



DIGITAL EMC CO., LTD.

683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

Tel: +82-31-321-2664 Fax: +82-31-321-1664

<http://www.digitalemc.com>

CERTIFICATION OF COMPLIANCE

D.O.Tel Co., Ltd.

#412, Kolon Science Valley II, 811 Guro-dong, Guro-gu, Seoul,
Korea 152-878

Dates of Tests: October 21 ~ November 12, 2009

Test Report S/N: DR50110911G

Test Site : DIGITAL EMC CO., LTD.

FCC ID

QD5-DOTH-100

APPLICANT

D.O.Tel Co., Ltd.

Purpose	:	Original Grant
FCC Equipment Class	:	Digital Transmission System (DTS)
Device name	:	Handheld Printer Terminal
Manufacturer	:	D.O.Tel Co., Ltd.
FCC ID	:	QD5-DOTH-100
Model name	:	DOTH-100
Test Device Serial number	:	Identical prototype
FCC Rule Part(s)	:	FCC Part 15.247 Subpart C ANSI C-63.4-2003
Frequency Range	:	2412 ~ 2462 MHz
Max. Output power	:	802.11b – 10.97 dBm Conducted 802.11g – 6.35 dBm Conducted
Data of issue	:	November 10, 2009

The Test results relate only to the tested sample. It is not allowed to copy this report even partly without the allowance of DIGITAL EMC CO., LTD.

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1. General information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address: 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail: harveysung@digitalemc.com

Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

Tested by: *Engineer*

November 10, 2009 D.C. Cha



Date

Name

Signature

Reviewed by: *Manager*

November 10, 2009 W.J. Lee



Date

Name

Signature

Applicant:

Company name : D.O.Tel Co., Ltd.

Address : #412, Kolon Science Valley II, 811 Guro-dong, Guro-gu, Seoul, Korea 152-878

Date of order : May 08, 2009

2. Equipment information

QD5-DOTH-100

2.1 Equipment information

Equipment model no.	DOTH-100
Equipment serial no.	Identical prototype
Type of equipment	Handheld Printer Terminal
Frequency band	2412 ~ 2462 MHz
Type of Modulation	802.11b – CCK 802.11g – OFDM
Power	DC 7.4V (Lithium Battery)
Type of antenna	☒ Internal Type: Chip Antenna ☐ External Type:



2.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Cradle	Cradle for DOTH-100	AT10CIG09997	D.O.Tel CO.,LTD.	-
Adaptor	KSAH0950300T1M2	NA	Kuan Tech(Shenzhen) Co., Ltd.	-

3. Information about test items

QD5-DOTH-100

3.1 Tested frequency

Frequency	TX	RX
Lowest frequency	2412MHz	2412MHz
Middle frequency	2437MHz	2437MHz
Highest frequency	2462MHz	2462MHz

3.2 Tested environment

Temperature	:	15 ~ 35 (°C)
Relative humidity content	:	20 ~ 75 %
Air pressure	:	86 ~ 103 kPa
Details of power supply	:	7.4 V DC AC 120V 50Hz

3.3 Test mode

Test Case 1	Only PDA
Test Case 2	PDA + Adaptor
Test Case 3	PDA + Cradle + Adaptor

3.4 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

3.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing

→ None

4. Test Report

4.1 Summary of tests

FCC Part Section(s)	Parameter	Limit (Using in 2400 ~ 2483.5MHz)	Test Condition	Status Note 1
I. Test Items				
15.247(a)(2)	6 dB Bandwidth	> 500 kHz	Conducted	C Note 2
15.247(b)(3)	Transmitter Output Power	< 1Watt		C Note 2
15.247(c)	Out of Band Emissions / Band Edge	20dBc in any 100kHz BW		C Note 2
				C Note 2
15.247(d)	Transmitter Power Spectral Density	< 8dBm / 3kHz		C Note 2
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits	Radiated	C Note 3
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	C Note 4
15.203	Antenna Requirements	FCC 15.203	-	C
Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable Note 2: This test item was tested in test case 1 supplying DC 7.4V. Note 3: This test item was performed in all test cases. And the worst data(Test case 3) were reported. Note 4: This test item was performed in test case 2 and 3. And the worst data(Test case 3) were reported. Note 5: The JBP(Computing device peripheral) portion was tested and approved by FCC DoC procedure.				

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003, DA00-705

4.2 Transmitter requirements

4.2.1 6 dB Bandwidth

- Procedure:

The bandwidth at 6 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies

Span = 50 MHz (Greater than EBW)

RBW = 100 kHz

Sweep = auto

VBW = $\geq$ RBW

Detector function = peak

Trace = max hold

- Measurement Data: **Comply**

Test Mode	Frequency	Test Results (MHz)
802.11b	Lowest	9.65
	Middle	9.85
	Highest	9.75
802.11g	Lowest	16.55
	Middle	16.60
	Highest	16.60

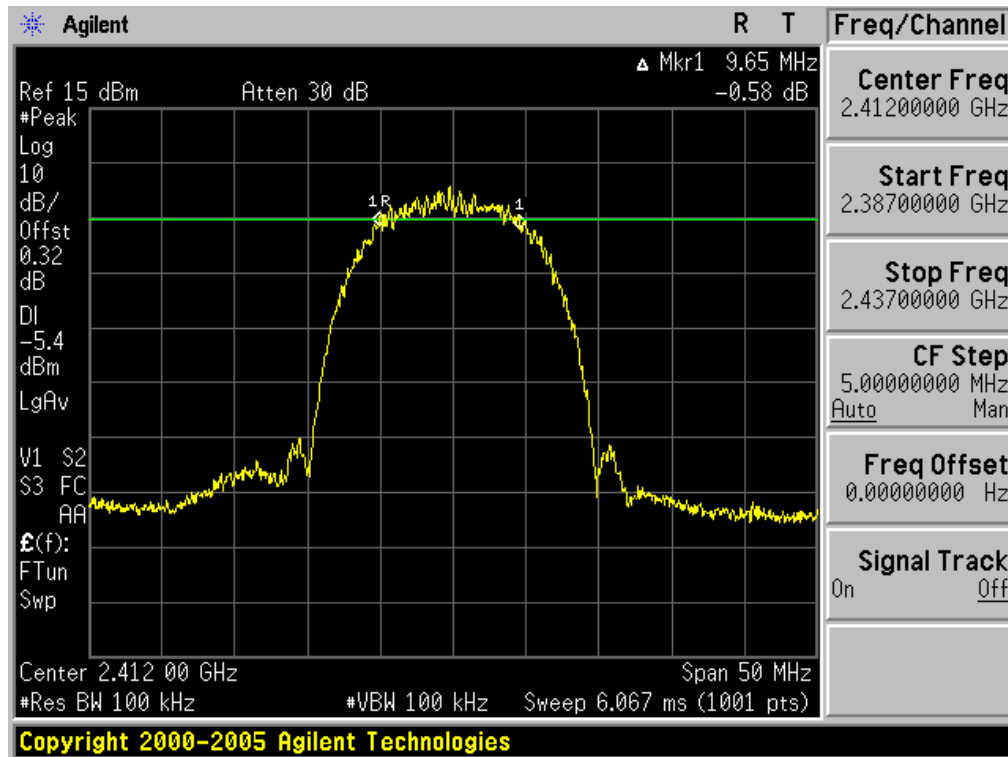
Note 1: See next pages for actual measured spectrum plots.

- Minimum Standard:

The minimum 6 dB bandwidth shall be at least 500 kHz

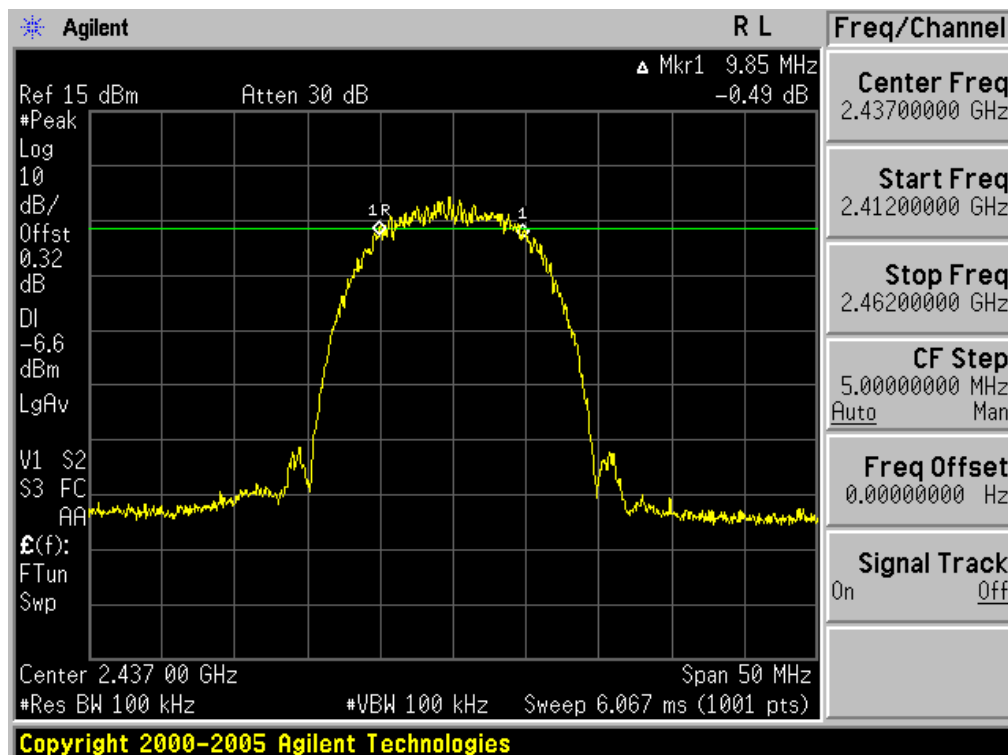
6 dB Bandwidth

Test Mode: 802.11b & Lowest Frequency



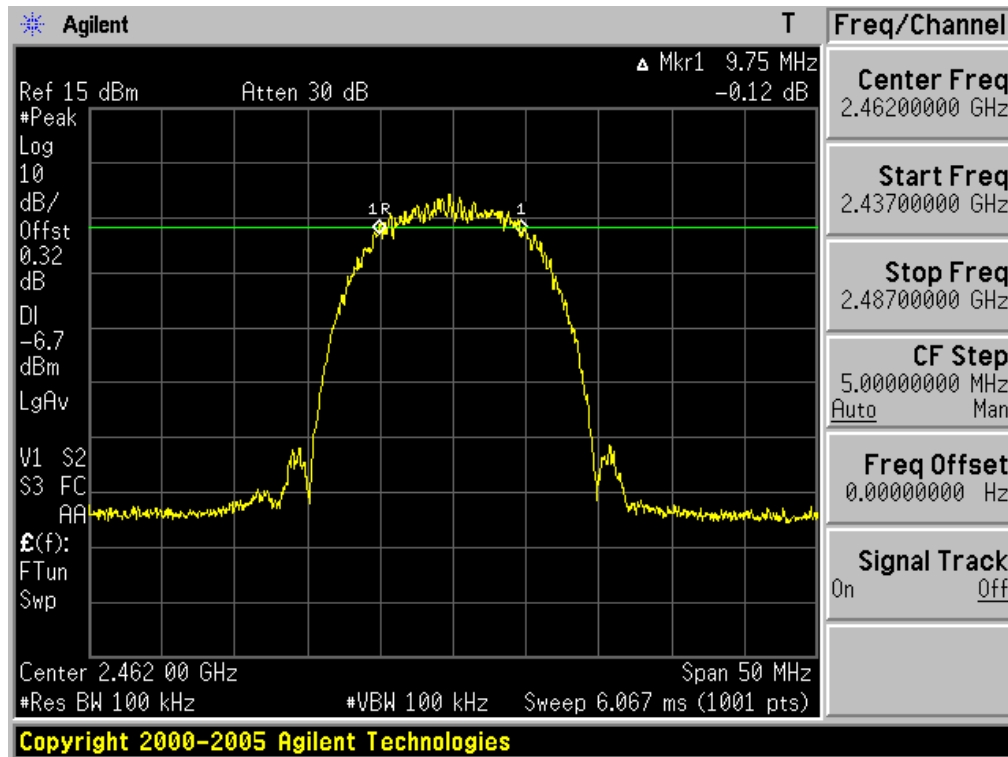
6 dB Bandwidth

Test Mode: 802.11b & Middle Frequency



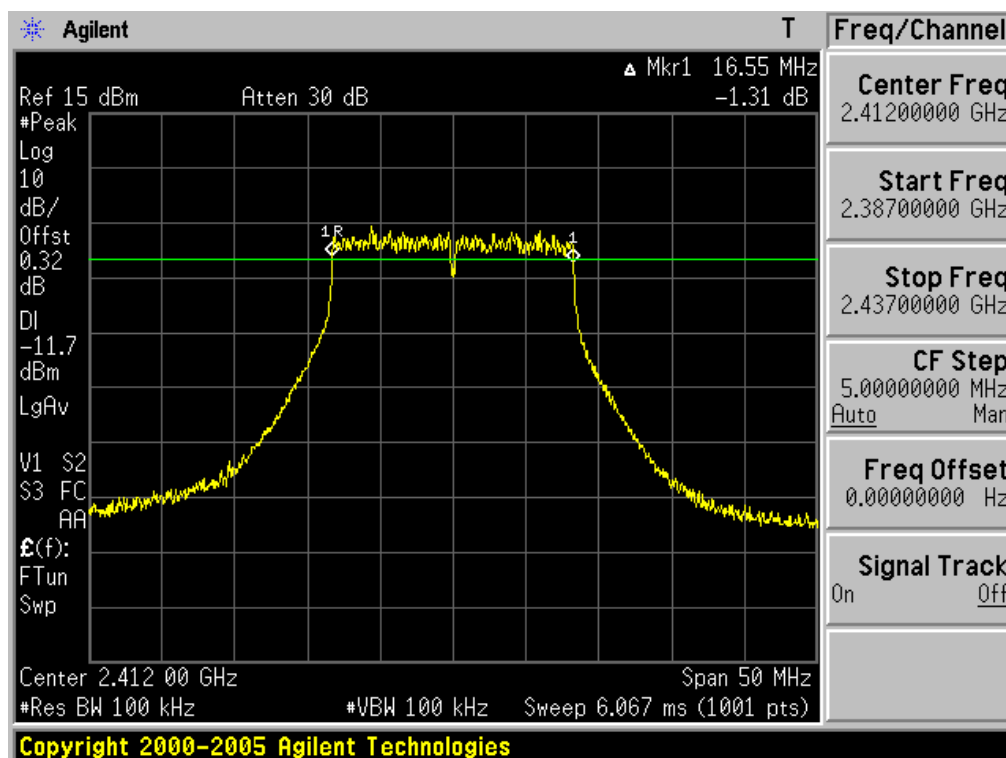
6 dB Bandwidth

Test Mode: 802.11b & Highest Frequency



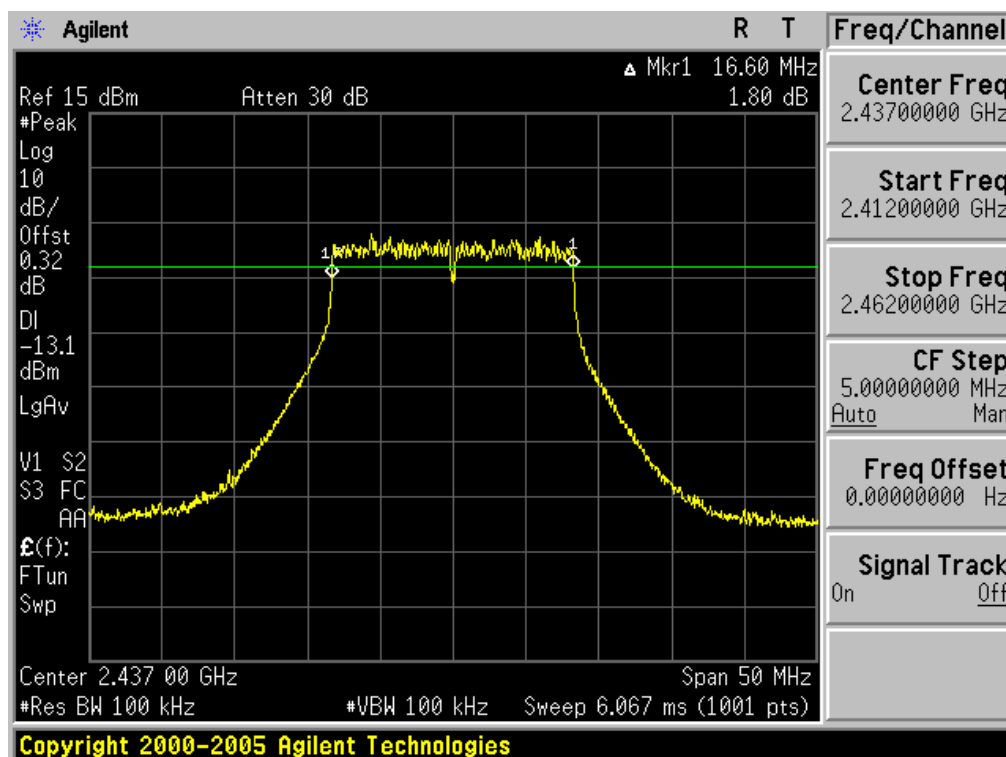
6 dB Bandwidth

Test Mode: 802.11g & Lowest Frequency



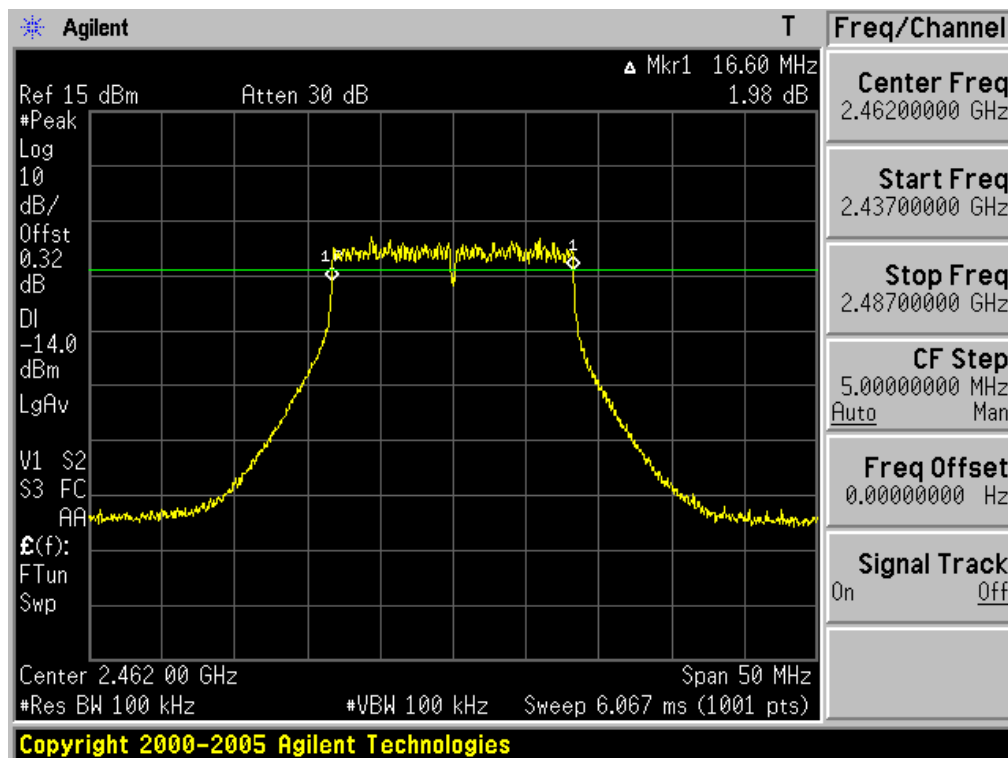
6 dB Bandwidth

Test Mode: 802.11g & Middle Frequency



6 dB Bandwidth

Test Mode: 802.11g & Highest Frequency



4.2.2 Peak Output Power

- Test Procedure and Spectrum Analyzer setting:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal at the highest, middle and the lowest available channels.

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 26dB EBW.

The test is performed in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005. The transmitter operates continuously therefore Power Output Option 2, Method #1 is used.

- Measurement Data: **Comply**

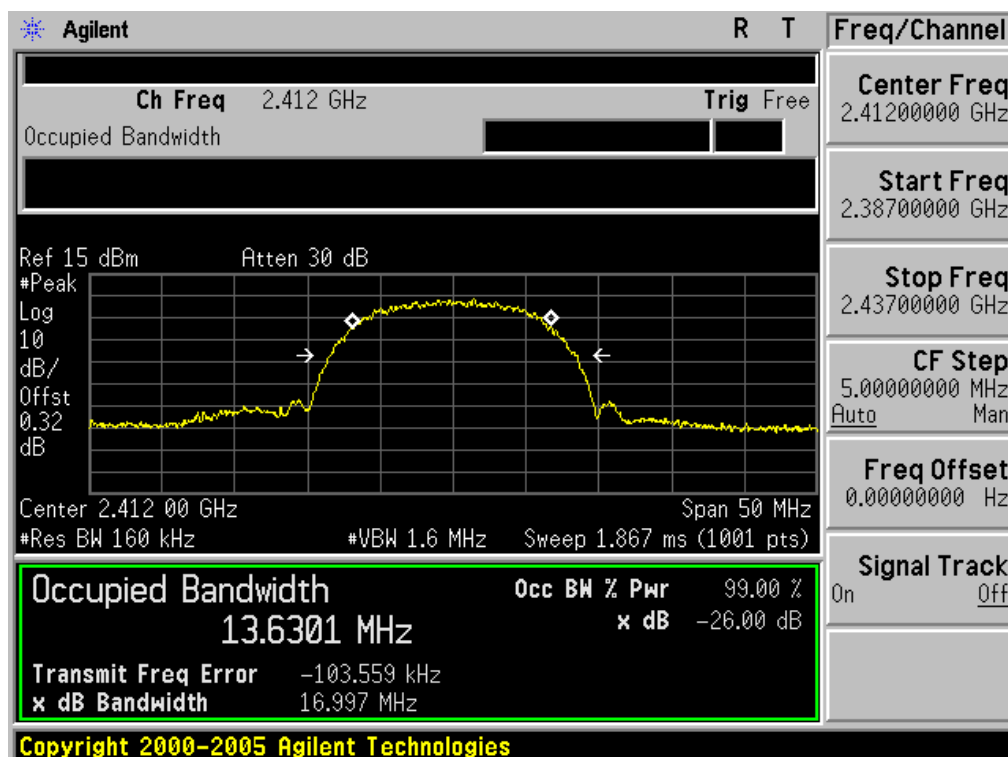
Test Mode	Frequency	Test Results	
		dBm	W
802.11b	Lowest	10.97	0.0125
	Middle	8.86	0.0077
	Highest	8.33	0.0068
802.11g	Lowest	6.35	0.0043
	Middle	4.33	0.0027
	Highest	4.50	0.0028

Note 1: See next pages for actual measured spectrum plots.

Minimum Standard:	< 1W
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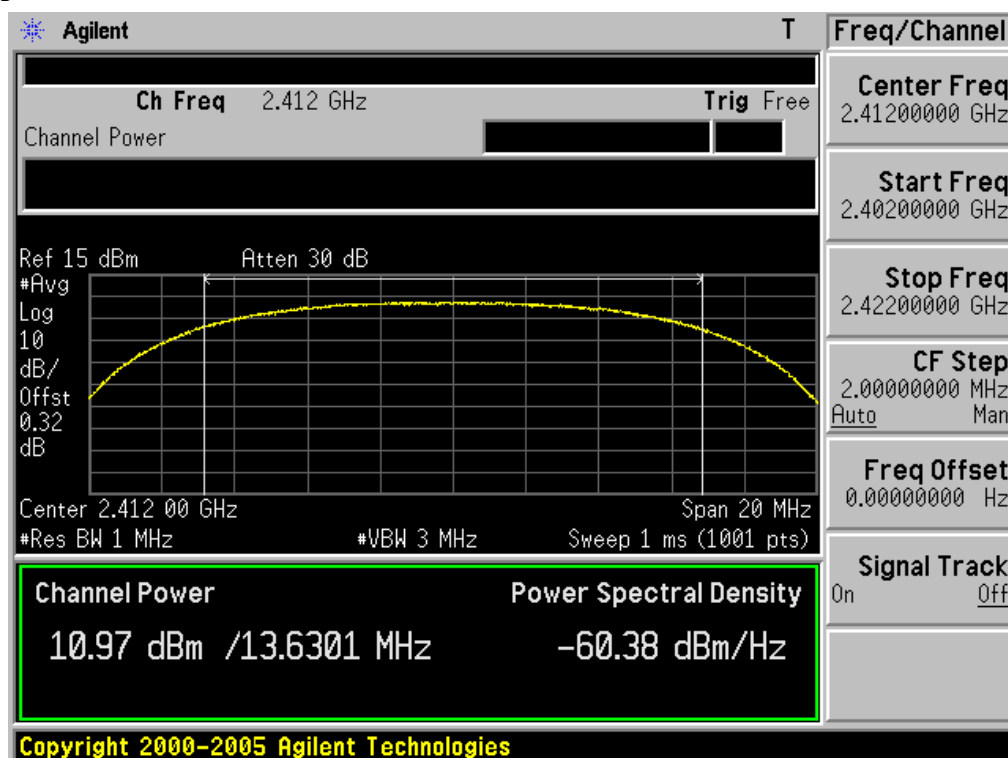
Occupied Bandwidth

Test Mode: 802.11b & Lowest Frequency



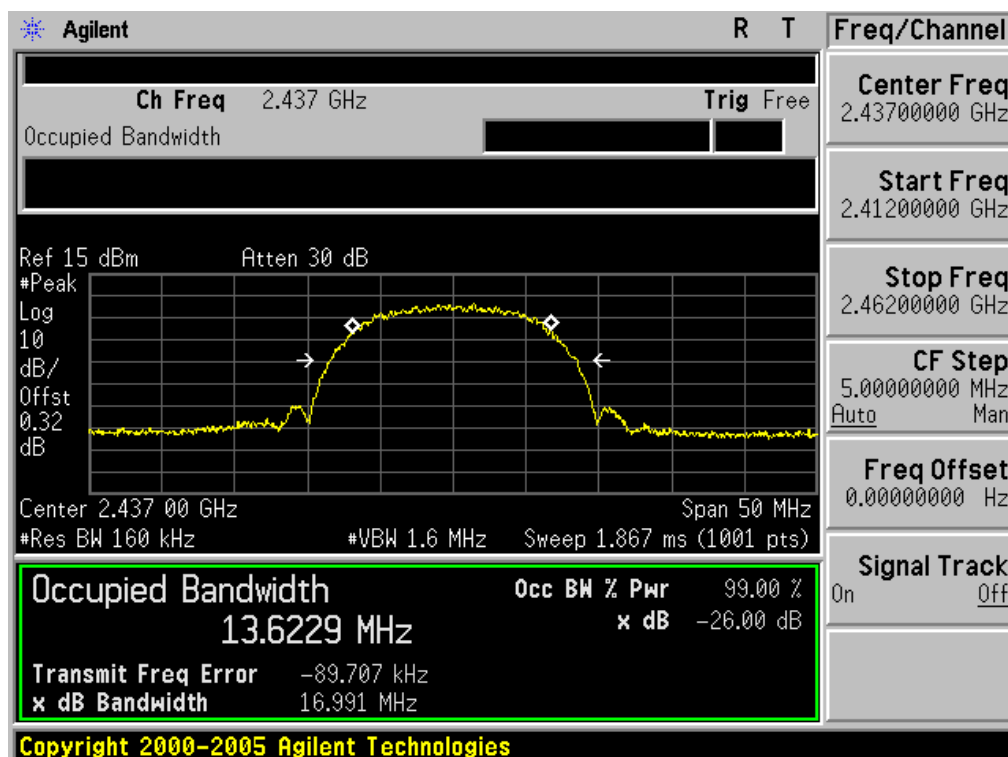
Peak Output Power

Test Mode: 802.11b & Lowest Frequency



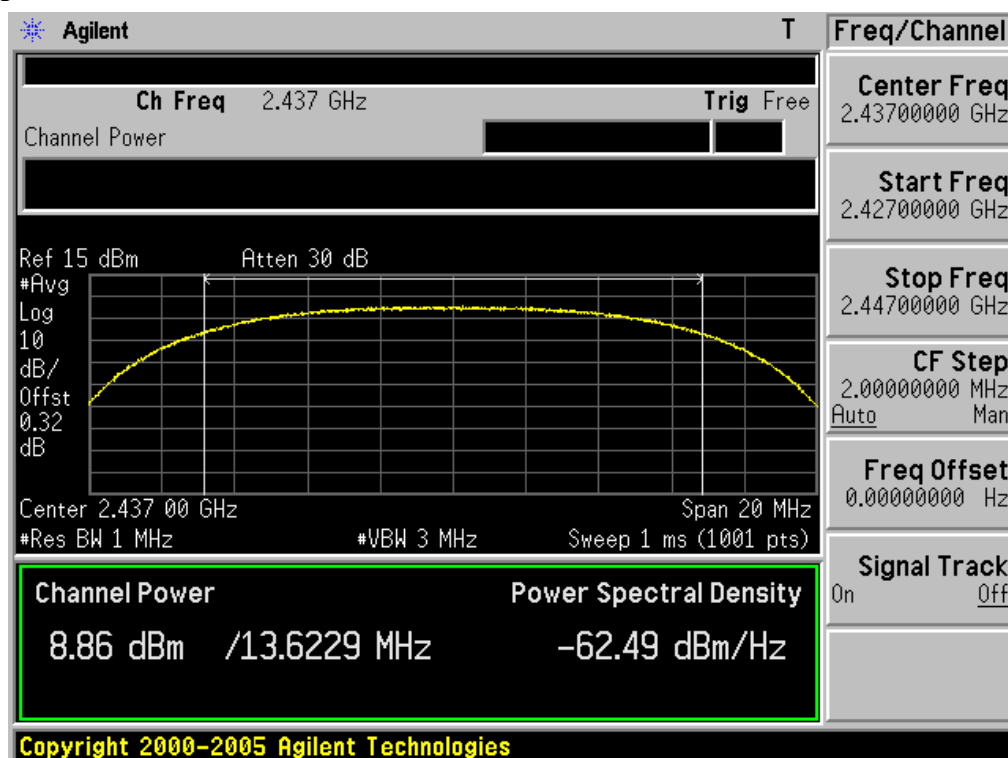
Occupied Bandwidth

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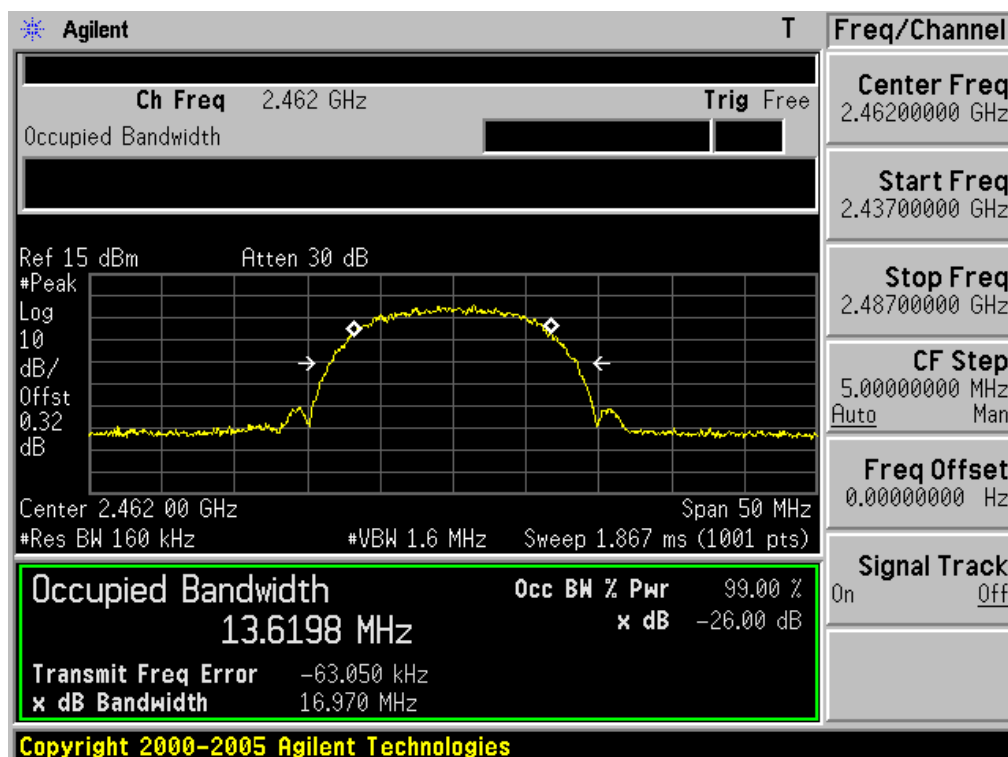
Peak Output Power

Test Mode: 802.11b & Middle Frequency



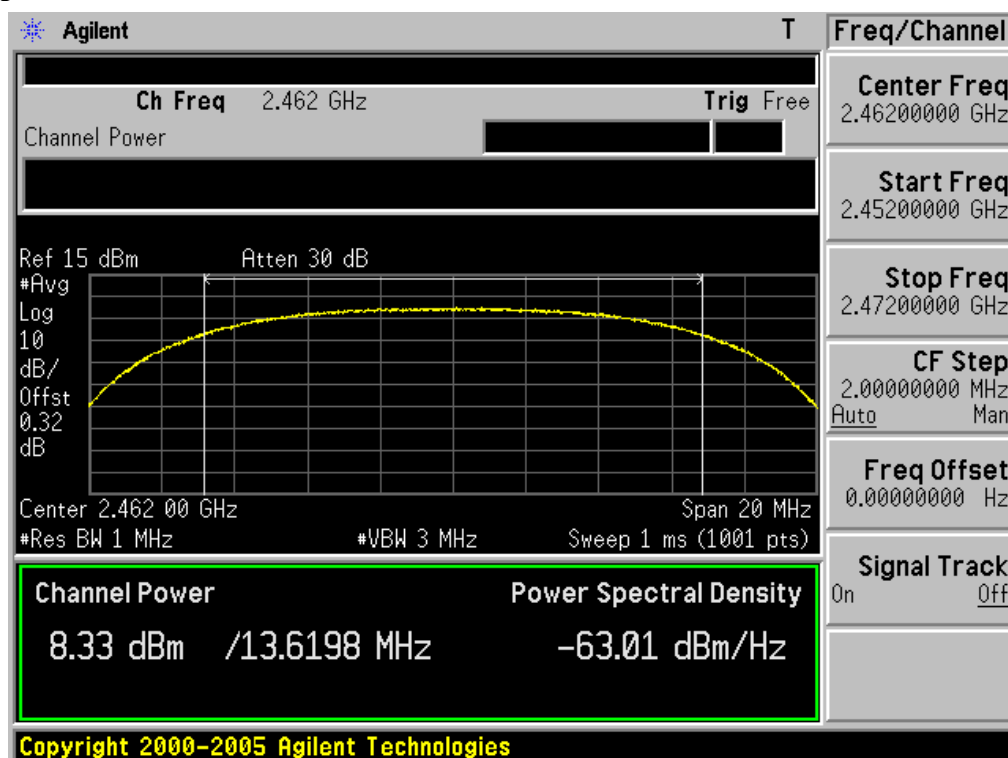
Occupied Bandwidth

Test Mode: 802.11b & Highest Frequency



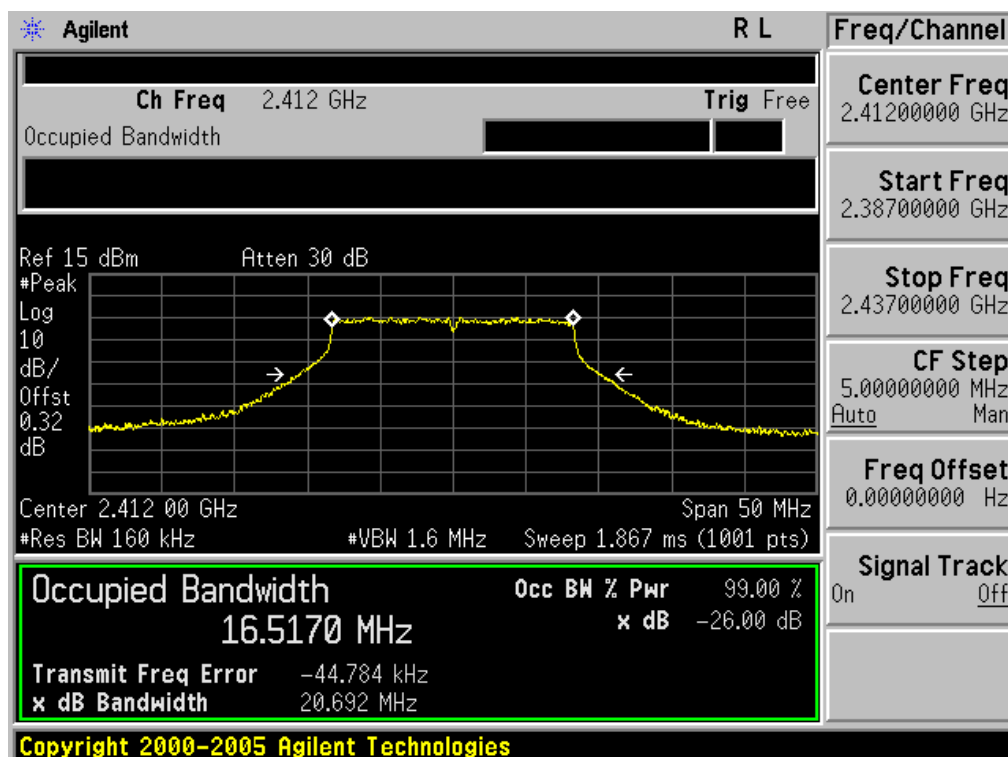
Peak Output Power

Test Mode: 802.11b & Highest Frequency



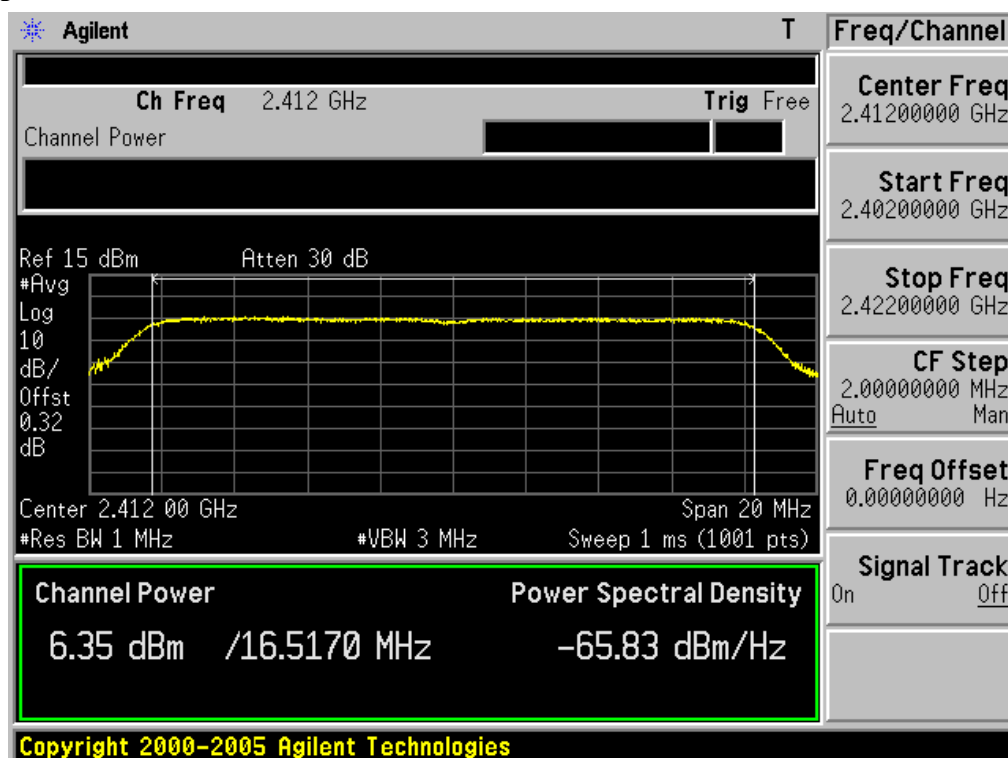
Occupied Bandwidth

Test Mode: 802.11g & Lowest Frequency



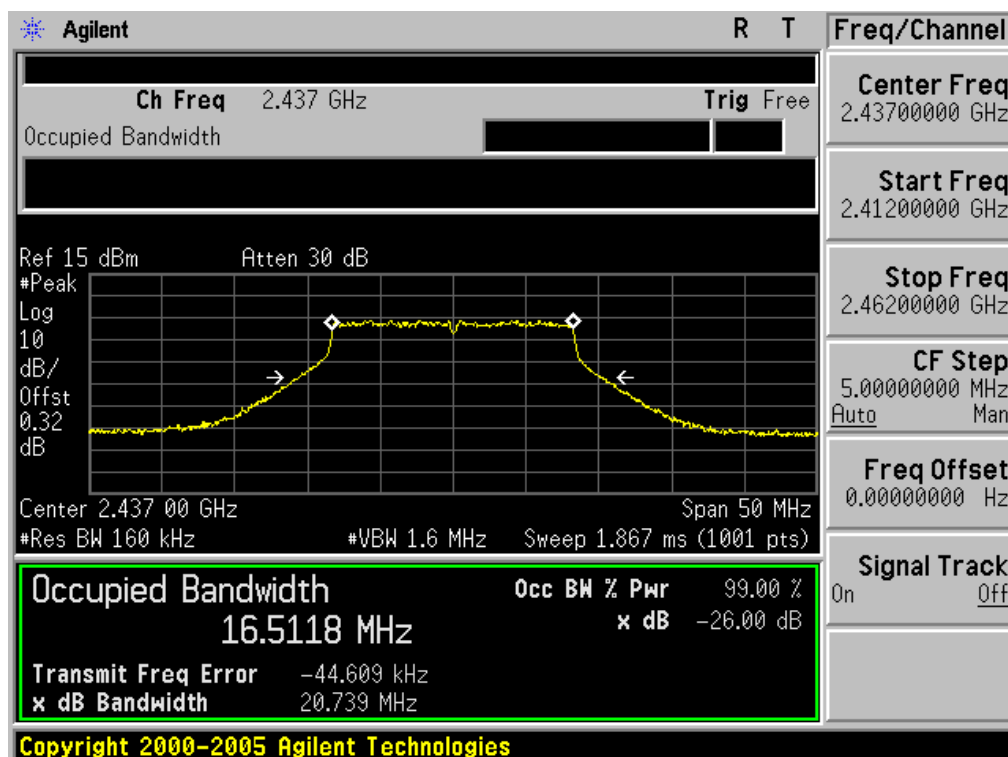
Peak Output Power

Test Mode: 802.11g & Lowest Frequency



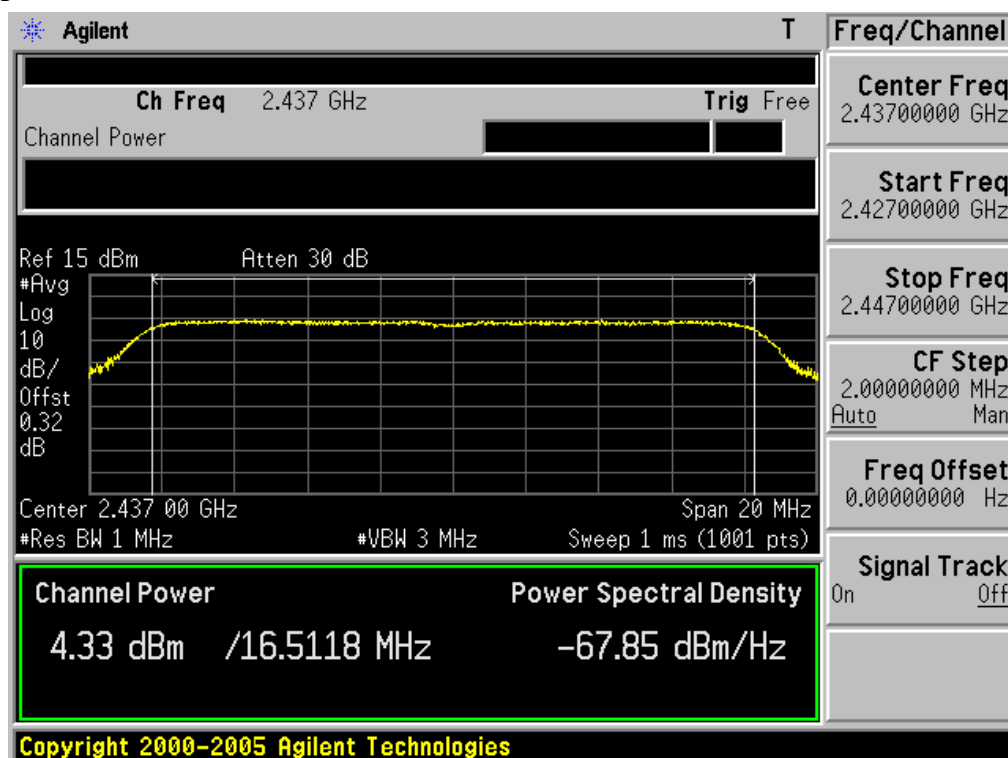
Occupied Bandwidth

Test Mode: 802.11g & Middle Frequency



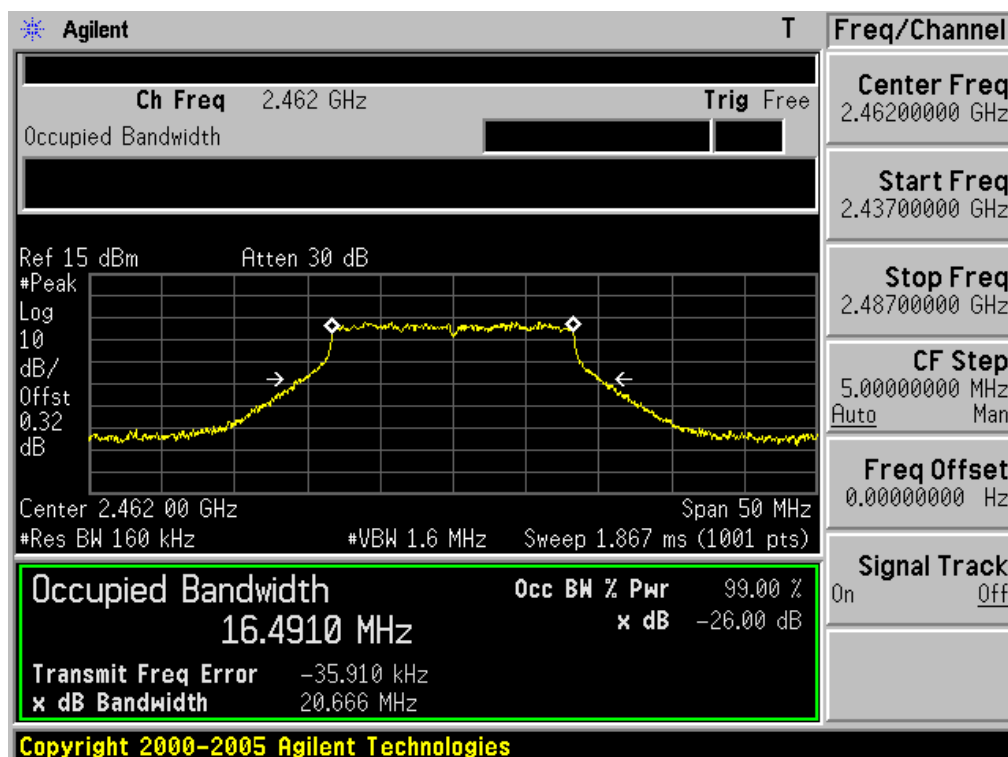
Peak Output Power

Test Mode: 802.11g & Middle Frequency



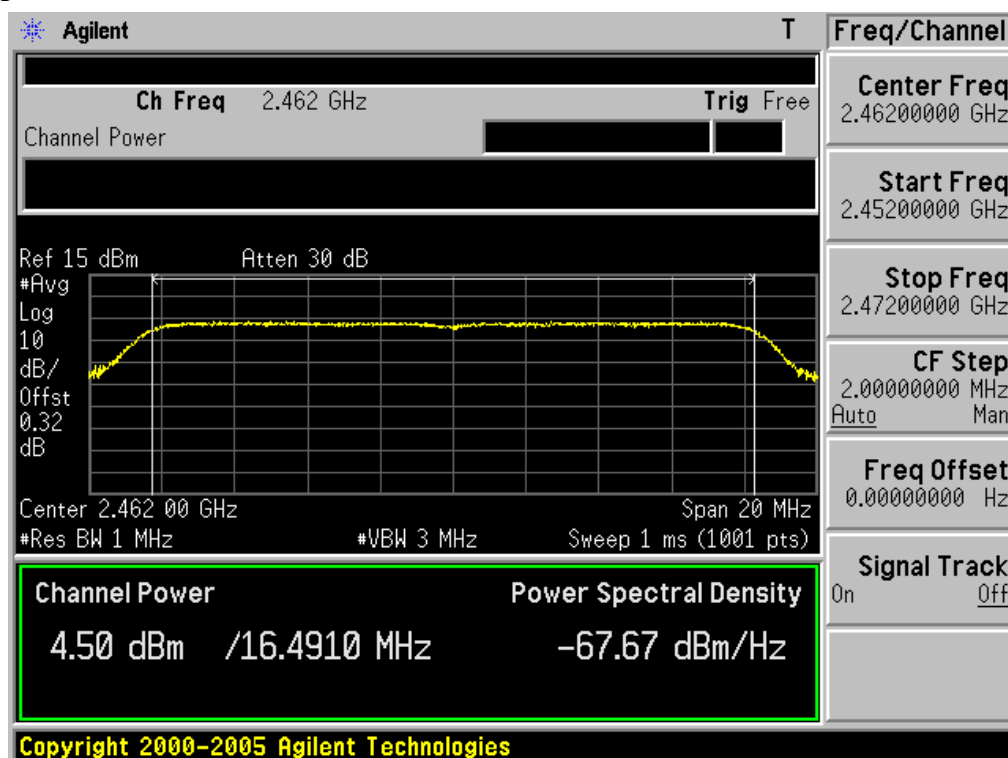
Occupied Bandwidth

Test Mode: 802.11g & Highest Frequency



Peak Output Power

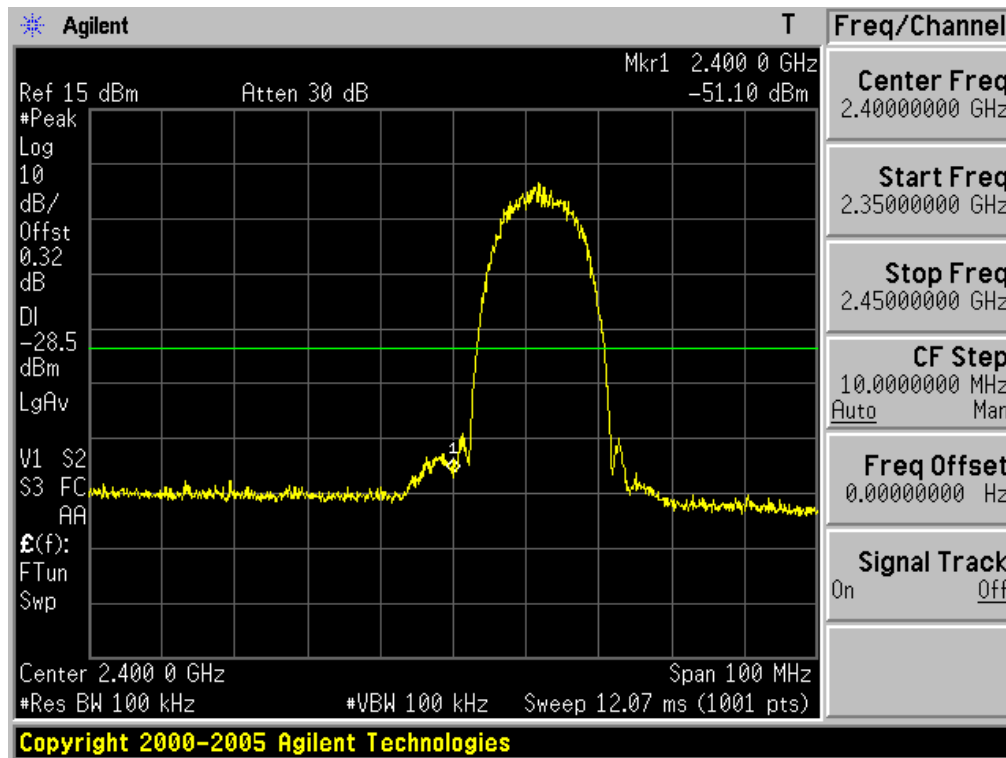
Test Mode: 802.11g & Highest Frequency



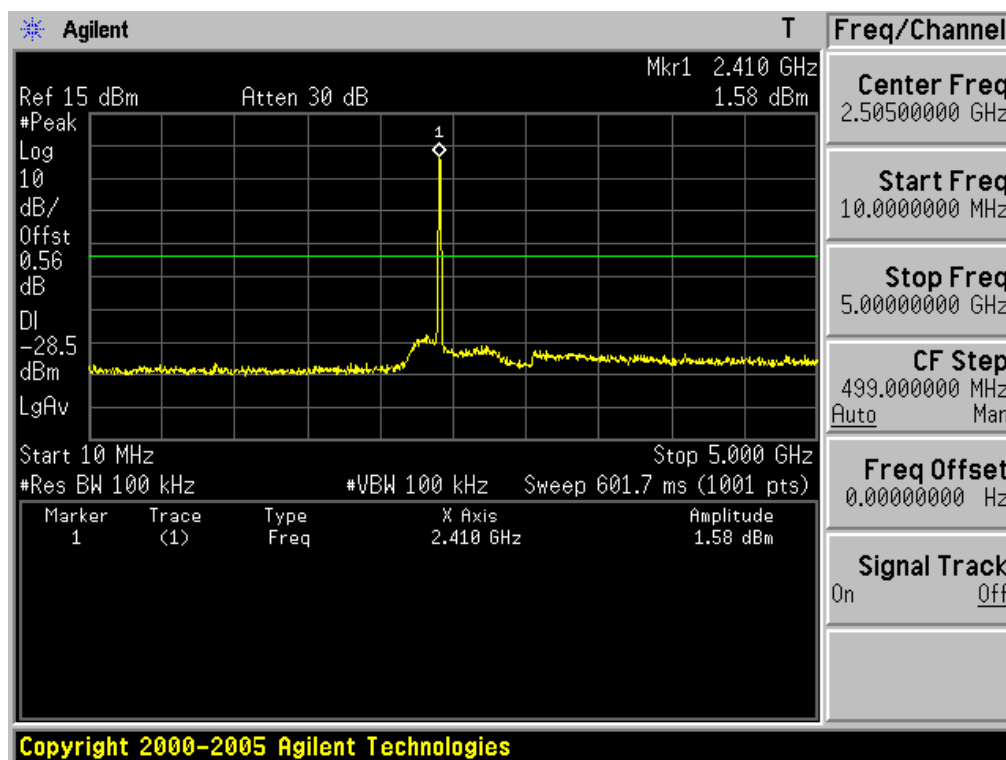
1. *Journal of the American Medical Association*, 1997; 277: 1039-1043.

Low Band-edge at 30 dB blow

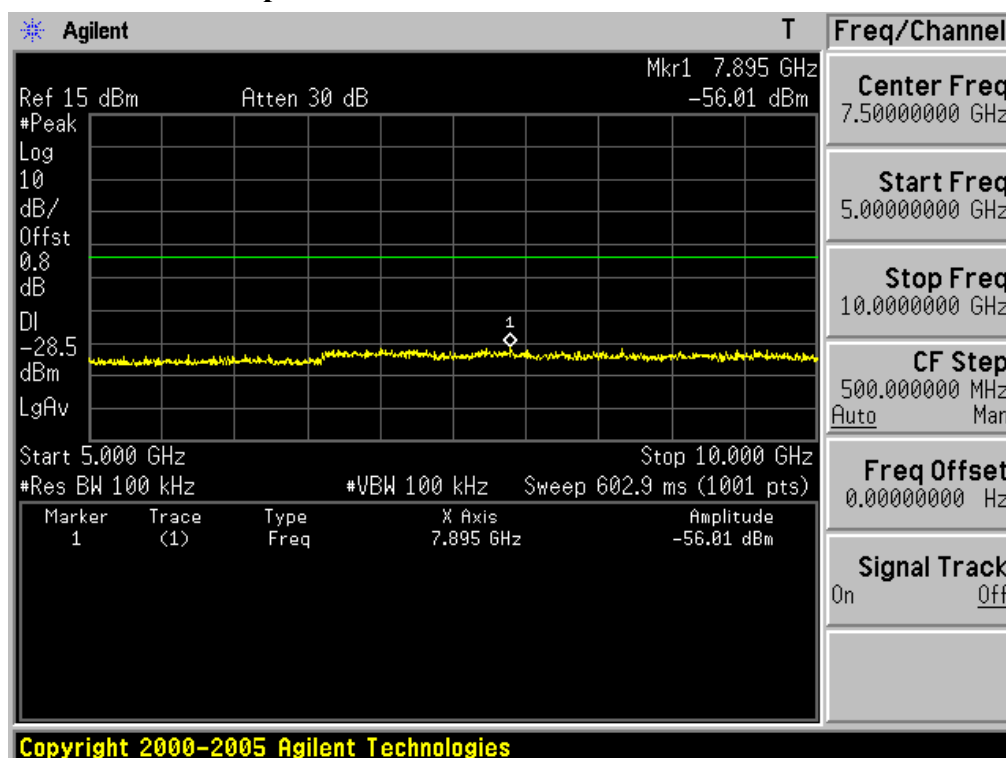
Test Mode: 802.11b



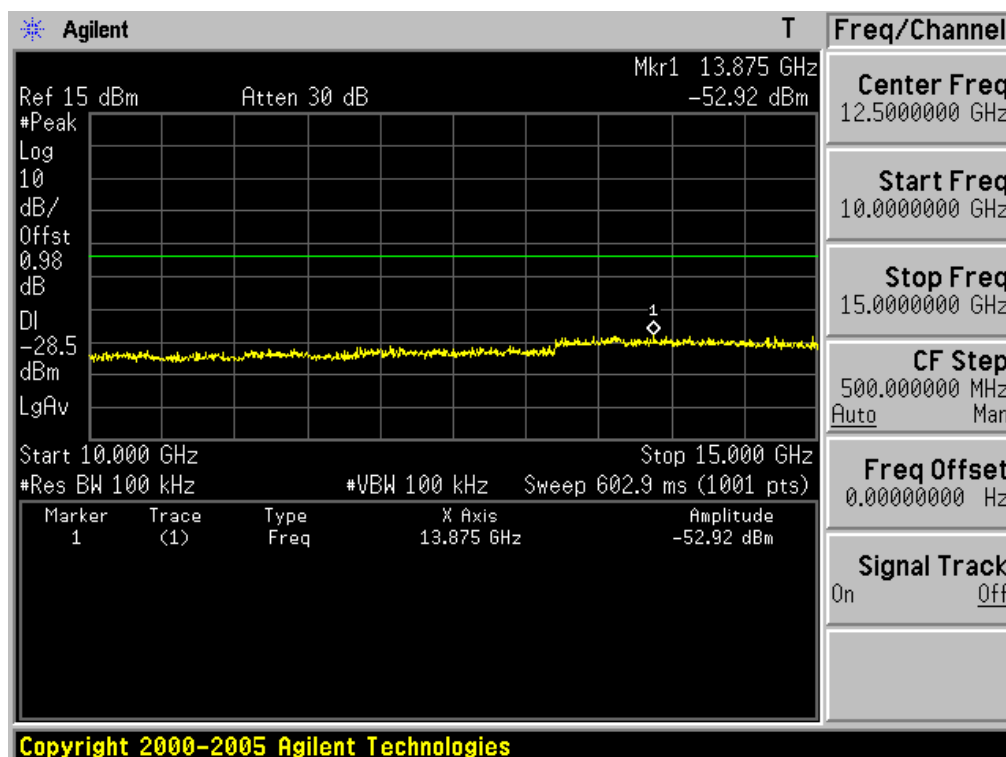
10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency



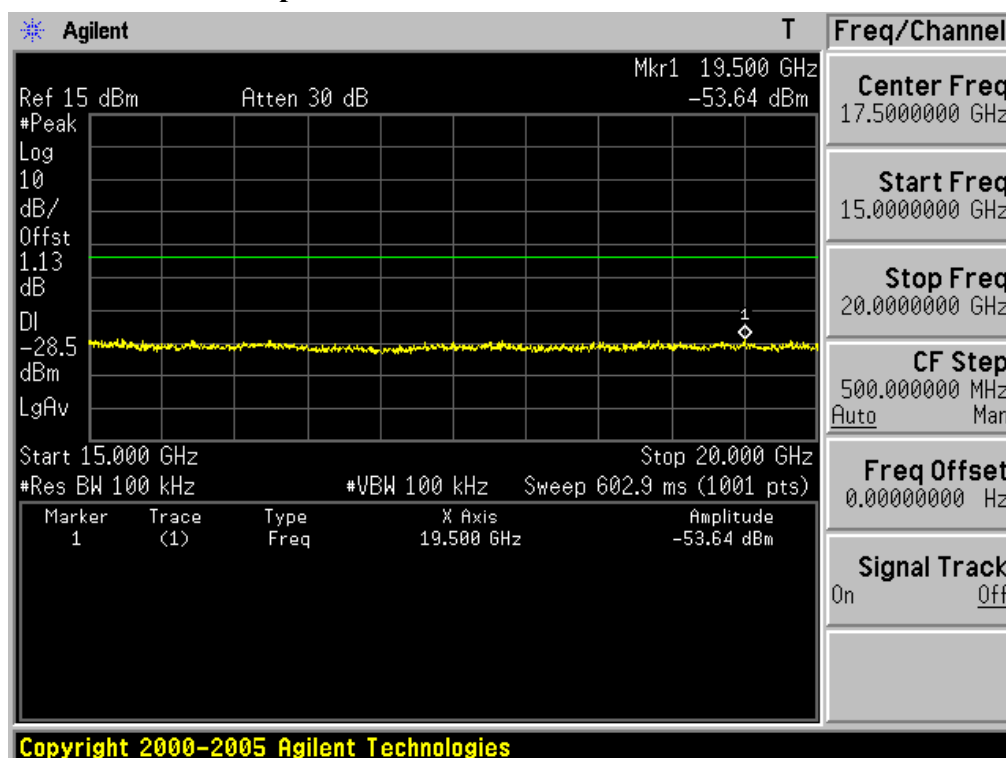
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency



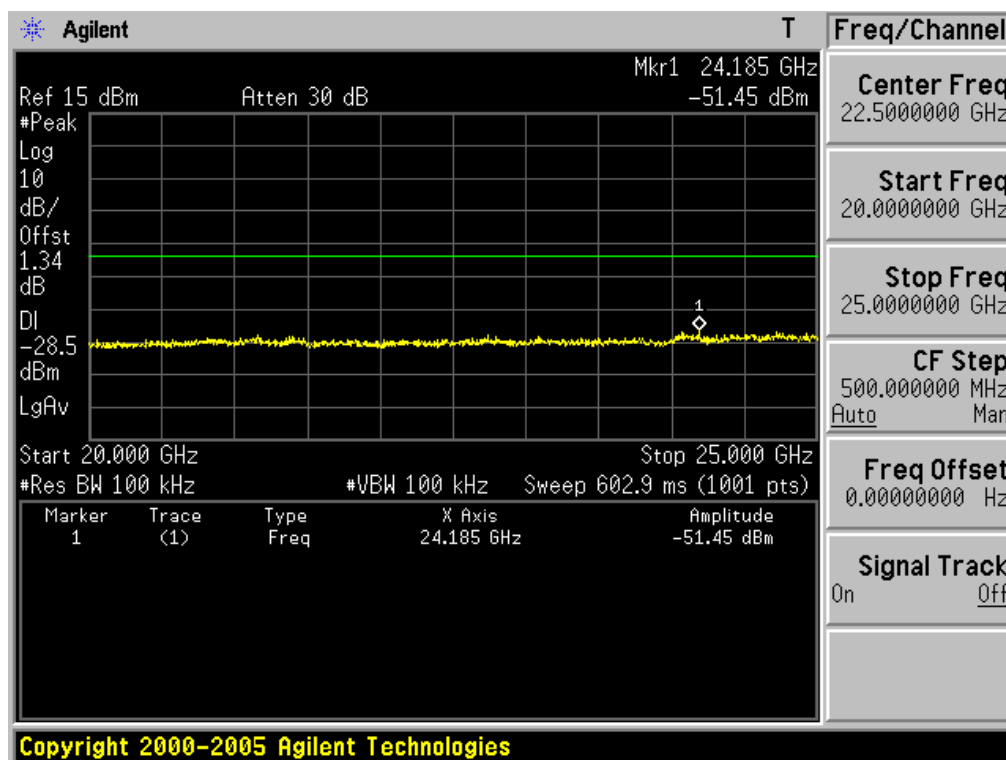
10GHz ~ 15GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency



15GHz ~ 20GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency

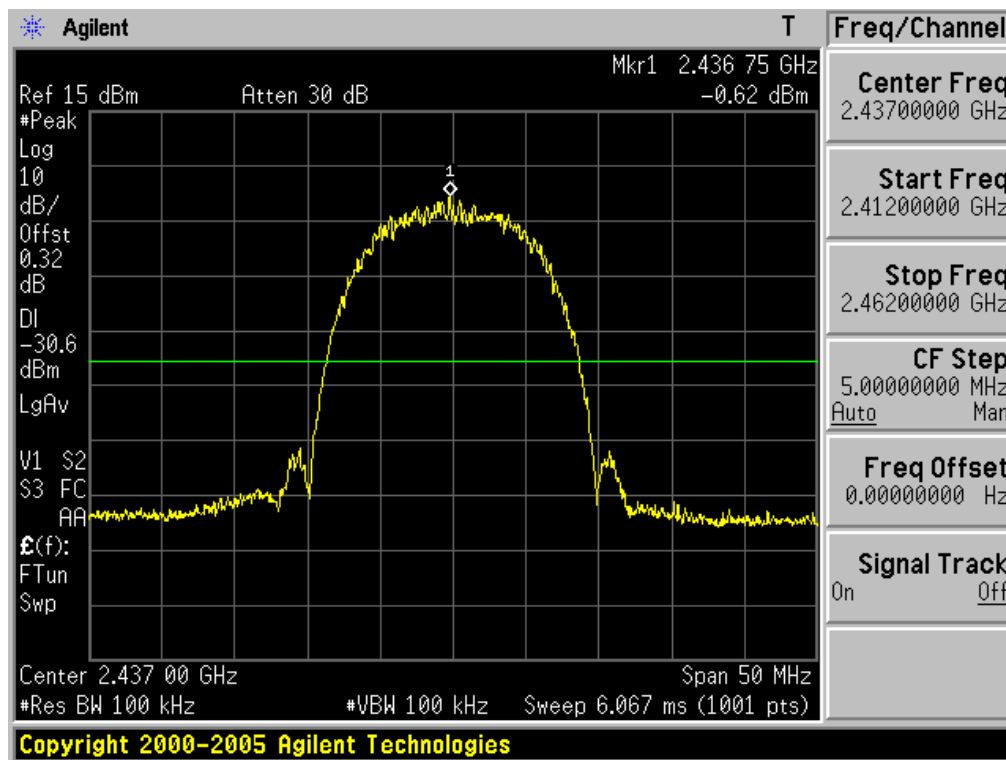


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency

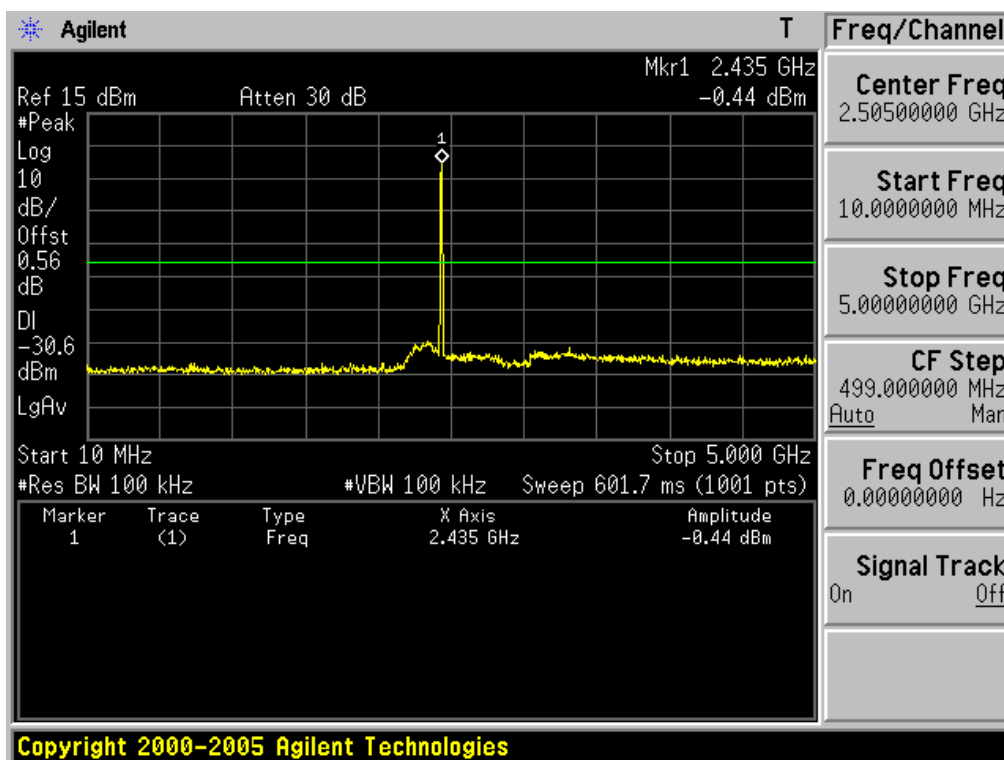


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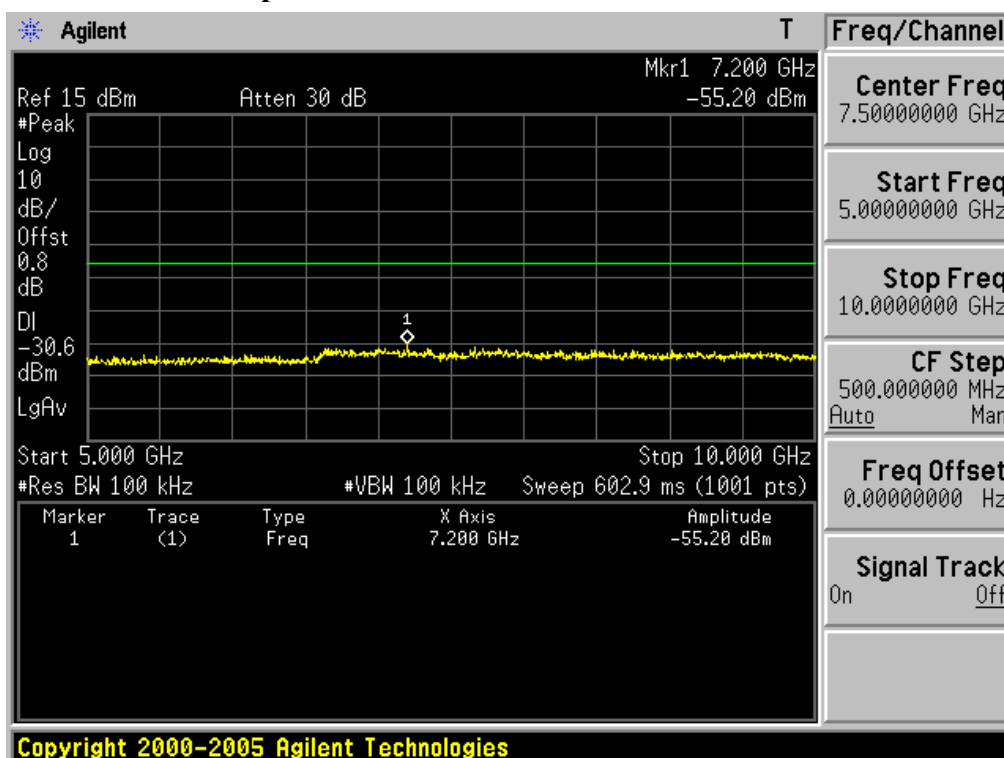
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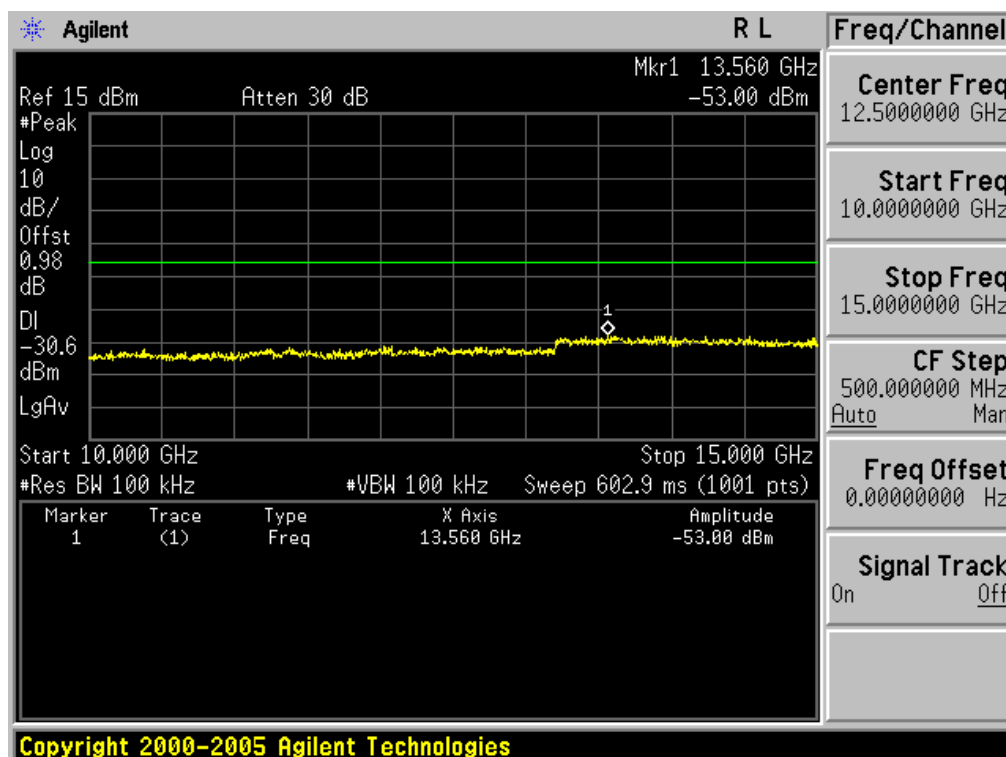
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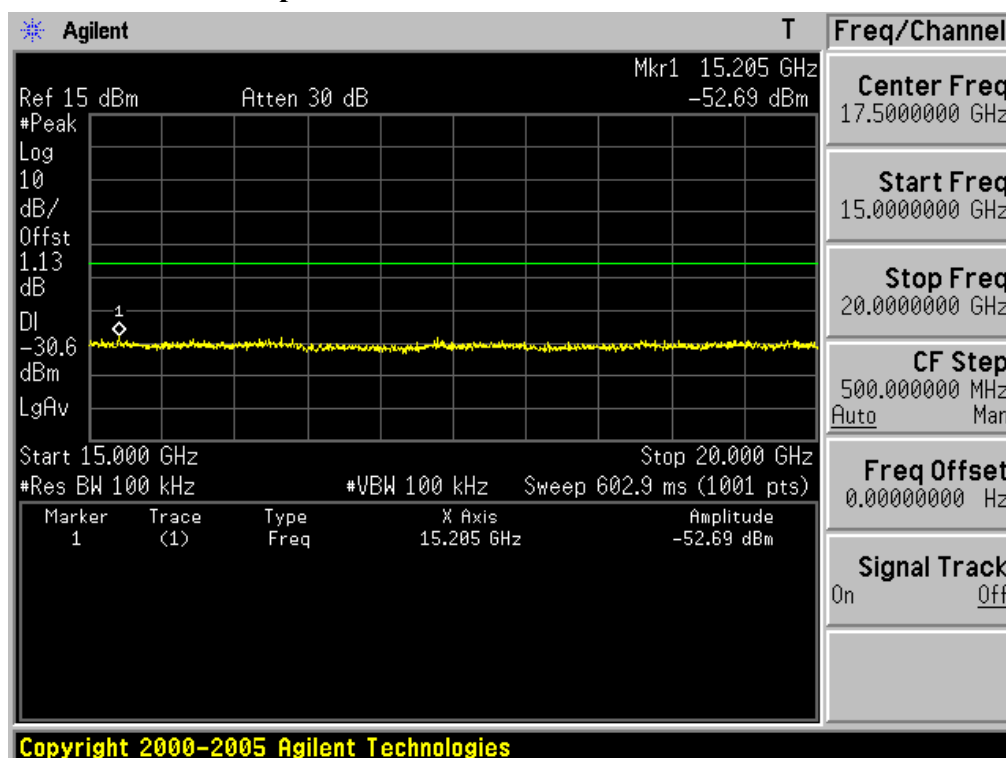
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11b & Middle Frequency



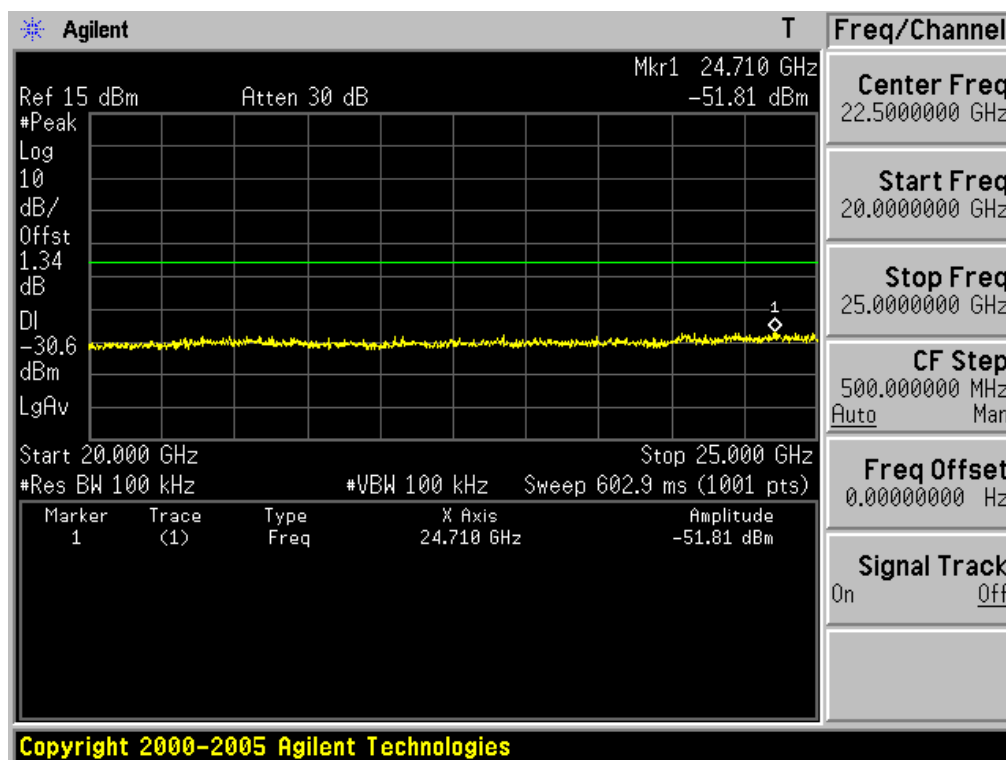
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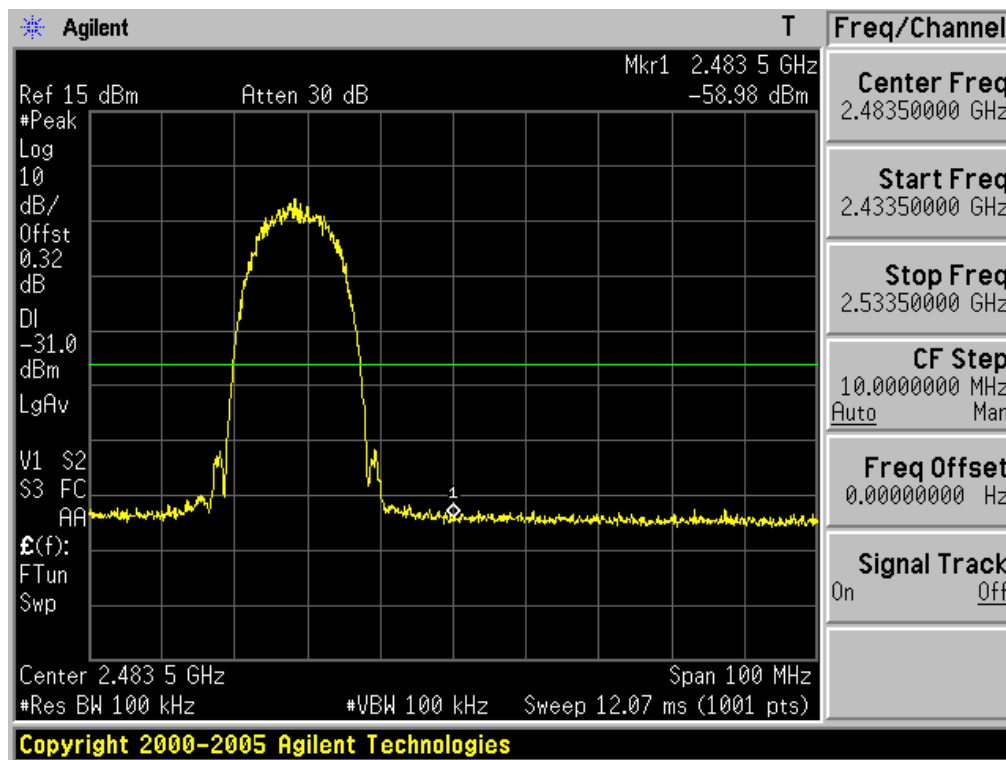
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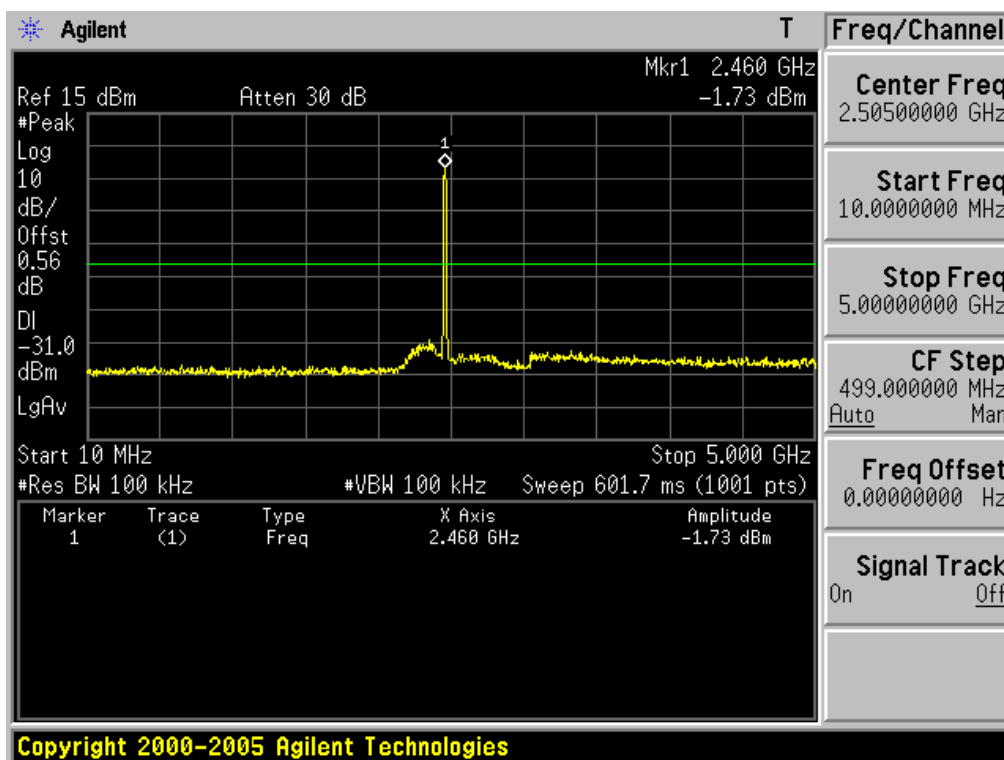
20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Middle Frequency



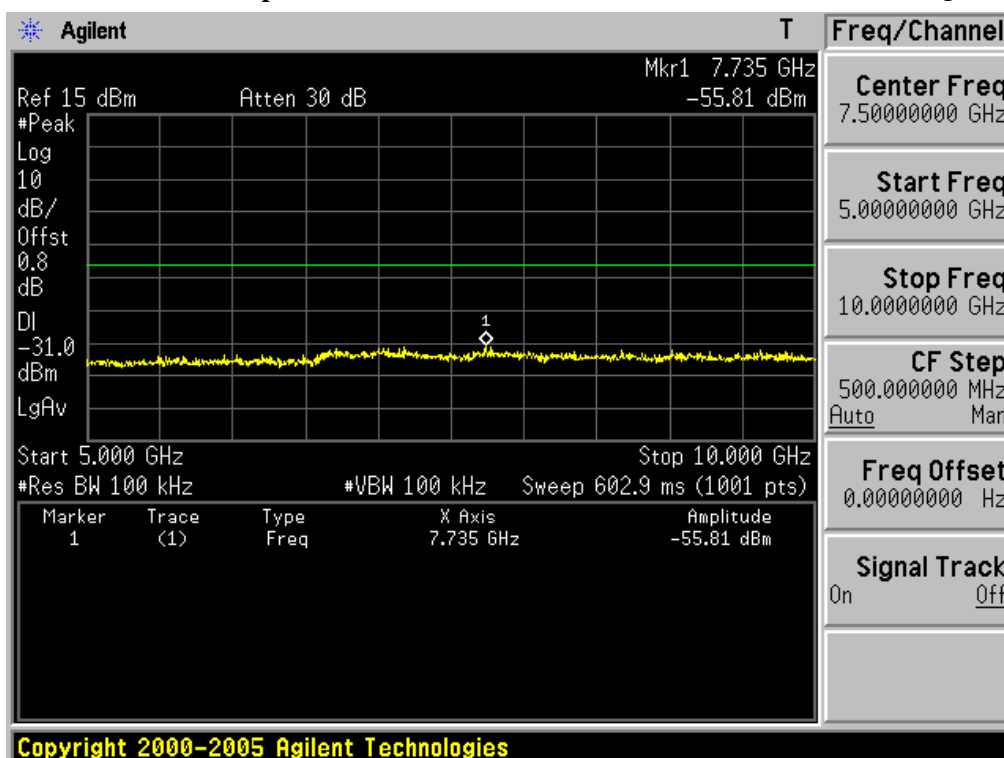
High Band-edge at 30 dB blow Test Mode: 802.11b & Highest Frequency



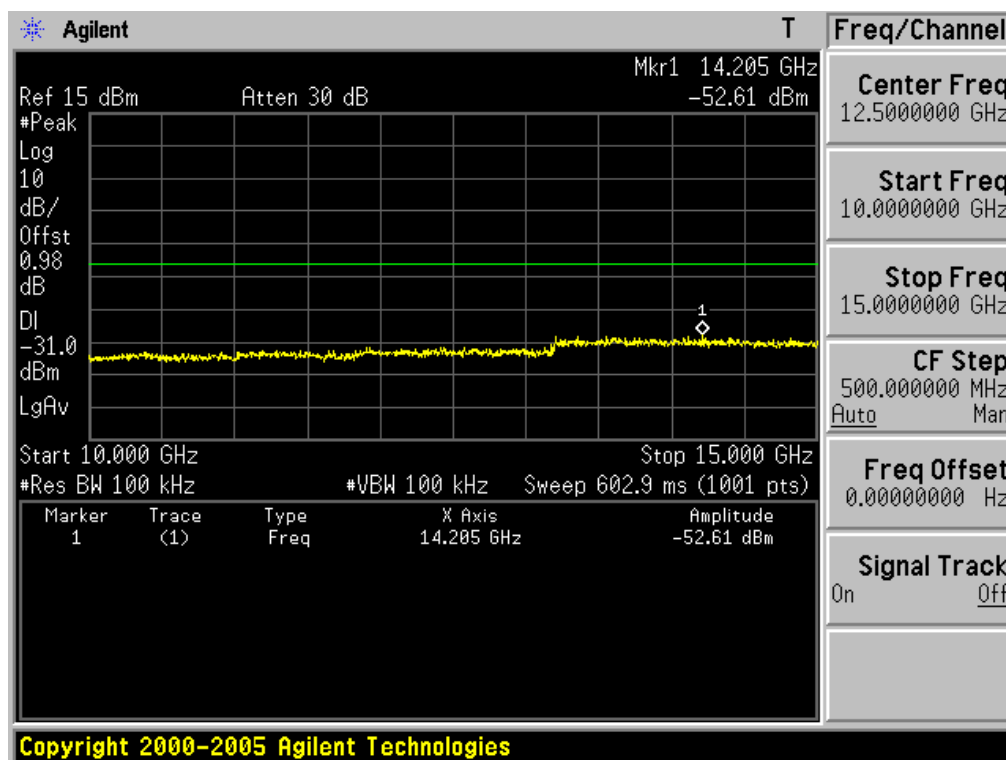
10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency



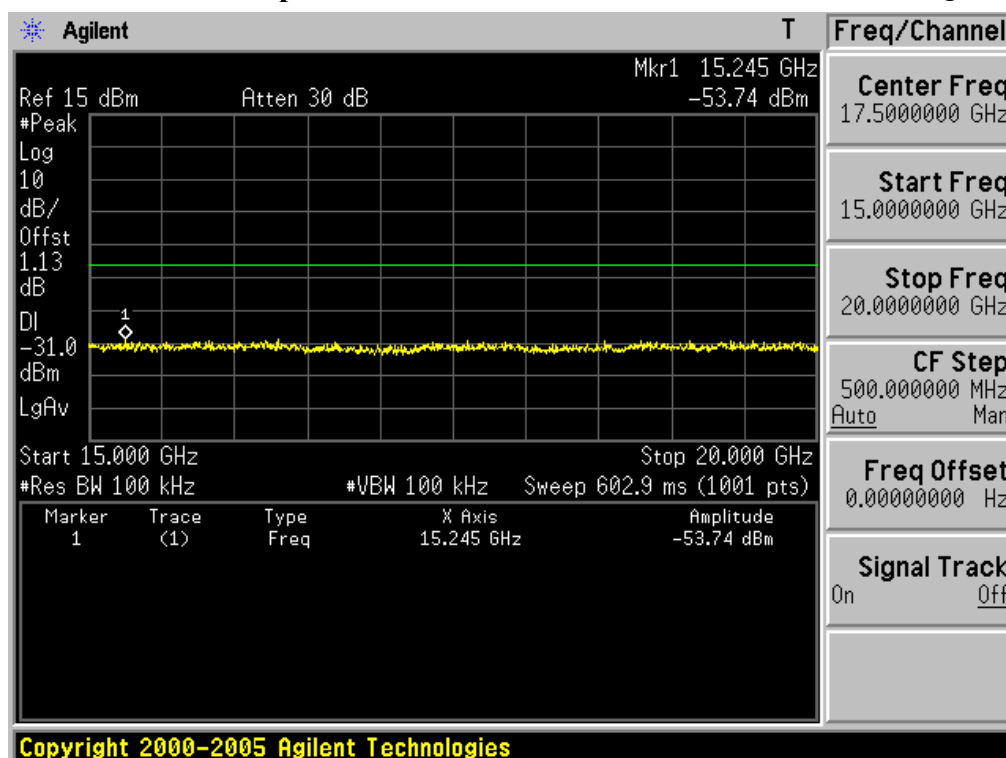
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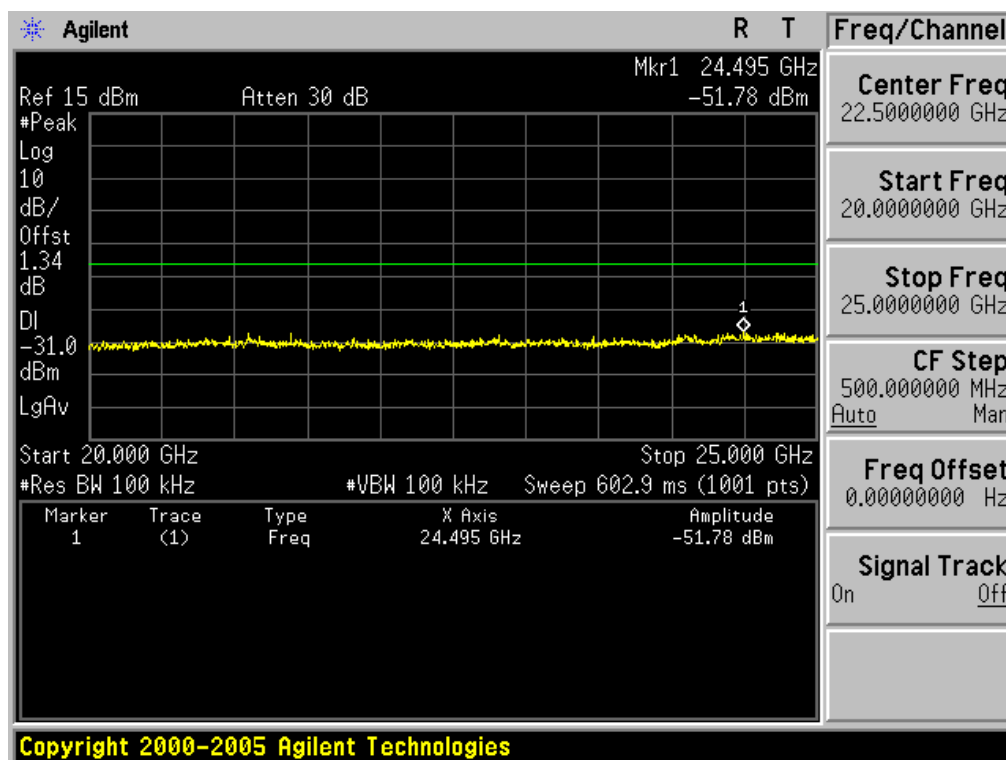
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15GHz ~ 20GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency

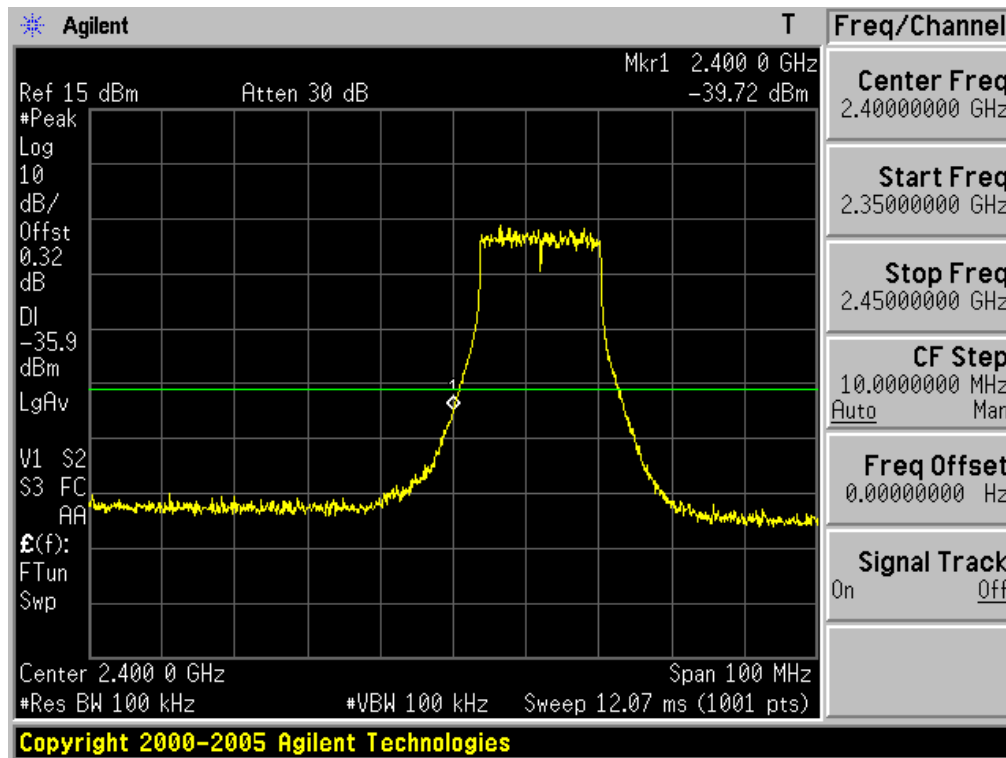


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency

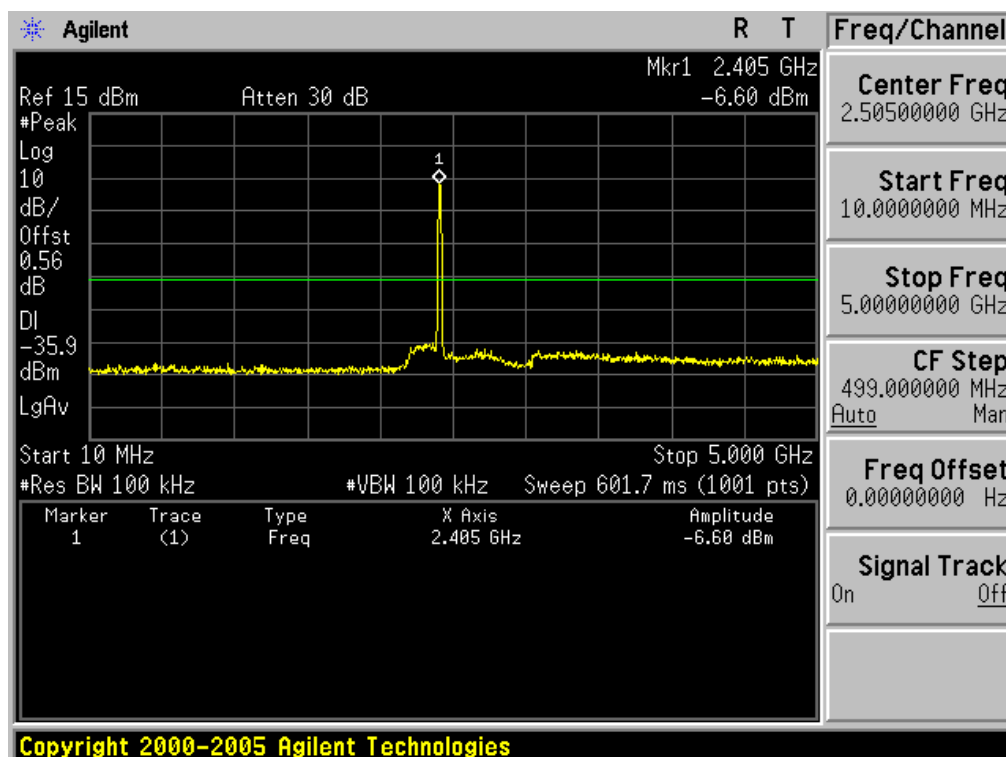


Low Band-edge at 30 dB blow

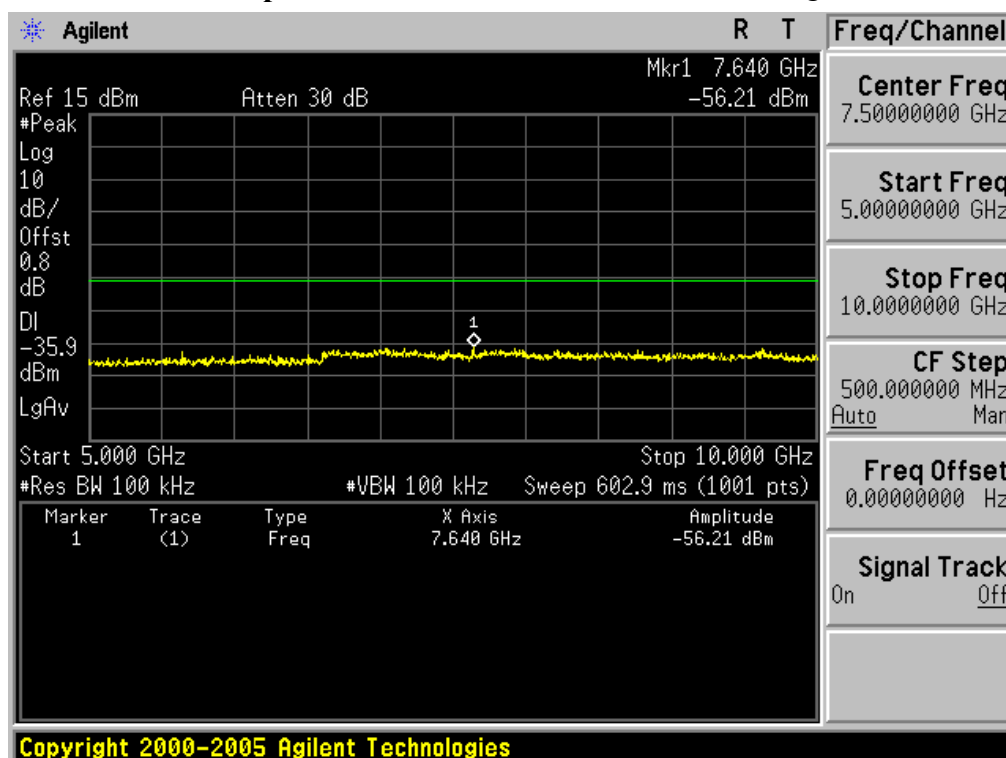
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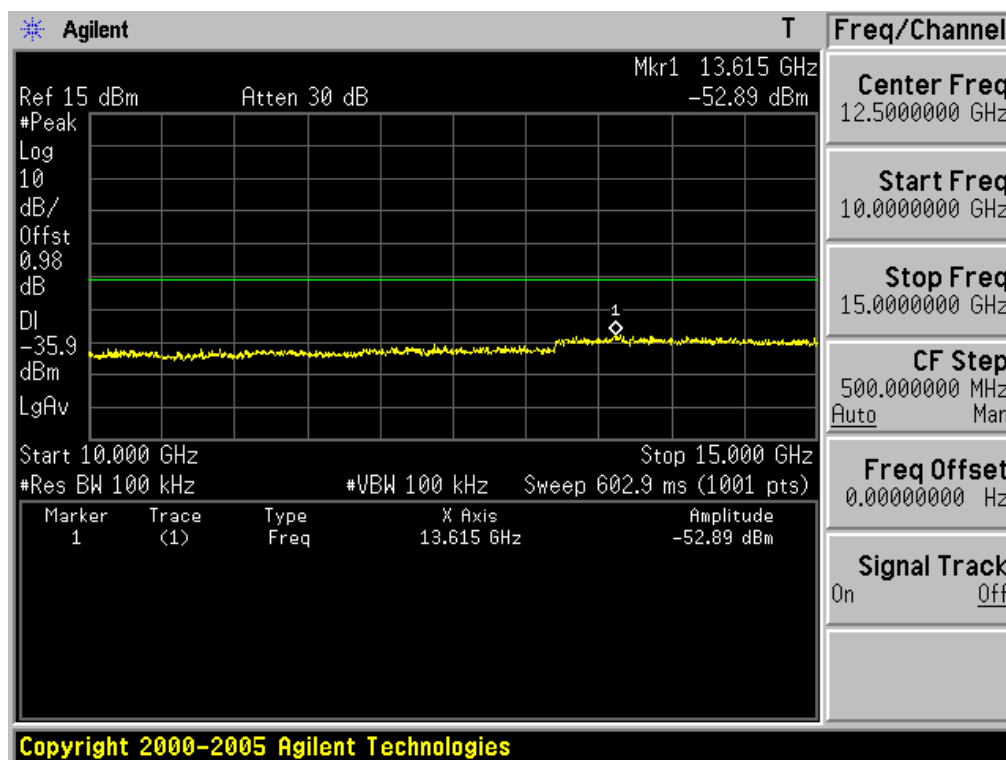
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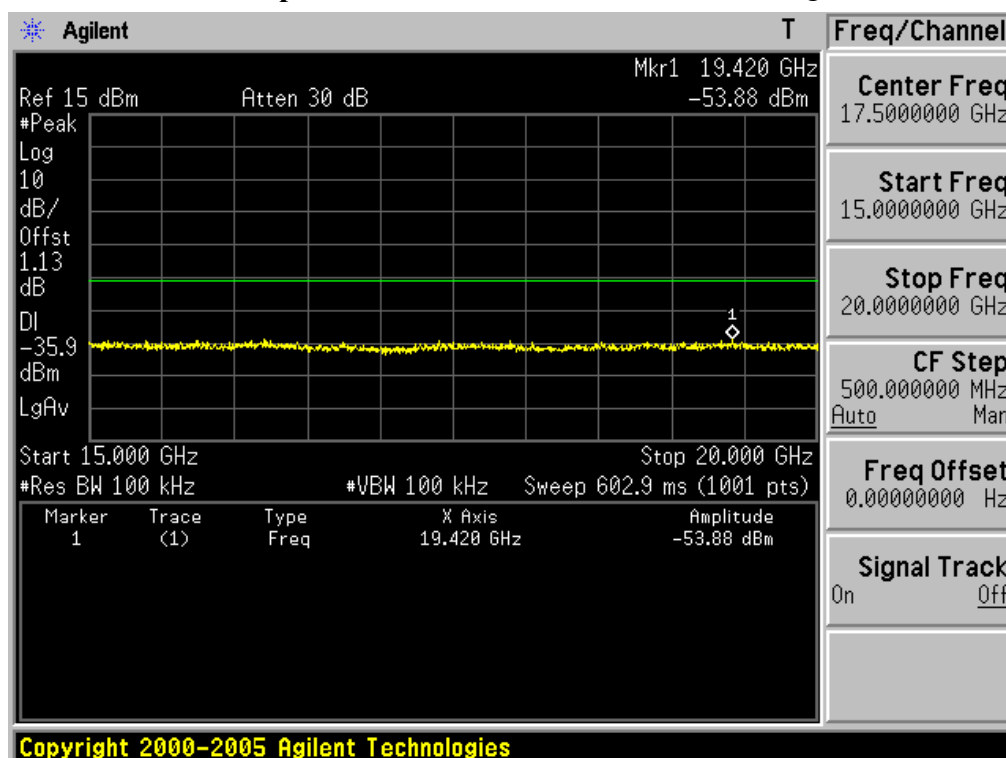
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11g & Lowest Frequency



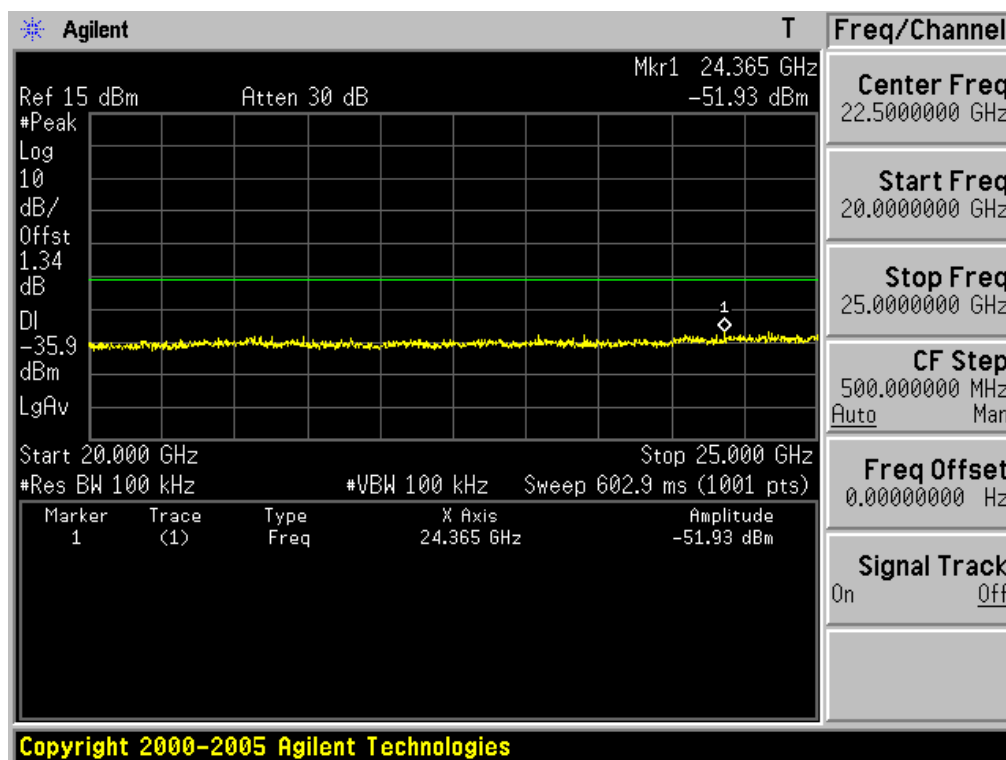
10GHz ~ 15GHz Conducted Spurious Emissions Test Mode: 802.11g & Lowest Frequency



15GHz ~ 20GHz Conducted Spurious Emissions Test Mode: 802.11g & Lowest Frequency

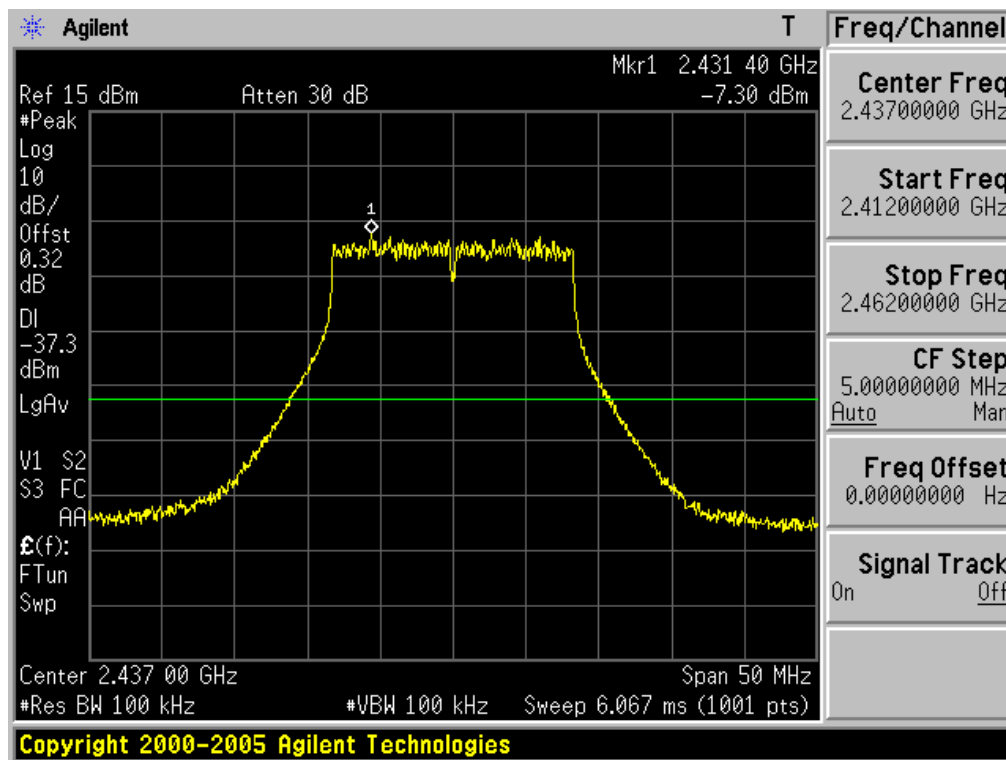


20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Lowest Frequency

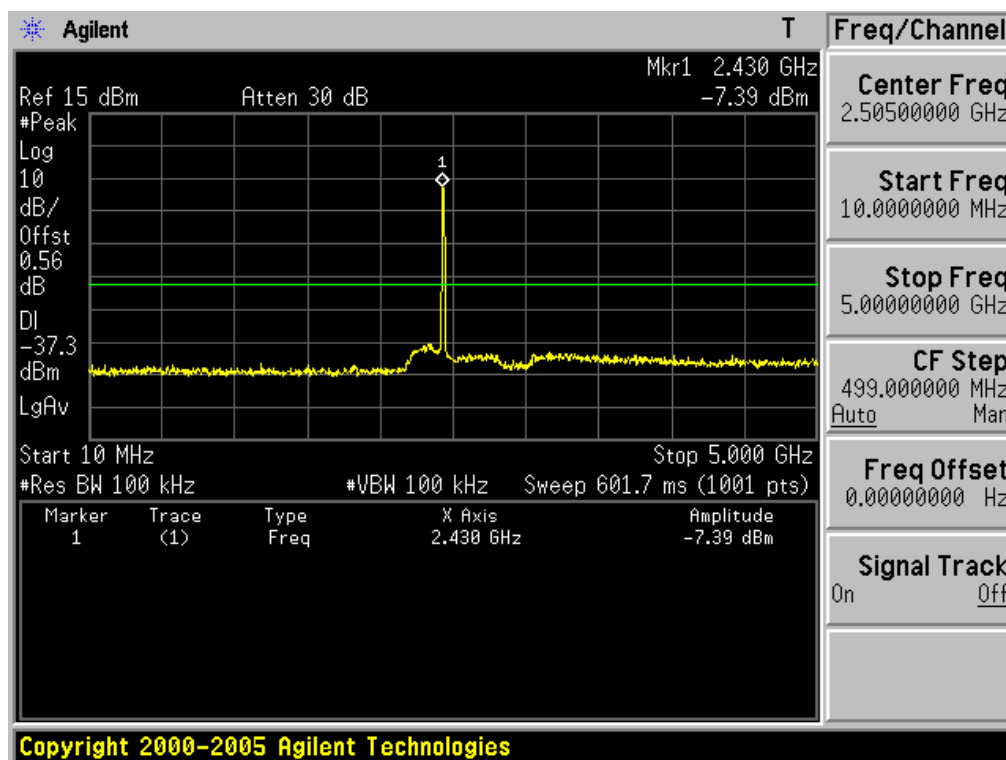


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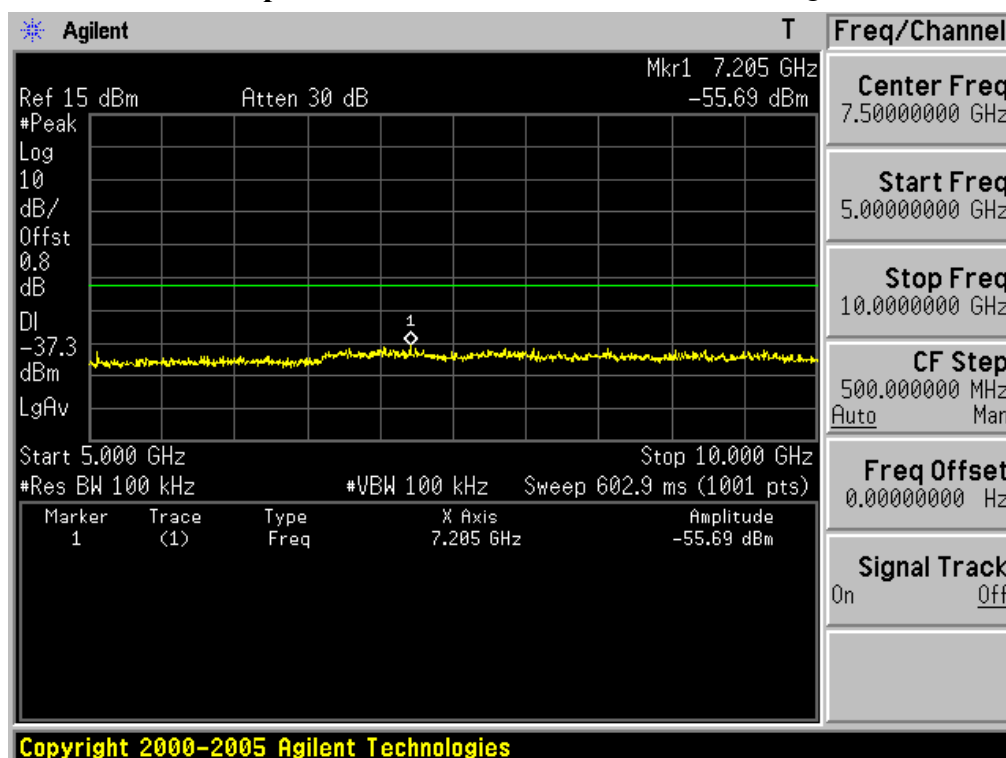
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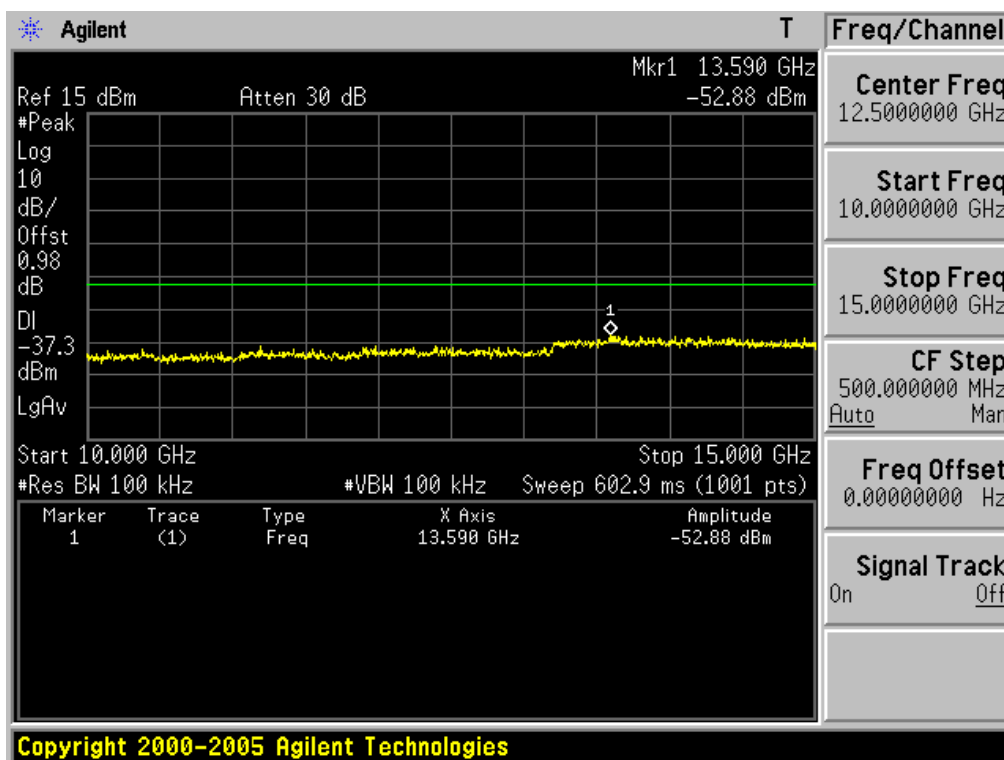
10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



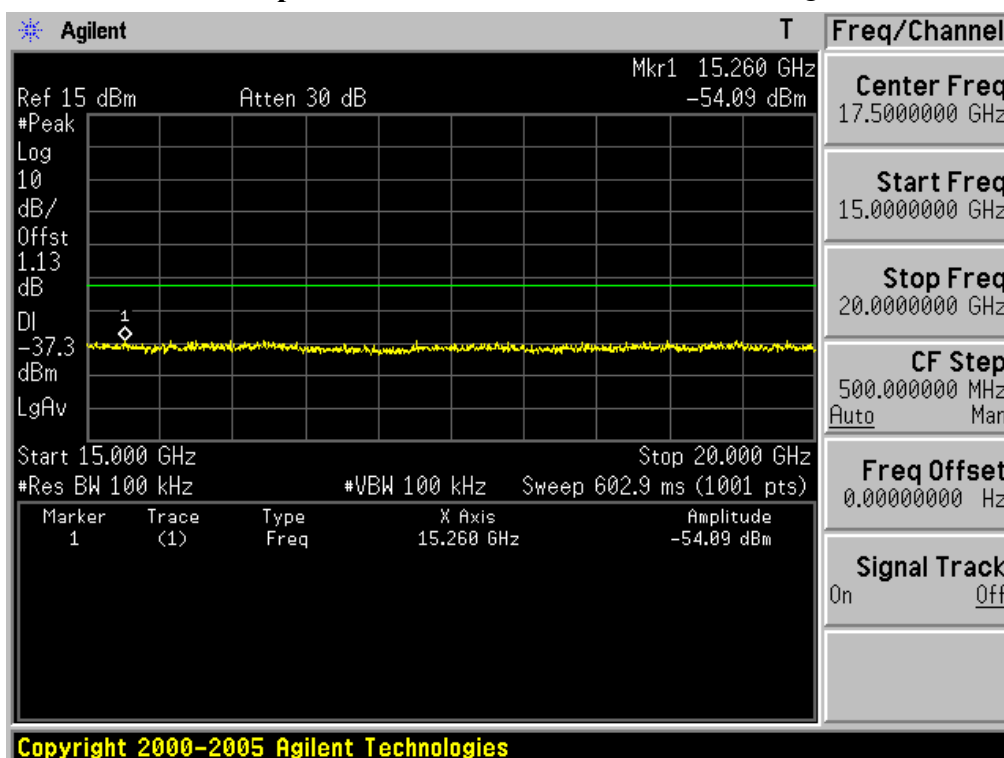
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



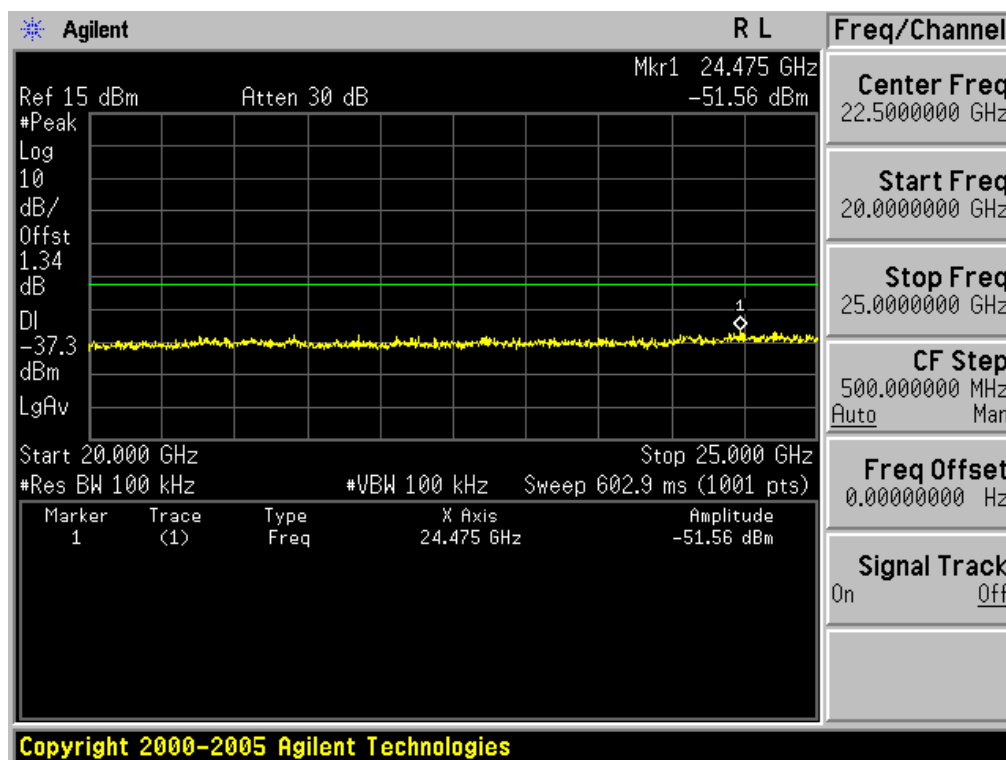
10GHz ~ 15GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



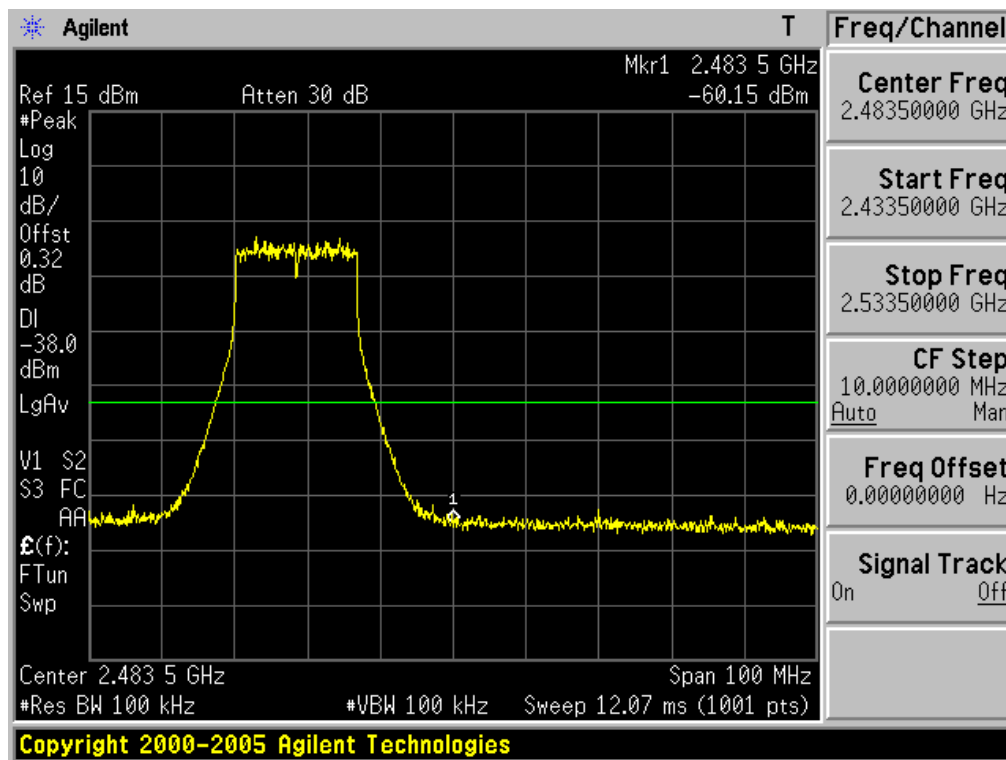
15GHz ~ 20GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



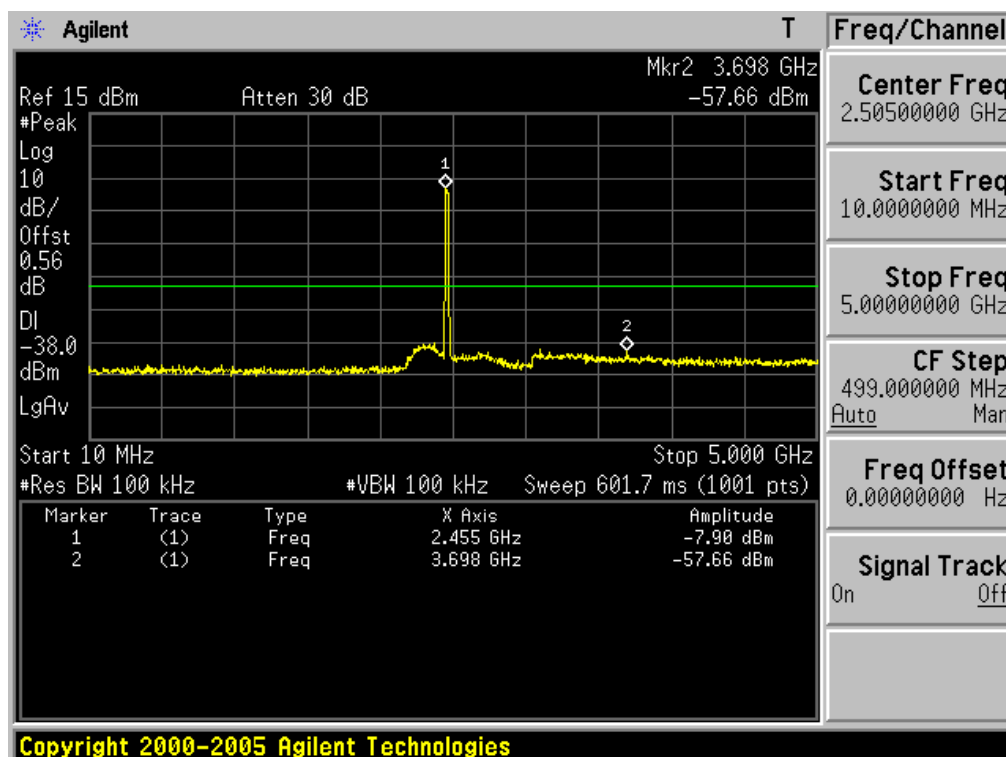
20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency



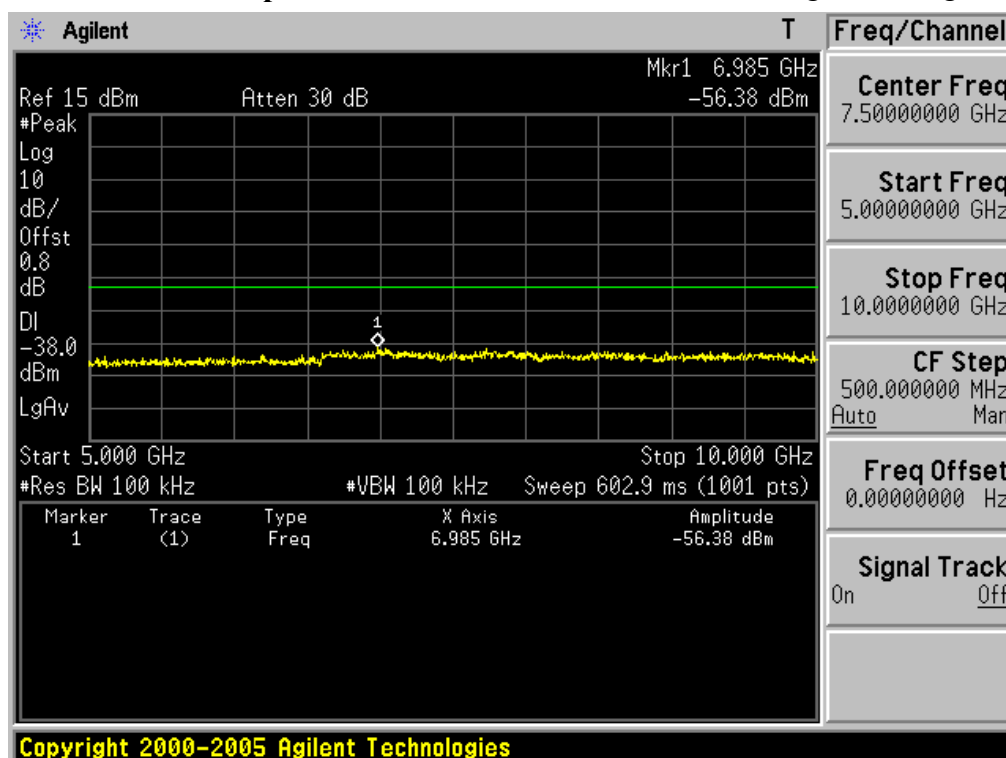
High Band-edge at 30 dB blow Test Mode: 802.11g & Highest Frequency



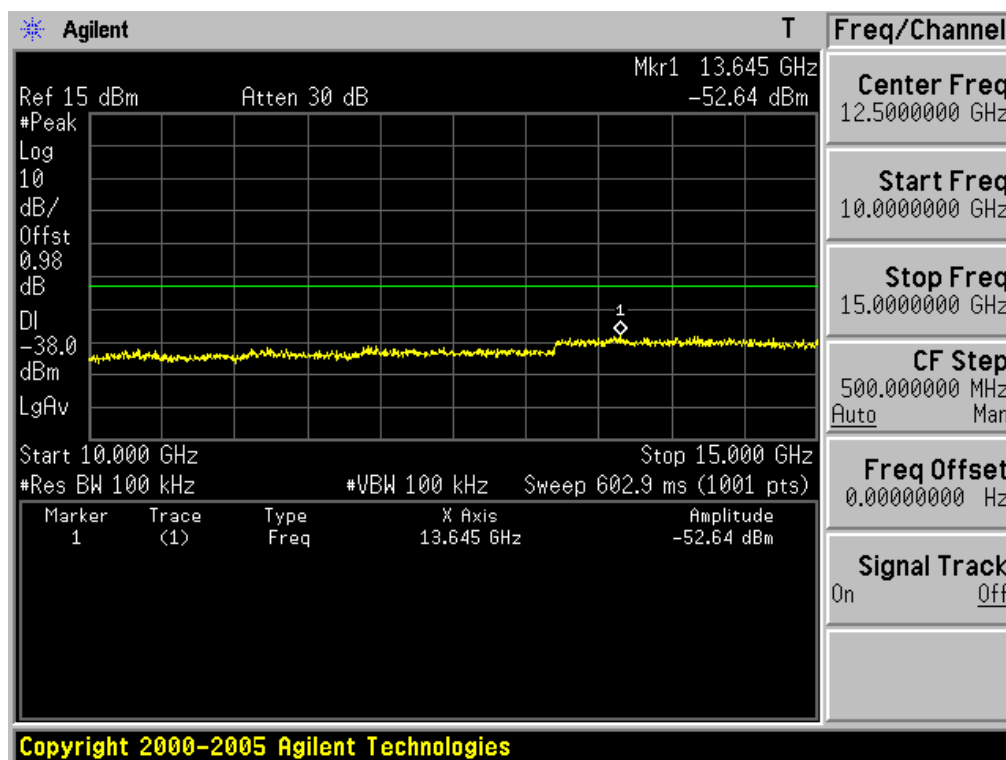
10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



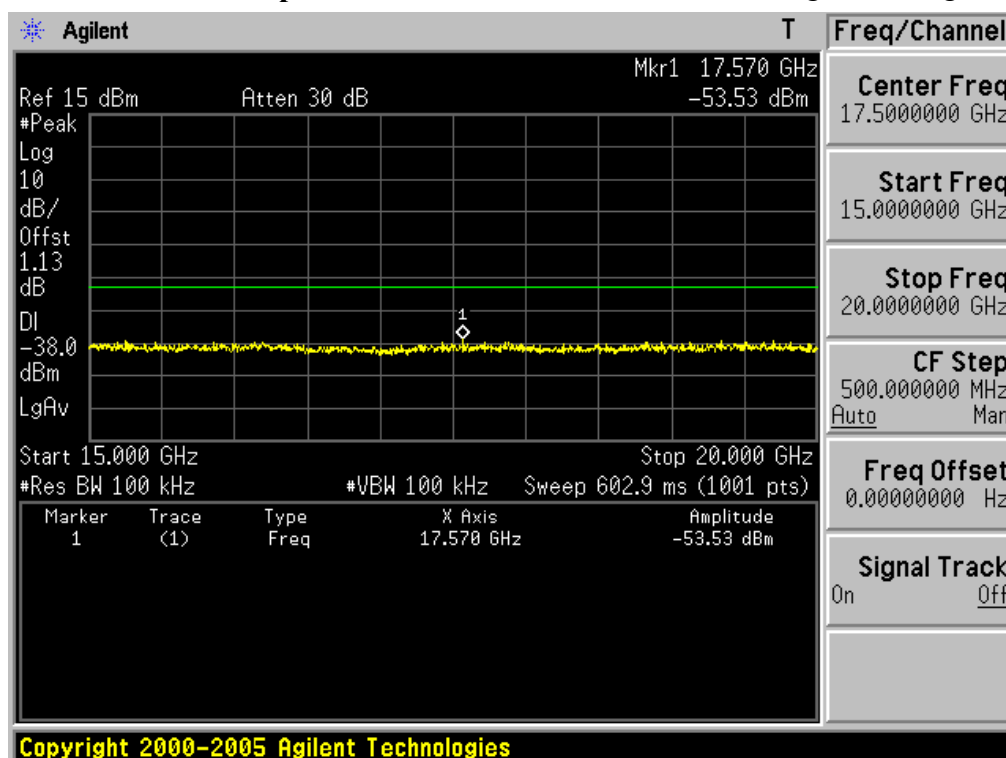
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



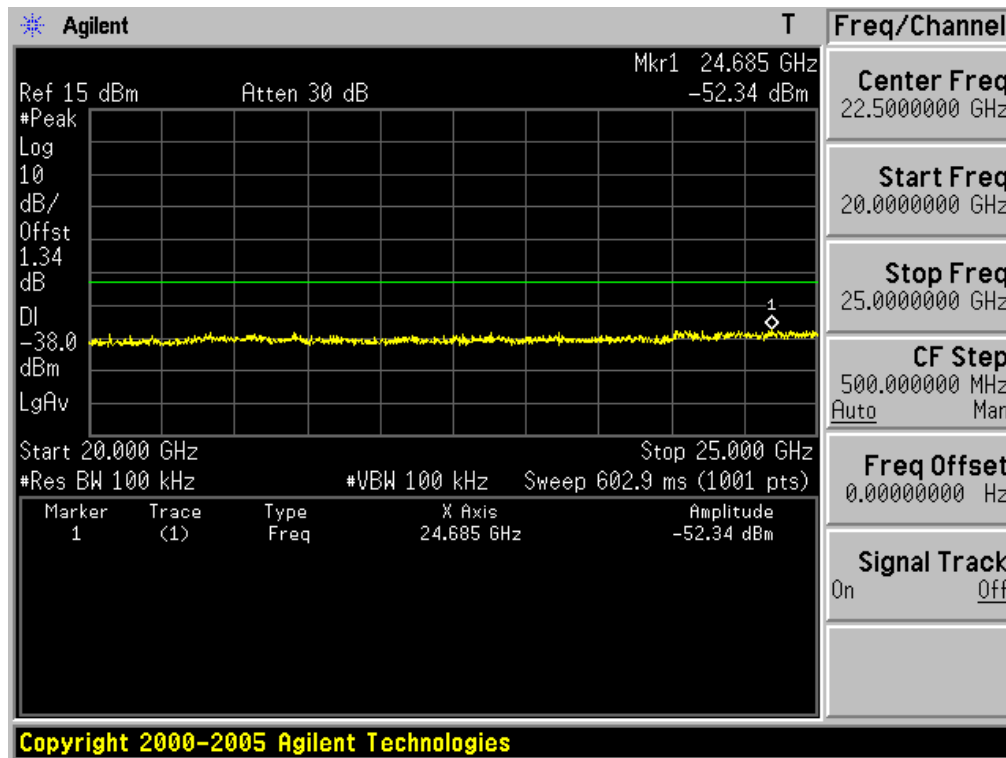
10GHz ~ 15GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



15GHz ~ 20GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



20GHz ~ 25GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



4.2.4 Out of band Emission – Radiated

- Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Tested frequency = Low, Middle, High Frequencies

Frequency Range = 30 MHz ~ 10th harmonic.

RBW and VBW = 1. Frequency range: 30MHz ~ 1GHz

RBW = 120KHz / VBW = $\geq$ RBW

2. Frequency range: 1GHz ~ 10th harmonics

Peak mode: RBW = 1MHz / VBW = $\geq$ RBW

Average mode: RBW = 1MHz / VBW = 10Hz

Detector function = Peak

Sweep = auto

Trace = max hold

- Measurement Data: **Comply**

Note 1: See next pages for actual measured spectrum plots and data.

Note 2: This test item was performed in all test cases.

And the worst data(Test case 3) were reported.

- Minimum Standard:

▪ FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

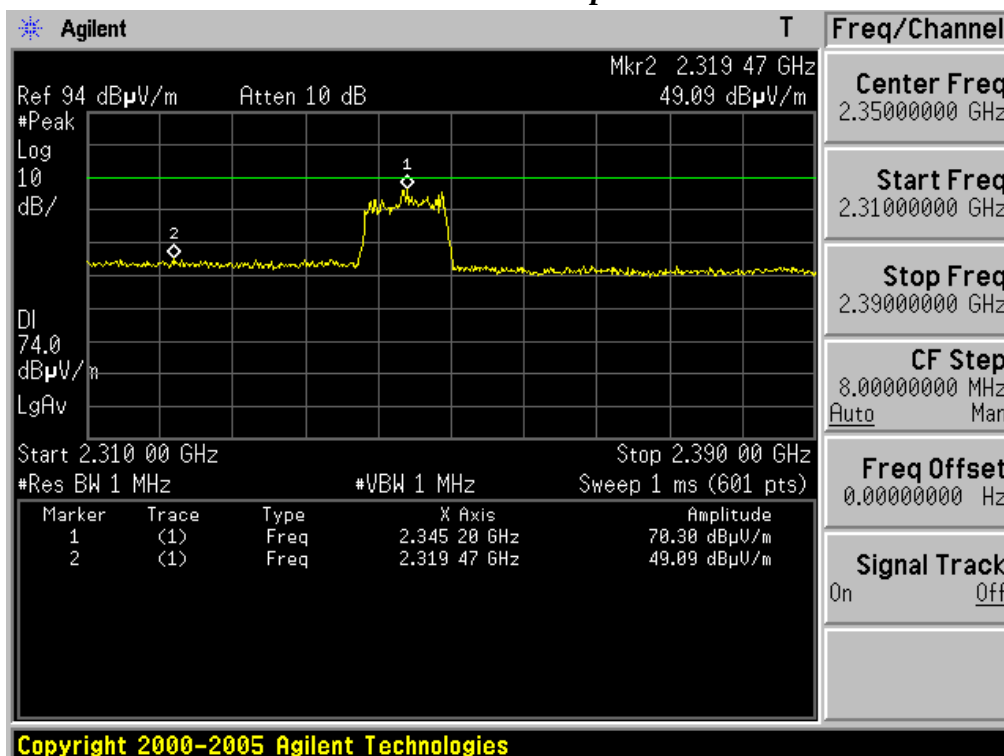
▪ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test case 3

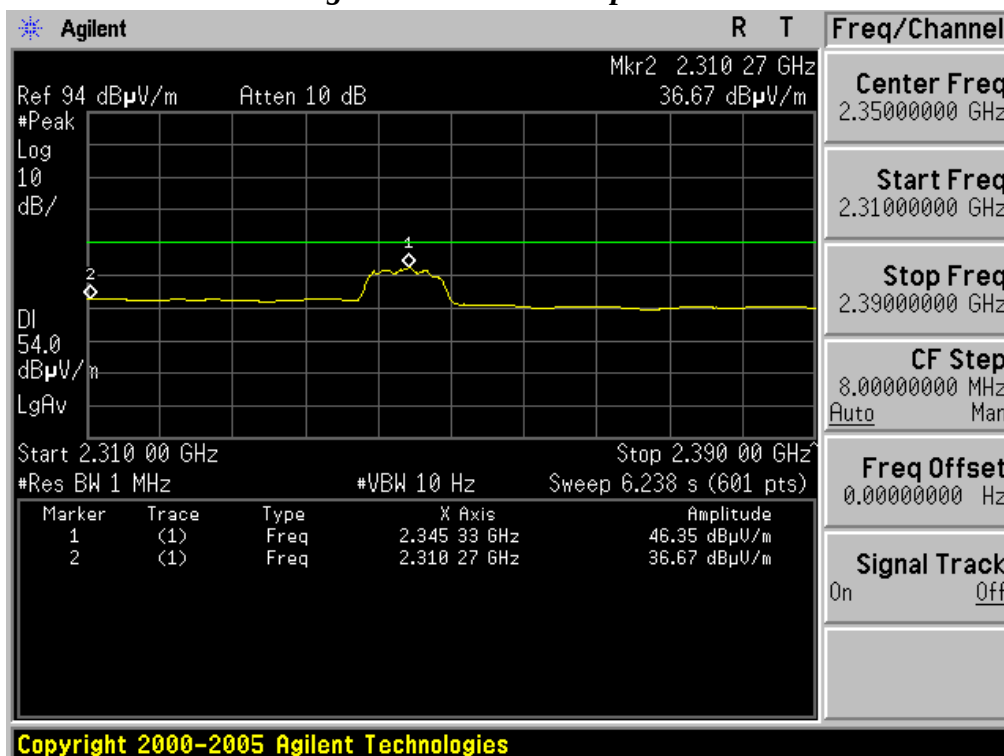
Peak mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test case 3

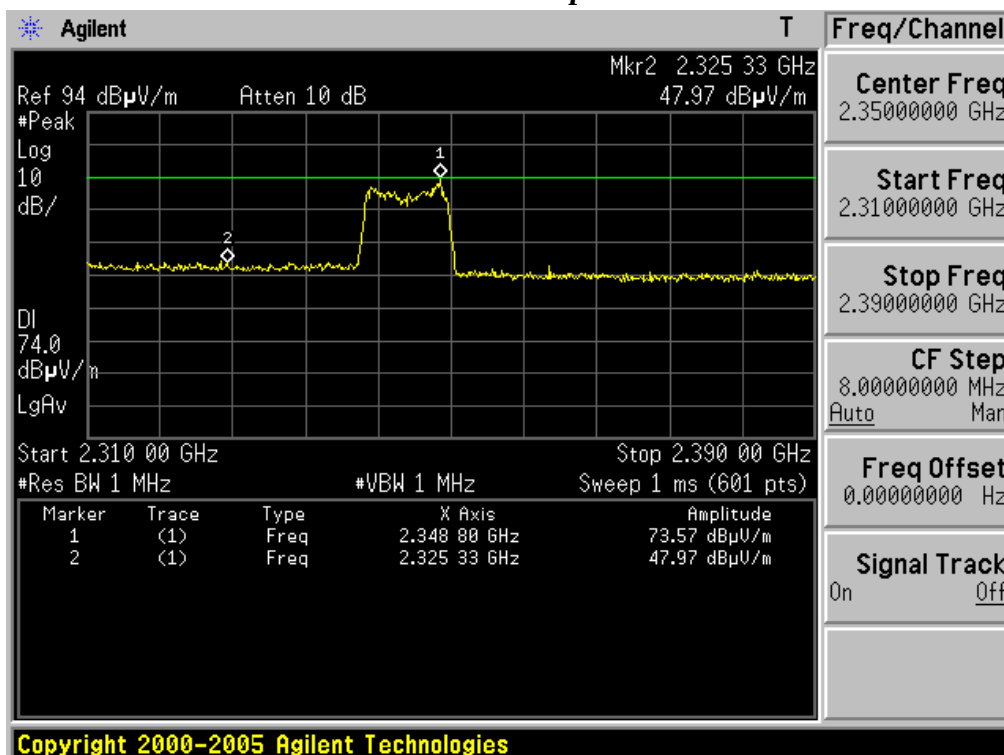
Average mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test case 3

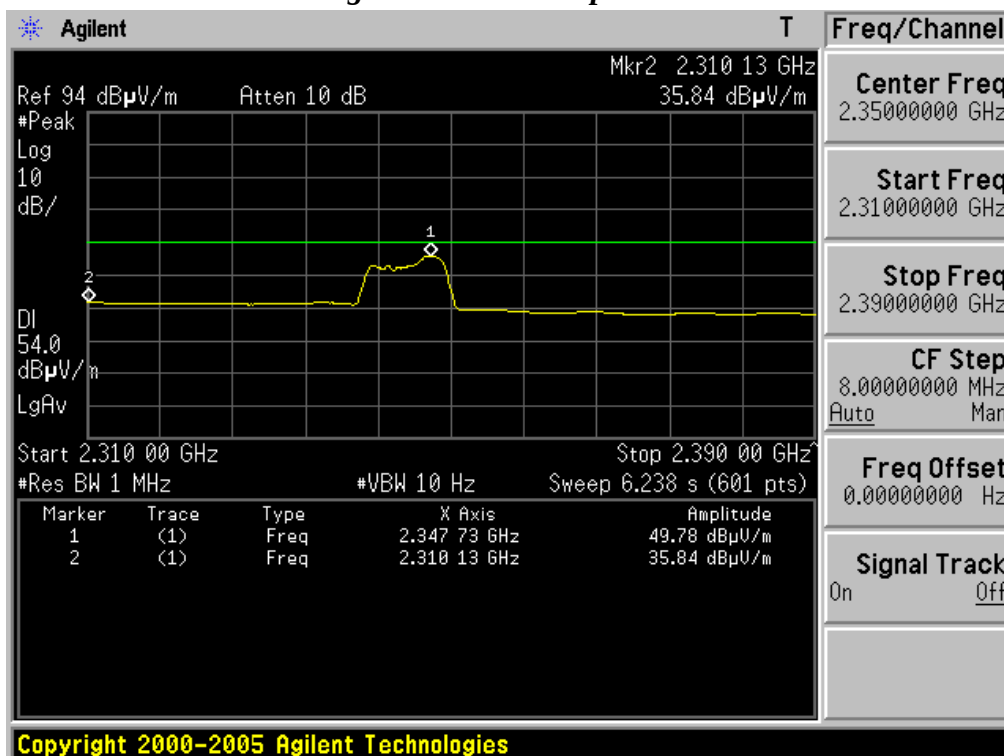
Peak mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test case 3

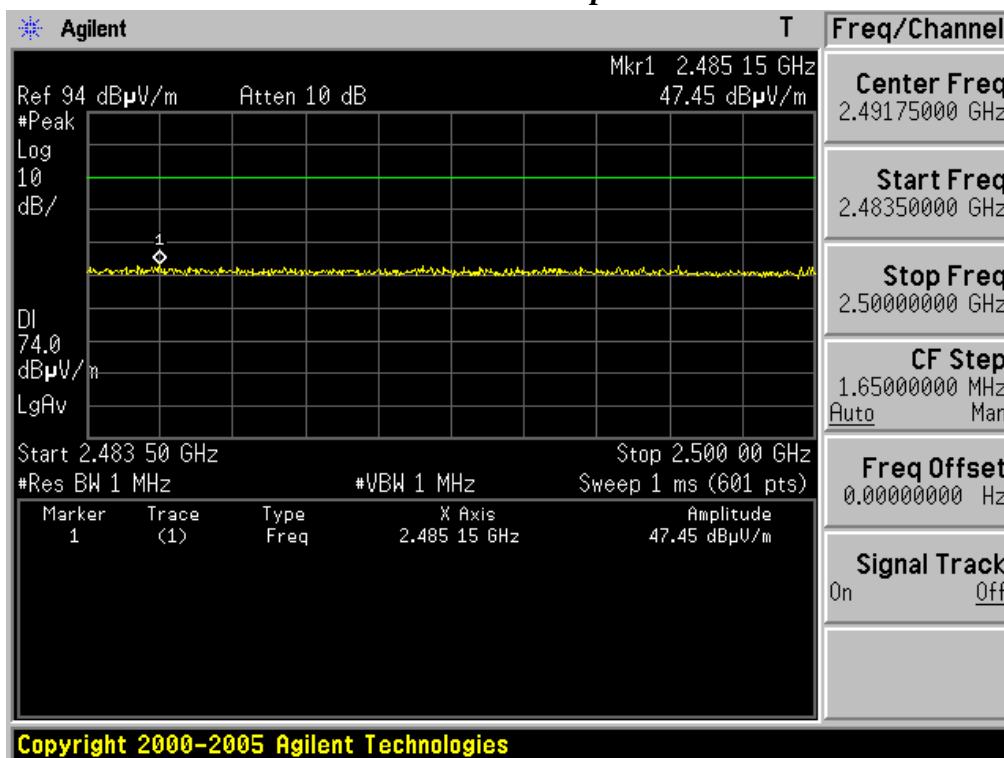
Average mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

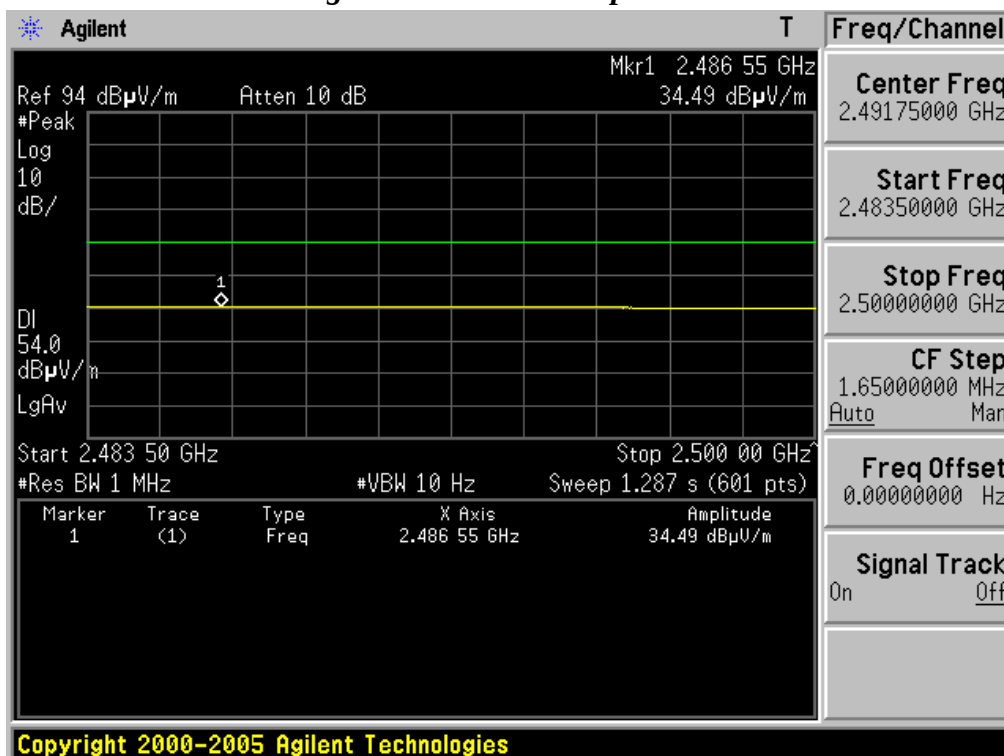
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test case 3

Peak mode / Horizontal polarization



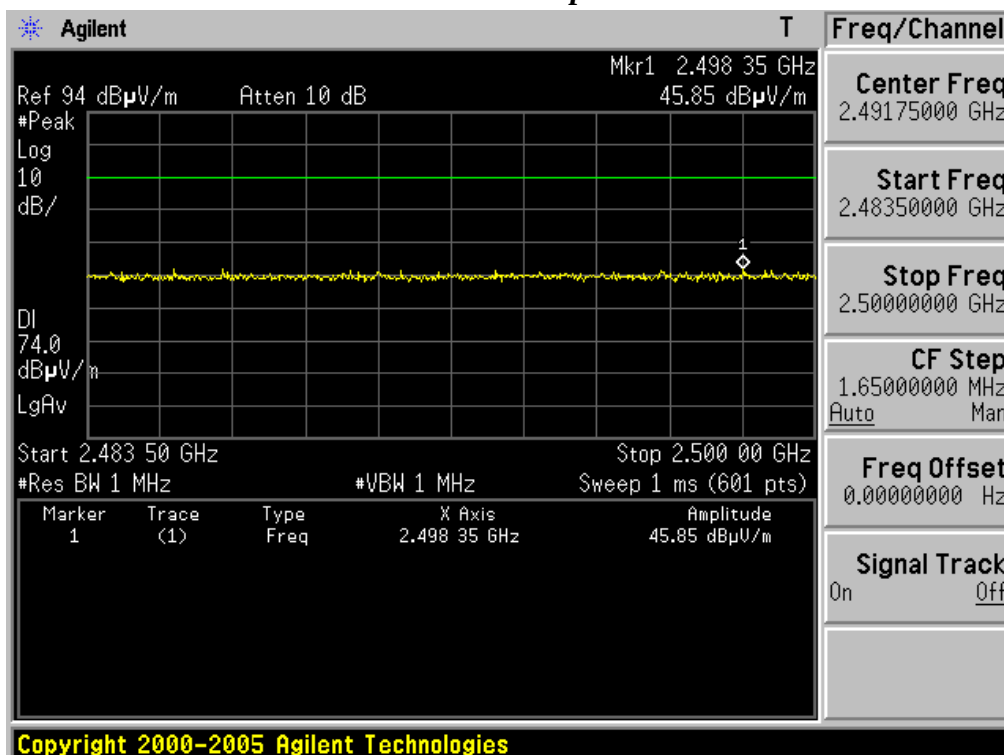
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test case 3

Average mode / Horizontal polarization



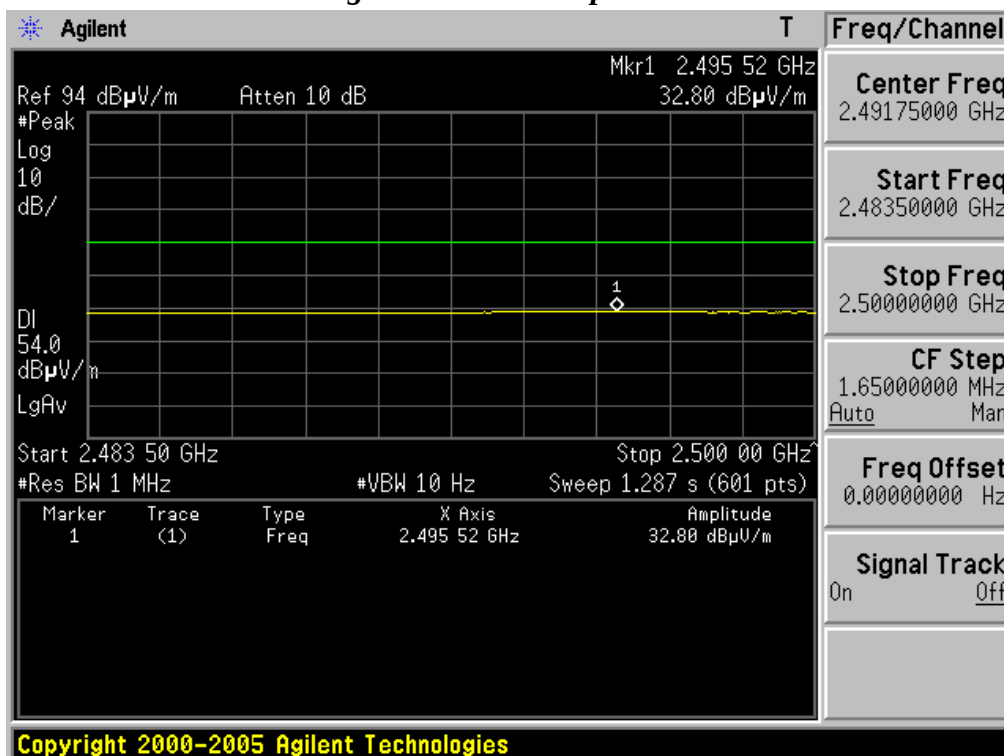
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test case 3

Peak mode / Vertical polarization



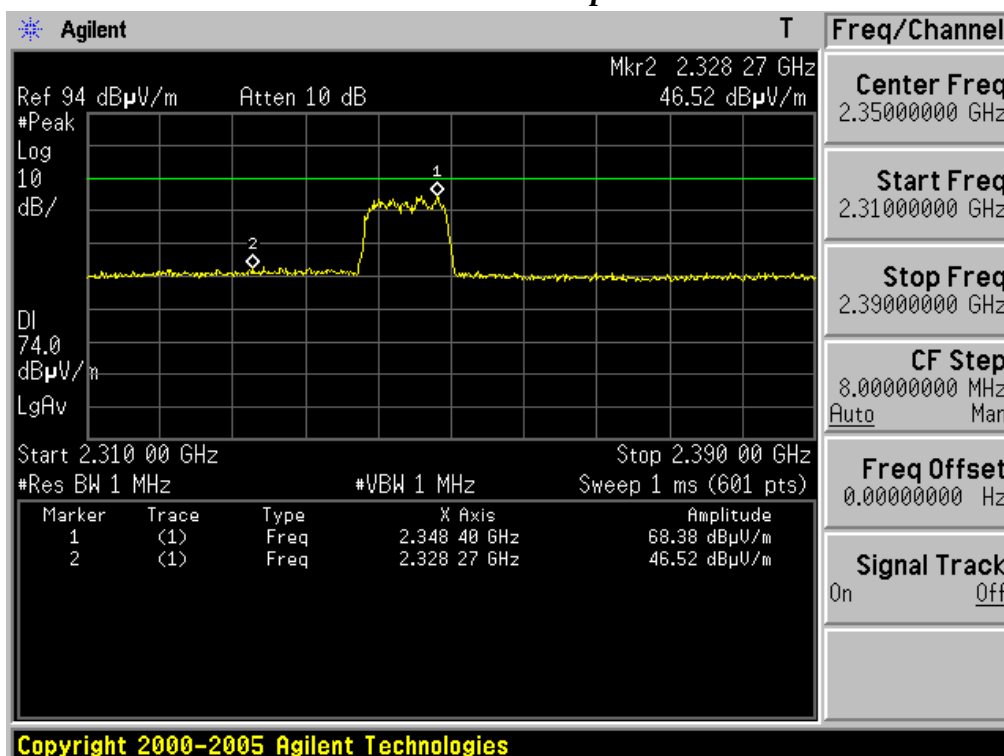
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test case 3

Average mode / Vertical polarization



Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test case 3

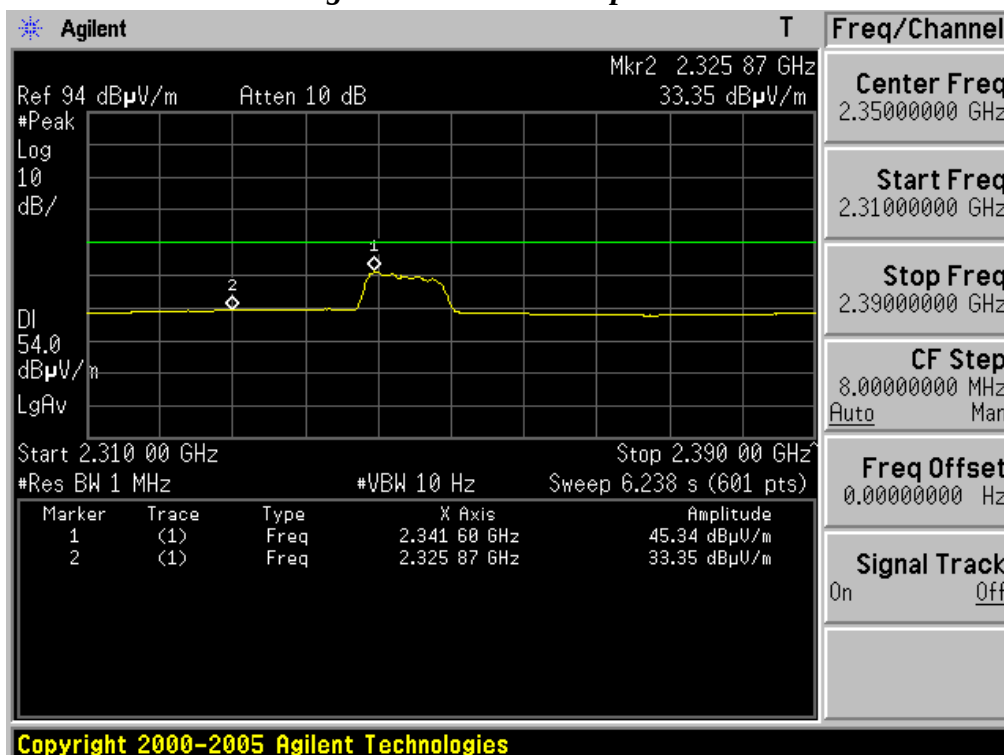
Peak mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test case 3

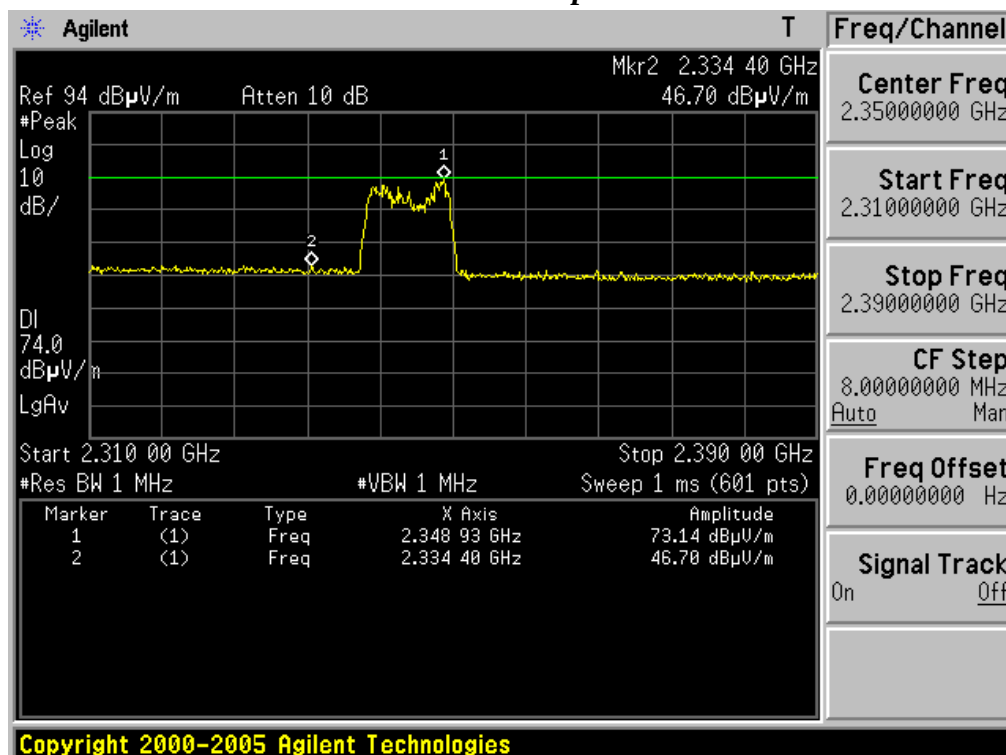
Average mode / Horizontal polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test case 3

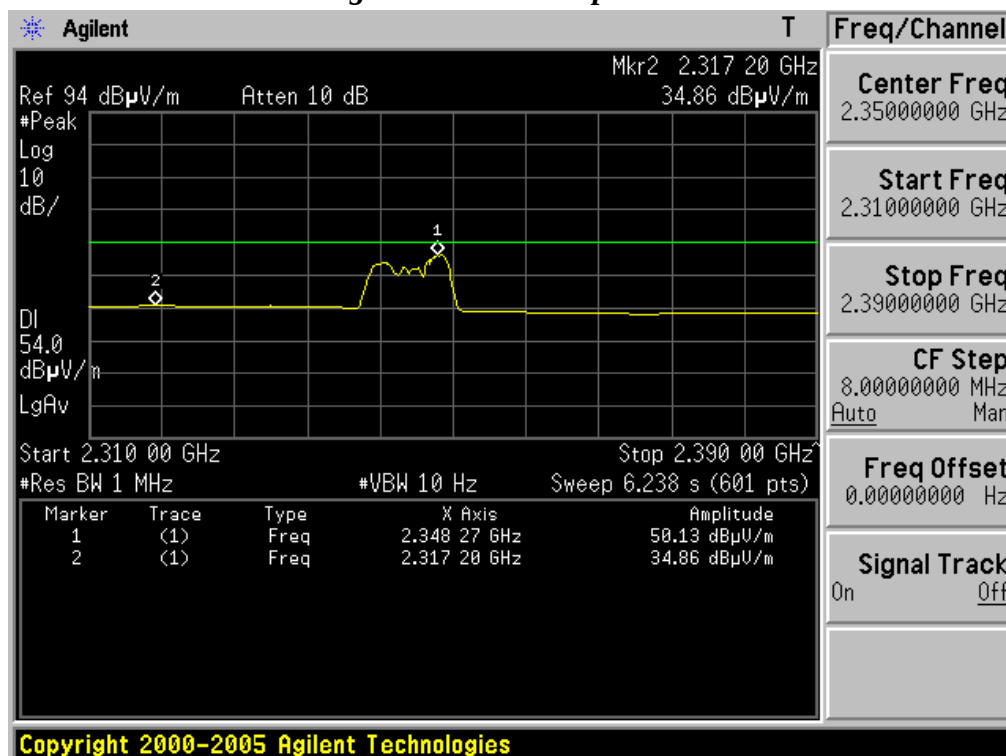
Peak mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test case 3

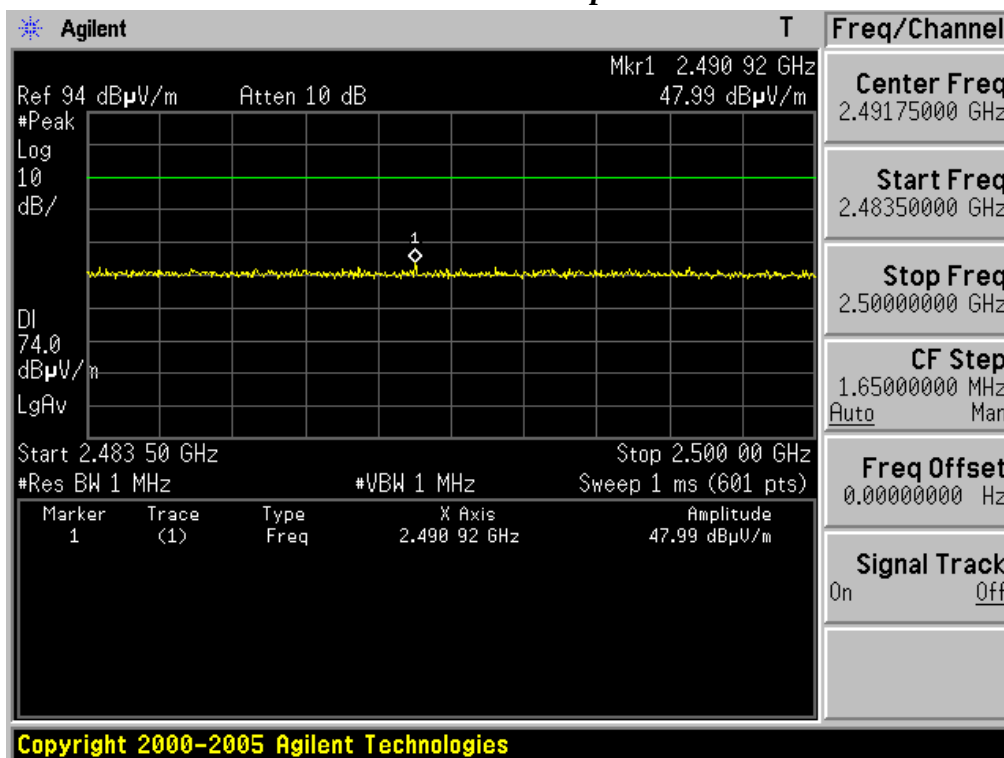
Average mode / Vertical polarization



Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

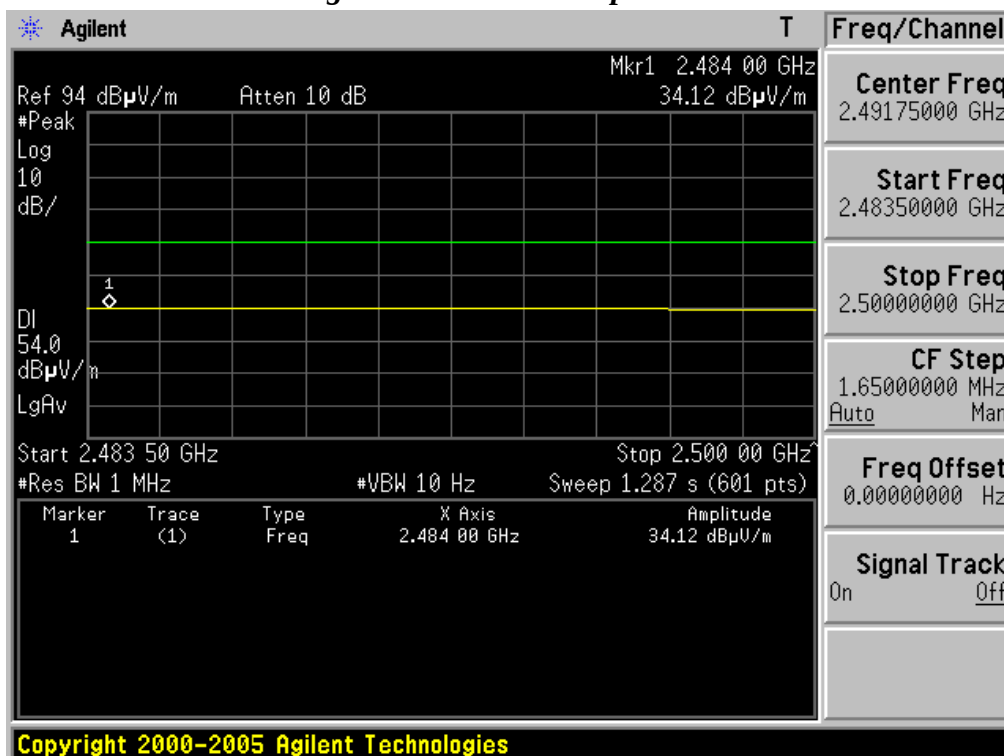
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test case 3

Peak mode / Horizontal polarization



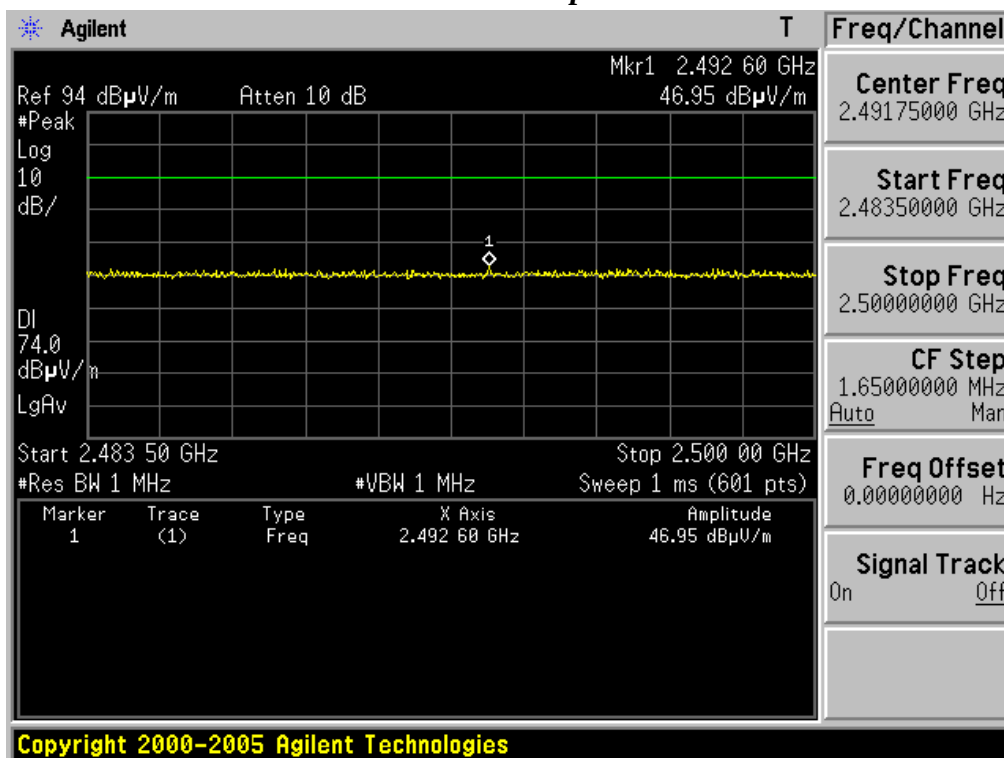
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test case 3

Average mode / Horizontal polarization



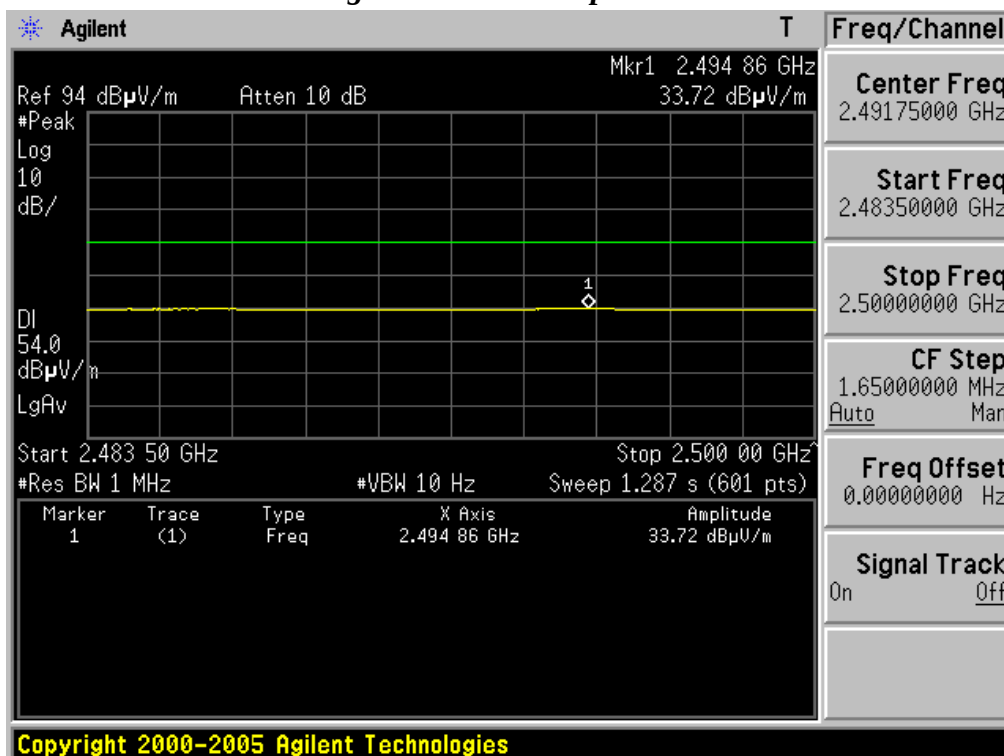
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test case 3

Peak mode / Vertical polarization



Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test case 3

Average mode / Vertical polarization



30MHz ~ 1GHz Radiated Spurious Emissions

▪ Test Mode: 802.11b & Lowest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
136.490	V	47.4	-9.6	37.8	43.5	5.7
175.491	V	48.3	-10.6	37.7	43.5	5.8
175.491	H	48.7	-10.6	38.1	43.5	5.4
194.997	H	44.1	-10.0	34.1	43.5	9.4
402.983	H	40.5	-4.4	36.1	46.0	9.9
409.477	H	40.9	-4.2	36.7	46.0	9.3
428.982	H	43.6	-3.9	39.7	46.0	6.3

▪ Test Mode: 802.11b & Middle Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
136.492	V	47.6	-9.6	38.0	43.5	5.5
175.488	H	49.3	-10.6	38.7	43.5	4.8
175.497	V	48.4	-10.6	37.8	43.5	5.7
428.973	H	42.9	-3.9	39.0	46.0	7.0

▪ Test Mode: 802.11b & Highest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
135.490	V	52.3	-9.6	42.7	43.5	0.8
136.492	H	44.5	-9.6	34.9	43.5	8.6
174.495	H	47.0	-10.6	36.4	43.5	7.1
175.494	V	50.2	-10.6	39.6	43.5	3.9
194.992	V	46.1	-10.0	36.1	43.5	7.4
214.495	V	43.9	-9.3	34.6	43.5	8.9

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 10dB below limit.
2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

30MHz ~ 1GHz Radiated Spurious Emissions

▪ Test Mode: 802.11g & Lowest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
136.501	V	47.3	-9.6	37.7	43.5	5.8
175.489	H	46.3	-10.6	35.7	43.5	7.8
175.495	V	48.2	-10.6	37.6	43.5	5.9
428.973	H	44.0	-3.9	40.1	46.0	5.9

▪ Test Mode: 802.11g & Middle Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
175.497	V	47.8	-10.6	37.2	43.5	6.3
409.481	H	41.2	-4.2	37.0	46.0	9.0
448.483	H	40.8	-3.7	37.1	46.0	8.9

▪ Test Mode: 802.11g & Highest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)	T.F (dB)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
		QP		QP	QP	QP
292.497	H	44.5	-6.7	37.8	46.0	8.2
331.477	H	44.0	-5.9	38.1	46.0	7.9
370.492	H	44.0	-5.0	39.0	46.0	7.0
409.492	H	44.8	-4.2	40.6	46.0	5.4
448.482	H	43.2	-3.7	39.5	46.0	6.5
487.496	H	40.0	-3.0	37.0	46.0	9.0

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 10dB below limit.
2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

1GHz ~ 25GHz Radiated Spurious Emissions

▪ Test Mode: 802.11b & Lowest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4824	H	50.16	38.58	7.44	57.60	46.02	74.00	54.00	16.40	7.98
4824	V	48.97	36.98	7.44	56.41	44.42	74.00	54.00	17.59	9.58
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11b & Middle Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4874	H	52.47	39.61	7.54	60.01	47.15	74.00	54.00	13.99	6.85
4874	V	51.10	37.85	7.54	58.64	45.39	74.00	54.00	15.36	8.61
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11b & Highest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4924	H	53.79	41.37	7.59	61.38	48.96	74.00	54.00	12.62	5.04
4924	V	51.36	38.52	7.59	58.95	46.11	74.00	54.00	15.05	7.89
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 20dB below limit.
2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

1GHz ~ 25GHz Radiated Spurious Emissions

▪ Test Mode: 802.11g & Lowest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4824	H	45.97	33.20	7.44	53.41	40.64	74.00	54.00	20.59	13.36
4824	V	43.93	31.79	7.44	51.37	39.23	74.00	54.00	22.63	14.77
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11g & Middle Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4874	H	47.64	34.91	7.54	55.18	42.45	74.00	54.00	18.82	11.55
4874	V	47.17	33.52	7.54	54.71	41.06	74.00	54.00	19.29	12.94
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11g & Highest Frequency & Test case 3

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
4924	H	47.80	35.42	7.59	55.39	43.01	74.00	54.00	18.61	10.99
4924	V	47.31	33.75	7.59	54.90	41.34	74.00	54.00	19.10	12.66
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 20dB below limit.
2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

4.2.5 Transmitter Power Spectral Density

- Procedure:

The transmitter output is connected to a spectrum analyzer. Locate and zoom in on emission peak within the passband. The maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3kHz and VBW > 9kHz, sweep time= auto, video averaging is turned off. Trace average 100 traces in power averaging mode. The PPSD is the highest level found across the emission in any 3kHz band. The test is performed in accordance with FCC document “Measurement of Digital Transmission Systems Operating under Section 15.247”, March 23, 2005. The transmitter output power was measured with power output option #2. Therefore, PSD was measured with PSD option #2.

- Measurement Data: **Comply**

Test Mode	Frequency	Test Results (dBm)
802.11b	Lowest	-11.526
	Middle	-11.495
	Highest	-11.277
802.11g	Lowest	-19.632
	Middle	-20.105
	Highest	-19.931

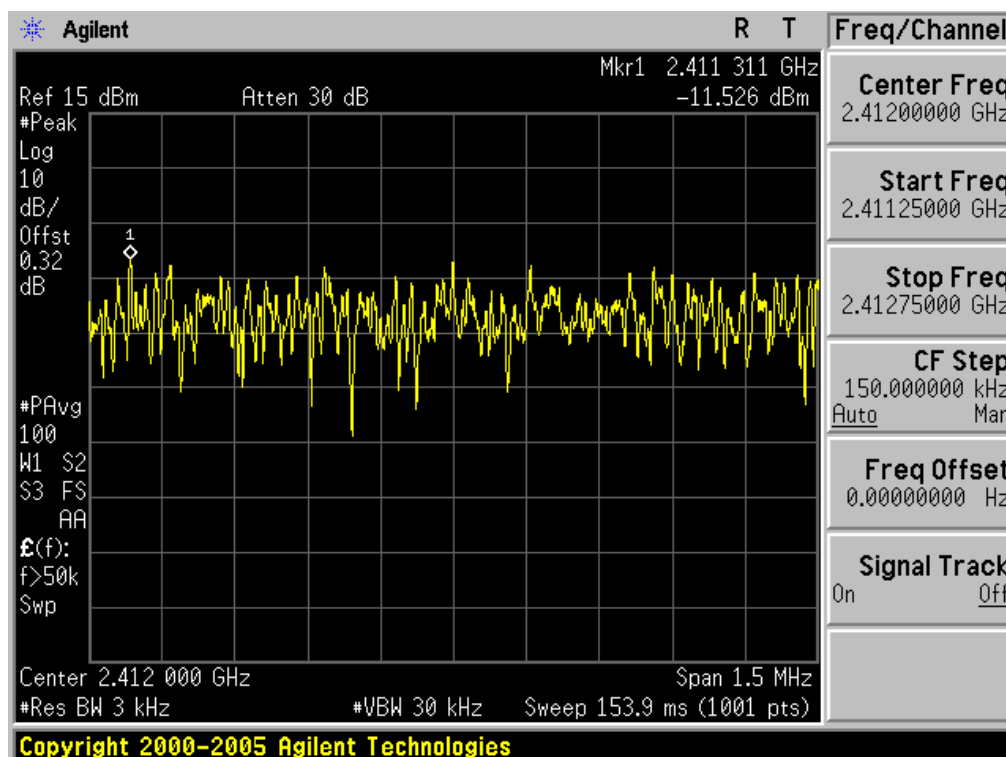
Note 1: See next pages for actual measured spectrum plots.

- Minimum Standard:

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3kHz BW.
--

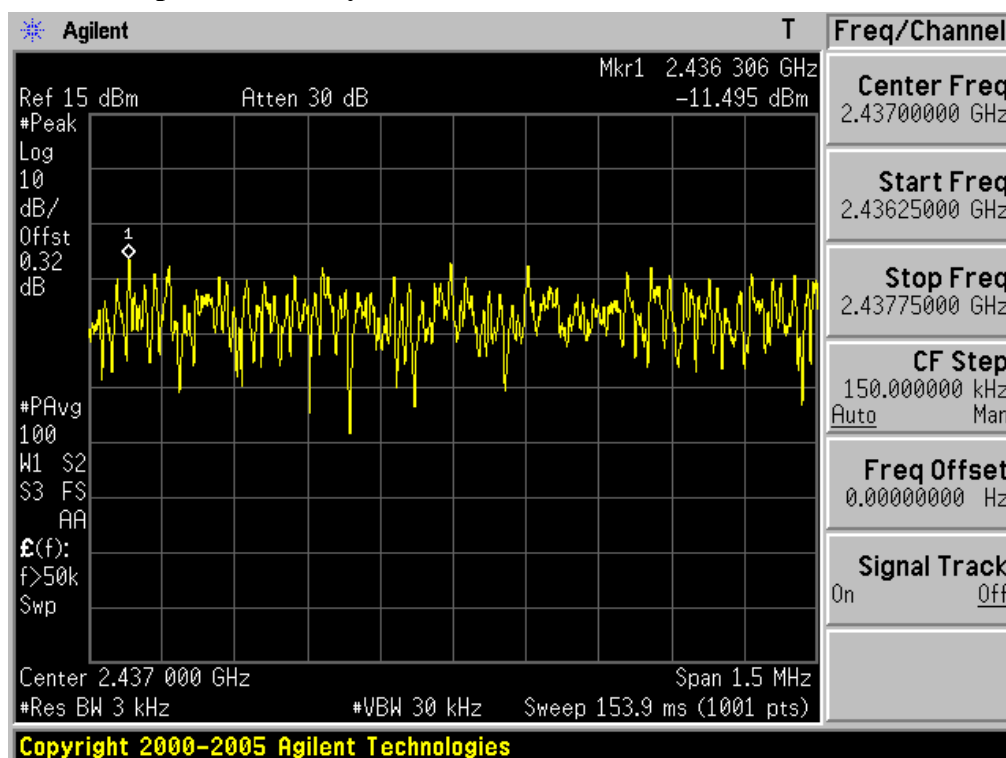
Transmitter Power Spectral Density

Test Mode: 802.11b & Lowest Frequency



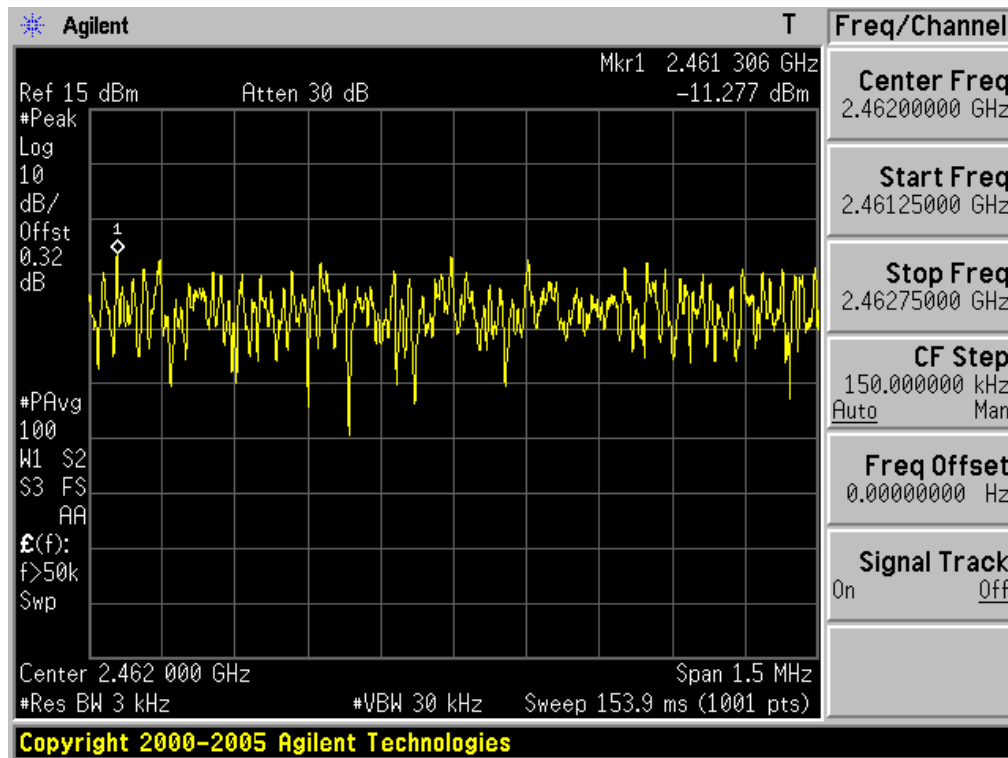
Transmitter Power Spectral Density

Test Mode: 802.11b & Middle Frequency



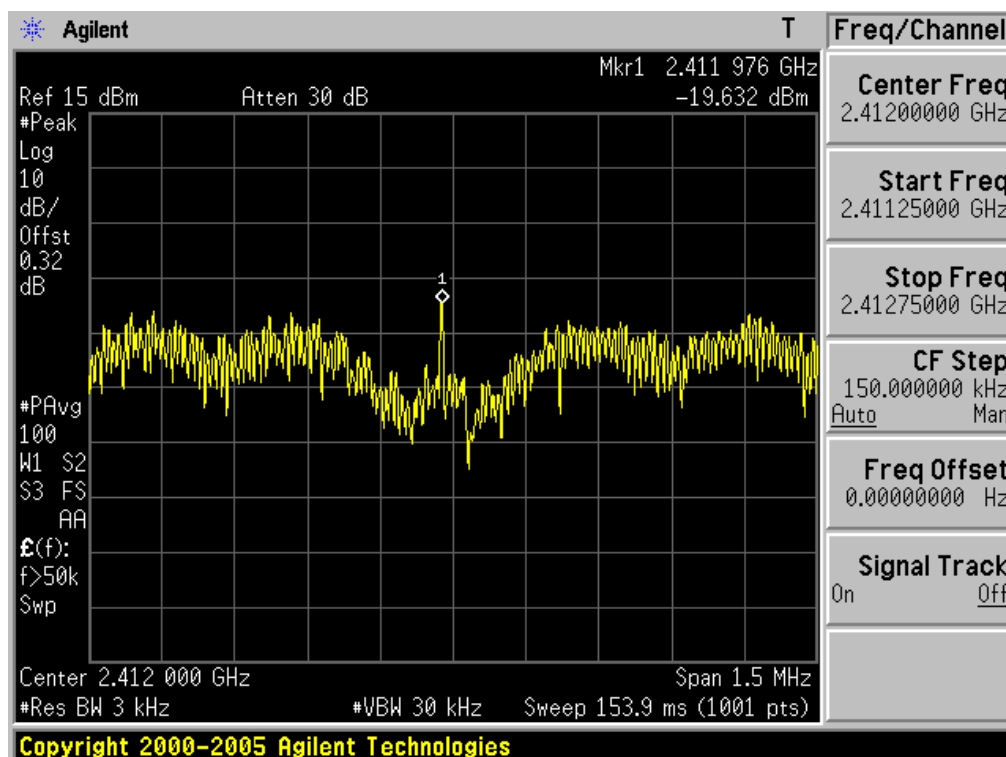
Transmitter Power Spectral Density

Test Mode: 802.11b & Highest Frequency



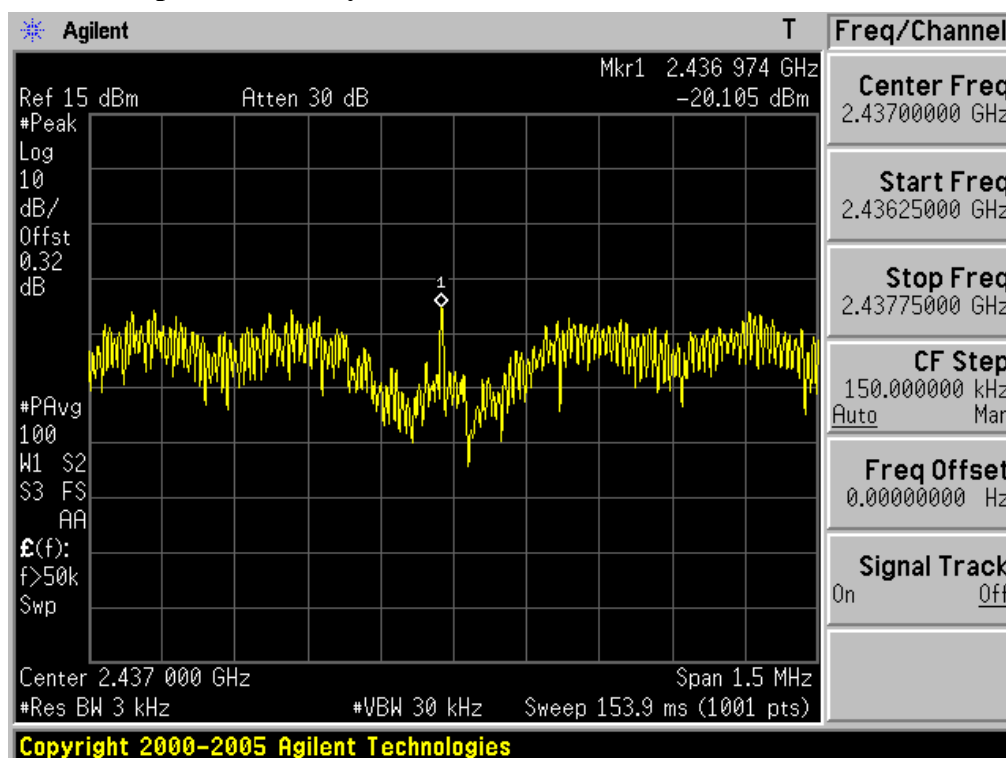
Transmitter Power Spectral Density

Test Mode: 802.11g & Lowest Frequency



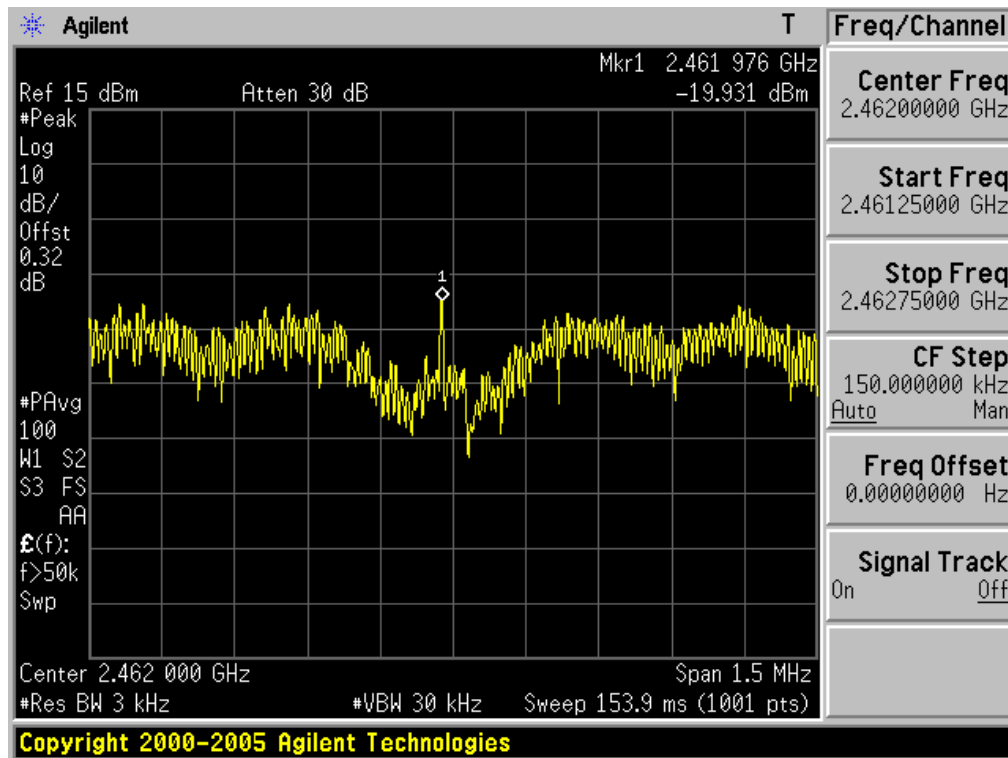
Transmitter Power Spectral Density

Test Mode: 802.11g & Middle Frequency



Transmitter Power Spectral Density

Test Mode: 802.11g & Highest Frequency



4.2.6 AC Conducted Emissions

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

- Measurement Data: **Comply**

Note 1: See next pages for actual measured spectrum plots and data.

Note 2: This test item was performed in test case 2 and 3.

And the worst data(Test case 3) were reported.

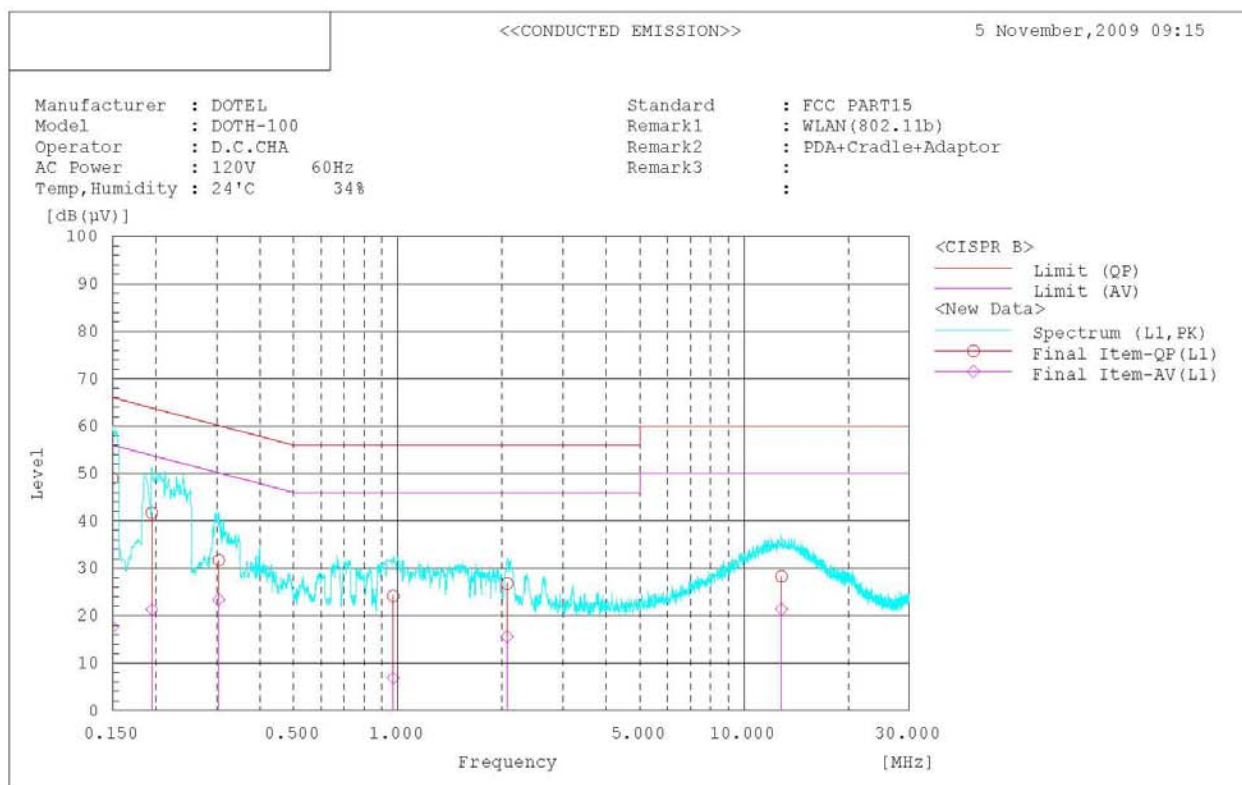
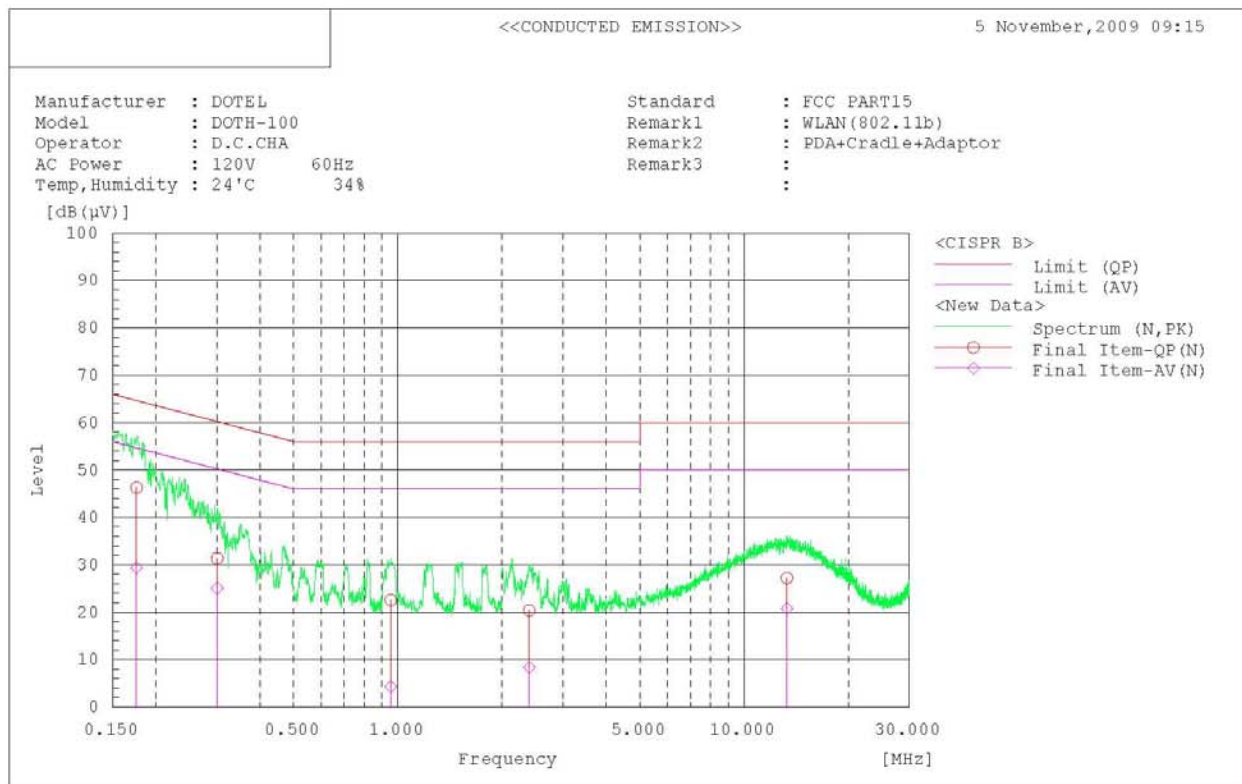
- Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & Test Case 3



AC Line Conducted Emissions (Data List)

Test Mode: 802.11b & Test Case 3

<<CONDUCTED EMISSION>>

5 November, 2009 09:15

Standard : FCC PART15

Manufacturer : DOTEK

Model : DOTH-100

Operator : D.C.CHA

AC Power : 120V 60Hz

Temp, Humidity : 24°C 34%

Remark1 : WLAN(802.11b)

Remark2 : PDA+Cradle+Adaptor

Remark3 :

Final Result

--- N Phase ---

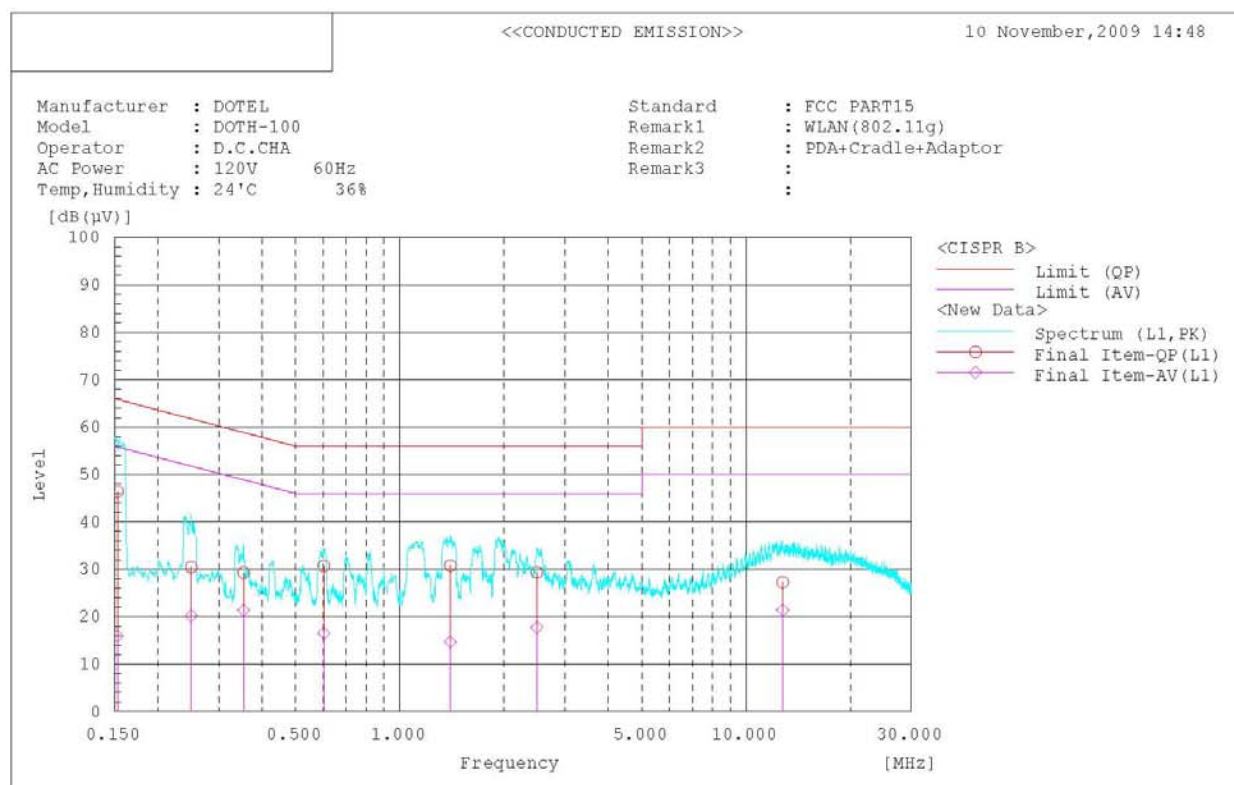
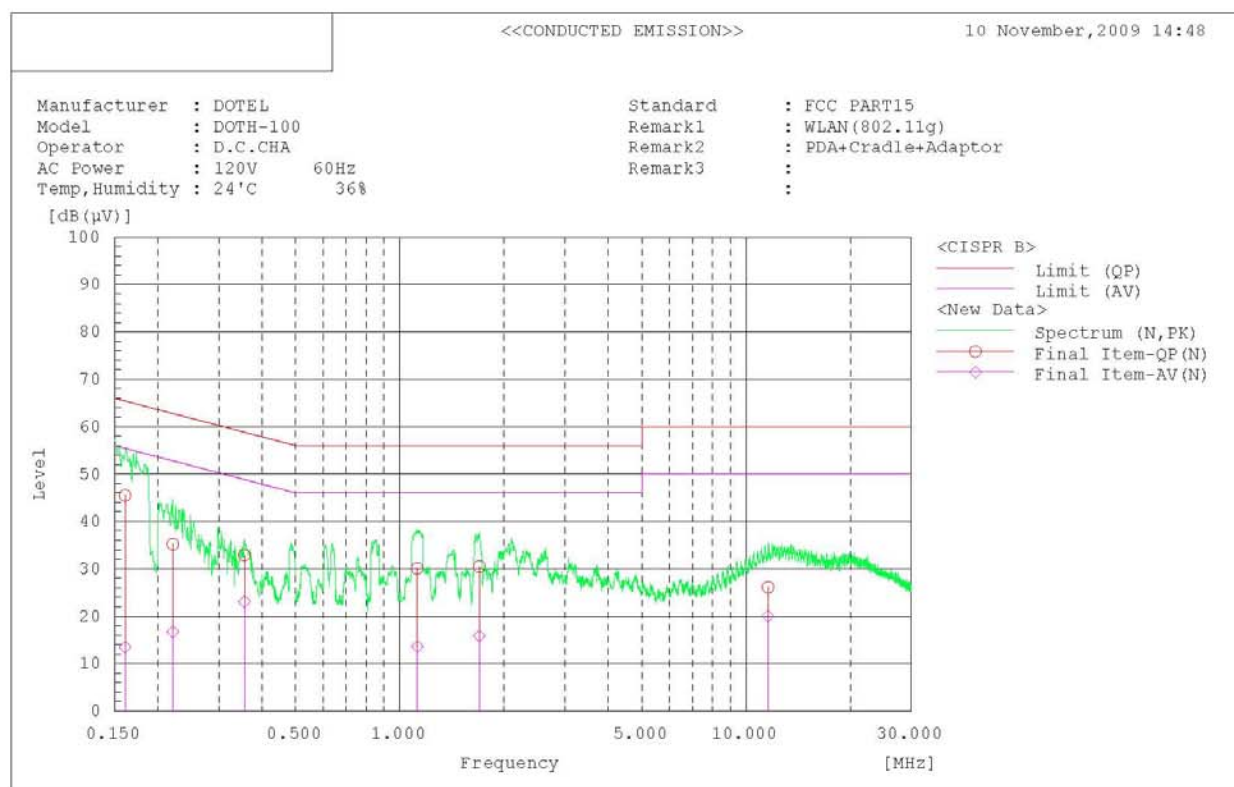
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]		[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.176	46.2	29.3	0.1	46.3	29.4	64.7	54.7	18.4	25.3	
2	0.301	31.3	25.0	0.1	31.4	25.1	60.2	50.2	28.8	25.1	
3	0.955	22.5	4.2	0.1	22.6	4.3	56.0	46.0	33.4	41.7	
4	2.400	20.2	8.2	0.2	20.4	8.4	56.0	46.0	35.6	37.6	
5	13.300	26.4	20.0	0.8	27.2	20.8	60.0	50.0	32.8	29.2	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]		[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.150	48.8	17.4	0.2	49.0	17.6	66.0	56.0	17.0	38.4	
2	0.195	41.4	21.0	0.3	41.7	21.3	63.8	53.8	22.1	32.5	
3	0.304	31.3	23.0	0.4	31.7	23.4	60.1	50.1	28.4	26.7	
4	0.971	23.7	6.4	0.5	24.2	6.9	56.0	46.0	31.8	39.1	
5	2.070	26.2	15.0	0.6	26.8	15.6	56.0	46.0	29.2	30.4	
6	12.837	27.2	20.3	1.1	28.3	21.4	60.0	50.0	31.7	28.6	

AC Line Conducted Emissions (Graph)

Test Mode: 802.11g & Test Case 3



AC Line Conducted Emissions (Data List)

Test Mode: 802.11g & Test Case 3

<<CONDUCTED EMISSION>>

10 November, 2009 14:48

Standard : FCC PART15
Manufacturer : DOTEK
Model : DOTH-100
Operator : D.C.CHA
AC Power : 120V 60Hz
Temp, Humidity : 24°C 36%
Remark1 : WLAN(802.11g)
Remark2 : PDA+Cradle+Adaptor
Remark3 :
:

Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.161	45.4	13.4	0.1	45.5	13.5	65.4	55.4	19.9	41.9	
2	0.221	35.1	16.6	0.1	35.2	16.7	62.8	52.8	27.6	36.1	
3	0.356	32.8	23.0	0.1	32.9	23.1	58.8	48.8	25.9	25.7	
4	1.123	29.9	13.4	0.2	30.1	13.6	56.0	46.0	25.9	32.4	
5	1.698	30.3	15.7	0.2	30.5	15.9	56.0	46.0	25.5	30.1	
6	11.584	25.4	19.3	0.7	26.1	20.0	60.0	50.0	33.9	30.0	

--- L1 Phase ---

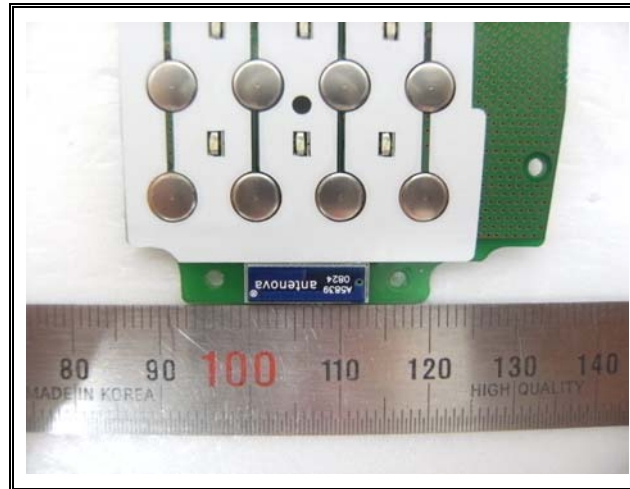
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.153	46.2	15.7	0.2	46.4	15.9	65.8	55.8	19.4	39.9	
2	0.250	30.2	19.9	0.3	30.5	20.2	61.8	51.8	31.3	31.6	
3	0.354	28.9	21.0	0.4	29.3	21.4	58.9	48.9	29.6	27.5	
4	0.603	30.2	16.0	0.5	30.7	16.5	56.0	46.0	25.3	29.5	
5	1.401	30.3	14.2	0.5	30.8	14.7	56.0	46.0	25.2	31.3	
6	2.490	28.8	17.1	0.6	29.4	17.7	56.0	46.0	26.6	28.3	
7	12.762	26.2	20.3	1.1	27.3	21.4	60.0	50.0	32.7	28.6	

4.2.7 Antenna Requirements

- Procedure:

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

- Conclusion: **Comply**



- Minimum Standard:

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.

APPENDIX

TEST EQUIPMENT FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☒	Spectrum Analyzer	Agilent	E4440A	25/09/09	25/09/10	MY45304199
☐	Spectrum Analyzer	Rohde Schwarz	FSQ26	05/06/09	05/06/10	200445
☐	Spectrum Analyzer(RE)	H.P	8563E	13/10/09	13/10/10	3551A04634
☐	Power Meter	H.P	EMP-442A	02/07/09	02/07/10	GB37170413
☐	Power Sensor	H.P	8481A	02/07/09	02/07/10	3318A96332
☐	Power Divider	Agilent	11636B	13/10/09	13/10/10	56471
☐	Power Splitter	Anritsu	K241B	13/10/09	13/10/10	20611
☐	Power Splitter	Anritsu	K241B	02/07/09	02/07/10	017060
☐	Frequency Counter	H.P	5342A	13/07/09	13/07/10	2119A04450
☐	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	10/10/09	10/10/10	30604493/021031
☒	Digital Multimeter	H.P	34401A	13/03/09	13/03/10	3146A13475, US36122178
☐	Multifuction Synthesizer	HP	8904A	06/10/09	06/10/10	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	13/03/09	13/03/10	101251
☒	Signal Generator	H.P	ESG-3000A	02/07/09	02/07/10	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	02/02/09	02/02/10	100148
☐	Audio Analyzer	H.P	8903B	02/07/09	02/07/10	3011A09448
☐	Modulation Analyzer	H.P	8901B	02/07/09	02/07/10	3028A03029
☐	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/09	02/07/10	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU 200	19/05/09	19/05/10	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	02/07/09	02/07/10	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-3
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-2
☒	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-4
☐	AC Power supply	DAEKWANG	5KVA	13/03/09	13/03/10	20060321-1
☒	DC Power Supply	HP	6622A	13/03/09	13/03/10	3448A03760
☐	DC Power Supply	HP	6633A	13/03/09	13/03/10	3524A06634
☐	BAND Reject Filter	Microwave Circuits	N0308372	06/10/09	06/10/10	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	06/10/09	06/10/10	2
☐	High-Pass Filter	ANRITSU	MP526D	06/10/09	06/10/10	M27756
☐	High-pass filter	Wainwright	WHKX2.1	N/A	N/A	1
☒	High-Pass Filter	Wainwright	WHKX3.0	N/A	N/A	9
☐	Tunable Notch Filter	Wainwright	WRCT800.0/960.0-0.2/40-8SSK	N/A	N/A	10
☐	Tunable Notch Filter	Wainwright	WRCD1700.0/2000.0-0.2/40-10SSK	N/A	N/A	27
☐	Tunable Notch Filter	Wainwright	WRCT1900.0/2200.0-5/40-10SSK	N/A	N/A	7
☒	HORN ANT	ETS	3115	17/06/09	17/06/10	6419
☐	HORN ANT	ETS	3115	23/09/09	23/09/10	21097
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	154
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2116
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2117
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2262
☐	LOOP Antenna	ETS	6502	14/09/09	14/09/10	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	02/07/09	02/07/10	MY39260700
☐	Coaxial Fixed Attenuators	Agilent	8491B	02/07/09	02/07/10	MY39260699
☐	Attenuator (10dB)	WEINSCHTEL	23-10-34	01/10/09	01/10/10	BP4386
☐	Attenuator (10dB)	WEINSCHTEL	23-10-34	19/01/09	19/01/10	BP4387
☐	Attenuator (20dB)	WEINSCHTEL	86-20-11	06/10/09	06/10/10	432
☐	Attenuator (10dB)	WEINSCHTEL	31696	06/10/09	06/10/10	446
☐	Attenuator (10dB)	WEINSCHTEL	31696	06/10/09	06/10/10	408
☐	Attenuator (40dB)	WEINSCHTEL	57-40-33	01/10/09	01/10/10	NN837
☐	Attenuator (30dB)	JFW	50FH-030-300	13/03/09	13/03/10	060320-1
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	02/07/09	02/07/10	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	02/07/09	02/07/10	790
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	02/07/09	02/07/10	112
☒	Amplifier (30dB)	Agilent	8449B	10/10/09	10/10/10	3008A01590
☐	Amplifier	EMPOWER	BBS3Q7ELU	02/02/09	02/02/10	1020
☐	RF Power Amplifier	OPHIRRF	5069F	02/07/09	02/07/10	1006
☒	EMI TEST RECEIVER	R&S	ESU	02/02/09	02/02/10	100014
☒	BILOG ANTENNA	SCHAFFNER	CBL6112B	02/06/09	02/06/10	2737
☒	Amplifier (22dB)	H.P	8447E	05/02/09	05/02/10	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/05/09	12/05/10	100364
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHLP9108A	30/05/09	30/05/10	590
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	02/06/09	02/06/10	2233
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHLP9108A1	07/10/09	07/10/10	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/10	91031946
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	13/03/09	13/03/10	1252741
☐	Amplifier (25dB)	Agilent	8447D	12/05/09	12/05/10	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	03/07/09	03/07/10	2648A04922
☒	Spectrum Analyzer(CE)	H.P	8591E	26/04/09	26/04/10	3649A05889
☐	LISN	Kyoritsu	KNW-407	03/07/09	03/07/10	8-317-8
☒	LISN	Kyoritsu	KNW-242	13/10/09	13/10/10	8-654-15
☒	CVCF	NF Electronic	4420	13/03/09	13/03/10	304935/337980
☒	DC BLOCK	Hyuplip	KEL-007	N/A	N/A	7-1581-5
☐	50 ohm Terminator	HME	CT-01	22/01/09	22/01/10	N/A
☒	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	03/07/09	03/07/10	4N-170-3