INTERSTELLAR COMMUNICATIONS, INC.
Broadcast Facility Engineering

Occupied Bandwidth Measurements

KSLY (96.1MHz), San Luis Obispo, CA
KSTT (101.3 MHz), Los Osos, CA

Conforming to CFR 47 73.317(b) through 73.317(d)

September 21, 2006

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Background

KSLY (96.1 MHz), San Luis Obispo, CA and KSTT (101.3 MHz), Los Osos, CA operate on a common antenna through a combining system. The combiner allow both stations to operate on the same antenna while filtering out sum and difference frequencies that would normally be generated by the mixing of the two fundamental frequencies. The antenna is located on a tower owned by KSBY-TV, San Luis Obispo, CA in the Los Padres National Forest.

Recently, the KSLY and KSTT combined antenna was moved lower on the tower to accommodate equipment upgrades for KSBY-TV. The antenna was lowered from 108m AGL to 84m AGL.

To insure that the installation meets the requirements of 47 CFR 73.317(b) through 73.317(d), testing was done using a Rohde & Schwarz 3GHz spectrum analyzer (S/N 100062). Calibration Date August 25, 2006.

Procedure

The equipment was connected as shown in Figure 1.

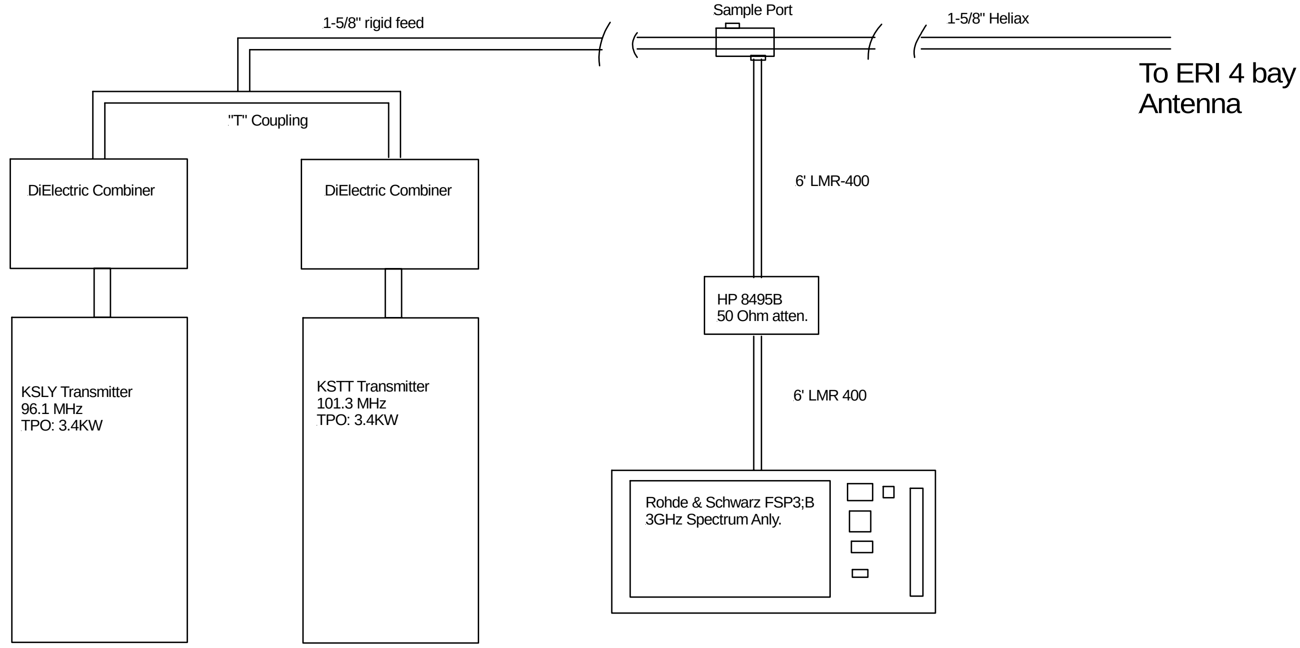

Figure 1
Test and Equipment Setup

The transmitters were found to be operating at their proper power to make licensed ERP. The sample port was installed at a location where 1-5/8" hard-line coupled to 1-5/8" Andrew Heliax. To insure that the input to the spectrum analyzer was not overloaded and producing mixing products, a variable attenuator was inserted in the line between the sample port and the spectrum analyzer. The attenuator (HP Model 8495B) has the capability of 70dB of attenuation in 10dB steps.

A calculation was made to determine the sum and difference frequencies that would likely result from the two fundamental frequencies that combine in this transmission line. A calculation was made to determine the harmonics of the fundamental frequencies as well as the sum and difference of the harmonics that would likely result.

In each measurement that was accomplished, a minimum attenuation was chosen that would show the desired signal without allowing mixing or overloading of the input of the spectrum analyzer.

The fundamental carriers were measured with 50 dB of attenuation inserted in line. The attenuator was checked against the display on the spectrum analyzer for accuracy. Each 10dB of attenuation appeared to correspond with a 10dB change in level on the analyzer. Each frequency on the calculation table (Table 1) was checked with the analyzer. The external attenuation was set to 30dB, which would allow simple math to calculate the resultant signal level using the following formula:

Pc = Pc(measured) – (Pref) – (ref attn. – meas. Attn.)

Pc = Pc(measured)-(30-(50-30))

Pc = Pc(measured) - 10

Where, ref attn. = 50dB, meas. Attn. = 30dB
Pc(measured) = measured carrier power of unknown
Pref = carrier power of fundamental

The resulting calculations are found in Table 1:

	Freq. (MHz)	Measured Signal	External Attenuation	Relative to Carrier
Fundamental 1(f1)	96.1	Figure 2	-50dB	0dB*
Fundamental 2(f2)	101.3	Figure 3	-50dB	0dB*
Harmonics				
f1 +1	192.2	Figure 4	-30dB	-88dB
f1 +2	288.3	Figure 7	-30dB	>100dB
f1 +3	384.4	unmeasureable	-30dB	>100dB
f1 +4	480.5	unmeasureable	-30dB	>100dB
f2 +1	202.6	Figure 6	-30dB	>100dB
f2 +2	303.9	Figure 8	-30dB	>100dB
f2 +3	405.2	unmeasureable	-30dB	>100dB
f2 +4	506.5	unmeasureable	-30dB	>100dB
Sums				
f1 + f2	197.4	Figure 5	-30dB	-83dB
f1.1 + f2	298.7	unmeasurable	-30dB	>100dB
f1.2 + f2	400	unmeasurable	-30dB	>100dB
f1.3 + f2	501.3	unmeasurable	-30dB	>100dB
f1.4 + f2	602.6	unmeasurable	-30dB	
f2 + f1.1	293.5	unmeasureable	-30dB	>100dB
f2 + f1.2	389.6	unmeasureable	-30dB	>100dB
f2 + f1.3	485.7	unmeasureable	-30dB	>100dB
f2 + f1.4	581.8	unmeasureable	-30dB	>100dB
Differences				
f2-f1	5.2	Figure 9	-30dB	-86dB
f2.1-f1	106.5	unmeasureable	-30dB	>100dB
f2.2-f1	207.8	unmeasureable	-30dB	>100dB
f1.1 - f2	90.9	unmeasureable	-30dB	>100dB
f2.1 - f1.1	10.4	unmeasureable	-30dB	>100dB

*Note: Carrier power is equal on both stations.

Table 1

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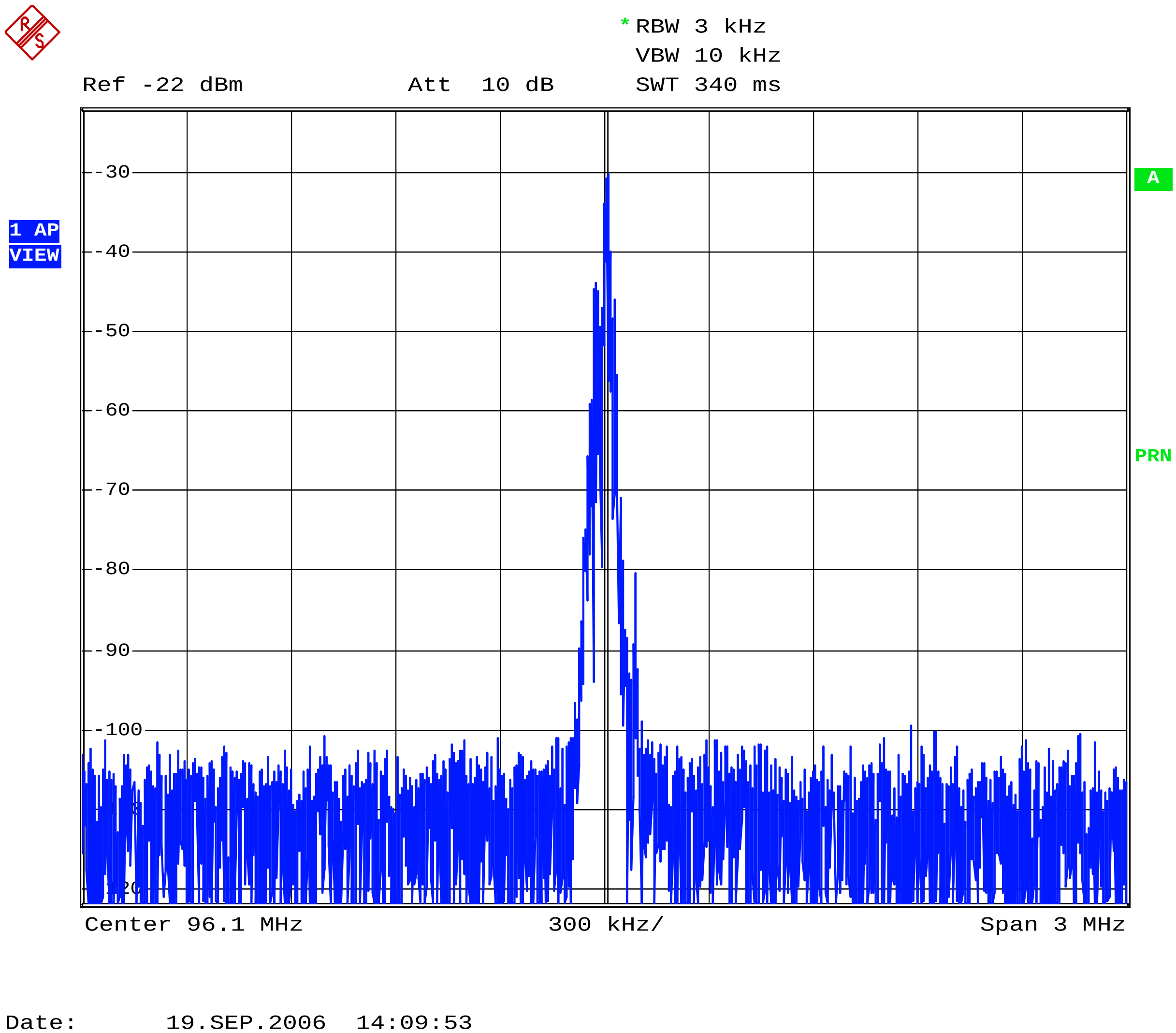

Figure 2
96.1 MHz Fundamental

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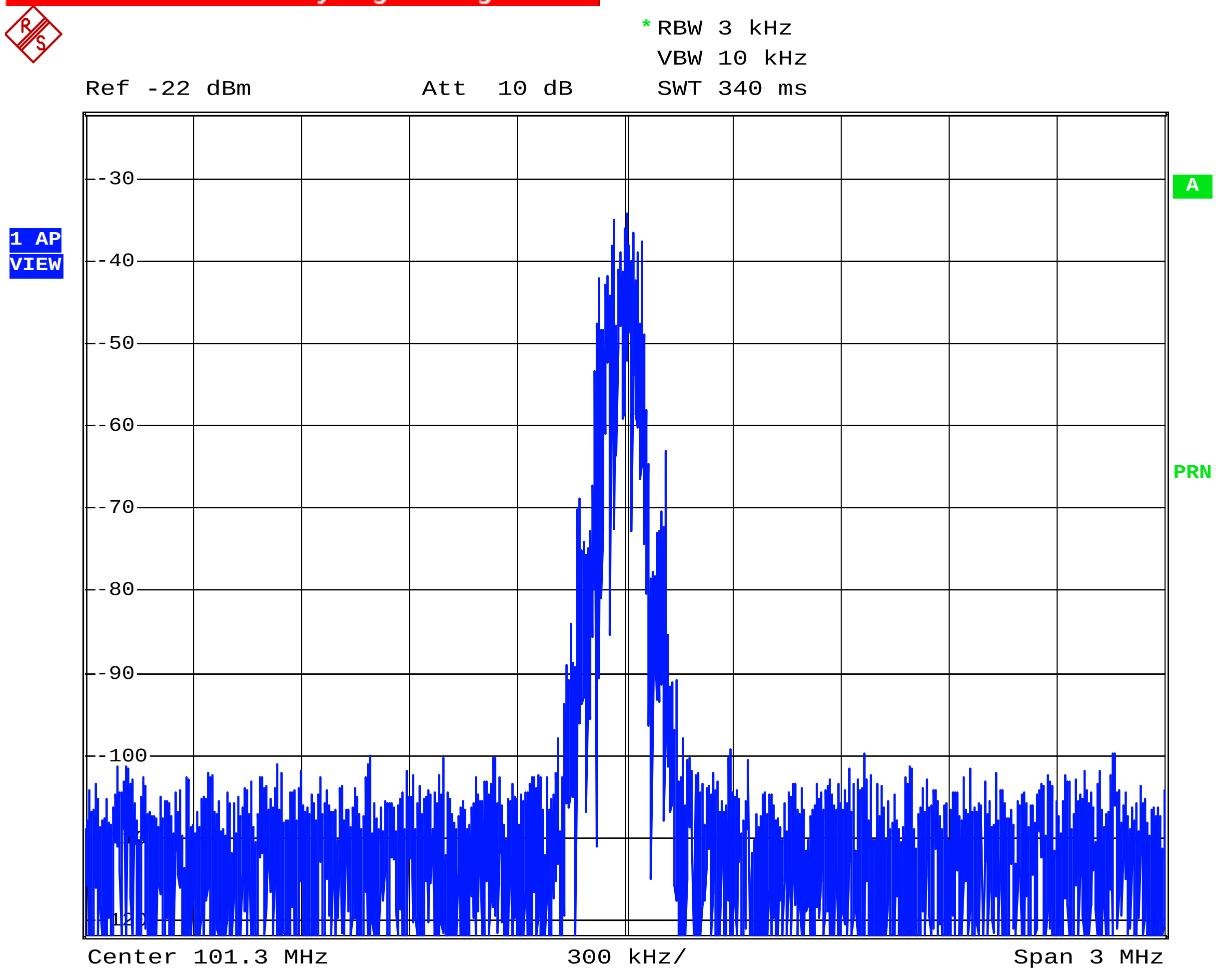

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Figure 3
101.3 MHz Fundamental

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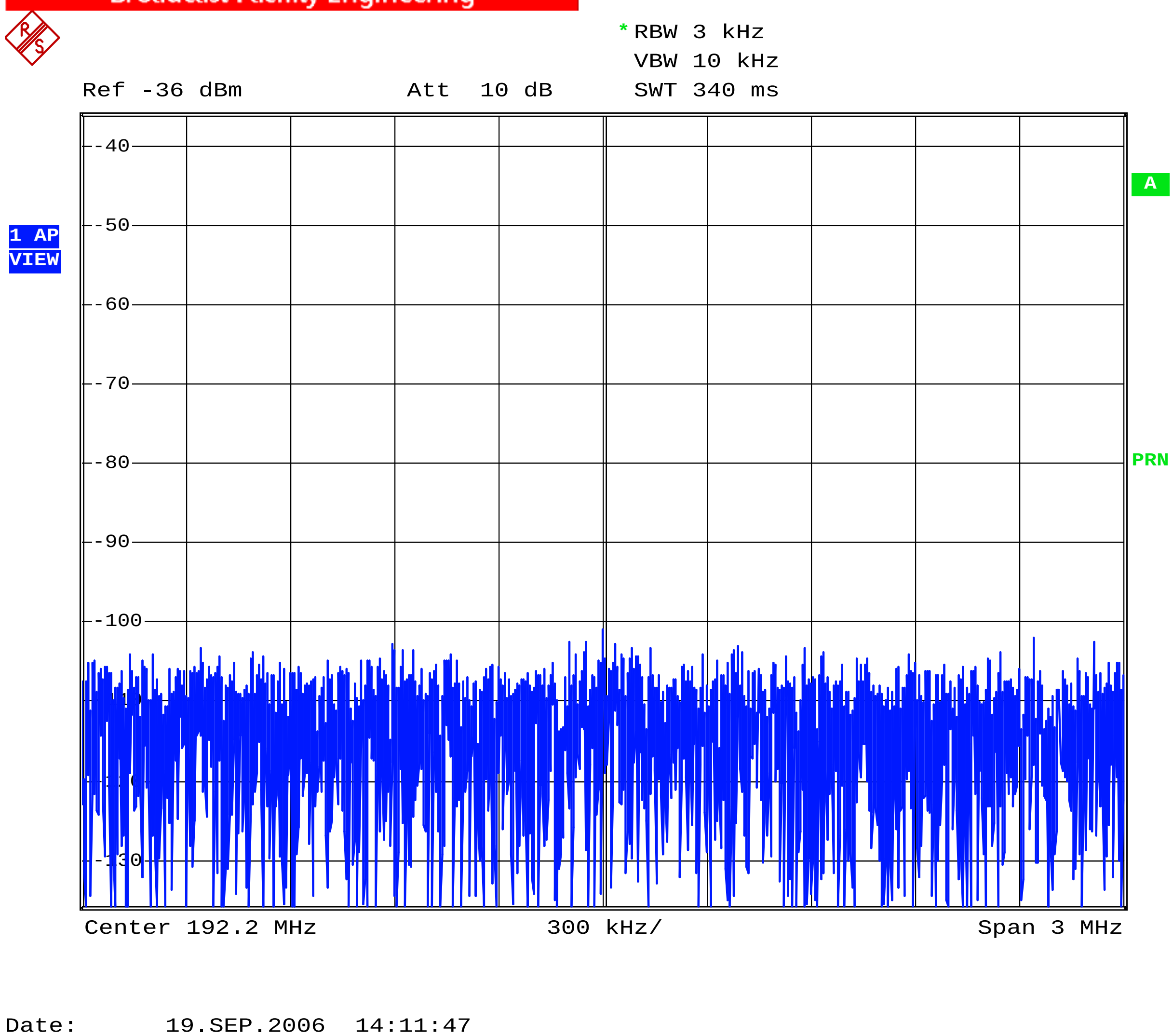

Figure 4
96.1 MHz 2nd Harmonic

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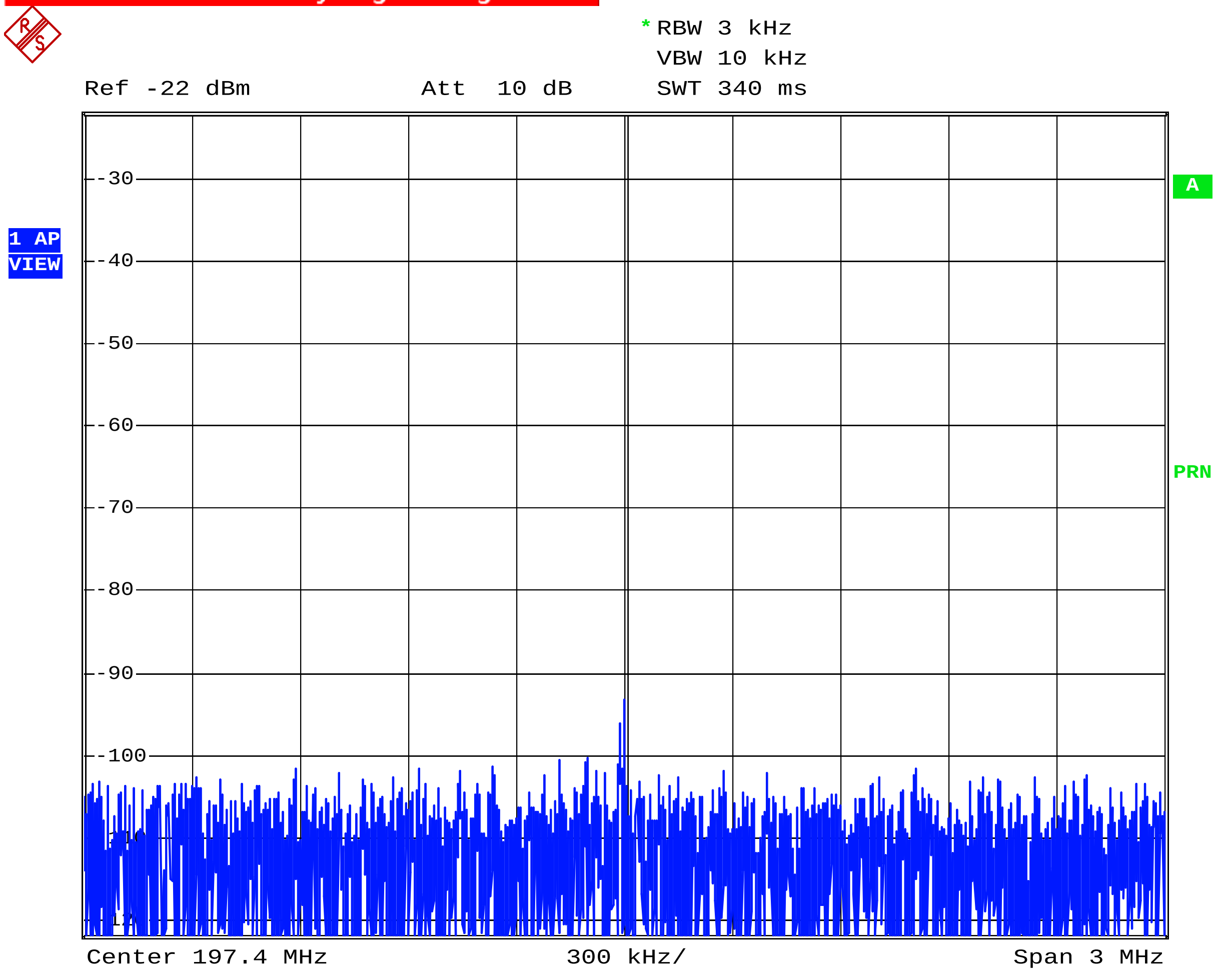

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Figure 5
96.1 MHz + 101.3 MHz

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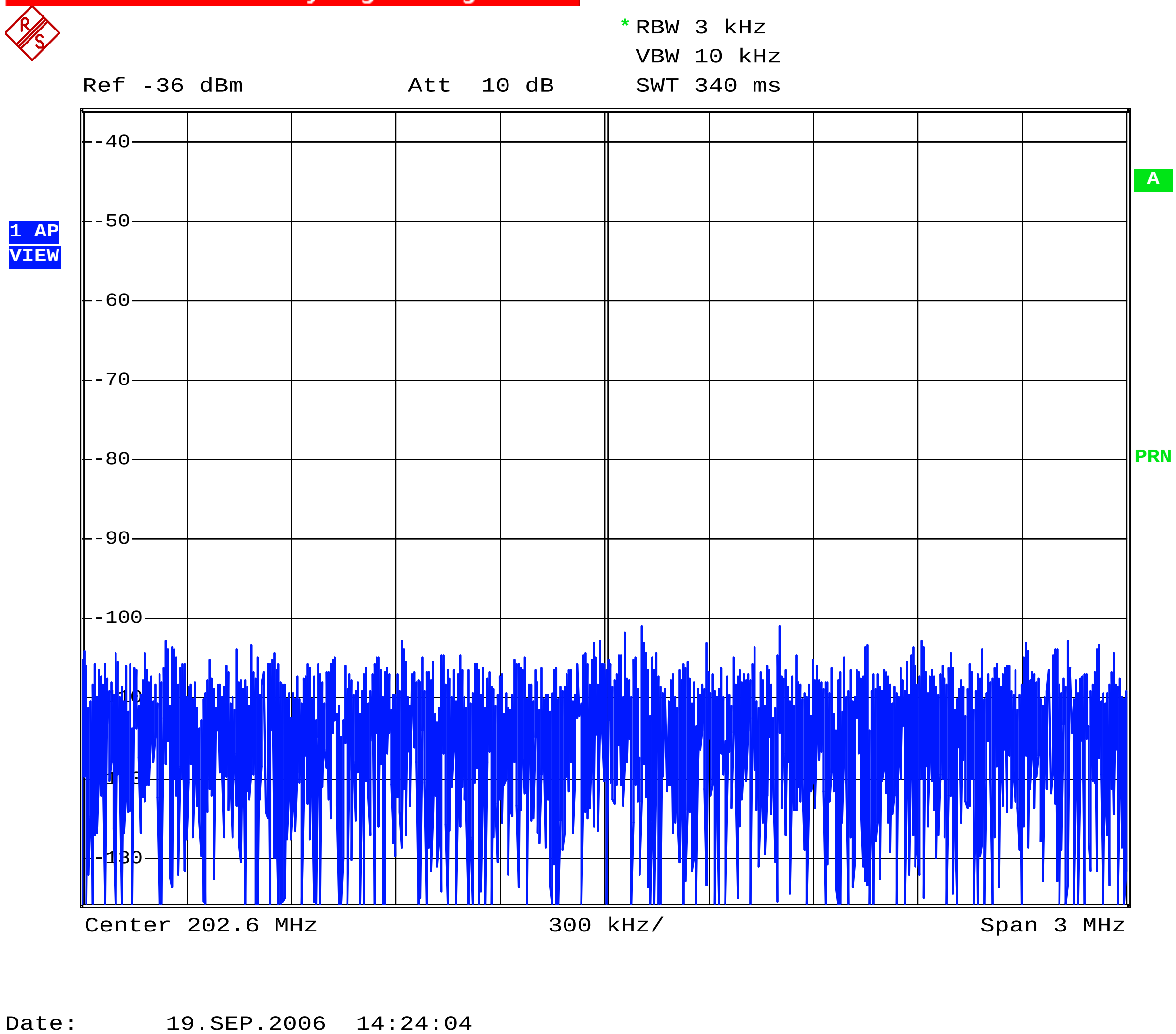

Figure 6
101.3 MHz 2nd Harmonic

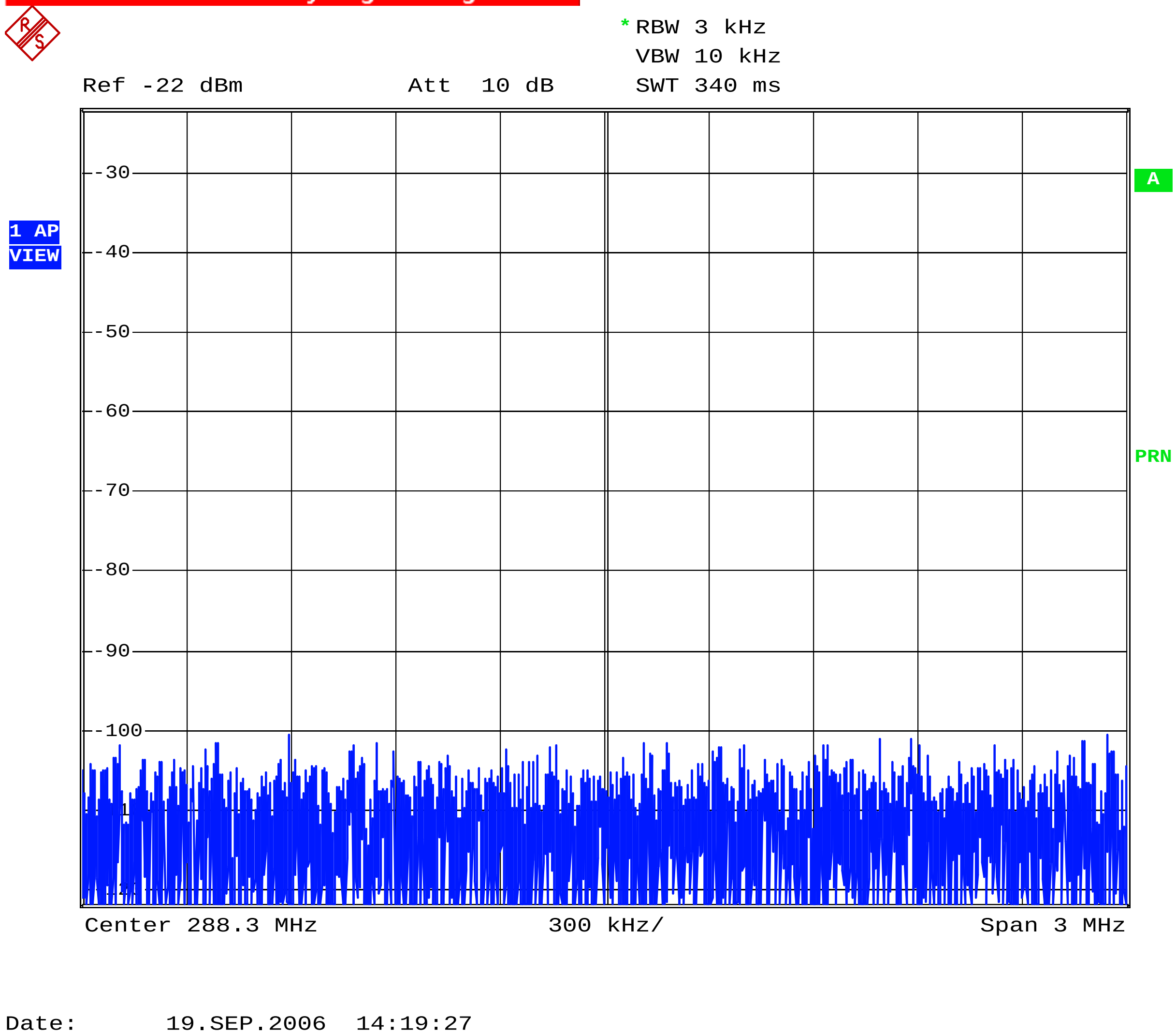

Figure 7
96.1 3rd Harmonic

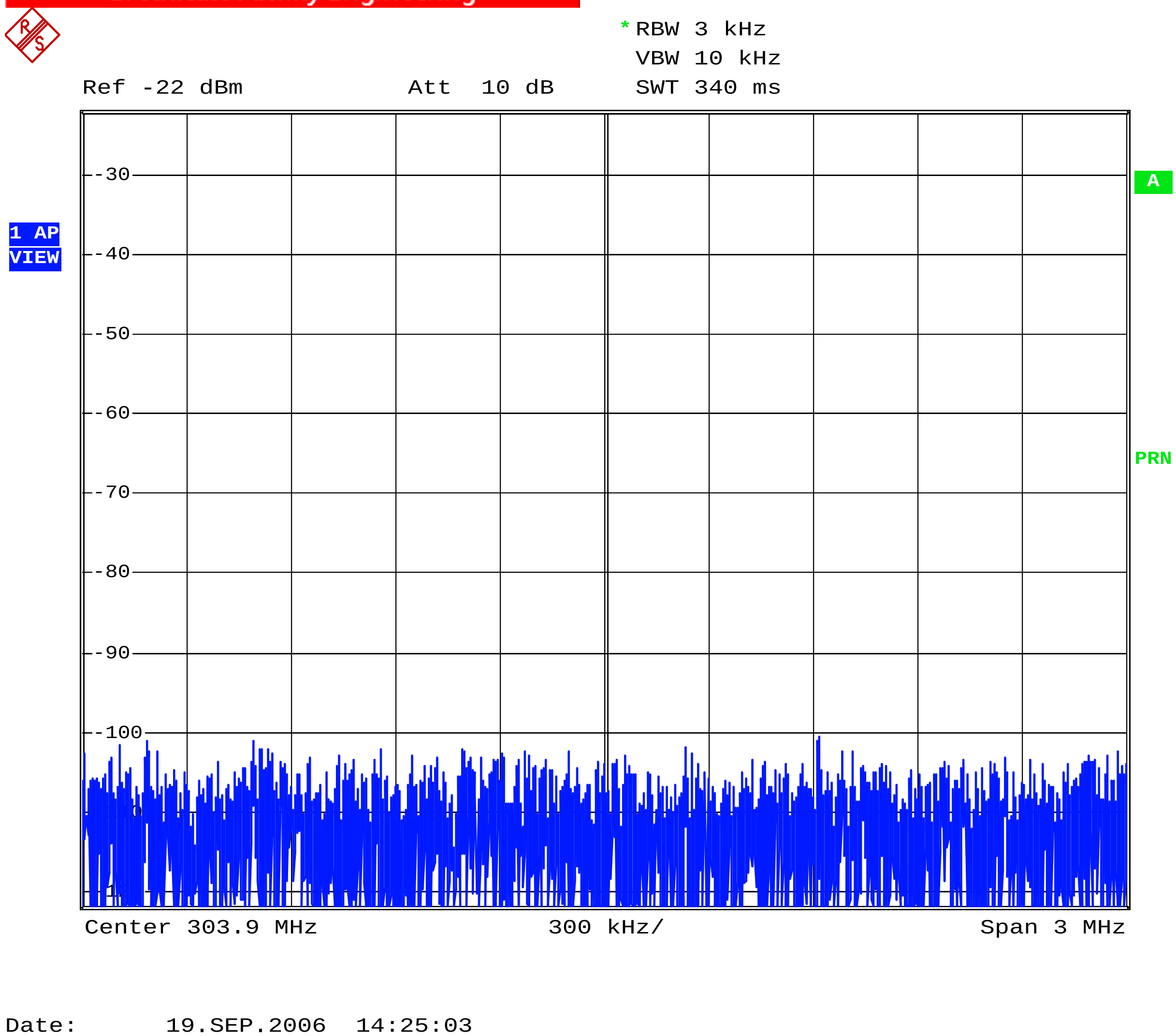

Figure 8
101.3MHz 3rd Harmonic

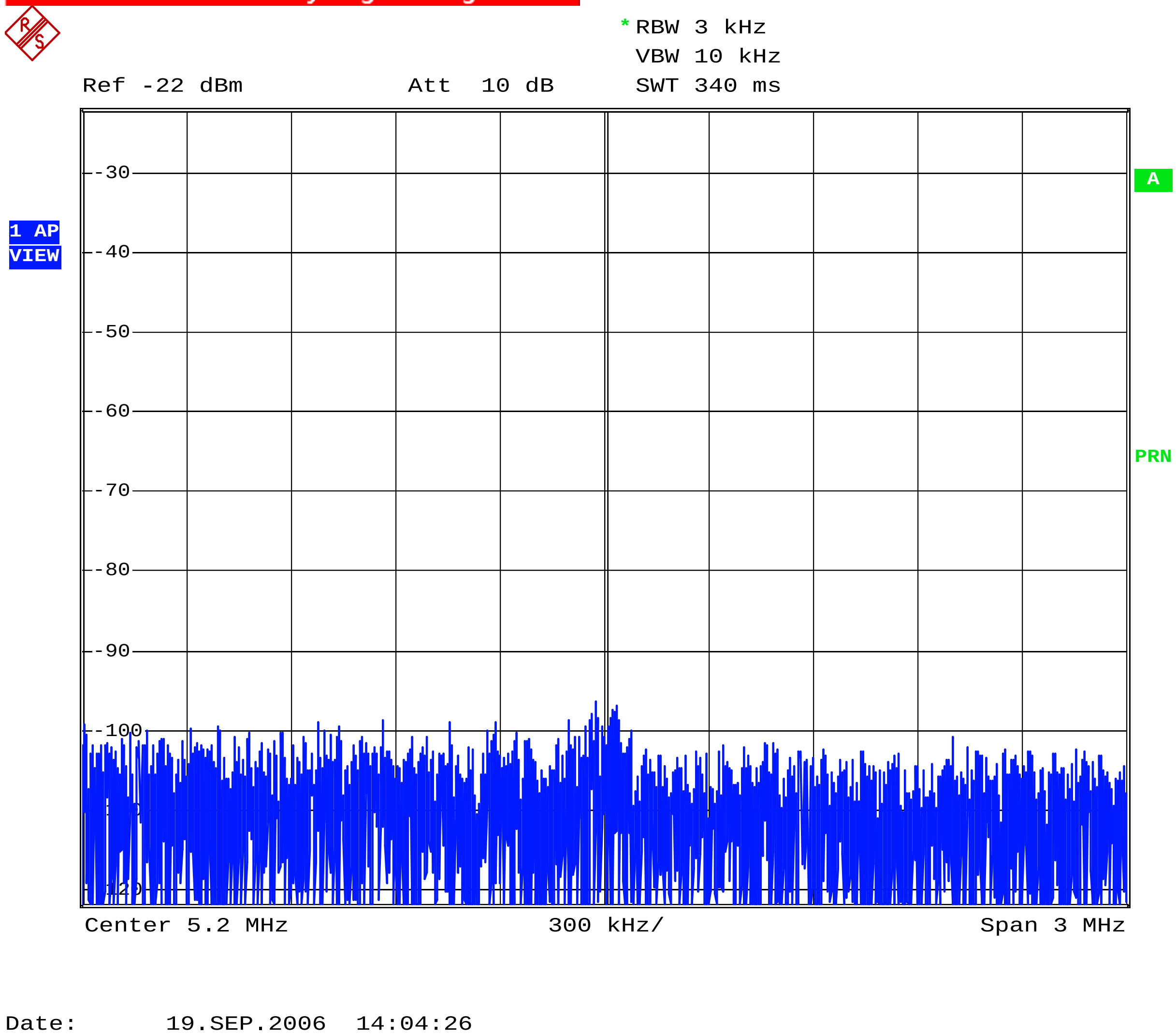

Figure 9
101.3MHz – 96.1 MHz

Conclusion

Under CFR 47 Section 73.317(b) through 73.317(d), the requirement for occupied bandwidth is as follows:

(b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated at least 25 dB below the level of the unmodulated carrier. Compliance with this requirement will be deemed to show the occupied bandwidth to be 240 kHz or less.

(c) Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the unmodulated carrier.

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 + 10 Log10 (Power, in watts) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

The data presented shows that the two stations, KSLY, San Luis Obispo, CA (96.1MHz) and KSTT, Los Osos, CA (101.3MHz) meet the requirements as even the greatest signal detected was greater than 80dB attenuated from the main carrier(s).

Certification

This is to certify that I personally made the aforementioned measurements at the date and times indicated. I hold a FCC lifetime General Class certification, have been employed as Chief Engineer for various Radio and Television stations for the past 25 years. I am an Engineering graduate of California Polytechnic State University and Michigan Technological University. My work is a matter of record with the Federal Communications Commission and other government agencies.

Signed: William H. Bordeaux

William H. Bordeaux, President
Interstellar Communications, Inc.