FCC Certification Test Report

FCC & IC Certification Test Report for ADTRAN, Inc. FCC ID: HDCTRC6420 IC: 2250A-TRC6420

February 28, 2005

Rev. 1: March 23, 2005

Prepared for:

ADTRAN, Inc.
901 Explorer Blvd
Huntsville, AL 35806

Prepared By:

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

FCC & IC Certification Test Report
for the
ADTRAN, Inc.
TRACER
Transceiver 6420
FCC ID: HDCTRC6420

WLL JOB# 8589-91

Prepared by: Brian J. Dettling
Documentation Specialist

Reviewed by: Gregory M. Snyder
Chief EMC Engineer

Abstract

This report has been prepared on behalf of ADTRAN, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Direct Sequence Spread Spectrum Transceiver under Part 15.247 of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-210 of Industry Canada. This Certification Test Report documents the test configuration and test results for an ADTRAN, Inc. TRACER Model 6420.

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 ADTRAN, Inc. TRACER 6420 complies with the limits for a Digitally Modulated Transceiver device under FCC Part 15.247 and Industry Canada RSS-210.

Revision 1 of this report removed a table listing the frequencies of the device. This was an out-dated table and was therefore removed.

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1 Introduction

1.1 Compliance Statement

The ADTRAN, Inc. TRACER 6420 Spread Spectrum System complies with the limits for a Digitally Modulated intentional radiator device under FCC Part 15.247 and Industry Canada RSS-210.

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed according to 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:	ADTRAN, Inc. 901 Explorer Blvd Huntsville, AL 35806
Quotation Number:	62208

1.4 Test Dates

Testing was performed on February 18 and February 19, 2005.

1.5 Test and Support Personnel

Washington Laboratories, LTD	Steve Koster, James Ritter

2 Equipment Under Test

2.1 EUT Identification & Description

ADTRAN Part #	Product Name/Description
12806420A	Tracer 6420 Plan A
12806420B	Tracer 6420 Plan B

Top Assembly #:	12806420A / B
Sub Assembly #(s):	2280019-1, 2280018-4
Circuit Board #(s):	5280019-1, 5280018-4

The 12806420 (Tracer 6420 Radio) Tracer 6420 operates in the 5725 to 5850 MHz unlicensed industrial, scientific, and medical (ISM) band, and serves as a radio frequency converter for 8xT1, 8xE1, and 10/100 Base-T Ethernet digital signals. The aggregate single-sided baseband bandwidth of the product is a maximum of 16.7 MHz, which accounts for 8xT1 plus framing overhead. Three frequency band plans are available: A1/B1, A2/B2, and A3/B3. Frequency plan A radios transmit (receive) in the lower (upper) band, while plan B radios transmit (receive) in the upper (lower) band.

I/O Ports and Cables available on the TRACER 6420:

Signal Input/Output Ports:

#	Signal/Port Name	Signal/ Port Type	Cable Type	NOTES
1	RSSI	I/O	test jack	0 to 5 VDC
2	GND	I/O	test jack	
3	TEST	I/O	RCA jack	0 to 5 VDC, 10 kHz, dual
4	ORDER WIRE	I/O	RJ-11	PLAR
5	CRAFT	I/O	DB-9 female	
6	MGMT	Network	RJ-45	10/100 Base-T, SNMP
7	MPS	I/O	3-pin header	Reserved; header has locking tab
8	DC POWER	Power	2-pin header	21 to 60 VDC, 1.8 A
9	FUSE	Power	fuse holder	Protection fuse for DC power
10	ALARM	Control	3-pin header	
11	ANTENNA	I/O	N-type female	5.8 GHz, 100 mW
12				
EX:	HDSL Loop 1	Span Pwr-I/O	Twisted Pair	137V Span Voltage

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	ADTRAN, Inc.
FCC ID Number	HDCTRC6420
EUT Name:	Tracer
Model:	6420
FCC Rule Parts:	§15.247
Frequency Range:	5744MHz – 5831MHz
Maximum Output Power:	96.3 mW
Modulation:	Digital (QPSK)
Bandwidth:	16.8MHz
Keying:	Automatic
Type of Information:	Data
Number of Channels:	2 plans (A and B), 3 channels/band
Power Output Level	Fixed
Antenna Type	Parabolic Dish Radio Waves, Inc. SP2-5.8; 28.5 dBi (Fixed Point-to-Point Installations)
Frequency Tolerance:	N/A
Emission Type(s):	N/A
Power Source & Voltage:	48 VDC

2.2 Test Configuration

The EUT was configured with an external power adapter to provide 48Vdc. Cables with loopback connections were connected to Channels A and B, unshielded wires were connected to the alarm I/O and a 50 Ohm coaxial cable was connected to the antenna port.

The EUT firmware was set up to provide continuous random data for Direct Sequence modulation to the output connector.

Two plans are available: “A” and “B”. Changing between the plans is accomplished by switching the internal diplexer cables. The channels are then programmed within the plan.

An HP Pavilion Laptop PC, Model Number N3350, S/N: TW02810306 was used to set up the EUT via Hyperterminal. The PC is only used for configuration and was removed during testing.

2.3 Testing Algorithm

The EUT was operated continuously by a firmware test sequence that provided a continuous modulated RF data stream to the output port.

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. 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. The measurement uncertainty of the data contained herein is ±2.3 dB.

For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ±2.3. 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:

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 = $0.5\ (2^2 + 1^2 + 4^2)^{1/2}$ = ±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

Equipment	WLL Asset #	Calibration Due
Hewlett-Packard 8568B Spectrum Analyzer	0073	7/08/05
Hewlett-Packard 85650A Quasi-Peak Adapter	0069	7/08/05
Hewlett-Packard 8593A Spectrum Analyzer	0074	8/17/05
Hewlett-Packard 8449B Microwave Preamp	0312	9/29/05
Hewlett-Packard 8672A Signal Generator	0080	3/25/05
ARA LPB-2520 BiconiLog Antenna	0007	9/14/05
ARA DRG118/A Microwave Horn Antenna	0425	4/17/05
Narda V638 Horn Antenna	0210	12/25/08
Hewlett-Packard 85685A RF Preselector	0071	7/08/05
Solar Electronics 8012-50-R-24-BNC LISN	0125	10/01/05
Solar Electronics 8012-50-R-24-BNC LISN	0126	10/01/05
Tektronix TDS 220 Oscilloscope	0476	7/29/05
Rohde & Schwarz SMT06 Signal Generator	0478	11/23/05
Wiltron 75N50 Diode Detector	0475	8/24/05
Hewlett-Packard 438A Power Meter	0394	3/10/05
Hewlett-Packard 8481B Power Head	0390	4/15/05

4 Test Results

4.1 RF Power Output (§15.247(b))

For devices within the scope of FCC §15.247, the peak power conducted from the intentional radiator to the antenna shall not be greater than one watt (30 dBm).

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.

The EUT carrier was modulated during this test.

Table 3. RF Power Output

Channel and/or Frequency	Measured Level (dBm)	Measured Level (mWatts)	Rated (mWatts)	Limit (mWatts)
Plan A Chan 1 @ 5.744GHz	19.6	93.2	100	1000
Plan A Chan 2 @ 5.747 GHz	19.8	96.2	100	1000
Plan A Chan 3 @ 5.751 GHz	19.8	96.3	100	1000
Plan B Chan 1 @ 5.824 GHz	19.6	93.3	100	1000
Plan B Chan 2 @ 5.827 GHz	19.7	94.3	100	1000
Plan B Chan 3 @ 5.831 GHz	19.6	93.2	100	1000

RF Output Power Measurement
Diode Detector Method Test Setup Diagram

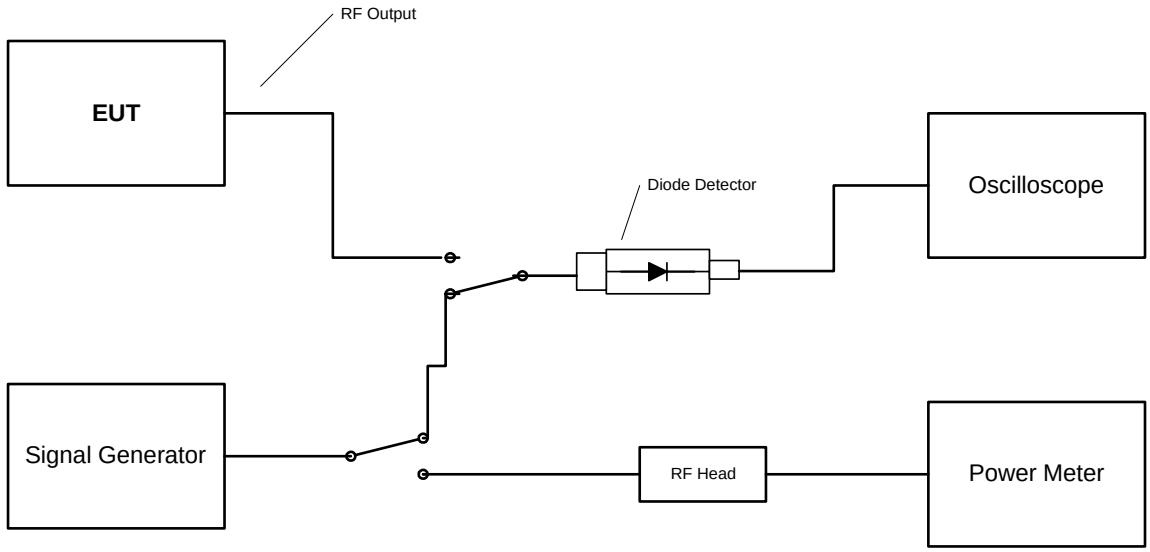

Figure 1, Power Measurement Setup

4.2 Occupied Bandwidth (§15.247(a)(2))

For systems using digital modulation techniques, FCC Part 15.247 requires that the minimum 6dB bandwidth be at least 500 kHz.

Occupied bandwidth was performed by connecting the RF output of the EUT to the input of a spectrum analyzer. The following plots depict the bandwidth measurements. Table 4 lists the measured bandwidths.

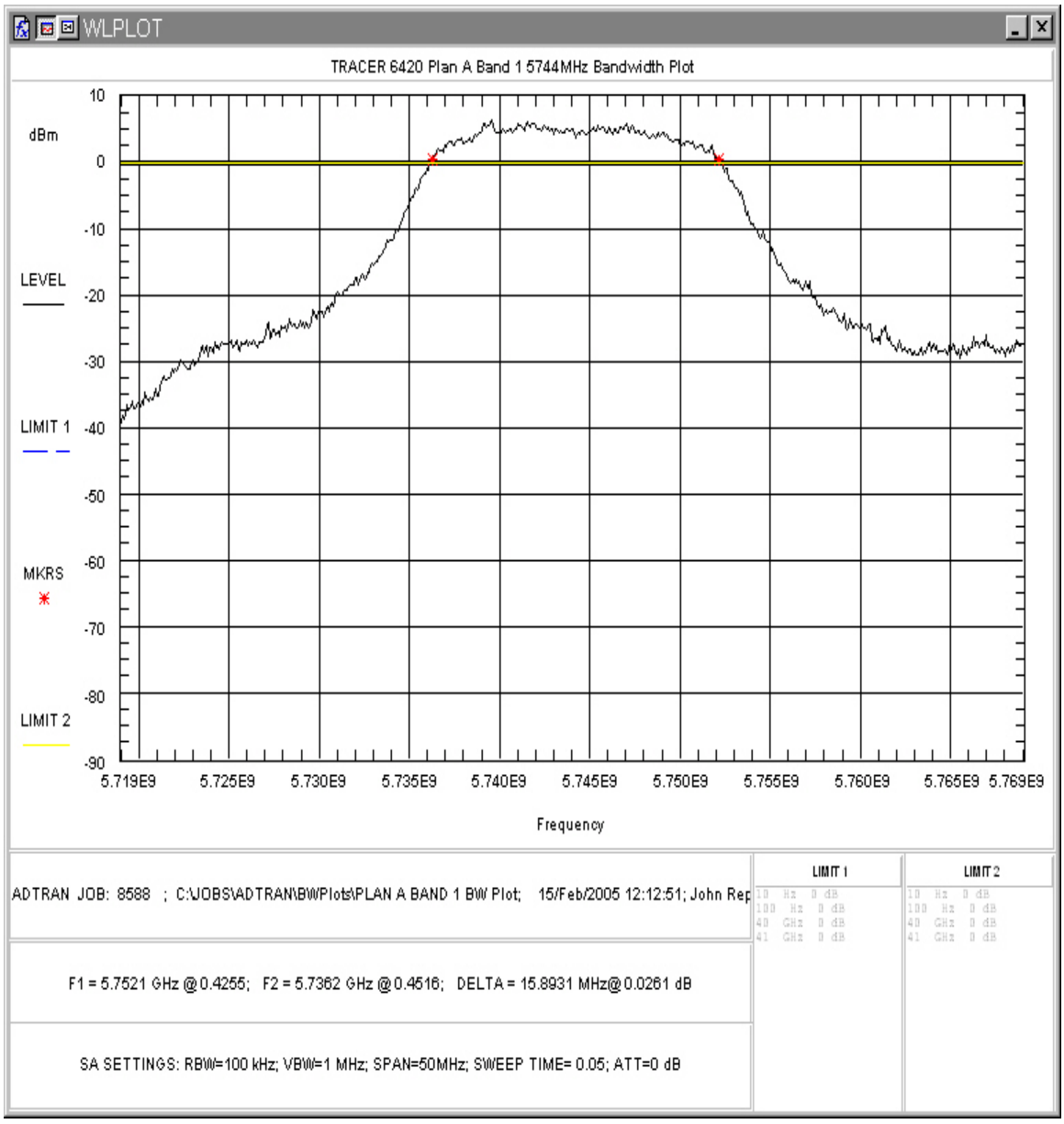

Figure 2. Occupied Bandwidth - Plan A , Band 1

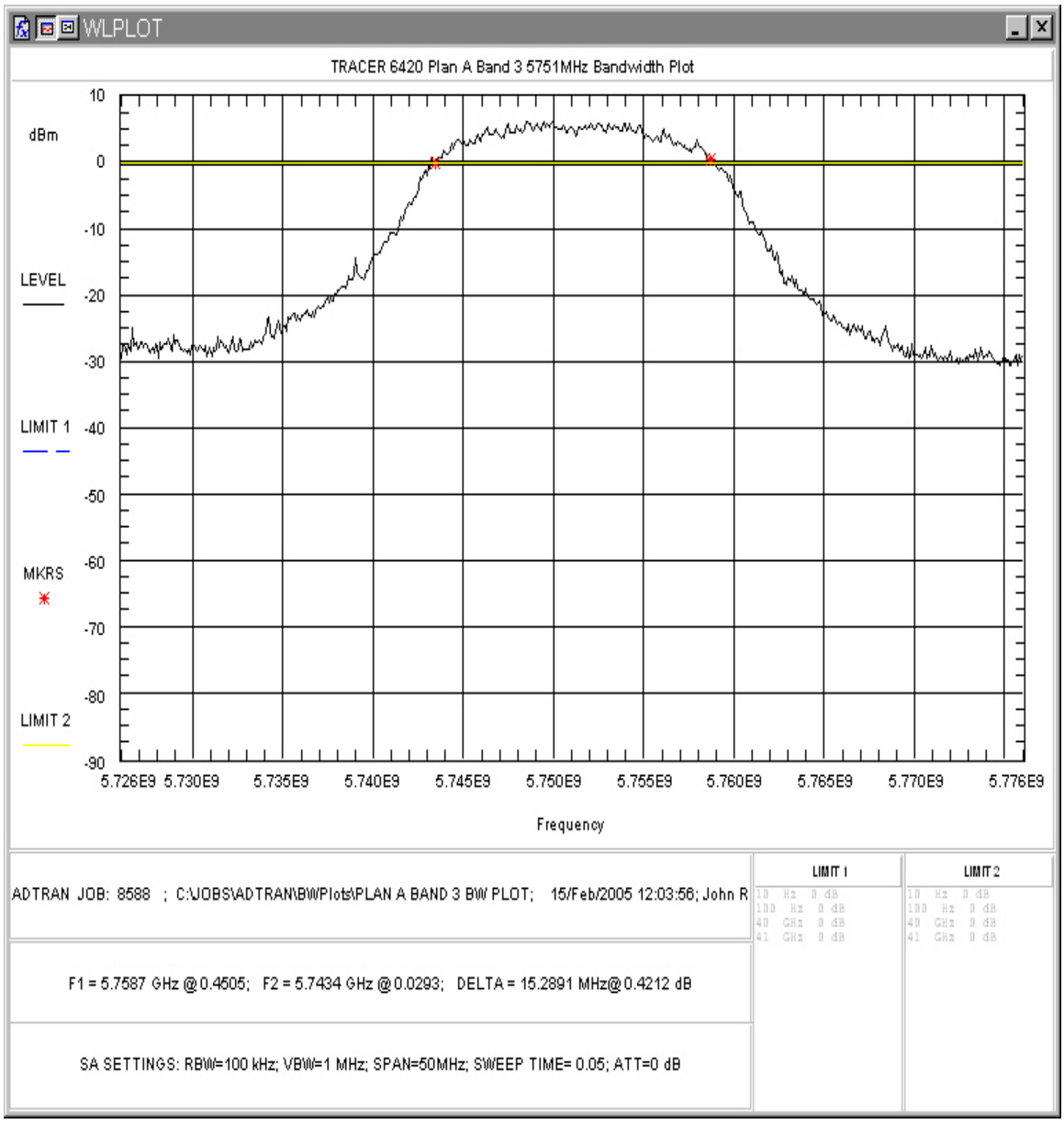

Figure 3. Occupied Bandwidth - Plan A, Band 3

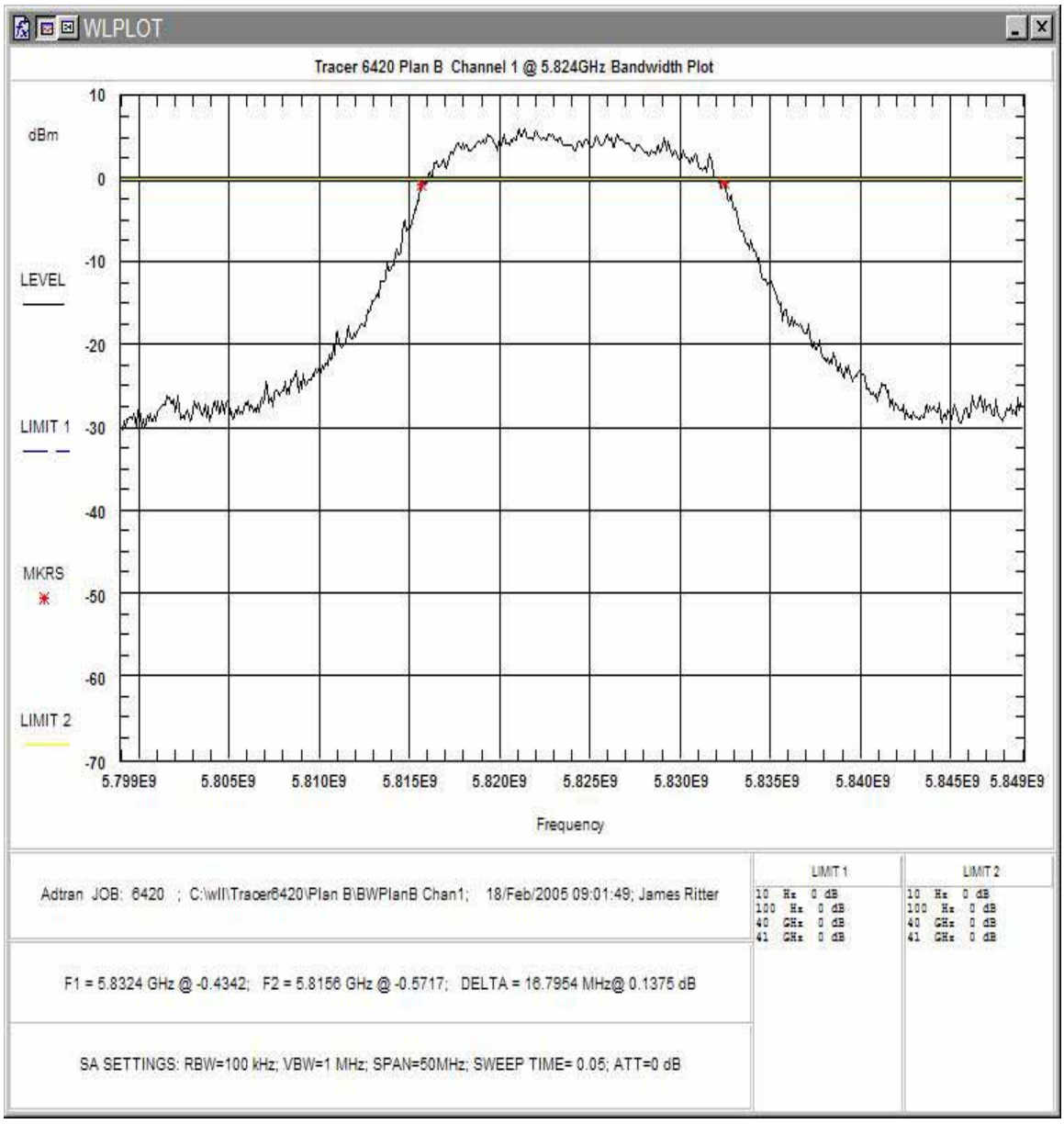

Figure 4. Occupied Bandwidth - Plan B, Band 1

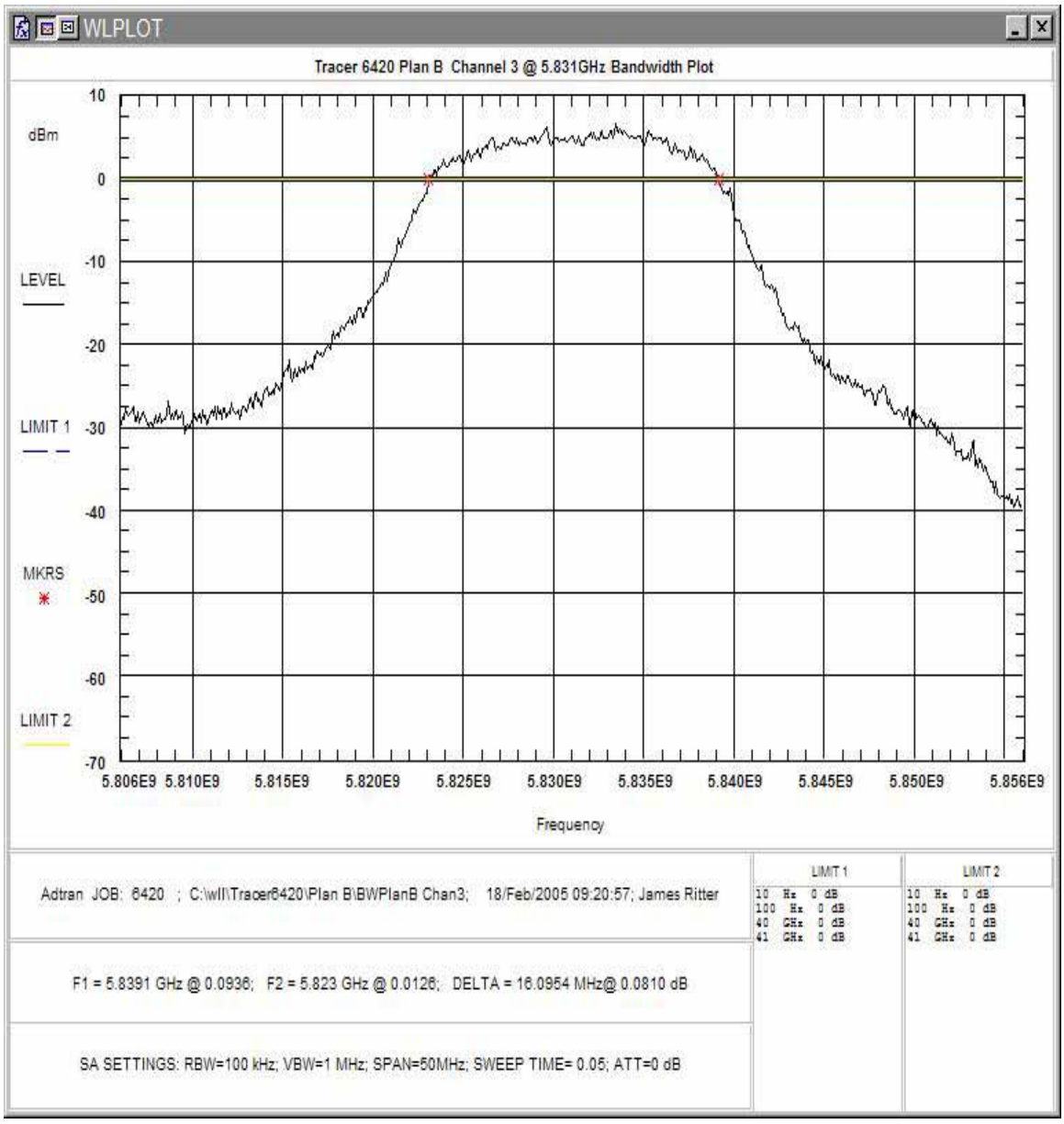

Figure 5. Occupied Bandwidth - Plan B, Band 3

Table 4 provides a summary of the Occupied Bandwidth Results.

Table 4. Occupied Bandwidth Results

Frequency	Bandwidth (MHz)	Limit	Pass/Fail
Plan A (1)	15.9	> 500 kHz	Pass
Plan A (3)	15.3	> 500 kHz	Pass
Plan B (1)	16.8	> 500 kHz	Pass
Plan B (3)	16.1	> 500 kHz	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 upper and lower channels of Plan A and Plan B. Plots of the PSD were taken as shown in Figure 6 through Figure 9 below. Table 5 provides a summary of the data.

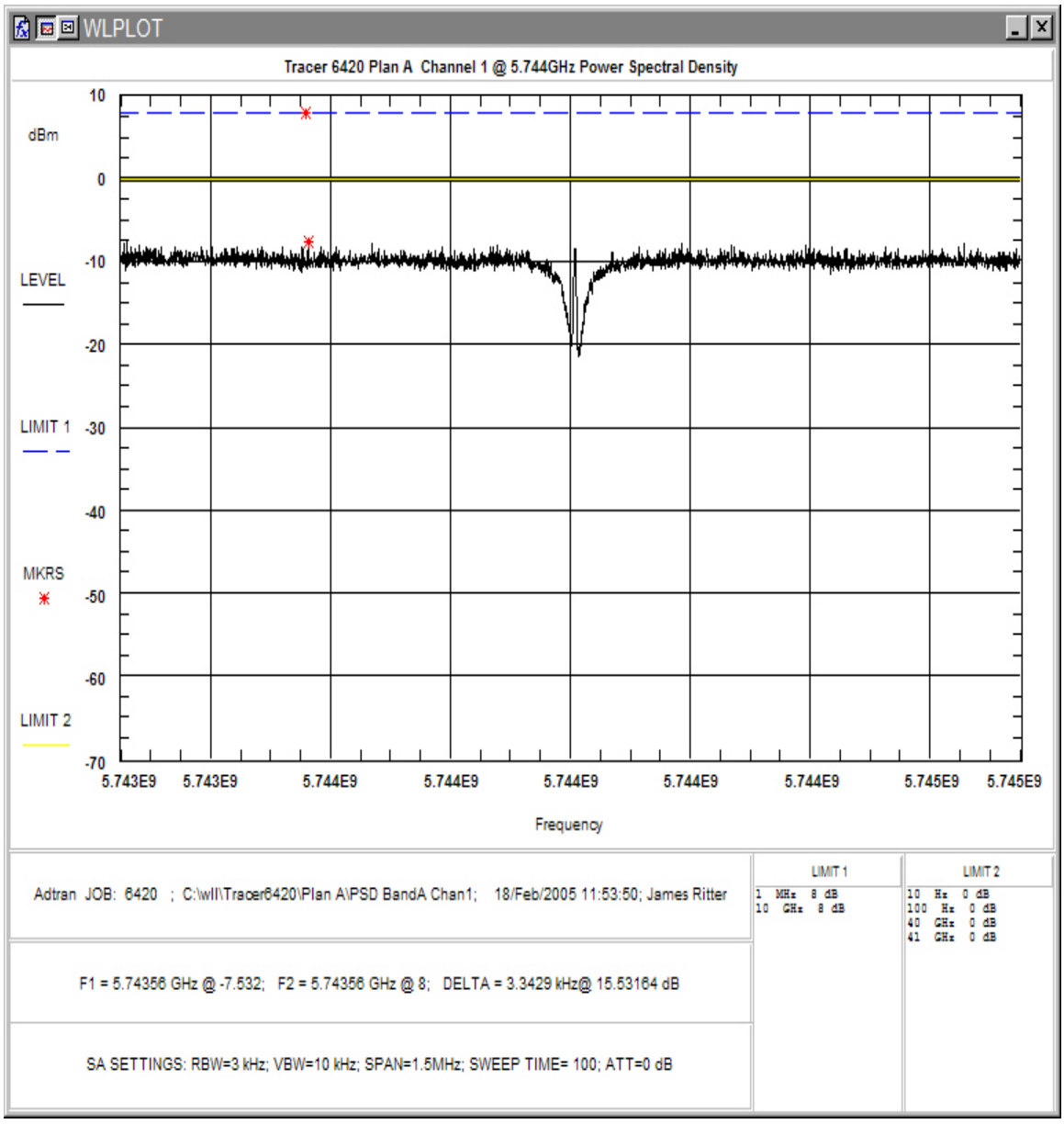

Figure 6. Power Spectral Density Plan A, Band 1

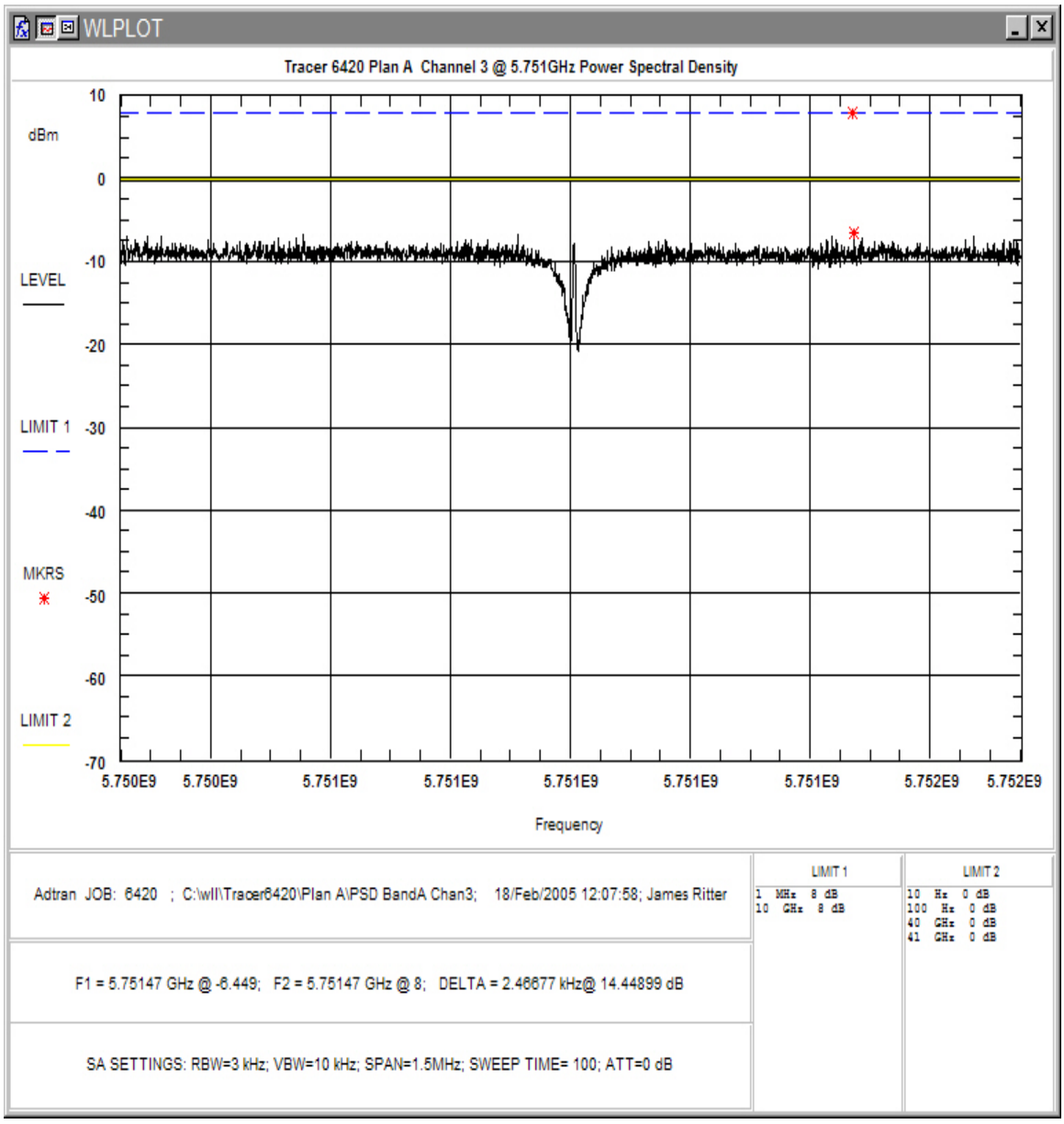

Figure 7. Power Spectral Density Plan A, Band 3

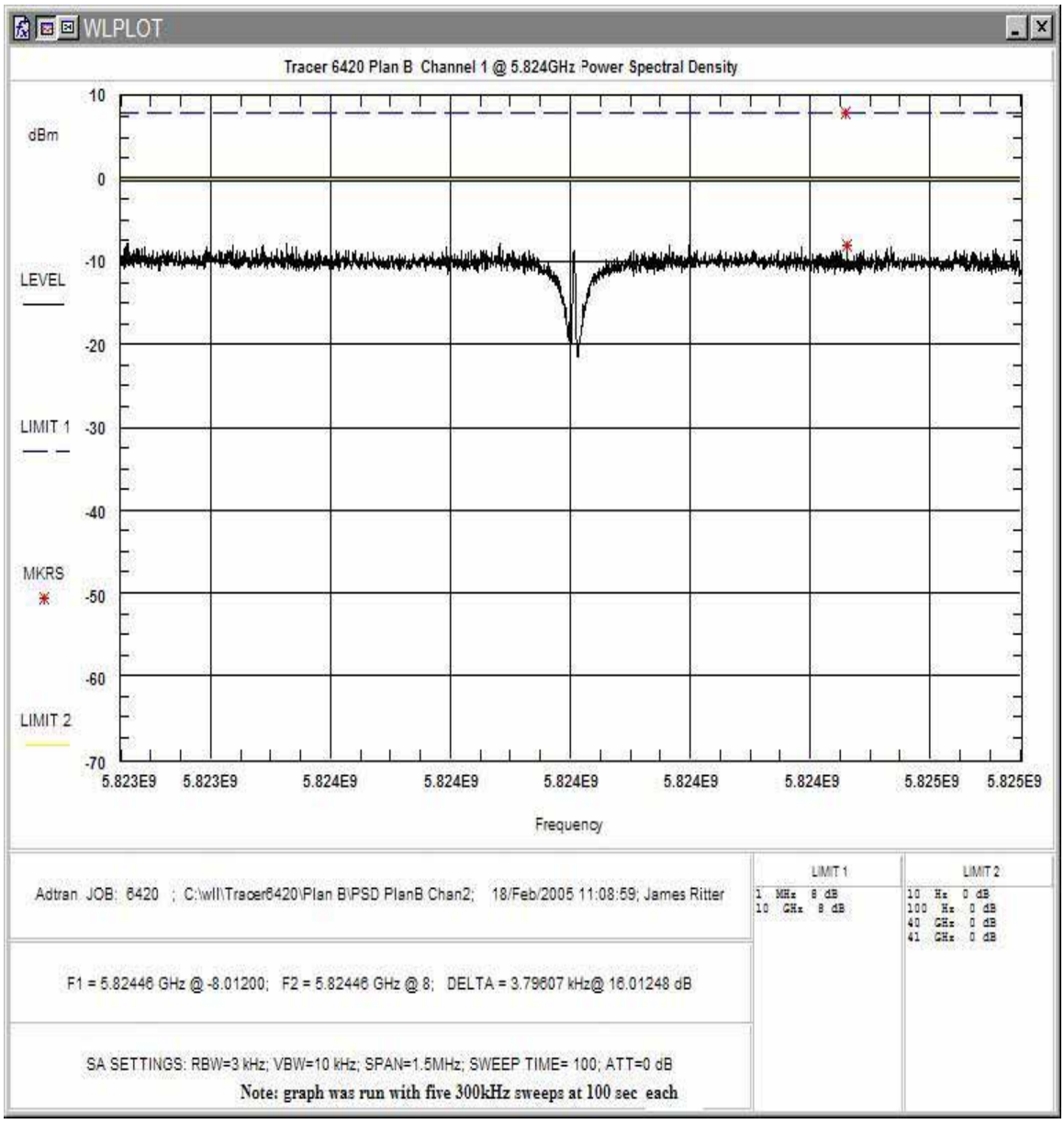

Figure 8. Power Spectral Density Plan B, Band 1

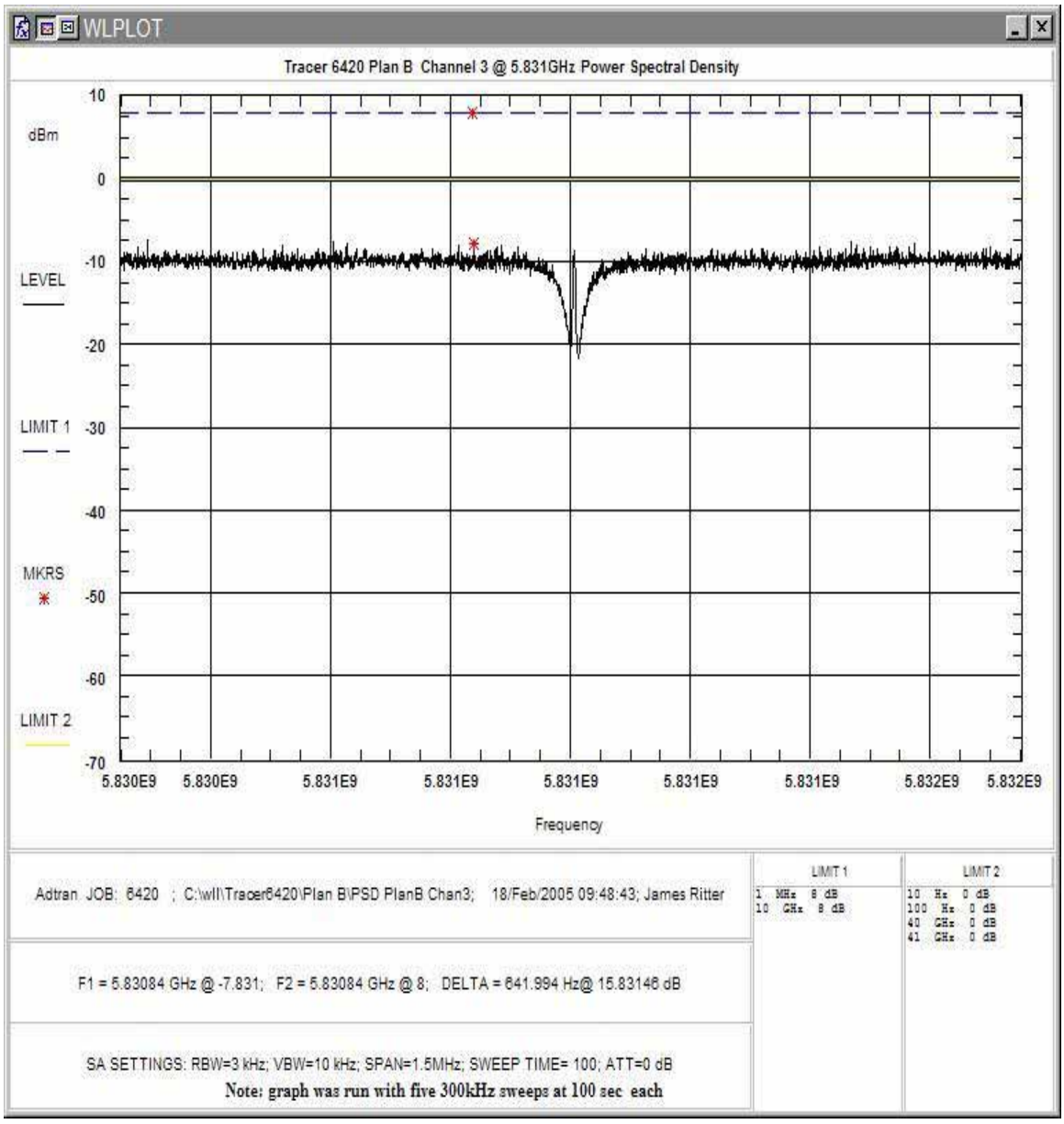

Figure 9. Power Spectral Density Plan B, Band 3

Table 5. RF Power Spectral Density

Frequency	Level (dBm)	Limit (dBm)	Pass/Fail
Plan A (1)	-7.53	8	P
Plan A (3)	-6.45	8	P
Plan B (1)	-8.01	8	P
Plan B (3)	-7.83	8	P

4.4 Spurious Emissions at Antenna Terminals (FCC Part §15.247(d))

In any 100 kHz band outside the frequency band in which the system is operating, the RF power shall be at least 20dB below that in the 100 kHz bandwidth that contain the highest level of the desired power.

All measurements were performed with a measurement bandwidth of 100kHz. The video bandwidth was set to 3MHz during the testing.

See the plots of conducted emissions plots below.

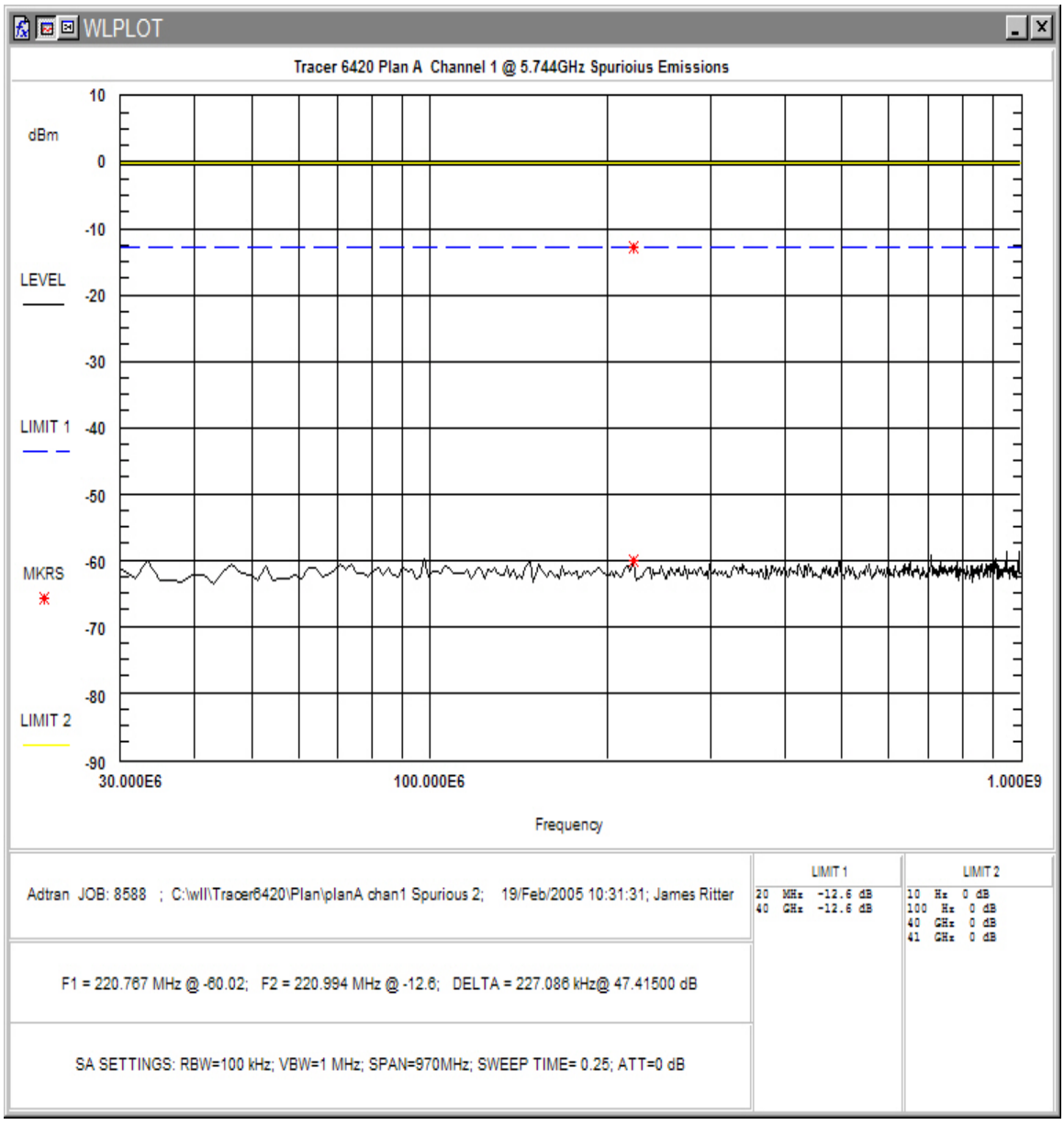

Figure 10. Conducted Spurious Emissions, Plan A Band 1, 30MHz - 1GHz

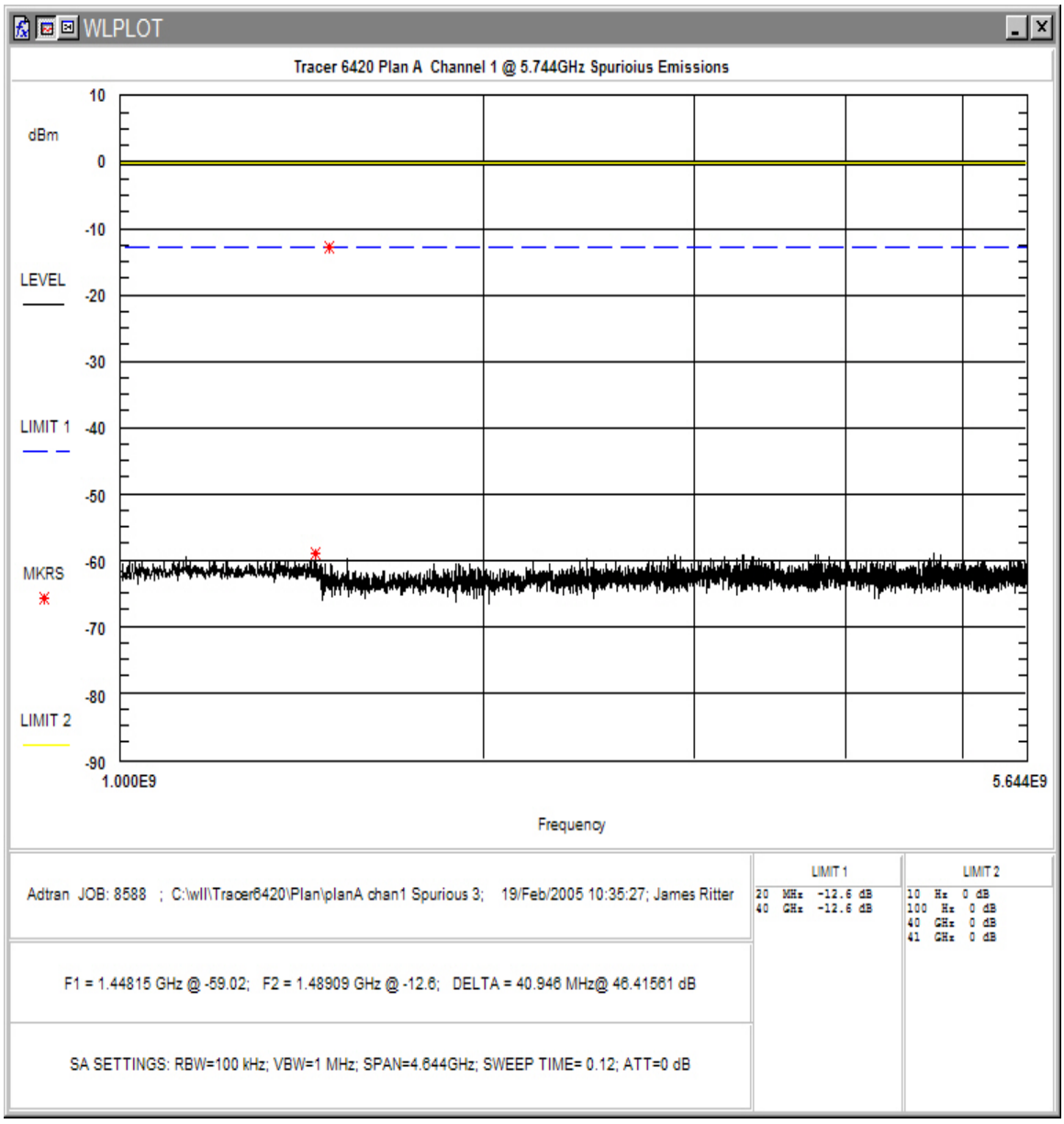

Figure 11. Conducted Spurious Emissions, Plan A Band 1, 1GHz – 5.64GHz

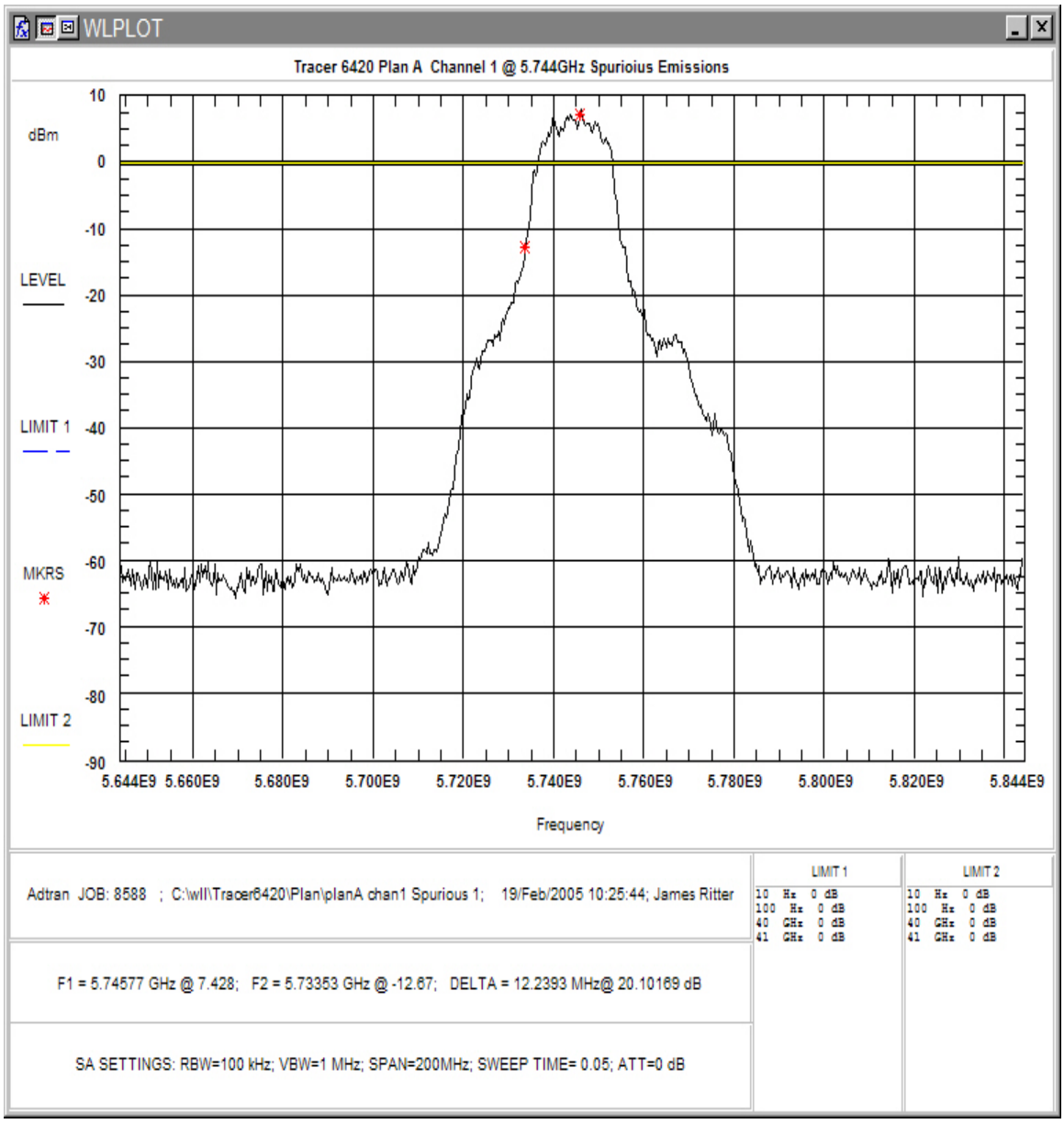

Figure 12. Conducted Spurious Emissions, Plan A Band 1, 5.64GHz – 5.84GHz

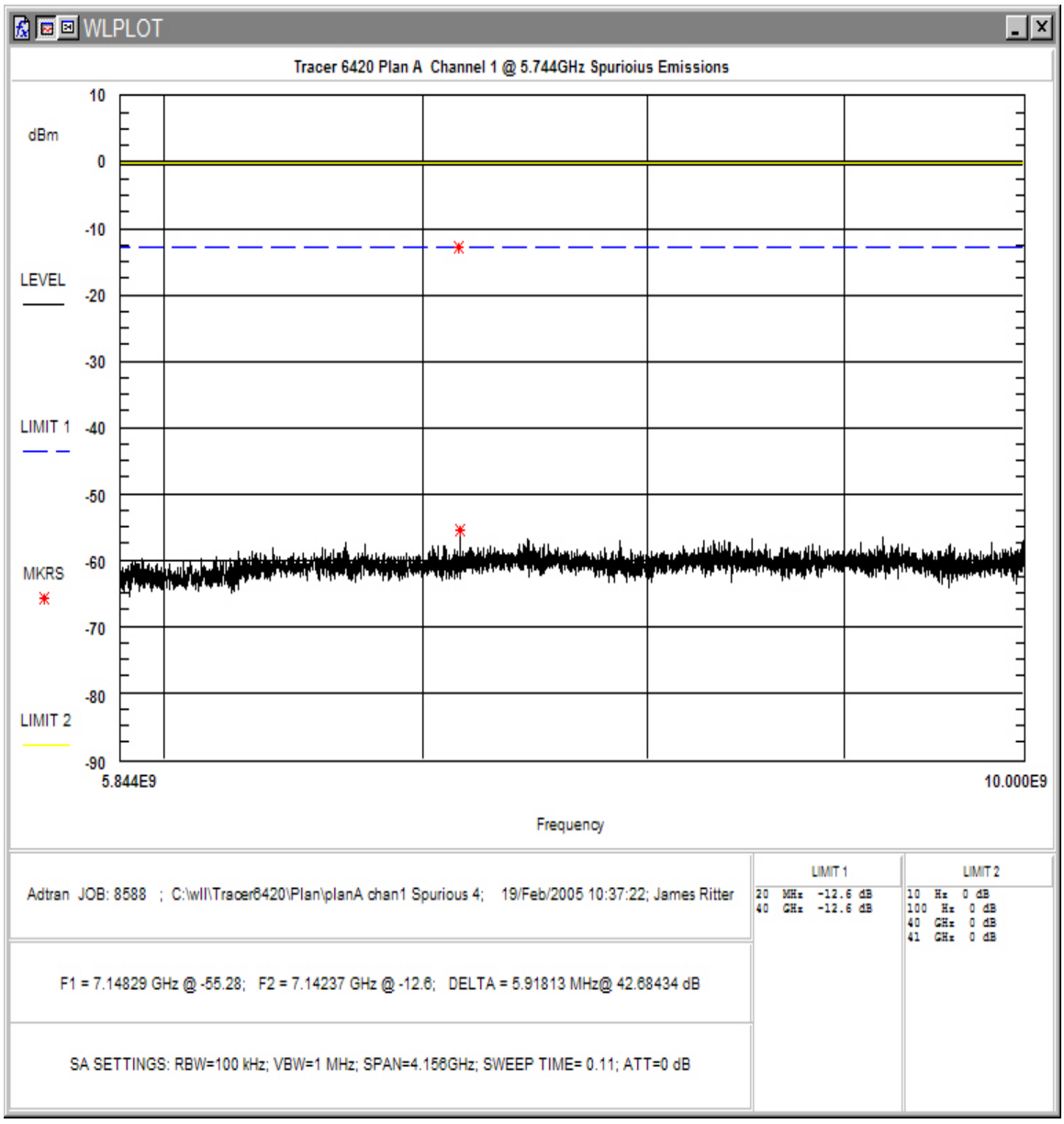

Figure 13. Conducted Spurious Emissions, Plan A Band 1, 5.84GHz - 10GHz

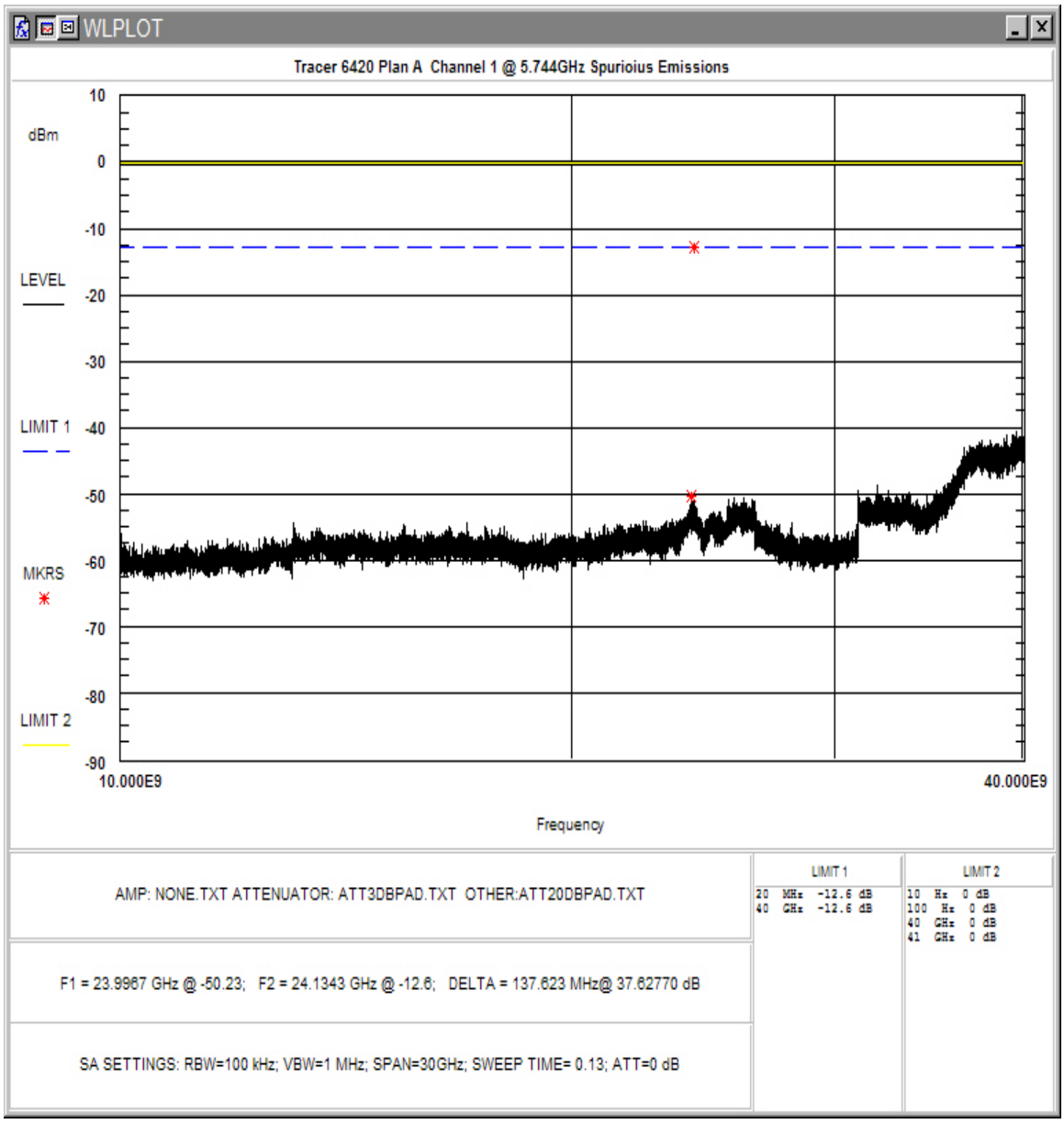

Figure 14. Conducted Spurious Emissions, Plan A Band 1, 10GHz – 40GHz

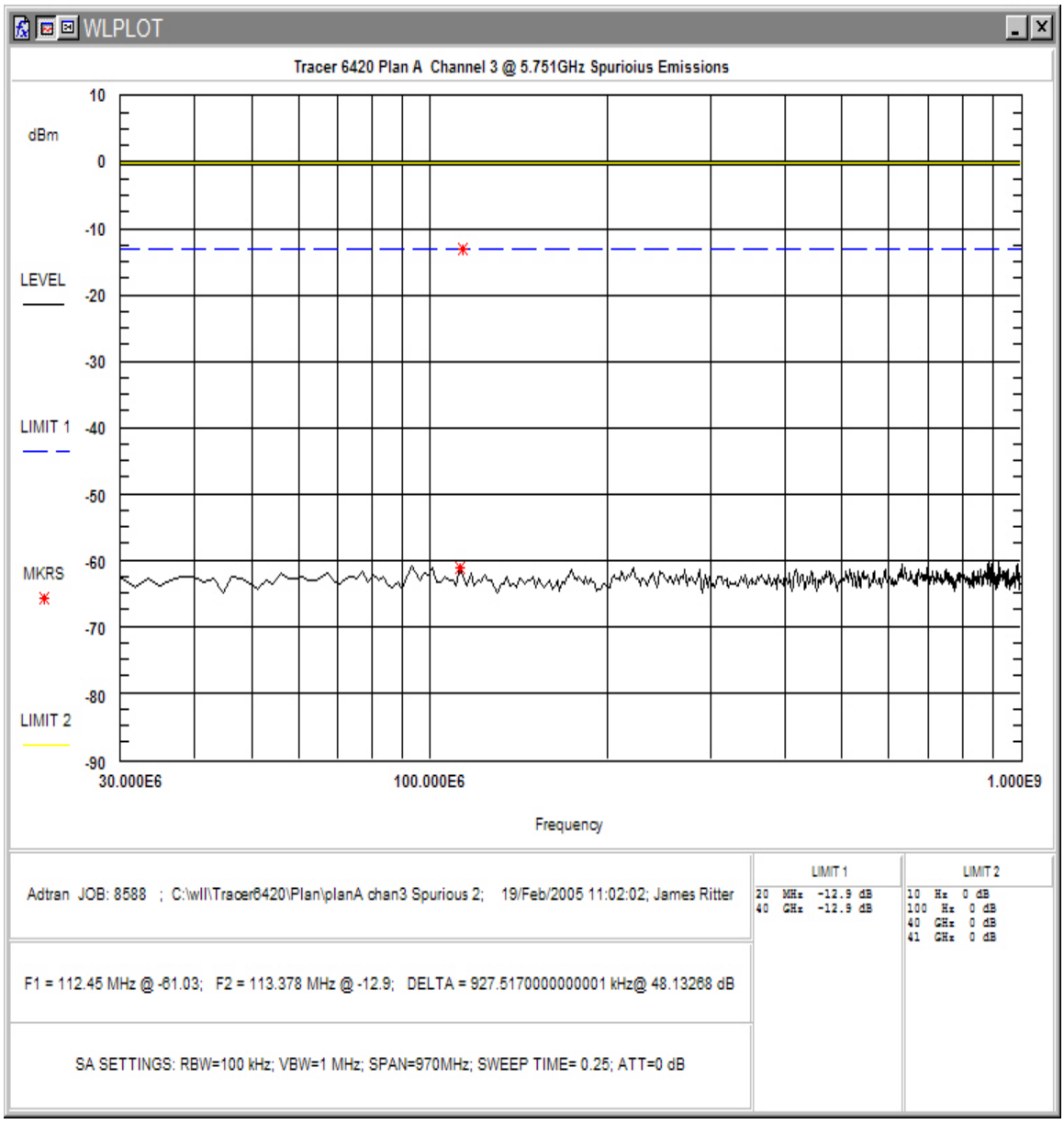

Figure 15. Conducted Spurious Emissions, Plan A Band 3, 30MHz – 1GHz

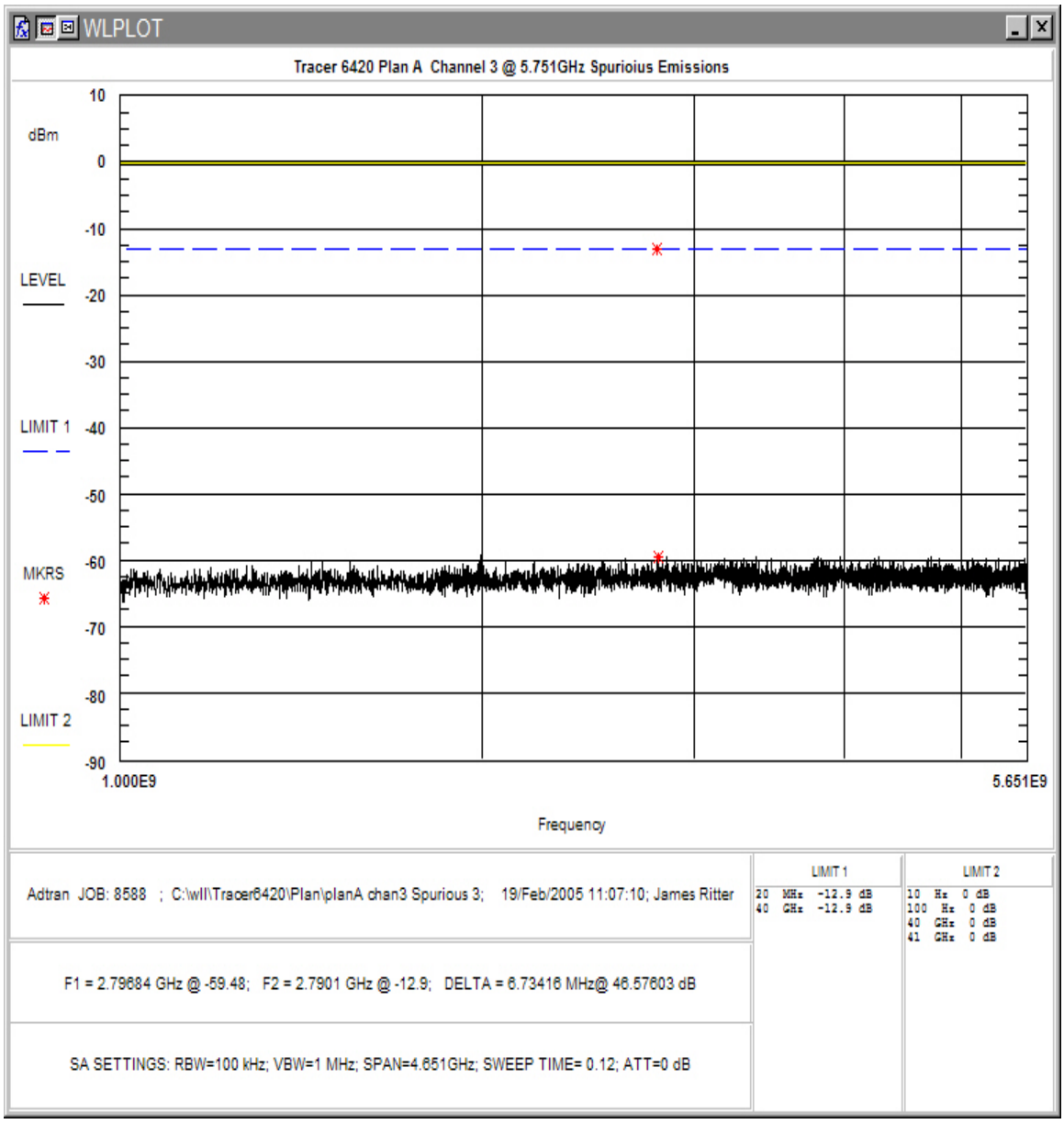

Figure 16. Conducted Spurious Emissions, Plan A Band 3, 1GHz - 5.65GHz

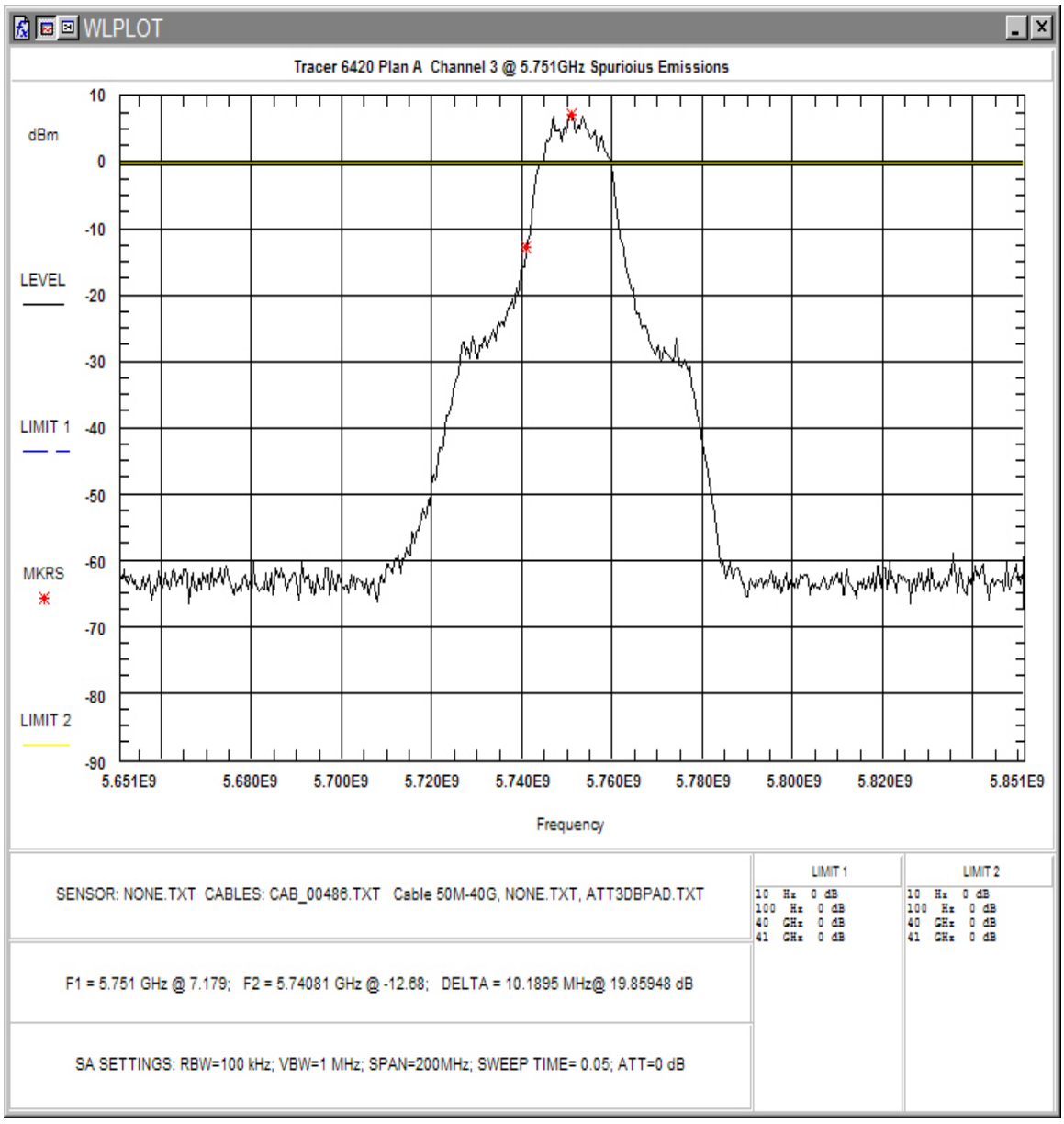

Figure 17. Conducted Spurious Emissions, Plan A Band 3, 5.65GHz - 5.85GHz

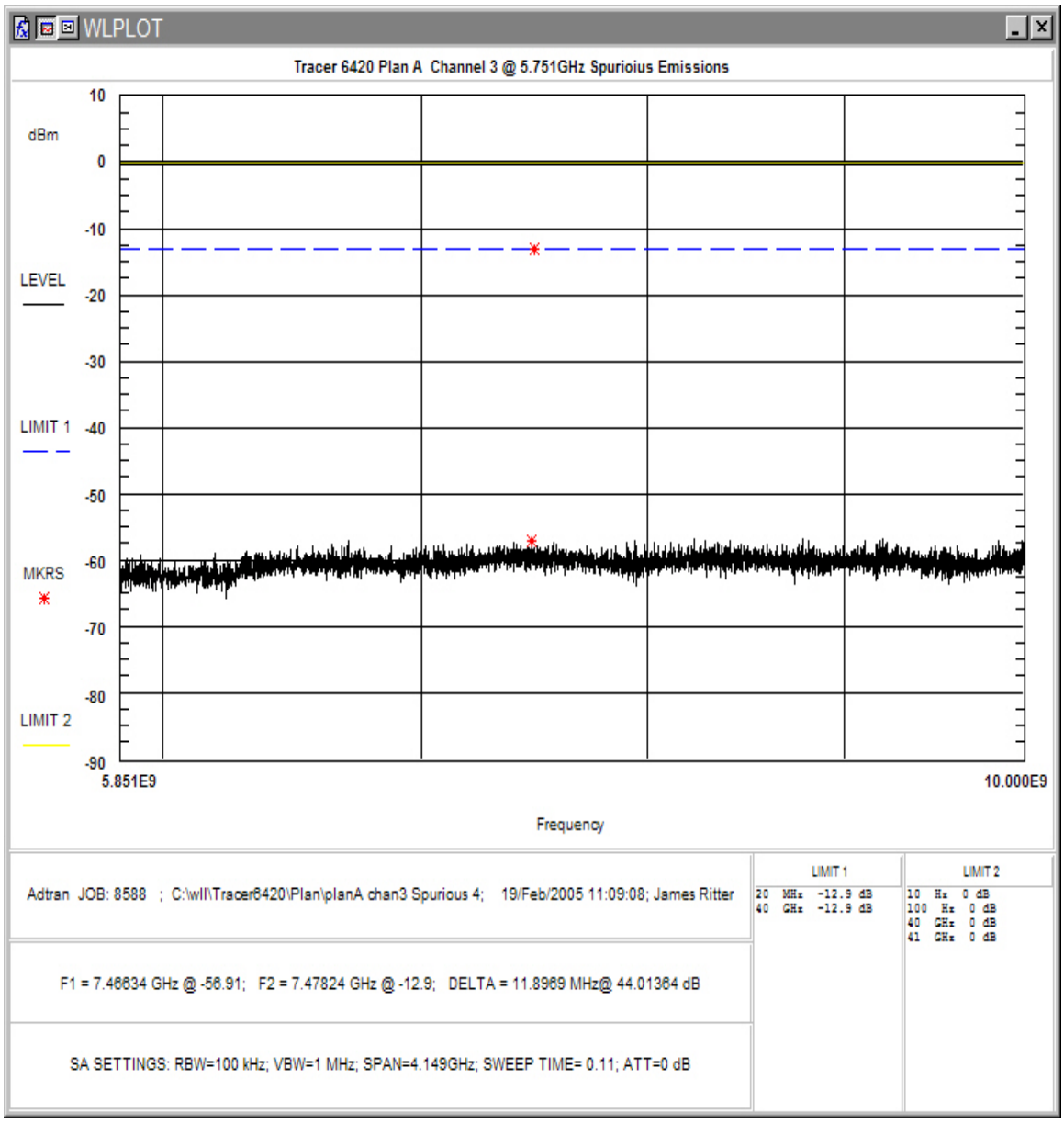

Figure 18. Conducted Spurious Emissions, Plan A Band 3, 5.85GHz - 10GHz

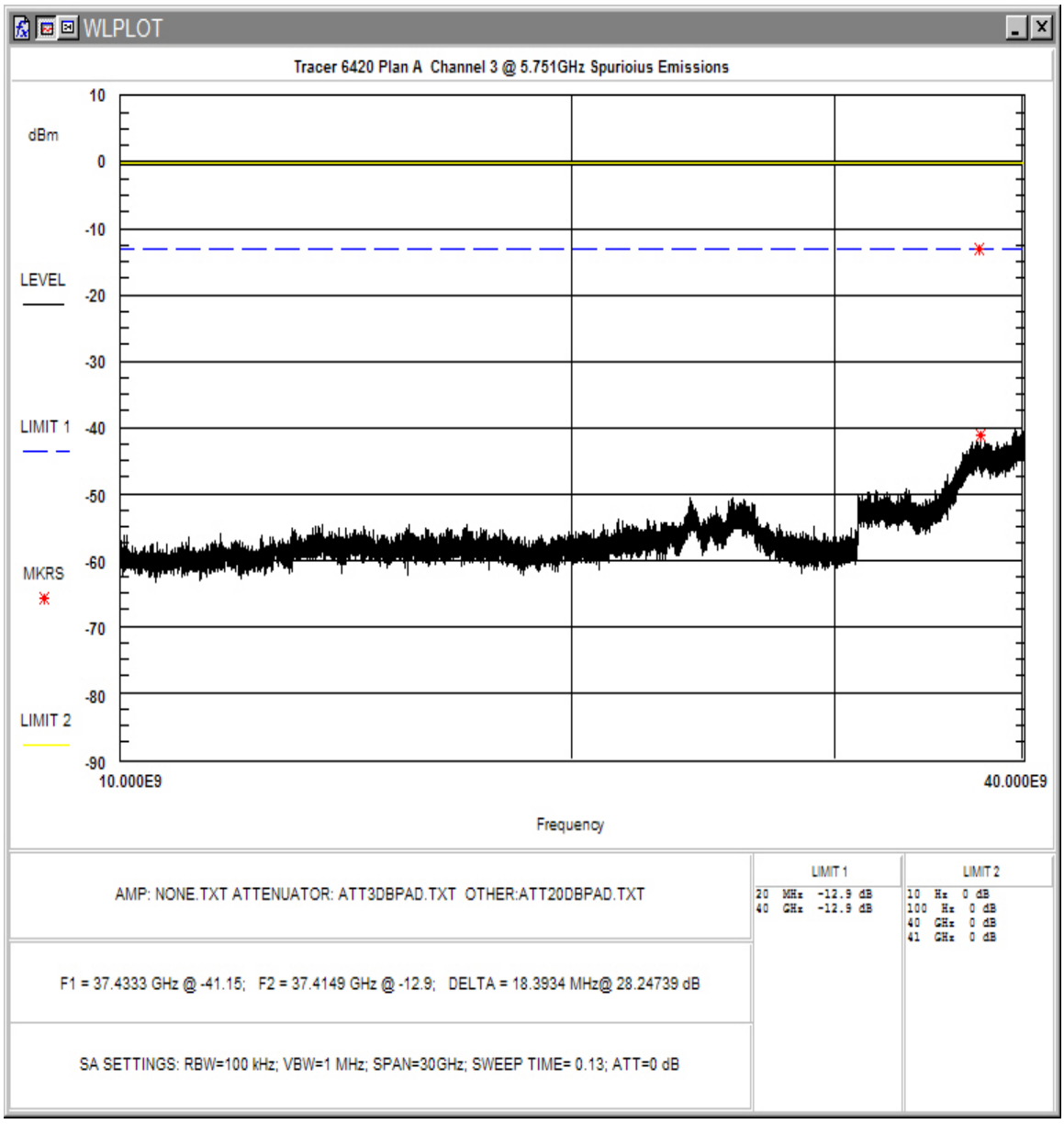

Figure 19. Conducted Spurious Emissions, Plan A Band 3, 10GHz - 40GHz

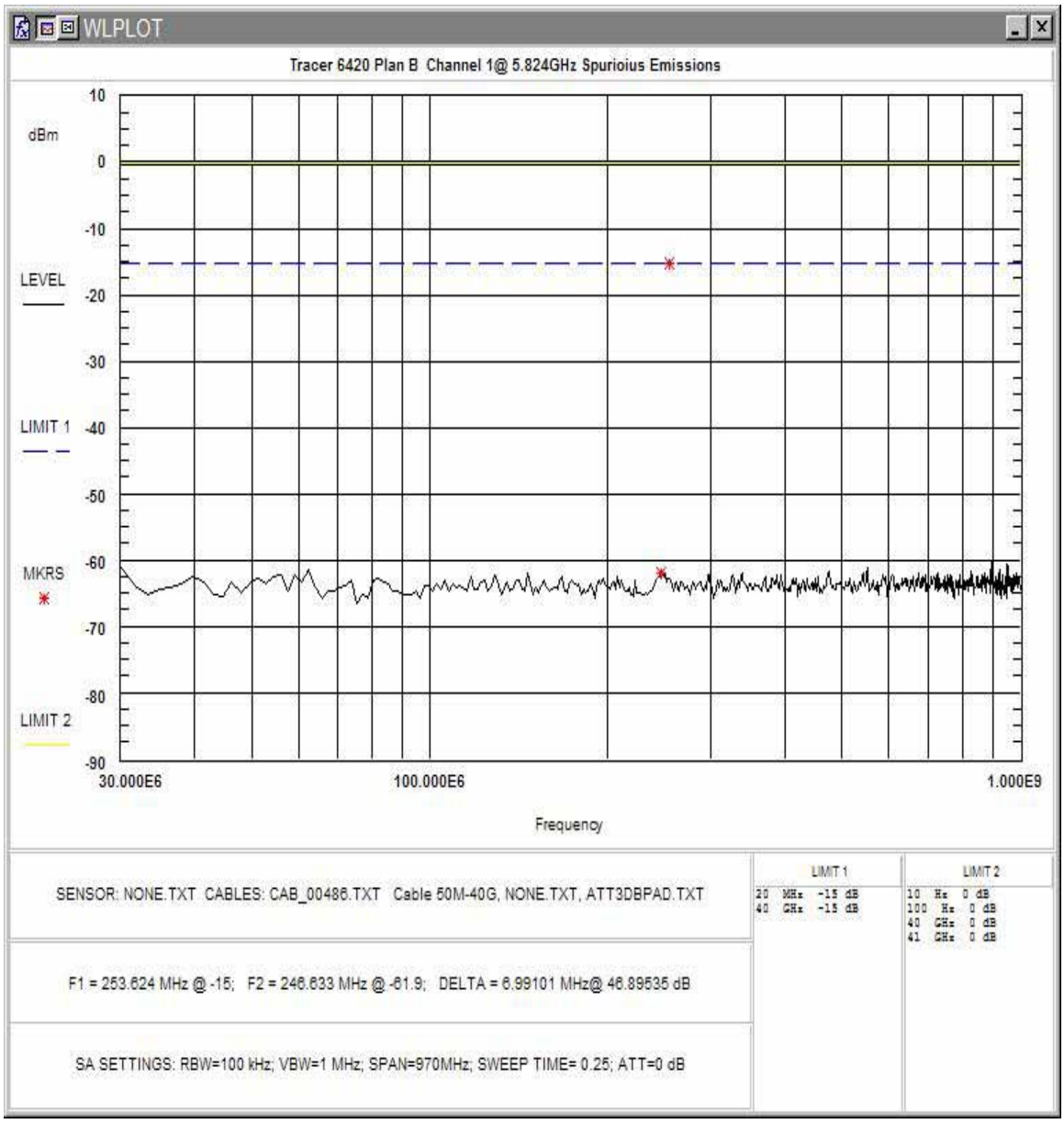

Figure 20. Conducted Spurious Emissions, Plan B Band 1, 30MHz - 1GHz

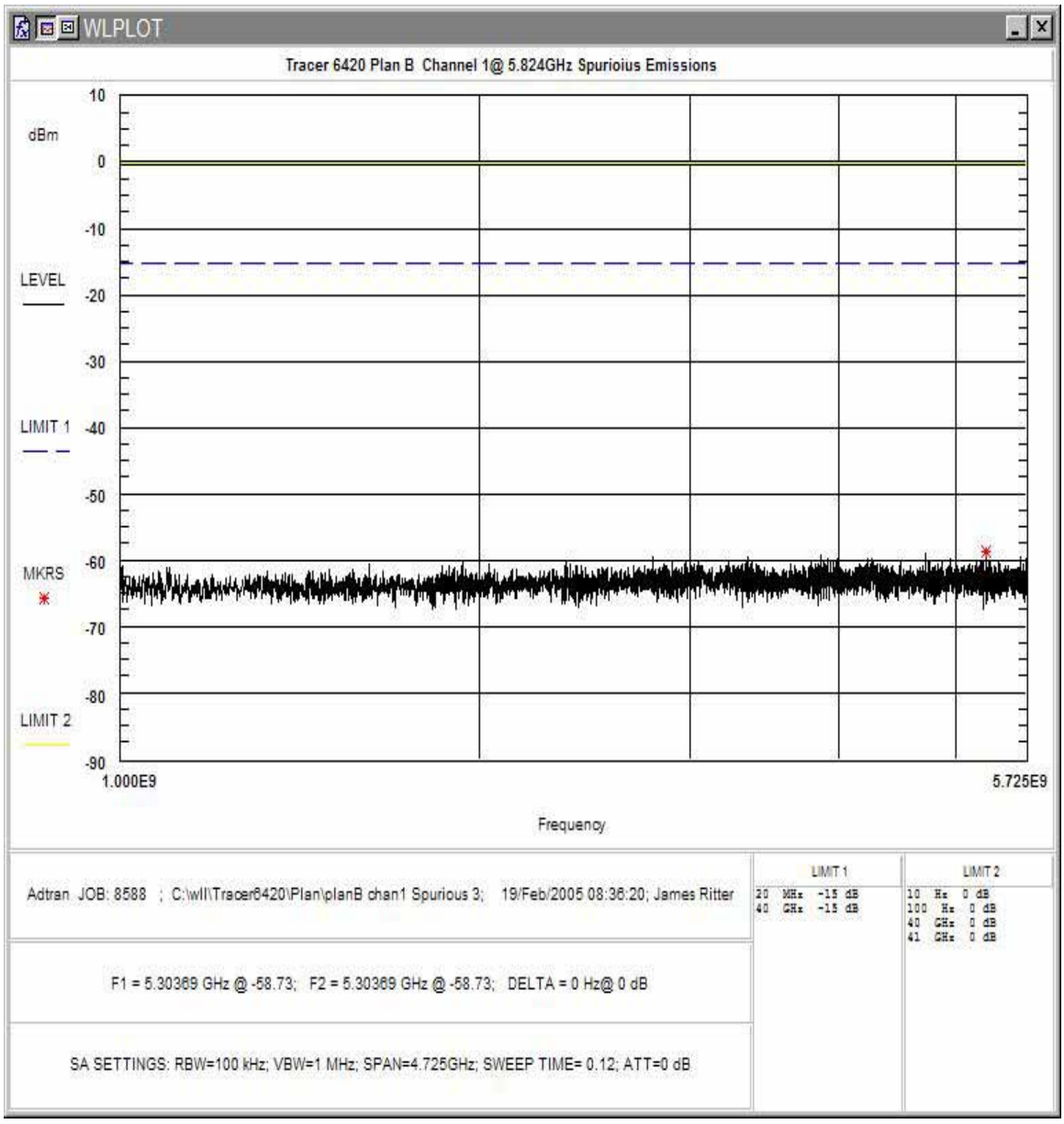

Figure 21. Conducted Spurious Emissions, Plan B Band 1, 1GHz - 5.72GHz

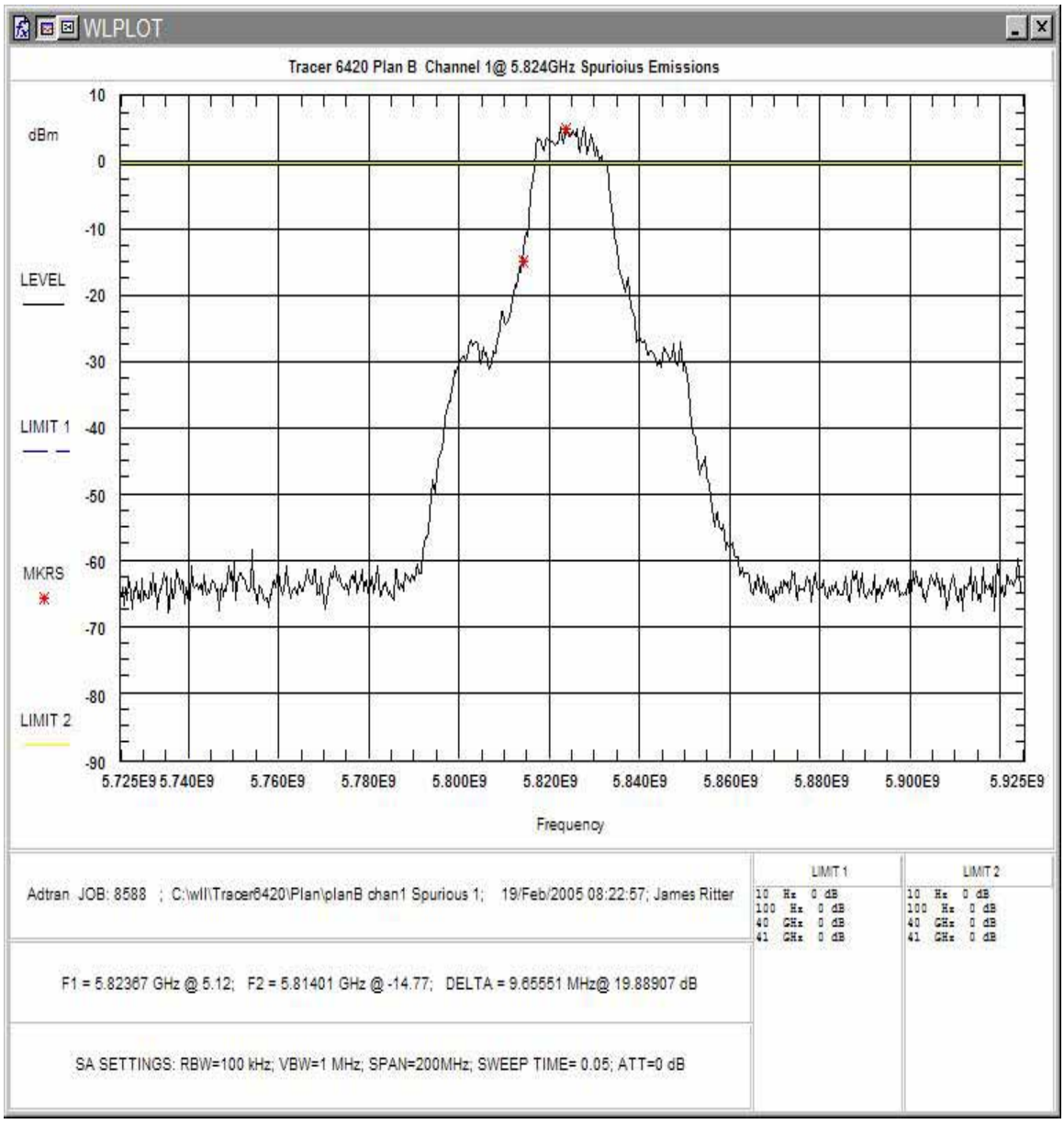

Figure 22. Conducted Spurious Emissions, Plan B Band 1, 5.72GHz – 5.92GHz

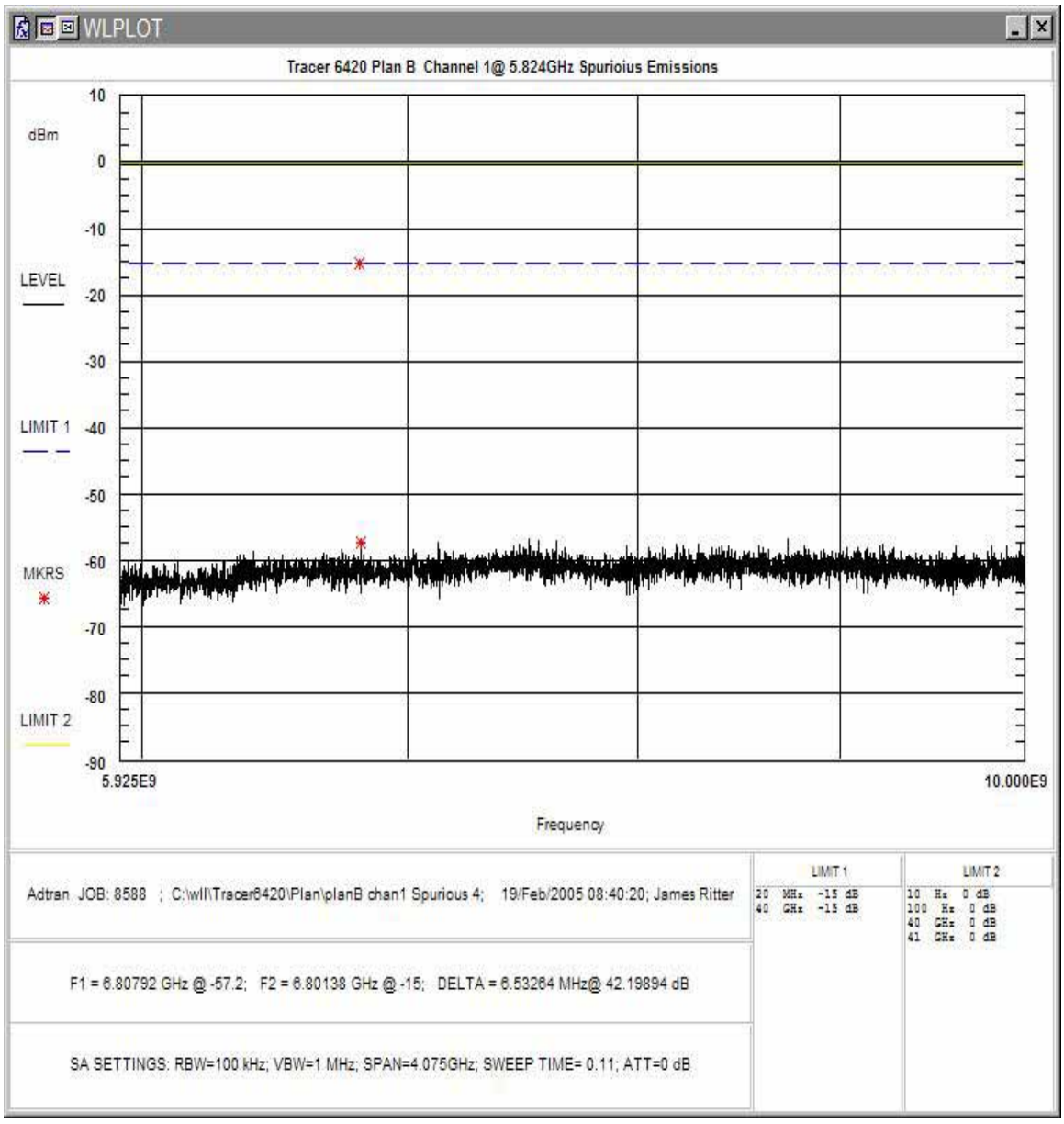

Figure 23. Conducted Spurious Emissions, Plan B Band 1, 5.92GHz - 10GHz

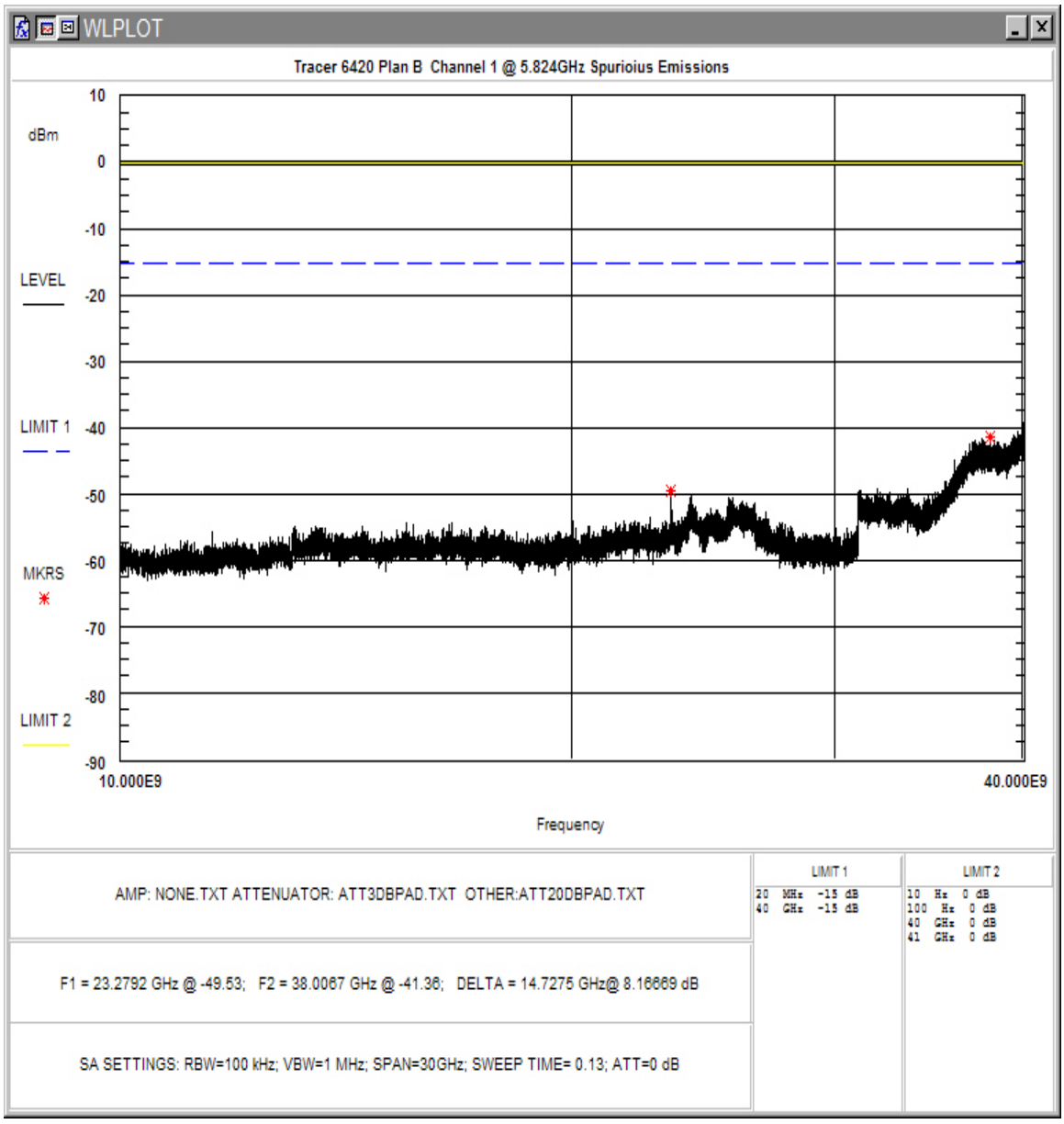

Figure 24. Conducted Spurious Emissions, Plan B Band 1, 10GHz - 40GHz

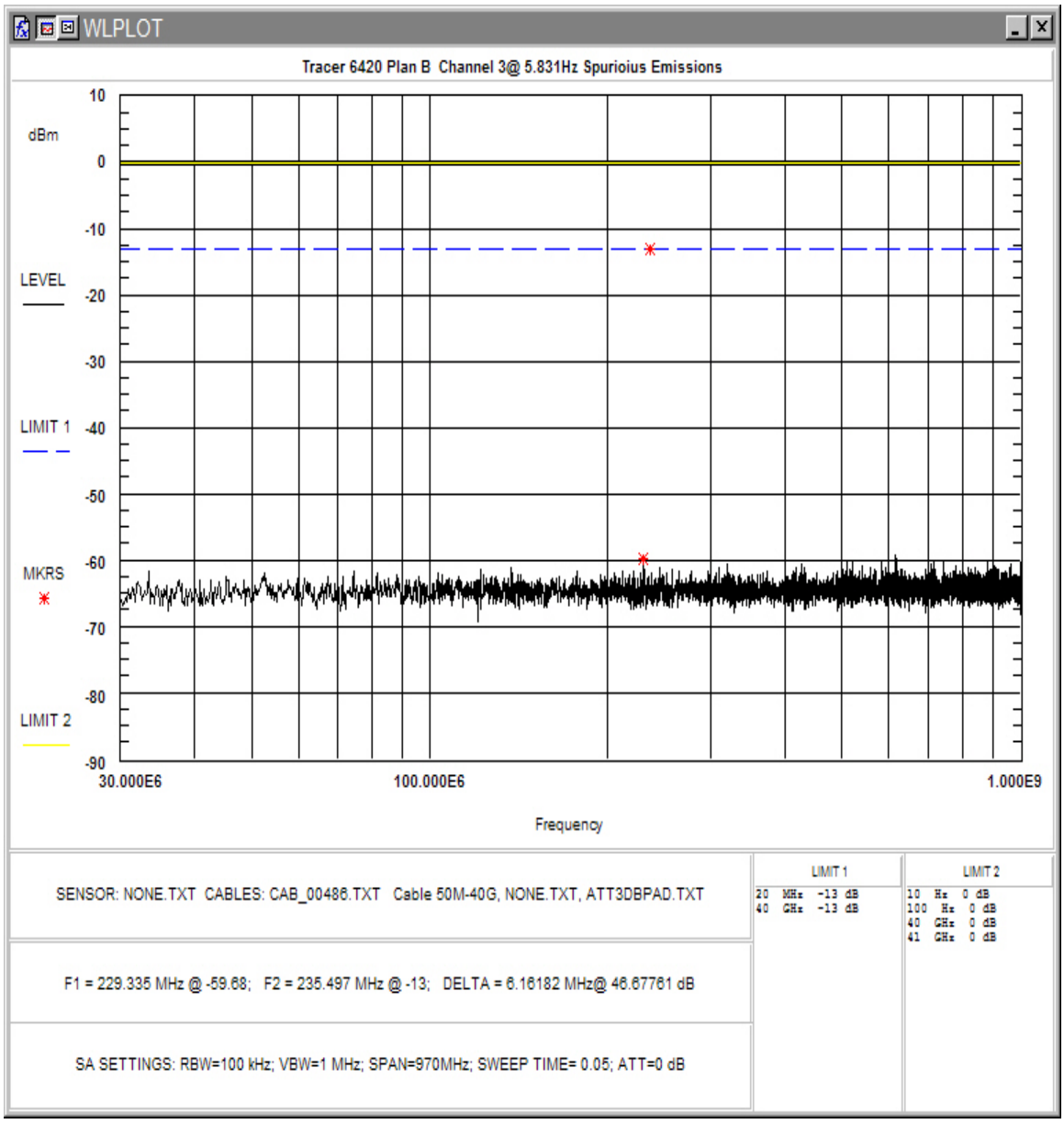

Figure 25. Conducted Spurious Emissions, Plan B Band 3, 30MHz - 1GHz

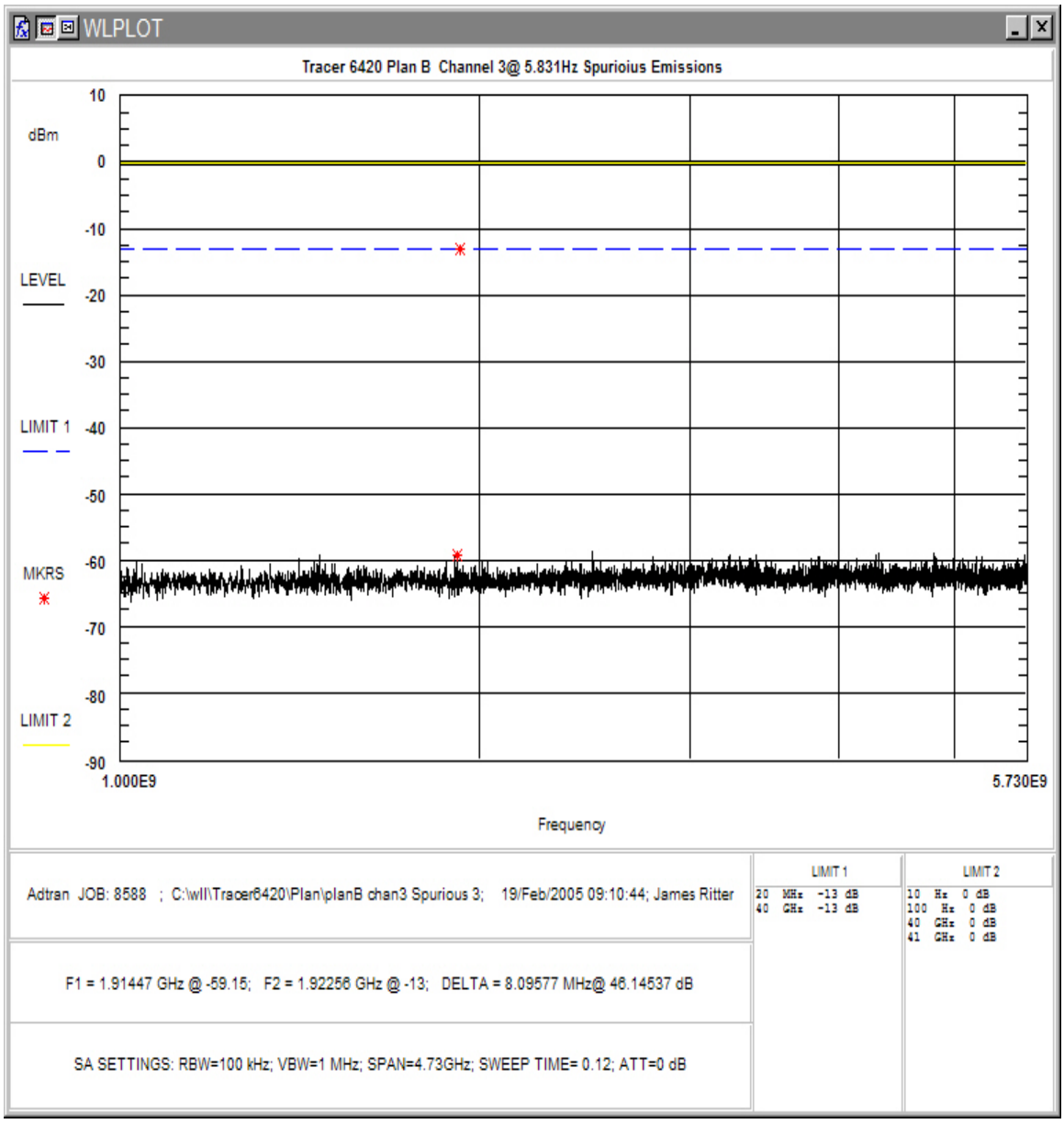

Figure 26. Conducted Spurious Emissions, Plan B Band 3, 1GHz - 5.73GHz

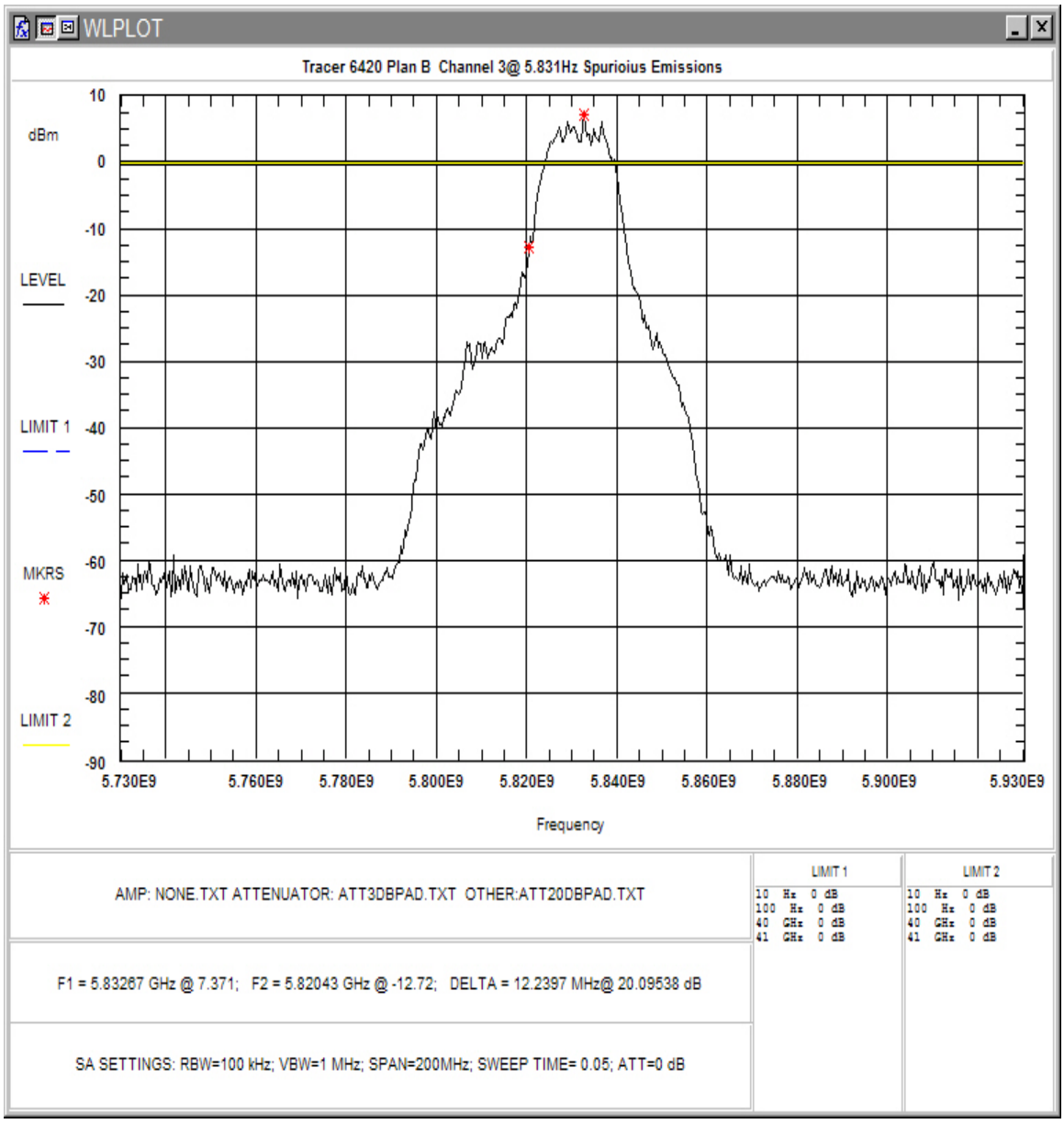

Figure 27. Conducted Spurious Emissions, Plan B Band 3, 5.73GHz – 5.93GHz

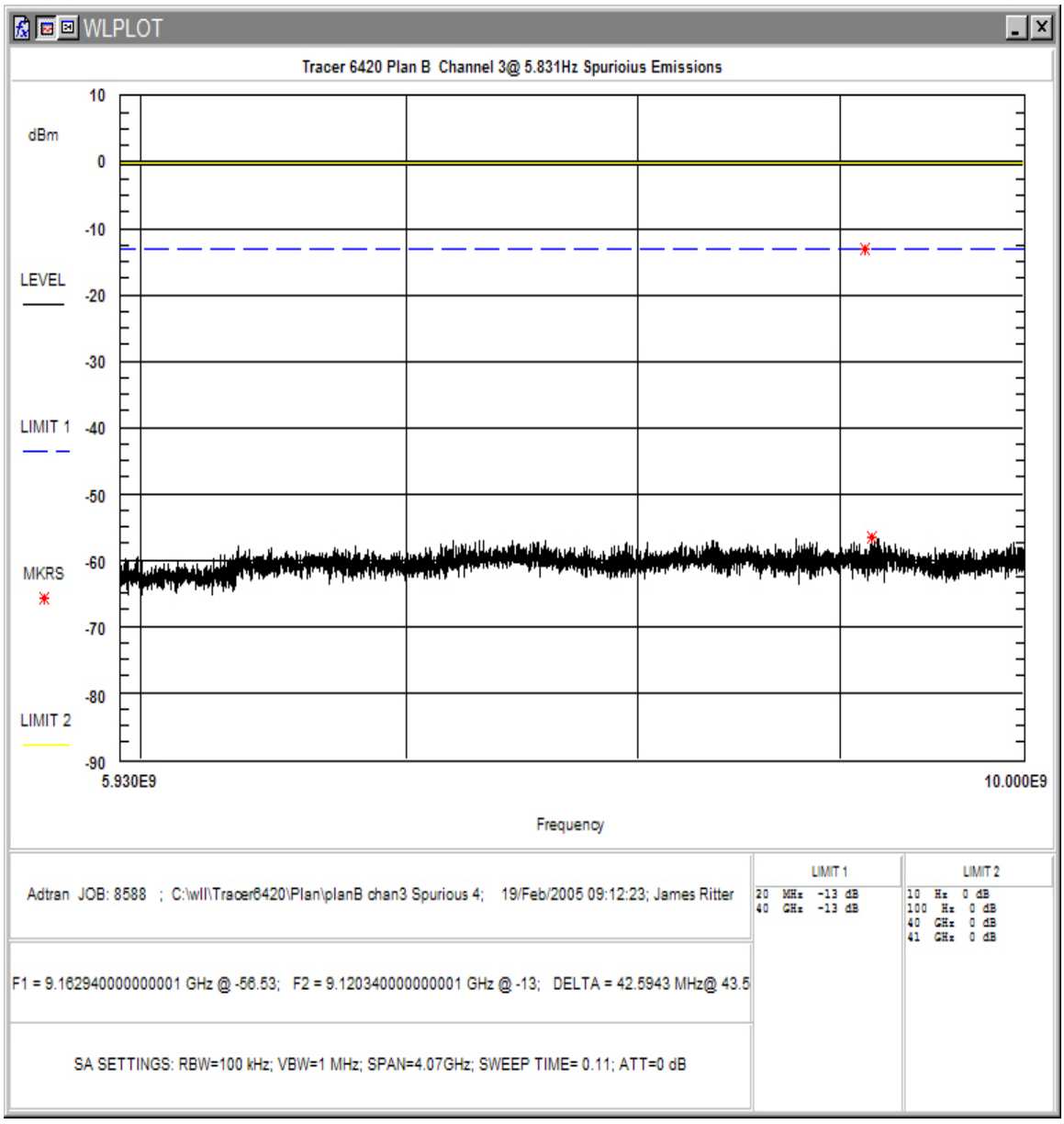

Figure 28. Conducted Spurious Emissions, Plan B Band 3, 5.93GHz – 10GHz

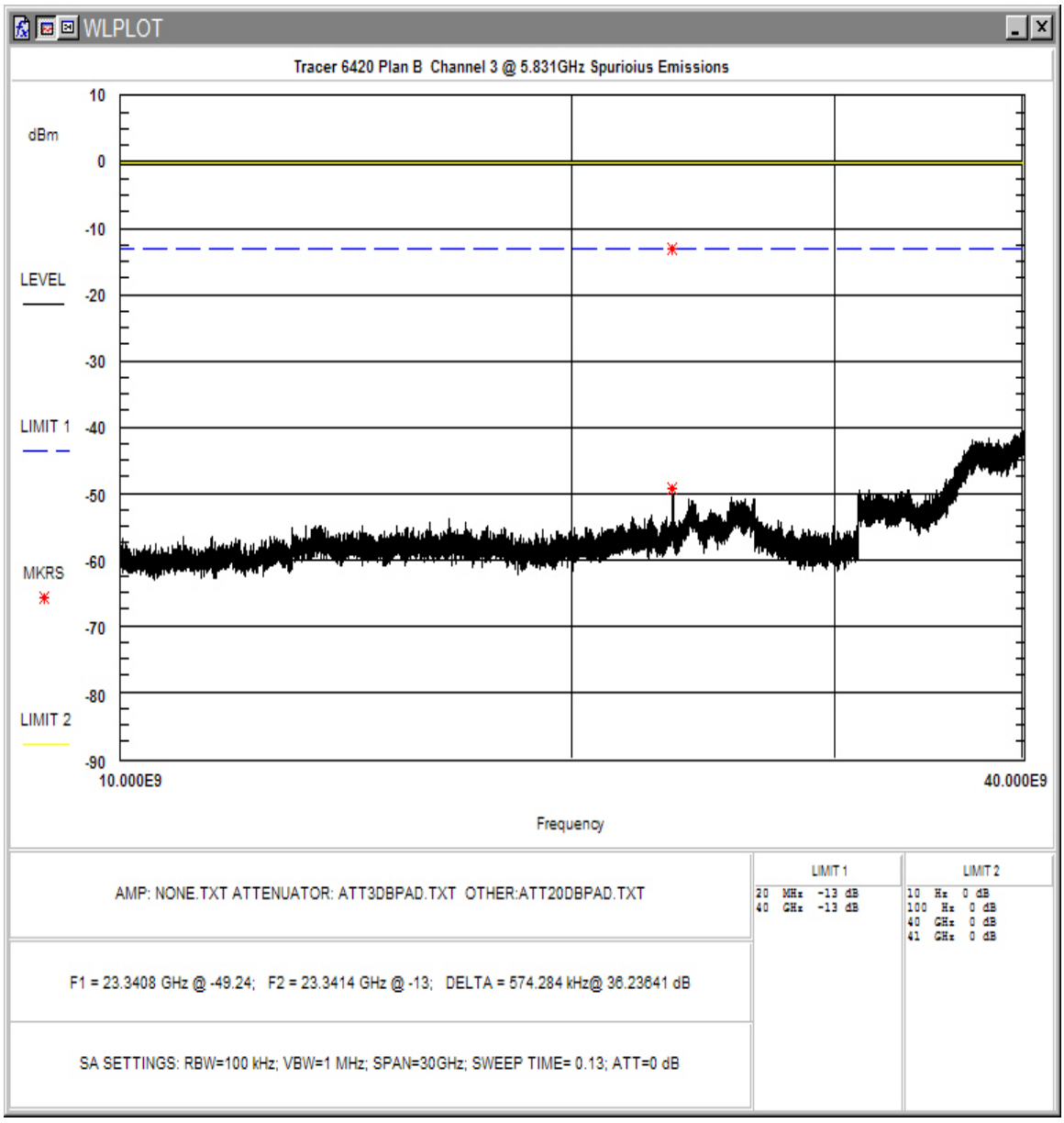

Figure 29. Conducted Spurious Emissions, Plan B Band 3, 10GHz – 40GHz

4.5 Radiated Spurious Emissions: (FCC Part §15.247(c))

Radiated emissions that fall in the restricted bands must comply with the general emissions limits in 15.209(a).

The emissions were measured using the following resolution bandwidths:

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

Harmonic and Spurious emissions that were identified as coming from the EUT were checked in Peak and in Average Mode. It was verified that the peak-to-average ratio did not exceed 20dB.

Peak measurements and average measurements are made. All emissions were determined to have a peak-to-average ratio of less than 20 dB.

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 EUT was tested in the following configurations and modes:

Antenna	Channel
Dish	A&B

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 40GHz. No emissions were detected above 12GHz. All detected emissions are reported in the following tables. Both peak and average measurements are listed.

Table 6: Radiated Emission Test Data - Plan A, Band 1

Restricted Band Spurious Emissions (§15.205)

CLIENT:	ADTRAN	DATE:	2/20/2005
TESTER:	Steve Koster	JOB #:	8588
EUT Information:		**Test Requirements:**	
EUT:	Tracer 6420	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting on Plan A, Band 1, 5.741GHz		
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
				Avg								
5464	H	225	1	45.8	33.6	4.3	34.7	49.0	281.3	500	-5.0	
5464	V	225	1	44.0	33.6	4.3	34.7	47.2	228.6	500	-6.8	
5684	H	112.5	1	40.0	33.9	4.2	34.7	43.4	147.9	500	-10.6	
5684	V	112.5	1	39.2	33.9	4.2	34.7	42.6	134.9	500	-11.4	
4860.5	V	0	1	45.2	32.6	4.3	34.6	47.4	234.6	500	-6.6	Res. Band
4884.2	V	0	1	46.0	32.6	4.3	34.6	48.3	259.7	500	-5.7	Res. Band
11484	V	0	1	37.3	39.7	5.0	33.9	48.1	254.8	500	-5.9	Res. Band (Amb)
17226	V	0	1	37.2	42.8	8.6	32.5	56.0	633.3	1500	-7.5	Amb/1m
				Peak								
5464	H	225	1	53.0	33.6	4.3	34.7	56.2	644.3	5000	-17.8	
5464	V	225	1	50.8	33.6	4.3	34.7	54.0	500.2	5000	-20.0	
5684	H	112.5	1	51.0	33.9	4.2	34.7	54.4	524.9	5000	-19.6	
5684	V	112.5	1	49.3	33.9	4.2	34.7	52.7	431.6	5000	-21.3	
4860.5	V	0	1	59.5	32.6	4.3	34.6	61.7	1217.1	5000	-12.3	Res. Band
4884.2	V	0	1	65.3	32.6	4.3	34.6	67.6	2404.2	5000	-6.4	Res. Band
11484	V	0	1	53	39.7	5.0	33.9	63.8	1548	5000	-10.2	Res. Band (Amb)
17226	V	0	1	48.2	42.8	8.6	32.5	67.0	2247	15000	-16.5	Amb/1m

Table 7: Radiated Emission Test Data - Plan A, Band 3

CLIENT:	ADTRAN	DATE:	2/20/2005
TESTER:	Steve Koster	JOB #:	8588
EUT Information:		**Test Requirements:**	
EUT:	Tracer 6420	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting on Plan A, Band 3, 5.824GHz		
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
				Avg								
5471	H	225	1	29.8	33.6	4.3	34.7	33.0	44.6	500	-21.0	
5544	V	157.5	1	32.5	33.6	4.3	34.7	33.7	48.4	500	-20.3	
11648	V	0	1	27.3	39.7	5.0	33.9	38.1	80.5	500	-15.9	Res. Band (Amb)
17472	V	0	1	27.5	42.8	8.6	32.5	46.5	210.4	1500	-17.0	Amb/1m
				Peak								
5471	H	157.5	1	39.2	33.6	4.3	34.7	42.4	131.7	5000	-31.6	
5544	V	157.5	1	43.0	33.6	4.3	34.7	45.2	181.8	5000	-28.8	
11648	V	0	1	38.8	39.7	5.0	33.9	49.6	302.7	5000	-24.4	Res. Band (Amb)
17472	V	0	1	39.3	42.8	8.6	32.5	67.2	2280.1	15000	-16.3	Amb/1m

Table 8: Radiated Emission Test Data - Plan B, Band 1

CLIENT:	ADTRAN	DATE:	2/20/2005
TESTER:	Steve Koster	JOB #:	8588
EUT Information:		**Test Requirements:**	
EUT:	Tracer 6420	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting on Plan B, Band 1, 5.824GHz		
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
				Avg								
5471	H	225	1	29.8	33.6	4.3	34.7	33.0	44.6	500	-21.0	
5544	V	157.5	1	32.5	33.6	4.3	34.7	33.7	48.4	500	-20.3	
11648	V	0	1	27.3	39.7	5.0	33.9	38.1	80.5	500	-15.9	Res. Band (Amb)
17472	V	0	1	27.5	42.8	8.6	32.5	46.5	210.4	1500	-17.0	Amb/1m
				Peak								
5471	H	157.5	1	39.2	33.6	4.3	34.7	42.4	131.7	5000	-31.6	
5544	V	157.5	1	43.0	33.6	4.3	34.7	45.2	181.8	5000	-28.8	
11648	V	0	1	38.8	39.7	5.0	33.9	49.6	302.7	5000	-24.4	Res. Band (Amb)
17472	V	0	1	39.3	42.8	8.6	32.5	67.2	2280.1	15000	-16.3	Amb/1m

Table 9: Radiated Emission Test Data - Plan B, Band 3

CLIENT:	ADTRAN	DATE:	2/20/2005
TESTER:	Steve Koster	JOB #:	8588
EUT Information:		**Test Requirements:**	
EUT:	Tracer 6420	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Transmitting on Plan B, Band 1, 5.831GHz		
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
				Avg								
5551	H	202.5	1	47.5	33.7	4.2	34.7	50.8	345.5	500	-3.2	
5551	V	202.5	1	50.0	33.7	4.2	34.7	53.3	460.8	500	-0.7	
5611	H	202.5	1	43.2	33.8	4.2	34.7	46.5	212.1	500	-7.4	
11662.57	H	22.5	1	27.3	39.8	5.0	33.8	38.3	82.6	500	-15.6	Res. Band (Amb)
17491.53	H	22.5	1	27.5	43.4	9.0	32.4	47.6	239.2	1500	-15.9	Amb/1m
				Peak								
5551	H	202.5	1	59.0	33.7	4.2	34.7	62.3	1298.7	5000	-11.7	
5551	V	202.5	1	55.5	33.7	4.2	34.7	58.8	868.0	5000	-15.2	
5611	H	202.5	1	54.2	33.8	4.2	34.7	57.5	752.5	5000	-16.4	
11662.57	H	22.5	1	38.6	39.8	5.0	33.8	49.6	302.0	5000	-24.4	Res. Band (Amb)

4.6 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 50Ω 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, peak, or average 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 for peak measurements.

Data is recorded in the following table.

Table 10: Conducted Emissions Test Data; §15.207

CLIENT:	ADTRAN	DATE:	2/28/2005
MODEL:	Tracer 6420	JOB #:	8589
TESTER:	John Repella	TEST STANDARD:	FCC Part 15
TEST SITE:	CSITE1_CE	CLASS:	FCC_B
TEST VOLTAGE:	120 VAC		

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
0.260	25.6	10.7	61.4	36.3	-25.2	25.6	10.7	36.3	51.4	-15.1
0.303	23.1	10.8	60.2	33.9	-26.2	21.9	10.8	32.7	50.2	-17.5
0.521	21.9	10.6	56.0	32.5	-23.5	18.4	10.6	29.0	46.0	-17.0
0.911	19.78	10.6	56.0	30.4	-25.6	18.4	10.6	29.0	46.0	-17.0
1.257	19.25	10.8	56.0	30.0	-26.0	17.8	10.8	28.6	46.0	-17.4
1.692	18.27	10.9	56.0	29.2	-26.8	17.1	10.9	28.0	46.0	-18.0
3.336	19.53	11.2	56.0	30.7	-25.3	17.1	11.2	28.3	46.0	-17.7
5.376	16.63	11.2	60.0	27.8	-32.2	15.1	11.2	26.3	50.0	-23.7

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
0.260	27.20	10.7	61.4	37.9	-23.5	27.1	10.7	37.8	51.4	-13.6
0.303	24.26	10.8	60.2	35.1	-25.1	23.1	10.8	33.9	50.2	-16.3
0.521	21.05	10.6	56.0	31.7	-24.3	19.8	10.6	30.4	46.0	-15.6
0.944	21.55	10.6	56.0	32.2	-23.8	19.9	10.6	30.5	46.0	-15.5
1.257	19.93	10.8	56.0	30.7	-25.3	19.1	10.8	29.9	46.0	-16.1
1.692	20.80	10.9	56.0	31.7	-24.3	18.3	10.9	29.2	46.0	-16.8
3.336	18.90	11.2	56.0	30.1	-25.9	17.7	11.2	28.9	46.0	-17.1
5.376	17.50	11.2	60.0	28.7	-31.3	16.8	11.2	28.0	50.0	-22.0