

Figure 27: Conducted Spurious Emissions, Mid Channel 2.395 – 2.488GHz

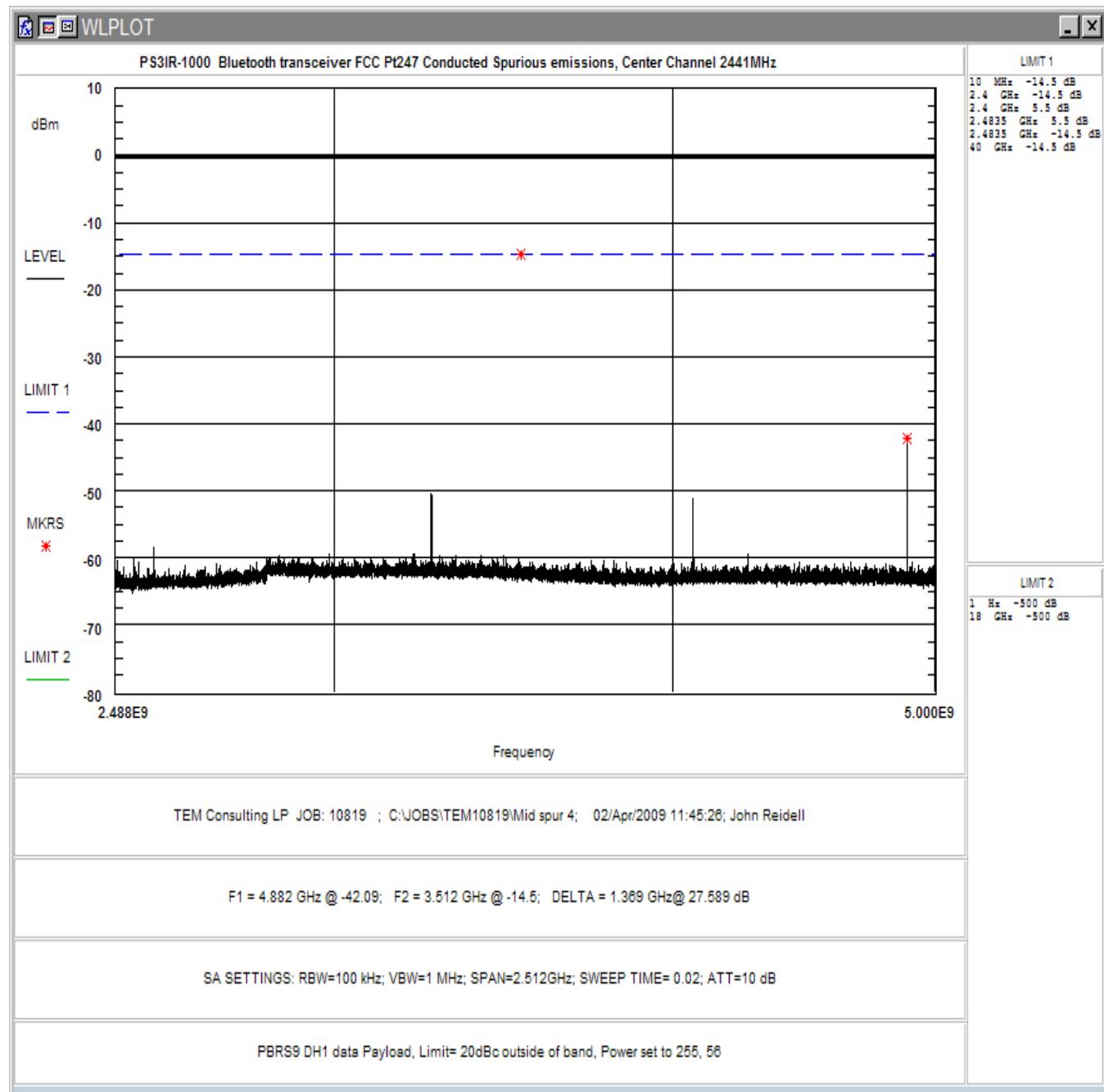


Figure 28: Conducted Spurious Emissions, Mid Channel 2.488 - 5GHz

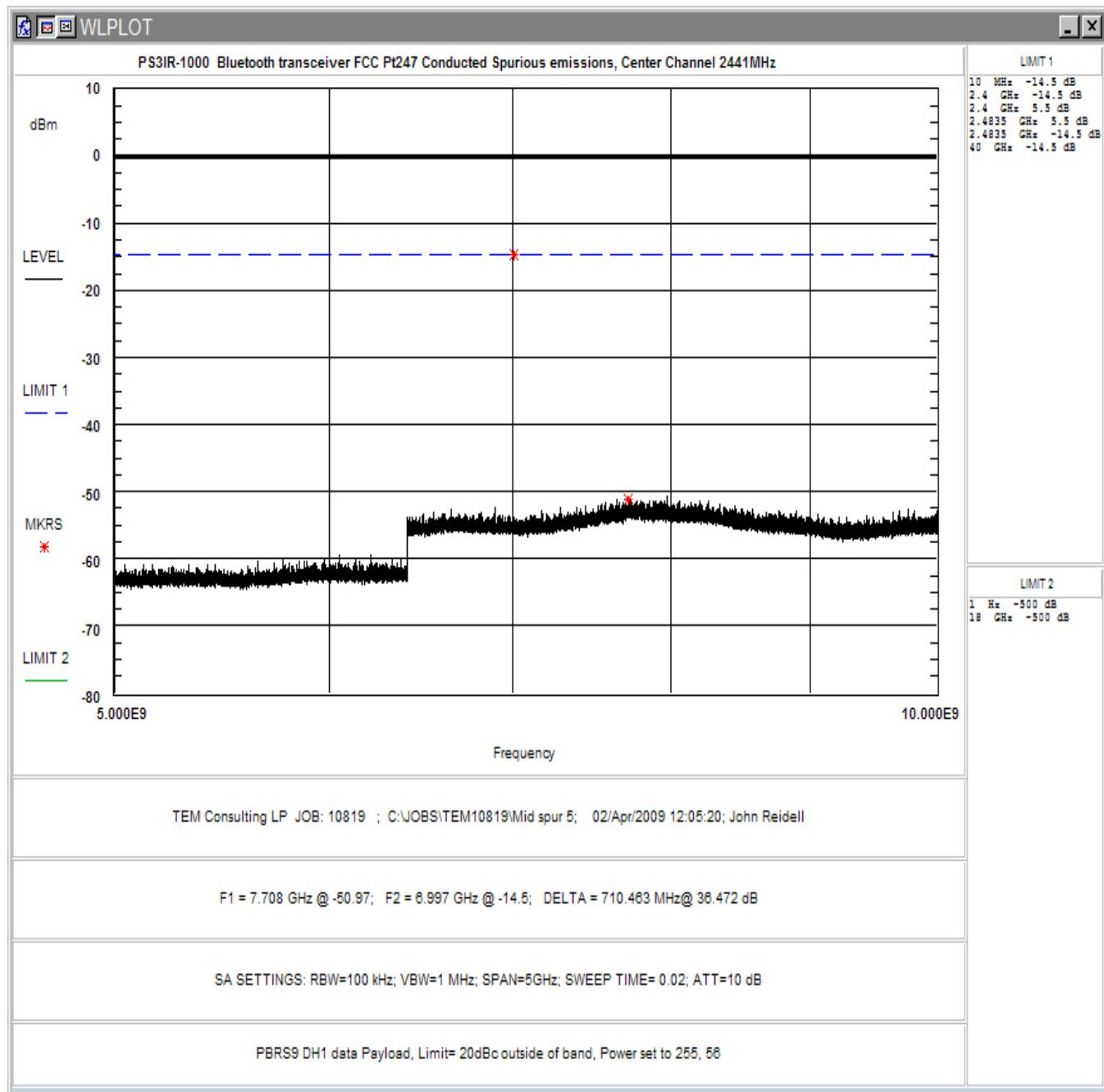


Figure 29: Conducted Spurious Emissions, Mid Channel 5 - 10GHz

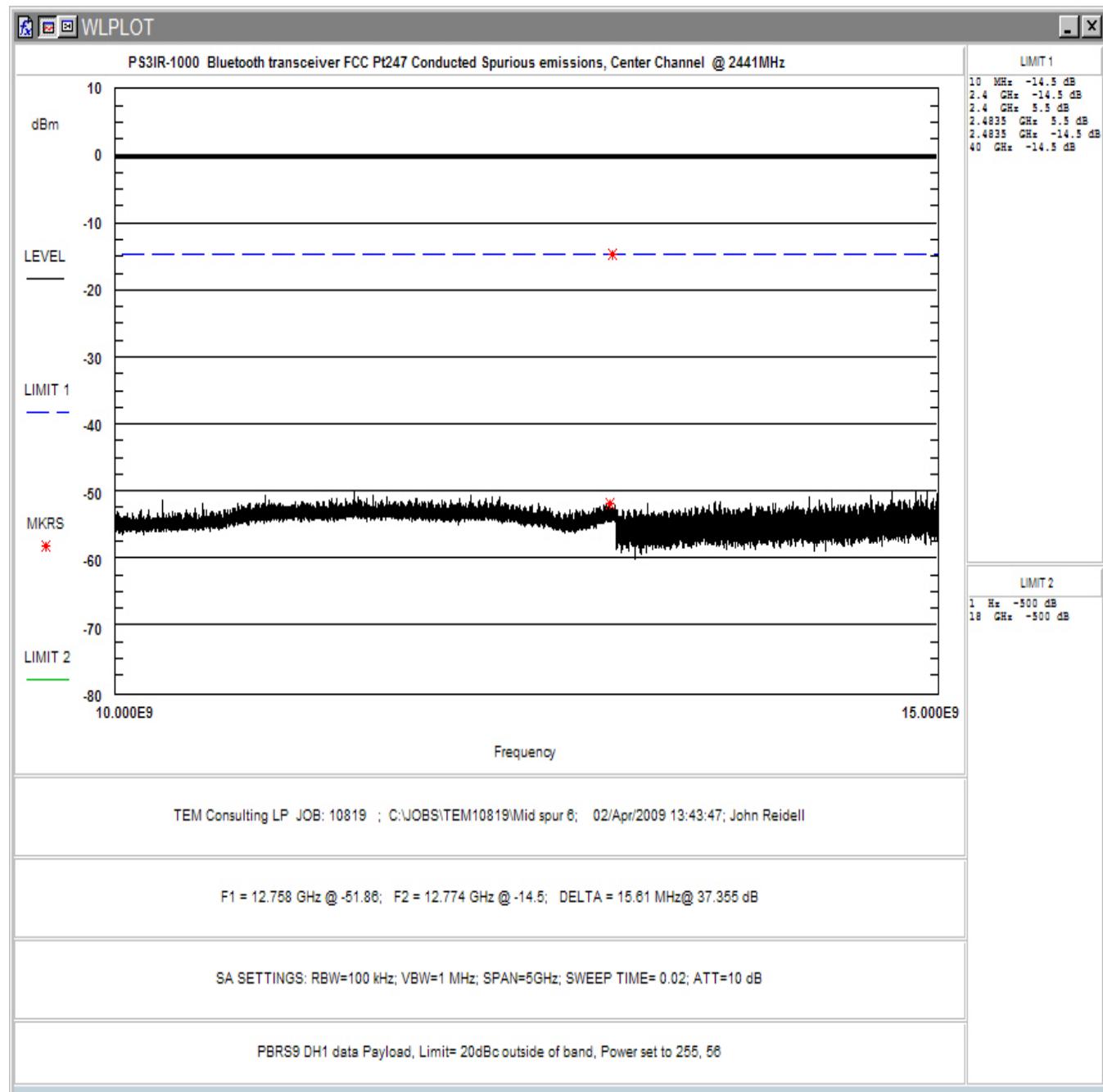


Figure 30: Conducted Spurious Emissions, Mid Channel 10-15GHz

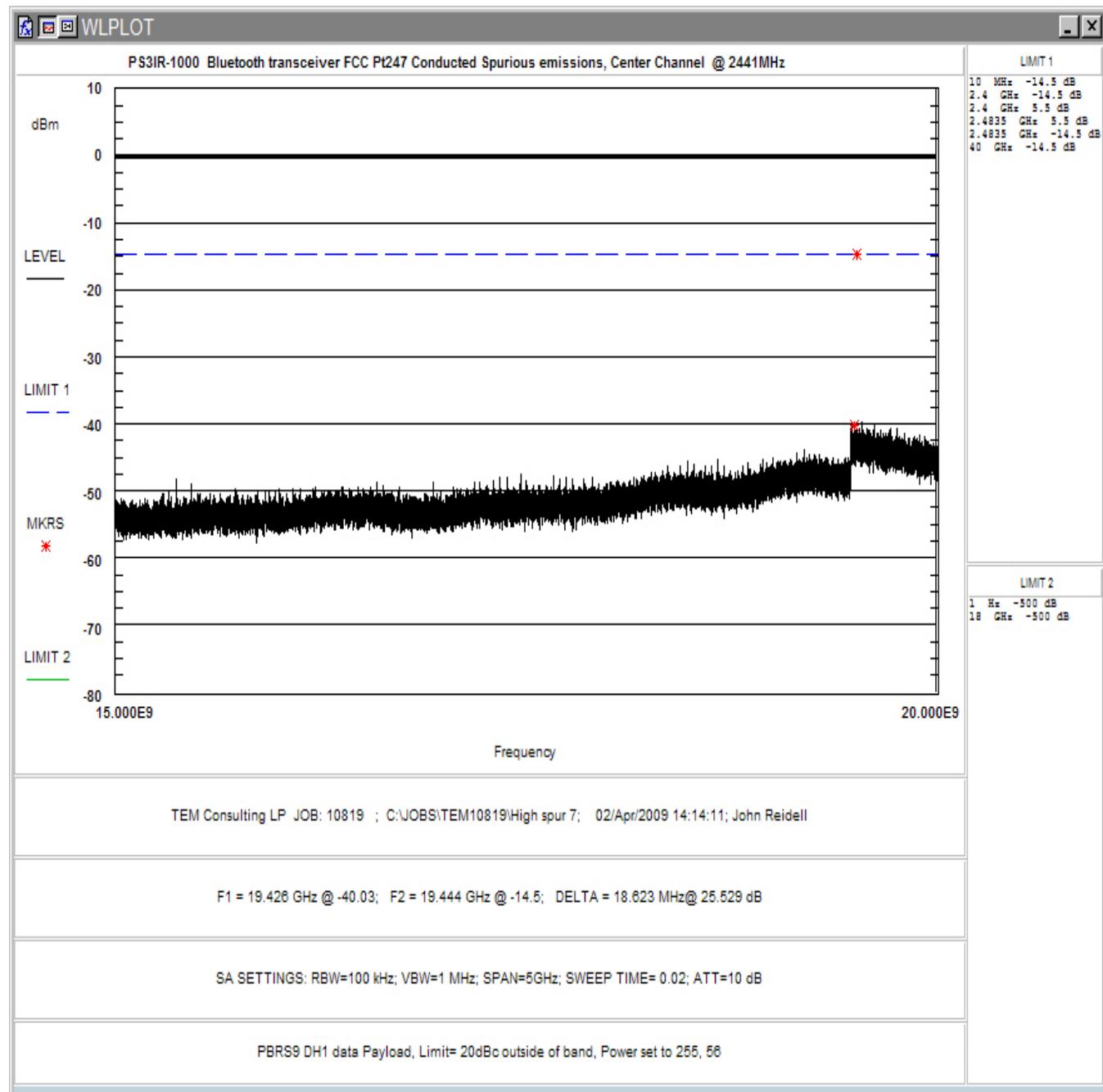


Figure 31: Conducted Spurious Emissions, Mid Channel 15-20GHz

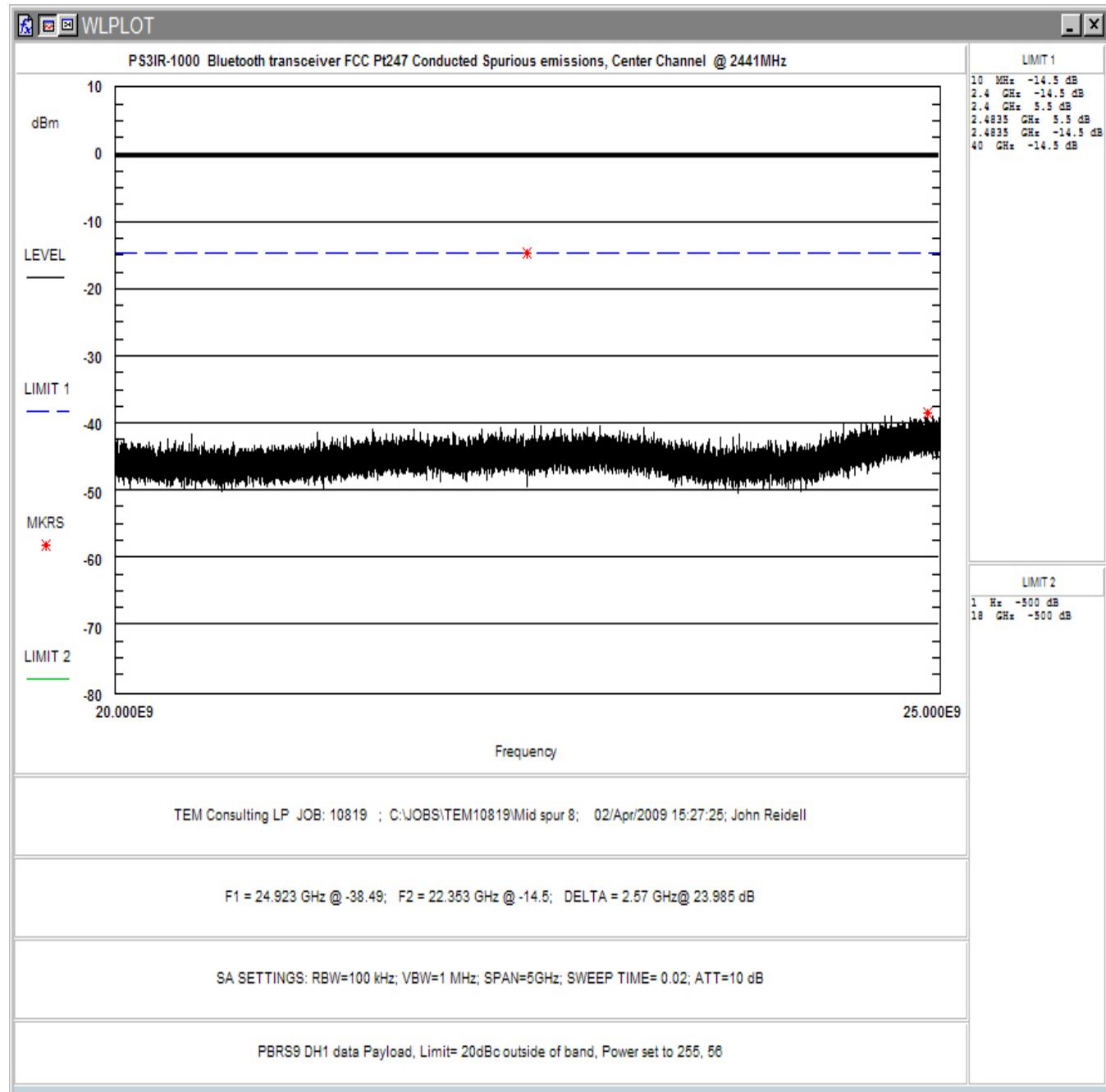


Figure 32: Conducted Spurious Emissions, Mid Channel 20-25GHz

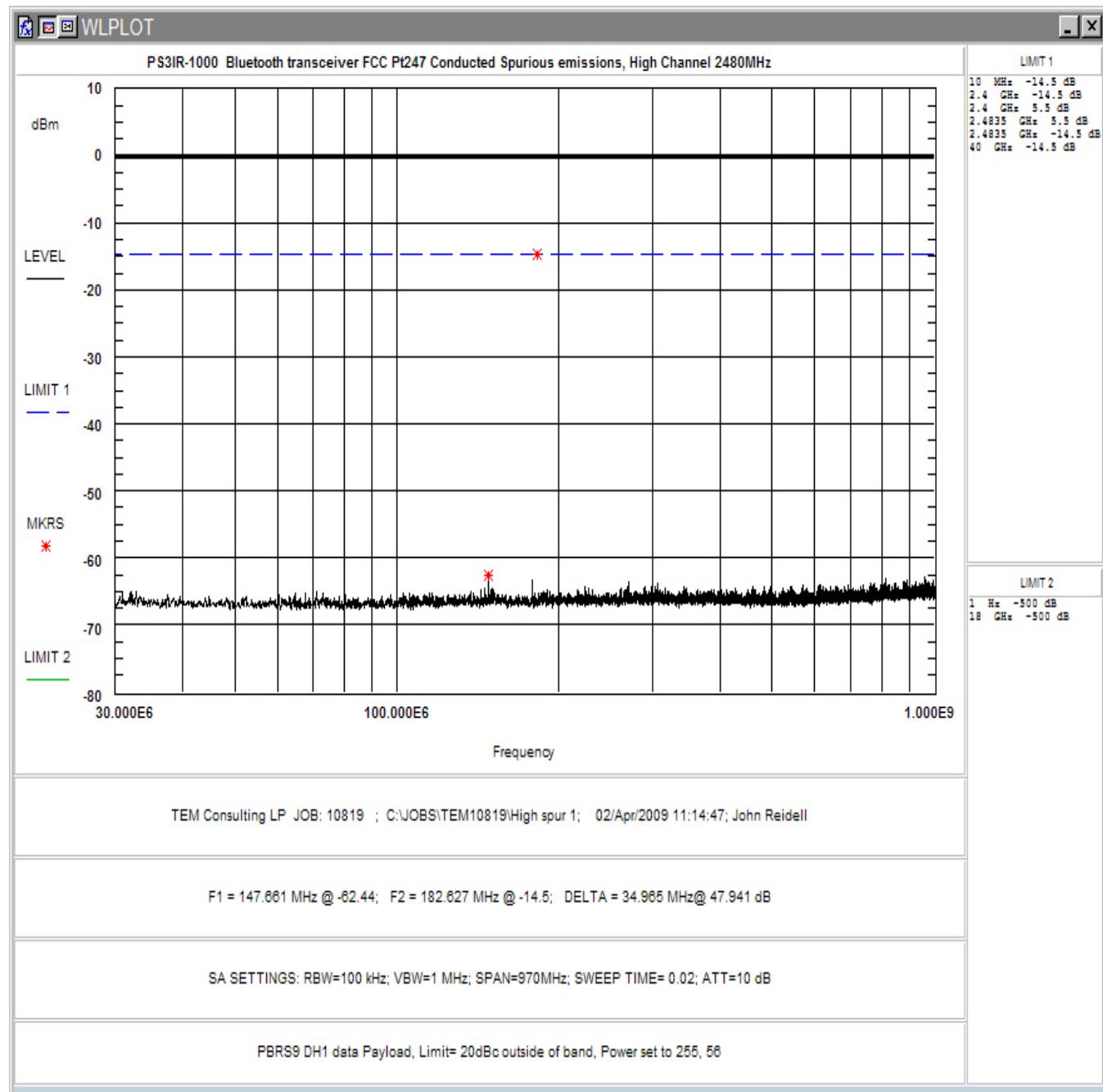


Figure 33: Conducted Spurious Emissions, High Channel 30 - 1000MHz

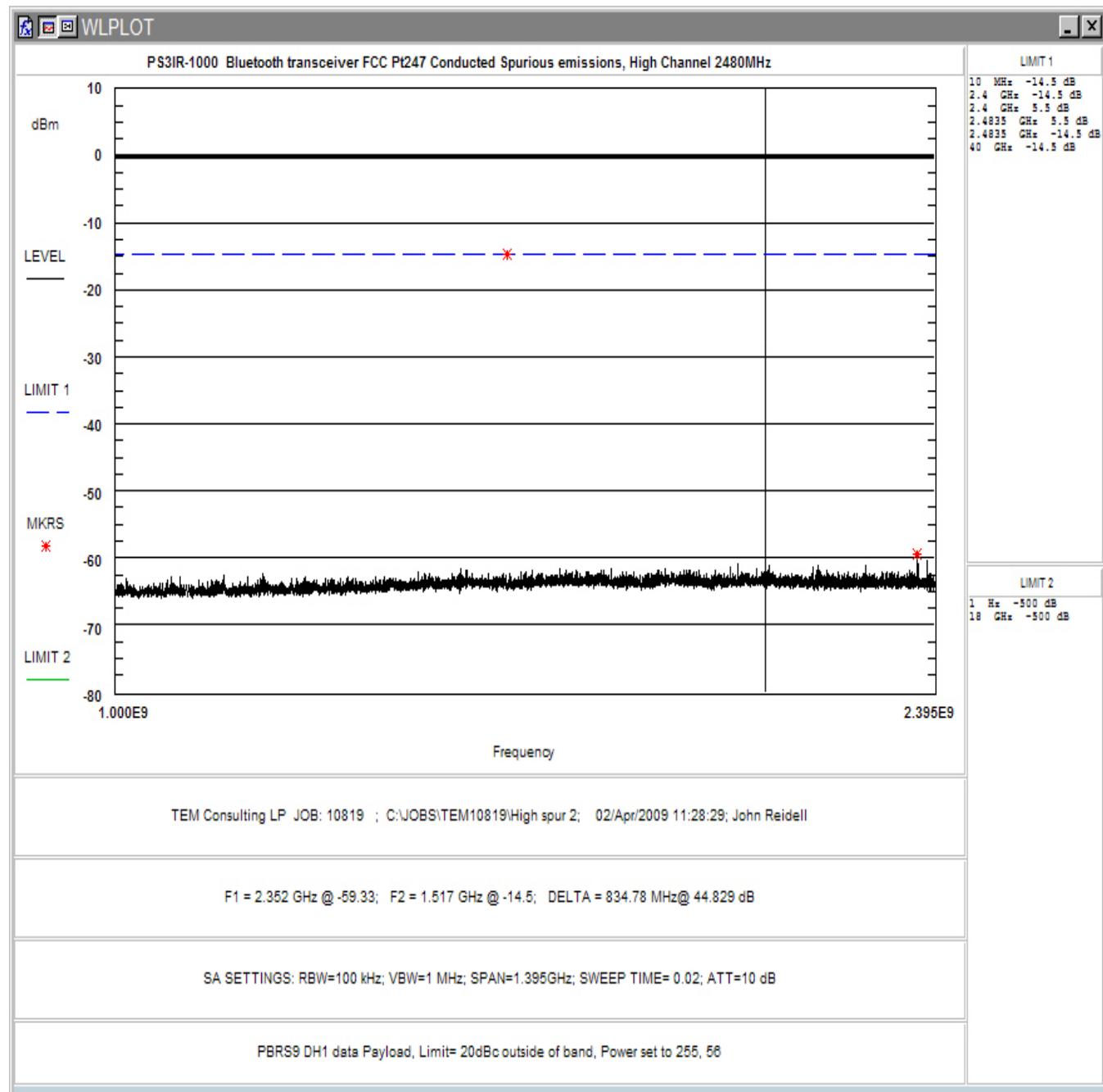


Figure 34: Conducted Spurious Emissions, High Channel 1 – 2.395GHz

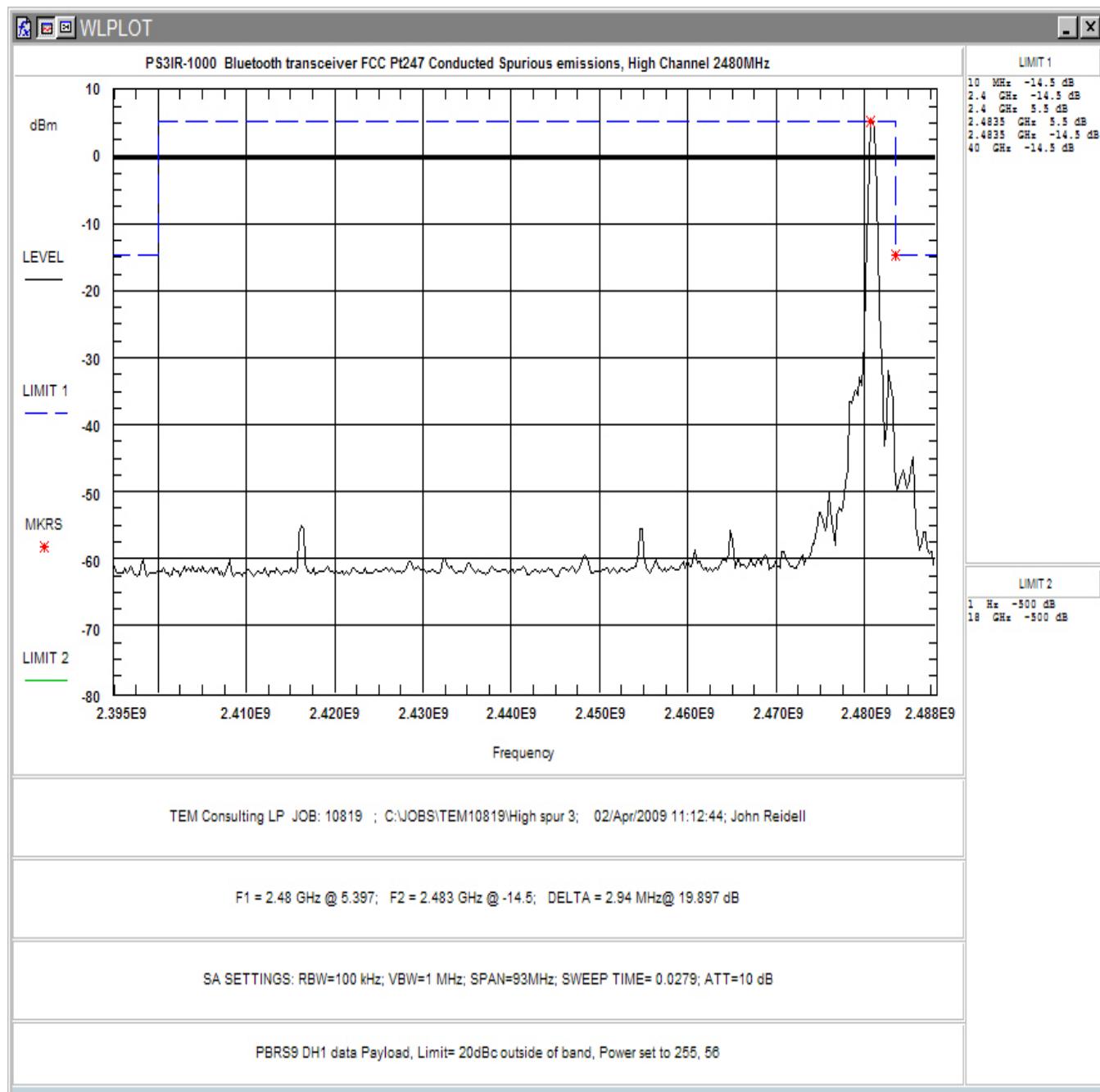


Figure 35: Conducted Spurious Emissions, High Channel 2.395 – 2.488GHz

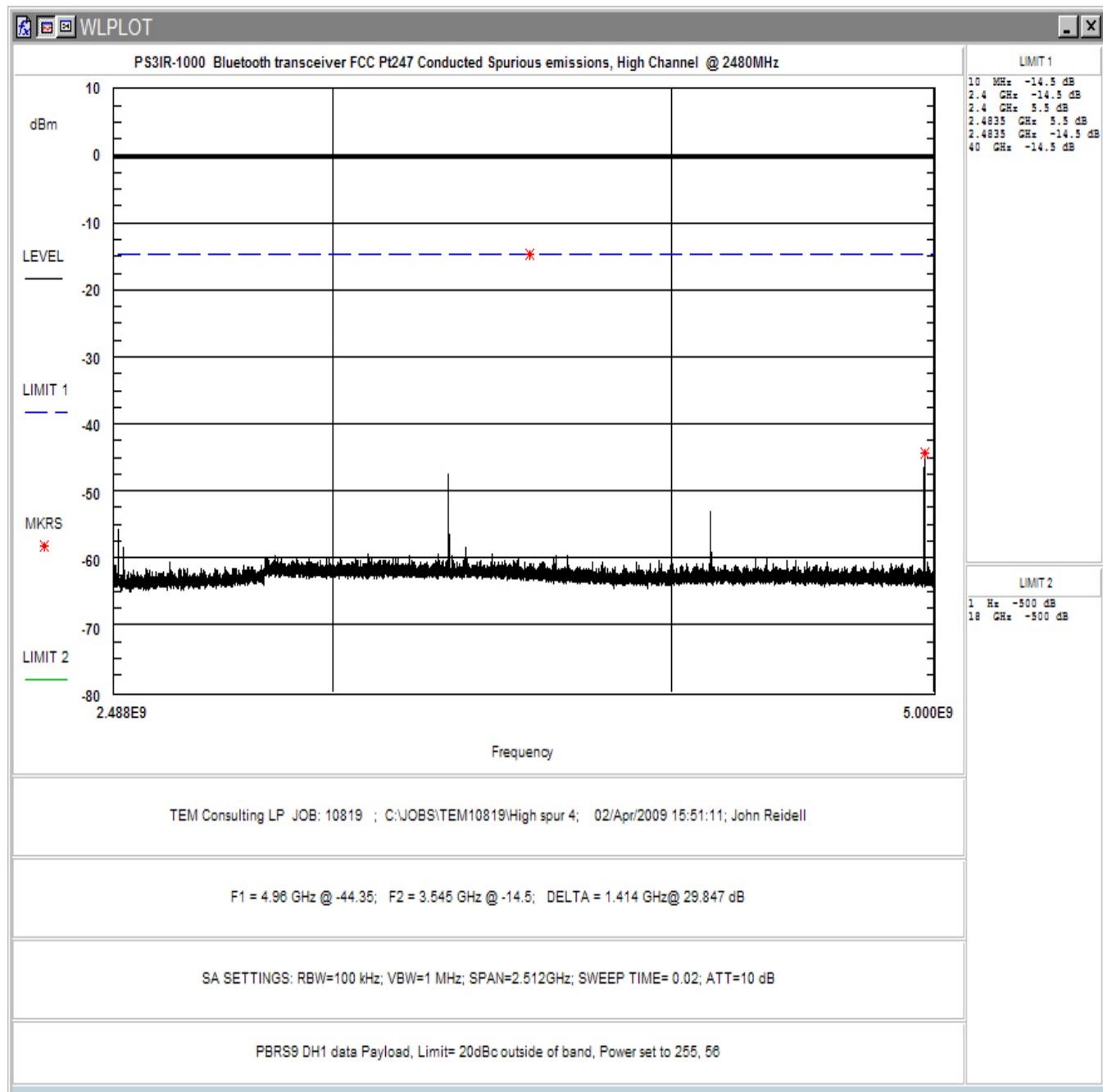


Figure 36: Conducted Spurious Emissions, High Channel 2.488 - 5GHz

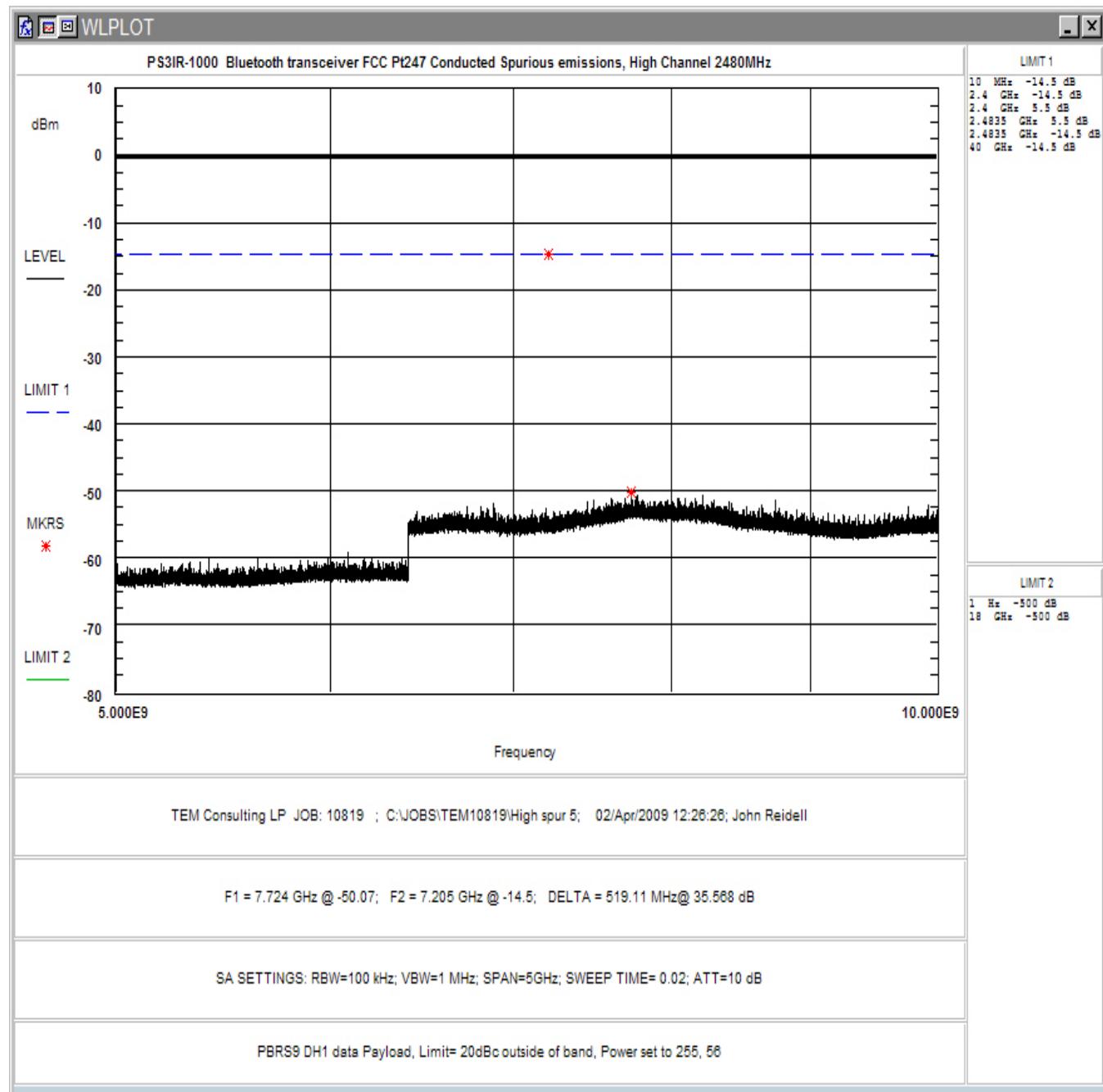


Figure 37: Conducted Spurious Emissions, High Channel 5 - 10GHz

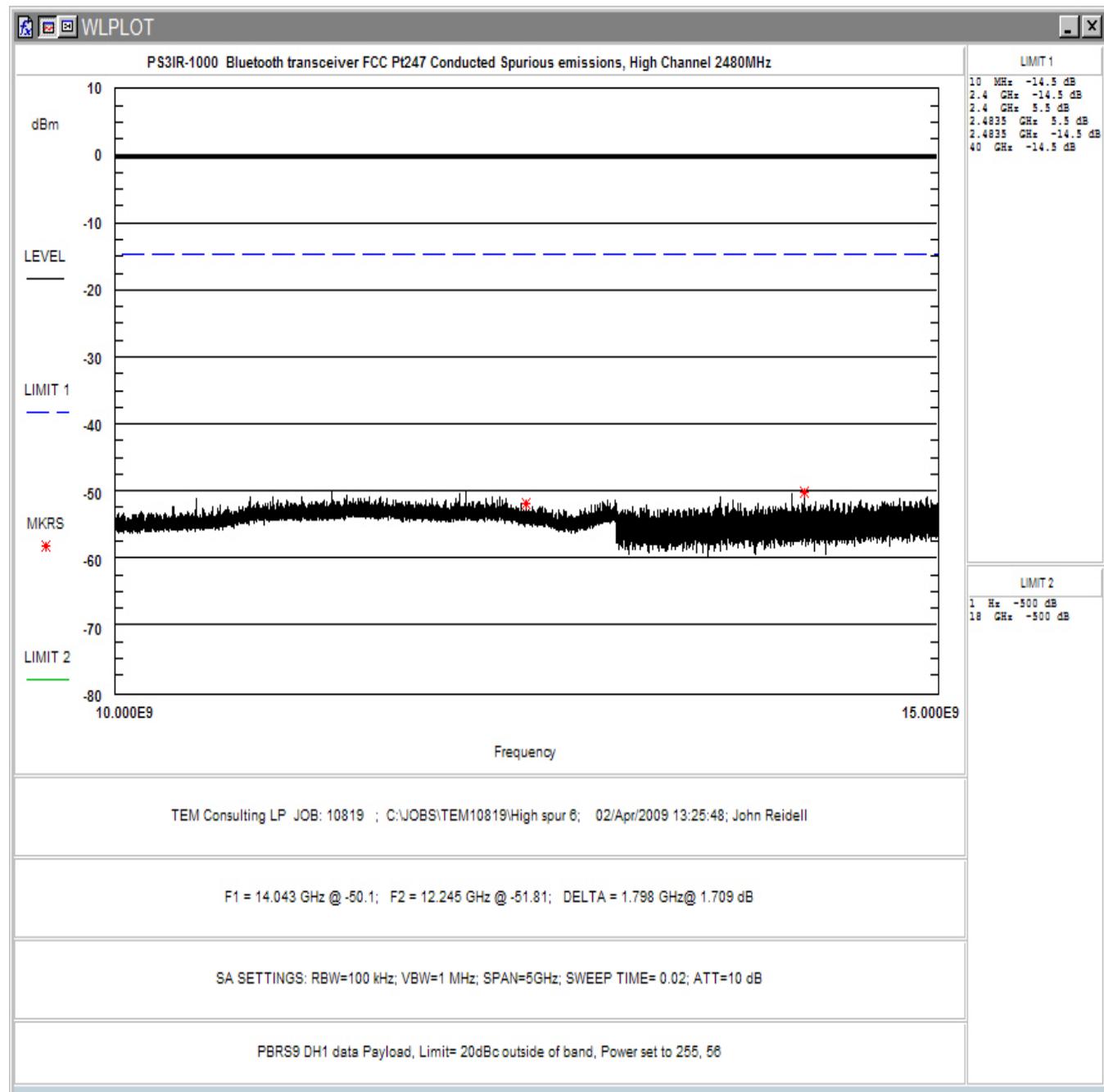


Figure 38: Conducted Spurious Emissions, High Channel 10 - 15GHz

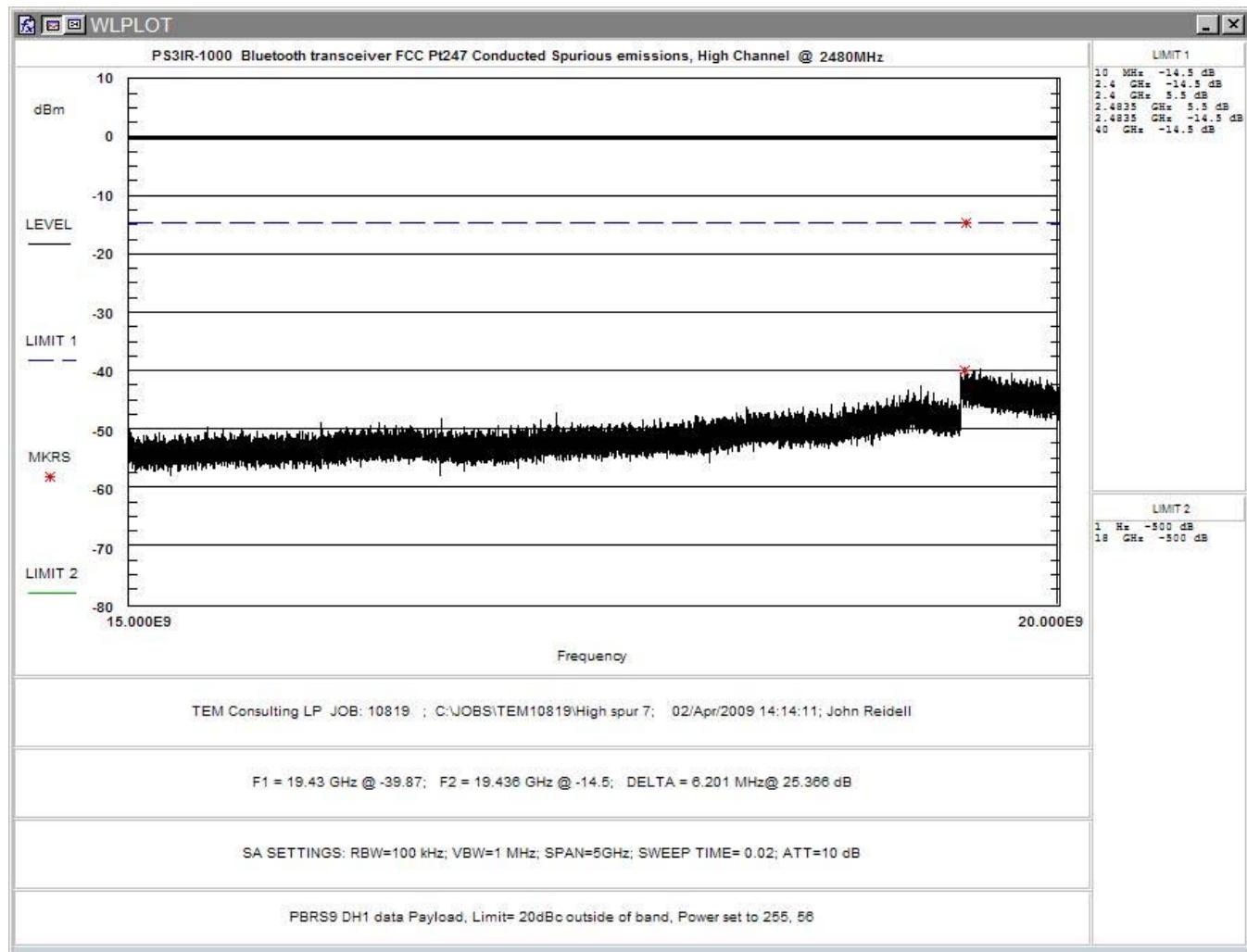


Figure 39: Conducted Spurious Emissions, High Channel 15-20GHz

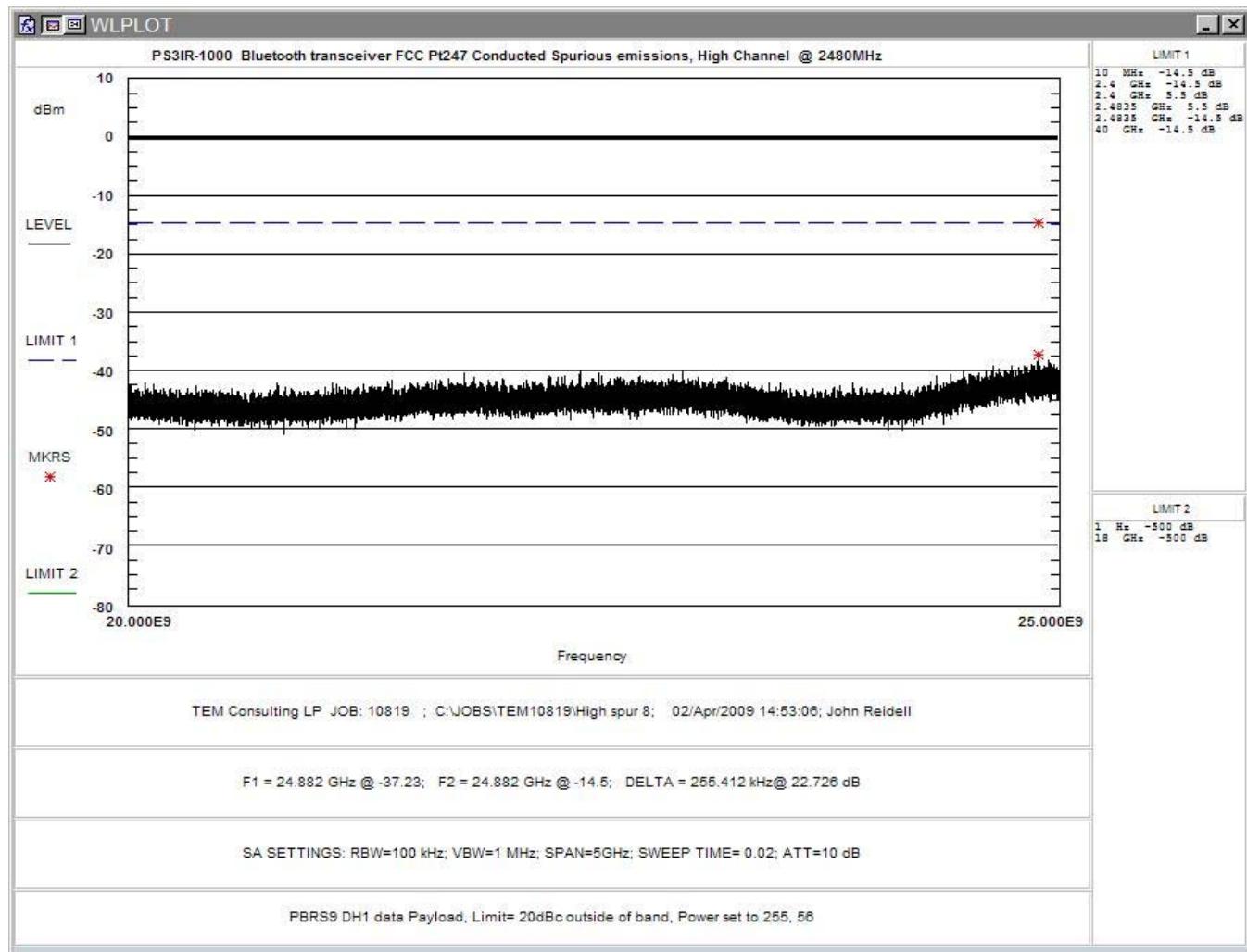


Figure 40: Conducted Spurious Emissions, High Channel 20-25GHz

5.6 Radiated Spurious Emissions: (FCC Part §2.1053)

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

5.6.1 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 EUT was checked in 3 orthogonals and the worst case emissions reported.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	10 Hz (Avg.) 1MHz (Peak)

Table 8 Radiated Emission Test Data (Restricted Bands), Transmit @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)
Average								
4804.00	V	225.00	2.79	24.00	2.4	21.0	500.0	-27.5
12010.00	V	225.00	2.79	20.50	15.3	61.6	500.0	-18.2
Peak								
4804.00	V	225.00	2.79	43.00	2.4	187.0	5000.0	-28.5
12010.00	V	225.00	2.79	29.00	15.3	163.9	5000.0	-29.7
Average								
4804.00	H	225.00	2.88	24.50	2.4	22.2	500.0	-27.0
12010.00	H	225.00	2.88	20.83	15.3	64.0	500.0	-17.9
Peak								
4804.00	H	225.00	2.88	45.33	2.4	244.6	5000.0	-26.2
12010.00	H	225.00	2.88	29.83	15.3	180.4	5000.0	-28.9
Non Harmonics								
109.19	V	100.00	1.00	10.60	13.1	15.3	150.0	-19.9
111.98	V	85.00	1.00	23.10	13.5	67.3	150.0	-7.0
166.22	V	175.00	1.46	12.30	14.2	21.2	150.0	-17.0
167.99	V	0.00	1.24	12.50	14.1	21.3	150.0	-16.9
74.20	H	180.00	3.80	14.60	9.9	16.8	100.0	-15.5
111.98	H	0.00	2.60	22.15	13.5	60.4	150.0	-7.9
119.99	H	170.00	2.60	15.26	14.8	31.8	150.0	-13.5
127.99	H	25.00	3.00	27.00	15.7	137.1	150.0	-0.8
171.93	H	0.00	2.10	17.60	13.8	37.1	150.0	-12.1

Table 9 Radiated Emission Test Data (Restricted Bands), Transmit @2441MHz

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)
Average								
4882.00	V	135.00	2.62	24.50	2.6	22.6	500.0	-26.9
7323.00	V	135.00	2.62	21.33	8.3	30.2	500.0	-24.4
12205.00	V	135.00	2.62	20.83	15.2	63.1	500.0	-18.0
Peak								
4882.00	V	135.00	2.62	46.83	2.6	295.6	5000.0	-24.6
7323.00	V	135.00	2.62	30.67	8.3	88.6	5000.0	-35.0
12205.00	V	135.00	2.62	29.00	15.2	161.7	5000.0	-29.8
Average								
4882.00	H	225.00	2.80	24.67	2.6	23.0	500.0	-26.7
7323.00	H	225.00	2.80	21.50	8.3	30.8	500.0	-24.2
12205.00	H	225.00	2.80	20.67	15.2	62.0	500.0	-18.1
Peak								
4882.00	H	225.00	2.80	46.33	2.6	279.0	5000.0	-25.1
7323.00	H	225.00	2.80	29.17	8.3	74.5	5000.0	-36.5
12205.00	H	225.00	2.80	29.33	15.2	168.0	5000.0	-29.5
Non Harmonics								
109.19	V	100.00	1.00	10.60	13.1	15.3	150.0	-19.9
111.98	V	85.00	1.00	23.10	13.5	67.3	150.0	-7.0
166.22	V	175.00	1.46	12.30	14.2	21.2	150.0	-17.0
167.99	V	0.00	1.24	12.50	14.1	21.3	150.0	-16.9
74.20	H	180.00	3.80	14.60	9.9	16.8	100.0	-15.5
111.98	H	0.00	2.60	22.15	13.5	60.4	150.0	-7.9
119.99	H	170.00	2.60	15.26	14.8	31.8	150.0	-13.5
127.99	H	25.00	3.00	27.00	15.7	137.1	150.0	-0.8
171.93	H	0.00	2.10	17.60	13.8	37.1	150.0	-12.1

Table 10 Radiated Emission Test Data (Restricted Bands), Transmit @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)
Average								
4960.00	V	225.00	2.86	25.67	2.7	26.3	500.0	-25.6
7440.00	V	225.00	2.86	21.50	8.3	30.9	500.0	-24.2
12400.0	V	225.00	2.86	20.83	15.1	62.3	500.0	-18.1
Peak								
4960.00	V	225.00	2.86	48.50	2.7	364.2	5000.0	-22.8
7440.00	V	225.00	2.86	30.83	8.3	90.5	5000.0	-34.8
12400.0	V	225.00	2.86	28.50	15.1	150.7	5000.0	-30.4
Average								
4960.00	H	225.00	2.73	26.17	2.7	27.9	500.0	-25.1
7440.00	H	225.00	2.73	21.50	8.3	30.9	500.0	-24.2
12400.0	H	225.00	2.73	20.67	15.1	61.2	500.0	-18.2
Peak								
4960.00	H	225.00	2.73	49.67	2.7	416.7	5000.0	-21.6
7440.00	H	225.00	2.73	30.00	8.3	82.3	5000.0	-35.7
12400.0	H	225.00	2.73	28.50	15.1	150.7	5000.0	-30.4
Non Harmonics								
109.19	V	100.00	1.00	10.60	13.1	15.3	150.0	-19.9
111.98	V	85.00	1.00	23.10	13.5	67.3	150.0	-7.0
166.22	V	175.00	1.46	12.30	14.2	21.2	150.0	-17.0
167.99	V	0.00	1.24	12.50	14.1	21.3	150.0	-16.9
74.20	H	180.00	3.80	14.60	9.9	16.8	100.0	-15.5
111.98	H	0.00	2.60	22.15	13.5	60.4	150.0	-7.9
119.99	H	170.00	2.60	15.26	14.8	31.8	150.0	-13.5
127.99	H	25.00	3.00	27.00	15.7	137.1	150.0	-0.8
171.93	H	0.00	2.10	17.60	13.8	37.1	150.0	-12.1

Notes: None

Test Engineer(s): John Reidell

Test Date(s): 4/10/2009

5.7 Receiver Radiated Spurious Emissions: (RSS-Gen [7.2.3.2])

The EUT must comply with the requirements for radiated spurious emissions from the receiver. These emissions must meet the limits specified in RSS-Gen.

5.7.1 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. Additionally, as the device is portable, the emissions were checked in three orthogonal with the worst case being reported. The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	100kHz	>100 kHz
>1000 MHz	1 MHz	10 Hz (Avg.)

5.7.2 Test Summary

The EUT complied with the requirements for receiver radiated emissions IC RSS-Gen.

Table 11 Radiated Emission Test Data (Receiver)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)
33.38	V	0.00	1.00	9.10	18.8	24.8	100.0	-12.1
47.99	V	90.00	1.00	15.50	9.0	16.8	100.0	-15.5
109.36	V	180.00	1.94	5.50	13.1	8.5	150.0	-24.9
111.96	V	135.00	2.50	11.40	13.5	17.5	150.0	-18.7
114.58	V	170.00	2.50	12.40	13.8	20.4	150.0	-17.3
147.17	V	90.00	3.20	9.40	14.2	15.1	150.0	-19.9
161.49	V	250.00	2.30	12.20	14.3	21.1	150.0	-17.0
199.85	V	100.00	2.30	16.90	14.3	36.3	150.0	-12.3
730.15	V	190.00	1.21	6.90	23.3	32.3	200.0	-15.8
900.00	V	100.00	1.31	5.30	25.6	35.1	200.0	-15.1
999.99	V	270.00	1.00	5.33	27.1	41.7	500.0	-21.6
1192.50	V	90.00	1.96	9.83	-7.6	1.3	500.0	-51.7
1300.00	V	270.00	1.30	11.00	-6.8	1.6	500.0	-49.8
1359.88	V	40.00	1.29	11.67	-6.4	1.8	500.0	-48.7
1400.00	V	270.00	1.18	10.33	-6.1	1.6	500.0	-49.8
1457.50	V	270.00	1.14	11.00	-5.8	1.8	500.0	-48.7
1500.00	V	270.00	1.14	13.50	-5.5	2.5	500.0	-46.0
2252.51	V	325.00	1.09	7.67	-3.5	1.6	500.0	-49.8
40.67	H	125.00	1.66	8.20	13.4	12.1	100.0	-18.4
47.99	H	145.00	4.00	18.90	9.0	24.9	100.0	-12.1
112.35	H	45.00	3.00	14.80	13.5	26.0	150.0	-15.2
114.99	H	30.00	4.00	18.20	13.9	40.0	150.0	-11.5
145.16	H	45.00	2.50	15.40	14.3	30.6	150.0	-13.8
239.81	H	300.00	1.57	14.50	13.3	24.7	200.0	-18.2
335.98	H	195.00	1.00	12.50	16.7	29.0	200.0	-16.8
383.98	H	130.00	1.00	10.00	17.9	24.8	200.0	-18.1
431.98	H	125.00	2.60	8.00	18.7	21.6	200.0	-19.4
499.98	H	80.00	2.00	5.80	19.9	19.3	200.0	-20.3
815.94	H	90.00	1.10	6.60	24.3	34.9	200.0	-15.2
900.00	H	0.00	1.20	6.56	25.6	40.6	200.0	-13.9
927.50	H	0.00	1.00	7.70	26.1	49.1	200.0	-12.2
959.96	H	0.00	1.00	3.20	25.6	27.7	200.0	-17.2
1037.27	H	135.00	2.94	10.83	-8.9	1.3	500.0	-52.0
1300.00	H	0.00	2.54	6.83	-6.8	1.0	500.0	-54.0
1400.00	H	270.00	2.49	7.50	-6.1	1.2	500.0	-52.6
1457.50	H	270.00	2.58	9.67	-5.8	1.6	500.0	-50.1
1500.00	H	265.00	2.52	10.67	-5.5	1.8	500.0	-48.8
2252.50	H	45.00	2.69	8.00	-3.5	1.7	500.0	-49.5

Conducted Emissions

5.7.3 Requirements

Test Arrangement: Table Top

Compliance Standard: FCC Part 15 (7/2008), Class B

FCC Compliance Limits		
Frequency	Quasi-peak	Average
0.15-0.5MHz	66 to 56dB μ V	56 to 46dB μ V
0.5 to 5MHz	56dB μ V	46dB μ V
0.5-30MHz	60dB μ V	50dB μ V

5.7.4 Test Procedure

The EUT is battery operated and the battery is charged via the USB port of a PC. When in the charging mode, normal operation is halted until the charging adapter is removed. AC conducted testing was performed on the EUT by connecting the charging port of the EUT to a Laptop computer USB port. The Laptop was then connected to the LISN and measurements were taken at the AC input of the Laptop power supply.

The $50\ \Omega$ 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 average measurements the post-detector filter was set to 10 Hz.

At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed.

5.7.5 Conducted Data Reduction and Reporting

At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed. The Conducted emissions level to be compared to the FCC limit is calculated as shown in the following example.

Example:

Spectrum Analyzer Voltage: VdB μ V

LISN Correction Factor: LISN dB

Cable Correction Factor: CF dB

Electric Field: $EdB\mu V = V\ dB\mu V + LISN\ dB + CF\ dB$

5.7.6 Test Data

The EUT complied with the Class B Conducted Emissions requirements. Table 12 provides the test results for phase and neutral line power line conducted emissions.

Table 12 AC Power line Conducted Emissions

NEUTRAL

Frequency (MHz)	Level QP (dB μ V)	Level AVG (dB μ V)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dB μ V)	Level Corr Avg (dB μ V)	Limit QP (dB μ V)	Limit AVG (dB μ V)	Margin QP (dB)	Margin AVG (dB)
0.155	40.2	27.0	10.1	0.3	50.6	37.4	65.7	55.7	-15.1	-18.3
0.213	34.0	21.7	10.2	0.5	44.6	32.3	63.1	53.1	-18.5	-20.7
1.708	22.2	14.0	10.5	0.2	32.9	24.7	56.0	46.0	-23.1	-21.3
3.477	20.8	8.9	10.7	0.4	31.8	20.0	56.0	46.0	-24.2	-26.0
14.384	23.4	21.8	11.3	1.3	36.0	34.4	60.0	50.0	-24.0	-15.6
25.271	16.9	8.2	11.7	1.5	30.1	21.4	60.0	50.0	-29.9	-28.6

Phase

Frequency (MHz)	Level QP (dB μ V)	Level AVG (dB μ V)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dB μ V)	Level Corr Avg (dB μ V)	Limit QP (dB μ V)	Limit AVG (dB μ V)	Margin QP (dB)	Margin AVG (dB)
0.158	40.9	26.1	10.1	0.2	51.2	36.5	65.6	55.6	-14.3	-19.1
0.375	33.5	12.4	10.2	0.3	44.0	22.9	58.4	48.4	-14.4	-25.5
3.659	21.3	9.4	10.7	0.4	32.4	20.5	56.0	46.0	-23.6	-25.5
7.700	18.2	9.7	11.0	0.8	30.0	21.5	60.0	50.0	-30.0	-28.5
13.901	23.8	20.8	11.3	1.2	36.3	33.3	60.0	50.0	-23.7	-16.7
20.926	16.7	12.0	11.5	1.5	29.7	25.0	60.0	50.0	-30.3	-25.0

Notes: None

Test Engineer(s): John Reidell

Test Date(s): 4/10/2009