



# DIGITAL EMC CO., LTD.

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<http://www.digitalemc.com>

## CERTIFICATION OF COMPLIANCE

**Clipcomm, Inc.**

2<sup>nd</sup> Fl. E.S.T Bldg. 229-15, Nonhyeon-dong,  
Gangnam-gu, Seoul 135-830, Korea

Dates of Tests: March 5 ~ 9, 2007

Test Report S/N: DR50110703H

Test Site : DIGITAL EMC CO., LTD.

FCC ID

**UXZFIPO**

APPLICANT

**Clipcomm, Inc.**

<b>FCC Classification</b>	:	<b>Frequency Hopping Spread Spectrum (FHSS)</b>
<b>Device name</b>	:	<b>Bluetooth Dongle</b>
<b>Manufacturer</b>	:	<b>Clipcomm, Inc.</b>
<b>FCC ID</b>	:	<b>UXZFIPO</b>
<b>Model name</b>	:	<b>FIPO</b>
<b>Test Device Serial number</b>	:	<b>Identical prototype</b>
<b>FCC Rule Part(s)</b>	:	<b>FCC Part 15.247 Subpart C</b> <b>ANSI C-63.4-2003</b>
<b>Frequency Range</b>	:	<b>2402 ~ 2480 MHz</b>
<b>Max. Output power</b>	:	<b>2.20dBm Conducted</b>
<b>Data of issue</b>	:	<b>March 16, 2007</b>

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



NVLAP LAB CODE 200559-0

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## 1. General information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

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

<http://www.digitalemc.com> E-mail : [Harveysung@digitalemc.com](mailto:Harveysung@digitalemc.com)

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

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

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

**Test operator: engineer**



March 16, 2007	Dong -Chul CHA
Data	Name

Signature

**Report Reviewed By: manager**



March 16, 2007	Harvay Sung
Data	Name

Signature

Ordering party:

Company name	:	Clipcomm, Inc.
Address	:	2 <sup>nd</sup> Fl. E.S.T Bldg. 229-15, Nonhyeon-dong, Gangnam-gu
City/town	:	Seoul
Country	:	Korea
Zip code	:	135-830
Date of order	:	February 25, 2007

## 2. Information about test item

### UXZFIPO

#### 2.1 Equipment information

Equipment model no.	FIPO
Equipment serial no.	Identical prototype
Type of equipment	Bluetooth Headset
Frequency band	2402 ~ 2480 MHz
Type of Modulation	GFSK
Channel Access Protocol	Frequency Hopping
Channel Spacing	1.0 MHz
Type of antenna	Chip Antenna

#### 2.2 Tested frequency

Frequency	TX	RX
Low frequency	2402MHz	2402MHz
Middle frequency	2441MHz	2441MHz
High frequency	2480MHz	2480MHz

#### 2.3 Tested environment

Temperature	: 15 ~ 35 (°C)
Relative humidity content	: 20 ~ 75 %
Air pressure	: 86 ~ 103 kPa
Details of power supply	: 5.0 VDC

#### 2.4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	PP02X	8K493A01	Dell
Mouse	1020	X10-17361	Microsoft
Printer	SRP-770	SRP77008060035	Samsung Electro-Mechanics
-	-	-	-

#### 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	Test Condition	Status (note 1)	
<b>I. Test Items</b>					
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C	
	Number of Hopping Frequencies	> 75 hops		C	
	20 dB Bandwidth	< 1 MHz		C	
	Dwell Time	0.4 seconds within a 30 second period per any frequency		C	
15.247(b)	Transmitter Output Power	< 1Watt	Conducted	C	
15.247(c)	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	Radiated Emissions	FCC 15.209 Limits	Radiated	C	
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	C	

Note 1: C=Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003

## 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 = 3 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 30 kHz (1% of the span or more)      Sweep = auto

VBW = 30 kHz      Detector function = peak

Trace = max hold

#### Measurement Data:

Frequency of marker #1 (MHz)	Frequency of marker #2 (MHz)	Test Results	
		Carrier Frequency Separation (MHz)	Result
2441.000	2442.000	1.000	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

#### Measurement Setup

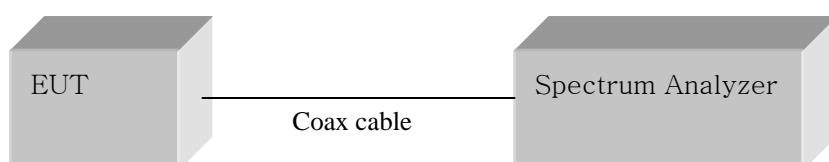
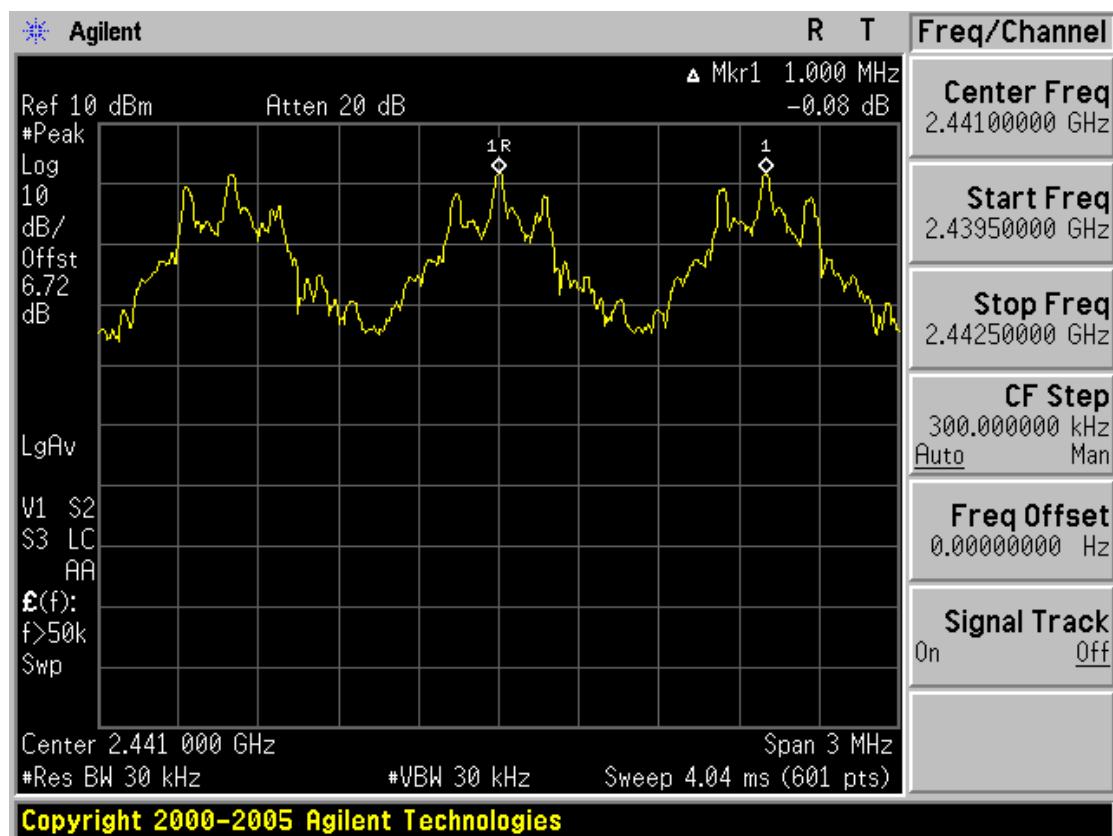


Figure 1: Measurement setup for the carrier frequency separation

## Carrier Frequency Separation



### 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:

Frequency range 1: Start = 2389.5MHz, Stop = 2414.5 MHz

2: Start = 2414.5MHz, Stop = 2439.5 MHz

3: Start = 2439.5MHz, Stop = 2464.5 MHz

4: Start = 2464.5MHz, Stop = 2489.5 MHz

RBW = 300 kHz (1% of the span or more) Sweep = auto

VBW = 300 kHz (VBW  $\geq$  RBW) Detector function = peak

Trace = max hold Span = 25MHz

#### Measurement Data: Complies

<b>Total number of Hopping Channels</b>	79
-----------------------------------------	----

- See next pages for actual measured spectrum plots.

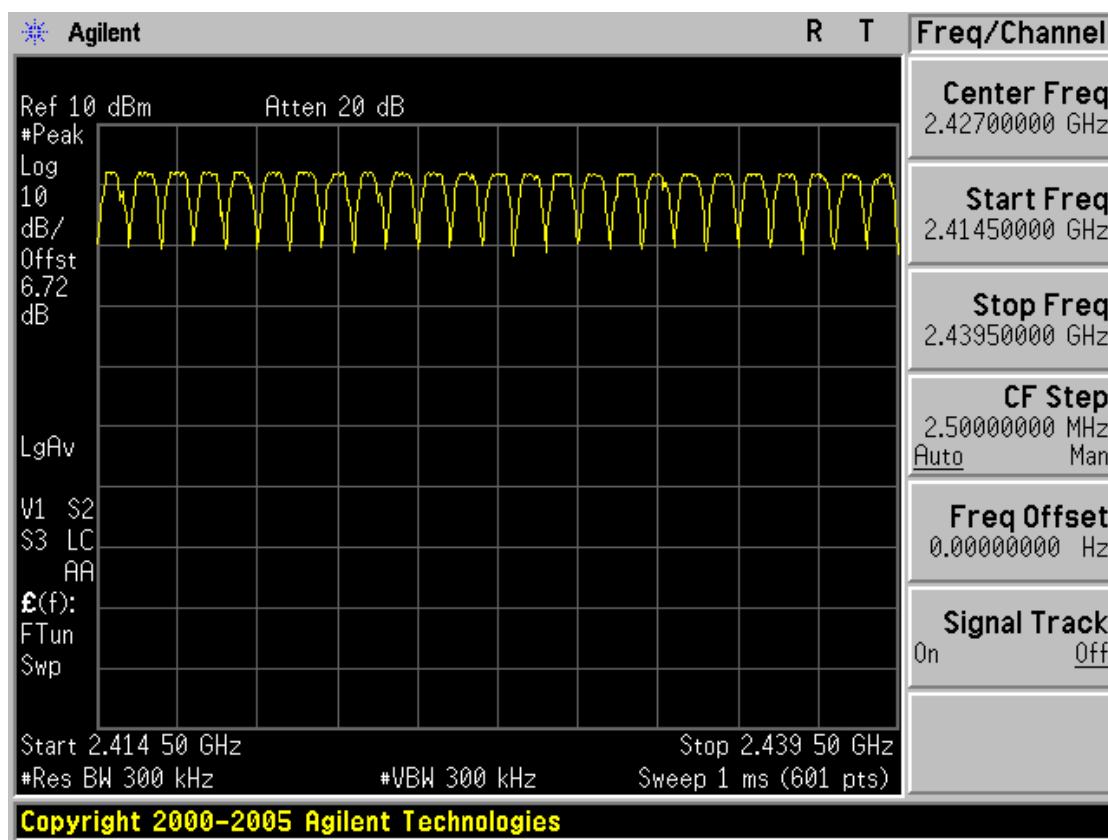
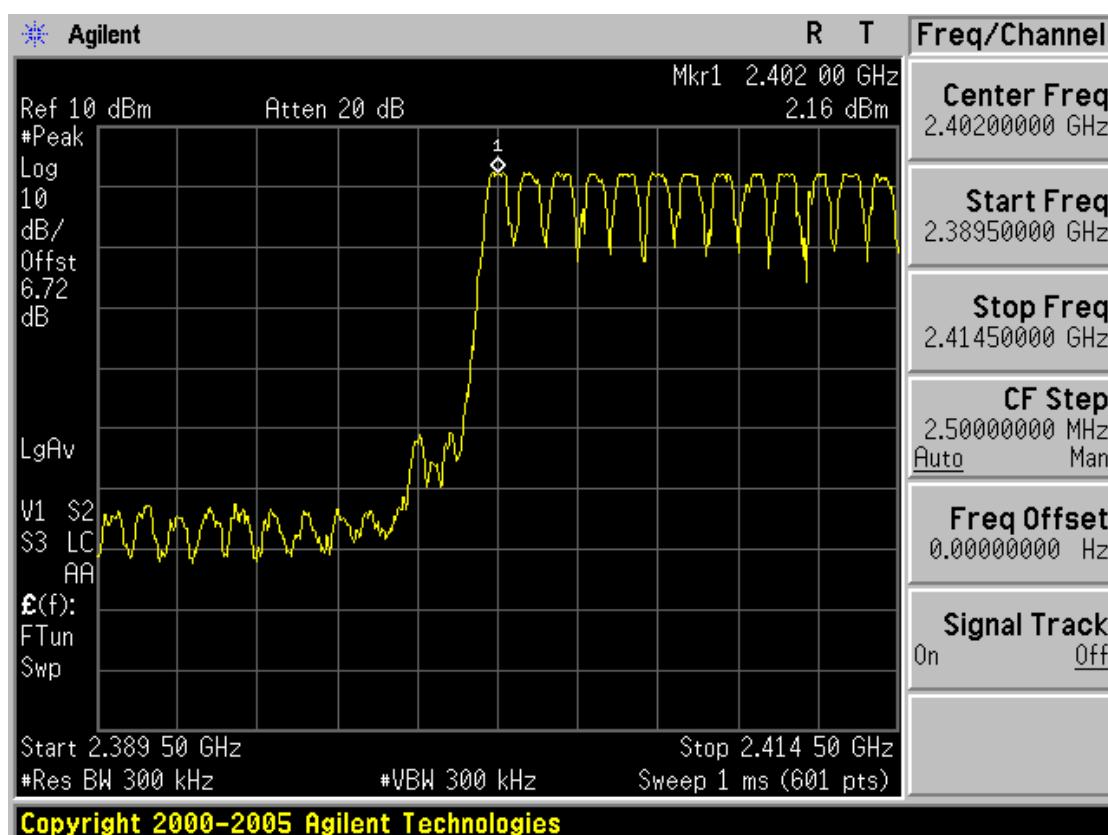
#### Minimum Standard:

At least 75 hopes
-------------------

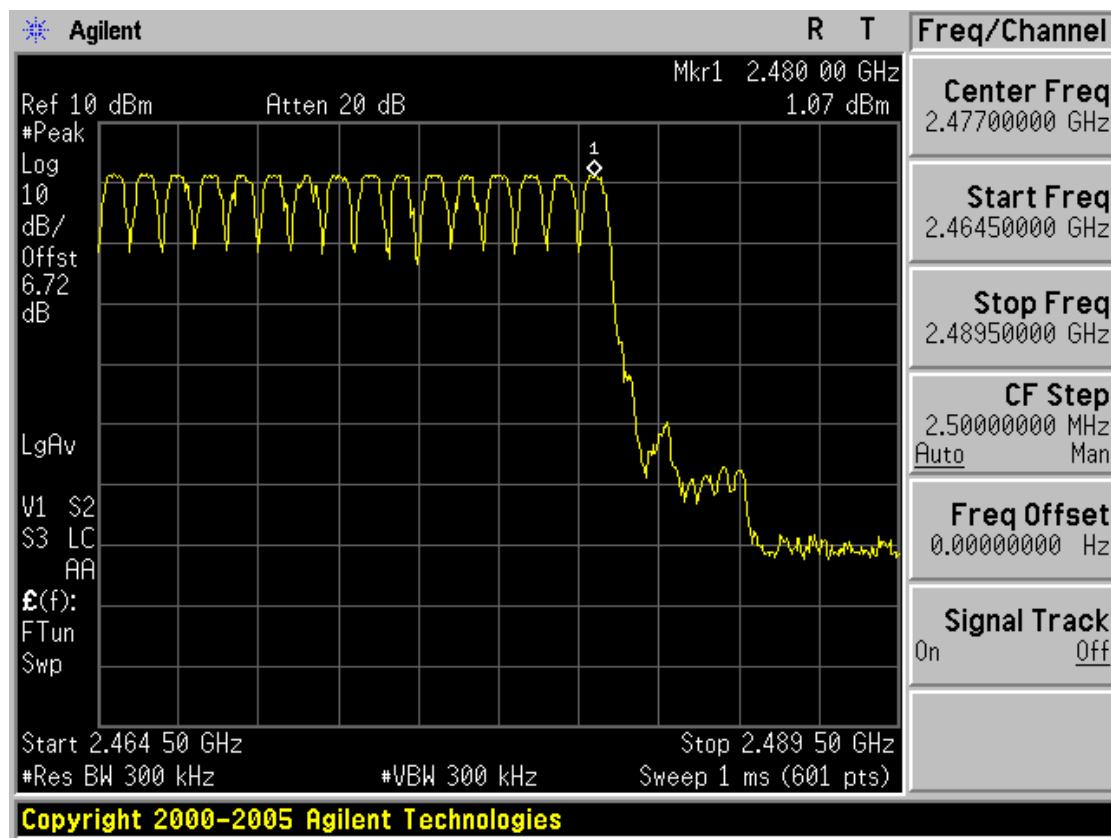
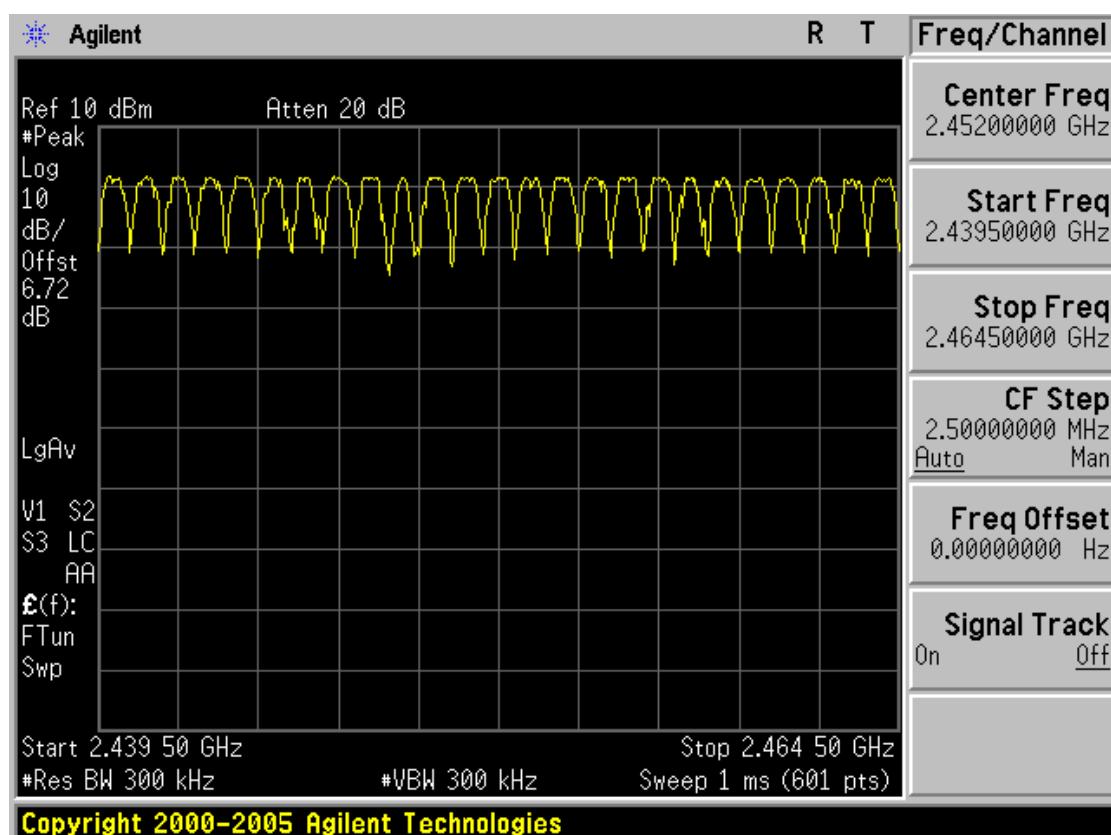
#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

## Number of Hopping Frequencies



## Number of Hopping Frequencies



### 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 channels

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

RBW = 10 kHz (1% of the 20dB bandwidth or more) Sweep = auto

VBW = 30 kHz (VBW  $\geq$  RBW) Detector function = peak

Trace = max hold

#### Measurement Data:

Frequency (MHz)	Channel No.	Test Results	
		Measured Bandwidth (MHz)	Result
2402	1	0.870	Complies
2441	40	0.873	Complies
2480	79	0.870	Complies

- See next pages for actual measured spectrum plots.

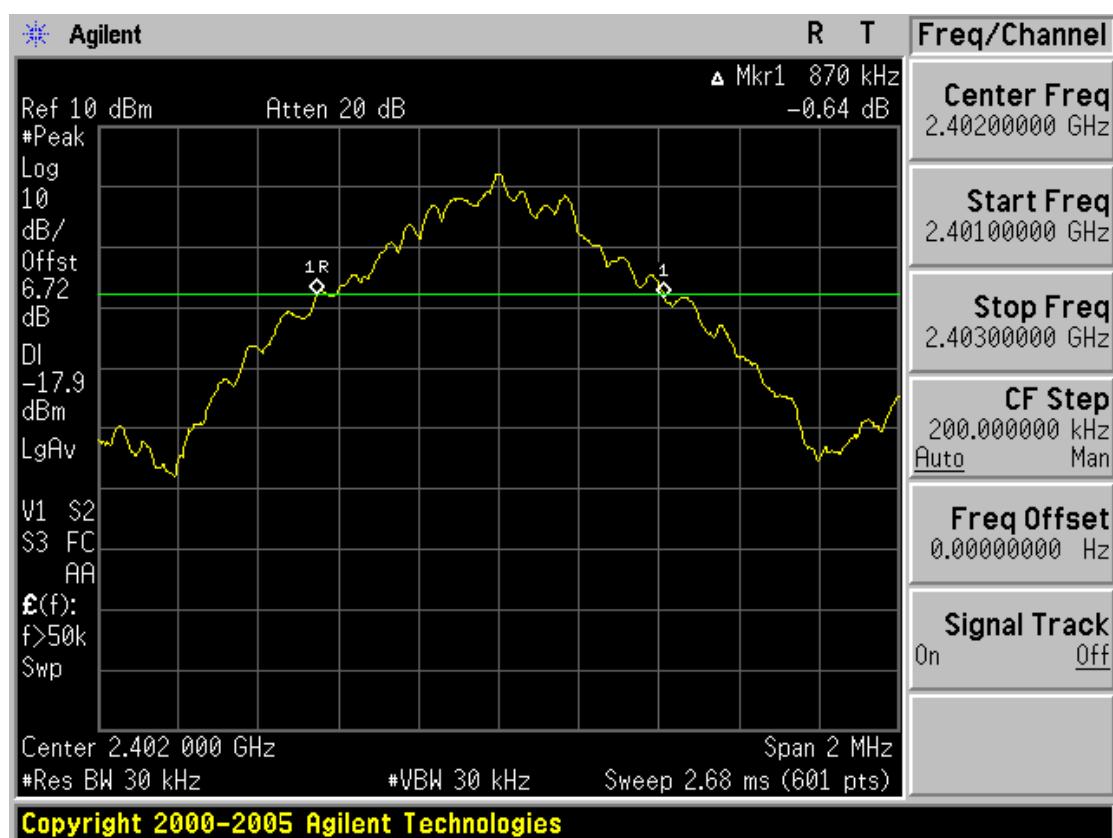
#### Minimum Standard:

The transmitter shall have a maximum 20dB bandwidth of 1 MHz.

#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

## 20 dB Bandwidth



## 20 dB Bandwidth



### 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 = 1 MHz (VBW  $\geq$  RBW)

Trace = max hold

Detector function = peak

#### Measurement Data:

Packet Type	Burst duration in one hop (us)	Test Results	
		Dwell Time (ms)	Result
DH 1	420	134.446	Complies
DH 3	1680	270.749	Complies
DH 5	2933	312.335	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

0.4 seconds within a 30 second period per any frequency

#### Measurement Setup

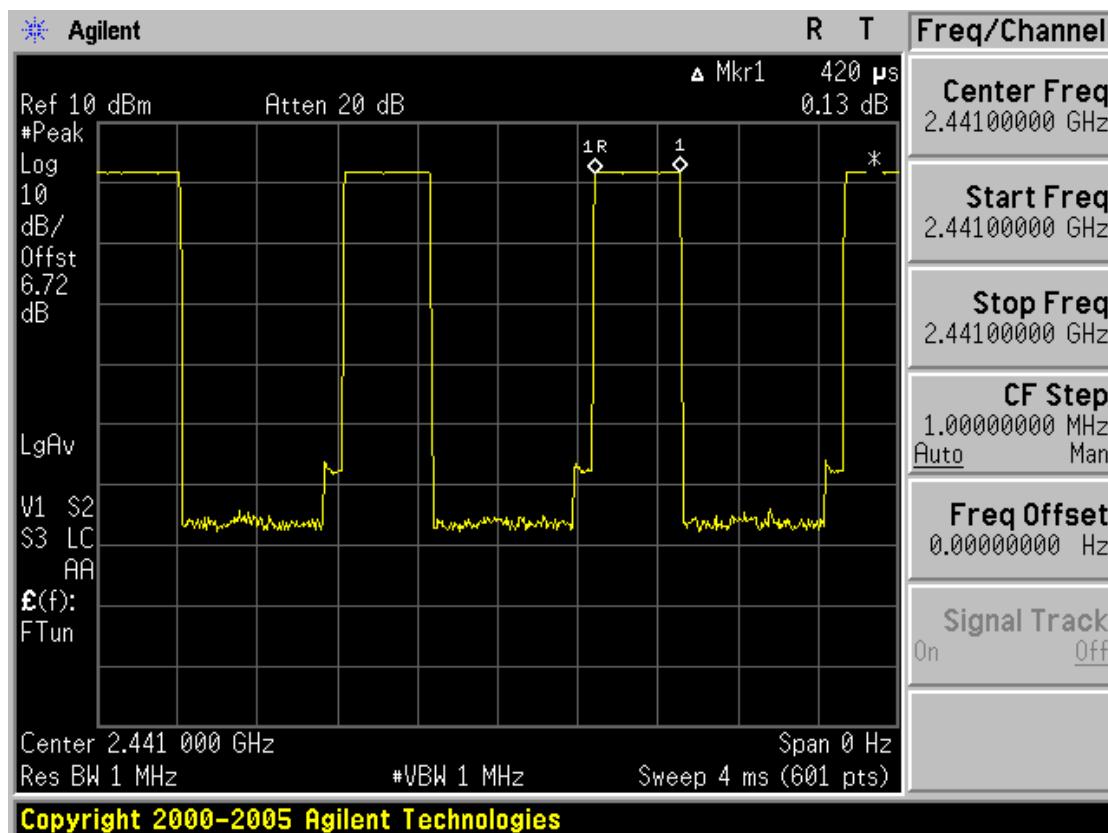
Same as the Chapter 3.2.1 (Figure 1)

### Time of Occupancy for Packet Type DH 1

The system makes worst case 1600 hops per second or 1 time slot has a length of 625 us with 79 channels. A DH 1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case  $1600/2 = 800$  hops per second with 79 channels. So you have each channel  $800/79 = 10.13$  times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $10.13 \times 31.6 = 320.11$  times of appearance.

Each Tx-time per appearance is 420 us

So we have  $320.11 \times 420\text{us} = 134.446$  ms per 31.6 seconds.

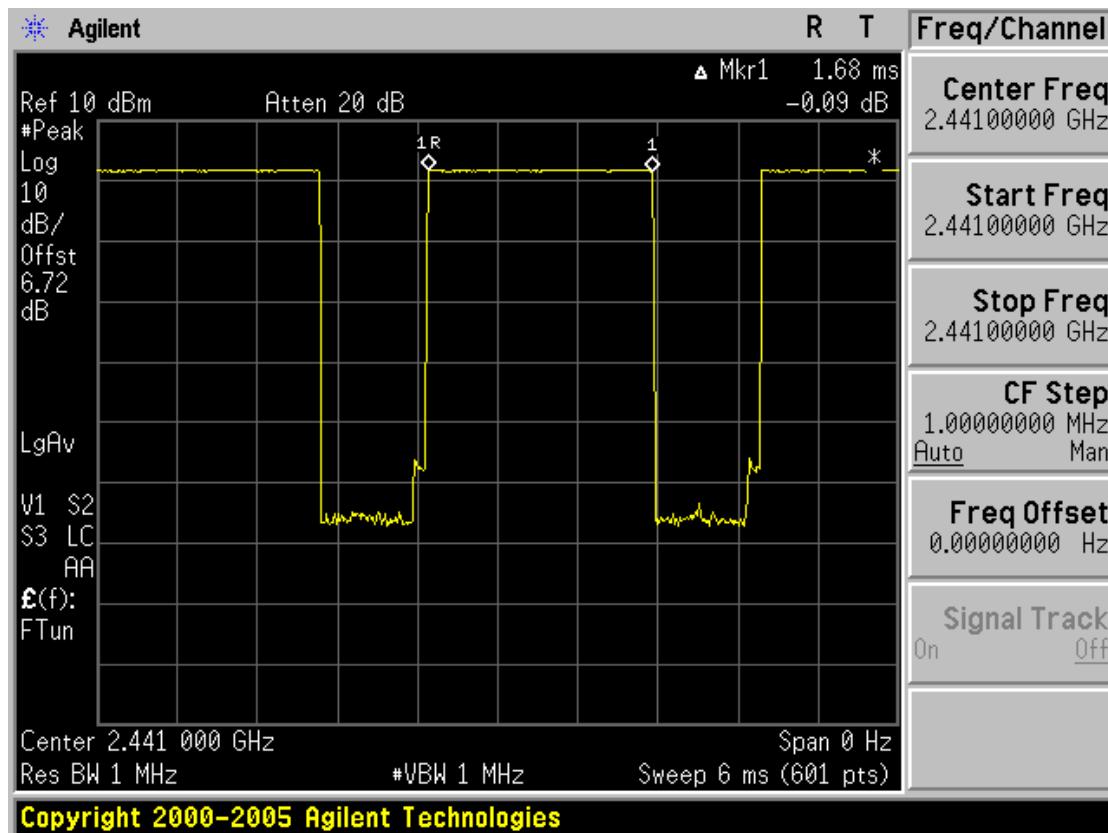


### Time of Occupancy for Packet Type DH 3

The system makes worst case 1600 hops per second or 1 time slot has a length of 625 us with 79 channels. A DH 3 Packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case  $1600/4 = 400$  hops per second with 79 channels. So you have each channel  $400/79 = 5.1$  times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $5.1 \times 31.6 = 161.16$  times of appearance.

Each Tx-time per appearance is 1.61 ms

So we have  $161.16 \times 1.68 \text{ ms} = 270.749 \text{ ms}$  per 31.6 seconds.

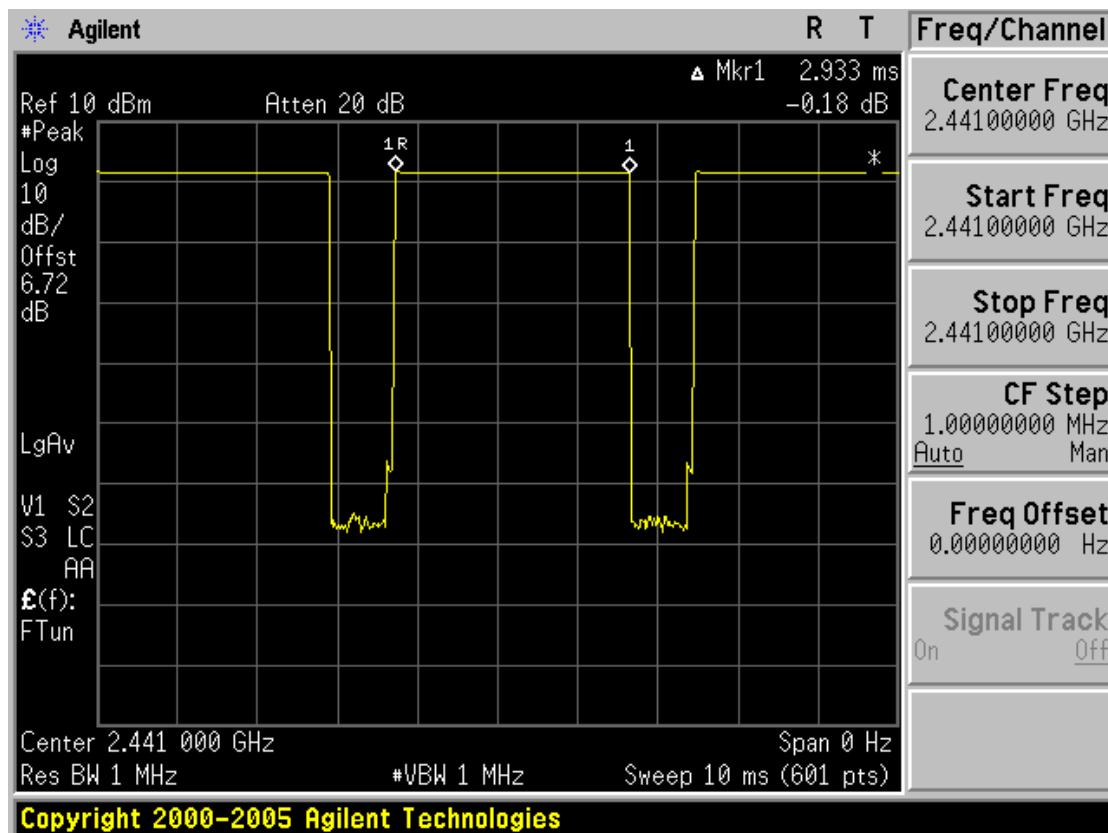


## Time of Occupancy for Packet Type DH 5

The system makes worst case 1600 hops per second or 1 time slot has a length of 625 us with 79 channels. A DH 5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case  $1600/6 = 266.67$  hops per second with 79 channels. So you have each channel  $266.67/79 = 3.37$  times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $3.37 \times 31.6 = 106.49$  times of appearance.

Each Tx-time per appearance is 2.878 ms

So we have  $106.49 \times 2.933 \text{ ms} = 312.335 \text{ ms}$  per 31.6 seconds.



### 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 channels

Span = 5 MHz (approximately 5 times of the 20 dB bandwidth)

RBW = 1 MHz (greater than the 20dB bandwidth of the emission being measured)

VBW = 1 MHz (VBW  $\geq$  RBW)

Detector function = peak

Trace = max hold

Sweep = auto

## Measurement Data:

Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2402	1	<b>2.20</b>	<b>1.660</b>	<b>Complies</b>
2441	40	<b>1.63</b>	<b>1.455</b>	<b>Complies</b>
2480	79	<b>1.15</b>	<b>1.303</b>	<b>Complies</b>

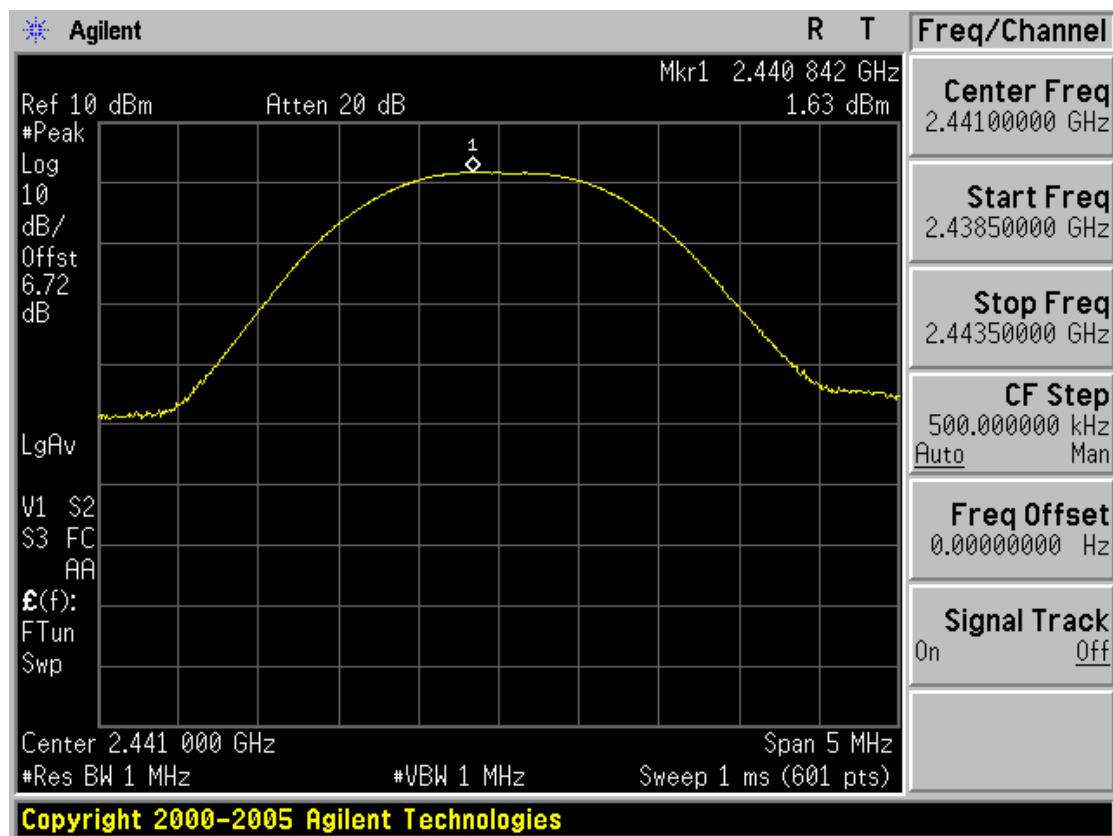
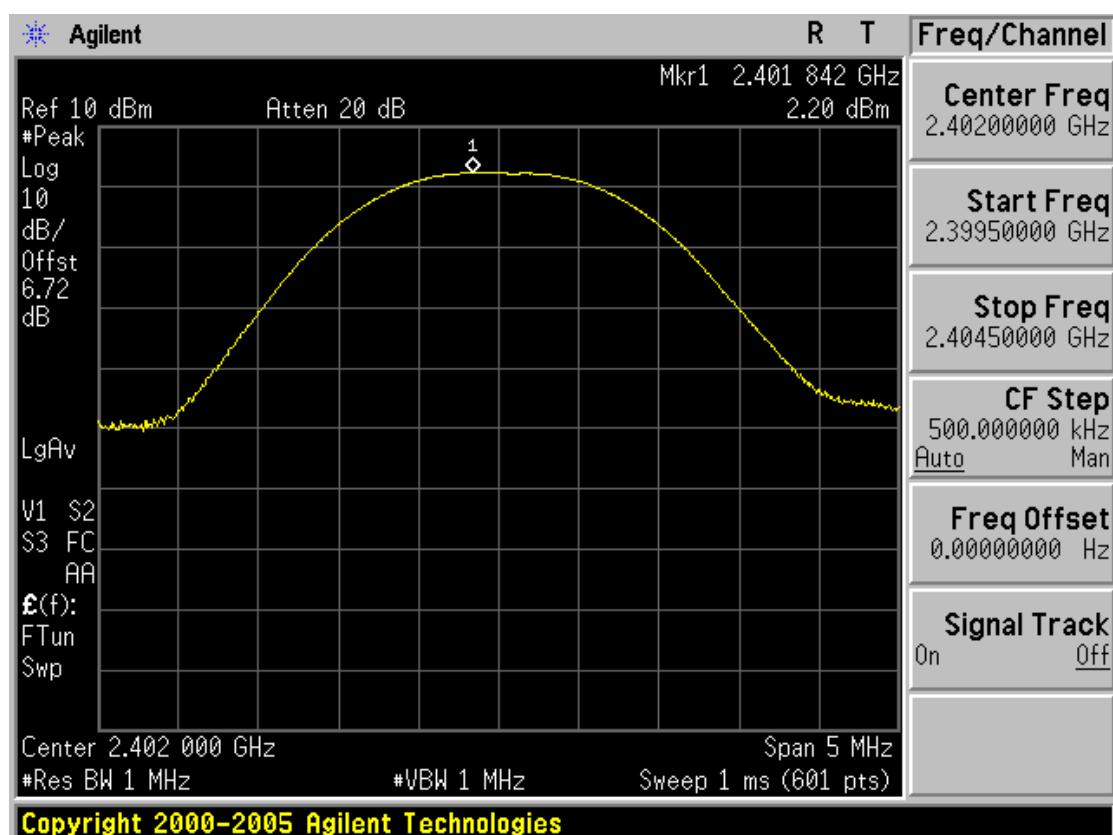
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	< 1W
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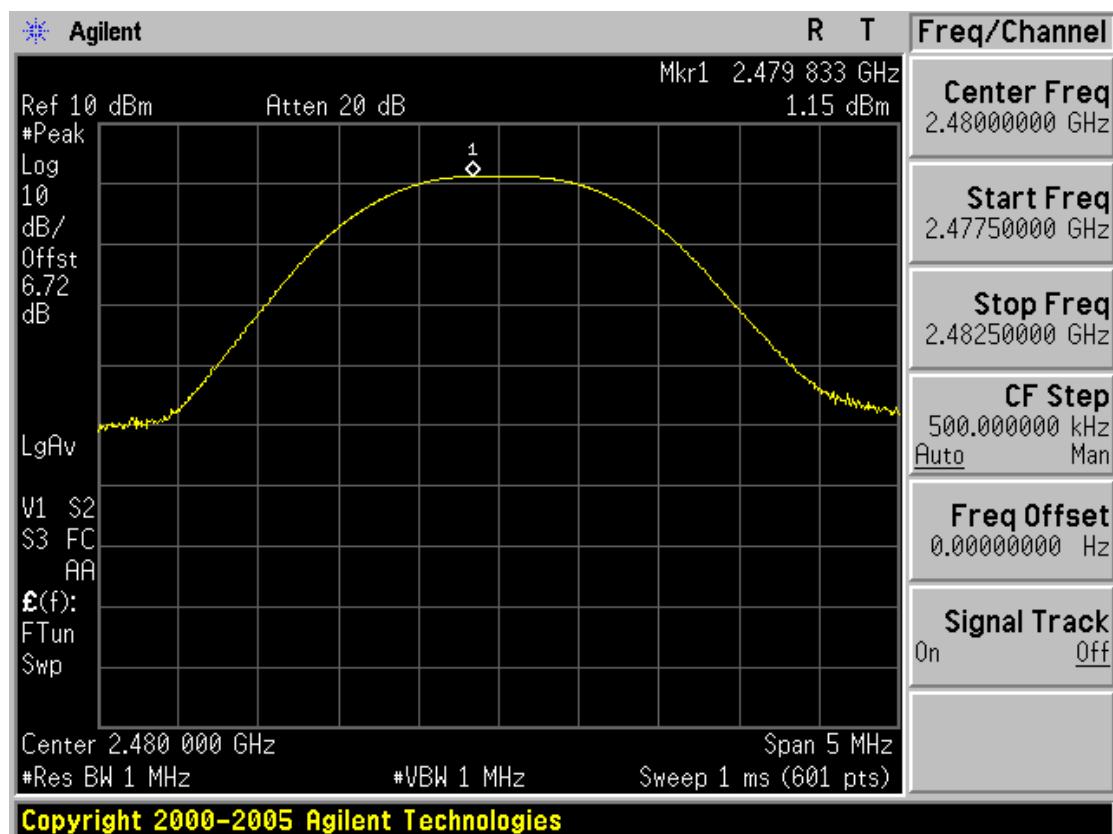
## Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

## Peak Output Power



## Peak Output Power



### 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.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Detector function = peak

Trace = max hold

Sweep = auto

### Measurement Data: **Complies**

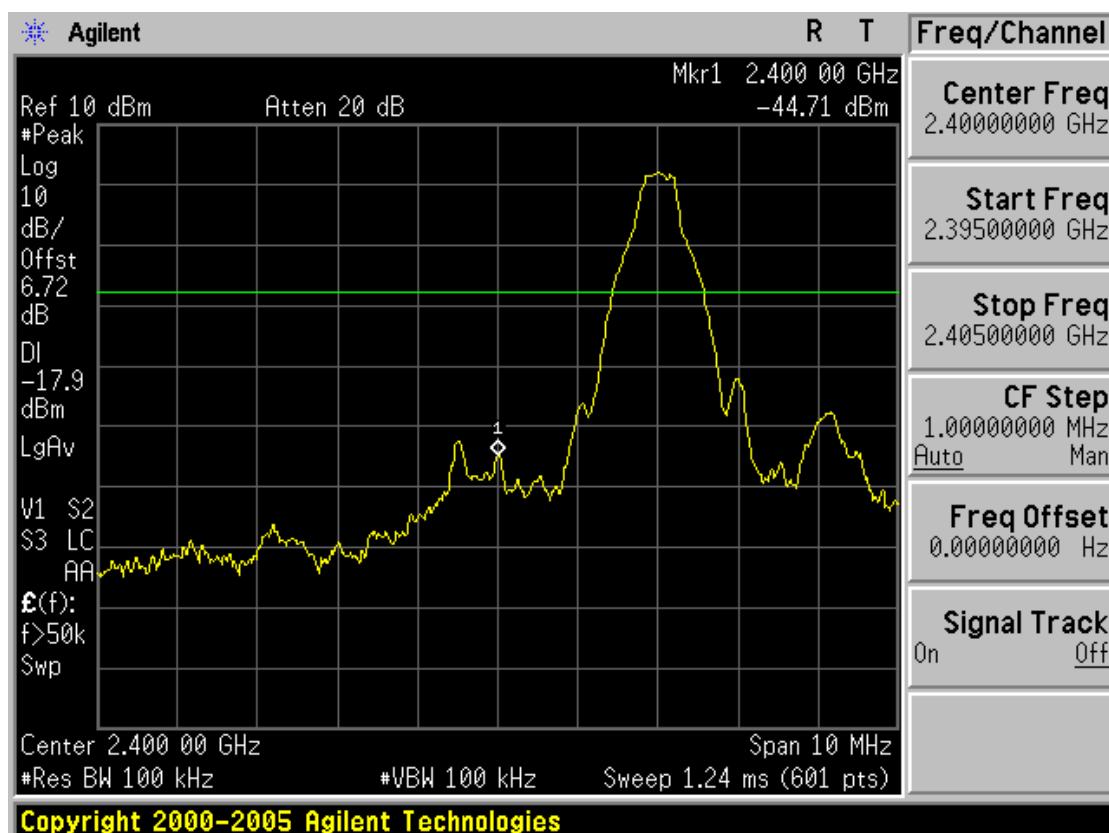
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	> 20 dBc
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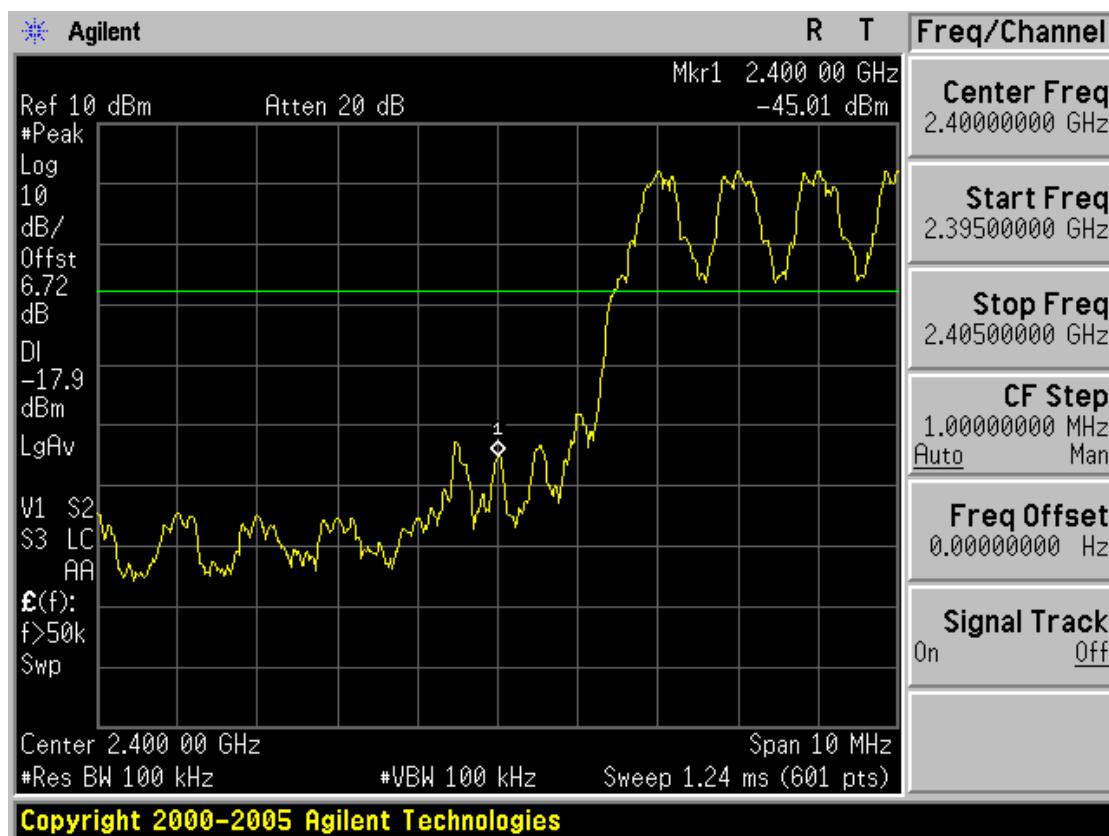
## Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

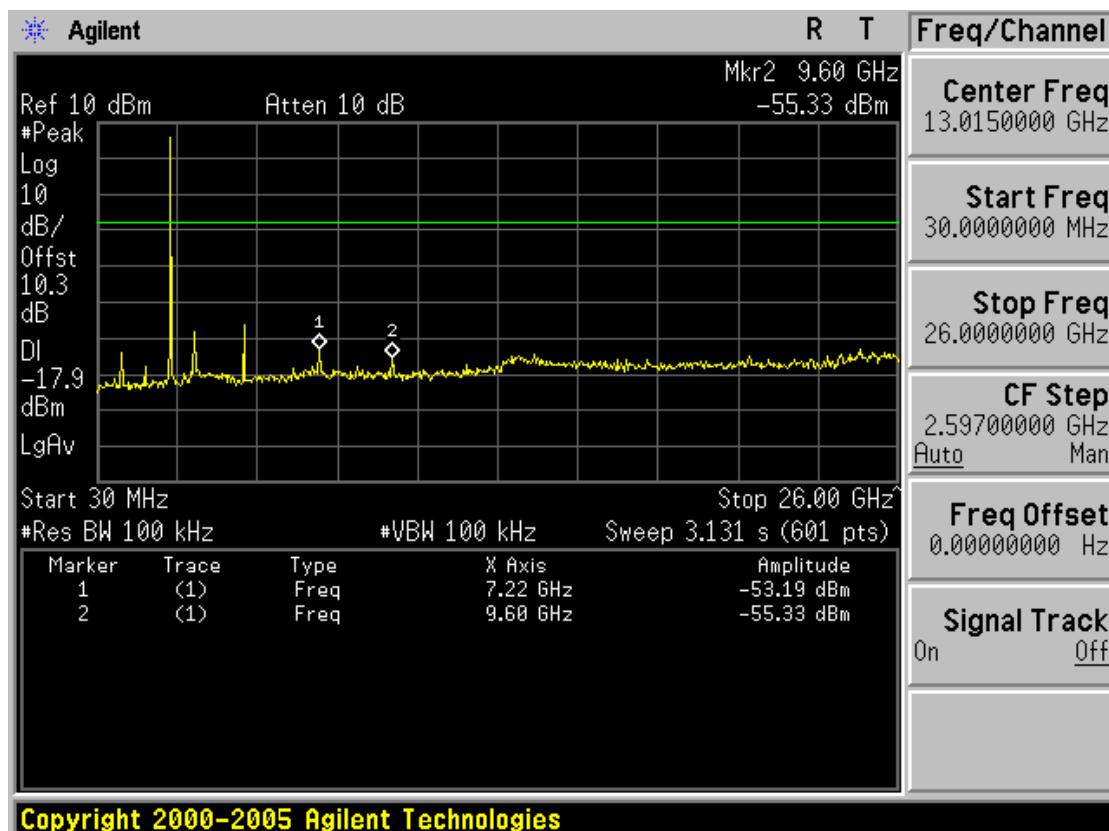
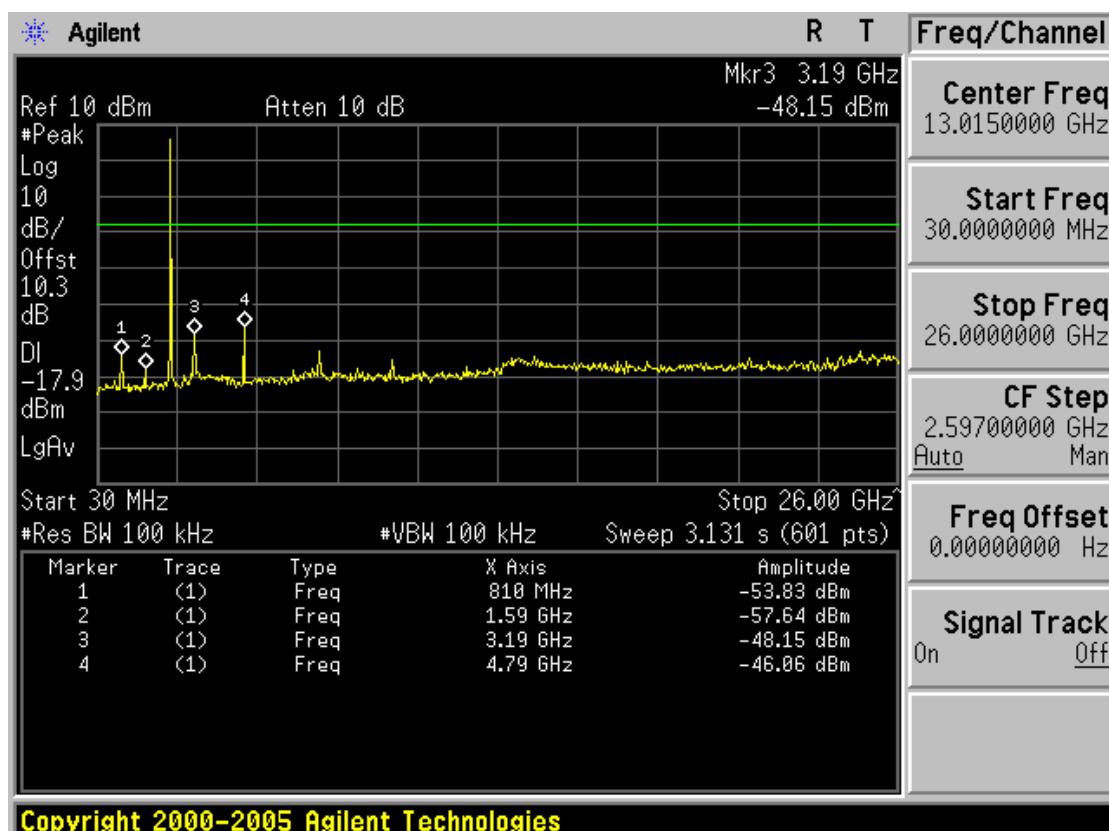
## Low band with hopping disabled



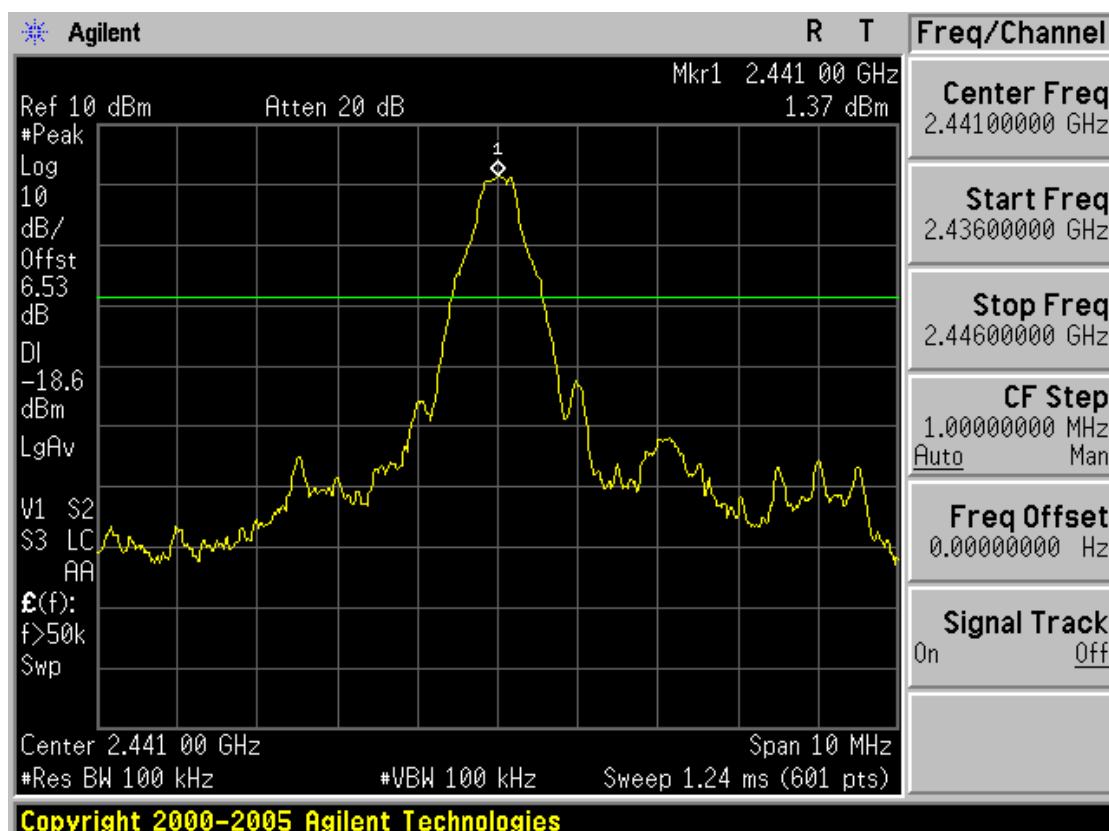
## Low band with hopping enabled



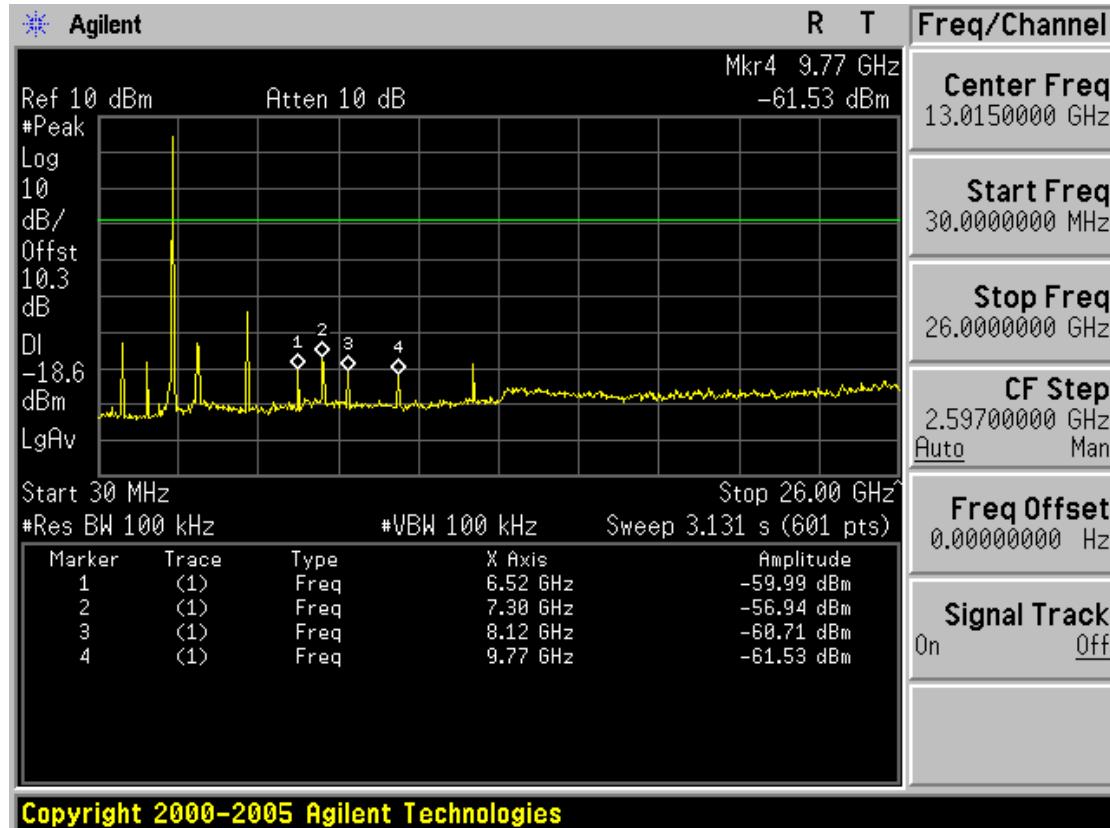
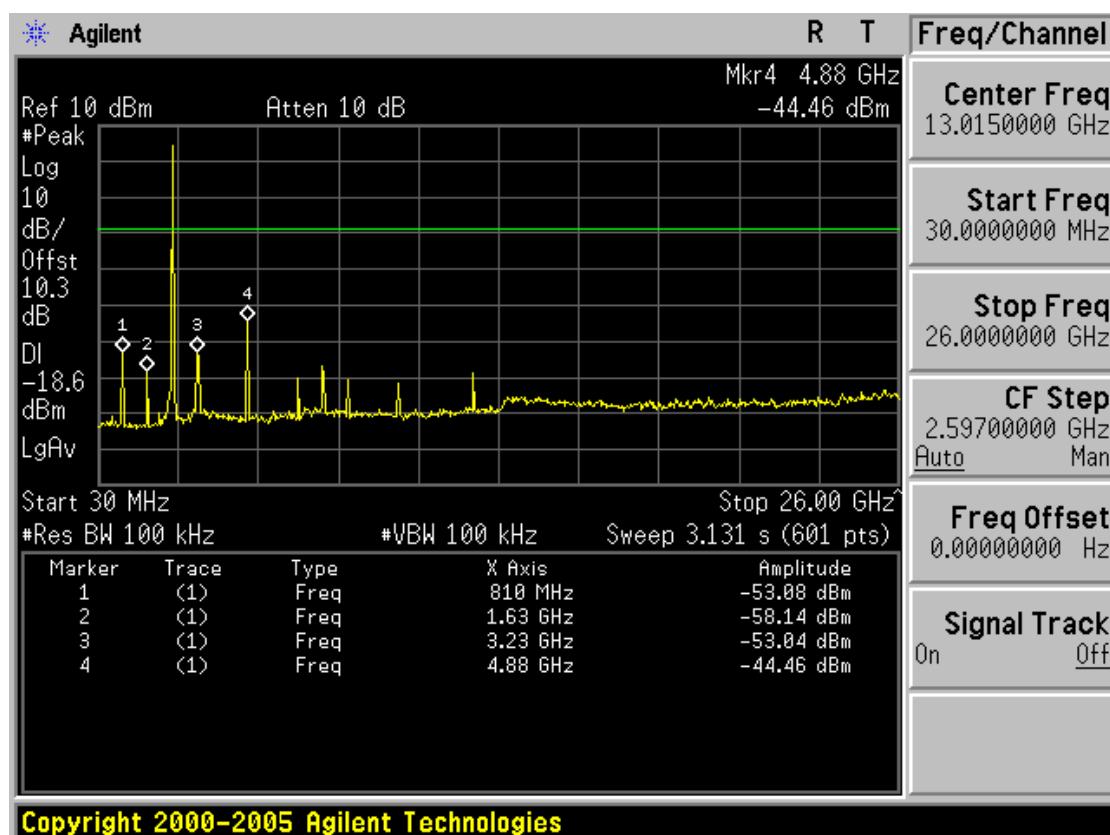
## Low channel spurious



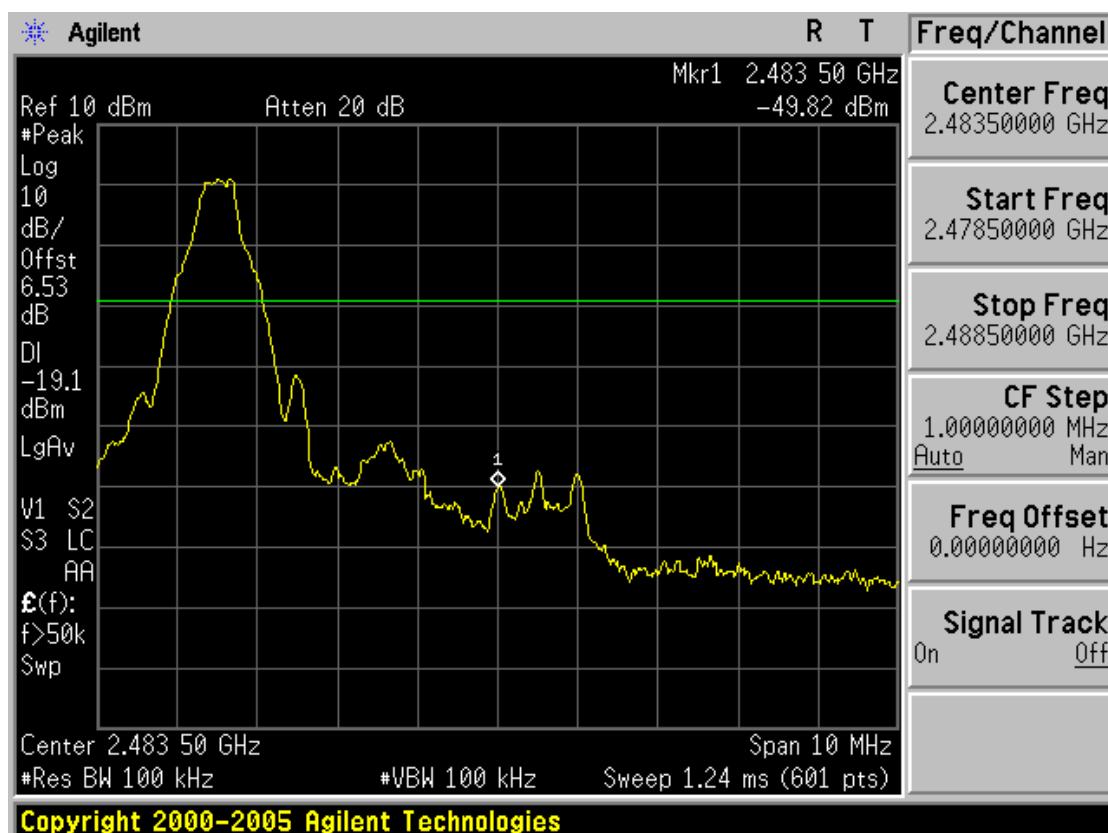
## Mid channel ref



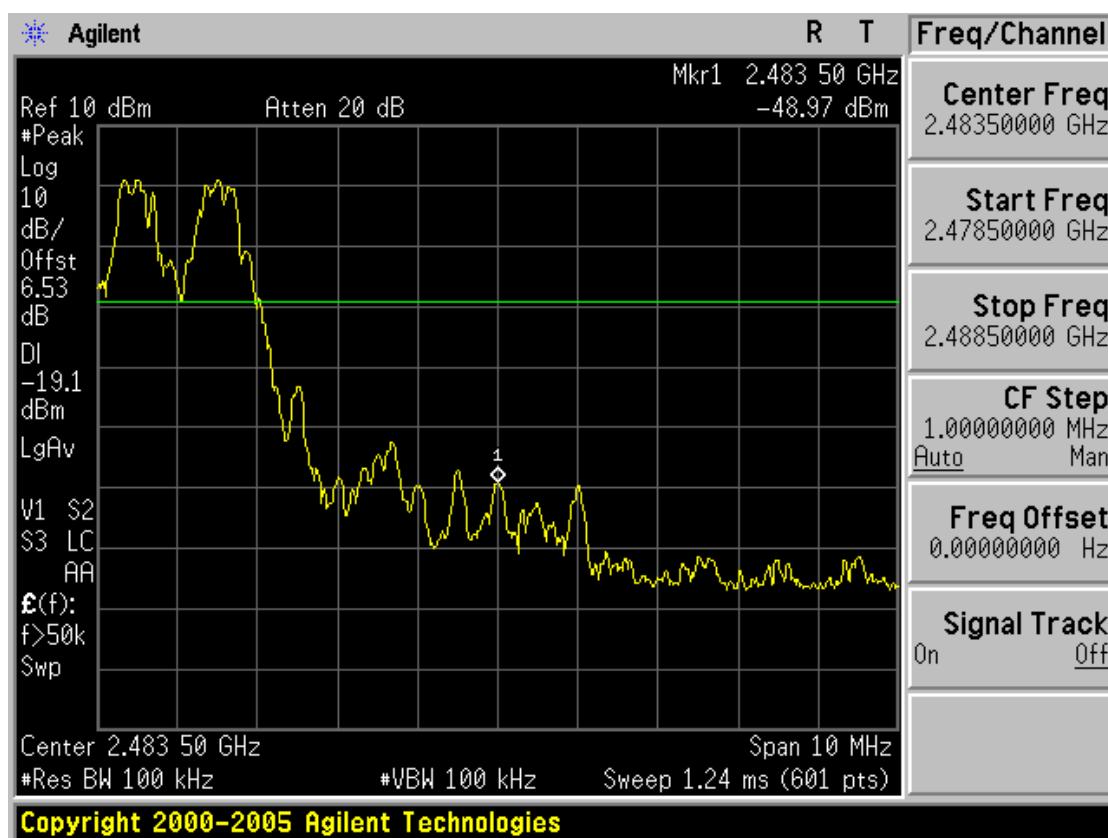
## Mid channel spurious



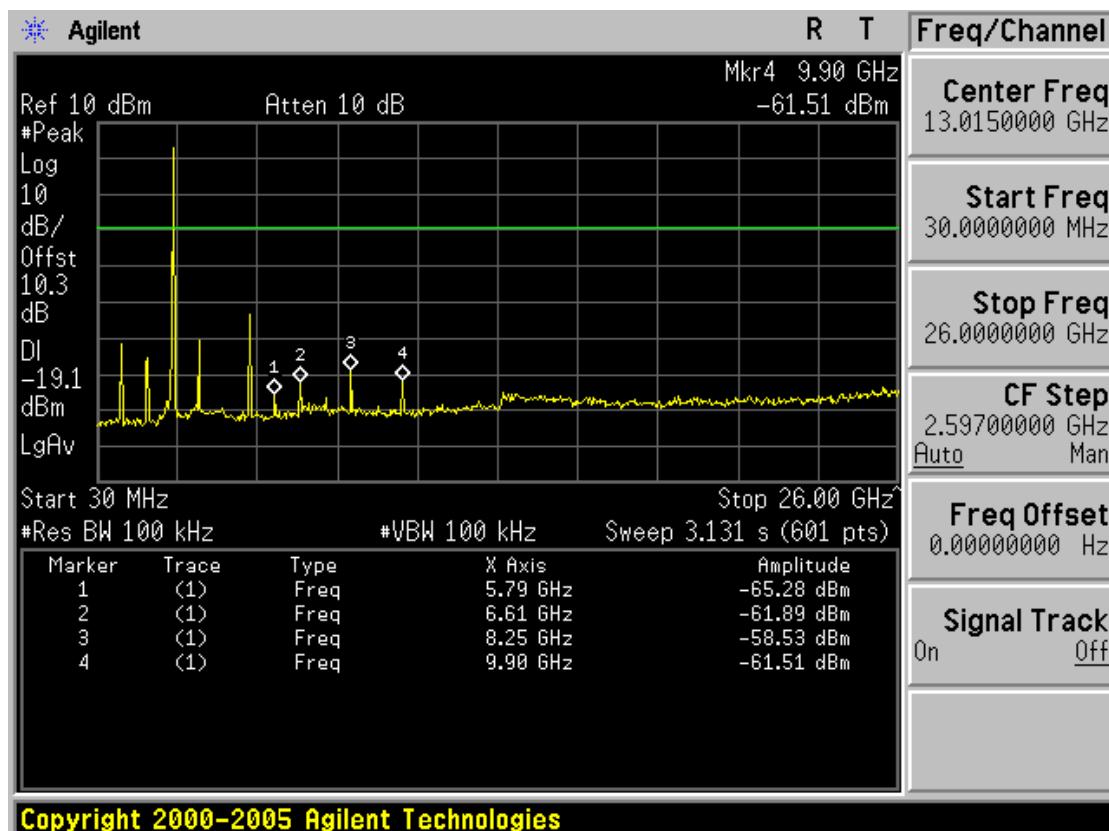
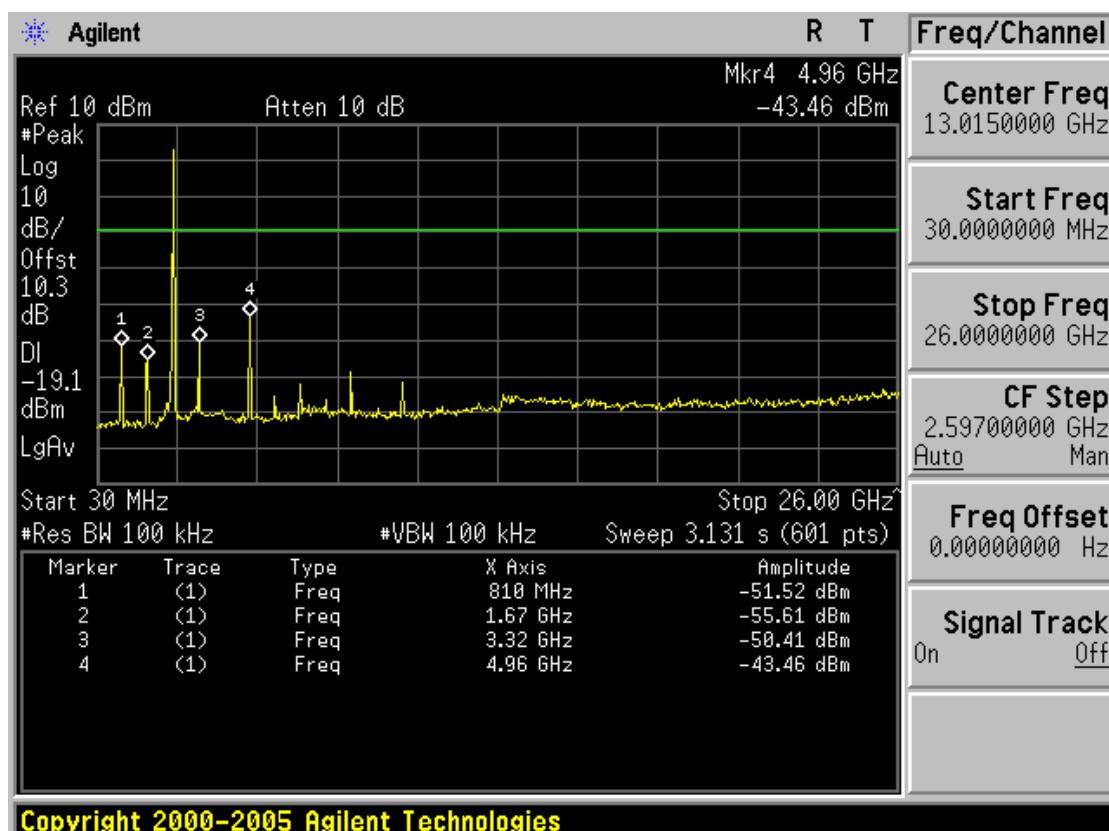
## High band with hopping disabled



## High band with hopping enabled



## High channel spurious



### 3.2.7 Radiated 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:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30MHz ~ 1 GHz)

VBW ≥ RBW ( Peak)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

VBW = 10Hz (Average)

Trace = max hold

Sweep = auto

#### Measurement Data: **Complies**

- No emissions were detected at a level greater than 10dB below limit.
- Refer to the next page.

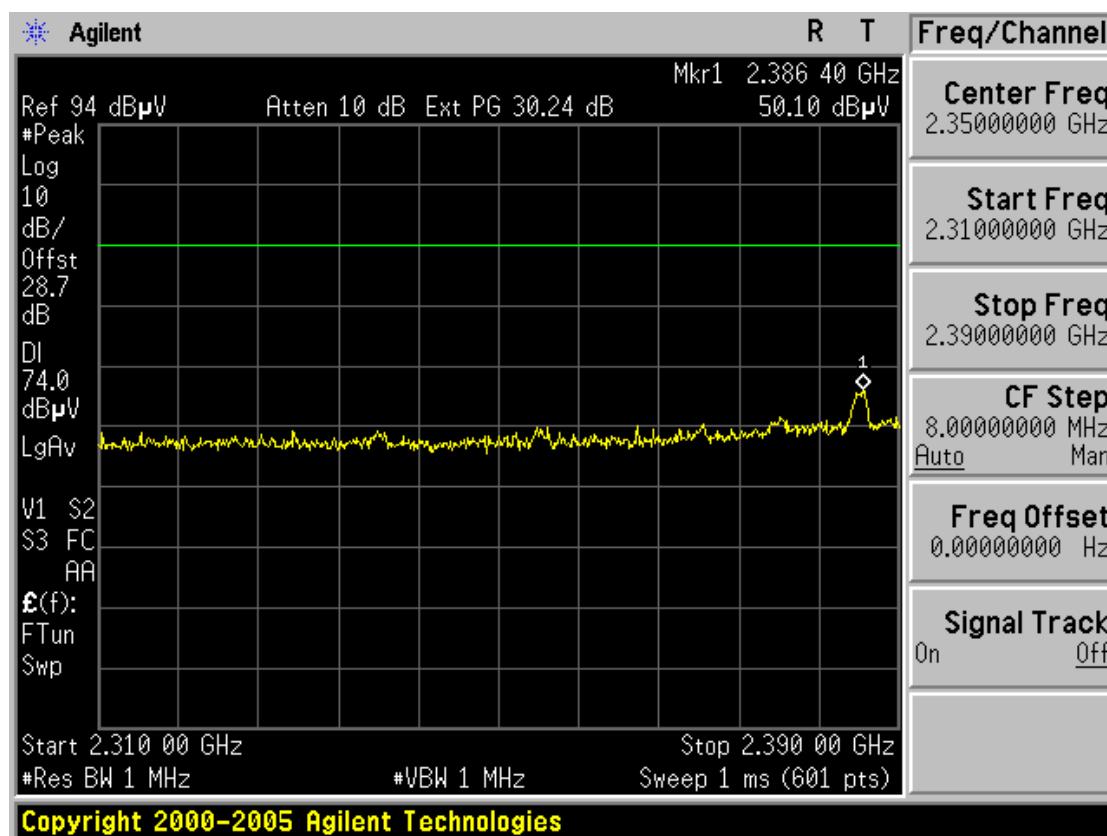
#### Minimum Standard: FCC Part 15.205 (a), 15.205(b), 15.209(a) and (b)

#### Limit : FCC P15.209(a)

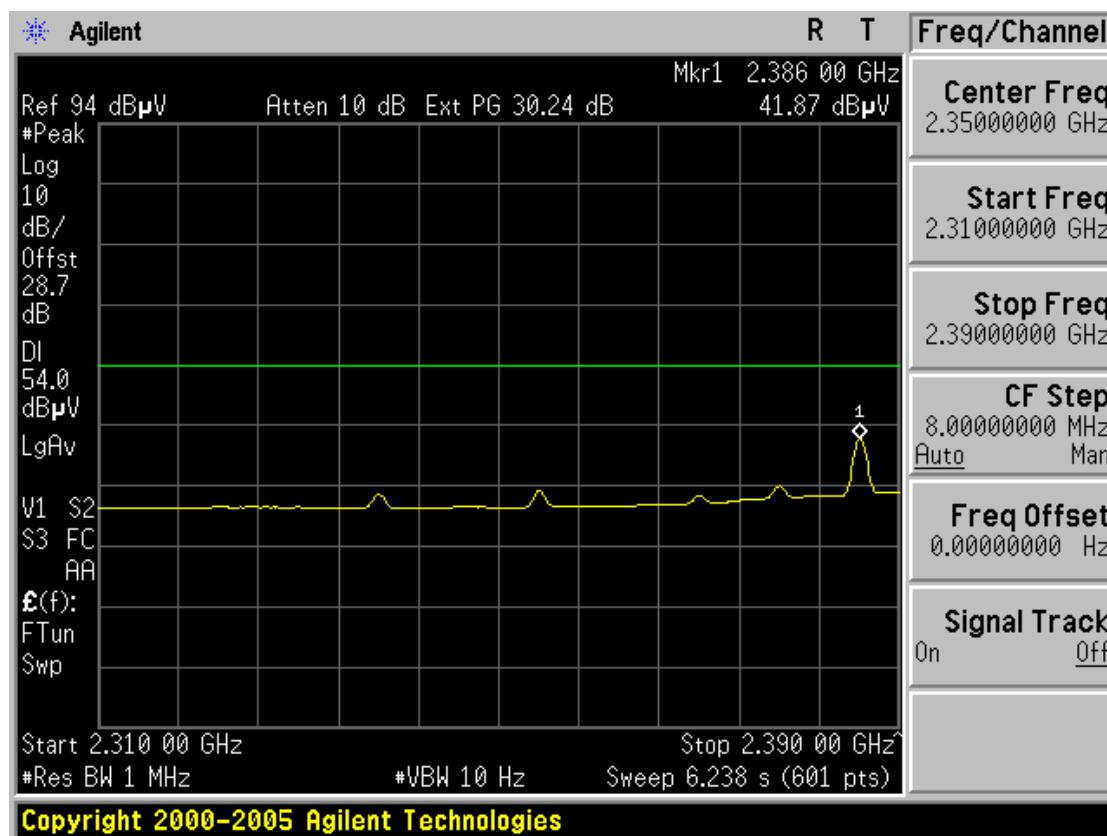
Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

\*\* 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.

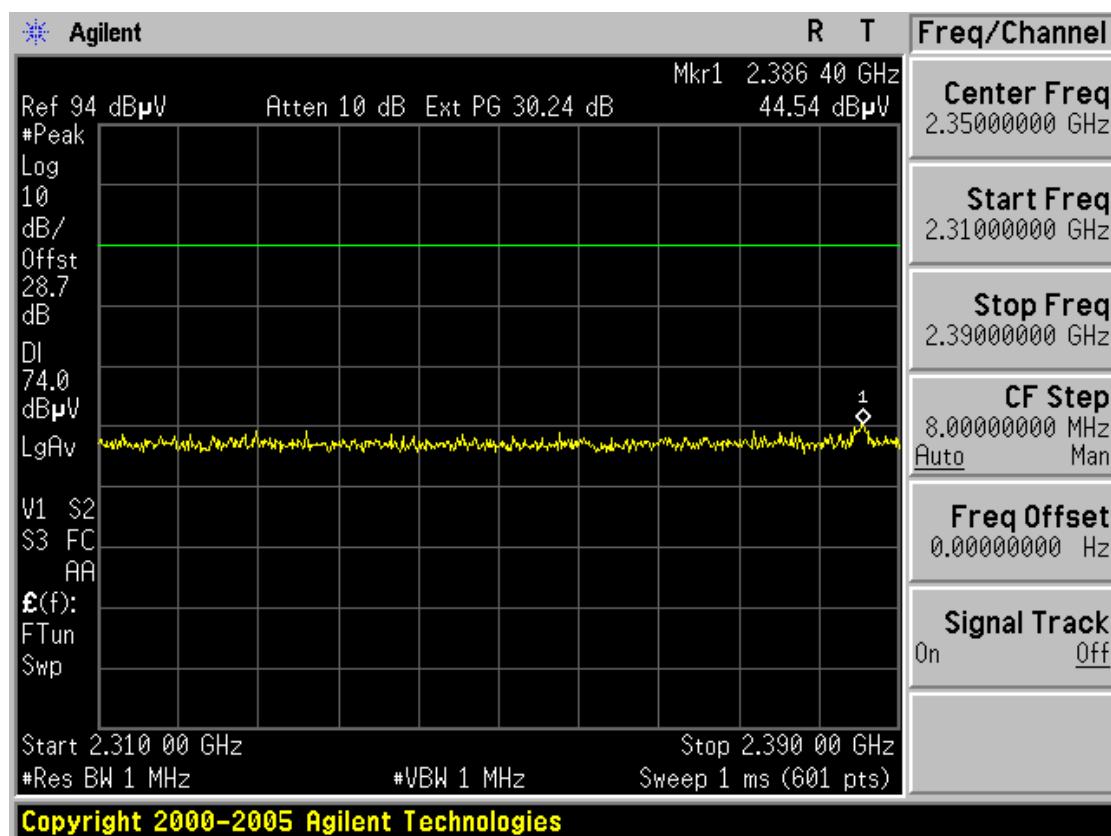
## Restricted Band Edge: Low Channel (Peak, Horizontal)



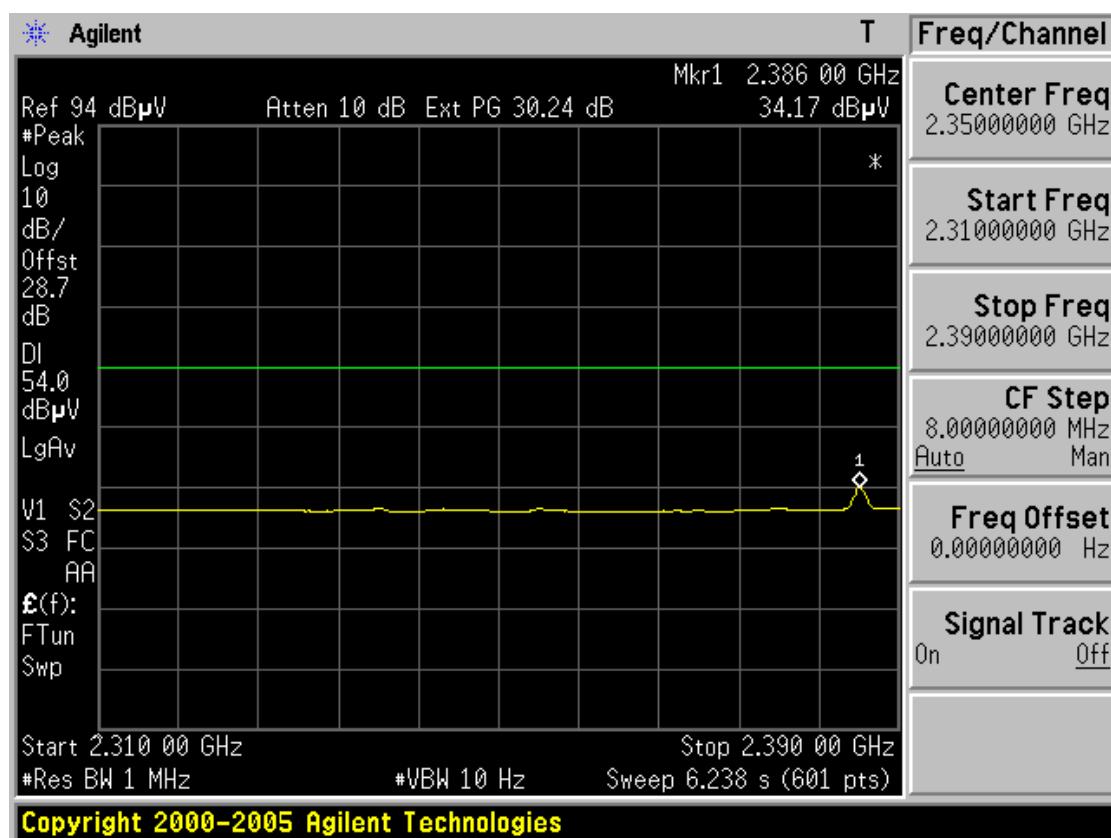
## Restricted Band Edge: Low Channel (Average, Horizontal)



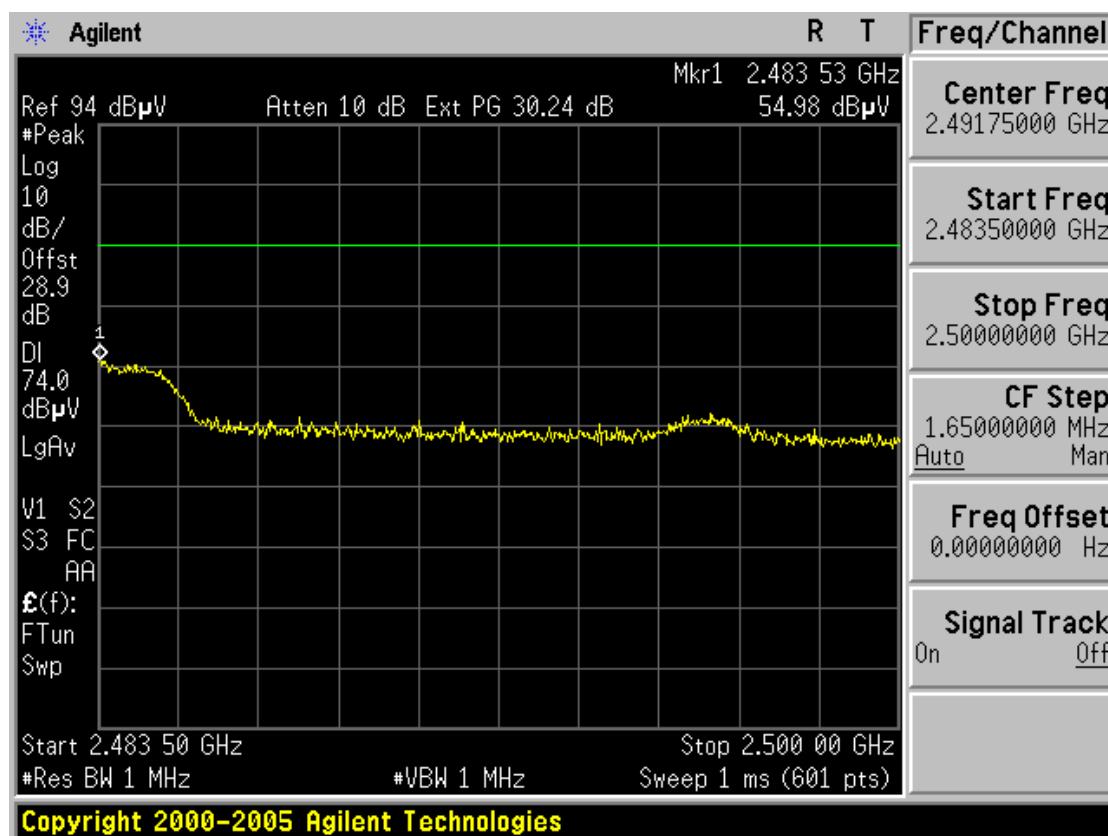
## Restricted Band Edge: Low Channel (Peak, Vertical)



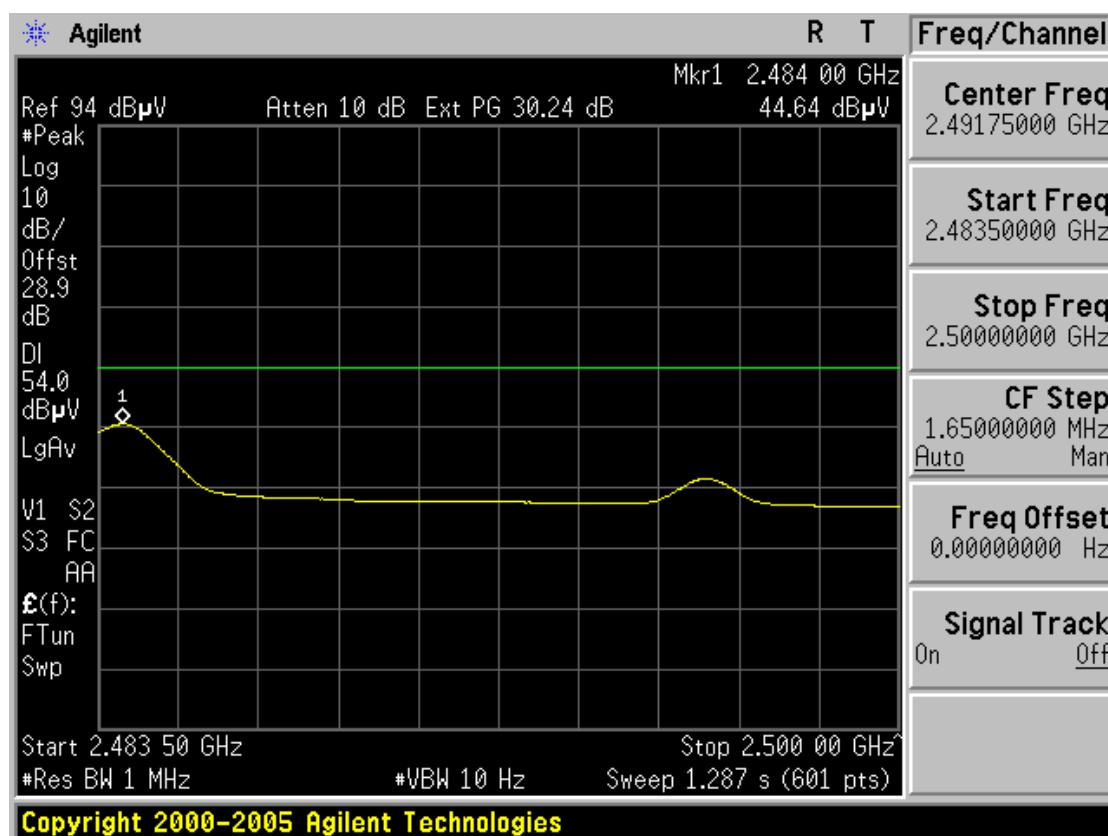
## Restricted Band Edge: Low Channel (Average, Vertical)



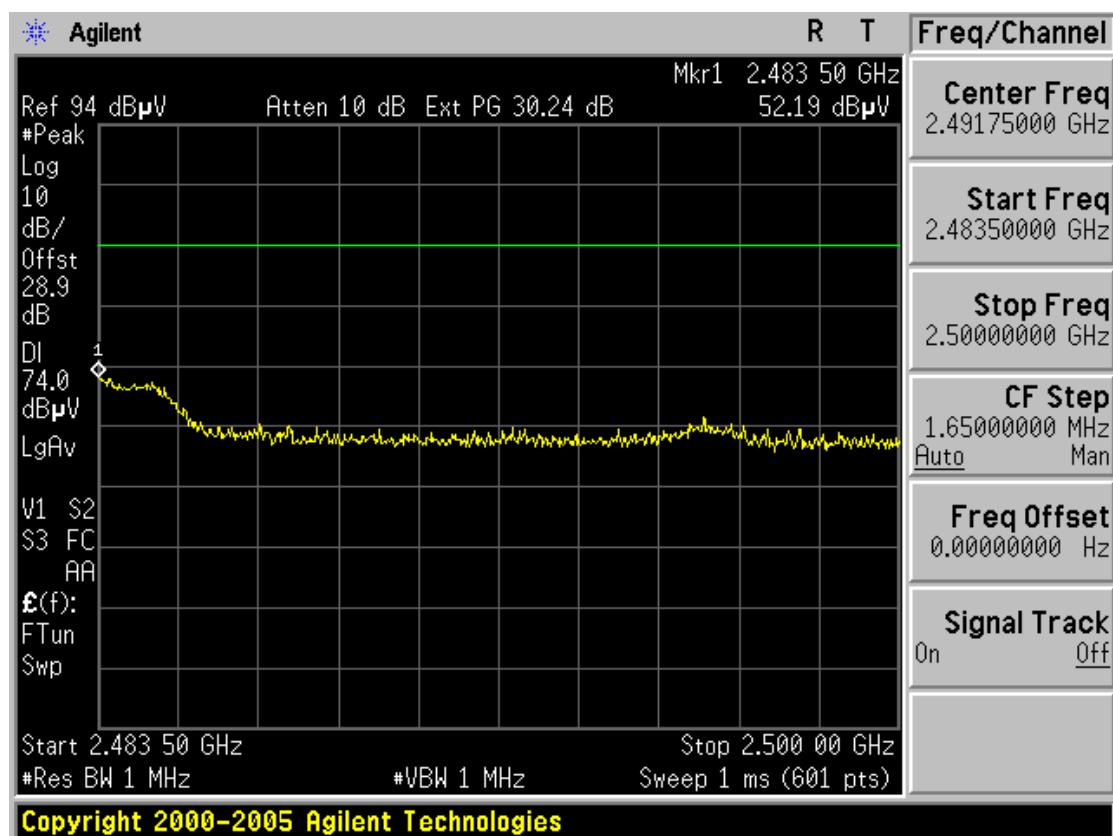
## Restricted Band Edge: High Channel (Peak, Horizontal)



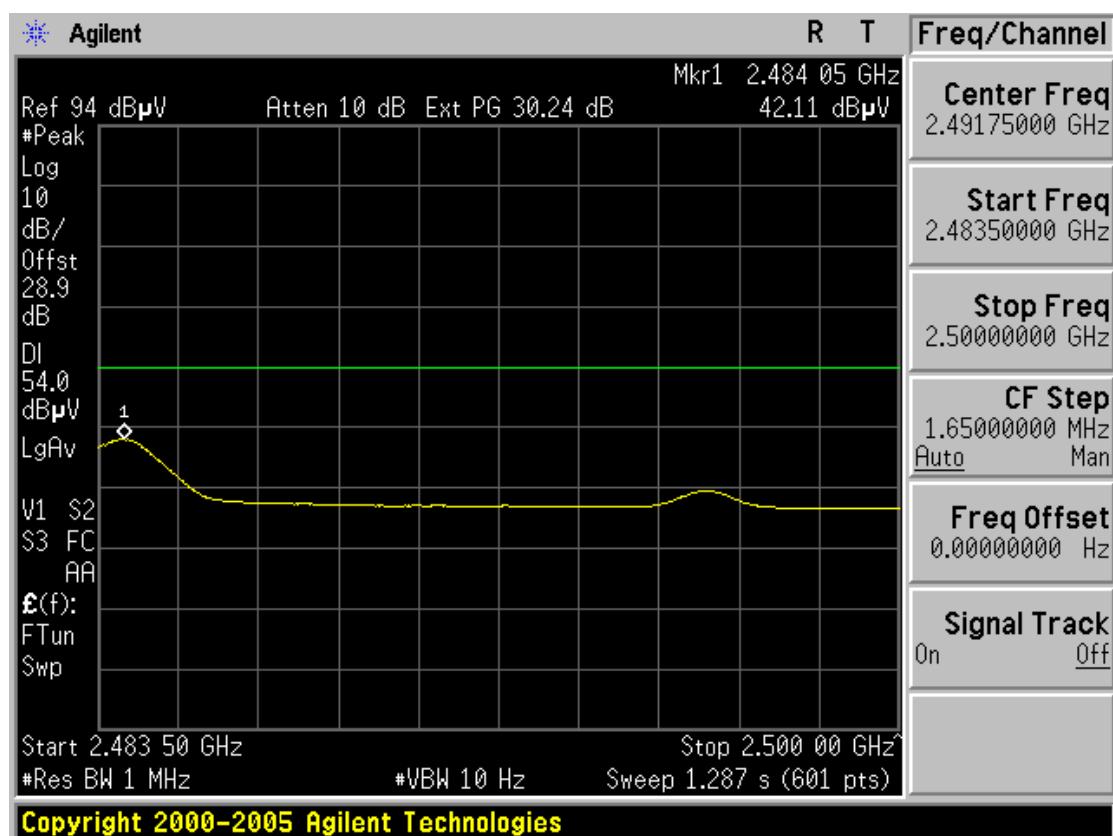
## Restricted Band Edge: High Channel (Average, Horizontal)



## Restricted Band Edge: High Channel (Peak, Vertical)



## Restricted Band Edge: High Channel (Average, Vertical)



**Radiated Spurious Emission Data(Harmonics)****Low Channel(2402MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV)		Limit (dBuV)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

**Middle Channel(2441MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV)		Limit (dBuV)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

**High Channel(2480MHz)**

Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)		T.F (dB)	Result (dBuV)		Limit (dBuV)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Not. 1. “ \*\* ” : No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor -AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

## Radiated Spurious Emission Data(Other Emissions)

(Continued...)

<b><u>Other Emissions</u></b>														
Frequency (MHz)	ANT Pol. (H/V)	Reading Value (dBuV)			T.F (dB)	Result (dBuV)			Limit (dBuV)			Margin (dB)		
		PK	QP	AV		PK	QP	AV	PK	QP	AV	PK	QP	AV
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Not. 1. “ \*\* ” : No other emissions were detected at a level greater than 10dB below limit.

2. T.F(Total Factor) = Cable Loss + Ant Factor -AMP Gain

3. Result = Reading Value + T.F

4. Margin = Limit - Result

### 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 mode (QP) 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: **Complies**

- Refer to the next page.

#### 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

#### Measurement Setup

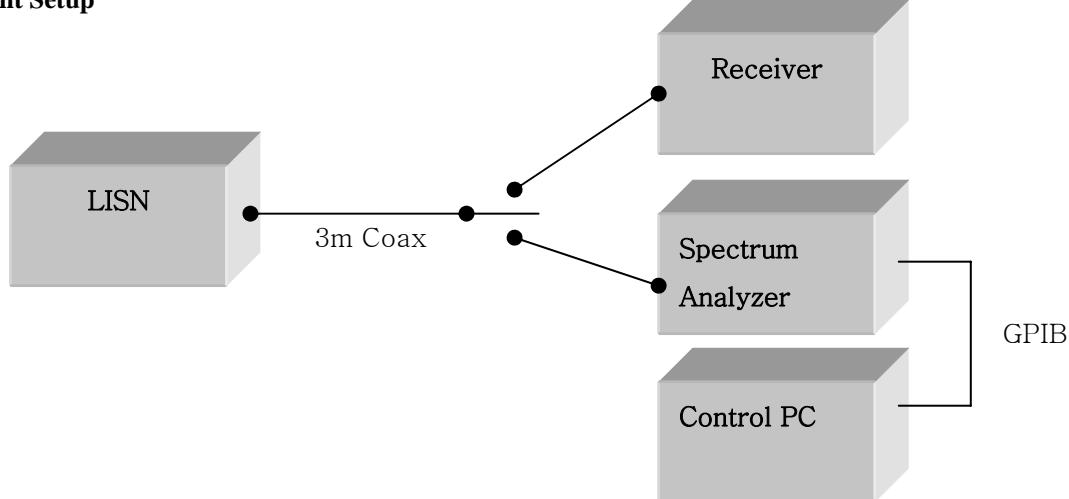
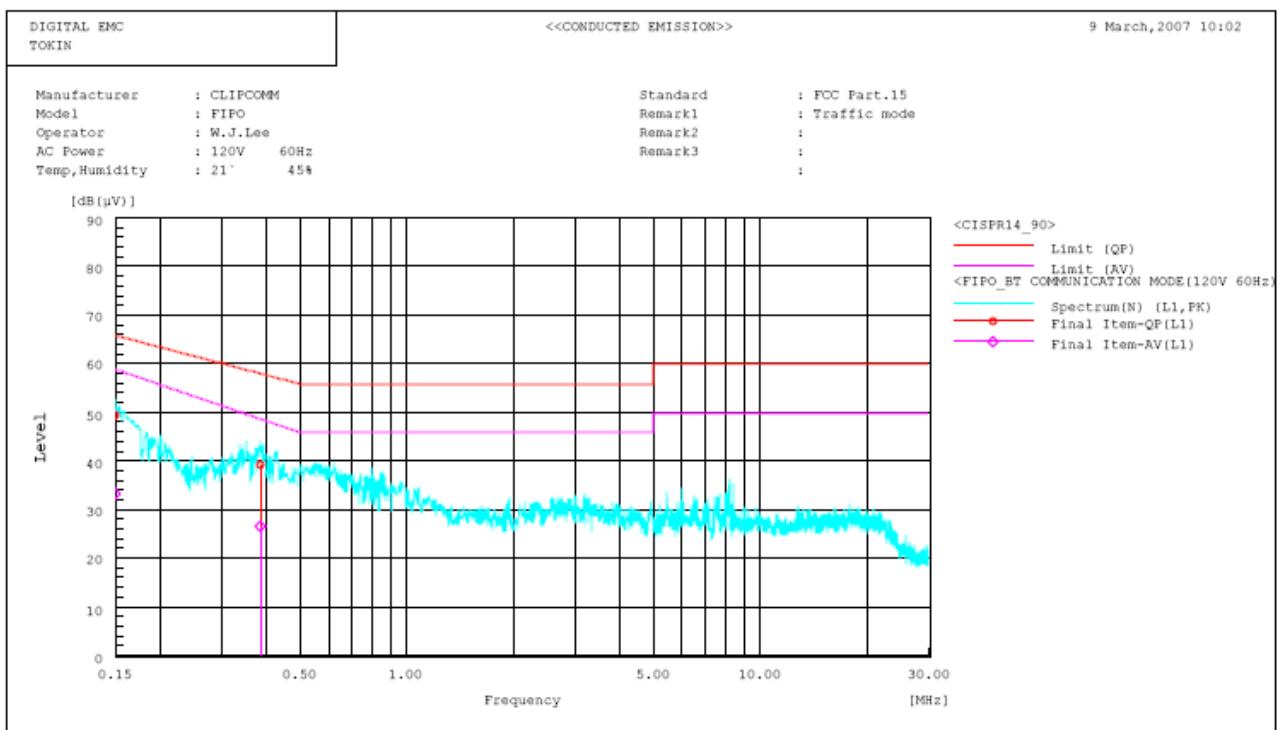
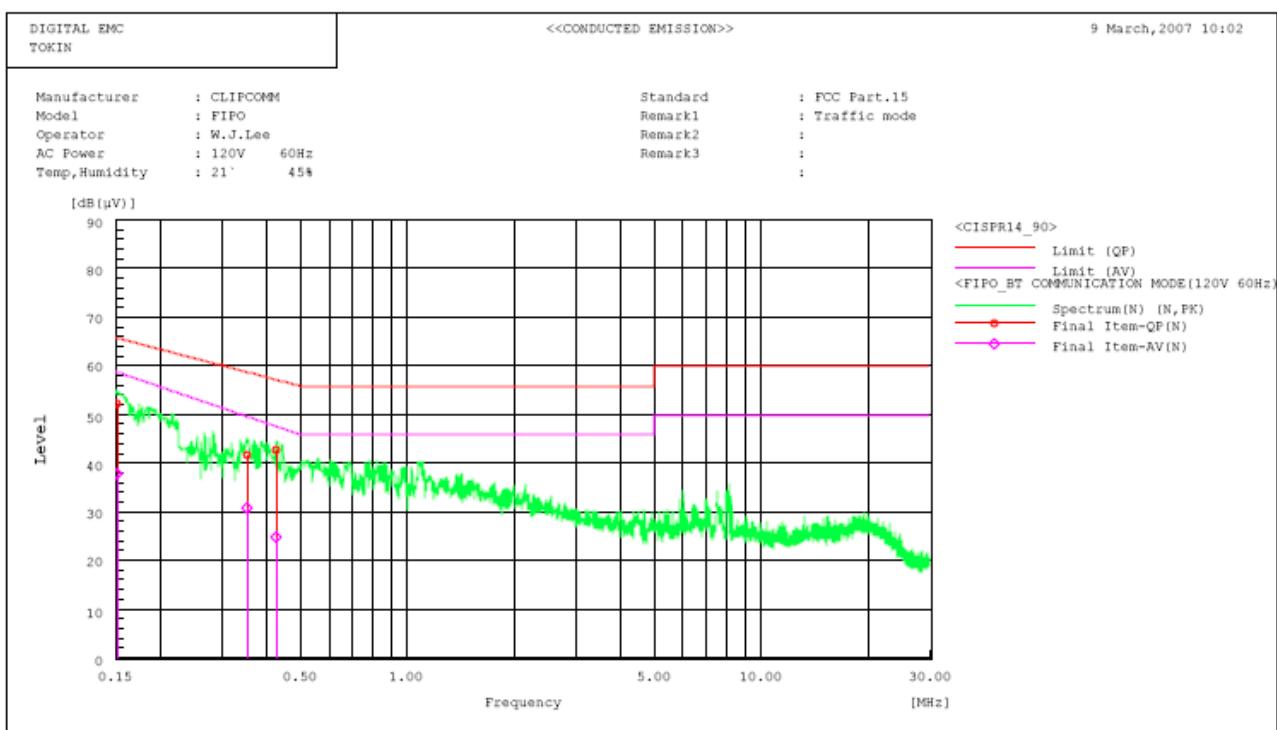


Figure 2: Measurement setup for AC Conducted Emission

## AC Conducted Emissions



## AC Conducted Emissions

\*\*\*\*\* DIGITAL EMC \*\*\*\*\*  
 <<CONDUCTED EMISSION>>

9 March, 2007 10:02

Standard : FCC Part.15  
 Manufacturer : CLIPCOMM  
 Model : F1PO  
 Operator : W.J.Lee  
 AC Power : 120V 60Hz  
 Temp, Humidity : 21' 45%  
 Remark1 : Traffic mode  
 Remark2 :  
 Remark3 :  
 \*\*\*\*\*

## Final Result

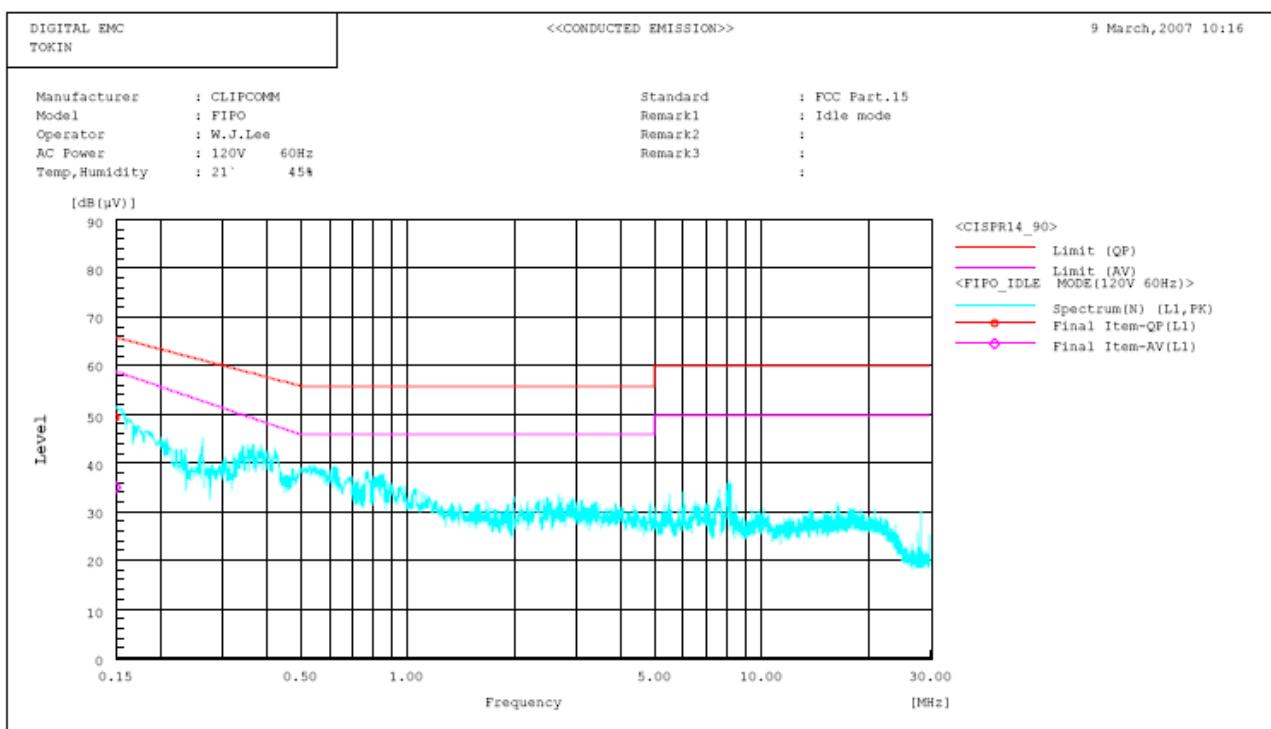
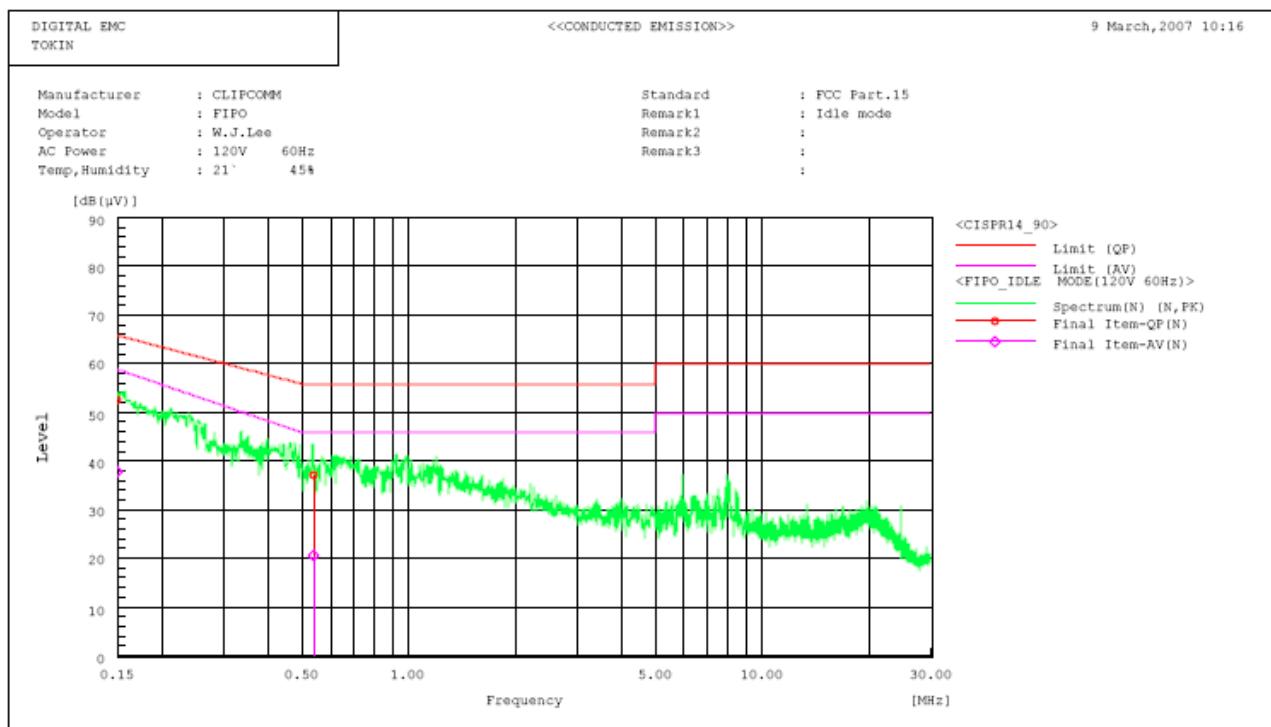
## --- N Phase ---

No.	Frequency [MHz]	Reading		c.f	Result		Result		Limit		Margin		Remark
		QP [dB(µV)]	AV [dB(µV)]		QP [dB]	AV [dB(µV)]	QP [dB(µV)]	AV [dB(µV)]	QP [dB(µV)]	AV [dB(µV)]	QP [dB]	AV [dB]	
1	0.151	52.3	37.7	0.1	52.4	37.6	65.9	56.9	18.5	21.1			
2	0.253	41.7	31.0	0.1	41.8	31.1	58.9	49.8	17.1	18.7			
3	0.429	42.8	24.8	0.1	42.9	24.9	57.3	47.7	14.4	22.6			

## --- L1 Phase ---

No.	Frequency [MHz]	Reading		c.f	Result		Result		Limit		Margin		Remark
		QP [dB(µV)]	AV [dB(µV)]		QP [dB]	AV [dB(µV)]	QP [dB(µV)]	AV [dB(µV)]	QP [dB(µV)]	AV [dB(µV)]	QP [dB]	AV [dB]	
1	0.150	49.5	33.4	0.1	49.6	33.5	66.0	59.0	16.4	25.5			
2	0.287	39.3	26.6	0.1	39.4	26.7	58.1	48.8	18.7	22.1			

## AC Conducted Emissions



## AC Conducted Emissions

\*\*\*\*\* DIGITAL EMC \*\*\*\*\*  
<<CONDUCTED EMISSION>>

9 March, 2007 10:16

Standard : FCC Part.15  
 Manufacturer : CLIPCOMM  
 Model : F1PO  
 Operator : W.J.Lee  
 AC Power : 120V 60Hz  
 Temp, Humidity : 21' 45%  
 Remark1 : Idle mode  
 Remark2 :  
 Remark3 :  
 :

## Final Result

## --- N Phase ---

No.	Frequency	Reading		c.f	Result		Limit		Margin		Remark
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.150	52.5	37.9	0.1	52.6	38.0	66.0	59.0	13.4	21.0	
2	0.538	37.1	20.5	0.1	37.2	20.6	56.0	46.0	18.8	25.4	

## --- L1 Phase ---

No.	Frequency	Reading		c.f	Result		Limit		Margin		Remark
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.150	49.6	35.1	0.1	49.7	35.2	66.0	59.0	16.3	28.8	

## 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)	S/N
01	Spectrum Analyzer	Agilent	E4404B	21/03/07	US41061134
02	Spectrum Analyzer	Agilent	E4440A	14/11/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EPM-442A	06/07/07	GB37170413
05	Power Sensor	H.P	8481A	14/07/07	3318A96332
06	Frequency Counter	H.P	5342A	15/09/07	2119A04450
07	Multifunction Synthesizer	H.P	8904A	12/10/07	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	22/03/07	101251
09	Signal Generator	H.P	E4421A	06/07/07	US37230529
10	Audio Analyzer	H.P	8903B	06/07/07	3011A0944B
11	Modulation Analyzer	H.P	8901B	10/07/07	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/07	B016821
13	8960 Series 10 Wireless Comms Test Set	Agilent	Z5515C	13/06/08	GB43461134
14	Universal Radio Communication Test	Rohde Schwarz	CMU200	21/03/07	107631
15	CDMA Mobile Station Test Set	H.P	8924C	15/09/07	US35360688
16	PCS Interface	HP	83236B	15/09/07	3711J03014
17	Multi system UE Tester	Japan Radid Co., Ltd	NJZ-2000	20/11/07	ET00095
18	Power Splitter	WEINSCHEL	1593	14/10/07	332
19	BAND Reject Filter	Microwave Circuits	N0308372	19/10/07	3125-01DC0312
20	BAND Reject Filter	Wainwright	WRCG1750	19/10/07	SN2
21	AC Power supply	DAEKWANG	5KVA	21/03/07	N/A
22	DC Power Supply	H.P	6622A	20/03/07	465487
23	HORN ANT	EMCO	3115	24/07/07	6419
24	HORN ANT	EMCO	3115	21/08/07	21097
25	HORN ANT	A.H.Systems	SAS-574	16/08/07	154
26	HORN ANT	A.H.Systems	SAS-574	16/08/07	155
27	Dipole Antenna	Schwarzbeck	VHA9103	18/11/07	2116
28	Dipole Antenna	Schwarzbeck	VHA9103	18/11/07	2117
29	Dipole Antenna	Schwarzbeck	UHA9105	18/11/07	2261
30	Dipole Antenna	Schwarzbeck	UHA9105	18/11/07	2262
31	Loop Antenna	ETS	6502	23/11/07	3471

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
32	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/07	021031
33	EMI Test Receiver	R&S	ESCI	28/04/07	100364
34	EMI Test Receiver	R&S	ESU	25/01/08	100014
35	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	21/07/07	4N-161-4
36	Frequency Converter	Kyorits	KCV-604C	21/07/07	4-230-3
37	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	26/09/07	1098
38	Biconical Antenna	Schwarzbeck	VHA9103	12/09/07	2233
39	Digital Multimeter	H.P	34401A	18/04/07	3146A13475
40	Attenuator (10dB)	WEINSCHEL	23-10-34	17/10/07	BP4386
41	High-Pass Filter	ANRITSU	MP526	13/10/07	M27756
42	Attenuator (3dB)	Agilent	8491B	10/07/07	58177
43	Attenuator (10dB)	WEINSCHEL	23-10-34	26/01/08	BP4387
44	Attenuator (30dB)	H.P	8498A	17/10/07	50101
45	Amplifier (25dB)	Agilent	8447D	12/04/07	2944A10144
46	Amplifier (30dB)	Agilent	8449B	13/10/07	3008A01590
47	Position Controller	TOKIN	5901T	N/A	14173
48	Driver	TOKIN	5902T2	N/A	14174
49	Spectrum Analyzer	H.P	8591E	21/03/07	3649A05889
50	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	11/07/07	4N-170-3
51	LISN	Kyorits	KNW-407	19/08/07	8-317-8
52	LISN	Kyorits	KNW-242	09/10/07	8-654-15
53	CVCF	NF Electronic	4400	N/A	344536 4420064
54	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
55	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
56	Software	AUDIX	e3	N/A	Ver 3.0
57	Software	Agilent	Benchlink	N/A	A.01.09 021211