



DIGITAL EMC CO., LTD.

683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
 Tel: +82-31-321-2664 Fax: +82-31-321-1664
<http://www.digitalemc.com>

CERTIFICATION OF COMPLIANCE

Cresyn Co., Ltd.
 8-22, Jamwon-Dong, Seocho-Gu
 Seoul, Korea

Dates of Tests: January 29~ February 14 2008
 Test Report S/N: DR50110802Y
 Test Site : DIGITAL EMC CO., LTD.

FCC ID

V2RUTS100

APPLICANT

Cresyn Co., Ltd.

FCC Classification : **Frequency Hopping Spread Spectrum (FHSS)**
Device name : **Mono headset**
Manufacturer : **Cresyn Co., Ltd.**
FCC ID : **V2RUTS100**
Model name : **UTS100**
Test Device Serial number : **Identical prototype**
FCC Rule Part(s) : **FCC Part 15.247 Subpart C**
ANSI C-63.4-2003
Frequency Range : **2402 ~ 2480 MHz**
Max. Output power : **0.69 dBm Conducted (Normal Mode, 1Mbps)**
-1.54 dBm Conducted (EDR Mode, 2Mbps)
Data of issue : **February 15, 2008**

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

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

February 15, 2008

D.C.Cha



Data

Name

Signature

Report Reviewed By: manager

February 15, 2008

Harvay Sung



Data

Name

Signature

Ordering party:

Company name : Cresyn Co., Ltd.

Address : 8-22, Jamwon-Dong, Seocho-Gu

City/town : Seoul

Country : Korea

Date of order : January 28, 2008

2. Information about test item

V2RUTS100

2.1 Equipment information

Equipment model no.	UTS100
Equipment serial no.	Identical prototype
Type of equipment	Mono headset
Frequency band	2402 ~ 2480 MHz
Type of Modulation	GFSK, - Π/4-DQPSK
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	: 3.7 V DC

2.4 Ancillary Equipment

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

2.5 EMI Suppression Device(s)/Modifications

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

-> None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit (Using in 2400 ~ 2483.5MHz)	Test Condition	Status (note 1)
I. Test Items				
15.247(a)	Carrier Frequency Separation	$\geq 20\text{dB BW}$ or \geq 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 within a 30 second period per any frequency		C
15.247(b)	Transmitter Output Power	$\leq 1\text{Watt}$, if CHs ≥ 75 Others $\leq 0.125\text{W}$		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
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	N/A
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:

MODE	Frequency of marker #1 (MHz)	Frequency of marker #2 (MHz)	Test Results	
			Carrier Frequency Separation (MHz)	Result
Normal 1Mbps	2440.049	2441.051	1.002	Comply
EDR 2Mbps	2442.170	2443.170	1.000	Comply

- 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

Measurement Setup

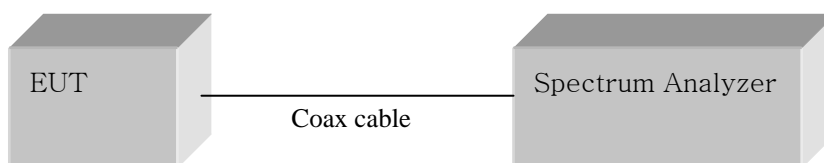
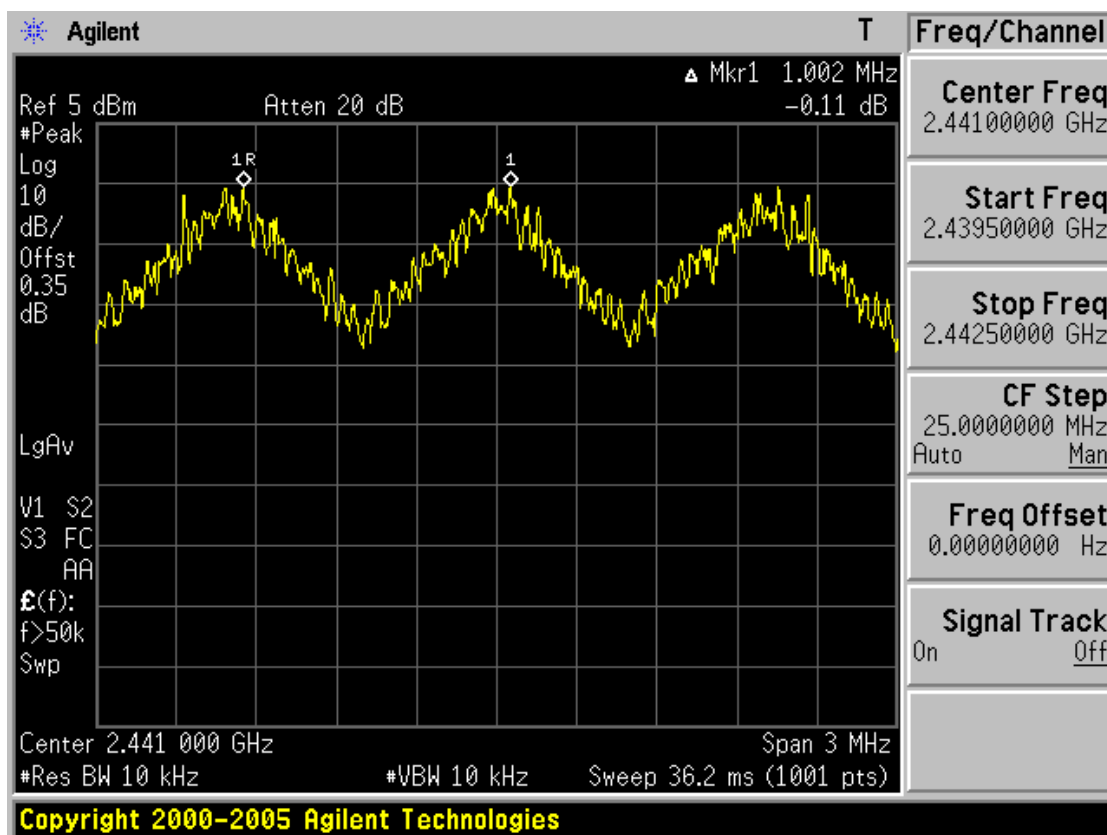
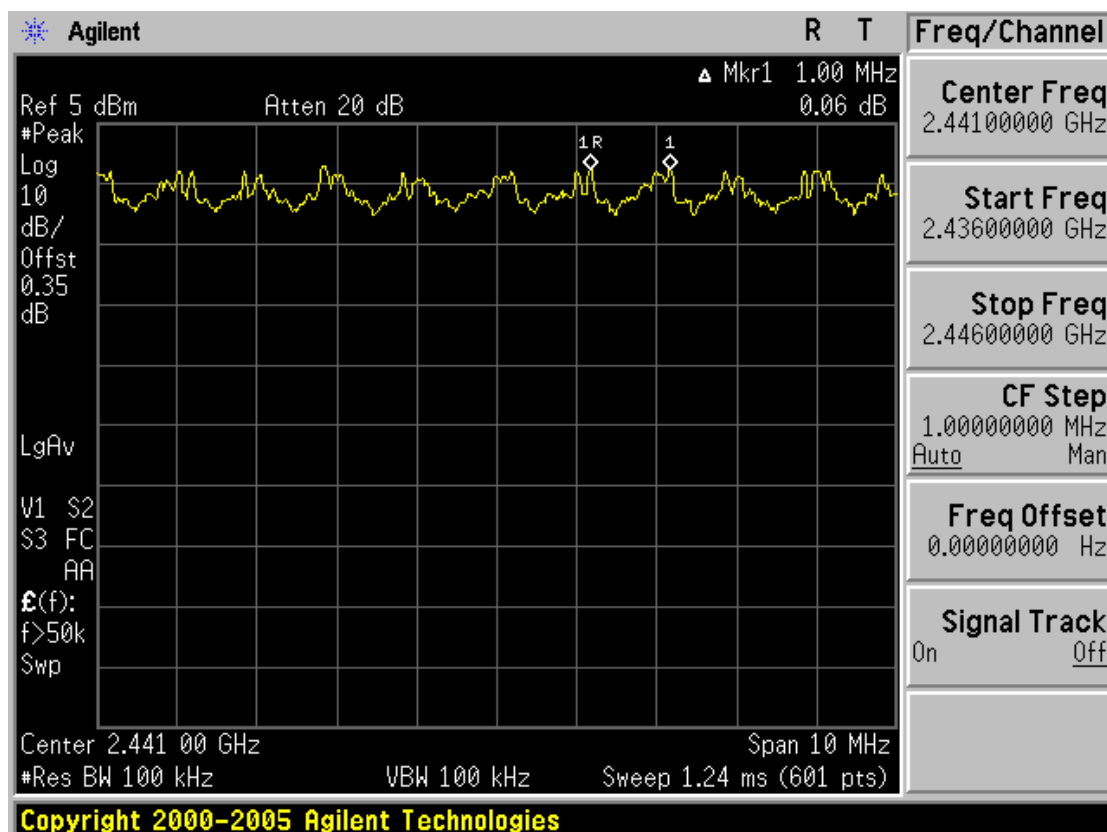


Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation (Normal 1Mbps)



Carrier Frequency Separation (EDR 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 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 ≥ RBW)	Detector function = peak
Trace = max hold	Span = 25MHz

Measurement Data: Complies

Total number of Hopping Channels	79 (Normal, EDR)
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- See next pages for actual measured spectrum plots.

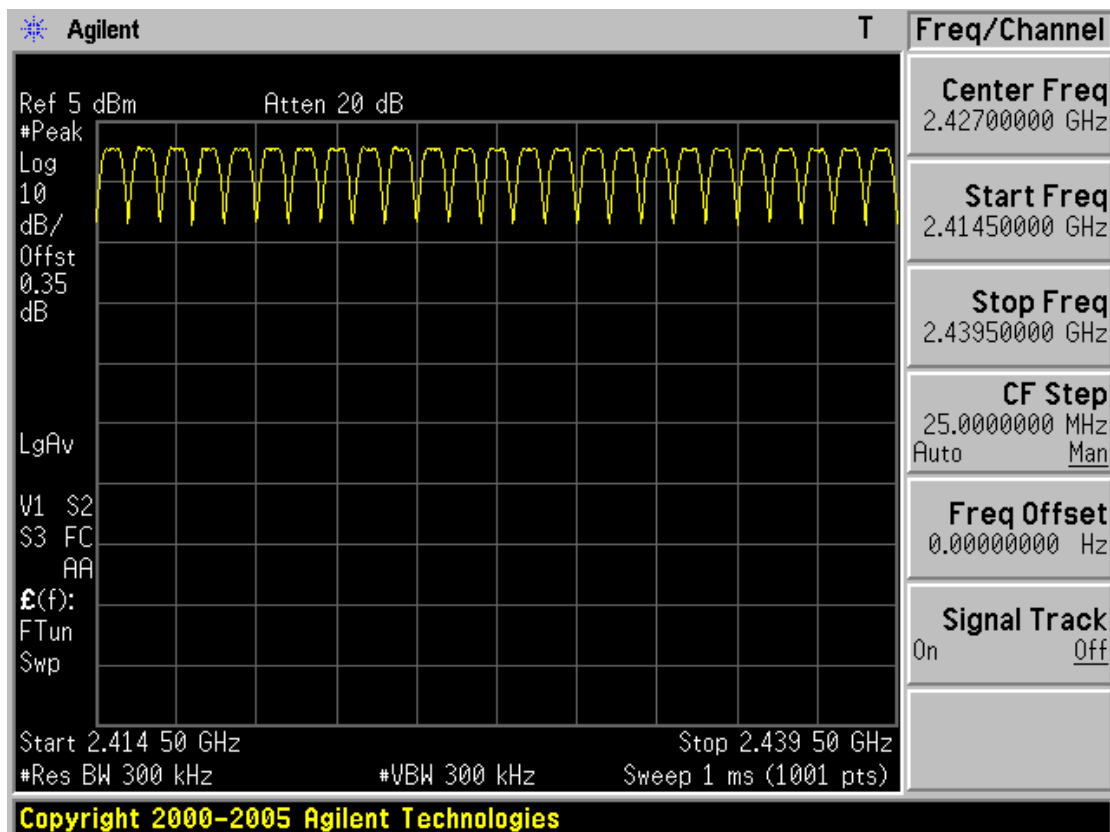
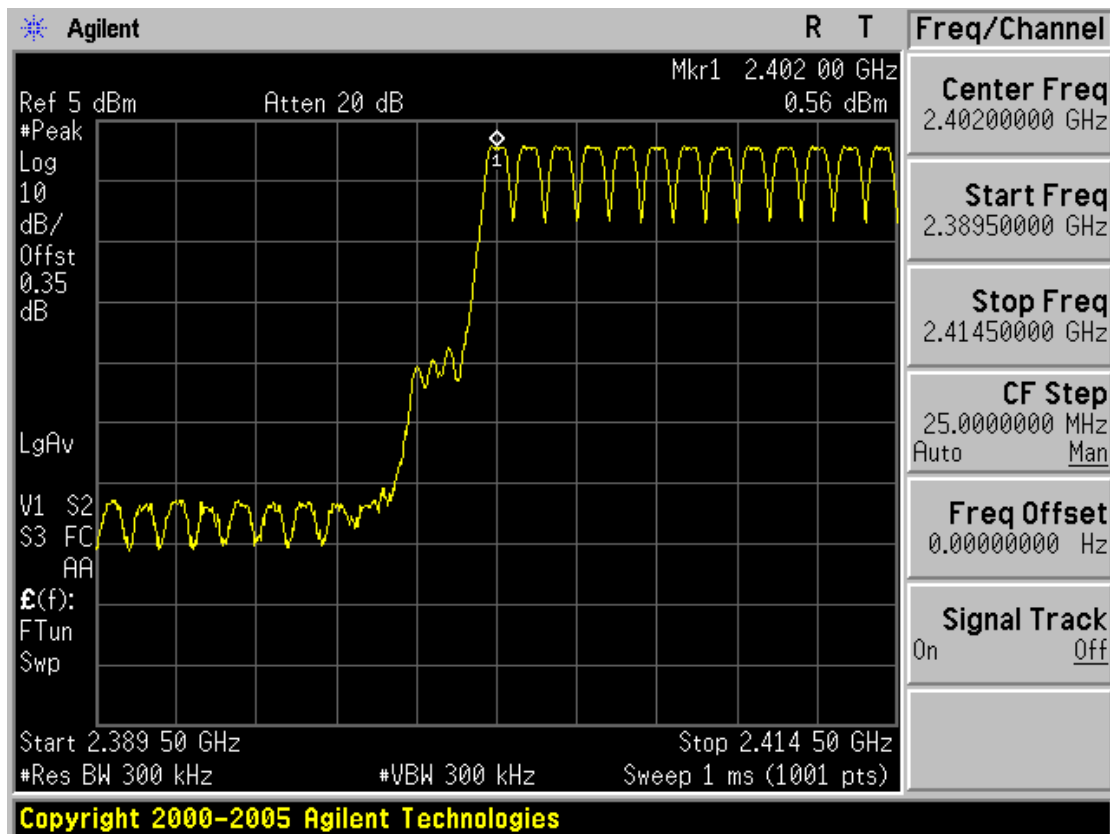
Minimum Standard:

At least 15 hopes

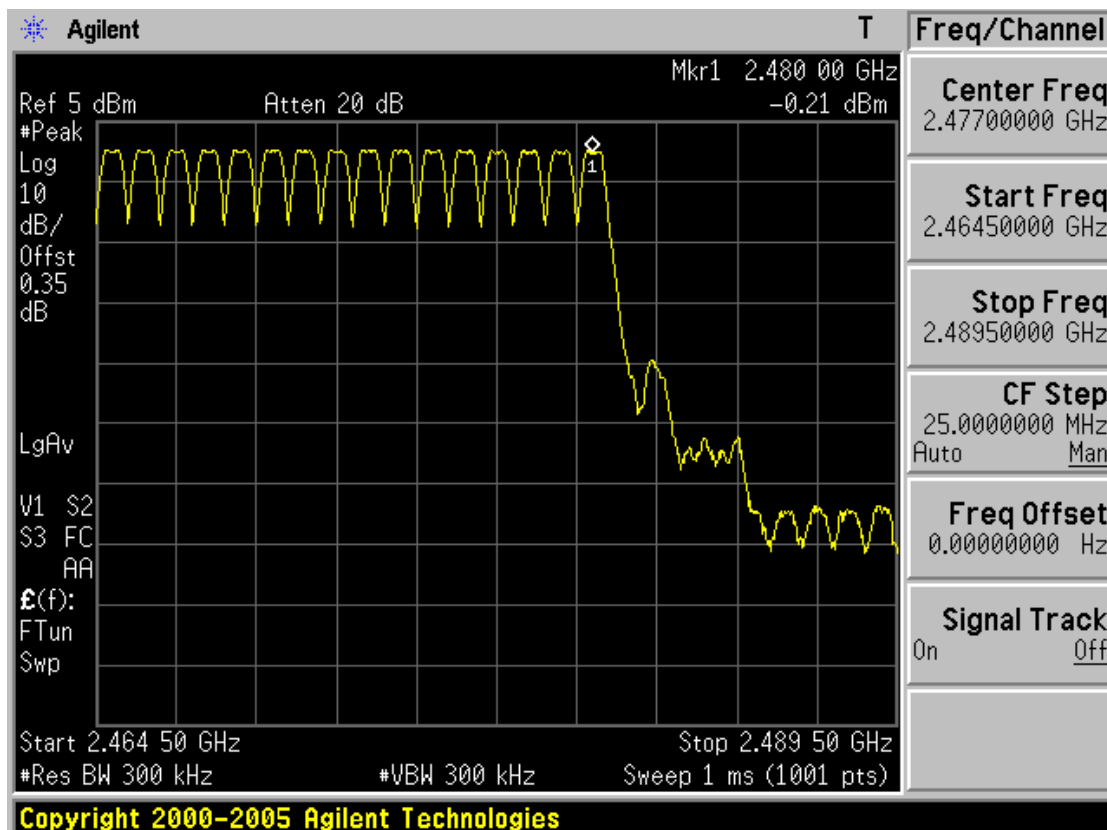
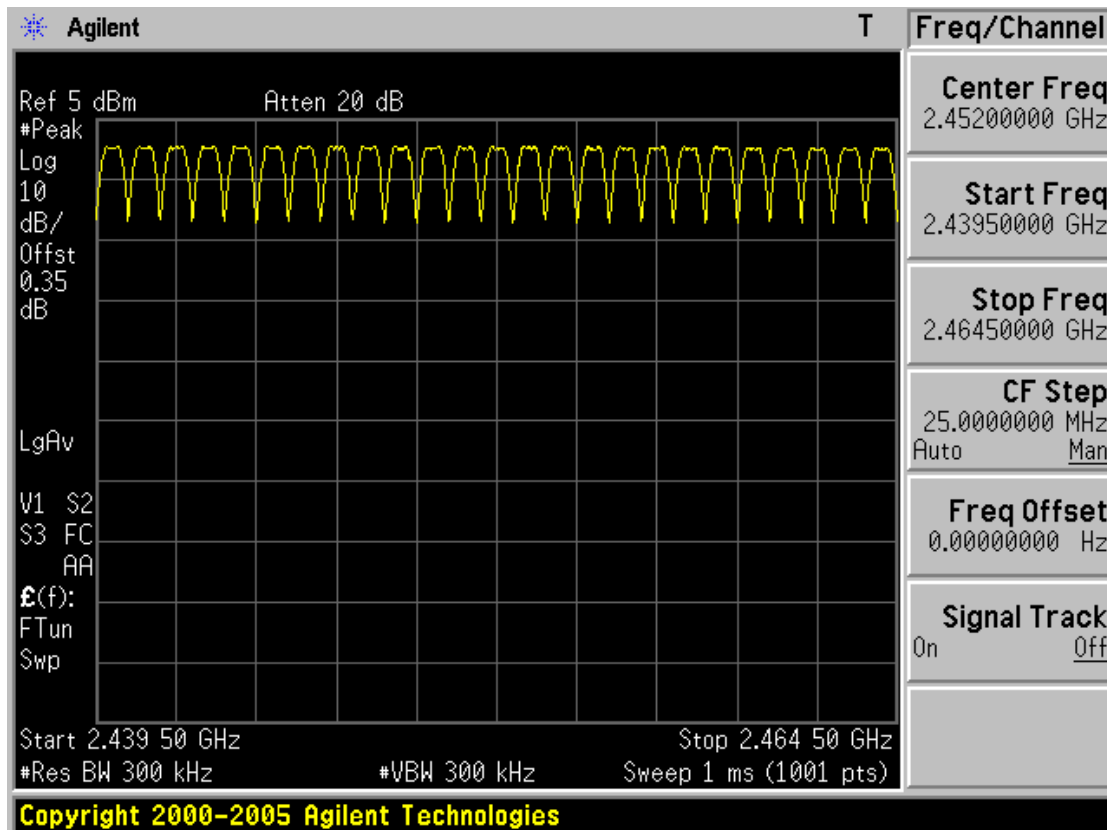
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

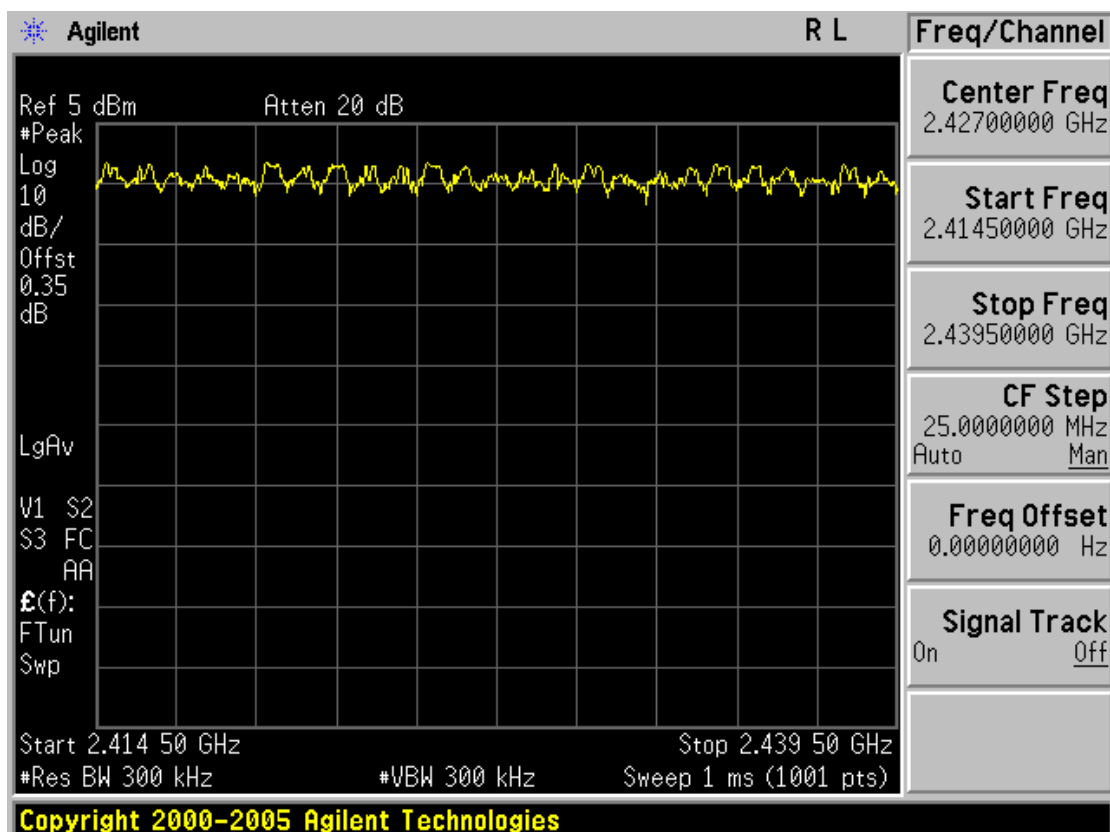
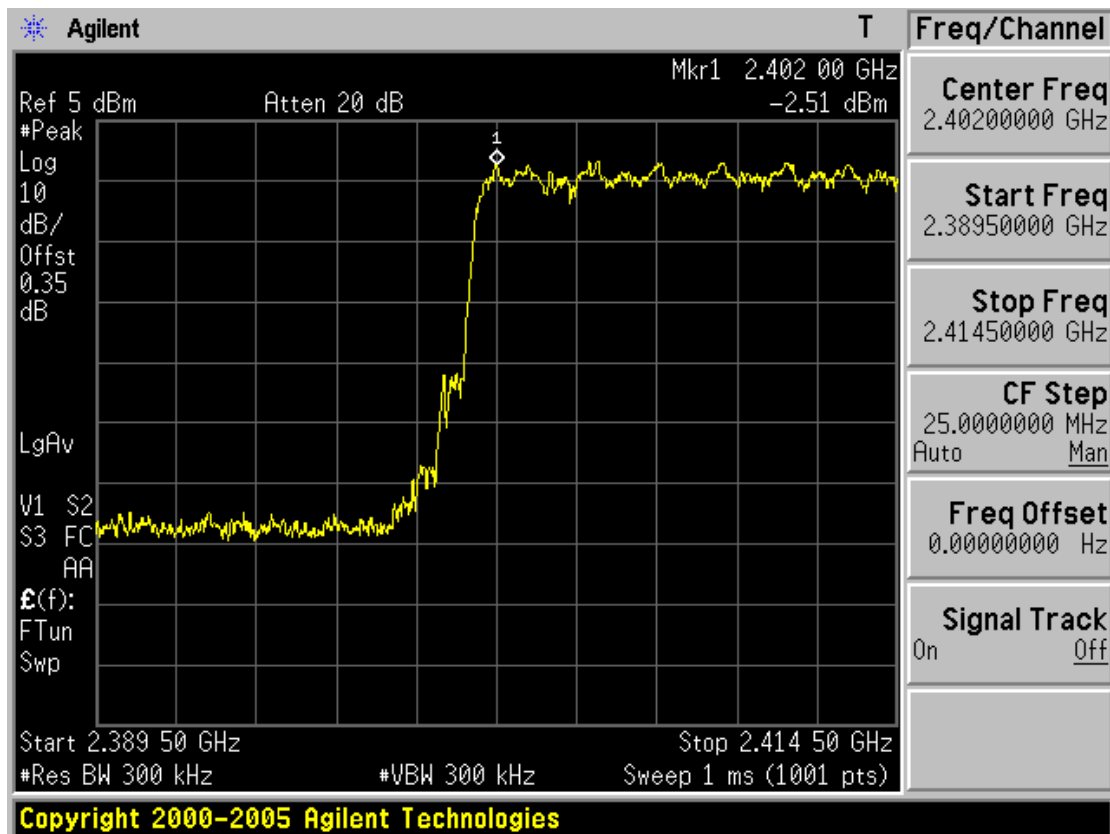
Number of Hopping Frequencies (Normal 1Mbps)



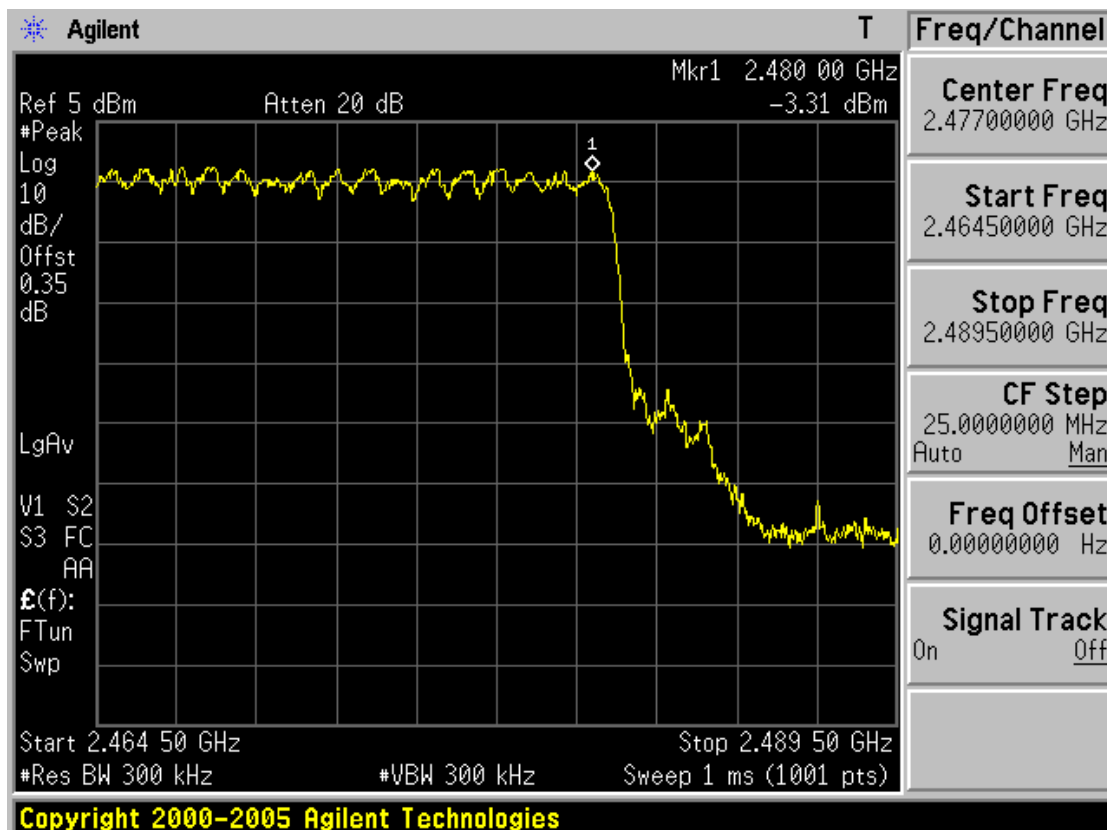
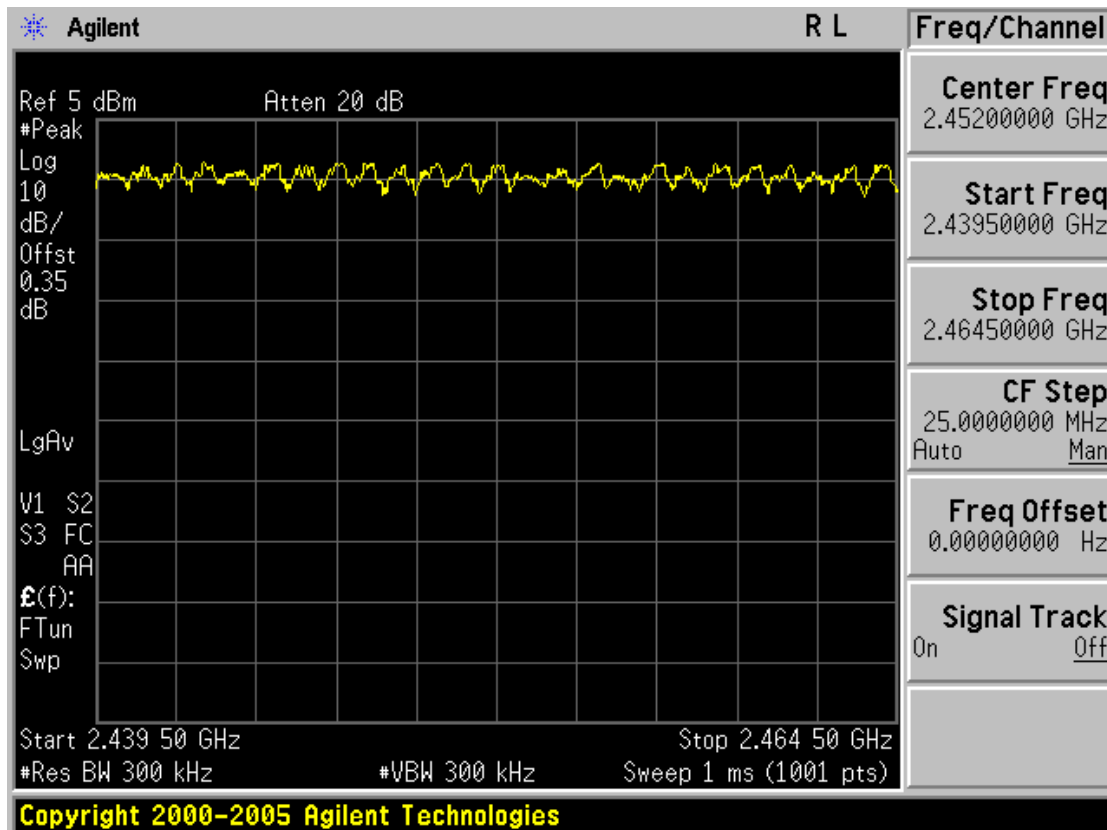
Number of Hopping Frequencies (Normal 1Mbps)



Number of Hopping Frequencies (EDR 2Mbps)



Number of Hopping Frequencies (EDR 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 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 ≥ RBW) Detector function = peak

Trace = max hold

Measurement Data:

MODE	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
Normal 1Mbps	2402	1	0.935	Comply
	2441	40	0.935	Comply
	2480	79	0.930	Comply
EDR 2Mbps	2402	1	1.315	Comply
	2441	40	1.315	Comply
	2480	79	1.315	Comply

- See next pages for actual measured spectrum plots.

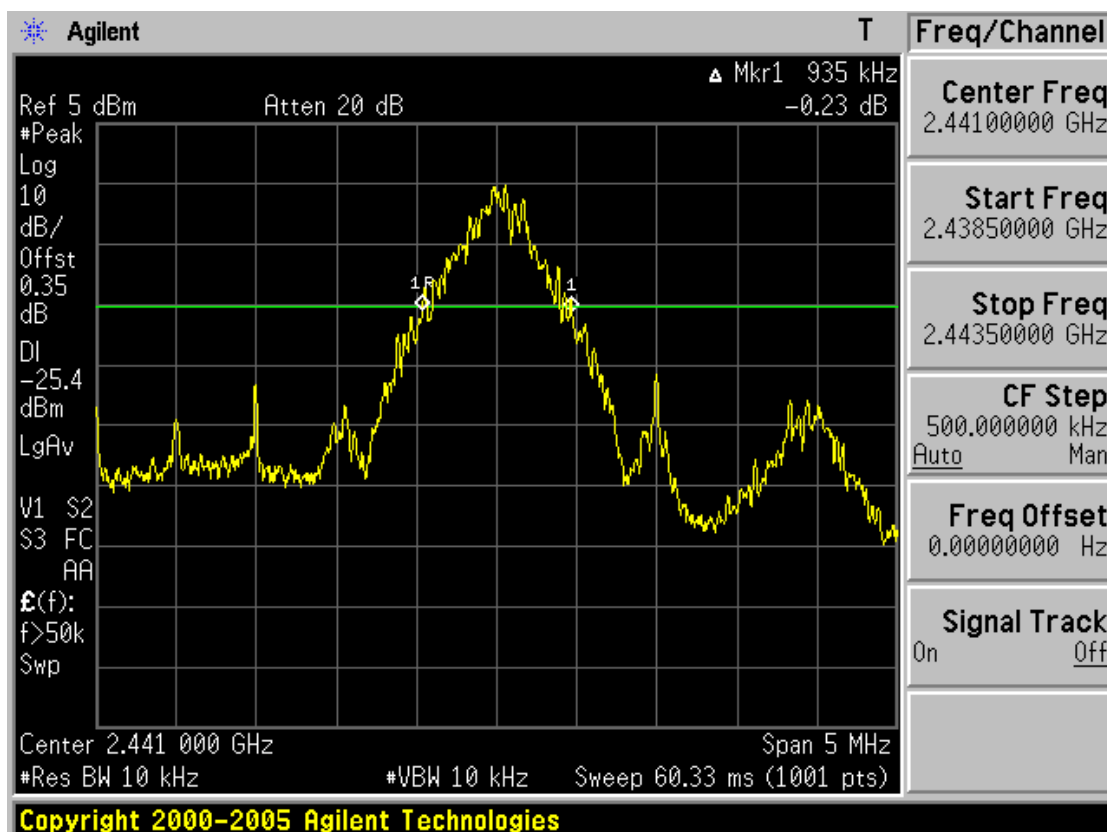
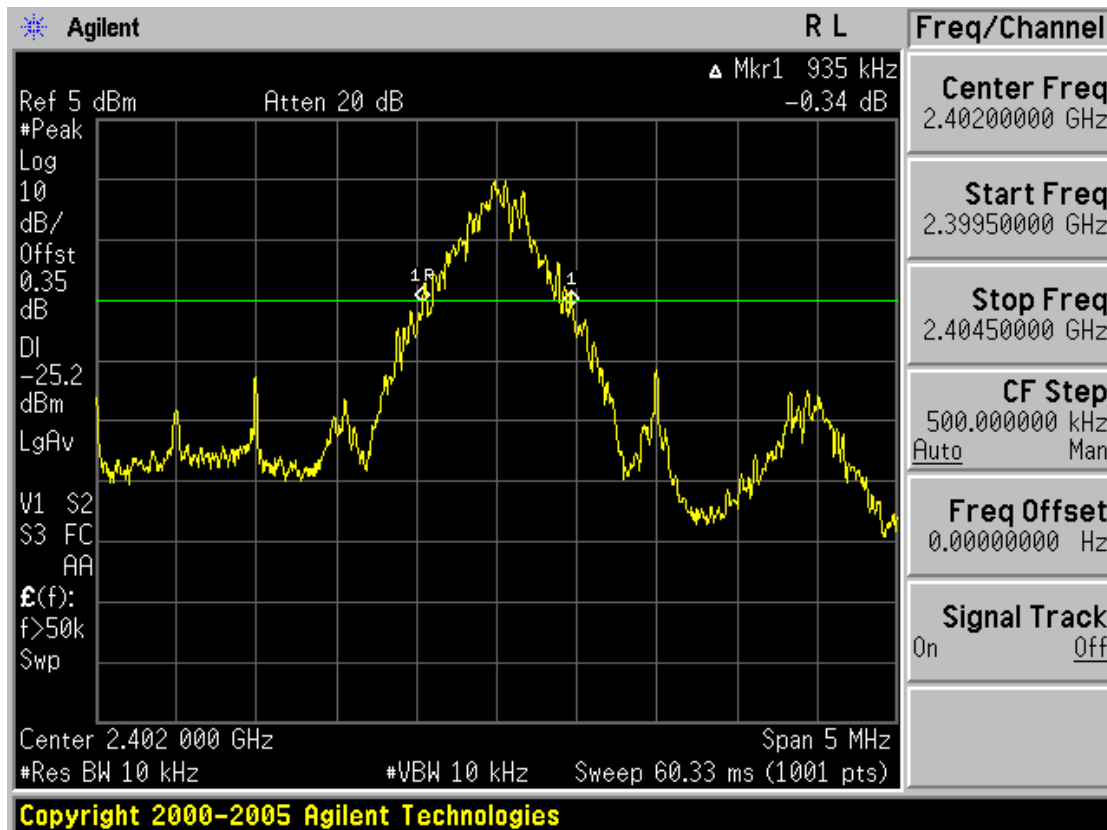
Minimum Standard:

None

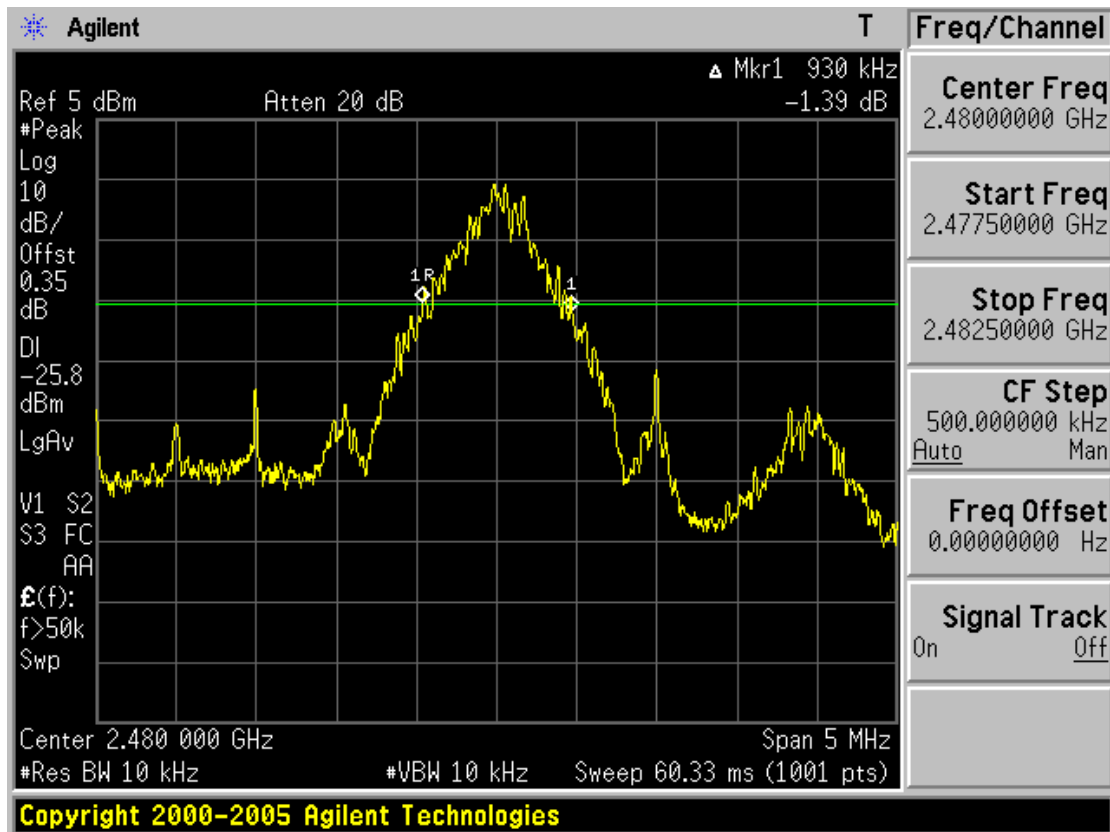
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

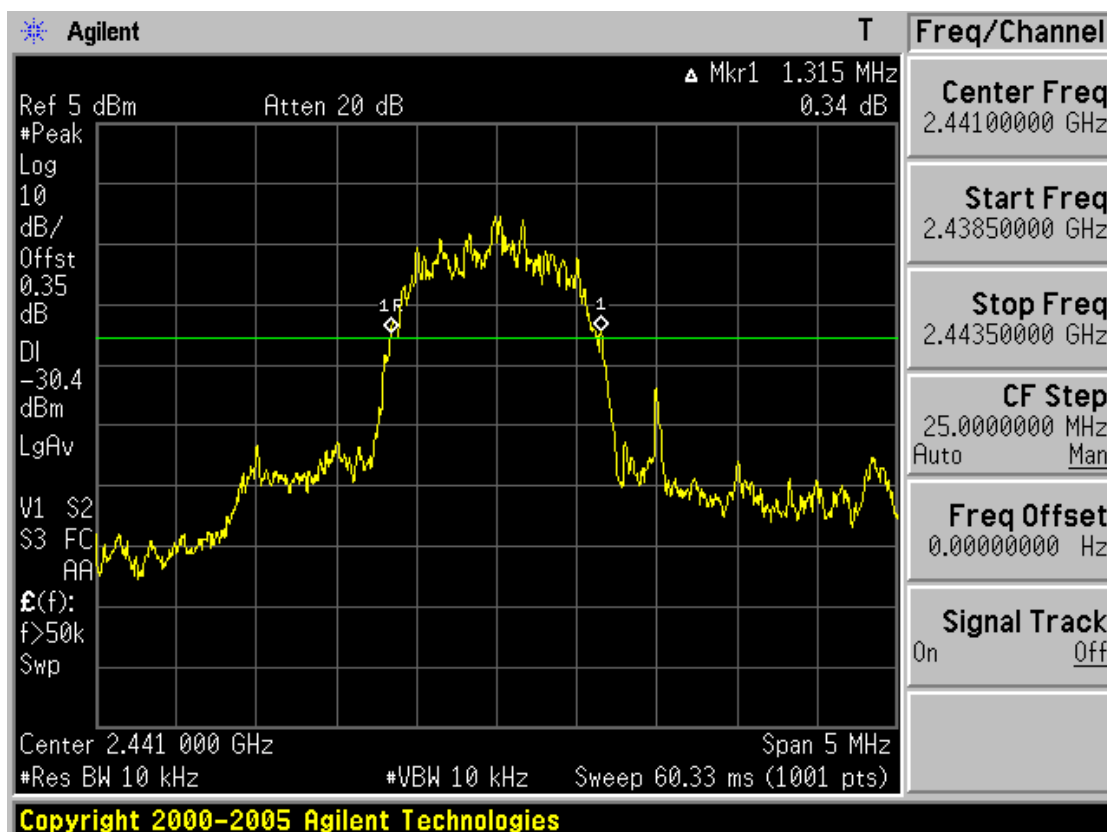
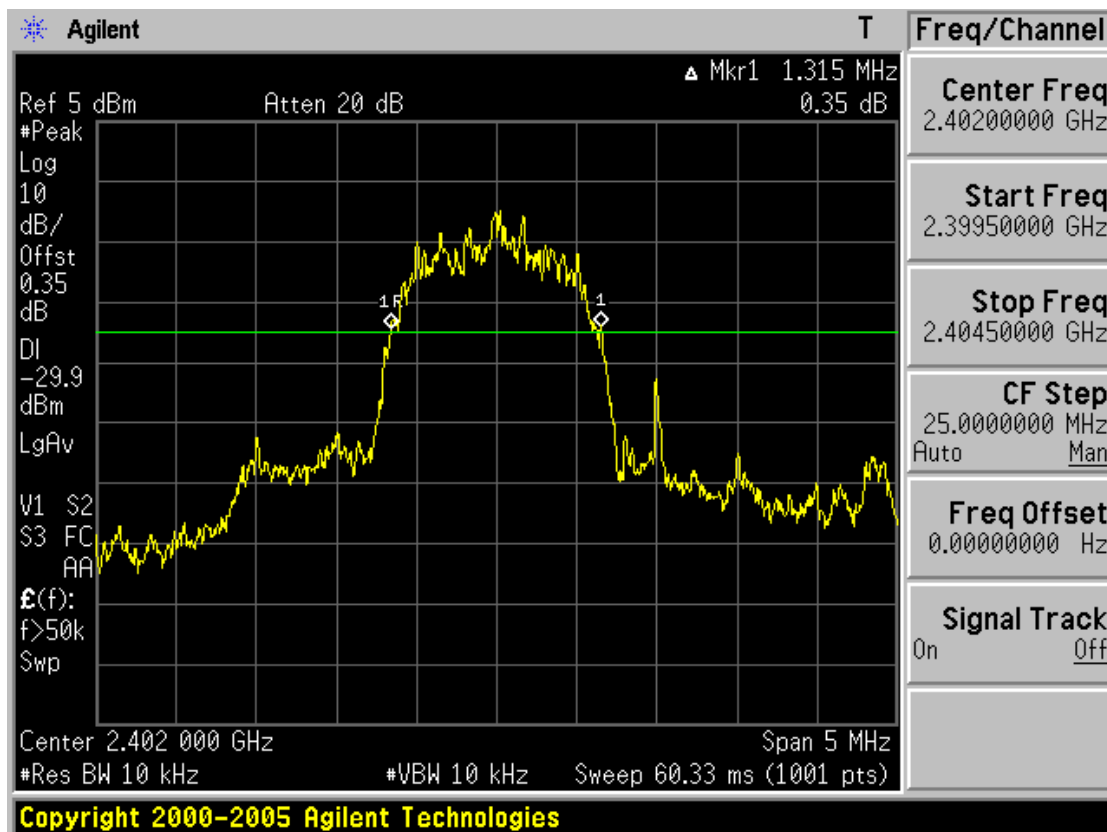
20 dB Bandwidth (Normal 1Mbps)



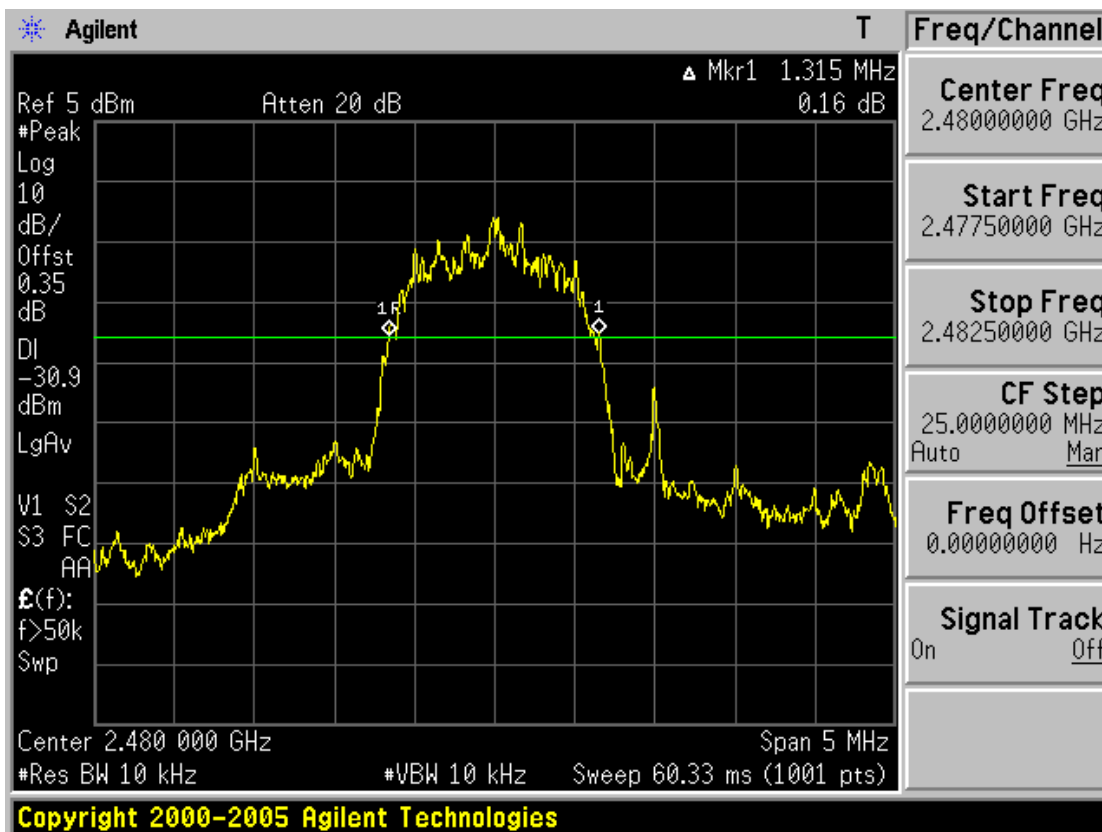
20 dB Bandwidth (Normal 1Mbps)



20 dB Bandwidth (EDR 2Mbps)



20 dB Bandwidth (EDR 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 = 1 MHz (VBW ≥ RBW)

Trace = max hold

Detector function = peak

Measurement Data:

MODE	Packet Type	Burst duration in one hop (us)	Test Results	
			Dwell Time (ms)	Result
Normal 1Mbps	DH 1	396	126.764	Comply
	DH 3	1130	182.111	Comply
	DH 5	2904	309.247	Comply
EDR 2Mbps	DH 1	399	127.724	Comply
	DH 3	1650	265.914	Comply
	DH 5	2904	309.247	Comply

- See next pages for actual measured spectrum plots.

Minimum Standard:

0.4 seconds within a 30 second period per any frequency

Measurement Setup

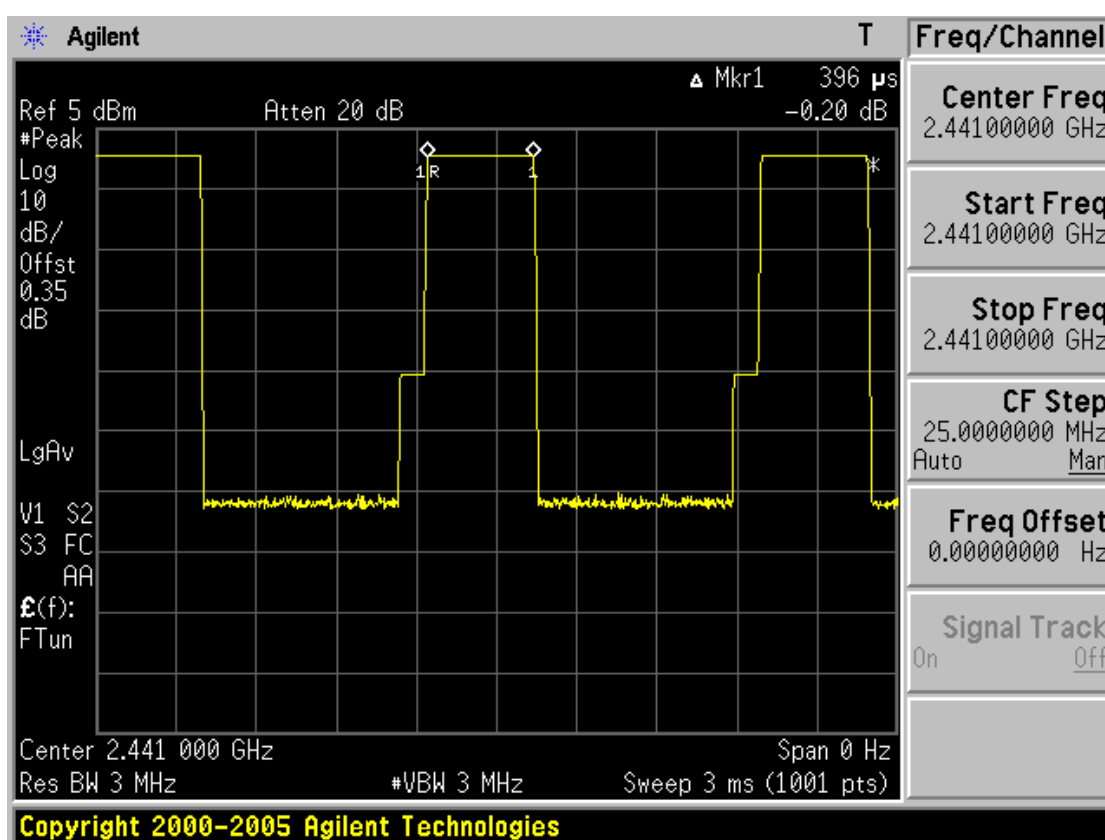
Same as the Chapter 3.2.1 (Figure 1)

Time of Occupancy for Packet Type DH 1 (Normal 1Mbps)

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 x 79 = 31.6 seconds you have 10.13 x 31.6 = 320.11 times of appearance.

Each Tx-time per appearance is 396 us

So we have 320.11 x 396 us = 126.764 ms per 31.6 seconds.

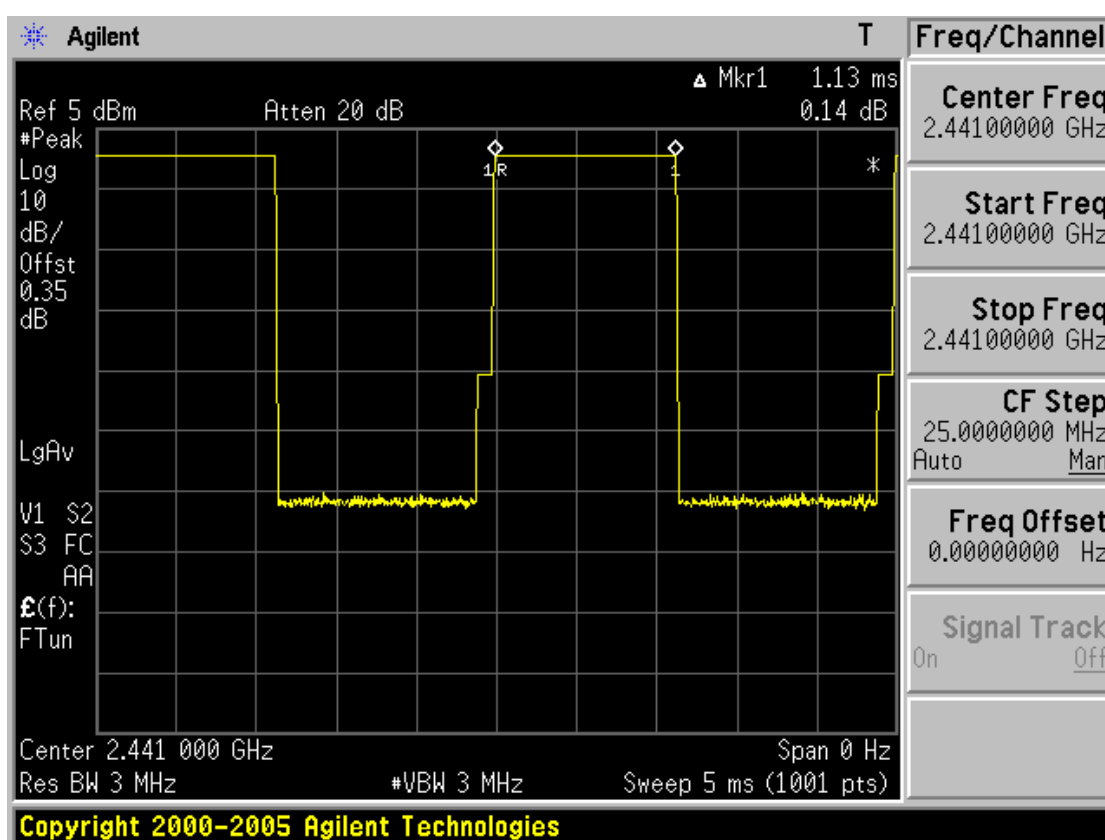


Time of Occupancy for Packet Type DH 3 (Normal 1Mbps)

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 x 79 = 31.6 seconds you have 5.1 x 31.6 = 161.16 times of appearance.

Each Tx-time per appearance is 1.13 ms

So we have 161.16 x 1.13 ms = 182.111 ms per 31.6 seconds.

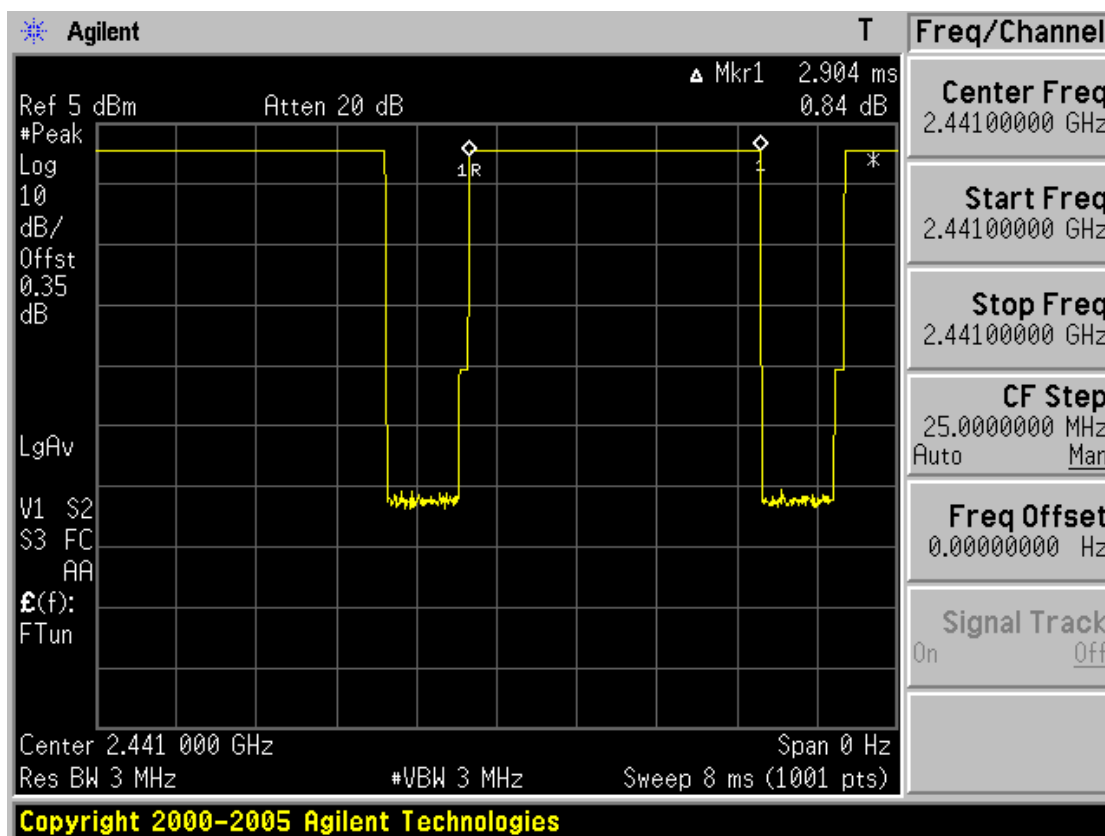


Time of Occupancy for Packet Type DH 5 (Normal 1Mbps)

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 2.904 ms

So we have $106.49 \times 2.904 \text{ ms} = 309.247 \text{ ms}$ per 31.6 seconds.

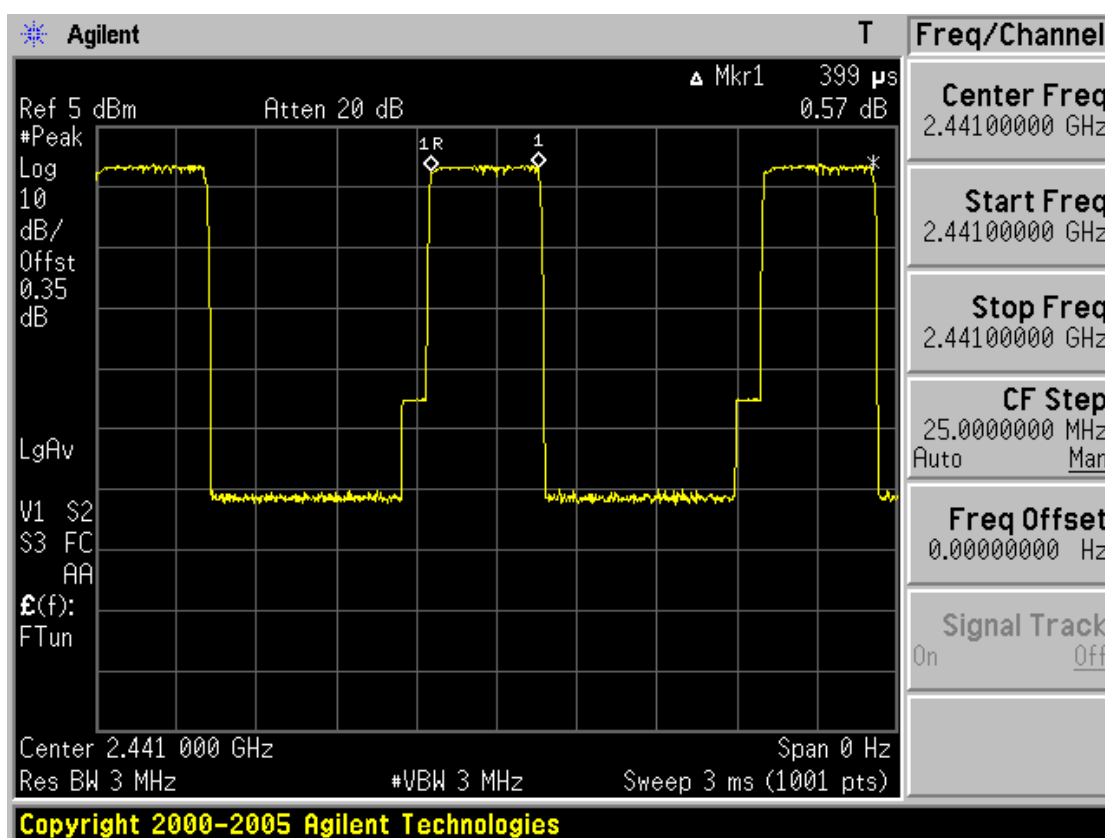


Time of Occupancy for Packet Type DH 1 (EDR 2Mbps)

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 x 79 = 31.6 seconds you have 10.13 x 31.6 = 320.11 times of appearance.

Each Tx-time per appearance is 399 us

So we have 320.11 x 399 us = 127.724 ms per 31.6 seconds.

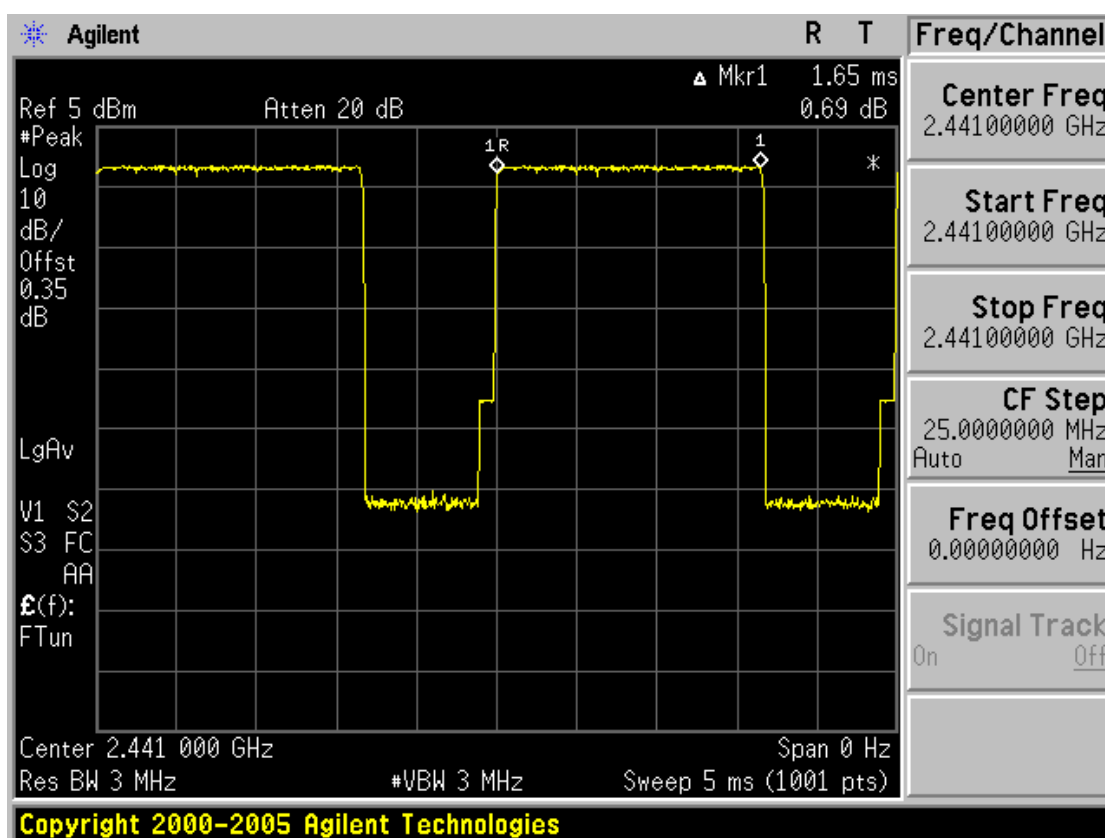


Time of Occupancy for Packet Type DH 3 (EDR 2Mbps)

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 x 79 = 31.6 seconds you have 5.1 x 31.6 = 161.16 times of appearance.

Each Tx-time per appearance is 1.65 ms

So we have 161.16 x 1.65 ms = 265.914 ms per 31.6 seconds.

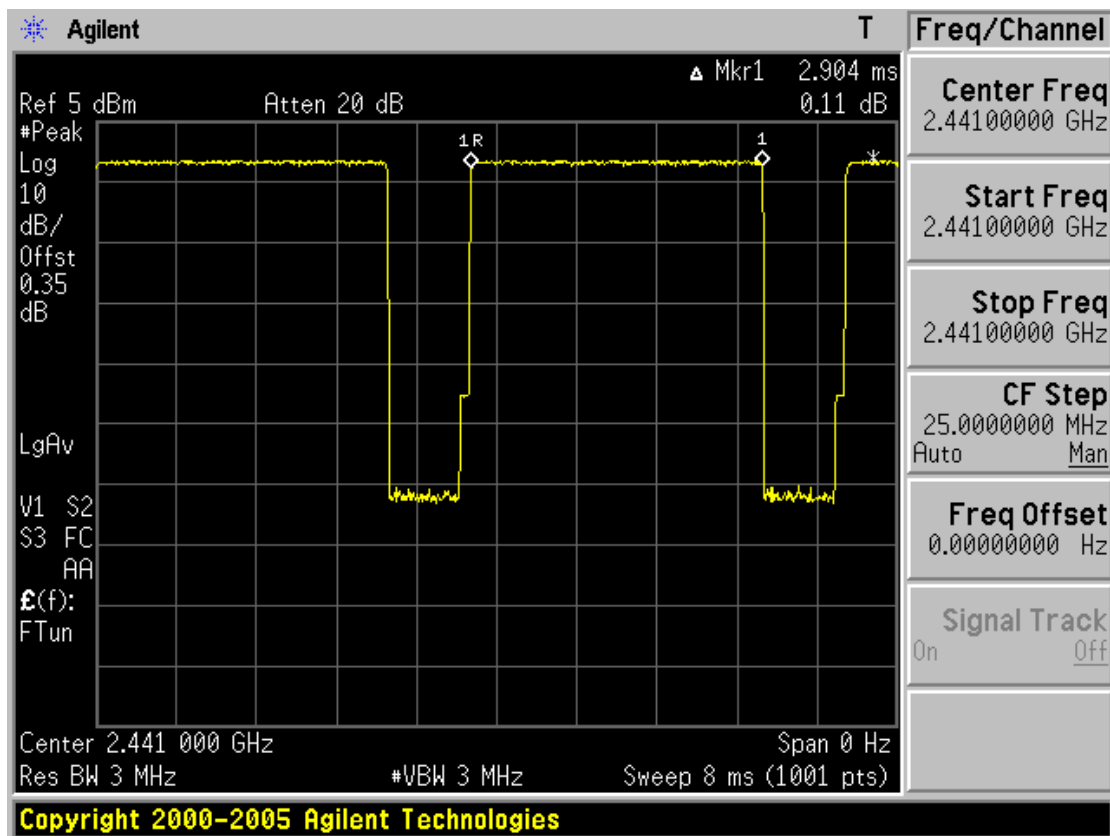


Time of Occupancy for Packet Type DH 5 (EDR 2Mbps)

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 2.904 ms

So we have $106.49 \times 2.904 \text{ ms} = 309.247 \text{ ms}$ 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 ≥ RBW)

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data:

MODE	Frequency (MHz)	Ch.	Test Results		
			dBm	mW	Result
Normal 1Mbps	2402	1	0.69	1.172	Comply
	2441	40	0.14	1.033	Comply
	2480	79	0.14	1.033	Comply
EDR 2Mbps	2402	1	-1.54	0.701	Comply
	2441	40	-2.06	0.622	Comply
	2480	79	-2.80	0.525	Comply

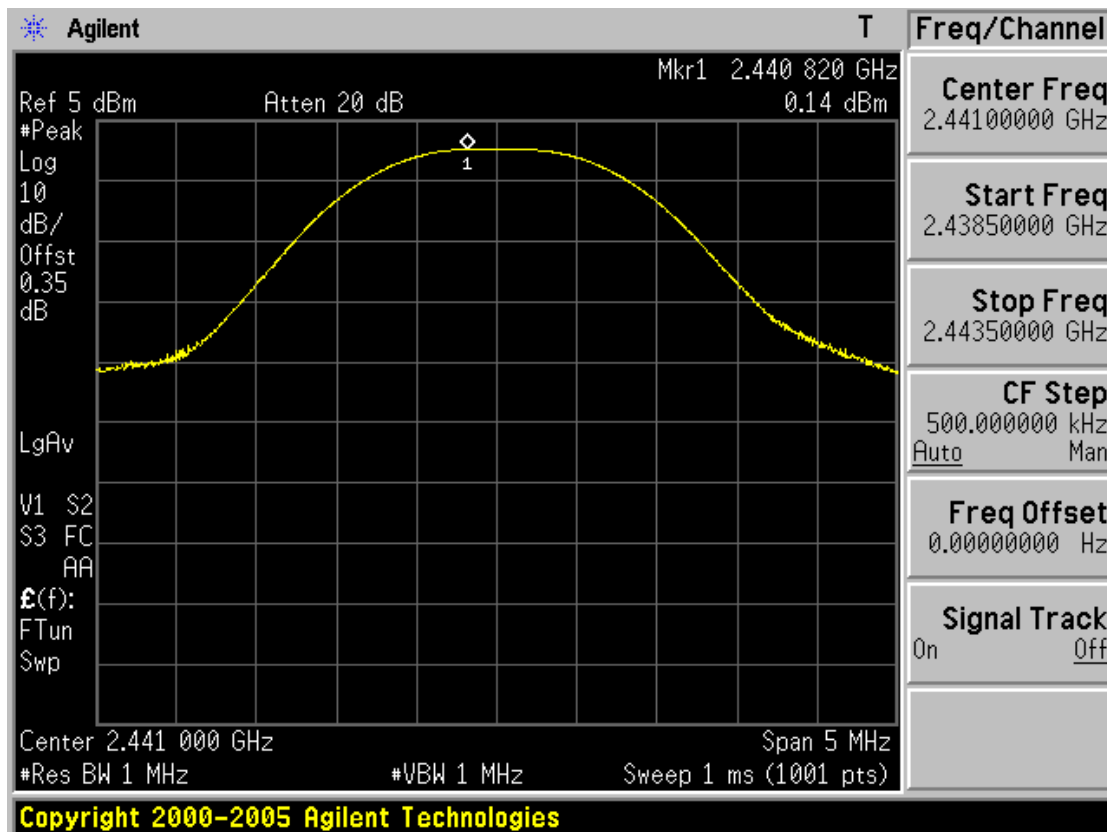
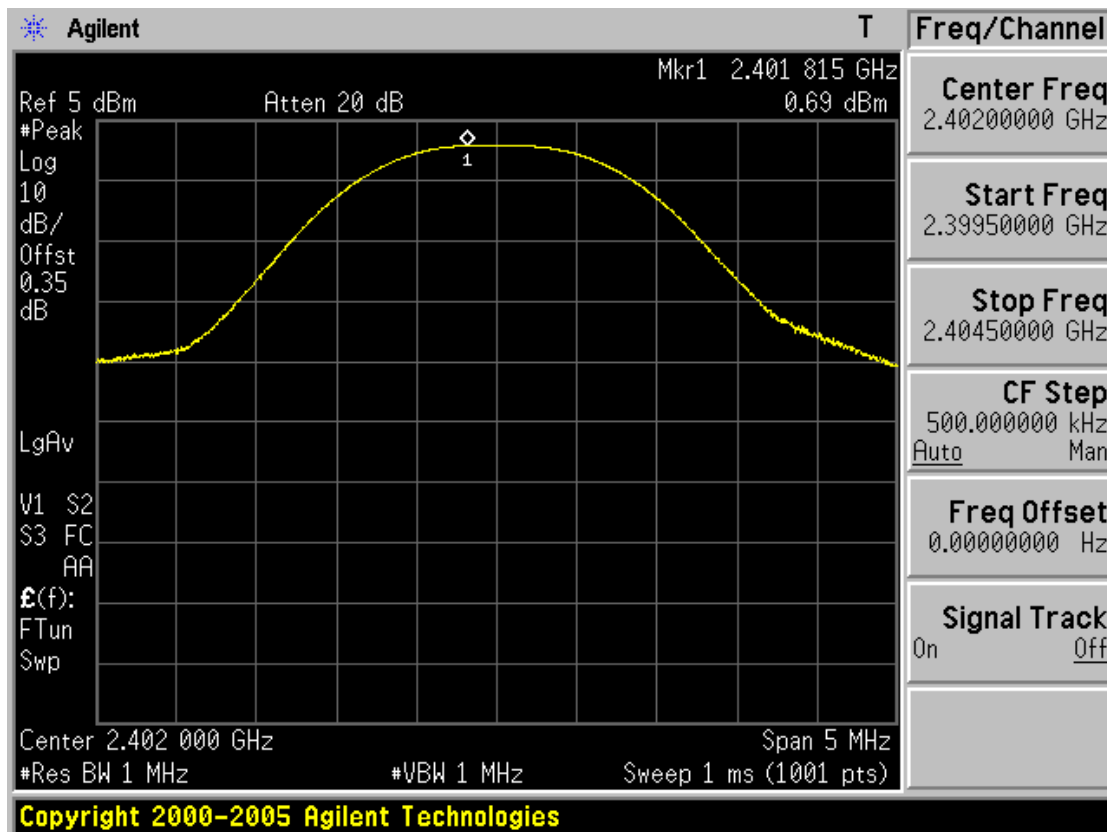
- See next pages for actual measured spectrum plots.

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
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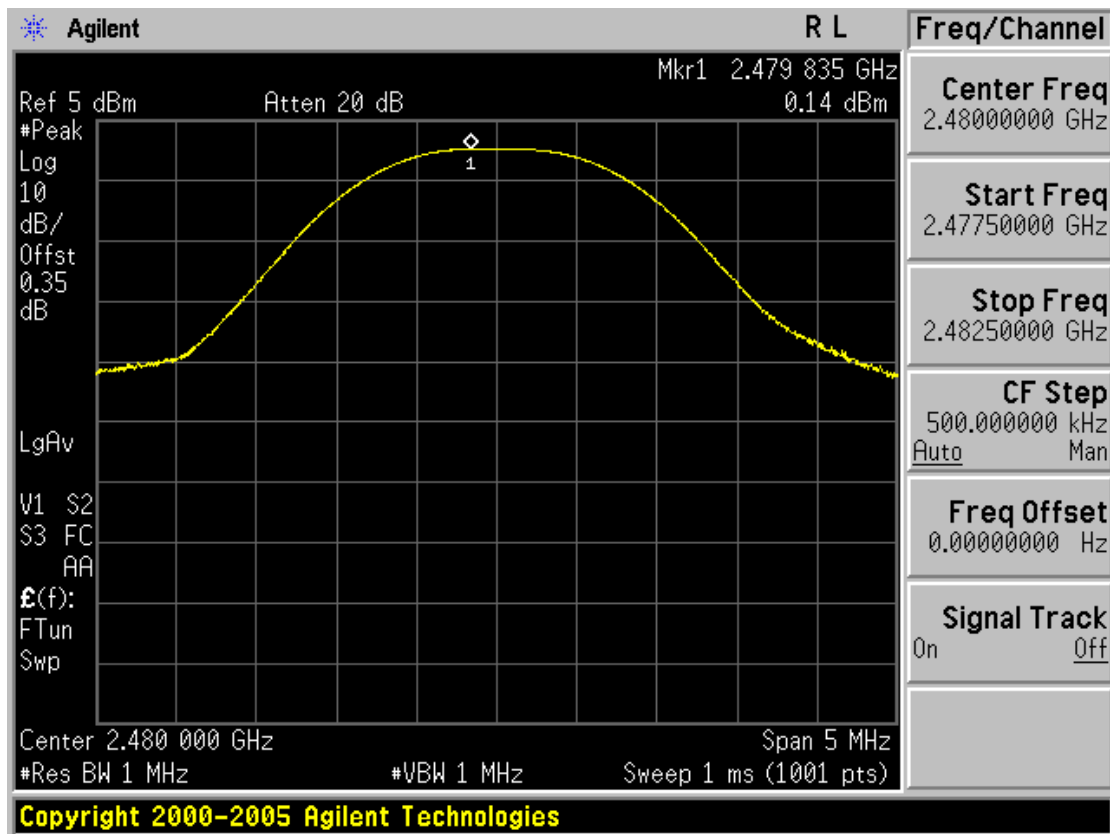
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

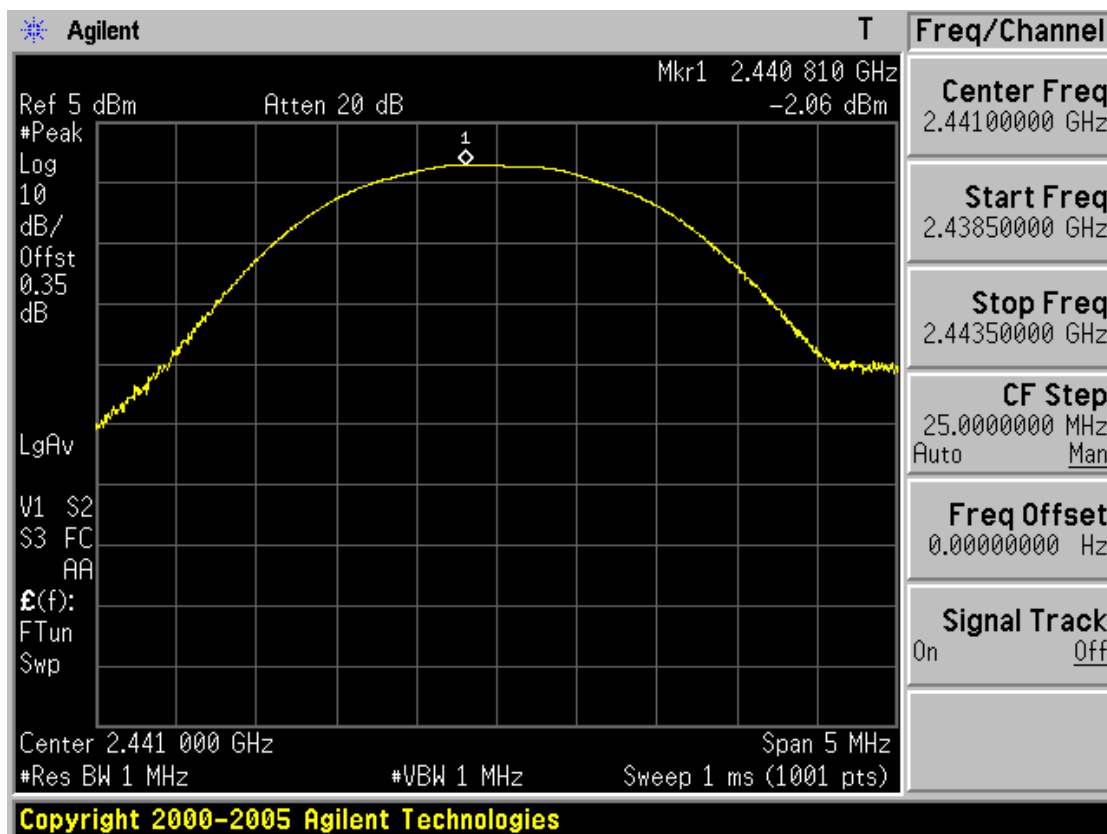
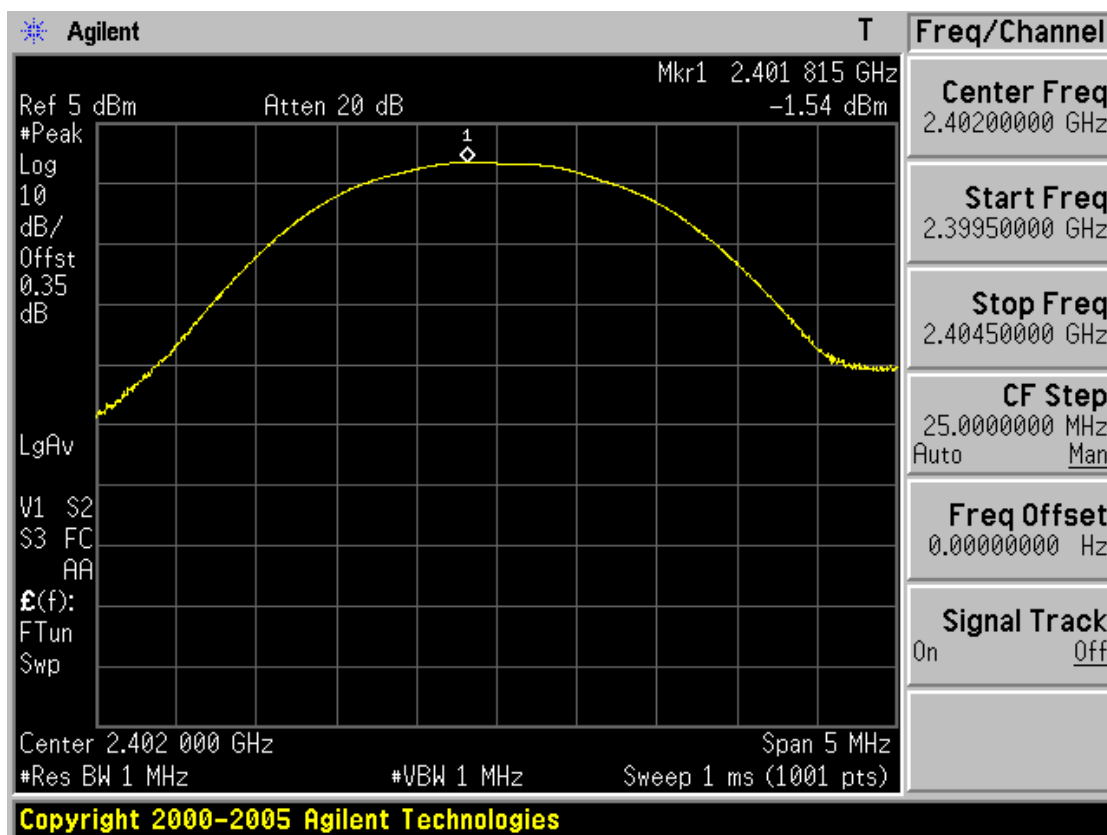
Peak Output Power (Normal 1Mbps)



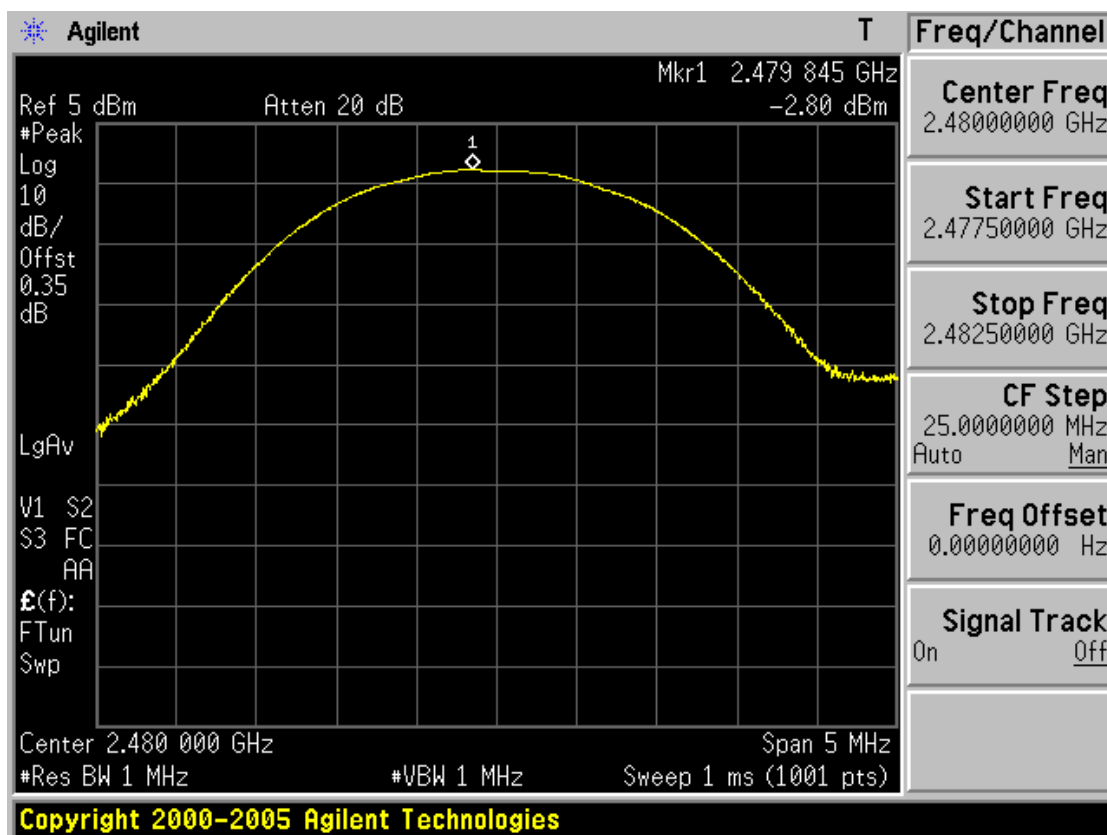
Peak Output Power (Normal 1Mbps)



Peak Output Power (EDR 2Mbps)



Peak Output Power (EDR 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.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Comply

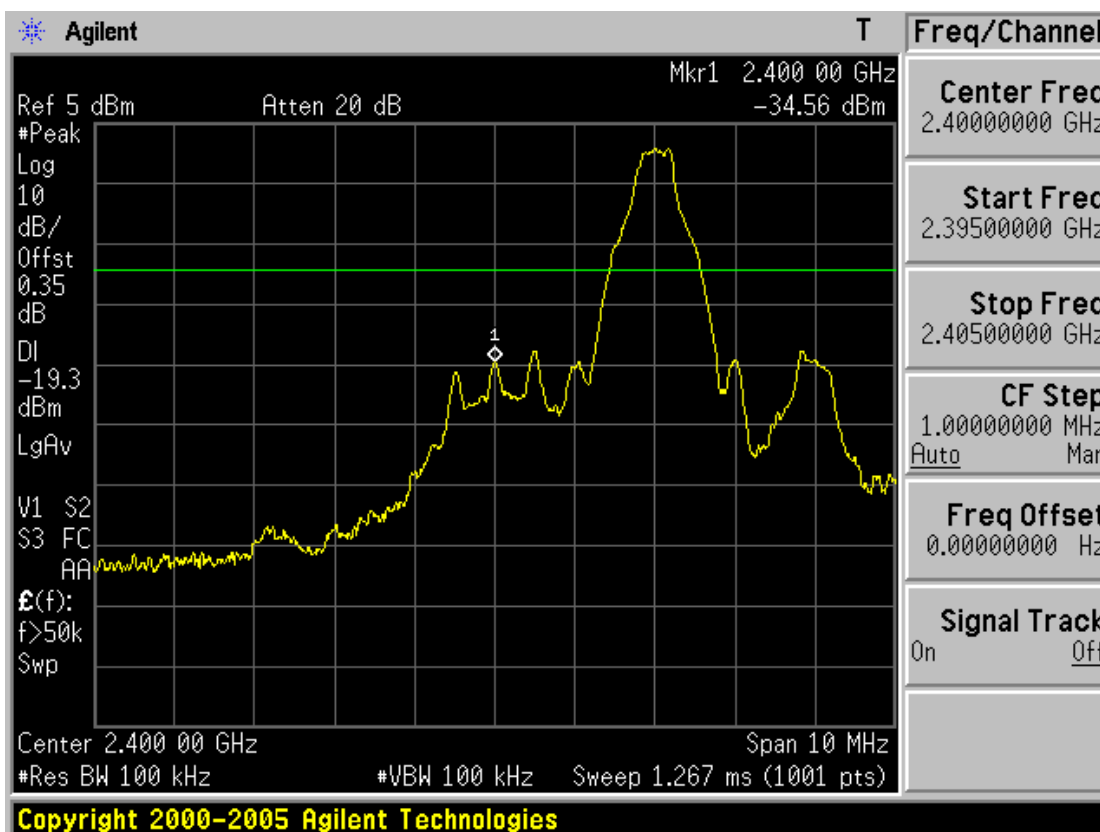
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density..
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
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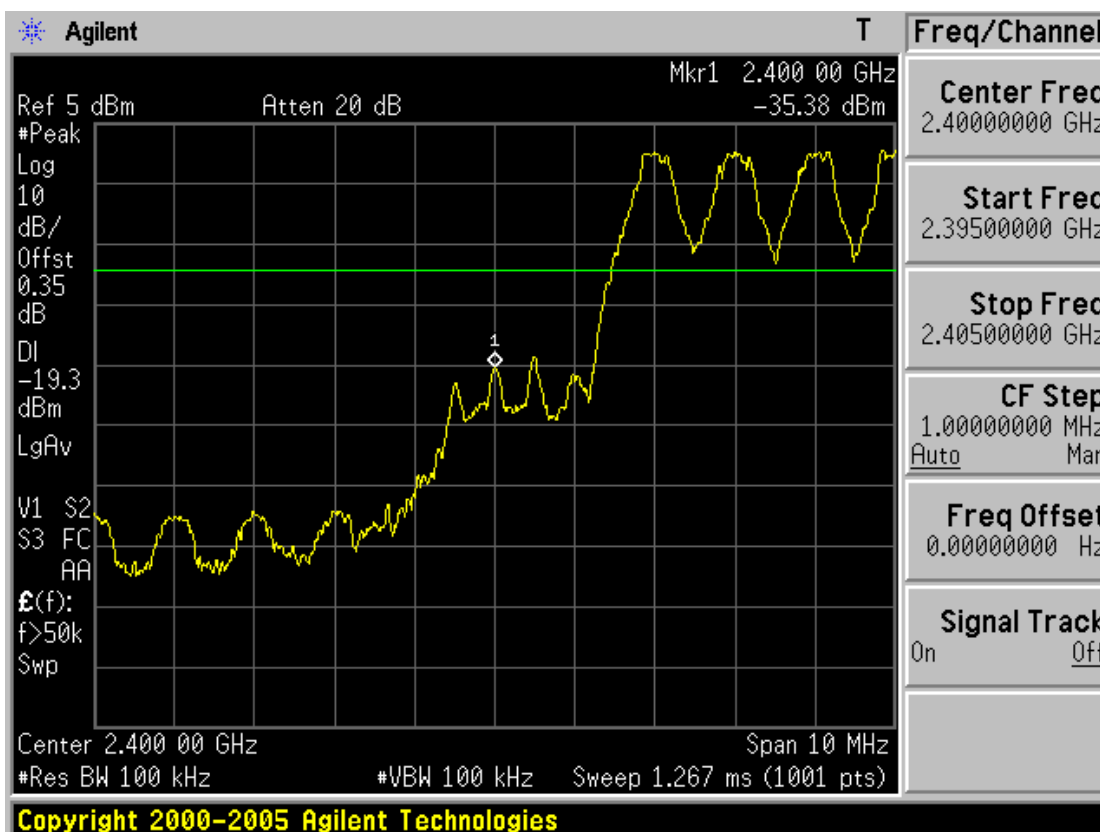
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

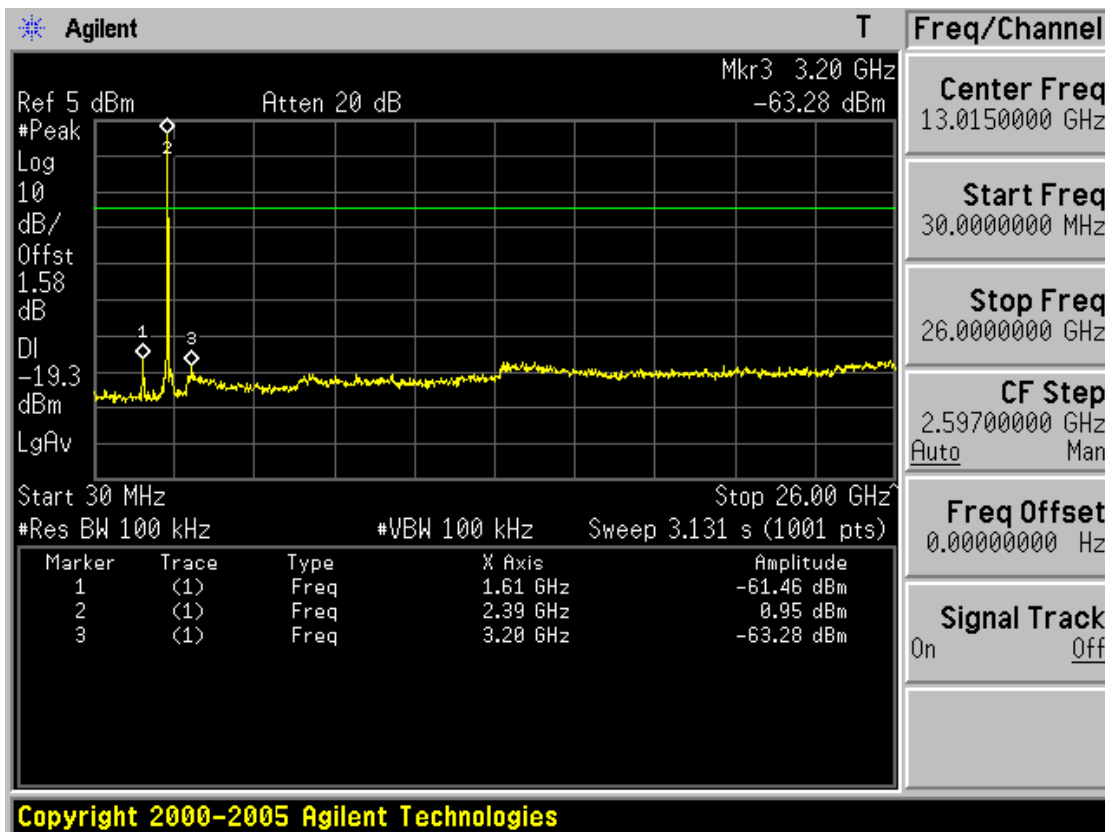
Low band with hopping disabled (Normal 1Mbps)



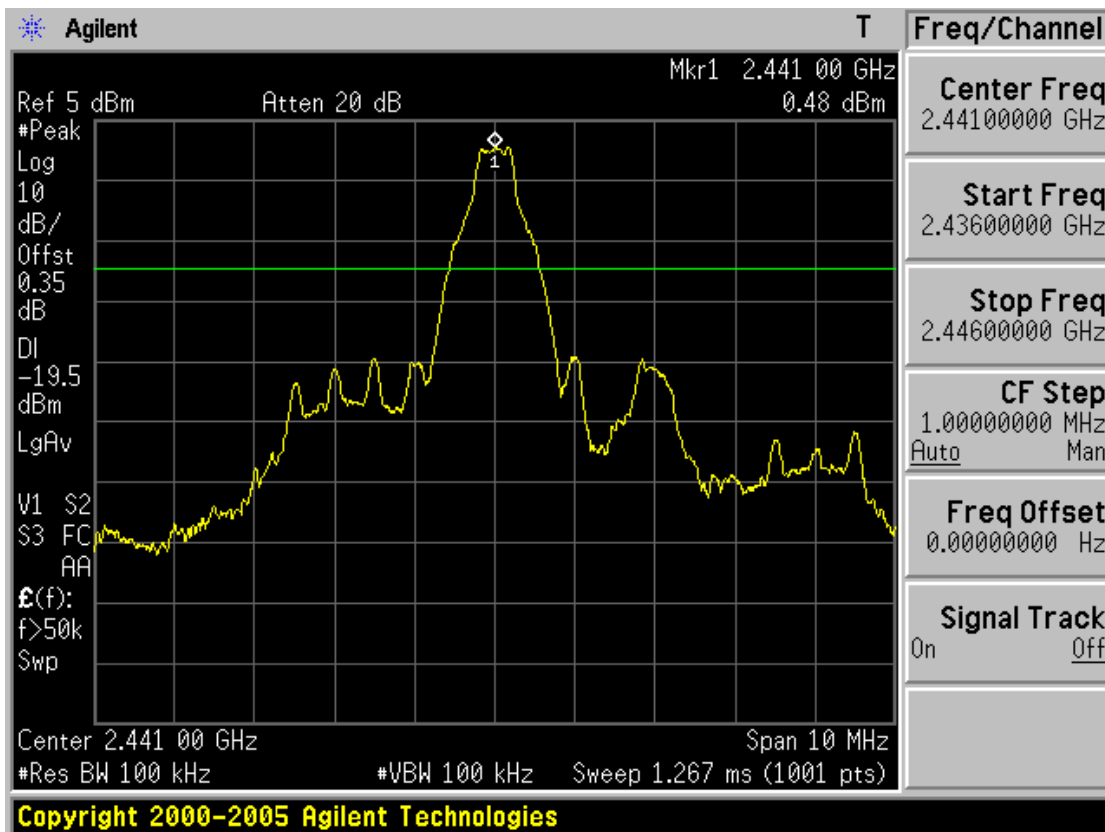
Low band with hopping enabled (Normal 1Mbps)



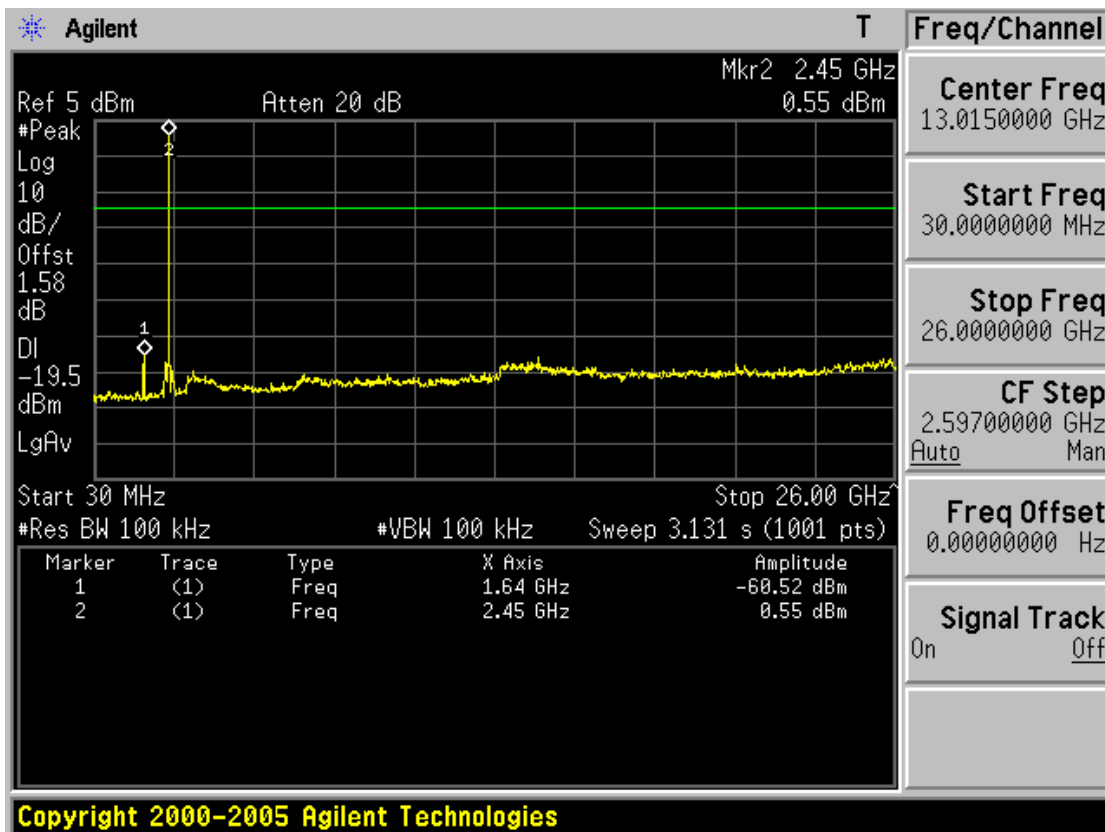
Low channel spurious (Normal 1Mbps)



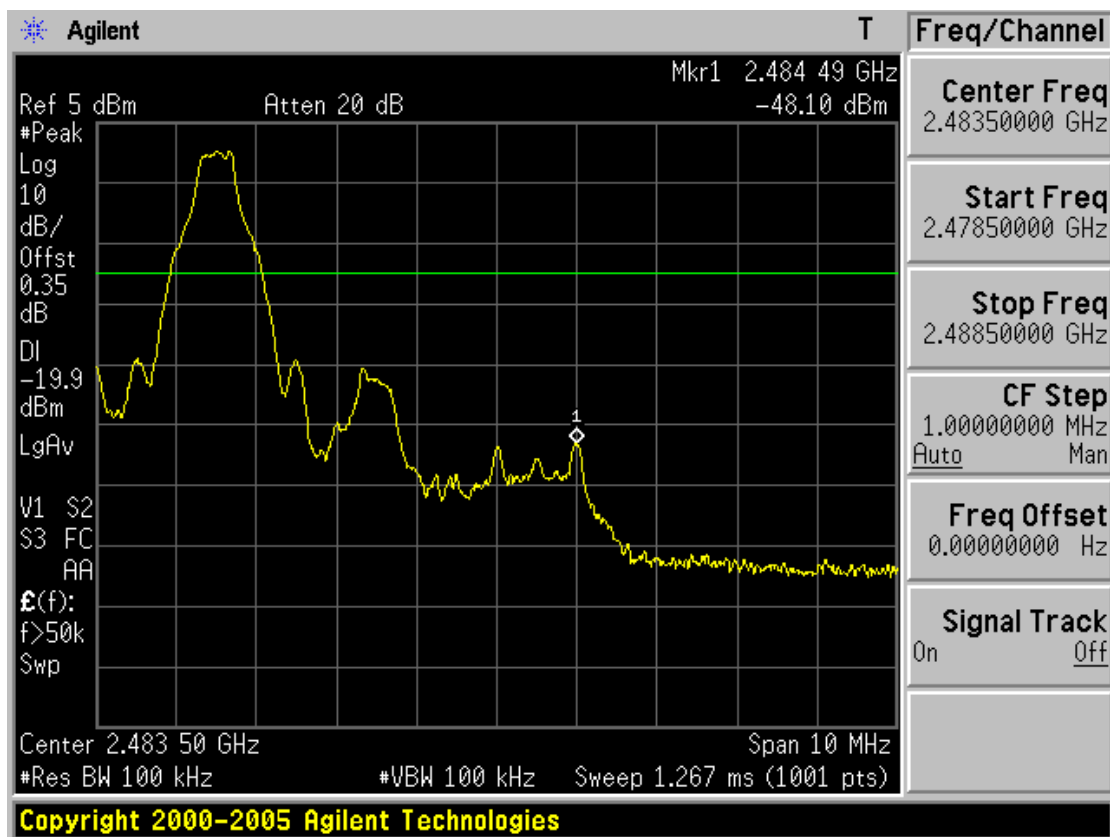
Mid channel ref (Normal 1Mbps)



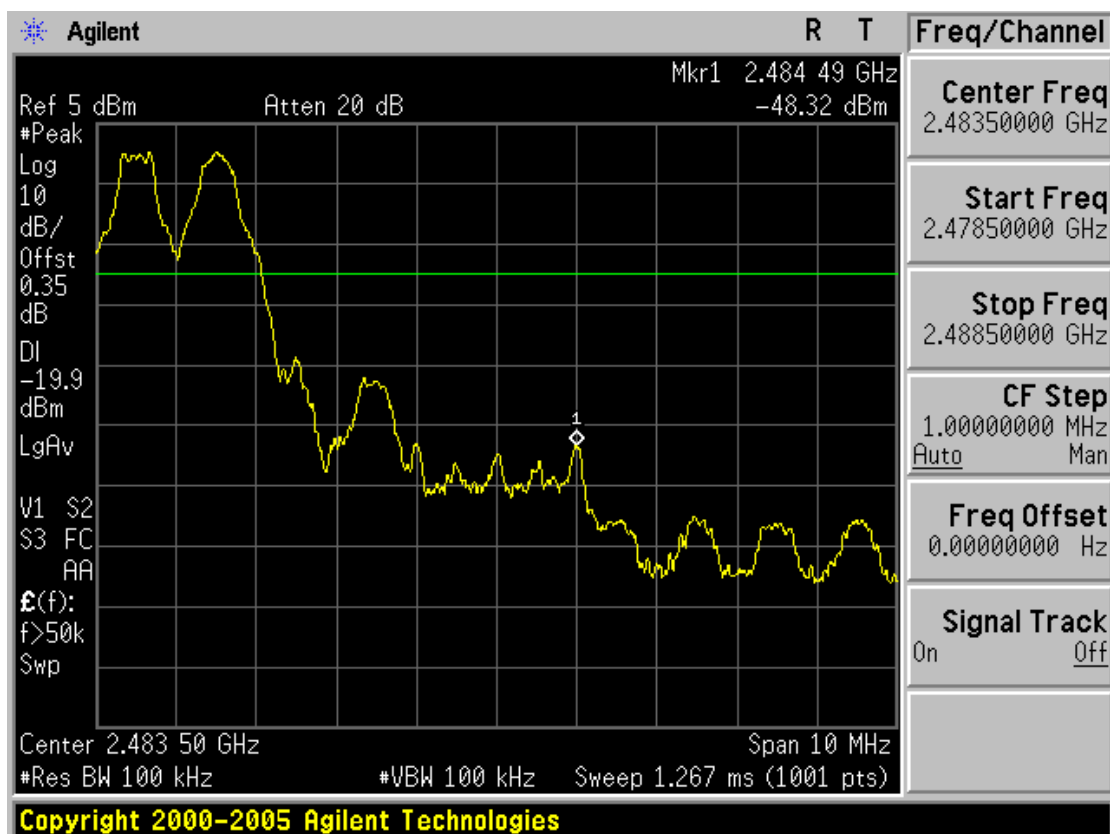
Mid channel spurious (Normal 1Mbps)



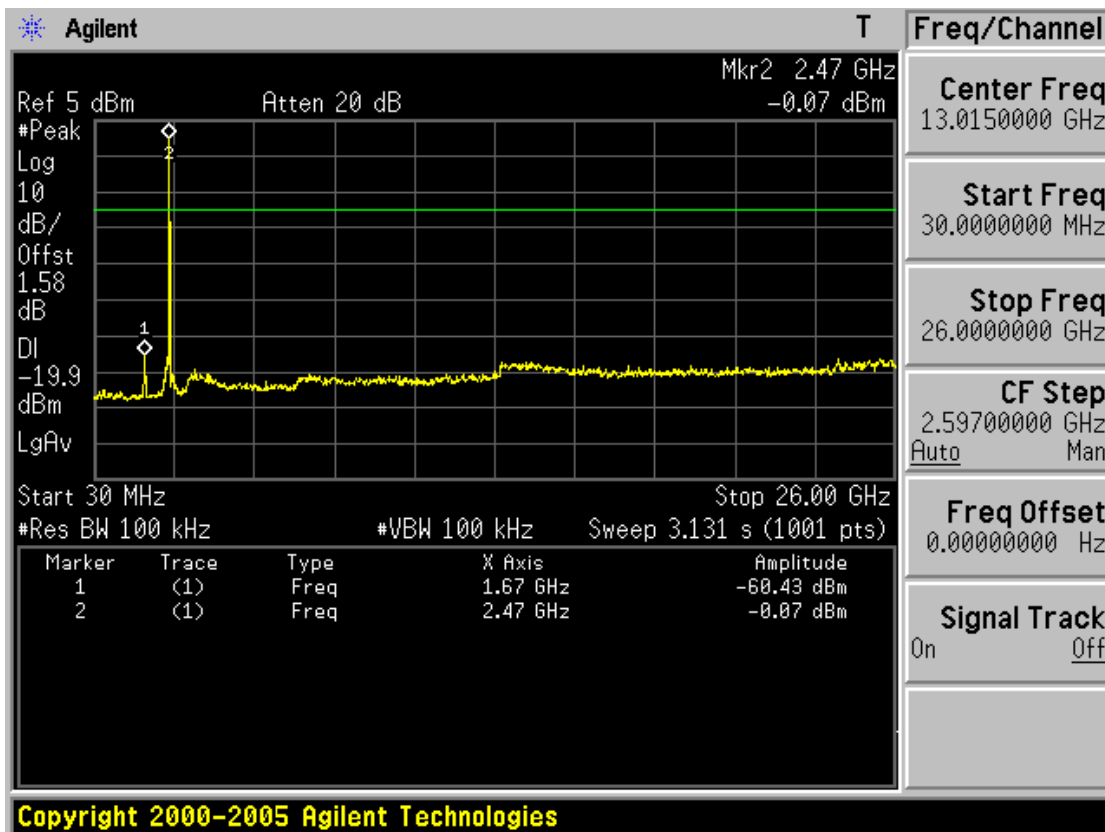
High band with hopping disabled (Normal 1Mbps)



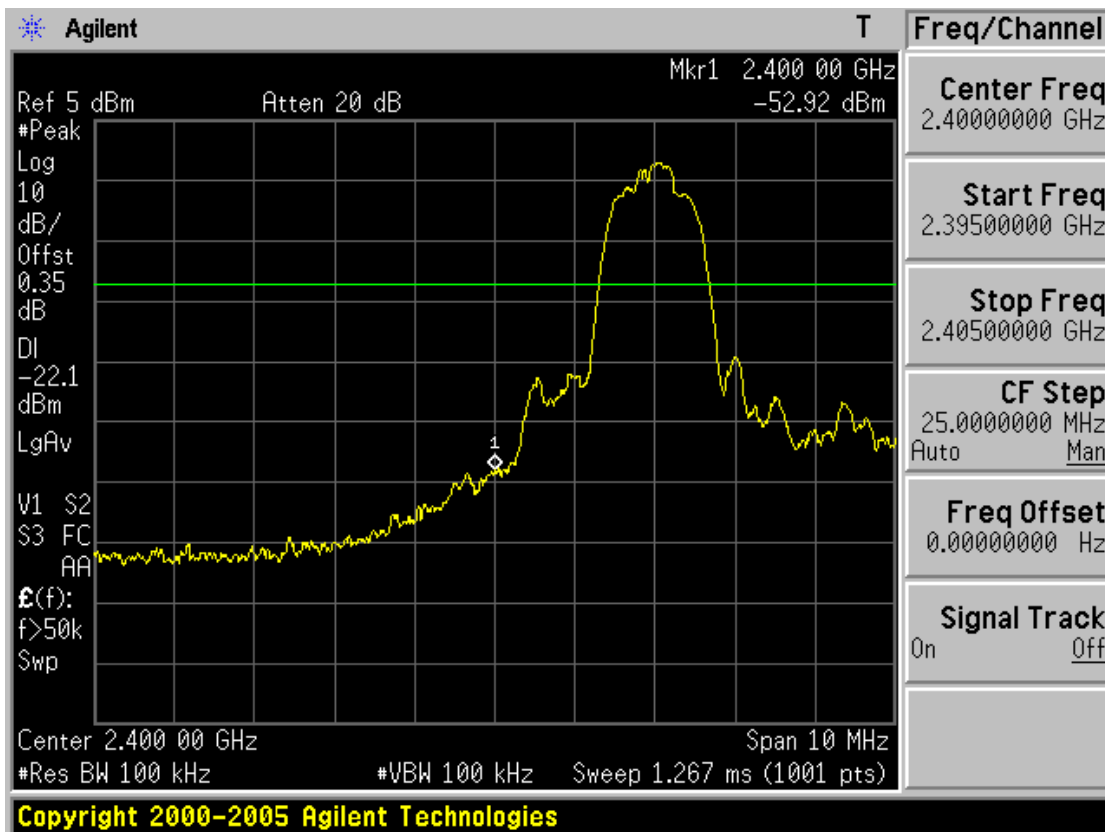
High band with hopping enabled (Normal 1Mbps)



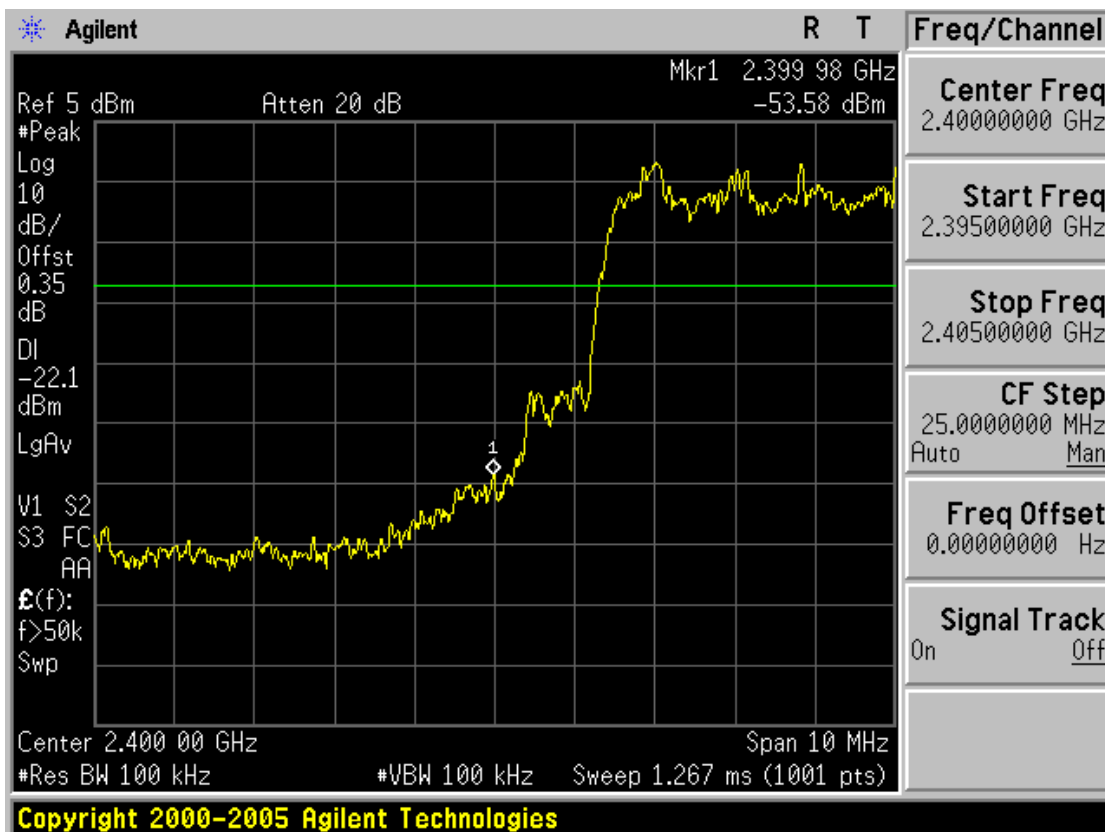
High channel spurious (Normal 1Mbps)



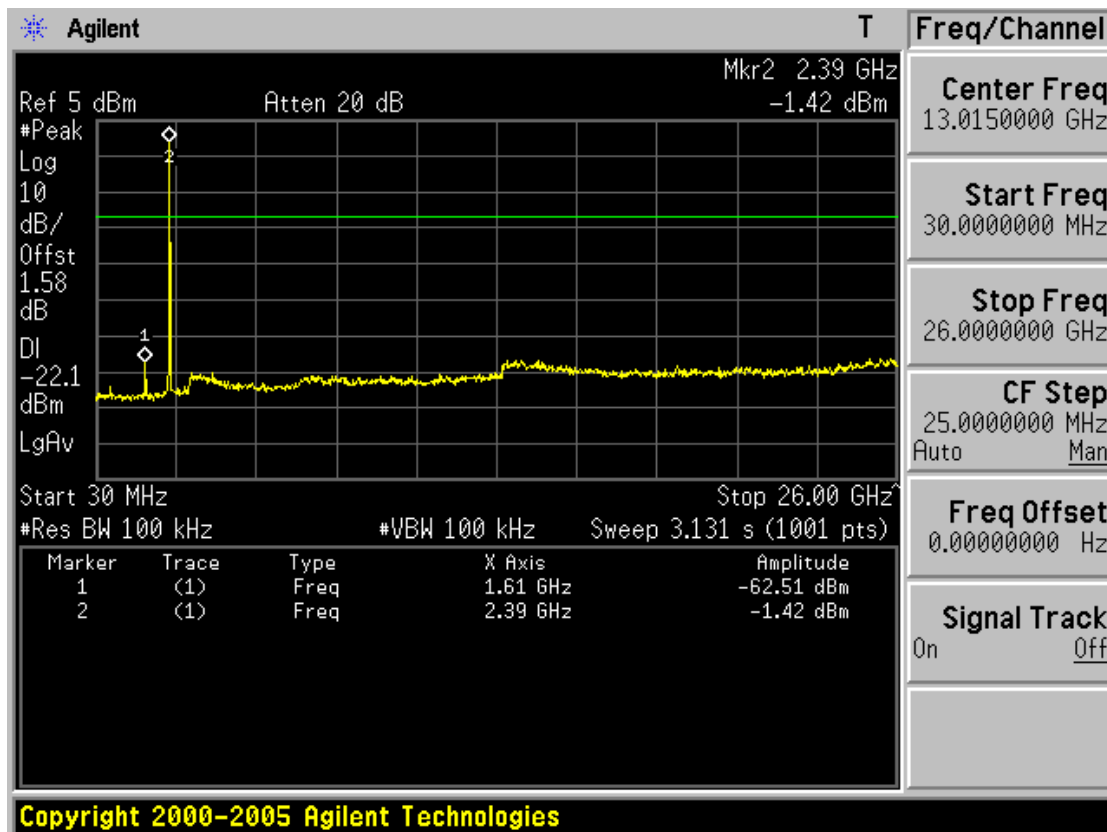
Low band with hopping disabled (EDR 2Mbps)



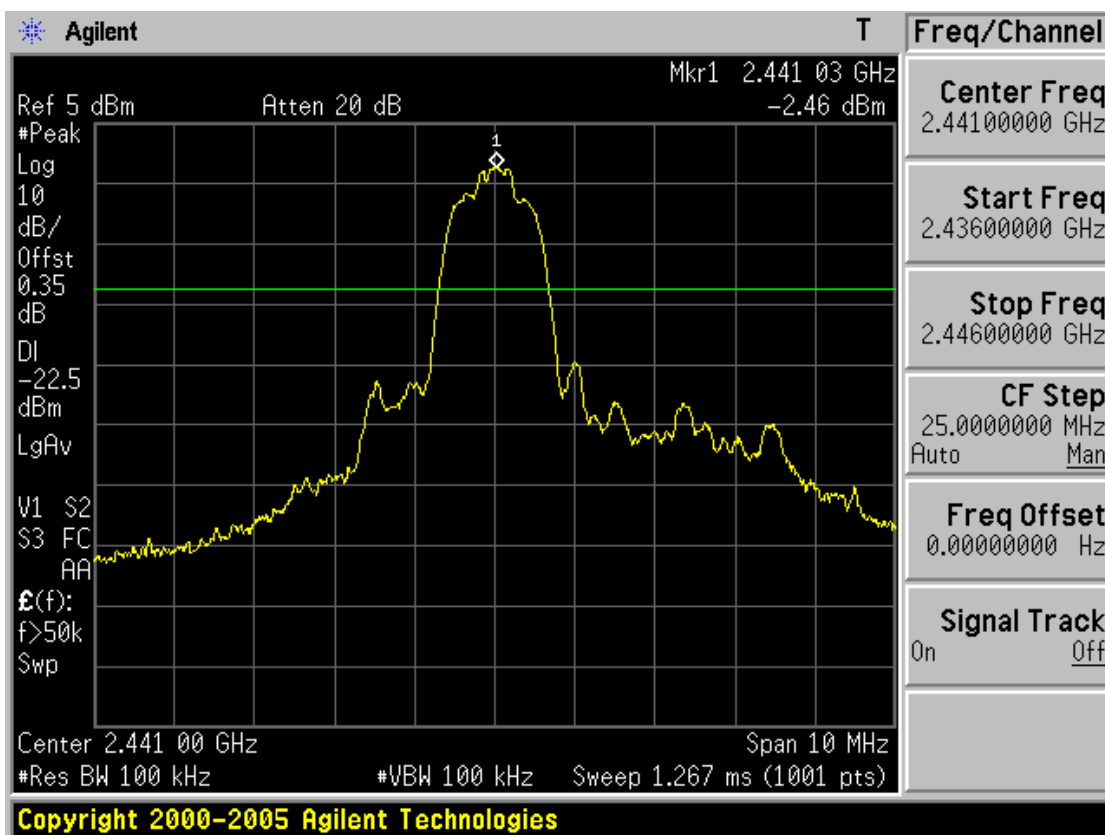
Low band with hopping enabled (EDR 2Mbps)



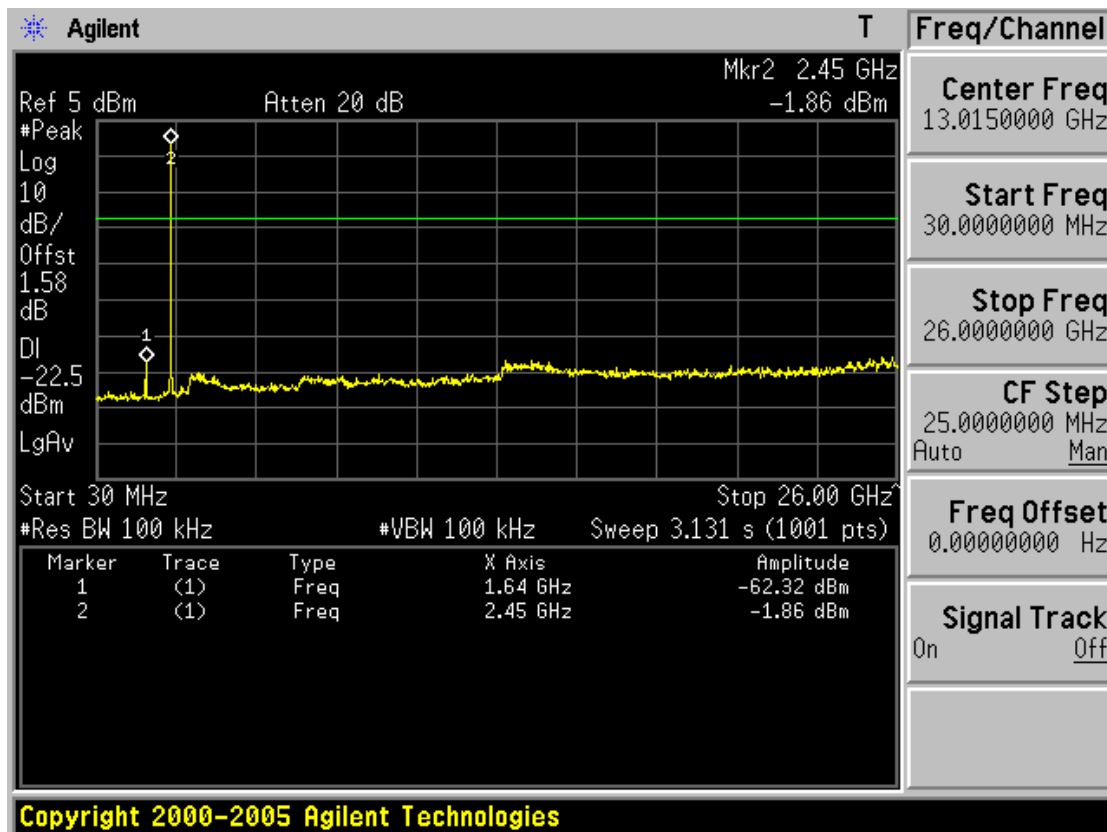
Low channel spurious (EDR 2Mbps)



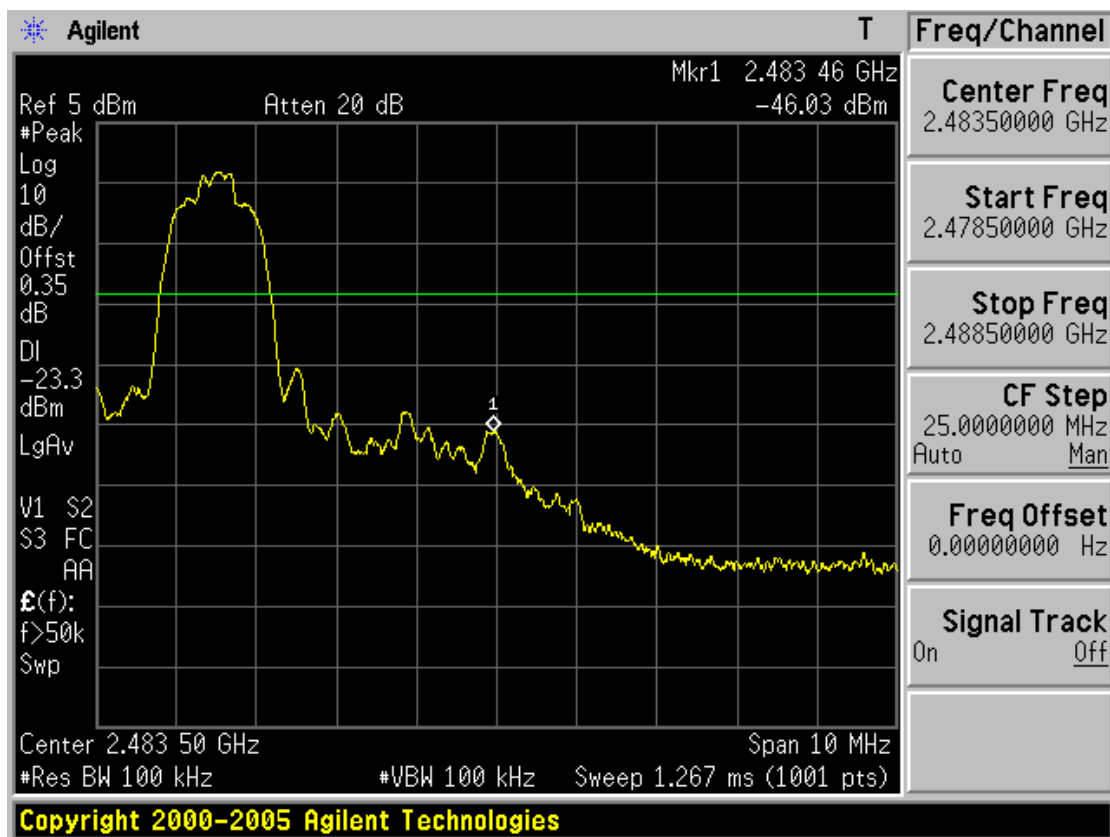
Mid channel ref (EDR 2Mbps)



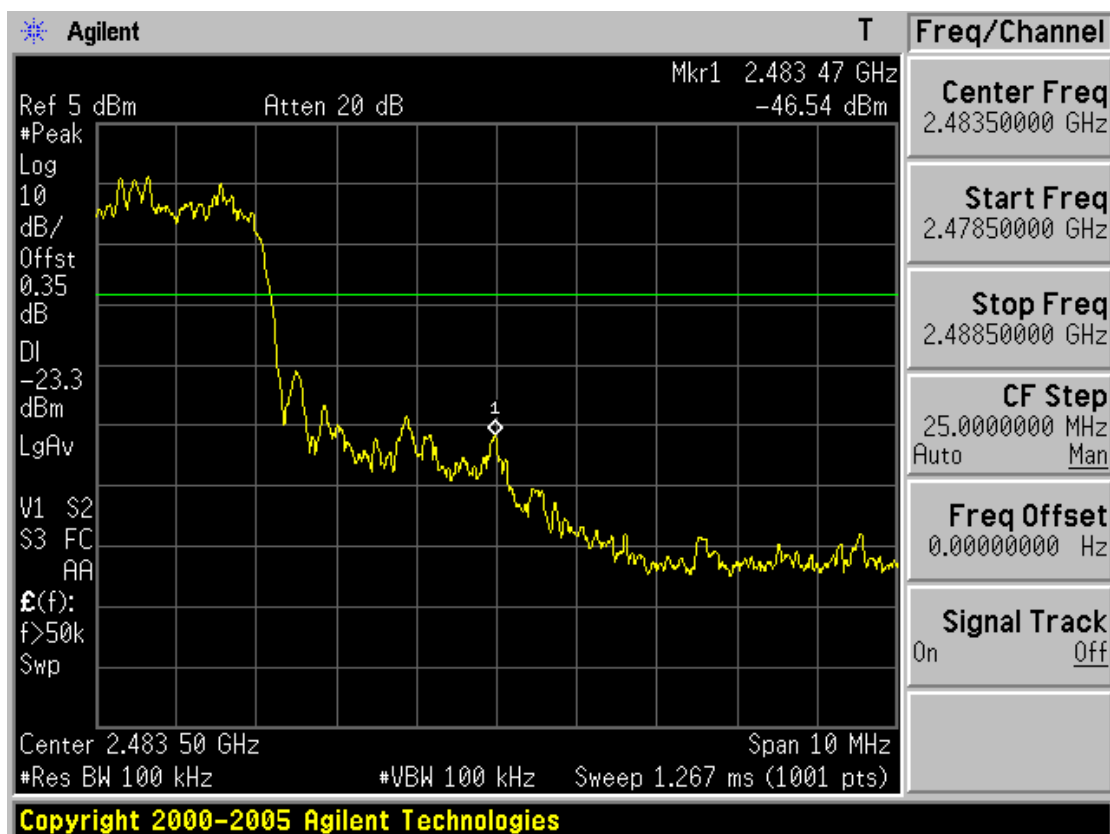
Mid channel spurious (EDR 2Mbps)



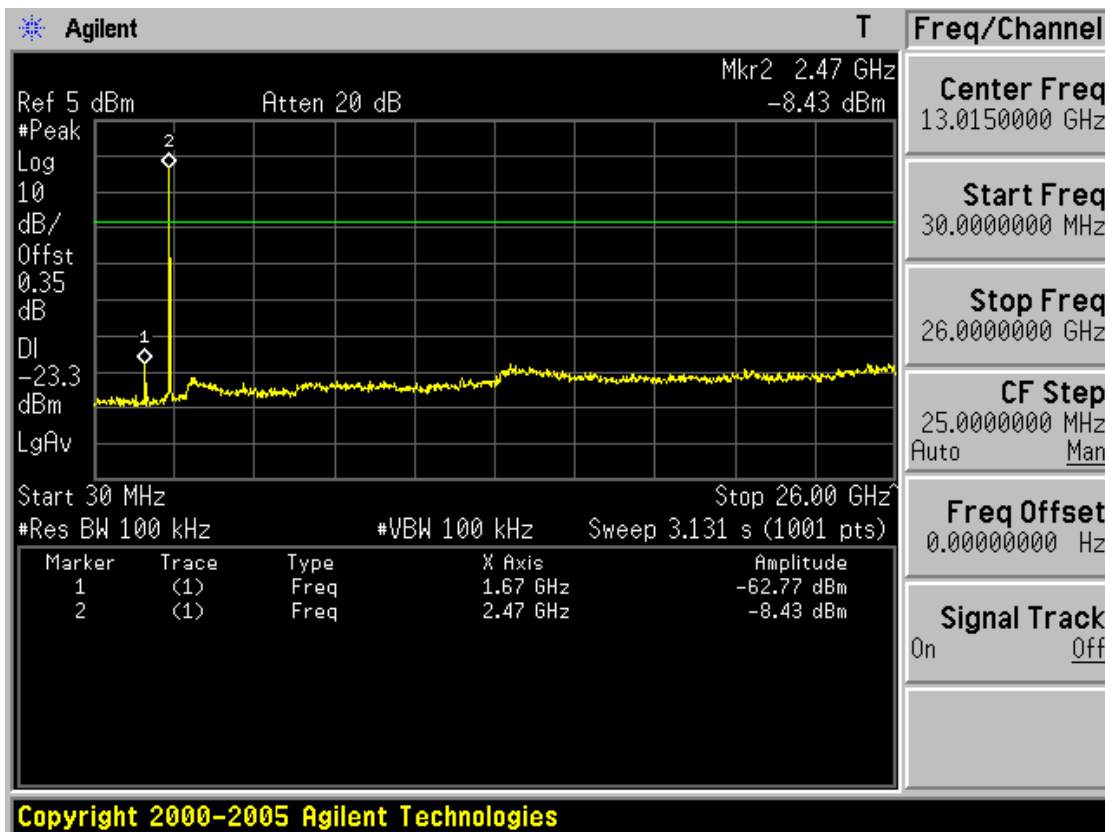
High band with hopping disabled (EDR 2Mbps)



High band with hopping enabled (EDR 2Mbps)



High channel spurious (EDR 2Mbps)



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 ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Trace = max hold

VBW ≥ RBW (Peak)

VBW = 10Hz (Average)

Sweep = auto

Measurement Data: Comply

- Refer to the next page.
- The plot data for low and high restricted band edges is expressed in dBuV unit due to the spectrum analyzer is not support dBuV/m unit. But the results must be field strength value in dBuV/m unit because the results included offset value such as antenna factor, cable loss and external AMP gain

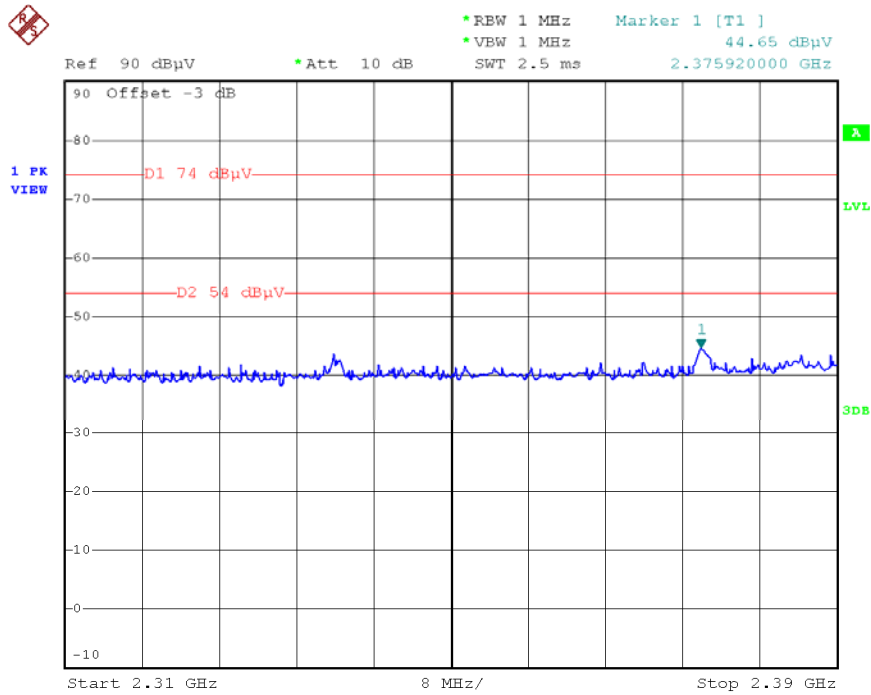
Minimum Standard: FCC Part 15.205 (a), 15.205(b), 15.209(a) and (b)

Limit : FCC P15.209(a)

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

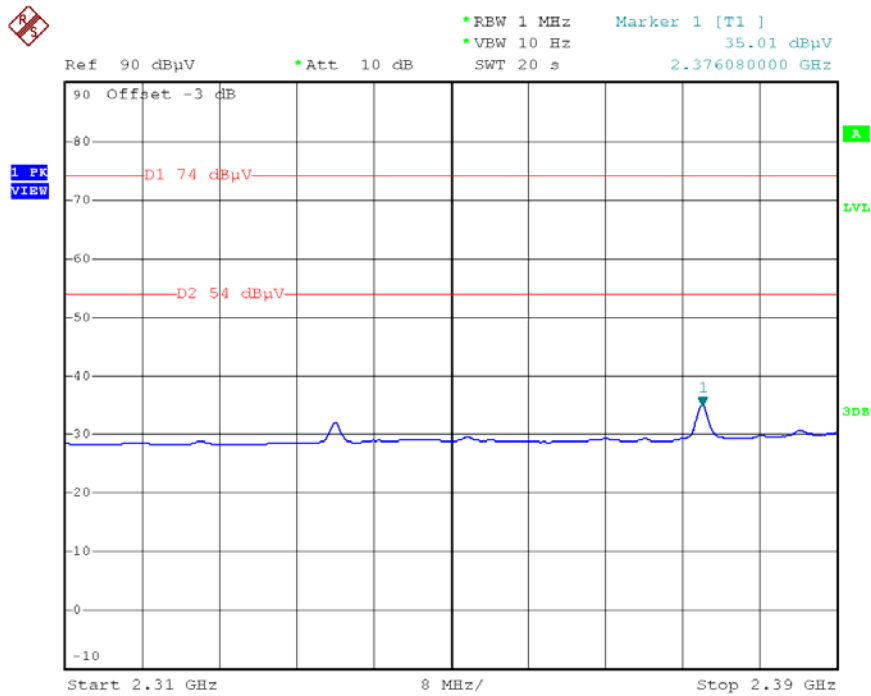
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Restricted Band Edge: Low Channel Normal 1Mbps (Peak, Horizontal)



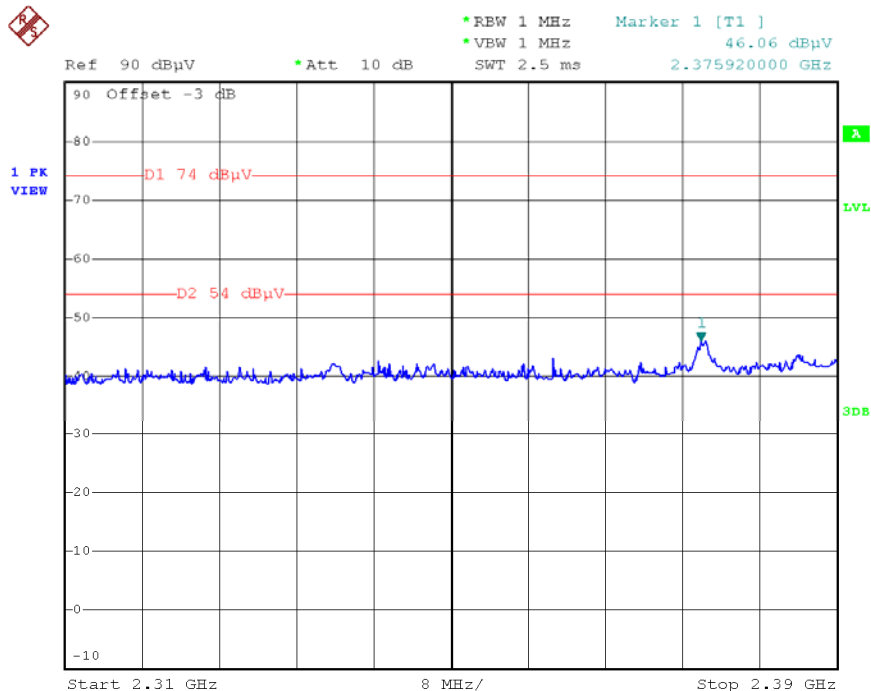
Date: 1.FEB.2008 03:15:04

Restricted Band Edge: Low Channel Normal 1Mbps (Average, Horizontal)



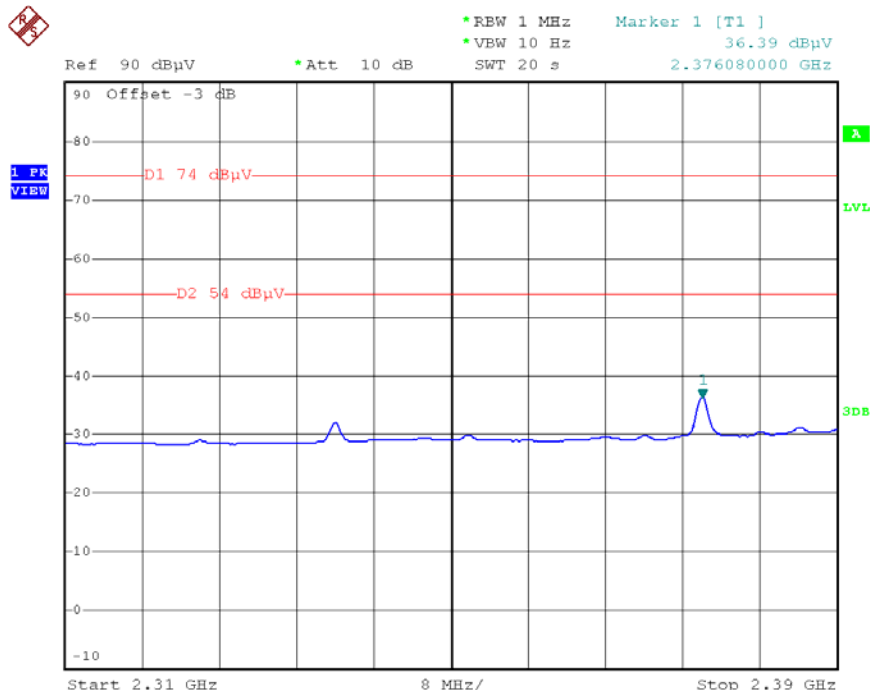
Date: 1.FEB.2008 03:16:35

Restricted Band Edge: Low Channel Normal 1Mbps (Peak, Vertical)



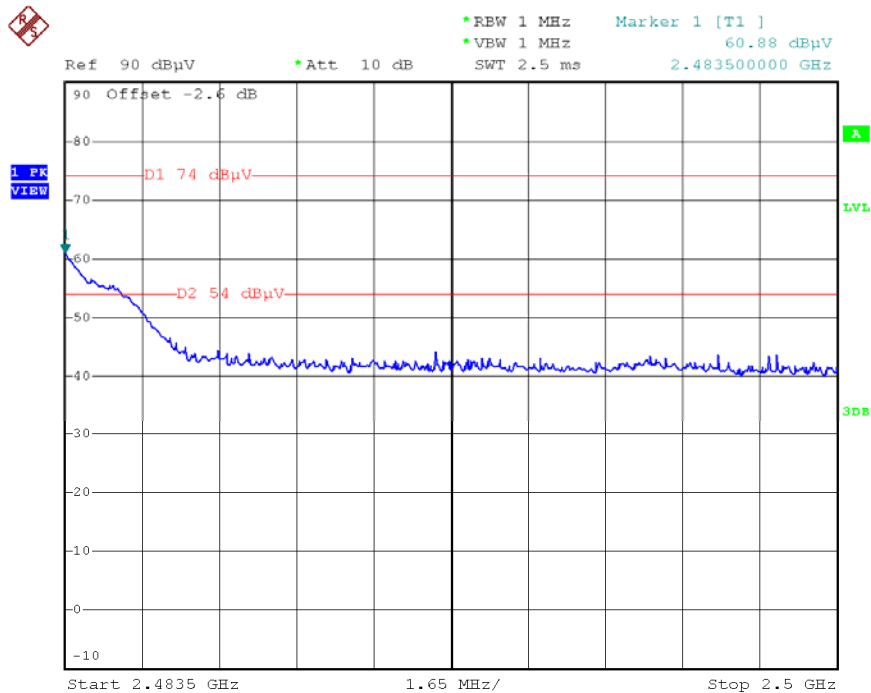
Date: 1.FEB.2008 03:24:23

Restricted Band Edge: Low Channel Normal 1Mbps (Average, Vertical)



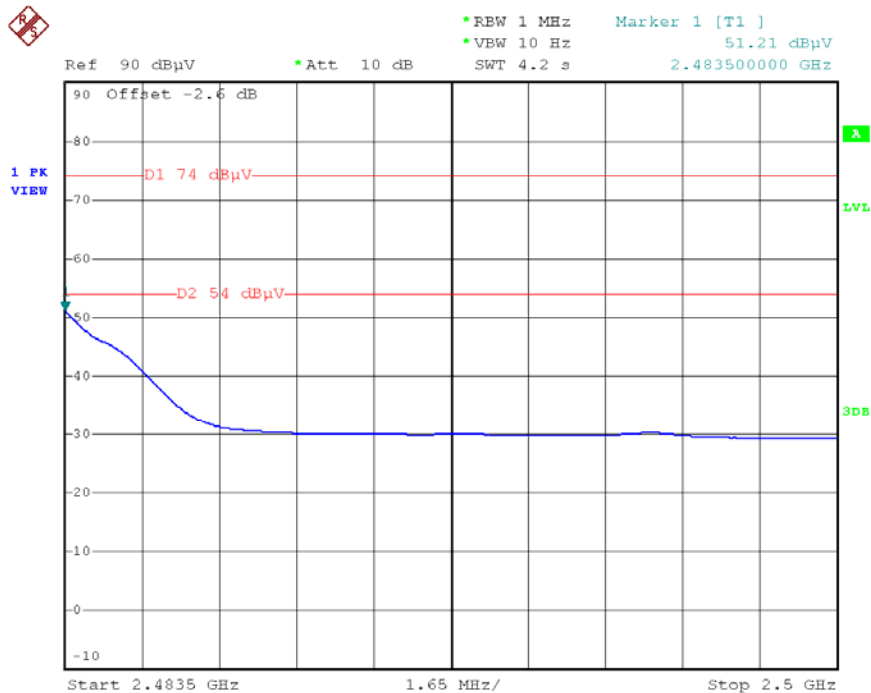
Date: 1.FEB.2008 03:25:40

Restricted Band Edge: High Channel Normal 1Mbps (Peak, Horizontal)



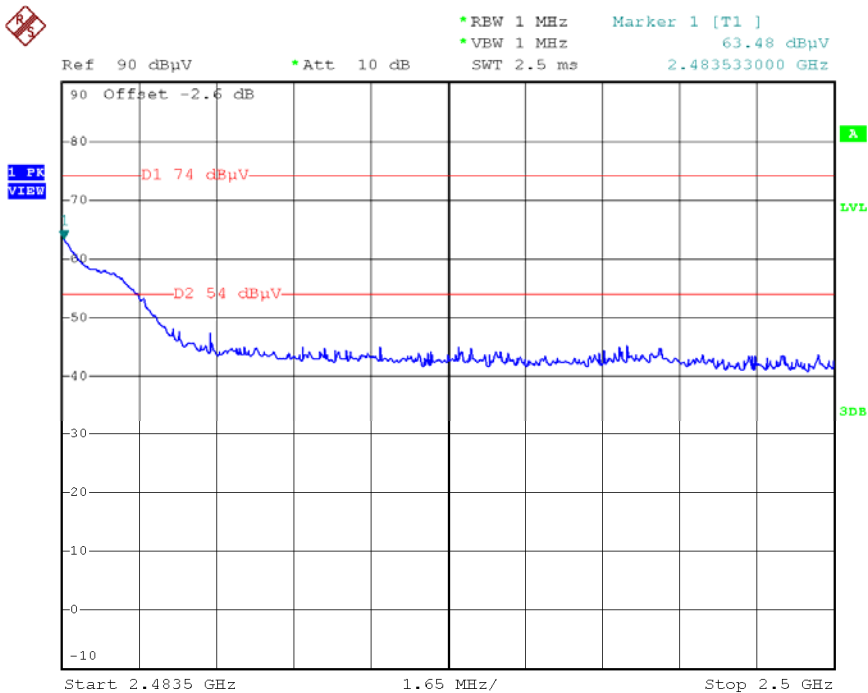
Date: 1.FEB.2008 03:08:38

Restricted Band Edge: High Channel Normal 1Mbps (Average, Horizontal)



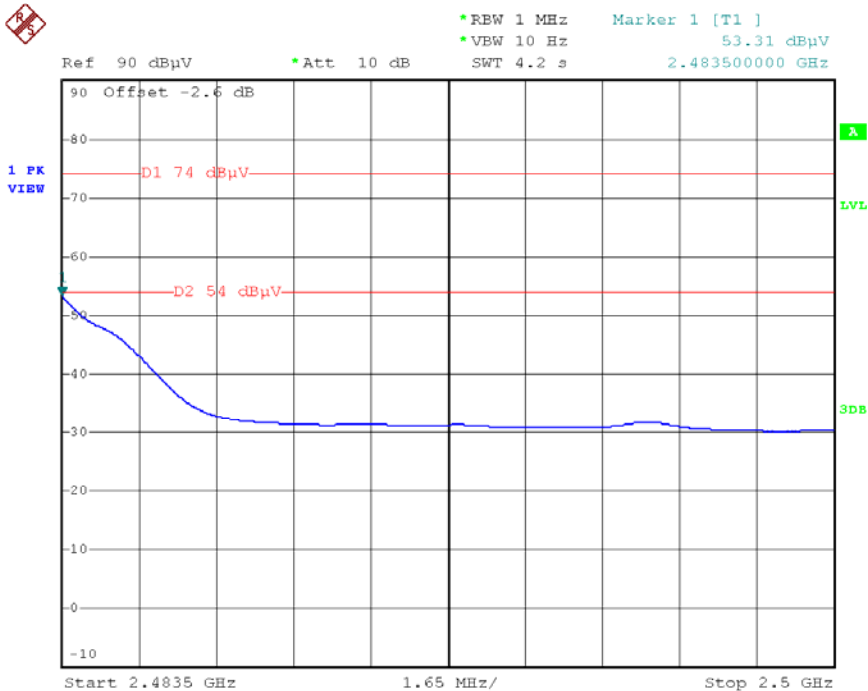
Date: 1.FEB.2008 03:07:46

Restricted Band Edge: High Channel Normal 1Mbps (Peak, Vertical)



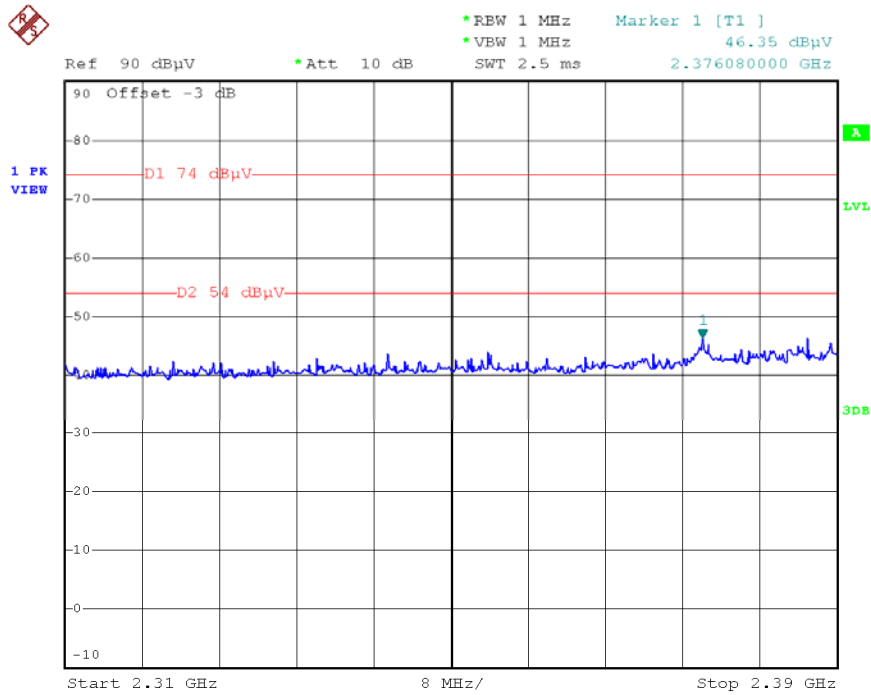
Date: 1.FEB.2008 03:02:21

Restricted Band Edge: High Channel Normal 1Mbps (Average, Vertical)



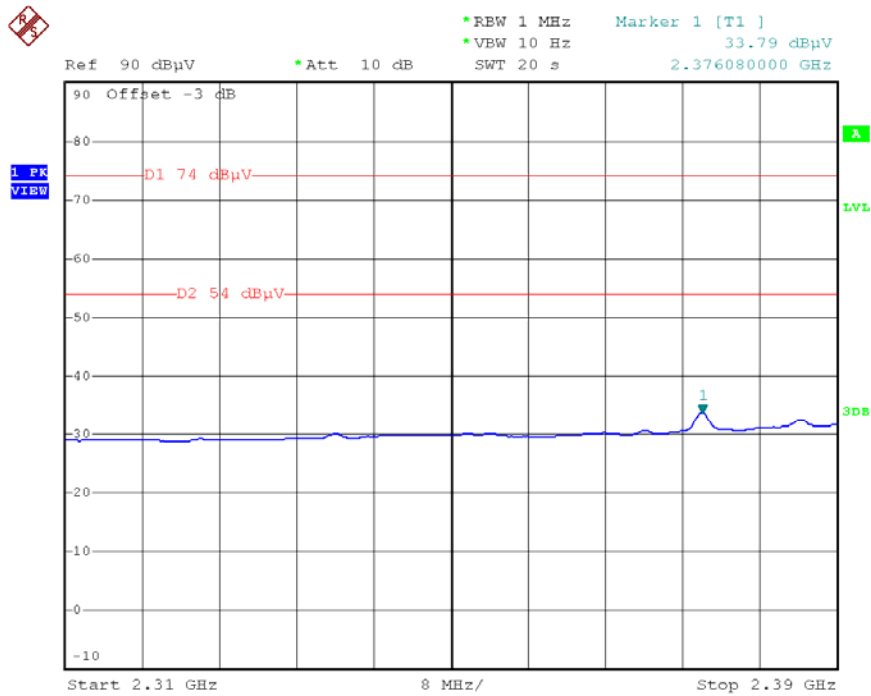
Date: 1.FEB.2008 03:01:45

Restricted Band Edge: Low Channel EDR 2Mbps (Peak, Horizontal)



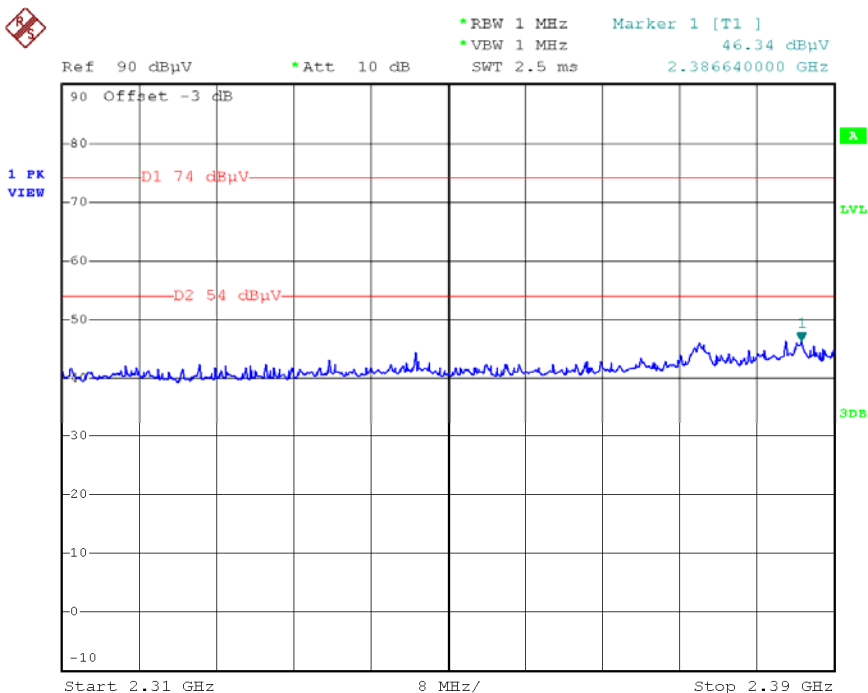
Date: 1.FEB.2008 00:58:39

Restricted Band Edge: Low Channel EDR 2Mbps (Average, Horizontal)



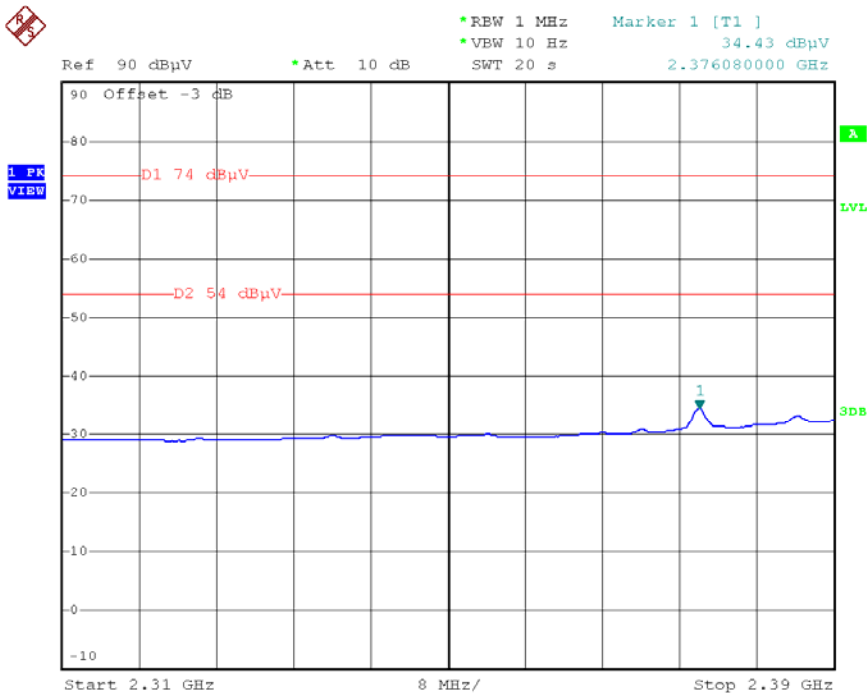
Date: 1.FEB.2008 01:00:01

Restricted Band Edge: Low Channel EDR 2Mbps (Peak, Vertical)



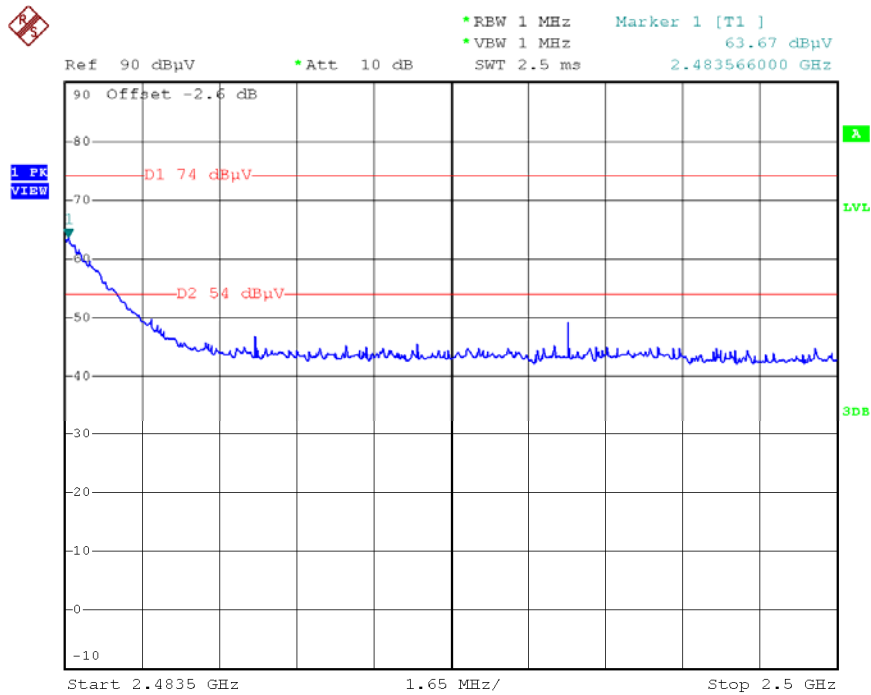
Date: 1.FEB.2008 00:52:17

Restricted Band Edge: Low Channel EDR 2Mbps (Average, Vertical)



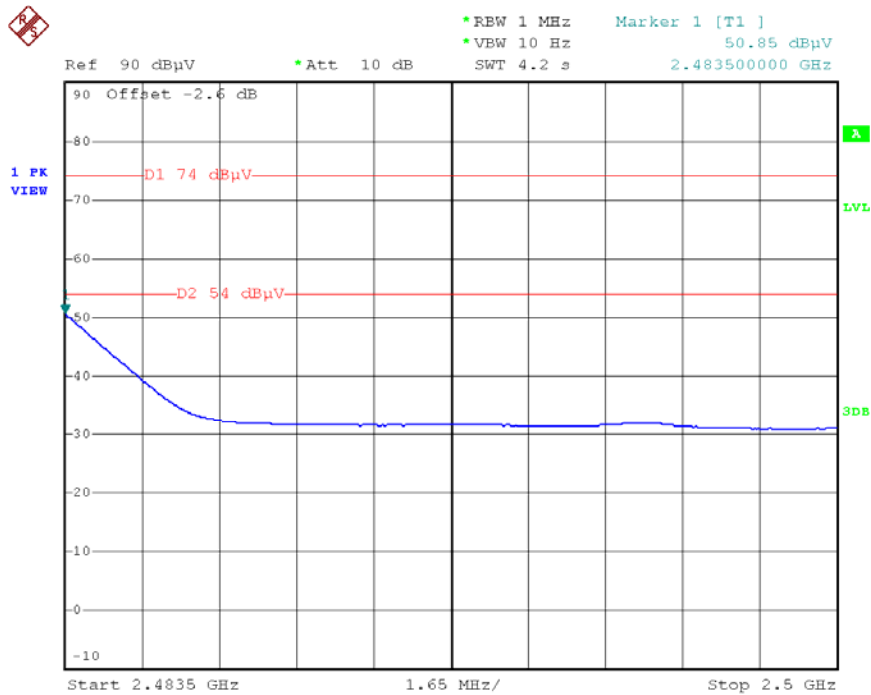
Date: 1.FEB.2008 00:53:44

Restricted Band Edge: High Channel EDR 2Mbps (Peak, Horizontal)



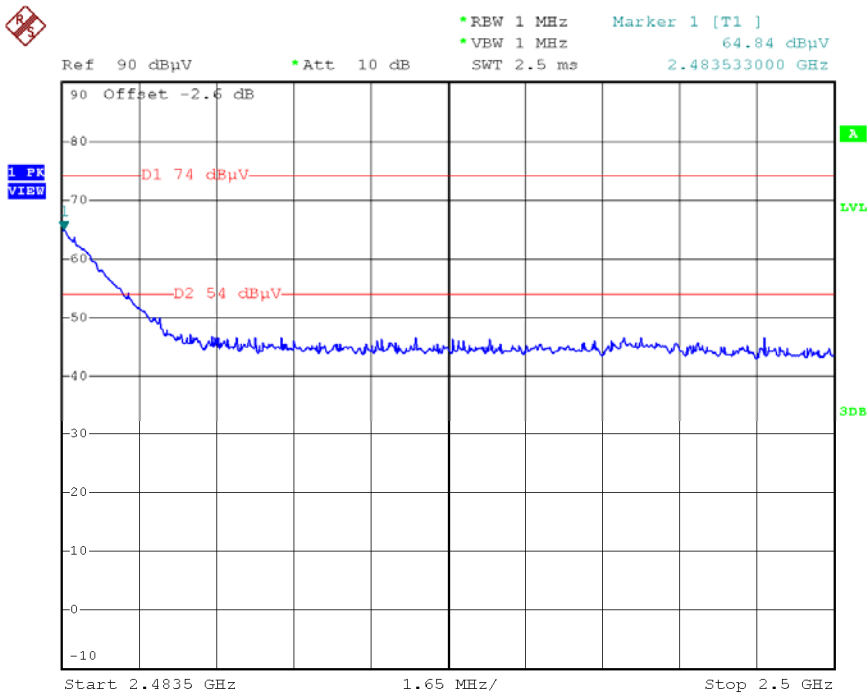
Date: 1.FEB.2008 00:37:59

Restricted Band Edge: High Channel EDR 2Mbps (Average, Horizontal)



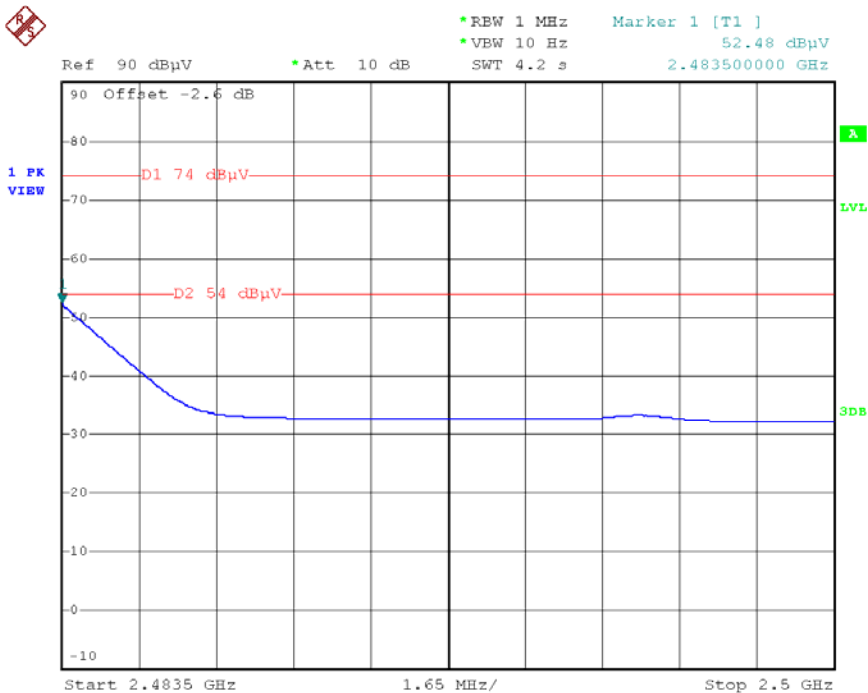
Date: 1.FEB.2008 00:37:17

Restricted Band Edge: High Channel EDR 2Mbps (Peak, Vertical)



Date: 1.FEB.2008 00:32:07

Restricted Band Edge: High Channel EDR 2Mbps (Average, Vertical)



Date: 1.FEB.2008 00:31:32

(Normal, 1Mbps)

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2402MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4804	H	-	51.54	42.80	4.61	-	56.15	47.41	-	74	54	-	17.85	6.59
4804	V	-	53.25	45.06	4.61	-	57.86	49.67	-	74	54	-	16.14	4.33
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2441MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4882	H	-	50.23	41.24	4.92	-	55.15	46.16	-	74	54	-	18.85	7.84
4882	V	-	53.90	45.95	4.92	-	58.82	50.87	-	74	54	-	15.18	3.13
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2480MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4960	H	-	50.17	41.49	5.19	-	55.36	46.68	-	74	54	-	18.64	7.32
4960	V	-	54.39	46.36	5.19	-	59.58	51.55	-	74	54	-	14.42	2.45
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 20dB below limit.
2. If peak result meet AV limit, AV measurement is omitted.
3. Sample Calculation.

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

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

(EDR, 2Mbps)

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2402MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4804	H	-	45.78	32.25	4.61	-	50.39	36.86	-	74	54	-	23.61	17.14
4804	V	-	45.86	32.80	4.61	-	50.47	37.41	-	74	54	-	23.53	16.59
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2441MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4882	H	-	45.17	31.30	4.92	-	50.09	36.22	-	74	54	-	23.91	17.78
4882	V	-	45.54	32.18	4.92	-	50.46	37.10	-	74	54	-	23.54	16.90
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2480MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
4960	H	-	45.41	31.12	5.19	-	50.60	36.31	-	74	54	-	23.40	17.69
4960	V	-	45.53	32.07	5.19	-	50.72	37.26	-	74	54	-	23.28	16.74
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note.

4. No other spurious and harmonic emissions were detected at a level greater than 20dB below limit.
5. If peak result meet AV limit, AV measurement is omitted.
6. Sample Calculation.

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

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

3.2.8 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: N/A

- Refer to the next page.
- The Bluetooth function of this device can not be operated in the charging mode.

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

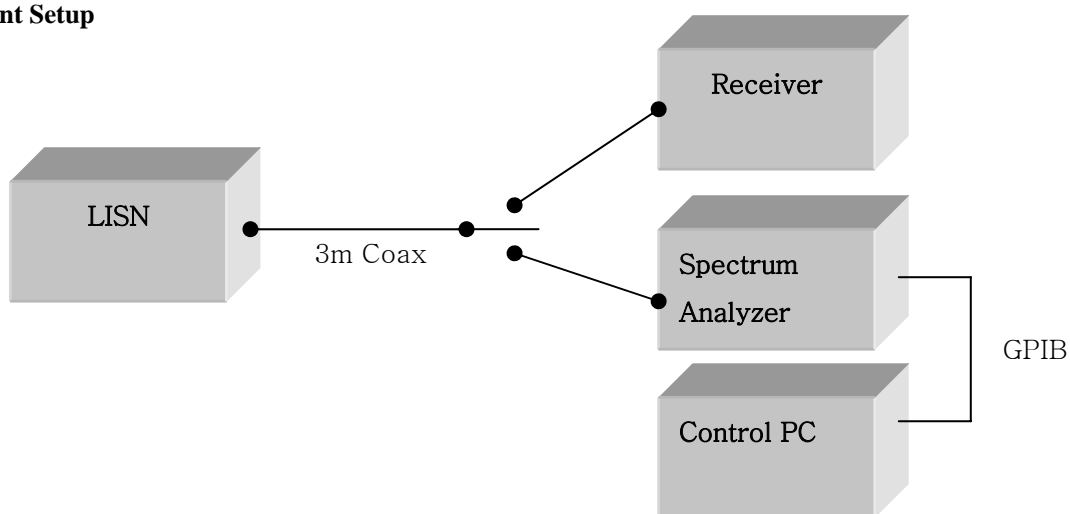


Figure 2: Measurement setup for AC Conducted Emission

APPENDIX
TEST EQUIPMENT FOR TESTS

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

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	17/04/07	17/04/08	US41061134
02	Spectrum Analyzer	Agilent	E4440A	15/11/07	15/11/08	MY45304199
03	Spectrum Analyzer	H.P	8563E	09/10/07	09/10/09	3551A04634
04	Spectrum Analyzer	AGILENT	8594E	09/10/07	09/10/08	3911A07952
05	EMI TEST RECEIVER	R&S	ESU	11/01/08	11/01/09	100014
06	EMI Test Receiver	R&S	ESCI	27/04/07	27/04/08	100364
07	Power Meter	H.P	EMP-442A	23/03/07	23/03/08	GB37170413
08	Power Sensor	H.P	8481A	23/03/07	23/03/08	3318A96566
09	Frequency Counter	H.P	5342A	06/09/07	06/09/08	2119A04450
10	Signal Generator	Rohde Schwarz	SMR20	21/03/07	21/03/08	101251
11	Signal Generator	H.P	ESG-3000A	10/07/07	10/07/08	US37230529
12	Audio Analyzer	H.P	8903B	10/07/07	10/07/08	3011A09448
13	Modulation Analyzer	H.P	8901B	14/07/07	14/07/08	3028A03029
14	Oscilloscope	Tektronix	TDS3052	02/11/07	02/11/08	B016821
15	Universal Radio Communication tester	Rohde Schwarz	CMU200	24/04/07	24/04/08	107631
16	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	18/07/07	18/07/09	GB43461134
17	Bluetooth Tester	TESCOM	TC-3000A	28/03/07	28/03/08	3000A4A0121
18	Power Splitter	WEINSCHEL	1593	05/10/07	05/10/08	332
19	BAND Reject Filter	Microwave Circuits	N0308372	18/10/07	18/10/08	3125-01DC0312
20	BAND Reject Filter	Wainwright	WRCG1750	18/10/07	18/10/08	SN2
21	AC Power supply	DAEKWANG	5KVA	20/03/07	20/03/08	N/A
22	DC Power Supply	H.P	6622A	20/03/07	20/03/08	465487
23	Attenuator (10dB)	WEINSCHEL	23-10-34	26/01/08	26/01/09	BP4387
24	HORN ANT	EMCO	3115	10/08/07	10/08/08	6419
25	HORN ANT	EMCO	3115	09/10/07	09/10/08	21097
26	HORN ANT	A.H.Systems	SAS-574	20/08/07	20/08/08	154
27	HORN ANT	A.H.Systems	SAS-574	20/08/07	20/08/08	155
28	Dipole Antenna	Schwarzbeck	VHA9103	19/12/07	19/12/08	2116
29	Dipole Antenna	Schwarzbeck	VHA9103	19/12/07	19/12/08	2117
30	Dipole Antenna	Schwarzbeck	UHA9105	20/12/07	20/12/08	2261
31	Dipole Antenna	Schwarzbeck	UHA9105	20/12/07	20/12/08	2262

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
32	Frequency Converter	Kyorits	KCV-604C	21/07/07	21/07/08	4-230-3
33	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	02/10/07	02/10/08	021031
34	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	08/06/07	08/06/08	1098
35	Biconical Antenna	Schwarzbeck	VHA9103	08/06/07	08/06/08	2233
36	Digital Multimeter	H.P	34401A	20/03/07	20/03/08	3146A13475
37	Attenuator (10dB)	WEINSCHEL	23-10-34	05/10/07	05/10/08	BP4386
38	High-Pass Filter	ANRITSU	MP526D	08/10/07	08/10/08	MP27756
39	Attenuator (3dB)	Agilent	8491B	12/07/07	12/07/08	58177
40	Amplifier (22dB)	H/P	8447E	20/07/07	20/07/08	2945A02865
41	Amplifier (25dB)	Agilent	8447D	08/08/07	08/08/08	2944A10144
42	Amplifier (30dB)	Agilent	8449B	25/10/07	25/10/08	3008A01590
43	Position Controller	TOKIN	5901T	N/A	N/A	14173
44	Driver	TOKIN	5902T2	N/A	N/A	14174
45	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	06/10/07	06/10/08	4N-170-3
46	LISN	Kyorits	KNW-407	30/08/07	30/08/08	8-317-8
47	LISN	Kyorits	KNW-242	06/10/07	06/10/08	8-654-15
48	CVCF	NF Electronic	4400	N/A	N/A	344536 4420064
49	Software	ToYo EMI	EP5/RE	N/A	N/A	Ver 2.0.800
50	Software	ToYo EMI	EP5/CE	N/A	N/A	Ver 2.0.801
51	Software	AUDIX	e3	N/A	N/A	Ver 3.0
52	Software	Agilent	Benchlink	N/A	N/A	A.01.09 021211