ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name:	**Smartphone**
Brand Name:	**HTC**
Model Name:	**PG59100**
Model Different:	**N/A**
FCC ID:	**NM8PG59100**
Report No.:	**EH/2011/30039**
Issue Date:	**Mar. 29, 2011**
FCC Rule Part:	**§15.247, Cat: DTS**
Prepared for:	**HTC Corporation**
	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, R.O.C.
Prepared by:	**SGS Taiwan Ltd.**
	Electronics & Communication Laboratory
	No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan

Testing Laboratory
0513

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VERIFICATION OF COMPLIANCE

Applicant:	HTC Corporation No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, R.O.C.
Equipment Under Test:	Smartphone
Brand Name:	HTC
Model No.:	PG59100
Model Difference:	N/A
FCC ID:	NM8PG59100
File Number:	EH/2011/30039
Date of test:	Mar. 11, 2011 ~ Mar. 14, 2011
Date of EUT Received:	Mar. 11, 2011

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 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.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Jason Wu	***Date***	Mar. 29, 2011
	Jason Wu / Asst. Supervisor		
Prepared By:	Judy Hsu	***Date***	Mar. 29, 2011
	Judy Hsu / General Admin.		
Approved By:	Jim Chang	***Date***	Mar. 29, 2011
	Jim Chang / Supervisor		

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Version

Version No.	Date	Description
00	Mar. 29, 2011	Initial creation of document

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1 GENERAL INFORMATION

General:

Product Name:	Smartphone	
Brand Name:	HTC	
Model Name:	PG59100	
Model Difference:	N/A	
Data Cable (USB):	1. M/N: DC M420, Supplier: MEC 2. M/N: DC M420, Supplier: Chant Sincere Co., LTD (COXOC) 3. M/N: DC M410, Supplier: Chant Sincere Co., LTD (COXOC) 4. M/N: DC M410, Supplier: Foxlink 5. M/N: DC M410, Supplier: MEC	
SHF:	1. M/N: RC E170, Supplier: COTRON Corporation (Cotron) 2. M/N: RC E160, Supplier: Foster 3. M/N: RC E160, Supplier: Merry 4. M/N: RC E160, Supplier: Cotron	
Power Supply	3.7 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter	
	Battery:	1. M/N: BG58100, Supplier: HT ENERGY 2. M/N: BG58100, Supplier: TOTAL WIRELESS SOLUTIONS INDUSTRIAL Ltd. (TWS) 3. M/N: BG58100, Supplier: Samsung SDI
	Adapter:	1. M/N: TC U260, Supplier: DELTA Electronics Inc (Delta) 2. M/N: TC U250, Supplier: Delta 3. M/N: TC U250, Supplier: Emerson 4. M/N: TC U250, Supplier: Phihong

Other Source:

Camera:	1. M/N: 11P1BA806, Supplier: Lite-On technology Corp. (LiteOn) 2. M/N: CMHT-8AA02D, Supplier: Foxconn
Video Camera:	1. M/N: 10P1BF007, Supplier: Lite-On technology Corp. (LiteOn) 2. M/N: FM03FF-290H, Supplier: FOXLINK Technology Ltd (Foxlink)

The EUT is compliance with Bluetooth 3.0 and IEEE 802.11 b/g/n Standard.

This report applies for WLAN, and complies with FCC rule part 15C.

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WLAN:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b : 22.01dBm g : 17.30dBm	DSSS, OFDM	b : 8M15G1D g : 15M23G1D
11n	HT20 2412-2462	11	n : 17.30dBm	OFDM	15M23G1D
Antenna Designation:			PIFA Antenna with 0.52 dBi peak gain		
Modulation type:			CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM		
Transition Rate:			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 – 65Mbps		

Bluetooth:

Bluetooth Version:	☐ V1.1 (GFSK) ☐ V1.2 (GFSK) ☐ V2.0 (GFSK) ☐ V2.0 + EDR (GFSK + π/4DQPSK + 8DPSK) ☐ V2.1 + EDR (GFSK + π/4DQPSK + 8DPSK) ☒ V3.0
Channel number:	79 channels
Modulation type:	GFSK + π/4DQPSK + 8DPSK
Output Power:	-0.62 dBm (Max. EDR mode)
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	<= 0.4s
Operating Mode:	Point-to-Point
Antenna Designation:	PIFA Antenna with 0.52 dBi peak gain

GSM and WCDMA:

	Operating Frequency		Rated Power
Cellular Phone Standards Frequency Range and Power:	GSM/GPRS/EDGE 850, Class 10	824.2 MHz– 848.8 MHz	33 dBm
	GSM/GPRS / EDGE1900, Class 10	1850.2MHz – 1909.8MHz	30 dBm
	WCDMA/HSUPA Band IV	1712.4MHz–1752.6MHz	23.5 dBm
IMEI:	355213040018095		

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1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: NM8PG59100** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. 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). Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Oct 2002 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 **AC** Power line Emission Configuration

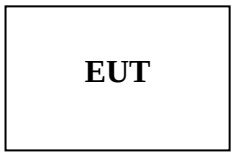

Fig. 2-2 Radiated Emission Configuration

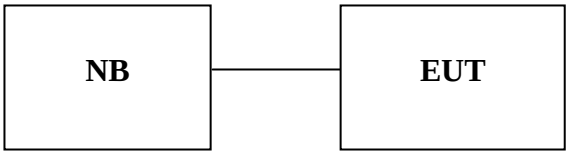

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.
1	NB	DELL	E5400	3704625136
2	Software	Broadcom Remote Controller	4325129	Version 1.51

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)(c)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant

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

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

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5 CONDUCTED EMISSION TEST

5.1 Standard Applicable:

According to §15.207, 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
1.The lower limit shall apply at the transition frequencies
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

5.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCS30	828985/004	09/16/2010	09/15/2011
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2011	02/01/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2011	02/01/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

5.3 EUT Setup:

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

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5.4 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.

5.5 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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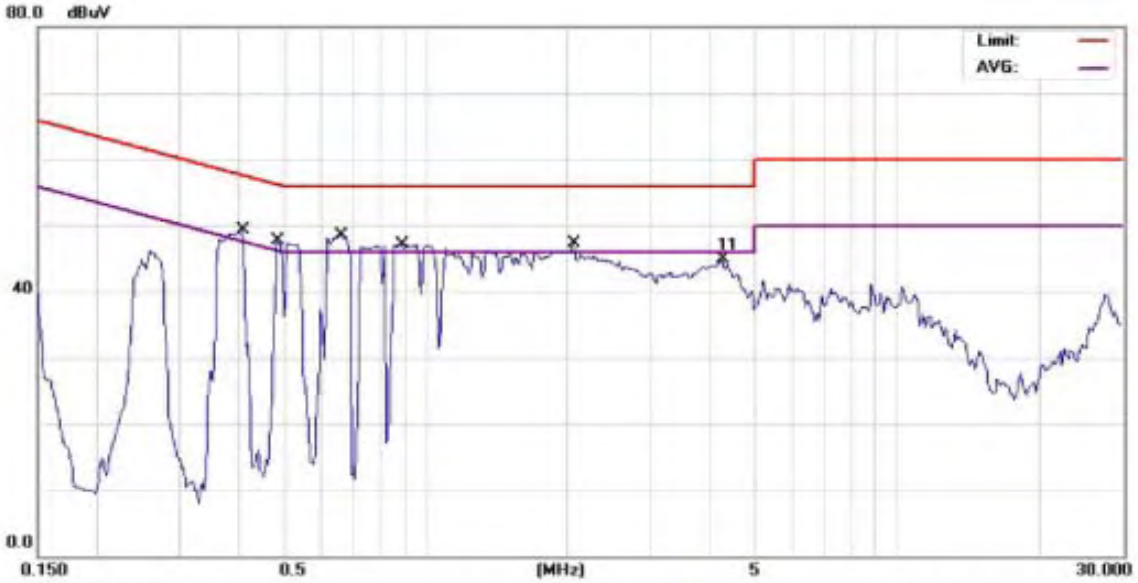
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	WLAN			Test Date:	Mar. 23, 2011
Temperature:	22 ℃	Humidity:	57%	Test By:	Jason



Site SGS CONDUCTED #1
Limit: CISPR22/11/EN55022 Class B
EUT: SmartPhone
M/N: PG59100
Note: BT+WLAN Operation

Phase: L1
Power: AC 120V/60Hz
Distance:

Temperature: 24 ℃
Humidity: 60%
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4085	45.50	0.12	45.62	57.68	-12.06	QP	
2		0.4085	25.68	0.12	25.80	47.68	-21.88	AVG	
3		0.4850	43.89	0.12	44.01	56.25	-12.24	QP	
4		0.4850	26.98	0.12	27.10	46.25	-19.15	AVG	
5		0.6600	43.67	0.12	43.79	56.00	-12.21	QP	
6		0.6600	24.68	0.12	24.80	46.00	-21.20	AVG	
7		0.8900	42.15	0.12	42.27	56.00	-13.73	QP	
8		0.8900	23.76	0.12	23.88	46.00	-22.12	AVG	
9		2.0600	41.98	0.16	42.14	56.00	-13.86	QP	
10		2.0600	23.67	0.16	23.83	46.00	-22.17	AVG	
11	*	4.2600	44.64	0.21	44.85	56.00	-11.15	peak	

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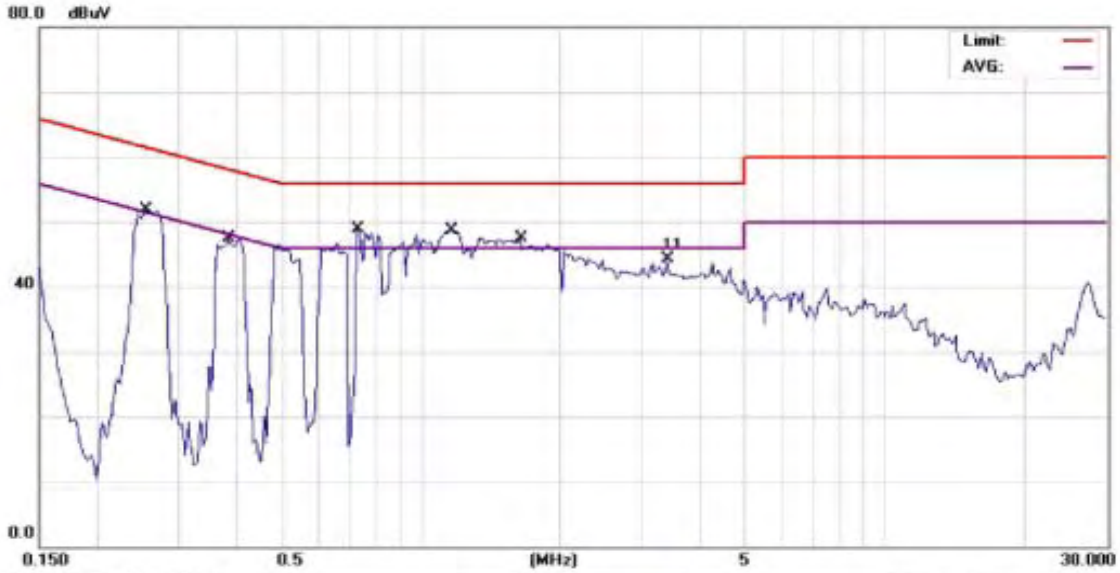

Site SGS CONDUCTED #1
Limit: CISPR22/11/EN55022 Class B
EUT: SmartPhone
M/N: PG59100
Note: BT+WLAN Operation

Phase: N
Power: AC 120V/60Hz
Distance:

Temperature: 24 ℃
Humidity: 60%
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2550	45.60	0.13	45.73	61.59	-15.86	QP	
2		0.2550	32.50	0.13	32.63	51.59	-18.96	AVG	
3		0.3850	43.80	0.12	43.92	58.17	-14.25	QP	
4		0.3850	30.20	0.12	30.32	48.17	-17.85	AVG	
5		0.7300	43.69	0.13	43.82	56.00	-12.18	QP	
6		0.7300	26.98	0.13	27.11	46.00	-18.89	AVG	
7		1.1600	42.35	0.13	42.48	56.00	-13.52	QP	
8		1.1600	25.98	0.13	26.11	46.00	-19.89	AVG	
9		1.6400	43.15	0.15	43.30	56.00	-12.70	QP	
10		1.6400	26.89	0.15	27.04	46.00	-18.96	AVG	
11	*	3.4000	44.12	0.19	44.31	56.00	-11.69	peak	

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6 PEAK OUTPUT POWER MEASUREMENT

6.1 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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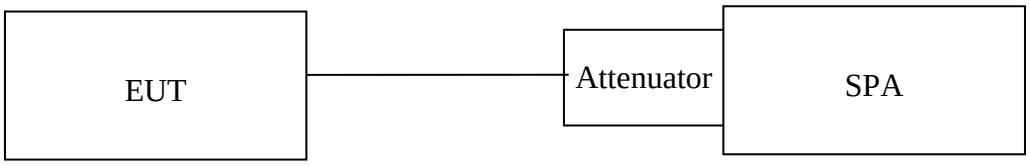
6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2011	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2010	07/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2010	07/04/2011
Splitter	Agilent	11636B	N/A	07/05/2010	07/04/2011

6.3 Test Set-up:



6.4 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, VBW = 1MHz,Bandwidth=26dB occupied Bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

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6.5 Measurement Result:

802.11b

Cable loss = 0		Peak Power Output (dBm)				
CH	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412	22.01	21.89	21.76	21.68	1 Watt = 30 dBm
6	2437	21.60	21.54	21.49	21.41	1 Watt = 30 dBm
11	2462	21.22	21.16	21.10	21.04	1 Watt = 30 dBm

802.11g

Cable loss = 0		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412	17.30	17.25	17.19	17.13	17.06	17.00	16.92	16.84	1 Watt = 30 dBm
6	2437	17.22	17.16	17.11	17.04	16.94	16.86	16.80	16.75	1 Watt = 30 dBm
11	2462	16.71	16.65	16.59	16.52	16.48	16.42	16.37	16.29	1 Watt = 30 dBm

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802.11n_20M

Cable loss = 0		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6.5	13	19.5	26	39	52	58.5	65	
1	2412	17.18	17.10	17.02	16.94	16.86	16.79	16.73	16.67	1 Watt = 30 dBm
6	2437	17.30	17.25	17.19	17.14	17.08	17.01	16.94	16.88	1 Watt = 30 dBm
11	2462	16.77	16.71	16.62	16.55	16.48	16.41	16.34	16.28	1 Watt = 30 dBm

**Note: Offset 0.5dB*

Note: Refer to next page for plots.

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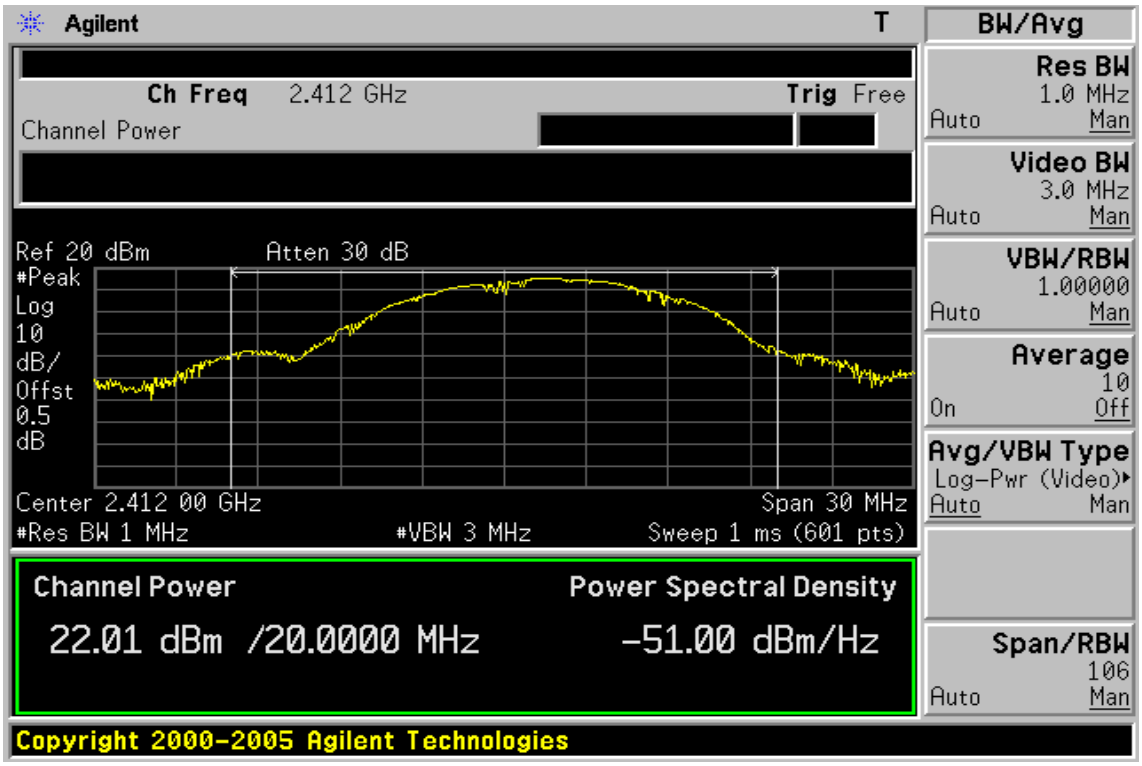
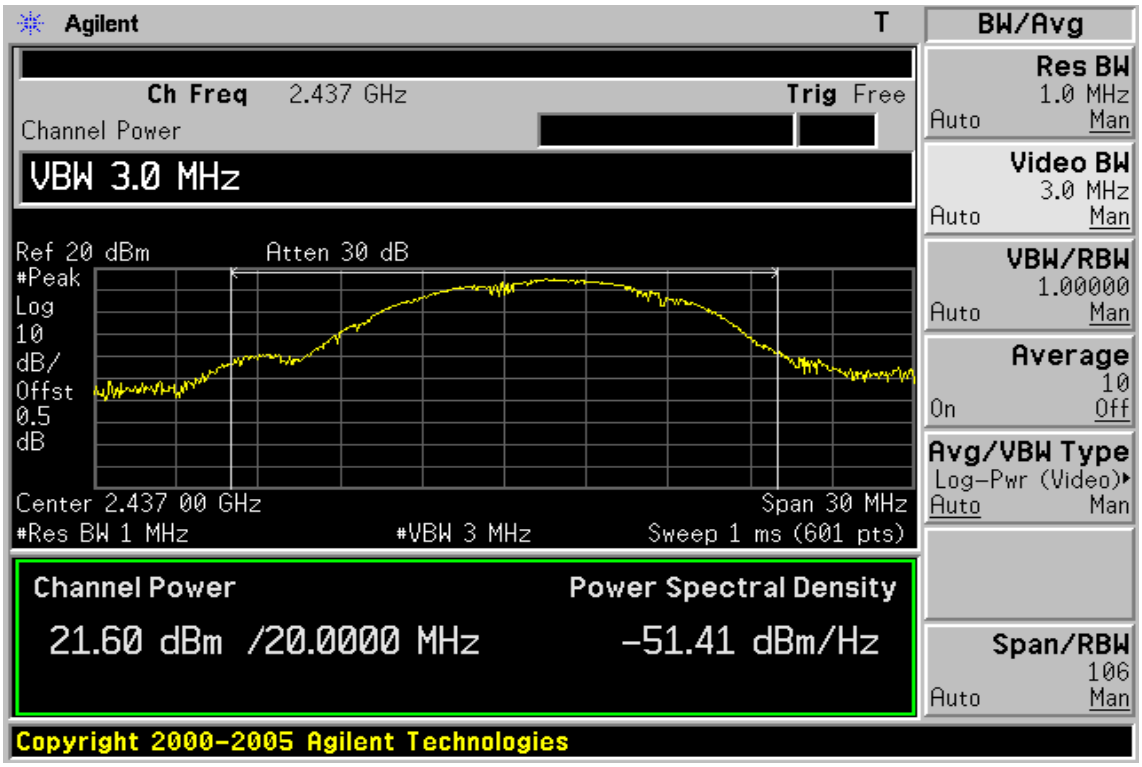
802.11b, 1Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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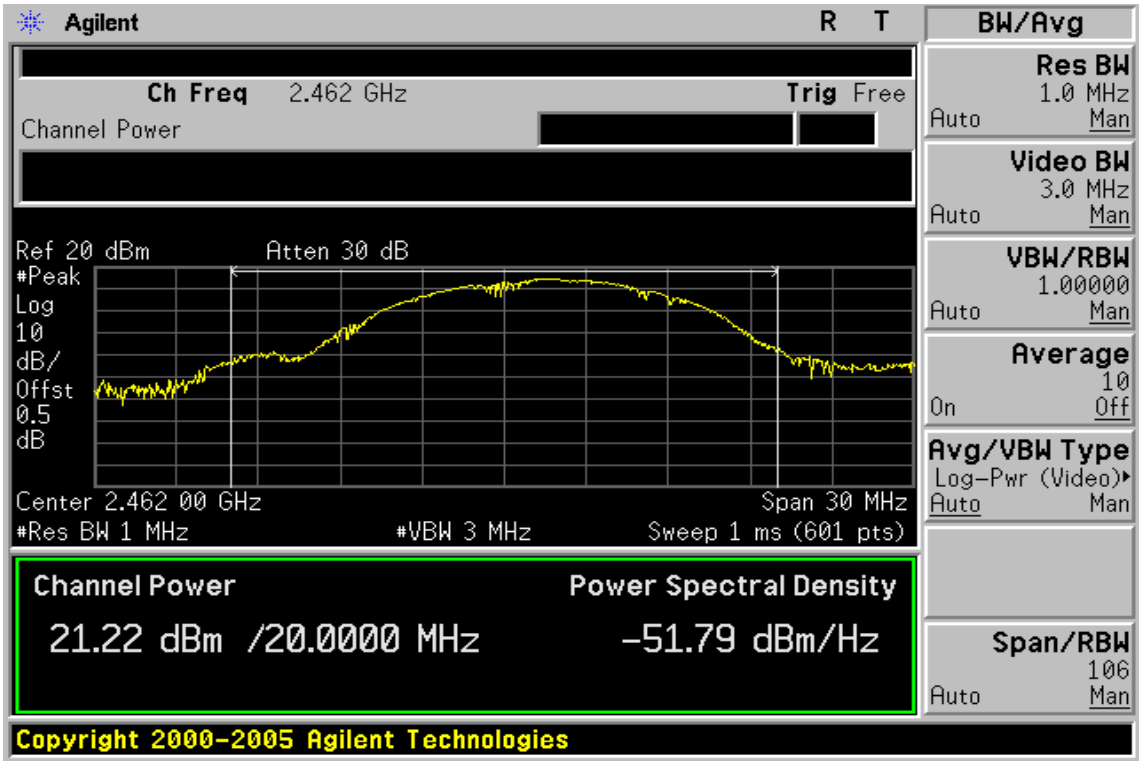
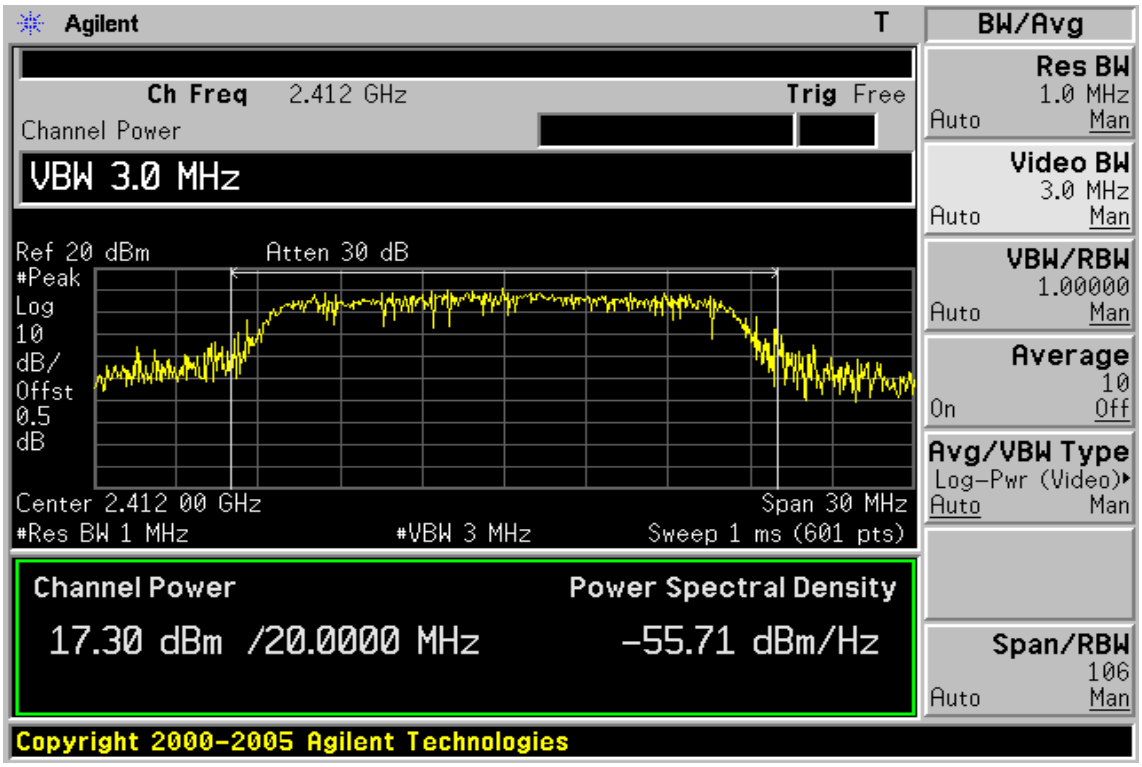
Peak Power Output Plot (CH High)



802.11g, 6Mbps

Peak Power Output Plot (CH Low)



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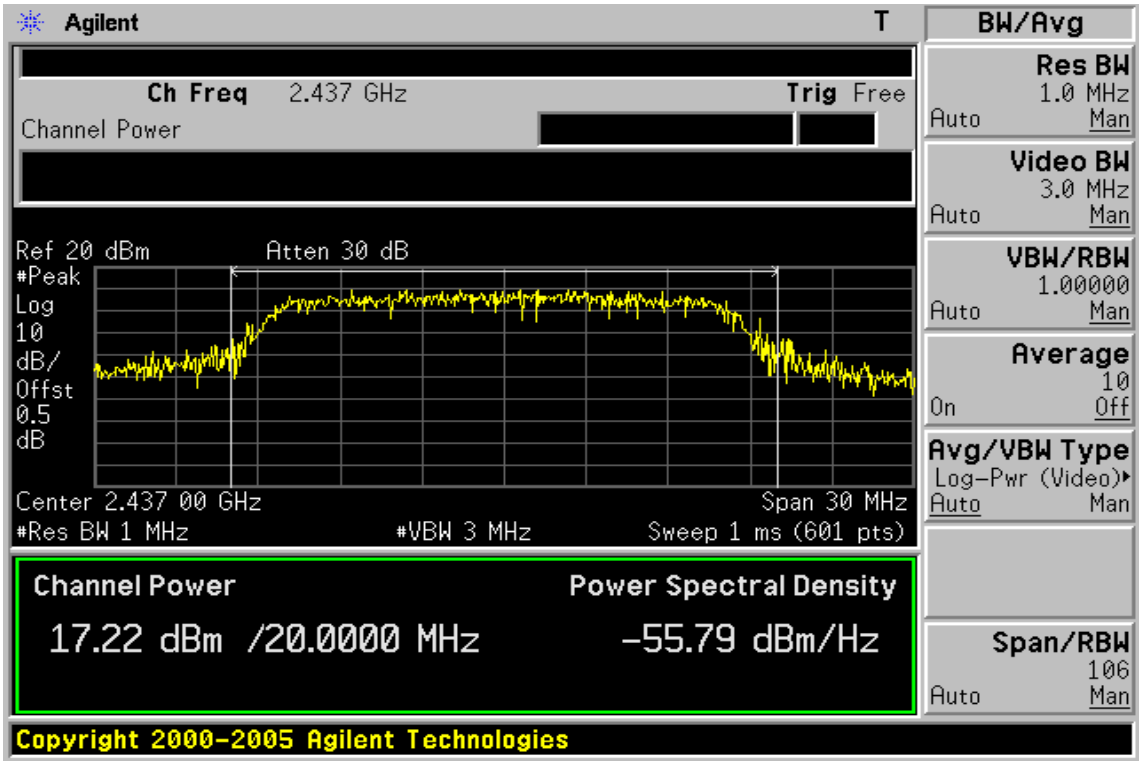
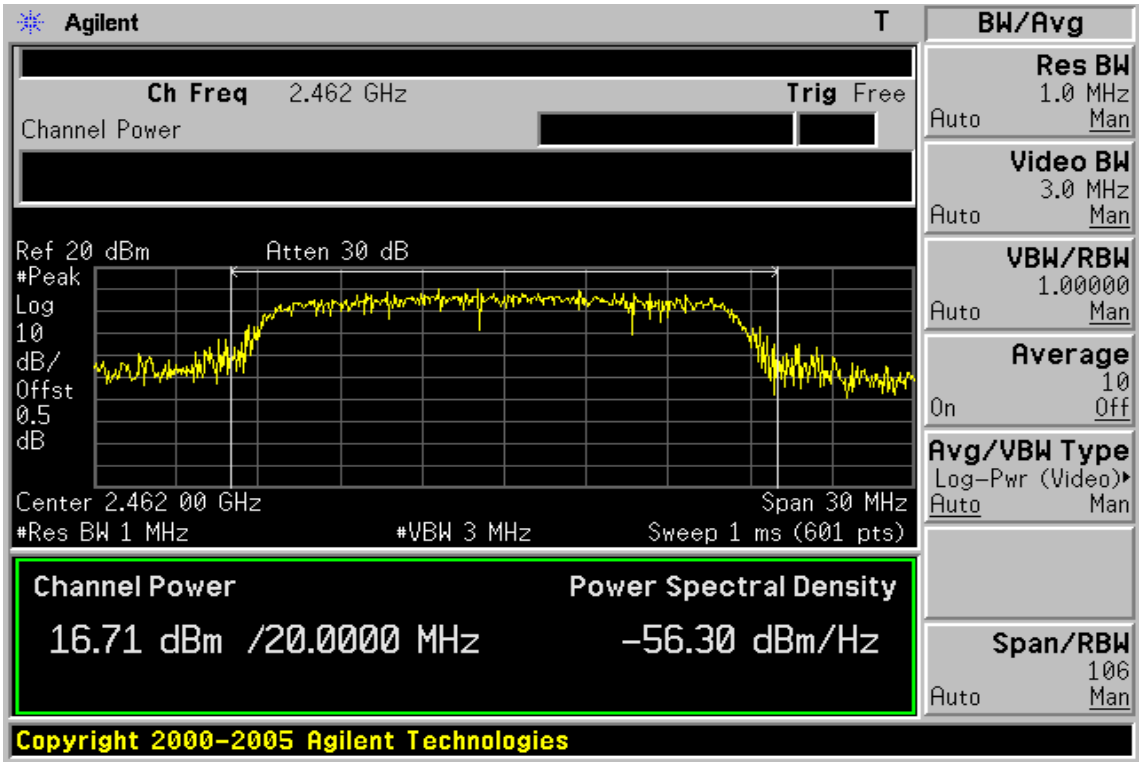
Peak Power Output Plot (CH Mid)



Peak Power Output Plot (CH High)



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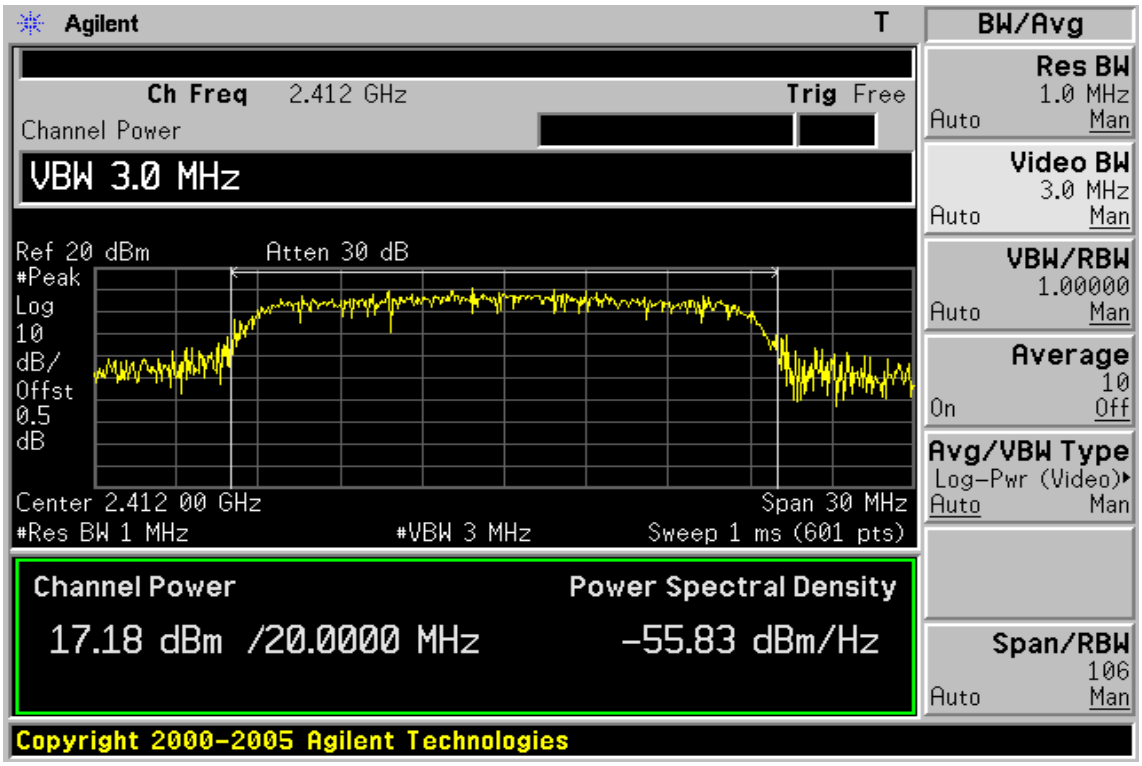
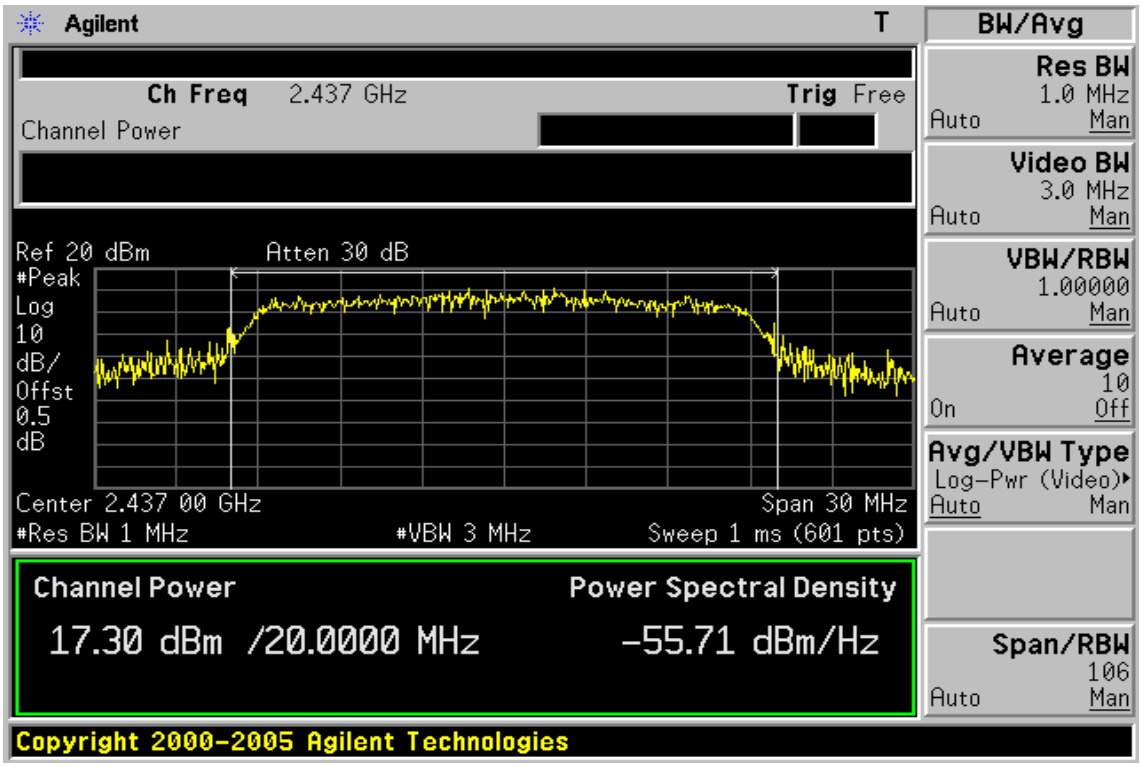
802.11n_20M, 6.5Mbps

Peak Power Output Plot (CH Low)



Peak Power Output Plot (CH Mid)



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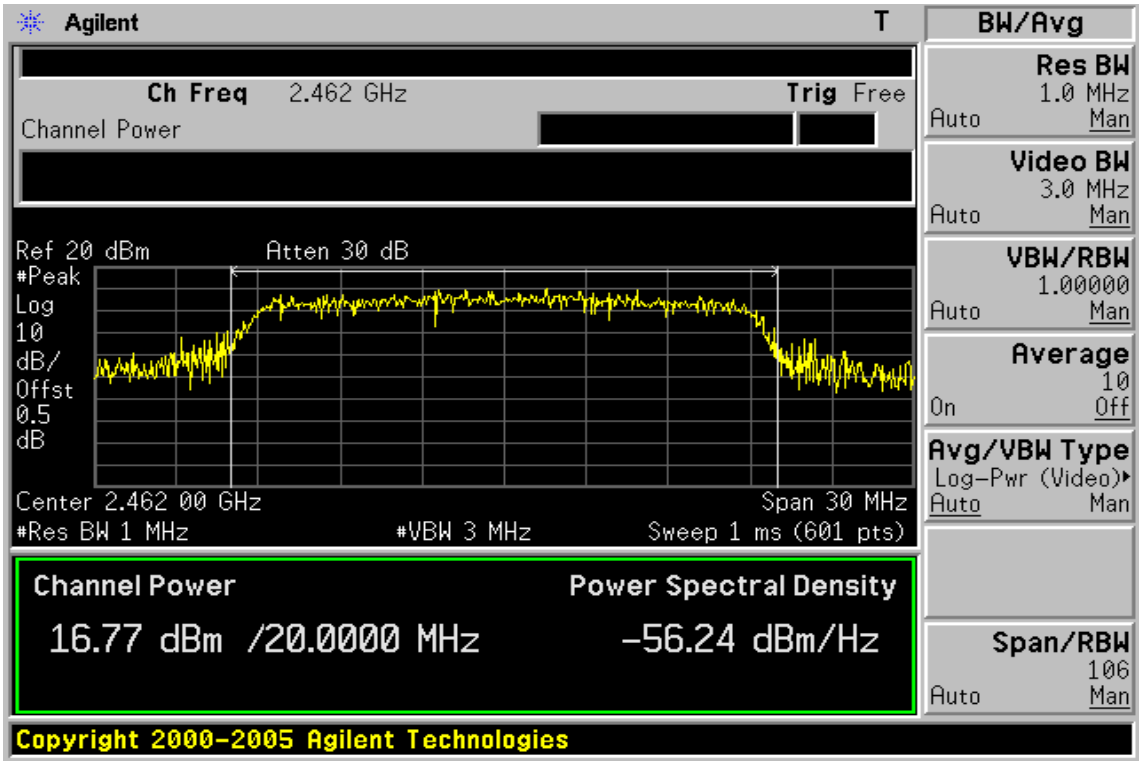
Peak Power Output Plot (CH High)



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7 6dB Bandwidth

7.1 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.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:

Refer to section 6.3 for details.

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 spectrum analyzer.

3.Set the spectrum analyzer as RBW=100KHz, VBW = 3*RBW, Span= 30M/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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7.5 Measurement Result:

802.11b

Frequency (MHz)	**Bandwidth (MHz)**	**Bandwidth (KHz)**	**Result**
2412	7.128	> 500	PASS
2437	7.134	> 500	PASS
2462	7.101	> 500	PASS

**Offset0.5 dB*

802.11g

Frequency (MHz)	**Bandwidth (MHz)**	**Bandwidth (KHz)**	**Result**
2412	15.200	> 500	PASS
2437	15.197	> 500	PASS
2462	15.194	> 500	PASS

**Offset 0.5dB*

802.11n_20M

Frequency (MHz)	**Bandwidth (MHz)**	**Bandwidth (KHz)**	**Result**
2412	15.177	> 500	PASS
2437	15.177	> 500	PASS
2462	15.187	> 500	PASS

**Offset 0.5dB*

Note: Refer to next page for plots.

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t (886-2) 2299-3279 f (886-2) 2298-0488 www.tw.sgs.com
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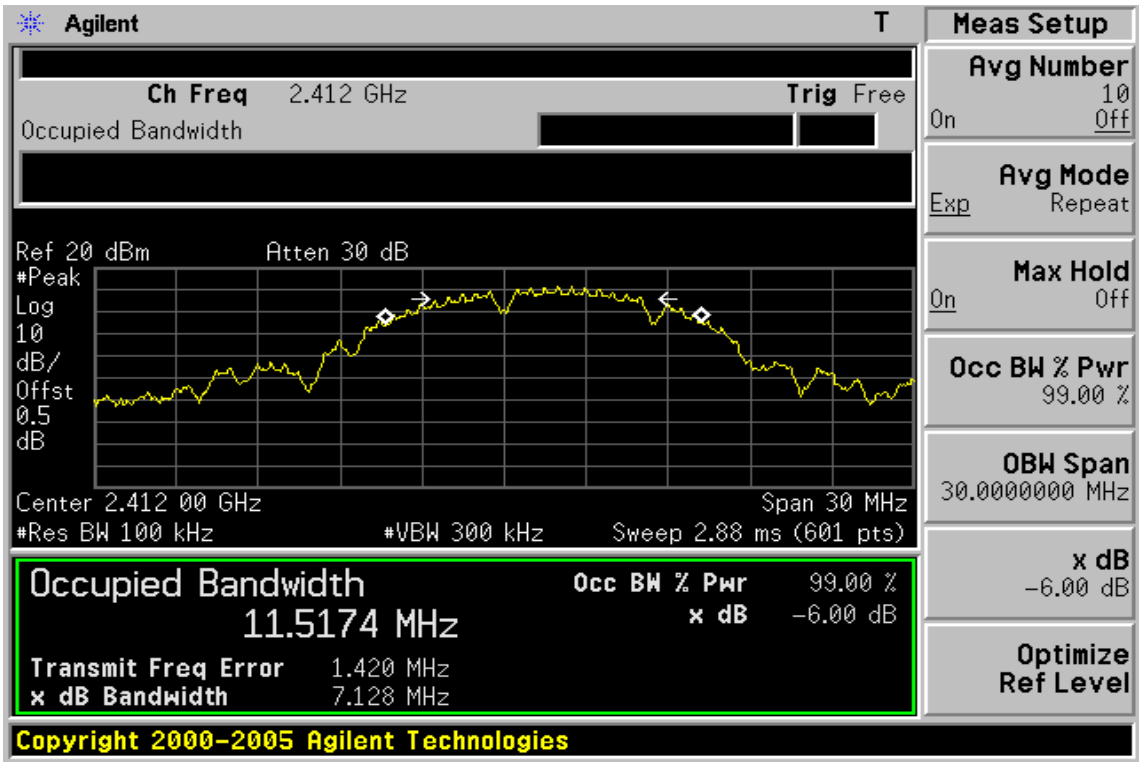
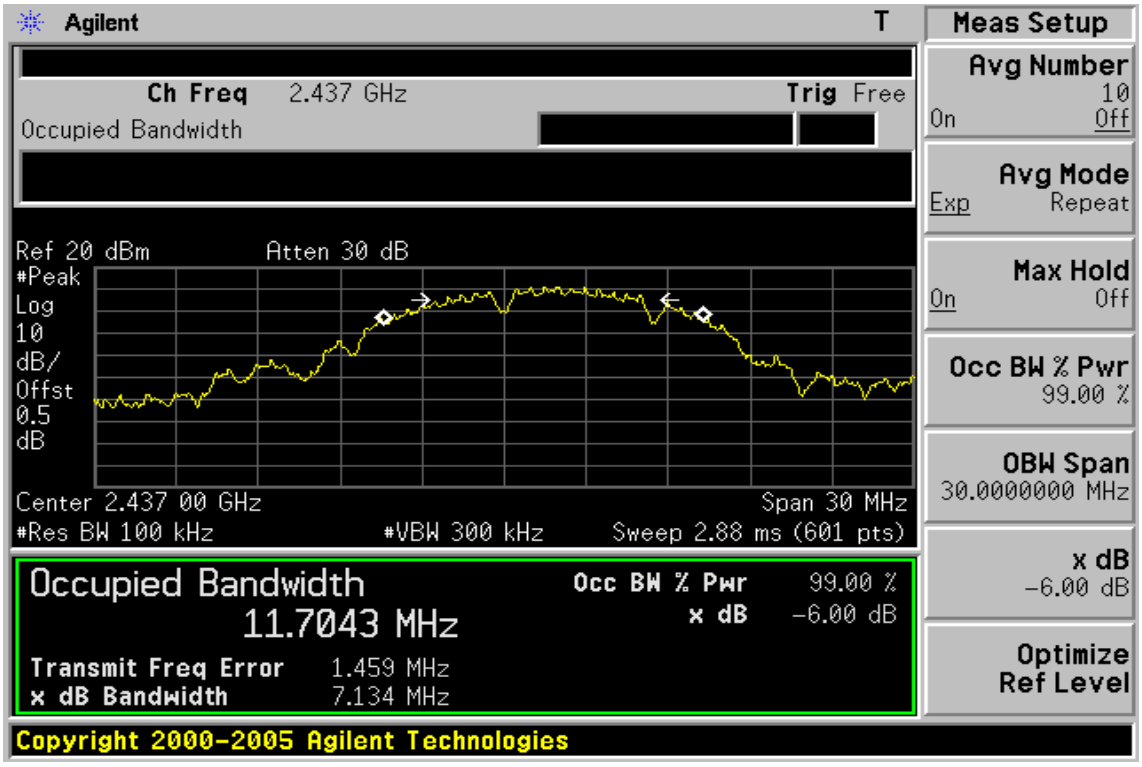
802.11b

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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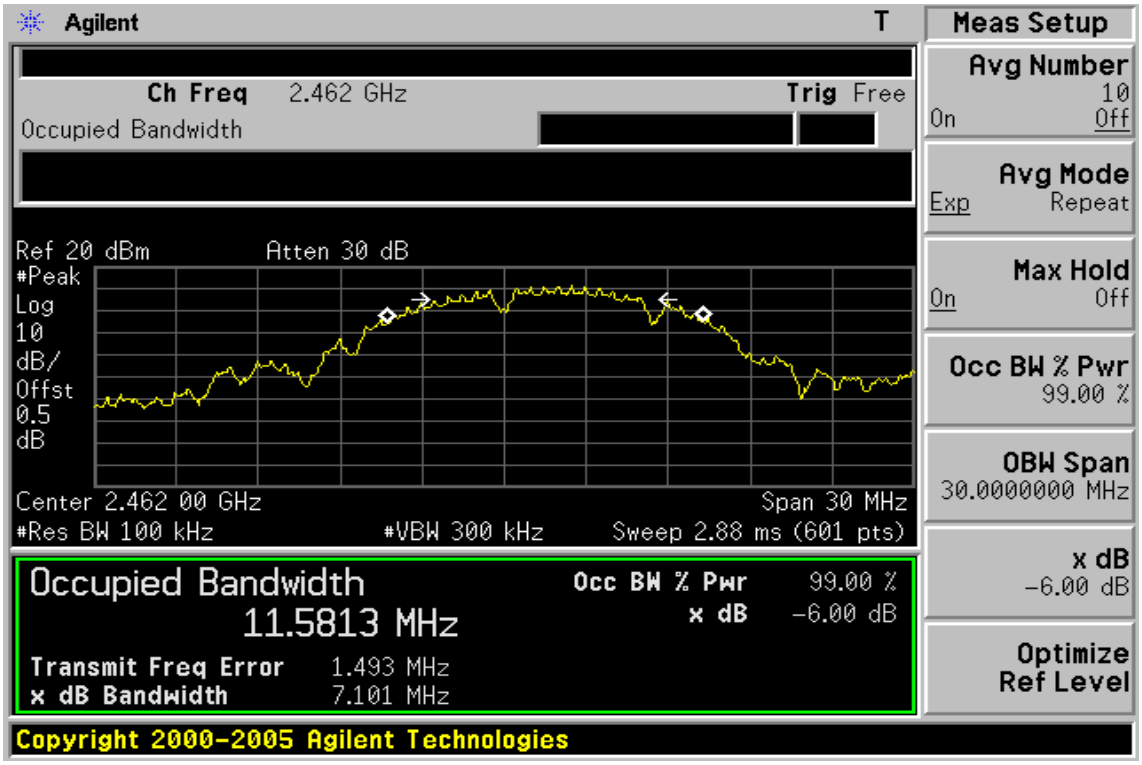
6dB Band Width Test Data CH-High



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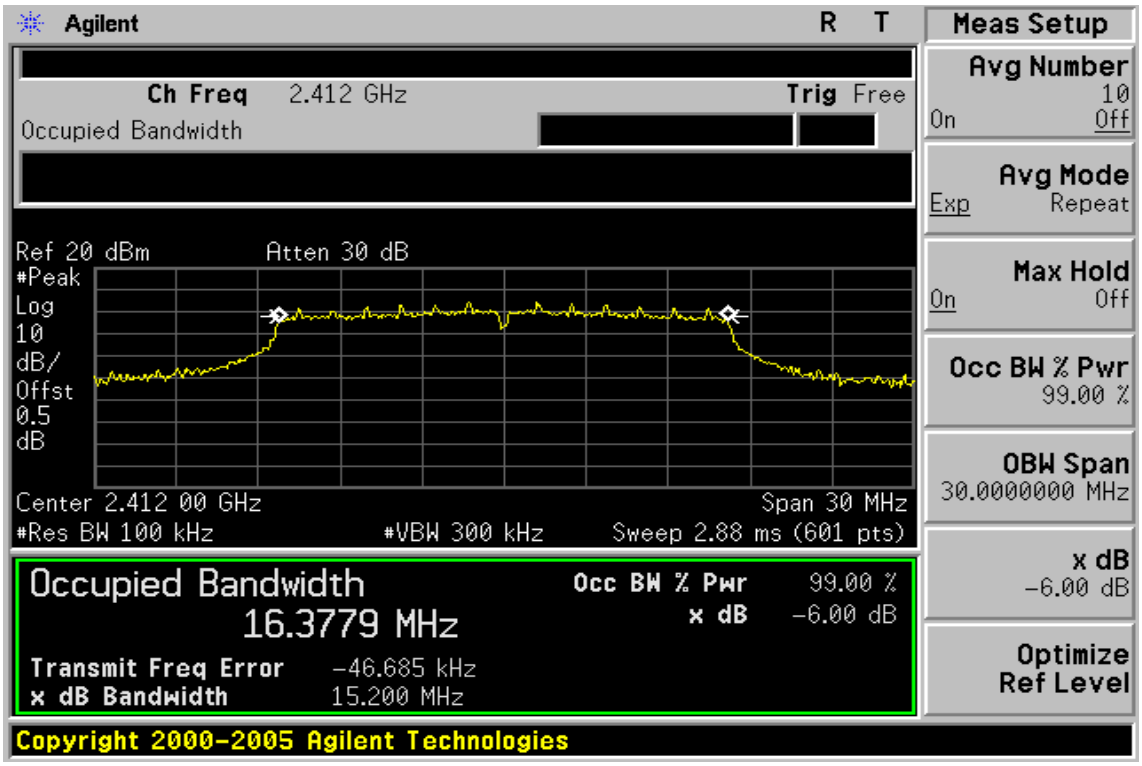
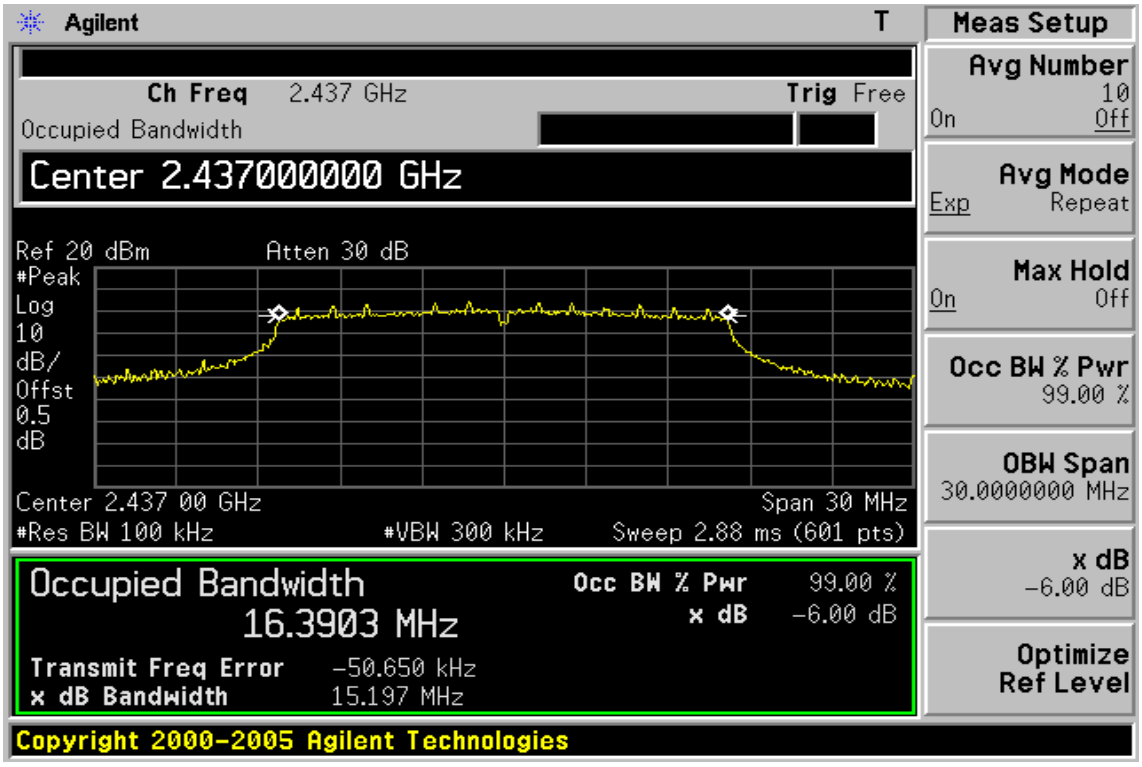
802.11g

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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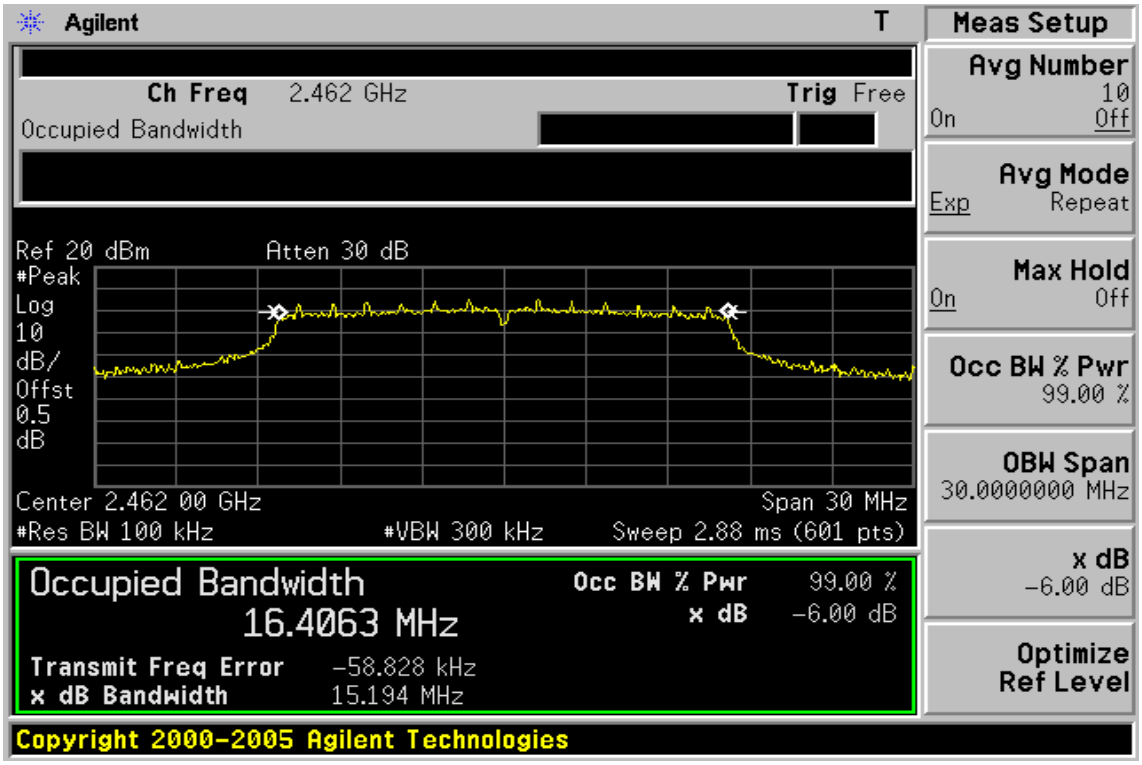
6dB Band Width Test Data CH-High



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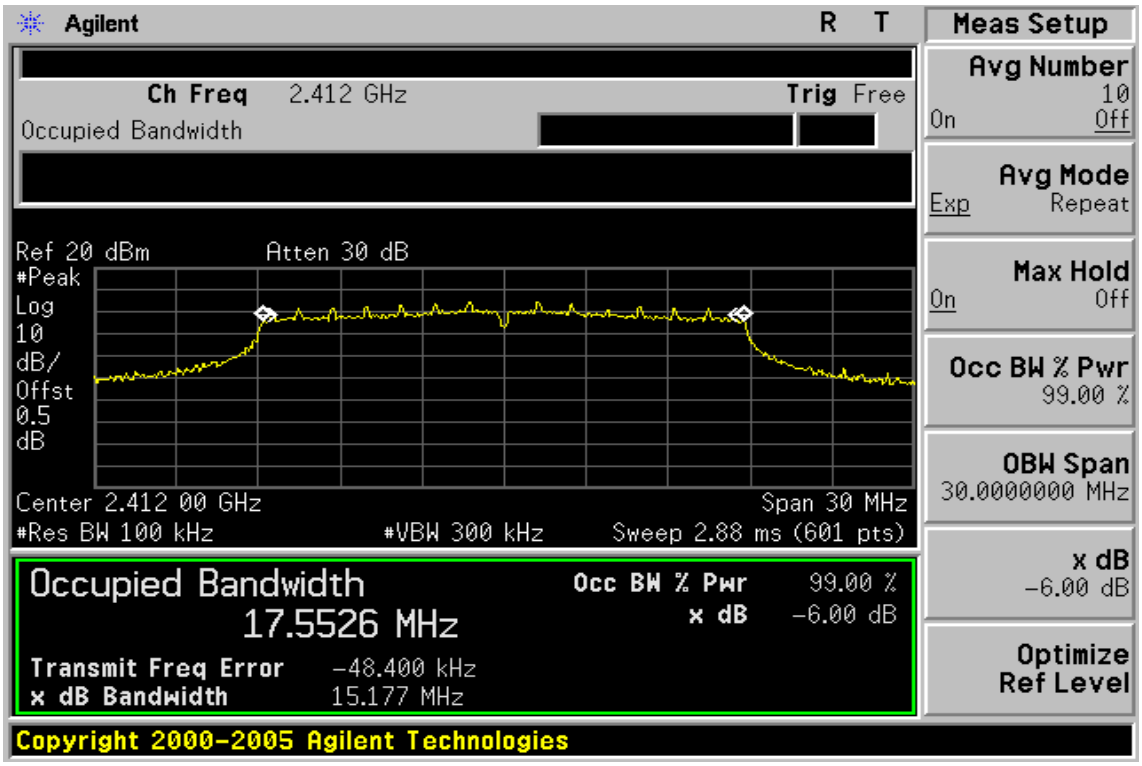
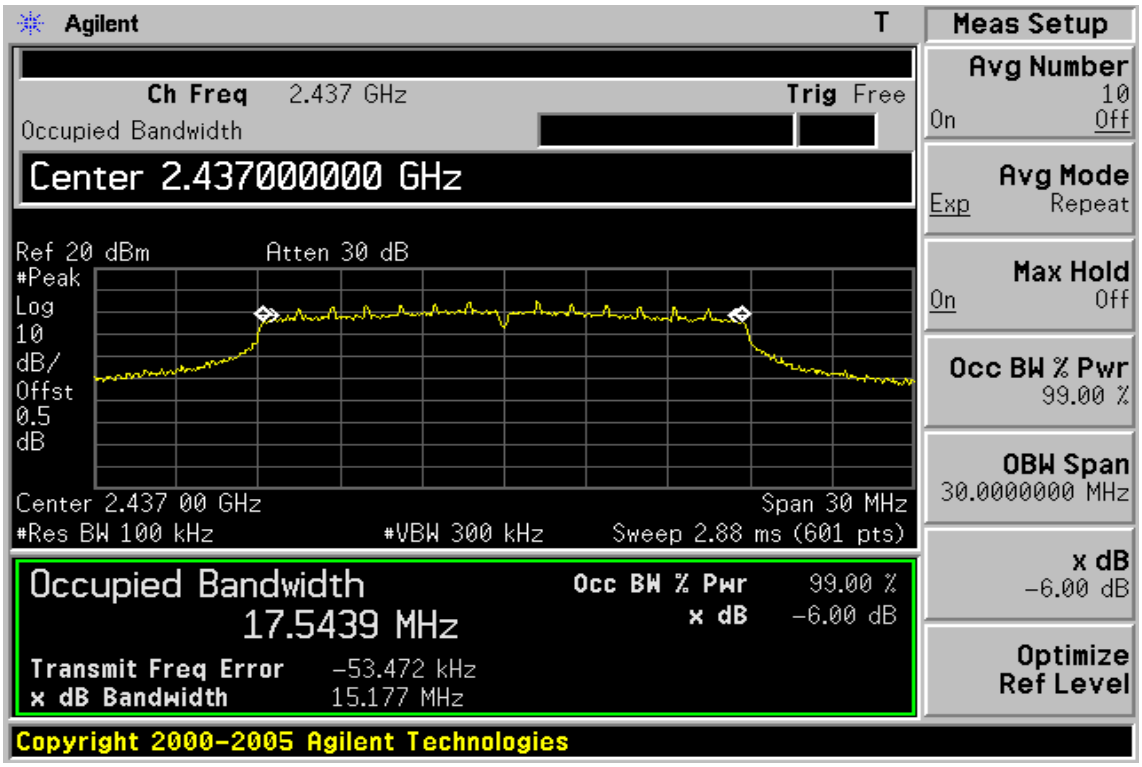
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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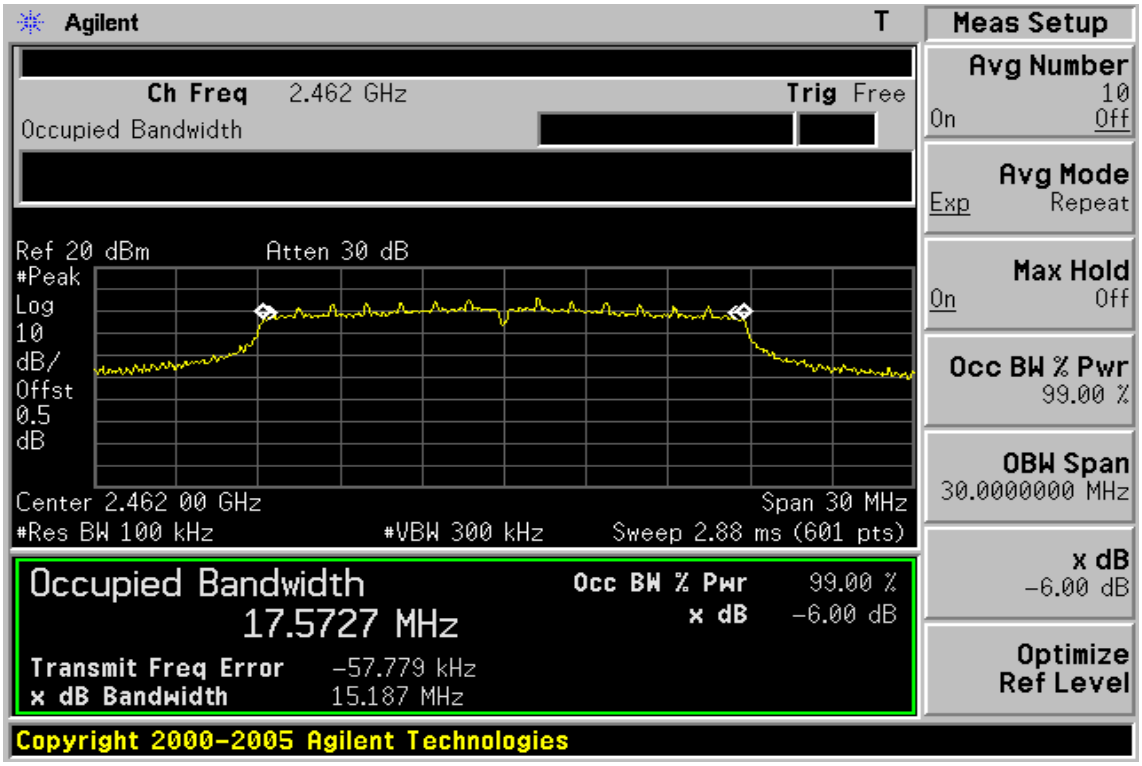
6dB Band Width Test Data CH-High



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8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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 in15.209(a).

8.2 Measurement Equipment Used:

8.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2 Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2011	02/11/2012
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2009	07/07/2011
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/19/2010	11/18/2011
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2010	05/08/2012
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2011	01/04/2012
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	SUCOFLEX 104PEA-10M	10m	01/05/2011	01/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012
3m Site	SGS	966 chamber	N/A	11/08/2010	11/09/2011

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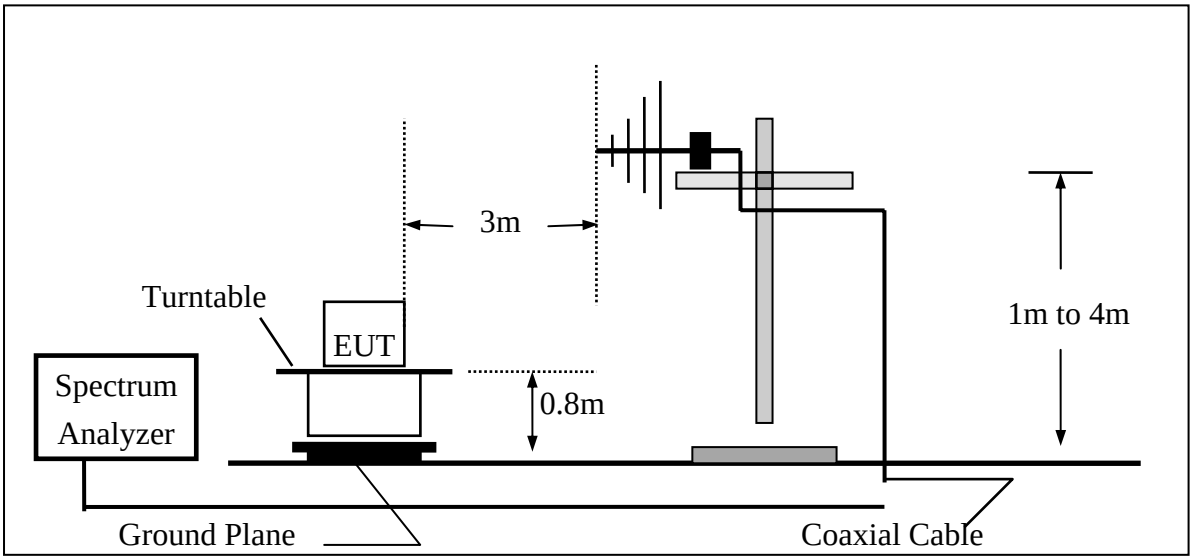
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

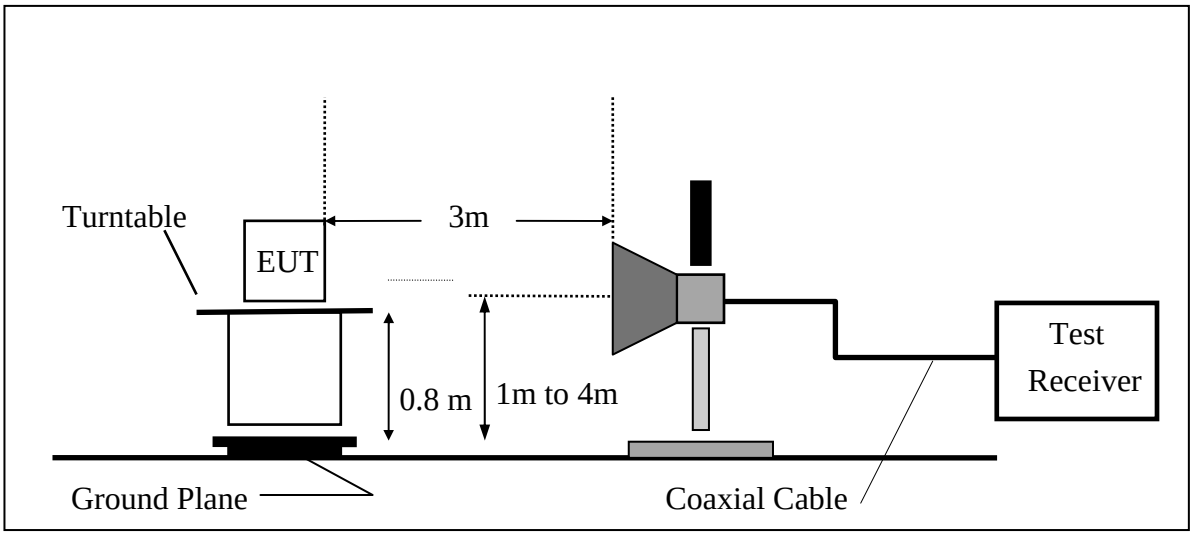
Refer to section 6.3 for details.

8.3.2 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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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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

8.5 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	

8.6 Measurement Result:

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

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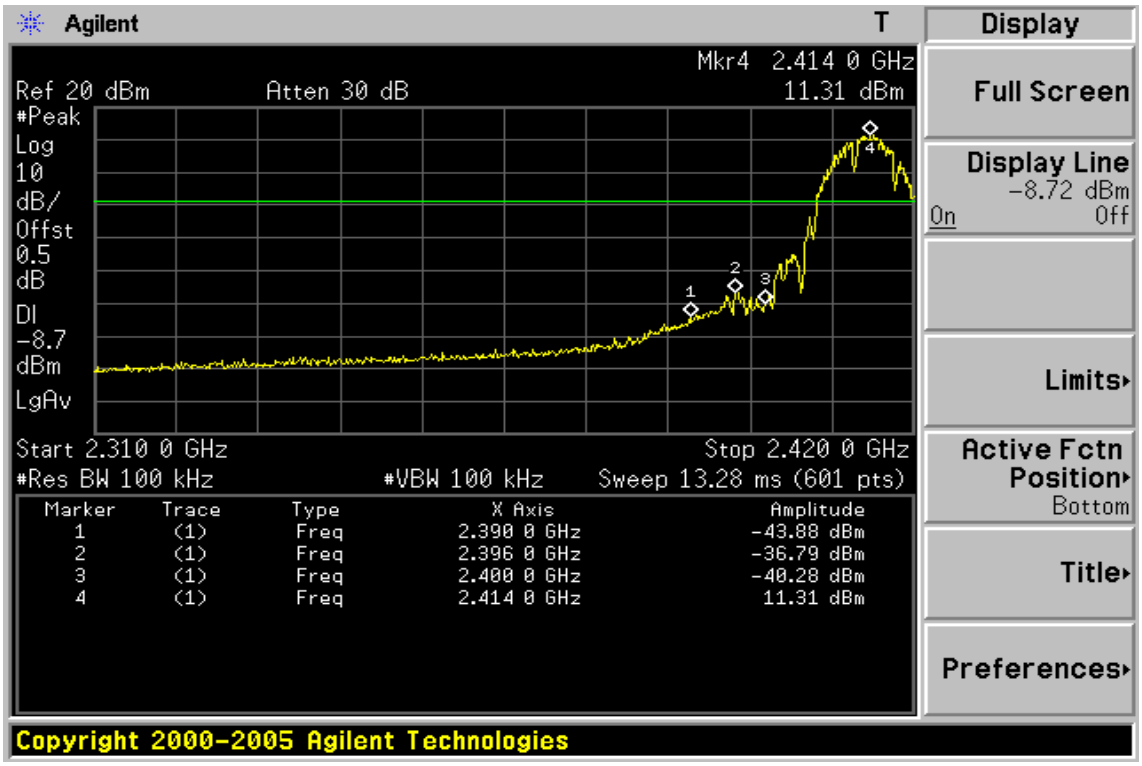
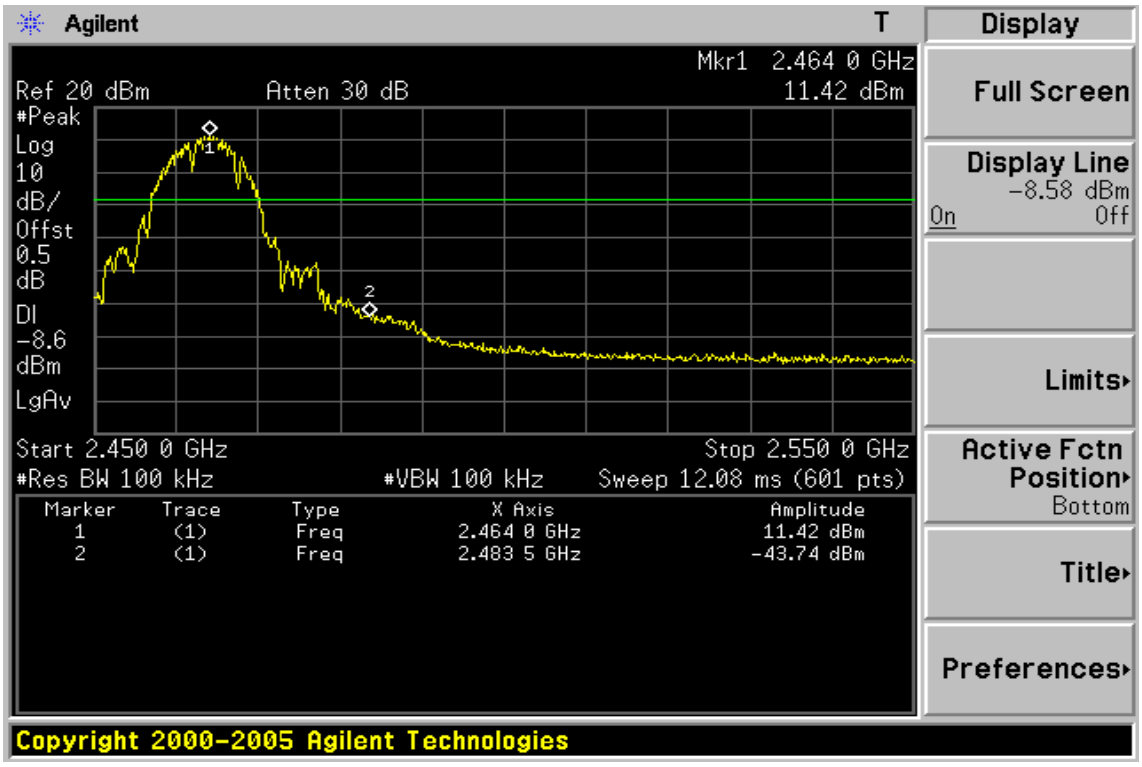
802.11b

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Radiated Emission: 802.11 b mode

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	54.16	45.63	-0.67	53.49	44.96	74.00	54.00	-9.04	Average

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	54.38	46.35	-0.67	53.71	45.68	74.00	54.00	-8.32	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Emission: 802.11 b mode

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	55.02	46.39	-0.52	54.50	45.87	74.00	54.00	-8.13	Average

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	54.35	45.56	-0.52	53.83	45.04	74.00	54.00	-8.96	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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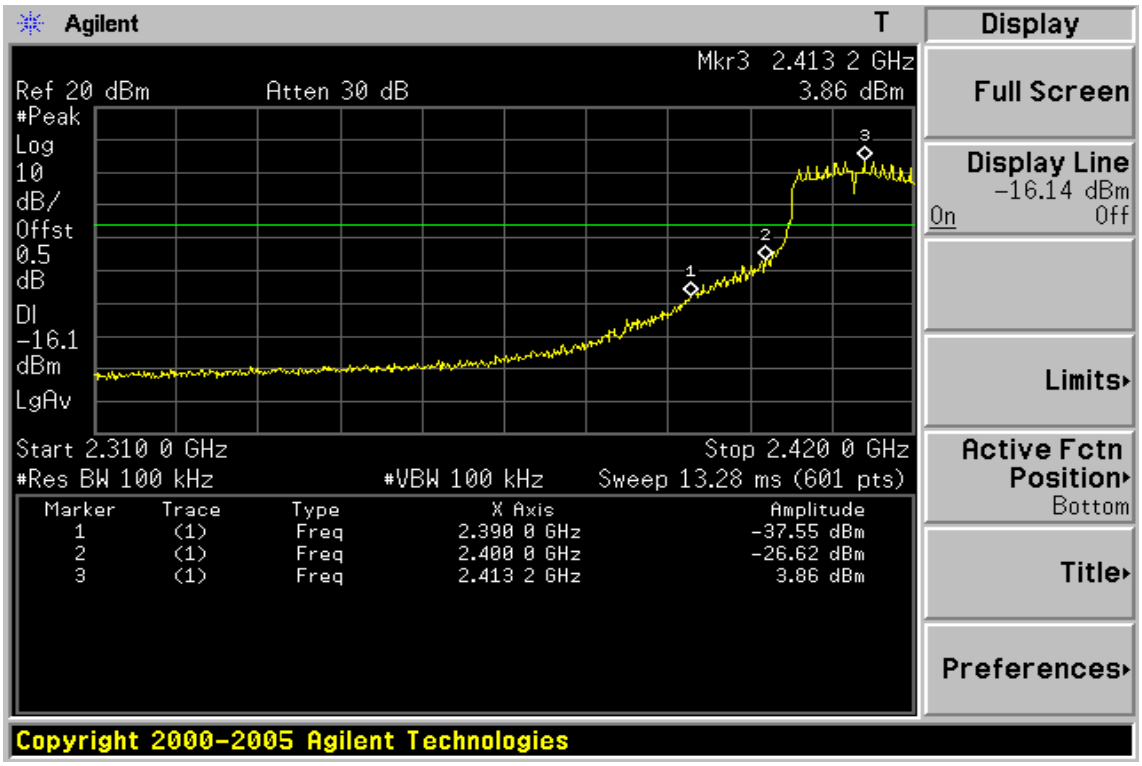
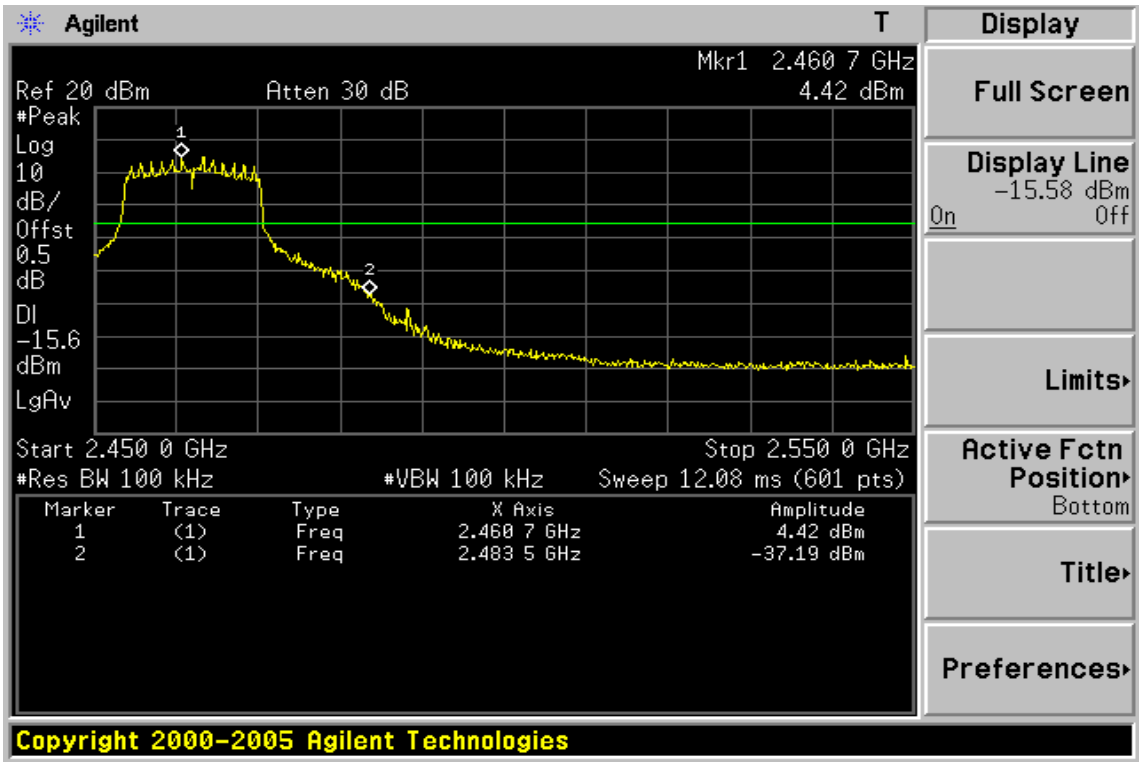
802.11g

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Radiated Emission: 802.11 g mode

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	66.72	49.89	-0.67	66.05	49.22	74.00	54.00	-4.78	Average

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	66.82	50.63	-0.67	66.15	49.96	74.00	54.00	-4.04	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Emission: 802.11 g mode

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	66.52	50.01	-0.52	66.00	49.49	74.00	54.00	-4.51	Average

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	63.79	48.76	-0.52	63.27	48.24	74.00	54.00	-5.76	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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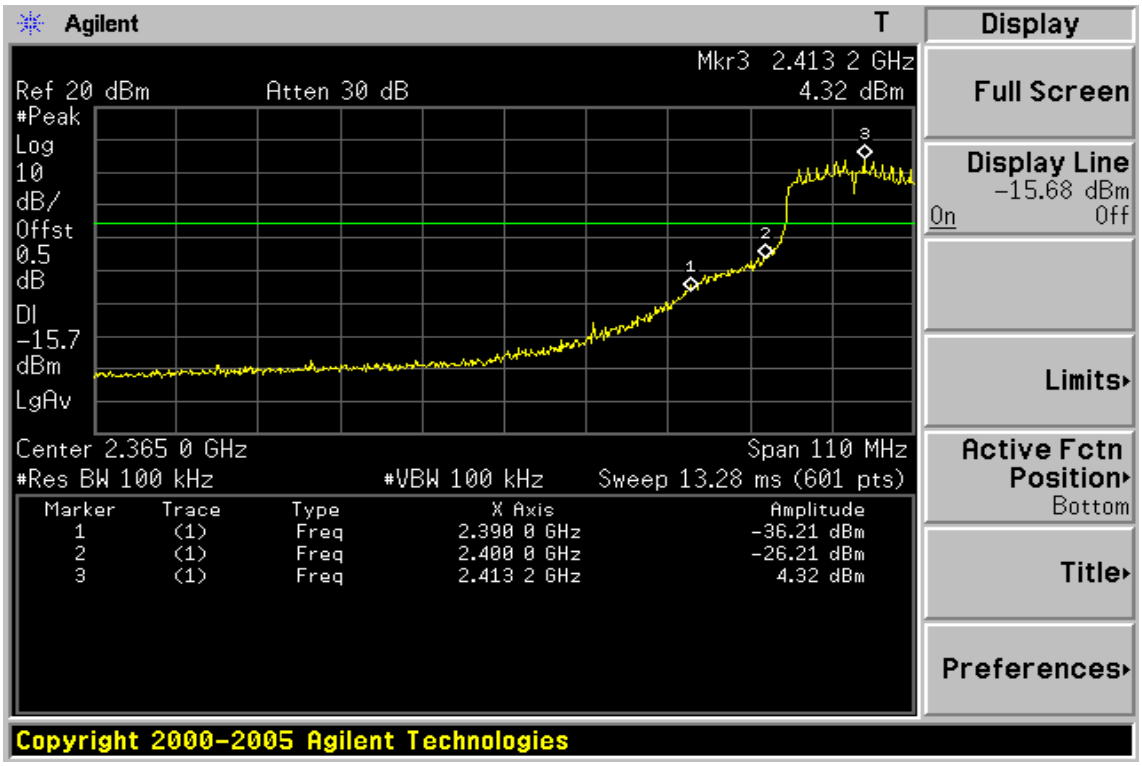
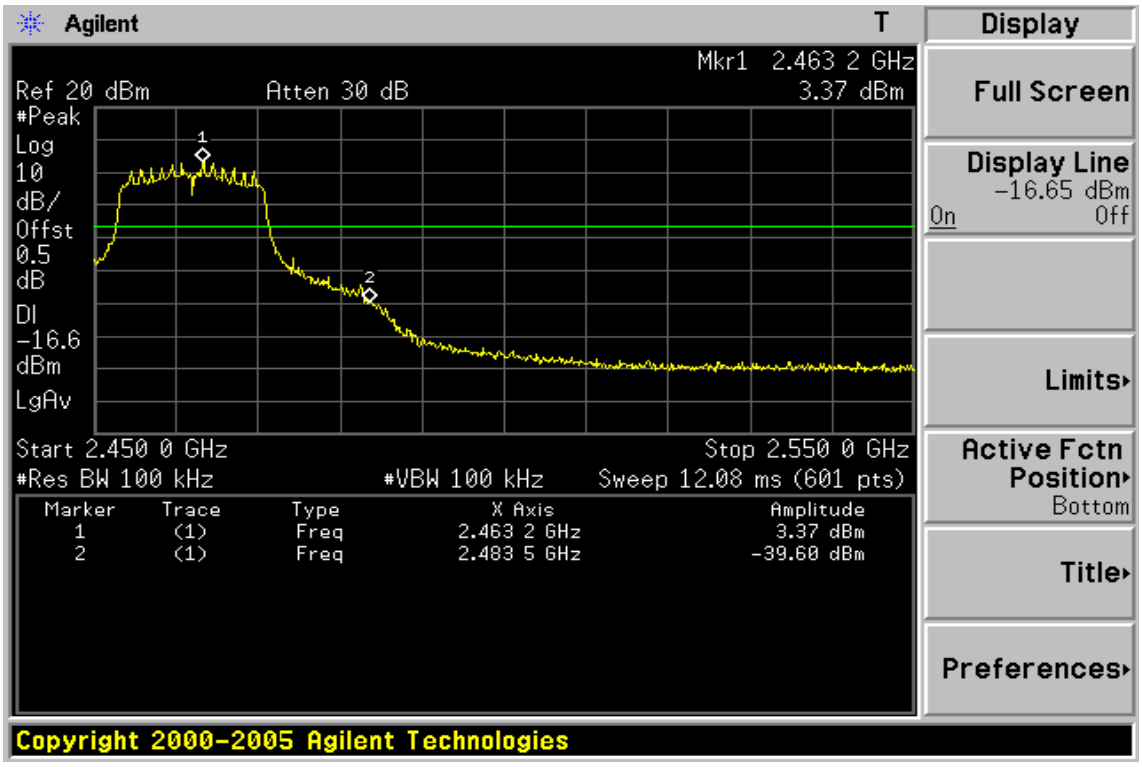
802.11n_20M

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Radiated Emission: 802.11 n_20M mode

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	67.12	51.47	-0.67	66.45	50.80	74.00	54.00	-3.20	Average

Operation Mode	TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.00	69.66	52.12	-0.67	68.99	51.45	74.00	54.00	-2.55	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Emission: 802.11 n_20M mode

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	68.18	50.76	-0.52	67.66	50.24	74.00	54.00	-3.76	Average

Operation Mode	TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462 MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.50	65.84	50.86	-0.52	65.32	50.34	74.00	54.00	-3.66	Average

Remark:

(1) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting: 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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9 SPURIOUS RADIATED EMISSION TEST

9.1 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.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2 Radiated emission:

Refer to section 7.2 for details.

9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2 Radiated emission:

Refer to section 7.3 for details.

9.4 Measurement Procedure:

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.

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9.5 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	

9.6 Measurement Result:

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

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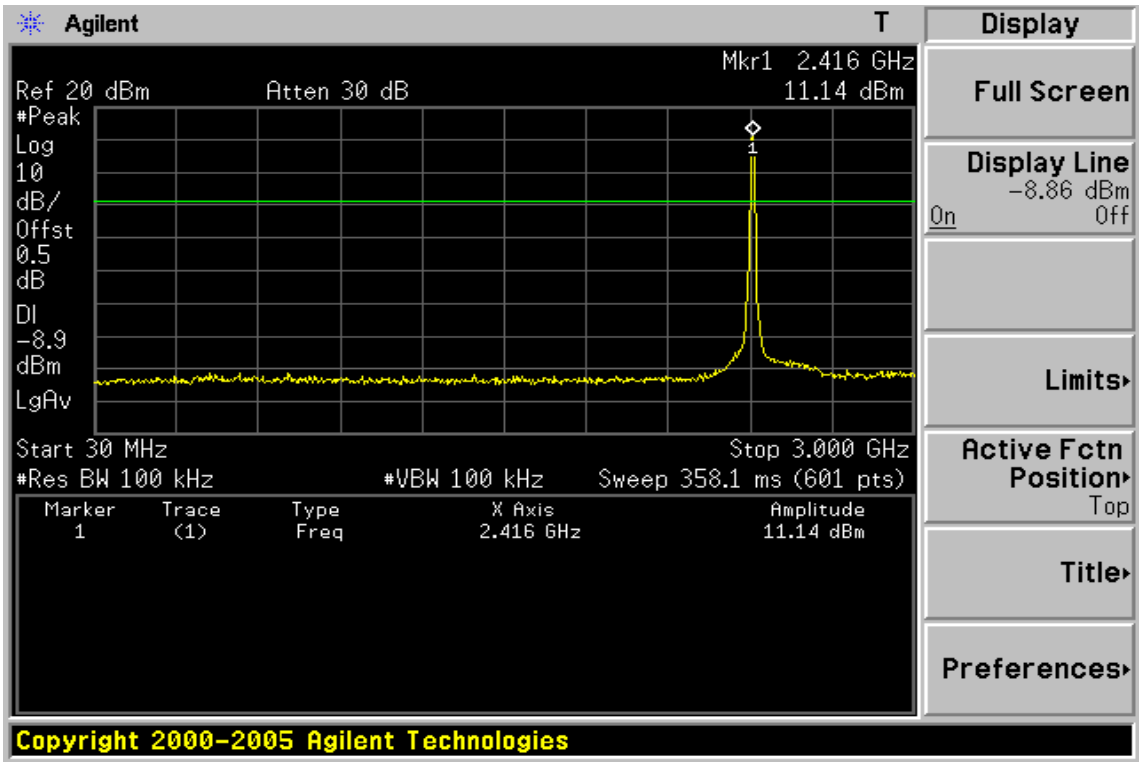
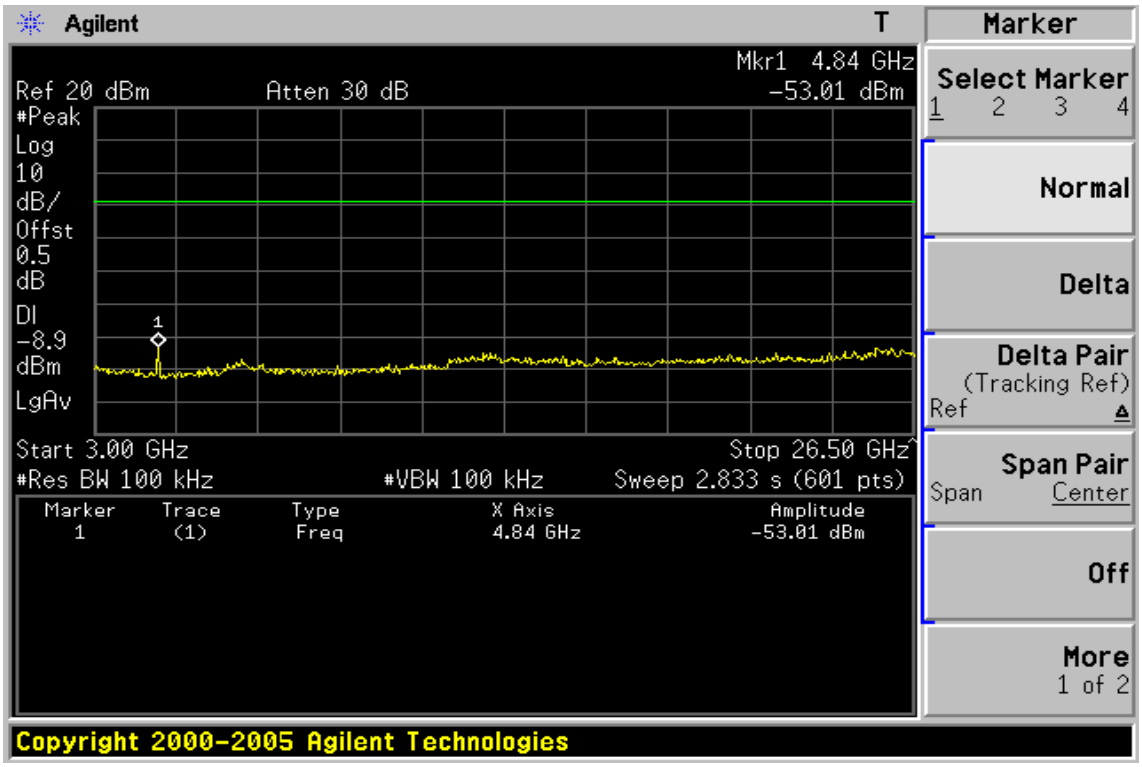
Conducted Spurious Emission Measurement Result (802.11b)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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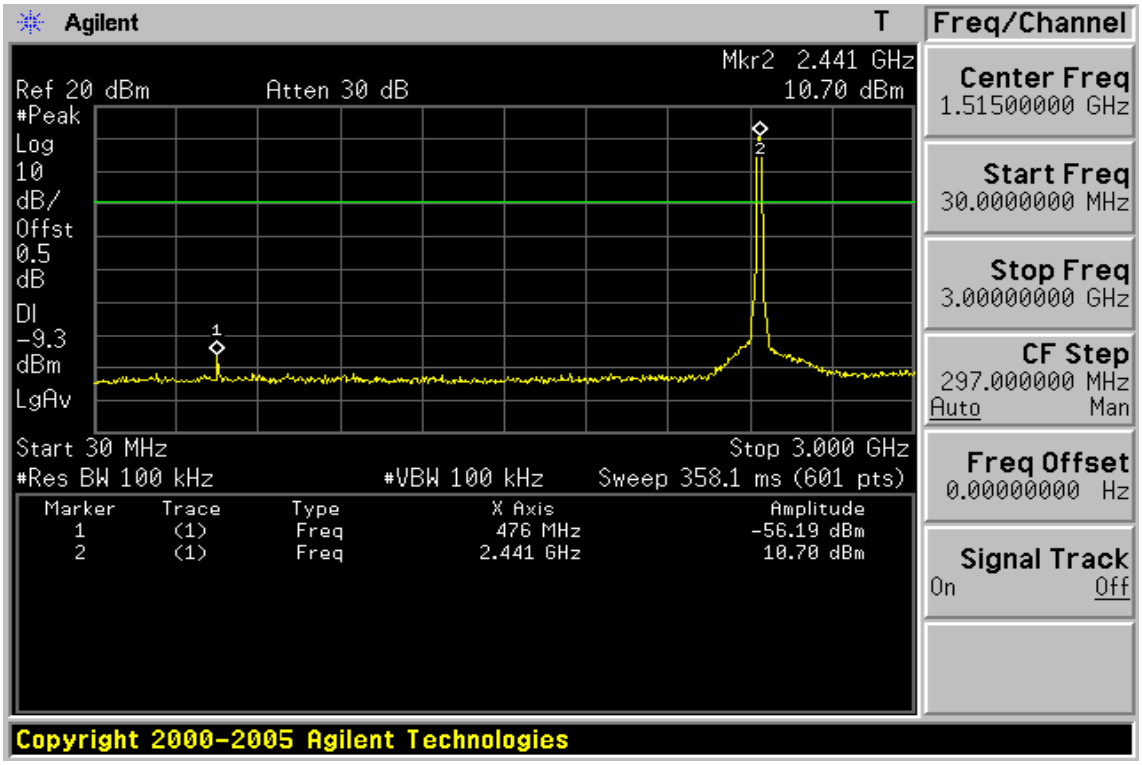
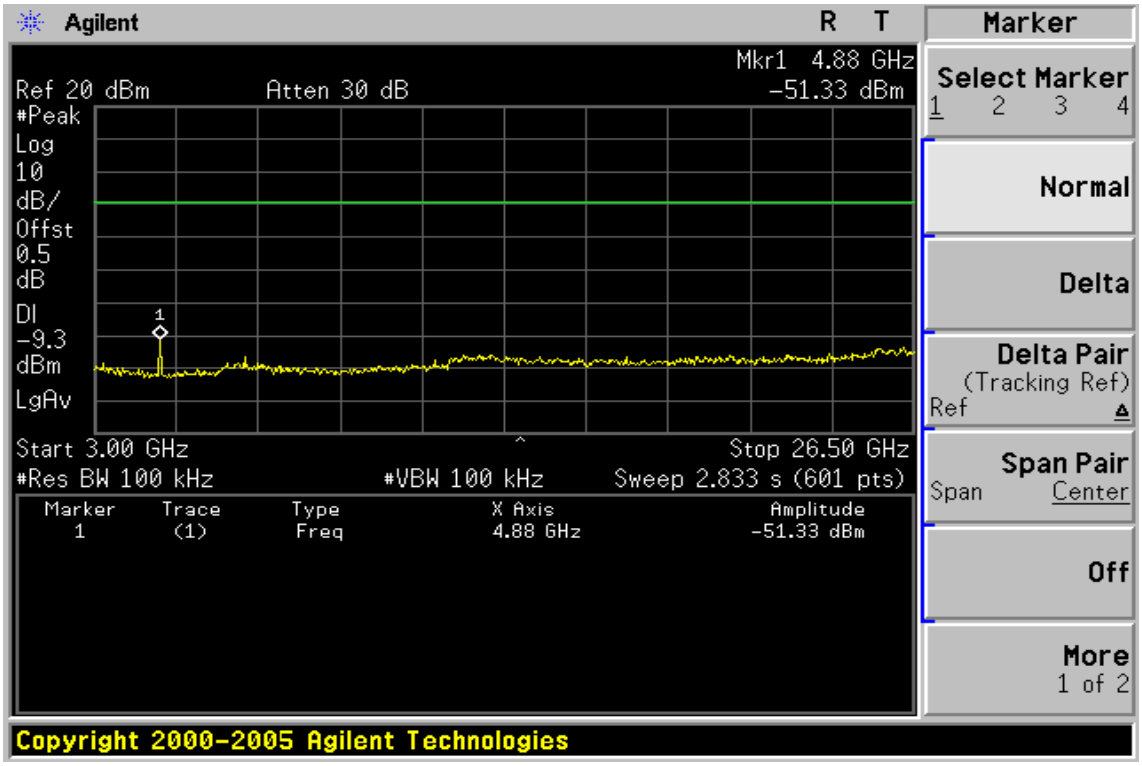
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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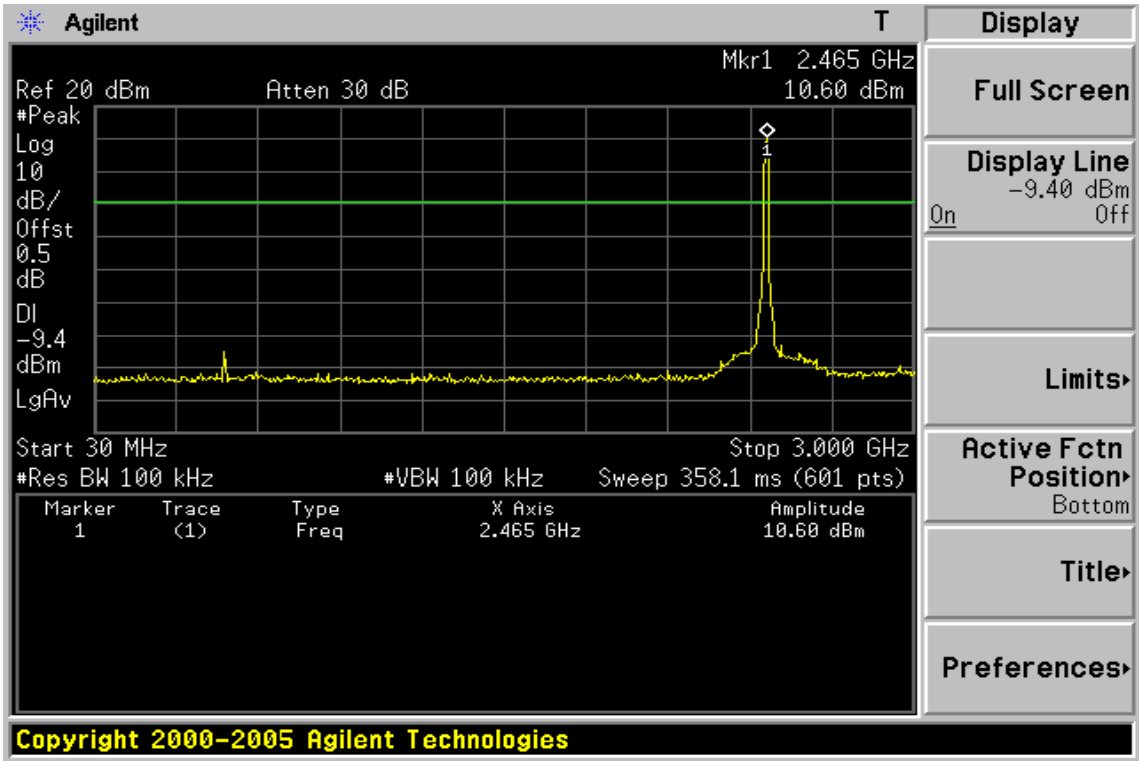
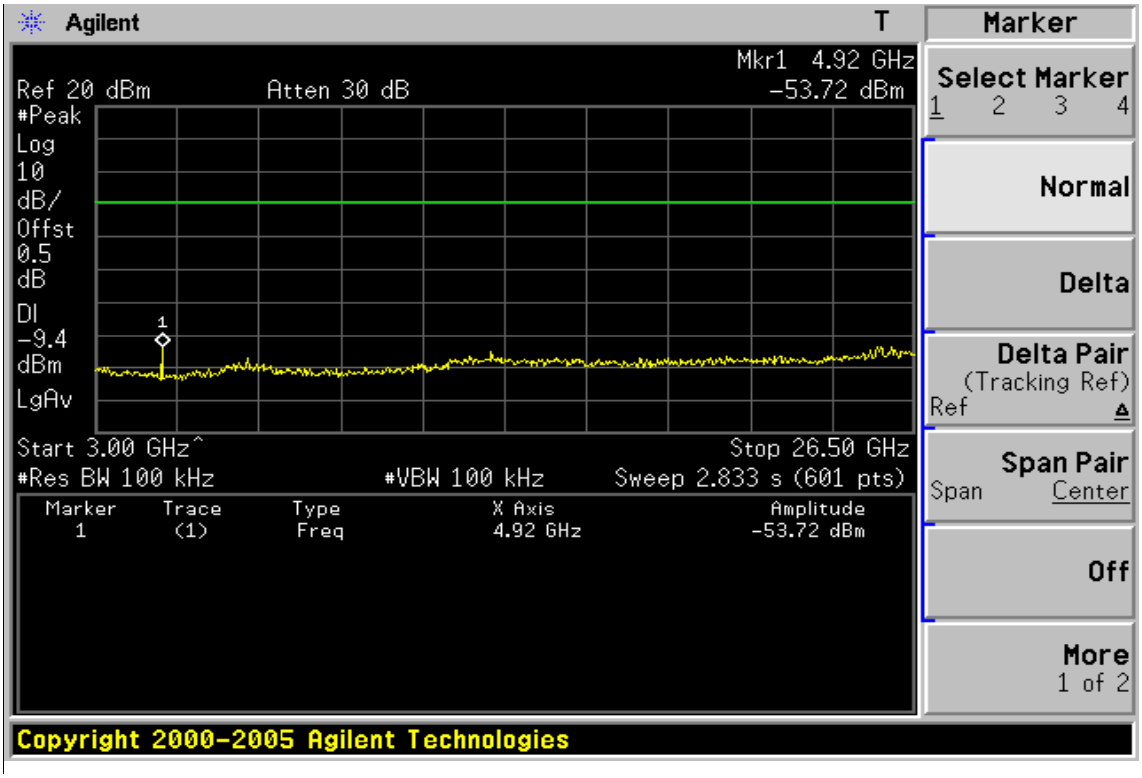
Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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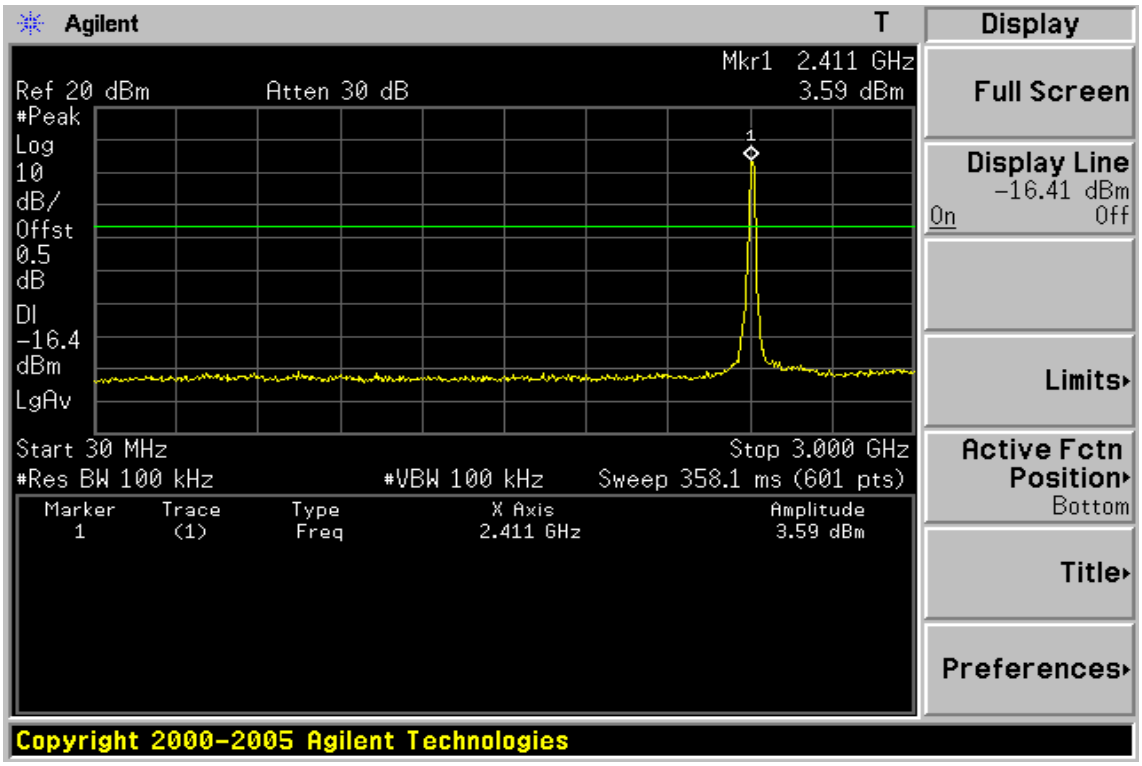
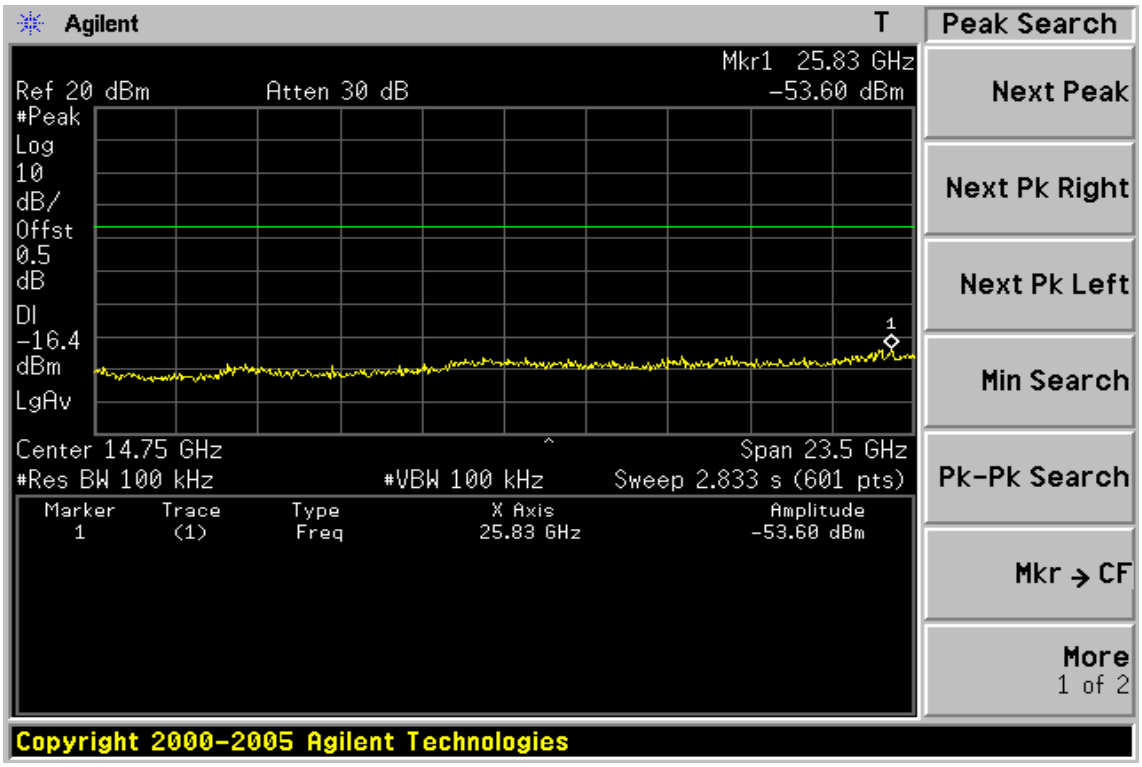
Conducted Spurious Emission Measurement Result (802.11g)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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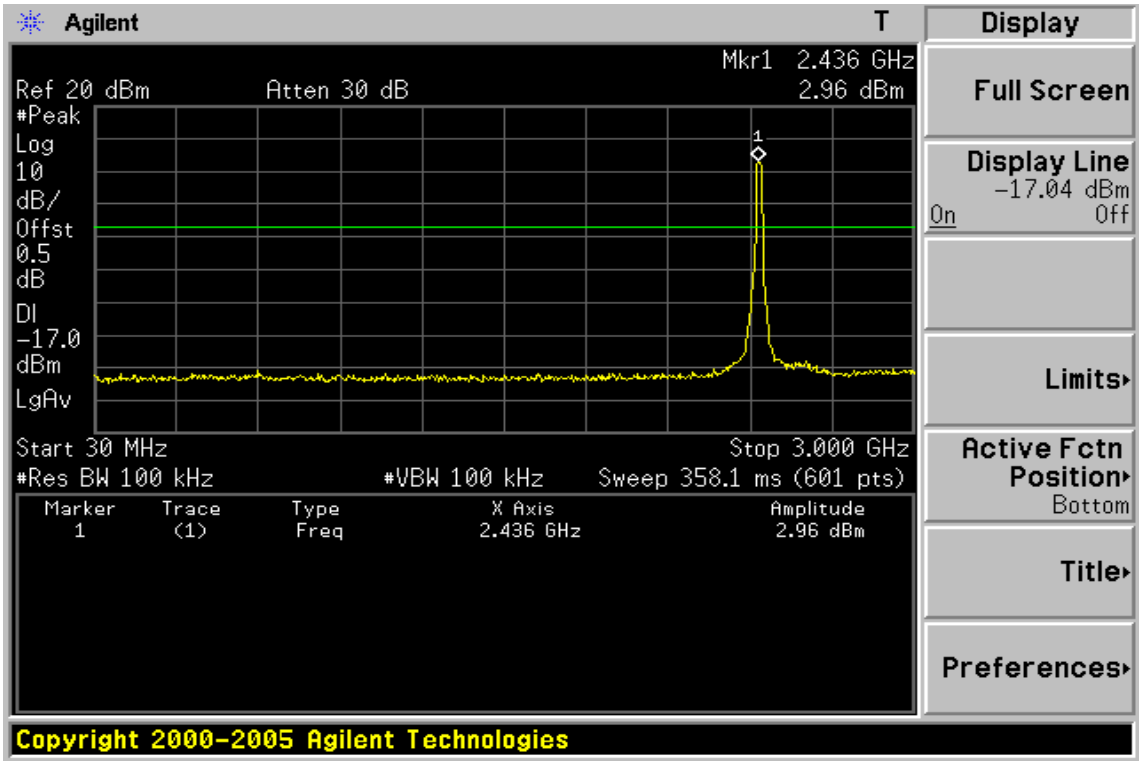
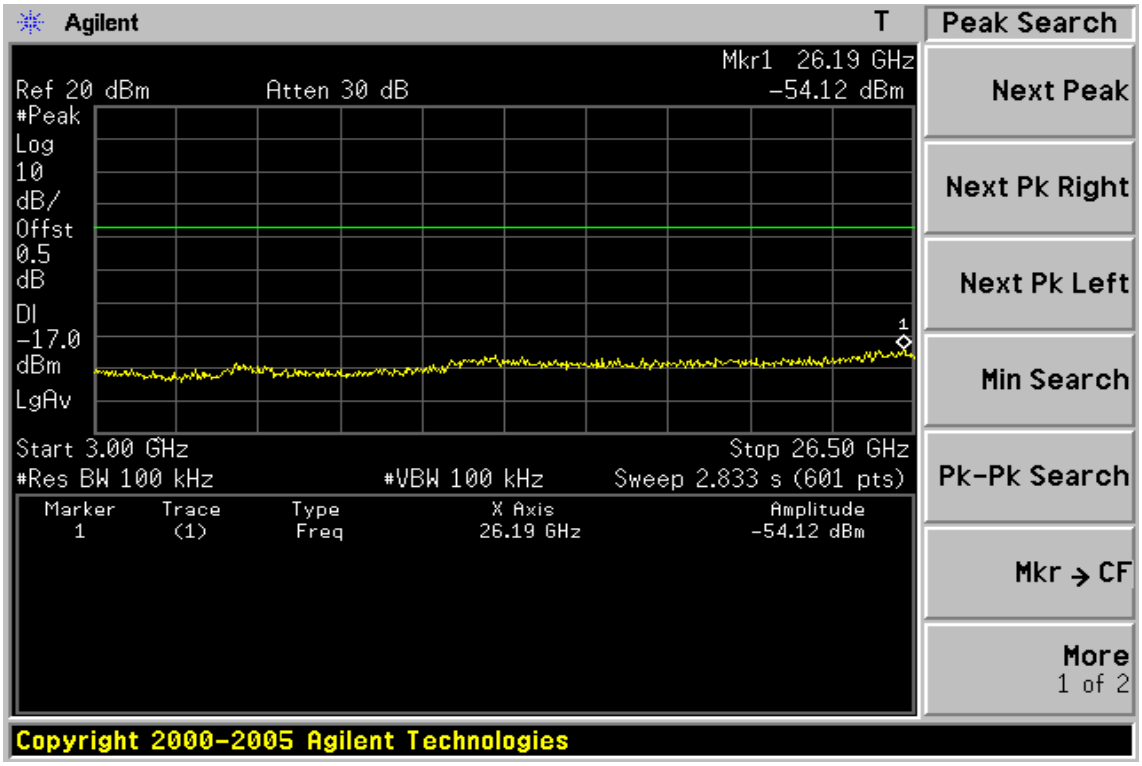
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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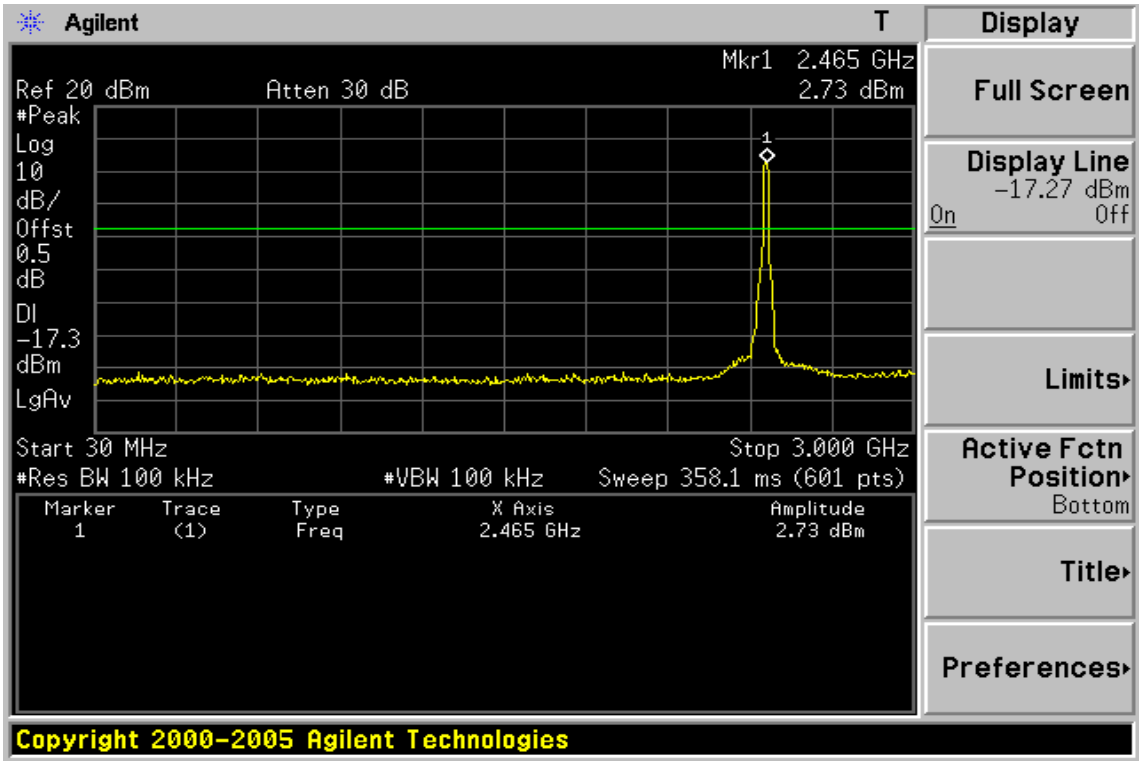
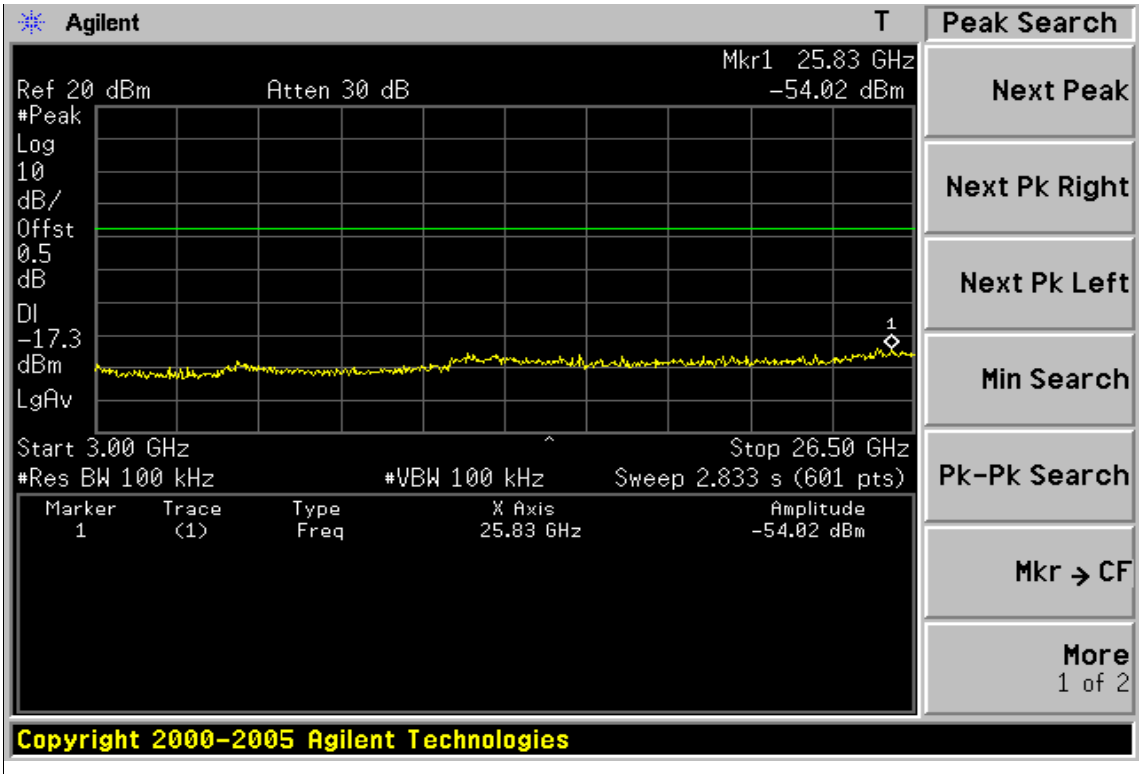
Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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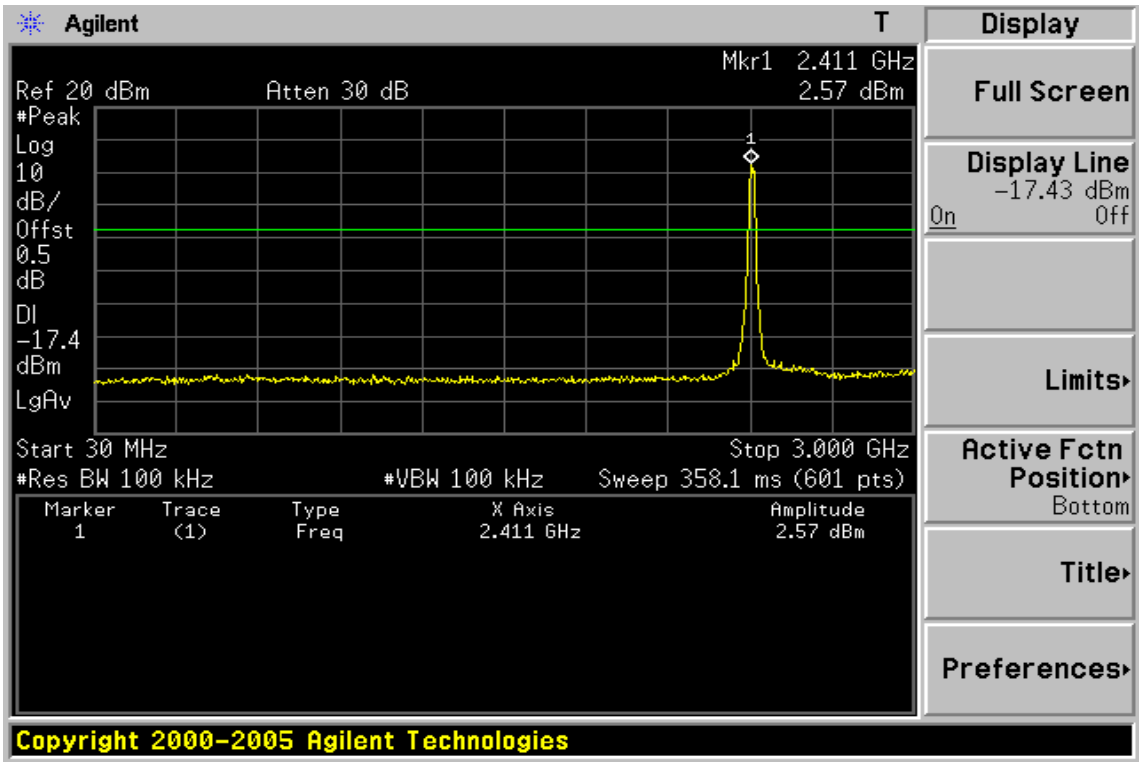
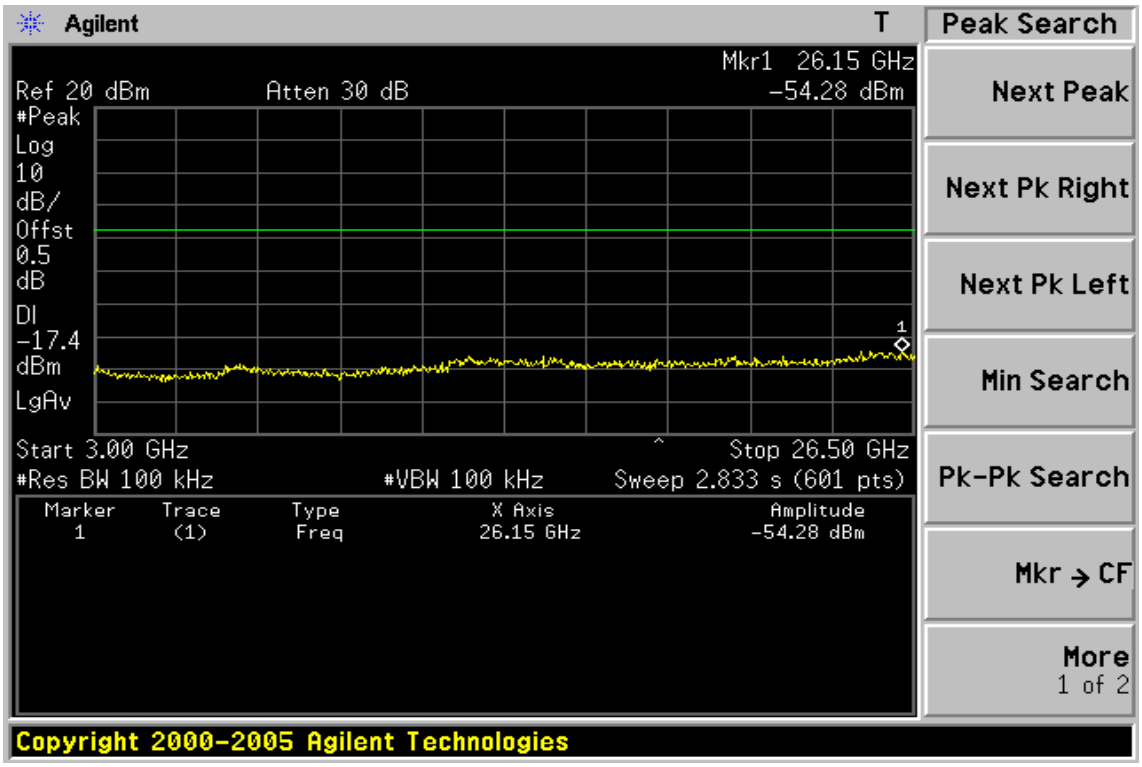
Conducted Spurious Emission Measurement Result (802.11n_20M)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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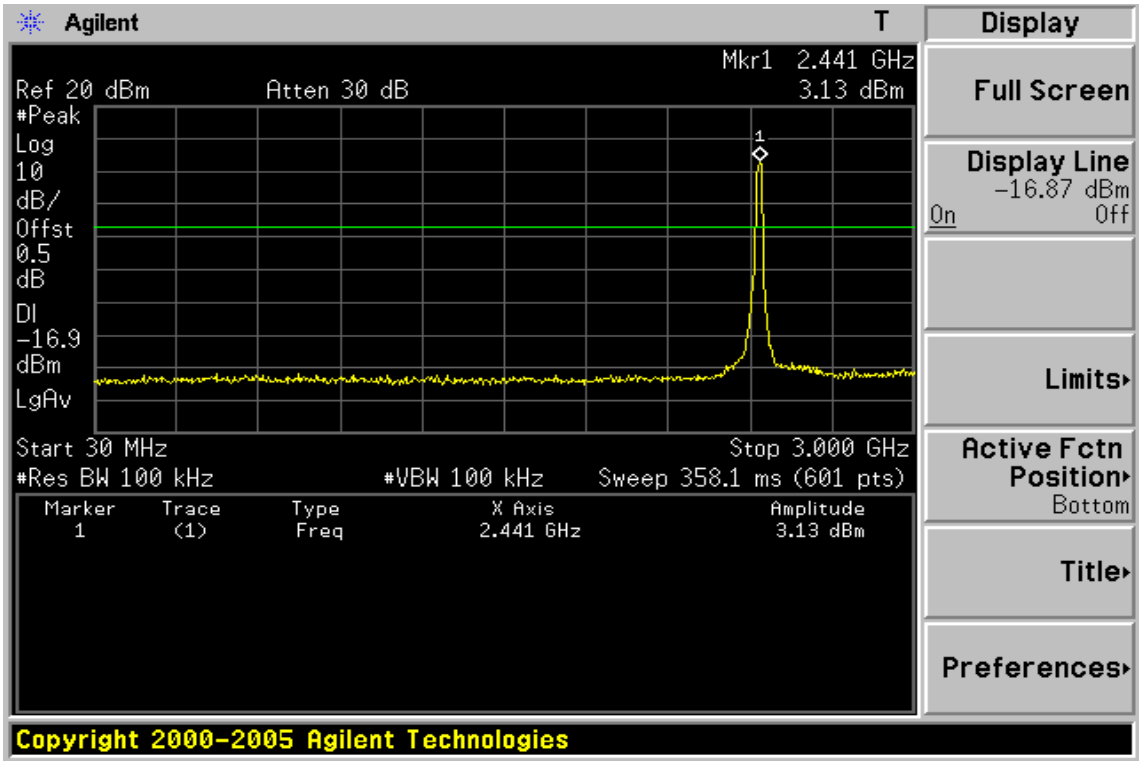
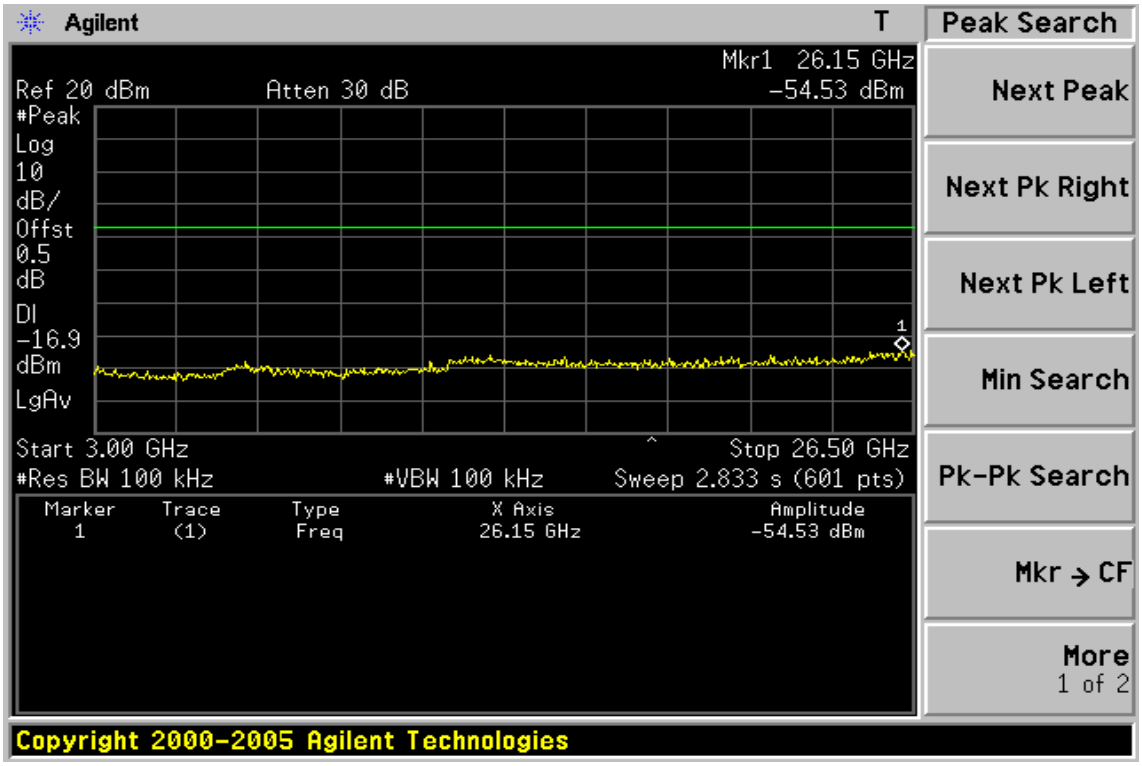
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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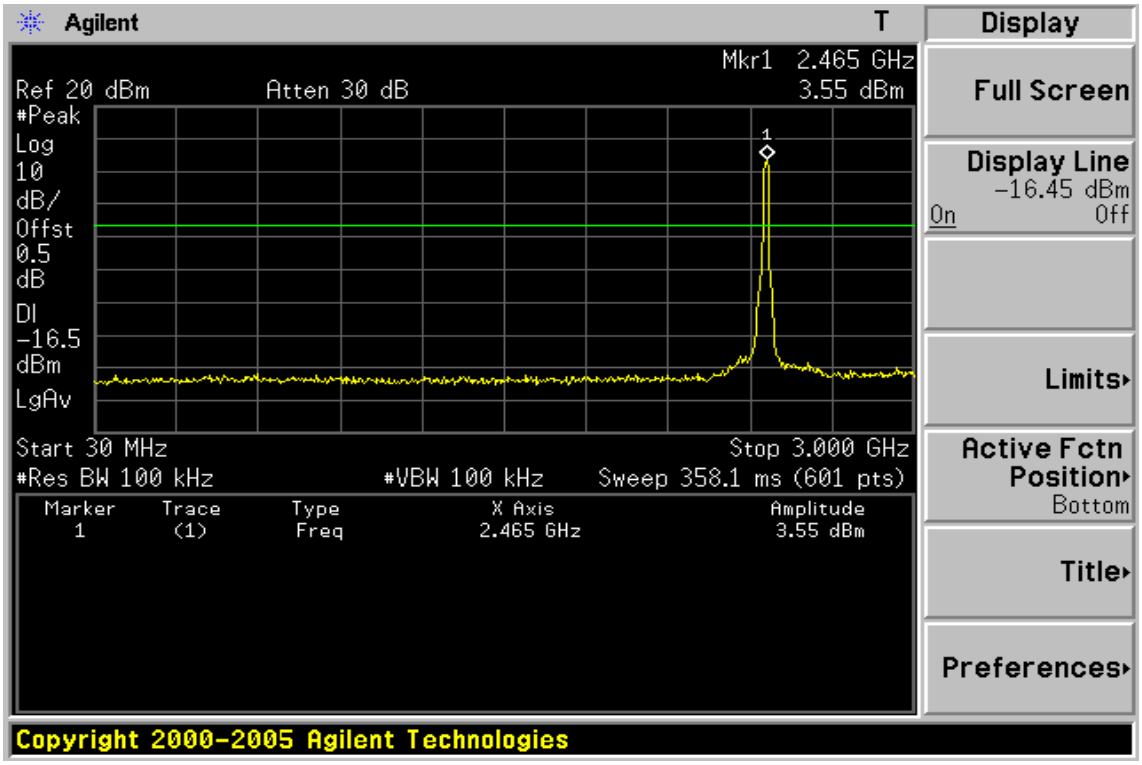
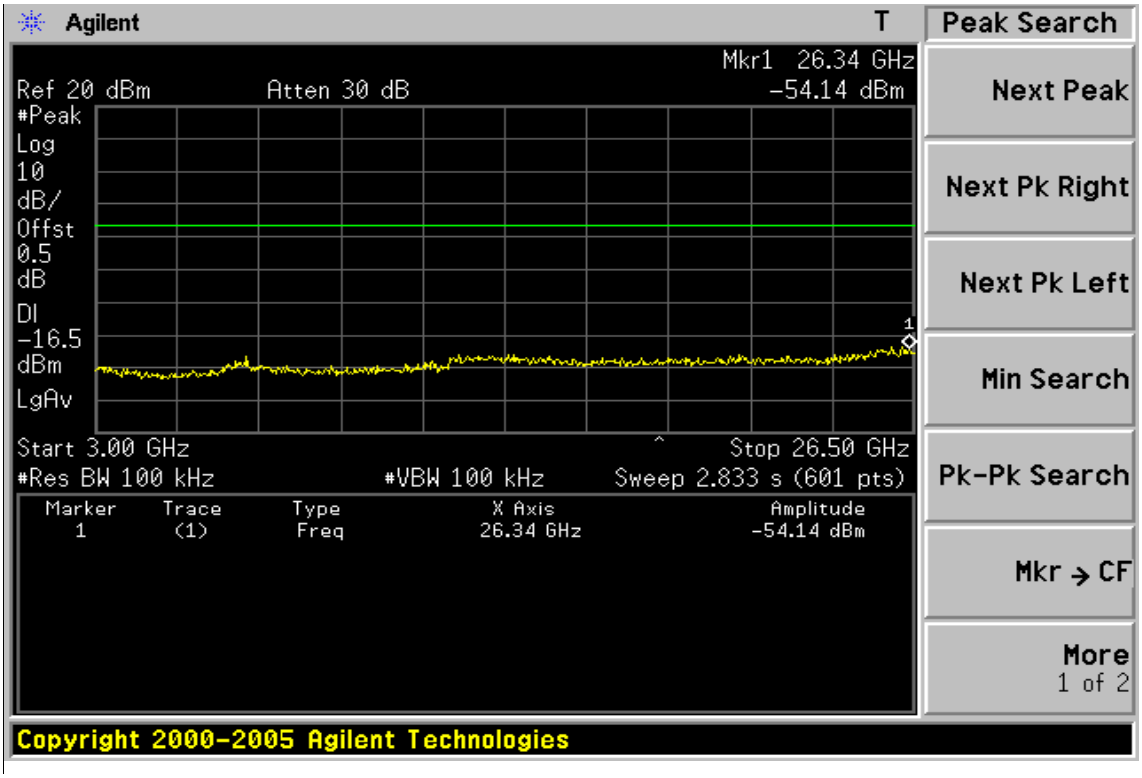
Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11b)

Operation Mode	802.11b TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
57.16	V	Peak	44.76	-14.37	30.39	40.00	-9.61
163.86	V	Peak	47.01	-12.35	34.66	43.50	-8.84
287.05	V	Peak	50.50	-12.77	37.73	46.00	-8.27
427.70	V	Peak	43.66	-10.29	33.37	46.00	-12.63
500.45	V	Peak	45.92	-9.09	36.83	46.00	-9.17
796.30	V	Peak	39.22	-3.70	35.52	46.00	-10.48
59.10	H	Peak	39.18	-14.52	24.66	40.00	-15.34
151.25	H	Peak	43.88	-12.20	31.68	43.50	-11.82
284.14	H	Peak	55.83	-12.86	42.97	46.00	-3.03
427.70	H	Peak	41.80	-10.29	31.51	46.00	-14.49
495.60	H	Peak	40.74	-9.21	31.53	46.00	-14.47
796.30	H	Peak	38.35	-3.70	34.65	46.00	-11.35

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11b)

Operation Mode	802.11b TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	45.48	-14.52	30.96	40.00	-9.04
160.95	V	Peak	46.99	-11.89	35.10	43.50	-8.40
284.14	V	Peak	50.13	-12.86	37.27	46.00	-8.73
427.70	V	Peak	43.77	-10.29	33.48	46.00	-12.52
495.60	V	Peak	44.87	-9.21	35.66	46.00	-10.34
796.30	V	Peak	38.11	-3.70	34.41	46.00	-11.59
59.10	H	Peak	39.37	-14.52	24.85	40.00	-15.15
146.40	H	Peak	44.83	-12.51	32.32	43.50	-11.18
287.05	H	Peak	54.98	-12.77	42.21	46.00	-3.79
427.70	H	Peak	42.86	-10.29	32.57	46.00	-13.43
500.45	H	Peak	41.28	-9.09	32.19	46.00	-13.81
798.24	H	Peak	37.62	-3.68	33.94	46.00	-12.06

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11b)

Operation Mode	802.11b TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	45.51	-14.52	30.99	40.00	-9.01
160.95	V	Peak	46.97	-11.98	34.99	43.50	-8.51
284.14	V	Peak	49.79	-12.86	36.93	46.00	-9.07
427.70	V	Peak	43.86	-10.29	33.57	46.00	-12.43
500.45	V	Peak	46.13	-9.09	37.04	46.00	-8.96
798.24	V	Peak	37.35	-3.68	33.67	46.00	-12.33
59.10	H	Peak	39.49	-14.52	24.97	40.00	-15.03
151.25	H	Peak	45.53	-12.20	33.33	43.50	-10.17
287.05	H	Peak	54.63	-12.77	41.86	46.00	-4.14
425.76	H	Peak	41.72	-10.33	31.39	46.00	-14.61
495.60	H	Peak	39.98	-9.21	30.77	46.00	-15.23
796.30	H	Peak	40.18	-3.70	36.48	46.00	-9.52

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11g)

Operation Mode	802.11g TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	45.81	-14.52	31.29	40.00	-8.71
163.86	V	Peak	46.43	-12.35	34.08	43.50	-9.42
284.14	V	Peak	50.27	-12.86	37.41	46.00	-8.59
427.70	V	Peak	43.32	-10.29	33.03	46.00	-12.97
495.60	V	Peak	45.48	-9.21	36.27	46.00	-9.73
796.30	V	Peak	39.16	-3.70	35.46	46.00	-10.54
59.10	H	Peak	39.10	-14.52	24.58	40.00	-15.42
151.25	H	Peak	44.77	-12.20	32.57	43.50	-10.93
284.14	H	Peak	55.41	-12.86	42.55	46.00	-3.45
384.05	H	Peak	43.52	-11.08	32.44	46.00	-13.56
495.60	H	Peak	40.53	-9.21	31.32	46.00	-14.68
798.24	H	Peak	38.61	-3.68	34.93	46.00	-11.07

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11g)

Operation Mode	802.11g TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	46.15	-14.52	31.63	40.00	-8.37
160.95	V	Peak	45.25	-11.98	33.27	43.50	-10.23
291.90	V	Peak	50.13	-12.64	37.49	46.00	-8.51
427.70	V	Peak	43.13	-10.29	32.84	46.00	-13.16
500.45	V	Peak	45.61	-9.09	36.52	46.00	-9.48
801.15	V	Peak	40.18	-3.65	36.53	46.00	-9.47
59.10	H	Peak	39.83	-14.52	25.31	40.00	-14.69
151.25	H	Peak	44.74	-12.20	32.54	43.50	-10.96
284.14	H	Peak	55.89	-12.86	43.03	46.00	-2.97
384.05	H	Peak	43.37	-11.08	32.29	46.00	-13.71
500.45	H	Peak	40.73	-9.09	31.64	46.00	-14.36
801.15	H	Peak	38.60	-3.65	34.95	46.00	-11.05

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11g)

Operation Mode	802.11g TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	46.63	-14.52	32.11	40.00	-7.89
160.95	V	Peak	46.79	-11.98	34.81	43.50	-8.69
287.05	V	Peak	51.58	-12.77	38.81	46.00	-7.19
427.70	V	Peak	42.47	-10.29	32.18	46.00	-13.82
500.45	V	Peak	46.63	-9.09	37.54	46.00	-8.46
801.15	V	Peak	39.86	-3.65	36.21	46.00	-9.79
59.10	H	Peak	39.73	-14.52	25.21	40.00	-14.79
146.40	H	Peak	45.22	-12.51	32.71	43.50	-10.79
284.14	H	Peak	56.16	-12.86	43.30	46.00	-2.70
384.05	H	Peak	43.31	-11.08	32.23	46.00	-13.77
495.60	H	Peak	40.70	-9.21	31.49	46.00	-14.51
801.15	H	Peak	40.10	-3.65	36.45	46.00	-9.55

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11n_20M)

Operation Mode	802.11g TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	46.81	-14.52	32.29	40.00	-7.71
160.95	V	Peak	46.32	-11.89	34.43	43.50	-9.07
291.90	V	Peak	50.62	-12.64	37.98	46.00	-8.02
427.70	V	Peak	42.61	-10.29	32.32	46.00	-13.68
495.60	V	Peak	47.17	-9.21	37.96	46.00	-8.04
801.15	V	Peak	38.05	-3.65	34.40	46.00	-11.60
59.10	H	Peak	39.84	-14.52	25.32	40.00	-14.68
146.40	H	Peak	44.94	-12.51	32.43	43.50	-11.07
287.05	H	Peak	54.48	-12.77	41.71	46.00	-4.29
384.05	H	Peak	43.75	-11.08	32.67	46.00	-13.33
495.60	H	Peak	41.73	-9.21	32.52	46.00	-13.48
796.30	H	Peak	39.46	-3.70	35.76	46.00	-10.24

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11n_20M)

Operation Mode	802.11g TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	46.76	-14.52	32.24	40.00	-7.76
160.95	V	Peak	45.19	-11.98	33.21	43.50	-10.29
284.14	V	Peak	51.20	-12.86	38.34	46.00	-7.66
427.70	V	Peak	44.32	-10.29	34.03	46.00	-11.97
500.45	V	Peak	46.18	-9.09	37.09	46.00	-8.91
796.30	V	Peak	40.78	-3.70	37.08	46.00	-8.92
59.10	H	Peak	39.73	-14.52	25.21	40.00	-14.79
148.34	H	Peak	45.68	-12.36	33.32	43.50	-10.18
284.14	H	Peak	57.11	-12.86	44.25	46.00	-1.75
384.05	H	Peak	43.56	-11.08	32.48	46.00	-13.52
495.60	H	Peak	41.26	-9.21	32.05	46.00	-13.95
798.24	H	Peak	38.24	-3.68	34.56	46.00	-11.44

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) (802.11n_20M)

Operation Mode	802.11g TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
59.10	V	Peak	45.60	-14.52	31.08	40.00	-8.92
160.95	V	Peak	45.04	-11.98	33.06	43.50	-10.44
284.14	V	Peak	50.39	-12.86	37.53	46.00	-8.47
427.70	V	Peak	44.00	-10.29	33.71	46.00	-12.29
500.45	V	Peak	45.55	-9.09	36.46	46.00	-9.54
796.30	V	Peak	38.64	-3.70	34.94	46.00	-11.06
59.10	H	Peak	39.68	-14.52	25.16	40.00	-14.84
151.25	H	Peak	44.40	-12.20	32.20	43.50	-11.30
284.14	H	Peak	56.27	-12.86	43.41	46.00	-2.59
384.05	H	Peak	42.75	-11.08	31.67	46.00	-14.33
495.60	H	Peak	41.39	-9.21	32.18	46.00	-13.82
796.30	H	Peak	39.17	-3.70	35.47	46.00	-10.53

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	45.51	---	-4.35	41.16	---	74.00	54.00	-12.84	Peak
4824.0	35.05	---	5.3	40.35	---	74.00	54.00	-13.65	Peak
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.54	---	-4.35	36.19	---	74.00	54.00	-17.81	Peak
4824.0	32.67	---	5.3	37.97	---	74.00	54.00	-16.03	
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	46.3	---	-4.35	41.95	---	74.00	54.00	-12.05	Peak
2007.5	39.71	---	-2.97	36.74	---	74.00	54.00	-17.26	Peak
4874.0	34.5	---	5.42	39.92	---	74.00	54.00	-14.08	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1247.0	36.96	---	-4.93	32.03	---	74.00	54.00	-21.97	Peak
1598.0	40.13	---	-4.35	35.78	---	74.00	54.00	-18.22	Peak
4874.0	31.59	---	5.42	37.01	---	74.00	54.00	-16.99	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	45.92	---	-4.35	41.57	---	74.00	54.00	-12.43	Peak
4924.0	35.3	---	5.56	40.86	---	74.00	54.00	-13.14	Peak
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11b)

Operation Mode	802.11b TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	43.65	---	-4.35	39.30	---	74.00	54.00	-14.70	Peak
4924.0	32.89	---	5.56	38.45	---	74.00	54.00	-15.55	Peak
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	44.11	---	-4.35	39.76	---	74.00	54.00	-14.24	Peak
4824.0	30.56	---	5.36	35.92	---	74.00	54.00	-18.08	Peak
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1637.0	40.93	---	-4.44	36.49	---	74.00	54.00	-17.51	Peak
4824.0	29.66	---	5.51	35.17	---	74.00	54.00	-18.83	Peak
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	43.24	---	-4.35	38.89	---	74.00	54.00	-15.11	Peak
4874.0	30.62	---	5.67	36.29	---	74.00	54.00	-17.71	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.4	---	-4.35	36.05	---	74.00	54.00	-17.95	Peak
4874.0	29.8	---	5.6	35.40	---	74.00	54.00	-18.60	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	45.15	---	-4.35	40.80	---	74.00	54.00	-13.20	Peak
4924.0	29.61	---	5.62	35.23	---	74.00	54.00	-18.77	Peak
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11g)

Operation Mode	802.11g TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.24	---	-4.35	35.89	---	74.00	54.00	-18.11	Peak
4924.0	29.65	---	5.62	35.27	---	74.00	54.00	-18.73	Peak
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	45.13	---	-4.35	40.78	---	74.00	54.00	-13.22	Peak
2417.0	35.44	---	-0.48	34.96	---	74.00	54.00	-19.04	Peak
4824.0	---					74.00	54.00		
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH Low	Test Date	Mar. 24, 2011
Fundamental Frequency	2412MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.09	---	-4.35	35.74	---	74.00	54.00	-18.26	Peak
2417.0	35.7	---	-0.48	35.22	---	74.00	54.00	-18.78	Peak
4824.0	---					74.00	54.00		
7236.0	----					74.00	54.00		
9648.0	----					74.00	54.00		
12060.0	----					74.00	54.00		
14472.0	----					74.00	54.00		
16884.0	----					74.00	54.00		
19296.0	----					74.00	54.00		
21708.0	----					74.00	54.00		
24120.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	45.84	---	-4.35	41.49	---	74.00	54.00	-12.51	Peak
4874.0	29.90	---	5.3	35.20	---	74.00	54.00	-18.80	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH Mid	Test Date	Mar. 24, 2011
Fundamental Frequency	2437MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.51	---	-4.35	36.16	---	74.00	54.00	-17.84	Peak
4874.0	30.61	---	5.42	36.03	---	74.00	54.00	-17.97	Peak
7311.0	----					74.00	54.00		
9748.0	----					74.00	54.00		
12185.0	----					74.00	54.00		
14622.0	----					74.00	54.00		
17059.0	----					74.00	54.00		
19496.0	----					74.00	54.00		
21933.0	----					74.00	54.00		
24370.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	43.45	---	-4.35	39.10	---	74.00	54.00	-14.90	Peak
4924.0	---					74.00	54.00		
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) (802.11n_20M)

Operation Mode	802.11n_20M TX CH High	Test Date	Mar. 24, 2011
Fundamental Frequency	2462MHz	Test By	Jason
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
1598.0	40.12	---	-4.35	35.77	---	74.00	54.00	-18.23	Peak
4924.0	---					74.00	54.00		
7386.0	----					74.00	54.00		
9848.0	----					74.00	54.00		
12310.0	----					74.00	54.00		
14772.0	----					74.00	54.00		
17234.0	----					74.00	54.00		
19696.0	----					74.00	54.00		
22158.0	----					74.00	54.00		
24620.0	----					74.00	54.00		

Remark:

1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

2 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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10 Peak Power Spectral Density

10.1 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.

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 6.3 for details.

10.4 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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10.5 Measurement Result:

802.11b

Frequency MHz	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-1.30	0.00	-1.30	8
2437	-1.41	0.00	-1.41	8
2462	-1.71	0.00	-1.71	8

**Offset 0.5 dB*

802.11g

Frequency MHz	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-10.72	0.00	-10.72	8
2437	-10.44	0.00	-10.44	8
2462	-10.82	0.00	-10.82	8

**Offset 0.5 dB*

802.11n_20M

Frequency MHz	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2412	-10.25	0.00	-10.25	8
2437	-9.41	0.00	-9.41	8
2462	-10.21	0.00	-10.21	8

**Offset 0.5 dB*

Note: Refer to next page for plots.

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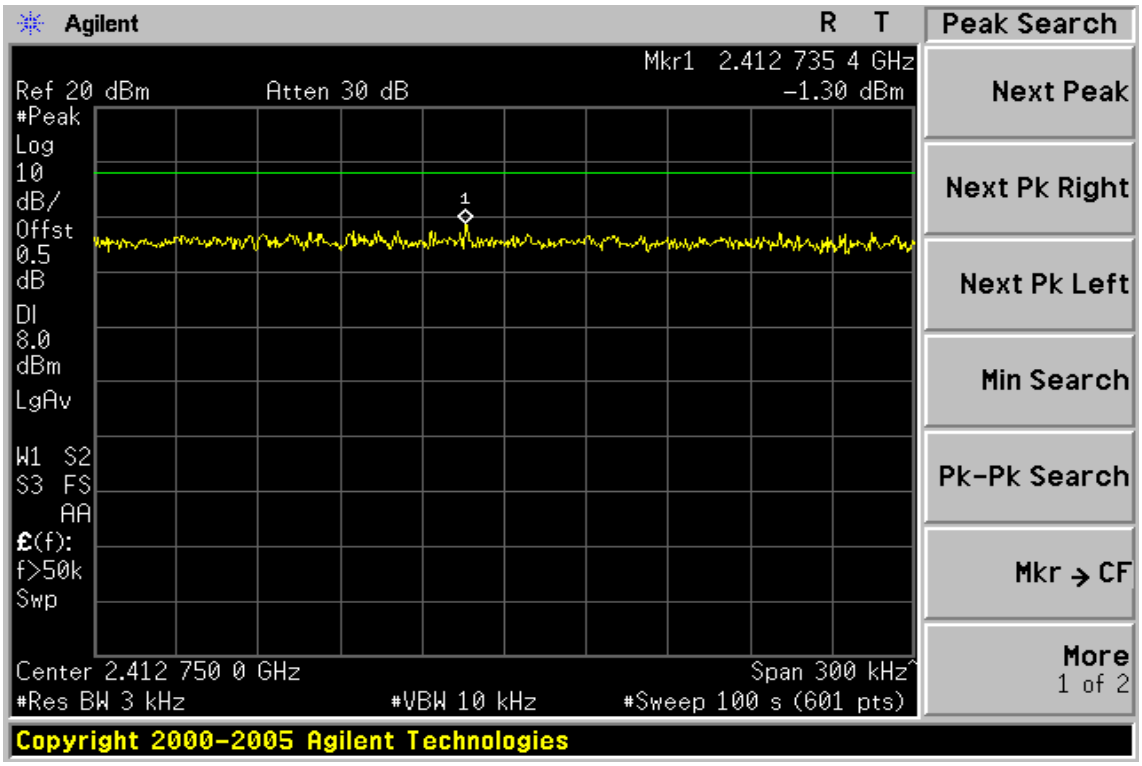
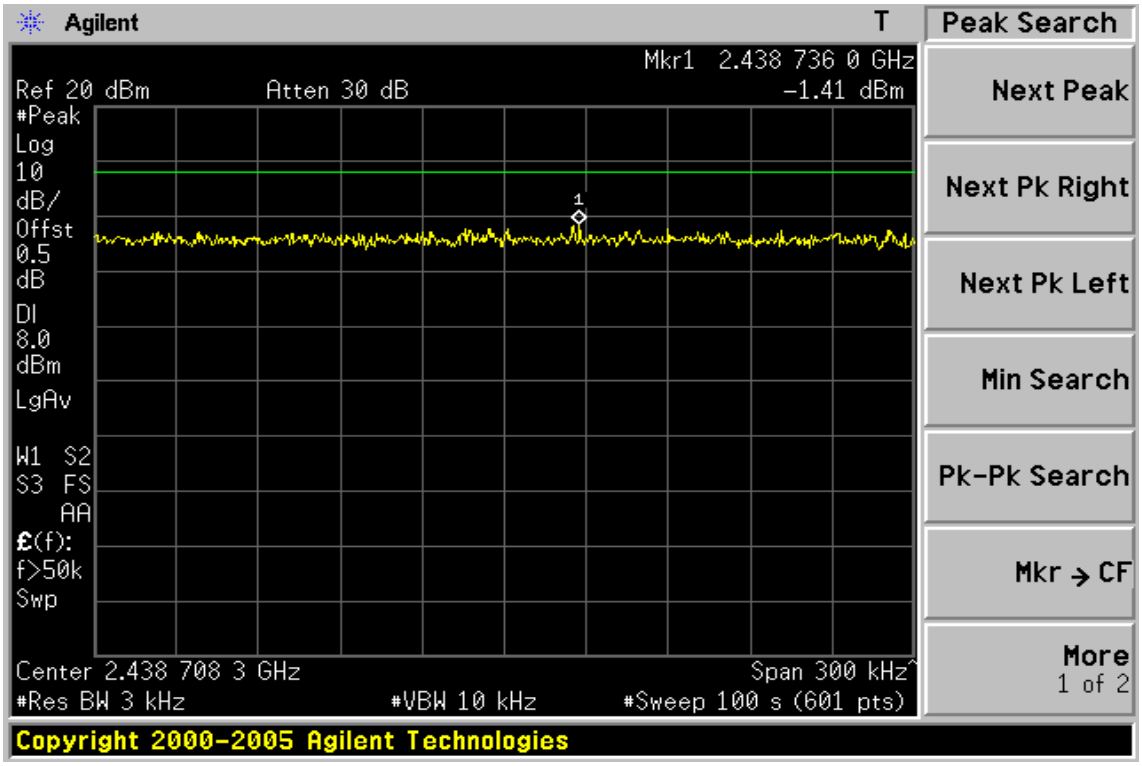
802.11b

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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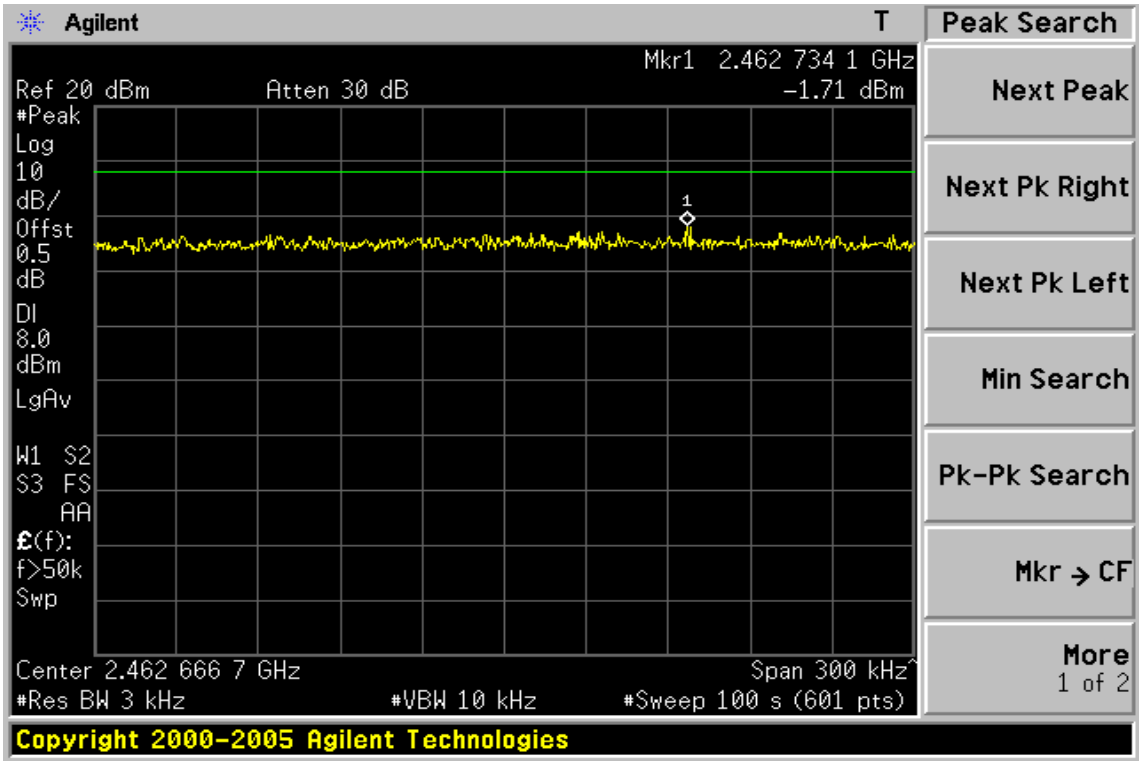
Power Spectral Density Test Plot (CH-High)



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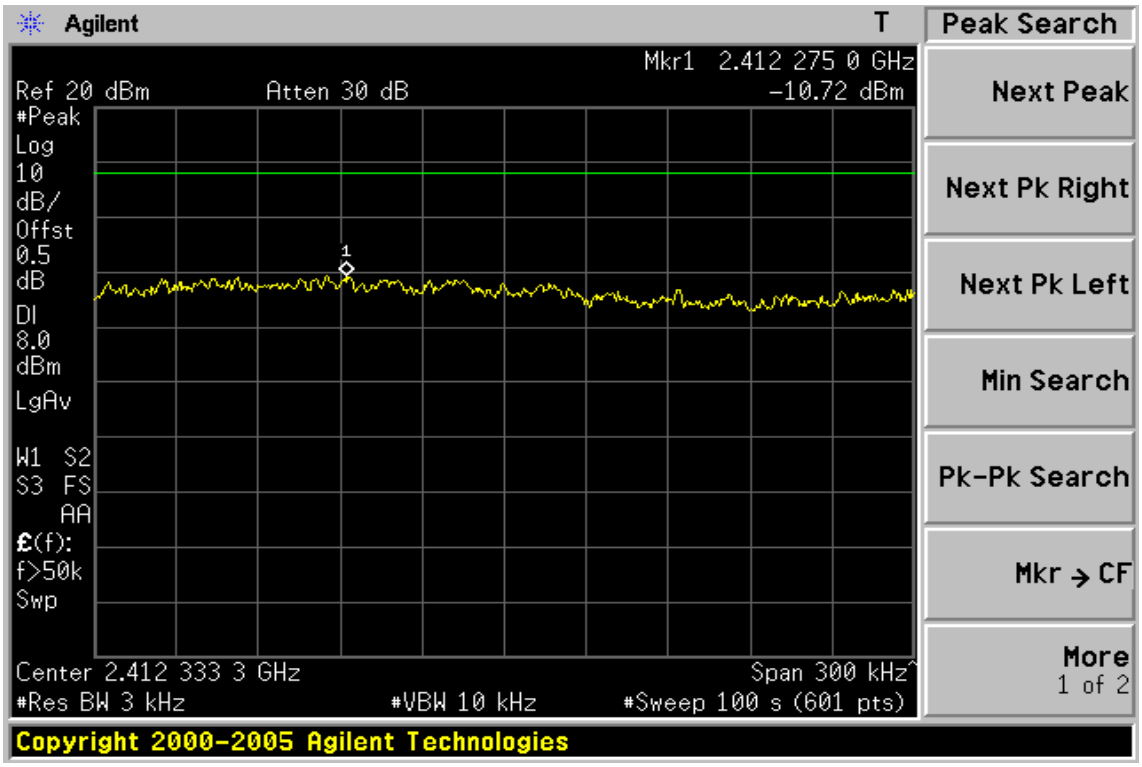
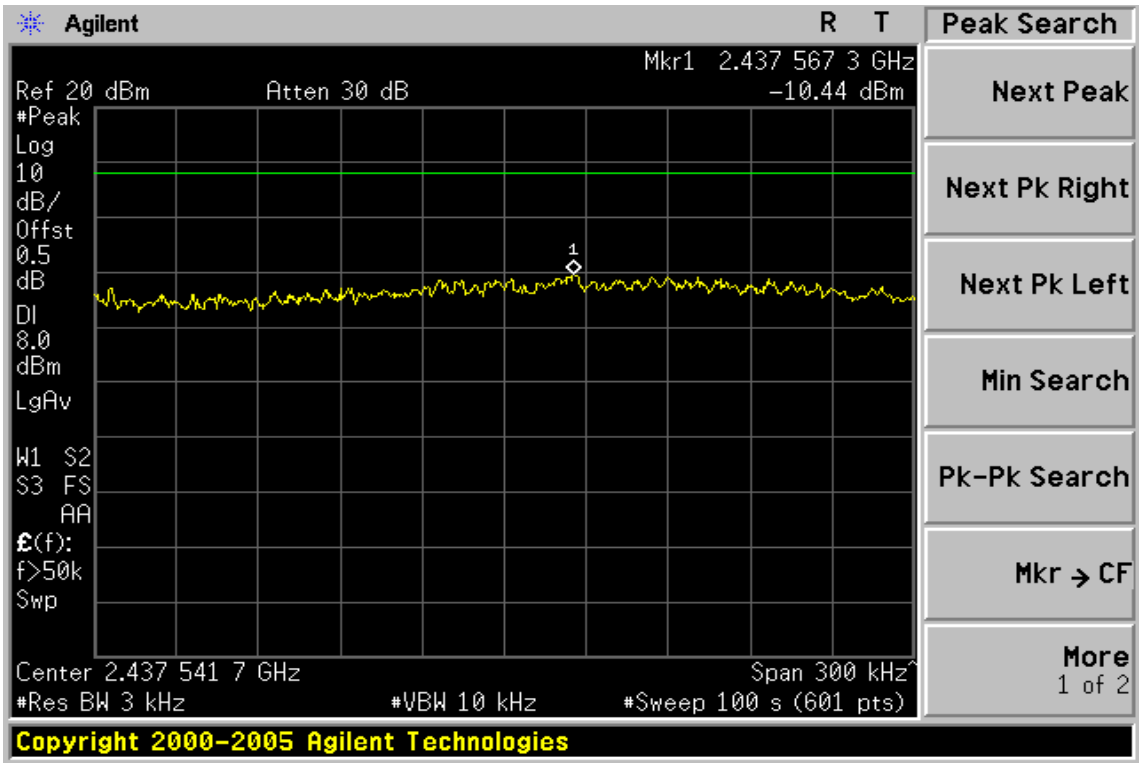
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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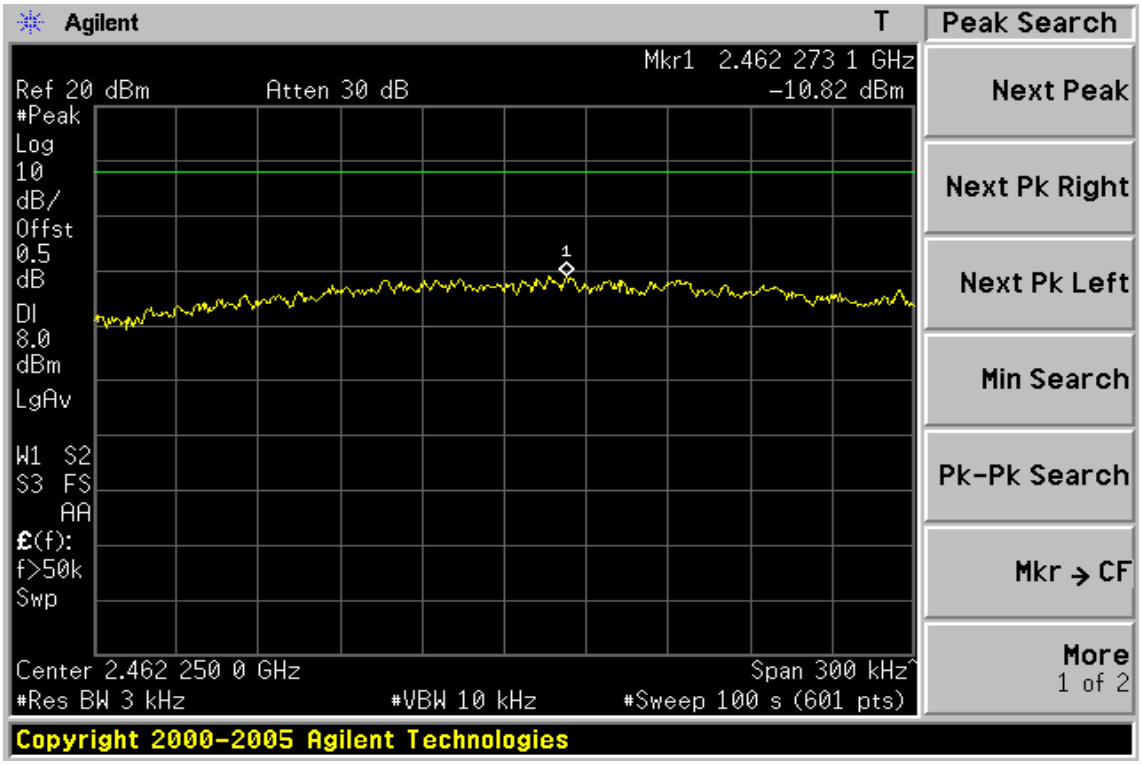
Power Spectral Density Test Plot (CH-High)



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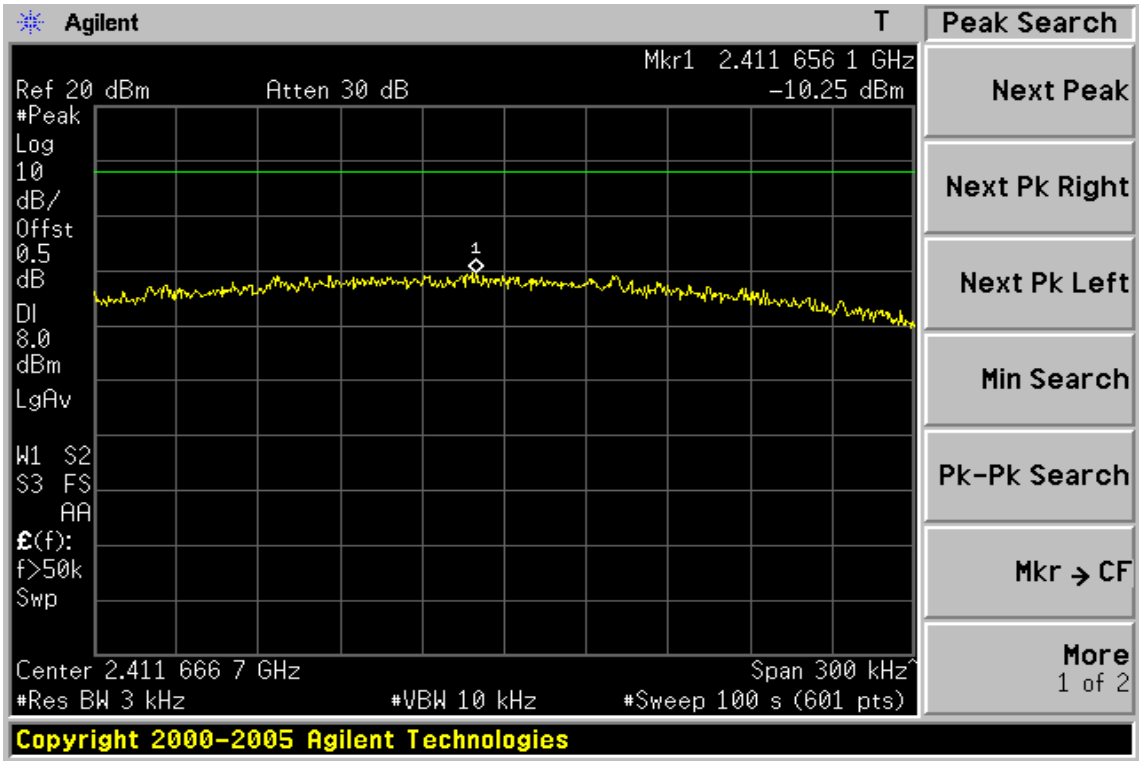
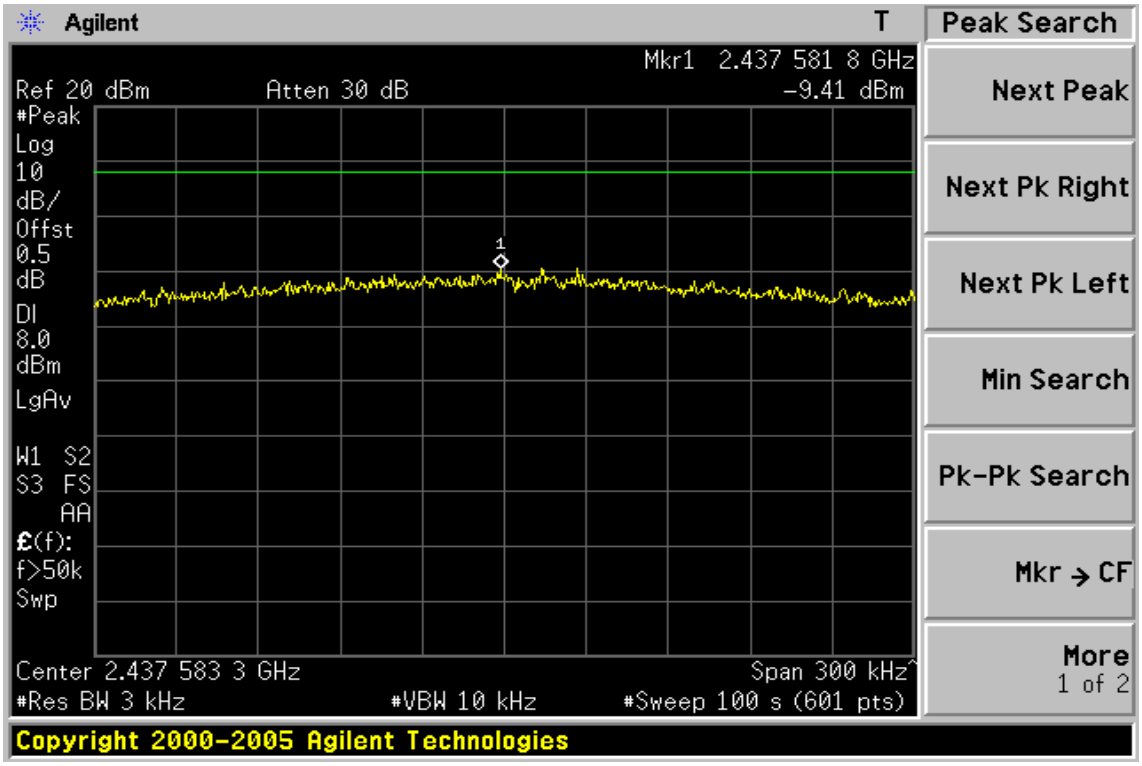
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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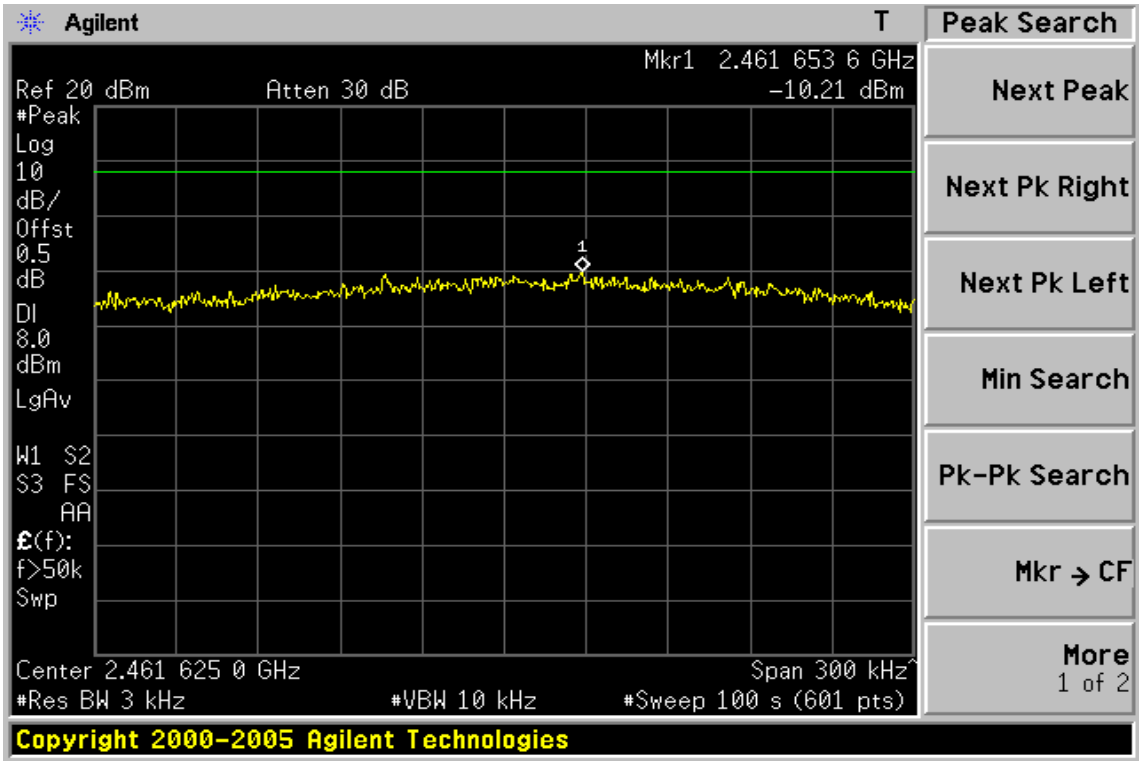
Power Spectral Density Test Plot (CH-High)



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11 ANTENNA REQUIREMENT

11.1 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.

11.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 0.52 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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