

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 210

OF

Product Name: Tablet Device

Brand Name: SONY

Model No.: SGPT1211

Model Different: N/A

FCC ID: AK8SGPT1211

IC: 409B-SGPT1211

Report No.: EF/2012/50007

Issue Date: Jun. 18, 2012

FCC Rule Part: §15.247, Cat: DTS

IC Rule Part: RSS-210 issue 8 :2010, Annex 8

Prepared for: Sony Corporation
1-7-1 Konan Minato-Ku, Tokyo, 108-0075 Japan

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan



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VERIFICATION OF COMPLIANCE

Applicant: Sony Corporation
1-7-1 Konan Minato-Ku, Tokyo, 108-0075 Japan

Product Name: Tablet Device

Brand Name: SONY

Model No.: SGPT1211

Model Difference: N/A

FCC ID: AK8SGPT1211

IC: 409B-SGPT1211

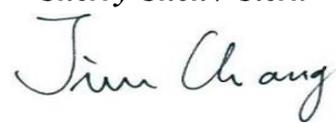
File Number: EF/2012/50007

Date of test: May. 29, 2012 ~ Jun. 18, 2012

Date of EUT Received: May. 29, 2012

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and RSS-Gen. issue 3. The energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and IC RSS 210 issue 8: 2010 Annex 8. The test results of this report relate only to the tested sample identified in this report.

Test By:		Date	Jun. 18, 2012
	_____ <i>Jimmy Liu / Engineer</i>		_____
Prepared By:		Date	Jun. 18, 2012
	_____ <i>Cherry Chen / Clerk</i>		_____
Approved By:		Date	Jun. 18, 2012
	_____ <i>Jim Chang / Supervisor</i>		_____

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Version

Version No.	Date	Description
00	Jun. 18, 2012	Initial creation of document

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1 GENERAL INFORMATION

General:

Product Name:	Tablet Device	
Brand Name:	SONY	
Model No.:	SGPT1211	
Model difference:	N/A	
Power Supply	3.7Vdc Rechargeable Lithium Ion battery or 5Vdc from AC/DC adapter	
	Battery:	(1) Model No.: SGPBP03, Supplier: SONY (2) Model No.: SGPBP04, Supplier: SONY
	Adapter :	Model No.: SGPAC5V4, Supplier: SONY

WLAN: 802.11 a/b/g/n

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b : 15.84dBm g : 17.21dBm	DSSS, OFDM	b : 13M7G1D g : 17M4D1D
11n (2.4GHz)	HT20 2412-2462	11	n : 17.73dBm	OFDM	18M4D1D

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Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission
11a	5150~5250	4	12.53dBm	OFDM	17M2D1D
	5250~5350	4	12.42 dBm		17M1D1D
	5470~5725	11	13.26dBm		17M0D1D
11n	HT20 5150~5250	4	HT20:12.52dBm	OFDM	18M1D1D
	HT20 5250~5350	4	HT20:12.85dBm		18M1D1D
	HT20 5470~5725	11	HT20:13.90dBm		18M1D1D
11n	HT40 5150~5250	2	HT40:12.90dBm	OFDM	36M4D1D
	HT40 5250~5350	2	HT40:13.35dBm		36M2D1D
	HT40 5470~5725	5	HT40:13.92dBm		36M2D1D
11a	5725-5850	5	a : 14.44 dBm	OFDM	17M1D1D
11n (5GHz)	HT20 5725-5850	5	HT20: 14.62 dBm		18M1D1D
11n (5GHz)	HT40 5725-5850	2	HT40: 14.38 dBm		36M3D1D

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Antenna Designation	Inverted-F Antenna 2.4GHz: 2.85dBi 5GHz Gain: 2.54dBi (5150MHz-5250MHz) 5GHz Gain: 2.13dBi (5250MHz-5350MHz) 5GHz Gain: 2.27dBi (5470MHz-5725MHz) 5GHz Gain: 1.58dBi (5725MHz-5850MHz)
Modulation type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps; 802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 13.5 – 135Mbps

The 2.4G max antenna gain is 2.85dBi which was choosing for Radiated Spurious Emission test.
The 5G max antenna gain is 2.54dBi which was choosing for Radiated Spurious Emission test.
The EUT is compliance with IEEE 802.11 a/b/g /n Standard.

This report applies for frequency bands:2412MHz-2462MHz, 5725MHz-5850MHz.

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1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: AK8SGPT1211** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. And **IC: 409B-SGPT1211** filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.2 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Jan 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

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2.4 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

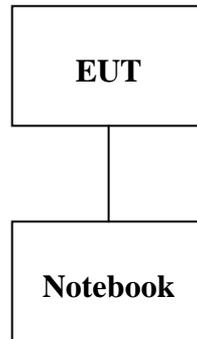


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	Notebook	DELL	E5400	3704625136	Un-shielded	Un-shielded

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §7.2.4	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)(c) RSS-210 §A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2) RSS-210 §A8.4(4)	6dB Bandwidth	Compliant
§15.247(d) RSS-210 §A8.4(4)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d) RSS-210 §A8.4(4)	Spurious Emission	Compliant
§15.247(e) RSS-210 §A8.2(b)	Peak Power Density	Compliant
§15.203 RSS-GEN §7.1.2,	Antenna Requirement	Compliant
RSS-Gen §4.6.1	99% Power Bandwidth	Compliant

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4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz) 、mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz) 、mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n_20MHz mode: Channel low (2412MHz) 、mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 a mode: Channel low (5745MHz) 、mid (5785MHz) and high (5825MHz) with 6Mbps highest data rate are chosen for full testing.

802.11 n (5GHz) _20MHz: Lowest (5745MHz), Mid (5785MHz) and high (5825MHz) with 6.5 Mbps highest data rate are chosen for full testing.

802.11 n (5GHz) _40MHz: Lowest (5755MHz) and high (5795MHz) with 13.5 Mbps highest data rate are chosen for full testing.

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5 MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: 3.37dB
	180MHz -417MHz: 3.19dB
	0.417GHz-1GHz: 3.19dB
	1GHz - 18GHz: 4.04dB
	18GHz - 40GHz: 4.04dB

Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: 4.22dB
	167MHz -500MHz: 3.44dB
	0.5GHz-1GHz: 3.39dB
	1GHz - 18GHz: 4.08dB
	18GHz - 40GHz: 4.08dB

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable:

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- The lower limit shall apply at the transition frequencies
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2011	09/22/2012
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2012	03/22/2013
LISN	FCC	FCC-LISN-50/250-2 5-2-01	04034	03/23/2012	03/22/2013
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2012	01/04/2013

6.3 EUT Setup:

- The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
- The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- The LISN was connected with 120Vac/60Hz power source.

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6.4 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

6.5 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

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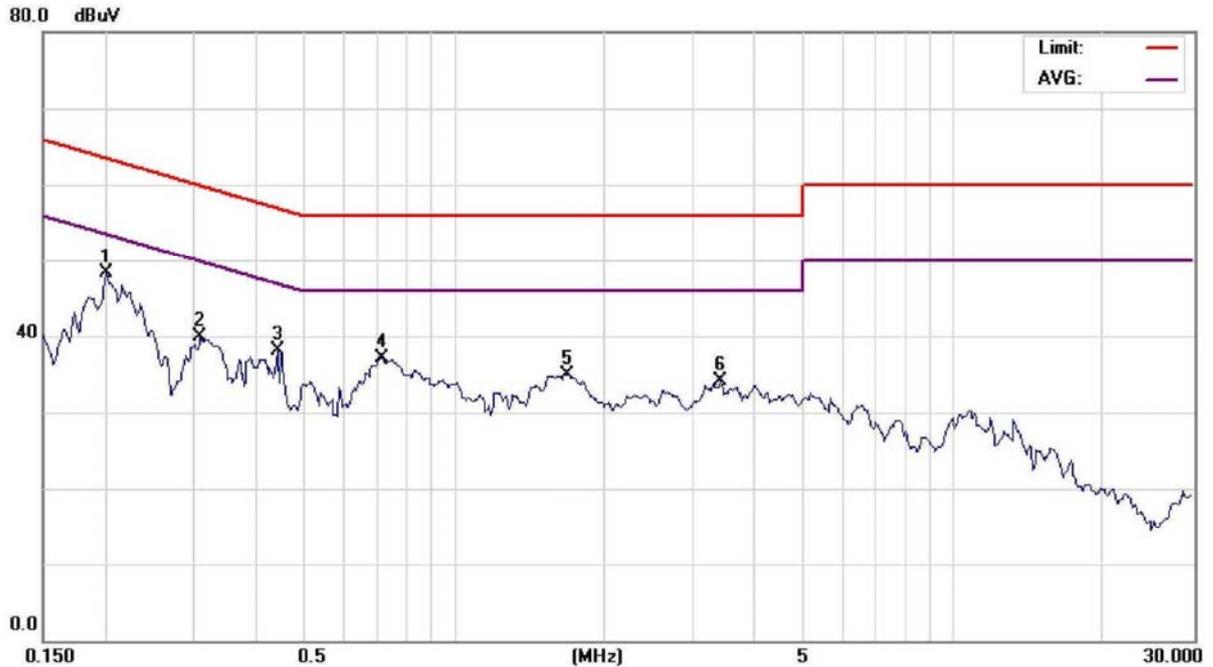
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation Mode			Test Date:	Jun. 14, 2012
Temperature:	26 °C	Humidity:	60 %	Test By:	Jimmy



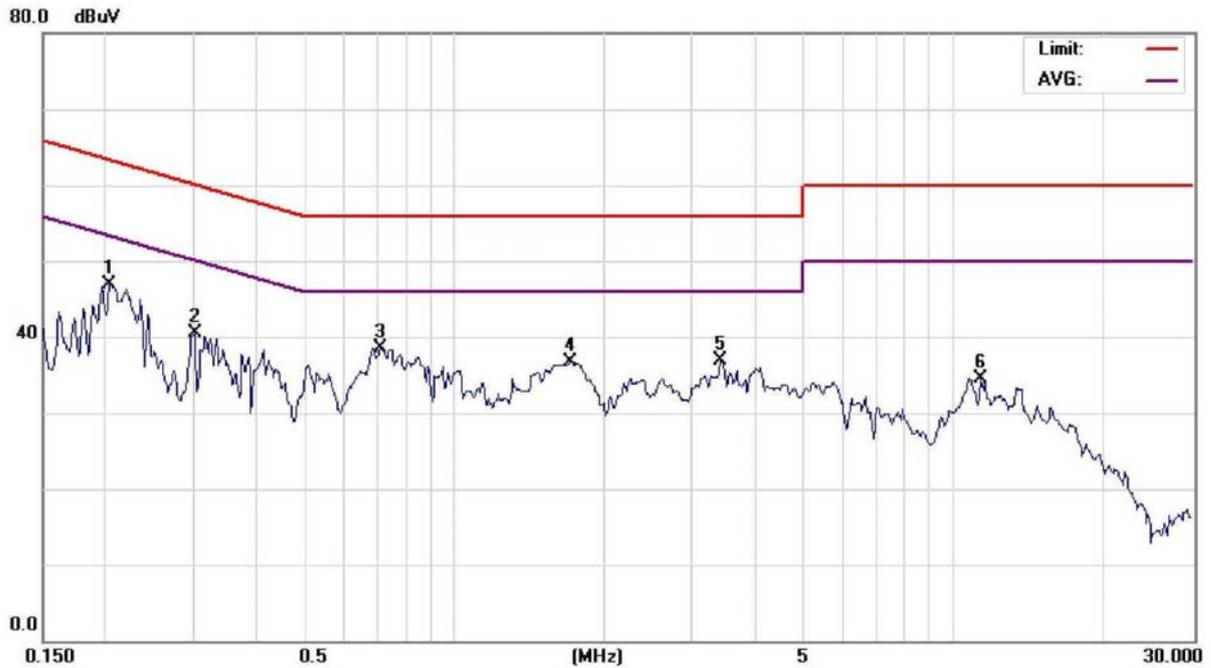
Site	ConductionRoom	Phase:	L1	Temperature:	26 °C
Limit:	FCC Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	60%
EUT:	Tablet Device	Distance:			
M/N:	SGPT1211				
Mode:	Operation Mode				
Note:					

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.2008	48.04	0.21	48.25	63.58	-15.33	peak	
2		0.3103	39.77	0.21	39.98	59.96	-19.98	peak	
3		0.4432	37.97	0.22	38.19	57.00	-18.81	peak	
4		0.7190	36.86	0.22	37.08	56.00	-18.92	peak	
5		1.6886	34.61	0.24	34.85	56.00	-21.15	peak	
6		3.4208	33.78	0.28	34.06	56.00	-21.94	peak	

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Site: ConductionRoom Phase: **N** Temperature: 26 °C
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60%
 EUT: Tablet Device Distance:
 M/N: SGPT1211
 Mode: Operation Mode
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.2047	46.54	0.31	46.85	63.42	-16.57	peak	
2		0.3025	40.13	0.32	40.45	60.17	-19.72	peak	
3		0.7150	38.23	0.32	38.55	56.00	-17.45	peak	
4		1.7082	36.36	0.33	36.69	56.00	-19.31	peak	
5		3.4325	36.51	0.34	36.85	56.00	-19.15	peak	
6		11.3420	34.00	0.50	34.50	60.00	-25.50	peak	

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7 PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable:

According to §15.247(a)(2), (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

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According to RSS-210 issue 8, §A8.4(4), for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

7.2 Measurement Equipment Used:

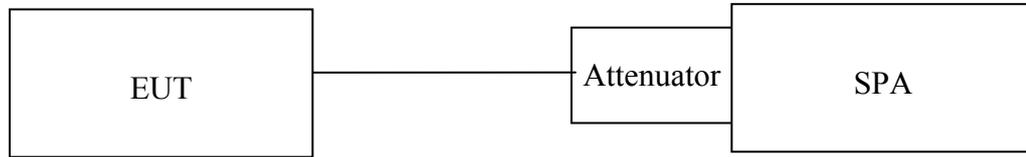
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014
Power Meter	Anritsu	MA2411B	917032	02/08/2012	02/07/2014
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/17/2012	03/16/2014
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2012	02/27/2013
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2012	02/27/2013
Splitter	Agilent	11636B	N/A	02/28/2012	02/27/2013

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7.3 Test Set-up:



7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Channel power function, RBW = 1MHz, VBW = 3MHz, Bandwidth = 26dB occupied Bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

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7.5 Measurement Result:

802.11b

Cable loss = 0		Peak Power Output (dBm)					Required Limit
CH	Frequency (MHz)	Data Rate					
		1	2	5.5	11		
1	2412	15.84	15.80	15.78	15.73	1 Watt = 30 dBm	
6	2437	15.65	15.62	15.59	15.58	1 Watt = 30 dBm	
11	2462	15.80	15.77	15.76	15.72	1 Watt = 30 dBm	

Cable loss = 0		Average Power Output (dBm)					Required Limit
CH	Frequency (MHz)	Data Rate					
		1	2	5.5	11		
1	2412	13.29	13.25	13.22	13.19	1 Watt = 30 dBm	
6	2437	13.16	13.13	13.10	13.08	1 Watt = 30 dBm	
11	2462	13.27	13.24	13.21	13.18	1 Watt = 30 dBm	

802.11g

Cable loss = 0		Peak Power Output(dBm)								Required Limit
CH	Frequency (MHz)	Data Rate								
		6	9	12	18	24	36	48	54	
1	2412	16.26	16.23	16.20	16.16	16.14	16.10	16.08	16.06	1 Watt = 30 dBm
6	2437	17.10	17.07	17.05	17.02	17.00	16.97	16.95	16.91	1 Watt = 30 dBm
11	2462	17.21	17.19	17.15	17.12	17.10	17.08	17.04	17.01	1 Watt = 30 dBm

Cable loss = 0		Average Power Output(dBm)								Required Limit
CH	Frequency (MHz)	Data Rate								
		6	9	12	18	24	36	48	54	
1	2412	12.87	12.85	12.83	12.81	12.77	12.76	12.72	12.69	1 Watt = 30 dBm
6	2437	13.73	13.71	13.7	13.68	13.65	13.61	13.58	13.53	1 Watt = 30 dBm
11	2462	14.41	13.82	13.8	13.79	13.74	13.73	13.7	13.69	1 Watt = 30 dBm

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802.11n_20M (2.4G)

Cable loss = 0		Peak Power Output(dBm)								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
1	2412	15.65	15.63	15.61	15.57	15.55	15.51	15.46	15.43	1 Watt = 30 dBm
6	2437	17.65	17.62	17.58	17.57	17.54	17.51	17.48	17.45	1 Watt = 30 dBm
11	2462	17.73	17.70	17.69	17.65	17.64	17.61	17.59	17.55	1 Watt = 30 dBm

Cable loss = 0		Average Power Output(dBm)								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
1	2412	12.20	12.17	12.15	12.11	12.09	12.04	12.01	12.00	1 Watt = 30 dBm
6	2437	14.24	14.22	14.19	14.16	14.11	14.08	14.05	14.03	1 Watt = 30 dBm
11	2462	14.33	14.31	14.27	14.25	14.21	14.18	14.14	14.12	1 Watt = 30 dBm

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802.11a

Cable loss = 0		Peak Power Output								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
149	5745	13.67	13.65	13.63	13.61	13.57	13.54	13.53	13.49	1 Watt = 30 dBm
157	5785	14.44	14.41	14.39	14.36	14.34	14.30	14.26	14.21	1 Watt = 30 dBm
165	5825	14.19	14.18	14.15	14.11	14.07	14.04	14.01	14.00	1 Watt = 30 dBm

Cable loss = 0		Average Power Output								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
149	5745	10.31	10.29	10.25	10.24	10.21	10.18	10.14	10.11	1 Watt = 30 dBm
157	5785	11.02	11.00	10.97	10.94	10.93	10.90	10.84	10.81	1 Watt = 30 dBm
165	5825	10.73	10.71	10.67	10.64	10.62	10.59	10.57	10.53	1 Watt = 30 dBm

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802.11n(5GHz)_20M

Cable loss = 0		Peak Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
149	5745	13.73	13.71	13.70	13.66	13.63	13.60	13.57	13.54	1 Watt = 30 dBm
157	5785	14.62	14.60	14.59	14.54	14.51	14.47	14.41	14.39	1 Watt = 30 dBm
165	5825	14.53	14.51	14.50	14.45	14.41	14.39	14.37	14.32	1 Watt = 30 dBm

Cable loss = 0		Average Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
149	5745	10.23	10.22	10.17	10.13	10.10	10.06	10.05	10.01	1 Watt = 30 dBm
157	5785	11.21	11.19	11.16	11.12	11.11	11.07	11.06	11.03	1 Watt = 30 dBm
165	5825	11.03	11.02	11.00	10.96	10.95	10.93	10.90	10.88	1 Watt = 30 dBm

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802.11n(5GHz)_40M

Cable loss = 0		Peak Power Output								
CH	Frequency (MHz)	Data Rate								Required Limit
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	14.28	14.25	14.23	14.19	14.16	14.14	14.11	14.09	1 Watt = 30 dBm
159	5795	14.38	14.37	14.34	14.30	14.26	14.23	14.19	14.15	1 Watt = 30 dBm

Cable loss = 0		Average Power Output								
CH	Frequency (MHz)	Data Rate								Required Limit
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	10.76	10.75	10.73	10.70	10.66	10.65	10.59	10.57	1 Watt = 30 dBm
159	5795	10.86	10.82	10.79	10.75	10.71	10.68	10.64	10.62	1 Watt = 30 dBm

**Note: Offset 11.1dB for 2.4G*

11.4dB for 5G

Note: Refer to next page for plots.

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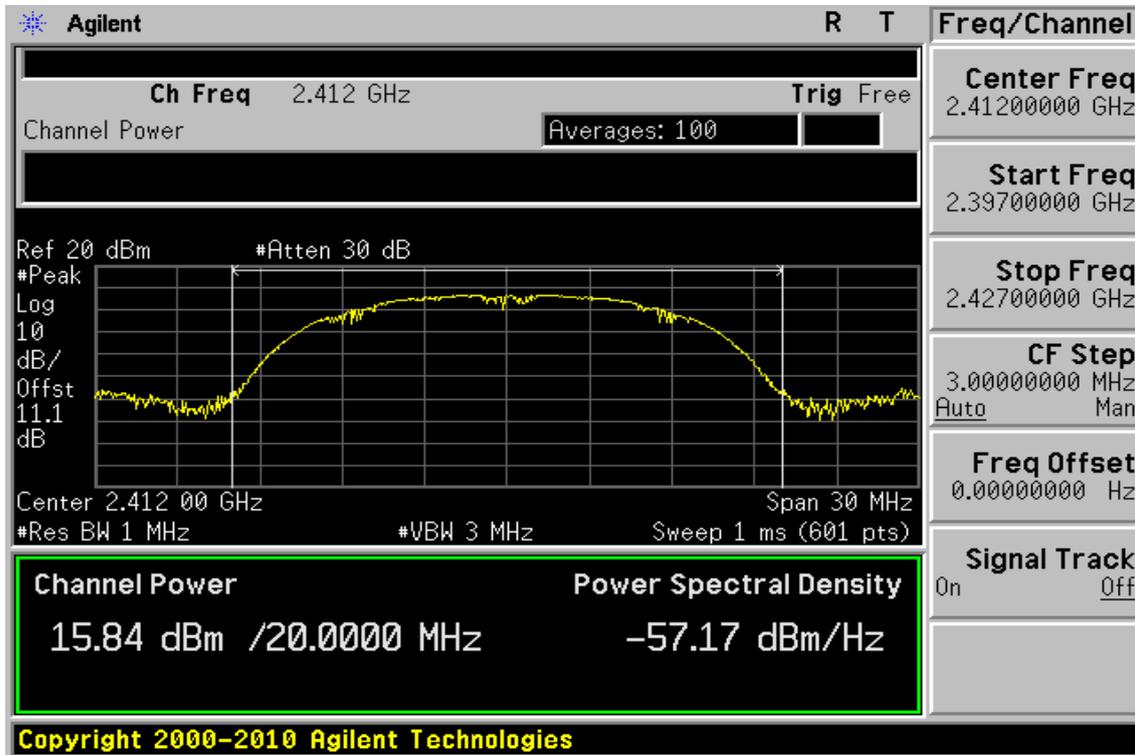
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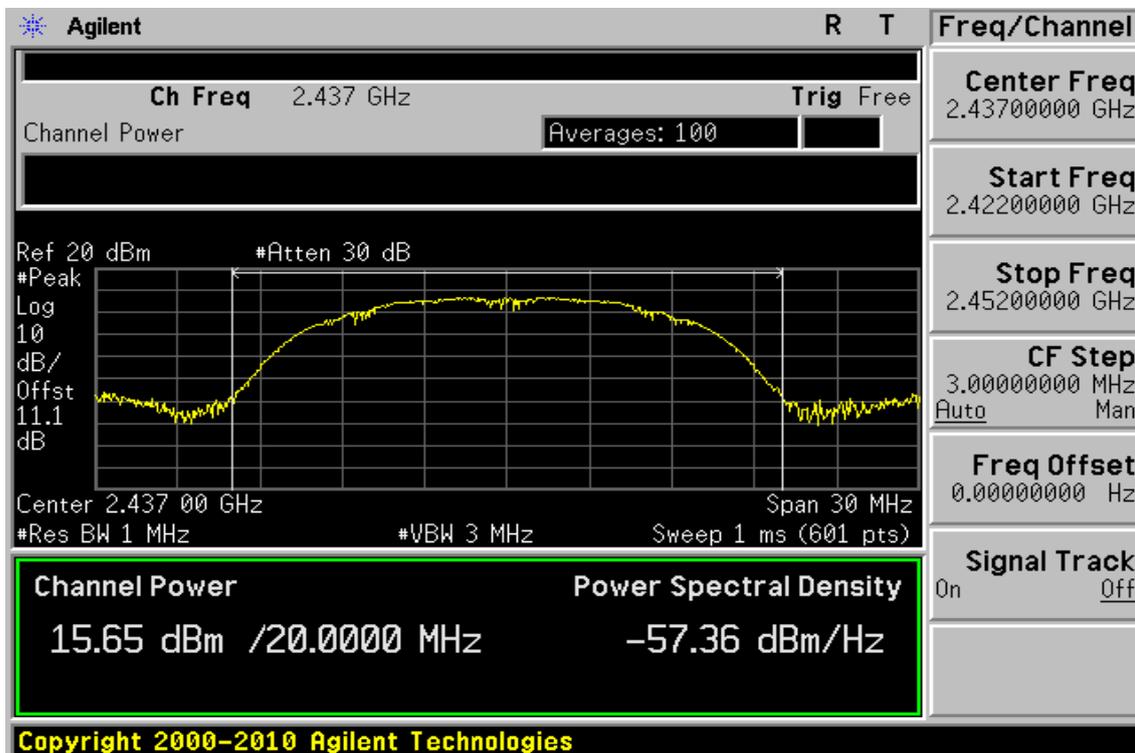
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802.11b, 1Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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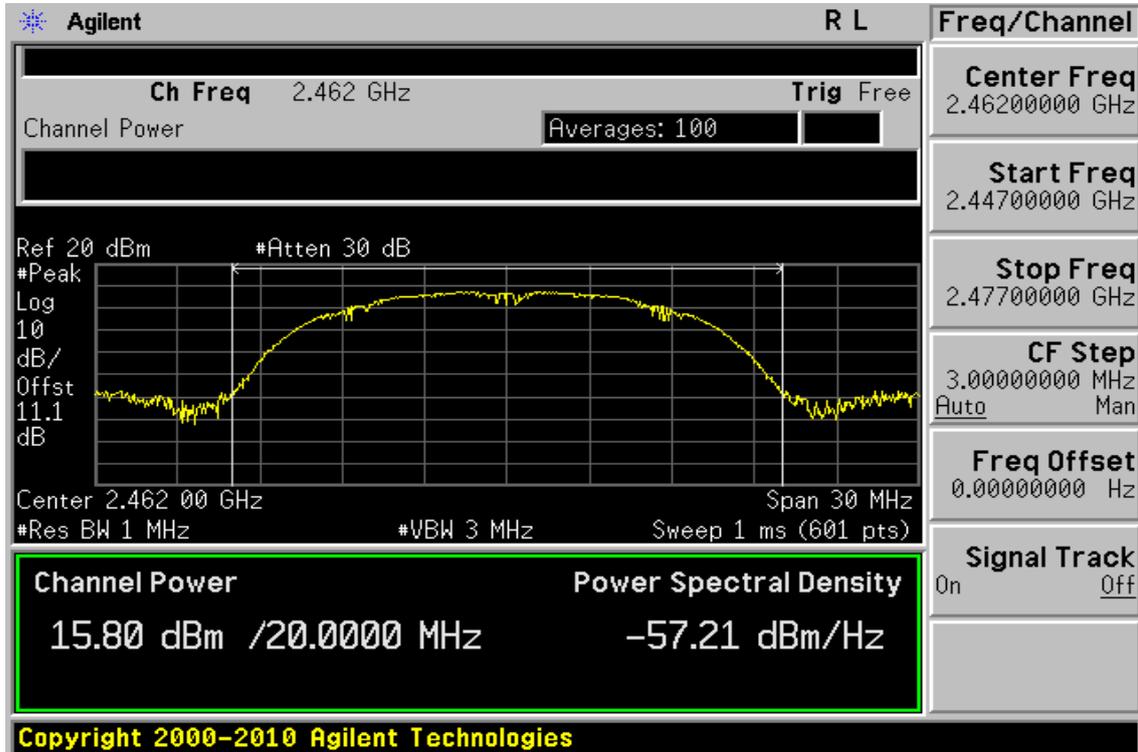
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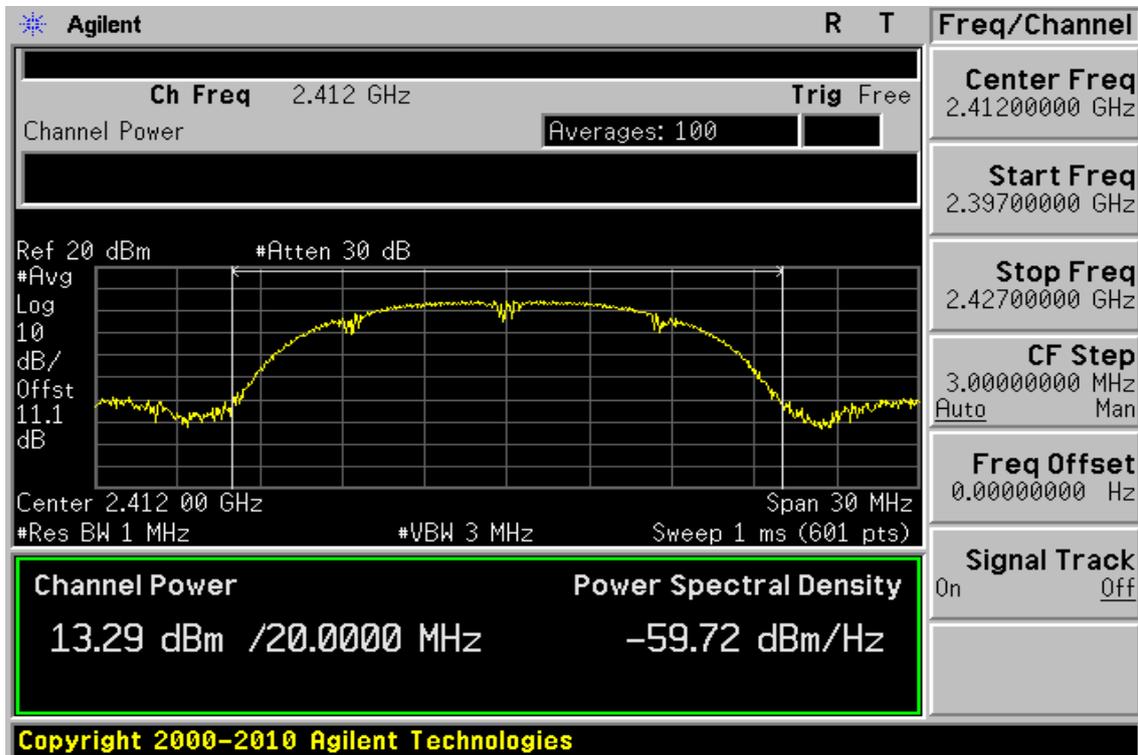
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Peak Power Output Plot (CH High)



Average Power Output Plot (CH Low)



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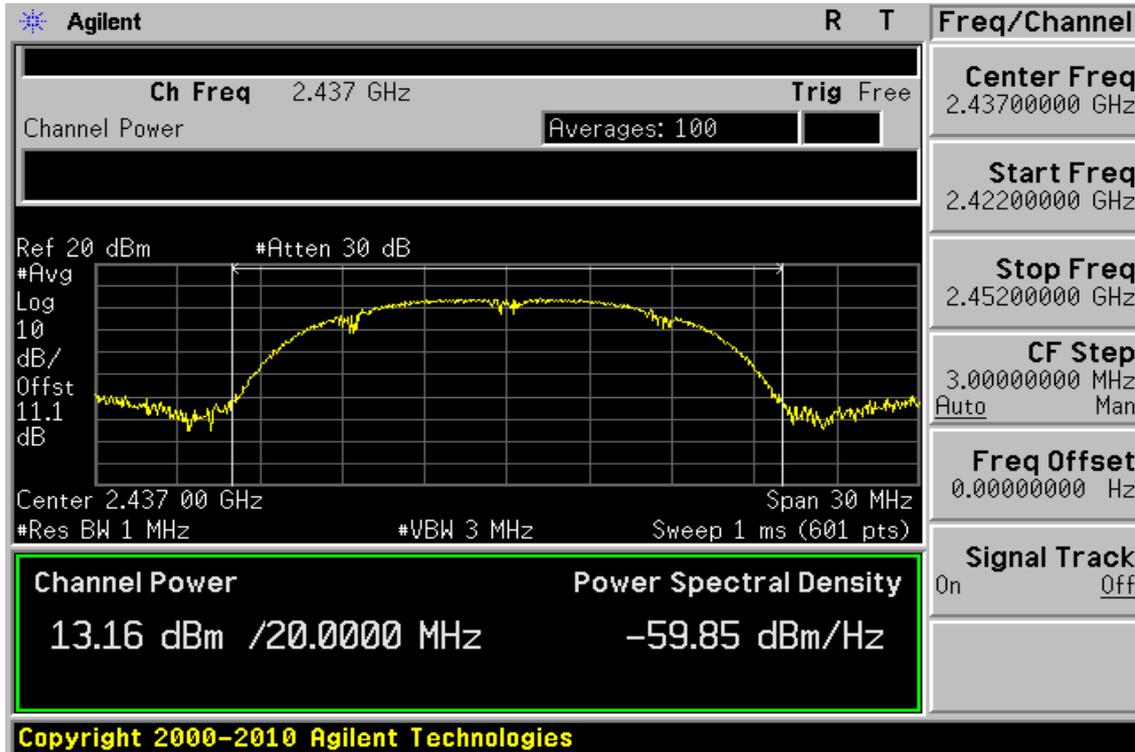
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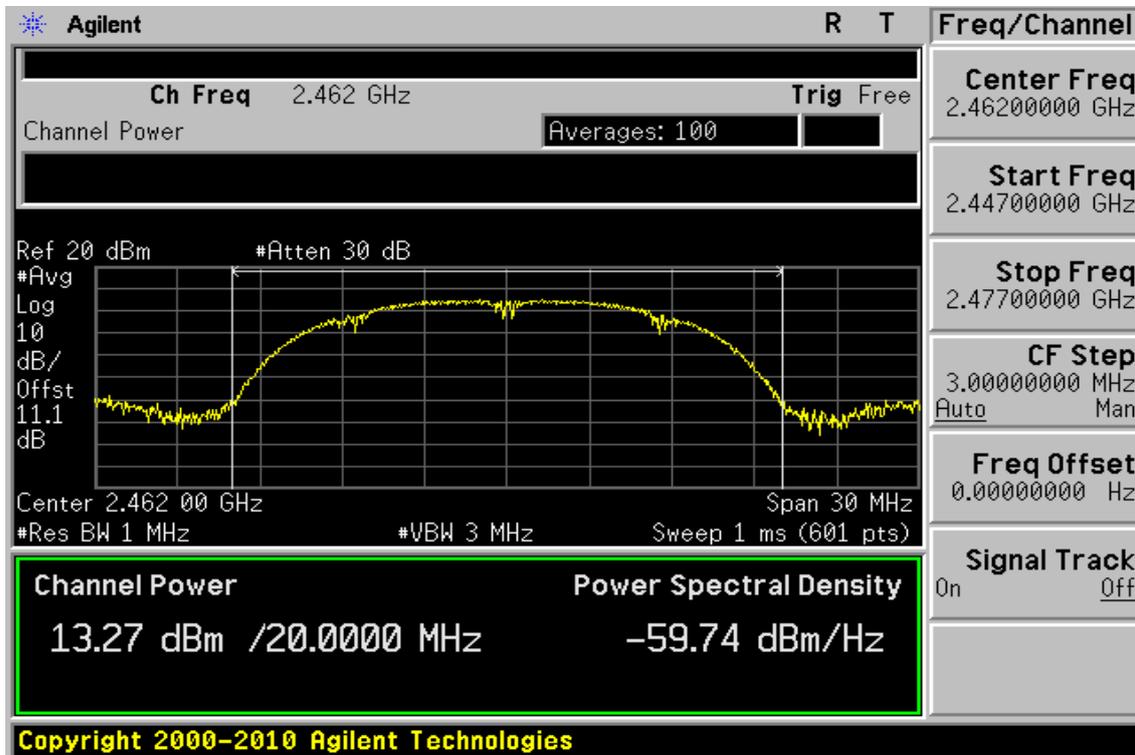
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Average Power Output Plot (CH Mid)



Average Power Output Plot (CH High)



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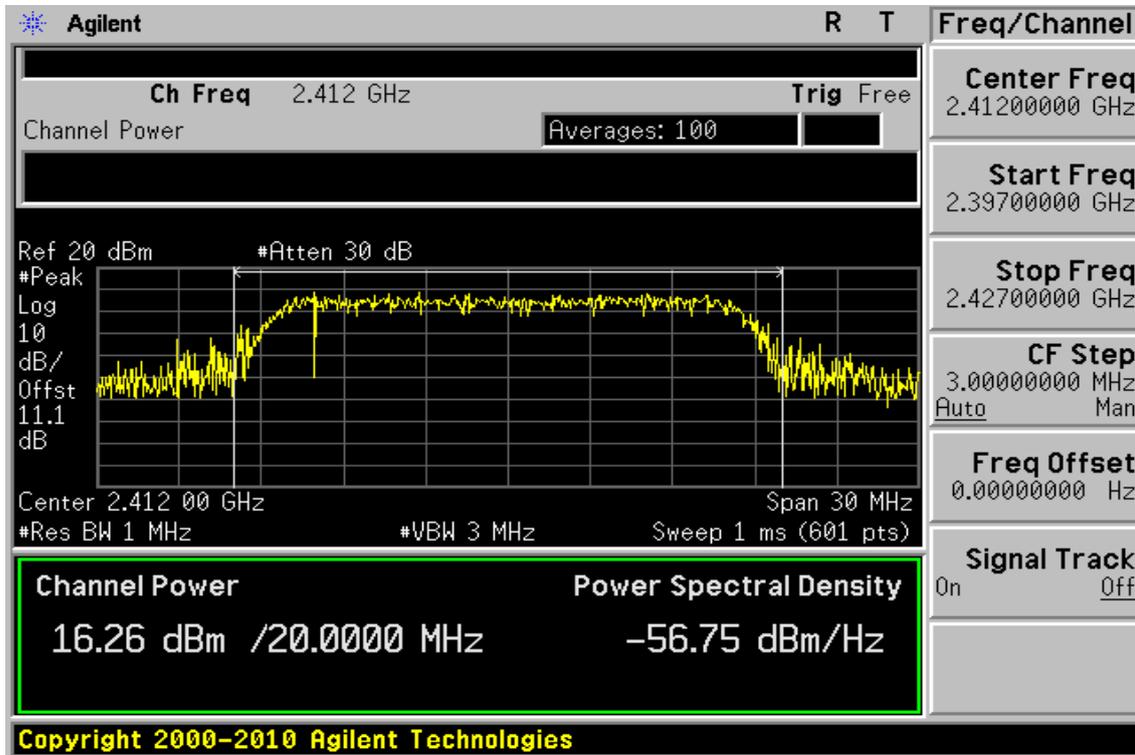
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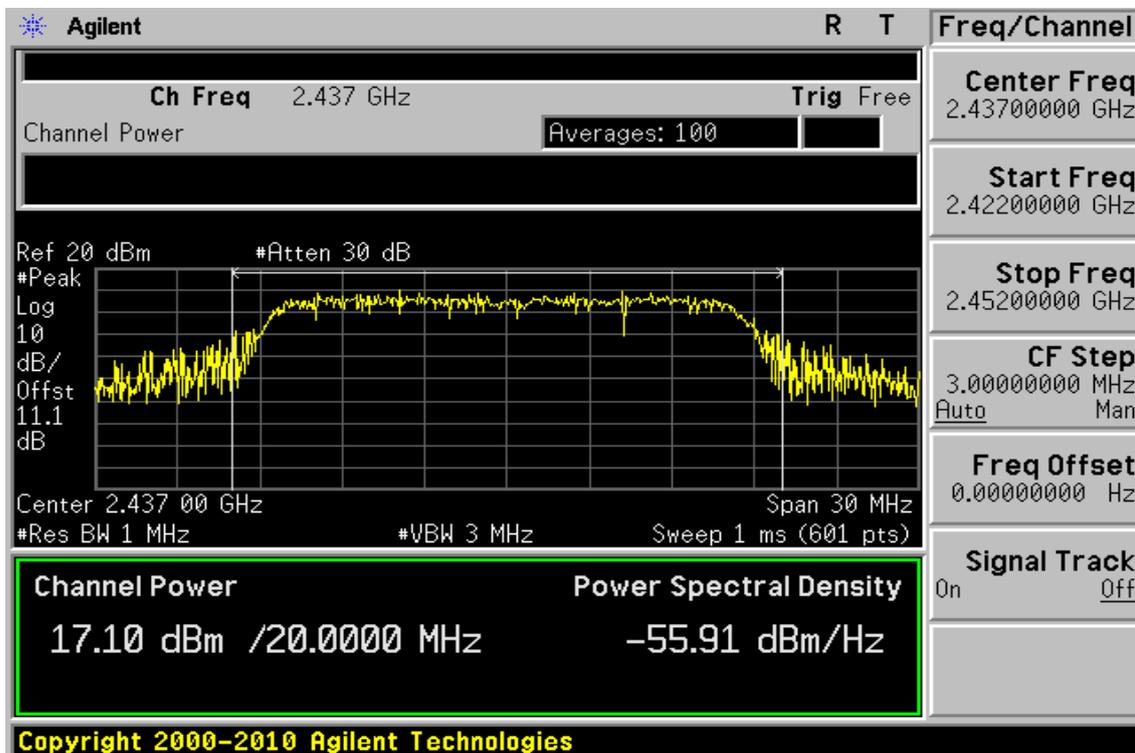
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802.11g, 6Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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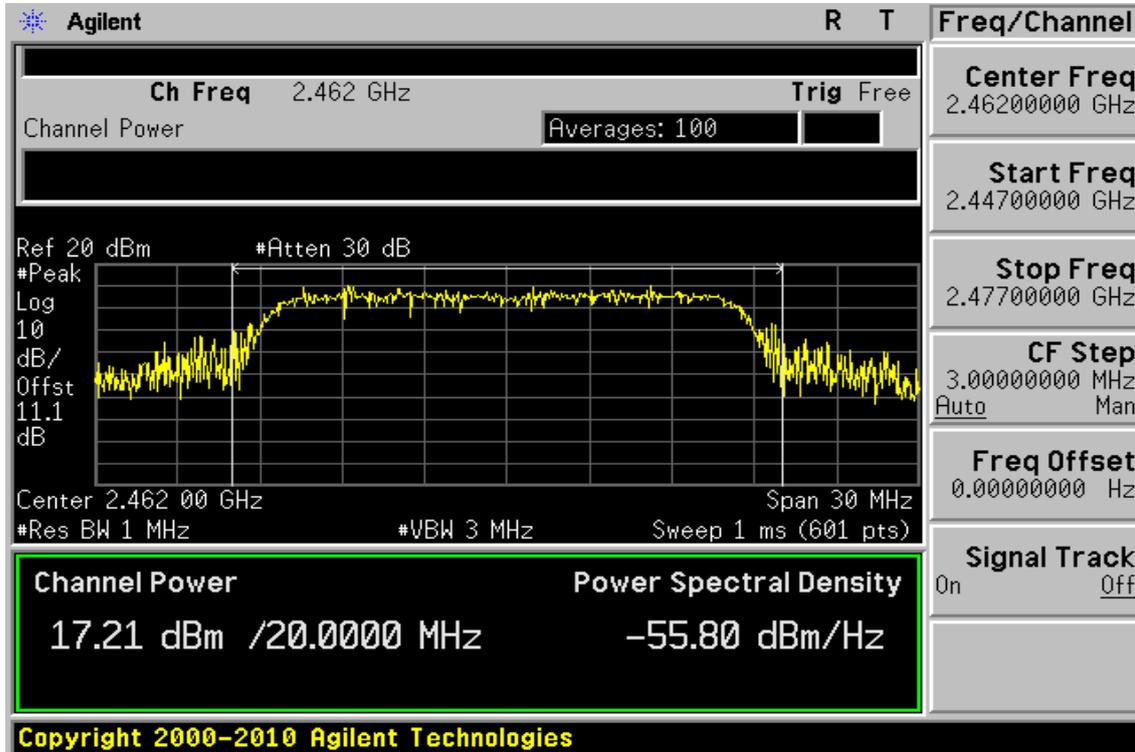
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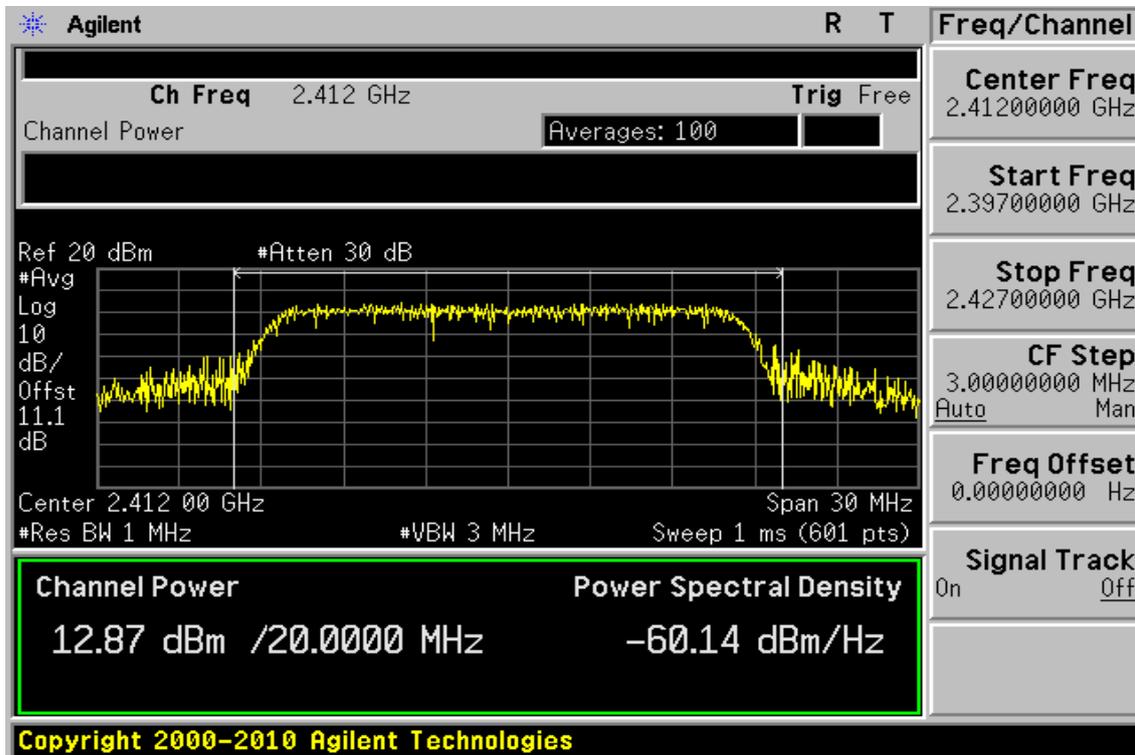
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Peak Power Output Plot (CH High)



Average Power Output Plot (CH Low)



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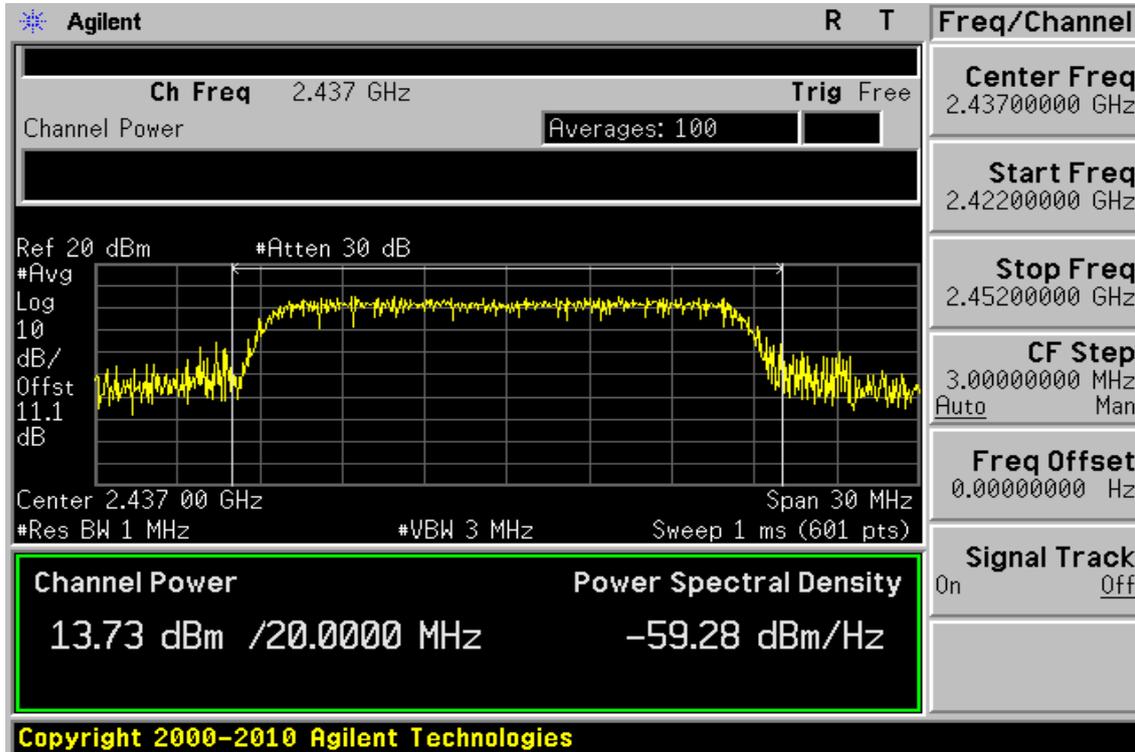
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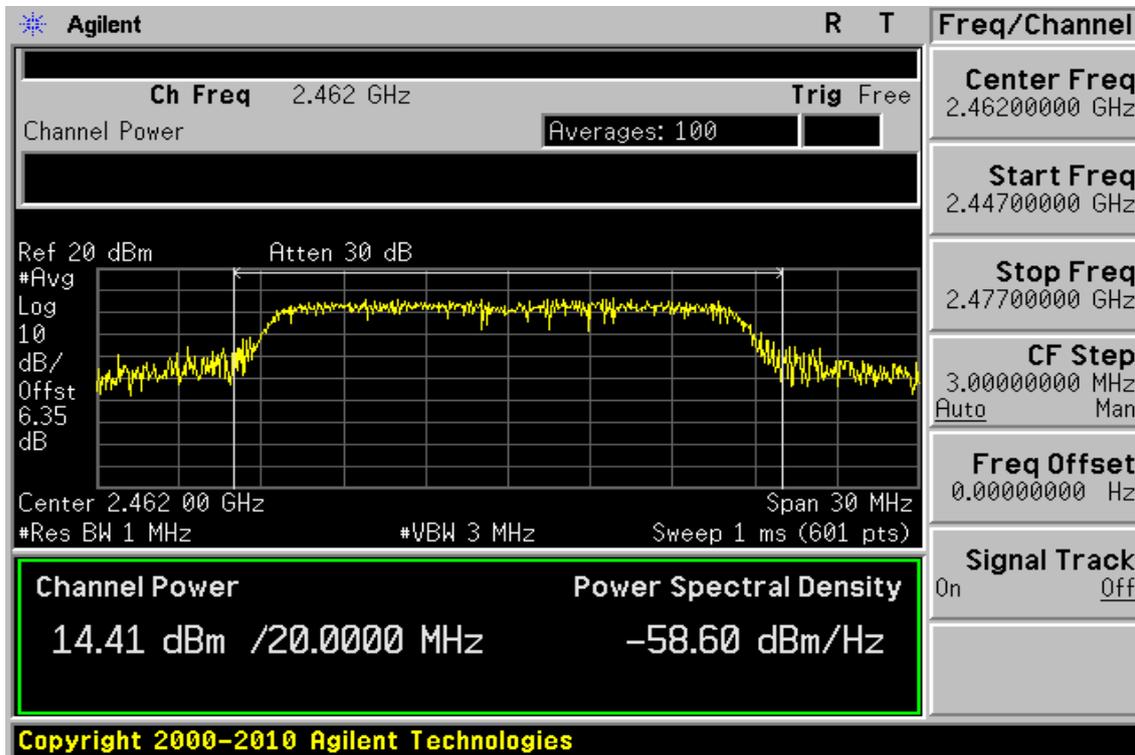
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Average Power Output Plot (CH Mid)



Average Power Output Plot (CH High)



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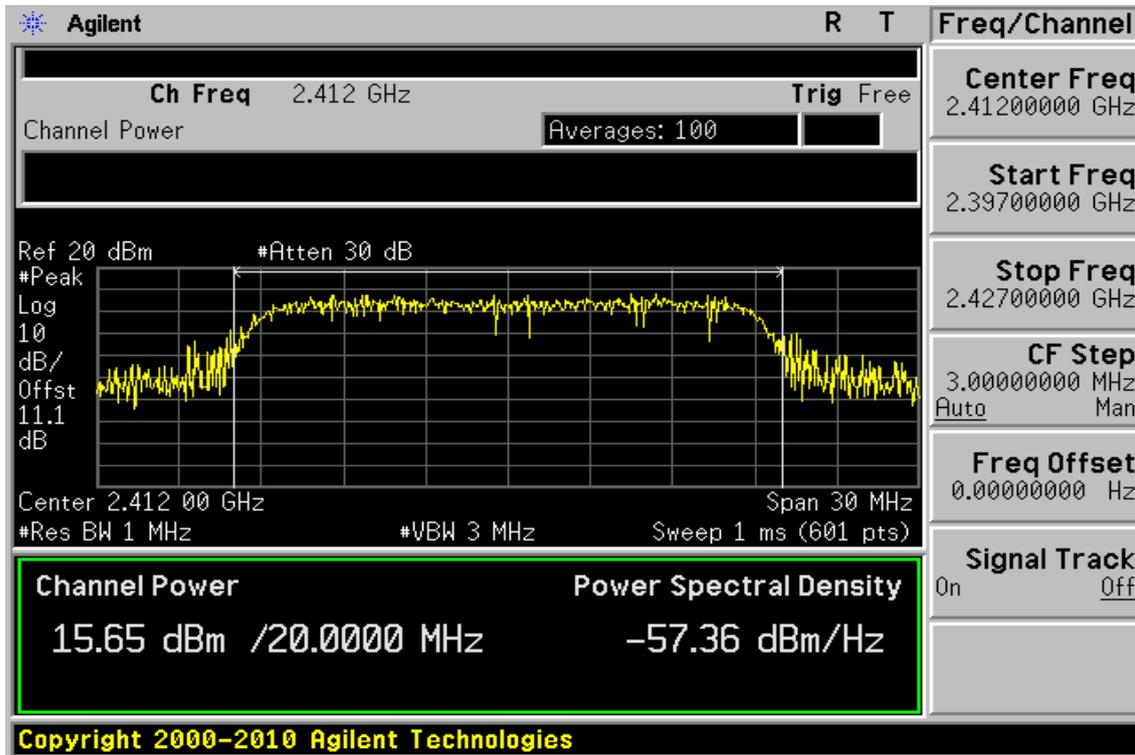
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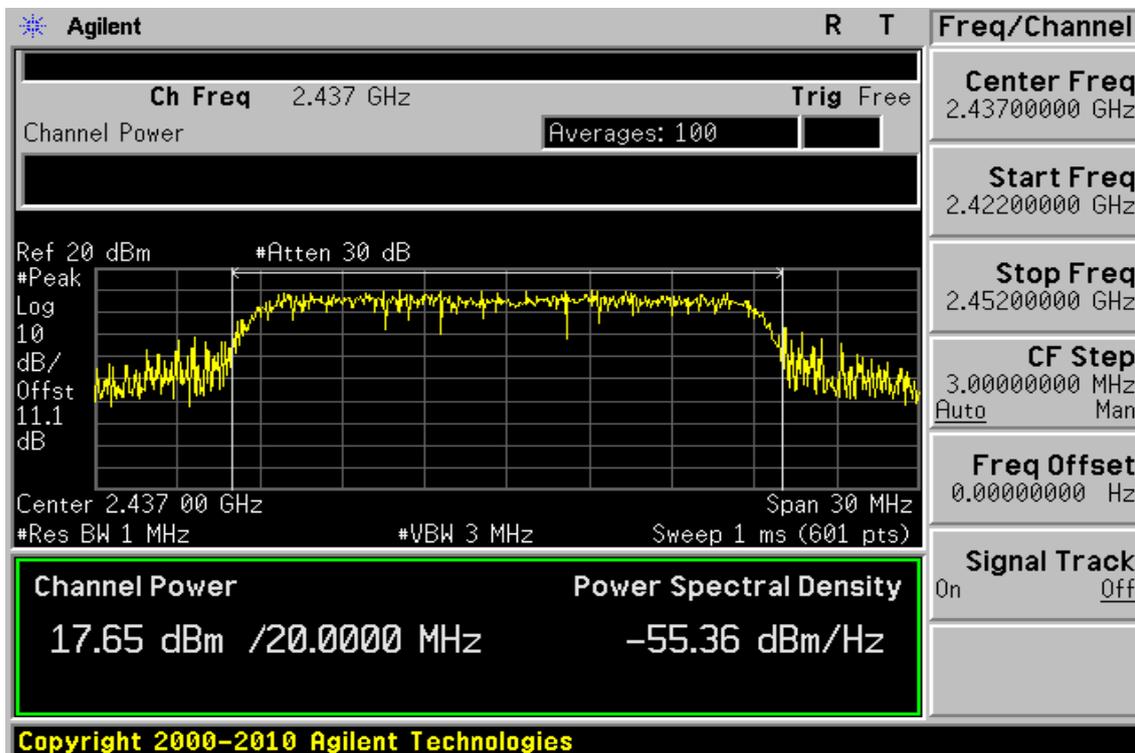
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802.11n_20M, 6.5Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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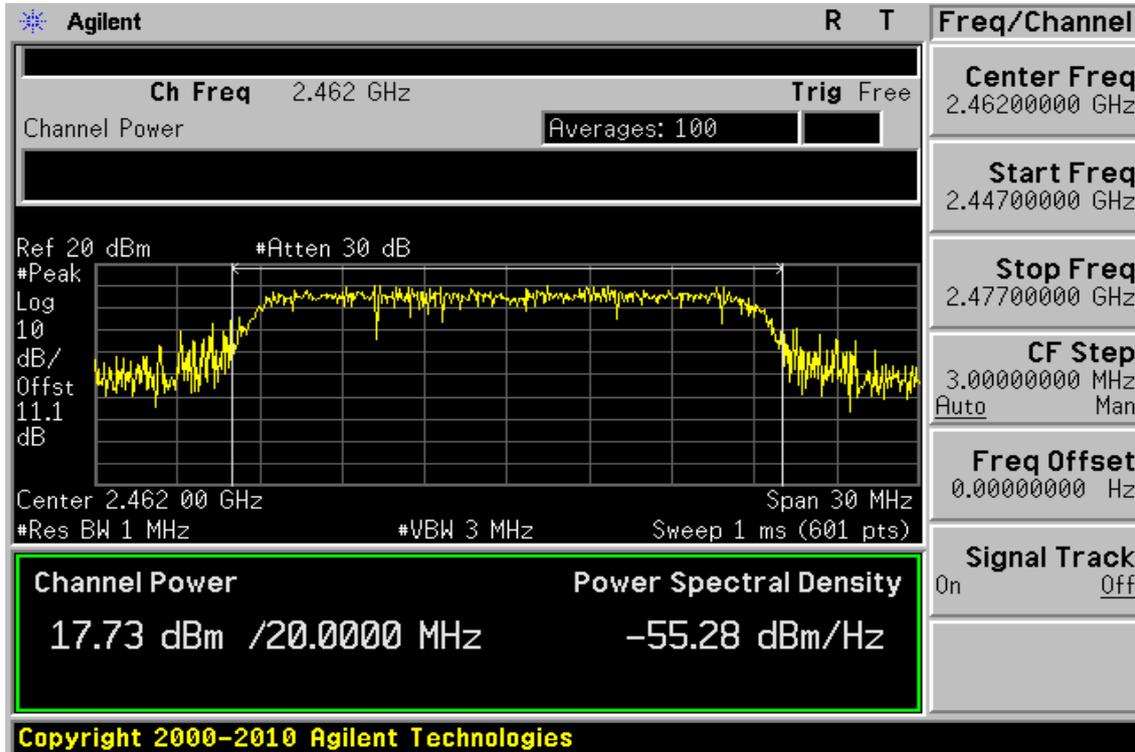
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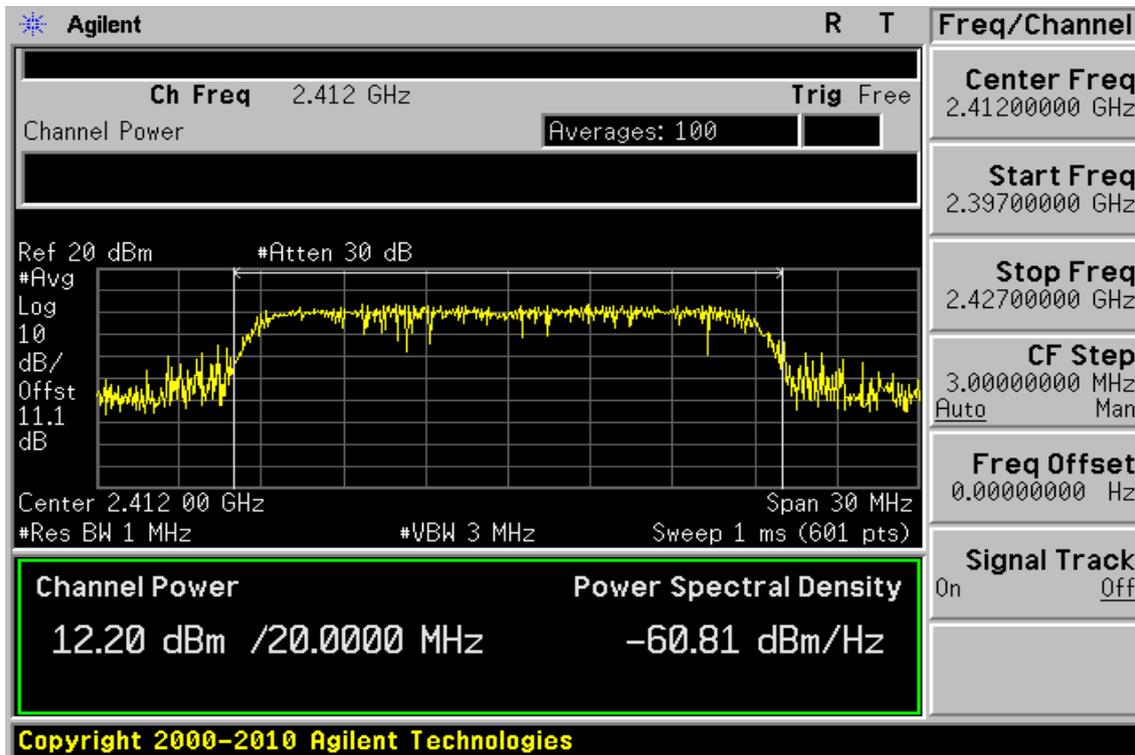
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Peak Power Output Plot (CH High)



Average Power Output Plot (CH Low)



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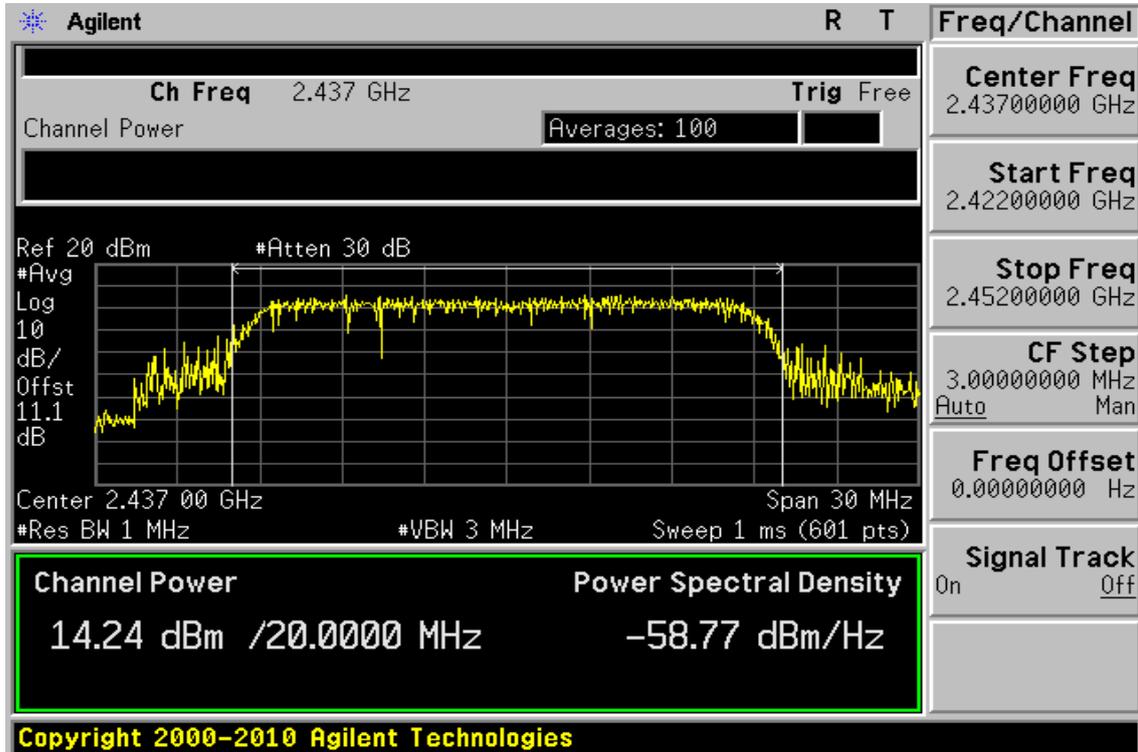
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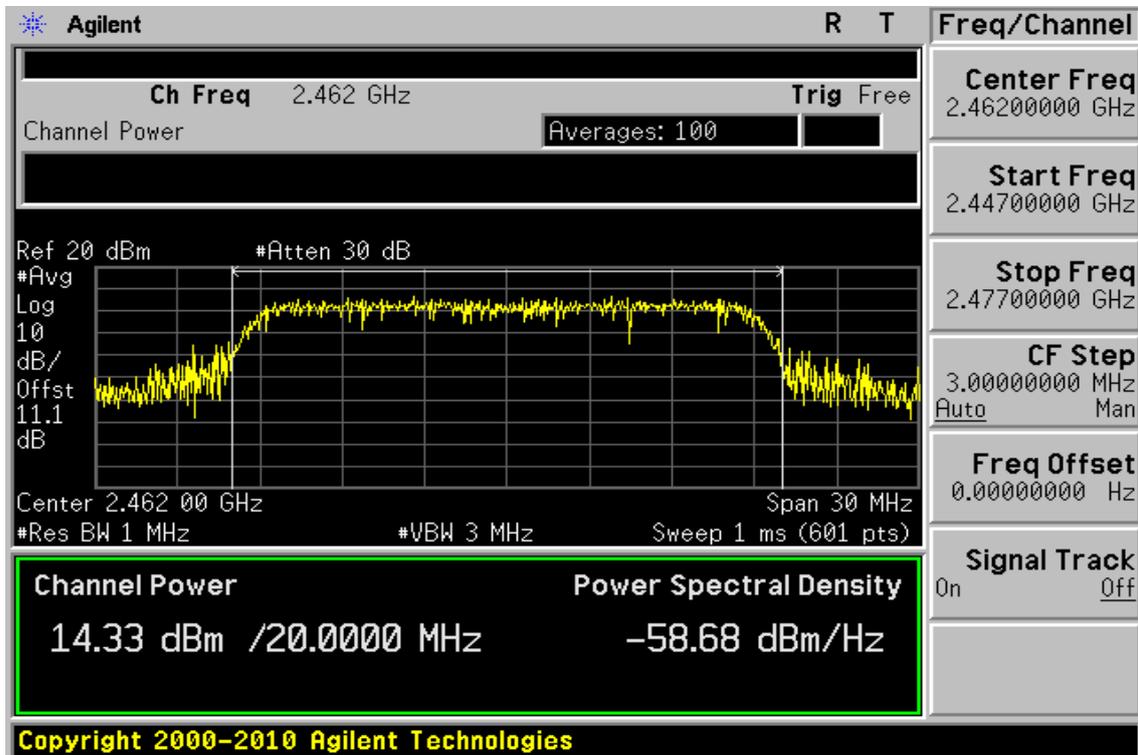
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Average Power Output Plot (CH Mid)



Average Power Output Plot (CH High)



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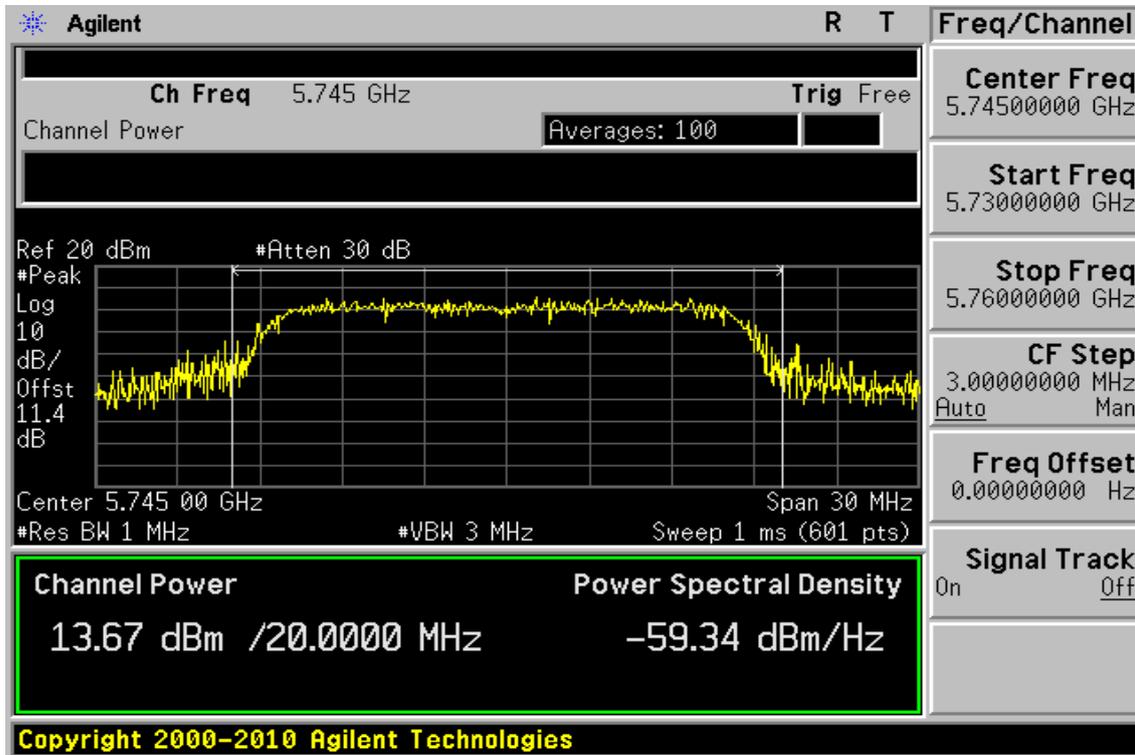
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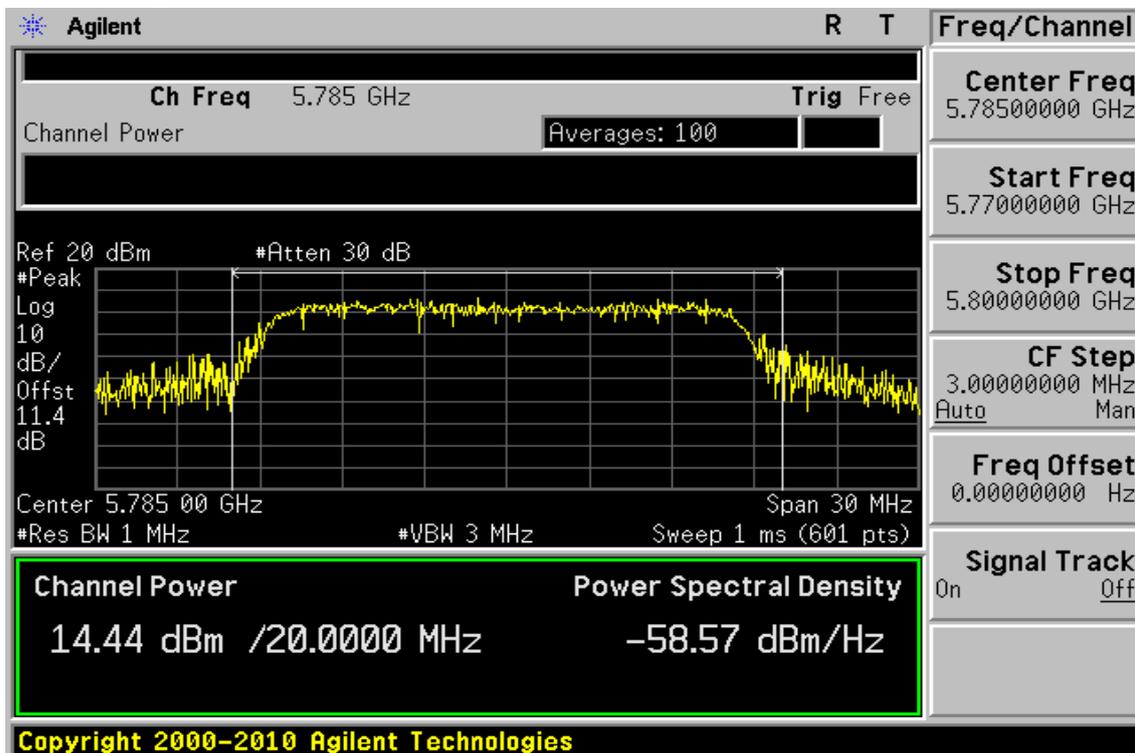
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802.11a, 6Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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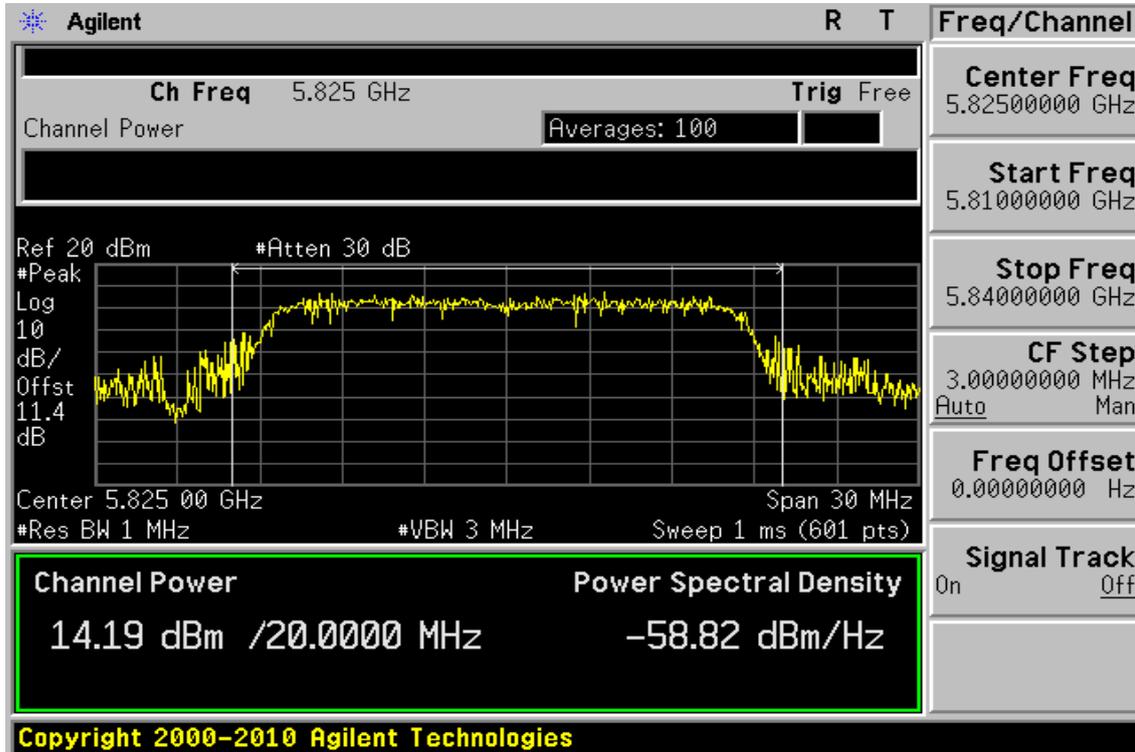
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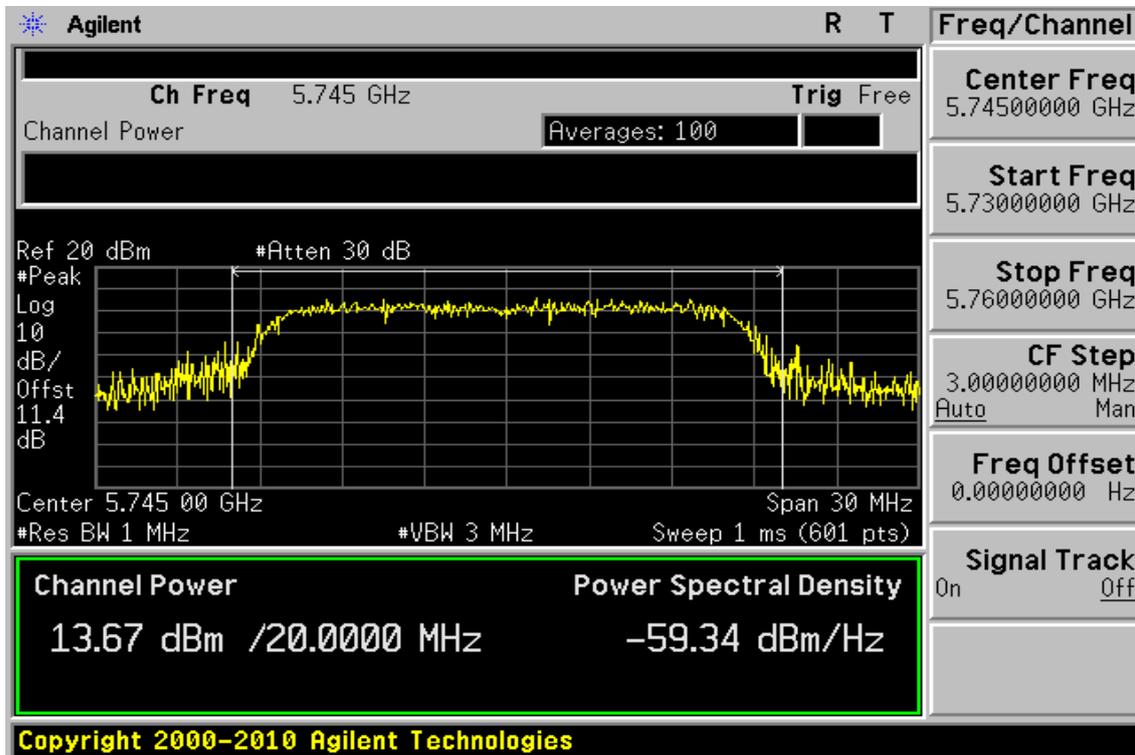
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Peak Power Output Plot (CH High)



Average Power Output Plot (CH Low)



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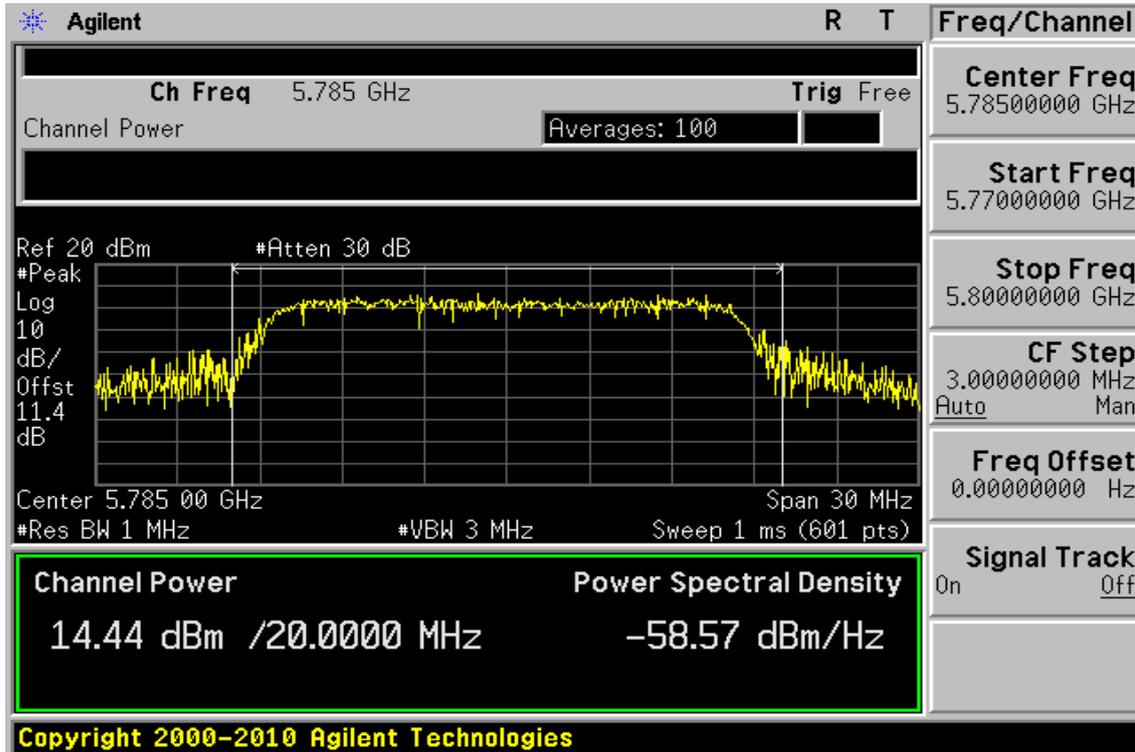
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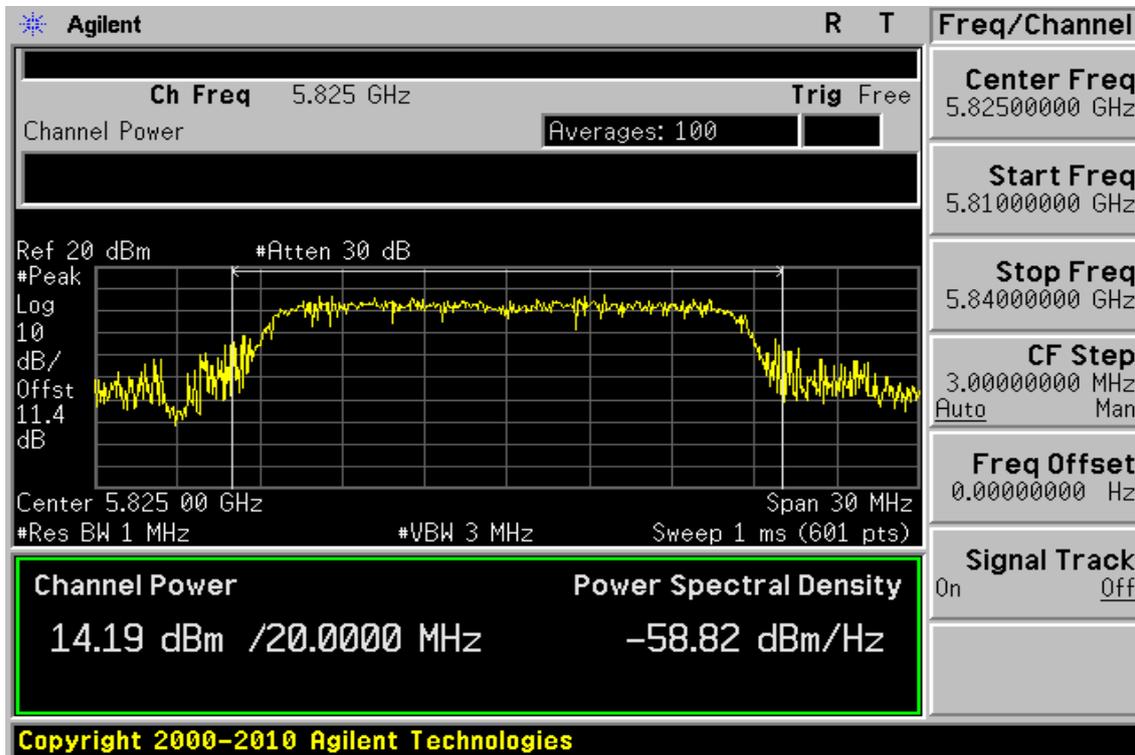
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Average Power Output Plot (CH Mid)



Average Power Output Plot (CH High)



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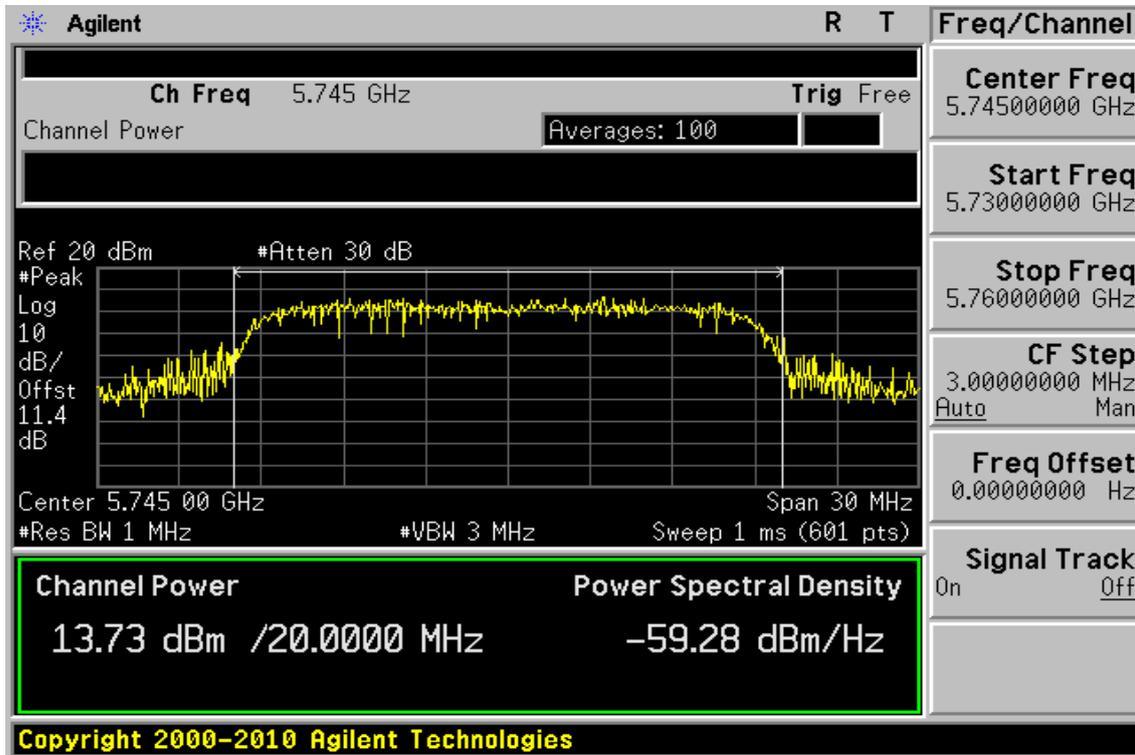
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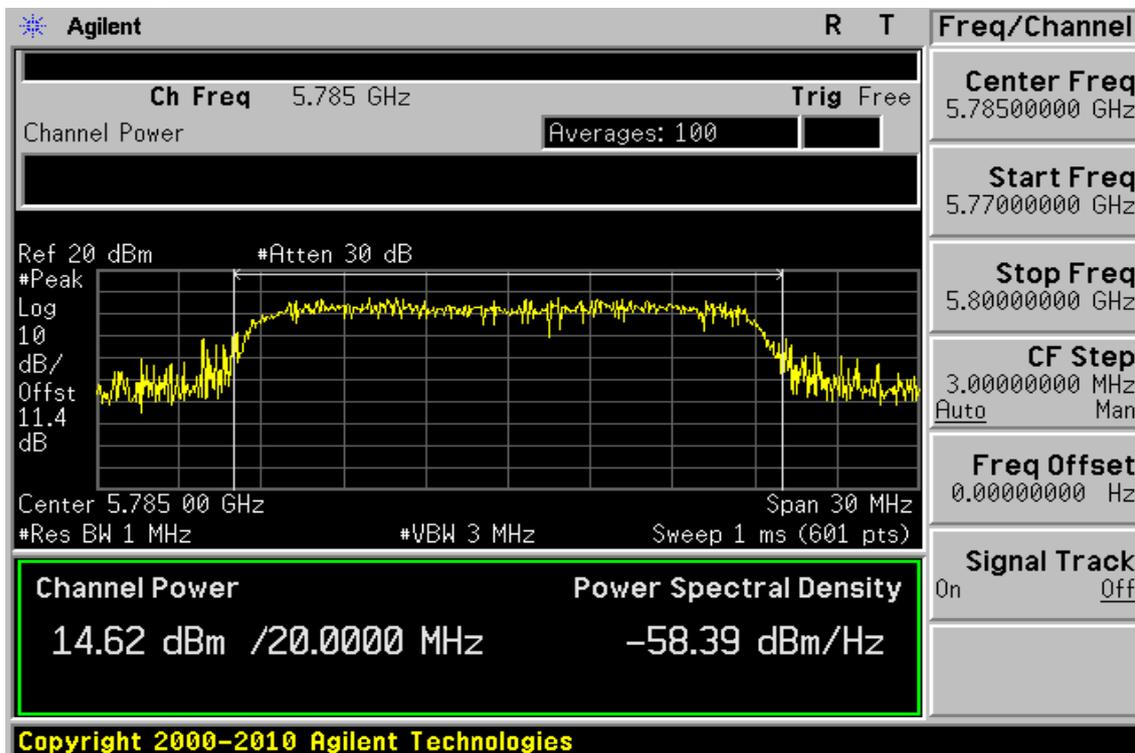
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802.11n (5GHz)_20M, 6.5Mbps
Peak Power Output Plot (CH Low)

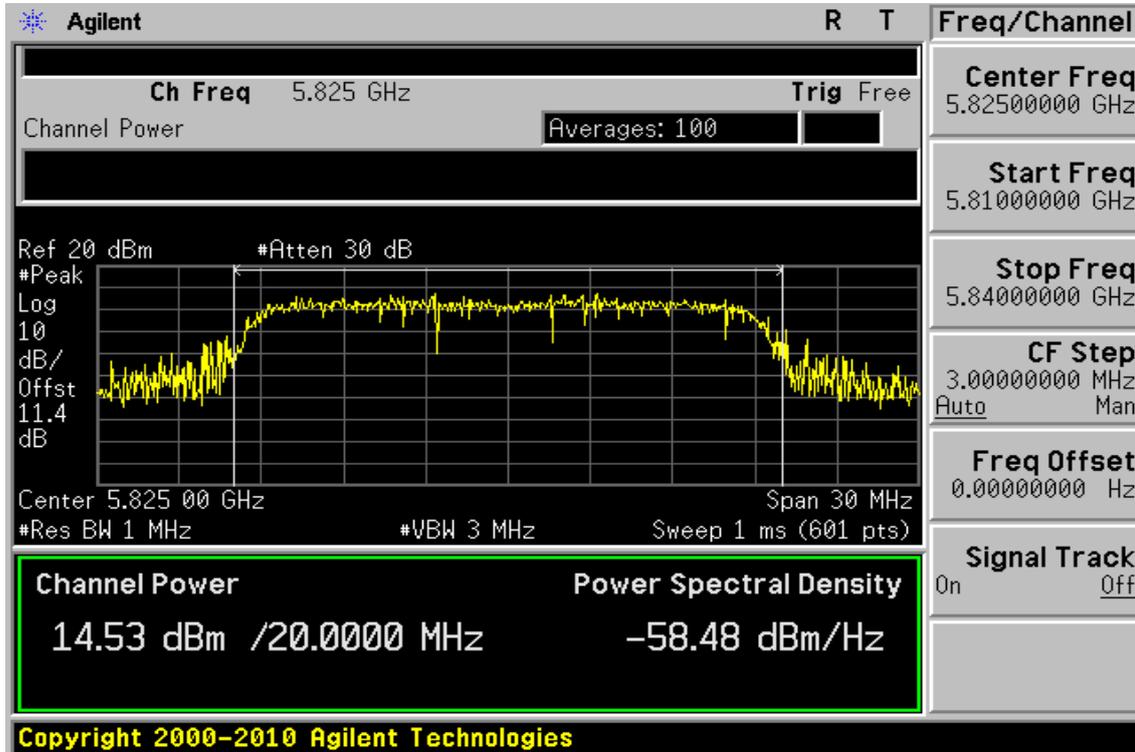


Peak Power Output Plot (CH Mid)

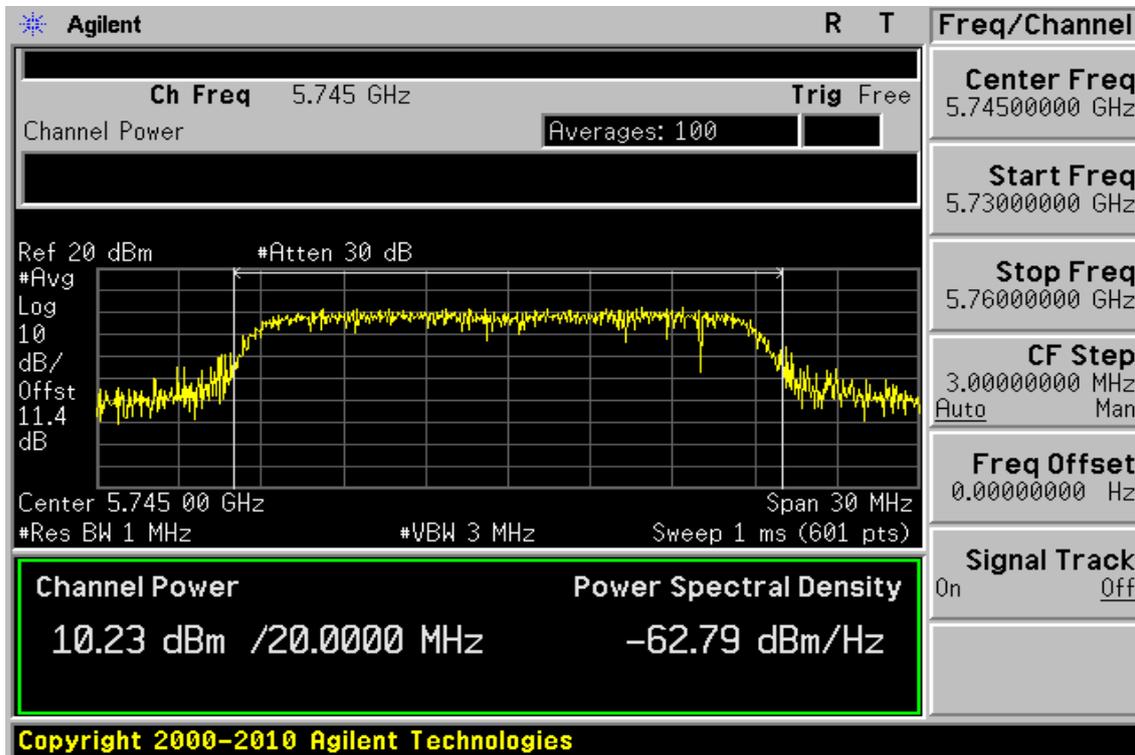


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Peak Power Output Plot (CH High)



Average Power Output Plot (CH Low)



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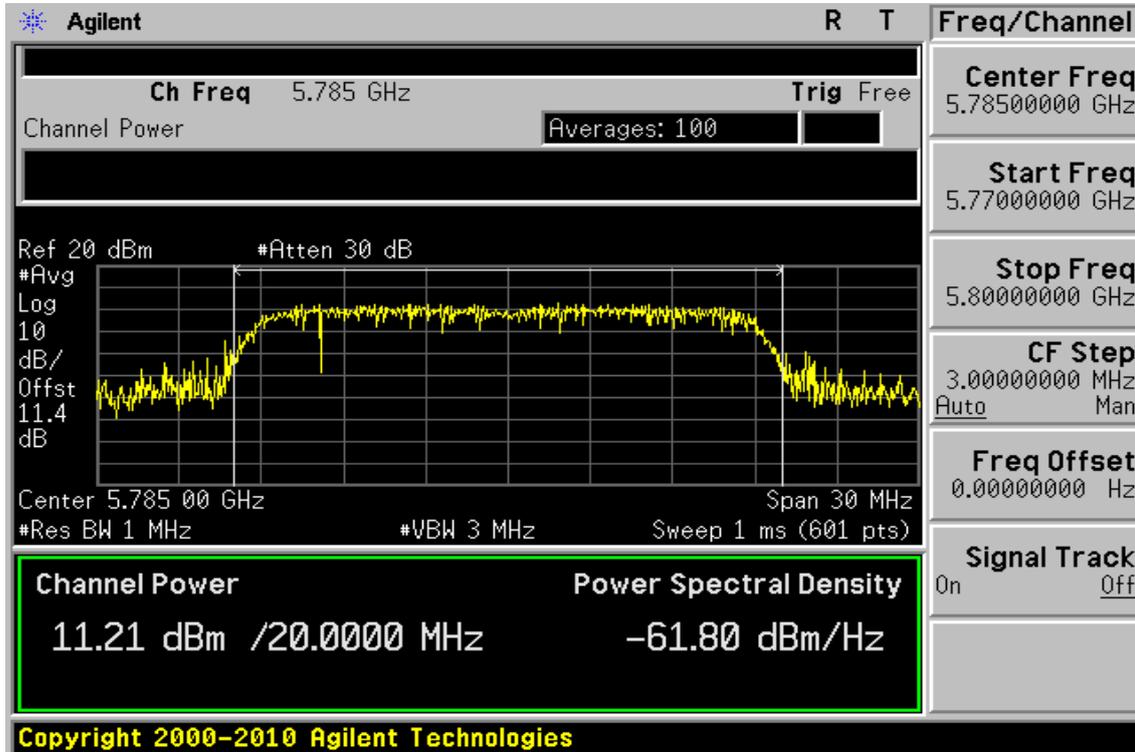
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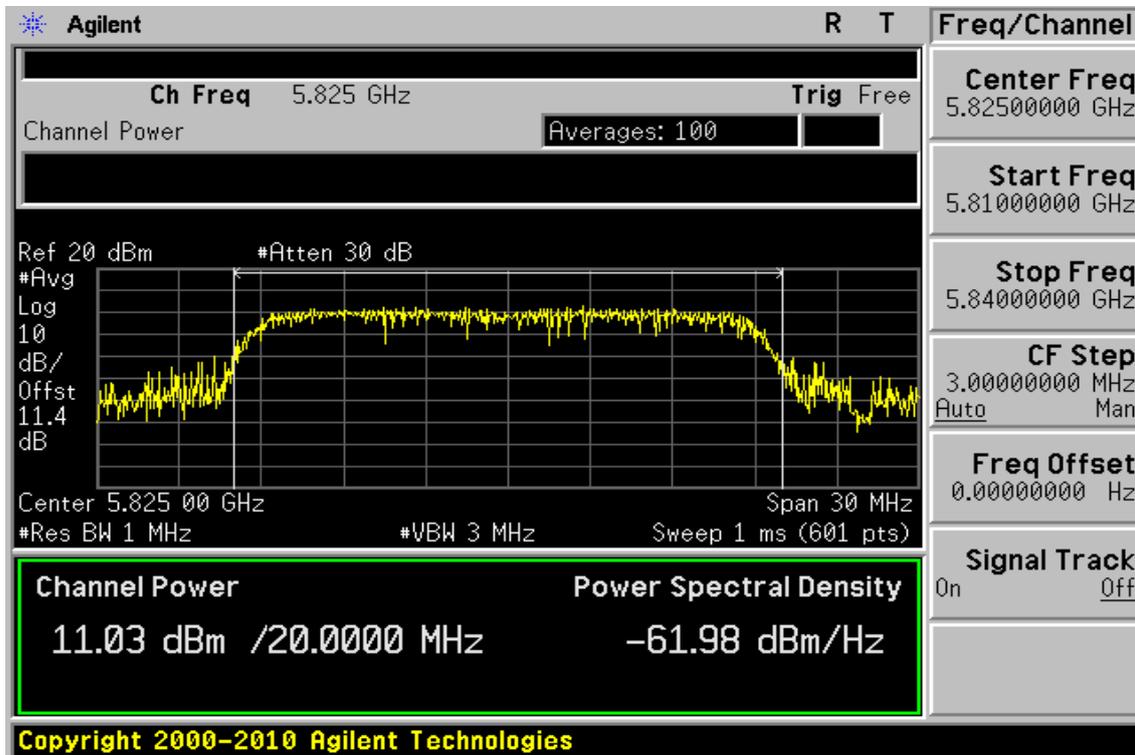
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Average Power Output Plot (CH Mid)



Average Power Output Plot (CH High)



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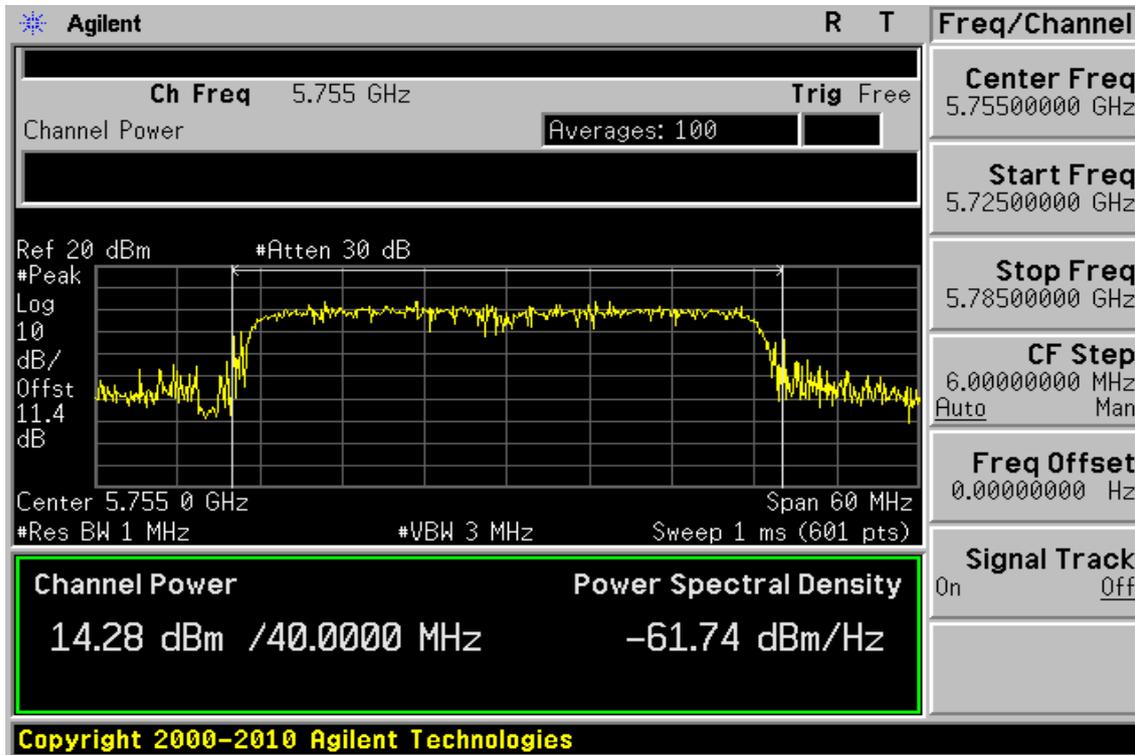
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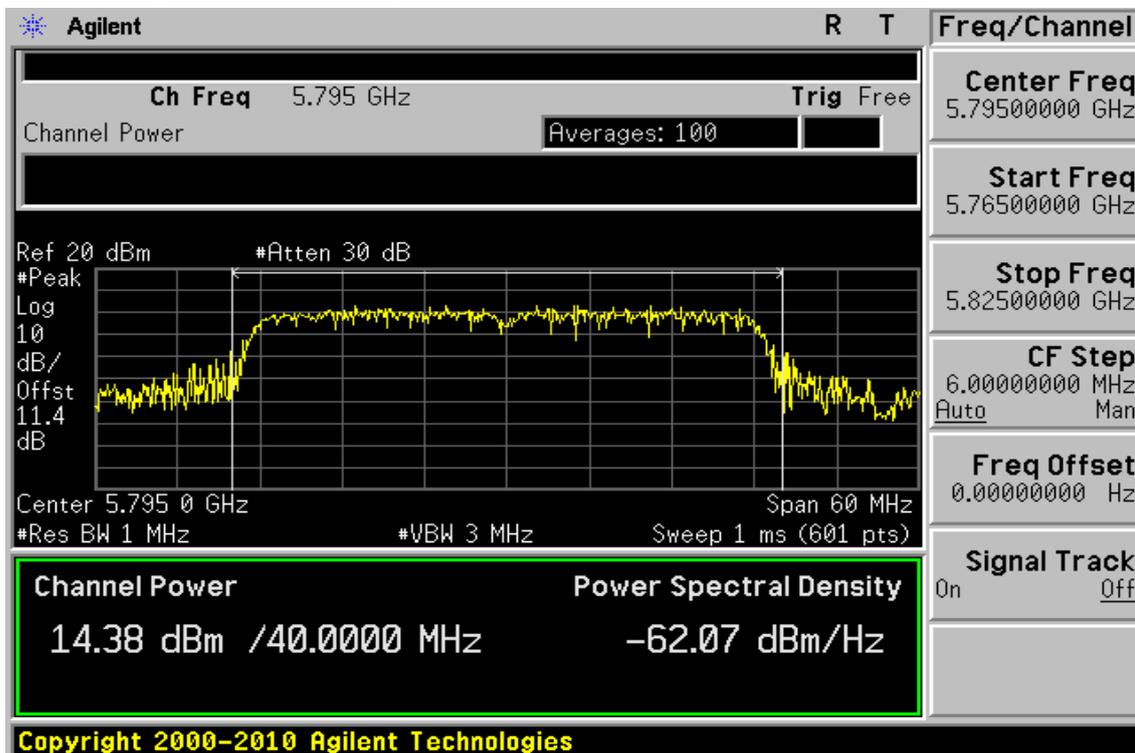
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802.11n (5GHz)_40M, 13.5Mbps
Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH High)



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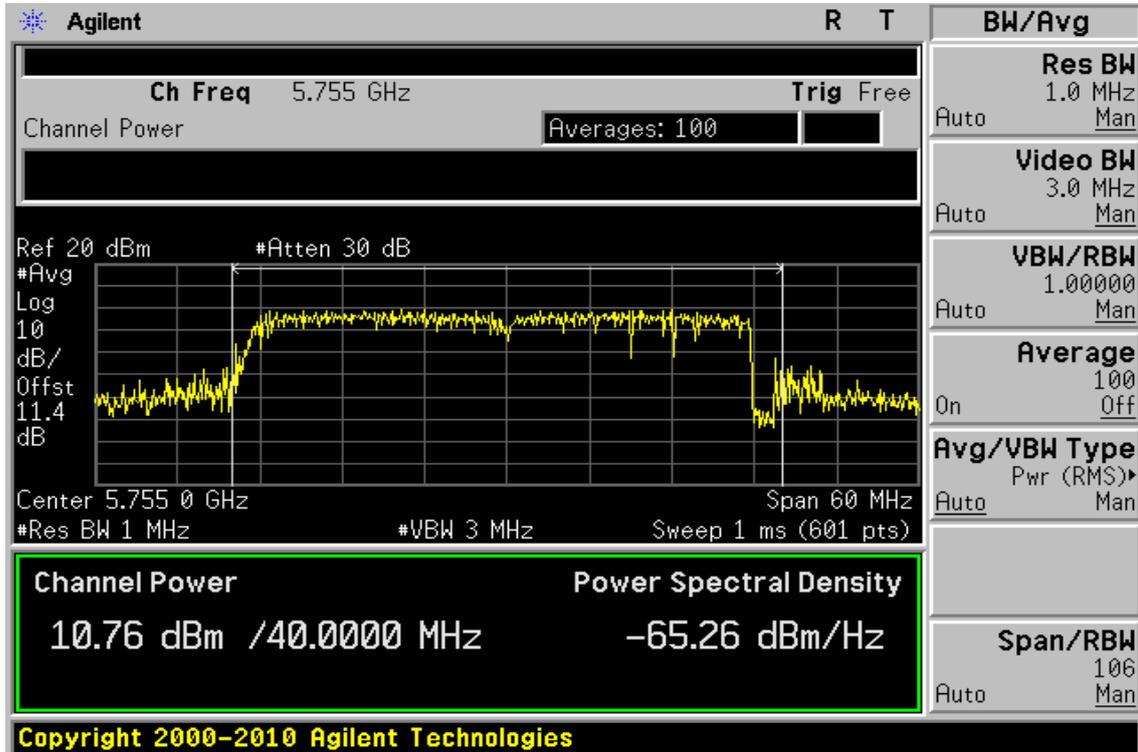
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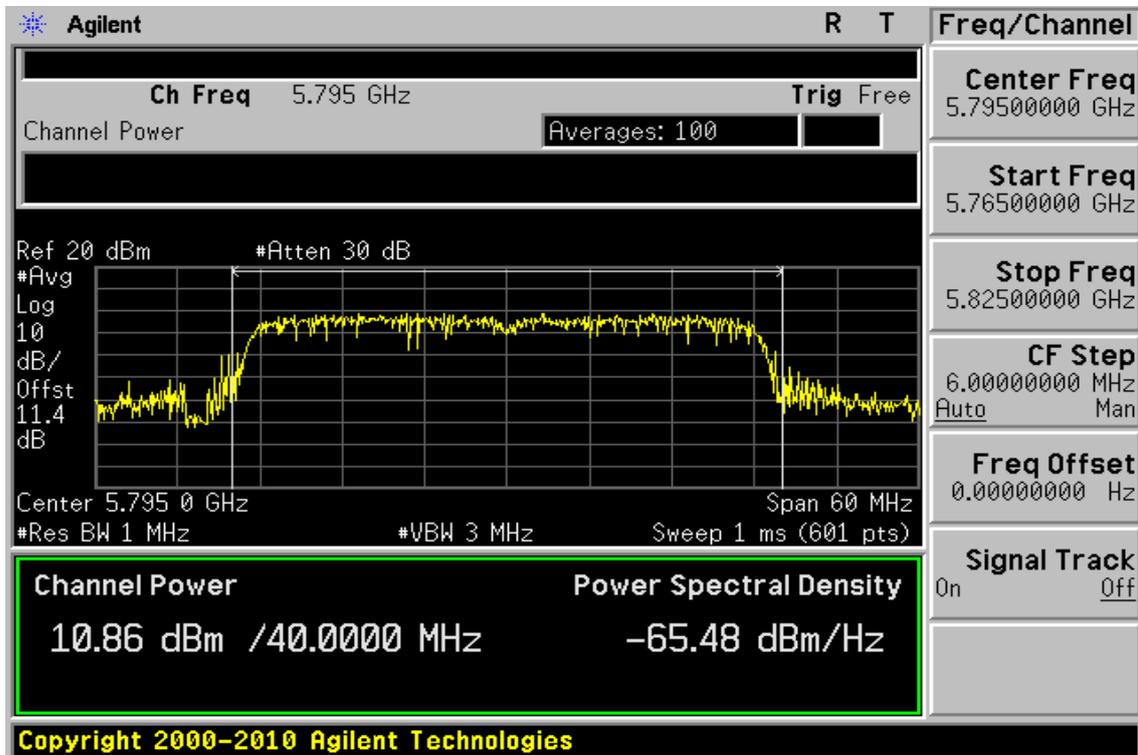
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Average Power Output Plot (CH Low)



Average Power Output Plot (CH High)



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8 6dB BANDWIDTH

8.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 8: 2010Annex 8.2. Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Measurement Equipment Used:

Refer to section 7.2 for details.

8.3 Test Set-up:

Refer to section 7.3 for details.

8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100KHz, VBW = 3*RBW, Span = 30MHz-50MHz, Sweep=auto
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

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8.5 Measurement Result:

802.11b

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	10.157	> 500	PASS
2437	10.079	> 500	PASS
2462	10.071	> 500	PASS

802.11g

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	16.410	> 500	PASS
2437	16.478	> 500	PASS
2462	16.438	> 500	PASS

802.11n_20M

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	17.553	> 500	PASS
2437	17.379	> 500	PASS
2462	17.308	> 500	PASS

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802.11a

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
5745	16.319	> 500	PASS
5785	16.350	> 500	PASS
5825	16.316	> 500	PASS

802.11n (5GHz)_20M

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
5745	16.886	> 500	PASS
5785	16.902	> 500	PASS
5825	16.926	> 500	PASS

802.11n (5GHz)_40M

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
5755	35.446	> 500	PASS
5795	35.272	> 500	PASS

**Offset 11.1dB for 2.4G*

11.4dB for 5G

Note: Refer to next page for plots.

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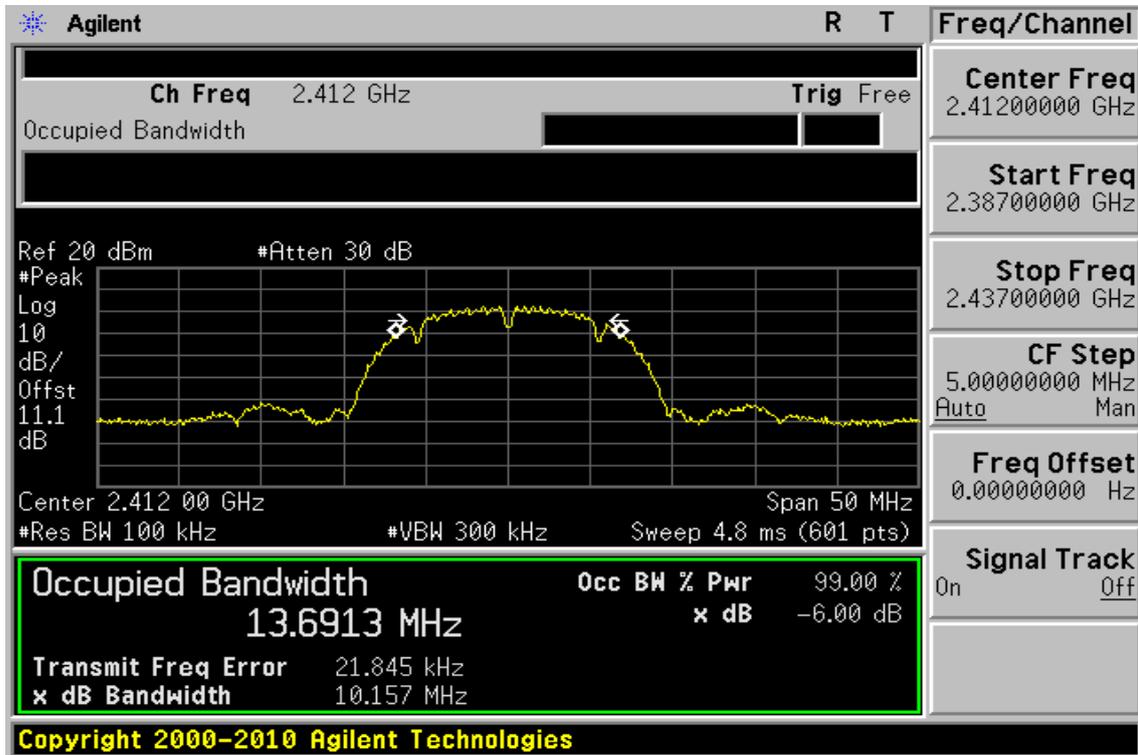
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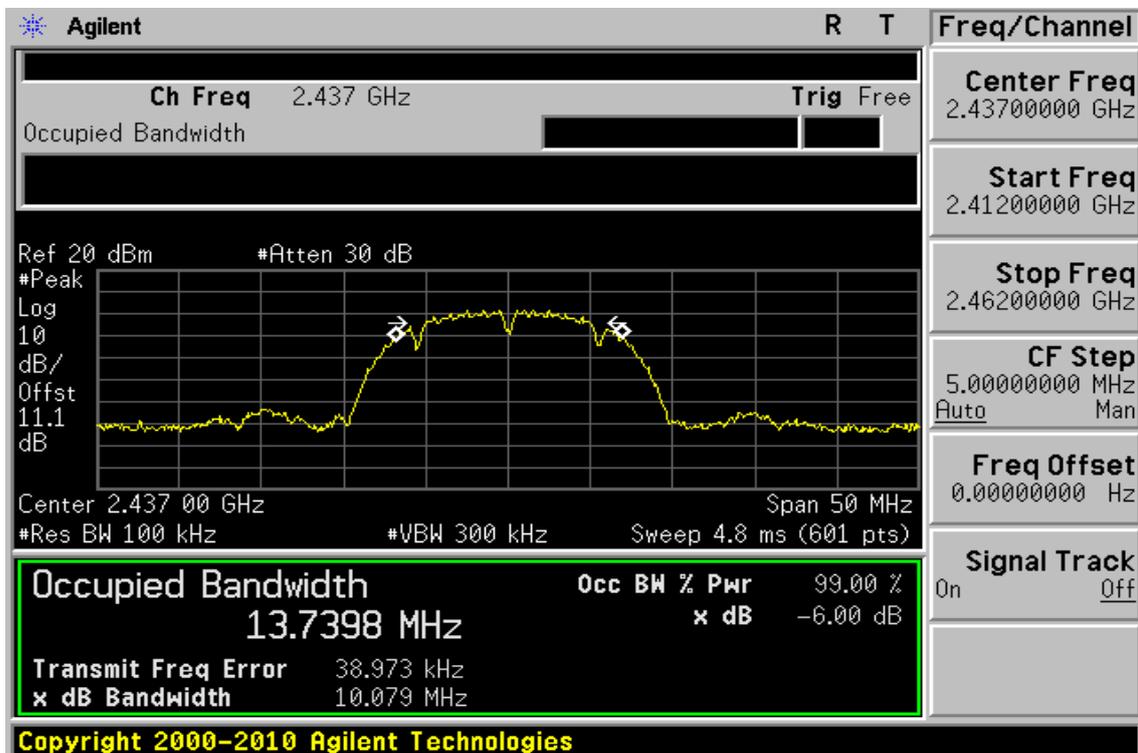
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802.11b

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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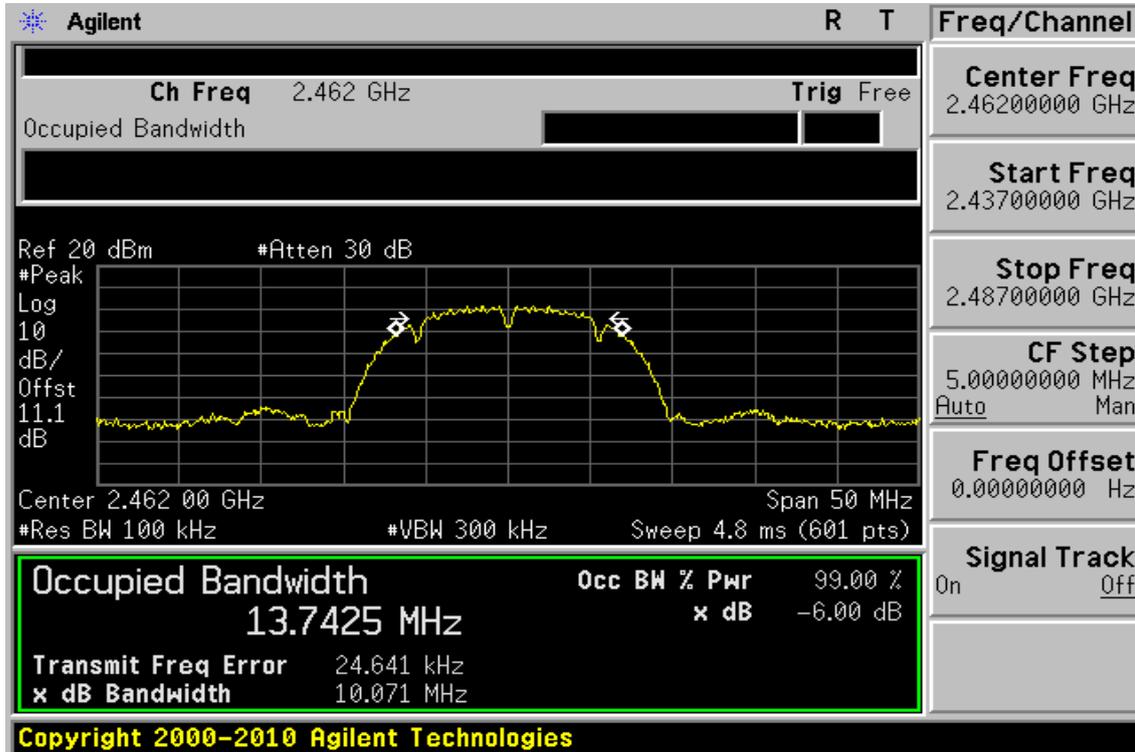
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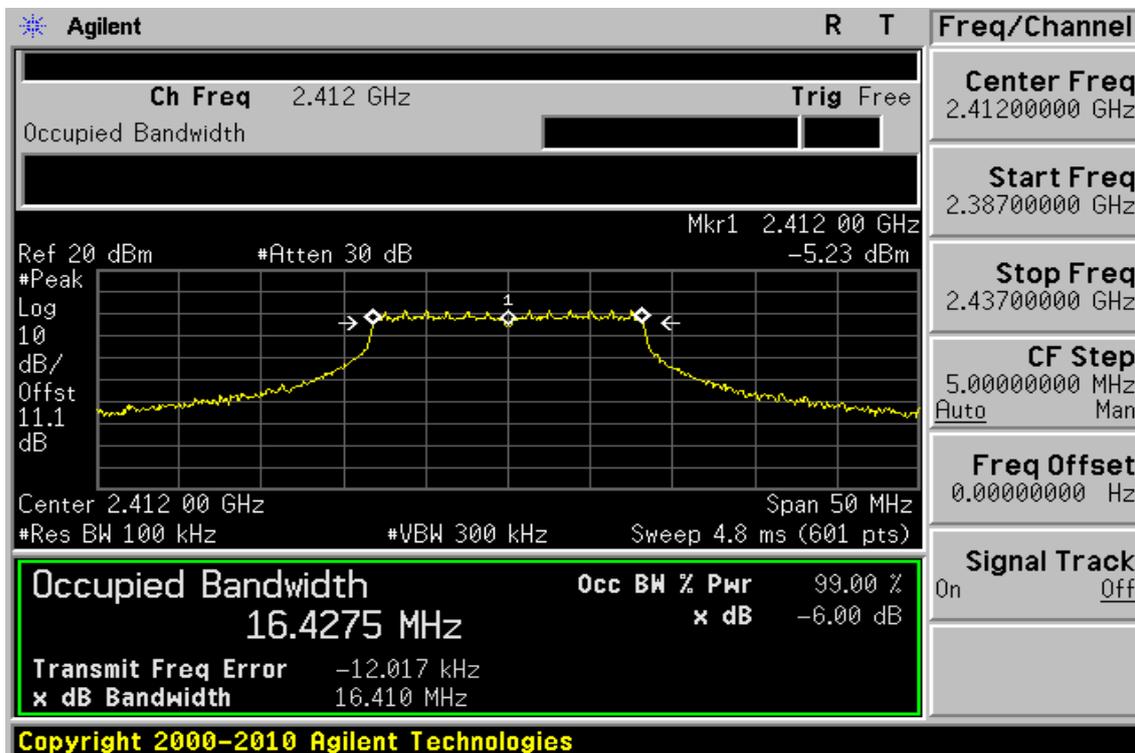
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6dB Band Width Test Data CH-High



802.11g

6dB Band Width Test Data CH-Low



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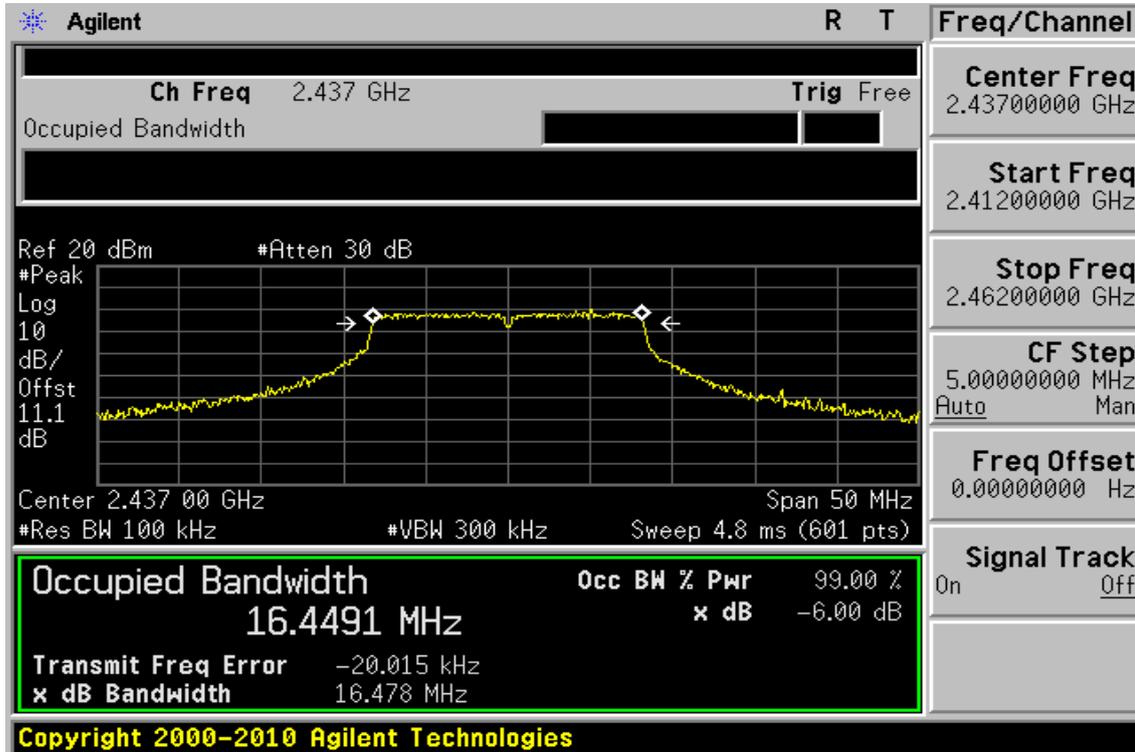
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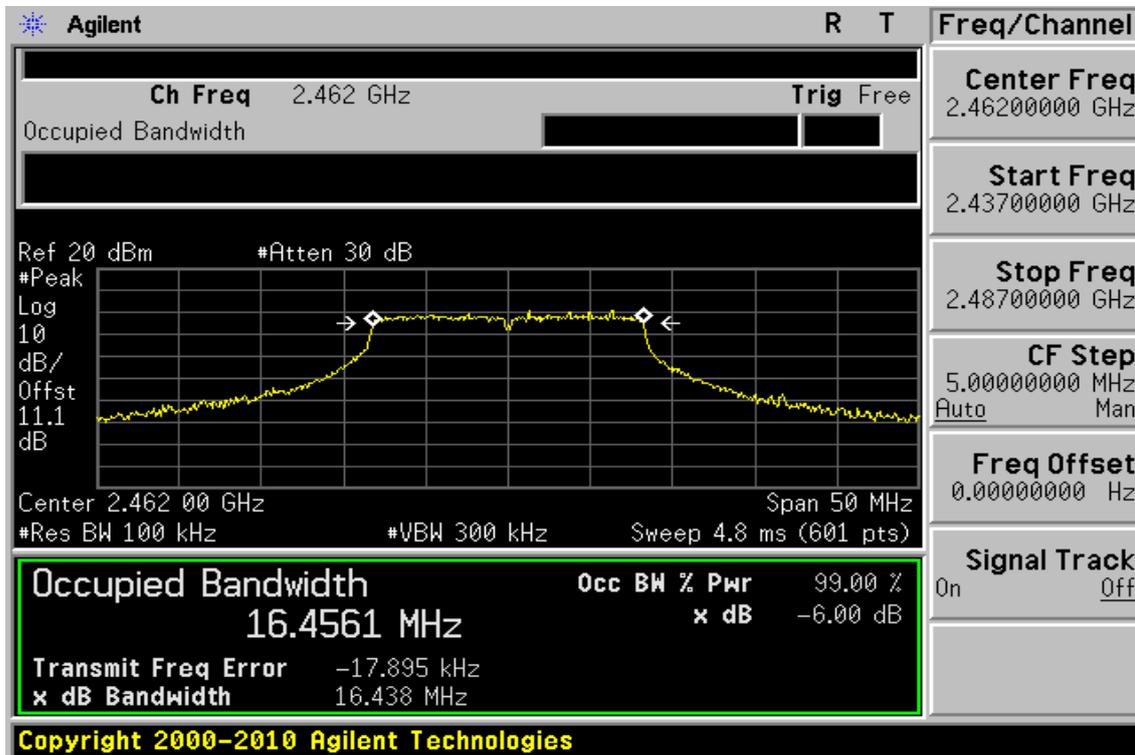
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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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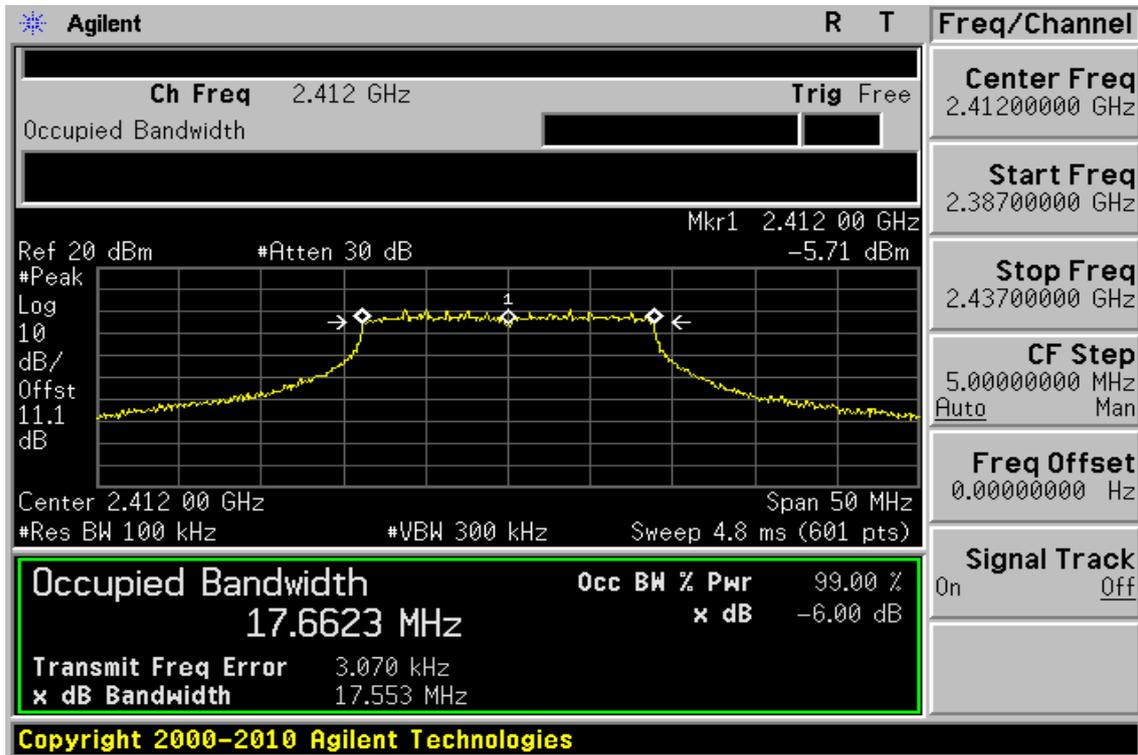
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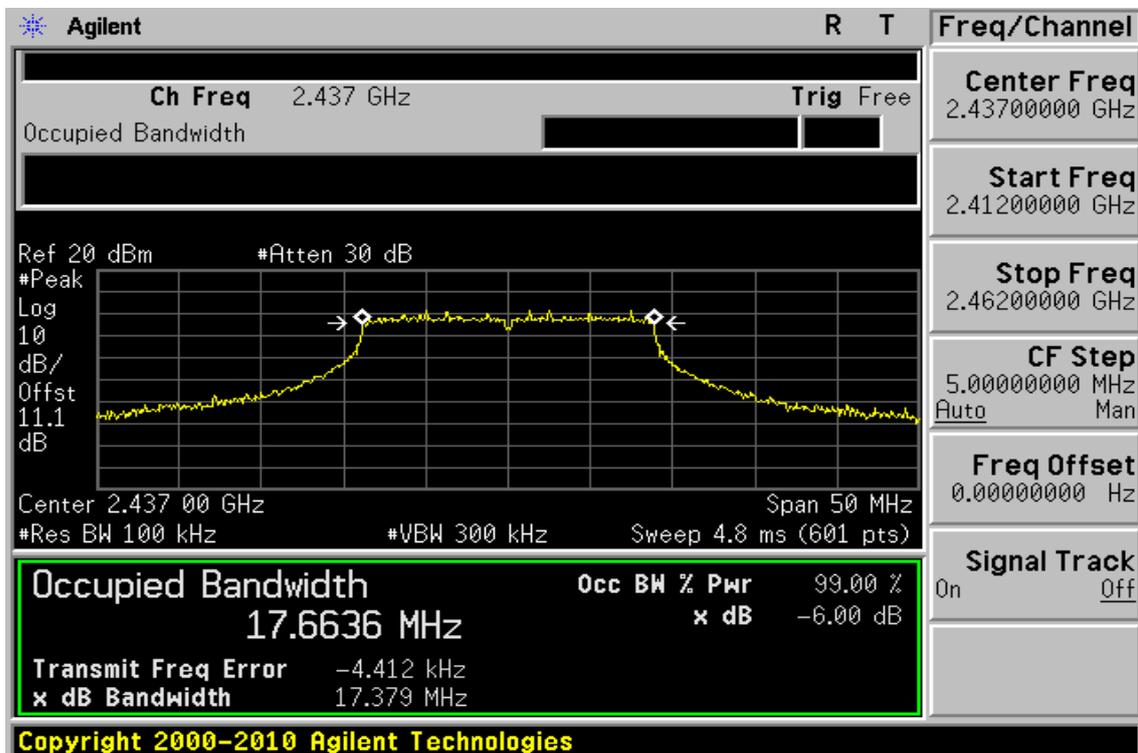
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802.11n_20M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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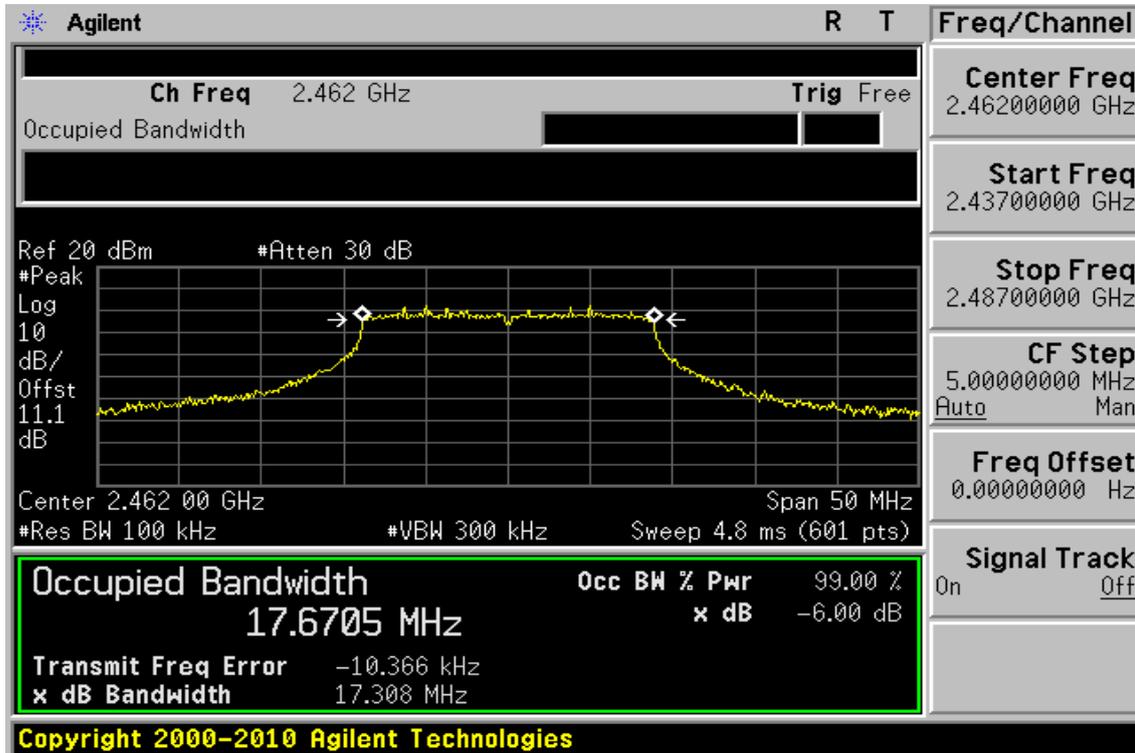
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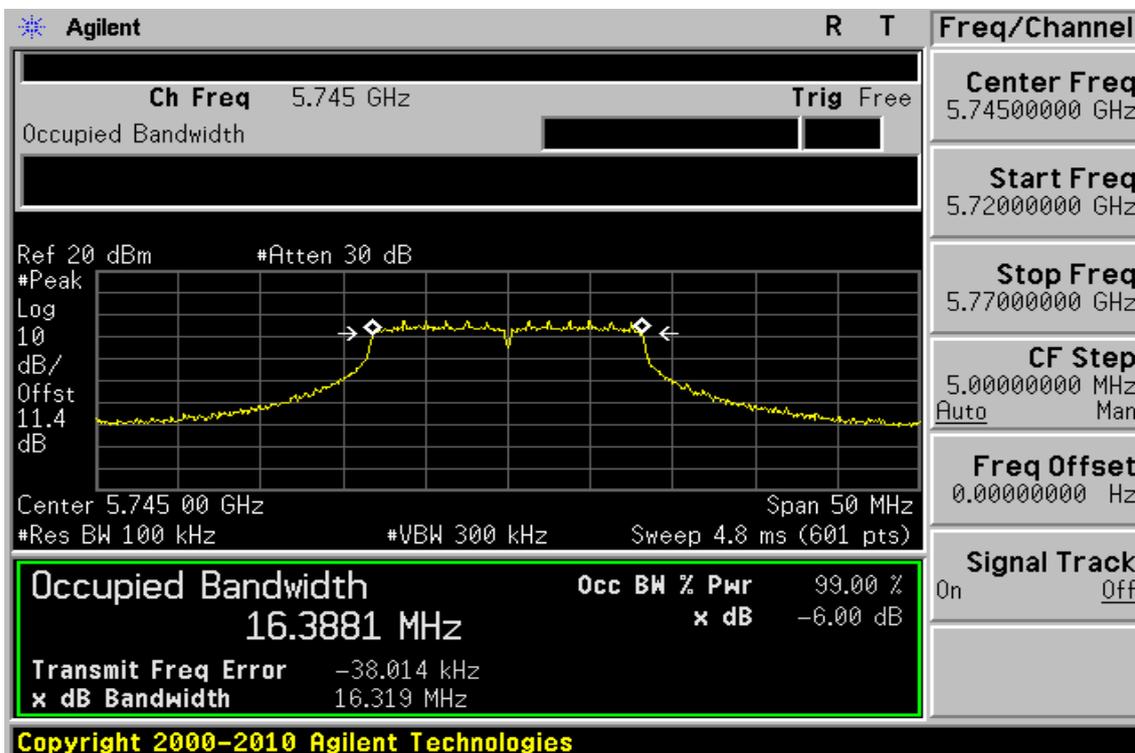
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6dB Band Width Test Data CH-High



802.11a

6dB Band Width Test Data CH-Low



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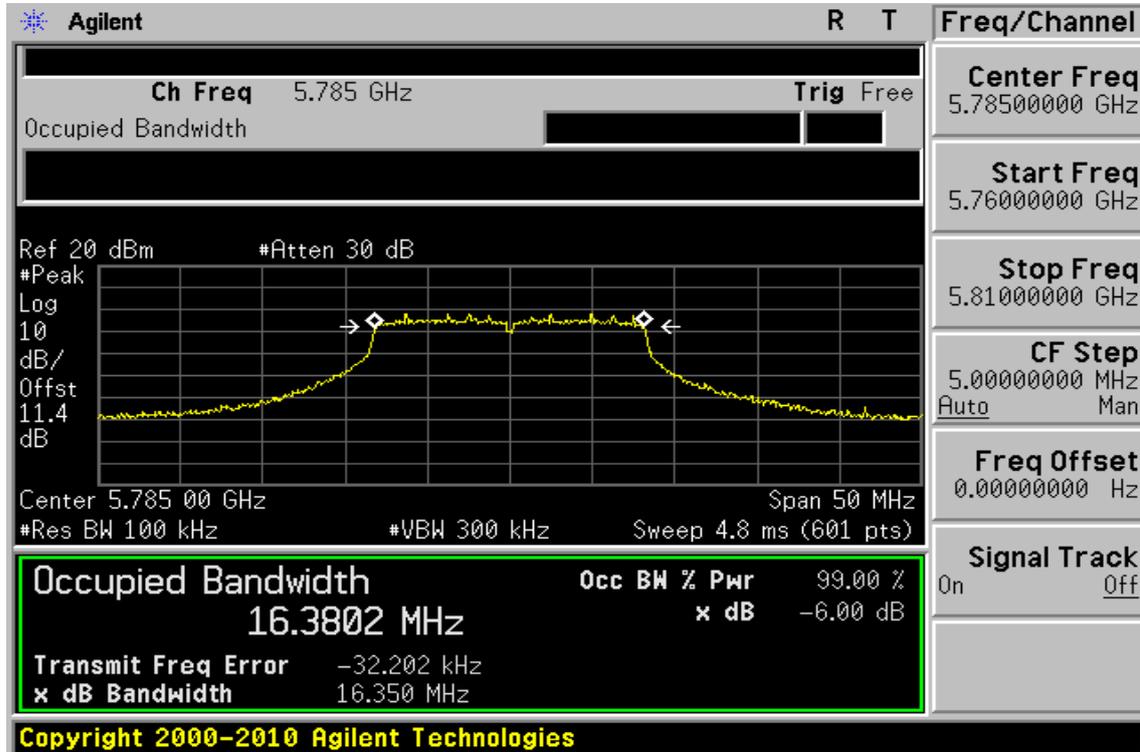
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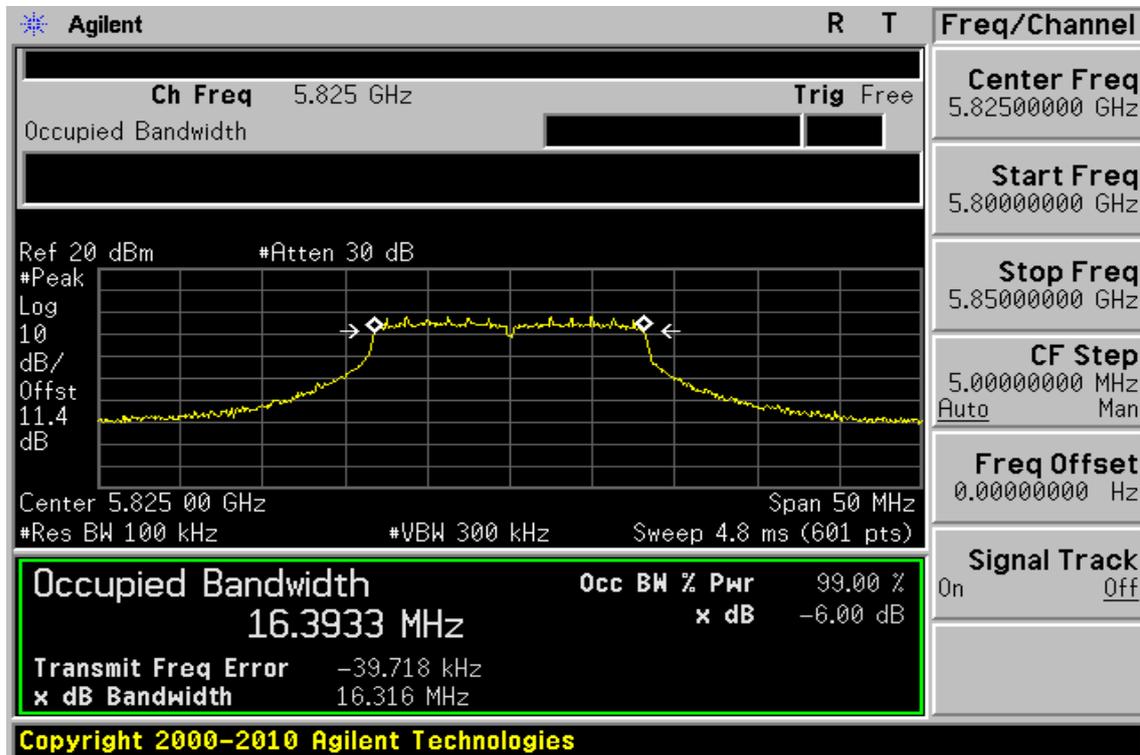
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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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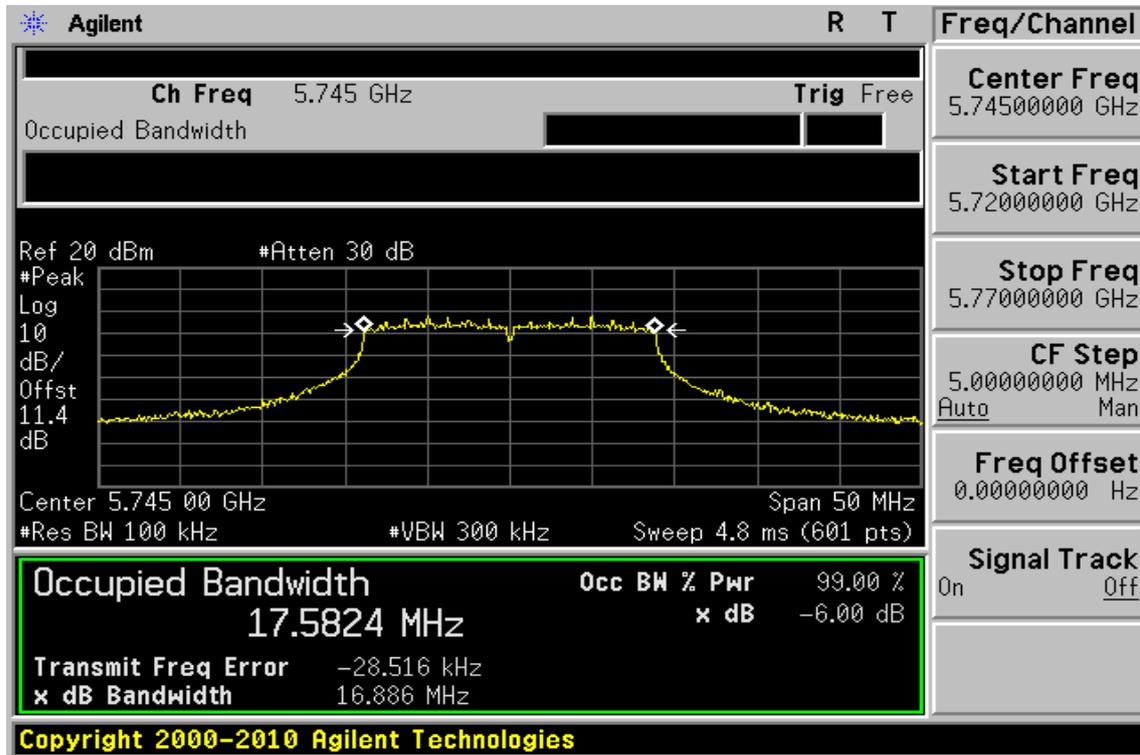
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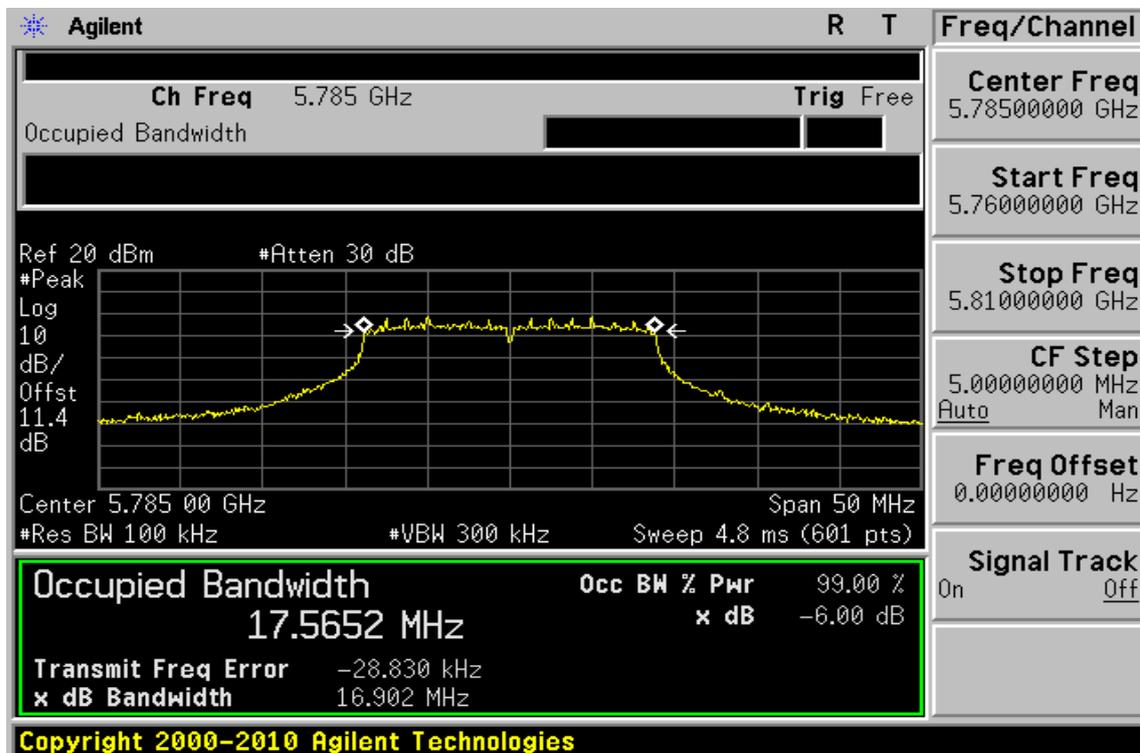
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802.11n (5GHz)_20M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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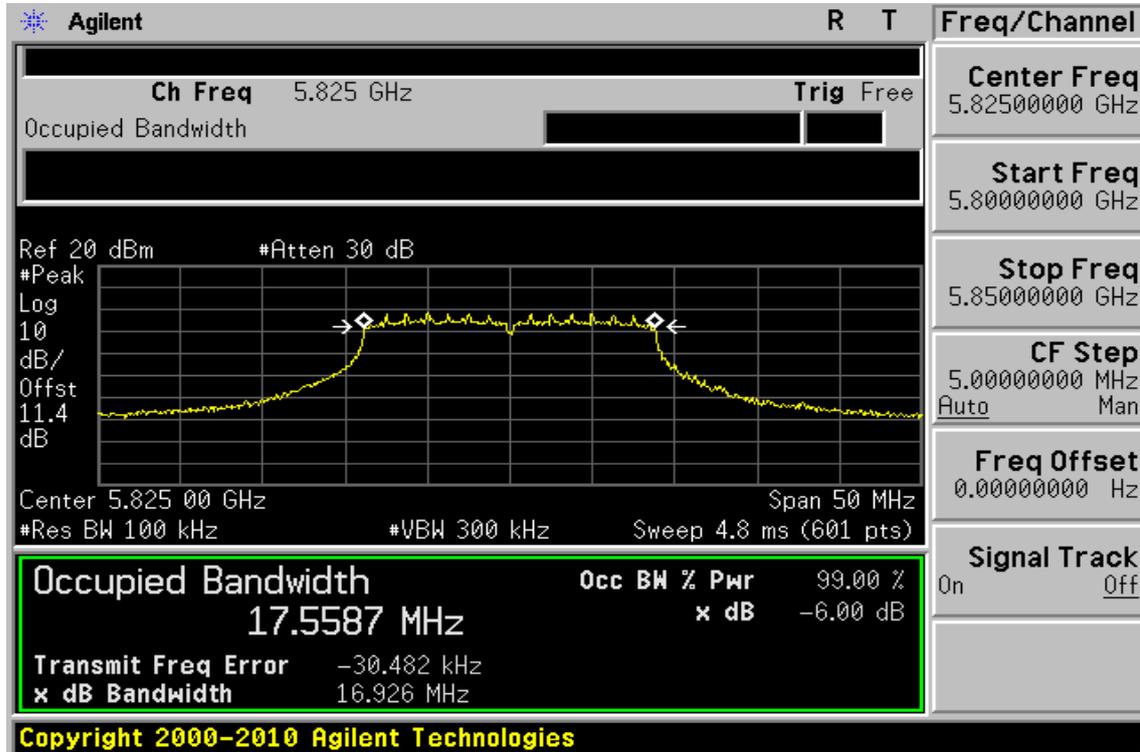
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6dB Band Width Test Data CH-High



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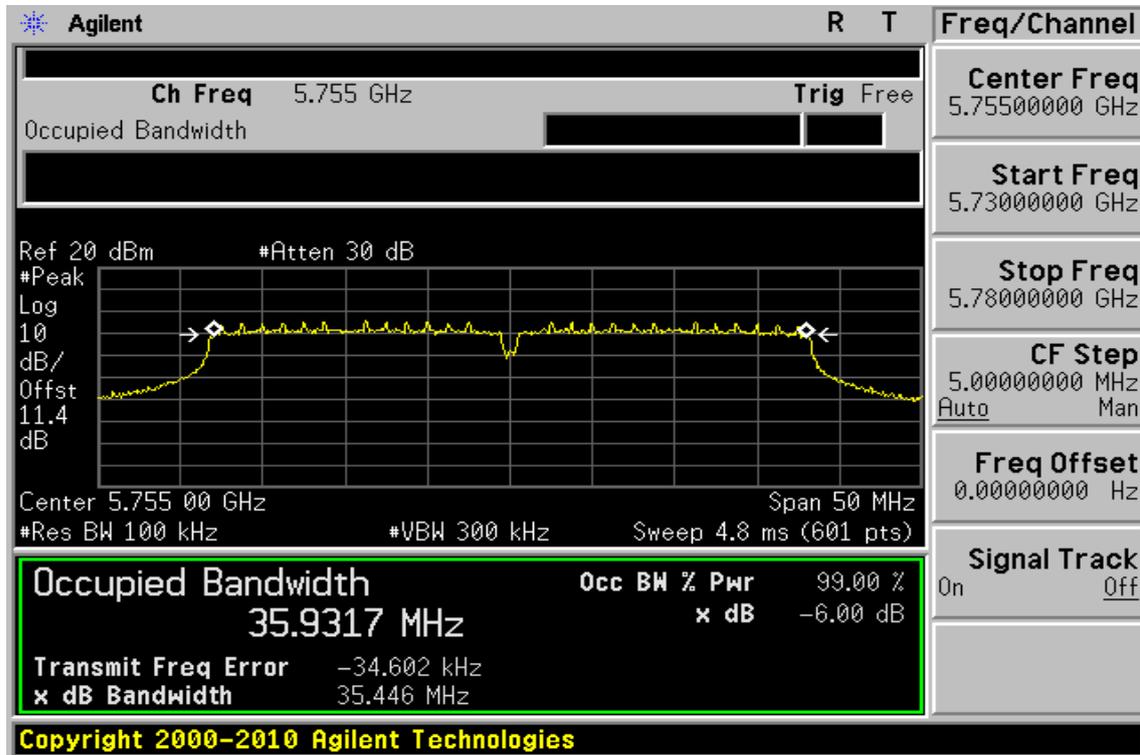
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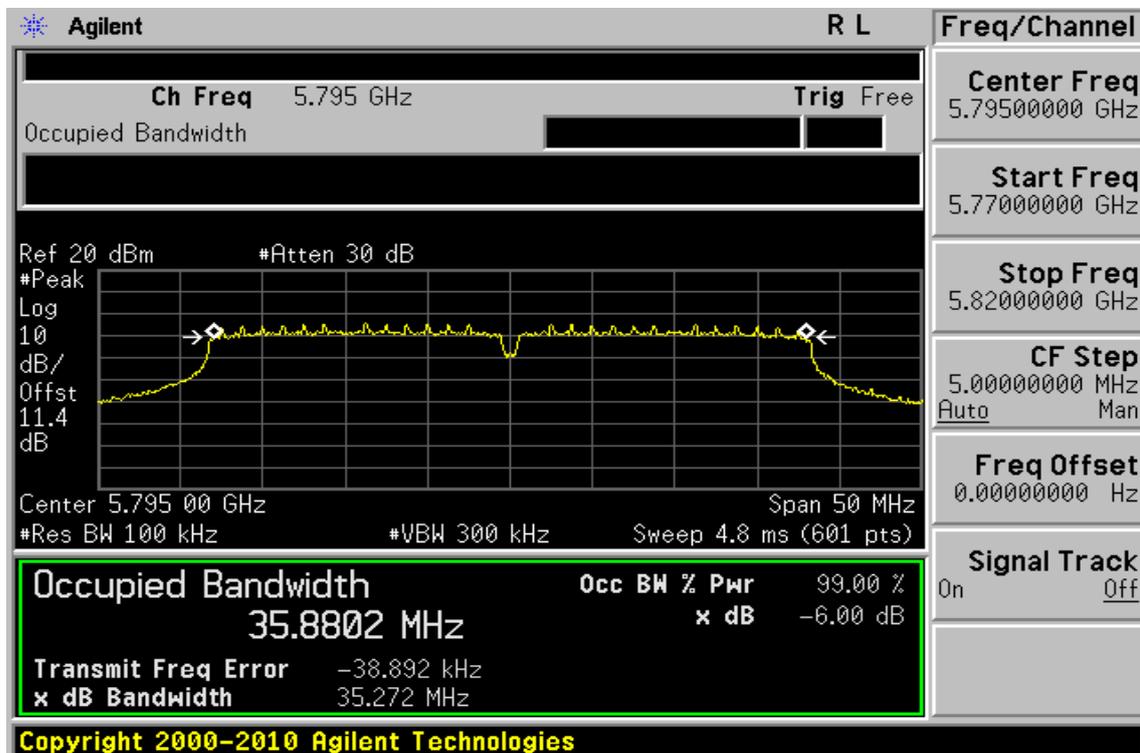
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802.11n (5GHz)_40M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-High



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9 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

9.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

According to RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

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9.2.2 Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2012	02/28/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/04/2012	01/03/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2011	07/14/2012

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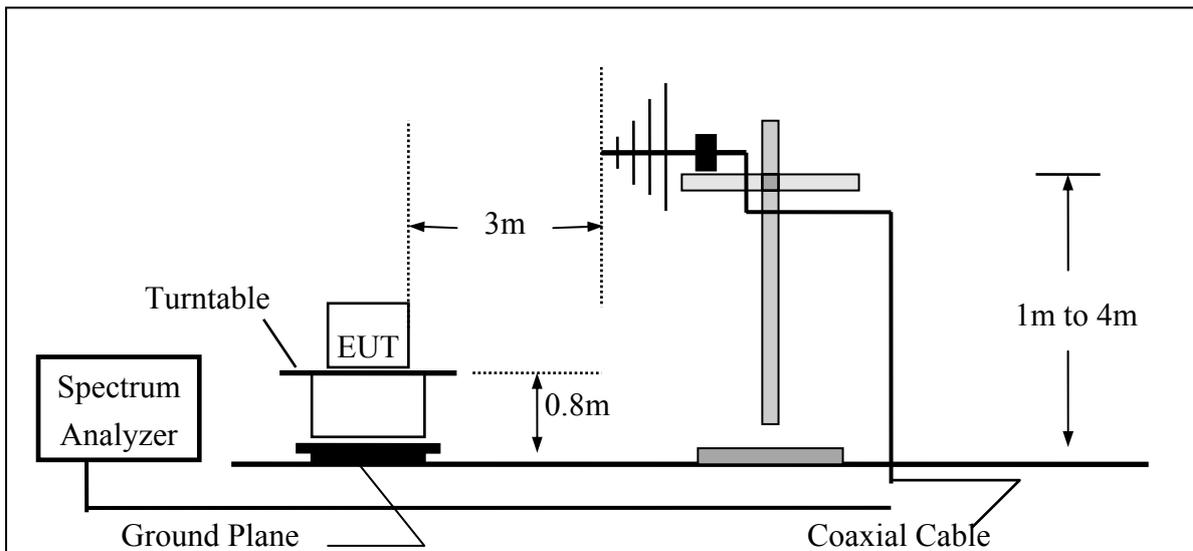
9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:

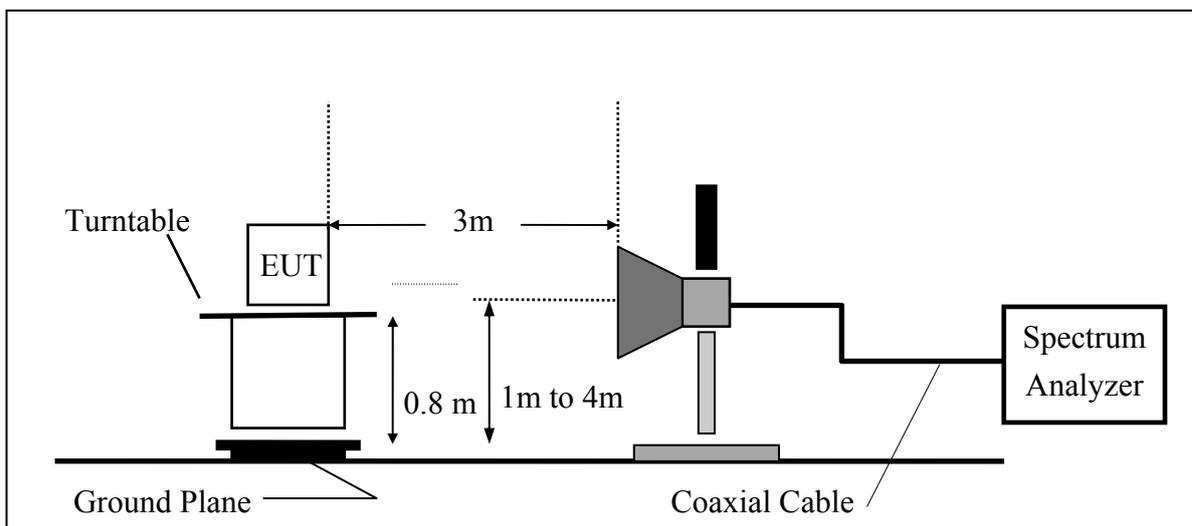
Refer to section 7.3 for details.

9.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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9.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW= 1 MHz, VBW ≥ 3 MHz
5. Ensure that the number of measurement points in the sweep ≥ 2 x (span/RBW).
6. Set sweep time = auto couple
7. Detector = sample.
8. Employ trace averaging over a minimum of 100 traces.
9. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
10. Repeat above procedures until all frequency measured were complete.

9.5 The Derivation of Limit of Compliance to Unwanted Emissions into Restricted Frequency Bands

EIRP = the equivalent isotropic radiated power in dBm,

E = electric field strength in dBμV/m,

d = measurement distance in meters.

$$\mathbf{EIRP = E + 20\log(d) - 104.8}$$

$$\text{Average: } 54 + 20\log(3) - 104.8 = -41.3$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

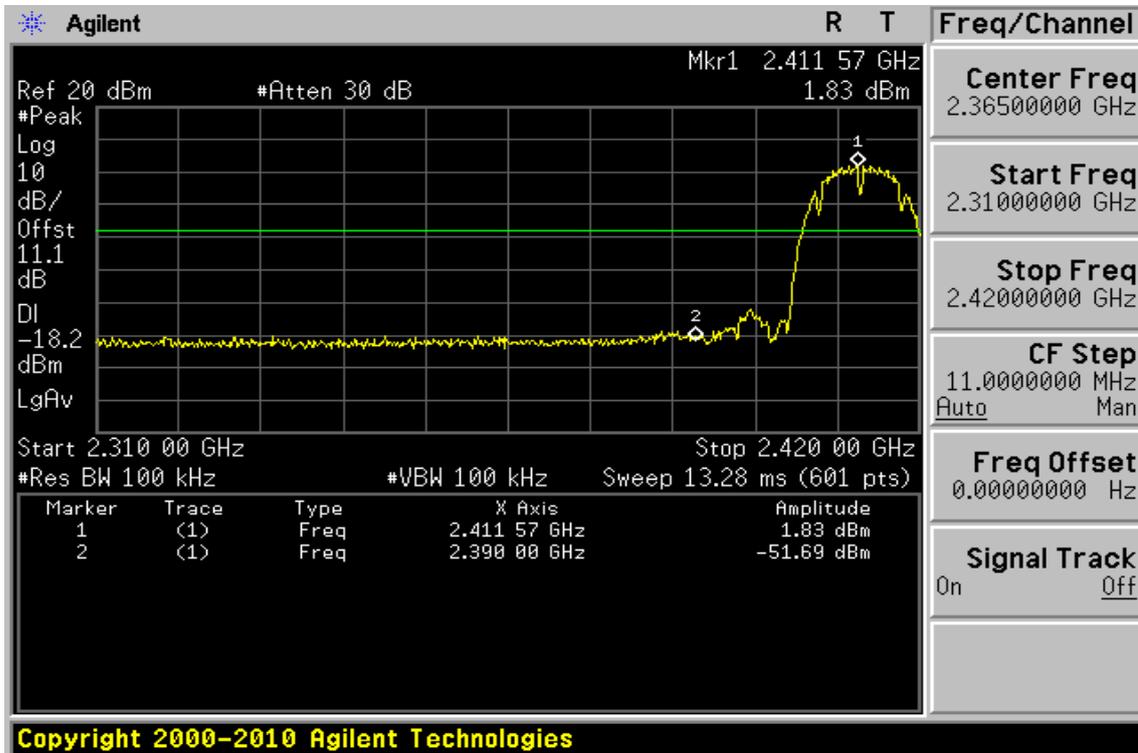
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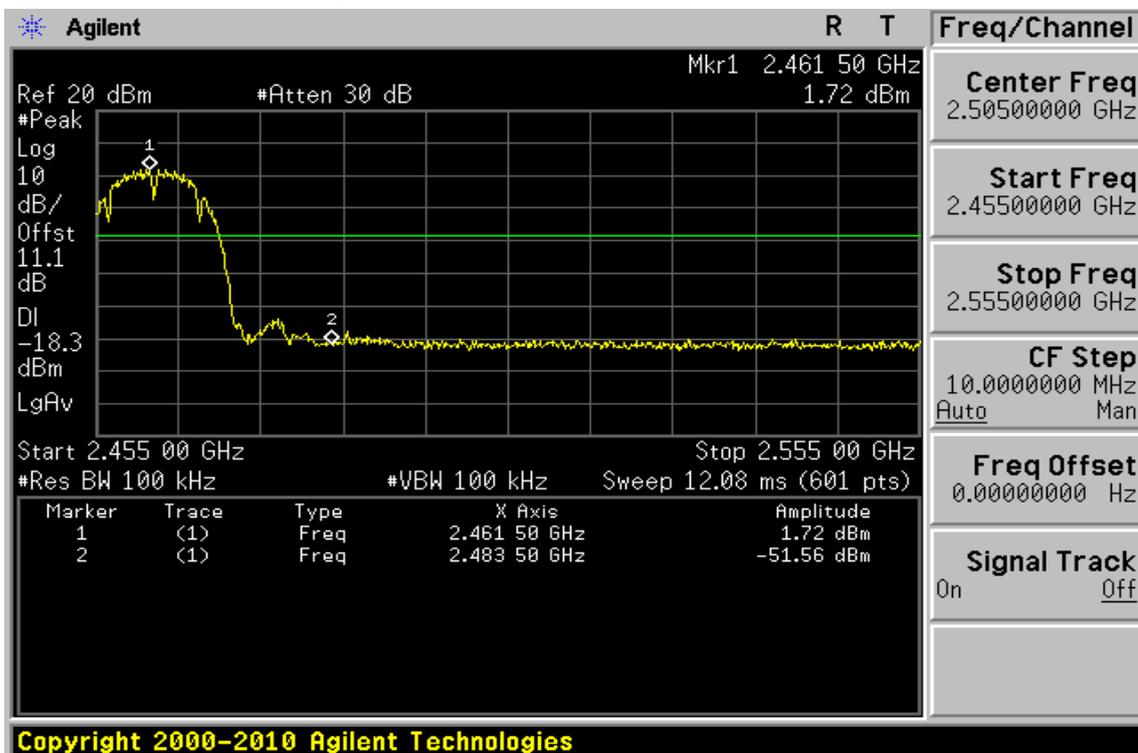
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802.11b

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	34.96	4.68	39.64	54.00	-14.36
2390.00	E	Peak	48.62	4.68	53.30	74.00	-20.70

Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	39.36	5.30	44.66	54.00	-9.34
2390.00	E	Peak	54.52	5.30	59.82	74.00	-14.18

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Operation Band :802.11b Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	36.88	5.26	42.14	54.00	-11.86
2483.50	E	Peak	52.44	5.26	57.70	74.00	-16.30

Operation Band :802.11b Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	38.71	6.29	45.00	54.00	-9.00
2483.50	E	Peak	49.98	6.29	56.27	74.00	-17.73

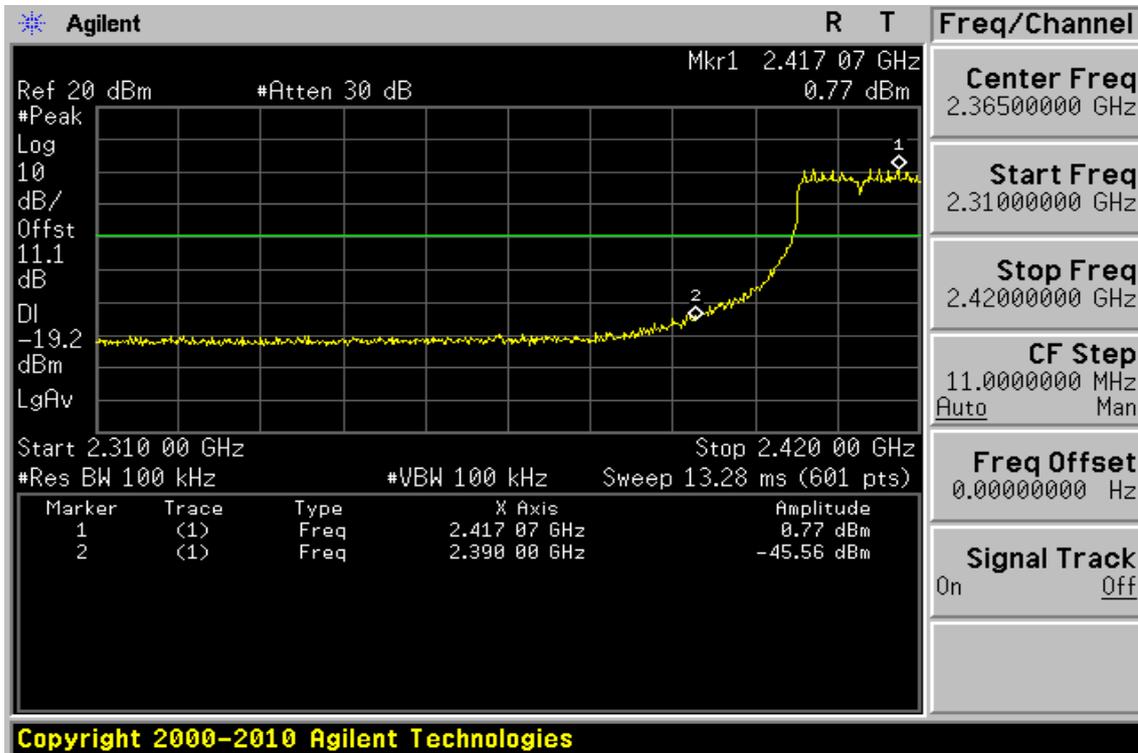
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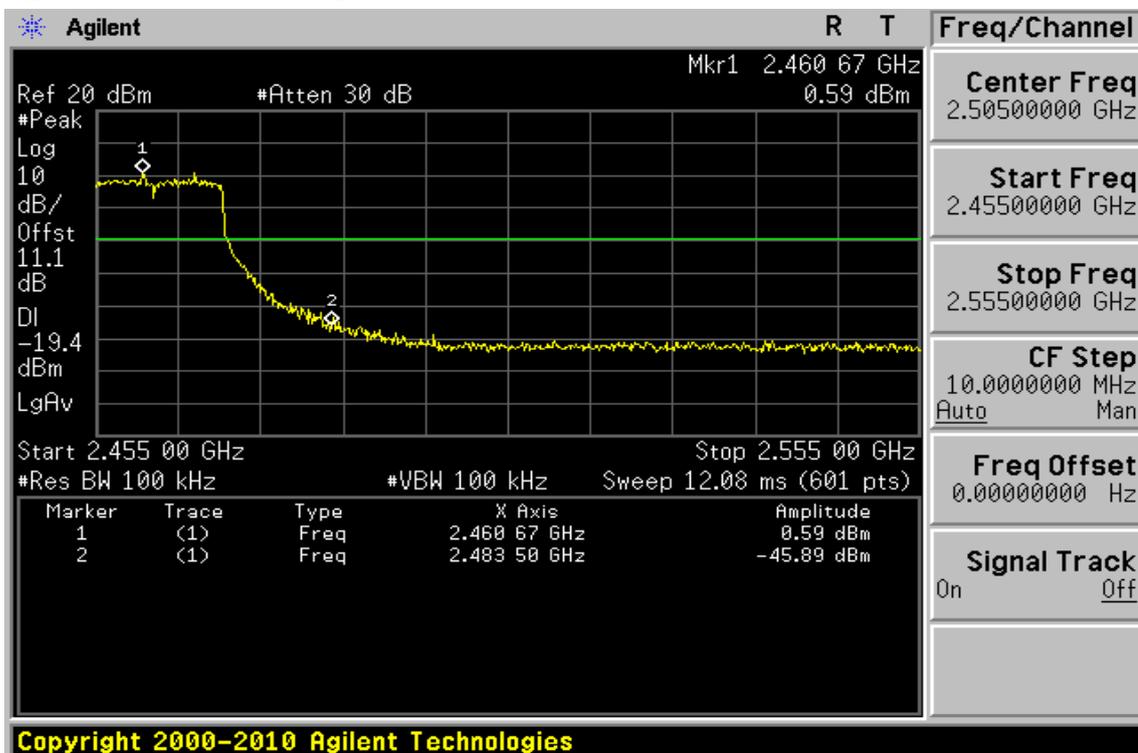
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802.11g

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	43.68	4.68	48.36	54.00	-5.64
2390.00	E	Peak	61.58	4.68	66.26	74.00	-7.74

Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	46.78	5.30	52.08	54.00	-1.92
2390.00	E	Peak	64.10	5.30	69.40	74.00	-4.60

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Operation Band :802.11g Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	41.73	5.26	46.99	54.00	-7.01
2483.50	E	Peak	61.23	5.26	66.49	74.00	-7.51

Operation Band :802.11g Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	43.12	6.29	49.41	54.00	-4.59
2483.50	E	Peak	62.78	6.29	69.07	74.00	-4.93

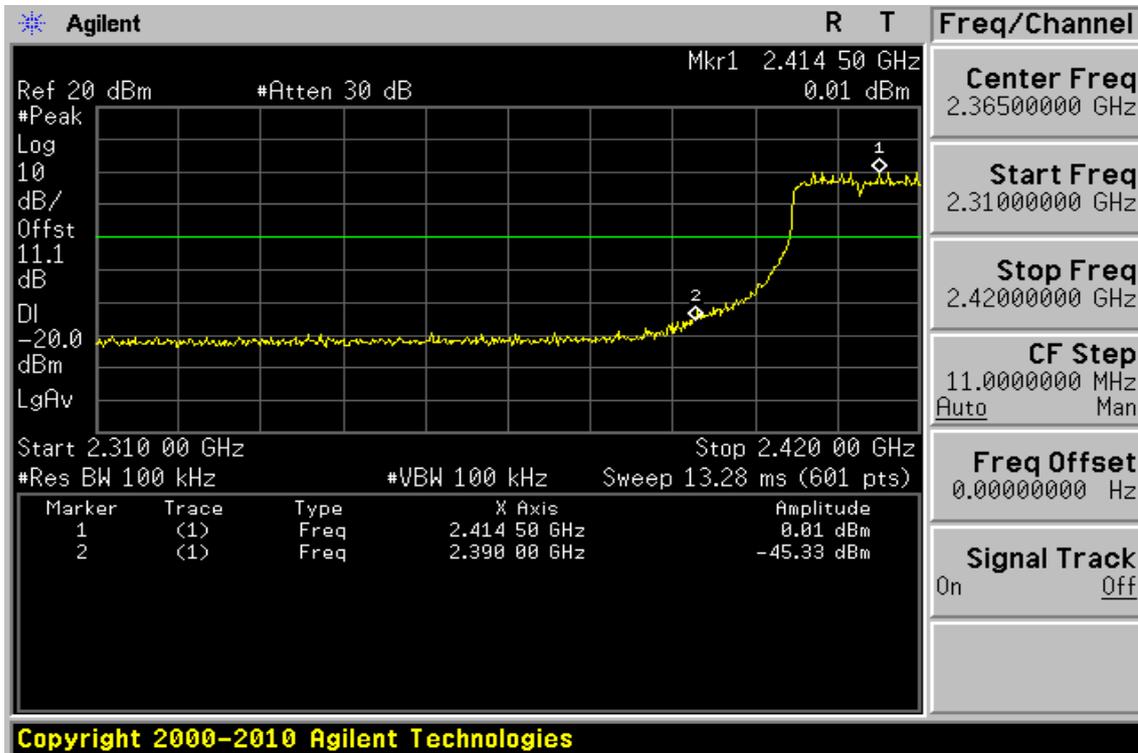
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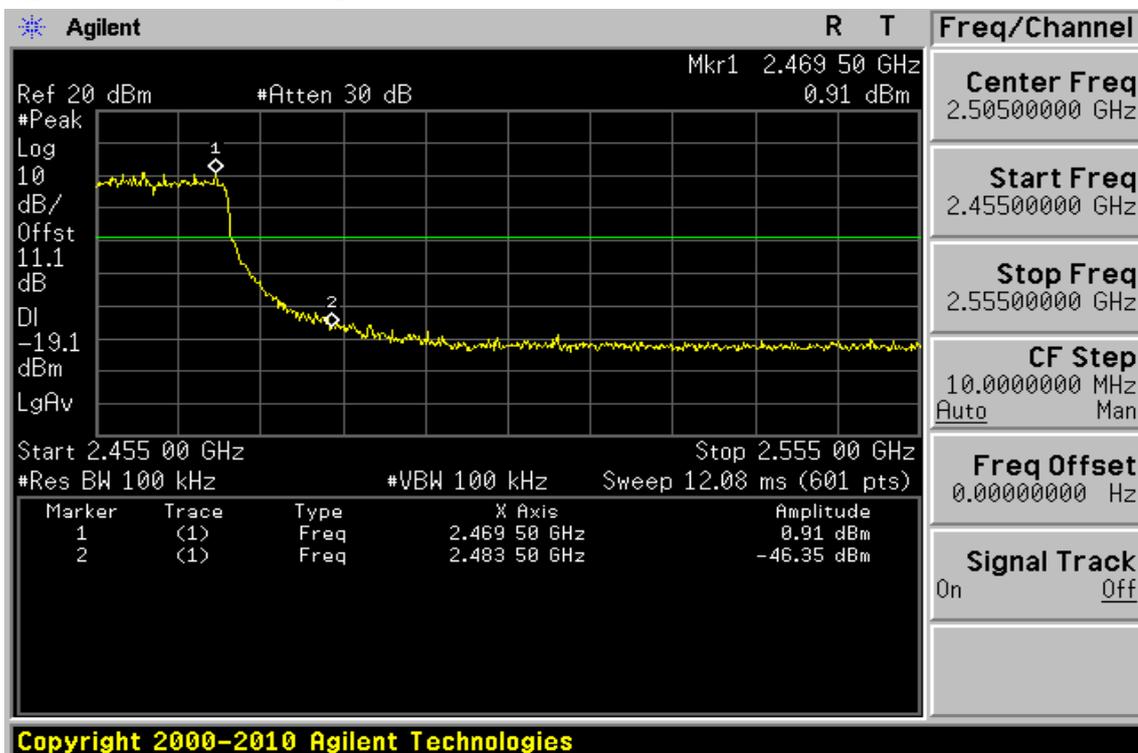
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802.11n_20M

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	44.61	4.68	49.29	54.00	-4.71
2390.00	E	Peak	62.54	4.68	67.22	74.00	-6.78

Operation Band	:802.11n20M	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:Bandedge	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2390.00	E	Average	47.42	5.30	52.72	54.00	-1.28
2390.00	E	Peak	64.48	5.30	69.78	74.00	-4.22

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	42.38	5.26	47.64	54.00	-6.36
2483.50	E	Peak	59.26	5.26	64.52	74.00	-9.48

Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :Bandedge Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
2483.50	E	Average	43.69	6.29	49.98	54.00	-4.02
2483.50	E	Peak	61.63	6.29	67.92	74.00	-6.08

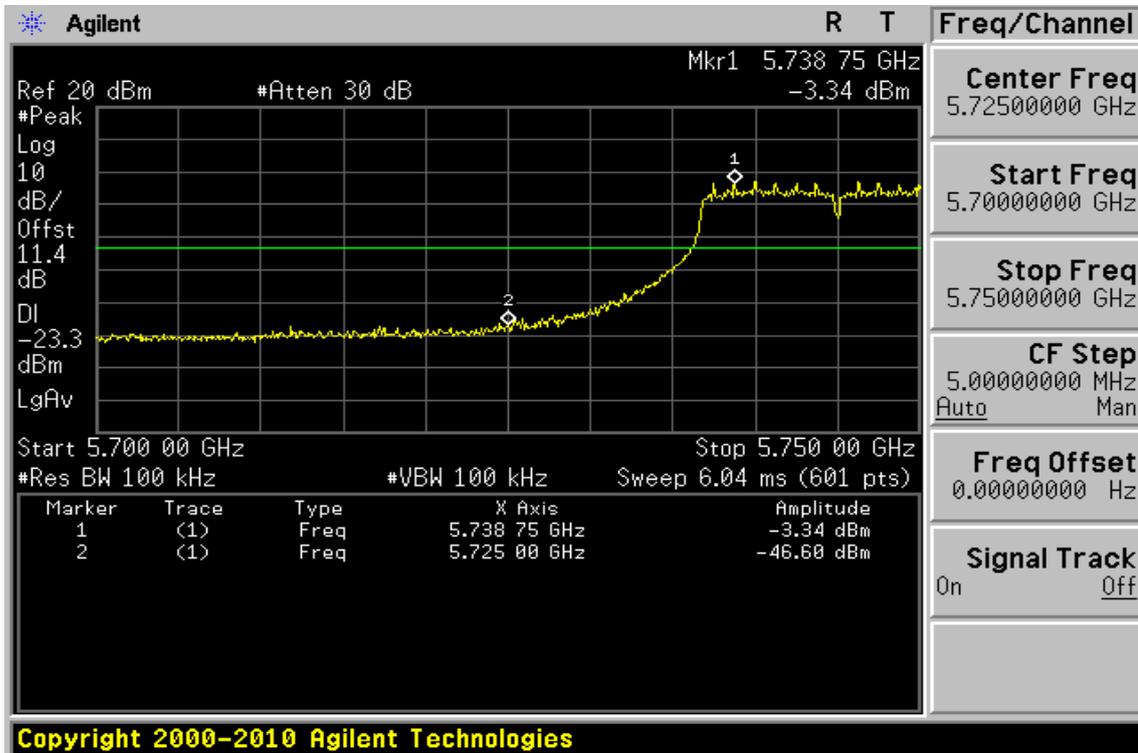
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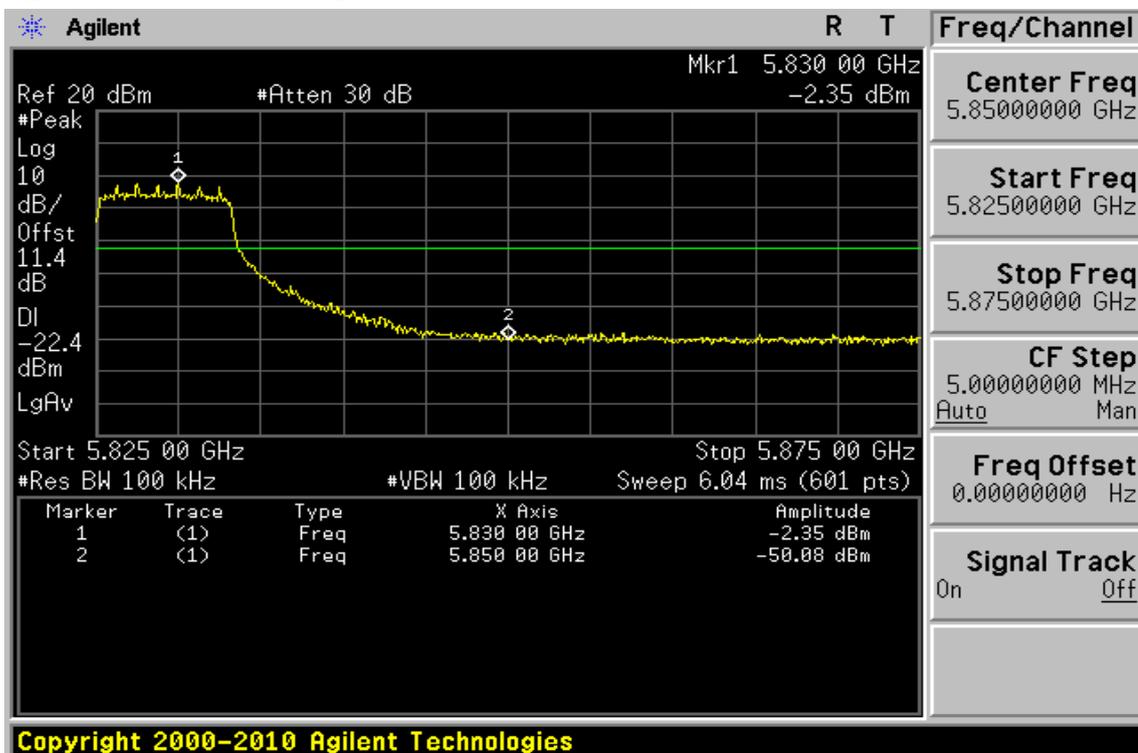
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802.11a

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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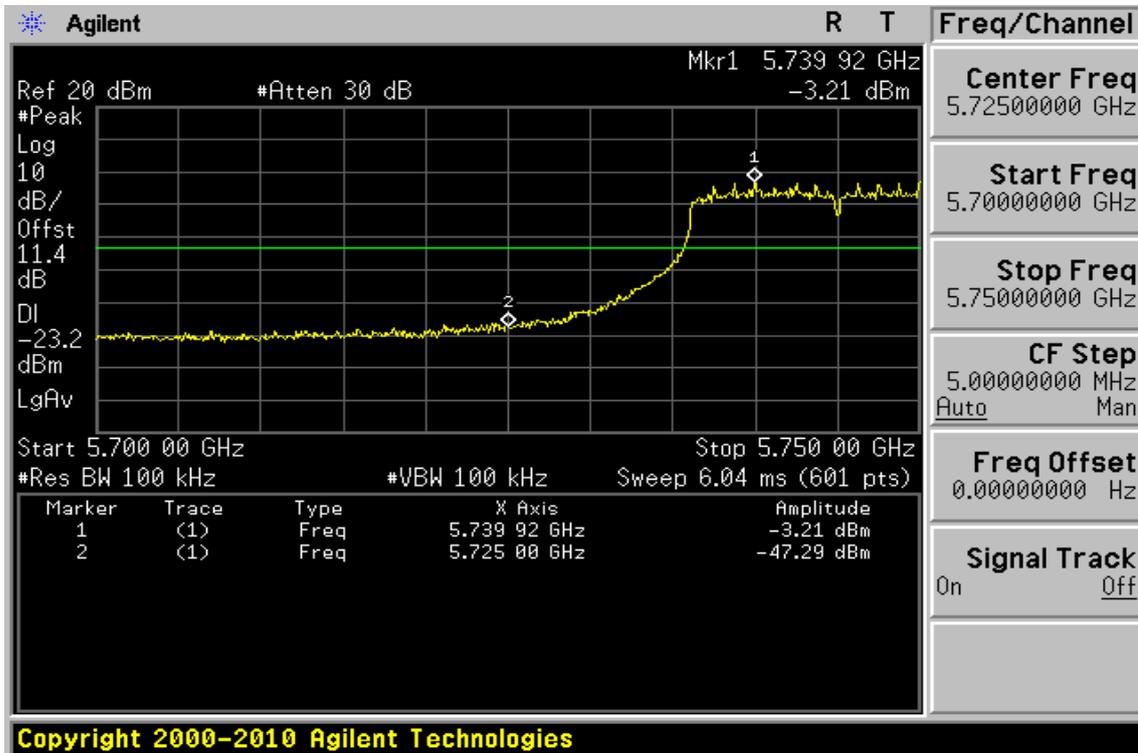
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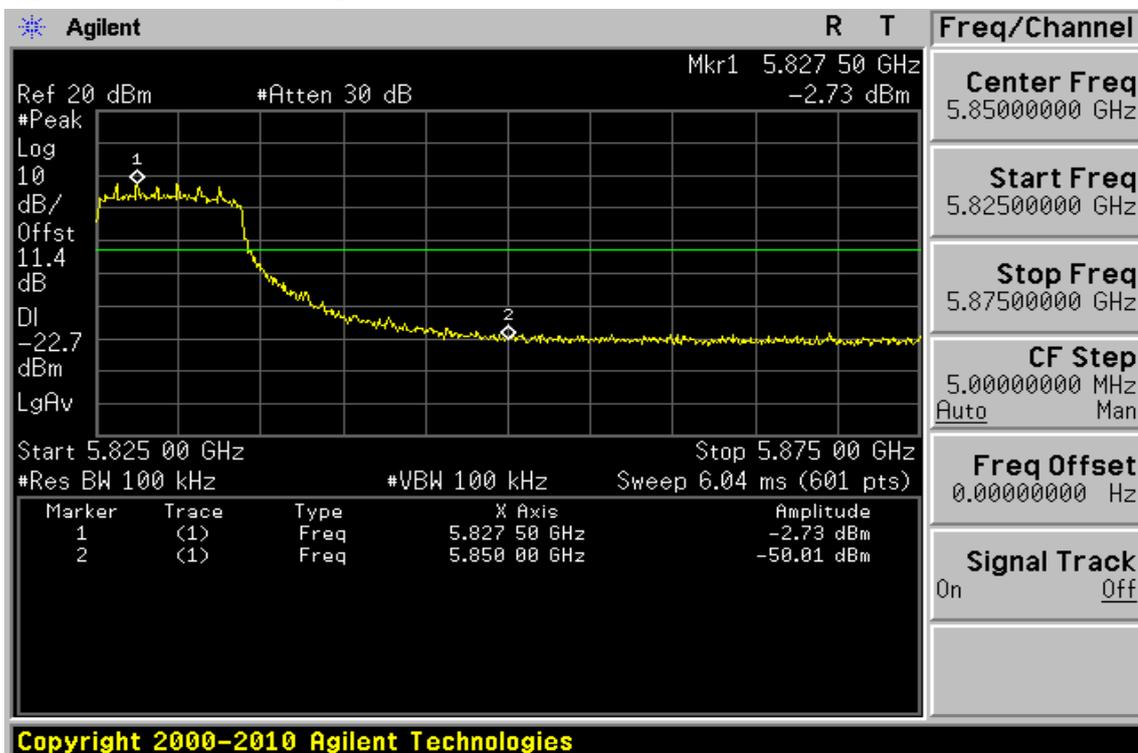
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802.11n(5GHz)_20M

Band Edges Test Data CH-Low



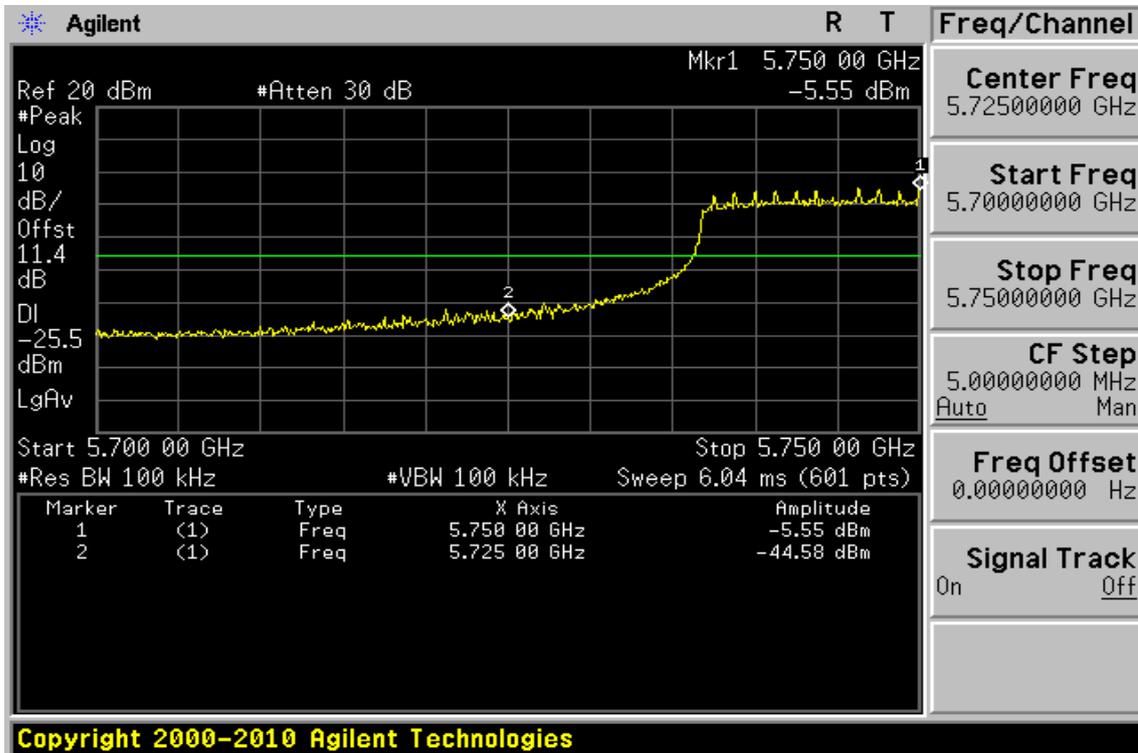
Band Edges Test Data CH-High



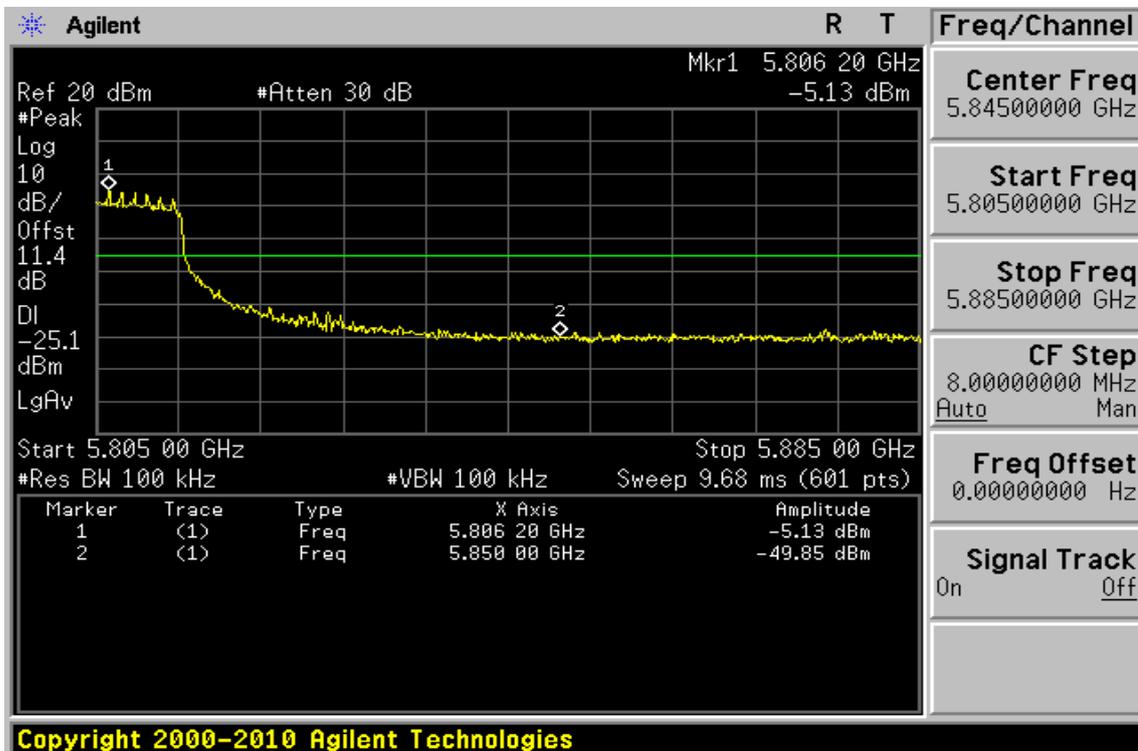
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802.11n(5GHz)_40M

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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10 SPURIOUS RADIATED EMISSION TEST

10.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

10.2 Measurement Equipment Used:

10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

10.3 Test SET-UP:

10.3.1 Conducted Emission at antenna port:

Refer to section 7.3 for details.

10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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10.4 Measurement Procedure:

Radiated Emission:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Conducted Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 100K & VBW = 100K on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz
4. Via Software, combine 5 spans of frequency range into one plot
5. 802.11n MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure the emission for MIMO mode.
Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

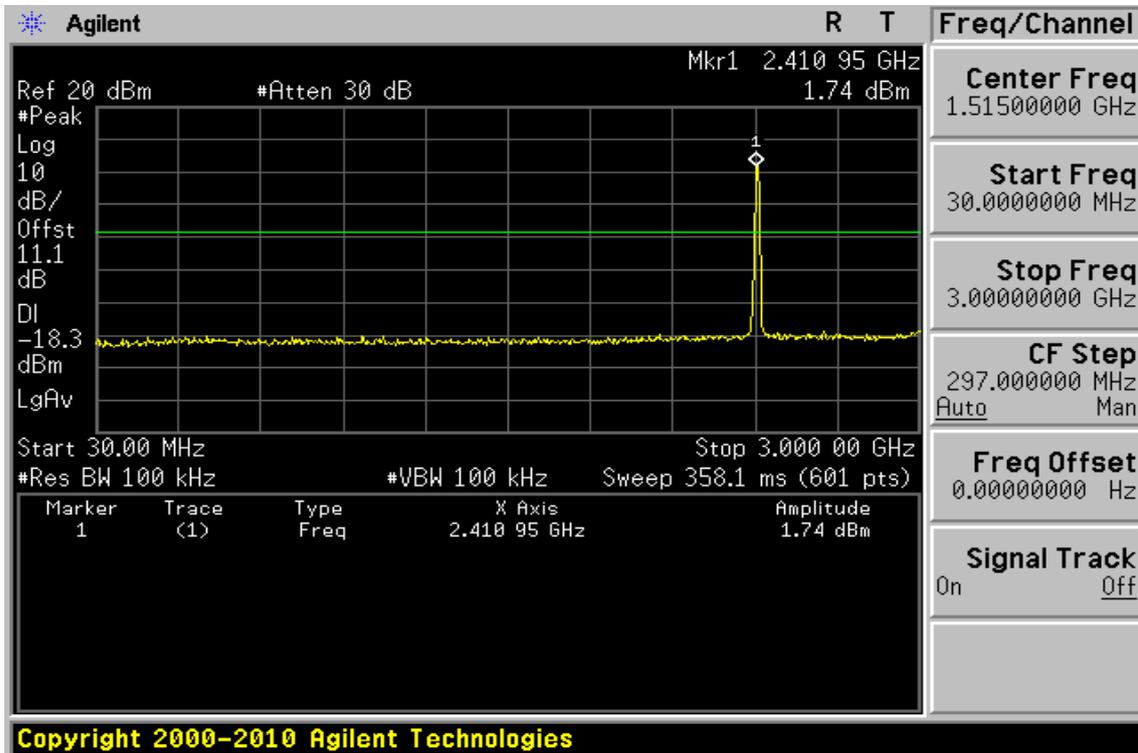
10.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

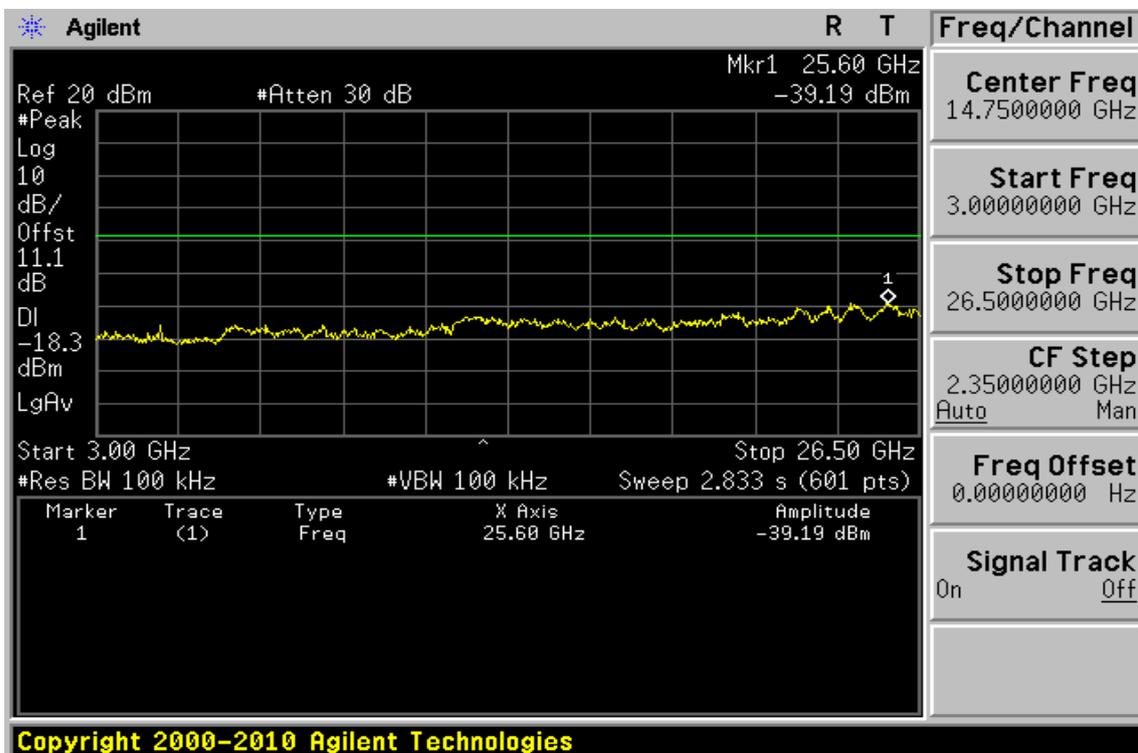
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Conducted Spurious Emission Measurement Result (802.11b) Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz

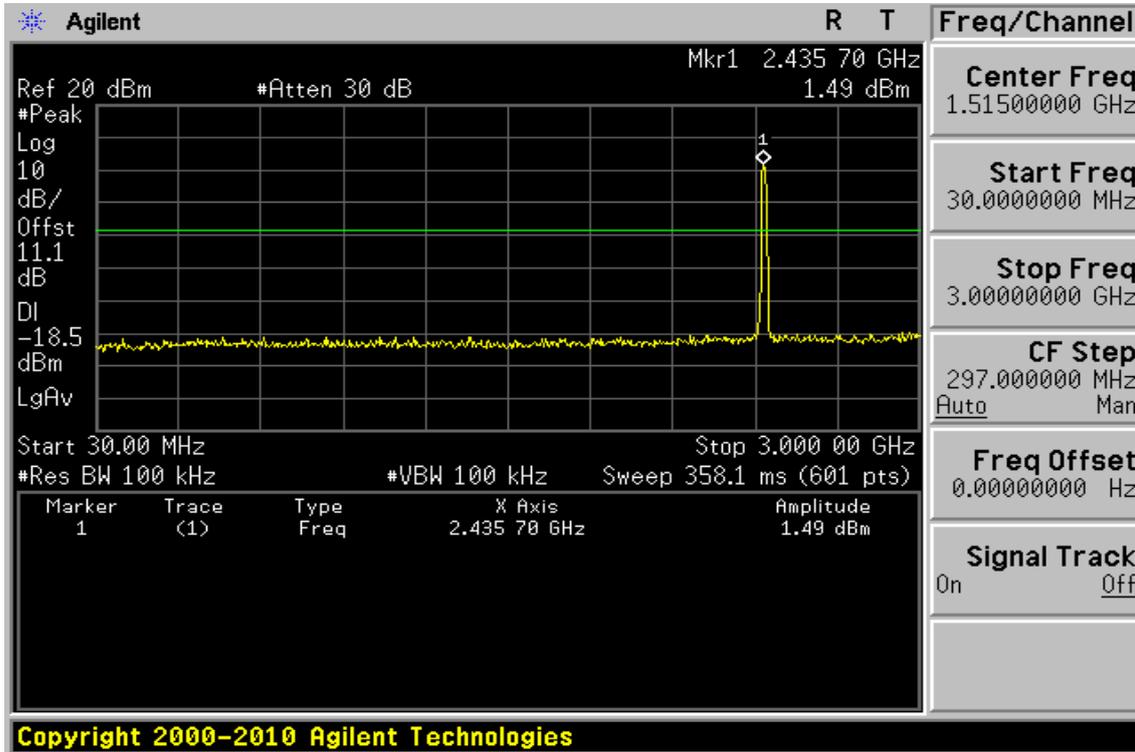


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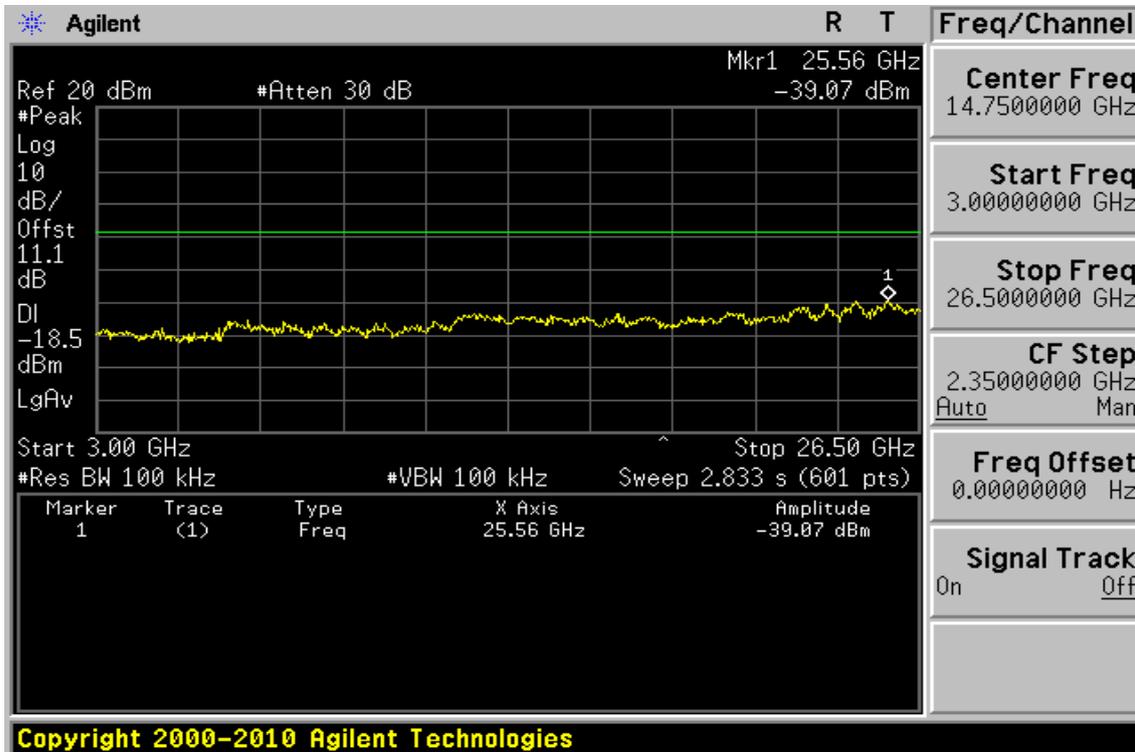
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Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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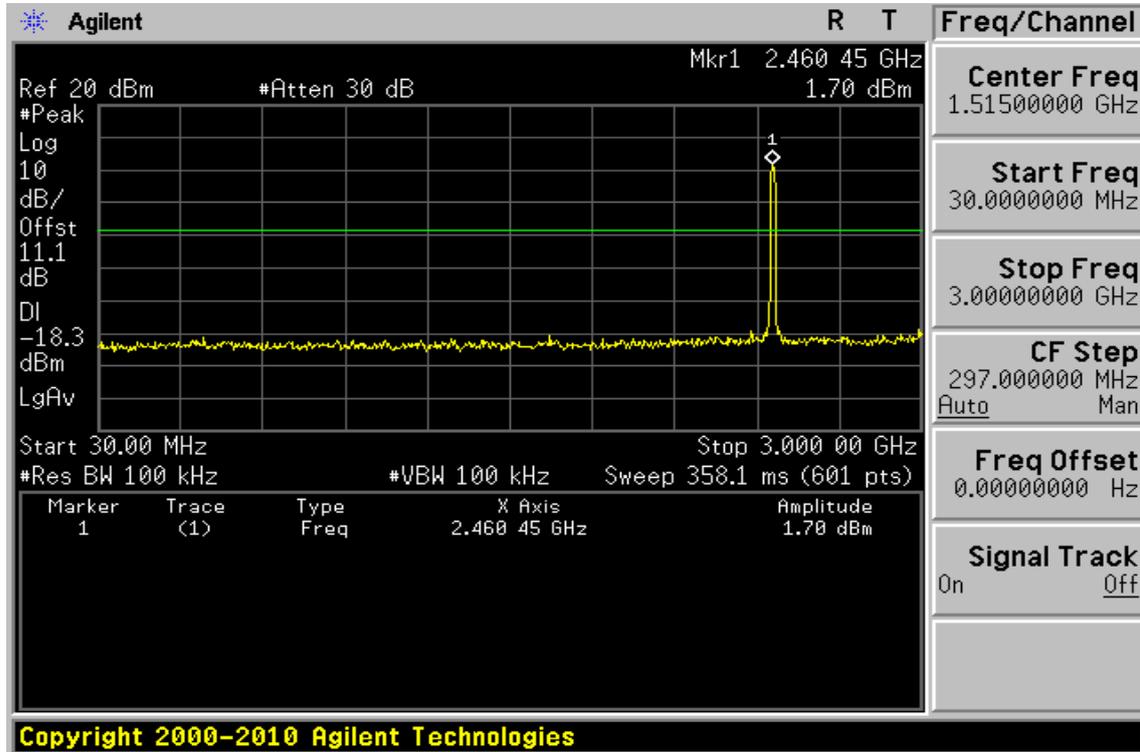
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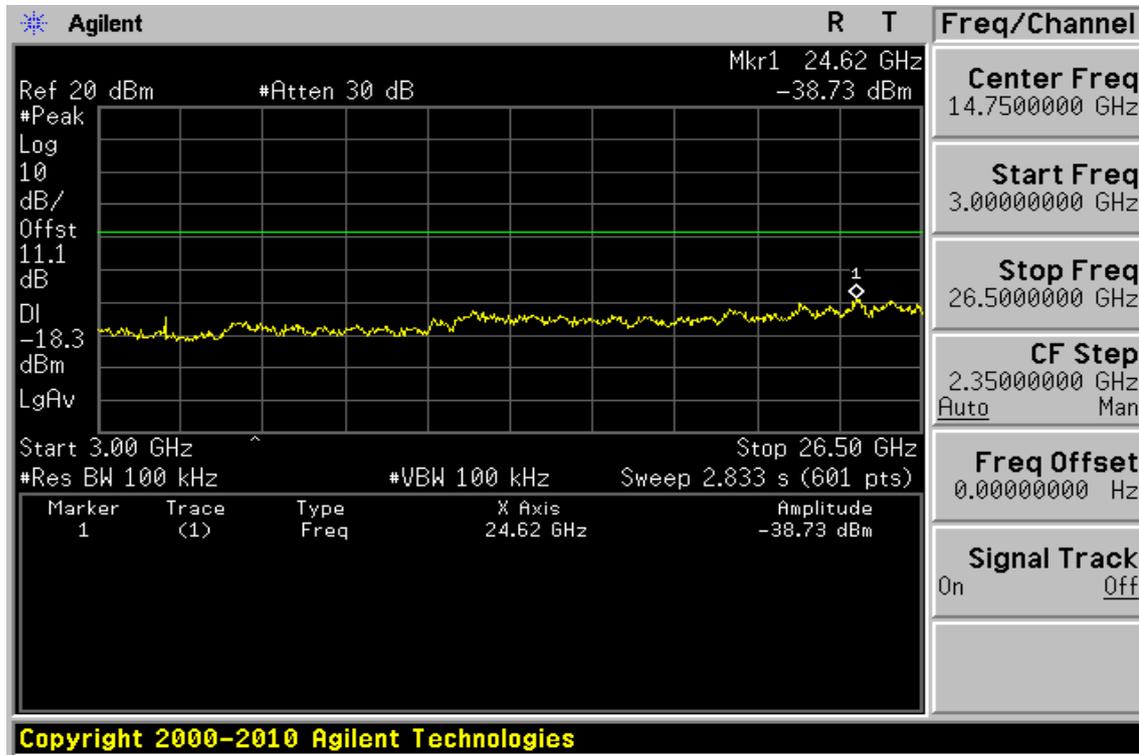
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Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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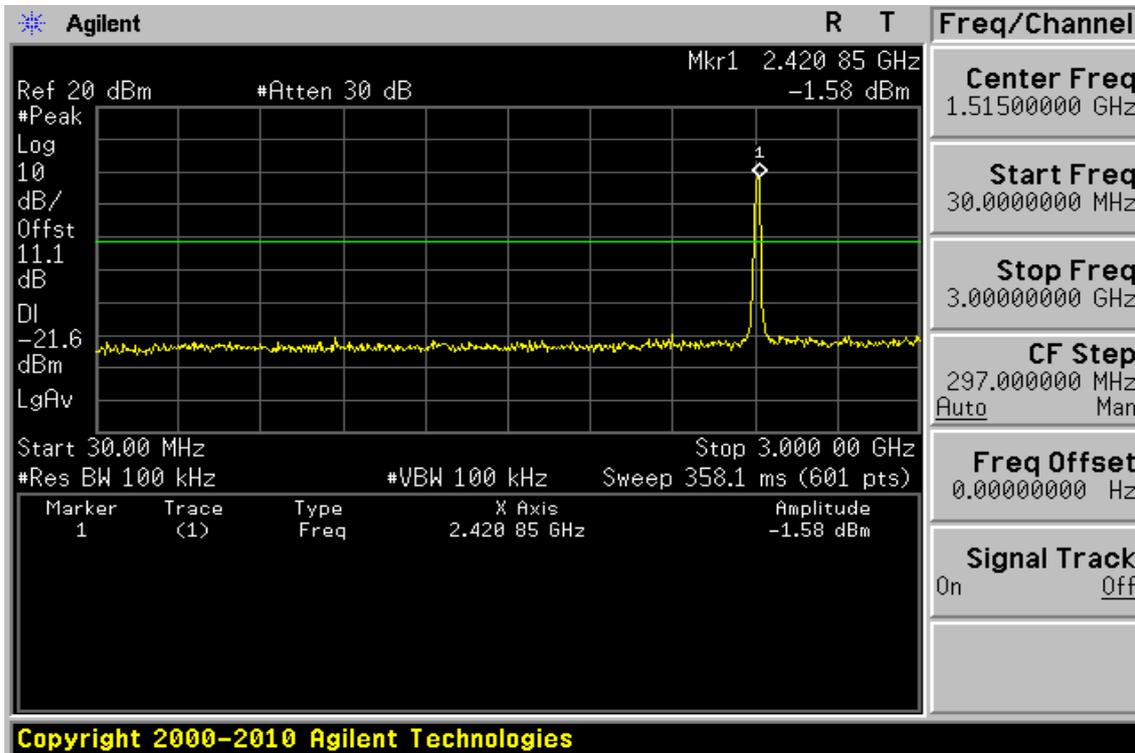
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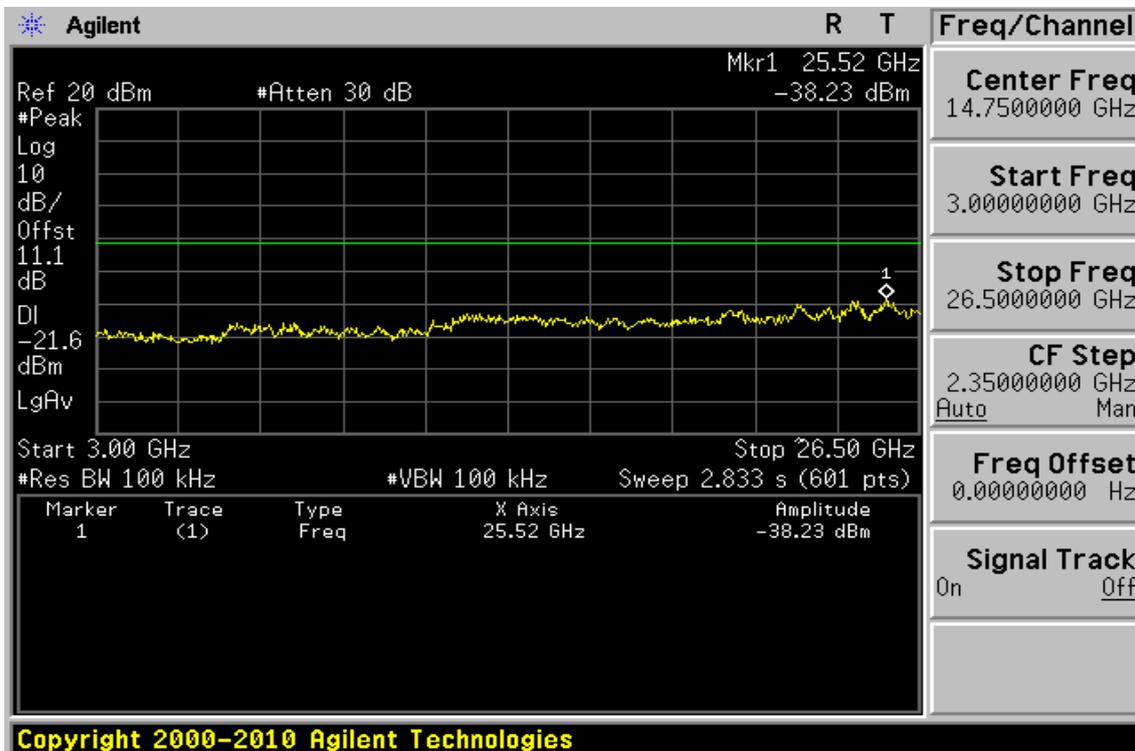
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Conducted Spurious Emission Measurement Result (802.11g) Ch Low 30MHz – 3GHz

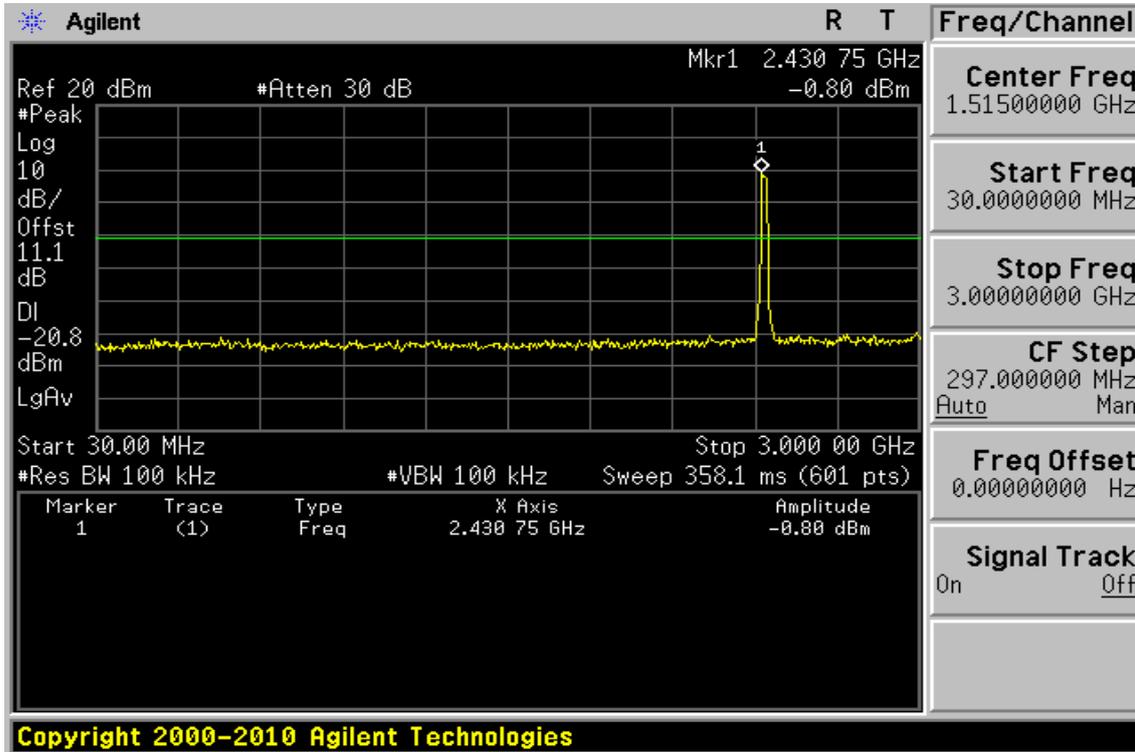


Ch Low 3GHz – 26.5GHz

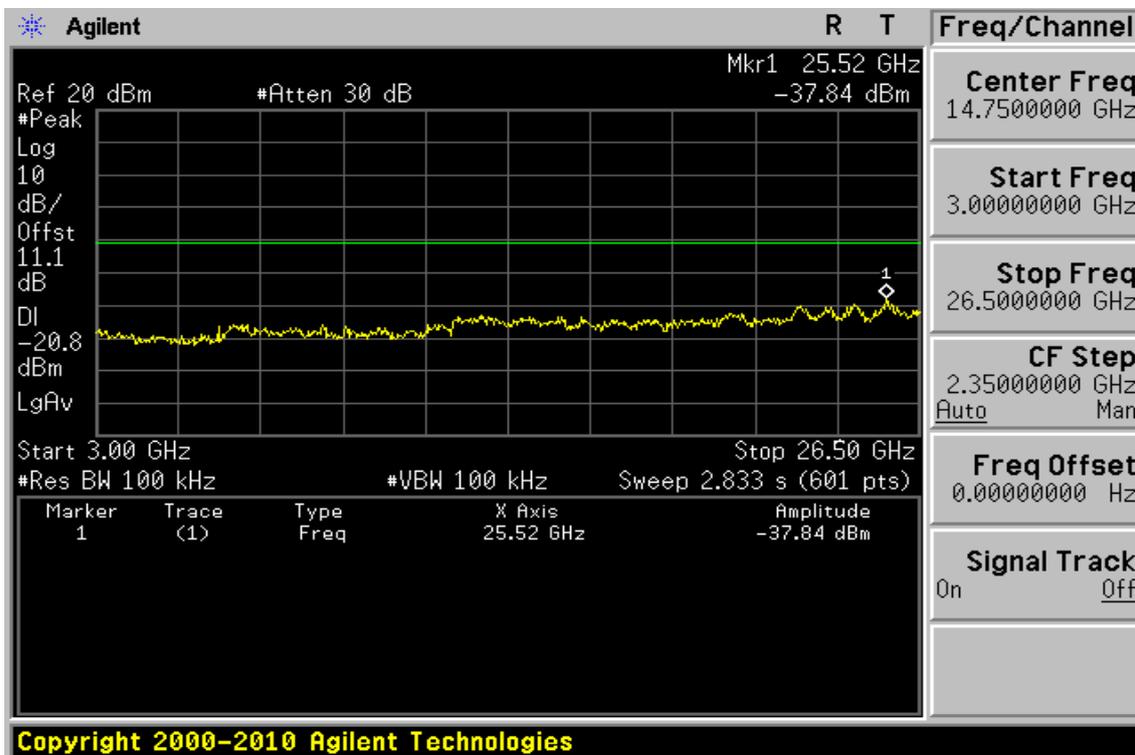


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Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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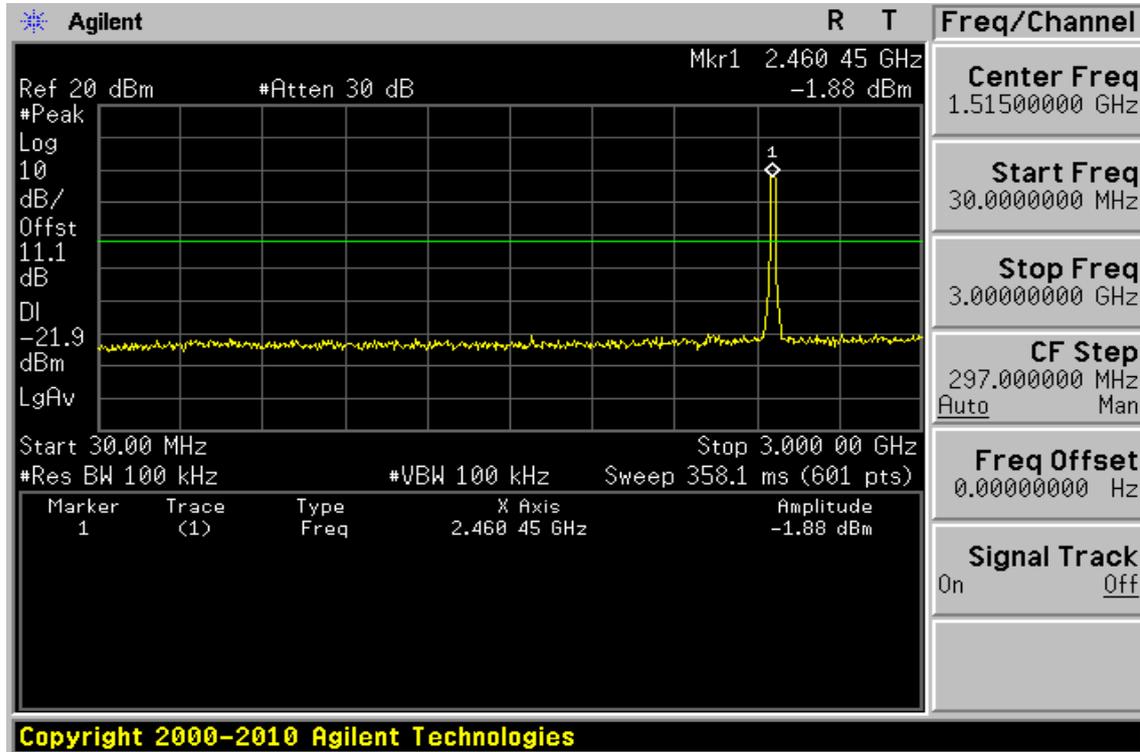
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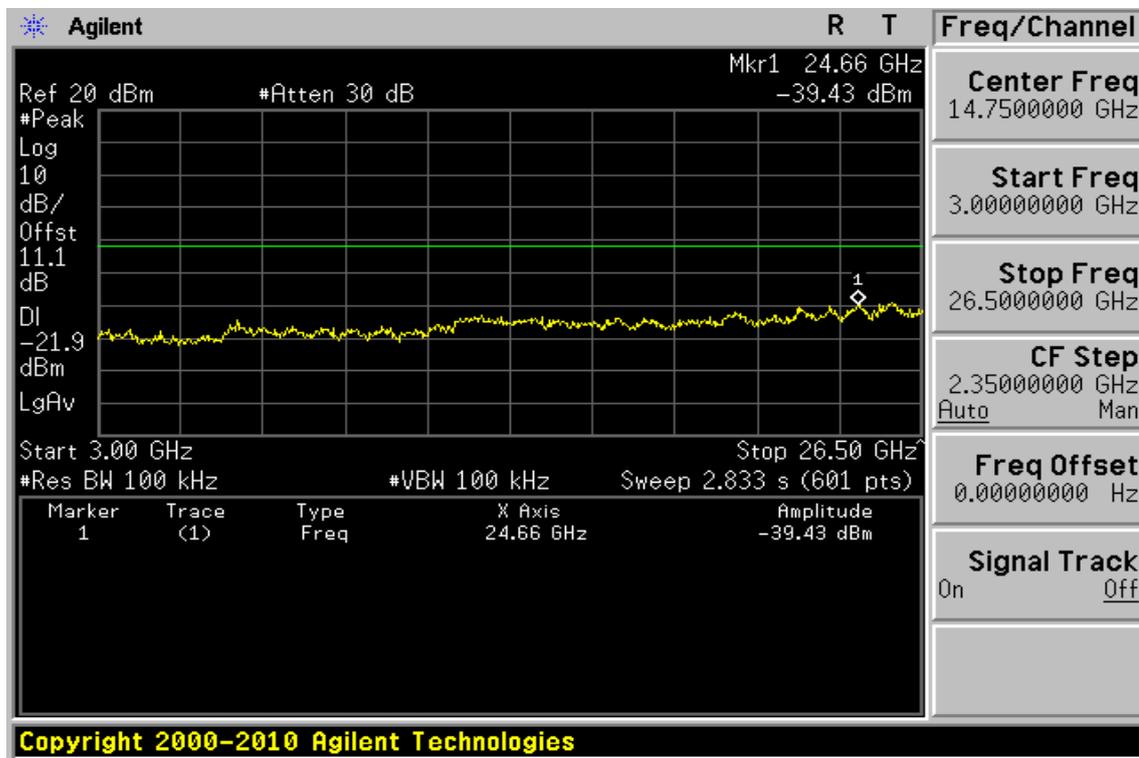
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Ch High 30MHz – 3GHz



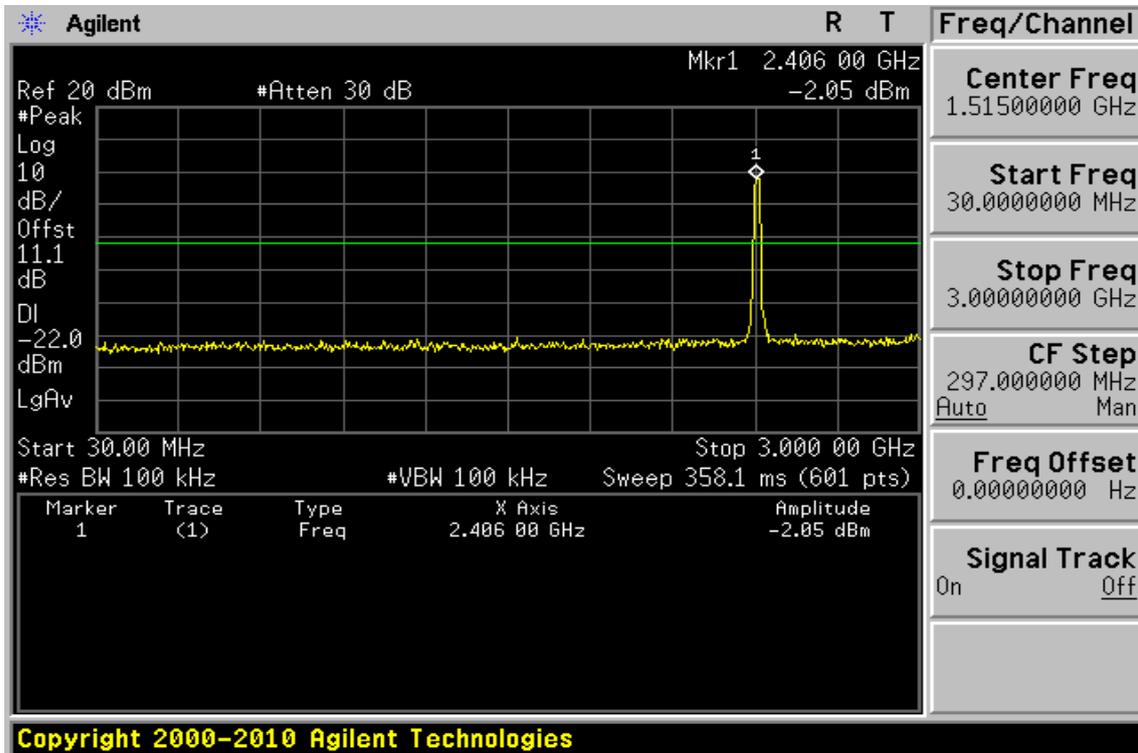
Ch High 3GHz – 26.5GHz



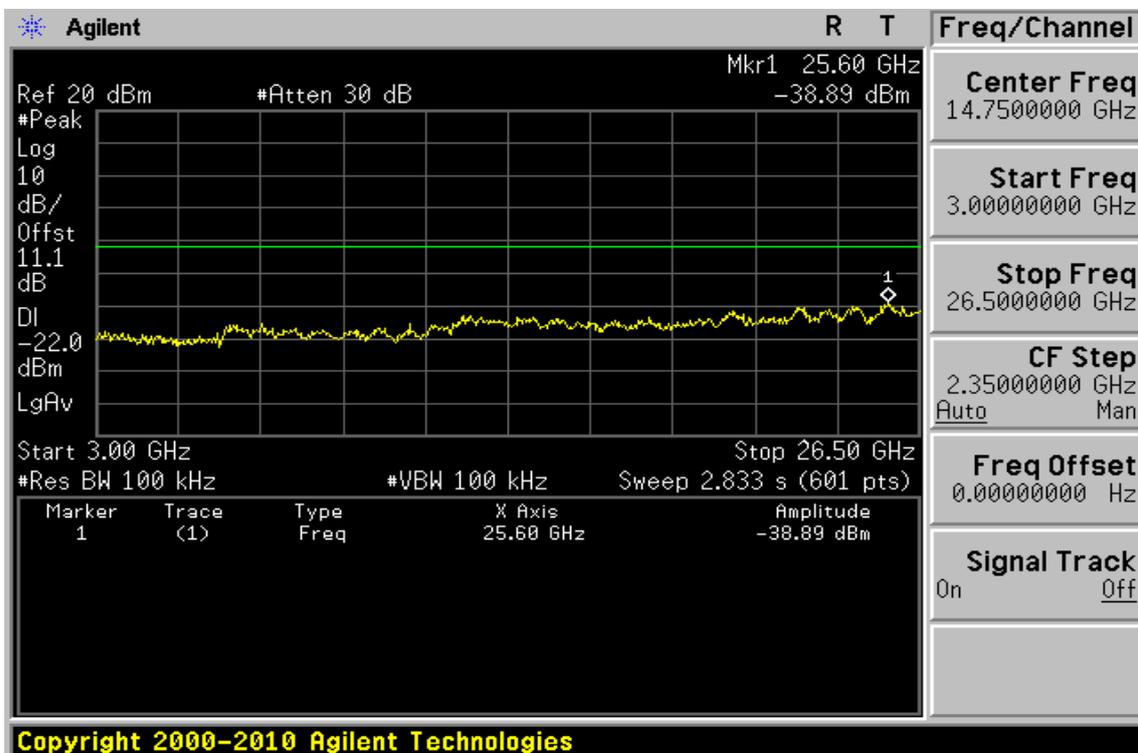
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Conducted Spurious Emission Measurement Result (802.11n_20M)
Ch Low 30MHz – 3GHz

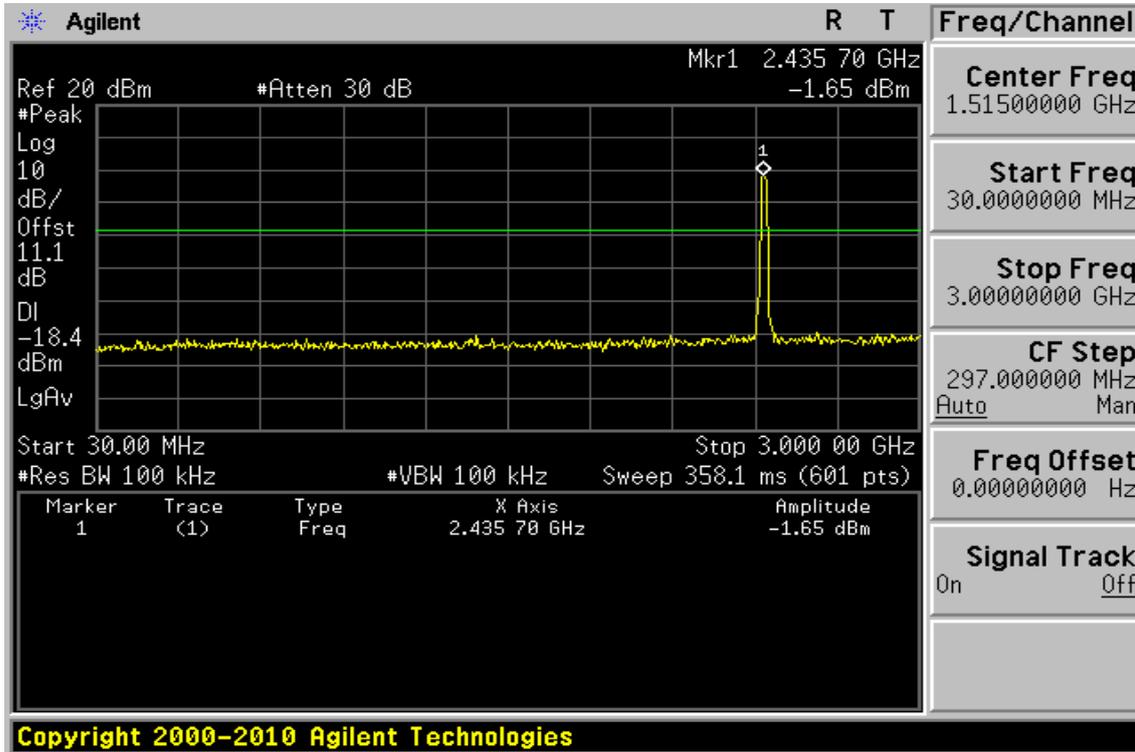


Ch Low 3GHz – 26.5GHz

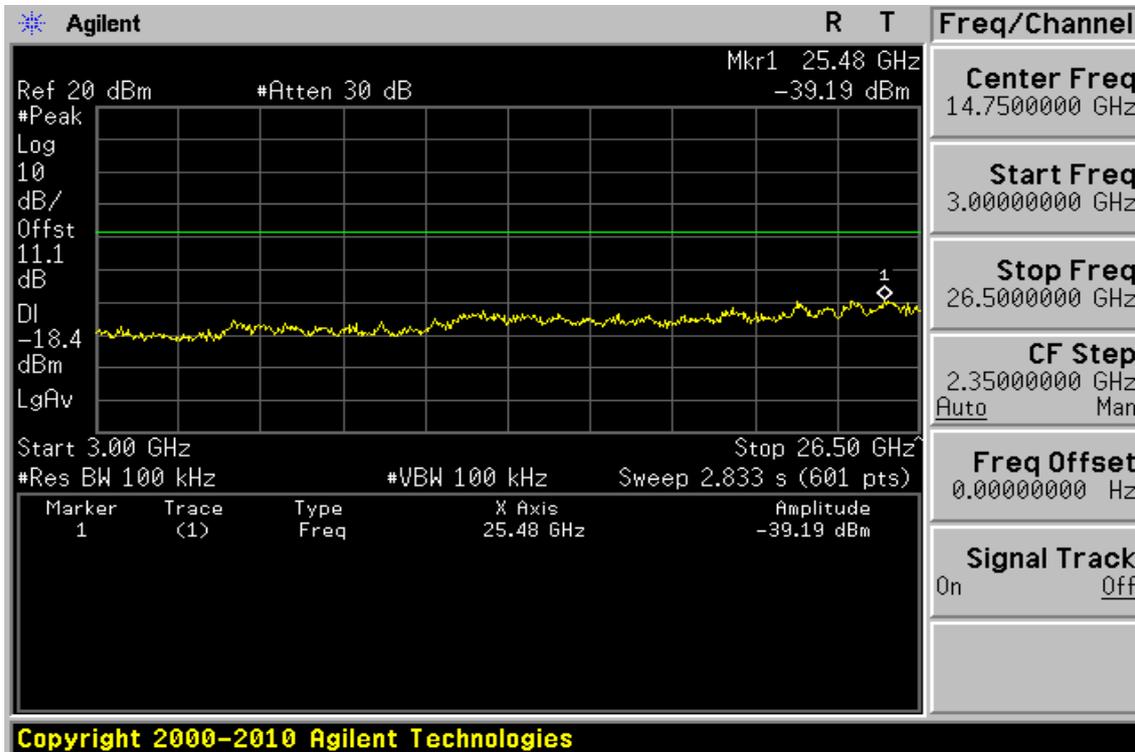


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Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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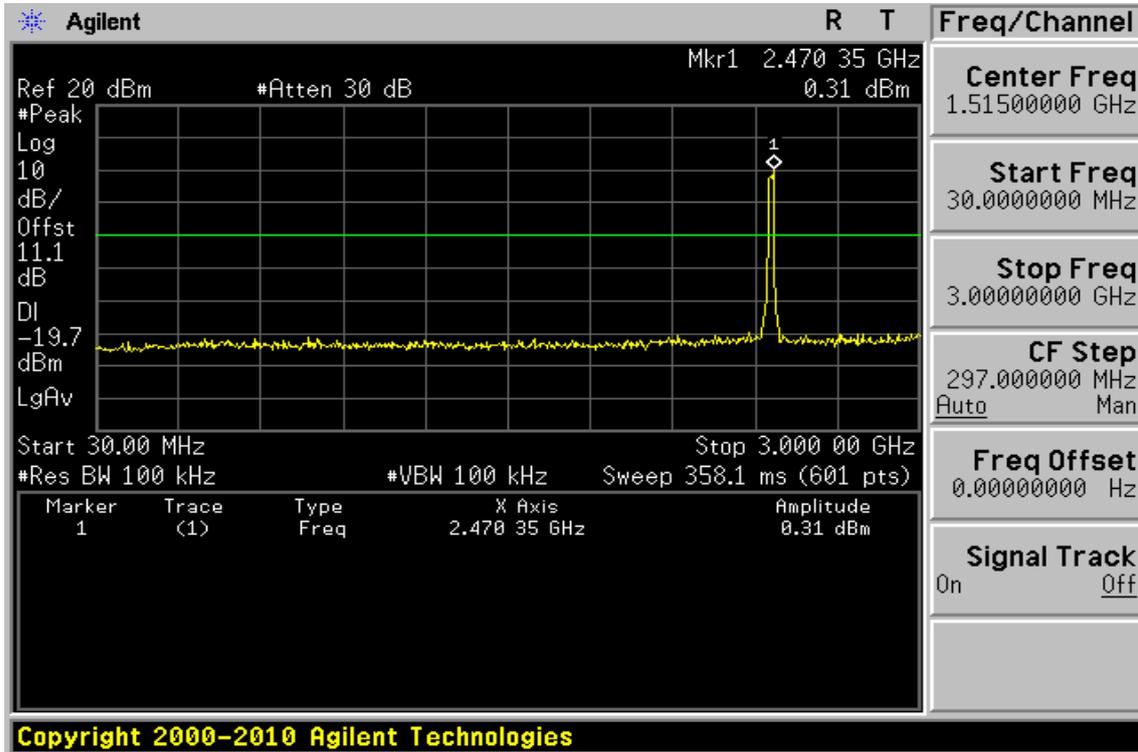
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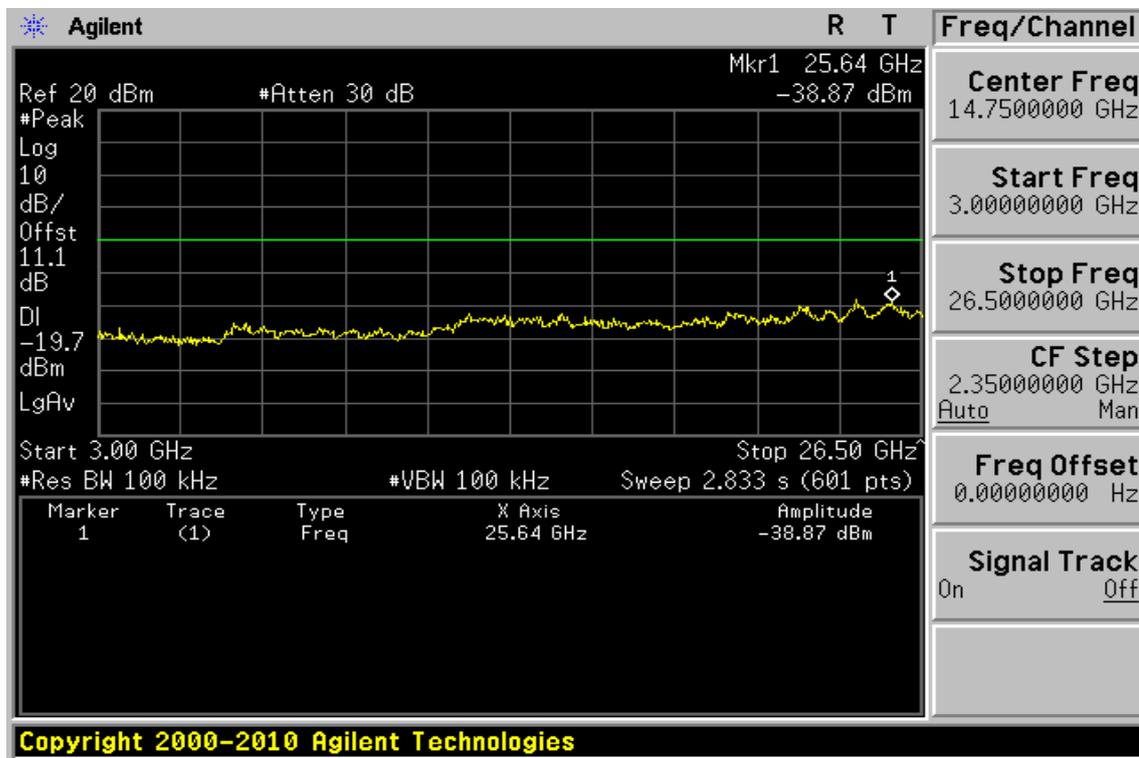
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Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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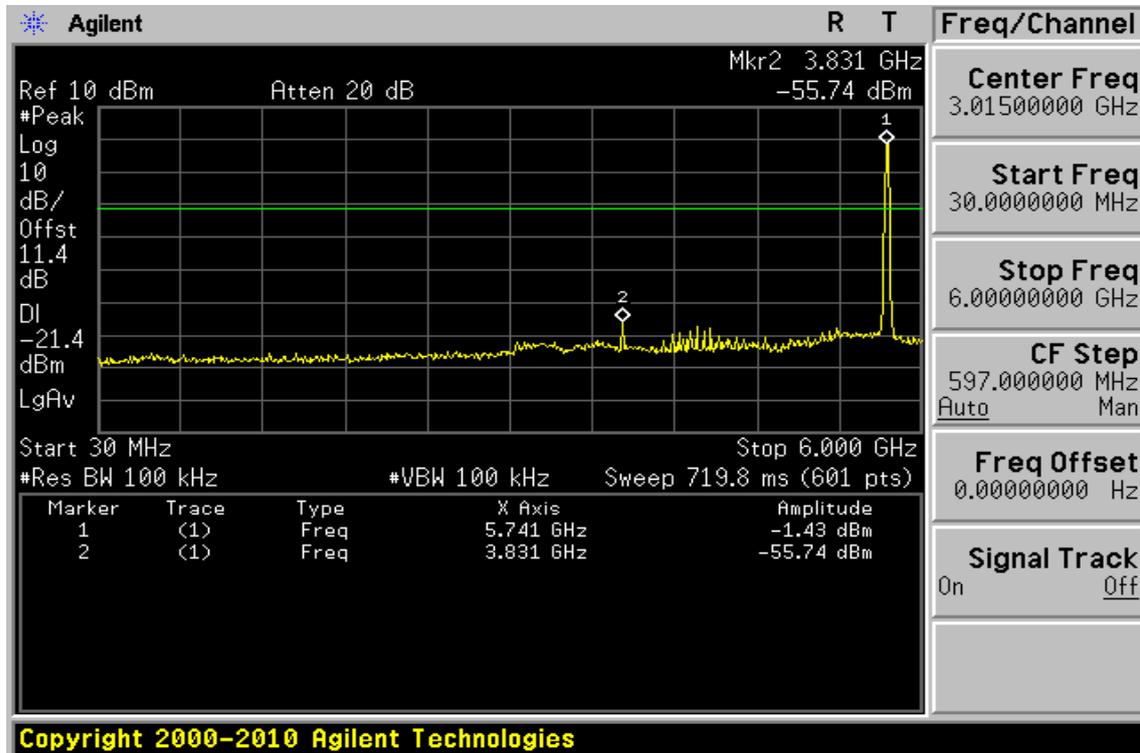
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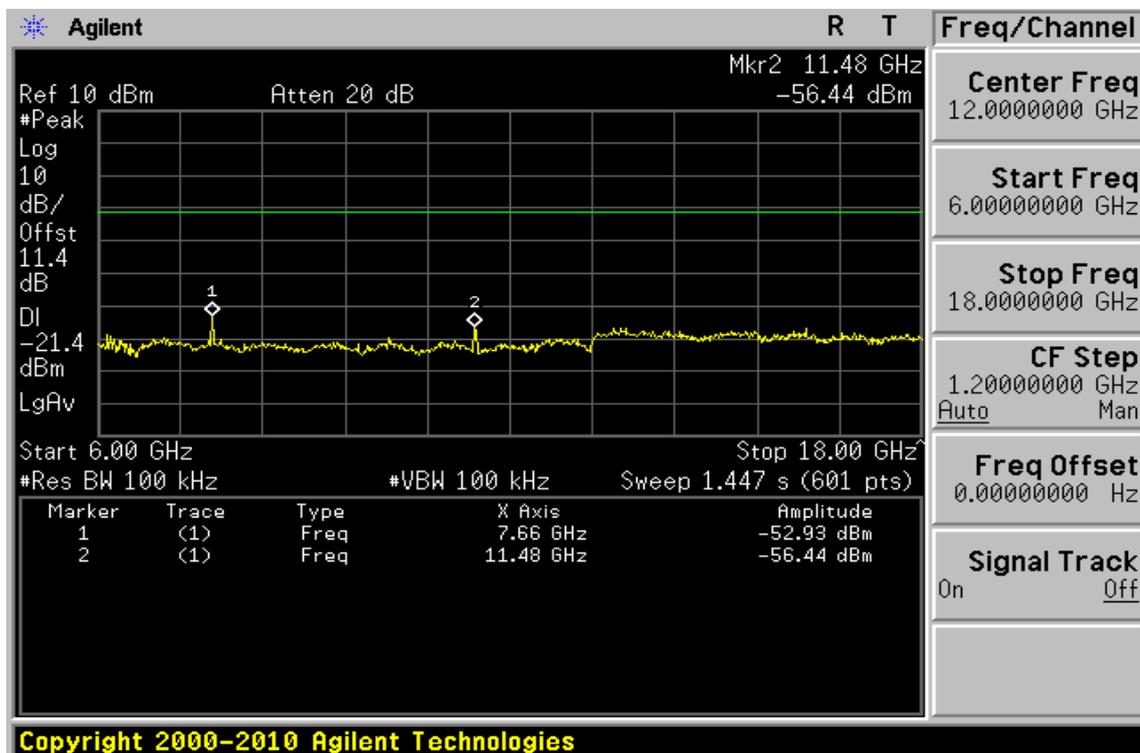
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Conducted Spurious Emission Measurement Result (802.11a)

Ch Low 30MHz – 6GHz



Ch Low 6GHz – 18GHz

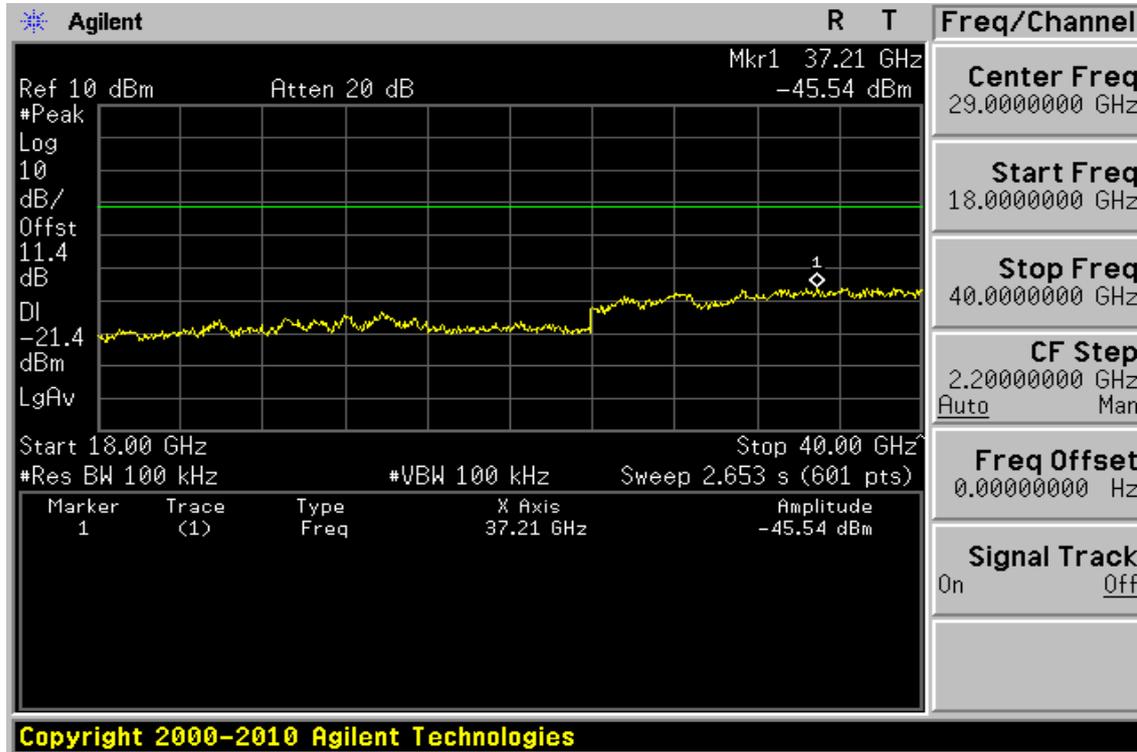


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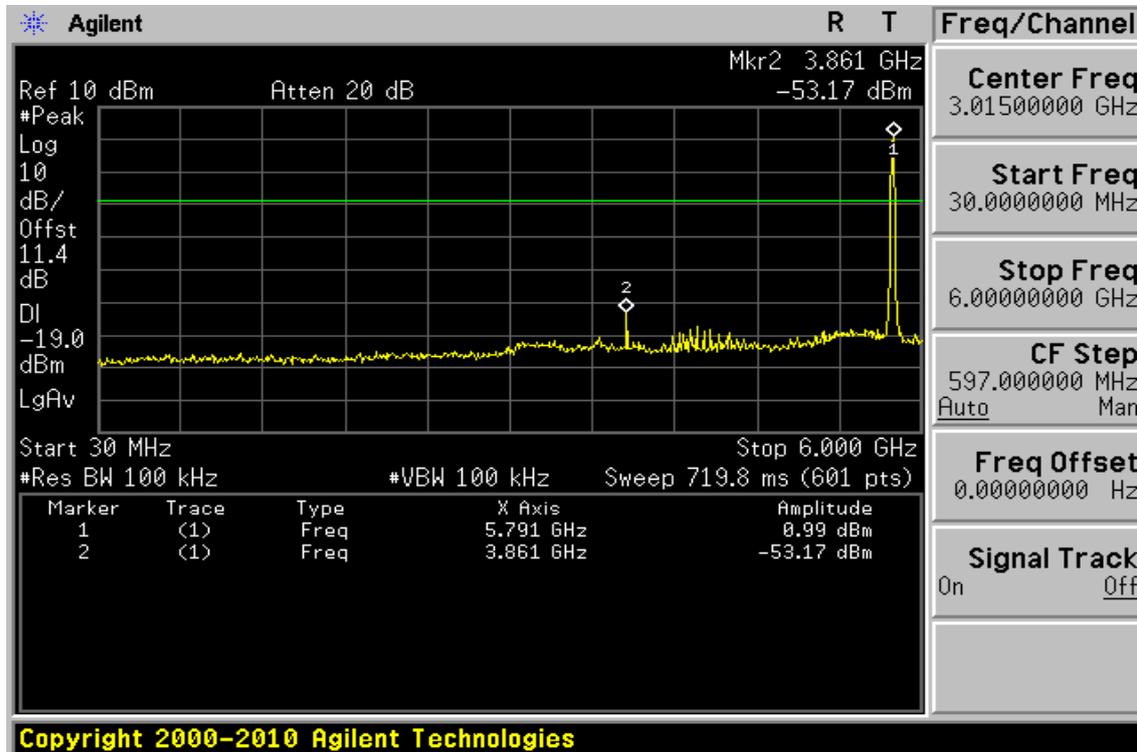
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Ch Low 18GHz – 40GHz

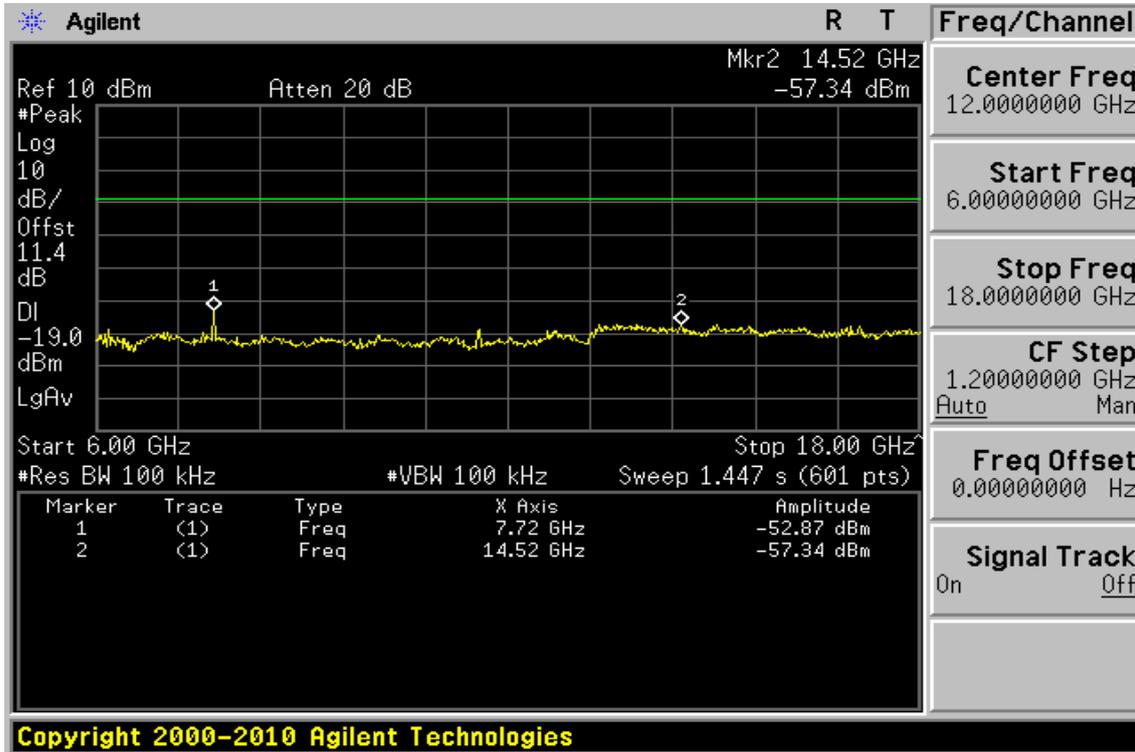


Ch Mid 30MHz – 6GHz

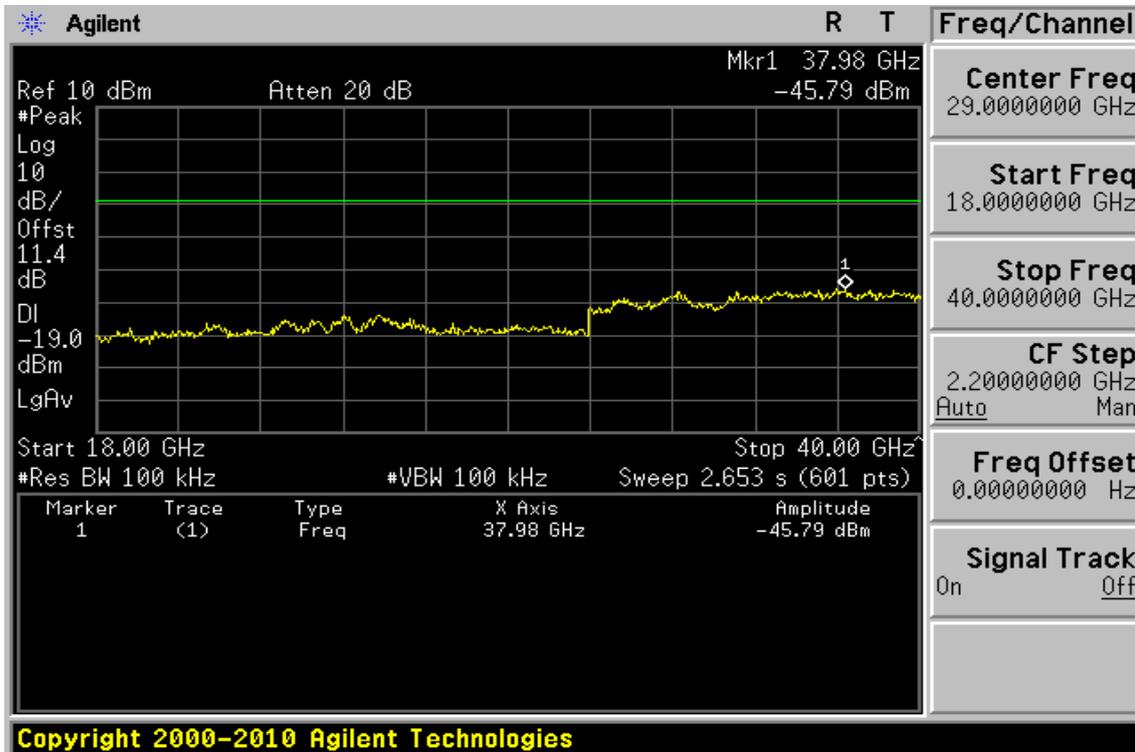


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Ch Mid 6GHz – 18GHz



Ch Mid 18GHz – 40GHz



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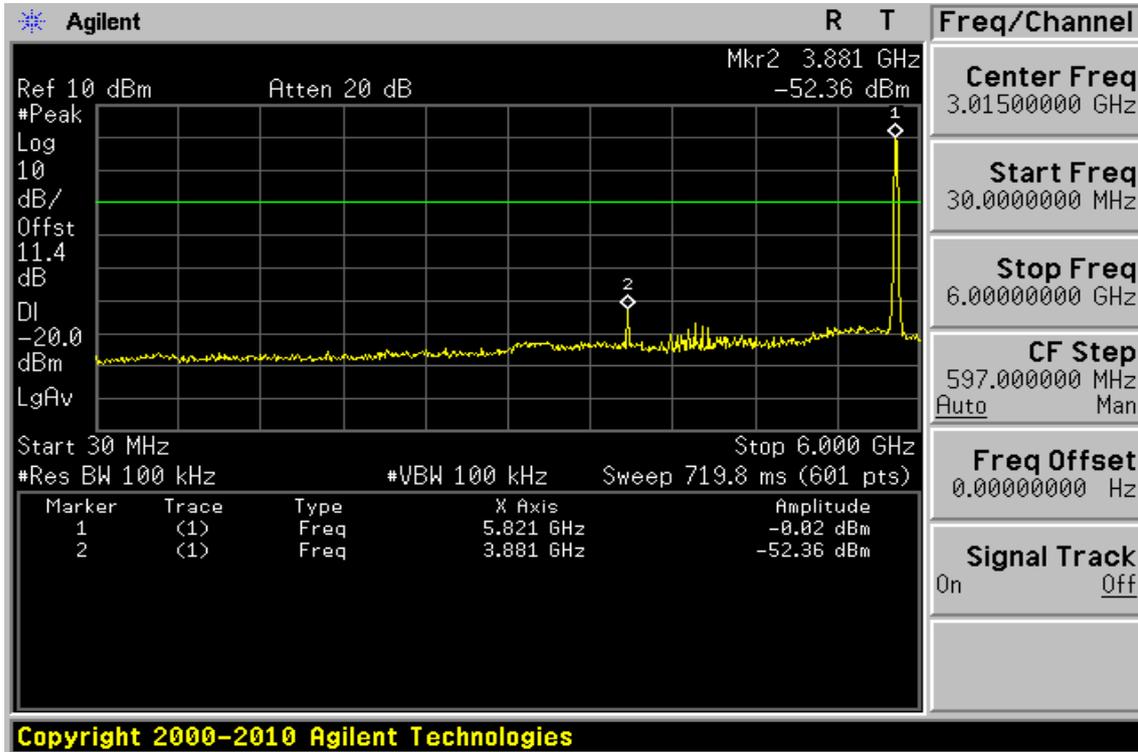
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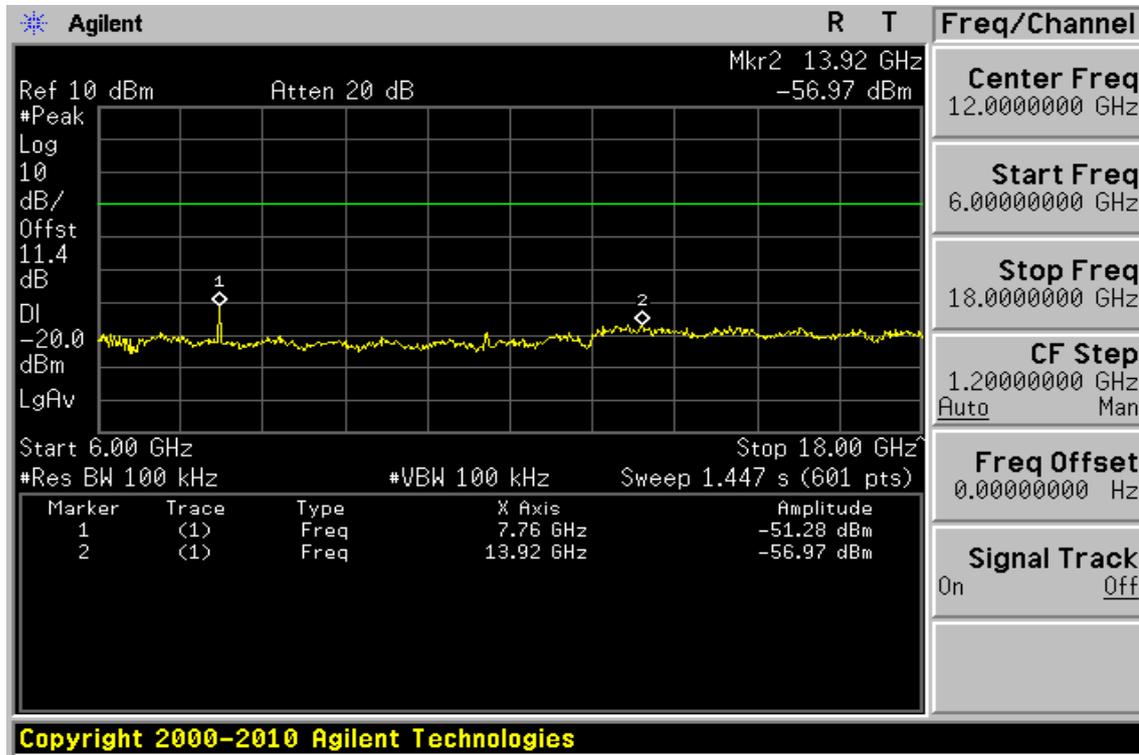
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Ch High 30MHz – 6GHz



Ch High 6GHz – 18GHz



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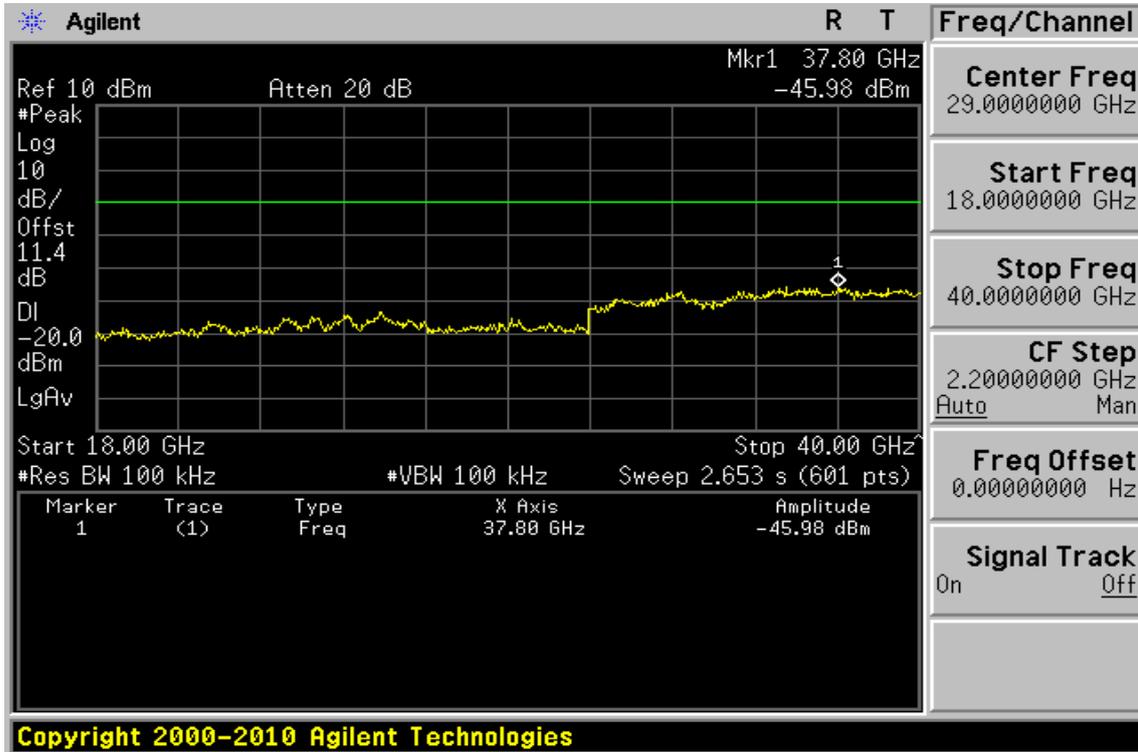
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Ch High 18GHz – 40GHz



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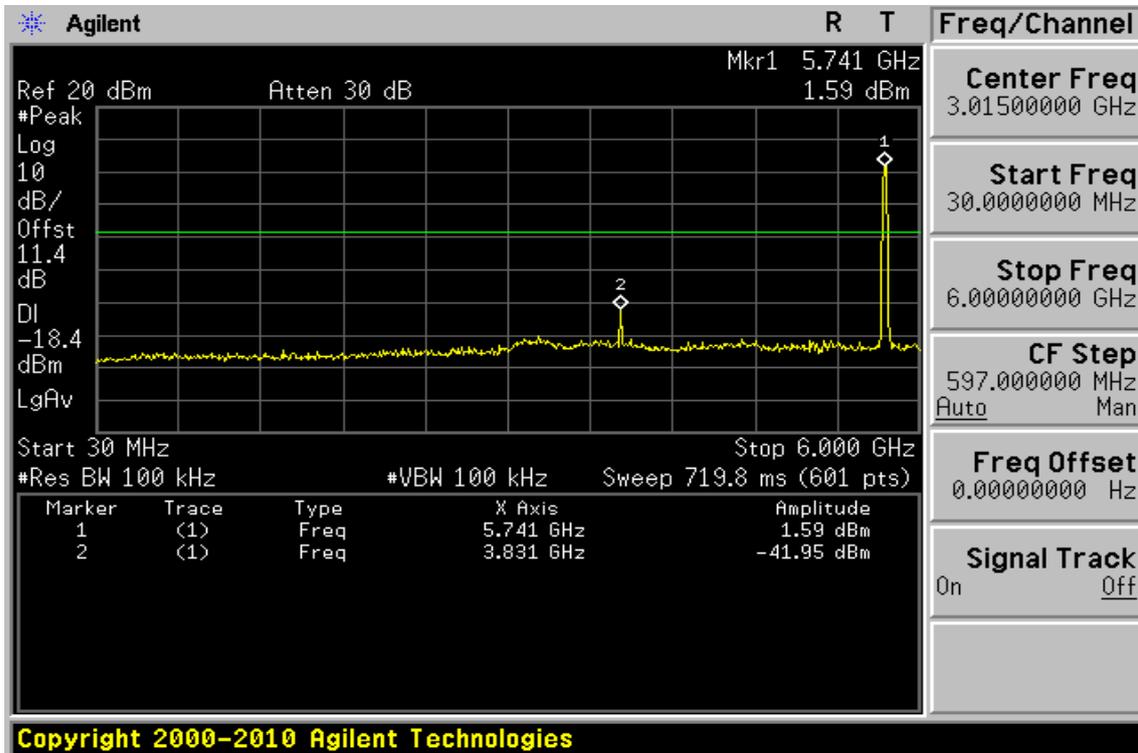
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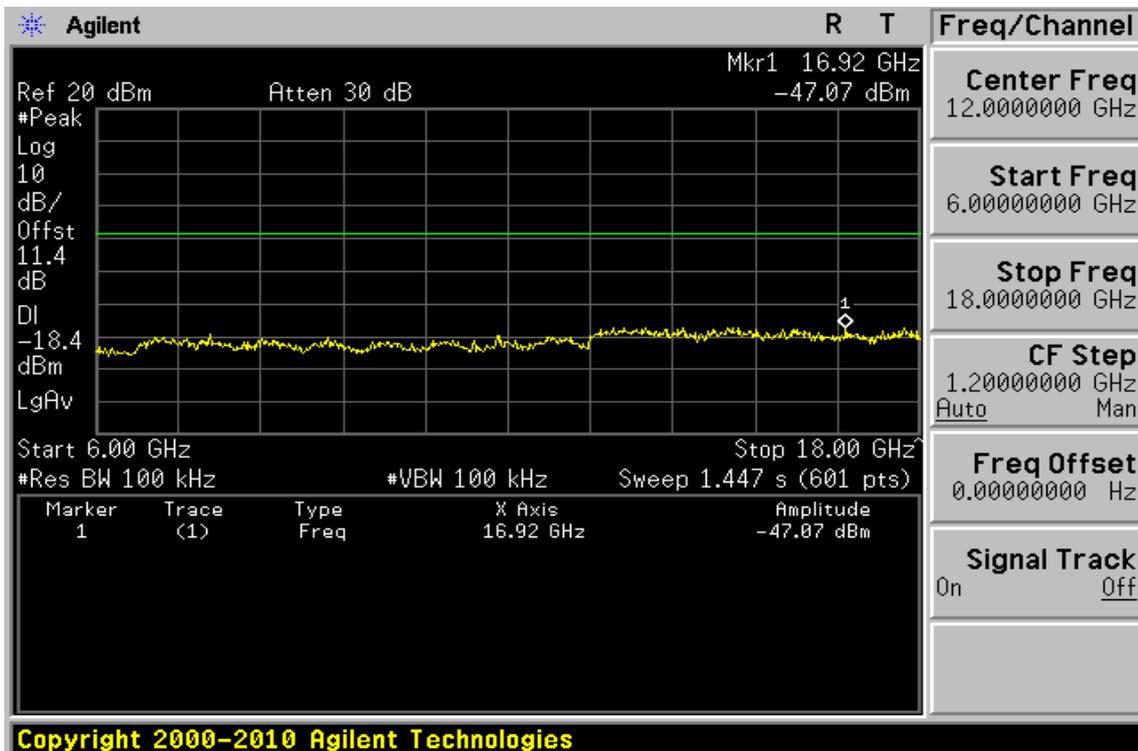
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Conducted Spurious Emission Measurement Result (802.11n(5GHz)_20M) Ch Low 30MHz – 6GHz



Ch Low 6GHz – 18GHz

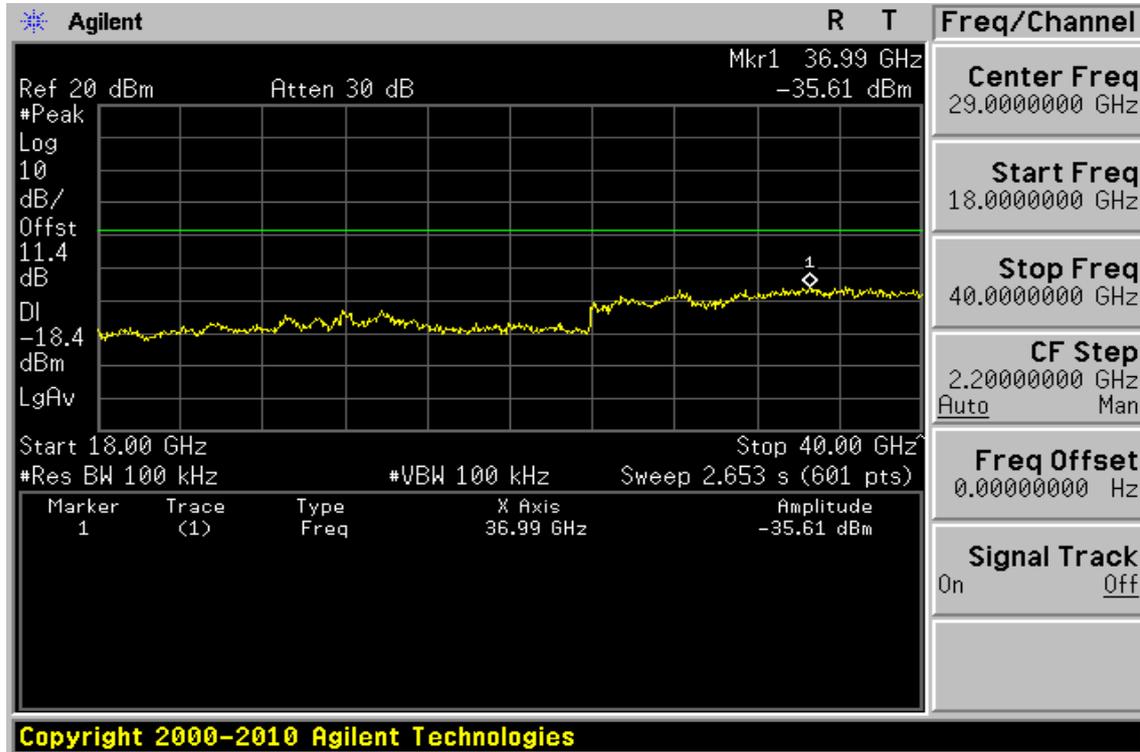


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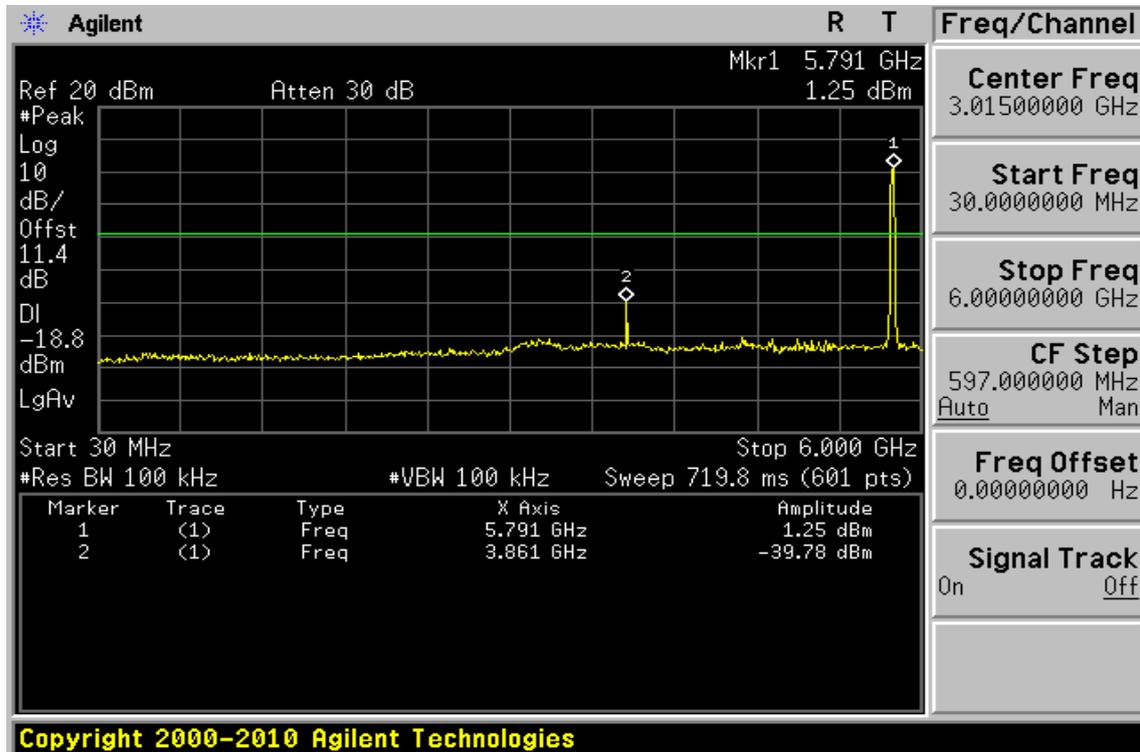
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Ch Low 18GHz – 40GHz



Ch Mid 30MHz – 6GHz



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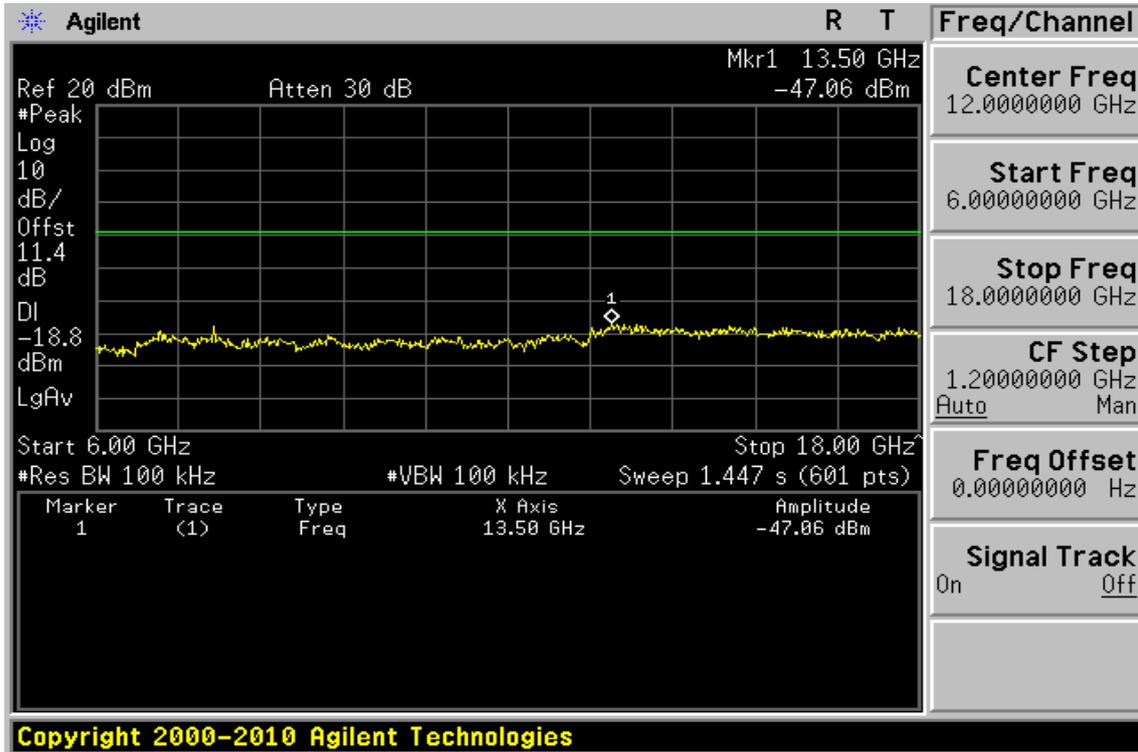
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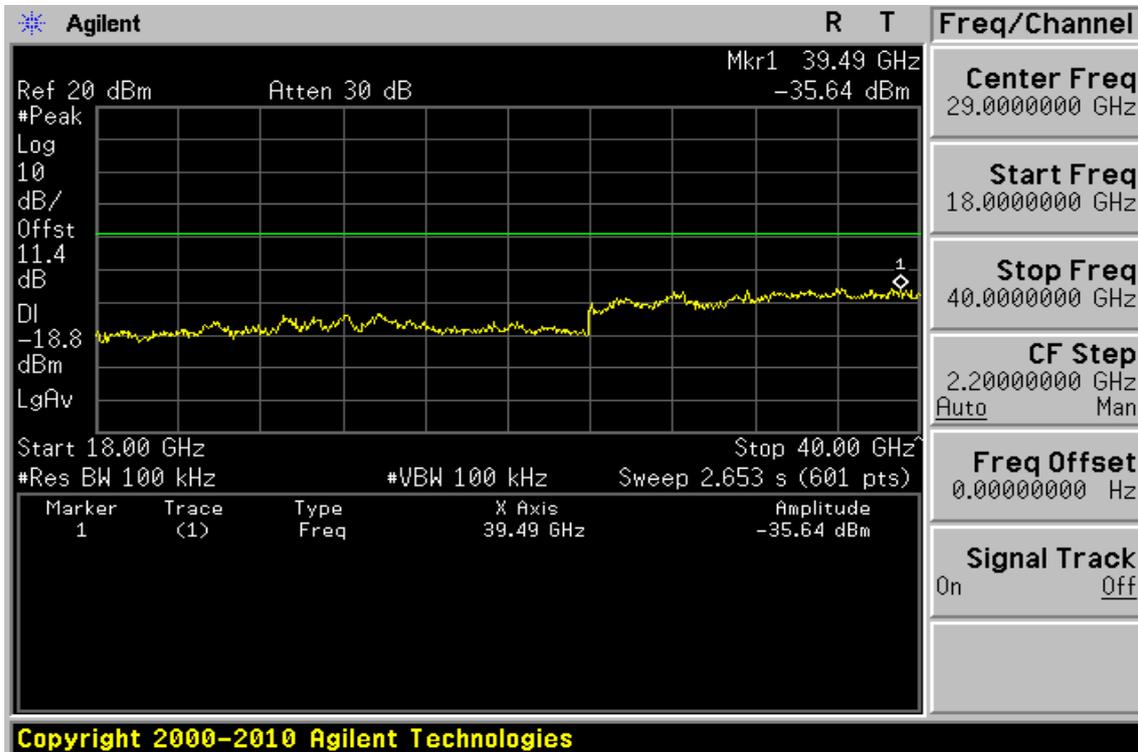
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Ch Mid 6GHz – 18GHz



Ch Mid 18GHz – 40GHz



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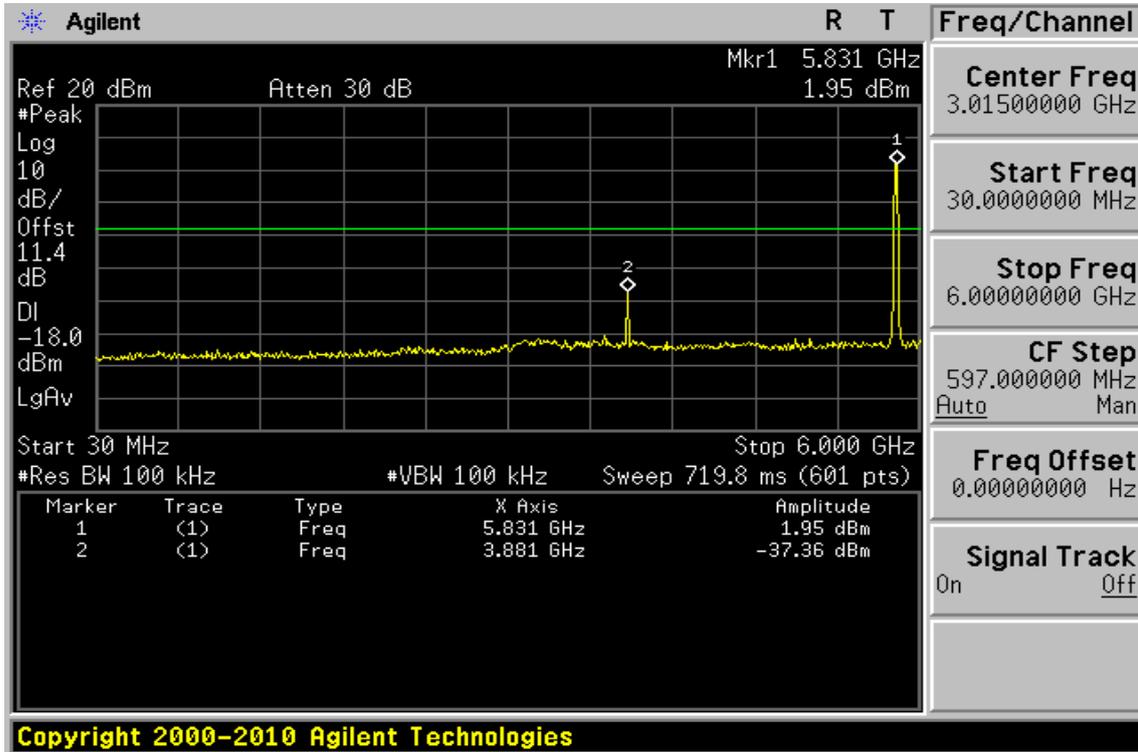
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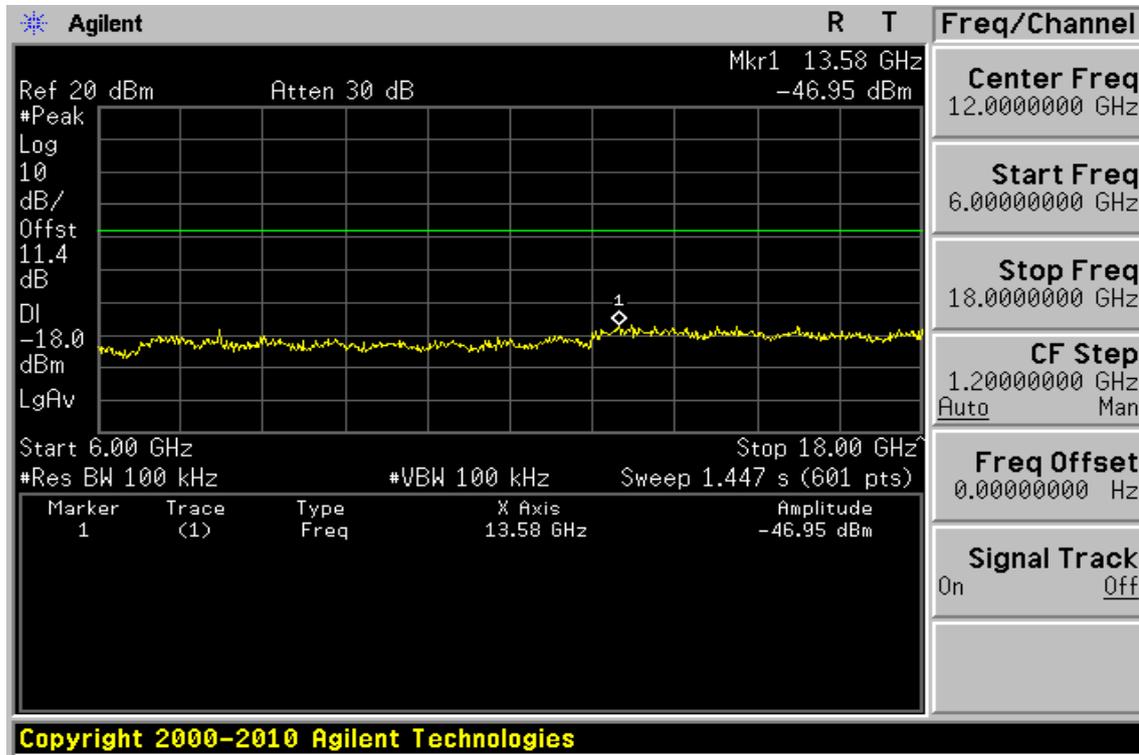
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Ch High 30MHz – 6GHz



Ch High 6GHz – 18GHz

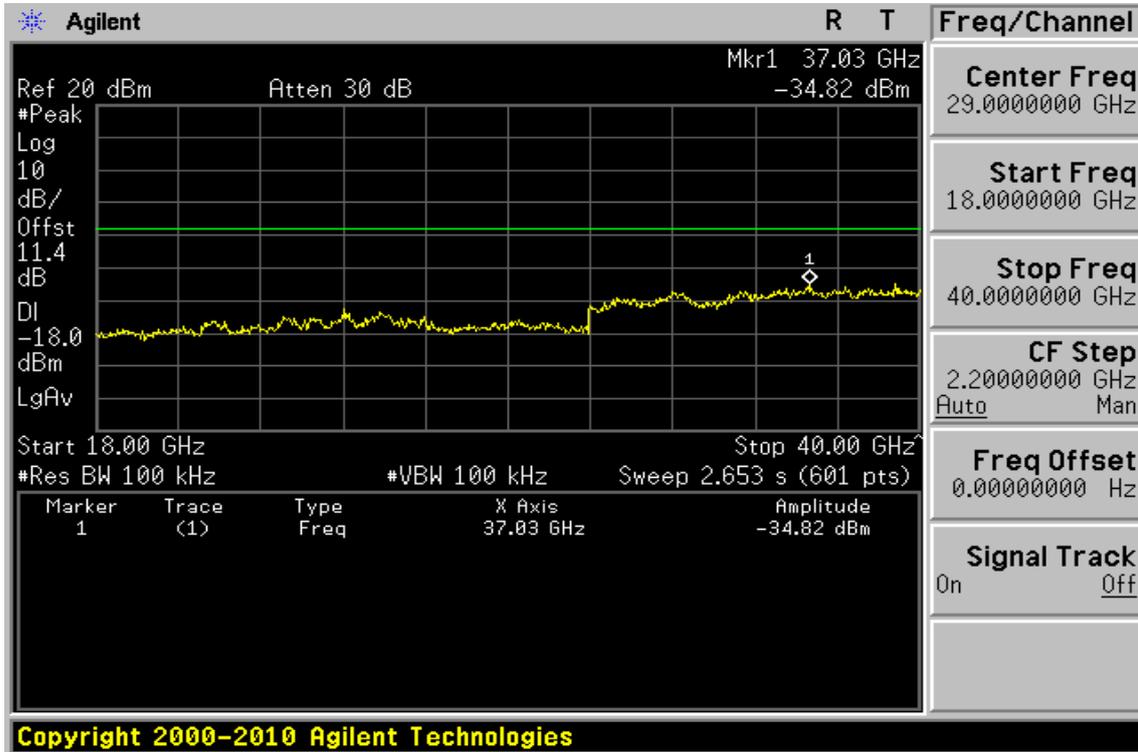


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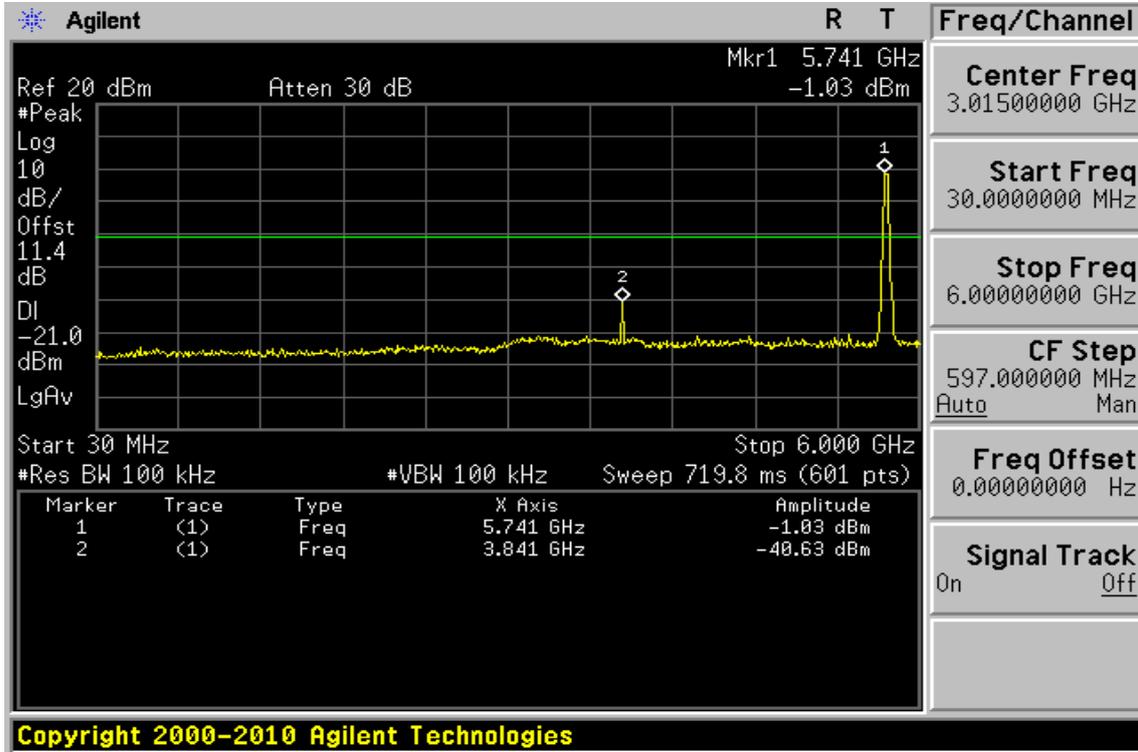
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Ch High 18GHz – 40GHz

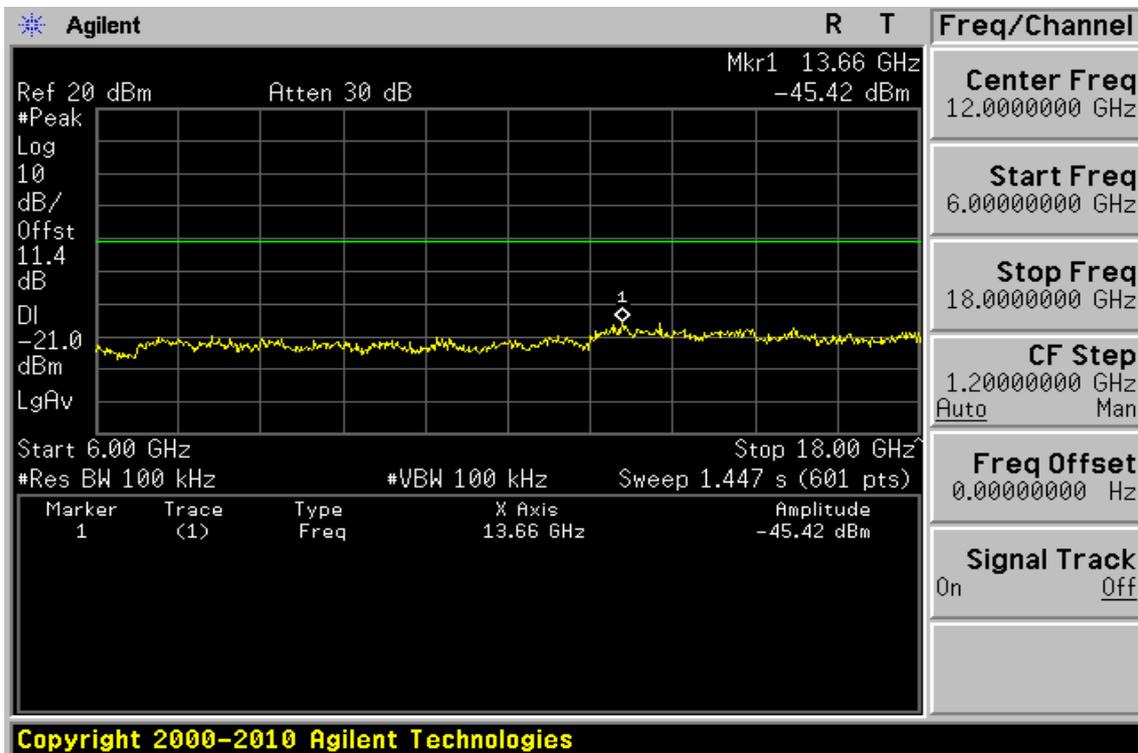


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Conducted Spurious Emission Measurement Result (802.11n(5GHz)_40M) Ch Low 30MHz – 6GHz



Ch Low 6GHz – 18GHz

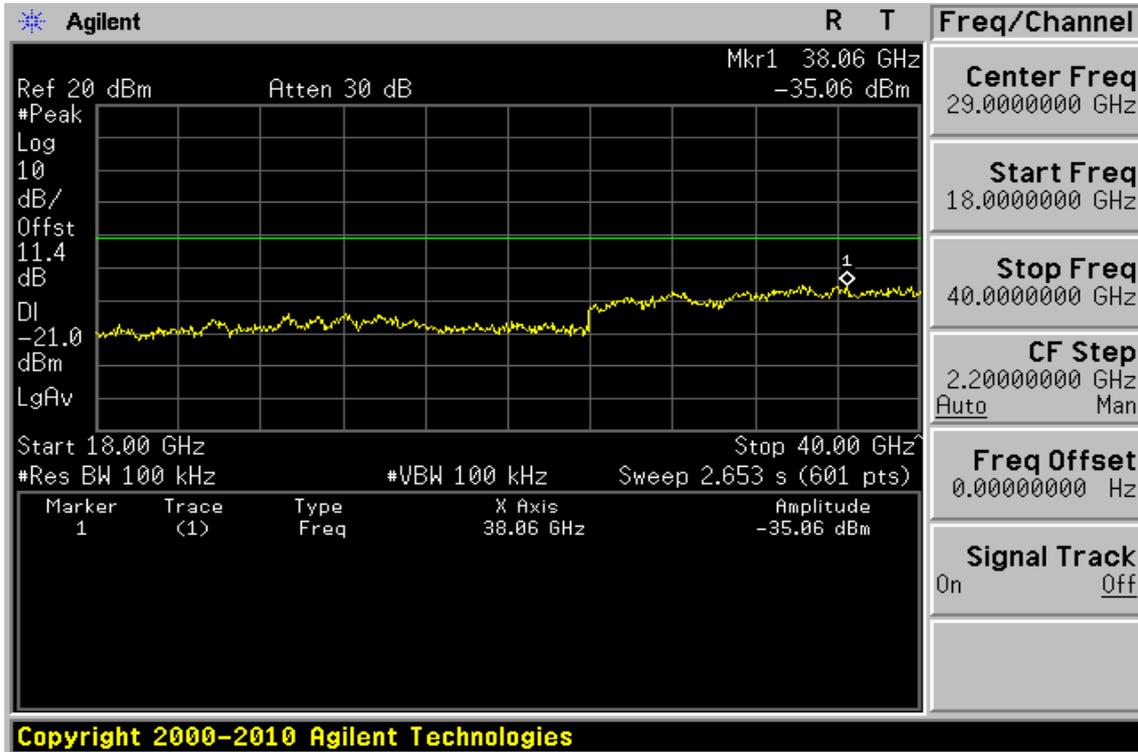


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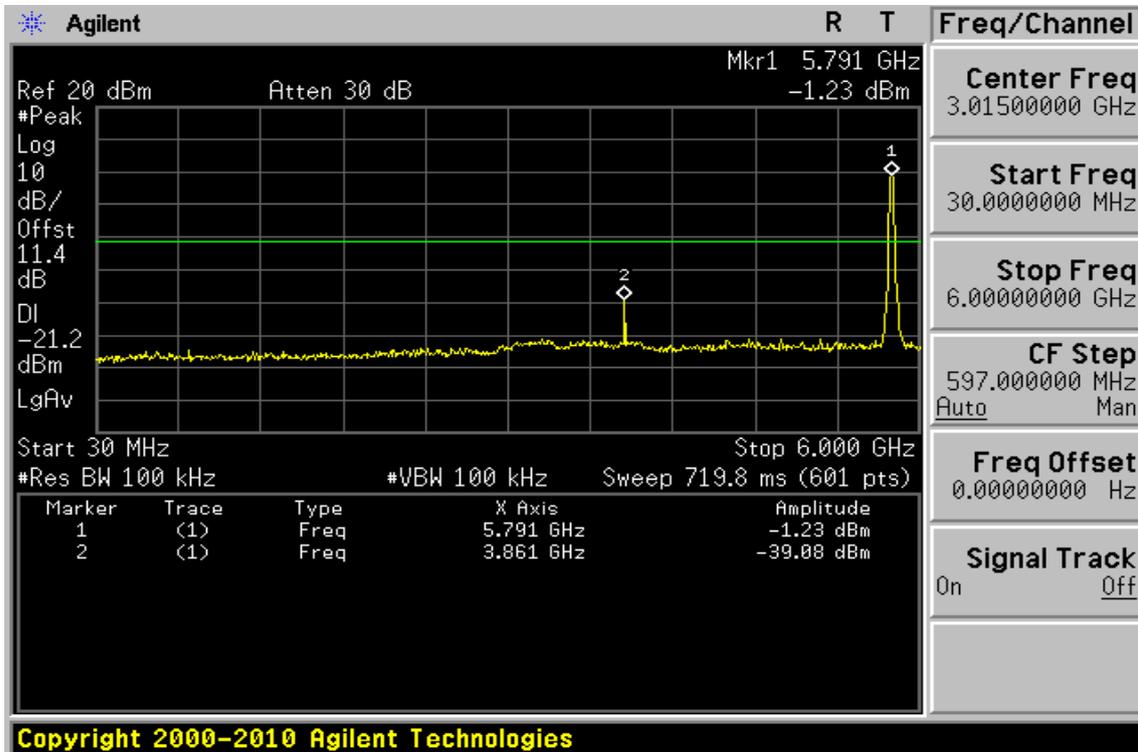
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Ch Low 18GHz – 40GHz



Ch High 30MHz – 6GHz



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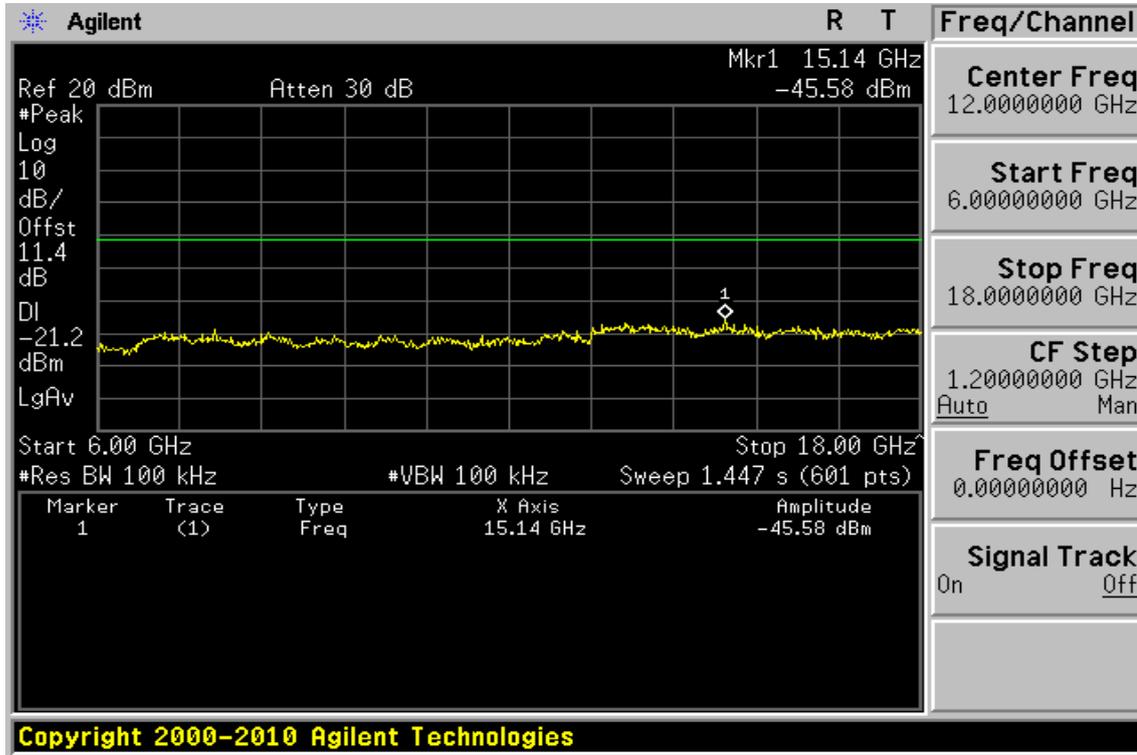
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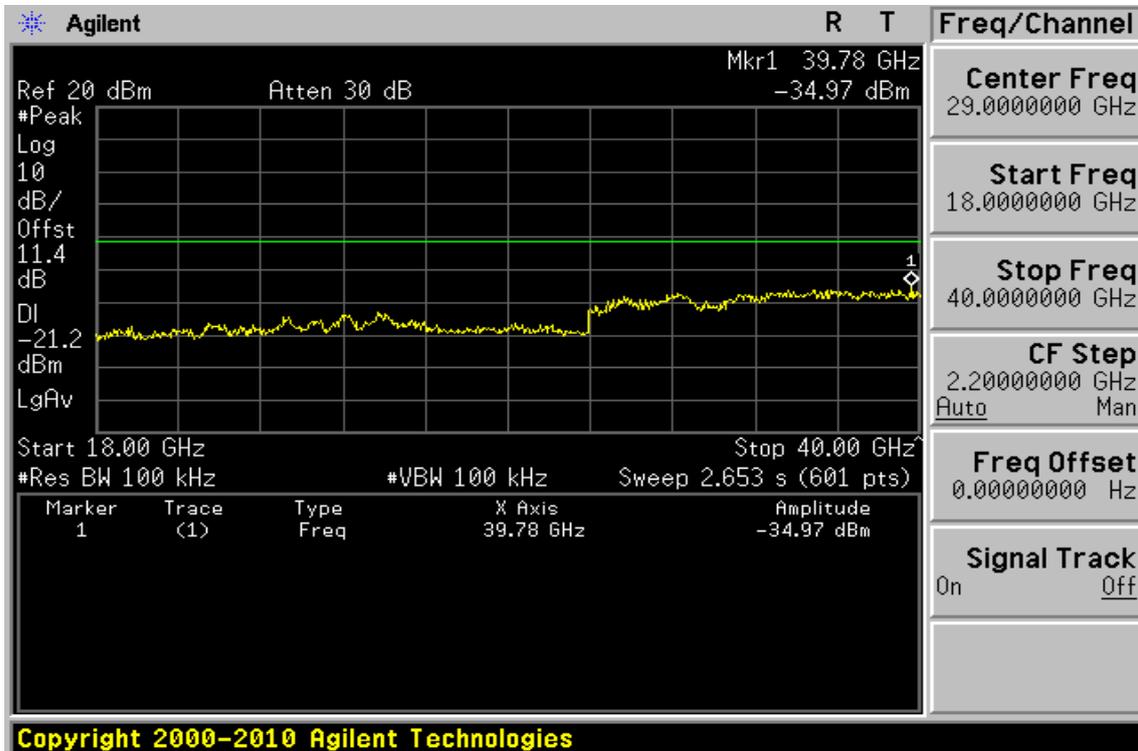
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Ch High 6GHz – 18GHz



Ch High 18GHz – 40GHz



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Radiated Spurious Emission Measurement Result (802.11b)

Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	45.92	-14.33	31.59	40.00	-8.41
125.06	S	Peak	41.12	-14.23	26.89	43.50	-16.61
183.26	S	Peak	39.83	-14.89	24.94	43.50	-18.56
533.43	S	Peak	43.53	-8.92	34.61	46.00	-11.39
623.64	S	Peak	30.62	-7.05	23.57	46.00	-22.43
798.24	S	Peak	29.79	-4.22	25.57	46.00	-20.43
1598.00	S	Peak	45.82	0.31	46.13	74.00	-27.87
4824.00	H	Peak	39.06	9.56	48.62	74.00	-25.38
4991.00	S	Peak	41.53	10.23	51.76	74.00	-22.24
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11b Test Date :2012-06-05
Fundamental Frequency :2412 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	44.10	-14.24	29.86	40.00	-10.14
183.26	S	Peak	43.60	-14.89	28.71	43.50	-14.79
201.69	S	Peak	44.25	-16.07	28.18	43.50	-15.32
362.71	S	Peak	41.71	-11.51	30.20	46.00	-15.80
533.43	S	Peak	39.40	-8.92	30.48	46.00	-15.52
800.18	S	Peak	36.16	-4.19	31.97	46.00	-14.03
1598.00	S	Peak	48.28	0.88	49.16	74.00	-24.84
4824.00	H	Peak	38.75	9.57	48.32	74.00	-25.68
4984.50	S	Peak	40.35	10.01	50.36	74.00	-23.64
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	46.17	-14.33	31.84	40.00	-8.16
126.03	S	Peak	41.39	-14.16	27.23	43.50	-16.27
183.26	S	Peak	40.37	-14.89	25.48	43.50	-18.02
451.95	S	Peak	31.47	-10.01	21.46	46.00	-24.54
533.43	S	Peak	42.30	-8.92	33.38	46.00	-12.62
623.64	S	Peak	30.71	-7.05	23.66	46.00	-22.34
1598.00	S	Peak	45.25	0.31	45.56	74.00	-28.44
4874.00	H	Peak	39.56	10.12	49.68	74.00	-24.32
4991.00	S	Peak	41.20	10.23	51.43	74.00	-22.57
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
31.94	S	Peak	46.37	-14.30	32.07	40.00	-7.93
183.26	S	Peak	43.73	-14.89	28.84	43.50	-14.66
369.50	S	Peak	40.92	-11.44	29.48	46.00	-16.52
533.43	S	Peak	36.44	-8.92	27.52	46.00	-18.48
773.99	S	Peak	36.85	-4.55	32.30	46.00	-13.70
797.27	S	Peak	35.56	-4.24	31.32	46.00	-14.68
1598.00	S	Peak	49.86	0.88	50.74	74.00	-23.26
4874.00	H	Peak	38.43	10.07	48.50	74.00	-25.50
4997.50	S	Peak	39.87	10.08	49.95	74.00	-24.05
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
31.94	S	Peak	46.87	-14.30	32.57	40.00	-7.43
126.03	S	Peak	41.46	-14.16	27.30	43.50	-16.20
183.26	S	Peak	40.07	-14.89	25.18	43.50	-18.32
533.43	S	Peak	43.56	-8.92	34.64	46.00	-11.36
623.64	S	Peak	31.03	-7.05	23.98	46.00	-22.02
799.21	S	Peak	29.16	-4.21	24.95	46.00	-21.05
1598.00	S	Peak	43.57	0.31	43.88	74.00	-30.12
4924.00	H	Peak	41.25	9.95	51.20	74.00	-22.80
4991.00	S	Peak	41.38	10.23	51.61	74.00	-22.39
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11b	Test Date	:2012-06-05
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	45.12	-14.24	30.88	40.00	-9.12
183.26	S	Peak	43.54	-14.89	28.65	43.50	-14.85
263.77	S	Peak	41.02	-13.60	27.42	46.00	-18.58
365.62	S	Peak	40.38	-11.49	28.89	46.00	-17.11
533.43	S	Peak	37.86	-8.92	28.94	46.00	-17.06
800.18	S	Peak	34.90	-4.19	30.71	46.00	-15.29
1598.00	S	Peak	50.49	0.88	51.37	74.00	-22.63
4924.00	H	Peak	38.13	9.84	47.97	74.00	-26.03
4991.00	S	Peak	39.59	10.04	49.63	74.00	-24.37
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11g)

Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	46.22	-14.24	31.98	40.00	-8.02
126.03	S	Peak	41.45	-14.16	27.29	43.50	-16.21
183.26	S	Peak	40.06	-14.89	25.17	43.50	-18.33
533.43	S	Peak	42.28	-8.92	33.36	46.00	-12.64
623.64	S	Peak	30.61	-7.05	23.56	46.00	-22.44
949.56	S	Peak	27.89	-2.10	25.79	46.00	-20.21
1598.00	S	Peak	46.98	0.31	47.29	74.00	-26.71
4824.00	H	Peak	37.49	9.56	47.05	74.00	-26.95
4991.00	S	Peak	41.31	10.23	51.54	74.00	-22.46
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	44.58	-14.24	30.34	40.00	-9.66
183.26	S	Peak	43.14	-14.89	28.25	43.50	-15.25
366.59	S	Peak	41.14	-11.48	29.66	46.00	-16.34
533.43	S	Peak	38.62	-8.92	29.70	46.00	-16.30
799.21	S	Peak	36.23	-4.21	32.02	46.00	-13.98
991.27	S	Peak	30.06	-1.89	28.17	54.00	-25.83
1598.00	S	Peak	48.13	0.88	49.01	74.00	-24.99
4824.00	H	Peak	37.26	9.57	46.83	74.00	-27.17
4978.00	S	Peak	39.99	9.98	49.97	74.00	-24.03
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	46.64	-14.24	32.40	40.00	-7.60
126.03	S	Peak	41.44	-14.16	27.28	43.50	-16.22
175.50	S	Peak	38.49	-13.90	24.59	43.50	-18.91
533.43	S	Peak	41.69	-8.92	32.77	46.00	-13.23
623.64	S	Peak	30.92	-7.05	23.87	46.00	-22.13
803.09	S	Peak	29.70	-4.15	25.55	46.00	-20.45
1598.00	S	Peak	44.47	0.31	44.78	74.00	-29.22
4874.00	H	Peak	37.94	10.12	48.06	74.00	-25.94
4997.50	S	Peak	41.15	10.28	51.43	74.00	-22.57
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	46.19	-14.24	31.95	40.00	-8.05
213.33	S	Peak	43.87	-15.64	28.23	43.50	-15.27
353.98	S	Peak	39.34	-11.63	27.71	46.00	-18.29
533.43	S	Peak	36.56	-8.92	27.64	46.00	-18.36
765.26	S	Peak	36.13	-4.70	31.43	46.00	-14.57
960.23	S	Peak	29.09	-2.06	27.03	54.00	-26.97
1598.00	S	Peak	48.23	0.88	49.11	74.00	-24.89
4874.00	H	Peak	38.14	10.07	48.21	74.00	-25.79
4978.00	S	Peak	40.48	9.98	50.46	74.00	-23.54
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
31.94	S	Peak	45.65	-14.30	31.35	40.00	-8.65
126.03	S	Peak	42.72	-14.16	28.56	43.50	-14.94
175.50	S	Peak	38.61	-13.90	24.71	43.50	-18.79
533.43	S	Peak	43.48	-8.92	34.56	46.00	-11.44
623.64	S	Peak	30.77	-7.05	23.72	46.00	-22.28
888.45	S	Peak	29.12	-3.04	26.08	46.00	-19.92
1598.00	S	Peak	46.88	0.31	47.19	74.00	-26.81
4924.00	H	Peak	41.06	9.95	51.01	74.00	-22.99
4978.00	S	Peak	41.81	10.15	51.96	74.00	-22.04
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11g	Test Date	:2012-06-05
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
31.94	S	Peak	45.31	-14.30	31.01	40.00	-8.99
207.51	S	Peak	43.44	-15.90	27.54	43.50	-15.96
366.59	S	Peak	39.09	-11.48	27.61	46.00	-18.39
533.43	S	Peak	36.92	-8.92	28.00	46.00	-18.00
756.53	S	Peak	35.45	-4.86	30.59	46.00	-15.41
914.64	S	Peak	29.40	-2.53	26.87	46.00	-19.13
1598.00	S	Peak	49.41	0.88	50.29	74.00	-23.71
4924.00	H	Peak	39.36	9.84	49.20	74.00	-24.80
4978.00	S	Peak	40.15	9.98	50.13	74.00	-23.87
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11n_20M)

Operation Band	:802.11n20M	Test Date	:2012-06-05
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	46.18	-14.33	31.85	40.00	-8.15
125.06	S	Peak	41.40	-14.23	27.17	43.50	-16.33
183.26	S	Peak	38.84	-14.89	23.95	43.50	-19.55
533.43	S	Peak	42.63	-8.92	33.71	46.00	-12.29
623.64	S	Peak	31.19	-7.05	24.14	46.00	-21.86
942.77	S	Peak	27.93	-2.16	25.77	46.00	-20.23
1598.00	S	Peak	41.43	0.31	41.74	74.00	-32.26
4824.00	H	Peak	38.56	9.63	48.19	74.00	-25.81
4978.00	S	Peak	41.22	10.15	51.37	74.00	-22.63
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2412 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	43.22	-14.33	28.89	40.00	-11.11
183.26	S	Peak	42.15	-14.89	27.26	43.50	-16.24
394.72	S	Peak	38.24	-11.14	27.10	46.00	-18.90
533.43	S	Peak	36.94	-8.92	28.02	46.00	-17.98
623.64	S	Peak	32.73	-7.05	25.68	46.00	-20.32
800.18	S	Peak	36.17	-4.19	31.98	46.00	-14.02
1598.00	S	Peak	50.75	0.88	51.63	74.00	-22.37
4824.00	H	Peak	38.99	9.57	48.56	74.00	-25.44
4991.00	S	Peak	40.12	10.04	50.16	74.00	-23.84
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2437 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	47.08	-14.24	32.84	40.00	-7.16
126.03	S	Peak	40.91	-14.16	26.75	43.50	-16.75
175.50	S	Peak	38.19	-13.90	24.29	43.50	-19.21
533.43	S	Peak	43.66	-8.92	34.74	46.00	-11.26
623.64	S	Peak	31.17	-7.05	24.12	46.00	-21.88
966.05	S	Peak	27.60	-2.03	25.57	54.00	-28.43
1598.00	S	Peak	45.19	0.31	45.50	74.00	-28.50
4874.00	H	Peak	38.82	10.12	48.94	74.00	-25.06
4984.50	S	Peak	41.23	10.19	51.42	74.00	-22.58
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2437 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	45.37	-14.24	31.13	40.00	-8.87
183.26	S	Peak	41.80	-14.89	26.91	43.50	-16.59
372.41	S	Peak	38.92	-11.39	27.53	46.00	-18.47
533.43	S	Peak	38.34	-8.92	29.42	46.00	-16.58
623.64	S	Peak	31.36	-7.05	24.31	46.00	-21.69
798.24	S	Peak	34.92	-4.22	30.70	46.00	-15.30
1598.00	S	Peak	49.24	0.88	50.12	74.00	-23.88
4874.00	H	Peak	39.30	10.07	49.37	74.00	-24.63
4984.50	S	Peak	39.40	10.01	49.41	74.00	-24.59
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	46.65	-14.24	32.41	40.00	-7.59
126.03	S	Peak	41.08	-14.16	26.92	43.50	-16.58
175.50	S	Peak	38.14	-13.90	24.24	43.50	-19.26
533.43	S	Peak	43.59	-8.92	34.67	46.00	-11.33
623.64	S	Peak	31.17	-7.05	24.12	46.00	-21.88
800.18	S	Peak	29.03	-4.19	24.84	46.00	-21.16
1598.00	S	Peak	44.07	0.31	44.38	74.00	-29.62
4924.00	H	Peak	41.03	9.95	50.98	74.00	-23.02
4997.50	S	Peak	41.54	10.28	51.82	74.00	-22.18
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band :802.11n20M Test Date :2012-06-05
Fundamental Frequency :2462 MHz Temp./Humi. :24.8 deg_C / 67 RH
Operation Mode :TX Engineer :Marcus
EUT Pol. :E2 plan Measurement Antenna Pol. :HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	46.71	-14.24	32.47	40.00	-7.53
183.26	S	Peak	42.19	-14.89	27.30	43.50	-16.20
384.05	S	Peak	37.31	-11.23	26.08	46.00	-19.92
533.43	S	Peak	37.61	-8.92	28.69	46.00	-17.31
623.64	S	Peak	32.71	-7.05	25.66	46.00	-20.34
749.74	S	Peak	35.26	-4.96	30.30	46.00	-15.70
1598.00	S	Peak	47.40	0.88	48.28	74.00	-25.72
4924.00	H	Peak	40.15	9.84	49.99	74.00	-24.01
4978.00	S	Peak	39.96	9.98	49.94	74.00	-24.06
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11a)

Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5745 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	49.65	-14.24	35.41	40.00	-4.59
126.03	S	Peak	39.89	-14.16	25.73	43.50	-17.77
175.50	S	Peak	39.63	-13.90	25.73	43.50	-17.77
533.43	S	Peak	43.92	-8.92	35.00	46.00	-11.00
623.64	S	Peak	30.91	-7.05	23.86	46.00	-22.14
804.06	S	Peak	30.78	-4.14	26.64	46.00	-19.36
1598.00	S	Peak	45.56	0.31	45.87	74.00	-28.13
11490.00	H	Peak	17.20	20.87	38.07	74.00	-35.93
17235.00	H	---					
22980.00	H	---					

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Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5745 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	49.55	-14.24	35.31	40.00	-4.69
181.32	S	Peak	41.82	-14.68	27.14	43.50	-16.36
373.38	S	Peak	38.32	-11.37	26.95	46.00	-19.05
533.43	S	Peak	32.79	-8.92	23.87	46.00	-22.13
623.64	S	Peak	30.36	-7.05	23.31	46.00	-22.69
799.21	S	Peak	37.68	-4.21	33.47	46.00	-12.53
1598.00	S	Peak	42.28	0.88	43.16	74.00	-30.84
11490.00	H	Peak	17.79	20.67	38.46	74.00	-35.54
17235.00	H	---					
22980.00	H	---					

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Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5785 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	49.39	-14.24	35.15	40.00	-4.85
137.67	S	Peak	36.38	-13.28	23.10	43.50	-20.40
198.78	S	Peak	41.21	-16.05	25.16	43.50	-18.34
533.43	S	Peak	36.42	-8.92	27.50	46.00	-18.50
623.64	S	Peak	32.28	-7.05	25.23	46.00	-20.77
804.06	S	Peak	36.66	-4.14	32.52	46.00	-13.48
1598.00	S	Peak	40.44	0.31	40.75	74.00	-33.25
11570.00	H	Peak	17.63	20.94	38.57	74.00	-35.43
17355.00	H	---					
23140.00	H	---					

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Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5785 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	48.34	-14.24	34.10	40.00	-5.90
182.29	S	Peak	41.90	-14.78	27.12	43.50	-16.38
409.27	S	Peak	38.20	-10.87	27.33	46.00	-18.67
533.43	S	Peak	31.57	-8.92	22.65	46.00	-23.35
623.64	S	Peak	30.82	-7.05	23.77	46.00	-22.23
755.56	S	Peak	37.80	-4.88	32.92	46.00	-13.08
1598.00	S	Peak	41.67	0.88	42.55	74.00	-31.45
11570.00	H	Peak	16.92	20.74	37.66	74.00	-36.34
17355.00	H	---					
23140.00	H	---					

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Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5825 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	51.00	-14.24	36.76	40.00	-3.24
137.67	S	Peak	36.03	-13.28	22.75	43.50	-20.75
198.78	S	Peak	42.39	-16.05	26.34	43.50	-17.16
533.43	S	Peak	35.58	-8.92	26.66	46.00	-19.34
623.64	S	Peak	30.80	-7.05	23.75	46.00	-22.25
798.24	S	Peak	29.57	-4.22	25.35	46.00	-20.65
1598.00	S	Peak	39.89	0.31	40.20	74.00	-33.80
11650.00	H	Peak	16.85	20.81	37.66	74.00	-36.34
17475.00	H	---					
23300.00	H	---					

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Operation Band	:802.11a	Test Date	:2012-06-08
Fundamental Frequency	:5825 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	49.82	-14.24	35.58	40.00	-4.42
184.23	S	Peak	43.48	-15.00	28.48	43.50	-15.02
399.57	S	Peak	38.87	-11.06	27.81	46.00	-18.19
533.43	S	Peak	34.09	-8.92	25.17	46.00	-20.83
623.64	S	Peak	32.27	-7.05	25.22	46.00	-20.78
800.18	S	Peak	36.50	-4.19	32.31	46.00	-13.69
1598.00	S	Peak	45.30	0.88	46.18	74.00	-27.82
11650.00	H	Peak	16.22	20.61	36.83	74.00	-37.17
17475.00	H	---					
23300.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11n(5GHz)_20M)

Operation Band :802.11n 20M Test Date :2012-06-08
 Fundamental Frequency :5745 MHz Temp./Humi. :24.8 deg_C / 67 RH
 Operation Mode :TX LOW Engineer :Marcus
 EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
143.49	S	Peak	28.89	-12.82	16.07	43.50	-27.43
240.49	S	Peak	29.05	-14.19	14.86	46.00	-31.14
533.43	S	Peak	41.95	-8.92	33.03	46.00	-12.97
623.64	S	Peak	33.69	-7.05	26.64	46.00	-19.36
759.44	S	Peak	30.53	-4.81	25.72	46.00	-20.28
799.21	S	Peak	37.34	-4.21	33.13	46.00	-12.87
1598.00	S	Peak	40.91	0.31	41.22	74.00	-32.78
11490.00	H	Peak	17.12	20.87	37.99	74.00	-36.01
17235.00	H	---					
22980.00	H	---					

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Operation Band	:802.11n 20M	Test Date	:2012-06-08
Fundamental Frequency	:5745 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
137.67	S	Peak	32.81	-13.28	19.53	43.50	-23.97
345.25	S	Peak	34.05	-11.73	22.32	46.00	-23.68
533.43	S	Peak	32.24	-8.92	23.32	46.00	-22.68
623.64	S	Peak	33.29	-7.05	26.24	46.00	-19.76
759.44	S	Peak	35.61	-4.81	30.80	46.00	-15.20
798.24	S	Peak	42.94	-4.22	38.72	46.00	-7.28
1598.00	S	Peak	41.79	0.88	42.67	74.00	-31.33
11490.00	H	Peak	17.27	20.67	37.94	74.00	-36.06
17235.00	H	---					
22980.00	H	---					

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Operation Band	:802.11n 20M	Test Date	:2012-06-08
Fundamental Frequency	:5785 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
99.84	S	Peak	31.64	-16.84	14.80	43.50	-28.70
143.49	S	Peak	28.53	-12.82	15.71	43.50	-27.79
533.43	S	Peak	38.15	-8.92	29.23	46.00	-16.77
623.64	S	Peak	33.77	-7.05	26.72	46.00	-19.28
759.44	S	Peak	30.05	-4.81	25.24	46.00	-20.76
798.24	S	Peak	38.40	-4.22	34.18	46.00	-11.82
1591.50	S	Peak	43.26	0.21	43.47	74.00	-30.53
11570.00	H	Peak	17.39	20.94	38.33	74.00	-35.67
17355.00	H	---					
23140.00	H	---					

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Operation Band	:802.11n 20M	Test Date	:2012-06-08
Fundamental Frequency	:5785 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
276.38	S	Peak	35.49	-13.16	22.33	46.00	-23.67
533.43	S	Peak	32.15	-8.92	23.23	46.00	-22.77
623.64	S	Peak	32.91	-7.05	25.86	46.00	-20.14
759.44	S	Peak	35.28	-4.81	30.47	46.00	-15.53
798.24	S	Peak	43.37	-4.22	39.15	46.00	-6.85
897.18	S	Peak	31.40	-2.87	28.53	46.00	-17.47
1598.00	S	Peak	42.53	0.88	43.41	74.00	-30.59
11570.00	H	Peak	17.39	20.74	38.13	74.00	-35.87
17355.00	H	---					
23140.00	H	---					

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Operation Band	:802.11n 20M	Test Date	:2012-06-08
Fundamental Frequency	:5825 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
143.49	S	Peak	29.33	-12.82	16.51	43.50	-26.99
533.43	S	Peak	36.80	-8.92	27.88	46.00	-18.12
623.64	S	Peak	34.08	-7.05	27.03	46.00	-18.97
759.44	S	Peak	30.47	-4.81	25.66	46.00	-20.34
799.21	S	Peak	36.93	-4.21	32.72	46.00	-13.28
935.98	S	Peak	27.42	-2.23	25.19	46.00	-20.81
1591.50	S	Peak	39.22	0.21	39.43	74.00	-34.57
11650.00	H	Peak	16.96	20.81	37.77	74.00	-36.23
17475.00	H	---					
23300.00	H	---					

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Operation Band	:802.11n 20M	Test Date	:2012-06-08
Fundamental Frequency	:5825 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
137.67	S	Peak	33.21	-13.28	19.93	43.50	-23.57
345.25	S	Peak	33.77	-11.73	22.04	46.00	-23.96
533.43	S	Peak	33.39	-8.92	24.47	46.00	-21.53
623.64	S	Peak	33.47	-7.05	26.42	46.00	-19.58
759.44	S	Peak	34.83	-4.81	30.02	46.00	-15.98
799.21	S	Peak	45.62	-4.21	41.41	46.00	-4.59
1598.00	S	Peak	44.44	0.88	45.32	74.00	-28.68
11650.00	H	Peak	16.85	20.61	37.46	74.00	-36.54
17475.00	H	---					
23300.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11n(5GHz)_40M)

Operation Band :802.11n 40M Test Date :2012-06-08
 Fundamental Frequency :5755 MHz Temp./Humi. :24.8 deg_C / 67 RH
 Operation Mode :TX LOW Engineer :Marcus
 EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	49.65	-14.33	35.32	40.00	-4.68
137.67	S	Peak	36.85	-13.28	23.57	43.50	-19.93
198.78	S	Peak	41.72	-16.05	25.67	43.50	-17.83
533.43	S	Peak	39.17	-8.92	30.25	46.00	-15.75
623.64	S	Peak	30.60	-7.05	23.55	46.00	-22.45
792.42	S	Peak	29.56	-4.29	25.27	46.00	-20.73
1591.50	S	Peak	42.76	0.21	42.97	74.00	-31.03
11510.00	H	Peak	16.95	20.89	37.84	74.00	-36.16
17265.00	H	---					
23020.00	H	---					

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Operation Band	:802.11n 40M	Test Date	:2012-06-08
Fundamental Frequency	:5755 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	48.87	-14.33	34.54	40.00	-5.46
181.32	S	Peak	41.82	-14.68	27.14	43.50	-16.36
199.75	S	Peak	42.59	-16.10	26.49	43.50	-17.01
391.81	S	Peak	37.95	-11.15	26.80	46.00	-19.20
533.43	S	Peak	33.23	-8.92	24.31	46.00	-21.69
773.99	S	Peak	37.04	-4.55	32.49	46.00	-13.51
1598.00	S	Peak	41.11	0.88	41.99	74.00	-32.01
11510.00	H	Peak	17.29	20.69	37.98	74.00	-36.02
17265.00	H	---					
23020.00	H	---					

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Operation Band	:802.11n 40M	Test Date	:2012-06-08
Fundamental Frequency	:5795 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
30.97	S	Peak	48.78	-14.33	34.45	40.00	-5.55
137.67	S	Peak	37.16	-13.28	23.88	43.50	-19.62
198.78	S	Peak	40.44	-16.05	24.39	43.50	-19.11
533.43	S	Peak	36.44	-8.92	27.52	46.00	-18.48
623.64	S	Peak	31.10	-7.05	24.05	46.00	-21.95
798.24	S	Peak	31.67	-4.22	27.45	46.00	-18.55
1598.00	S	Peak	38.60	0.31	38.91	74.00	-35.09
11590.00	H	Peak	17.60	20.91	38.51	74.00	-35.49
17385.00	H	---					
23180.00	H	---					

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Operation Band	:802.11n 40M	Test Date	:2012-06-08
Fundamental Frequency	:5795 MHz	Temp./Humi.	:24.8 deg_C / 67 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
32.91	S	Peak	49.36	-14.24	35.12	40.00	-4.88
178.41	S	Peak	41.55	-14.31	27.24	43.50	-16.26
409.27	S	Peak	38.47	-10.87	27.60	46.00	-18.40
533.43	S	Peak	32.31	-8.92	23.39	46.00	-22.61
623.64	S	Peak	31.95	-7.05	24.90	46.00	-21.10
780.78	S	Peak	36.61	-4.44	32.17	46.00	-13.83
1598.00	S	Peak	43.07	0.88	43.95	74.00	-30.05
11590.00	H	Peak	17.61	20.71	38.32	74.00	-35.68
17385.00	H	---					
23180.00	H	---					

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11 PEAK POWER SPECTRAL DENSITY

11.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 8, §A8.2(b) The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0 second duration.

11.2 Measurement Equipment Used:

Refer to section 7.2 for details.

11.3 Test Set-up:

Refer to section 7.3 for details.

11.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

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11.5 Measurement Result:

802.11b

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-13.29	-13.29	8
2437	-13.74	-13.74	8
2462	-12.13	-12.13	8

802.11g

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-12.45	-12.45	8
2437	-11.87	-11.87	8
2462	-9.30	-9.30	8

802.11n_20M

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-11.71	-11.71	8
2437	-11.12	-11.12	8
2462	-11.29	-11.29	8

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802.11a

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
5745	-16.85	-16.85	8
5785	-23.67	-23.67	8
5825	-16.18	-16.18	8

802.11n (5GHz)_20M

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
5745	-15.85	-15.85	8
5785	-14.76	-14.76	8
5825	-15.70	-15.70	8

802.11 n (5GHz)_40M

Frequency MHz	RF Power Density Reading (dBm)	RF Power Density Level (dBm)	Maximum Limit (dBm)
5755	-17.28	-17.28	8
5795	-17.75	-17.75	8

**Offset 11.1 dB for 2.4G*

11.4 dB for 5G

Note: Refer to next page for plots.

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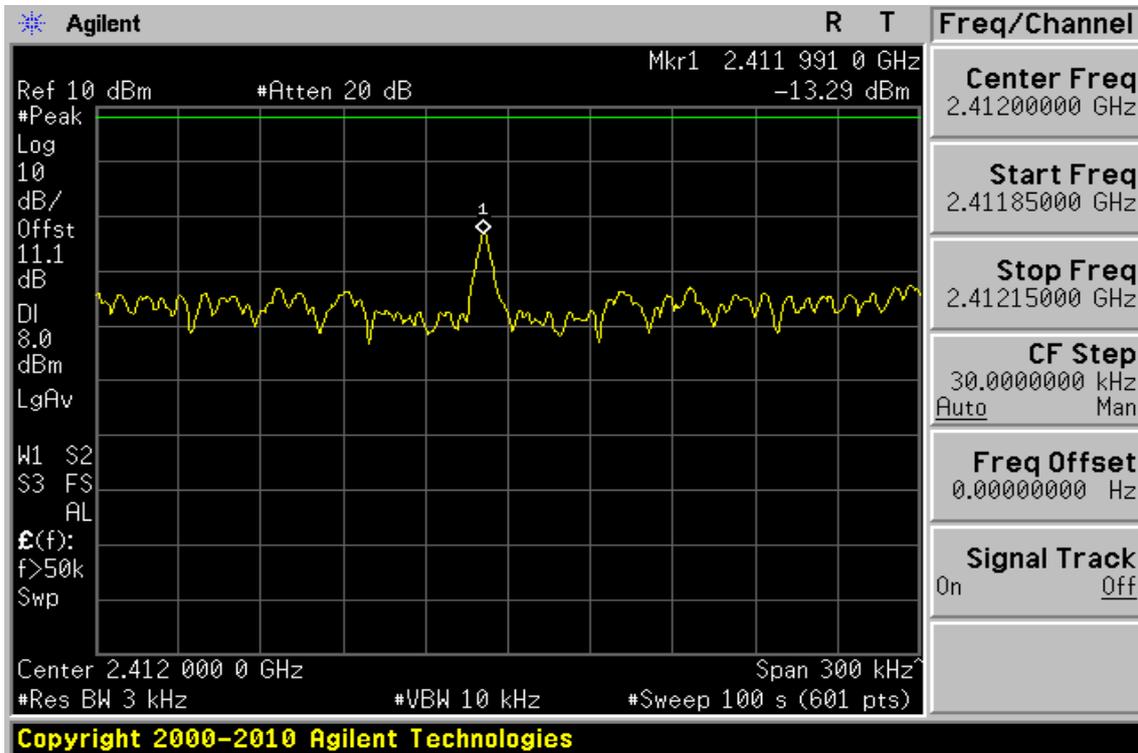
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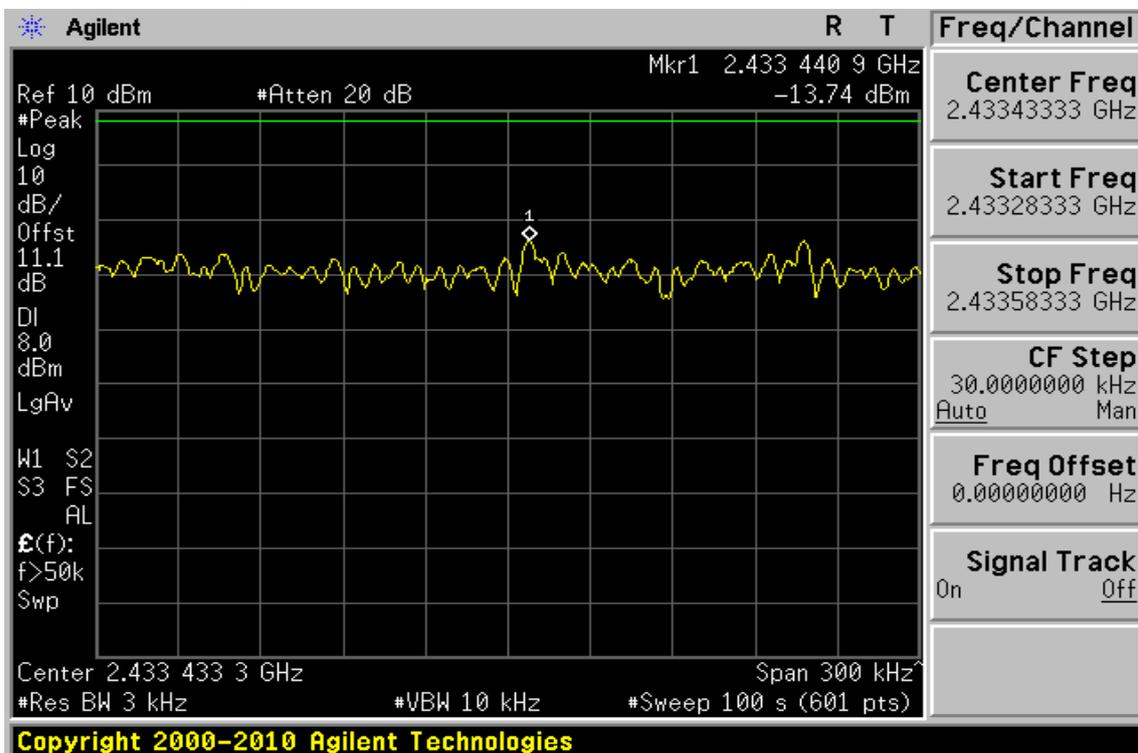
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802.11b

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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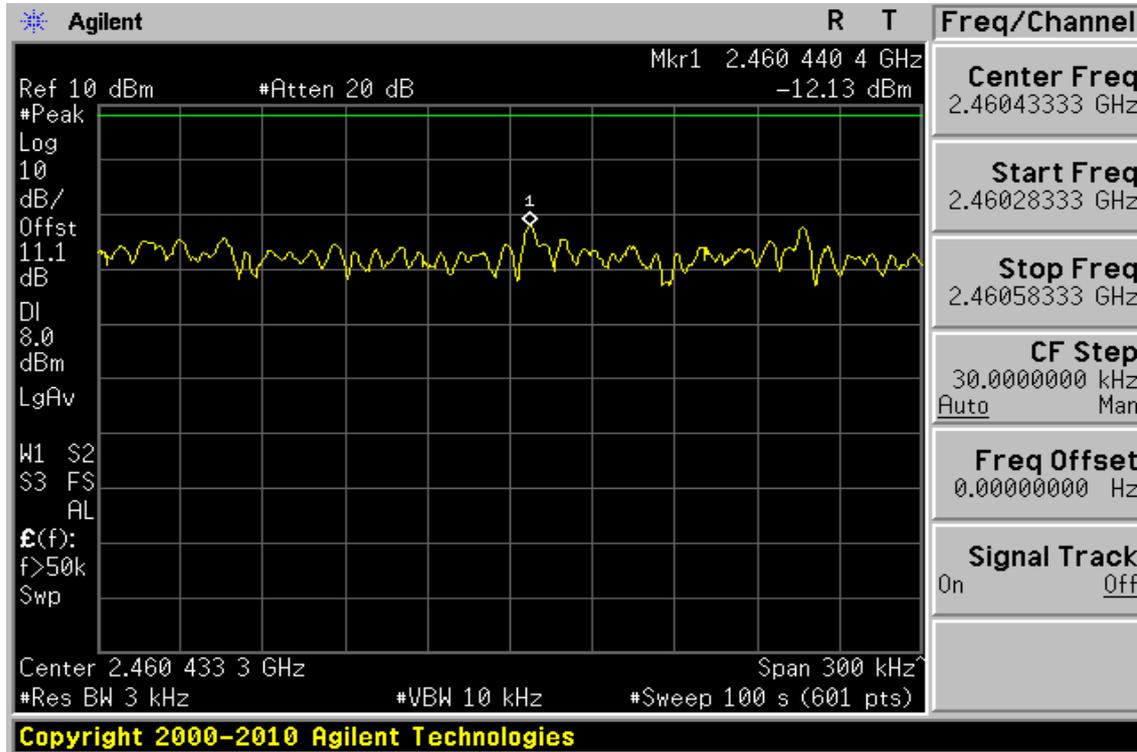
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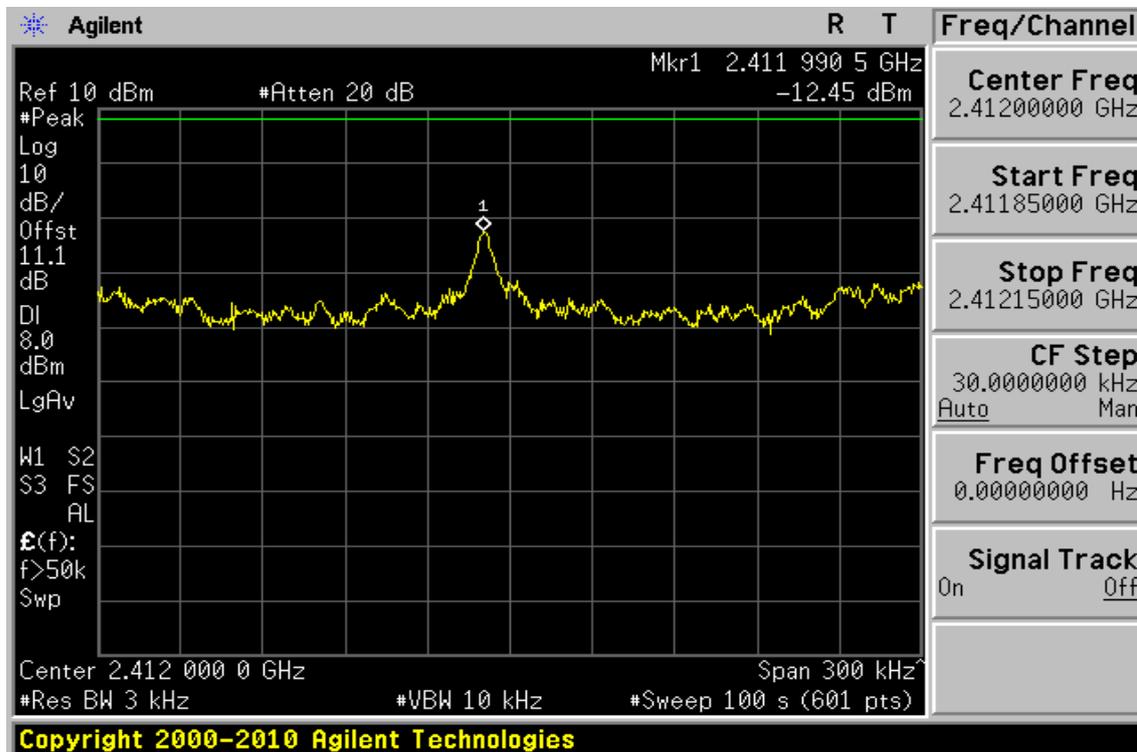
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Power Spectral Density Test Plot (CH-High)



802.11g

Power Spectral Density Test Plot (CH-Low)



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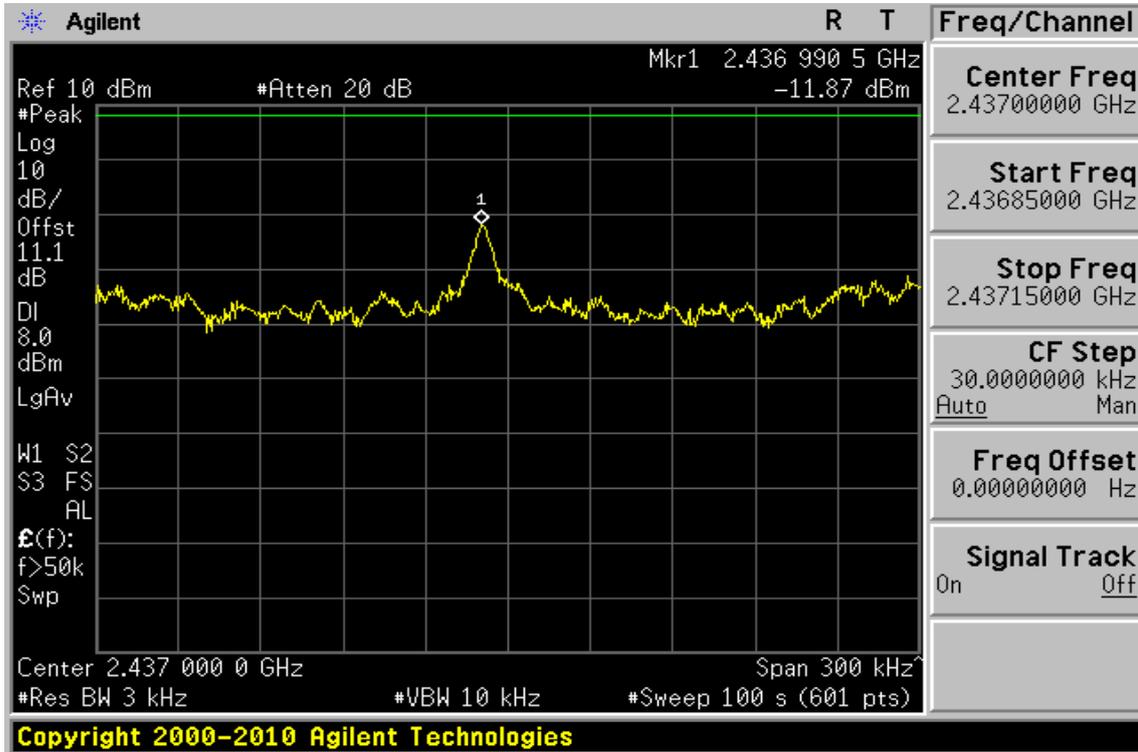
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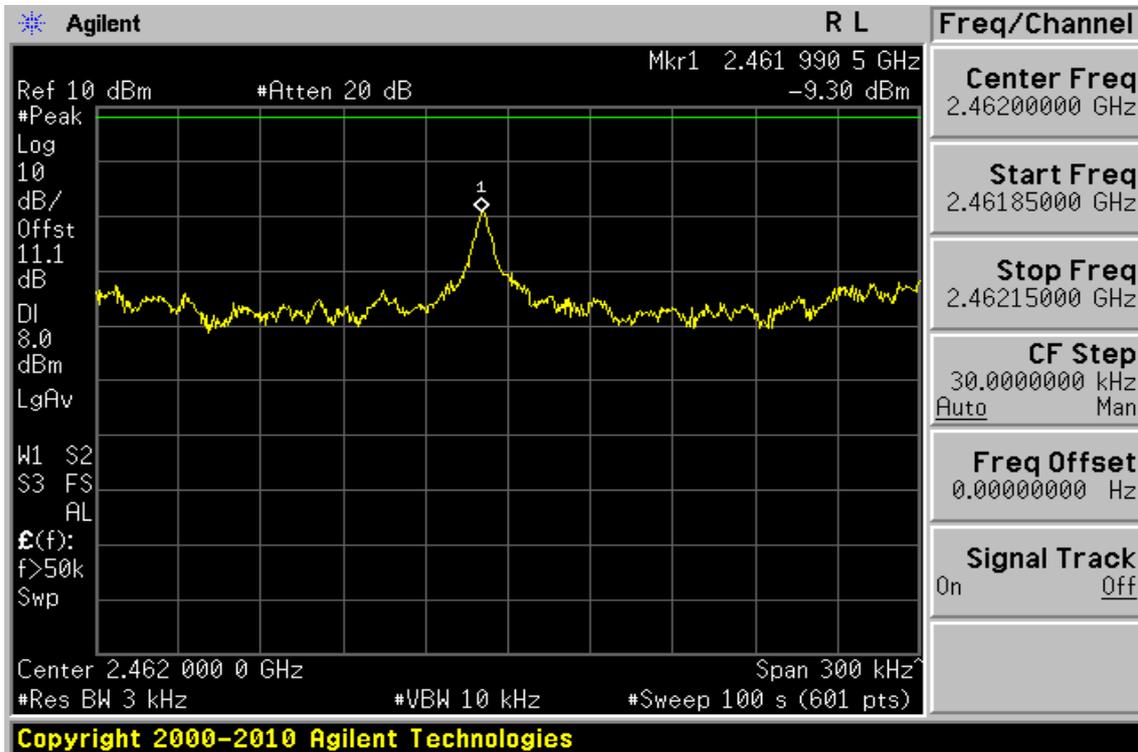
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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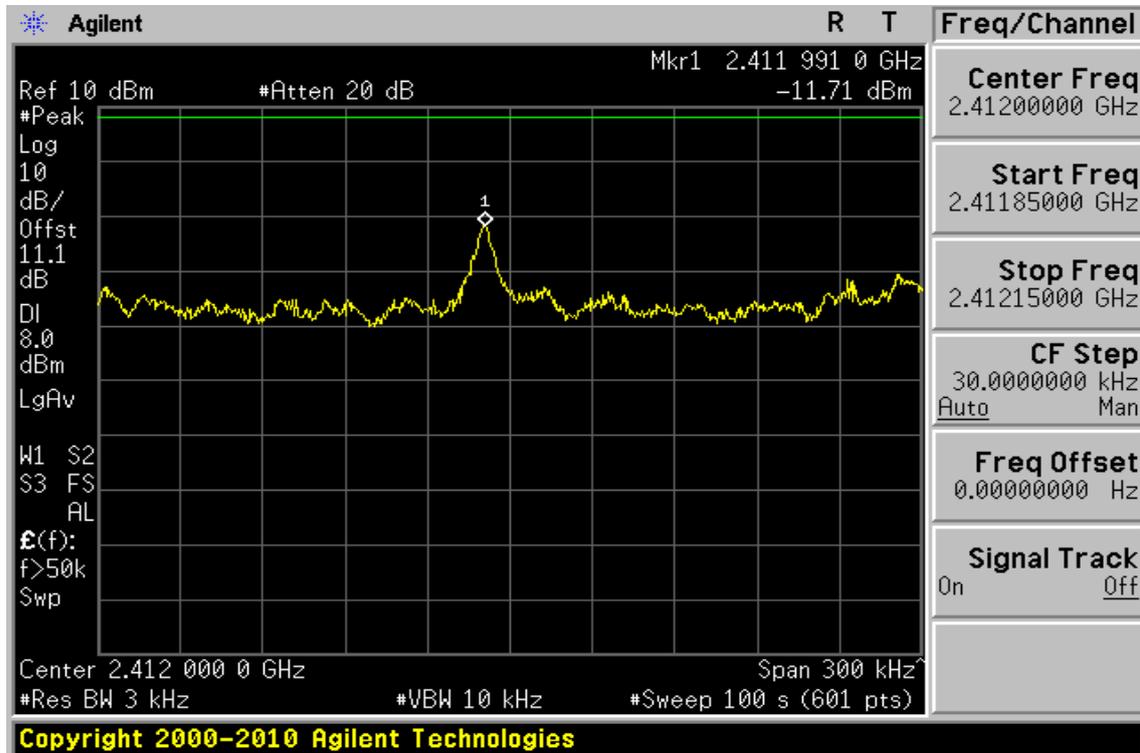
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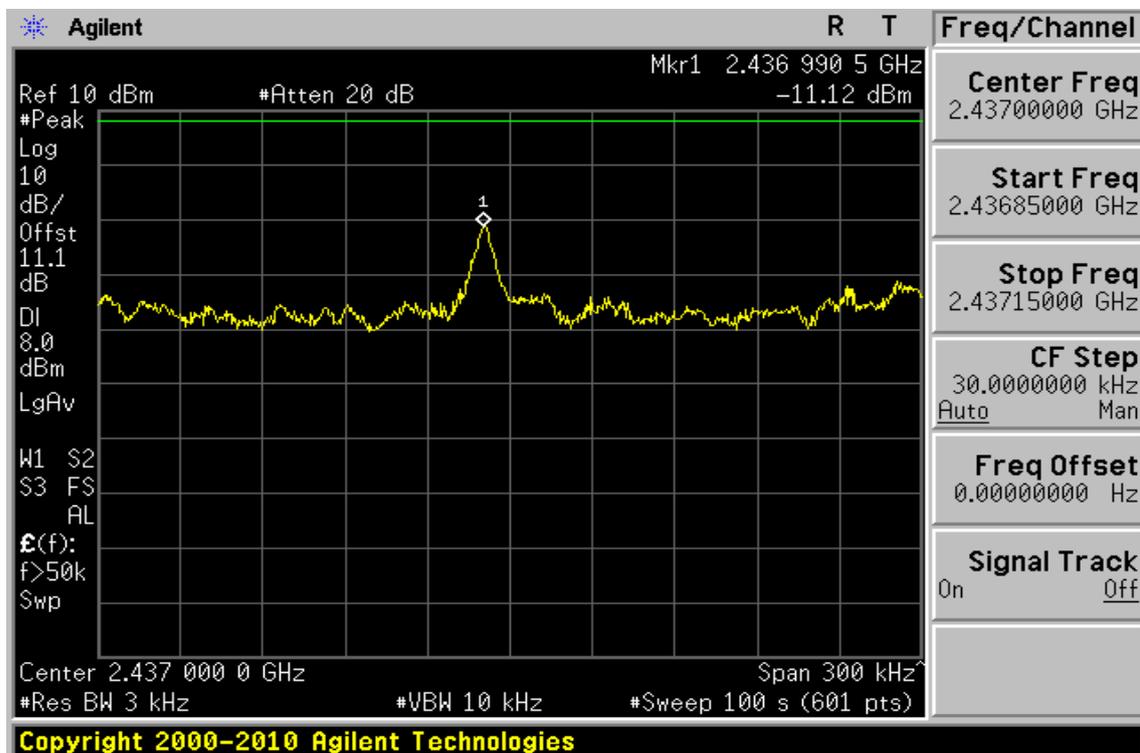
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802.11n_20M

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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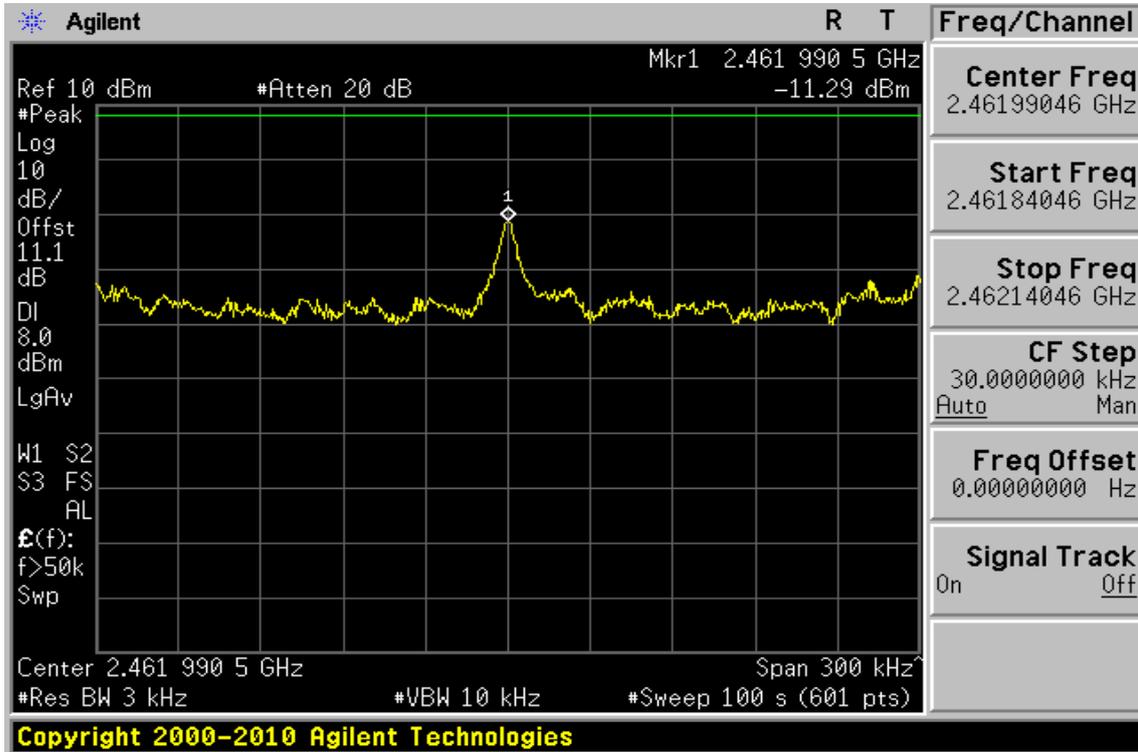
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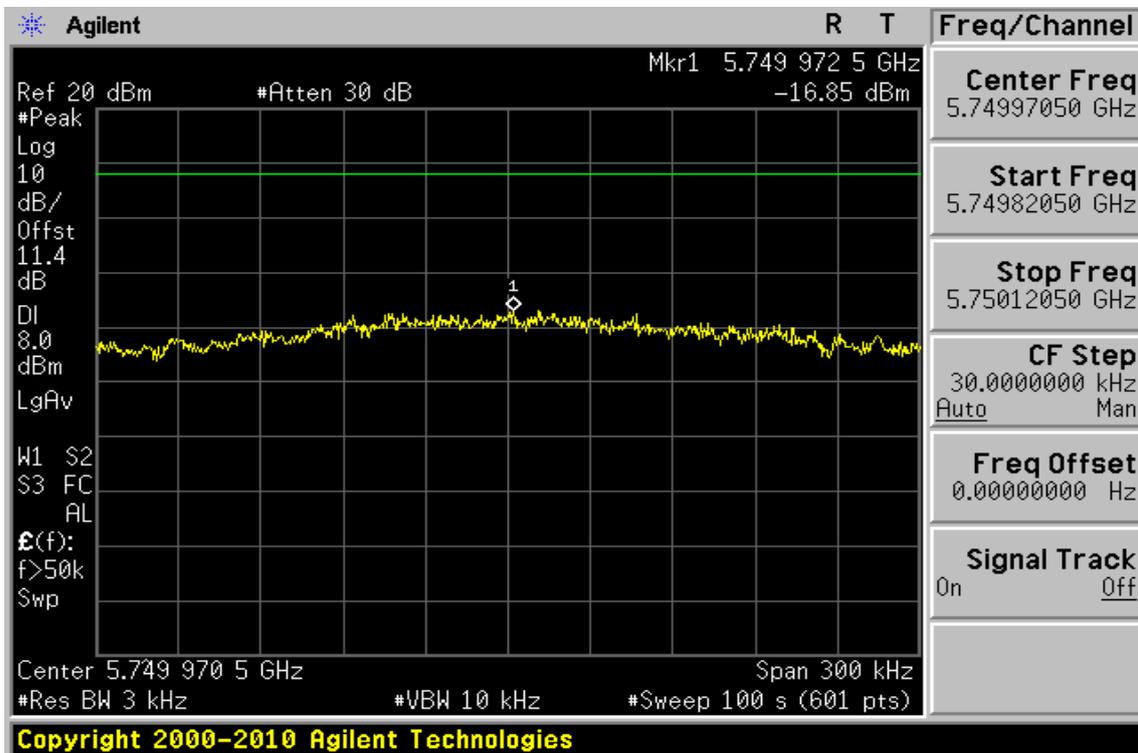
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Power Spectral Density Test Plot (CH-High)



802.11a

Power Spectral Density Test Plot (CH-Low)



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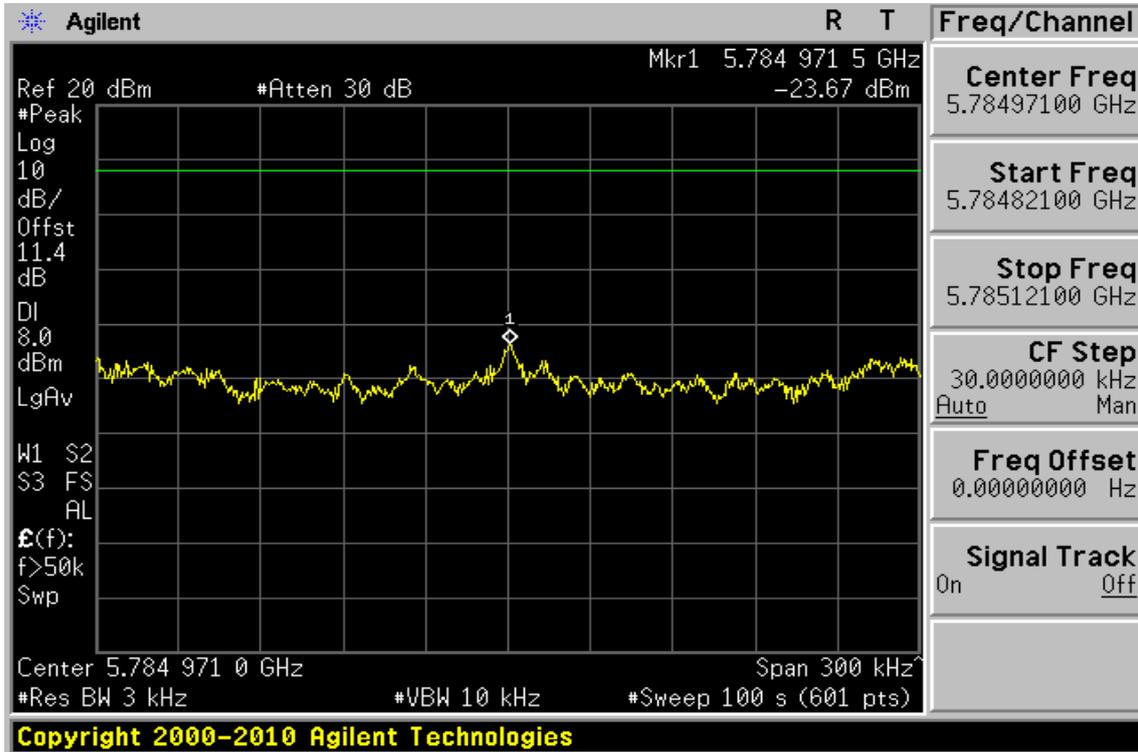
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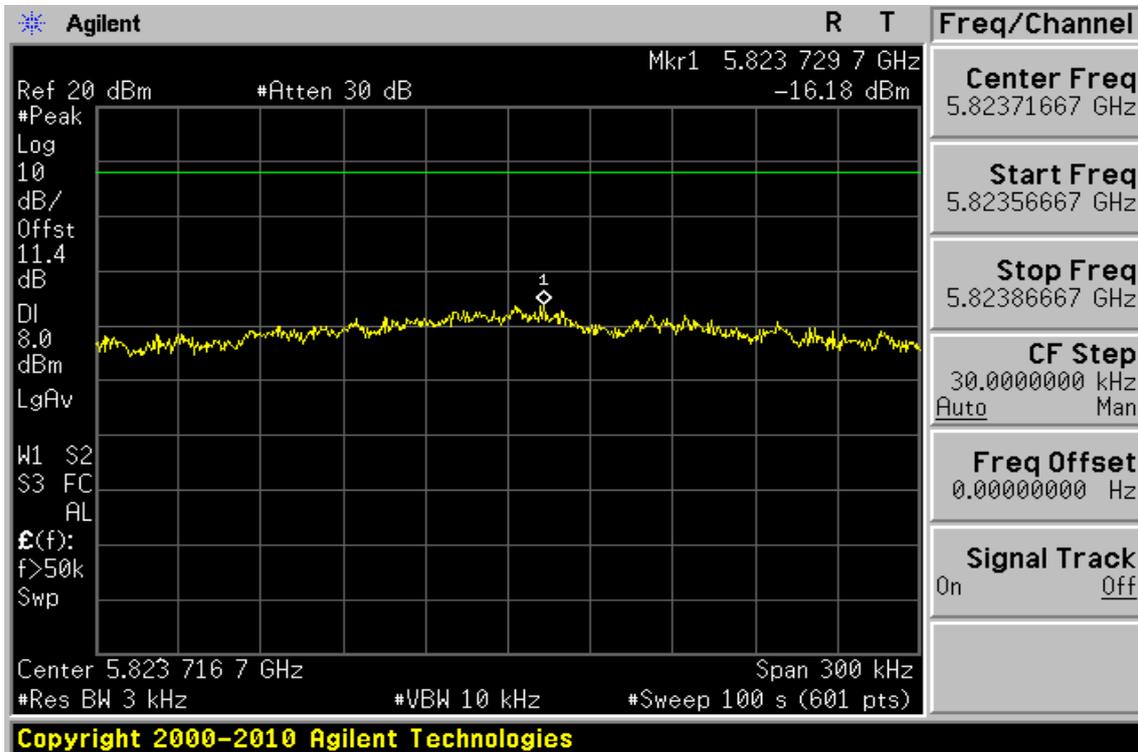
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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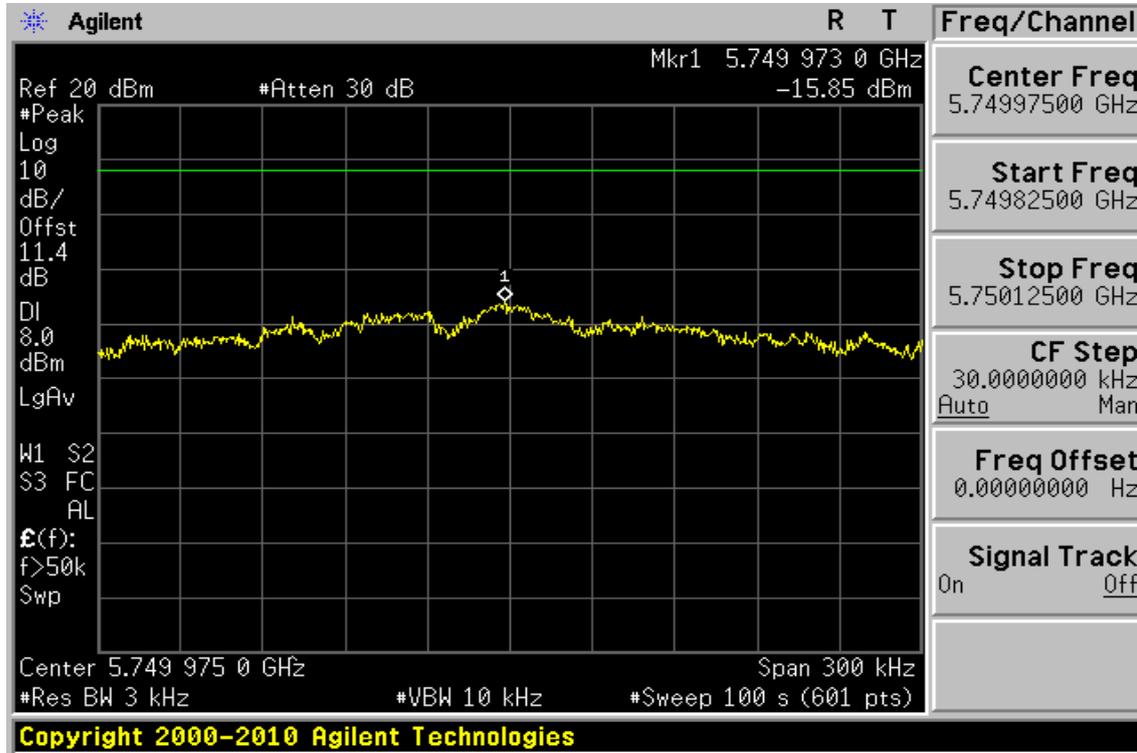
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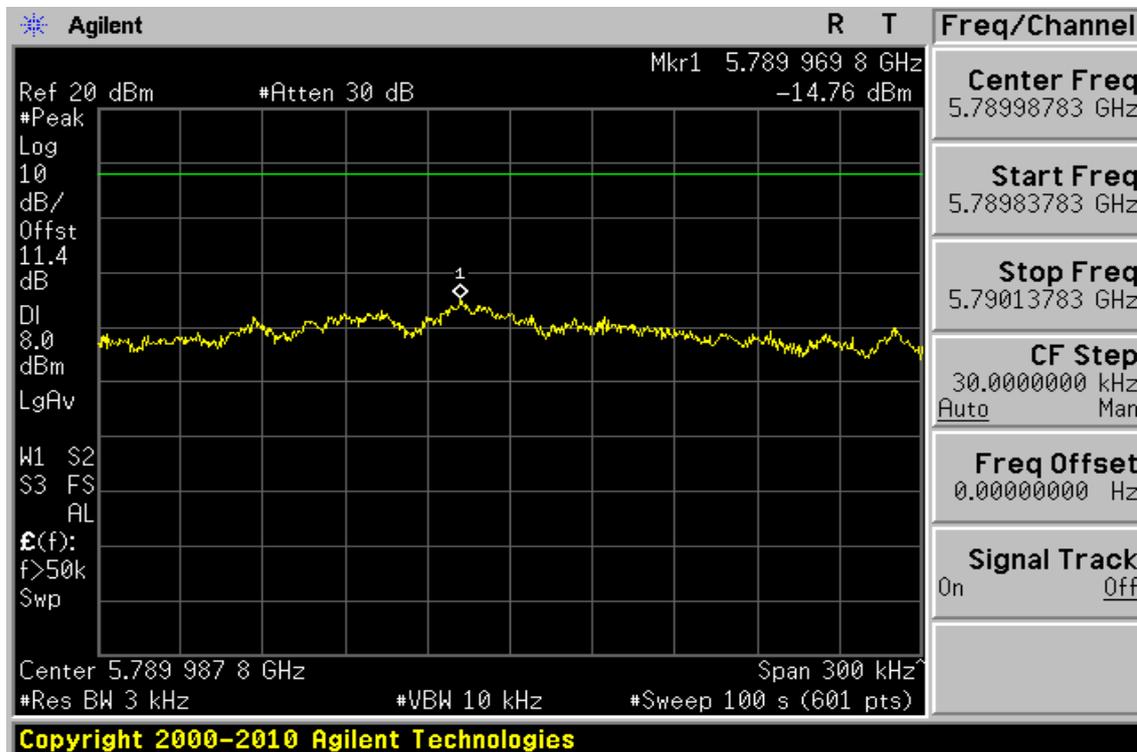
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802.11n (5GHz)_20M

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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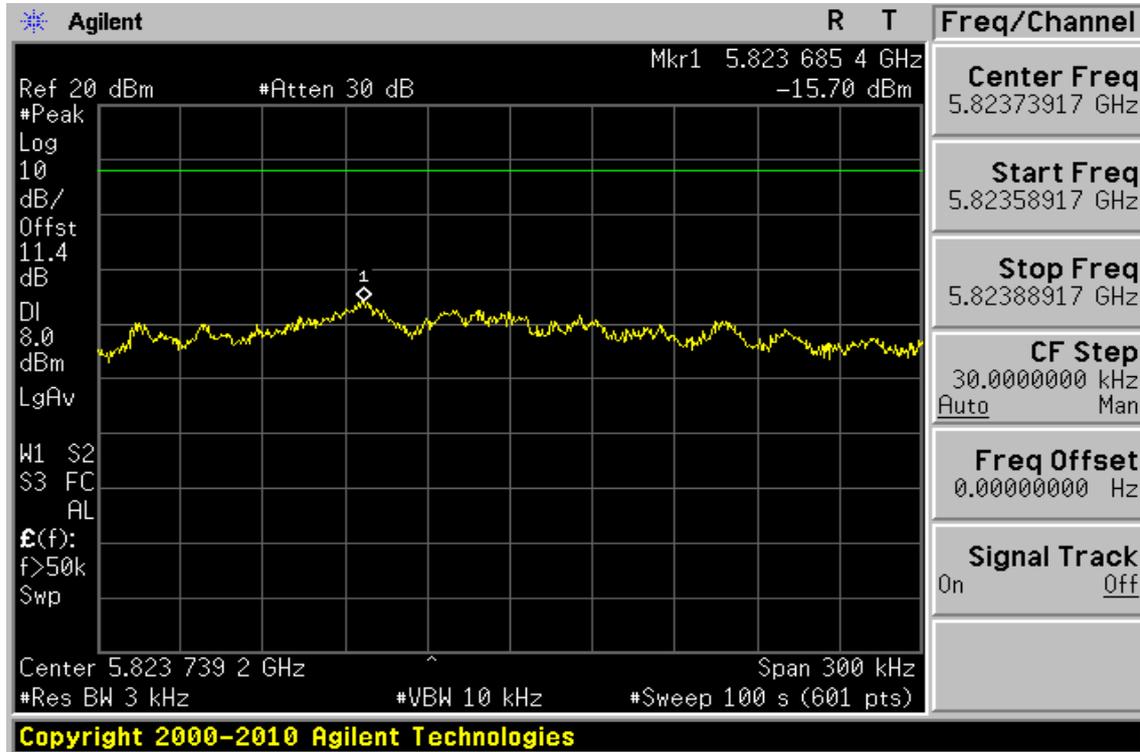
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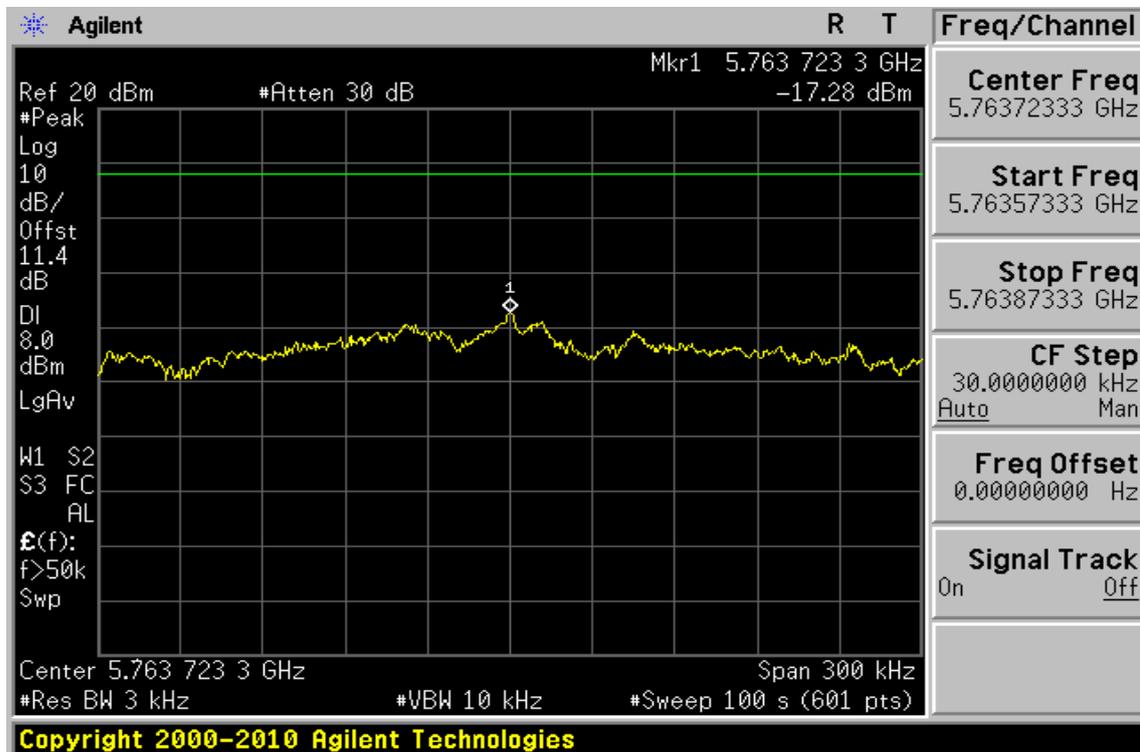
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Power Spectral Density Test Plot (CH-High)



802.11n (5GHz)_40M

Power Spectral Density Test Plot (CH-Low)



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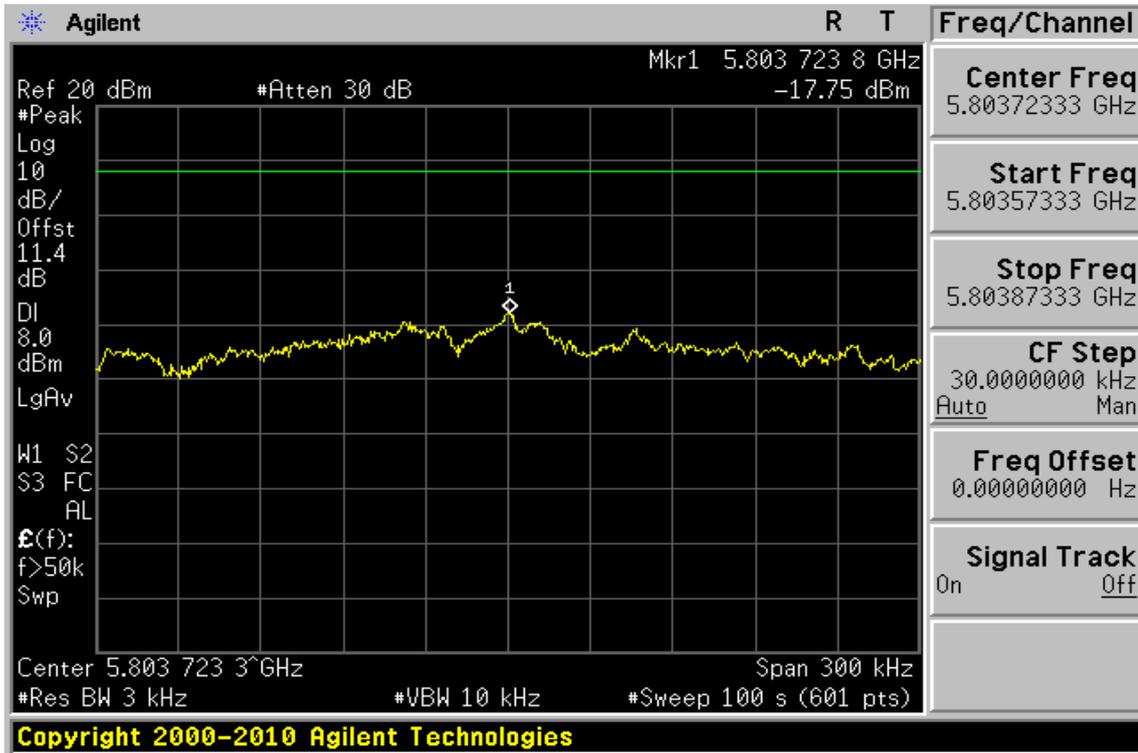
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Power Spectral Density Test Plot (CH-High)



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12 ANTENNA REQUIREMENT

12.1 Standard Applicable:

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

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When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 2.85 dBi, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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13 99% BANDWIDTH MEASUREMENT

13.1 Standard Applicable:

RSS-Gen §4.6.1, the transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

13.2 Measurement Equipment Used:

Refer to section 7.2 for details.

13.3 Test Set-up:

Refer to section 7.3 for details.

13.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=1% of the Span, VBW = 3 times RBW, Span= 50MHz.
4. Turn on the 99% bandwidth function, max reading..
5. Repeat above procedures until all frequency measured were complete.

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13.5 Measurement Result:

802.11b

Frequency MHz	99%Bandwidth (MHz)
2412	13.7406
2437	13.7474
2462	13.7470

802.11g

Frequency MHz	99%Bandwidth (MHz)
2412	17.2896
2437	17.2351
2462	17.3706

802.11n_20M

Frequency MHz	99%Bandwidth (MHz)
2412	18.3841
2437	18.3895
2462	18.3496

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802.11a

Frequency MHz	99%Bandwidth (MHz)
5745	16.8493
5785	16.8705
5825	17.0591

802.11n (5GHz)_20M

Frequency MHz	99%Bandwidth (MHz)
5745	18.0000
5785	18.0737
5825	18.1347

802.11n (5GHz)_40M

Frequency MHz	99%Bandwidth (MHz)
5755	36.2846
5795	36.2197

**Offset 11.1 dB for 2.4G
11.4 dB for 5G*

Note: Refer to next page for plots.

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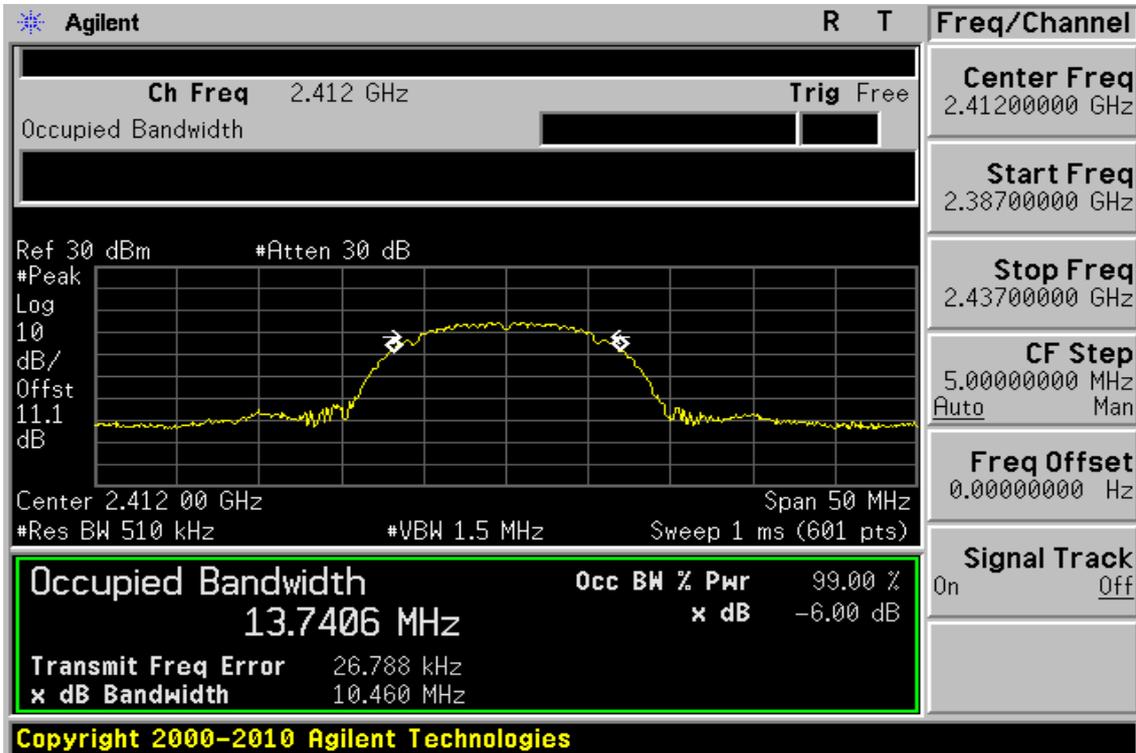
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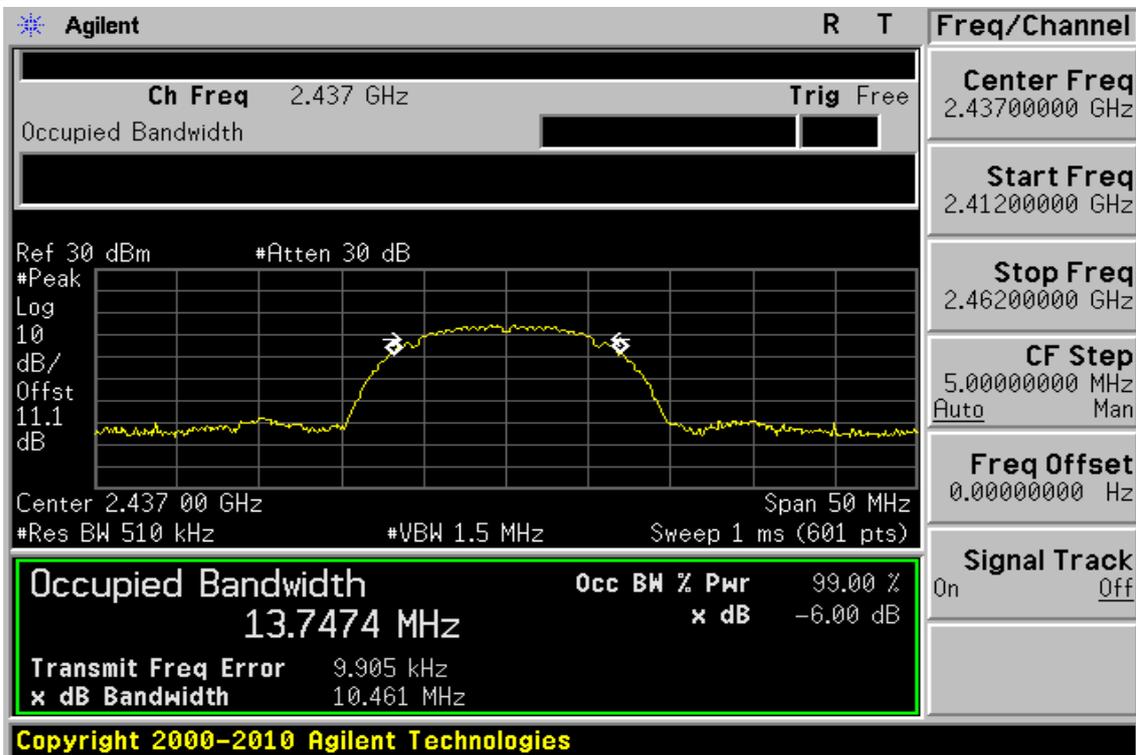
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802.11b

99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

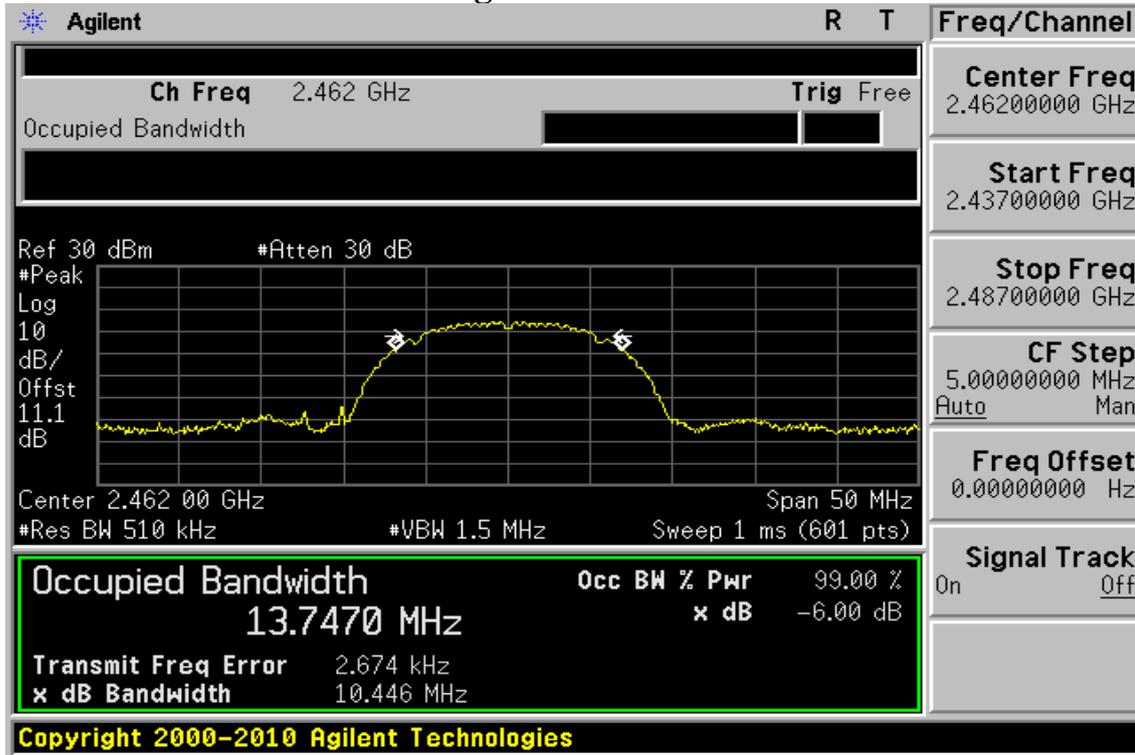


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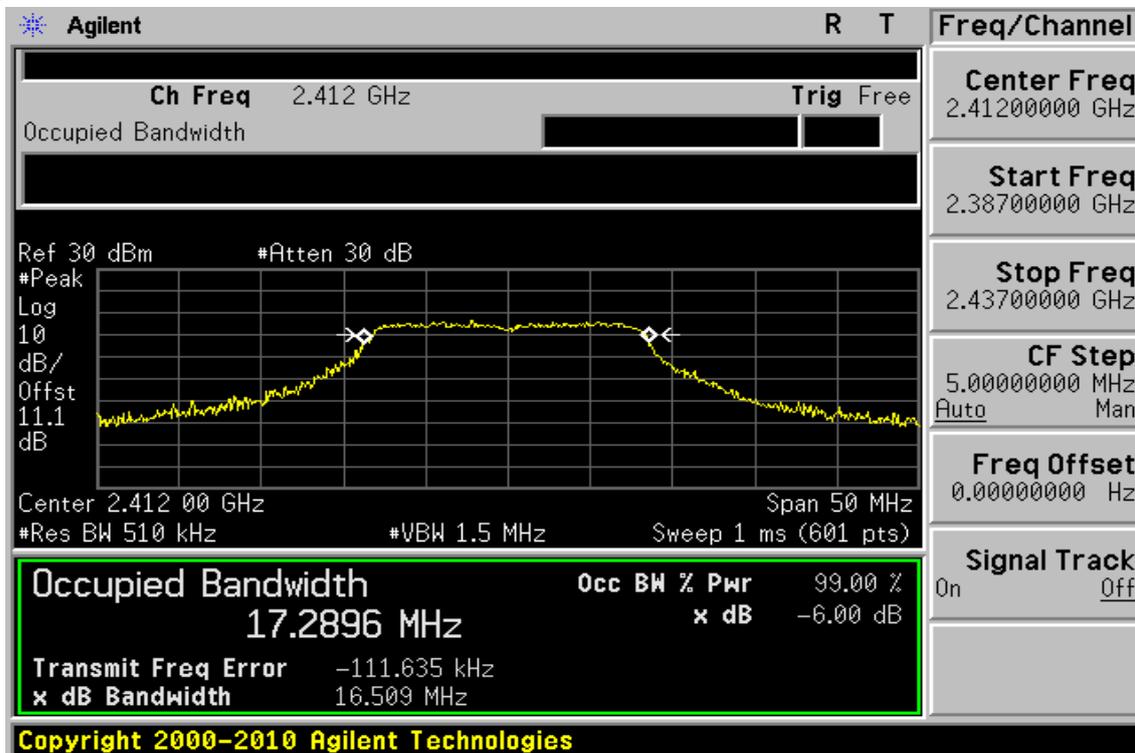
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99% Band Width Test Data CH-High



802.11g

99% Band Width Test Data CH-Low

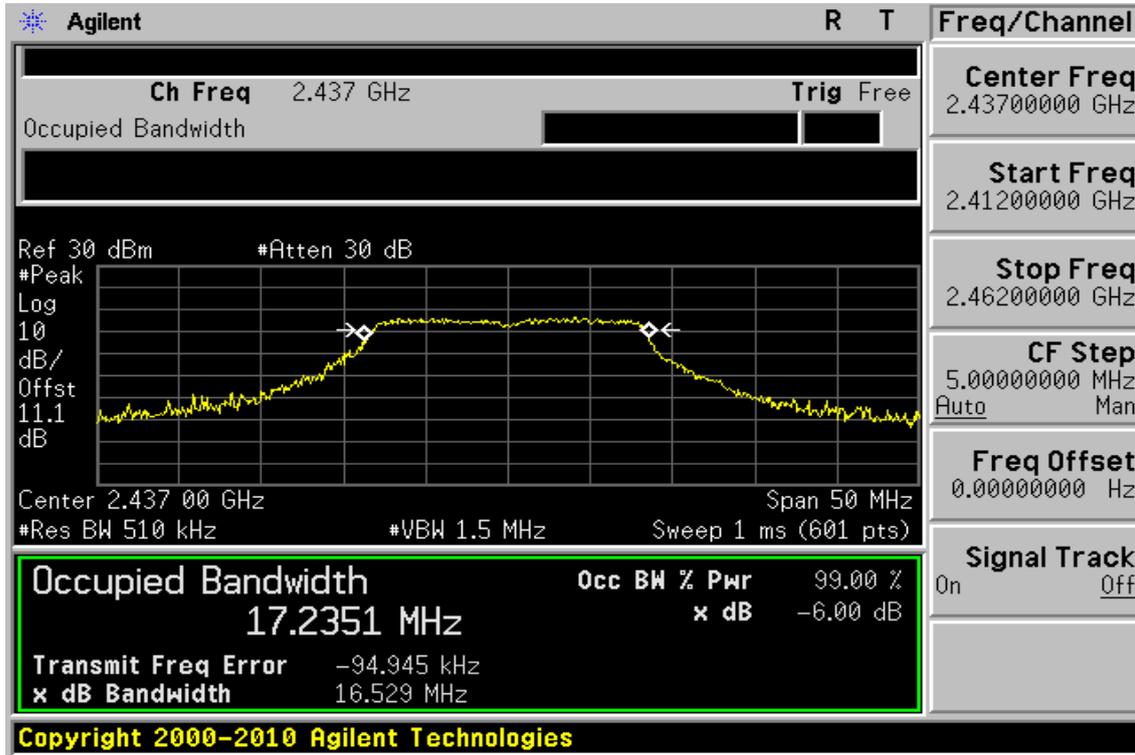


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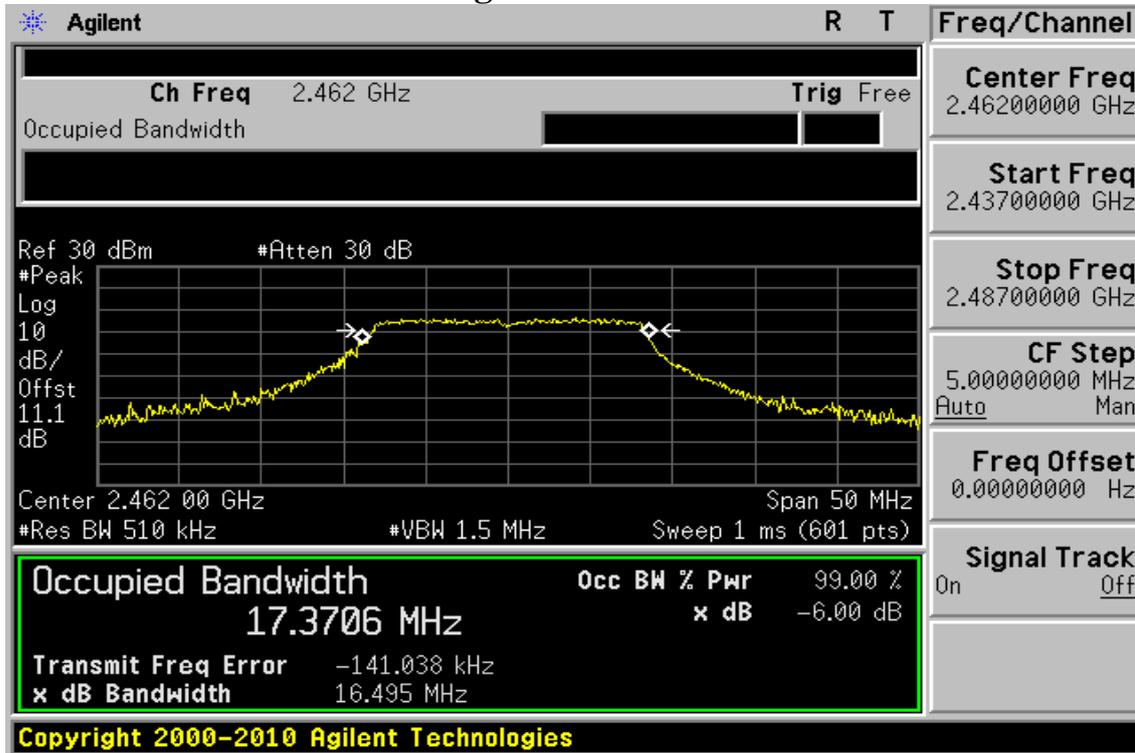
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99% Band Width Test Data CH-Mid



99% Band Width Test Data CH-High



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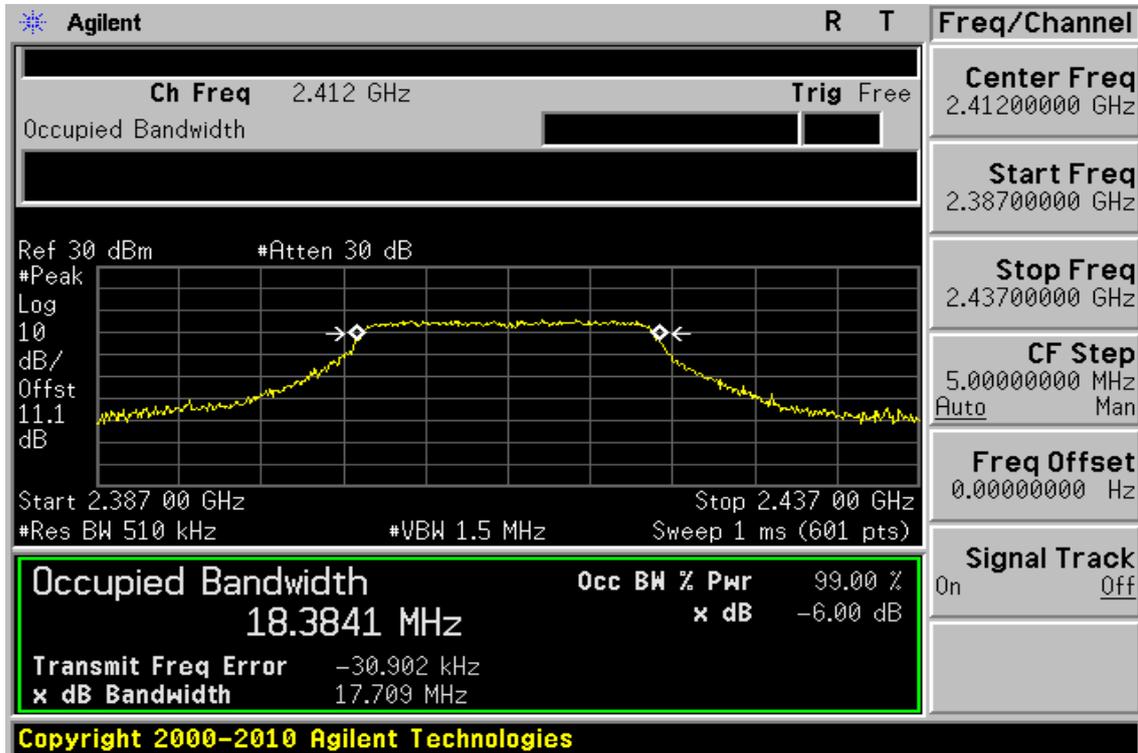
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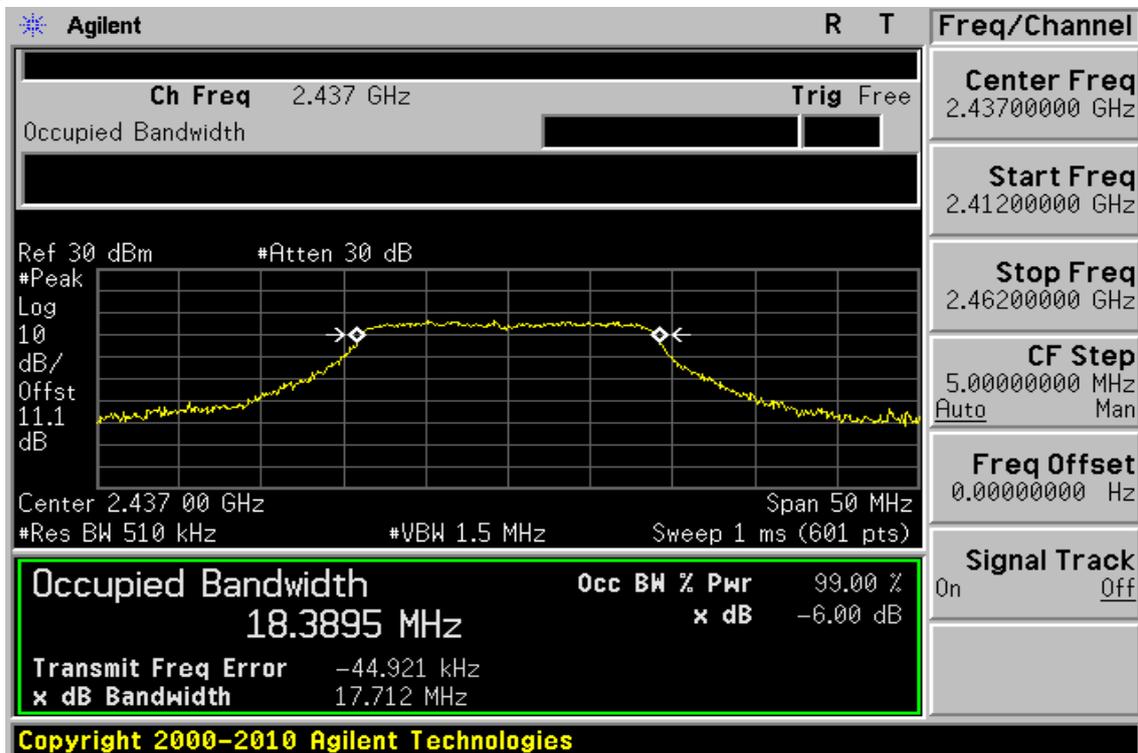
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802.11n_20M

99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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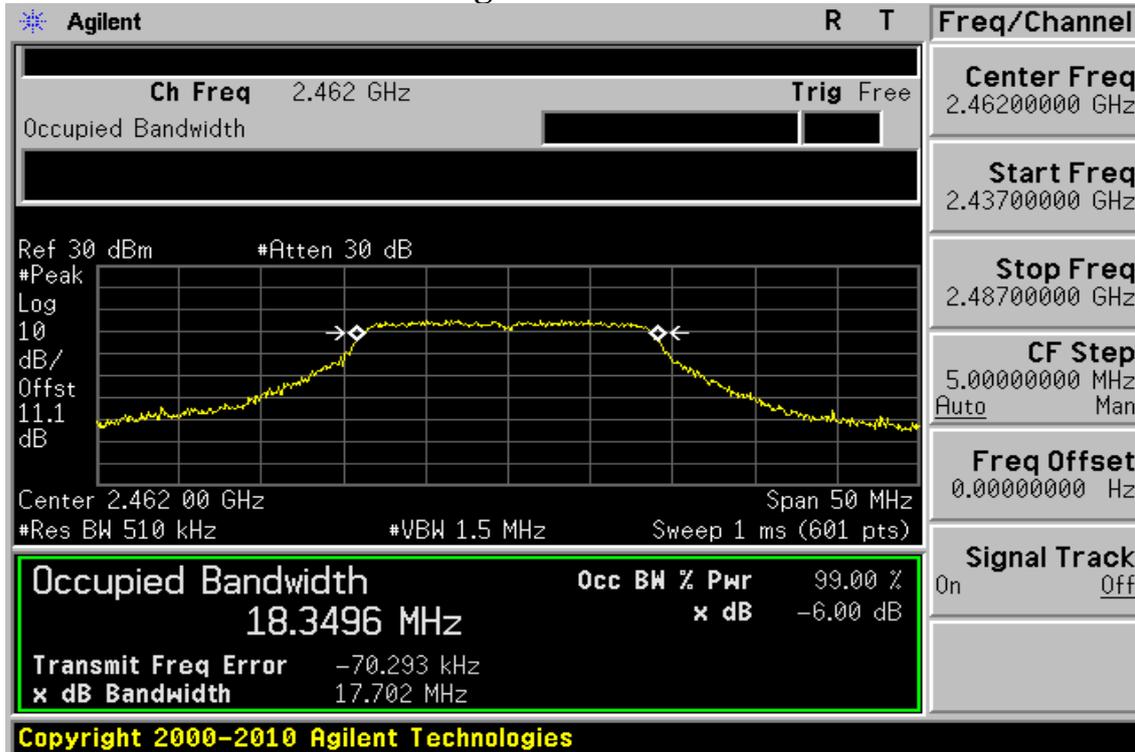
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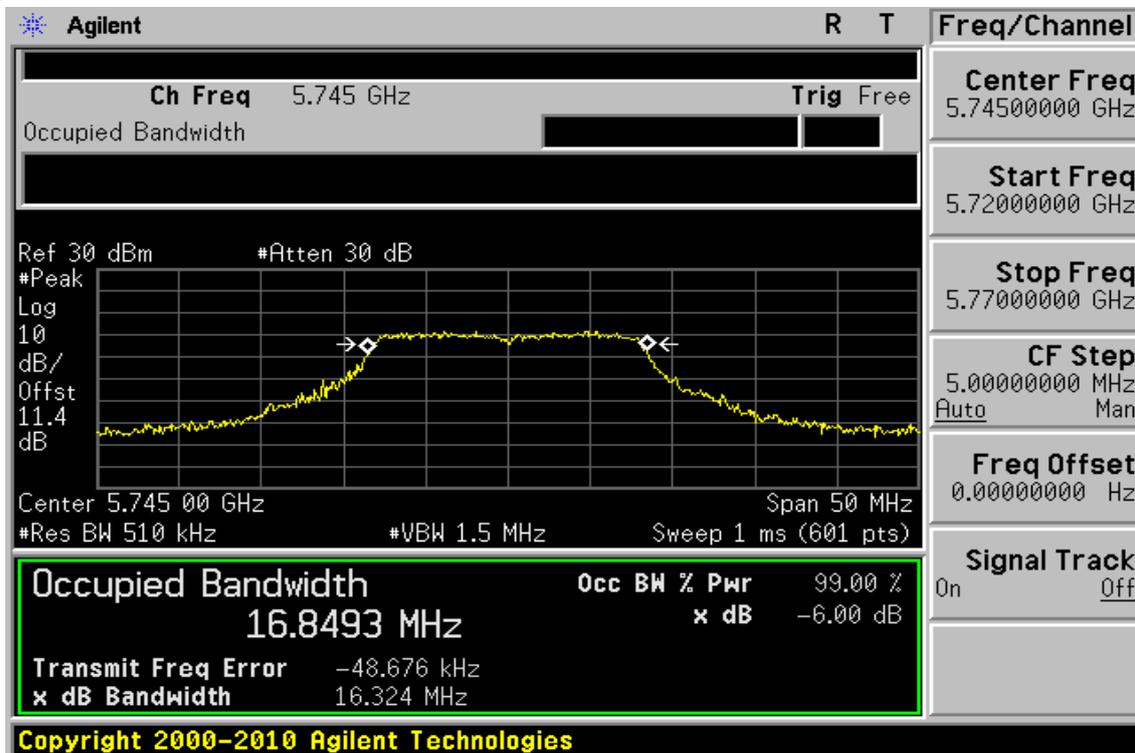
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99% Band Width Test Data CH-High



802.11a

99% Band Width Test Data CH-Low



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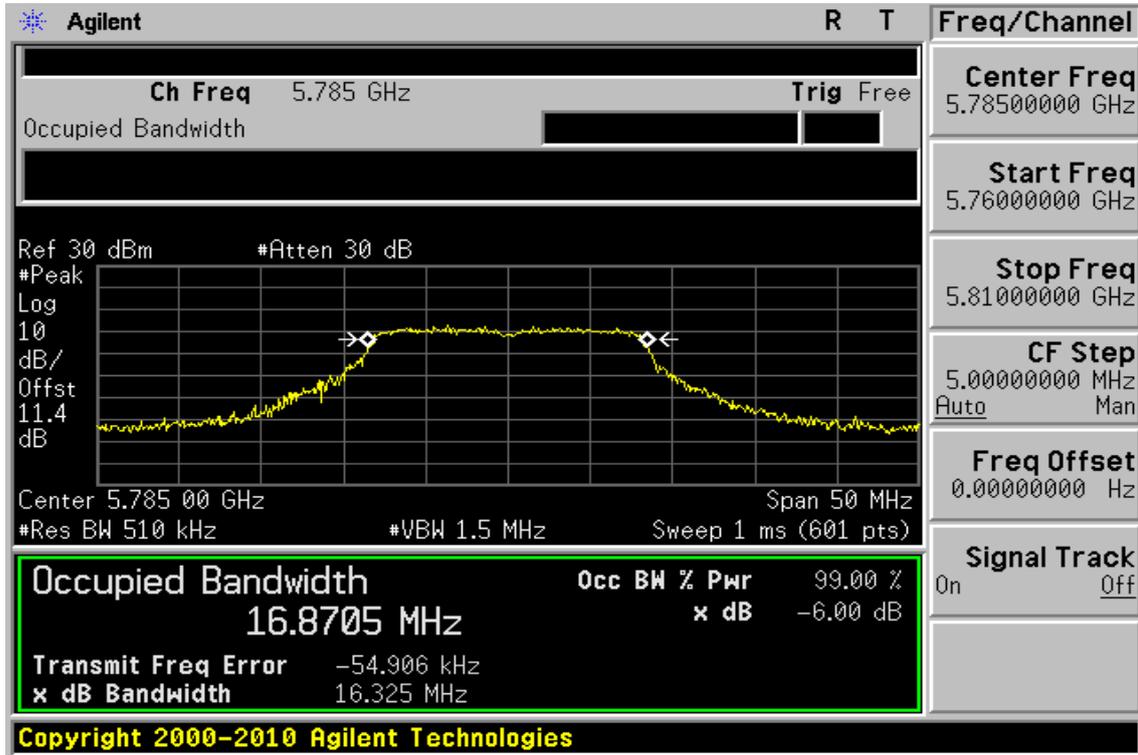
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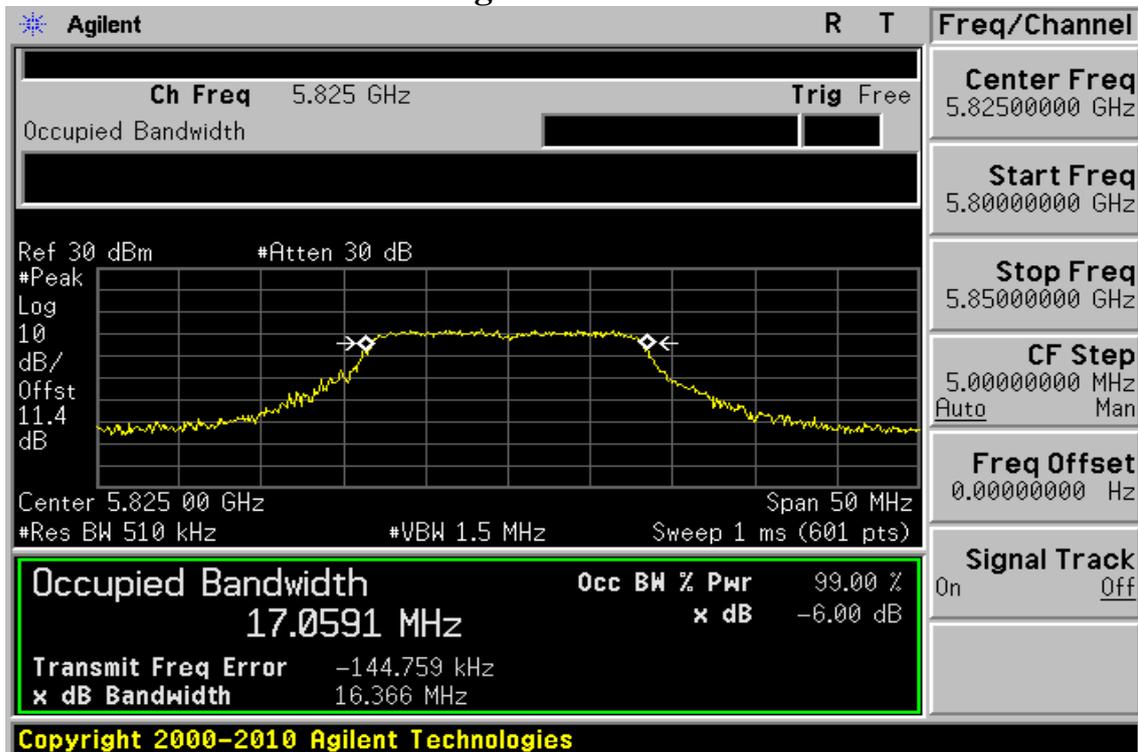
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99% Band Width Test Data CH-Mid



99% Band Width Test Data CH-High



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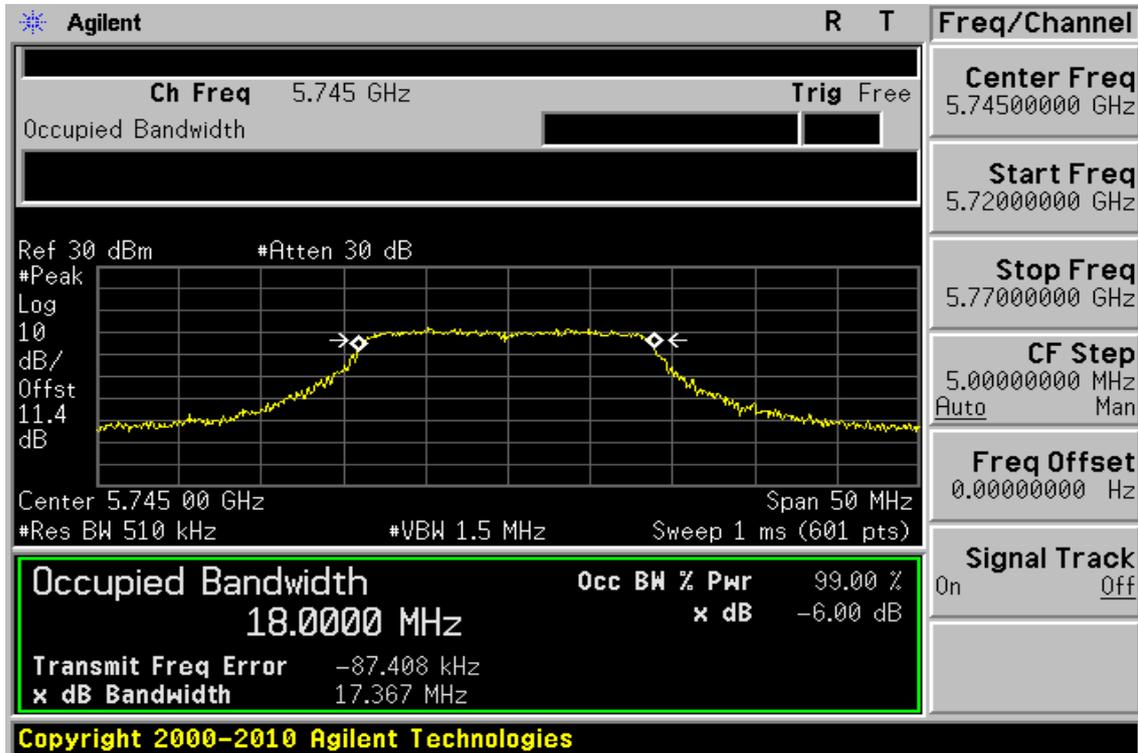
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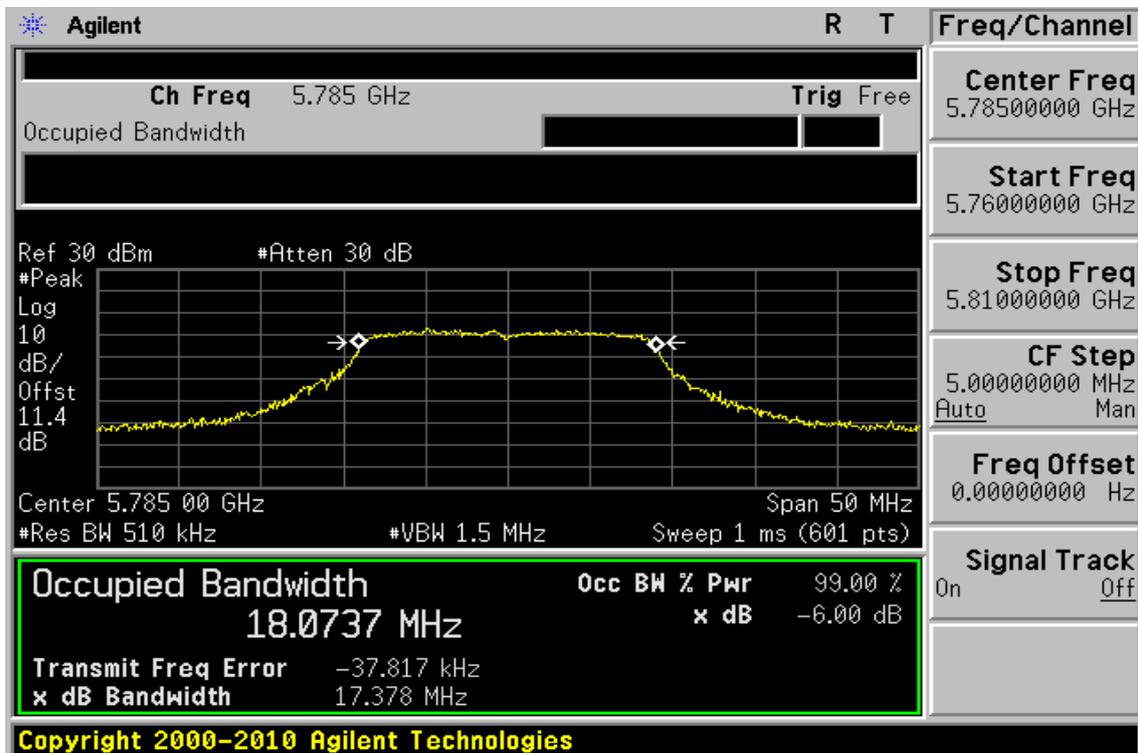
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802.11n (5GHz)_20M
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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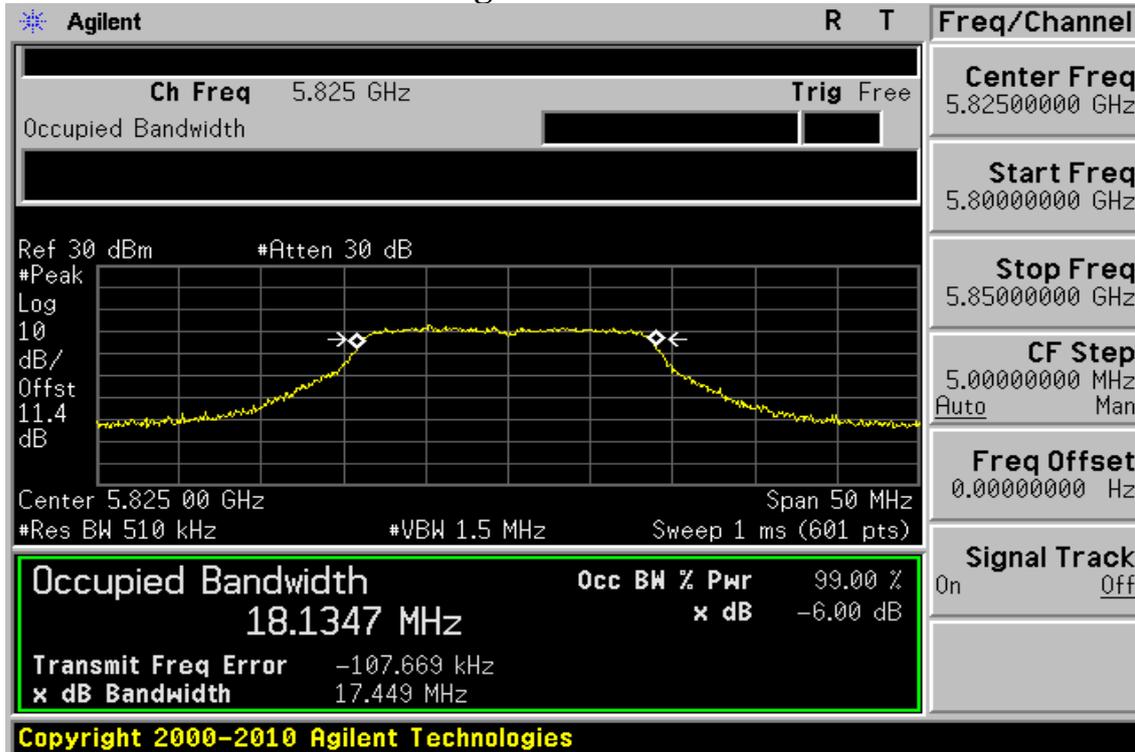
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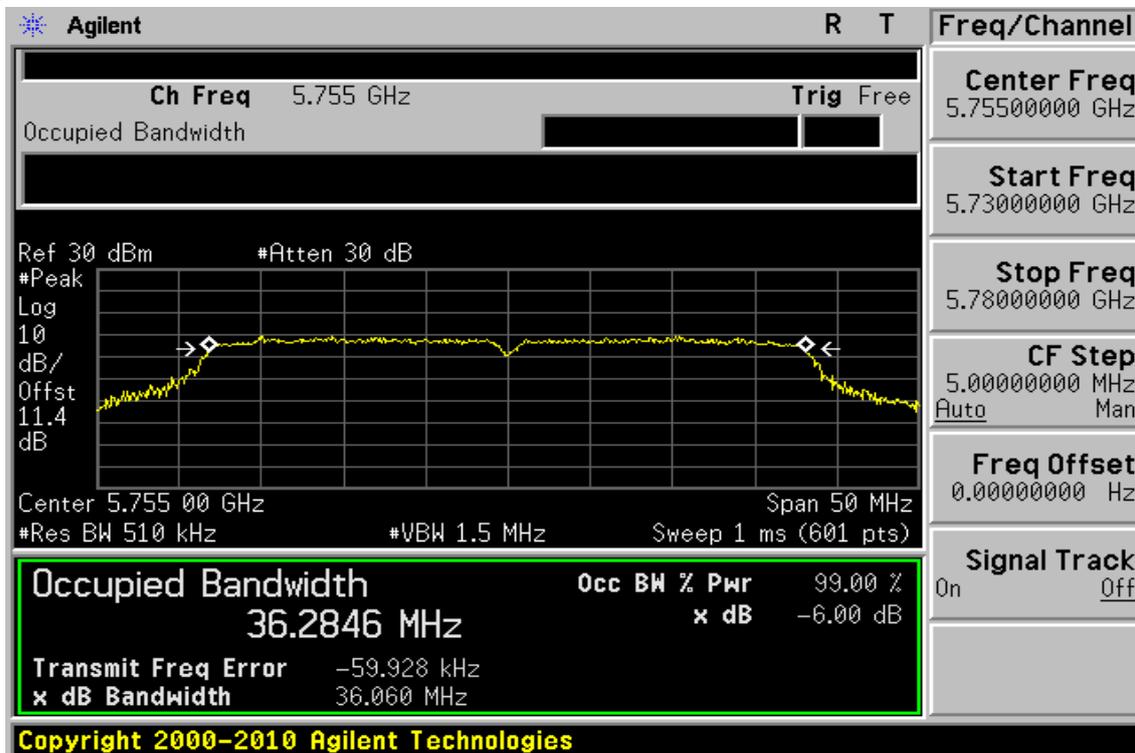
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99% Band Width Test Data CH-High



802.11n (5GHz)_40M

99% Band Width Test Data CH-Low



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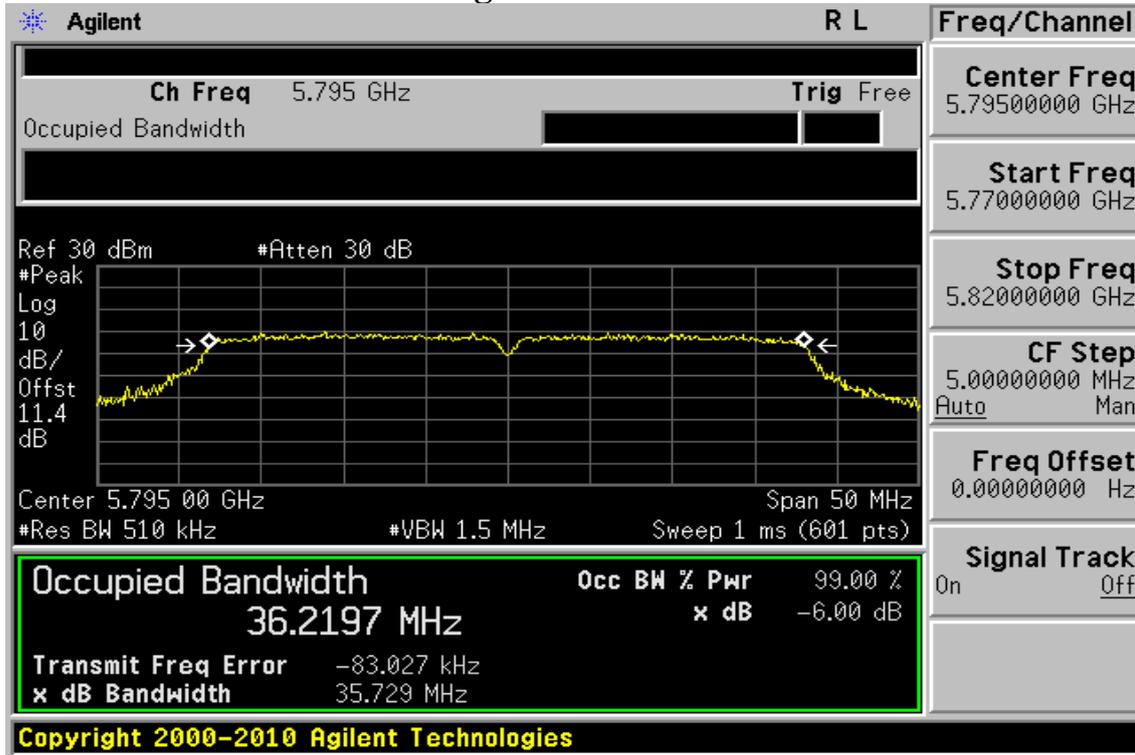
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99% Band Width Test Data CH-High



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