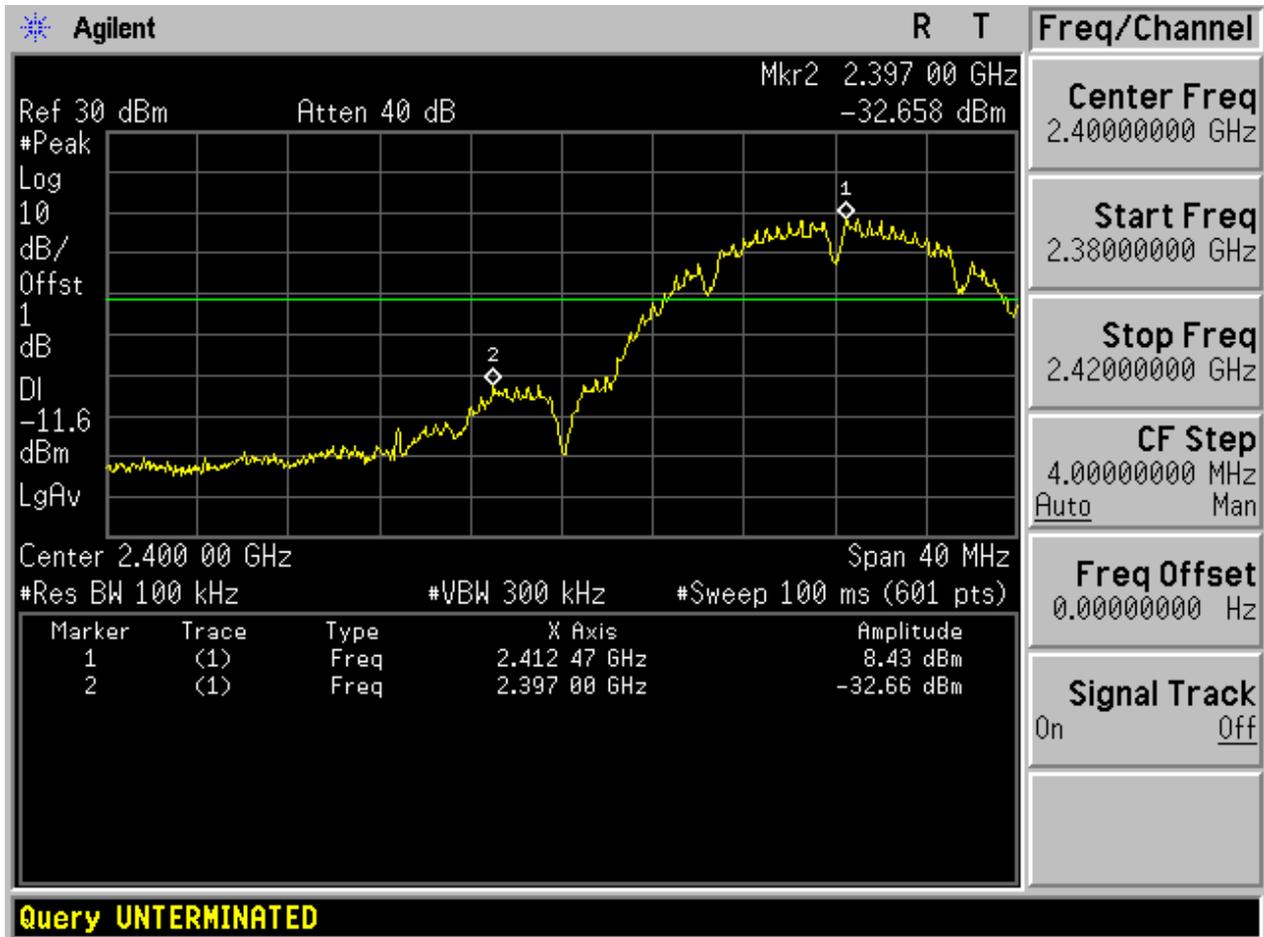
Appendix E: Band Edges Compliance

Part I - Test Results

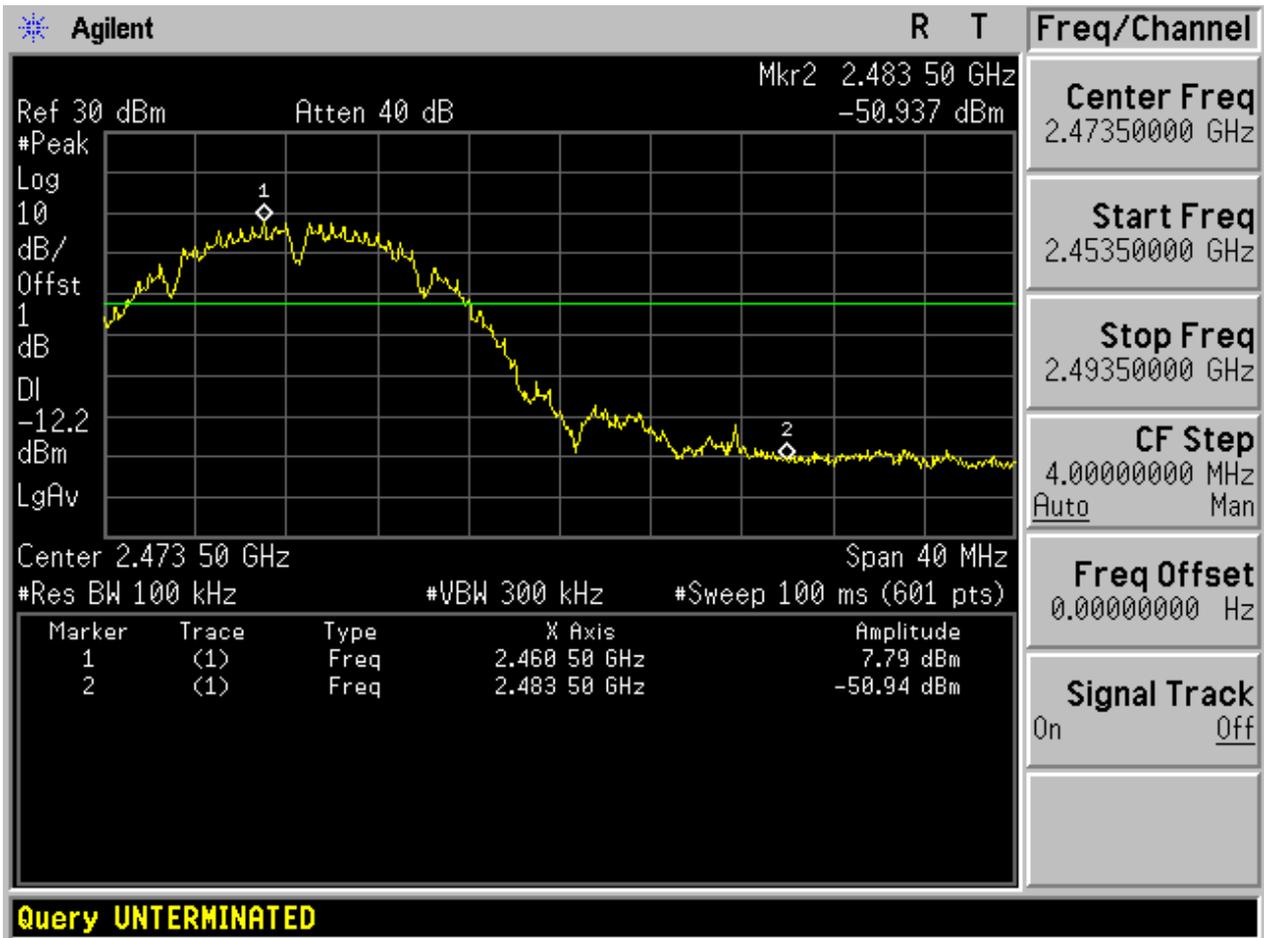
Test Mode	Test Channel	Frequency[MHz]	Carrier Power[dBm]	Max.Spurious Level[dBm]	Verdict
11B	L	2412	8.43	-32.66	pass
11B	H	2462	7.79	-50.94	pass
11G	L	2412	0.77	-31.42	pass
11G	H	2462	0.61	-48.38	pass
11N20	L	2412	-0.61	-34.91	pass
11N20	H	2462	-0.53	-50.06	pass

Part II - Test Plots

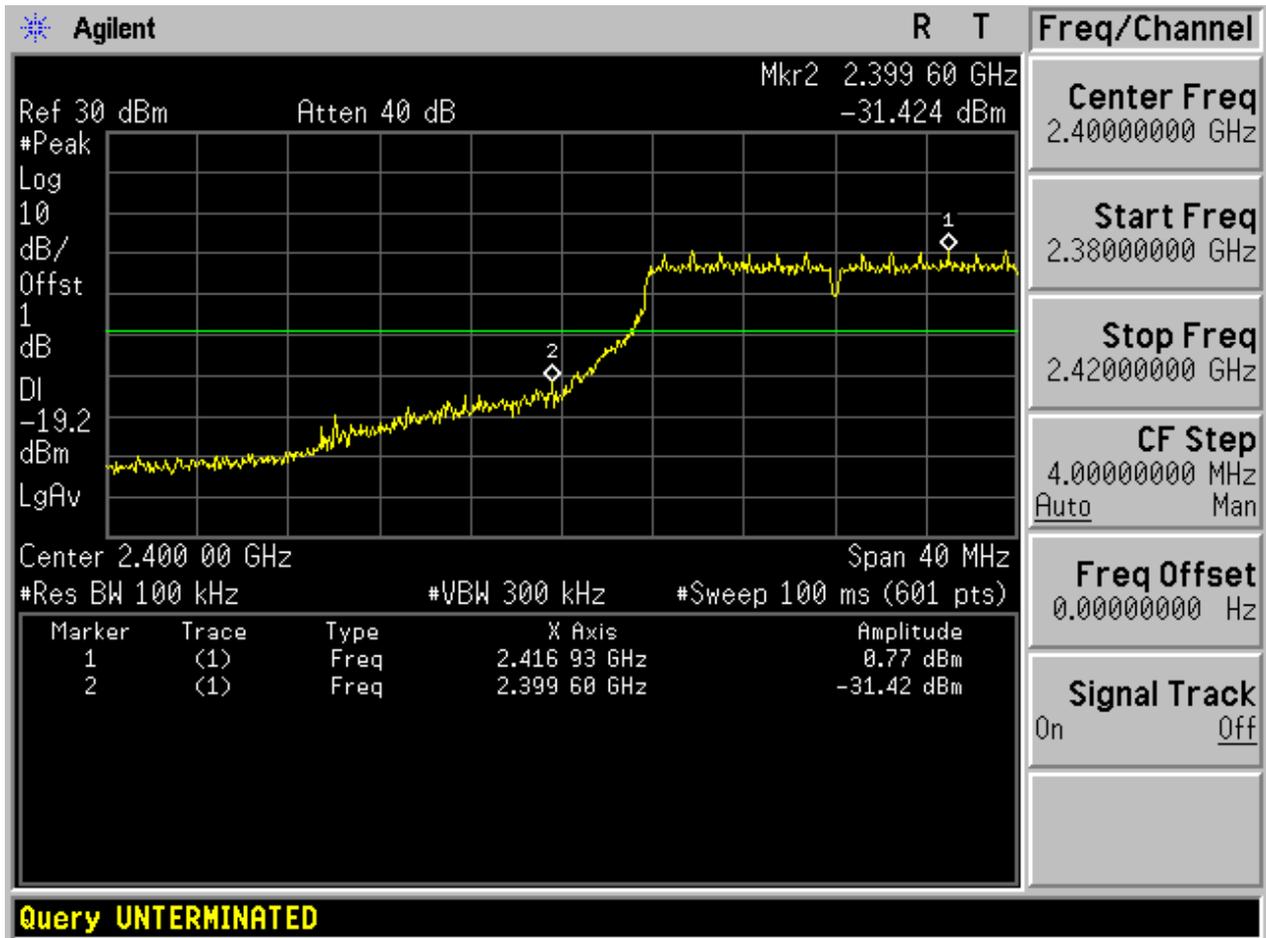
2.1 11B_L



2.2 11B_H

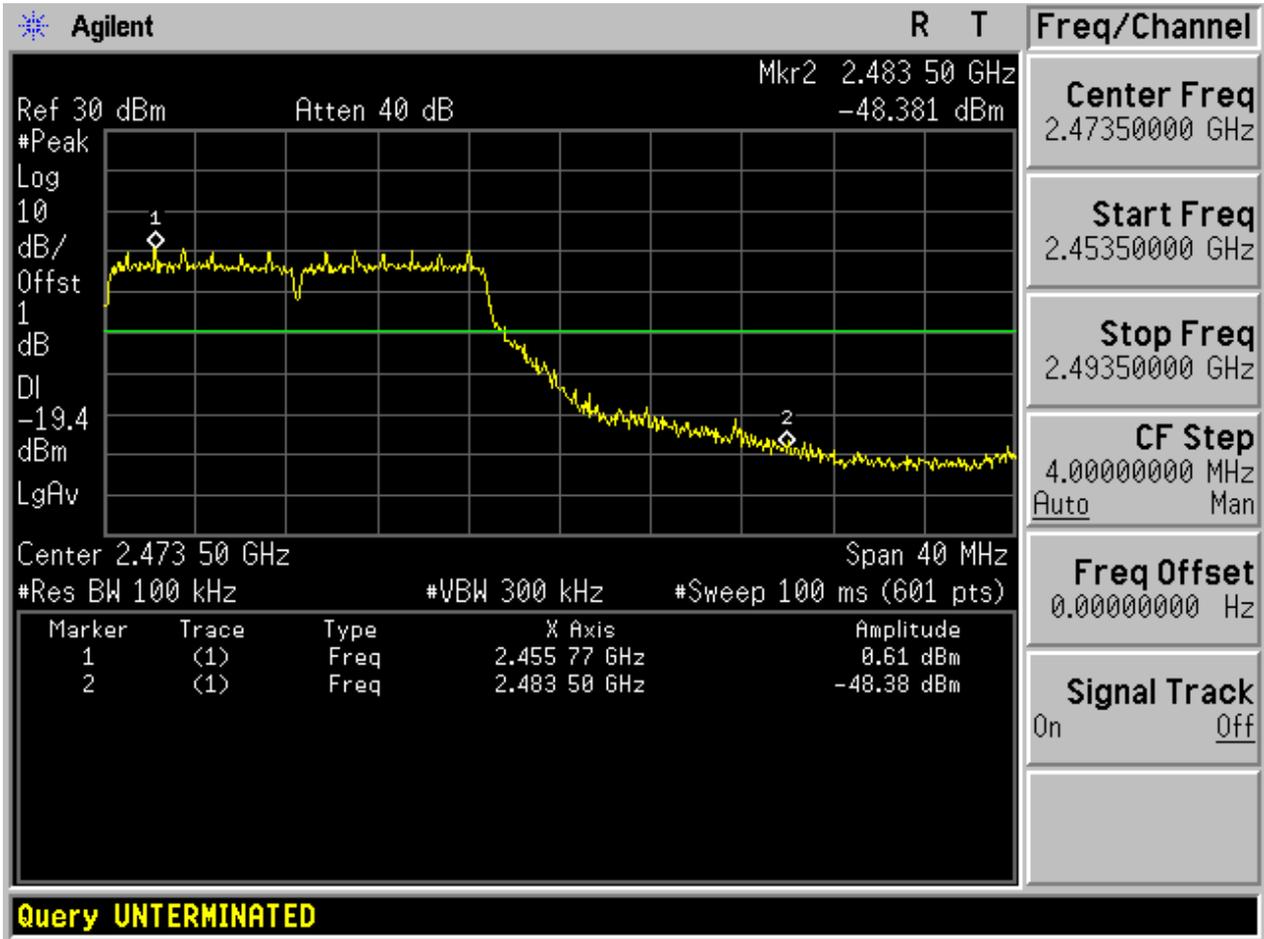


2.3 11G_L

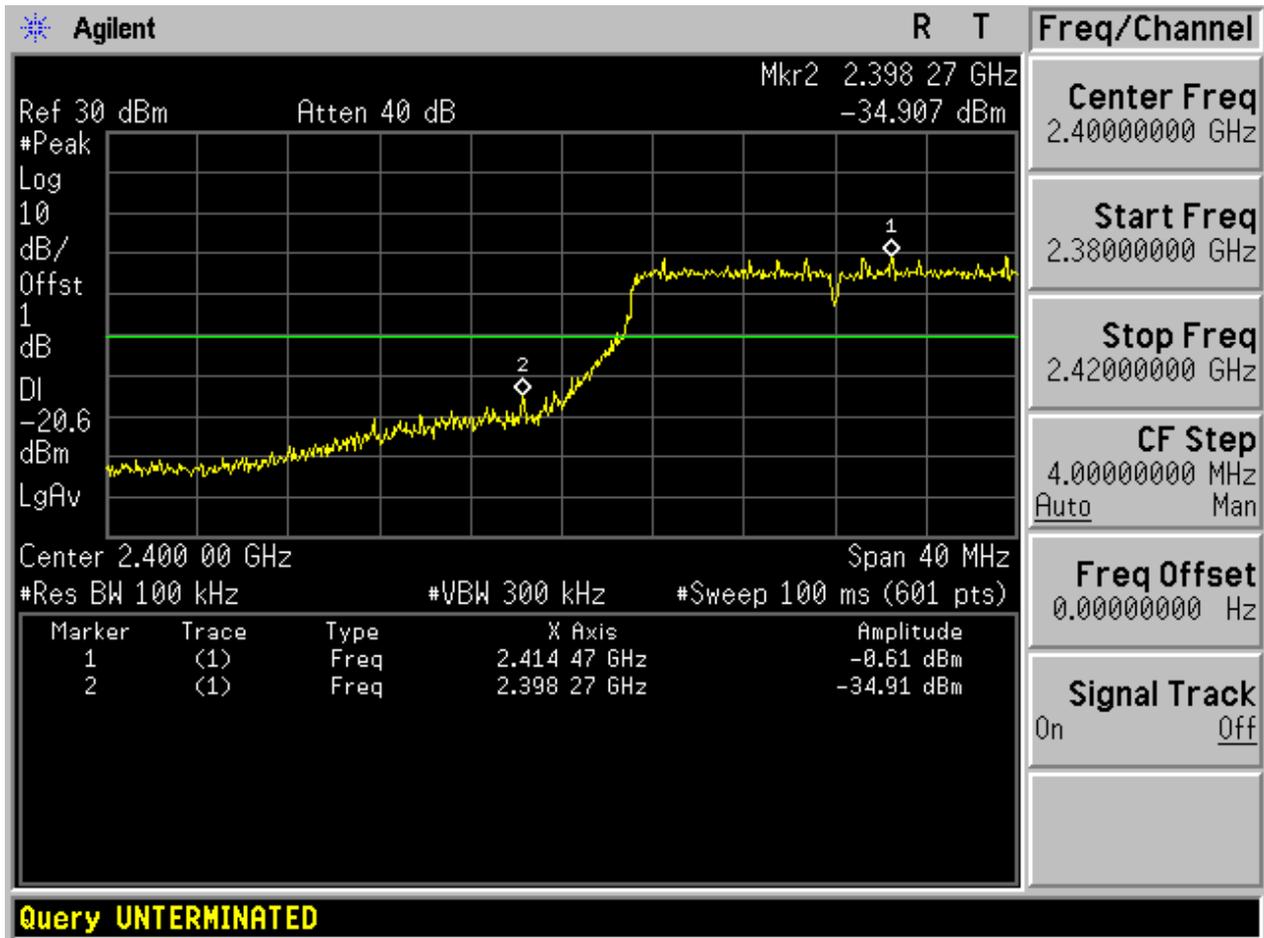




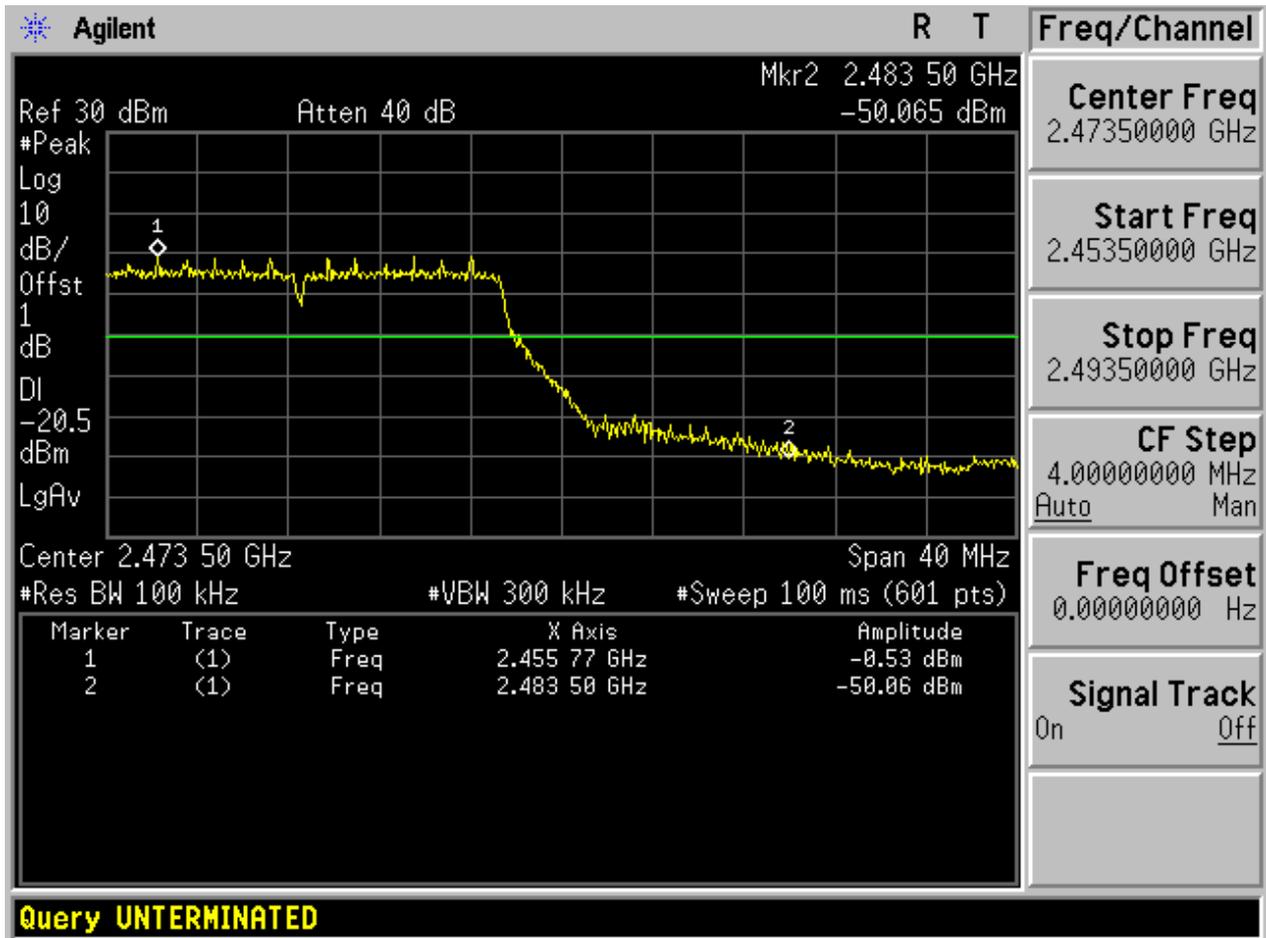
2.4 11G_H



2.5 11N20_L



2.6 11N20_H



Appendix F: Unwanted Emissions into Non-Restricted Frequency

Bands

In this Appendix, the "Pref", which is used as the reference level, refers to the peak power level in any 100 kHz bandwidth within the fundamental emission, the "Puw" refers to the maximum emission power in 100 kHz band segments outside of the authorized frequency band.

Considering that the higher ratio of RBW to the span for the frequency ranges below 30 MHz makes the results determination be complicated, a narrower RBW other than 100 kHz is used for these ranges. The measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \times \lg(100 [kHz]/\text{narrower RBW [kHz]})$. As to this Appendix, the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain and used as respective results for each chain, due to the relative-limit requirement.

In the result table, the "< Limit" denotes that "The Puw [dBm] is less than Pref[dBm]-20[dBm], see test plots for detailed".

Part I - Test Results

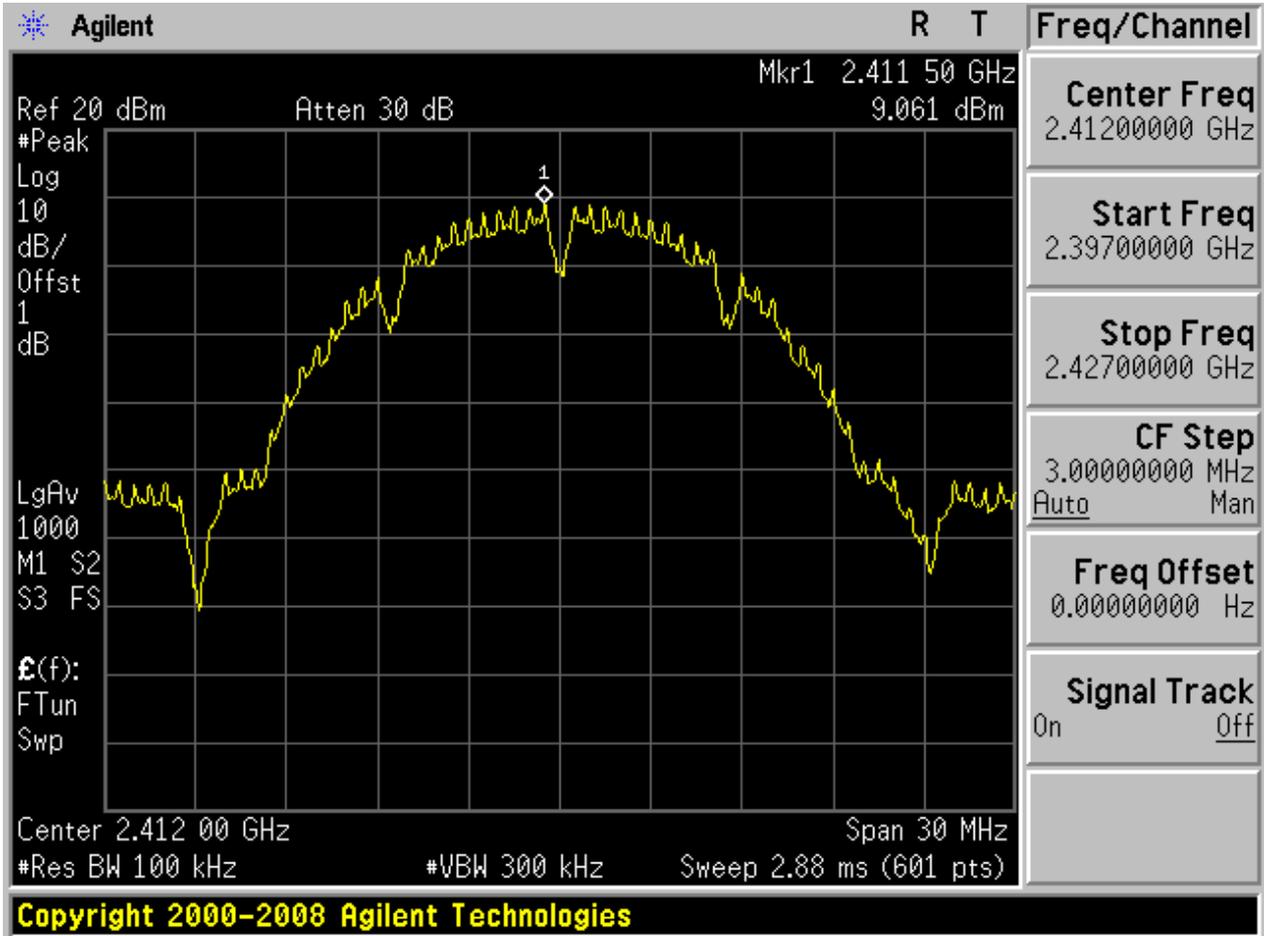
Test Mode	Test Channel	Frequency[MHz]	Pref[dBm]	Puw[dBm]	Verdict
11B	L	2412	9.06	<limit	pass
11B	M	2437	8.74	<limit	pass
11B	H	2462	8.39	<limit	pass
11G	L	2412	1.43	<limit	pass
11G	M	2437	1.30	<limit	pass
11G	H	2462	1.12	<limit	pass
11N20	L	2412	0.11	<limit	pass
11N20	M	2437	0.24	<limit	pass
11N20	H	2462	0.12	<limit	pass



Part II - Test Plots

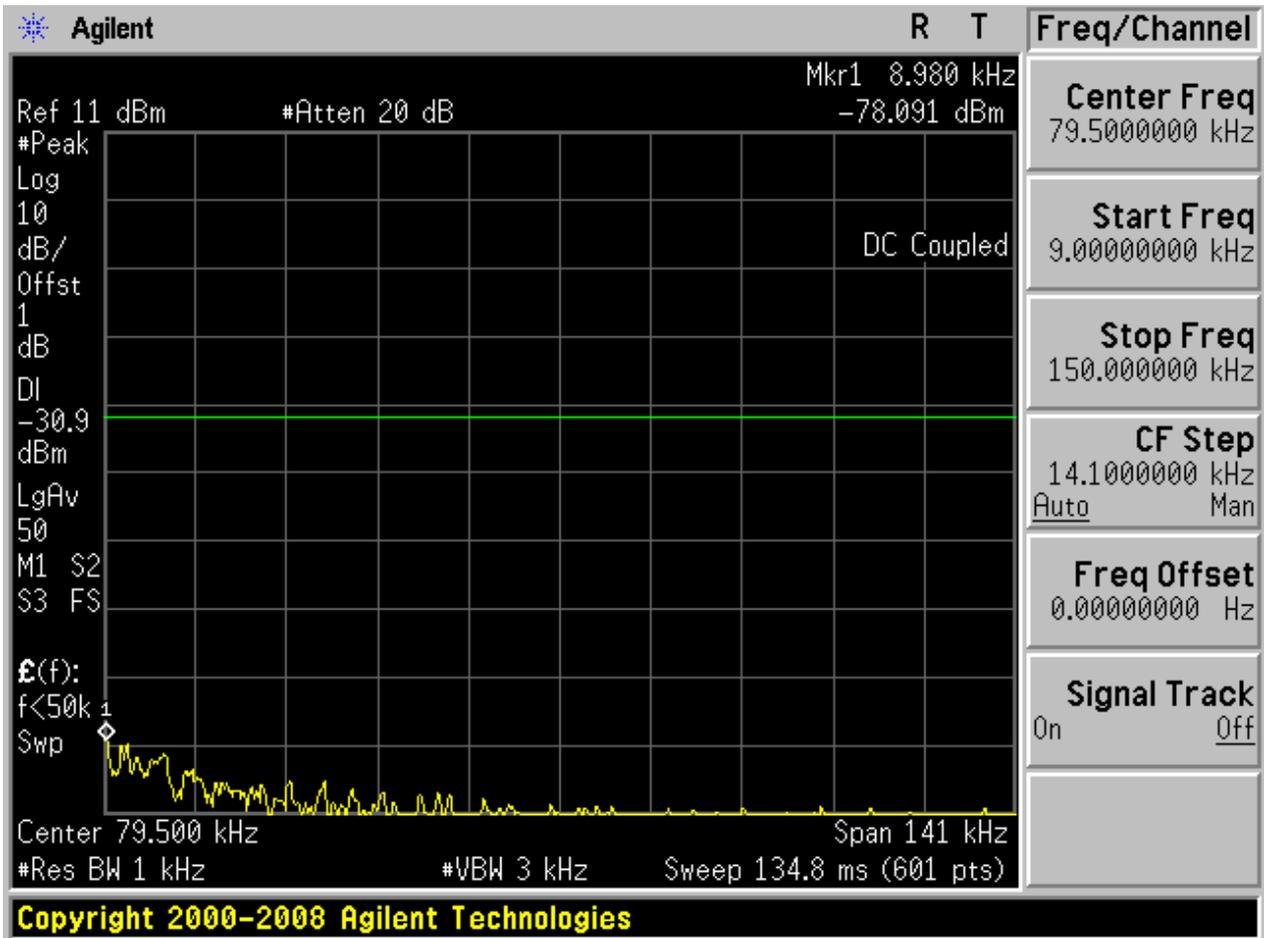
2.1 11B_L

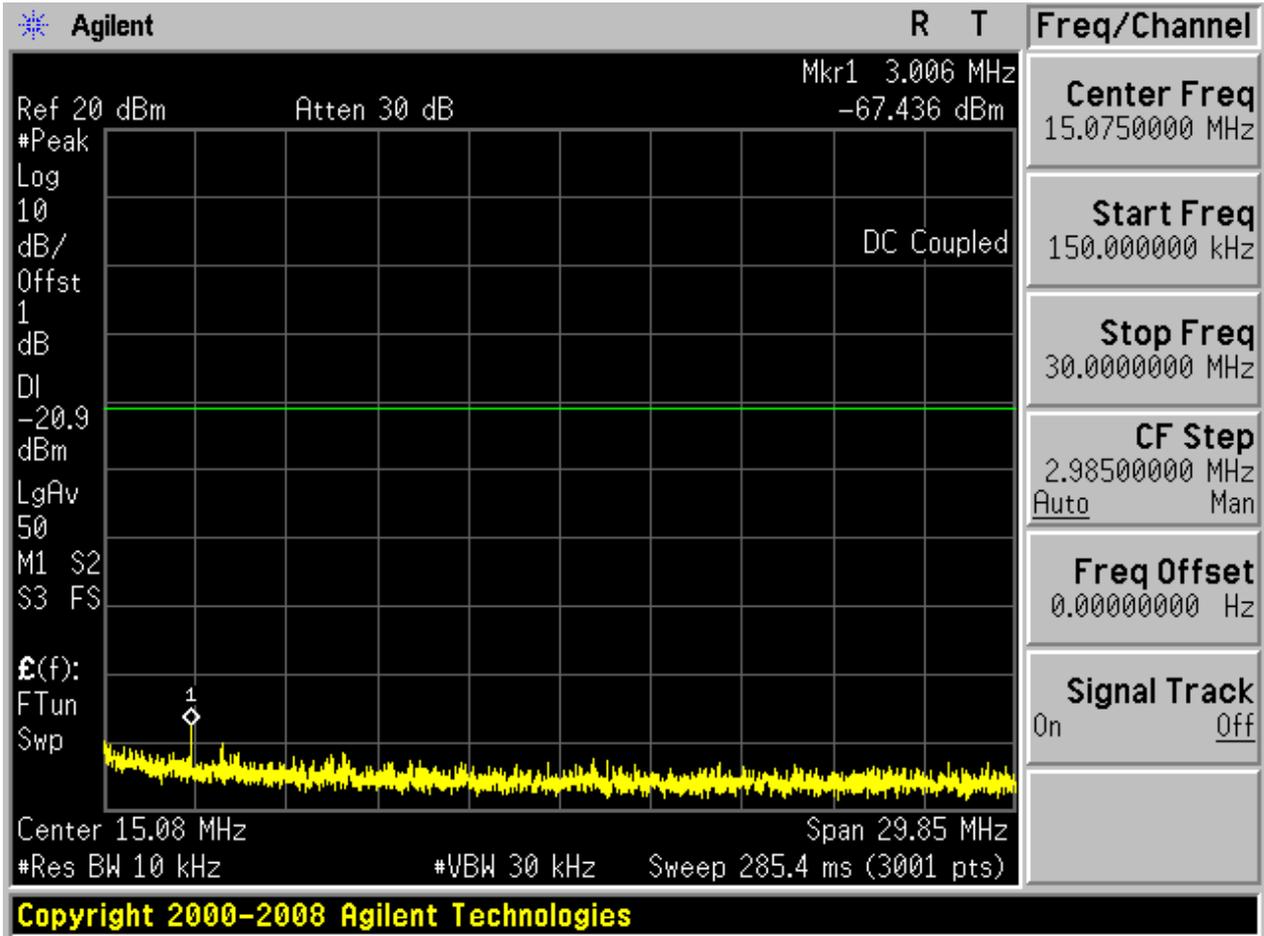
Pref:

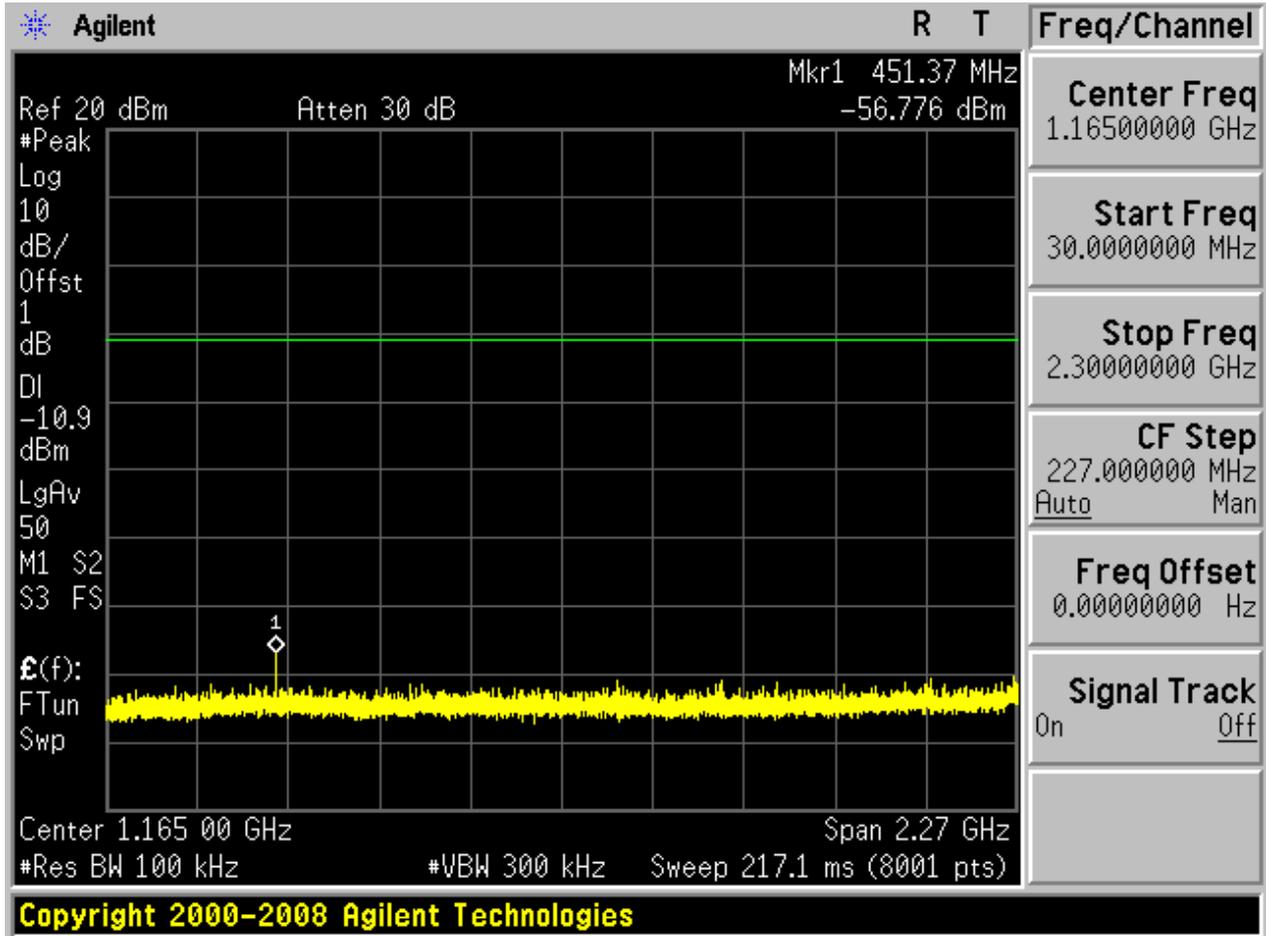


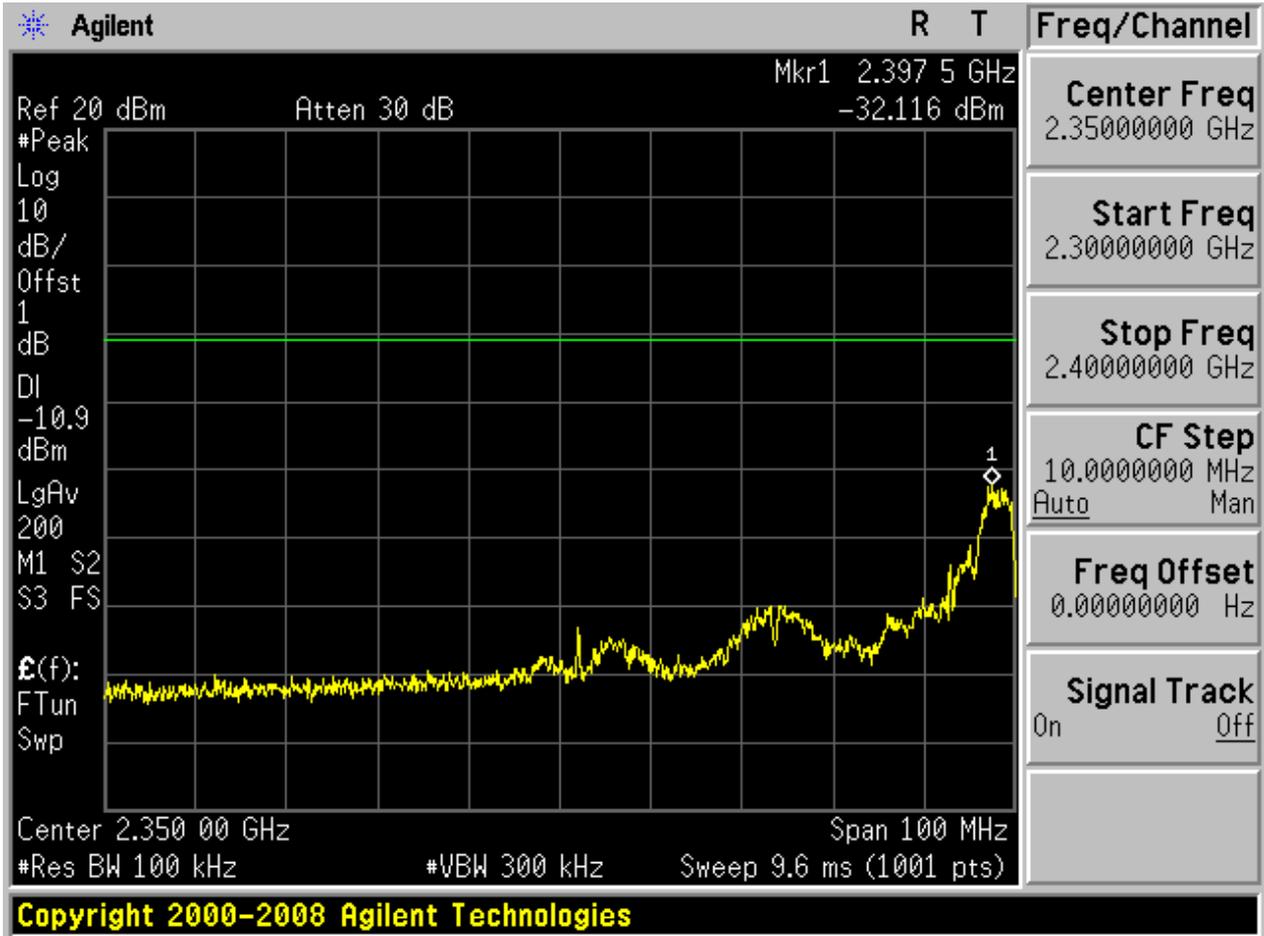


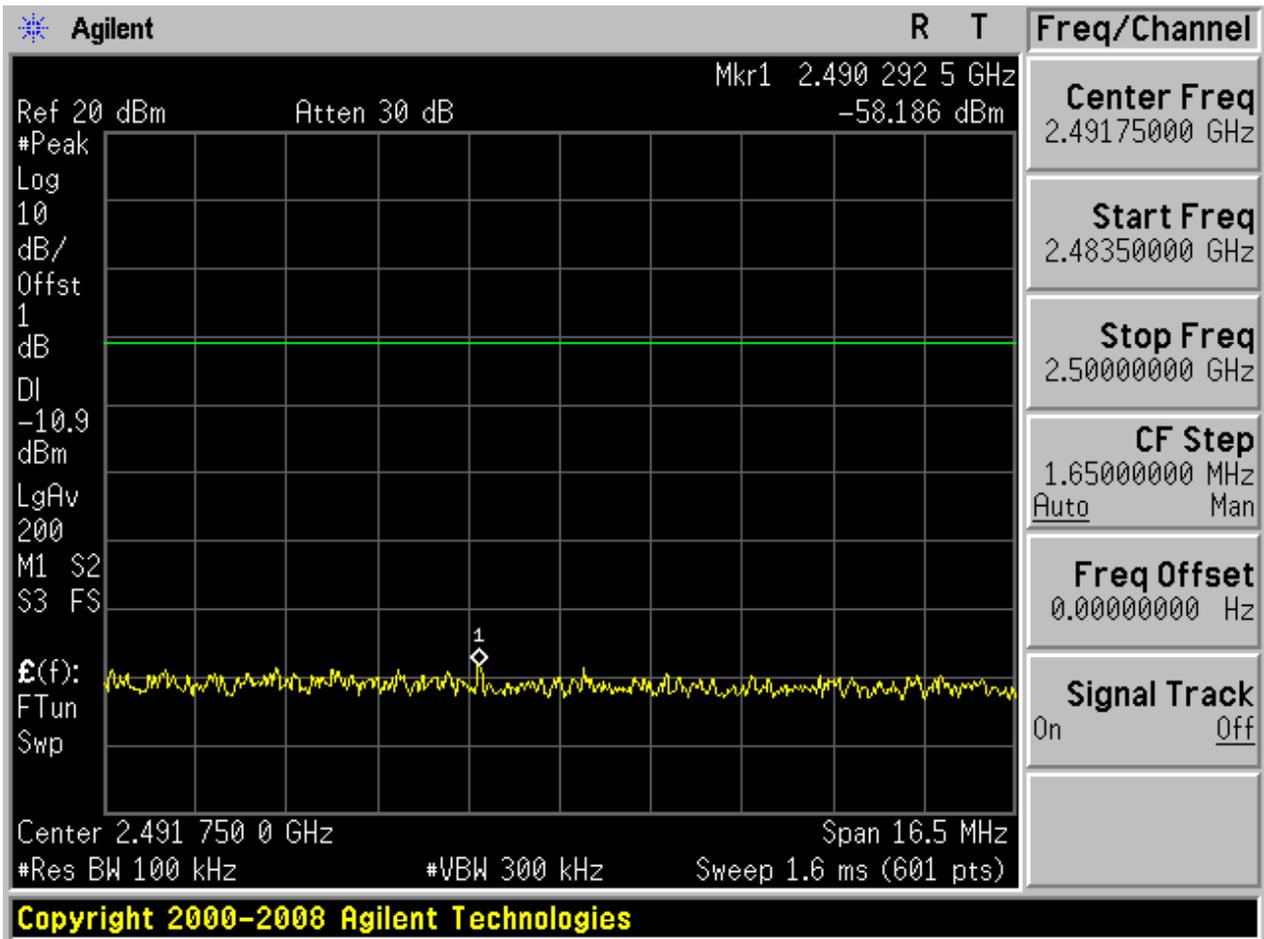
Puw:

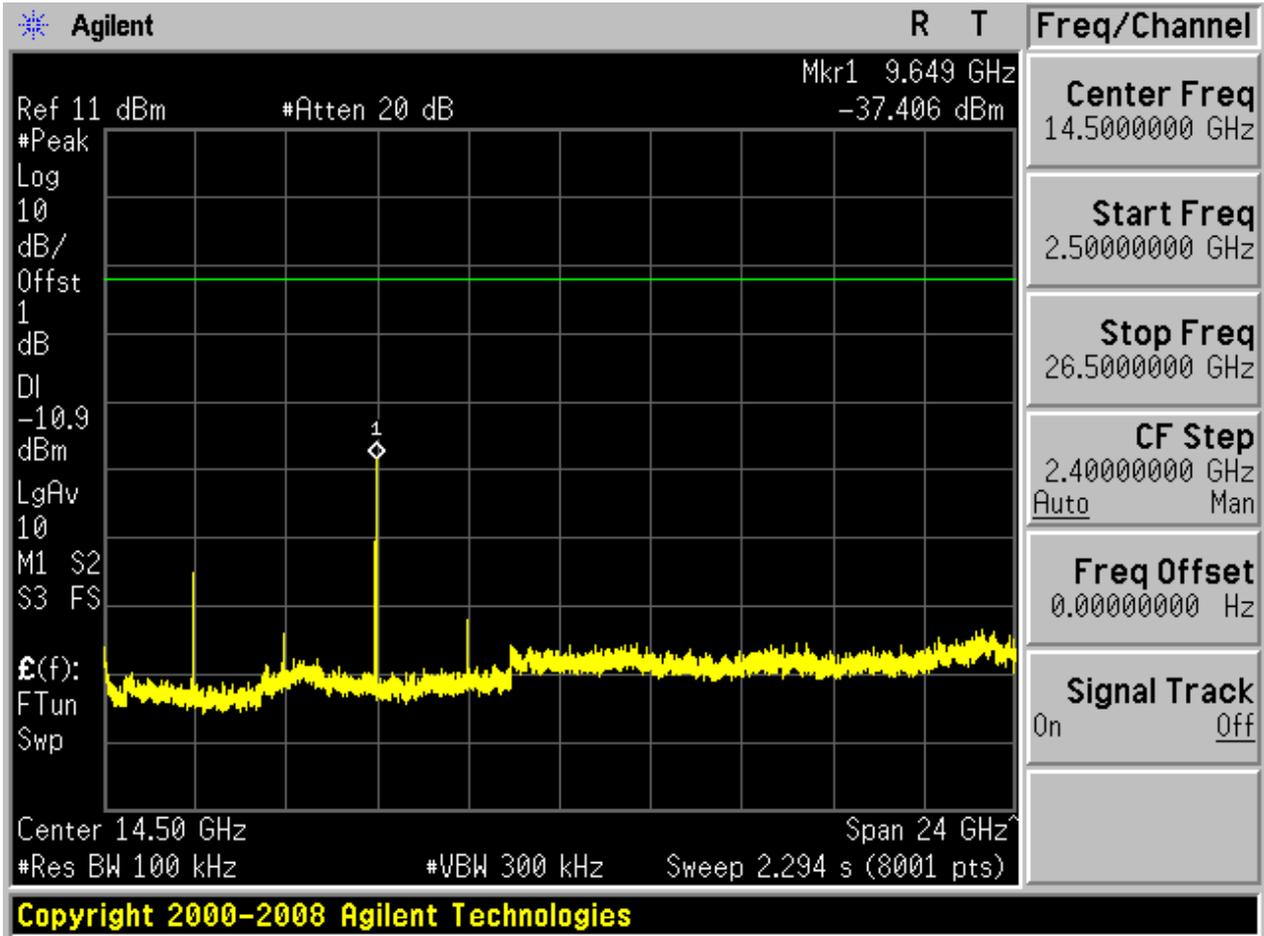






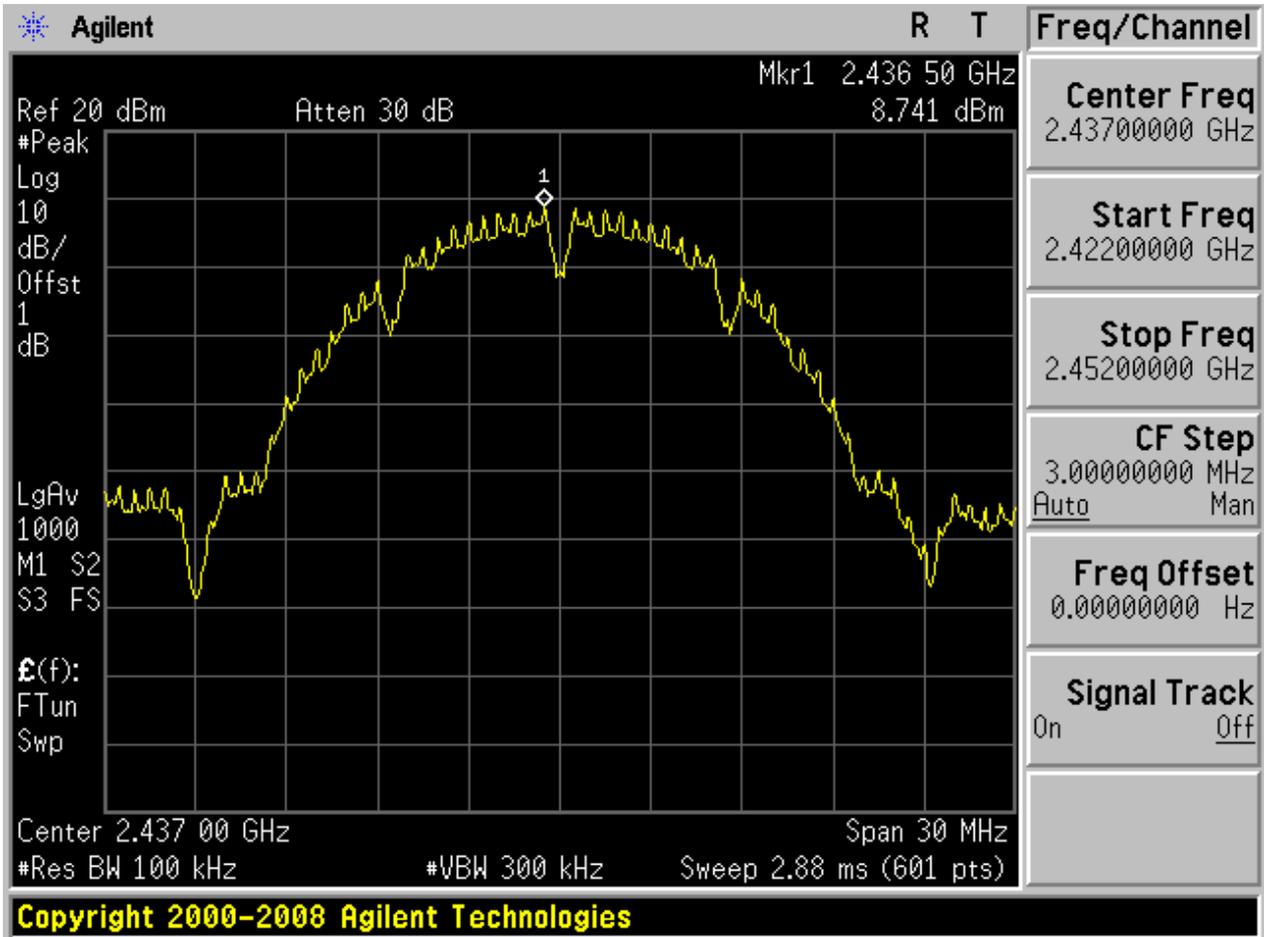






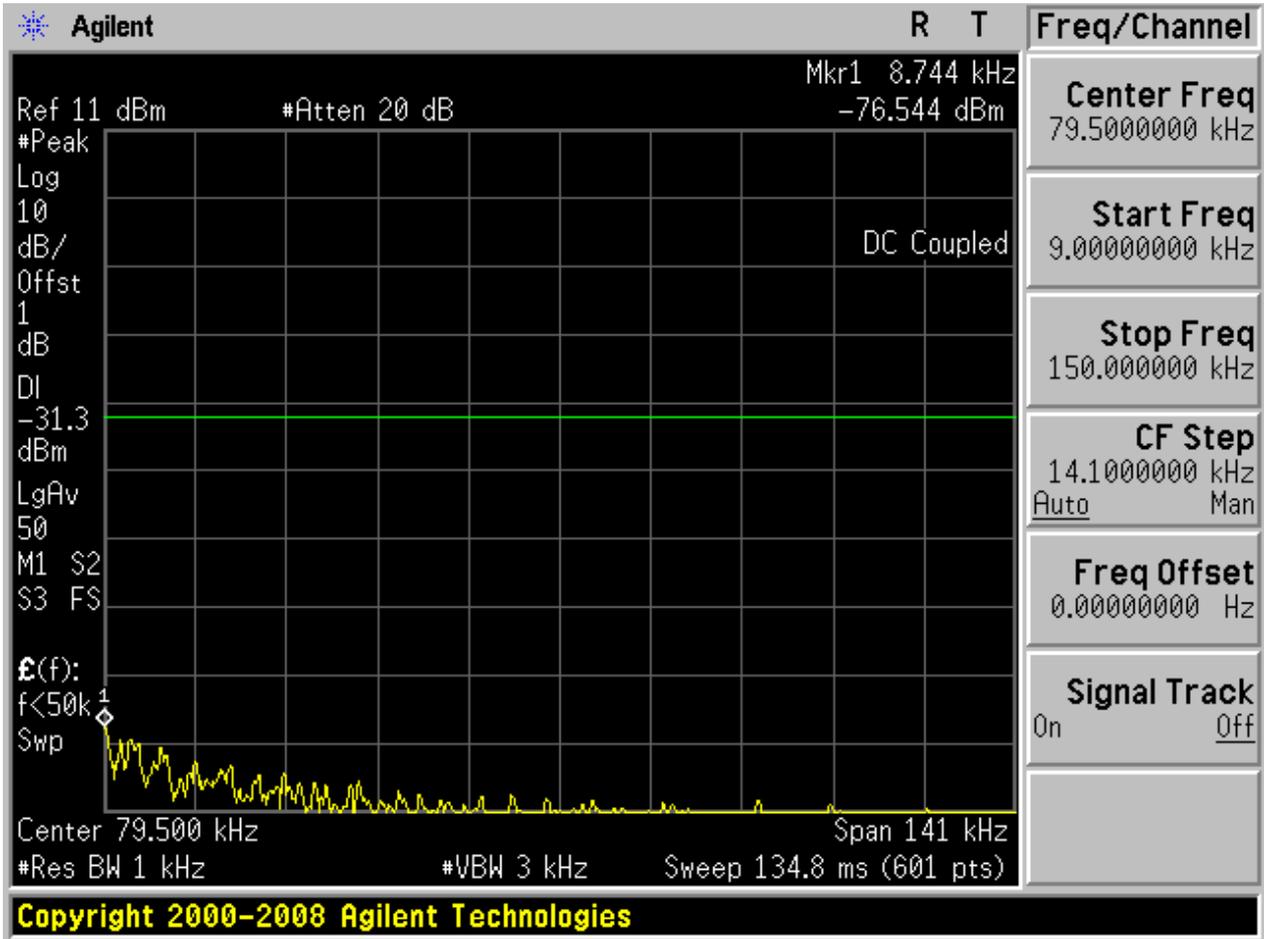
2.2 11B_M

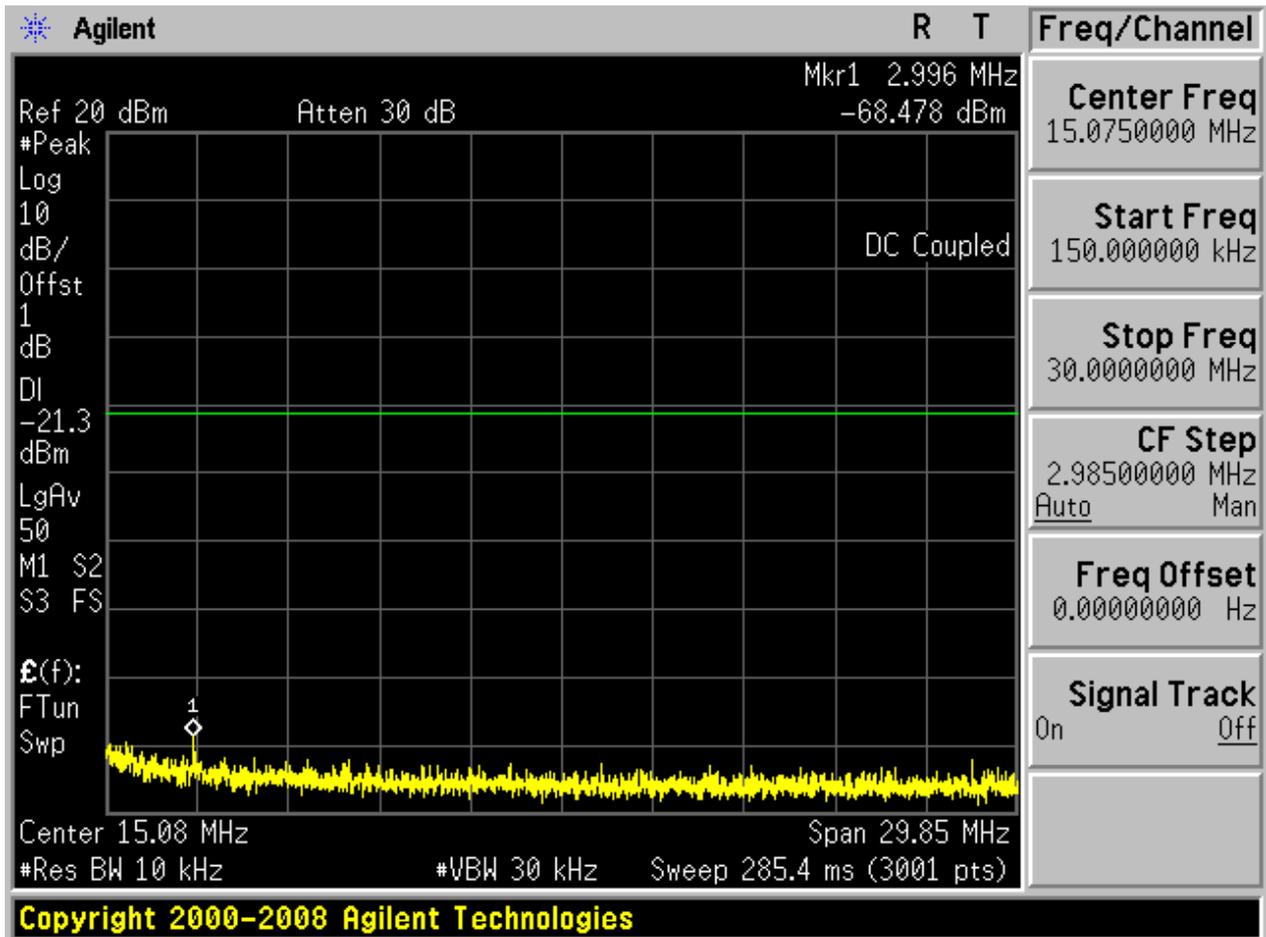
Pref:

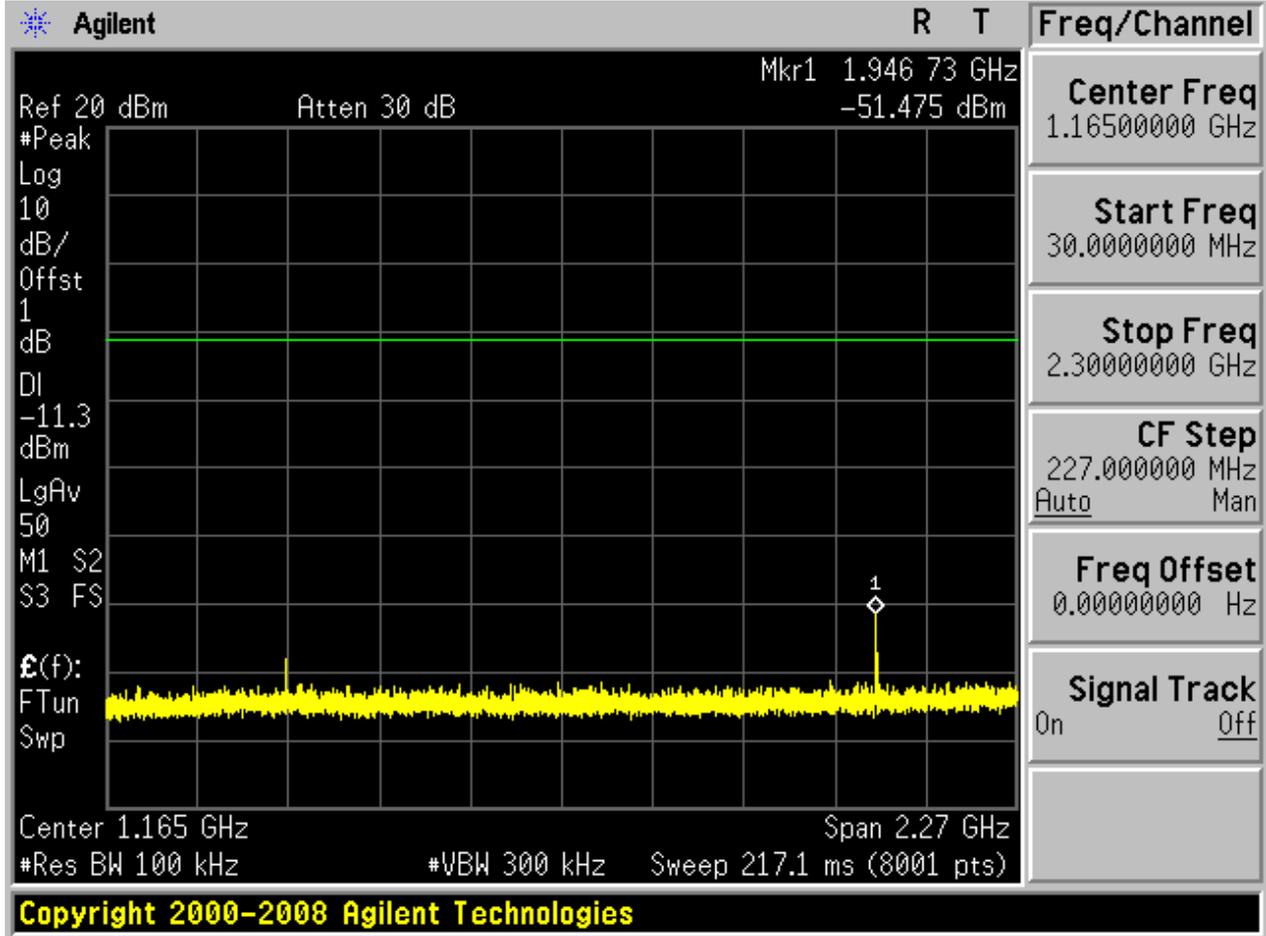


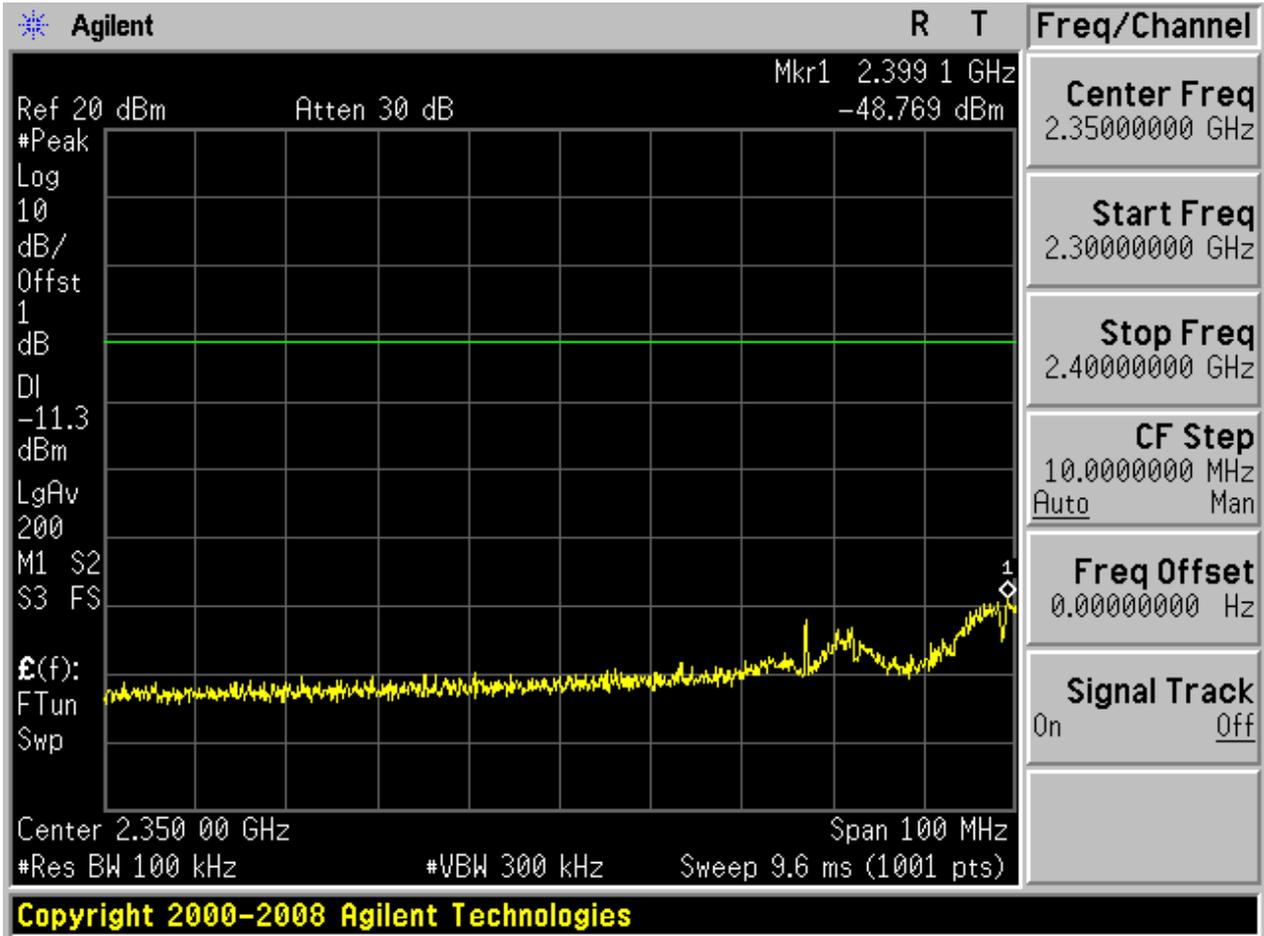


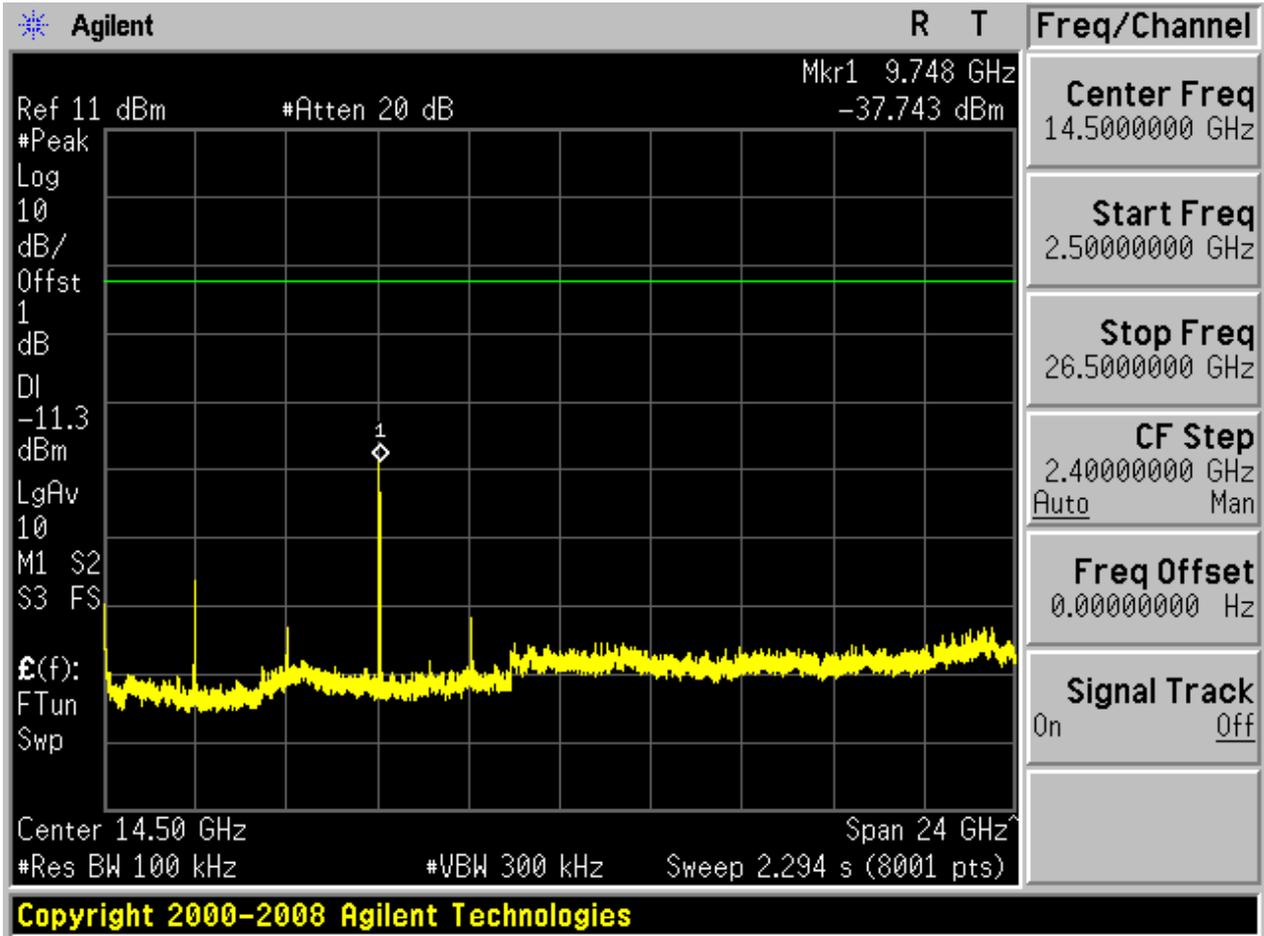
Puw:





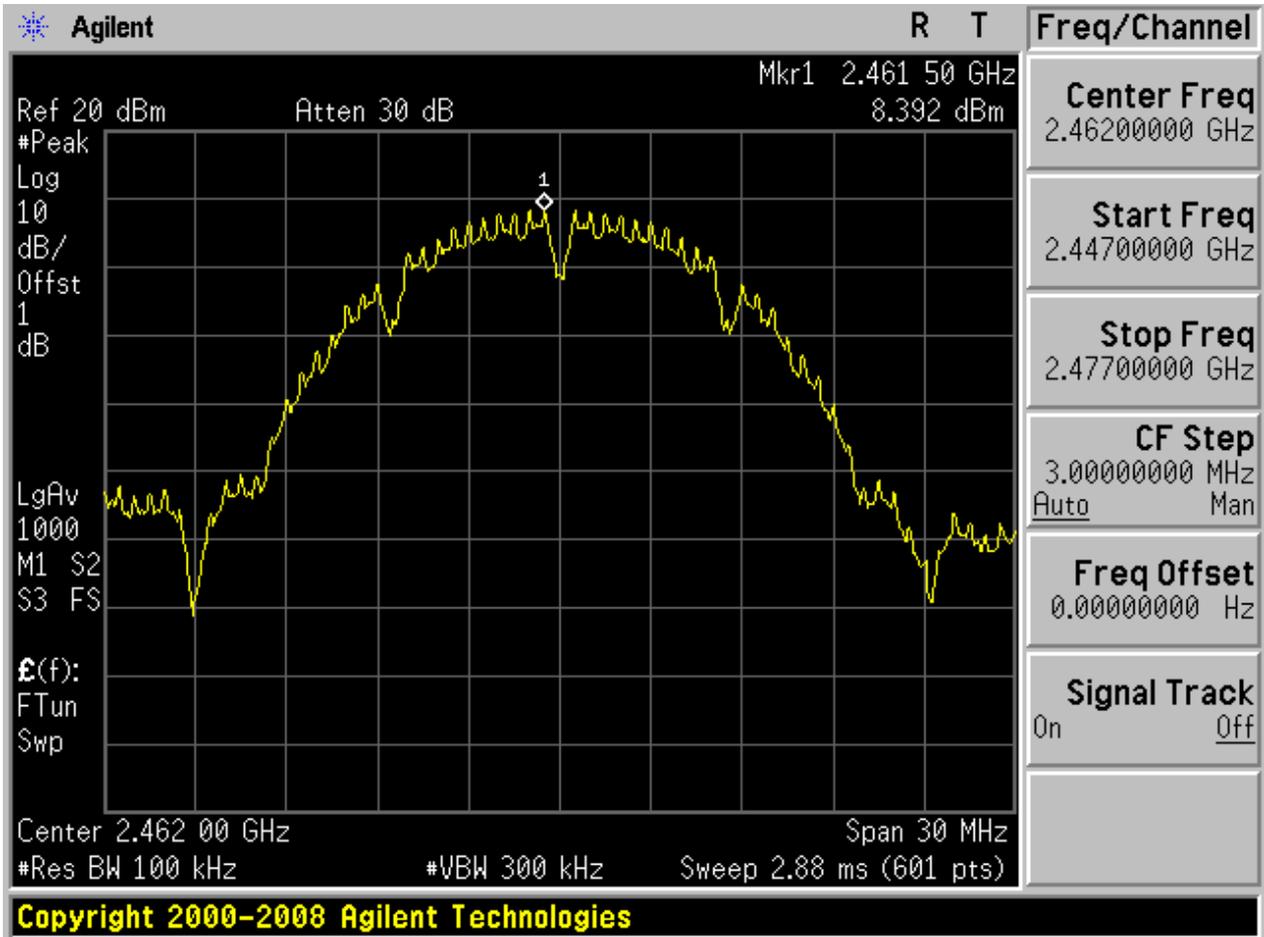






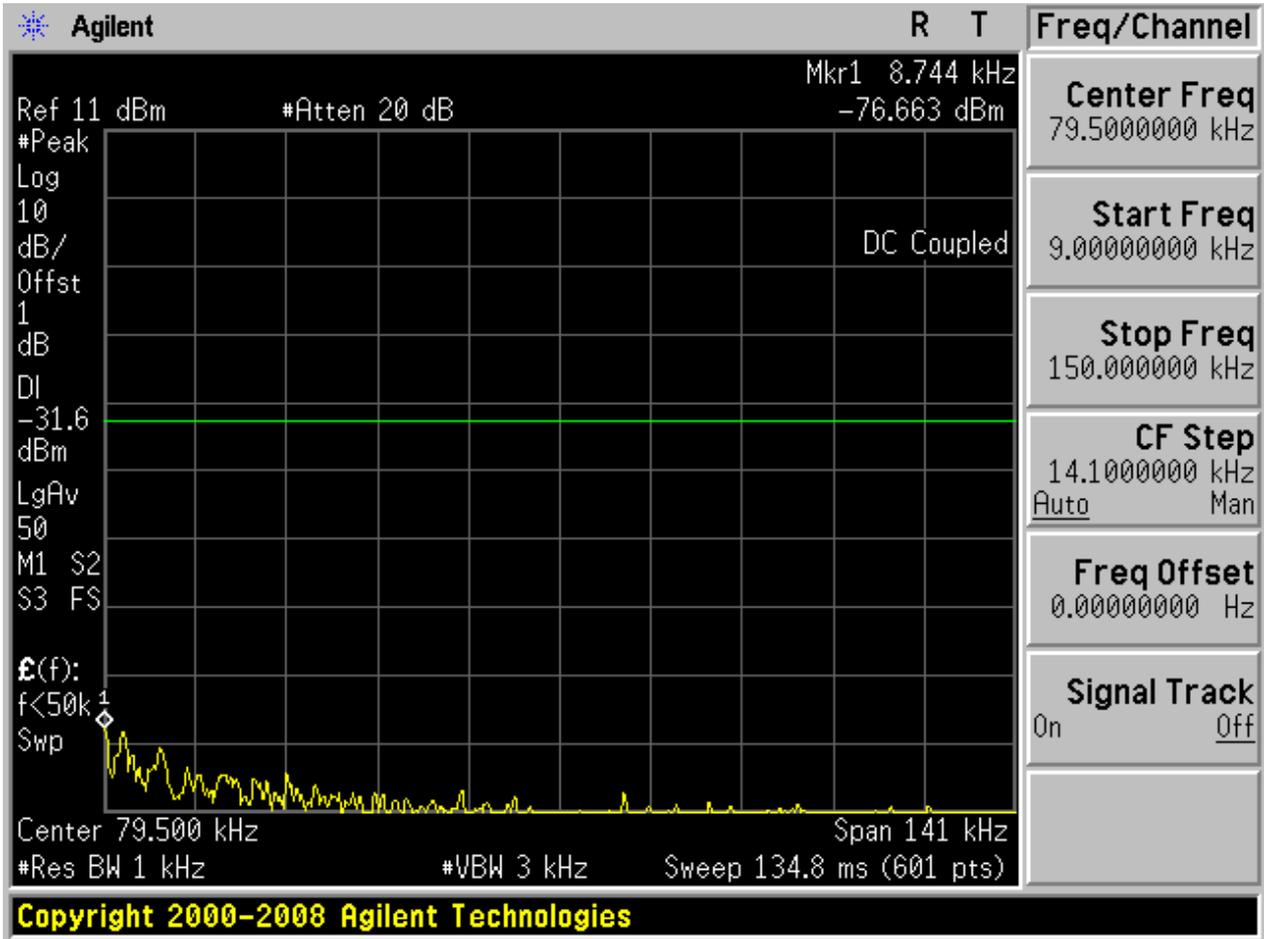
2.3 11B_H

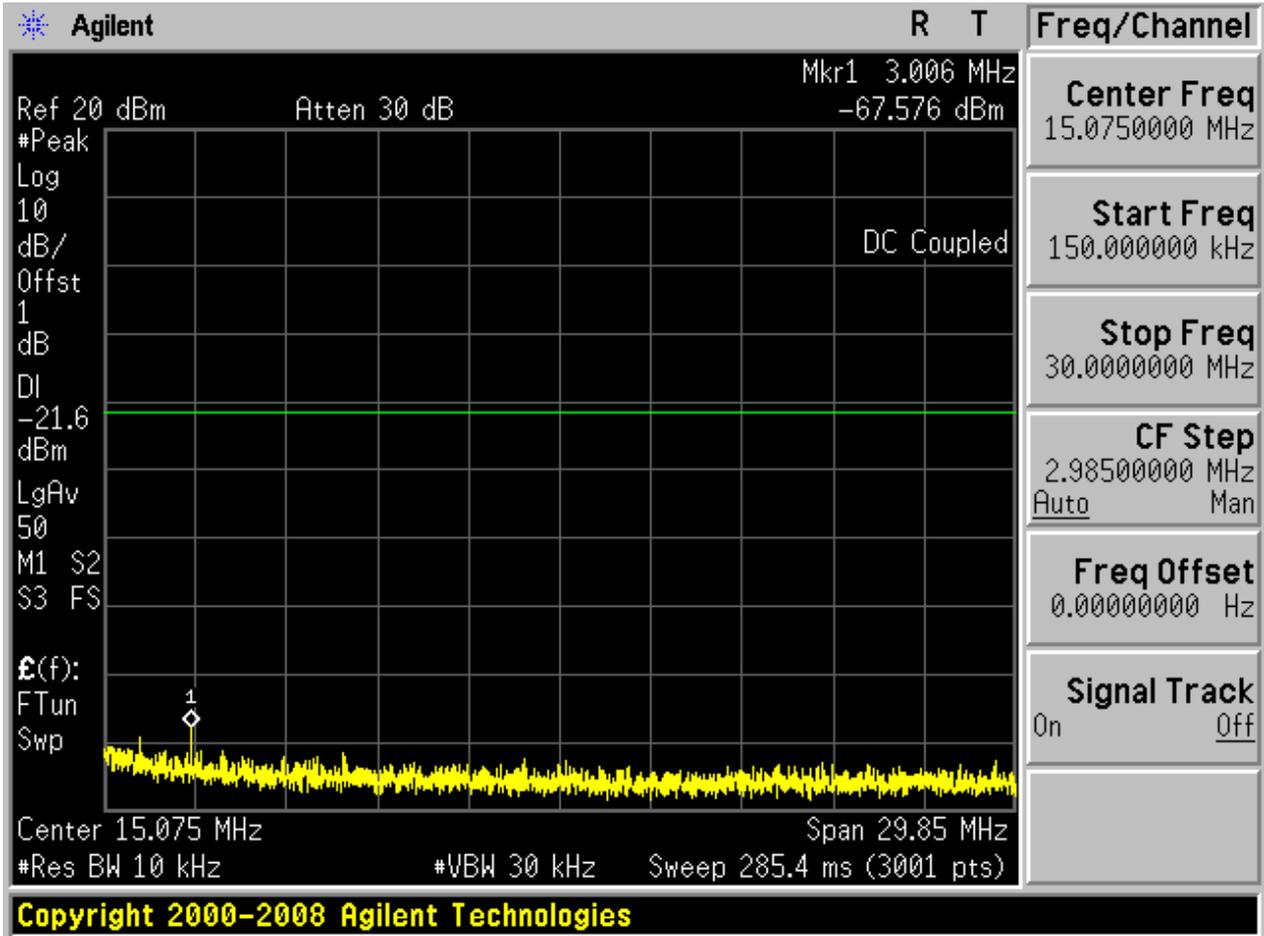
Pref:

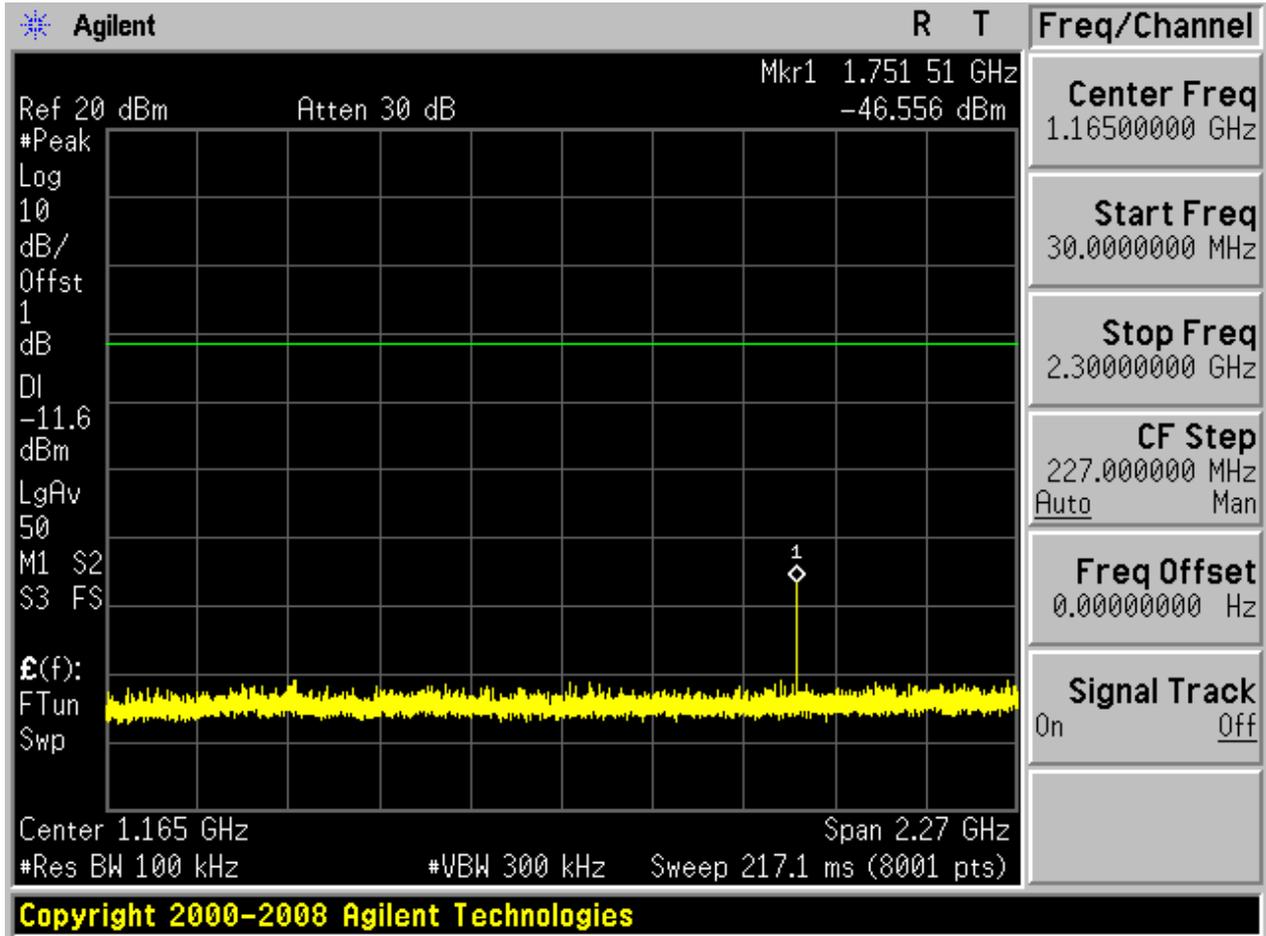


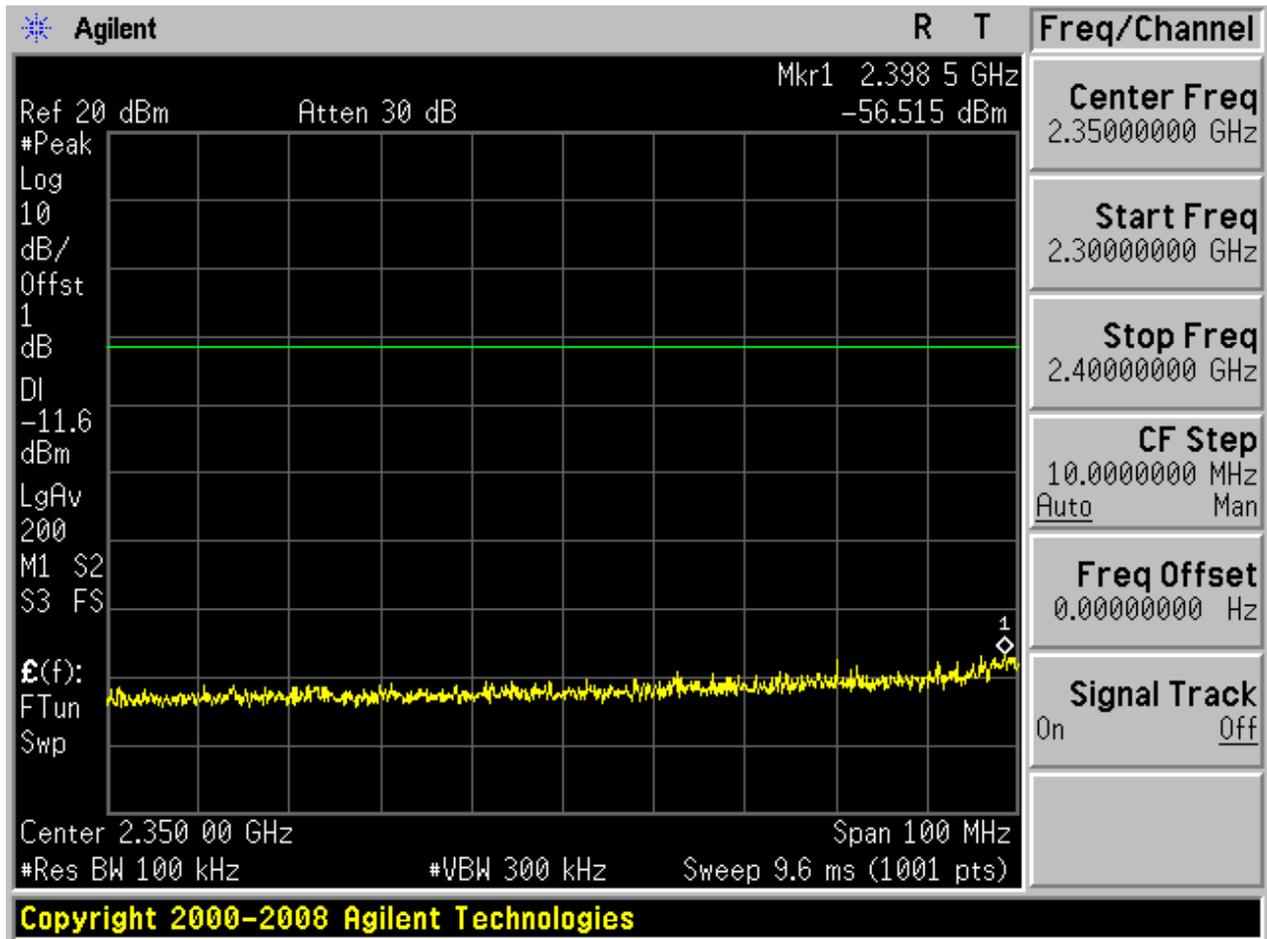


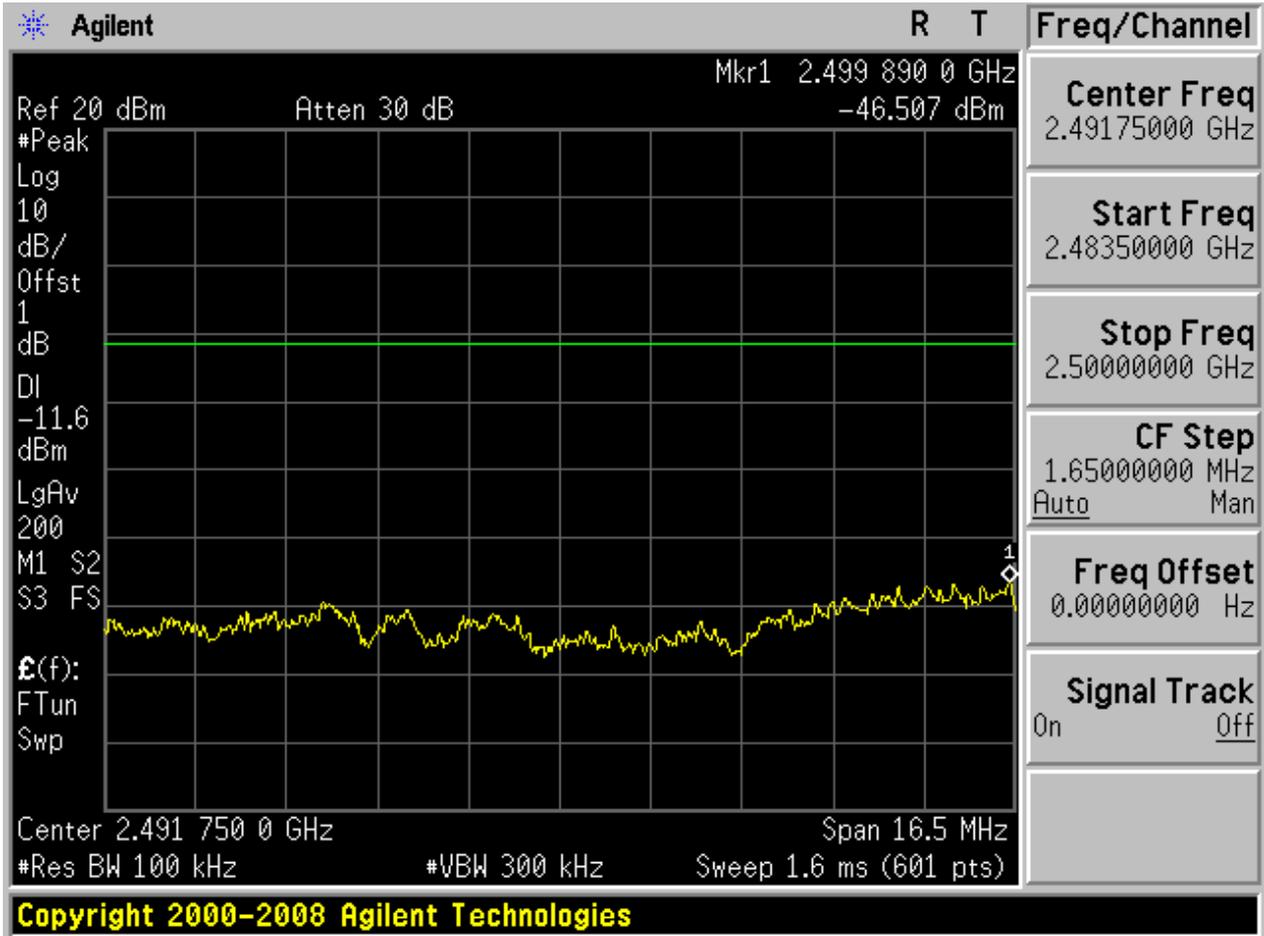
Puw:

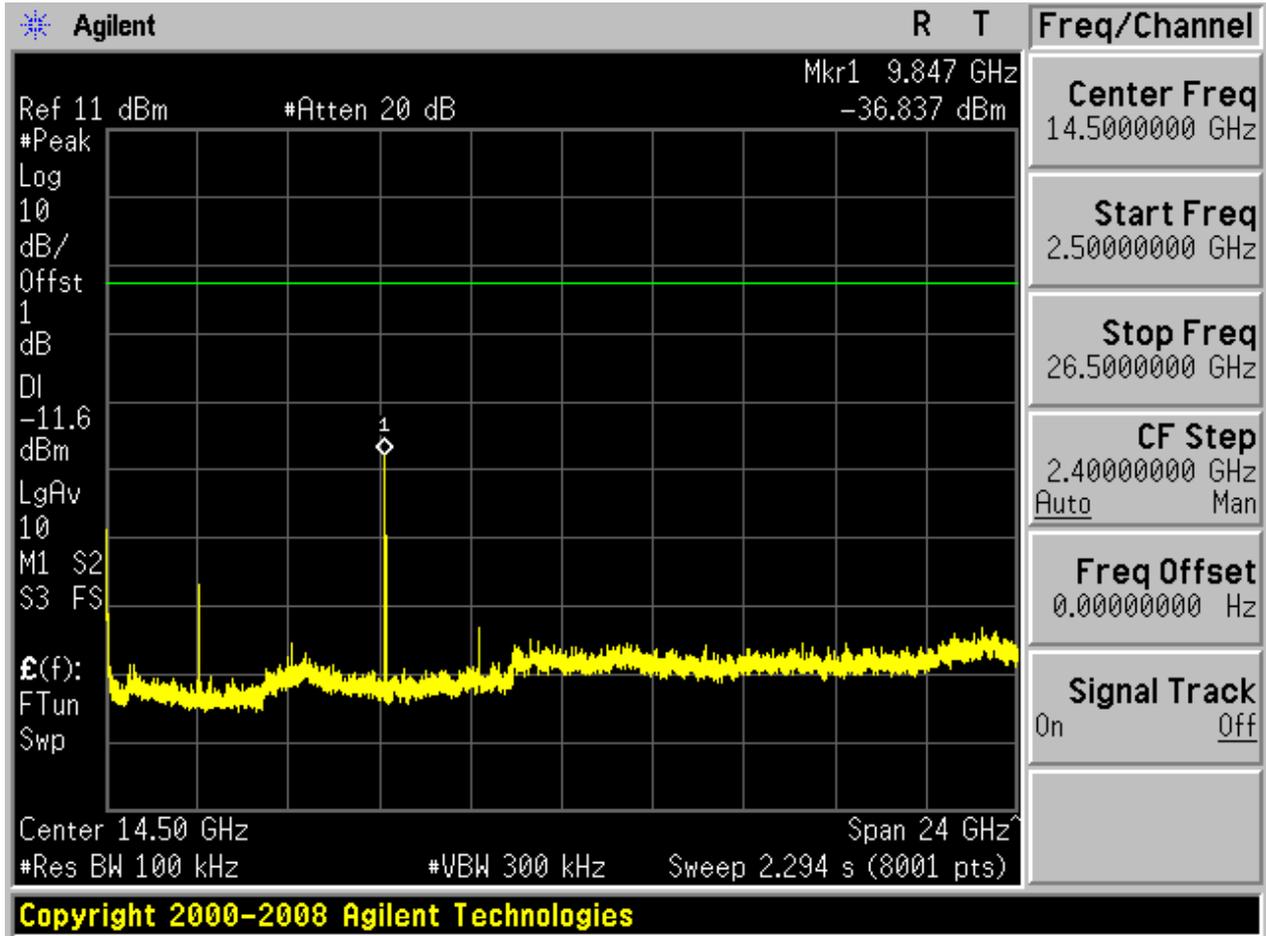








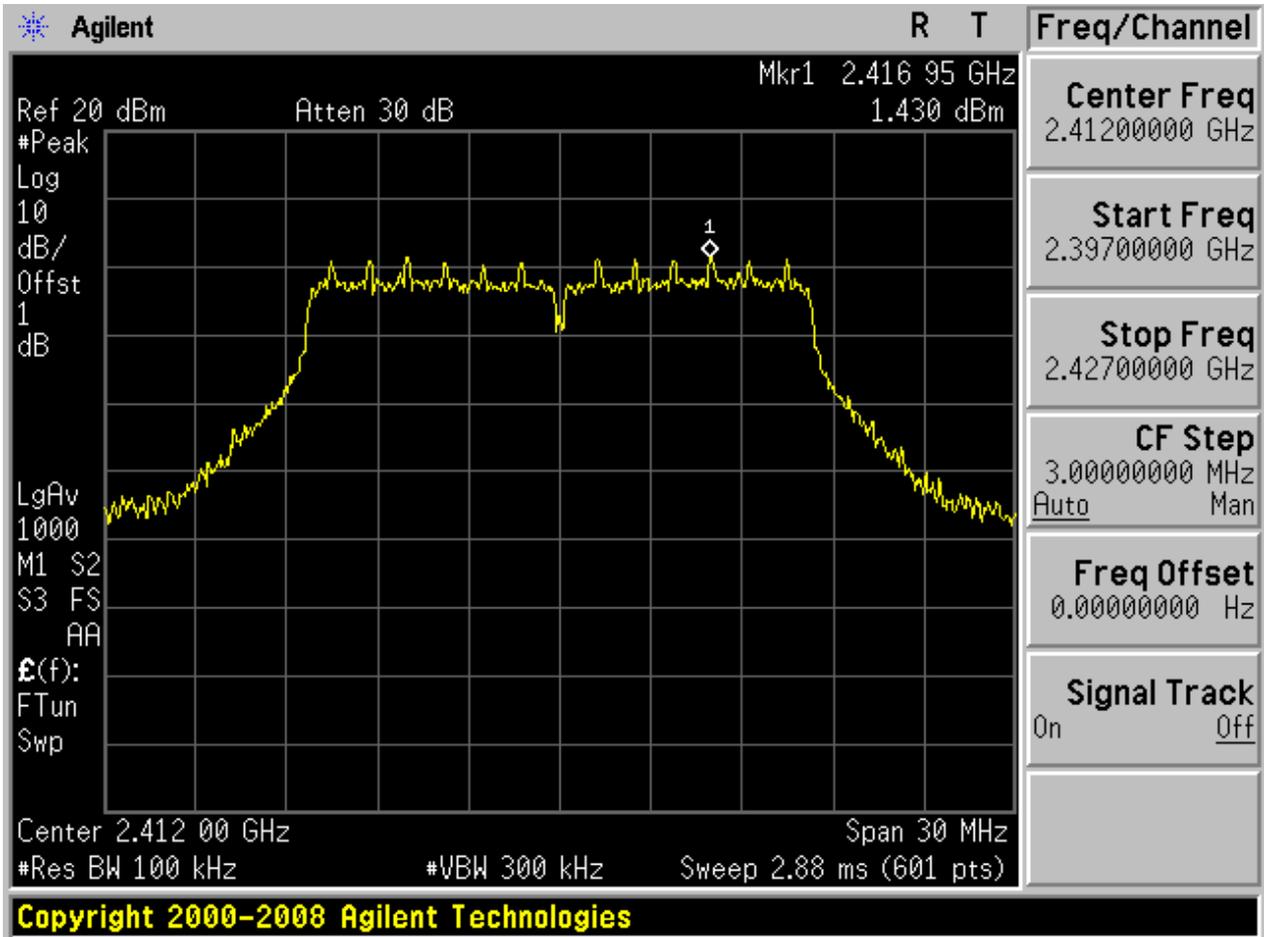






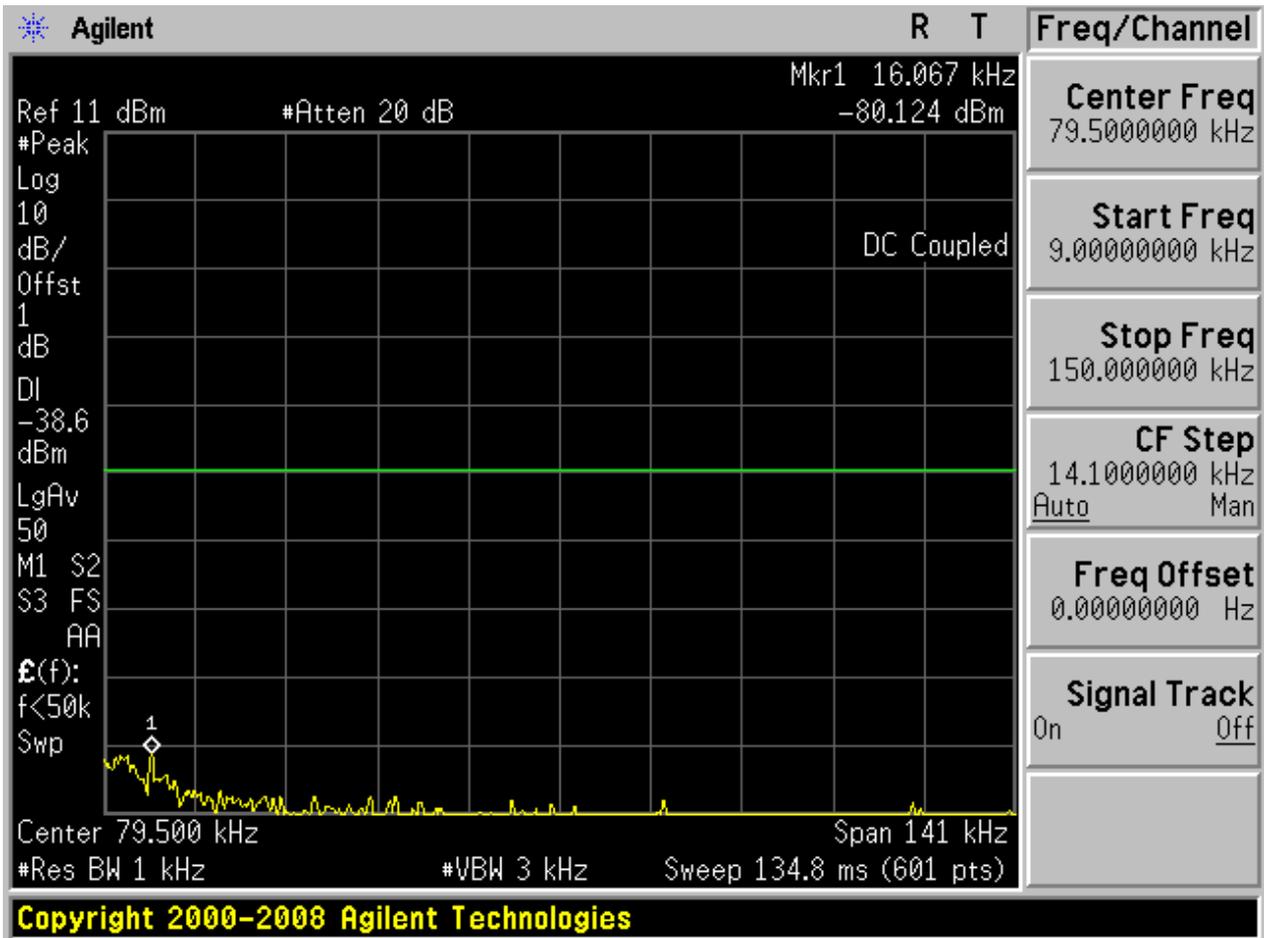
2.4 11G_L

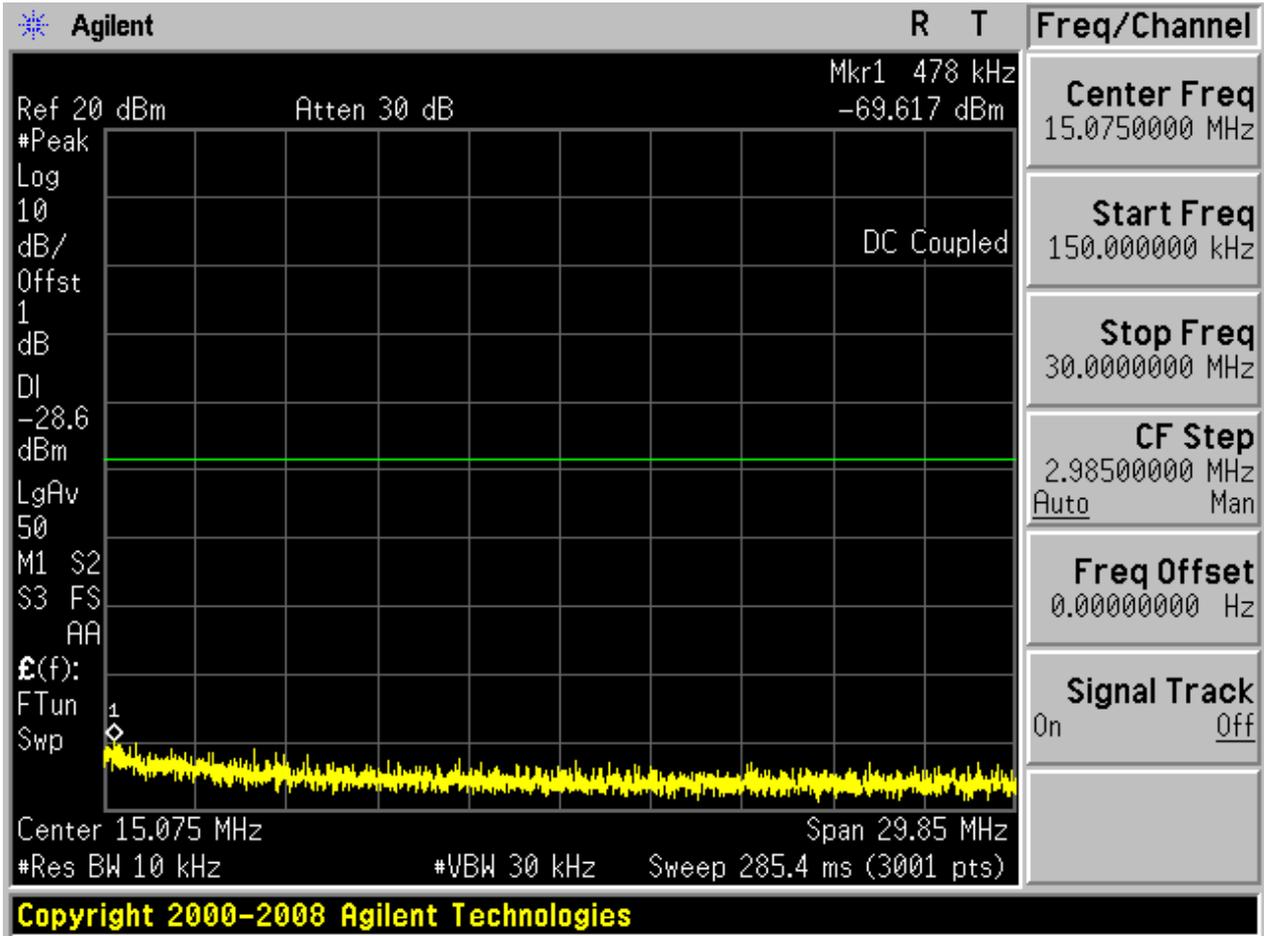
Pref:

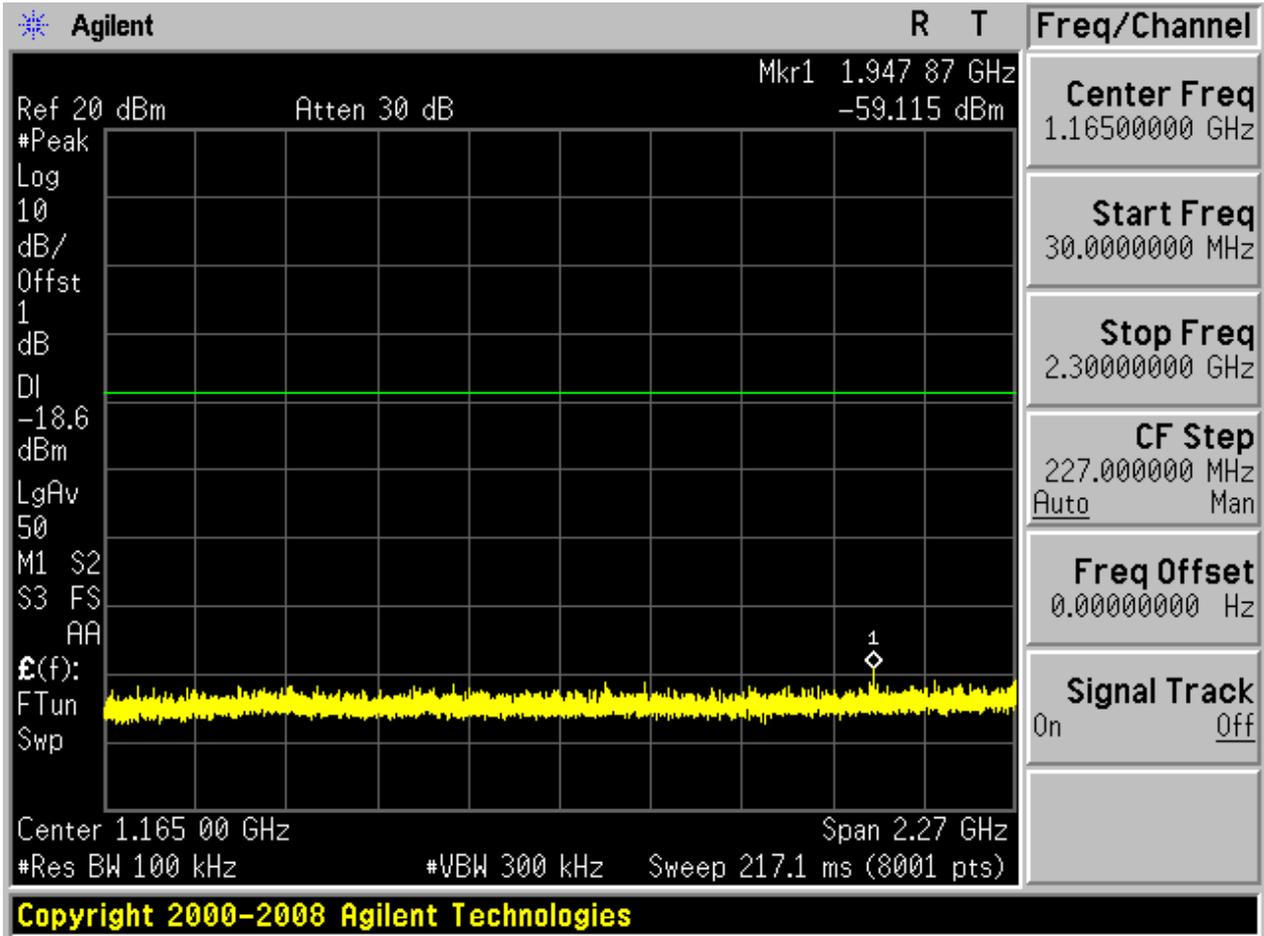


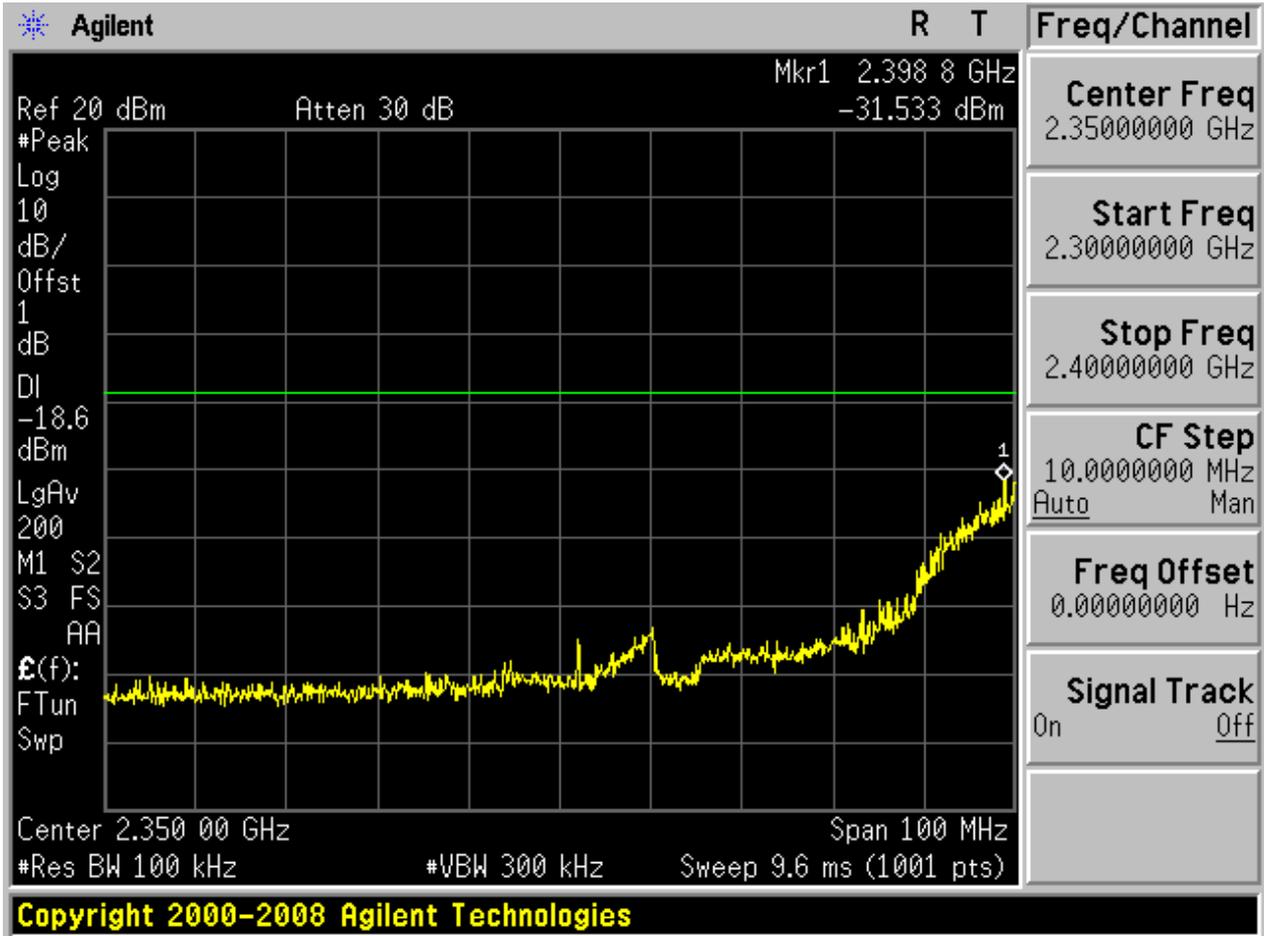


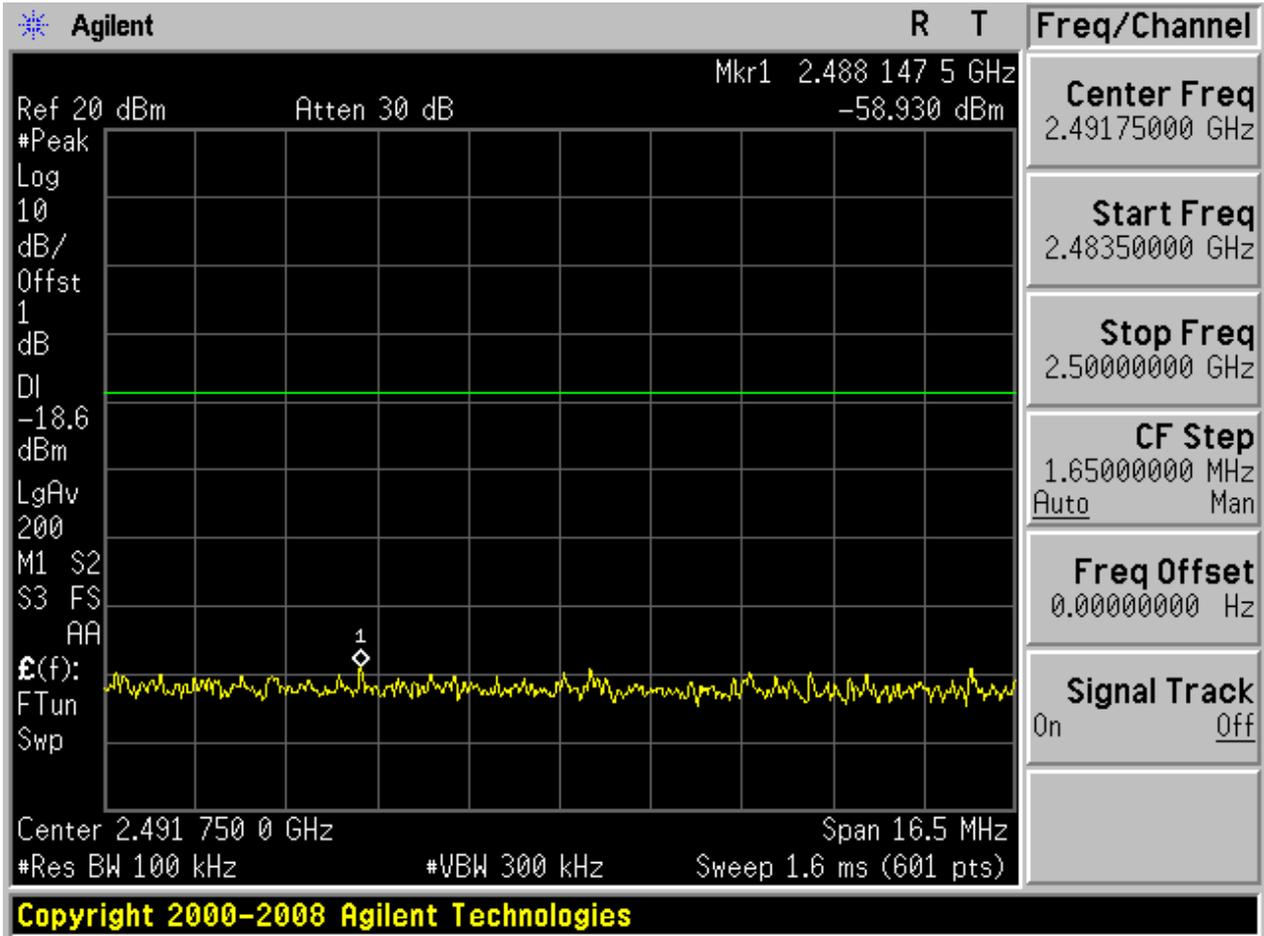
Puw:

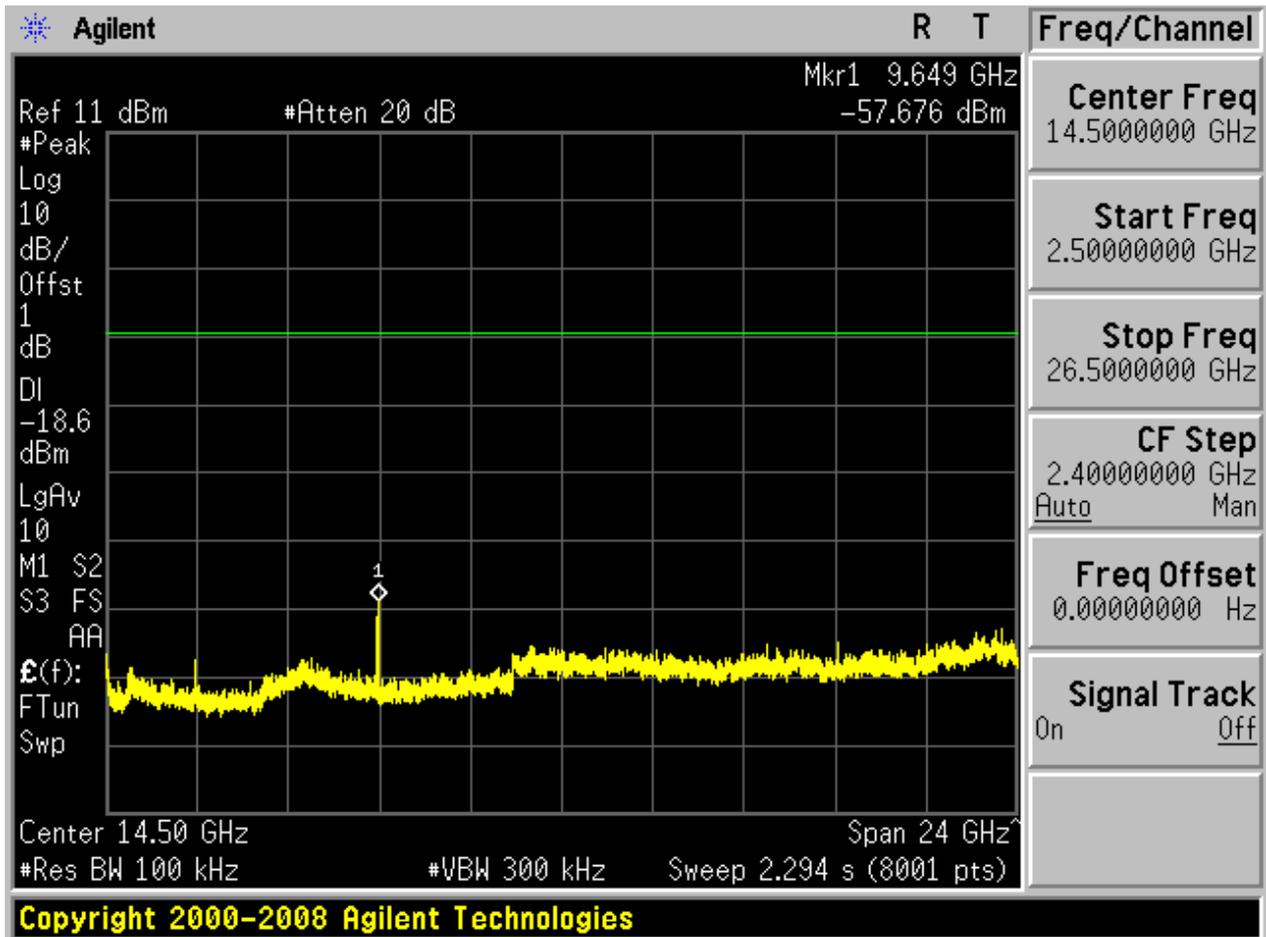








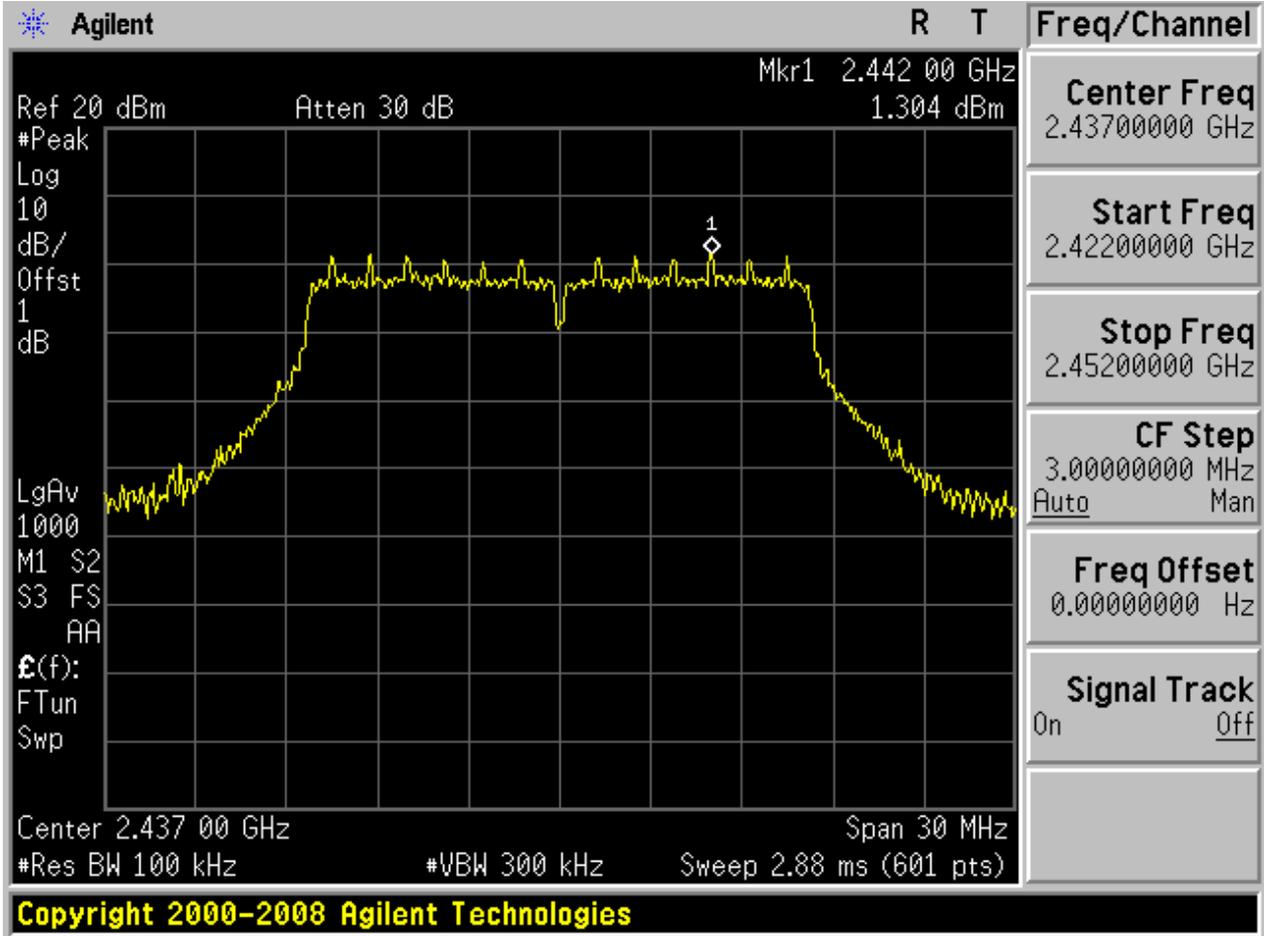






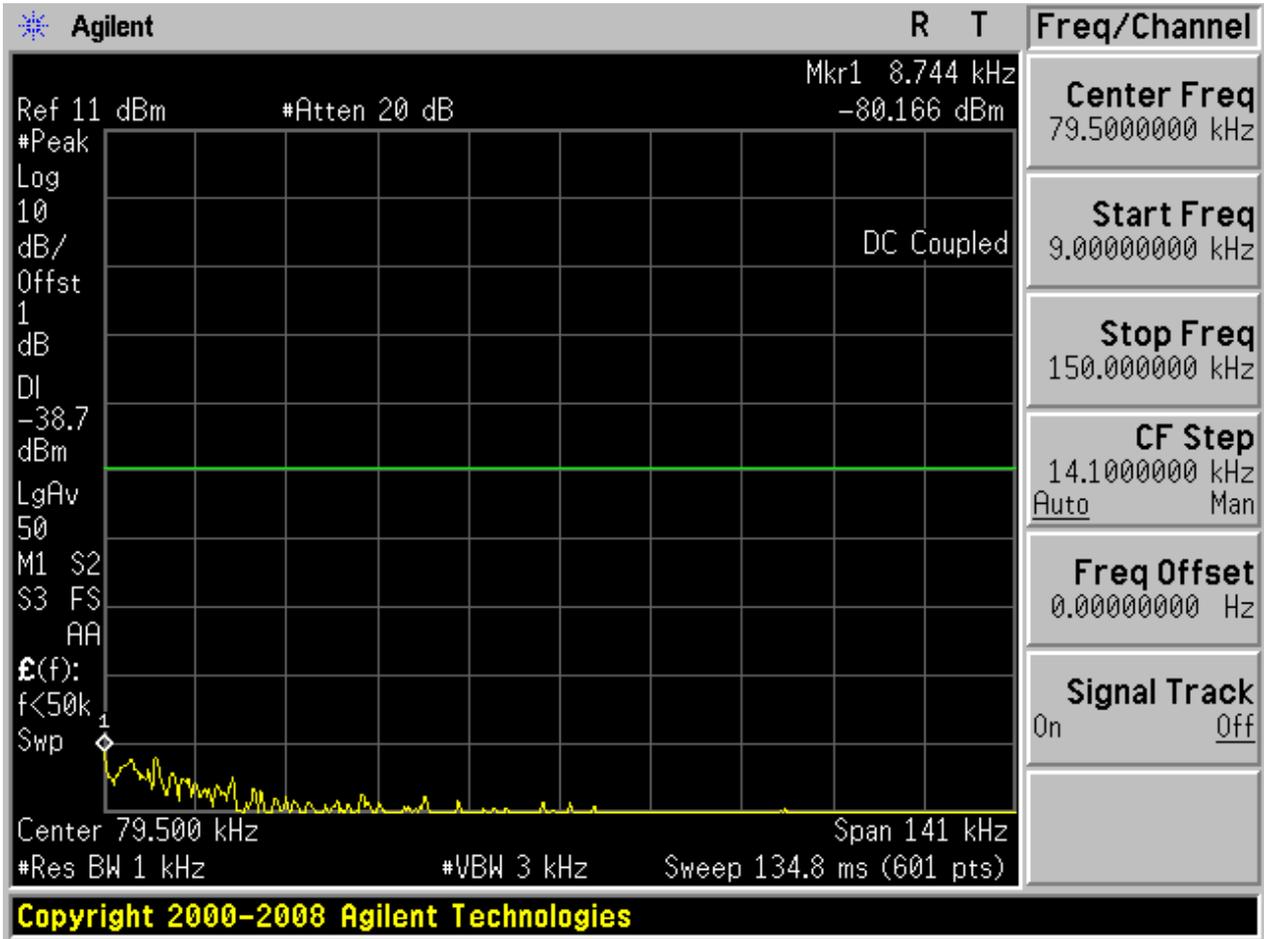
2.5 11G_M

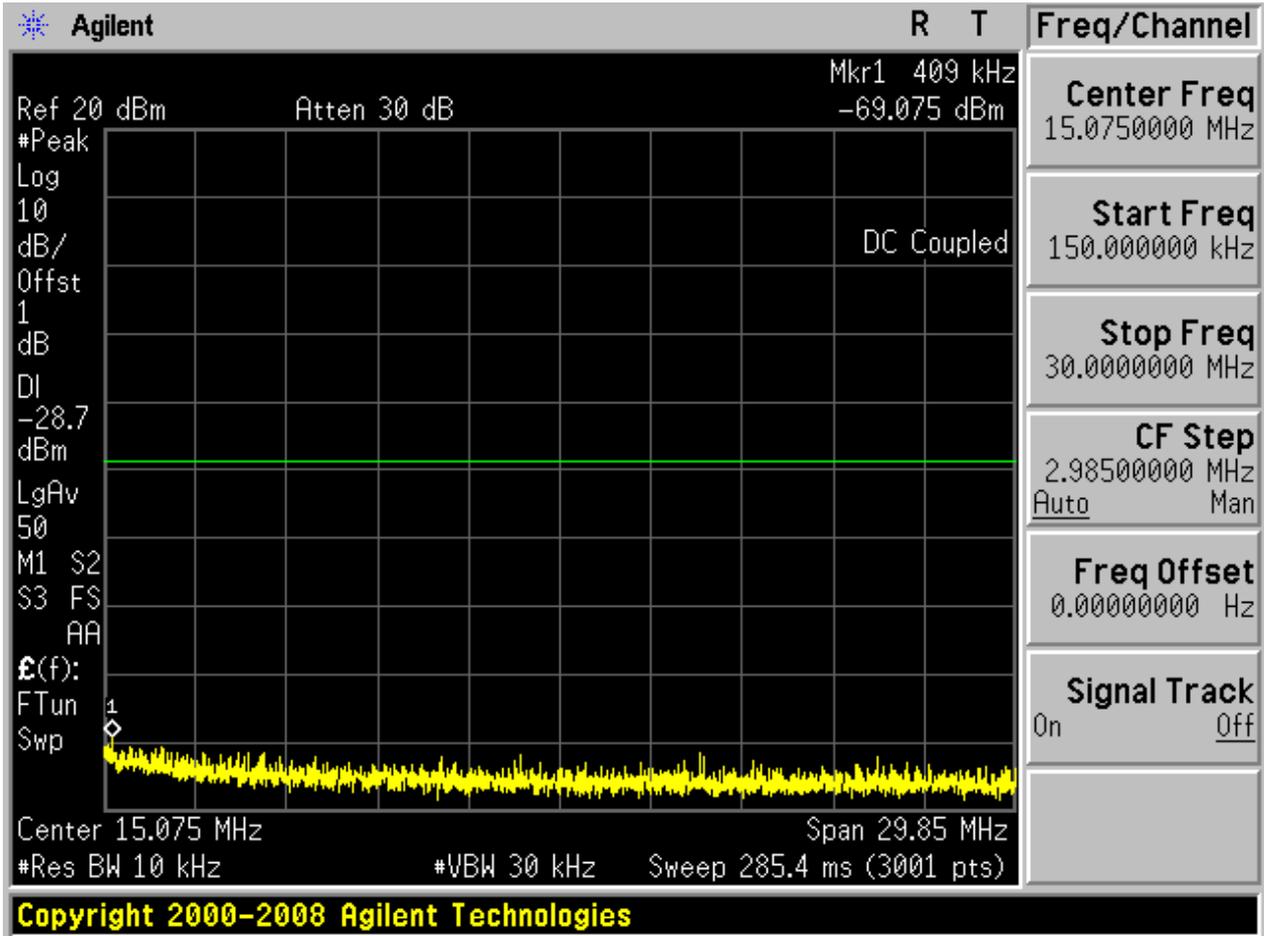
Pref:

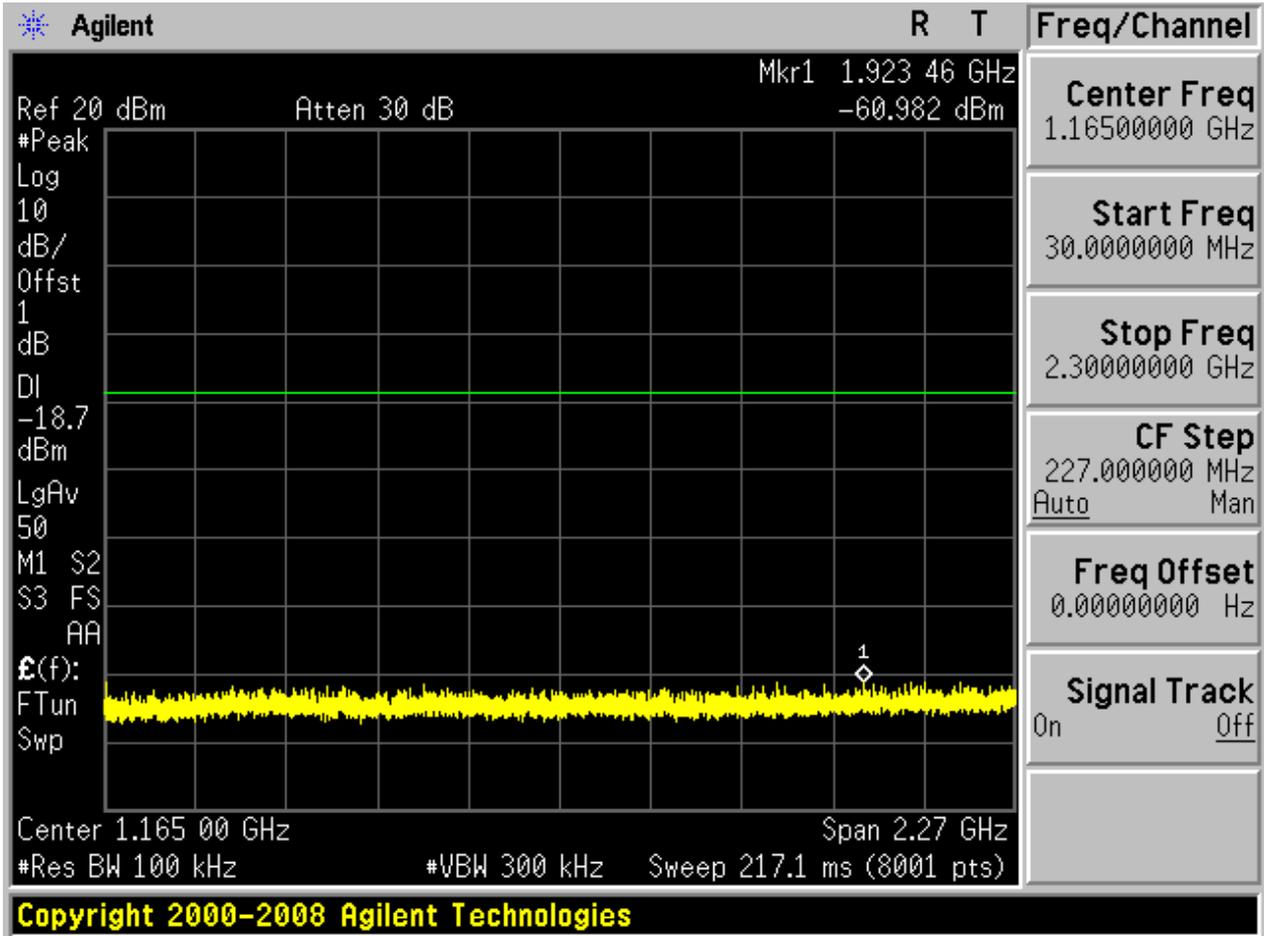


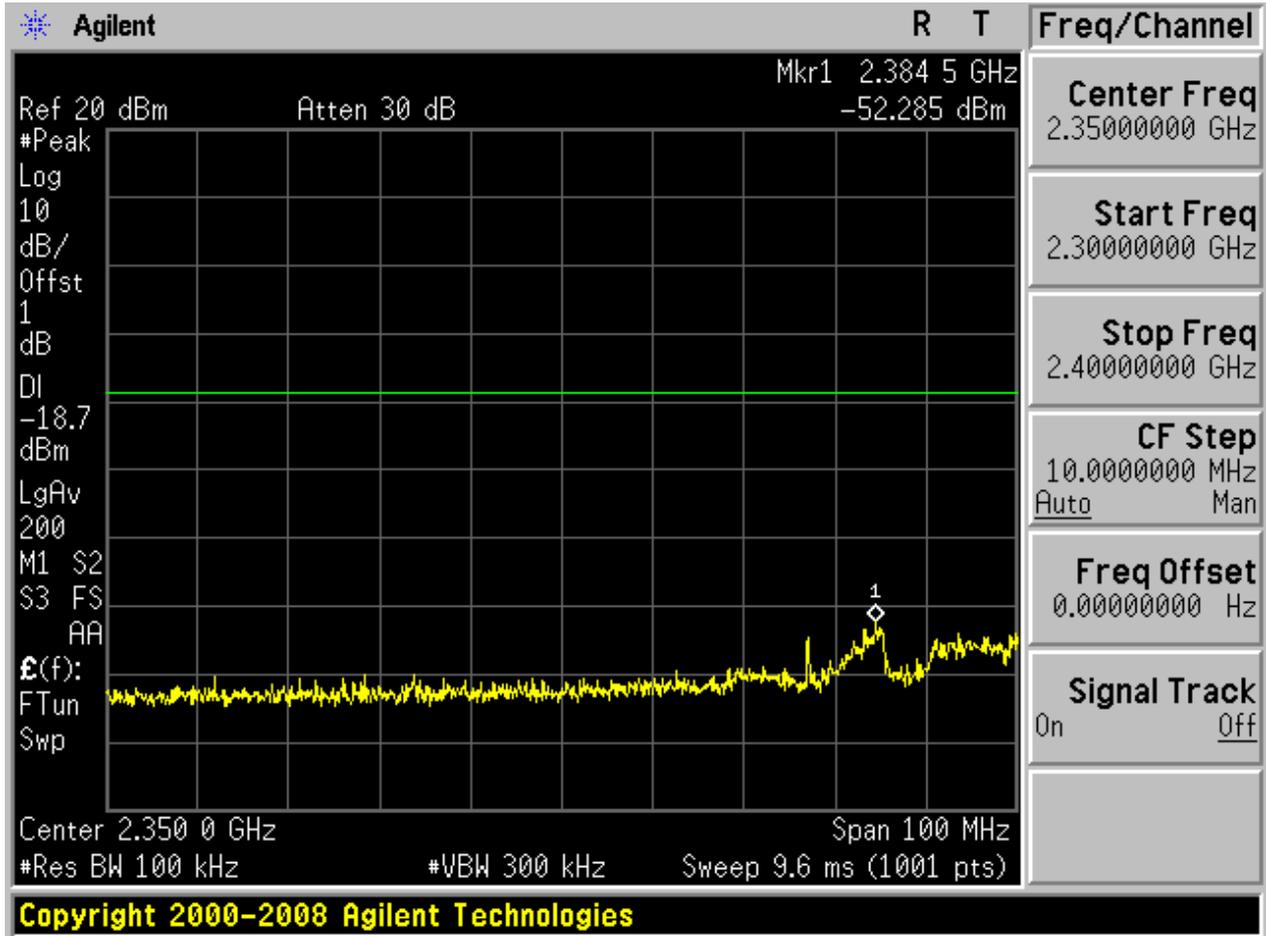


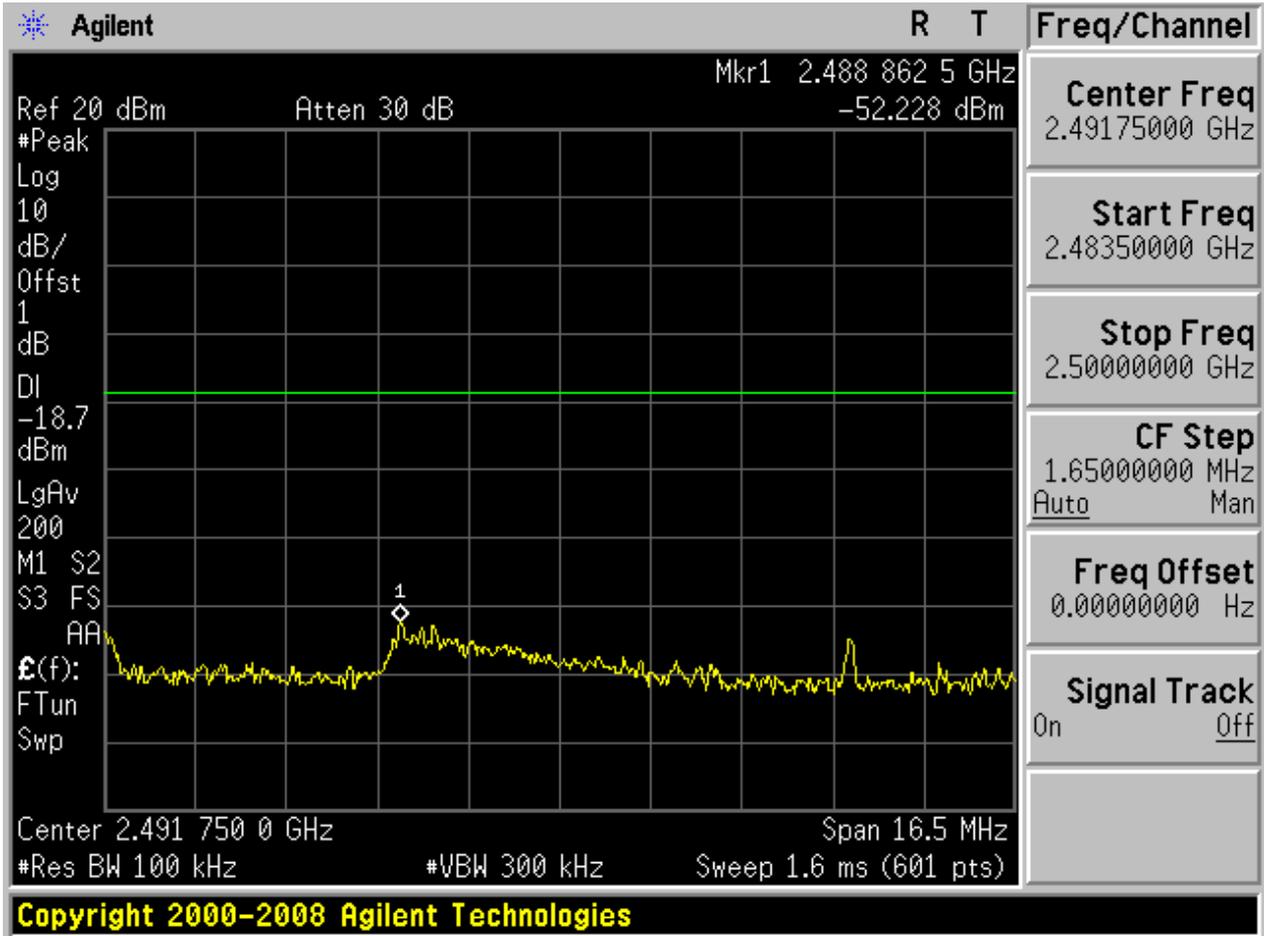
Puw:

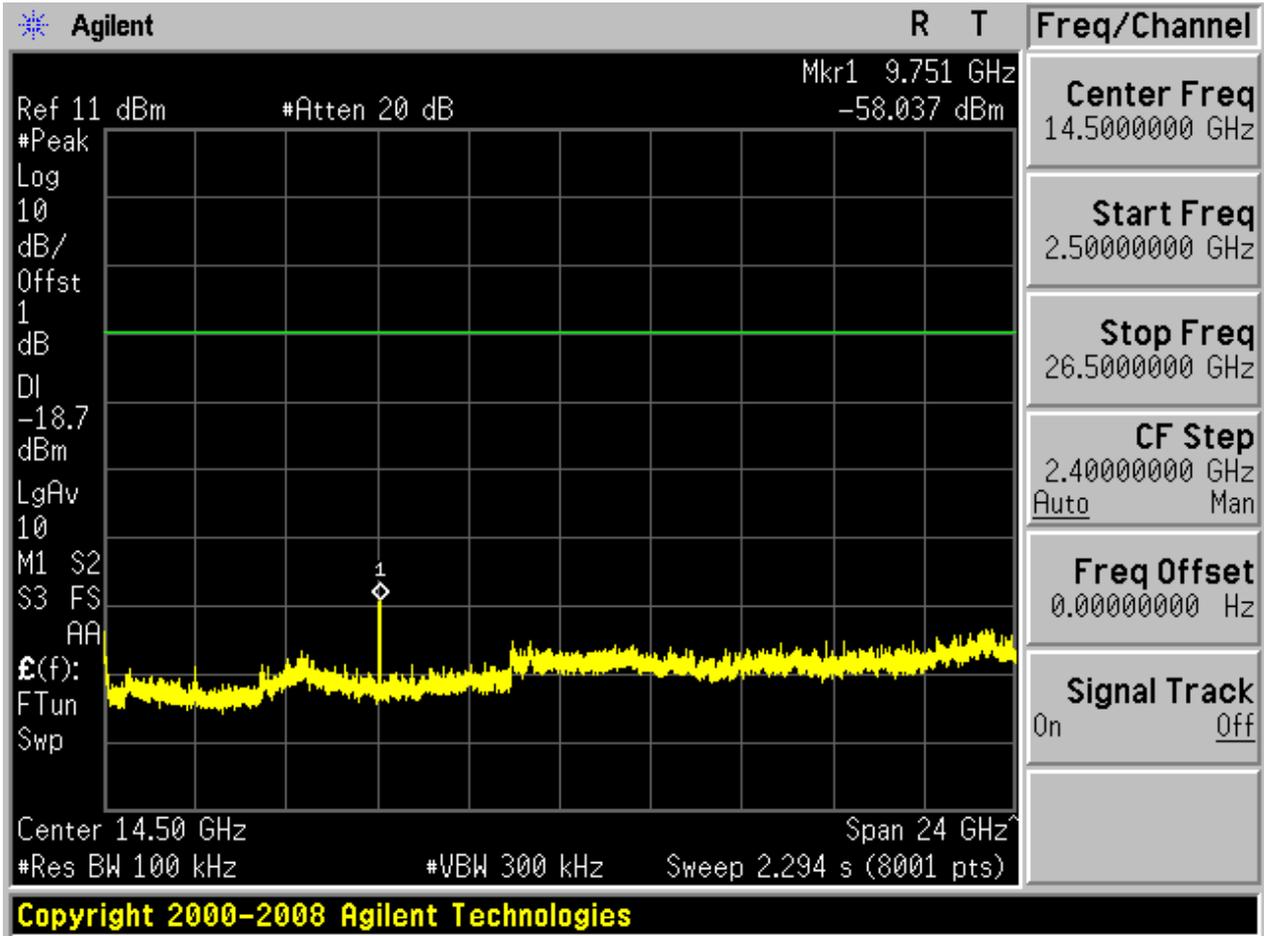






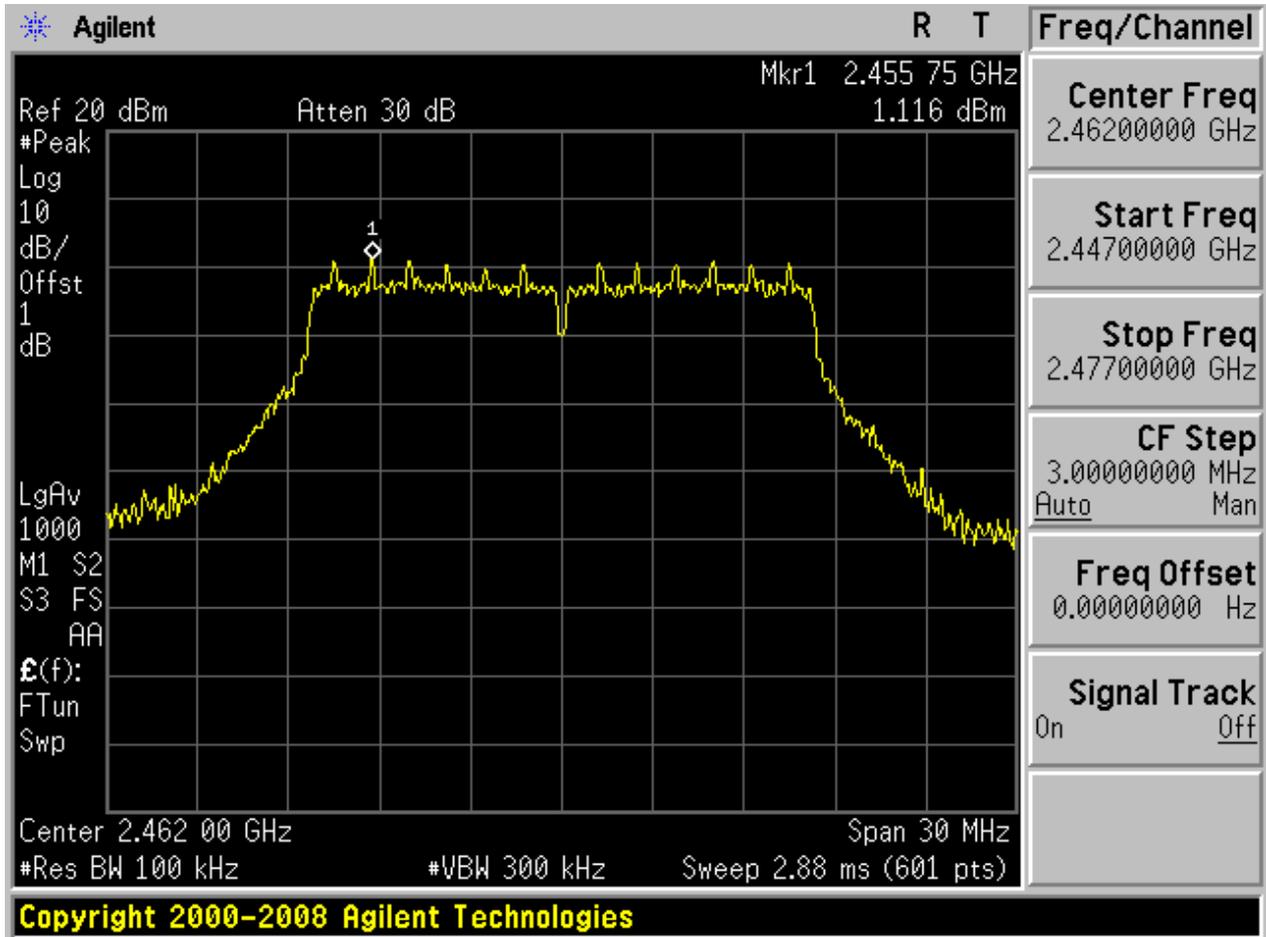






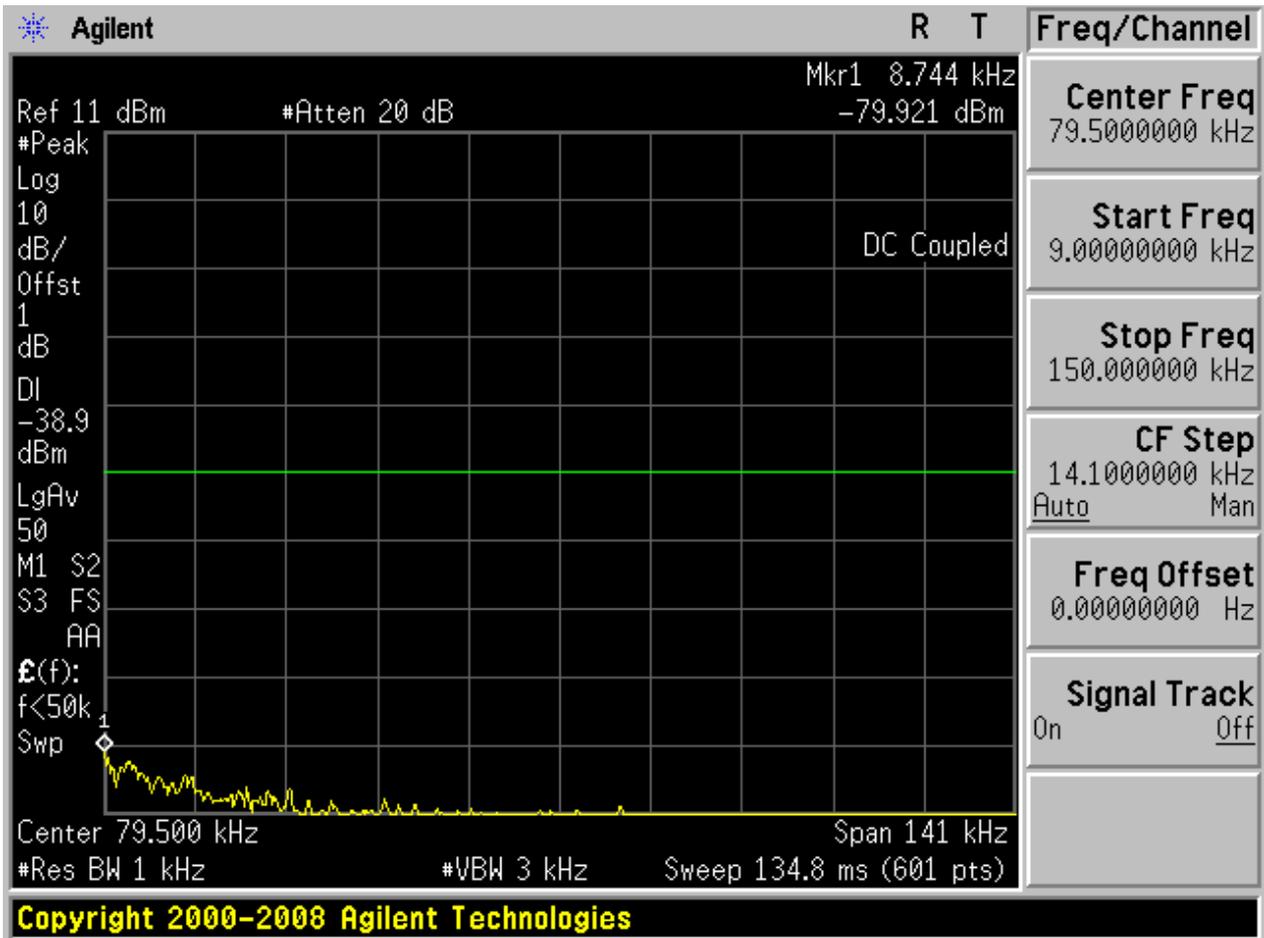
2.6 11G_H

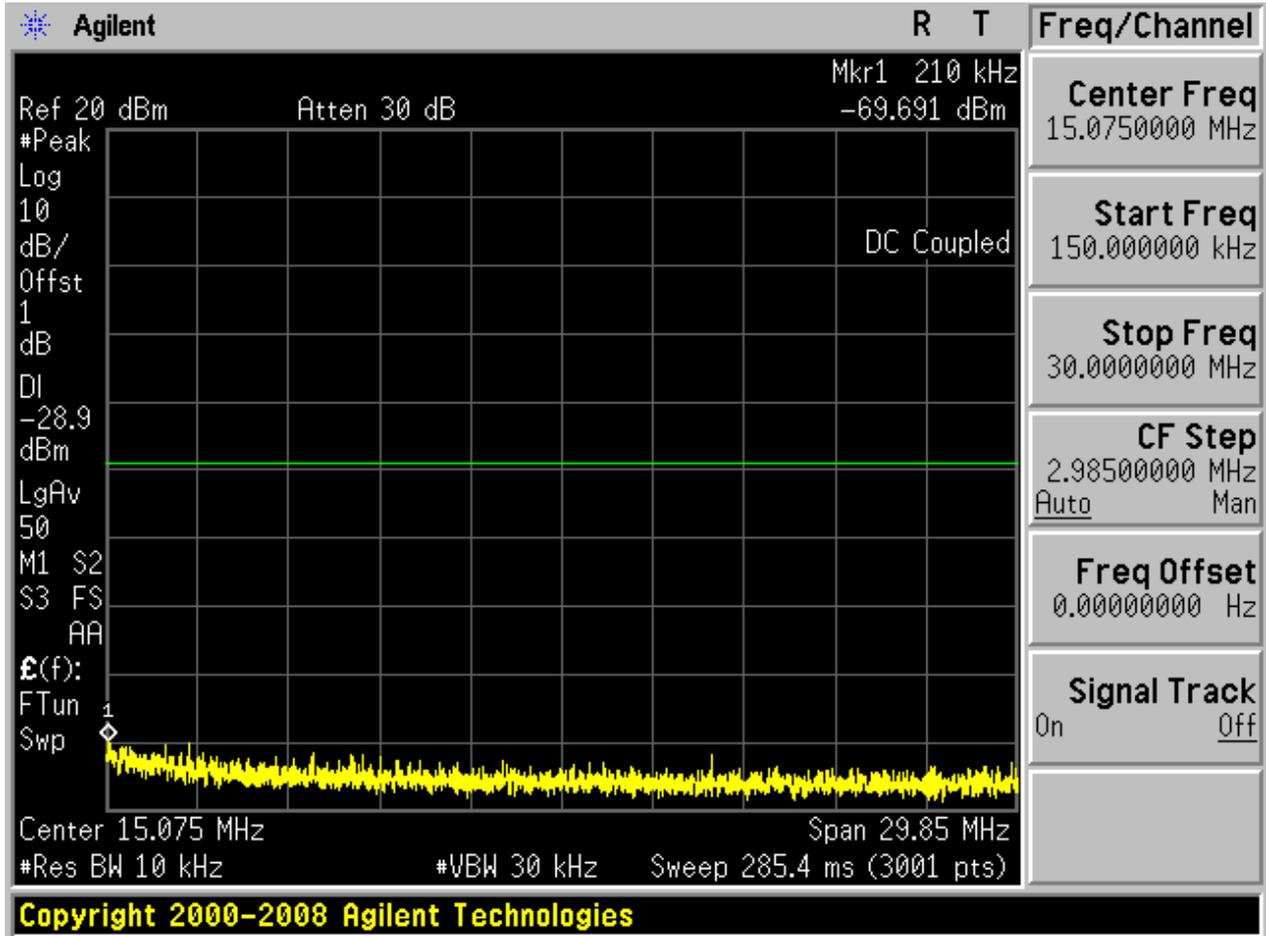
Pref:

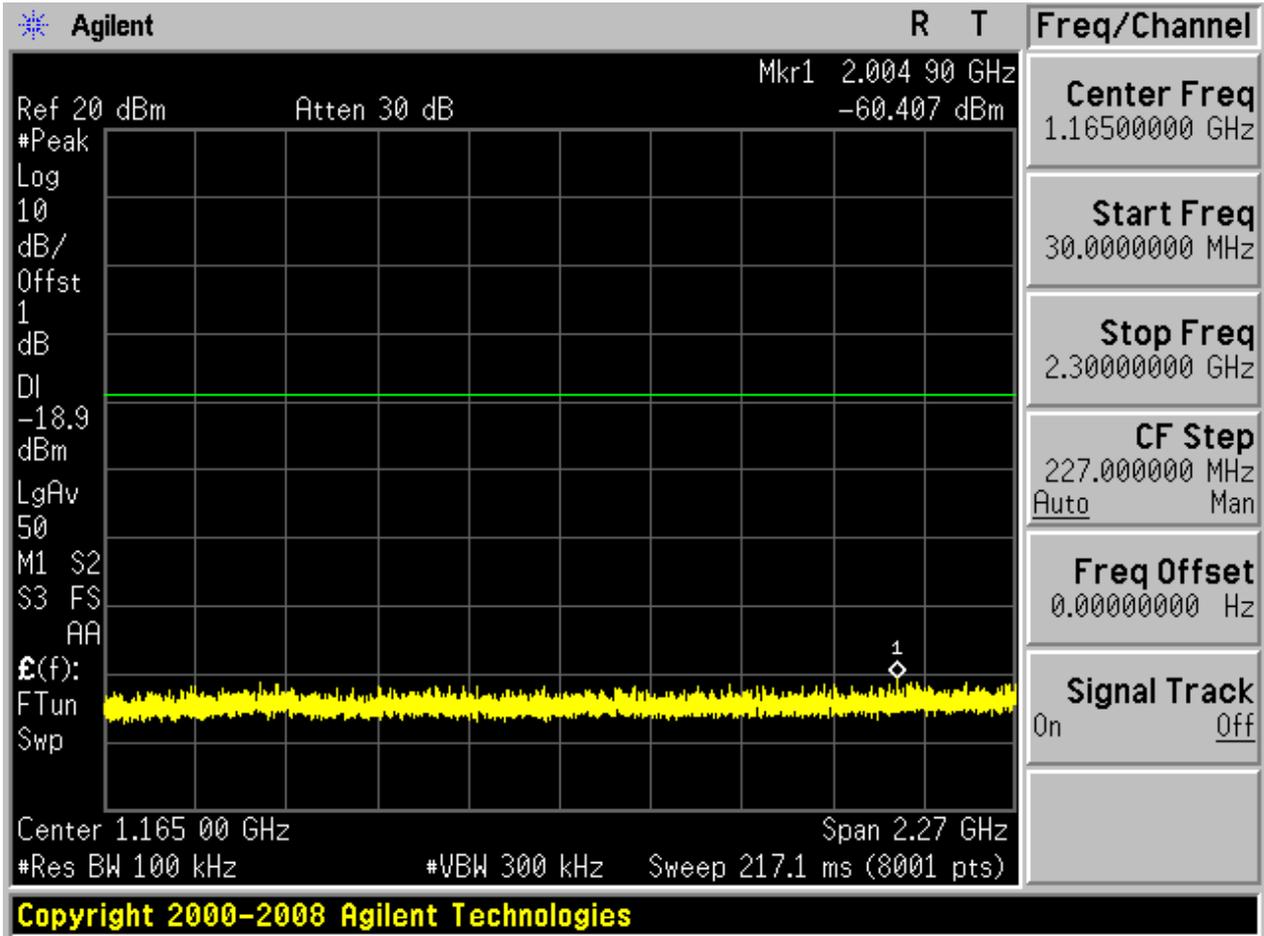


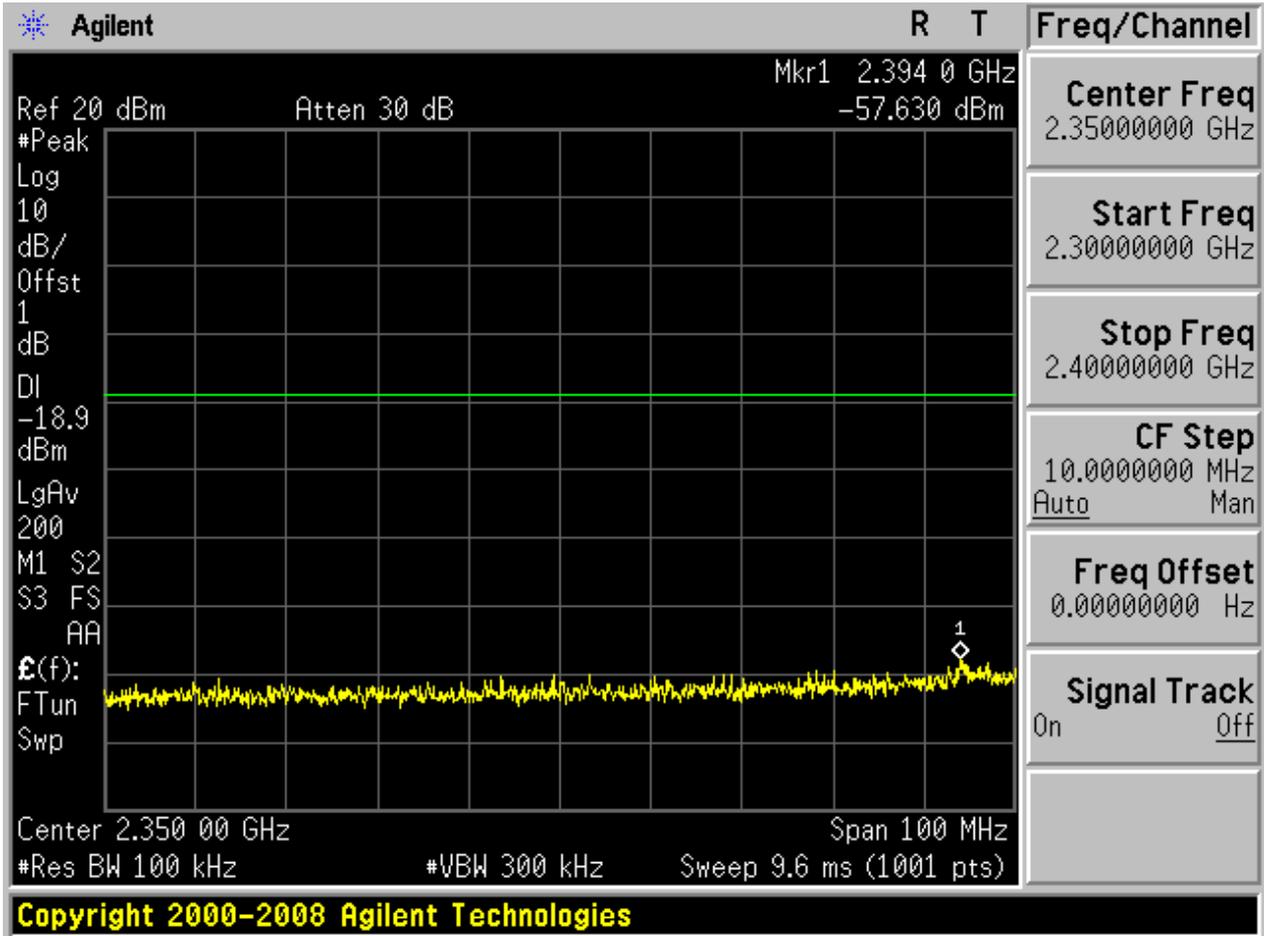


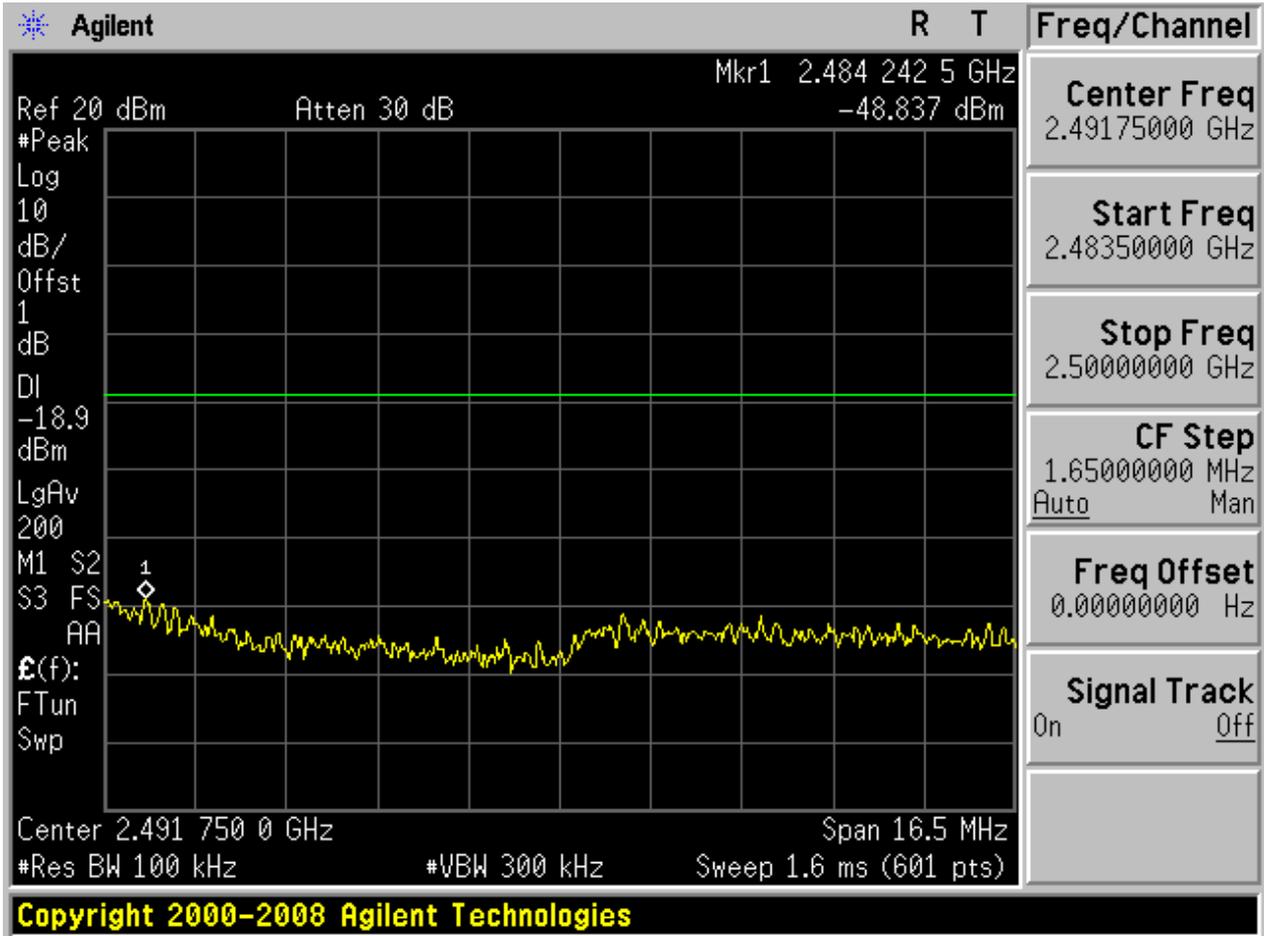
Puw:

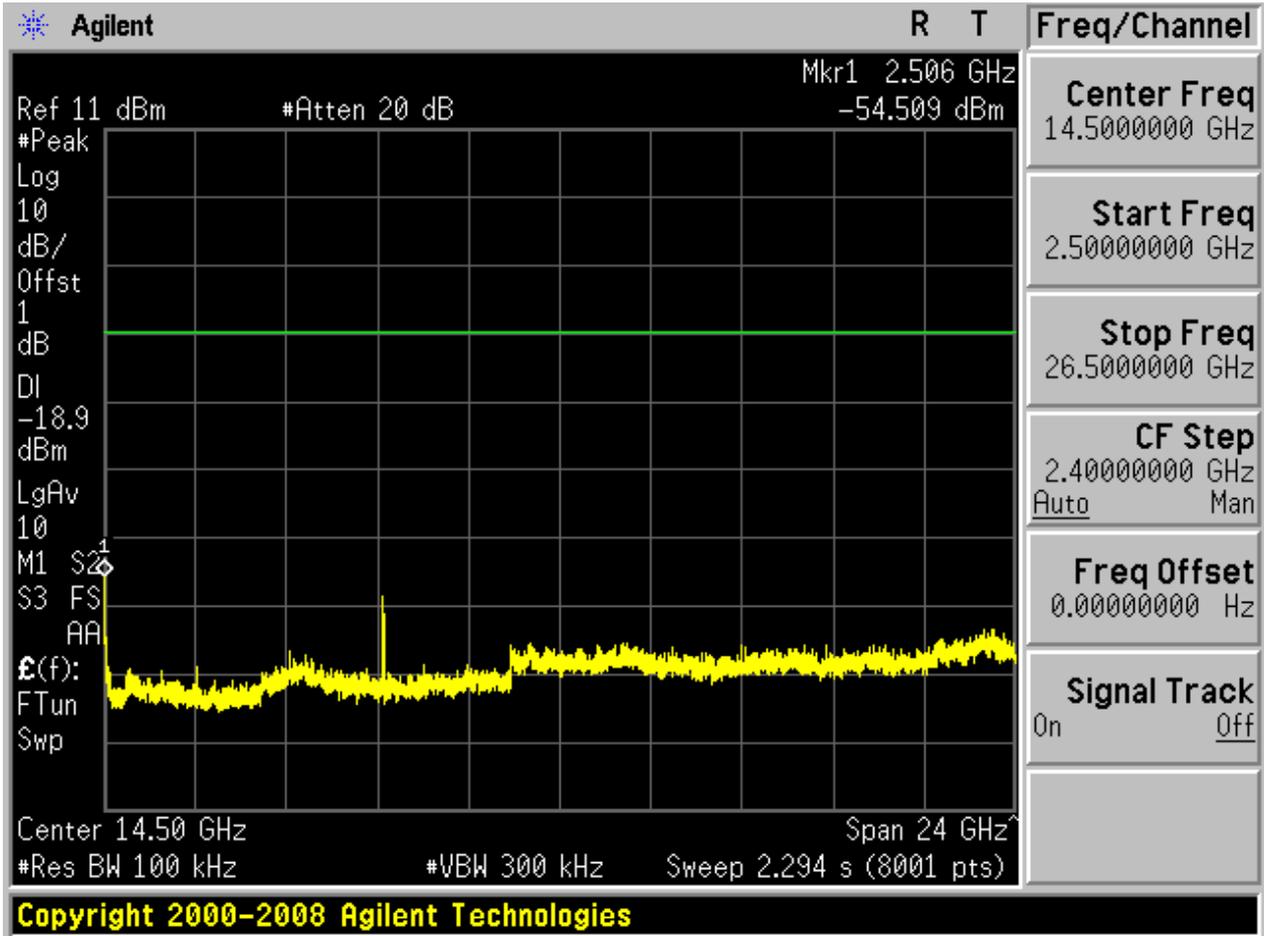






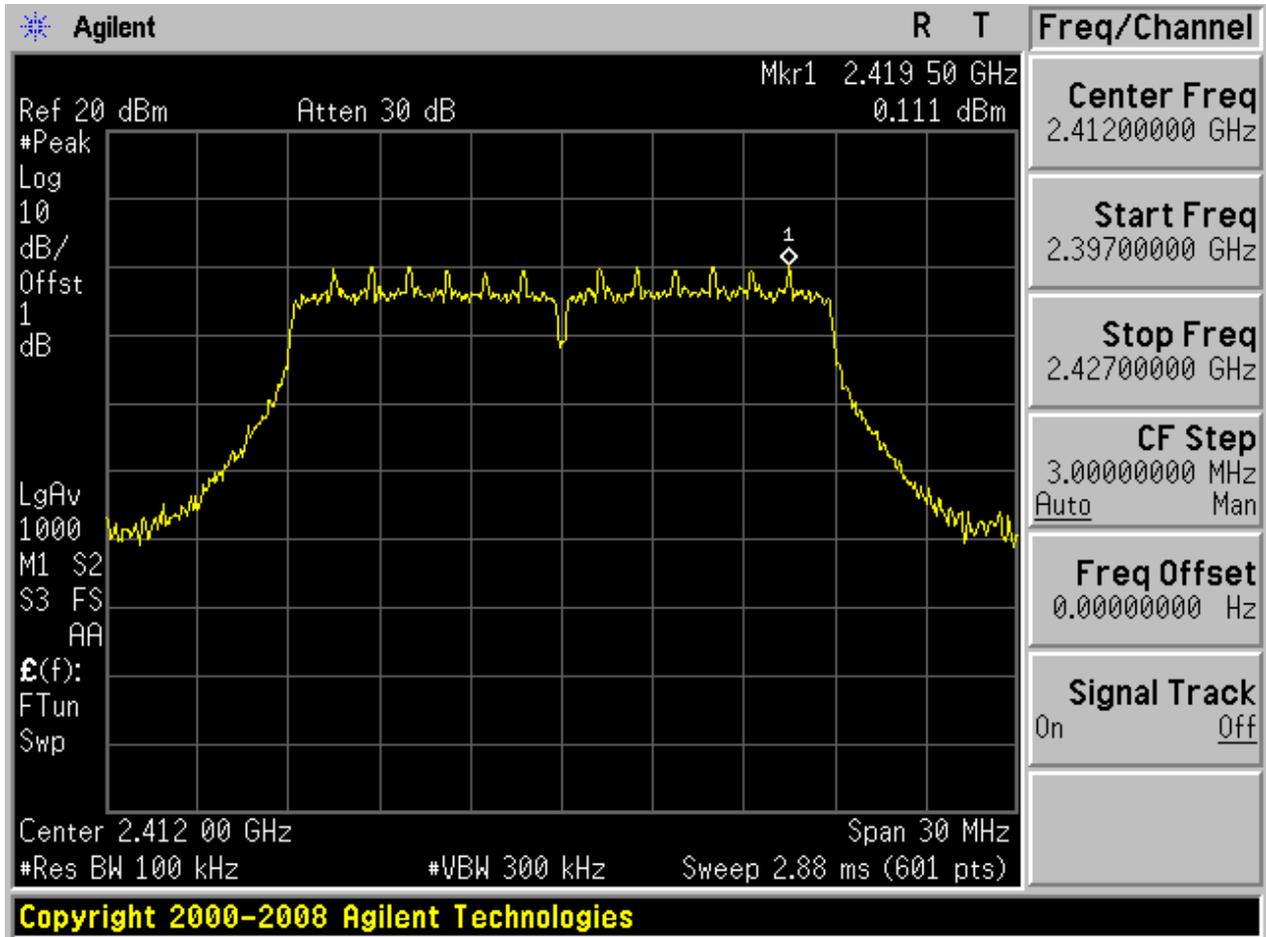






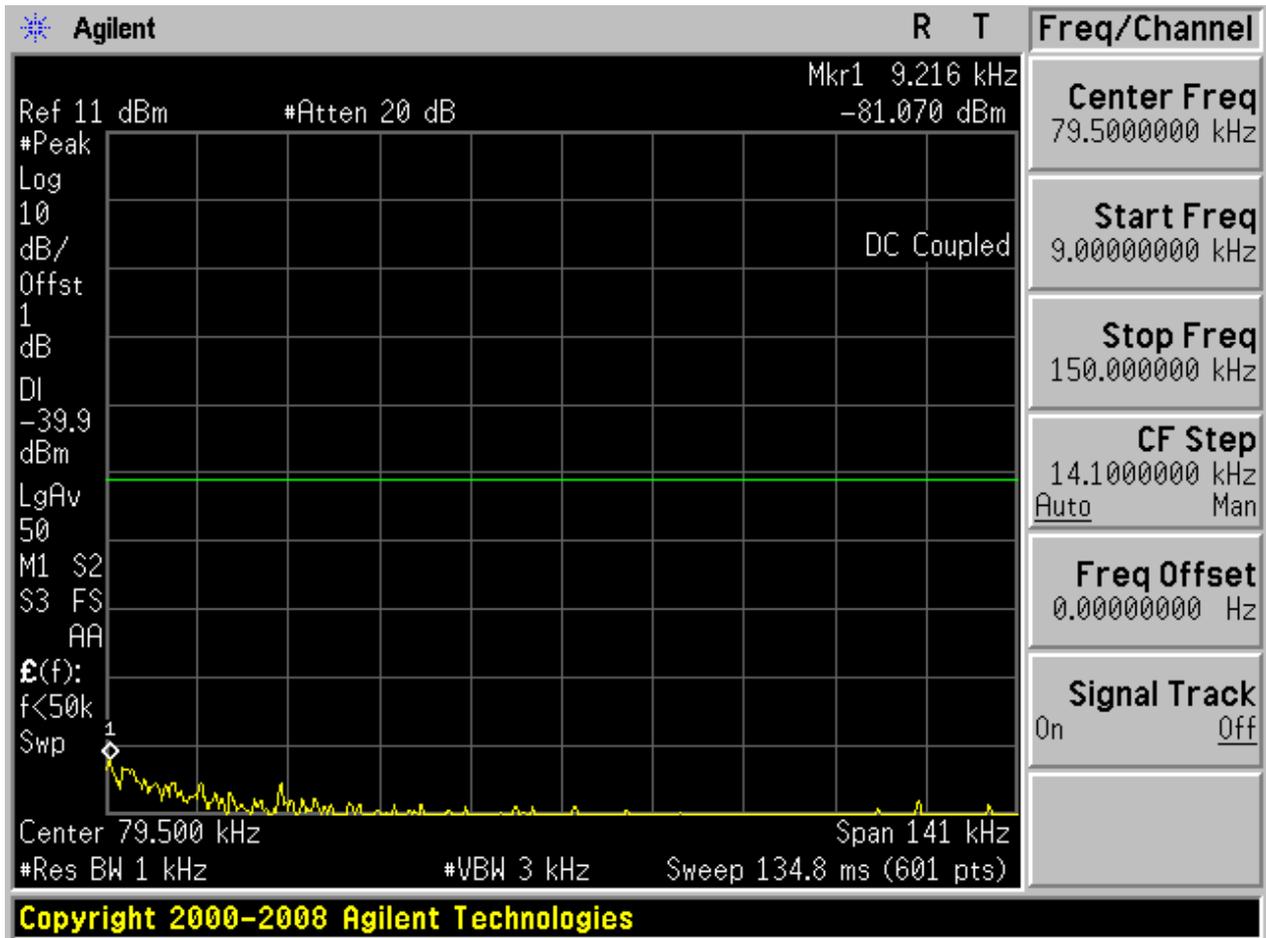
2.7 11N20_L

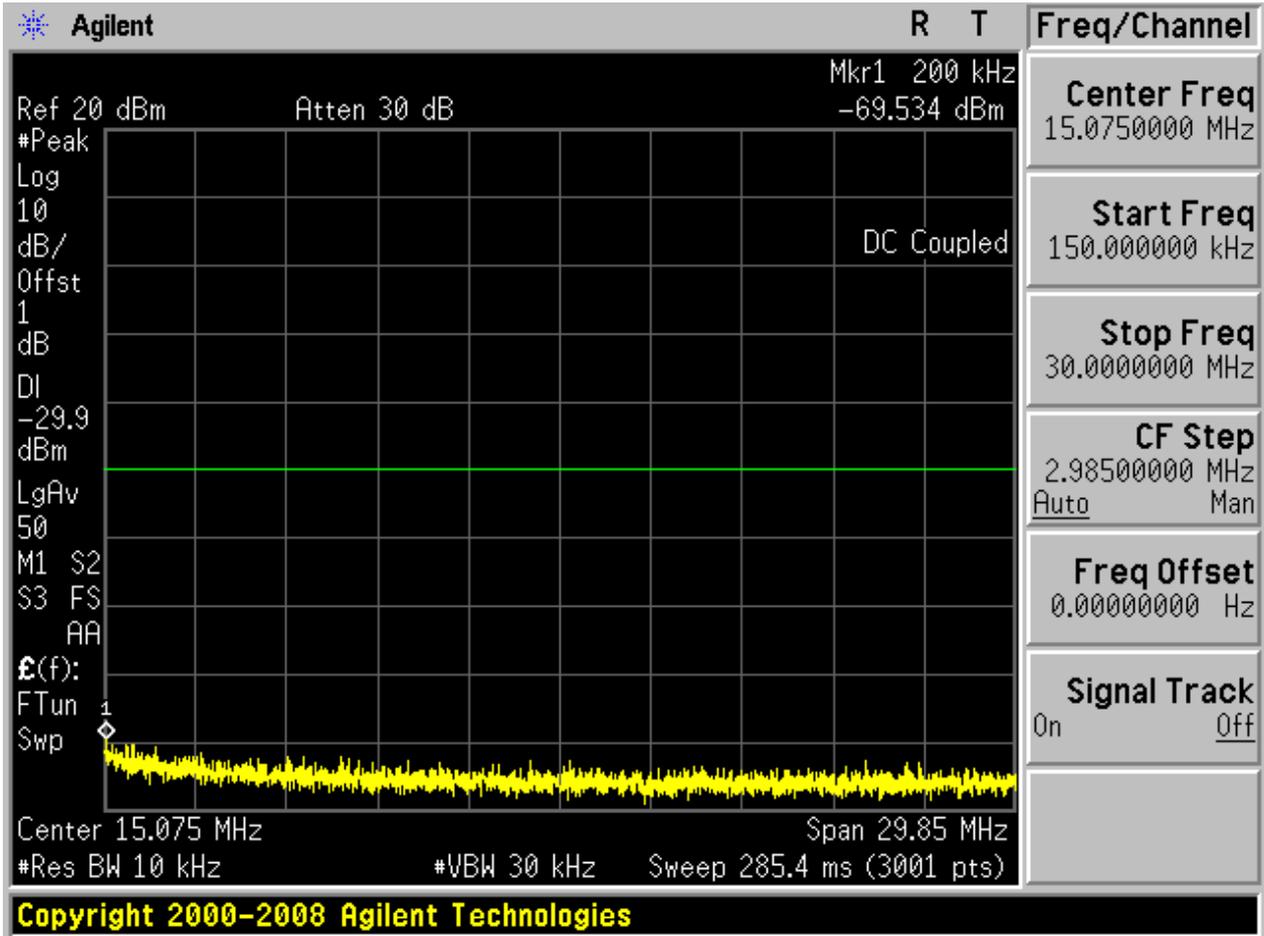
Pref:

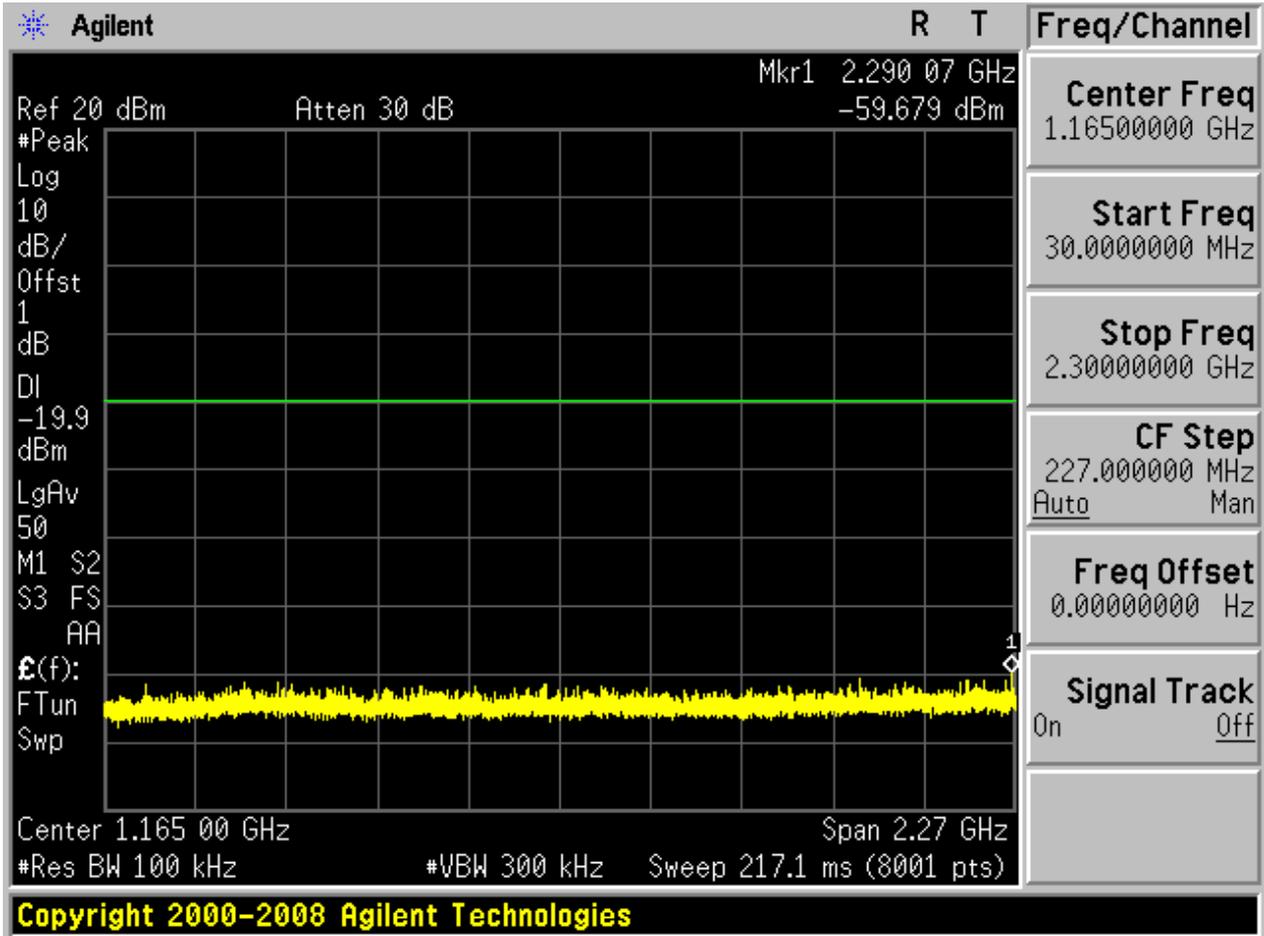


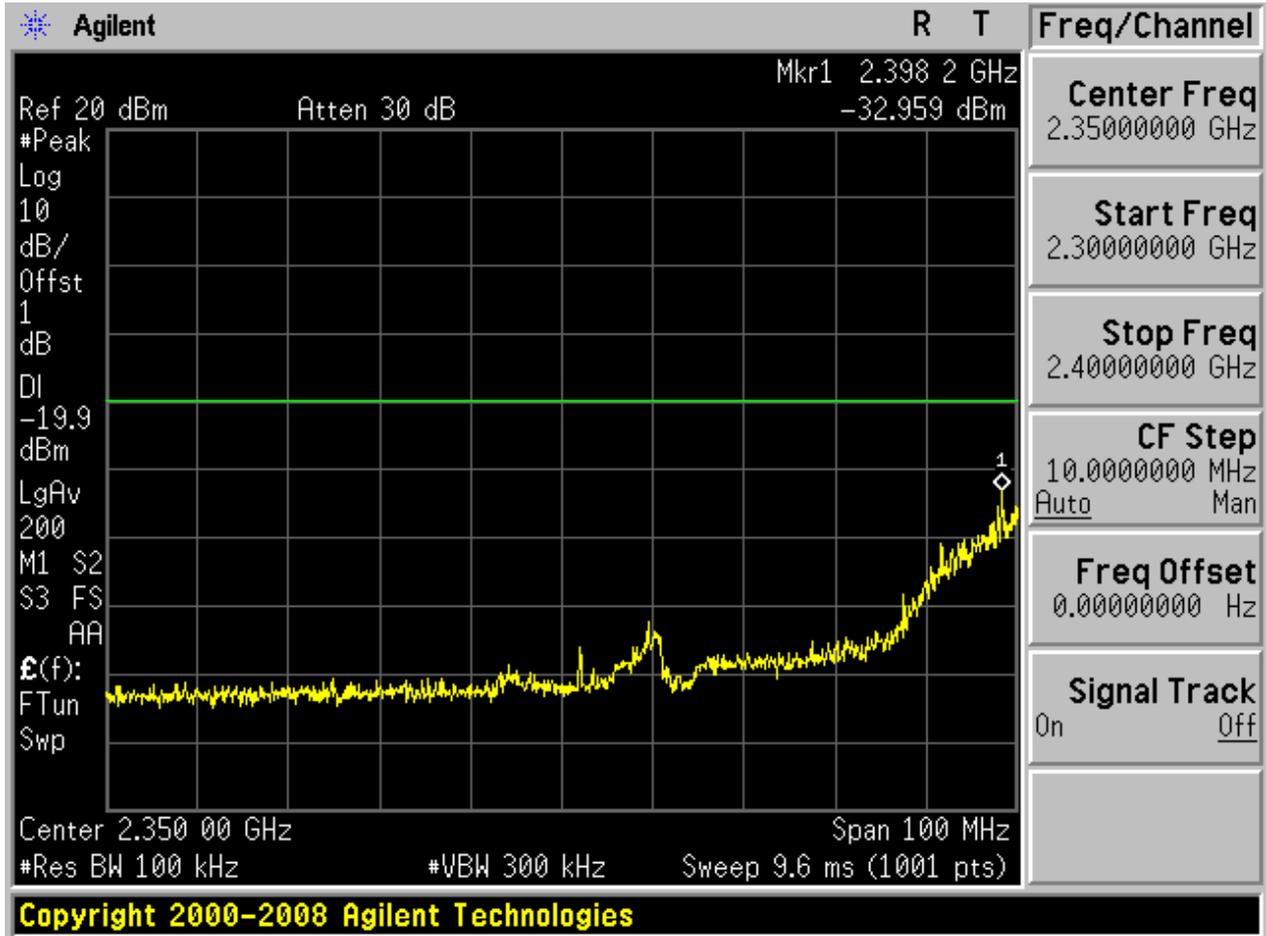


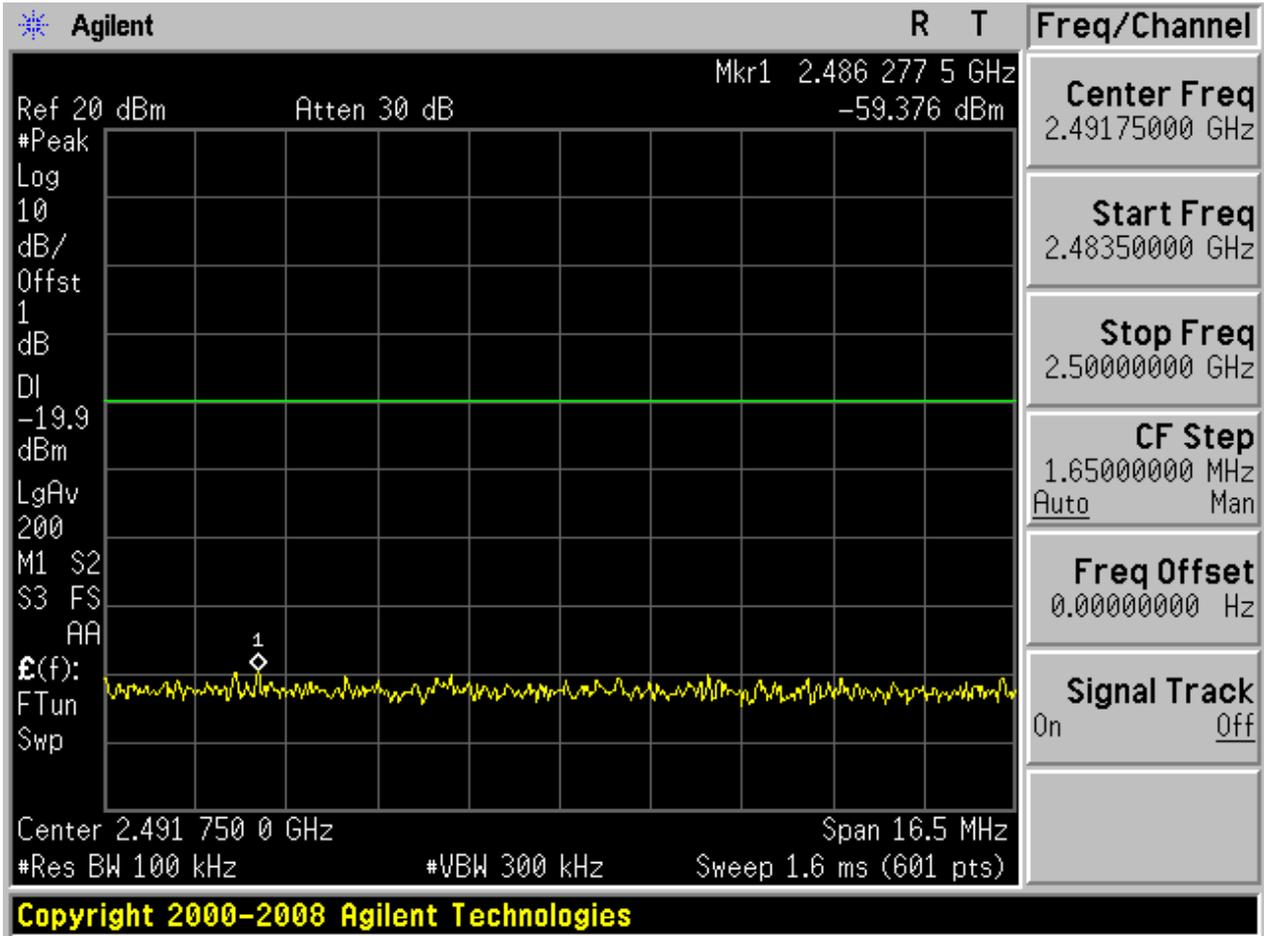
Puw:

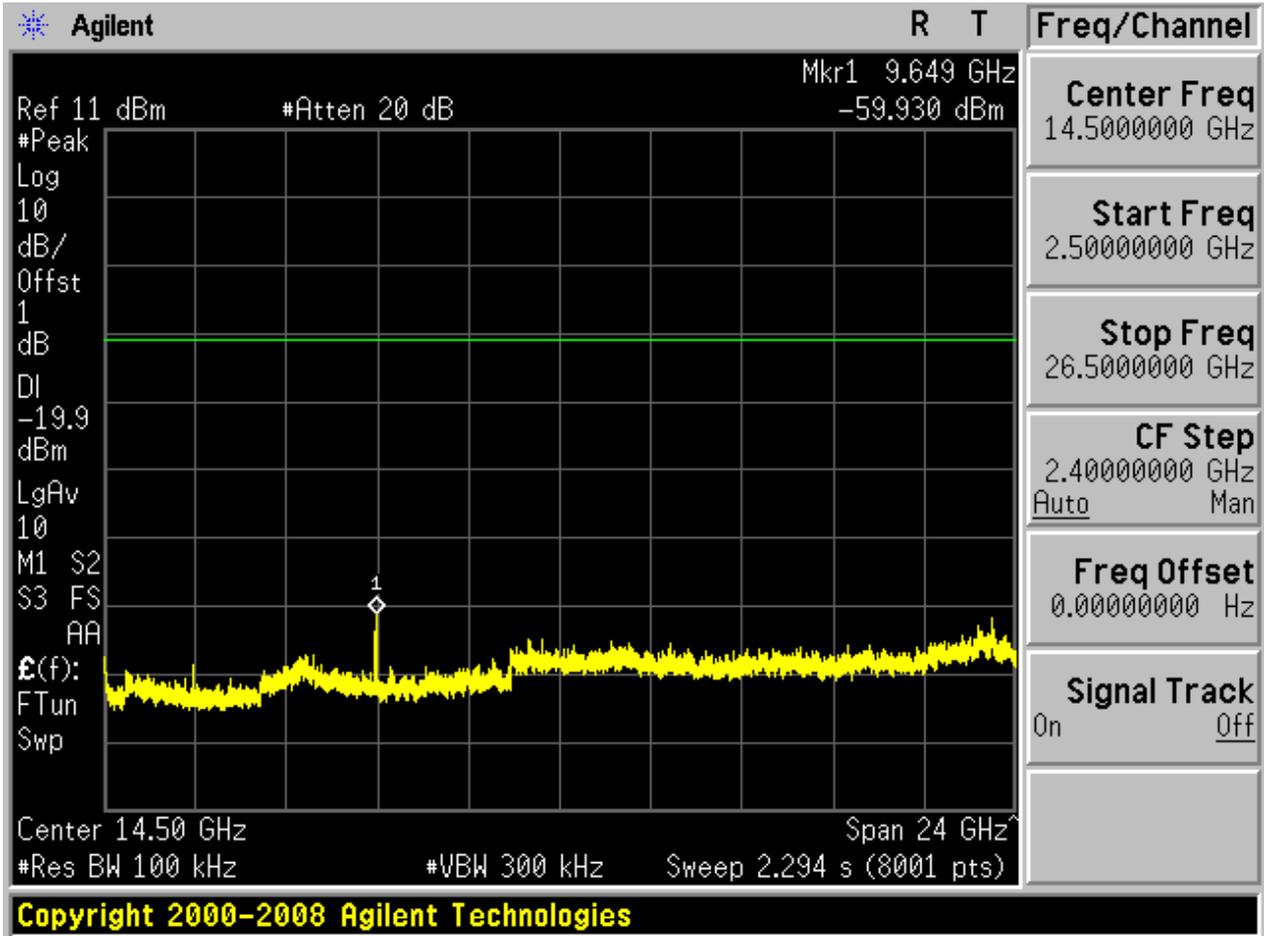








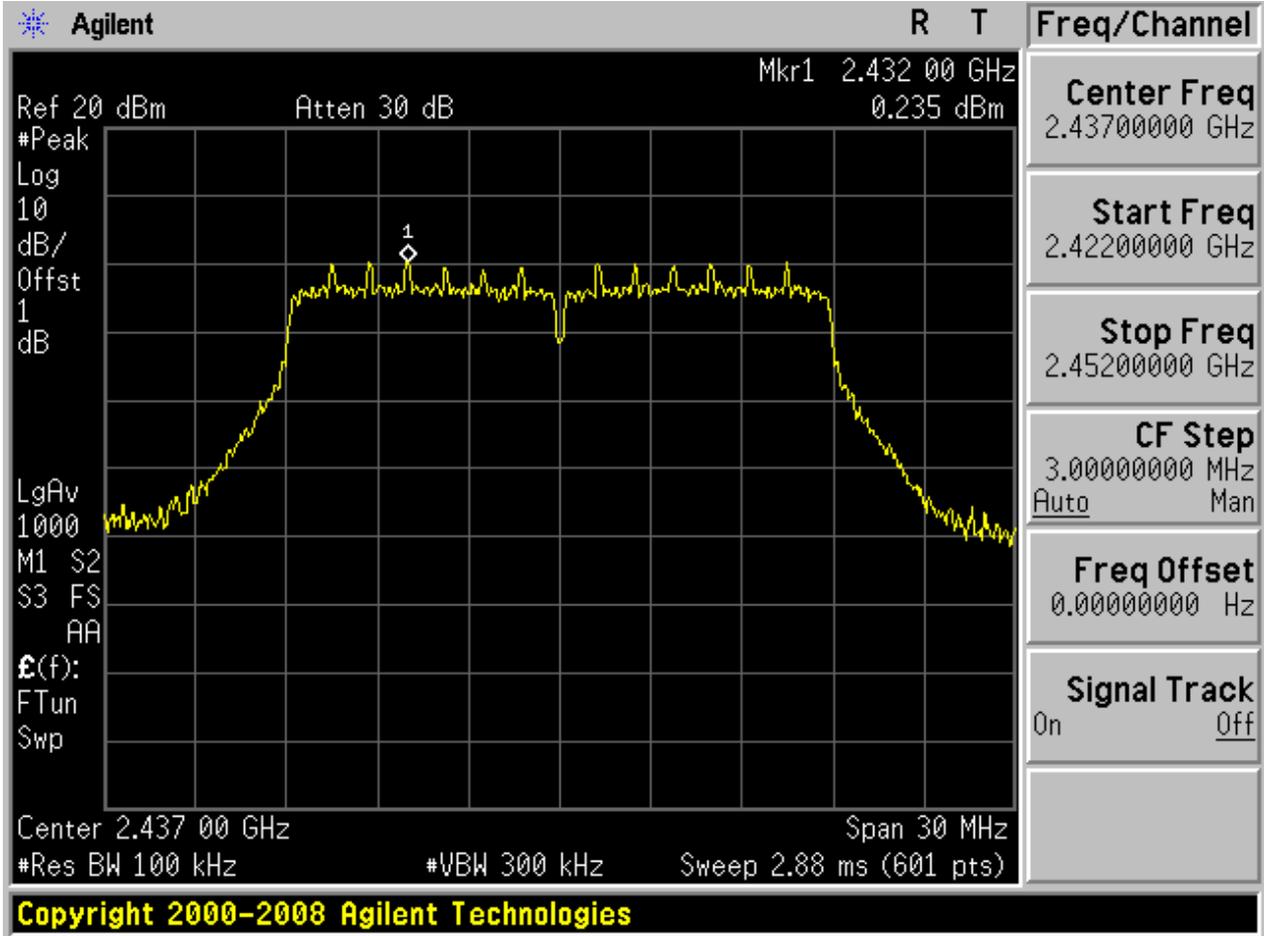






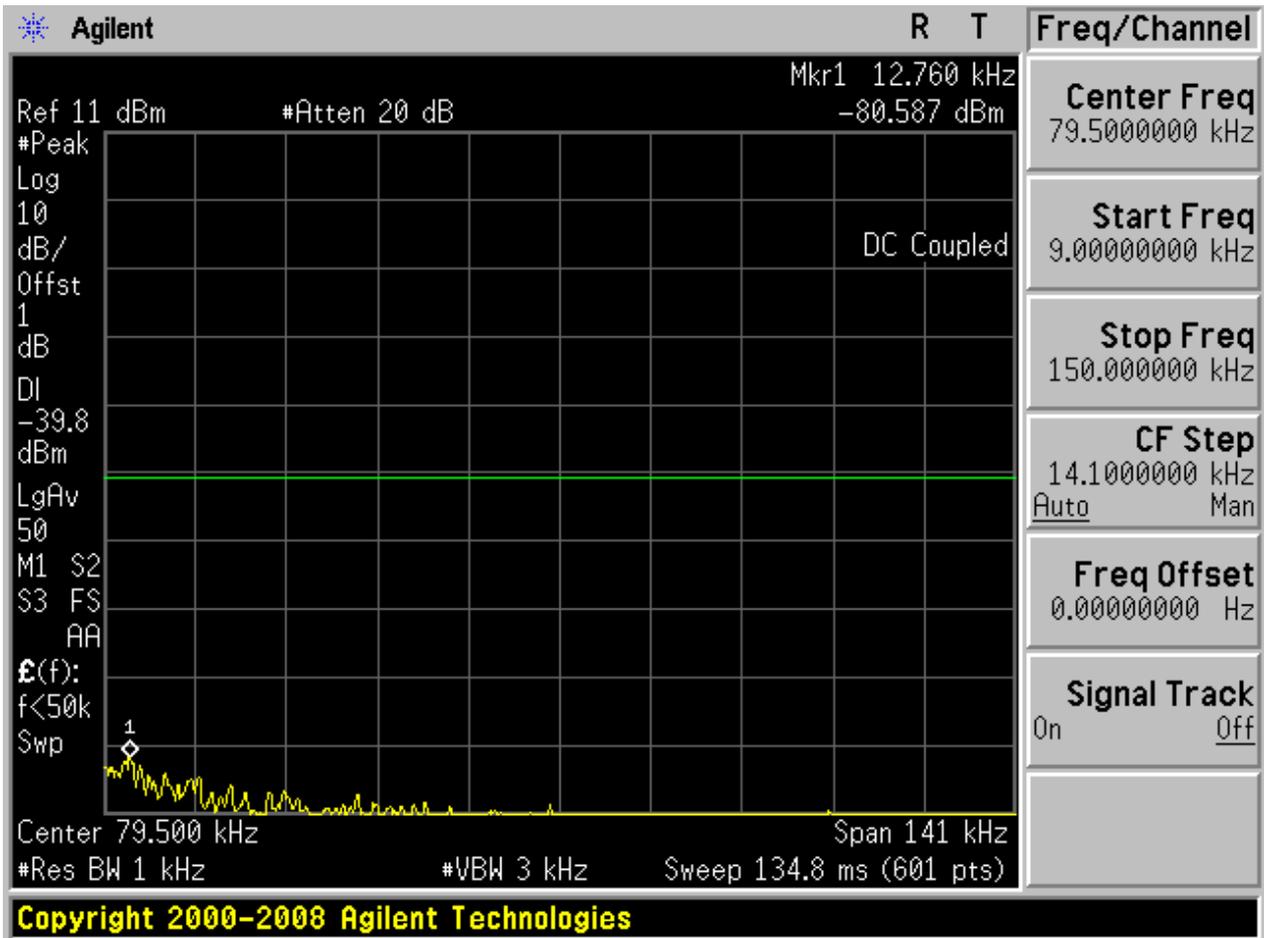
2.8 11N20_M

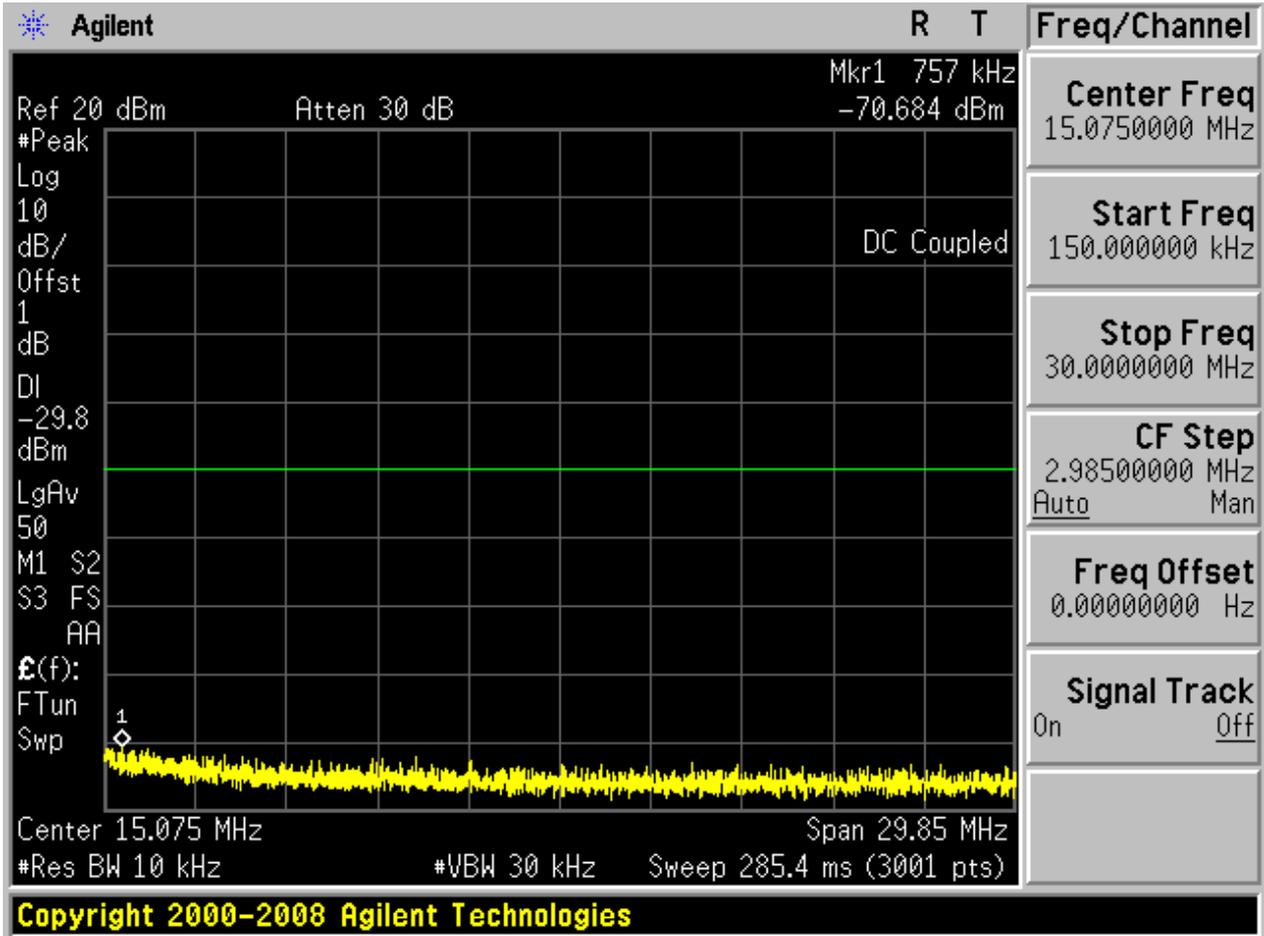
Pref:

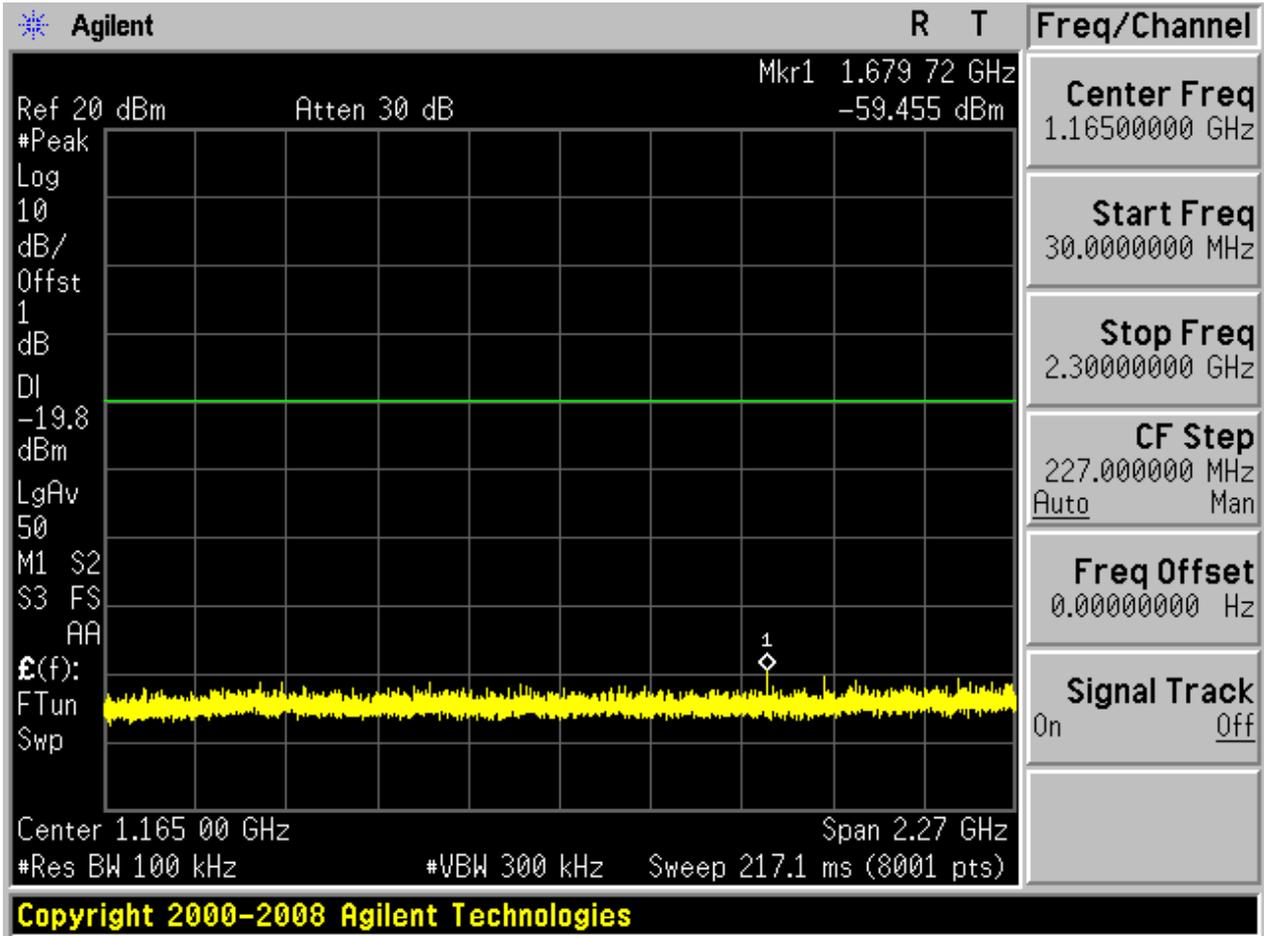


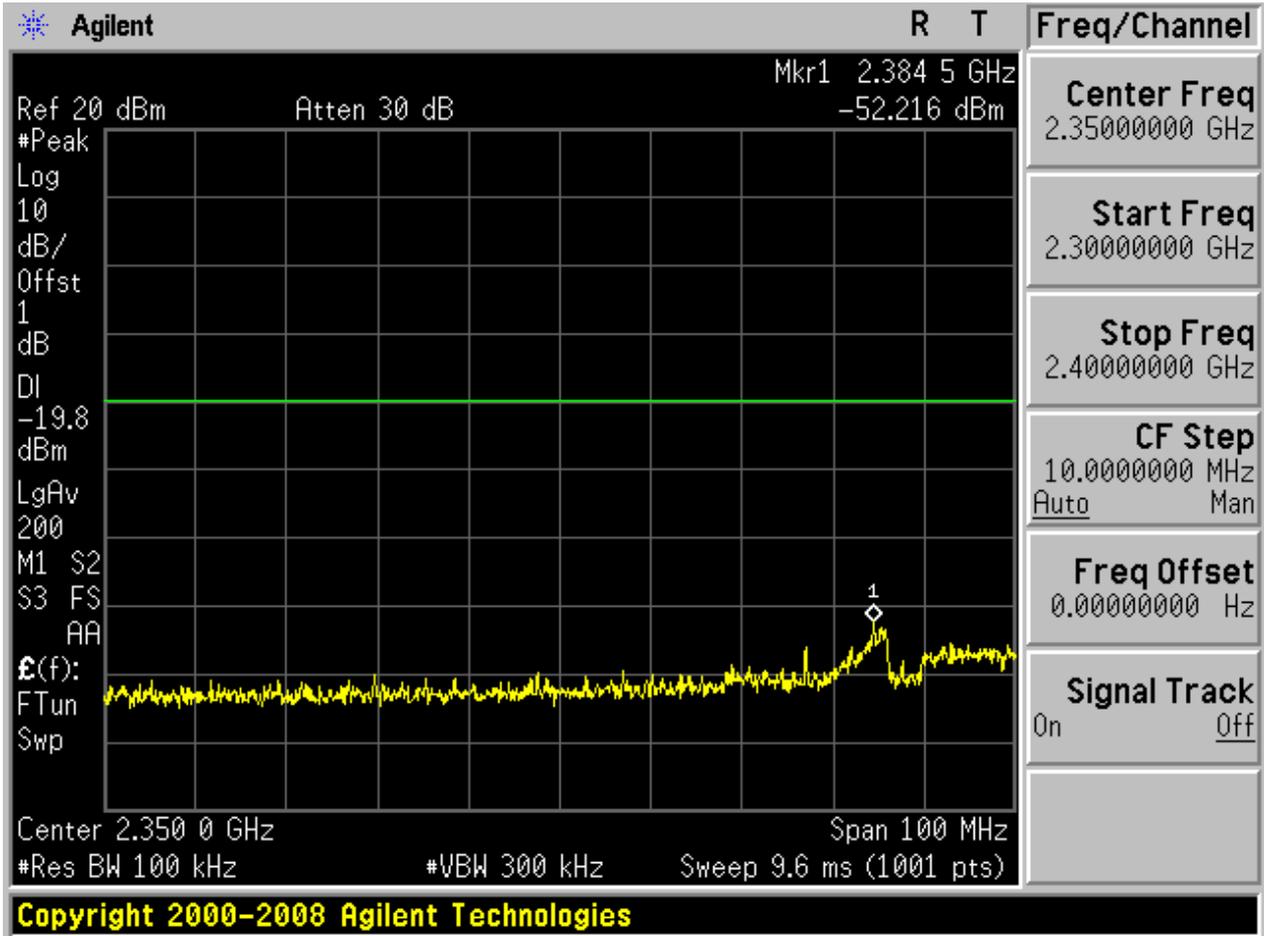


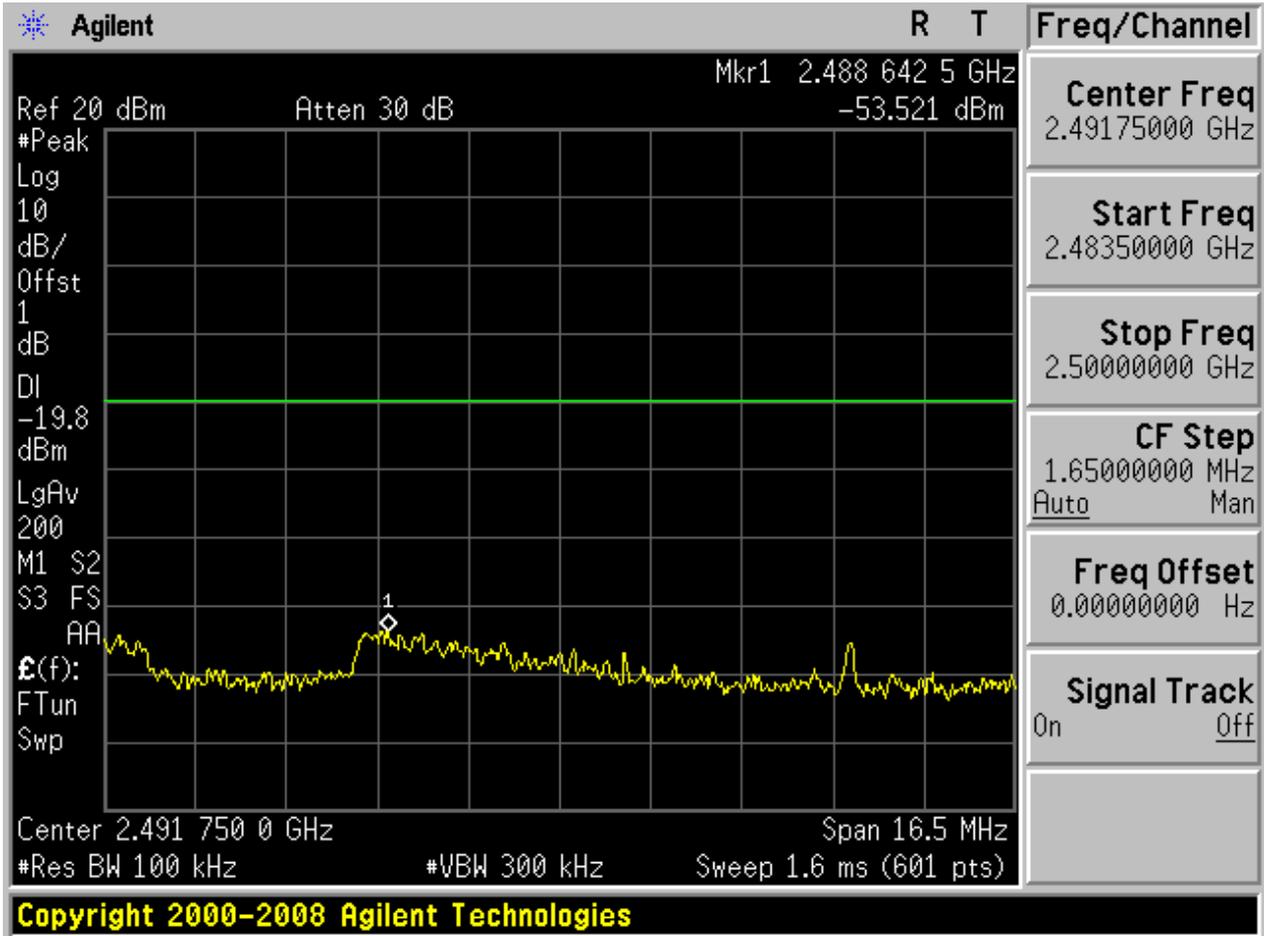
Puw:

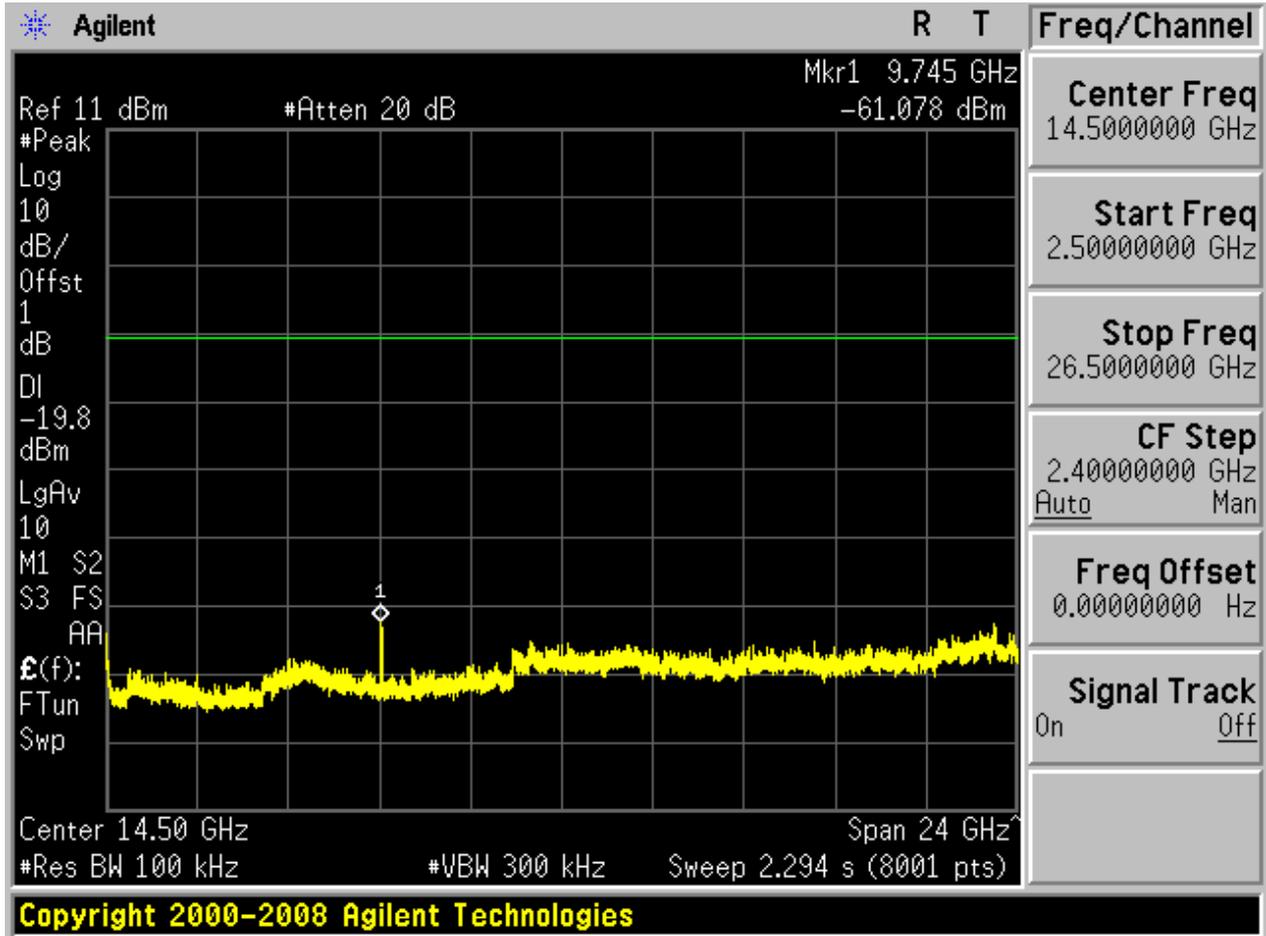






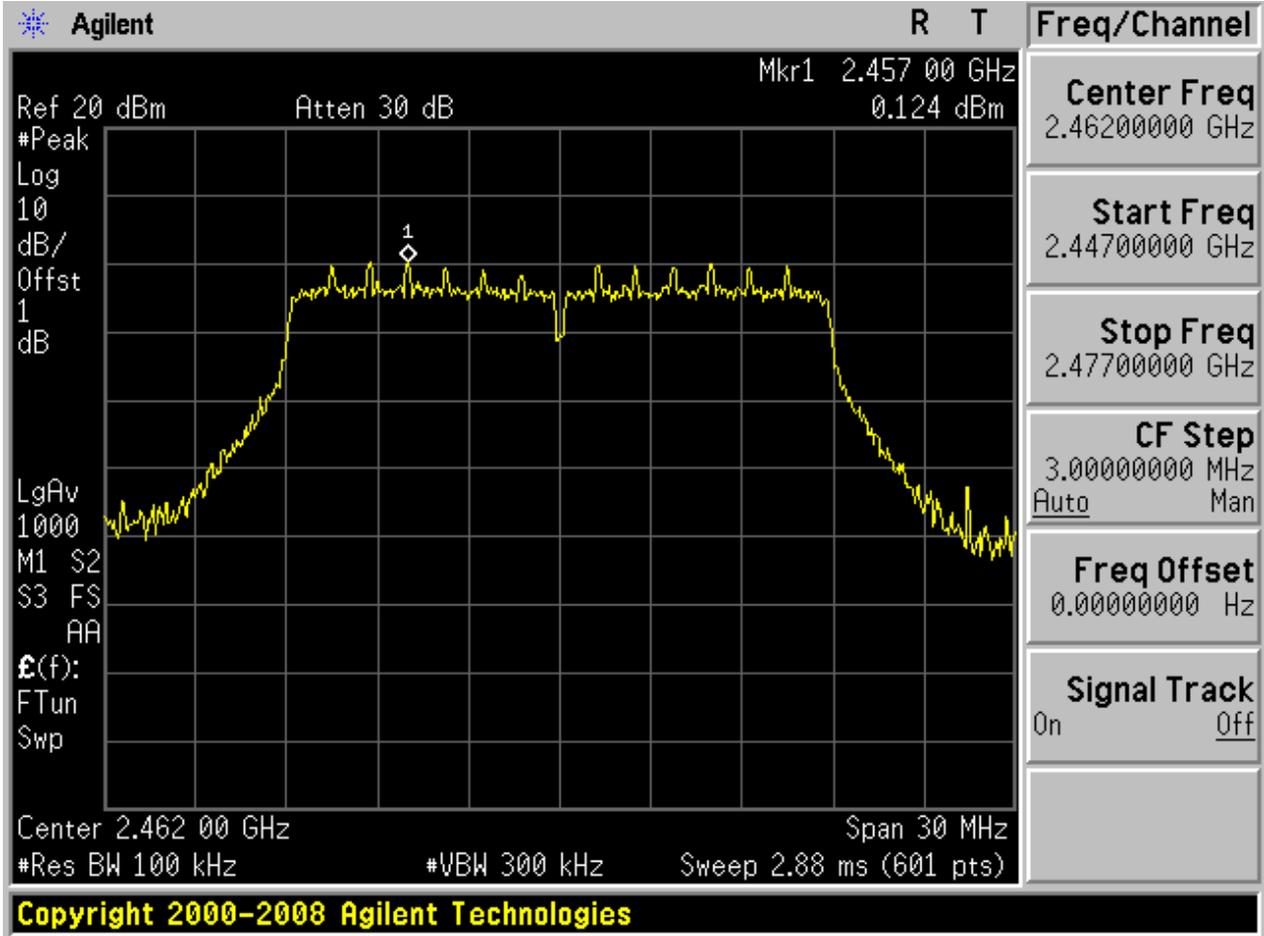






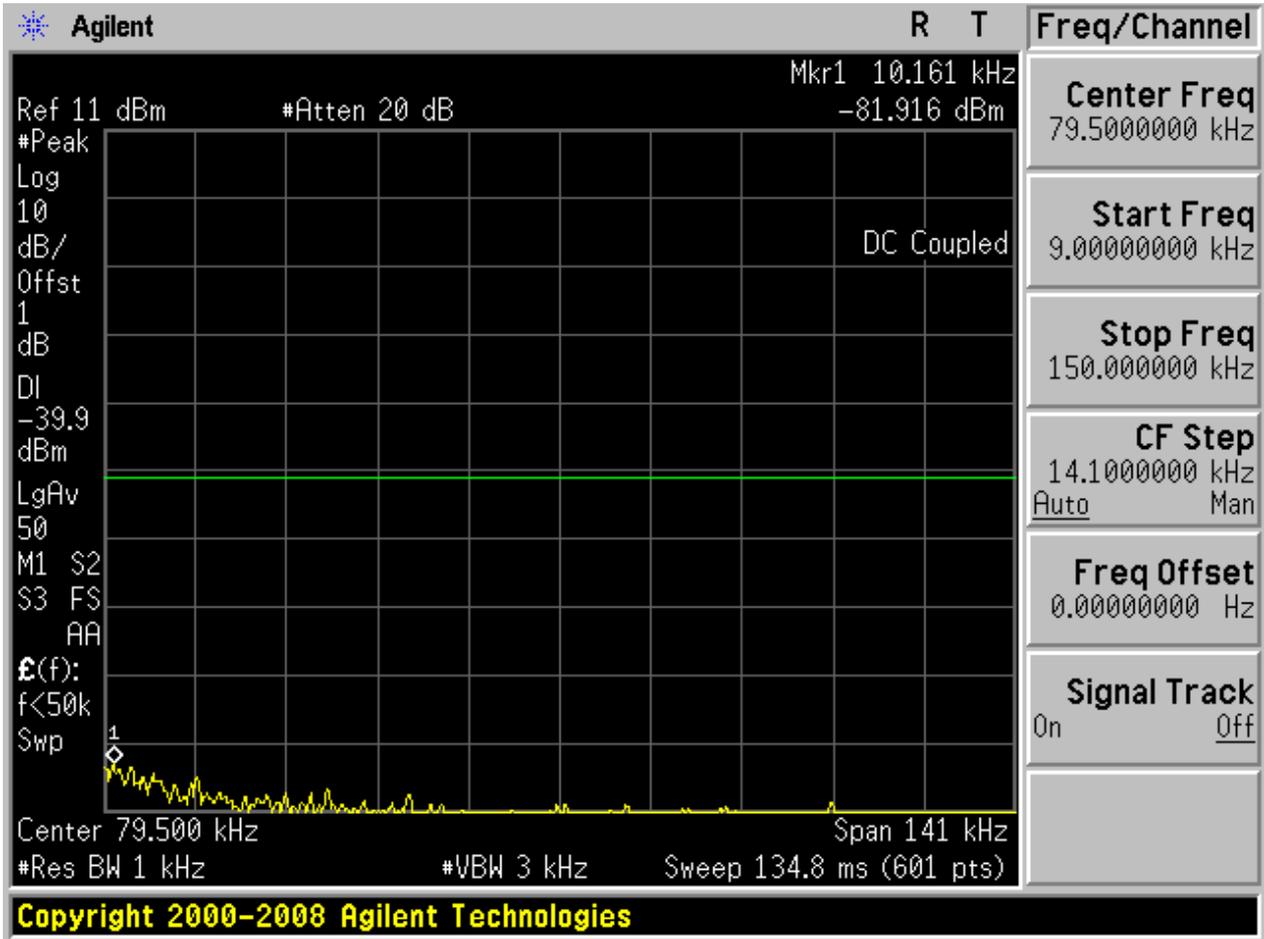
2.9 11N20_H

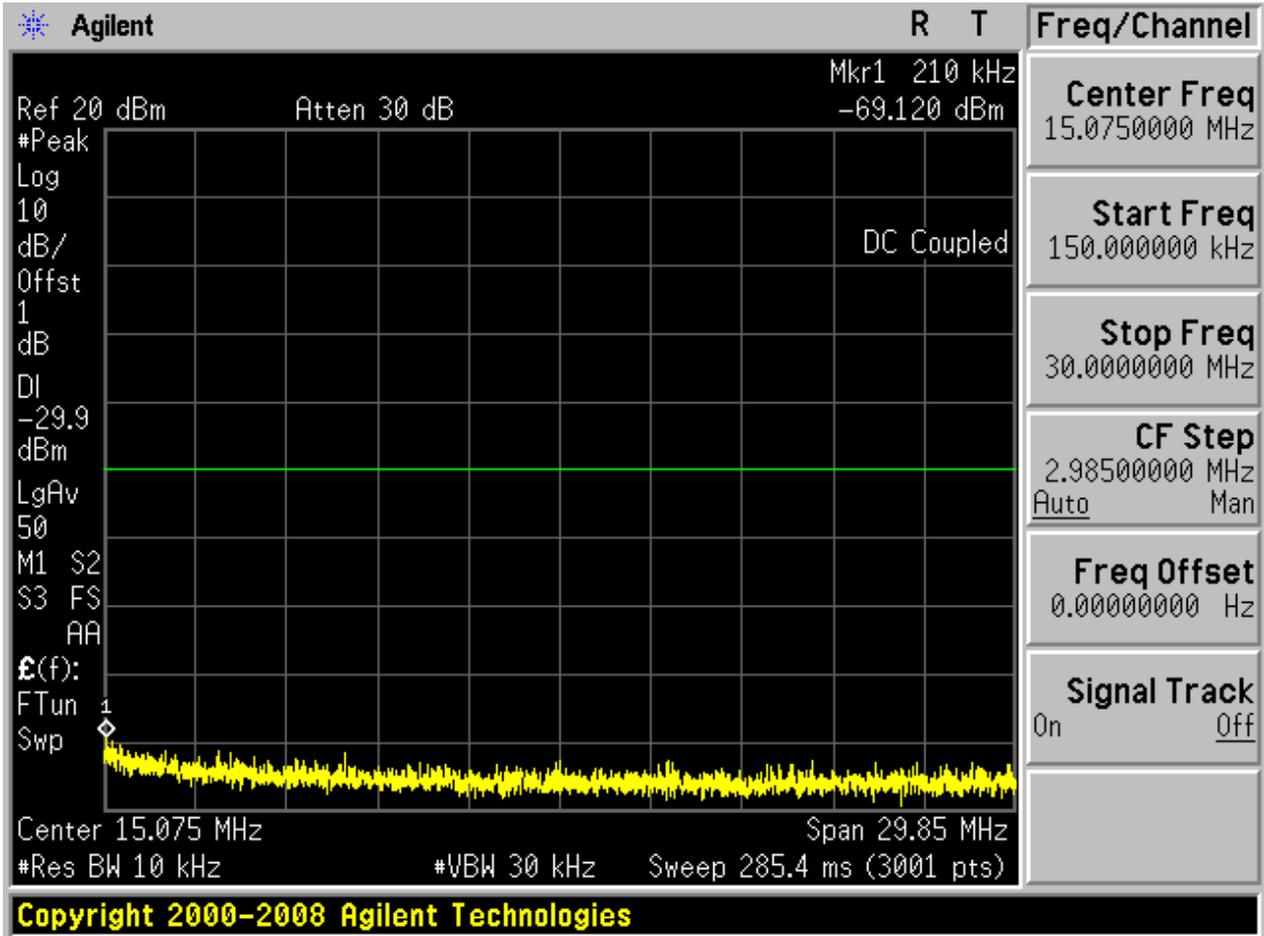
Pref:

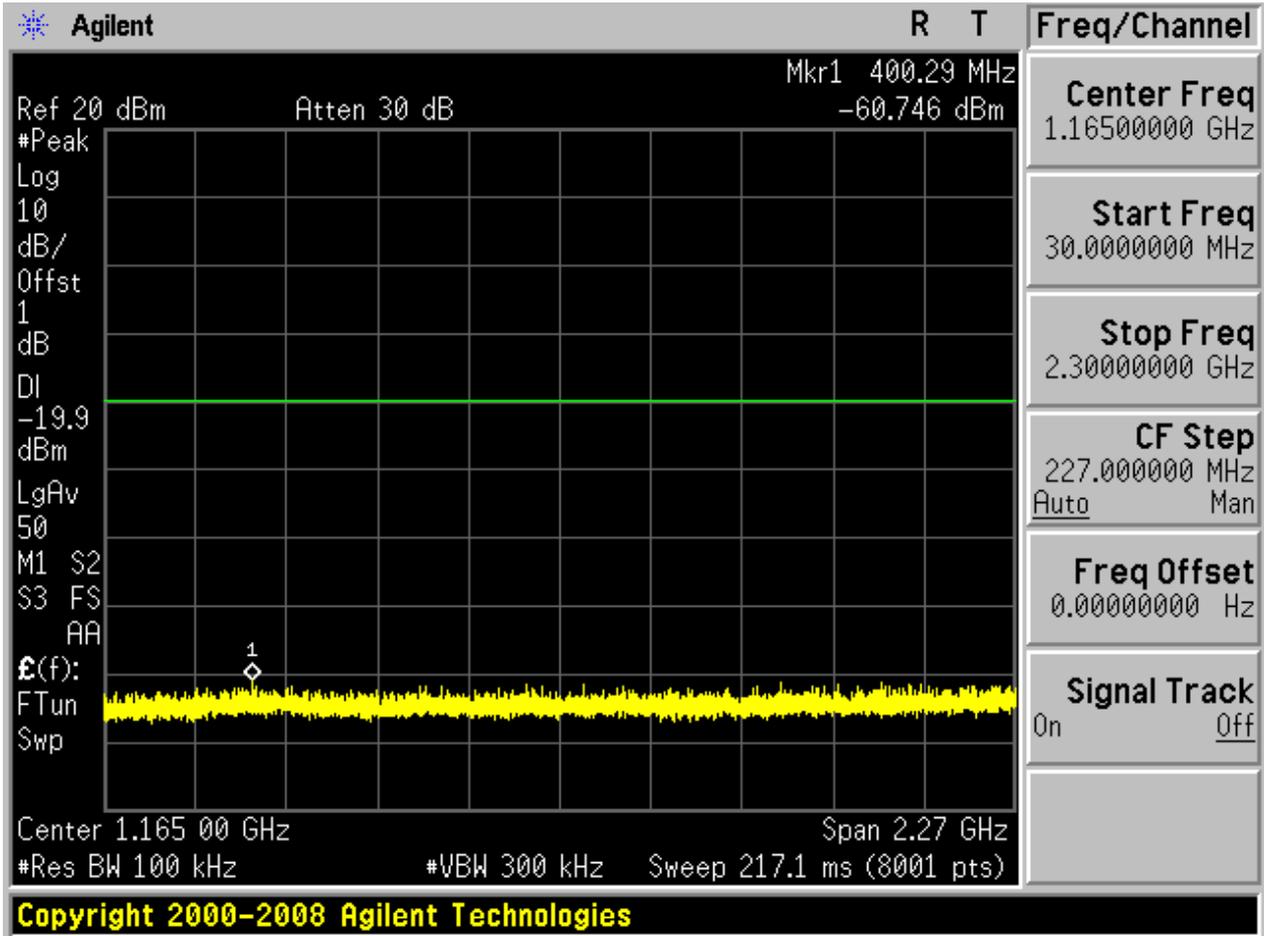


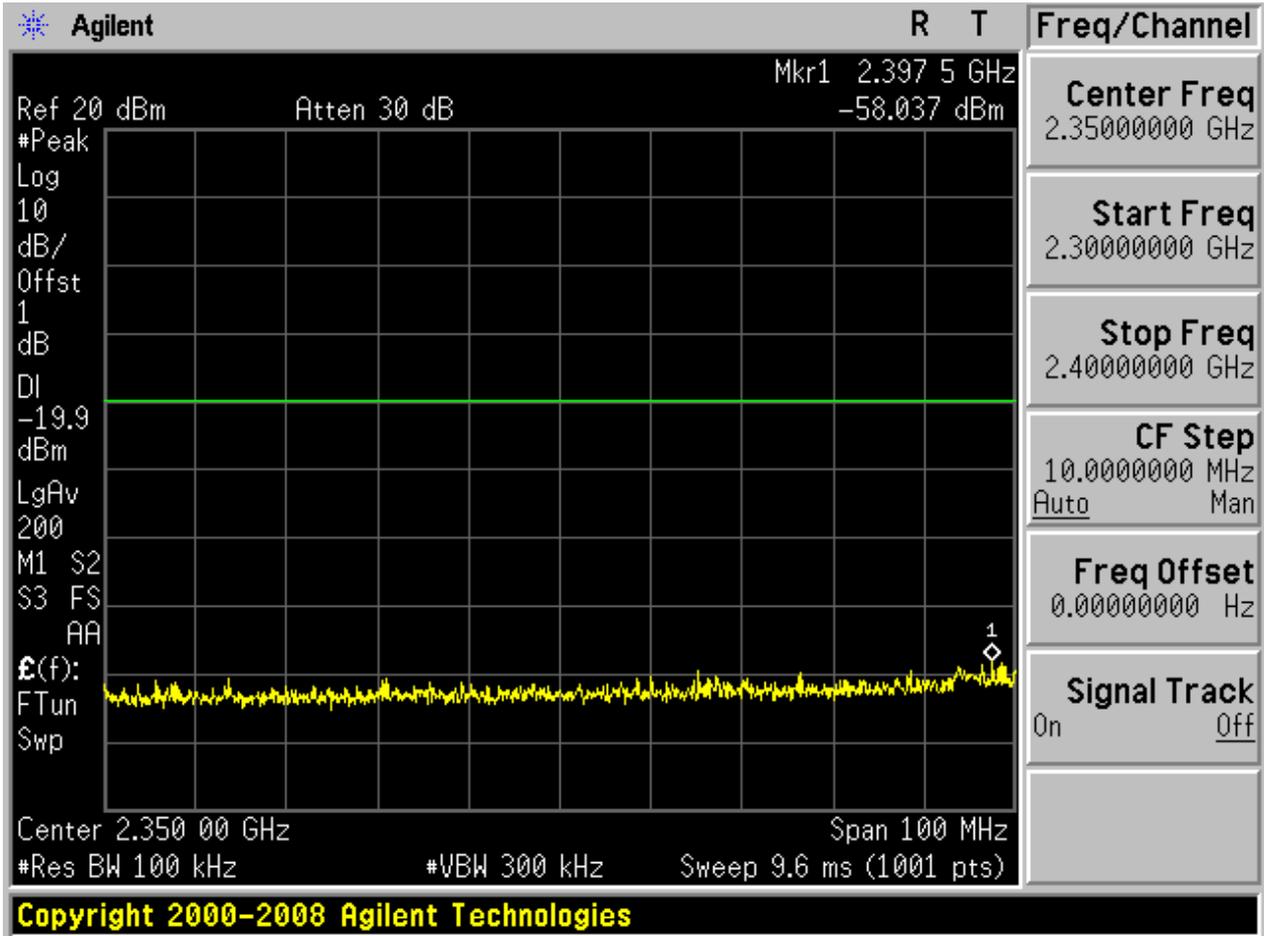


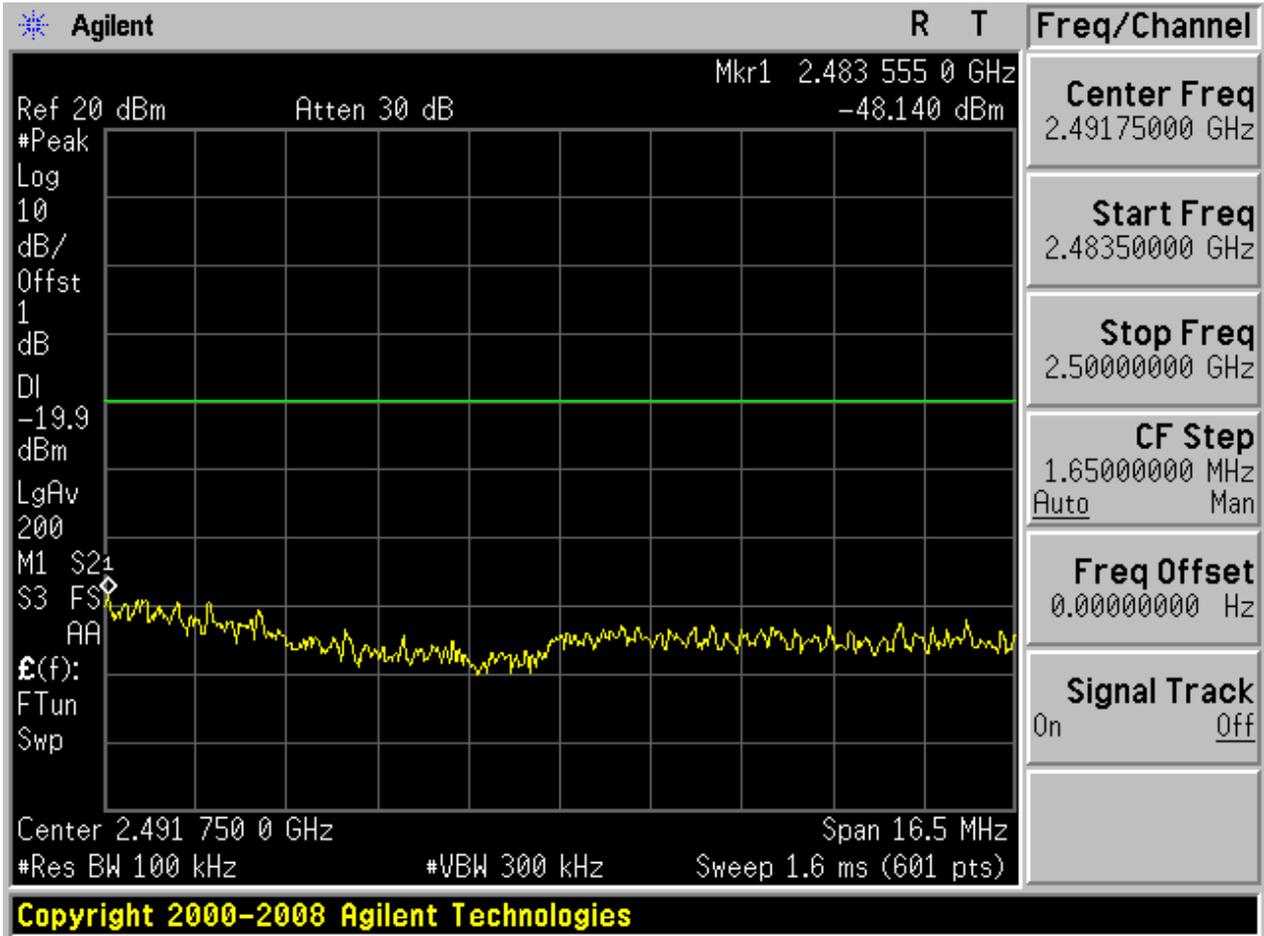
Puw:

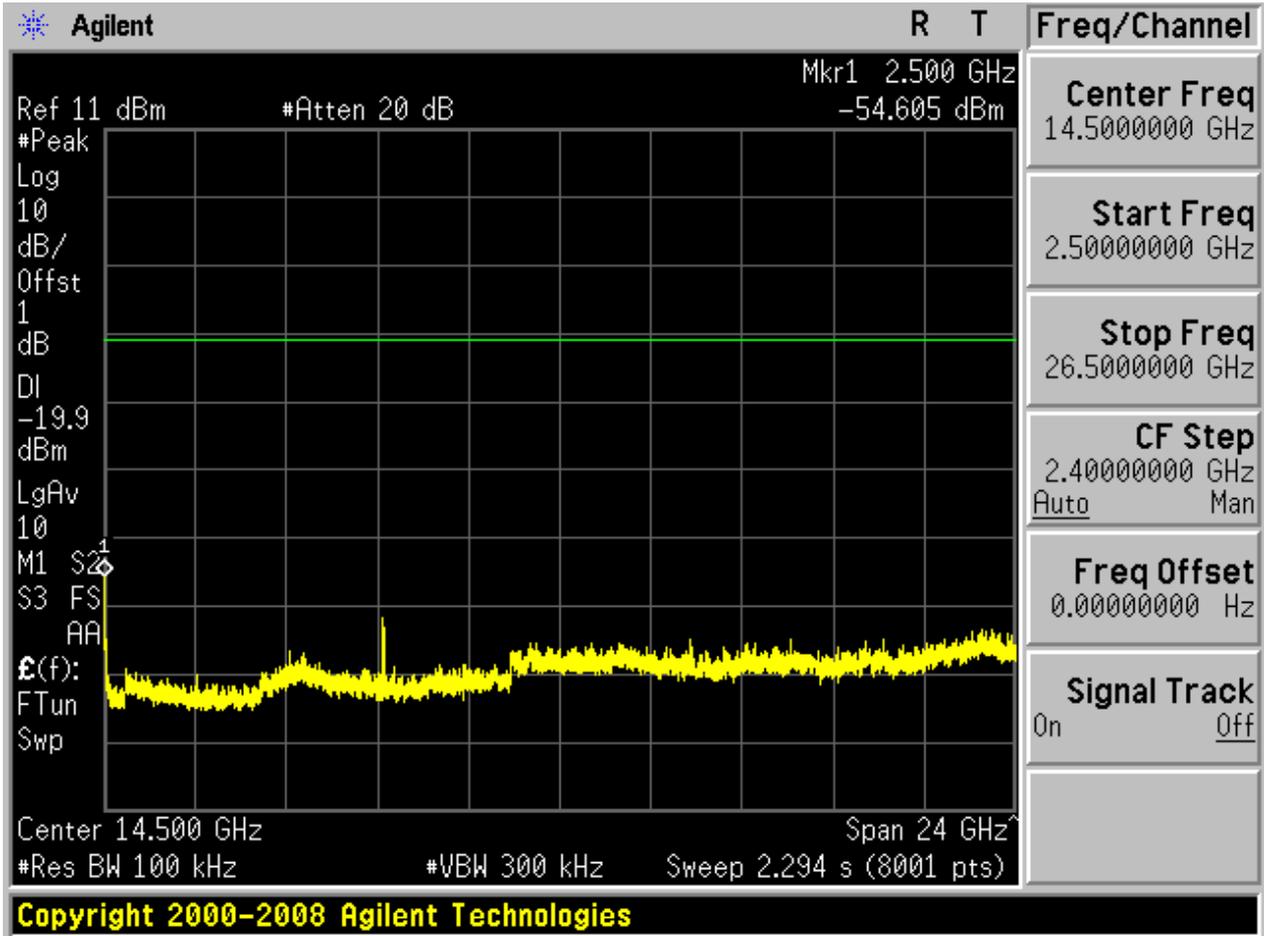












Appendix G: Radiated Spurious Emission & Spurious in Restricted Band

Note: Below 1GHz, RBW = 100 kHz, VBW = 300 kHz.

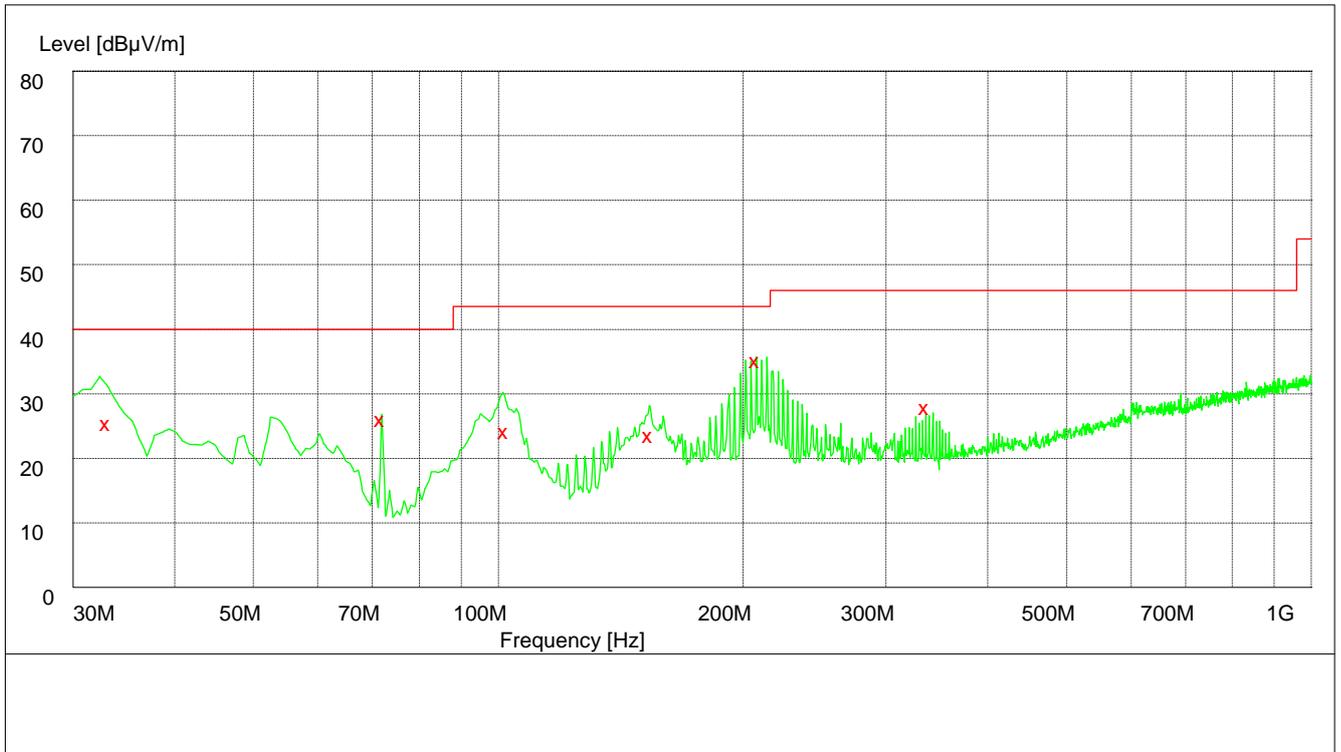
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz.

The simultaneous transmission has been considered

Part 1: Testing Range of “30 MHz to 1 GHz”

Note 1: The test results and plot for testing range of “30 MHz to 1 GHz” showed as below is **the WORST case for all Test Modes and Channels**. This range will not be presented for each Test Mode and each Channel.

Note 2: **The emissions in this range are mainly from the Platform Device (Notepad PC and its ancillary components).**



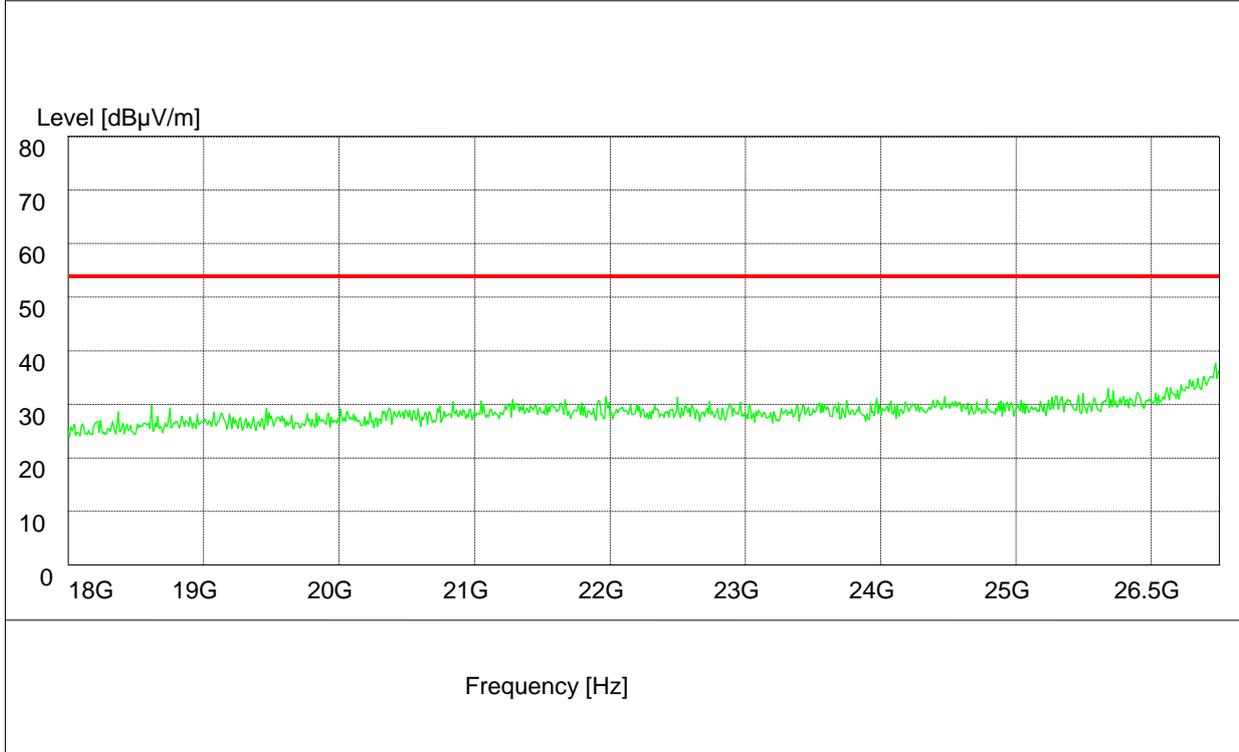
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Plarization
33.060000	26.90	11.8	40.0	13.1	100.0	18.00	HORIZONTAL



72.000000	27.50	8.1	40.0	12.5	100.0	360.00	HORIZONTAL
102.180000	25.70	12.9	43.5	17.8	100.0	346.00	HORIZONTAL
153.600000	25.10	9.3	43.5	18.4	100.0	5.00	HORIZONTAL
208.020000	36.60	12.5	43.5	6.9	100.0	360.00	HORIZONTAL
336.000000	29.40	16.8	46.0	16.6	100.0	29.00	VERTICAL

Part 2: Testing Range of “18 GHz to 26.5 GHz”

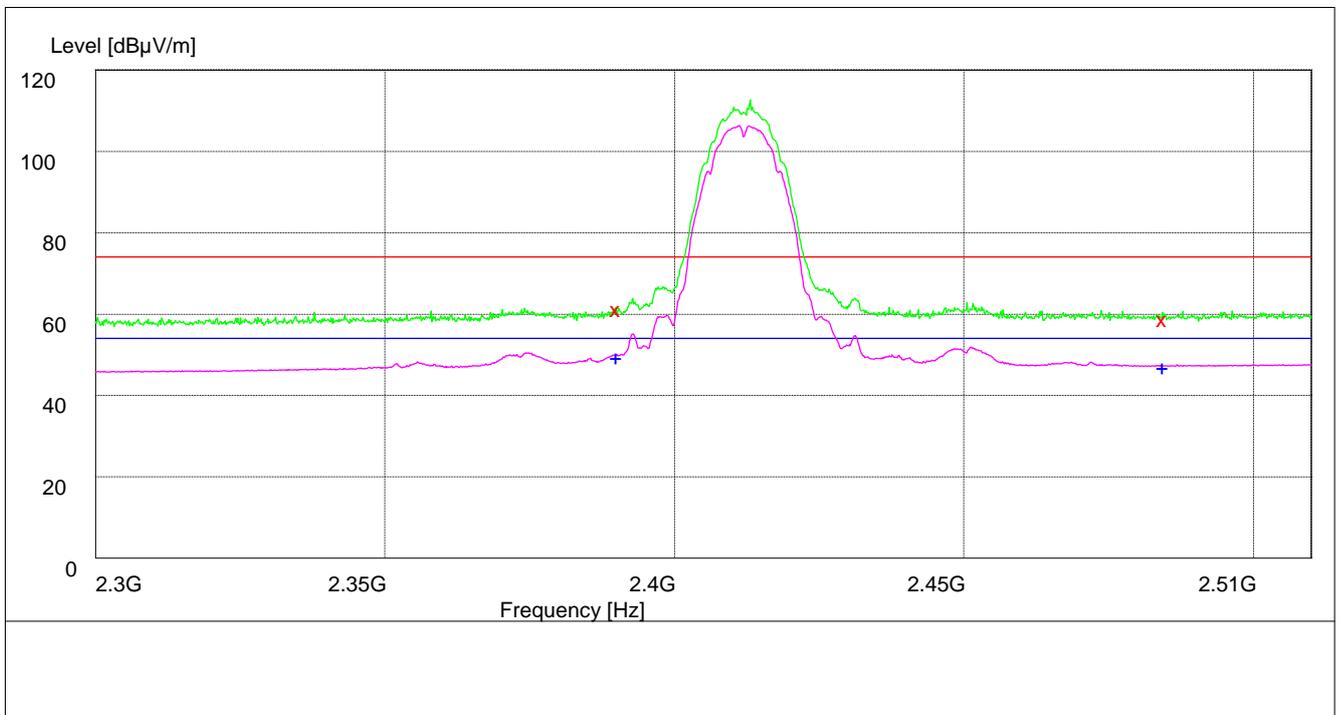
Note: No peak found in pre- test.

**Part 3: Testing Range of “2.3GHz to 2.5GHz”**

- Note 1: The testing range of “2.3 GHz to 2.5 GHz” is for checking radiated emissions located in restricted bands near the EUT operating bands.
- Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB μ V/m) and Average Limit (54 dB μ V/m).
- Note 3: The peak spike exceeds the limit line is EUT’s operating frequency.

Test Mode: 11b

Channel 01



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	61.20	34.8	74.0	12.8	100.0	82.00	HORIZONTAL
2483.500000	59.20	35.1	74.0	14.8	100.0	112.00	VERTICAL

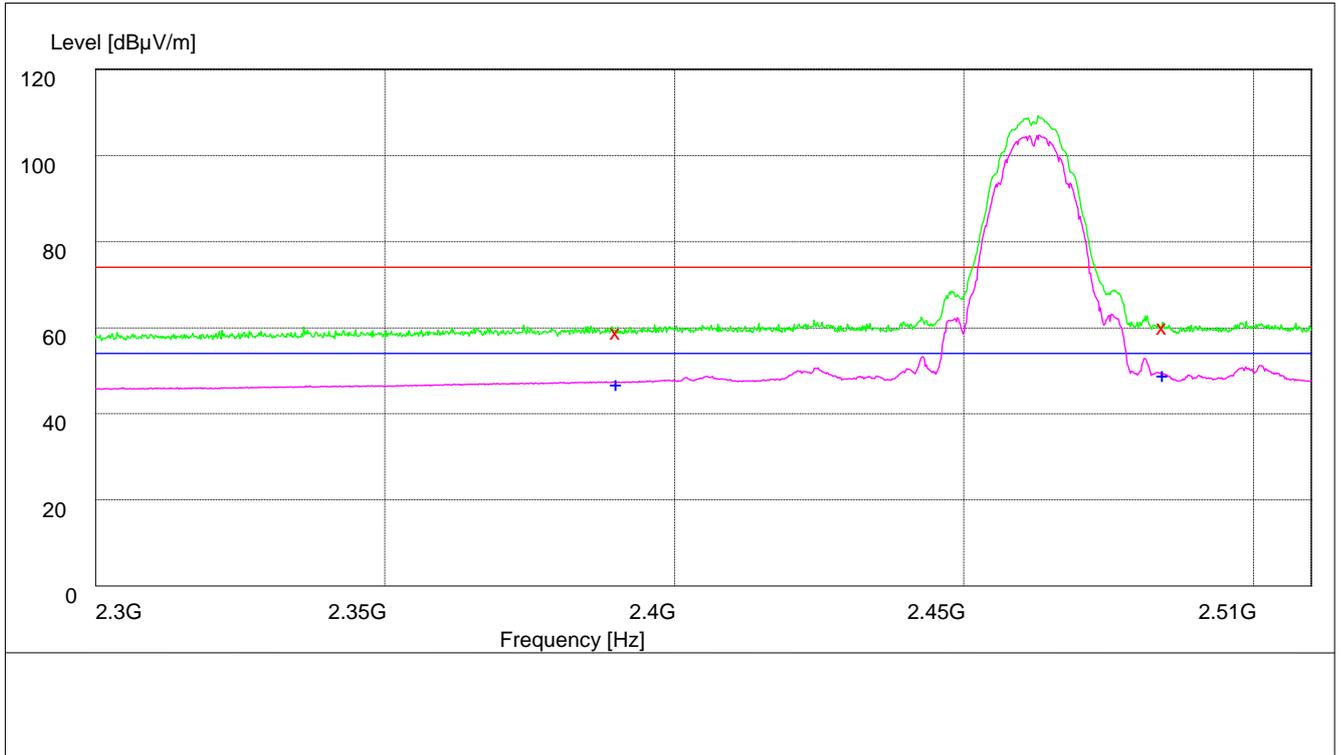
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	48.60	34.8	54.0	5.4	100.0	127.00	HORIZONTAL



2483.500000	47.30	35.1	54.0	6.7	104.0	241.00	VERTICAL
-------------	-------	------	------	-----	-------	--------	----------

Channel 11



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

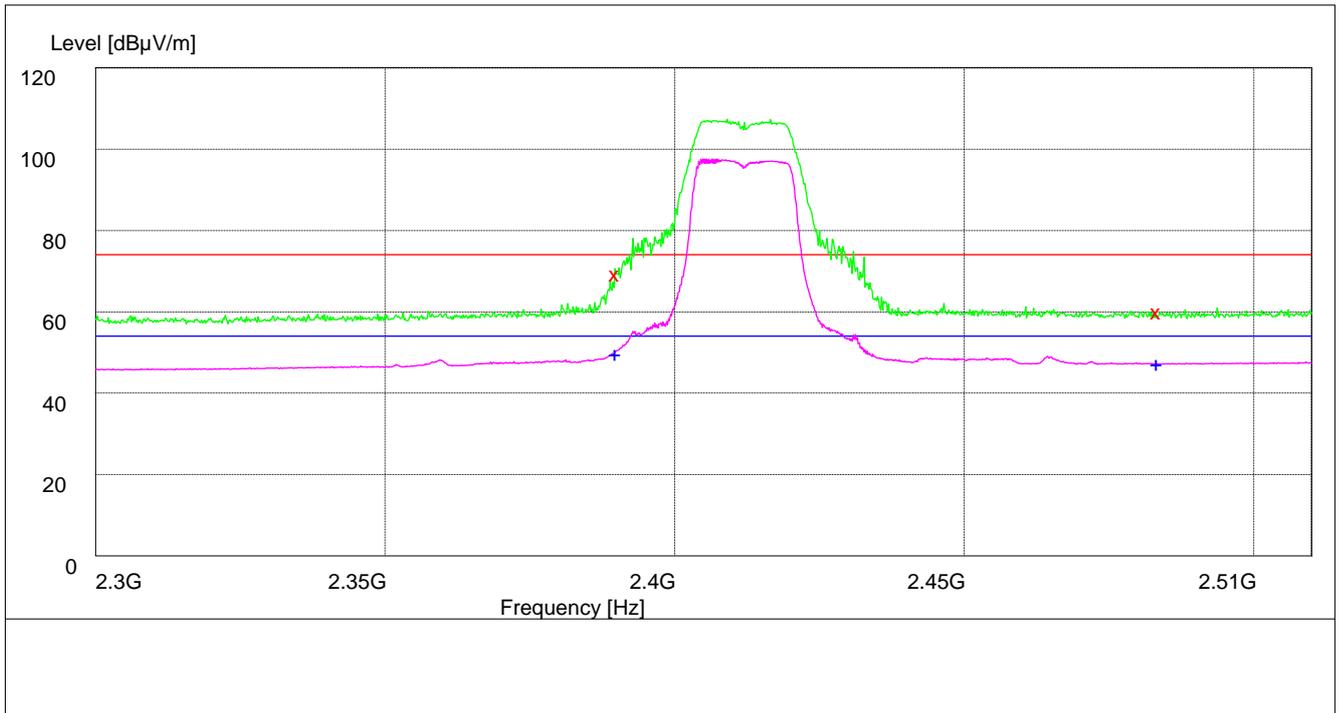
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	58.90	34.8	74.0	15.1	107.0	38.00	VERTICAL
2483.500000	60.30	35.1	74.0	13.4	114.0	261.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	47.60	34.8	54.0	6.4	100.0	58.00	HORIZONTAL
2483.500000	48.80	35.1	54.0	5.2	100.0	222.00	HORIZONTAL

Test Mode: 11g

Channel 01



Note: The peak exceeds the limit line is carrier frequency.

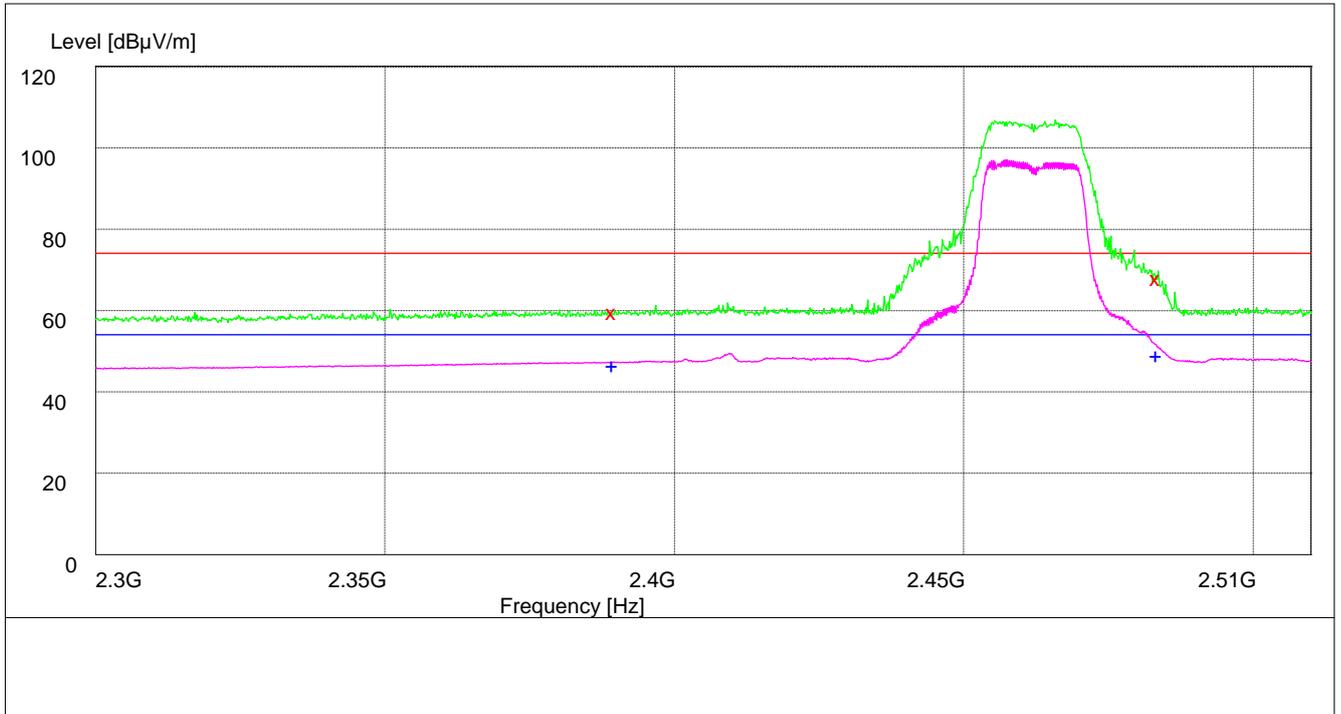
MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	69.60	34.8	74.0	4.4	101.0	124.00	HORIZONTAL
2483.500000	59.60	35.1	74.0	6.4	106.0	210.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	48.80	34.8	54.0	5.2	101.0	264.00	HORIZONTAL
2483.500000	47.30	35.1	54.0	6.7	106.0	86.00	VERTICAL

Channel 11



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

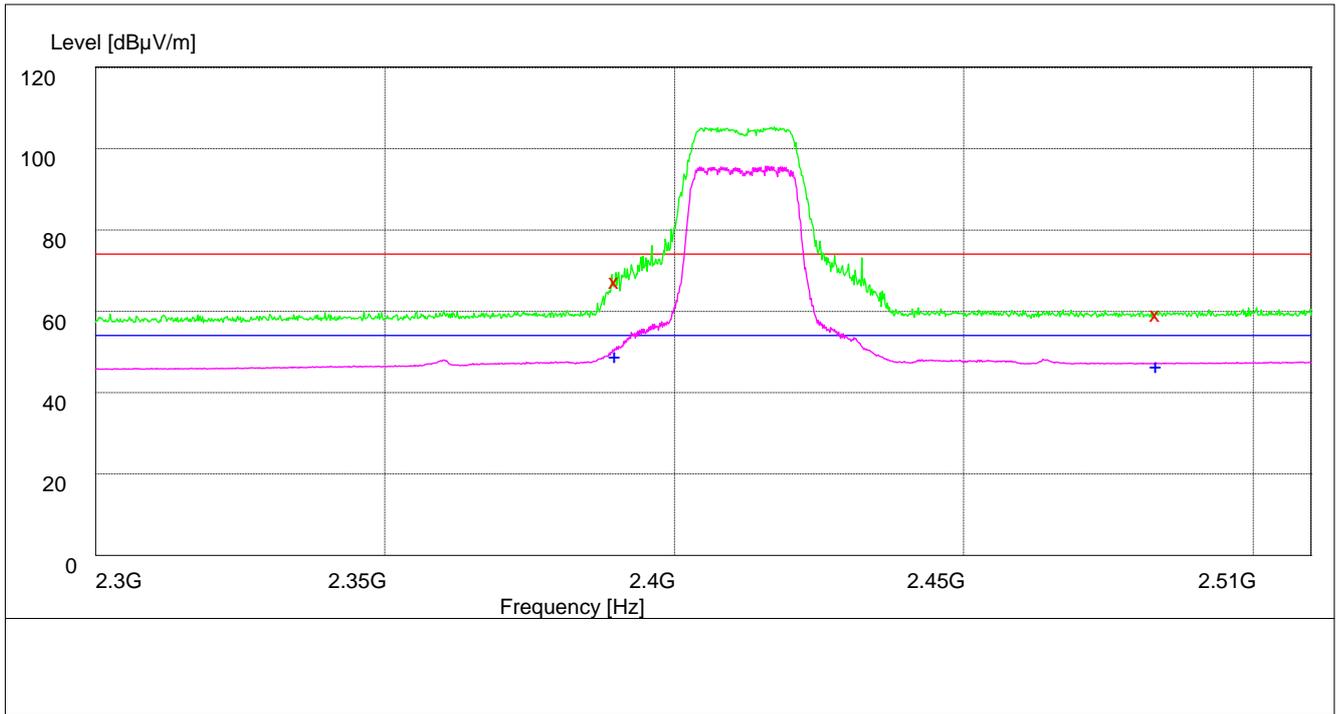
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	59.00	34.8	74.0	15.0	100.0	217.00	VERTICAL
2483.500000	68.00	35.1	74.0	6.0	100.0	135.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	47.00	34.8	54.0	7.0	104.0	22.00	HORIZONTAL
2483.500000	49.10	35.1	54.0	4.9	100.0	224.00	VERTICAL

Test Mode: 11n

Channel 01



Note: The peak exceeds the limit line is carrier frequency.

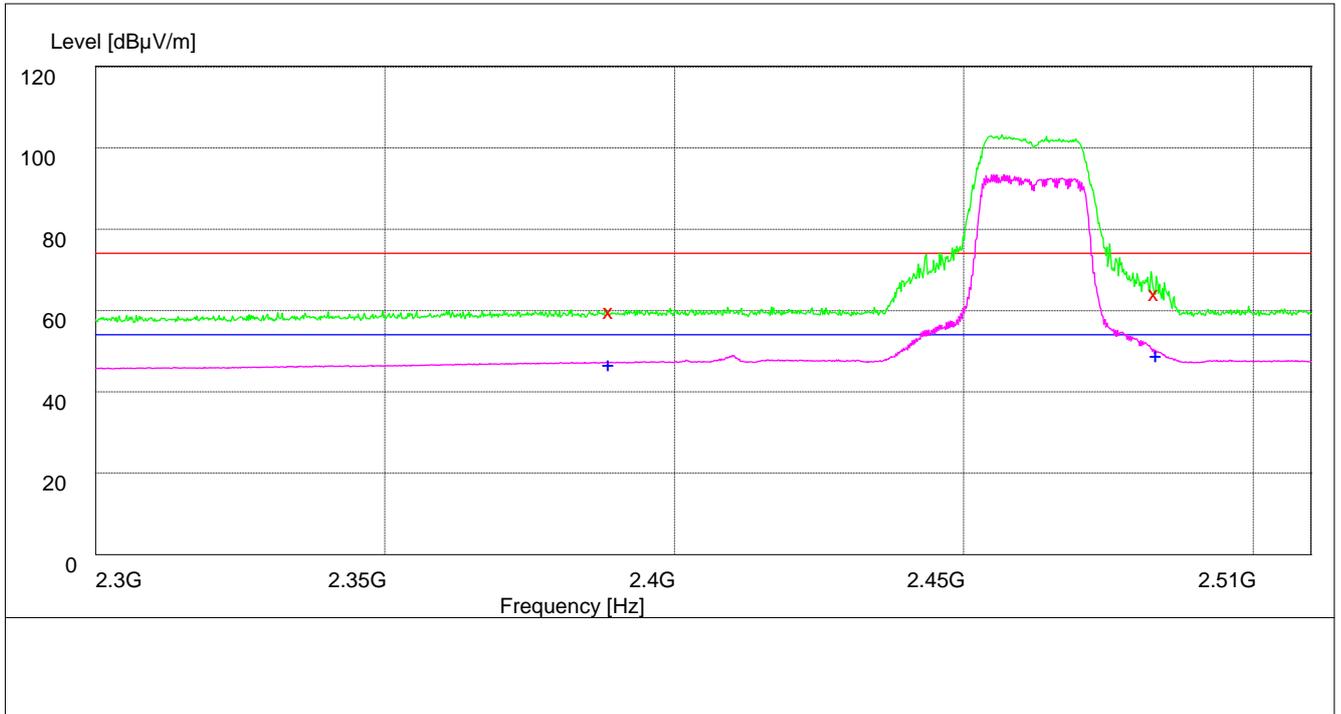
MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	67.70	34.8	74.0	6.3	104.0	258.00	VERTICAL
2483.500000	59.50	35.1	74.0	14.5	101.0	107.00	HORIZONTAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	48.50	34.8	54.0	5.5	104.0	141.00	VERTICAL
2483.500000	47.50	35.1	54.0	6.5	103.0	29.00	HORIZONTAL

Channel 11



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

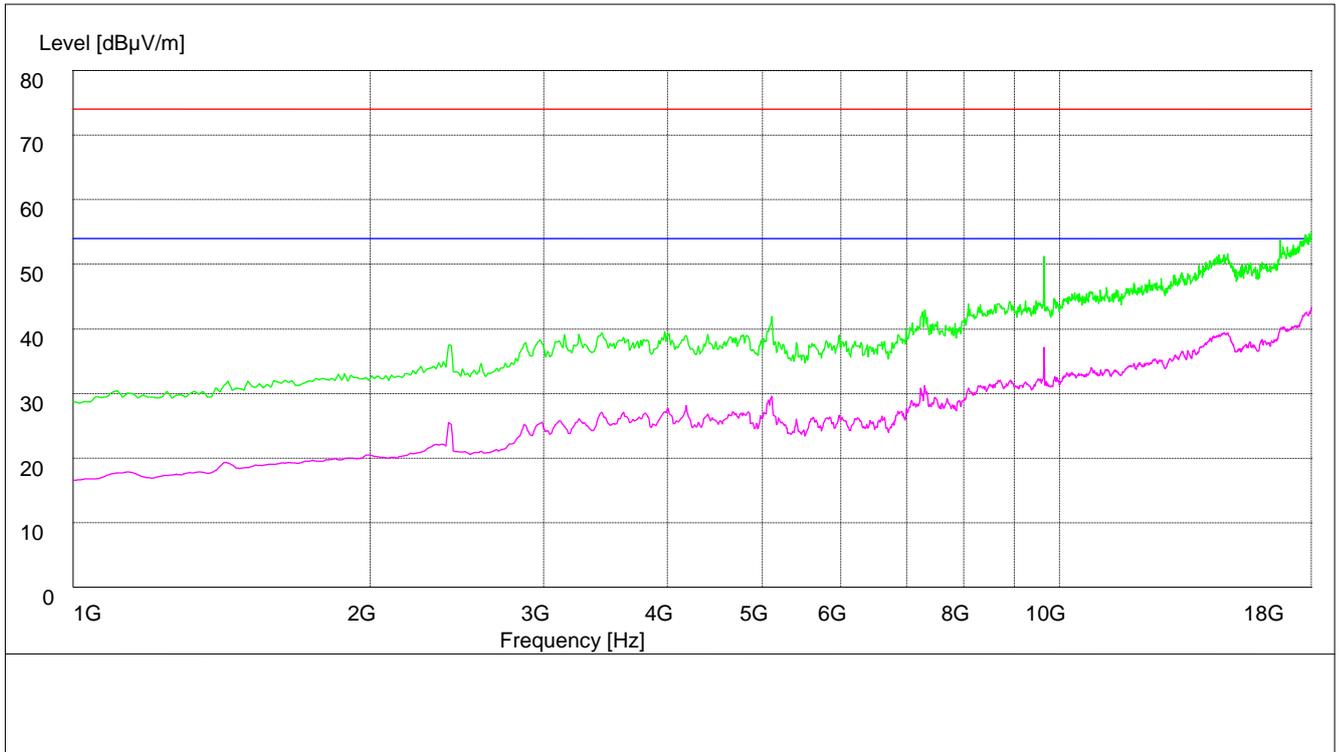
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	59.40	34.8	74.0	14.6	100.0	37.00	HORIZONTAL
2483.500000	64.30	35.1	74.0	9.7	104.0	223.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	47.40	34.8	54.0	6.6	107.0	48.00	VERTICAL
2483.500000	48.60	35.1	54.0	5.4	119.0	271.00	VERTICAL

Part 4: Testing Range of “1 GHz to 18 GHz”

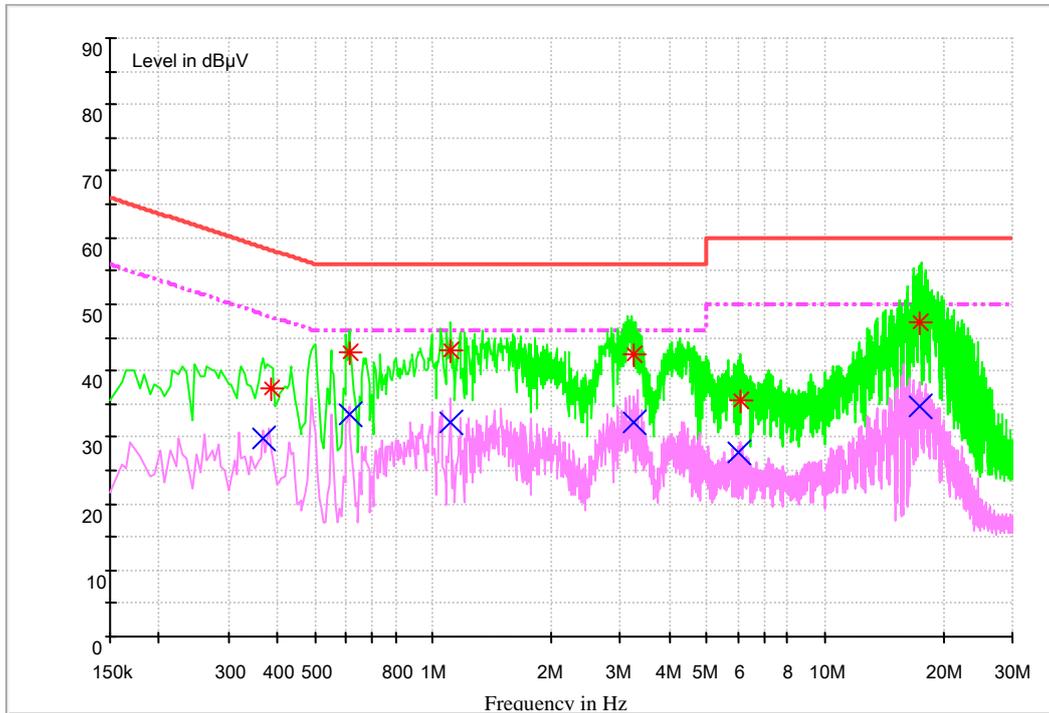
- Note 1: The test results and plot for testing range of “1 GHz to 18 GHz” showed as below is **the WORST case for all Test Modes and Channels**. This range will not be presented for each Test Mode and each Channel.
- Note 2: The testing range of “1 GHz to 18 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.
- Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB μ V/m) and Average Limit (54 dB μ V/m).



Appendix H: Conducted Emission at Power Port

Note: RBW =9 kHz, VBW = 30 kHz

Channel 6



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.386074	37.2	9.7	58.1	20.9	N	FLO
0.610672	42.8	9.7	56.0	13.2	N	FLO
1.108004	43.0	9.7	56.0	13.0	N	FLO
3.259920	42.4	9.7	56.0	13.6	N	FLO
6.061582	35.4	9.8	60.0	24.6	N	FLO
17.512242	47.3	10.1	60.0	12.7	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.368074	29.8	9.7	48.5	18.7	N	FLO



0.609998	33.4	9.7	46.0	12.6	N	FLO
1.109264	32.3	9.7	46.0	13.7	N	FLO
3.265816	32.2	9.7	46.0	13.8	N	FLO
6.034762	27.6	9.8	50.0	22.4	N	FLO
17.439252	34.6	10.1	50.0	15.4	L1	FLO

END