FCC Certification Test Report

FCC Certification Test Report
For
ZCOMAX
FCC ID: RWQ-325H4

Prepared for:

ZCOMAX
400 Morris Avenue
Denville, NJ 07834

Prepared By:

Washington Laboratories, Ltd.
7560 Lindbergh Drive
Gaithersburg, Maryland 20879

FCC Certification Test Report
for the
ZCOMAX
XI-325H (1mW to 370mW Power)
FCC ID: RWQ-325H4

WLL JOB# 8165

Prepared by: Christina M. Karlhoff
Technical Liaison

Reviewed by: Gregory M. Snyder
Chief EMC Engineer

Abstract

This report has been prepared on behalf of ZCOMAX to support the attached Application for Equipment Authorization. The test report and application are submitted for a Direct Sequence Spread Spectrum Transmitter under Part 15.247 of the FCC Rules and Regulations. This Certification Test Report documents the test configuration and test results for a ZCOMAX XI-325H 11mbps Wireless LAN Card.

ZCOMAX wishes to have this device approved as a module. Attestation letter and information are found in the related correspondence exhibits to this application.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The ZCOMAX XI-325H 11mbps Wireless LAN Card complies with the limits for a Direct Sequence Spread Spectrum Transmitter device under FCC Part 15.247.

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1 Introduction

1.1 Compliance Statement

The ZCOMAX XI-325H 11mbps Wireless LAN Card complies with the limits for a Direct Sequence Spread Spectrum Transmitter device under FCC Part 15.247.

The product is a mobile device designed for wireless access application and use.

1.2 Test Scope

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance with FCC Public Notice DA 00-705 and the 2003 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer: ZCOMAX
400 Morris Avenue
Denville, NJ 07834

Purchase Order Number: SL051904MS01

Quotation Number: 61597

1.4 Test Dates

Testing was performed as follows:

Description	Test Notes/ Special Requirements	Test Date
Spurious Radiated Emissions	15.247 Restricted Bands	4/15/05
Spurious Conducted Emissions at Antenna Terminals	15.247	5/26/05
RF Power Level/Field Strength of Carrier	15.247	3/1/05
Bandwidth Plots	15.247	5/26/05
Power Spectral Density	15.247	5/26/05
RF Power	15.247	5/27/05

1.5 Test and Support Personnel

Washington Laboratories, LTD Steve Koster; James Ritter; Greg Snyder

Client Representative Mitch Szanyi

2 Equipment Under Test

2.1 EUT Identification & Description

The ZCOMAX Model XI-325H is an 11mbps wireless LAN Card.

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	ZCOMAX
FCC ID:	RWQ-325H4
EUT Name:	11mbps Wireless LAN Card
Model:	XI-325H
FCC Rule Parts:	§15.247
Industry Canada:	RSS210
Frequency Range:	2412M – 2462MHz
Maximum Output Power:	361.5 mW (25.6dBm)
Modulation:	DQPSK, DBPSK or CCK
Occupied Bandwidth:	11.1MHz
Keying:	Automatic, Manual
Type of Information:	Data
Power Output Level	1mW to 362mW
Antenna Connector	MMCX
Antenna Type	0dBd (2.2dBi) Whip
Interface Cables:	PCMCIA Slot
Power Source & Voltage:	120VAC

EUT Components

Nomenclature	Serial Number
Lan Card 2.4 GHZ X325H	325H48NU01733
10cm Whip Antenna	None Listed

2.2 EUT Peripherals

Description	WLL Peripherals # Manufacturer	Model Number	Serial Number
Personal computer	(WL asset 325) HP	Pavilion	TW02106834

2.3 Test Configuration

The 325H was configured with an extender card attached to a laptop PC and a 0dBi whip antenna.

2.4 Testing Algorithm

The 325H4 was programmed for continuous transmission at the highest power level of 362mW. The unit was set to transmit on the lowest channel, highest channel, and a mid channel. In order to comply with the band edge emissions the unit is factory set so that the Channel 1 and Channel 11 output powers are reduced. For this reason, additional testing was performed to show the output power at the highest setting for channels 2, 9 and 10. Additionally, the spurious conducted emissions and output power were measured at the lowest power setting of 1mW.

Worst-case emission levels are provided in the test results data.

3 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

3.1 Measurements

3.1.1 References

FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ±2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5\ (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.

4 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

Table 2: Test Equipment List

Equipment	WLL Asset #	Calibration Due
Sunol JB1 Biconilog Antenna	0382	1/06/06
ARA DRG118/A Microwave Horn Antenna	0425	6/30/05
EMCO 6502 Active Loop Antenna	0031	1/10/06
Hewlett-Packard 8568B Spectrum Analyzer	0072	7/01/05
Hewlett-Packard 85650A Quasi-Peak Adapter	0069	7/08/05
Hewlett-Packard 85685A RF Preselector	0070	7/06/05
Hewlett-Packard 8593A Spectrum Analyzer	0074	8/17/05
Hewlett-Packard 8449B Microwave Preamp	0312	9/29/05
Solar Electronics 8028-50-TS-24-BNC LISN	0125	10/01/05
Solar Electronics 8028-50-TS-24-BNC LISN	0126	10/01/05
Tektronics TDS 5104 Oscilloscope	00461	7/29/05
AR PM2002 Power Meter	00310	2/08/06
Wiltron 75N50 Diode Detector	00475	8/25/05
Rhoade & Schwarz Signal Generator	00478	11/23/05

5 Test Results

5.1 RF Power Output: (FCC Part §2.1046)

The output power was measured a low, high and middle channel.

The power measurement was made using the substitution method. The output of the EUT was connected to a diode detector, which was connected to the input of an oscilloscope. When the radio was turned on, the deflection of the oscilloscope was noted. Then, a signal generator, set to the same frequency as the radio, was connected to the input of the diode and the signal adjusted to get the same deflection as caused by the radio. The output of the signal generator was then connected to the input of a power meter and the resultant power measured. This represents the conducted output power from the radio, which is summarized in the following table.

Table 3. RF Power Output

Channel and/or Frequency	Measured Level (dBm)	Measured Level (mWatts)	Rated (mWatts)	Limit (mWatts)
HIGH POWER				
Channel 1: 2412 MHz	24.26	266.7	370	1000
Channel 5: 2432 MHz	25.58	361.5	370	1000
Channel 11: 2462 MHz	24.01	251.8	370	1000
Channel 2: 2417 MHz	25.44	350.0	370	1000
Channel 10: 2457 MHz	24.59	287.7	370	1000
Channel 9 :2452 MHz	25.52	356.5	370	1000
LOW POWER				
Channel 1: 2412 MHz	-0.65	0.861	1	1000
Channel 5: 2432 MHz	-0.8	0.832	1	1000
Channel 11: 2462 MHz	-0.2	0.955	1	1000

Notes: Used the Diode detector method.

5.2 Power Spectral Density

For DSSS devices, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer. The analyzer offset was adjusted to compensate for the attenuator and other losses in the system.

Following are plots of the Power Spectral Density emissions for the Low, Middle and High channels.

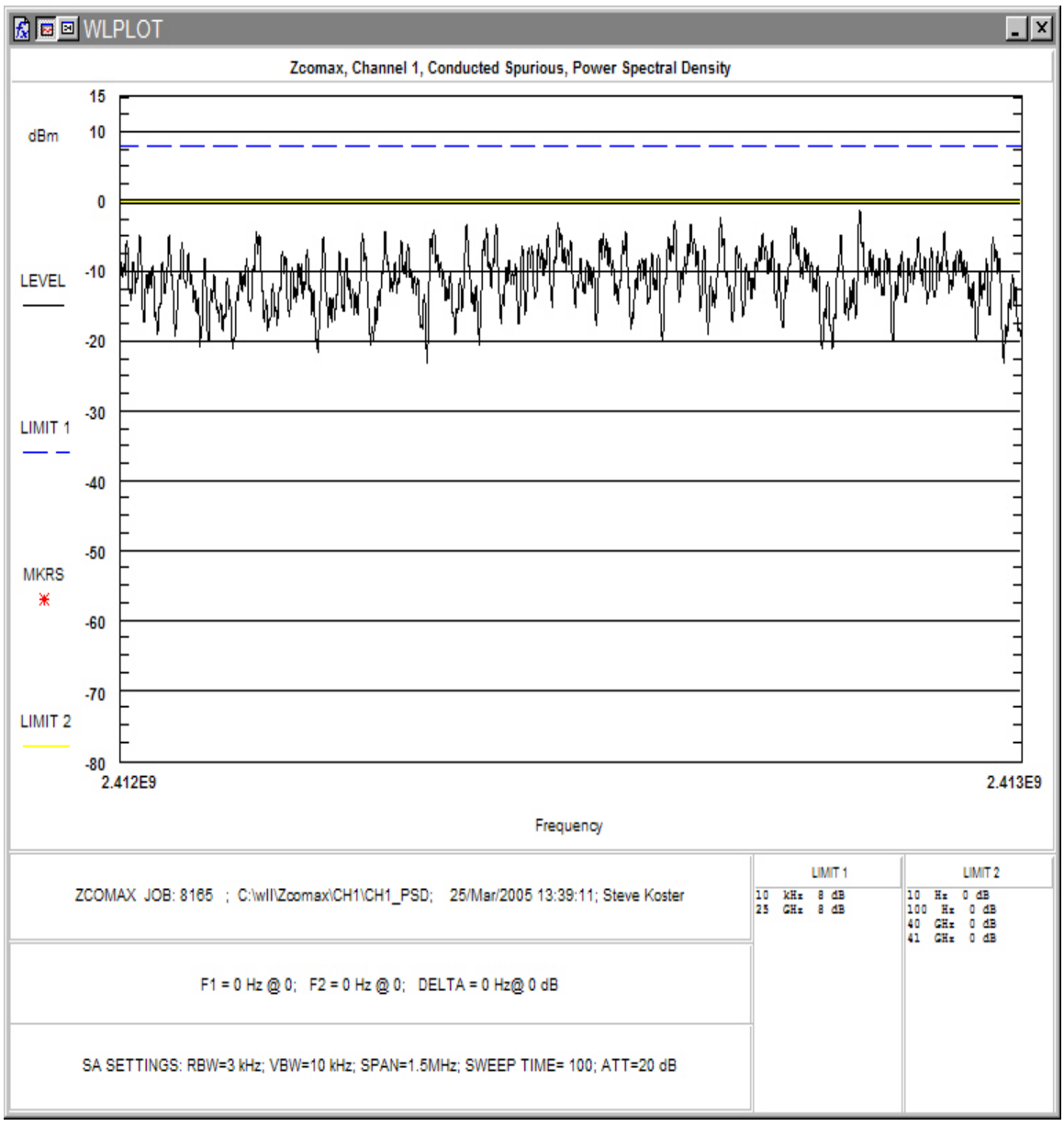

Figure 5-1: Power Spectral Density Plot, Channel 1

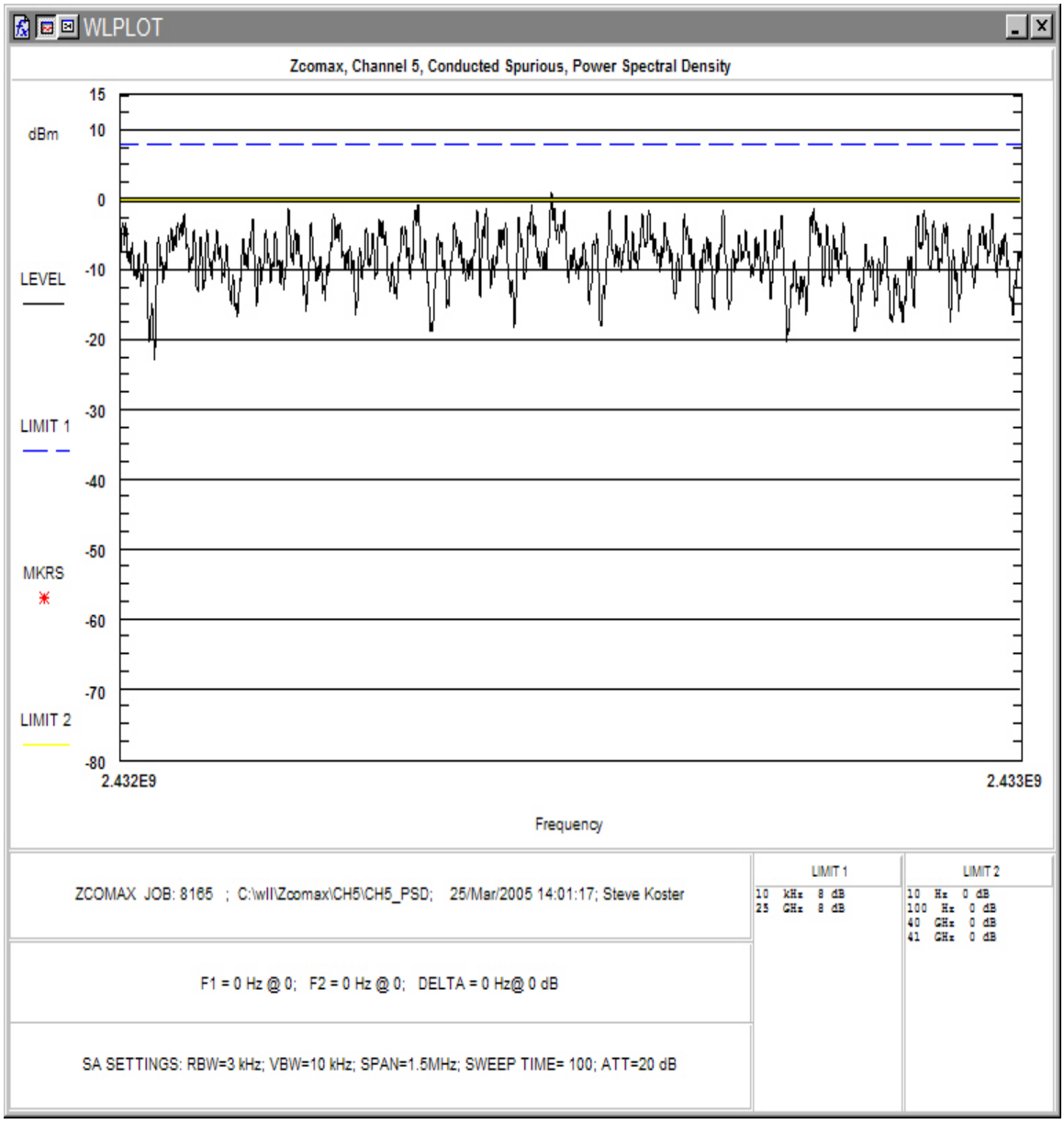

Figure 5-2: Power Spectral Density Plot, Channel 5

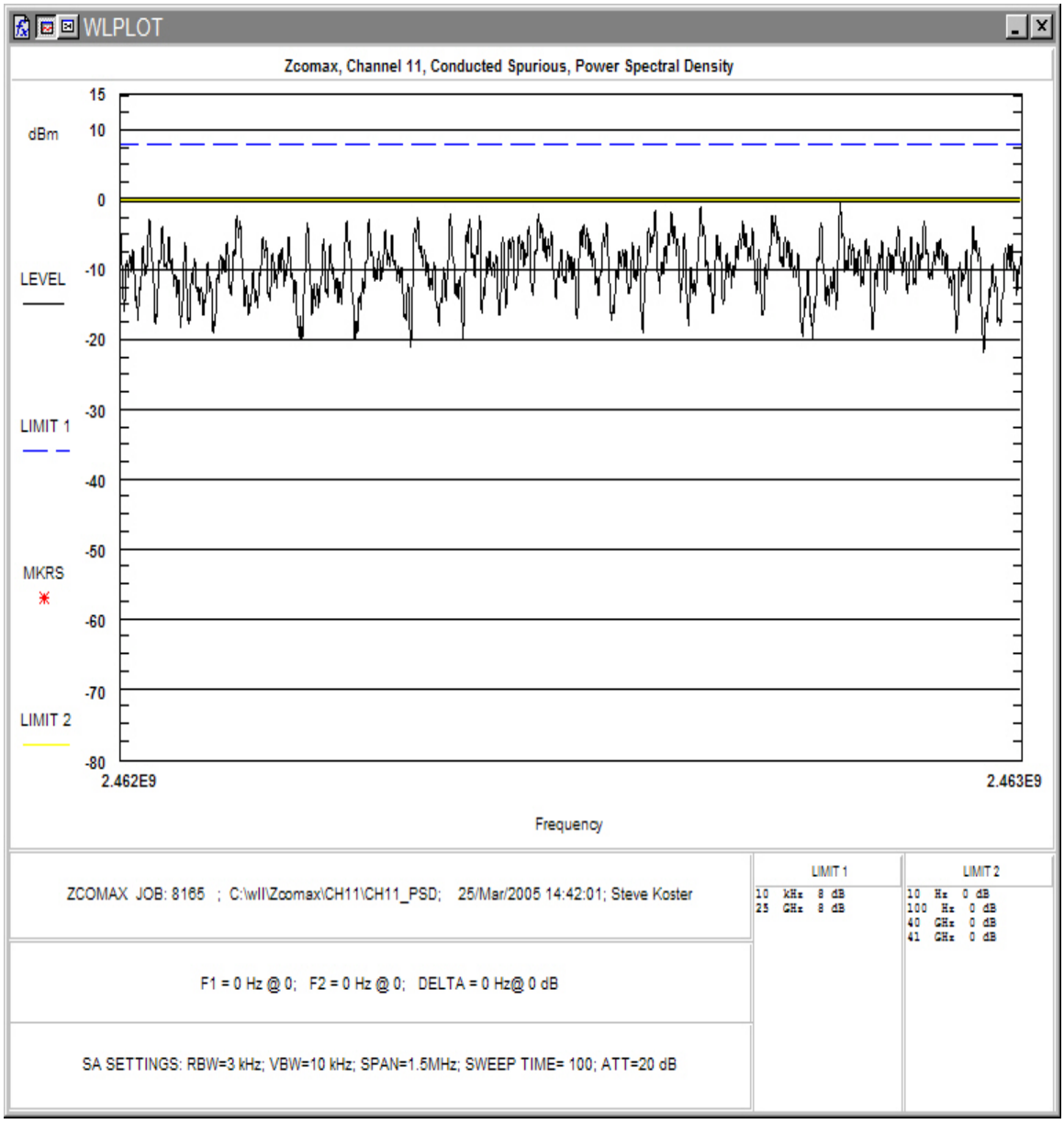

Figure 5-3: Power Spectral Density Plot, Channel 11

5.3 Occupied Bandwidth: (FCC Part §2.1049)

The occupied bandwidth was measured by coupling the output of the EUT to the input of a spectrum analyzer.

For Direct Sequence Spread Spectrum Systems, FCC Part 15.247 requires that the minimum 6 dB bandwidth be at least 500 kHz. Three channels were measured with the data shown in Figure 5.4 through Figure 5.6.

At full modulation, the occupied bandwidth was measured as shown:

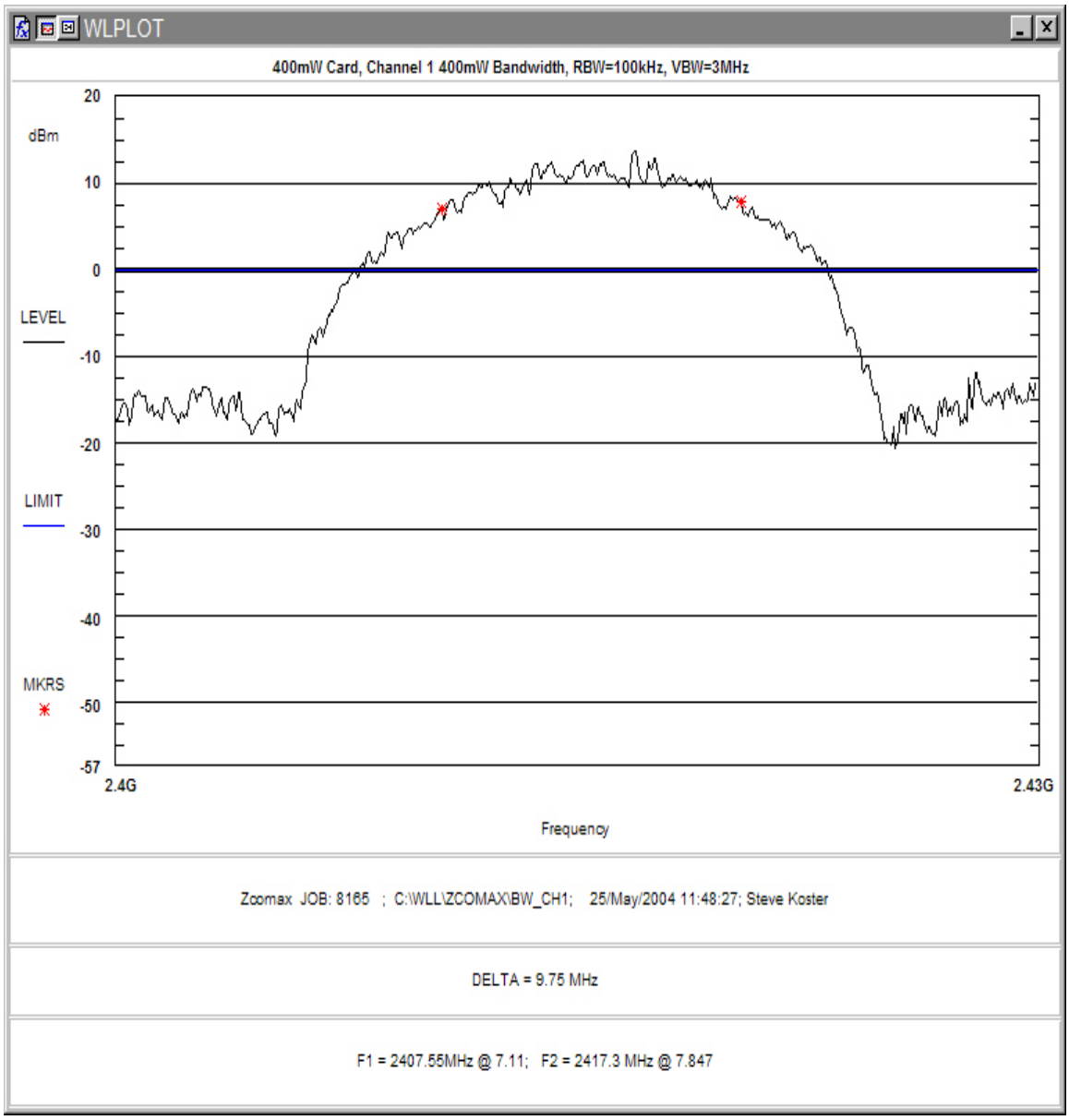

Figure 5-4. Occupied Bandwidth, Low Channel (Channel 1)

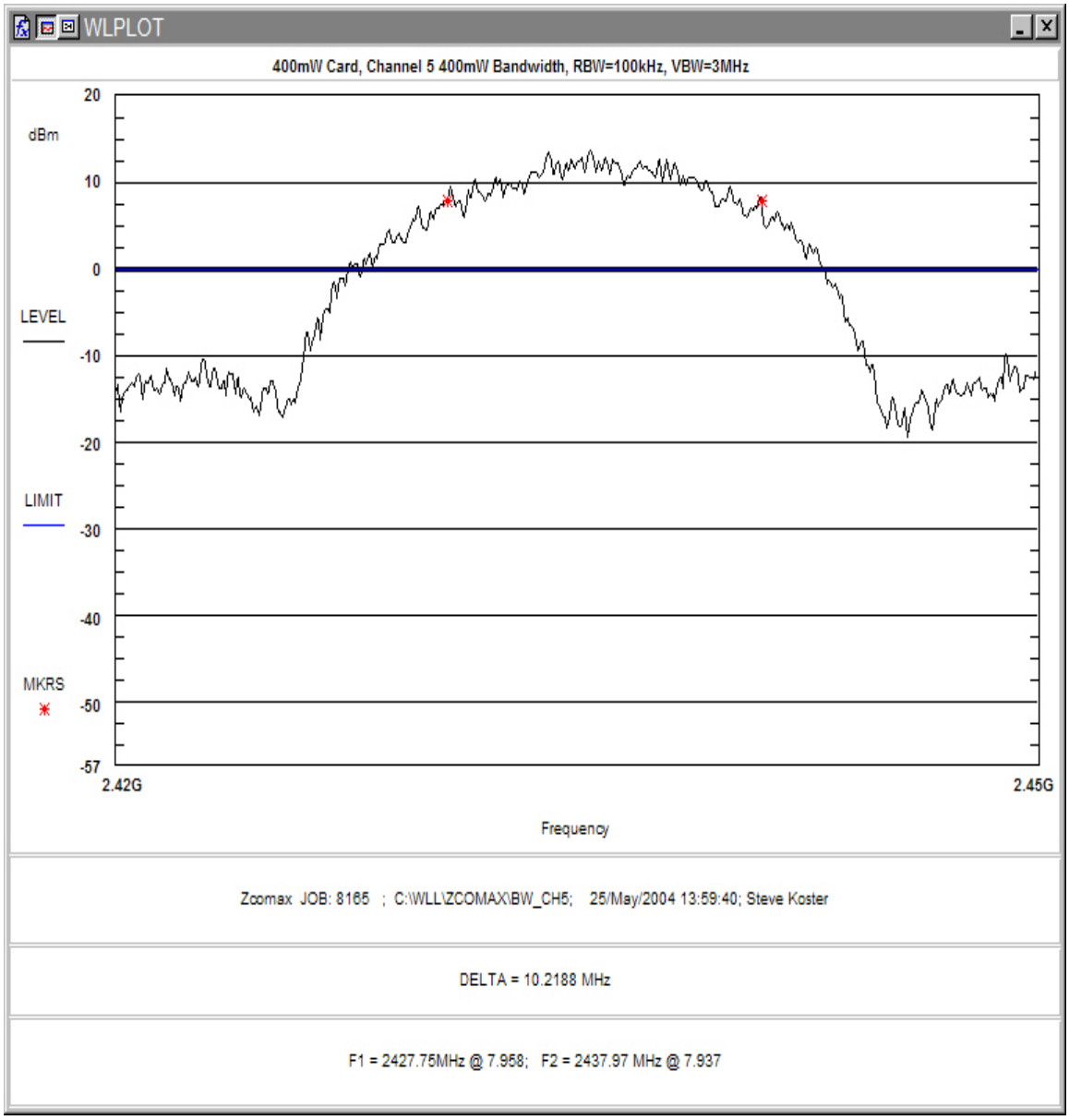

Figure 5-5. Occupied Bandwidth, Mid Channel (Channel 5)

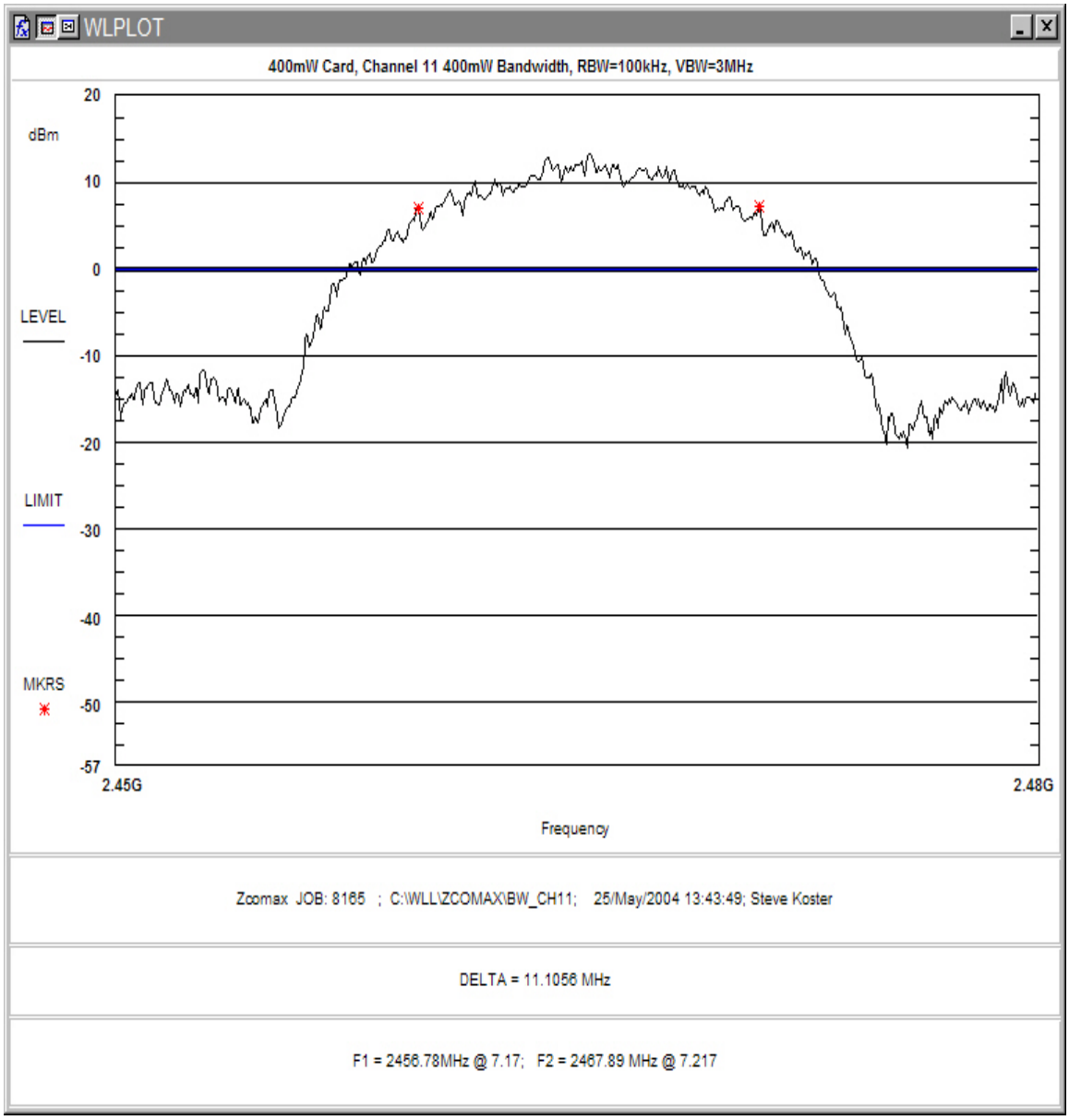

Figure 5-6. Occupied Bandwidth, High Channel (Channel 11)

5.4 Conducted Spurious Emissions at Antenna Terminals (FCC Part §2.1051)

The EUT must comply with requirements for spurious emissions at antenna terminals. Per §15.247(c) all spurious emissions in any 100 kHz bandwidth outside the frequency band in which the spread spectrum device is operating shall be attenuated 20 dB below the highest power level in a 100 kHz bandwidth within the band containing the highest level of the desired power.

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 10 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 kHz. The amplitude of the EUT carrier frequency was measured to determine the emissions limit (20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier.

The following are plots of the conducted spurious emissions data for the high power setting followed by the low power setting.

High Power

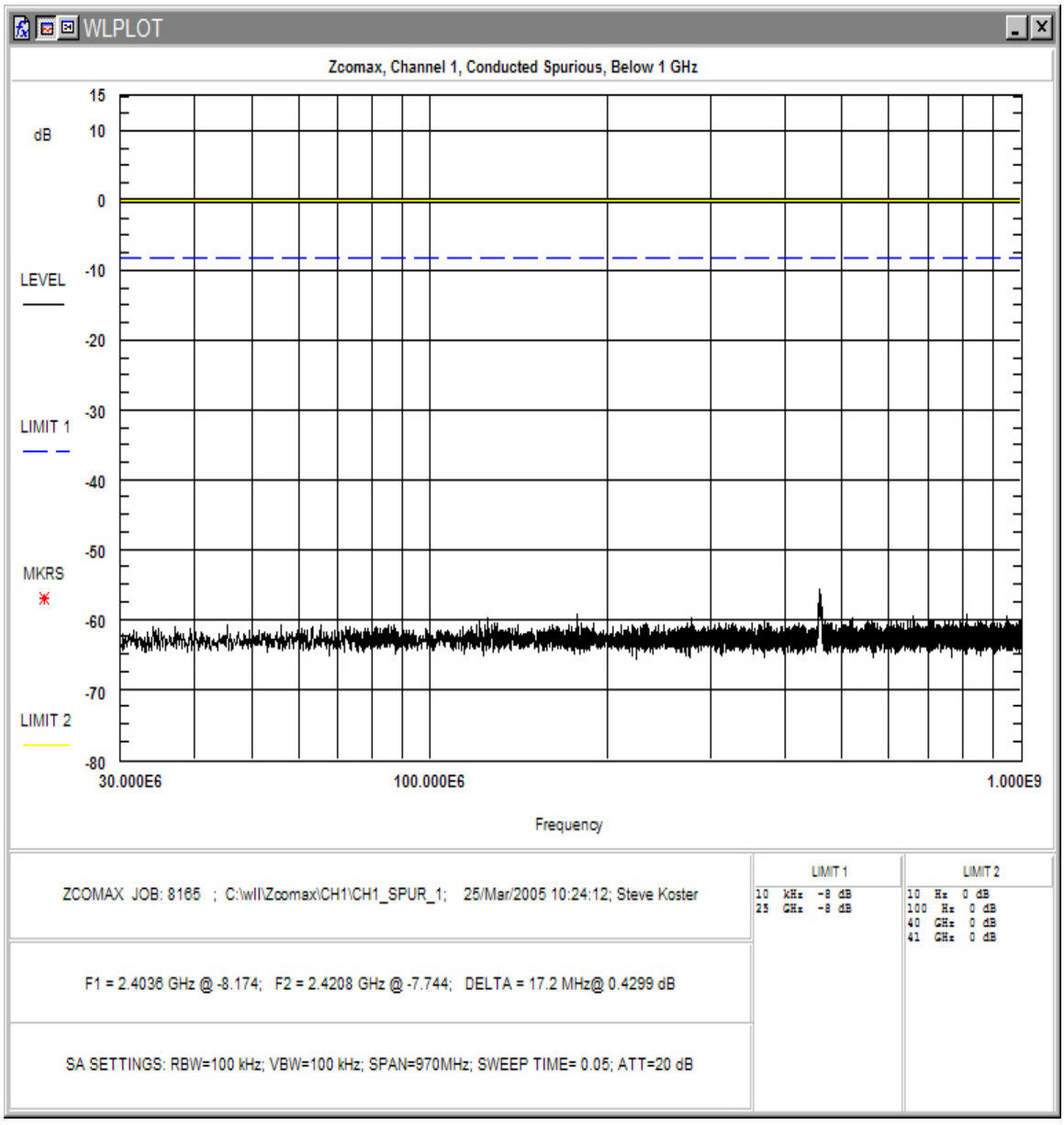

Figure 5-7. Conducted Spurious Emissions, Low Channel 30 - 1000MHz

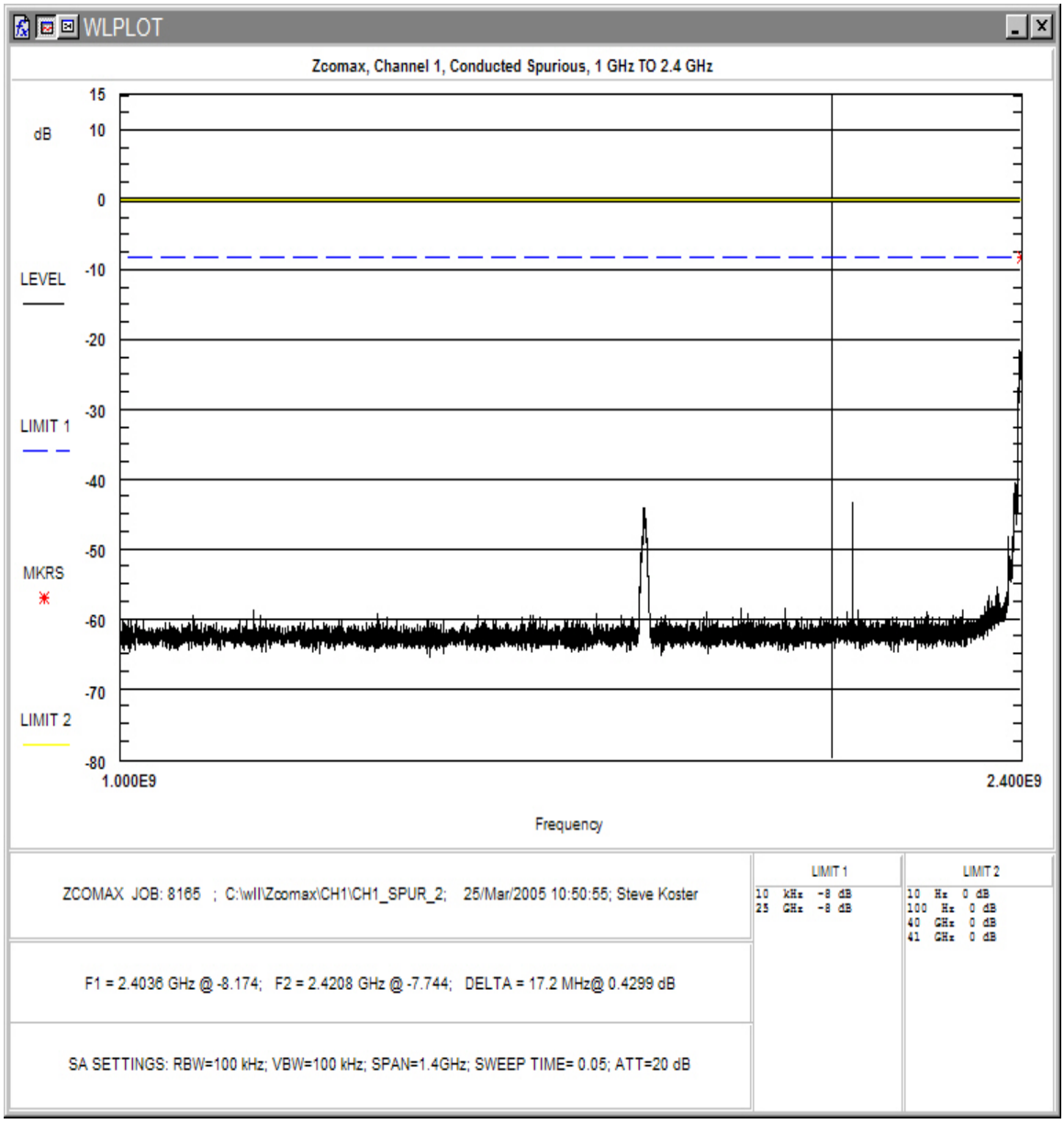

Figure 5-8. Conducted Spurious Emissions, Low Channel 1 – 2.4GHz

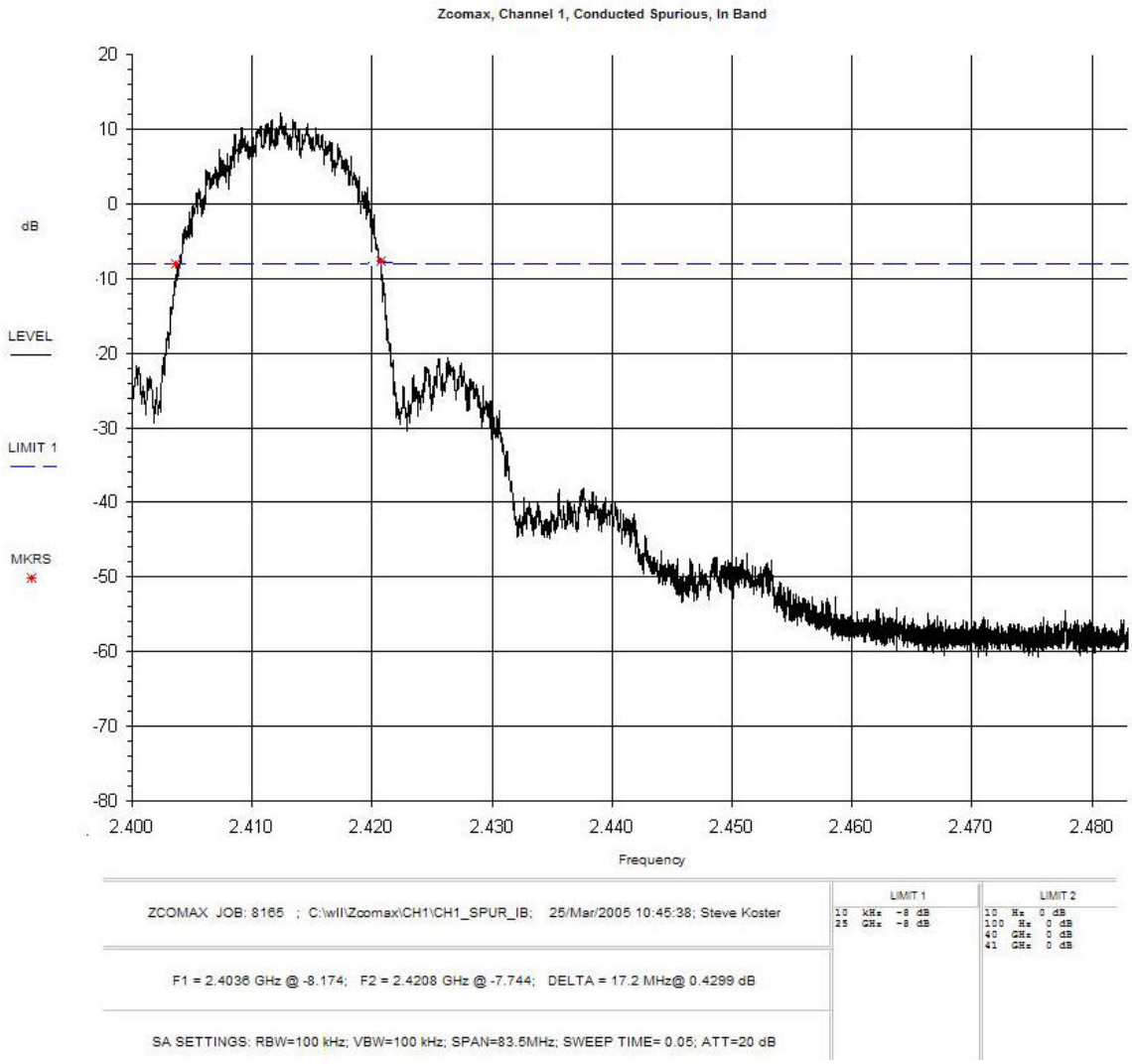

Figure 5-9. Conducted Spurious Emissions, Low Channel – In Band

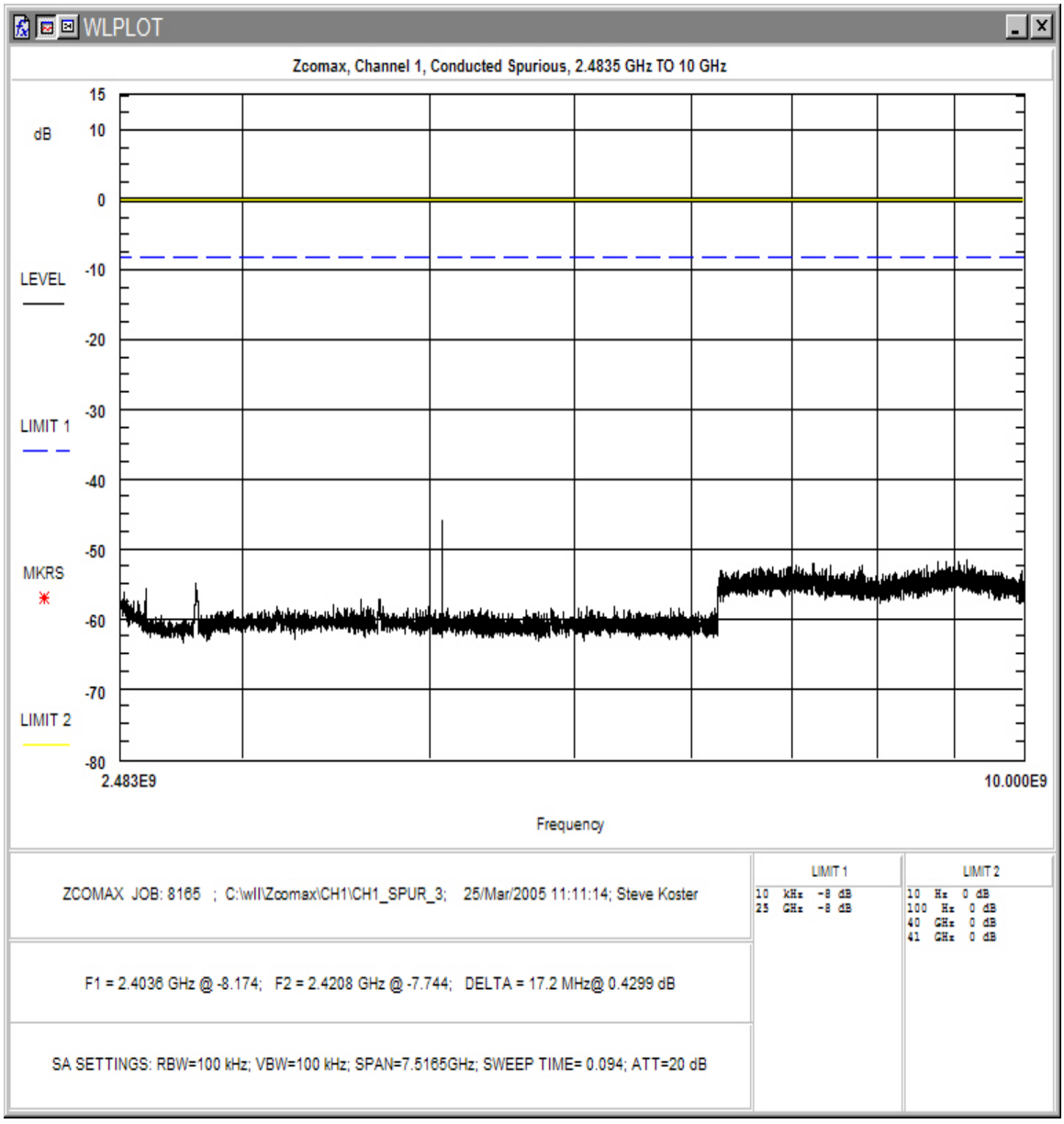

Figure 5-10. Conducted Spurious Emissions, Low Channel 2.4 – 10 GHz

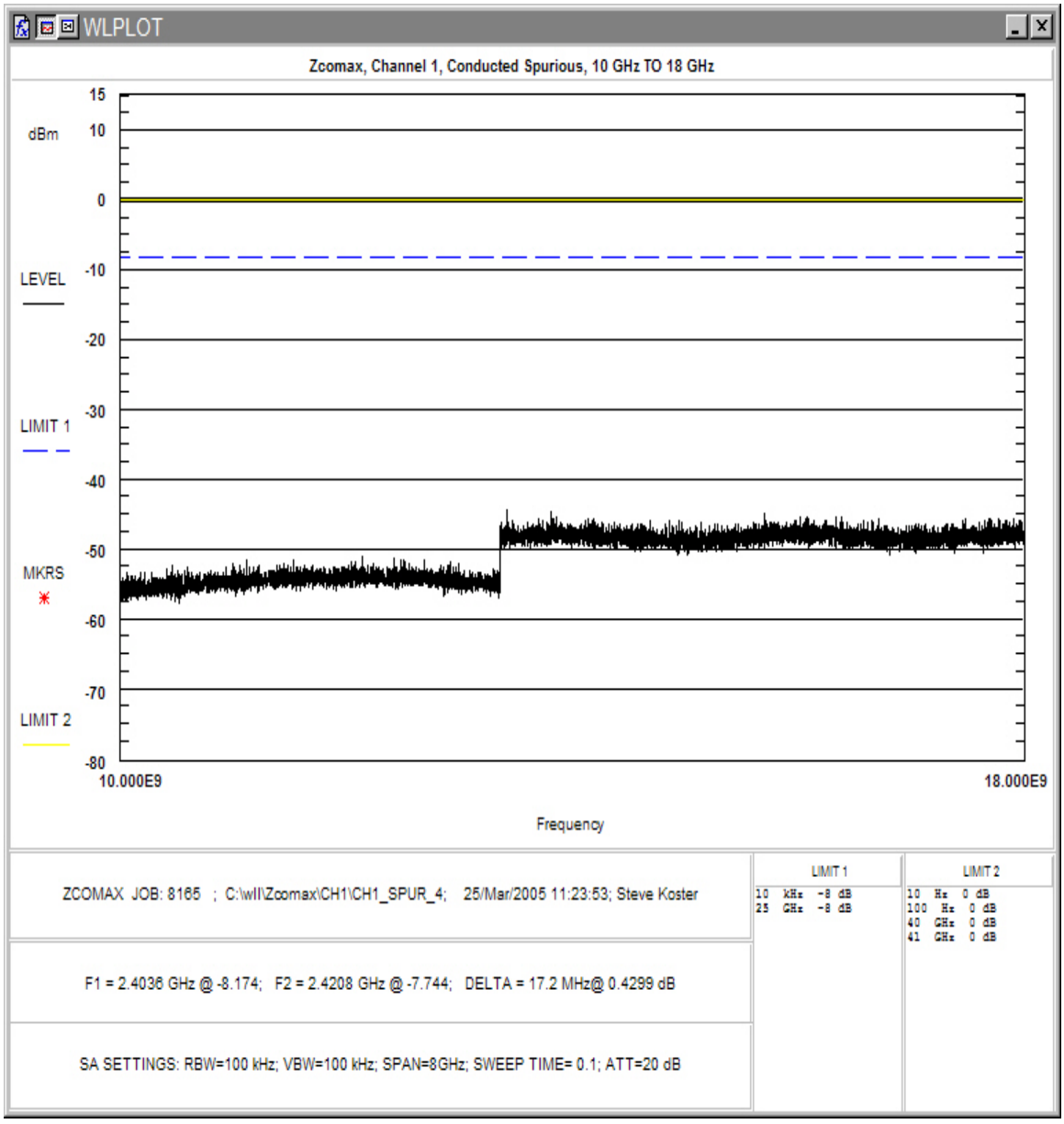

Figure 5-11. Conducted Spurious Emissions, Low Channel 10 - 18GHz

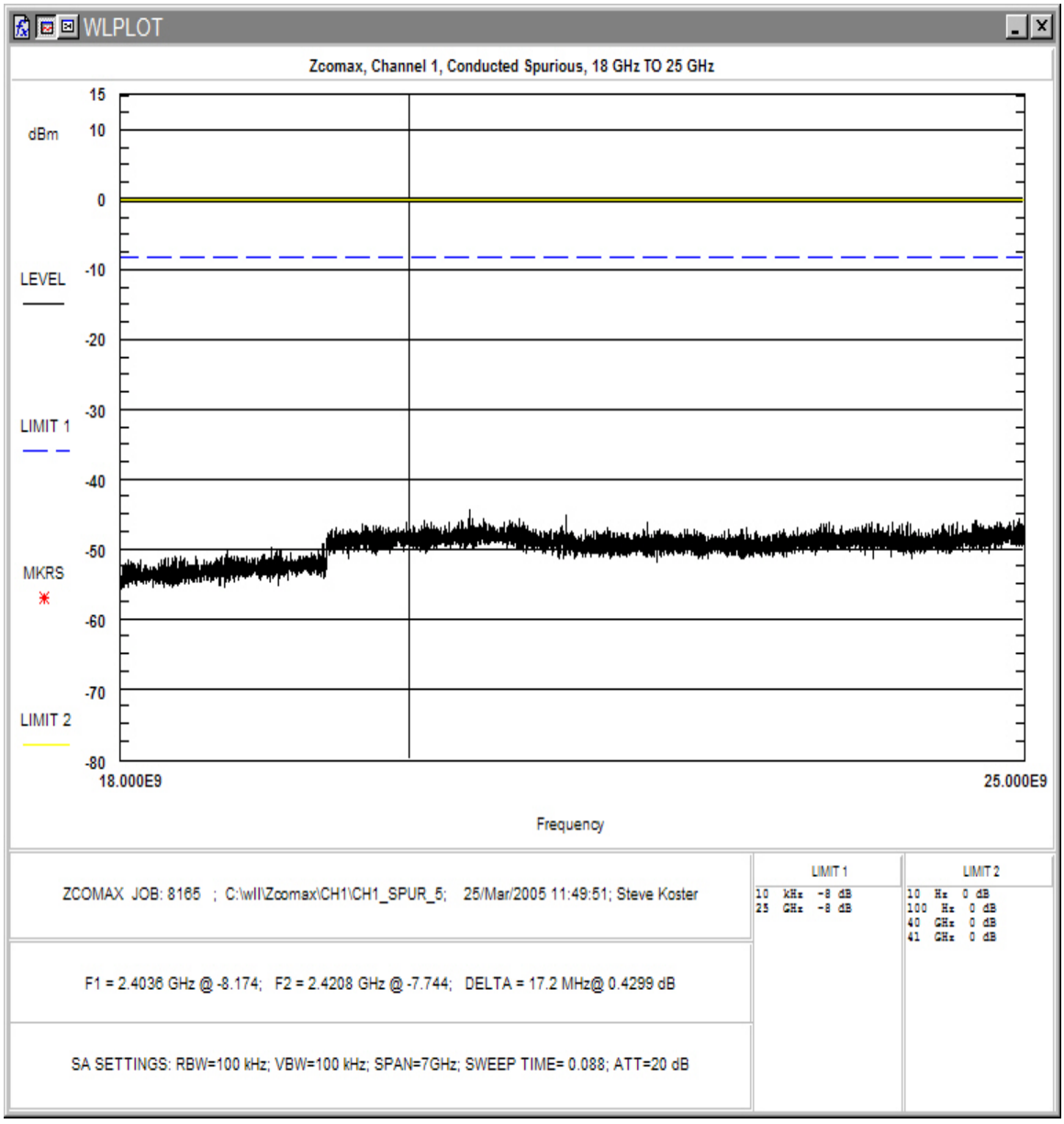

Figure 5-12. Conducted Spurious Emissions, Low Channel 18 - 25GHz

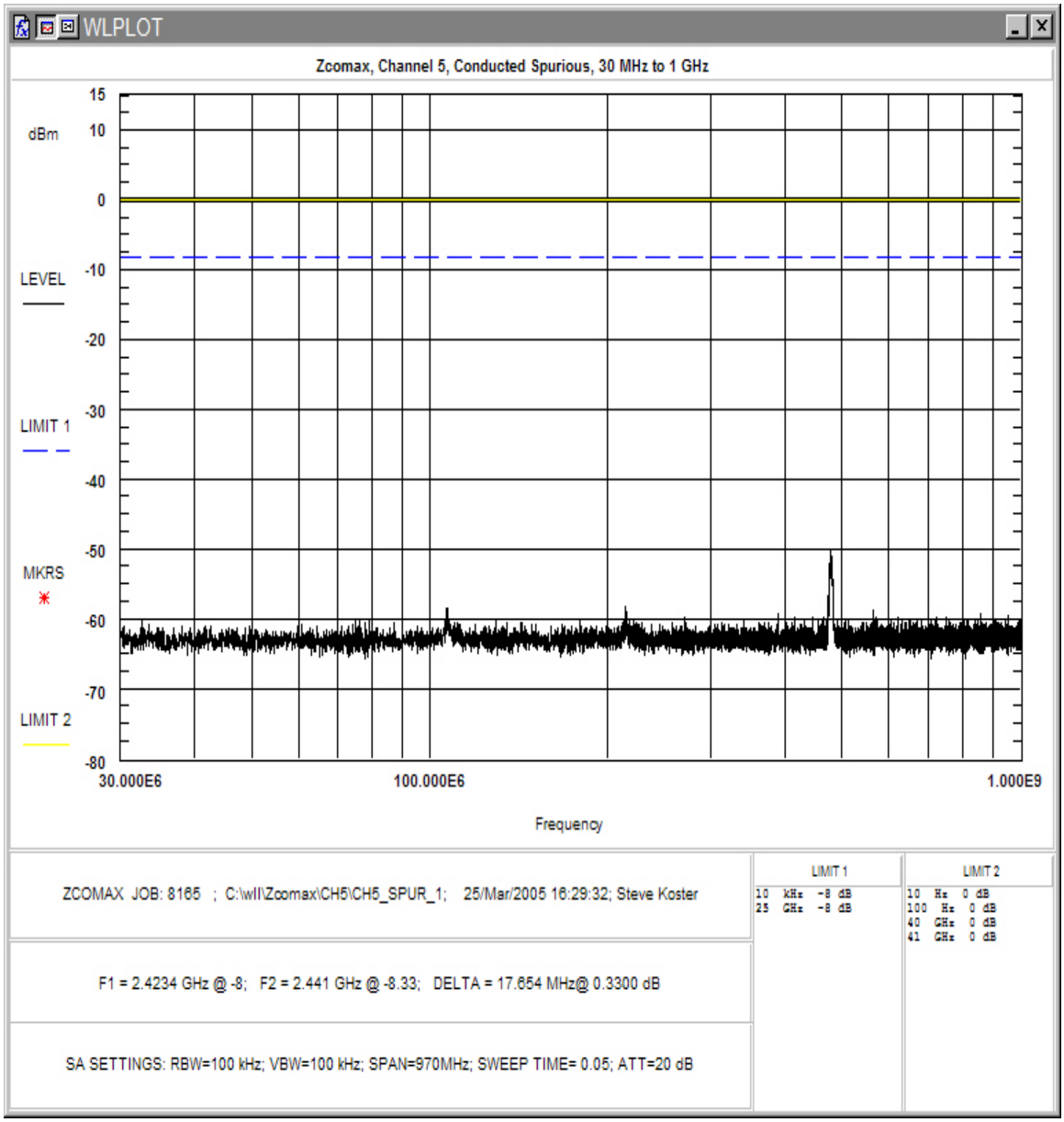

Figure 5-13. Conducted Spurious Emissions, Mid Channel 30 - 1000MHz

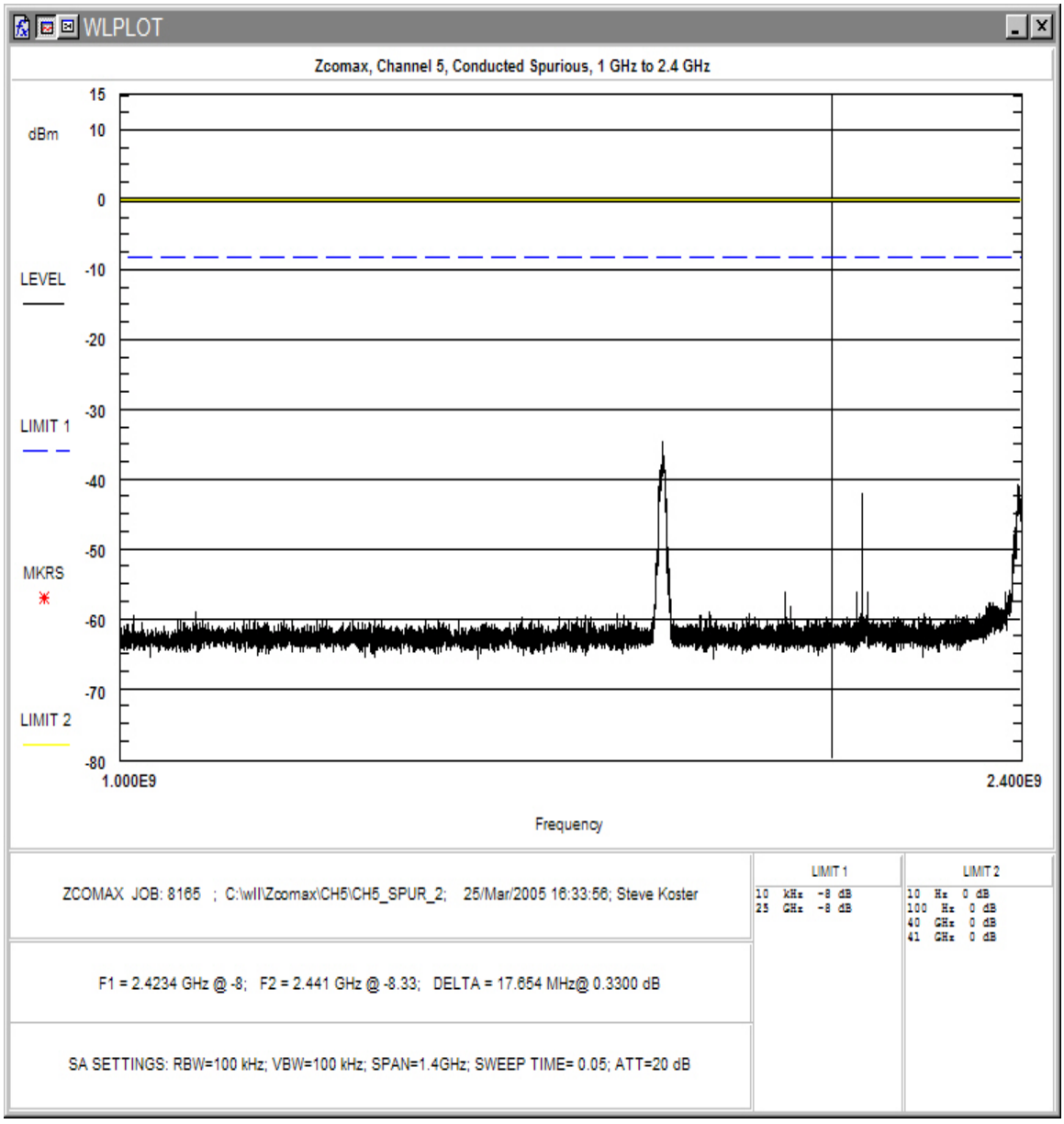

Figure 5-14. Conducted Spurious Emissions, Mid Channel 1 – 2.4 GHz

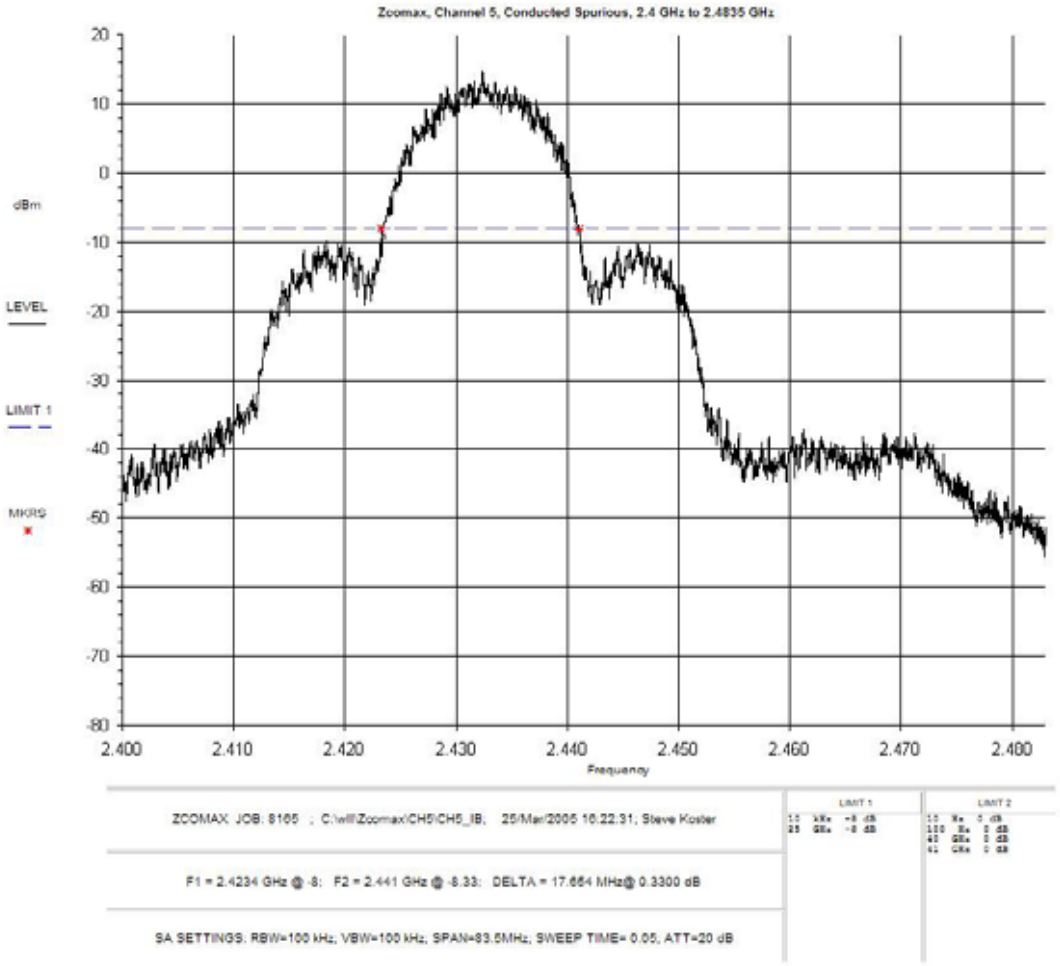

Figure 5-15. Conducted Spurious Emissions, Mid Channel - In Band

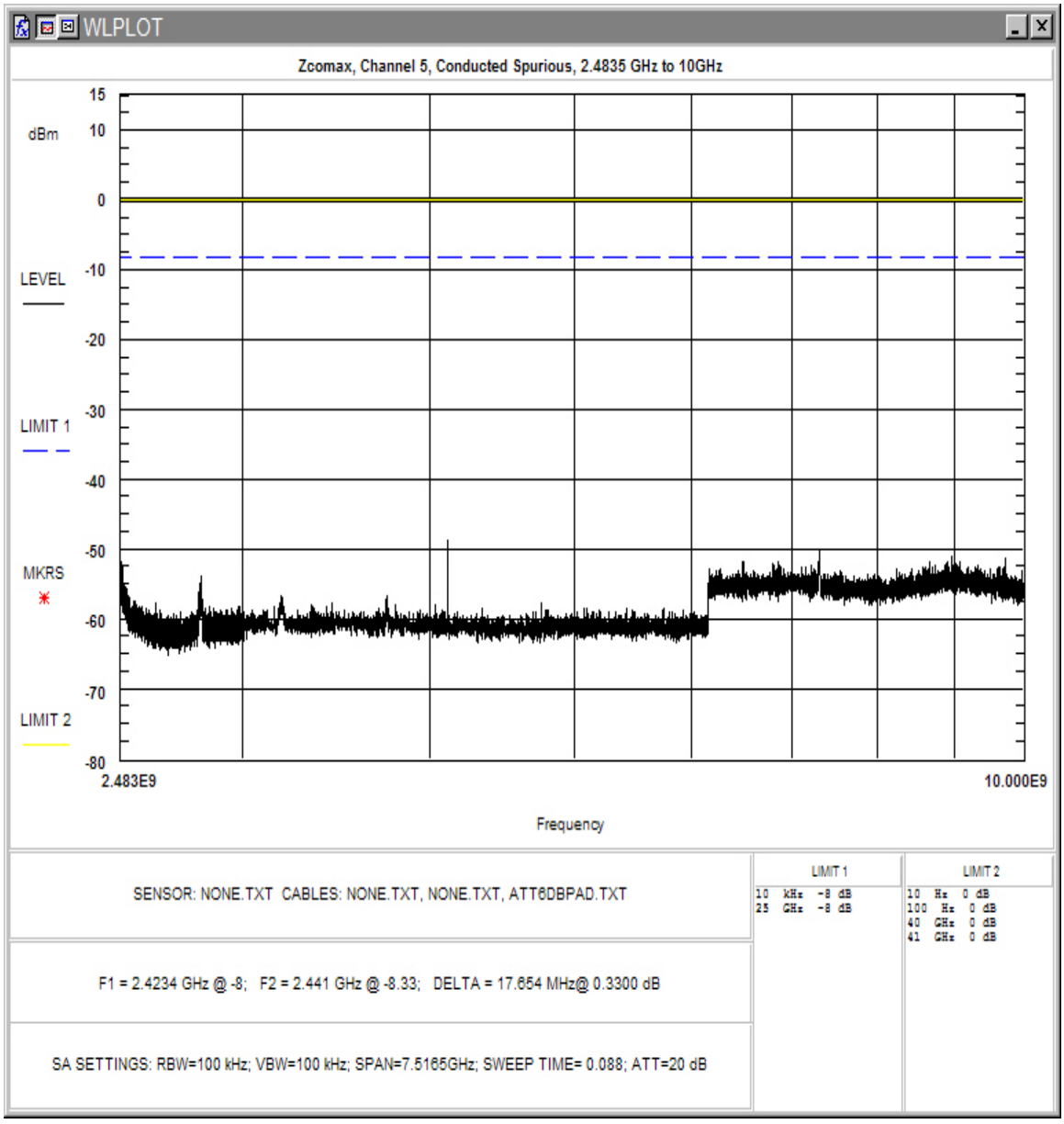

Figure 5-16. Conducted Spurious Emissions, Mid Channel 2.4 – 10 GHz

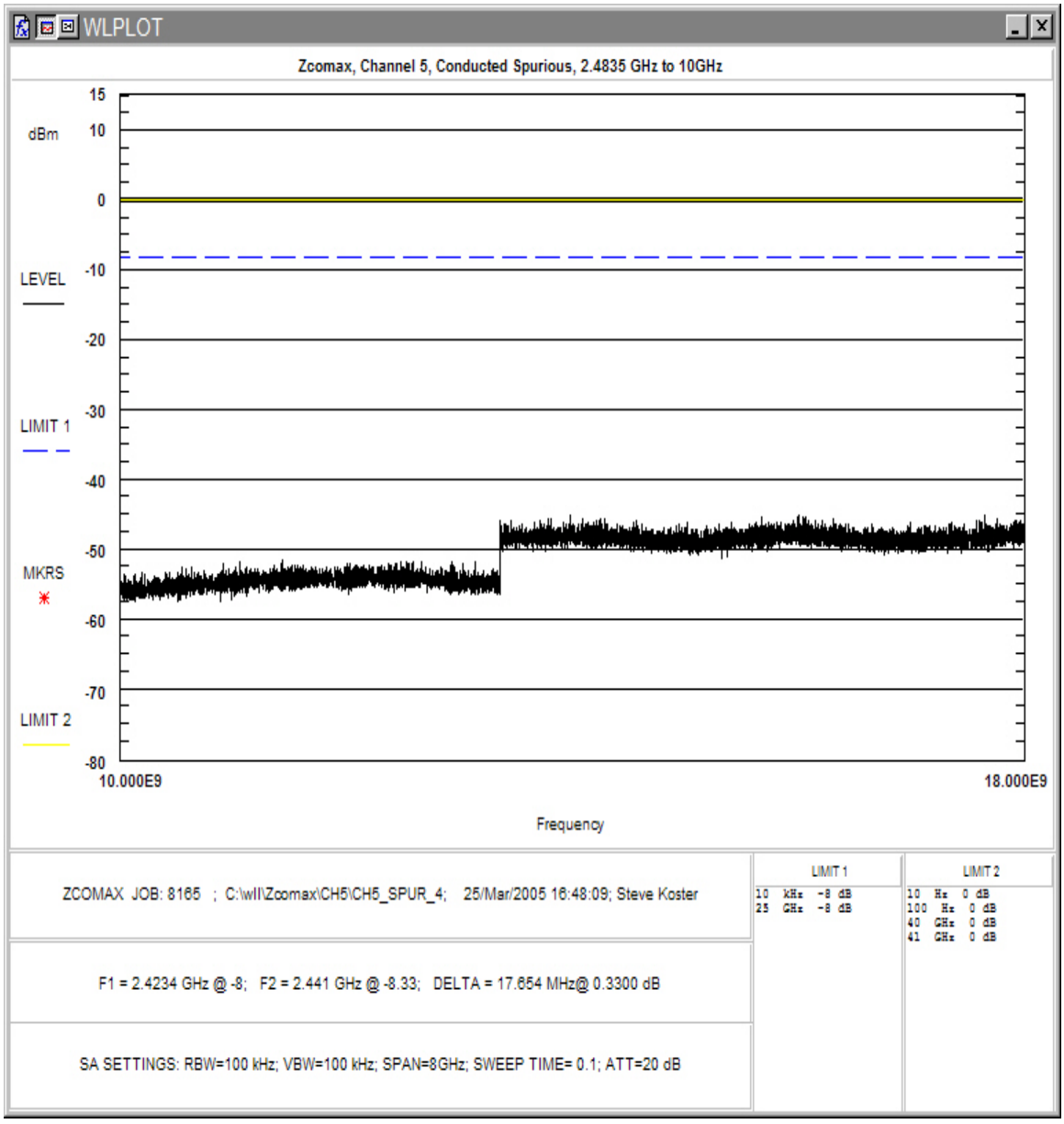

Figure 5-17. Conducted Spurious Emissions, Mid Channel 2.4 - 10GHz

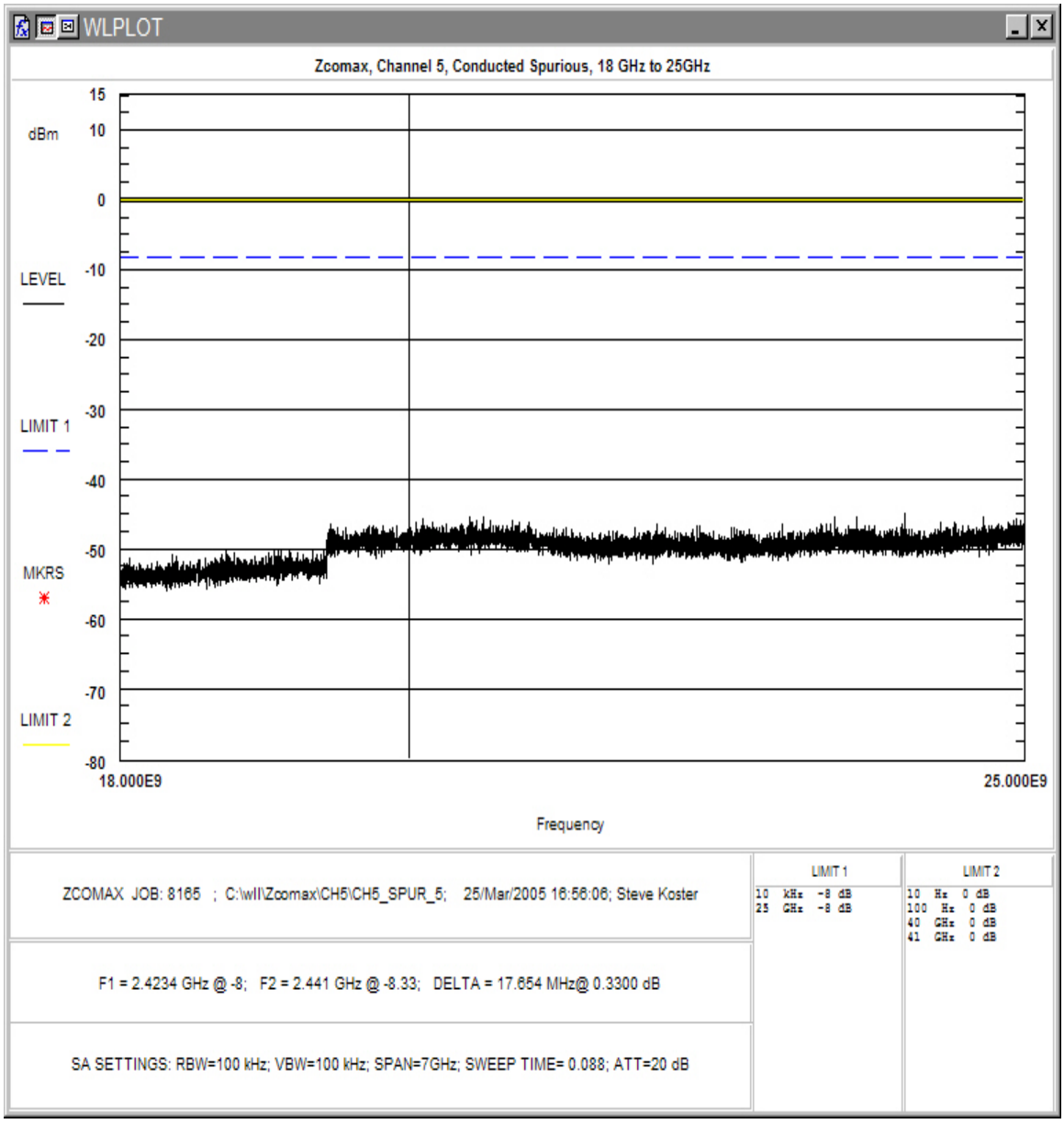

Figure 5-18. Conducted Spurious Emissions, Mid Channel 18 - 25GHz

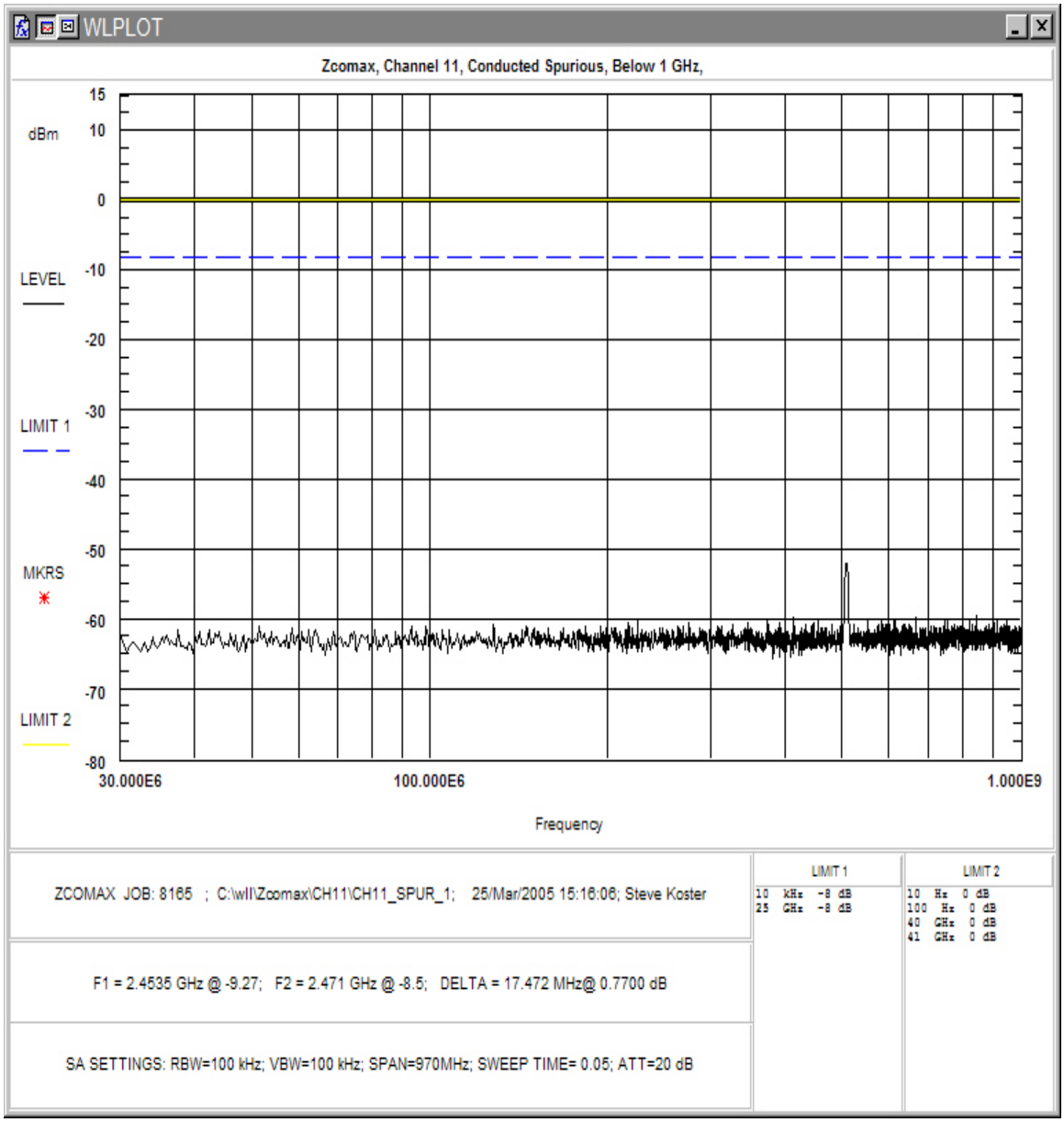

Figure 5-19. Conducted Spurious Emissions, High Channel 30 - 1000MHz

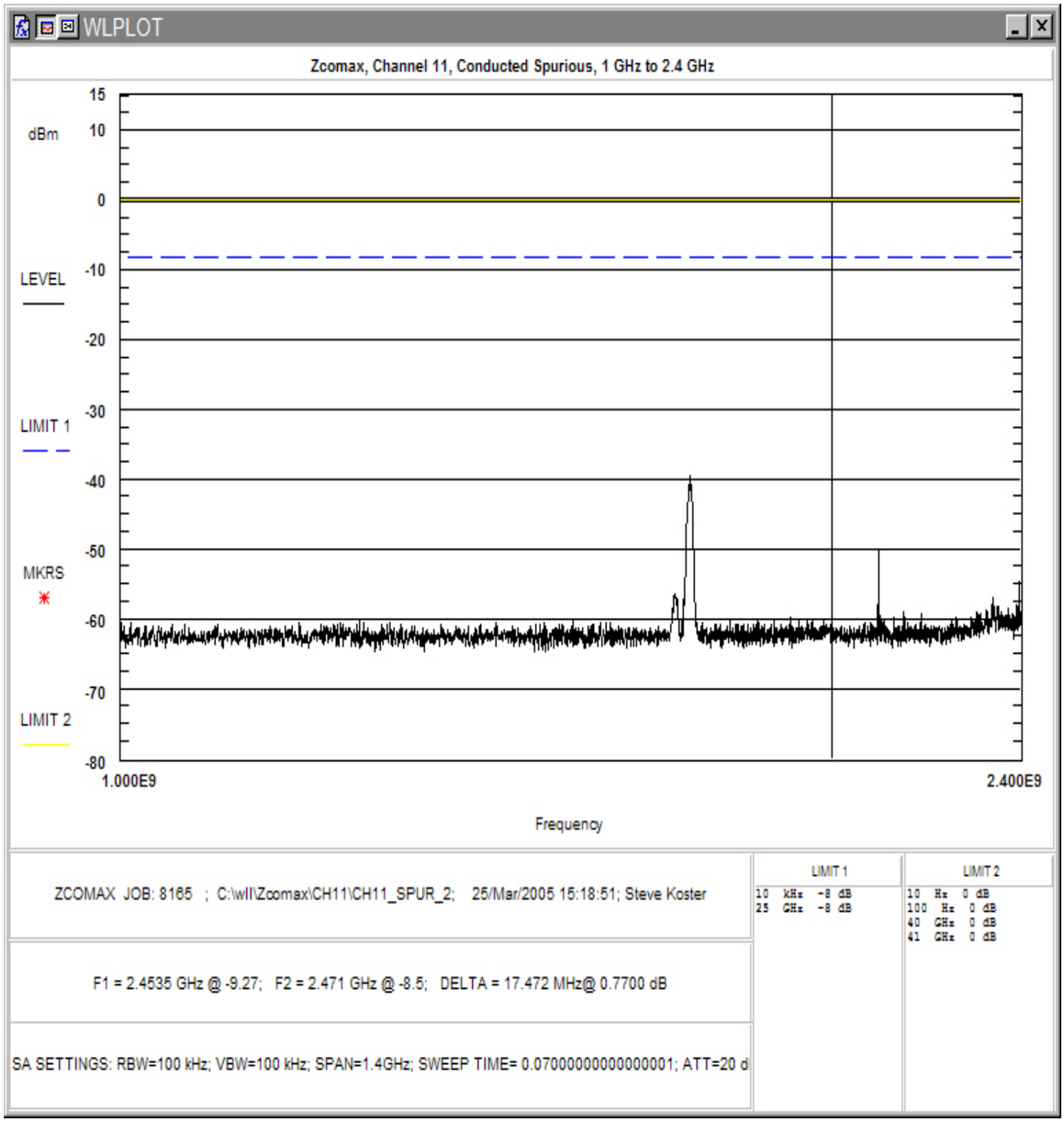

Figure 5-20. Conducted Spurious Emissions, High Channel 1 – 2.4 GHz

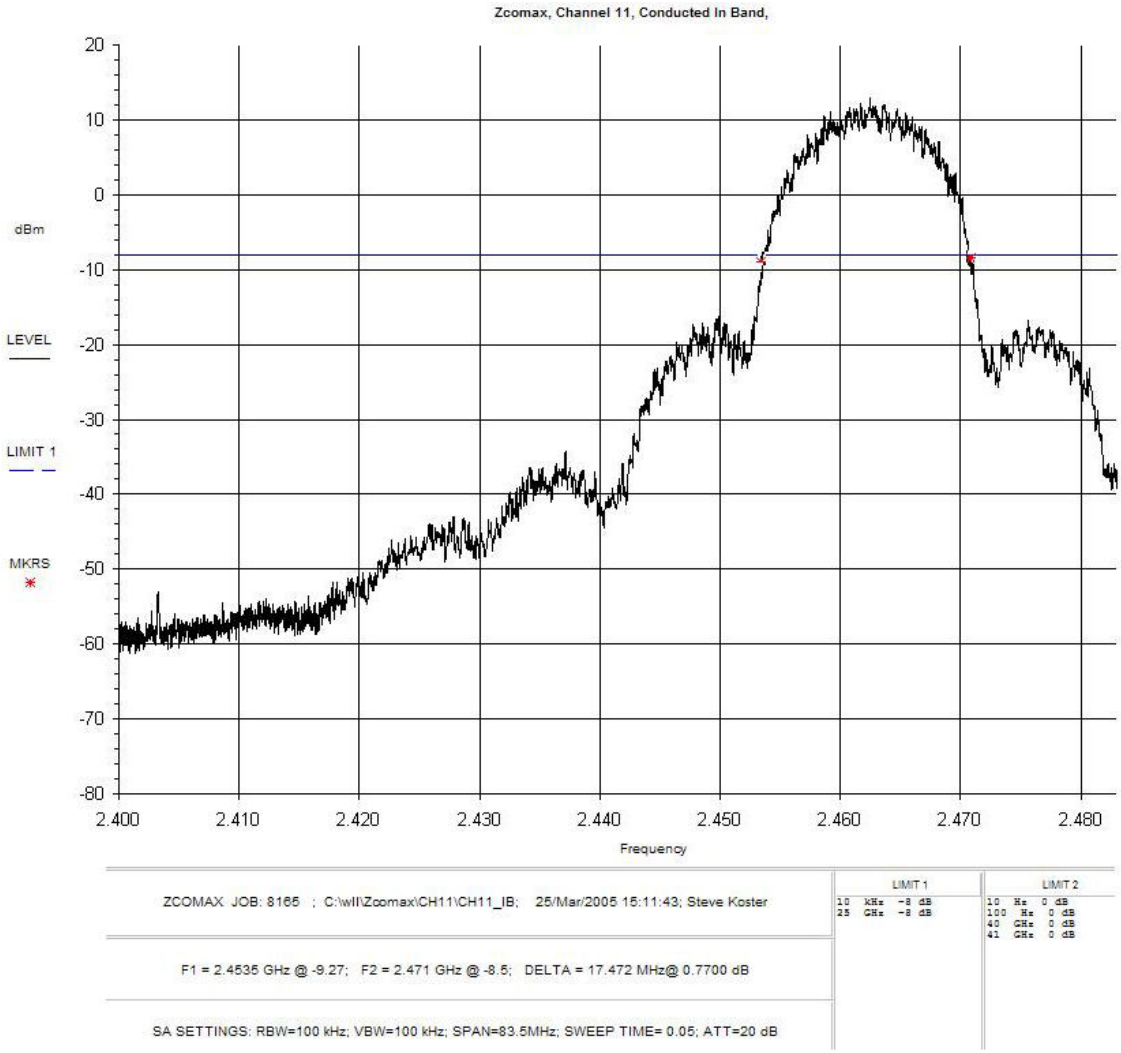

Figure 5-21. Conducted Spurious Emissions, High Channel - In Band

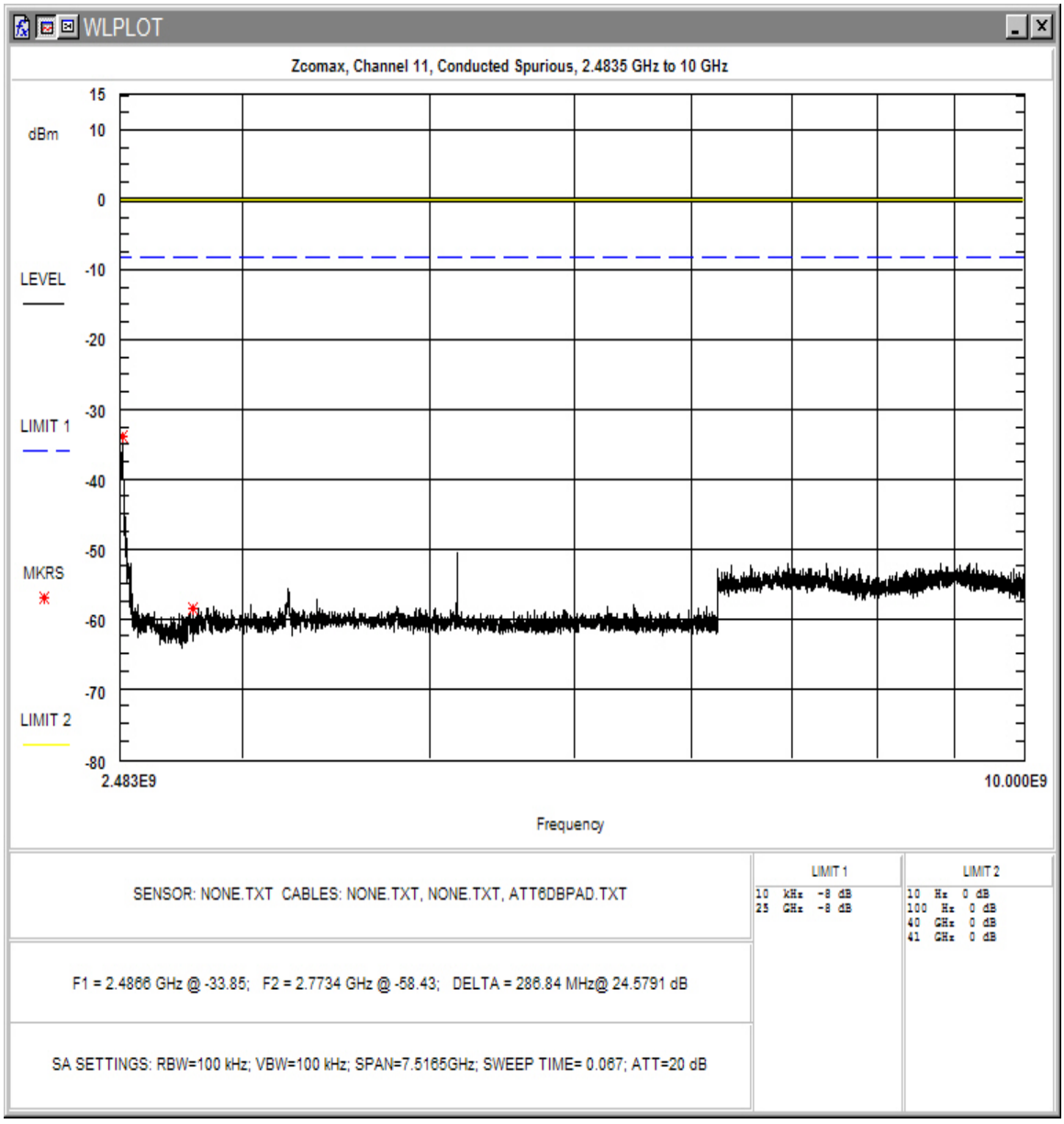

Figure 5-22. Conducted Spurious Emissions, High Channel 2.4 – 10 GHz

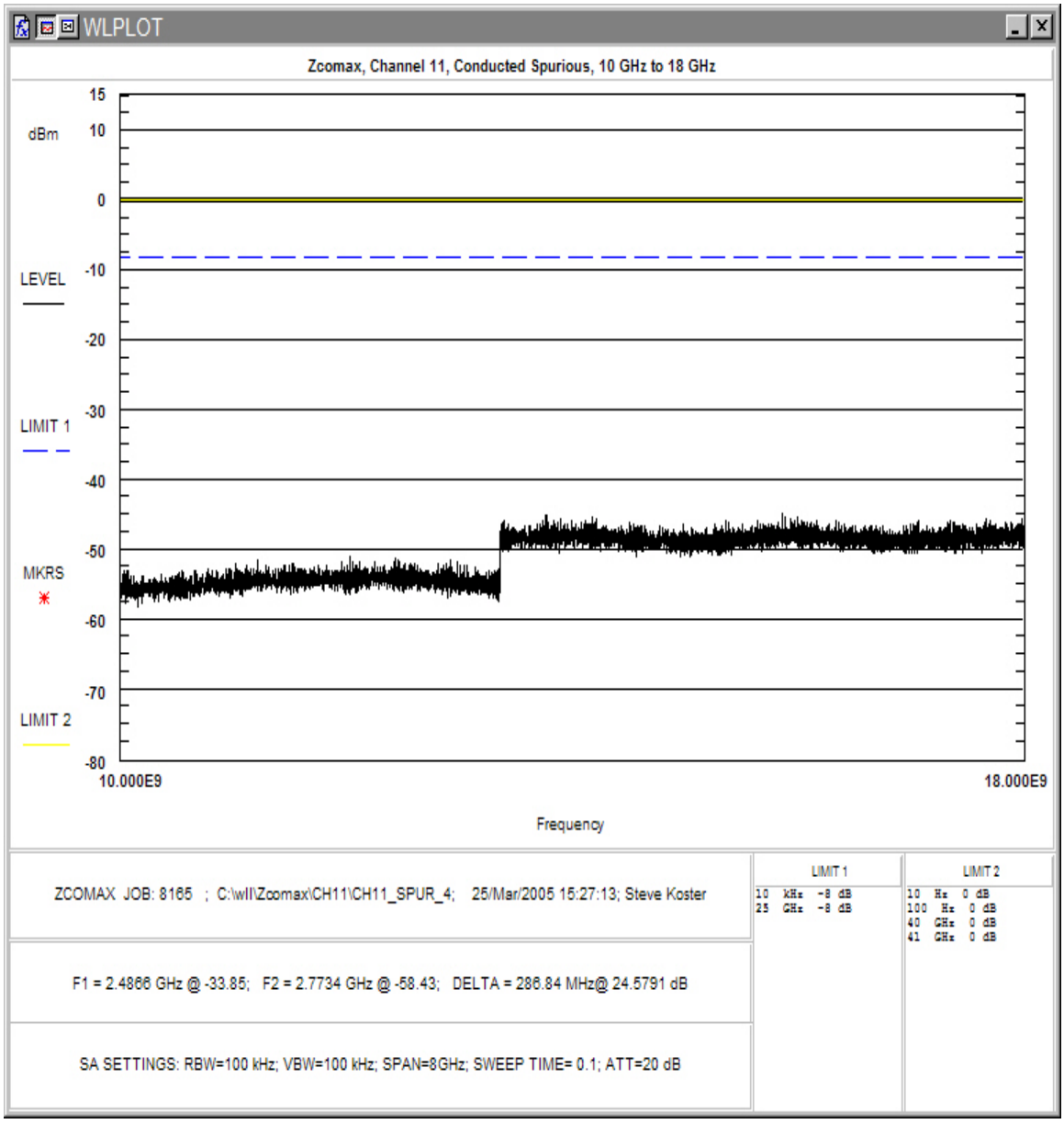

Figure 5-23. Conducted Spurious Emissions, High Channel 10 – 18 GHz

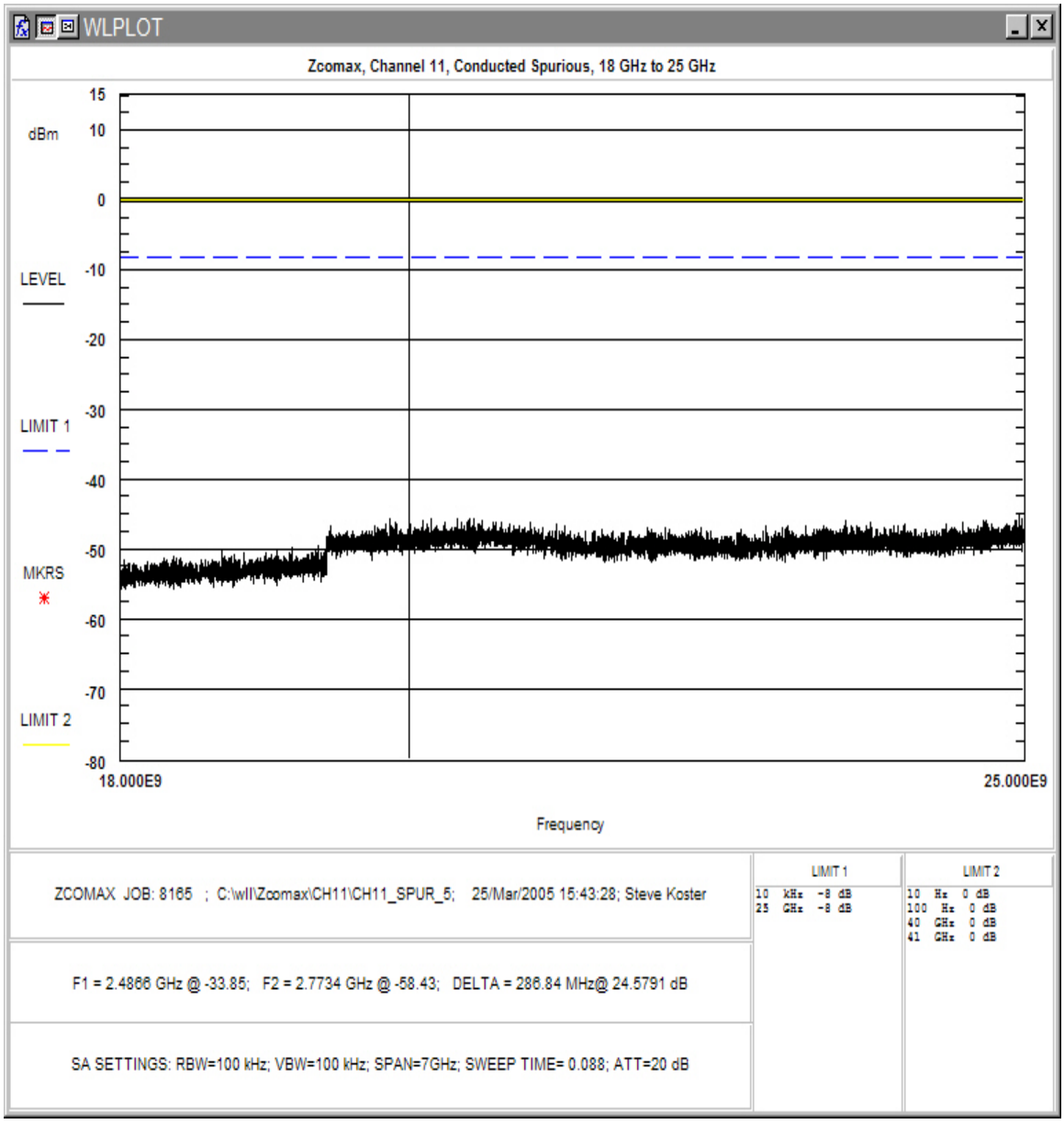

Figure 5-24. Conducted Spurious Emissions, High Channel 18 – 25 GHz

Low Power

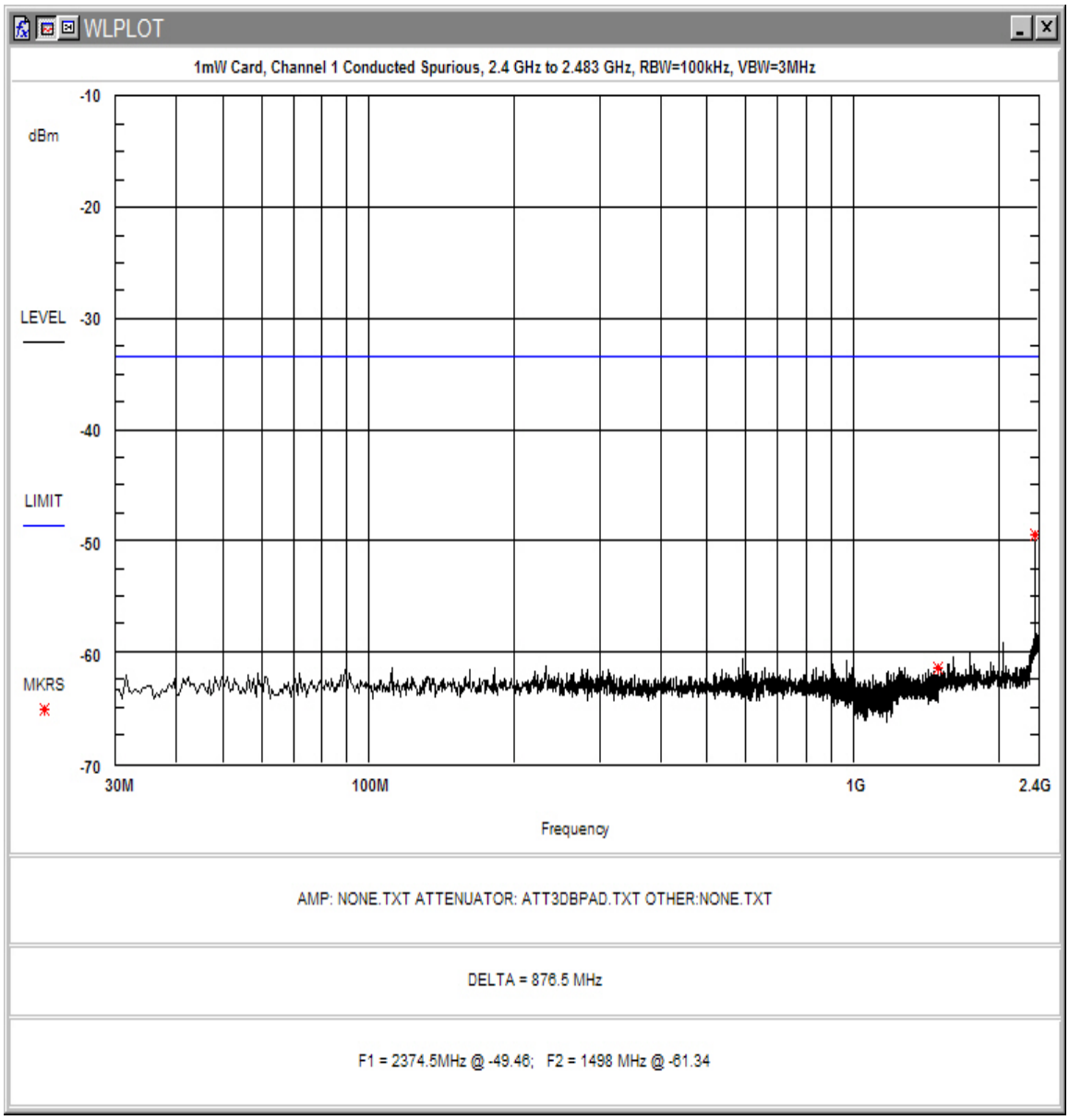

Figure 5-25. Conducted Spurious Emissions, Low Channel 30 - 2400MHz

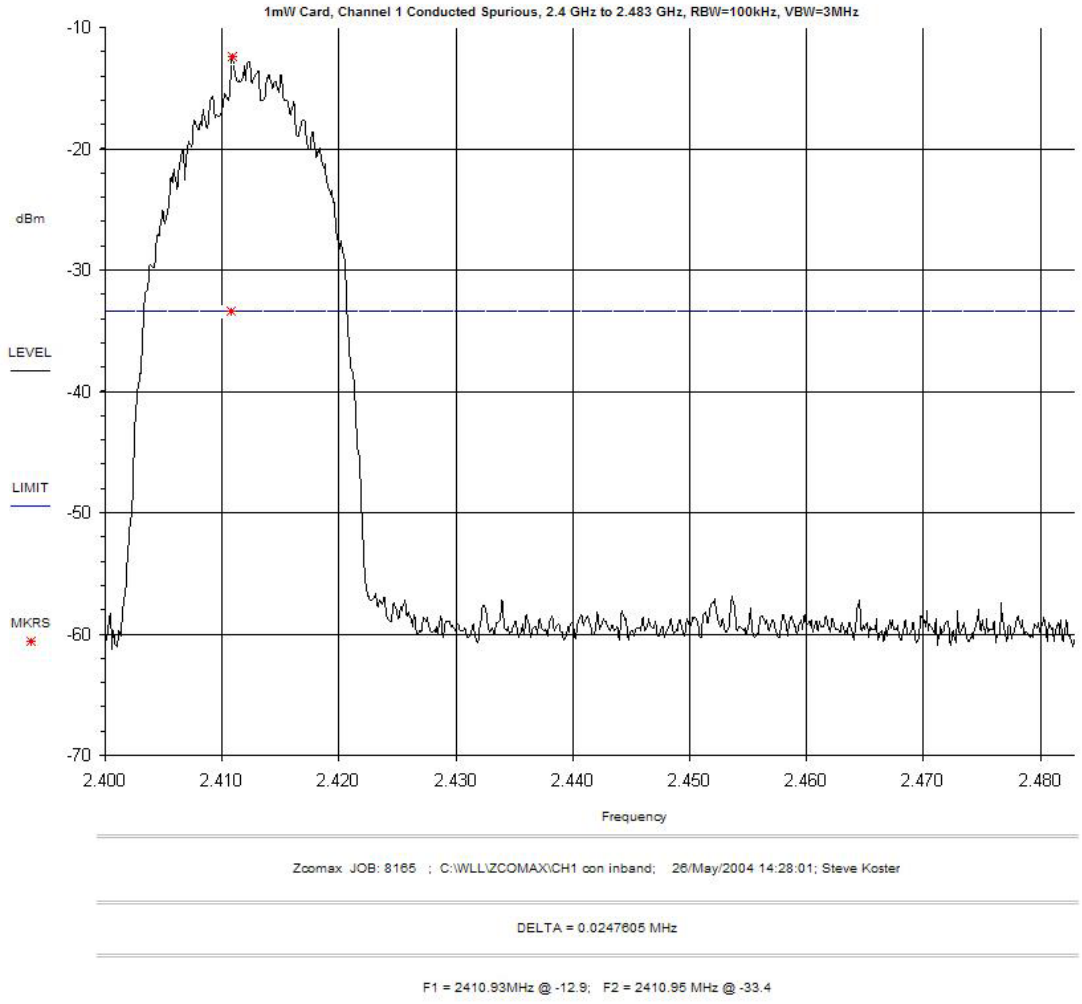

Figure 5-26. Conducted Spurious Emissions, Low Channel – In Band

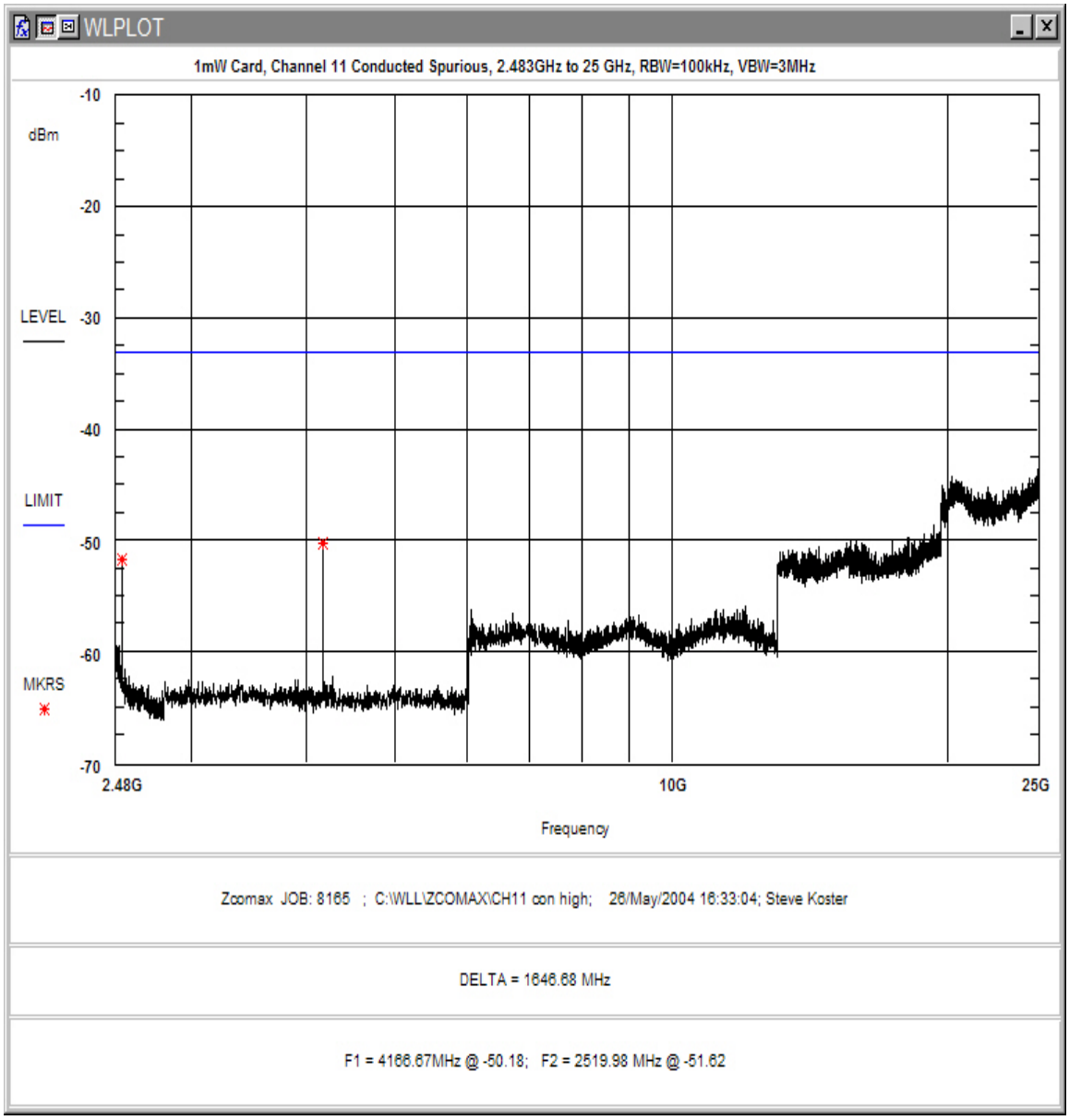

Figure 5-27. Conducted Spurious Emissions, Low Channel 2.48 – 25 GHz

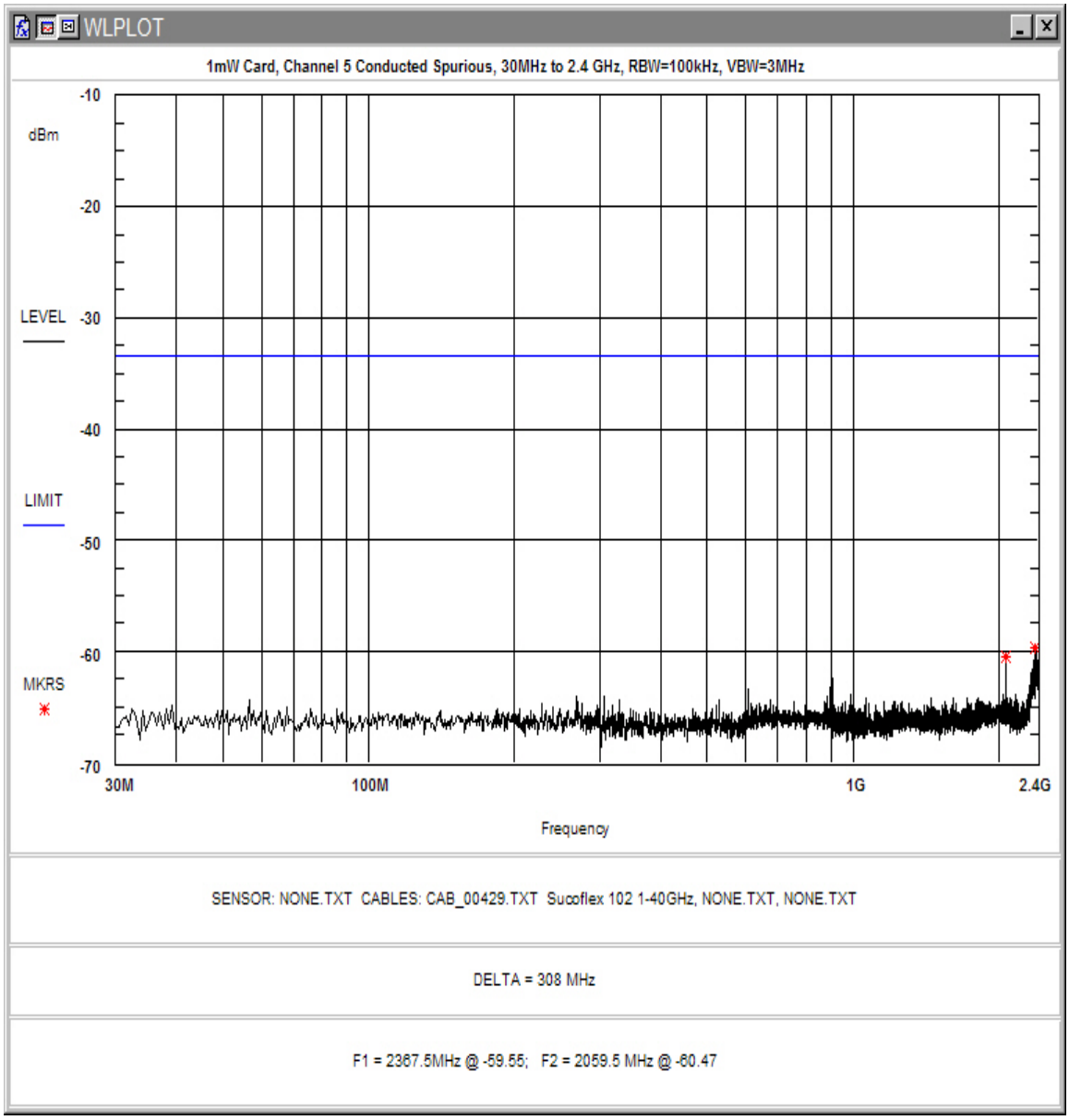

Figure 5-28. Conducted Spurious Emissions, Mid Channel 30 - 2400MHz

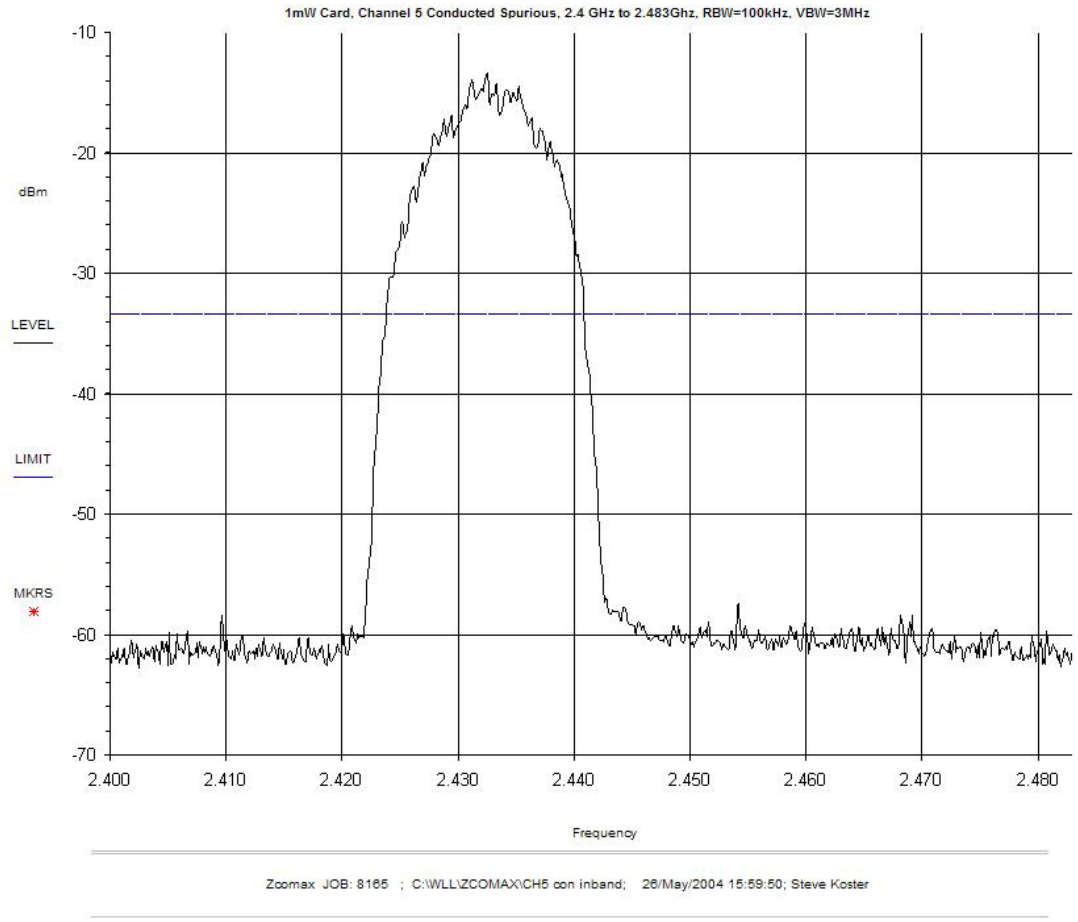

Figure 5-29. Conducted Spurious Emissions, Mid Channel - In Band

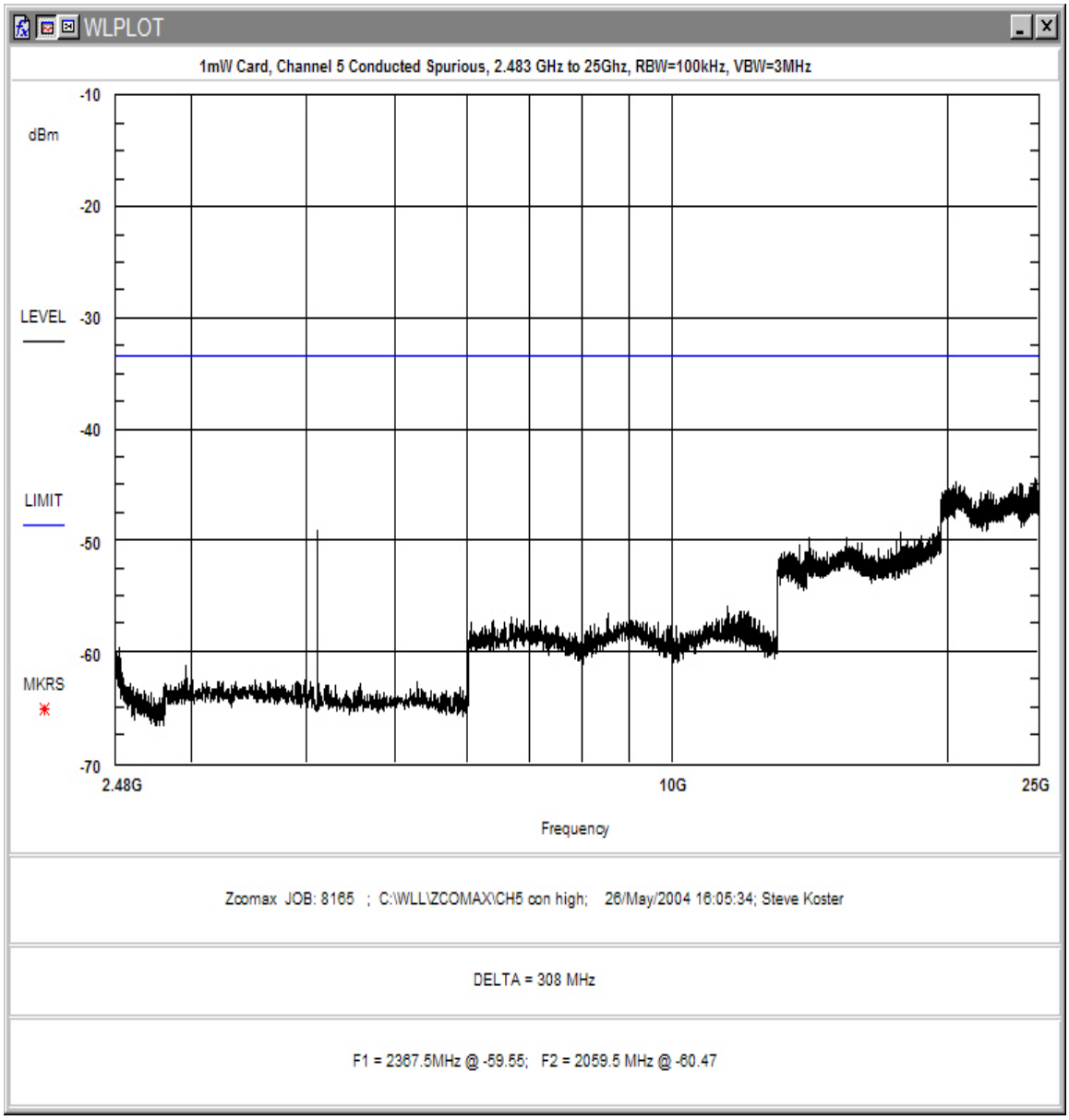

Figure 5-30. Conducted Spurious Emissions, Mid Channel 2.4 – 25GHz

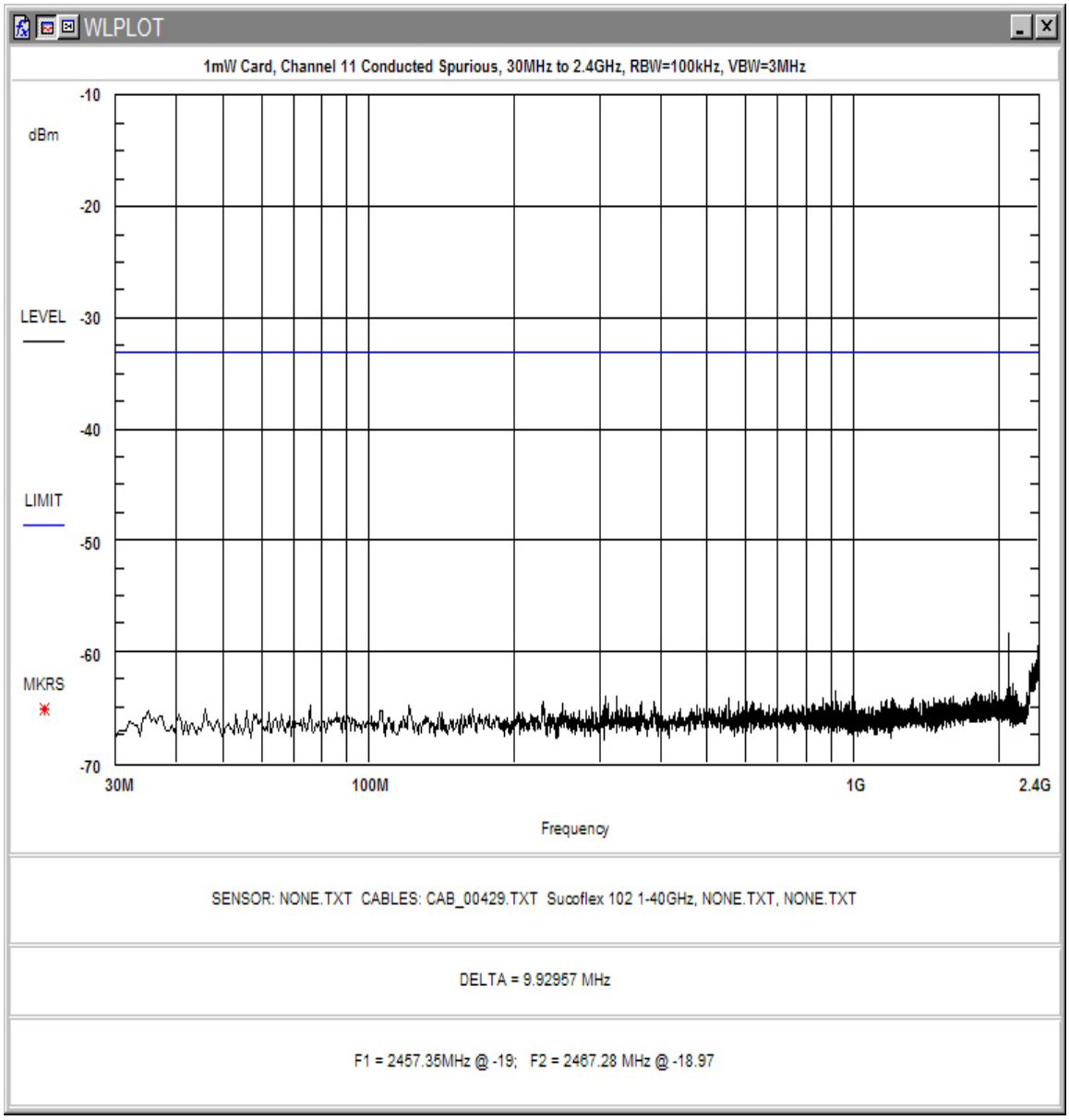

Figure 5-31. Conducted Spurious Emissions, High Channel 30 - 2400MHz

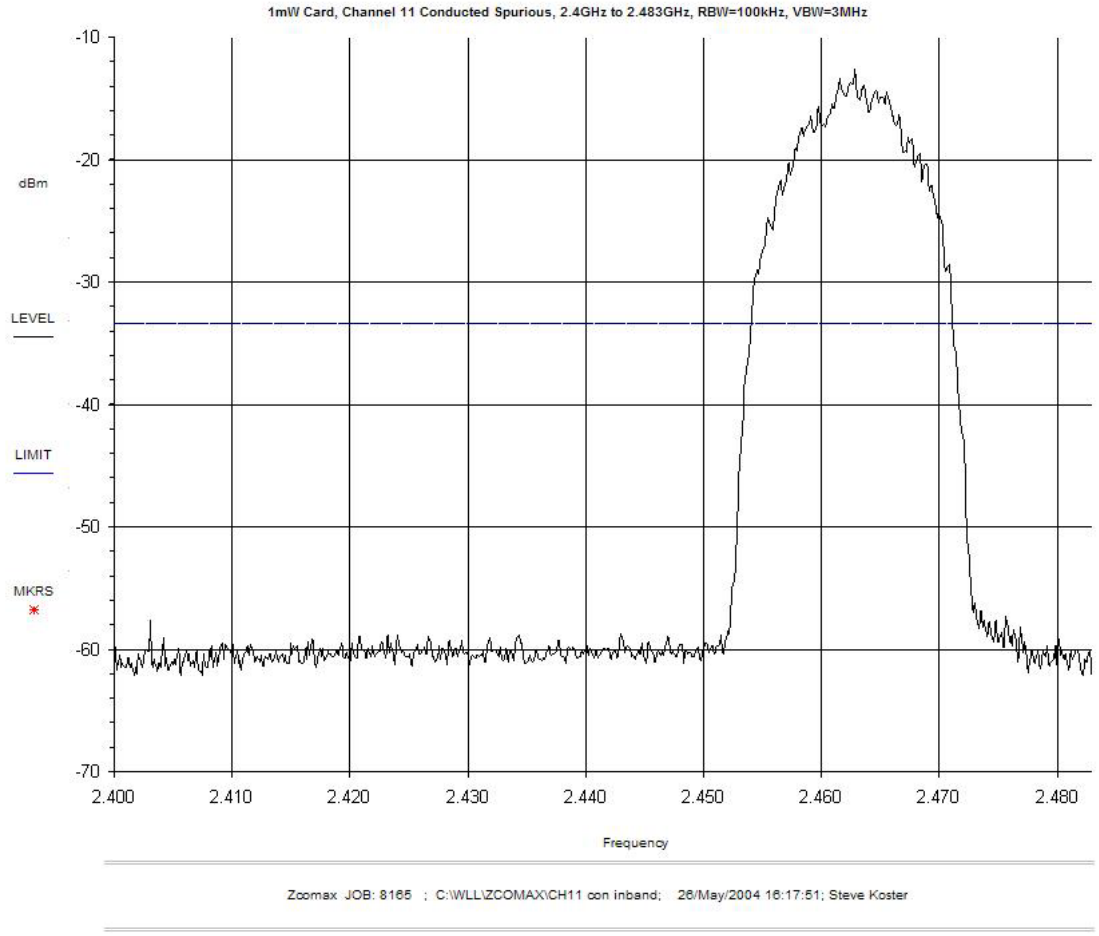

Figure 5-32. Conducted Spurious Emissions, High Channel - In Band

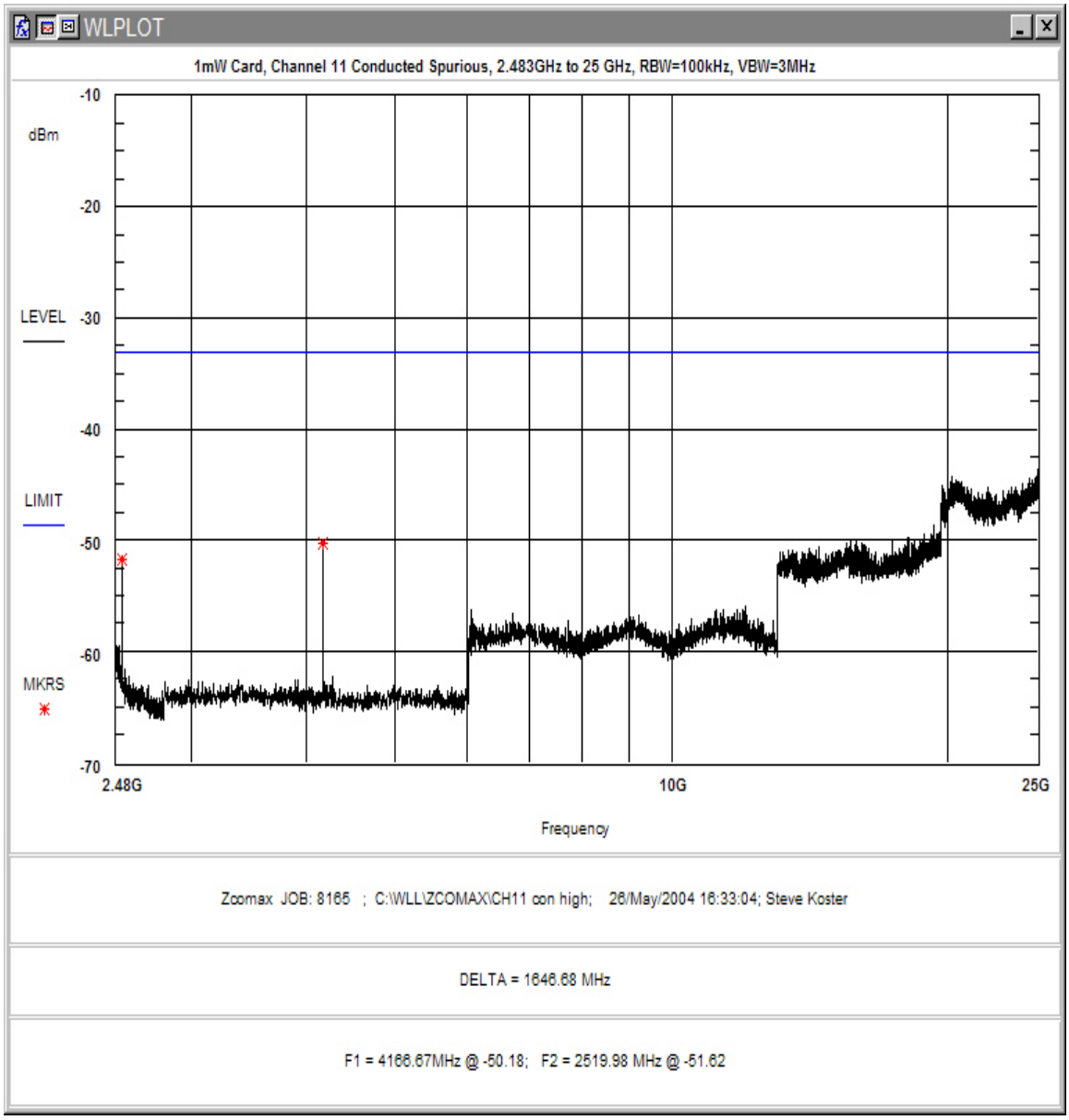

Figure 5-33. Conducted Spurious Emissions, High Channel 2.4 – 10 GHz

5.5 Radiated Spurious Emissions: (FCC Part §2.1053)

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.209 and §15.35(b) for peak measurements.

5.5.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.4-2003. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	<30 Hz (Avg.) 1MHz (Peak)

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level): VdBµV
Antenna Factor (Ant Corr): AFdB/m
Cable Loss Correction (Cable Corr): CCdB
Amplifier Gain: GdB
Electric Field (Corr Level): EdBµV/m = VdBµV + AFdB/m + CCdB - GdB
To convert to linear units: EµV/m = antilog (EdBµV/m/20)

Table 4: Radiated Emission Test Data, Low Frequency Data (<1GHz)

CLIENT:	ZCOMAX	DATE:	4/22/2005
TESTER:	Greg Snyder	JOB #:	8165
EUT Information:		**Test Requirements:**	
EUT:	ZCOMAX XI-325H	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting	DISTANCE:	3m
CLASS:	B		
Test Equipment/Limit:			
ANTENNA:	A_00382	LIMIT:	LFCC_3m_Class_B
CABLE:	CSITE1_3m	AMPLIFIER (dB)	None

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB
156.717	V	180.0	1.0	12.2	12.2	1.9	26.3	20.7	150.0	-17.2
245.770	V	315.0	1.0	20.2	11.8	2.4	34.4	52.2	200.0	-11.7
256.110	V	112.5	1.0	18.0	12.1	2.5	32.5	42.2	200.0	-13.5
264.000	V	45.0	1.0	16.6	12.8	2.5	31.9	39.2	200.0	-14.2
331.812	V	202.5	1.0	12.5	14.0	2.8	29.3	29.3	200.0	-16.7
400.460	V	180.0	1.0	11.4	15.5	3.1	30.0	31.6	200.0	-16.0
608.200	V	202.5	1.0	10.2	18.5	4.1	32.9	43.9	200.0	-13.2
245.770	H	180.0	1.0	18.4	11.8	2.4	32.6	42.5	200.0	-13.5
256.110	H	90.0	1.0	25.4	12.1	2.5	39.9	99.0	200.0	-6.1
264.000	H	180.0	1.0	19.8	12.8	2.5	35.1	56.6	200.0	-11.0
331.812	H	0.0	1.0	16.1	14.0	2.8	32.9	44.3	200.0	-13.1
400.460	H	45.0	1.5	19.8	15.5	3.1	38.4	83.2	200.0	-7.6
608.200	H	180.0	1.5	12.8	18.5	4.1	35.5	59.3	200.0	-10.6

Table 5: Radiated Emission Test Data, High Frequency Data (>1GHz)

(Restricted Bands)

CLIENT:	ZCOMAX	DATE:	4/15/2005
TESTER:	James Ritter	JOB #:	8165
EUT Information:		**Test Requirements:**	
EUT:	XI-325H	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting Hi Power	DISTANCE:	3m
CLASS:	B		
Test Equipment/Limit:			
ANTENNA:	A_00425	LIMIT:	LFCC_3m_Class_B
CABLE:	CSITE1_HF	AMPLIFIER (dB)	A_00066

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Low Ch:				**Peak**								
4824.000	H	0.0	1.0	41.1	33.3	4.1	35.9	42.5	133.7	5000.0	-31.5	Amb
7236.000	H	0.0	1.0	44.1	37.6	5.0	35.9	50.8	348.4	5000.0	-23.1	Amb
12060.000	H	180.0	1.0	48.3	41.4	6.6	35.8	60.6	1071.3	5000.0	-13.4	Amb
14472.000	H	180.0	1.0	43.5	40.8	7.5	34.8	57.0	710.3	5000.0	-17.0	Amb
4824.000	V	90.0	1.0	46.5	33.3	4.1	35.9	47.9	248.9	5000.0	-26.1	Amb
7236.000	V	0.0	1.0	46.7	37.6	5.0	35.9	53.4	468.4	5000.0	-20.6	Amb
12060.000	V	0.0	1.0	45.5	41.4	6.6	35.8	57.8	773.4	5000.0	-16.2	Amb
14472.000	V	180.0	1.0	46.3	40.8	7.5	34.8	59.9	983.9	5000.0	-14.1	Amb
Low Ch:				**Avg**								
4824.000	H	0.0	1.0	33.7	33.3	4.1	35.9	35.1	57.0	500.0	-18.9	Amb
7236.000	H	0.0	1.0	35.1	37.6	5.0	35.9	41.8	123.6	500.0	-12.1	Amb
12060.000	H	180.0	1.0	35.3	41.4	6.6	35.8	47.6	239.8	500.0	-6.4	Amb
14472.000	H	180.0	1.0	33.0	40.8	7.5	34.8	46.5	212.1	500.0	-7.5	Amb
4824.000	V	90.0	1.0	34.5	33.3	4.1	35.9	35.9	62.5	500.0	-18.1	Amb
7236.000	V	0.0	1.0	34.0	37.6	5.0	35.9	40.7	108.9	500.0	-13.2	Amb
12060.000	V	0.0	1.0	33.7	41.4	6.6	35.8	45.9	198.1	500.0	-8.0	Amb
14472.000	V	180.0	1.0	33.0	40.8	7.5	34.8	46.5	212.1	500.0	-7.5	Amb
Mid Ch:				**Peak**								
4864.000	H	0.0	1.0	45.8	33.4	4.1	36.0	47.3	232.5	5000.0	-26.7	Amb
7296.000	H	180.0	1.0	45.7	37.7	5.0	35.9	52.4	419.1	5000.0	-21.5	Amb
12160.000	H	0.0	1.0	45.2	41.3	6.6	35.7	57.5	745.6	5000.0	-16.5	Amb
4864.000	V	0.0	1.0	46.1	33.4	4.1	36.0	47.6	239.8	5000.0	-26.4	Amb
7296.000	V	180.0	1.0	45.8	37.7	5.0	35.9	52.6	426.4	5000.0	-21.4	Amb
12160.000	V	0.0	1.0	44.3	41.3	6.6	35.7	56.6	674.6	5000.0	-17.4	Amb
Mid Ch:				**Avg.**								
4864.000	H	0.0	1.0	33.7	33.4	4.1	36.0	35.2	57.3	500.0	-18.8	Amb
7296.000	H	180.0	1.0	33.5	37.7	5.0	35.9	40.3	103.5	500.0	-13.7	Amb
12160.000	H	0.0	1.0	34.2	41.3	6.6	35.7	46.5	210.9	500.0	-7.5	Amb

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
4864.000	V	0.0	1.0	33.9	33.4	4.1	36.0	35.4	58.9	500.0	-18.6	Amb
7296.000	V	180.0	1.0	33.7	37.7	5.0	35.9	40.5	105.9	500.0	-13.5	Amb
12160.000	V	0.0	1.0	33.8	41.3	6.6	35.7	46.1	201.4	500.0	-7.9	Amb
High Ch:				**Peak**								
4924.000	H	180.0	1.0	42.3	33.5	4.1	36.0	43.9	156.9	5000.0	-30.1	Amb
7386.000	H	0.0	1.0	44.2	37.8	5.1	35.9	51.1	358.0	5001.0	-22.9	Amb
12310.000	H	0.0	1.0	46.1	41.1	6.7	35.5	58.4	831.7	5003.0	-15.6	Amb
4924.000	V	180.0	1.0	44.0	33.5	4.1	36.0	45.6	190.9	5000.0	-28.4	Amb
7386.000	V	0.0	1.0	43.5	37.8	5.1	35.9	50.4	330.3	5000.0	-23.6	Amb
12310.000	V	0.0	1.0	45.8	41.1	6.7	35.5	58.1	803.5	5000.0	-15.9	Amb
High Ch.				**Avg.**								
4924.000	H	180.0	1.0	33.3	33.5	4.1	36.0	34.9	55.9	500.0	-19.0	Amb
7386.000	H	0.0	1.0	34.5	37.8	5.1	35.9	41.4	117.2	500.0	-12.6	Amb
12310.000	H	0.0	1.0	34.2	41.1	6.7	35.5	46.5	211.3	500.0	-7.5	Amb
4924.000	V	180.0	1.0	34.8	33.5	4.1	36.0	36.4	66.2	500.0	-17.6	Amb
7386.000	V	0.0	1.0	36.0	37.8	5.1	35.9	42.9	139.3	500.0	-11.1	Amb
12310.000	V	0.0	1.0	33.9	41.1	6.7	35.5	46.2	204.2	500.0	-7.8	Amb

Table 6: Radiated Emission Test Data, Band Edge Data

CLIENT:	ZComax	DATE:	3/7/2005
TESTER:	James Ritter	JOB #:	8165
EUT Information:		**Test Requirements:**	
EUT:	325H	TEST STD:	FCC Part 15
CONFIGURATION:	TX on channel 11	DISTANCE:	3m
CLASS:	B		
Test Equipment/Limit:			
ANTENNA:	A_00004	LIMIT:	LFCC_3m_Class_B
CABLE:	CSITE2_HF	AMPLIFIER (dB)	A_00312

Freq (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Chan 10				**Peak**								
2483.50	H	180.0	1.0	56.0	29.1	3.1	33.4	54.7	543.0	5000.0	-19.3	Band edge, Peak
2483.50	V	160.0	1.0	60.8	29.1	3.1	33.4	59.5	941.4	5000.0	-14.5	Band edge, Peak
				Avg								
2483.50	H	180.0	1.0	44.0	29.1	3.1	33.4	42.7	136.7	500.0	-11.3	Band edge, Avg.
2483.50	V	160.0	1.0	49.4	29.1	3.1	33.4	48.0	252.2	500.0	-5.9	Band edge, Avg.
Chan 9				**Peak**								
2492.38	V	190.0	1.0	63.6	29.1	3.1	33.5	62.2	1292.4	5000.0	-11.8	Band edge, Peak (highest)
2492.38	H	150.0	1.0	54.6	29.1	3.1	33.5	53.3	460.7	5000.0	-20.7	Band edge, Peak (highest)
				Avg								
2492.38	V	190.0	1.0	51.6	29.1	3.1	33.5	50.3	326.5	500.0	-3.7	Band edge, Avg. (highest)
2492.38	H	150.0	1.0	42.3	29.1	3.1	33.5	41.0	112.2	500.0	-13.0	Band edge, Avg. (highest)
Chan 11				**Peak**								
2488.30	H	180.0	1.0	56.4	29.1	3.1	33.5	55.1	568.9	5000.0	-18.9	Band edge, Peak(highest)
2488.30	V	190.0	1.0	61.6	29.1	3.1	33.5	60.3	1032.8	5000.0	-13.7	Band edge, Peak(highest)
				Avg.								
2488.30	H	180.0	1.0	44.4	29.1	3.1	33.5	43.0	141.8	500.0	-10.9	Band edge, Avg. (highest)
2488.30	V	190.0	1.0	49.1	29.1	3.1	33.5	47.8	244.4	500.0	-6.2	Band edge, Avg. (highest)
Chan 1				**Peak**								
2386.90	V	170.0	1.0	58.5	28.9	3.1	33.0	57.5	749.6	5000.0	-16.5	Restricted Band
2386.90	H	190.0	1.0	54.4	28.9	3.1	33.0	53.4	469.2	5000.0	-20.6	Restricted Band
				Avg.								
2386.90	V	170.0	1.0	49.3	28.9	3.1	33.0	48.3	259.9	500.0	-5.7	Restricted Band
2386.90	H	190.0	1.0	44.1	28.9	3.1	33.0	43.1	143.3	500.0	-10.9	Restricted Band
Chan 2				**Peak**								
2390.00	V	160.0	1.0	62.7	28.9	3.1	33.0	61.7	1217.1	5000.0	-12.3	Restricted Band
2390.00	H	170.0	1.0	56.6	28.9	3.1	33.0	55.6	600.3	5000.0	-18.4	Restricted Band
				Avg								
2390.00	V	160.0	1.0	50.2	28.9	3.1	33.0	49.2	287.6	500.0	-4.8	Restricted Band
2390.00	H	170.0	1.0	44.8	28.9	3.1	33.0	43.8	154.6	500.0	-10.2	Restricted Band

5.6 AC Powerline Conducted Emissions: (FCC Part §15.207)

The EUT was placed on an 80 cm high 1 x 1.5 m non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 μH Line Impedance Stabilization Network bonded to a 3 x 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak or peak, as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth.

Data is recorded in Table 7.

Table 7: Conducted Emissions Test Data; 15.207

CLIENT:	ZCOMAX	DATE:	4/22/2005
MODEL:	XI-325H	JOB #:	8165
TESTER:	Greg Snyder	TEST SITE:	CSITE1_CE
TEST STANDARD:	FCC Part 15	TEST VOLTAGE:	120 VAC
CLASS:	FCC_B		

LINE 1 - NEUTRAL

Frequency MHz	Level QP dBuV	Cable Loss dB	Limit QP dBuV	Level Corr dBuV	Margin QP dB	Level AVG dBuV	Cable Loss dB	Level Corr dBuV	Limit AVG dBuV	Margin AVG dB
0.153	38.5	10.3	65.8	48.8	-17.1	3.8	10.3	14.1	55.8	-41.8
0.193	40.0	10.2	63.9	50.2	-13.7	25.8	10.2	36.0	53.9	-17.9
0.393	32.0	10.1	58.0	42.1	-15.9	29.5	10.1	39.6	48.0	-8.4
3.408	22.2	10.7	56.0	32.9	-23.1	22.2	10.7	32.9	46.0	-13.1
8.180	24.4	11.1	60.0	35.5	-24.5	24.4	11.1	35.5	50.0	-14.5
9.040	26.2	11.1	60.0	37.3	-22.7	26.2	11.1	37.3	50.0	-12.7
13.900	16.4	11.5	60.0	27.9	-32.1	16.4	11.5	27.9	50.0	-22.1
20.620	17.3	11.8	60.0	29.1	-30.9	17.3	11.8	29.1	50.0	-20.9

LINE 2 - PHASE

Frequency MHz	Level QP dBuV	Cable Loss dB	Limit QP dBuV	Level Corr dBuV	Margin QP dB	Level AVG dBuV	Cable Loss dB	Level Corr dBuV	Limit AVG dBuV	Margin AVG dB
0.150	40.0	10.3	66.0	50.3	-15.7	3.4	10.3	13.7	56.0	-42.3
0.196	40.2	10.2	63.8	50.4	-13.4	26.4	10.2	36.6	53.8	-17.2
0.396	32.5	10.1	57.9	42.6	-15.3	29.7	10.1	39.8	47.9	-8.1
3.670	21.9	10.7	56.0	32.6	-23.4	21.9	10.7	32.6	46.0	-13.4
8.185	25.5	11.1	60.0	36.6	-23.4	25.5	11.1	36.6	50.0	-13.4
8.645	26.2	11.1	60.0	37.3	-22.7	26.2	11.1	37.3	50.0	-12.7
10.170	17.0	11.2	60.0	28.2	-31.8	17.0	11.2	28.2	50.0	-21.8
23.660	14.4	11.9	60.0	26.3	-33.7	14.4	11.9	26.3	50.0	-23.7