FCC
RF Test Report

Product Name: Smart Phone

Model Number: HUAWEI CRR-L09

Report No: SYBH(Z-RF)017052015-2003

FCC ID: QISCRR-L09

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Reliability Laboratory of Huawei Technologies Co., Ltd.

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

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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.

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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:	2015-06-01
Start Date of Test:	2015-06-01
End Date of Test:	2015-06-20

Test Result: Pass

Approved by Senior Engineer:	2015-06-25	Liu Chunlin	Liu Chunlin
	Date	Name	Signature

Prepared by:	2015-06-25	Wu Tingsi	Wu Tingsi
	Date	Name	Signature

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Modification Record

No.	Last Report No.	Modification Description
		First Report

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1 General Information

1.1 Applied Standard

Applied Rules:	47 CFR FCC Part 2, Subpart J 2014 47 CFR FCC Part 15, Subpart C 2014
Test Method:	FCC KDB 558074 D01 DTS Meas Guidance v03r02 ANSI C63.10-2013, 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
Test Location 2:	BTL Laboratory
Address :	No.3,Jinshagang 1st Road,ShiXia,Dalang Town,DongGuan,China.

1.3 Test Environment Condition

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

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2 Test Summary

Test Item	FCC Part No.	Requirements	Test Result	Verdict
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz.	Appendix A	Pass
Occupied Bandwidth	---	---	Appendix B	Pass
Duty Cycle	KDB 558074（6.0）	No limit	Appendix C	Pass
Maximum Conducted Average Output Power	15.247(b)(3)	For directional gain: < 30 dBm – (G[dBi] – 6 [dB]), Average; Otherwise: < 30 dBm, Average.	Appendix D	Pass
Maximum Power Spectral Density Level	15.247(e)	For directional gain: < 8 dBm/3 kHz – (G[dBi] – 6 [dB]), Average. Otherwise: < 8 dBm/3 kHz, Average.	Appendix E	Pass
Band Edges Compliance	15.247(d)	< -30 dBr/100 kHz if total peak power ≤ power limit.	Appendix F	Pass
Unwanted Emissions into Non-Restricted Frequency Bands			Appendix G	Pass
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	FCC Part 15.209 field strength limit;	Appendix H	Pass
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	Appendix I	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.

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3 Description of the Equipment under Test (EUT)

3.1 General Description

HUAWEI CRR-L09 is subscriber equipment in the LTE/UMTS/GSM system. The LTE frequency band is Band I,Band II,Band III,Band IV,Band V,Band VII,Band VIII,Band XII,BandXVII,BandXVIII,BandXIX,Band XX,Band XXV,Band XXVI,Band XXVIII and Band XL. The HSUPA/HSDPA/UMTS frequency band is Band I, Band II, Band IV, Band V, Band VI, Band VIII and Band XIX. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/UMTS/GSM protocol processing, voice, video, MMS service, GPS, AGPS WIFI and NFC etc. Externally it provides earphone port (to provide voice service) and USIM card interface. 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		
Description	Hardware Version	Serial NO
Main Board	HL1CRRL09M	CRR-L09V100R001C900B017

3.2.2 Sub-Assembly

Name	Manufacture	Description
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050200B01 ~100-240V 50/60Hz 0.5A Output voltage: 5V ⎓ 2A Rated Power: 10W
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050200E01 ~100-240V 50/60Hz 0.5A Output voltage: 5V ⎓ 2A Rated Power: 10W
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050200U01 ~100-240V 50/60Hz 0.5A Output voltage: 5V ⎓ 2A Rated Power: 10W

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Adapter	Huawei Technologies Co., Ltd.	Model: HW-050200A01 ~100-240V 50/60Hz 0.5A Output voltage: 5V ⎓ 2A Rated Power: 10W

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3.2.3 Battery

Name	Manufacture	Description
Rechargeable Li-ion	Huawei Technologies Co., Ltd.	Battery Model: HB436178EBW Rated capacity: 2620mAh Nominal Voltage: ⎓ +3.8V Charging Voltage: ⎓ +4.35V

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3.3 Technical Description

Characteristics	Description			
IEEE 802.11 WLAN Mode Supported	☒ 802.11b (20 MHz channel bandwidth), ☒ 802.11g (20 MHz channel bandwidth) ☒ 802.11n (20 MHz channel bandwidth)			
TX/RX Operating Range	2412-2462 MHz band	fc = 2407 MHz + N * 5 MHz, where: - fc = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 1 to 11 for the 20 MHz 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	12M3G7D (for 802.11b mode), 16M6G7D (for 802.11g mod), 17M7G7D (for 802.11n 20m mode) , 36M2G7D (for 802.11n 40m mode)			
TX Power Control	☐ Supported, ☒ Not Supported			
Standby Mode	☐ Supported, ☒ Not Supported			
Equipment Type	☐ Stand-alone equipment, ☐ Plug-in radio device, ☒ Combined equipment			
Antenna	Description	Isotropic Antenna		
	Type	☐ External, ☒ Integrated		
	Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3		
	Smart System	☒ SISO (for 802.11b/g/n), ☐ MIMO (for 802.11n): 2 Tx & 2 Rx, ☐ Diversity (for 802.11b/g) : Tx & Rx		
	Gain	1 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	☒ AC/DC Adapter	☐ PoE:	☐ Other:

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4 General Test Conditions / Configurations

4.1 Test Modes

NOTE: Worst cases for each IEEE 802.11 mode are selected to perform tests.

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.
11N40	IEEE 802.11n with data date of MCS0 and bandwidth of 40 MHz using SISO mode.

4.2 EUT Configurations

4.2.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, - 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.	TX Freq. [MHz]	Ch. BW [MHz]	Power Conf., per Port	Duty cycle [%]
11B	L	Ch No. 1 / 2412 MHz	20	15	92.1
11B	M	Ch No. 6 / 2437 MHz	20	15	92.1
11B	H	Ch No. 11 / 2462 MHz	20	15	92.1
11G	L	Ch No. 1 / 2412 MHz	20	15	70.4
11G	M	Ch No. 6 / 2437 MHz	20	15	70.4
11G	H	Ch No. 11 / 2462 MHz	20	15	70.4
11N20	L	Ch No. 1 / 2412 MHz	20	14	68.1
11N20	M	Ch No. 6 / 2437 MHz	20	14	68.1
11N20	H	Ch No. 11 / 2462 MHz	20	14	68.1
11N40	L	Ch No. 1 / 2422 MHz	40	14	50
11N40	M	Ch No. 6 / 2437 MHz	40	14	50
11N40	H	Ch No. 11 / 2452 MHz	40	14	50

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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	3.8 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 HUAWEI CRR-L09 are **permanently attached.**
There are no provisions for connection to an external antenna.

Conclusion:
The **EUT FCC ID: QISCRR-L09** unit complies with the requirement of §15.203.
Ch. Frequency (MHz)

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

Frequency/ Channel Operations

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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 Duty Cycle 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 Duty Cycle with spectrum analyzer.

4.5.3 Maximum Conducted Average 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.

4.5.4 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 (2013). The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013.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

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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

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: 2013.

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 150 kHz to 30 MHz: 9 kHz;

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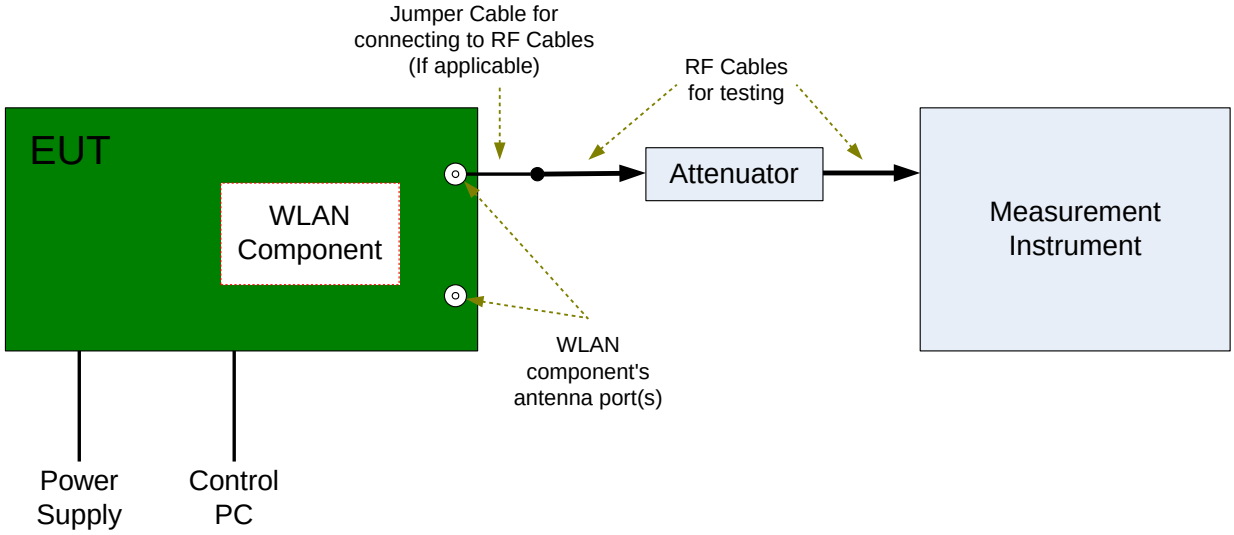
4.6 Test Setups

4.6.1 Test Setup 1

The WLAN component's antenna ports(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. The test distance is 3m.The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

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).

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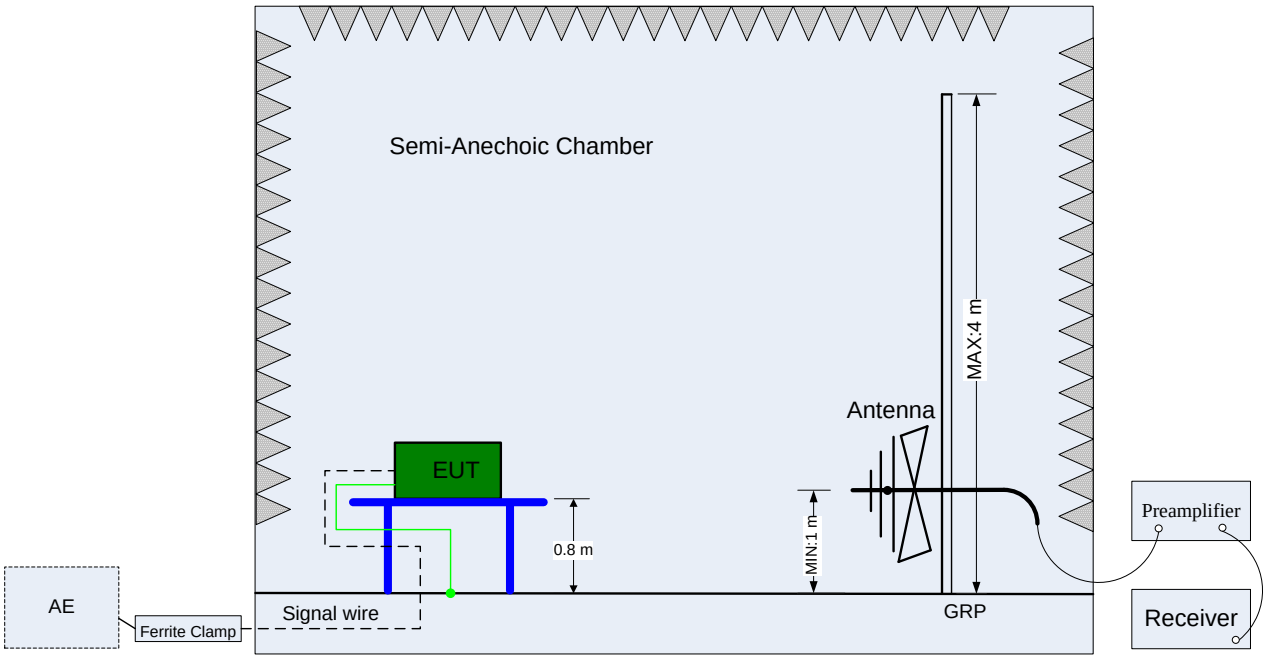
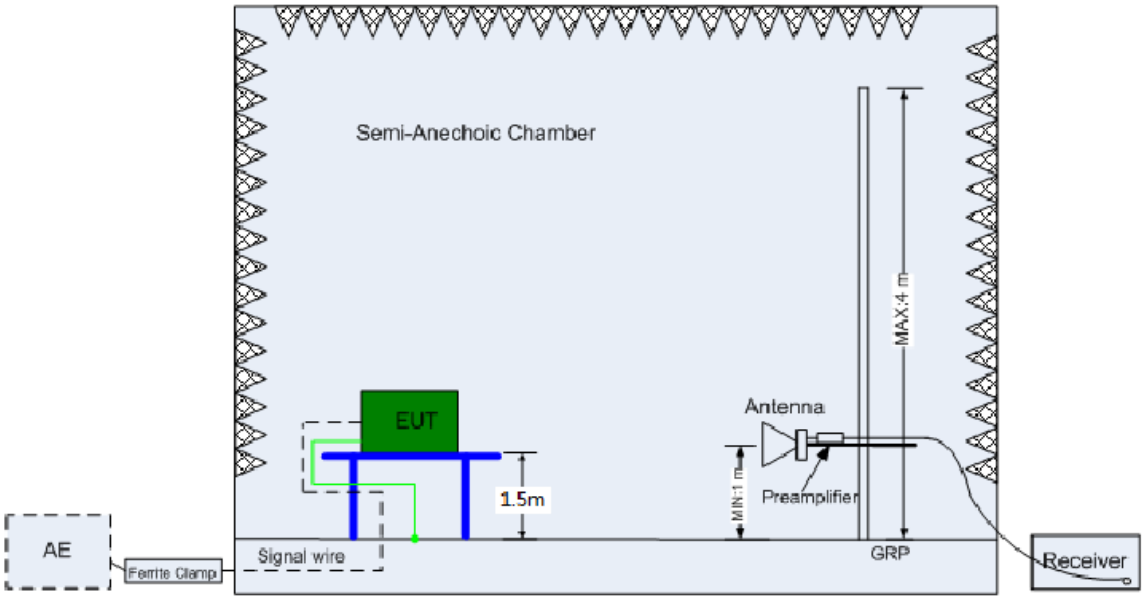


(Below 1 GHz)



(Above 1 GHz)

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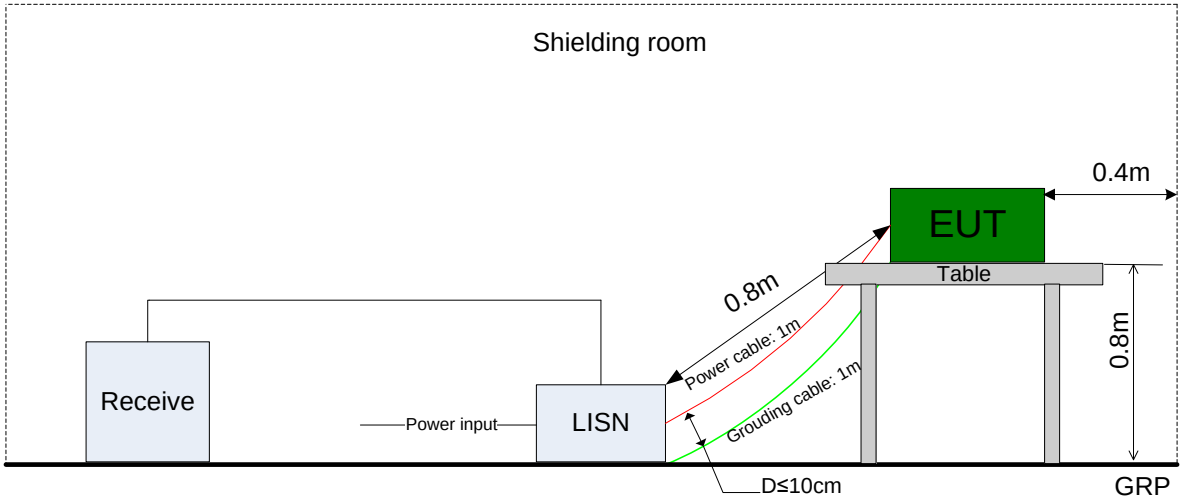
4.6.3 Test Setup 3

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 0.8m 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.



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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 11N40_L, 11 N40_M, 11 N40_H
Maximum Conducted Average Output Power	Measurement Method	FCC KDB 558074 §9.2 .2. 4
	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 11N40_L, 11 N40_M, 11 N40_H
Maximum Power Spectral Density Level	Measurement Method	FCC KDB 558074 §10.5
	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 11N40_L, 11 N40_M, 11 N40_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 11N40_L, 11 N40_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 11N40_L, 11 N40_M, 11 N40_H
Unwanted Emissions into Restricted	Measurement Method	ANSI C63.10; FCC KDB 558074 §12.1, Radiated
	Test Environment	NTNV
	Test Setup	Test Setup 2

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Test Case	Test Conditions	
	Configuration	Description
Frequency Bands (Radiated)	EUT Placement	☐ Flat wise, ☐ Upright, ☐ Hung
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
	EUT Configuration	11x_RX
AC Power Line Conducted Emissions	Measurement Method	AC mains conducted.
	Test Environment	NTNV
	Test Setup	Test Setup 3
	EUT Configuration	(Worst Conf.).

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5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	A120714713	2014-08-07	2016-08-06
Wireless Communication Test set	Agilent	N4010A	MY49081592	2014-11-04	2015-11-03
Universal Radio Communication Tester	R&S	CMU200	123299	2014-11-04	2015-11-03
Spectrum Analyzer	Agilent	N9020A	MY52090652	2014-07-11	2015-07-10
Universal Radio Communication Tester	R & S	CMW500	126854	2015-02-13	2016-02-12
Spectrum Analyzer	Agilent	E4440A	MY48250119	2014-07-11	2015-07-10
Signal Analyzer	R&S	FSQ31	200021	2014-11-04	2015-11-03
Spectrum Analyzer	Agilent	N9030A	MY49431698	2014-11-04	2015-11-03
Temperature Chamber	WEISS	WKL64	56246002940010	2015-02-13	2016-02-12
Signal generator	Agilent	E8257D	MY49281095	2014-11-04	2015-11-03
Vector Signal Generator	R&S	SMU200A	104162	2014-11-04	2015-11-03
Spectrum analyzer	R&S	FSU3	200474	2014-11-04	2015-11-03
Spectrum analyzer	R&S	FSU43	100144	2014-11-04	2015-11-03
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2013-12-21	2015-12-20
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-521	2013-12-21	2015-12-20
Pyramidal Horn Antenna(18GHz-26-5GHz)	ETS-LINDGREN	3160-09	5140299	2015-01-05	2017-01-04
Artificial Mains Network	R&S	ENV4200	100134	2014-11-04	2015-11-03
Artificial Mains Network	R&S	ENV216	100382	2014-11-04	2015-11-03
Power Detecting & Sampling Unit	R&S	OSP-B157	19709DD	2014-09-08	2015-09-07
Signal Generator	Agilent	E4438C	MY47271904	2014-10-28	2015-10-27

Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
EXA Spectrum Analyzer	N9010A	MY5052044	Agilent	Mar.28,2016
Microwave Preamplifier With Adaptor	EMC012645B	980221	EMC INSTRUMENT	Oct.22,2015
Amplifier	8449B	3008A02274	Agilent	Mar.28,2016
Double Ridged Guide Antenna	3115	00075846	ETS.LINDGREN	Mar.28,2016
Antenna	VULB9160	9160-3231	SCHWARZBECK	Mar.28,2016

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Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
controller	SC100	9163-235	CT	N/A

END

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Appendix for Test report

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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]	Ant	DTS6dBBW[MHz]	Verdict
11B	L	2412	Ant 1	8.07	pass
11B	M	2437	Ant 1	7.76	pass
11B	H	2462	Ant 1	8.24	pass
11G	L	2412	Ant 1	16.51	pass
11G	M	2437	Ant 1	16.56	pass
11G	H	2462	Ant 1	16.55	pass
11N20	L	2412	Ant 1	17.69	pass
11N20	M	2437	Ant 1	17.79	pass
11N20	H	2462	Ant 1	17.71	pass
11N20	H	2462	Ant 1	17.75	pass
11N40	L	2422	Ant 1	35.88	pass
11N40	M	2437	Ant 1	36.50	pass
11N40	H	2452	Ant 1	36.49	pass

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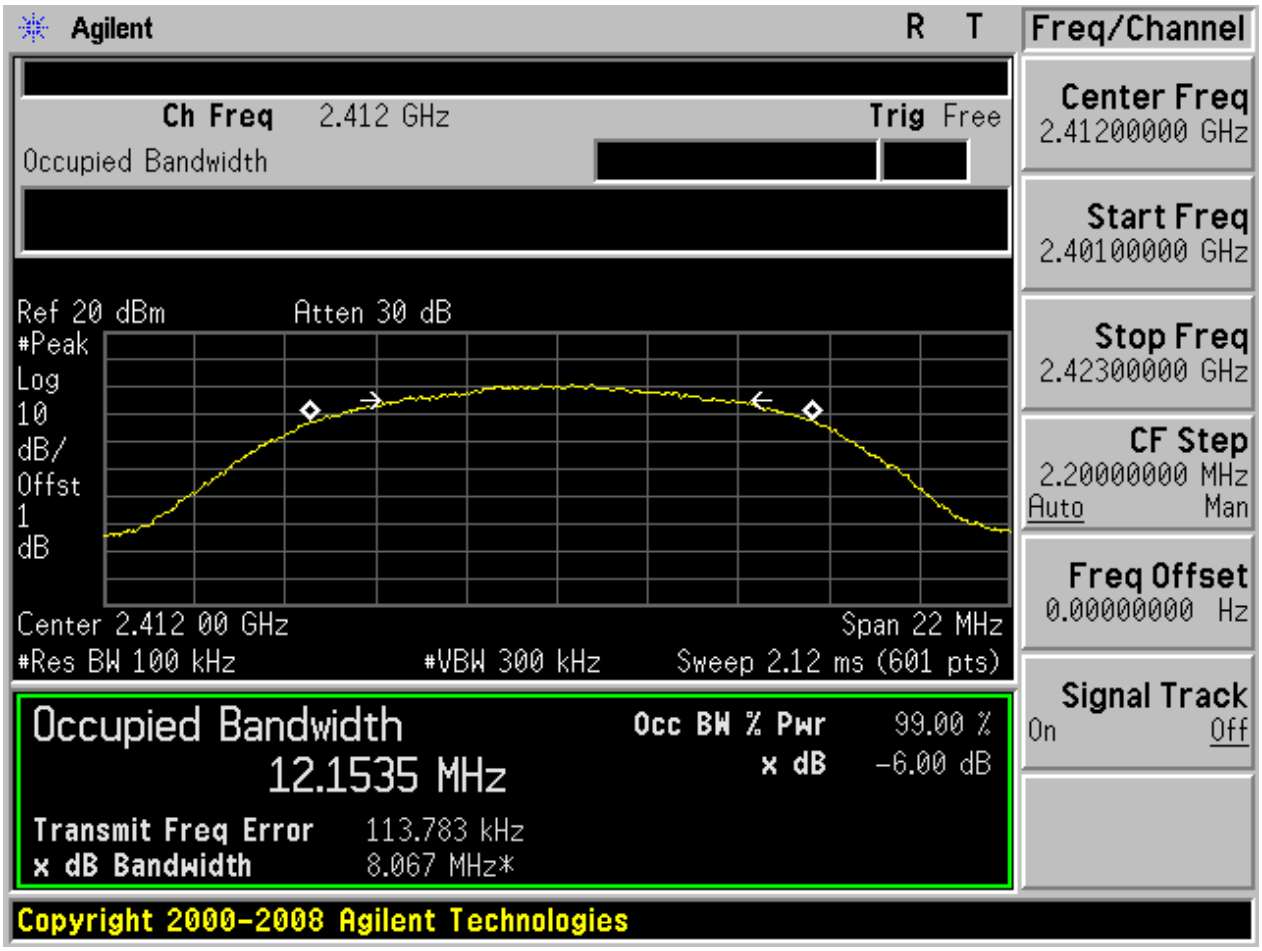
Part II - Test Plots

2.1 11B_L@Ant 1



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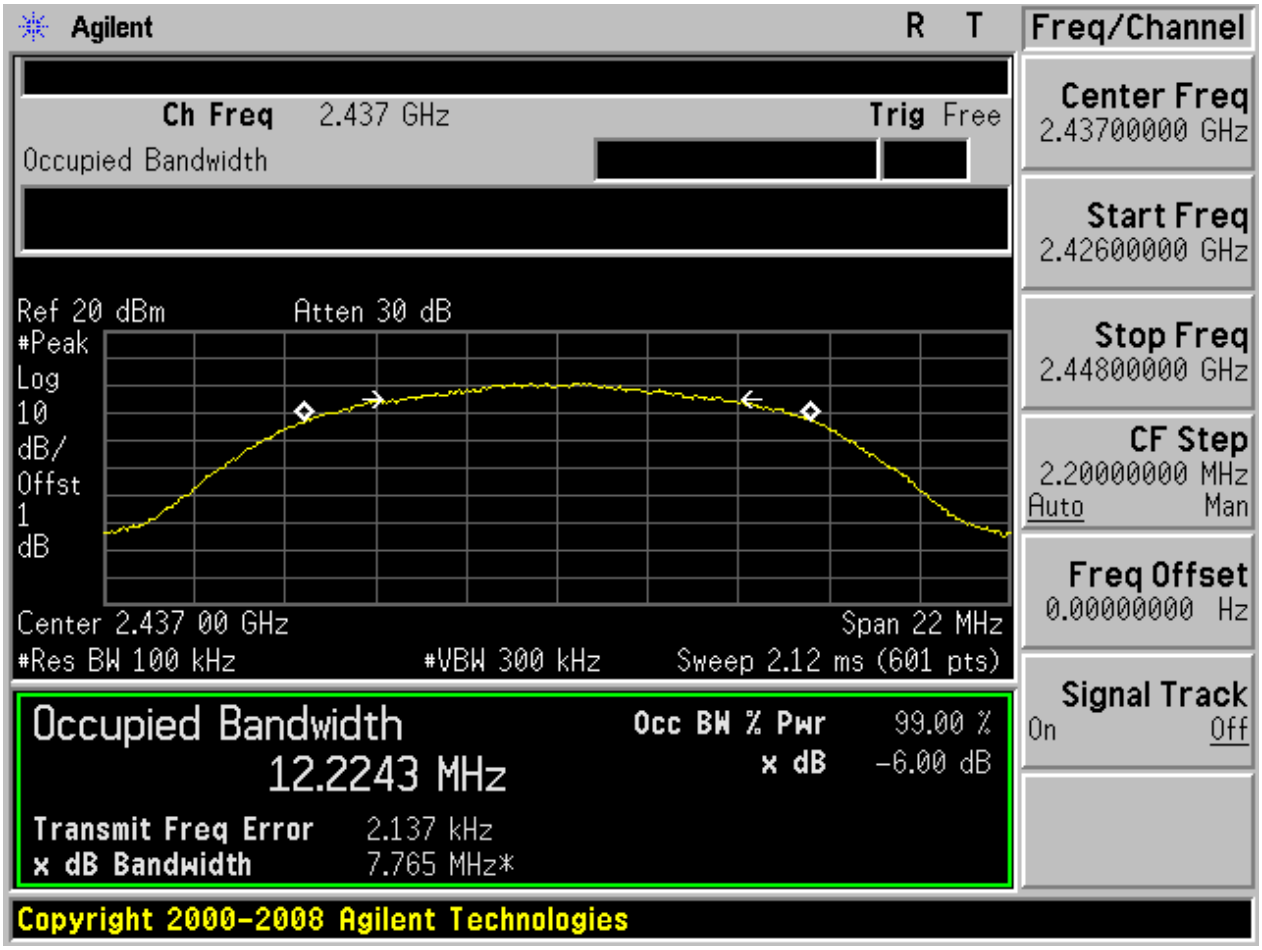
2.3 11B_M@Ant 1



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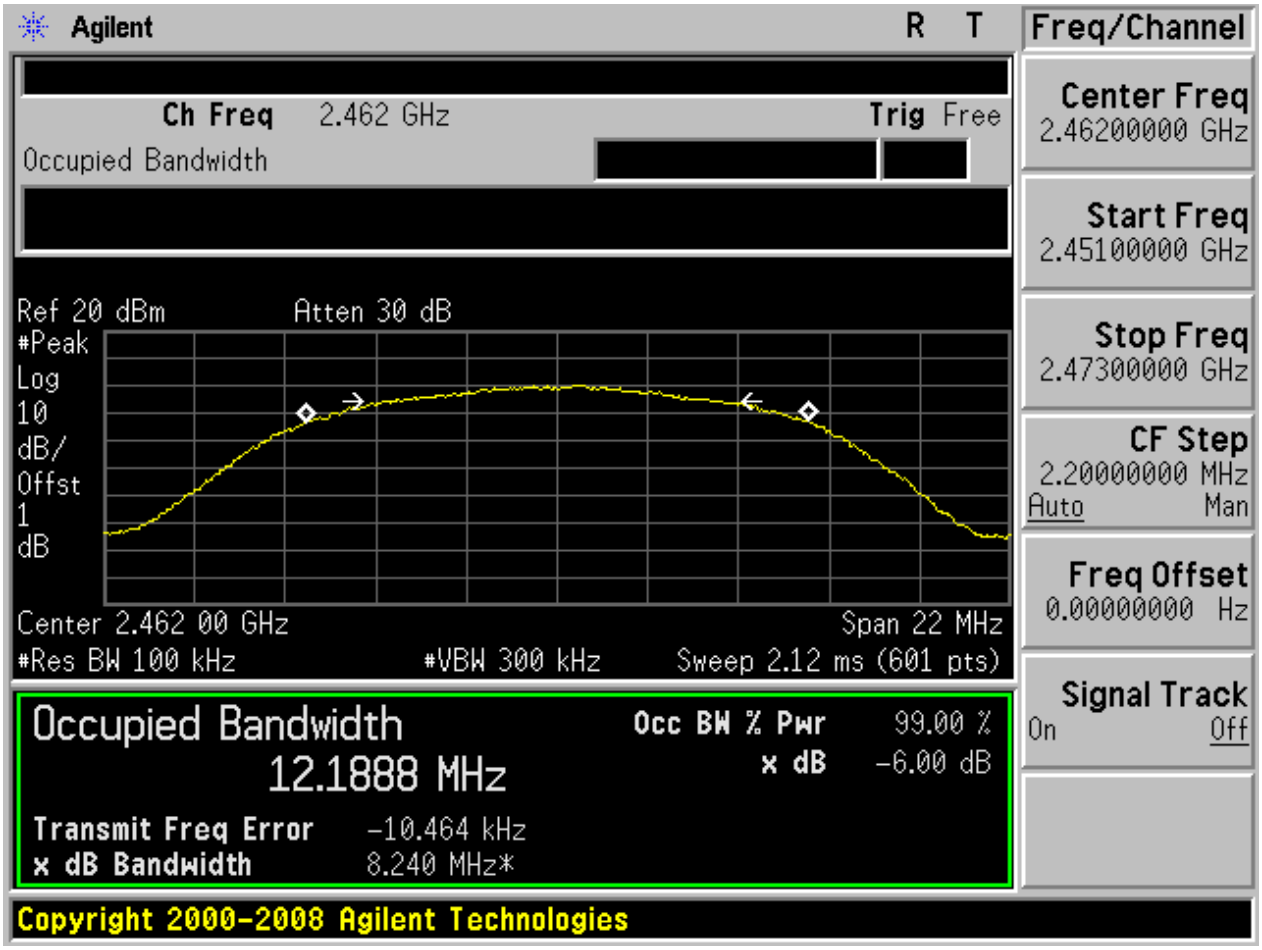
2.5 11B_H@Ant 1



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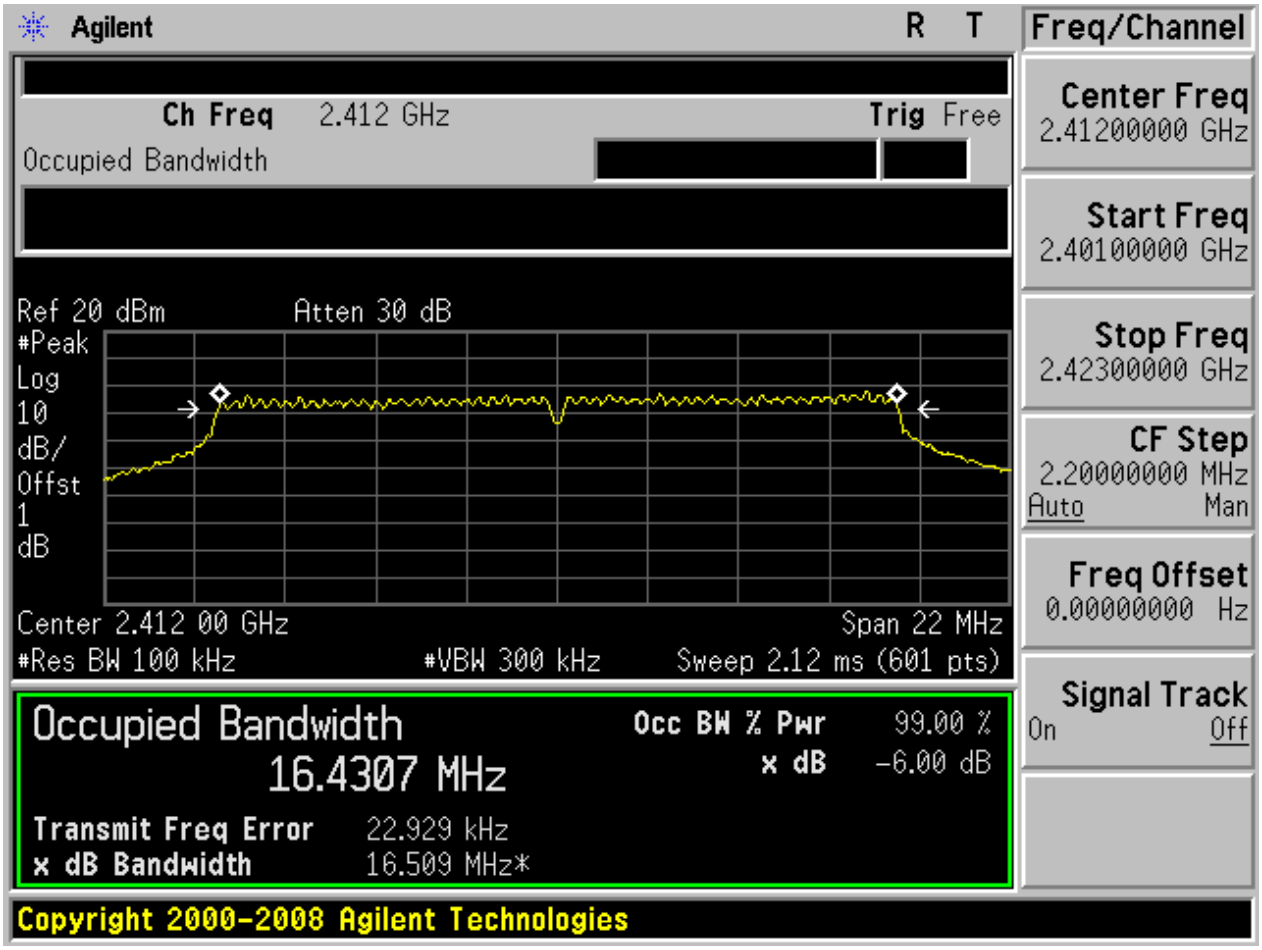
2.7 11G_L@Ant 1



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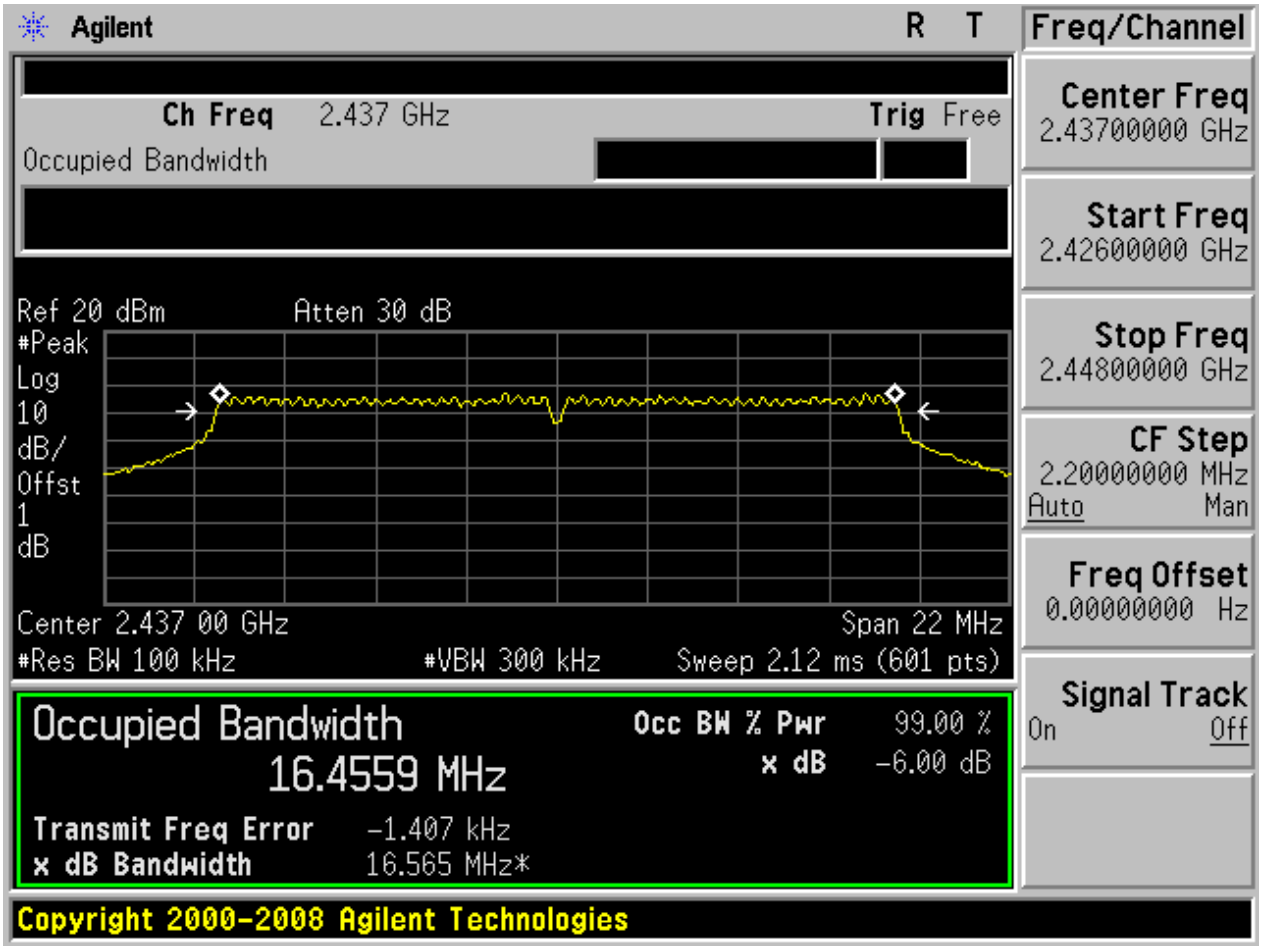
2.9 11G_M@Ant 1



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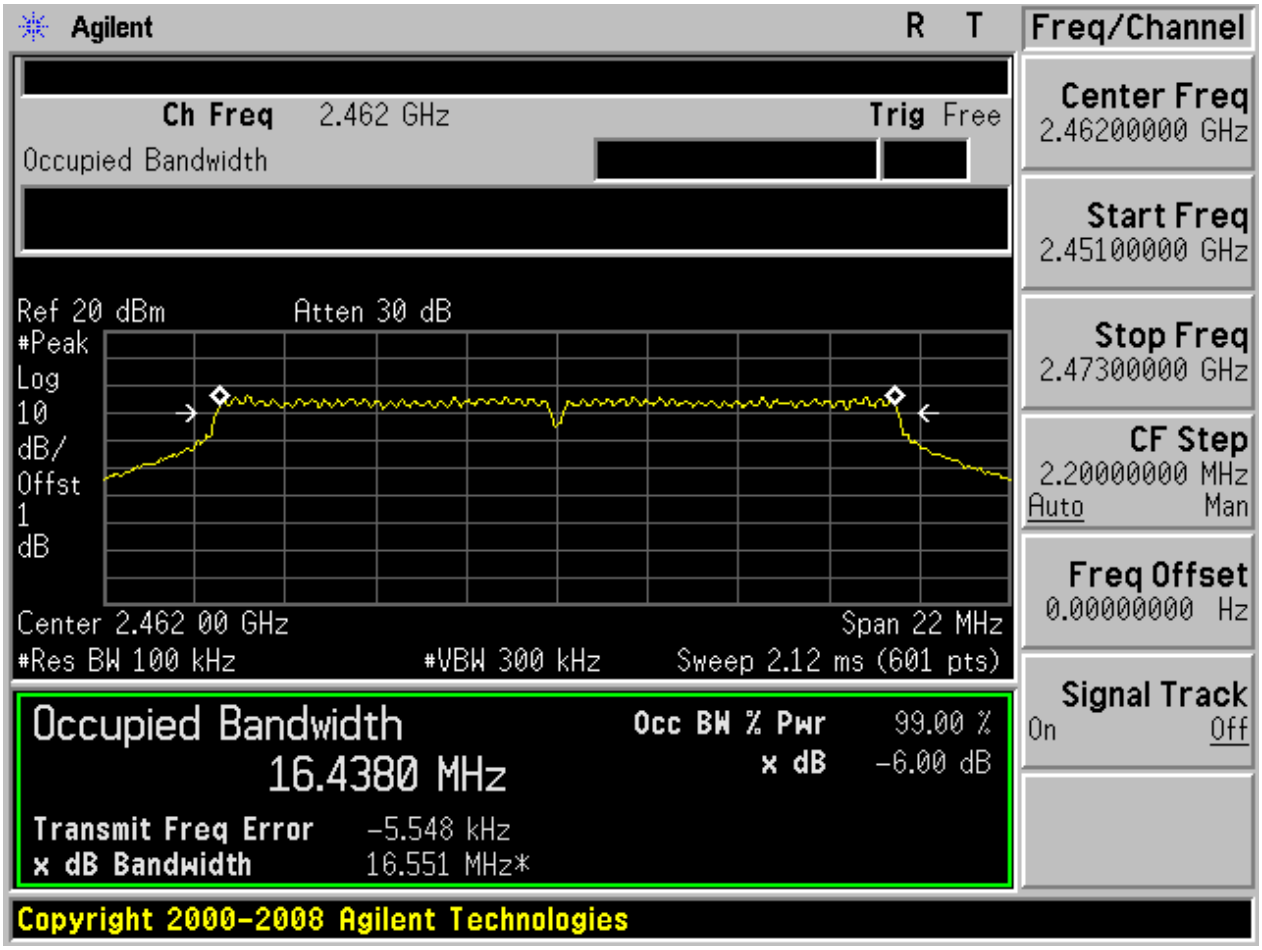

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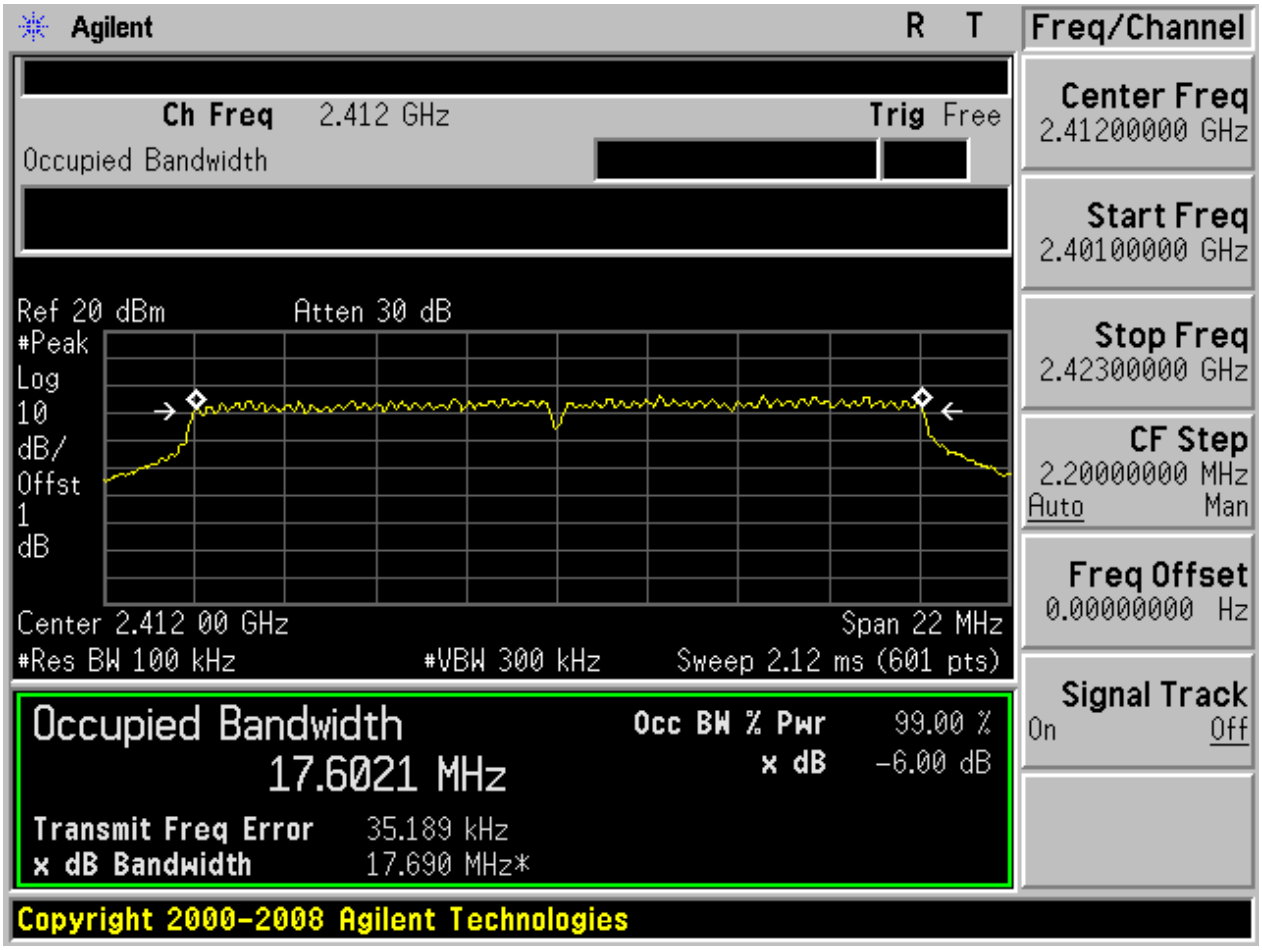

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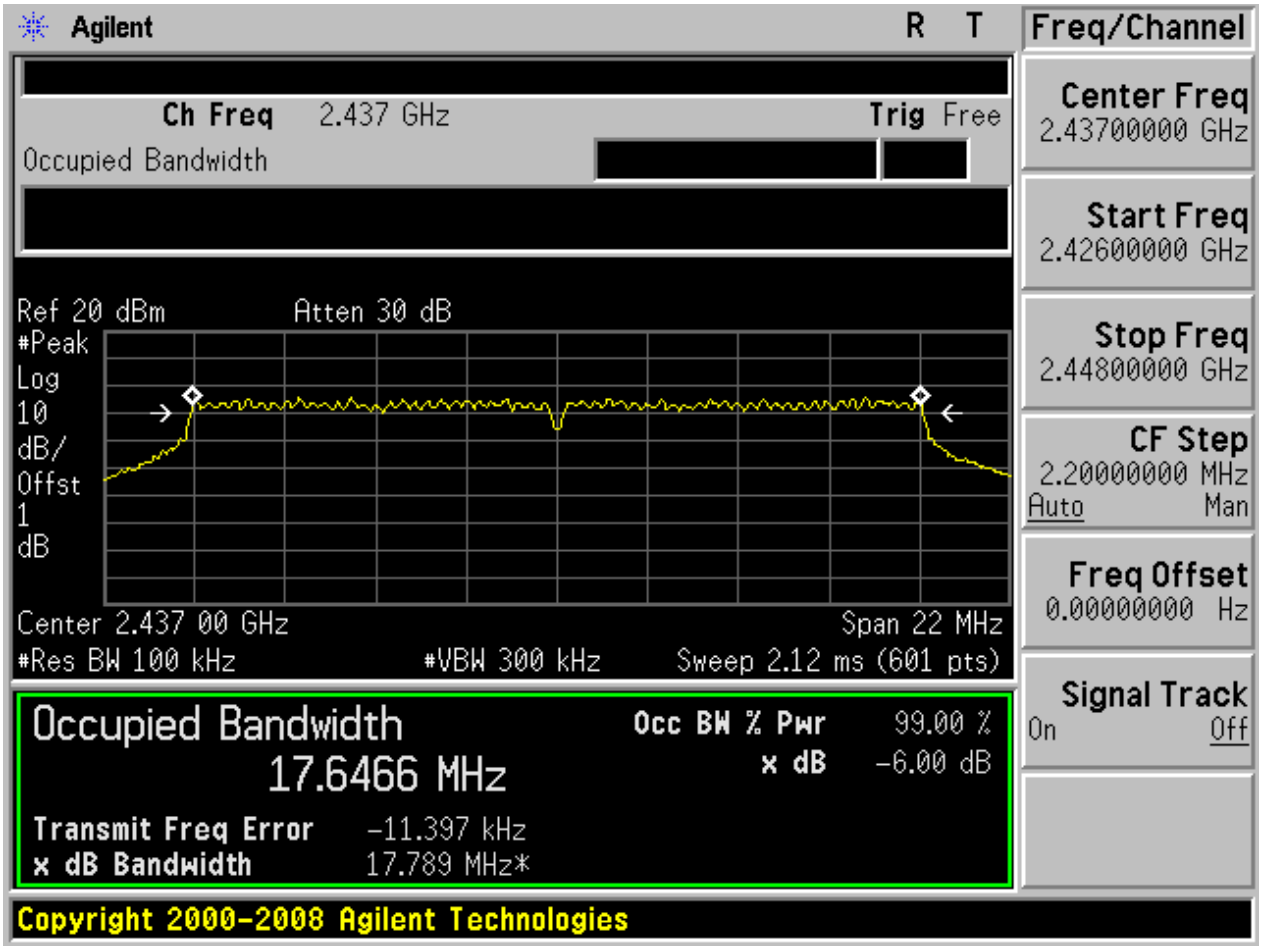

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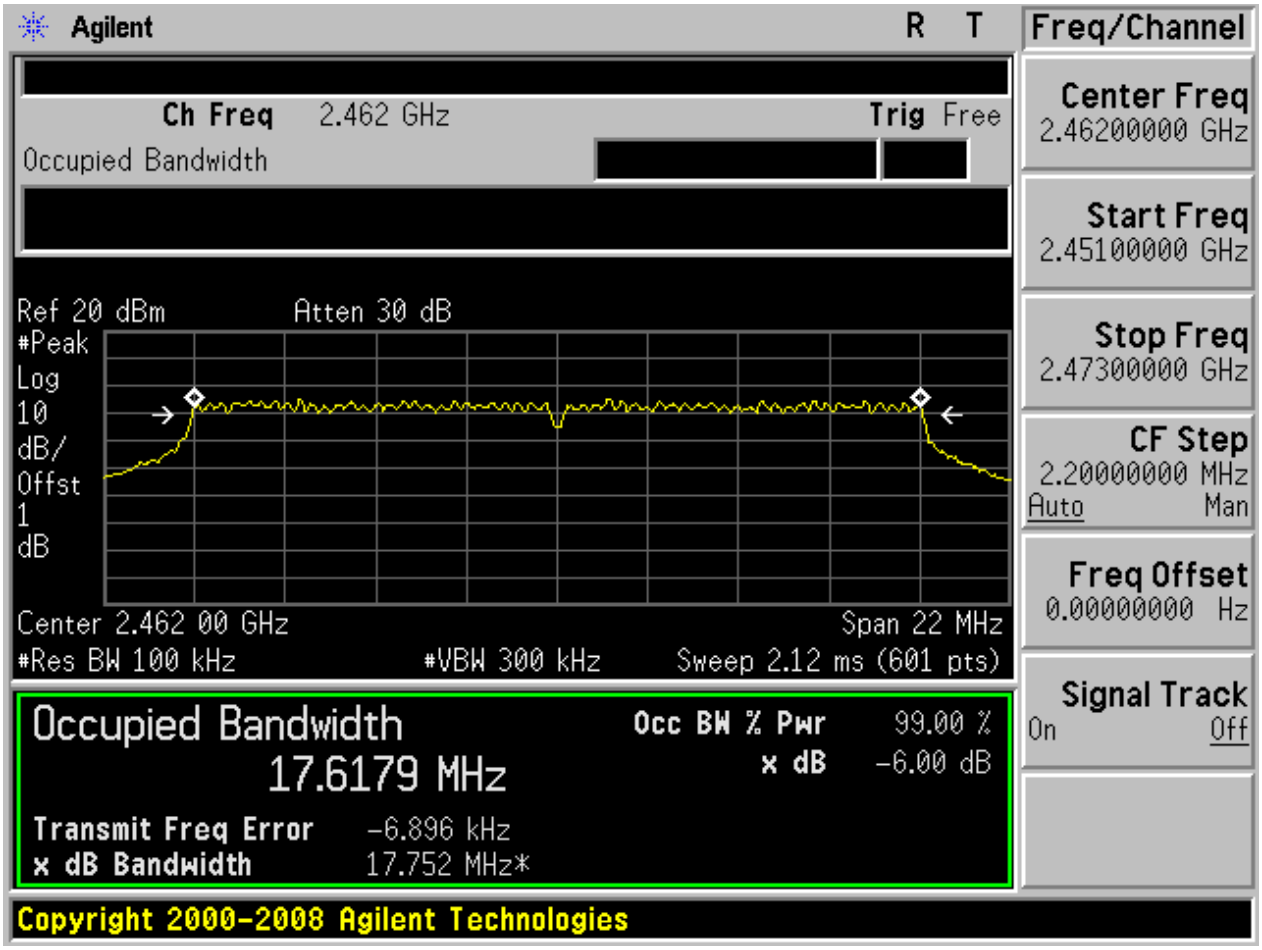

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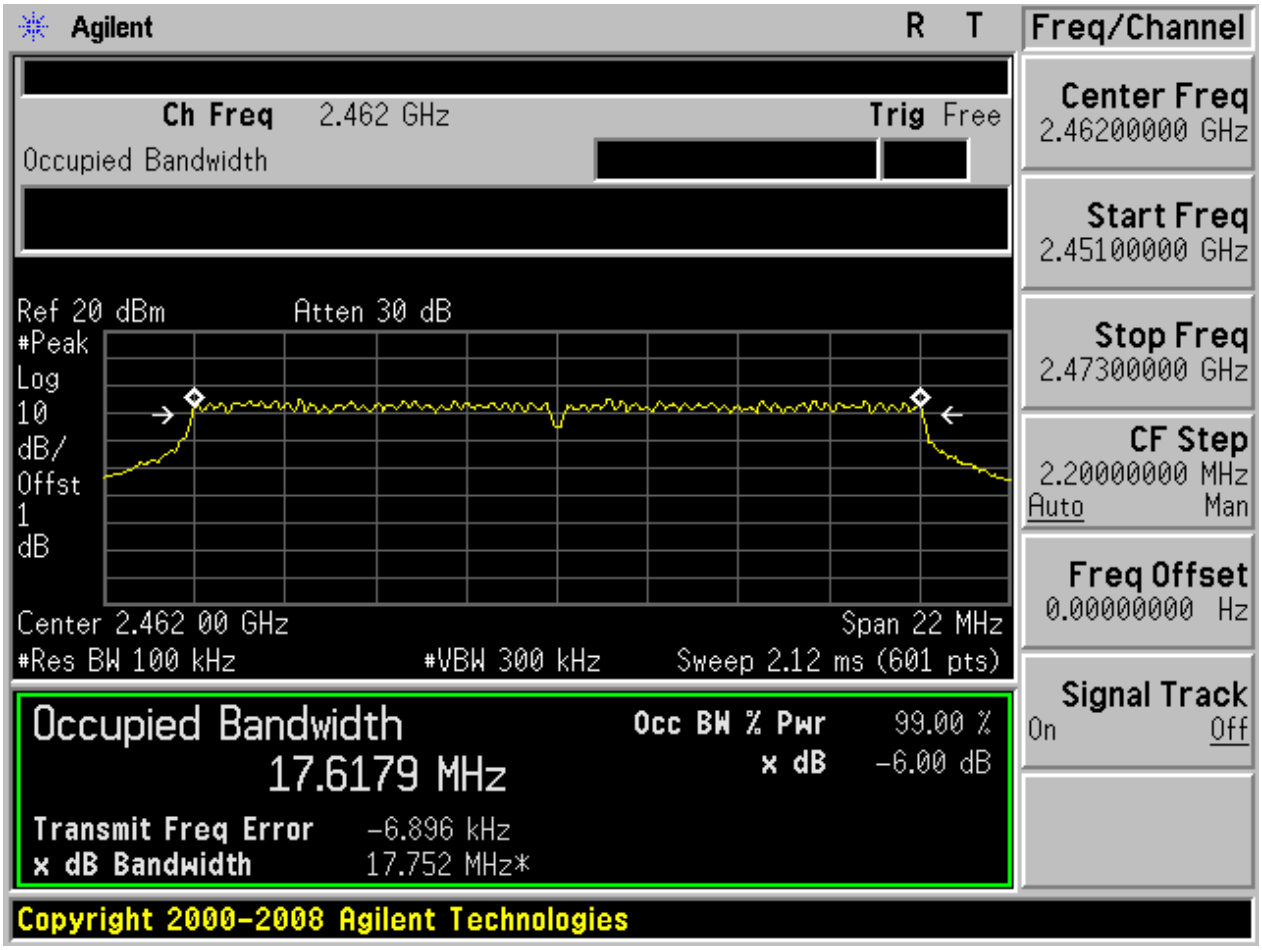
2.17 11N20_H@Ant 1



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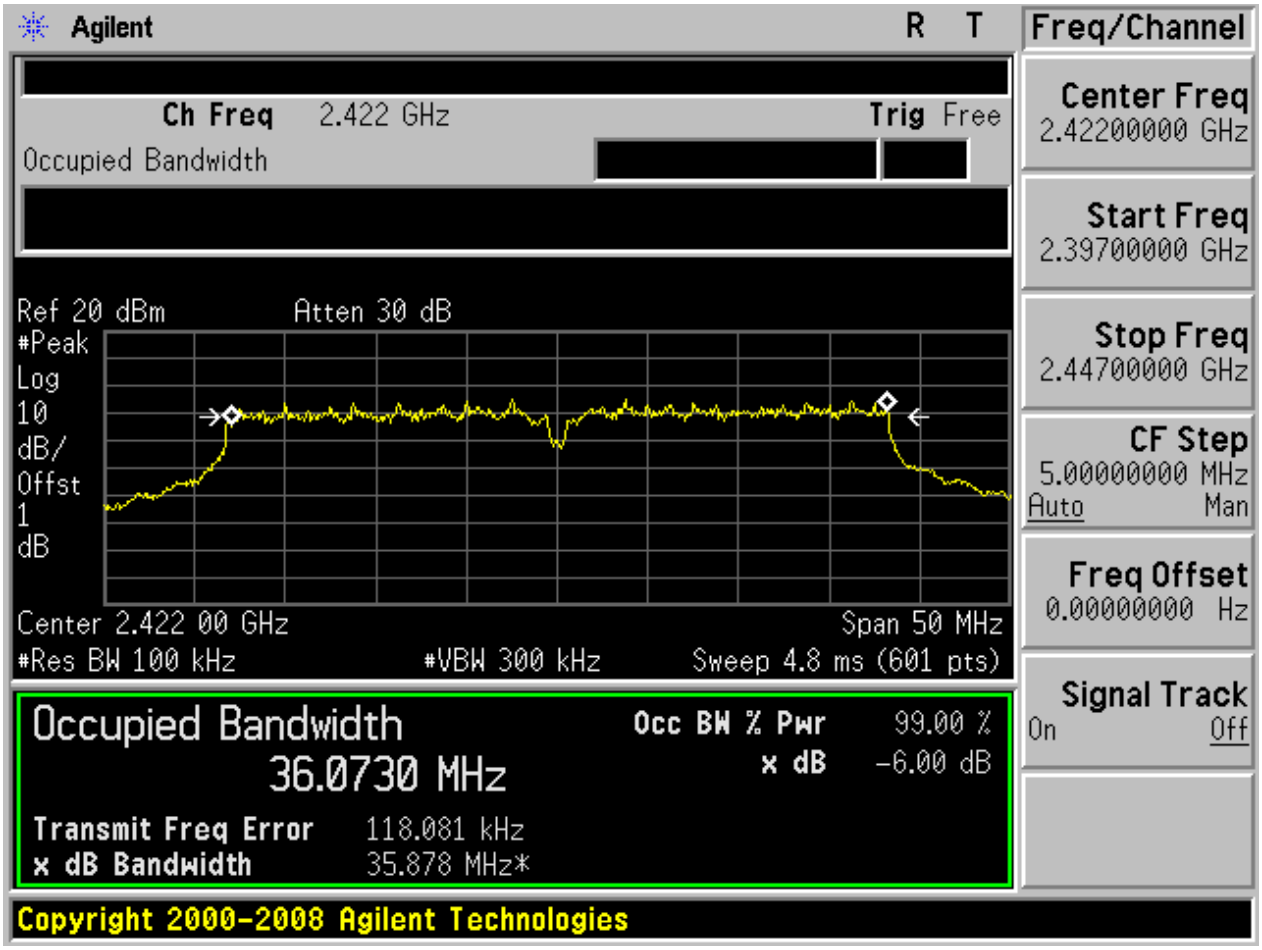
2.19 11N40_L@Ant 1



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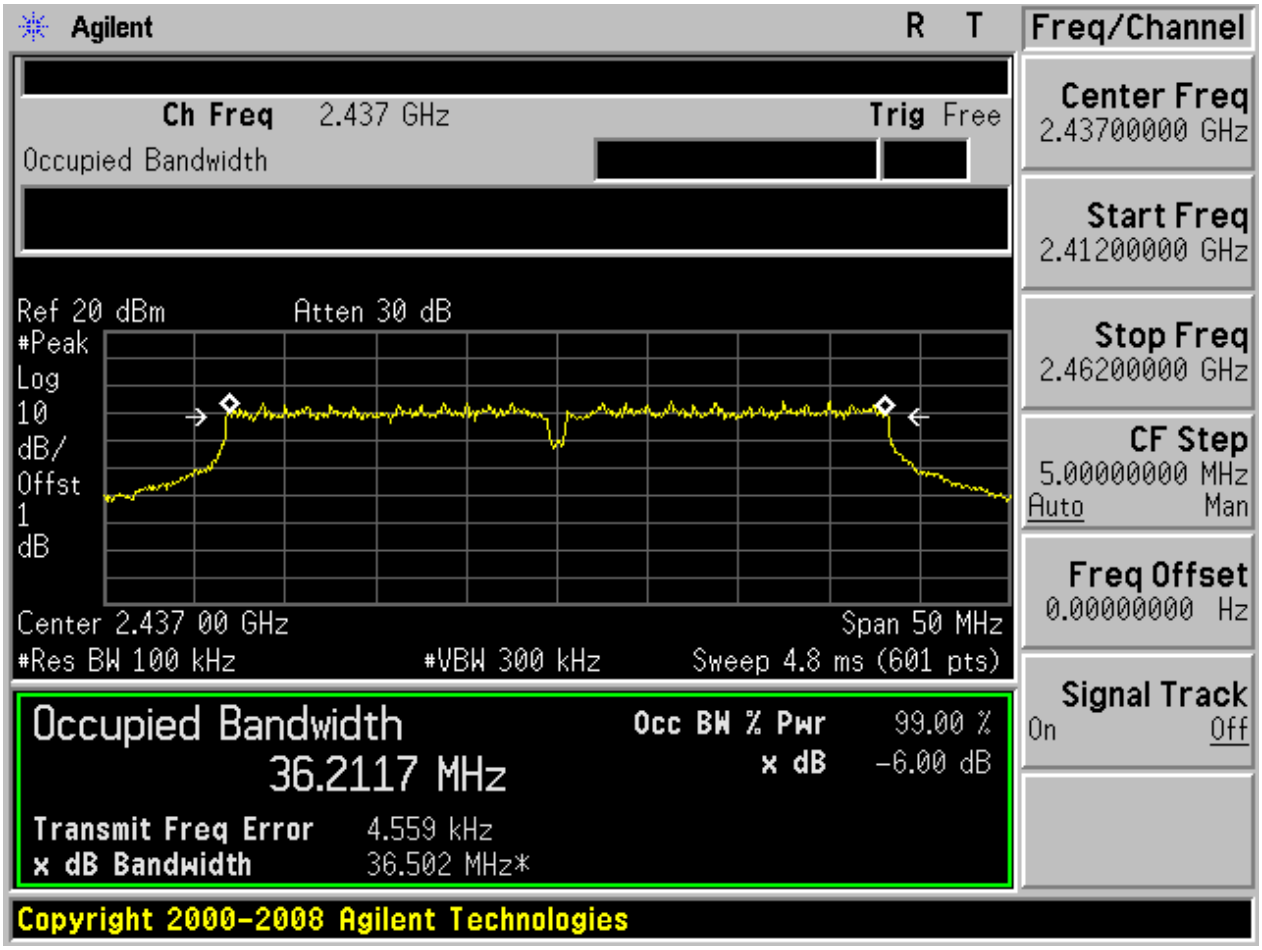
2.21 11N40_M@Ant 1



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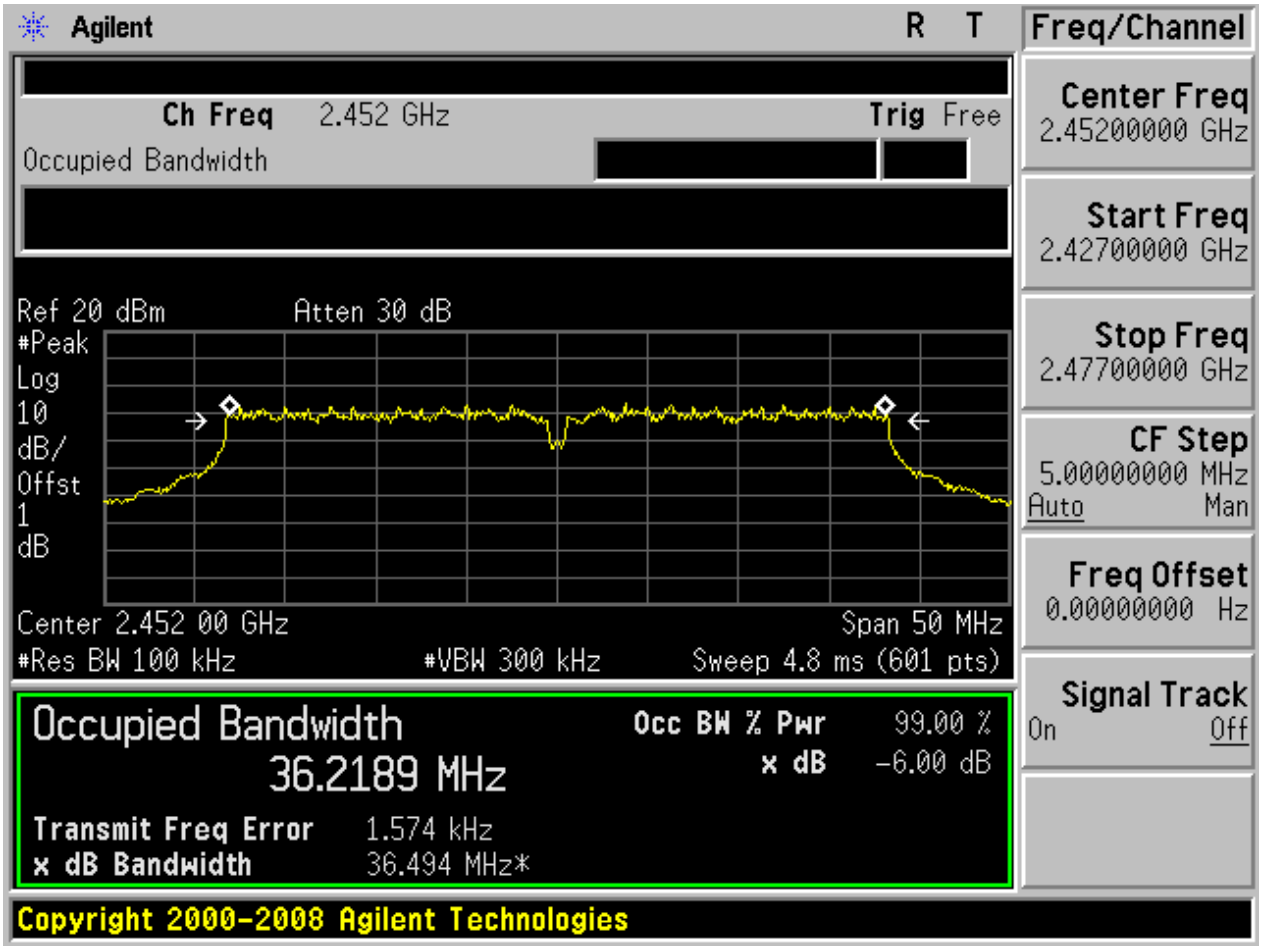
2.23 11N40_H@Ant 1



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Appendix B: Occupied Bandwidth

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]	Ant	Occupied Bandwidth [MHz]	Verdict
11B	L	2412	Ant 1	12.22	pass
11B	M	2437	Ant 1	12.31	pass
11B	H	2462	Ant 1	12.16	pass
11G	L	2412	Ant 1	16.47	pass
11G	M	2437	Ant 1	16.48	pass
11G	H	2462	Ant 1	16.54	pass
11N20	L	2412	Ant 1	17.64	pass
11N20	M	2437	Ant 1	17.74	pass
11N20	H	2462	Ant 1	17.61	pass
11N40	L	2422	Ant 1	36.13	pass
11N40	M	2437	Ant 1	36.22	pass
11N40	H	2452	Ant 1	36.08	pass

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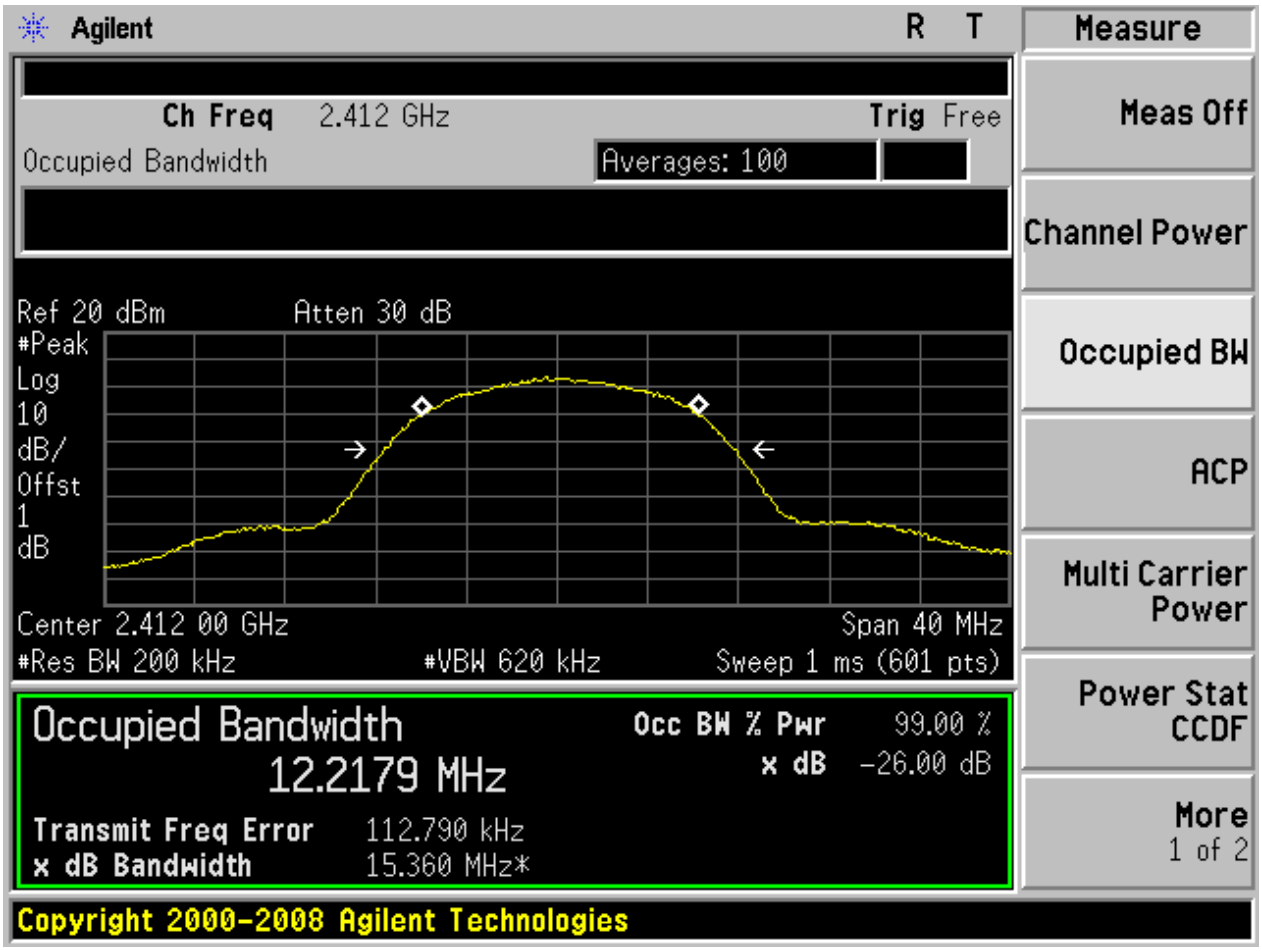
Part II - Test Plots

2.1 11B_L@Ant 1



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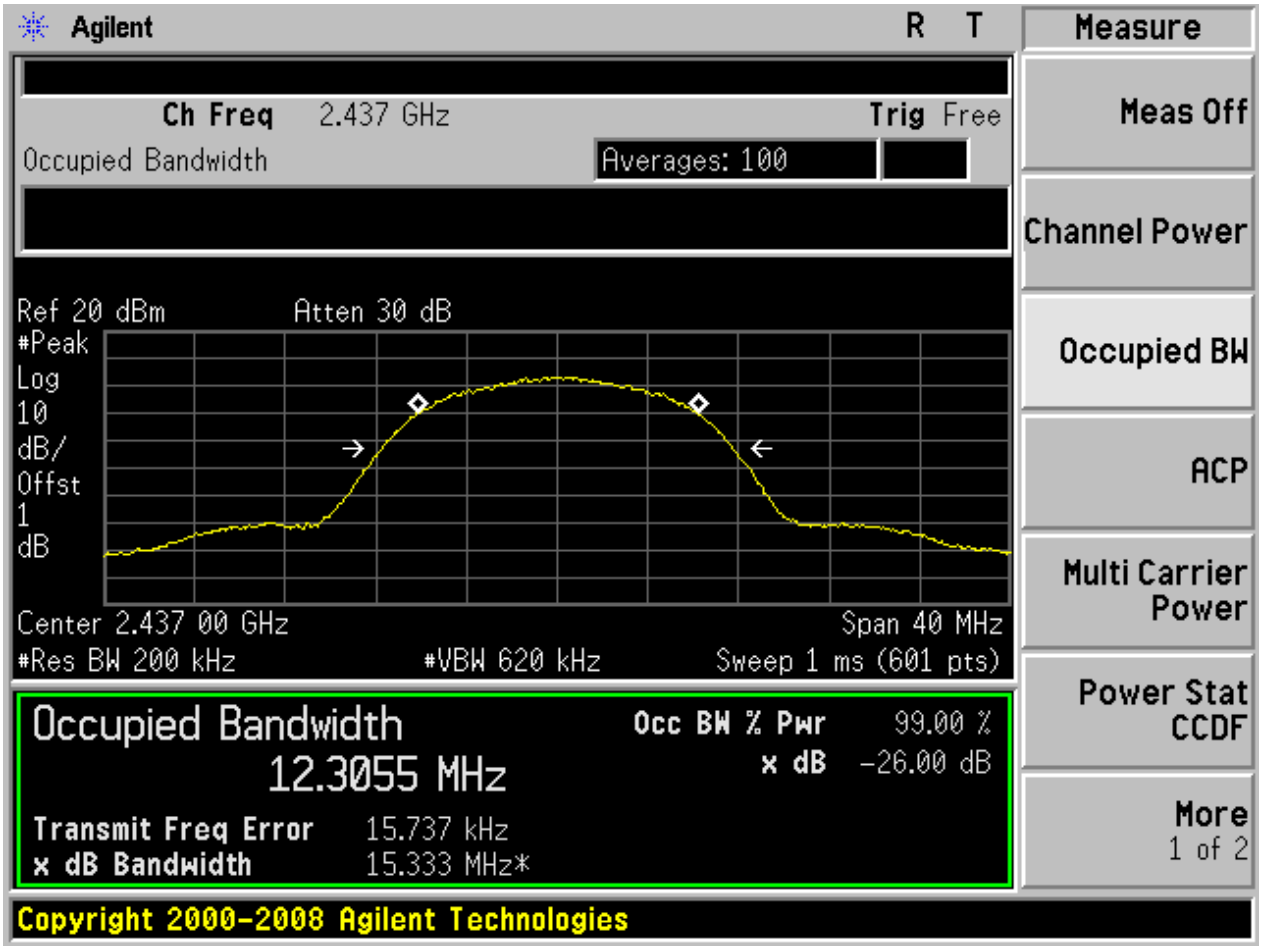

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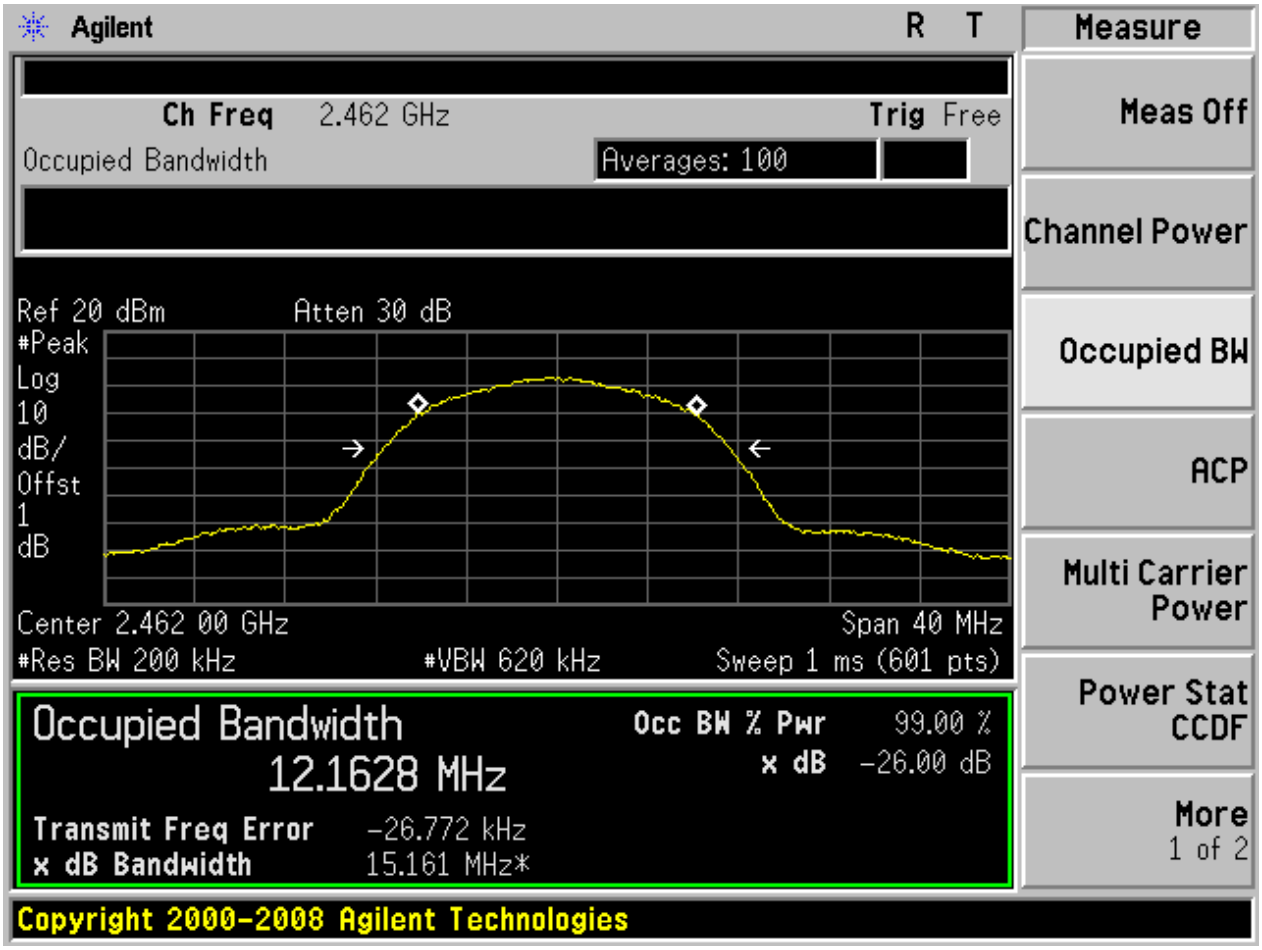

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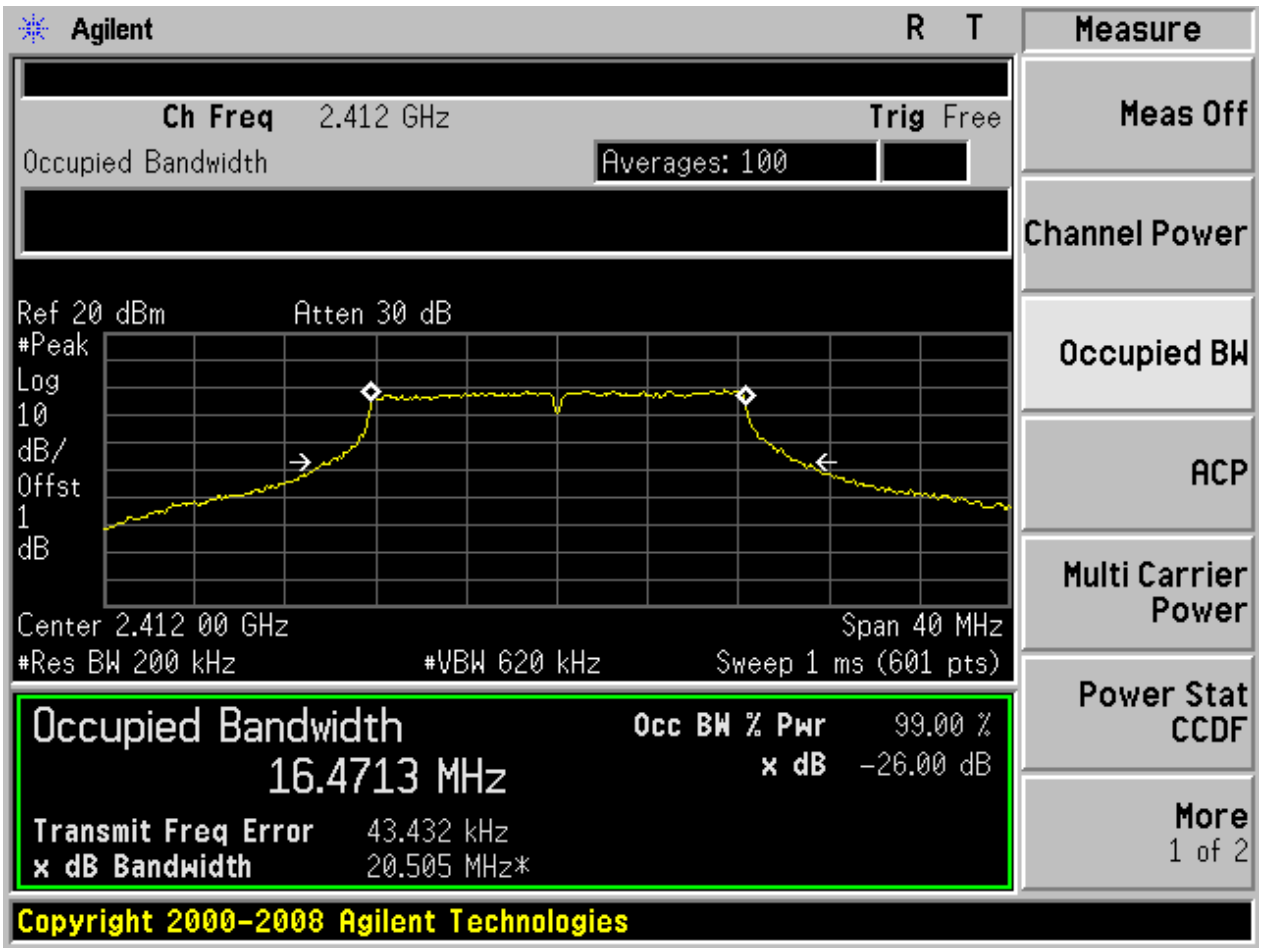

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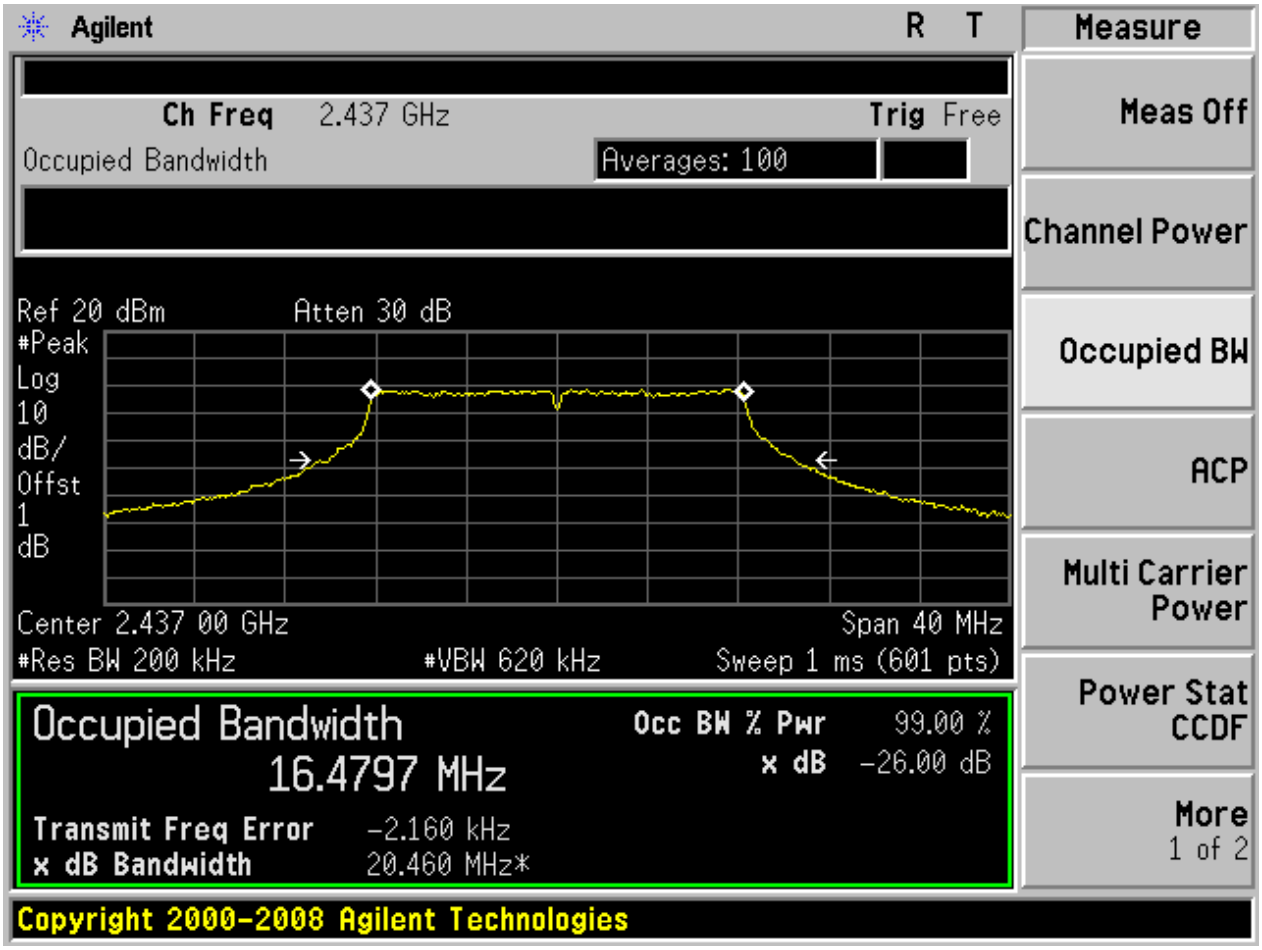

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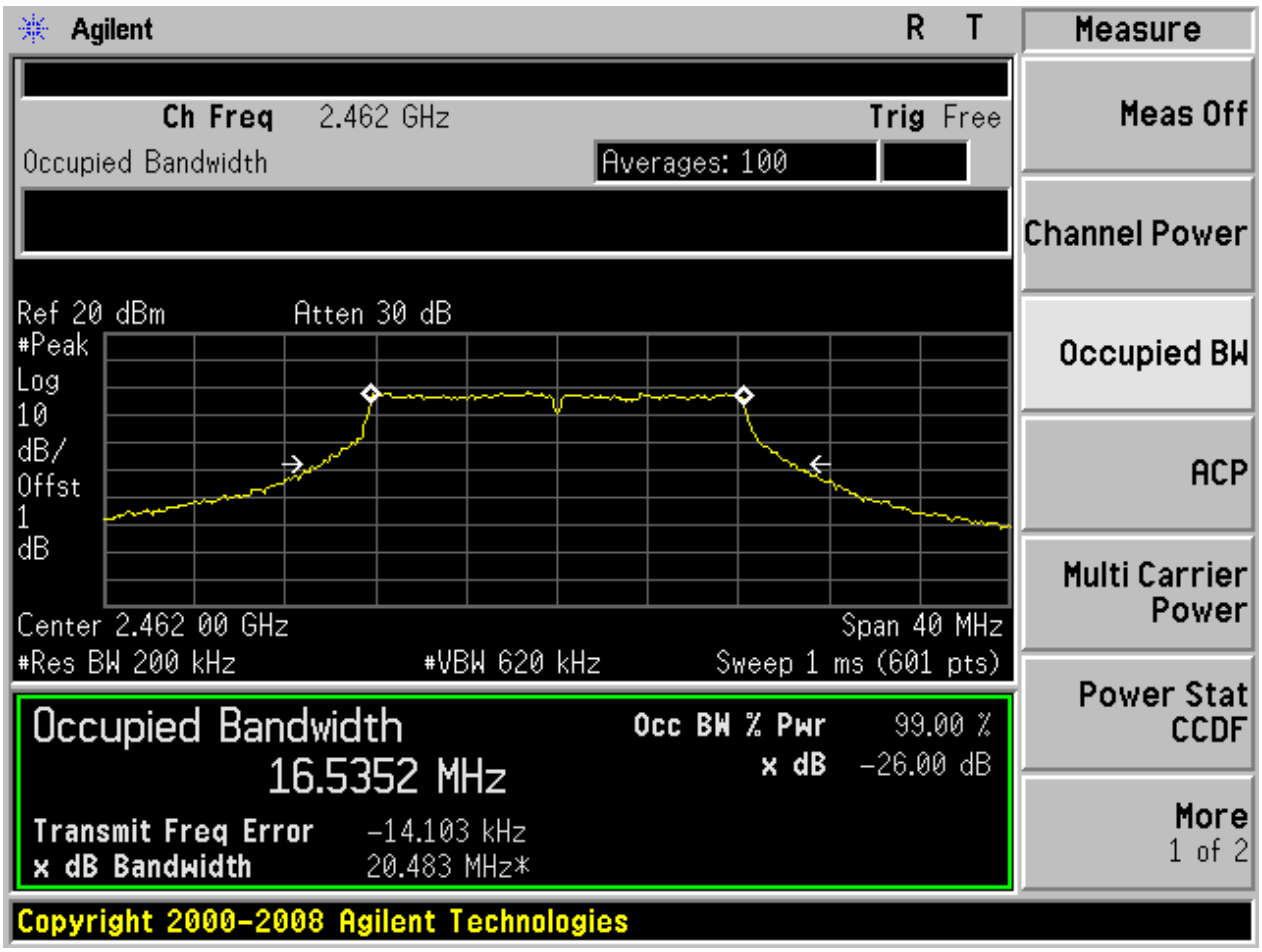

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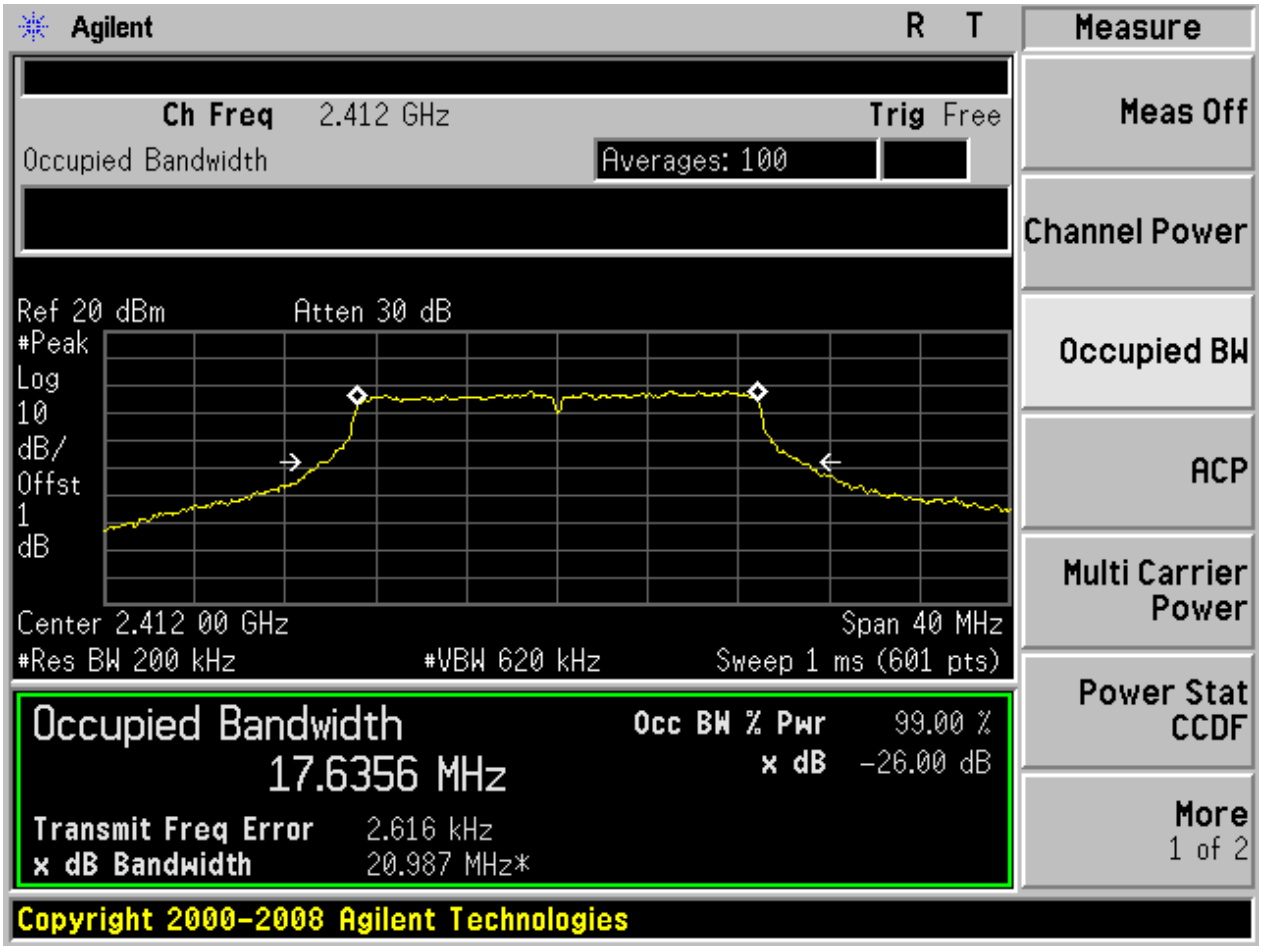

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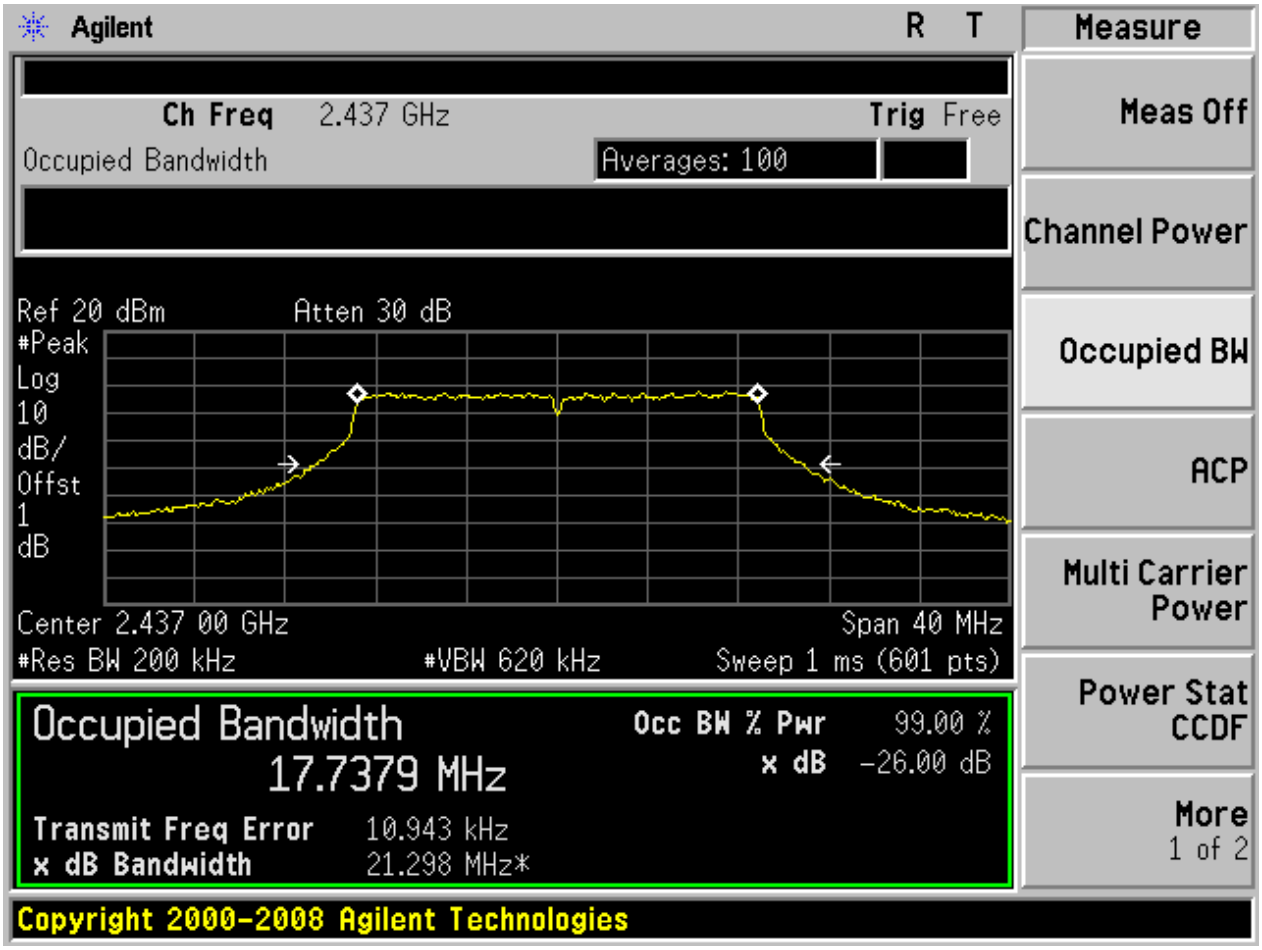

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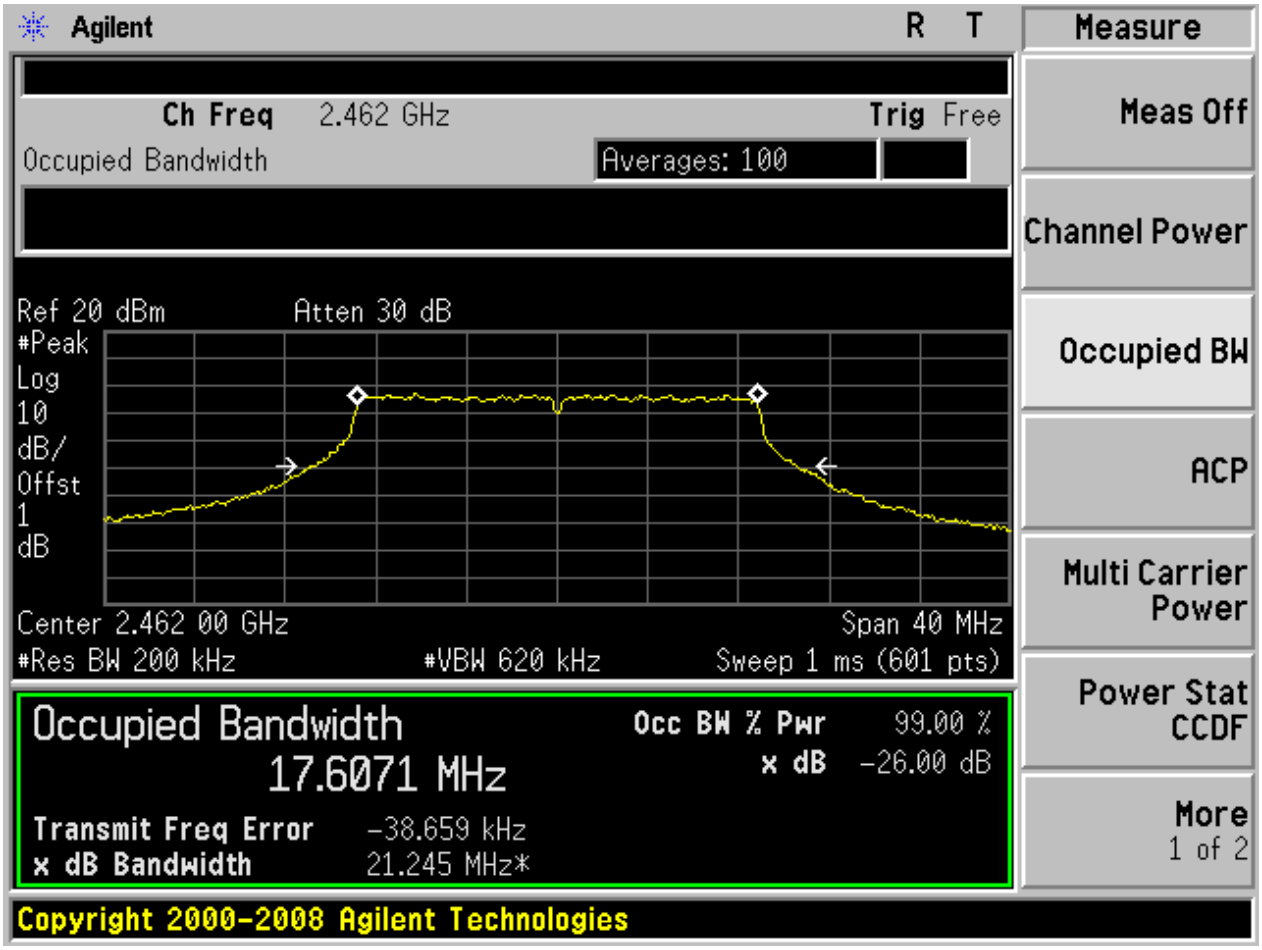

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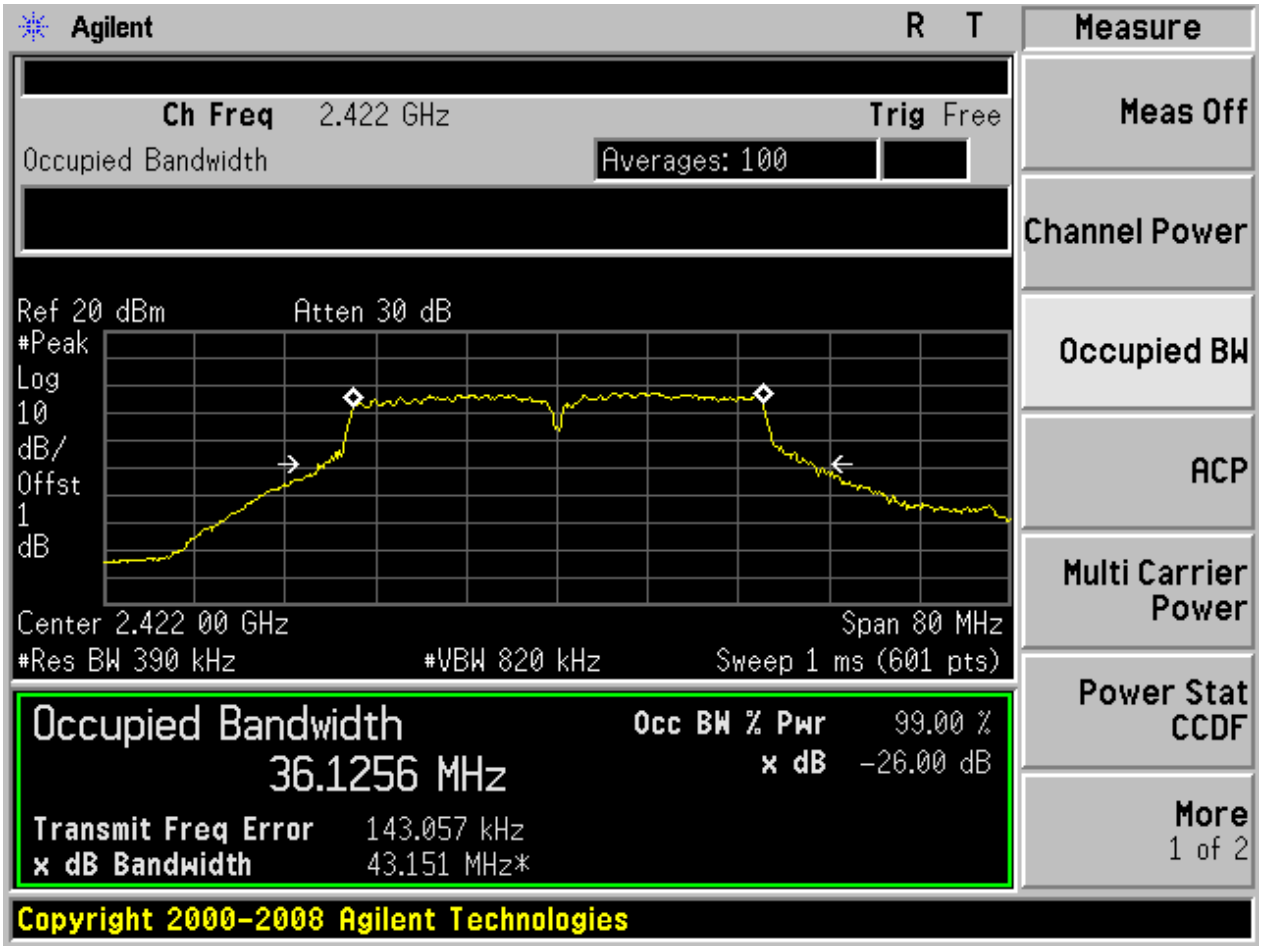

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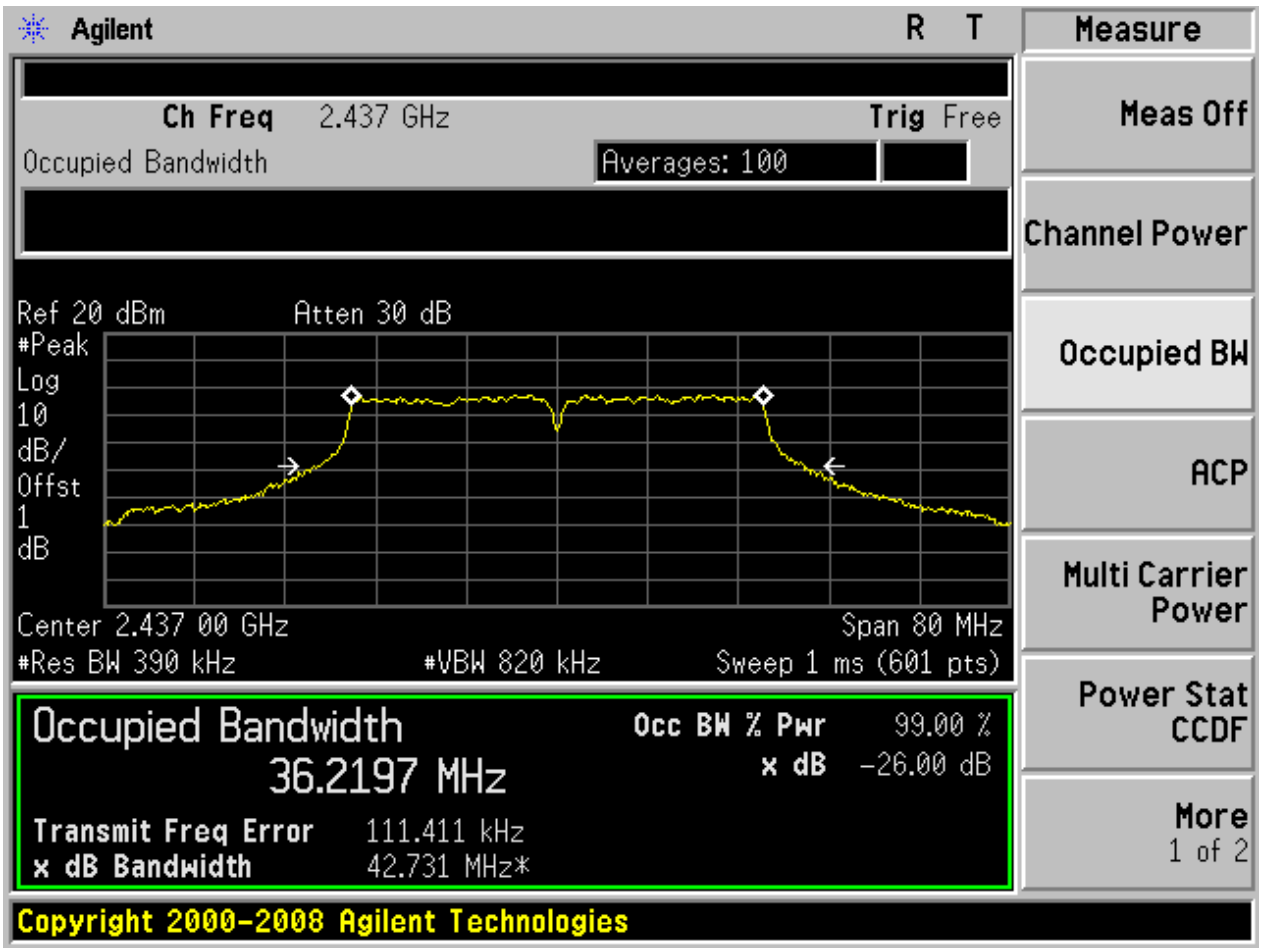

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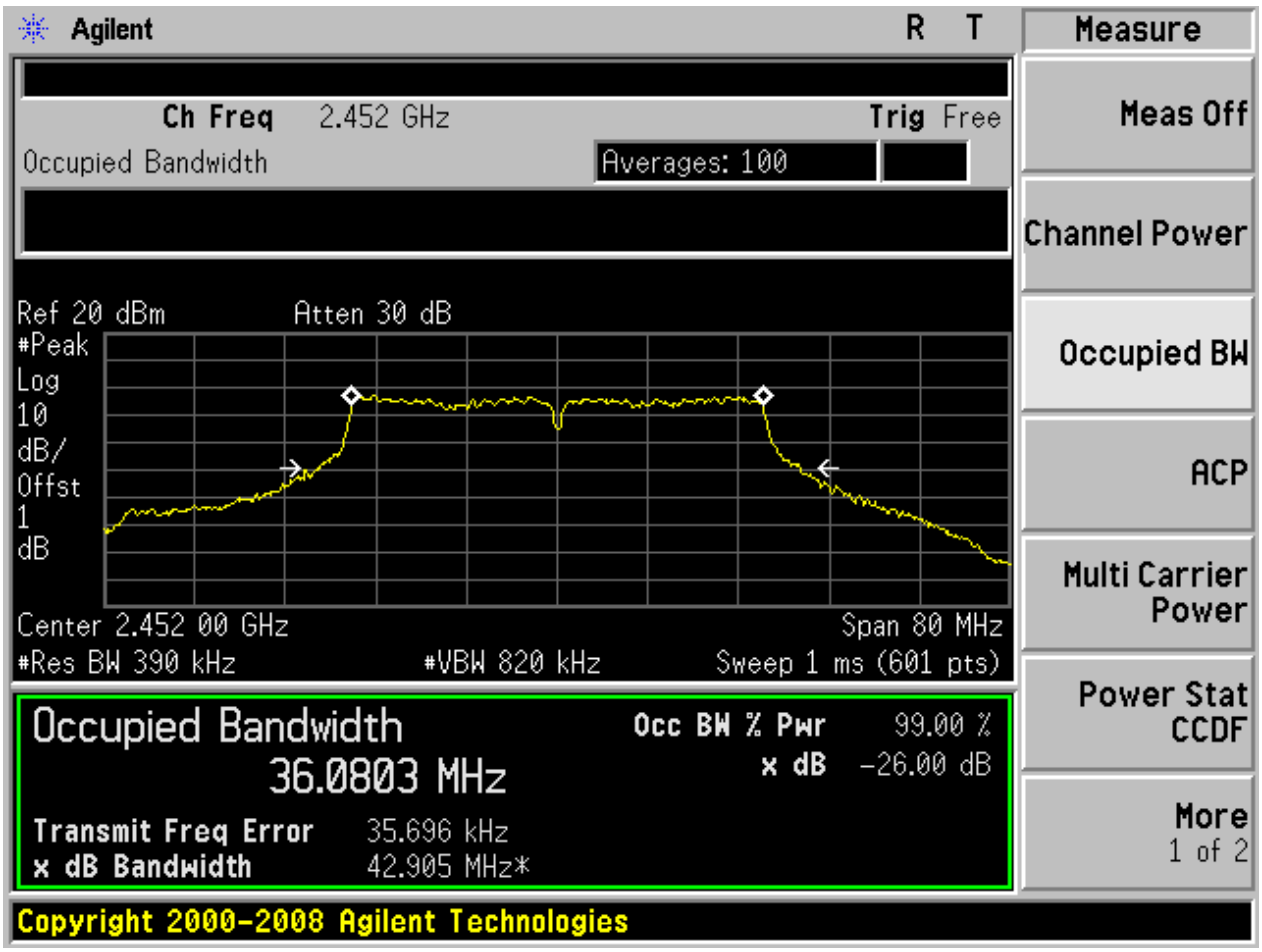
2.23 11N40_H@Ant 1



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Appendix C: Duty Cycle

Part I - Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: 2437 MHz	92.1
11G	Ant 1: 2437 MHz	70.4
11N_20M_SISO	Ant 1: 2437 MHz	68.1
11N_40M_SISO	Ant 1: 2437 MHz	50

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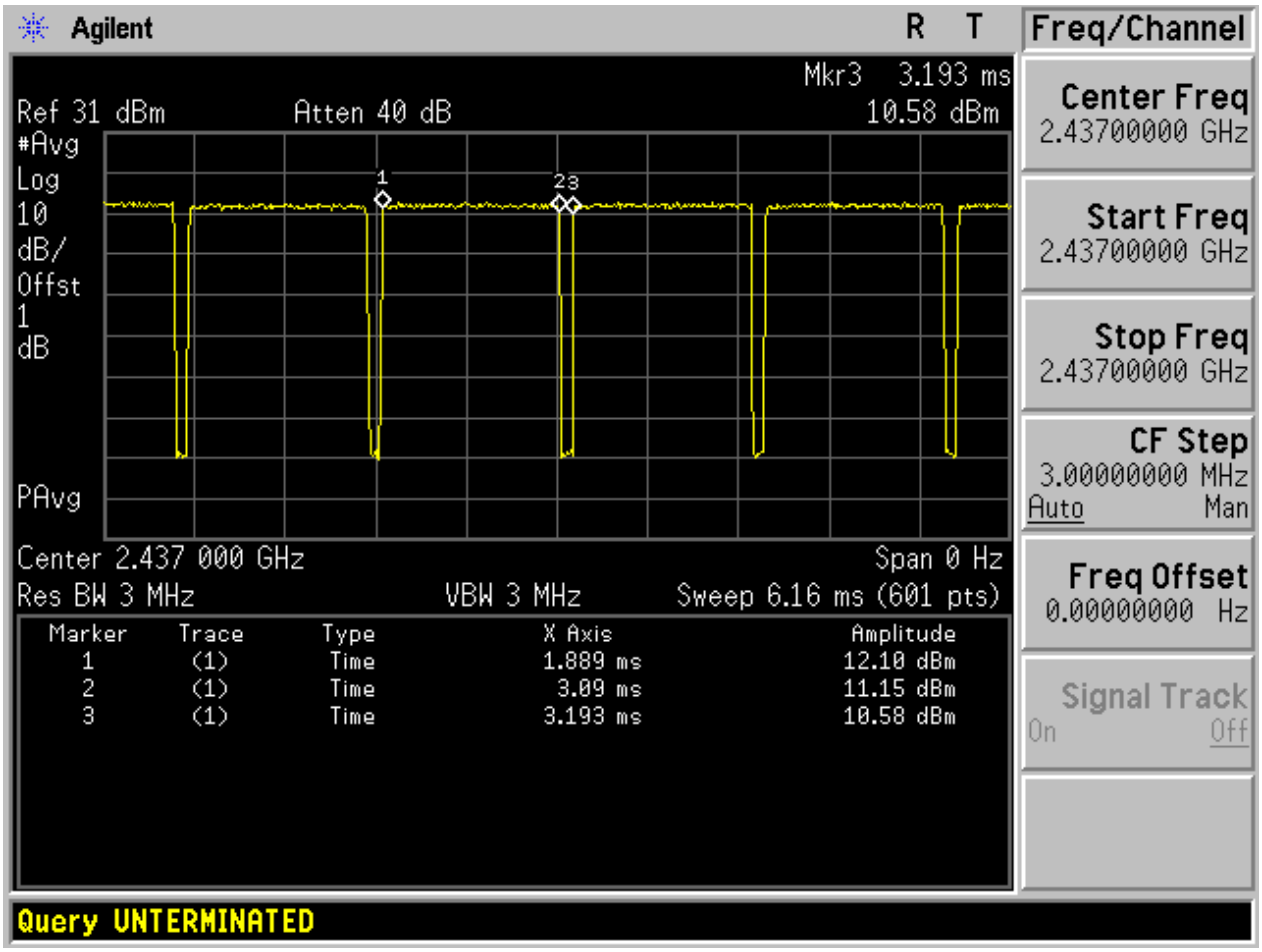
Part II - Test Plots

2.1 11B_M@Ant 1



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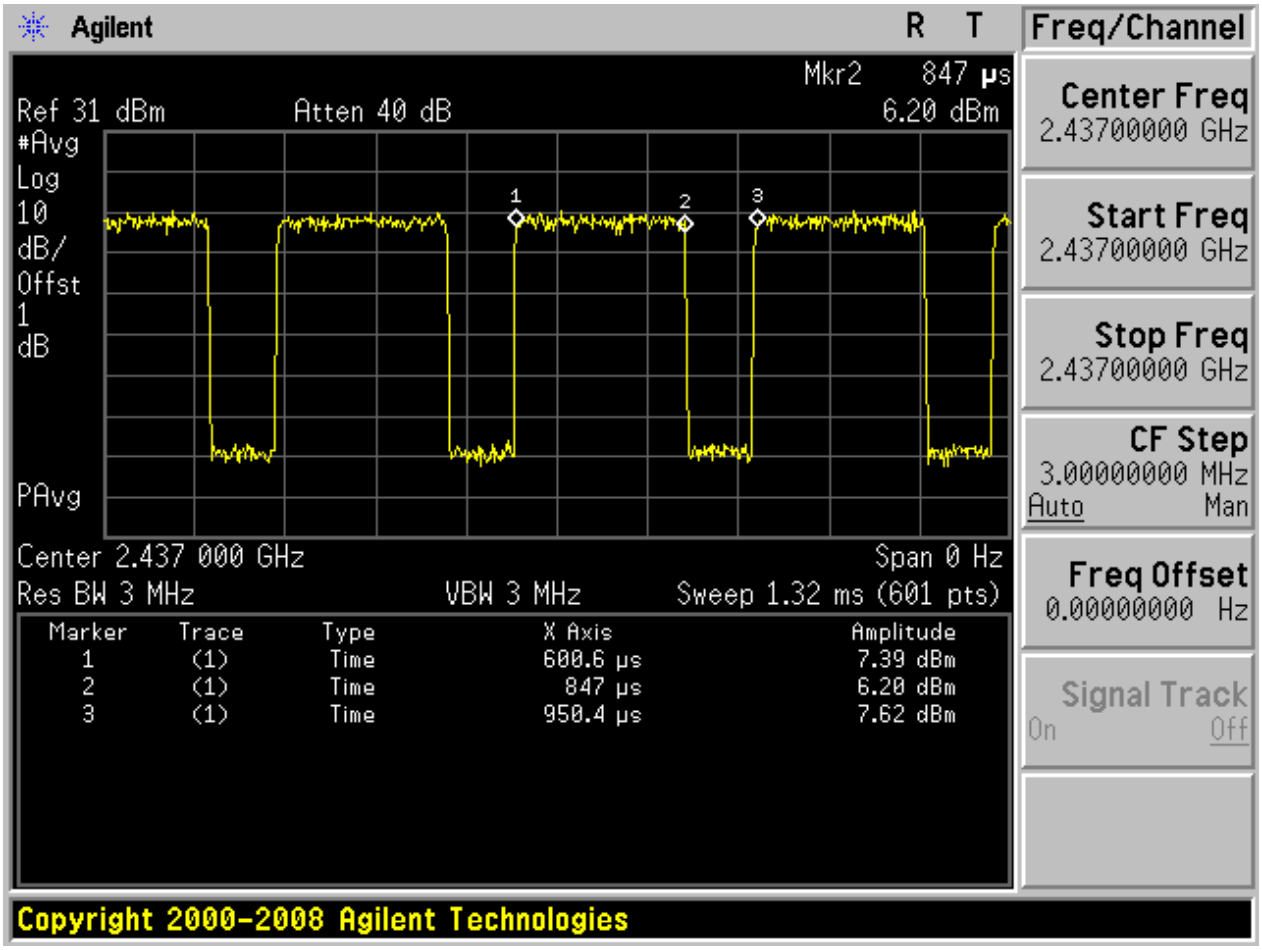

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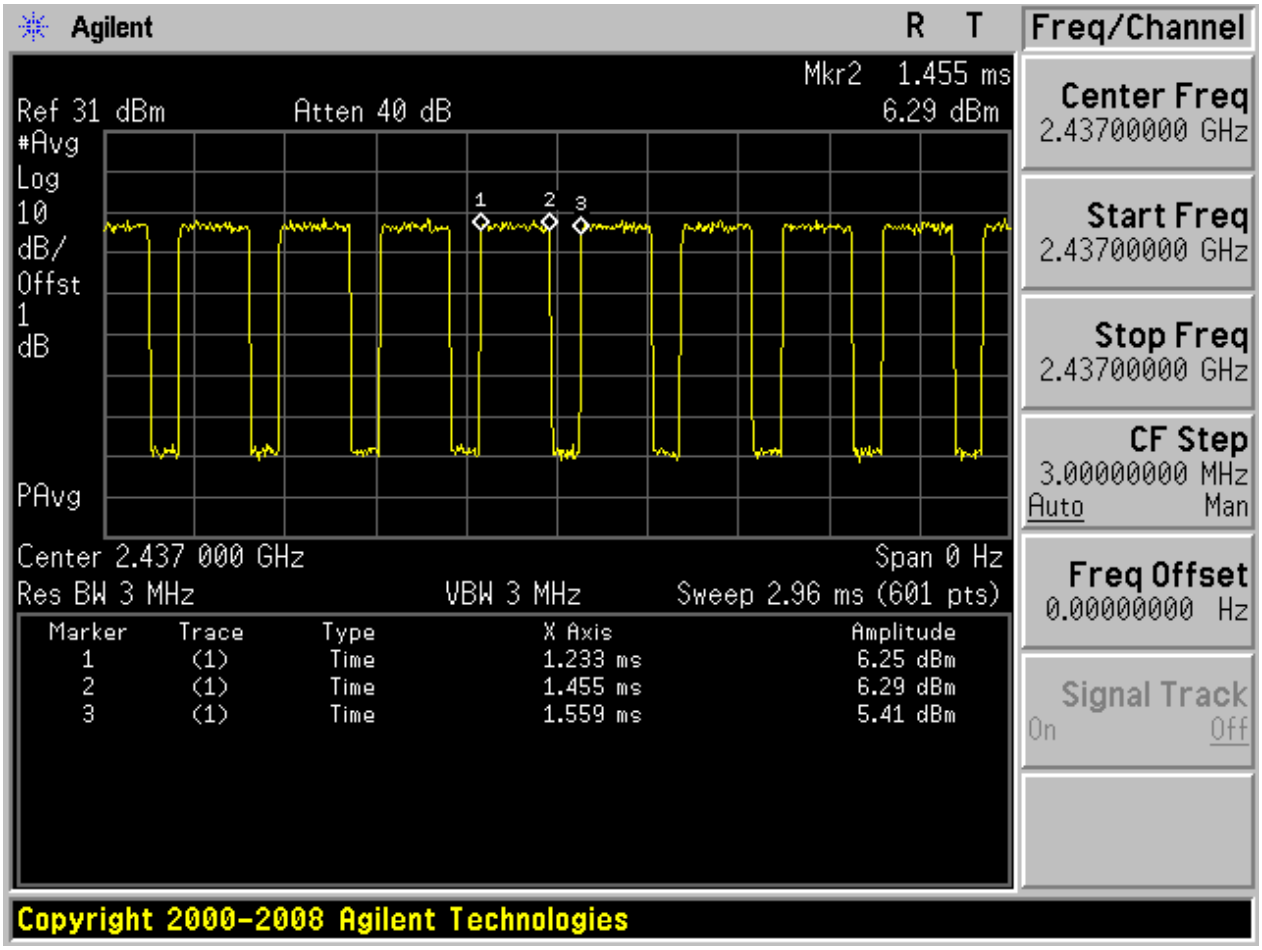
2.1 11N20_M@Ant 1



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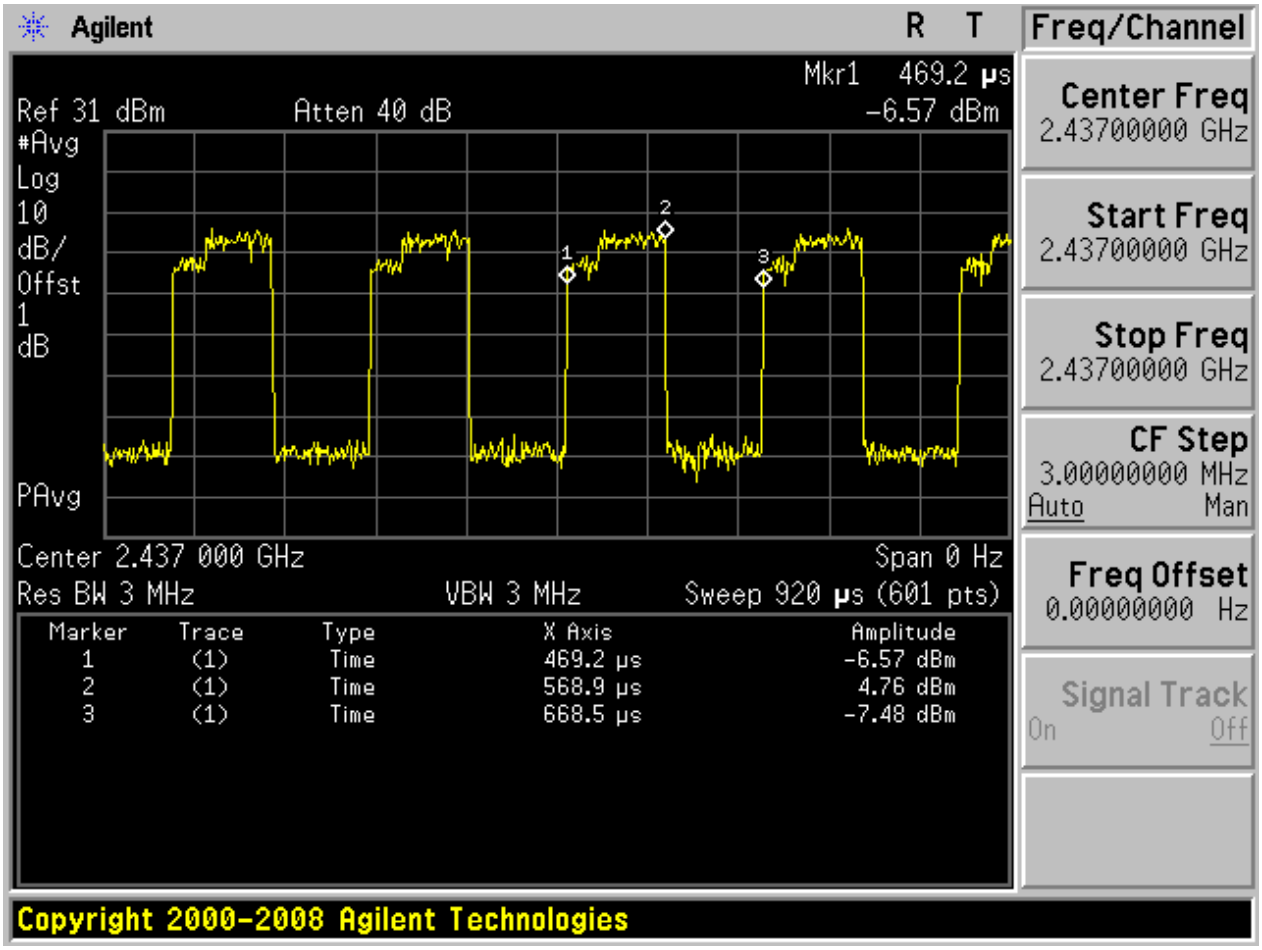

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Appendix D: Maximum Conducted Average Output Power

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Power[dBm]	Verdict
11B	L	2412	Ant 1	16.08	pass
11B	M	2437	Ant 1	16.09	pass
11B	H	2462	Ant 1	15.45	pass
11G	L	2412	Ant 1	16.07	pass
11G	M	2437	Ant 1	15.99	pass
11G	H	2462	Ant 1	15.43	pass
11N20	L	2412	Ant 1	15.15	pass
11N20	M	2437	Ant 1	15.14	pass
11N20	H	2462	Ant 1	14.53	pass
11N40	L	2422	Ant 1	15.42	pass
11N40	M	2437	Ant 1	15.70	pass
11N40	H	2452	Ant 1	14.90	pass

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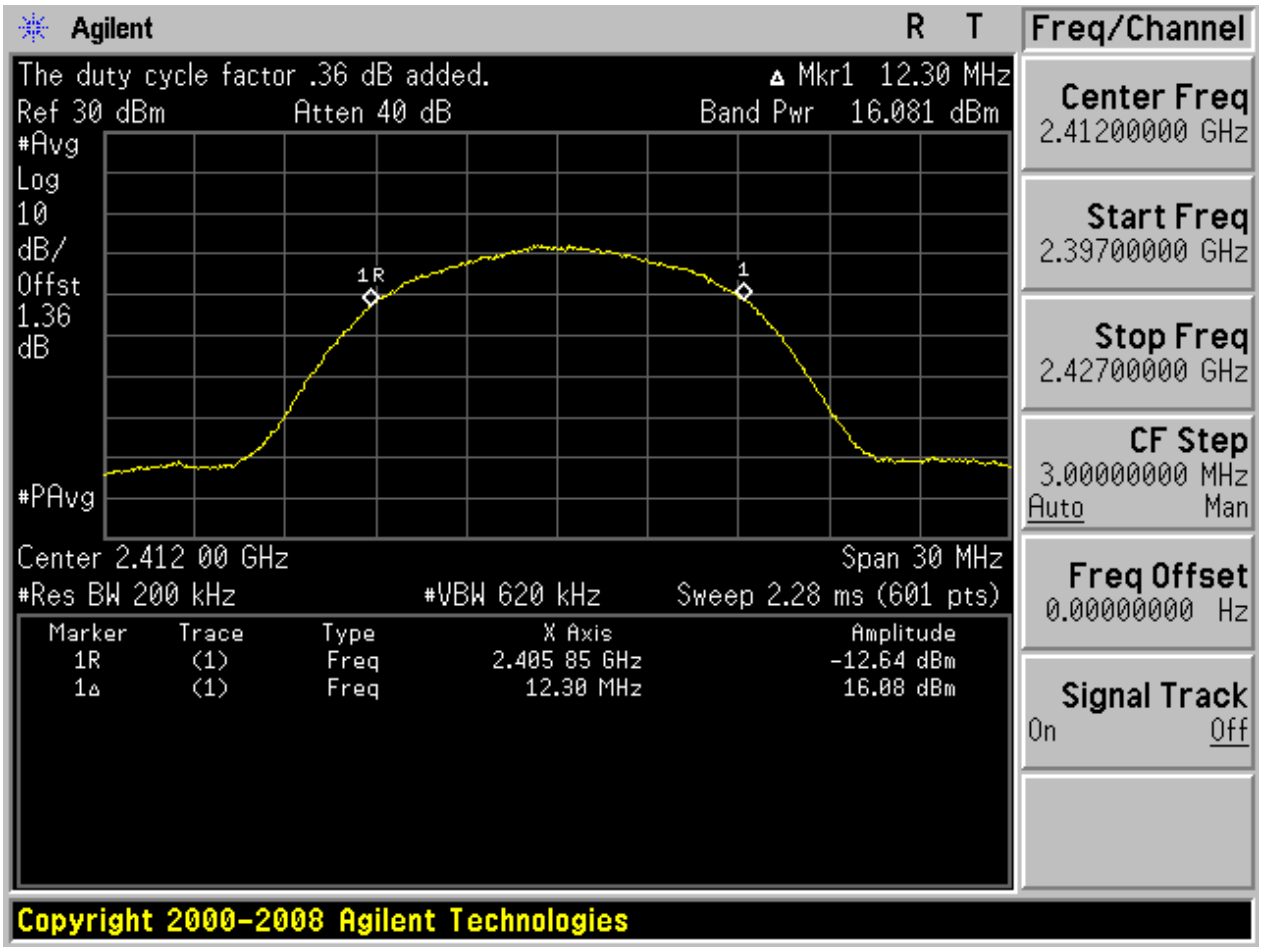
Part II - Test Plots

2.1 11B_L@Ant 1



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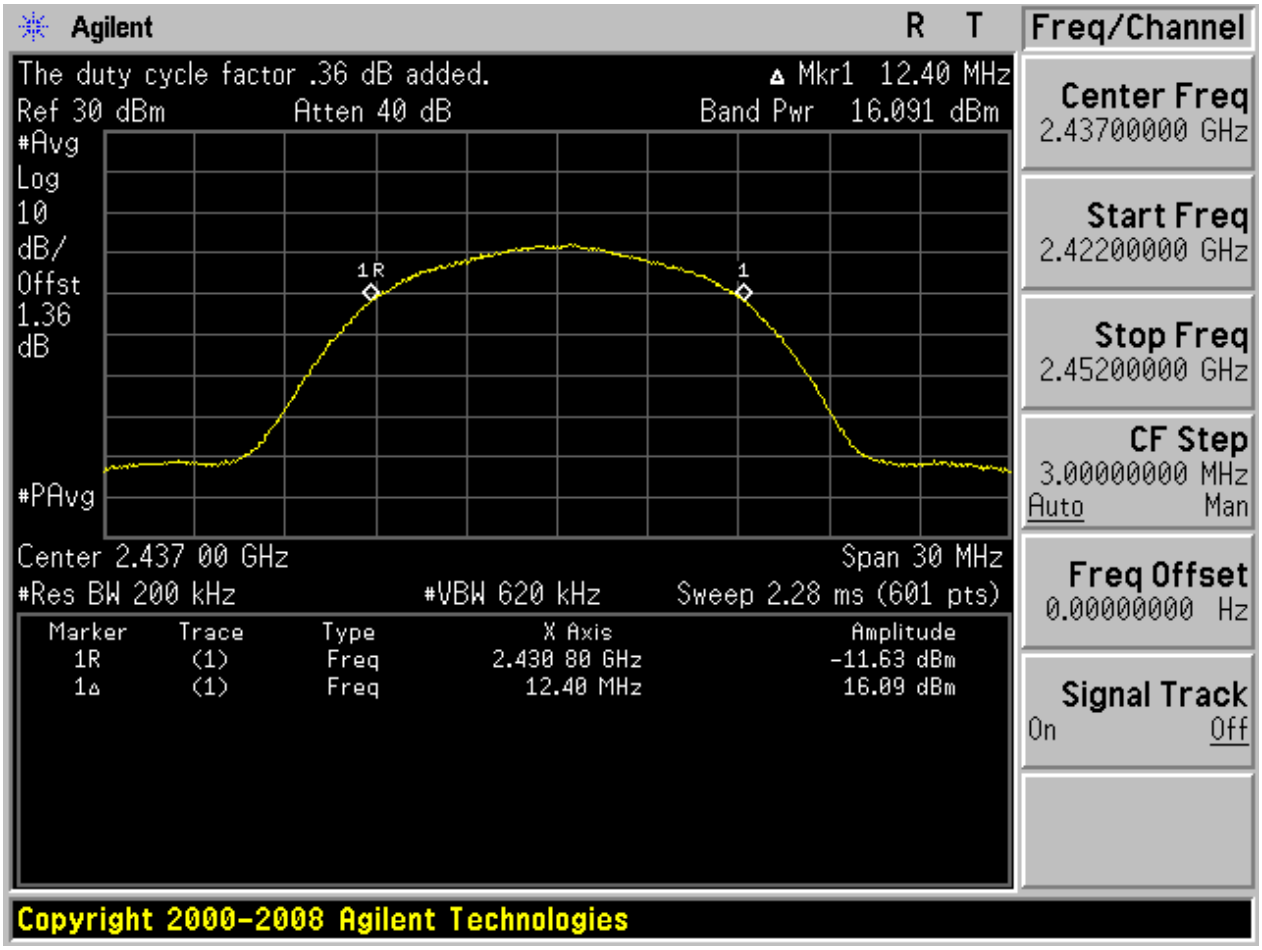

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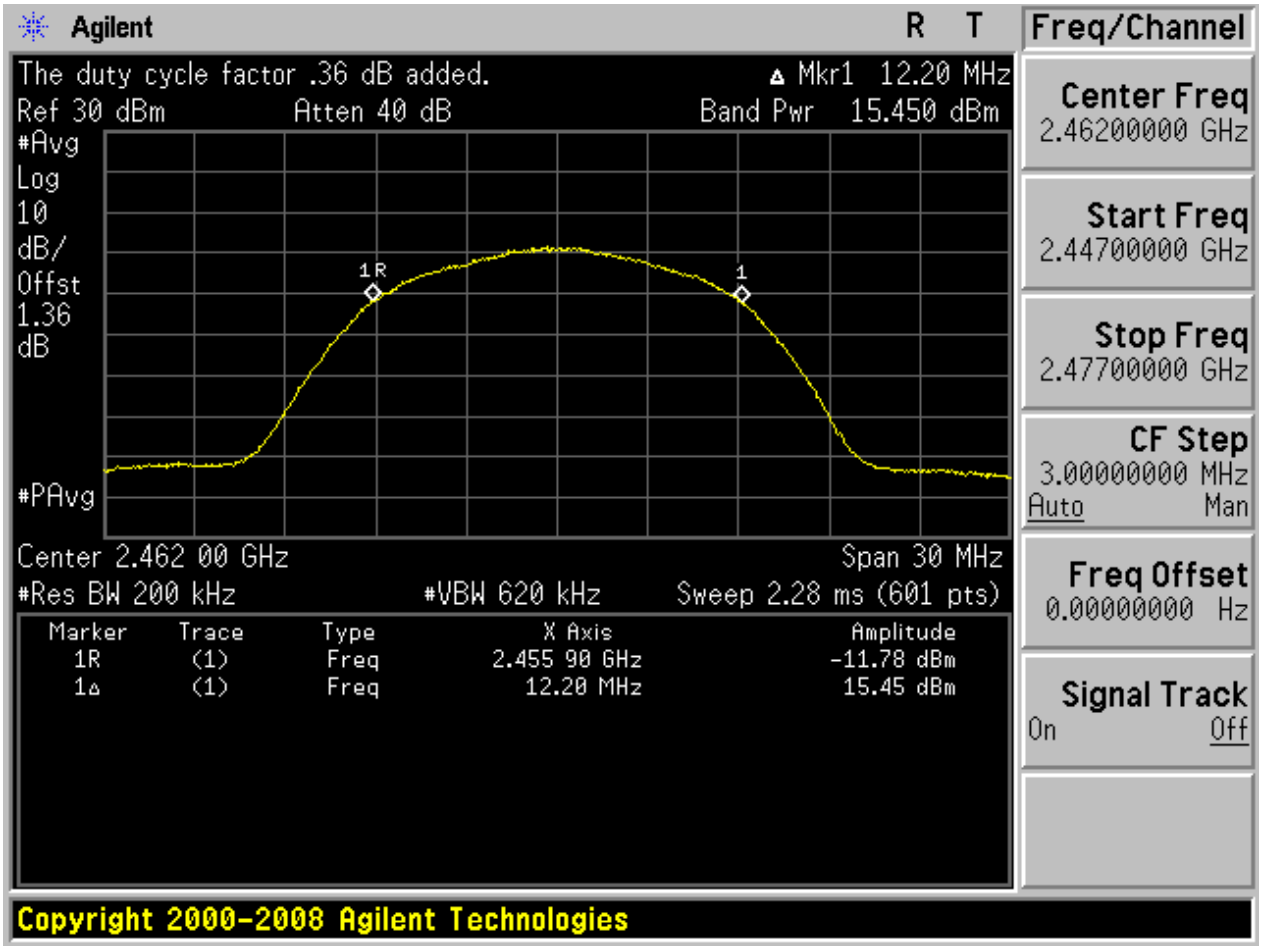

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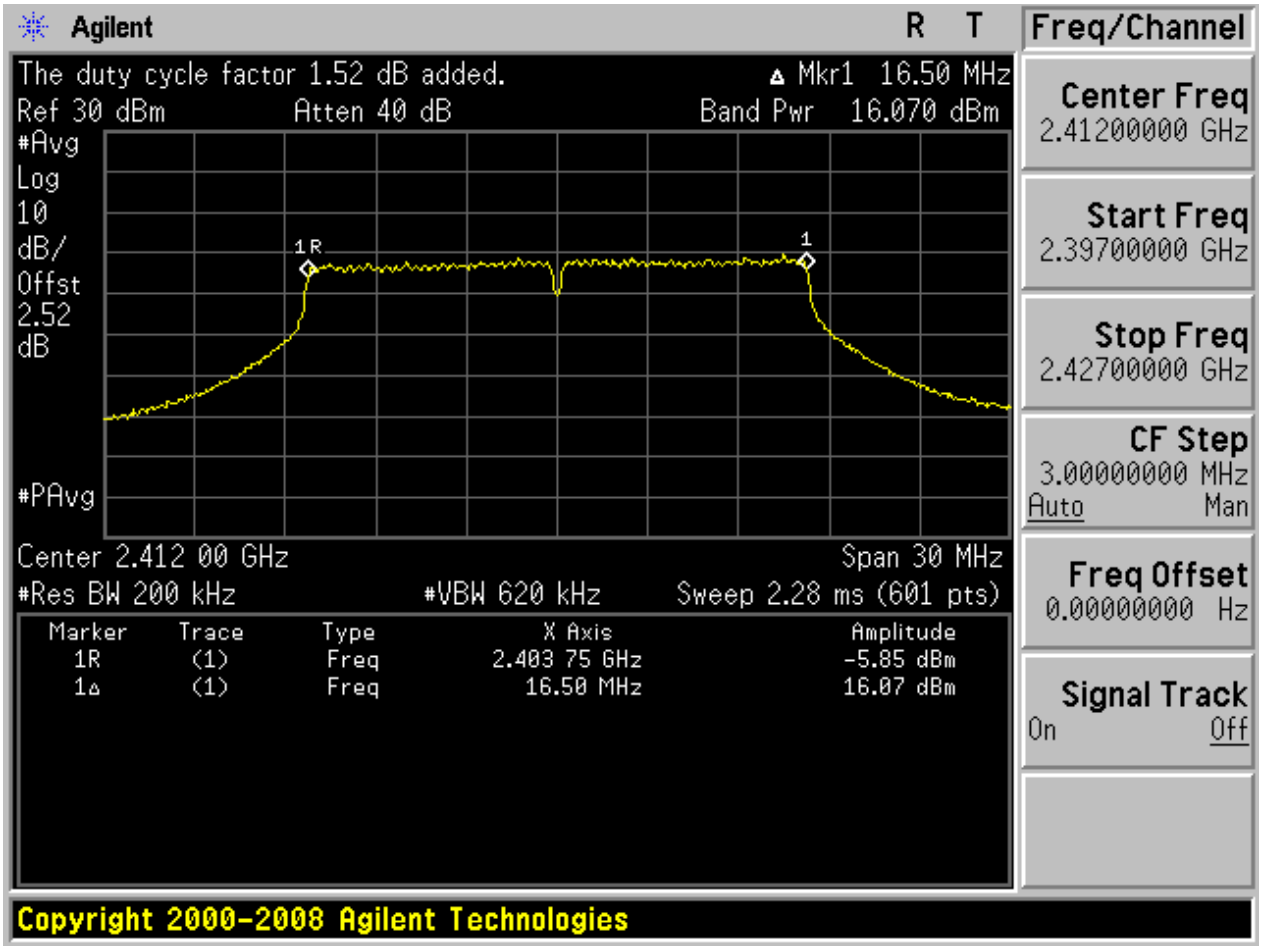

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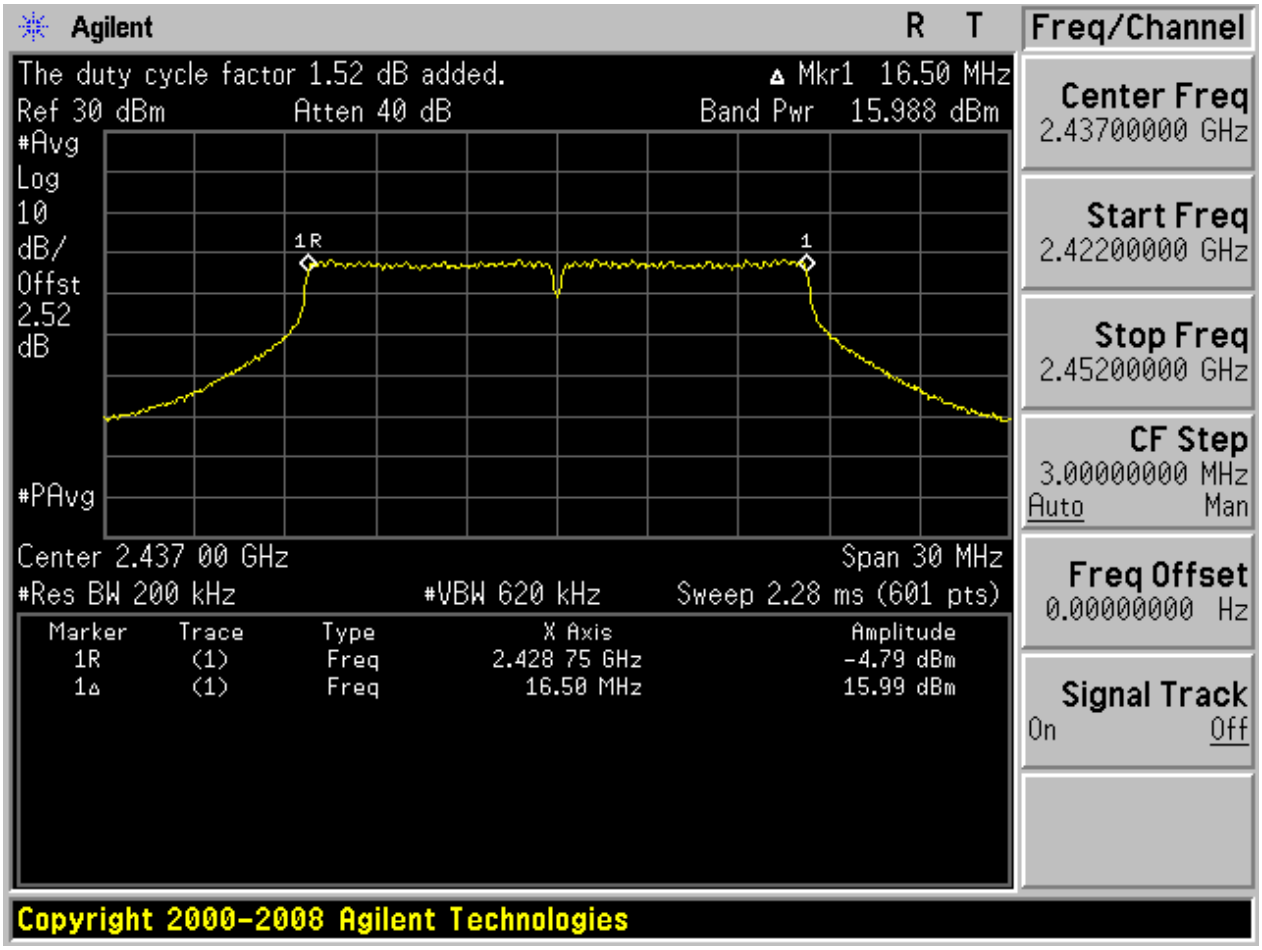
2.9 11G_M@Ant 1



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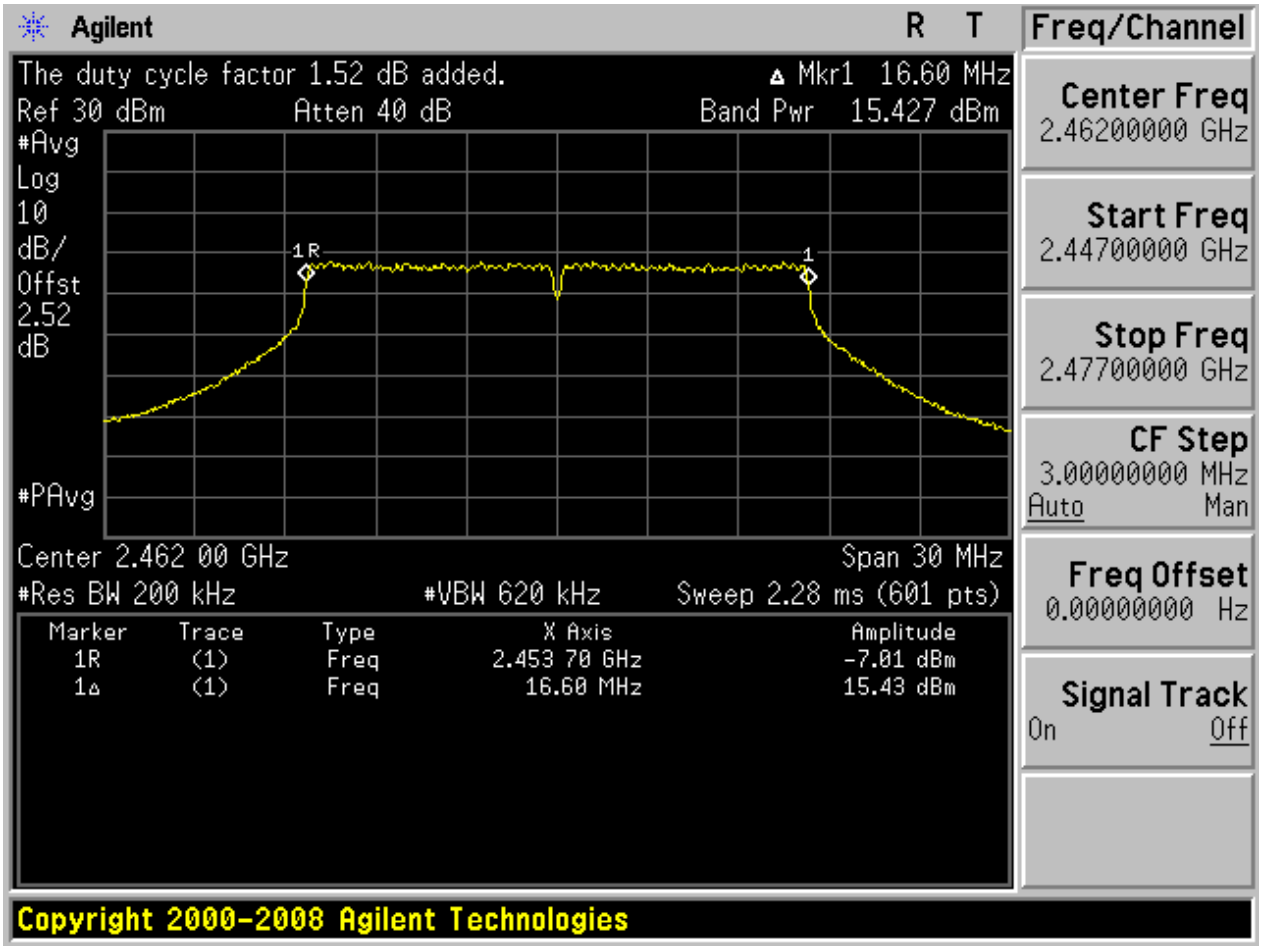

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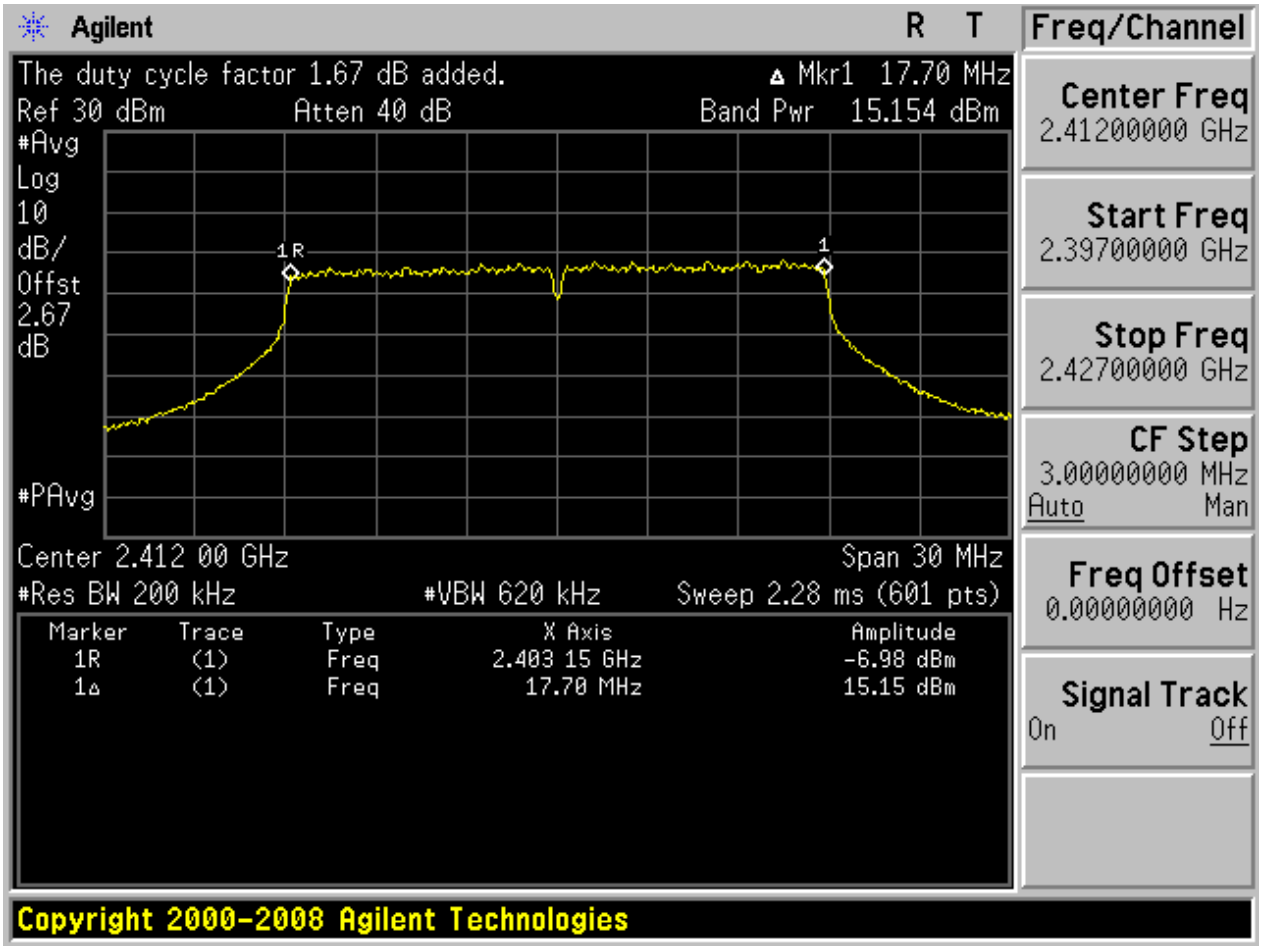
2.13 11N20_L@Ant 1



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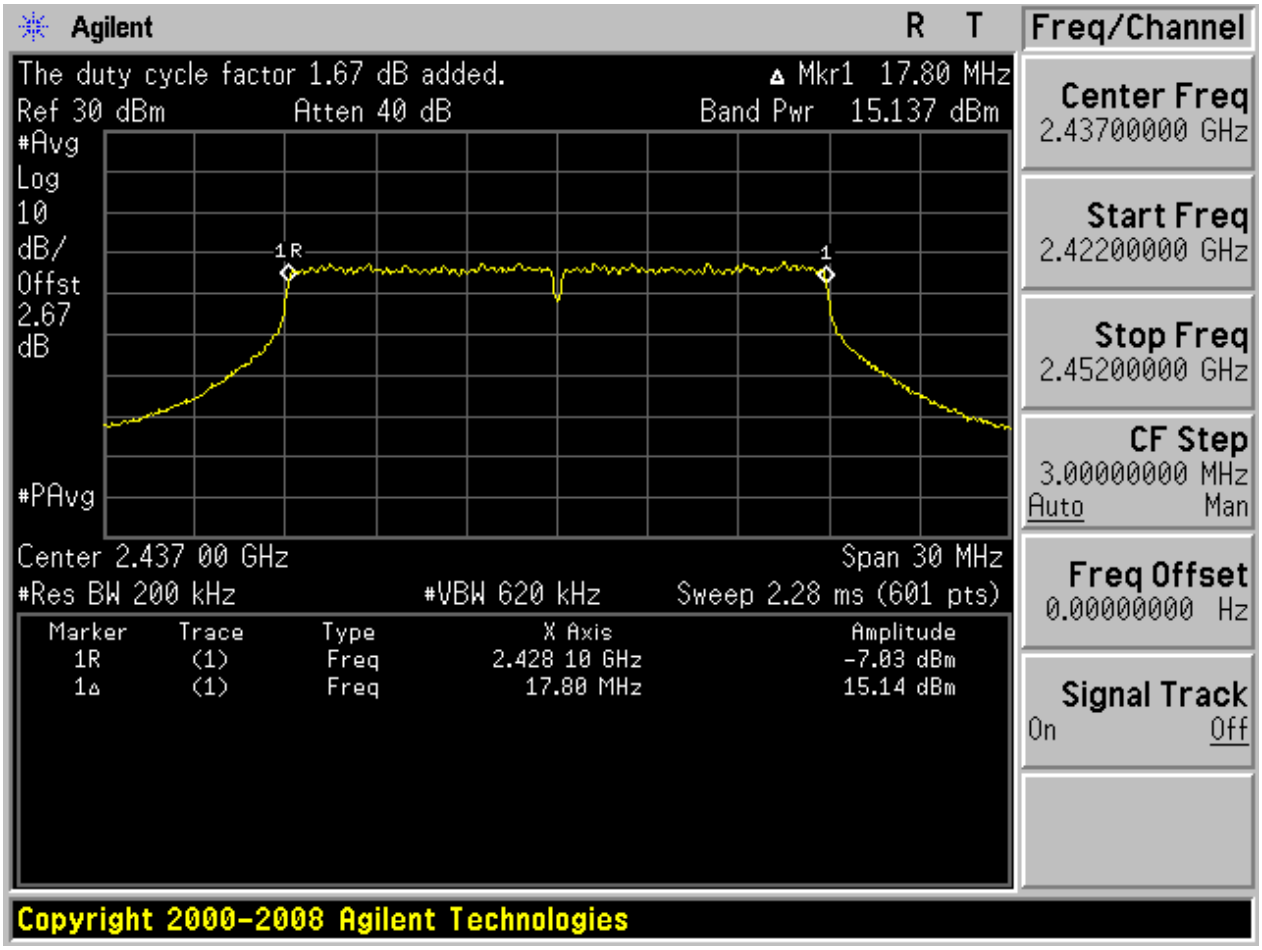
2.15 11N20_M@Ant 1



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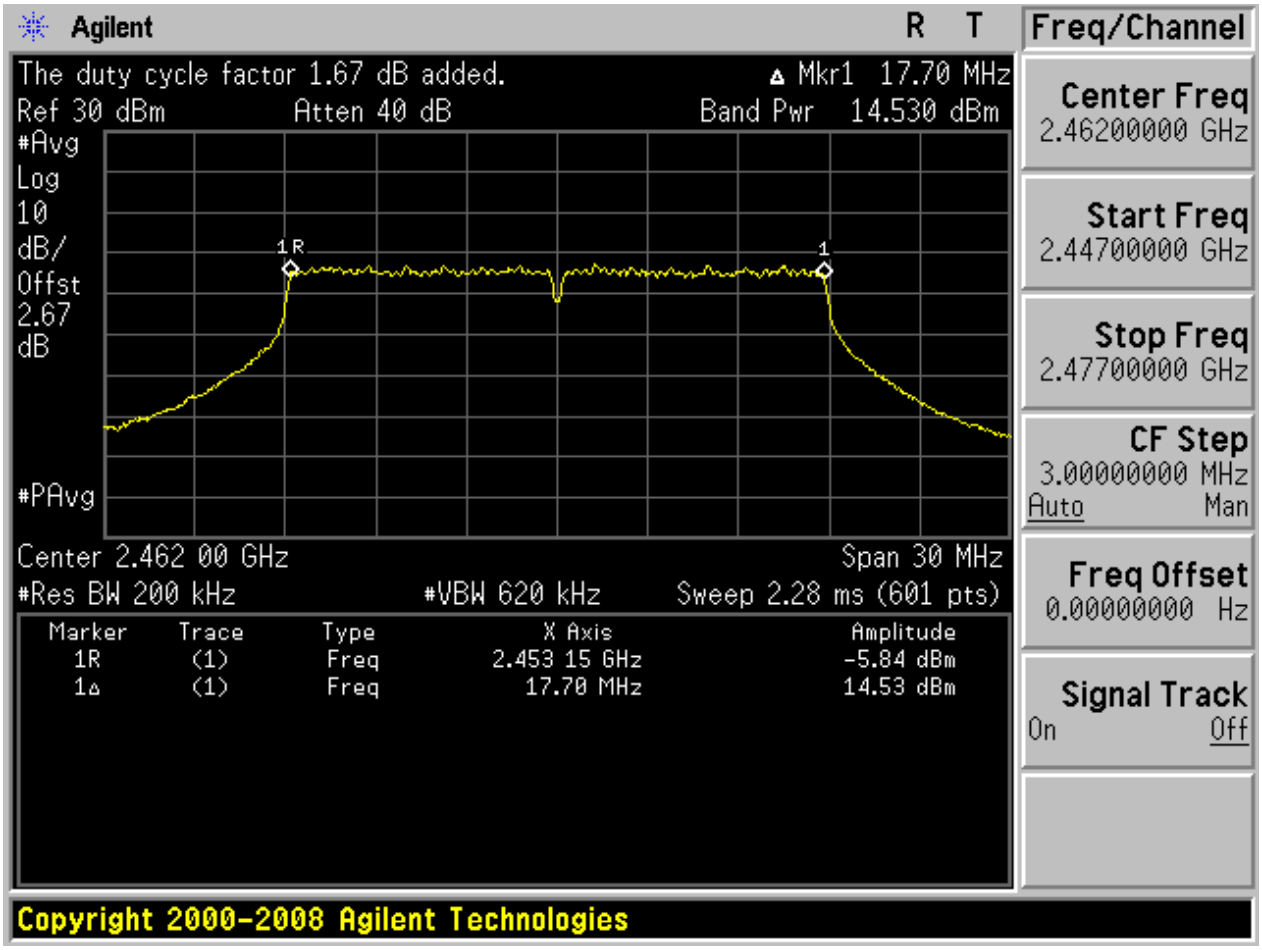
2.17 11N20_H@Ant 1



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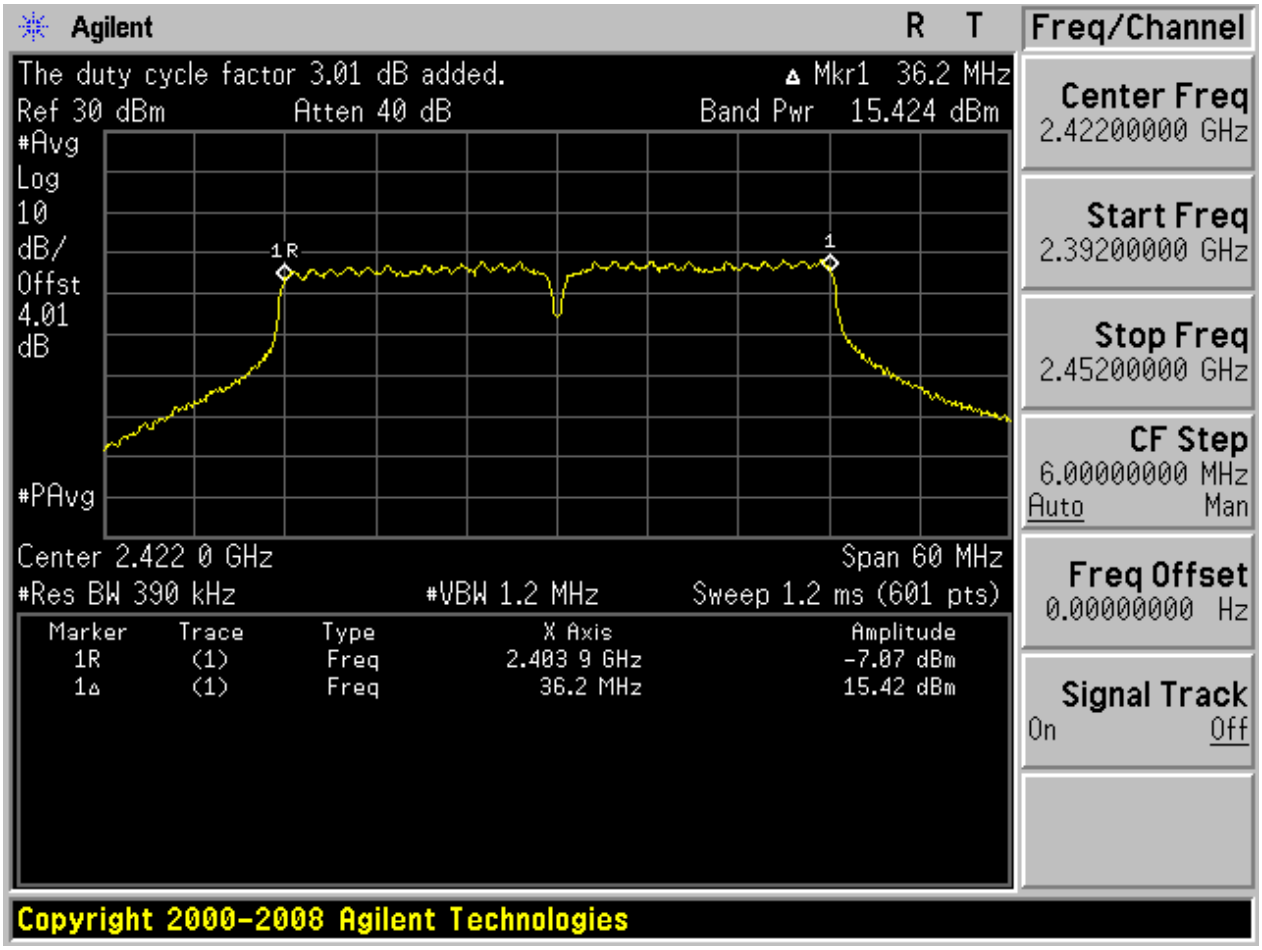

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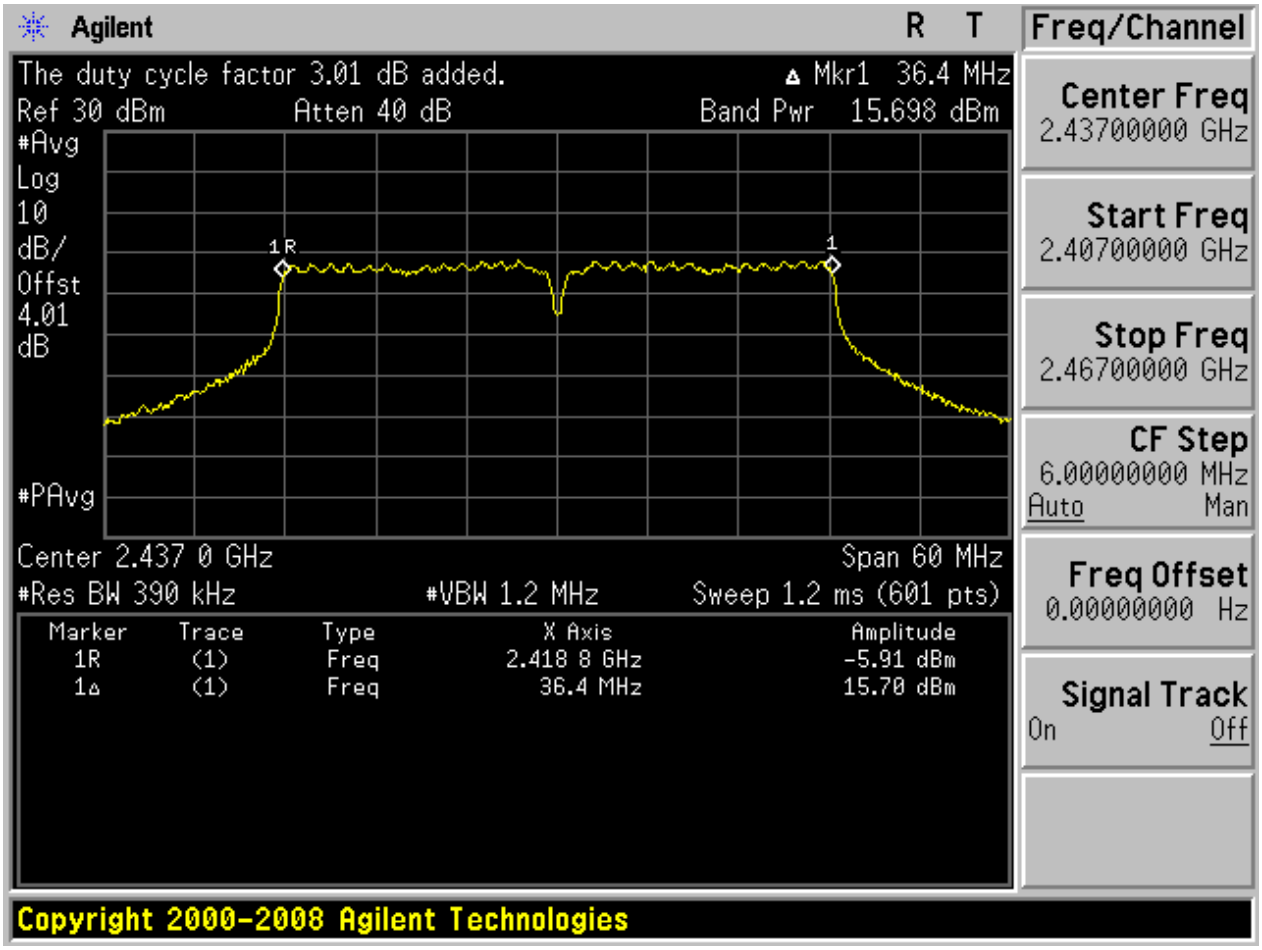
2.21 11N40_M@Ant 1



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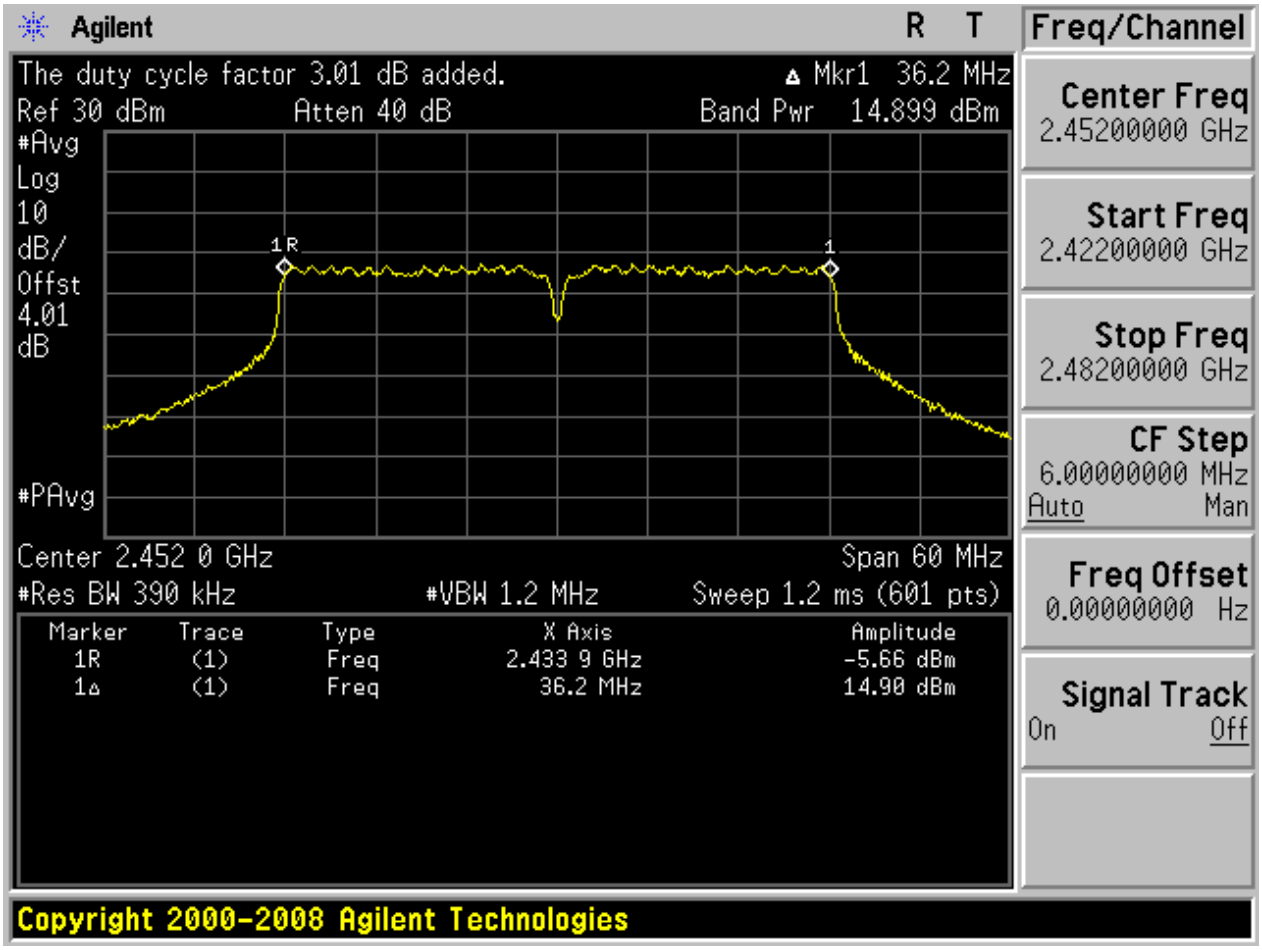

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Appendix E: Maximum Power Spectral Density Level

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	PD[MHz]	Verdict
11B	L	2412	Ant 1	-10.48	pass
11B	M	2437	Ant 1	-10.47	pass
11B	H	2462	Ant 1	-10.91	pass
11G	L	2412	Ant 1	-12.32	pass
11G	M	2437	Ant 1	-13.13	pass
11G	H	2462	Ant 1	-13.64	pass
11N20	L	2412	Ant 1	-12.78	pass
11N20	M	2437	Ant 1	-13.16	pass
11N20	H	2462	Ant 1	-13.94	pass
11N40	L	2422	Ant 1	-14.60	pass
11N40	M	2437	Ant 1	-14.92	pass
11N40	H	2452	Ant 1	-15.75	pass

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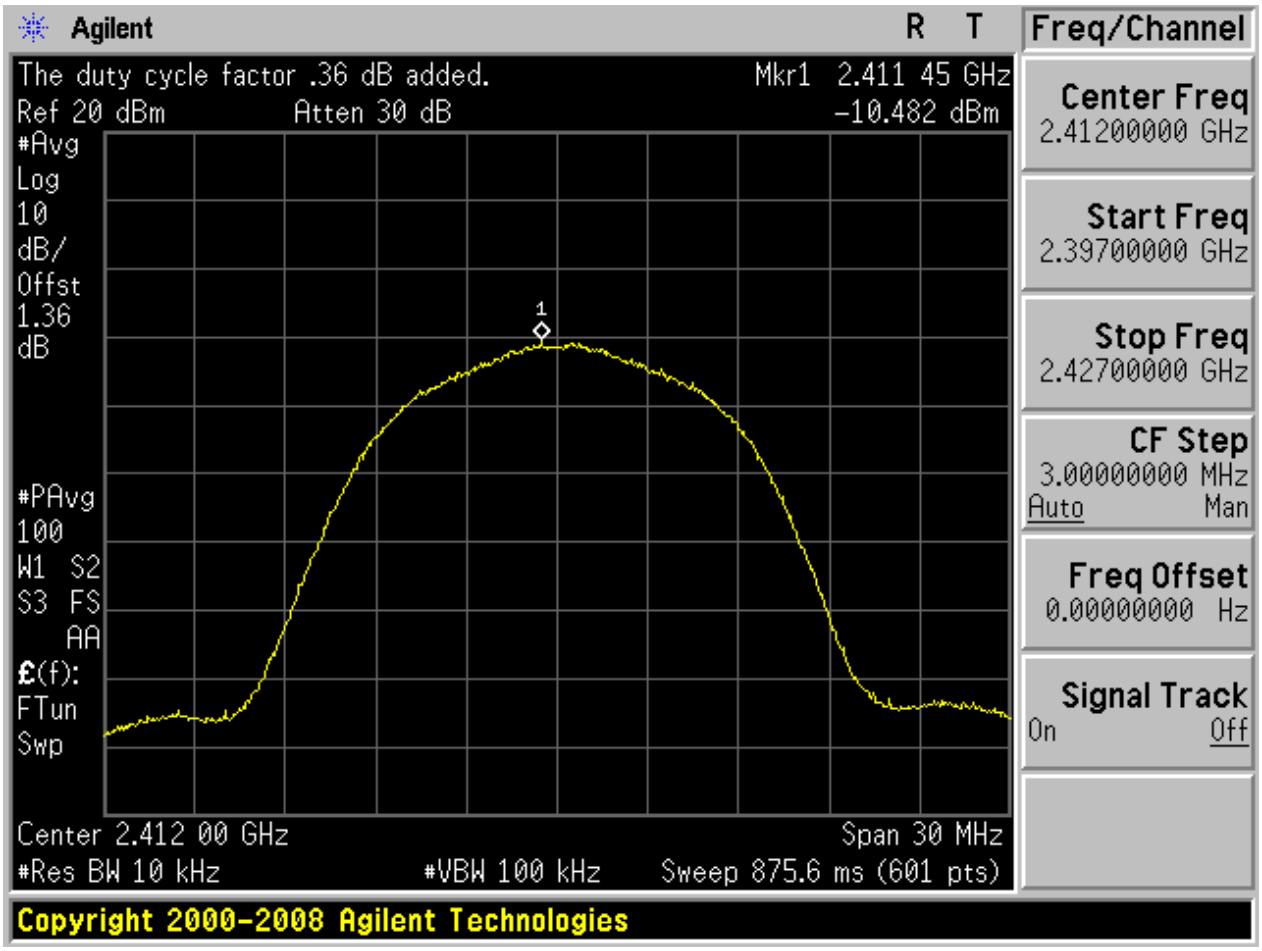
Part II - Test Plots

2.1 11B_L@Ant 1



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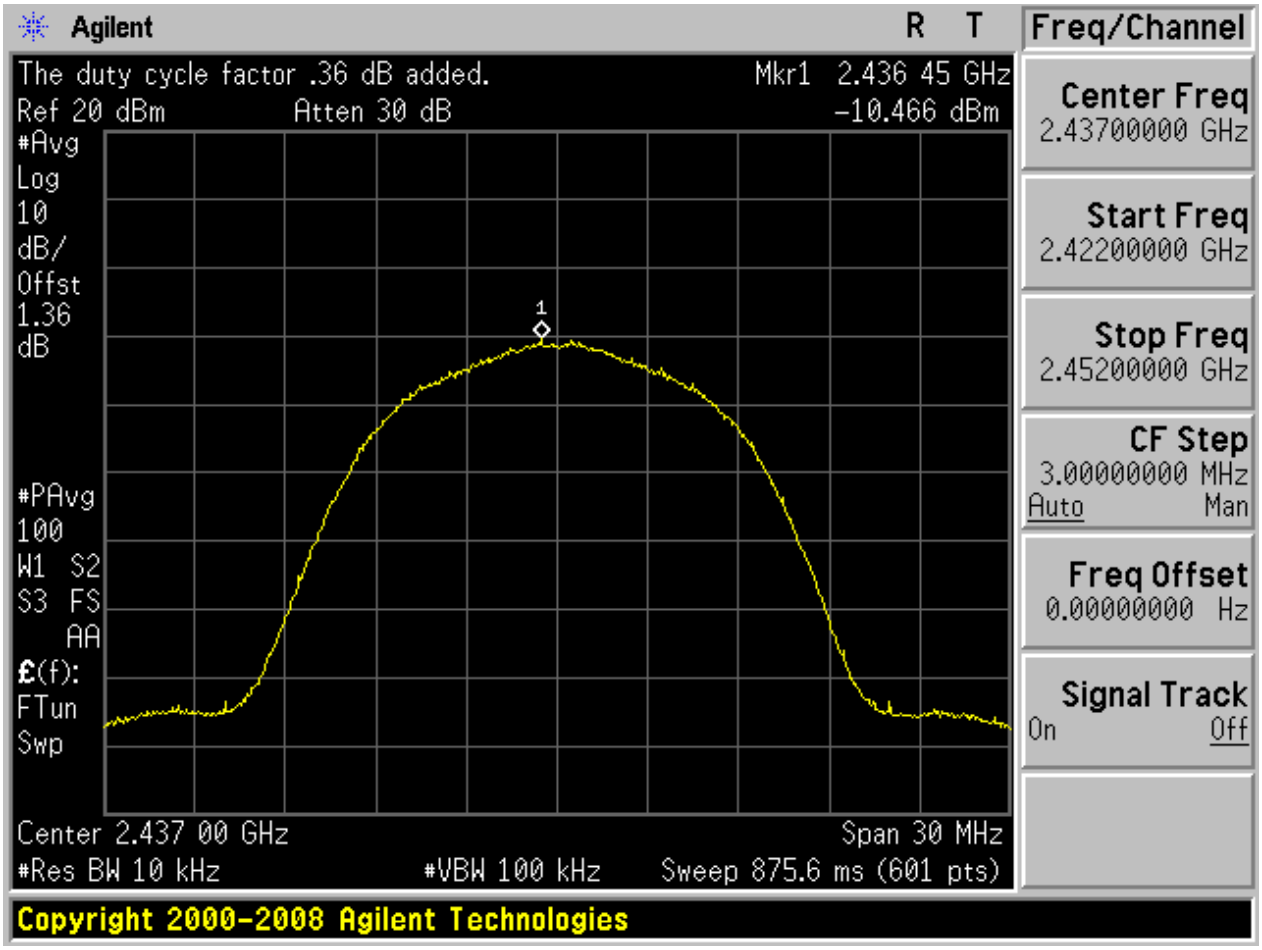

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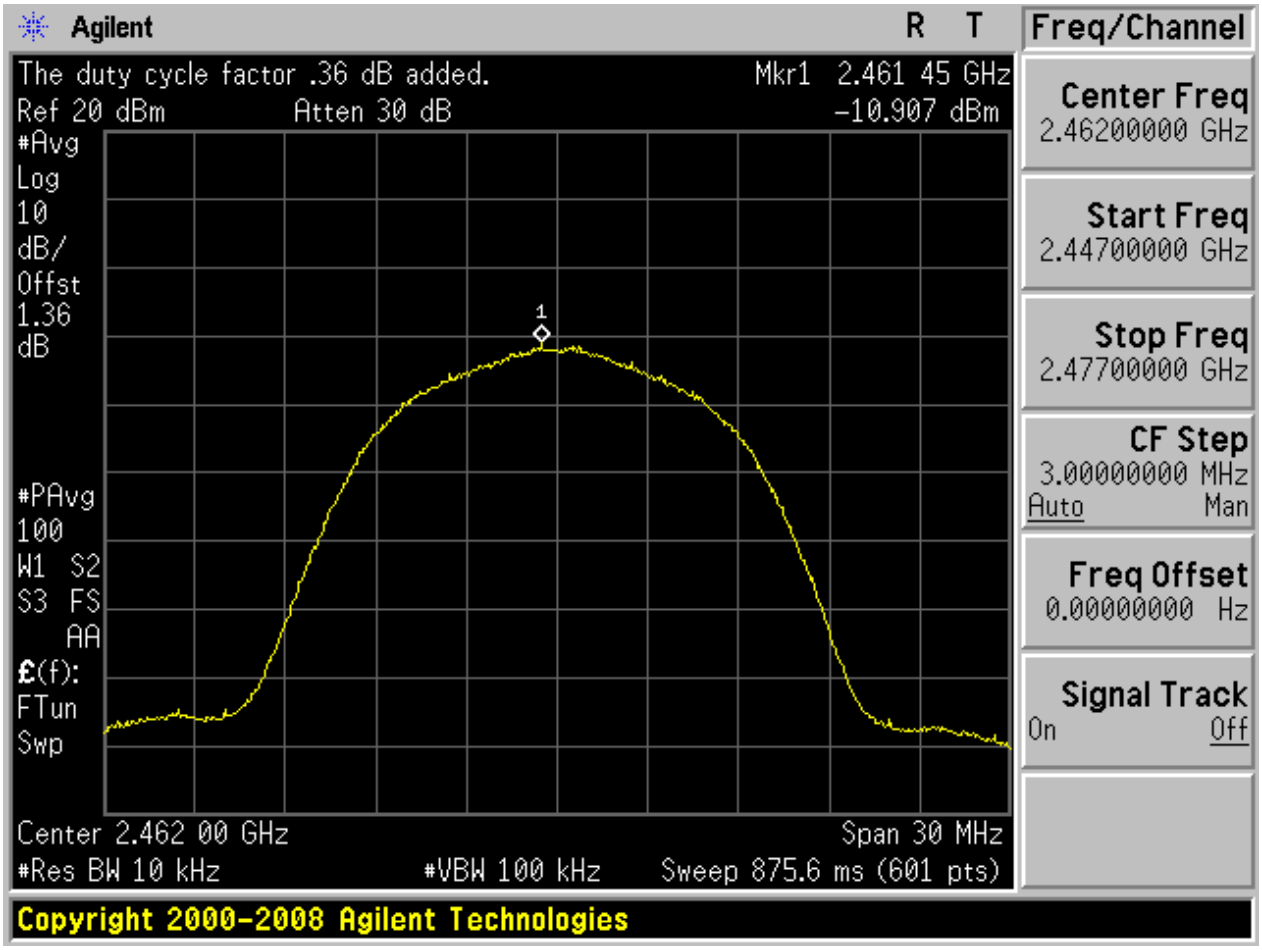
2.5 11B_H@Ant 1



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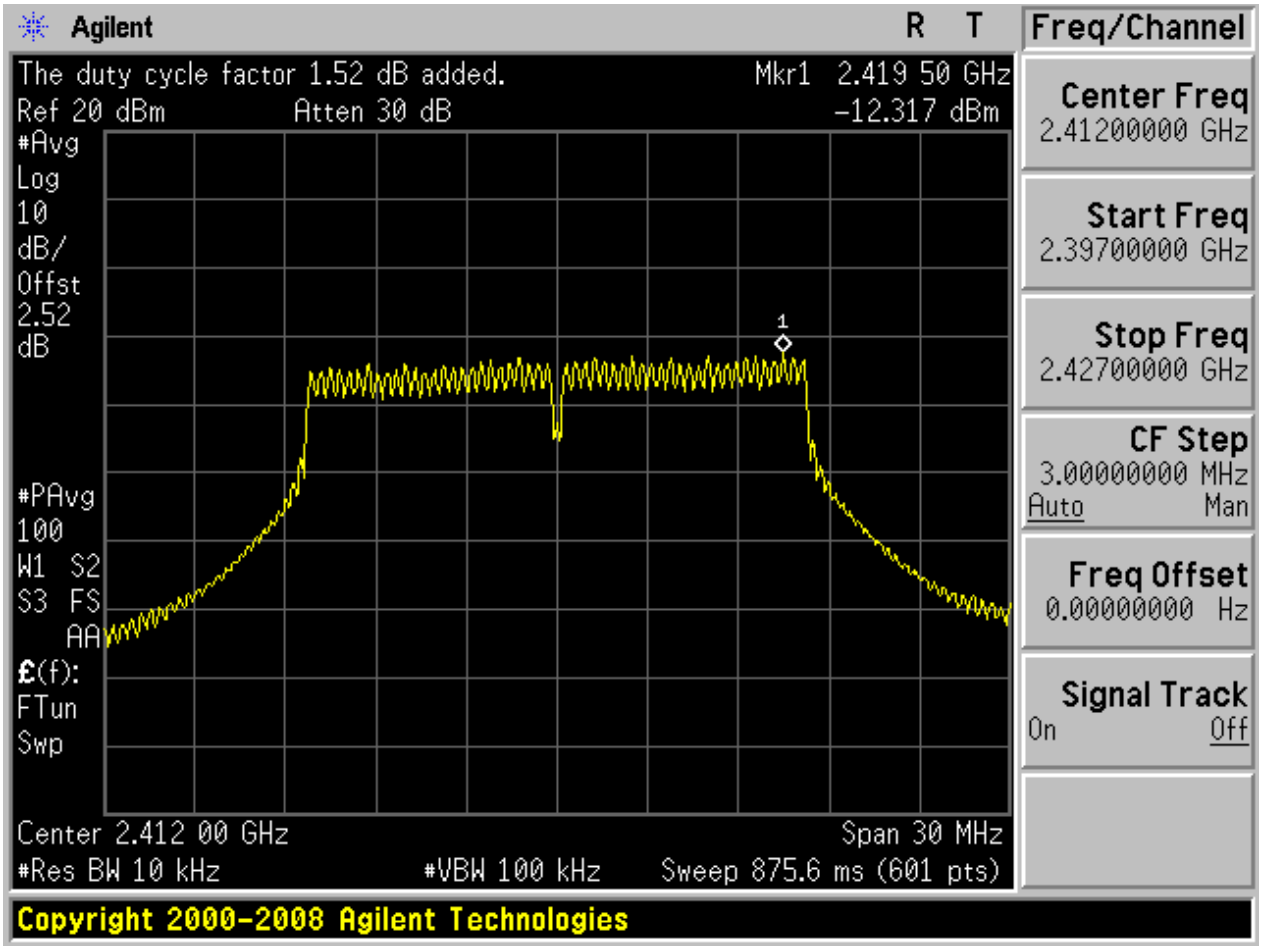
2.7 11G_L@Ant 1



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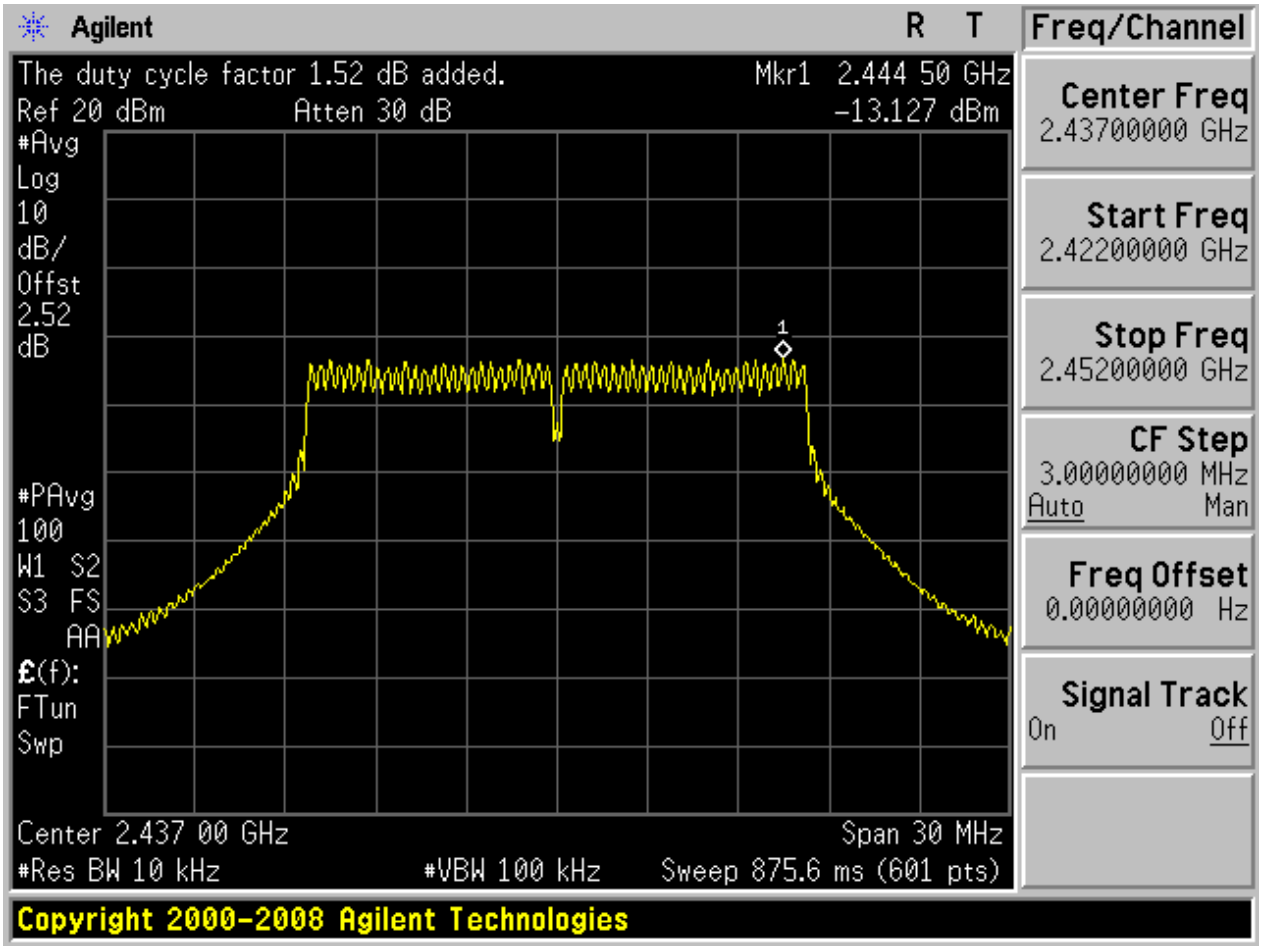

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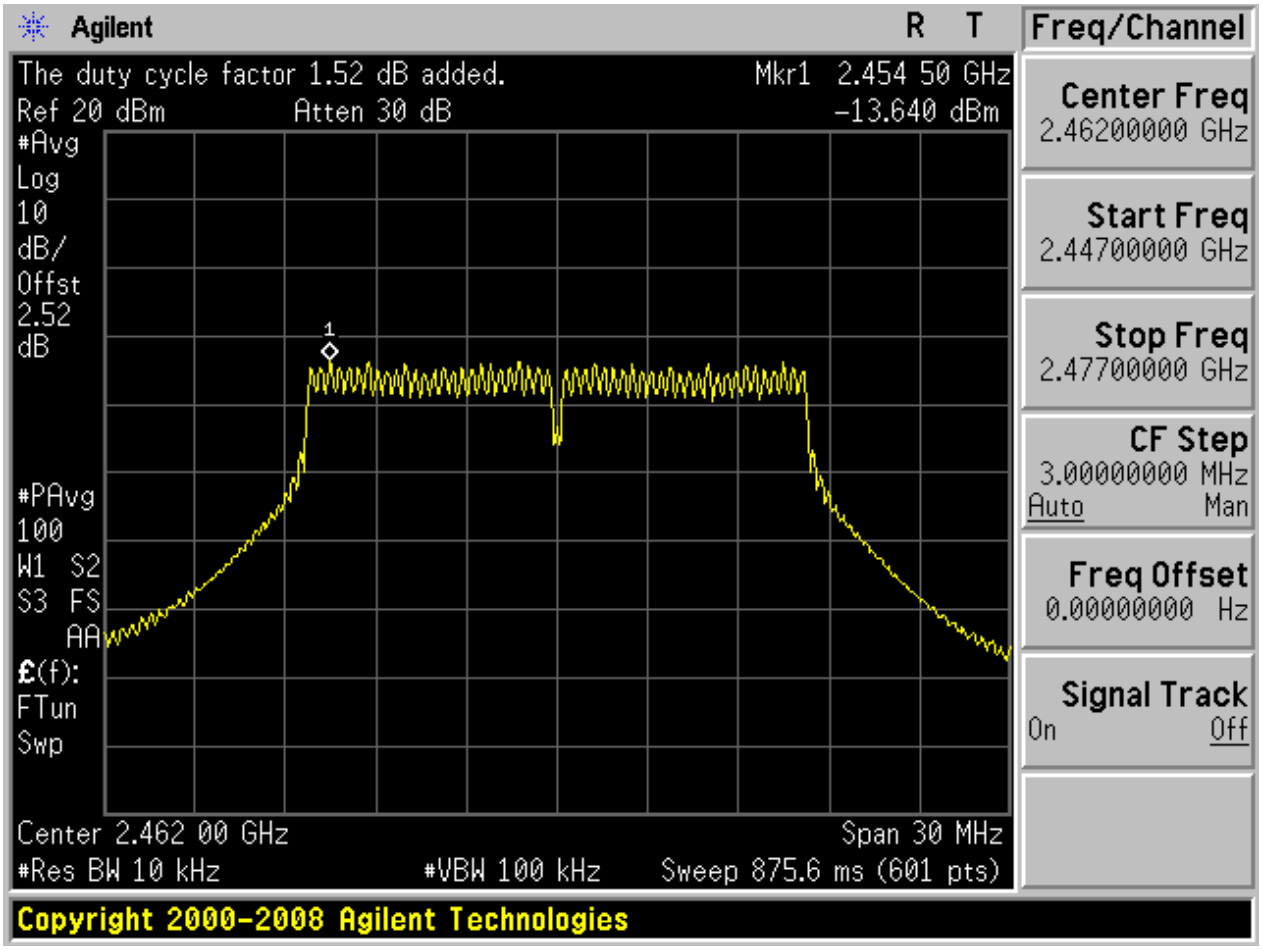

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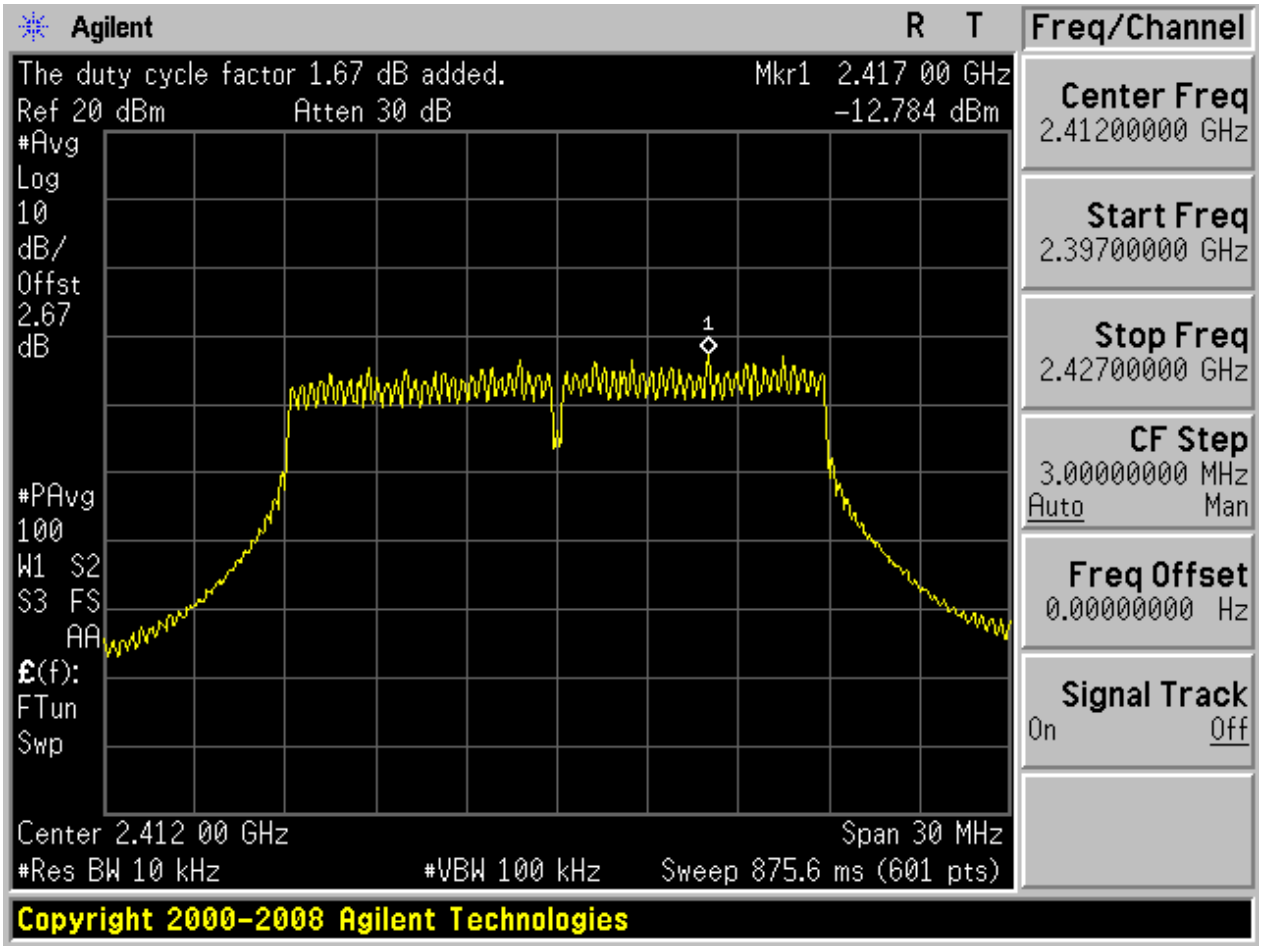

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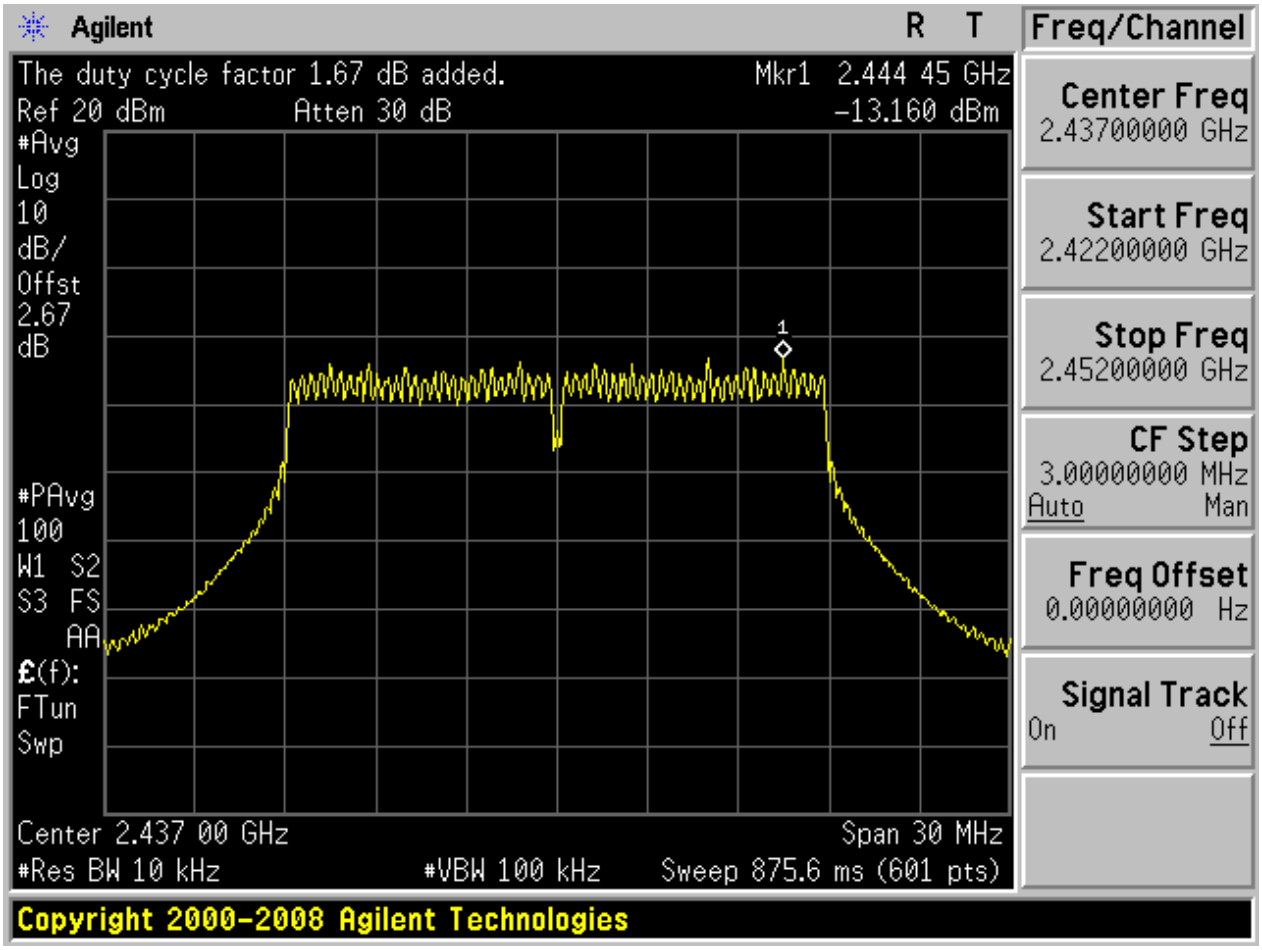

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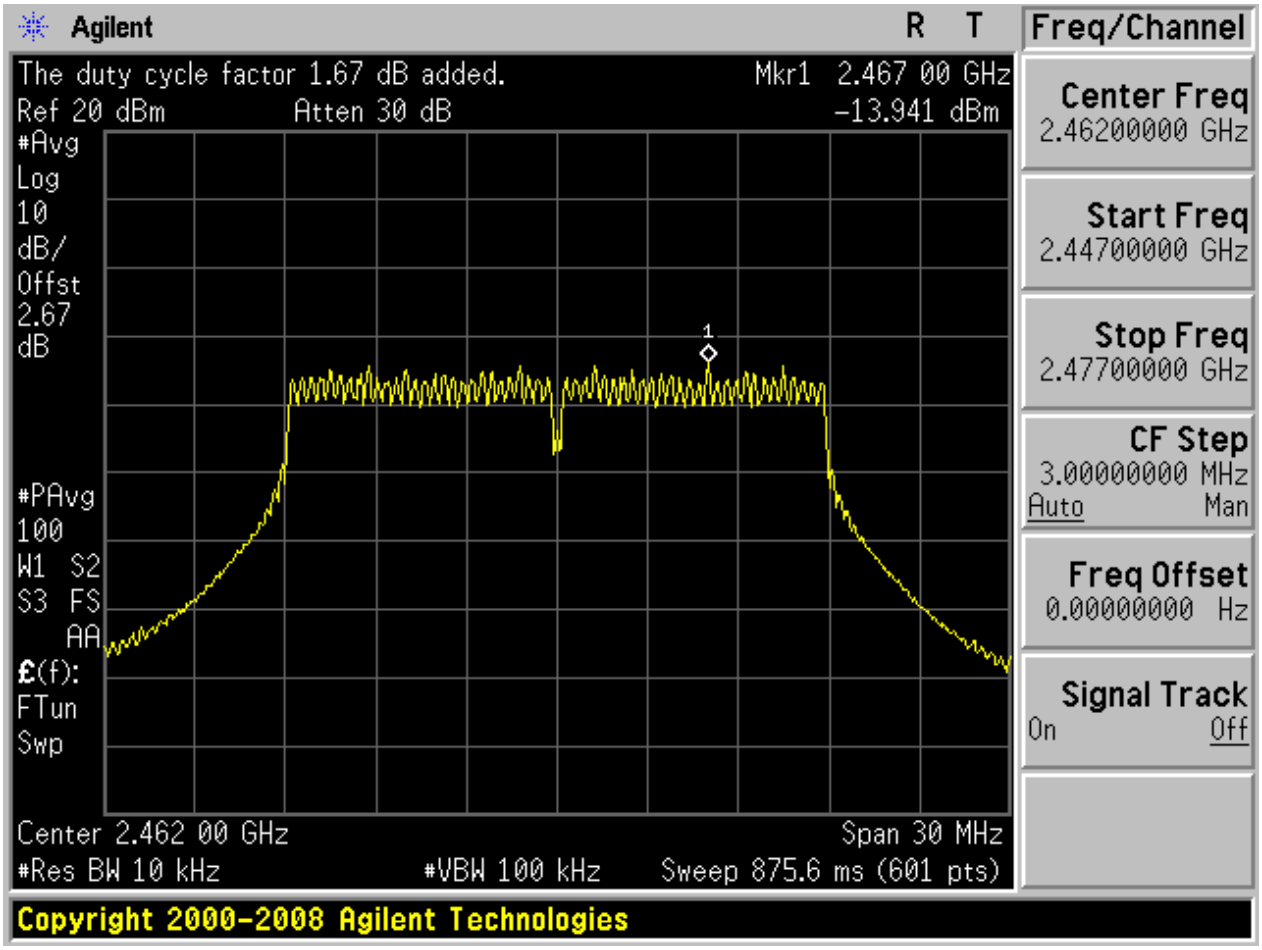

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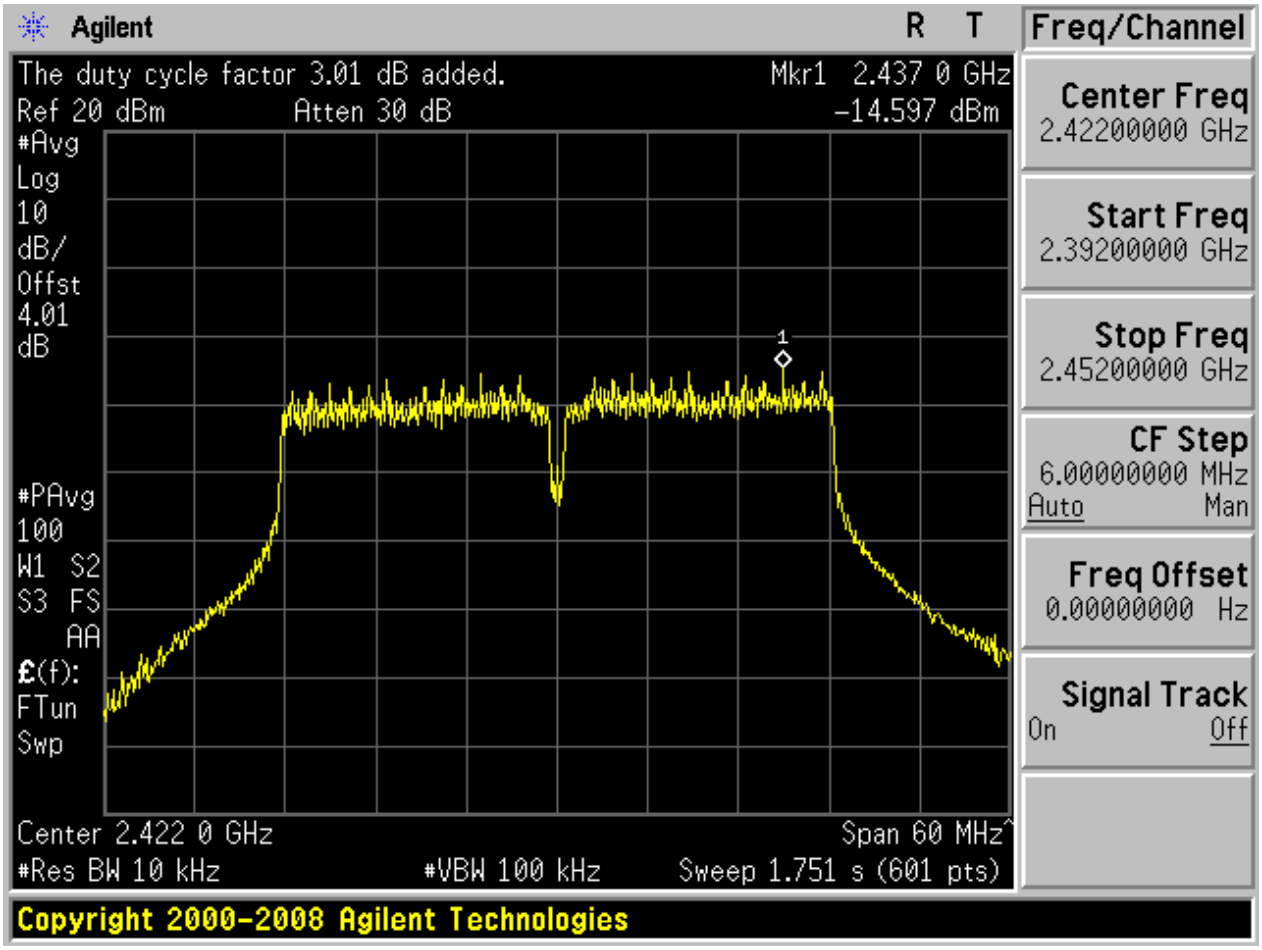

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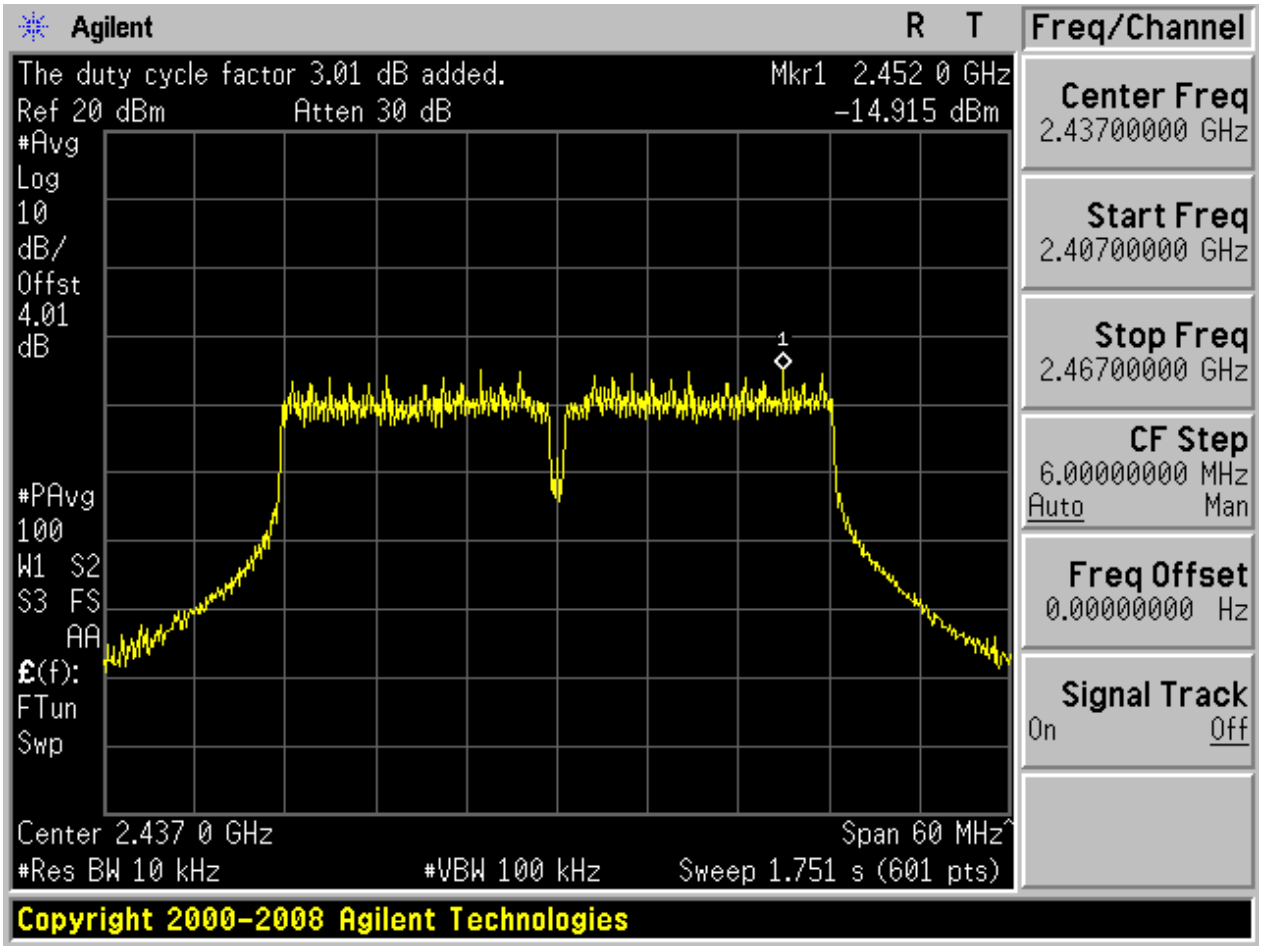

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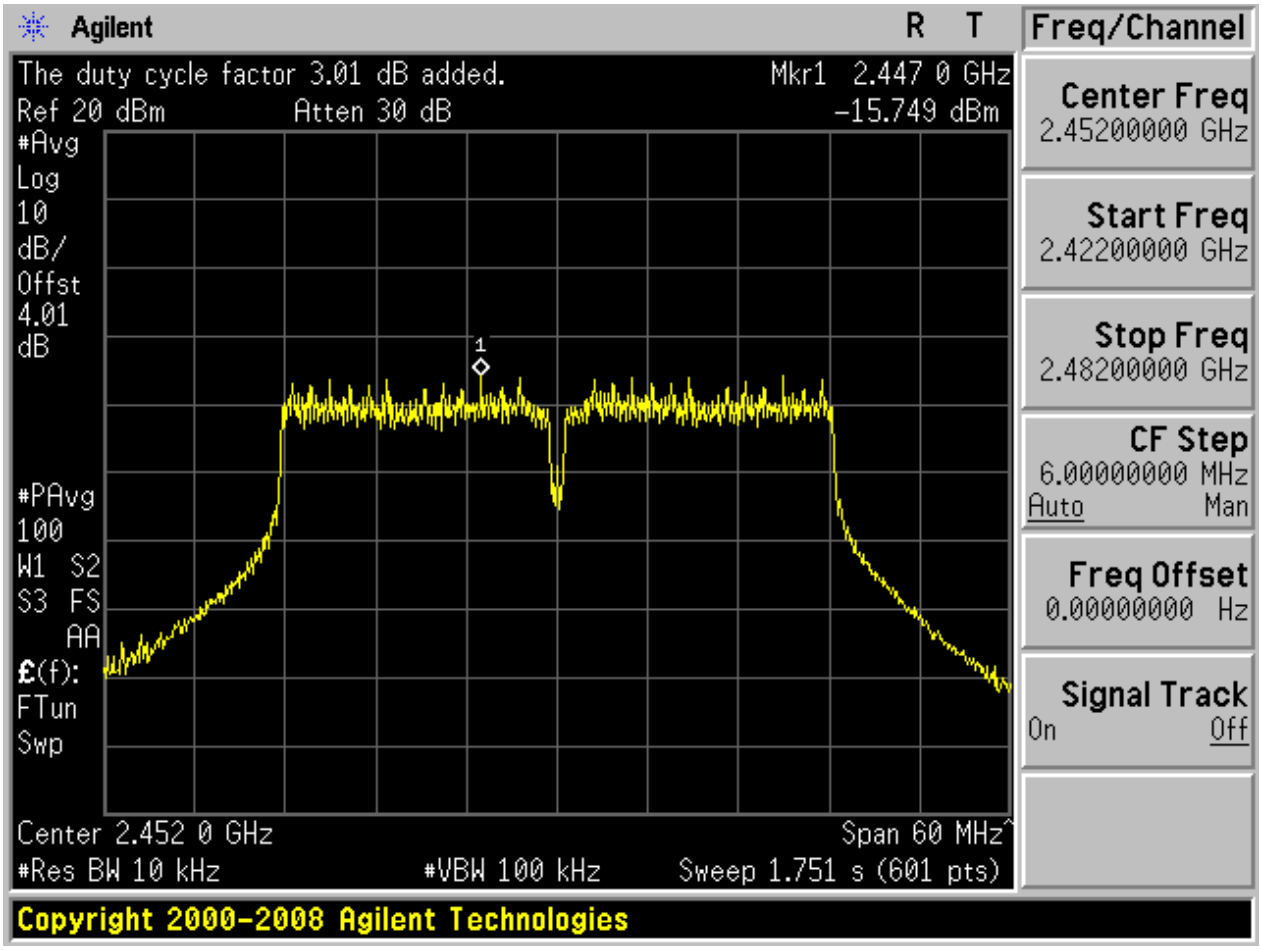

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Appendix F: Band Edges Compliance

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Carrier Power[dBm]	Max.Spurious Level[dBm]	Verdict
11B	L	2412	Ant 1	7.88	-54.44	pass
11B	H	2462	Ant 1	7.74	-54.00	pass
11G	L	2412	Ant 1	5.18	-52.04	pass
11G	H	2462	Ant 1	4.13	-48.64	pass
11N20	L	2412	Ant 1	4.36	-53.63	pass
11N20	H	2462	Ant 1	2.86	-49.13	pass
11N40	L	2412	Ant 1	1.03	-51.02	pass
11N40	H	2462	Ant 1	0.69	-45.93	pass

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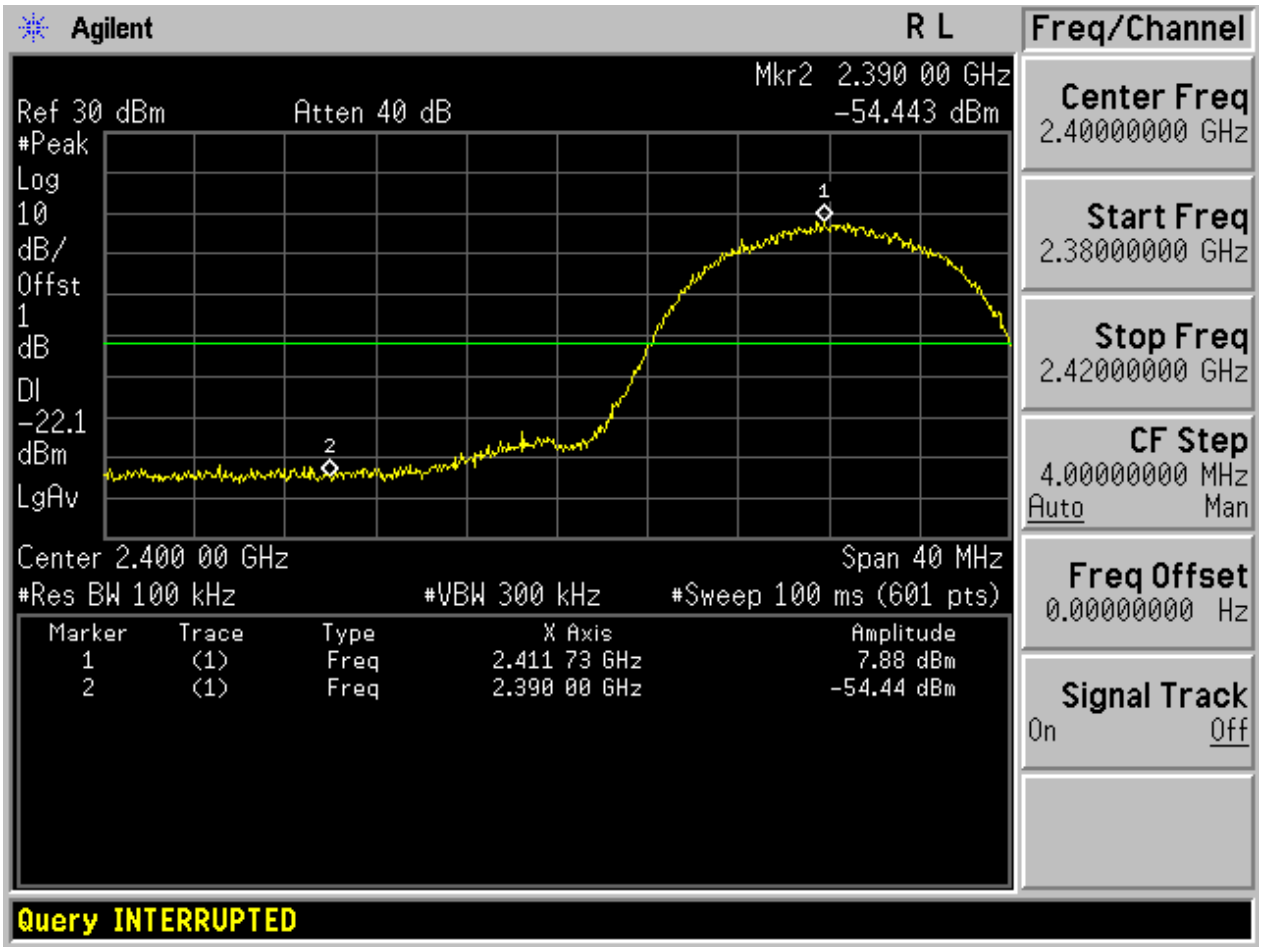
Part II - Test Plots

2.1 11B_L@Ant 1



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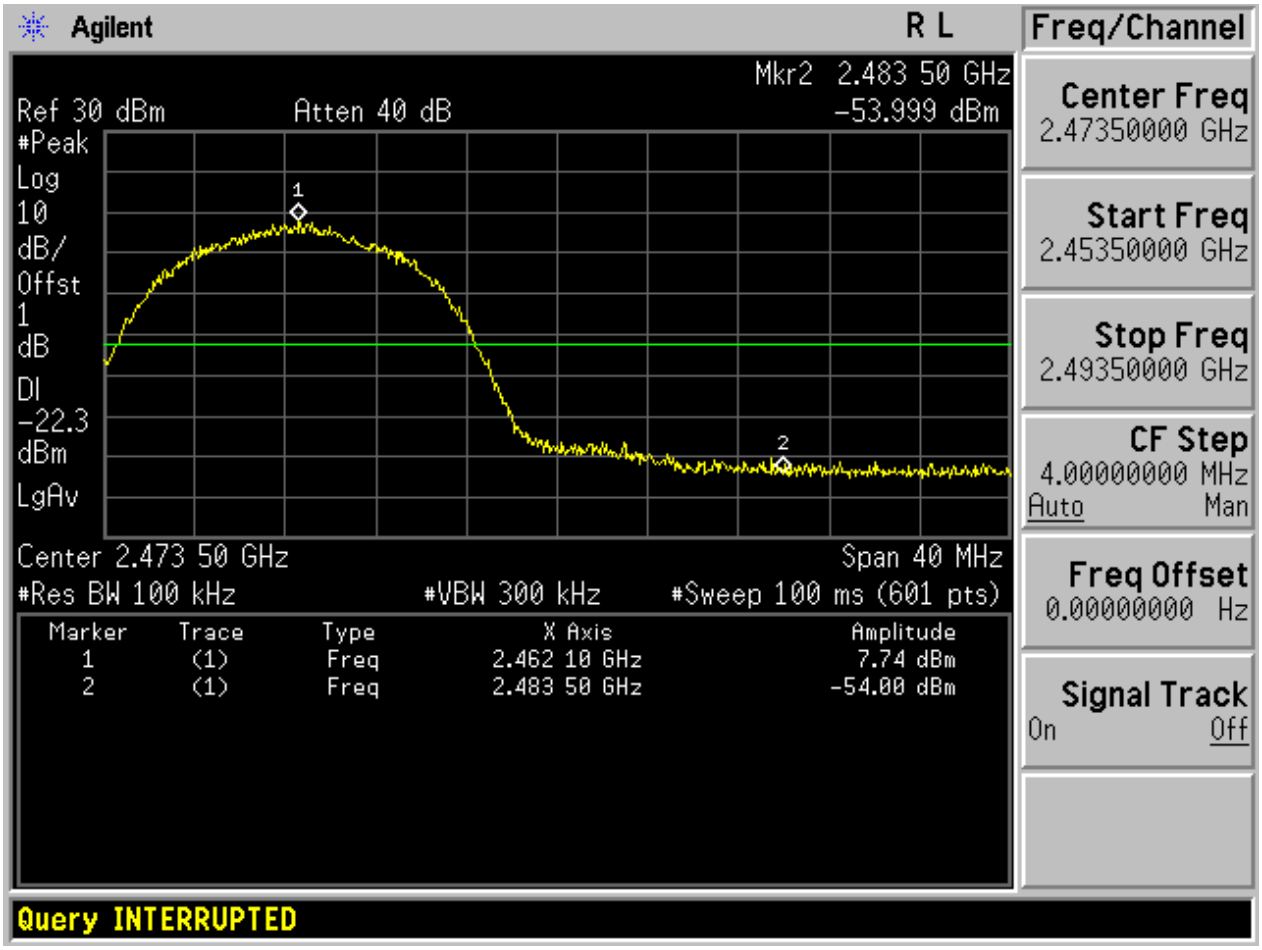

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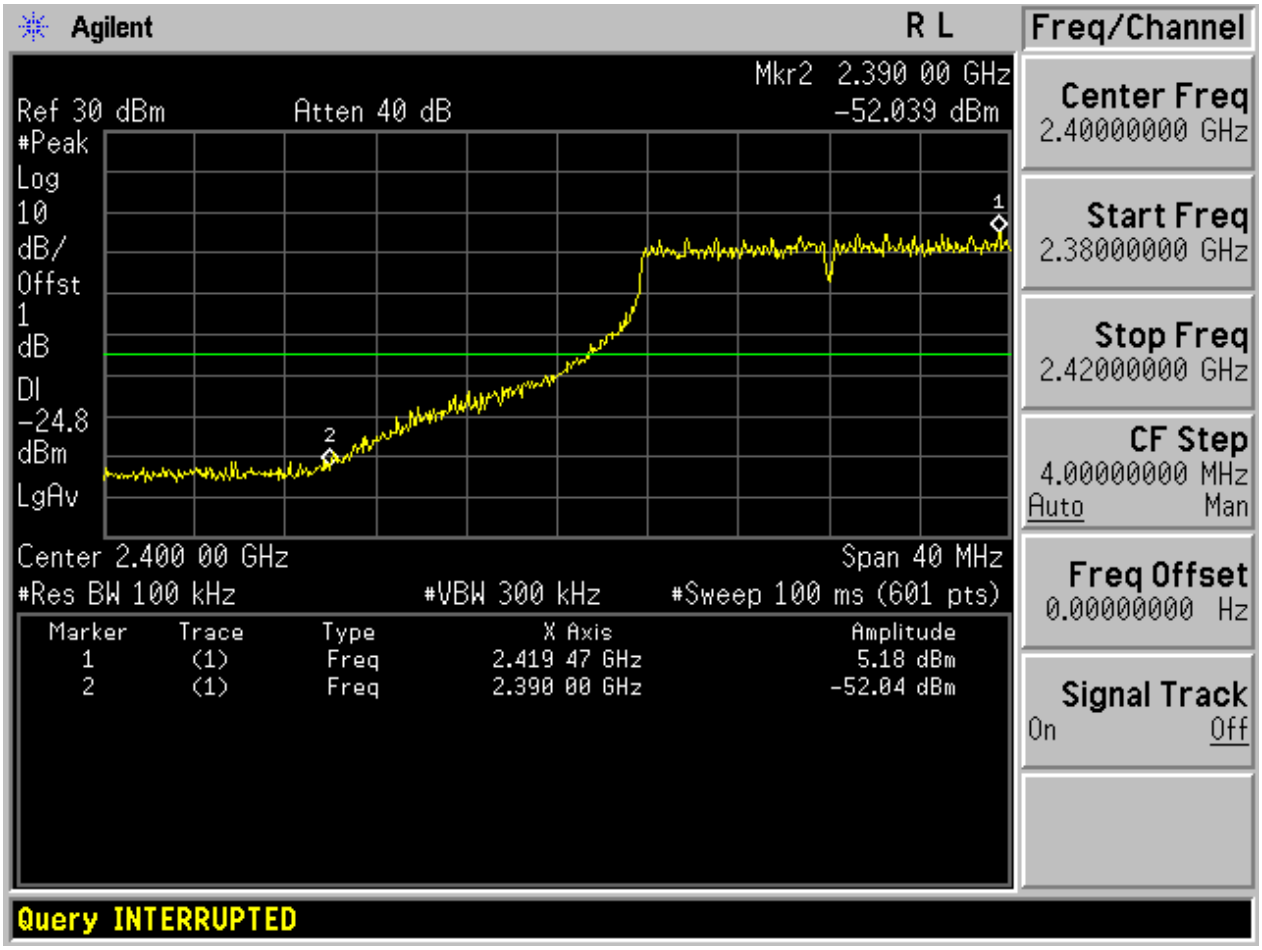
2.5 11G_L@Ant 1



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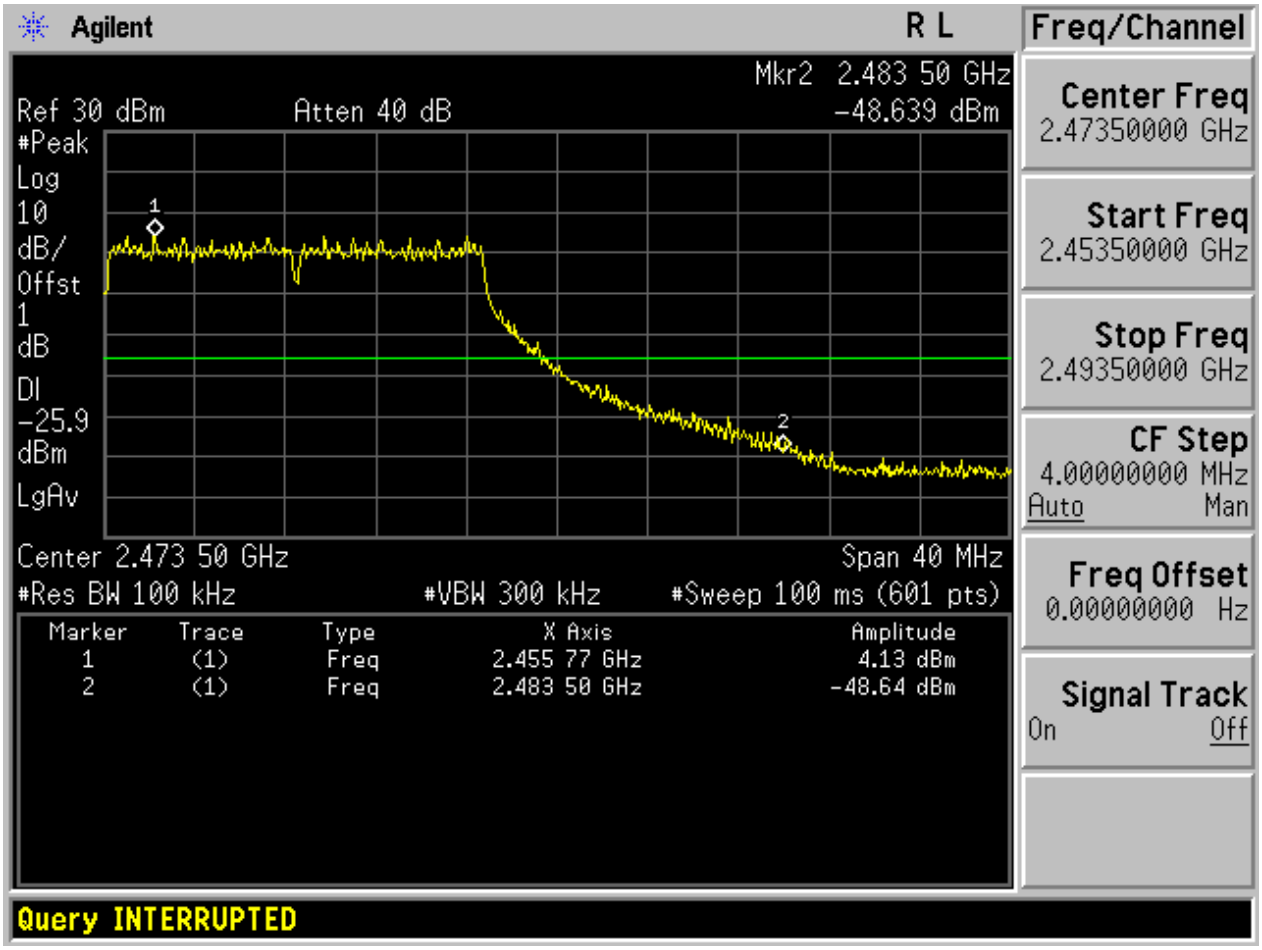

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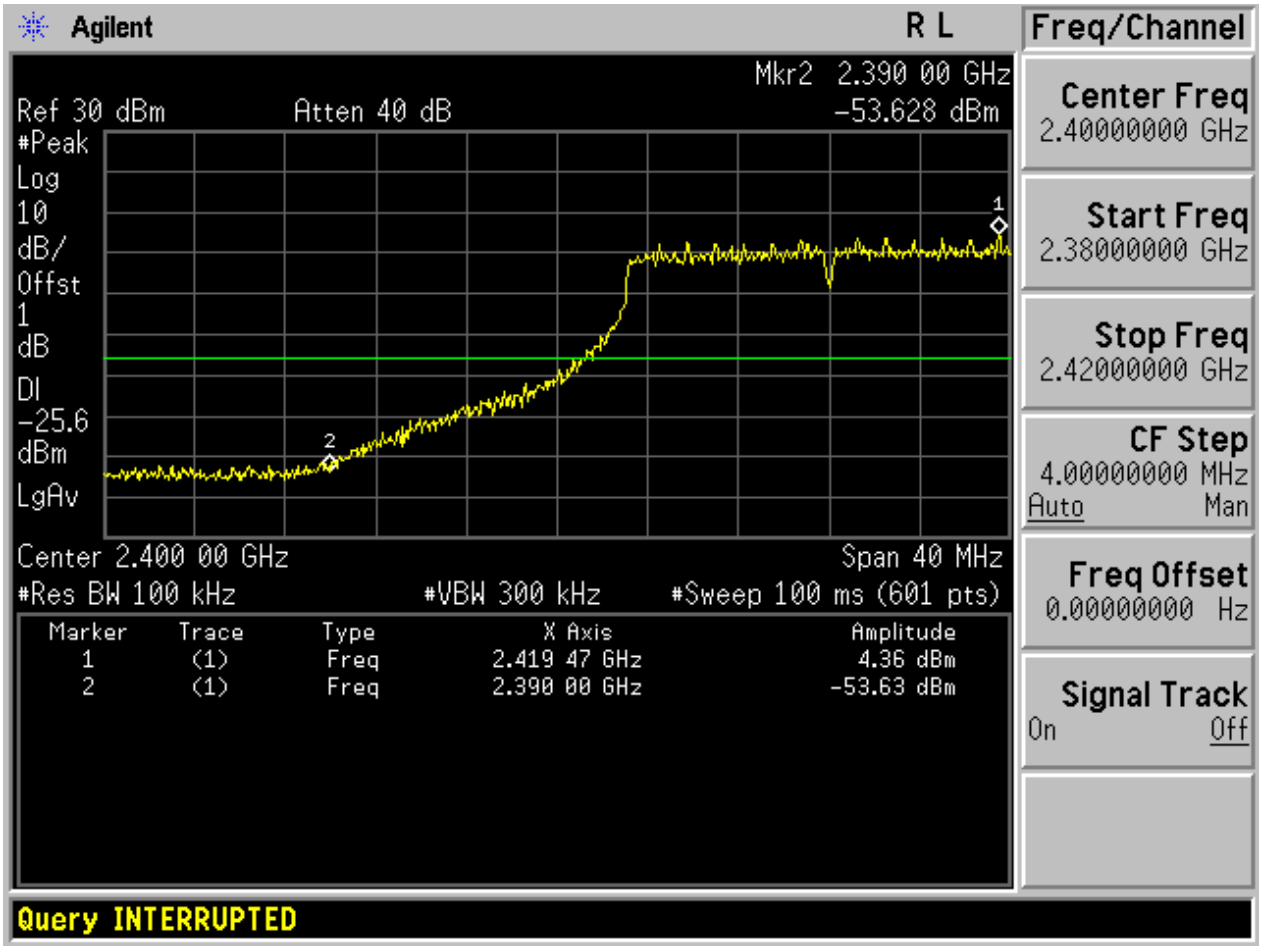

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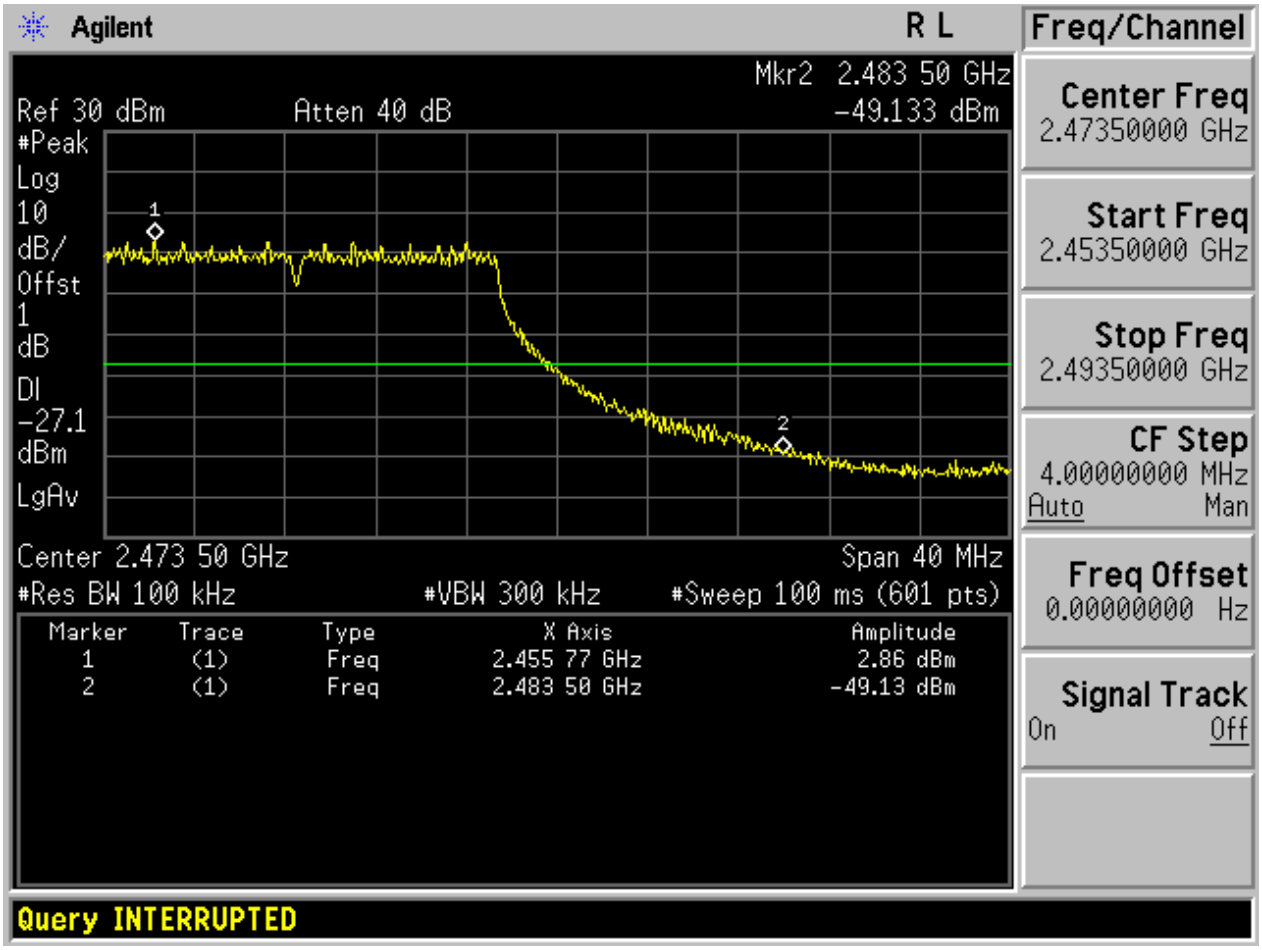

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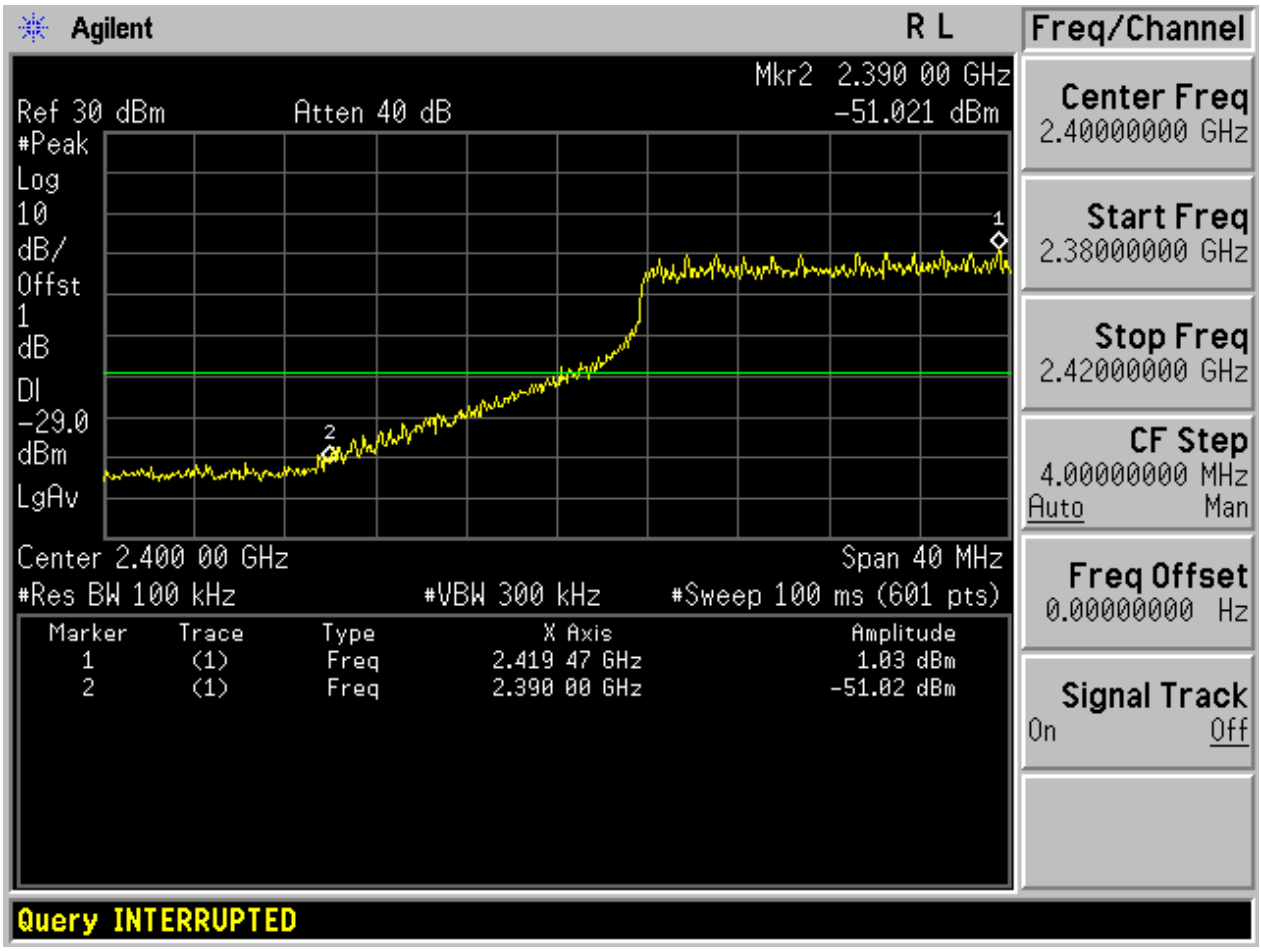

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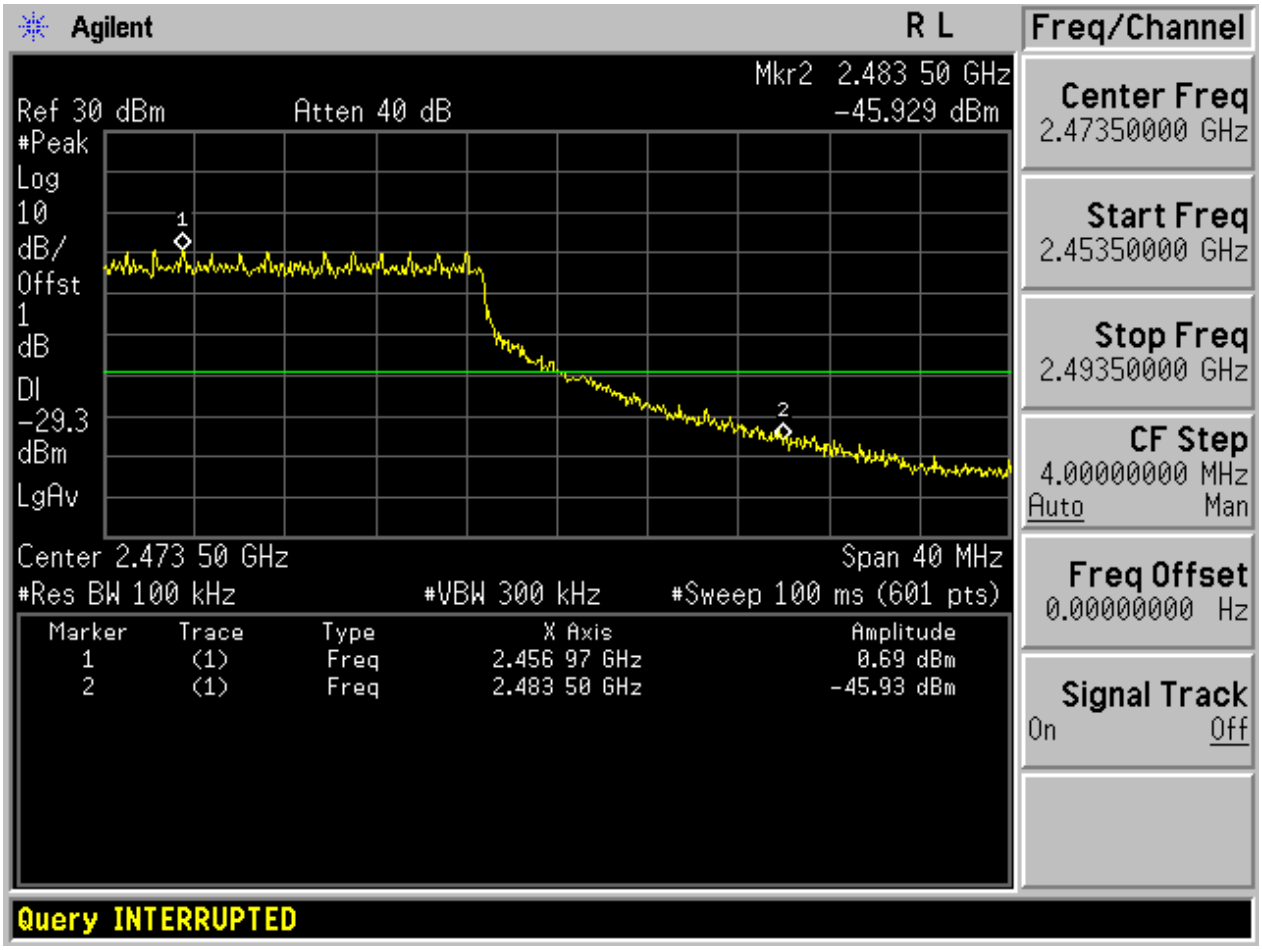

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Appendix G: Unwanted Emissions into Non-Restricted Frequency Bands

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" referrers 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 x lg(100 [kHz]/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]-30[dBm],see test plots for detailed".

Part I - Test Results

Test Mode	Test Channel	Frequency[MHz]	Ant	Pref[dBm]	Puw[dBm]	Verdict
11B	L	2412	Ant 1	9.14	<limit	pass
11B	M	2437	Ant 1	8.73	<limit	pass
11B	H	2462	Ant 1	9.13	<limit	pass
11G	L	2412	Ant 1	5.50	<limit	pass
11G	M	2437	Ant 1	4.93	<limit	pass
11G	H	2462	Ant 1	4.59	<limit	pass
11N20	L	2412	Ant 1	4.51	<limit	pass
11N20	M	2437	Ant 1	4.06	<limit	pass
11N20	H	2462	Ant 1	3.43	<limit	pass
11N40	L	2422	Ant 1	1.76	<limit	pass
11N40	M	2437	Ant 1	1.58	<limit	pass
11N40	H	2452	Ant 1	0.88	<limit	pass

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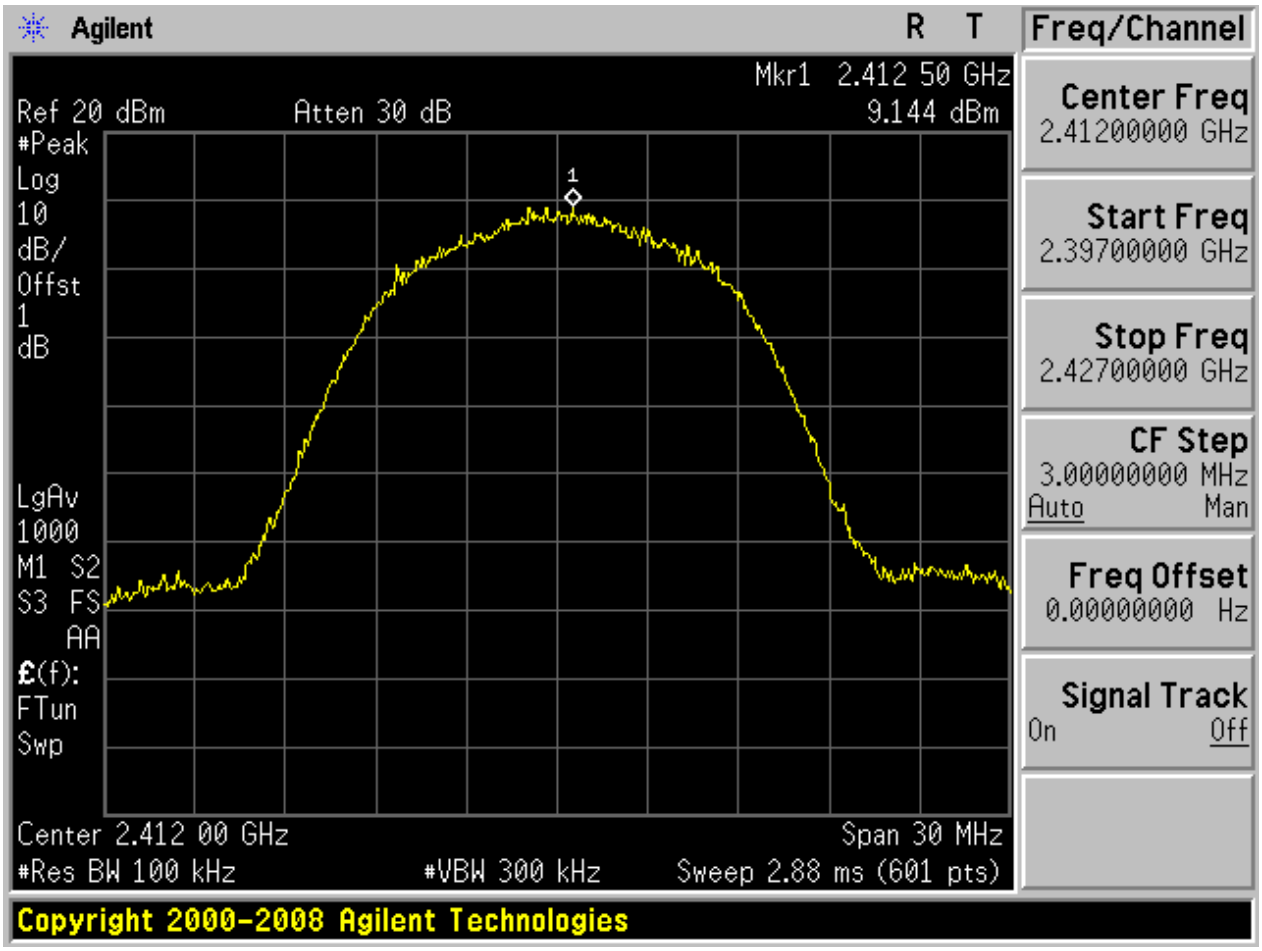
Part II - Test Plots

2.1 11B_L@Ant 1

Pref:



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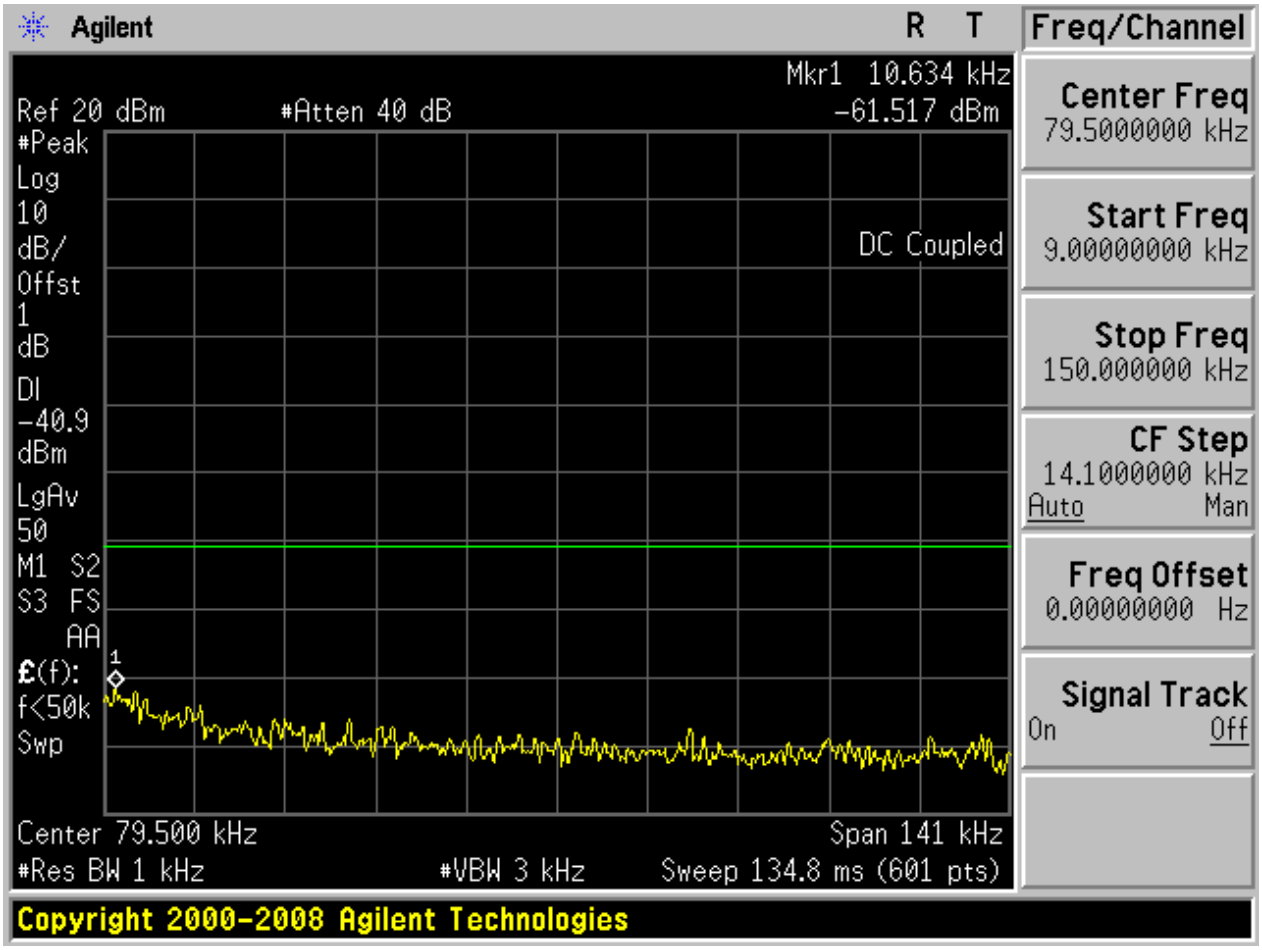

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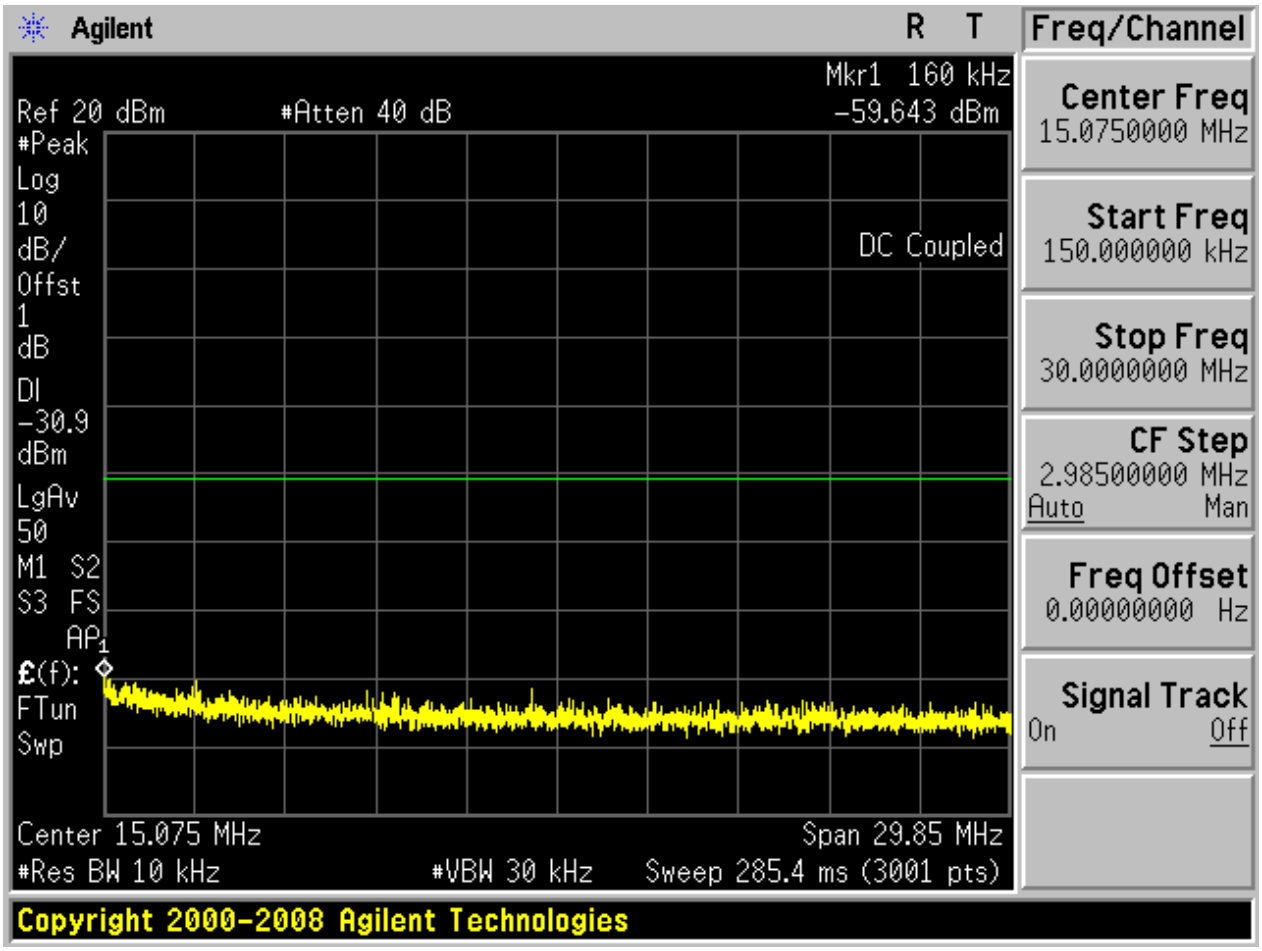

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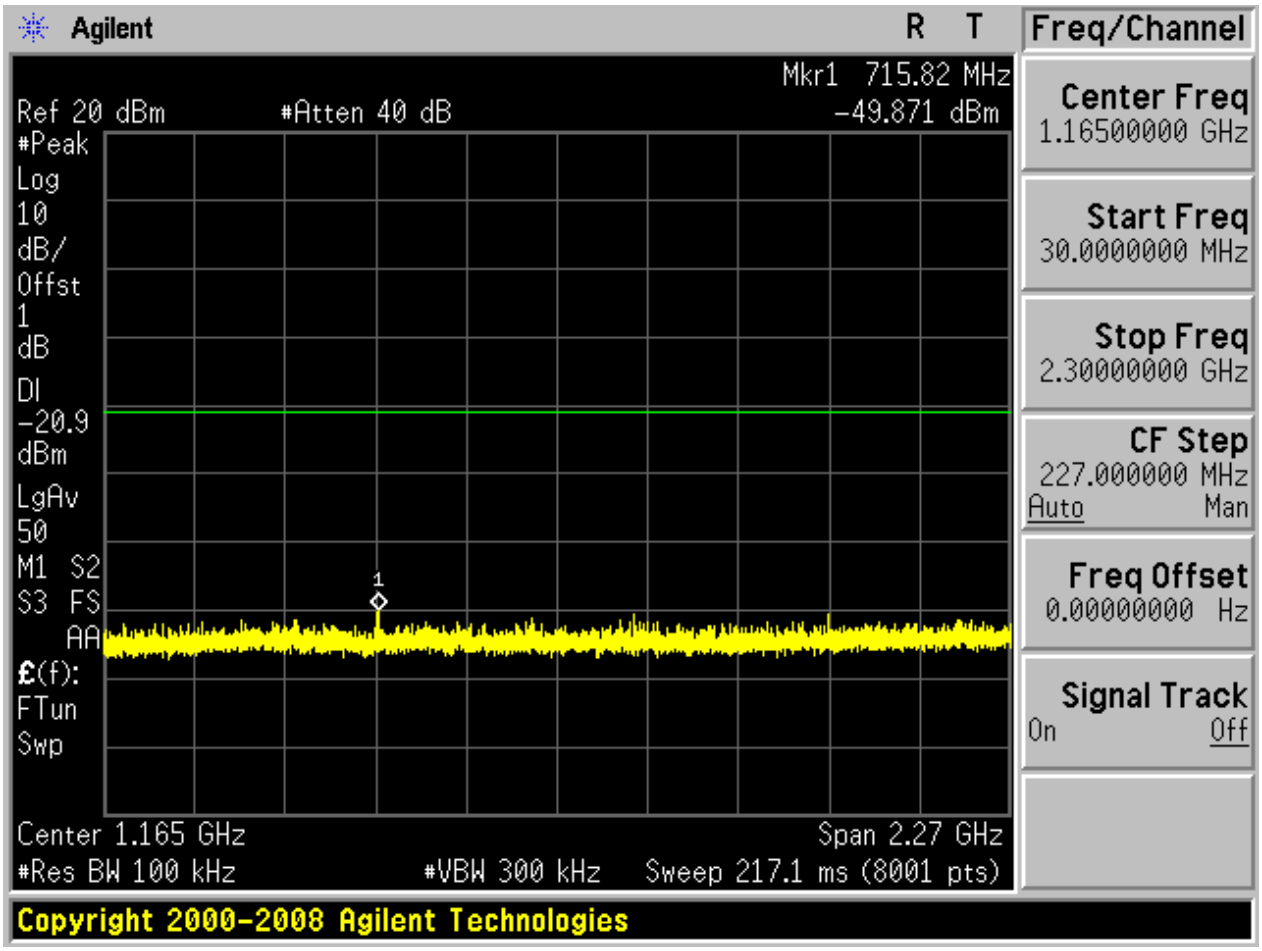

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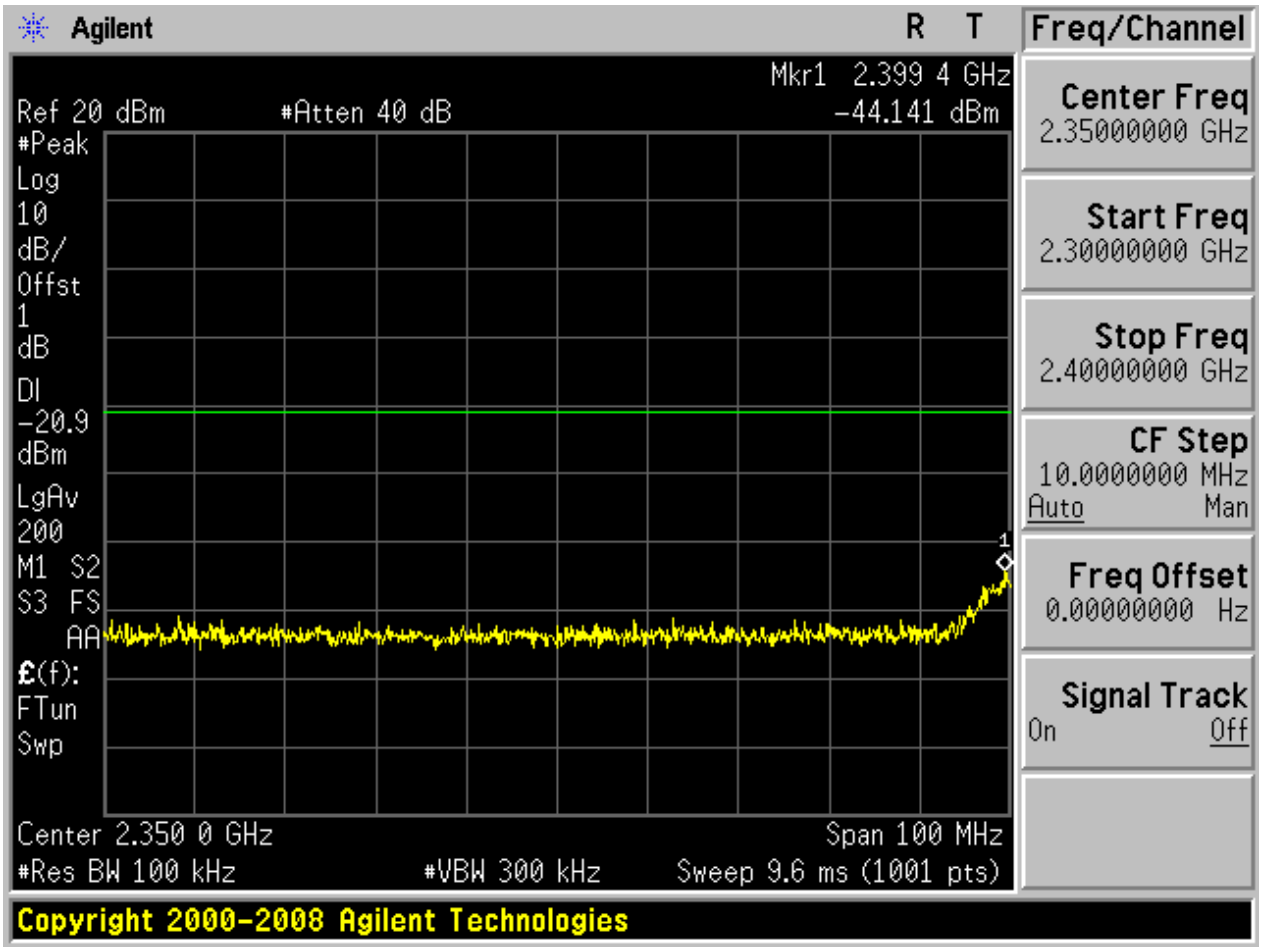

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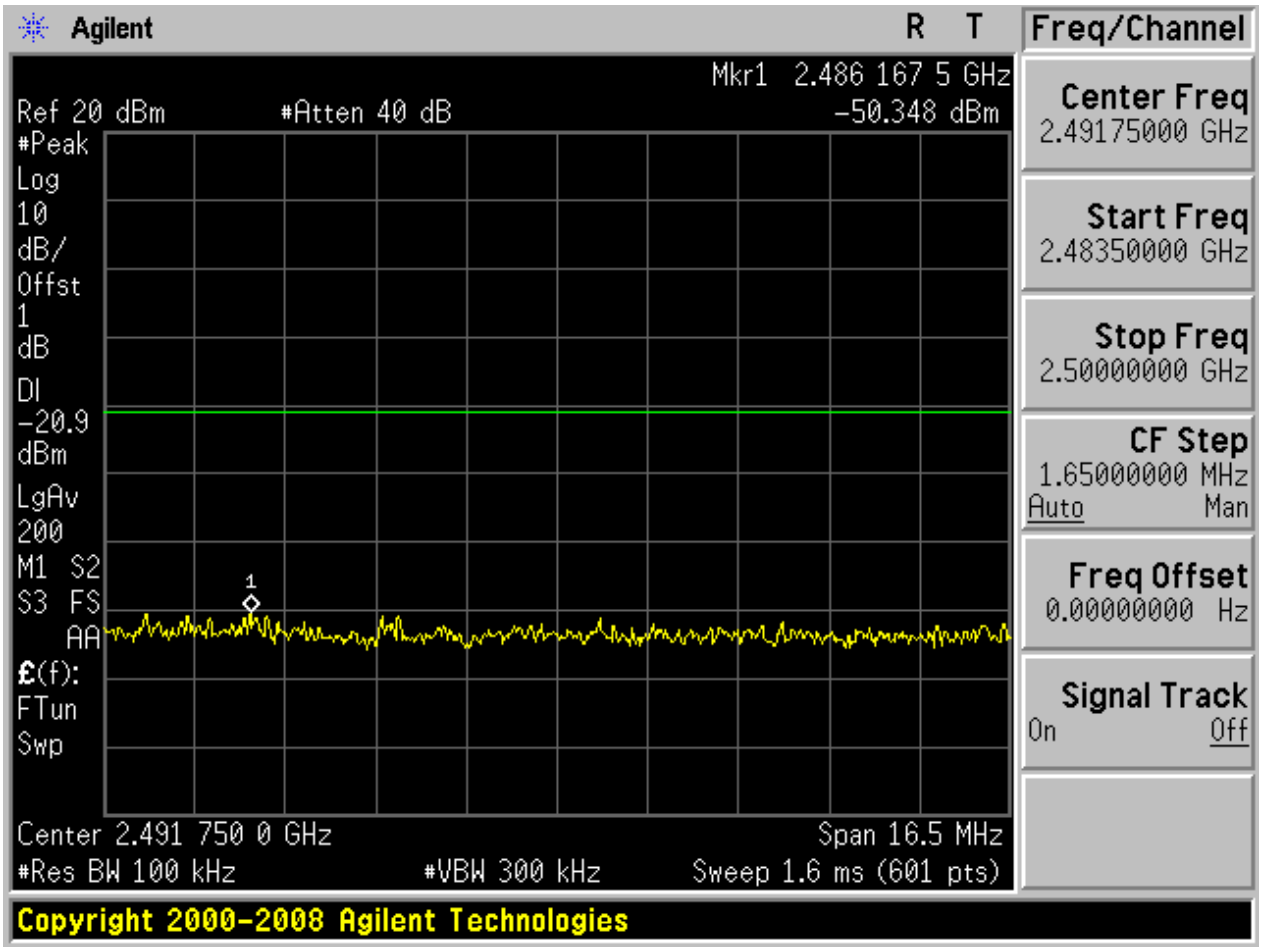

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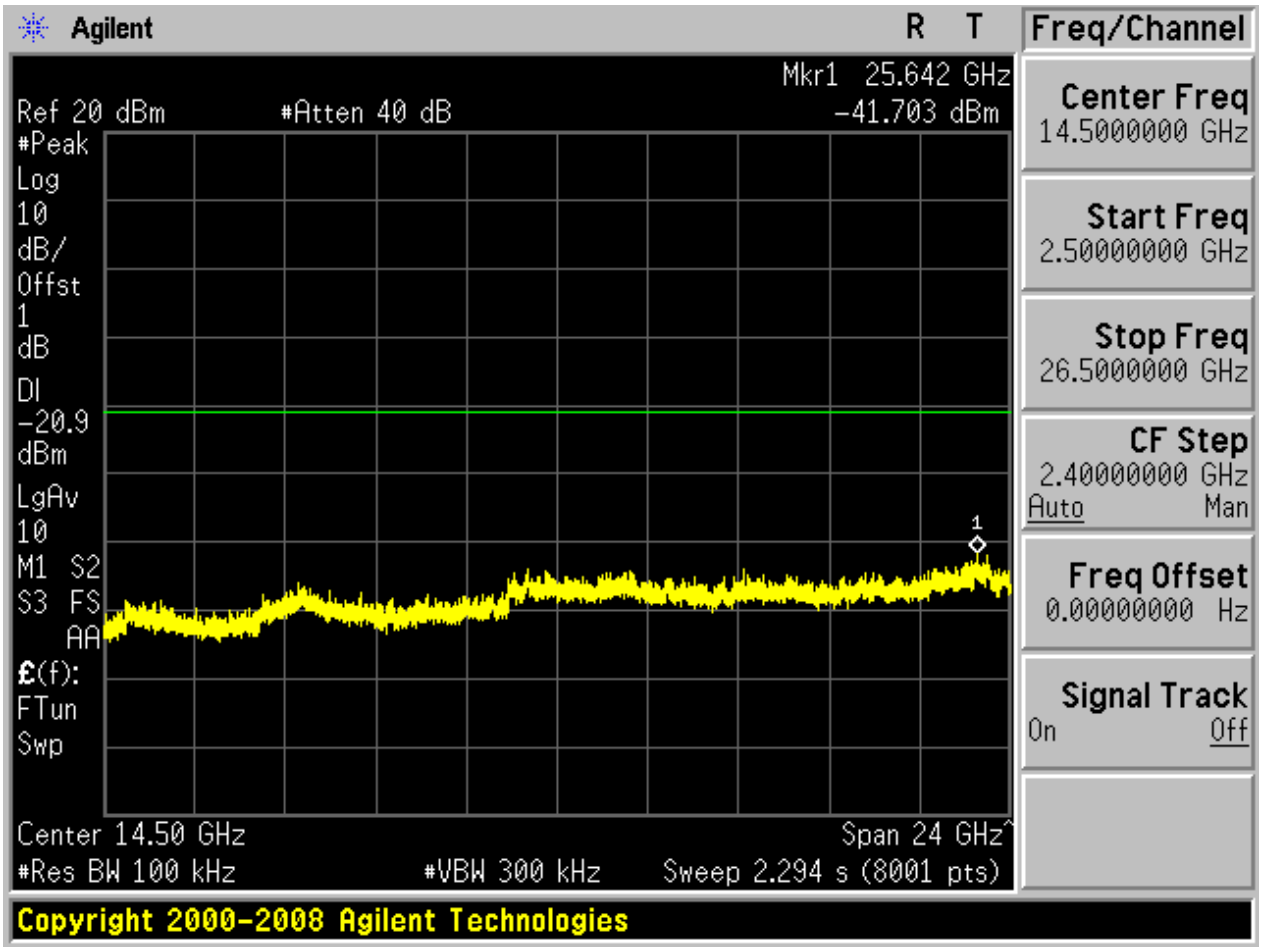

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2.3 11B_M@Ant 1

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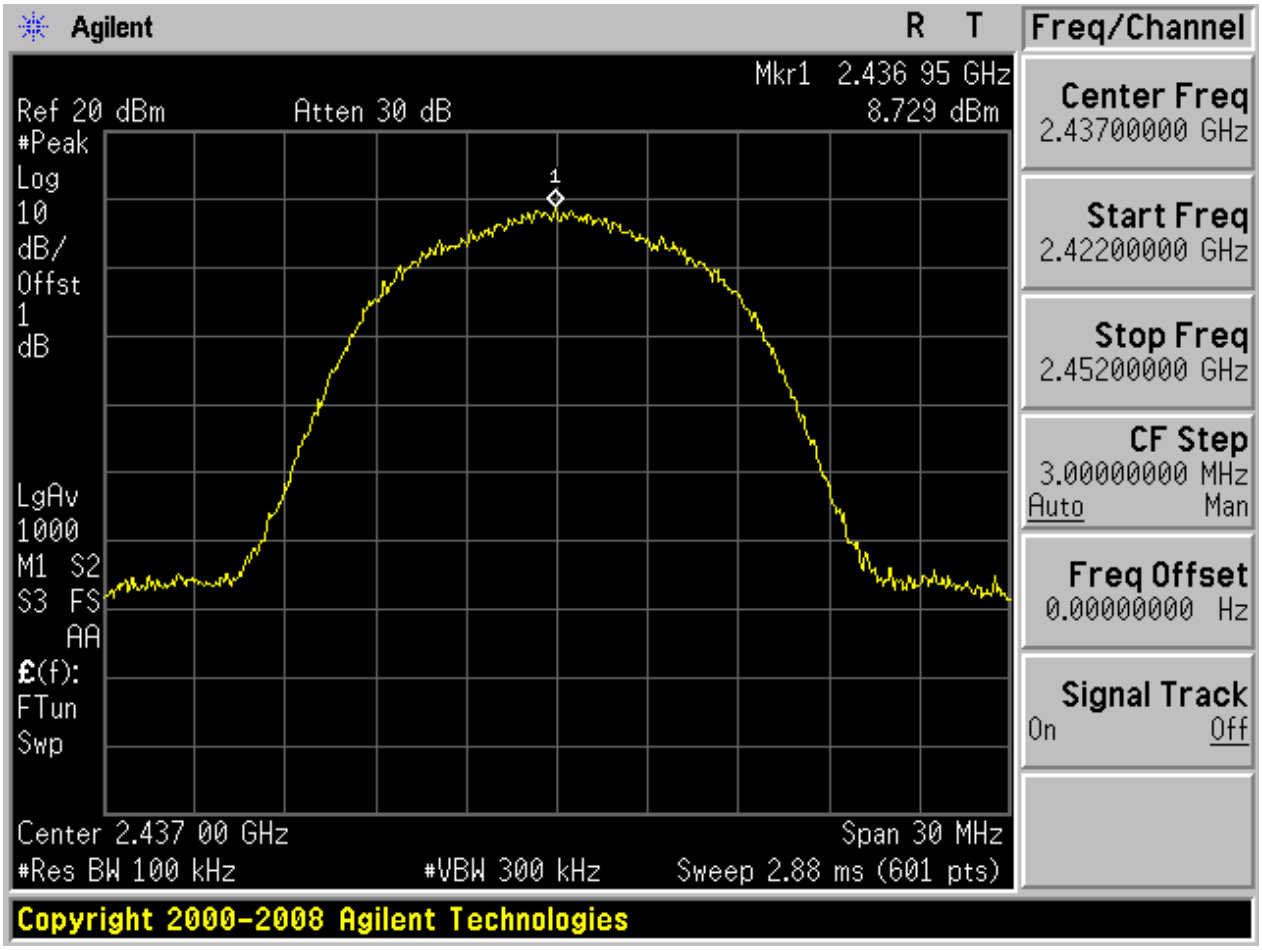

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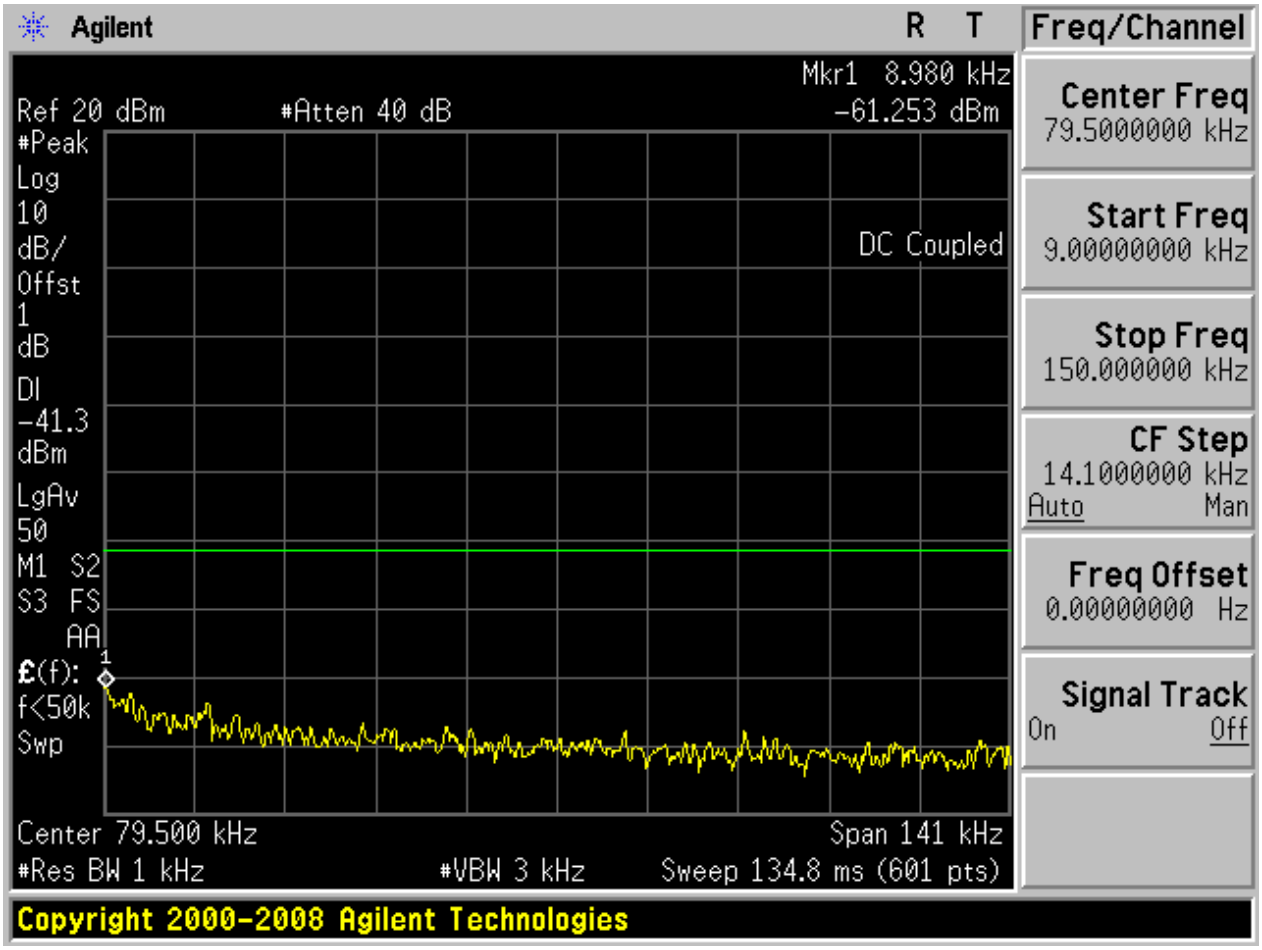
Agilent
R T
Freq/Channel
Mkr1 8.980 kHz
Ref 20 dBm
#Atten 40 dB
-61.253 dBm
#Peak
Log
10
dB/
Offst
1
dB
Dl
-41.3
dBm
LgAv
50
M1 S2
S3 FS
AA
£(f):
f<50k
Swp
DC Coupled
Center Freq
79.5000000 kHz
Start Freq
9.000000000 kHz
Stop Freq
150.000000 kHz
CF Step
14.1000000 kHz
Auto
Man
Freq Offset
0.000000000 Hz
Signal Track
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Span 141 kHz
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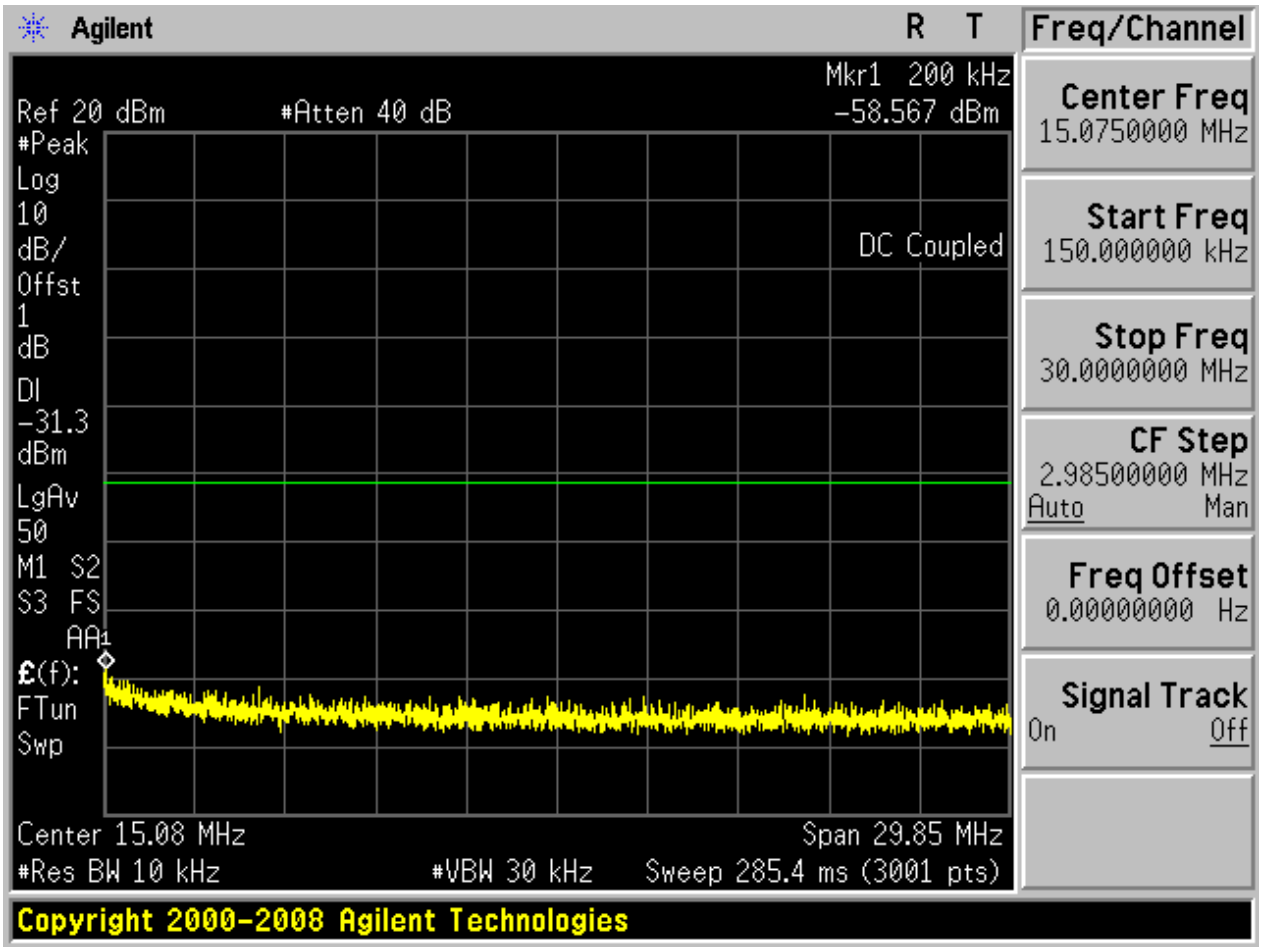
#VBW 3 kHz
Sweep 134.8 ms (601 pts)
Copyright 2000-2008 Agilent Technologies



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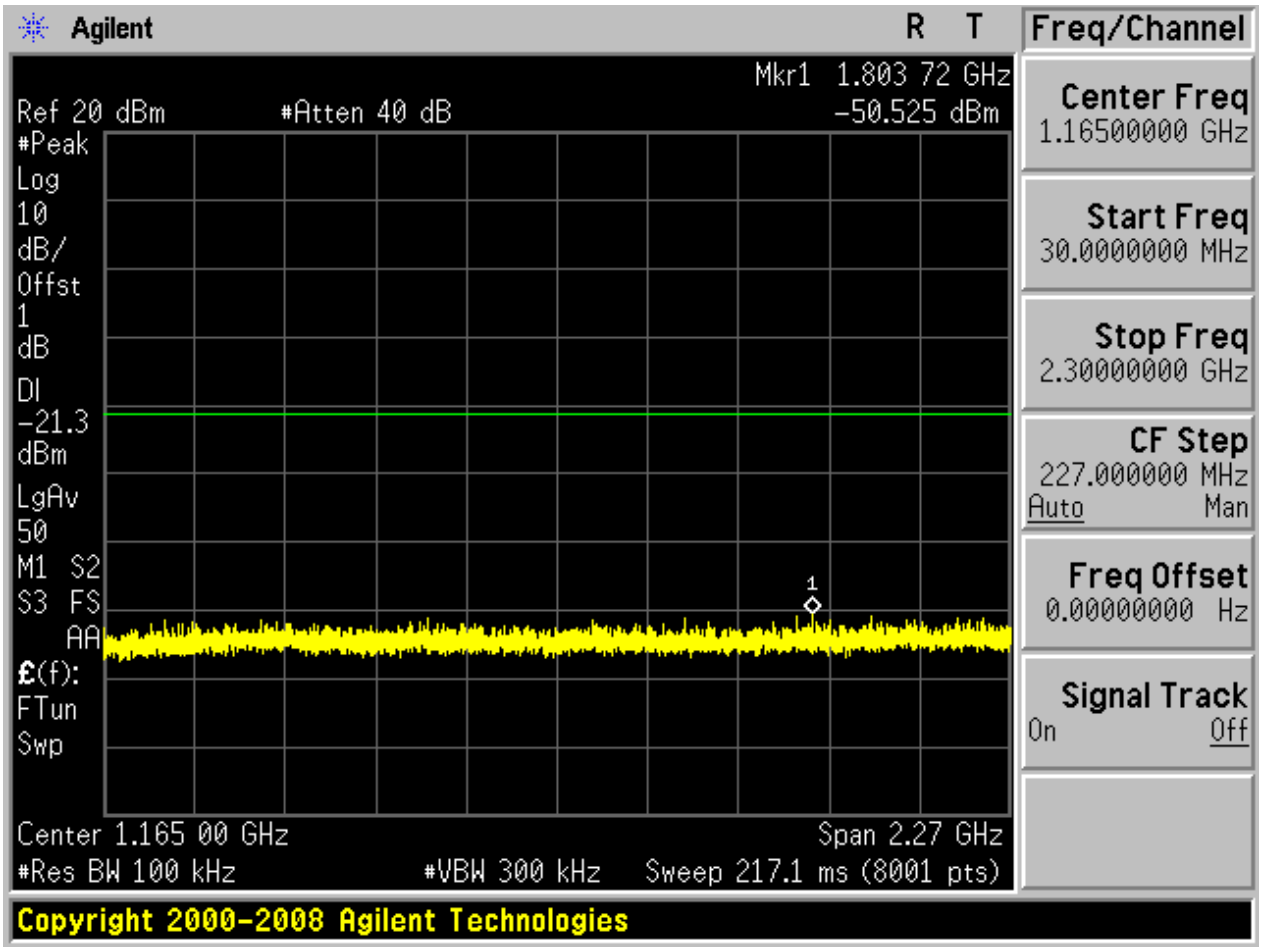

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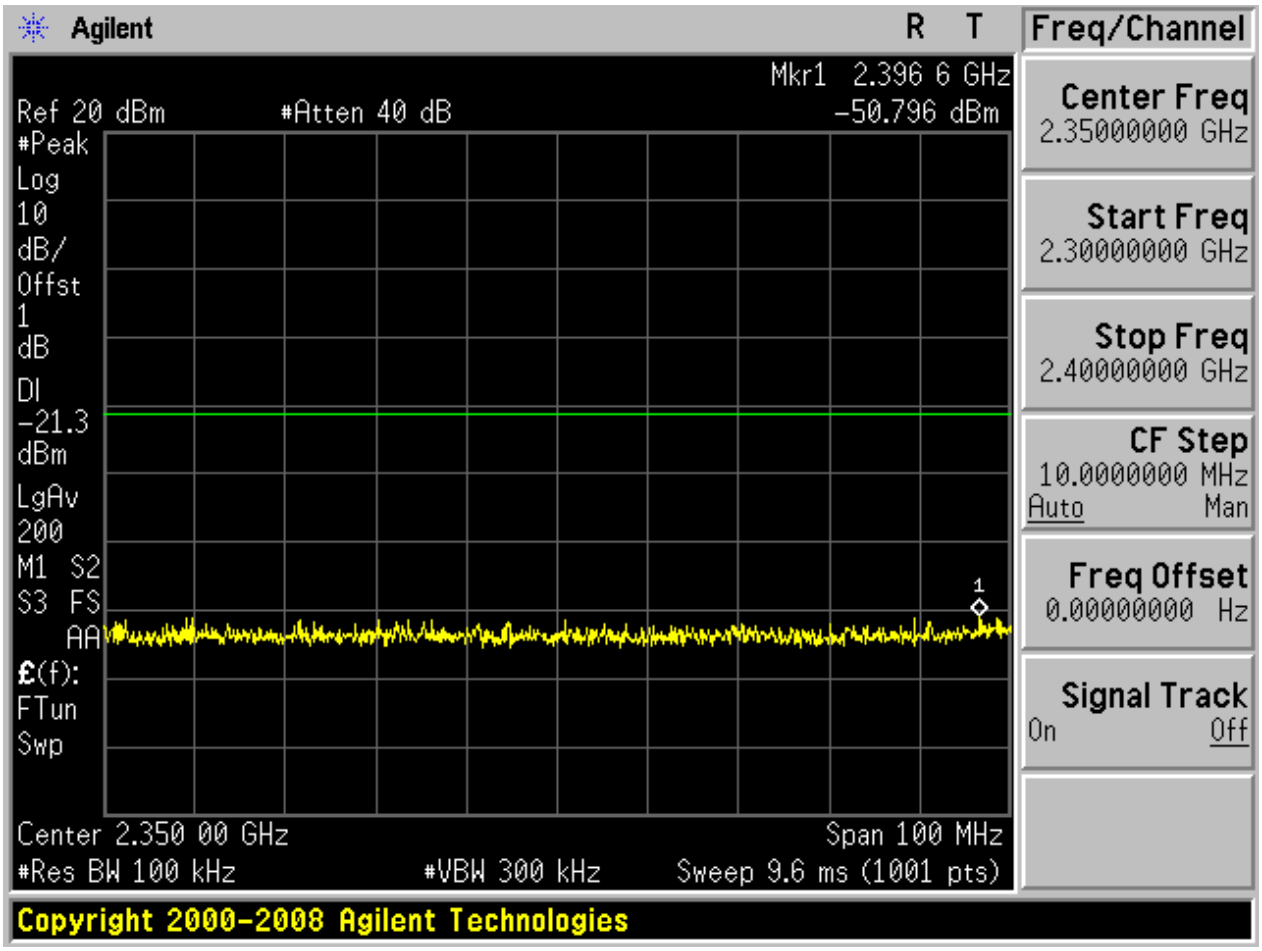

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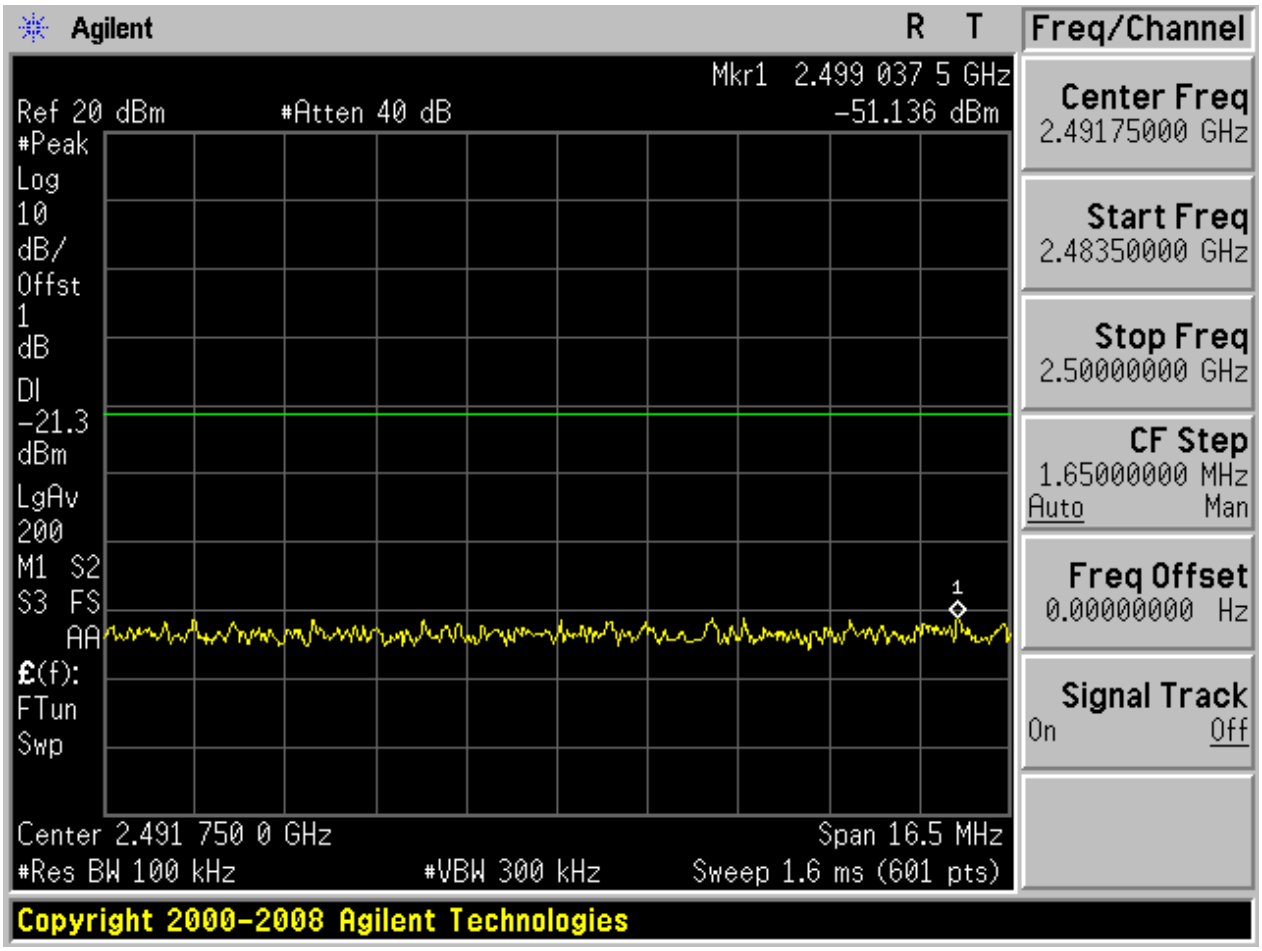

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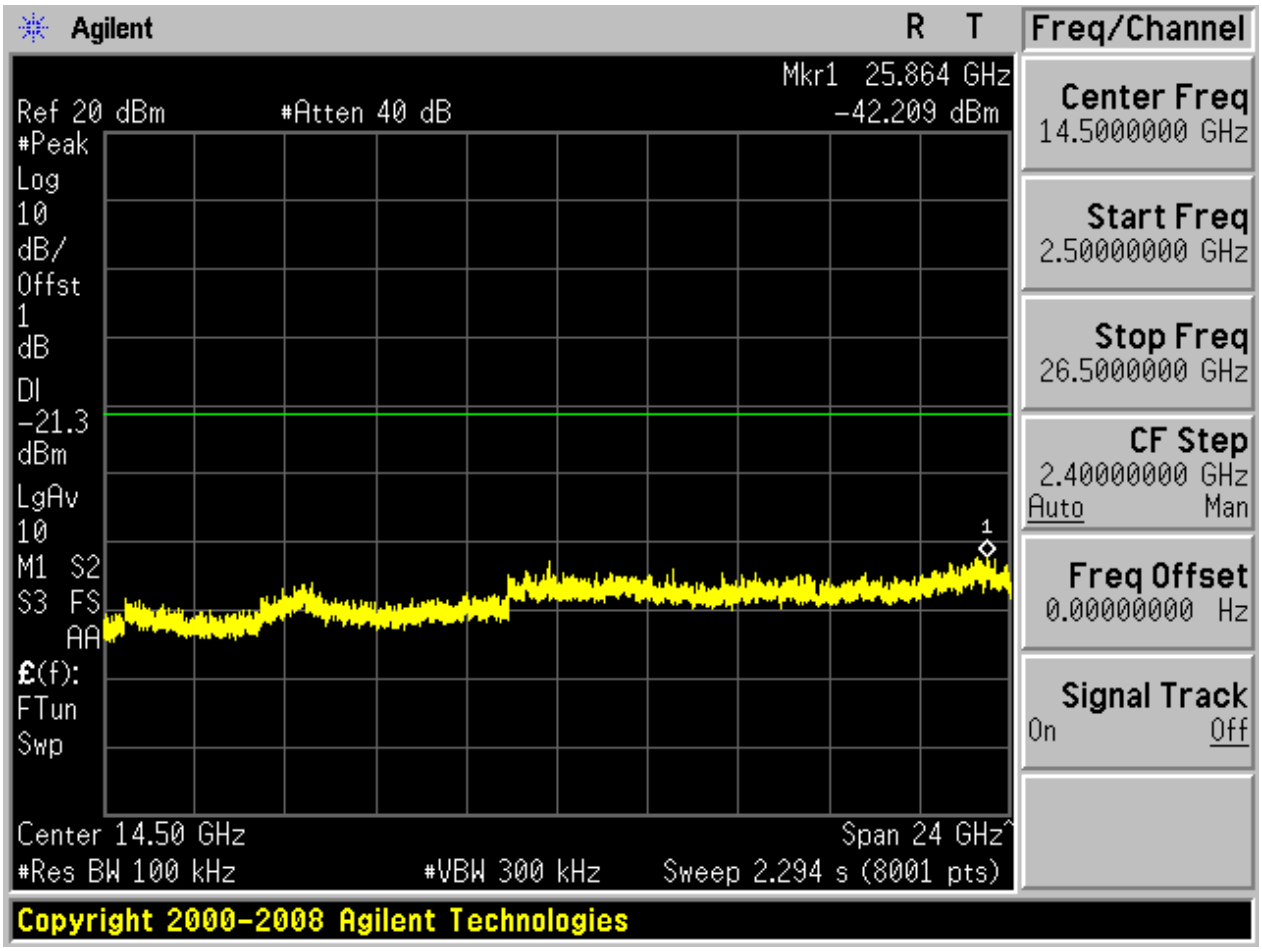

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2.5 11B_H@Ant 1

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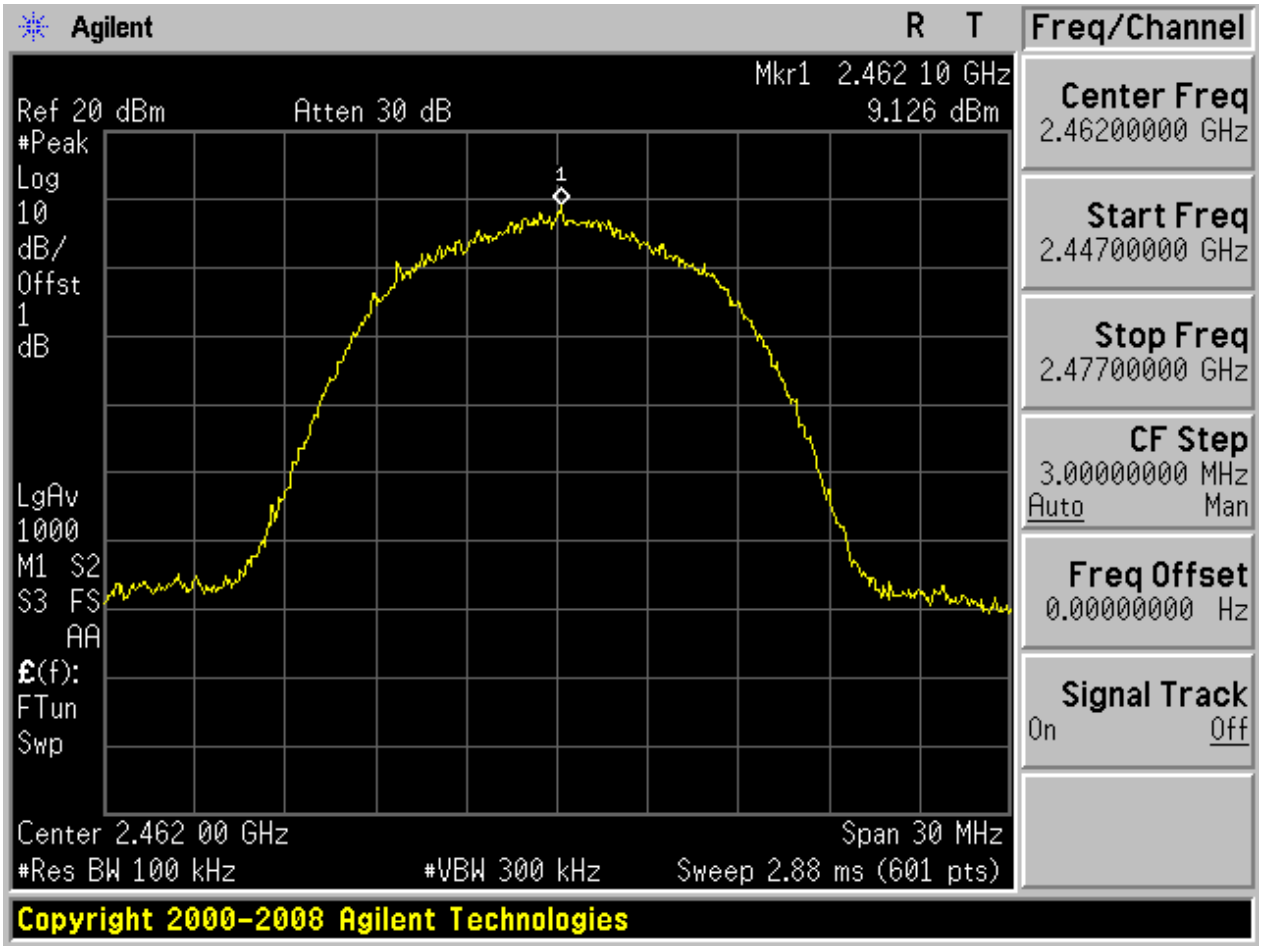

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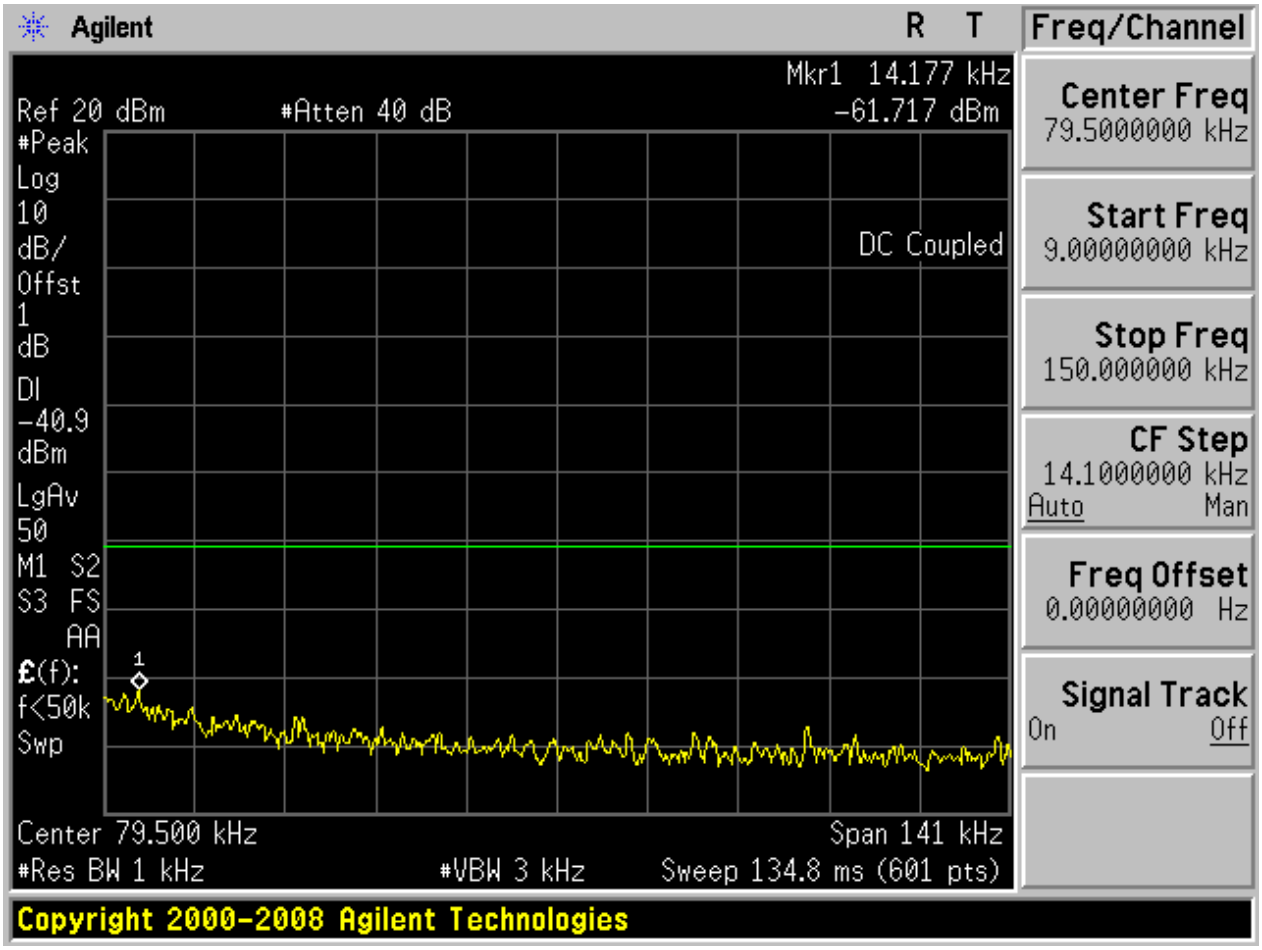

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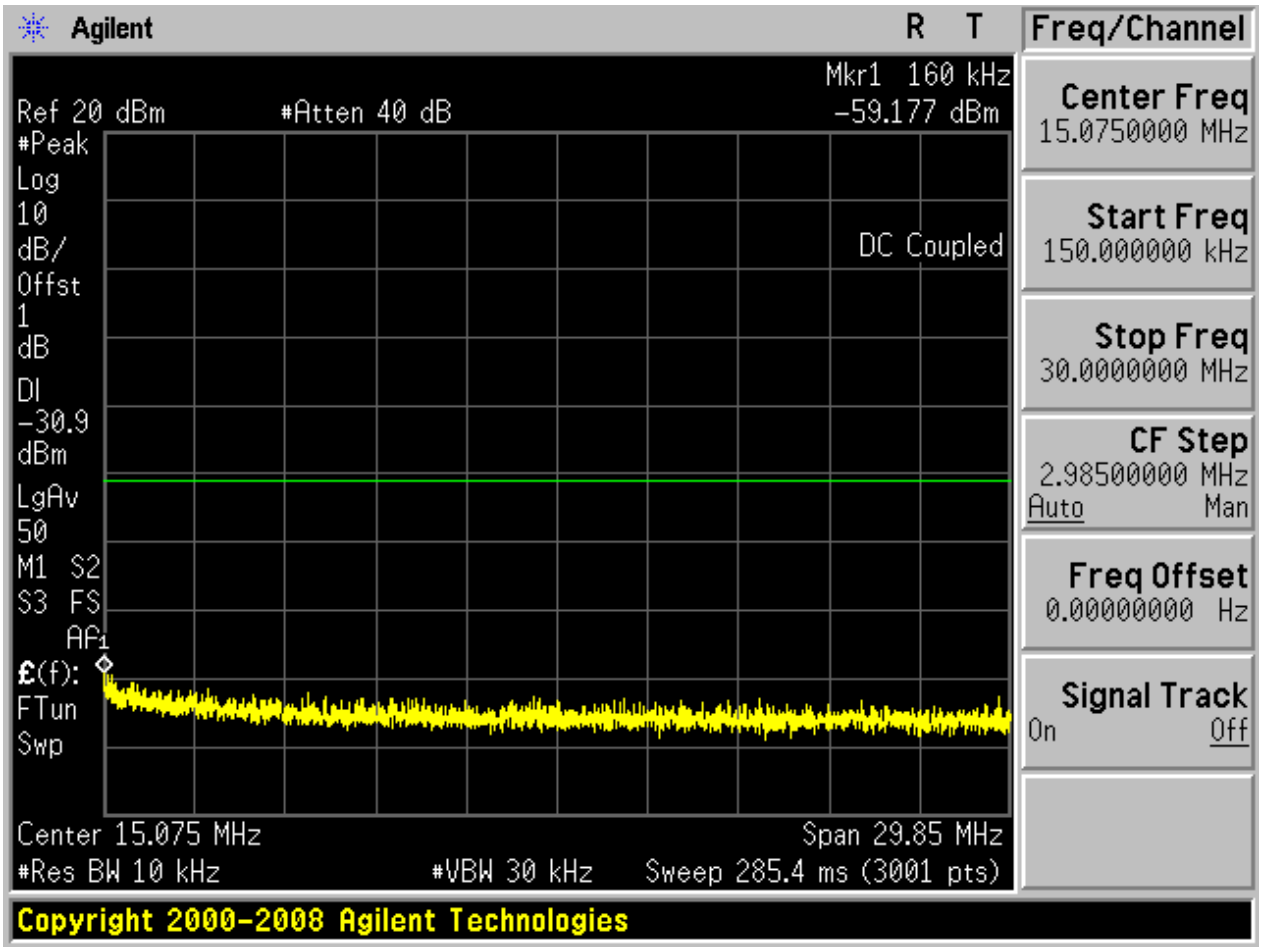

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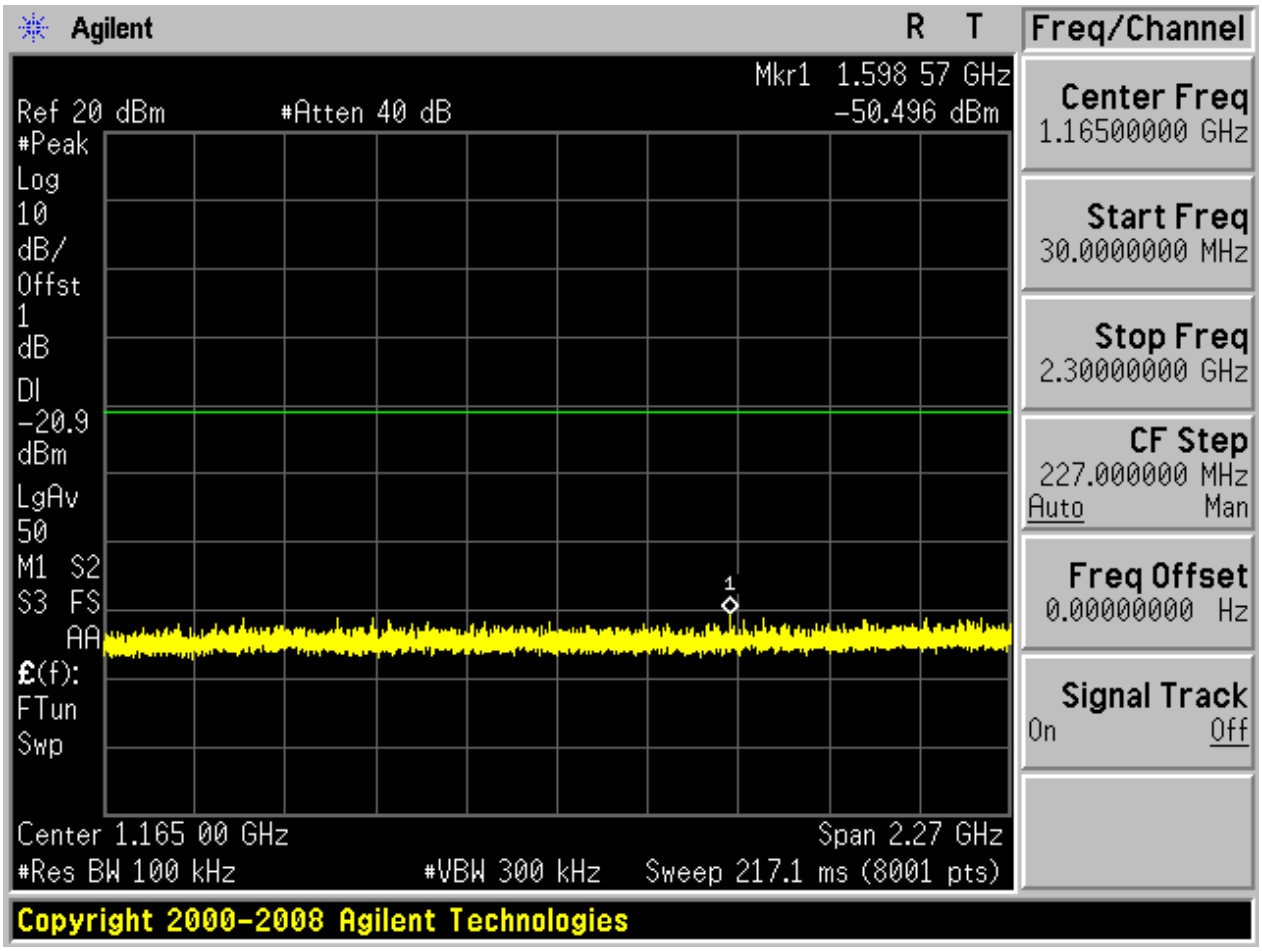

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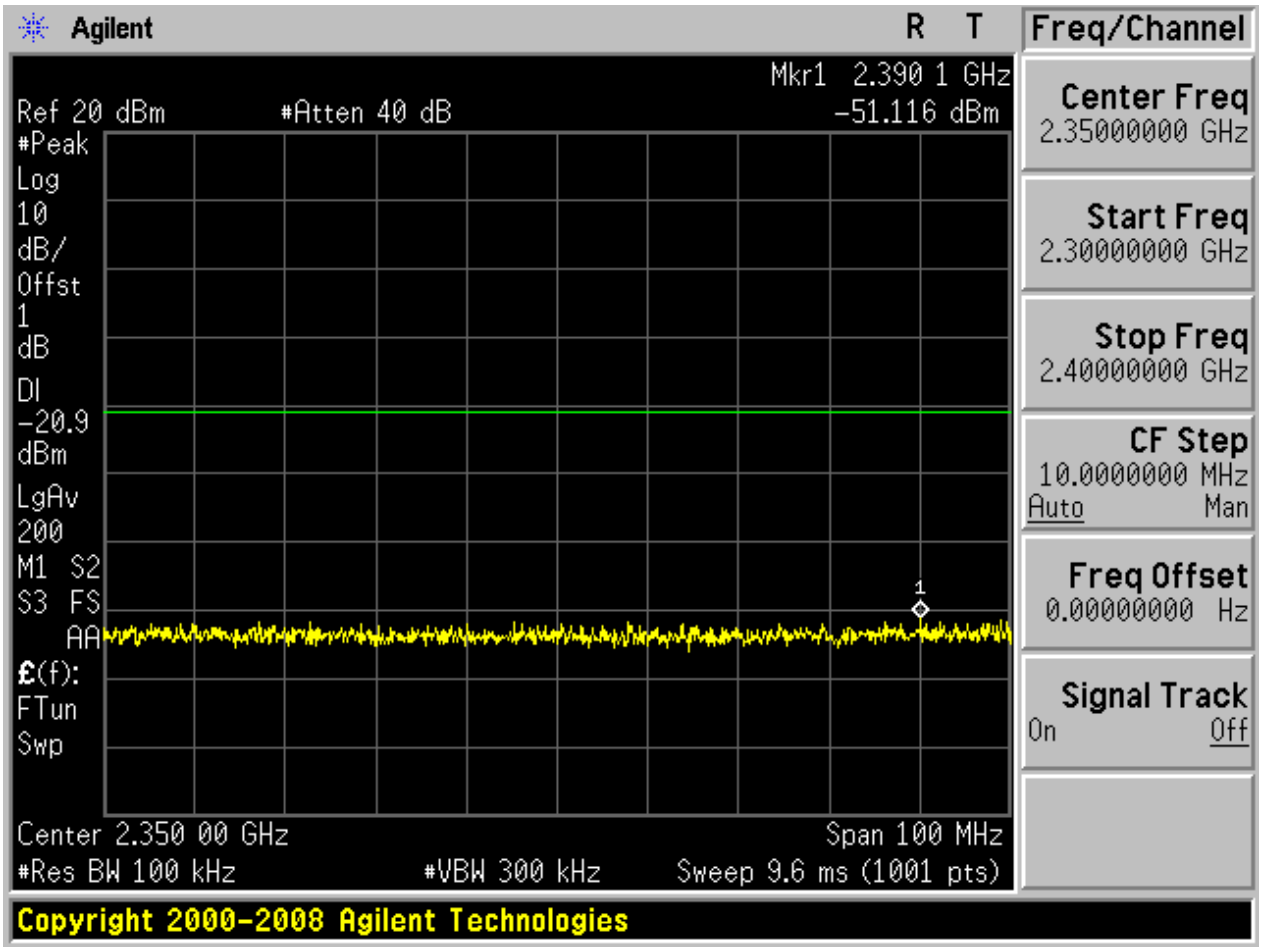

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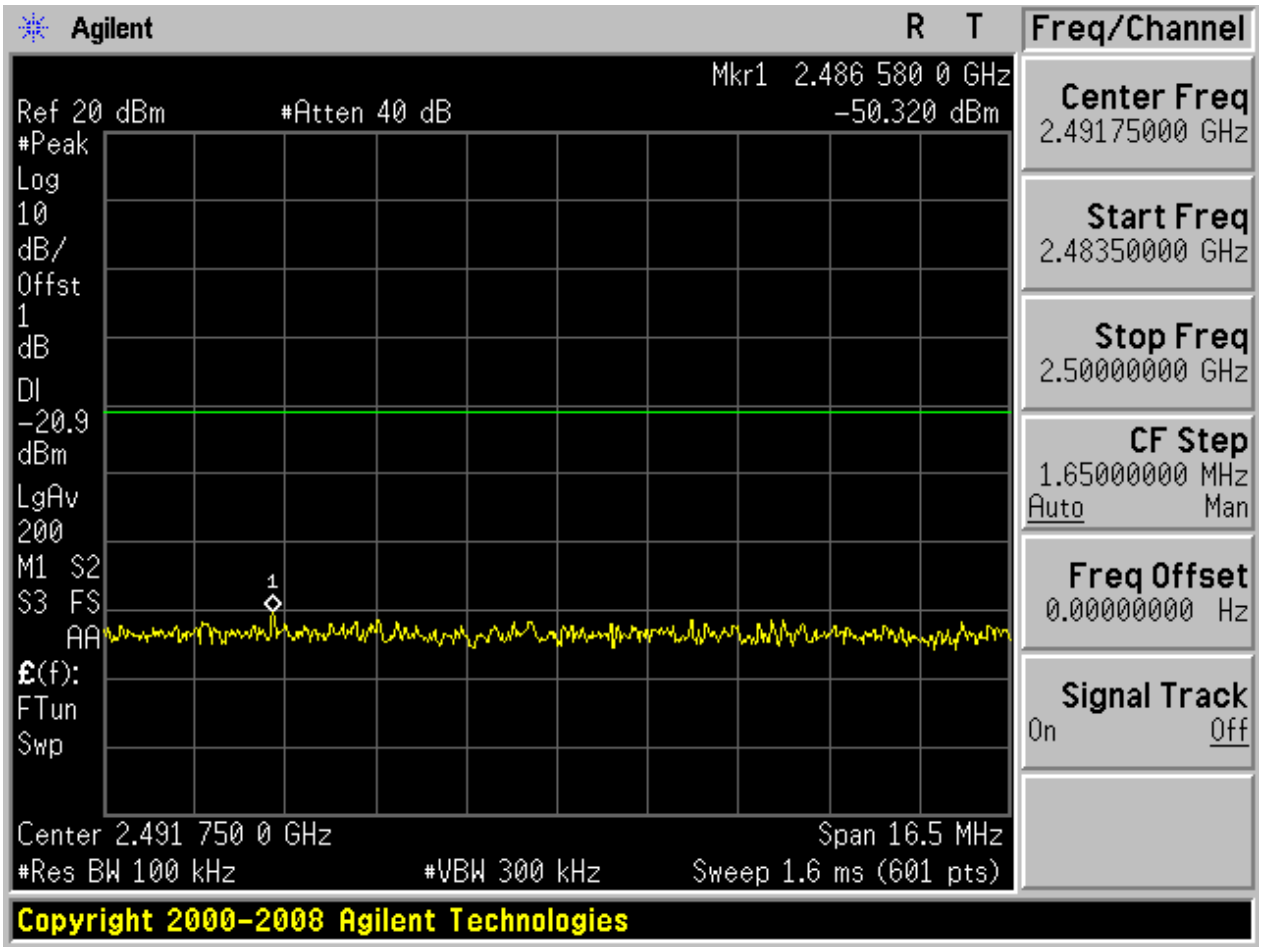

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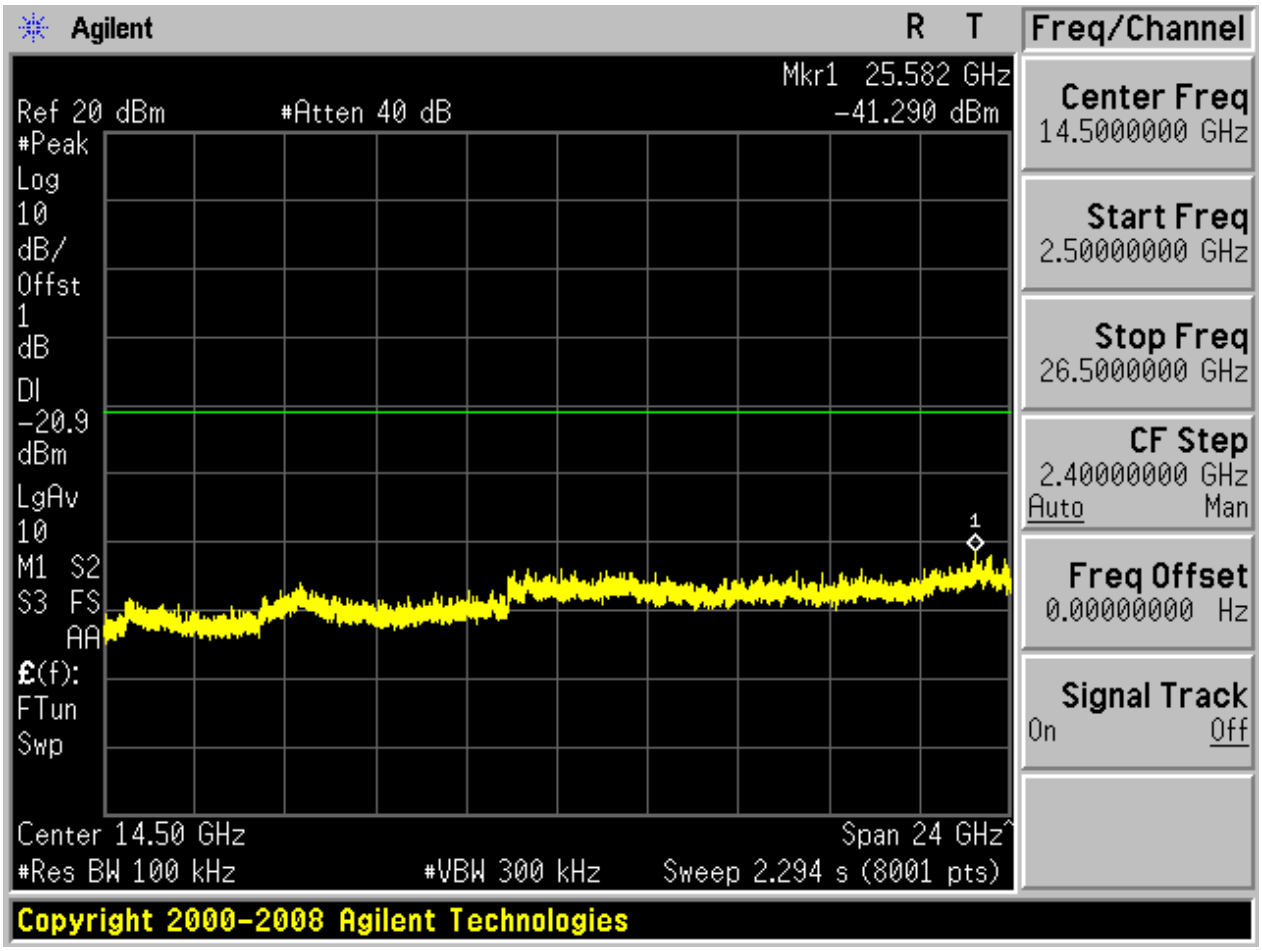

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2.7 11G_L@Ant 1

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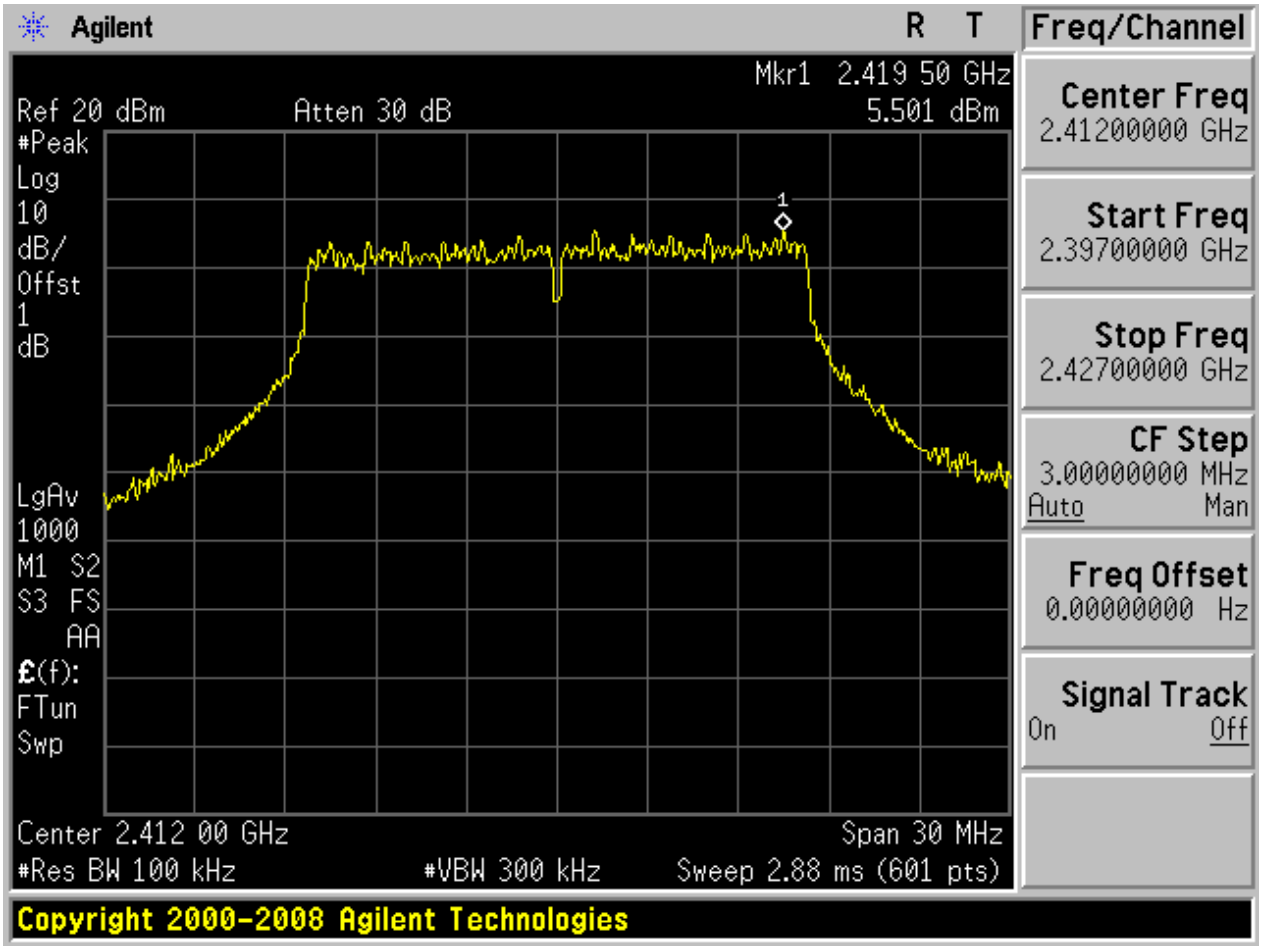

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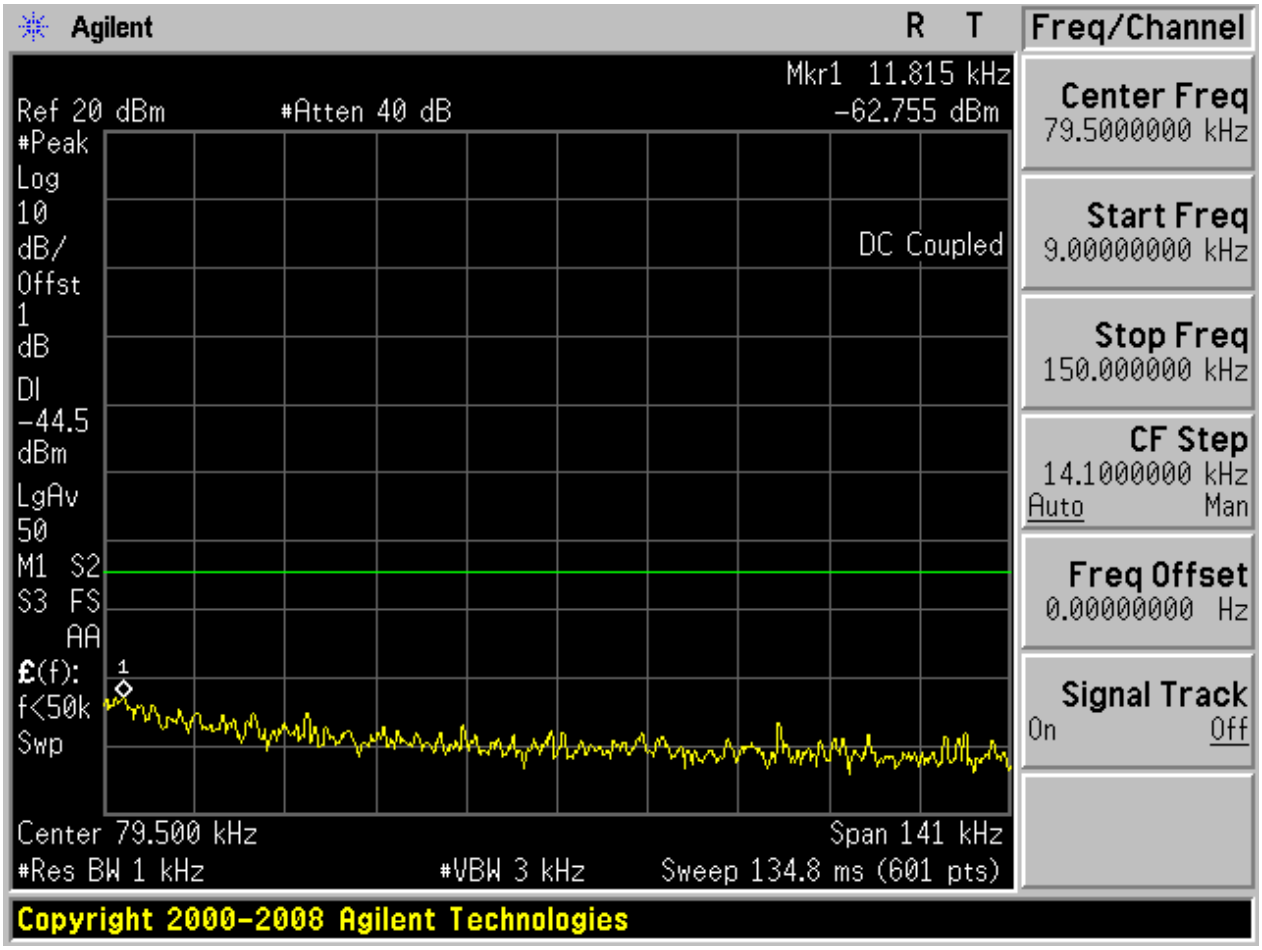

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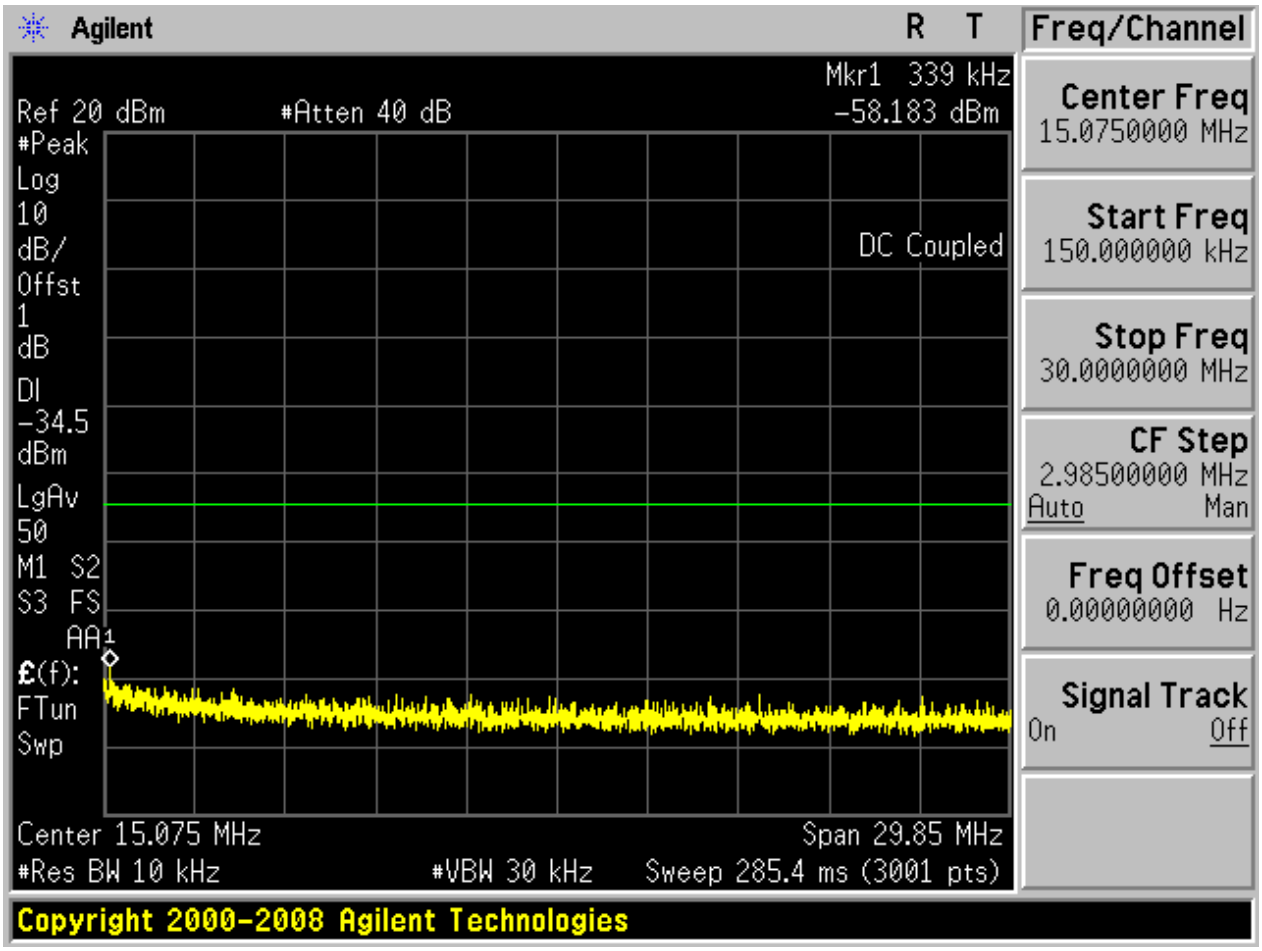

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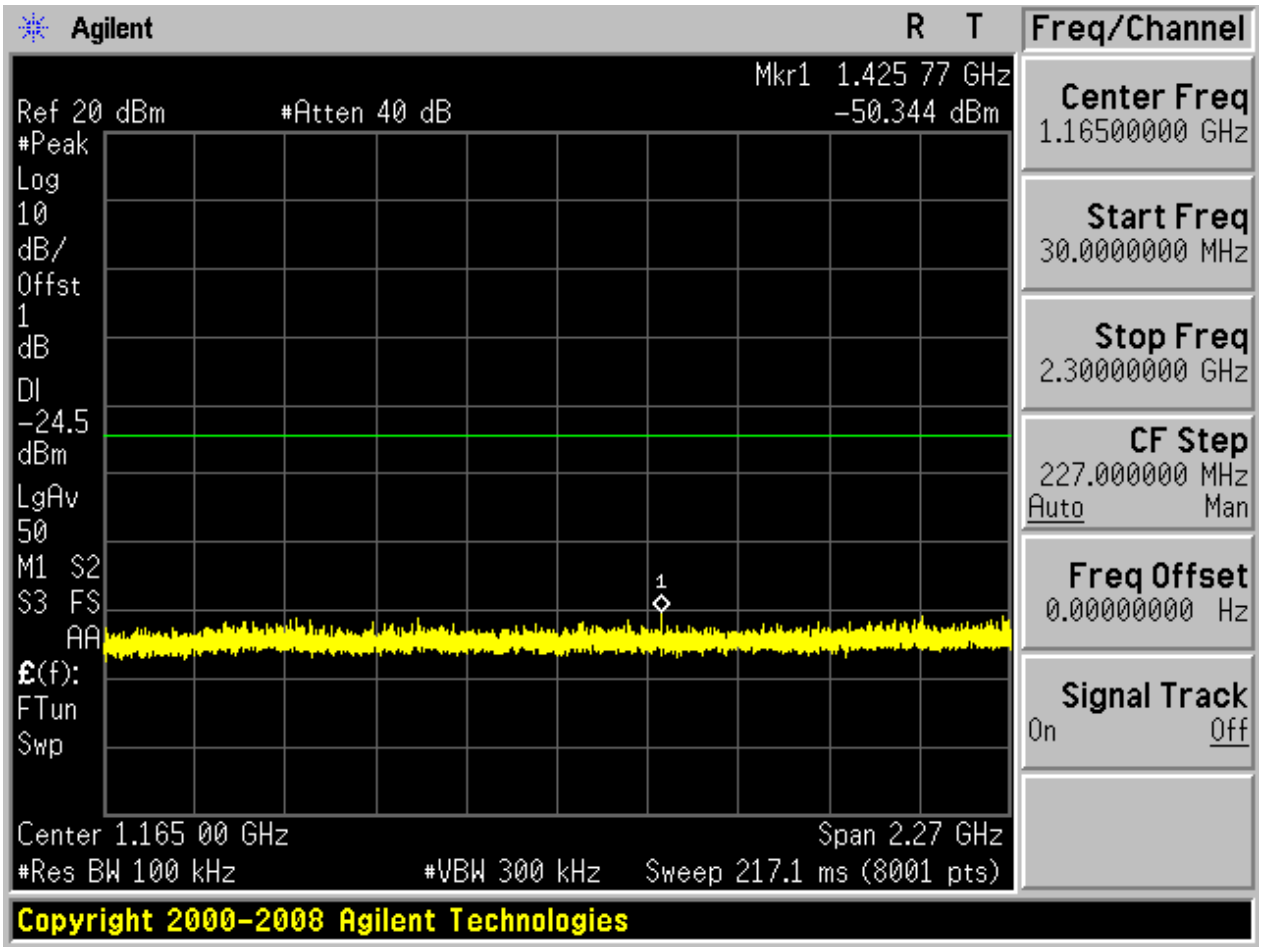

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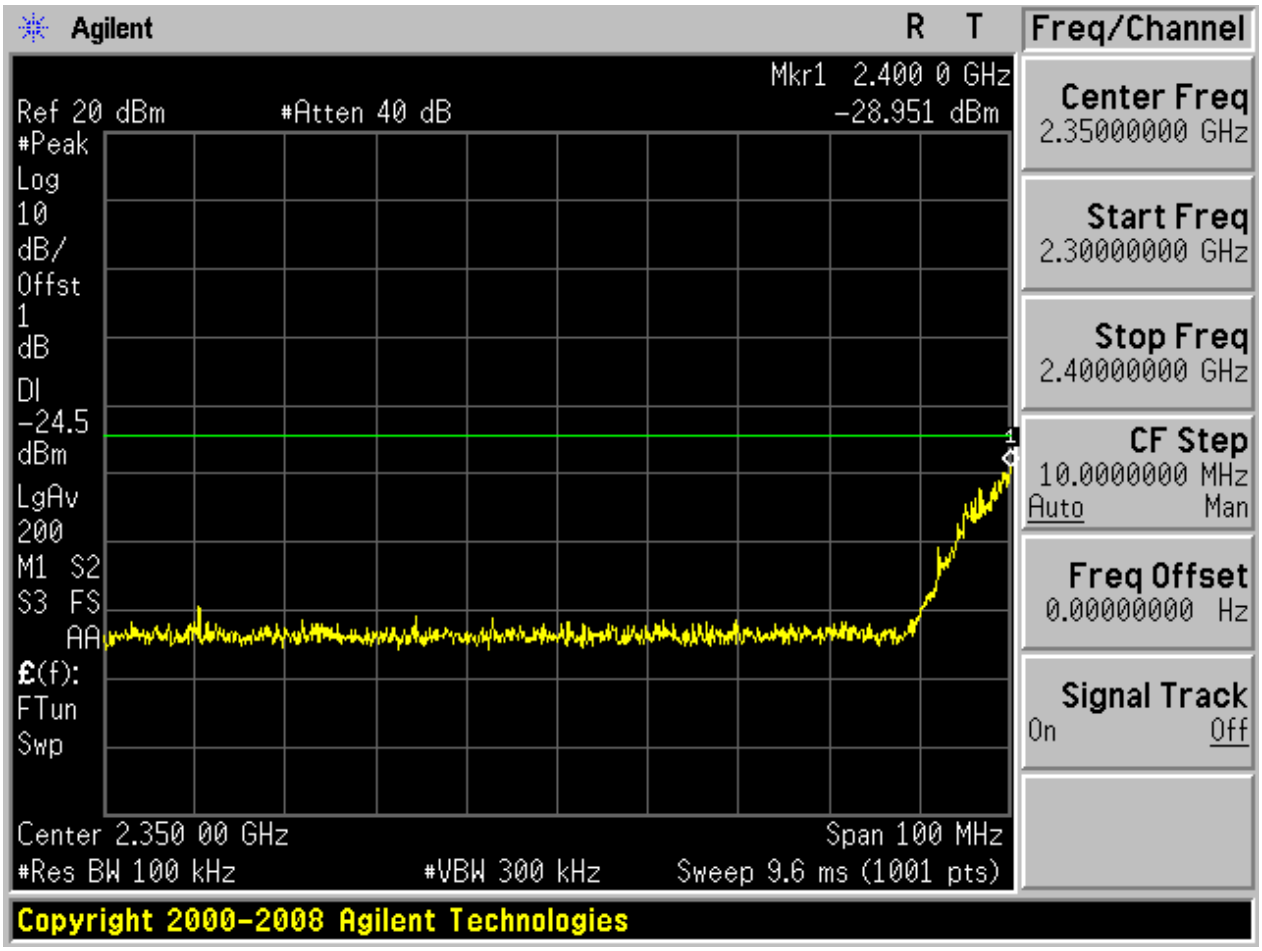

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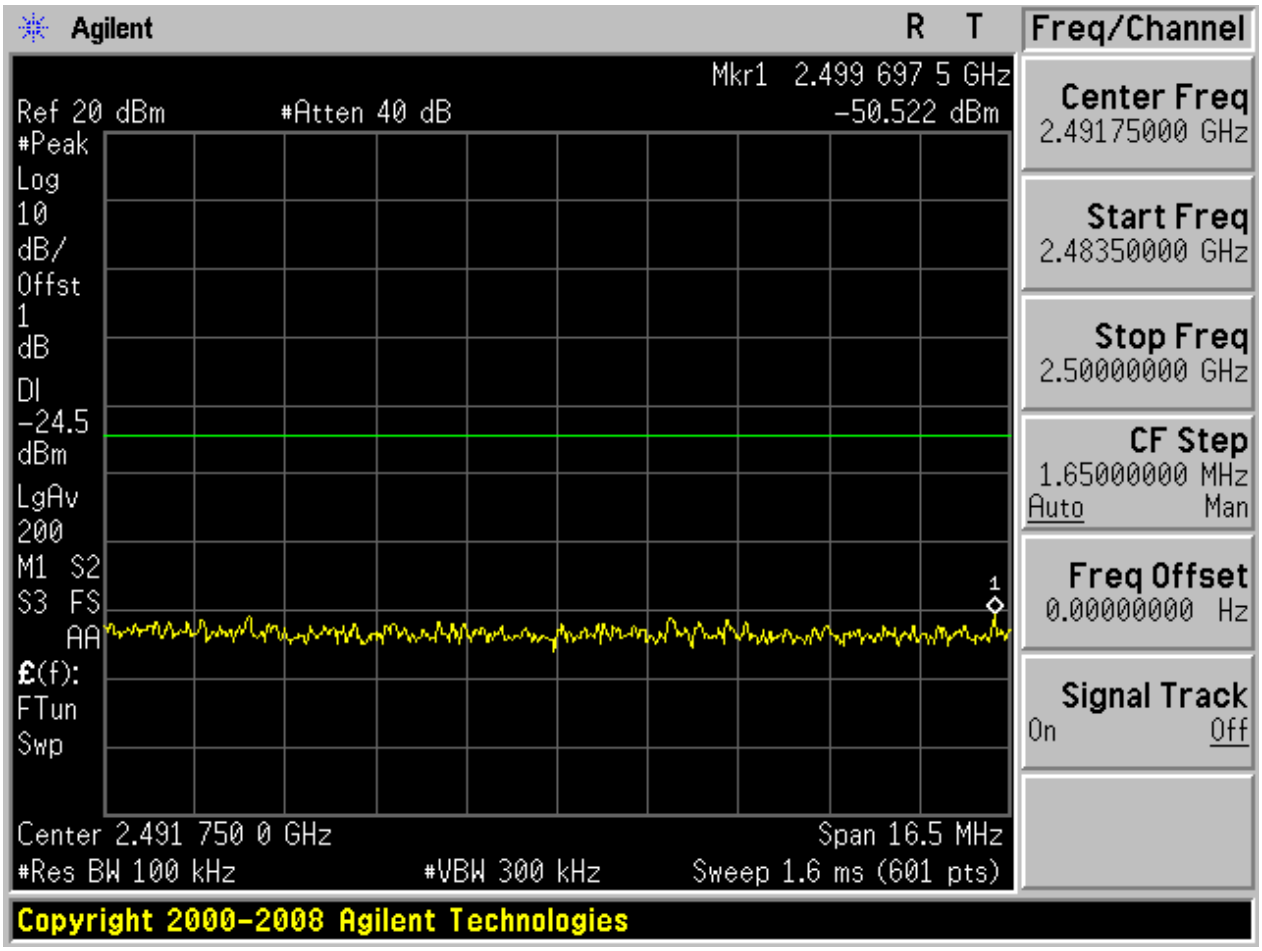

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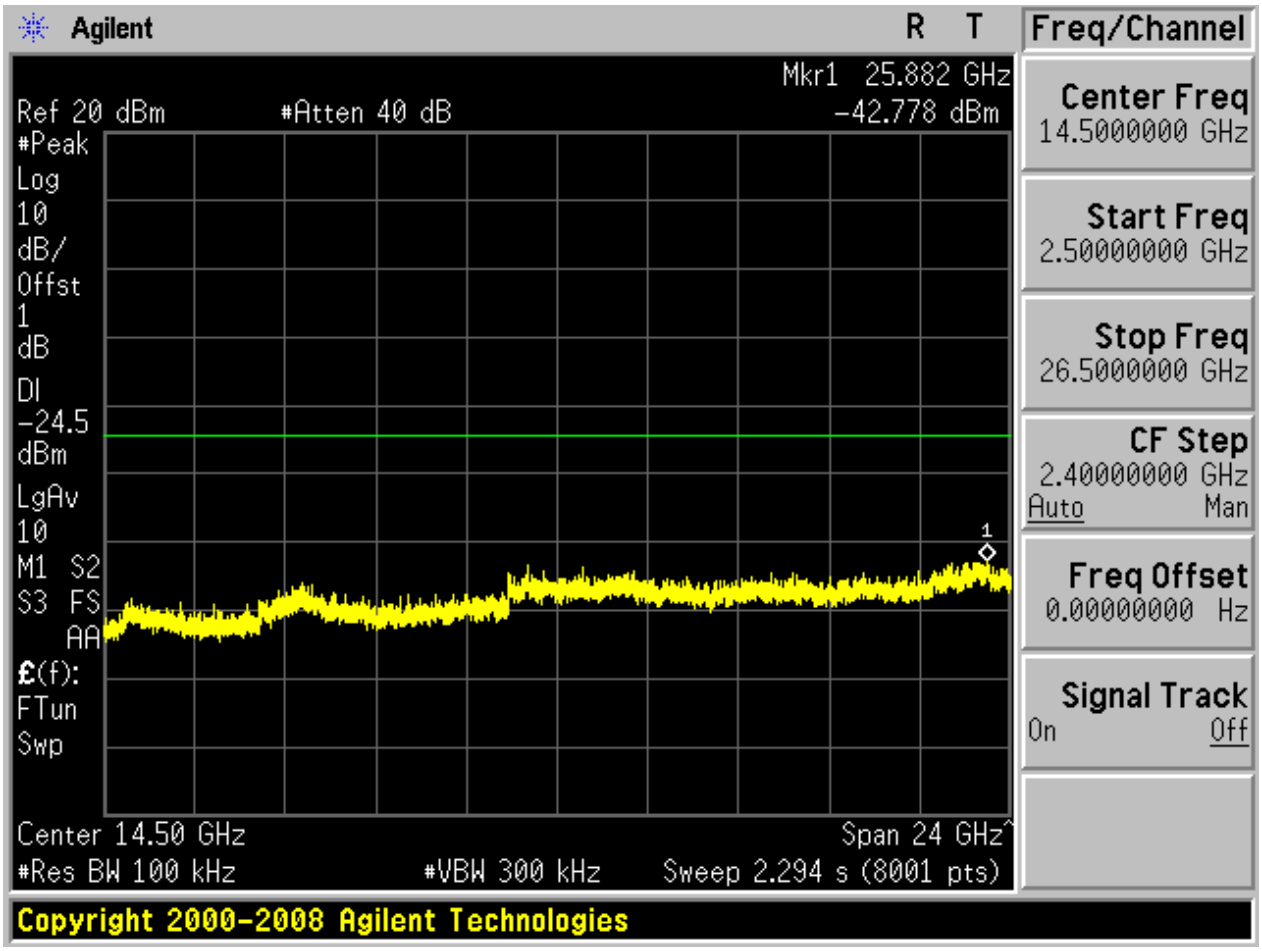

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2.9 11G_M@Ant 1

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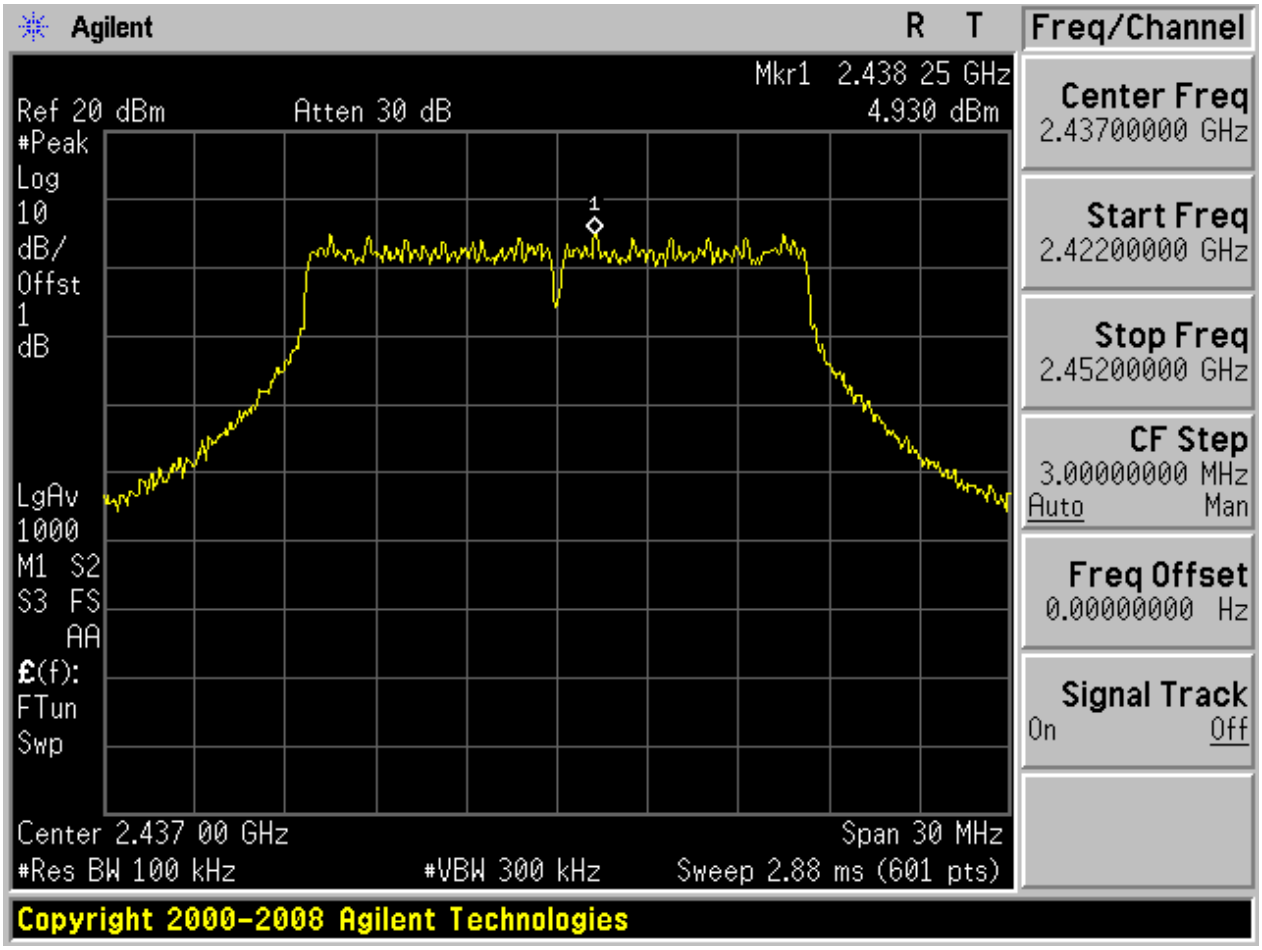

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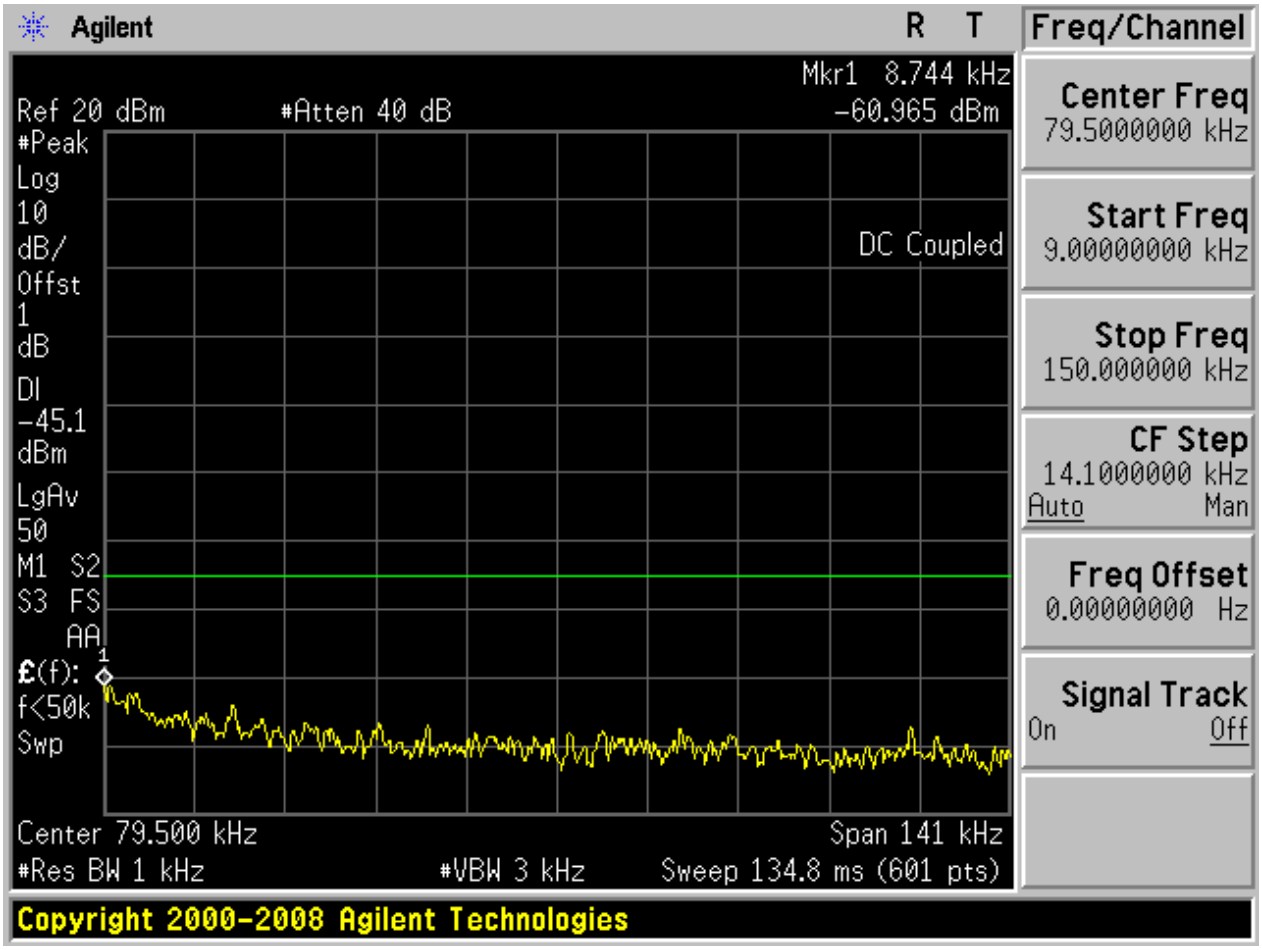
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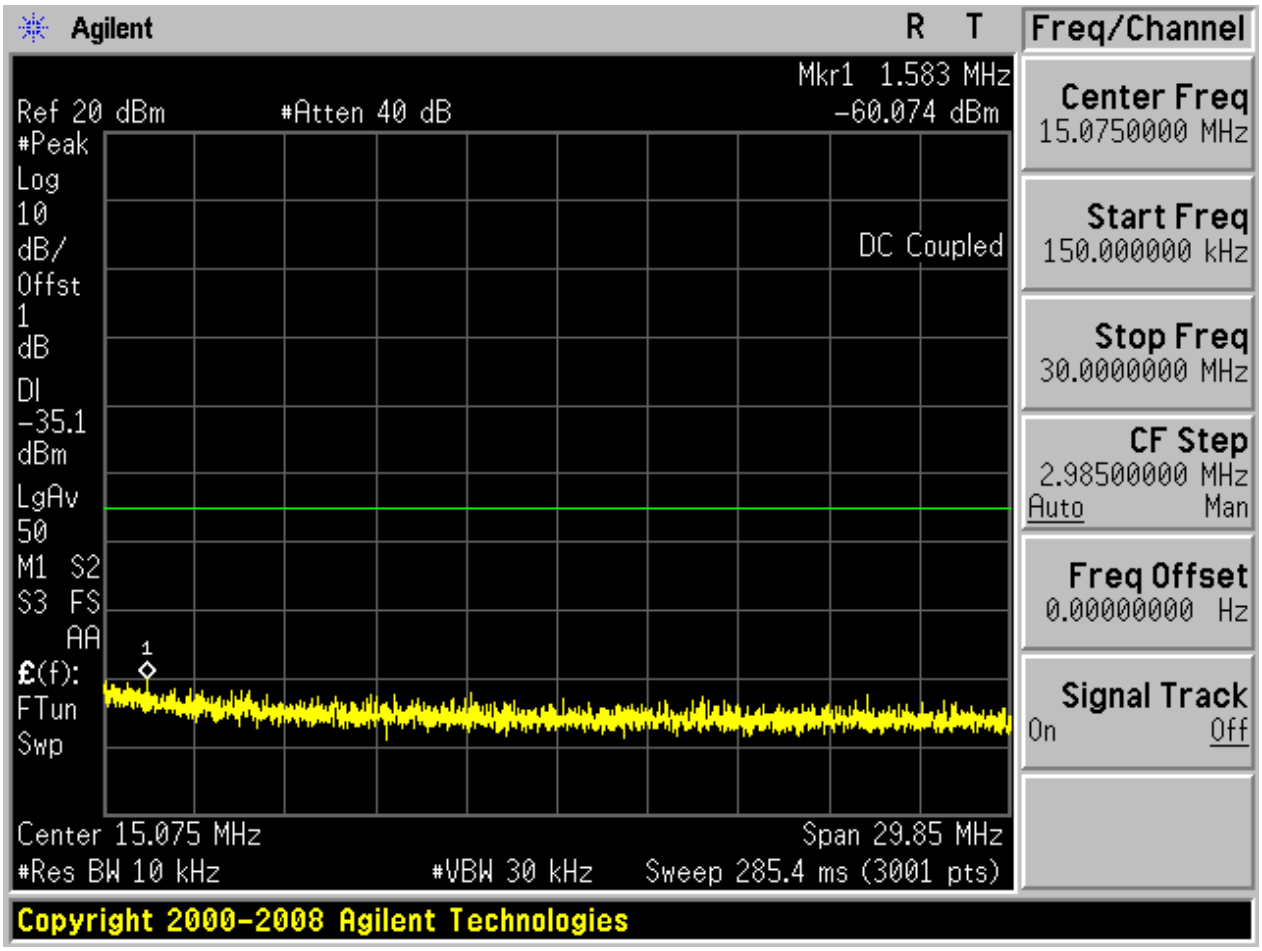
Freq/Channel
Mkr1 8.744 kHz
Ref 20 dBm
#Atten 40 dB
-60.965 dBm
#Peak
Log
10
dB/
Offst
1
dB
Dl
-45.1
dBm
LgAv
50
M1 S2
S3 FS
AA
£(f):
f<50k
Swp
DC Coupled
Center Freq
79.5000000 kHz
Start Freq
9.00000000 kHz
Stop Freq
150.000000 kHz
CF Step
14.1000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Center 79.500 kHz
Span 141 kHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 134.8 ms (601 pts)
Copyright 2000-2008 Agilent Technologies



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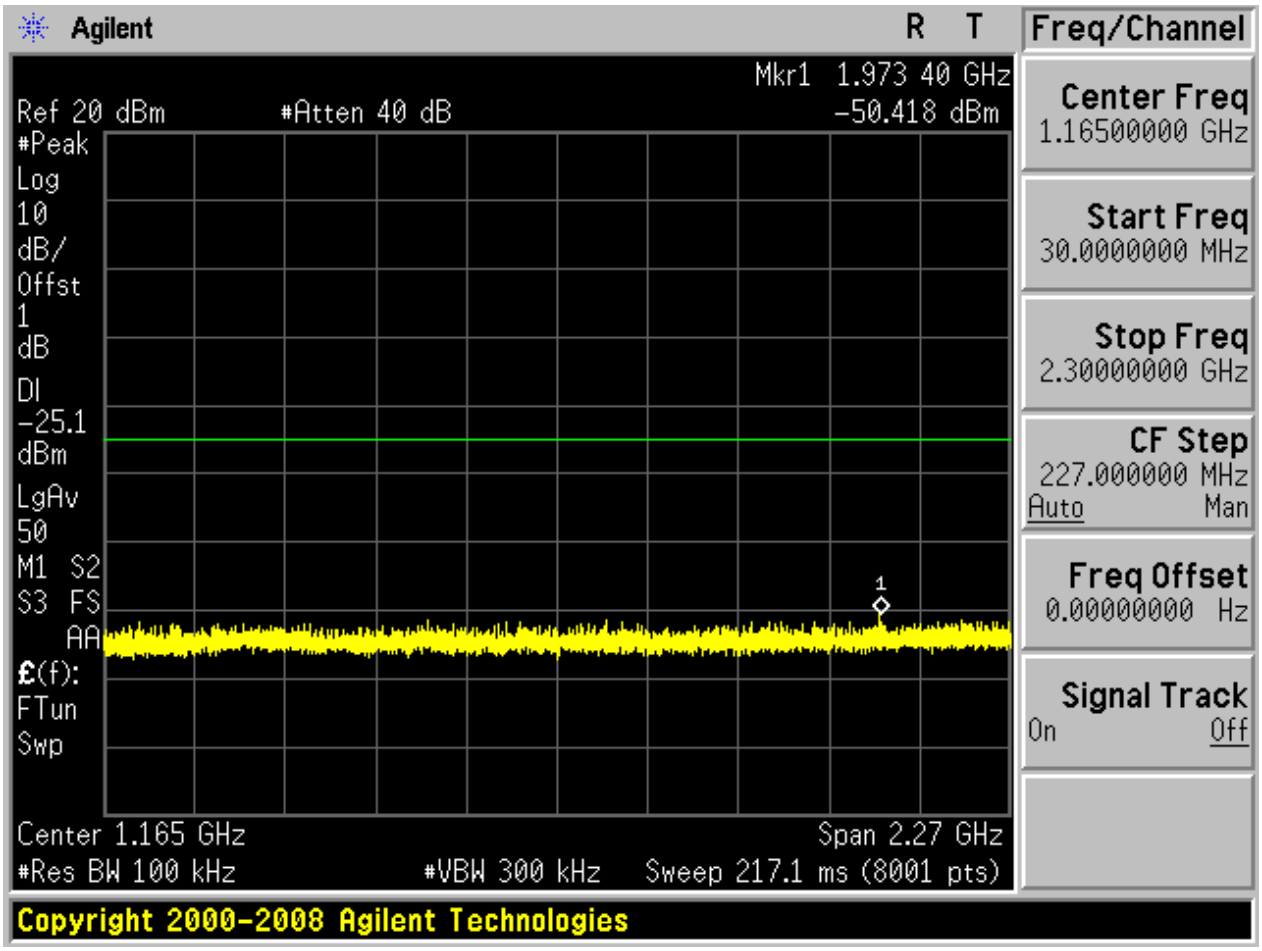

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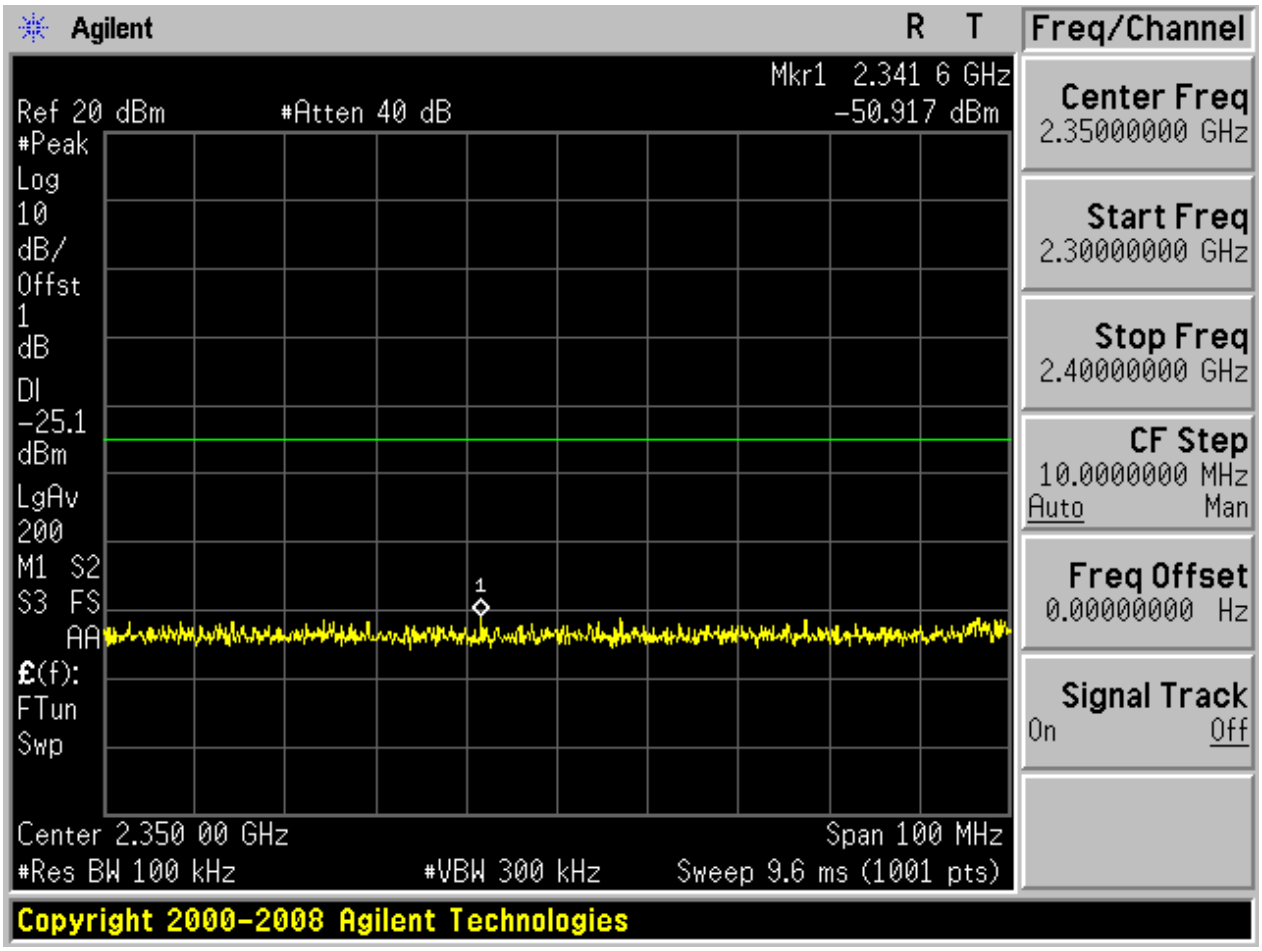

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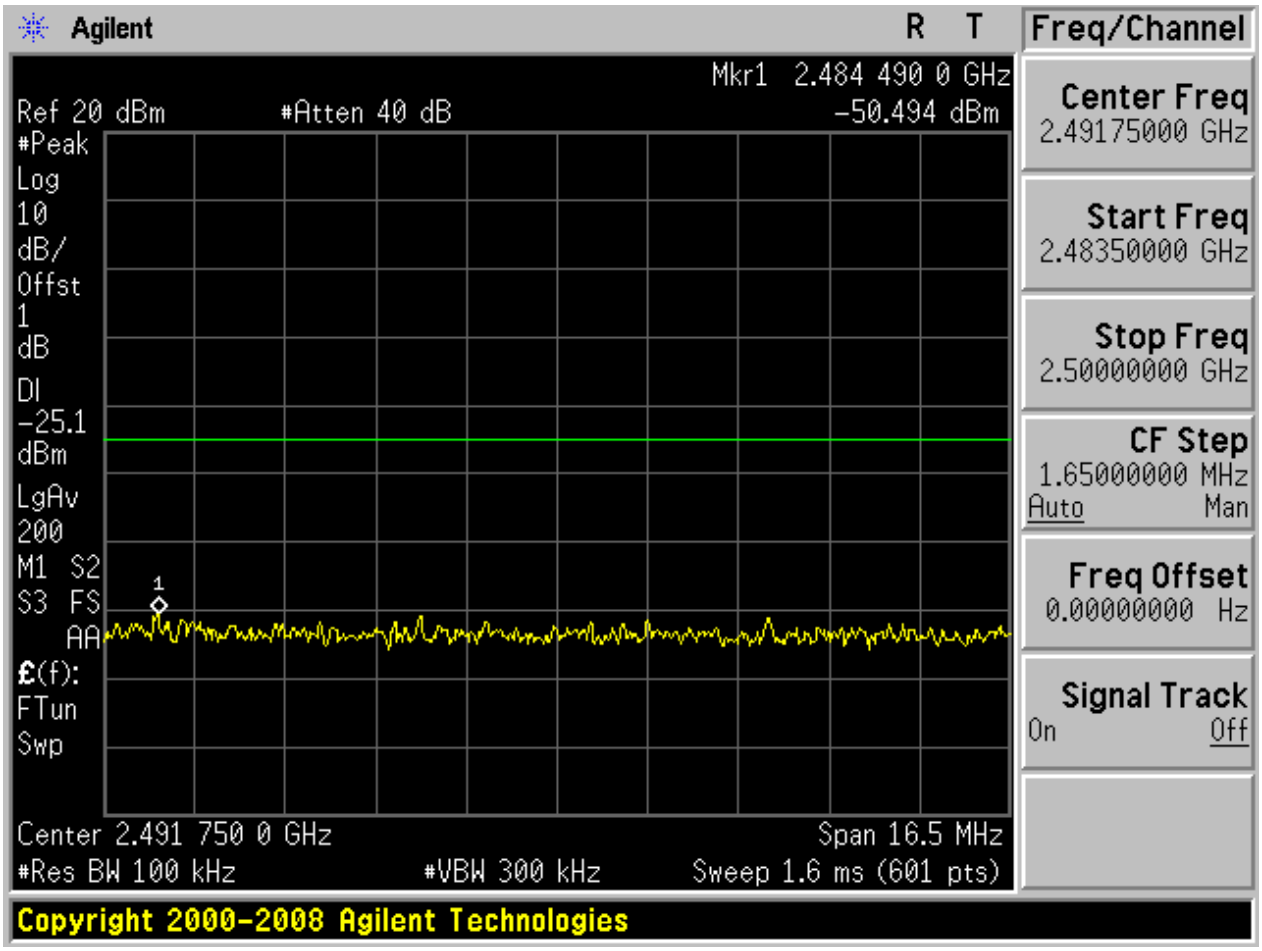

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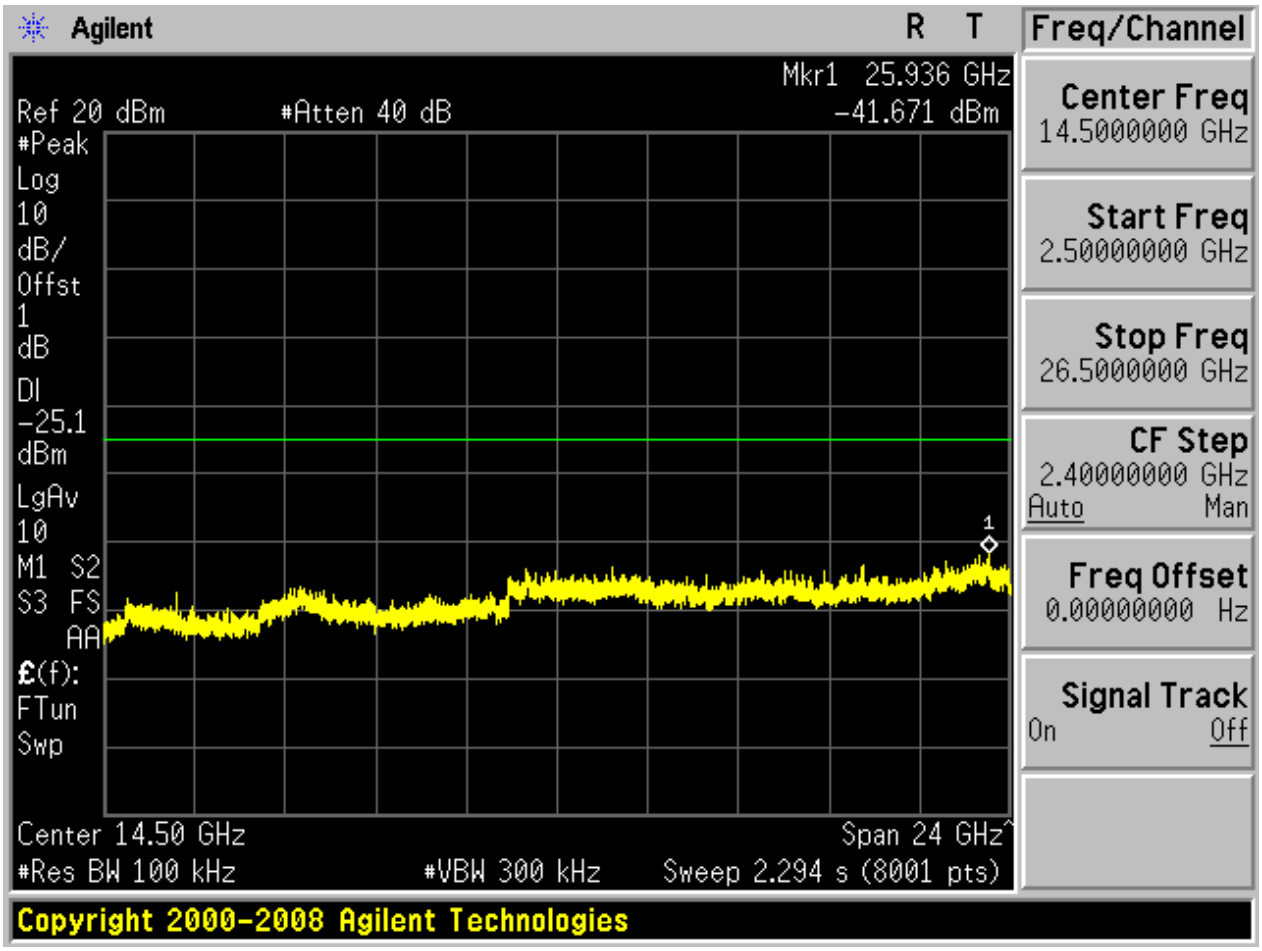

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2.11 11G_H@Ant 1

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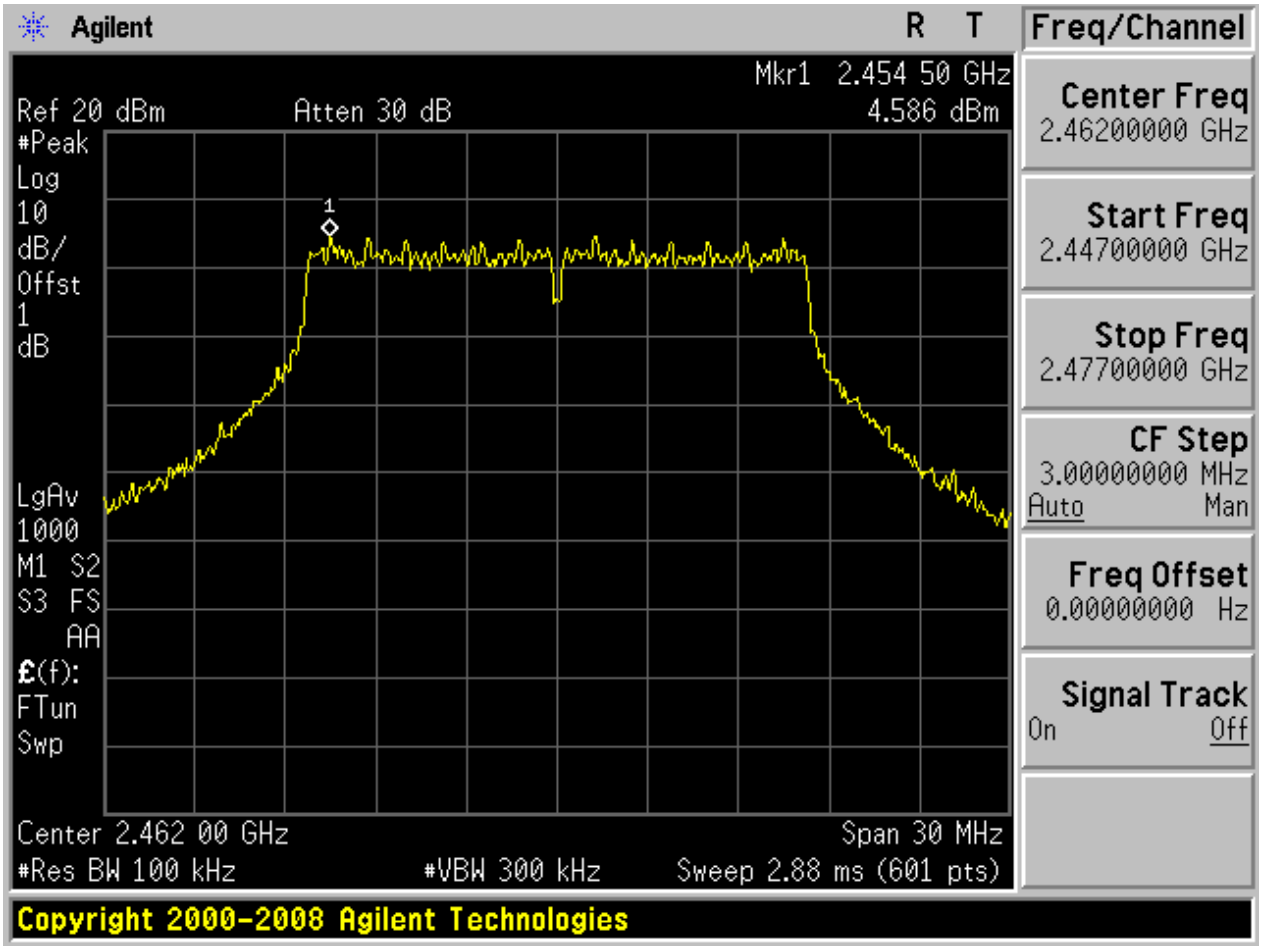

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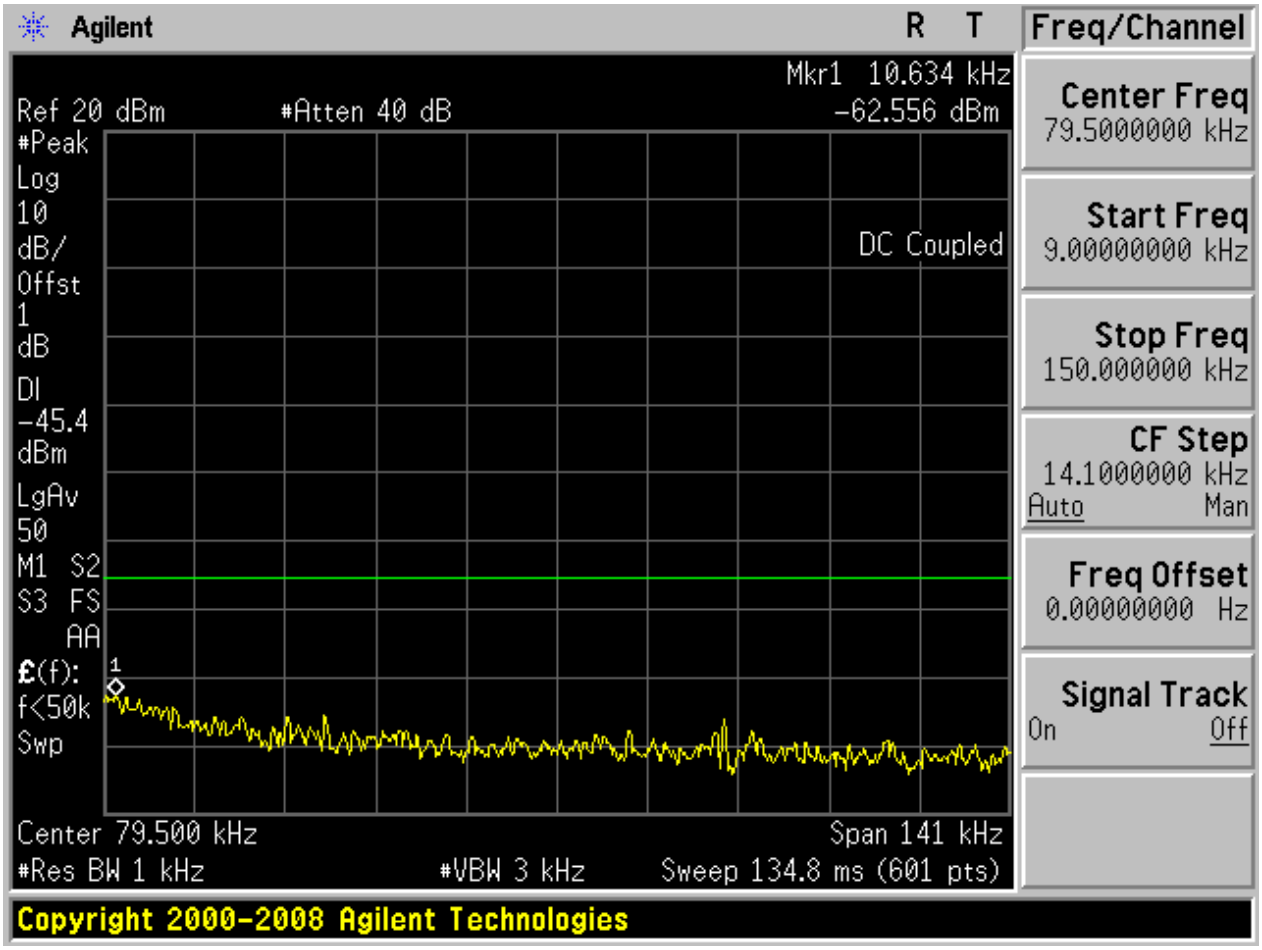

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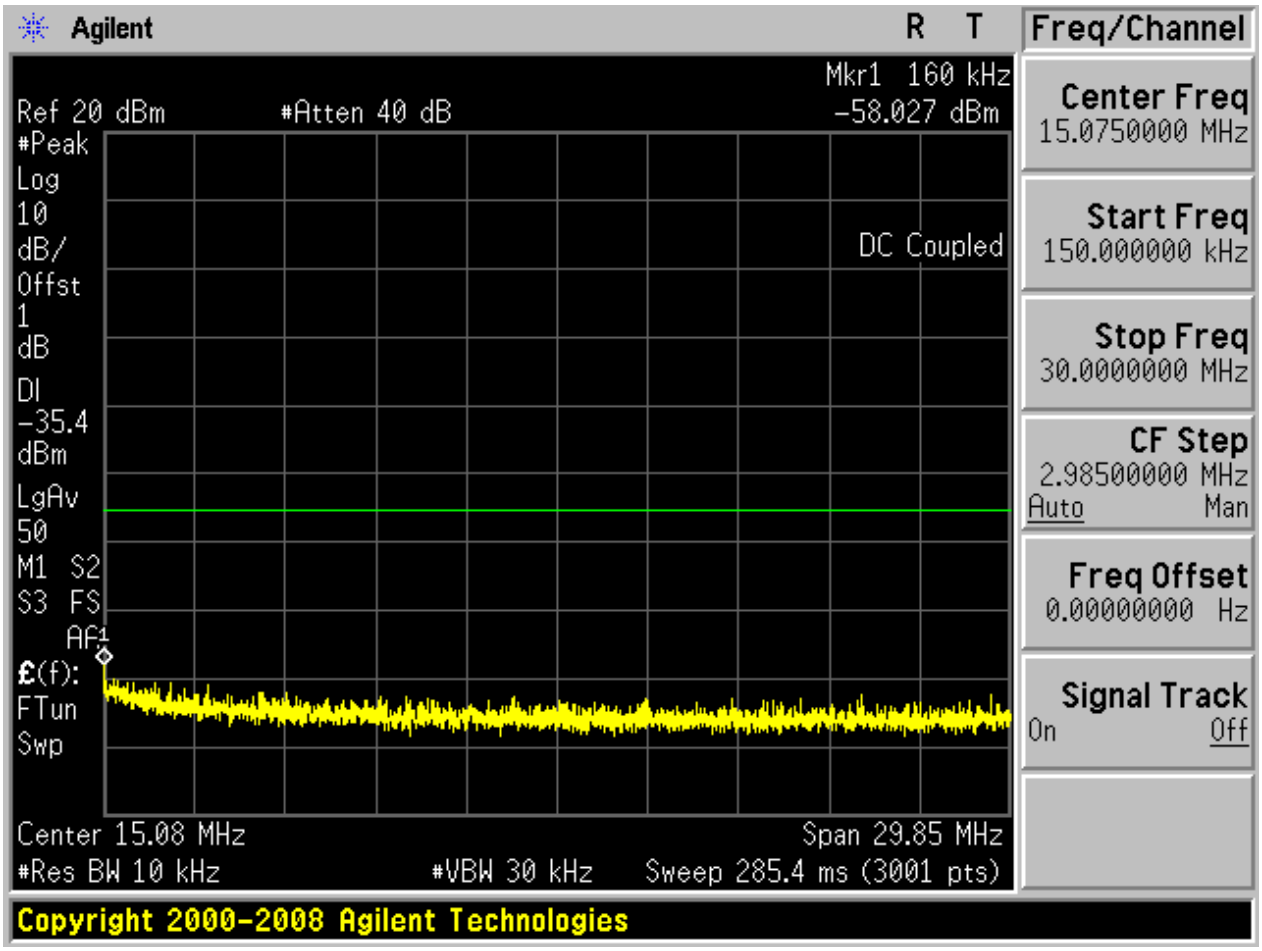

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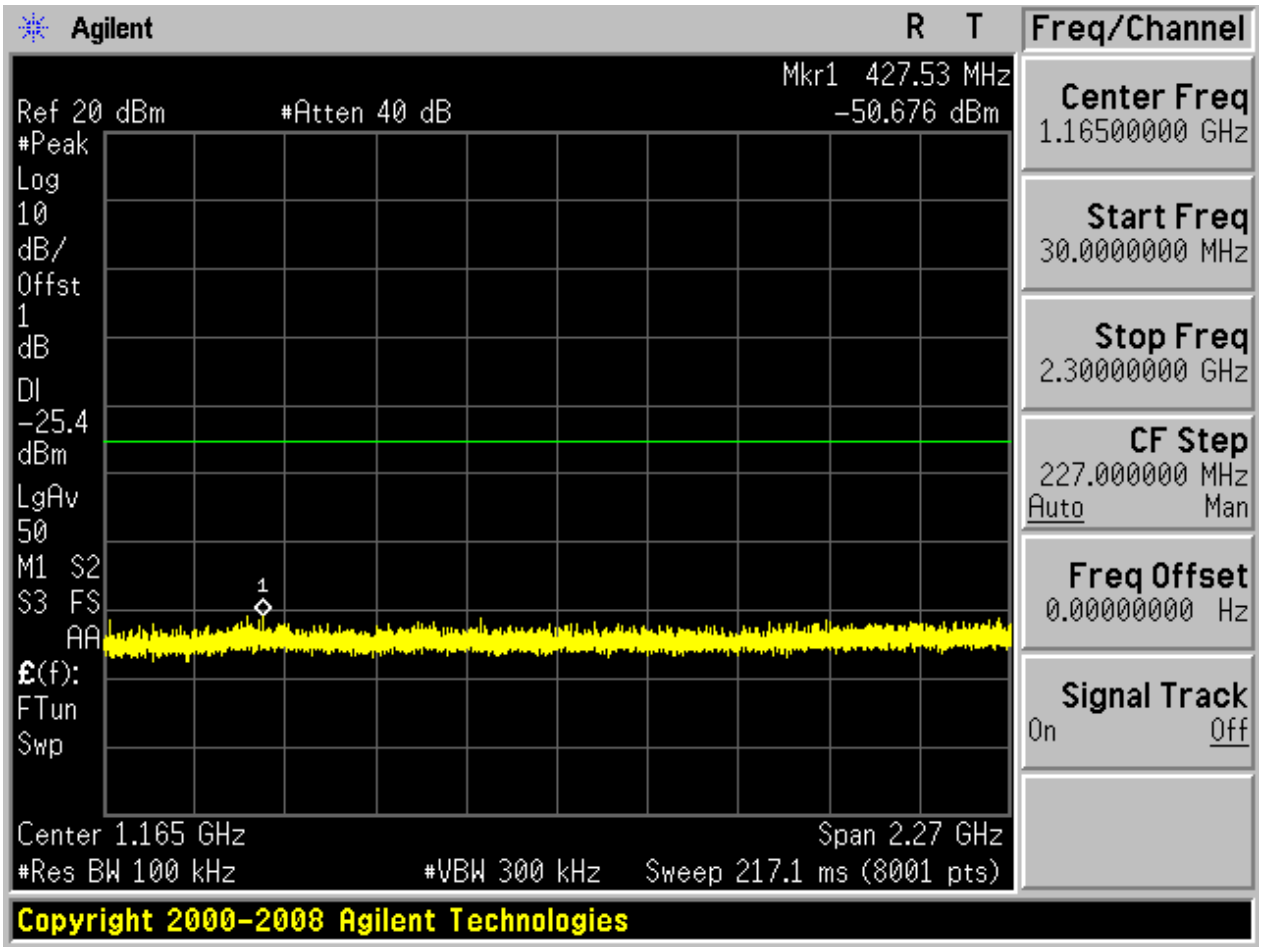

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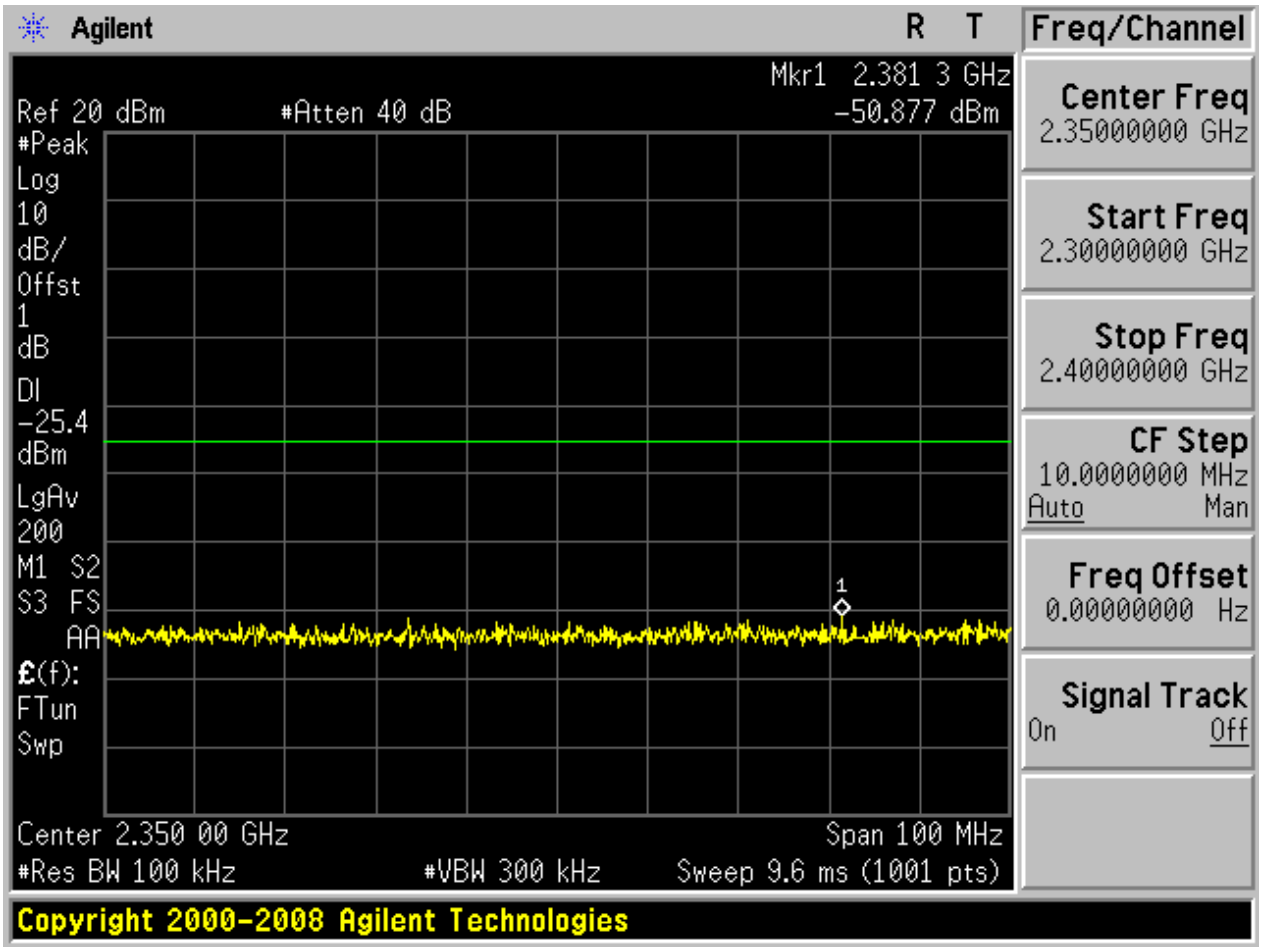

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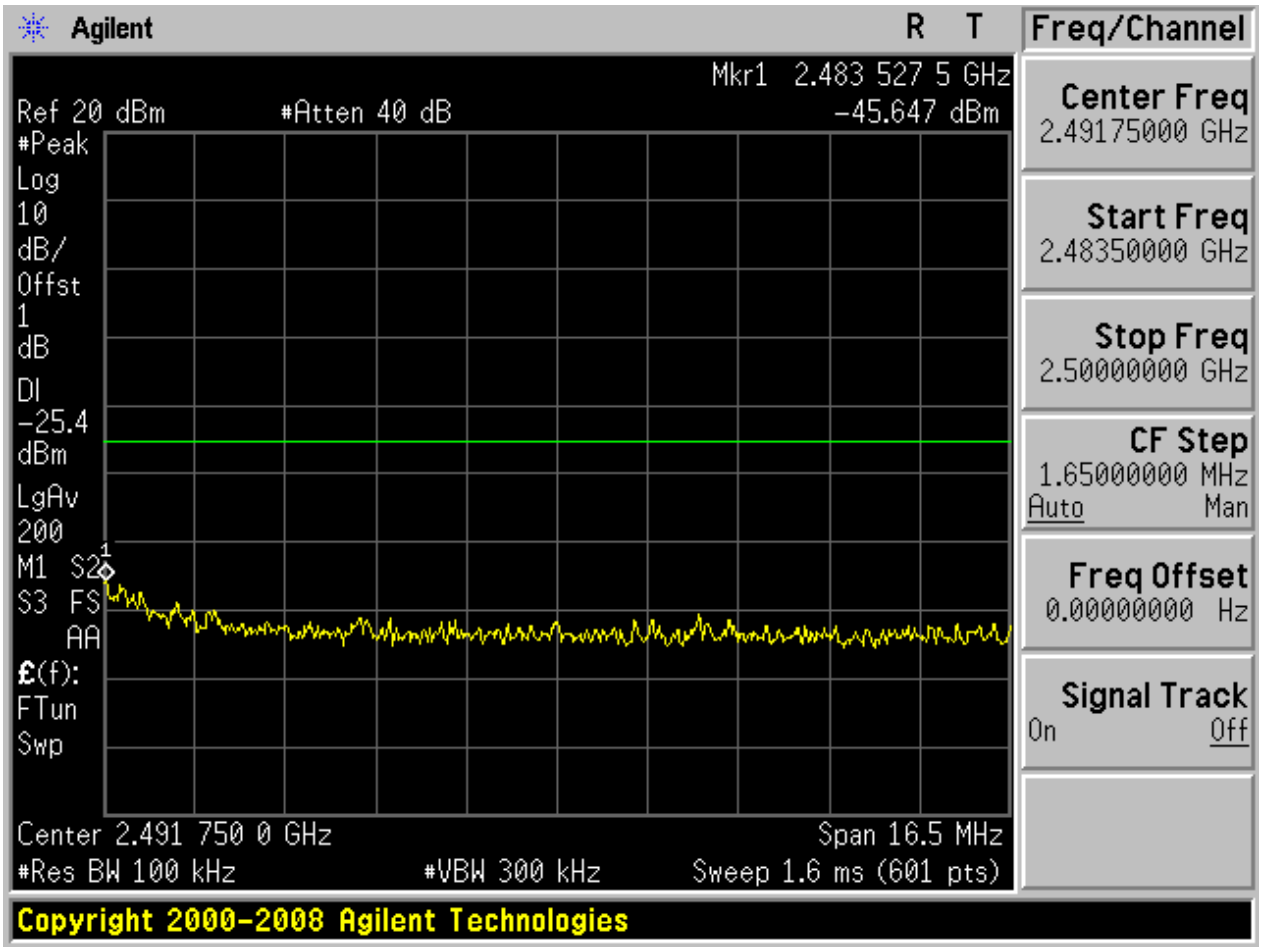

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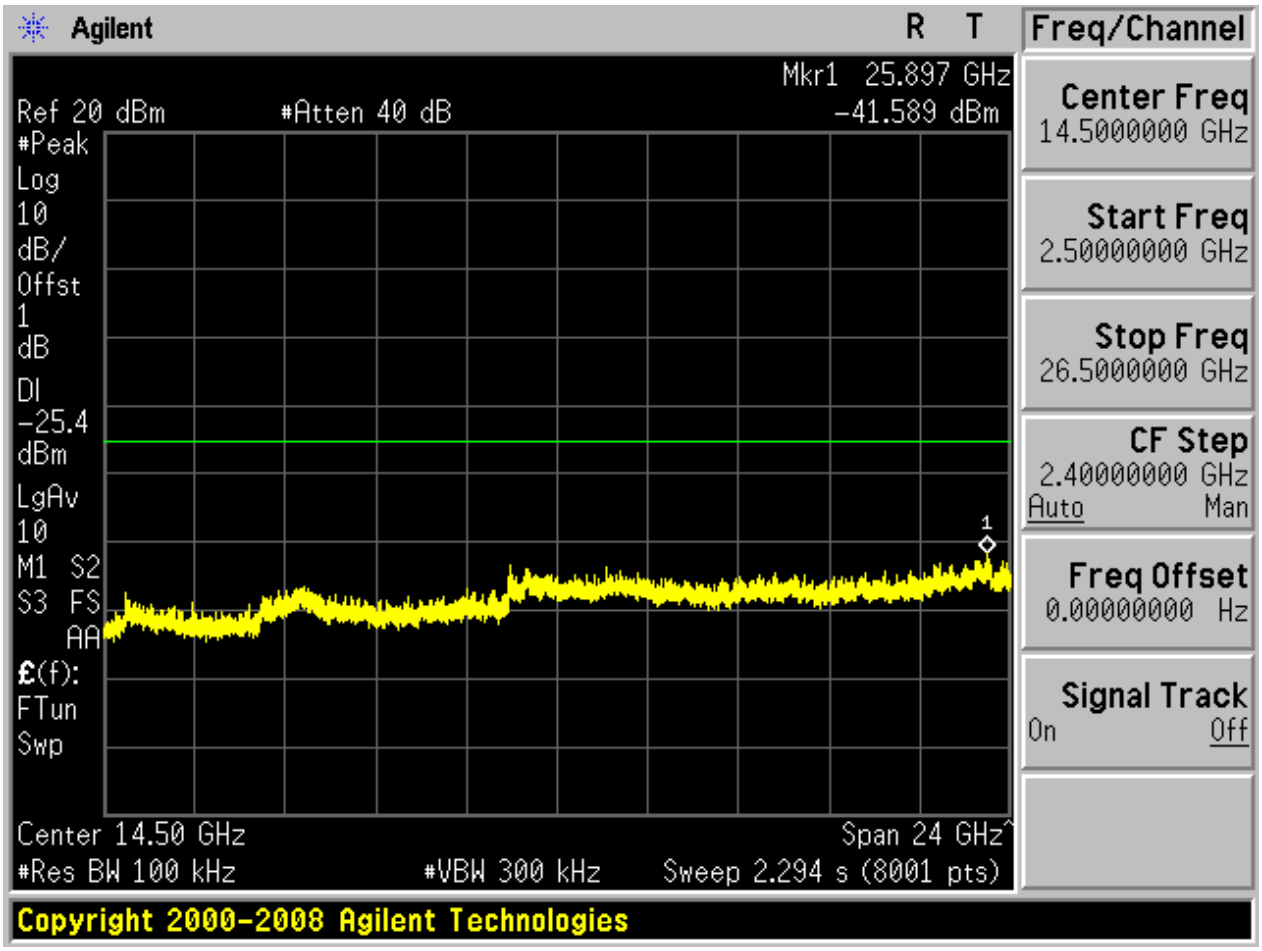

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2.13 11N20_L@Ant 1

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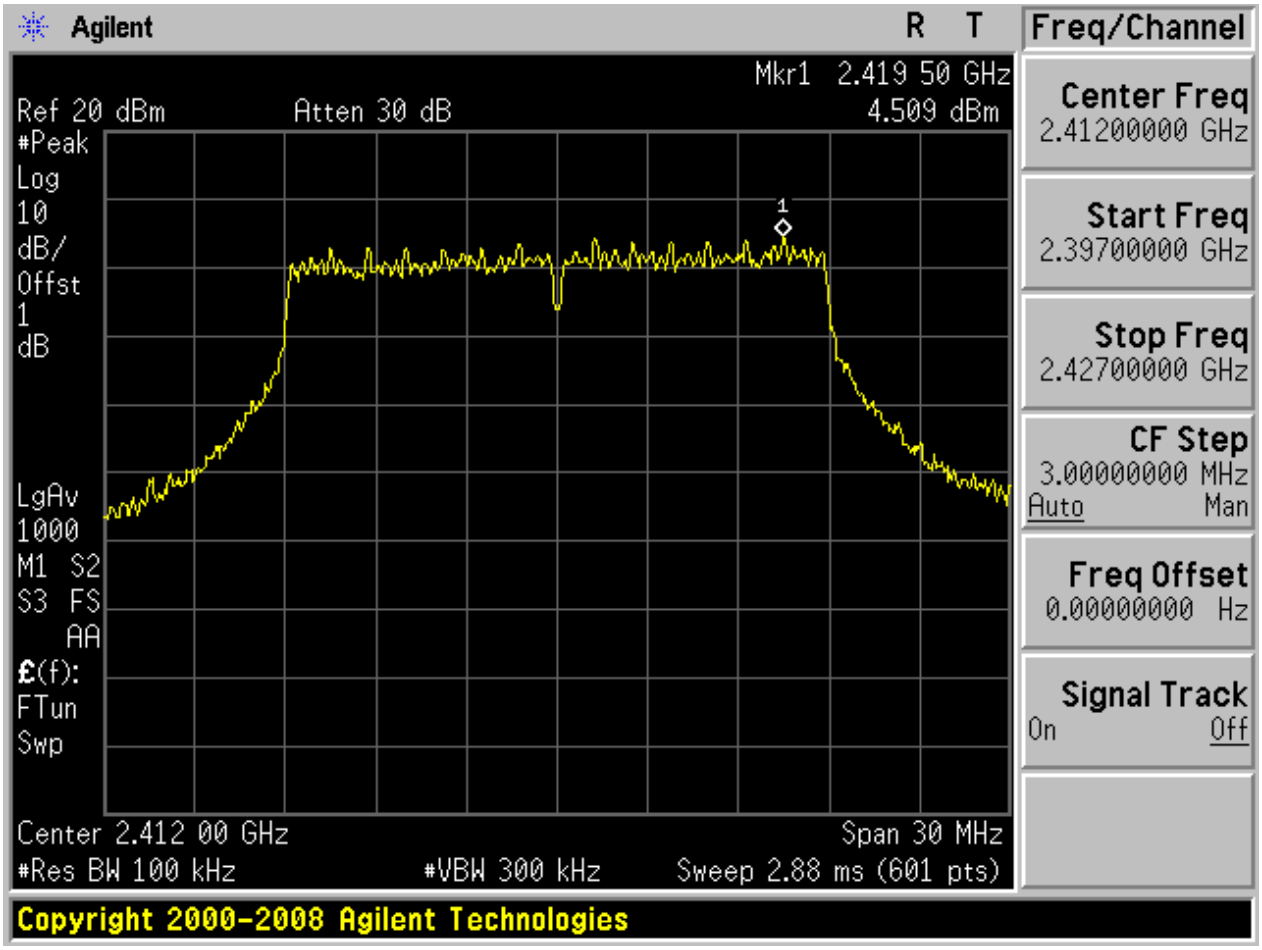

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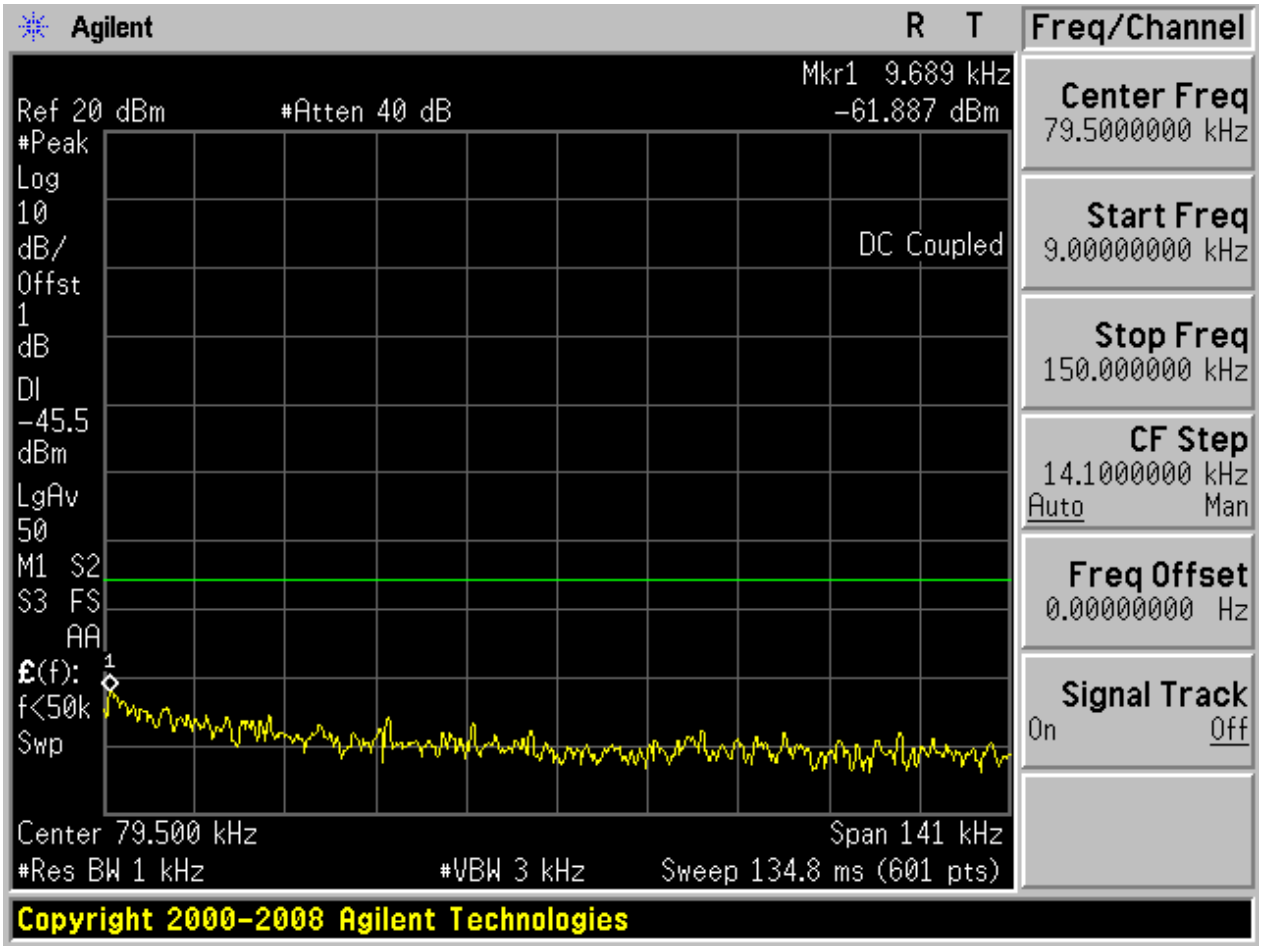
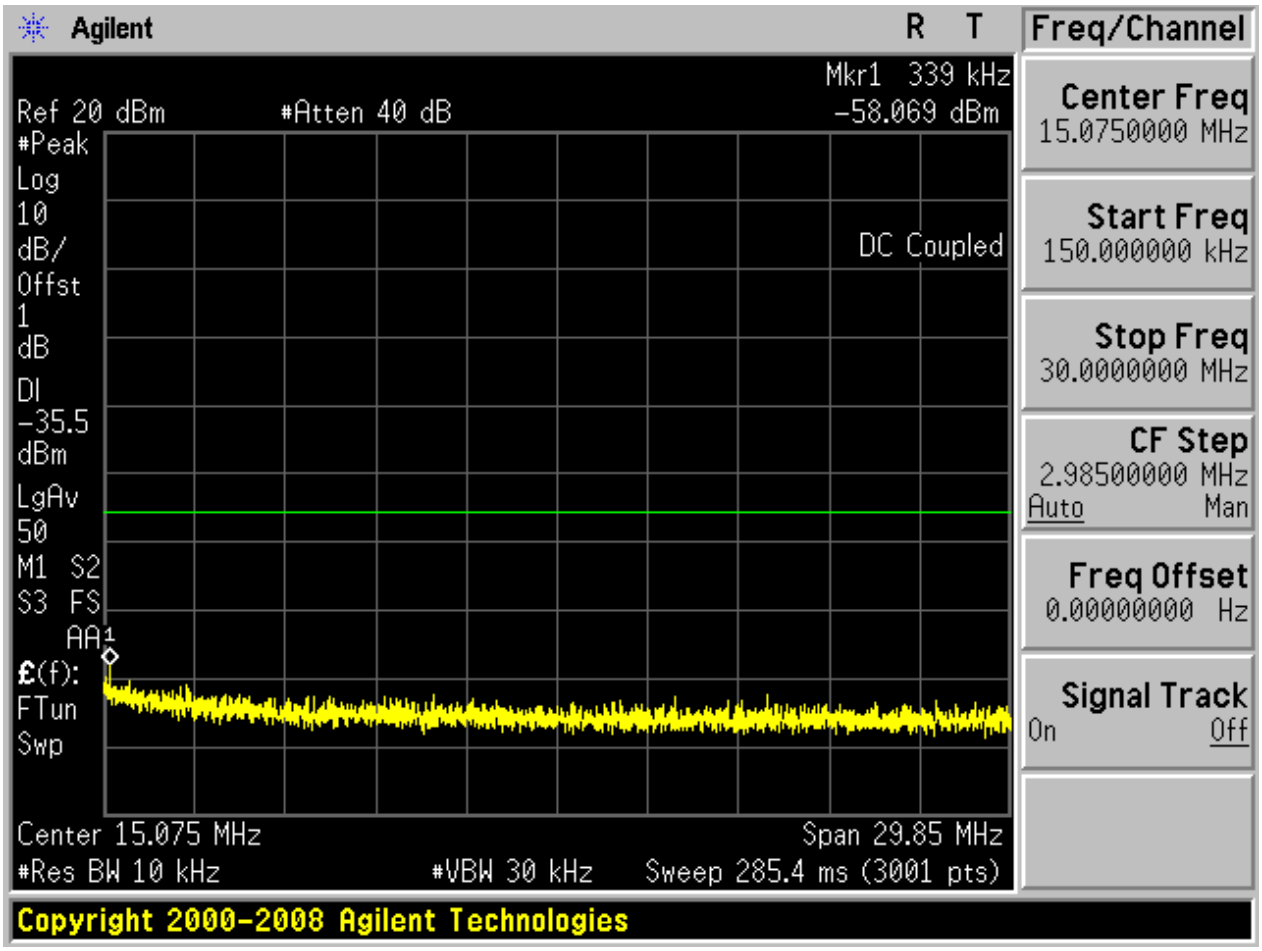

Agilent
R T
Freq/Channel
Mkr1 9.689 kHz
Ref 20 dBm
#Atten 40 dB
-61.887 dBm
#Peak
Log
10
dB/
Offst
1
dB
Dl
-45.5
dBm
LgAv
50
M1 S2
S3 FS
AA
£(f):
f<50k
Swp
DC Coupled
Center Freq
79.5000000 kHz
Start Freq
9.00000000 kHz
Stop Freq
150.000000 kHz
CF Step
14.1000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Center 79.500 kHz
Span 141 kHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 134.8 ms (601 pts)
Copyright 2000-2008 Agilent Technologies



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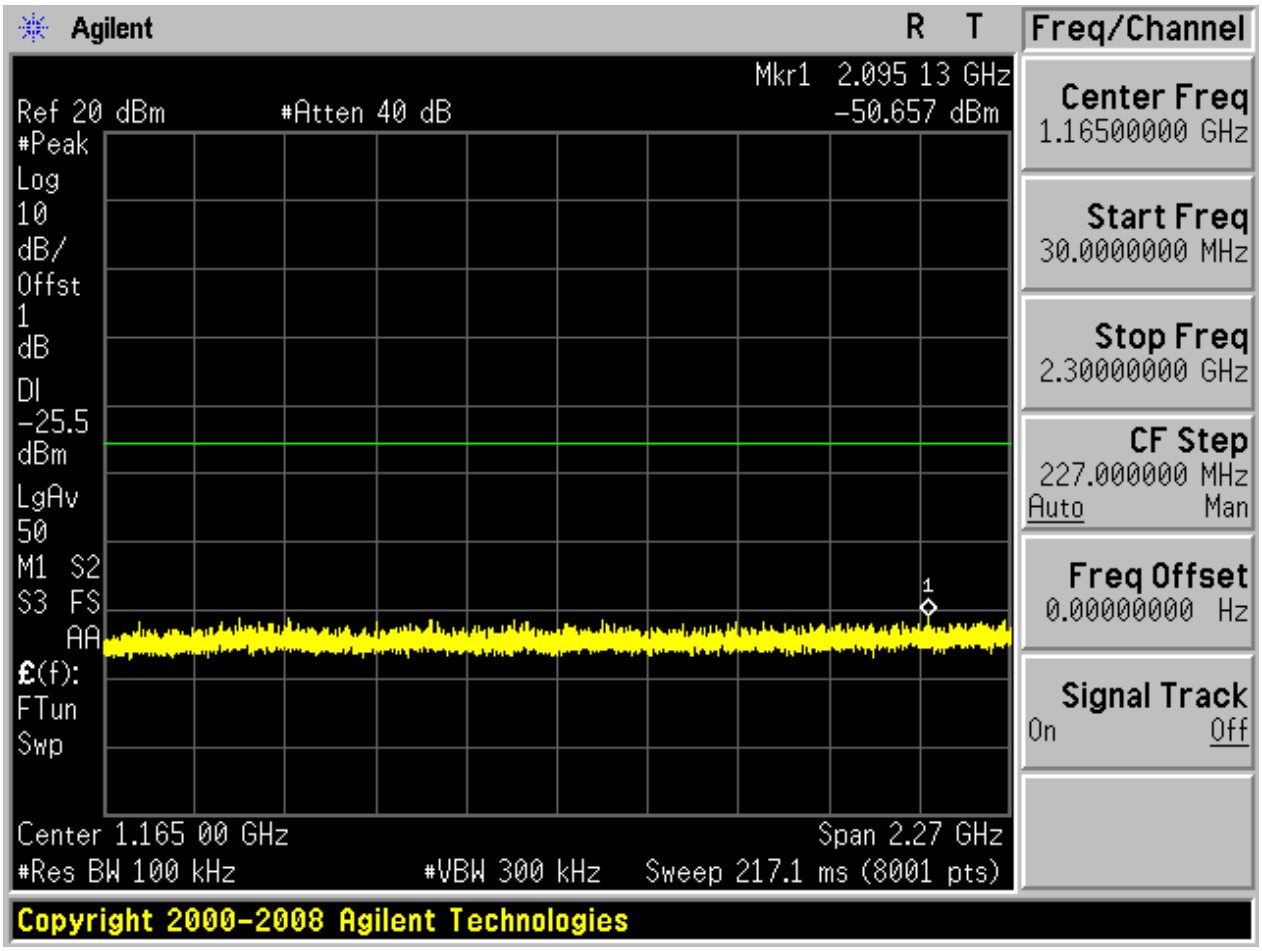

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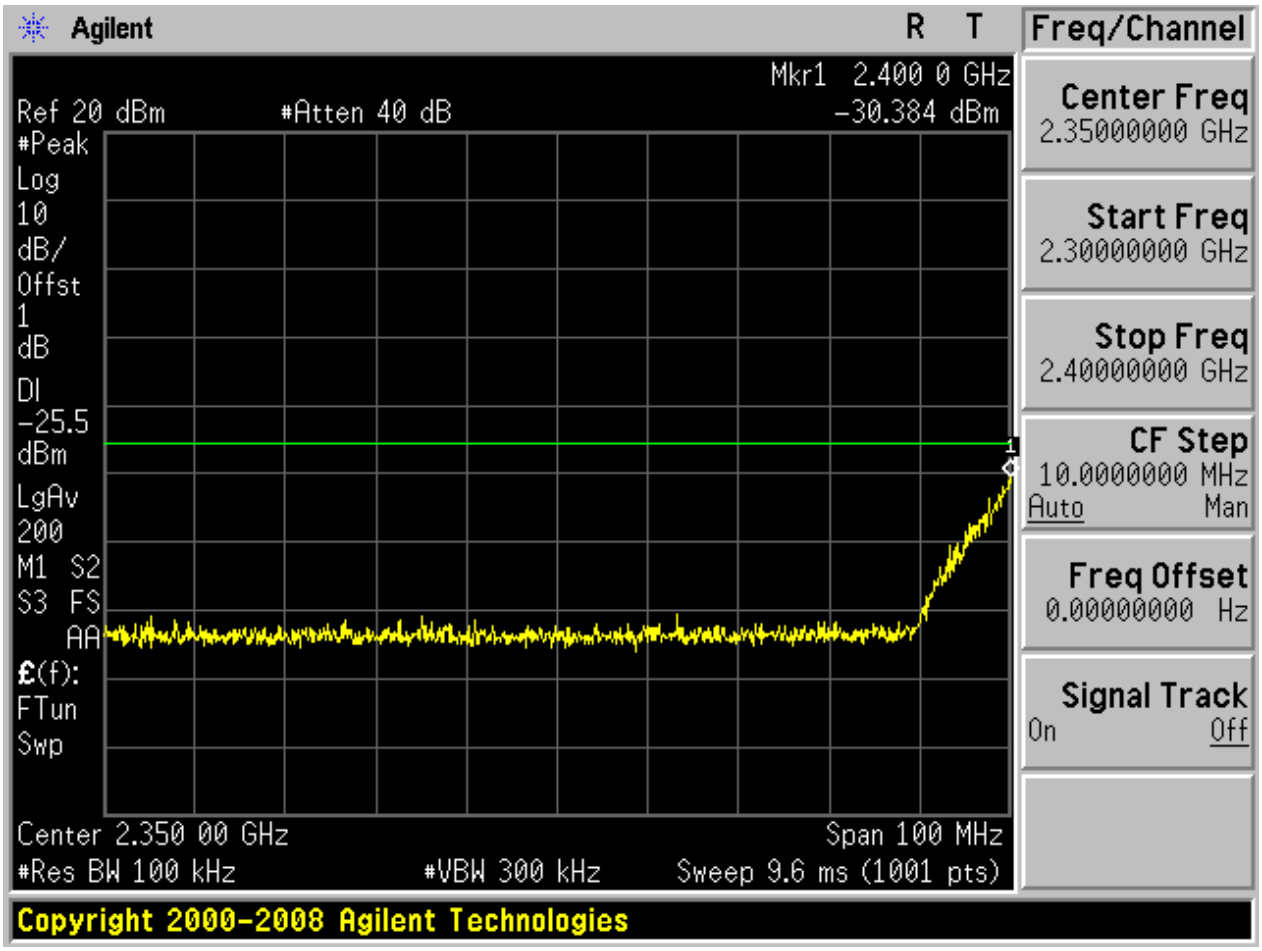

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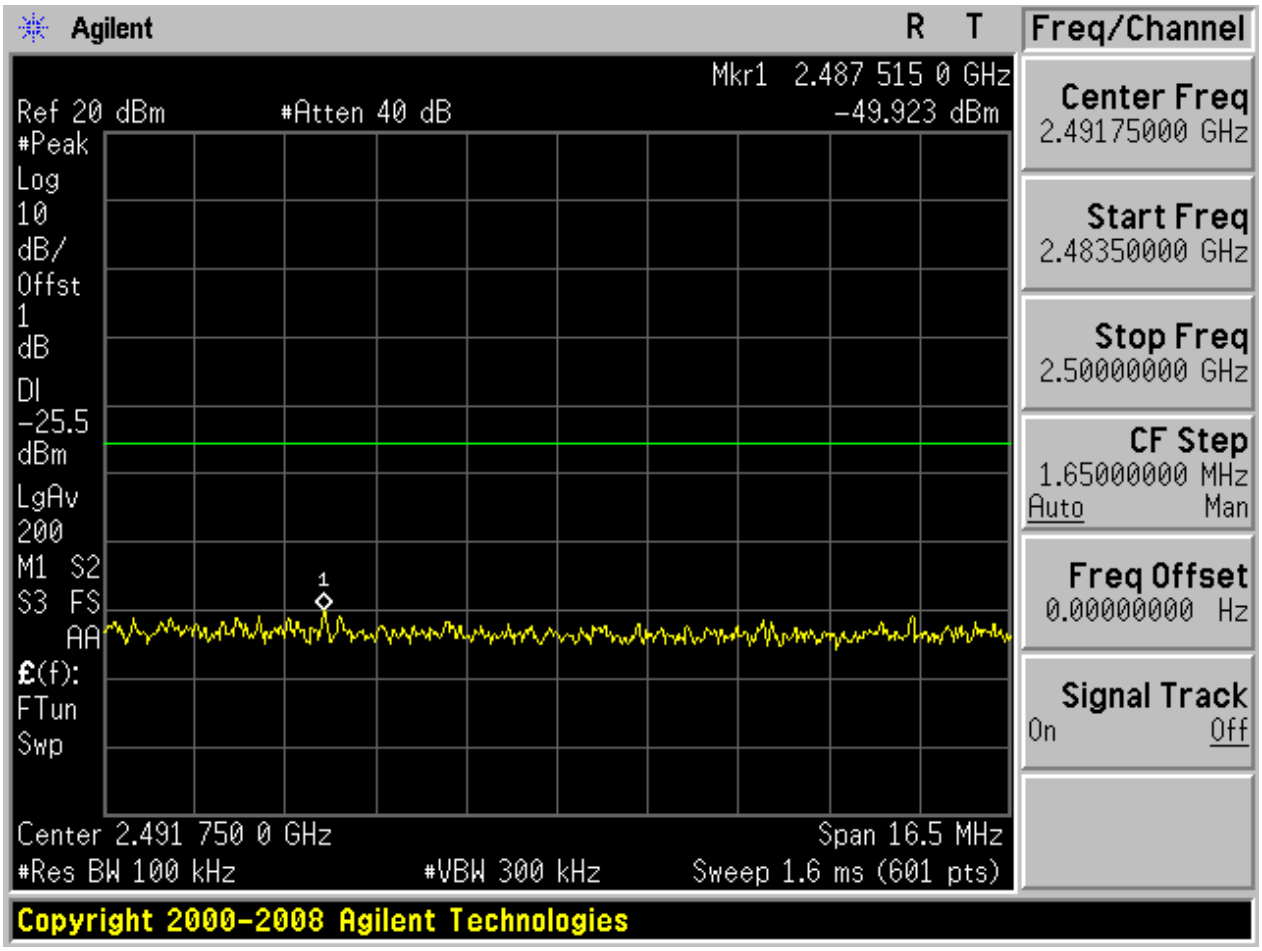

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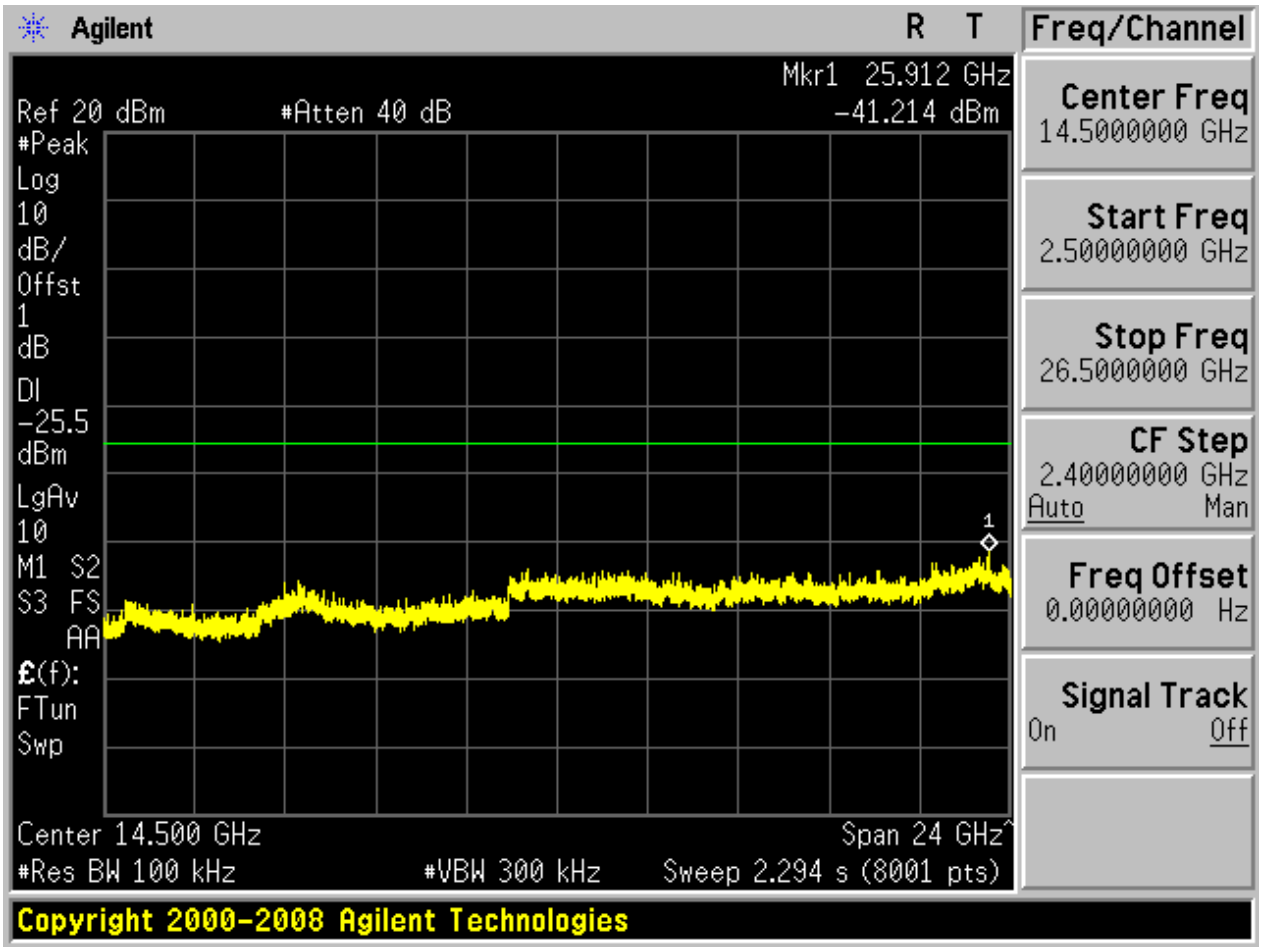

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2.15 11N20_M@Ant 1

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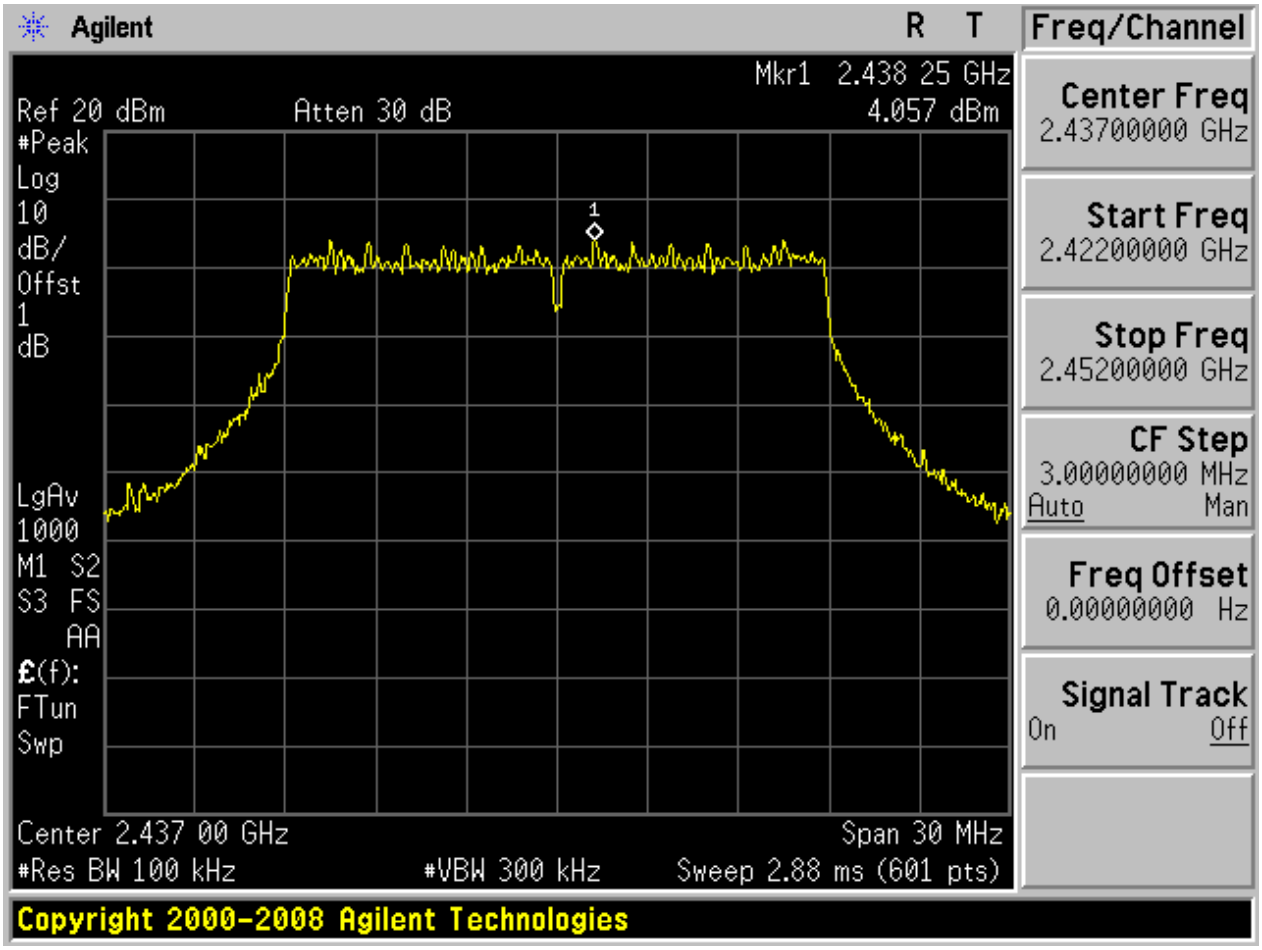

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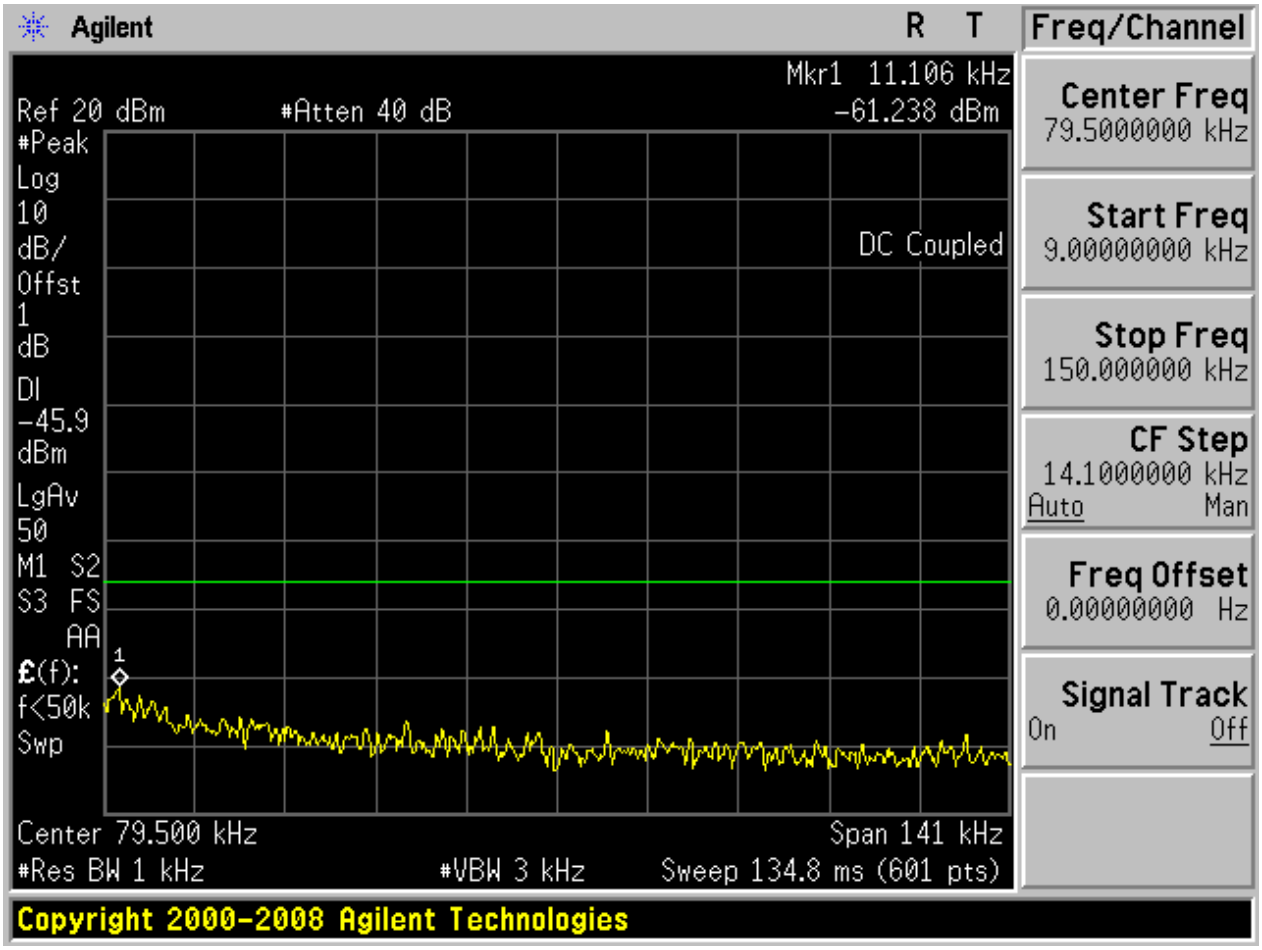

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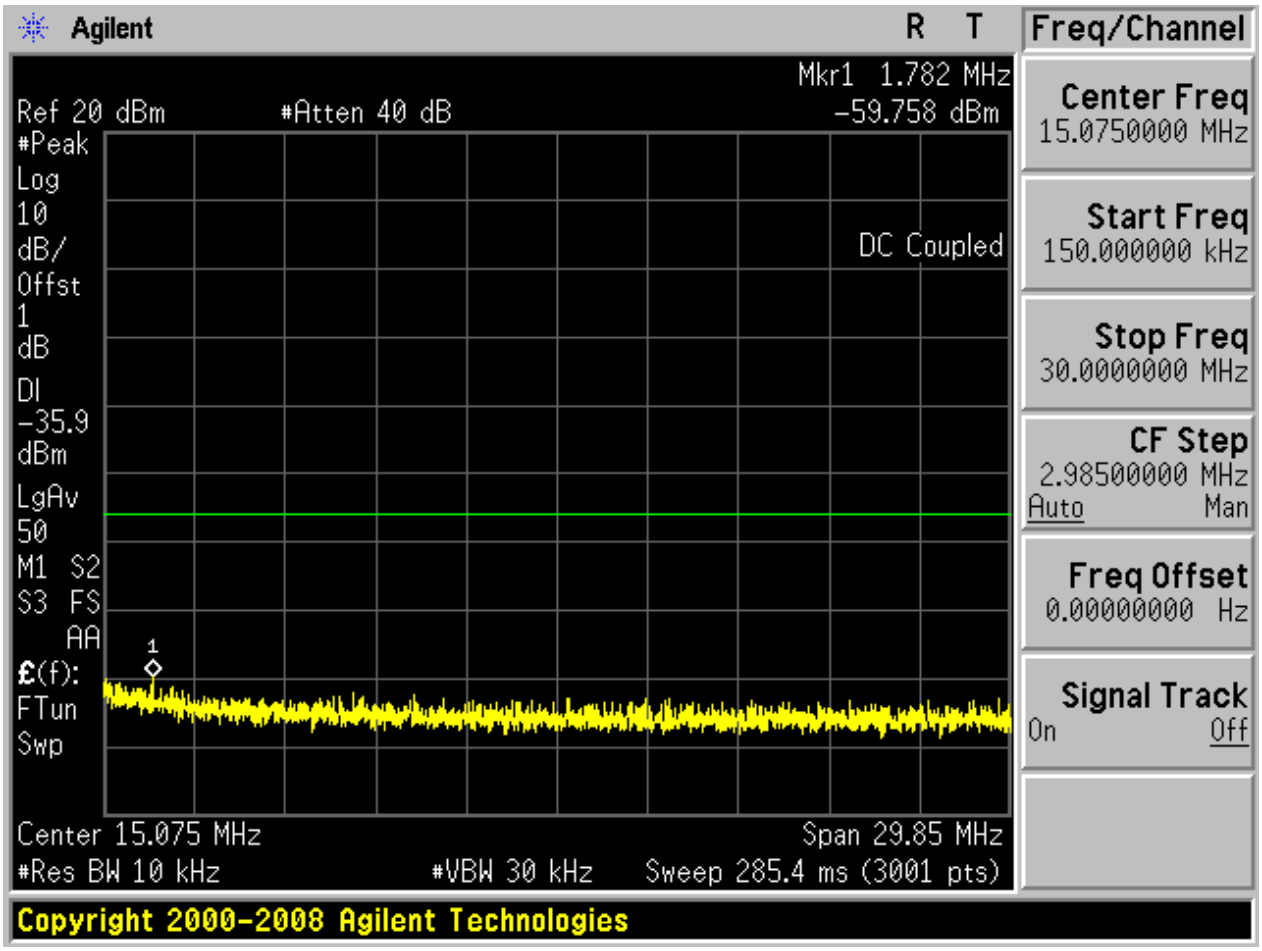

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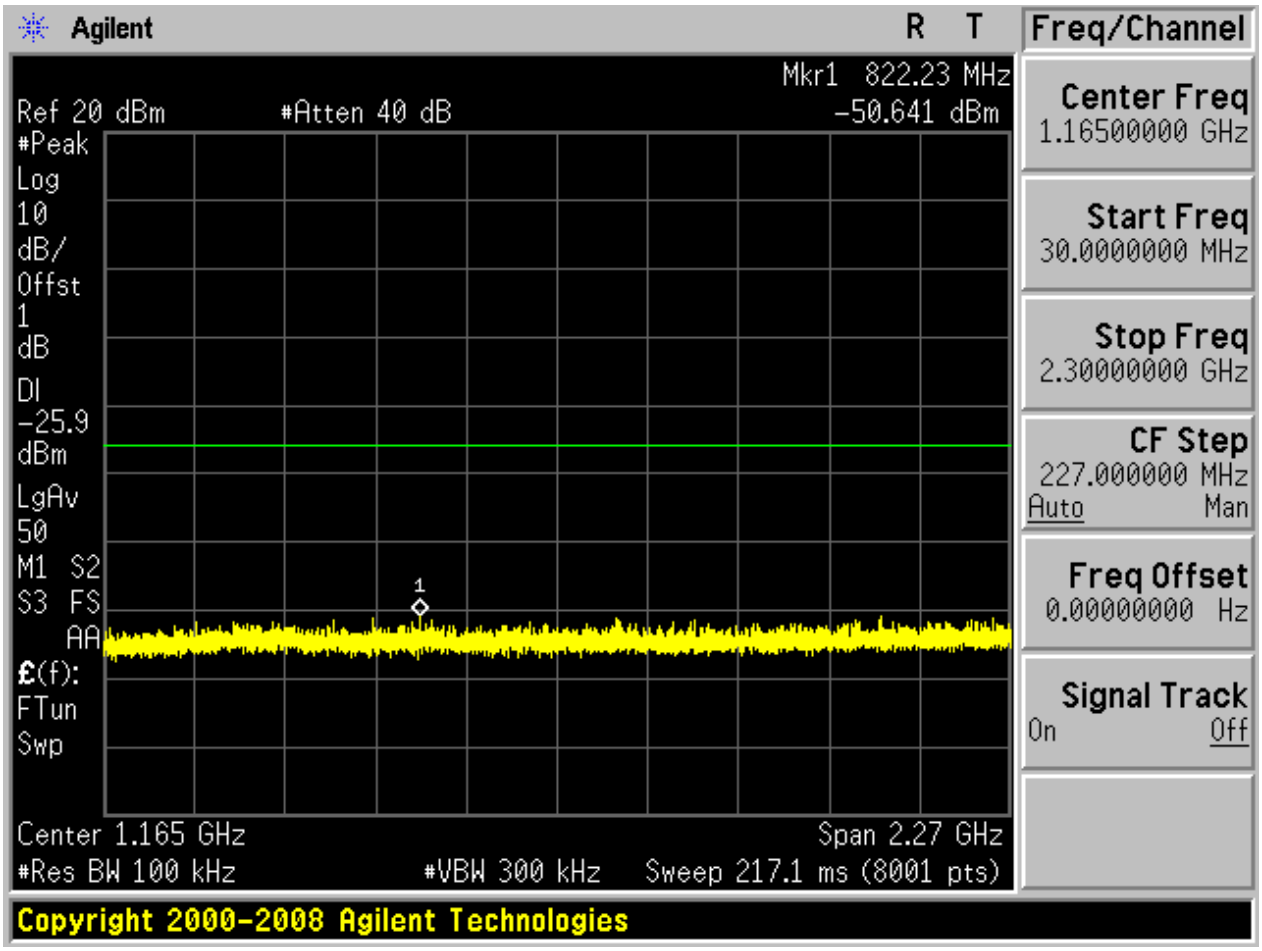

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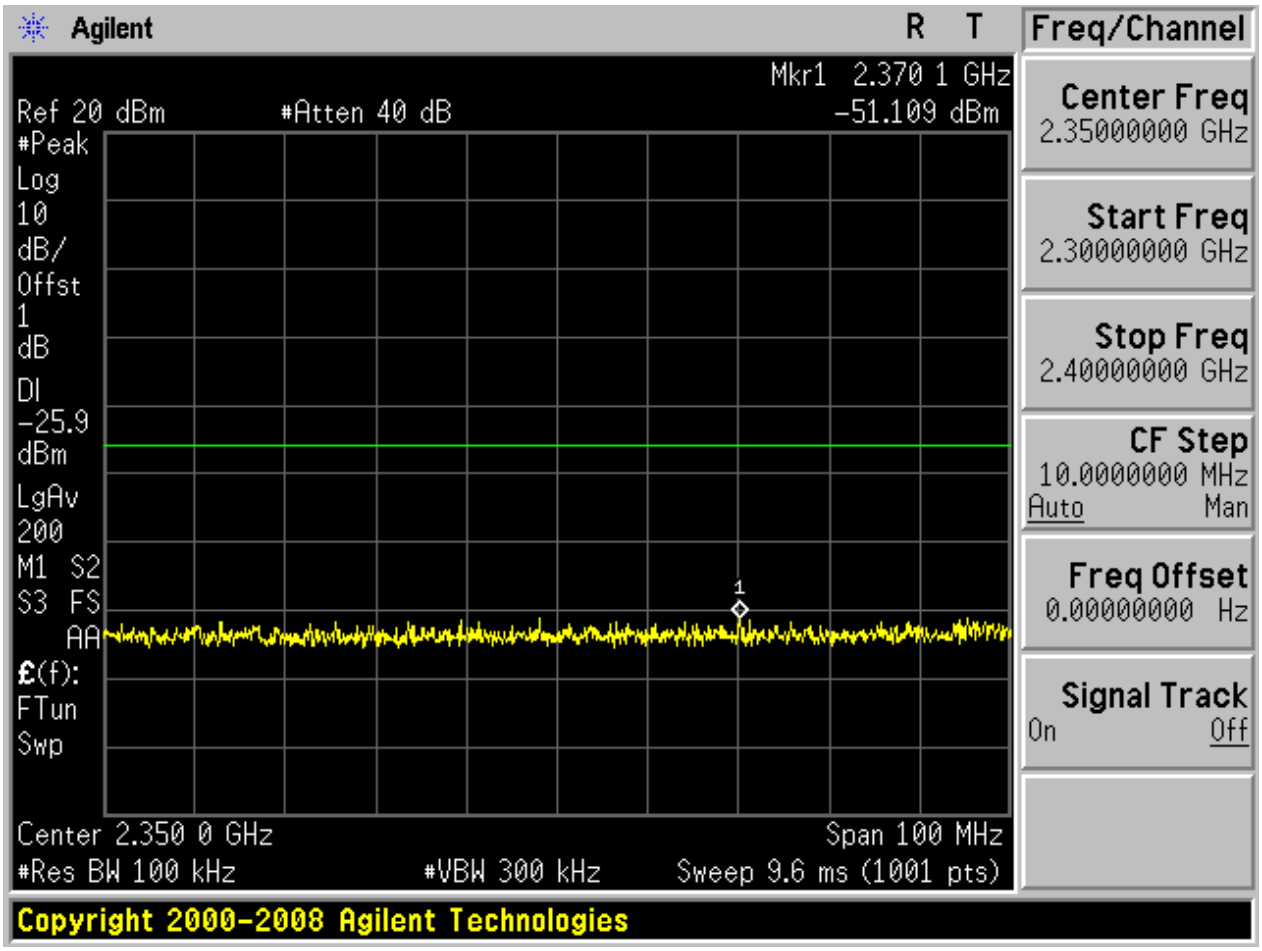

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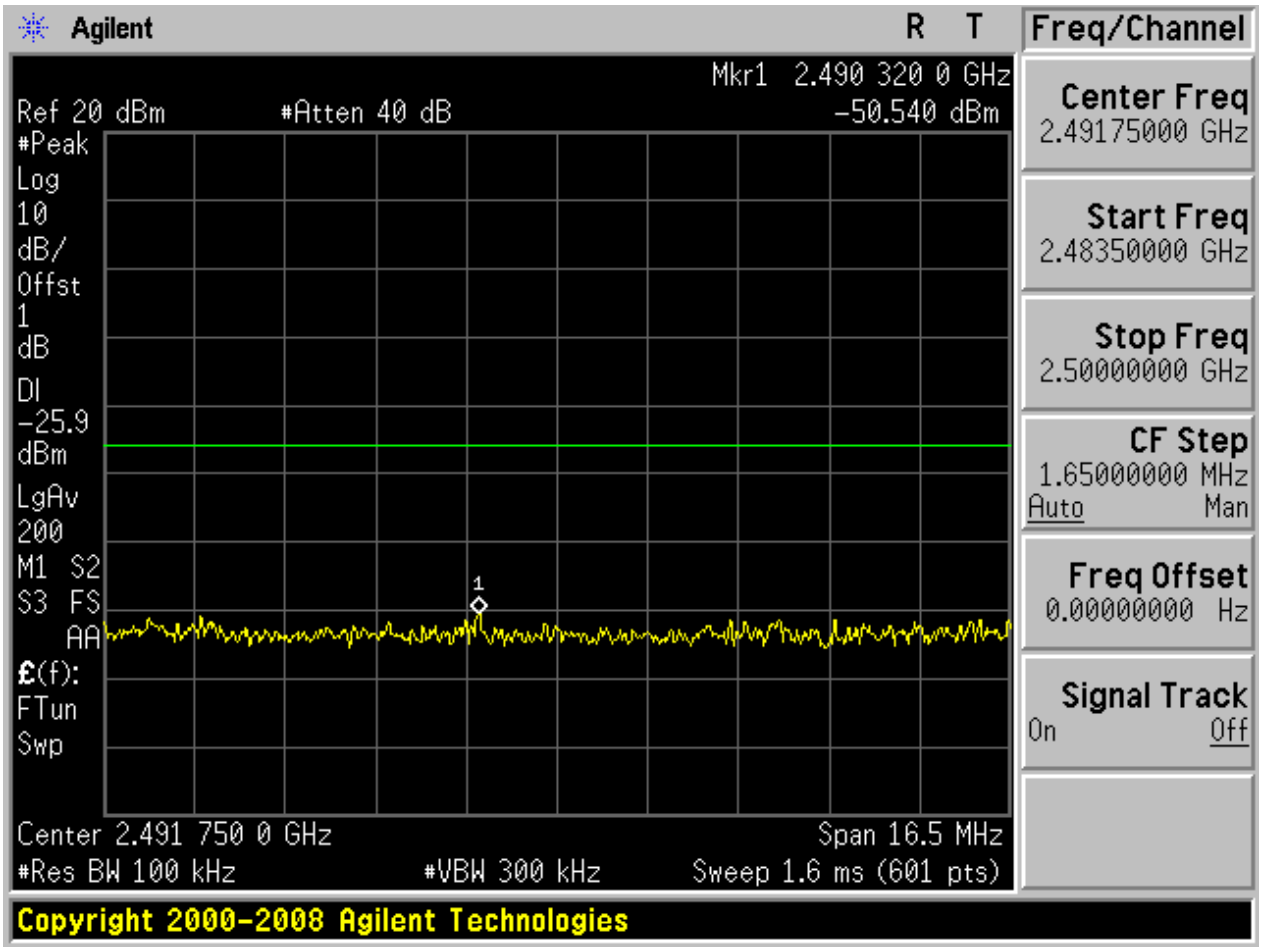

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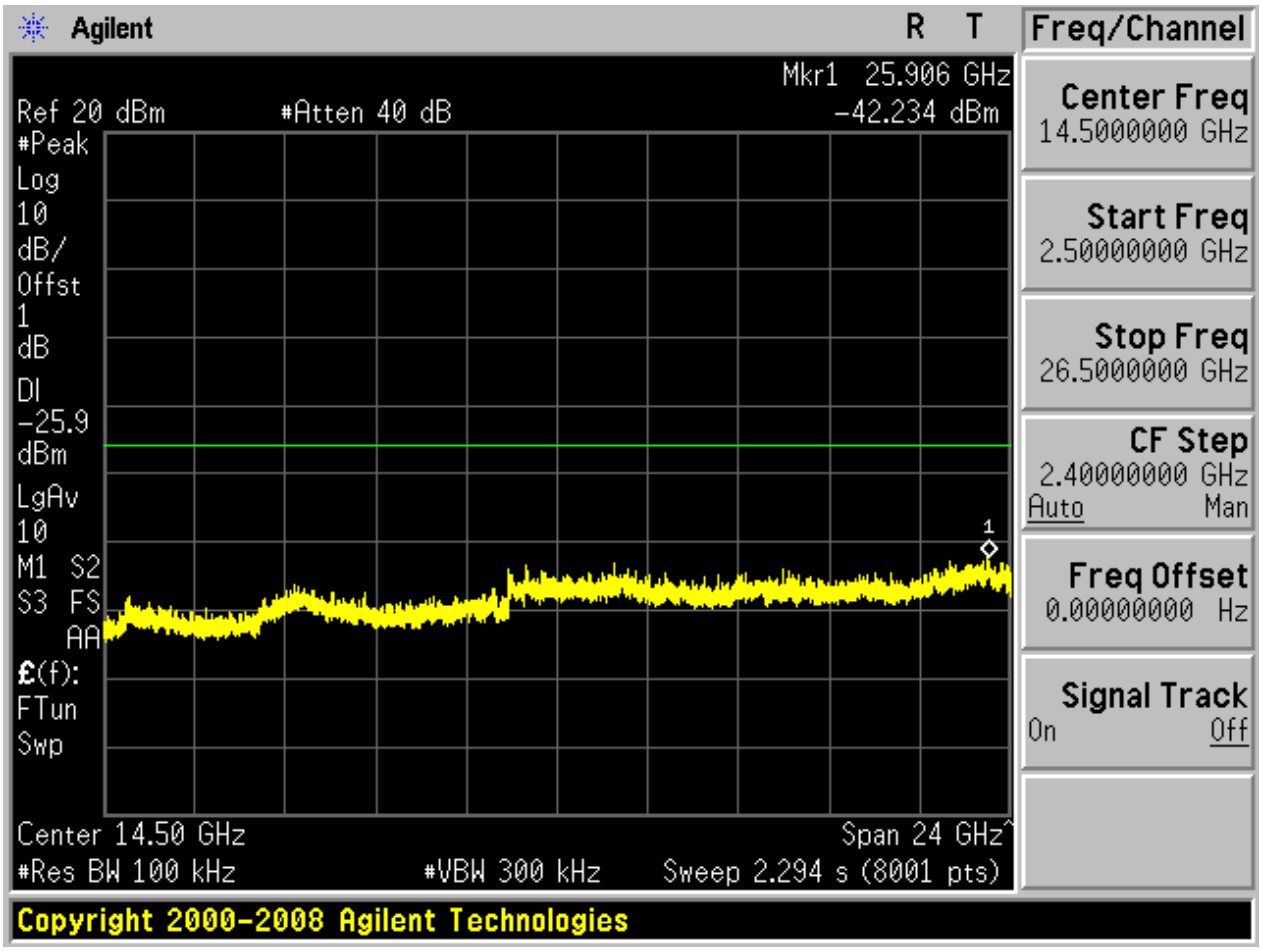

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2.17 11N20_H@Ant 1

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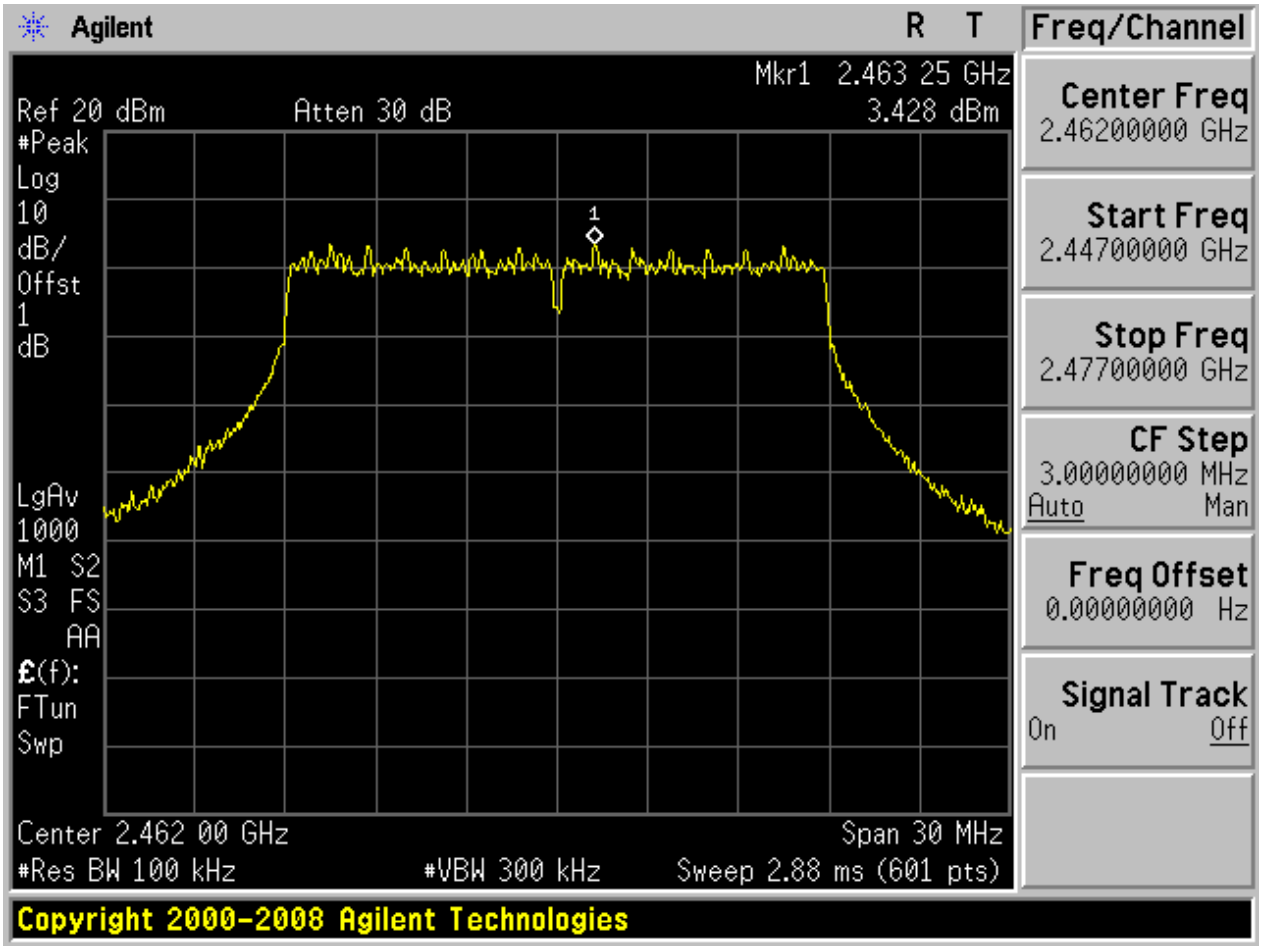

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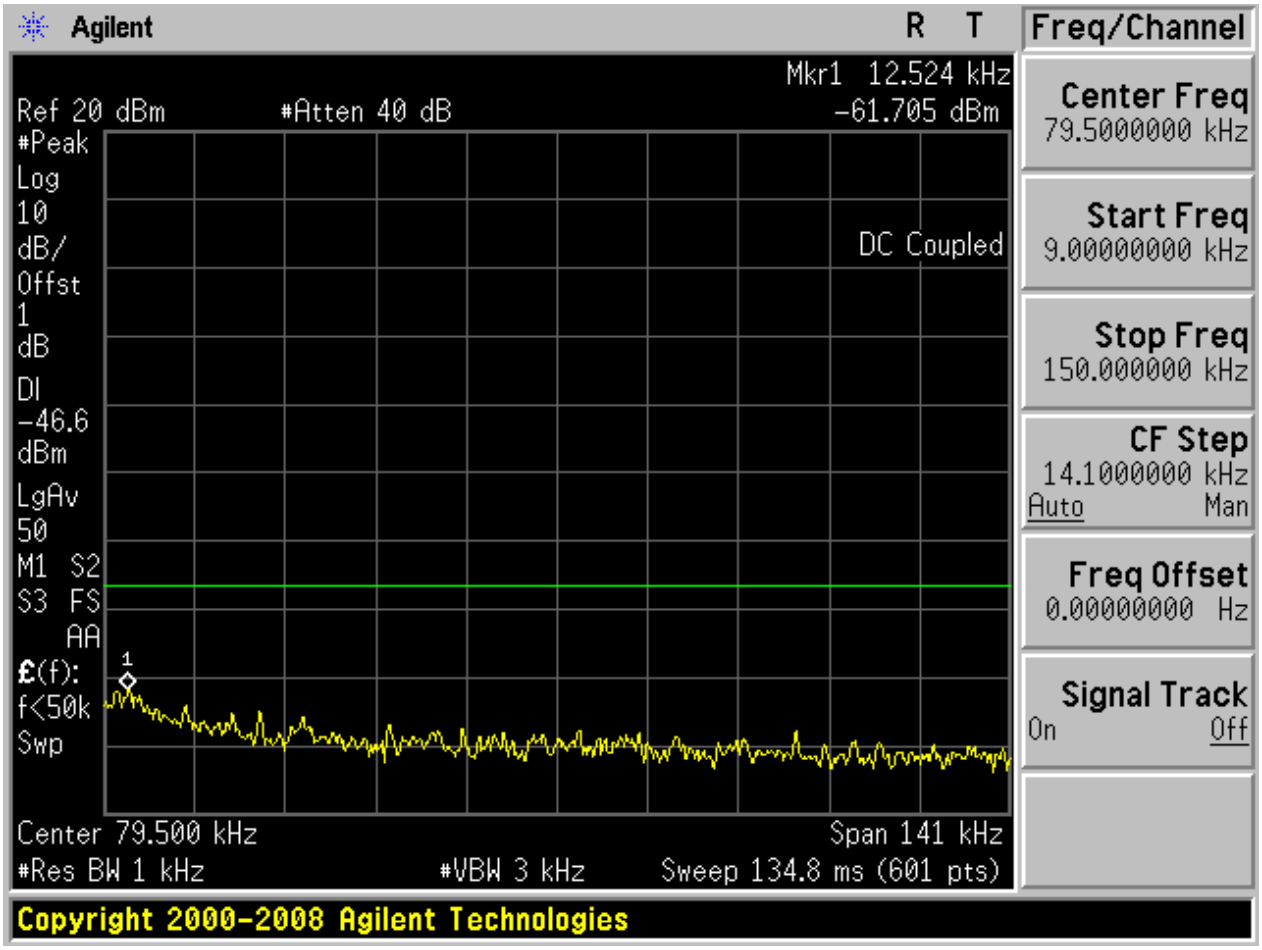

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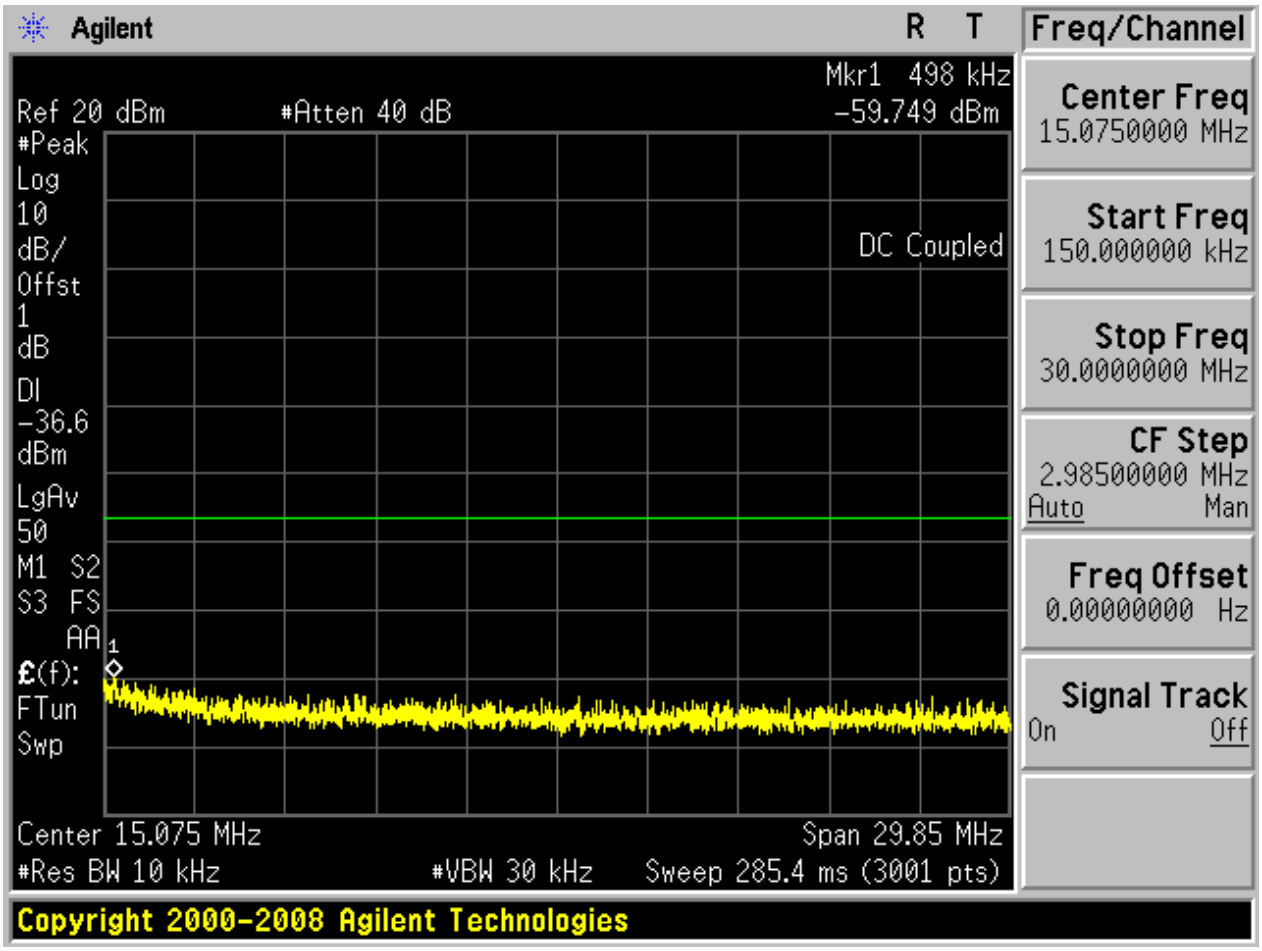

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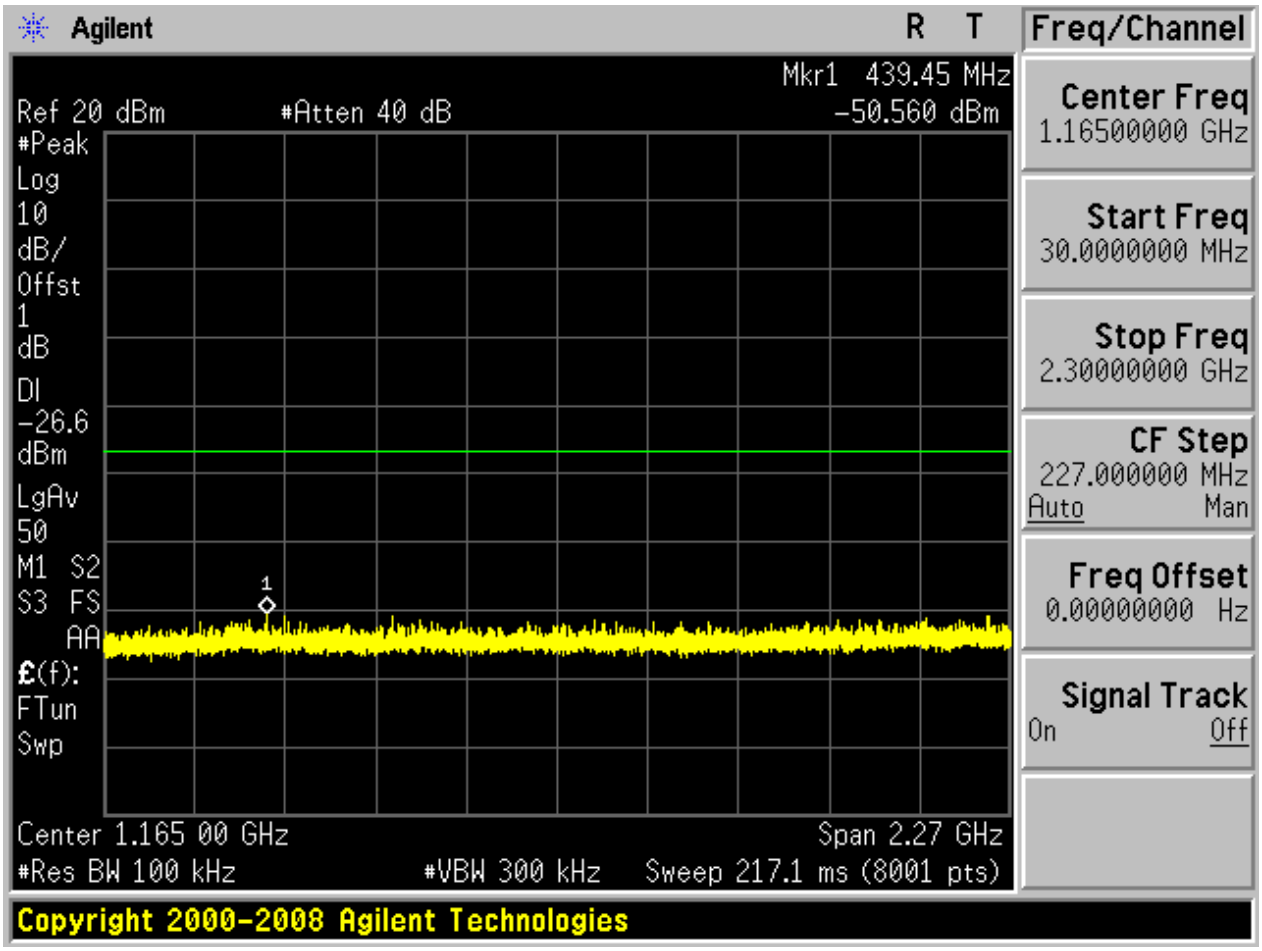

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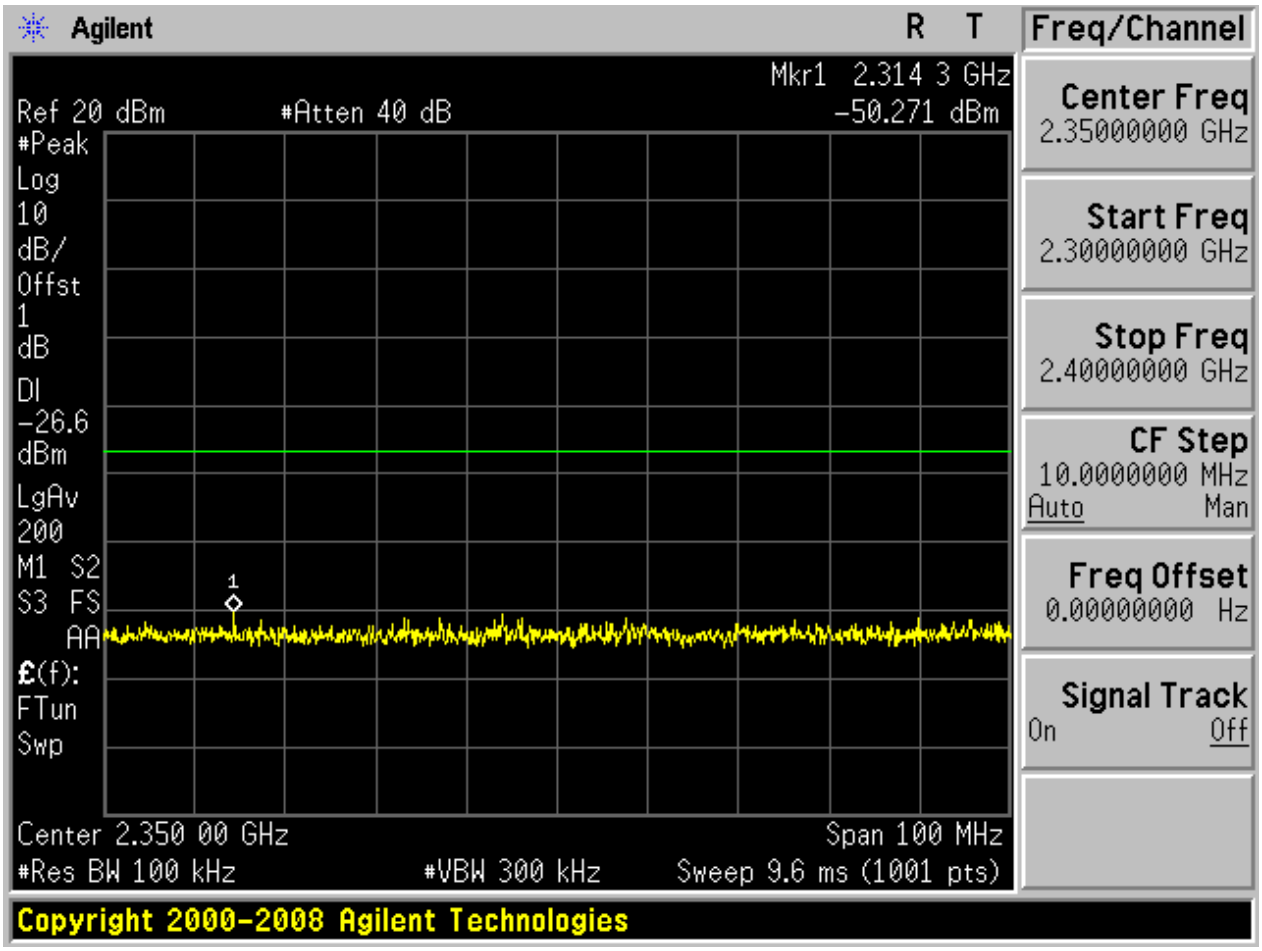

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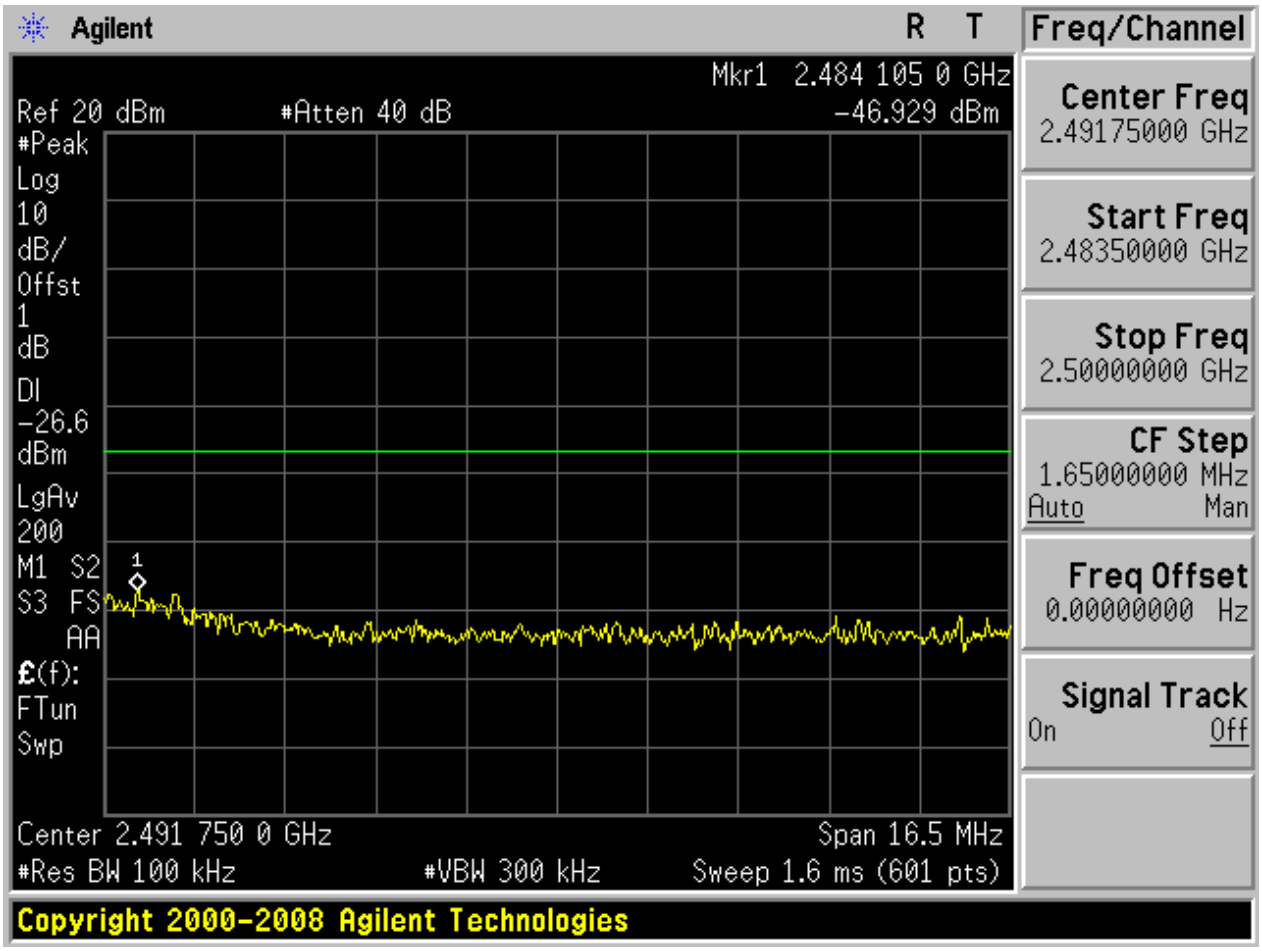

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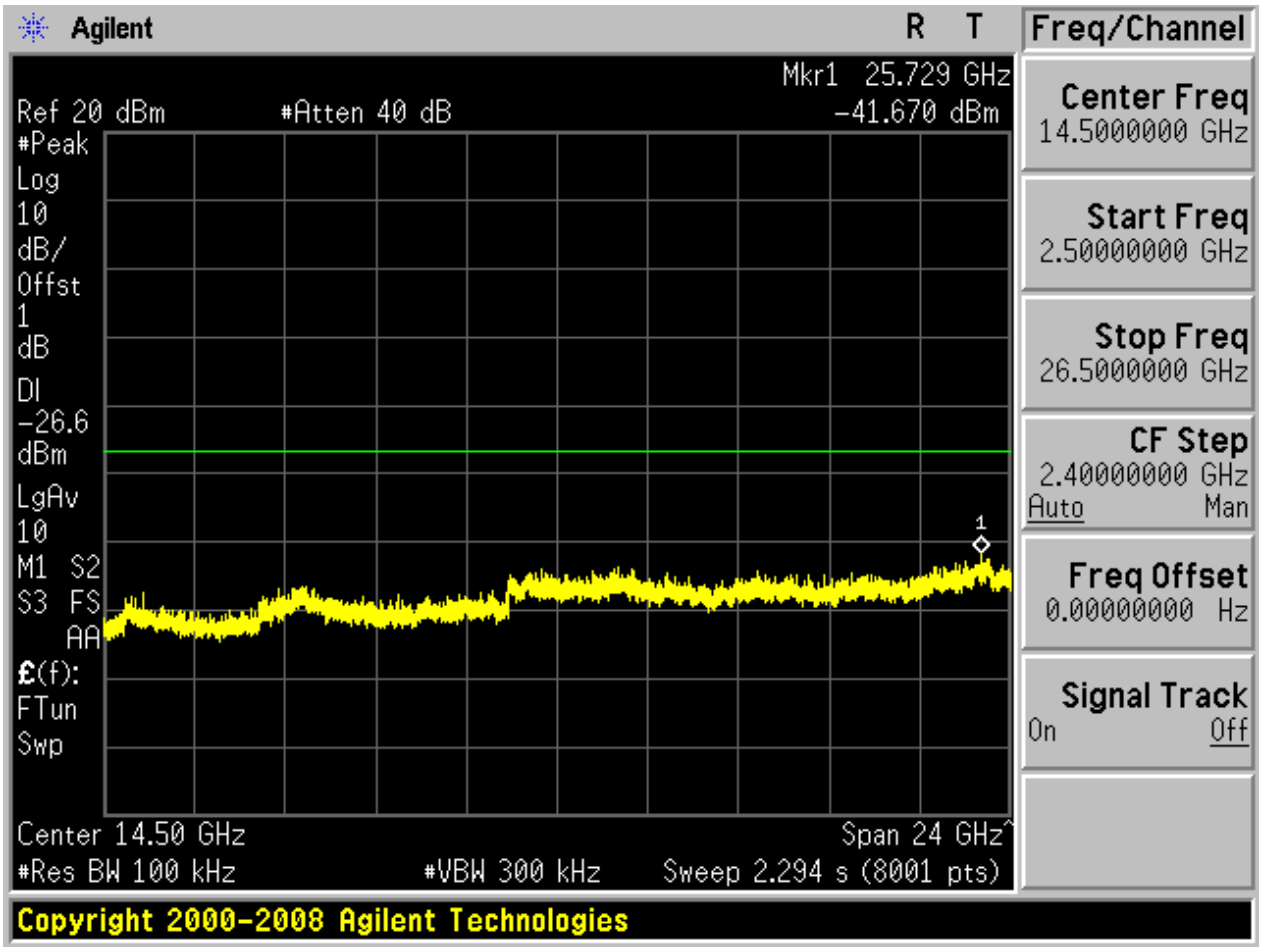

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2.19 11N40_L@Ant 1

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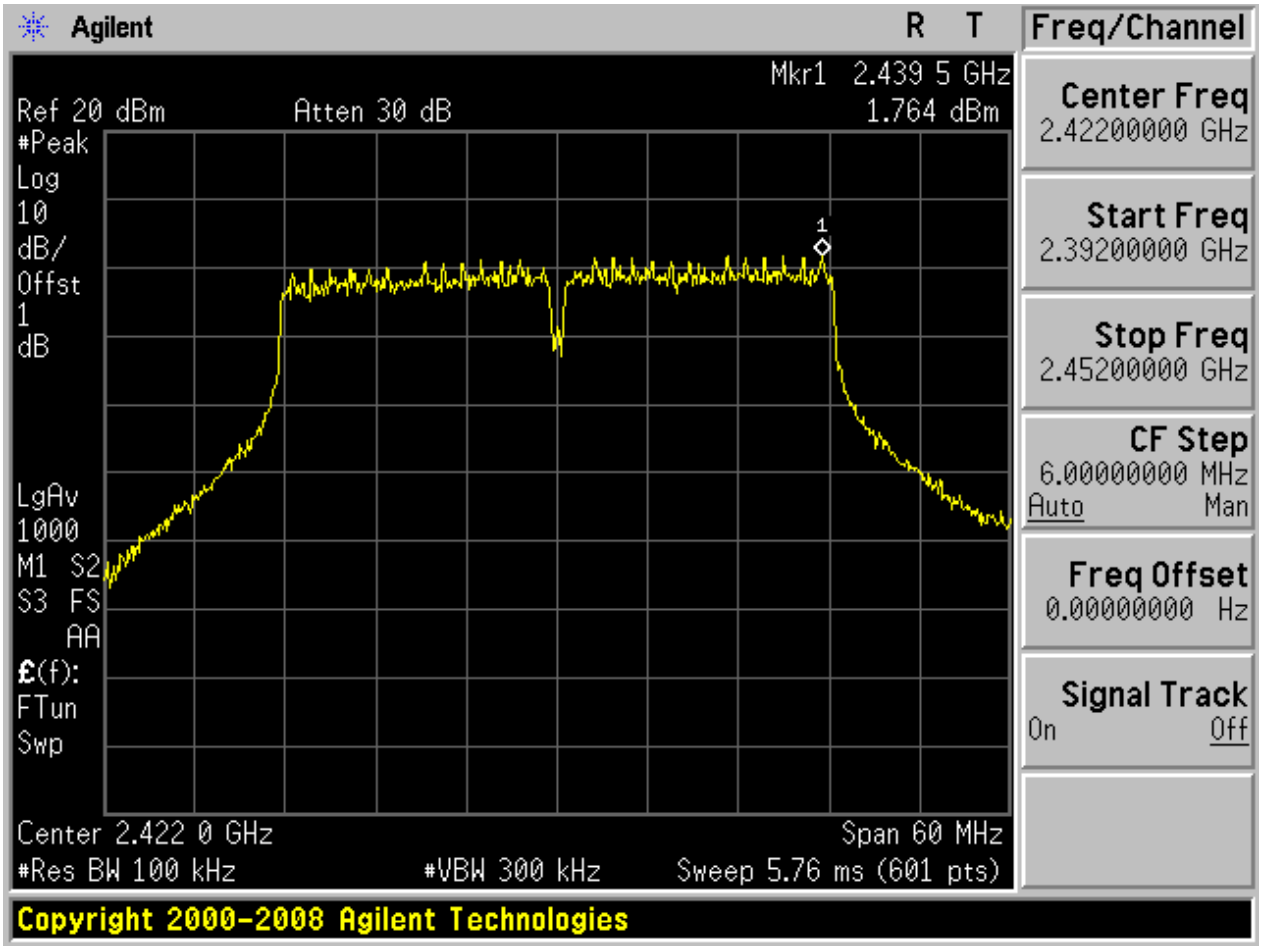

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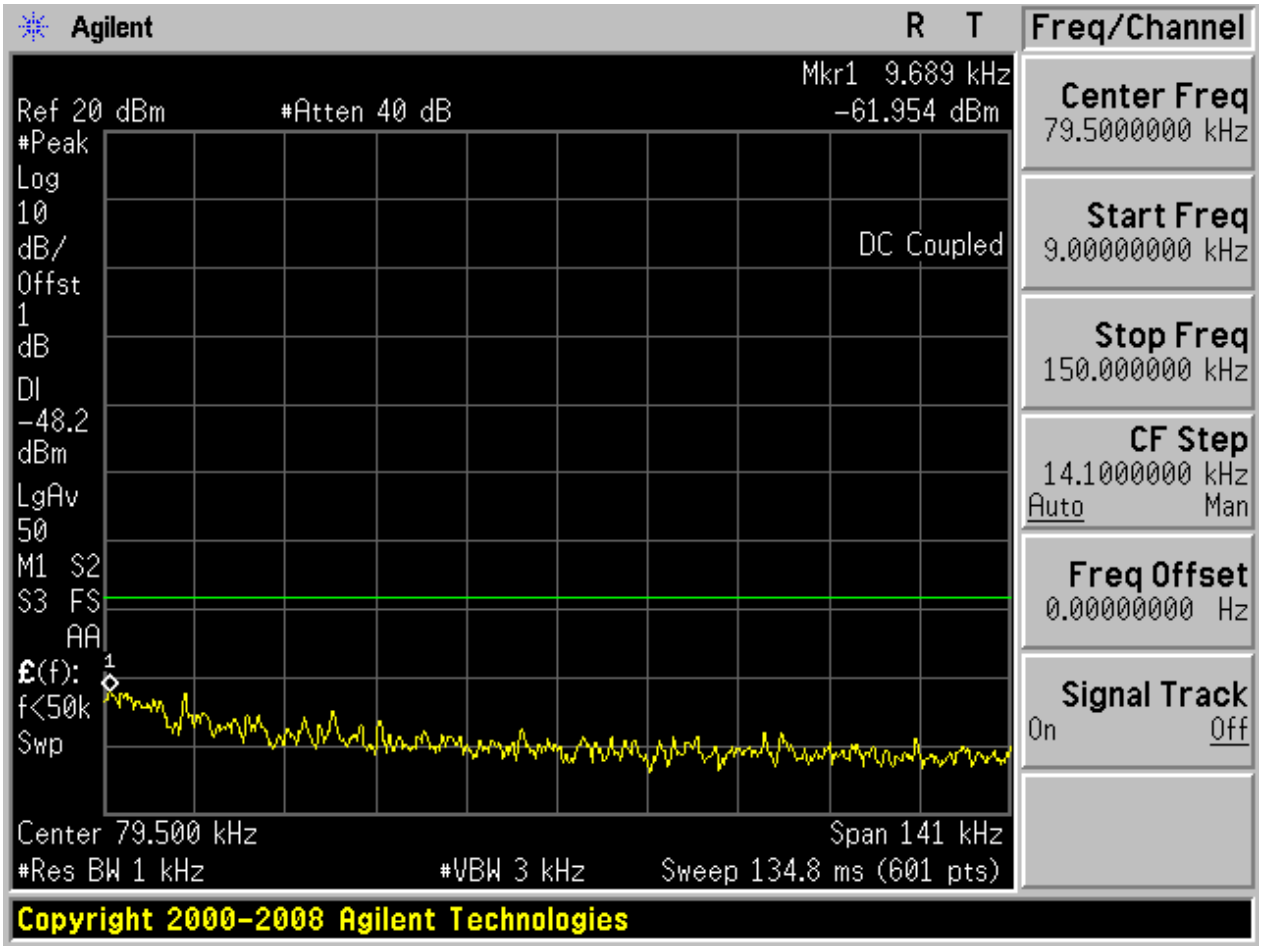

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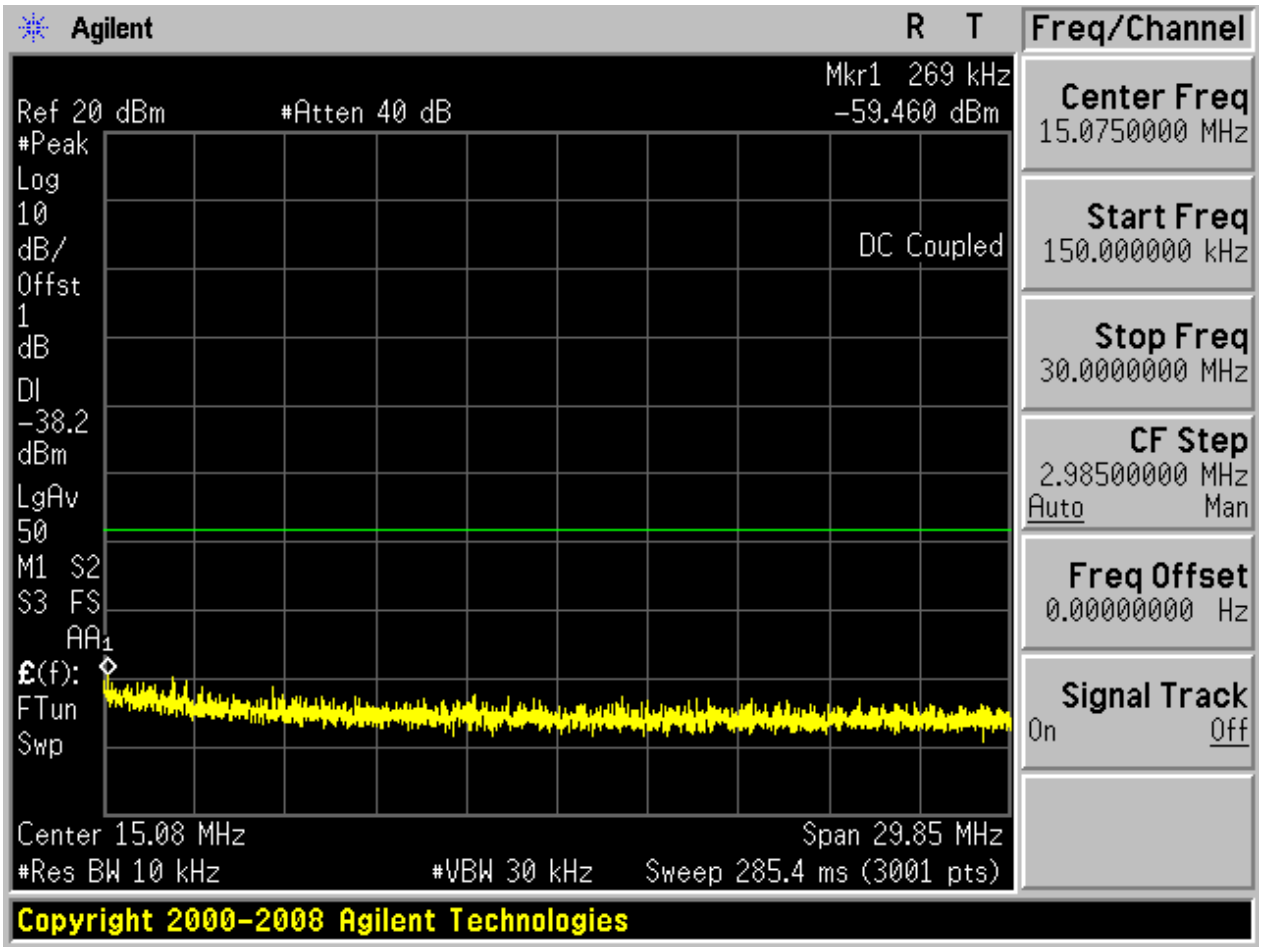

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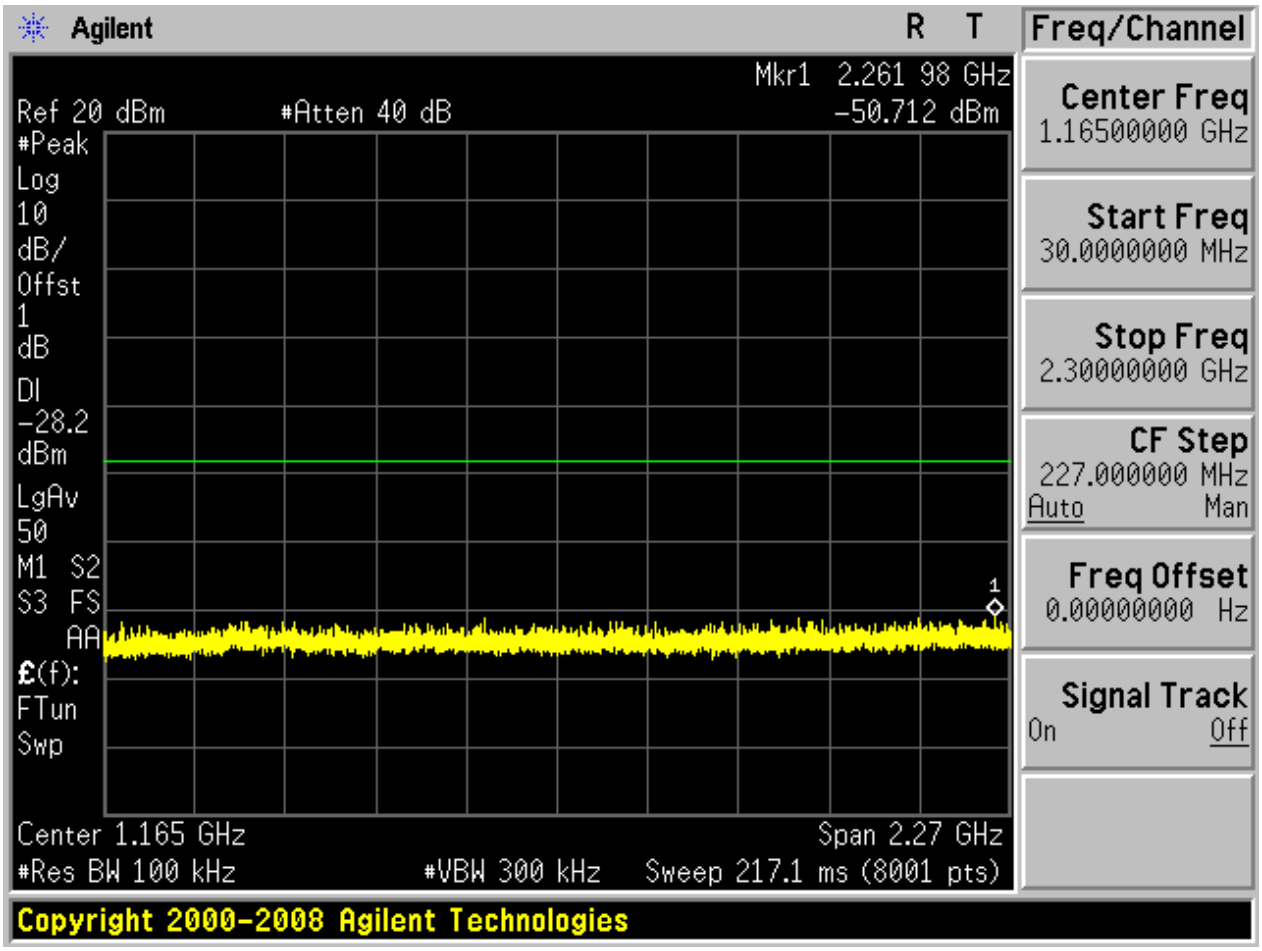

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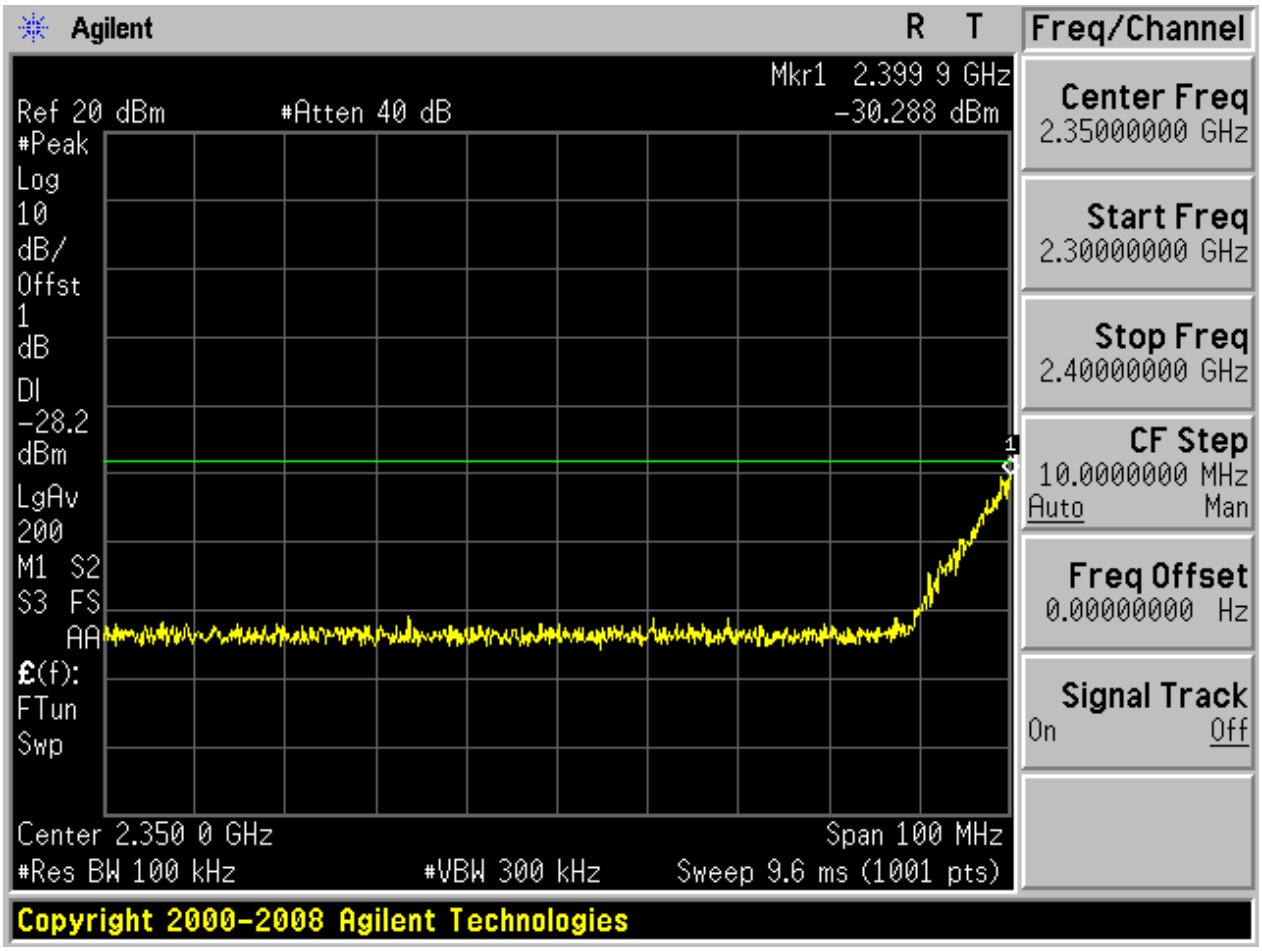

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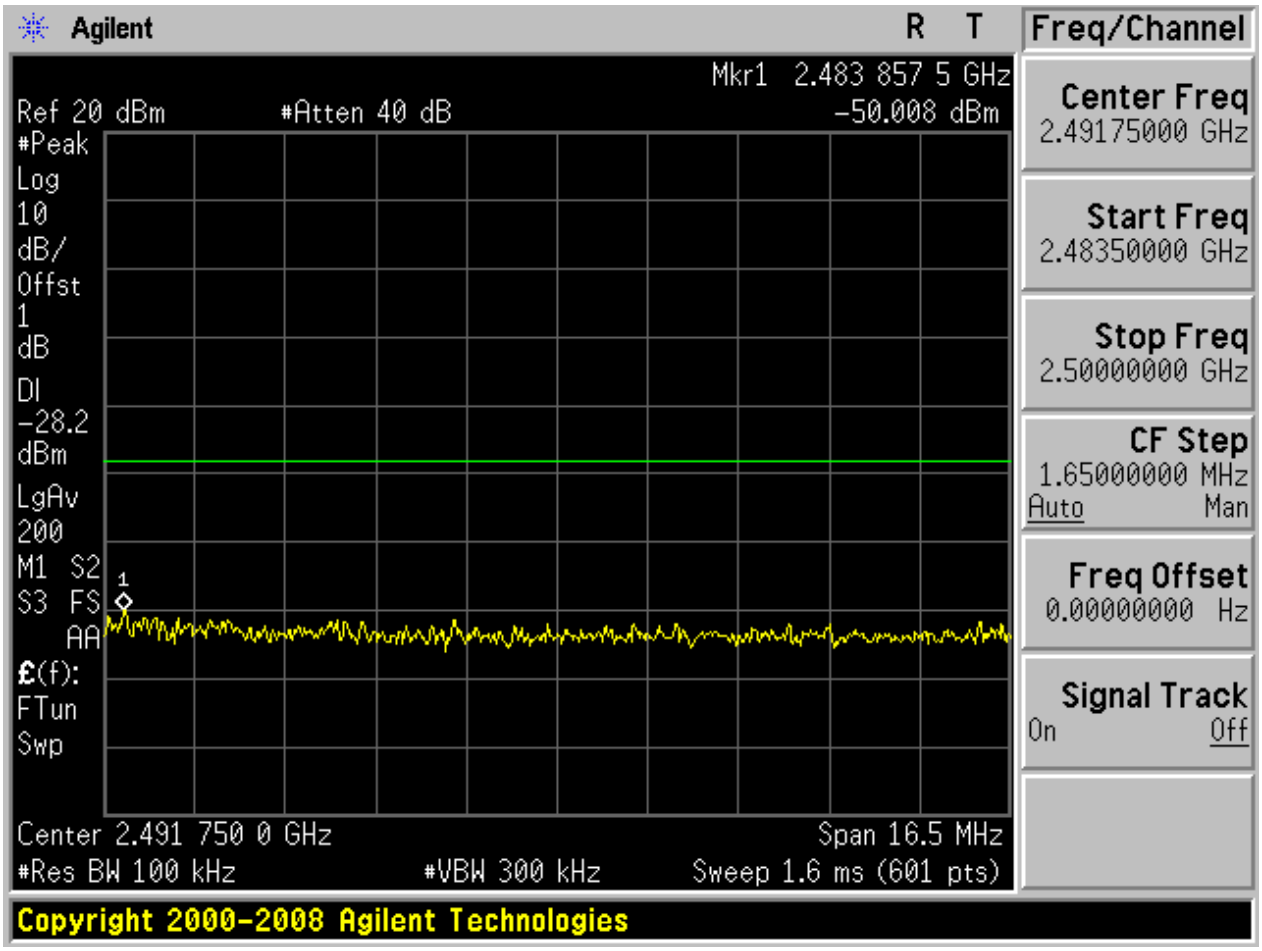
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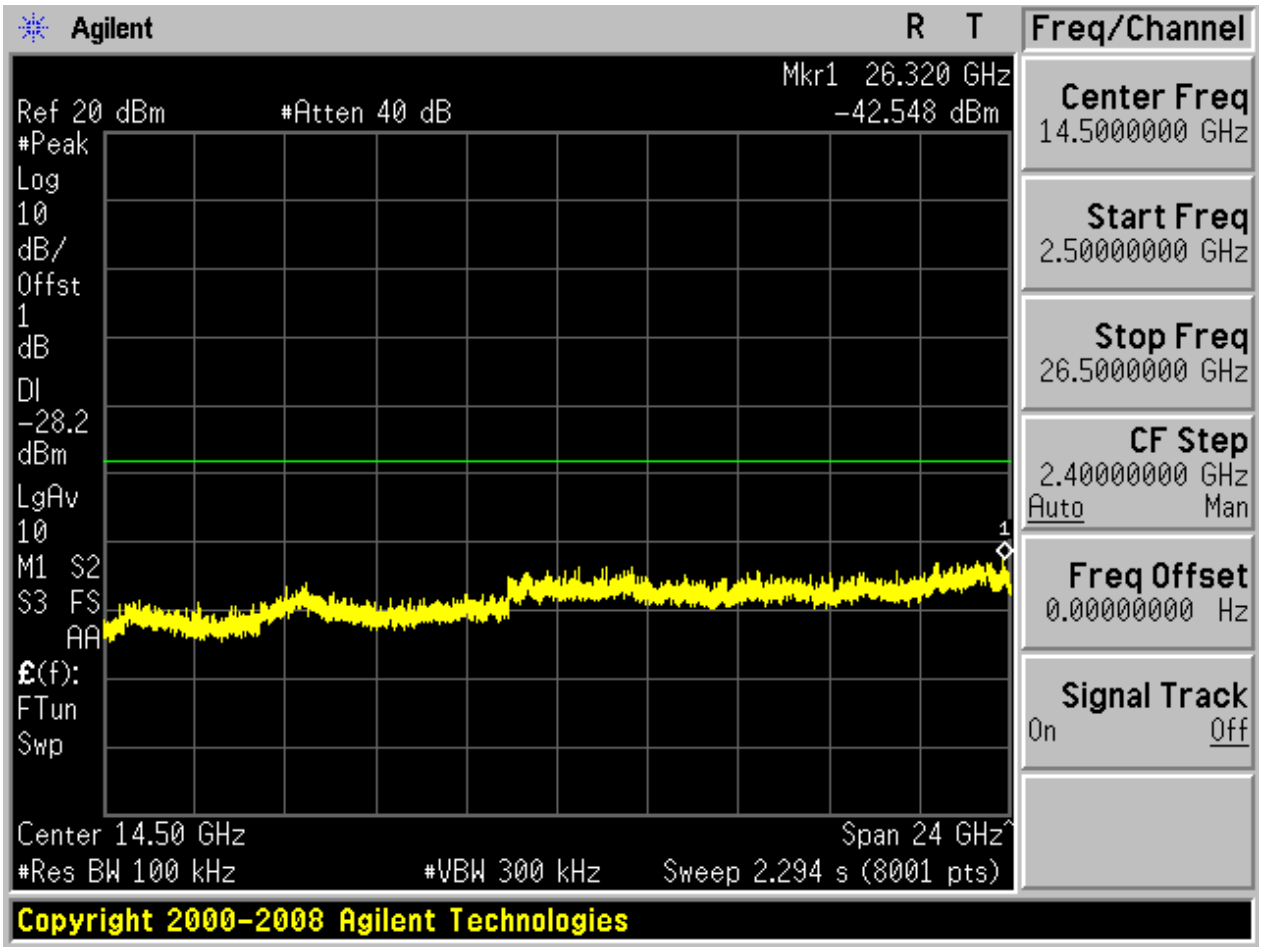
R T
Freq/Channel
Mkr1 2.483 857 5 GHz
Ref 20 dBm
#Atten 40 dB
-50.008 dBm
#Peak
Log
10
dB/
Offst
1
dB
Dl
-28.2
dBm
LgAv
200
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Center Freq
2.49175000 GHz
Start Freq
2.48350000 GHz
Stop Freq
2.50000000 GHz
CF Step
1.65000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Center 2.491 750 0 GHz
Span 16.5 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.6 ms (601 pts)
Copyright 2000-2008 Agilent Technologies



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2.21 11N40_M@Ant 1

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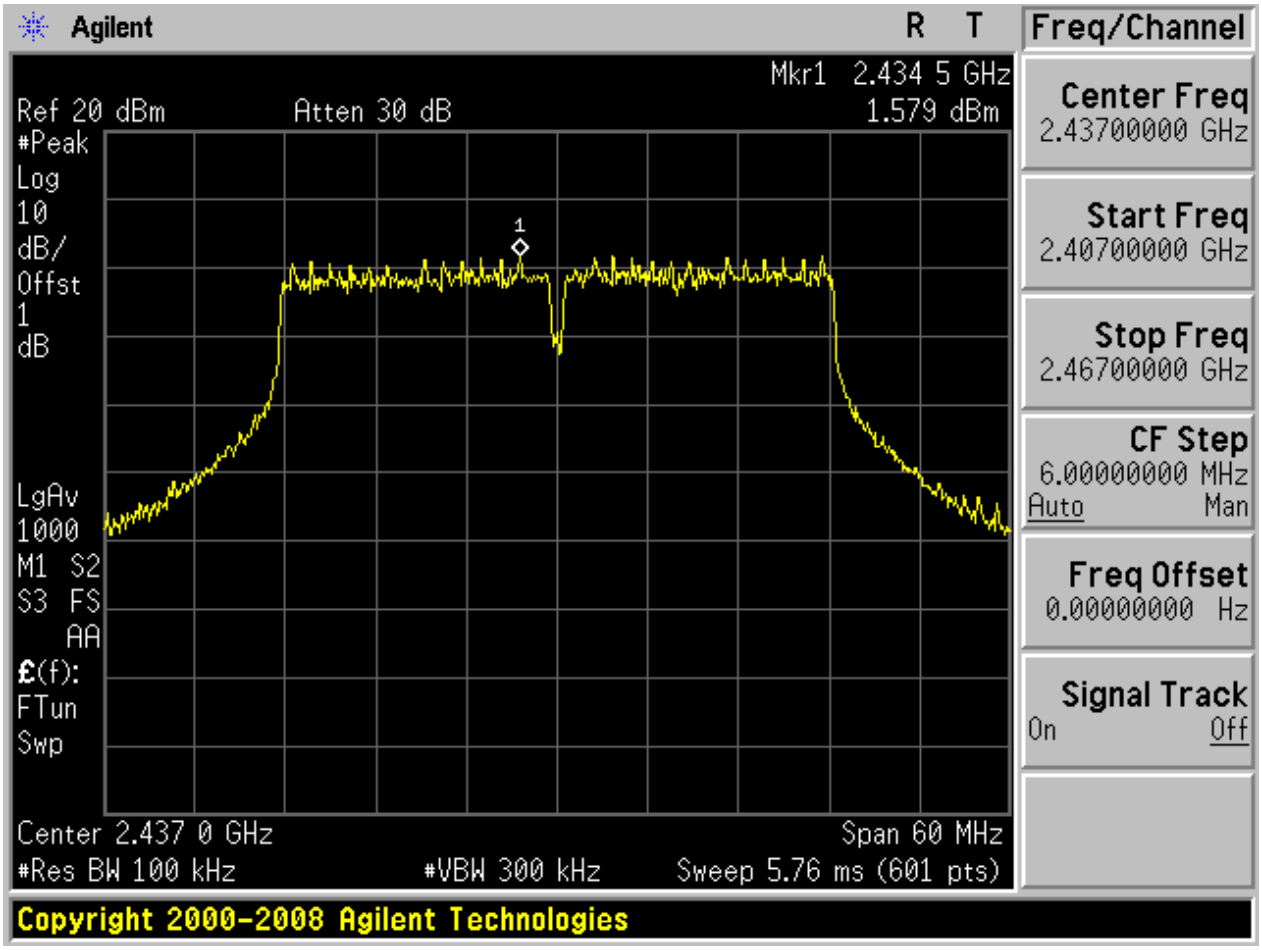

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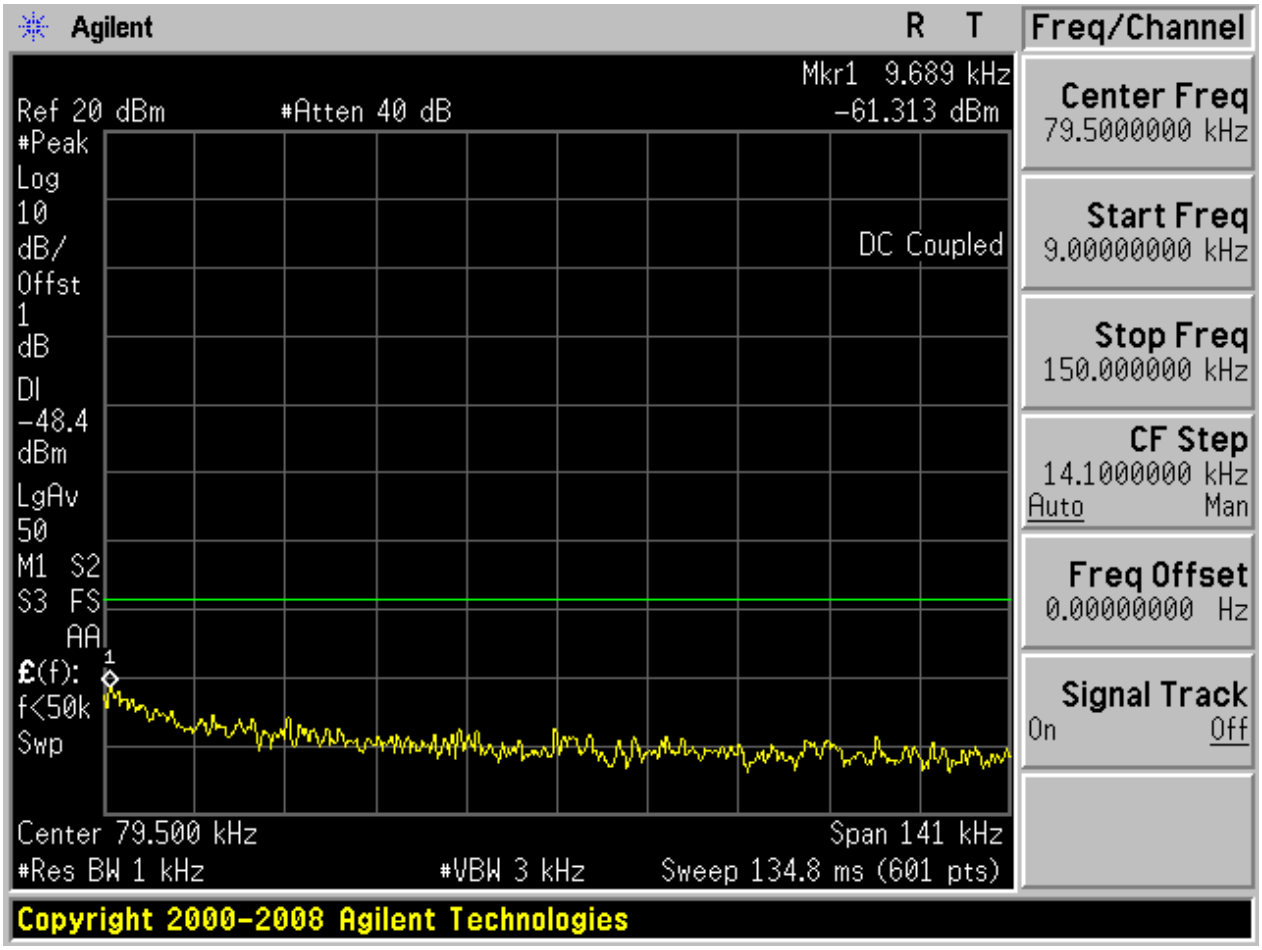
Puw:



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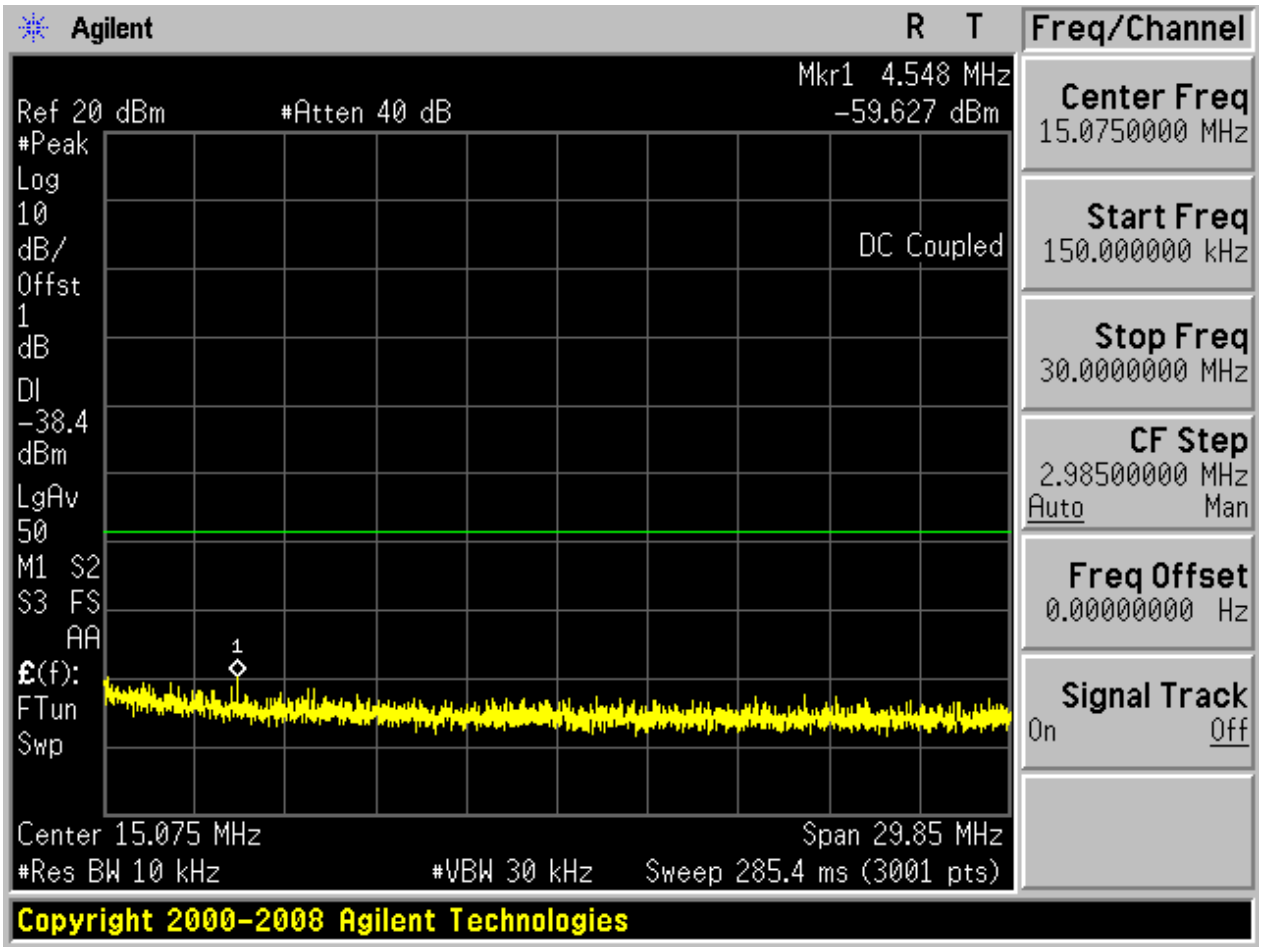

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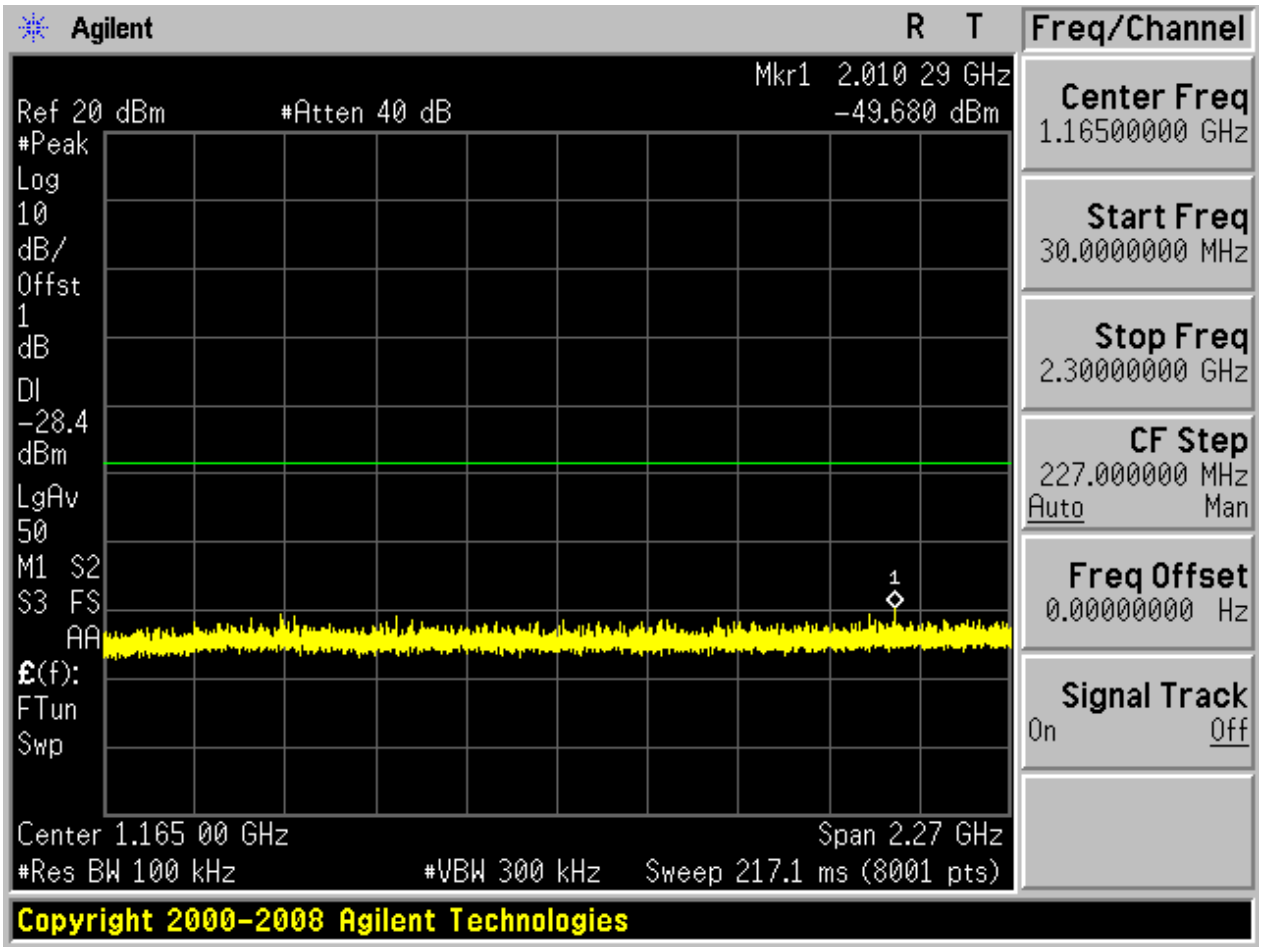

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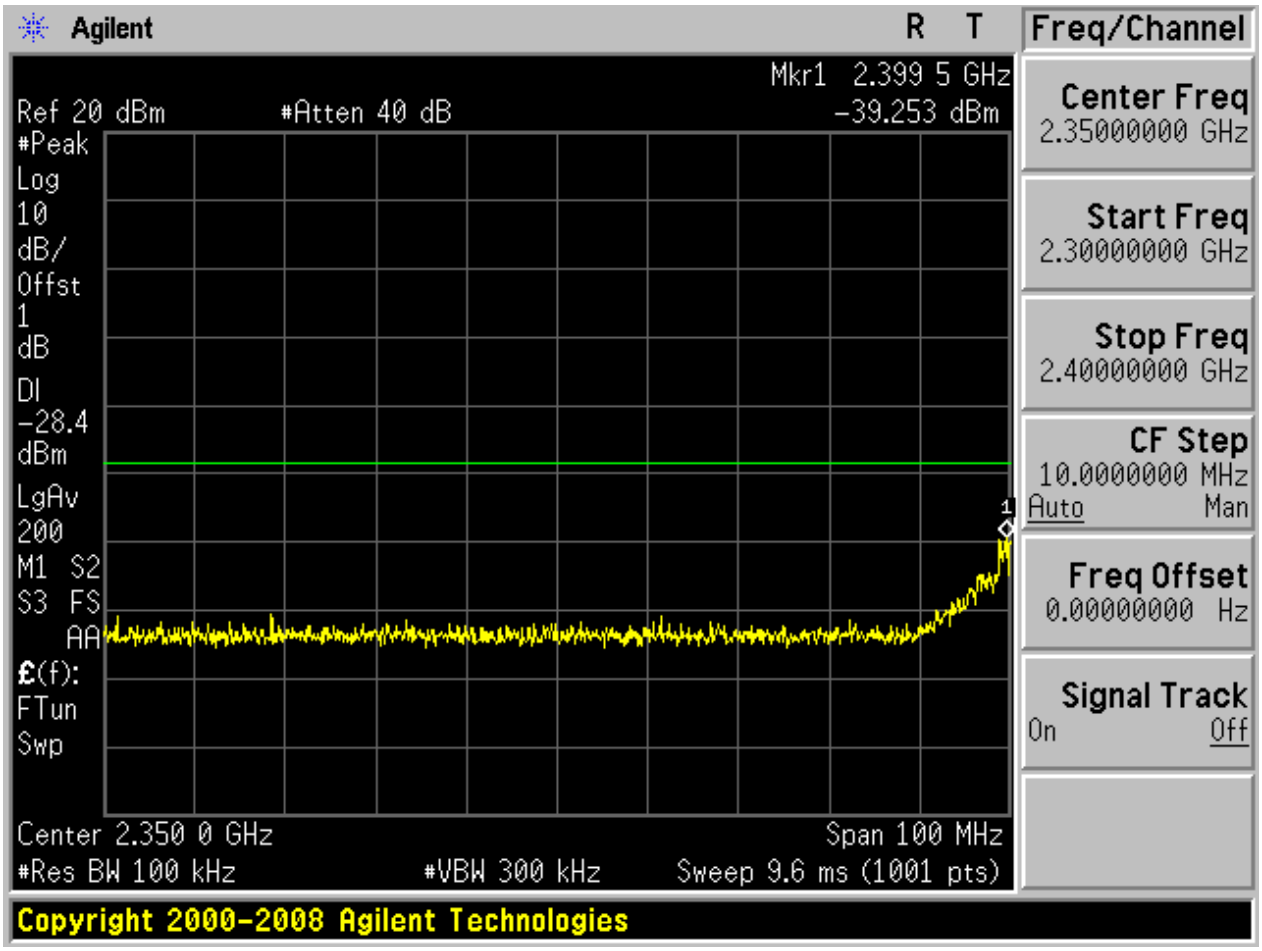

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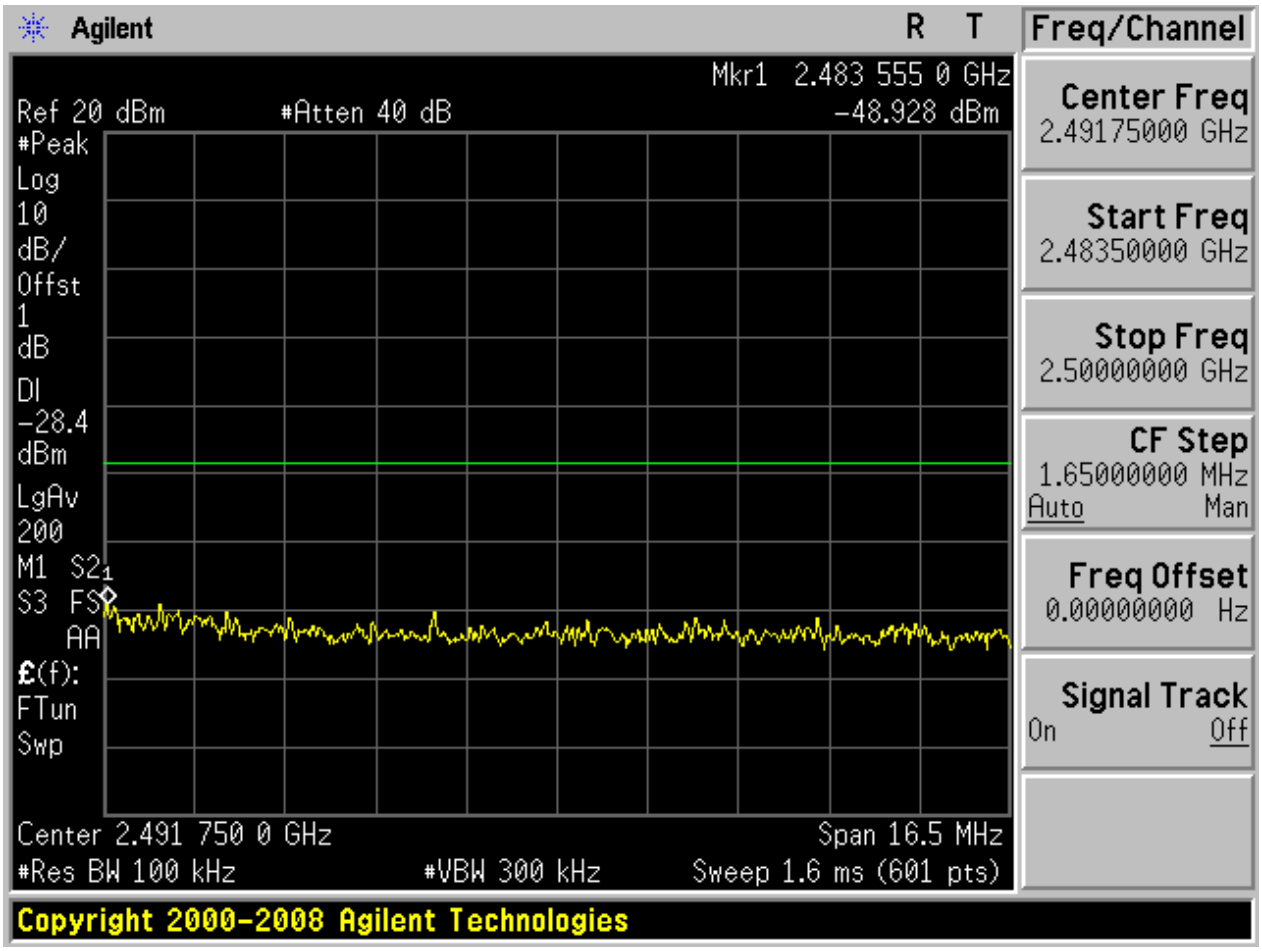

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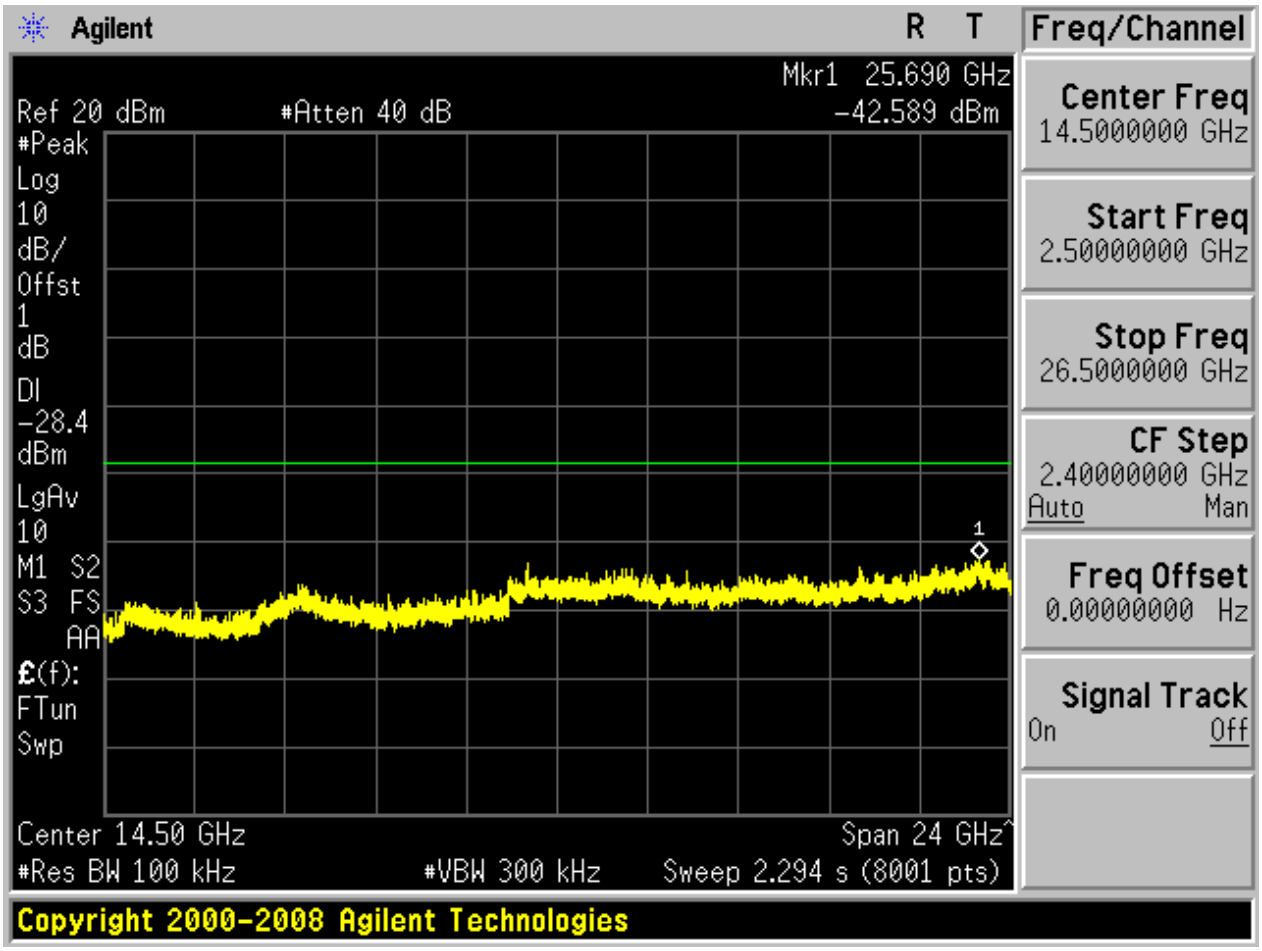

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2.23 11N40_H@Ant 1

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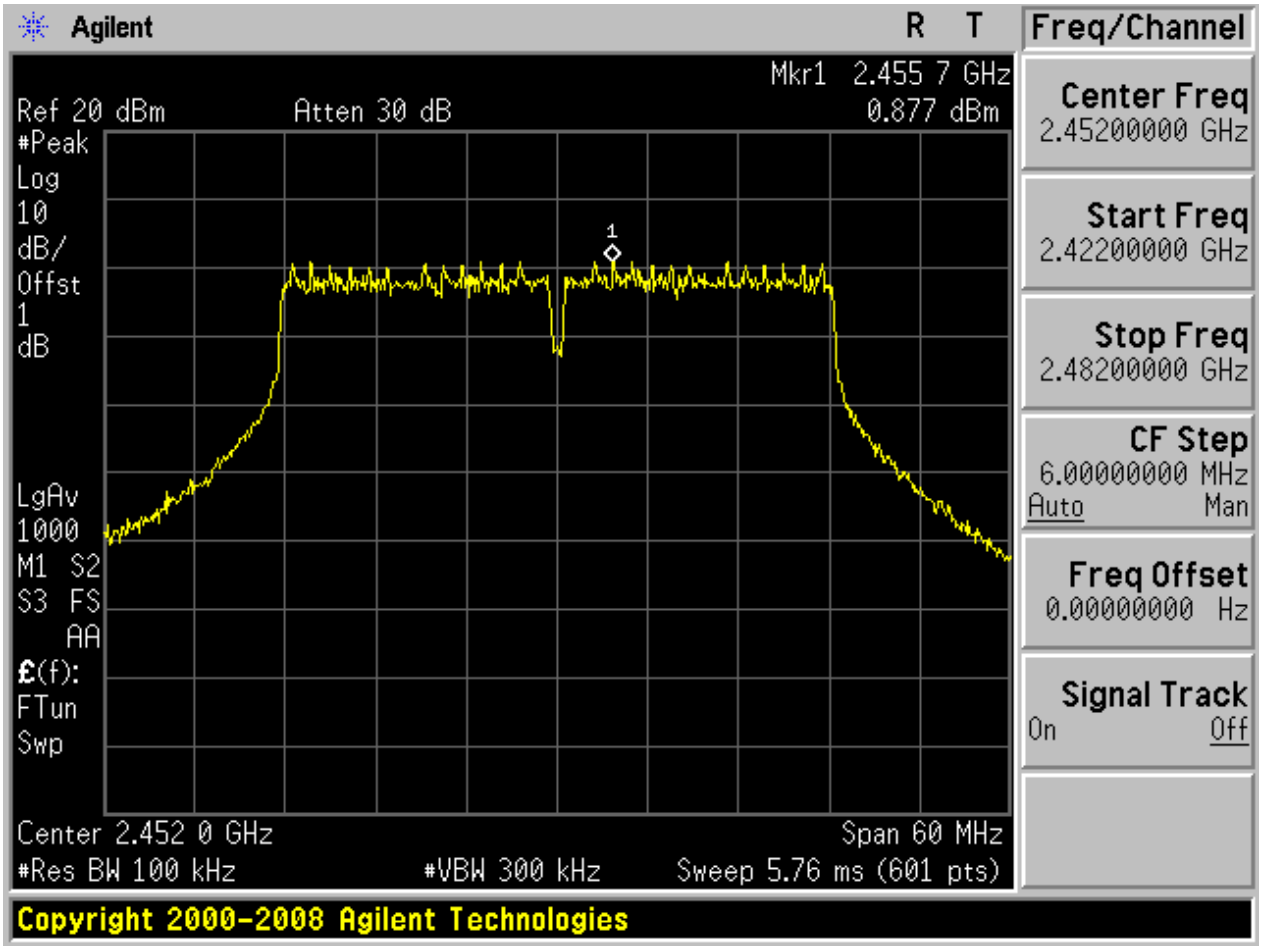

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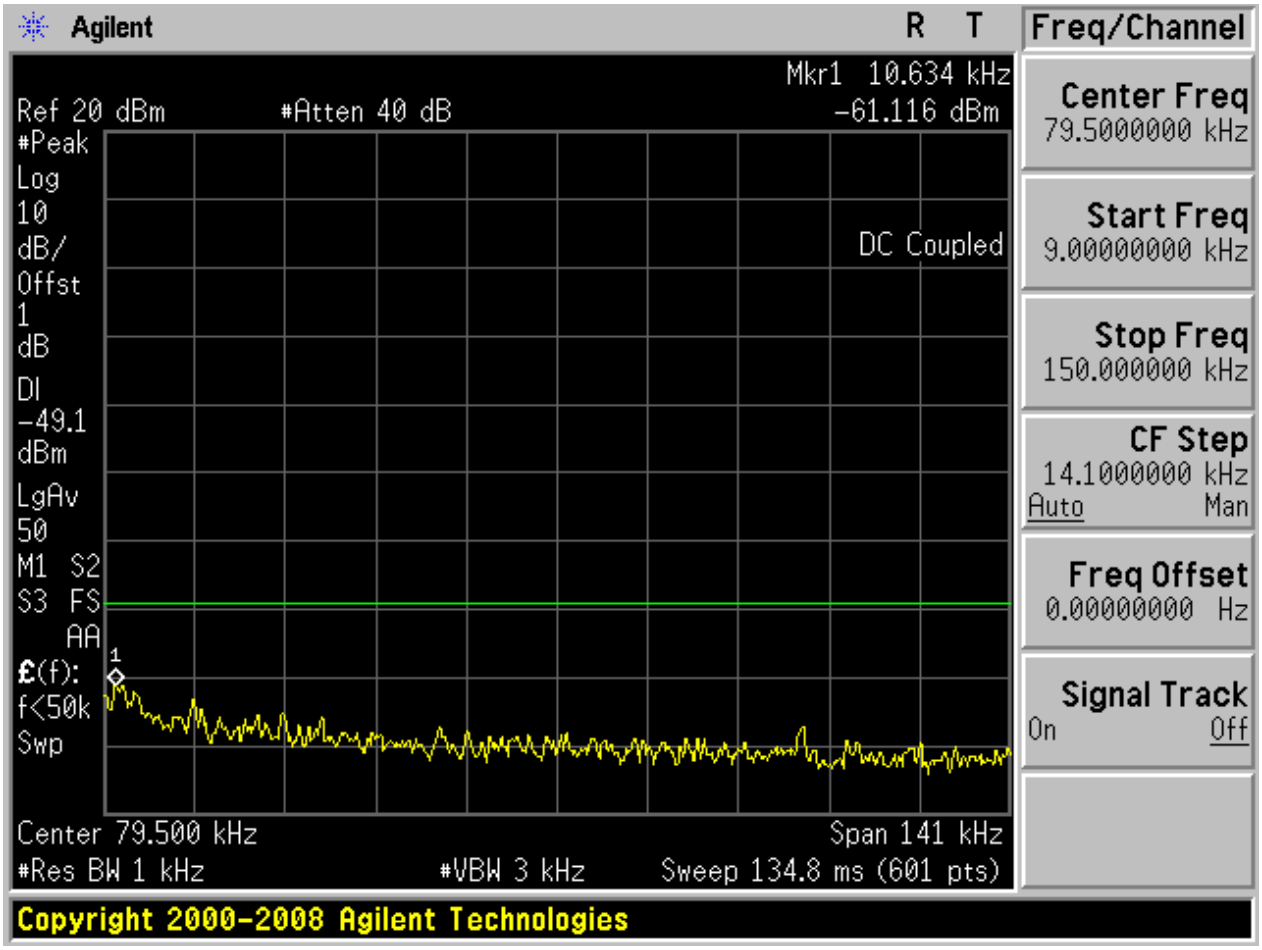
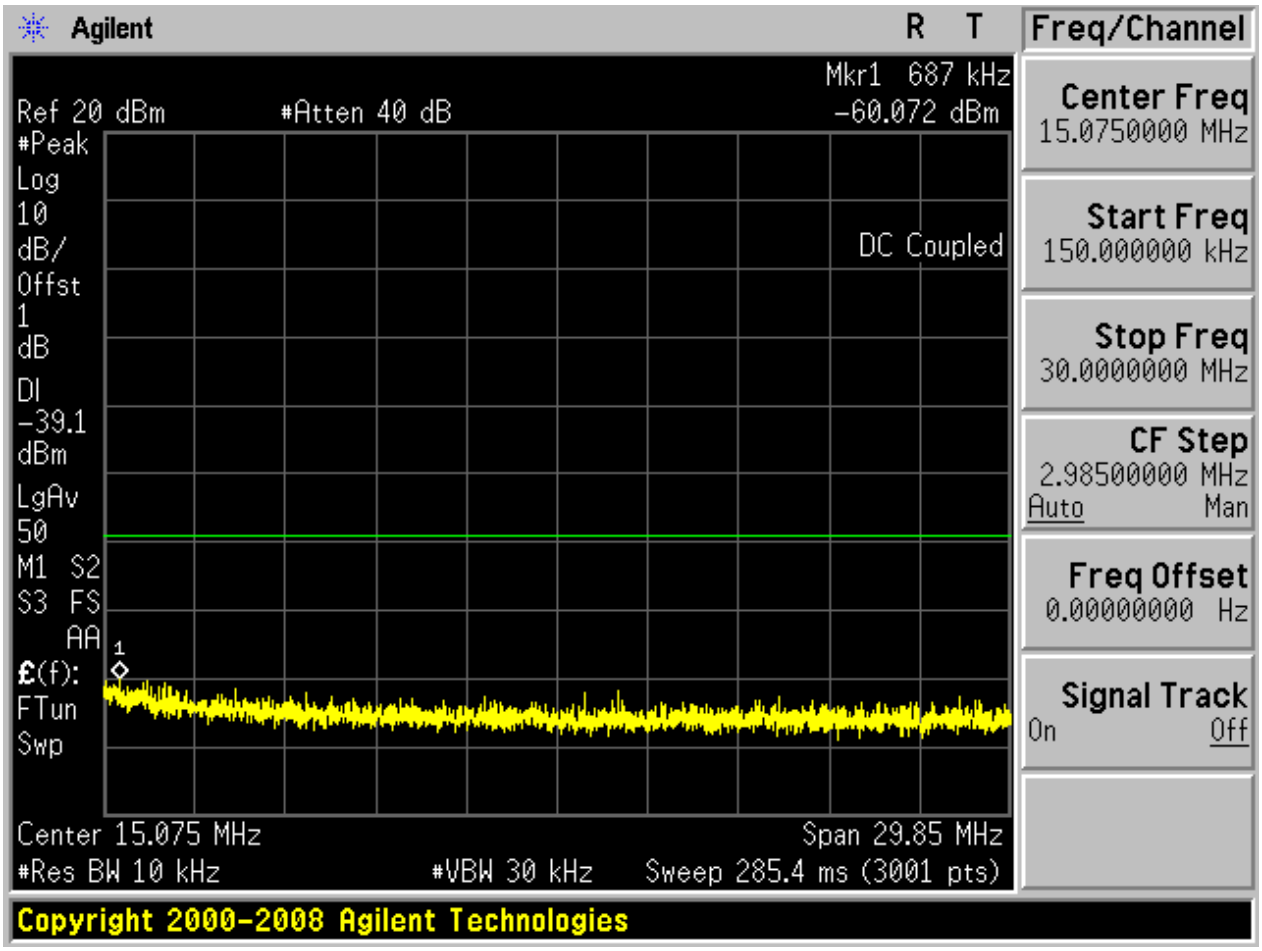

Agilent
R T
Freq/Channel
Mkr1 10.634 kHz
Ref 20 dBm
#Atten 40 dB
-61.116 dBm
#Peak
Log
10
dB/
Offst
1
dB
Dl
-49.1
dBm
LgAv
50
M1 S2
S3 FS
AA
£(f):
f<50k
Swp
DC Coupled
Center Freq
79.5000000 kHz
Start Freq
9.00000000 kHz
Stop Freq
150.000000 kHz
CF Step
14.1000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Center 79.500 kHz
Span 141 kHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 134.8 ms (601 pts)
Copyright 2000-2008 Agilent Technologies



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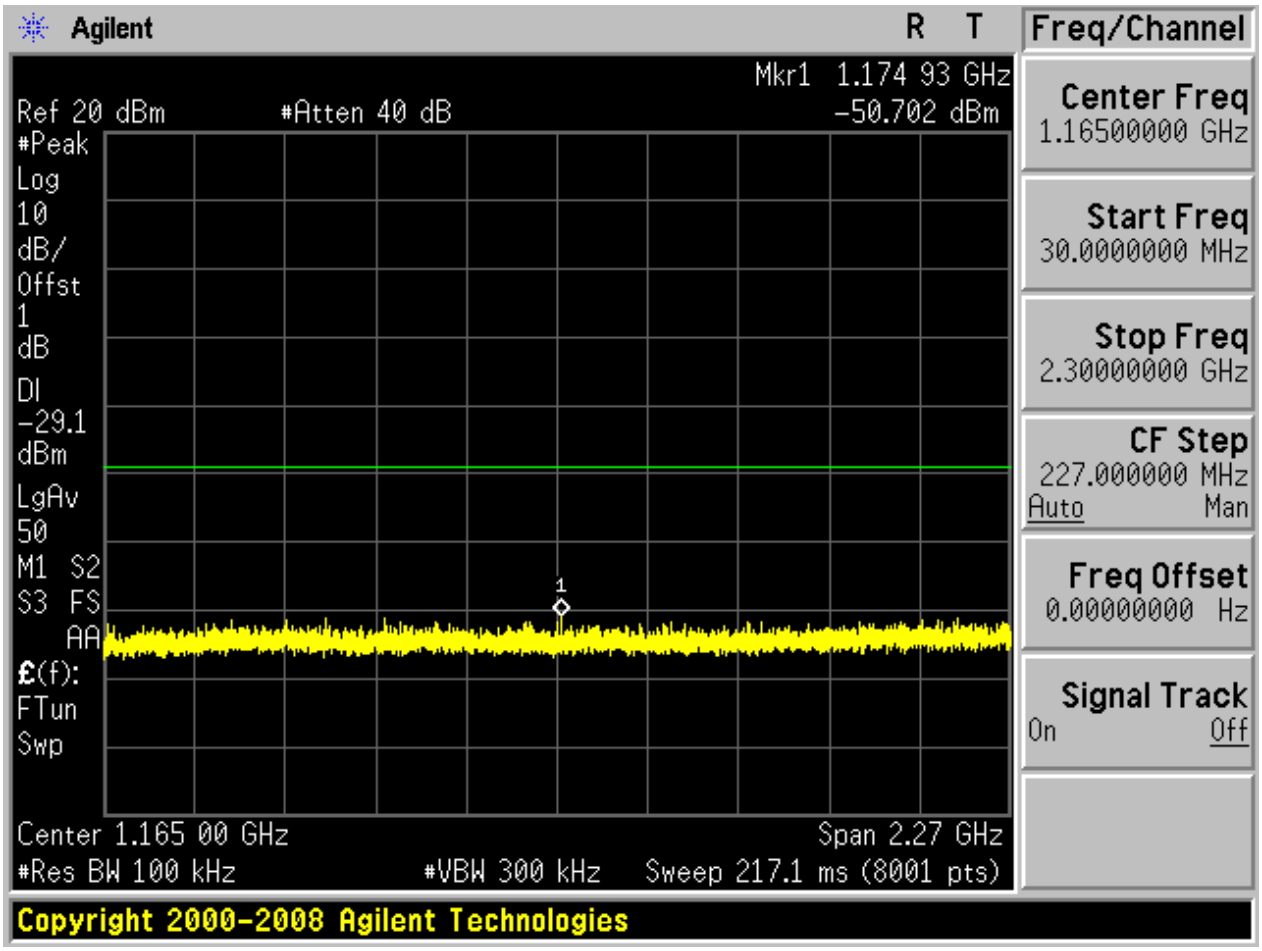

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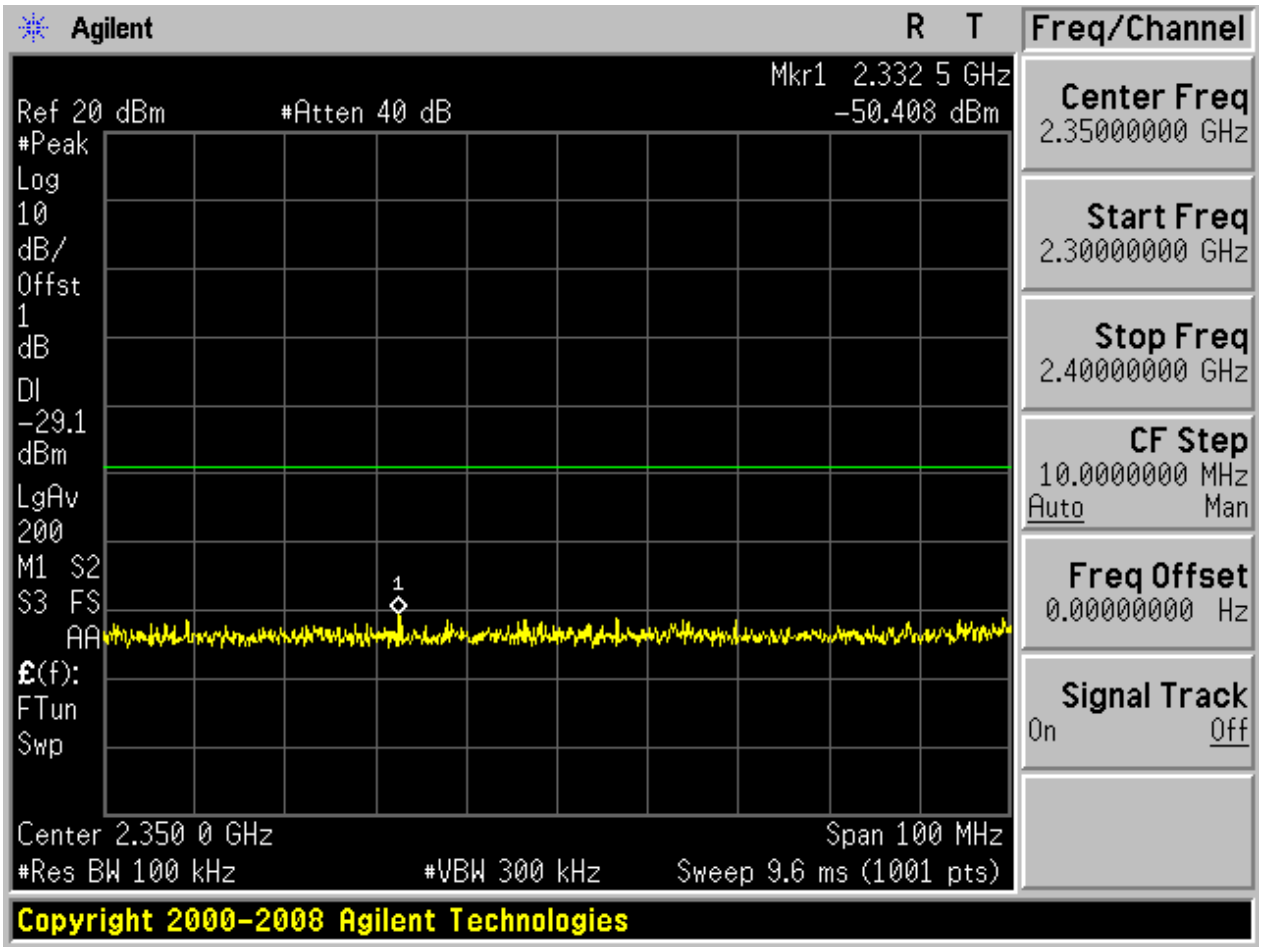

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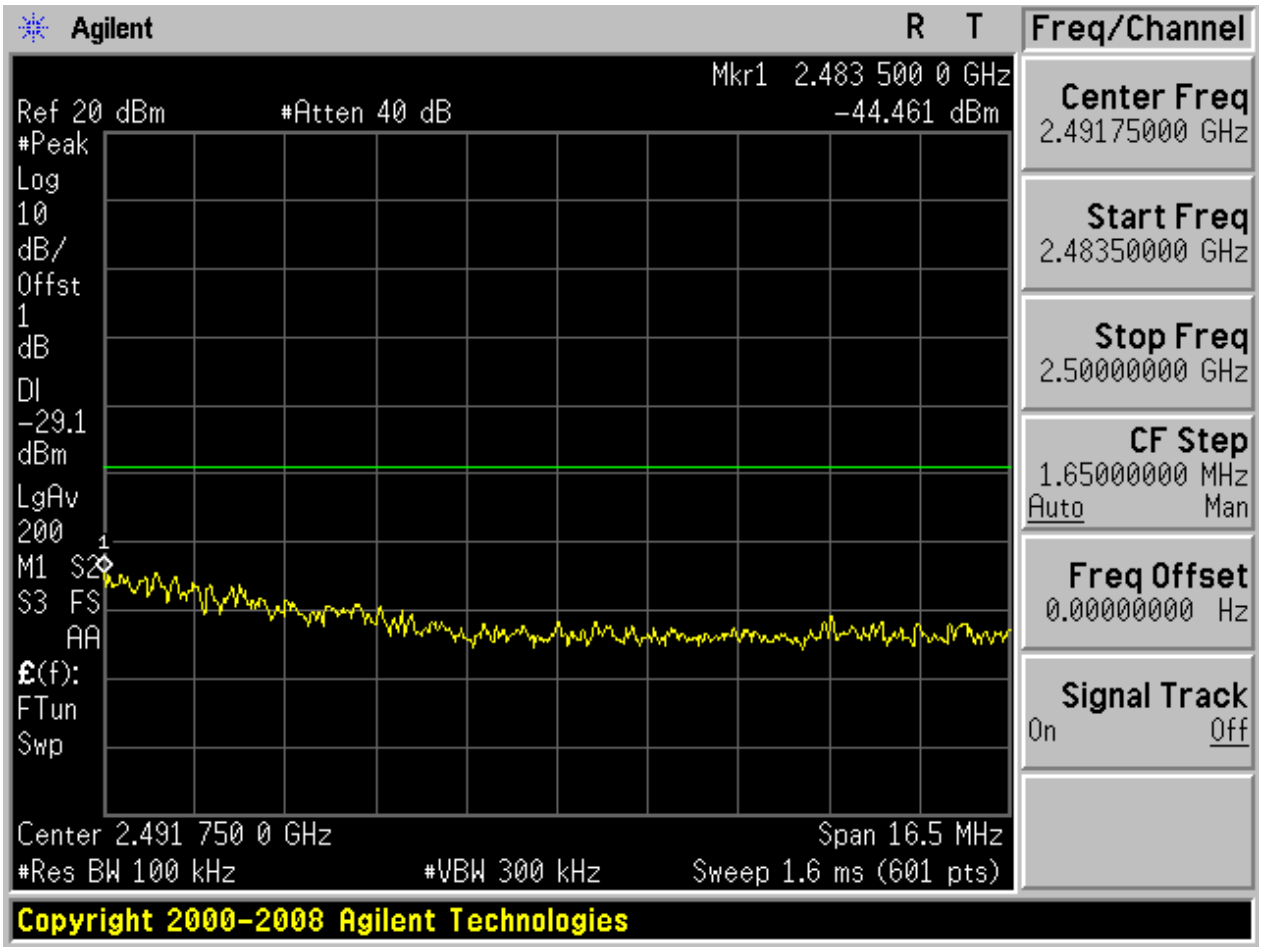

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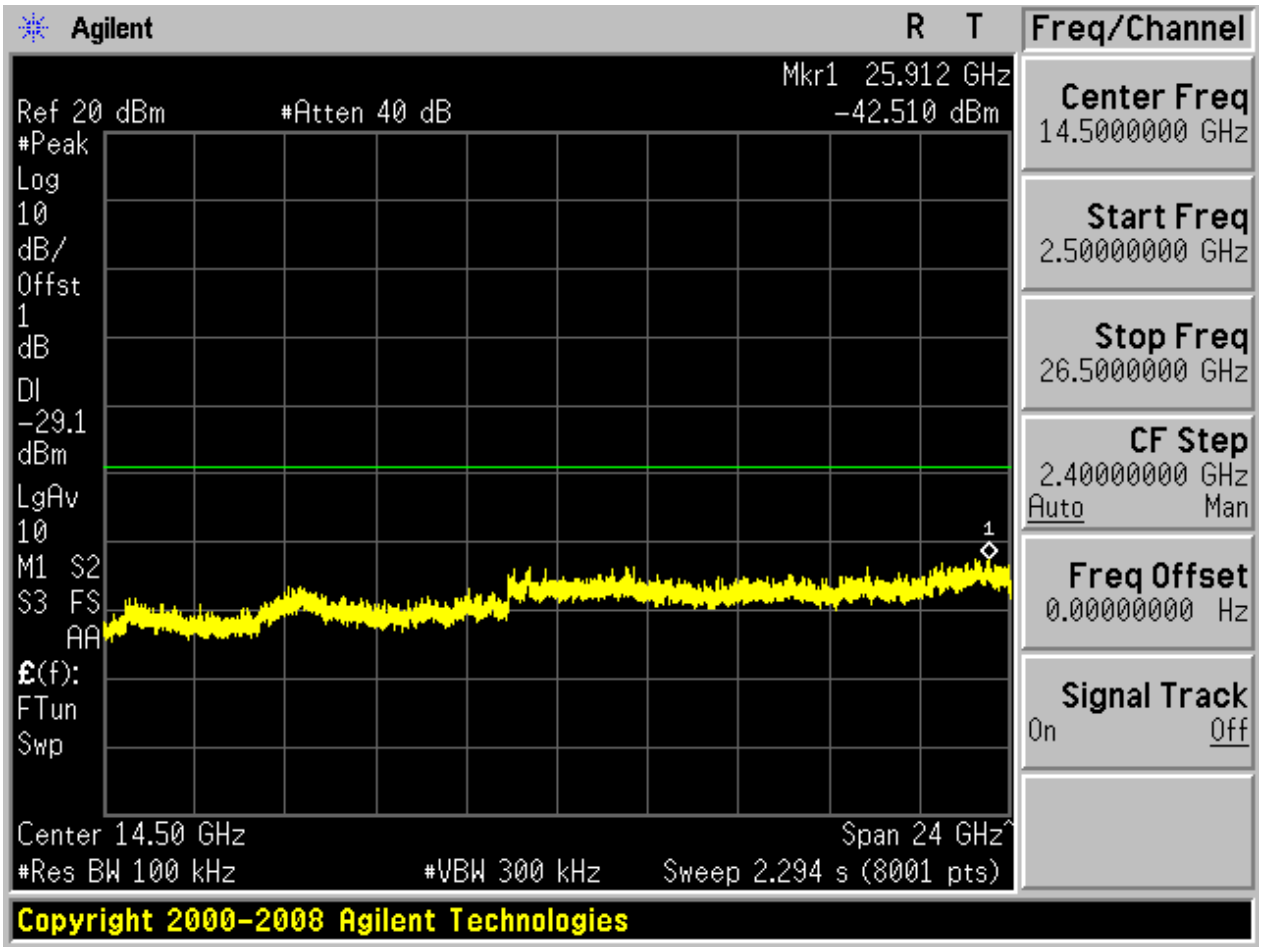

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Appendix H: Radiated Spurious Emission & Spurious in Restricted Band

Note: We tested all modes, but the data presented below is the worst case.Below 1GHz, RBW = 100 kHz, VBW = 300 kHz.

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

The simultaneous transmission has been considered

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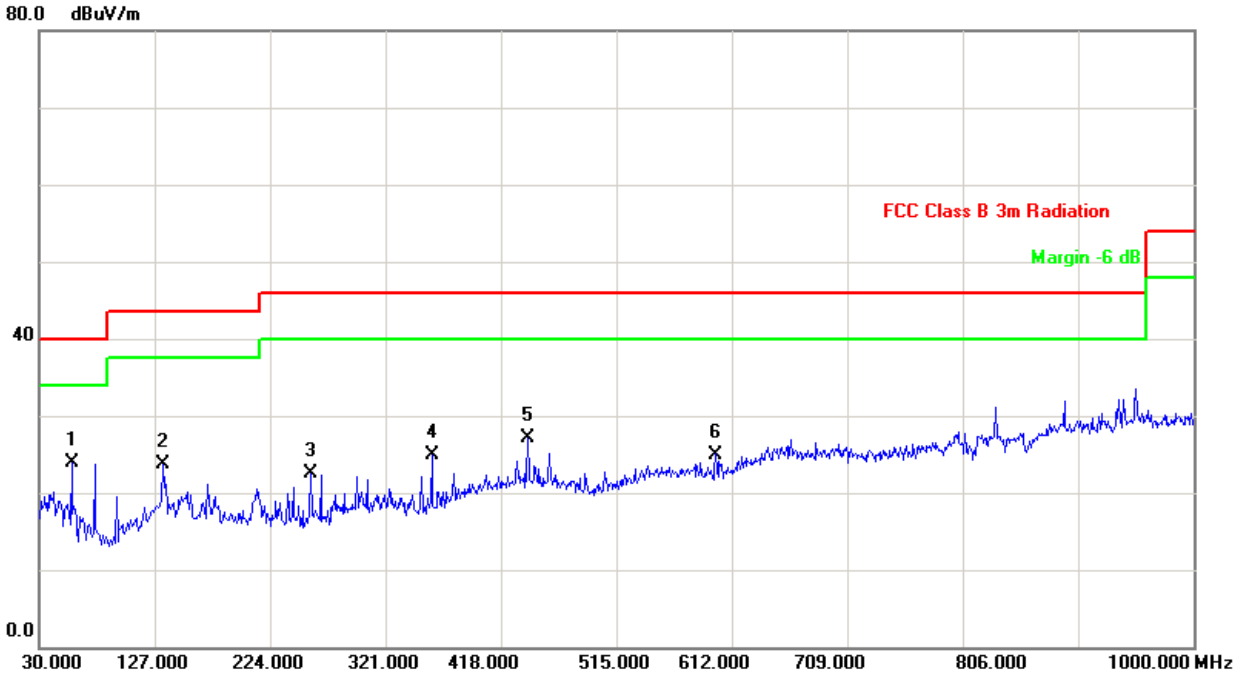
7.1Part 1: Testing Range of “9 kHz to 30MHz”

NOTE1: No peak found in the Test Range of “9 kHz to 30MHz”

7.2Part 2: 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	Factor dB	Measurement dBµV/m	Limit dBµV/m	Margin dB	Detector
57.16	36.84	-13.03	23.81	40	-16.19	QP
133.79	35.14	-11.53	23.61	43.5	-19.89	QP
257.95	35.2	-12.64	22.56	46	-23.44	QP
359.8	34.25	-9.4	24.85	46	-21.15	QP
440.31	33.31	-6.15	27.16	46	-18.84	QP
598.42	29.63	-4.63	25	46	-21	QP

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7.3Part 3: Testing Range of “18 GHz to 26.5 GHz”

NOTE: No peak found in the Test Range of “18 GHz to 26.5GHz”

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7.4Part 4: 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.

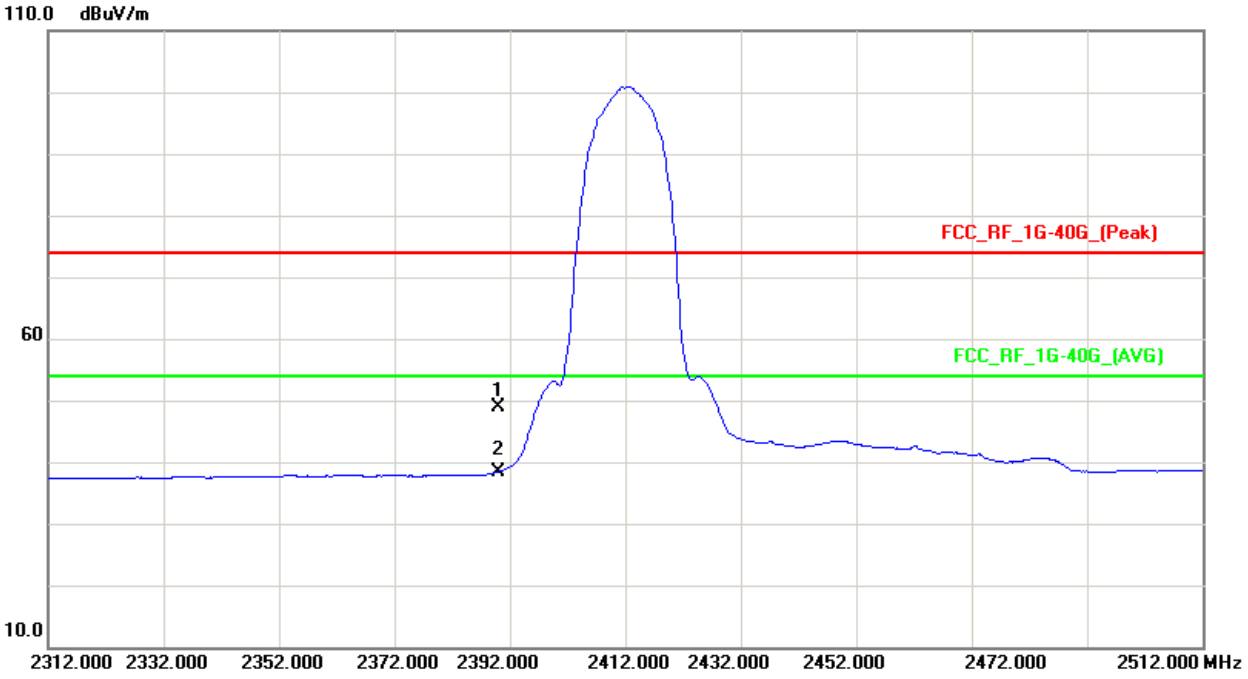
Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dBµV/m) and Average Limit (54 dBµV/m).

Note 3: The peak spike exceeds the limit line is EUT's operating frequency.

Test Mode:

7.4.1Test Mode: 11B

7.4.1.1Channel 0



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2390.000	V	13.05	35.88	48.93	74.00	-25.07	peak
2390.000	V	2.56	35.88	38.44	54.00	-15.56	AVG

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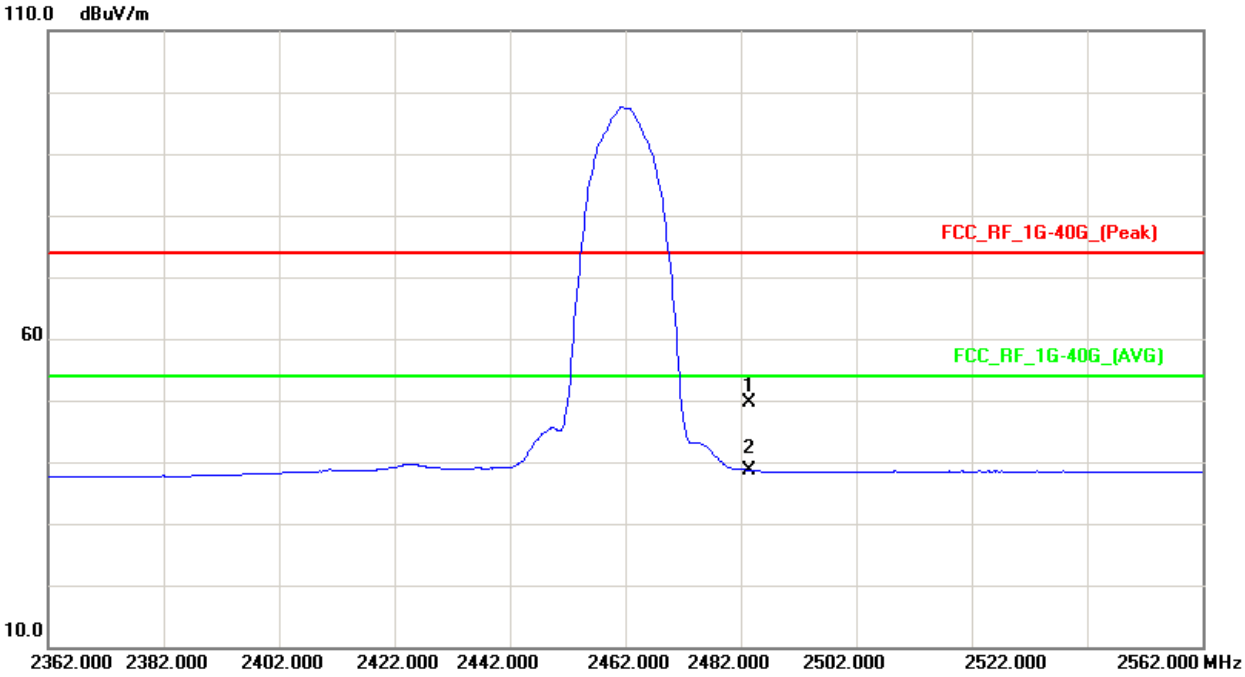
7.4.1.2 Channel 78



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2483.500	H	13.26	36.39	49.65	74.00	-24.35	peak
2483.500	H	2.26	36.39	38.65	54.00	-15.35	AVG

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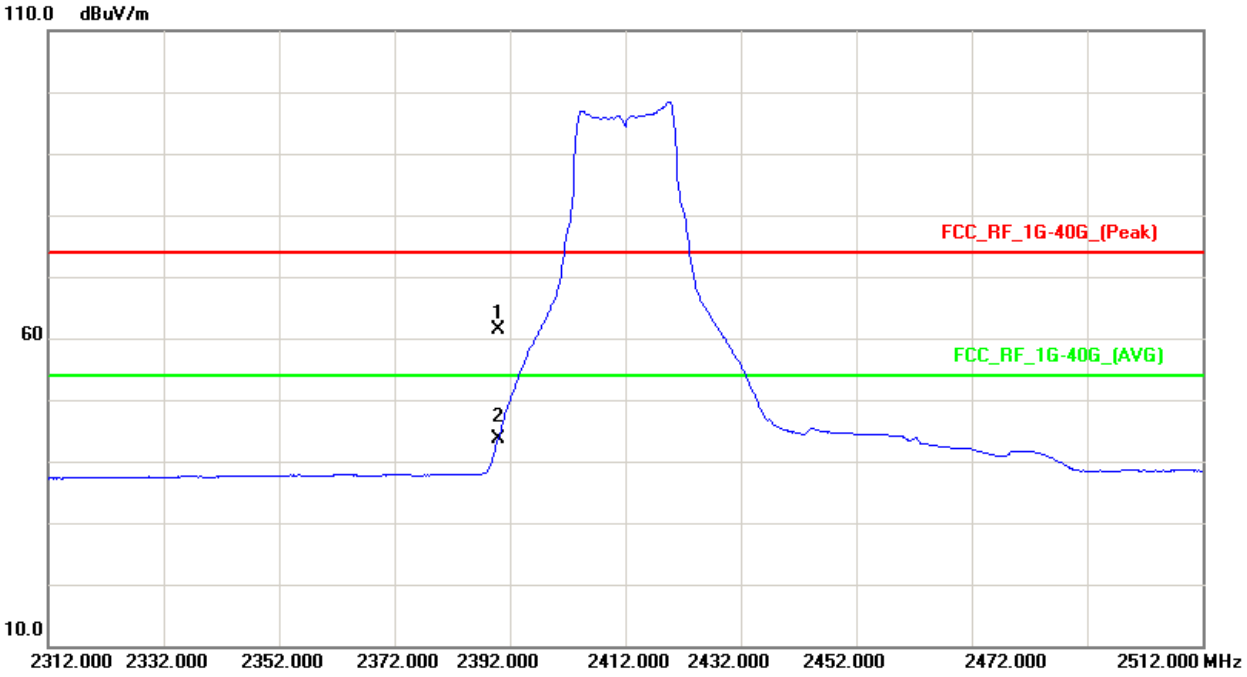
7.4.1Test Mode: 11G

7.4.1.1Channel 0



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2390.000	V	25.51	35.88	61.39	74.00	-12.61	peak
2390.000	V	7.80	35.88	43.68	54.00	-10.32	AVG

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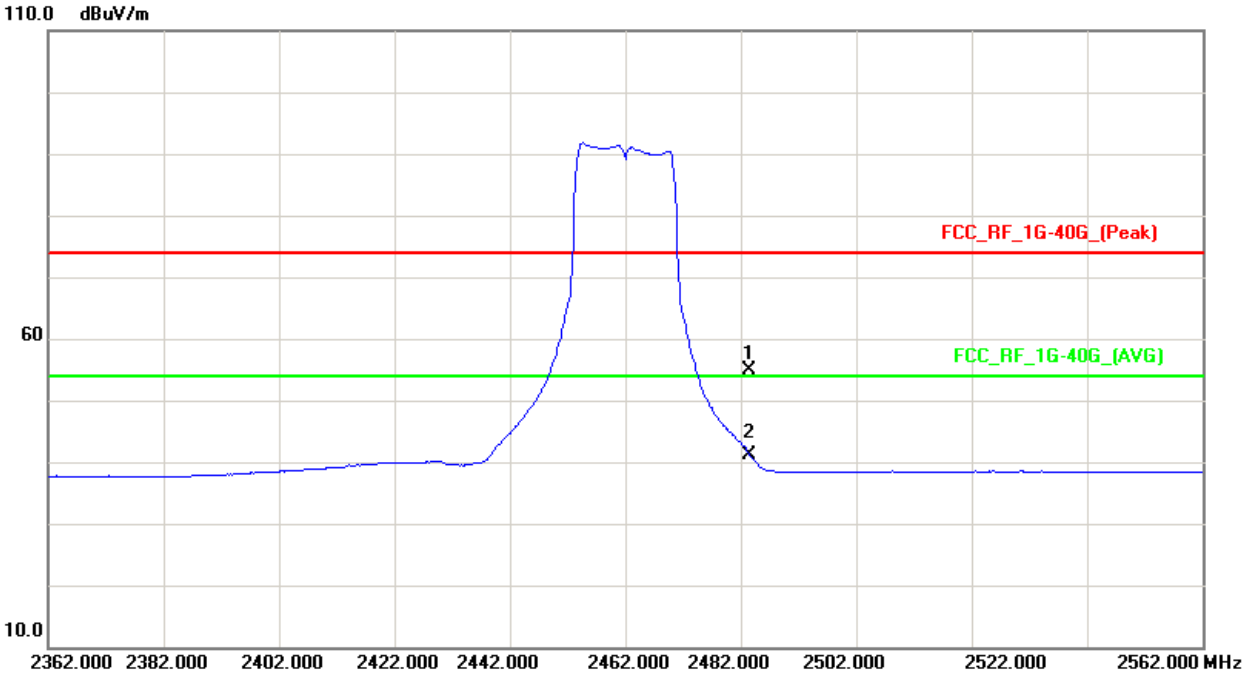
7.4.1.2 Channel 78



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2483.500	H	18.57	36.39	54.96	74.00	-19.04	peak
2483.500	H	4.83	36.39	41.22	54.00	-12.78	AVG

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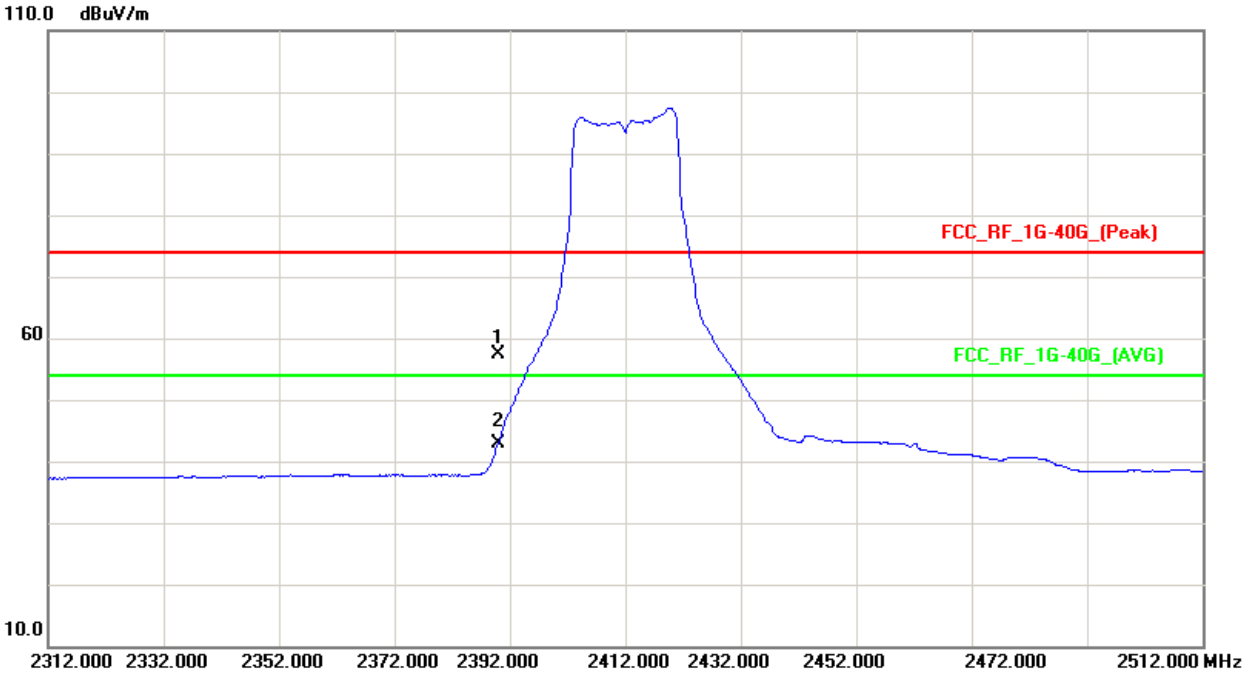
7.4.1Test Mode: 11N

7.4.1.1Channel 0



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2390.000	V	21.46	35.88	57.34	74.00	-16.66	peak
2390.000	V	6.97	35.88	42.85	54.00	-11.15	AVG

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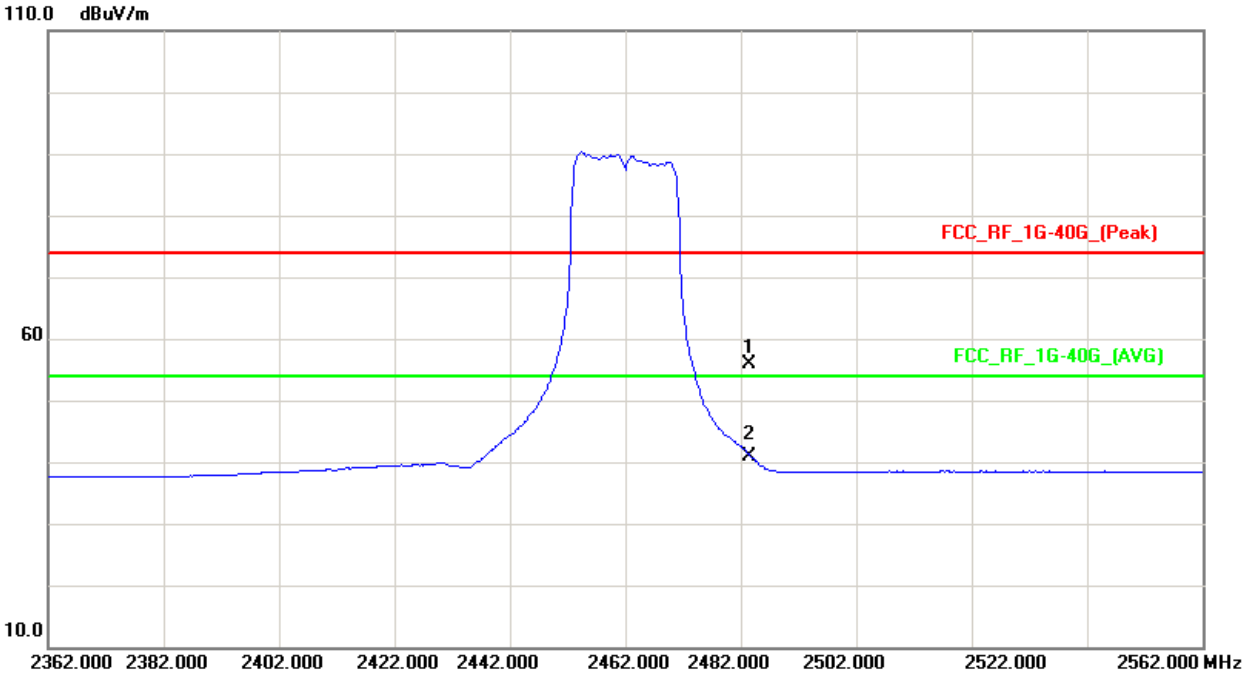
7.4.1.2 Channel 78



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

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Note
2483.500	H	19.47	36.39	55.86	74.00	-18.14	peak
2483.500	H	4.61	36.39	41.00	54.00	-13.00	AVG

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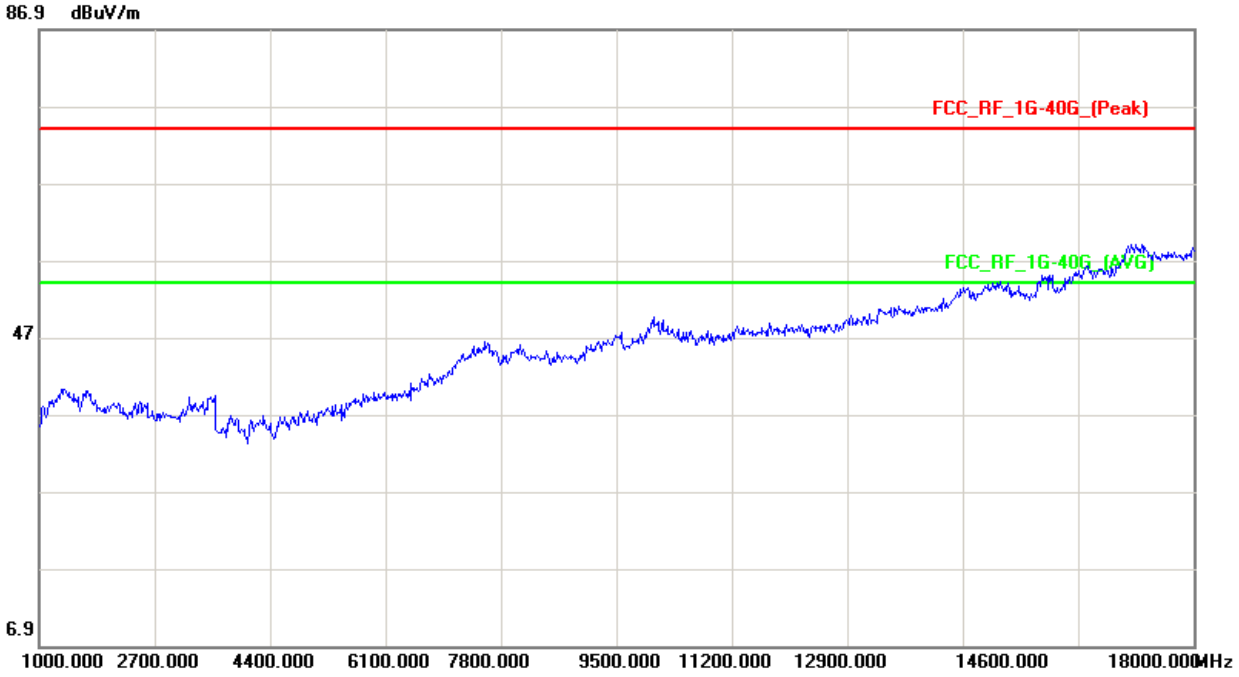
7.5Part 5: Testing Range of "1 GHz to 18 GHz"

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 dBµV/m) and Average Limit (54 dBµV/m).



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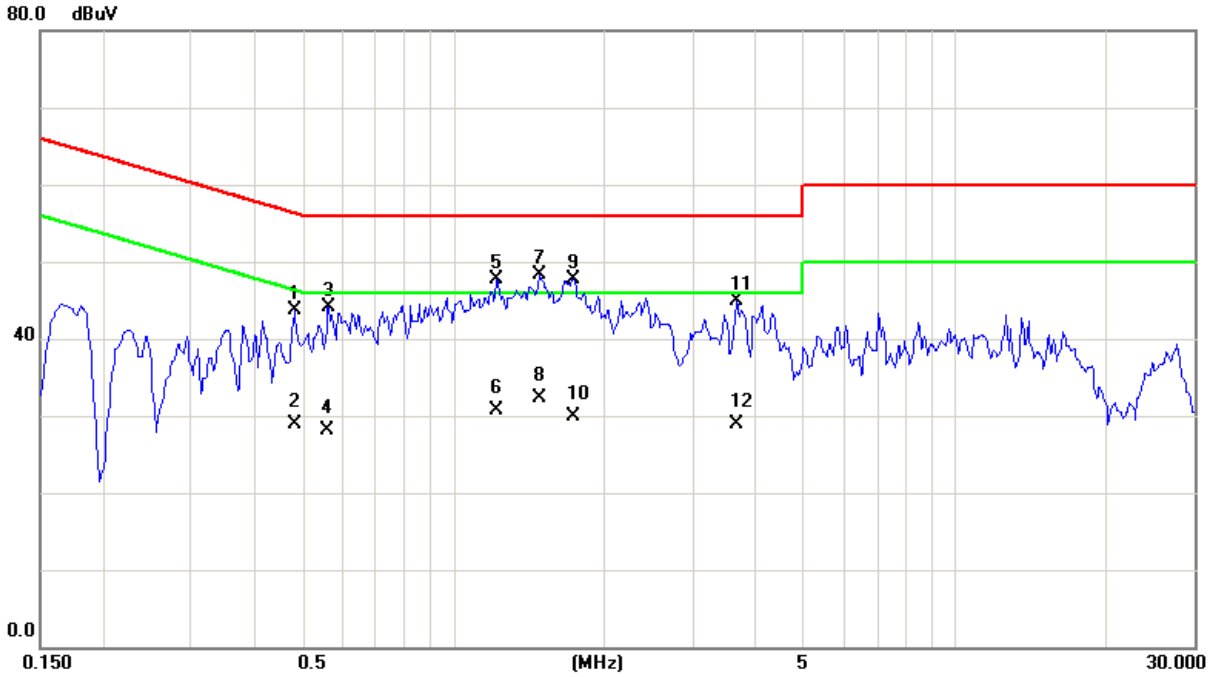
Appendix I: Conducted Emission at Power Port

Note: RBW =9 kHz, VBW = 30 kHz

Channel 39



NO.KR.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Margin dB	Detector
1	0.482	33.96	9.65	43.61	56.3	-12.69	peak
2	0.482	19.3	9.65	28.95	46.3	-17.35	AVG
3	0.5641	34.42	9.67	44.09	56	-11.91	peak
4	0.5641	18.5	9.67	28.17	46	-17.83	AVG
5	1.2203	37.99	9.8	47.79	56	-8.21	peak
6	1.2203	21	9.8	30.8	46	-15.2	AVG
7	1.486	38.4	9.82	48.22	56	-7.78	peak

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8	1.486	22.4	9.82	32.22	46	-13.78	AVG
9	1.7398	37.88	9.87	47.75	56	-8.25	peak
10	1.7398	20.1	9.87	29.97	46	-16.03	AVG
11	3.668	35.09	9.91	45	56	-11	peak
12	3.668	18.9	9.91	28.81	46	-17.19	AVG

Note: Level= Reading level+ Transd (cable loss + correction factor).The reading level is used to calculate by software which is not shown in the sheet.

END

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