RF TEST REPORT

Test item	:	ConnectLine Microphone
Model No.	:	MIC-110
Order No.	:	1011-01027
Date of receipt	:	2010-10-11
Test duration	:	2010-11-16 ~ 2010-11-26
Date of issue	:	2010-11-26
Use of report	:	FCC & IC Original Grant

Applicant : Oticon A/S
Kongebakken 9, 2765, Smorum, DK-Denmark

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 RSS-210
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer D.C. Cha	N/A	Manager W.J. Lee

CONTENTS

1. Equipment information

1.1 Equipment description

FCC Equipment Class	Part 15 Spread Spectrum Transmitter(DSS)
Equipment type	ConnectLine Microphone
Equipment model name	MIC-110
Equipment add model name	N/A
Equipment serial no.	1010-01027
Frequency band	2402 ~ 2480 MHz
Spread Spectrum	Frequency Hopping
Modulation type	GFSK, π/4-DQPSK
Transmission rate	1Mbps, 2Mbps
Channel Spacing	1.0 MHz
Power	Lithium Battery: DC 3.7 V
Antenna type	Internal Type: PIFA Antenna (Max. Peak Gain: 0.8 dBi)

1.2 Ancillary equipment

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

2. Information about test items

2.1 Test mode & EUT Position

This device was tested in maximum duty mode at maximum power of hopping enable / disable mode.

Test Case 1	-
Test Case 2	-
Test Case 3	-

EUT position: refer to Test photo file.

2.2 Auxiliary equipment

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

2.3 Tested frequency

- Hopping Function: Enable

	TX Frequency (MHz)	RX Frequency (MHz)
Hopping Band	2402 ~ 2480	2402 ~ 2480

- Hopping Function: Disable

	TX Frequency (MHz)	RX Frequency (MHz)
Lowest Channel	2402	2402
Middle Channel	2441	2441
Highest Channel	2480	2480

2.4 Tested environment

Temperature	:	21 ~ 24 °C
Relative humidity content	:	22 ~ 59 % R.H.
Details of power supply	:	DC 3.7 V

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 RSS-210 & GEN	Parameter	Limit (Using in 2400 ~ 2483.5MHz)	Test Condition	Status (note 1)
I. Transmit mode (Tx)				
15.247(a) RSS-210(A8.1)	Carrier Frequency Separation	>= 20dB BW or >= Two-Thirds of the 20dB BW	Conducted	C
	Number of Hopping Frequencies	>= 15 hops		C
	20 dB Bandwidth	None		C
	Dwell Time	=< 0.4 seconds		C
15.247(b) RSS-210(A8.4)	Transmitter Output Power	=< 1Watt , if CHs >= 75 Others =<0.125W		C
15.247(d) RSS-210(A8.5)	Band-edge /Conducted	The radiated emission to any 100 kHz of outband shall be at least 20dB below the highest inband spectral density.		C
	Conducted Spurious Emissions			C
15.205,15.209 RSS-210(A8.5)	Radiated Emissions	FCC 15.209	Radiated	C Note 2
15.207 RSS-Gen(7.2.4)	AC Conducted Emissions	FCC 15.207	AC Line Conducted	NA Note 3
RSS Gen Issue 3	Occupied Bandwidth (99%)	RSS-Gen(4.6.1)	Conducted	C
15.203 RSS-Gen(7.1.2)	Antenna Requirements	FCC 15.203	-	C
II. Receive mode (Rx)				
RSS-Gen(7.2.4)	AC Conducted Emissions	RSS-Gen(7.2.4 Table 4)	Line Conducted	C
RSS-Gen(6)	Receiver Spurious Emissions	RSS-Gen(6 Table 2)	Radiated	C

Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable
Note 2: This test item was performed in each axis. And the worst case data were reported.
Note 3: When this device is in the charging mode, the Bluetooth function is disabled.

The sample was tested according to the following specification:
ANSI C-63.4-2003, DA00-705, RSS-Gen Issue 3

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation

- Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = wide enough to capture the peaks of two adjacent channels

RBW = 1% of the span Sweep = auto

VBW = ≥ RBW Detector function = peak

Trace = max hold

- Measurement Data: Comply

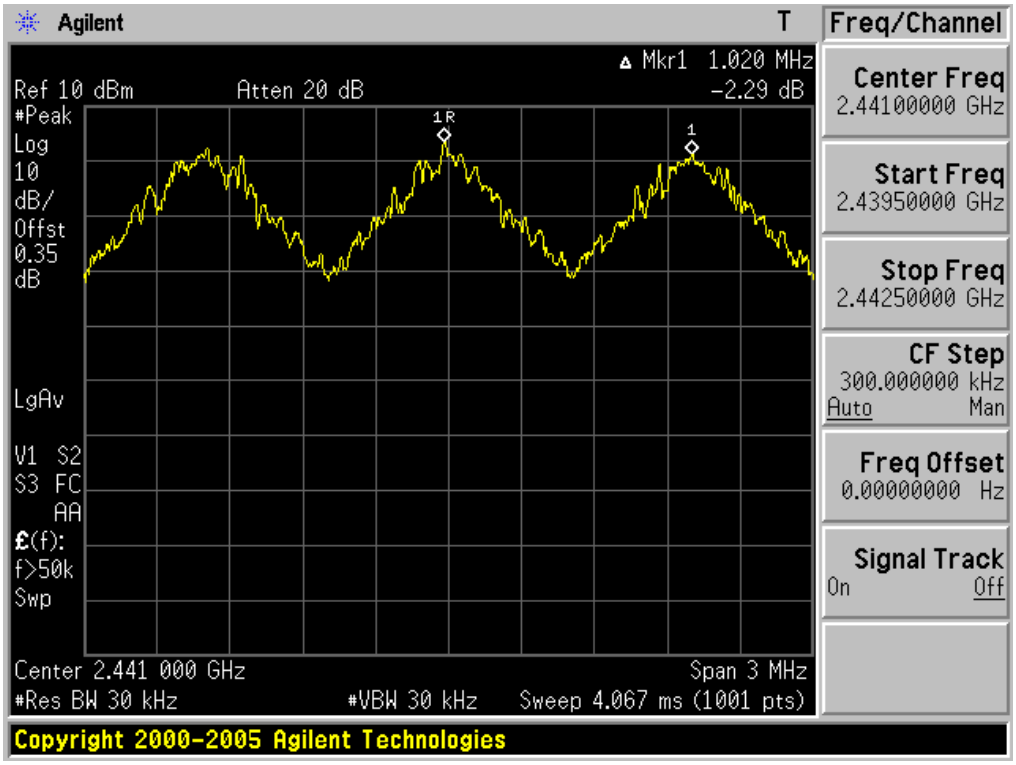
Hopping Mode	Test Mode	Peak of center channel (MHz)	Peak of adjacent Channel (MHz)	Test Result (MHz)
Enable	Data rate:1Mbps	2440.982	2442.002	1.020
	Data rate: 2Mbps	2439.986	2441.000	1.014

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

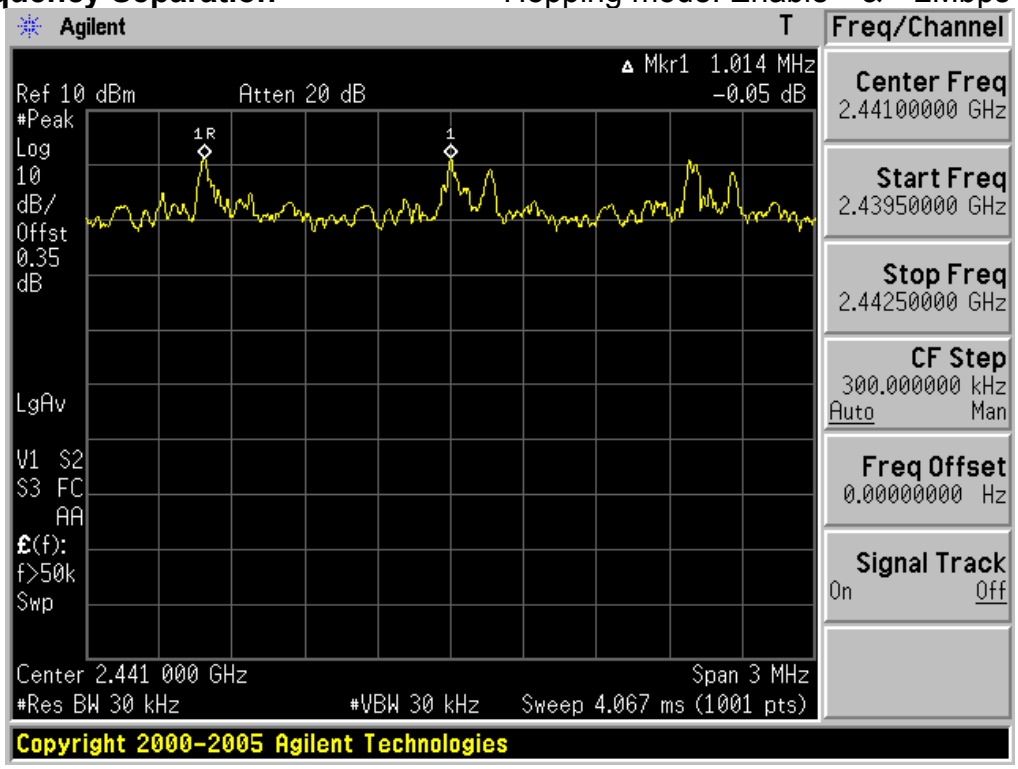
- Minimum Standard:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

Carrier Frequency Separation Hopping mode: Enable & 1Mbps



Carrier Frequency Separation Hopping mode: Enable & 2Mbps



3.2.2 Number of Hopping Frequencies

- Procedure:

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.
To get higher resolution, four frequency ranges within the 2400 ~ 2483.5 MHz FH band were examined.

The spectrum analyzer is set to:

Span = 25MHz
Plot 1: Start Frequency = 2389.5MHz, Stop Frequency = 2414.5 MHz
Plot 2: Start Frequency = 2414.5MHz, Stop Frequency = 2439.5 MHz
Plot 3: Start Frequency = 2439.5MHz, Stop Frequency = 2464.5 MHz
Plot 4: Start Frequency = 2464.5MHz, Stop Frequency = 2489.5 MHz

RBW = 1% of the span or more
Sweep = auto
VBW = ≥ RBW
Detector function = peak
Trace = max hold

- **Measurement Data: Comply**

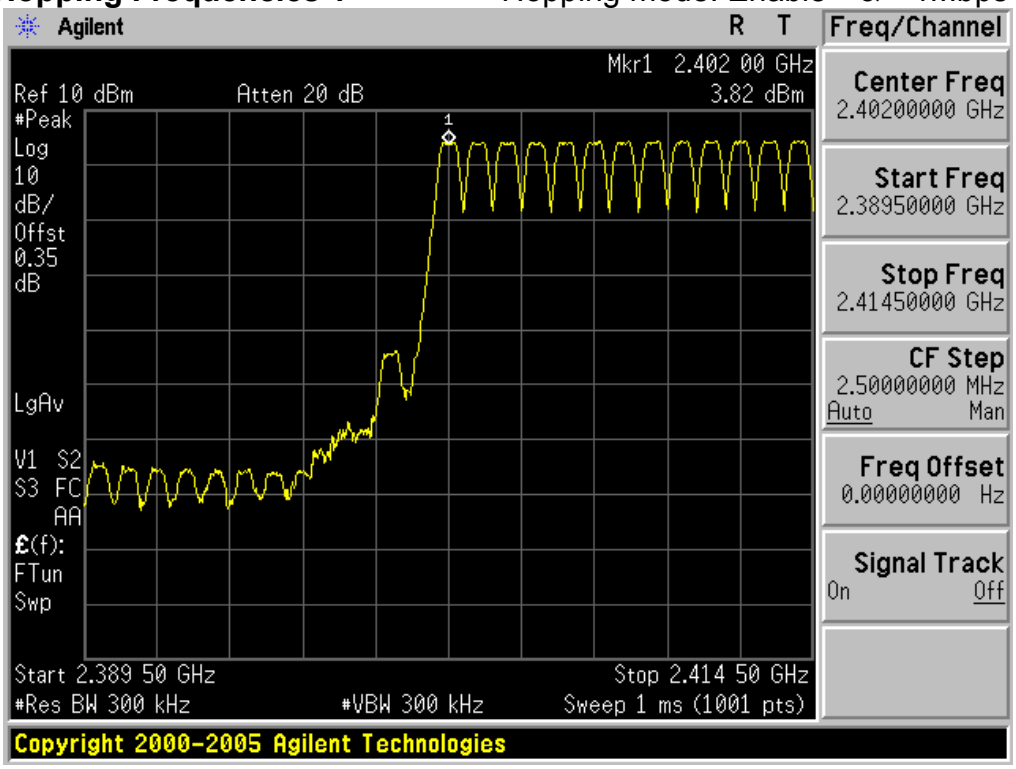
Hopping mode	Test mode	Test Result (Total Hops)
Enable	Data rate: 1Mbps	79
	Data rate: 2Mbps	79

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

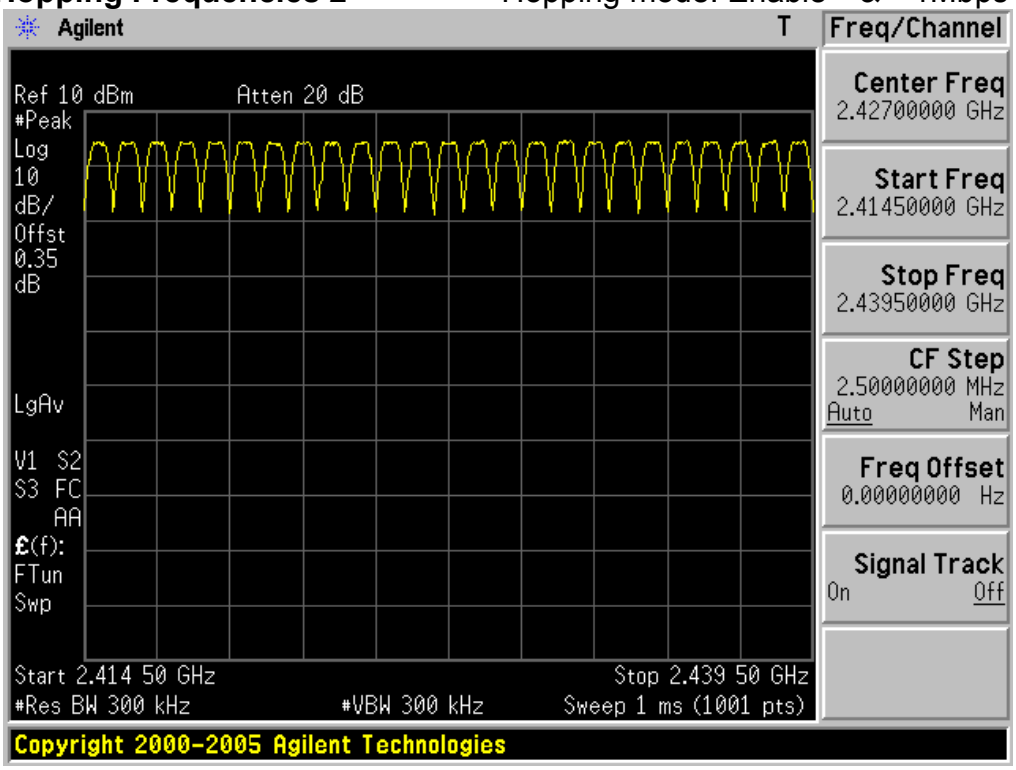
- Minimum Standard:

At least 15 hopes

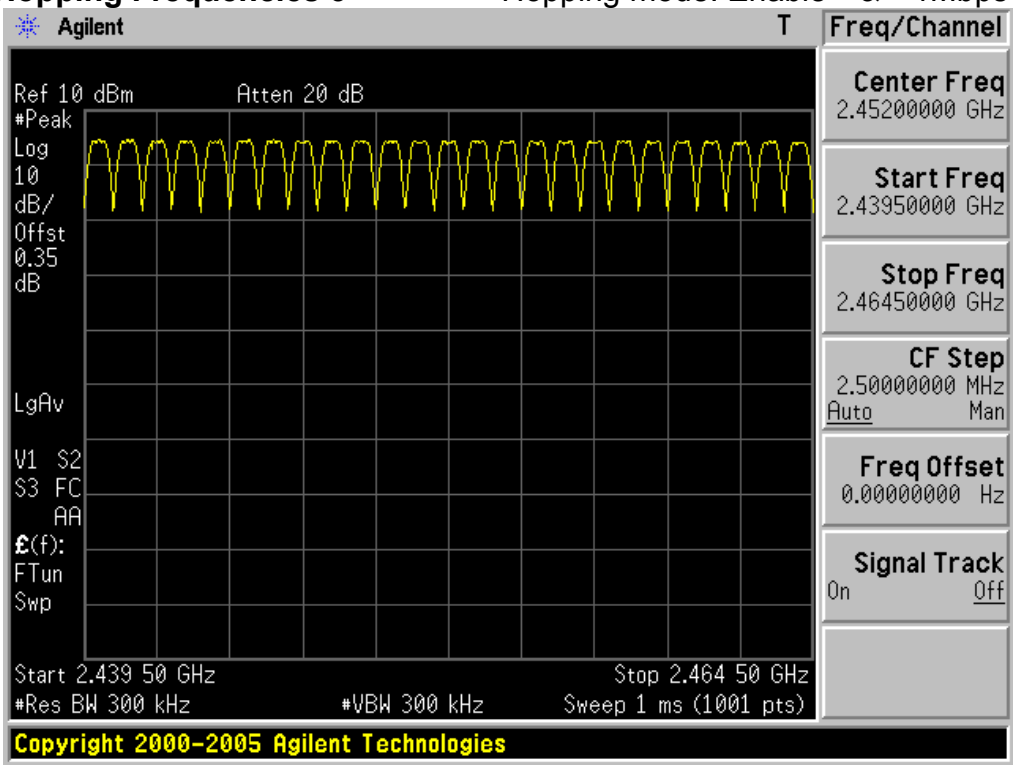
Number of Hopping Frequencies 1 Hopping mode: Enable & 1Mbps



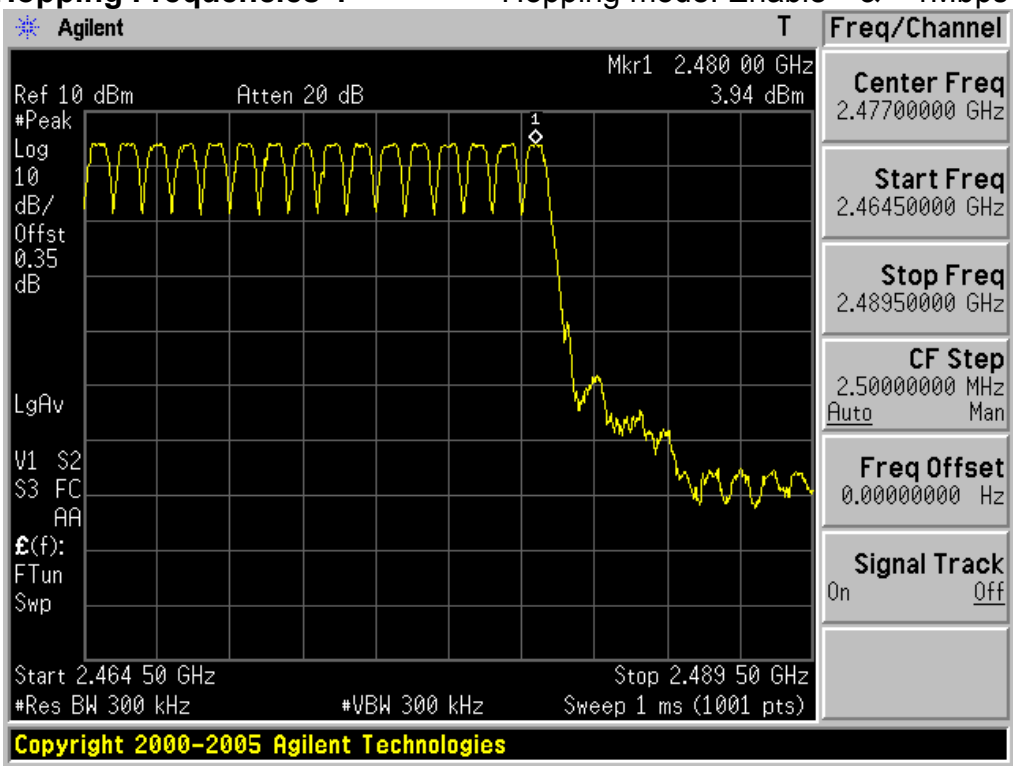
Number of Hopping Frequencies 2 Hopping mode: Enable & 1Mbps



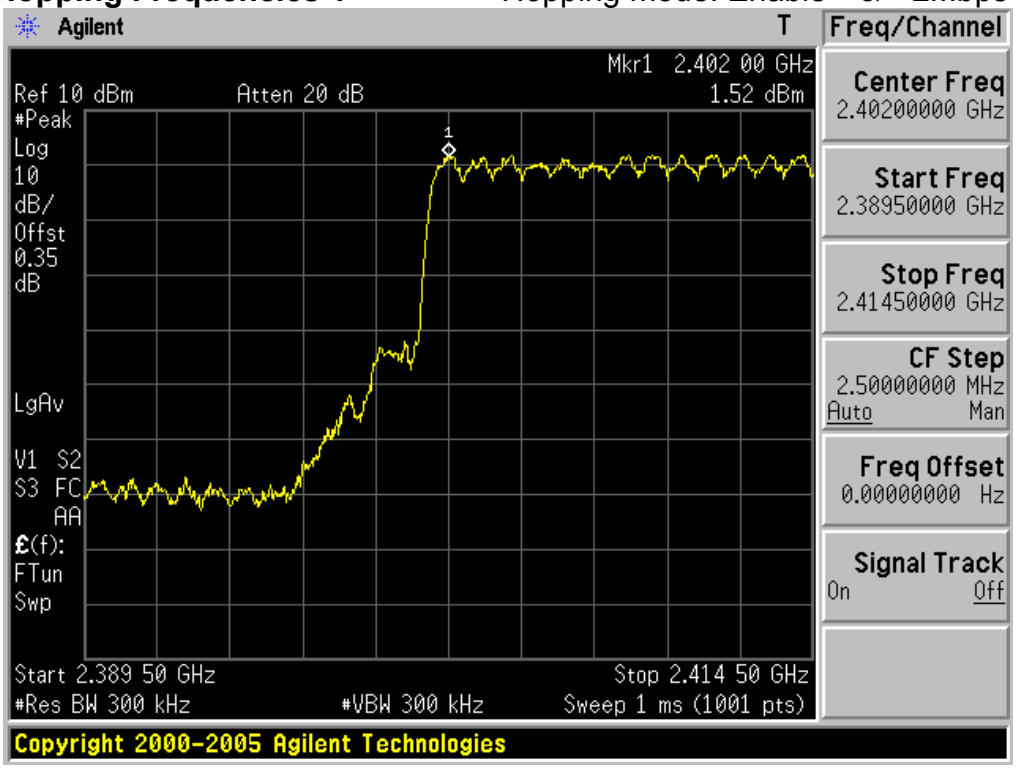
Number of Hopping Frequencies 3 Hopping mode: Enable & 1Mbps



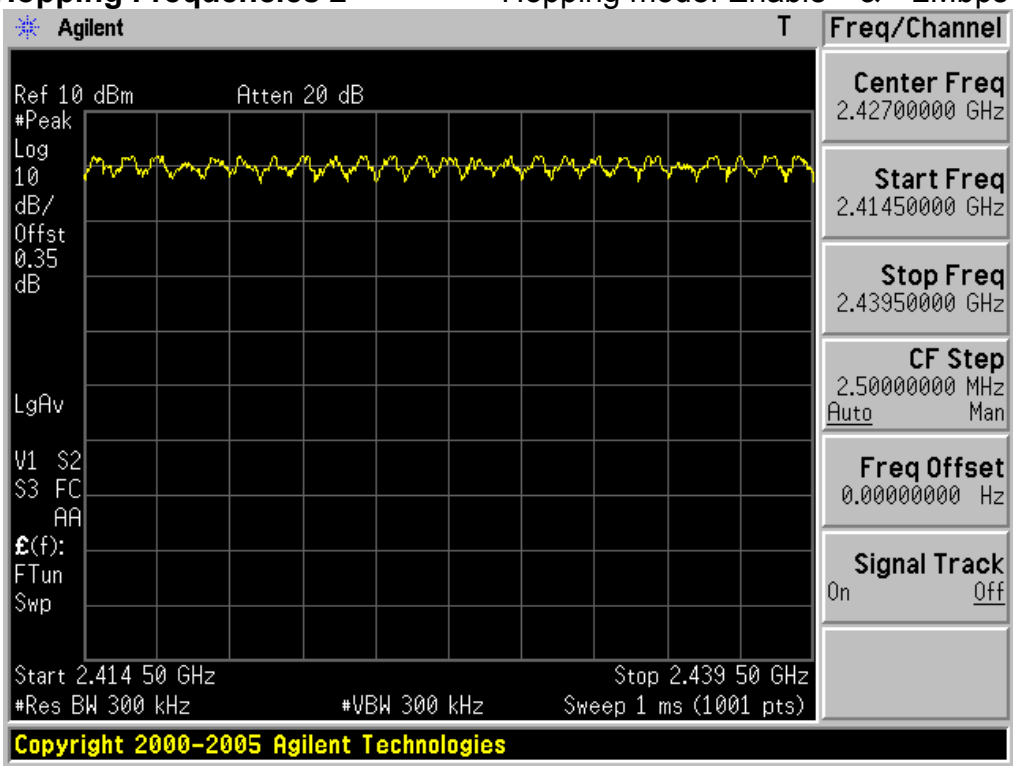
Number of Hopping Frequencies 4 Hopping mode: Enable & 1Mbps



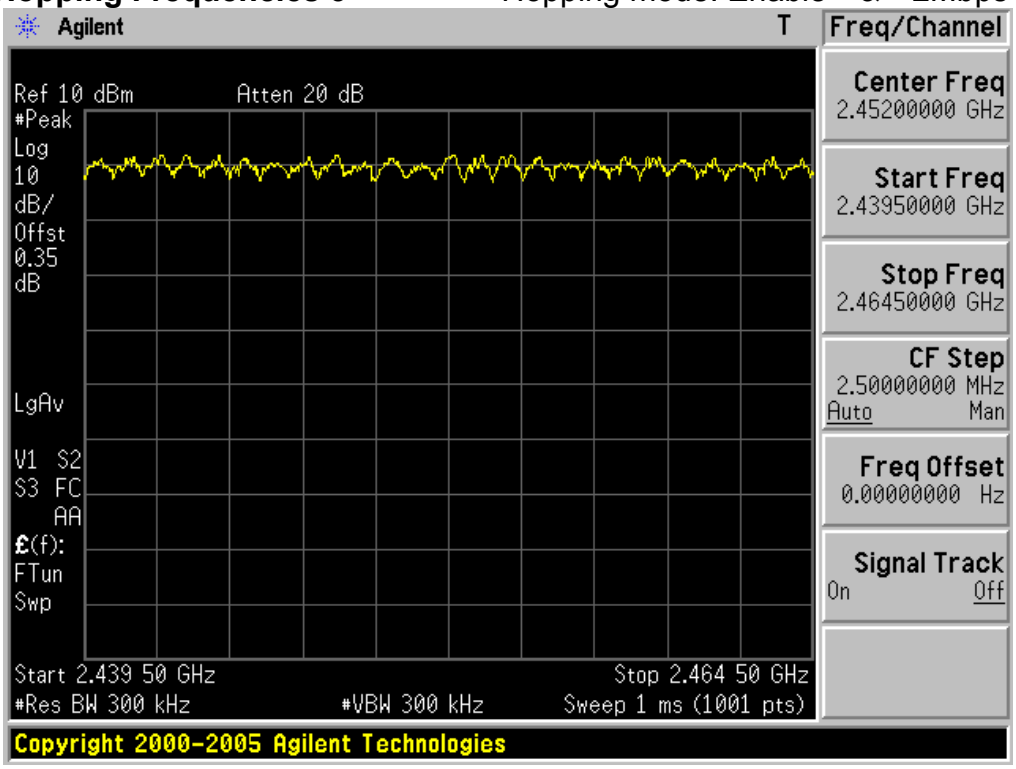
Number of Hopping Frequencies 1 Hopping mode: Enable & 2Mbps



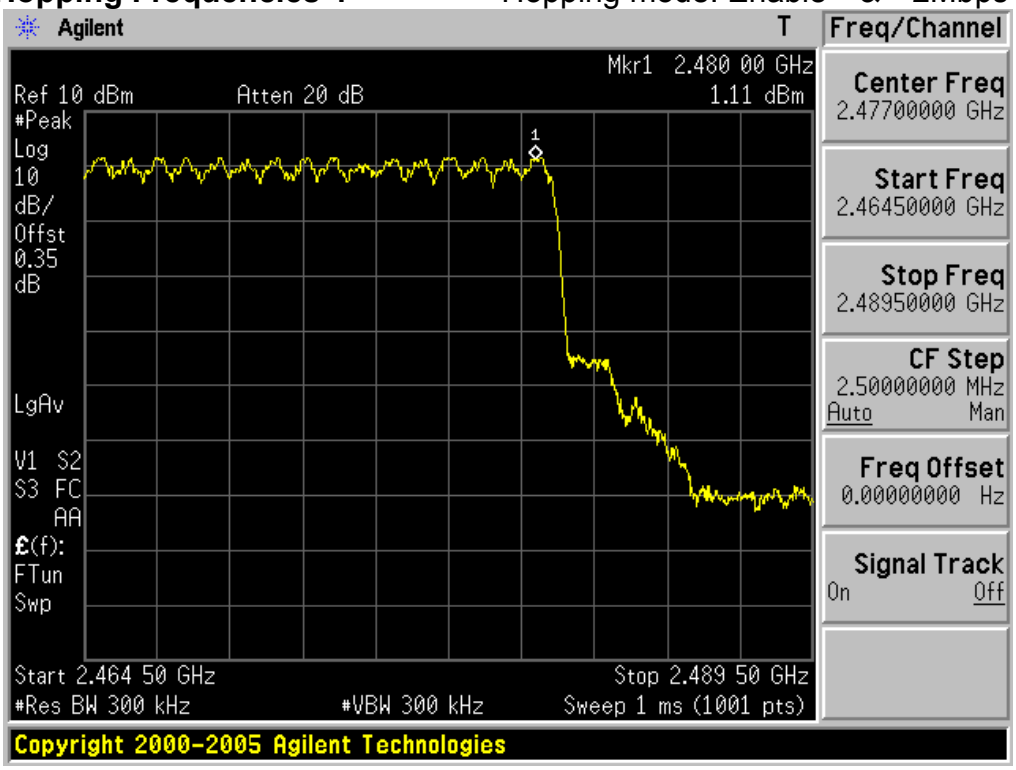
Number of Hopping Frequencies 2 Hopping mode: Enable & 2Mbps



Number of Hopping Frequencies 3 Hopping mode: Enable & 2Mbps



Number of Hopping Frequencies 4 Hopping mode: Enable & 2Mbps



3.2.3 20 dB Bandwidth

- Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled 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 20dB 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 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest Frequencies

Span = approximately 2 or 3 times of the 20 dB bandwidth

RBW = 1% of the 20dB bandwidth or more

VBW = ≥ RBW

Trace = max hold

Sweep = auto

Detector function = peak

- Measurement Data: Comply

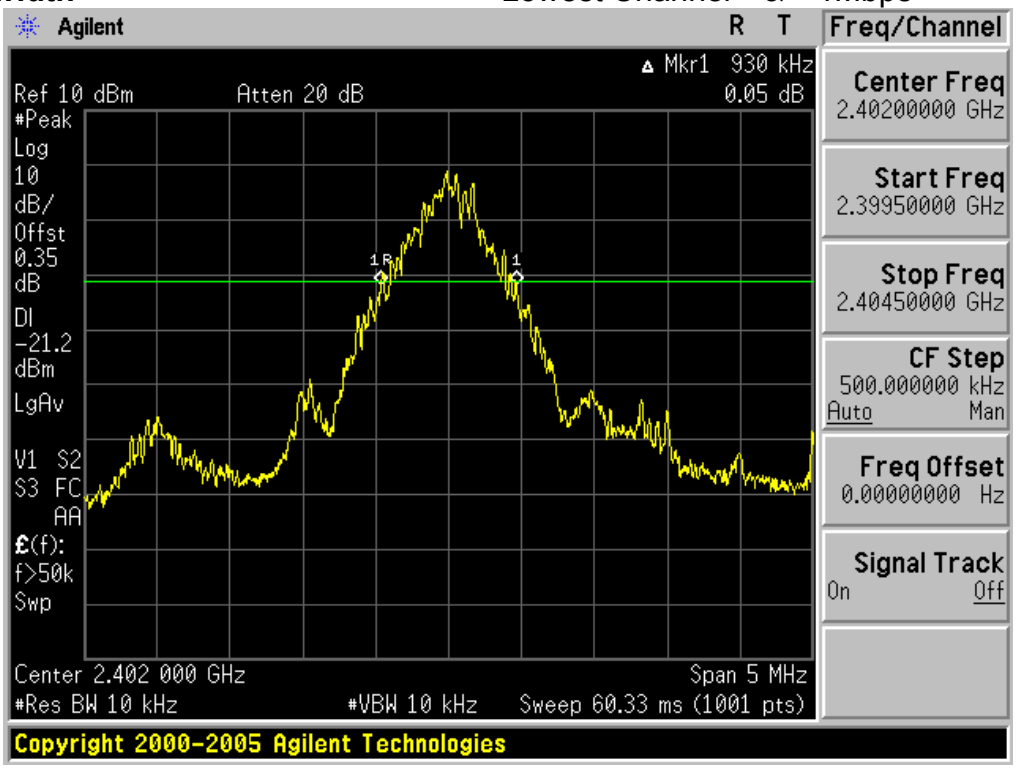
Hopping mode	Test mode	Tested Channel	Test Results (MHz)
Disable	Date rate: 1Mbps	Lowest	0.930
		Middle	0.940
		Highest	0.940
	Date rate: 2Mbps	Lowest	1.265
		Middle	1.245
		Highest	1.240

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

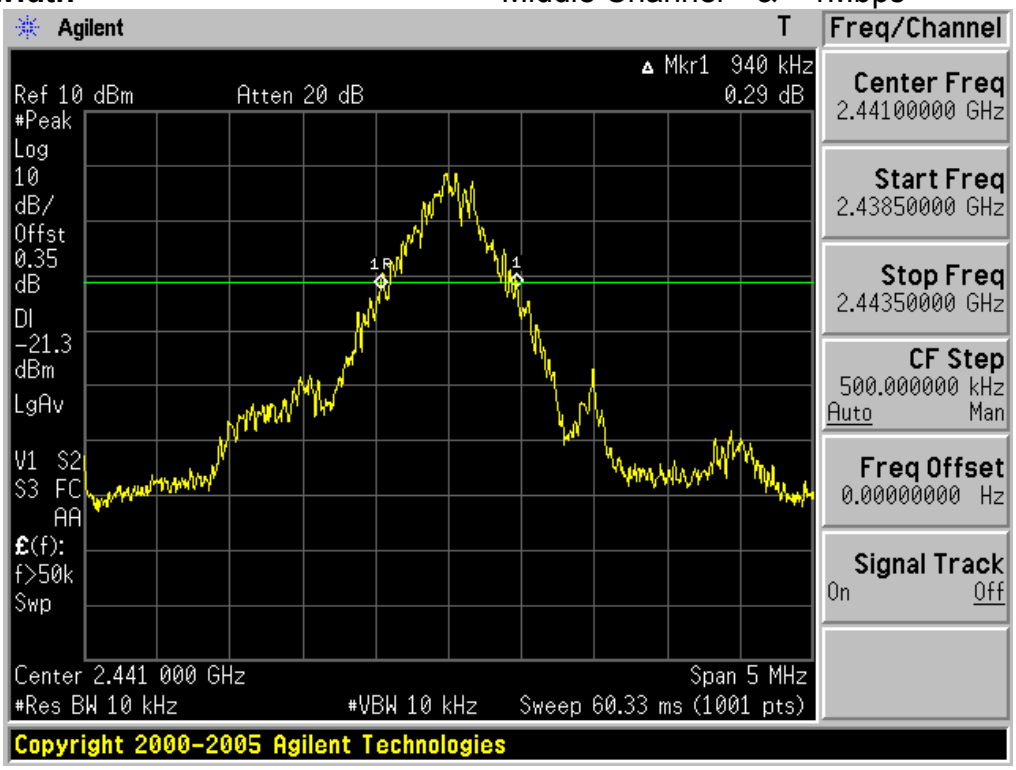
- Minimum Standard:

None

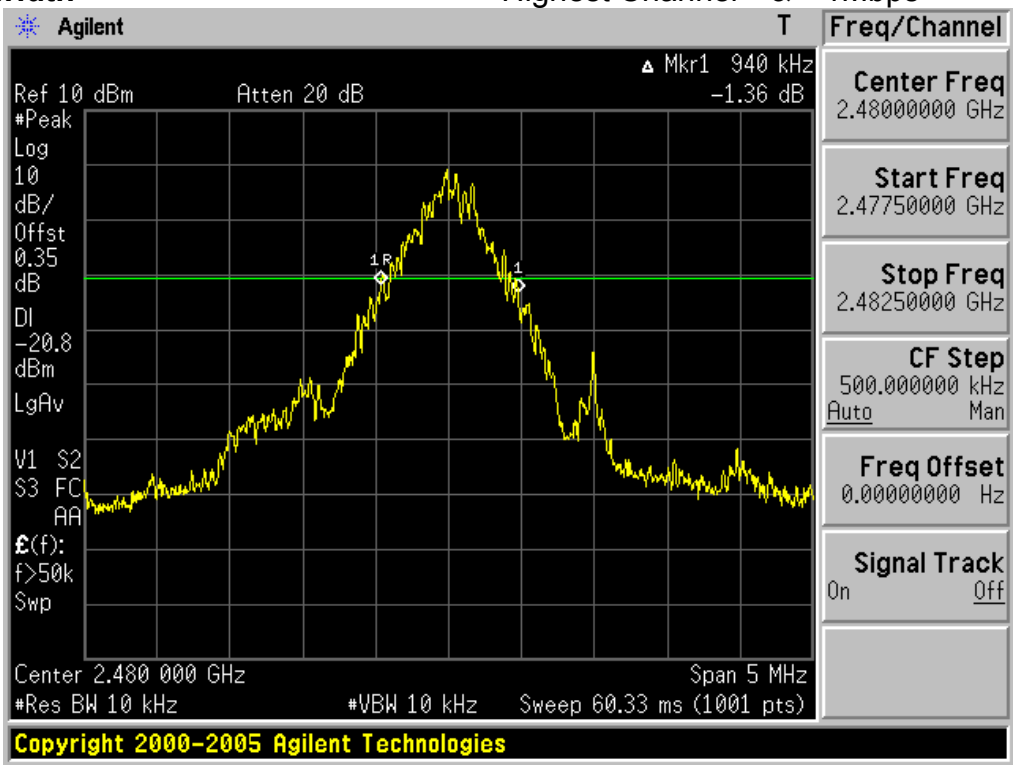
20dB Bandwidth Lowest Channel & 1Mbps



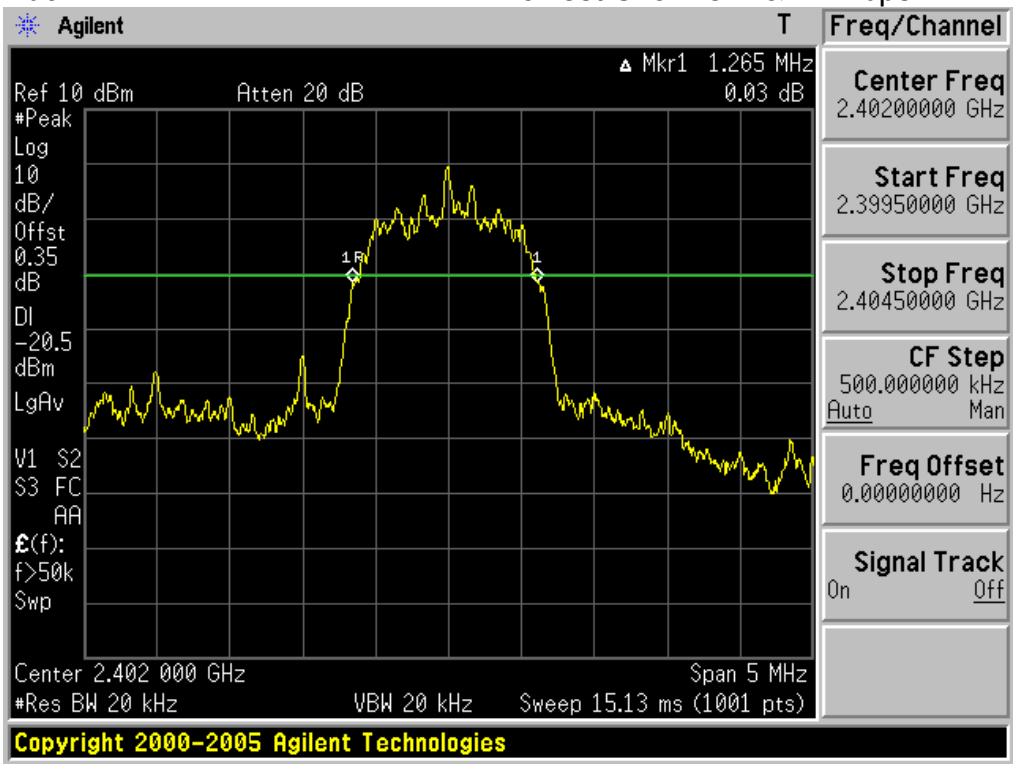
20dB Bandwidth Middle Channel & 1Mbps



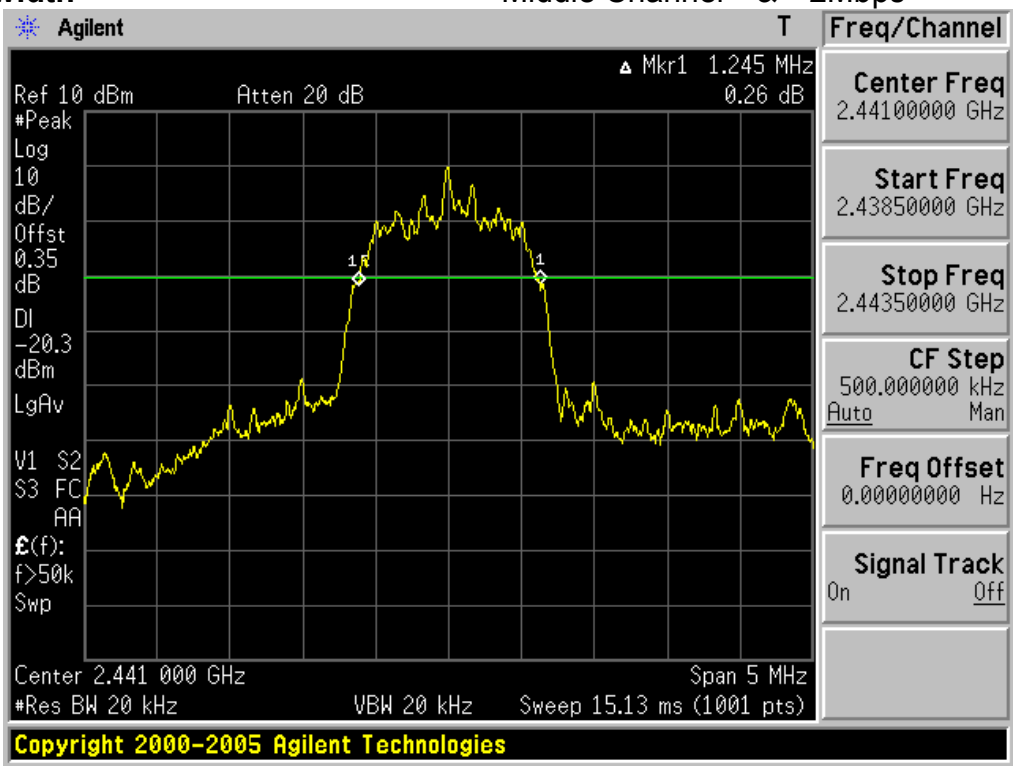
20dB Bandwidth Highest Channel & 1Mbps



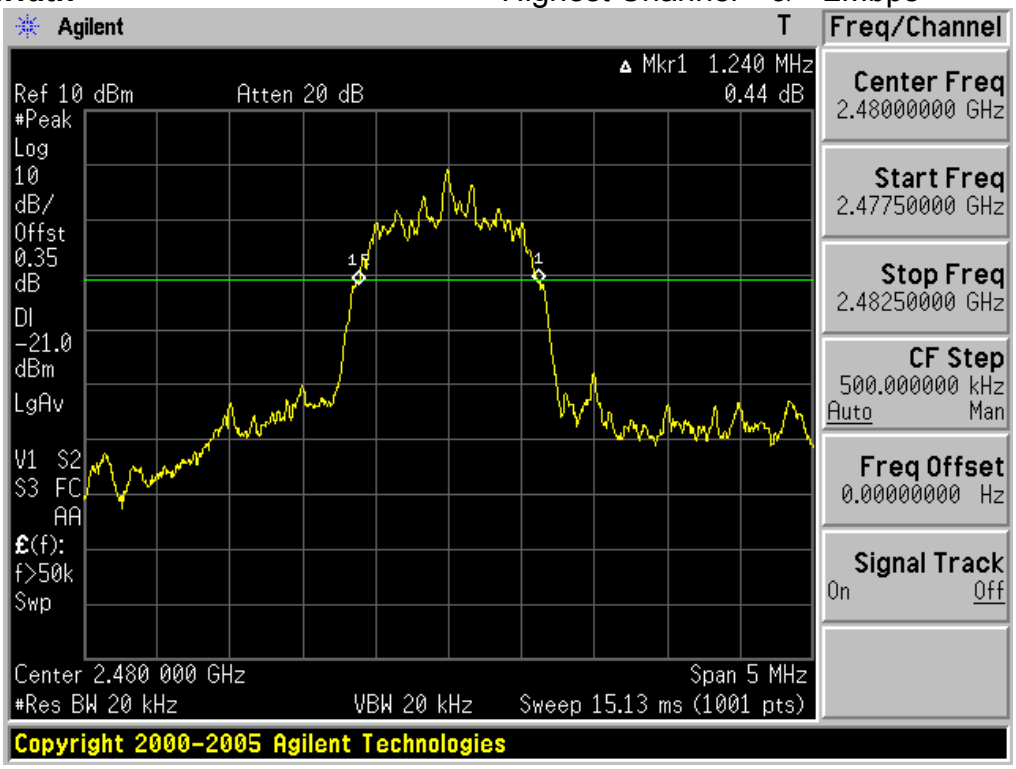
20dB Bandwidth Lowest Channel & 2Mbps



20dB Bandwidth Middle Channel & 2Mbps



20dB Bandwidth Highest Channel & 2Mbps



3.2.4 Time of Occupancy (Dwell Time)

- Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 2441 MHz	Span = zero
RBW = 1 MHz	VBW = ≥ RBW
Trace = max hold	Detector function = peak

- Measurement Data: Comply

Hopping mode	Test mode	Packet Type	Burst On Time (ms)	Period (ms)	Number of hopping Channels	Test Result (s)
Enable	Data Rate: 1Mbps	DH 5	2.895	3.75	79	0.3088
	Data Rate: 2Mbps	DH 5	2.91	3.75	79	0.3104

Note 1: Each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.

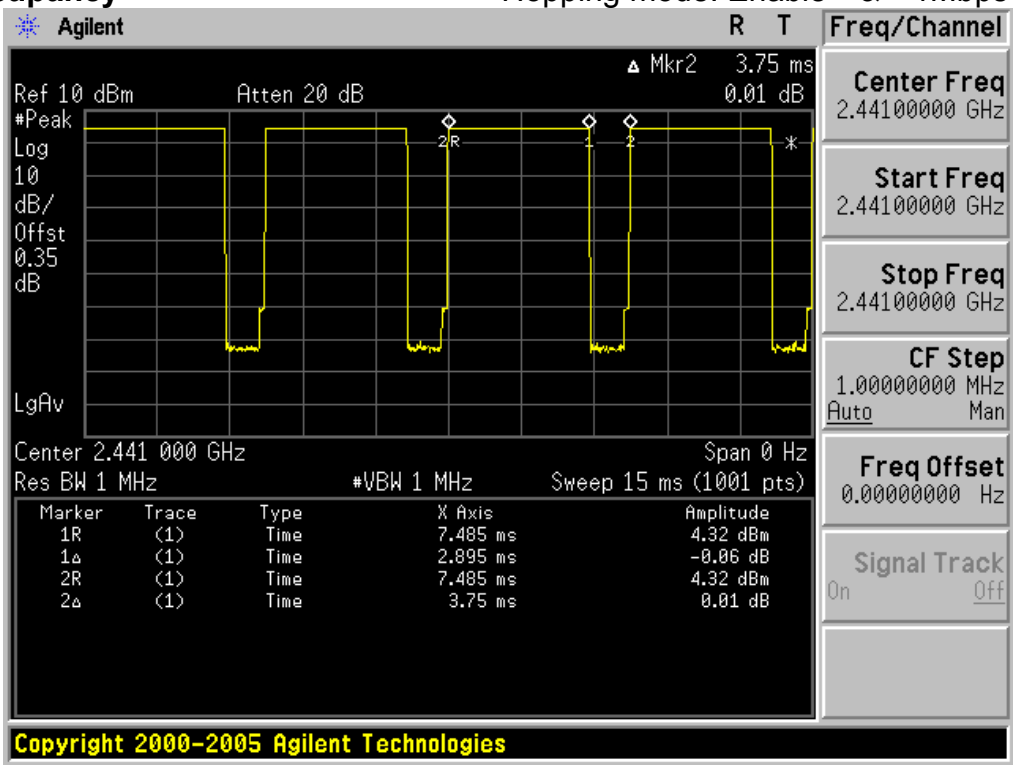
DWELL TIME=(0.4 x Number of hopping Channels) x Burst On time / (period x Number of hopping Channels)

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

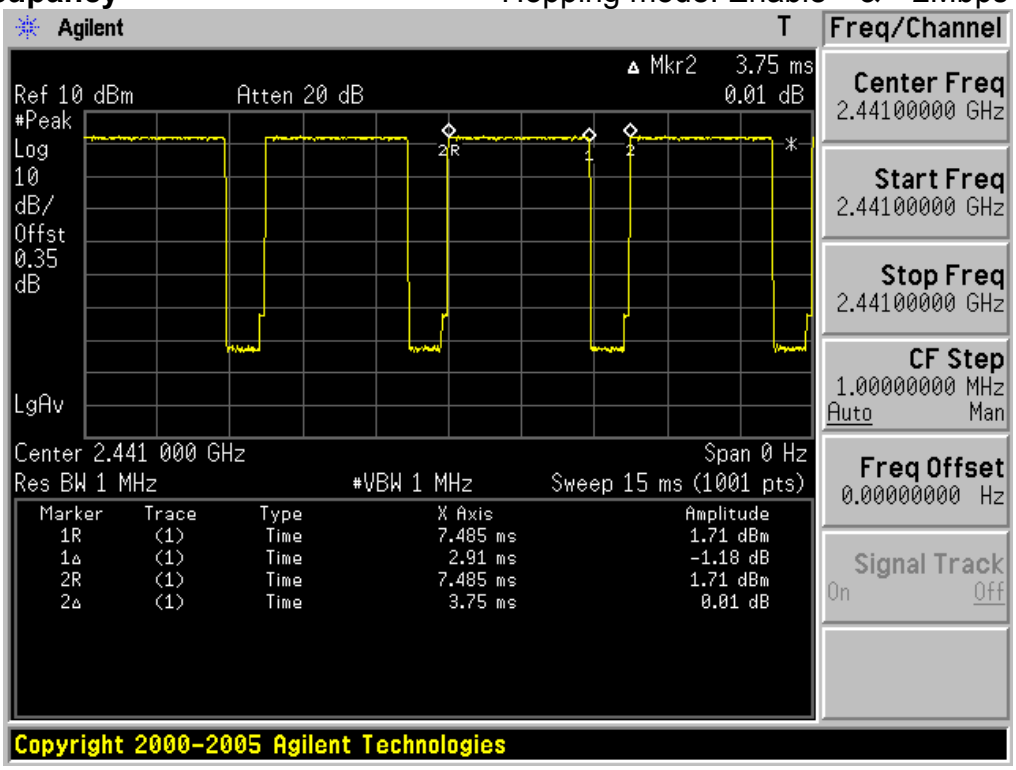
- Minimum Standard:

No greater than 0.4 seconds

Time of Occupancy Hopping mode: Enable & 1Mbps



Time of Occupancy Hopping mode: Enable & 2Mbps



3.2.5 Peak Output Power

- Procedure:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled 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. The indicated level is the peak output power.

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 = ≥ RBW Detector function = peak
Trace = max hold Sweep = auto

- **Measurement Data: Comply**

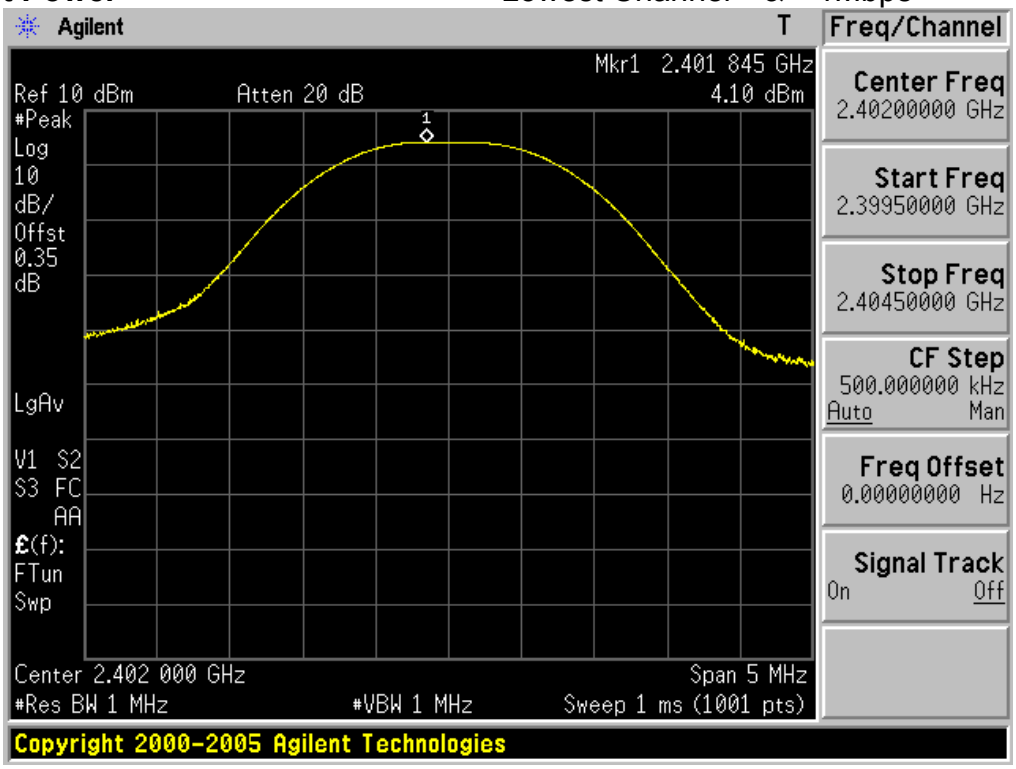
Hopping mode	Test mode	Tested Channel	Test Results	
			dBm	mW
Disable	Data rate: 1Mbps	Lowest	4.01	2.518
		Middle	**4.56**	**2.858**
		Highest	4.01	2.518
	Data rate: 2Mbps	Lowest	2.41	1.742
		Middle	**2.74**	**1.879**
		Highest	2.34	1.714

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

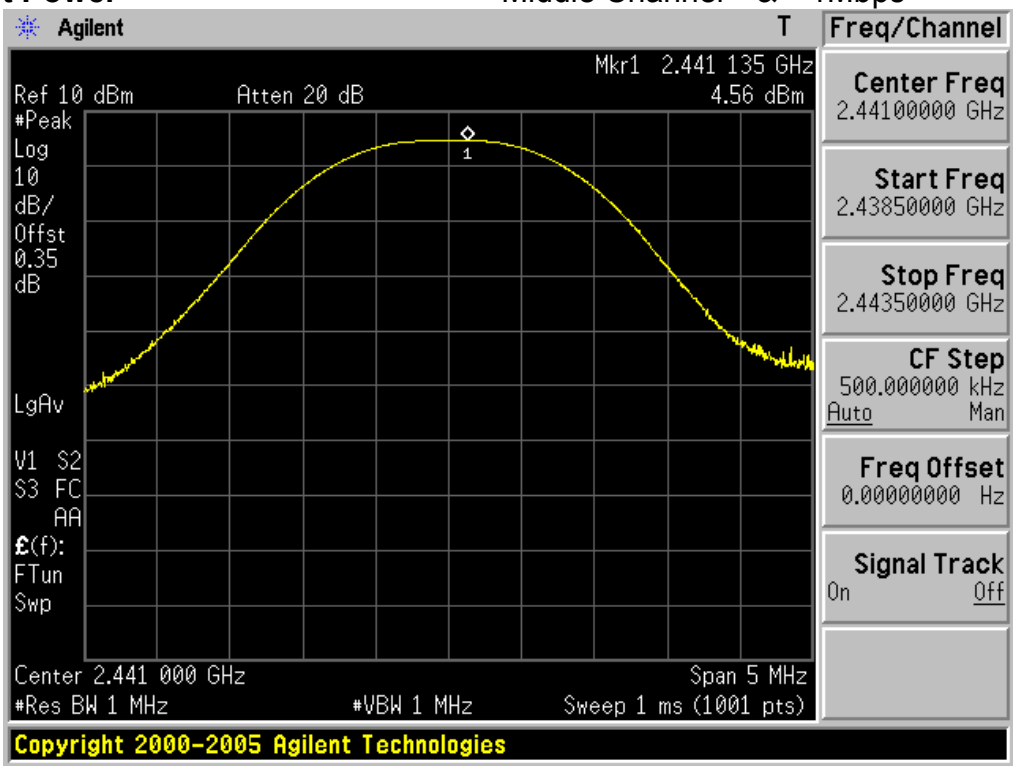
- Minimum Standard:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: **1 Watt**. For all other frequency hopping systems in the 2400-2483.5 MHz band: **0.125 Watts**

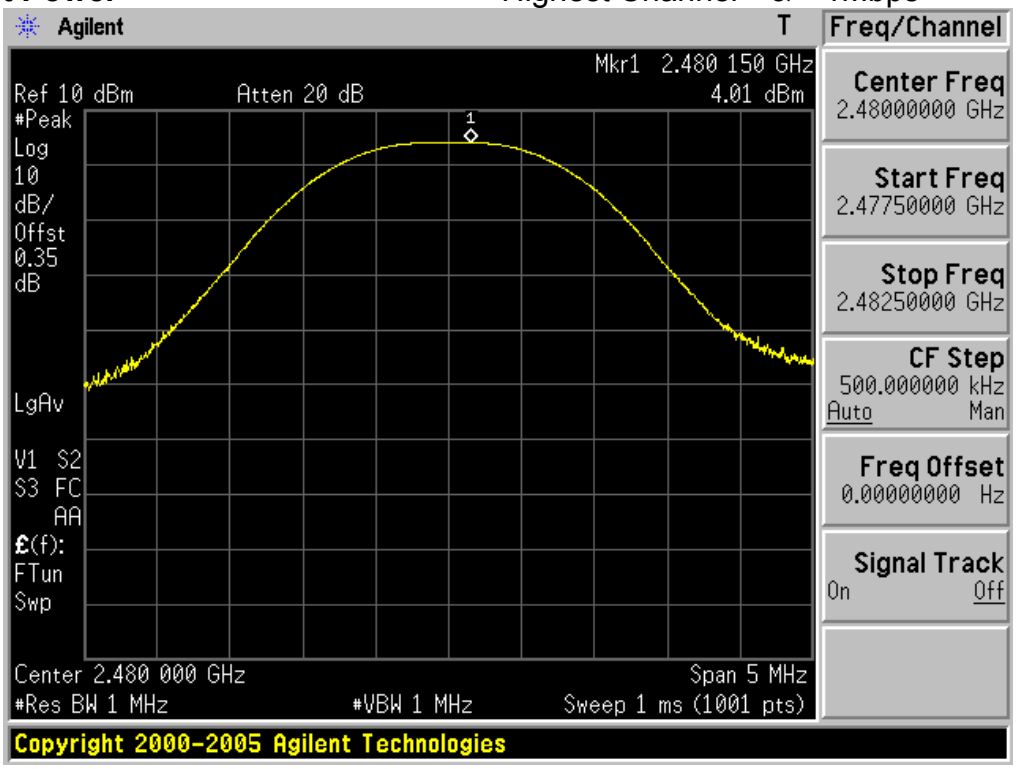
Peak Output Power Lowest Channel & 1Mbps



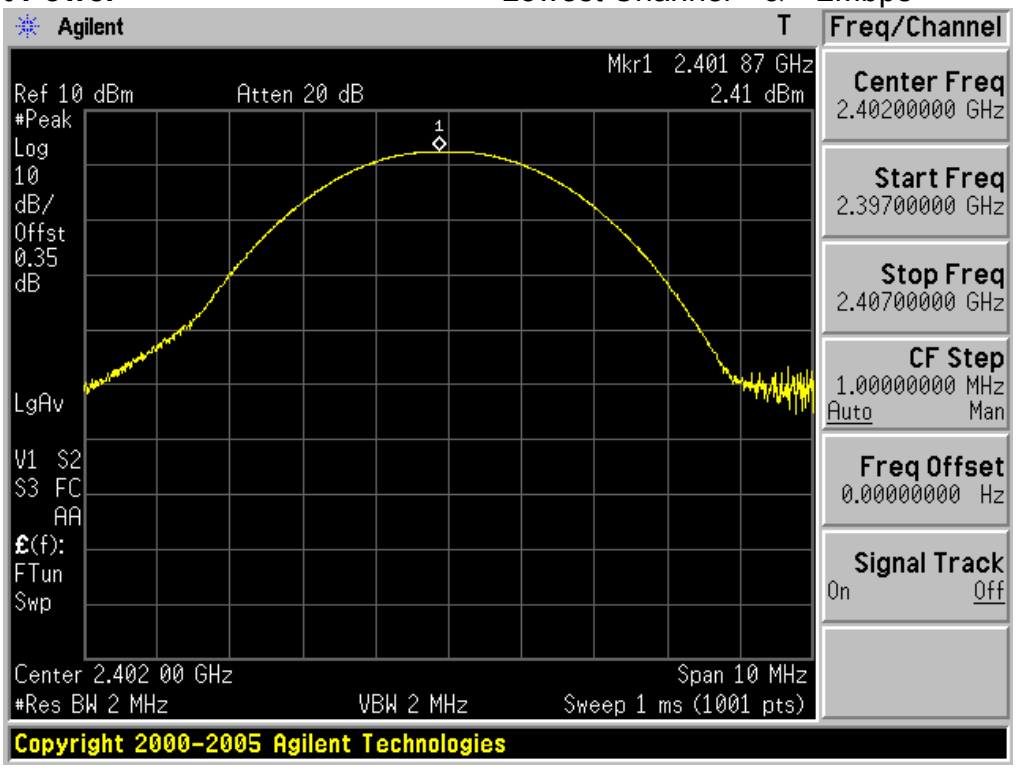
Peak Output Power Middle Channel & 1Mbps



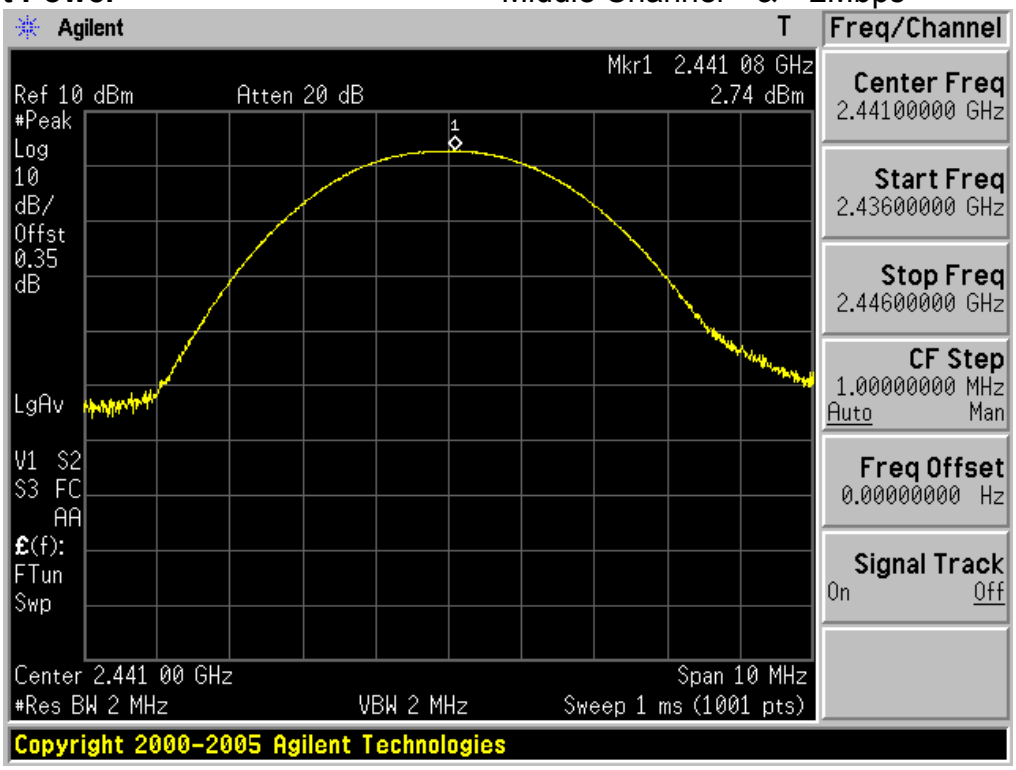
Peak Output Power Highest Channel & 1Mbps



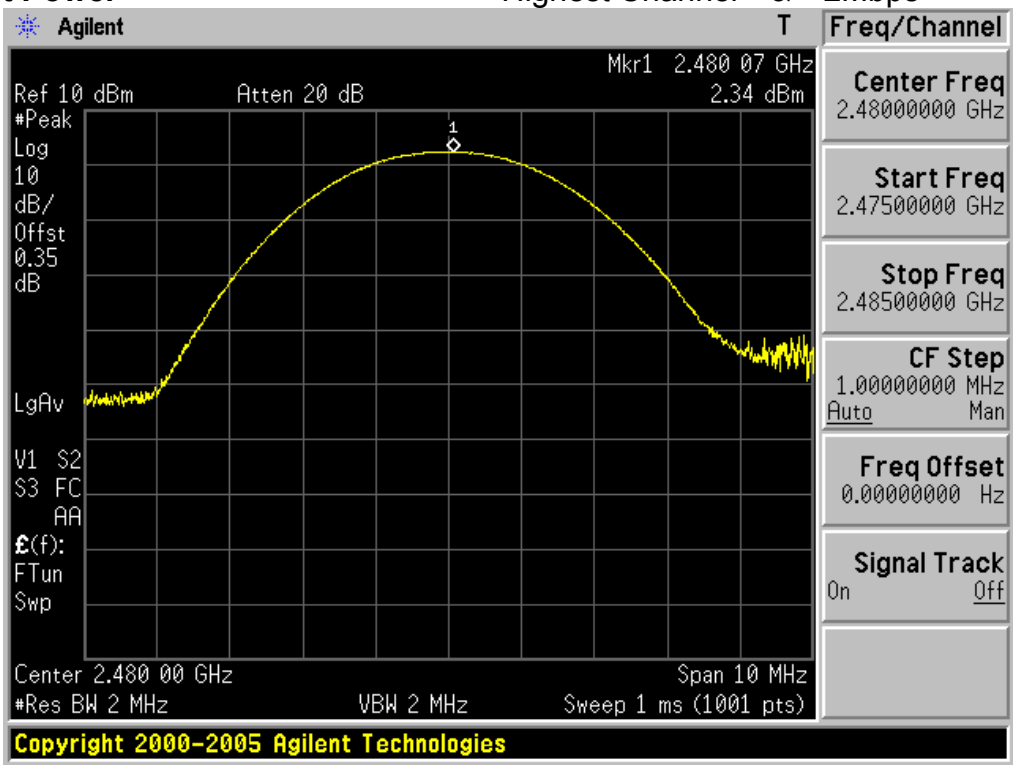
Peak Output Power Lowest Channel & 2Mbps



Peak Output Power Middle Channel & 2Mbps



Peak Output Power Highest Channel & 2Mbps



3.2.6 Conducted Spurious Emissions

- Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled 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.

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

Tested frequency = the highest and the lowest Frequencies

Center frequency = 2400MHz, 2483.5MHz

Span = 10MHz Detector function = peak

RBW = 1% of the span VBW = ≥ RBW

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 = ≥ RBW

Detector function = peak Sweep = auto

Trace = max hold

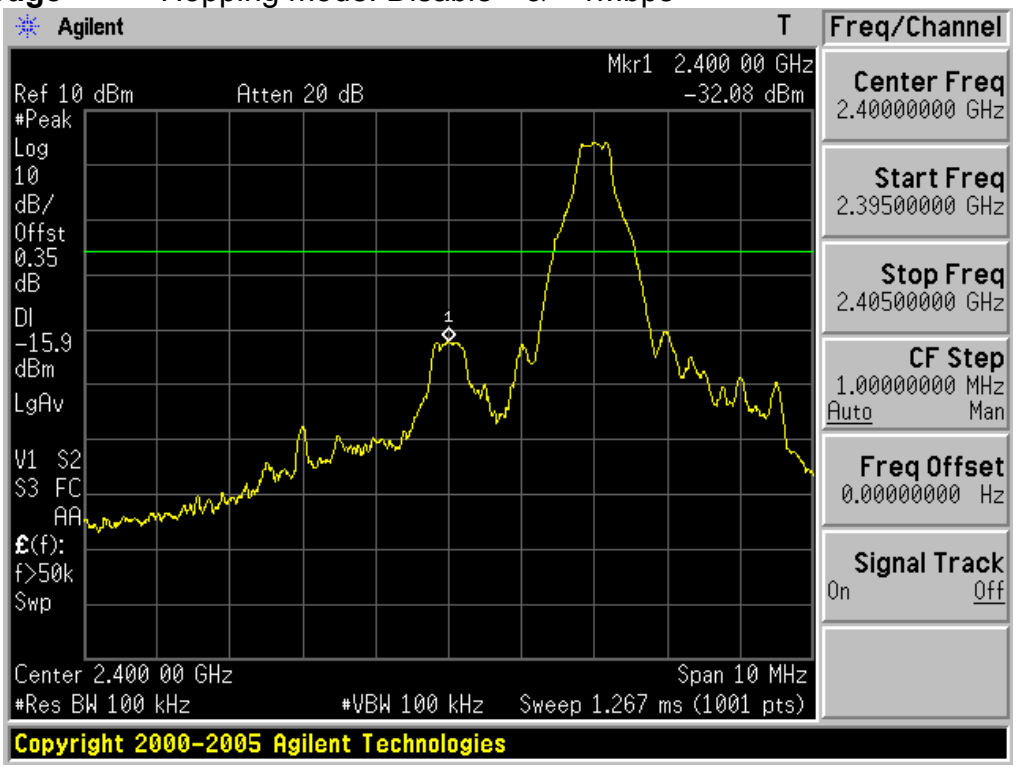
- Measurement Data: Comply

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

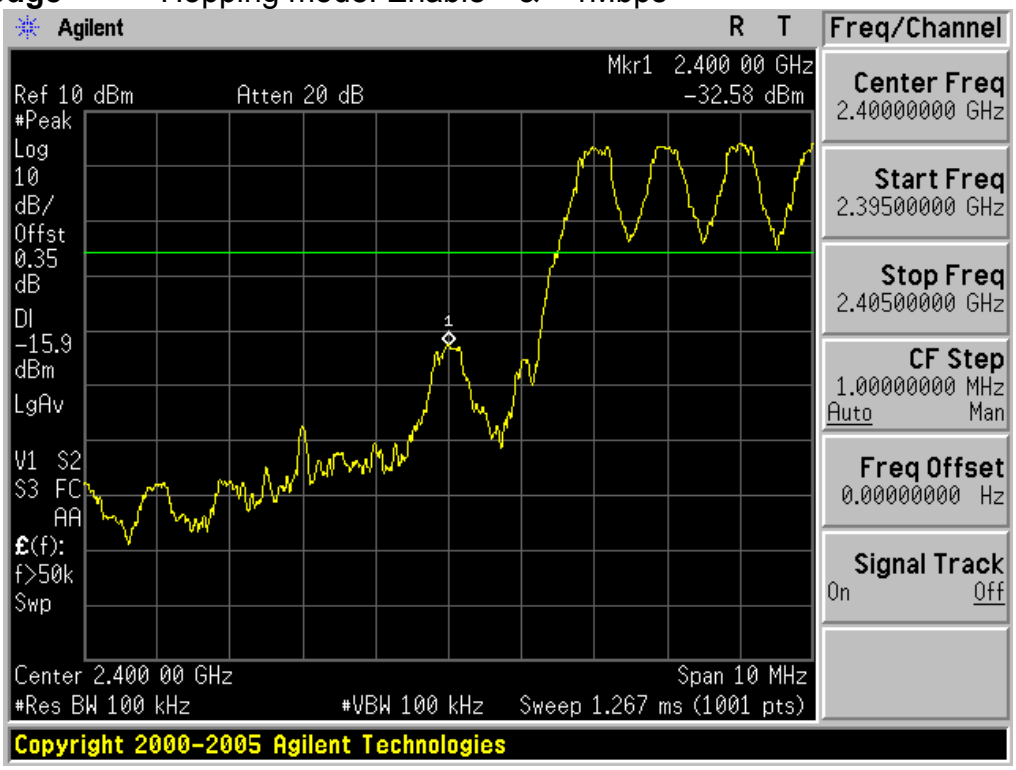
- **Minimum Standard:**

Minimum Standard:	> 20 dBc

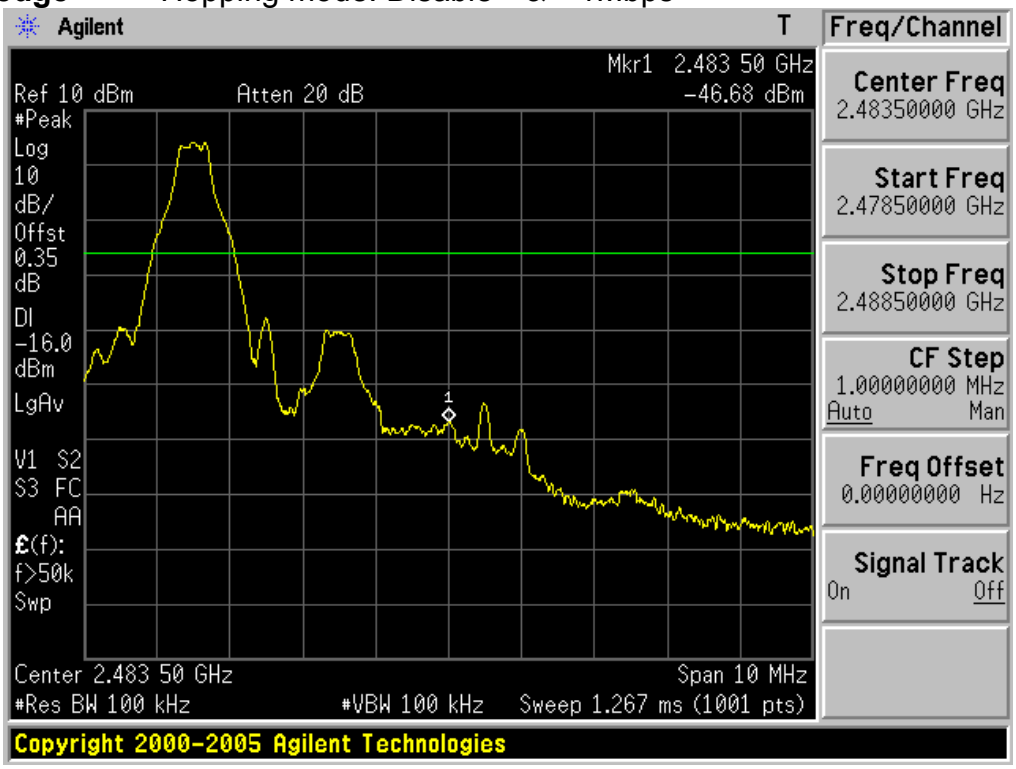
Low Band-edge Hopping mode: Disable & 1Mbps



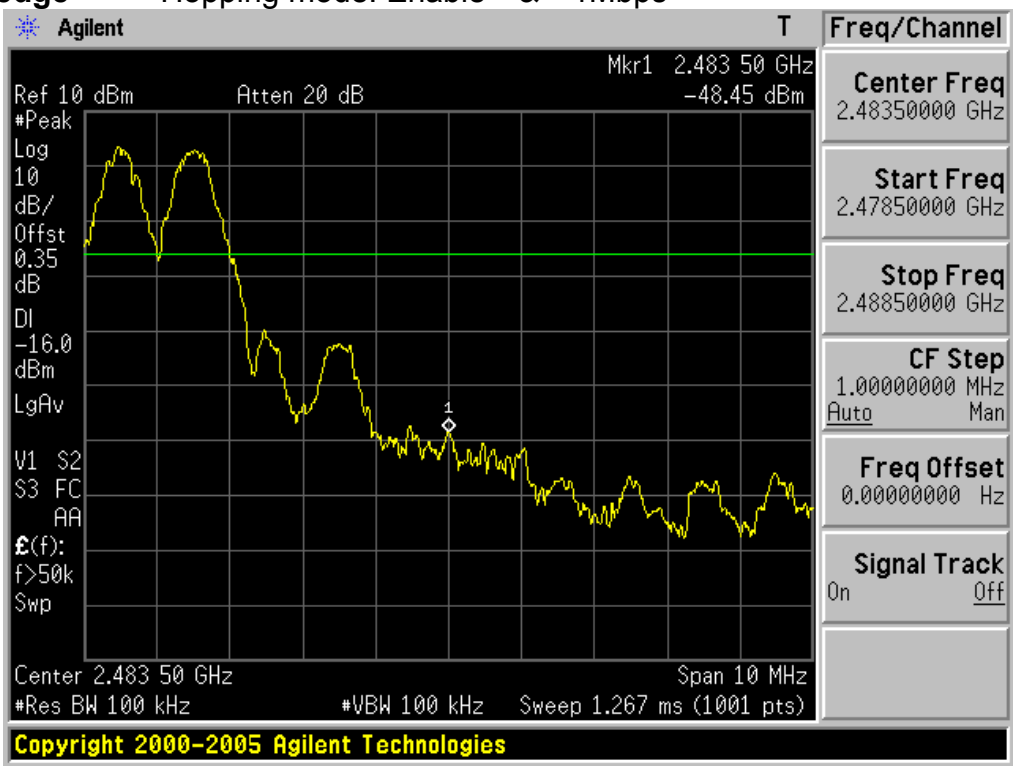
Low Band-edge Hopping mode: Enable & 1Mbps



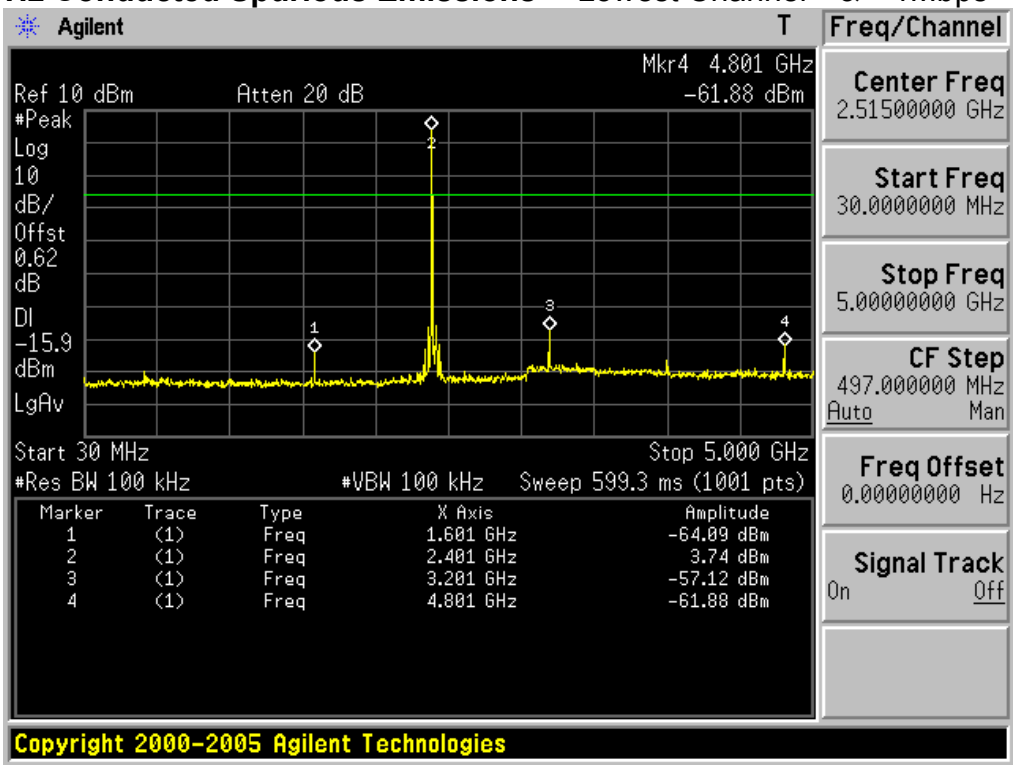
High Band-edge Hopping mode: Disable & 1Mbps



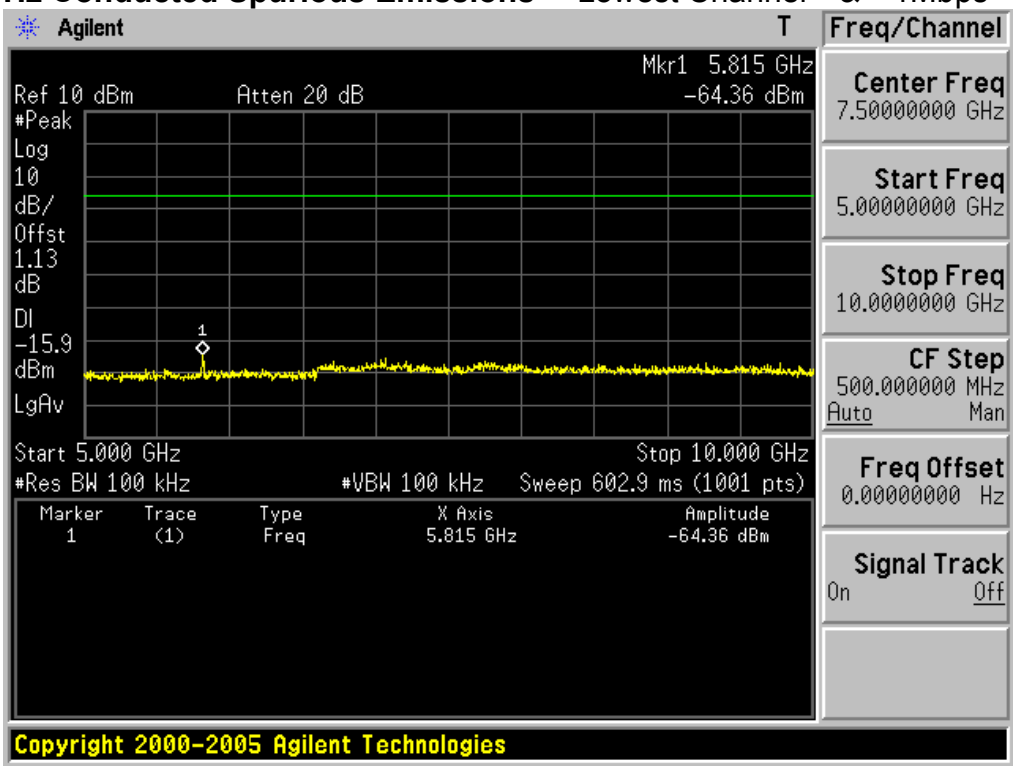
High Band-edge Hopping mode: Enable & 1Mbps



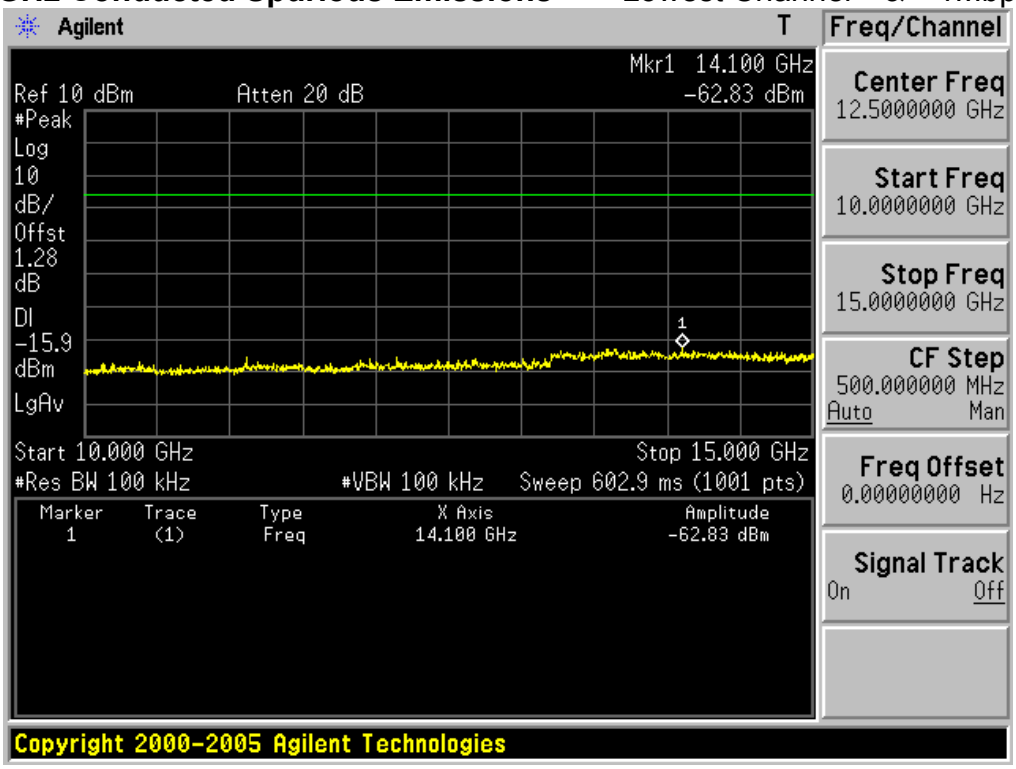
30MHz ~ 5GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



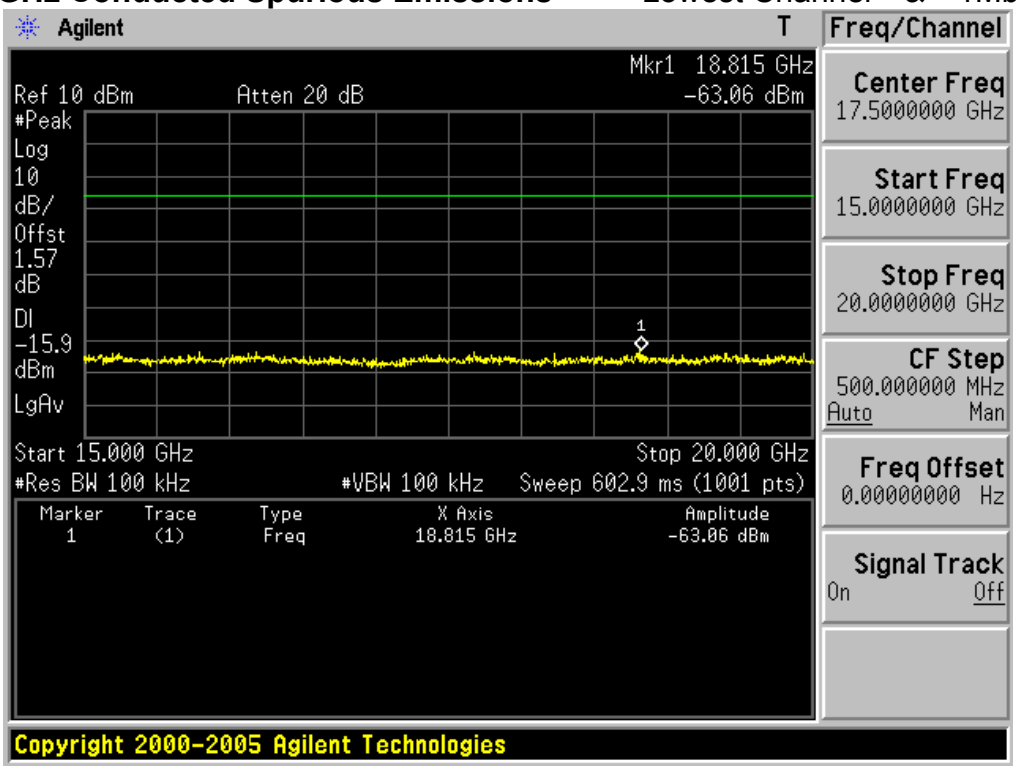
5GHz ~ 10GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



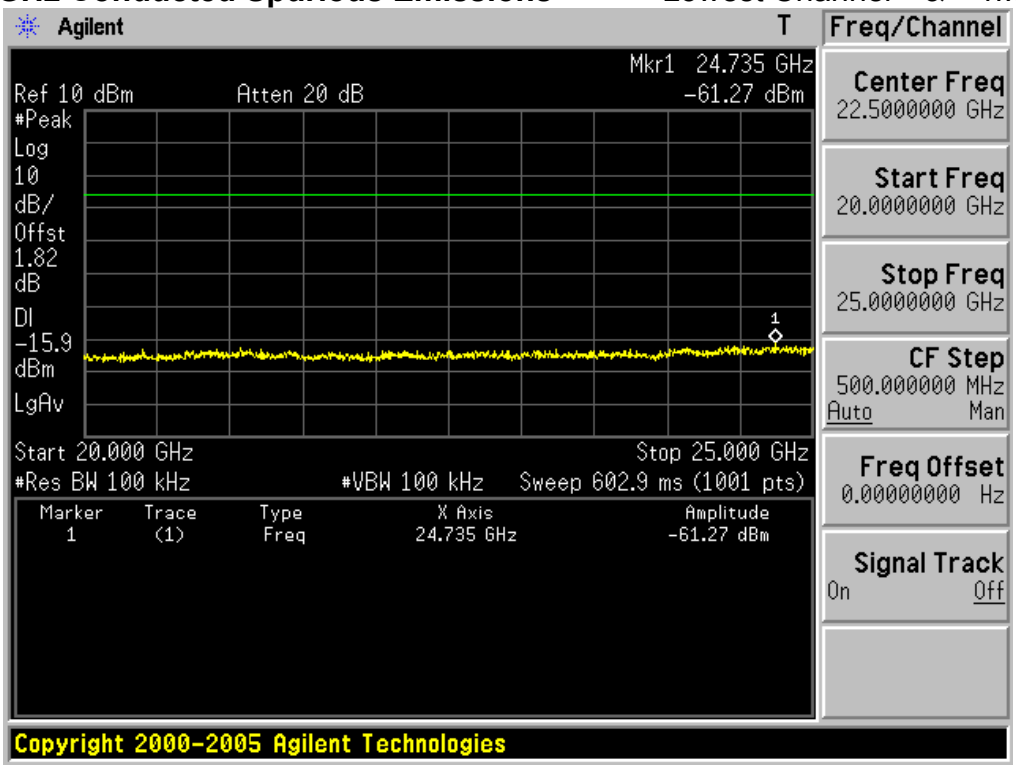
10GHz ~ 15GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



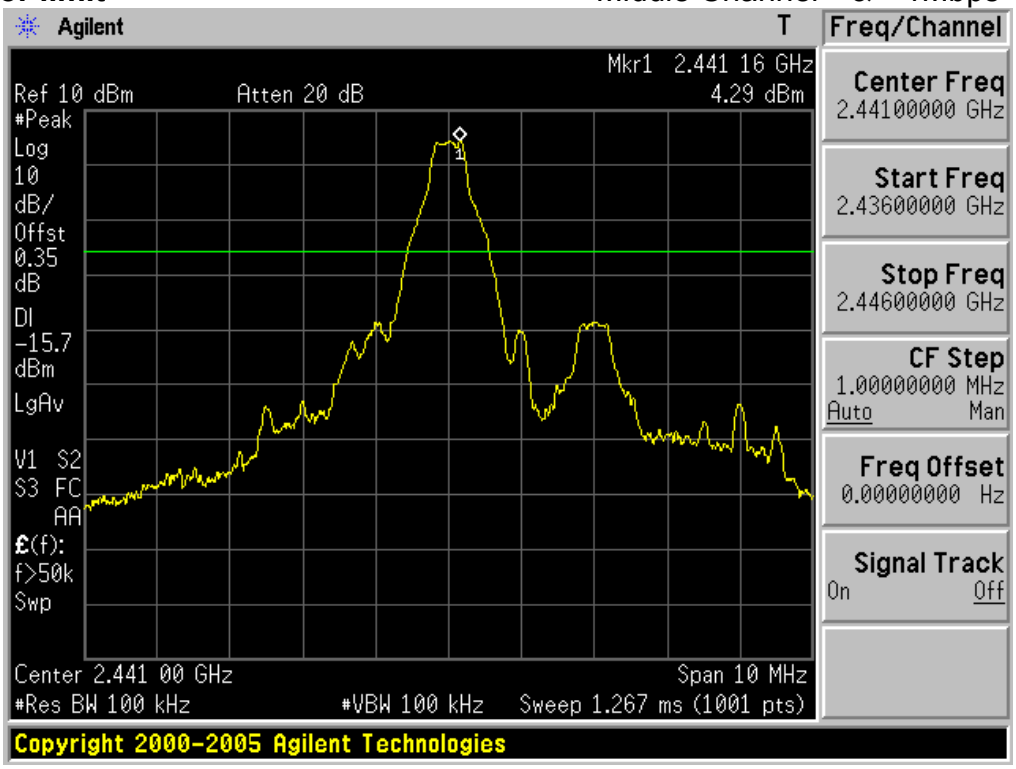
15GHz ~ 20GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



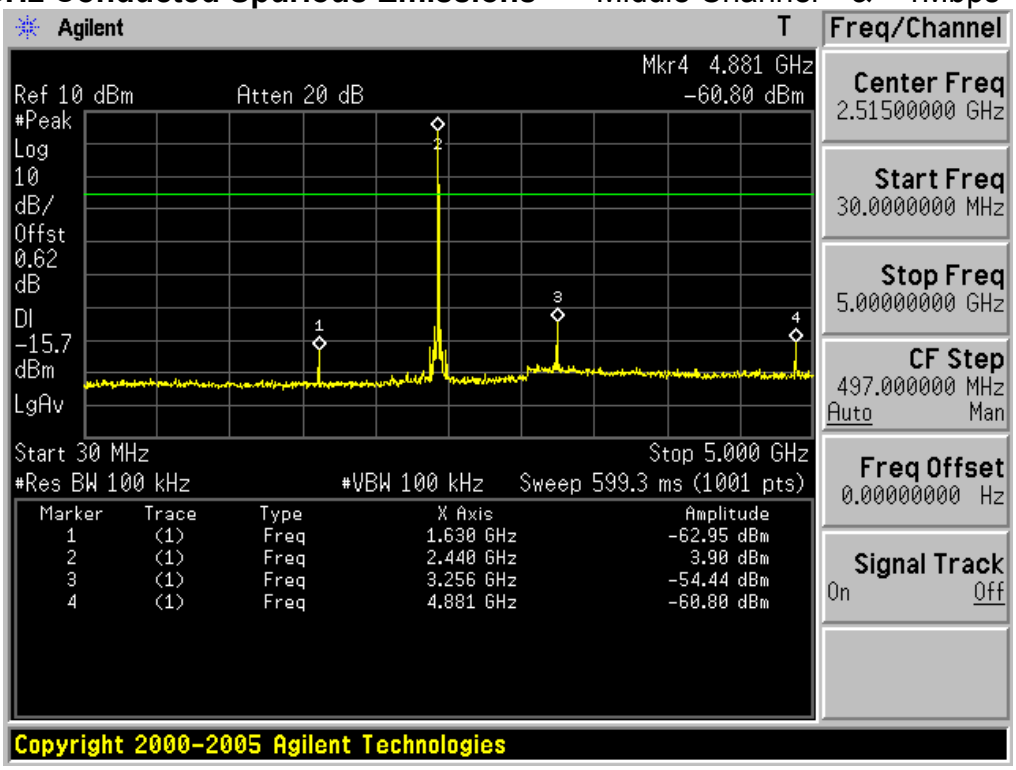
20GHz ~ 25GHz Conducted Spurious Emissions Lowest Channel & 1Mbps



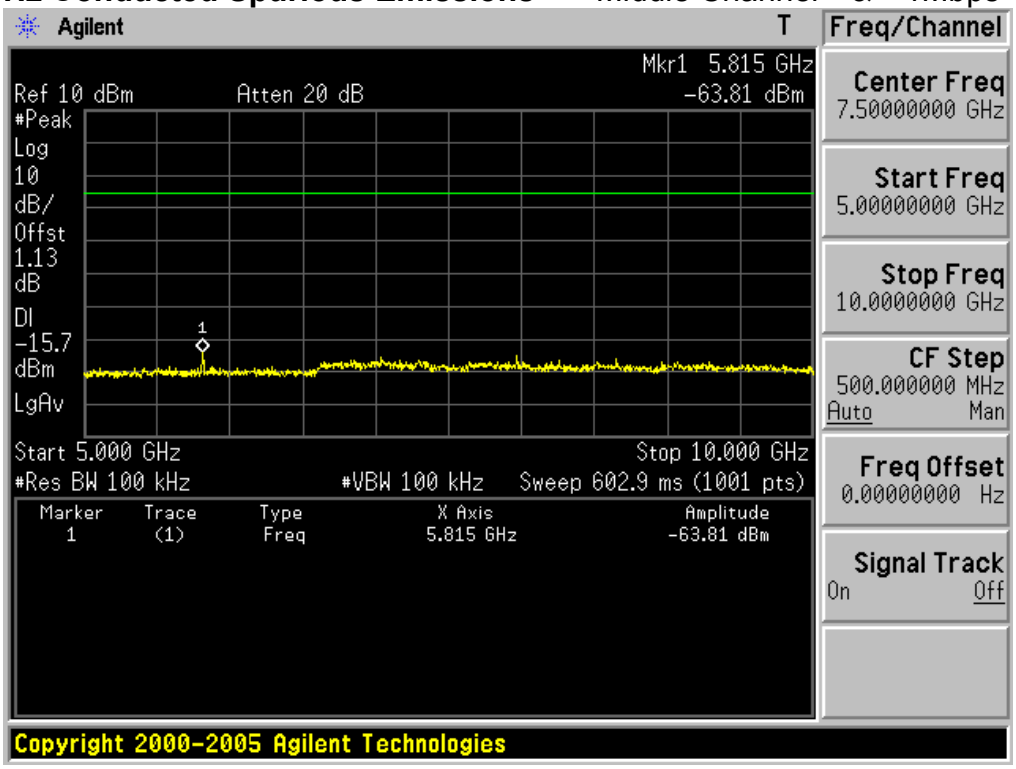
Reference for limit Middle Channel & 1Mbps



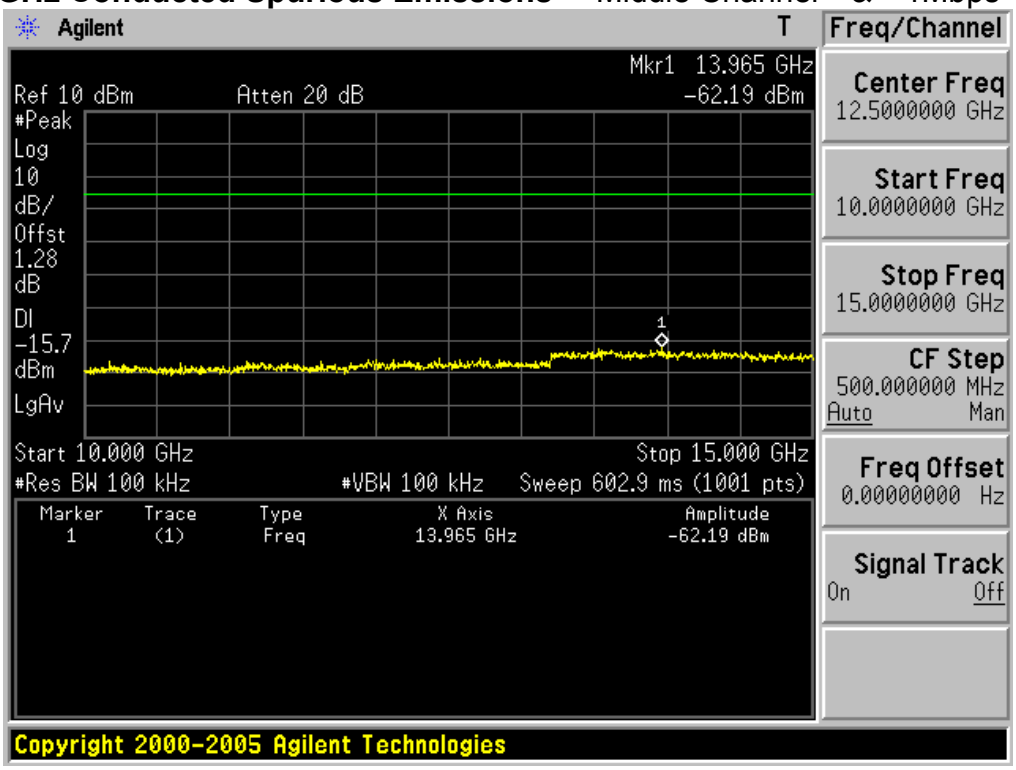
30MHz ~ 5GHz Conducted Spurious Emissions Middle Channel & 1Mbps



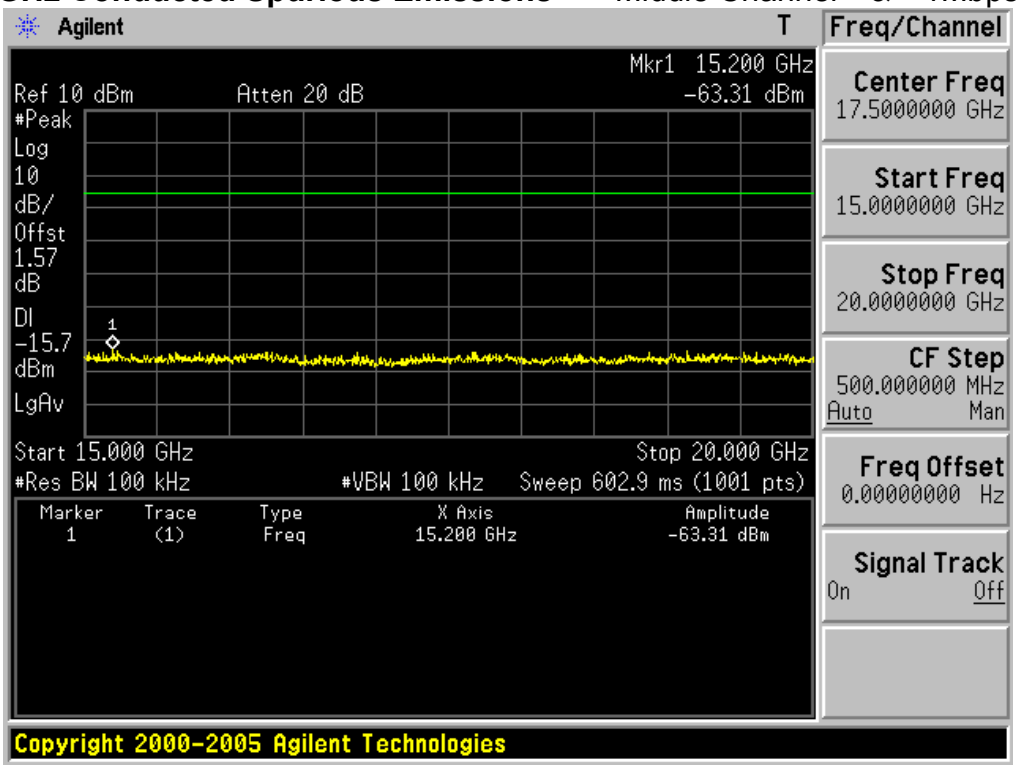
5GHz ~ 10GHz Conducted Spurious Emissions Middle Channel & 1Mbps



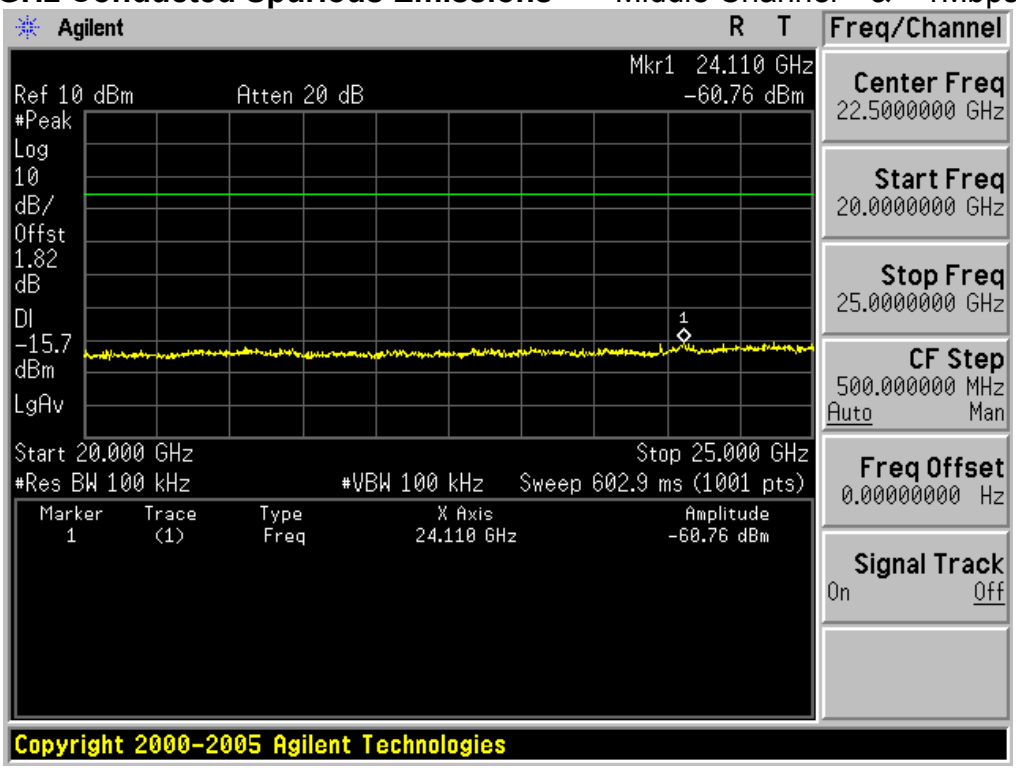
10GHz ~ 15GHz Conducted Spurious Emissions Middle Channel & 1Mbps



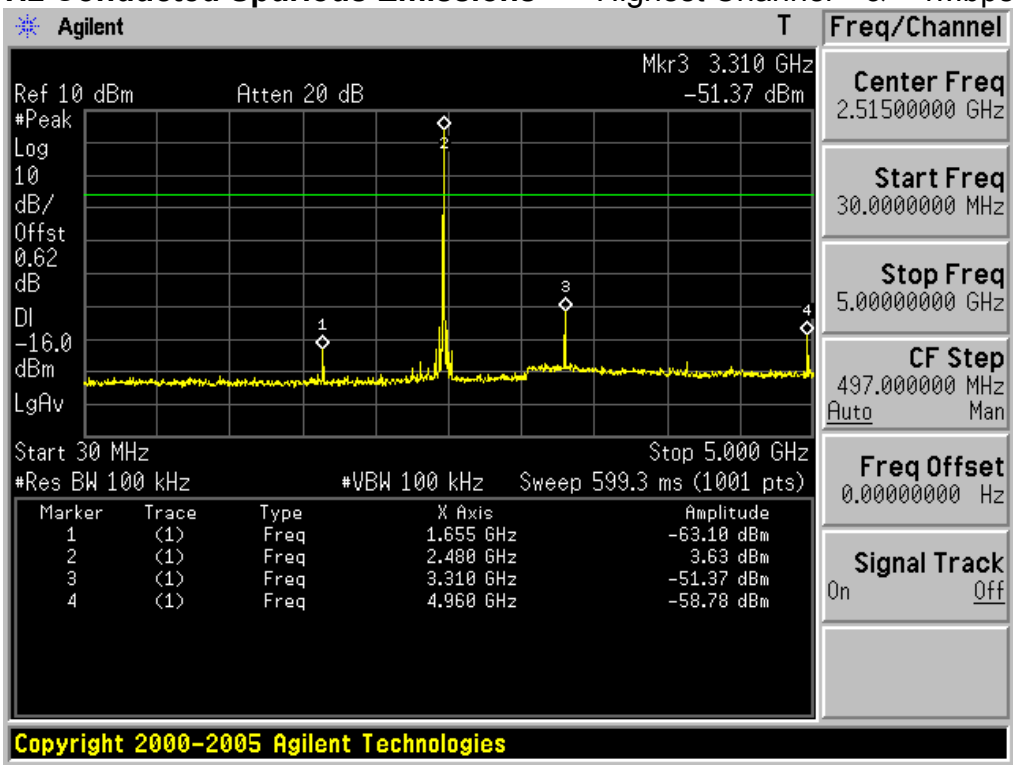
15GHz ~ 20GHz Conducted Spurious Emissions Middle Channel & 1Mbps



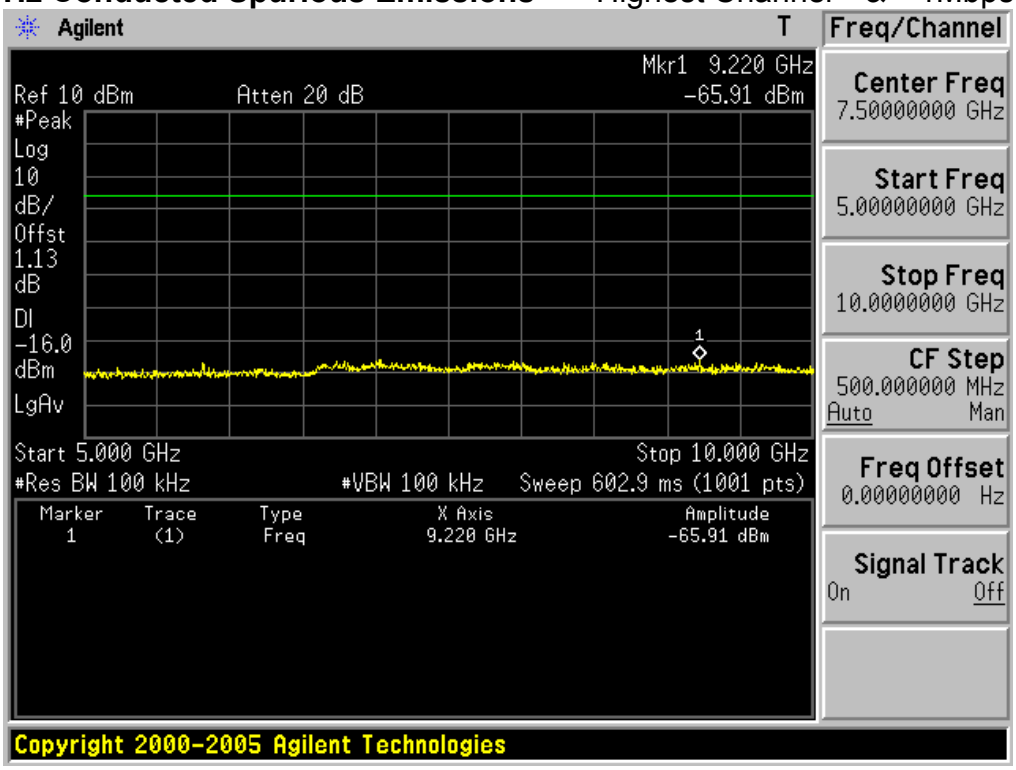
20GHz ~ 25GHz Conducted Spurious Emissions Middle Channel & 1Mbps



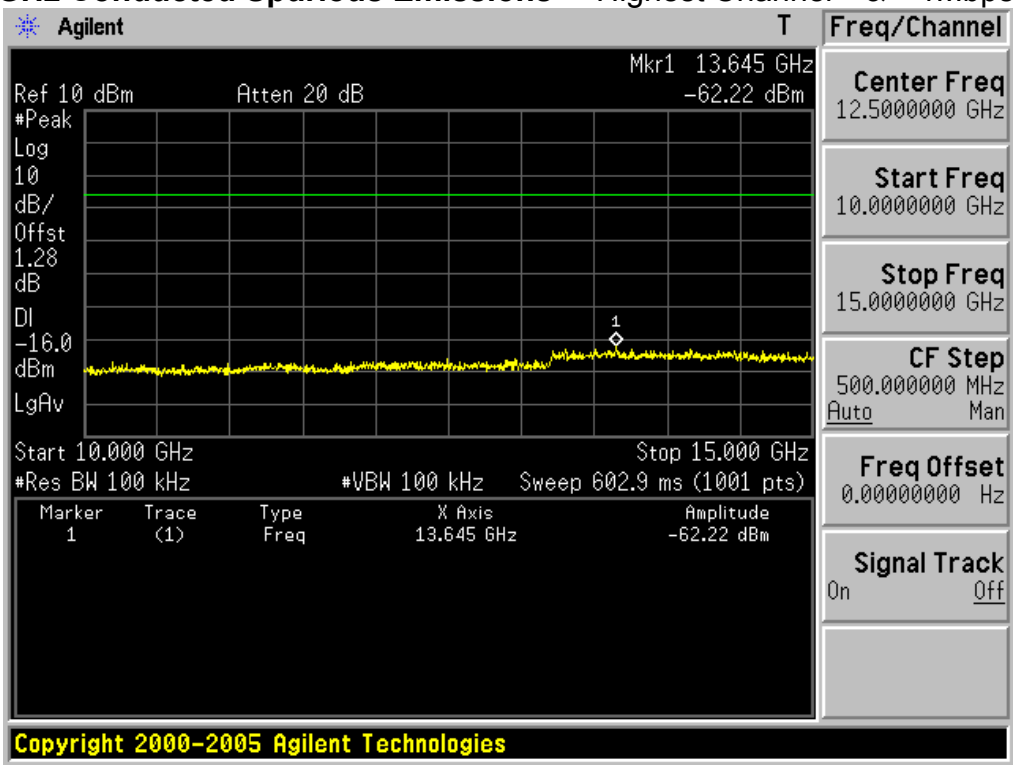
30MHz ~ 5GHz Conducted Spurious Emissions Highest Channel & 1Mbps



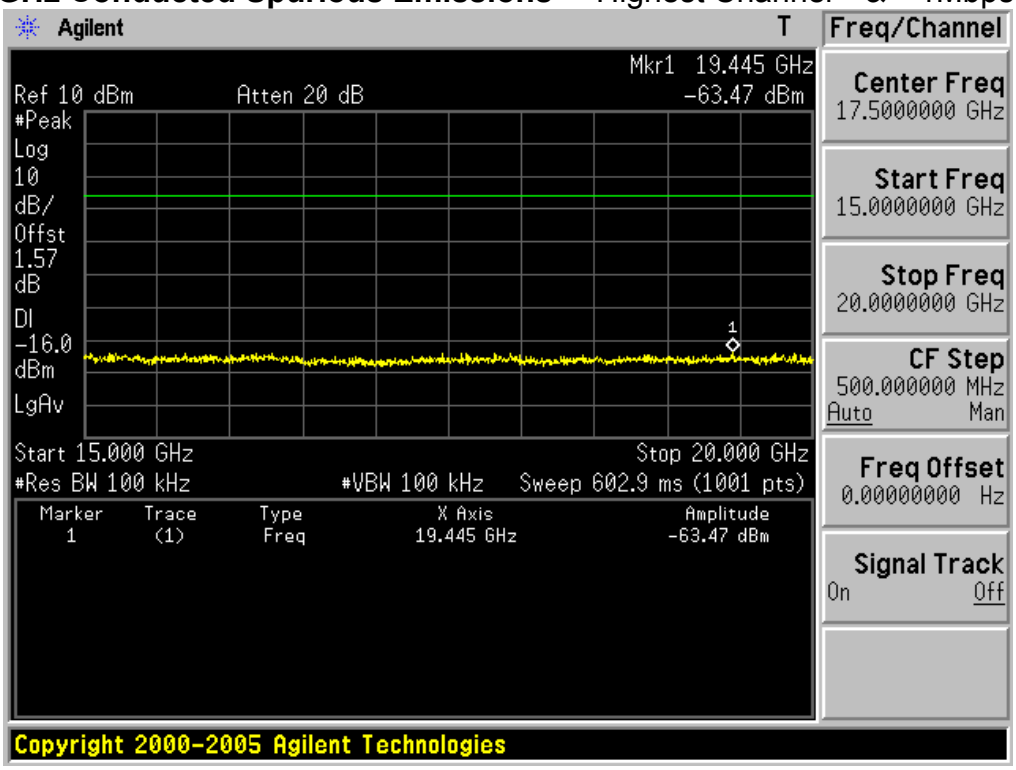
5GHz ~ 10GHz Conducted Spurious Emissions Highest Channel & 1Mbps



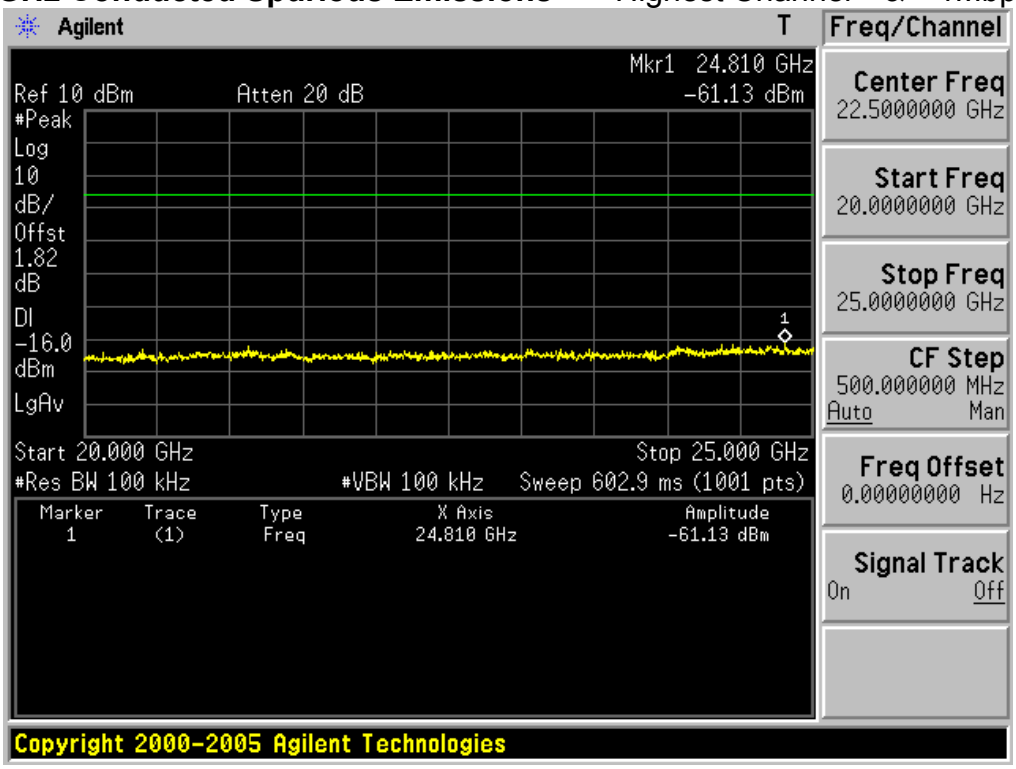
10GHz ~ 15GHz Conducted Spurious Emissions Highest Channel & 1Mbps



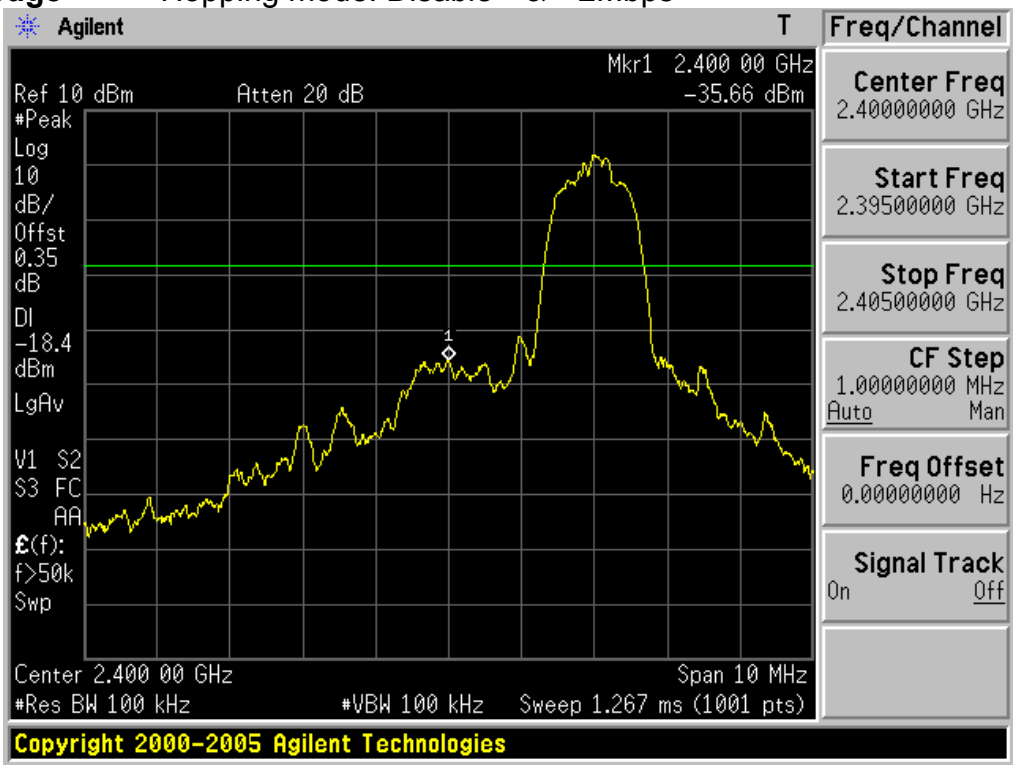
15GHz ~ 20GHz Conducted Spurious Emissions Highest Channel & 1Mbps



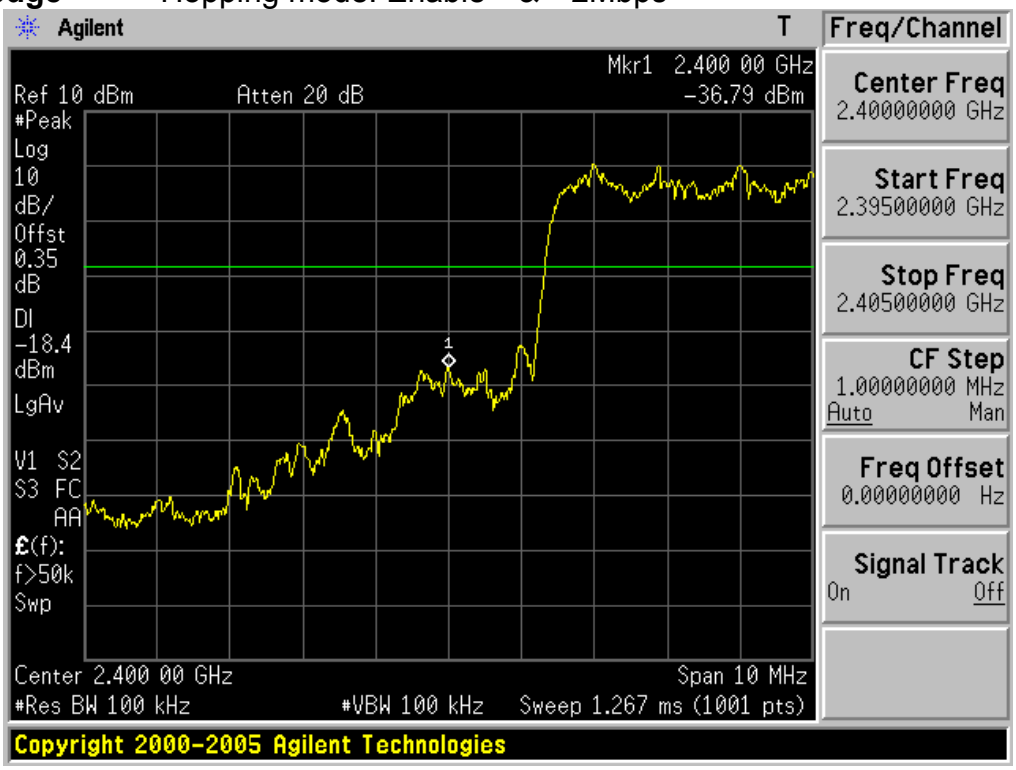
20GHz ~ 25GHz Conducted Spurious Emissions Highest Channel & 1Mbps



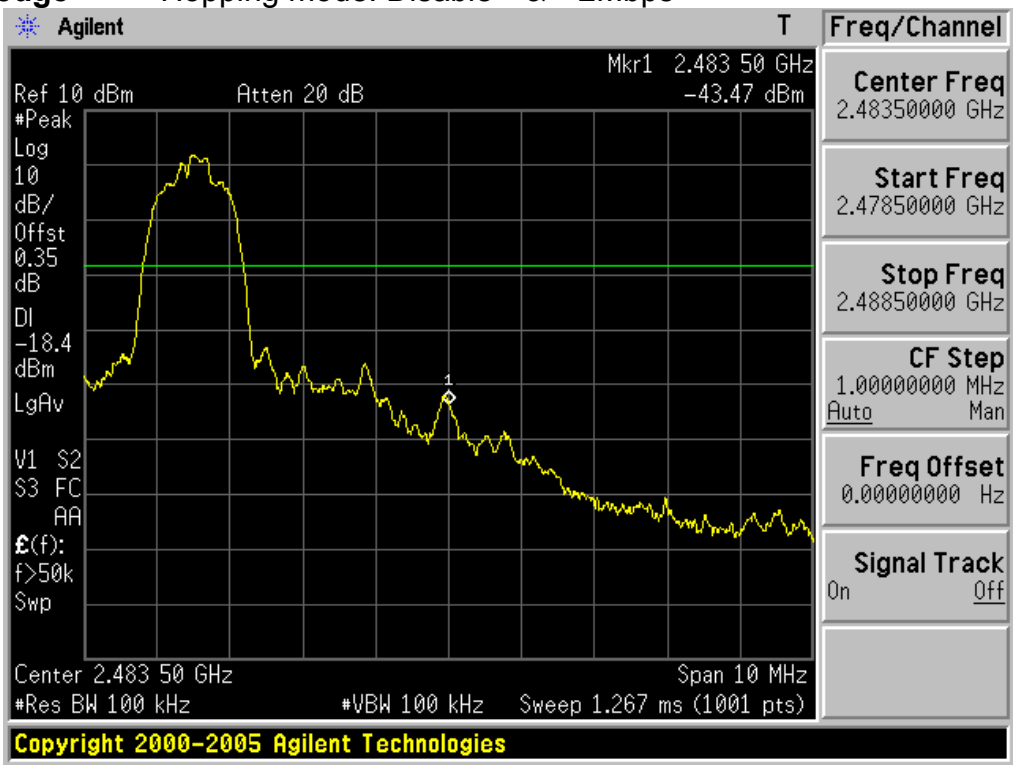
Low Band-edge Hopping mode: Disable & 2Mbps



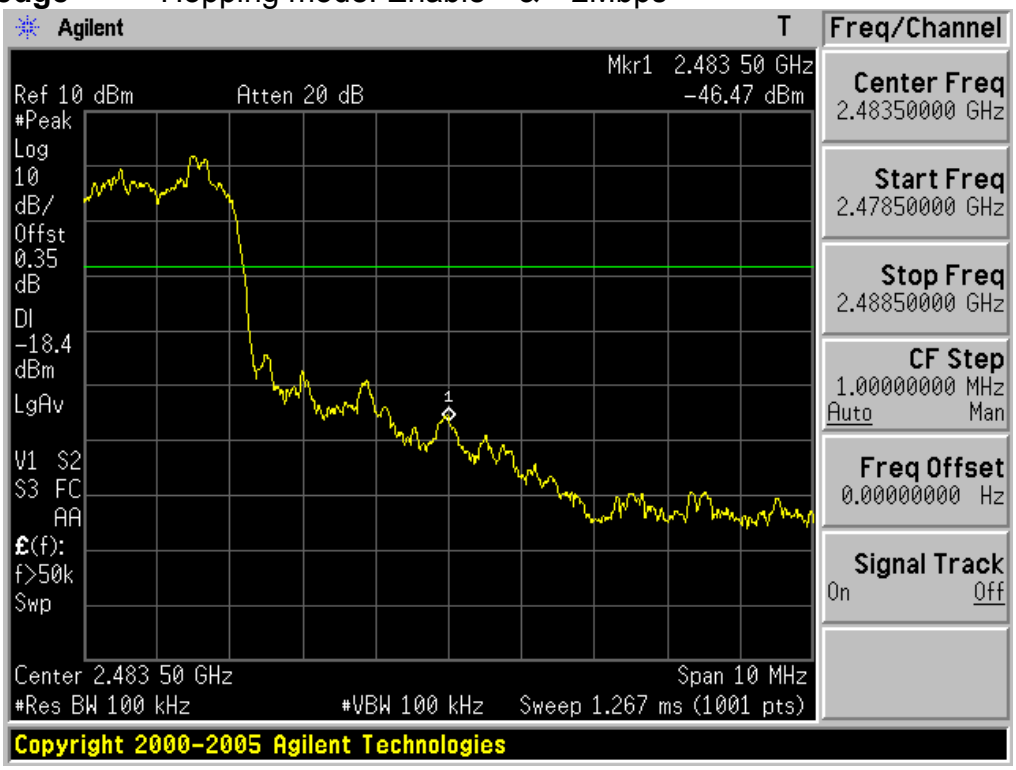
Low Band-edge Hopping mode: Enable & 2Mbps



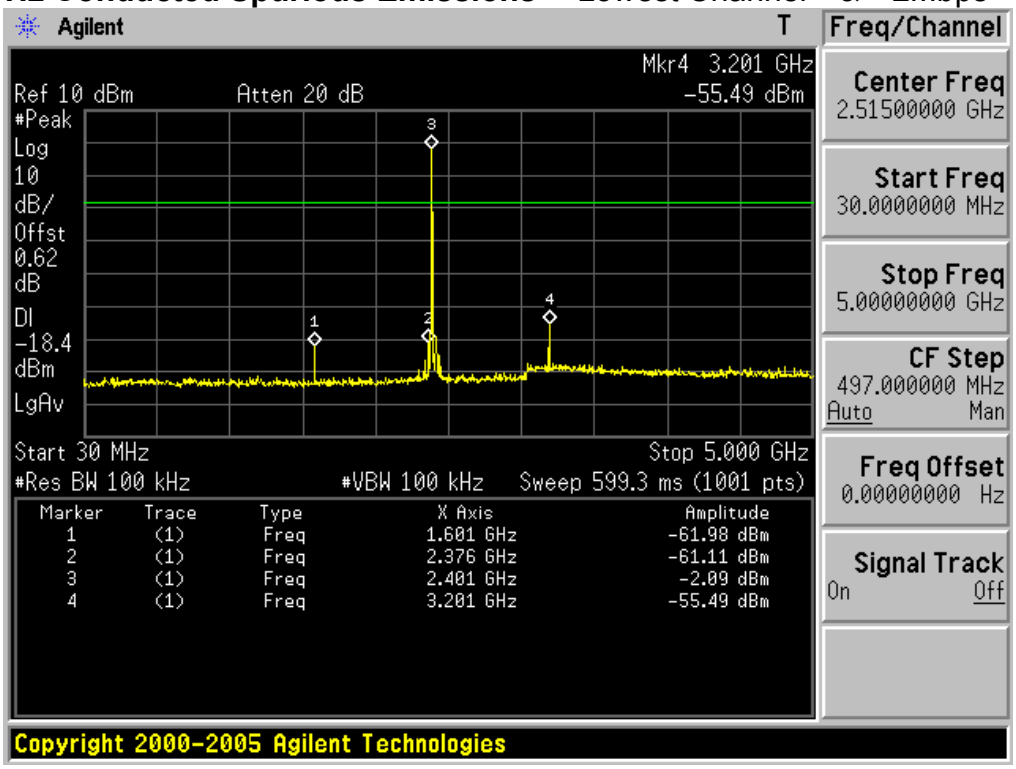
High Band-edge Hopping mode: Disable & 2Mbps



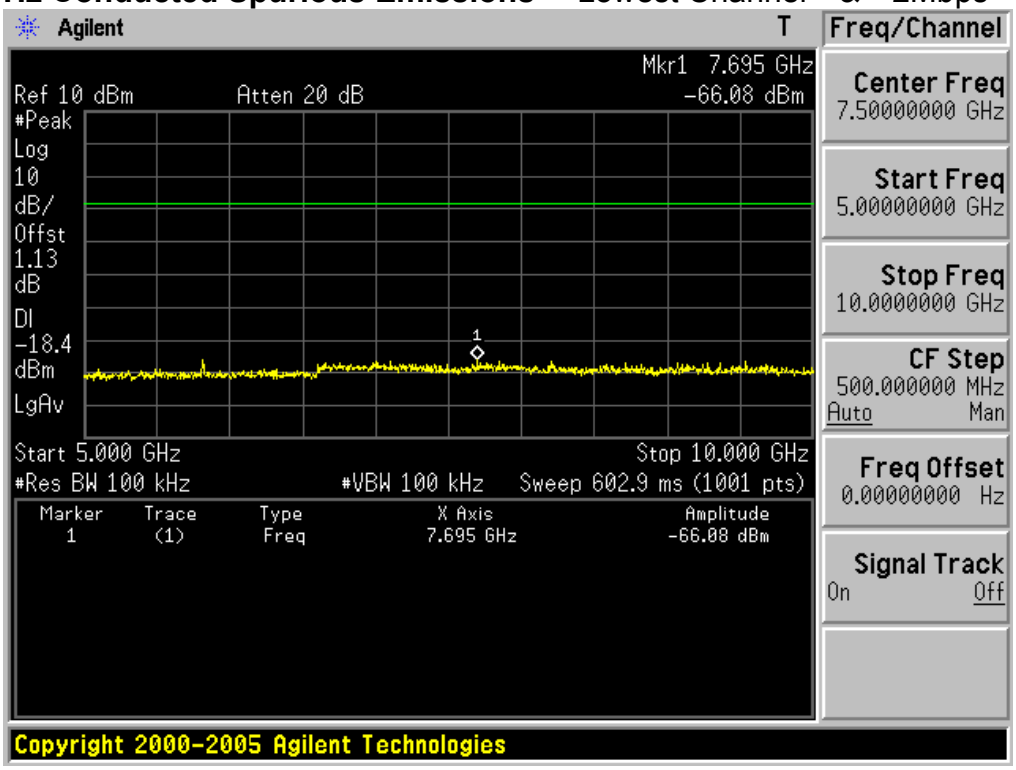
High Band-edge Hopping mode: Enable & 2Mbps



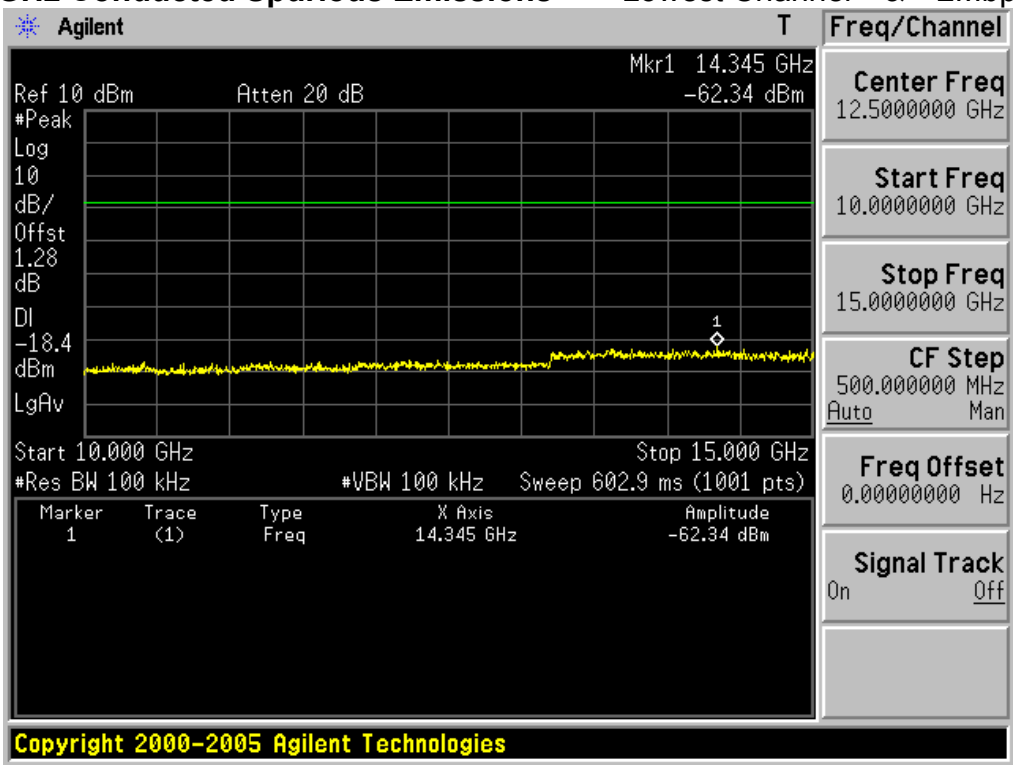
30MHz ~ 5GHz Conducted Spurious Emissions Lowest Channel & 2Mbps



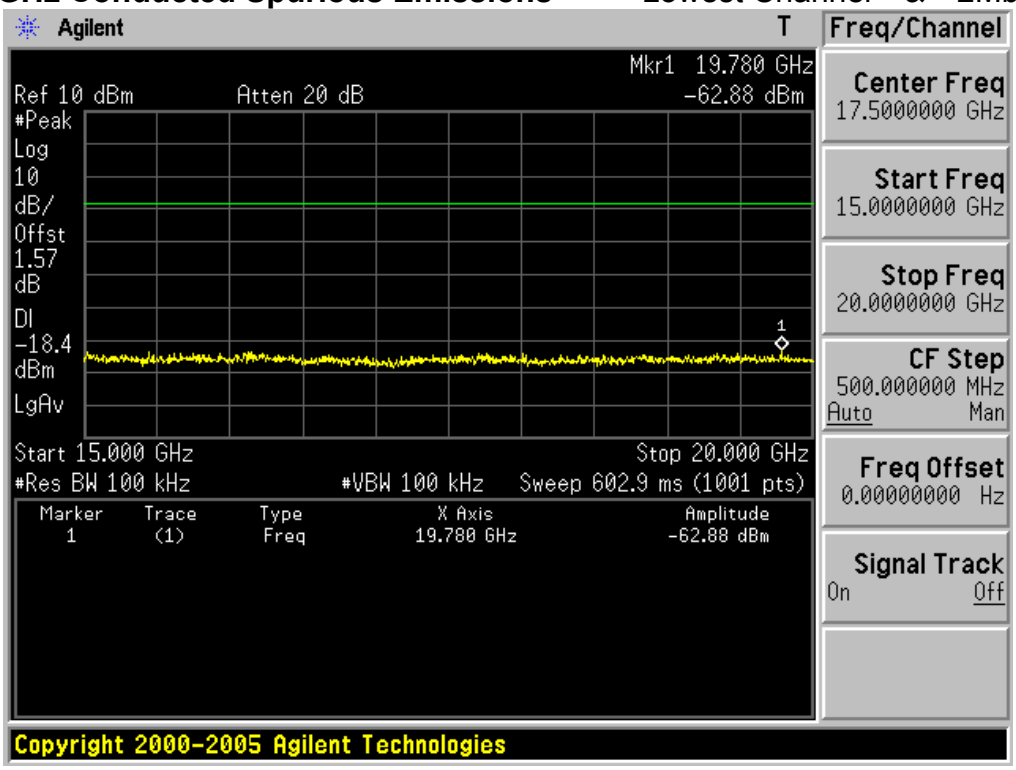
5GHz ~ 10GHz Conducted Spurious Emissions Lowest Channel & 2Mbps



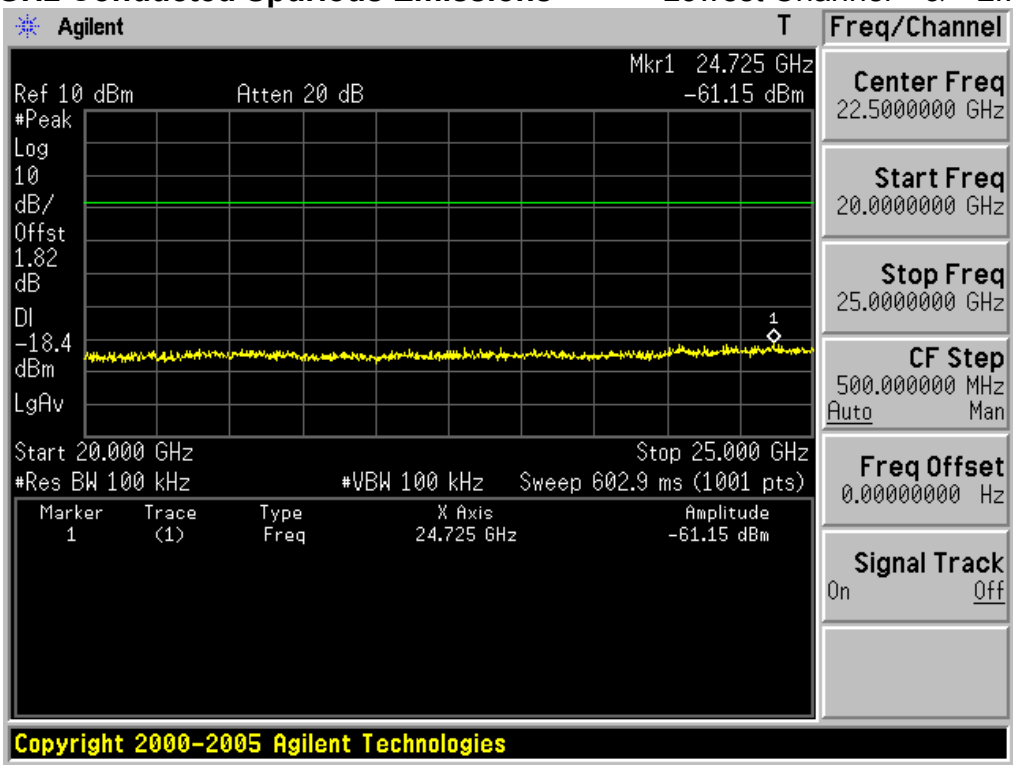
10GHz ~ 15GHz Conducted Spurious Emissions Lowest Channel & 2Mbps



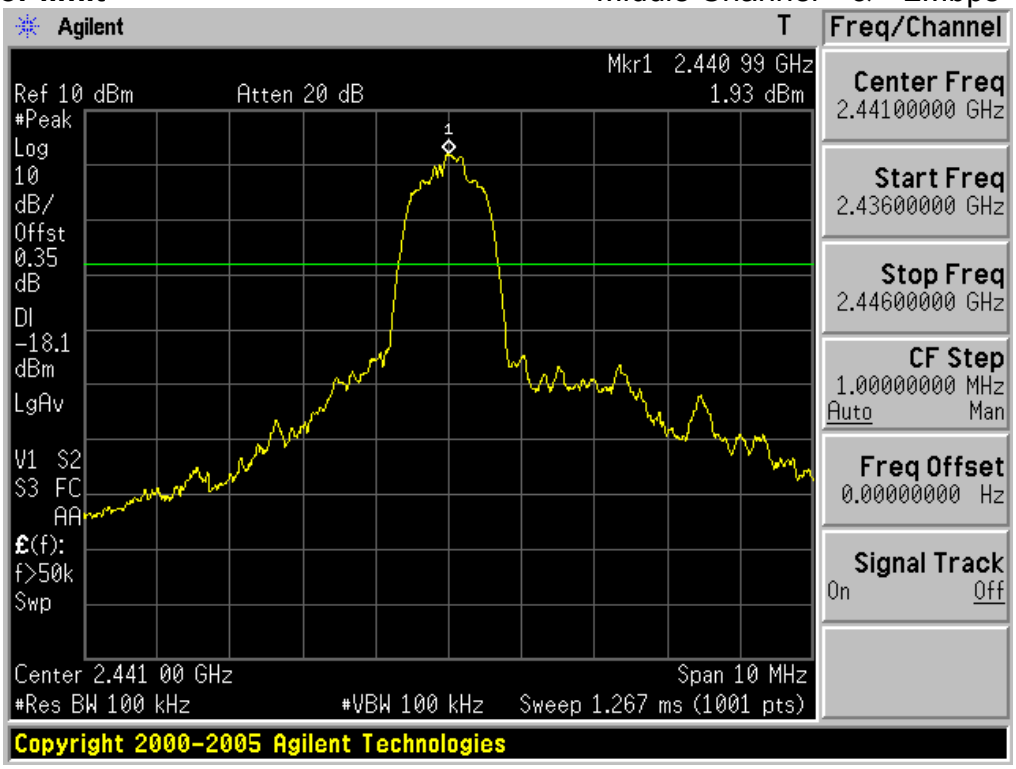
15GHz ~ 20GHz Conducted Spurious Emissions Lowest Channel & 2Mbps



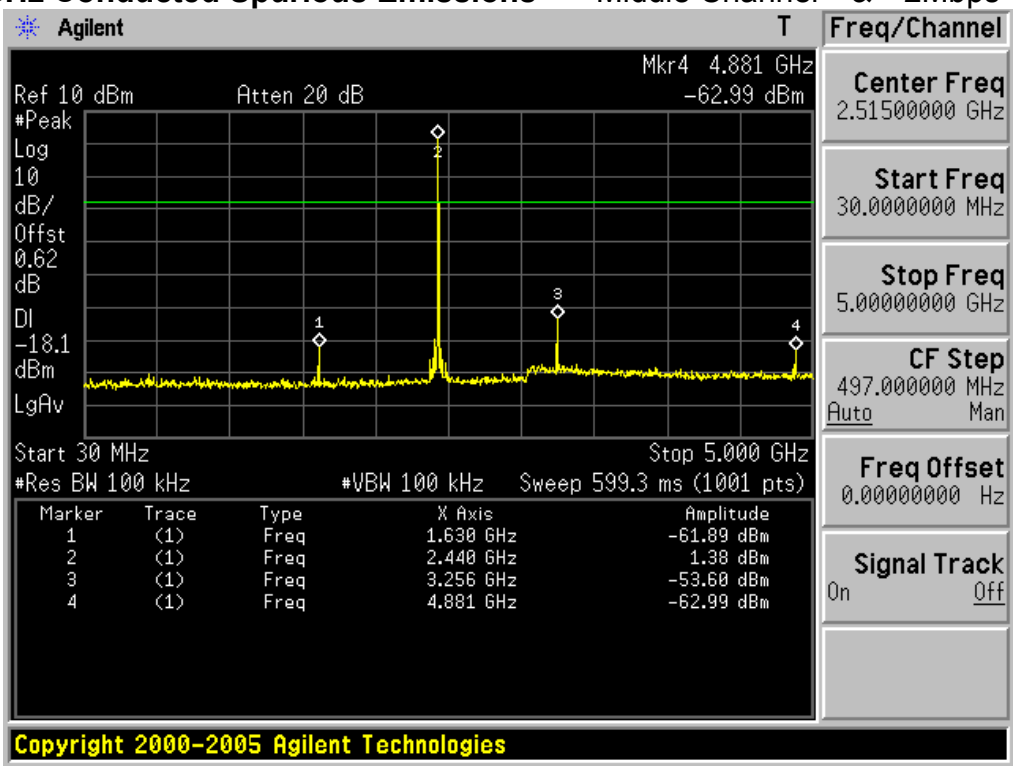
20GHz ~ 25GHz Conducted Spurious Emissions Lowest Channel & 2Mbps



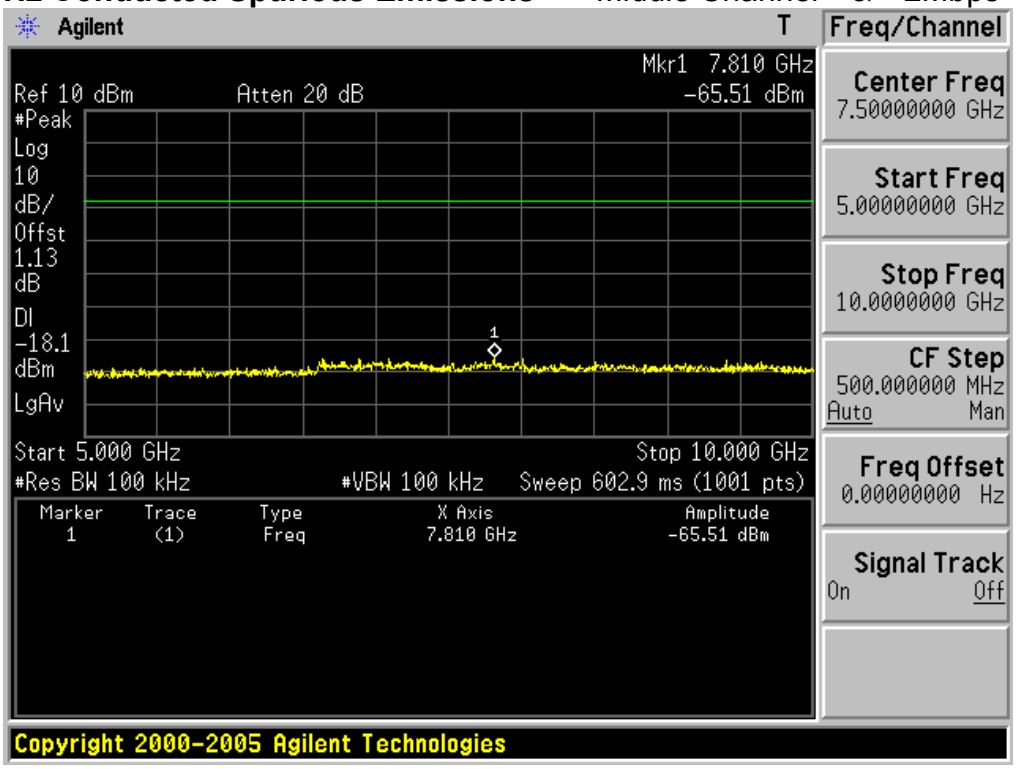
Reference for limit Middle Channel & 2Mbps



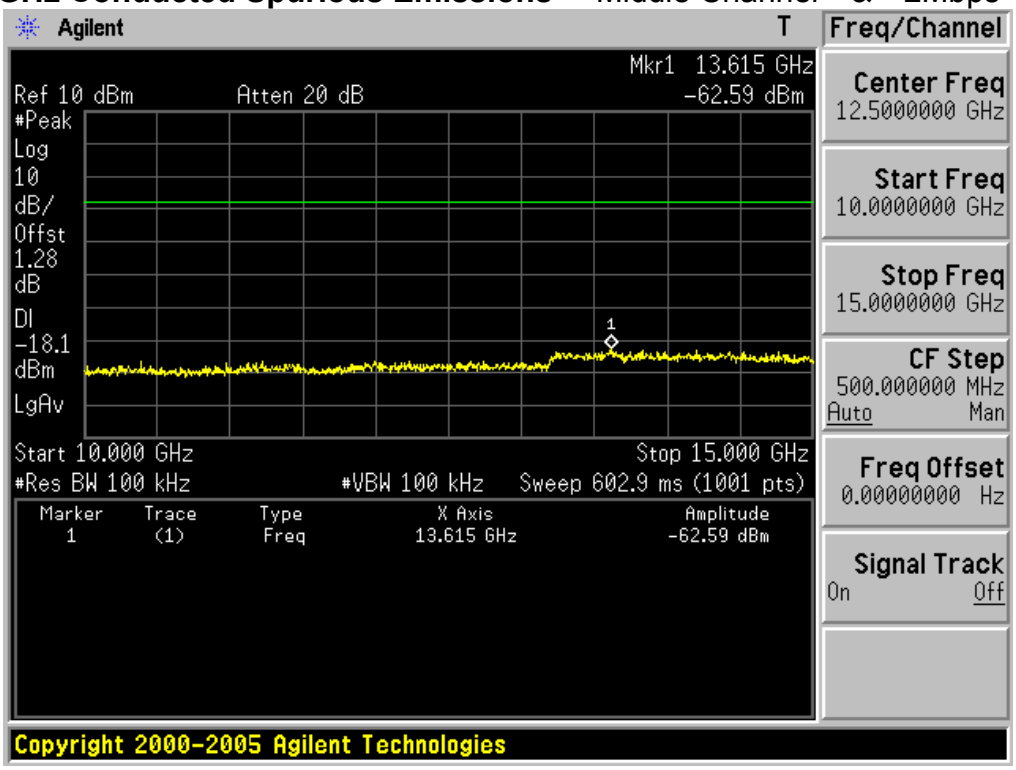
30MHz ~ 5GHz Conducted Spurious Emissions Middle Channel & 2Mbps



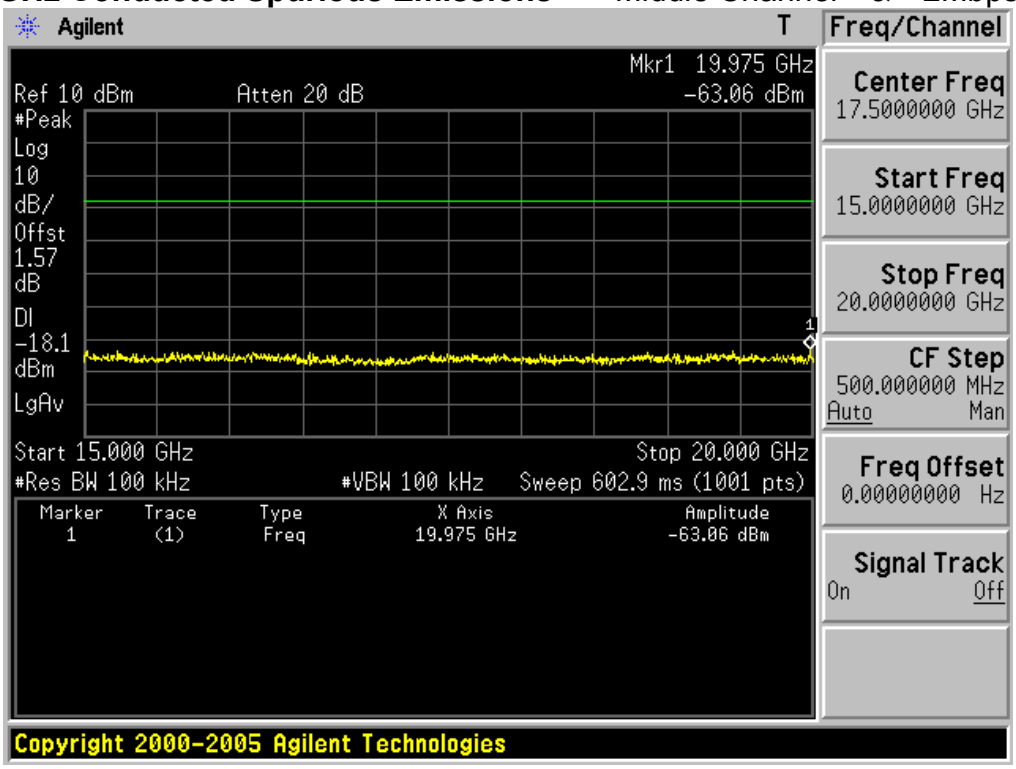
5GHz ~ 10GHz Conducted Spurious Emissions Middle Channel & 2Mbps



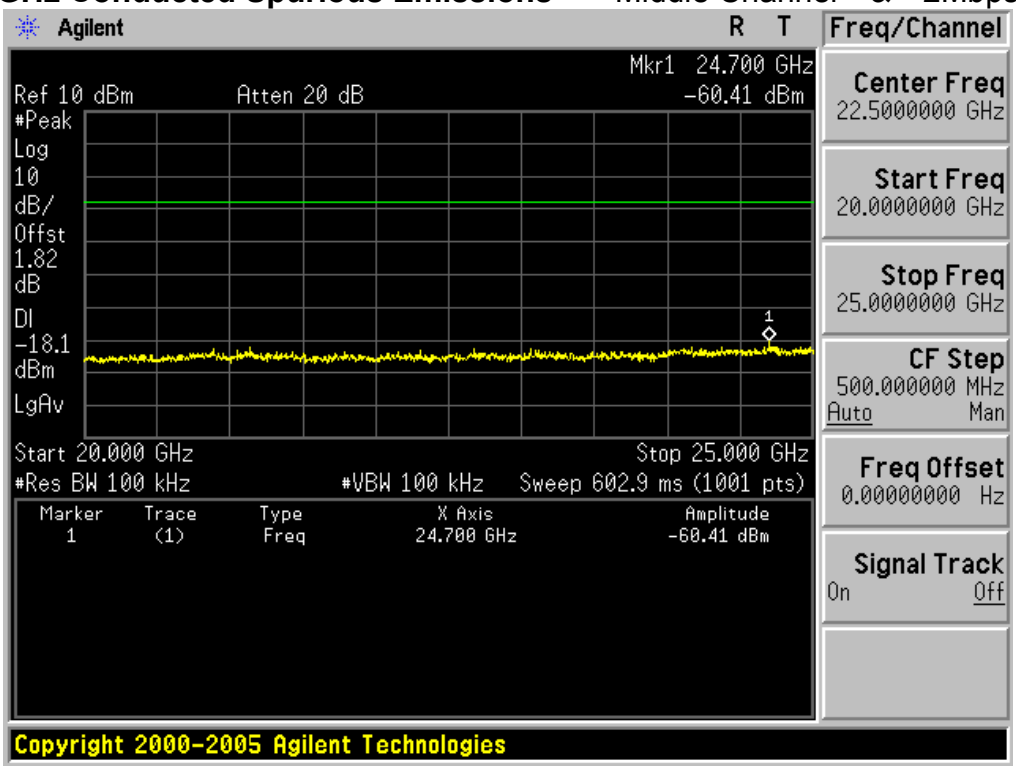
10GHz ~ 15GHz Conducted Spurious Emissions Middle Channel & 2Mbps



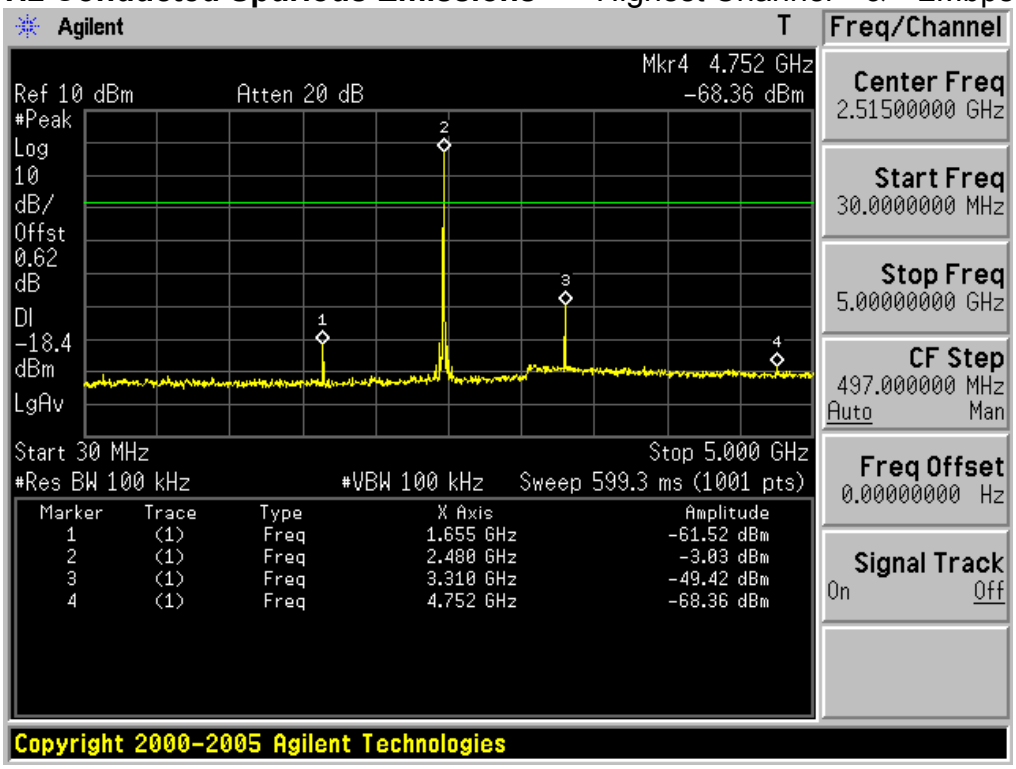
15GHz ~ 20GHz Conducted Spurious Emissions Middle Channel & 2Mbps



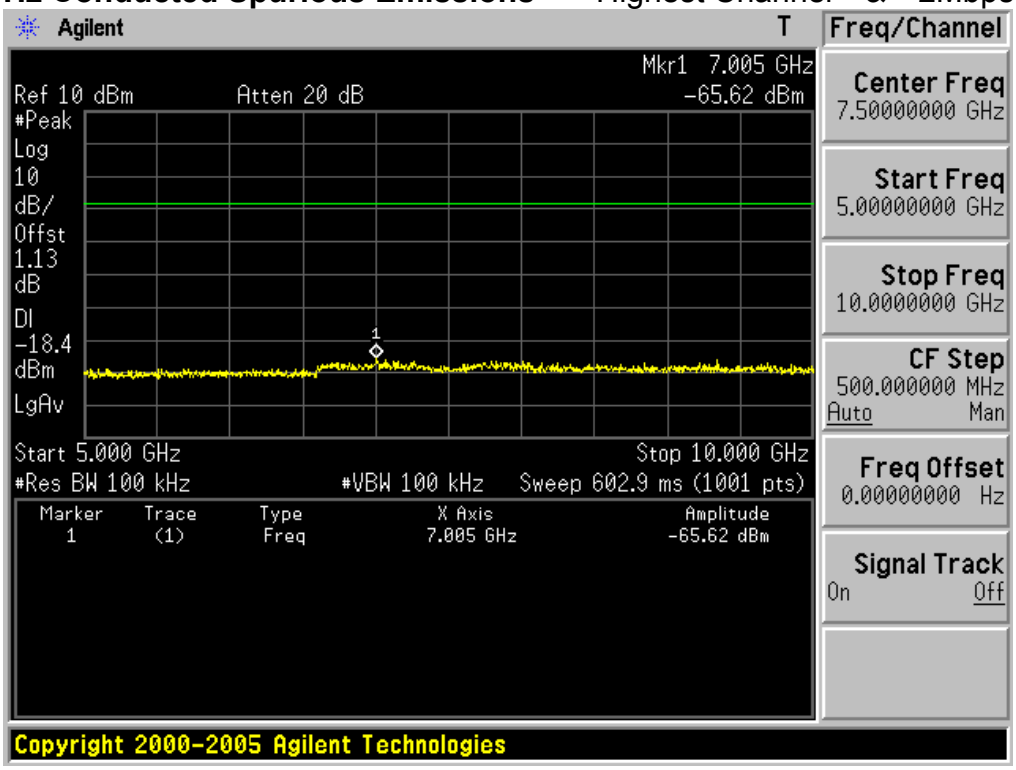
20GHz ~ 25GHz Conducted Spurious Emissions Middle Channel & 2Mbps



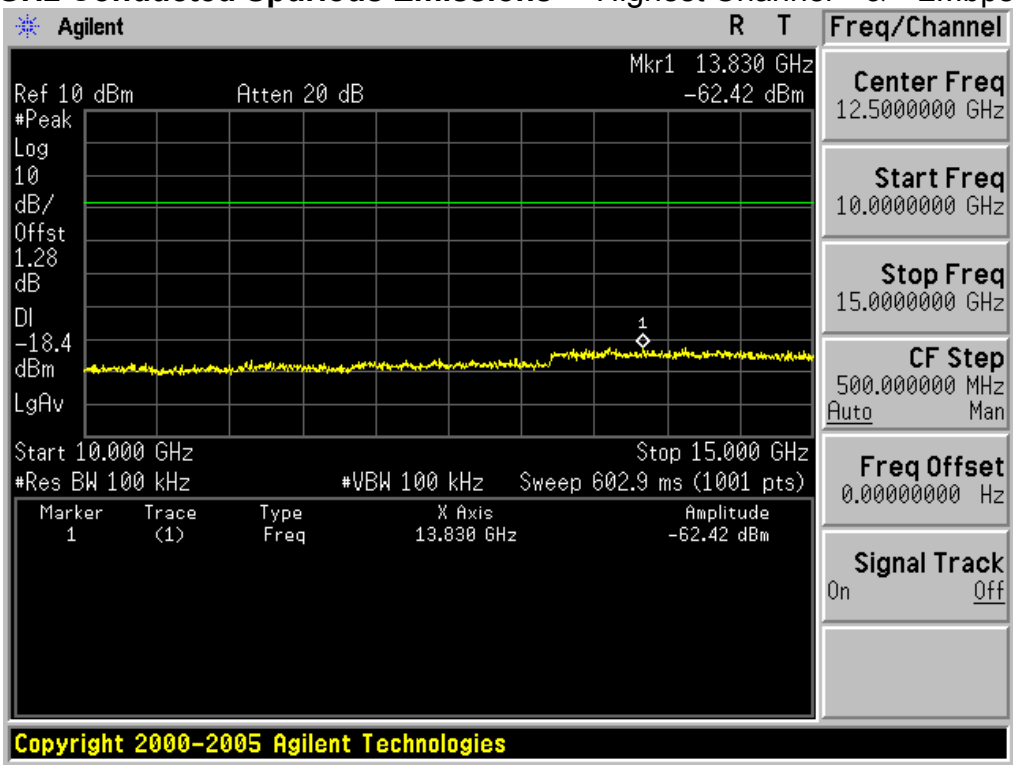
30MHz ~ 5GHz Conducted Spurious Emissions Highest Channel & 2Mbps



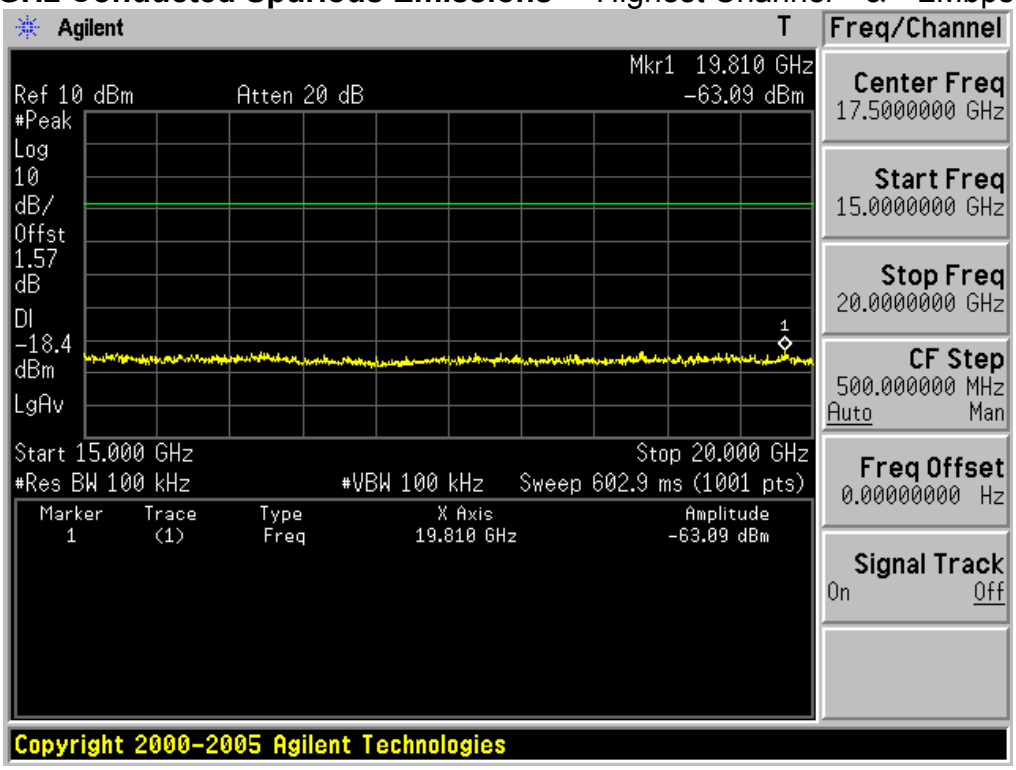
5GHz ~ 10GHz Conducted Spurious Emissions Highest Channel & 2Mbps



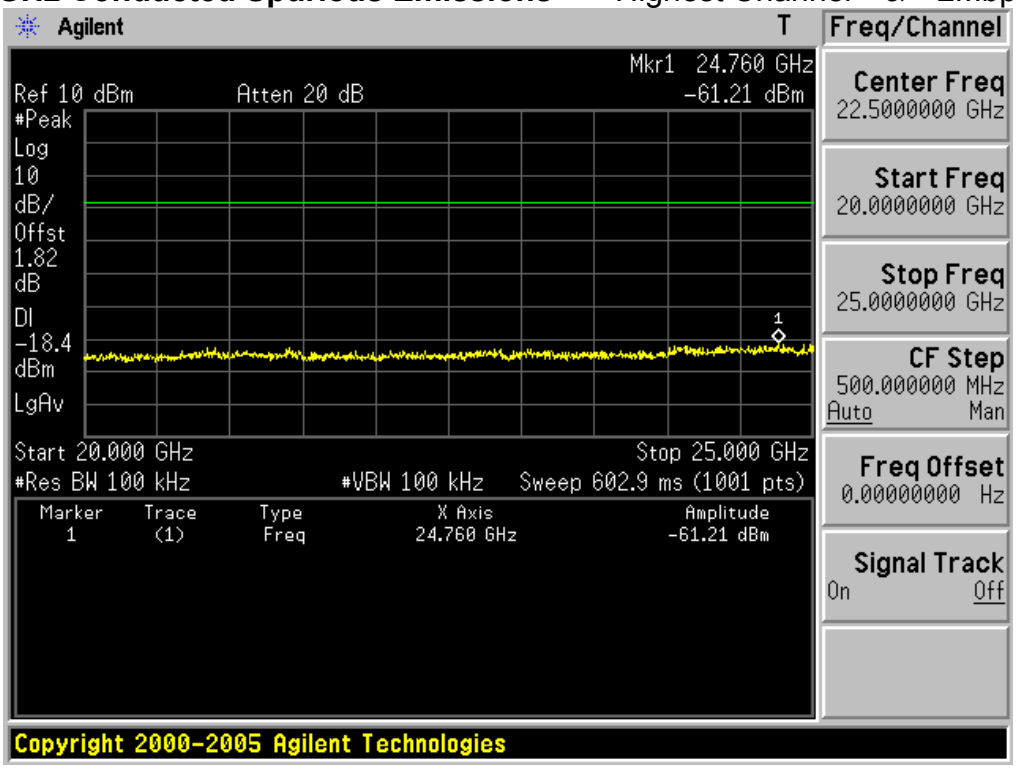
10GHz ~ 15GHz Conducted Spurious Emissions Highest Channel & 2Mbps



15GHz ~ 20GHz Conducted Spurious Emissions Highest Channel & 2Mbps



20GHz ~ 25GHz Conducted Spurious Emissions Highest Channel & 2Mbps



3.2.7 Radiated Spurious Emissions

- 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 = ≥ RBW
2. Frequency range: 1GHz ~ 10th harmonics
Peak mode: RBW = 1MHz / VBW = ≥ 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.

- 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.

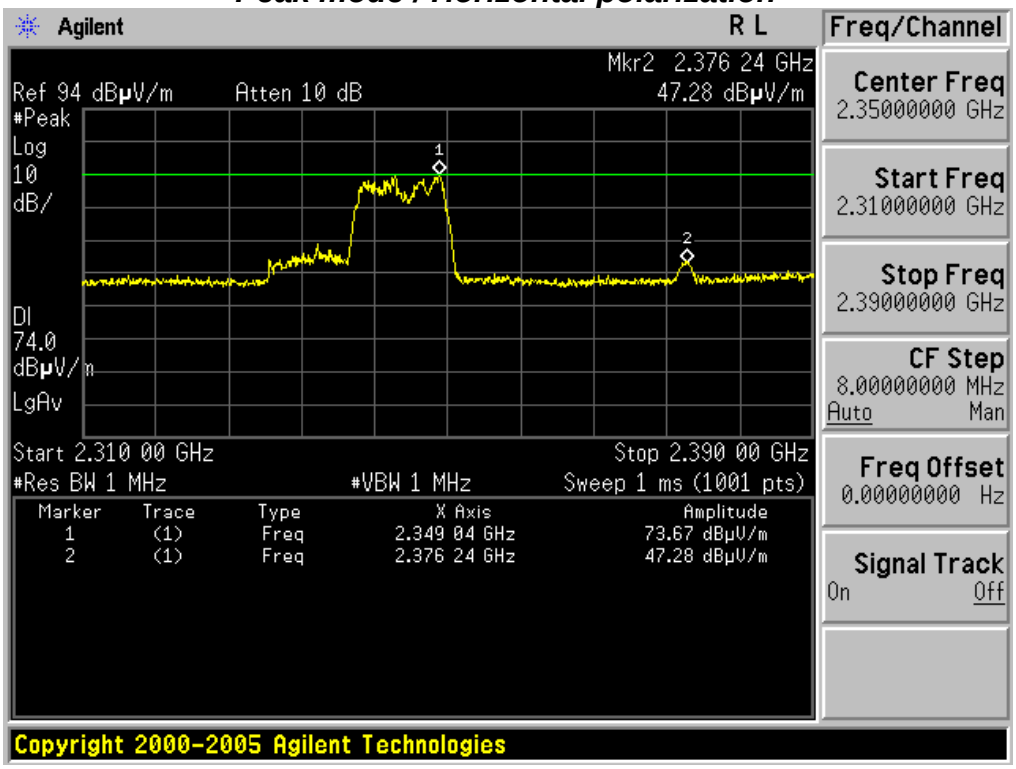
▪ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

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 Lowest Channel & 1Mbps & The worst case EUT Position: Z-axis

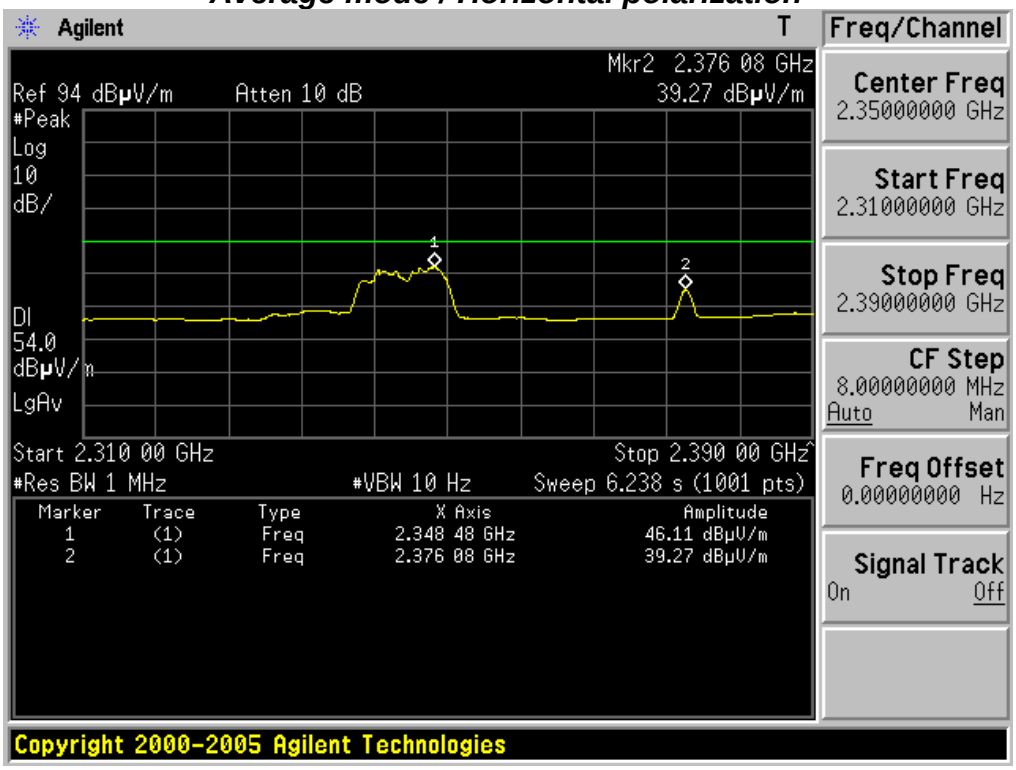
Peak mode / Horizontal polarization



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

Restricted Band Edge Lowest Channel & 1Mbps & The worst case EUT Position: Z-axis

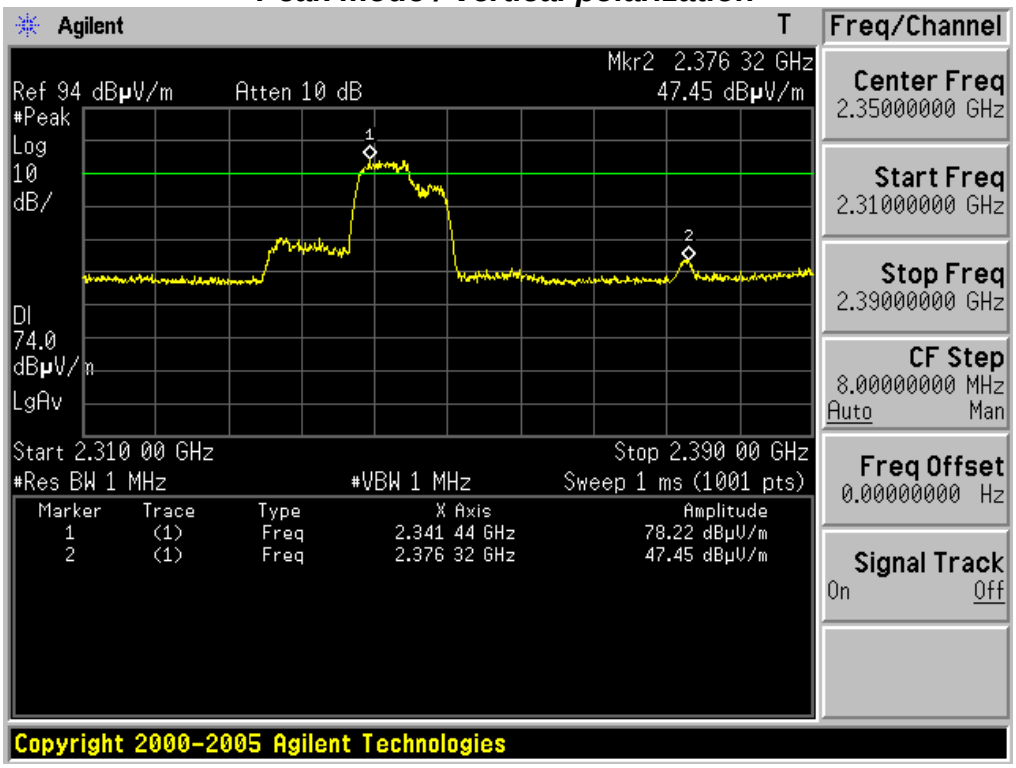
Average mode / Horizontal polarization



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

Restricted Band Edge Lowest Channel & 1Mbps & The worst case EUT Position: Y-axis

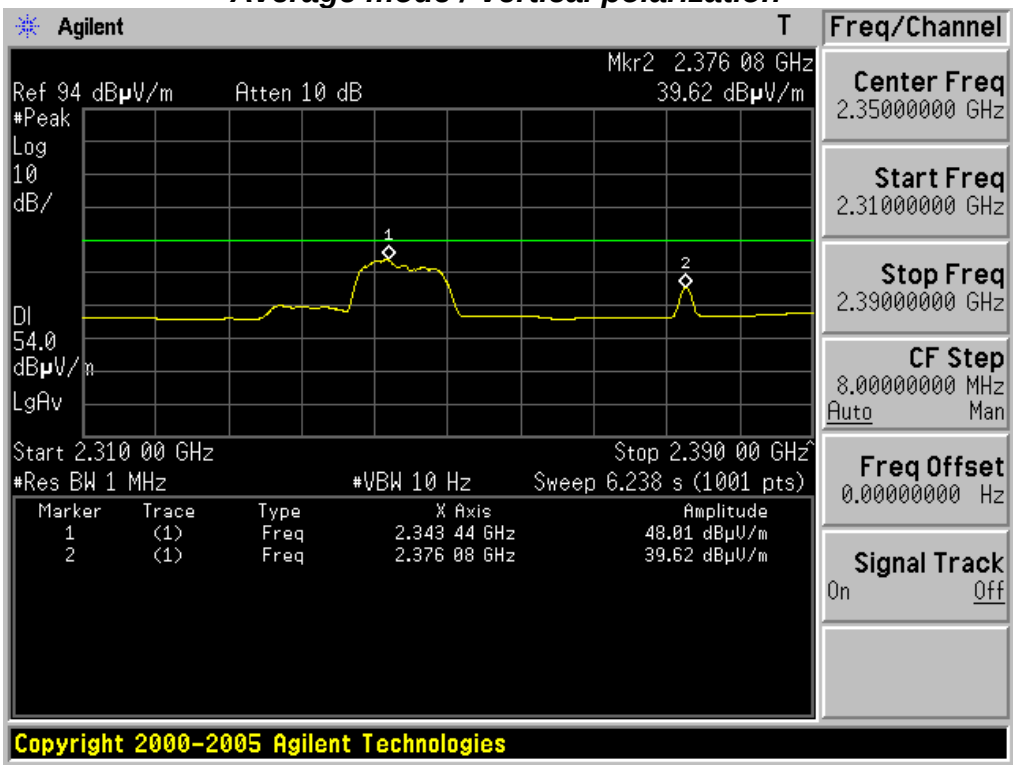
Peak mode / Vertical polarization



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

Restricted Band Edge Lowest Channel & 1Mbps & The worst case EUT Position: Y-axis

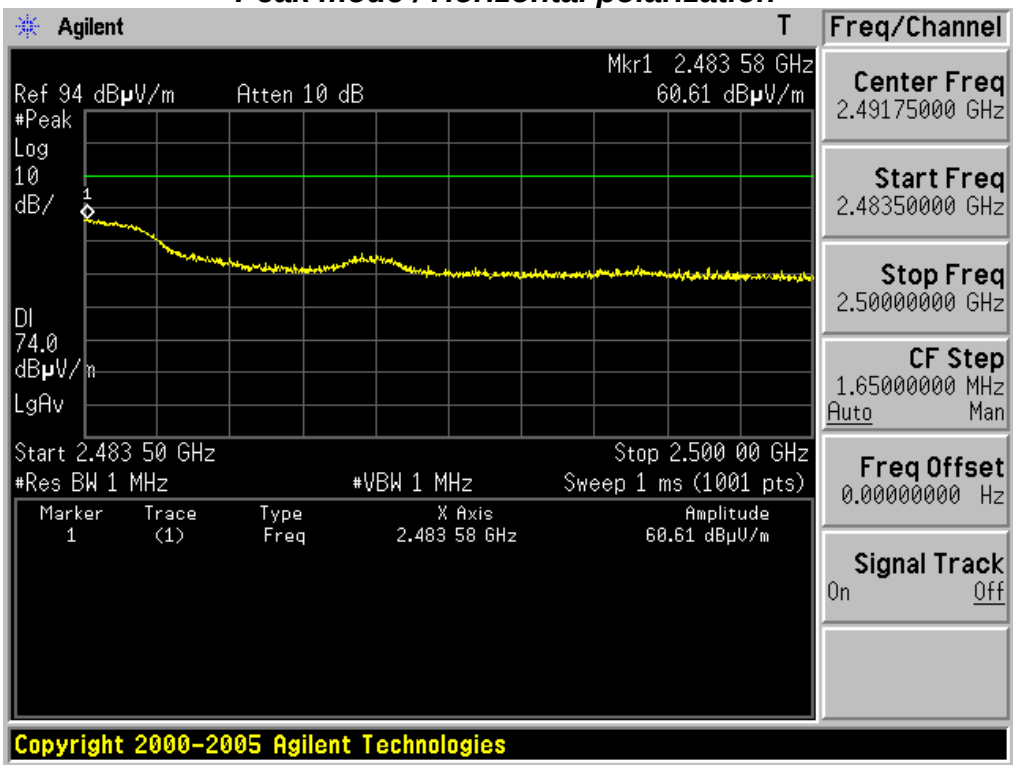
Average mode / Vertical polarization



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

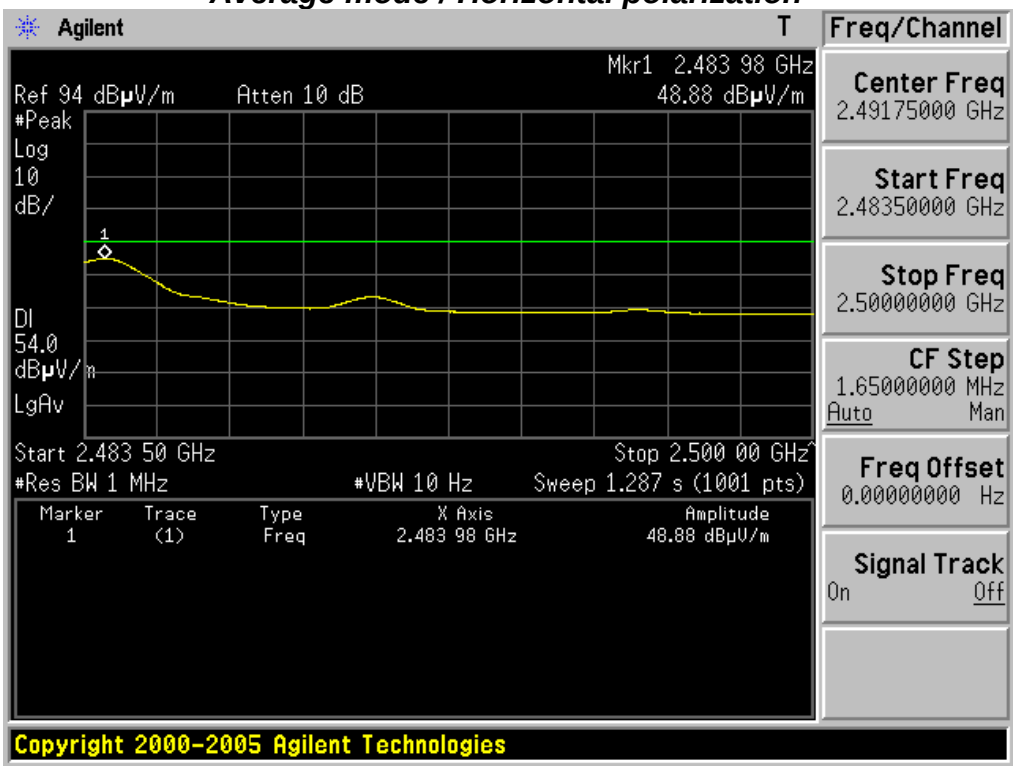
Restricted Band Edge Highest Channel & 1Mbps & The worst case EUT Position: X-axis

Peak mode / Horizontal polarization



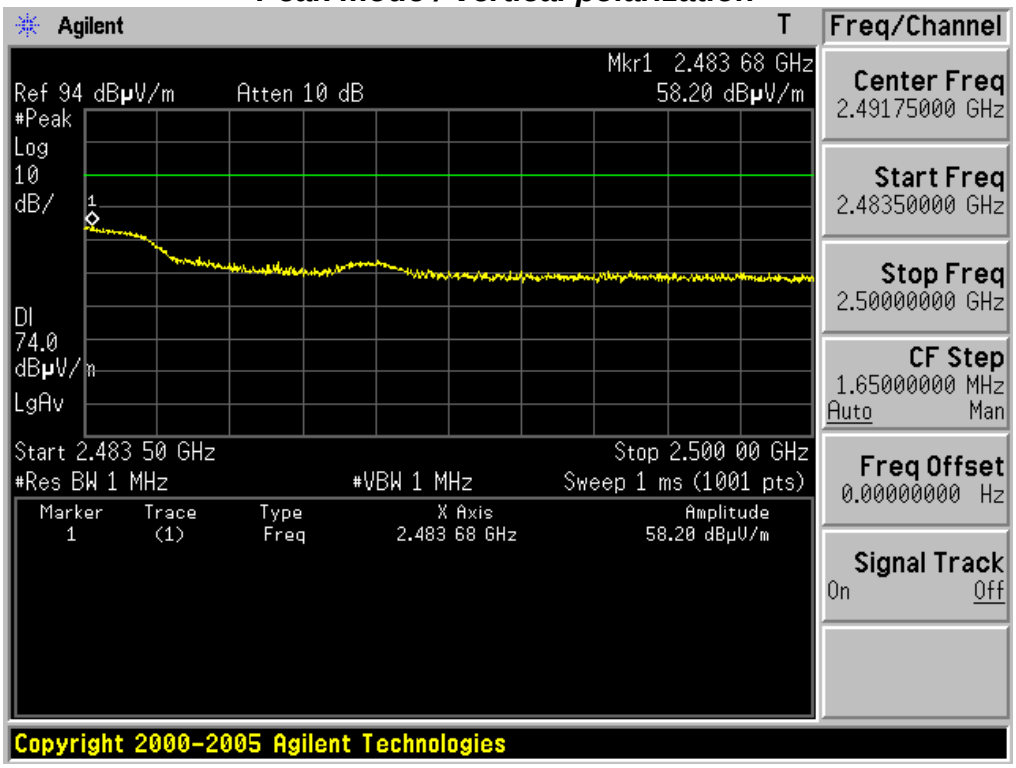
Restricted Band Edge Highest Channel & 1Mbps & The worst case EUT Position: X-axis

Average mode / Horizontal polarization



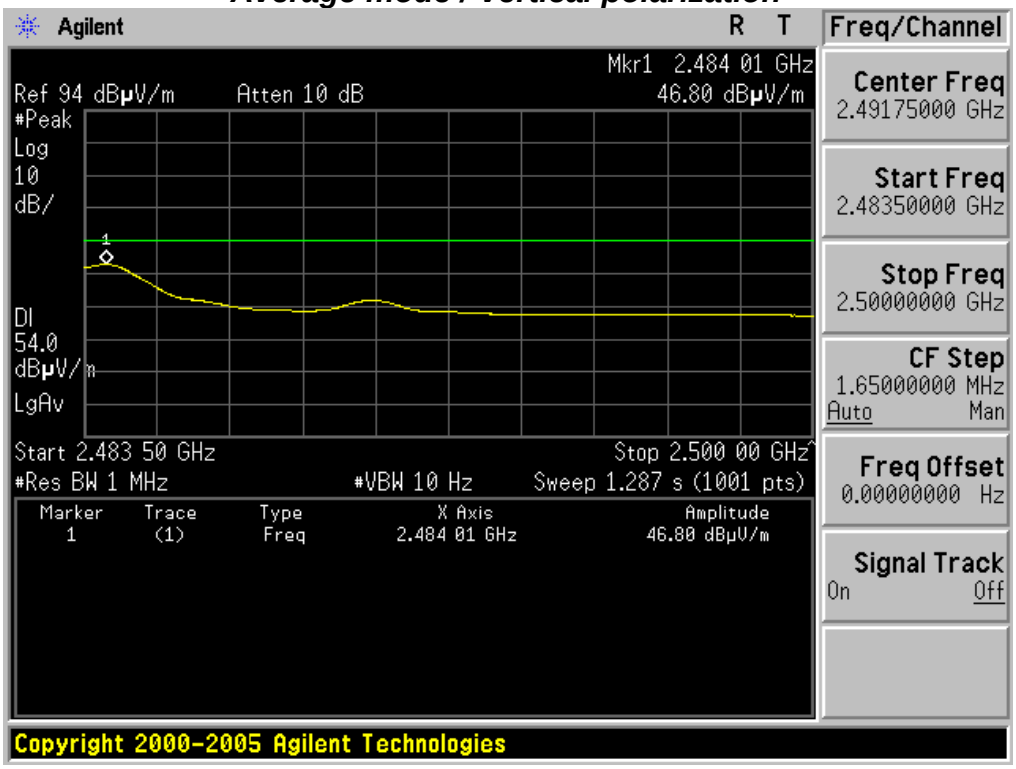
Restricted Band Edge Highest Channel & 1Mbps & The worst case EUT Position: Y-axis

Peak mode / Vertical polarization



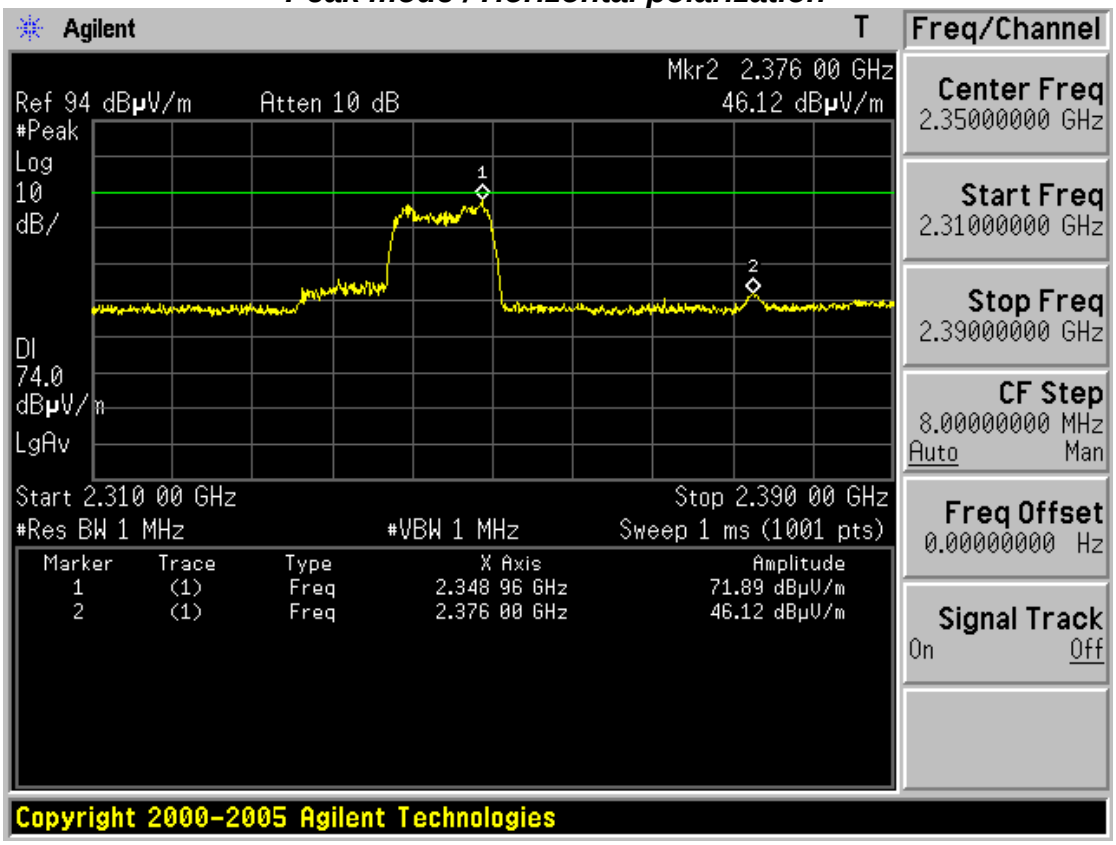
Restricted Band Edge Highest Channel & 1Mbps & The worst case EUT Position: Y-axis

Average mode / Vertical polarization



Restricted Band Edge Lowest Channel & 2Mbps & The worst case EUT Position: X-axis

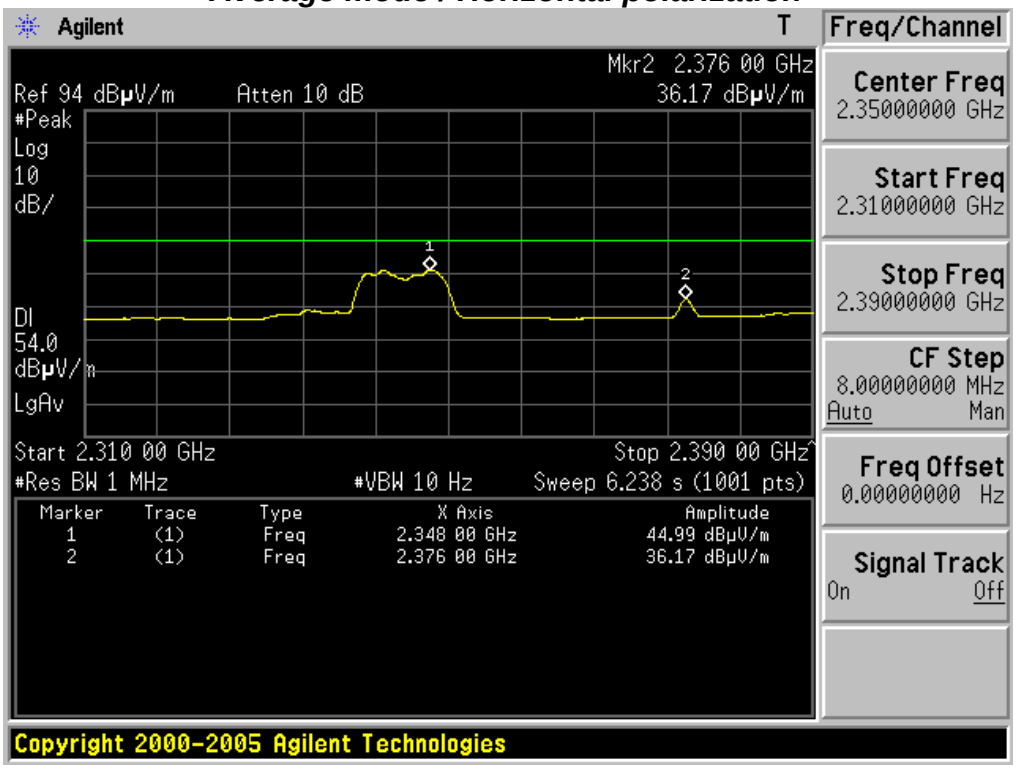
Peak mode / Horizontal polarization



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

Restricted Band Edge Lowest Channel & 2Mbps & The worst case EUT Position: X-axis

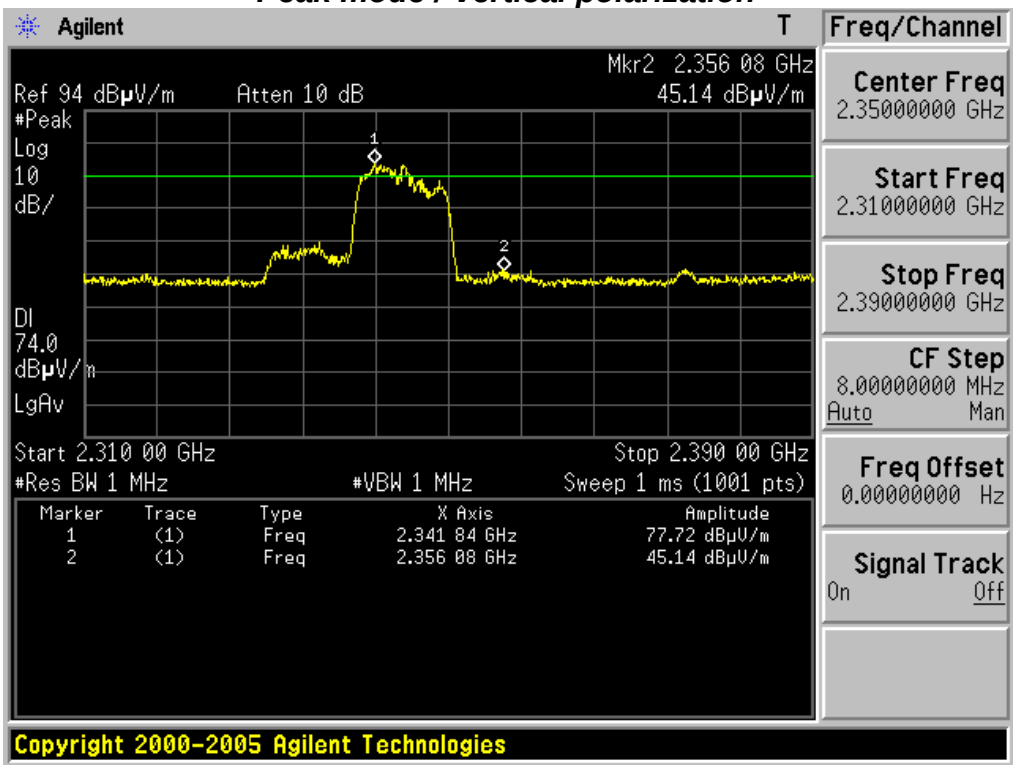
Average mode / Horizontal polarization



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

Restricted Band Edge Lowest Channel & 2Mbps & The worst case EUT Position: Y-axis

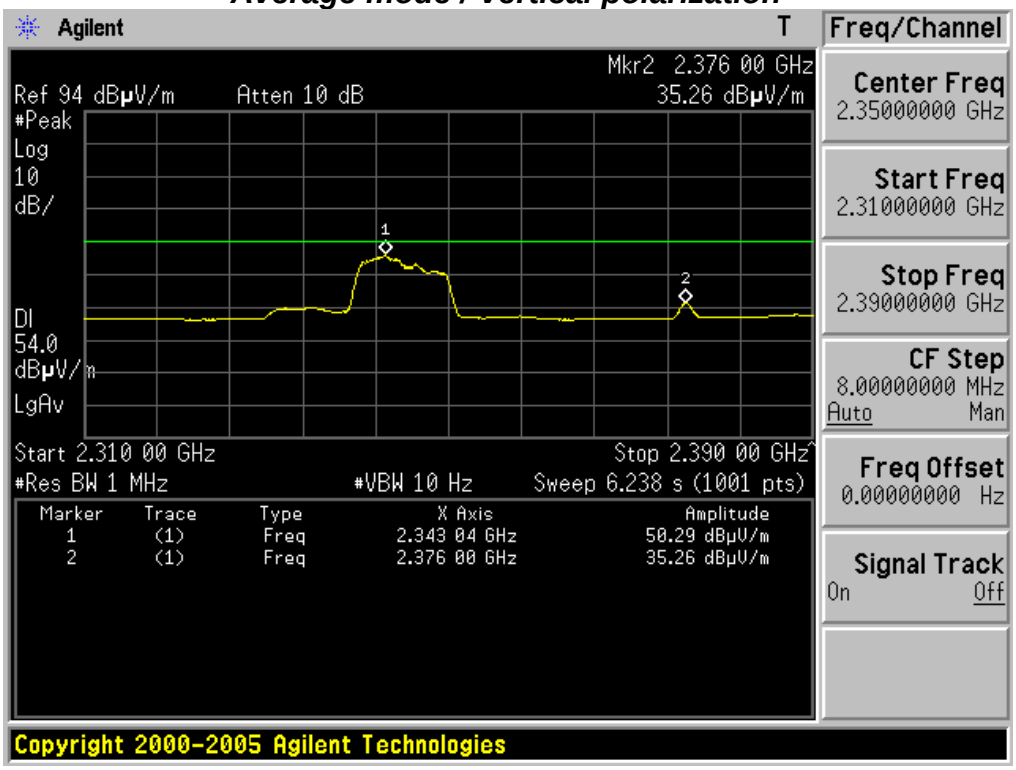
Peak mode / Vertical polarization



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

Restricted Band Edge Lowest Channel & 2Mbps & The worst case EUT Position: Y-axis

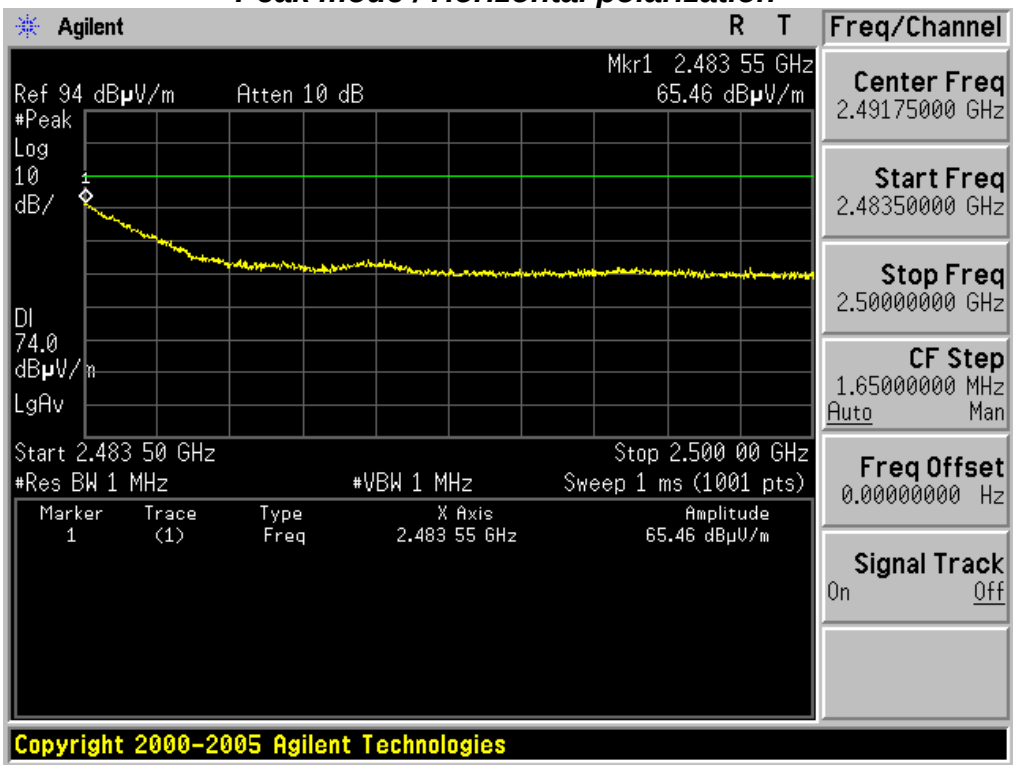
Average mode / Vertical polarization



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

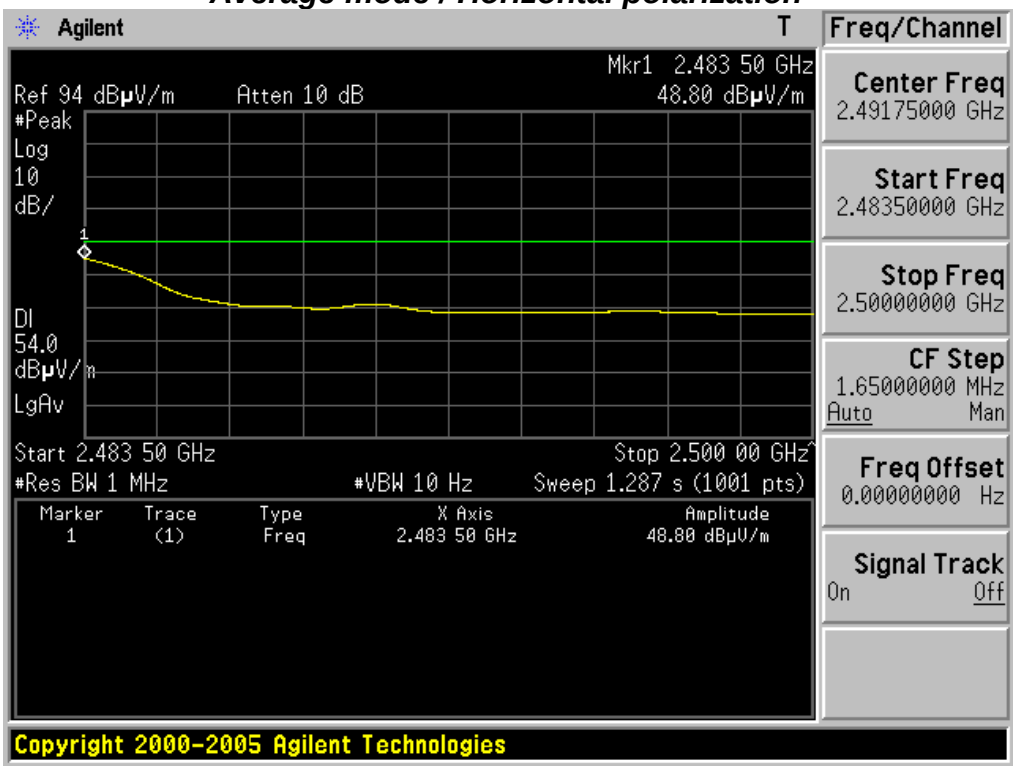
Restricted Band Edge Highest Channel & 2Mbps & The worst case EUT Position: X-axis

Peak mode / Horizontal polarization



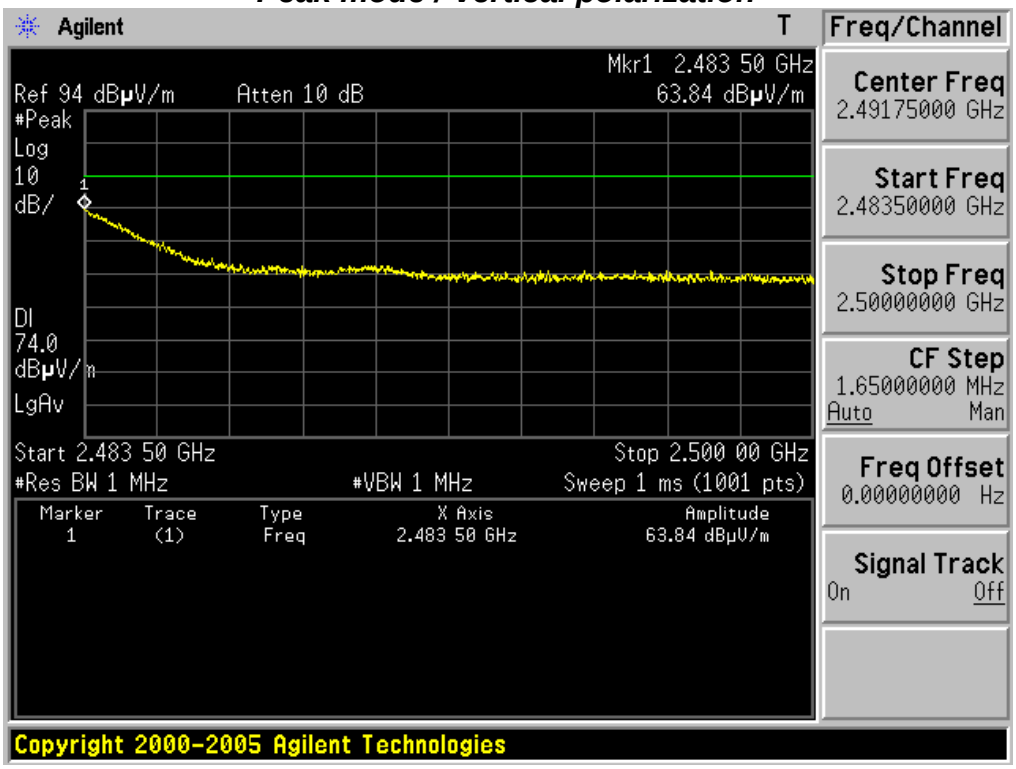
Restricted Band Edge Highest Channel & 2Mbps & The worst case EUT Position: X-axis

Average mode / Horizontal polarization



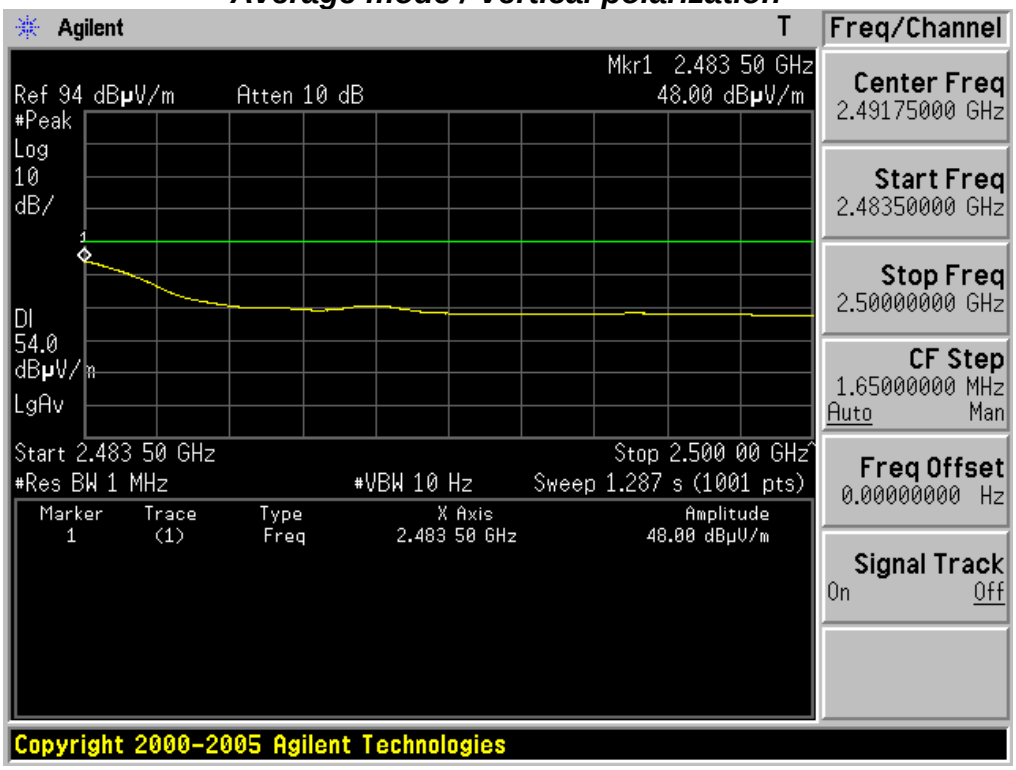
Restricted Band Edge Highest Channel & 2Mbps & The worst case EUT Position: Y-axis

Peak mode / Vertical polarization



Restricted Band Edge Highest Channel & 2Mbps & The worst case EUT Position: Y-axis

Average mode / Vertical polarization



30MHz ~ 1GHz Radiated Spurious Emissions & 1Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
938.888	H	Z axis	19.91	1.08	20.99	46.00	25.01
-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
938.231	H	Z axis	20.20	1.08	21.28	46.00	24.72
-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
937.836	H	Z axis	20.21	1.06	21.27	46.00	24.73
-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 30dB below limit.
2. Above listed point data is the worst case data.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

30MHz ~ 1GHz Radiated Spurious Emissions & 2Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
937.256	H	X axis	20.60	1.06	21.66	46.00	24.34
-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
937.423	H	X axis	19.00	1.07	20.07	46.00	25.93
-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)	T.F (dB/m)	Result(dBuV/m)	Limit(dBuV/m)	Margin(dB)
			QP		QP	QP	QP
937.234	H	Z axis	19.80	1.06	20.86	46.00	25.14
-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 30dB below limit.
2. Above listed point data is the worst case data.
3. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

1GHz ~ 25GHz Radiated Spurious Emissions & 1Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4804.265	H	Z axis	47.76	39.43	5.28	-	53.04	44.71	74.00	54.00	20.96	9.29
4803.955	V	Z axis	47.49	39.58	5.28	-	52.77	44.86	74.00	54.00	21.23	9.14
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4882.310	H	X axis	48.19	39.68	5.27	-	53.46	44.95	74.00	54.00	20.54	9.05
4882.470	V	Y axis	48.75	40.31	5.27	-	54.02	45.58	74.00	54.00	19.98	8.42
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4959.585	H	X axis	47.15	37.71	5.64	-	52.79	43.35	74.00	54.00	21.21	10.65
4960.190	V	Y axis	47.52	38.64	5.64	-	53.16	44.28	74.00	54.00	20.84	9.72
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 25dB below limit.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F + D.C.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   D.C.F = Duty Correction Factor

1GHz ~ 25GHz Radiated Spurious Emissions & 2Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4806.015	H	Z axis	45.05	32.27	5.28	-	50.33	37.55	74.00	54.00	23.67	16.45
4803.825	V	X axis	44.11	31.81	5.28	-	49.39	37.09	74.00	54.00	24.61	16.91
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4881.895	H	Y axis	44.13	32.44	5.27	-	49.40	37.71	74.00	54.00	24.60	16.29
4881.430	V	Y axis	44.30	32.42	5.27	-	49.57	37.69	74.00	54.00	24.43	16.31
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	D.C.F	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV			PK	AV	PK	AV	PK	AV
4959.025	H	Y axis	44.35	33.14	5.64	-	49.99	38.78	74.00	54.00	24.01	15.22
4961.370	V	Y axis	43.94	32.80	5.64	-	49.58	38.44	74.00	54.00	24.42	15.56
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 25dB below limit.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F + D.C.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
   D.C.F = Duty Correction Factor

3.2.8 AC Line Conducted Emissions

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak and average detector mode 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: NA

Note: When this device is in the charging mode, the Bluetooth function is disabled.

- 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

3.2.9 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.

3.2.10 Occupied Bandwidth (99%)

- Procedure: (RSS-Gen Issue 3)
- The 99% power bandwidth was measured with a calibrated spectrum analyzer.
- Spectrum analyzer plots are included on the following pages.

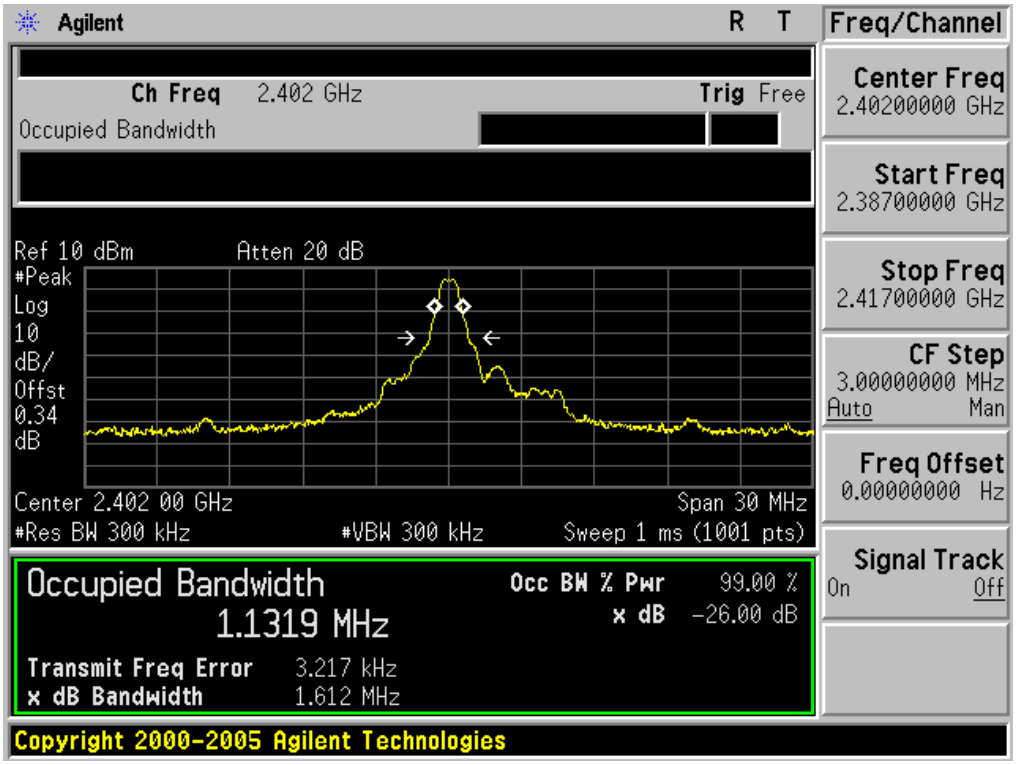
- Measurement Data: Comply

Hopping mode	Test Mode	Tested Channel	Test Results (KHz)
Disable	Data rate:1Mbps	Lowest	1.1319
		Middle	1.1179
		Highest	1.1211
	Data rate: 2Mbps	Lowest	1.4809
		Middle	1.4672
		Highest	1.4792

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

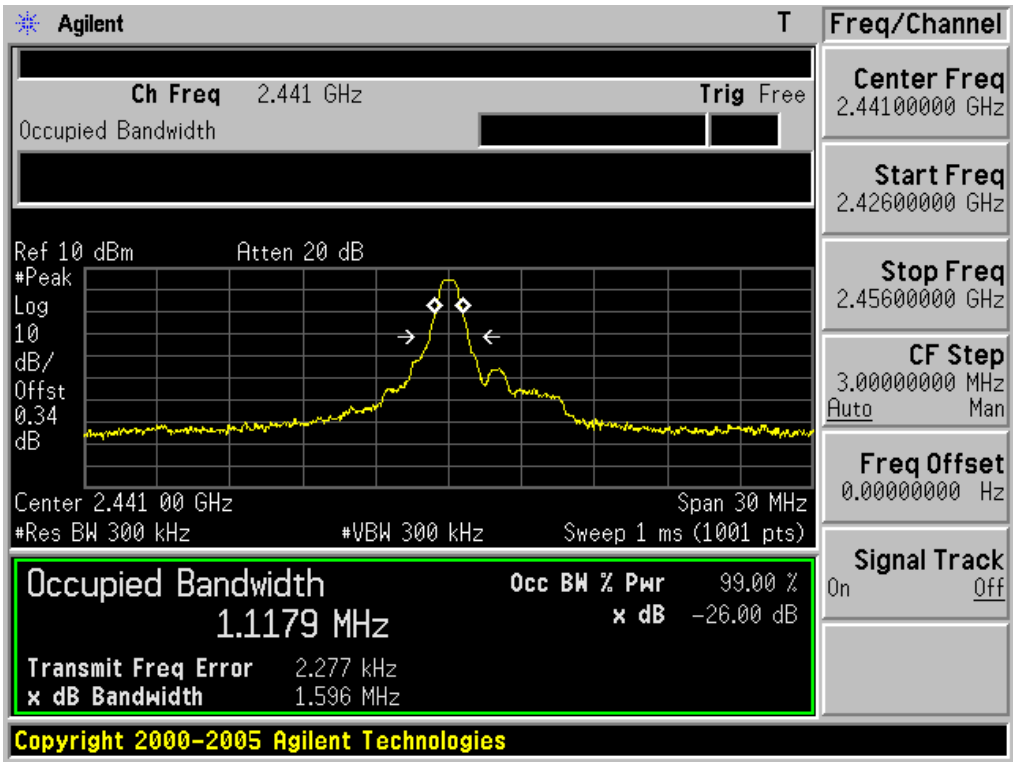
Occupied Bandwidth Lowest Channel & 1Mbps

99 % Bandwidth



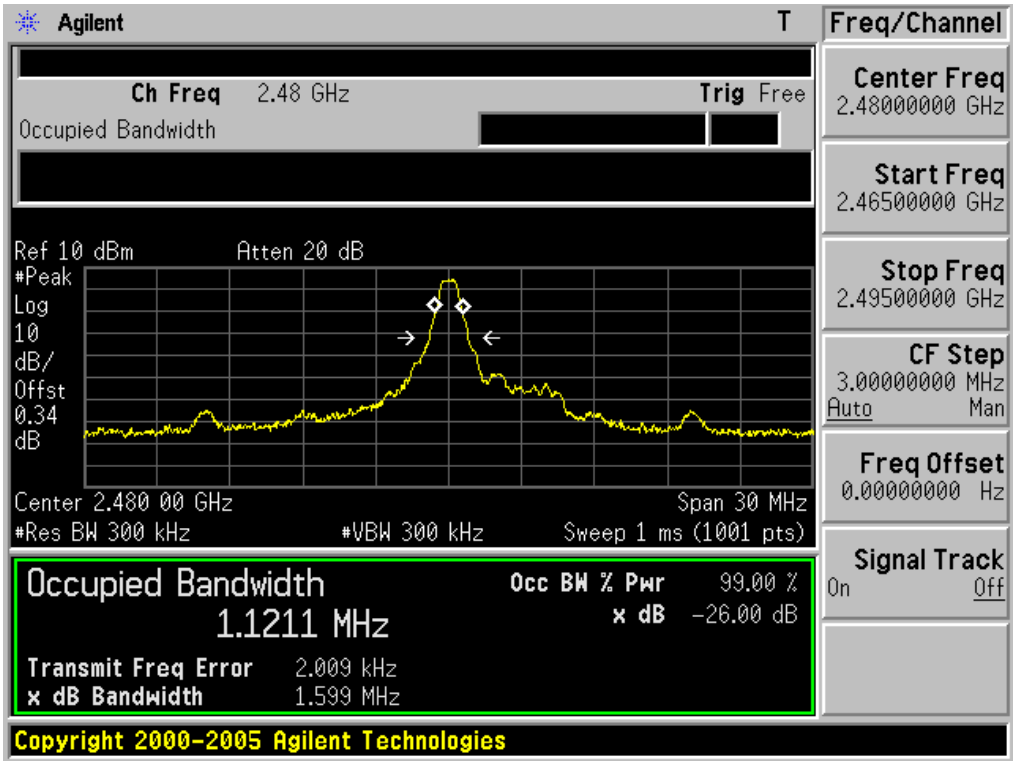
Occupied Bandwidth Middle Channel & 1Mbps

99 % Bandwidth



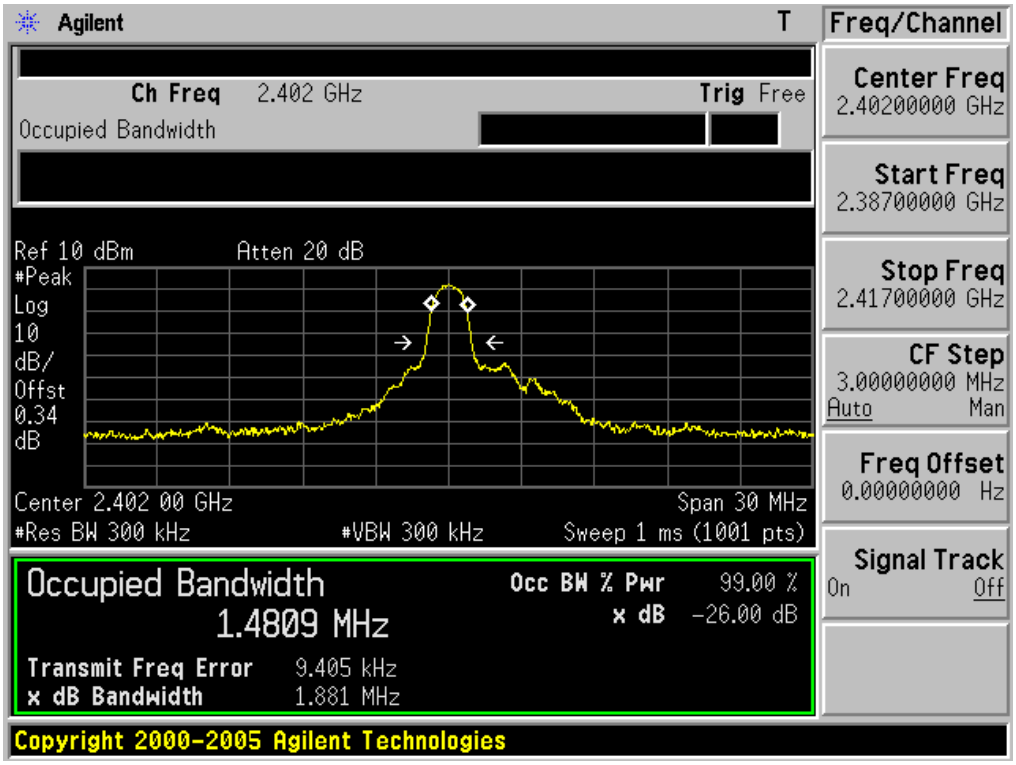
Occupied Bandwidth Highest Channel & 1Mbps

99 % Bandwidth



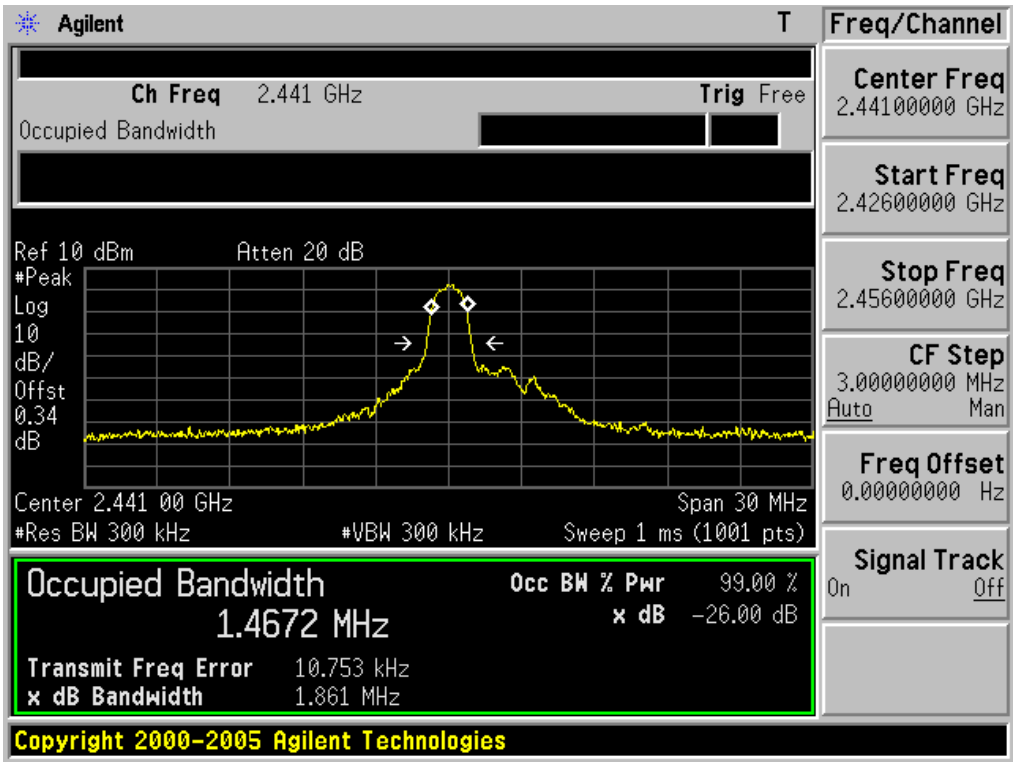
Occupied Bandwidth Lowest Channel & 2Mbps

99 % Bandwidth



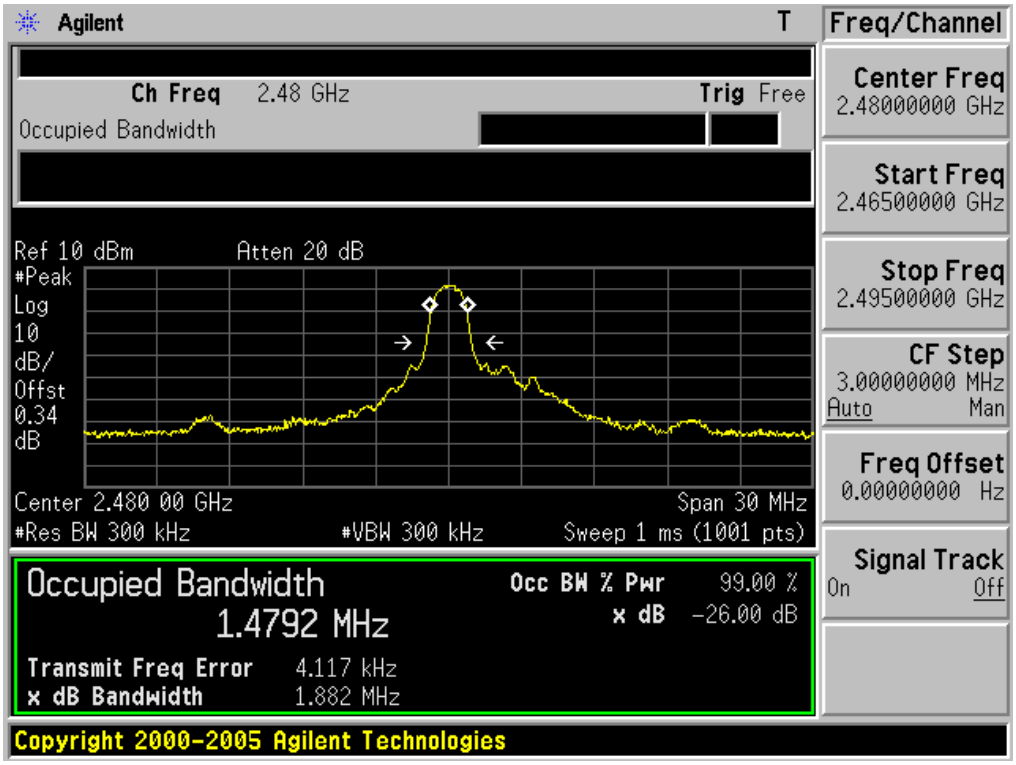
Occupied Bandwidth Middle Channel & 2Mbps

99 % Bandwidth



Occupied Bandwidth Highest Channel & 2Mbps

99 % Bandwidth



3.3 Receiver requirements

3.3.1 AC Conducted Emissions (Receiver Mode)

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its receiving function. 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

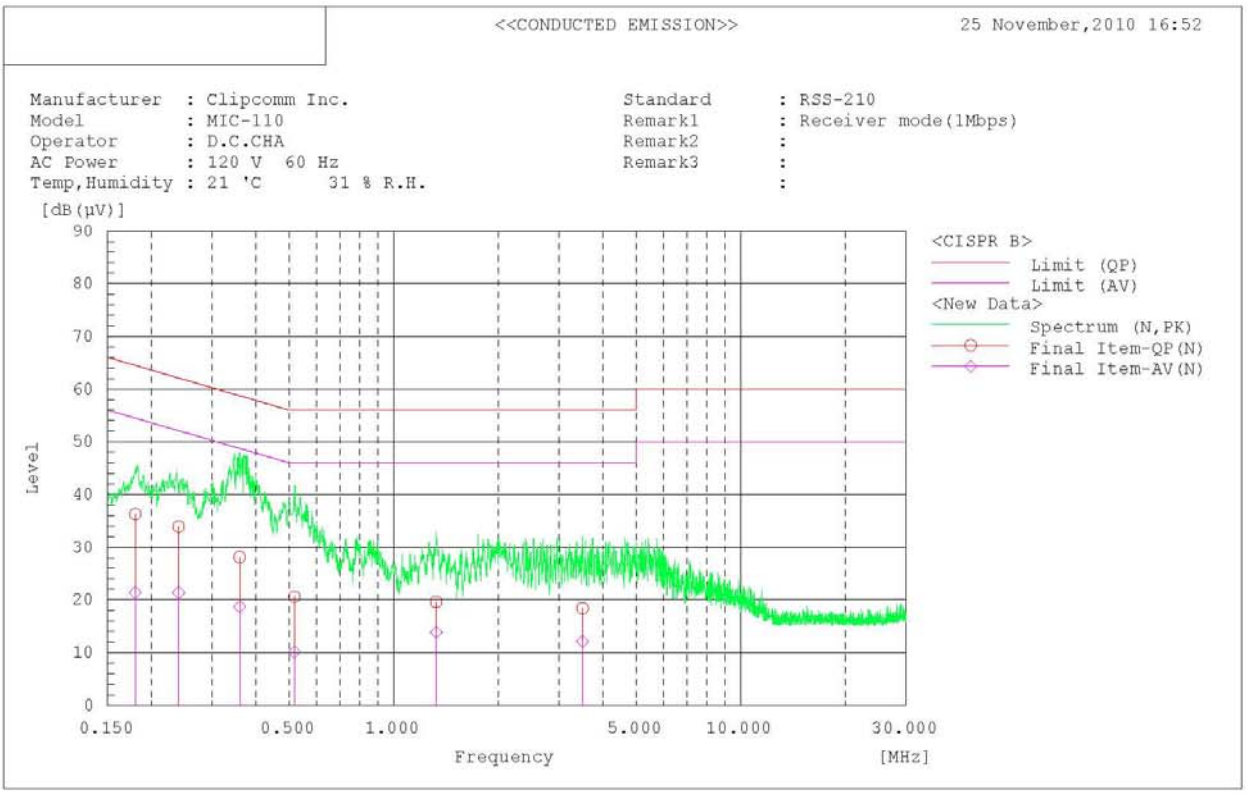
Note 1: See next pages for actual measured spectrum plots.

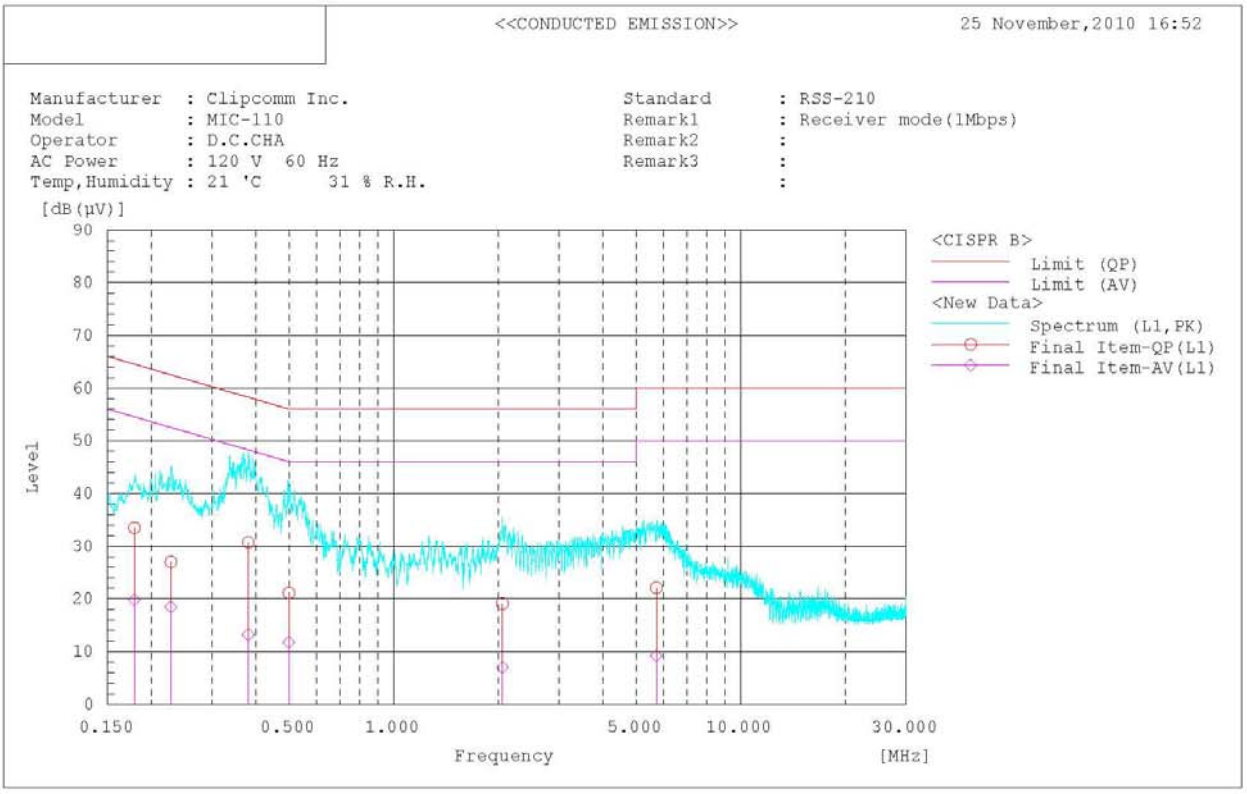
- Minimum Standard: FCC Part 15.207(a)/EN 55022

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) 1Mbps





AC Line Conducted Emissions (Data List) 1Mbps

<<CONDUCTED EMISSION>>

25 November,2010 16:52

Standard : RSS-210
Manufacturer : Clipcomm Inc.
Model : MIC-110
Operator : D.C.CHA
AC Power : 120 V 60 Hz
Temp,Humidity : 21 'C 31 % R.H.
Remark1 : Receiver mode(1Mbps)
Remark2 :
Remark3 :
:

Final Result

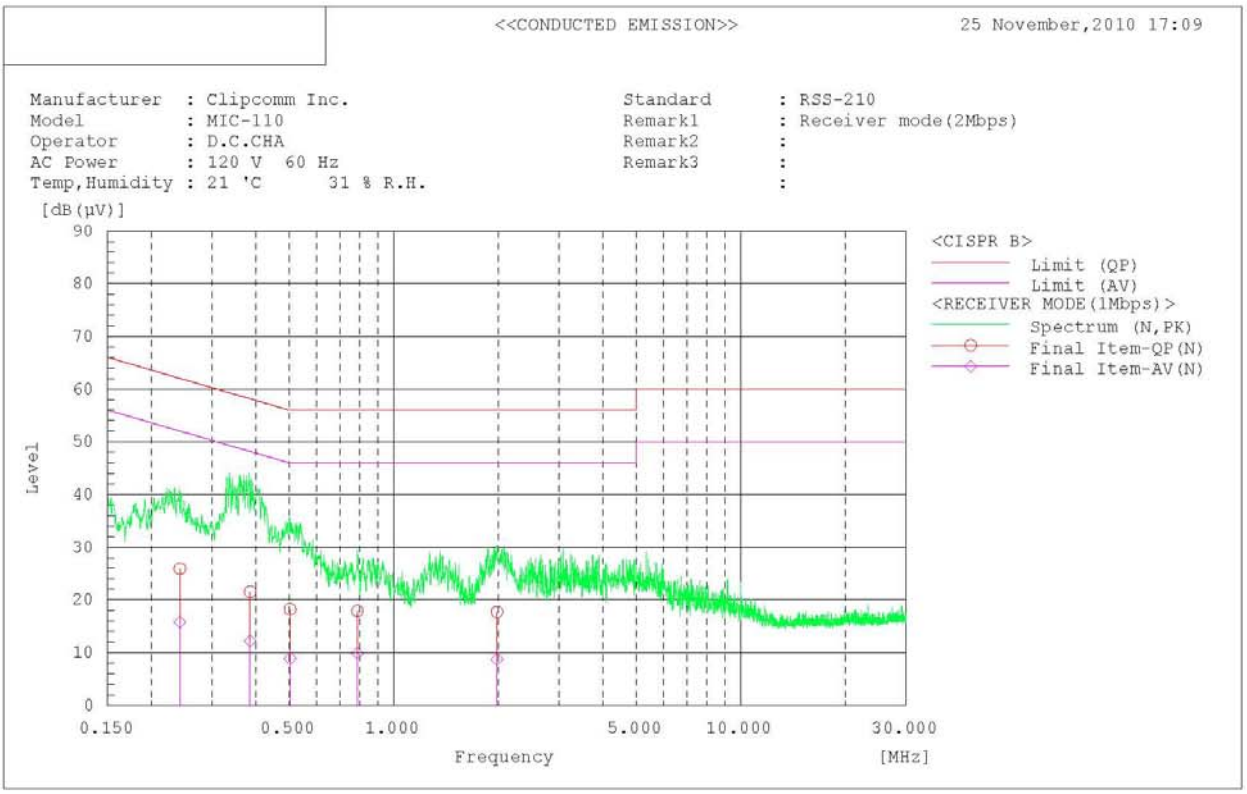
--- N Phase ---

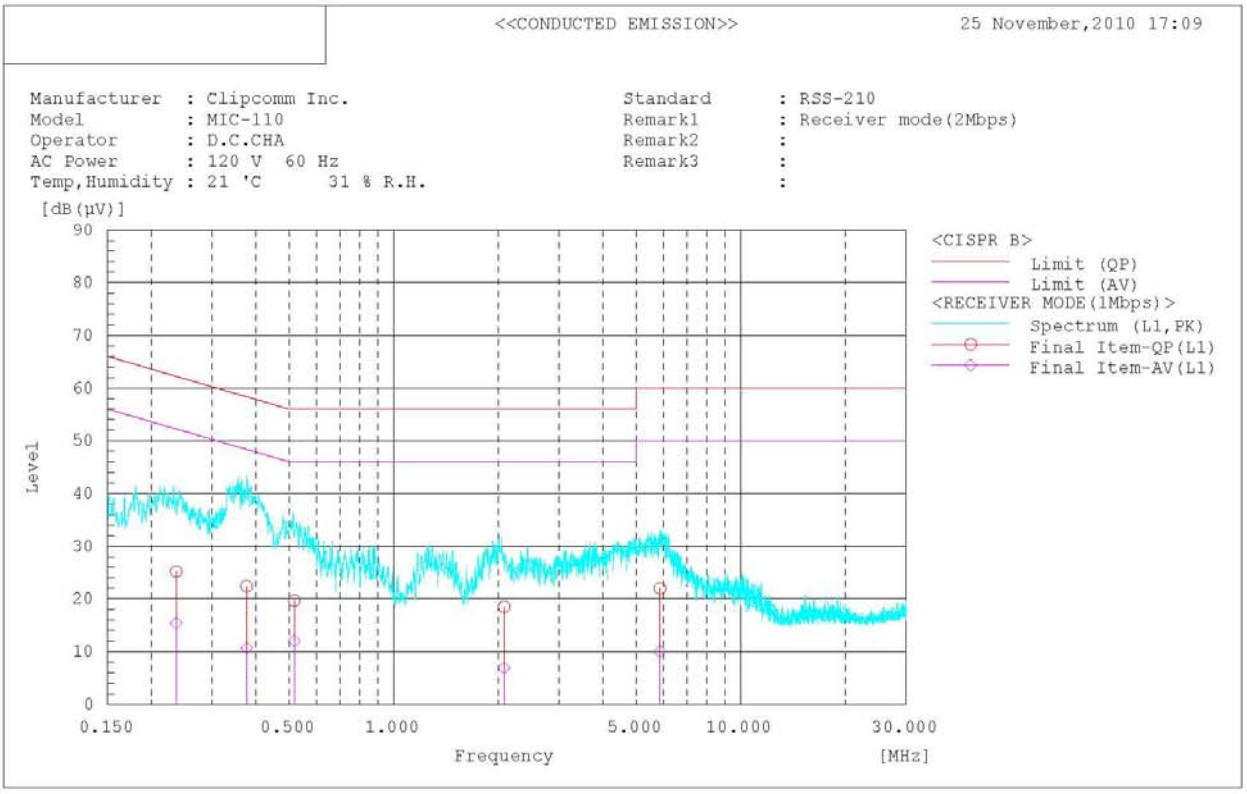
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.180	36.2	21.3	0.1	36.3	21.4	64.5	54.5	28.2	33.1	
2	0.240	33.8	21.3	0.1	33.9	21.4	62.1	52.1	28.2	30.7	
3	0.360	28.0	18.6	0.1	28.1	18.7	58.7	48.7	30.6	30.0	
4	0.517	20.5	10.0	0.1	20.6	10.1	56.0	46.0	35.4	35.9	
5	1.326	19.5	13.8	0.1	19.6	13.9	56.0	46.0	36.4	32.1	
6	3.500	18.2	11.9	0.2	18.4	12.1	56.0	46.0	37.6	33.9	

--- 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	0.179	33.3	19.6	0.2	33.5	19.8	64.5	54.5	31.0	34.7	
2	0.228	26.8	18.3	0.2	27.0	18.5	62.5	52.5	35.5	34.0	
3	0.381	30.5	13.0	0.2	30.7	13.2	58.3	48.3	27.6	35.1	
4	0.499	20.9	11.6	0.2	21.1	11.8	56.0	46.0	34.9	34.2	
5	2.056	18.8	6.7	0.3	19.1	7.0	56.0	46.0	36.9	39.0	
6	5.714	21.7	8.8	0.4	22.1	9.2	60.0	50.0	37.9	40.8	

AC Line Conducted Emissions (Graph) 2Mbps





AC Line Conducted Emissions (Data List) 2Mbps

<<CONDUCTED EMISSION>>

25 November,2010 17:09

Standard : RSS-210
Manufacturer : Clipcomm Inc.
Model : MIC-110
Operator : D.C.CHA
AC Power : 120 V 60 Hz
Temp,Humidity : 21 'C 31 % R.H.
Remark1 : Receiver mode(2Mbps)
Remark2 :
Remark3 :
:

Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.242	25.8	15.7	0.1	25.9	15.8	62.0	52.0	36.1	36.2	
2	0.386	21.4	12.1	0.1	21.5	12.2	58.1	48.1	36.6	35.9	
3	0.503	18.1	8.8	0.1	18.2	8.9	56.0	46.0	37.8	37.1	
4	0.786	17.8	9.7	0.1	17.9	9.8	56.0	46.0	38.1	36.2	
5	1.986	17.5	8.5	0.2	17.7	8.7	56.0	46.0	38.3	37.3	

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.236	25.0	15.2	0.2	25.2	15.4	62.2	52.2	37.0	36.8	
2	0.377	22.2	10.5	0.2	22.4	10.7	58.3	48.3	35.9	37.6	
3	0.517	19.4	11.7	0.3	19.7	12.0	56.0	46.0	36.3	34.0	
4	2.082	18.2	6.6	0.3	18.5	6.9	56.0	46.0	37.5	39.1	
5	5.856	21.6	9.6	0.4	22.0	10.0	60.0	50.0	38.0	40.0	

3.3.2 Out of Band Emissions – Radiated (Receiver Mode)

- 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 a 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:

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)
= 1 MHz (1 GHz ~ 10th harmonic)

VBW = 10Hz (Average), VBW ≥ RBW (Peak)

Trace = max hold

Detector function = peak

Sweep = auto

- Measurement Data: Comply (Refer to the Next page)

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

Note 2: This test item was performed in each axis. and the worst case data were reported.

- Minimum Standard: FCC Part 15.109(a)

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.

30MHz ~ 1GHz Receiver Spurious Emissions Lowest Channel & 1Mbps

Digital EMC

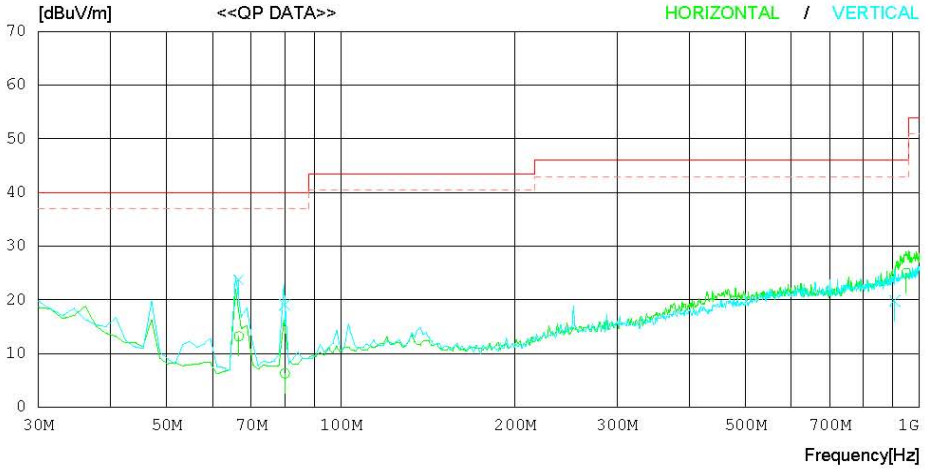
RADIATED EMISSION

Date : 2010-11-22

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 59 % R.H
Test Condition	:	RX / 2402 MHz (1Mbps)	Operator	:	D.C.CHA

Memo : X-axis

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	66.610	28.7	6.2	1.0	22.7	13.2	40.0	26.8	101	153
2	80.044	20.8	7.1	1.1	22.7	6.3	40.0	33.7	103	110
3	948.699	23.2	21.1	3.7	23.0	25.0	46.0	21.0	100	136
----- Vertical ------										
4	66.602	39.2	6.2	1.0	22.7	23.7	40.0	16.3	103	214
5	79.990	33.6	7.1	1.1	22.7	19.1	40.0	20.9	102	96
6	906.699	18.9	20.5	3.6	23.2	19.8	46.0	26.2	100	100

- Note: Above listed point data is the worst case data.

30MHz ~ 1GHz Receiver Spurious Emissions Middle Channel & 1Mbps

Digital EMC

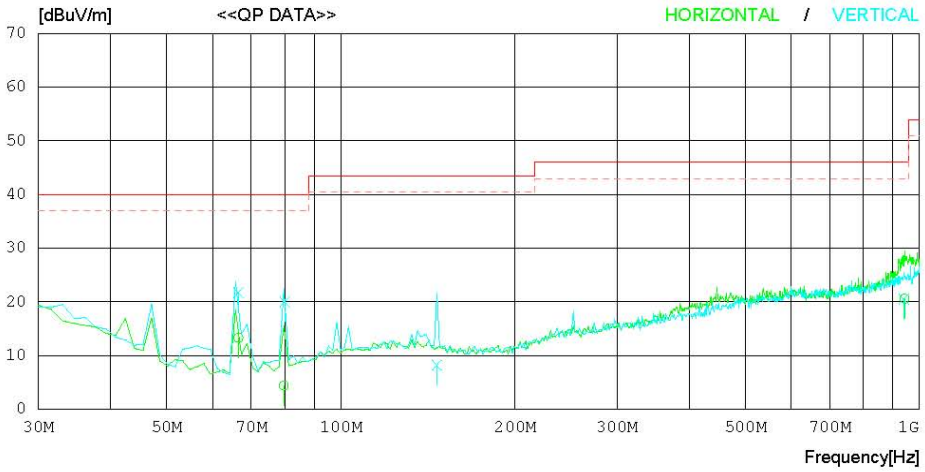
RADIATED EMISSION

Date : 2010-11-22

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 59 % R.H
Test Condition	:	RX / 2441 MHz (1Mbps)	Operator	:	D.C.CHA

Memo : X-axis

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	66.530	28.8	6.2	1.0	22.7	13.3	40.0	26.7	101	45
2	79.736	18.9	7.1	1.1	22.7	4.4	40.0	35.6	101	147
3	942.468	18.9	21.0	3.7	23.0	20.6	46.0	25.4	100	358
----- Vertical ------										
4	66.554	37.2	6.2	1.0	22.7	21.7	40.0	18.3	101	165
5	80.000	34.5	7.1	1.1	22.7	20.0	40.0	20.0	103	214
6	146.556	19.4	10.4	1.4	23.0	8.2	43.5	35.3	100	198
7	939.378	18.9	21.0	3.7	23.1	20.5	46.0	25.5	102	133

- Note: Above listed point data is the worst case data.

30MHz ~ 1GHz Receiver Spurious Emissions Highest Channel & 1Mbps

Digital EMC

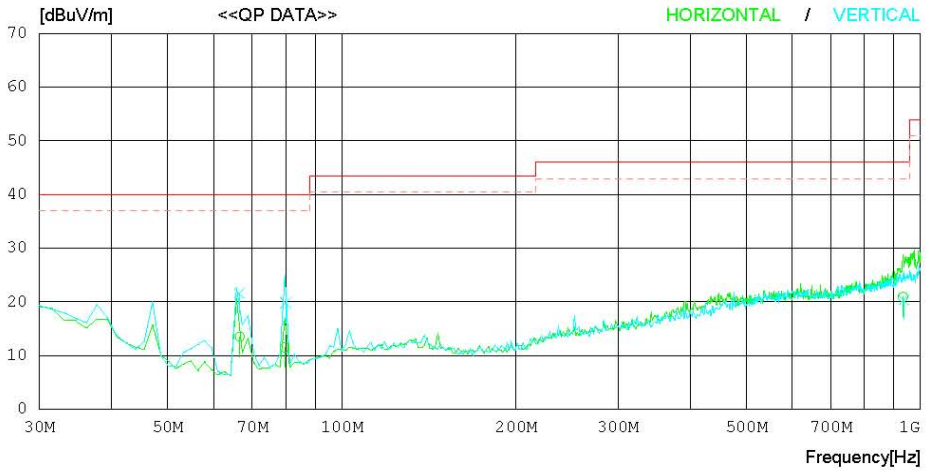
RADIATED EMISSION

Date : 2010-11-22

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 59 % R.H
Test Condition	:	RX / 2480 MHz (1Mbps)	Operator	:	D.C.CHA

Memo : X-axis

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	66.594	29.0	6.2	1.0	22.7	13.5	40.0	26.5	110	263
2	79.733	26.0	7.1	1.1	22.7	11.5	40.0	28.5	102	165
3	933.110	19.4	20.9	3.7	23.1	20.9	46.0	25.1	100	189
----- Vertical ------										
4	66.554	37.1	6.2	1.0	22.7	21.6	40.0	18.4	102	241
5	79.984	34.3	7.1	1.1	22.7	19.8	40.0	20.2	103	247
6	936.255	18.9	20.9	3.7	23.1	20.4	46.0	25.6	102	119

- Note: Above listed point data is the worst case data.

30MHz ~ 1GHz Receiver Spurious Emissions Lowest Channel & 2Mbps

Digital EMC

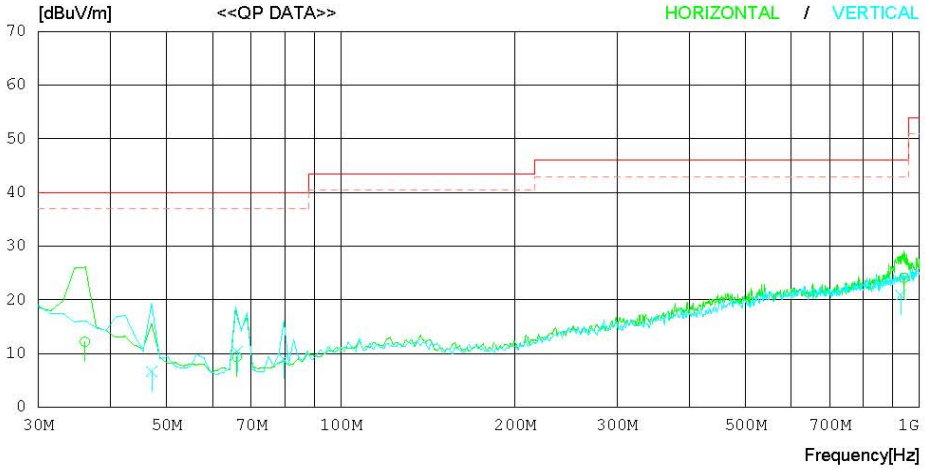
RADIATED EMISSION

Date : 2010-10-23

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 38 % R.H
Test Condition	:	RX / 2402 MHz (2Mbps)	Operator	:	D.C.CHA

Memo : Z-axis

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	36.104	18.6	15.4	0.8	22.6	12.2	40.0	27.8	105	258
2	66.102	24.9	6.2	1.0	22.7	9.4	40.0	30.6	102	169
3	940.926	22.4	21.0	3.7	23.0	24.1	46.0	21.9	100	358
----- Vertical ------										
4	47.115	18.9	9.5	0.9	22.7	6.6	40.0	33.4	103	344
5	66.274	25.9	6.2	1.0	22.7	10.4	40.0	29.6	102	126
6	79.710	23.5	7.1	1.1	22.7	9.0	40.0	31.0	106	248
7	928.489	19.5	20.8	3.7	23.1	20.9	46.0	25.1	104	110

- Note: Above listed point data is the worst case data.

30MHz ~ 1GHz Receiver Spurious Emissions Middle Channel & 2Mbps

Digital EMC

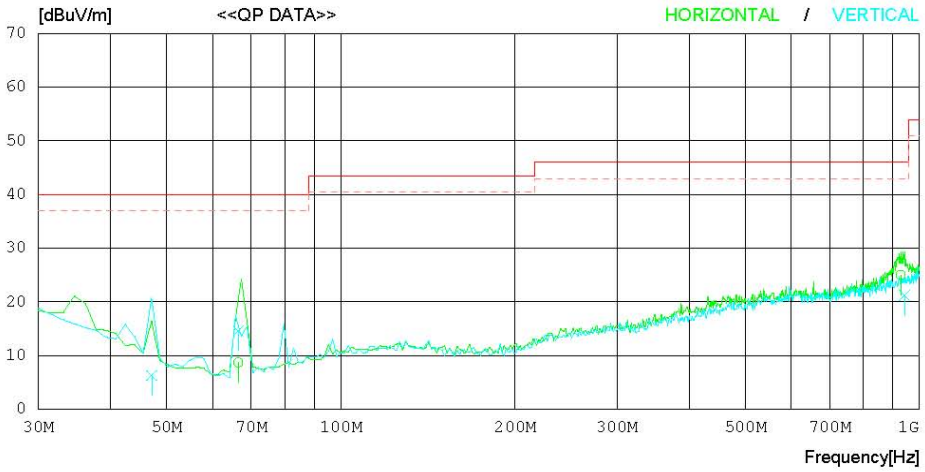
RADIATED EMISSION

Date : 2010-10-23

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 38 % R.H
Test Condition	:	RX / 2441 MHz (2Mbps)	Operator	:	D.C.CHA

Memo : Y-axis

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	66.506	24.2	6.2	1.0	22.7	8.7	40.0	31.3	102	87
2	928.484	23.6	20.8	3.7	23.1	25.0	46.0	21.0	108	158
----- Vertical ------										
3	47.121	18.6	9.5	0.9	22.7	6.3	40.0	33.7	101	218
4	66.548	30.1	6.2	1.0	22.7	14.6	40.0	25.4	120	110
5	942.474	19.5	21.0	3.7	23.0	21.2	46.0	24.8	105	94

- Note: Above listed point data is the worst case data.

30MHz ~ 1GHz Receiver Spurious Emissions Highest Channel & 2Mbps

Digital EMC

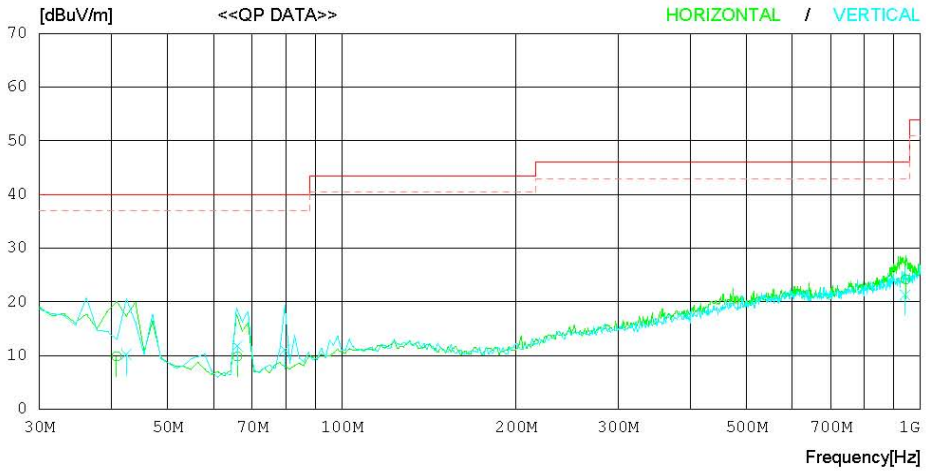
RADIATED EMISSION

Date : 2010-10-23

Model Name	:	MIC-110	Reference No.	:	
Model No.	:		Power Supply	:	DC 3.7 V
Serial No.	:	Identical prototype	Temp/Humi	:	22 'C 38 % R.H
Test Condition	:	RX / 2480 MHz (2Mbps)	Operator	:	D.C.CHA

Memo : Z-axis

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	40.789	18.5	13.1	0.8	22.6	9.8	40.0	30.2	102	198
2	66.003	25.3	6.2	1.0	22.7	9.8	40.0	30.2	106	110
3	942.466	22.5	21.0	3.7	23.0	24.2	46.0	21.8	100	255
----- Vertical ------										
4	42.436	19.9	12.1	0.8	22.6	10.2	40.0	29.8	106	159
5	66.058	27.3	6.2	1.0	22.7	11.8	40.0	28.2	102	287
6	79.685	25.6	7.1	1.1	22.7	11.1	40.0	28.9	100	325
7	940.932	19.6	21.0	3.7	23.0	21.3	46.0	24.7	102	300

- Note: Above listed point data is the worst case data.

1GHz ~ 25GHz Radiated Spurious Emissions & 1Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5479.175	H	Z axis	45.00	31.30	4.10	49.10	35.40	74.00	54.00	24.90	18.60
-	-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5495.201	H	Y axis	45.00	31.00	4.30	49.30	35.30	74.00	54.00	24.70	18.70
-	-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5447.125	V	X axis	44.90	31.50	4.00	48.90	35.50	74.00	54.00	25.10	18.50
-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. Except for the above table: All other spurious emissions were less than 30dB for the limit.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

1GHz ~ 25GHz Radiated Spurious Emissions & 2Mbps

▪ Lowest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5463.150	V	Y axis	45.20	31.70	4.00	49.20	35.70	74.00	54.00	24.80	18.30
-	-	-	-	-	-	-	-	-	-	-	-

▪ Middle Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5727.569	V	Y axis	44.90	32.00	3.50	48.40	35.50	74.00	54.00	25.60	18.50
-	-	-	-	-	-	-	-	-	-	-	-

▪ Highest Channel

Frequency (MHz)	ANT Pol	The worst case EUT Position	Reading(dBuV)		T.F (dB/m)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
			PK	AV		PK	AV	PK	AV	PK	AV
5735.582	V	Y axis	44.60	31.90	4.30	48.90	36.20	74.00	54.00	25.10	17.80
-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. Except for the above table: All other spurious emissions were less than 30dB for the limit.
2. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

APPENDIX I

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	11/10/10	11/10/11	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	04/10/10	04/10/11	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
☐	LOOP Antenna	ETS	6502	29/10/10	29/10/11	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	01/07/10	01/07/11	MY39260700
☐	Attenuator (3dB)	WEINSCHEL	56-3	05/10/10	05/10/11	Y2342
☐	Attenuator (3dB)	WEINSCHEL	56-3	05/10/10	05/10/11	Y2370
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	01/10/10	01/10/11	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	11/01/10	11/01/11	BP4387
☐	Attenuator (10dB)	WEINSCHEL	31696	05/10/10	05/10/11	446
☐	Attenuator (10dB)	WEINSCHEL	31696	05/10/10	05/10/11	408
☐	Attenuator (20dB)	WEINSCHEL	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)	WEINSCHEL	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	CBL6112B	14/07/10	14/07/11	2737
☒	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	07/10/11	1098
☒	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/11	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