Washington Laboratories, Ltd.
www.wll.com
7560 Lindbergh Drive . Gaithersburg, MD 20879
301.216.1500 . info@wll.com

FCC Certification Test Report
For the
Datamatic Ltd.
D4111 Water Firefly Rev G

FCC ID: ODYD4111G

WLL Report #12883-01 Rev 1
March 29, 2013

Re-issued April 16, 2013

Prepared for:

Datamatic Ltd.
3600 K Ave
Plano, TX 75074

Prepared By:

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

Testing Certificate AT-1448

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Prepared by:

Steven Dovell
Compliance Engineer

Reviewed by:

Steven D. Koster
Vice President

Abstract

This report has been prepared on behalf of Datamatic Ltd. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Frequency Hopping Spread Spectrum Transmitter under Part 15.247 (10/2010) of the FCC Rules and Regulations and Spectrum Management. This Certification Test Report documents the test configuration and test results for the Datamatic Ltd. D4111 Water Firefly Rev G.

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 ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

The Datamatic Ltd. D4111 Water Firefly Rev G complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.

Revision History	Description of Change	Date
Rev 0	Initial Release	March 29, 2013
Rev 1	Comments from ACB incorporated in report	April 16, 2013

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1 Introduction

1.1 Compliance Statement

The Datamatic Ltd. D4111 Water Firefly Rev G complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.247 (10/2010).

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 "Measurement Guidance for Frequency Hopping Spread Spectrum Systems. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer:	Datamatic Ltd. 3600 K Ave Plano, TX 75074
Purchase Order Number:	DATAM-2000008709
Quotation Number:	67036

1.4 Test Dates

Testing was performed on the following date(s):	9/18/12 – 9/20/13 & 3/28/13

1.5 Test and Support Personnel

Washington Laboratories, LTD	Steven Dovell
Client Representative	Leyia M. Streefkerk.

1.6 Abbreviations

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	**Amp**ere**s**
b/s	**b**its per **s**econd
BW	**B**and**W**idth
CE	**C**onducted **E**mission
cm	**c**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FM	**F**requency **M**odulation
G	**g**iga - prefix for 10^9 multiplier
Hz	**H**ertz
IF	**I**ntermediate **F**requency
k	**k**ilo - prefix for 10^3 multiplier
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
M	**M**ega - prefix for 10^6 multiplier
m	**m**eter
µ	**m**icro - prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
QP	**Q**uasi-**P**eak
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
V	**V**olt

2 Equipment Under Test

2.1 EUT Identification & Description

The Datamatic Ltd. Water Firefly Rev G is a device that is capable of reading water meters. The radio portion operates in the 902 – 928 MHz ISM Band.

Table 1: Device Summary

ITEM	DESCRIPTION
Manufacturer:	Datamatic Ltd.
FCC ID:	ODYD4111G
Model:	D4111 Water Firefly Rev G
FCC Rule Parts:	§15.247
Frequency Range:	902.5MHz – 927MHz
Maximum Output Power:	167.5mW (22.24dBm)
Modulation:	FSK
Occupied Bandwidth:	118.369kHz (MESH Mode), 262.954kHz (Fence Mode)
Keying:	Automatic
Type of Information:	Data
Number of Channels:	50
Power Output Level	Fixed
Antenna Connector	None - integral
Antenna Type	Dipole
Interface Cables:	None
Power Source & Voltage:	Dual 3.6V Lithium Thionylchloride Battery

2.2 Test Configuration

The D4111 Water Firefly Rev G was with a lap power supply providing 3.6VDC to the unit for conducted testing. Radiated testing used two 3.6VDC Lithium Thionylchloride batteries for input power. A serial communications port was used to send commands to the unit for testing purposes.

2.3 Testing Algorithm

The D4111 Water Firefly Rev G was programmed for FHSS operation via the serial communications port and a laptop running Procomm Scripts to send test commands.

The EUT has two operating modes, the Fence Mode and the Mesh mode. The frequency range and power for both modes are the same. Timing and Bandwidth vary between modes.

Both modes were tested.

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

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 ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

2.5 Measurements

2.5.1 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 Methods of Measurement of Radio Noise 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 basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

Where u_c = standard uncertainty

a, b, c,.. = individual uncertainty elements

$Div_{a, b, c}$ = the individual uncertainty element divisor based on the probability distribution

Divisor = 1.732 for rectangular distribution

Divisor = 2 for normal distribution

Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where U = expanded uncertainty

k = coverage factor

k ≤ 2 for 95% coverage (ANSI/NCSL Z540-2 Annex G)

u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 2 below.

Table 2: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	4.55 dB

3 Test Equipment

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Table 3: Test Equipment List

Test Name: **Radiated Emissions**		Test Date: **03/28/2013**	
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
528	AGILENT - E4446A	ANALYZER SPECTRUM	8/30/2013
742	PENN ENGINEERING - WR284	2.2-4.15GHZ BANDPASS FILTER	5/29/2014
626	ARA - DRG-118/A	ANTENNA HORN	6/16/2013
627	AGILENT - 8449B	AMPLIFIER 1-26GHZ	5/24/2013
281	ITC - 21A-3A1	WAVEGUIDE 4.51-10.0GHZ	5/29/2014
382	SUNOL SCIENCES CORPORATION - JB1	ANTENNA BICONLOG	6/26/2014
69	HP - 85650A	ADAPTER QP	6/27/2013
802	HP - 8568B	SPECTRUM ANALYZER	4/27/2013
71	HP - 85685A	PRESELECTOR RF	6/27/2013

Test Name: **Conducted at the Antenna port**		Test Date: **9/20/2012**	
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
528	AGILENT - E4446A	ANALYZER SPECTRUM	8/30/2013

4 Test Results

4.1 Duty Cycle Correction

In accordance with the FCC Public Notice the spurious radiated emissions measurements may be adjusted if using a duty cycle correction factor if the dwell time per channel of the hopping signal is less than 100 ms.

The duty cycle correction factor is calculated by:

20 x LOG (dwell time/100 ms)

The following figure shows the plot of the dwell time for the transmitter in Fence mode. Based on this plot, the dwell time per hop is 65.1ms. Therefore the total dwell time per 100ms is 65.1ms. This corresponds to a duty cycle correction of -3.73dB, however, duty cycle correction was not used.

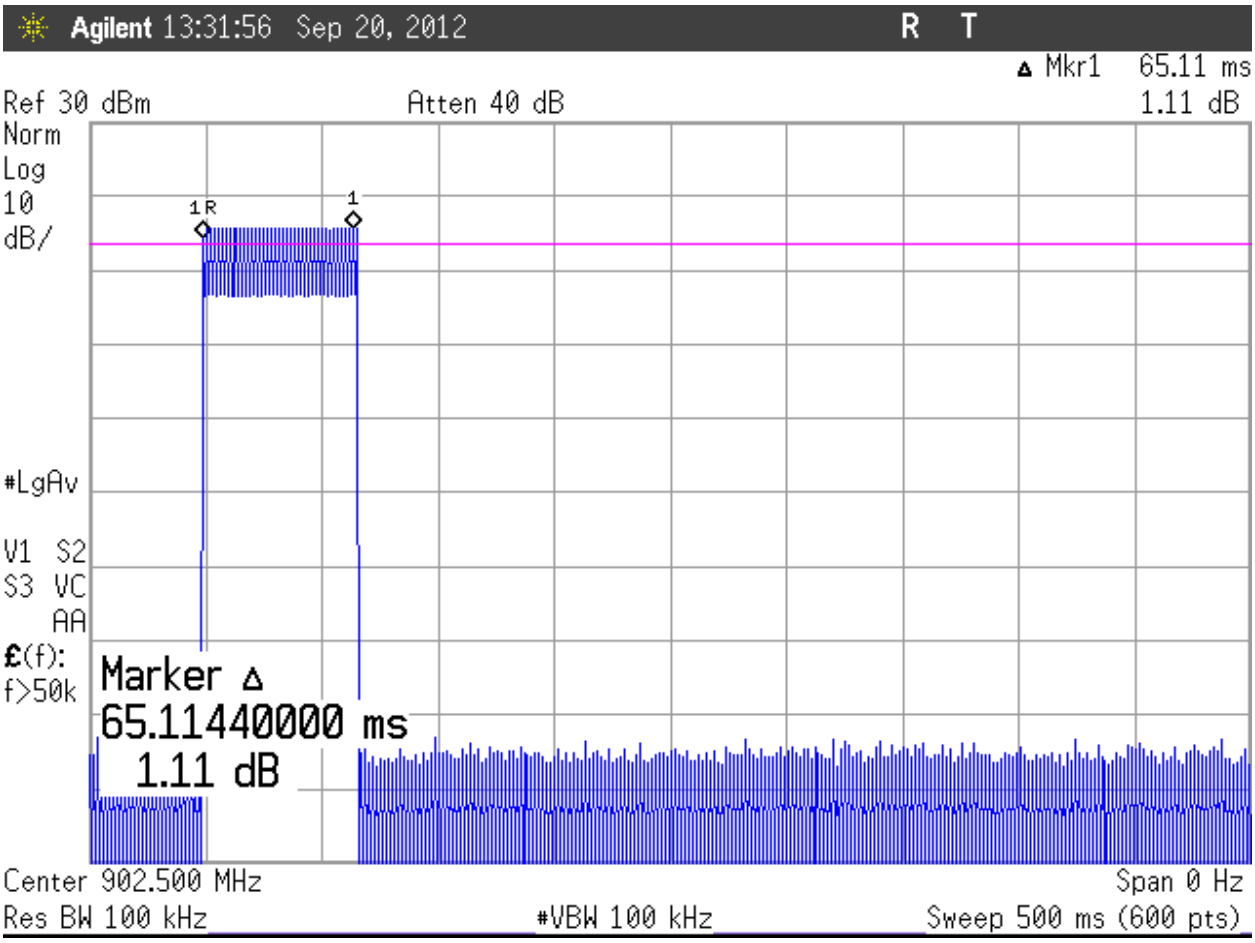

Figure 1: Duty Cycle Plot Fence Mode – Single pulse

The following figure shows the plot of the dwell time for the transmitter in Mesh mode. Based on this plot, the dwell time per hop is 178.3ms. Since the dwell time of a single channel is greater then 100ms no additional duty cycle correction is allowed.

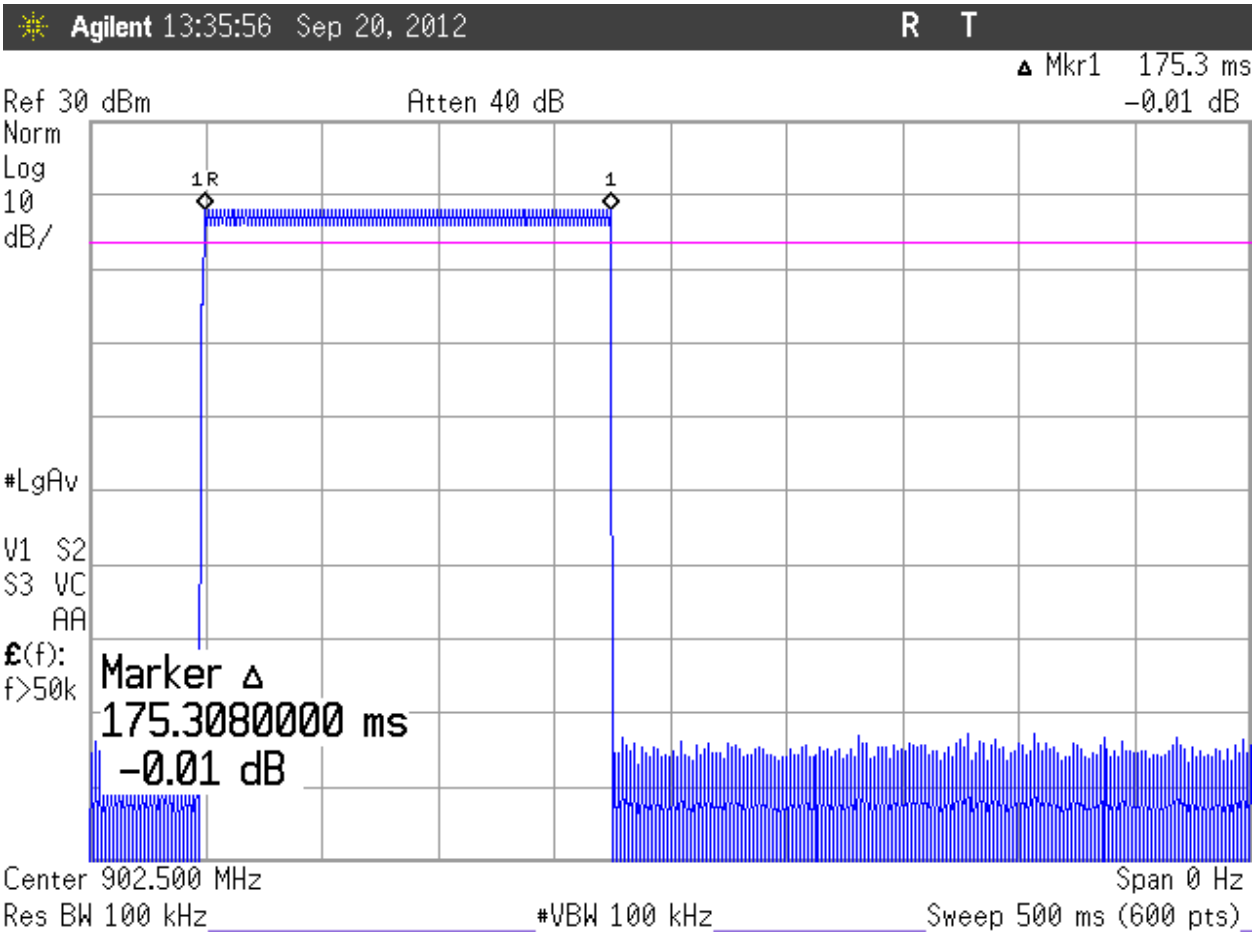

Figure 2: Duty Cycle Plot Mesh Mode

4.2 RF Power Output: (FCC Part §2.1046)

To measure the output power the hopping sequence was stopped while the frequency dwelled on a low, high and middle channel. 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.

Table 4: RF Power Output – Mesh Mode

Frequency	Level	Limit	Pass/Fail
Low Channel: 902.5MHz	22.24 dBm	30 dBm	Pass
Mid Channel: 915MHz	22.24 dBm	30 dBm	Pass
High Channel: 927MHz	22.24 dBm	30 dBm	Pass

Table 5: RF Power Output – Fence Mode

Frequency	Level	Limit	Pass/Fail
Low Channel: 902.5MHz	22.24 dBm	30 dBm	Pass
Mid Channel: 915MHz	22.24 dBm	30 dBm	Pass
High Channel: 927MHz	22.24 dBm	30 dBm	Pass

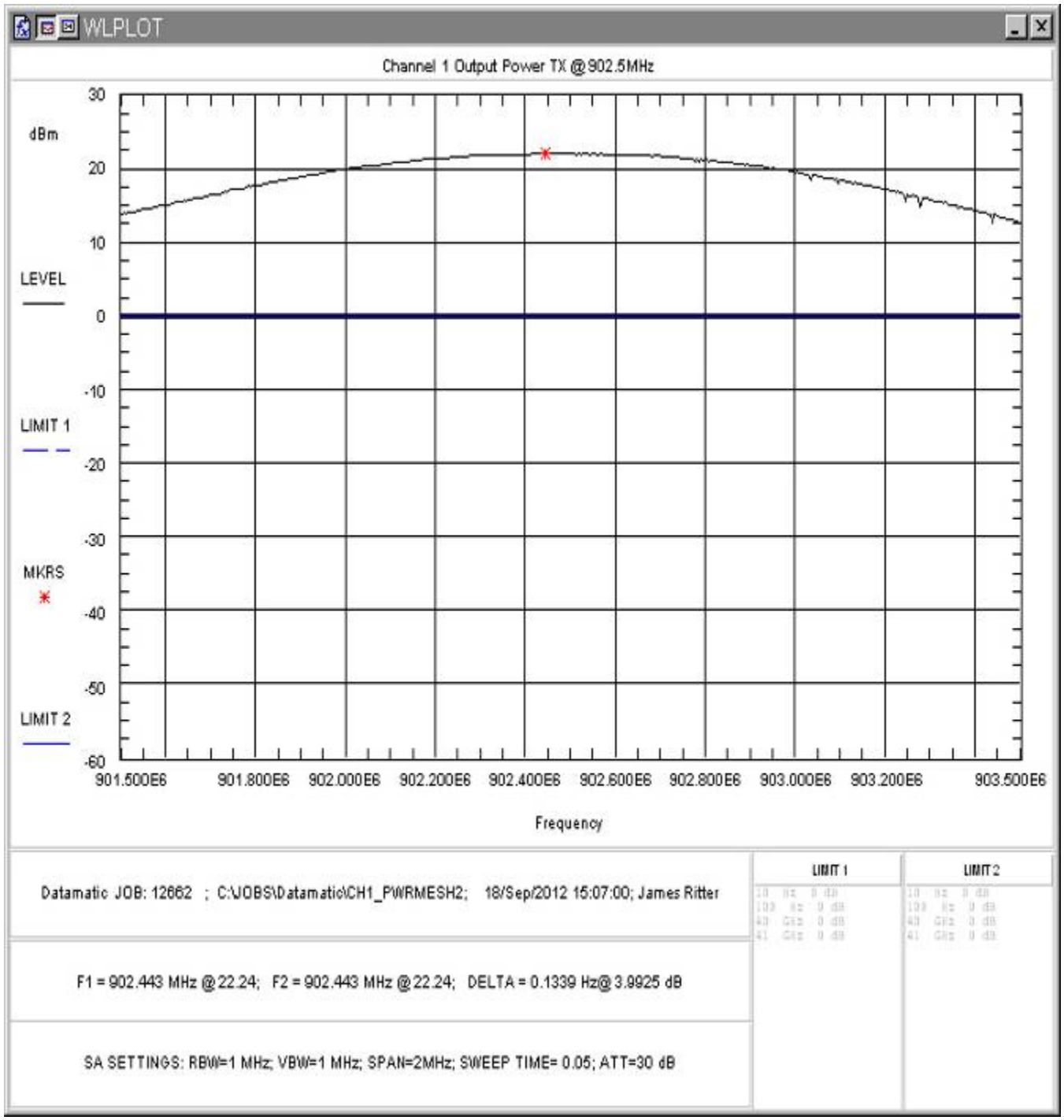

Figure 3: RF Peak Power, Low Channel – Mesh Mode

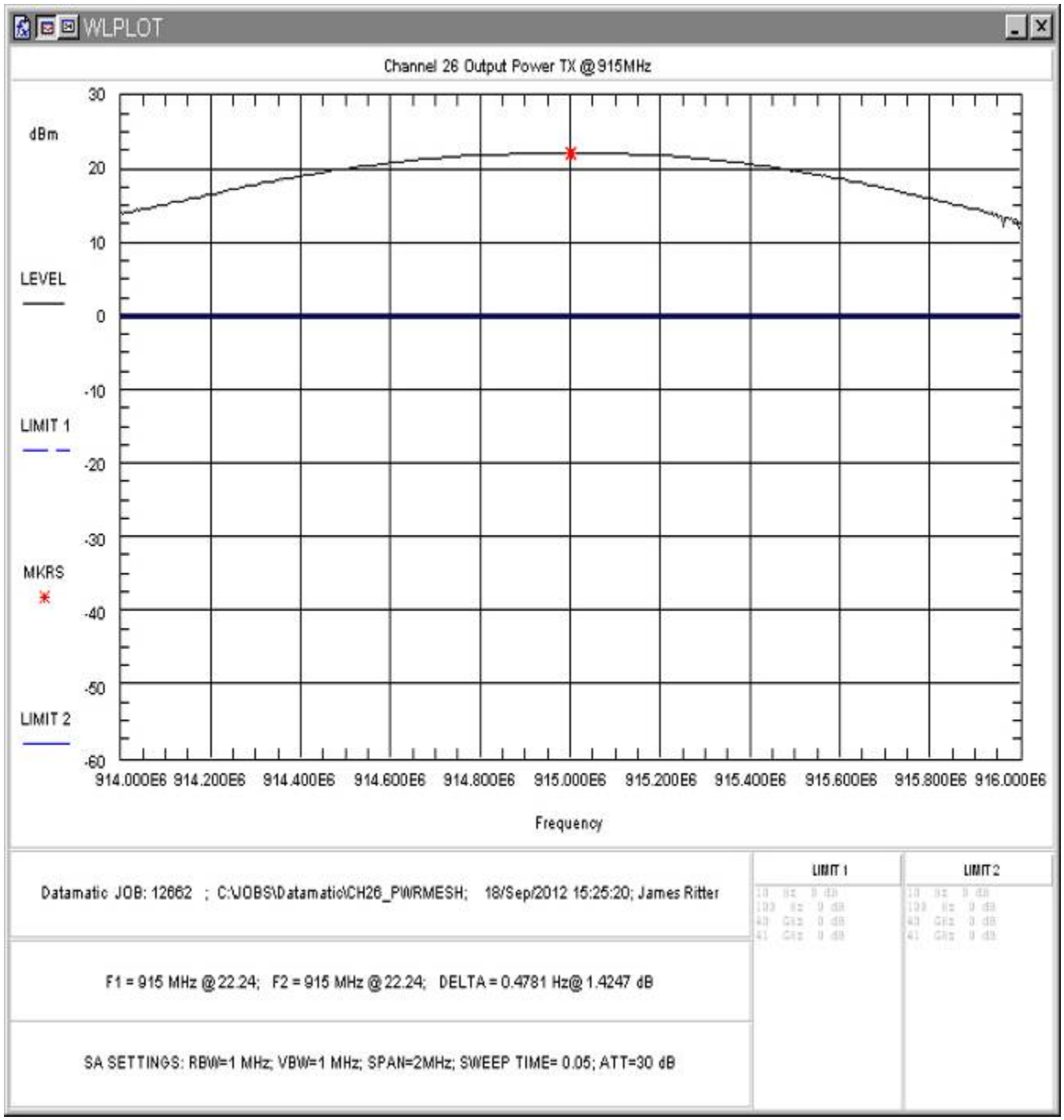

Figure 4: RF Peak Power, Mid Channel – Mesh Mode

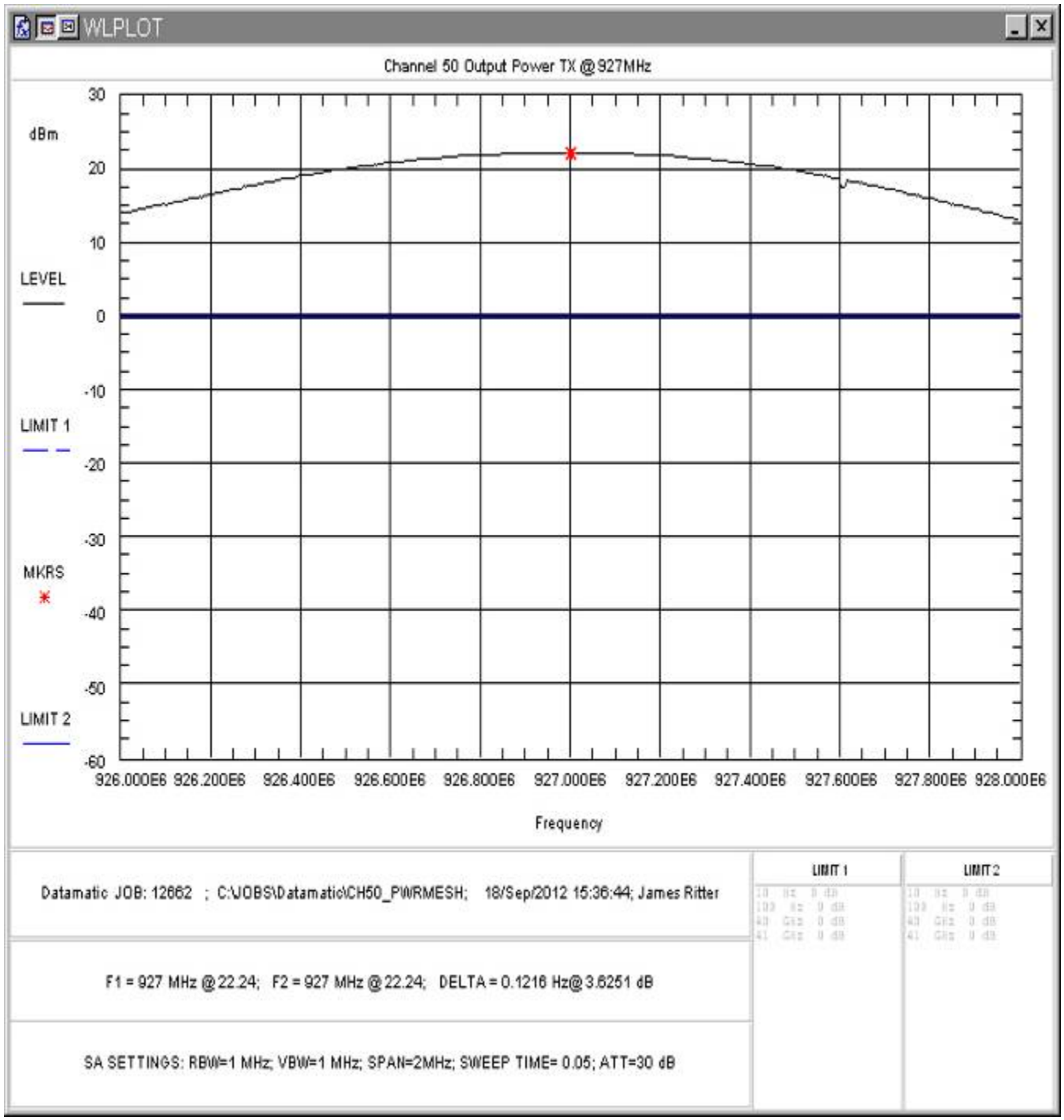

Figure 5: RF Peak Power, High Channel – Mesh Mode

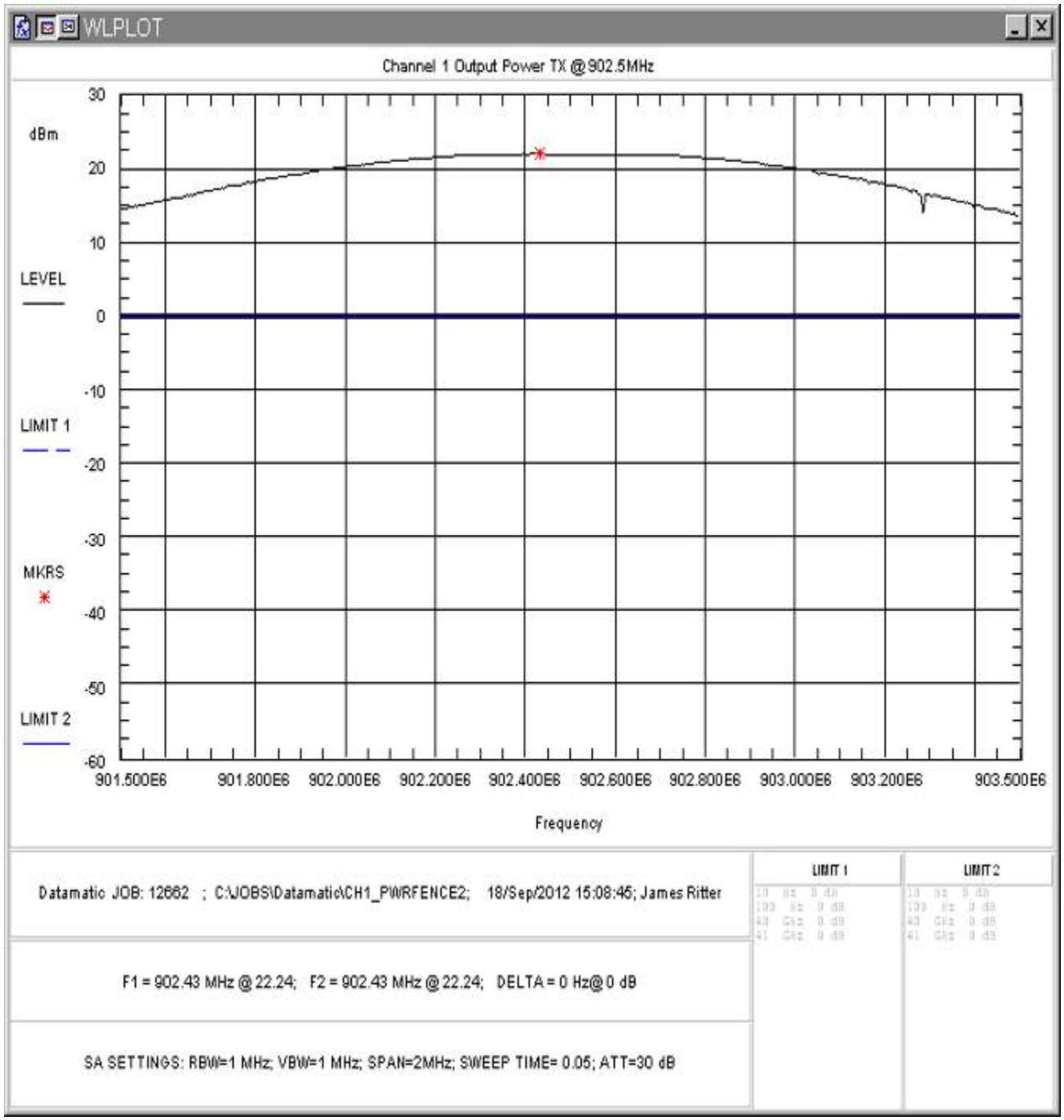

Figure 6: RF Peak Power, Low Channel – Fence Mode

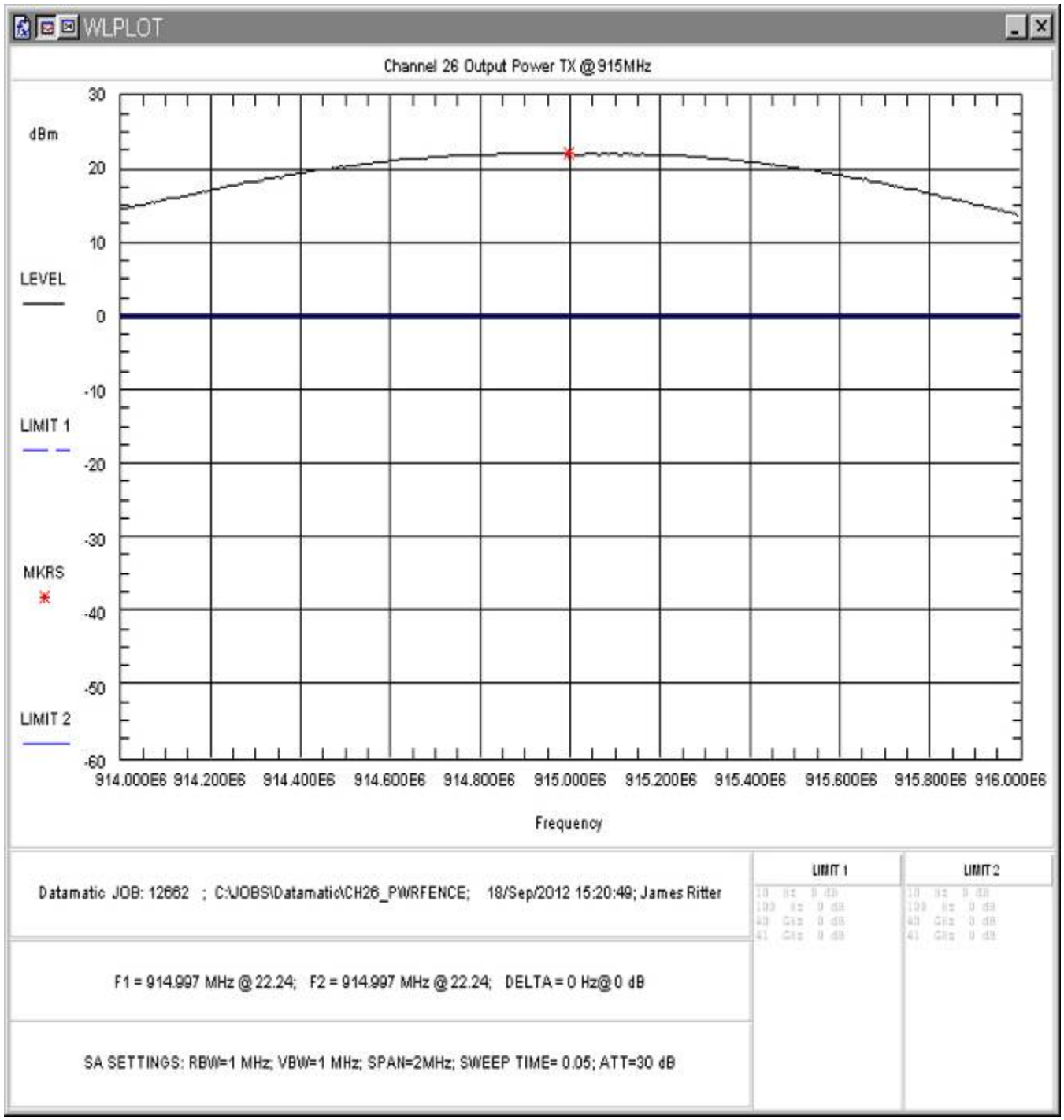

Figure 7: RF Peak Power, Mid Channel – Fence Mode

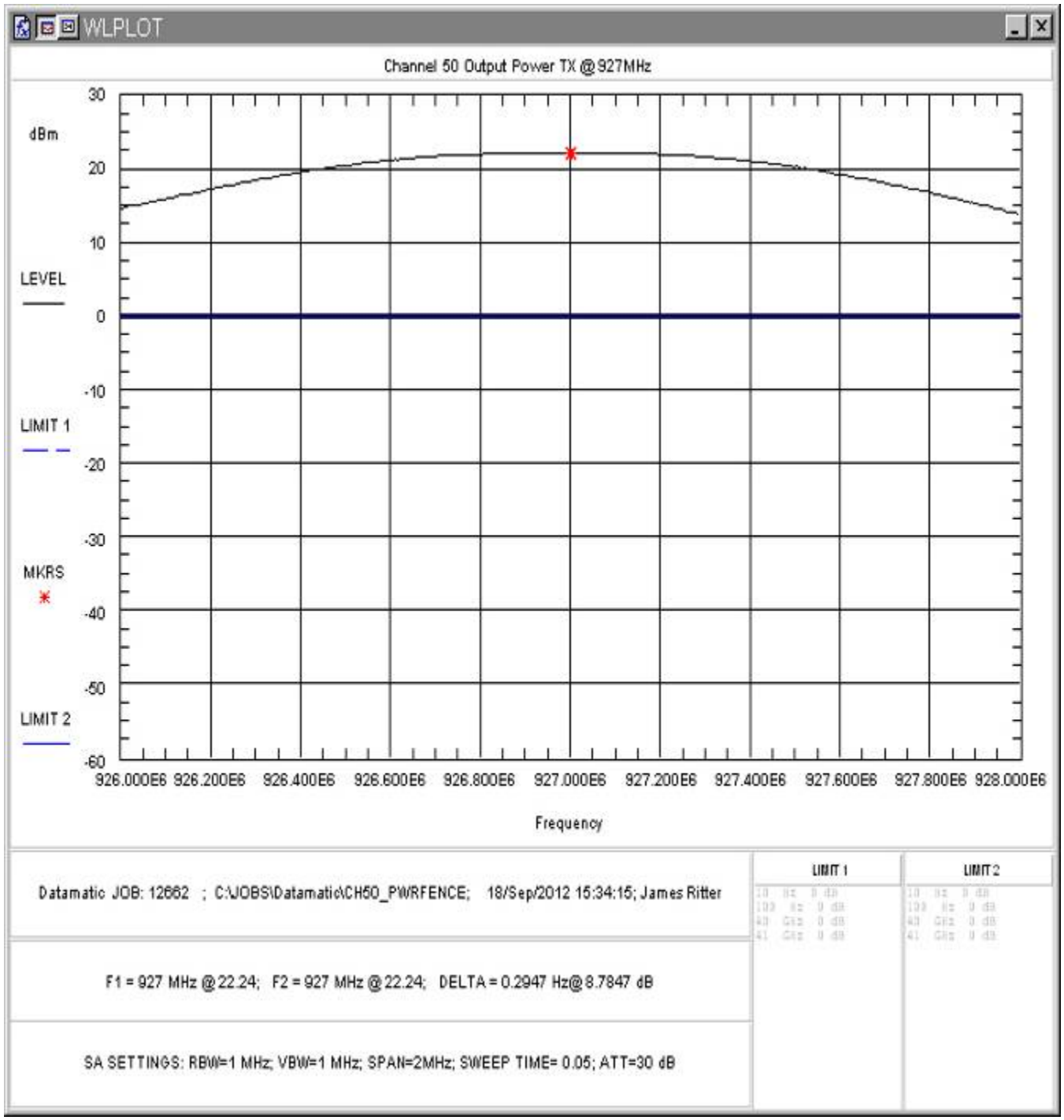

Figure 8: RF Peak Power, High Channel – Fence Mode

4.3 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 Frequency Hopping Spread Spectrum Systems, FCC Part 15.247 requires the maximum 20 dB bandwidth not exceed 500kHz.

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

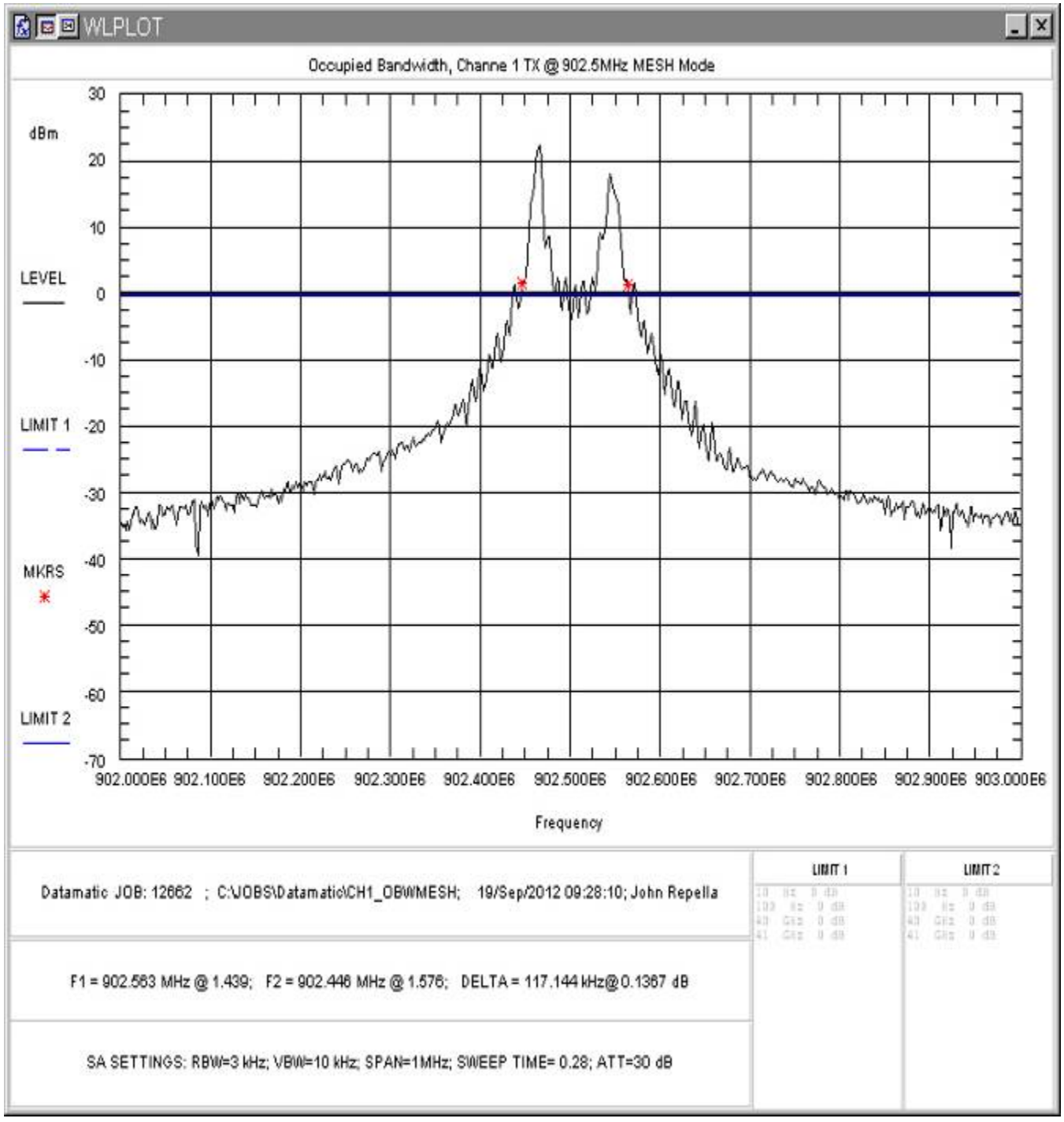

Figure 9: Occupied Bandwidth, Low Channel – Mesh Mode

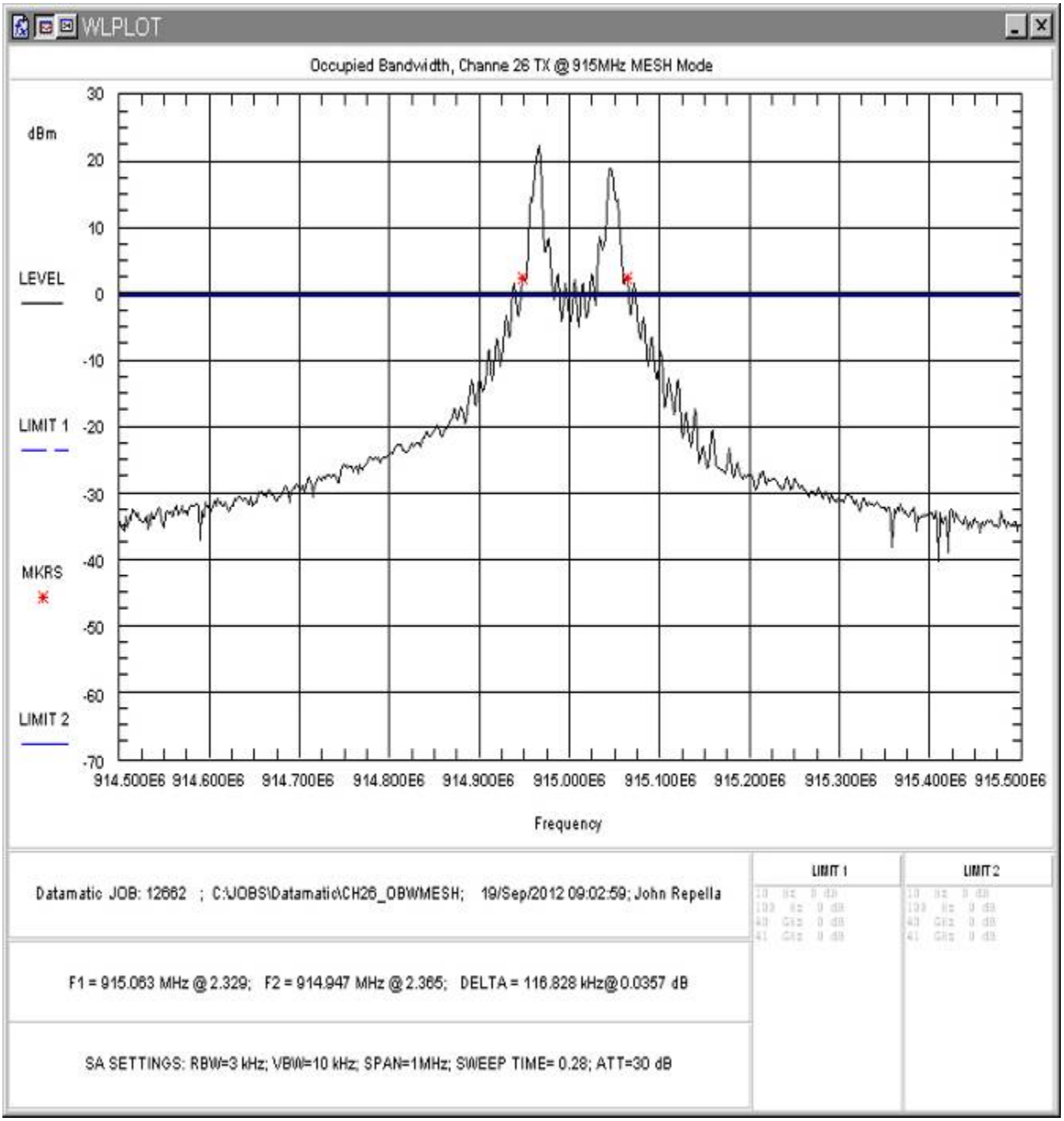

Figure 10: Occupied Bandwidth, Mid Channel – Mesh Mode

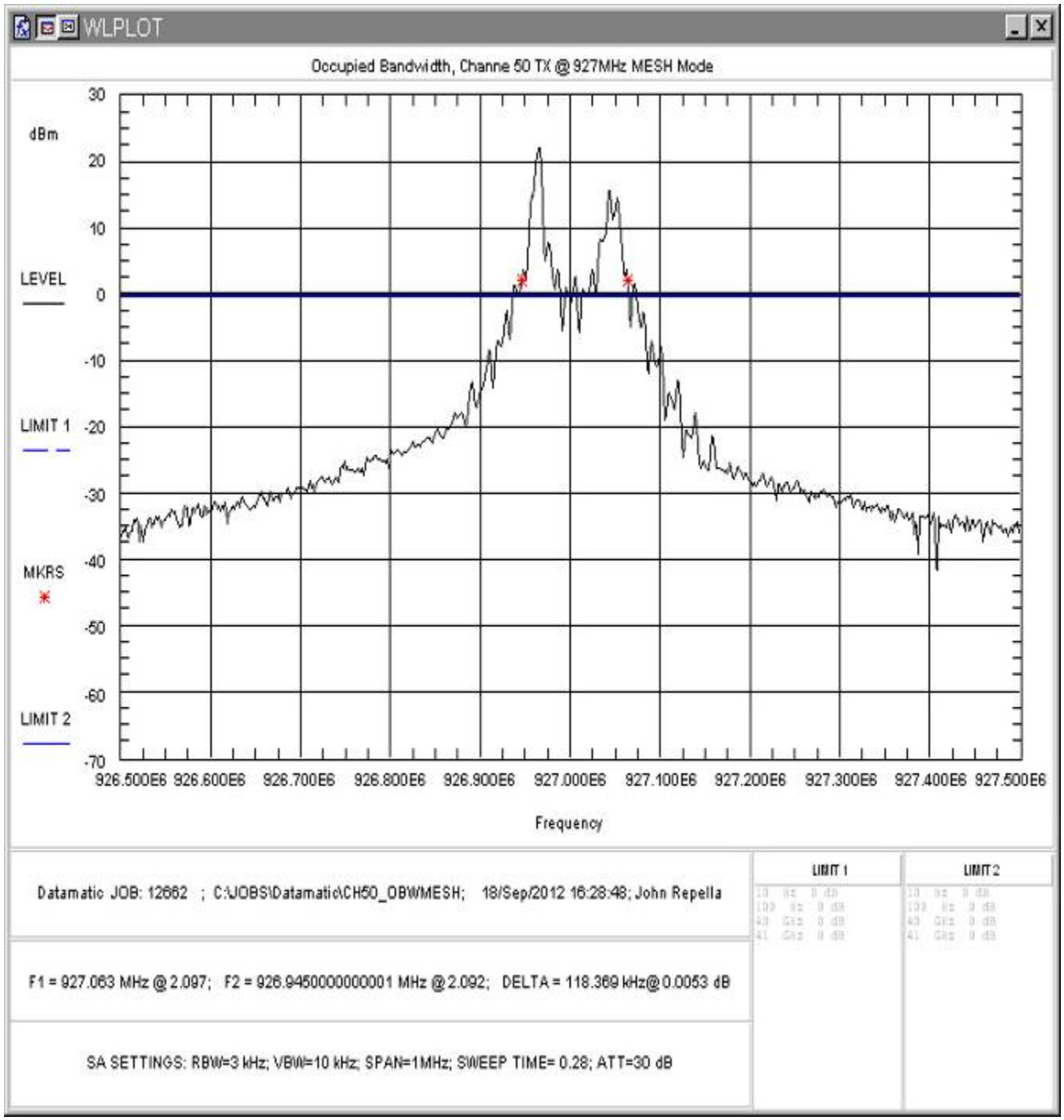

Figure 11: Occupied Bandwidth, High Channel – Mesh Mode

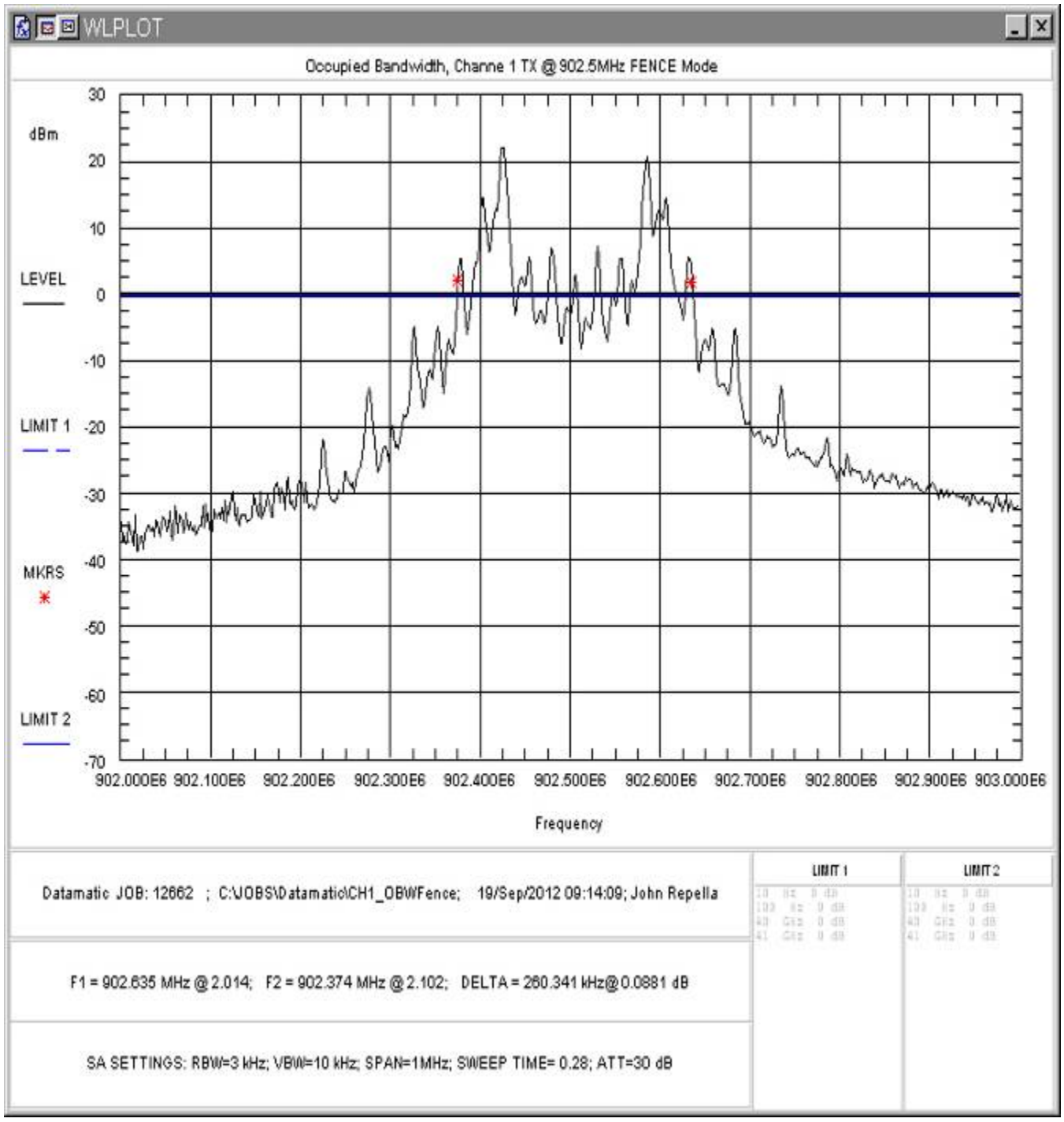

Figure 12: Occupied Bandwidth, Low Channel – Fence Mode

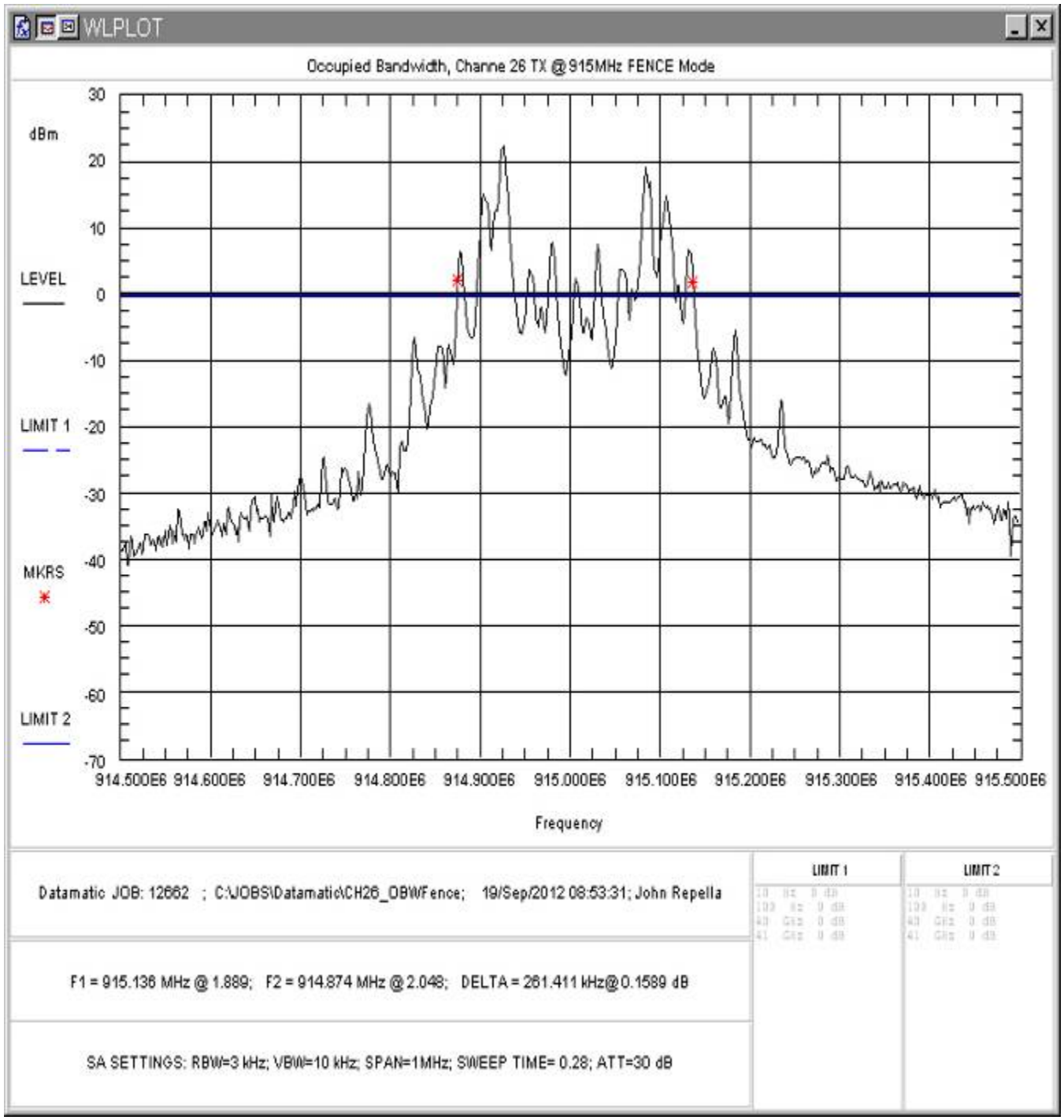

Figure 13: Occupied Bandwidth, Mid Channel – Fence Mode

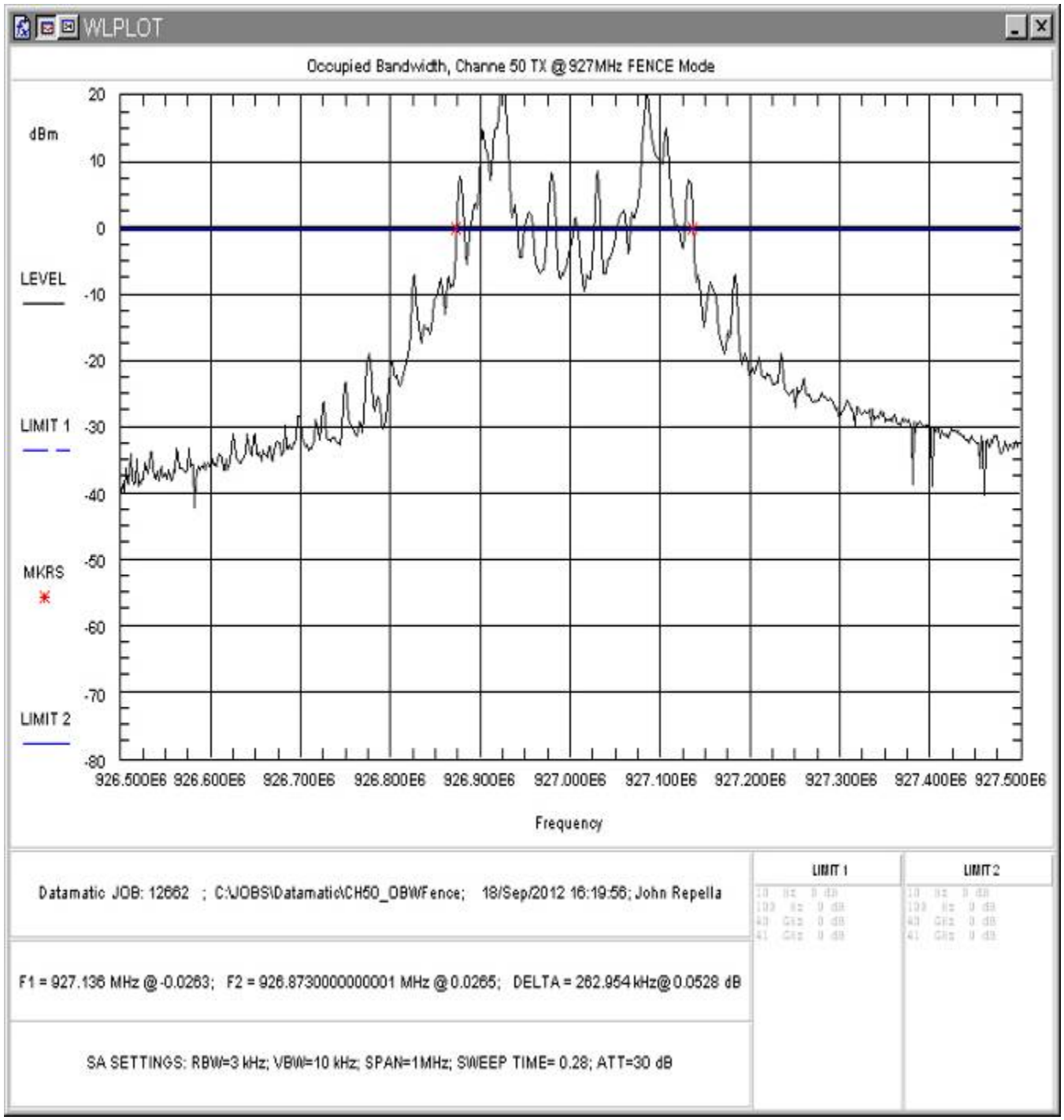

Figure 14: Occupied Bandwidth, High Channel – Fence Mode

Table 6 provides a summary of the Occupied Bandwidth Results.

Table 6: Occupied Bandwidth Results – Mesh Mode

Frequency	Bandwidth	Limit	Pass/Fail

Low Channel: 902.5MHz	117.144kHz	1 MHz	Pass
Mid Channel: 915MHz	116.828kHz	1 MHz	Pass
High Channel: 927MHz	118.369kHz	1 MHz	Pass

Table 7: Occupied Bandwidth Results – Fence Mode

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel: 902.5MHz	260.341kHz	1 MHz	Pass
Mid Channel: 915MHz	261.411kHz	1 MHz	Pass
High Channel: 927MHz	262.954kHz	1 MHz	Pass

4.4 Channel Spacing and Number of Hop Channels (FCC Part §15247(a)(1)

Per the FCC requirements, frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth, whichever is greater. The maximum 20dB bandwidth measured is 262.954kHz (Fence mode) and 118.369kHz (Mesh Mode) so the channel spacing must be more than 500kHz.

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 channel spacing of 2 adjacent channels was measured using a spectrum analyzer span setting of 1.5MHz. Also, the number of hopping channels was measured from 902MHz to 928MHz.

The following are plots of the channel spacing and number of hopping channels data. The channel spacing was measured to be 500kHz and the number of channels used is 50.

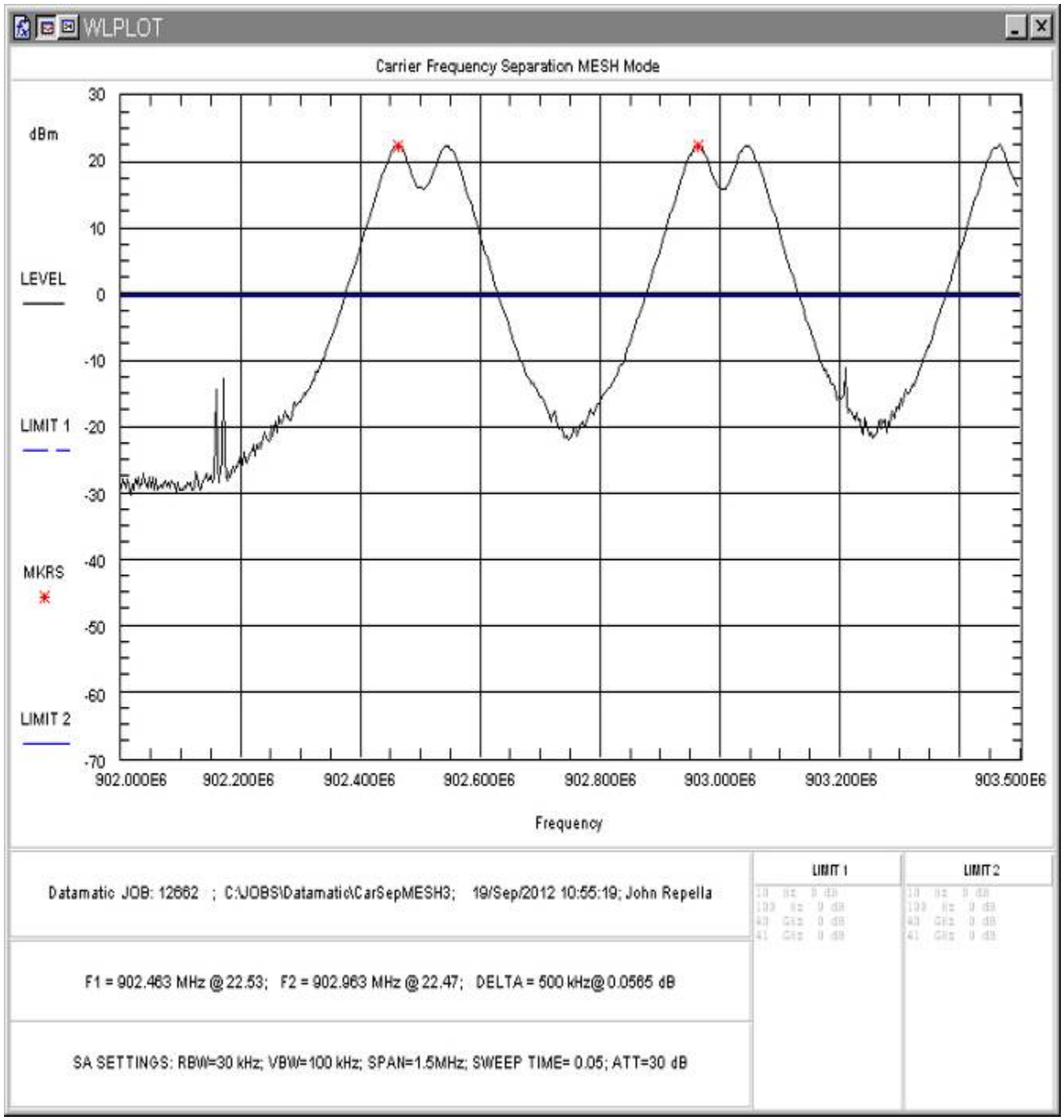

Figure 15: Channel Spacing – Mesh Mode

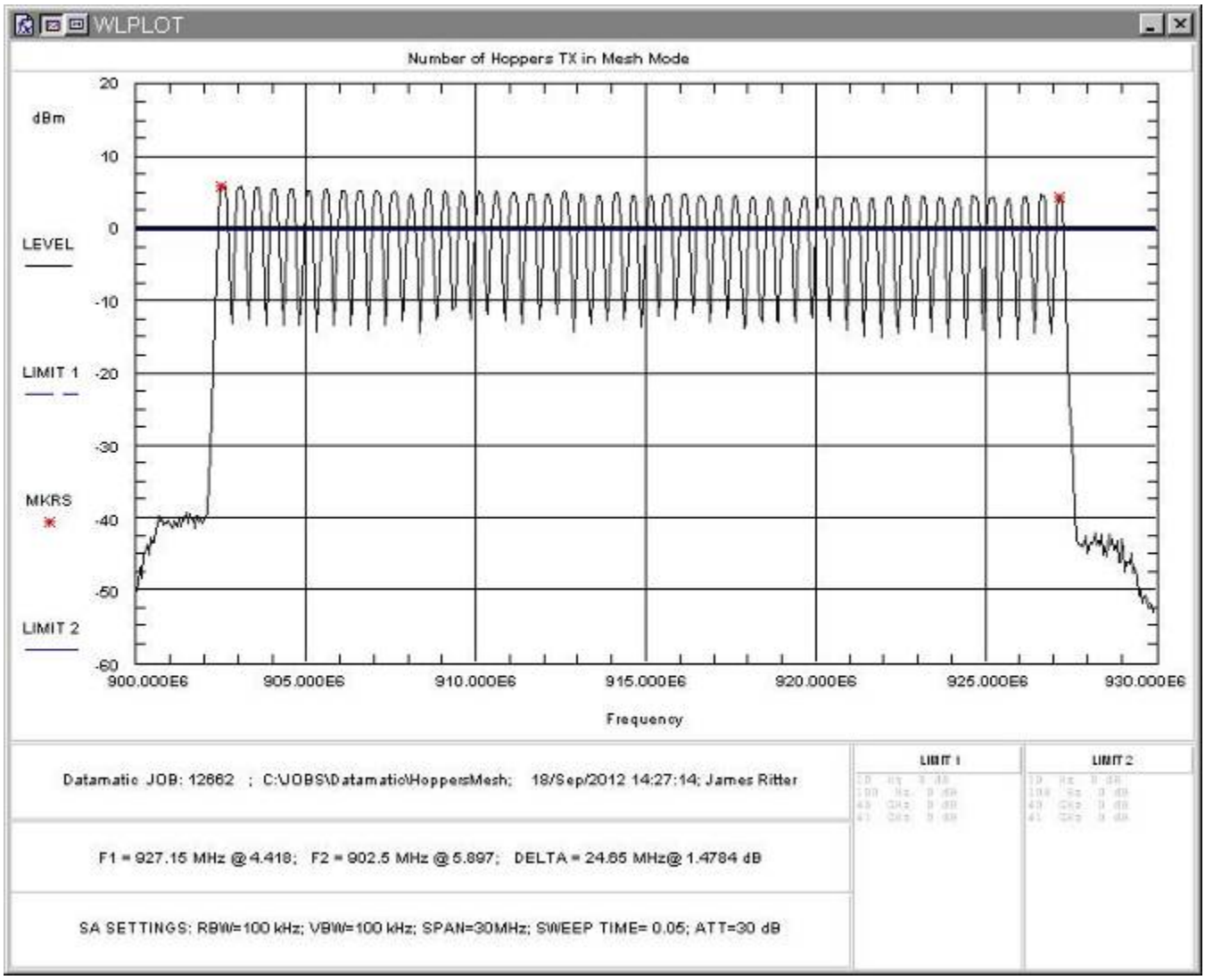

Figure 16: Number of Channels – Mesh Mode

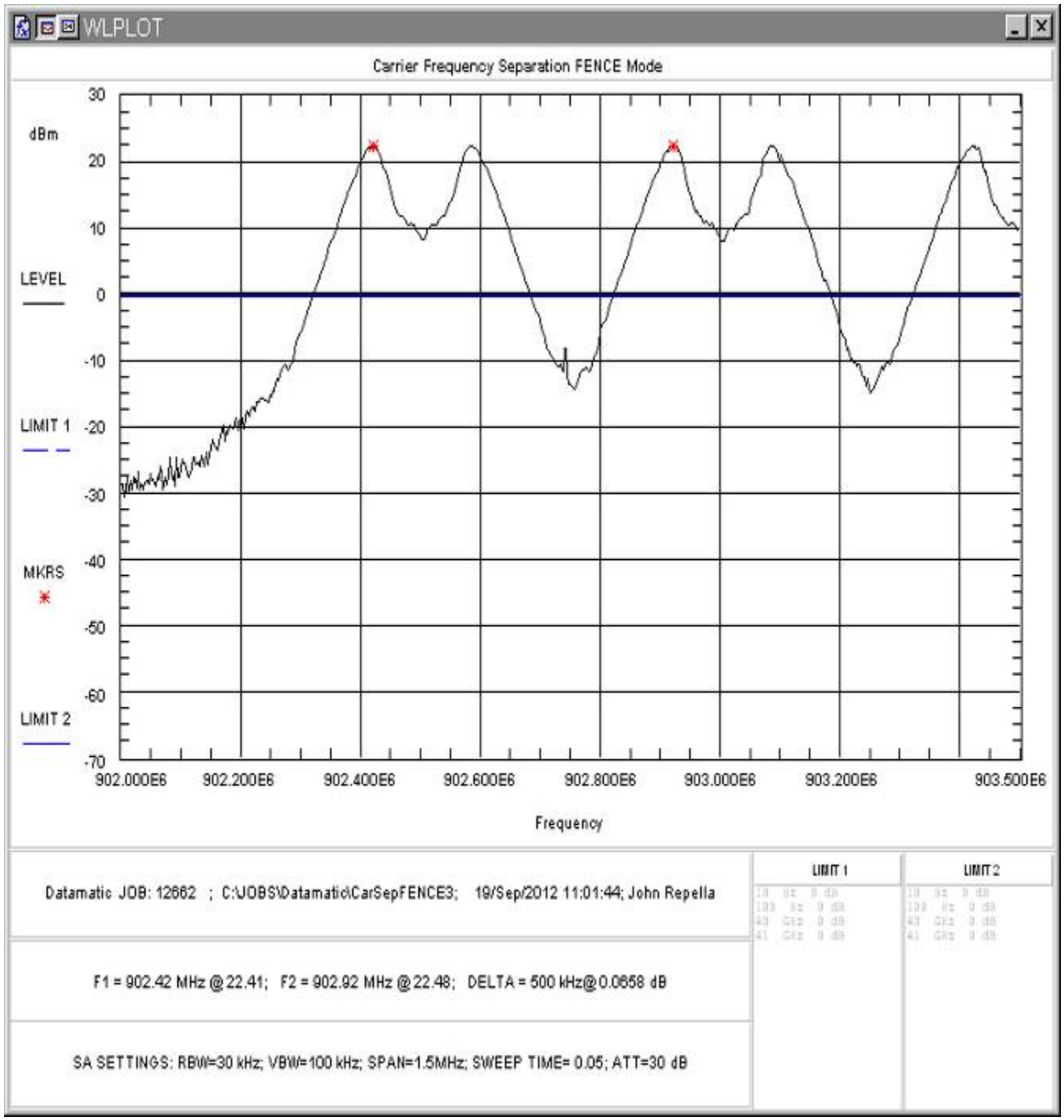

Figure 17: Channel Spacing – Fence Mode

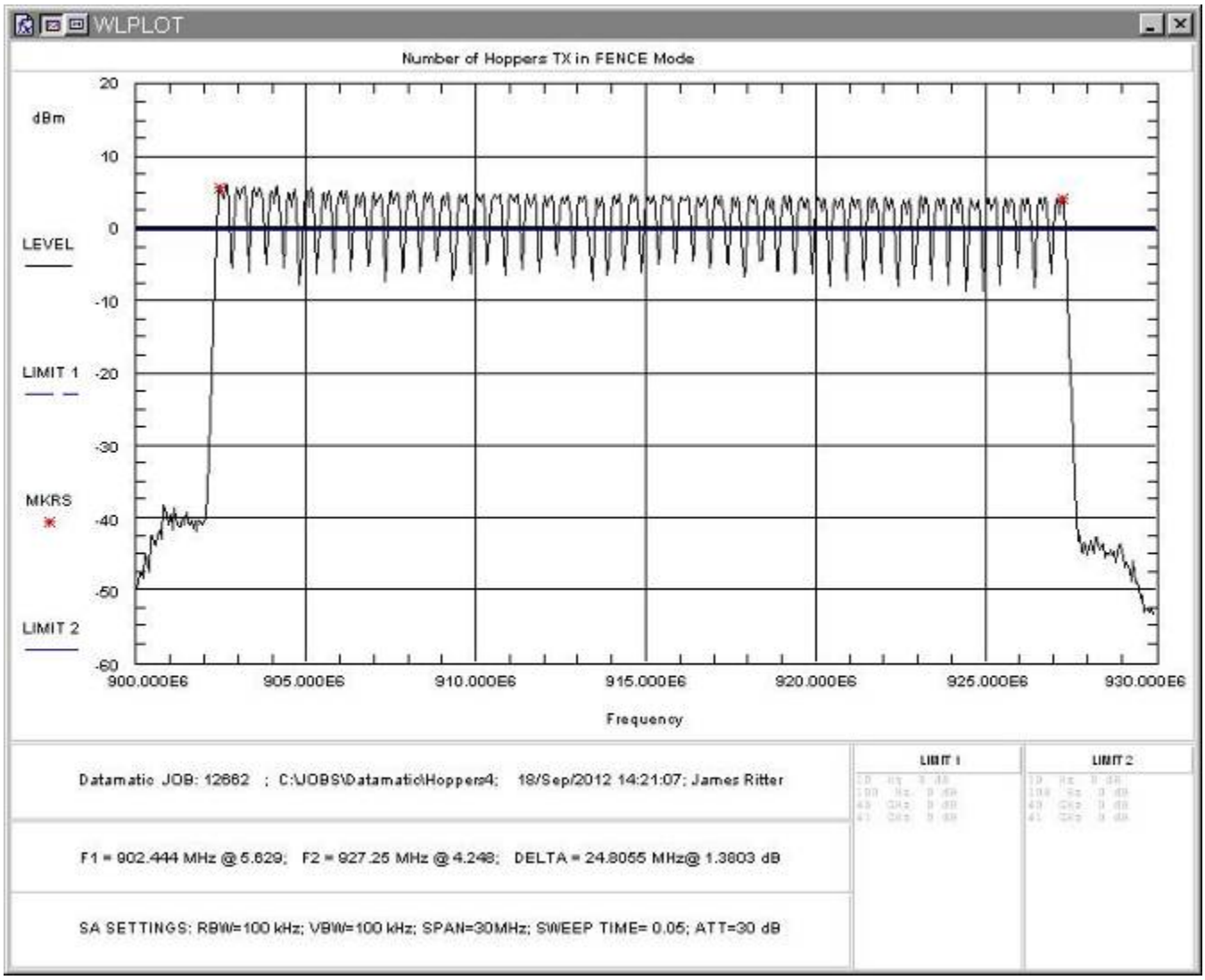

Figure 18: Number of Channels – Fence Mode

4.5 Time of Occupancy

The following figures show the plots of the dwell time for the transmitter. Duty Cycle plots from section 4.1 show the dwell time per hop is 178.3ms for 'Mesh Mode' and 65.1ms for 'Fence mode'. The bandwidths recorded in section 4.3 Tables 6 & 7 show the maximum Occupied 20dB bandwidth of the 'Mesh Mode' to be 118.369 kHz and the 'Fence Mode' to be 262.954kHz. FCC part 15.247 requires that for hopping signals with an occupied bandwidth of greater than 250kHz the total transmit dwell time must be no more than 0.4 seconds per 10 seconds . For signals less than 250 kHz the limit is 0.4 seconds per 20 seconds. As the 'Mesh Mode' bandwidth is less than 250kHz and the 'Fence Mode' is more than 250kHz both modes were tested. Both modes showed only one pulse per 20 seconds and thus comply with both the 20 second and 10 second maximum of 0.4 seconds (178.3ms per 20 sec. for Mesh Mode and 65.1ms per 10seconds[shown in 20second window]for Fence Mode).

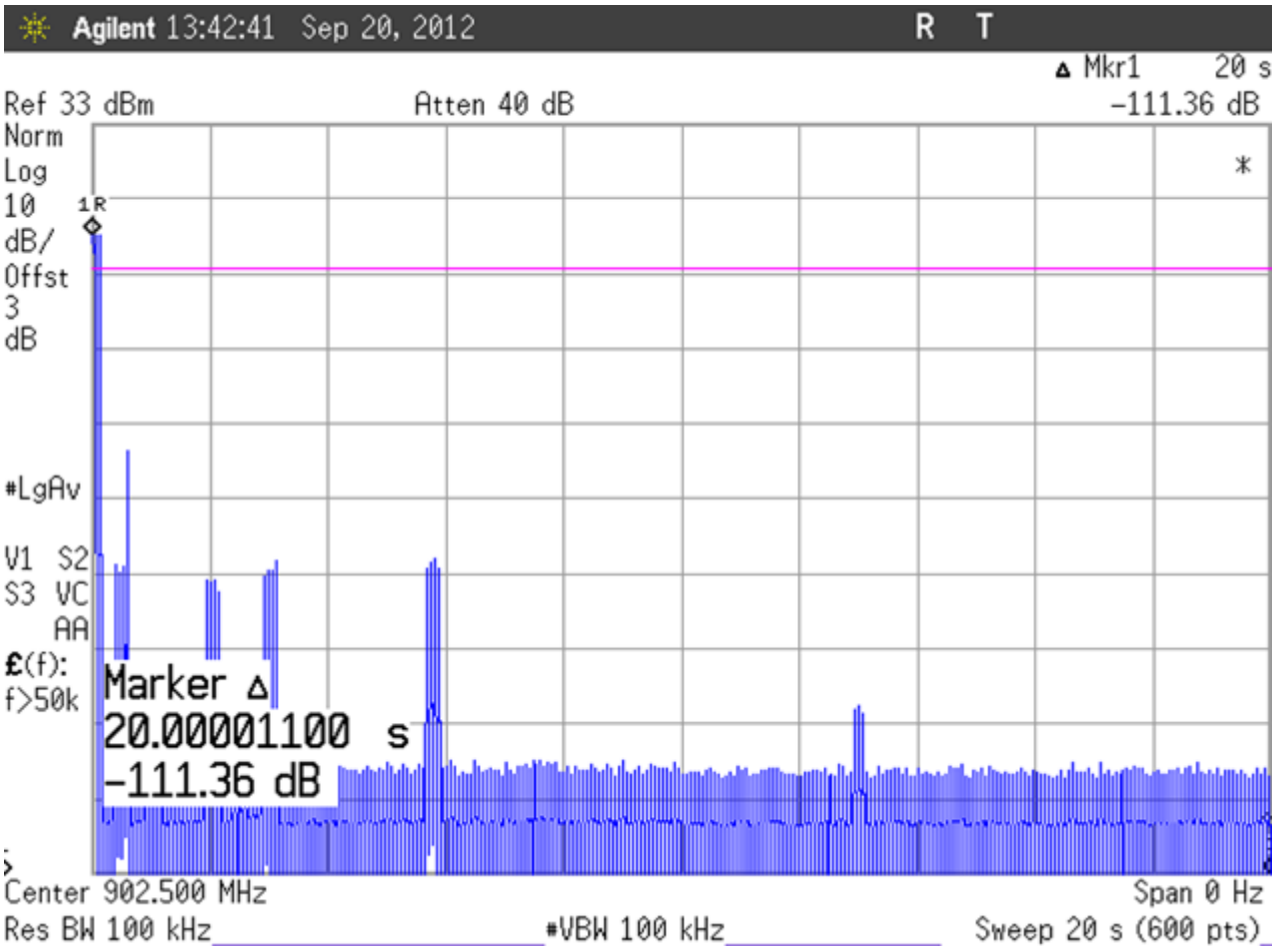

Figure 19: Time of Occupancy - Mesh mode

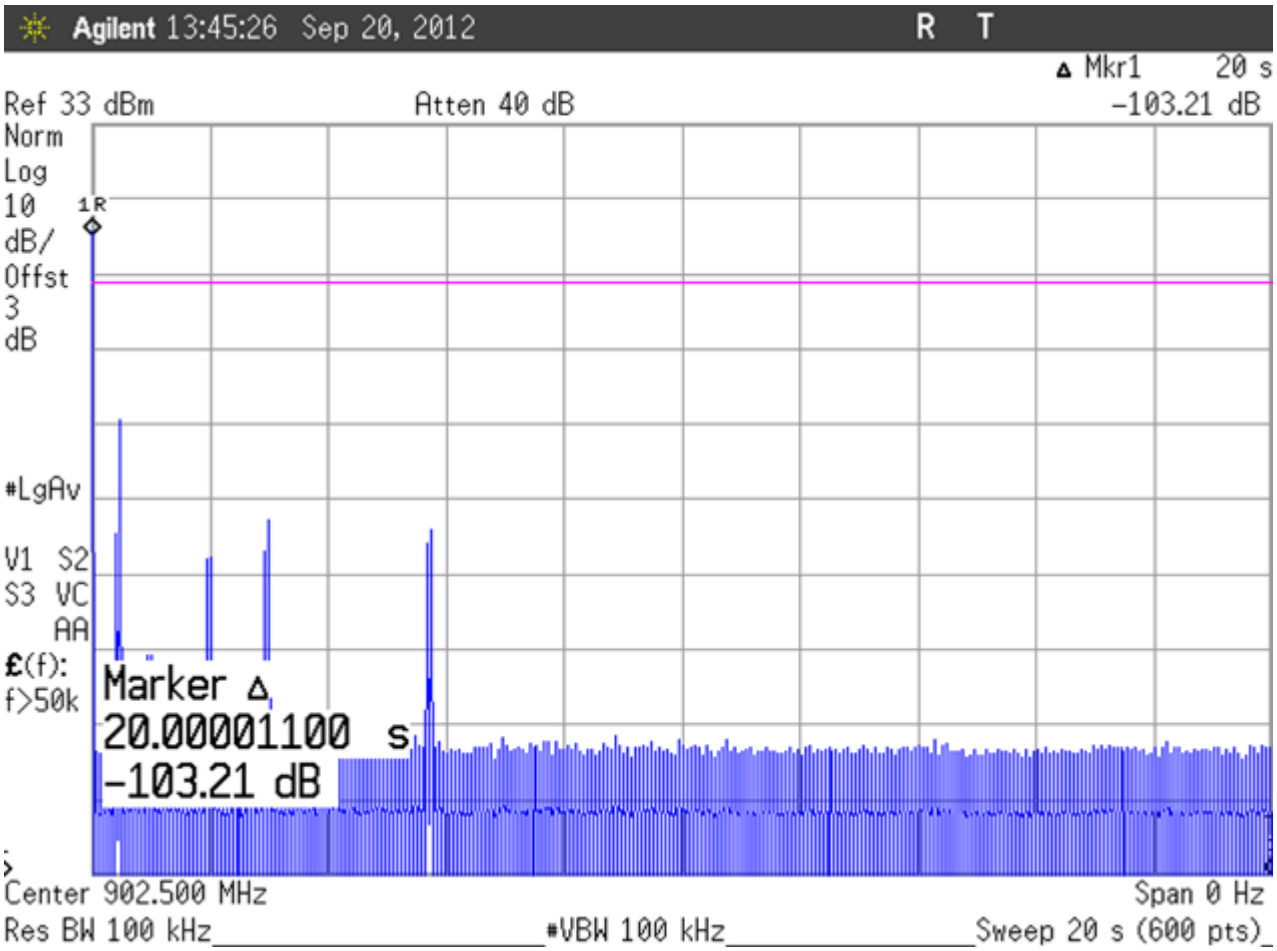

Figure 20: Time of Occupancy – Fence Mode

4.6 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.

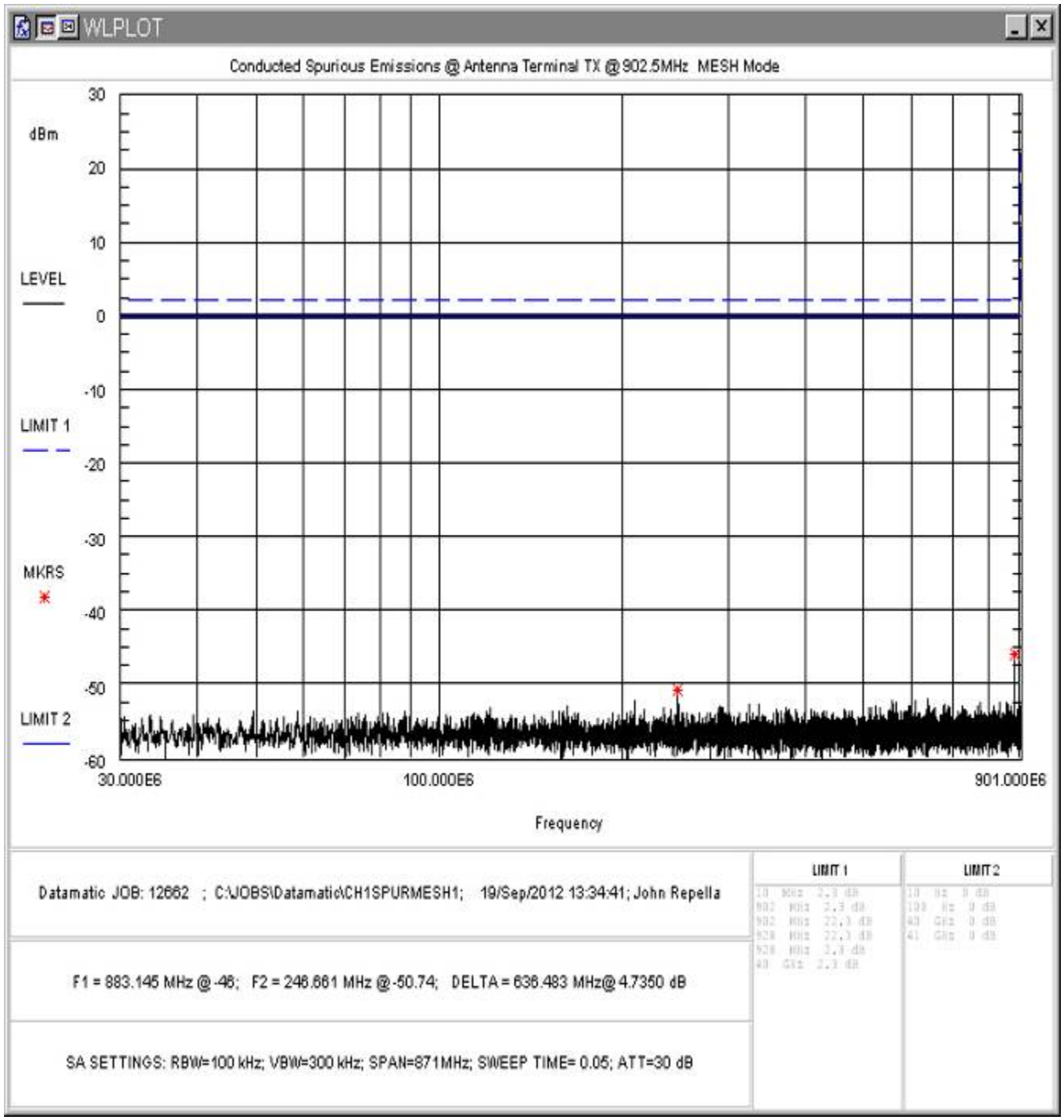

Figure 21: Conducted Spurious Emissions, Low Channel – Mesh Mode, 30 - 901MHz

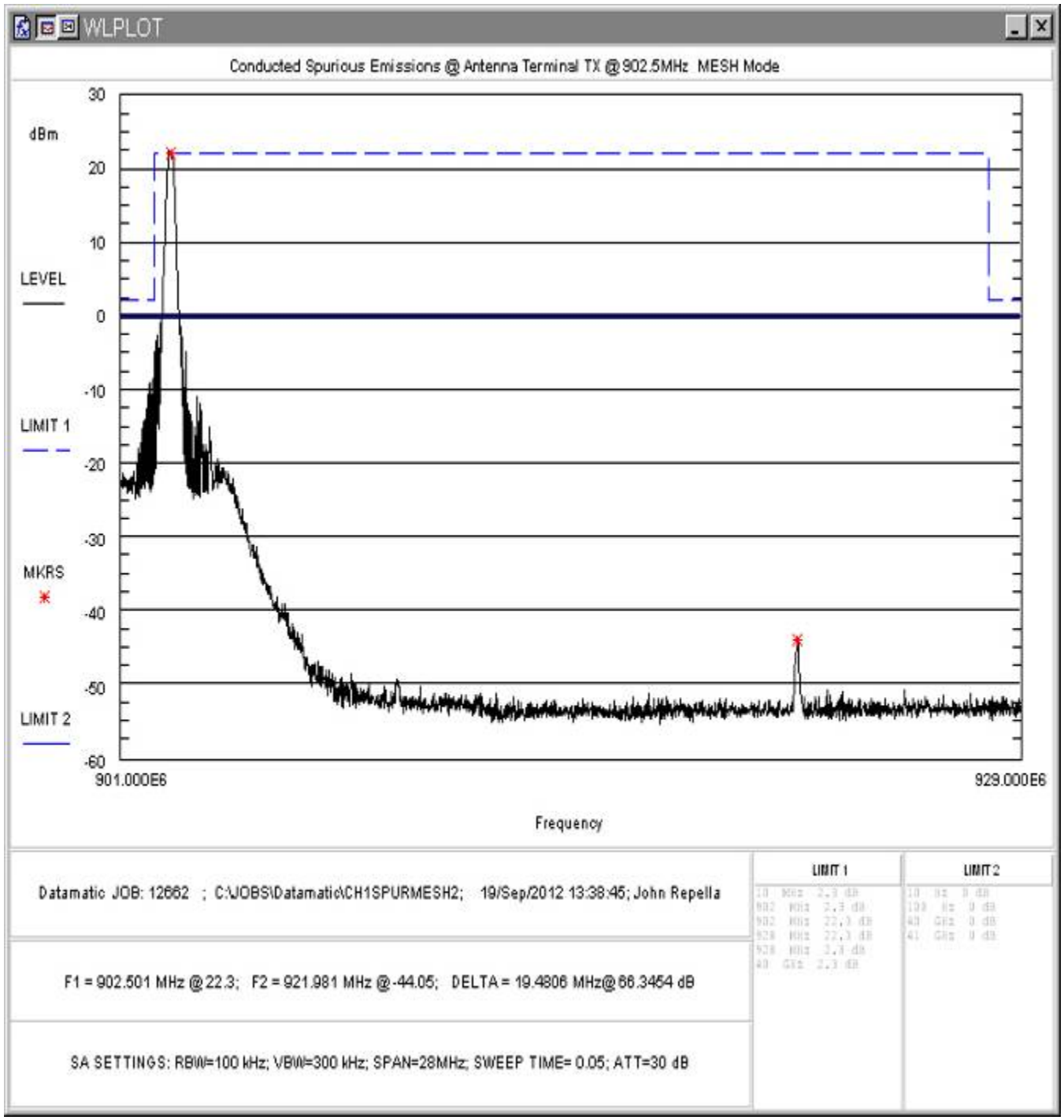

Figure 22: Conducted Spurious Emissions, Low Channel – Mesh Mode, 901 - 929MHz

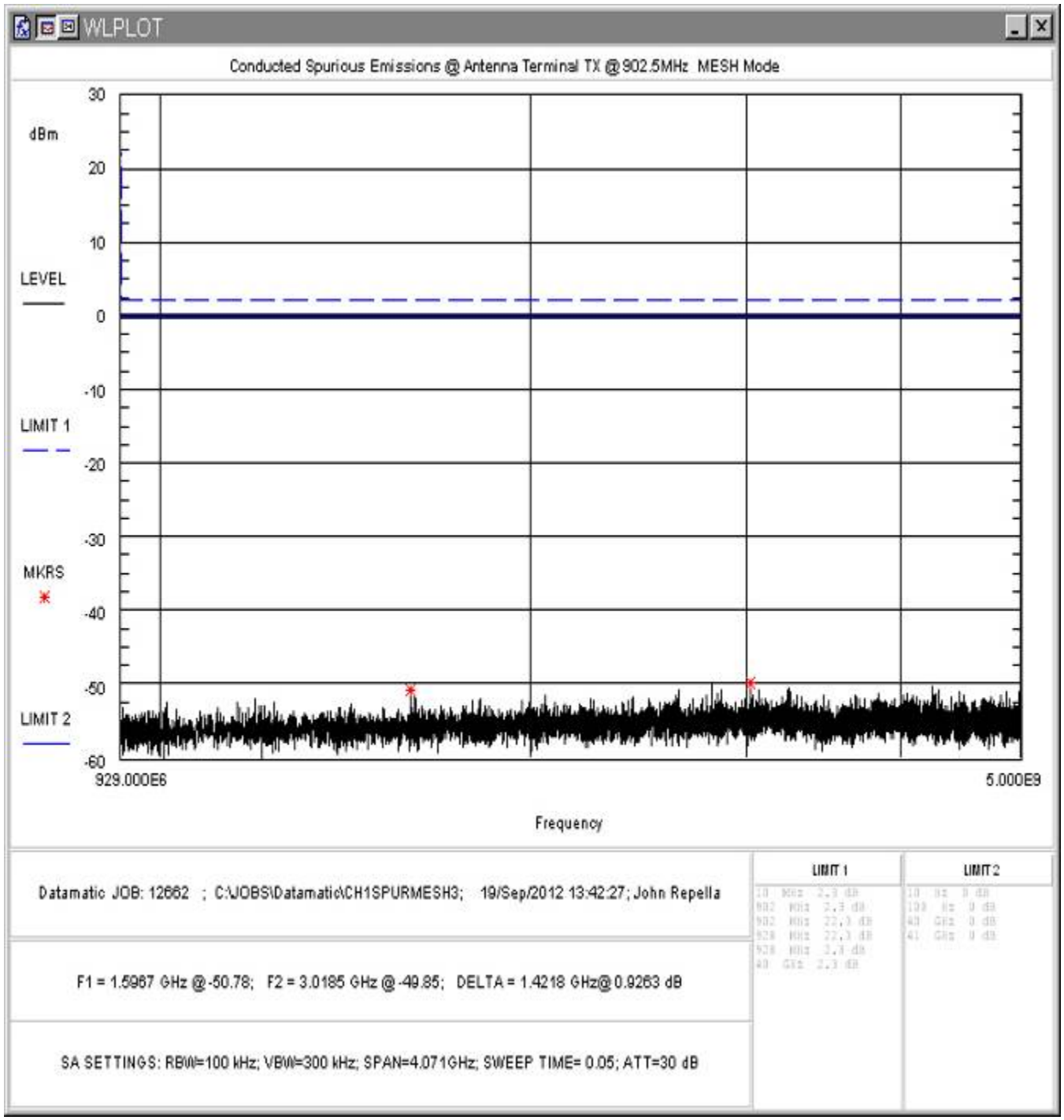

Figure 23: Conducted Spurious Emissions, Low Channel – Mesh Mode, 929MHz - 5GHz

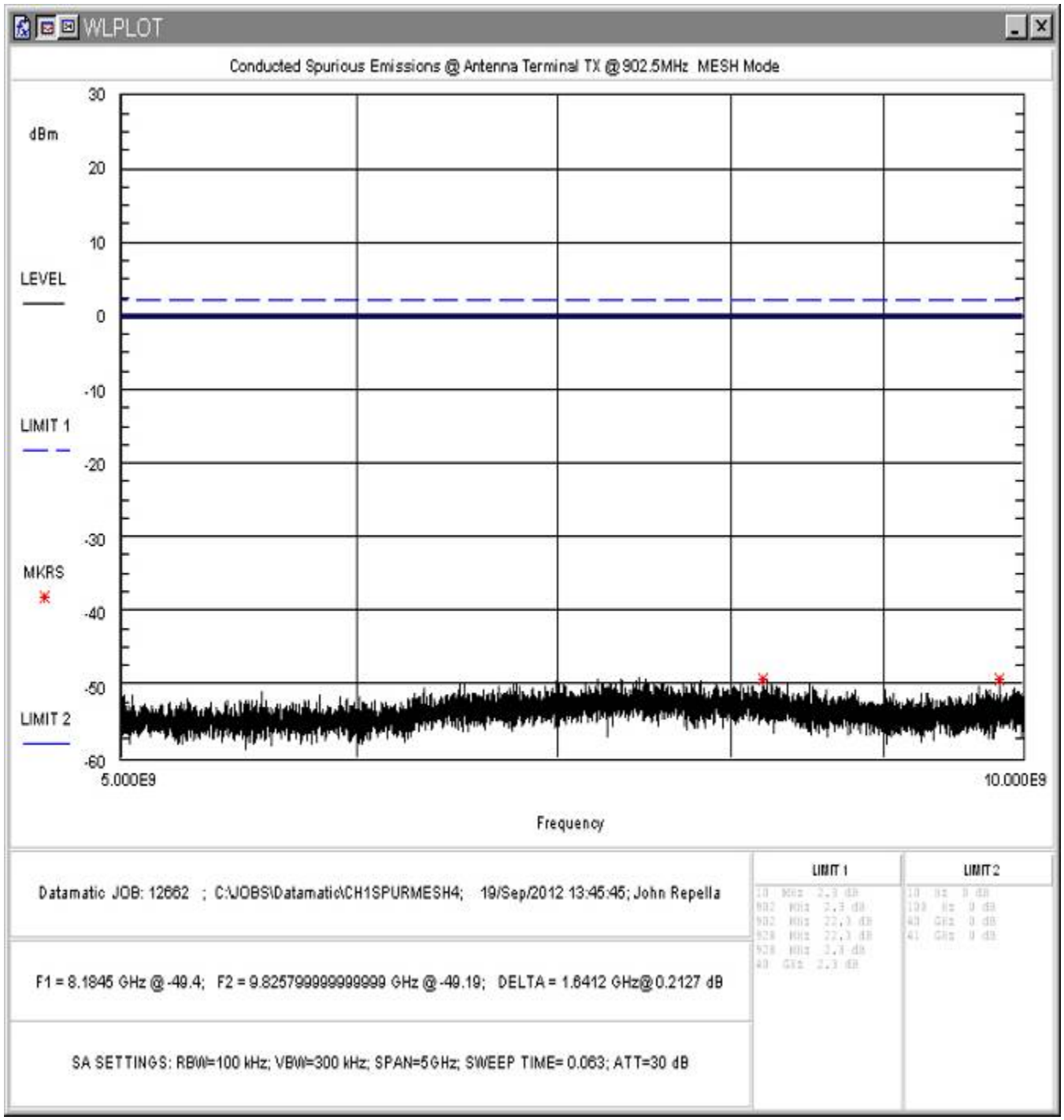

Figure 24: Conducted Spurious Emissions, Low Channel – Mesh Mode, 5 - 10GHz

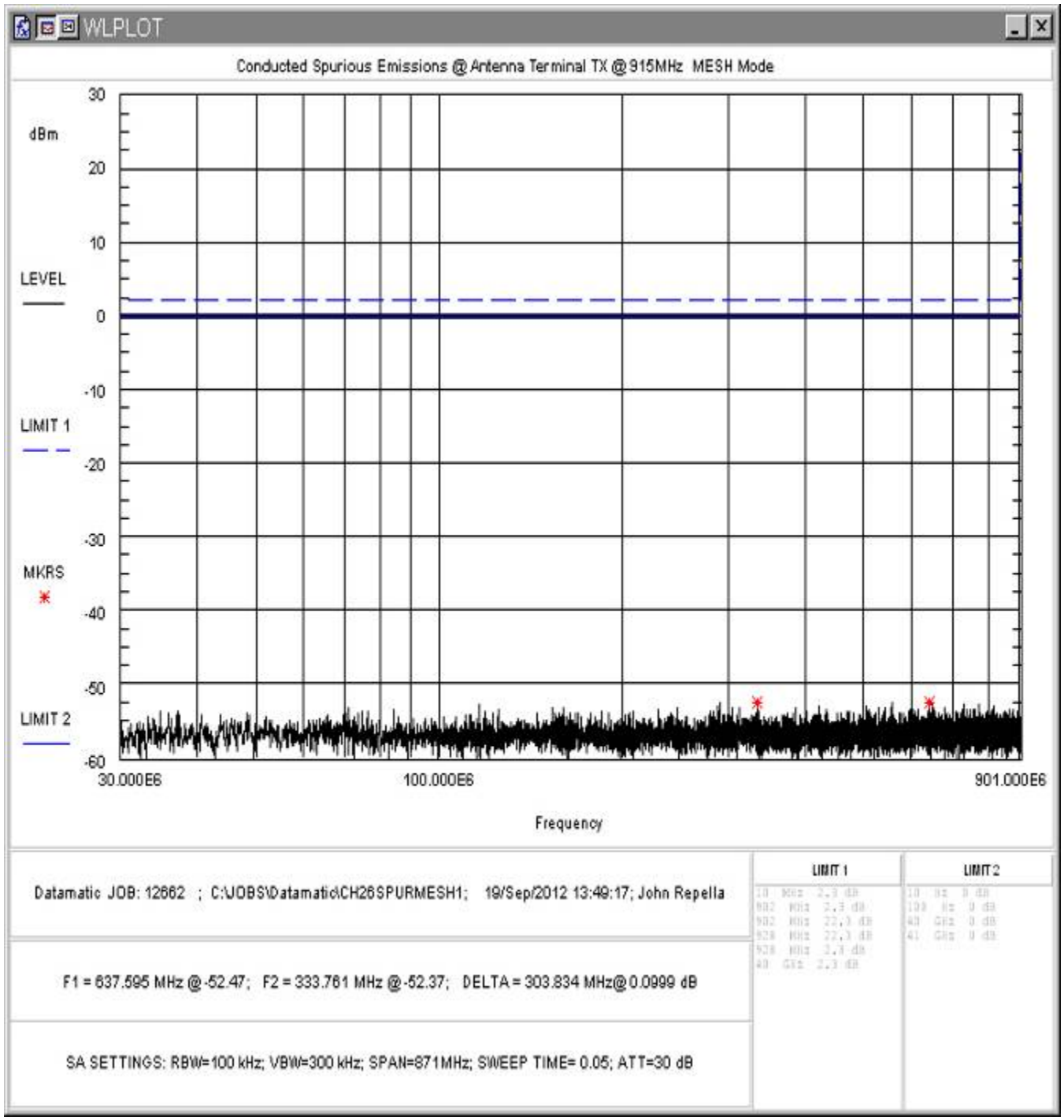

Figure 25: Conducted Spurious Emissions, Mid Channel – Mesh Mode, 30 - 901MHz

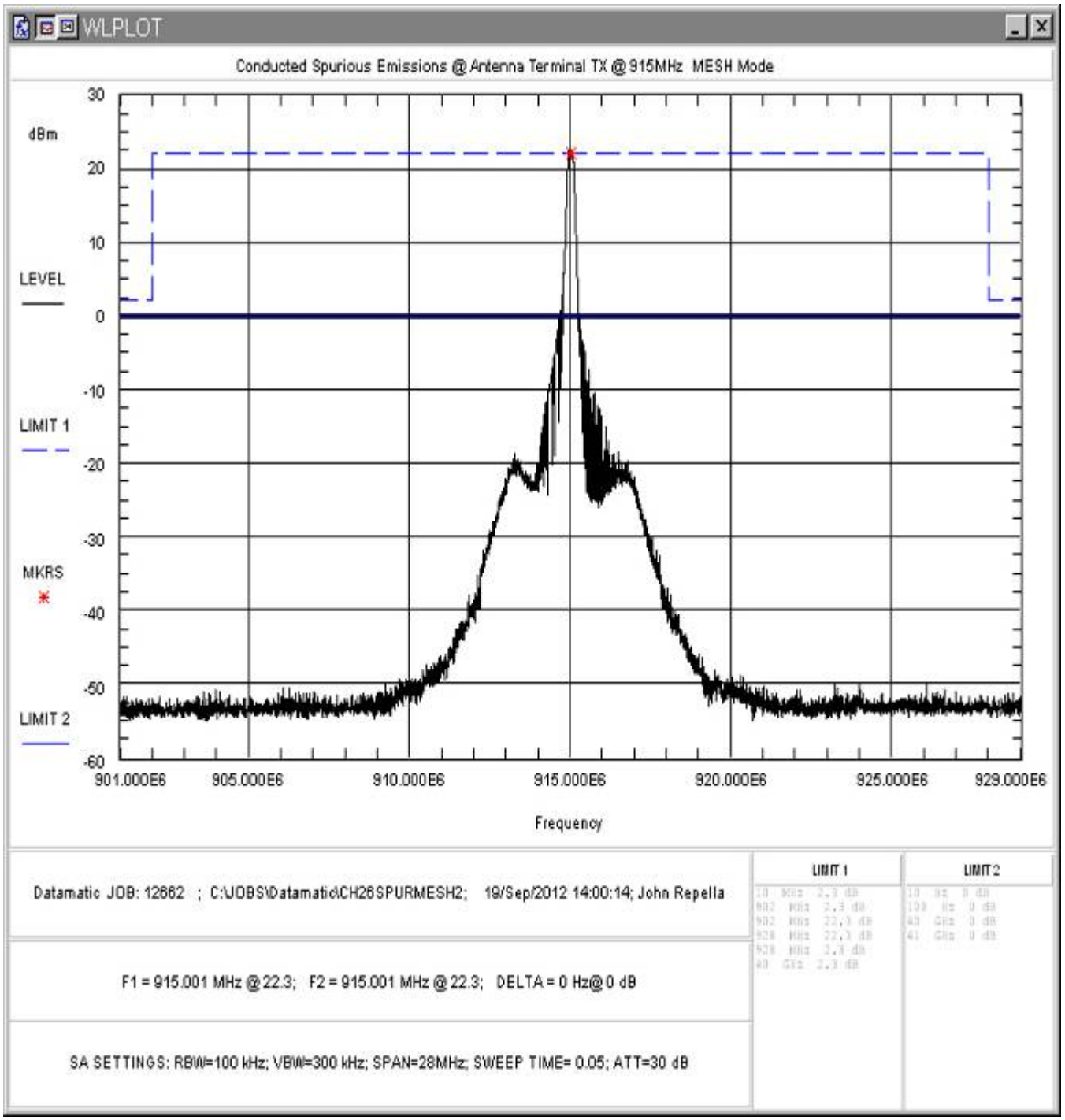

Figure 26: Conducted Spurious Emissions, Mid Channel – Mesh Mode, 901 - 929MHz

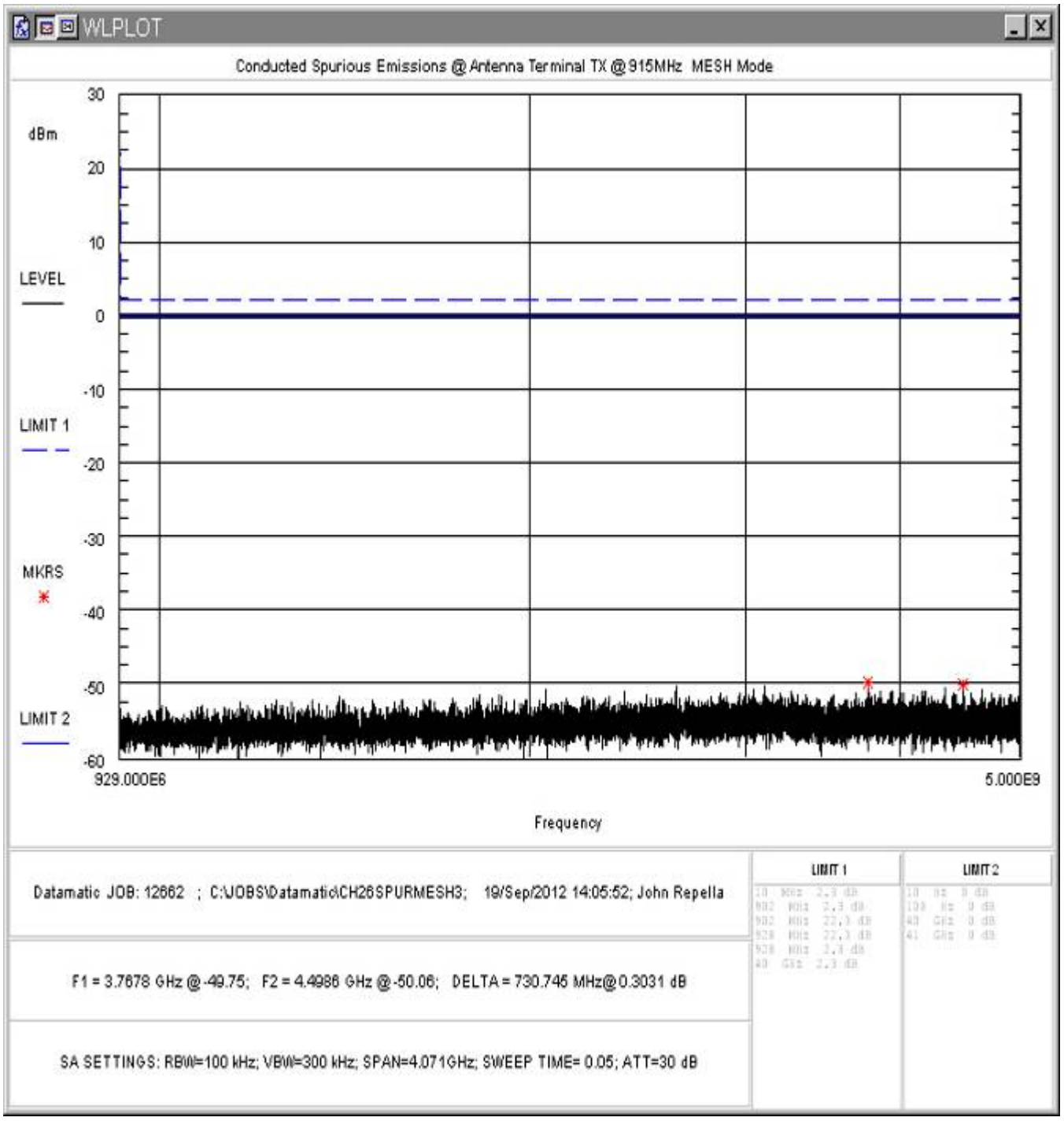

Figure 27: Conducted Spurious Emissions, Mid Channel – Mesh Mode, 929MHz - 5GHz

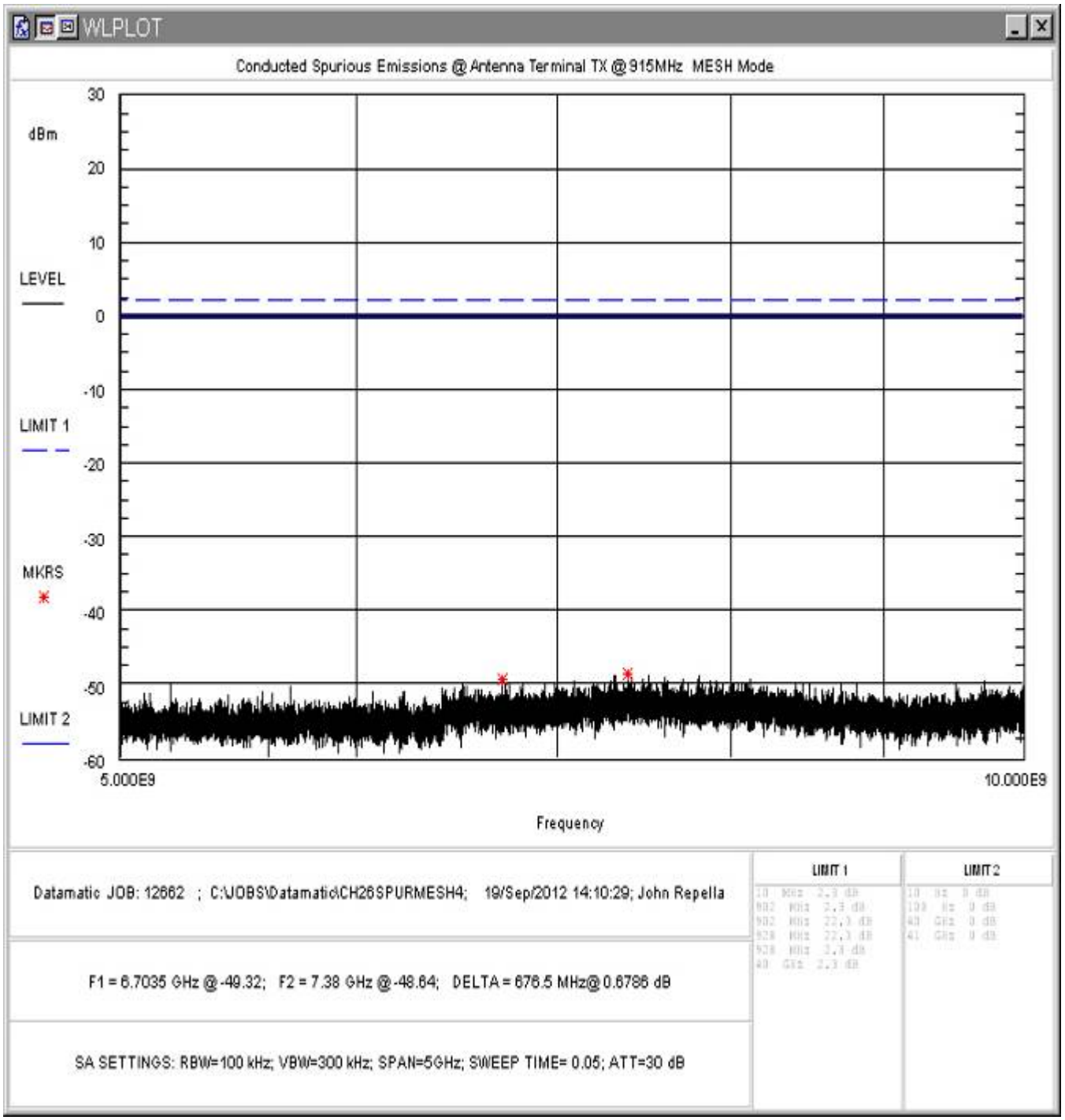

Figure 28: Conducted Spurious Emissions, Mid Channel – Mesh Mode, 5 - 10GHz

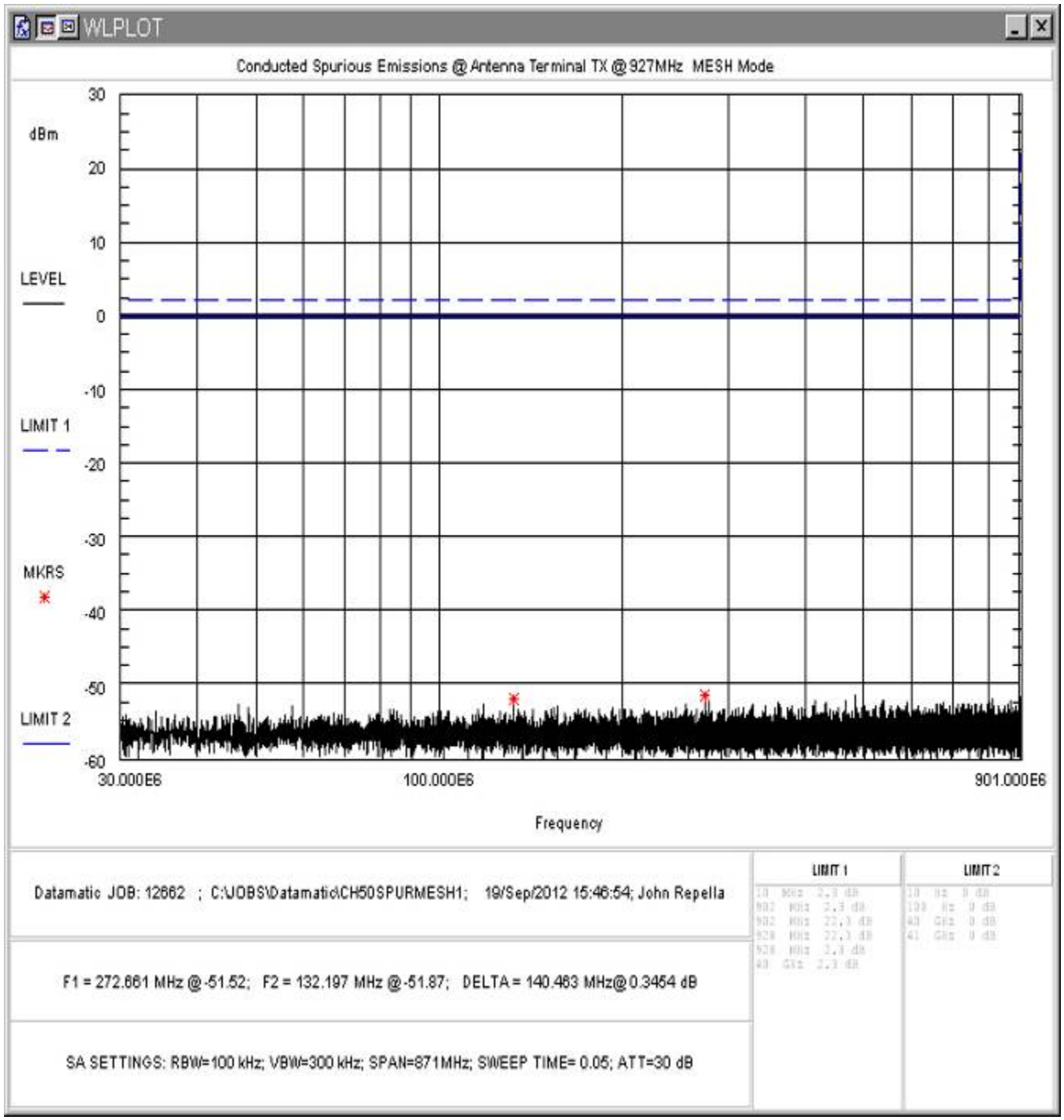

Figure 29: Conducted Spurious Emissions, High Channel – Mesh Mode, 30 - 901MHz

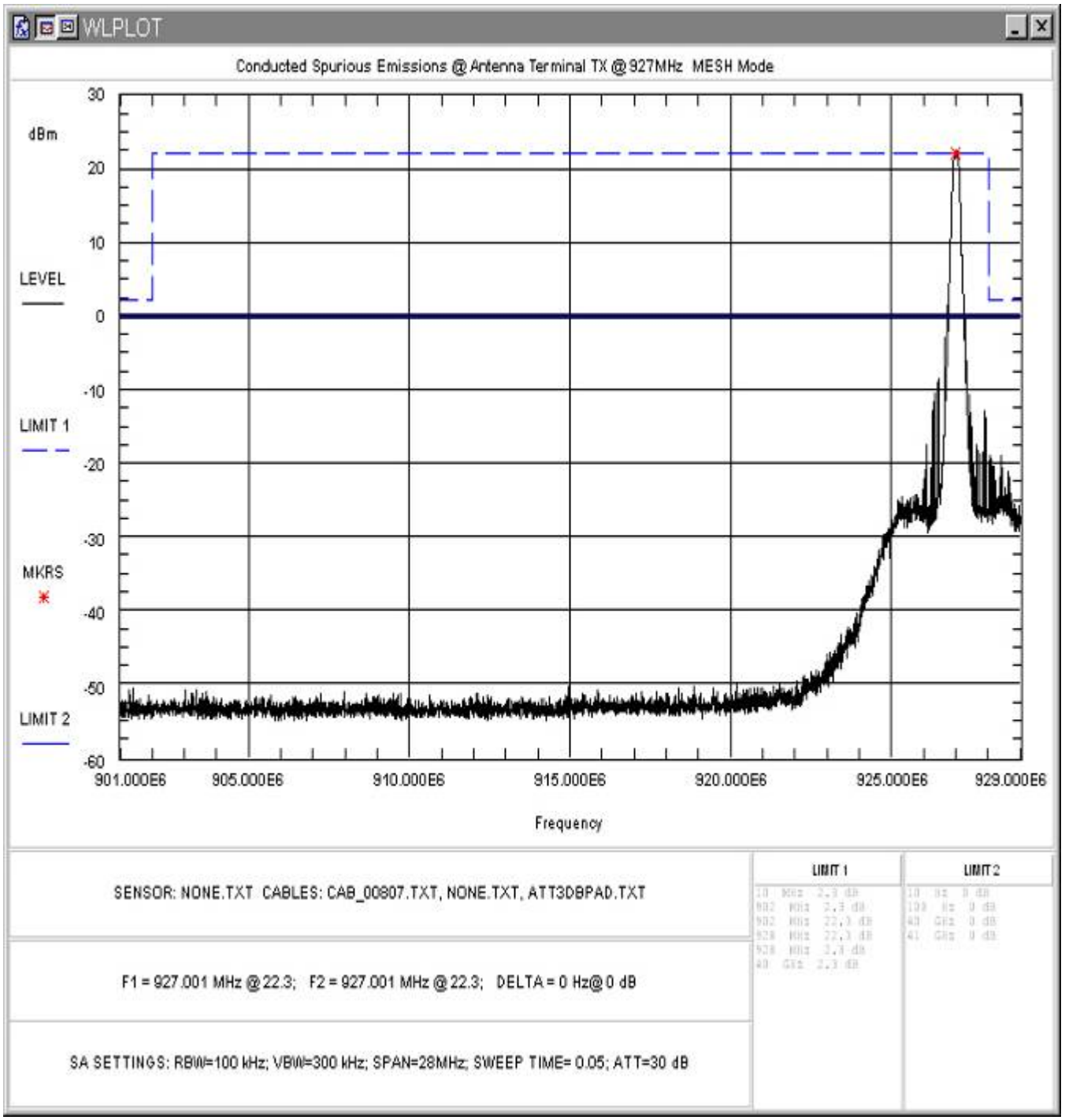

Figure 30: Conducted Spurious Emissions, High Channel – Mesh Mode, 901 - 929MHz

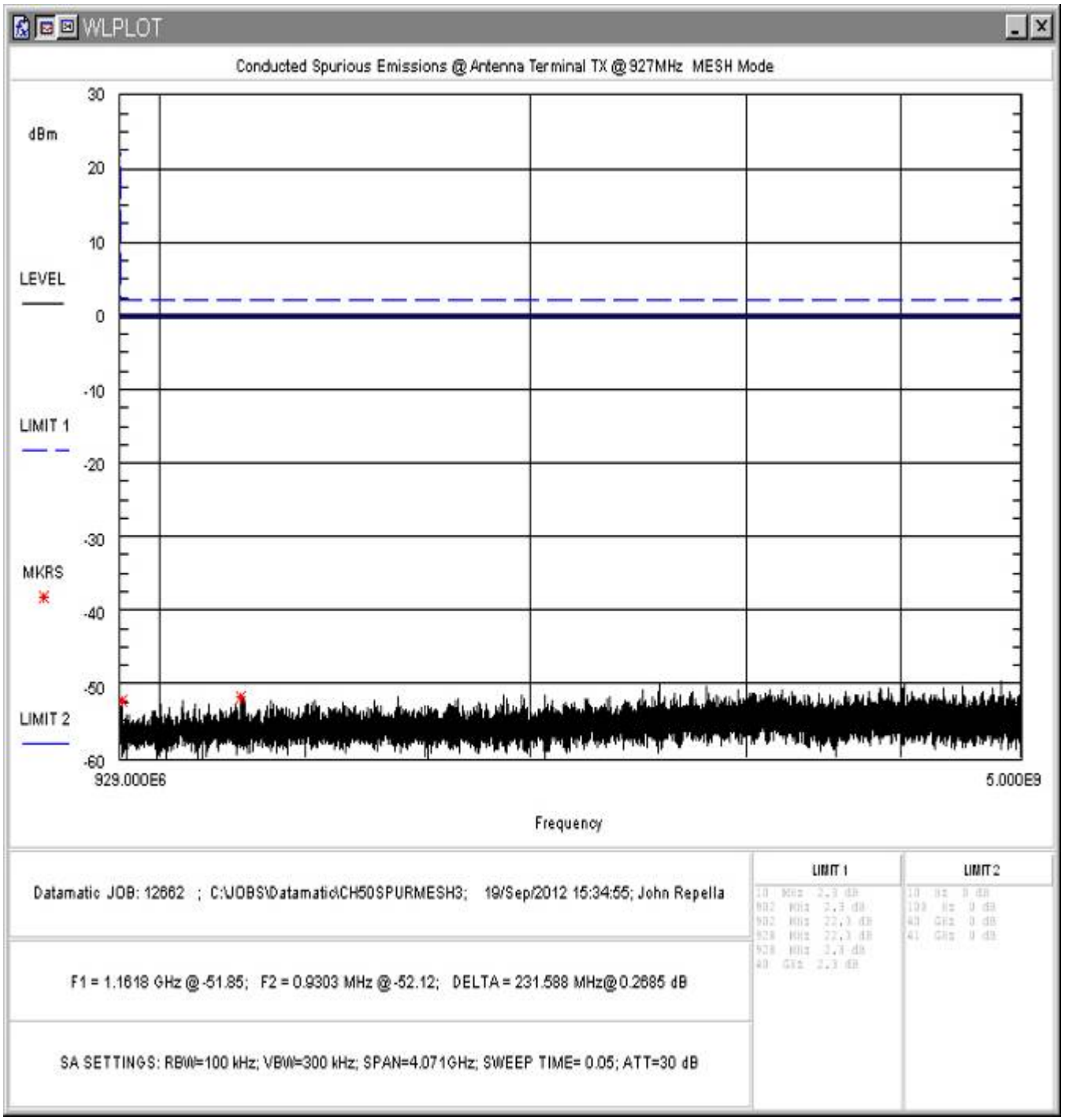

Figure 31: Conducted Spurious Emissions, High Channel – Mesh Mode, 929MHz - 5GHz

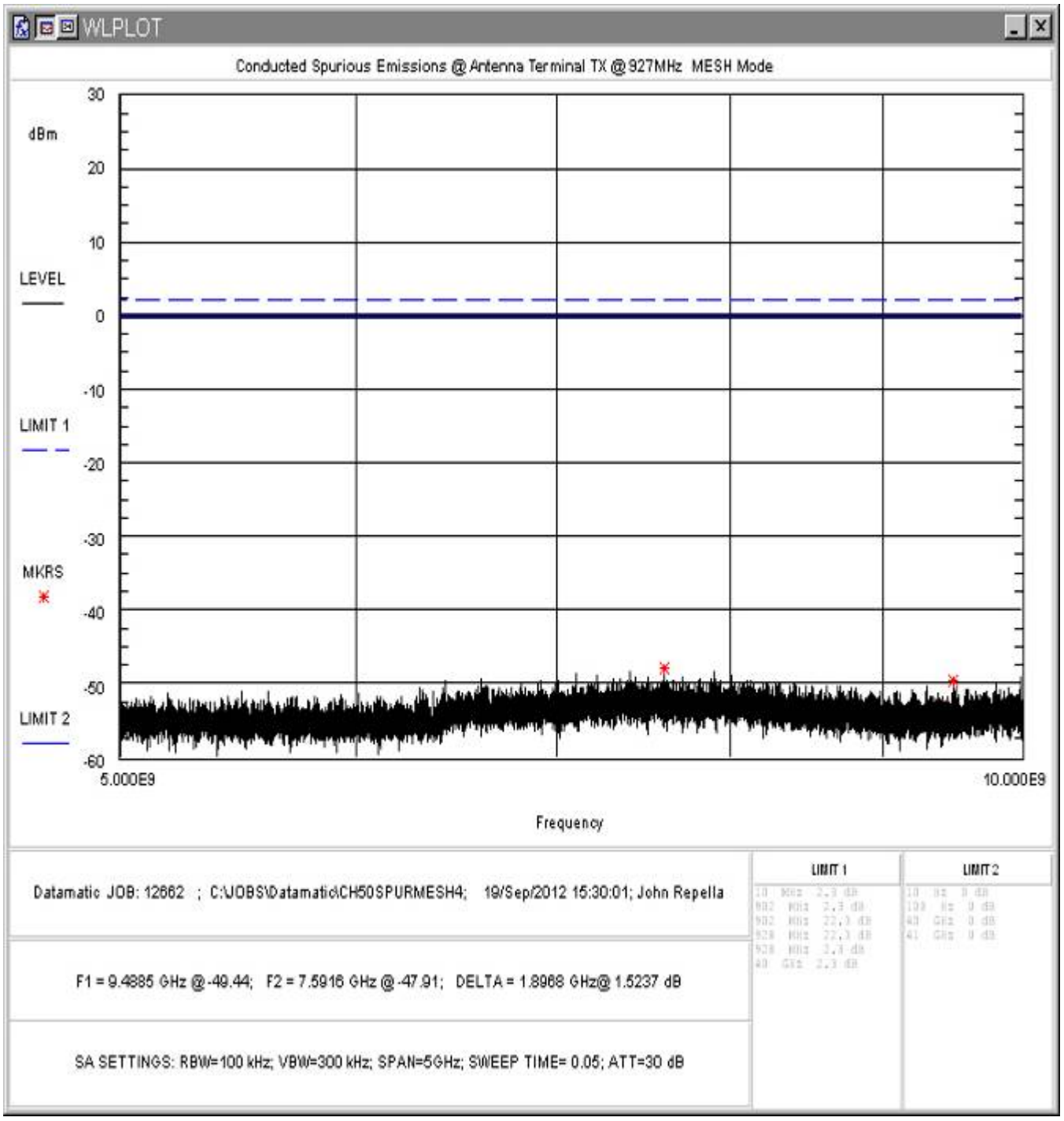

Figure 32: Conducted Spurious Emissions, High Channel – Mesh Mode, 5 - 10GHz

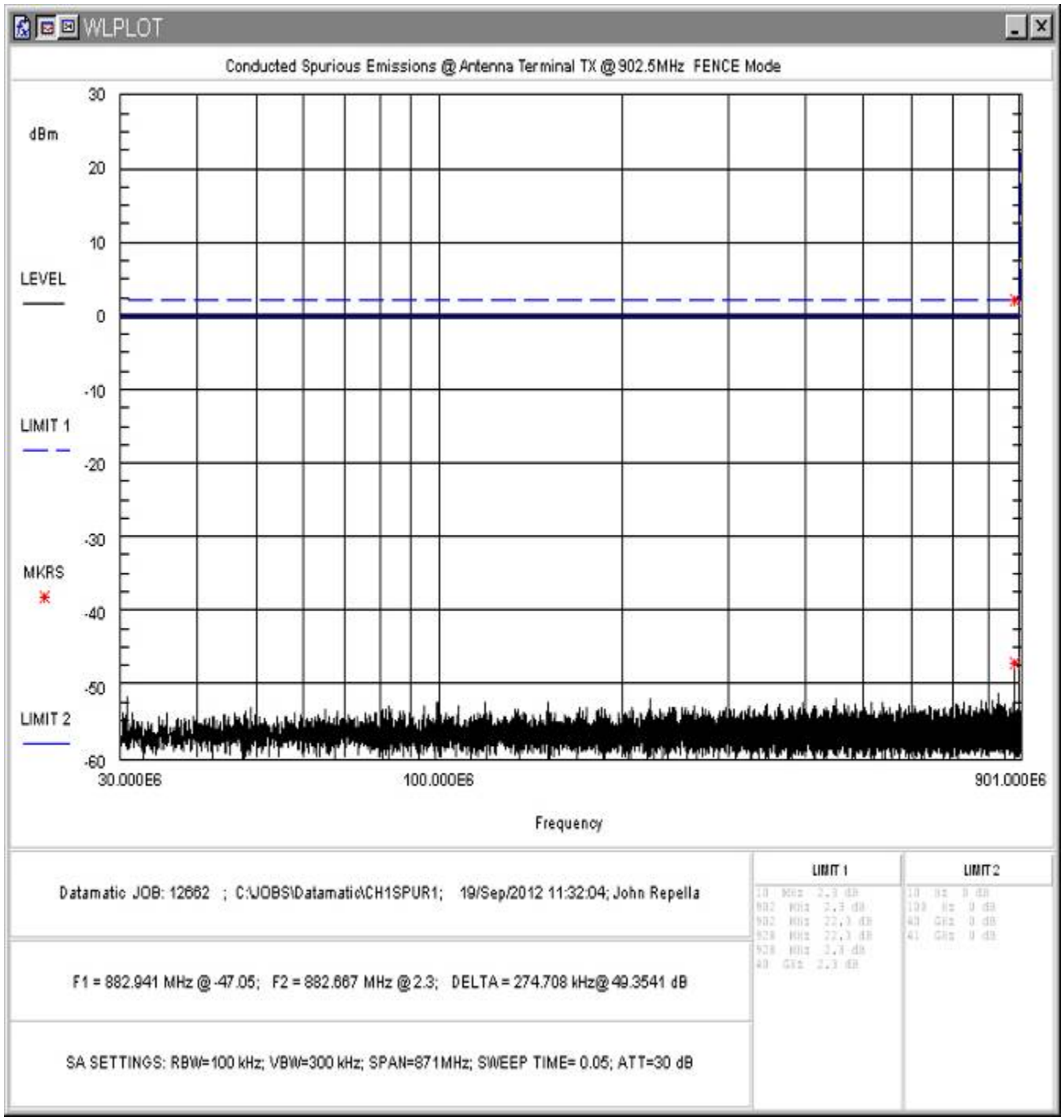

Figure 33: Conducted Spurious Emissions, Low Channel – Fence Mode, 30 - 901MHz

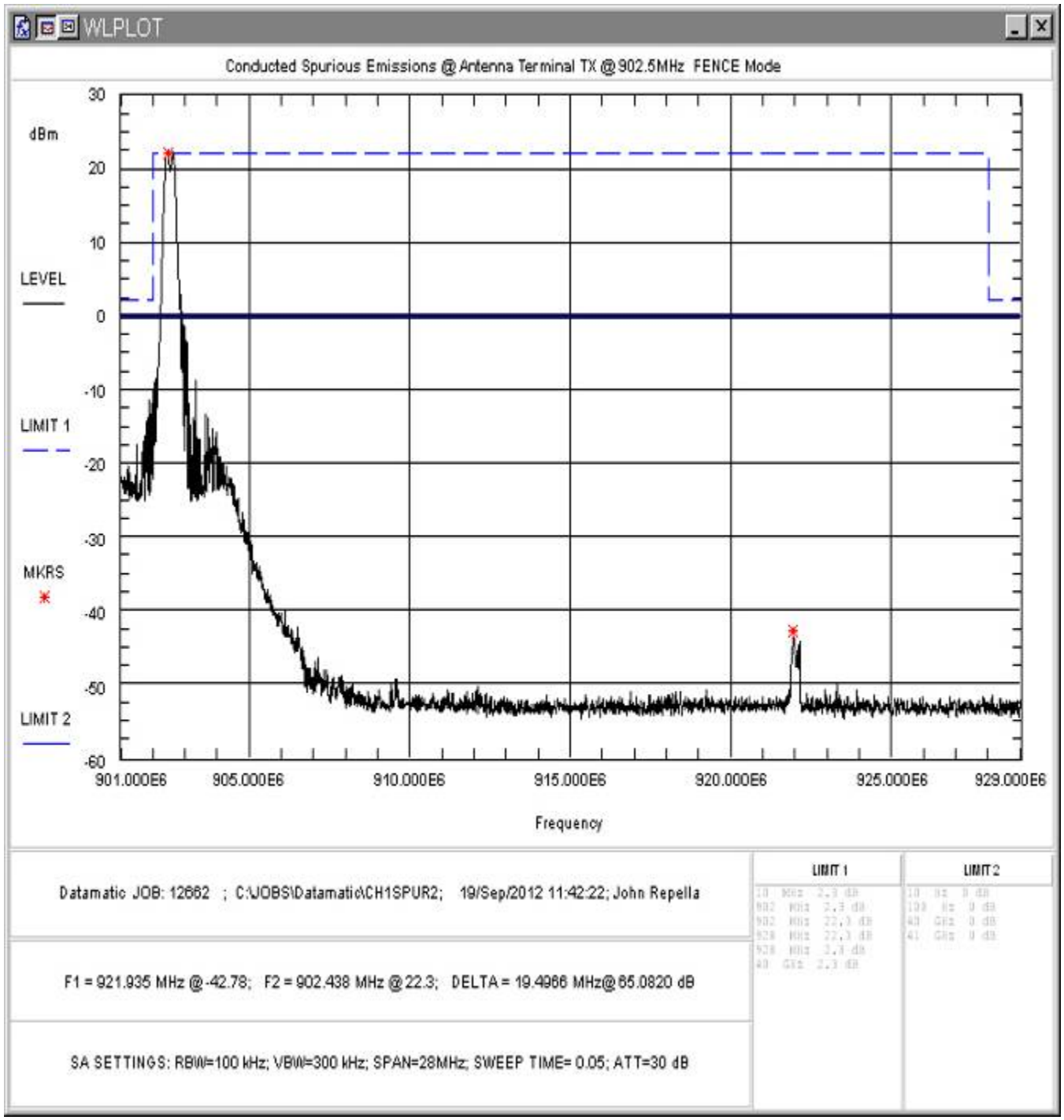

Figure 34: Conducted Spurious Emissions, Low Channel – Fence Mode, 901 - 929MHz

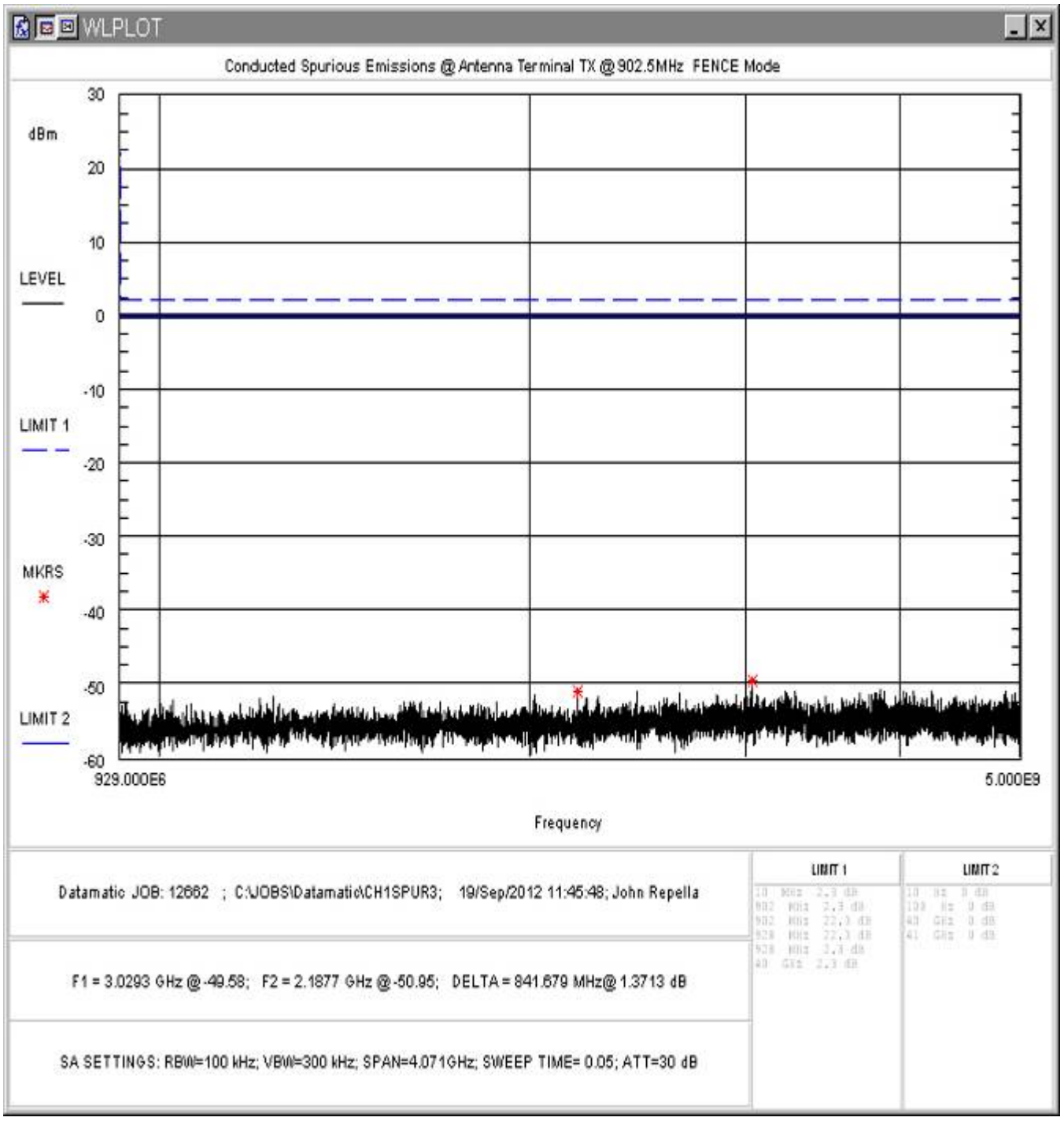

Figure 35: Conducted Spurious Emissions, Low Channel – Fence Mode, 929MHz - 5GHz

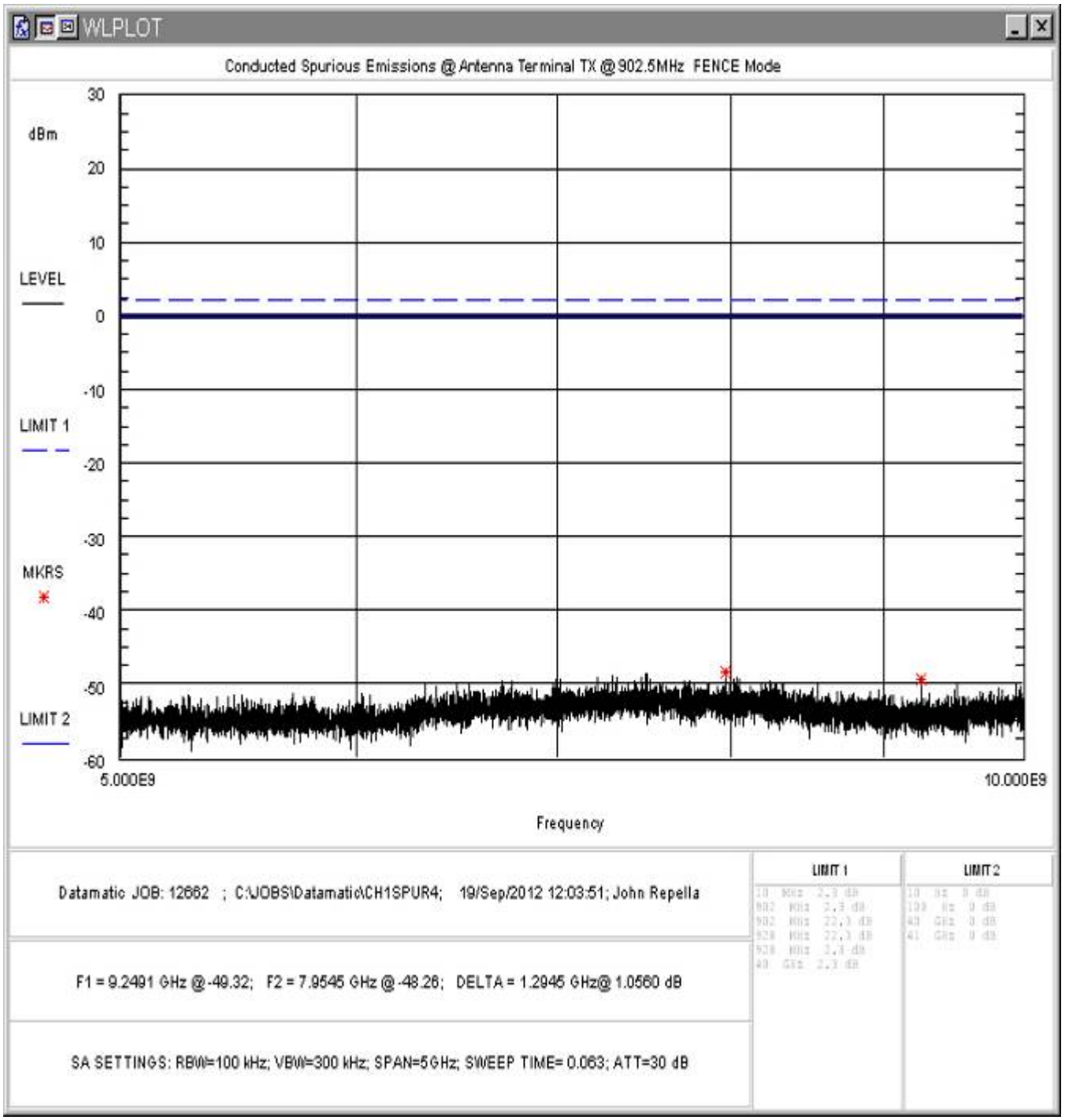

Figure 36: Conducted Spurious Emissions, Low Channel – Fence Mode, 5 - 10GHz

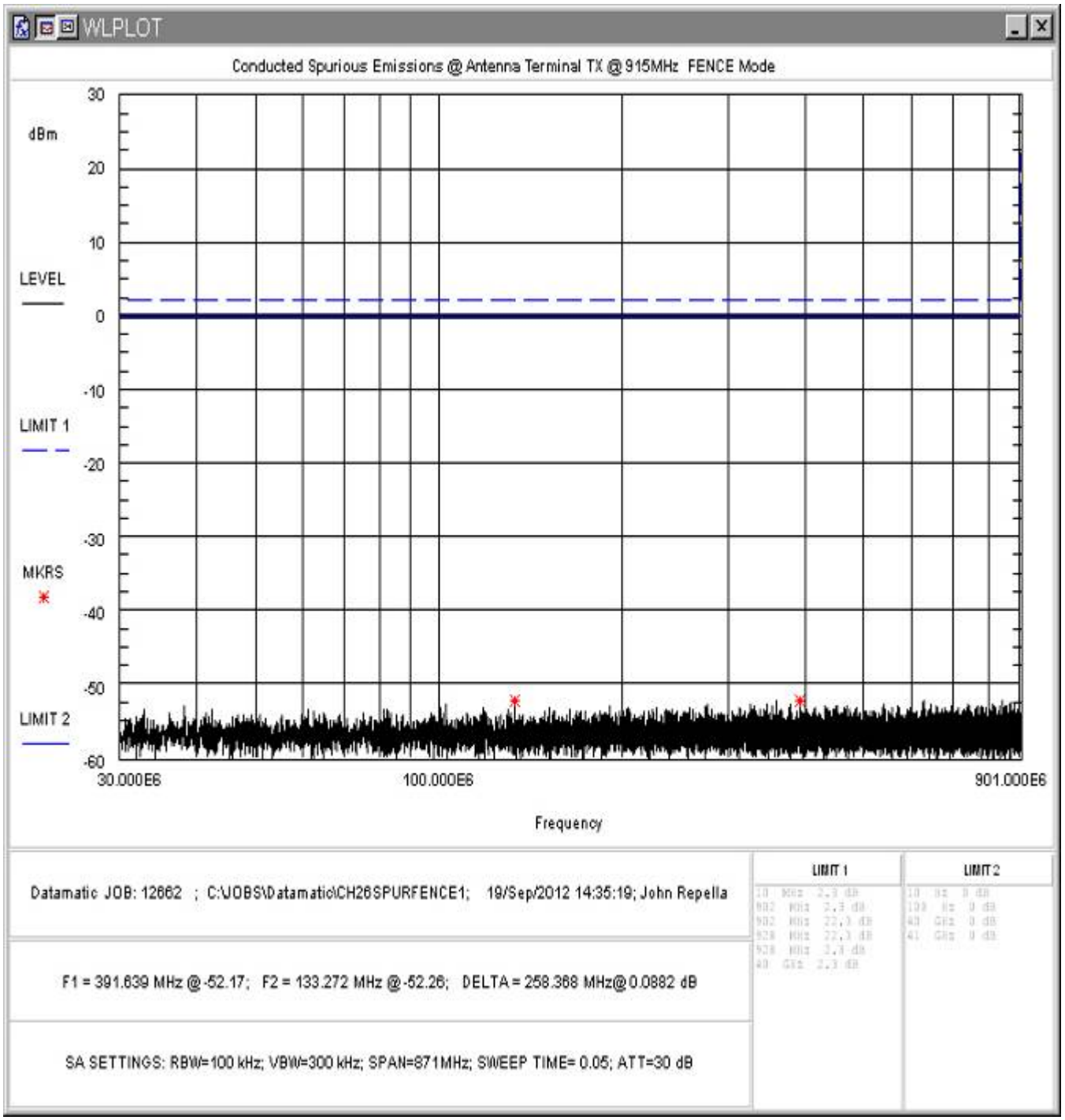

Figure 37: Conducted Spurious Emissions, Mid Channel – Fence Mode, 30 - 901MHz

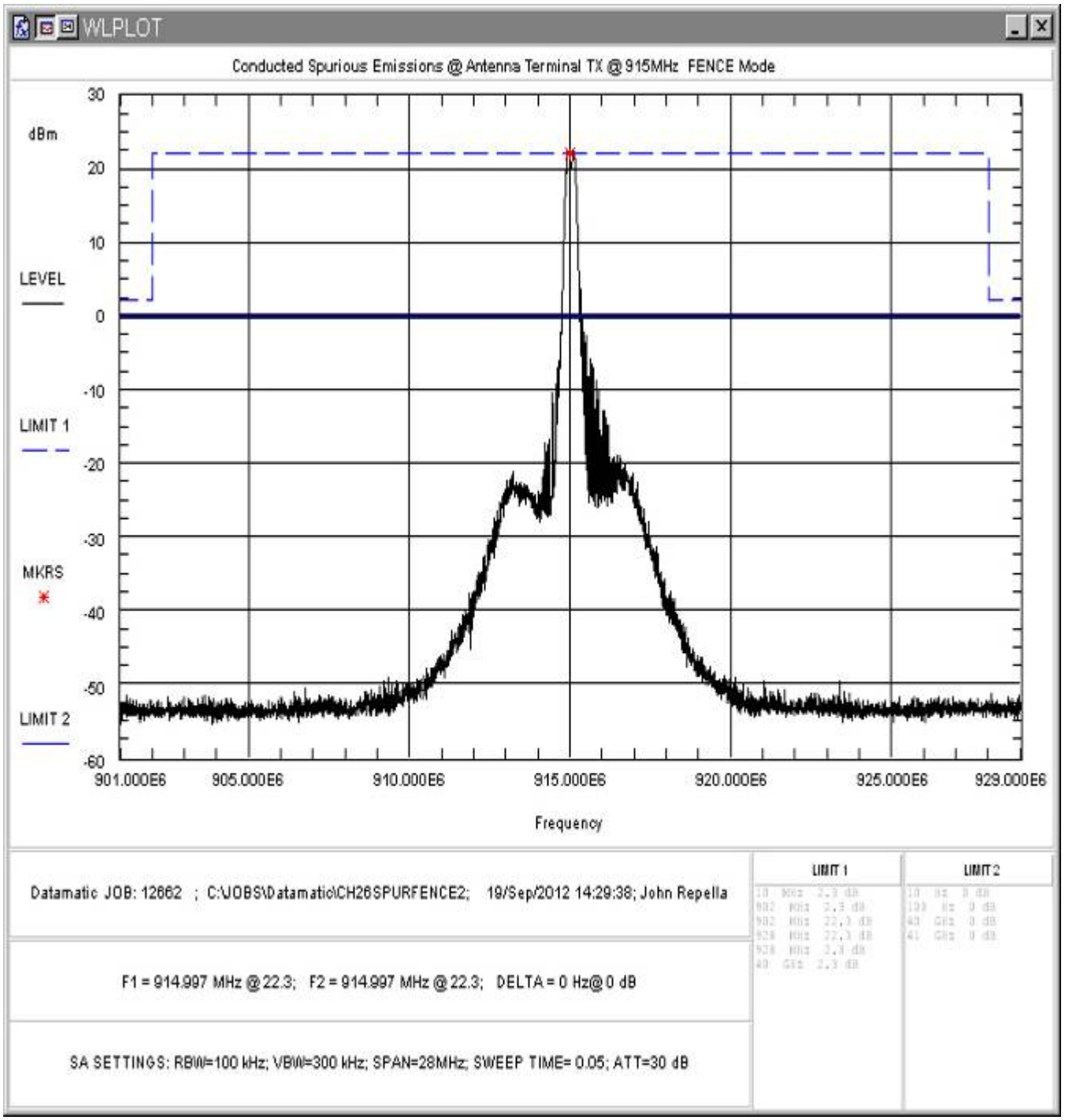

Figure 38: Conducted Spurious Emissions, Mid Channel – Fence Mode, 901 - 929MHz

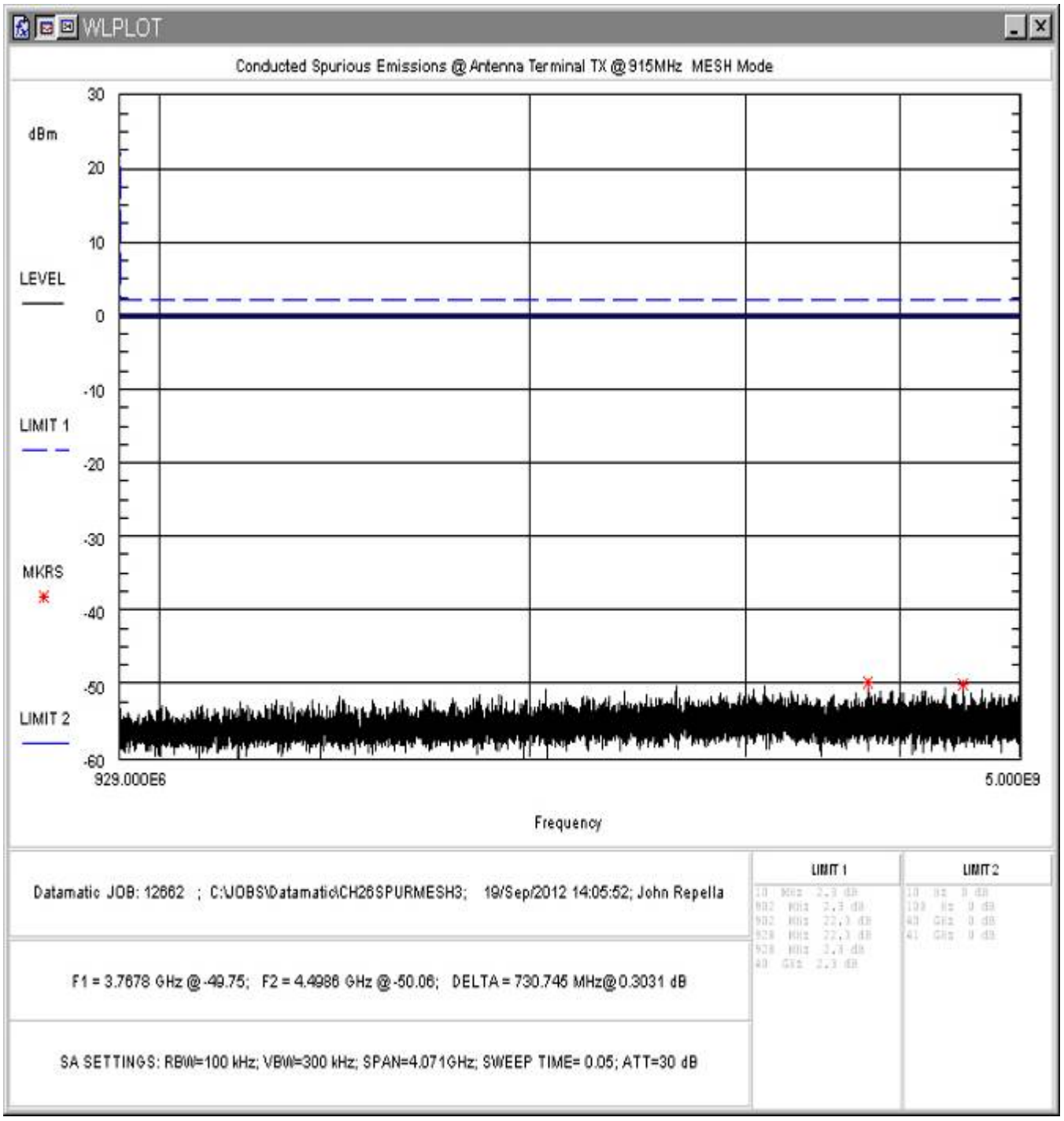

Figure 39: Conducted Spurious Emissions, Mid Channel – Fence Mode, 929MHz - 5GHz

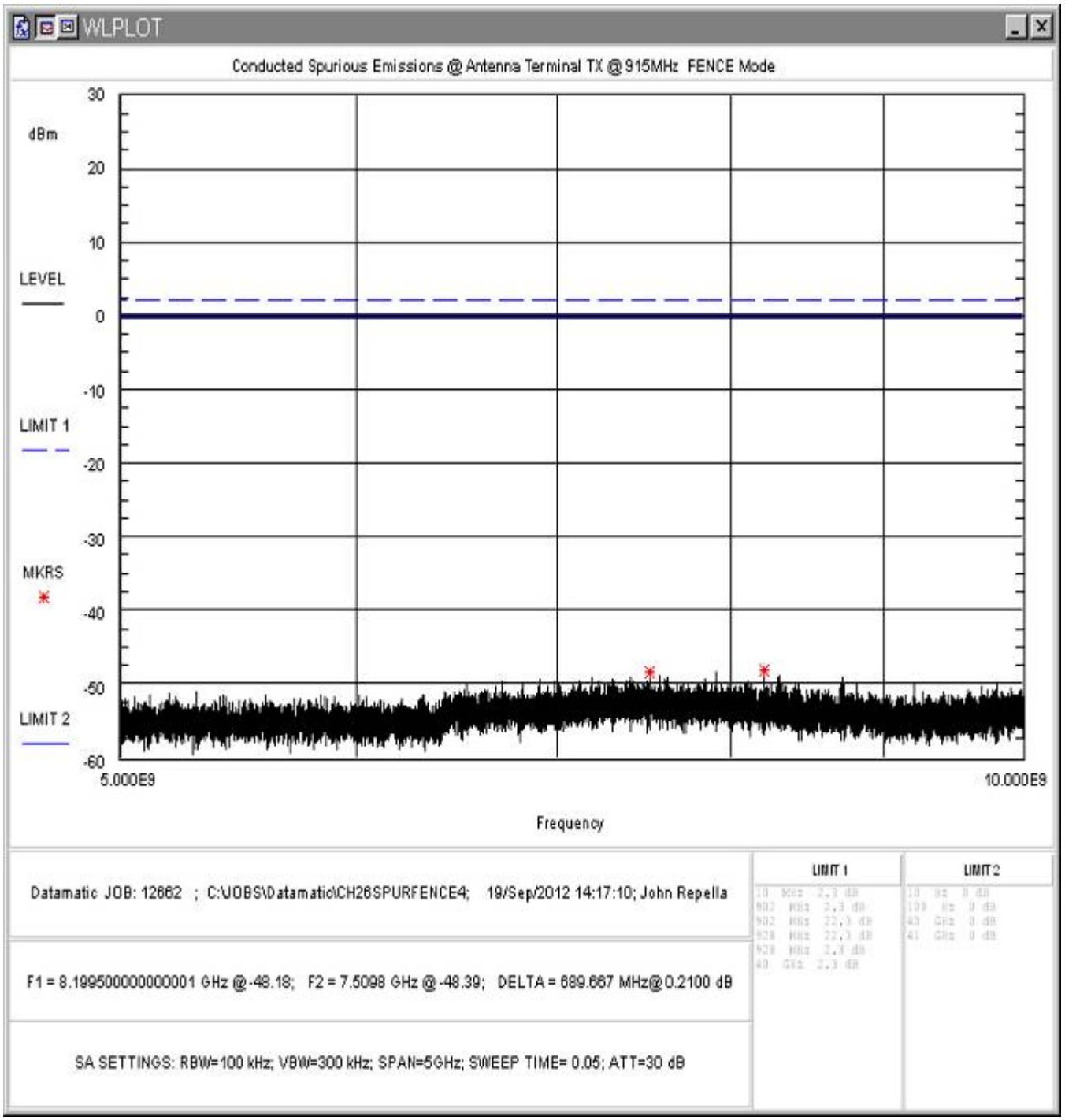

Figure 40: Conducted Spurious Emissions, Mid Channel – Fence Mode, 5 - 10GHz

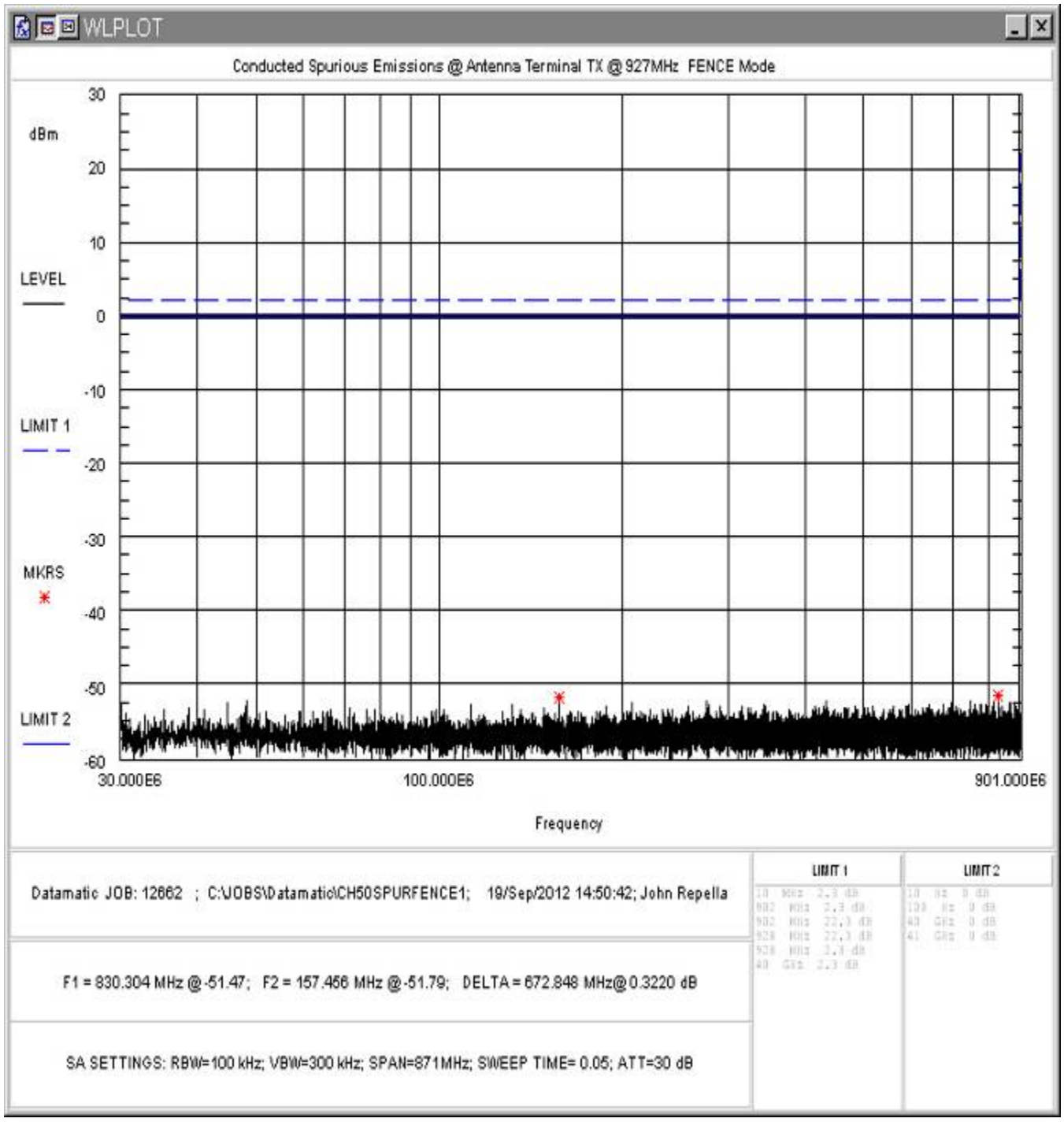

Figure 41: Conducted Spurious Emissions, High Channel – Fence Mode, 30 - 901MHz

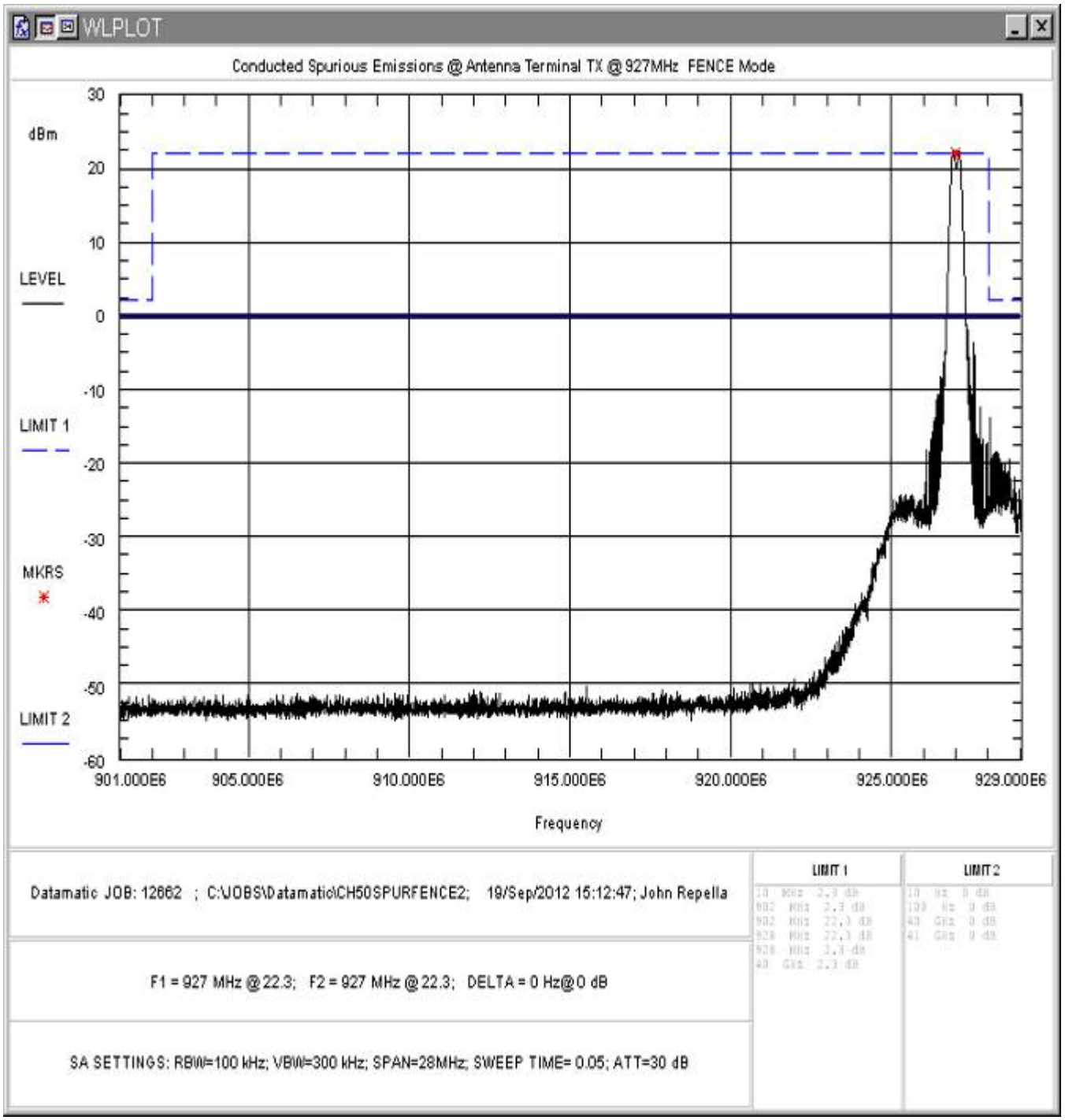

Figure 42: Conducted Spurious Emissions, High Channel – Fence Mode, 901 - 929MHz

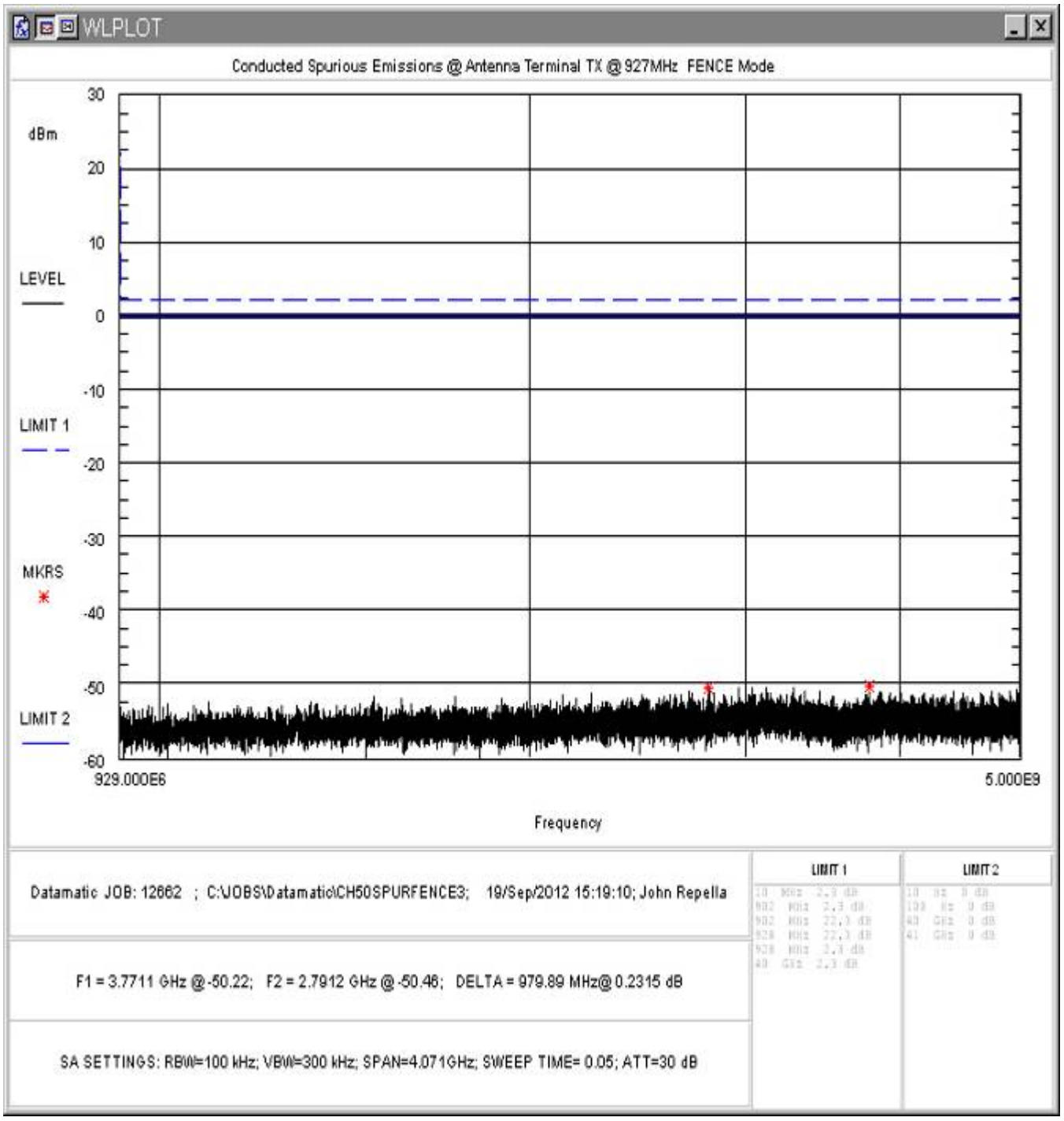

Figure 43: Conducted Spurious Emissions, High Channel – Fence Mode, 929MHz - 5GHz

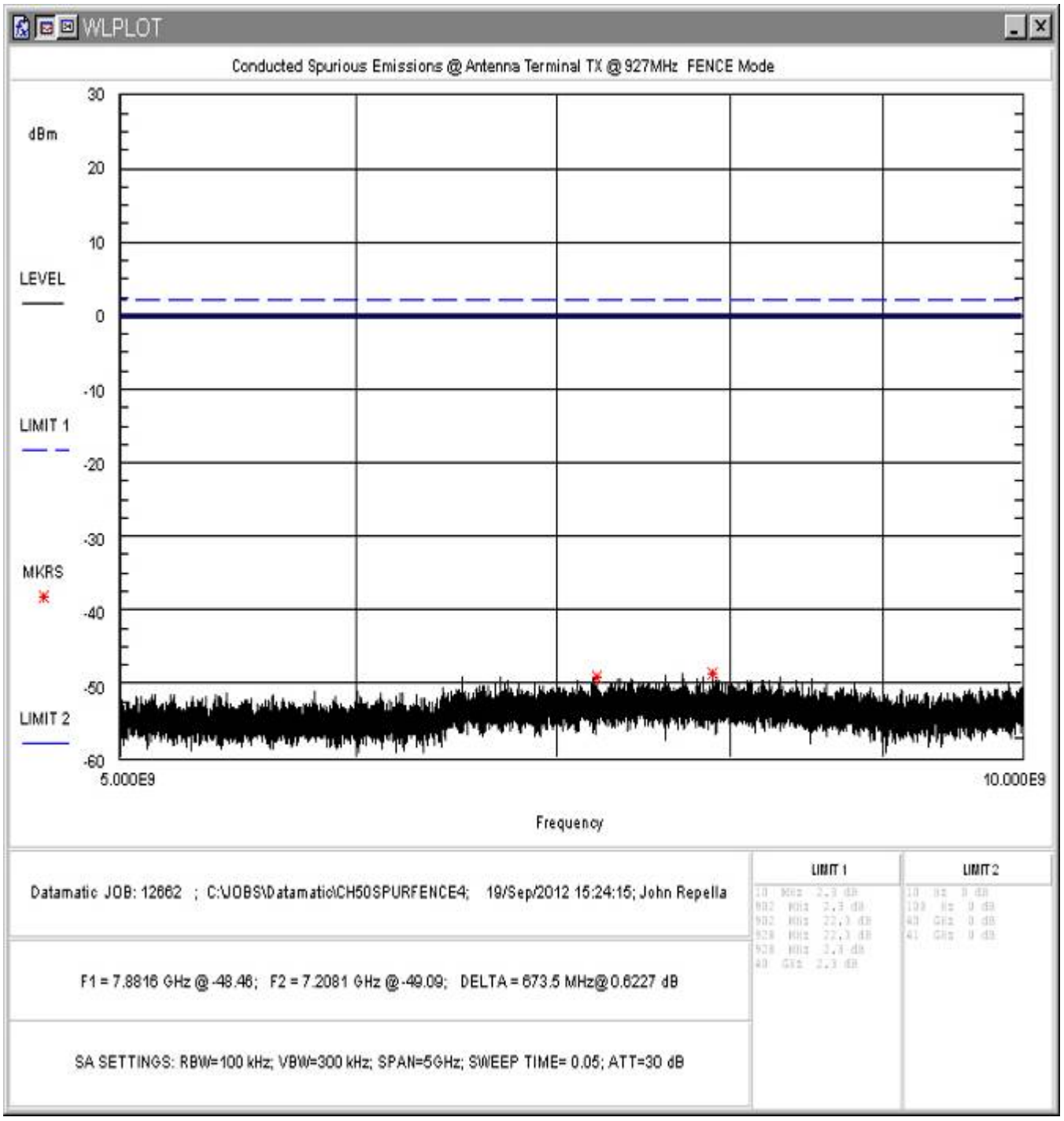

Figure 44: Conducted Spurious Emissions, High Channel – Fence Mode, 5 - 10GHz

4.7 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.

4.7.1 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:

Table 8: Spectrum Analyzer Settings

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

Average measurements above 1GHz were made with the Spectrum analyzer set to the linear mode with a Video bandwidth of 10Hz, and the resultant reading mathematically converted to dBuV. Correction factors were then applied and the resulting value was compared to the limit.

Spurious emissions below 1GHz were common in both modes and all channels.

Table 9: Radiated Emission Test Data, Low Frequency Data (<1GHz)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector
73.04	V	270.00	1.00	17.50	9.6	22.7	100.0	-12.9	Peak
74.93	V	270.00	1.00	17.70	9.6	23.1	100.0	-12.7	Peak
118.05	V	180.00	1.00	7.30	15.4	13.6	150.0	-20.8	Peak
132.30	V	250.00	1.00	9.50	15.4	17.5	150.0	-18.7	Peak
164.12	V	280.00	1.00	11.70	13.9	19.1	150.0	-17.9	Peak
249.10	V	270.00	1.00	10.50	14.7	18.2	200.0	-20.8	Peak
249.10	V	270.00	1.00	10.50	14.7	18.2	200.0	-20.8	Peak
38.76	H	180.00	4.00	4.60	15.8	10.5	100.0	-19.6	Peak
74.90	H	125.00	2.77	12.10	9.6	12.1	100.0	-18.3	Peak
109.37	H	180.00	4.00	11.40	14.0	18.6	150.0	-18.1	Peak
128.76	H	185.00	2.35	10.60	15.5	20.1	150.0	-17.4	Peak
164.81	H	125.00	2.16	11.30	14.0	18.3	150.0	-18.3	Peak
249.10	H	0.00	4.00	2.90	14.7	7.6	200.0	-28.4	Peak

Table 10: Radiated Emission Test Data, Mesh Mode Low Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2707.16	V	170.00	1.90	50.00	-1.4	268.2	5000.0	-25.4	Peak
2707.16	V	170.00	1.90	42.00	-1.4	106.8	500.0	-13.4	Average
3609.65	V	170.00	1.93	56.80	-0.1	684.4	5000.0	-17.3	Peak
3609.65	V	170.00	1.93	48.80	-0.1	272.5	500.0	-5.3	Average
4512.17	V	175.00	1.87	47.90	1.7	301.8	5000.0	-24.4	Peak
4512.17	V	175.00	1.87	39.90	1.7	120.2	500.0	-12.4	Average
2707.16	H	185.00	1.92	54.80	-1.4	466.1	5000.0	-20.6	Peak
2707.16	H	185.00	1.92	46.80	-1.4	185.6	500.0	-8.6	Average
3609.65	H	185.00	1.87	56.90	-0.1	692.3	5000.0	-17.2	Peak
3609.65	H	185.00	1.87	48.90	-0.1	275.6	500.0	-5.2	Average
4512.17	H	190.00	1.92	50.60	1.7	411.9	5000.0	-21.7	Peak
4512.17	H	190.00	1.92	42.60	1.7	164.0	500.0	-9.7	Average

Table 11: Radiated Emission Test Data, Mesh Mode Mid Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2745.00	V	160.00	1.87	51.30	-1.5	310.3	5000.0	-24.1	Peak
2745.00	V	160.00	1.87	43.30	-1.5	123.5	500.0	-12.1	Average
3660.00	V	170.00	1.81	55.70	0.1	619.3	5000.0	-18.1	Peak
3660.00	V	170.00	1.81	47.70	0.1	246.6	500.0	-6.1	Average
4575.00	V	160.00	1.74	48.35	1.9	323.7	5000.0	-23.8	Peak
4575.00	V	160.00	1.74	40.35	1.9	128.9	500.0	-11.8	Average
2745.00	H	155.00	1.91	54.40	-1.5	443.3	5000.0	-21.0	Peak
2745.00	H	155.00	1.91	46.40	-1.5	176.5	500.0	-9.0	Average
3660.00	H	125.00	1.92	55.64	0.1	615.1	5000.0	-18.2	Peak
3660.00	H	125.00	1.92	47.64	0.1	244.9	500.0	-6.2	Average
4575.00	H	150.00	1.95	47.93	1.9	308.5	5000.0	-24.2	Peak
4575.00	H	150.00	1.95	39.93	1.9	122.8	500.0	-12.2	Average

Table 12: Radiated Emission Test Data, Mesh Mode High Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.00	V	180.00	2.06	57.00	-1.5	595.8	5000.0	-18.5	Peak
2781.00	V	180.00	2.06	49.00	-1.5	237.2	500.0	-6.5	Average
3708.00	V	225.00	1.96	47.80	0.4	255.9	5000.0	-25.8	Peak
3708.00	V	225.00	1.96	39.80	0.4	101.9	500.0	-13.8	Average
4635.00	V	250.00	1.97	52.60	2.2	550.4	5000.0	-19.2	Peak
4635.00	V	250.00	1.97	44.60	2.2	219.1	500.0	-7.2	Average
2781.00	H	170.00	2.03	59.20	-1.5	767.6	5000.0	-16.3	Peak
2781.00	H	170.00	2.03	51.20	-1.5	305.6	500.0	-4.3	Average
3708.00	H	170.00	2.00	47.30	0.4	241.6	5000.0	-26.3	Peak
3708.00	H	170.00	2.00	39.30	0.4	96.2	500.0	-14.3	Average
4635.00	H	125.00	1.94	55.00	2.2	725.6	5000.0	-16.8	Peak
4635.00	H	125.00	1.94	47.00	2.2	288.9	500.0	-4.8	Average

Table 13: Radiated Emission Test Data, Fence Mode Low Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2707.16	V	45.00	1.60	57.33	-1.4	623.7	5000.0	-18.1	Peak
2707.16	V	45.00	1.60	40.33	-1.4	88.1	500.0	-15.1	Average
3609.65	V	45.00	1.90	58.67	-0.1	848.8	5000.0	-15.4	Peak
3609.65	V	45.00	1.90	41.67	-0.1	119.9	500.0	-12.4	Average
4512.17	V	0.00	1.93	54.67	1.7	658.0	5000.0	-17.6	Peak
4512.17	V	0.00	1.93	37.67	1.7	93.0	500.0	-14.6	Average
2707.09	H	155.00	2.72	62.00	-1.4	1067.8	5000.0	-13.4	Peak
2707.09	H	155.00	2.72	45.00	-1.4	150.8	500.0	-10.4	Average
3609.69	H	35.00	3.13	62.00	-0.1	1245.4	5000.0	-12.1	Peak
3609.69	H	35.00	3.13	45.00	-0.1	175.9	500.0	-9.1	Average
4512.11	H	0.00	3.07	53.50	1.7	575.1	5000.0	-18.8	Peak
4512.17	H	0.00	3.07	36.50	1.7	81.2	500.0	-15.8	Average

Table 14: Radiated Emission Test Data, Fence Mode Mid Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2745.00	V	125.00	1.70	50.56	-1.5	284.9	5000.0	-24.9	Peak
2745.00	V	125.00	1.70	32.96	-1.5	37.6	500.0	-22.5	Average
3660.00	V	185.00	1.61	56.86	0.1	707.8	5000.0	-17.0	Peak
3660.00	V	185.00	1.61	39.26	0.1	93.3	500.0	-14.6	Average
4575.00	V	160.00	1.55	49.30	1.9	361.2	5000.0	-22.8	Peak
4575.00	V	160.00	1.55	31.70	1.9	47.6	500.0	-20.4	Average
2744.73	H	0.00	2.07	52.87	-1.5	371.8	5000.0	-22.6	Peak
2744.73	H	0.00	2.07	35.27	-1.5	49.0	500.0	-20.2	Average
3660.00	H	5.00	2.05	52.80	0.1	443.5	5000.0	-21.0	Peak
3660.00	H	5.00	2.05	35.20	0.1	58.5	500.0	-18.6	Average
4575.00	H	5.00	1.96	47.50	1.9	293.6	5000.0	-24.6	Peak
4575.00	H	5.00	1.96	29.90	1.9	38.7	500.0	-22.2	Average

Table 15: Radiated Emission Test Data, Fence Mode High Channel (>1GHz)

(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.00	V	195.00	1.96	52.10	-1.5	338.9	5000.0	-23.4	Peak
2781.00	V	195.00	1.96	34.50	-1.5	44.7	500.0	-21.0	Average
3708.00	V	200.00	2.03	53.20	0.4	476.6	5000.0	-20.4	Peak
3708.00	V	200.00	2.03	35.60	0.4	62.8	500.0	-18.0	Average
4635.00	V	180.00	1.90	49.20	2.2	372.1	5000.0	-22.6	Peak
4635.00	V	180.00	1.90	31.60	2.2	49.1	500.0	-20.2	Average
2781.00	H	175.00	2.00	56.10	-1.5	537.2	5000.0	-19.4	Peak
2781.00	H	175.00	2.00	38.50	-1.5	70.8	500.0	-17.0	Average
3708.00	H	160.00	1.94	59.80	0.4	1018.9	5000.0	-13.8	Peak
3708.00	H	160.00	1.94	42.20	0.4	134.3	500.0	-11.4	Average
4635.00	H	125.00	1.94	48.70	2.2	351.3	5000.0	-23.1	Peak
4635.00	H	125.00	1.94	31.10	2.2	46.3	500.0	-20.7	Average

Table 16: Radiated Emission Test Data, Receive Only Mode

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Detector
40.17	V	270.00	1.00	6.90	13.4	10.4	100.0	-19.7	Peak
46.82	V	270.00	1.00	13.30	9.7	14.2	100.0	-17.0	Peak
67.72	V	270.00	1.00	17.30	9.5	22.0	100.0	-13.2	Peak
118.05	V	180.00	1.00	7.30	15.8	14.3	150.0	-20.4	Peak
201.49	V	180.00	1.00	15.20	14.7	31.2	150.0	-13.6	Peak
249.10	V	270.00	1.00	10.50	14.6	18.0	200.0	-20.9	Peak
40.17	H	0.00	4.00	3.90	13.4	7.4	100.0	-22.7	Peak
46.82	H	0.00	4.00	3.80	9.7	4.8	100.0	-26.5	Peak
67.72	H	0.00	4.00	5.40	9.5	5.6	100.0	-25.1	Peak
109.37	H	180.00	4.00	11.40	14.5	19.7	150.0	-17.6	Peak
204.48	H	180.00	4.00	6.60	14.7	11.6	150.0	-22.2	Peak
249.10	H	0.00	4.00	2.90	14.6	7.5	200.0	-28.5	Peak