

RF TEST REPORT

Test item : CDMA 1x EV-DO USB Modem with WLAN
Model No. : SER-8189
Order No. : 1005-00159
Date of receipt : 2010-05-31
Test duration : 2010-07-06 ~ 2010-07-12
Date of issue : 2010-10-06
Use of report : FCC Original Grant

Applicant : EpiCom Co., Ltd.

Lordland EZ Tower #511, 513, Gumi-dong, Bundang-Gu, Sungnam City,
Kyunggi-Do, Korea

Test laboratory : Digital EMC Co., Ltd.

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

Test specification : FCC Part 15.247 Subpart C
ANSI C63.4-2003

Test environment : See appended test report

Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:



Engineer
D.C. Cha

Witnessed by:

N/A

Reviewed by:



Manager
W.J. Lee

CONTENTS

1. Equipment information.....	3
1.1 Equipment description.....	3
1.2 Ancillary equipment	3
2. Information about test items.....	4
2.1 Test case	4
2.2 Auxiliary equipment	4
2.3 Tested frequency	4
2.4 Tested environment	4
2.5 EMI Suppression Device(s)/Modifications	4
3. Test Report	5
3.1 Summary of tests	5
3.2 Transmitter requirements	6
3.2.1 6 dB Bandwidth.....	6
3.2.2 Peak Output Power	11
3.2.3 Out of Band Emissions / Band Edge.....	18
3.2.4 Out of band Emission – Radiated	43
3.2.5 Transmitter Power Spectral Density.....	60
3.2.6 AC Conducted Emissions.....	65
3.2.7 Antenna Requirements	70
APPENDIX.....	71

1. Equipment information

1.1 Equipment description

FCC Equipment Class	Digital Transmission System (DTS)
Equipment type	CDMA 1x EV-DO USB Modem with WLAN
Equipment model name	SER-8189
Equipment add model name	N/A
Equipment serial no.	Identical prototype
Frequency band	2412 ~ 2462 MHz
Modulation type	CCK, OFDM
Channel Access Protocol	CSMA/CA
Channel Spacing	5.0 MHz
Antenna type	Internal Type: PIFA Antenna (Max. peak gain: -1.97 dBi)
Power Supply	Li-ion polymer Battery: DC 3.7V AC-DC Adaptor: AC 120V 60Hz

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Adapter	FJ-SW0502000U	NA	SHENZHEN FU JIA APPLIANCE	-
-	-	-	-	-

2. Information about test items

2.1 Test cases

Test Case 1	Only EUT
Test Case 2	EUT + Adapter

2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Notebook	A1278	W8943CMB66D	APPLE	-
Mouse	MOC5UO	10201LWF	DELL	-

2.3 Tested frequency

	TX Frequency (MHz)	RX Frequency (MHz)
Lowest Channel	2412	2412
Middle Channel	2437	2437
Highest Channel	2462	2462

2.4 Tested environment

Temperature	: 22 ~ 26 °C
Relative humidity content	: 45 ~ 55 % R.H.
Details of power supply	: Battery: DC 3.7 V AC 120V 60Hz

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit (Using in 2400 ~ 483.5MHz)	Test Condition	Status Note 1
I. Test Items				
15.247(a)(2)	6 dB Bandwidth	> 500 kHz	Conducted	C Note 1
15.247(b)(3)	Transmitter Output Power	< 1Watt		C Note 1
15.247(d)	Out of Band Emissions / Band Edge	30dBc in any 100kHz BW		C Note 1
15.247(e)	Transmitter Power Spectral Density	< 8dBm / 3kHz		C Note 1
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: The test item was performed at only test case 1. Note 3: The test item was performed in all the test cases. And the worst test results were reported. Note 4: The test item was performed at only test case 2.				

The sample was tested according to the following specification:
ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 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

VBW = $\geq$ RBW

Trace = max hold

Sweep = auto

Detector function = peak

- Measurement Data: **Comply**

Test Mode	Frequency	Test Results (MHz)
802.11b	Lowest	11.20
	Middle	10.15
	Highest	11.30
802.11g	Lowest	16.55
	Middle	16.55
	Highest	16.50

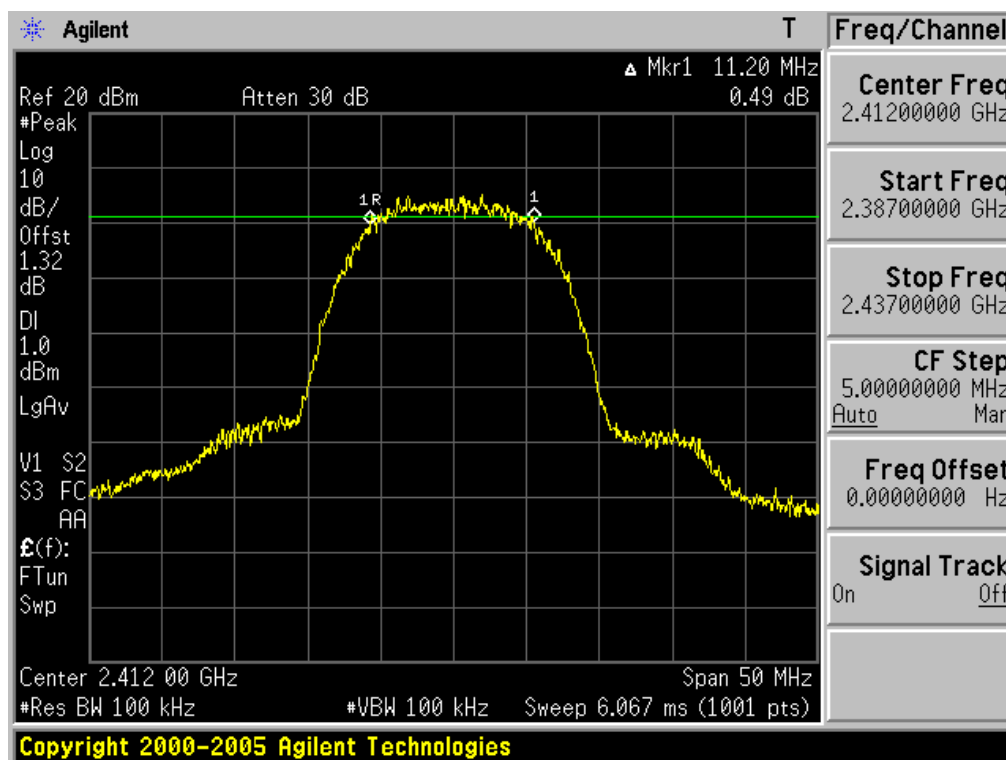
Note 1: See next pages for actual measured spectrum plots.

- Minimum Standard:

The minimum 6 dB bandwidth shall be at least 500 kHz

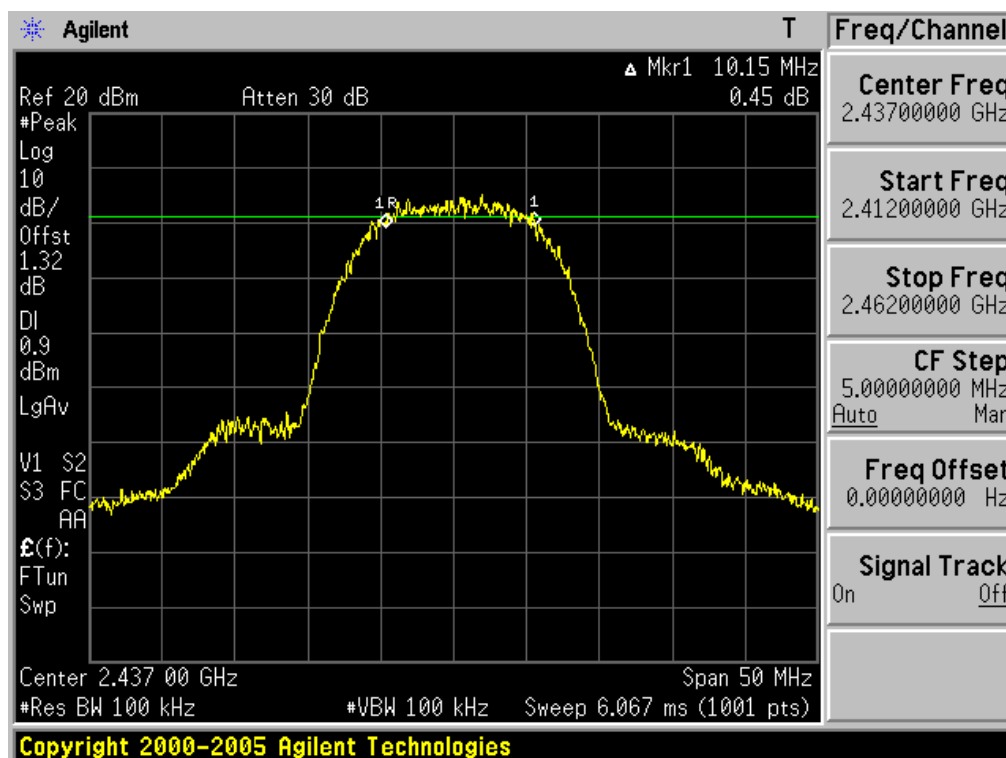
6 dB Bandwidth

Test Mode: 802.11b & Lowest Frequency



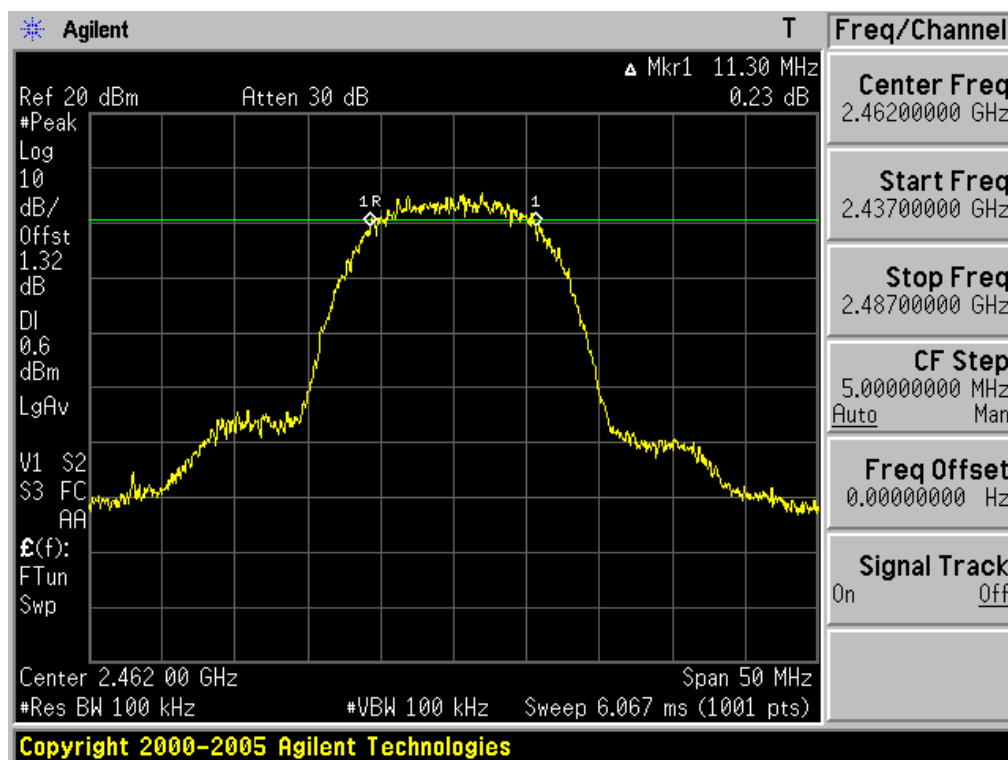
6 dB Bandwidth

Test Mode: 802.11b & Middle Frequency



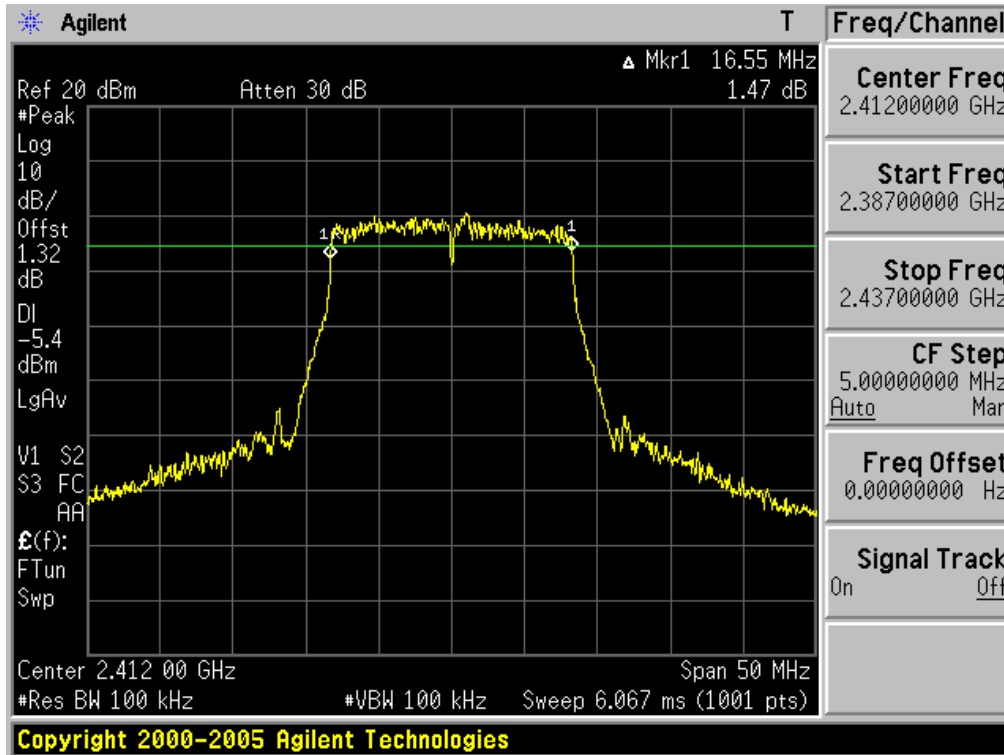
6 dB Bandwidth

Test Mode: 802.11b & Highest Frequency



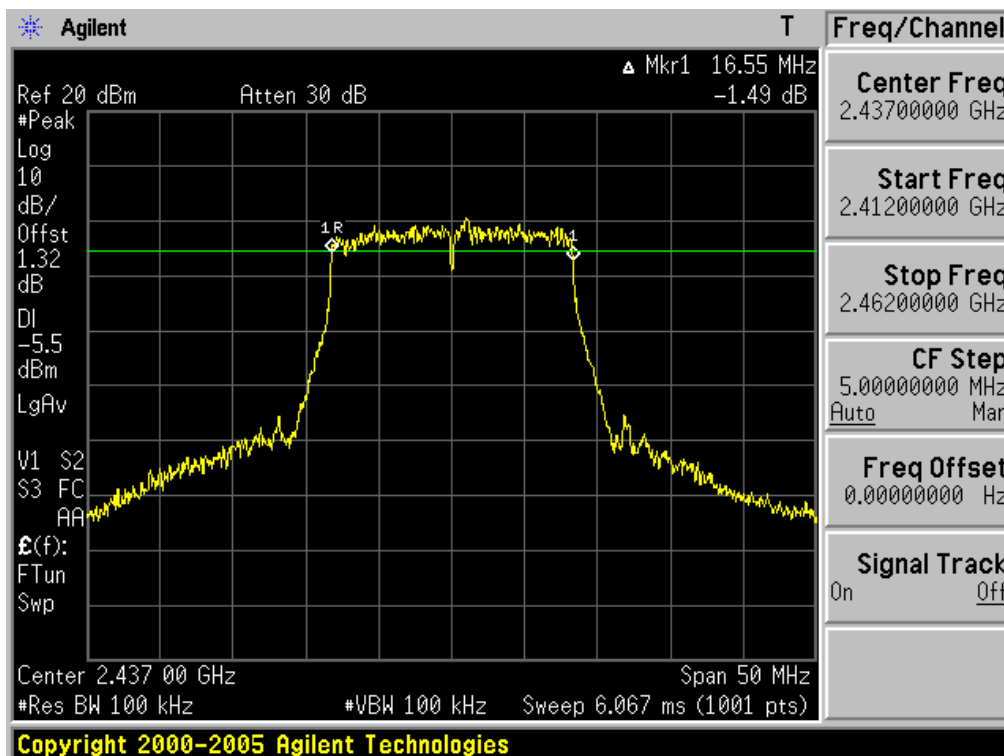
6 dB Bandwidth

Test Mode: 802.11g & Lowest Frequency



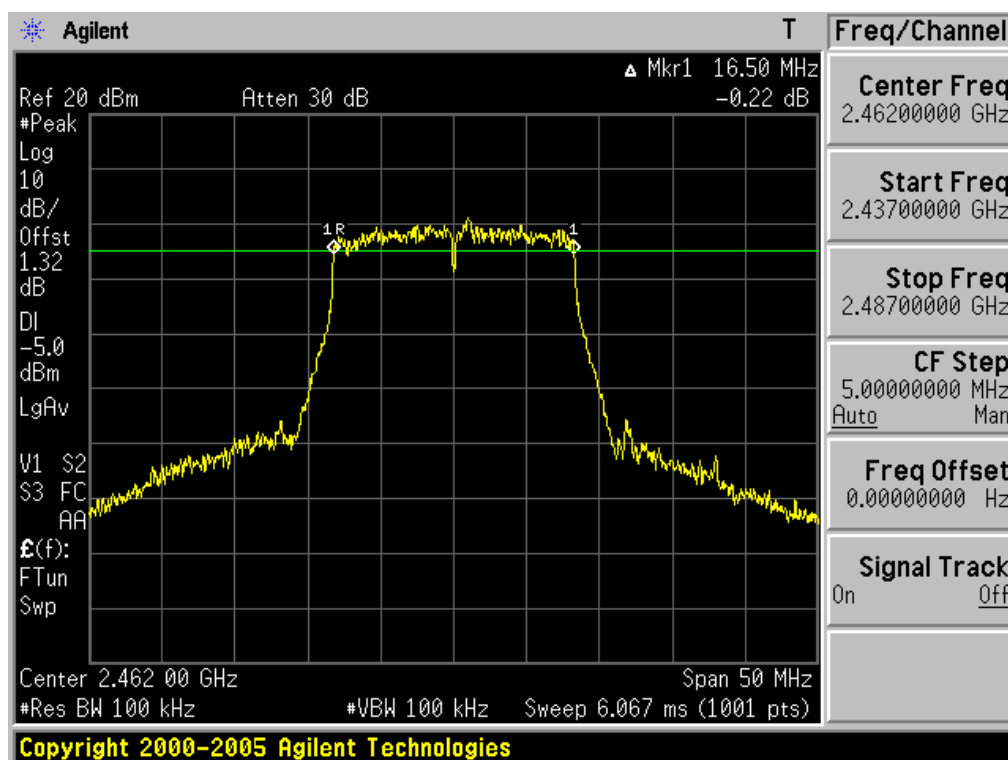
6 dB Bandwidth

Test Mode: 802.11g & Middle Frequency



6 dB Bandwidth

Test Mode: 802.11b & Highest Frequency



3.2.2 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

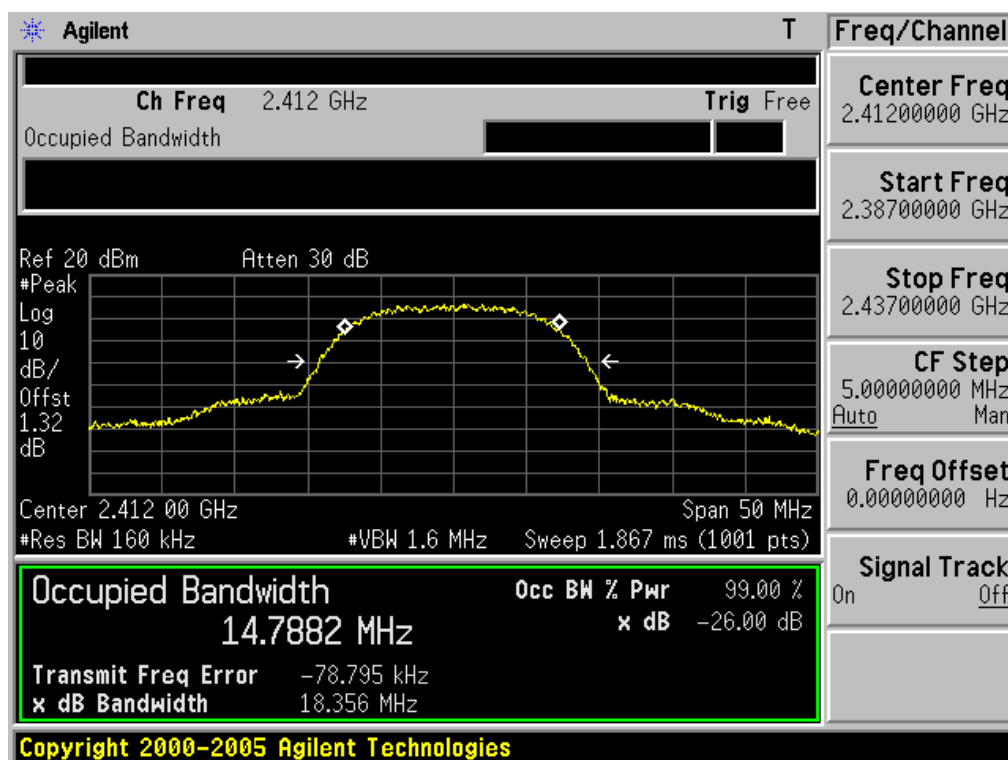
Test Mode	Frequency	Test Results	
		dBm	W
802.11b	Lowest	14.18	0.0262
	Middle	14.00	0.0251
	Highest	14.42	0.0277
802.11g	Lowest	12.05	0.0160
	Middle	11.92	0.0156
	Highest	12.27	0.0169

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

Minimum Standard:	< 1W
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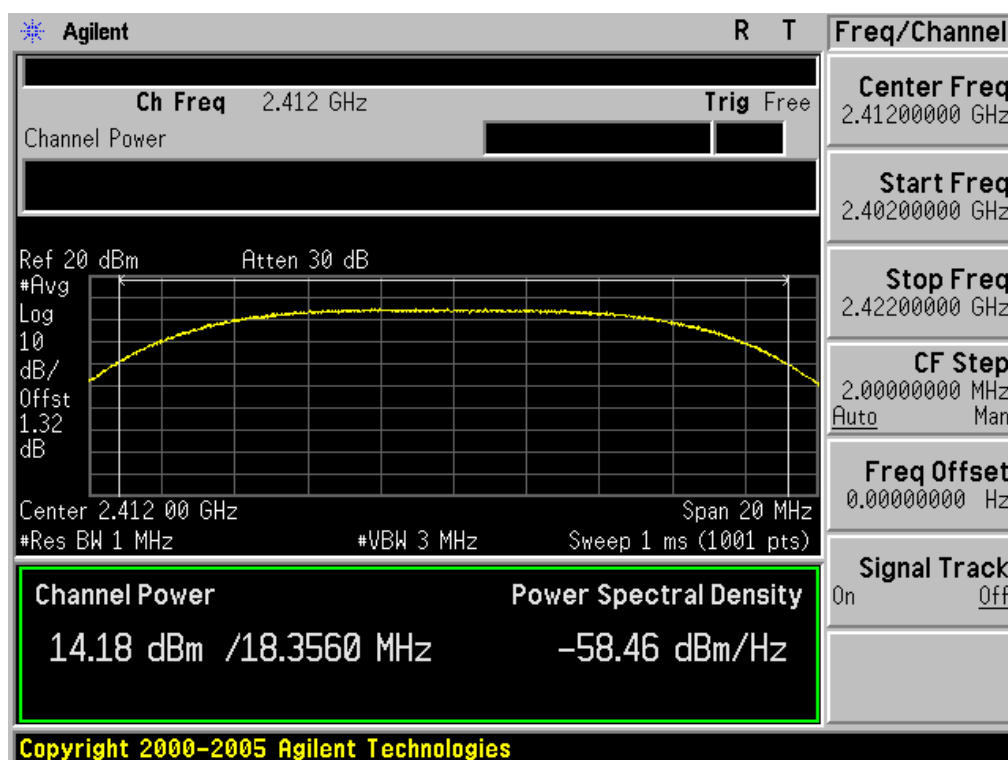
26 dB Bandwidth

Test Mode: 802.11b & Lowest Frequency



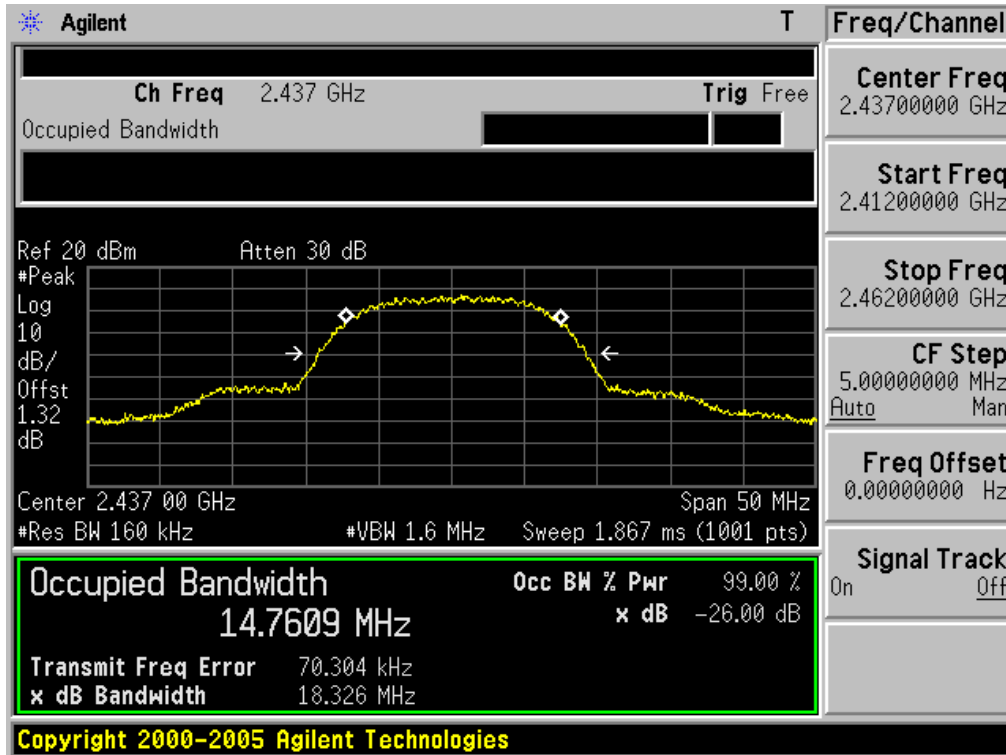
Peak Output Power

Test Mode: 802.11b & Lowest Frequency



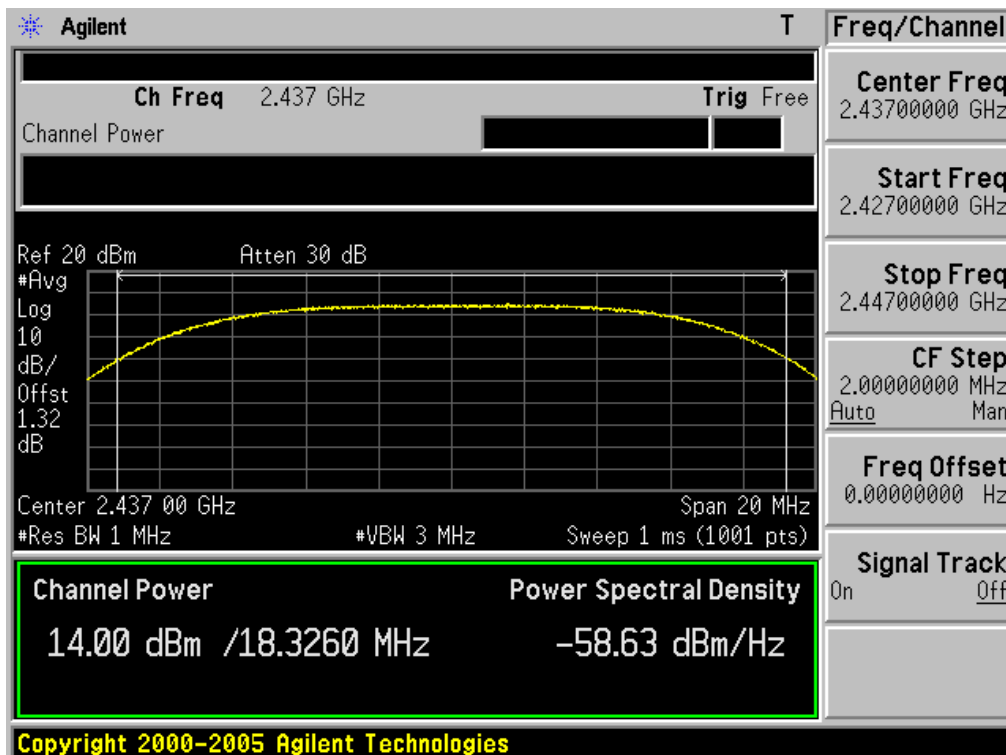
26 dB Bandwidth

Test Mode: 802.11b & Middle Frequency



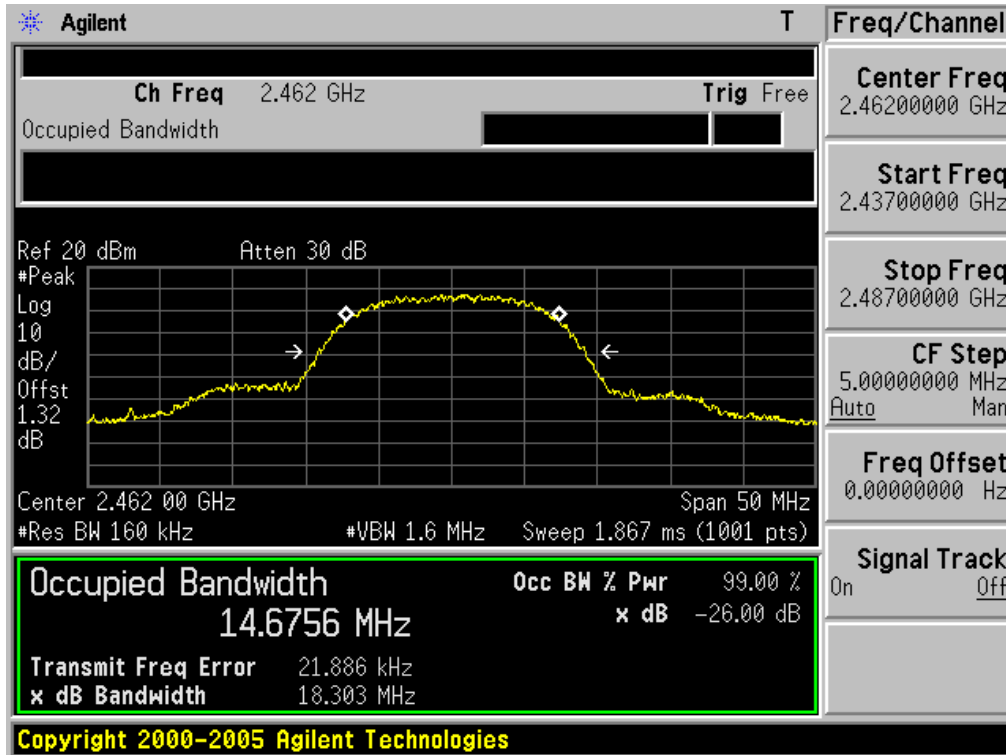
Peak Output Power

Test Mode: 802.11b & Middle Frequency



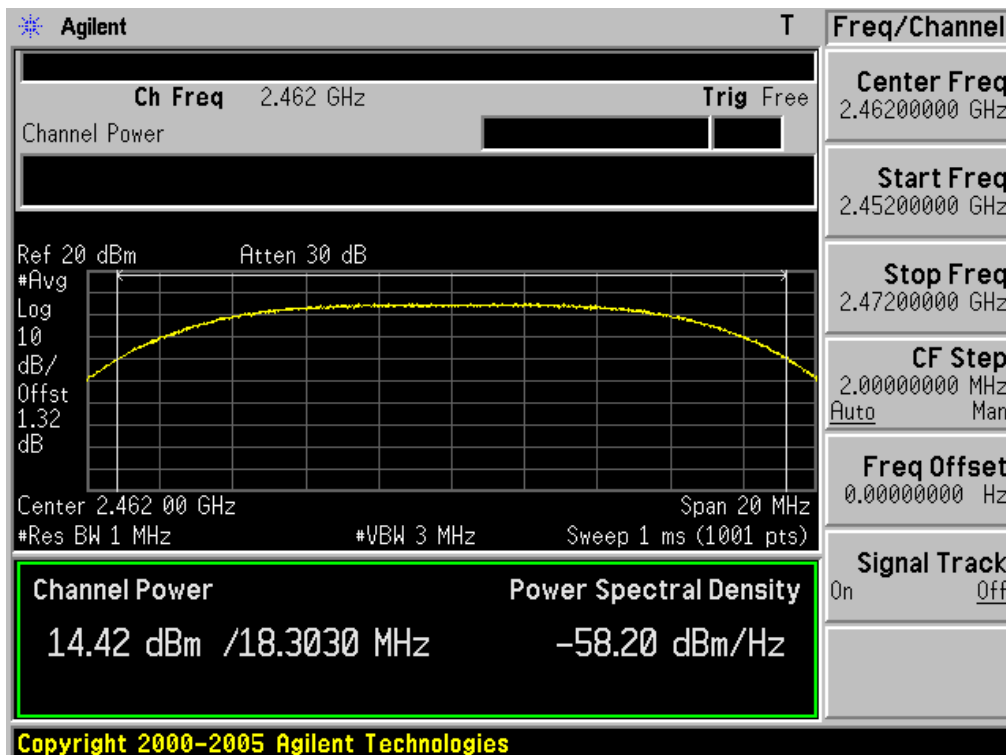
26 dB Bandwidth

Test Mode: 802.11b & Highest Frequency



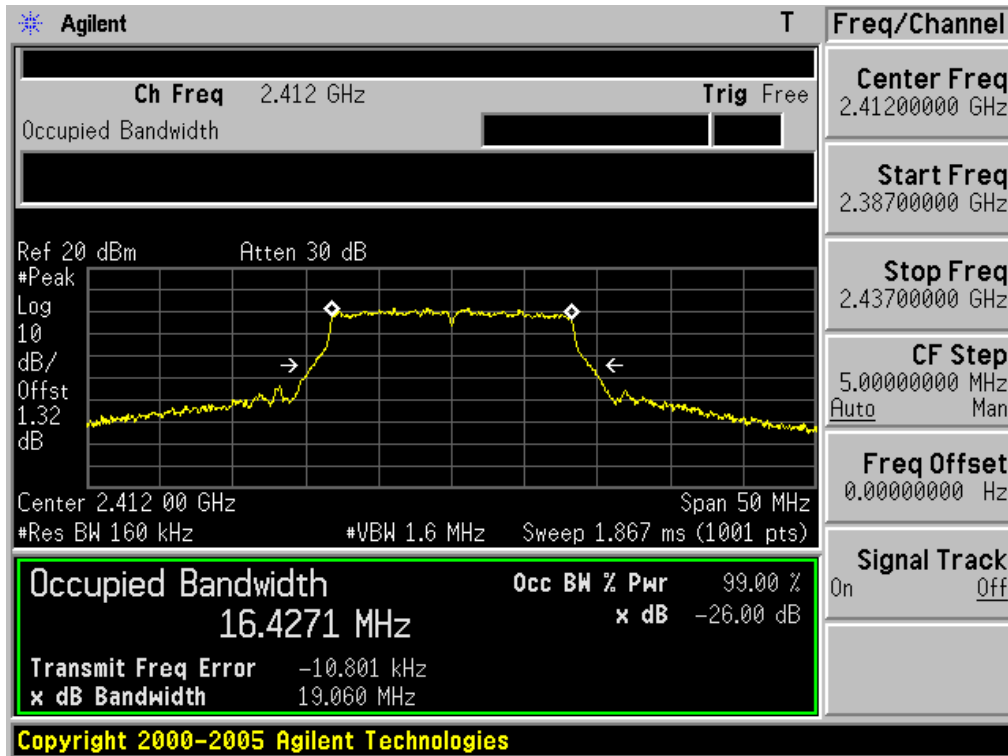
Peak Output Power

Test Mode: 802.11b & Highest Frequency



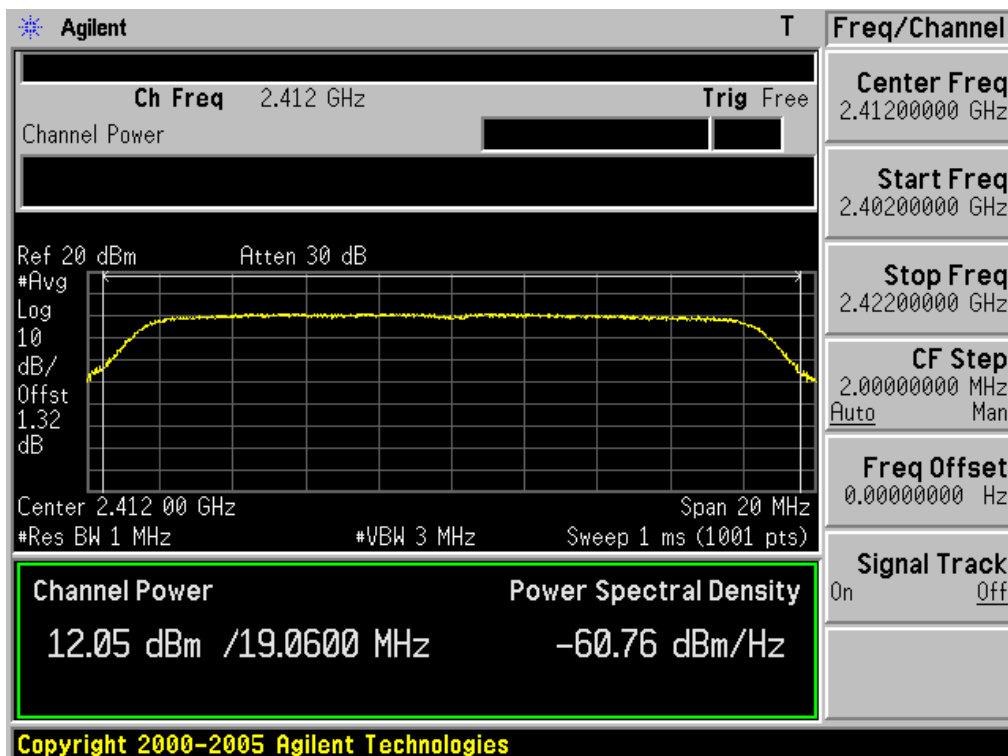
26 dB Bandwidth

Test Mode: 802.11g & Lowest Frequency



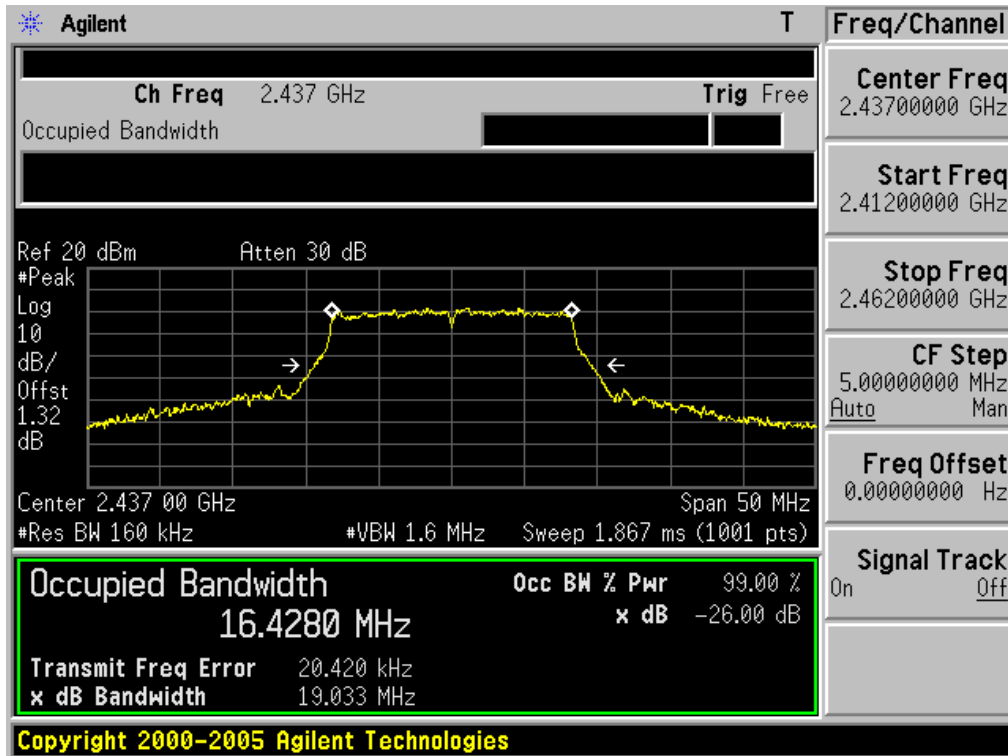
Peak Output Power

Test Mode: 802.11g & Lowest Frequency



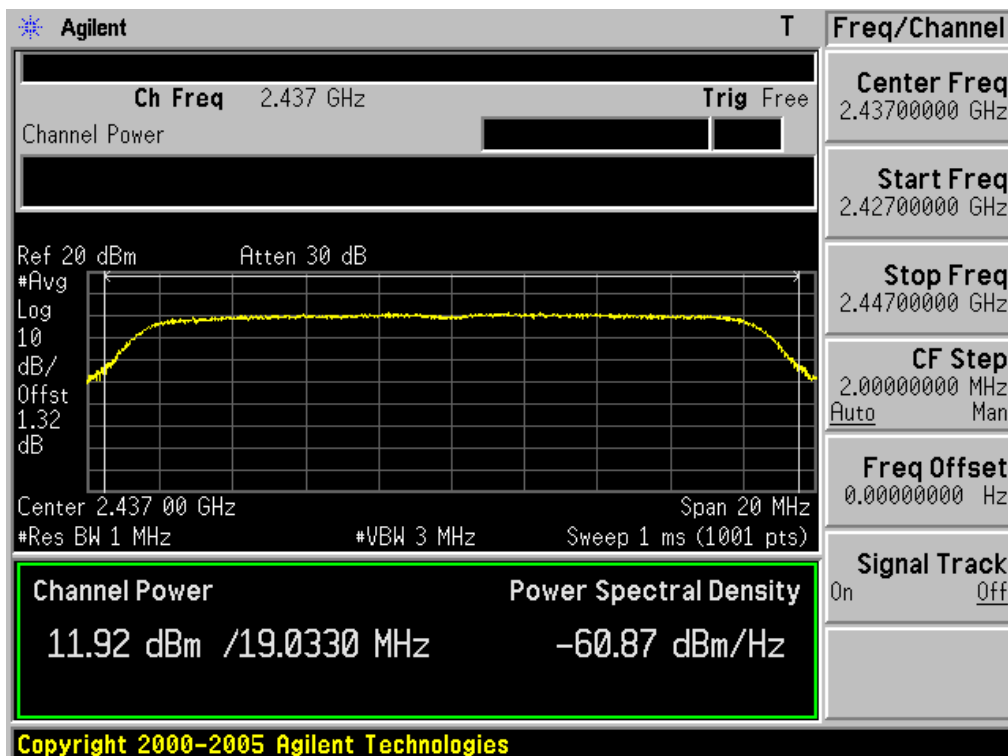
26 dB Bandwidth

Test Mode: 802.11g & Middle Frequency



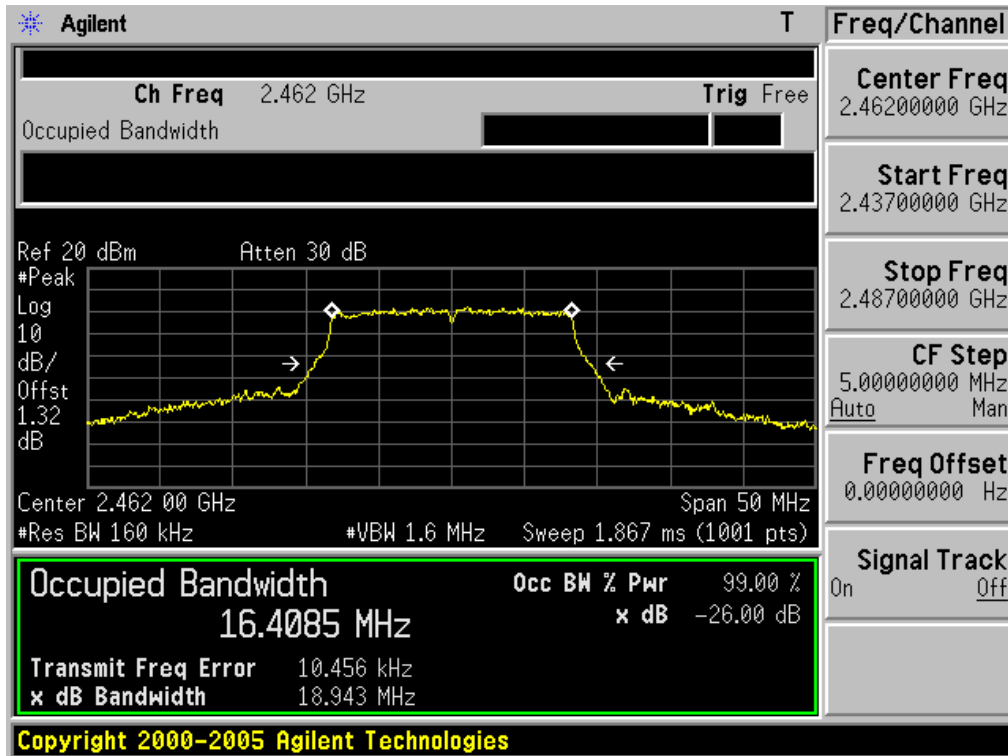
Peak Output Power

Test Mode: 802.11g & Middle Frequency



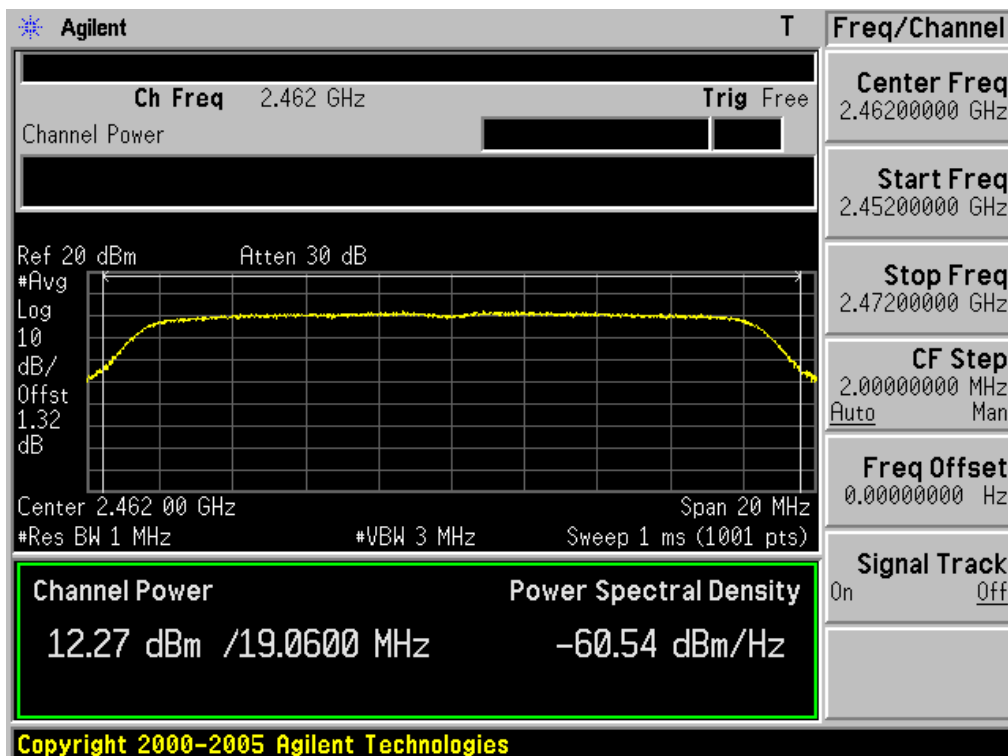
26 dB Bandwidth

Test Mode: 802.11g & Highest Frequency



Peak Output Power

Test Mode: 802.11g & Highest Frequency



3.2.3 Out of Band Emissions / Band Edge

- Procedure:

The bandwidth at 20dB down from the highest inband spectral density is 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 measure 20 dB down both sides of the intentional emission.

This device complies with use of power option 2. The attenuation under this paragraph shall be 30dB instead of 20dB.

For Band-edge testing the spectrum analyzer is set to:

Tested frequency = the highest and the lowest Frequencies

Center frequency = 2400MHz, 2483.5MHz

Span = 100MHz

Detector function = peak

RBW = 1% of the span

VBW = 100 kHz

Trace = max hold

Sweep = auto

For spurious testing the spectrum analyzer is set to:

Tested frequency = the highest, middle and the lowest Frequencies

RBW = 100 kHz

VBW = 100 kHz

Detector function = peak

Sweep = auto

Trace = max hold

- Measurement Data: **Comply**

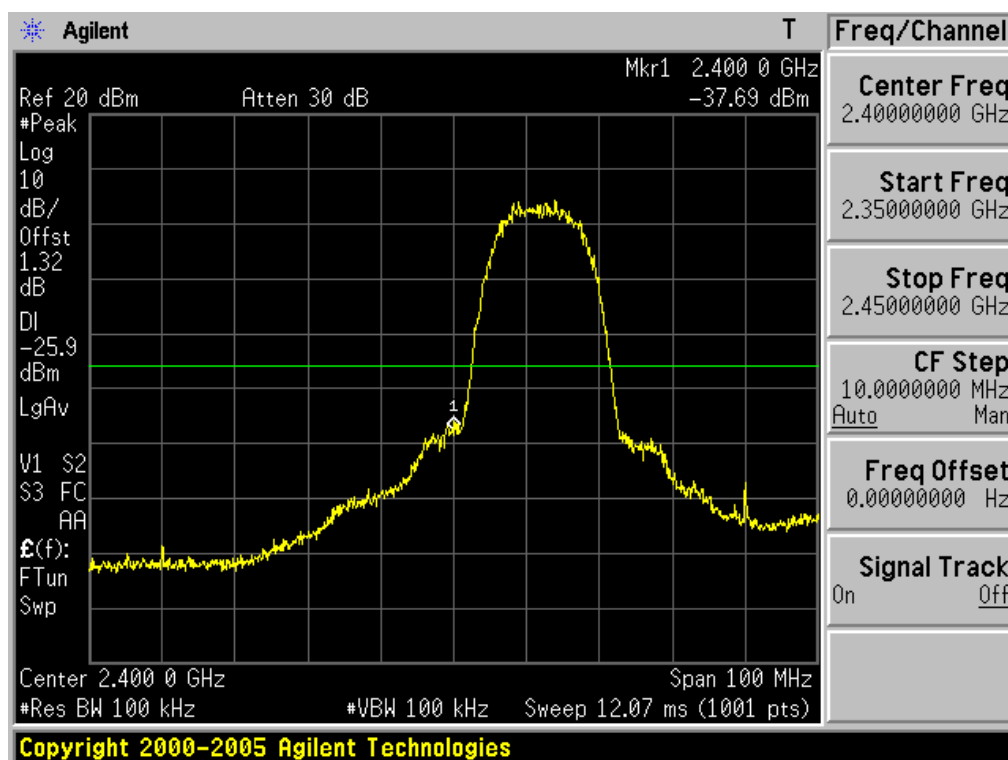
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 30dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.

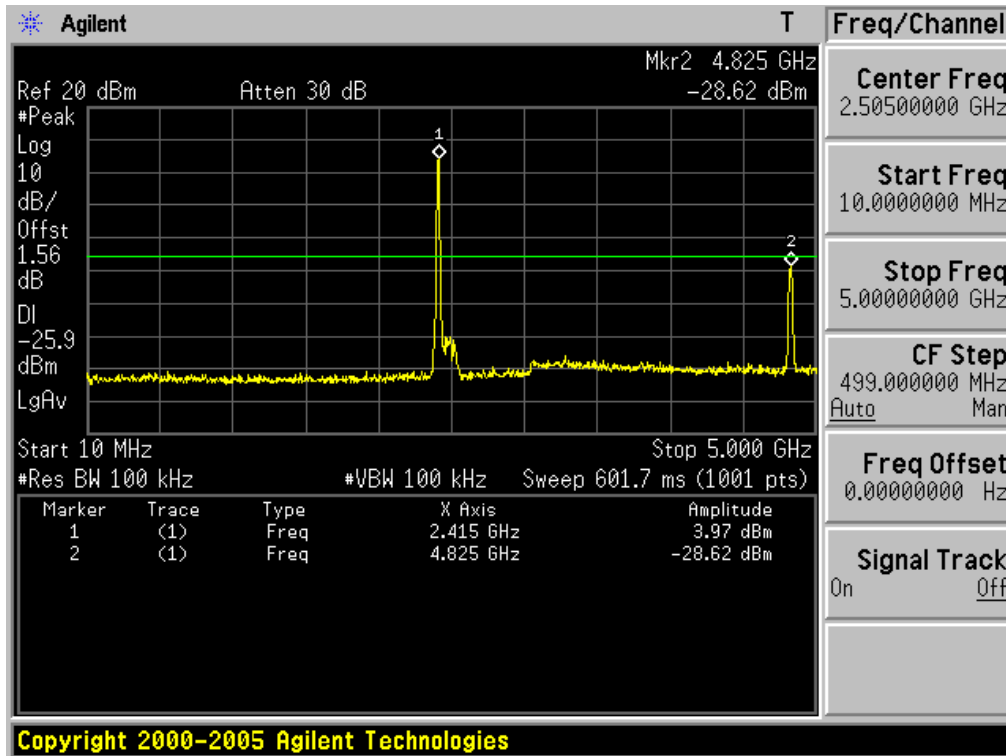
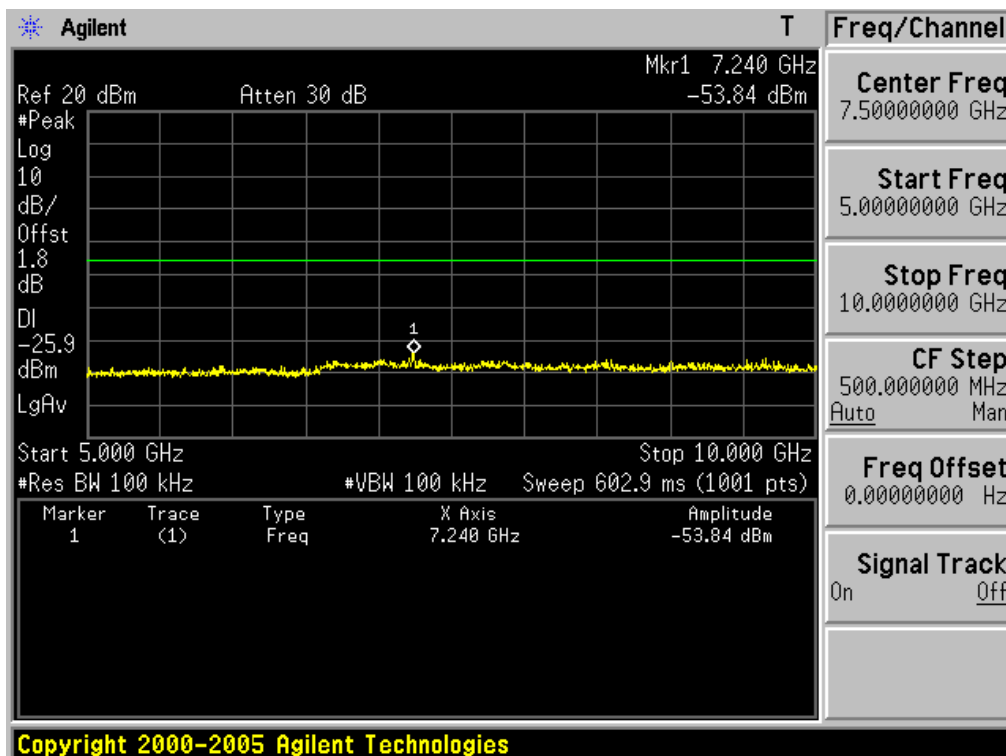
Note 1: See next pages for actual measured spectrum plots.

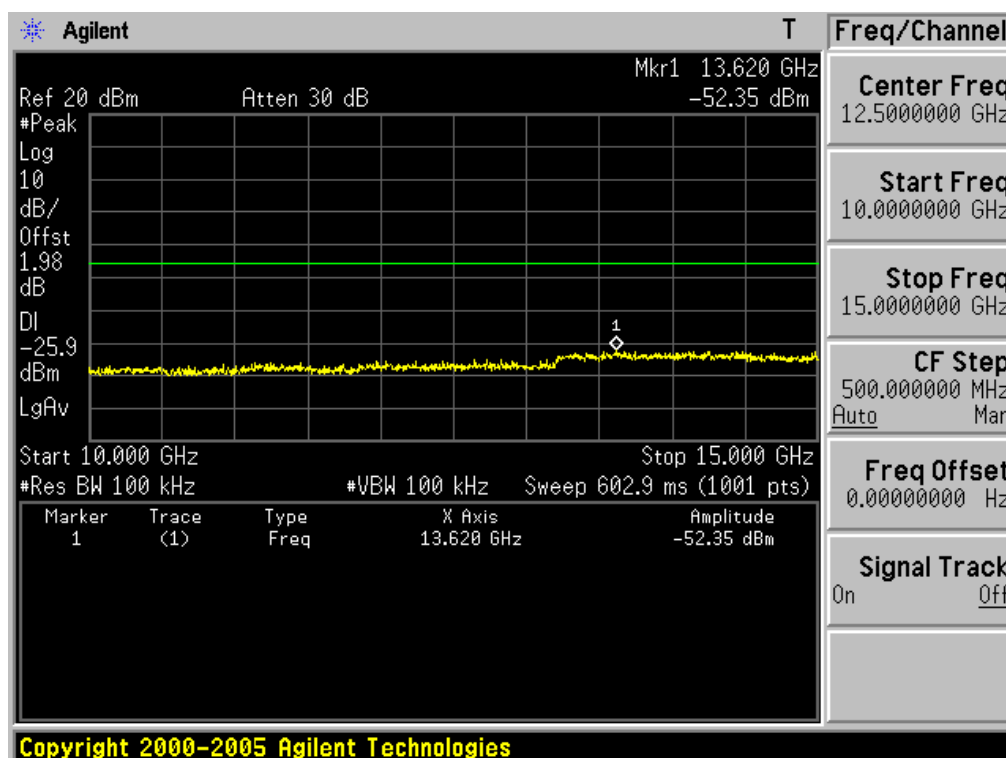
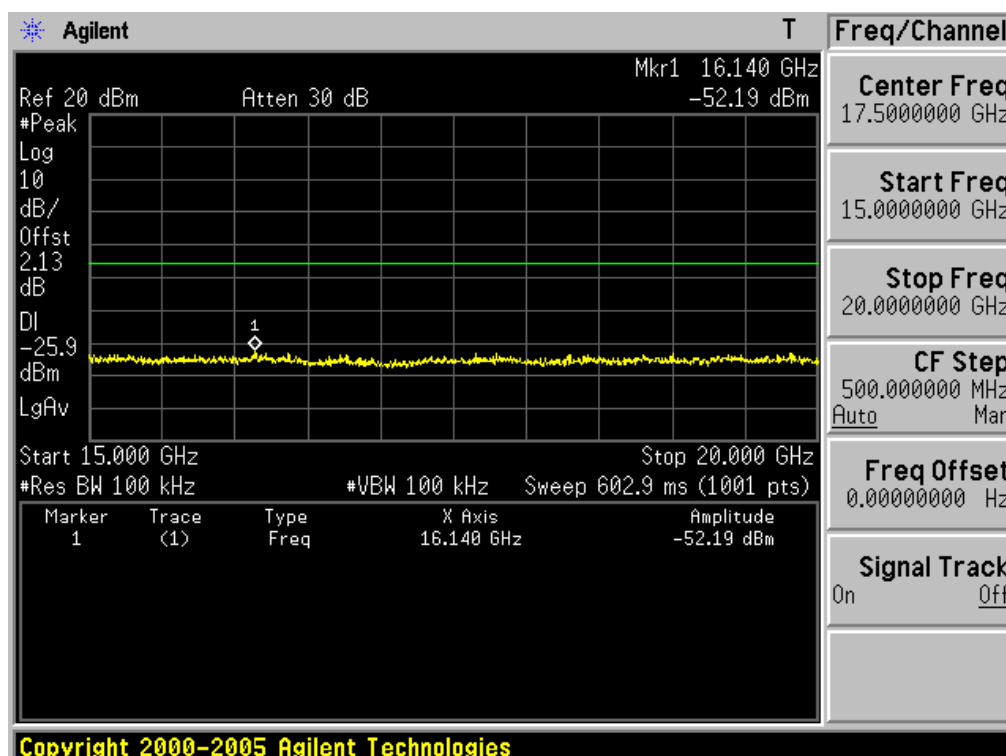
Minimum Standard:	> 30 dBc
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Low Band-edge at 30 dB blow

Test Mode: 802.11b

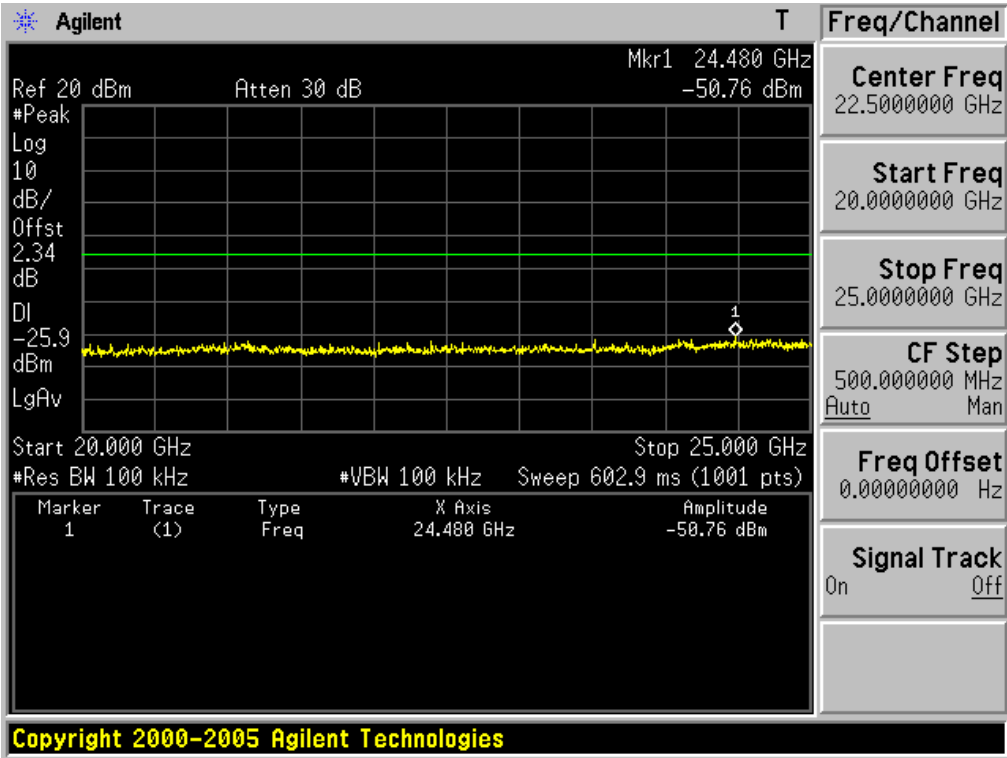


10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11b & Lowest Frequency

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


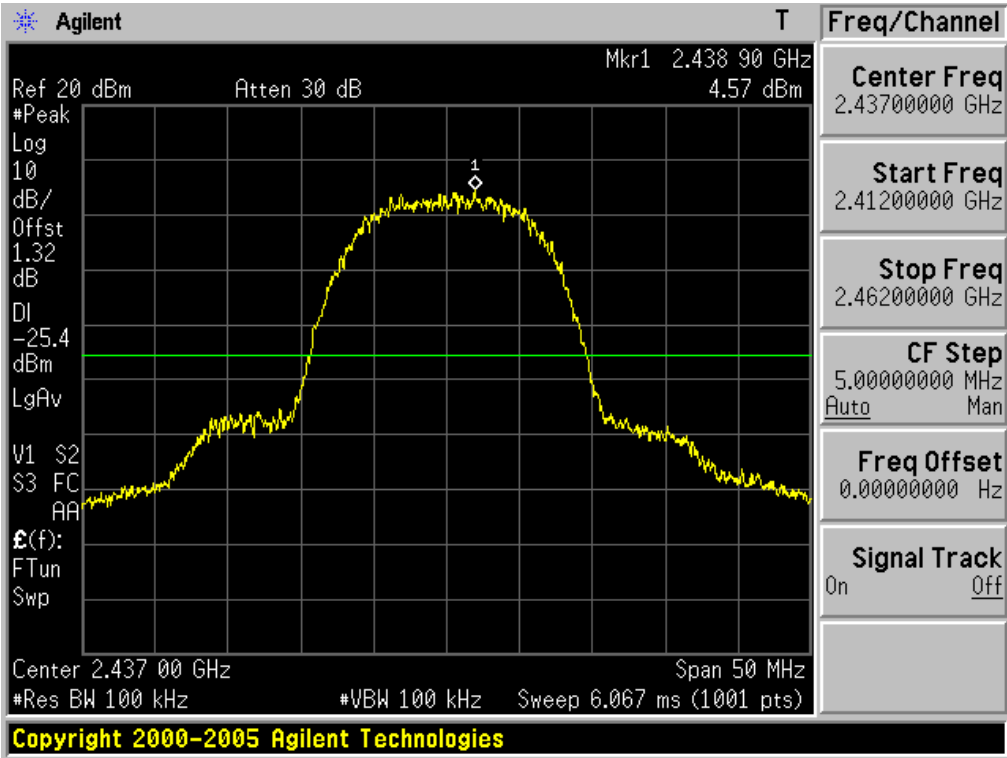
20GHz ~ 25GHz Conducted Spurious Emissions

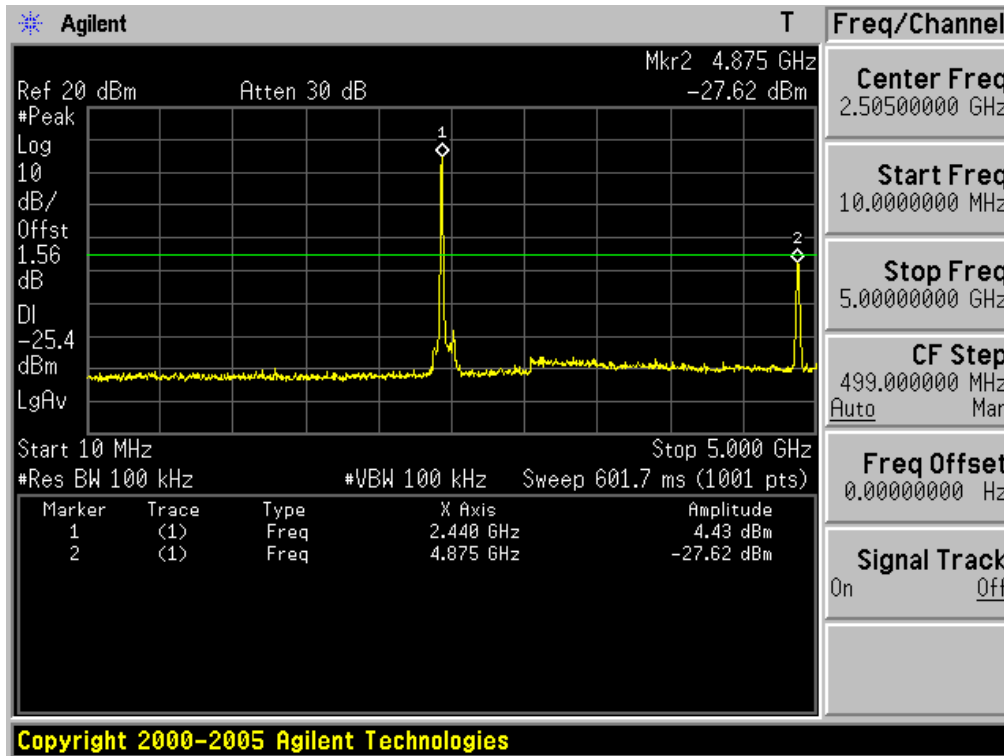
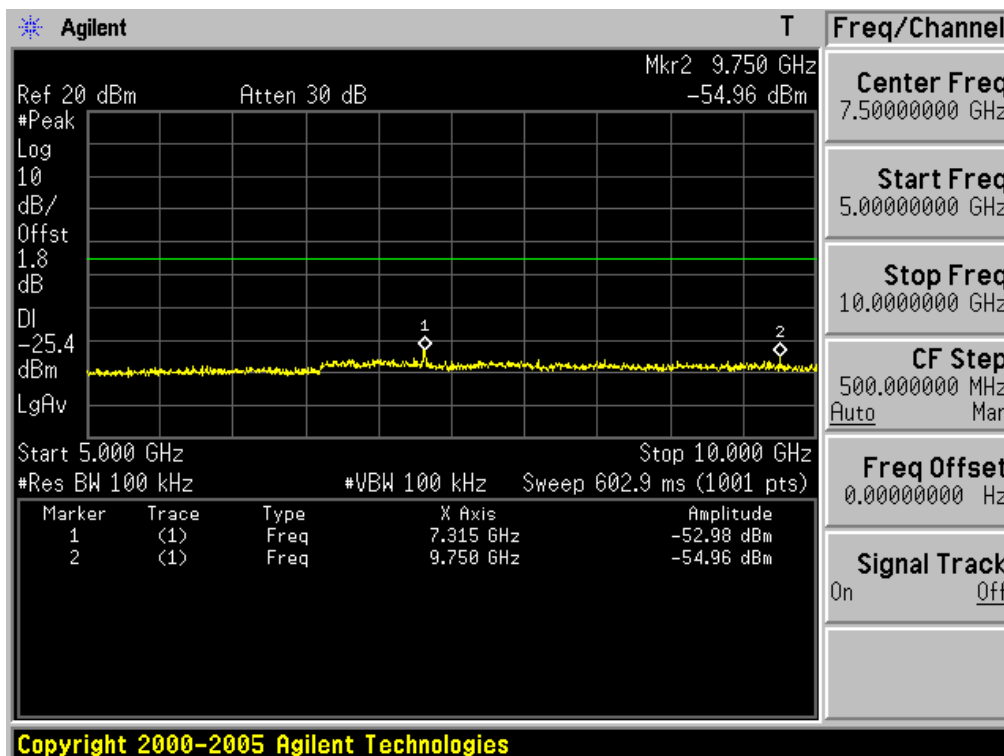
Test Mode: 802.11b & Lowest Frequency



Reference for limit

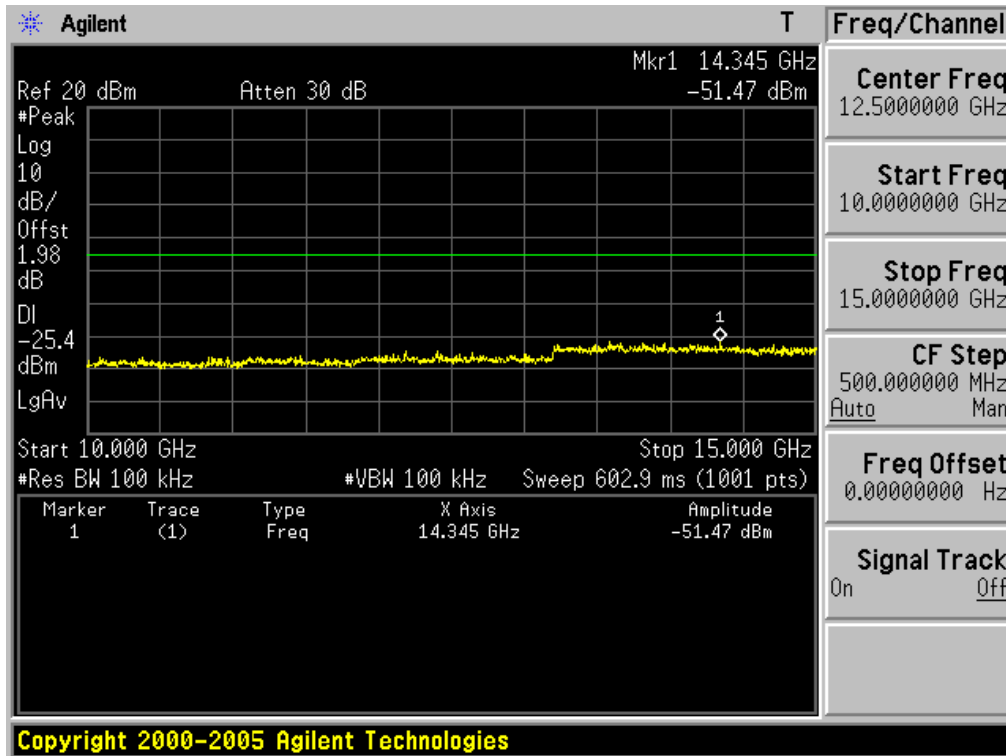
Test Mode: 802.11b & Middle Frequency



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

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


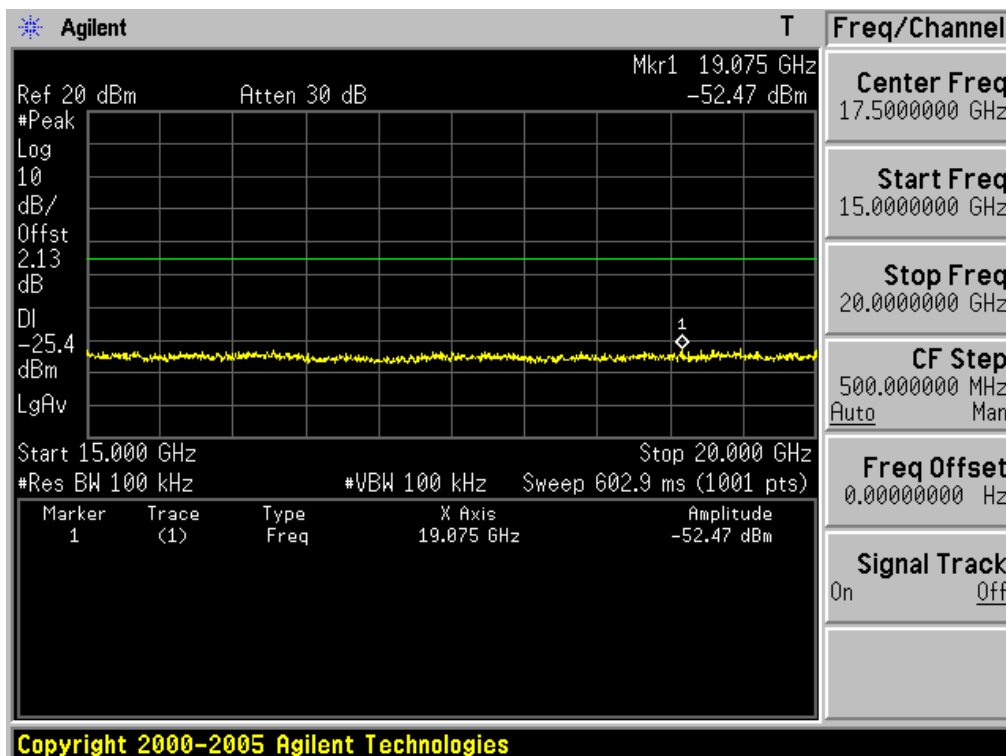
10GHz ~ 15GHz Conducted Spurious Emissions

Test Mode: 802.11b & Middle Frequency



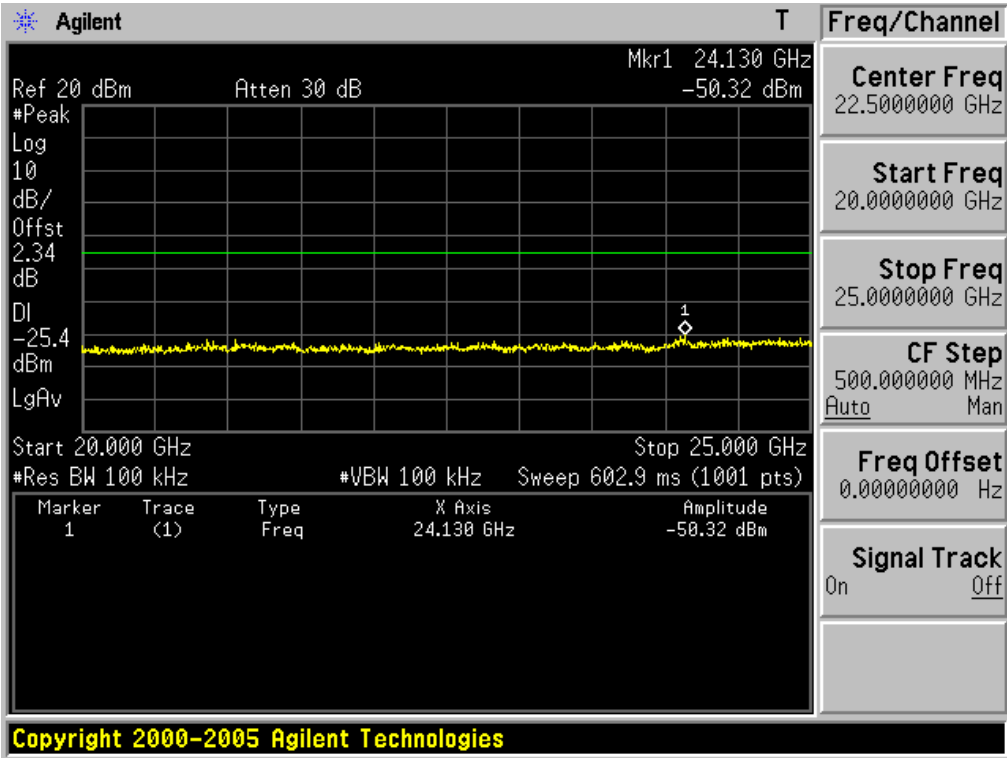
15GHz ~ 20GHz Conducted Spurious Emissions

Test Mode: 802.11b & Middle Frequency



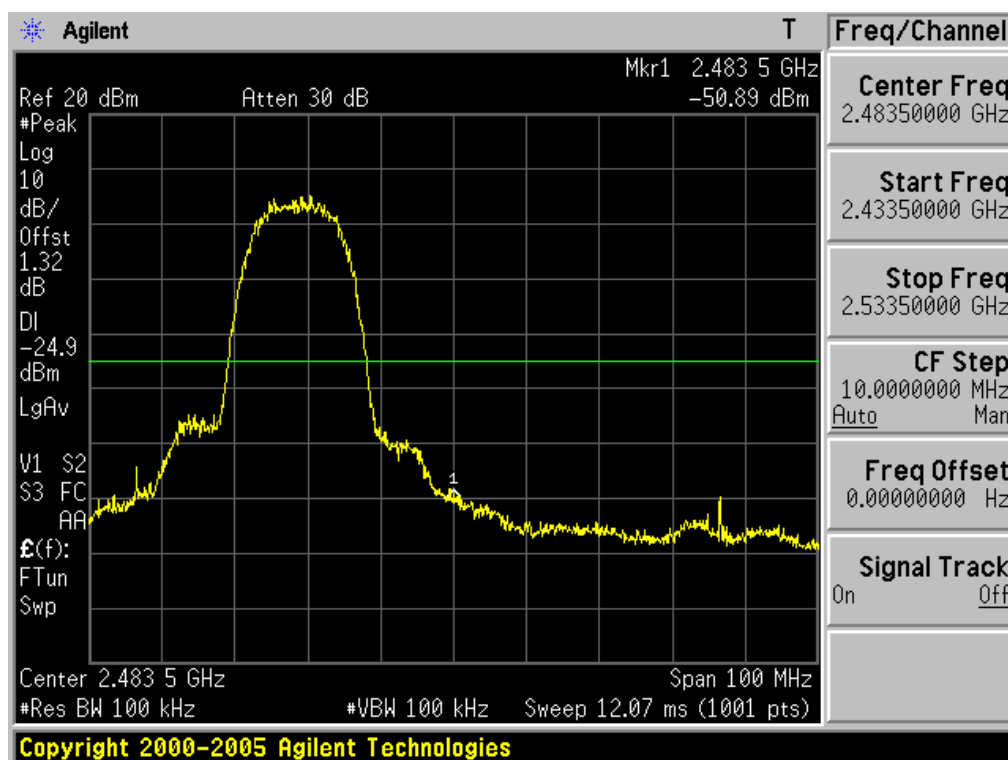
20GHz ~ 25GHz Conducted Spurious Emissions

Test Mode: 802.11b & Middle Frequency

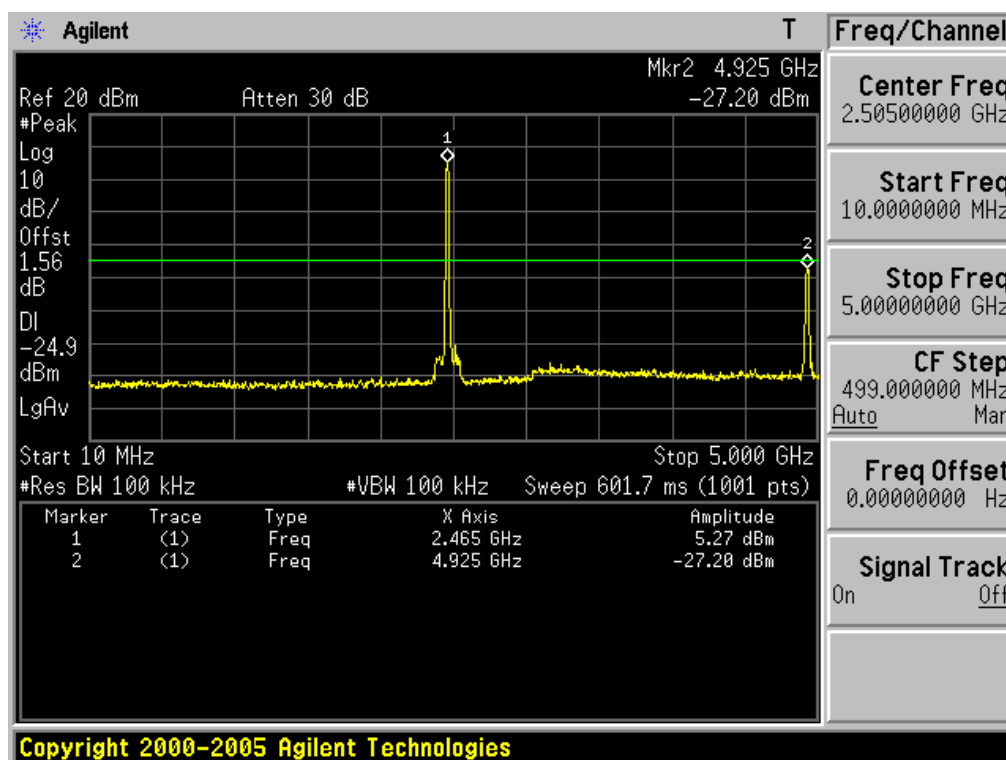


High Band-edge at 30 dB blow

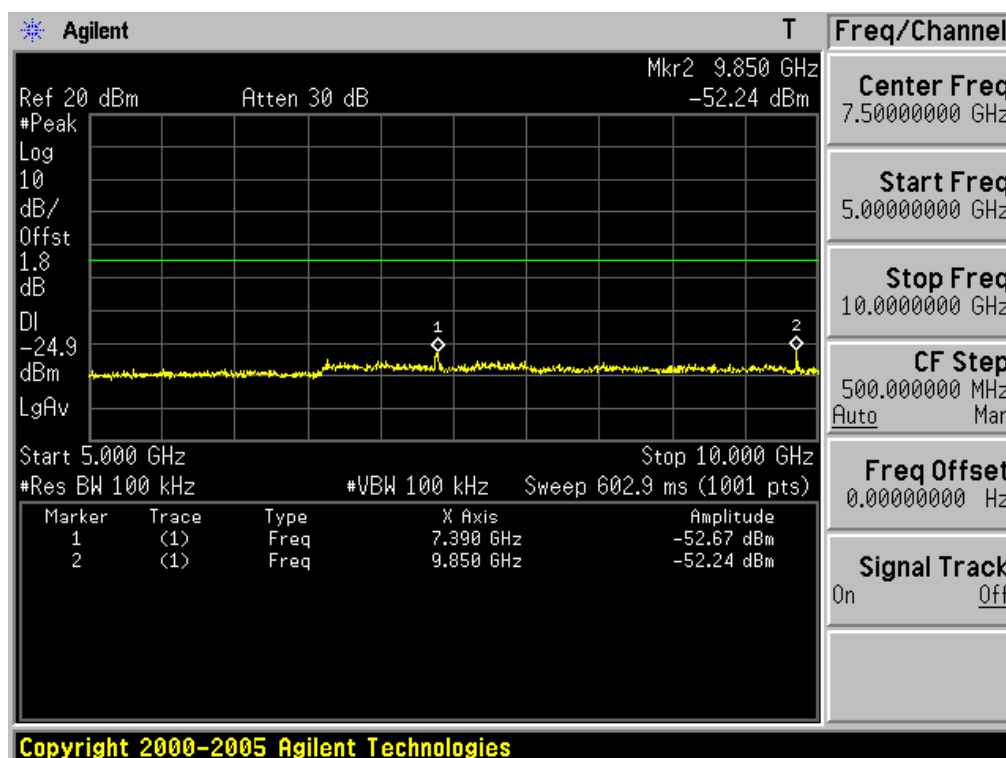
Test Mode: 802.11b & Highest Frequency

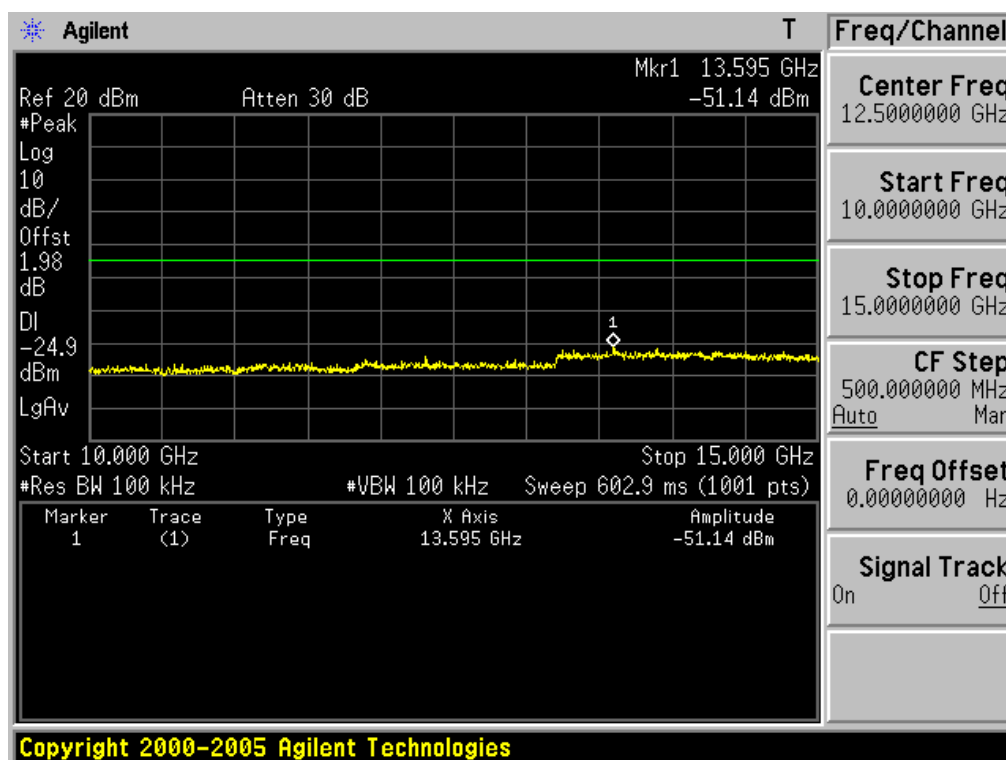
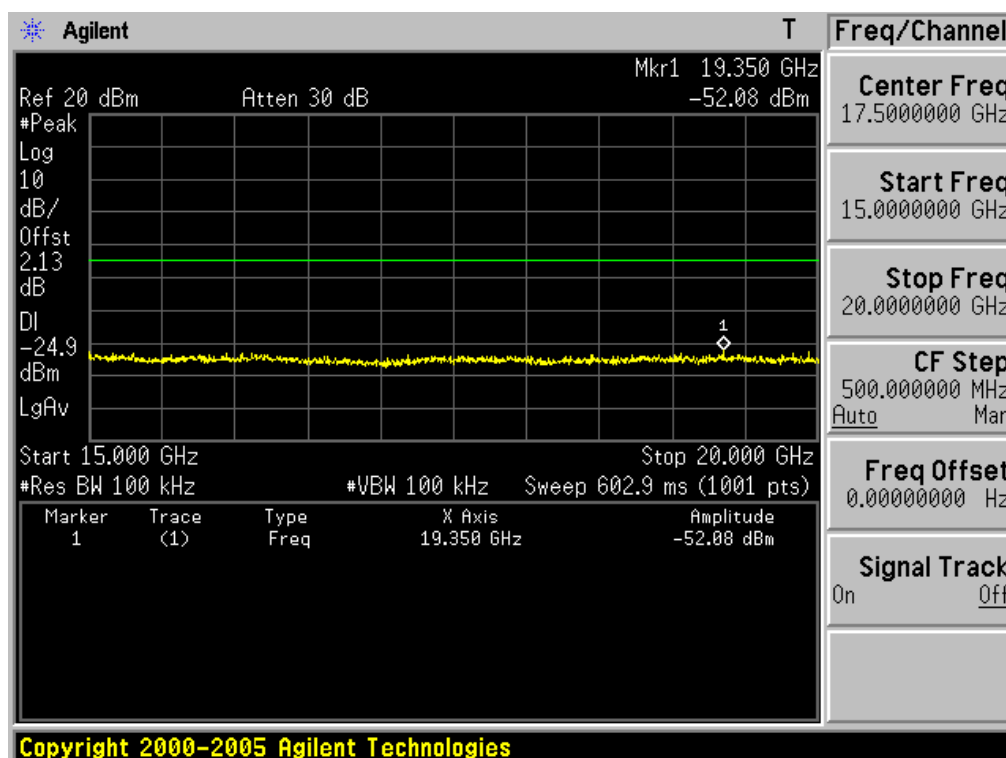


10MHz ~ 5GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency



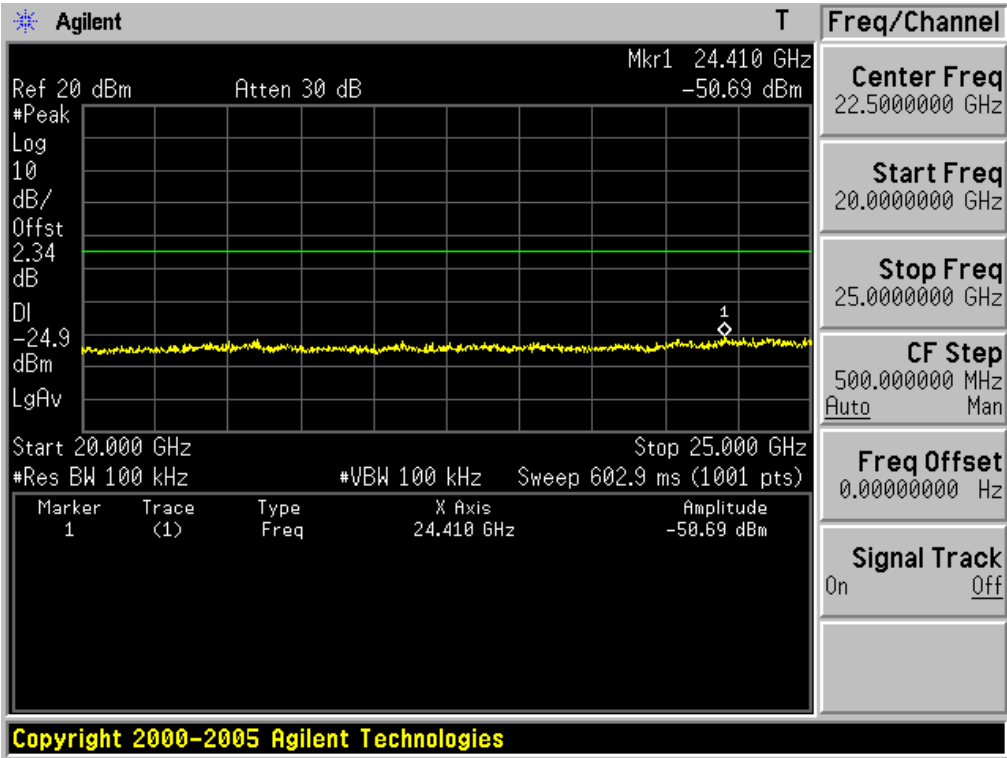
5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11b & Highest Frequency



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

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


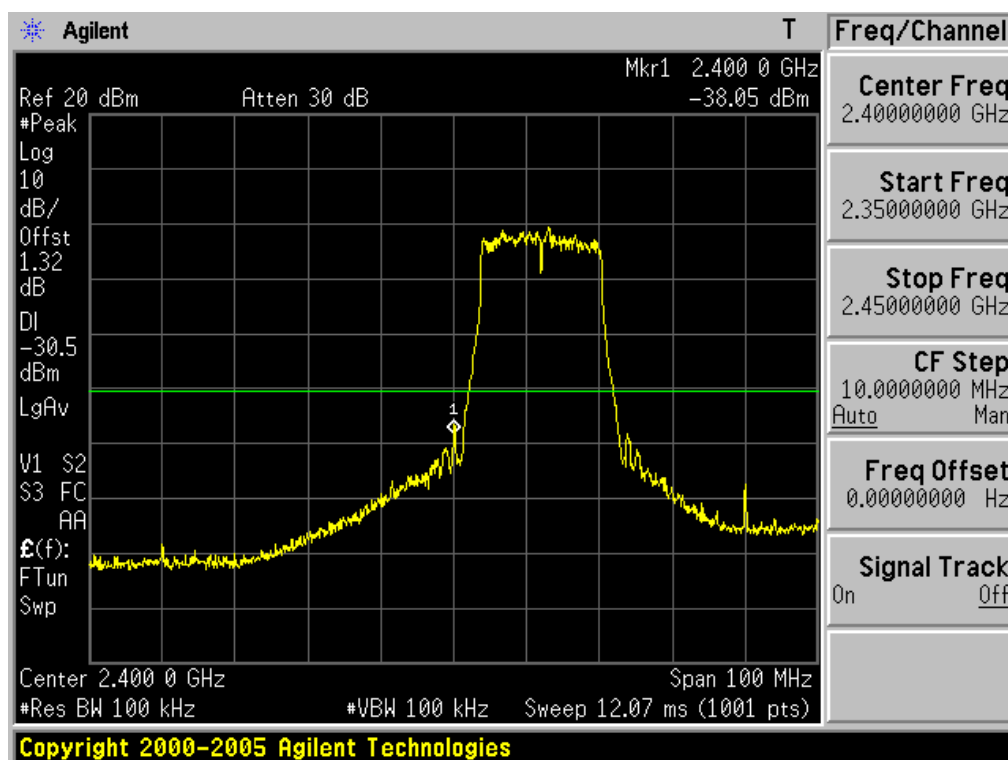
20GHz ~ 25GHz Conducted Spurious Emissions

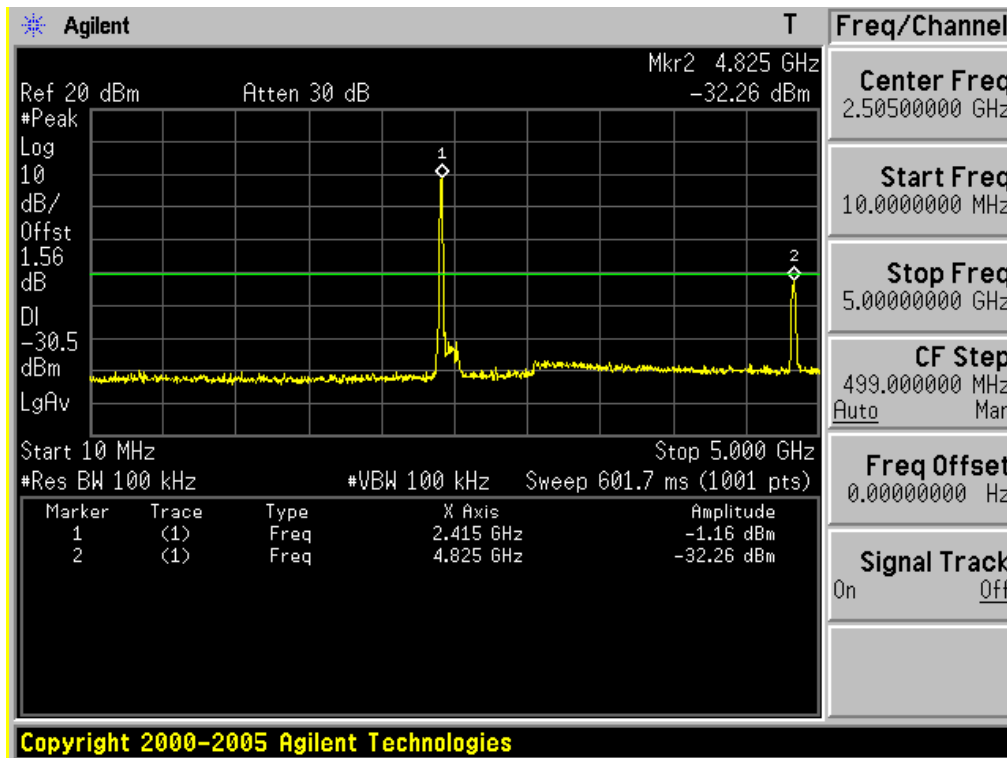
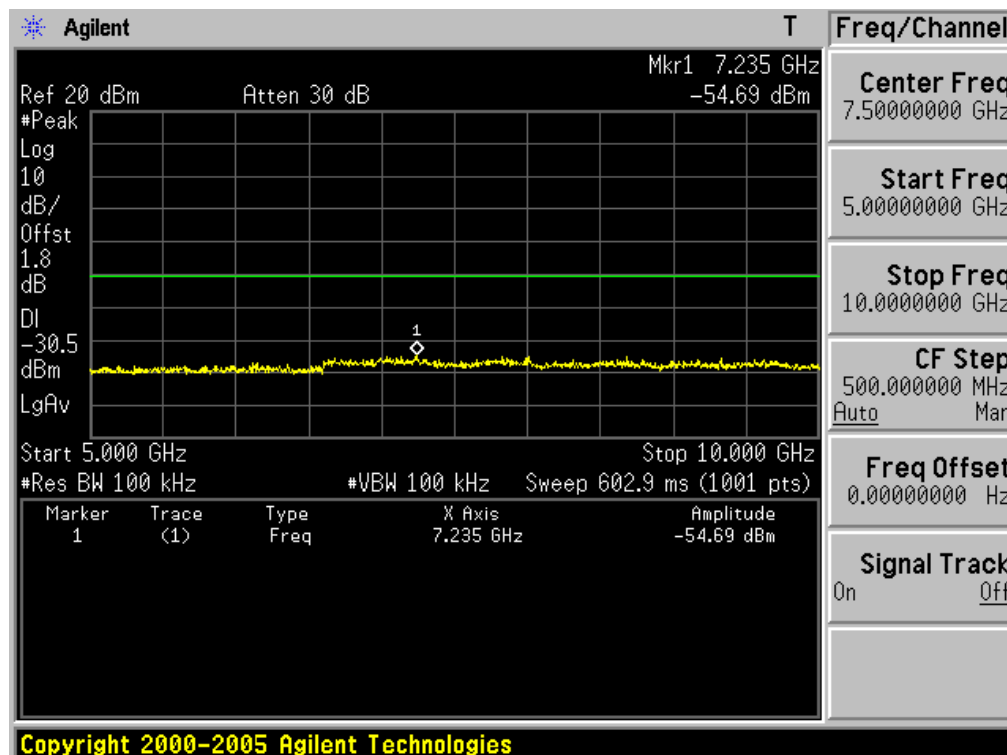
Test Mode: 802.11b & Highest Frequency

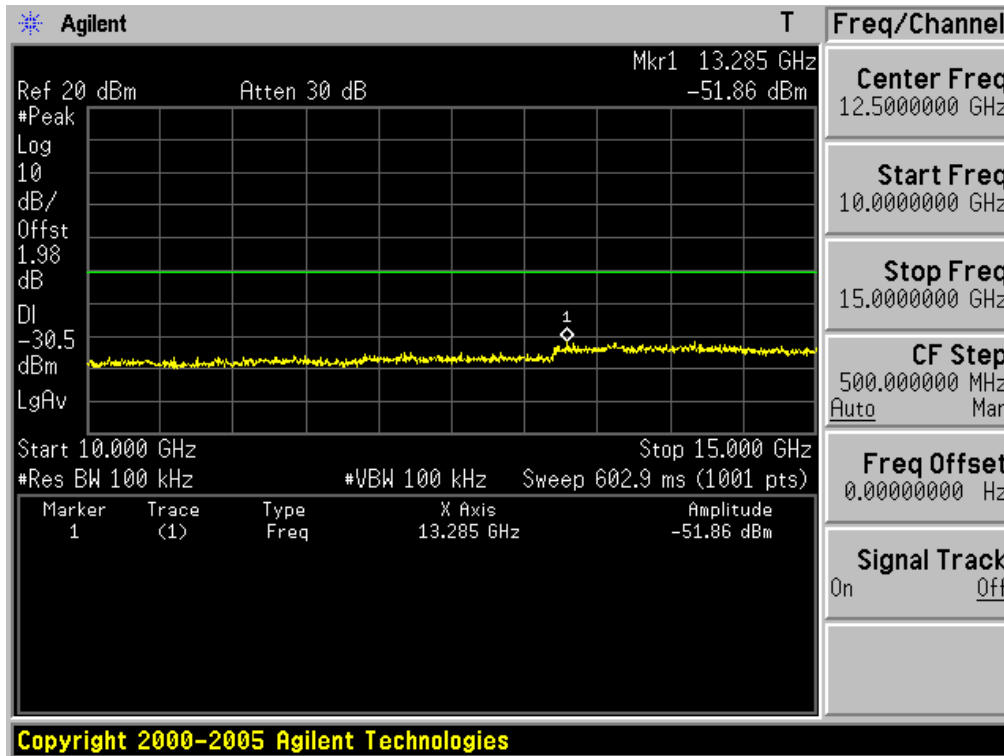
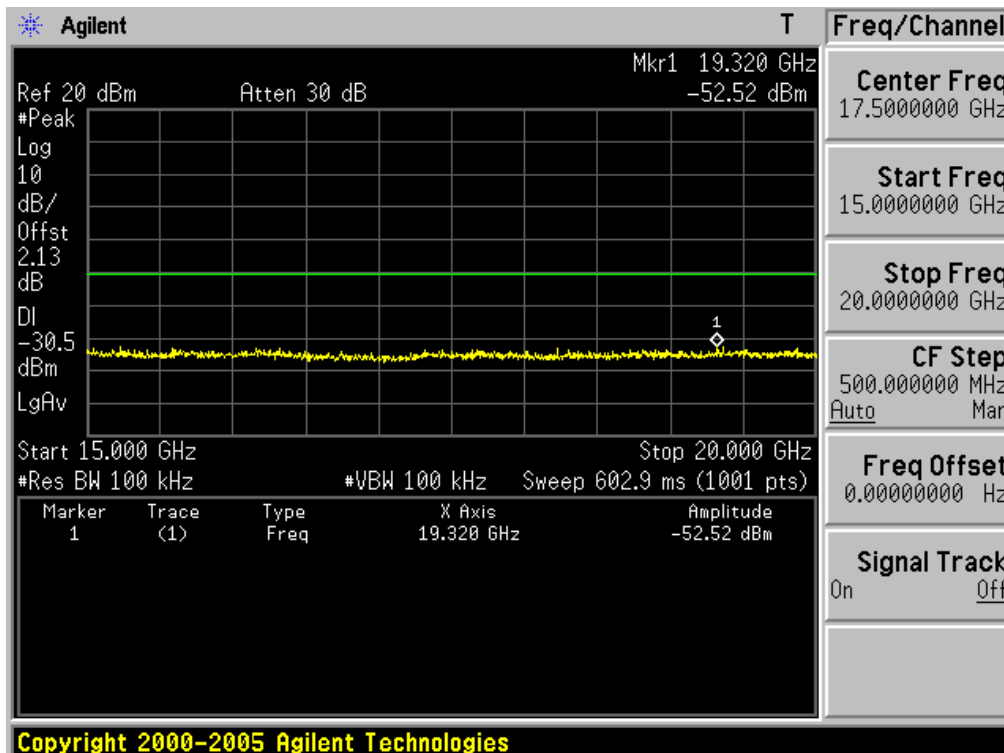


Low Band-edge at 30 dB blow

Test Mode: 802.11g

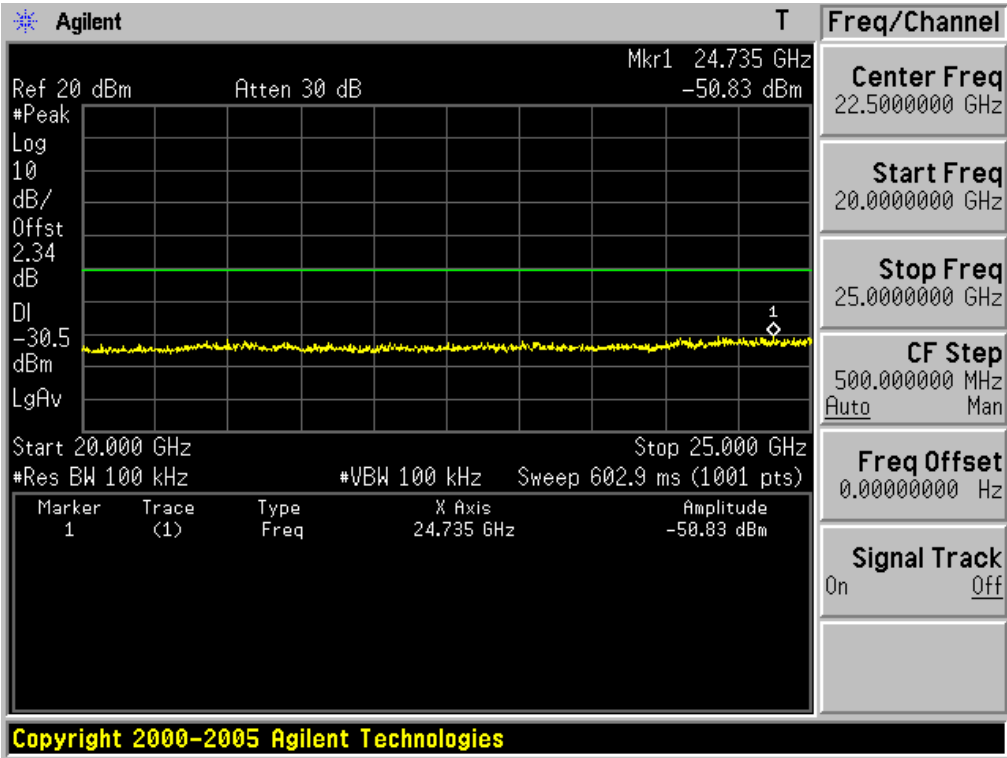


10MHz ~ 5GHz Conducted Spurious Emissions**Test Mode: 802.11g & Lowest Frequency****5GHz ~ 10GHz Conducted Spurious Emissions****Test Mode: 802.11g & Lowest Frequency**

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

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


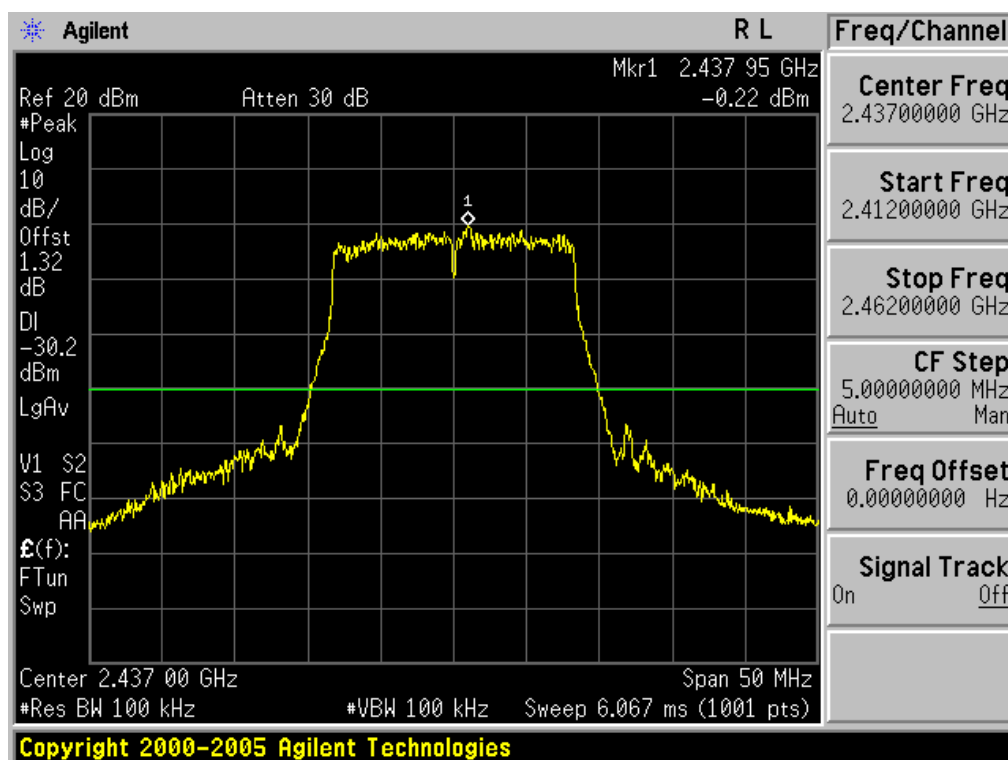
20GHz ~ 25GHz Conducted Spurious Emissions

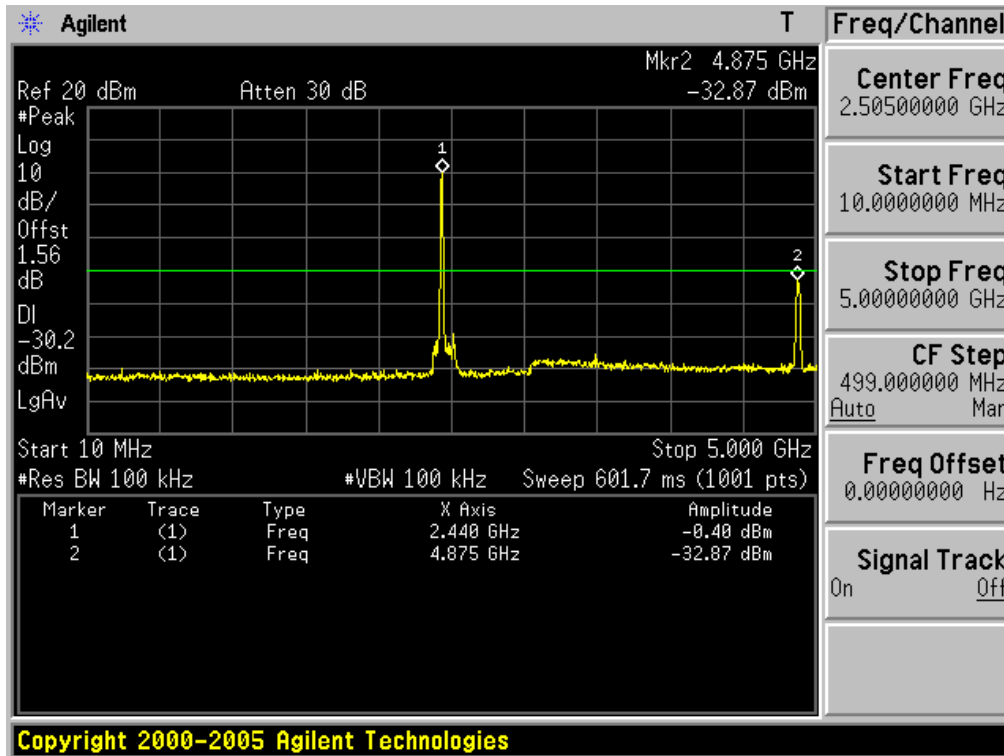
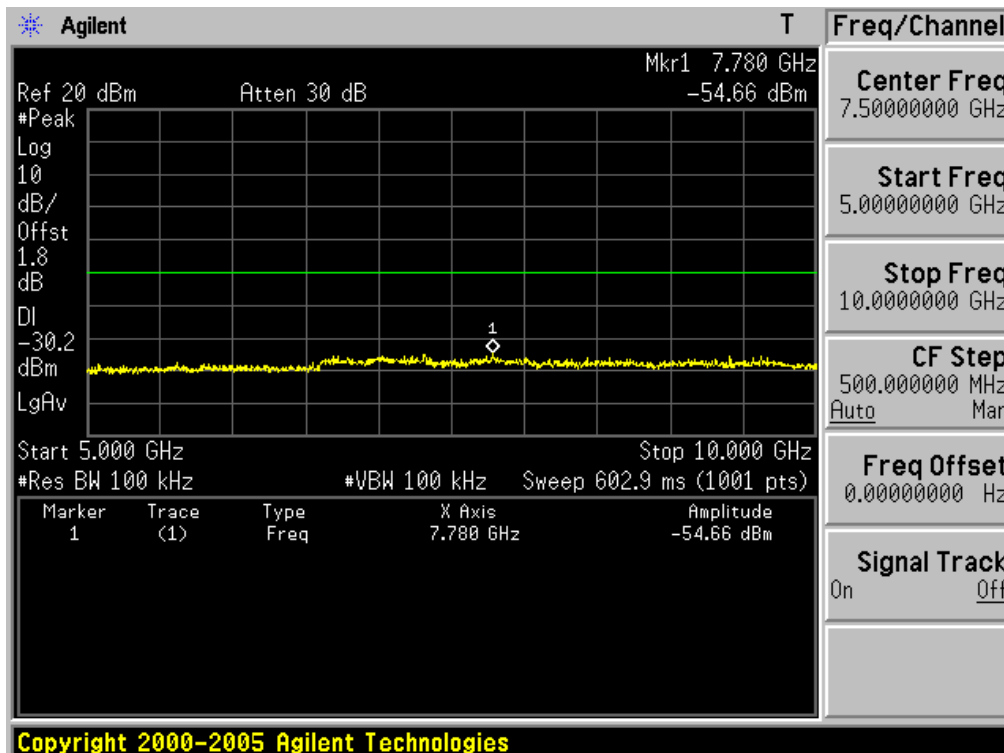
Test Mode: 802.11g & Lowest Frequency

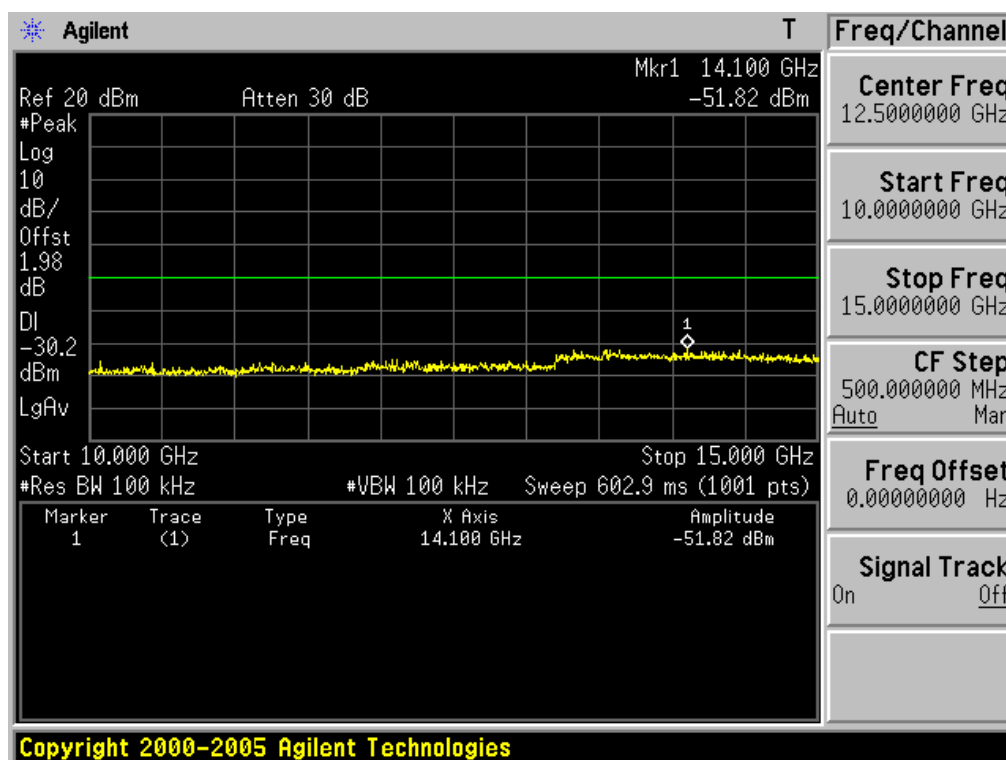
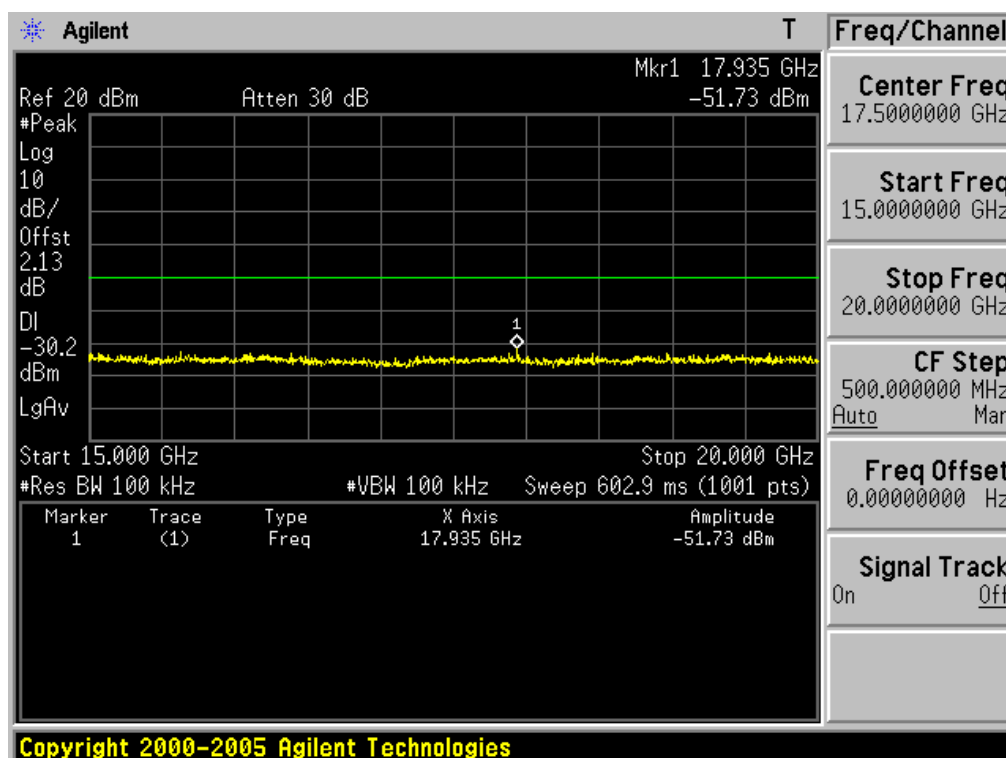


Reference for limit

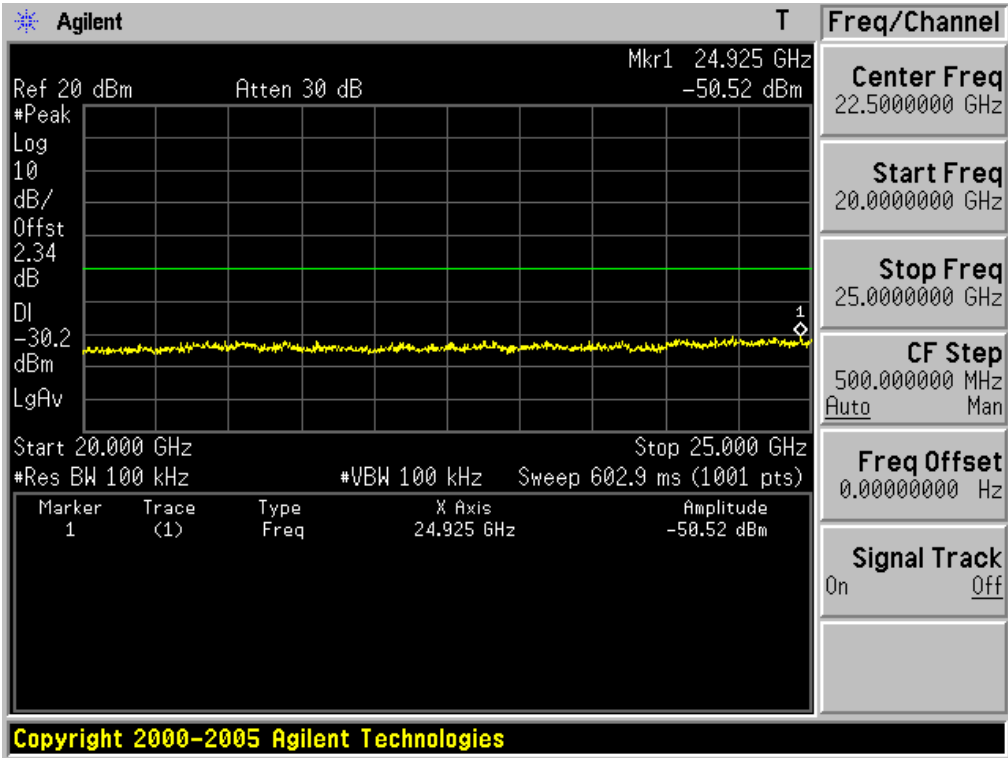
Test Mode: 802.11g & Middle Frequency



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

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


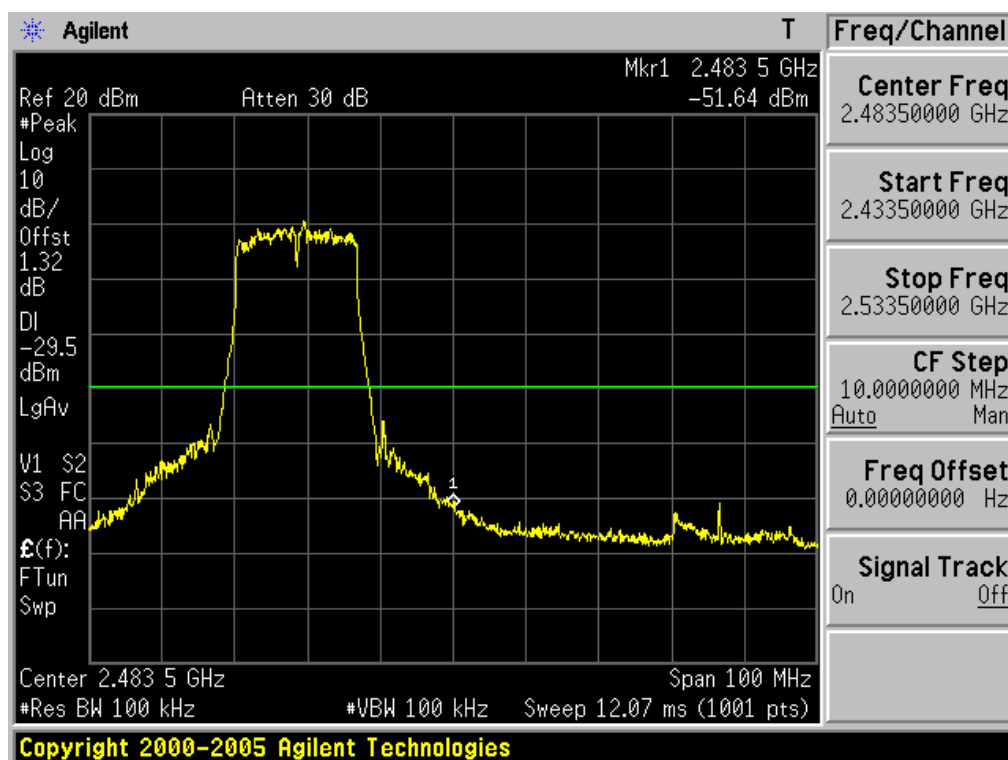
10GHz ~ 15GHz Conducted Spurious Emissions Test Mode: 802.11g & Middle Frequency

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


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

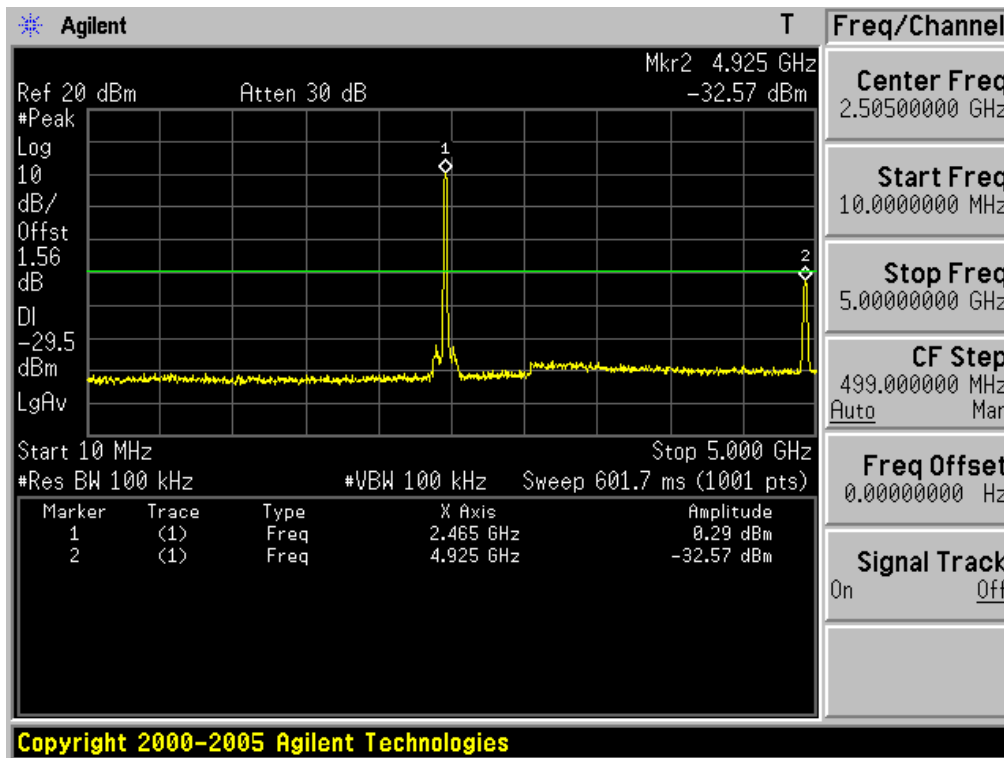


High Band-edge at 30 dB blow

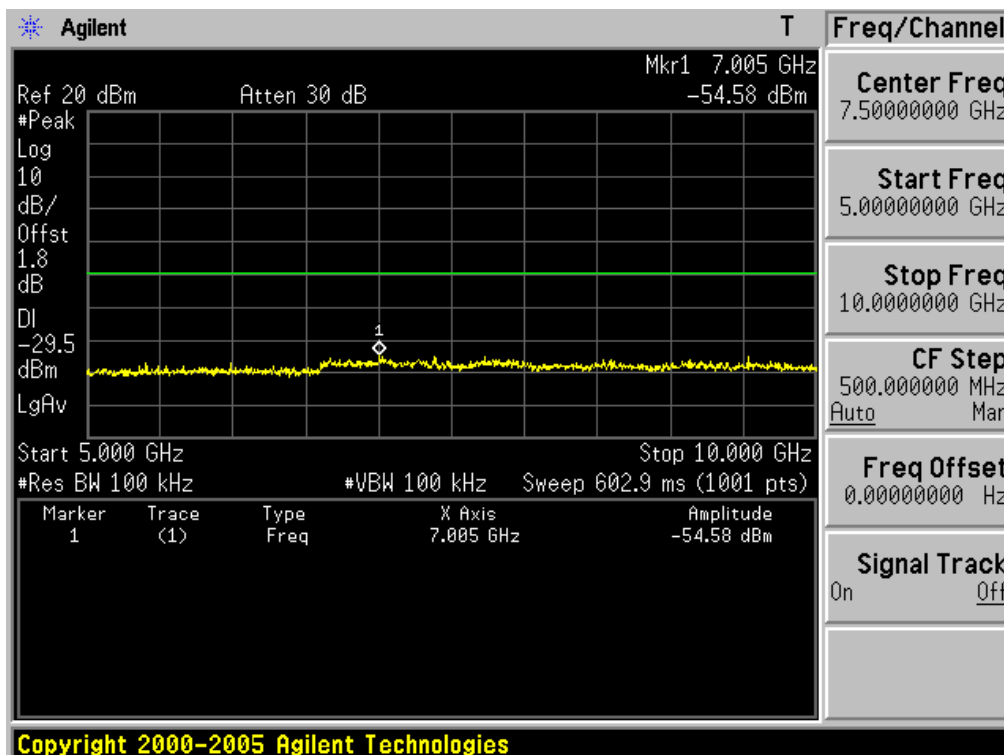
Test Mode: 802.11g & Highest Frequency



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

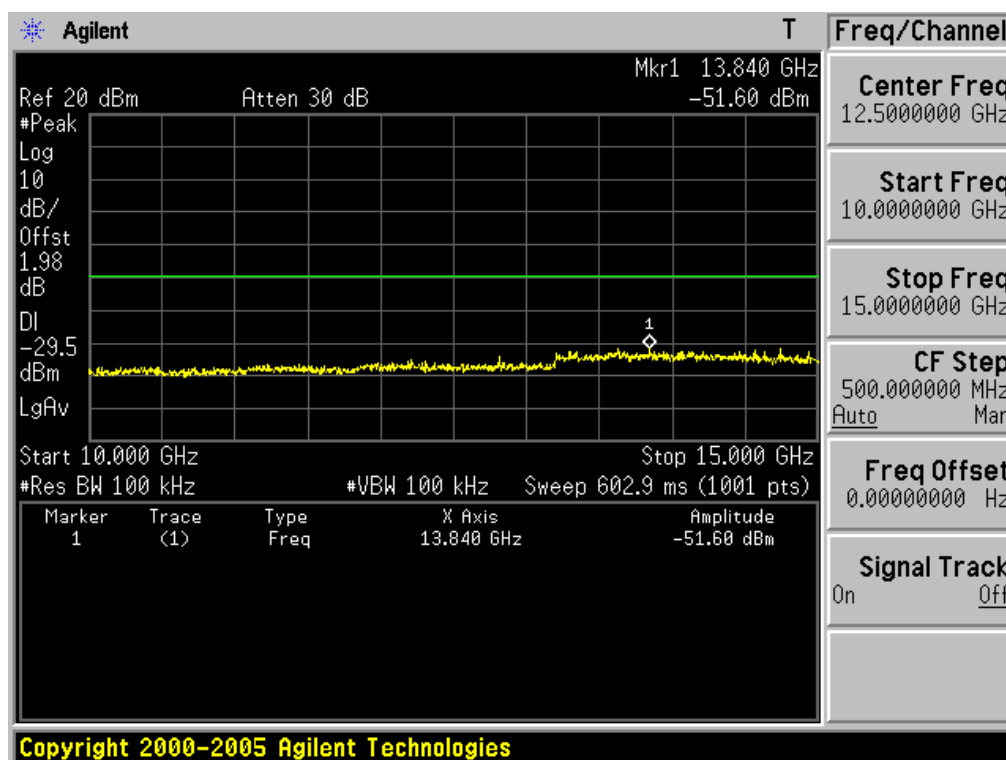


5GHz ~ 10GHz Conducted Spurious Emissions Test Mode: 802.11g & Highest Frequency



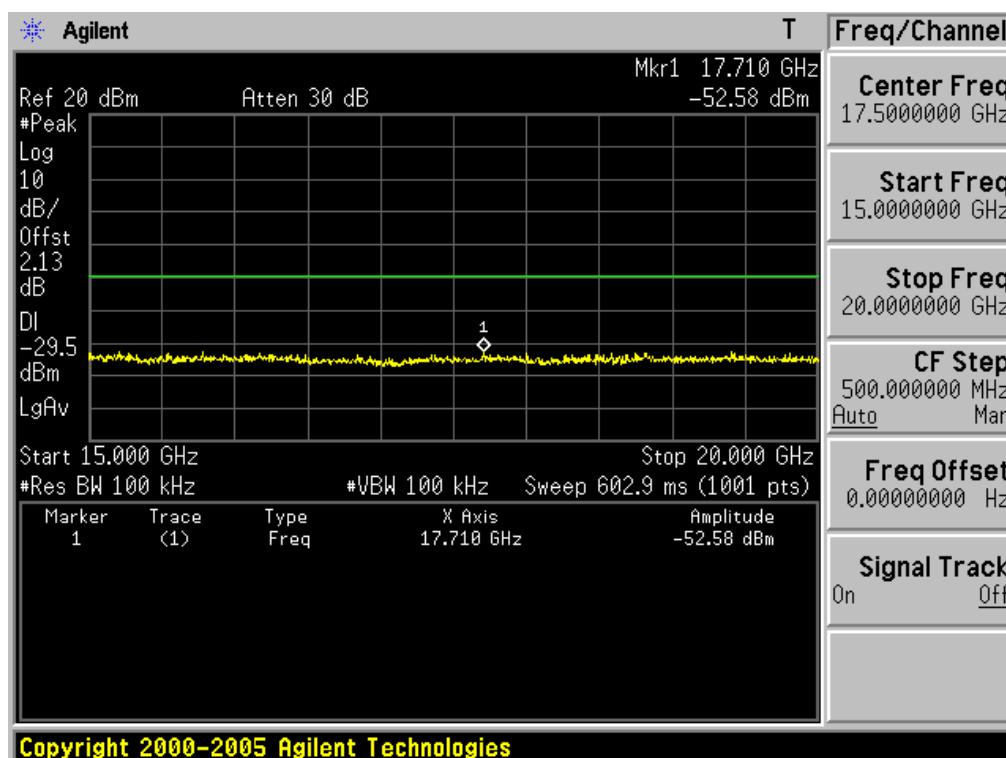
10GHz ~ 15GHz Conducted Spurious Emissions

Test Mode: 802.11g & Highest Frequency



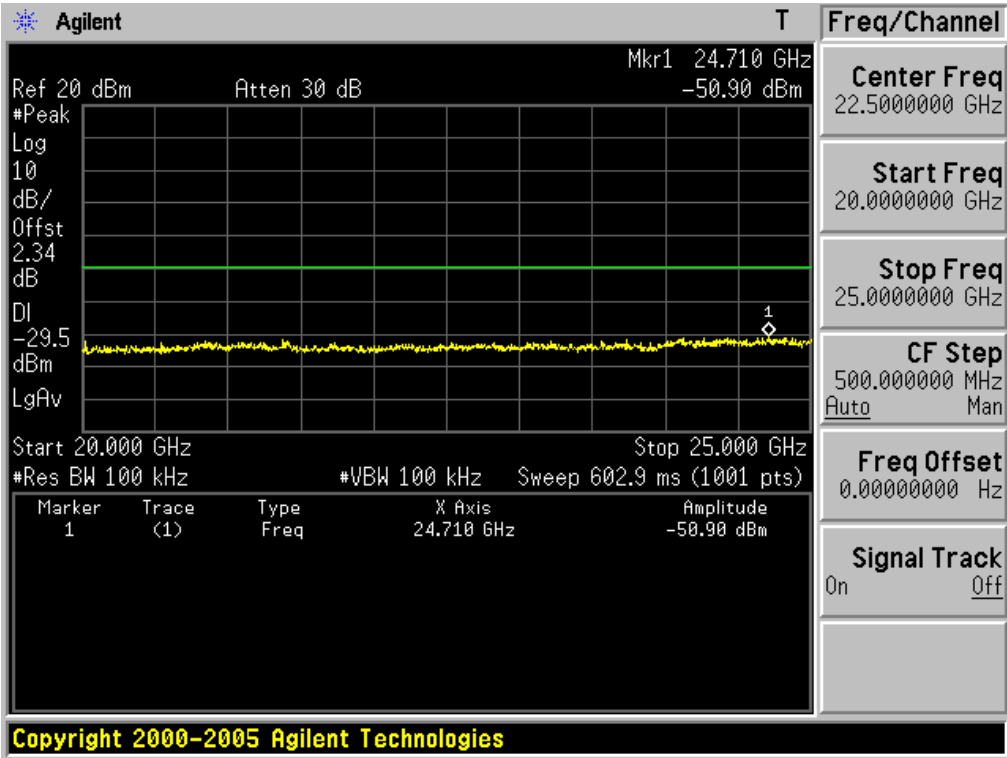
15GHz ~ 20GHz Conducted Spurious Emissions

Test Mode: 802.11g & Highest Frequency



20GHz ~ 25GHz Conducted Spurious Emissions

Test Mode: 802.11g & Highest Frequency



3.2.4 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: The test item was performed in all the test cases. And the worst test results were reported.

Note 2: See next pages for actual measured spectrum plots and data.

- Minimum Standard:

• FCC Part 15.209(a) and (b)

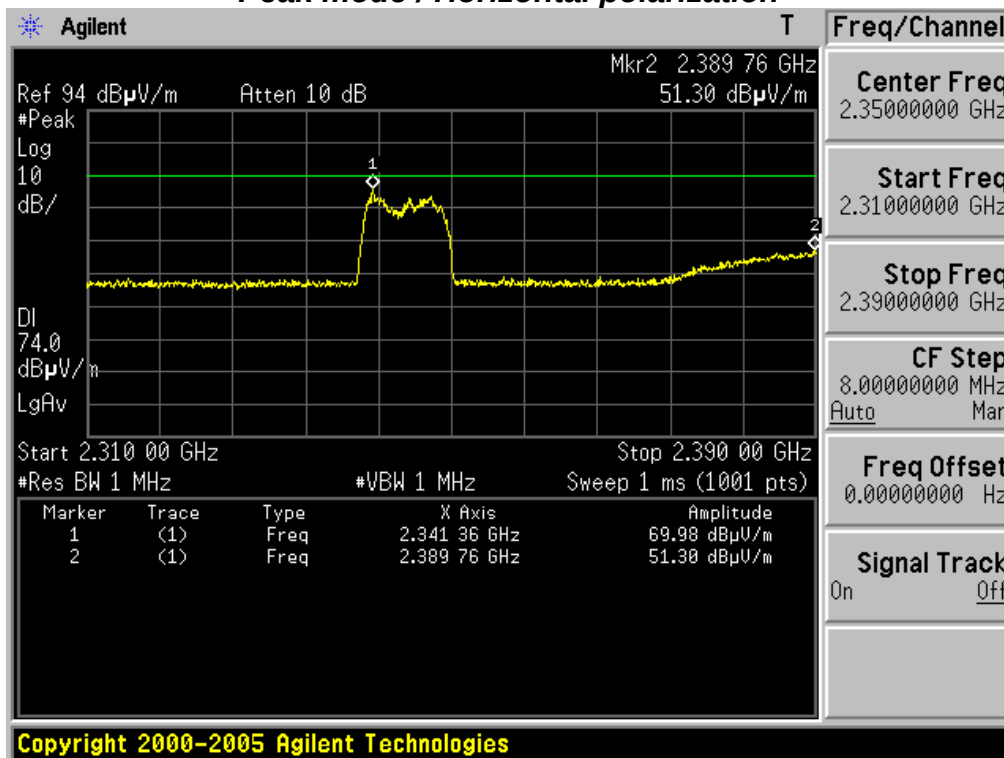
Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** 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.

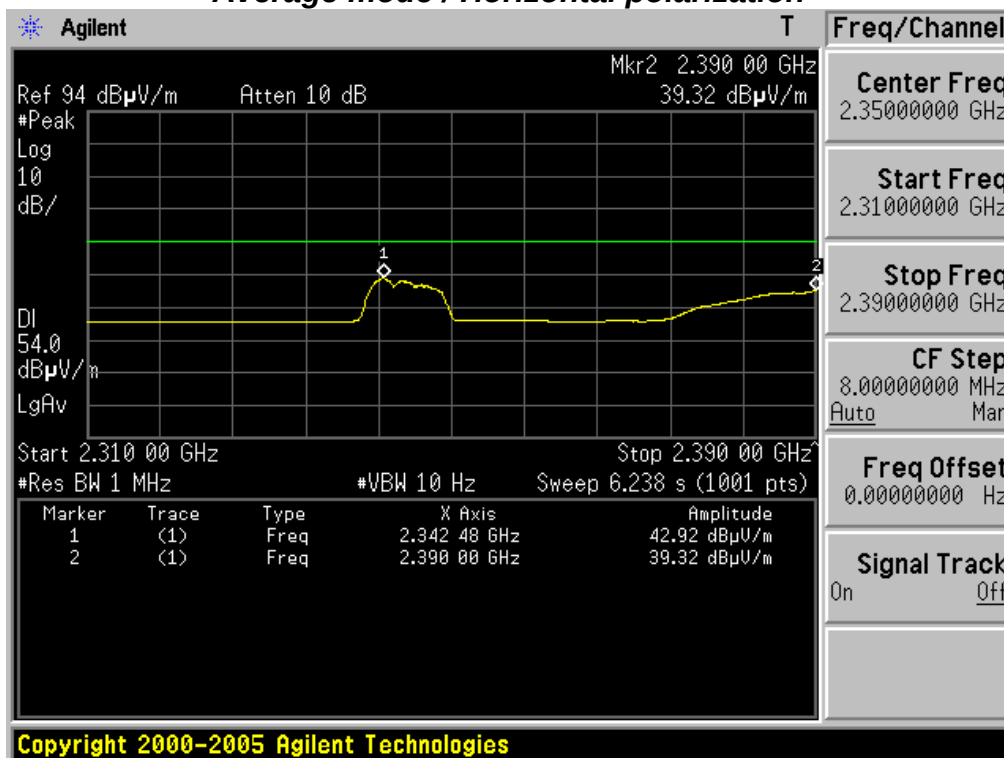
• FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

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 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240			
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

• **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.

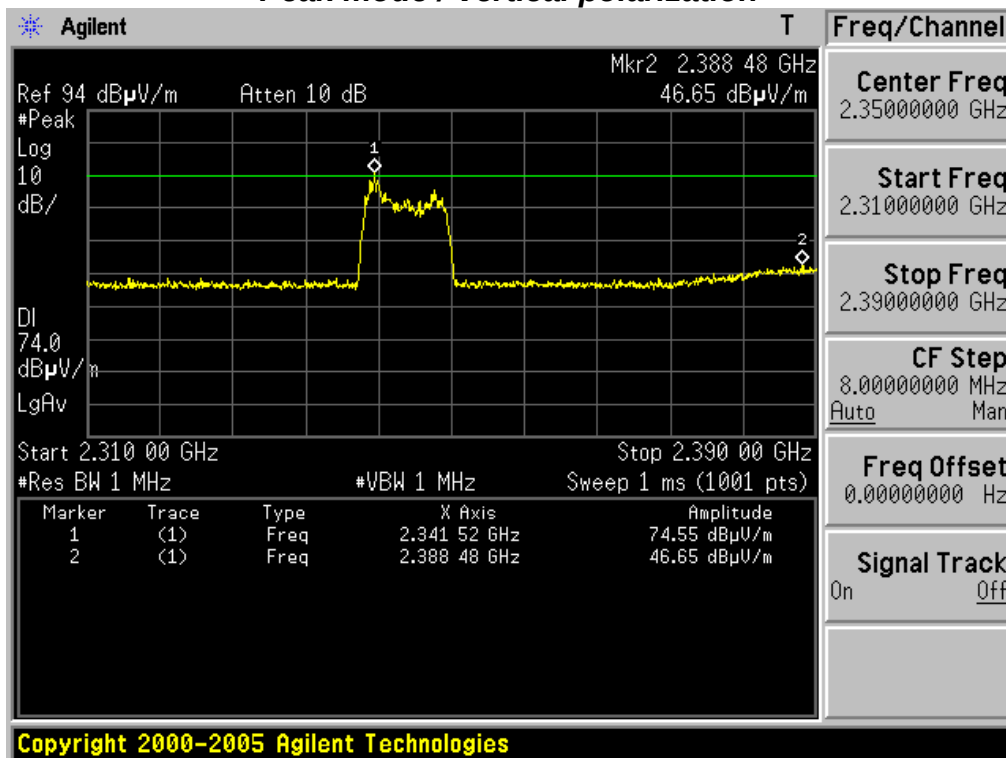
Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test Case 2**Peak mode / Horizontal polarization**

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 2**Average mode / Horizontal polarization**

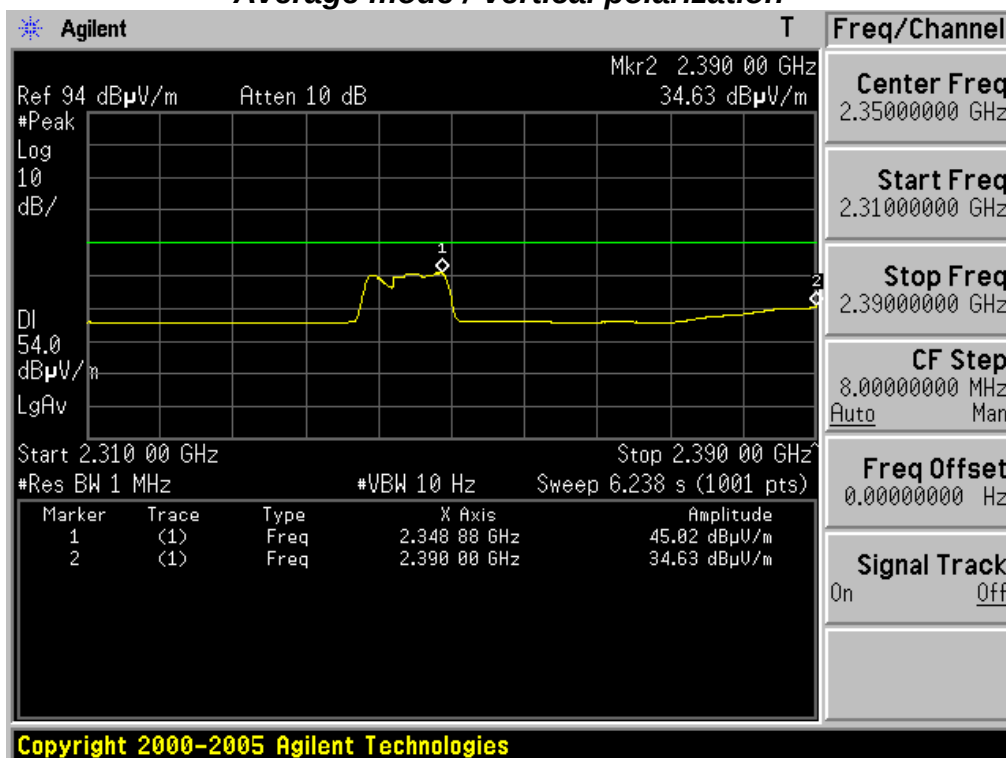
Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test Case 2

Peak mode / Vertical polarization


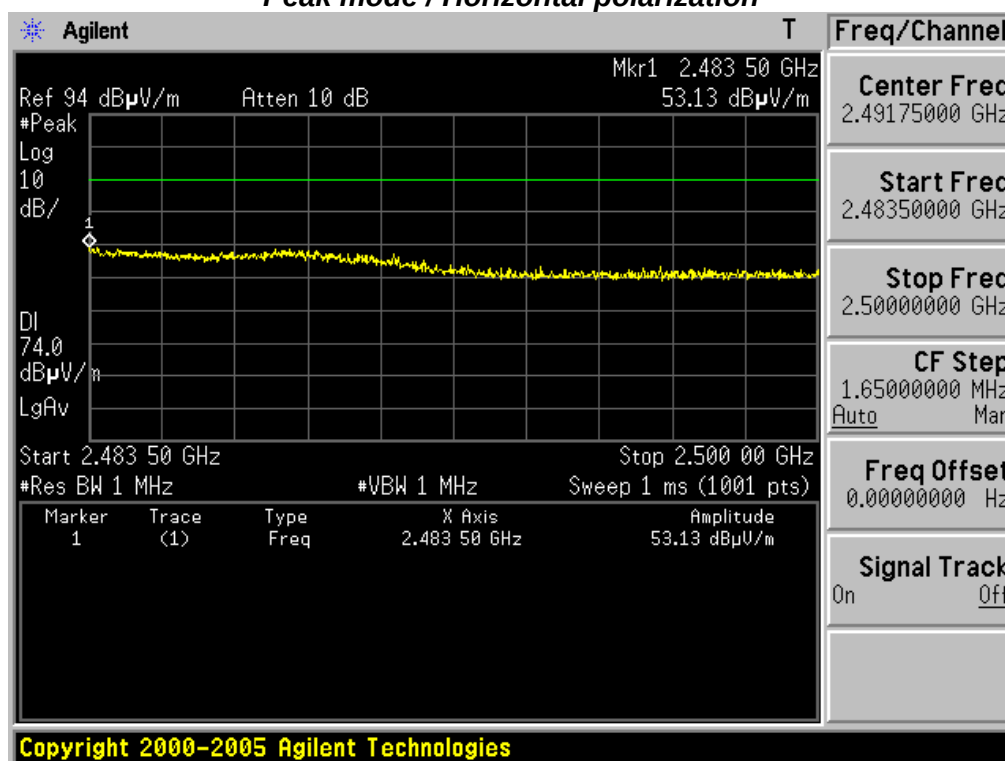
Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

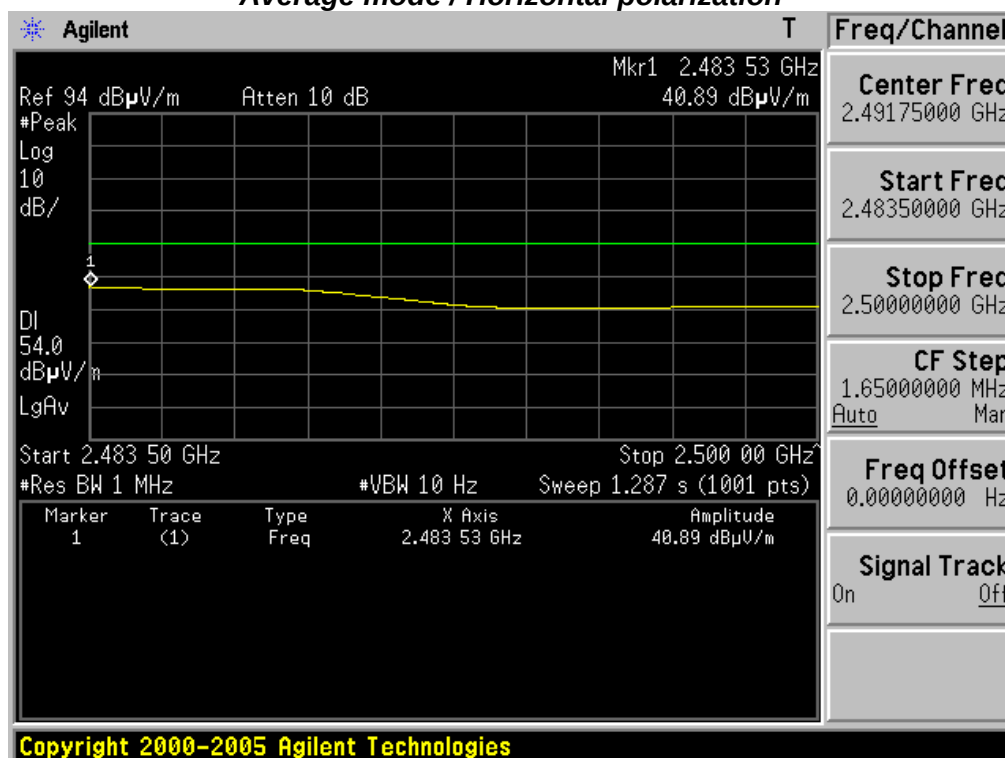
Restricted Band Edge Test Mode: 802.11b & Lowest Frequency & Test Case 2

Average mode / Vertical polarization


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

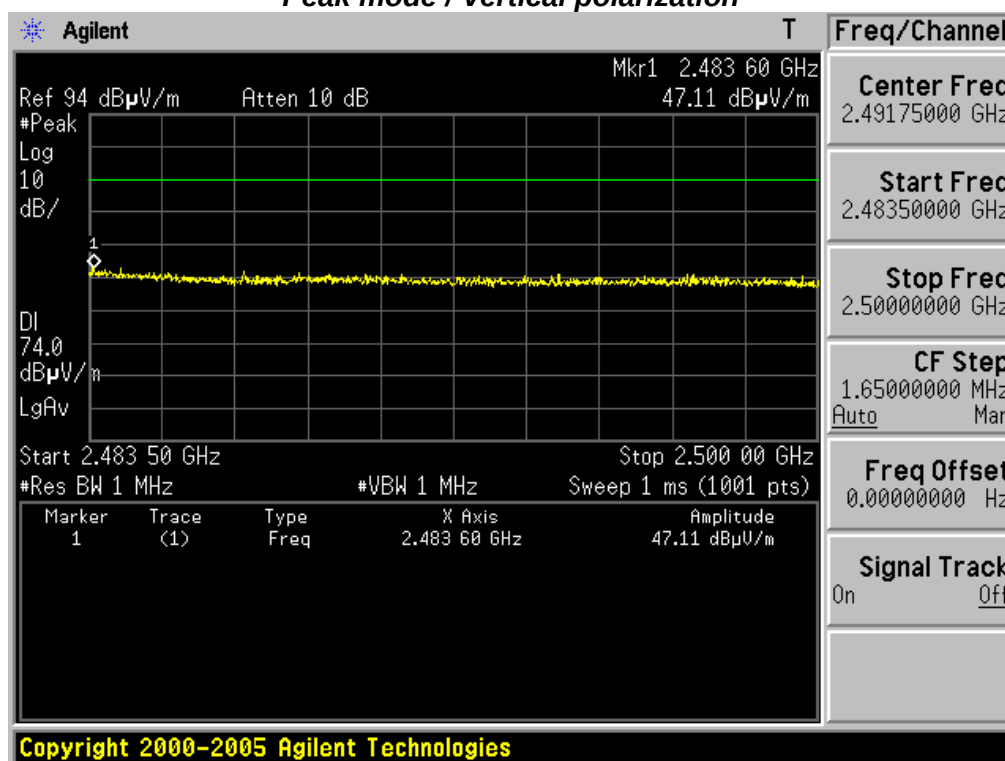
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test Case 2

Peak mode / Horizontal polarization

Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test Case 2

Average mode / Horizontal polarization


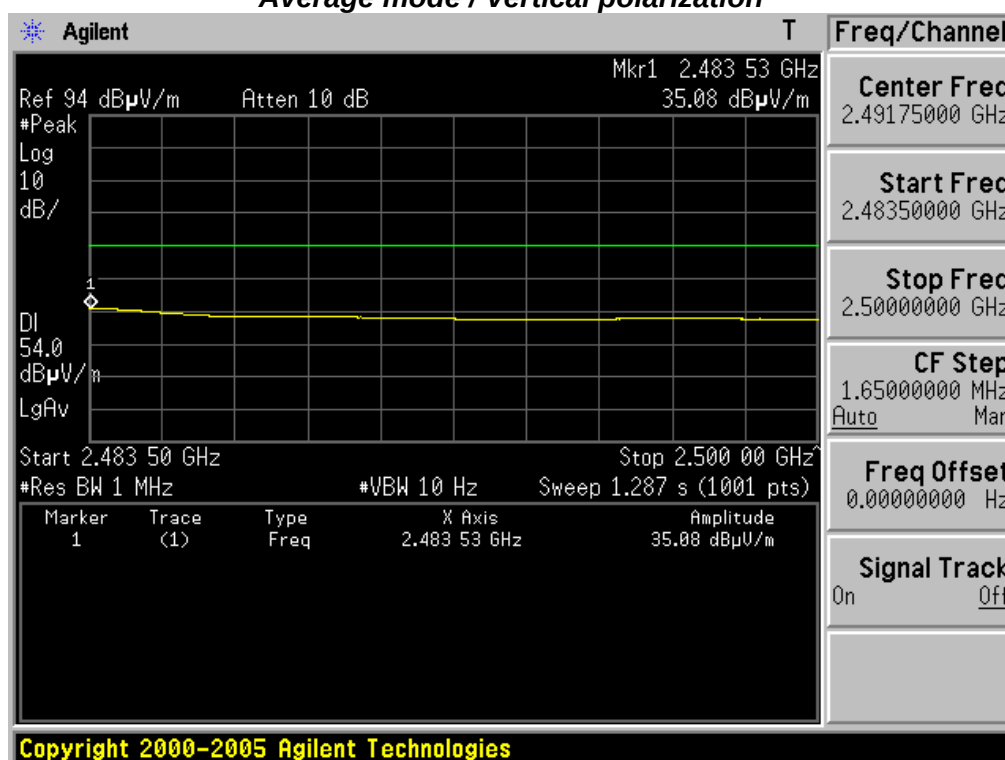
Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test Case 2

Peak mode / Vertical polarization

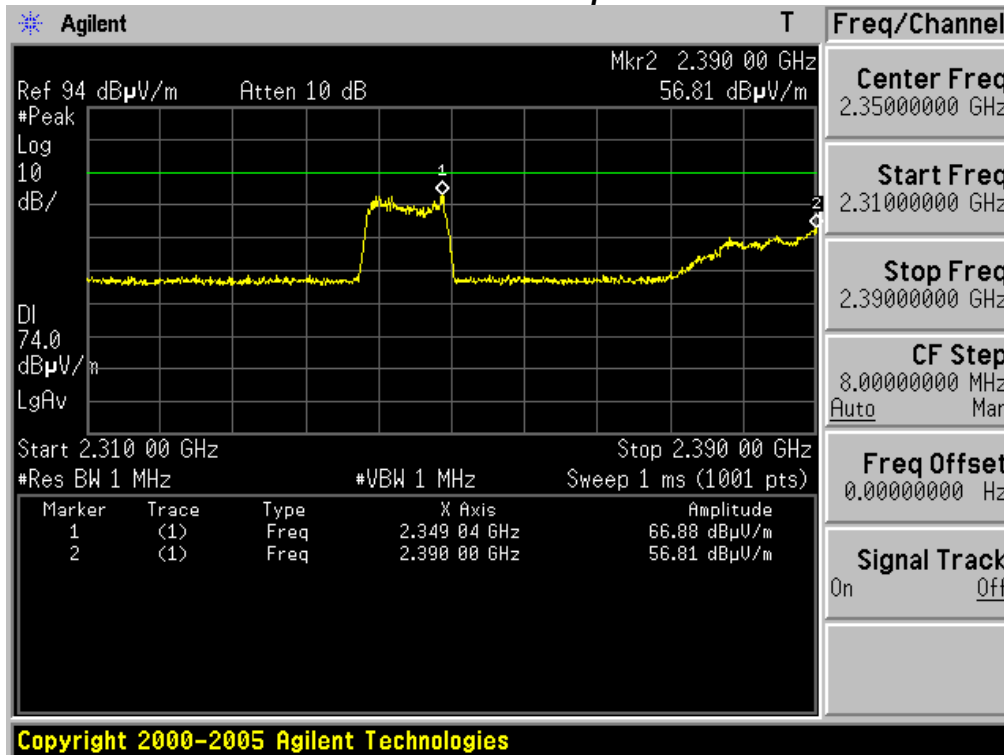


Restricted Band Edge Test Mode: 802.11b & Highest Frequency & Test Case 2

Average mode / Vertical polarization

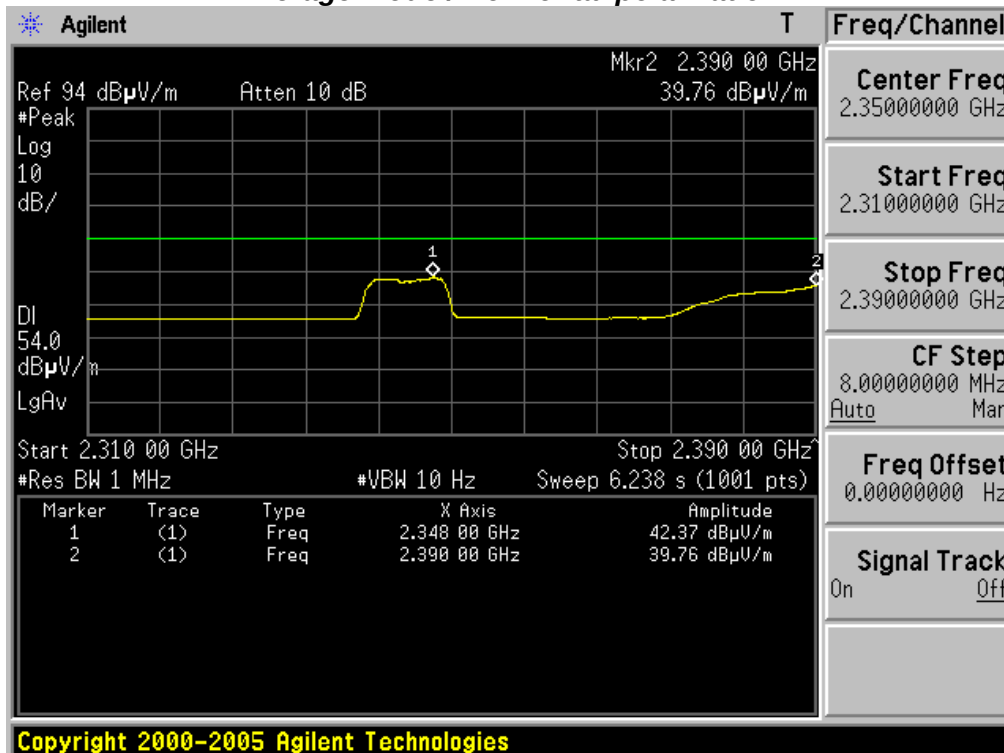


Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test Case 2

Peak mode / Horizontal polarization


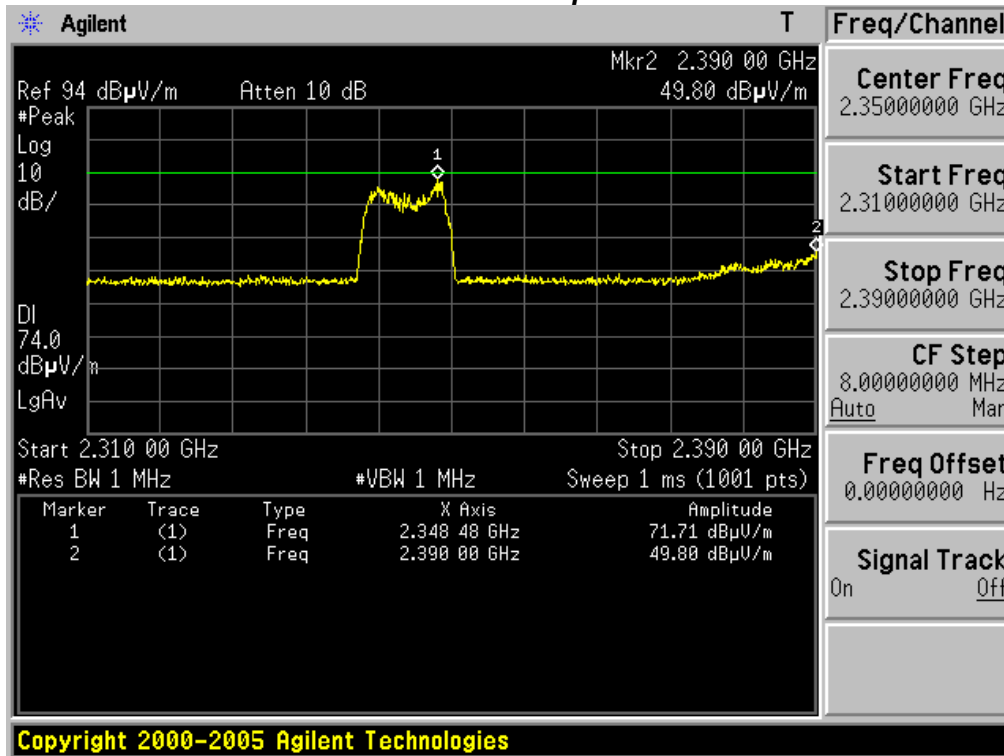
Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test Case 2

Average mode / Horizontal polarization


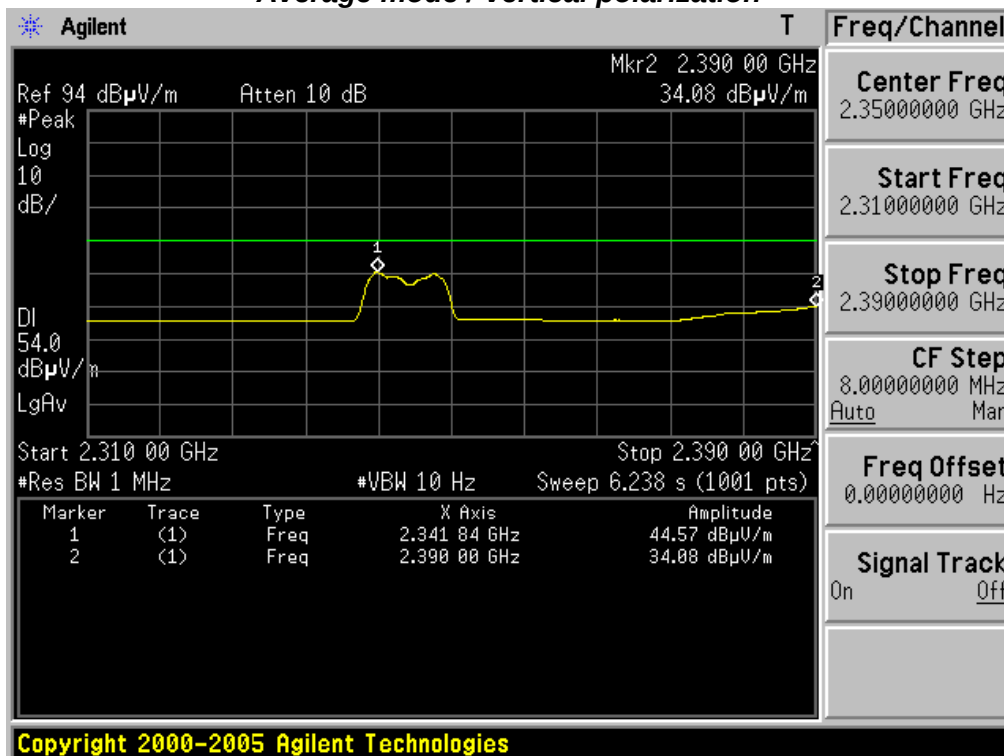
Marker 1's emissions of the low band edge test plots are emissions from WIMAX downlink signal in Korea.

Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test Case 2

Peak mode / Vertical polarization


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

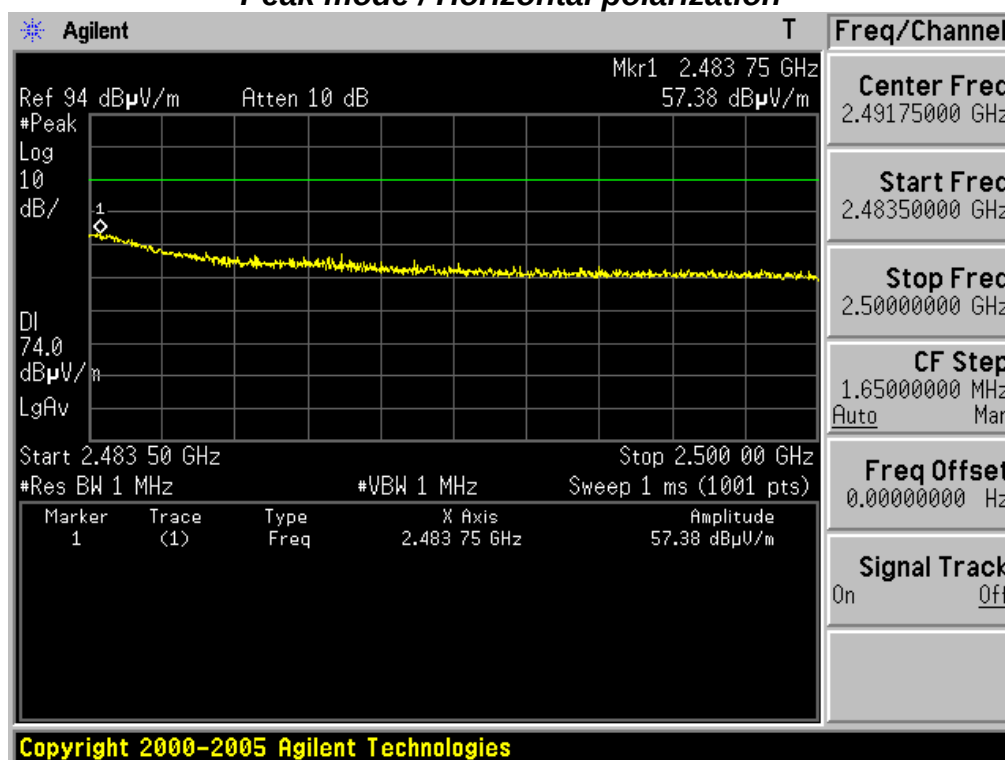
Restricted Band Edge Test Mode: 802.11g & Lowest Frequency & Test Case 2

Average mode / Vertical polarization


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

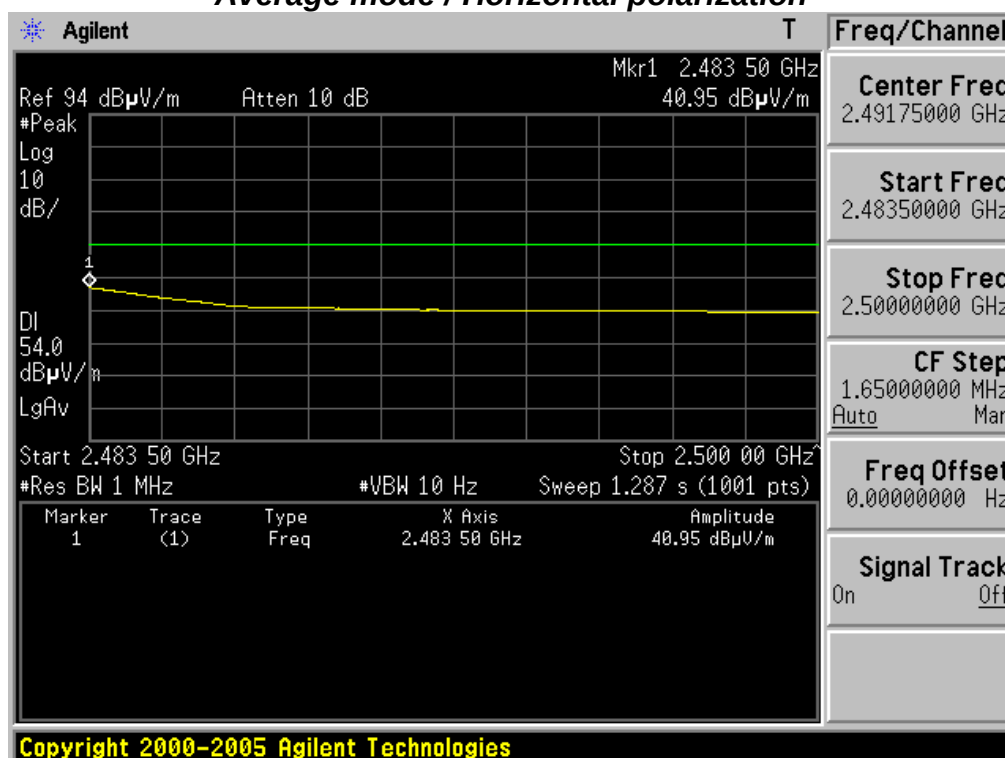
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test Case 2

Peak mode / Horizontal polarization



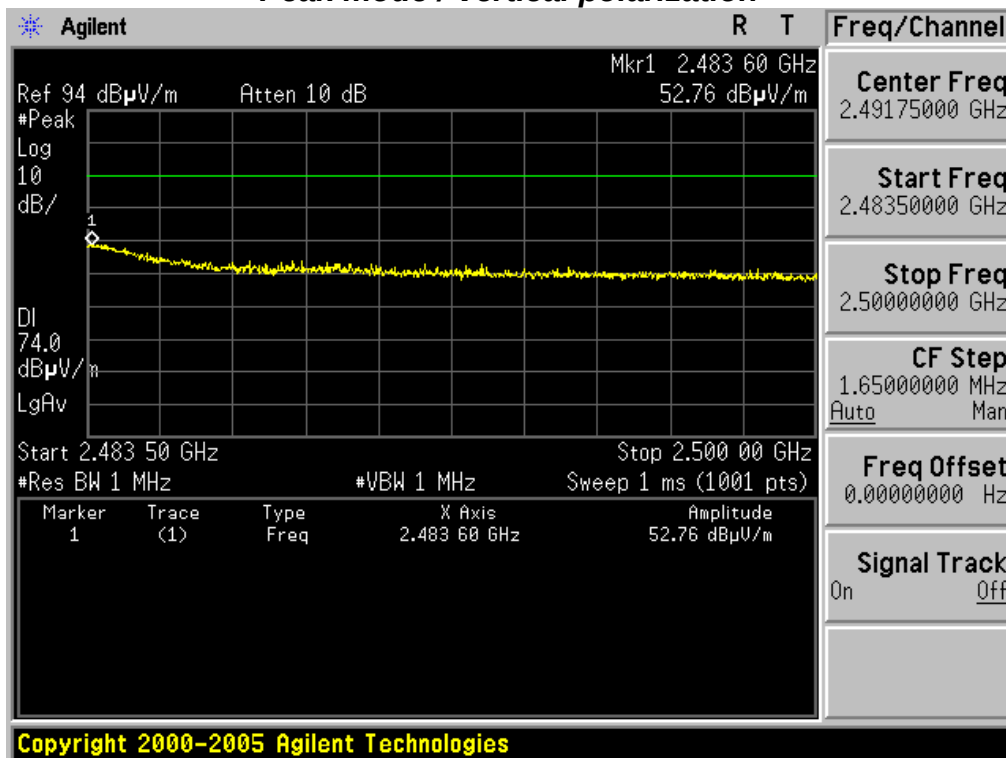
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test Case 2

Average mode / Horizontal polarization



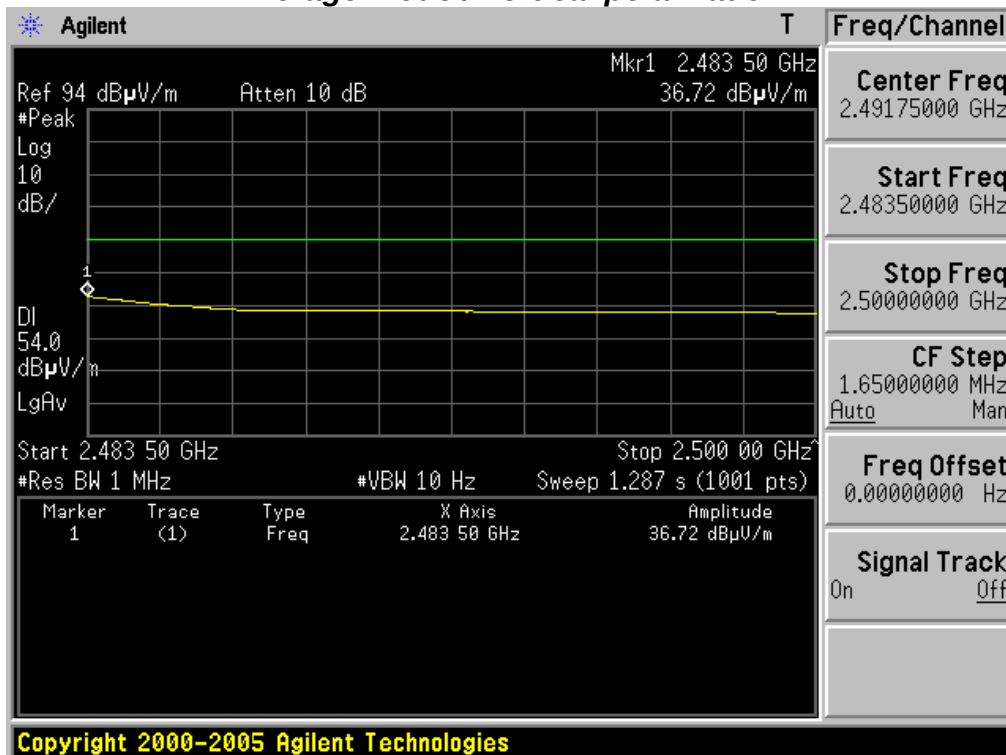
Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test Case 2

Peak mode / Vertical polarization



Restricted Band Edge Test Mode: 802.11g & Highest Frequency & Test Case 2

Average mode / Vertical polarization



30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11b & Lowest Frequency & Test Case 2



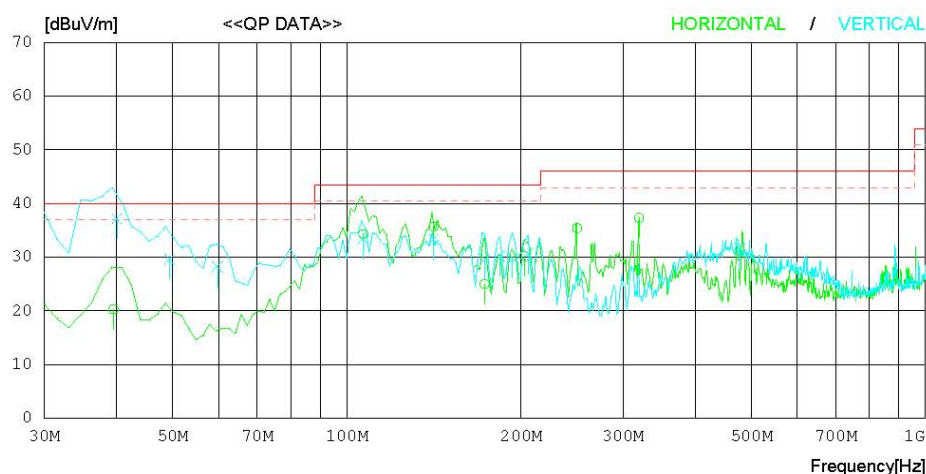
RADIATED EMISSION

Date : 2010-07-05

Model Name : SER-8189D
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2412 MHz (802.11b)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 °C 55 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



NO.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	39.503	28.3	13.8	0.8	22.6	20.3	40.0	19.7	106	157
2	106.742	45.1	10.7	1.2	22.7	34.3	43.5	9.2	252	325
3	141.177	46.5	10.7	1.4	22.9	35.7	43.5	7.8	220	164
4	173.005	36.5	10.1	1.5	23.1	25.0	43.5	18.5	120	349
5	202.724	40.9	10.9	1.7	23.3	30.2	43.5	13.3	104	198
6	250.006	43.8	13.3	1.8	23.5	35.4	46.0	10.6	102	58
7	319.993	44.8	14.3	2.1	23.9	37.3	46.0	8.7	110	154
----- Vertical -----										
8	40.078	45.4	13.6	0.8	22.6	37.2	40.0	2.8	104	354
9	49.423	43.0	8.4	0.9	22.7	29.6	40.0	10.4	101	156
10	59.749	44.0	6.0	0.9	22.7	28.2	40.0	11.8	102	156
11	106.721	44.2	10.7	1.2	22.7	33.4	43.5	10.1	101	219
12	141.192	44.1	10.7	1.4	22.9	33.3	43.5	10.2	110	358
13	173.205	41.2	10.1	1.5	23.1	29.7	43.5	13.8	103	237
14	183.887	41.5	10.3	1.6	23.2	30.2	43.5	13.3	106	151
15	193.241	40.9	10.6	1.6	23.3	29.8	43.5	13.7	101	290
16	205.598	41.2	11.0	1.7	23.3	30.6	43.5	12.9	114	116
17	476.910	36.4	17.3	2.6	24.5	31.8	46.0	14.2	123	296

30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11b & Middle Frequency & Test Case 2



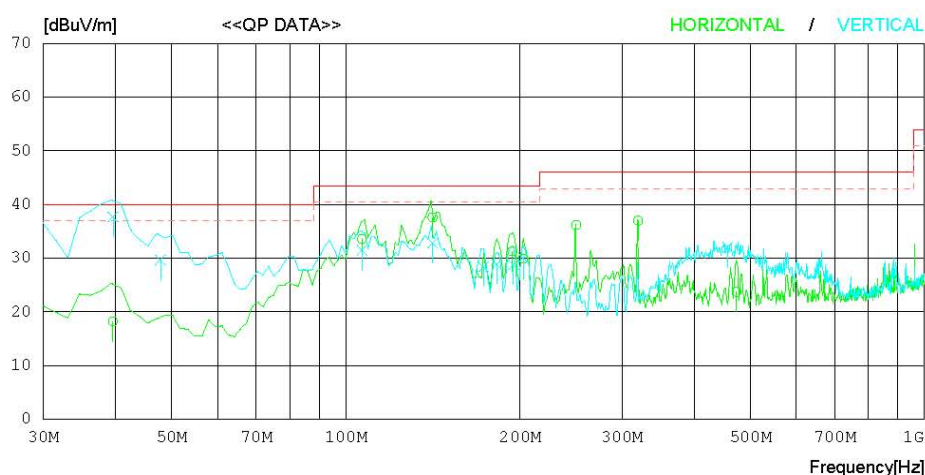
RADIATED EMISSION

Date : 2010-07-05

Model Name : SER-8189D
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2437 MHz (802.11b)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 'C 55 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	39.554	26.2	13.8	0.8	22.6	18.2	40.0	21.8	110	162
2	106.683	44.4	10.7	1.2	22.7	33.6	43.5	9.9	222	74
3	141.189	48.4	10.7	1.4	22.9	37.6	43.5	5.9	252	310
4	193.961	42.3	10.6	1.7	23.3	31.3	43.5	12.2	115	287
5	202.550	40.6	10.9	1.7	23.3	29.9	43.5	13.6	105	138
6	250.011	44.6	13.3	1.8	23.5	36.2	46.0	9.8	100	258
7	320.001	44.5	14.3	2.1	23.9	37.0	46.0	9.0	103	165
8	473.389	28.4	17.2	2.6	24.5	23.7	46.0	22.3	100	254
----- Vertical -----										
9	39.599	45.7	13.8	0.8	22.6	37.7	40.0	2.3	102	68
10	47.832	42.3	9.2	0.9	22.7	29.7	40.0	10.3	103	117
11	106.702	42.3	10.7	1.2	22.7	31.5	43.5	12.0	105	125
12	141.224	43.6	10.7	1.4	22.9	32.8	43.5	10.7	100	220
13	173.100	39.9	10.1	1.5	23.1	28.4	43.5	15.1	100	57
14	182.355	40.2	10.3	1.6	23.2	28.9	43.5	14.6	100	110
15	194.741	39.8	10.6	1.7	23.3	28.8	43.5	14.7	102	302
16	202.562	40.8	10.9	1.7	23.3	30.1	43.5	13.4	110	120
17	456.506	37.0	17.0	2.5	24.5	32.0	46.0	14.0	103	355

30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11b & Highest Frequency & Test Case 2



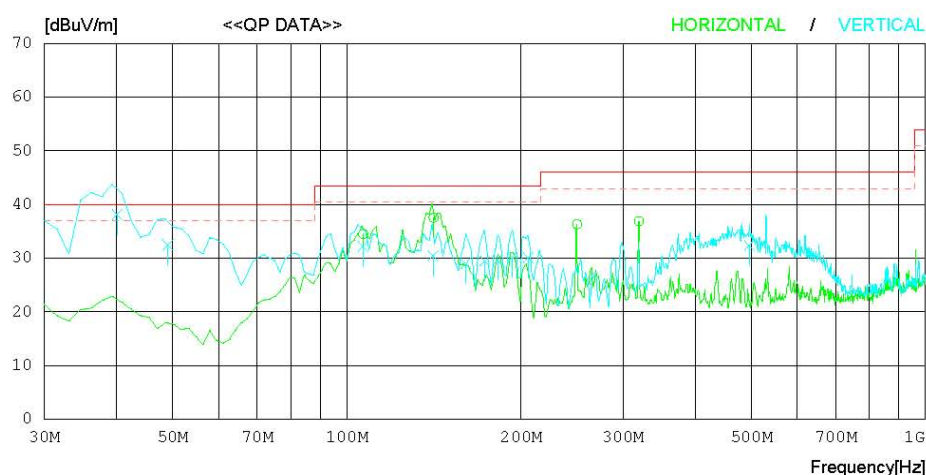
RADIATED EMISSION

Date : 2010-07-05

Model Name : SER-8189D
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2462 MHz (802.11b)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 'C 55 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	106.720	45.3	10.7	1.2	22.7	34.5	43.5	9.0	214	257
2	141.189	48.3	10.7	1.4	22.9	37.5	43.5	6.0	235	165
3	249.993	44.7	13.3	1.8	23.5	36.3	46.0	9.7	103	257
4	319.989	44.4	14.3	2.1	23.9	36.9	46.0	9.1	105	156
----- Vertical -----										
5	40.093	46.4	13.5	0.8	22.6	38.1	40.0	1.9	103	156
6	49.062	45.7	8.6	0.9	22.7	32.5	40.0	7.5	104	115
7	106.714	43.0	10.7	1.2	22.7	32.2	43.5	11.3	101	268
8	141.208	41.2	10.7	1.4	22.9	30.4	43.5	13.1	105	354
9	160.589	40.5	10.2	1.4	23.1	29.0	43.5	14.5	106	245
10	173.110	41.0	10.1	1.5	23.1	29.5	43.5	14.0	110	287
11	182.500	40.9	10.3	1.6	23.2	29.6	43.5	13.9	103	321
12	193.274	41.3	10.6	1.6	23.3	30.2	43.5	13.3	110	168
13	205.640	40.7	11.0	1.7	23.3	30.1	43.5	13.4	105	136
14	495.999	36.7	17.6	2.6	24.5	32.4	46.0	13.6	108	214

30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11g & Lowest Frequency & Test Case 2



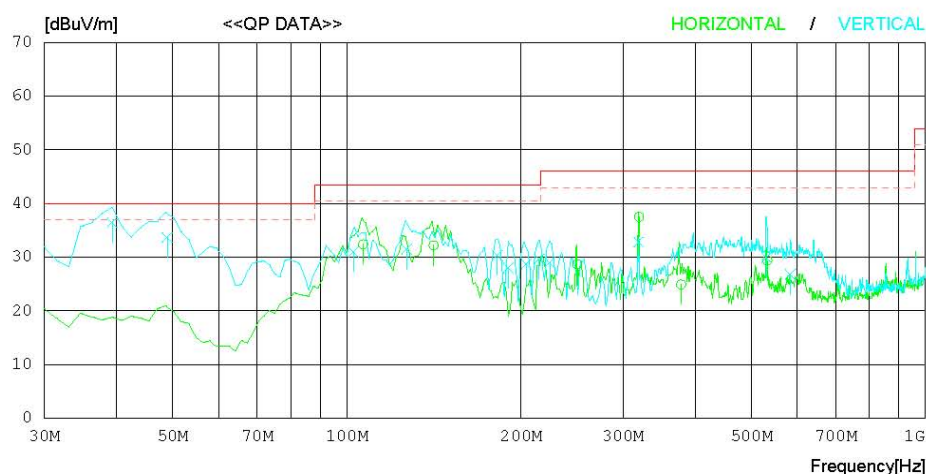
RADIATED EMISSION

Date : 2010-07-12

Model Name : SER-8189
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2412 MHz (802.11g)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 °C 47 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



NO.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	106.714	43.2	10.7	1.2	22.7	32.4	43.5	11.1	270	265
2	141.242	43.0	10.7	1.4	22.9	32.2	43.5	11.3	232	150
3	249.998	37.1	13.3	1.8	23.5	28.7	46.0	17.3	101	310
4	320.007	45.0	14.3	2.1	23.9	37.5	46.0	8.5	101	256
5	378.148	31.2	15.6	2.3	24.2	24.9	46.0	21.1	101	130
6	533.338	33.2	18.0	2.7	24.5	29.4	46.0	16.6	182	126
----- Vertical -----										
7	39.320	44.4	13.9	0.8	22.6	36.5	40.0	3.5	103	157
8	48.942	46.8	8.7	0.9	22.7	33.7	40.0	6.3	100	244
9	102.764	41.9	10.6	1.2	22.7	31.0	43.5	12.5	102	88
10	127.067	41.7	11.4	1.3	22.9	31.5	43.5	12.0	110	324
11	182.083	41.6	10.3	1.6	23.2	30.3	43.5	13.2	105	87
12	190.300	39.2	10.5	1.6	23.3	28.0	43.5	15.5	106	155
13	204.382	39.3	11.0	1.7	23.3	28.7	43.5	14.8	244	117
14	214.815	39.9	11.5	1.7	23.4	29.7	43.5	13.8	100	217
15	224.328	38.7	12.0	1.7	23.4	29.0	46.0	17.0	100	244
16	319.200	40.3	14.3	2.1	23.9	32.8	46.0	13.2	103	312
17	531.320	33.7	18.0	2.7	24.5	29.9	46.0	16.1	100	128
18	584.930	29.7	18.6	2.9	24.4	26.8	46.0	19.2	105	169

30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11g & Middle Frequency & Test Case 2



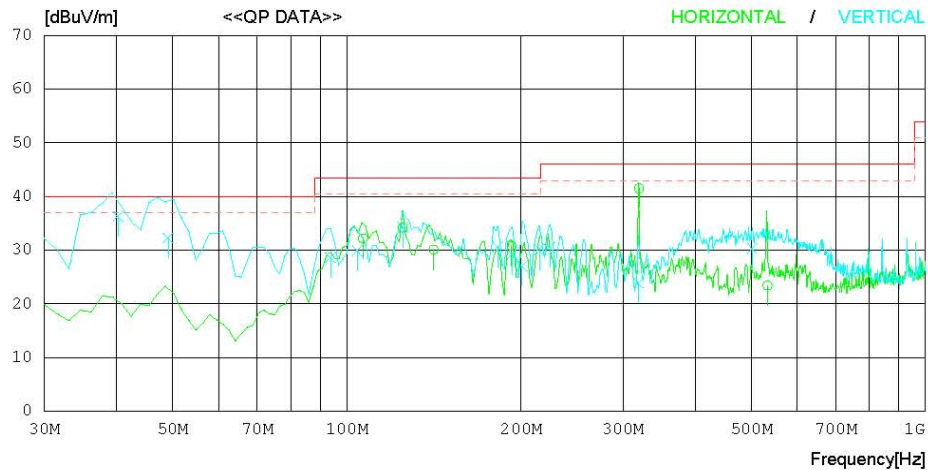
RADIATED EMISSION

Date : 2010-07-12

Model Name : SER-8189
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2437 MHz (802.11g)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 °C 47 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	106.714	43.0	10.7	1.2	22.7	32.2	43.5	11.3	278	350
2	124.984	44.2	11.5	1.3	22.8	34.2	43.5	9.3	248	149
3	141.177	40.9	10.7	1.4	22.9	30.1	43.5	13.4	234	79
4	192.596	41.9	10.6	1.6	23.3	30.8	43.5	12.7	106	229
5	319.985	49.0	14.3	2.1	23.9	41.5	46.0	4.5	100	168
6	533.348	27.2	18.0	2.7	24.5	23.4	46.0	22.6	103	115
----- Vertical -----										
7	40.248	44.7	13.4	0.8	22.6	36.3	40.0	3.7	103	99
8	49.110	45.5	8.6	0.9	22.7	32.3	40.0	7.7	101	310
9	93.693	40.7	9.4	1.2	22.7	28.6	43.5	14.9	100	196
10	104.158	40.8	10.6	1.2	22.7	29.9	43.5	13.6	105	241
11	125.008	44.3	11.5	1.3	22.8	34.3	43.5	9.2	106	174
12	182.360	41.9	10.3	1.6	23.2	30.6	43.5	12.9	106	210
13	193.221	40.3	10.6	1.6	23.3	29.2	43.5	14.3	187	224
14	200.850	37.9	10.8	1.7	23.3	27.1	43.5	16.4	201	91
15	214.995	40.3	11.5	1.7	23.4	30.1	43.5	13.4	100	113
16	224.362	40.2	12.0	1.7	23.4	30.5	46.0	15.5	102	195
17	319.210	31.4	14.3	2.1	23.9	23.9	46.0	22.1	100	64
18	502.582	34.5	17.7	2.6	24.5	30.3	46.0	15.7	100	268

30MHz ~ 1GHz Radiated Spurious Emissions

Test Mode: 802.11g & Highest Frequency & Test Case 2



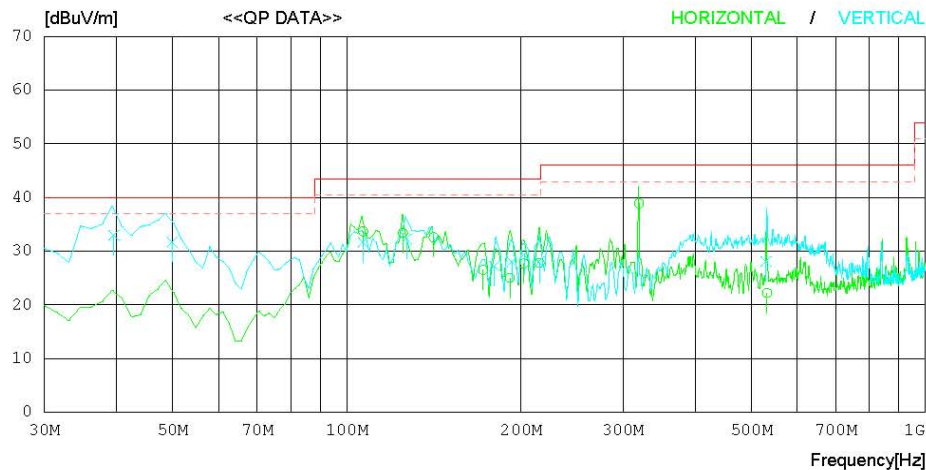
RADIATED EMISSION

Date : 2010-07-12

Model Name : SER-8189
 Model No. : #1
 Serial No. : Identical prototype
 Test Condition : TX: 2462 MHz (802.11g)
 Reference No. :
 Power Supply : 120 V 60 Hz
 Temp/Humi : 22 'C 47 %
 Operator : D.C.CHA

Memo : Test Case 2 and EUT positions: X, Y, Z

LIMIT : FCC Part15 Subpart.B Class B (3m)
 MARGIN: 3 dB



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	106.698	44.5	10.7	1.2	22.7	33.7	43.5	9.8	250	153
2	125.016	43.4	11.5	1.3	22.8	33.4	43.5	10.1	115	66
3	141.162	43.4	10.7	1.4	22.9	32.6	43.5	10.9	227	147
4	171.979	37.9	10.2	1.5	23.1	26.5	43.5	17.0	201	68
5	191.314	36.2	10.5	1.6	23.3	25.0	43.5	18.5	100	125
6	202.182	38.5	10.8	1.7	23.3	27.7	43.5	15.8	102	265
7	215.336	38.0	11.5	1.7	23.4	27.8	43.5	15.7	103	125
8	319.991	46.4	14.3	2.1	23.9	38.9	46.0	7.1	100	214
9	532.323	26.0	18.0	2.7	24.5	22.2	46.0	23.8	103	287
----- Vertical -----										
10	39.568	41.0	13.8	0.8	22.6	33.0	40.0	7.0	103	150
11	49.968	45.3	8.2	0.9	22.7	31.7	40.0	8.3	102	158
12	106.722	42.4	10.7	1.2	22.7	31.6	43.5	11.9	103	150
13	126.922	42.4	11.5	1.3	22.9	32.3	43.5	11.2	100	247
14	179.815	38.5	10.3	1.6	23.2	27.2	43.5	16.3	103	98
15	193.265	39.1	10.6	1.6	23.3	28.0	43.5	15.5	264	98
16	202.600	40.0	10.9	1.7	23.3	29.3	43.5	14.2	270	358
17	214.984	38.2	11.5	1.7	23.4	28.0	43.5	15.5	102	99
18	530.320	31.9	18.0	2.7	24.5	28.1	46.0	17.9	103	117

1GHz ~ 25GHz Radiated Spurious Emissions

▪ Test Mode: 802.11b & Lowest Frequency & Test Case 2

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
4824.000	H	52.58	39.29	5.41	57.99	44.70	74.00	54.00	16.01	9.30
4823.950	V	52.90	39.63	5.41	58.31	45.04	74.00	54.00	15.69	8.96
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11b & Middle Frequency & Test Case 2

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
4874.100	H	53.27	40.65	5.47	58.74	46.12	74.00	54.00	15.26	7.88
4874.050	V	54.10	41.35	5.47	59.57	46.82	74.00	54.00	14.43	7.18
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11b & Highest Frequency & Test Case 2

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
4923.850	H	53.55	42.15	5.81	59.36	47.96	74.00	54.00	14.64	6.04
4924.000	V	57.12	44.35	5.81	62.93	50.16	74.00	54.00	11.07	3.84
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

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 2

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
4823.800	H	47.79	35.62	5.41	53.20	41.03	74.00	54.00	20.80	12.97
4820.450	V	49.50	37.01	5.41	54.91	42.42	74.00	54.00	19.09	11.58
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11g & Middle Frequency & Test Case 2

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
4878.550	H	48.55	36.20	5.47	54.02	41.67	74.00	54.00	19.98	12.33
4874.300	V	47.77	35.19	5.47	53.24	40.66	74.00	54.00	20.76	13.34
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

▪ Test Mode: 802.11g & Highest Frequency & Test Case 2

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
4926.150	H	49.18	37.01	5.81	54.99	42.82	74.00	54.00	19.01	11.18
4924.450	V	51.96	39.37	5.81	57.77	45.18	74.00	54.00	16.23	8.82
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 25dB 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

3.2.5 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.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies

Span = approximately 5 times of the 20 dB bandwidth

RBW = greater than the 20dB bandwidth of the emission being measured

VBW = $\geq$ RBW

Trace = max hold

Detector function = peak

Sweep = auto

- Measurement Data: **Comply**

Test Mode	Frequency	Test Results (dBm)
802.11b	Lowest	-10.361
	Middle	-10.188
	Highest	-9.595
802.11g	Lowest	-17.031
	Middle	-16.777
	Highest	-16.117

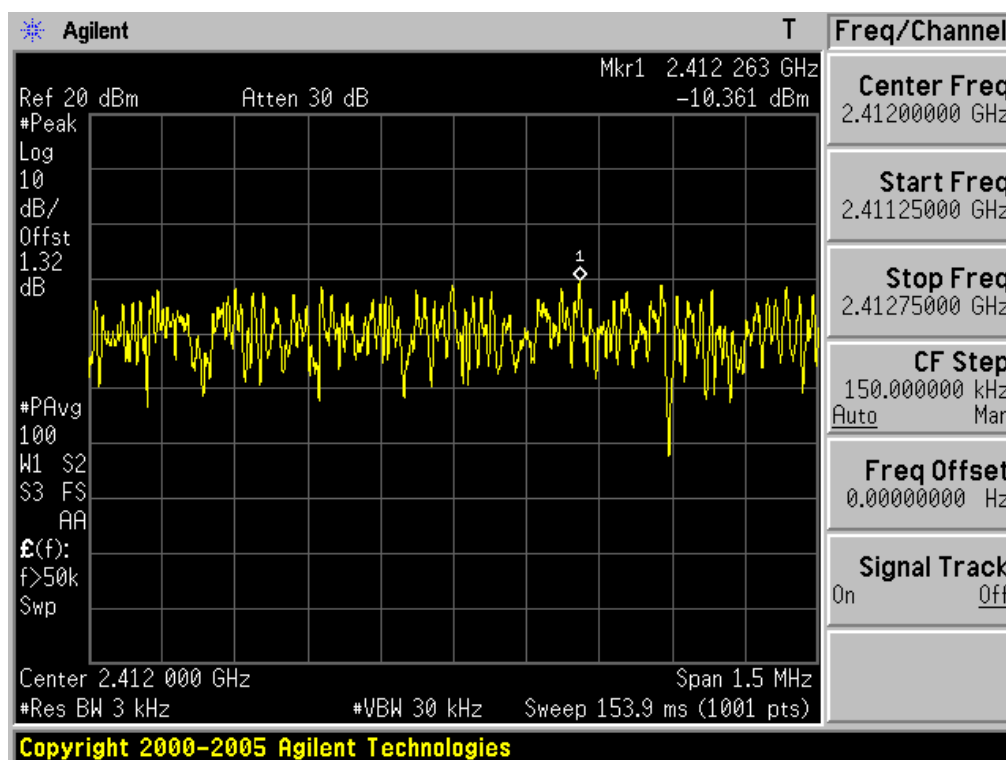
Note 1: See next pages for actual measured spectrum plots.

- Minimum Standard:

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

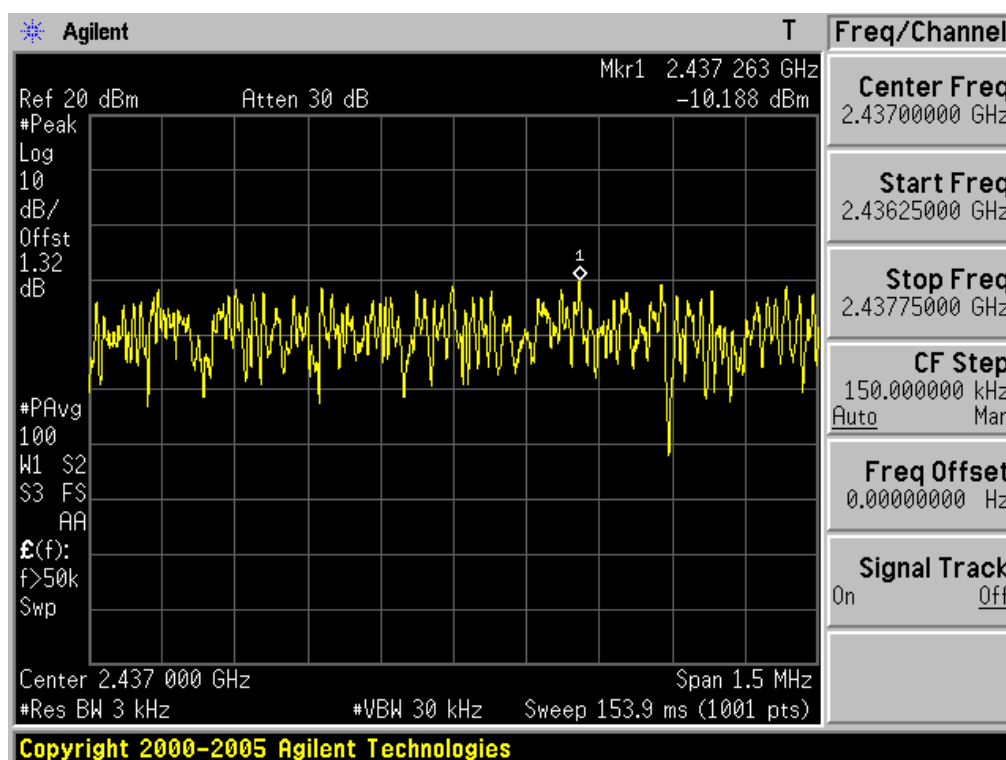
Transmitter Power Spectral Density

Test Mode: 802.11b & Lowest Frequency



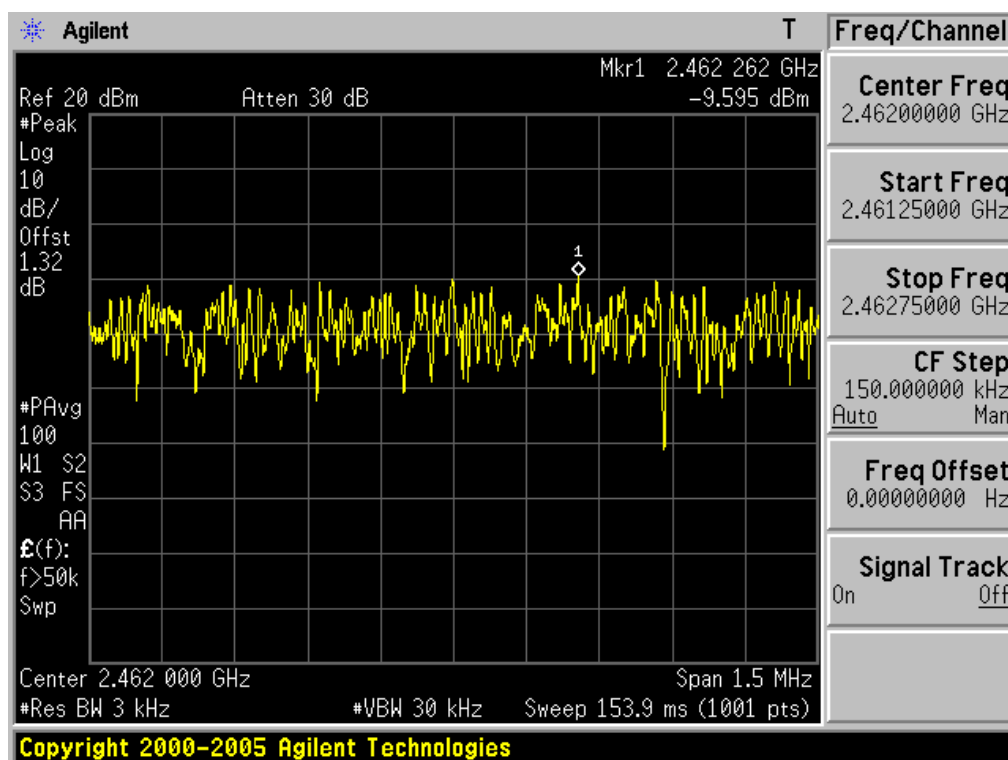
Transmitter Power Spectral Density

Test Mode: 802.11b & Middle Frequency



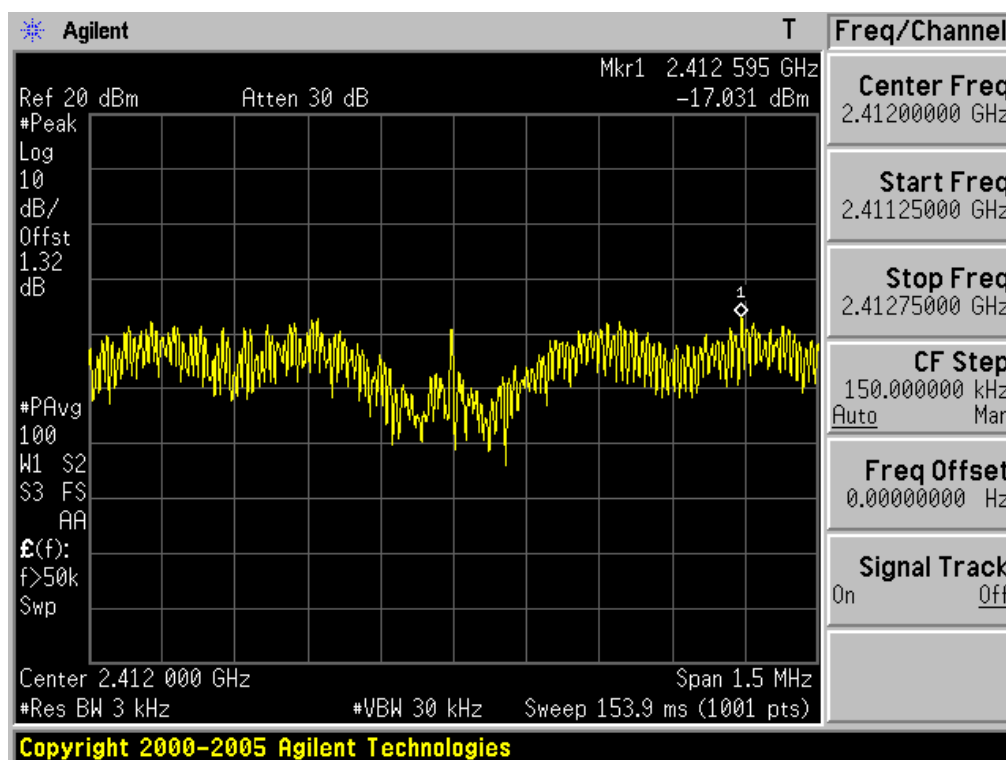
Transmitter Power Spectral Density

Test Mode: 802.11b & Highest Frequency



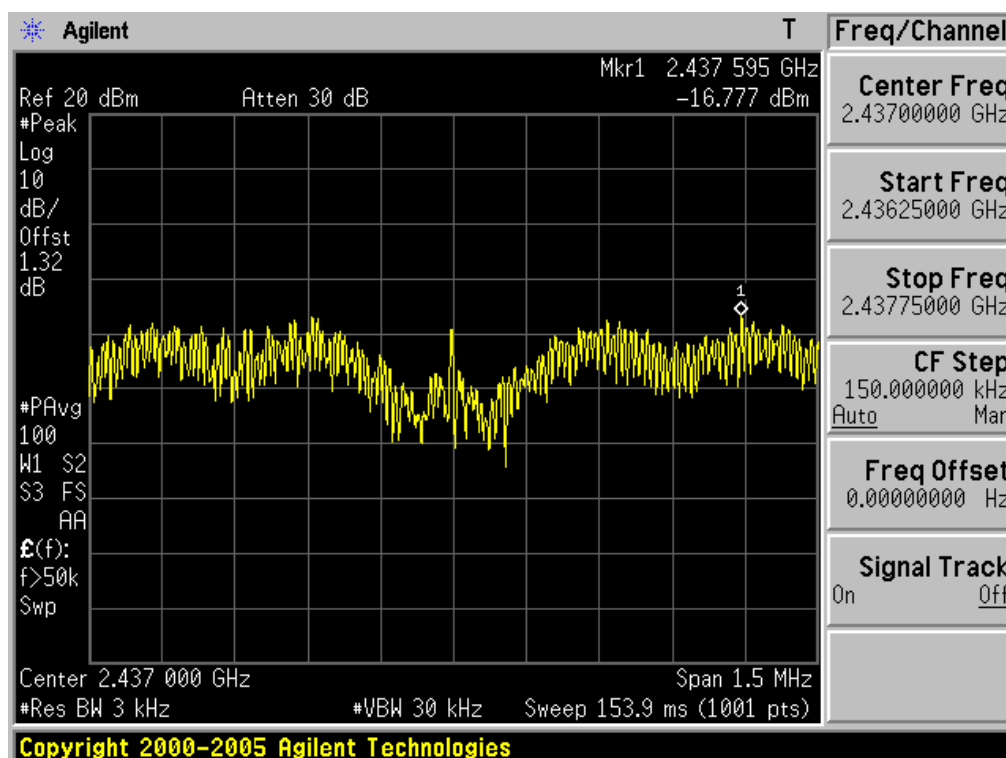
Transmitter Power Spectral Density

Test Mode: 802.11g & Lowest Frequency



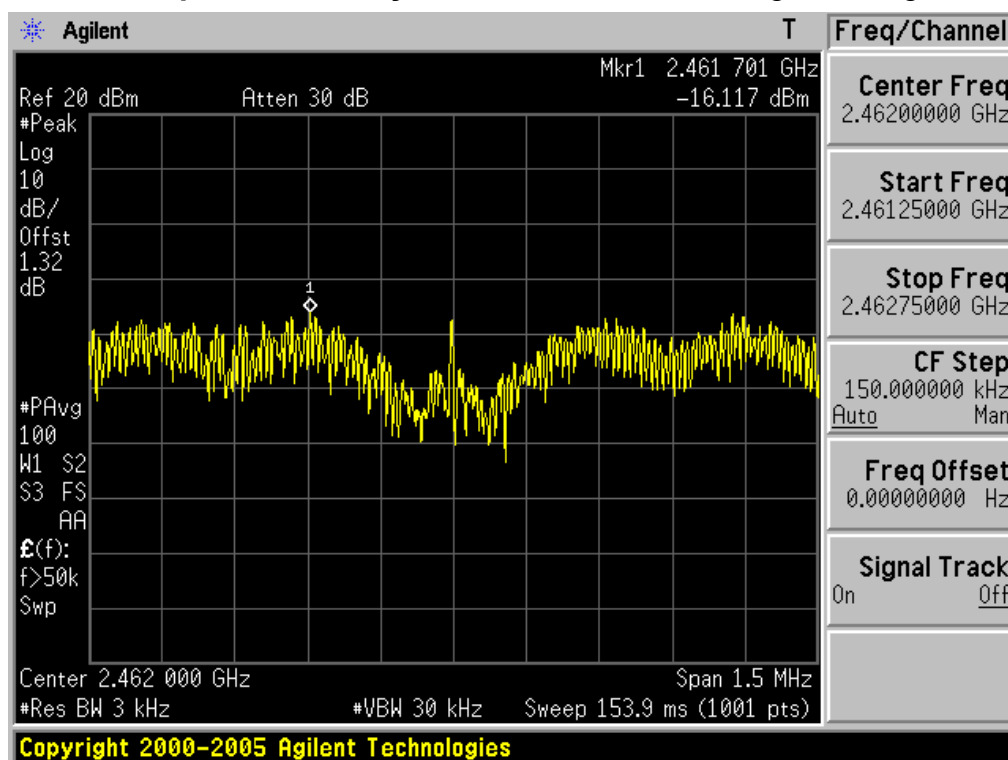
Transmitter Power Spectral Density

Test Mode: 802.11g & Middle Frequency



Transmitter Power Spectral Density

Test Mode: 802.11g & Highest Frequency



3.2.6 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.

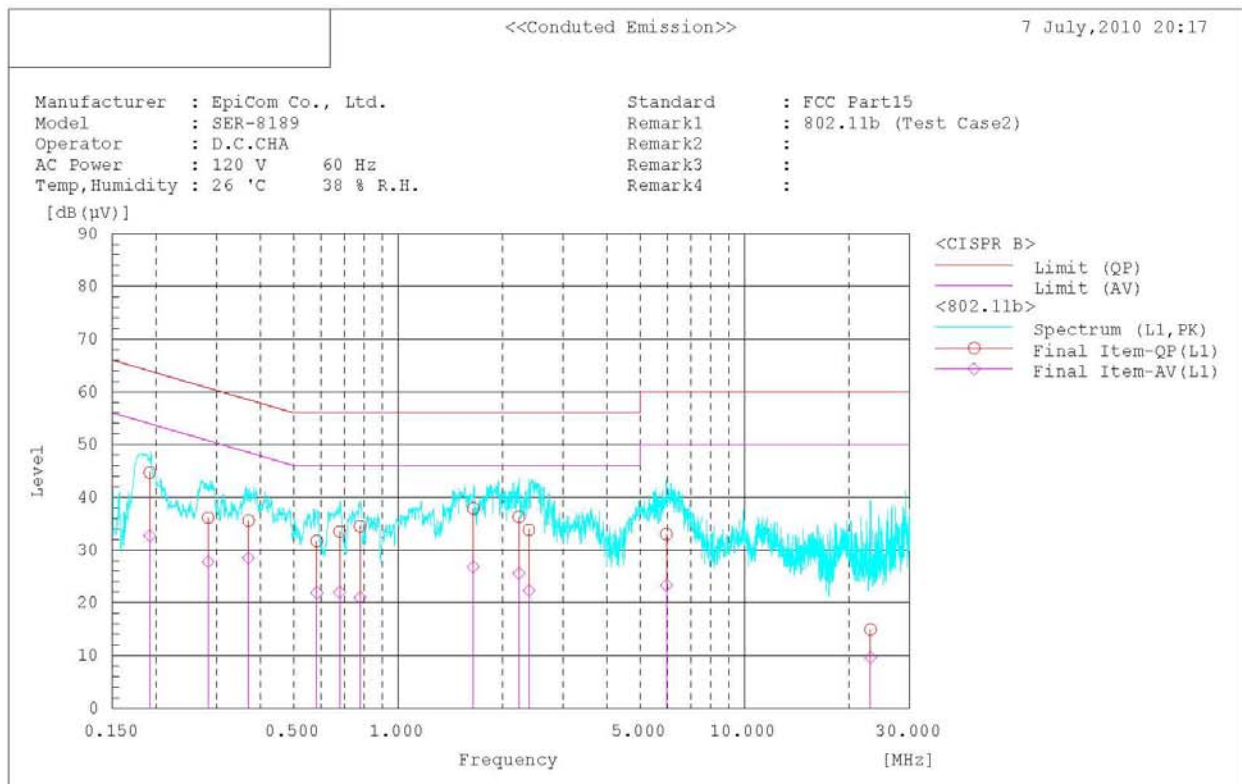
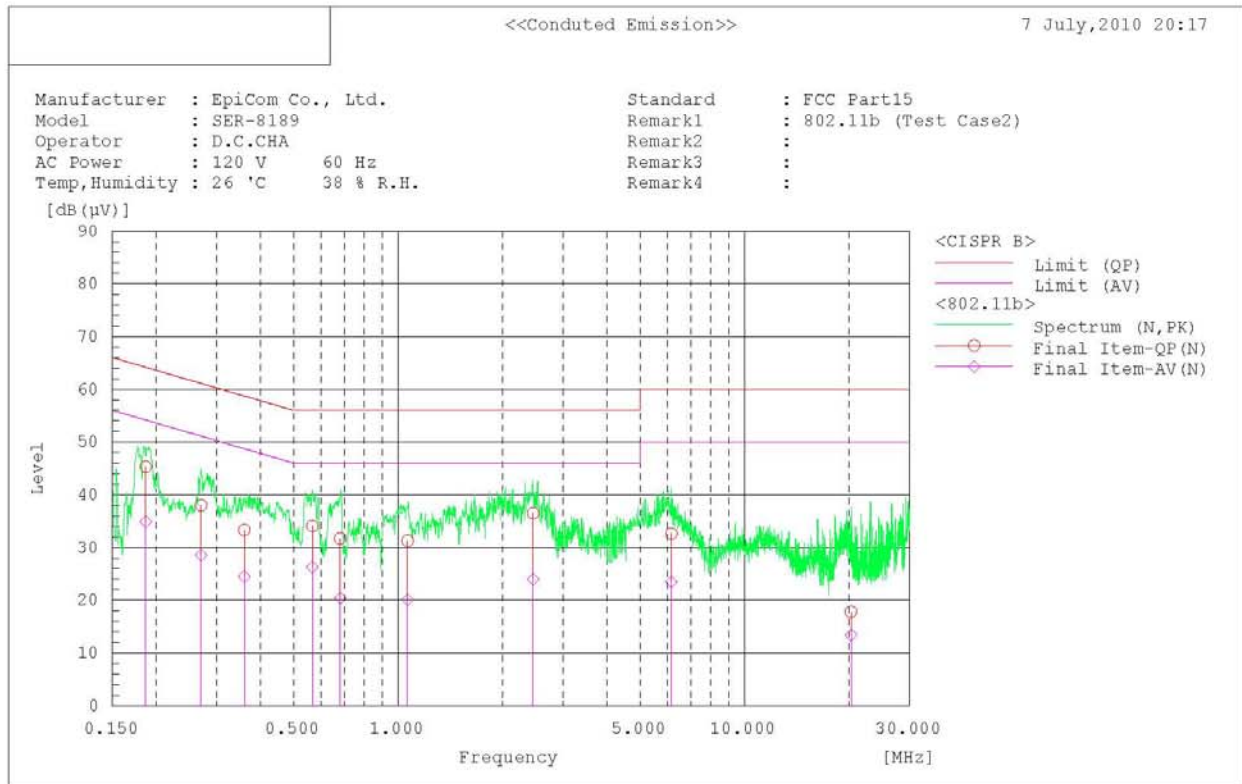
- Minimum Standard: FCC Part 15.207(a)/EN 55022

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



AC Line Conducted Emissions (Data List)

Test Mode: 802.11b

<<Conducted Emission>>

7 July, 2010 20:17

Standard : FCC Part15

Manufacturer : EpiCom Co., Ltd.

Model : SER-8189

Operator : D.C.CHA

AC Power : 120 V 60 Hz

Temp, Humidity : 26 °C 38 % R.H.

Remark1 : 802.11b (Test Case2)

Remark2 :

Remark3 :

Remark4 :

Final Result

--- N Phase ---

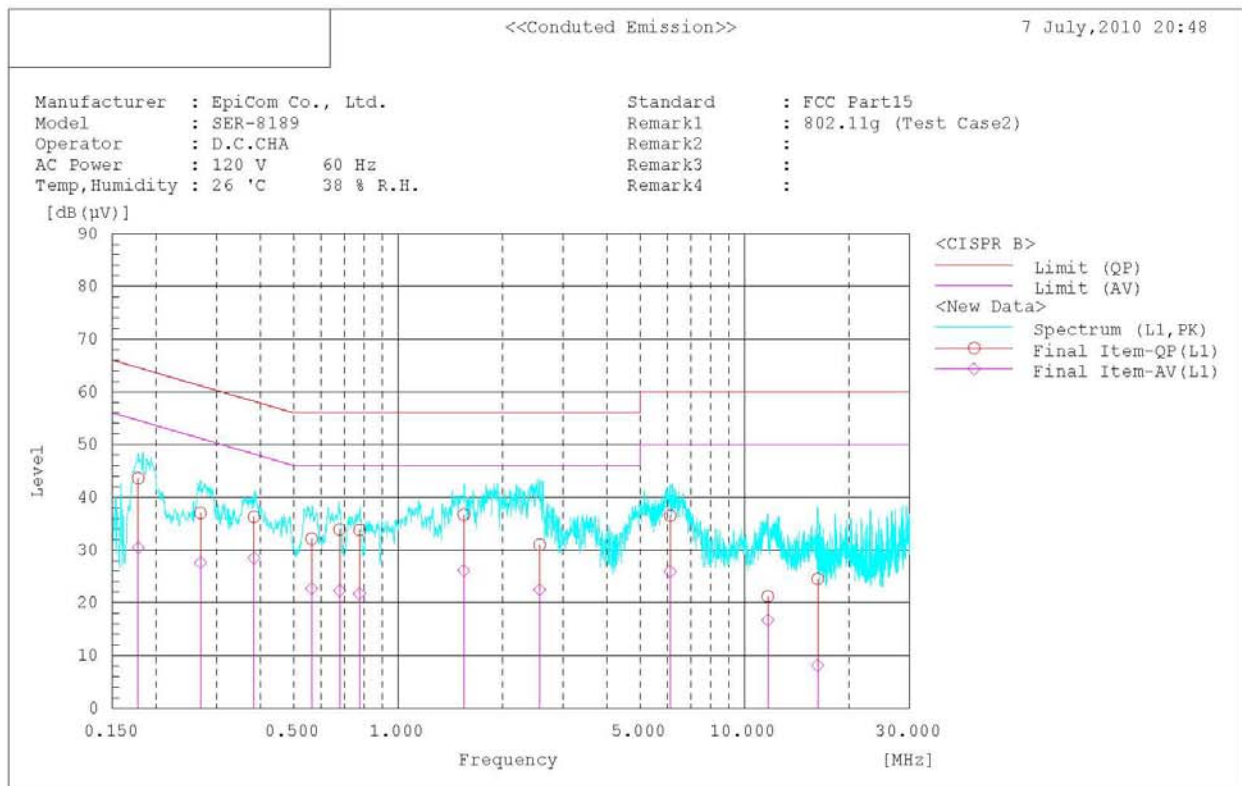
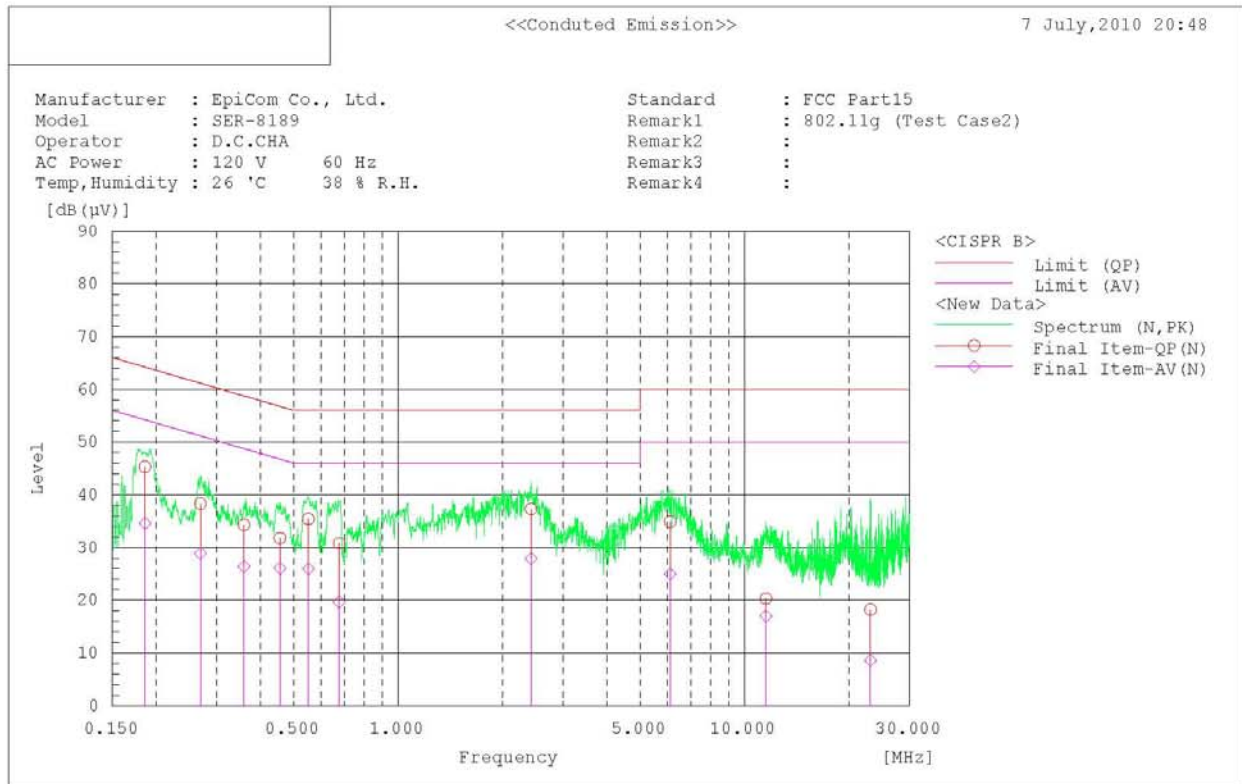
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]		[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.187	45.2	34.8	0.1	45.3	34.9	64.2	54.2	18.9	19.3	
2	0.270	37.9	28.5	0.1	38.0	28.6	61.1	51.1	23.1	22.5	
3	0.360	33.2	24.4	0.1	33.3	24.5	58.7	48.7	25.4	24.2	
4	0.566	34.0	26.2	0.1	34.1	26.3	56.0	46.0	21.9	19.7	
5	0.681	31.6	20.3	0.1	31.7	20.4	56.0	46.0	24.3	25.6	
6	1.065	31.2	20.0	0.1	31.3	20.1	56.0	46.0	24.7	25.9	
7	2.455	36.3	23.8	0.2	36.5	24.0	56.0	46.0	19.5	22.0	
8	6.148	32.2	23.1	0.4	32.6	23.5	60.0	50.0	27.4	26.5	
9	20.291	16.6	12.2	1.2	17.8	13.4	60.0	50.0	42.2	36.6	

--- Ll 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	0.192	44.4	32.4	0.3	44.7	32.7	63.9	53.9	19.2	21.2	
2	0.283	35.8	27.5	0.3	36.1	27.8	60.7	50.7	24.6	22.9	
3	0.370	35.3	28.2	0.3	35.6	28.5	58.5	48.5	22.9	20.0	
4	0.583	31.4	21.6	0.3	31.7	21.9	56.0	46.0	24.3	24.1	
5	0.679	33.2	21.7	0.3	33.5	22.0	56.0	46.0	22.5	24.0	
6	0.777	34.2	20.7	0.3	34.5	21.0	56.0	46.0	21.5	25.0	
7	1.650	37.6	26.5	0.3	37.9	26.8	56.0	46.0	18.1	19.2	
8	2.232	36.0	25.3	0.3	36.3	25.6	56.0	46.0	19.7	20.4	
9	2.387	33.5	22.0	0.3	33.8	22.3	56.0	46.0	22.2	23.7	
10	5.950	32.5	22.8	0.5	33.0	23.3	60.0	50.0	27.0	26.7	
11	23.102	13.5	8.2	1.4	14.9	9.6	60.0	50.0	45.1	40.4	

AC Line Conducted Emissions (Graph)

Test Mode: 802.11g



AC Line Conducted Emissions (Data List)

Test Mode: 802.11g

<<Conducted Emission>>

7 July, 2010 20:48

Standard : FCC Part15

Manufacturer : EpiCom Co., Ltd.

Model : SER-8189

Operator : D.C.CHA

AC Power : 120 V 60 Hz

Temp, Humidity : 26 °C 38 % R.H.

Remark1 : 802.11g (Test Case2)

Remark2 :

Remark3 :

Remark4 :

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	0.186	45.2	34.5	0.1	45.3	34.6	64.2	54.2	18.9	19.6	
2	0.269	38.2	28.8	0.1	38.3	28.9	61.1	51.1	22.8	22.2	
3	0.359	34.2	26.3	0.1	34.3	26.4	58.8	48.8	24.5	22.4	
4	0.456	31.7	26.0	0.1	31.8	26.1	56.8	46.8	25.0	20.7	
5	0.551	35.3	25.9	0.1	35.4	26.0	56.0	46.0	20.6	20.0	
6	0.676	30.7	19.6	0.1	30.8	19.7	56.0	46.0	25.2	26.3	
7	2.422	37.1	27.7	0.2	37.3	27.9	56.0	46.0	18.7	18.1	
8	6.103	34.5	24.6	0.4	34.9	25.0	60.0	50.0	25.1	25.0	
9	11.531	19.6	16.3	0.7	20.3	17.0	60.0	50.0	39.7	33.0	
10	23.104	16.8	7.2	1.4	18.2	8.6	60.0	50.0	41.8	41.4	

--- 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	0.178	43.3	30.1	0.3	43.6	30.4	64.6	54.6	21.0	24.2	
2	0.269	36.7	27.3	0.3	37.0	27.6	61.1	51.1	24.1	23.5	
3	0.384	36.0	28.2	0.3	36.3	28.5	58.2	48.2	21.9	19.7	
4	0.563	31.8	22.4	0.3	32.1	22.7	56.0	46.0	23.9	23.3	
5	0.678	33.6	22.0	0.3	33.9	22.3	56.0	46.0	22.1	23.7	
6	0.774	33.5	21.4	0.3	33.8	21.7	56.0	46.0	22.2	24.3	
7	1.548	36.4	25.8	0.3	36.7	26.1	56.0	46.0	19.3	19.9	
8	2.564	30.7	22.2	0.3	31.0	22.5	56.0	46.0	25.0	23.5	
9	6.102	36.0	25.4	0.5	36.5	25.9	60.0	50.0	23.5	24.1	
10	11.670	20.4	15.9	0.8	21.2	16.7	60.0	50.0	38.8	33.3	
11	16.261	23.5	7.1	1.0	24.5	8.1	60.0	50.0	35.5	41.9	

3.2.7 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

The antenna is permanently attached by soldering. (Refer to Internal Photo file.)

- 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	30/09/10	30/09/11	MY45304199
☐	Spectrum Analyzer	Rohde Schwarz	FSQ26	25/02/10	25/02/11	200445
☐	Spectrum Analyzer(RE)	H.P	8563E	04/10/10	04/10/11	3551A04634
☐	Power Meter	H.P	EPM-442A	01/07/10	01/07/11	GB37170413
☐	Power Sensor	H.P	8481A	01/07/10	01/07/11	3318A96332
☐	Power Divider	Agilent	11636B	05/10/10	05/10/11	56471
☐	Power Splitter	Anritsu	K241B	05/10/10	05/10/11	020611
☐	Power Splitter	Anritsu	K241B	01/07/10	01/07/11	017060
☐	Frequency Counter	H.P	5342A	01/07/10	01/07/11	2119A04450
☐	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	04/10/10	04/10/11	30604493/021031
☒	Digital Multimeter	H.P	34401A	12/03/10	12/03/11	3146A13475, US36122178
☐	Multifunction Synthesizer	HP	8904A	06/10/09	06/10/09	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	12/03/10	12/03/11	101251
☐	Signal Generator	H.P	ESG-3000A	01/07/10	01/07/11	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/10	11/01/11	100148
☐	Vector Signal Generator	Rohde Schwarz	SMBV100A	23/02/10	23/02/11	255571
☐	Audio Analyzer	H.P	8903B	02/07/10	02/07/11	3011A09448
☐	Modulation Analyzer	H.P	8901B	01/07/10	01/07/11	3028A03029
☐	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/10	02/07/11	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU 200	12/03/10	12/03/11	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	01/07/10	01/07/11	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-3
☒	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-4
☐	AC Power supply	DAEKWANG	5KVA	12/03/10	12/03/11	20060321-1
☒	DC Power Supply	HP	6622A	12/03/10	12/03/11	3448A03760
☐	DC Power Supply	HP	6633A	12/03/10	12/03/11	3524A06634
☐	DC Power Supply	Protek	PWS-3010D	04/10/10	04/10/11	4072702
☐	BAND Reject Filter	Microwave Circuits	N0308372	05/10/10	05/10/11	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	05/10/10	05/10/11	2
☐	High-Pass Filter	ANRITSU	MP526D	04/10/10	04/10/11	M27756
☐	High-pass filter	Wainwright	WHNX2.1	N/A	N/A	1
☒	High-pass filter	Wainwright	WHNX3.0	N/A	N/A	9
☐	High-pass filter	Wainwright	WHNX5.0	N/A	N/A	8
☐	High-Pass Filter	Wainwright	WHKX8.5	N/A	N/A	1
☐	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	32
☐	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	53
☐	Tunable Notch Filter	Wainwright	WRCT1900.0 /2200.0-5/40-10SSK	N/A	N/A	30
☐	HORN ANT	ETS	3115	23/09/09	Calibrating	21097
☒	HORN ANT	ETS	3115	14/07/10	14/07/11	6419
☒	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	154
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	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	Calibrating	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	Calibrating	2262
☐	LOOP Antenna	ETS	6502	05/11/09	05/11/10	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	01/07/10	01/07/11	MY39260700
☐	Attenuator (3dB)	WEINSCHTEL	56-3	05/10/10	05/10/11	Y2342
☐	Attenuator (3dB)	WEINSCHTEL	56-3	05/10/10	05/10/11	Y2370
☐	Attenuator (10dB)	WEINSCHTEL	23-10-34	01/10/10	01/10/11	BP4386
☐	Attenuator (10dB)	WEINSCHTEL	23-10-34	11/01/10	11/01/11	BP4387
☐	Attenuator (10dB)	WEINSCHTEL	31696	05/10/10	05/10/11	446
☐	Attenuator (10dB)	WEINSCHTEL	31696	05/10/10	05/10/11	408
☐	Attenuator (20dB)	WEINSCHTEL	86-20-11	05/10/10	05/10/11	432
☐	Attenuator (30dB)	JFW	50FH-030-300	12/03/10	12/03/11	060320-1
☐	Attenuator (40dB)	WEINSCHTEL	57-40-33	01/10/10	01/10/11	NN837
☐	Termination	H.P	HP-909D	02/07/10	02/07/11	02750
☐	Termination	H.P	HP-909D	02/07/10	02/07/11	02702
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	01/07/10	01/07/11	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	01/07/10	01/07/11	790
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	01/07/10	01/07/11	112
☒	Amplifier (30dB)	Agilent	8449B	23/04/10	23/04/11	3008A01590
☐	Amplifier (30dB)	H.P	8449B	13/05/10	13/05/11	3008A00370
☐	Amplifier	EMPOWER	BBS3Q7ELU	04/10/10	04/10/11	1020
☐	RF Power Amplifier	OPHIRRF	5069F	01/07/10	01/07/11	1006
☒	EMI TEST RECEIVER	R&S	ESU	29/01/10	29/01/11	100014
☒	BILOG ANTENNA	SCHAFFNER	CBL 6112D	28/10/09	28/10/10	22609
☒	Amplifier (22dB)	H.P	8447E	29/01/10	29/01/11	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/05/10	12/05/11	100364
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP 9108 A-1	07/10/09	07/10/10	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/10	91031946
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	07/07/10	07/07/11	590
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	12/03/10	12/03/11	1252741
☐	Amplifier (25dB)	Agilent	8447D	12/03/10	12/03/11	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	01/07/10	01/07/11	2648A04922
☒	Spectrum Analyzer(CE)	H.P	8591E	12/03/10	12/03/11	3649A05889
☒	LISN	Kyoritsu	KNW-407	29/01/10	29/01/11	8-317-8
☒	LISN	Kyoritsu	KNW-242	29/01/10	29/01/11	8-654-15
☒	CVCF	NF Electronic	4420	12/03/10	12/03/11	304935/337980
☒	50 ohm Terminator	HME	CT-01	12/01/10	12/01/11	N/A
☒	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	02/07/10	02/07/11	4N-170-3