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FCC & Industry Canada Certification Test Report

For the

SIMPLE MATTERS

ditto

FCC ID: 2AB7P-0001

IC ID: 11900A-0001

WLL JOB# **13580-01 Rev 0**
August 25, 2014

Prepared for:

SIMPLE MATTERS
3050-C AIRPORT AVE.
SANTA MONICA, CA, 90405

Prepared By:

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

ACLASS ACCREDITED TESTING

Testing Certificate AT-1448

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Prepared by:

James Ritter
EMC Compliance Engineer

Reviewed by:

Steven D. Koster
Vice President

Abstract

This report has been prepared on behalf of Simple Matters to support the attached Application for Equipment Authorization. The test report and application are submitted for a Digital Transmission System (DTS) Transmitter under Part 15.247 (10/2013) of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-210 issue 8 of Industry Canada. This Certification Test Report documents the test configuration and test results for the Simple Matters ditto.

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

The Simple Matters ditto complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 and Industry Canada RSS-210.

Revision History	Description of Change	Date
Rev 0	Initial Release	August 25, 2014

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1 Introduction

1.1 Compliance Statement

The Simple Matters ditto complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 (10/2013) and Industry Canada RSS-210 issue 8 December 2010.

1.2 Test Scope

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance with "558074 D01 DTS Meas Guidance v03r02" June 2014. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer:	TEM Consulting LP 140 River Road Georgetown, TX, 78628
On Behalf of:	Simple Matters 3050-C Airport Ave. Santa Monica, CA, 90405
Quotation Number:	68261

1.4 Test Dates

Testing was performed on the following date(s):	8/19/2014 to 8/22/2014

1.5 Test and Support Personnel

Washington Laboratories, LTD	James Ritter
Customer Representative	Stephen Berger

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 Simple Matters ditto a remote alert device designed to be used with an iPhone. It connects to the iPhone through Bluetooth LE and vibrates when a call comes in or an alarm goes off.

Table 1: Device Summary

ITEM	DESCRIPTION
Manufacturer:	Simple Matters
FCC ID:	2AB7P-0001
IC:	11900A-0001
Model:	ditto
FCC Rule Parts:	§15.247
Industry Canada:	RSS210
Frequency Range:	2402-2480MHz
Maximum Output Power:	2.14mW (3.3dBm)
Modulation:	GFSK
Occupied Bandwidth:	740kHz
Keying:	Automatic, Manual
Type of Information:	Data
Number of Channels:	40 total channels, 3 Advertising Channels, 37 Data Channels
Power Output Level	Fixed
Antenna Connector	N/A - antenna is part of the PCB
Antenna Type	PCB inverted ‘F’, 3.32 dBi gain
Interface Cables:	None
Power Source & Voltage:	3VDC from CR1632 battery
Emission Designator	740KFXD
Highest TX spurious Emission	78.8dBuV/m @ 4884MHz @ 3m
Highest RX Spurious Emission	7.3dBuV/m @ 40MHz@3m

2.2 Test Configuration

The device was preprogrammed to transmit a one of 3 frequencies (2402, 2442, & 2480MHz). 6 total units were provided (one for radiated testing with antenna and one with a wired connect for conducted tests at each of the3 frequencies above. The EUT started transmitting as soon as 3V was provided to the units; the radiated test units received 3 V from the EUT replaceable battery while the conducted units were powered from a lab 3VDC power supply. All units were tested in a stand-alone configuration.

2.3 Testing Algorithm

The ditto was pre -programmed for DTS operation by the manufacturer. Three units were provided one with each of the required test frequencies.

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

558074 DTS Measurement Guidance v03r01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247"

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(R2012) 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

Parameter	Uncertainty	Actual (+/-)	Unit
Radio Frequency	±1 x 10^{-7}	8.64E-08	parts
RF Power conducted (up to 160 W)	±0.75 dB	0.3	dB
Conducted RF Power variations using a test fixture	±0.75 dB	0.3	dB
Transmitter transient frequency (frequency difference)	±250 Hz	160.7	Hz
Transmitter transient time	±20 %	9.2	%

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: **Conducted Antenna Tests**			Test Date: **08/20/2014**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
528	AGILENT - E4446A	ANALYZER SPECTRUM	4/23/2016
728	AGILENT - 8564EC	SPECTRUM ANALYZER 30HZ - 40GHZ	8/30/2014

Test Name: **Radiated Emissions**			Test Date: **08/22/2014**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
4	ARA - DRG-118/A	ANTENNA DRG 1-18GHZ	2/20/2015
528	AGILENT - E4446A	ANALYZER SPECTRUM	4/23/2016
66	B&Z - BZ-01002650-401545-282525	PRE-AMPLIFIER RF. 1-26.5GHZ	10/2/2014
69	HP - 85650A	ADAPTER QP	1/9/2015
802	HP - 8568B	SPECTRUM ANALYZER	1/9/2015
71	HP - 85685A	PRESELECTOR RF	1/9/2015
644	SUNOL SCIENCES CORPORATION - JB1 925-833-9936	BICONALOG ANTENNA	1/17/2016
209	NARDA - V637	HORN STANDARD GAIN	CNR
210	NARDA - V638	HORN STANDARD GAIN	CNR
453	AH SYSTEMS - PAM1840	PRE-AMPLIFIER 18GHZ-40 GHZ	5/9/2015

4 Test Summary

The Table Below shows the results of testing for compliance with a Frequency Hopping System in accordance with FCC Part 15.247 10/2013 and RSS210 issue 8, 12/2010. Full results are shown in section 5.

Table 4: Test Summary Table

TX Test Summary (Digital Transmission System (DTS))			
FCC Rule Part	**IC Rule Part**	**Description**	**Result**
15.247 (2)	RSS-210 [A8. 2 (a)]	6dB Bandwidth	Pass
15.247 (2)(b)(3)	RSS-210 [A8.4 (4)]	Transmit Output Power	Pass
15.247 (e)	RSS-210 [A8.2 (b)]	Power Spectral Density	Pass
15.247 (d)	RSS-210 [A8. 5]	Occupied BW / Out-of-Band Emissions (Band Edge @ 20dB below)	Pass
15.205 15.209	RSS-210 Sect.2.2 RSS-Gen 7.2.2	General Field Strength Limits (Restricted Bands & RE Limits)	Pass
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	NA
RX/Digital Test Summary (Digital Transmission System (DTS))			
FCC Rule Part	**IC Rule Part**	**Description**	**Result**
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	NA
15.209	RSS-210 sect 2.5 RSS-Gen [4.1]	General Field Strength Limits	Pass

5 Test Results

5.1 Occupied (DTS) Bandwidth:

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

For Direct Sequence Spread Spectrum Systems, FCC Part 15.247 requires the minimum 6 dB bandwidth be at least 500 kHz.

5.1.1 Measurement Method:

558074 D01 DTS Measurement Guidance v03r02
Section 8.1 Option 1

Table 5: Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth
100kHz	300kHz

At full modulation, the occupied bandwidth was measured as shown in Figures 1-3.

Table 6 provides a summary of the Occupied Bandwidth Results.

Table 6: Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel: 2402MHz	681.80kHz	≥500kHz	Pass
Center Channel: 2442MHz	740.00kHz	≥500kHz	Pass
High Channel: 2480MHz	678.25kHz	≥500kHz	Pass

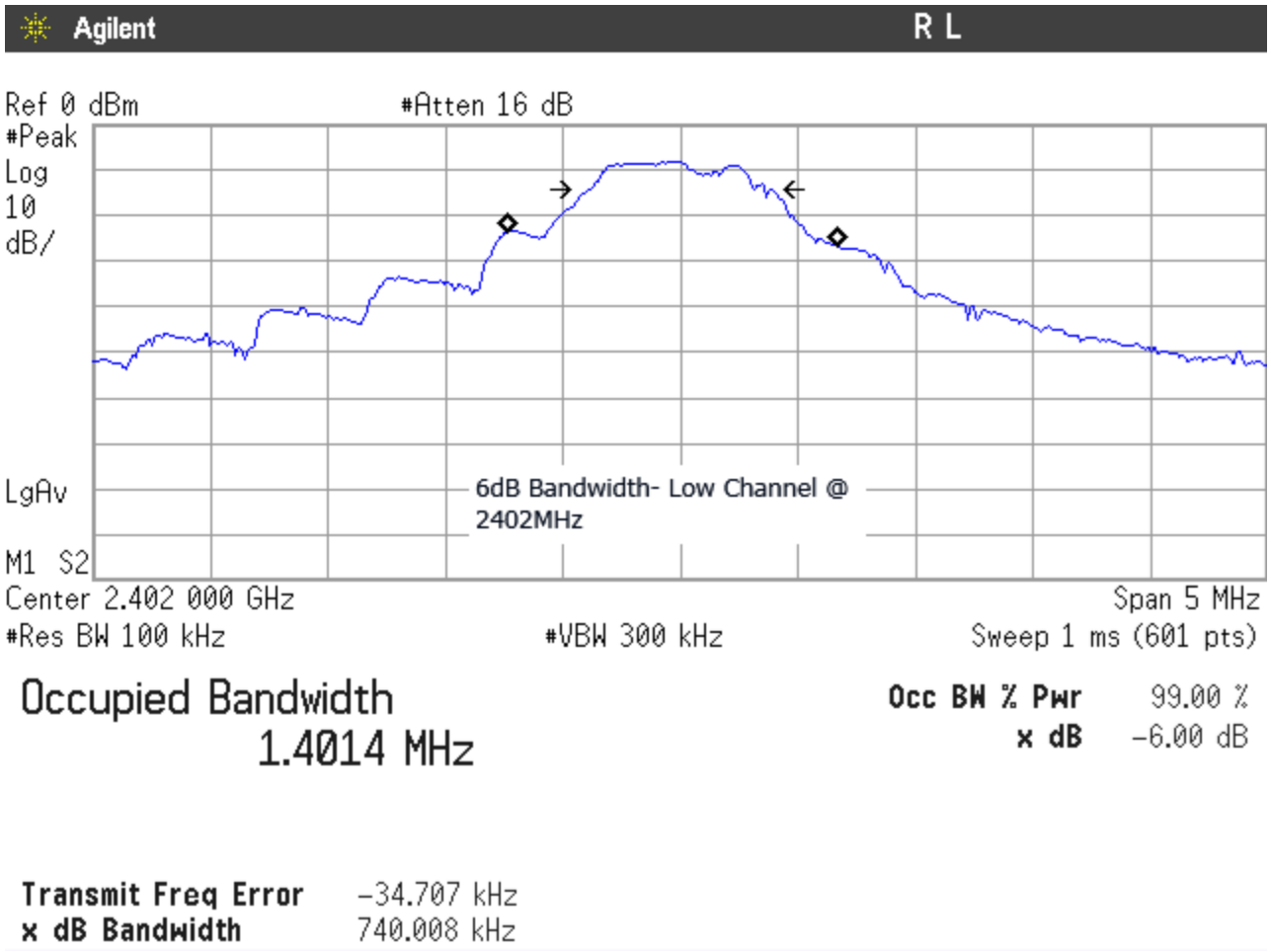

Figure 1: Occupied Bandwidth, Low Channel

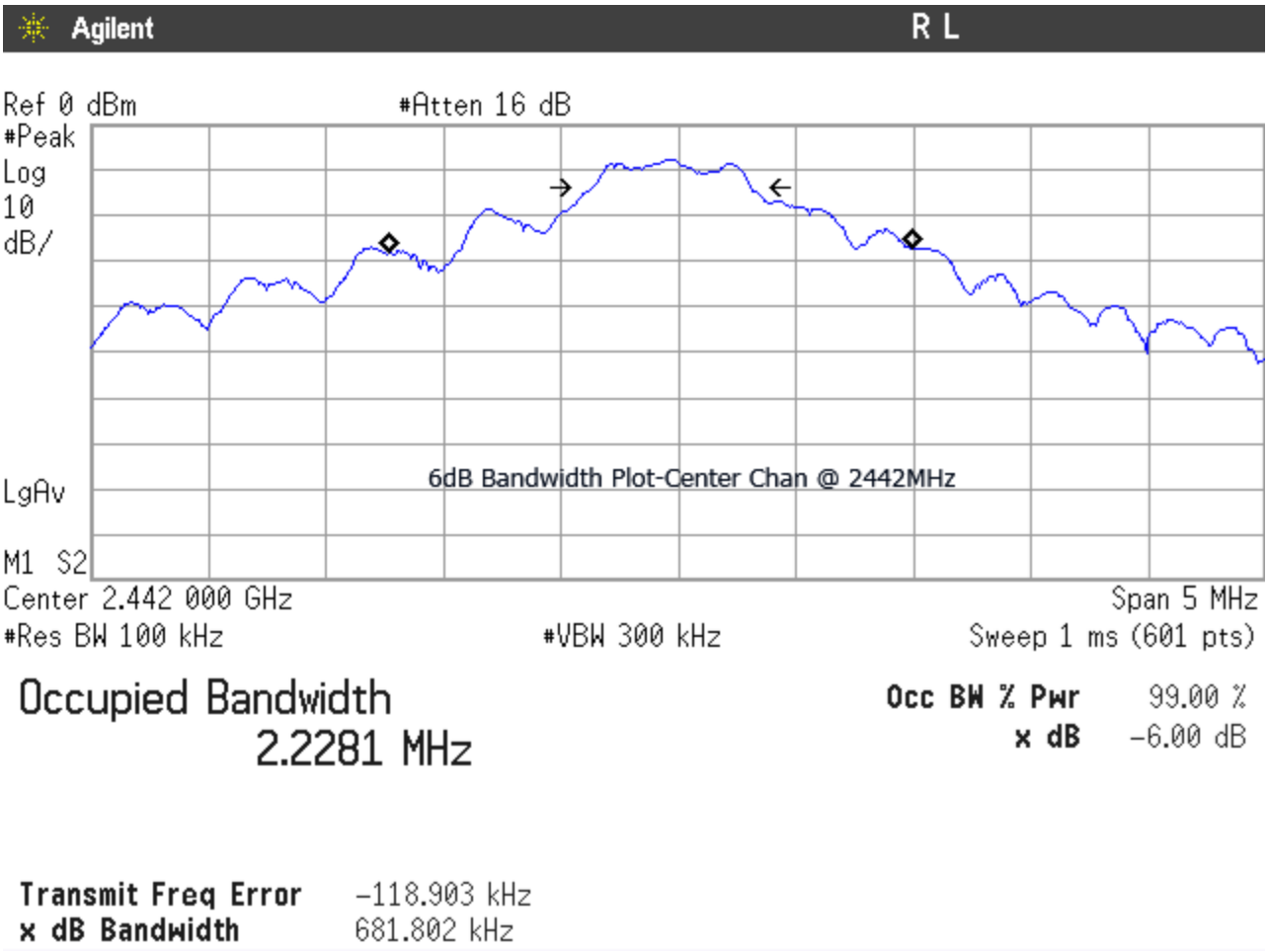

Figure 2: Occupied Bandwidth, Center Channel

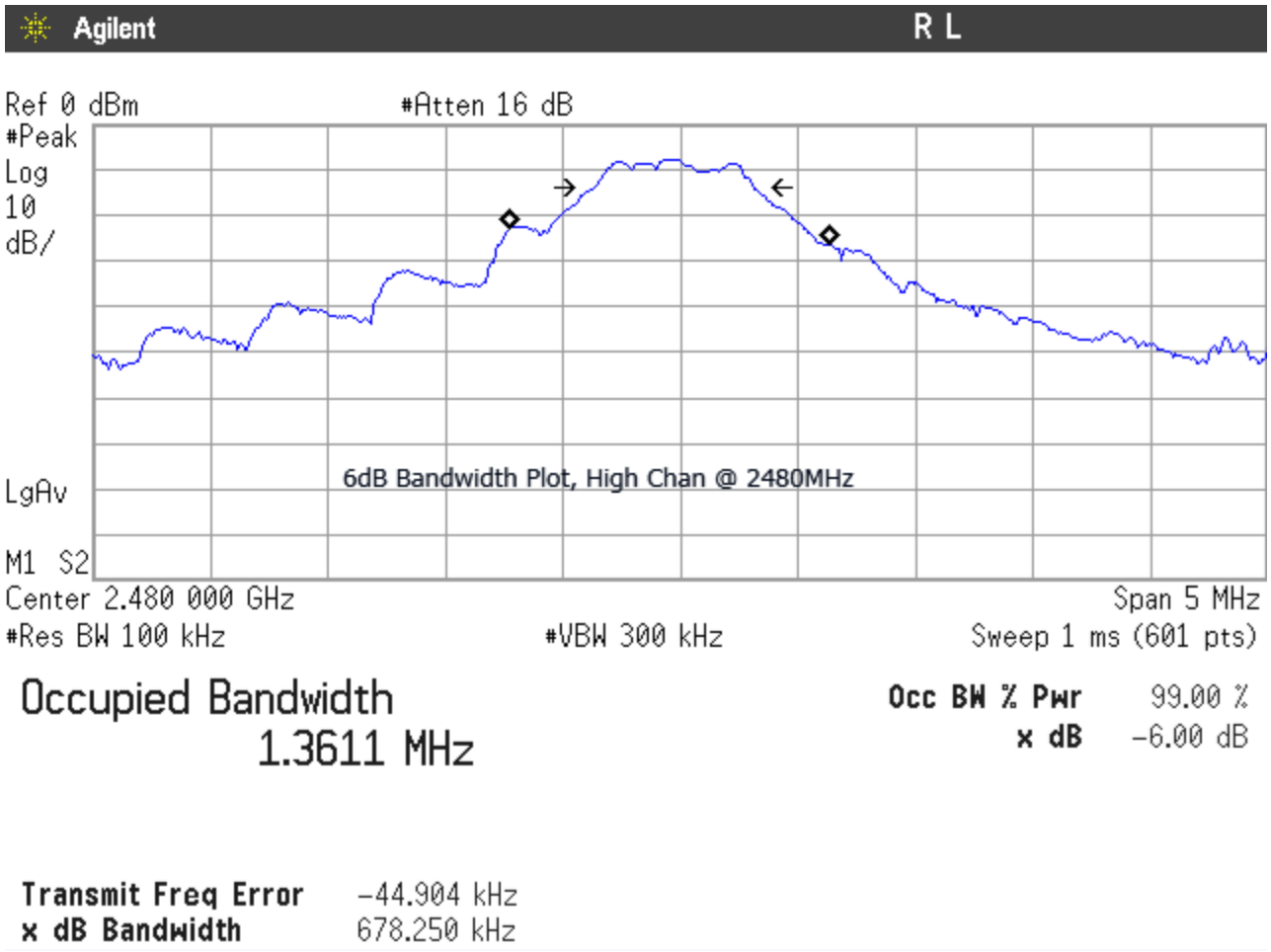

Figure 3: Occupied Bandwidth, High Channel

5.2 RF Power Output:

To measure the output power the unit was set to dwelled on the 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.

5.2.1 Measurement Method:

558074 D01 DTS Measurement Guidance v03r02

Section 9.1.1 RBW $\geq$ DTS Bandwidth

Table 7: Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth
1MHz	3MHz

Table 8: RF Power Output

Frequency	Level	Limit	Pass/Fail
Low Channel: 2402MHz	2.77 dBm	30 dBm	Pass
Center Channel: 2442MHz	3.02 dBm	30 dBm	Pass
High Channel: 2480MHz	3.30 dBm	30 dBm	Pass

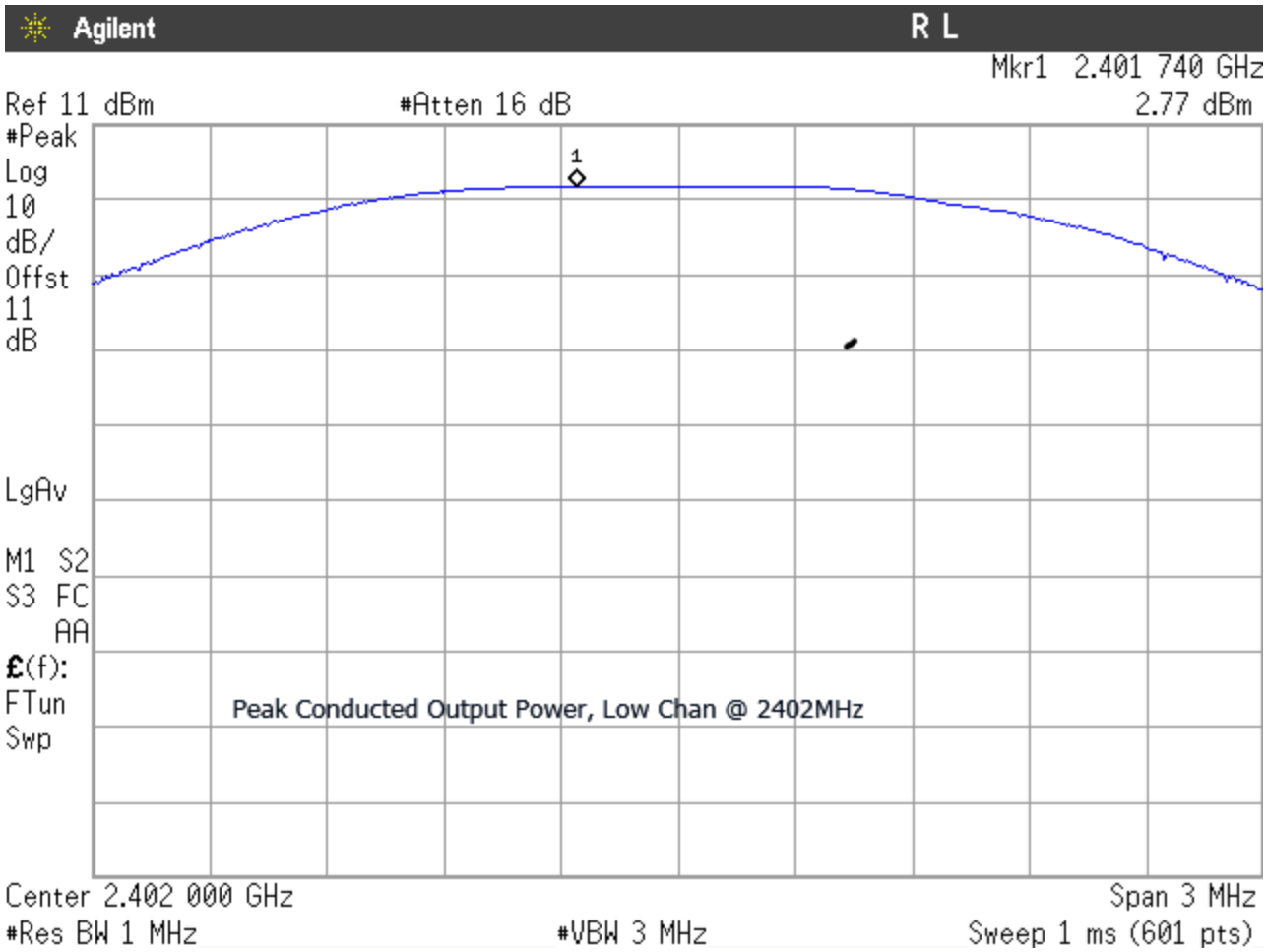

Figure 4: RF Peak Power, Low Channel

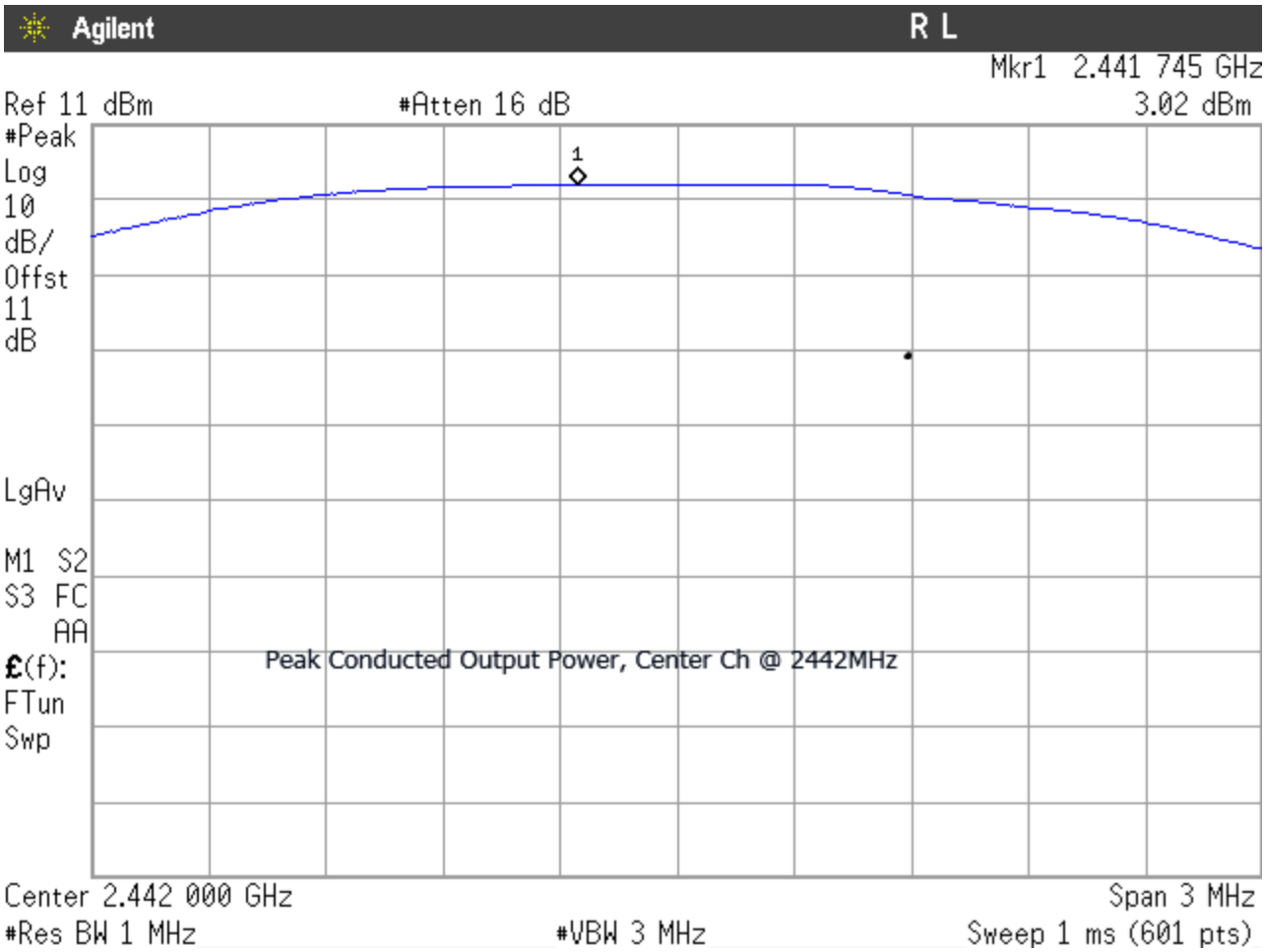

Figure 5: RF Peak Power, Center Channel

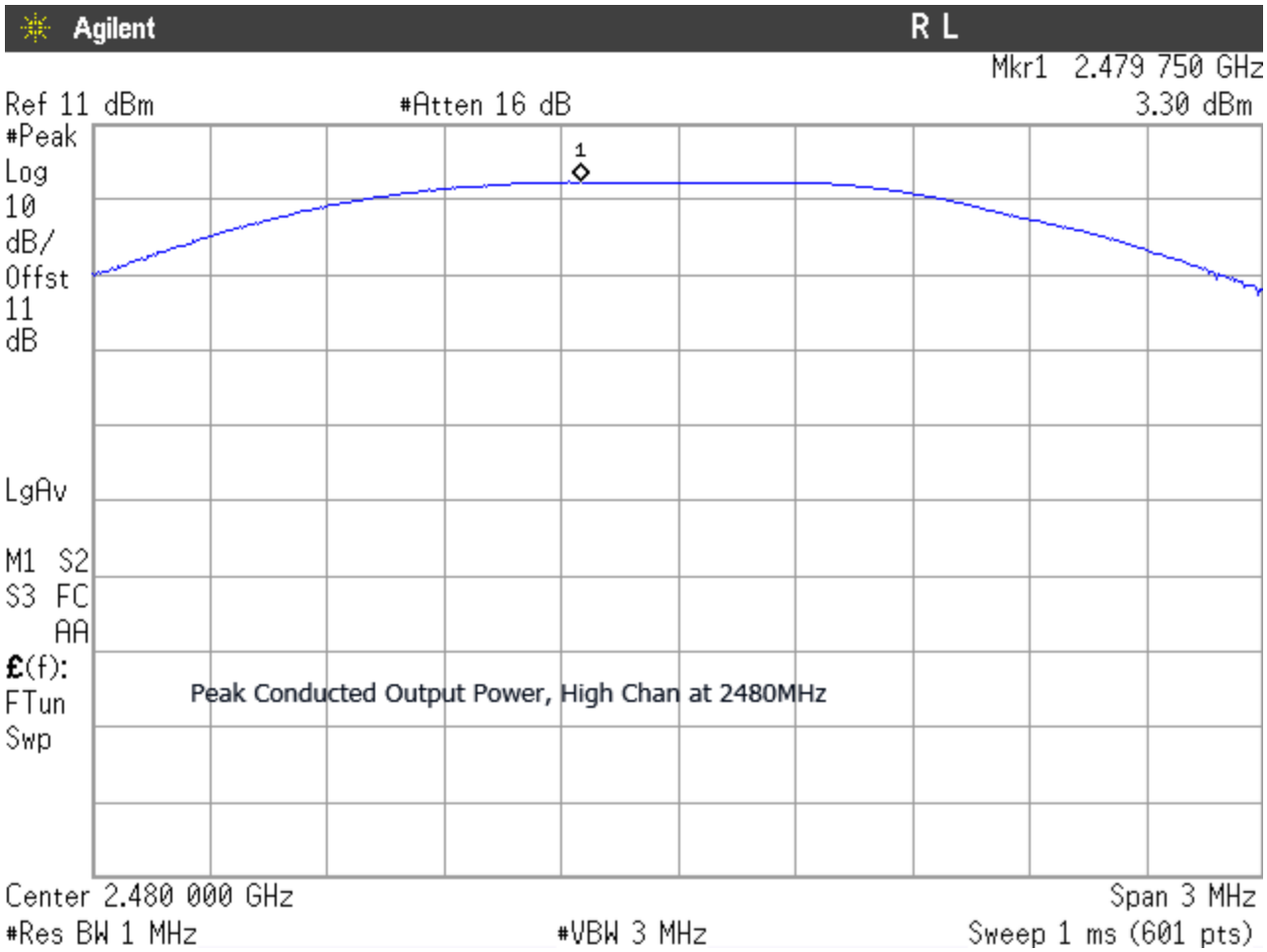

Figure 6: RF Peak Power, High Channel

5.3 Power Spectral Density

Measurements for power spectral density were taken in accordance with 15.247(e). The spectrum analyzer was set to peak detect mode with a RBW of 3kHz ,VBW of 10kHz across a 1.2MHz span using an auto sweep time.

5.3.1 Measurement Method:

558074 D01 DTS Measurement Guidance v03r02

Section 10.2 Peak PSD

The highest level detected across any 3 kHz band for continuous transmission was then recorded and compared to the limit 8dBm. The following table and plots give the results for power spectral density testing.

Table 9: Power Spectral Density

Frequency	Peak Level	Limit	Pass/Fail
Low Channel: 2402MHz	-9.69dBm	8 dBm	Pass
Center Channel: 2442MHz	-9.40dBm	8 dBm	Pass
High Channel: 2480MHz	-9.06dBm	8 dBm	Pass

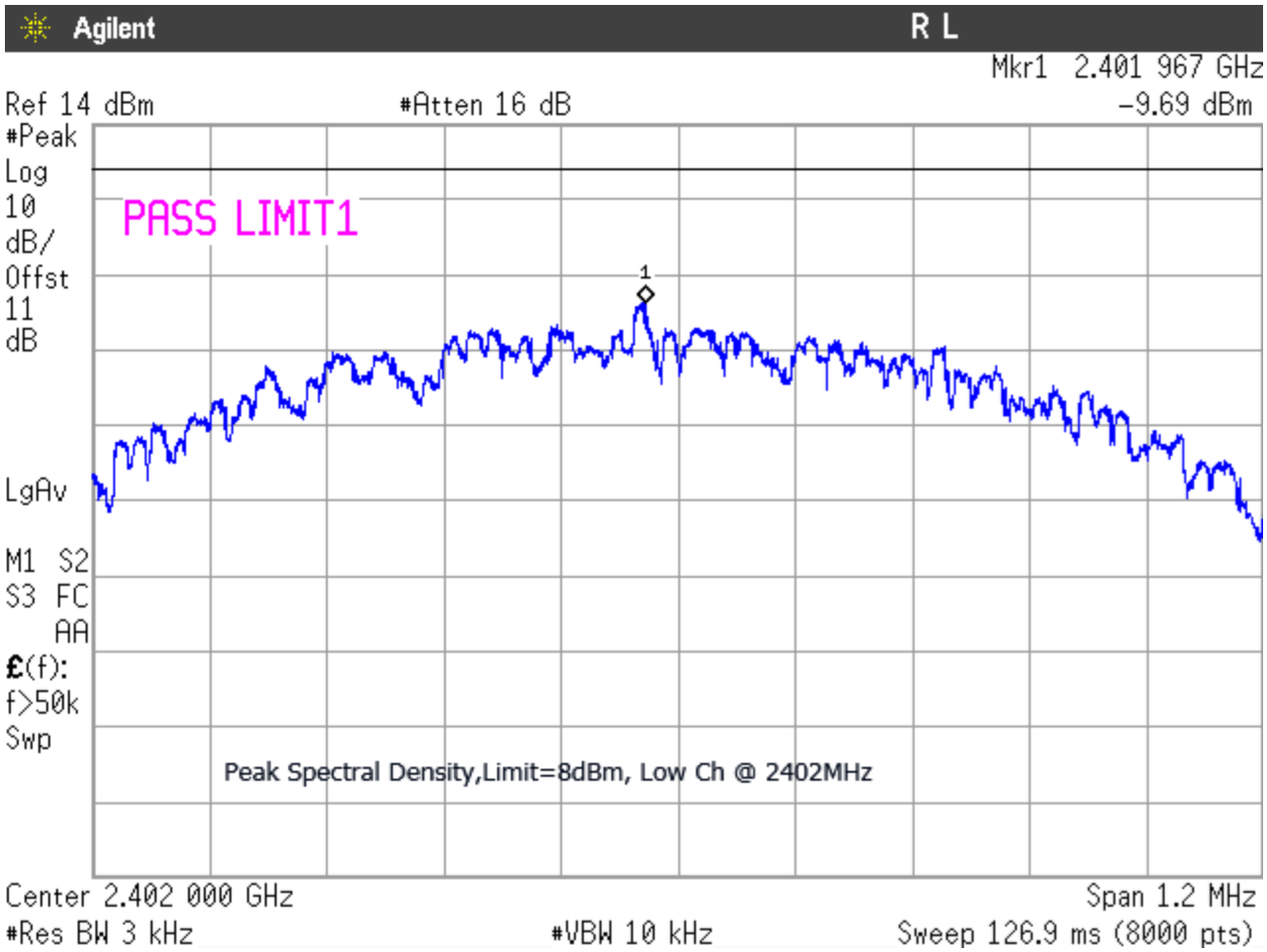

Figure 7: Power Spectral Density, Low Channel

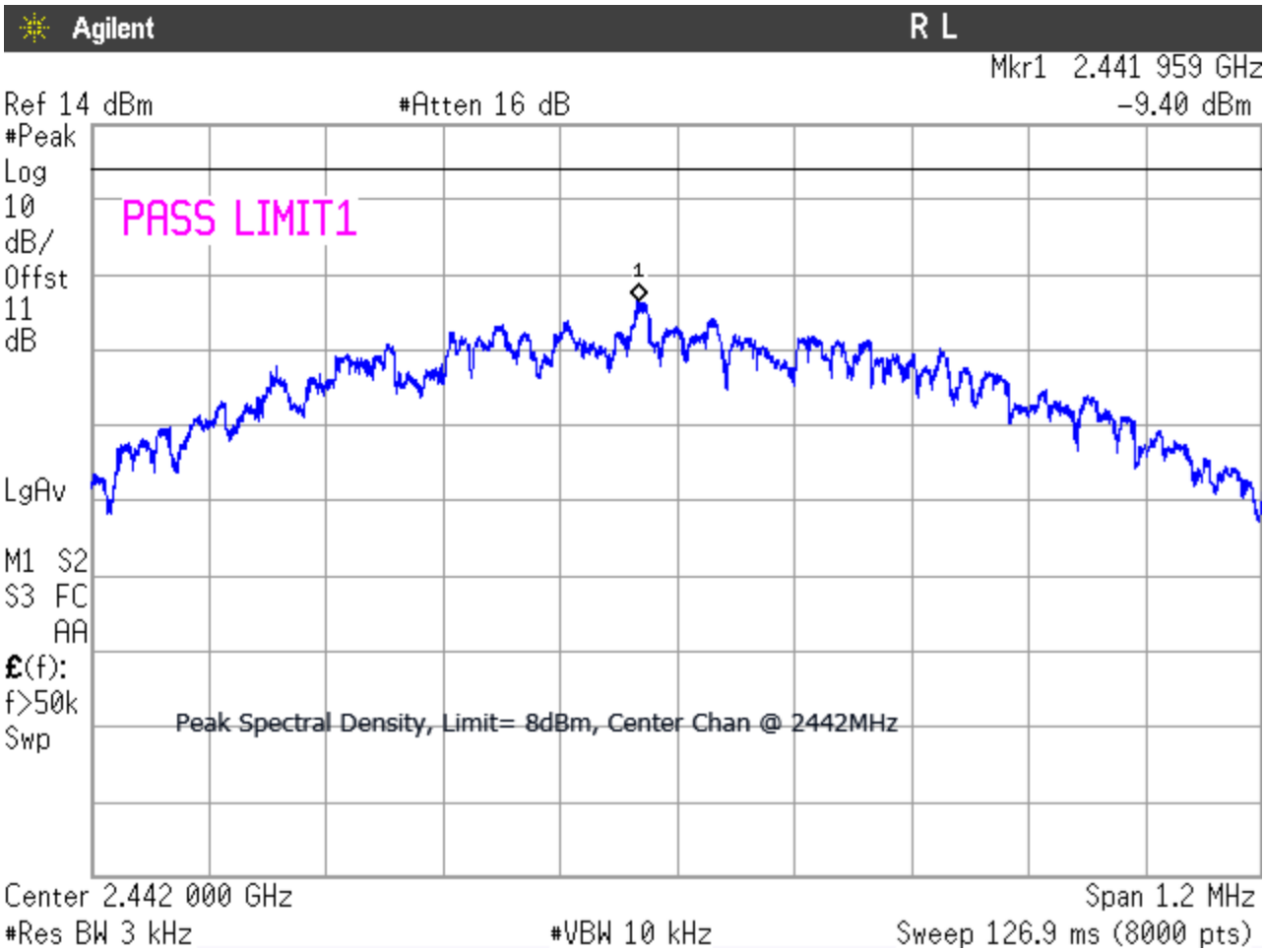

Figure 8: Power Spectral Density, Center Channel

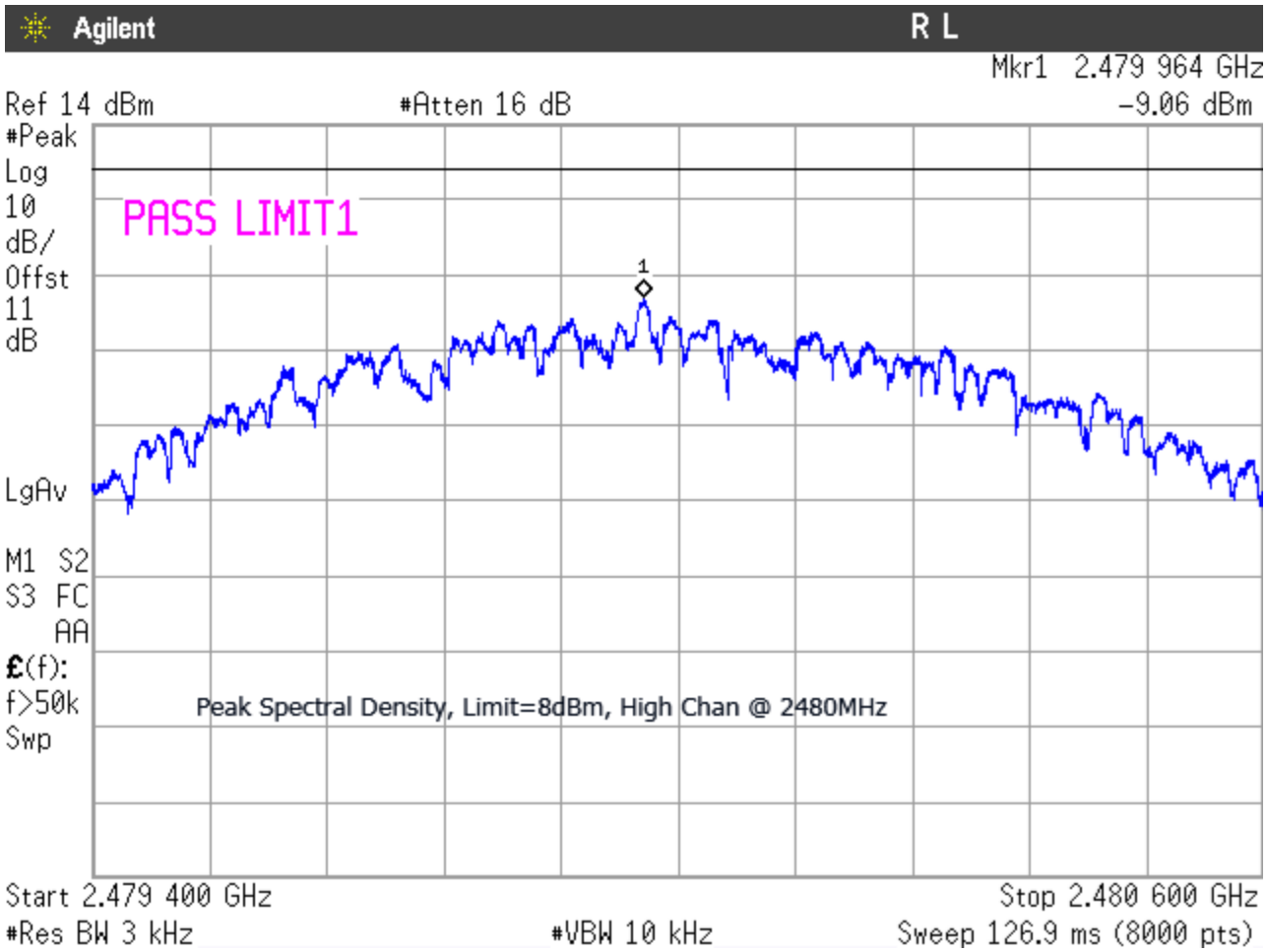

Figure 9: Power Spectral Density, High Channel

5.4 Conducted Spurious Emissions at Antenna Terminals

The EUT must comply with requirements for spurious emissions at antenna terminals. Per §15.247(d) 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.

Table 10: Conducted Spurious Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth
100kHz	1MHz

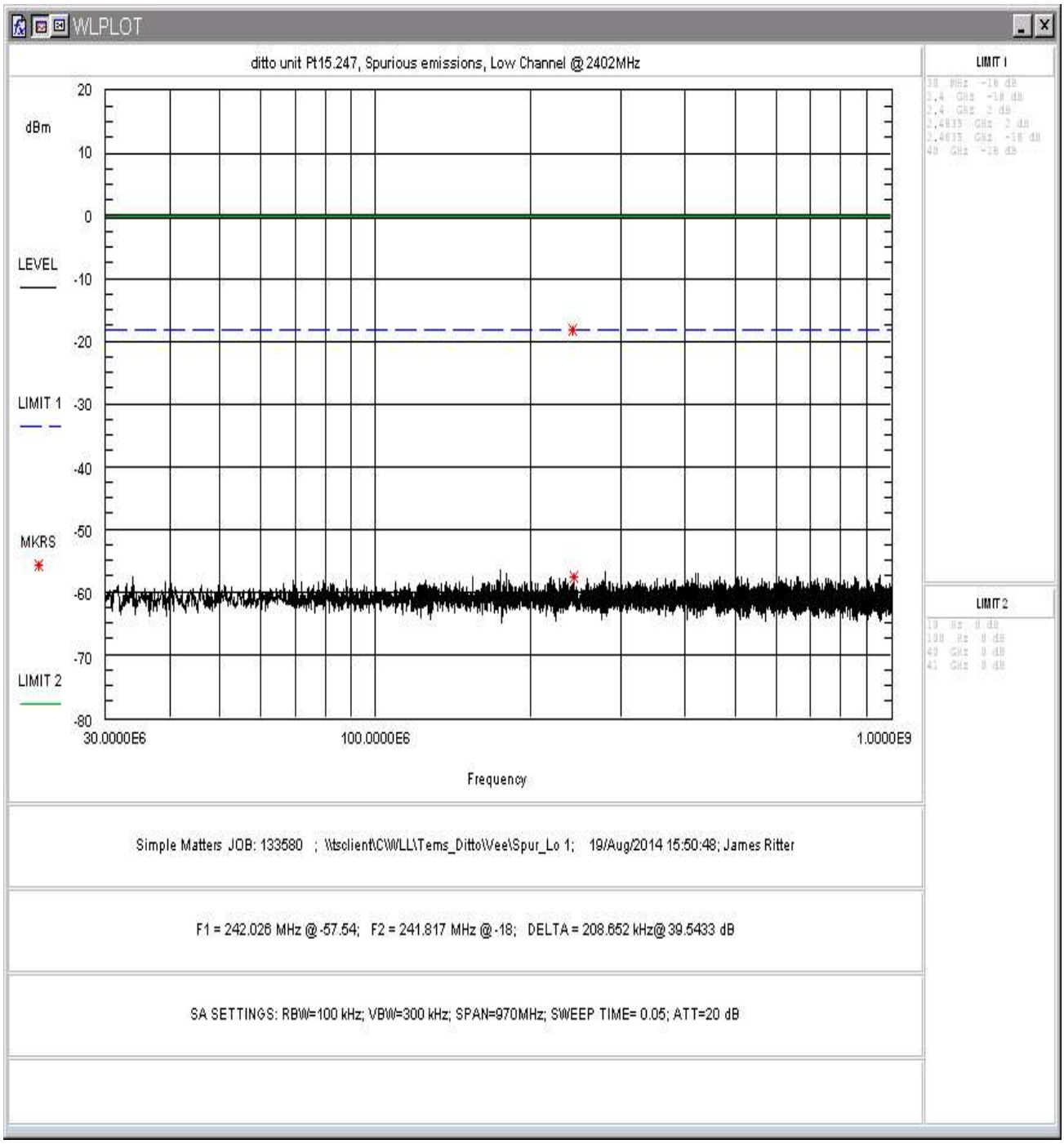

Figure 10: Conducted Spurious Emissions, Low Channel 30 - 1000MHz

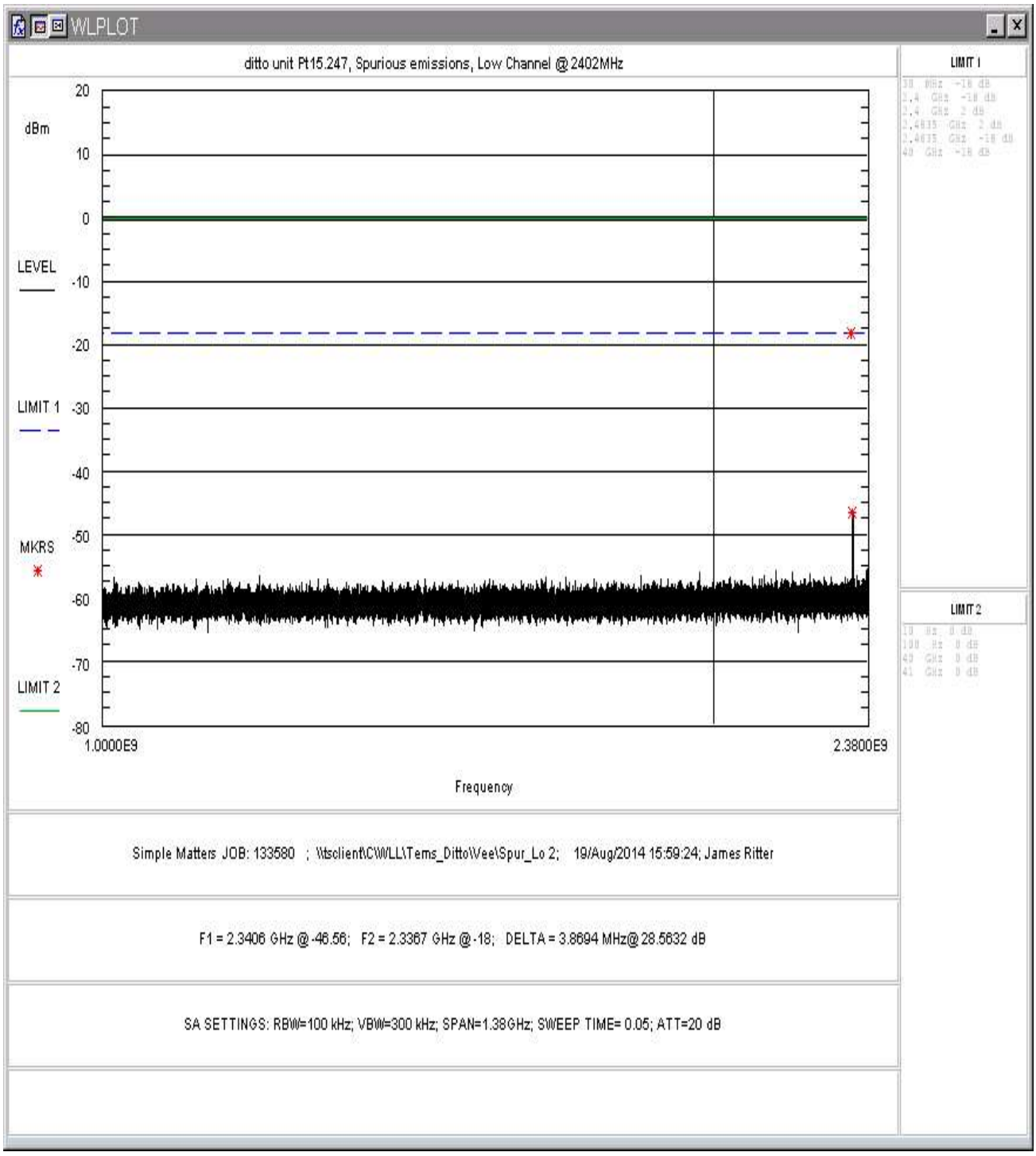

Figure 11: Conducted Spurious Emissions, Low Channel 1 – 2.38GHz

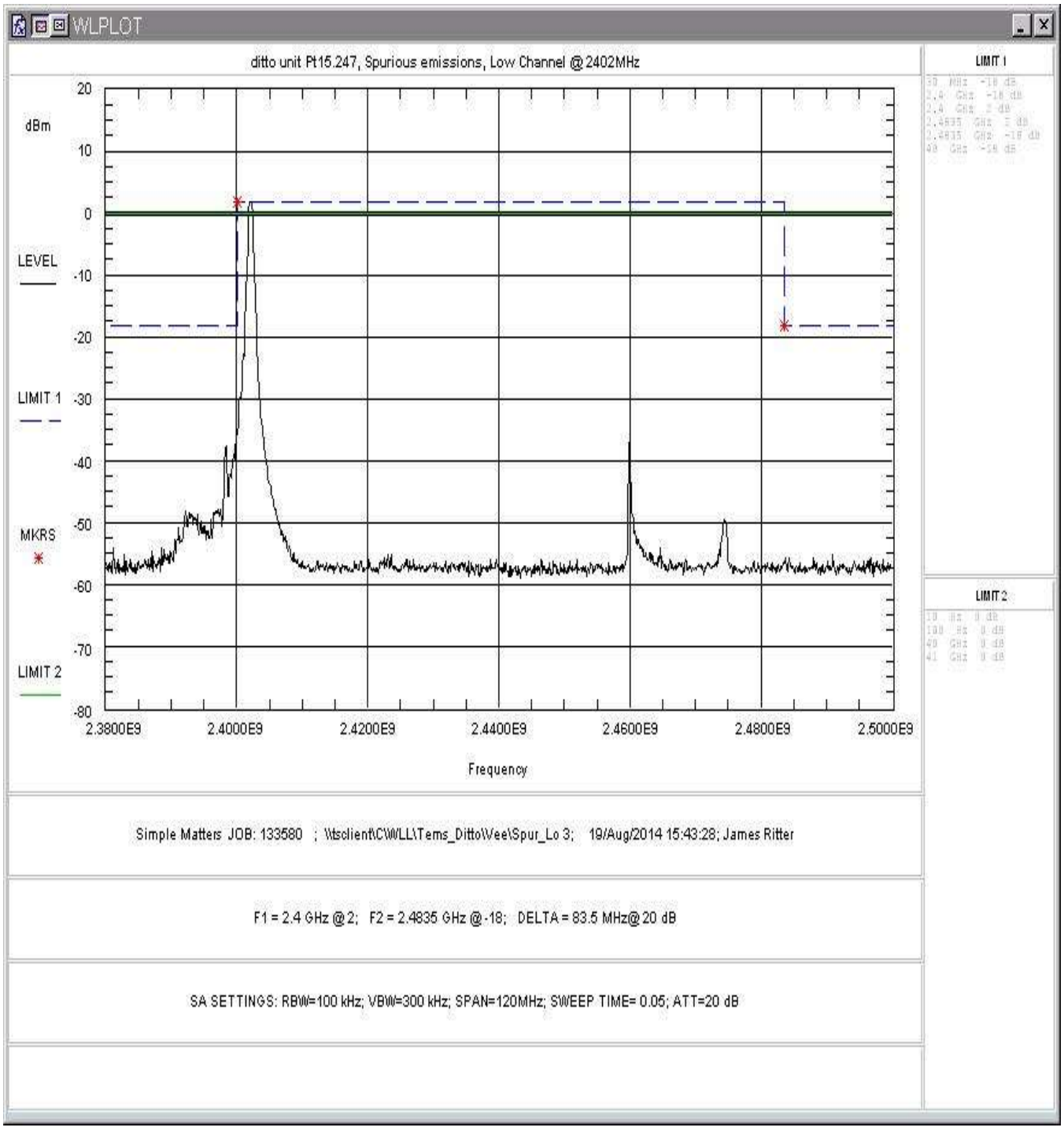

Figure 12: Conducted Spurious Emissions, Low Channel 2.38 – 2.5GHz

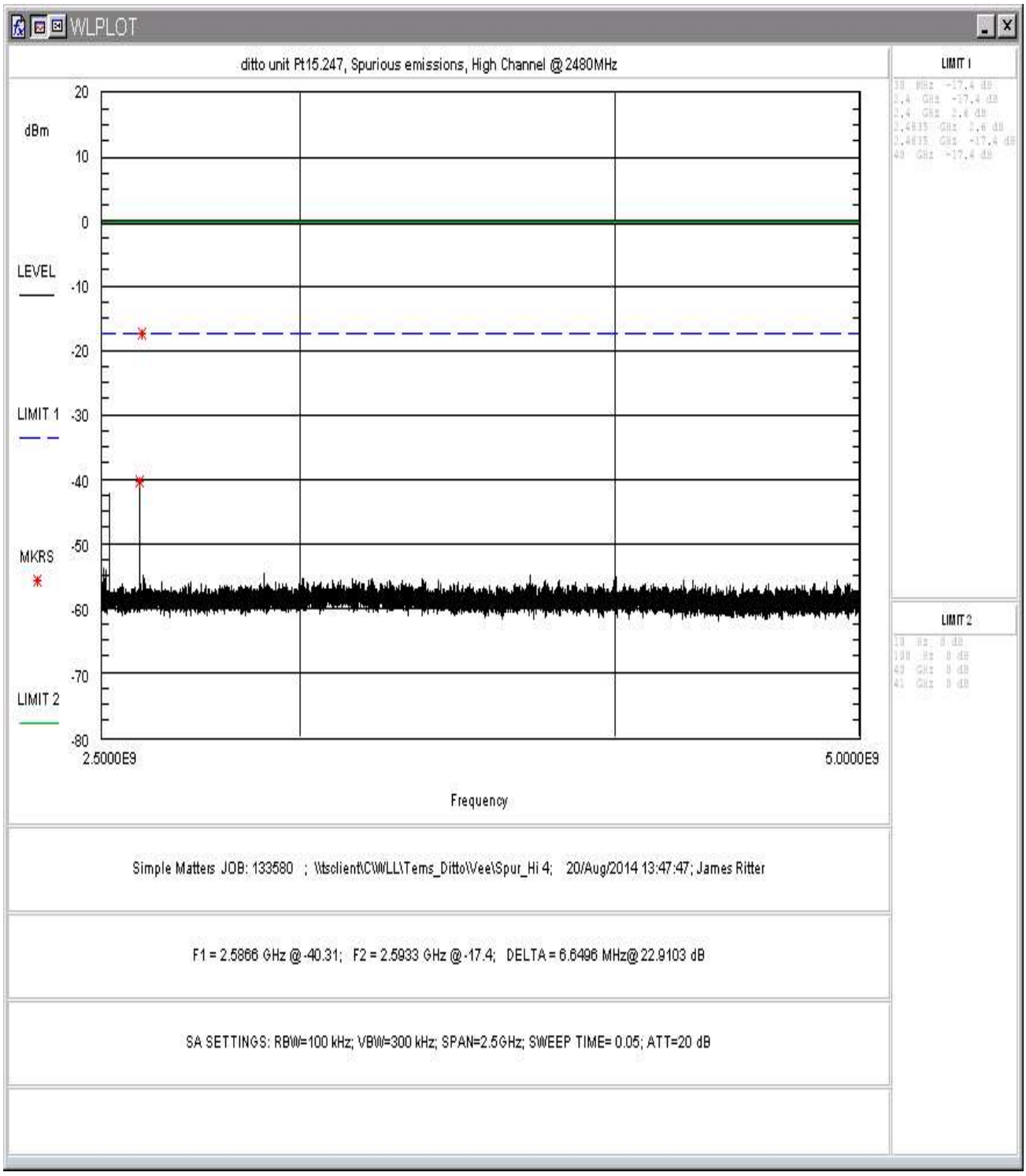

Figure 13: Conducted Spurious Emissions, Low Channel 2.5– 5GHz

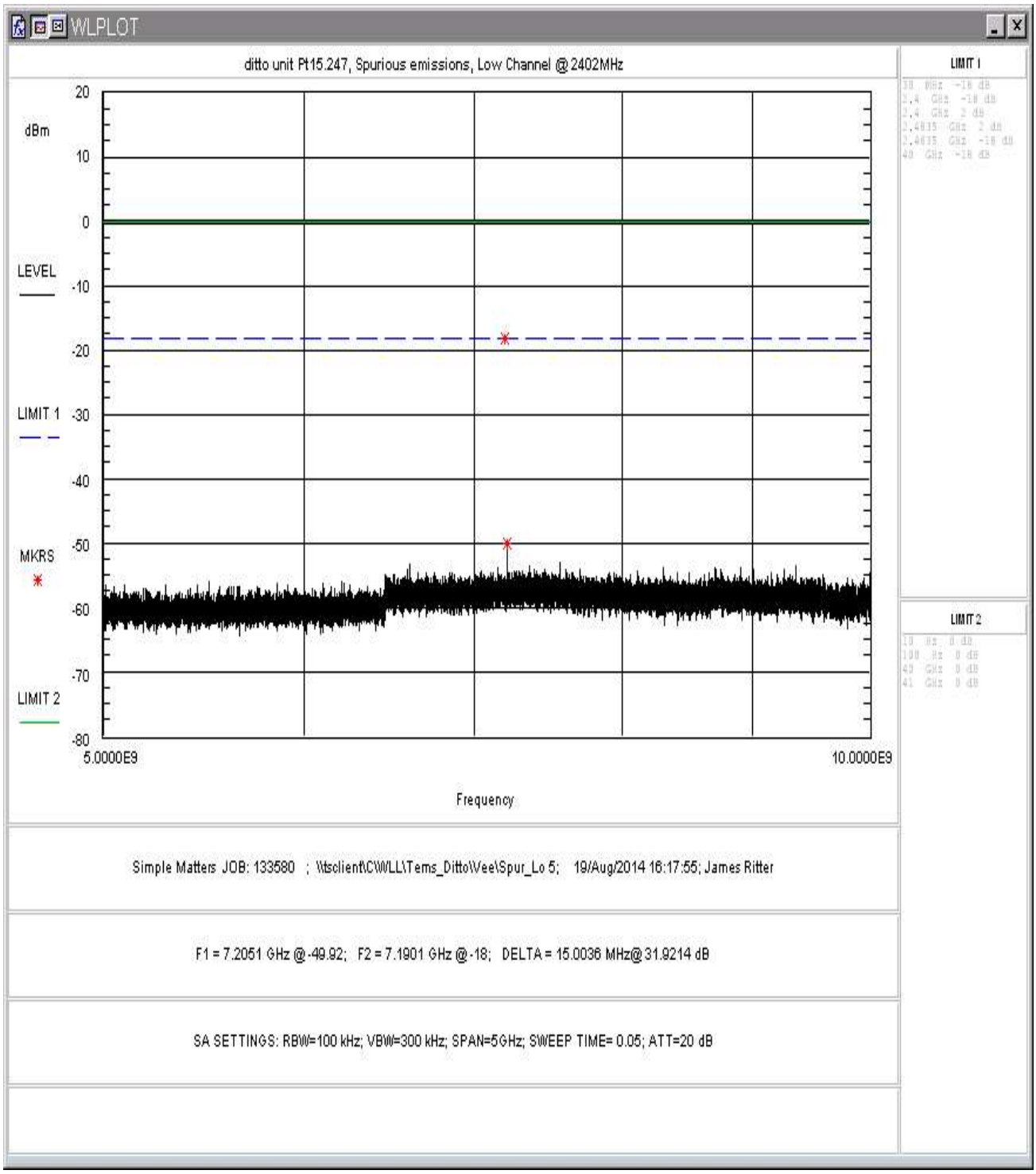

Figure 14: Conducted Spurious Emissions, Low Channel 5 - 10GHz

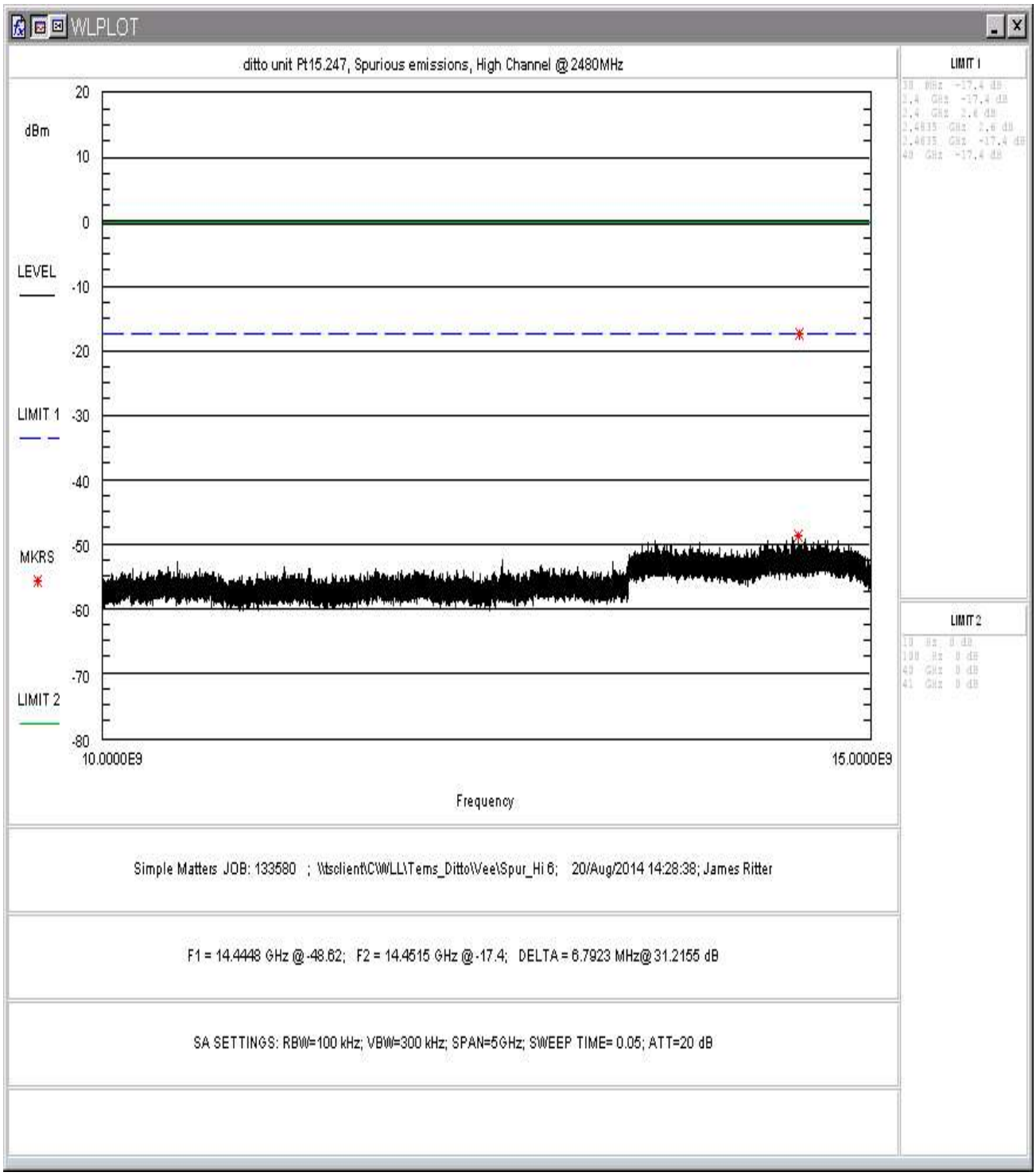

Figure 15: Conducted Spurious Emissions, Low Channel 10 - 15GHz

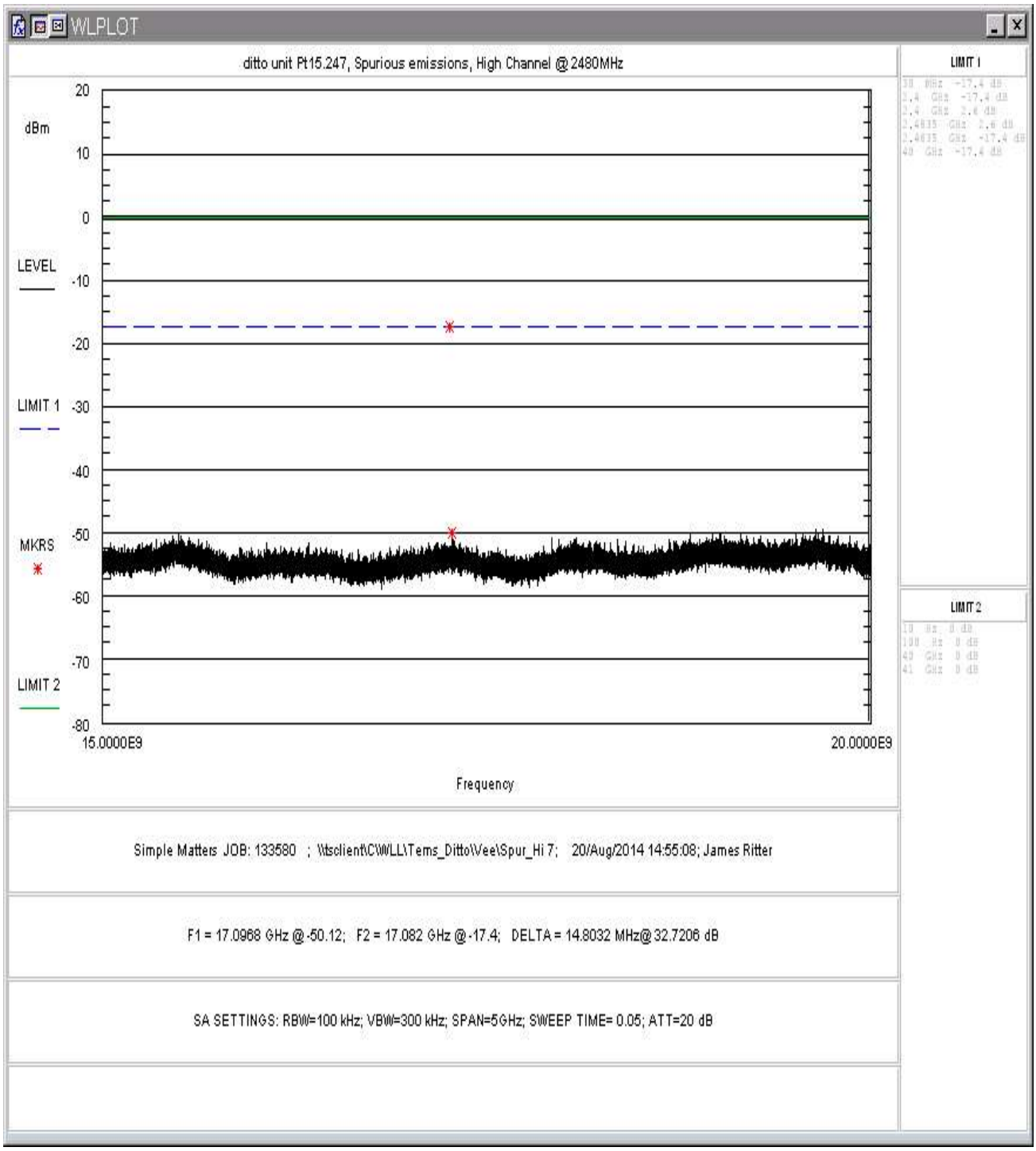

Figure 16: Conducted Spurious Emissions, Low Channel 15 - 20GHz

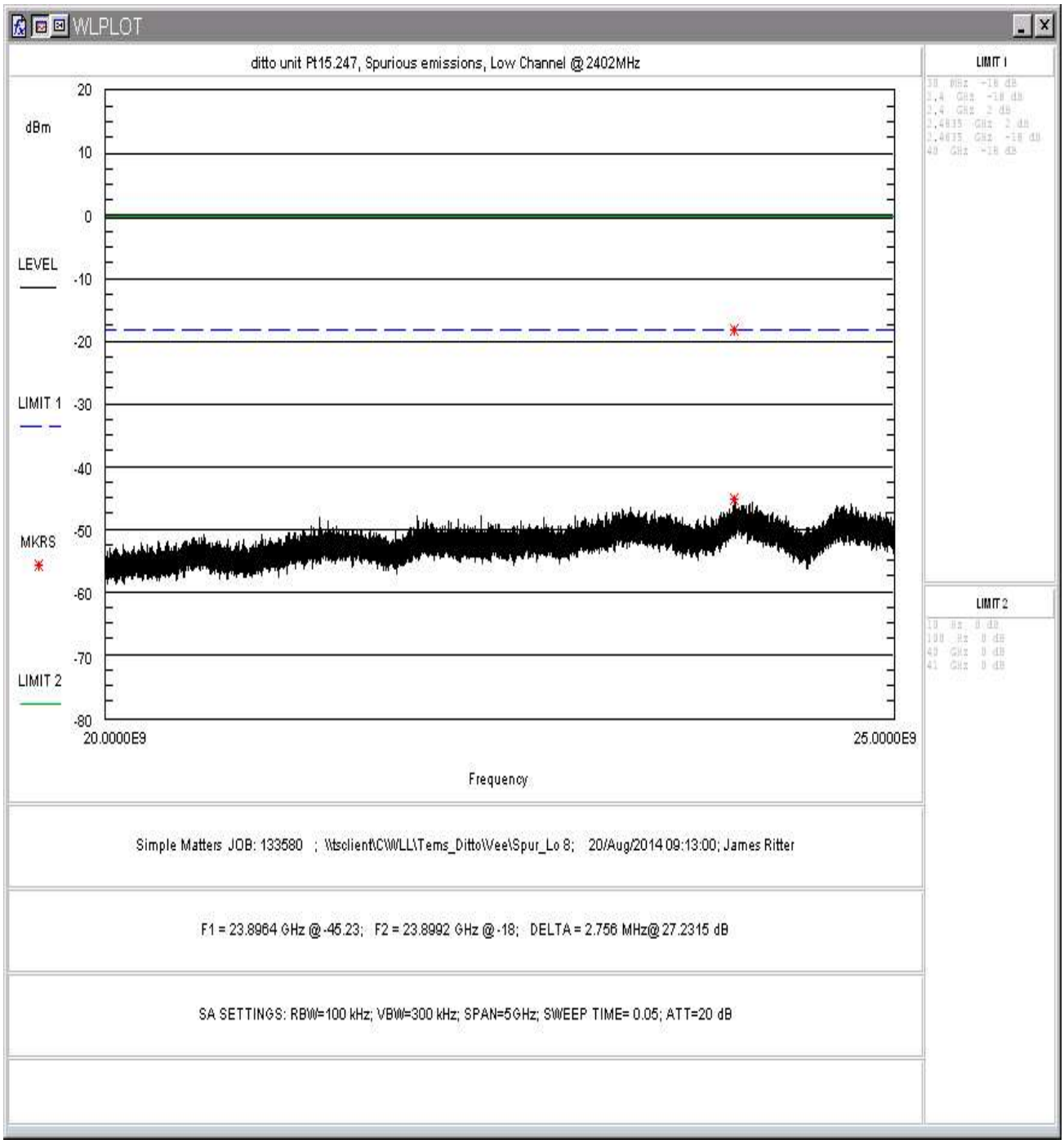

Figure 17: Conducted Spurious Emissions, Low Channel 20 - 25GHz

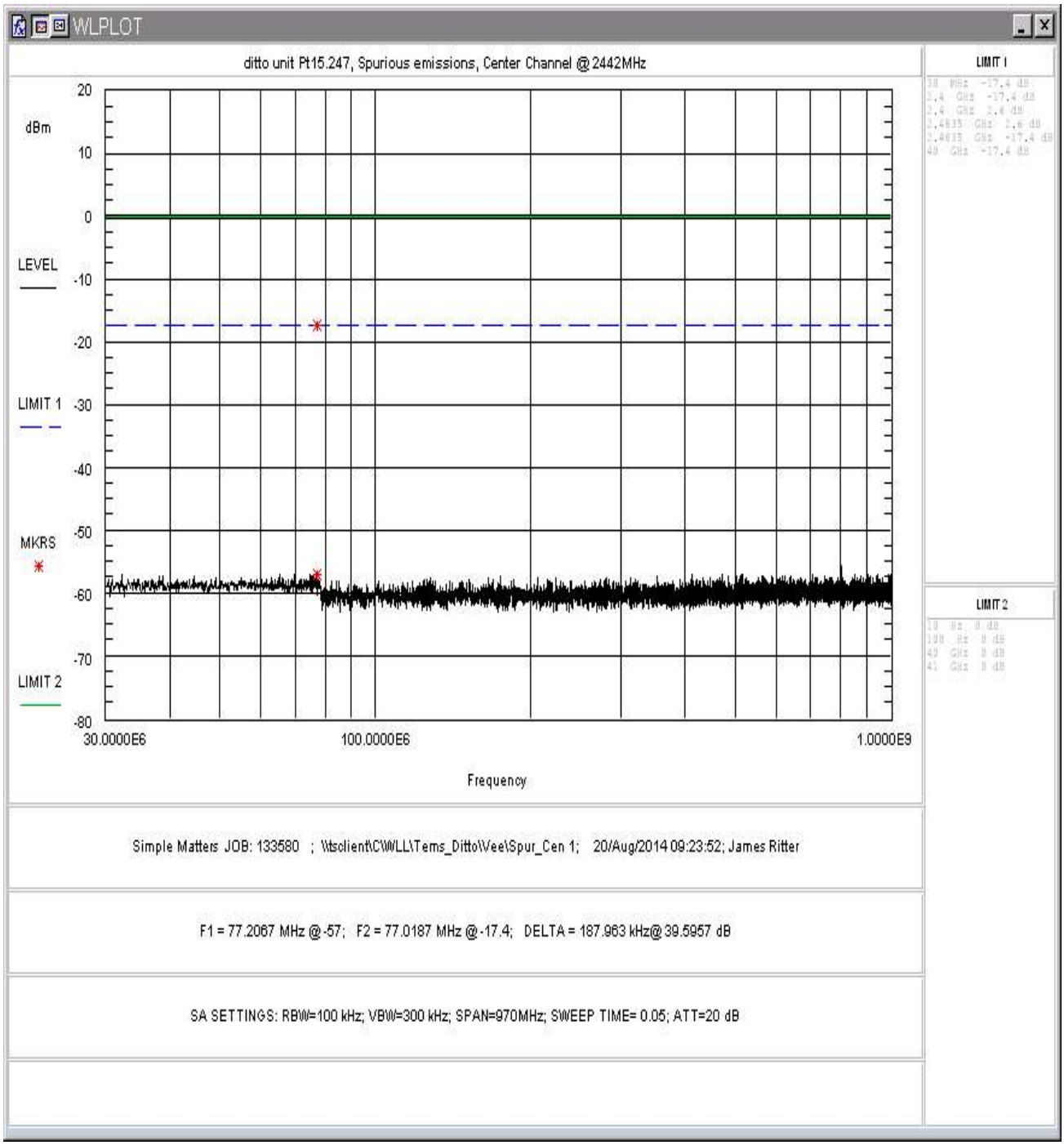

Figure 18: Conducted Spurious Emissions, Center Channel 30 - 1000MHz

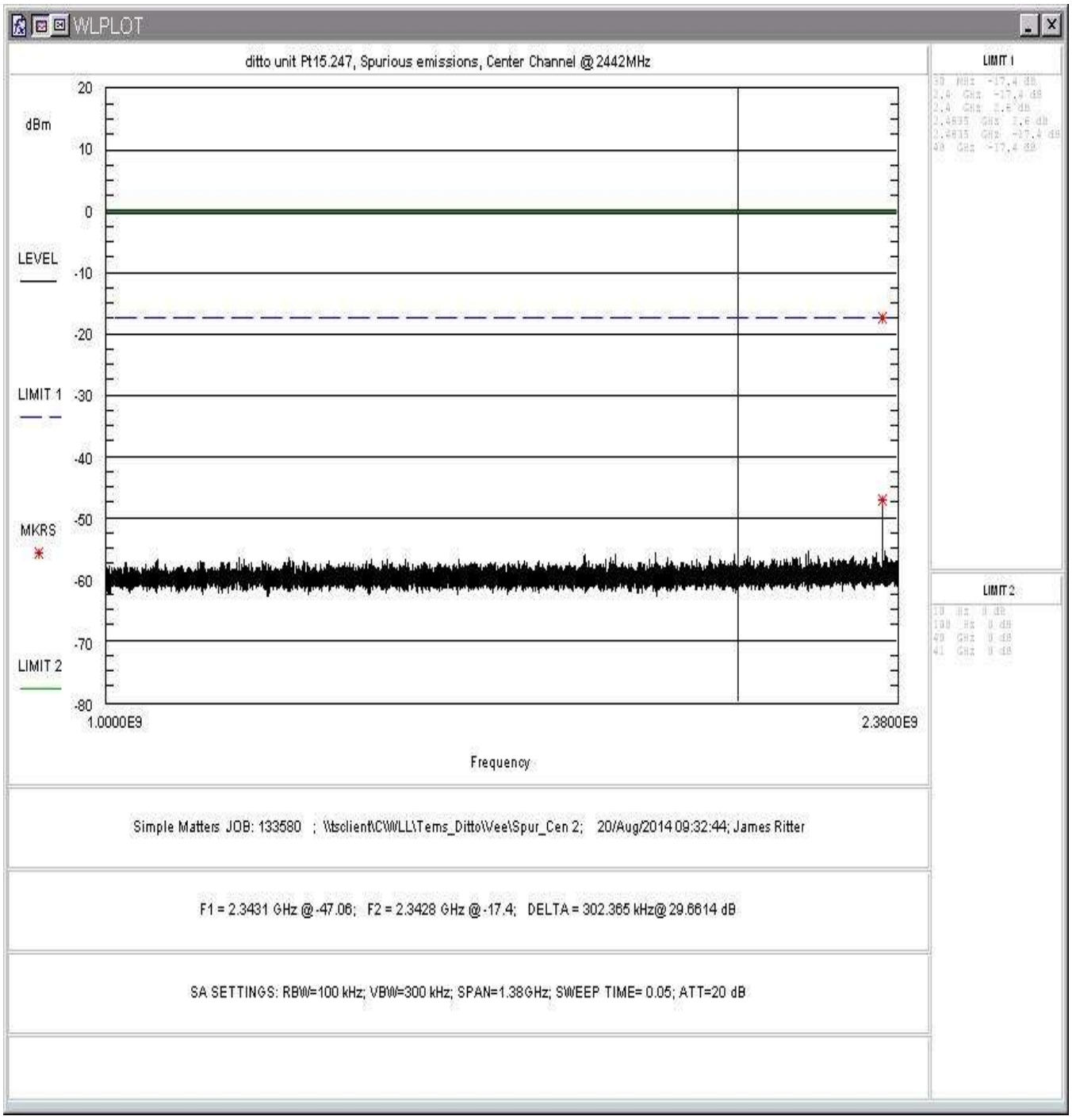

Figure 19: Conducted Spurious Emissions, Center Channel 1 – 2.38GHz

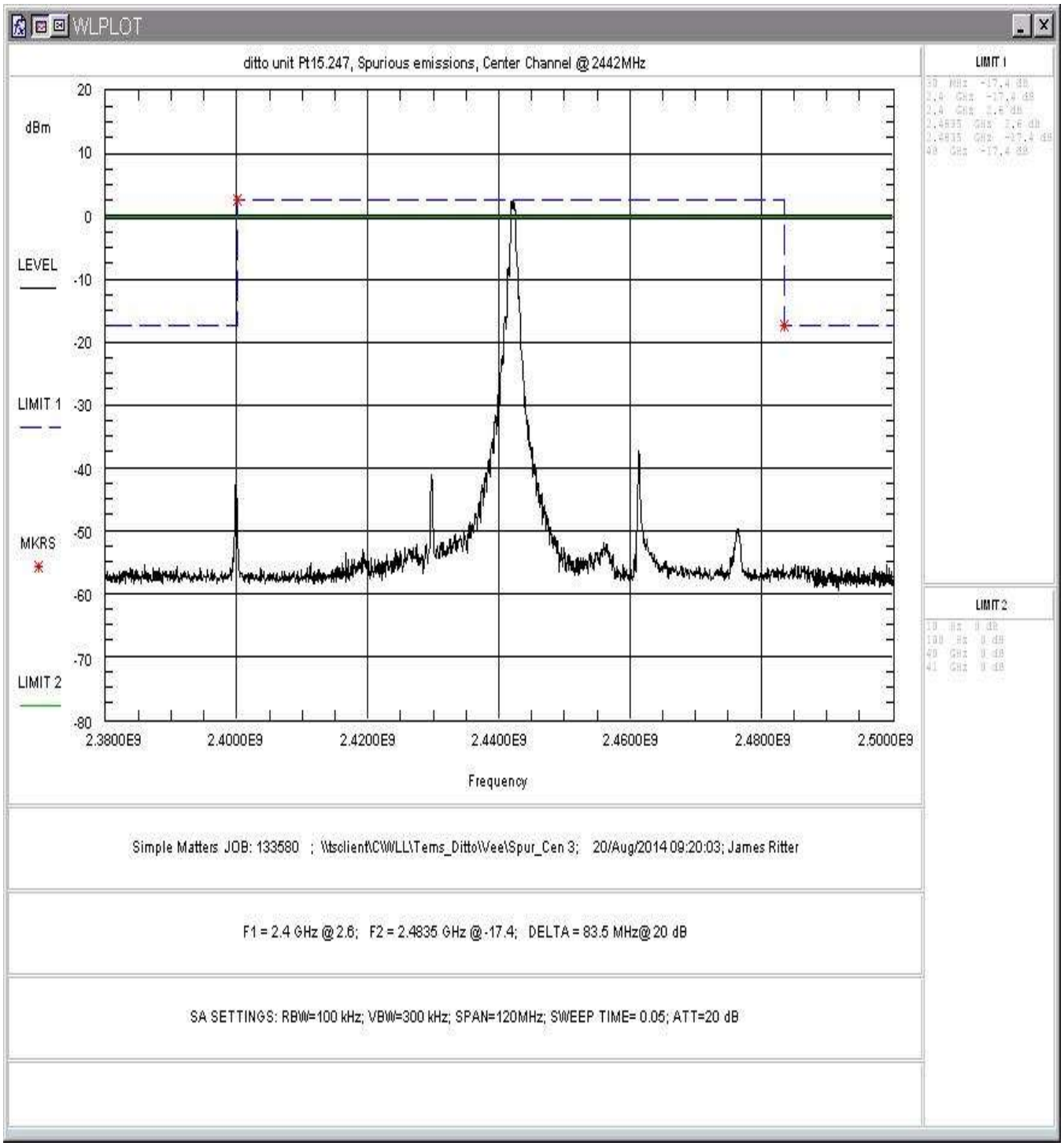

Figure 20: Conducted Spurious Emissions, Center Channel 2.38 – 2.5GHz

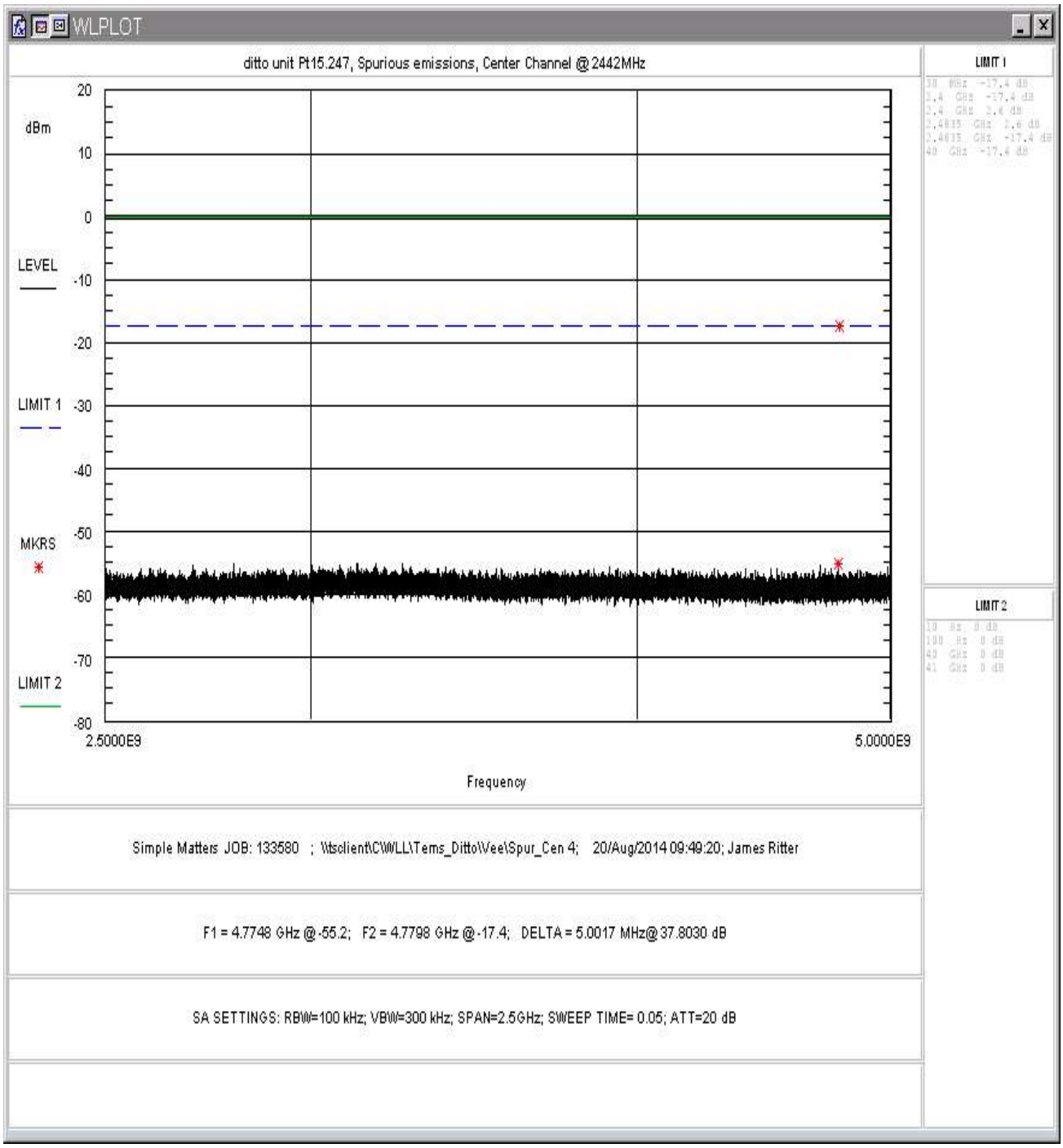

Figure 21: Conducted Spurious Emissions, Center Channel 2.5 - 5GHz

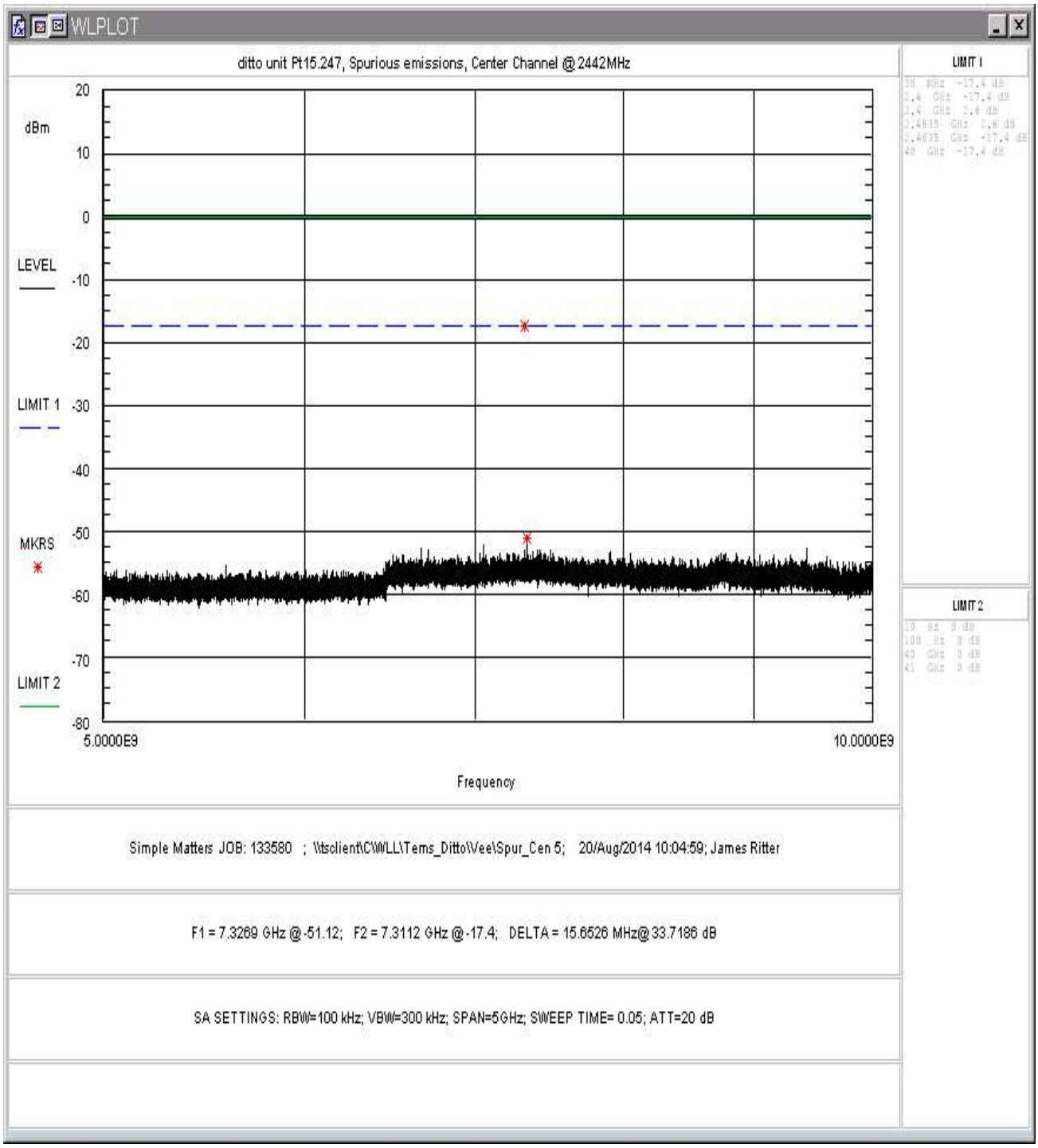

Figure 22: Conducted Spurious Emissions, Center Channel 5 – 10GHz

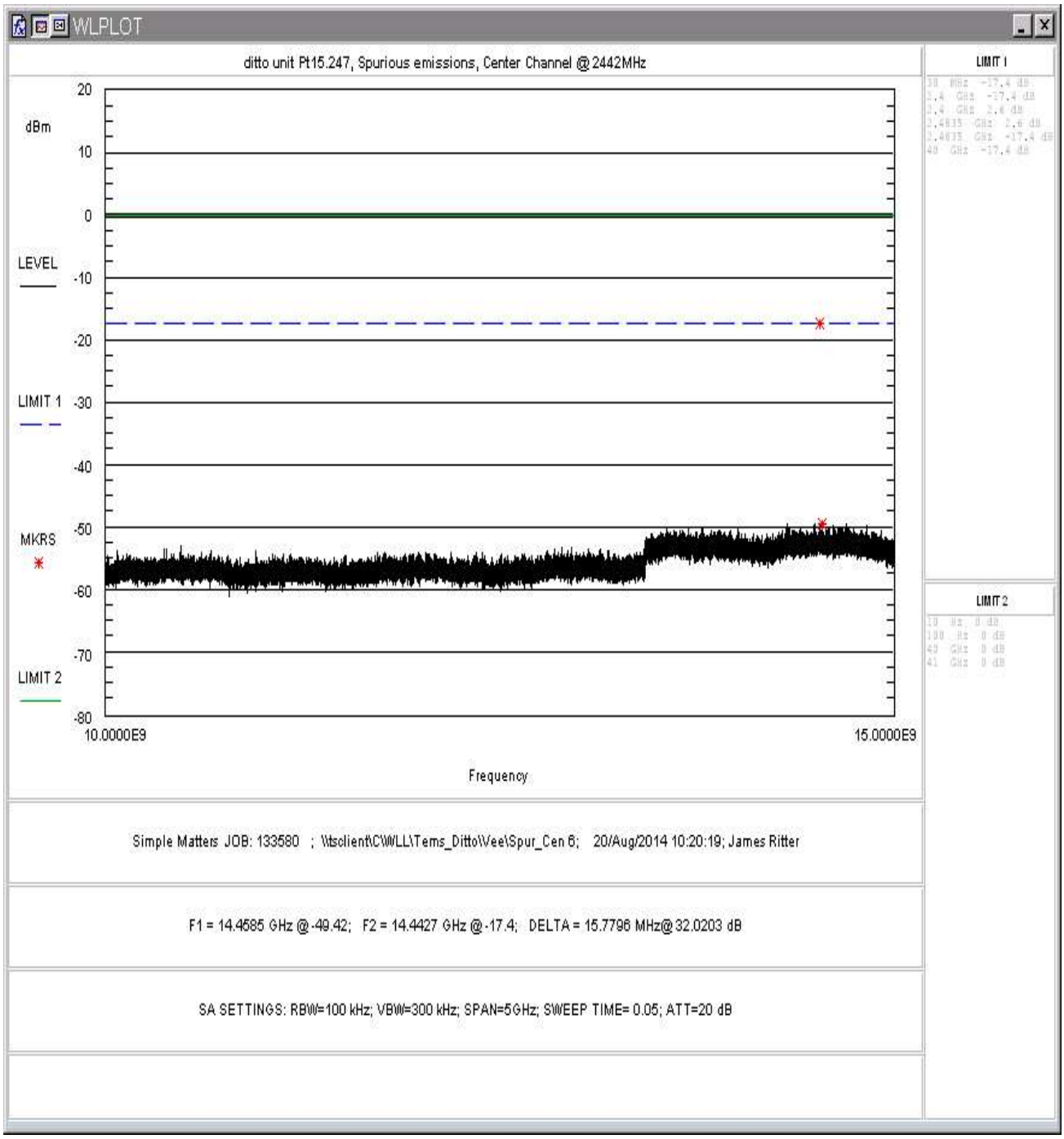

Figure 23: Conducted Spurious Emissions, Center Channel 10 - 15GHz

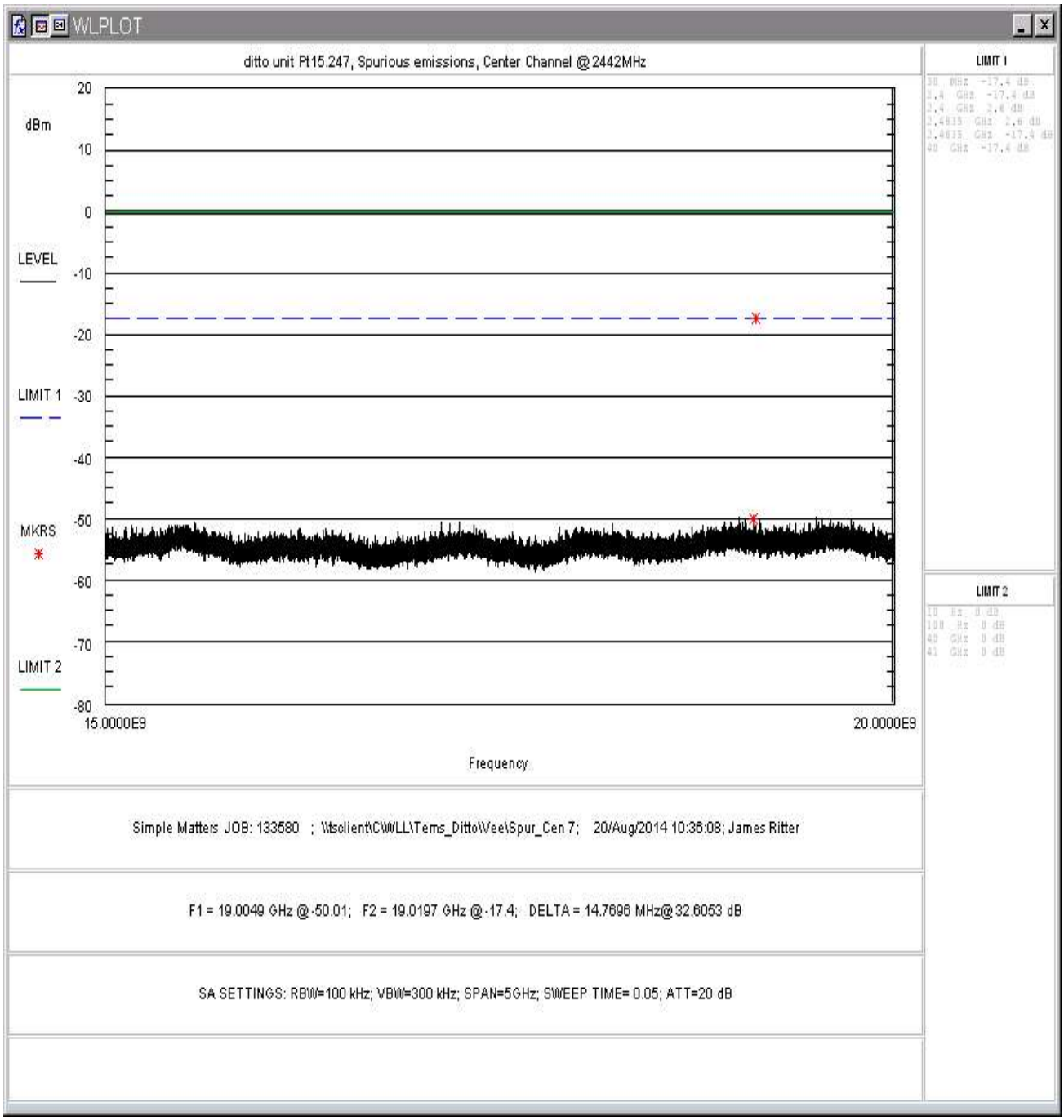

Figure 24: Conducted Spurious Emissions, Center Channel 15 - 20GHz

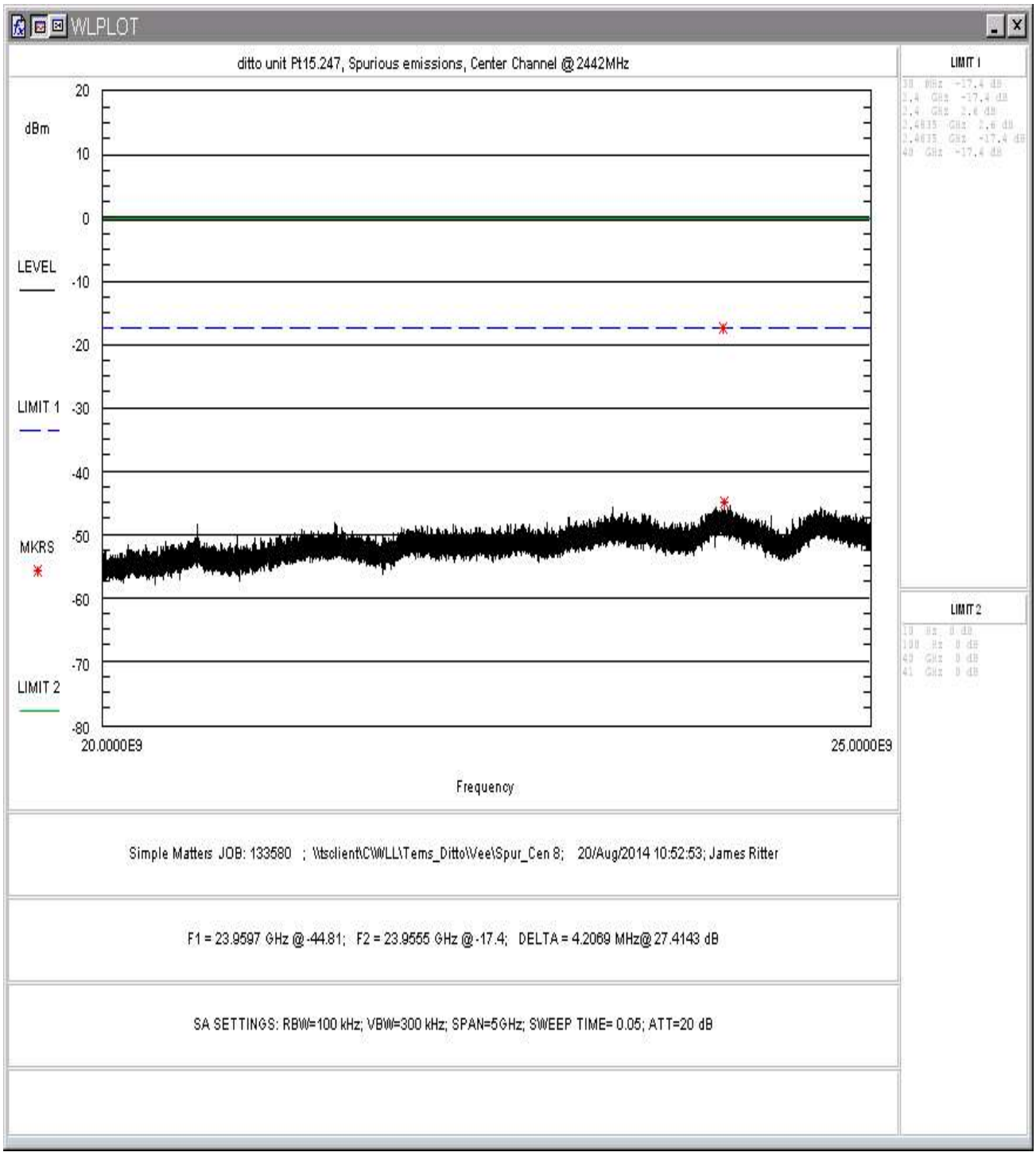

Figure 25: Conducted Spurious Emissions, Center Channel 20 - 25GHz

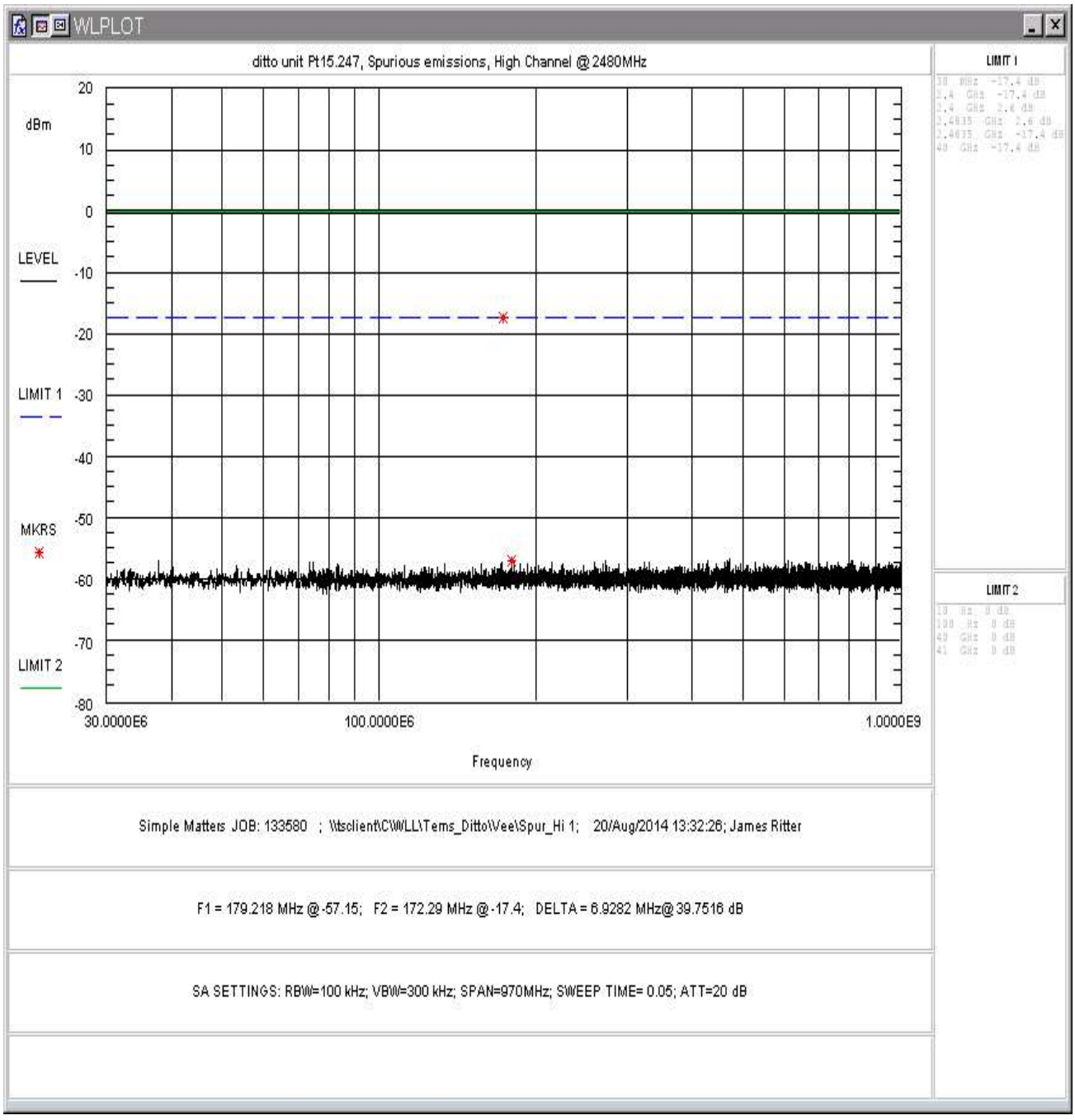

Figure 26: Conducted Spurious Emissions, High Channel 30 - 1000MHz

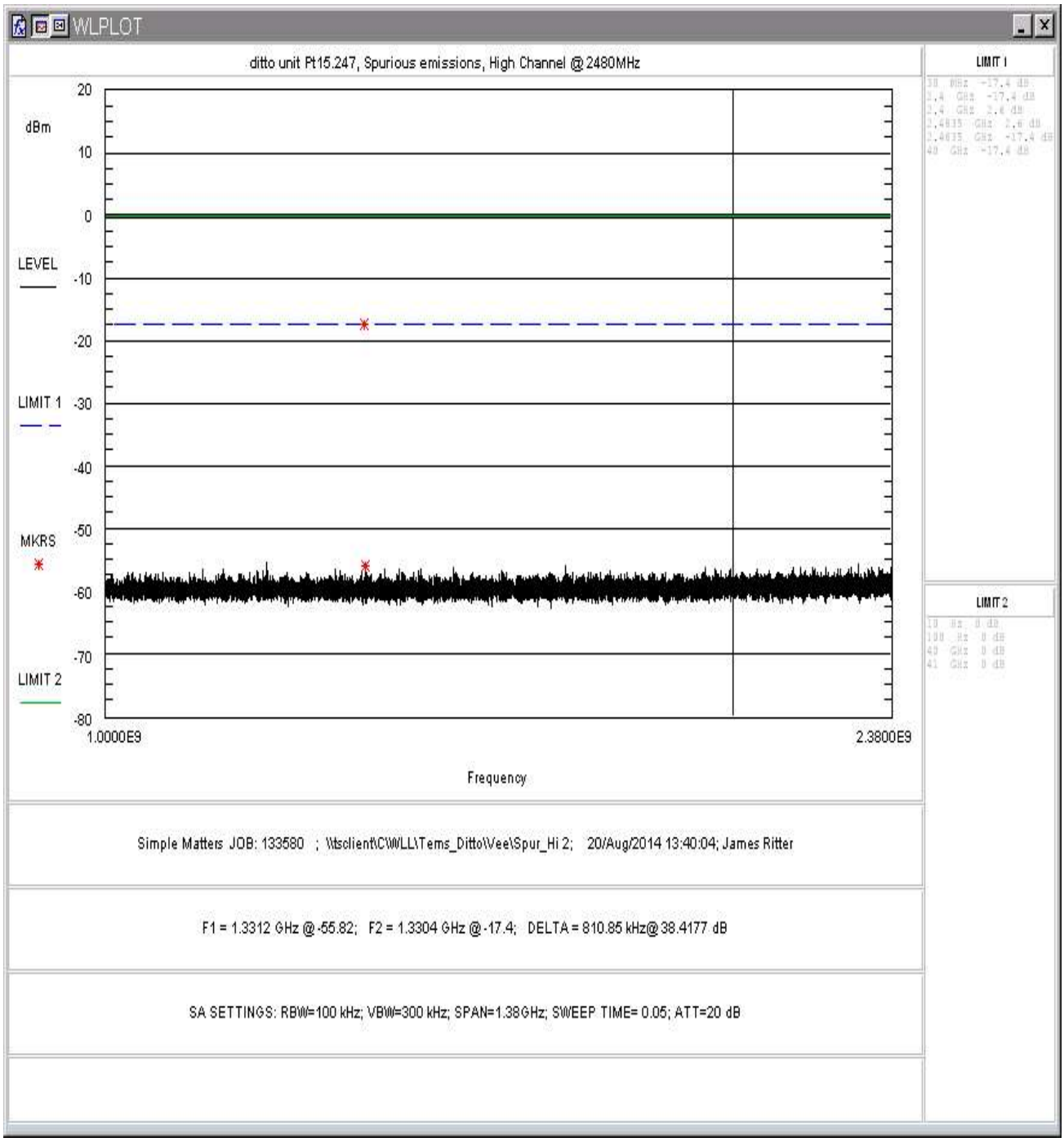

Figure 27: Conducted Spurious Emissions, High Channel 1 – 2.38GHz

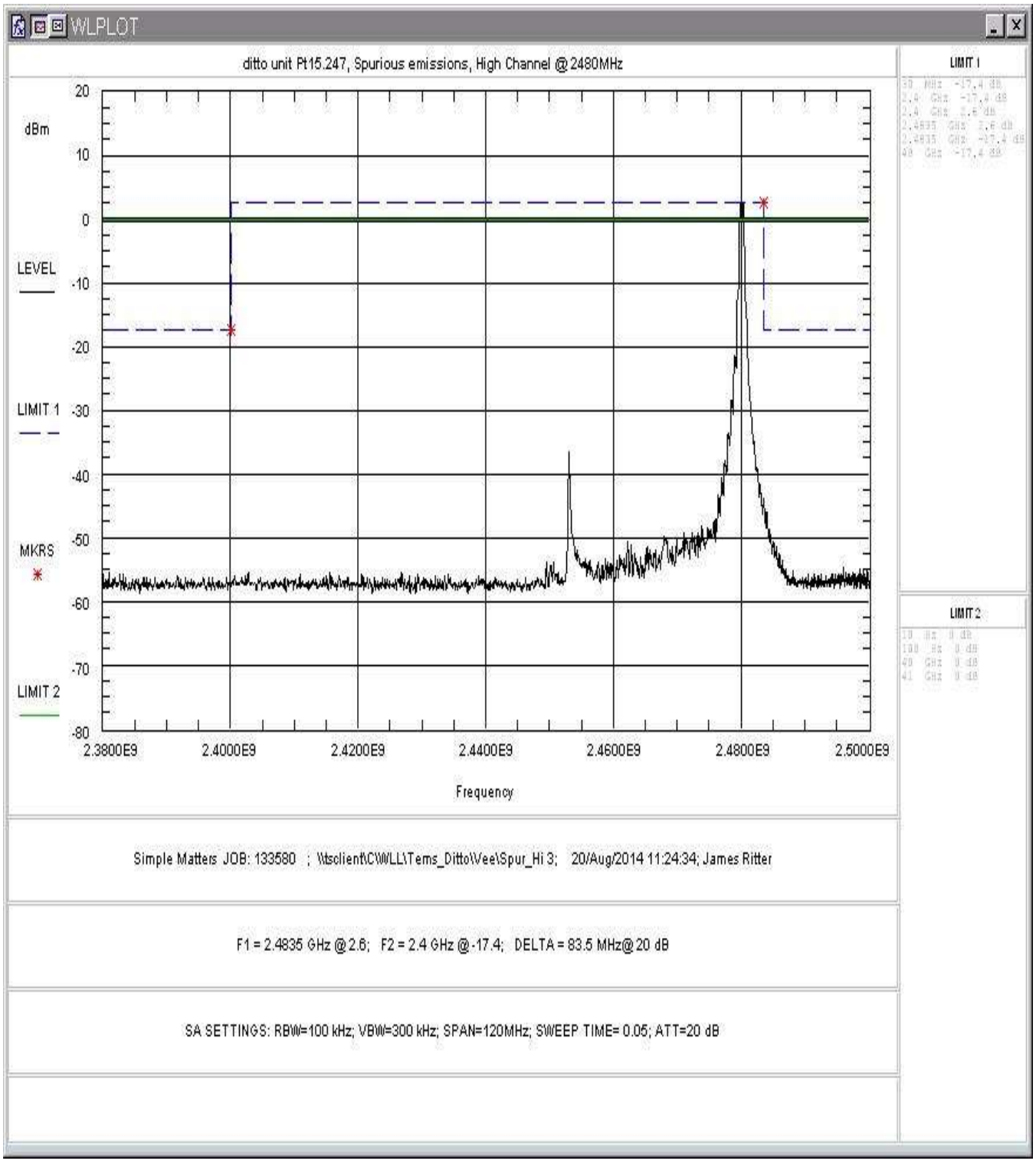

Figure 28: Conducted Spurious Emissions, High Channel 2.38 – 2.5GHz

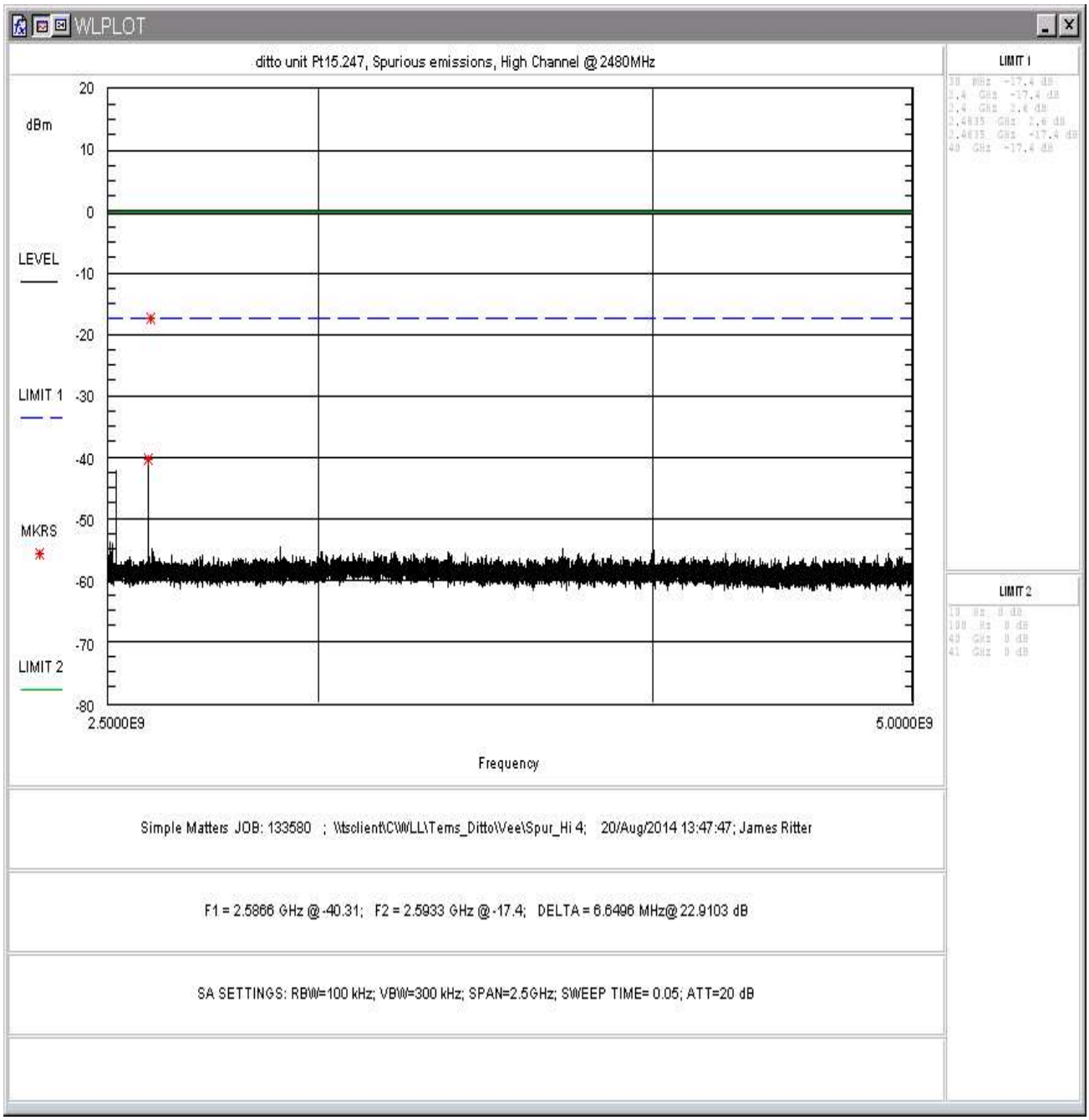

Figure 29: Conducted Spurious Emissions, High Channel 2.38 – 5GHz

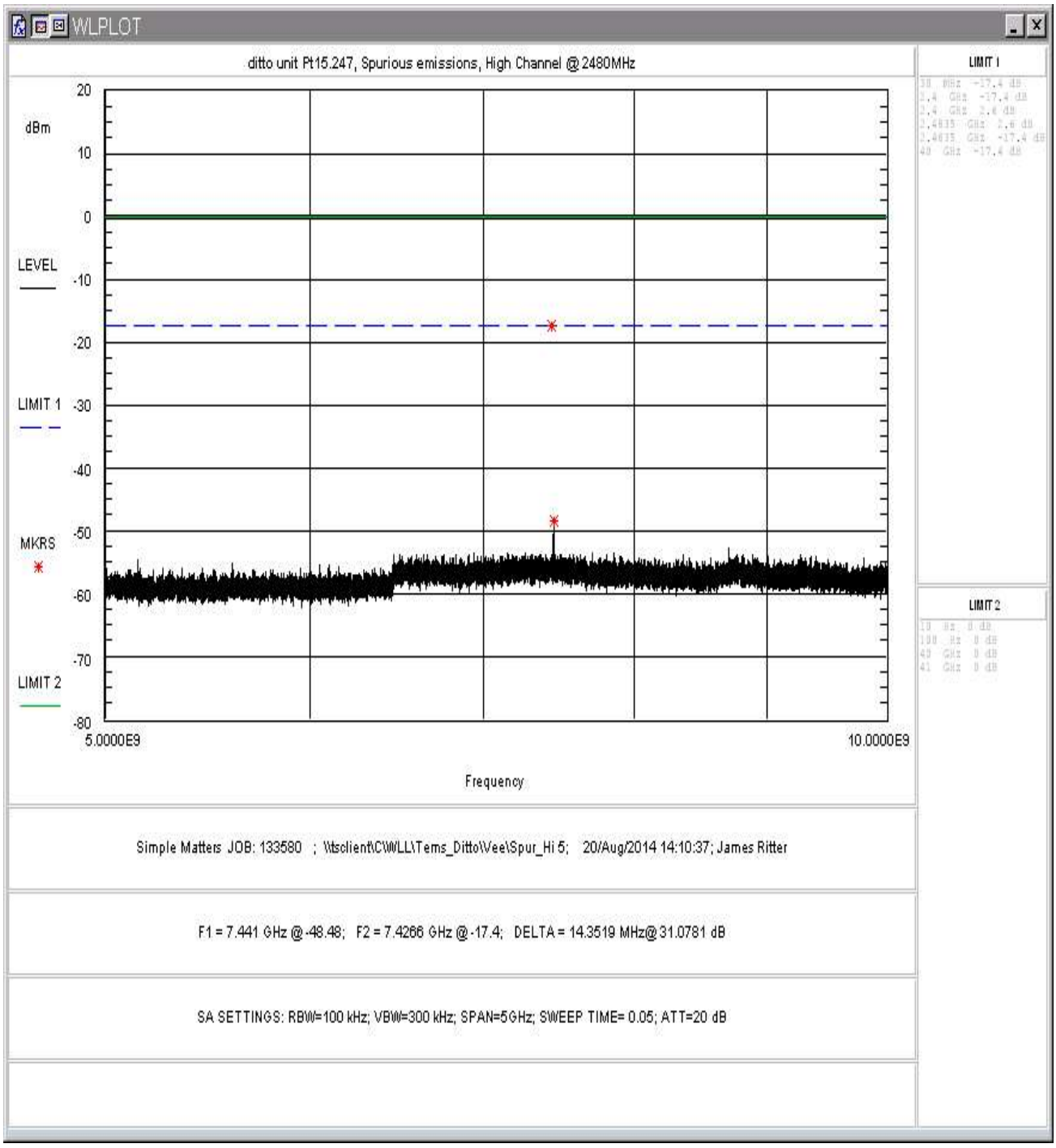

Figure 30: Conducted Spurious Emissions, High Channel 5 - 10GHz

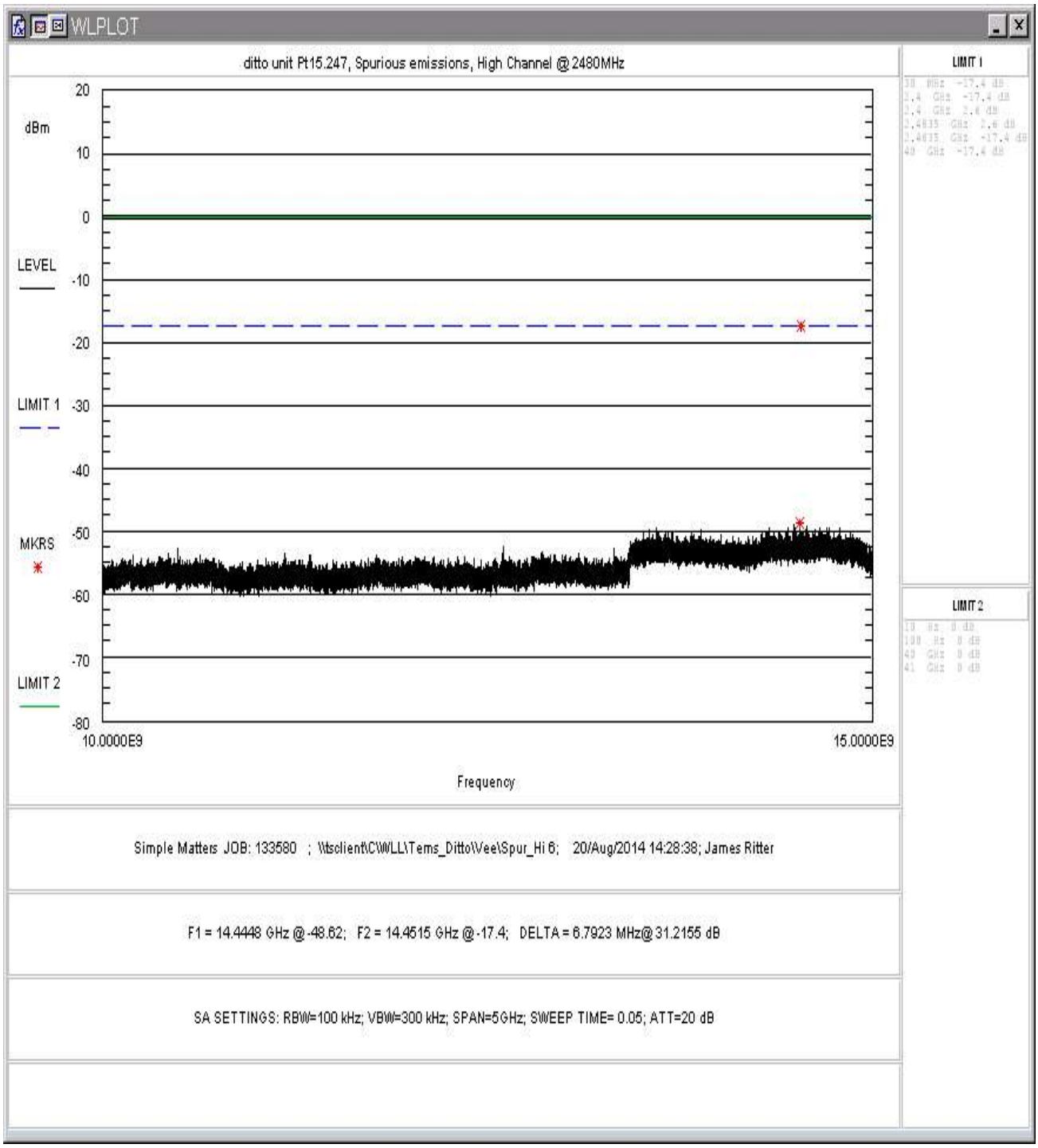

Figure 31: Conducted Spurious Emissions, High Channel 10 - 15GHz

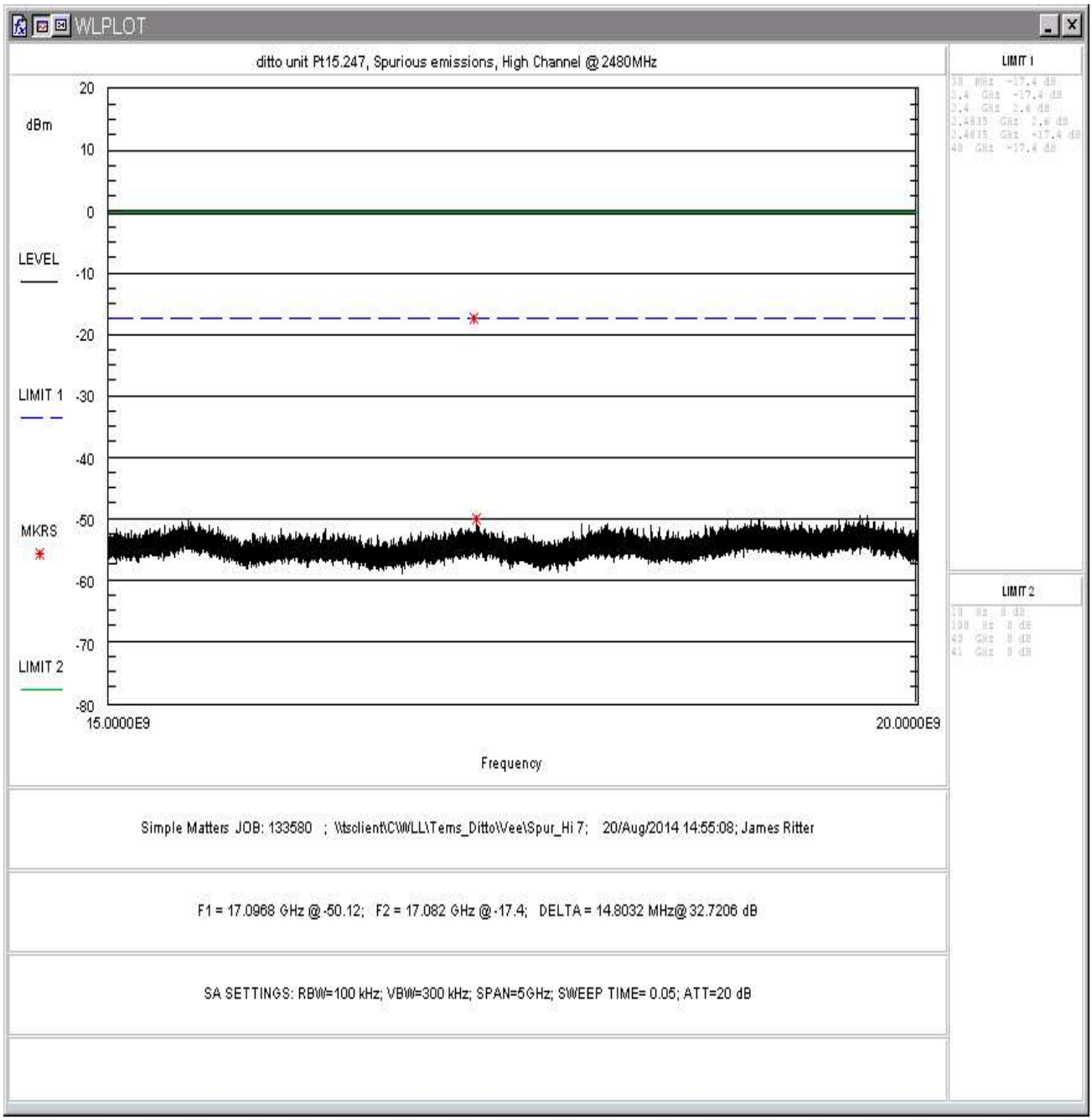

Figure 32: Conducted Spurious Emissions, High Channel 15 - 20GHz

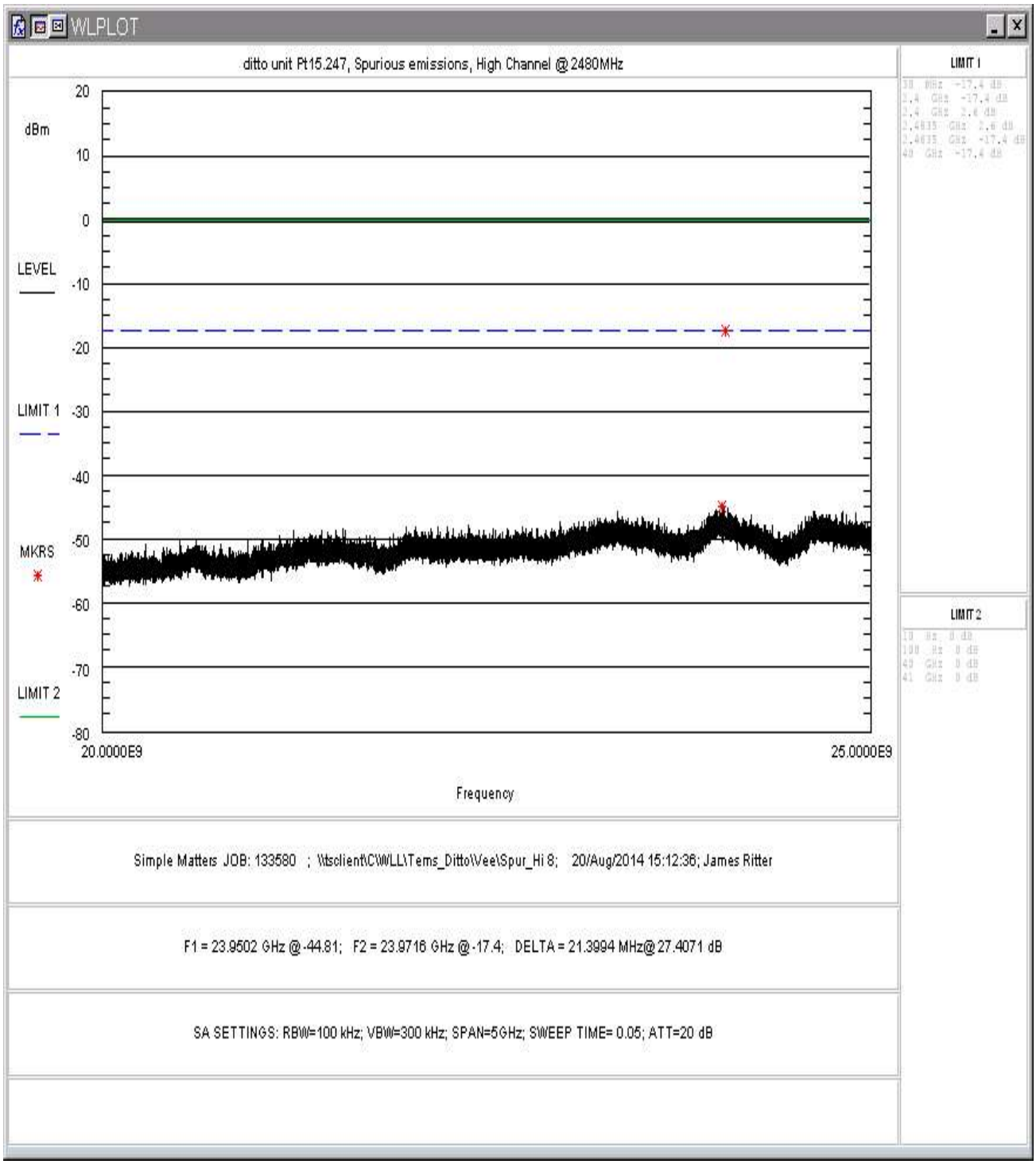

Figure 33: Conducted Spurious Emissions, High Channel 20 - 25GHz

5.4.1 Band Edge Compliance

Close-up plots of the upper and lower channels with respect to the nearest authorized band-edges are provided below. The tests were performed in the same manner as the above conducted spurious emissions tests

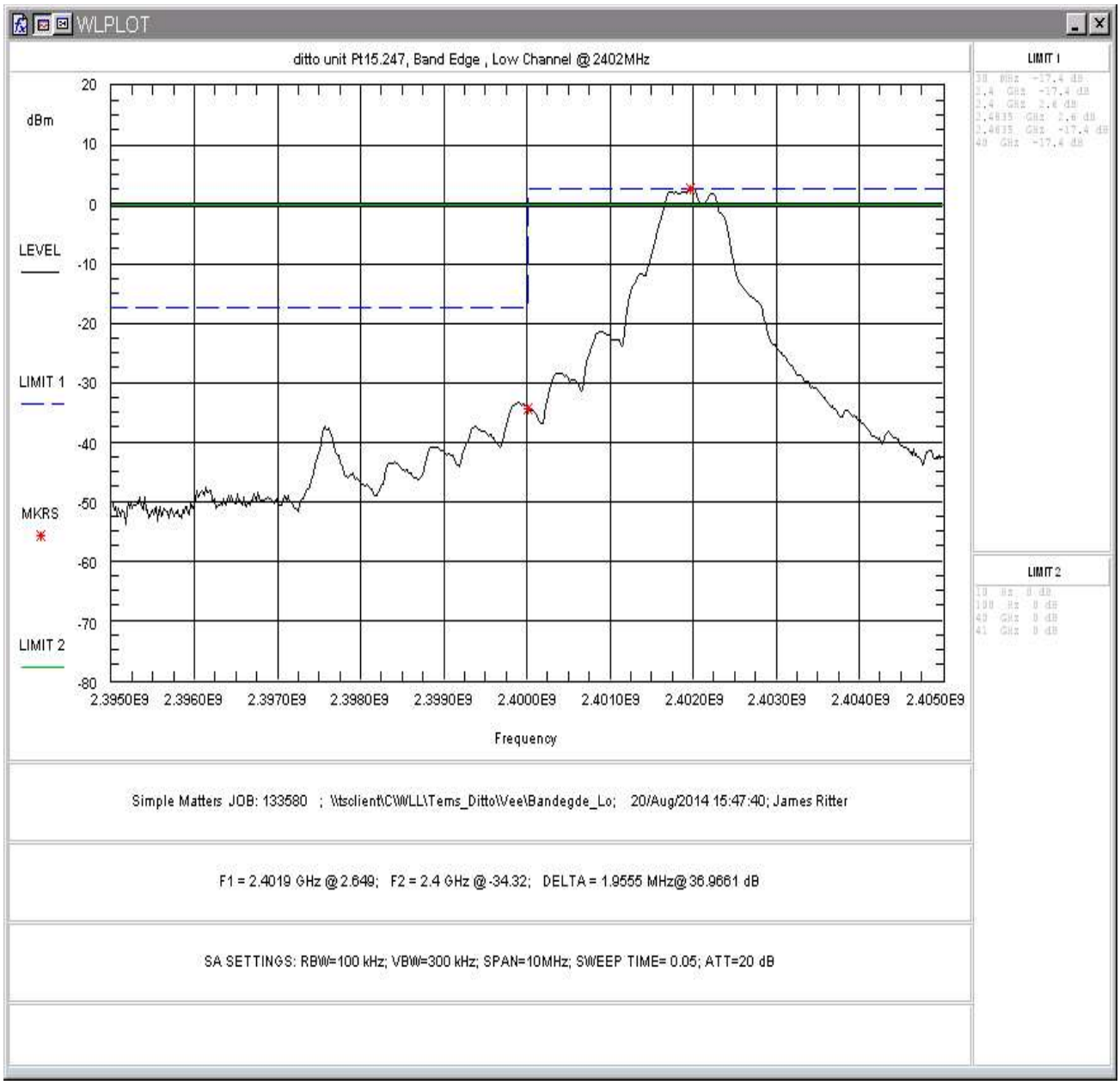

Figure 34: Lower Band-edge, Low Channel

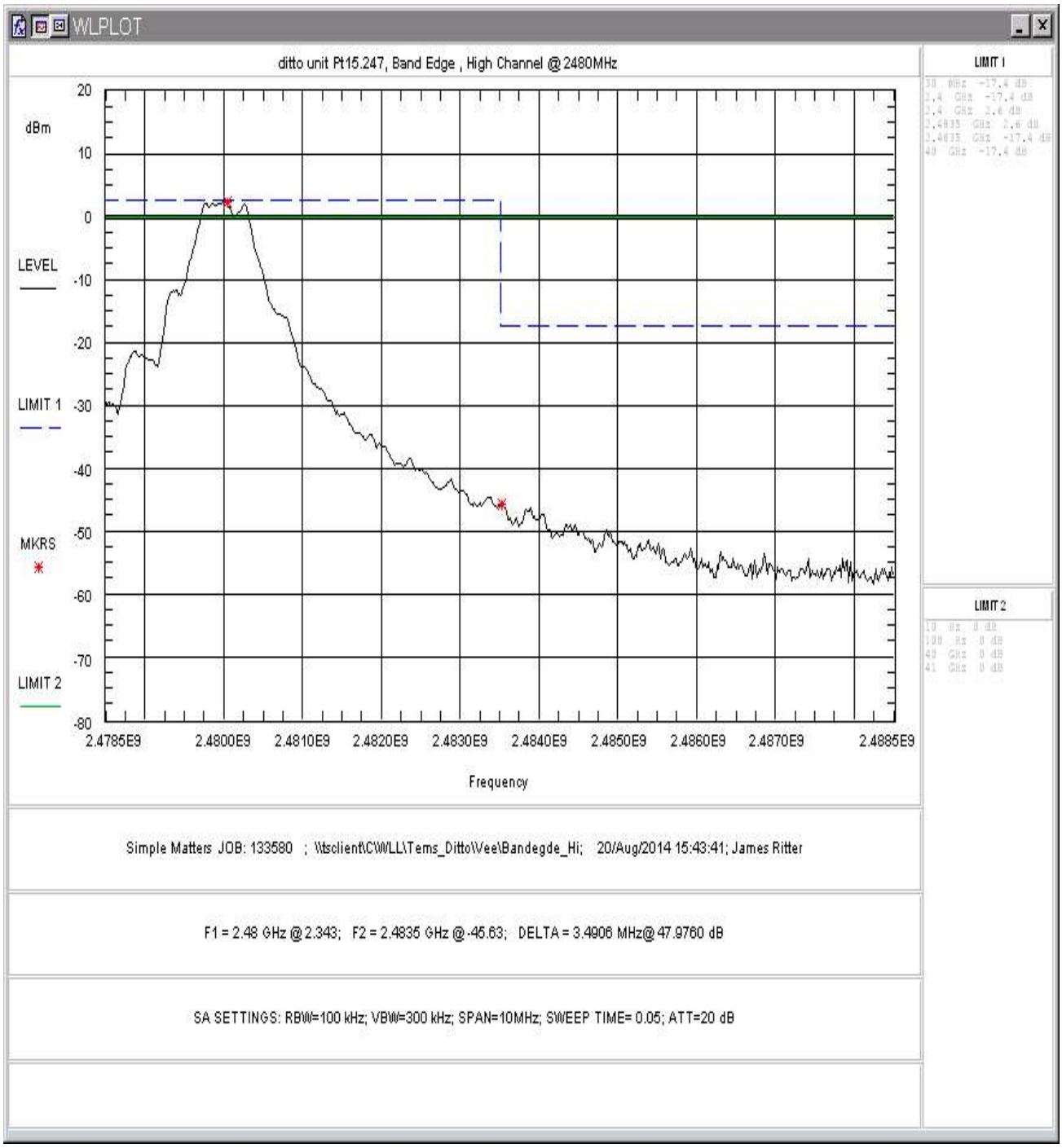

Figure 35: Upper Band-edge, High Channel

5.5 Radiated Spurious Emissions:

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

5.5.1 Test Procedure

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

The EUT was tested in 3 orthogonals with the worst case readings reported

The emissions were measured using the following resolution bandwidths:

Table 11: Spectrum Analyzer Settings

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	10 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.

No emissions below 1GHz were noted in the restricted bands.

Table 12: Radiated Emission Test Data, Low Channel

(Restricted Bands/Band Edge)

Low Channel @ 2402MHz

	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
peak	4804.00	V	10.00	1.40	63.10	-8.8	516.9	5000.0	-19.7	
avg	4804.00	V	10.00	1.40	45.60	-8.8	68.9	500.0	-17.2	
peak	2345.00	V	0.00	1.60	67.80	-17.4	332.1	5000.0	-23.6	
avg	2345.00	V	0.00	1.60	53.60	-17.4	64.8	500.0	-17.8	
peak	2390.00	V	0.00	1.60	64.30	-17.6	216.1	5000.0	-27.3	restricted band edge
avg	2390.00	V	0.00	1.60	51.60	-17.6	50.1	500.0	-20.0	
peak	4804.00	H	90.00	1.30	62.90	-8.8	505.2	5000.0	-19.9	
avg	4804.00	H	90.00	1.30	48.80	-8.8	99.6	500.0	-14.0	
peak	2345.00	H	45.00	1.60	70.50	-17.4	453.2	5000.0	-20.9	
avg	2345.00	H	45.00	1.60	52.70	-17.4	58.4	500.0	-18.7	
peak	2390.00	H	90.00	1.70	67.10	-17.6	298.3	5000.0	-24.5	restricted band edge
avg	2390.00	H	90.00	1.70	52.77	-17.6	57.3	500.0	-18.8	

No Emissions were noted in the restricted bands below 1GHz

Table 13: Radiated Emission Test Data, Center Channel

(Restricted Bands)

Center Channel @ 2442 MHz

	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
peak	4804.00	V	10.00	1.40	63.10	-8.8	516.9	5000.0	-19.7	
avg	4804.00	V	10.00	1.40	45.60	-8.8	68.9	500.0	-17.2	
peak	4884.00	V	45.00	1.50	63.40	-8.2	577.6	5000.0	-18.7	
avg	4884.00	V	45.00	1.50	46.10	-8.2	78.8	500.0	-16.0	
	2340.00	V	10.00	1.40	59.20	-17.4	123.4	5000.0	-32.2	
	2340.00	V	10.00	1.40	43.40	-17.4	20.0	500.0	-28.0	
peak	4884.00	H	90.00	1.60	58.40	-8.2	324.8	5000.0	-23.7	
avg	4884.00	H	90.00	1.60	42.80	-8.2	53.9	500.0	-19.3	
peak	2340.00	H	90.00	1.80	61.00	-17.4	151.8	5000.0	-30.4	
avg	2340.00	H	90.00	1.80	43.50	-17.4	20.2	500.0	-27.9	

No Emissions were noted in the restricted bands below 1GHz

Table 14: Radiated Emission Test Data, HighChannel

(Restricted Bands/Band Edge)

High Channel @ 2480MHz

	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
peak	4960.00	V	10.00	1.40	60.50	-7.4	451.9	5000.0	-20.9	
avg	4960.00	V	10.00	1.40	42.80	-7.4	58.9	500.0	-18.6	
peak	2517.00	V	0.00	1.80	58.20	-17.5	108.7	5000.0	-33.3	
avg	2517.00	V	0.00	1.80	46.50	-17.5	28.3	500.0	-25.0	
peak	2483.50	V	0.00	1.80	64.20	-17.6	214.7	5000.0	-27.3	restricted band edge
avg	2483.50	V	0.00	1.80	41.90	-17.6	16.5	500.0	-29.6	
peak	4960.00	H	270.00	1.60	57.70	-7.4	327.4	5000.0	-23.7	
avg	4960.00	H	270.00	1.60	41.20	-7.4	49.0	500.0	-20.2	
peak	2517.00	H	0.00	1.50	61.20	-17.5	153.6	5000.0	-30.3	
avg	2517.00	H	0.00	1.50	40.80	-17.5	14.7	500.0	-30.7	
peak	2483.50	H	0.00	1.70	64.50	-17.6	222.2	5000.0	-27.0	restricted band edge
avg	2483.50	H	0.00	1.70	42.80	-17.6	18.3	500.0	-28.7	

No Emissions were noted in the restricted bands below 1GHz

5.6 Receiver Radiated Spurious Emissions

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

5.6.1 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 15: Spectrum Analyzer Settings

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	10 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.

Table 16: Radiated Emission Test Data, Receiver

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)
40.00	V	0.00	1.00	2.40	14.9	7.3	100.0	-22.7
53.44	V	45.00	1.00	3.90	8.0	4.0	100.0	-28.1
64.00	V	90.00	1.20	6.50	8.8	5.8	100.0	-24.7
80.00	V	90.00	1.30	6.60	9.0	6.0	100.0	-24.4
160.00	V	90.00	1.50	1.50	14.0	5.9	150.0	-28.1
40.00	H	45.00	4.00	1.40	14.9	6.5	100.0	-23.7
53.44	H	0.00	4.00	3.20	8.0	3.6	100.0	-28.8
64.00	H	10.00	3.90	3.40	8.8	4.1	100.0	-27.8
80.00	H	180.00	3.69	6.60	9.0	6.0	100.0	-24.4
160.00	H	10.00	3.00	2.10	14.0	6.4	150.0	-27.5

5.7 AC Conducted Emissions

5.7.1 Test Summary

As unit is solely battery powered this test is not required.

