Washington Laboratories, Ltd.

FCC Certification Test Report
For the
Hughes Network Systems
HUGHES 9250
(2.4GHz Radio, 802.11b Mode)
FCC ID: K3YHNS9250

WLL JOB# **9514**
December 22, 2006

Prepared for:

Hughes Network Systems
11717 Exploration Lane
Germantown, MD 20876

Prepared By:

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

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Prepared by: Brian J. Dettling
Documentation Specialist

Reviewed by: Steven D. Koster
EMC Operations Manager

Abstract

This report has been prepared on behalf of Hughes Network Systems to support the attached Application for Equipment Authorization. The test report and application are submitted for a Digital Transmission System Transmitter under Part 15.247 of the FCC Rules and Regulations.

This Certification Test Report documents the test configuration and test results for a Hughes Network Systems HUGHES 9250 2.4GHz card operating in the 802.11b mode.

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. 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 Hughes Network Systems HUGHES 9250 complies with the limits for a Digital Transmission System Transmitter device under FCC Part 15.247.

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1 Introduction

1.1 Compliance Statement

The Hughes Network Systems HUGHES 9250 complies with the limits for a Digital Transmission System Transmitter device under FCC Part 15.247.

1.2 Test Scope

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance with 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:	Hughes Network Systems 11717 Exploration Lane Germantown, MD 20876
Quotation Number:	63337

1.4 Test Dates

Testing performed on the following date(s):	December 4 to December 18, 2006

1.5 Test and Support Personnel

Washington Laboratories, LTD	James Ritter
Client Representative	Norbert Owona

2 Equipment Under Test

2.1 EUT Identification & Description

The Hughes Network Systems HUGHES 9250 is a broadband Satellite IP terminal and WLAN access point with an external Spacecom C10 antenna made for mobile applications. It allows IP packet data via Ethernet or WLAN interfaces to the Immarsat BGAN network.

The Hughes Network Systems HUGHES 9250 reported here is one configuration of a dual band access point product line.

- 2.4GHz + 1.6GHz L-Band

The **2.4 GHz 802.11b** portion of the radio is reported here.

The product is offered with an external connector. External antennas must be professionally installed.

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	Hughes network Systems
FCC ID:	K3YHNS9250
Model:	9250
FCC Rule Parts:	§15.247
Frequency Range:	2412-2462MHz
Maximum Output Power:	30mW
Modulation:	OFDM
Occupied Bandwidth:	12.5MHz (6dB BW)
Keying:	Automatic
Type of Information:	Data 802.11b
Number of Channels:	11
Power Output Level	Fixed
Antenna Type	external
Interface Cables:	Serial, LAN, ISDN, Power
Power Source & Voltage:	13.5 VDC Vehicle power

2.2 Test Configuration

The HUGHES 9250 was configured with the following components:

Description	Manufacturer	Model	S/N
Satellite Modem	HNS	9250	
Antenna	Spacecom	AS BGAN C10 HNS	06110001
Control box	HNS	9250 Control Box	
DC/DC Power adapter	EDAC Power electric	ED1010	54

The system was provided 14VDC from a lab power supply to the vehicle accessory plug. All conducted readings were taken at the output of the high power amp in the Spacecom C10 antenna assembly. For case radiated emissions this output was terminated.

The following ports and cable I/Os are available on the HUGHES 9250:

Port ID	Connector Type	Cable Length	Shielded (Y/N)	Connected To/From
Serial Port	USB to DB9	1	Y	9250 Transceiver to 9250 control box
Power in	Minijack			9250 Control Box to Transceiver
Ethernet	RG45	<2m cat5	N	9250 Transceiver to Laptop
ISDN	RG45	2m cat5	N	9250 Transceiver to unterminated
RF	SMA	1.5m	Y	9250 Transceiver to 9250 control box
ANT	SMA	5m	Y	9250 control box to Spacecom C10 Antenna
Power	Vehicle accessory plug	50cm	N	Lab Power supply to DC/DC converter
Power	Miniplug	1.5m	N	DC/DC converter to 9250 control box

The following diagram shows the test configuration:

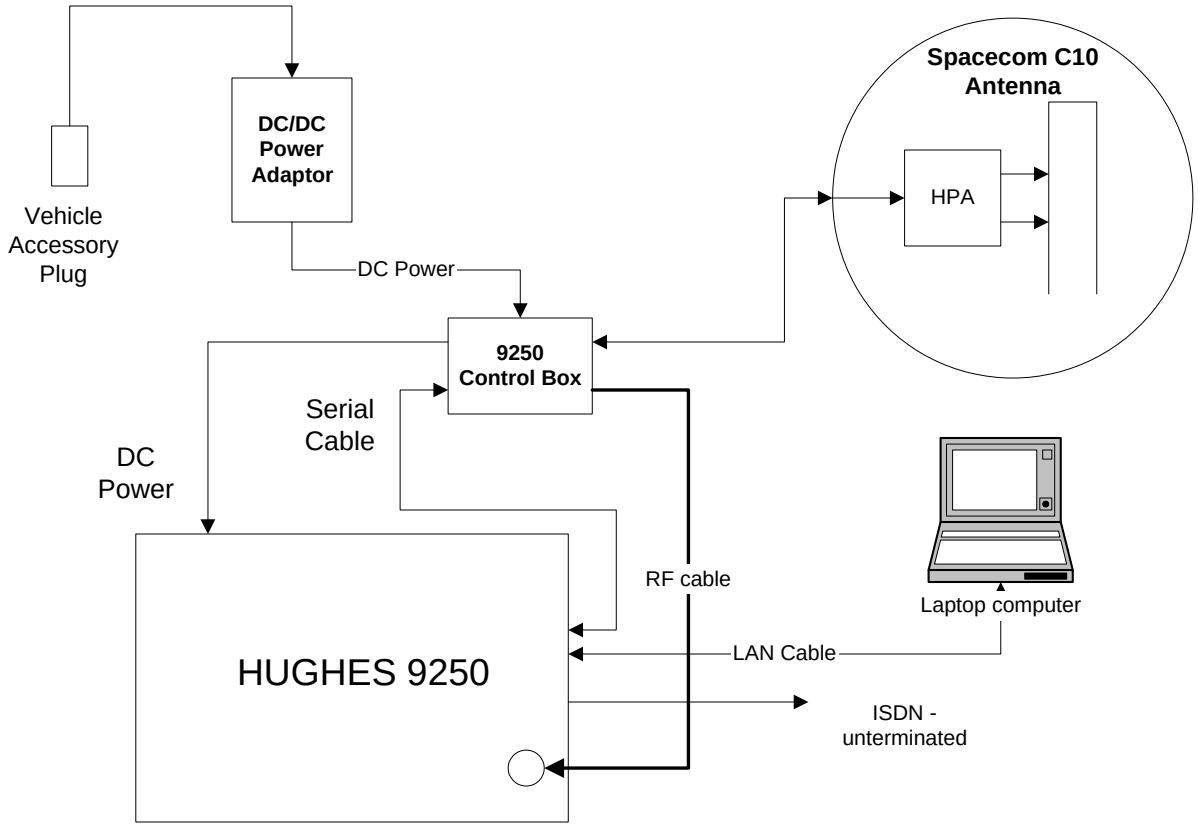

Figure 1: HUGHES 9250 Test Configuration

2.3 Testing Algorithm

A batch script file was provided for each Low, Center, and High channels in each modulation mode to place the EUT into transmit operation.

2.4 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.

2.5 Measurements

2.5.1 References

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

2.6 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.

3 Test Equipment

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

Table 2: Test Equipment List

WLL Asset #	Manufacturer Model/Type	Function	Cal. Due
0073	HP 8568B	SPECTRUM ANALYZER	6/26/2007
0069	HP 85650A	QUASI-PEAK ADAPTER	6/26/2007
0007	ARA LPB-2520	BICONILOG ANTENNA	12/20/2006
0074	HEWLETT-PACKARD 8593A	SPECTRUM ANALYZER	10/04/2006
0522	HEWLETT-PACKARD 8449B	MICROWAVE PREAMP	5/4/2007
0425	ARA DRG118/A	MICROWAVE HORN ANTENNA	1/17/2007
0557	Schaffner, CBL6141A	BICONILOG ANTENNA	12/1/2006
0071	HP 85685A	RF PRESELECTOR	6/26/2007
0605	AGILENT N1911A	POWER METER	2/04/2007

4 Test Results

4.1 RF Power Output: (FCC Part §2.1046)

The output from the transmitter was connected to a diode detector and oscilloscope. The peak deflection was measured on the oscilloscope and recorded. A signal generator was then substituted in place of EUT and set to the same frequency as the transmitter. The CW output of the signal generator was increased until the same deflection was noted on the oscilloscope. A power meter was then connected to the output of the signal generator to determine the output power of the signal generator. This level is then recorded as the output power of the EUT at the specified frequency.

Table 3. RF Power Output

Channel and/or Frequency	Measured Level (dBm)	Measured Level (Watts)	Rated (Watts)	Limit (Watts)
Channel 1 @ 2412 MHz	13.72	.0235	.03	1
Channel 6 @ 2437 MHz	13.11	.0214	.03	1
Channel 11 @ 2462 MHz	12.81	.0182	.03	1

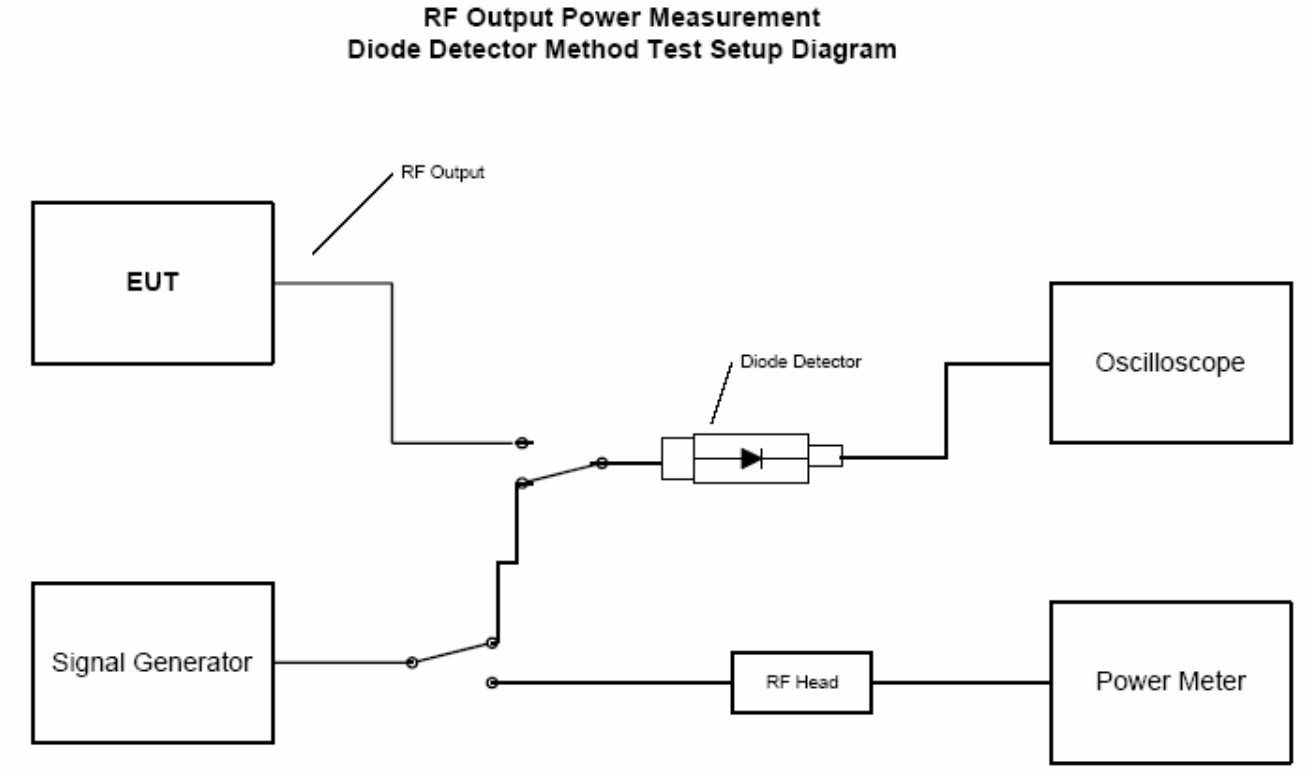

Figure 2. Power Measurement Setup

4.2 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer.

For DTS systems, FCC Part 15.247 requires that the 20 dB bandwidth exceed 0.5MHz.

At full modulation, the occupied bandwidth was measured as shown in the charts below. Table 4 provides a summary of the Occupied Bandwidth Results.

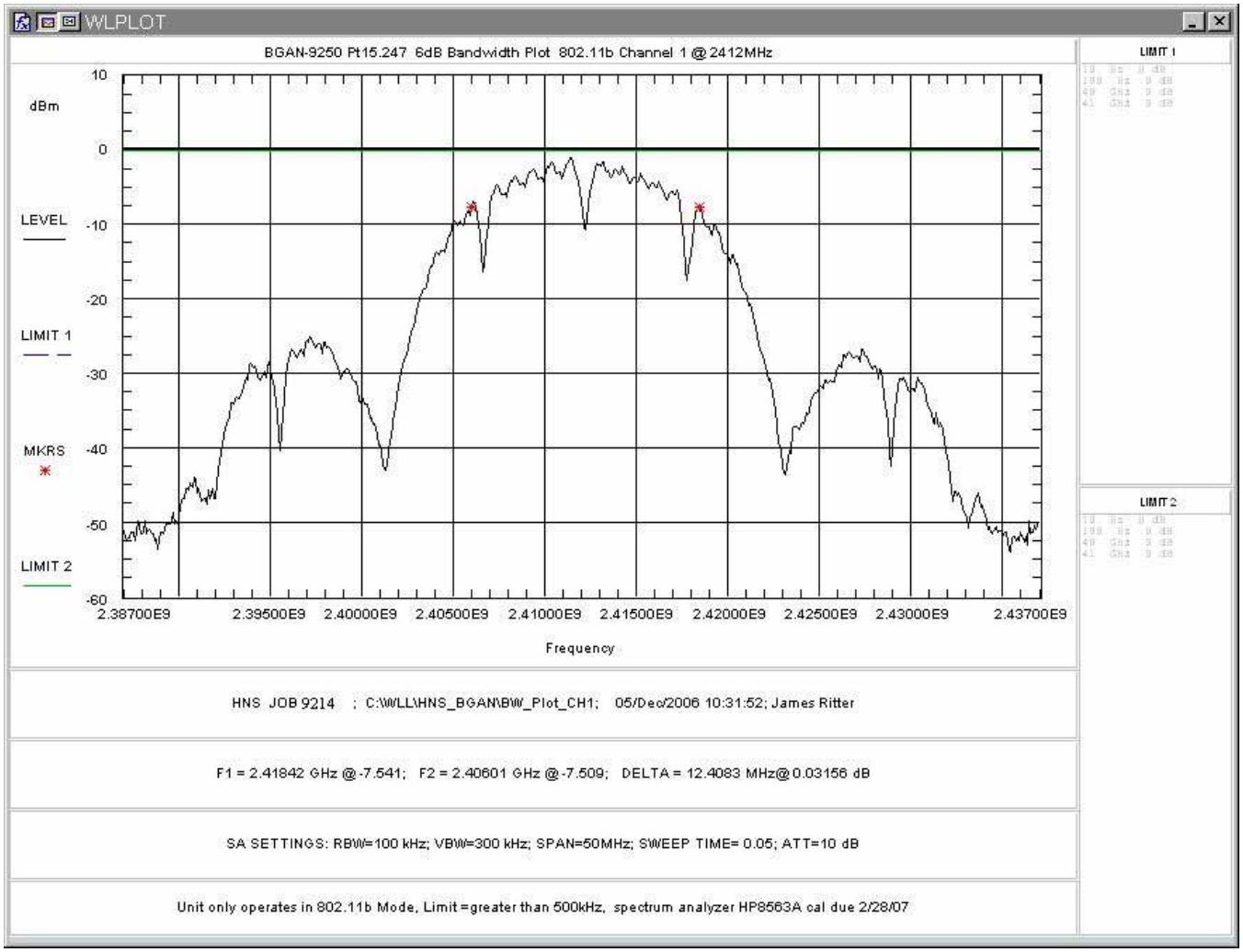

Figure 4-3. Occupied Bandwidth, Low Channel

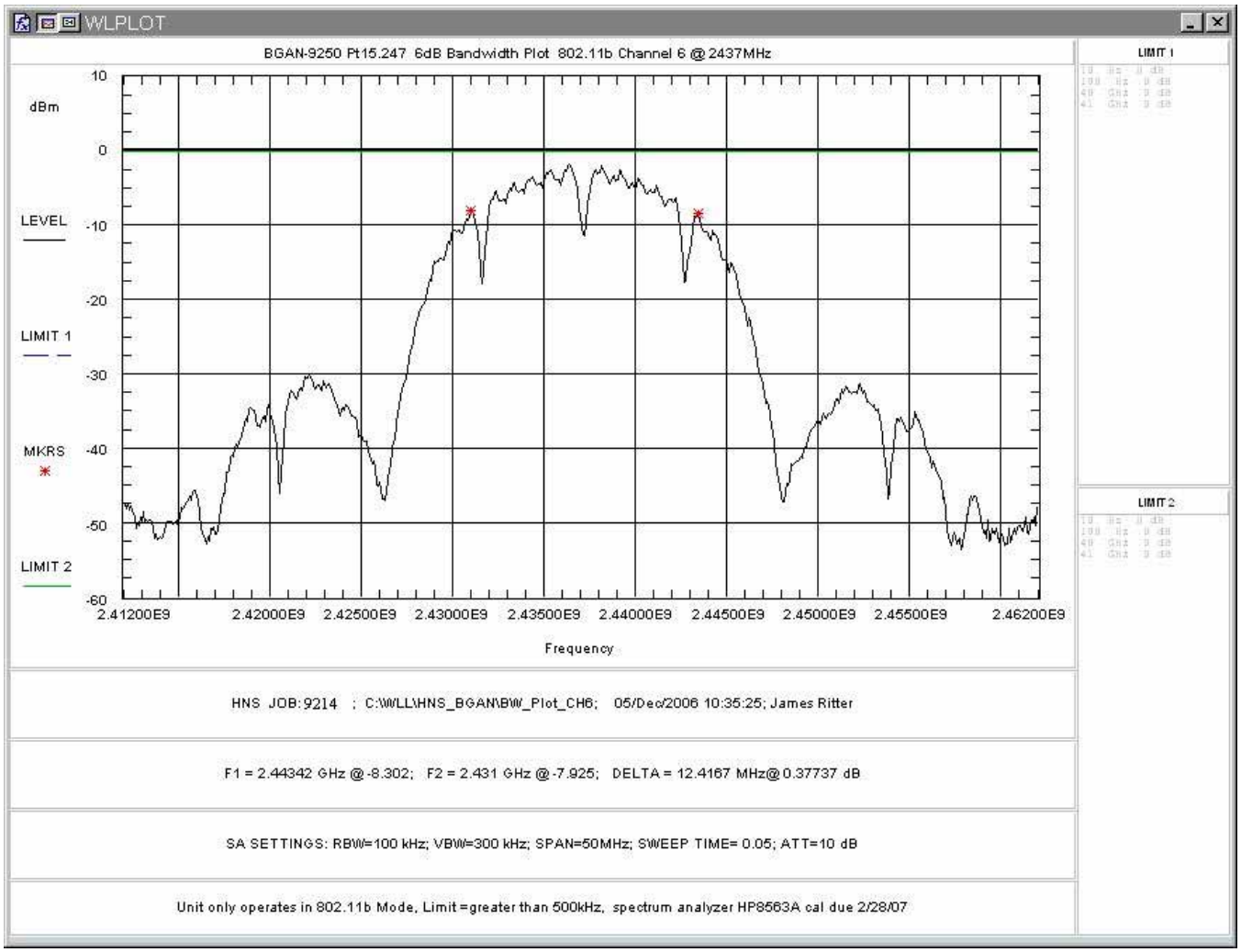

Figure 4-4. Occupied Bandwidth, Mid Channel

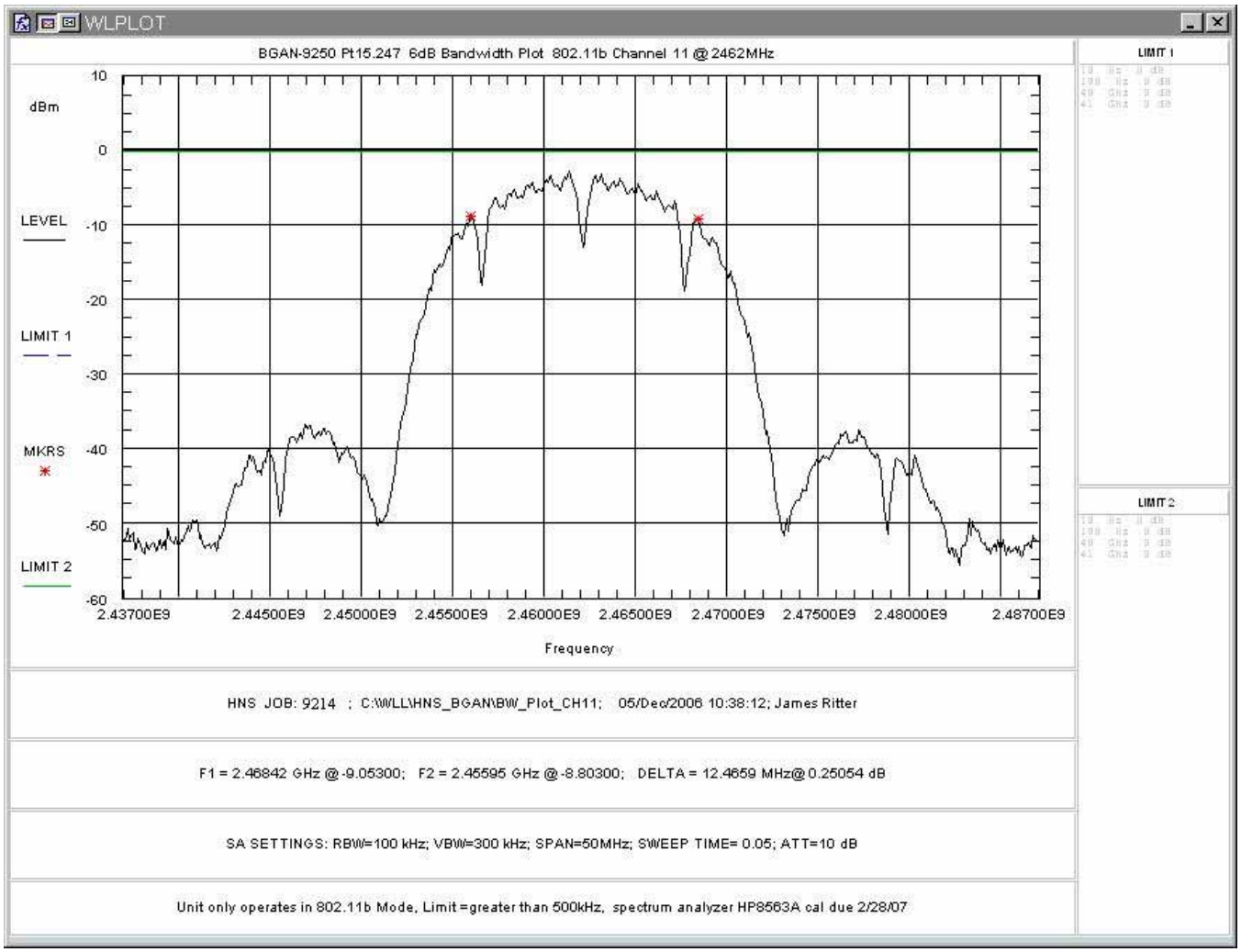

Figure 4-5. Occupied Bandwidth, High Channel

Table 4. Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel 2412MHz	12.408MHz	>0.5 MHz	Pass
Mid Channel 2437MHz	12.416MHz	>0.5 MHz	Pass
High Channel 2462MHz	12.465MHz	>0.5 MHz	Pass

4.3 RF Peak Power Spectral Density (§15.247(e))

For digitally modulated systems, 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 during any time interval of continuous transmission.

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.

The highest peak within the transmission was located and measured for the high, middle and low channels of operation. Plots of the PSD were taken as shown in Figure 6 through Figure 9 below.

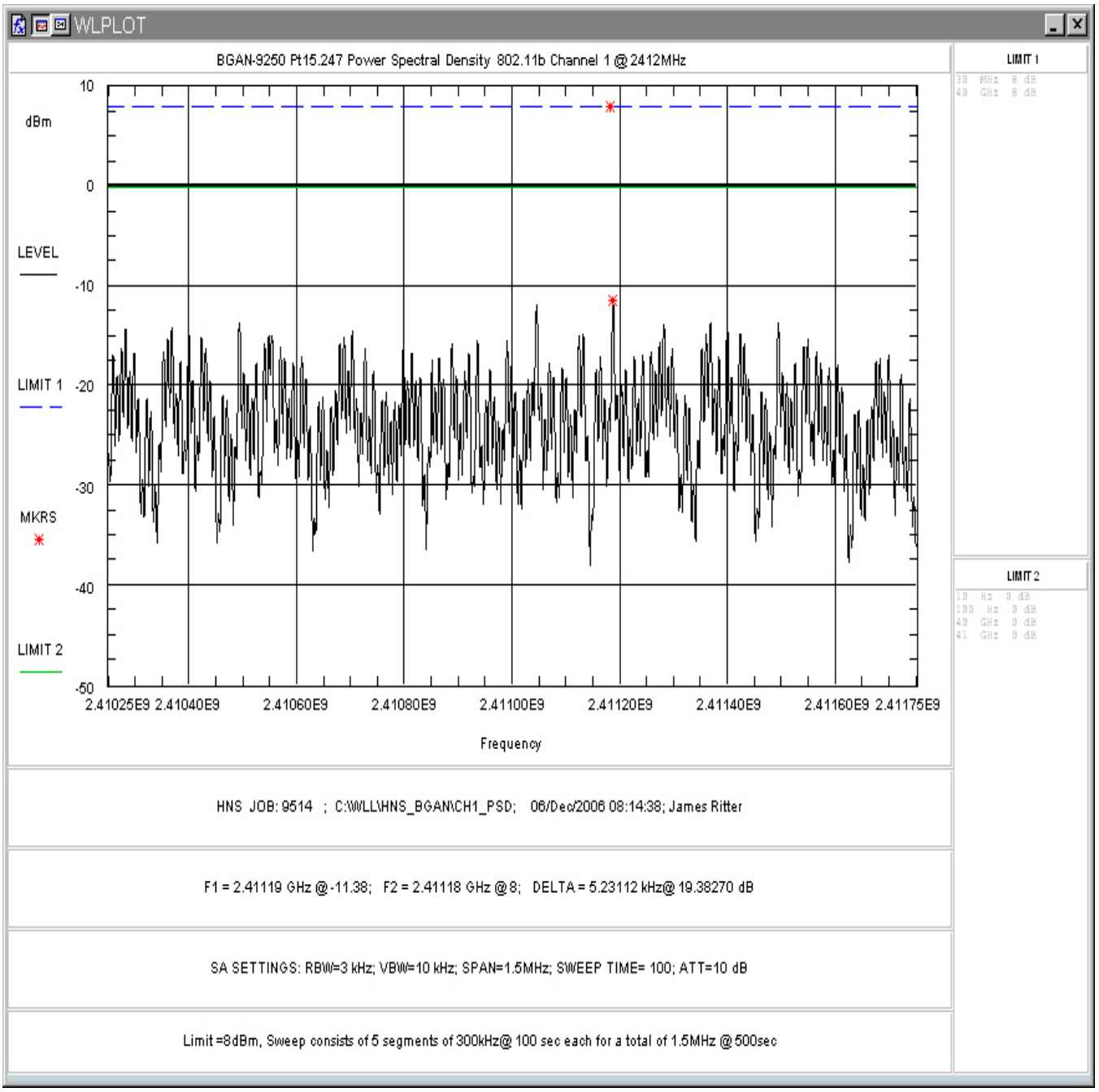

Figure 4-6: Power Spectral Density, Low Channel

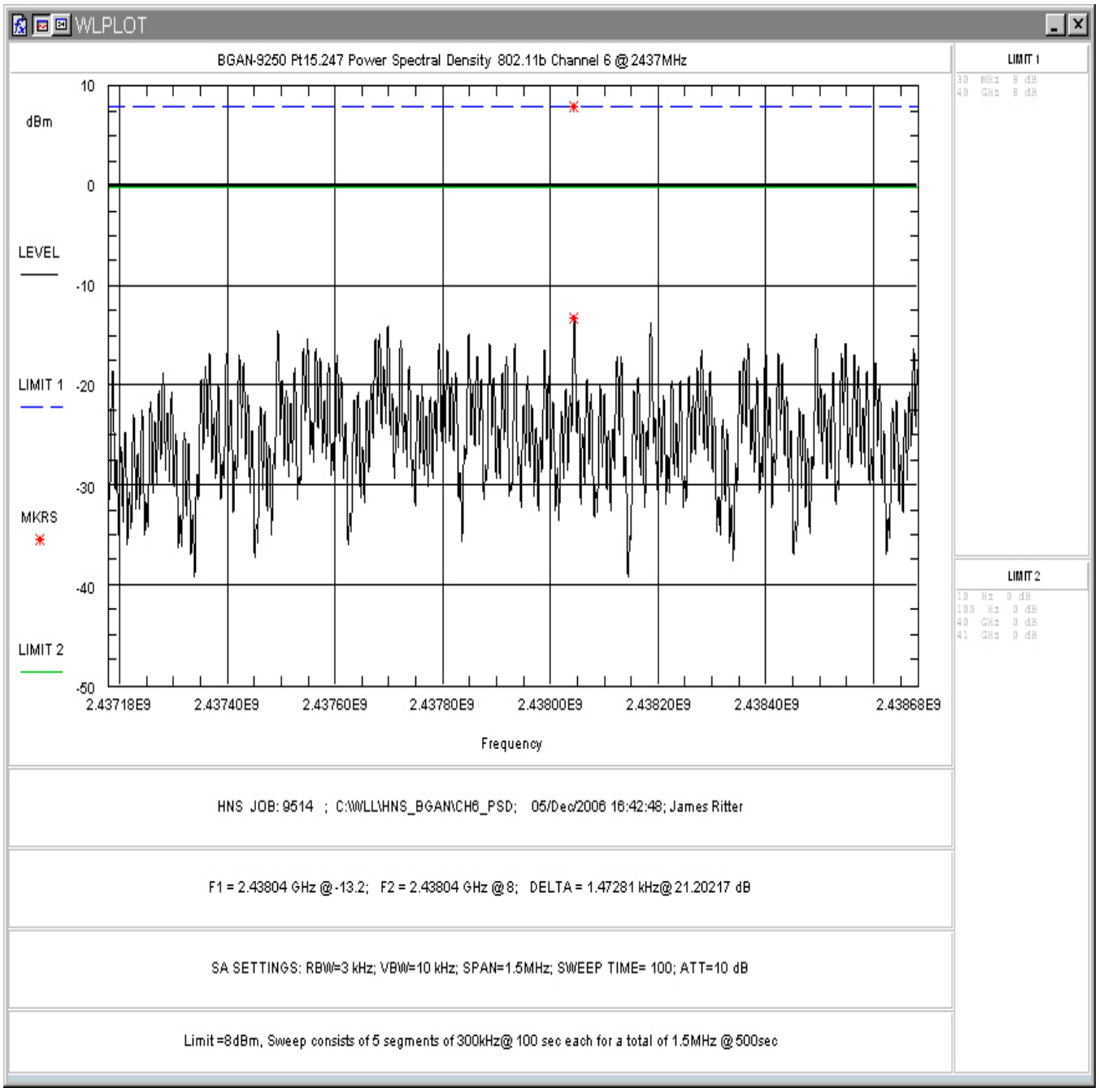

Figure 4-7: Power Spectral Density, Mid Channel

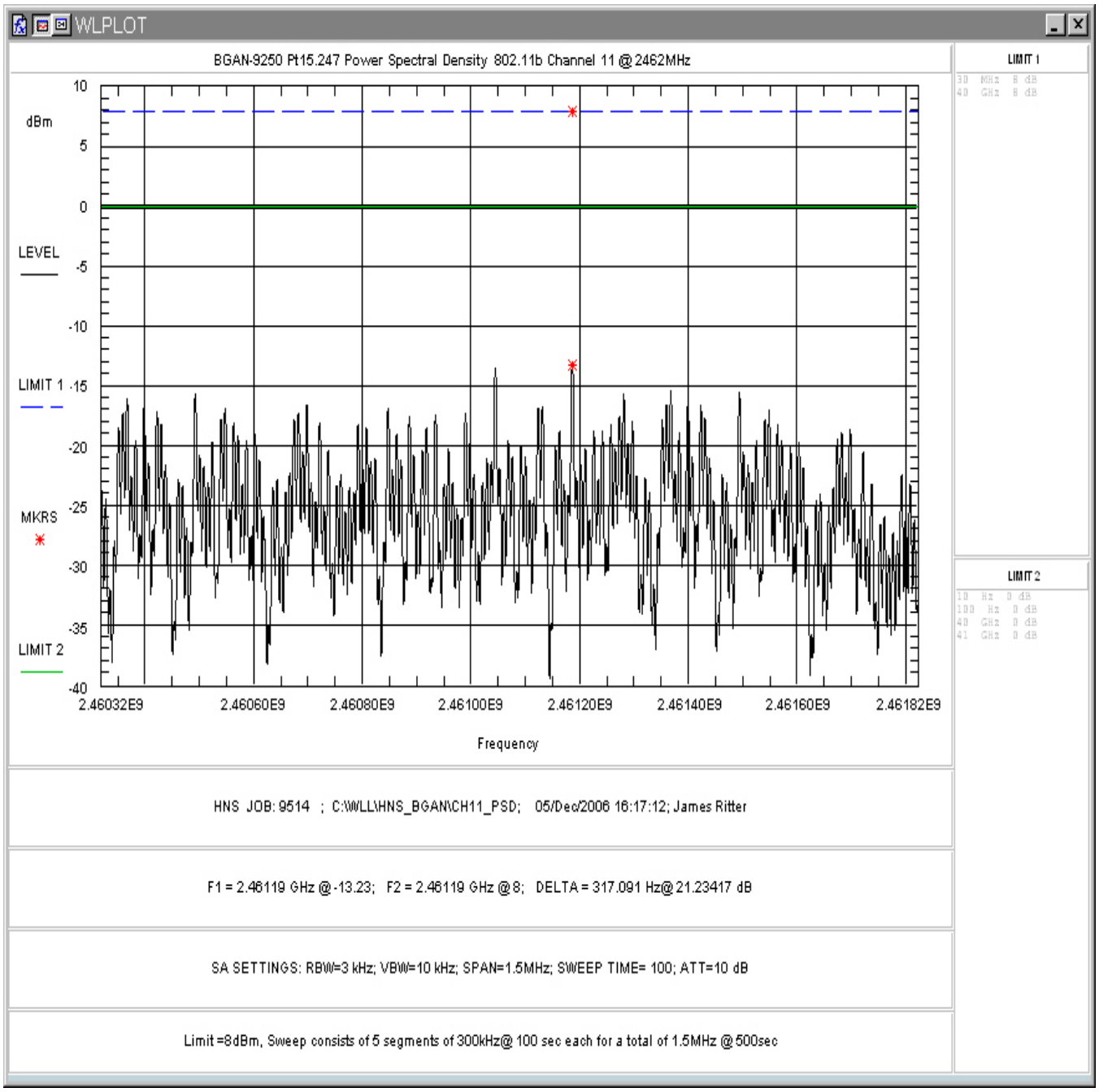

Figure 4-8: Power Spectral Density, High Channel

4.4 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.

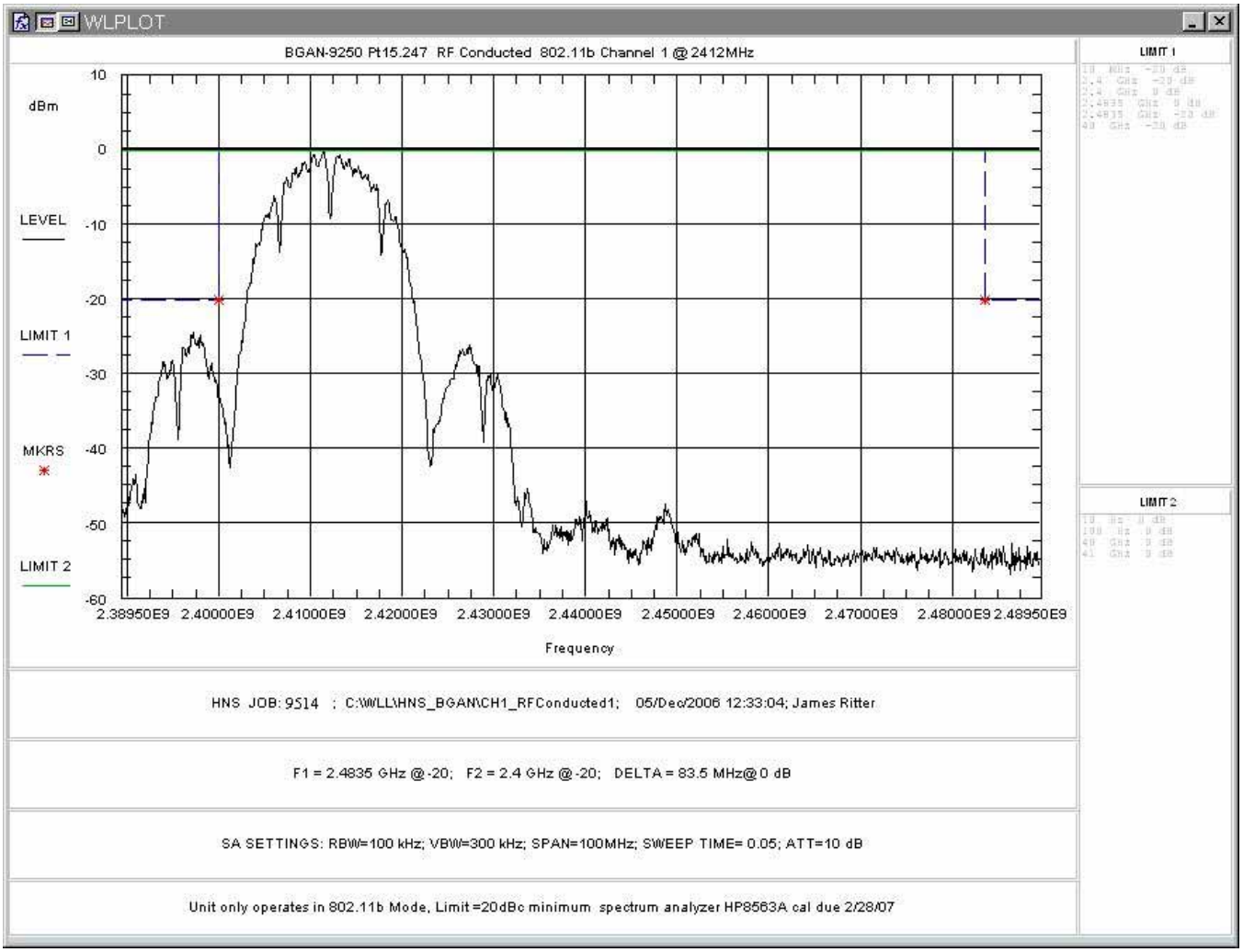

Figure 4-9. Conducted Spurious Emissions: Low Channel, In-Band (2389 – 2489MHz)

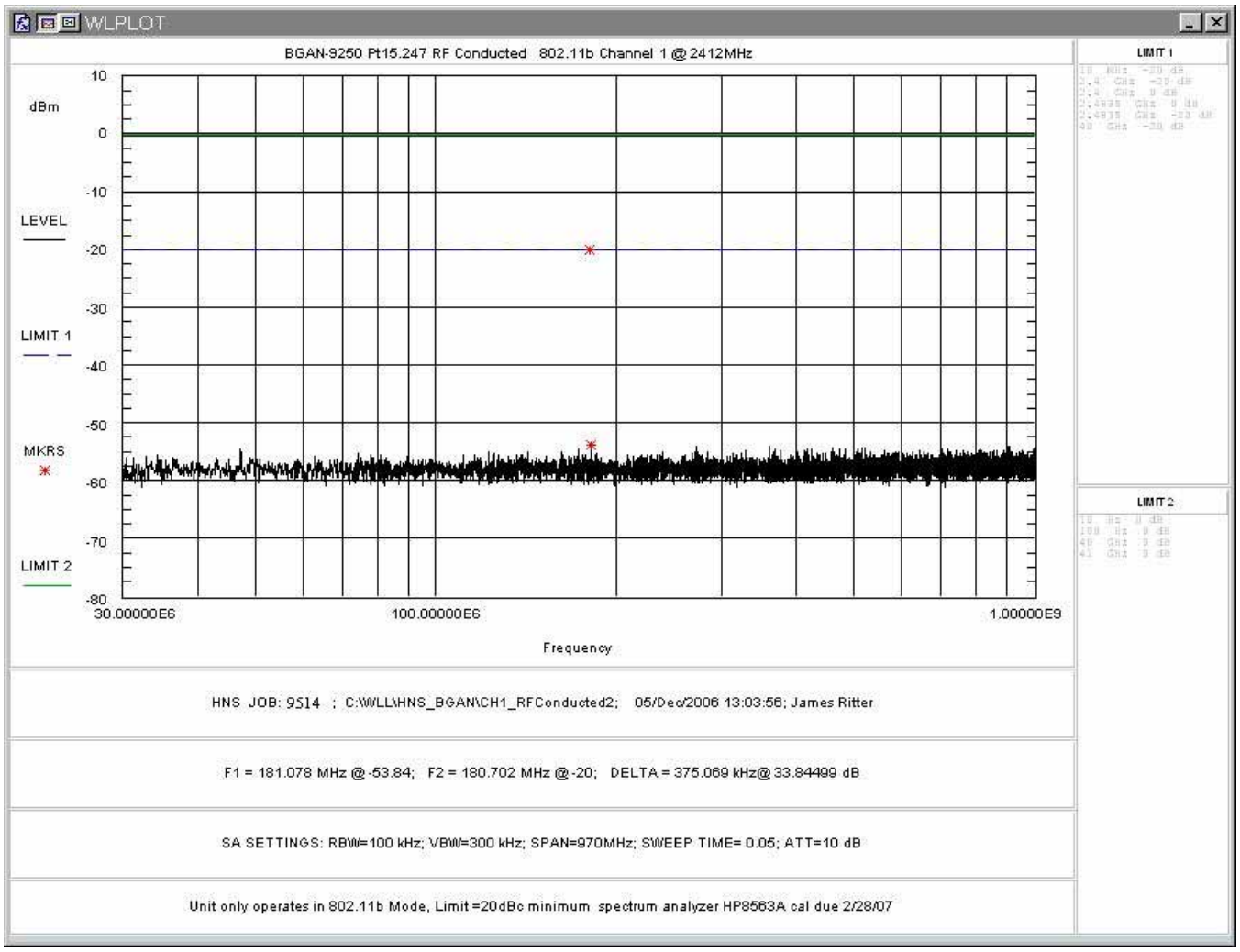

Figure 4-10. Conducted Spurious Emissions: Low Channel, 30 - 1000MHz

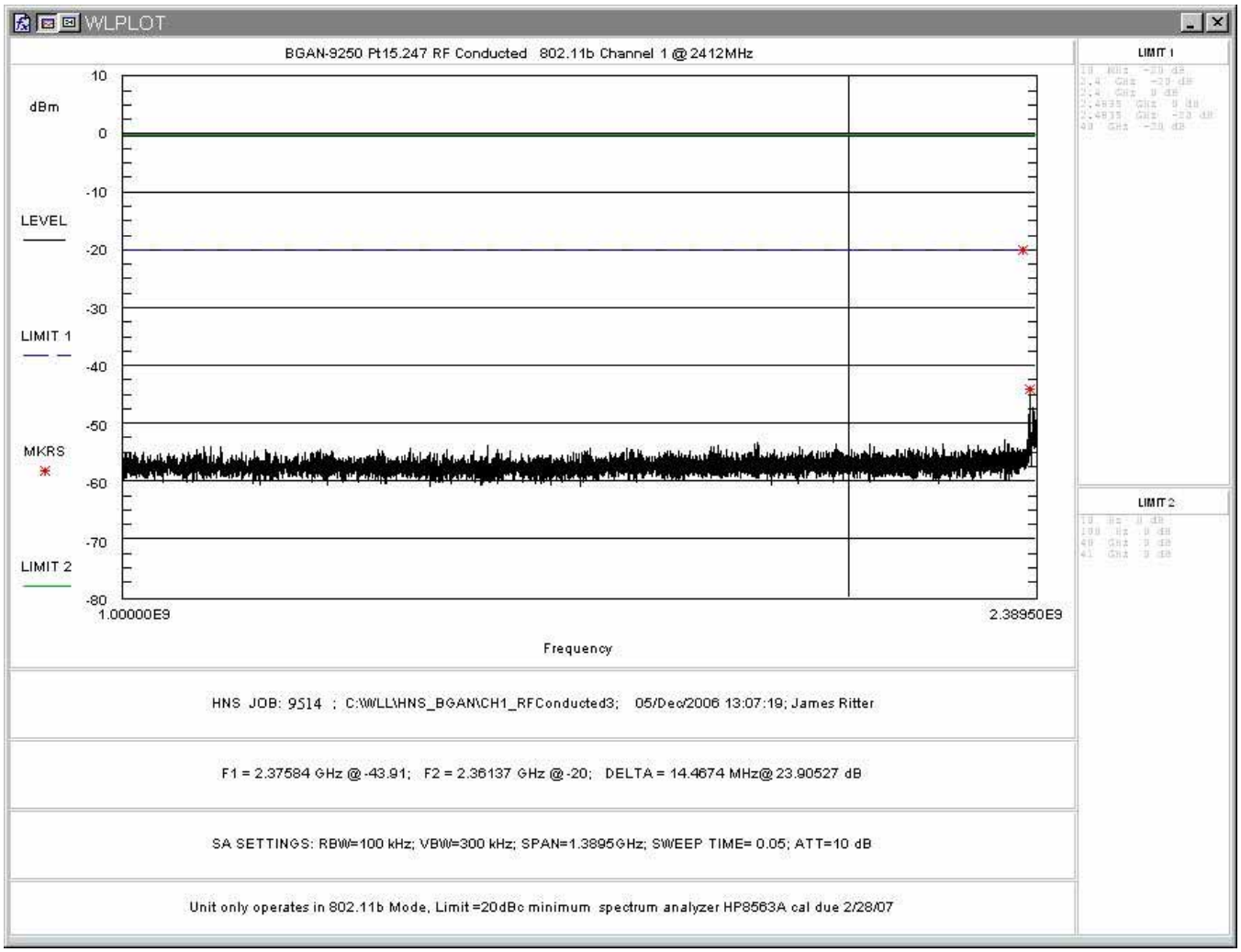

Figure 4-11. Conducted Spurious Emissions: Low Channel, 1 – 2.38GHz

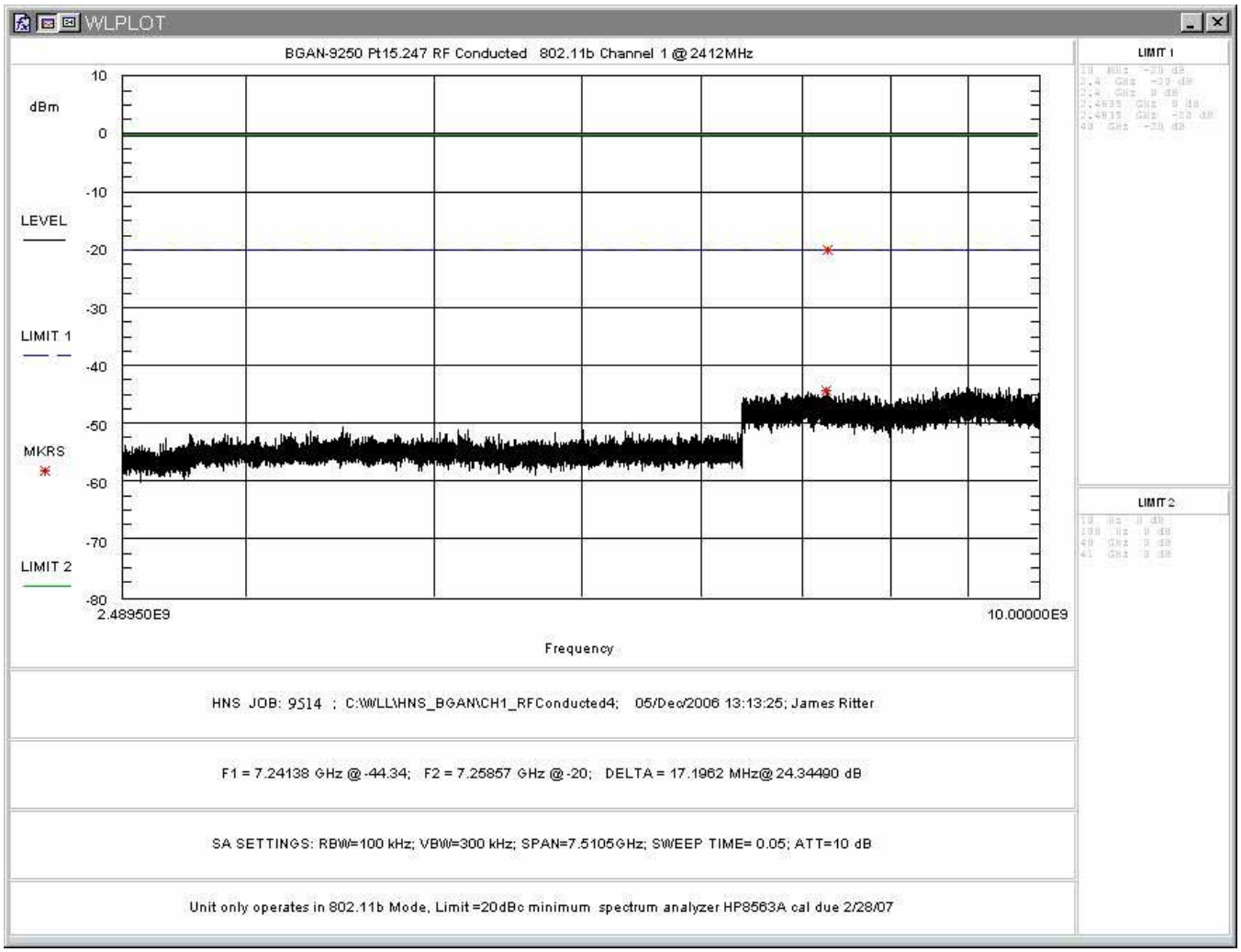

Figure 4-12. Conducted Spurious Emissions: Low Channel, 2.48 -10GHz

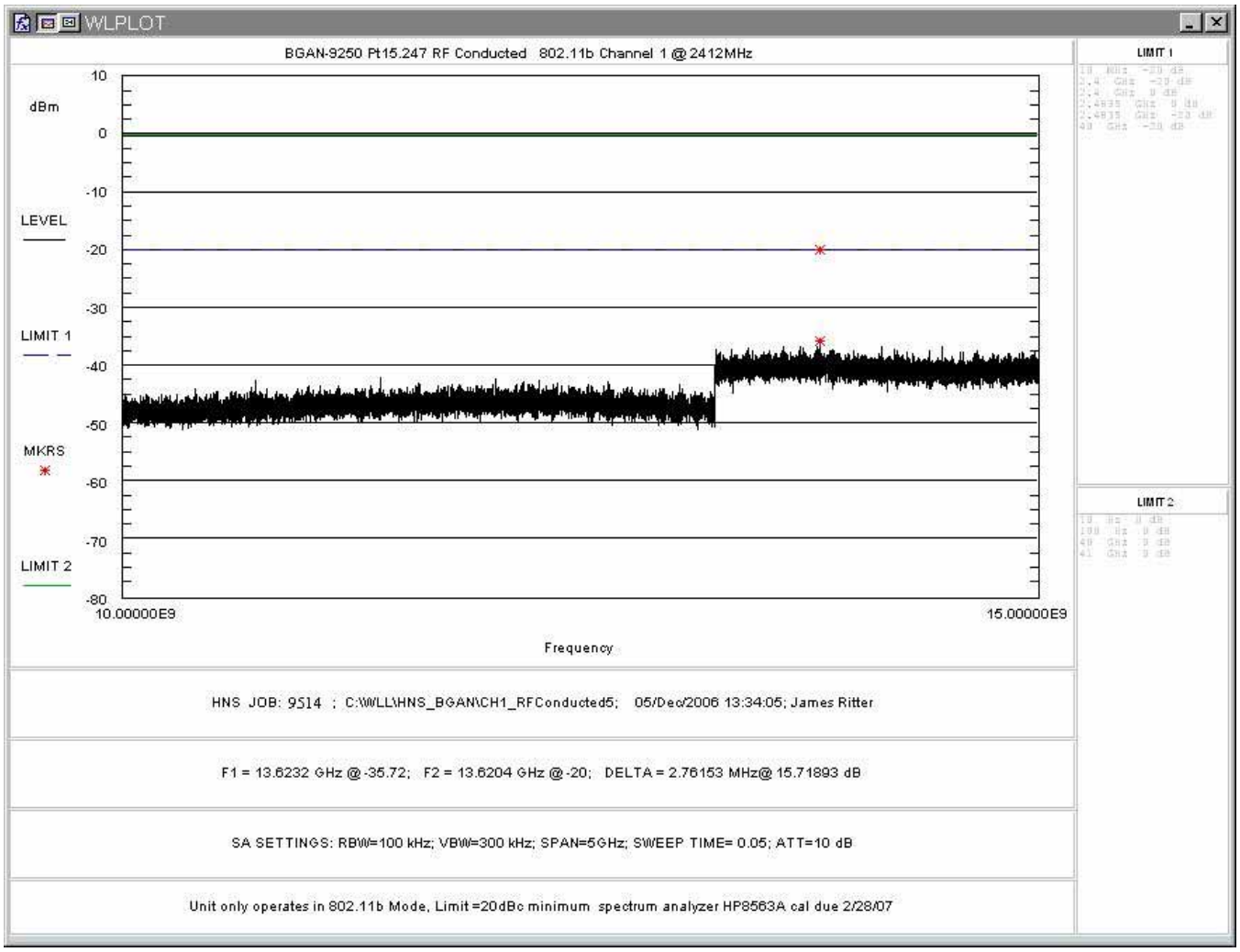

Figure 4-13. Conducted Spurious Emissions: Low Channel, 10– 15GHz

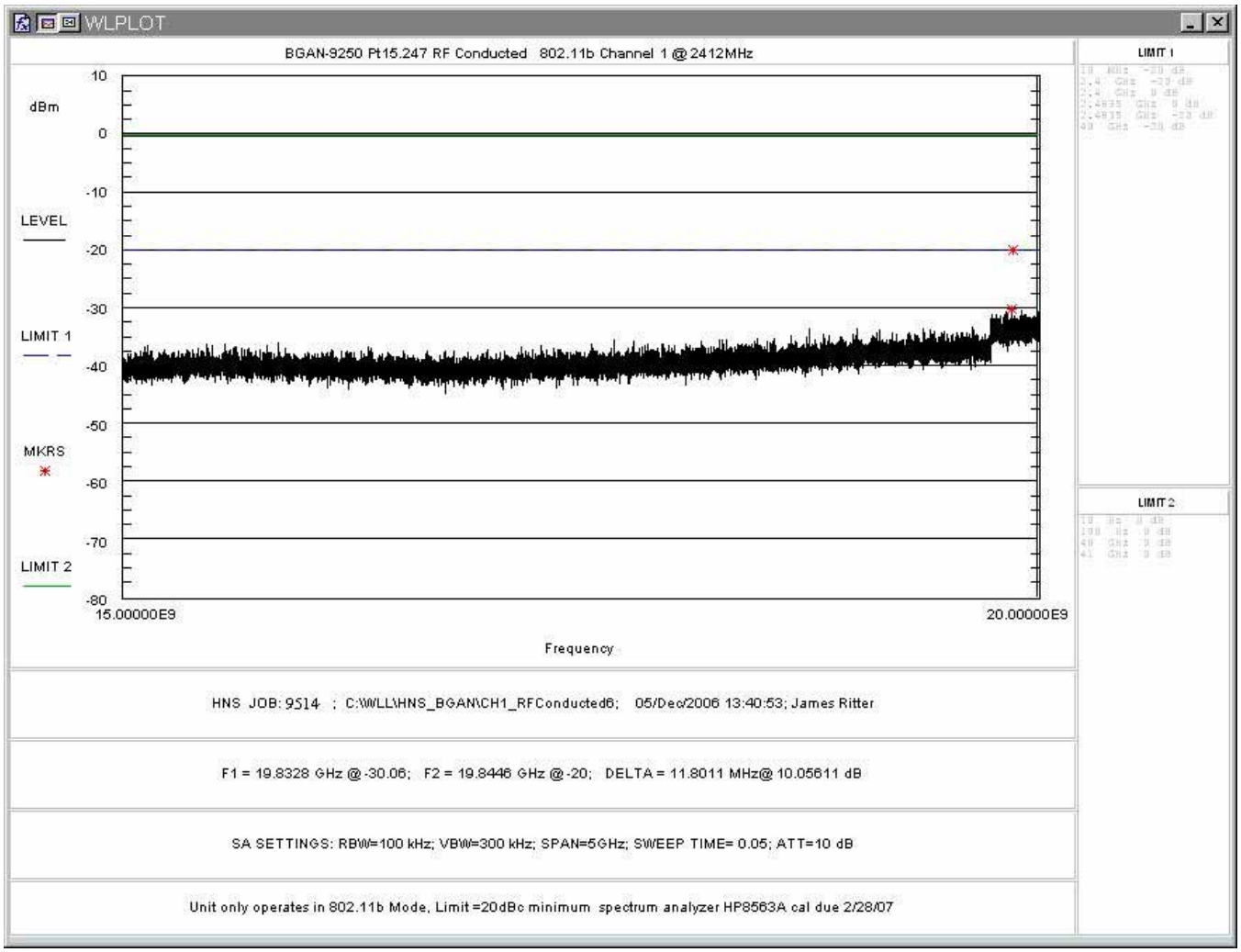

Figure 4-14. Conducted Spurious Emissions: Low Channel, 15– 20GHz

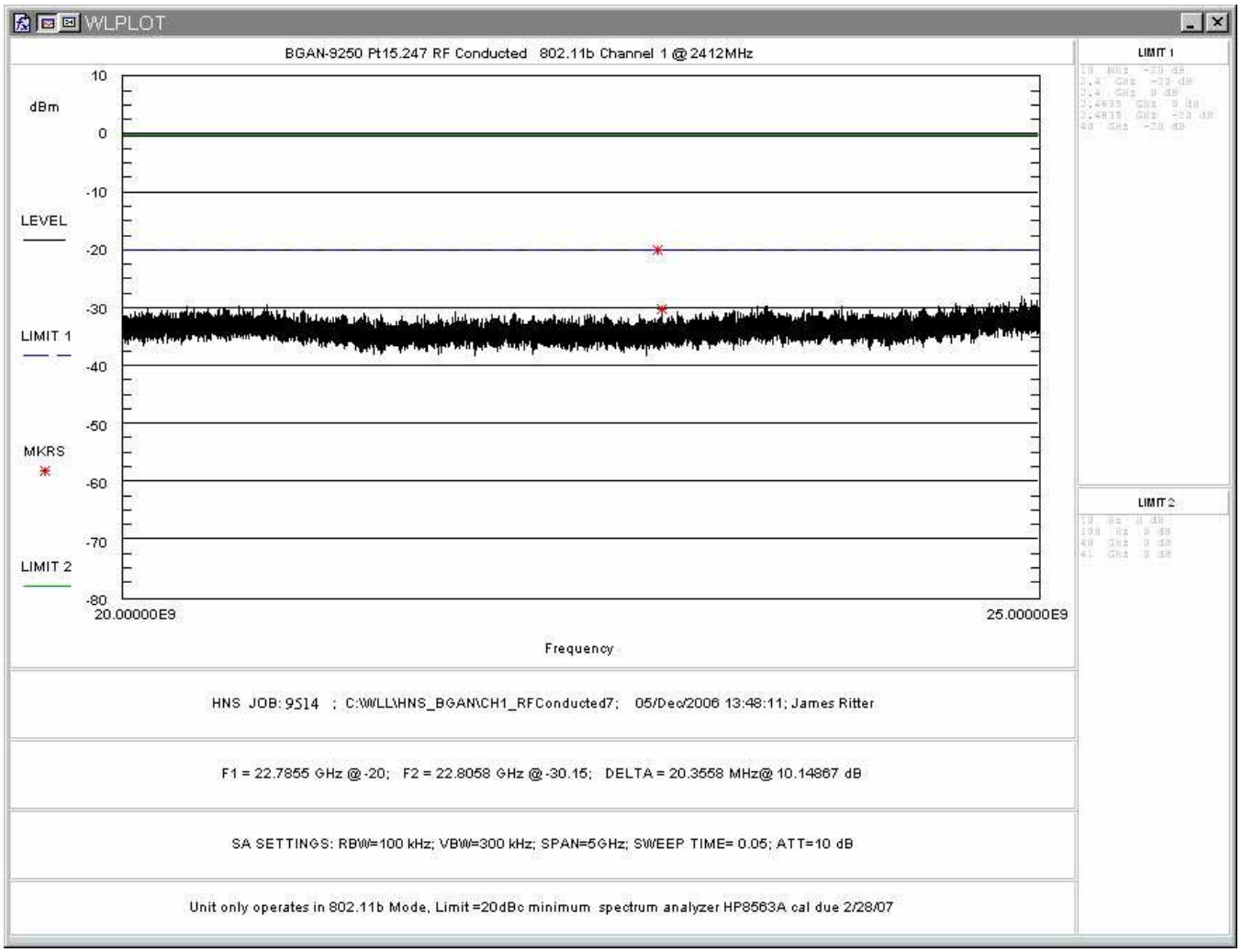

Figure 4-15. Conducted Spurious Emissions: Low Channel, 20– 25GHz

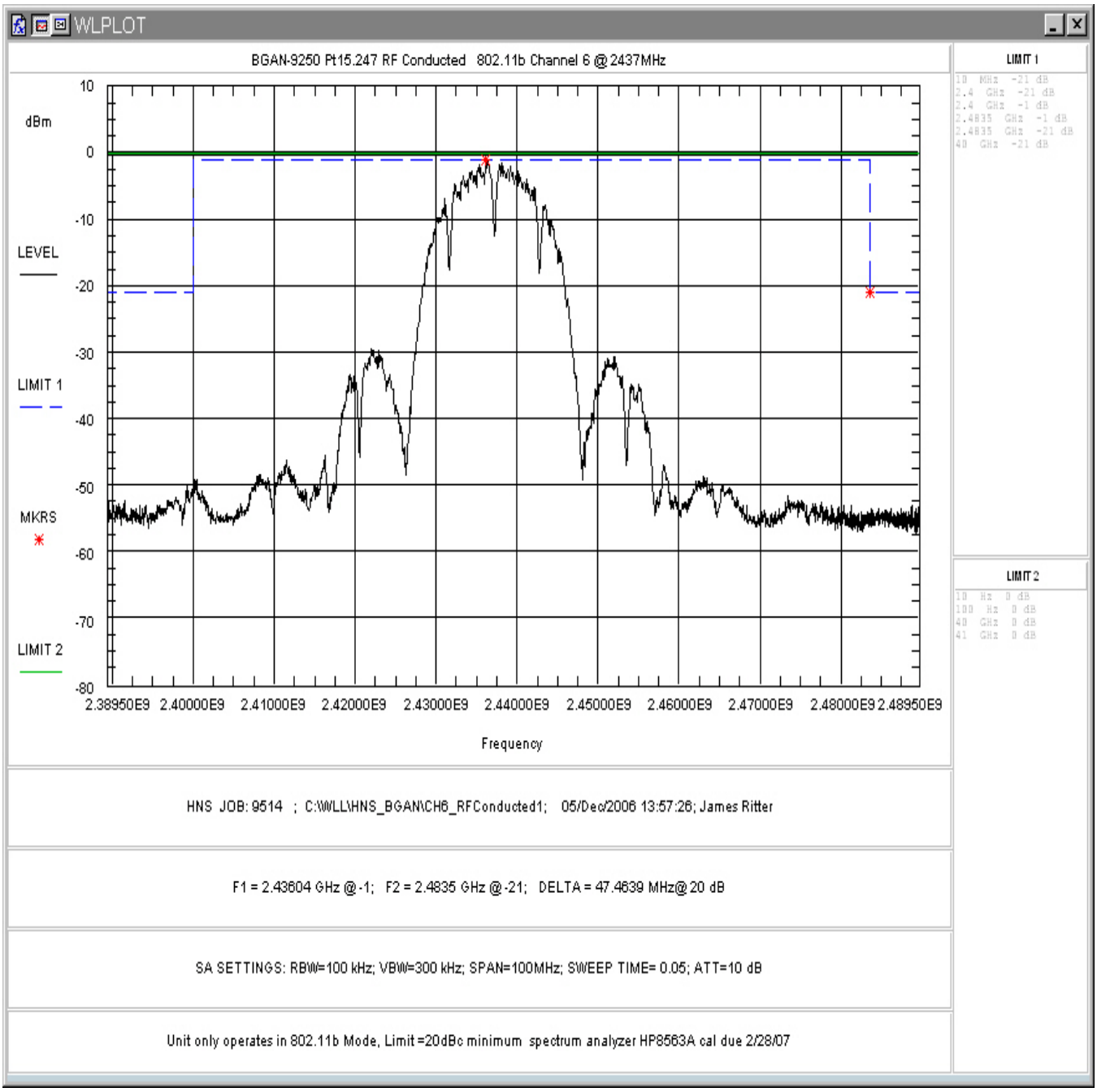

Figure 4-16. Conducted Spurious Emissions: Mid Channel, In-Band (2389 – 2489MHz)

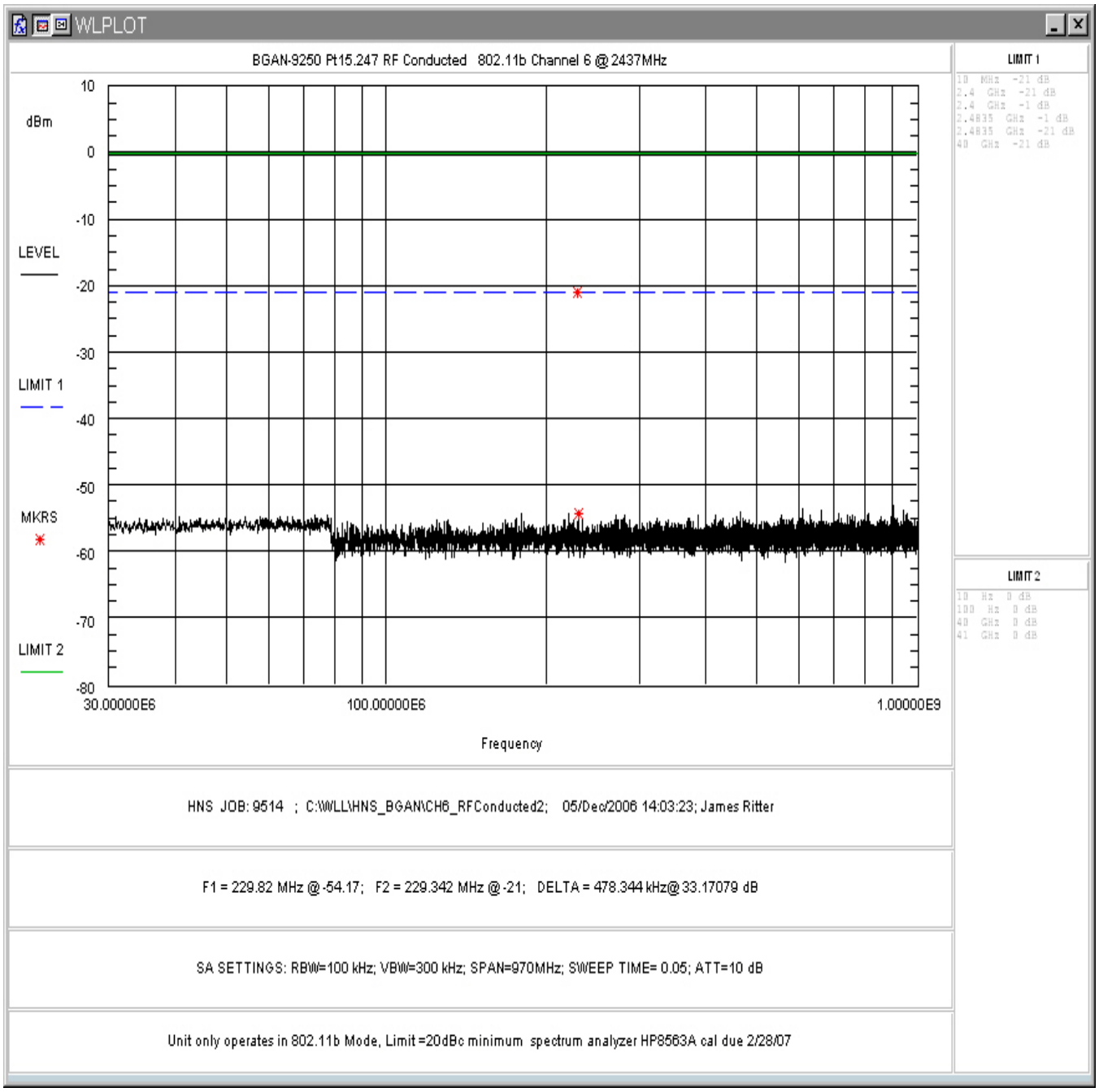

Figure 4-17. Conducted Spurious Emissions: Mid Channel, 30 - 1000MHz

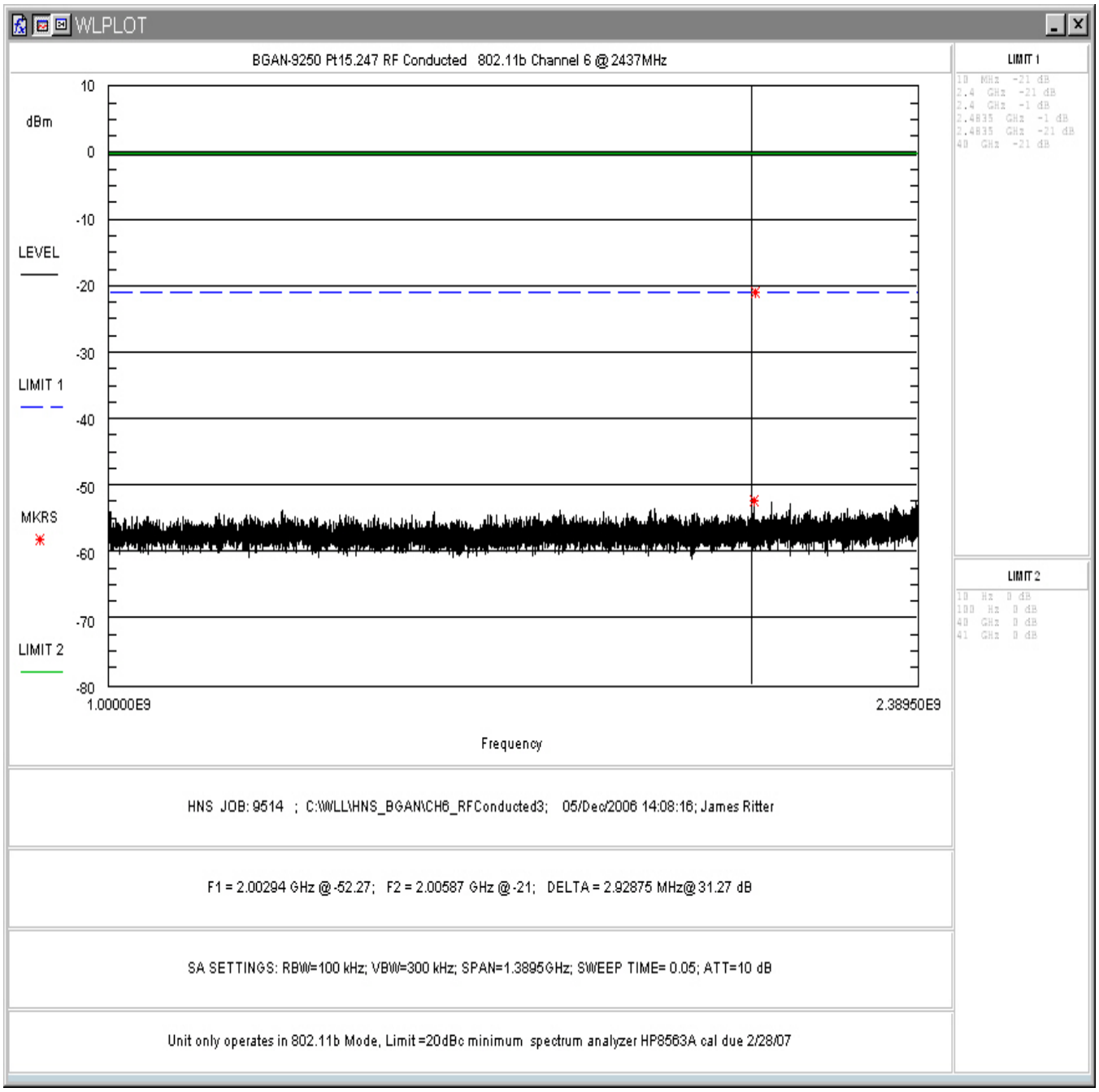

Figure 4-18. Conducted Spurious Emissions: Mid Channel, 1 – 2.38GHz

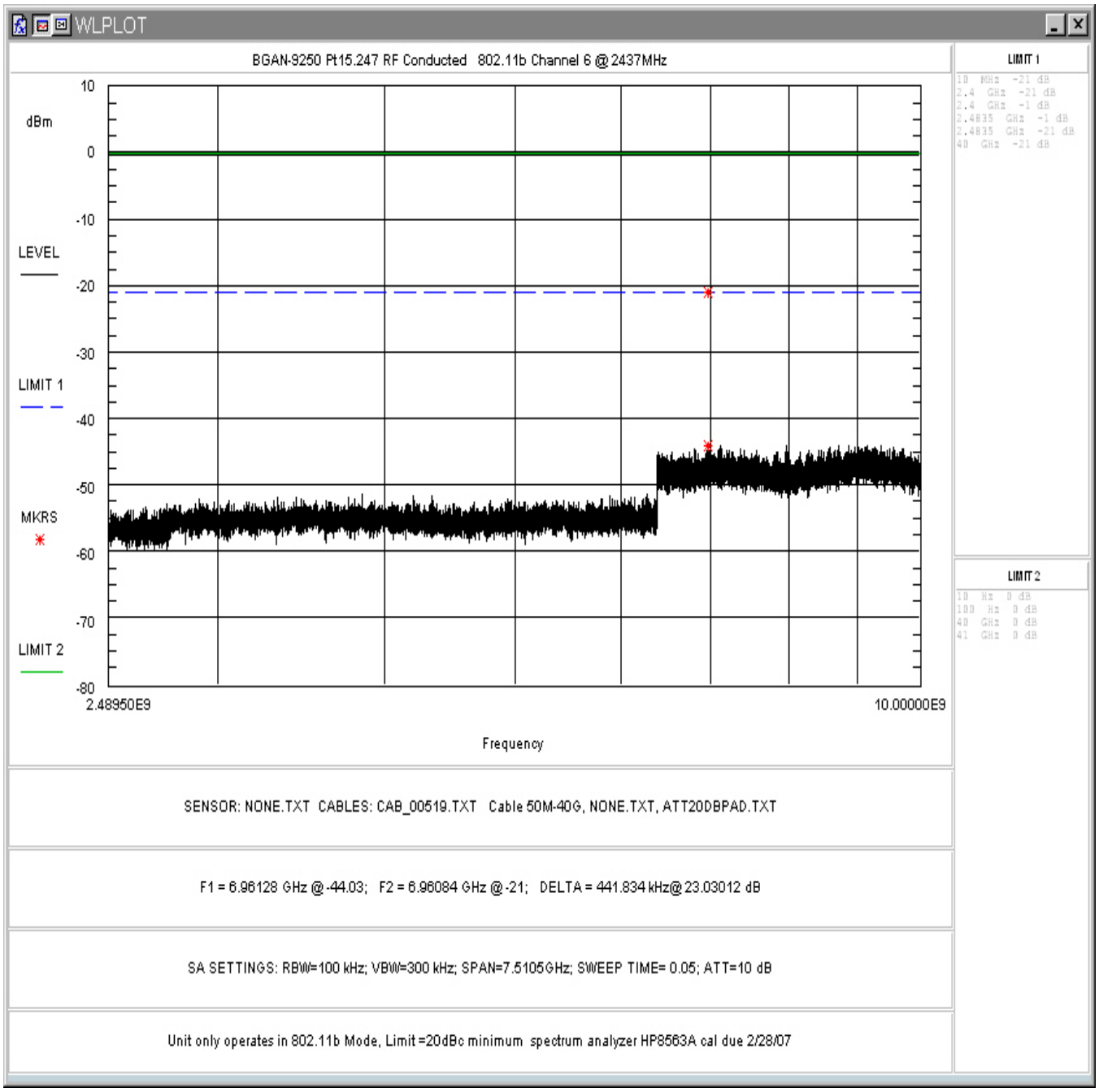

Figure 4-19. Conducted Spurious Emissions: Mid Channel, 2.48 -10GHz

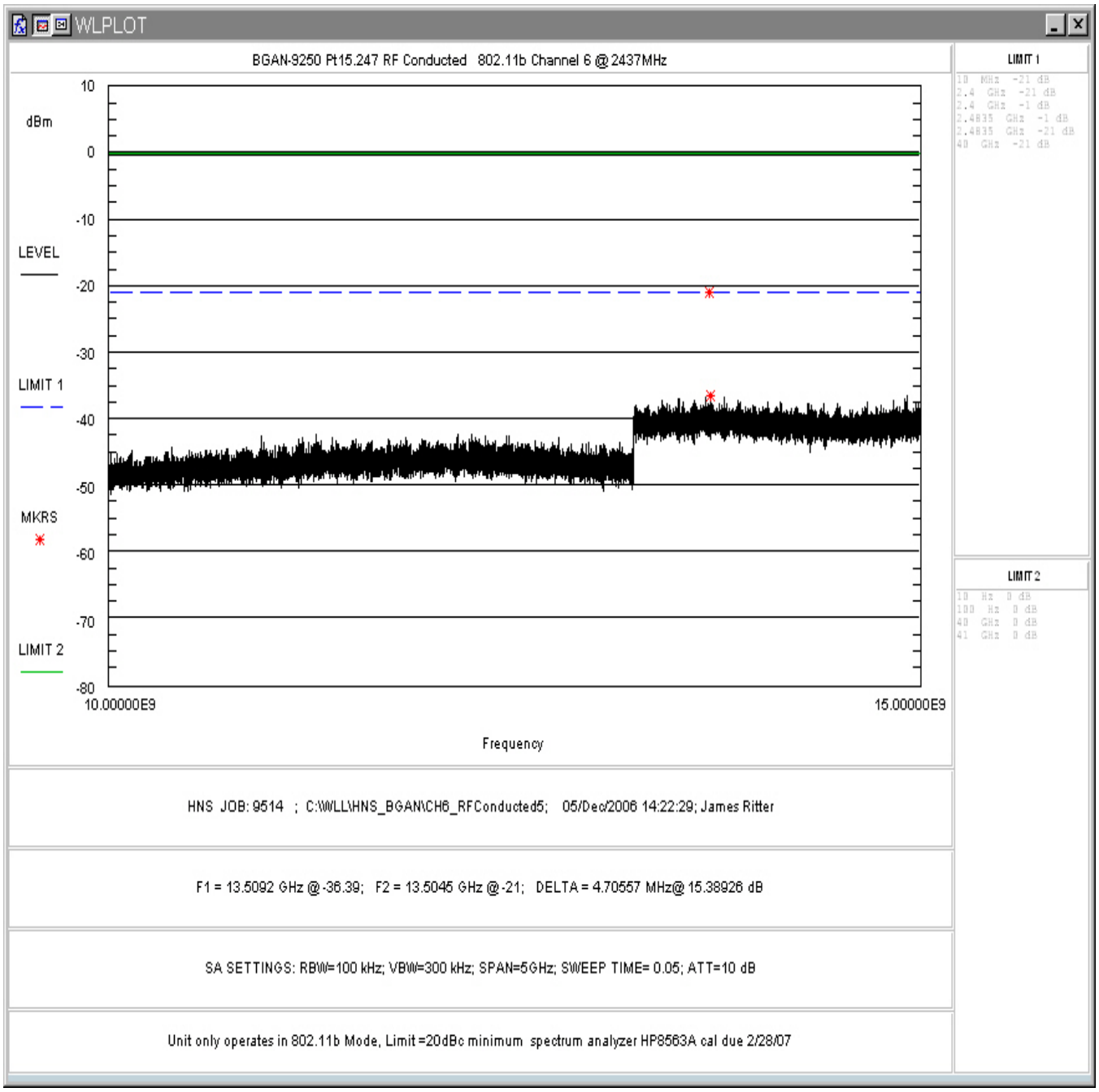

Figure 4-20. Conducted Spurious Emissions: Mid Channel, 10– 15GHz

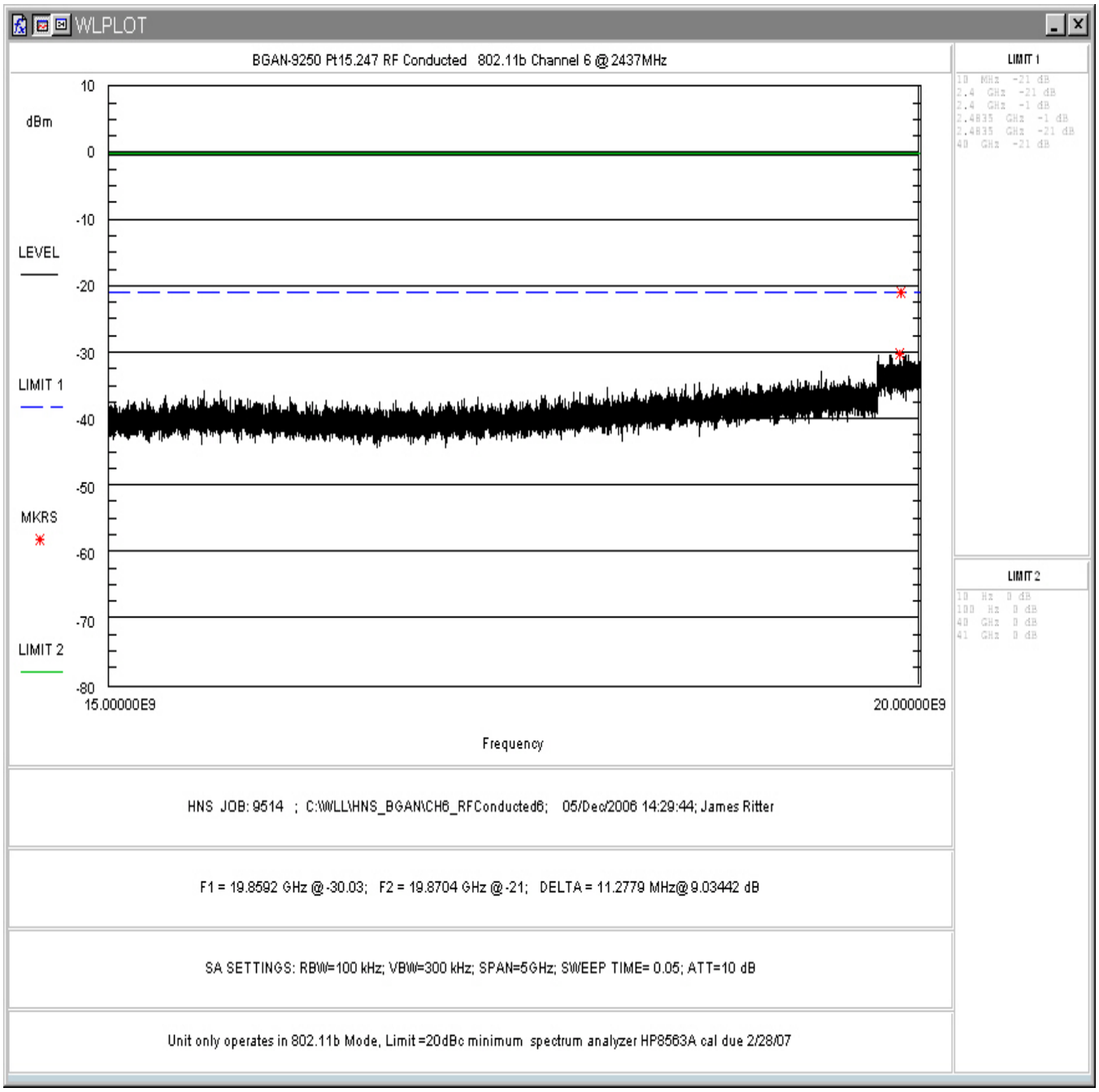

Figure 4-21. Conducted Spurious Emissions: Mid Channel, 15– 20GHz

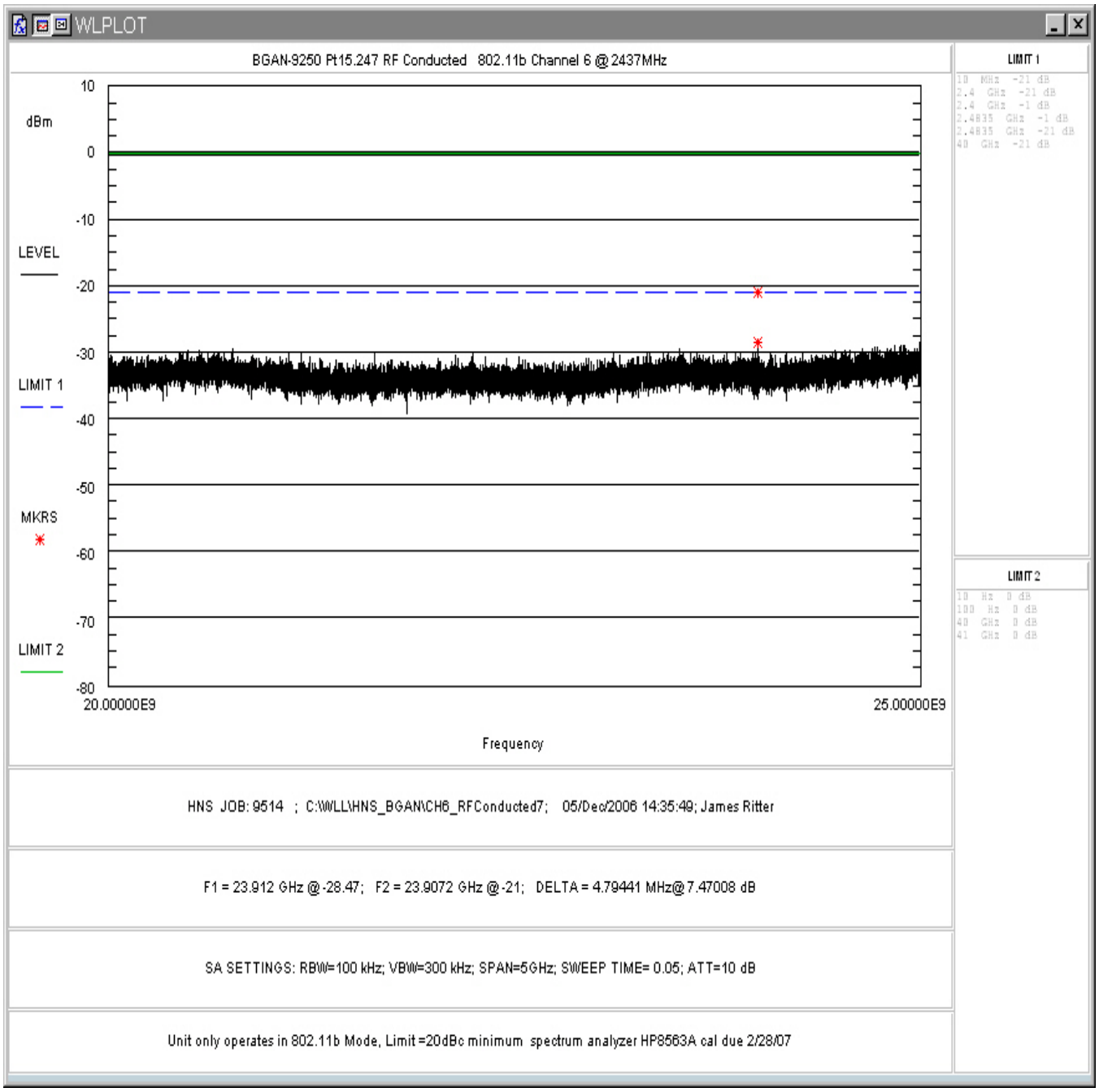

Figure 4-22. Conducted Spurious Emissions: Mid Channel, 20– 25GHz

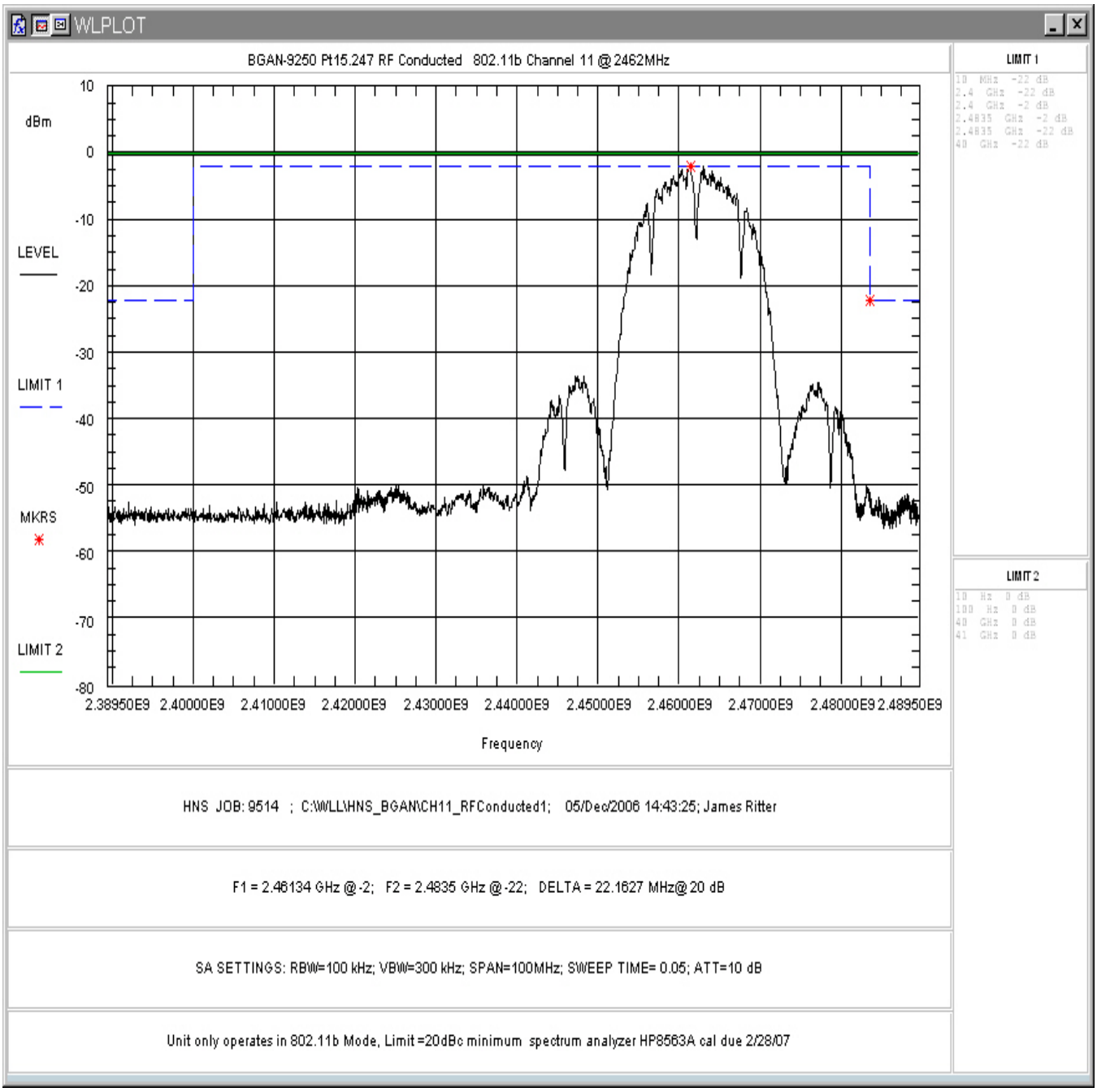

Figure 4-23. Conducted Spurious Emissions: High Channel, In-Band (2389 – 2489MHz)

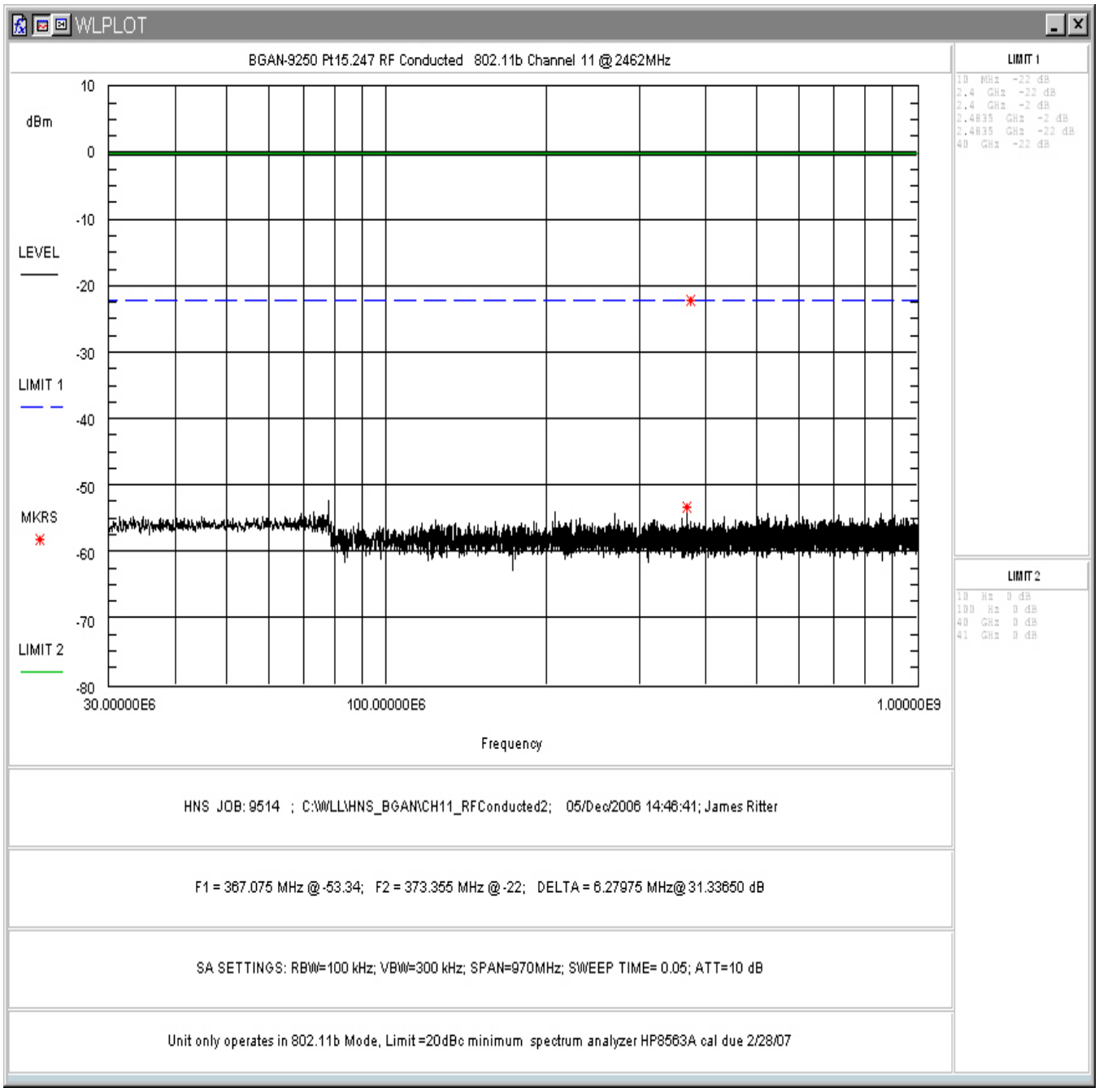

Figure 4-24. Conducted Spurious Emissions: High Channel, 30 - 1000MHz

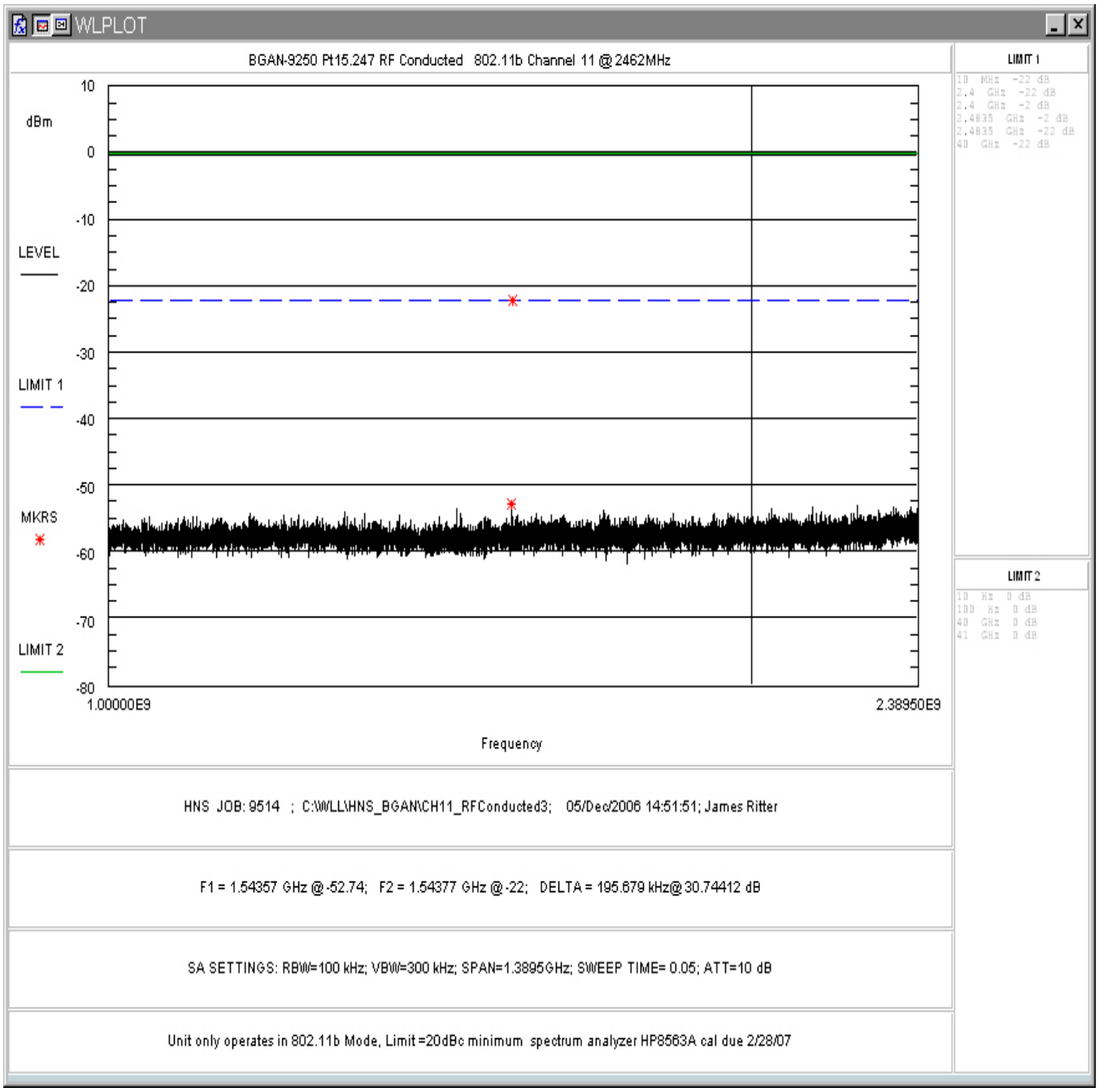

Figure 4-25. Conducted Spurious Emissions: High Channel, 1 – 2.38GHz

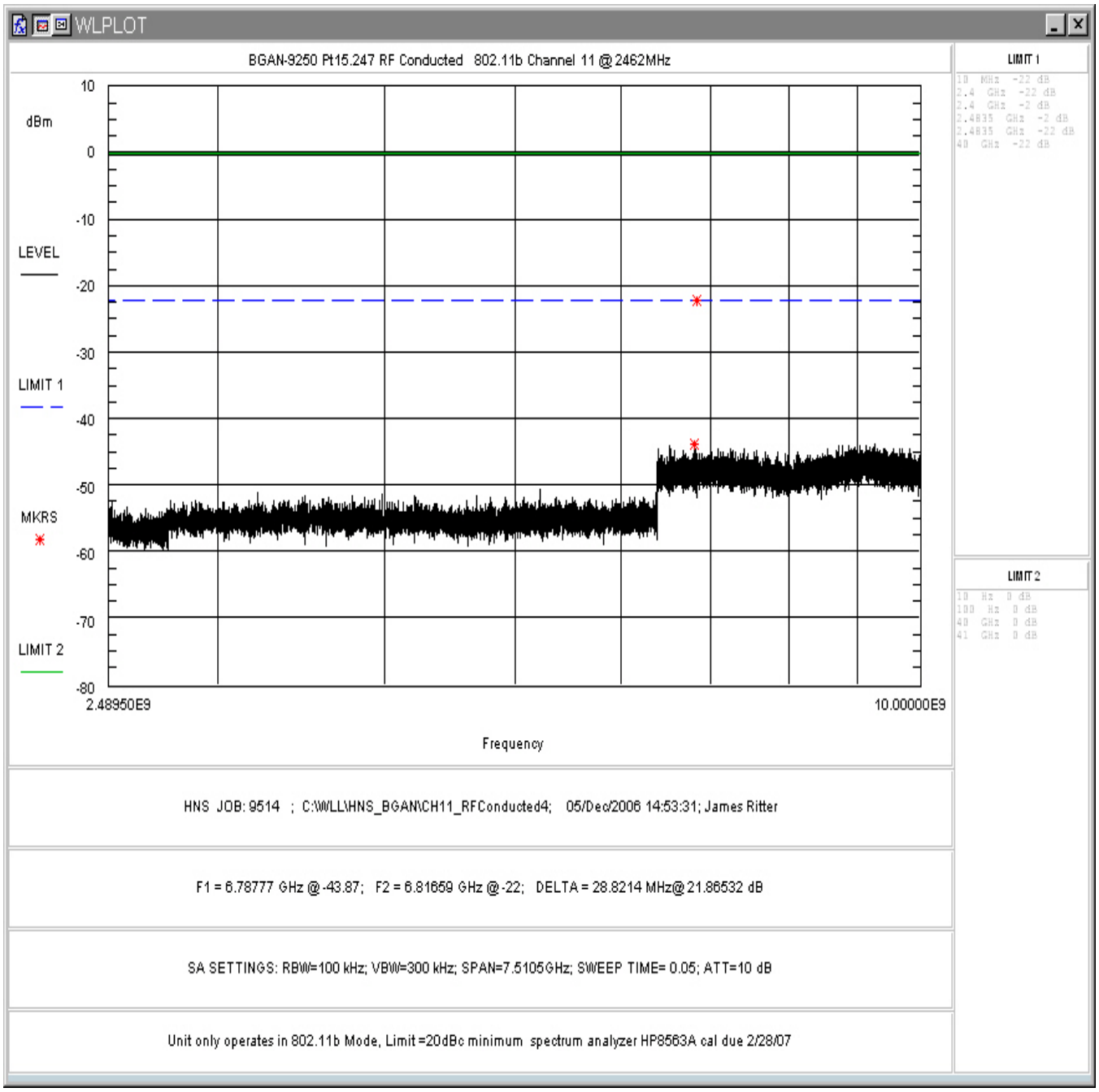

Figure 4-26. Conducted Spurious Emissions: High Channel, 2.48 -10GHz

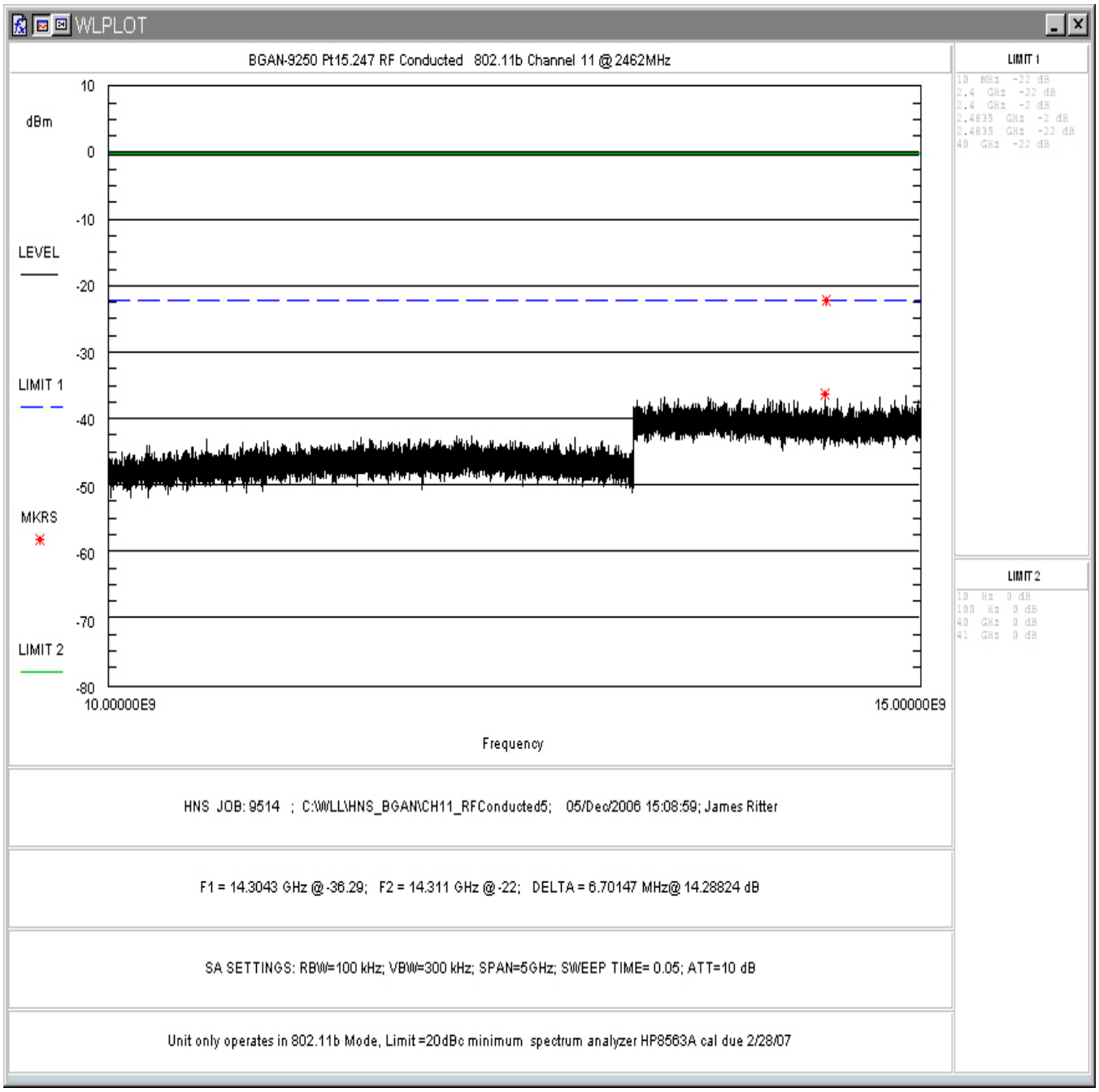

Figure 4-27. Conducted Spurious Emissions: High Channel, 10– 15GHz

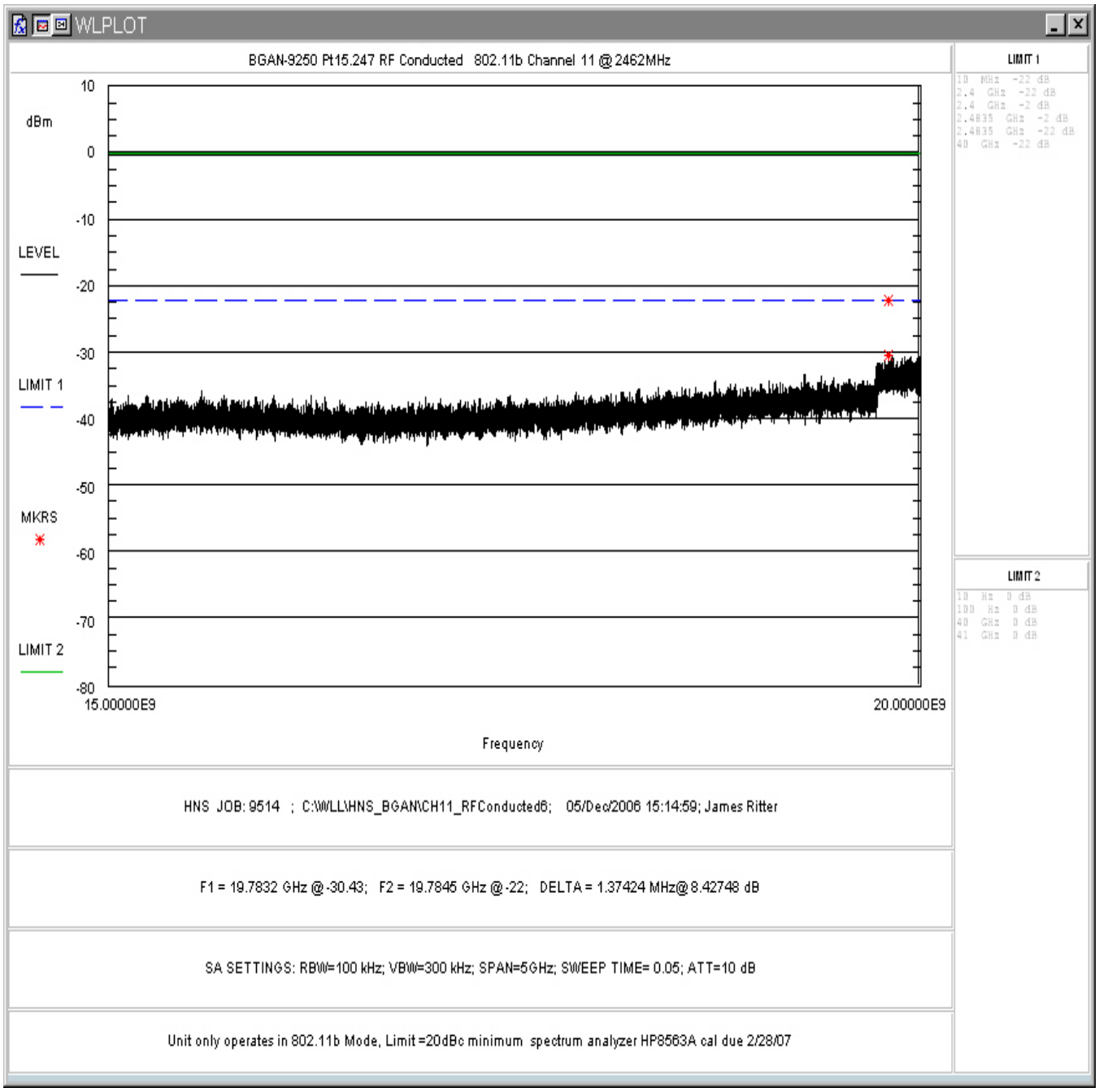

Figure 4-28. Conducted Spurious Emissions: High Channel, 15– 20GHz

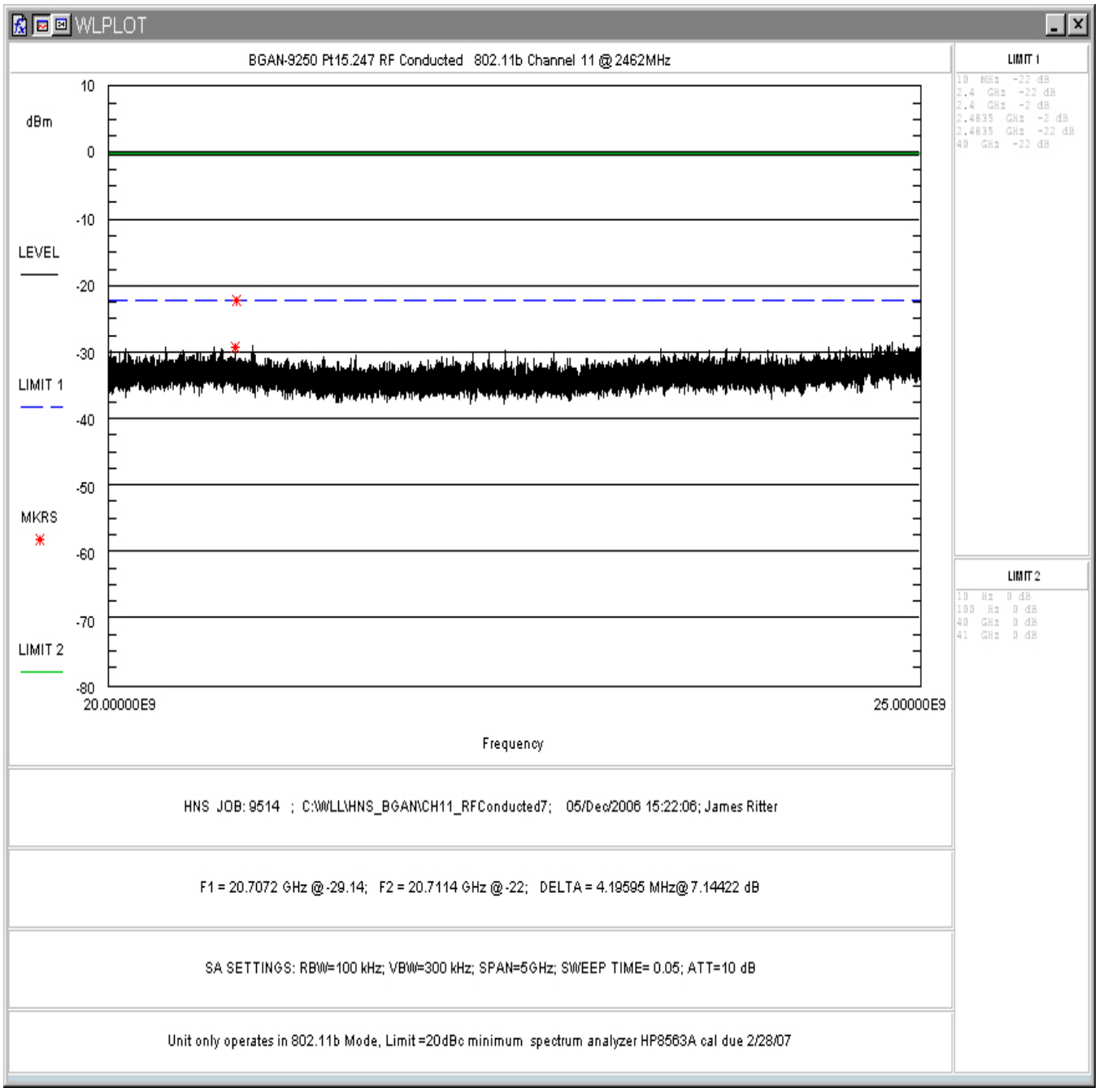

Figure 4-29. Conducted Spurious Emissions: High Channel, 20– 25GHz

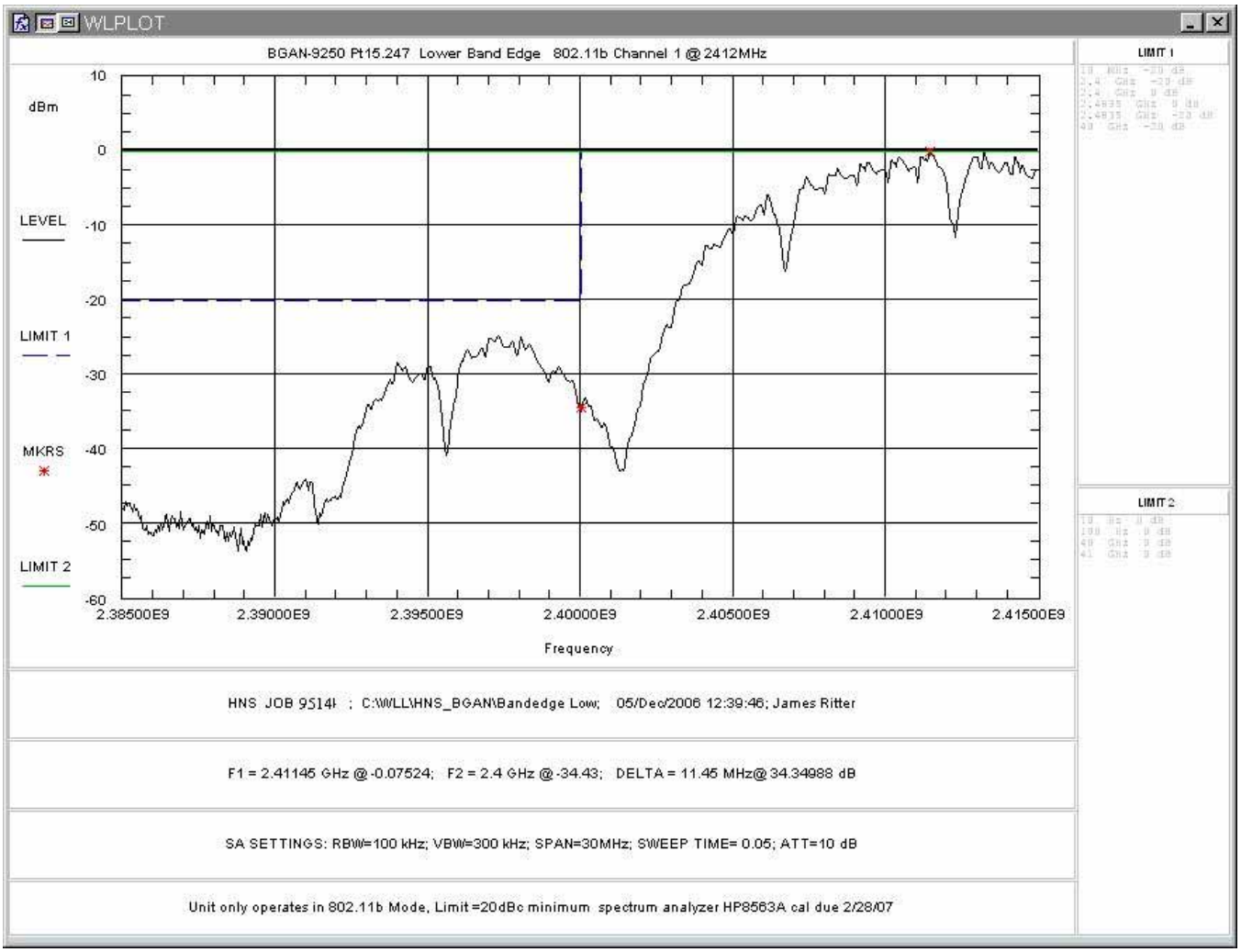

Figure 4-30. Conducted Spurious Emissions: Low Channel, Band-edge

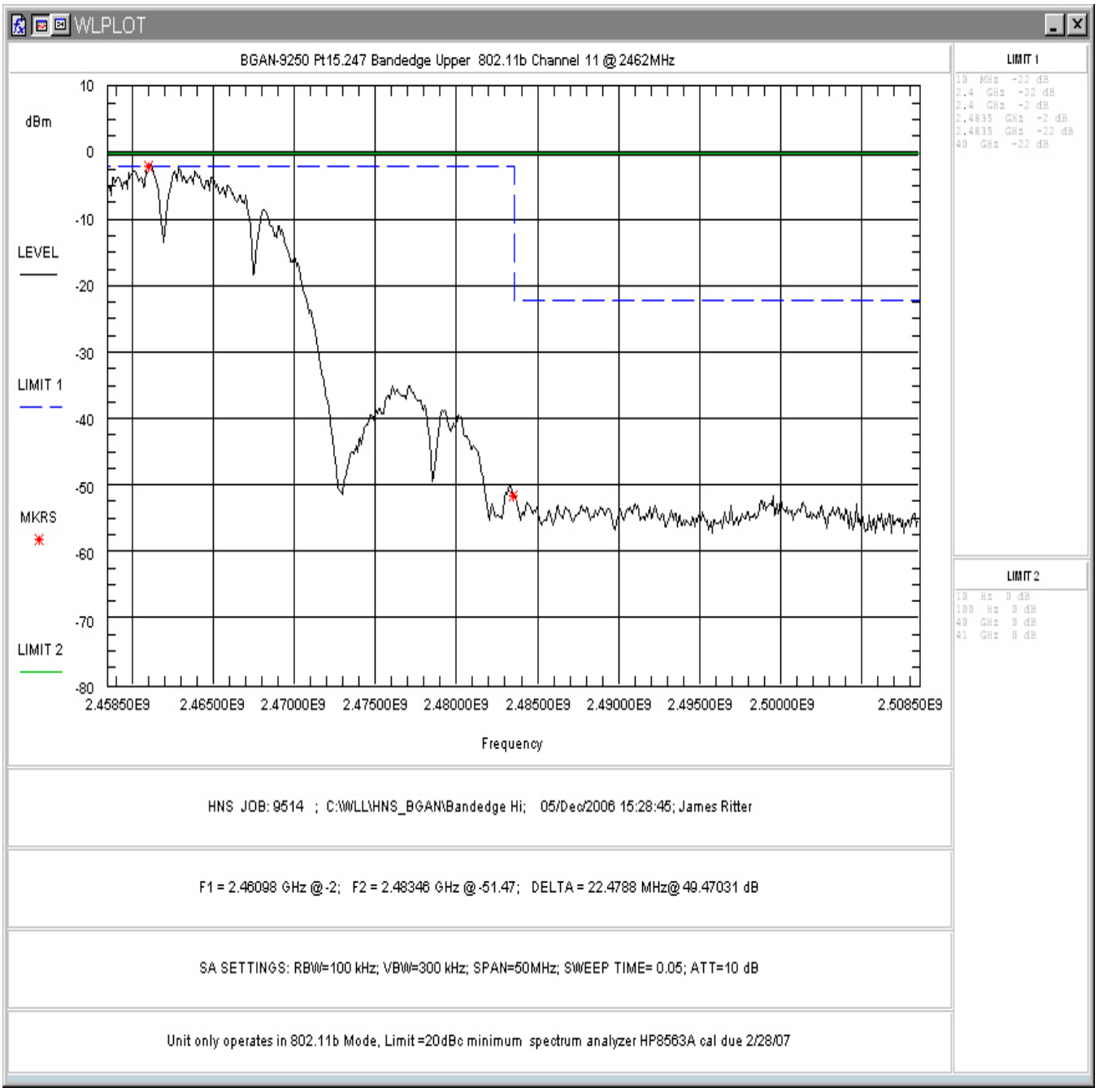

Figure 4-31. Conducted Spurious Emissions: High Channel, Band-edge

4.5 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.

4.5.1 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):	V dBµV
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)

Data are supplied in the following tables. Testing was performed to 25GHz. All detected emissions are reported in the following tables. Both peak and average measurements are listed.

Notes: Fund = Fundamental Amb = Ambient RBE = Restricted Band Edge

Table 5. Radiated Emissions Data, <1000MHz

Frequency (MHz)	Polarity H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin (dB)
39.63	V	180.0	1.0	12.2	11.6	1.4	25.2	18.3	100.0	-14.8
62.04	V	90.0	1.0	11.4	9.6	1.7	22.7	13.7	100.0	-17.3
86.00	V	190.0	1.2	18.6	9.6	2.0	30.2	32.3	100.0	-9.8
108.52	V	270.0	1.4	9.9	10.8	2.2	22.9	13.9	150.0	-20.7
116.11	V	120.0	1.5	11.4	11.4	2.2	25.0	17.8	150.0	-18.5
149.75	V	190.0	1.4	7.0	12.6	2.4	22.0	12.6	150.0	-21.5
298.57	V	250.0	1.2	16.1	20.8	3.3	40.2	102.9	200.0	-5.8
300.00	V	270.0	2.0	10.4	14.1	3.4	27.9	24.7	200.0	-18.2
375.99	V	90.0	1.6	11.2	16.6	3.8	31.5	37.8	200.0	-14.5
394.44	V	180.0	2.0	5.8	16.5	3.8	26.2	20.3	200.0	-19.9
398.10	V	180.0	1.0	22.2	16.5	3.9	42.6	134.4	200.0	-3.5
467.21	V	180.0	2.0	4.0	17.1	4.3	25.3	18.5	200.0	-20.7
497.66	V	200.0	1.6	20.4	17.2	4.4	42.0	126.4	200.0	-4.0
796.25	V	90.0	2.7	7.2	21.3	6.2	34.8	54.7	200.0	-11.3
995.31	V	90.0	3.5	3.4	24.0	7.4	34.8	54.7	500.0	-19.2
39.63	H	240.0	1.0	11.1	11.6	1.4	24.1	16.1	100.0	-15.9
86.00	H	90.0	2.0	7.5	9.6	2.0	19.1	9.0	100.0	-20.9
108.52	H	270.0	2.5	9.4	10.8	2.2	22.4	13.1	150.0	-21.2
116.11	H	90.0	3.0	9.5	11.4	2.2	23.1	14.3	150.0	-20.4
149.75	H	45.0	2.0	9.5	12.6	2.4	24.5	16.8	150.0	-19.0
298.57	H	0.0	1.6	13.2	20.8	3.3	37.3	73.7	200.0	-8.7
300.000	H	190.0	3.8	10.7	14.1	3.4	28.2	25.6	200.0	-17.9
375.990	H	0.0	3.5	12.8	16.6	3.8	33.1	45.4	200.0	-12.9
394.435	H	0.0	3.0	5.5	16.5	3.8	25.9	19.6	200.0	-20.2
398.100	H	0.0	3.5	21.2	16.5	3.9	41.6	119.8	200.0	-4.5
467.210	H	0.0	2.5	5.2	17.1	4.3	26.5	21.2	200.0	-19.5
497.661	H	260.0	3.1	20.8	17.2	4.4	42.4	132.4	200.0	-3.6
796.249	H	250.0	1.6	9.8	21.3	6.2	37.4	73.8	200.0	-8.7
995.310	H	250.0	1.0	4.1	24.0	7.4	35.5	59.3	500.0	-18.5

Table 6: Radiated Emission Test Data >1000MHz, Low Channel (2412MHz)

Frequency (MHz)	Polarity H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (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
		Peak										
2412.00	H	180.0	1.0	100.3	28.9	1.6	32.0	98.8	87173.9	NA	**NA**	Fund
4824.00	H	180.0	1.0	56.3	32.5	3.5	31.8	60.5	1064.7	5000.0	-13.4	
7236.20	H	180.0	1.0	45.2	37.1	4.3	31.4	55.1	570.2	5000.0	-18.9	Amb
12060.00	H	180.0	1.0	43.5	40.0	5.0	30.6	58.0	792.0	5000.0	-16.0	Amb
14472.00	H	180.0	1.0	43.3	41.3	6.2	29.9	61.0	1116.0	5000.0	-13.0	Amb
2390.00	H	190.0	1.0	50.8	28.9	1.6	32.0	49.3	290.6	5000.0	-24.7	RBE
2483.50	H	180.0	1.0	44.5	29.1	1.5	32.0	43.1	143.1	500.0	-10.9	RBE
1094.83	H	170.0	1.0	50.2	25.0	1.3	32.1	44.4	165.6	5000.0	-29.6	
1680.04	H	180.0	1.0	52.0	27.1	1.5	32.0	48.6	269.7	5000.0	-25.4	
2412.00	V	200.0	1.0	95.2	28.9	1.6	32.0	93.6	48126.7	NA	**NA**	Fund
4824.00	V	190.0	1.0	49.8	32.5	3.5	31.8	54.0	503.8	5000.0	-19.9	
7236.20	V	200.0	1.0	48.1	37.1	4.3	31.4	58.1	800.7	5000.0	-15.9	Amb
12060.00	V	200.0	1.0	43.5	40.0	5.0	30.6	58.0	792.0	5000.0	-16.0	Amb
14472.00	V	190.0	1.0	44.5	41.3	6.2	29.9	62.1	1276.9	5000.0	-11.9	Amb
2390.00	V	170.0	1.0	48.9	28.9	1.6	32.0	47.3	232.7	5000.0	-26.6	RBE
2483.50	V	190.0	1.0	45.7	29.1	1.5	32.0	44.3	163.8	500.0	-9.7	RBE
1094.83	V	180.0	1.0	51.2	25.0	1.3	32.1	45.4	186.4	5000.0	-28.6	
1680.04	V	190.0	1.0	50.1	27.1	1.5	32.0	46.7	216.7	5000.0	-27.3	
		Average										
2412.00	H	180.0	1.0	94.3	28.9	1.6	32.0	92.8	43690.4	NA	**NA**	Fund
4824.00	H	180.0	1.0	45.1	32.5	3.5	31.8	49.3	292.6	500.0	-4.7	
7236.20	H	180.0	1.0	33.7	37.1	4.3	31.4	43.6	152.1	500.0	-10.3	Amb
12060.00	H	180.0	1.0	34.2	40.0	5.0	30.6	48.6	270.5	500.0	-5.3	Amb
14472.00	H	180.0	1.0	33.1	41.3	6.2	29.9	50.7	343.7	500.0	-3.3	Amb
2390.00	H	190.0	1.0	40.2	28.9	1.6	32.0	38.6	85.2	500.0	-15.4	RBE
2483.50	H	180.0	1.0	34.3	29.1	1.5	32.0	32.9	44.4	500.0	-21.0	RBE
1094.830	H	170.0	1.0	42.8	25.0	1.3	32.1	37.0	71.1	500.0	-16.9	
1680.04	H	180.0	1.0	48.1	27.1	1.5	32.0	44.7	172.2	500.0	-9.3	
2412.00	V	200.0	1.0	90.7	28.9	1.6	32.0	89.1	28667.3			Fund
4824.00	V	190.0	1.0	40.5	32.5	3.5	31.8	44.7	172.1	500.0	-9.3	
7236.20	V	200.0	1.0	36.5	37.1	4.3	31.4	46.5	210.6	500.0	-7.5	Amb
12060.00	V	200.0	1.0	33.3	40.0	5.0	30.6	47.8	244.8	500.0	-6.2	Amb
14472.00	V	190.0	1.0	33.4	41.3	6.2	29.9	51.0	355.8	500.0	-3.0	Amb
2390.00	V	170.0	1.0	39.3	28.9	1.6	32.0	37.8	77.3	500.0	-16.2	RBE
2483.50	V	190.0	1.0	34.8	29.1	1.5	32.0	33.4	47.0	500.0	-20.5	RBE
1094.83	V	180.0	1.0	42.3	25.0	1.3	32.1	36.5	67.1	500.0	-17.4	
1680.04	V	190.0	1.0	40.1	27.1	1.5	32.0	36.7	68.5	500.0	-17.3	

Table 7: Radiated Emission Test Data >1000MHz, Mid Channel (2437MHz)

Frequency (MHz)	Polarity H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (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
		Peak										
2437.00	H	190.0	1.0	99.3	29.0	1.6	32.0	97.9	78127.2	NA	**NA**	Fund
4874.00	H	190.0	1.0	55.3	32.6	3.5	31.8	59.7	961.1	5000.0	-14.3	
7311.00	H	180.0	1.0	48.3	37.1	4.5	31.3	58.6	848.1	5000.0	-15.4	Amb
12185.00	H	180.0	1.0	42.8	40.0	5.2	30.5	57.5	746.4	5000.0	-16.5	Amb
2390.00	H	190.0	1.0	45.0	28.9	1.6	32.0	43.4	148.5	5000.0	-30.5	RBE
2483.50	H	190.0	1.0	44.5	29.1	1.5	32.0	43.1	143.1	5000.0	-30.9	RBE
1094.83	H	170.0	1.0	50.2	25.0	1.3	32.1	44.4	165.6	5000.0	-29.6	
1720.70	H	180.0	1.0	43.3	27.3	1.5	32.0	40.1	101.0	5000.0	-33.9	
2437.00	V	180.0	1.0	99.0	29.0	1.6	32.0	97.5	75214.6	NA	**NA**	Fund
4874.00	V	200.0	1.0	52.5	32.6	3.5	31.8	56.8	693.9	5000.0	-17.2	
7311.00	V	180.0	1.0	47.0	37.1	4.5	31.3	57.2	727.7	5000.0	-16.7	Amb
12185.00	V	180.0	1.0	42.0	40.0	5.2	30.5	56.6	678.4	5000.0	-17.4	Amb
2390.00	V	200.0	1.0	43.5	28.9	1.6	32.0	41.9	125.0	5000.0	-32.0	RBE
2483.50	V	190.0	1.0	42.8	29.1	1.5	32.0	41.4	118.1	5000.0	-32.5	RBE
1094.83	V	180.0	1.0	49.7	25.0	1.3	32.1	43.9	156.9	5000.0	-30.1	
1720.70	V	180.0	1.0	47.2	27.3	1.5	32.0	44.0	157.6	5000.0	-30.0	
		Average										
2437.00	H	190.0	1.0	96.8	29.0	1.6	32.0	95.3	58385.1	NA	**NA**	Fund
4874.00	H	190.0	1.0	46.4	32.6	3.5	31.8	50.7	343.8	500.0	-3.3	
7311.00	H	180.0	1.0	37.8	37.1	4.5	31.3	48.1	253.2	500.0	-5.9	Amb
12185.00	H	180.0	1.0	33.0	40.0	5.2	30.5	47.6	240.7	500.0	-6.4	Amb
2390.00	H	190.0	1.0	33.5	28.9	1.6	32.0	31.9	39.5	500.0	-22.0	RBE
2483.50	H	190.0	1.0	33.2	29.1	1.5	32.0	31.8	38.8	500.0	-22.2	RBE
1094.83	H	170.0	1.0	42.8	25.0	1.3	32.1	37.0	71.1	500.0	-16.9	
1720.70	H	0.0	1.0	34.1	27.3	1.5	32.0	30.9	34.9	500.0	-23.1	
2437.00	V	180.0	1.0	94.8	29.0	1.6	32.0	93.4	46537.4	NA	**NA**	Fund
4874.00	V	200.0	1.0	41.7	32.6	3.5	31.8	46.0	199.4	500.0	-8.0	
7311.00	V	180.0	1.0	36.8	37.1	4.5	31.3	47.0	224.9	500.0	-6.9	Amb
12185.00	V	180.0	1.0	32.3	40.0	5.2	30.5	47.0	222.8	500.0	-7.0	Amb
2390.00	V	200.0	1.0	31.5	28.9	1.6	32.0	29.9	31.4	500.0	-24.0	RBE
2483.50	V	190.0	1.0	33.3	29.1	1.5	32.0	31.9	39.6	500.0	-22.0	RBE
1094.83	V	180.0	1.0	42.2	25.0	1.3	32.1	36.4	66.1	500.0	-17.6	

Table 8: Radiated Emission Test Data >1000MHz, High Channel (2462MHz)

Frequency (MHz)	Polarity H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (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
		Peak										
2462.00	V	180.0	1.0	97.4	29.0	1.5	32.0	95.9	62689.3	NA	**NA**	Fund
4924.00	V	200.0	1.0	52.0	32.7	3.6	31.8	56.4	663.4	5000.0	-17.5	
7386.00	V	190.0	1.0	48.0	37.1	4.7	31.3	58.5	842.1	5000.0	-15.5	Amb
12310.00	V	190.0	1.0	45.2	40.0	5.3	30.5	60.0	994.5	5000.0	-14.0	Amb
2390.00	V	190.0	1.0	43.2	28.9	1.6	32.0	41.6	120.3	5000.0	-32.4	RBE
2483.50	V	180.0	1.0	49.2	29.1	1.5	32.0	47.8	245.0	5000.0	-26.2	RBE
1094.83	V	180.0	1.0	48.1	25.0	1.3	32.1	42.3	130.5	5000.0	-31.7	
1720.70	V	210.0	1.0	56.2	27.3	1.5	32.0	53.0	444.3	5000.0	-21.0	
2462.00	H	180.0	1.0	99.3	29.0	1.5	32.0	97.9	78558.6	NA	**NA**	Fund
4924.00	H	180.0	1.0	53.9	32.7	3.6	31.8	58.3	825.6	5000.0	-15.6	
7386.00	H	190.0	1.0	49.5	37.1	4.7	31.3	60.0	1000.8	5000.0	-14.0	Amb
12310.00	H	190.0	1.0	43.5	40.0	5.3	30.5	58.3	820.6	5000.0	-15.7	Amb
2390.00	H	180.0	1.0	44.5	28.9	1.6	32.0	42.9	140.2	5000.0	-31.0	RBE
2483.50	H	170.0	1.0	49.7	29.1	1.5	32.0	48.3	259.6	5000.0	-25.7	RBE
1094.83	H	180.0	1.0	48.0	25.0	1.3	32.1	42.2	129.0	5000.0	-31.8	
1720.70	H	190.0	1.0	47.2	27.3	1.5	32.0	44.0	157.6	5000.0	-30.0	
		Average										
2462.00	V	180.0	1.0	92.6	29.0	1.5	32.0	91.2	36198.8	NA	**NA**	Fund
4924.00	V	200.0	1.0	42.3	32.7	3.6	31.8	46.8	217.9	500.0	-7.2	
7386.00	V	190.0	1.0	38.0	37.1	4.7	31.3	48.5	266.3	500.0	-5.5	Amb
12310.00	V	190.0	1.0	32.5	40.0	5.3	30.5	47.3	231.3	500.0	-6.7	Amb
2390.00	V	190.0	1.0	32.5	28.9	1.6	32.0	30.9	35.2	500.0	-23.0	RBE
2483.50	V	180.0	1.0	36.6	29.1	1.5	32.0	35.2	57.6	500.0	-18.8	RBE
1094.83	V	180.0	1.0	42.0	25.0	1.3	32.1	36.2	64.6	500.0	-17.8	
1720.70	V	210.0	1.0	37.3	27.3	1.5	32.0	34.1	50.6	500.0	-19.9	
2462.00	H	180.0	1.0	94.0	29.0	1.5	32.0	92.6	42529.8	NA	**NA**	Fund
4924.00	H	180.0	1.0	46.2	32.7	3.6	31.8	50.6	339.0	500.0	-3.4	
7386.00	H	190.0	1.0	37.8	37.1	4.7	31.3	48.3	260.2	500.0	-5.7	Amb
12310.00	H	190.0	1.0	33.0	40.0	5.3	30.5	47.8	245.0	500.0	-6.2	Amb
2390.00	H	180.0	1.0	34.1	28.9	1.6	32.0	32.5	42.3	500.0	-21.4	RBE
2483.50	H	170.0	1.0	38.6	29.1	1.5	32.0	37.2	72.6	500.0	-16.8	RBE
1094.83	H	180.0	1.0	42.0	25.0	1.3	32.1	36.2	64.6	500.0	-17.8	
1720.70	H	190.0	1.0	39.0	27.3	1.5	32.0	35.8	61.3	500.0	-18.2	