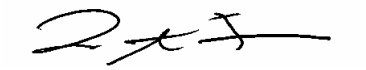
Cirronet
FCC Part 15, Certification Application
WIT2410NF Spread Spectrum Transceiver

UST Project: 07-0183
Issue Date: August 18, 2007

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

I certify that I am authorized to sign for the manufacturer and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

UNITED STATES TECHNOLOGIES, INC. (AGENT RESPONSIBLE FOR TEST):

By: 

Name: Louis A. Feudi

Title: VP/ Operations & Engineering

Date: August 18, 2007

Cirronet Corporation
3079 Premiere Parkway Suite 140
Duluth, GA 30097

By:_____

Name:_____

Title:_____

Date:_____

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www.ustech-lab.com

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Cirronet**

MODEL: **WIT2410NF**

FCC ID: **HSW-2410NF**

DATE: **August 18, 2007**

This report concerns (check one): Original grant X
Class II change_____

Equipment type: **2.4 GHz Spread Spectrum Transceiver**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until:_____
date

N.A. agrees to notify the Commission by N.A.
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

United States Technologies, Inc.
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

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SECTION 1

GENERAL INFORMATION

GENERAL INFORMATION

1.1 Product Description

The Equipment Under Test (EUT) is a Cirronet, Model WIT2410NF modular 2.4 GHz spread spectrum transceiver. The EUT will be used with one antenna.

1.2 Related Submittal(s)/Grant(s)

The EUT will be used to send/receive data. The transceiver presented in this report will be used with other like transceivers:

The EUT is subject to the following authorizations:

a) Certification as a transceiver (modular approval)
b) Verification as a digital device

The information contained in this report is presented for the certification & verification authorization(s) for the EUT. The manufacturer desires to seek a modular approval on this device.

SECTION 2

TESTS AND MEASUREMENTS

TEST AND MEASUREMENTS

2.1 Configuration of Tested System

The sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003). Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Bock diagrams of the tested systems are shown in Figures 1a and 16. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2a -g.

The sample used for testing was received by U.S. Technologies on May 1, 2007 in good condition.

2.2 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and registered with the FCC, under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

2.3 Test Equipment

Table 2 describes test equipment used to evaluate this product.

2.4 Modifications

No modifications were made by US Tech, to bring the EUT into compliance with FCC Part 15, Class B Limits for the transmitter portion of the EUT or the Class B Digital Device Requirements.

FIGURE 1a
TEST CONFIGURATION

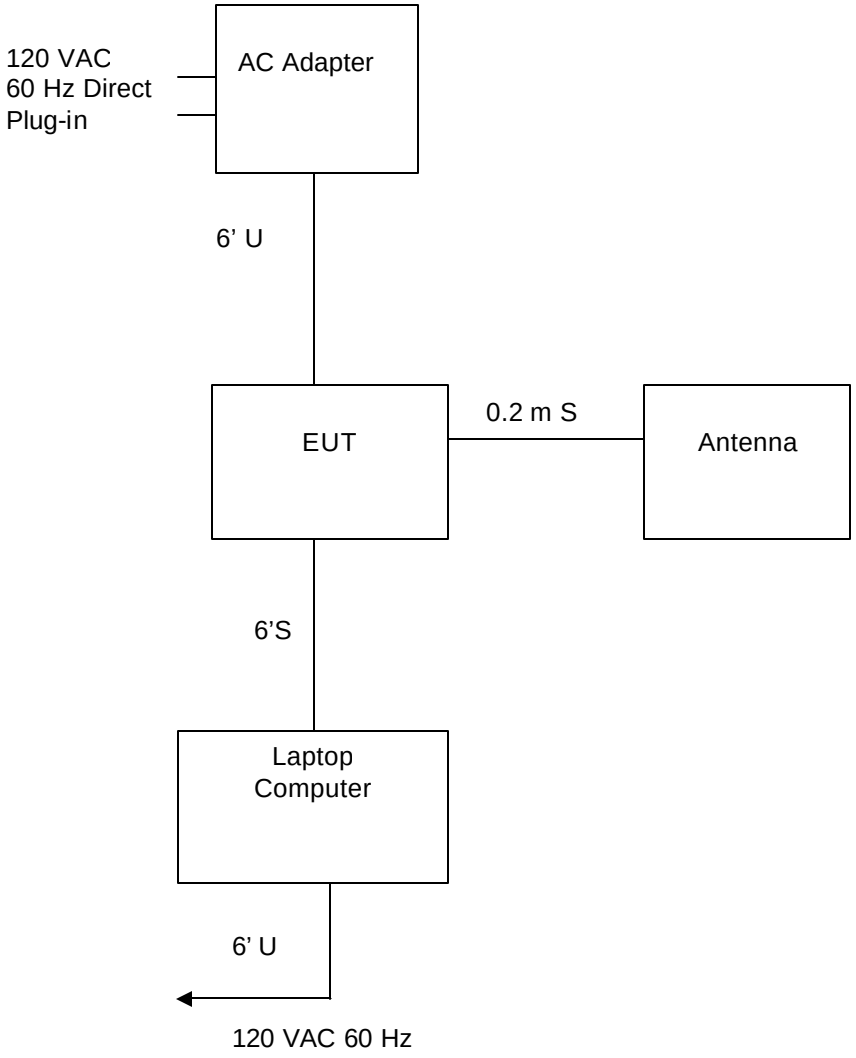


TABLE 1

Test Date: May 1 through 8, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

EUT and Peripherals

PERIPHERAL MANU.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
(EUT) Cirronet	WIT2410NF	000010	HSW-2410NF	0.2 m S
Antenna see antenna descriptions	Dipole 2 dBi	None	None	None
AC Adapter Volgen	SPU10R-1	None	None	6' U 120 VAC/ 60 Hz Direct Plug-in
Laptop Computer IBM	ThinkPad	78-RG-537	None	6' U 120 VAC/ 60 Hz Power Cord

TABLE 2
TEST INSTRUMENTS

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	7/03/06
SIGNAL GENERATOR	8648B	HEWLETT-PACKARD	3642U01679	10/13/06
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	6/14/07
BICONICAL ANTENNA	3110B	EMCO	9307-1431	10/11/06
LOG PERIODIC	3146	EMCO	3110-3236	9/15/06 2 Yr
LISN (x 2) 8028-50-TS24-BNC	8028	SOLAR ELE.	910494 & 910495	5/10/07
HORN ANTENNA	3115	EMCO	9107-3723	10/16/06
PREAMP	8449B	HEWLETT PACKARD	3008A00480	8/10/06
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.5 Antenna Description (Paragraph 15.203)

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 of this section.

Cirronet Corporation will sell the WIT2410NF with the following antenna.

MANUFACTURER	TYPE OF ANTENNA	MODEL	GAIN dB	TYPE OR CONNECTOR
Mobile Antennas				
Cirronet	Dipole	RWA249R	2 dBi	Reverse SMA to MMCX via Adapter Cable

To ensure compliance with 15.203, Cirronet Corporation attaches reverse-sex TNC or N connectors to all antennas except the 12 dBi and 6 dBi Patch antennas.

When producing multiple antennas, Cirronet Corporation. has arranged for the manufacturers of the antennas to provide reverse-sex TNC or N connectors for these antennas. OEM customers wanting to use one of these antennas in their product will first need to obtain a special part number from Cirronet Corporation to give to the antenna manufacturer. The manufacturer, upon receipt of this number, will know to attach the reverse-sex TNC or N connector (or SMA in the case of the dipole) to the end of the antenna cable before shipping.

The customer then purchases an adapter cable from Cirronet Corporation that will connect the MMCX port on the module to the reverse-sex connector on the antenna. No other type of commercially available antenna will attach to this reverse-sex TNC or N connector (or SMA for the case of the dipole). Given the nonstandard nature of the interconnect between module and antenna and the difficulty involved in circumventing that connection, Cirronet Corporation feel that this procedure meets the requirements called out in 15.203.

For this evaluation only one antenna is provided or approved for use with the WIT2410NF.

2.6 Peak power within the band 2400 – 2483.5 GHz per FCC Section 15.247(b)

Peak power within the band 2400-2483.5 GHz has been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer. The spectrum analyzer was set for a 50 Ω impedance with the VBW $\geq$ RBW 6 dB bandwidth. The results of the measurements are given in Table 3 and Figure 3a through Figure 3c.

Fundamental Frequencies were measured at Low Channel, Mid Channel, and High Channel.

TABLE 3
PEAK POWER OUTPUT

Test Date: May 1, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (mW)*	FCC Limit (Watt)
2401.83	17.23	52.84	1.0
2435.55	17.45	55.6	1.0
2470.00	17.19	52.36	1.0

*** Measurement includes 0.1 dB for cable loss**

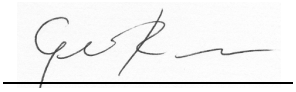
Tester Signature:  **Name:** **Gersop Riera**

Figure 3a.
Peak Power per FCC Section 15.247(b) Low Channel

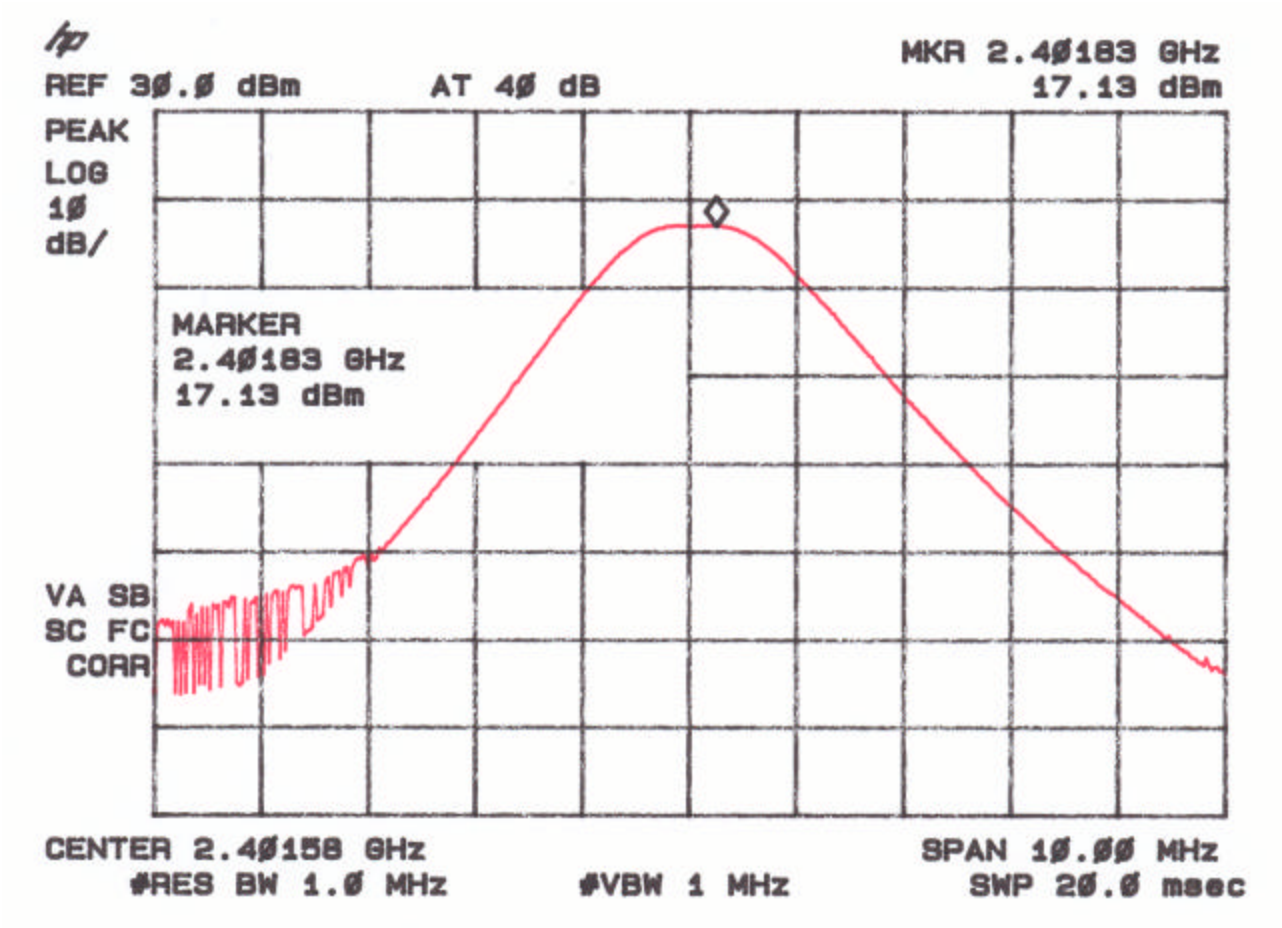


Figure 3b.
Peak Power per FCC Section 15.247(b) Mid Channel

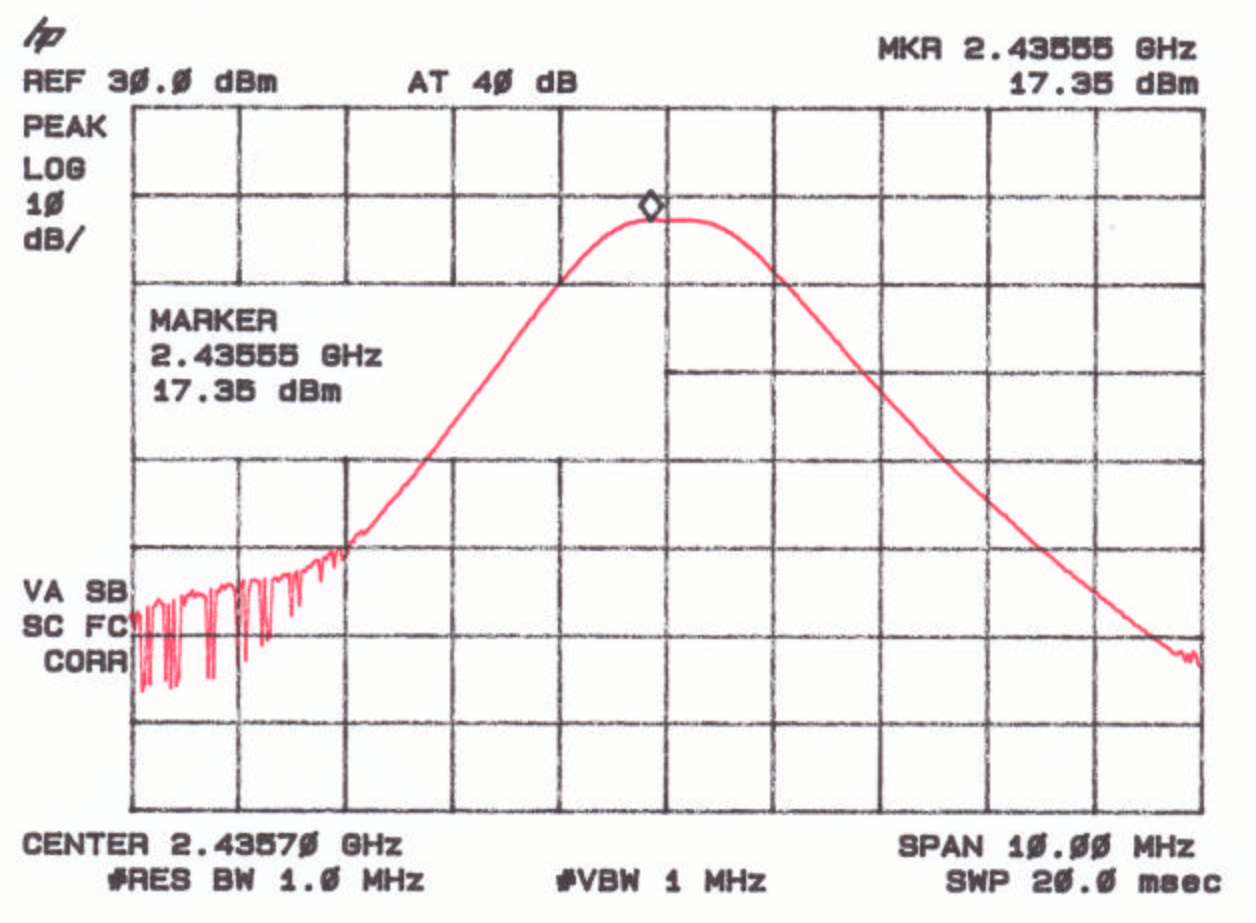
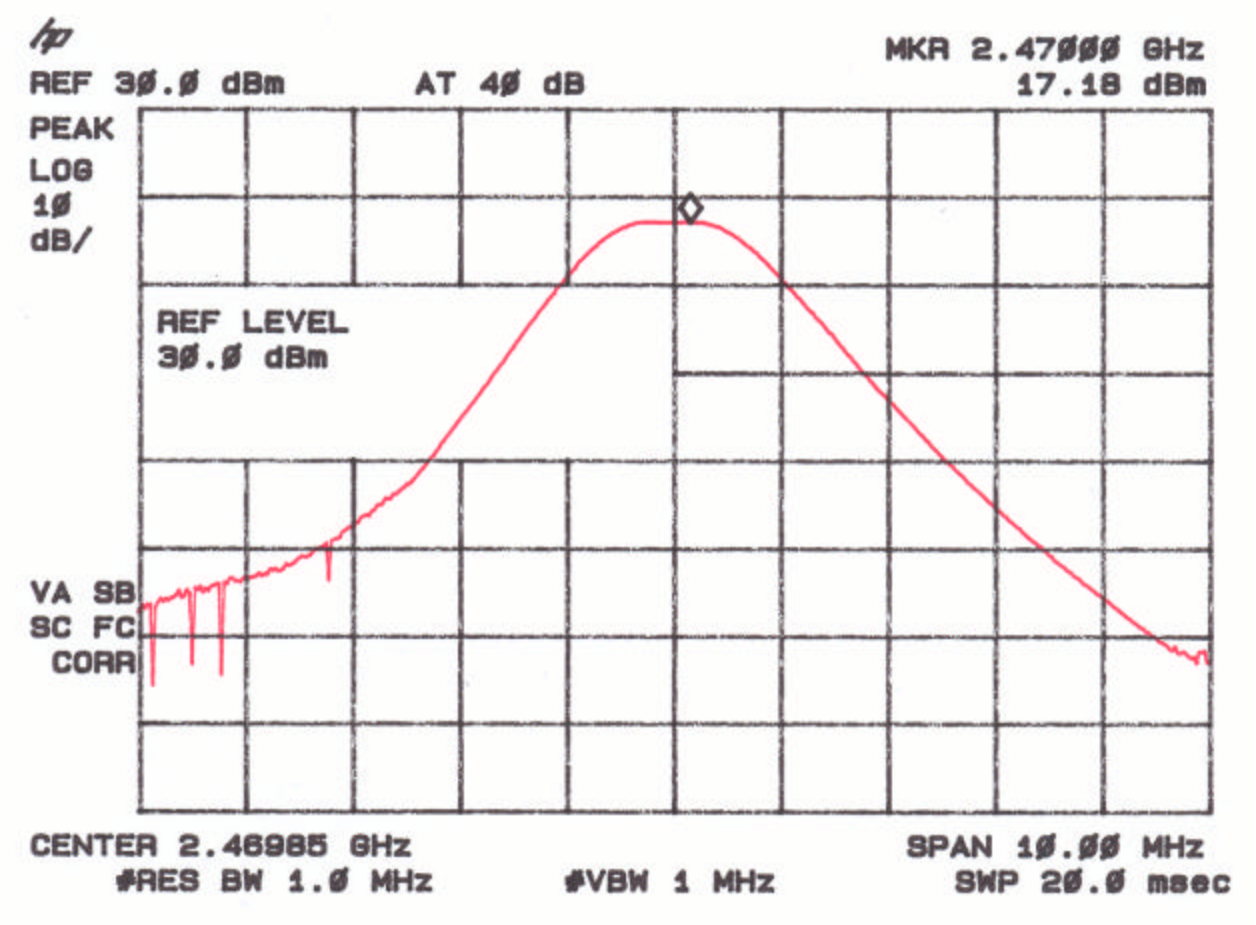


Figure 3c.
Peak Power per FCC Section 15.247(b) High Channel



2.7 Antenna Conducted Spurious Emission the Frequency Range 30 – 25000 MHz (FCC Section 15.247(c))

Spurious emissions in the frequency range 30 – 25000 MHz have been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer. The spectrum analyzer was set for a 50 Ω impedance with the RBW = 100 kHz & VBW> RBW. All spurious emissions were measured to be greater than 20 dB down from the fundamental. The results or conducted spurious emissions are given in Figure 4a through 4i.

Figure 4a
Antenna Conducted Spurious Emissions 15.247(c) Low

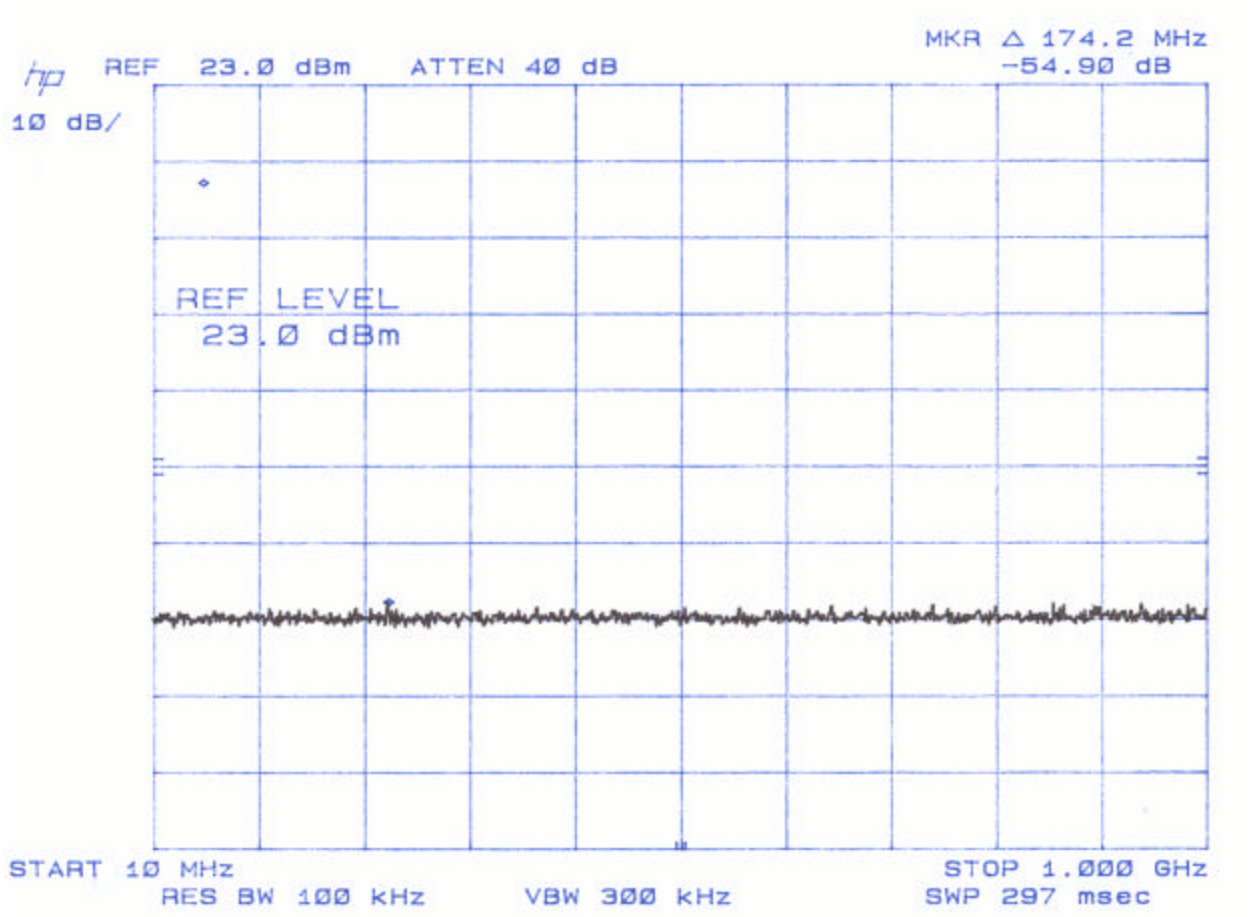
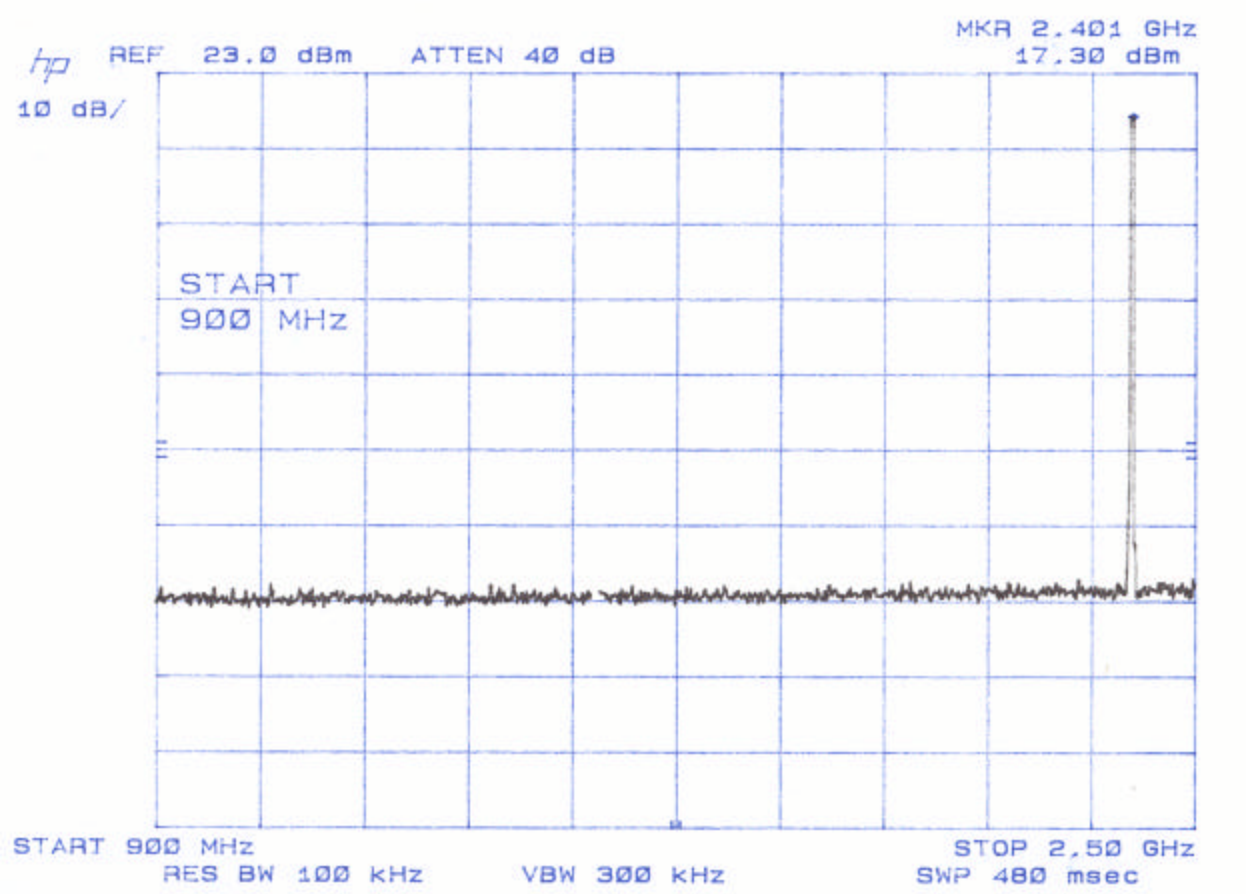


Figure 4b
Antenna Conducted Spurious Emissions 5.247(c) Low



Note: Signal shown represents Fundamental Frequency.

Figure 4c
Antenna Conducted Spurious Emissi ons 15.247(c) Low

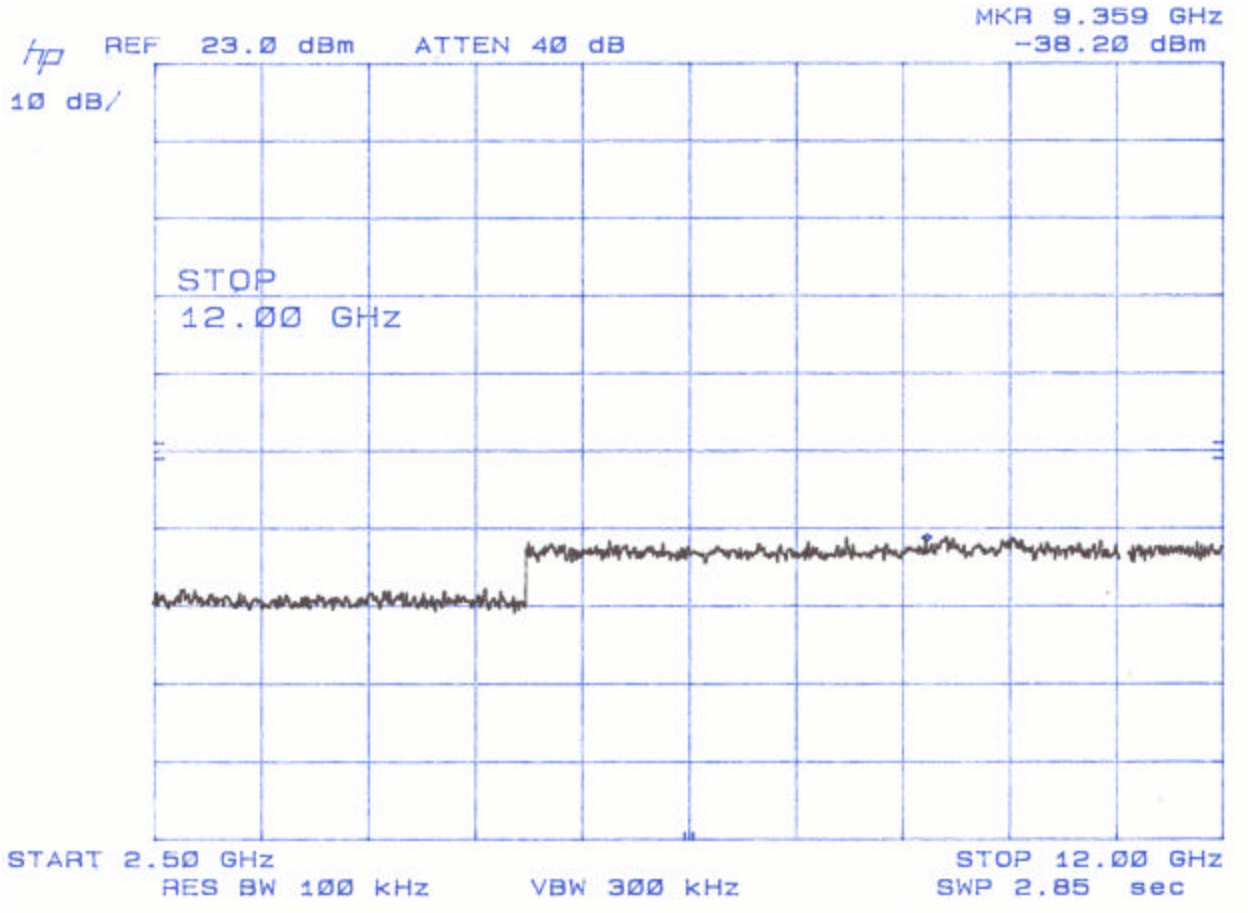


Figure 4d
Antenna Conducted Spurious Emissions 15.247(c) Mid

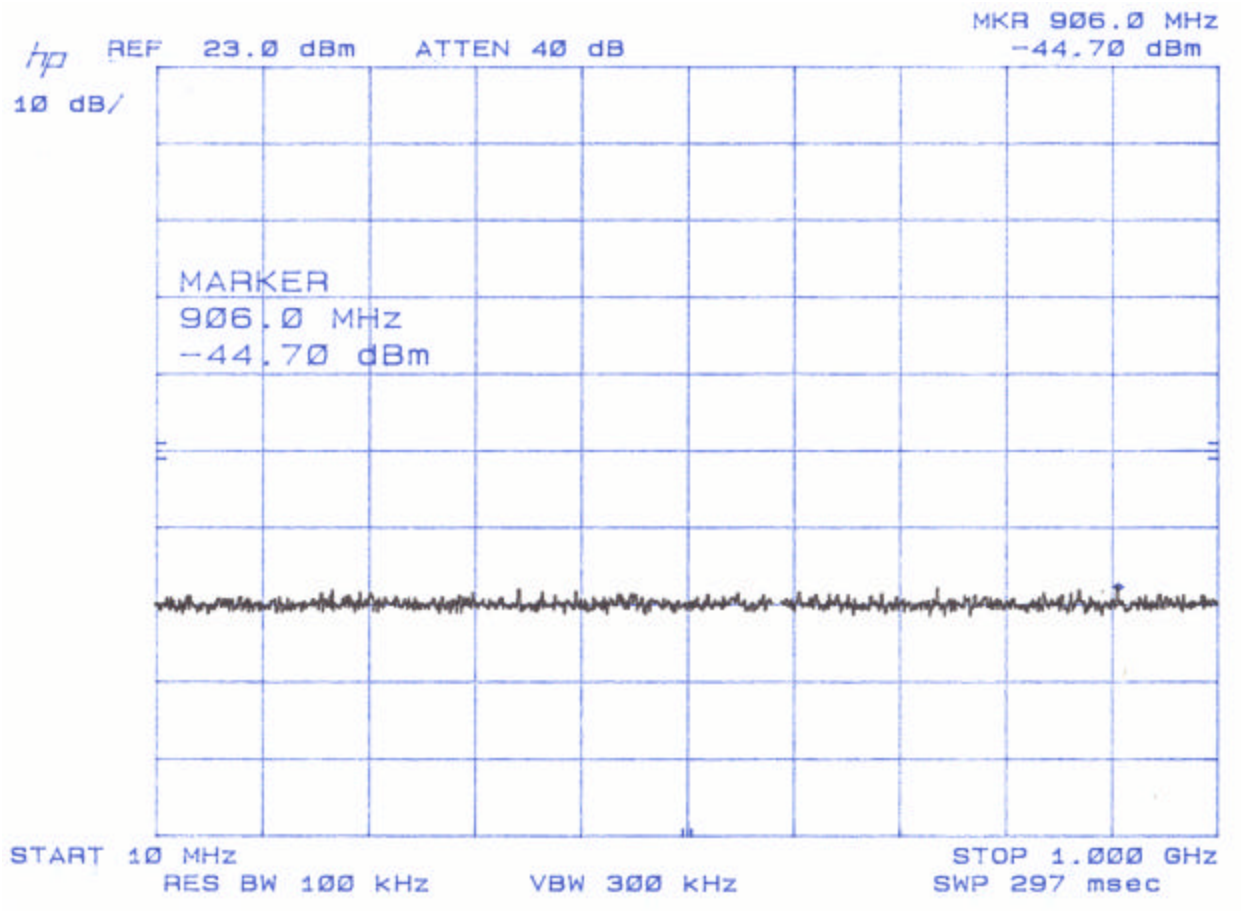
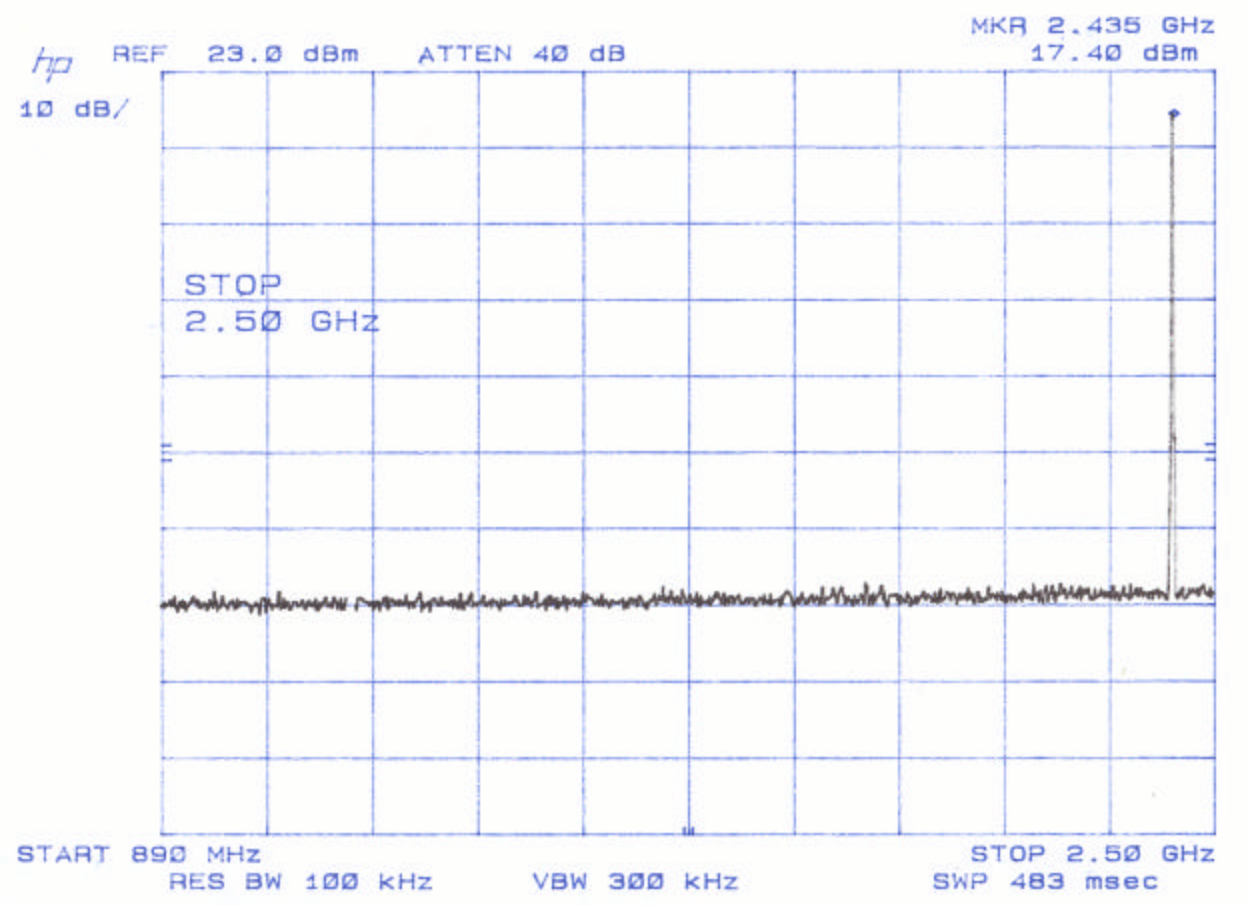


Figure 4e
Antenna Conducted Spurious Emissions 15.247(c) Mid



Note: Signal shown represents Fundamental Frequency.

Figure 4f
Antenna Conducted Spurious Emissions 15.247(c) Mid

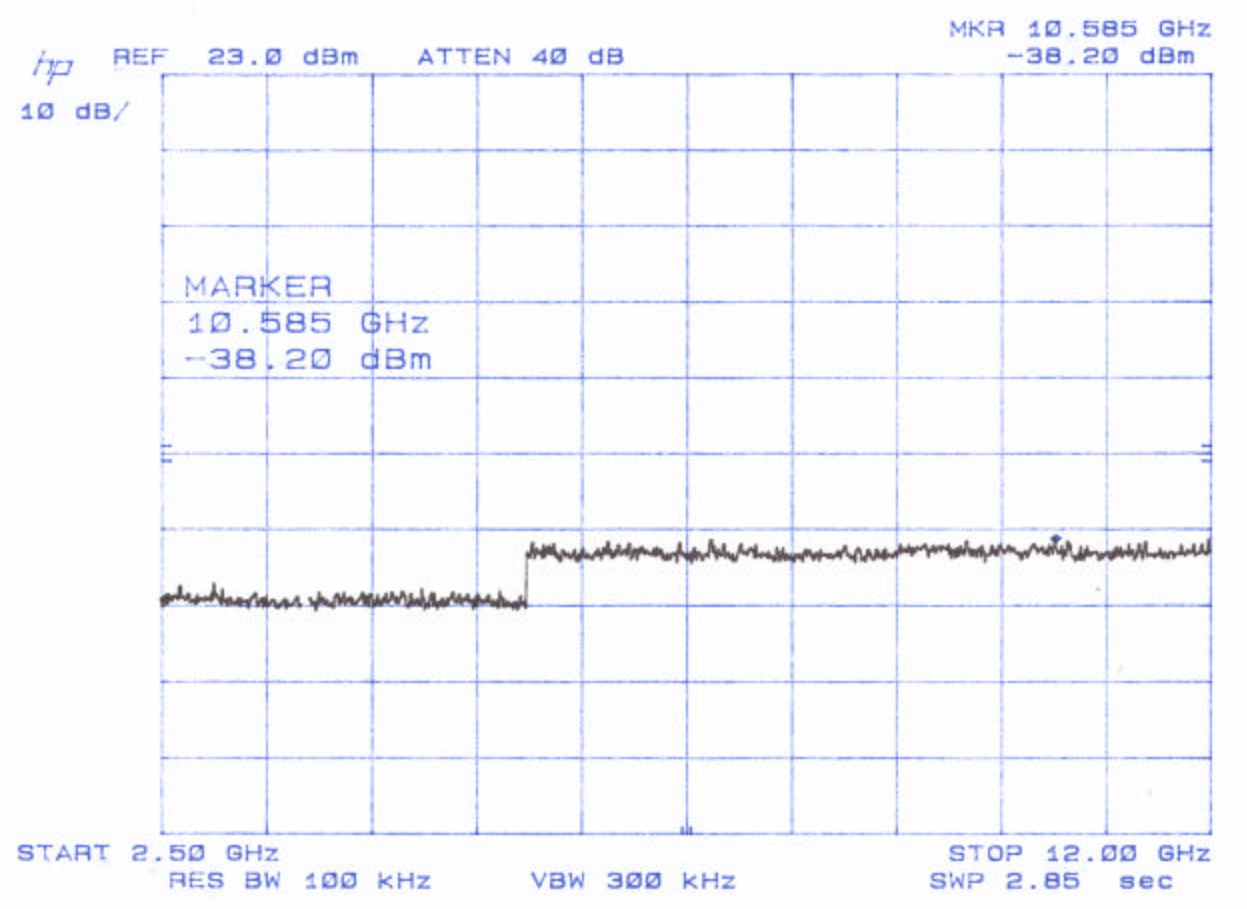


Figure 4g
Antenna Conducted Spurious Emissions 15.247(c) High

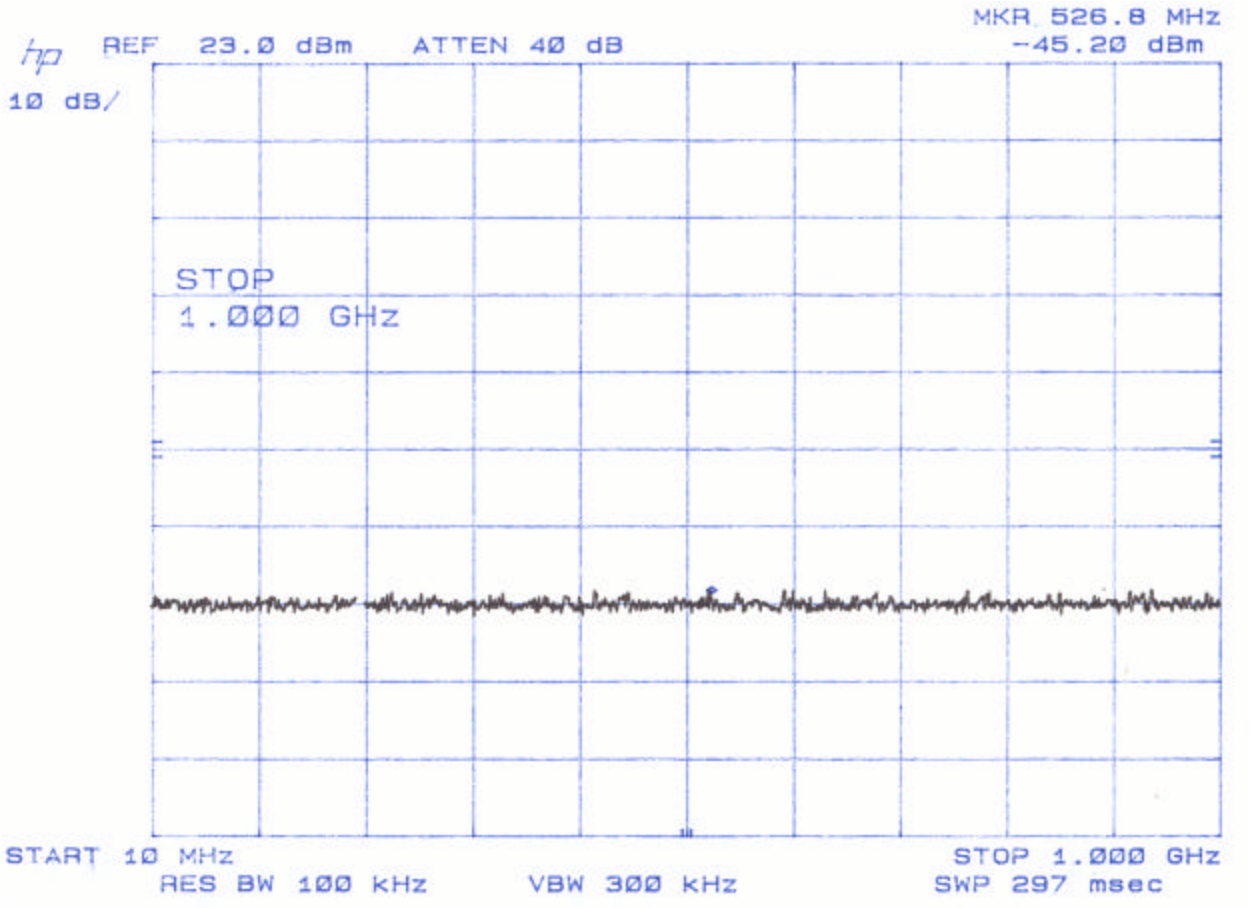
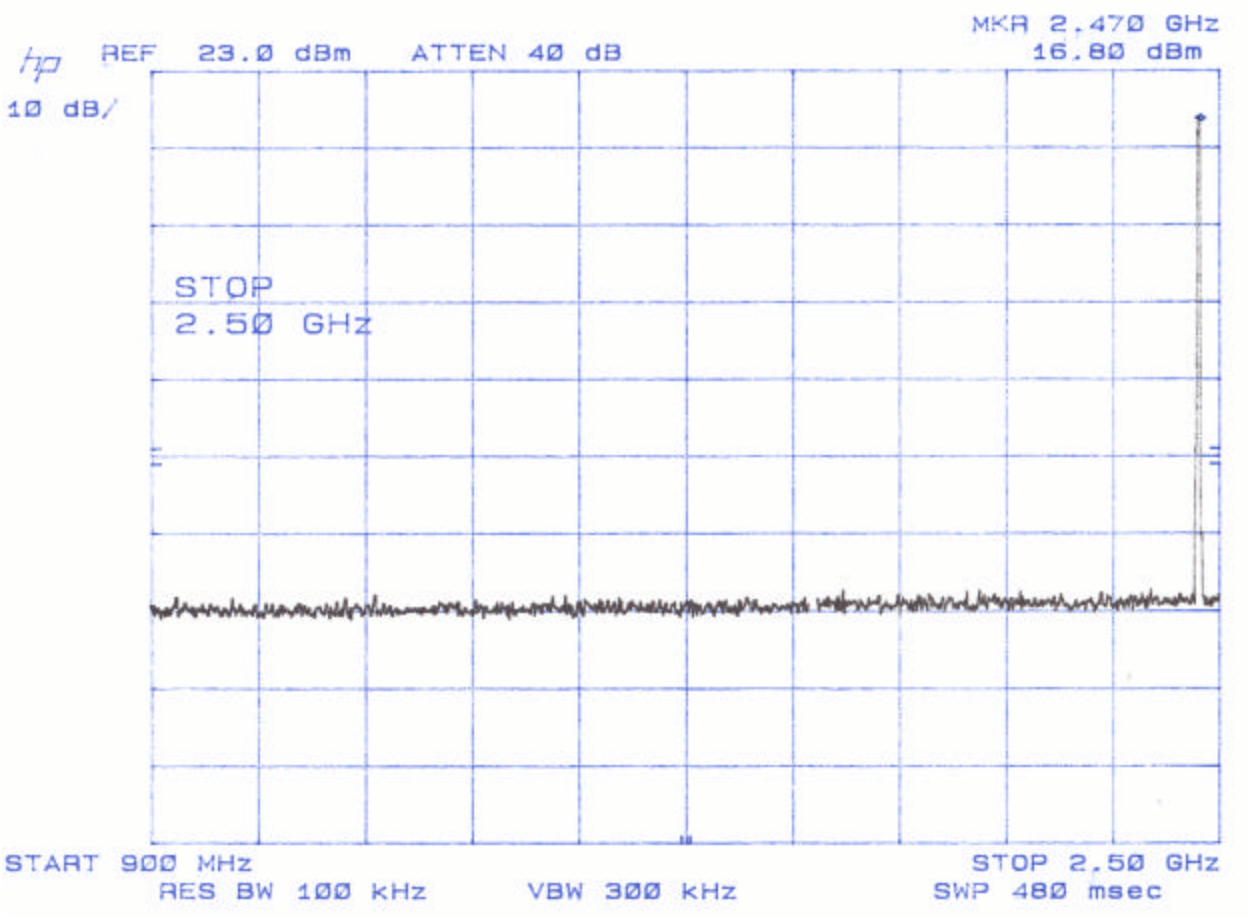


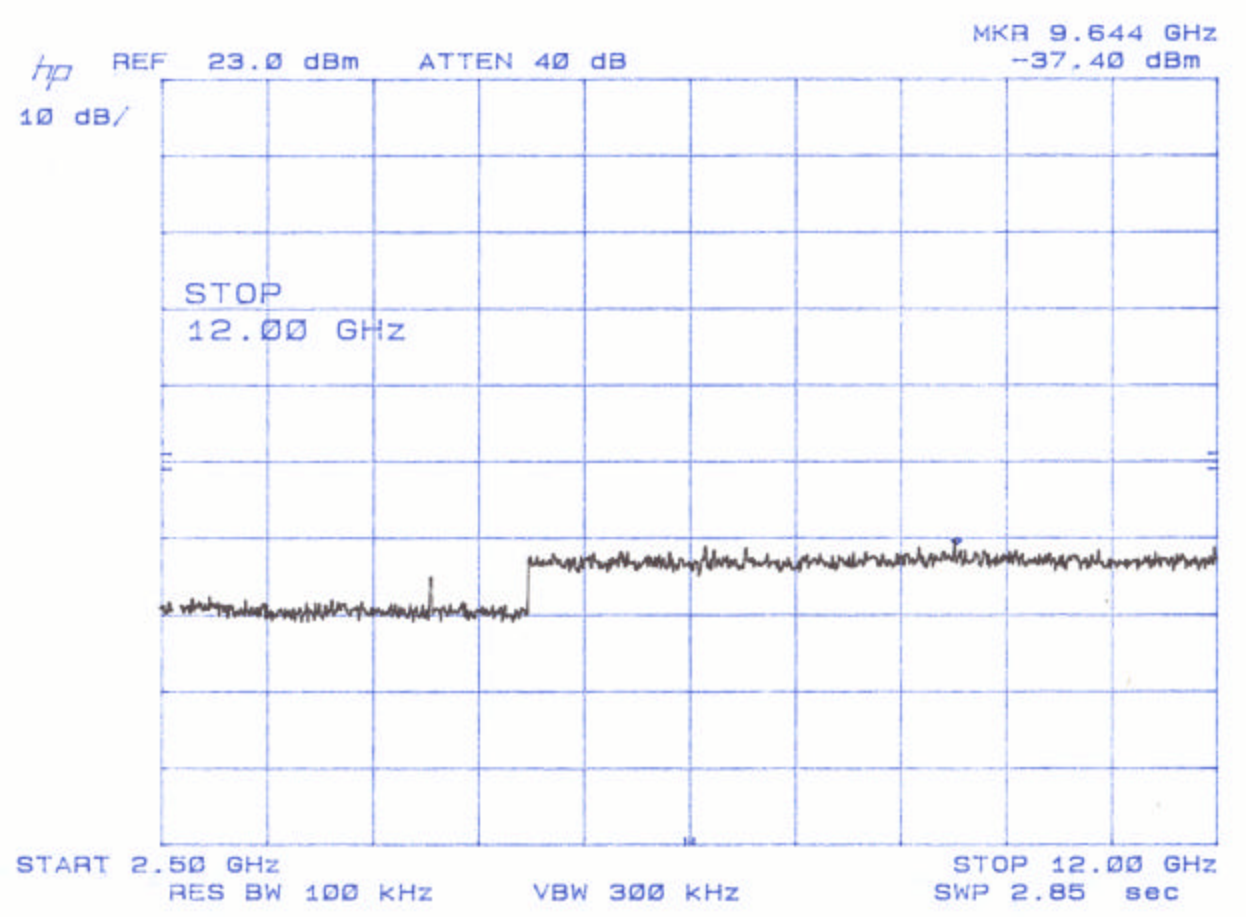
Figure 4h

Antenna Conducted Spurious Emissions 15.247(c) High



Note: Signal shown represents Fundamental Frequency.

Figure 4i
Antenna Conducted Spurious Emissions 15.247(c) High



2.8 Peak Radiated Spurious Emission in the Frequency Range 30 -25000 MHz (FCC Section 15.247(c))

The EUT was hop-stopped and when possible, placed into a continuous transmit mode of operation. A preliminary scan was performed on the EUT to determine frequencies that were caused by the transmitter portion of the product. Significant emissions that fell within restricted bands were then measured on an OAT's site. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. The results of peak radiated spurious emissions falling within restricted bands are given in Table 4a –4c and Figure 4a – Figure 4c.

Table 4a. PEAK RADIATED SPURIOUS EMISSIONS (Low)

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions - Low Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**Peak**	**Model:**	WIT2410NF		
Frequency (MHz)	**Test Data (dBm)**	**AF Table**	**Test Data (dBuV)**	**AF+CA-AMP (dB)**	**Results (uV/m)**	**Limits (uV/m)**	**Distance / Polarity**	**Margin (dB)**	**PK / QP**
2401.709	-26.4	1HN3mv	80.6	31.9	423317.0		3m./VERT		**PK**
4803.134	-64.7	1HN3mh	42.3	5.4	242.9	5000.0	3m./HORZ	**26.3**	**PK**
7204.948	-58.6	1HN3mv	48.4	9.6	789.0	42331.7	3m./VERT	**34.6**	**PK**
9605.94	-66.4	1HN3mv	40.6	13.1	480.9	42331.7	3m./VERT	**38.9**	**PK**
12008.5	-64.5	1HN3mv	42.5	17.3	973.7	5000.0	3m./VERT	**14.2**	**PK**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:
RESULTS (uV/m @ 3m) = Antilog ((-64.7 + 5.4 + 107)/20) = 242.9
CONVERSION FROM dBm TO dBuV = 107 dB

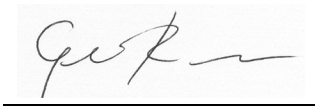
Tester Signature:  **Name: Gersop Riera**

Figure 4a - 1
Peak Radiated Spurious Emission 15.247(c) Fundamental Low

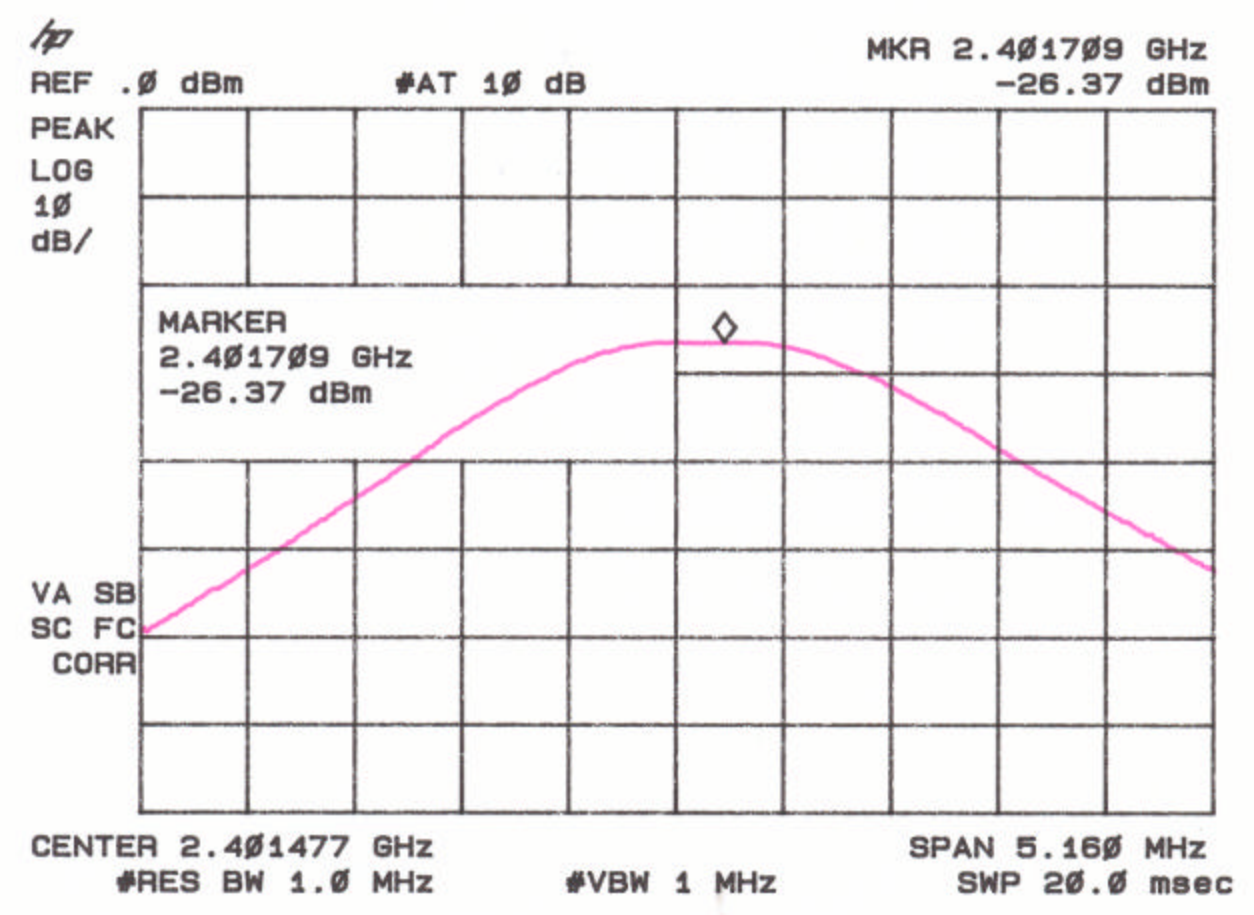


Table 4b. PEAK RADIATED SPURIOUS EMISSIONS (Mid)

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions- -Mid Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**B**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance / Polarity**	**Margin**	**PK / QP**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**		**(dB)**	
2435.877	-25.6	1HN3mv	81.5	32.0	468360.5		3m./VERT		**PK**
4871.664	-49.9	1HN3mv	57.1	5.4	1347.4	5000.0	3m./VERT	**11.4**	**PK**
7307.361	-48.4	1HN3mh	58.6	10.1	2742.1	5000.0	3m./HORZ	**5.2**	**PK**
9742.41	-70.1	1HN3mv	37.0	13.3	323.8	46836.1	3m./VERT	**43.2**	**PK**
12178.06	-64.2	1HN3mv	42.8	17.6	1045.0	5000.0	3m./VERT	**13.6**	**PK**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:
RESULTS (uV/m @ 3m) = Antilog ((-49.9 + 5.4 + 107)/20) = 1347.4
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Signature:  **Name: Gersop Riera**

Figure 4b - 1
Peak Radiated Spurious Emission 15.247(c) Fundamental Mid

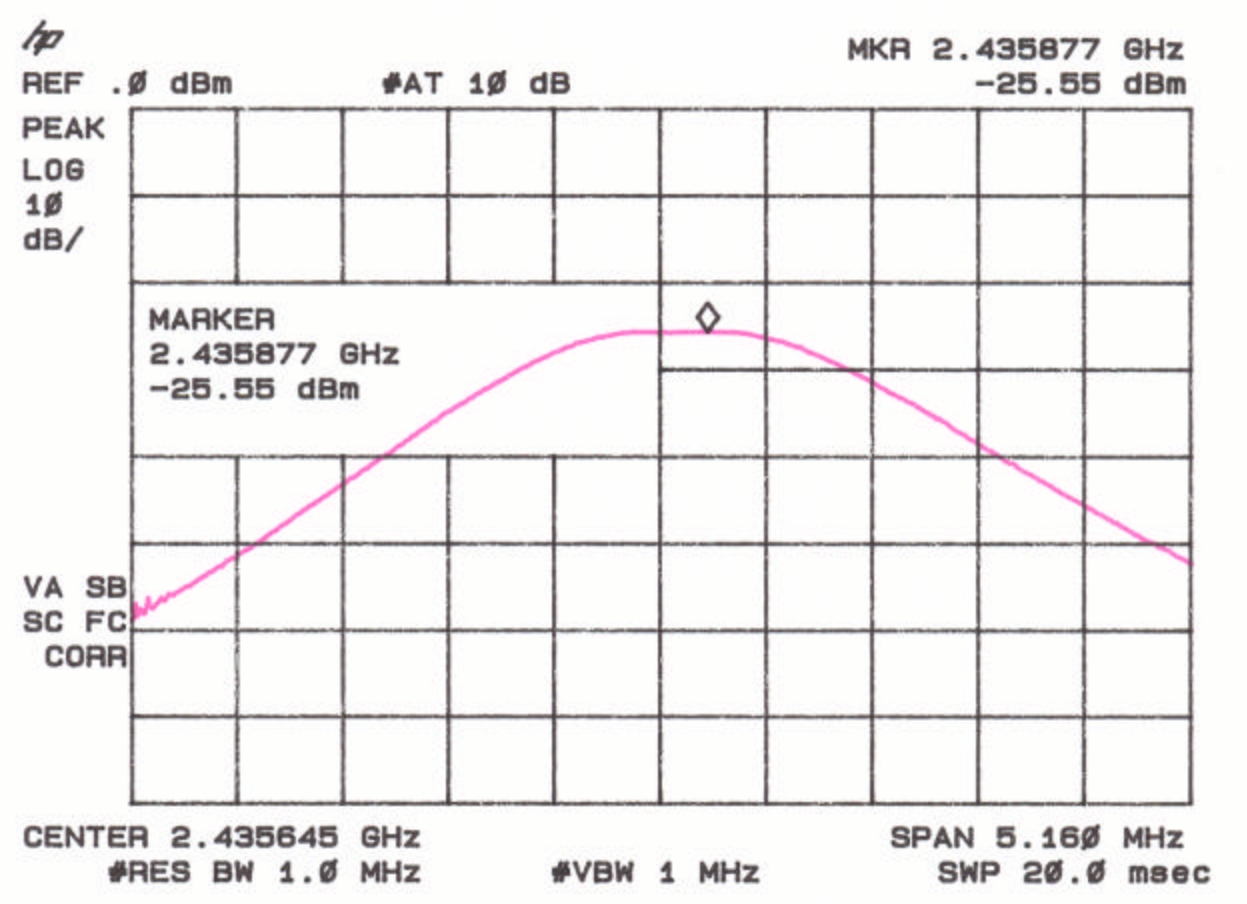


Table 4c. PEAK RADIATED SPURIOUS EMISSIONS (High)

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions- High Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**B**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance/**	**Margin**	**PK**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	**/ QP**
2470	-26.4	1HN3mv	80.6	32.0	426570.7		3m./VERT		**PK**
4939.755	-51.8	1HN3mv	55.2	5.7	1105.3	5000.0	3m./VERT	**13.1**	**PK**
7410.065	-55.6	1HN3mv	51.4	10.1	1186.2	5000.0	3m./VERT	**12.5**	**PK**
9880.31	-68.6	1HN3mv	38.4	13.5	393.2	42657.1	3m./VERT	**40.7**	**PK**
12349.94	-63.2	1HN3mv	43.8	17.9	1214.7	5000.0	3m./VERT	**12.3**	**PK**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:
RESULTS (uV/m @ 3m) = Antilog ((-51.8 + 5.7.+ 107)/20) = 1105.3
CONVERSION FROM dBm TO dBuV = 107 dB

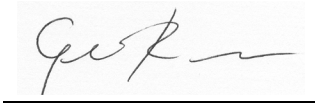
Tester Signature:  **Name: Gersop Riera**

Figure 4c – 1
Peak Radiated Spurious Emission 15.247(c) Fundamental High

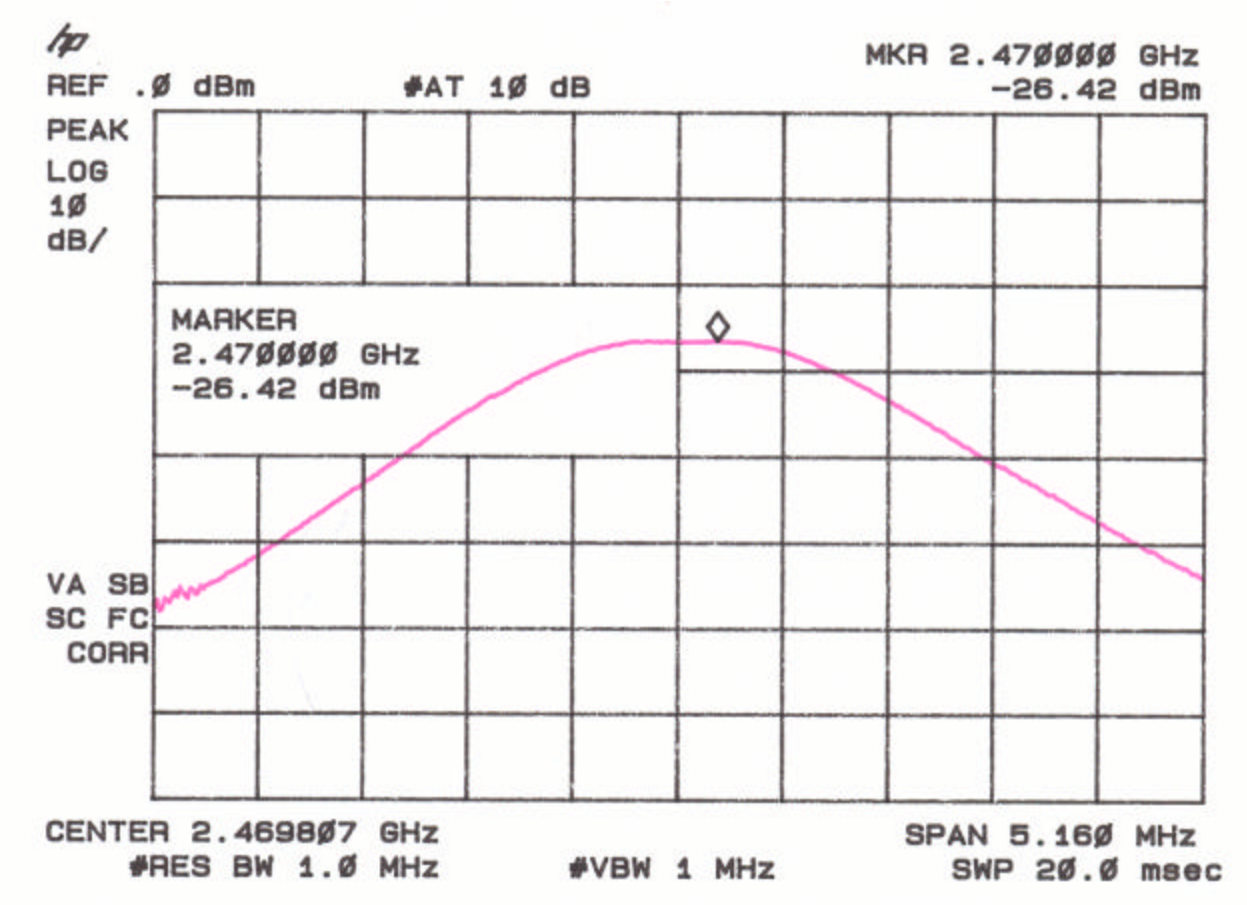
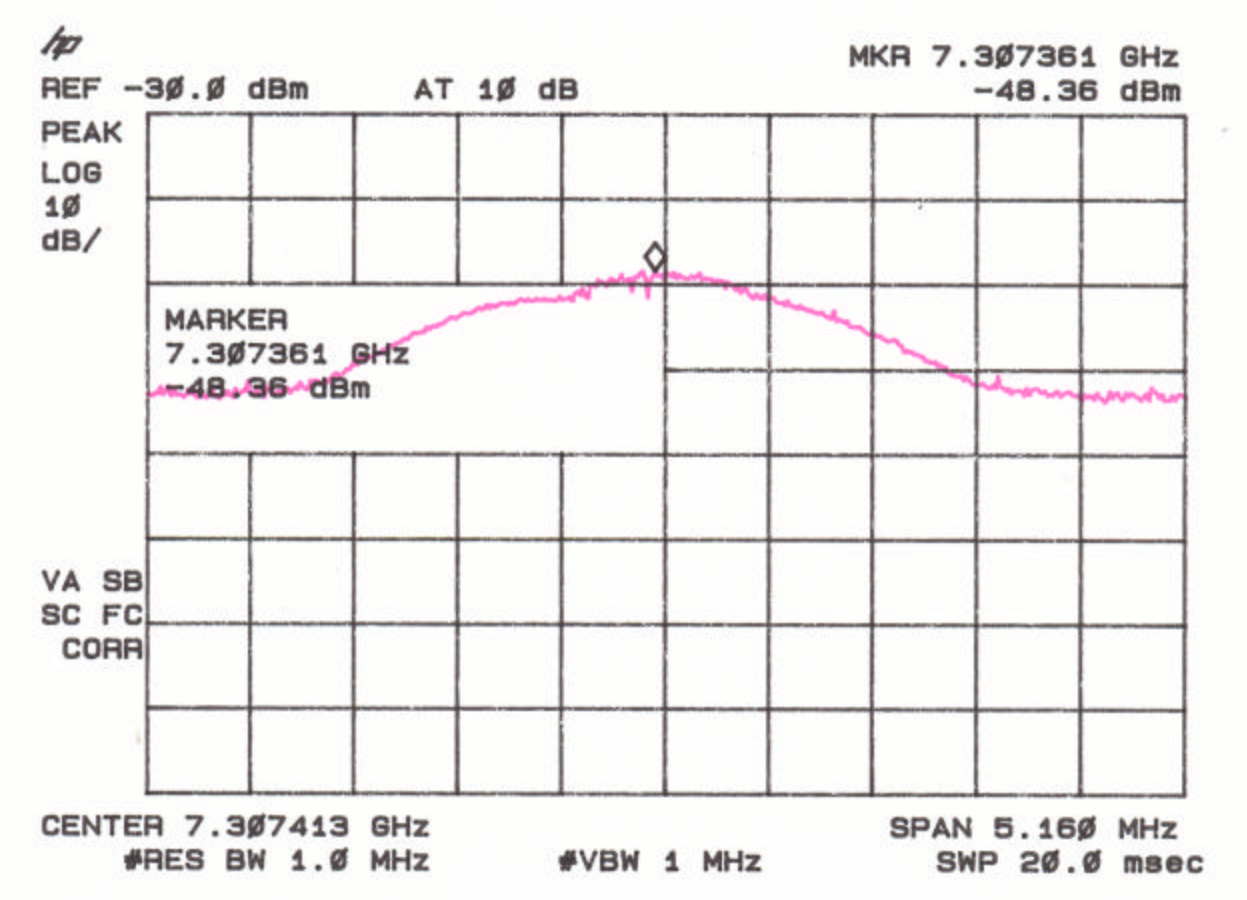


Figure 4d
Worst Case Peak Radiated Spurious Emission 15.247(c)



2.9 Average Spurious Emission in the Frequency Range 30 - 25000 MHz (FCC Section 15.247(c))

The results of average radiated spurious emissions falling within restricted bands are given in Tables 5a – 5u.

Calculation of Maximum Transmit Duty Cycle

As outlined in Appendix I, each remote WIT2410NF can transmit only once during a dwell time. The maximum length of the transmitted packet from each remote is set by the system design and cannot be adjusted by the user. That packet length is calculated as follows:

Preamble	9 bytes
Sync and CRC	10 bytes
Data Payload	13 bytes
Maximum packet length	32 bytes
Bit time (1/460 Kbps)	2.1739 us
Byte time (bit time * 8)	17.3912 us
Maximum packet time (byte time * 32)	556.5184 us

The maximum amount of time that our Remote transmitter can operate in any 10 millisecond period is 556.5 us. Therefore, our source-averaged transmit duty cycle becomes 0.0556 (556.5 us / 10 ms). Note that this duty cycle is not dependent on our use of Frequency Hopping. We are not averaging our power over the number of hops. The above calculation is strictly based on the maximum amount of time our transmitter can transmit in any 10 ms time period – regardless of the channel the radio happens to be on at the time.

The transmission duty cycle correction factor is then calculated as:

$$20 \log_{10} (0.556\text{ms}/10\text{ms}) = \mathbf{-25\ dB}$$

Table 5a. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions- Low Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**Average**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance/**	**Margin**	**PK**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	**/ QP**
2401.709	-51.3	1HN3mv	55.7	31.9	23997.5		3m./VERT		**AVG**
4803.134	-89.7	1HN3mh	17.3	5.4	13.7	500.0	3m./HORZ	**31.3**	**AVG**
7204.948	-83.6	1HN3mv	23.4	9.6	44.4	2399.8	3m./VERT	**34.7**	**AVG**
9605.94	-91.4	1HN3mv	15.6	13.1	27.0	2399.8	3m./VERT	**39.0**	**AVG**
12008.5	-89.5	1HN3mv	17.5	17.3	54.8	500.0	3m./VERT	**19.2**	**AVG**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:RESULTS (uV/m @ 3m) = Antilog ((-89.7 + 5.4 + 107)/20) = 13.7
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Signature:  **Name: Gersop Riera**

Table 5b. AVERAGE RADIATED SPURIOUS EMISSIONS Mid Channel

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions- Mid Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**Average**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance/**	**Margin**	**PK**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	**/ QP**
2435.877	-50.6	1HN3mv	56.5	32.0	26337.8		3m./VERT		**AVG**
4871.664	-74.9	1HN3mv	32.1	5.4	75.8	500.0	3m./VERT	**16.4**	**AVG**
7307.361	-73.4	1HN3mh	33.6	10.1	154.2	500.0	3m./HORZ	**10.2**	**AVG**
9742.41	-95.1	1HN3mv	12.0	13.3	18.2	2633.8	3m./VERT	**43.2**	**AVG**
12178.06	-89.2	1HN3mv	17.8	17.6	58.8	500.0	3m./VERT	**18.6**	**AVG**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:RESULTS (uV/m @ 3m) = Antilog ((-74.9 + 5.4 + 107)/20) = 75.8
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Signature:  **Name: Gersop Riera**

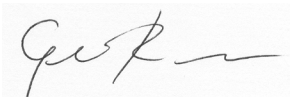
Table 5c. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel

Radiated Spurious Emissions									
Test By:	**Test:**	Spurious Emissions- High Channel				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**Average**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance/**	**Margin**	**PK**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	**/ QP**
2470	-51.4	1HN3mv	55.6	32.0	23987.8		3m./VERT		**AVG**
4939.755	-76.8	1HN3mv	30.2	5.7	62.2	500.0	3m./VERT	**18.1**	**AVG**
7410.065	-80.6	1HN3mv	26.4	10.1	66.7	500.0	3m./VERT	**17.5**	**AVG**
9880.31	-93.6	1HN3mv	13.4	13.5	22.1	2398.8	3m./VERT	**40.7**	**AVG**
12349.94	-88.2	1HN3mv	18.8	17.9	68.3	500.0	3m./VERT	**17.3**	**AVG**

Data corrected by 0.1 dB for loss of high pass filter, except to fundamental

** Conversion from 1 meter to 3 meters = -9.54 dB

SAMPLE CALCULATION:RESULTS (uV/m @ 3m) = Antilog ((-76.8 + 5.7 + 107)/20) = 62.2
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Signature:  **Name: Gersop Riera**

2.10 Band Edge Measurements

Band Edge measurements were made at a Low Channel and High Channel peak at highest EUT related emission outside the occupied bandwidth. A peak measurement was made of the fundamental, and the emission was measured using a peak setting. A Resolution Bandwidth of > 1% of the emission bandwidth was used. This procedure was repeated for the high channel.

The plots shown were verified using a Horn Antenna. No preamp was used.

The limits were derived as follows:

High Bandedge

5000 uV/m = -33.02 dBm

-33.02 dBm – 32.0 dB (antenna factor and cable loss) = -65.02 dBm limit

Fundamental measured at High Channel from Table 4c: -26.4 dBm

Delta from conducted measurement of band edge from fundamental peak to highest spur 10 MHz outside band edge: -58.9

-26.4 – 58.9 = -85.3

Low Bandedge

-33.02 dBm – 31.9 dB (antenna factor and cable loss) = -64.92 dBm limit

Fundamental measured at Low Channel from Table 4a: -26.4 dBm

Delta from conducted measurement of band edge from fundamental peak to highest spur 10 MHz outside band edge: -59.6

-26.4 – 59.6 = -86.0

Figure 6a. Band Edge Compliance
Antenna Conducted, High Channel

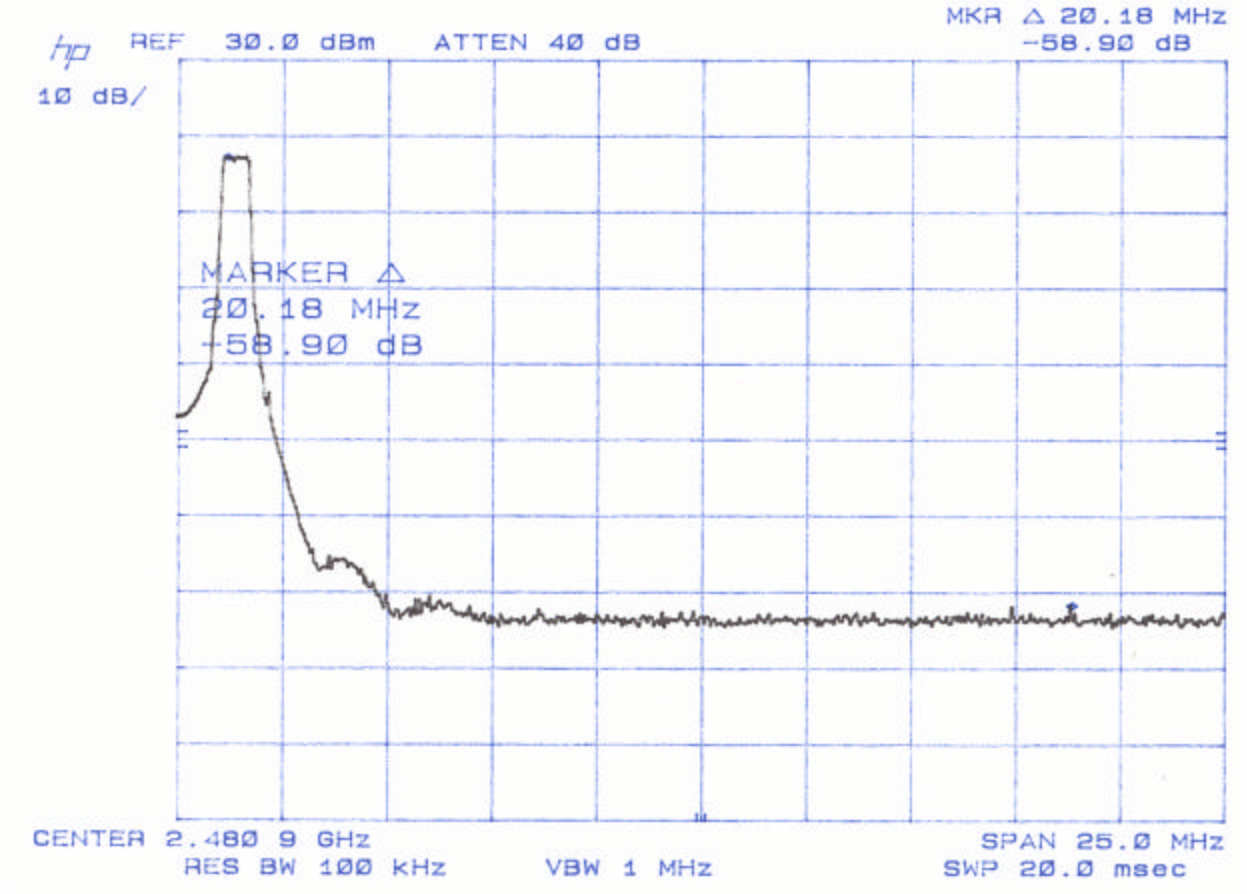
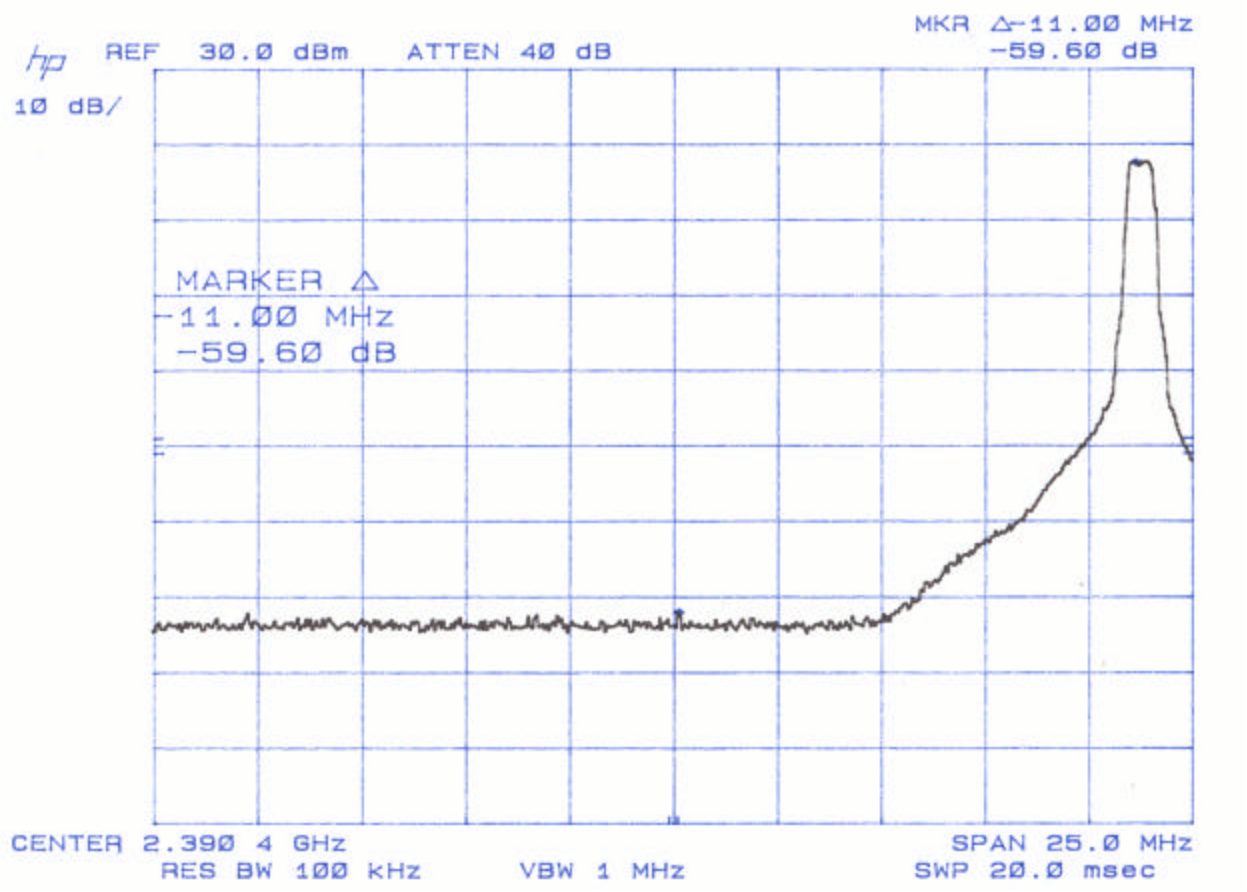


Figure 6b. Band Edge Compliance
Antenna Conducted, Low Channel



2.11 20 dB Bandwidth per FCC Section 15.247(a)(1)(ii)

The antenna port was connected to a spectrum analyzer that was set for a 50 Ω impedance with the RBW = approximately 1/100 of the manufacturers claimed RBW & VBW > RBW. The results of this test are given in Table 6 and Figure 7.

TABLE 6
20 dB Bandwidth

Test Date: May 2, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

Frequency (GHz)	20 dB Bandwidth (MHz)	FCC Limit (MHz)
2.40170	0.600	1.0
2.43580	0.612	1.0
2.46988	0.612	1.0

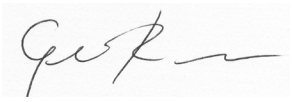
Tester Signature:  **Name:** **Gersop Riera**

Figure 7a.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) Low

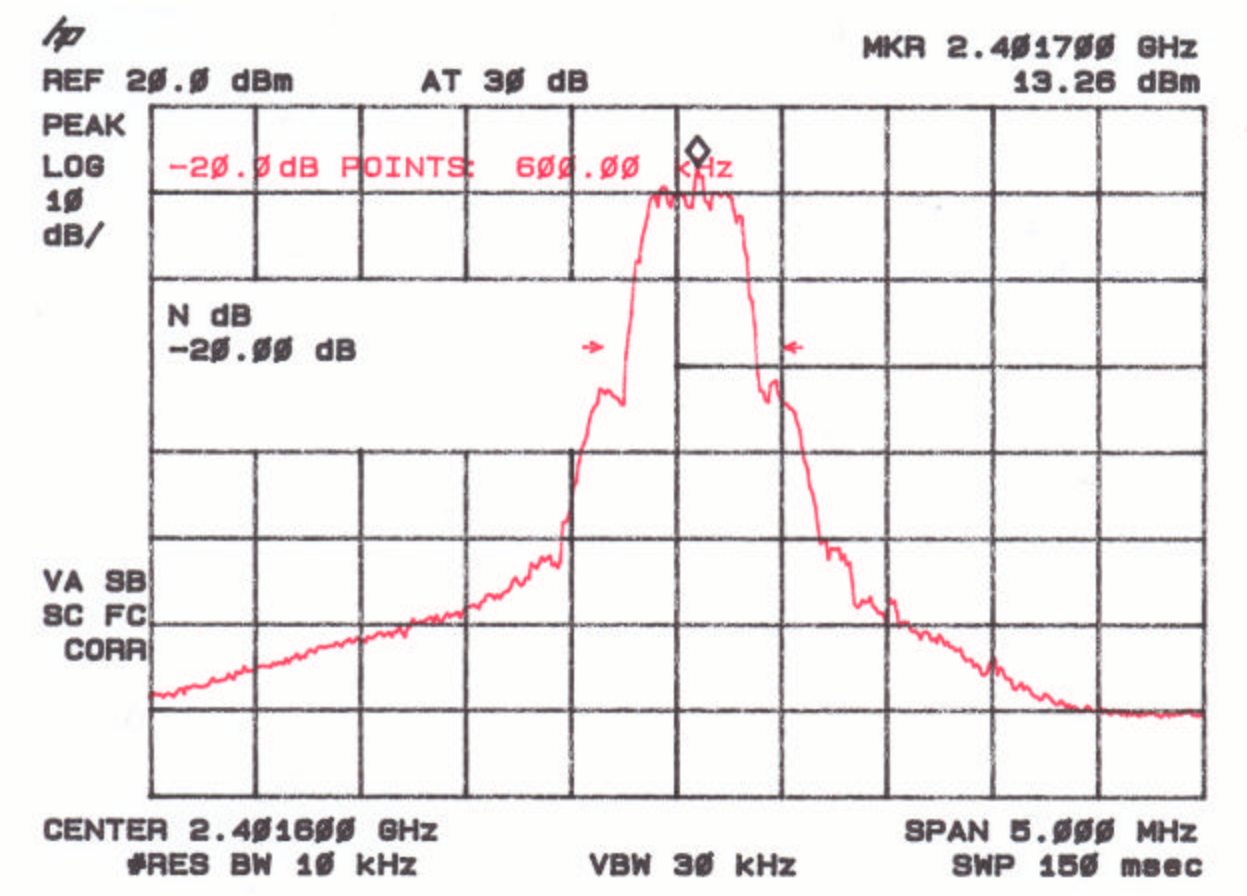


Figure 7b.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) Mid

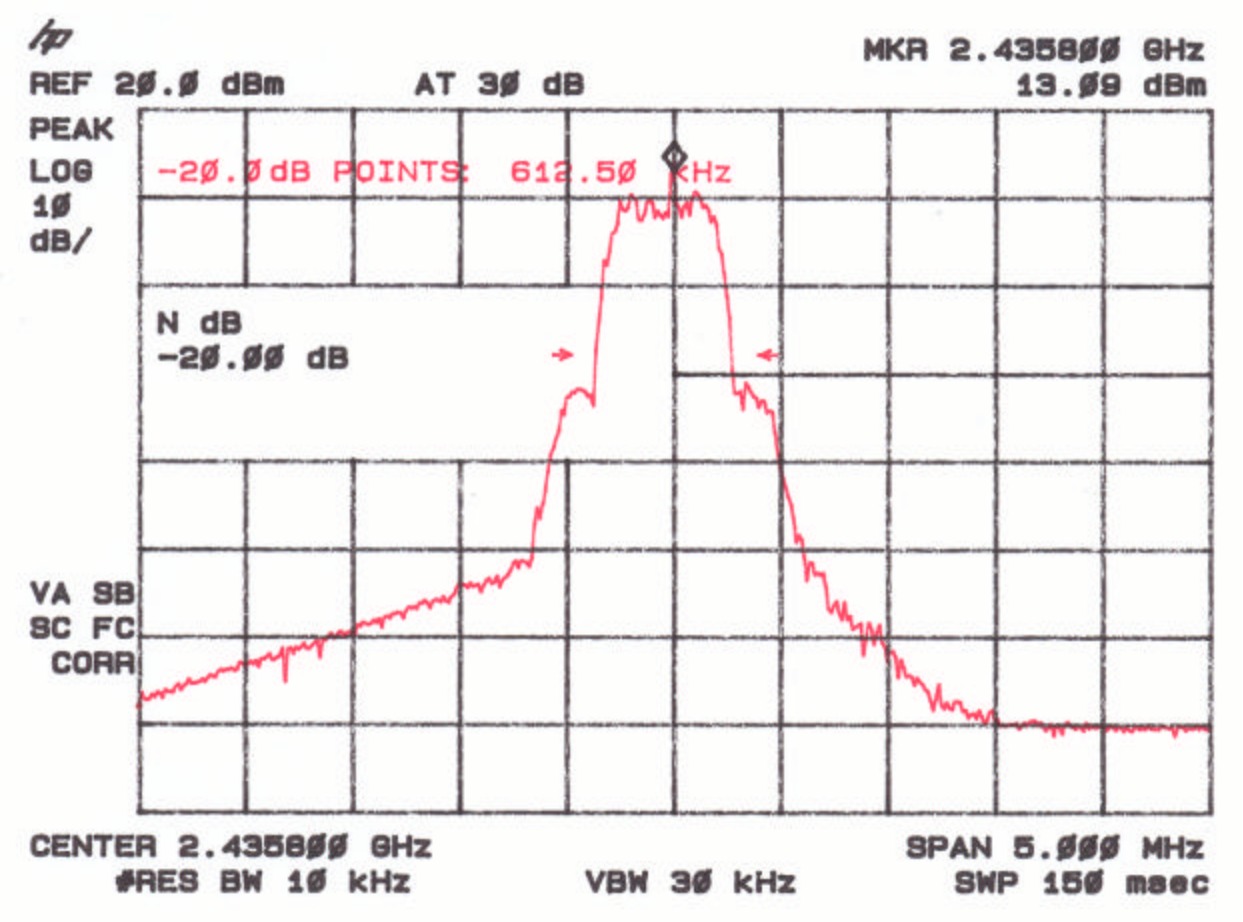
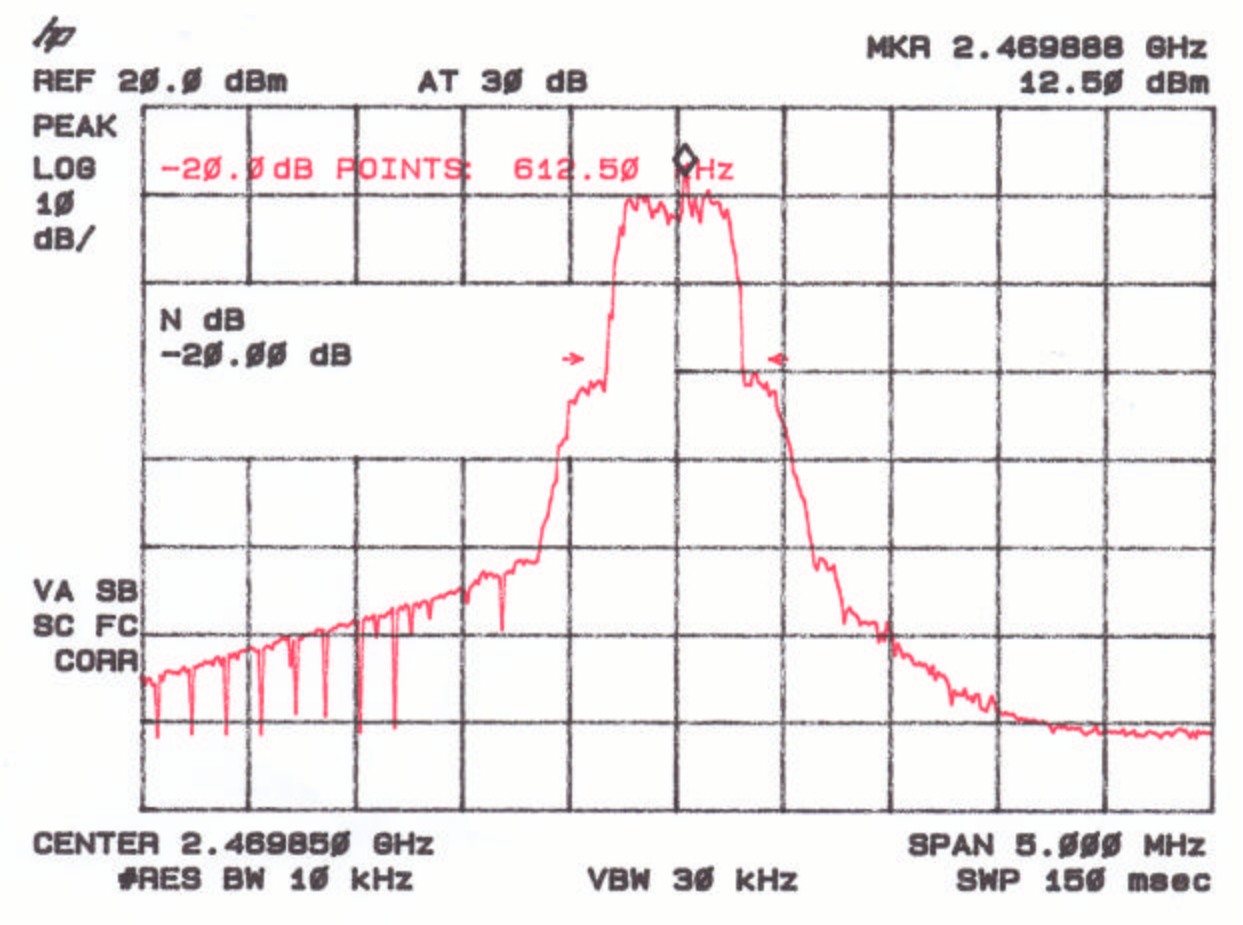


Figure 7c.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) High



2.12 Number of Hopping Channels FCC Section 15.247(a)(1)(ii)

The transmitter was placed into a typical frequency hopping mode of operation. The 2400 – 2483.5 MHz band was centered on the screen and the RBW and VBW chosen such that the individual channels could be discerned. The trace capture time was a minimum of 5 minutes.

The results of this test are given in Table 7 and Figures 8a through 8c.

TABLE 7
NUMBER OF HOPPING CHANNELS

Test Date: May 2, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

Number of Hopping Frequencies Measured	FCC Limit (Minimum Number of Channels)
75	75

Figure 8a
Number of Hopping Channels FCC Section 15.247(a)(1)(ii)

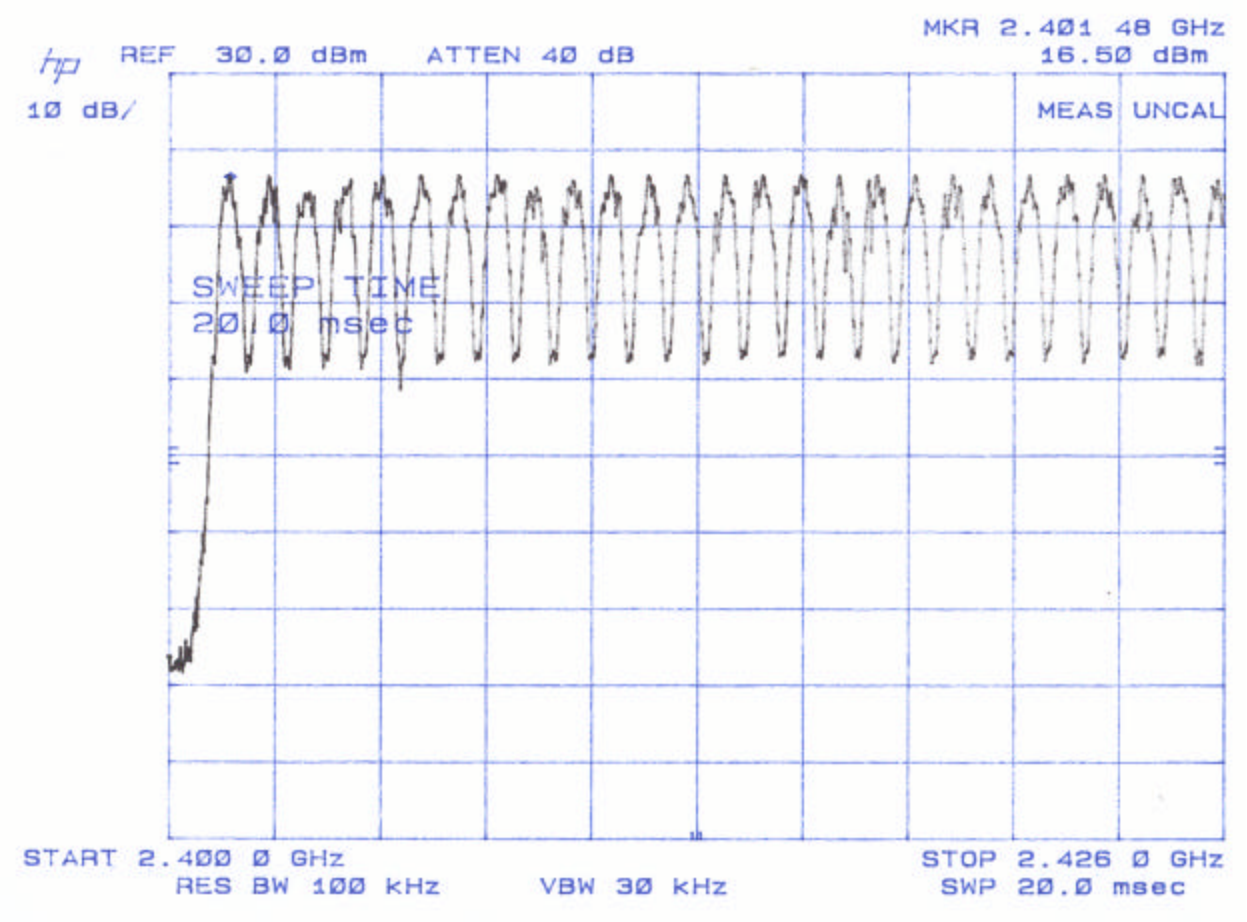


Figure 8b
Number of Hopping Channels FCC Section 15.247(a)(1)(ii)

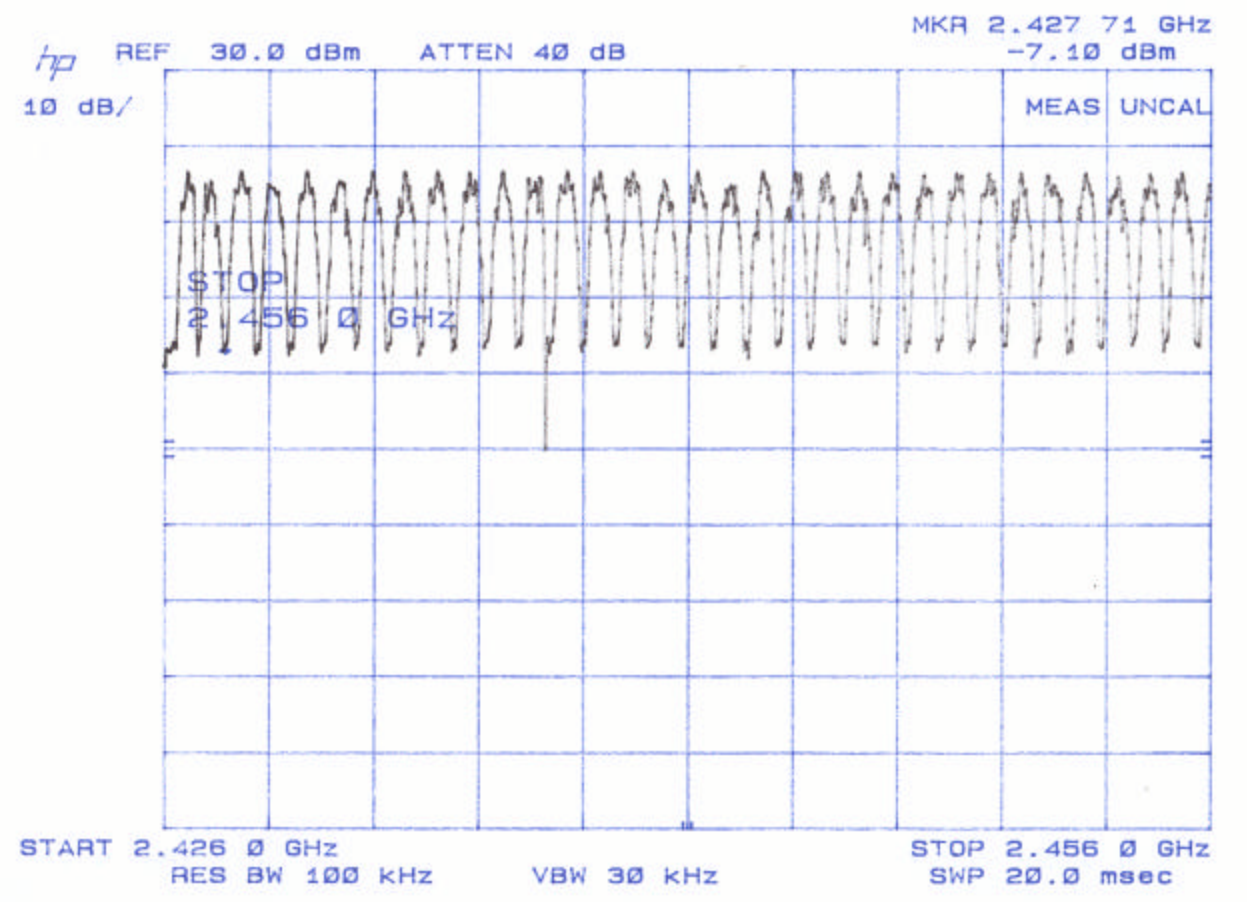
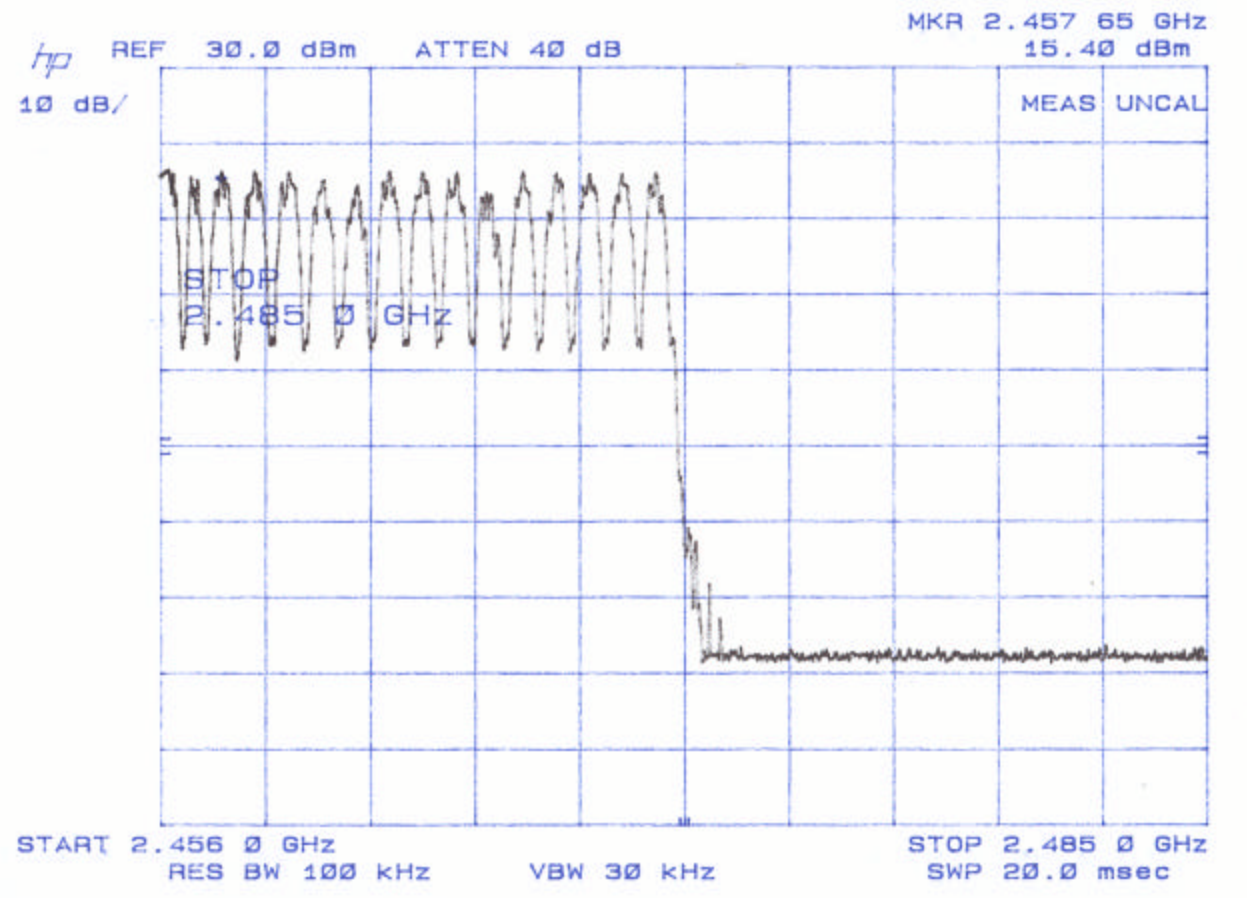


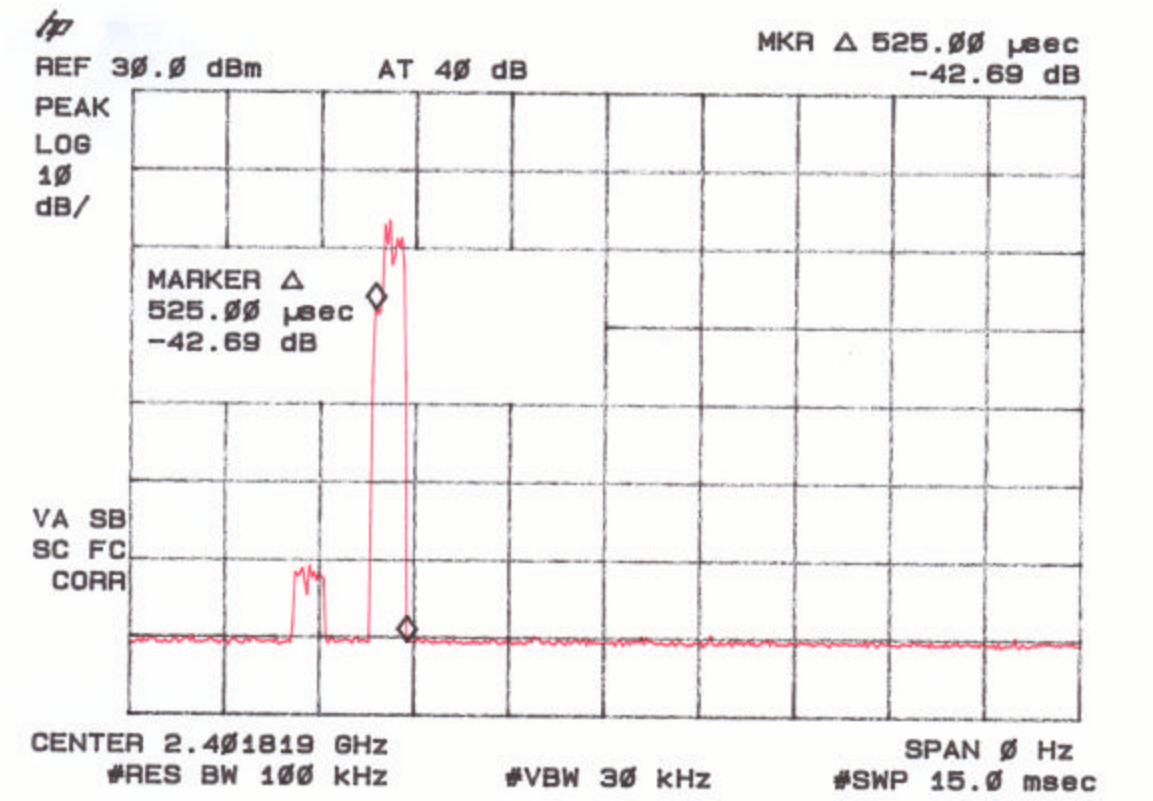
Figure 8c
Number of Hopping Channels FCC Section 15.247(a)(1)(ii)



2.13 Average Time of Occupancy per Channel FCC Section 15.247(a)(1)(ii)

Please refer to the Average Spurious Emissions portion of the report for details, and to Figure 9a-b.

Figure 9a


REF 30.0 dBm
AT 40 dB
MKR Δ 525.00 µsec
-42.69 dB
PEAK
LOG
10
dB/
MARKER Δ
525.00 µsec
-42.69 dB
VA SB
SC FC
CORR
CENTER 2.401819 GHz
#RES BW 100 kHz
#VBW 30 kHz
SPAN 0 Hz
#SWP 15.0 msec

2.14 Power Line Conducted Emissions for Transmitter FCC Section 15.207

The conducted voltage measurements have been carried out in accordance with FCC Section 15.207, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmit. The results are given in Tables 8a-8b.

TABLE 8a. CONDUCTED EMISSIONS DATA

CLASS B

Test Date: May 10, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

(Peak vs Average Limits)

.

Conducted Emissions								
Test By:	Test:	FCC Conducted Emissions Peak Vs. Average Phase			Client:	Cirronet		
GR	Project:	07-0183	Class:	B	Model:	WIT2410NF		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Margin	PK
(MHz)	(dBm)	Table	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	/ QP
0.21	-61.8	LISNP	45.2	-0.1	45.1	53.0	7.9	PK
0.3215	-68.8	LISNP	38.2	-0.1	38.1	47.0	8.9	PK
0.5325	-71.9	LISNP	35.1	0.0	35.0	46.0	11.0	PK
0.6425	-76.2	LISNP	30.8	0.0	30.8	46.0	15.2	PK
0.7488	-74.3	LISNP	32.7	0.0	32.7	46.0	13.3	PK
3.43	-75.3	LISNP	31.8	0.3	32.0	46.0	14.0	PK
9.525	-72.0	LISNP	35.0	0.4	35.4	50.0	14.6	PK
10.88	-72.2	LISNP	34.8	0.5	35.3	50.0	14.7	PK
23.4	-80.4	LISNP	26.7	0.5	27.2	50.0	22.8	PK

SAMPLE CALCULATIONS: 45.2 + -0.1 = 45.1 dBuV

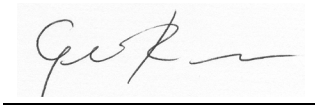
Tester Signature:  **Name: Gersop Riera**

TABLE 8b. CONDUCTED EMISSIONS DATA

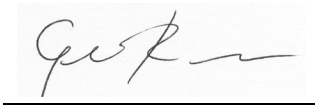
CLASS B

Test Date: May 10, 2007
UST Project: 07-0183
Customer: Cirronet
Model: WIT2410NF

(PK vs Average Limits)

Conducted Emissions								
Test By:	**Test:**	FCC Conducted Emissions Peak Vs. Average Neutral			**Client:**	Cirronet		
GR	**Project:**	07-0183	**Class:**	**B**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Margin**	**PK**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(dBuV)**	**(dBuV)**	**(dB)**	**/ QP**
0.21	-61.1	LISNN	45.9	-0.1	45.8	53.0	**7.2**	**PK**
0.3206	-67.9	LISNN	39.1	-0.1	39.0	47.0	**8.0**	**PK**
0.5338	-78.4	LISNN	28.6	0.0	28.6	46.0	**17.4**	**PK**
0.6413	-72.4	LISNN	34.7	0.0	34.7	46.0	**11.3**	**PK**
0.7488	-77.2	LISNN	29.8	0.1	29.9	46.0	**16.1**	**PK**
3.64	-73.7	LISNN	33.3	0.3	33.6	46.0	**12.4**	**PK**
9.412	-73.4	LISNN	33.6	0.4	34.0	50.0	**16.0**	**PK**
10.23	-74.3	LISNN	32.7	0.5	33.1	50.0	**16.9**	**PK**
20.25	-82.2	LISNN	24.8	0.6	25.4	50.0	**24.6**	**PK**

SAMPLE CALCULATIONS: 36.0 + -0.1 = 35.9 dBuV

Tester Signature:  **Name: Gersop Riera**

2.15 Radiated Emissions for Digital Device & Receiver (47 CFR 15.109a)

Radiated emissions were evaluated from 30 to 14500 MHz while the EUT was placed into a Receive mode of operation. Measurements were made with the analyzer's bandwidth set to 120 kHz measurements made less than 1 GHz and 1 MHz for measurements made greater than or equal to 1 GHz. The results are shown in Table 9. No emissions were seen above 1 GHz within 20dB of the FCC limits for Peak and Average emissions.

TABLE 9. RADIATED EMISSIONS DATA
(Digital Device & Receiver)

CLASS B

Test Date: May 16, 2007
UST Project: 07-0183
Customer: Cirronet
Product: WIT2410NF

Radiated Emissions									
Test By:	**Test:**	FCC Part 15				**Client:**	Cirronet		
GR	**Project:**	07-0183		**Class:**	**B**	**Model:**	WIT2410NF		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance**	**Margin**	**PK = n**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	**/ QP**
218.00	-98.0	2LP3mh	9.0	14.4	14.7	200.0	3m./HORZ	**22.7**	**PK**
225	-98.0	2LP3mh	9.0	14.4	14.8	200.0	3m./HORZ	**22.6**	**PK**

Tester Signature:  **Name:** **Gersop Riera**

.2.16 Power Line Conducted Emissions for Digital Device and Receiver
FCC Section 15.107

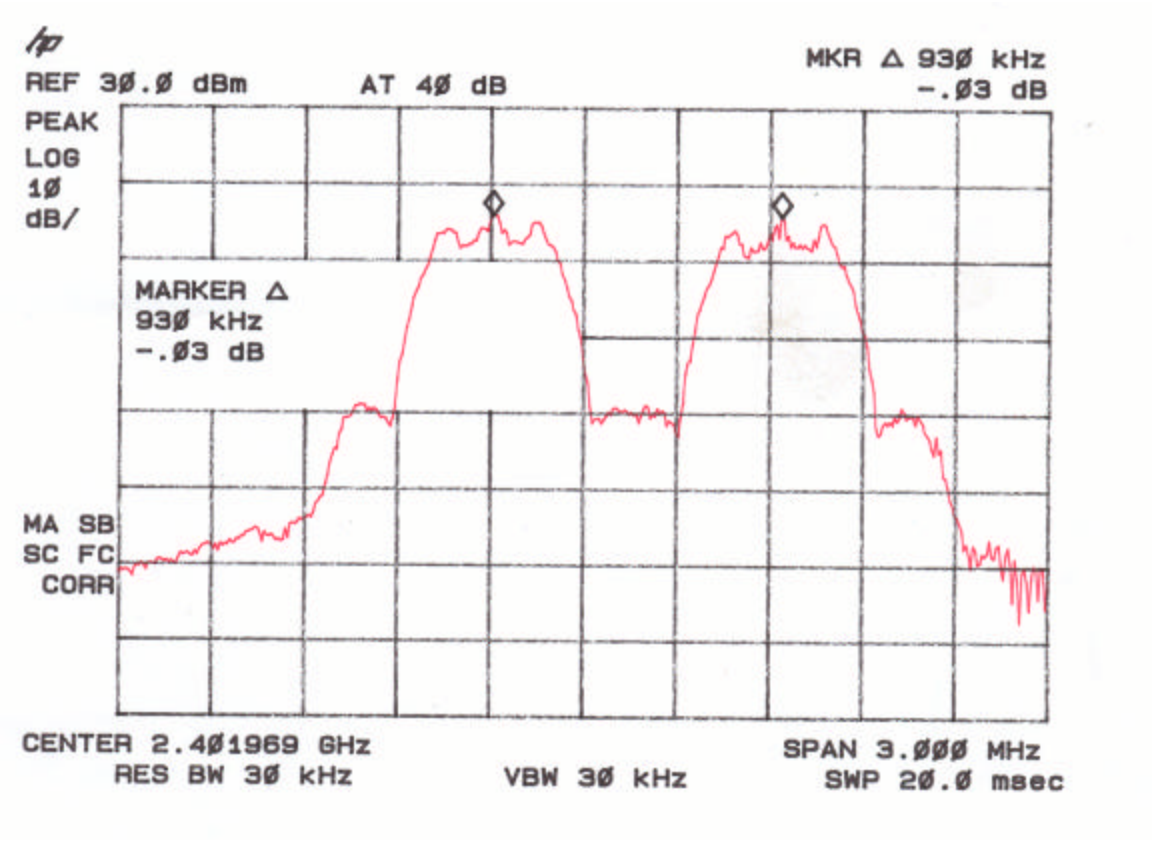
The conducted voltage measurements have been carried out in accordance with FCC Section 15.107, with a spectrum analyzer connected to a LISN and the EUT placed into an idle condition or a continuous mode of receive. Similar results were seen as compared to the EUT in a transmit mode of operation. **Therefore, please refer to the results as shown in Table 8.**

2.17 Channel Separation (15.247(a)(1))

The transmitter was placed into a typical frequency hopping mode of operation. The 2400 -2403 MHz band was centered on the screen and the RBW and VBW chosen such that the individual channels could be discerned. The trace capture time was a minimum of 20msec. The EUT was instructed to transmit at channel 1 and 2, respectively, with the Spectrum Analyzer on max-hold setting.

Results are shown in Figure 10a.

Figure 10a


REF 30.0 dBm
AT 40 dB
MKR Δ 930 kHz
-.03 dB
PEAK
LOG
10
dB/
MARKER Δ
930 kHz
-.03 dB
MA SB
SC FC
CORR
CENTER 2.401969 GHz
RES BW 30 kHz
VBW 30 kHz
SPAN 3.000 MHz
SWP 20.0 msec