

ENGINEERING STATEMENT
IN SUPPORT OF
AN APPLICATION FOR STATION LICENSE
FOR COMMUNITY BOOSTER STATIONS
KJMY-FM2, KODJ-FM1, KOSY-FM1,
KRCL-FM1, KNRS-FM1, KUER-FM2 AND KZHT-FM1
ON BEHALF OF
CLEAR CHANNEL, INC.

NOVEMBER 14, 2009

MARIO HIEB, P.E.
CONSULTING ENGINEER
SALT LAKE CITY, UT

NARRATIVE

This report is a summary of tests conducted on a community antenna system for Clear Channel, Inc. on November 5, 2009 to verify system performance and compliance with FCC Rules.

The system is comprised of a community antenna manufactured by Jampro Antennas, Inc. The parameters of the antenna are as follows:

MAKE: JAMPRO

MODEL: JCPD-2/1(2) RFR.95

SERIAL NUMBER: 13363

FREQUENCY: 88-108 MHz.

POLARIZATION: Circular

AZUMITH PATTERN: Directional

GAIN: 6.4X (8.0 dBd)

BEAM TILT: 0.0 degrees

NULL FILL: 0%

INPUT POWER: 5 kW average

MAXIMUM VSWR: 1.1:1

The parameters of the main combiner are as follows:

MAKE: JAMPRO

MODEL: RCC-102-0.8 WITH RCCS-104-2.5

SERIAL NUMBER: 13364

FREQUENCY: 90.9, 84.1, 97.1, 99.5, 105.7, 106.5 MHz.

INPUT POWER: 6 X 250W

ISOLATION: >32 dB

To combine KUER-FM2, an additional combiner module is added to the main combiner.
The parameters of the additional combiner module are as follows:

MAKE: JAMPRO

MODEL: RCC-101-0.8 HB

SERIAL NUMBER: 14757

FREQUENCY: 90.1 MHz.

NB INPUT POWER: 250W + 2.5W HD Radio

ISOLATION: >32 dB

The site is located on Lewis Peak in Summit County, Utah. The recently constructed community antenna site is comprised of the following FM booster stations:

- KJMY-FM2
- KODJ-FM1
- KOSY-FM1
- KRCL-FM1
- KZHT-FM1
- KNRS-FM1
- KUER-FM2

Also at the site are other FM boosters, FM translators, two-way radio, microwave, etc., including the following FM booster stations:

- KEGA-FM7
- KBZN-FM1
- KXRK-FM1
- KJQN-FM3

Table 1 shows the power output of each of the community antenna stations and calculated maximum emission level for frequencies greater than 600 kHz from carrier.

TRANSMITTER		COMBINER			TOTAL		>600kHz
CALL	FREQ	TPO	INS LOSS	LINE LOSS	LOSSES	ERP	EMMISSION
-	MHz	W	dB	dB	dB	W	dB
KRCL-FM1	90.9	20.70	0.987	0.28	1.26	99	63.0
KODJ-FM1	94.1	205.62	0.915	0.28	1.19	1000	73.0
KZHT-FM1	97.1	243.03	1.641	0.28	1.92	1000	73.0
KJMY-FM2	99.5	209.92	1.005	0.28	1.28	1000	73.0
KNRS-FM1	105.7	236.24	1.518	0.28	1.80	1000	73.0
KOSY-FM1	106.5	212.70	1.062	0.28	1.34	1000	73.0
KUER-FM2	90.1	209.38	0.9938	0.28	1.27	1000	73.0

TABLE 1: Power output of community antenna stations and calculated maximum emission level for frequencies greater than 600 kHz from carrier.

RFR TESTING

DATE/TIME: November 5, 2009 4:20 PM

METER: Narda 8718B

SERIAL NUMBER: 1205

CALIBRATED: 4/11/06

PROBE: Isotropic E probe

SERIAL NUMBER: 11001

CALIBRATED: 4/06

CORRECTION FACTOR: 1.07

FREQUENCY: 99.9 MHz.,

PROBE BANDWIDTH: 300 kHz. – 3 GHz.

The maximum peak reading taken at the site, with the FM booster stations operating at full power, was $17.3 \mu\text{W}/\text{cm}^2$ or 8.7% of the General Population Exposure limit of $200 \mu\text{W}/\text{cm}^2$. Please note that KXRK-FM1, KEGA-FM7, and KJQN-FM3, co-located booster stations, were not operating at the time of the measurements. The stations are therefore in compliance with non-ionizing radiation requirements of OET Bulletin 65.

RFR warning signs have been posted as shown in Figures 1.



FIGURE 1: RFR warning sign.

SPECTRAL EMISSIONS

Spectral emissions were measured using the following:

ANALYZER: HP

MODEL: 8491A

SERIAL NUMBER: 3045U01127

Figure 3 is a block diagram of the test setup. Measurements are not taken at the output of the combiner due to the high gain and wide bandwidth of the community antenna; too many extraneous off-air signals appear at this point. Instead, mixing products are measured at the output of each FM transmitter. Here the unwanted emission is worst-case and the post-combiner signal is further attenuated.

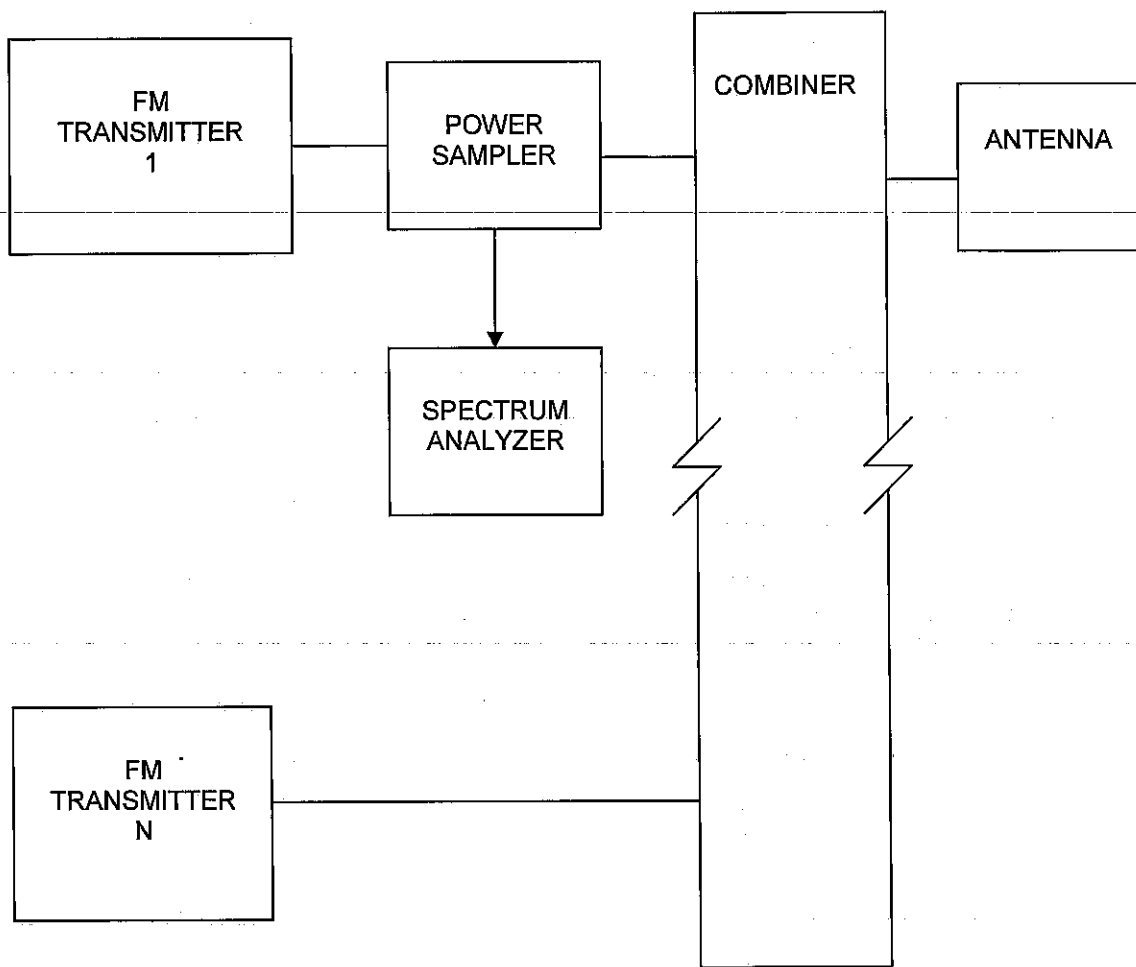


FIGURE 3: Emission Measurement Setup

Figures 4 through 10 are stored images of the actual screen display of the measured spectrum emissions of the respective stations.

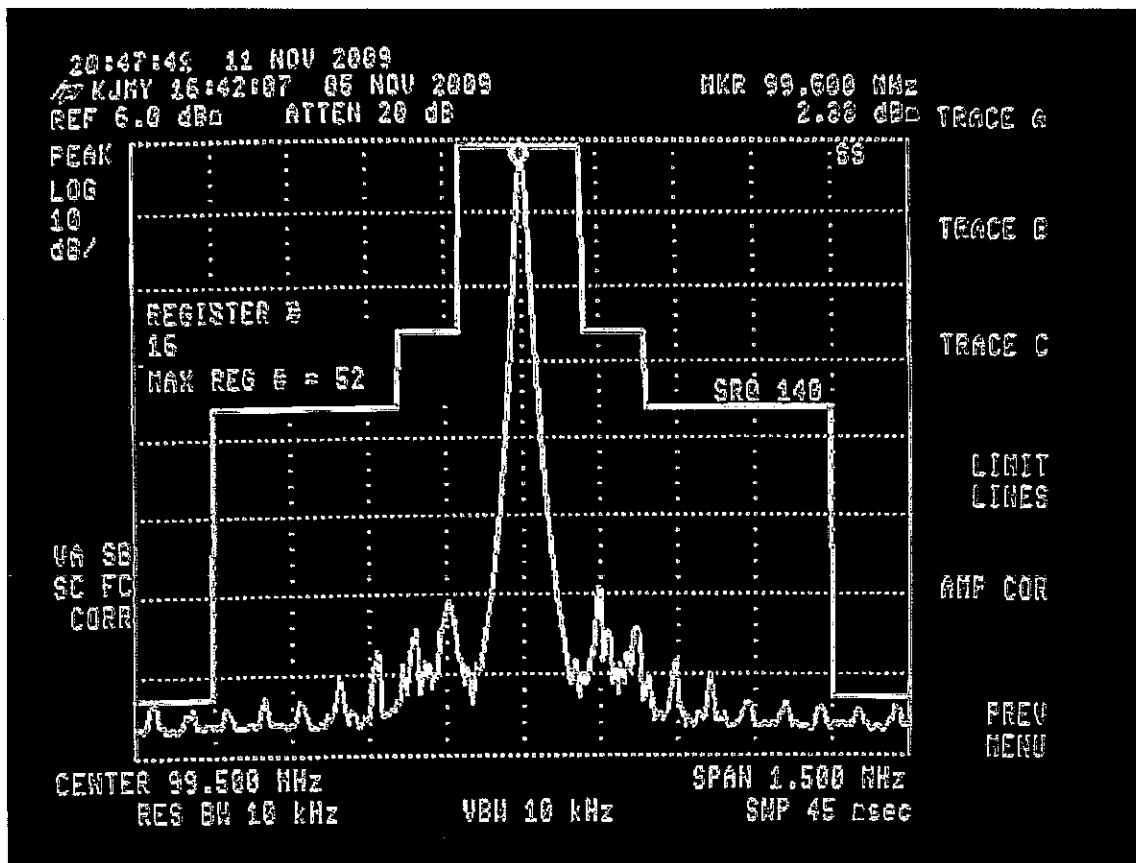


FIGURE 4: Spectrum Display of KJMY-FM1.

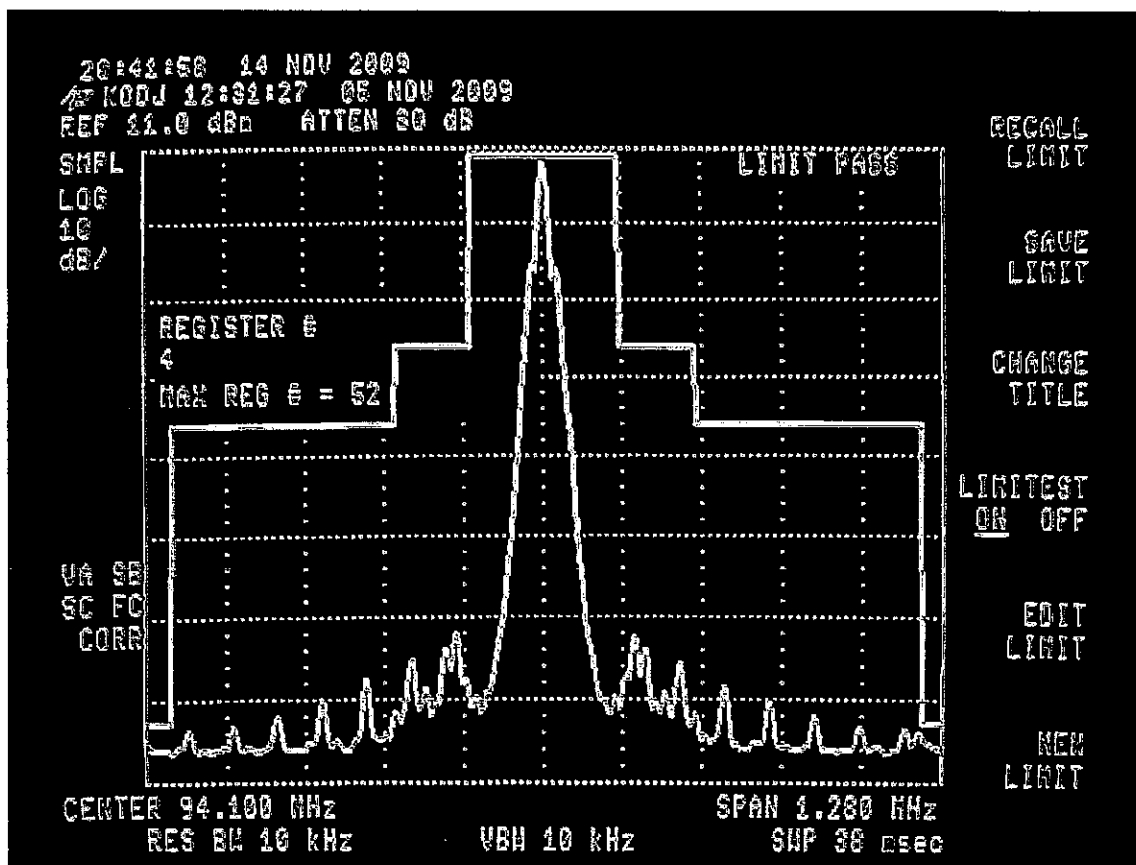


FIGURE 5: Spectrum Display of KODJ-FM1.

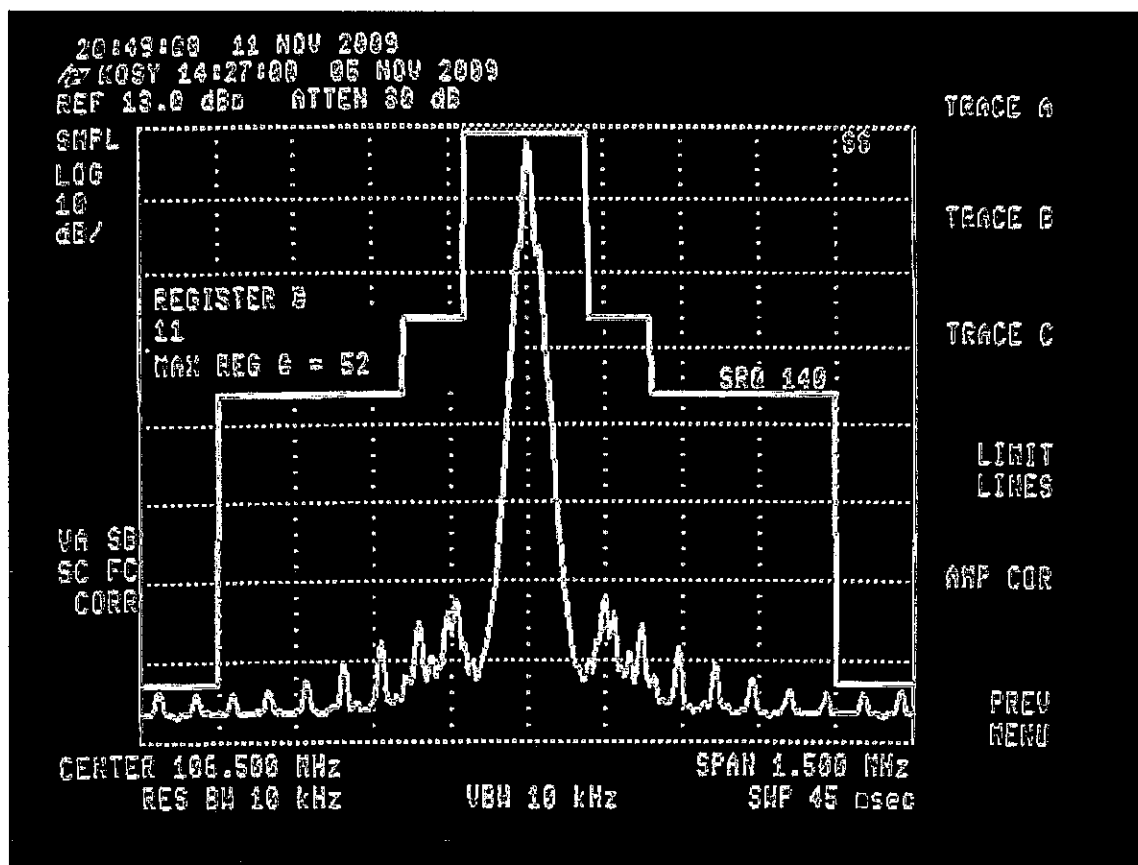


FIGURE 6: Spectrum Display of KOSY-FM1.

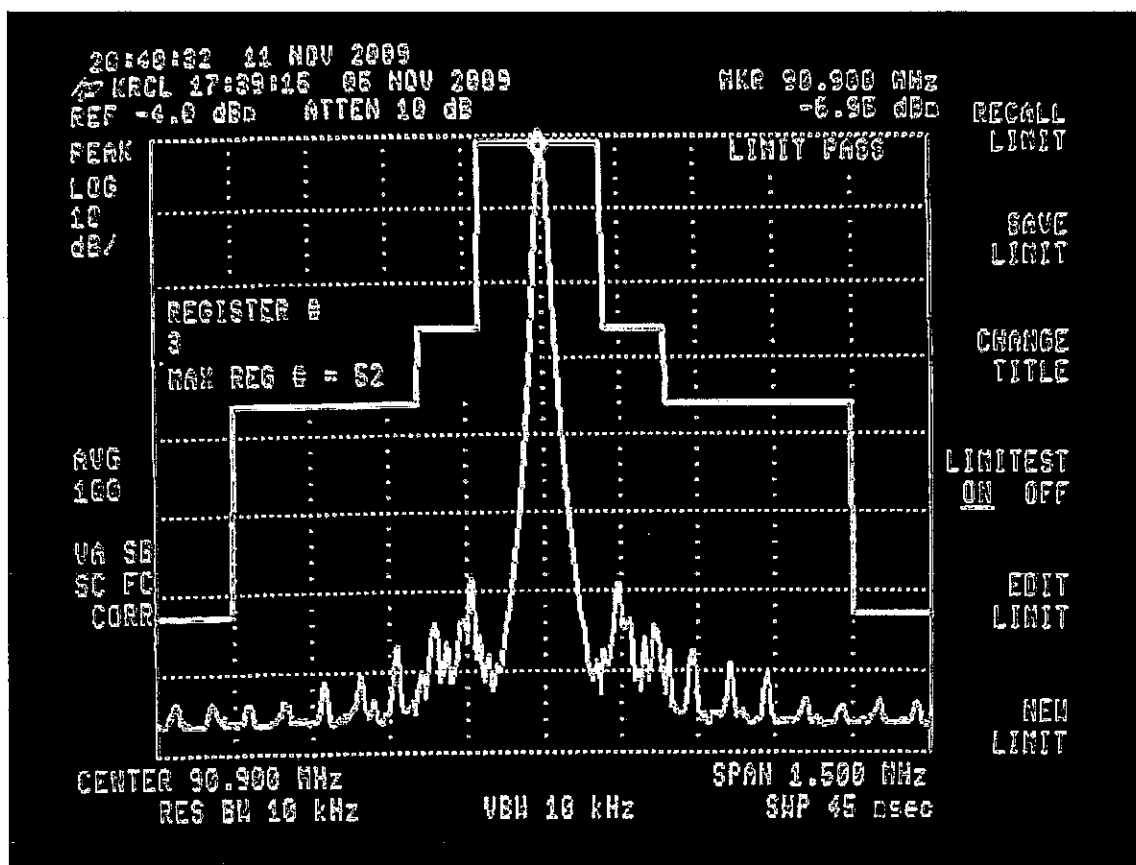


FIGURE 7: Spectrum Display of KRCL-FM1.

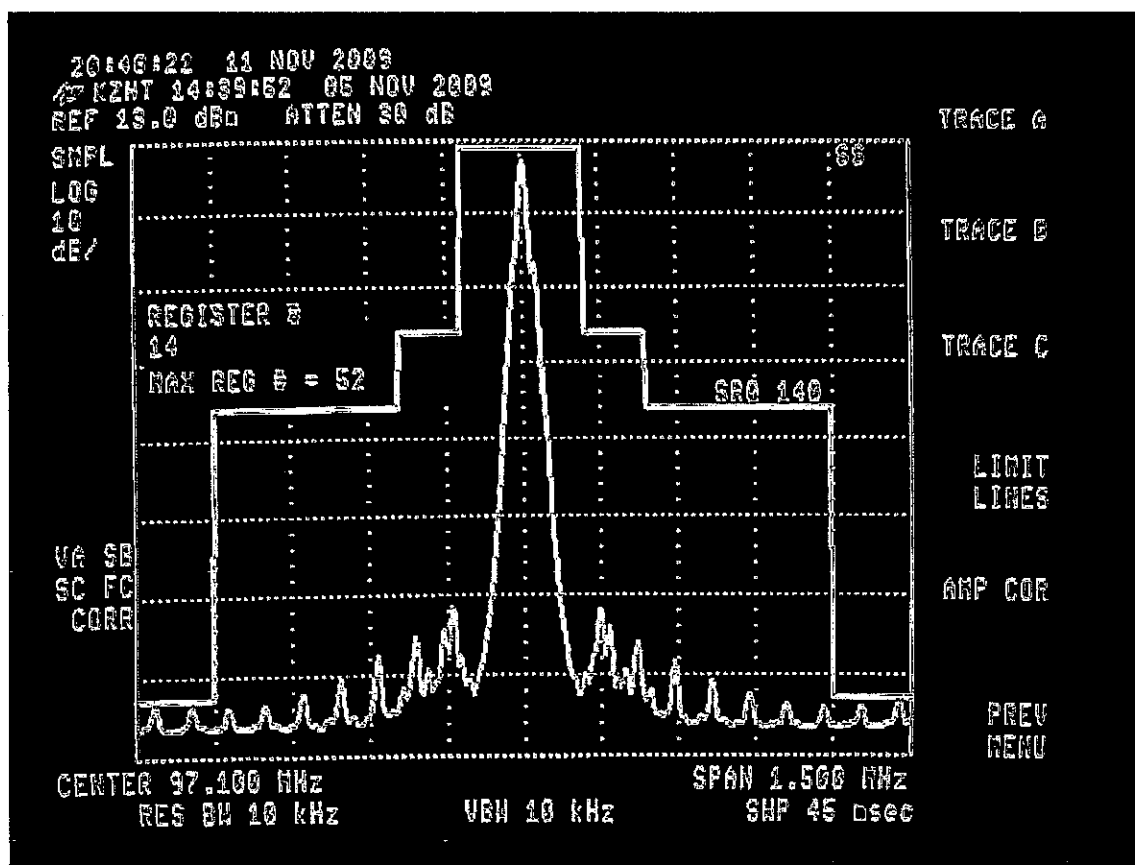


FIGURE 8: Spectrum Display of KZHT-FM1.

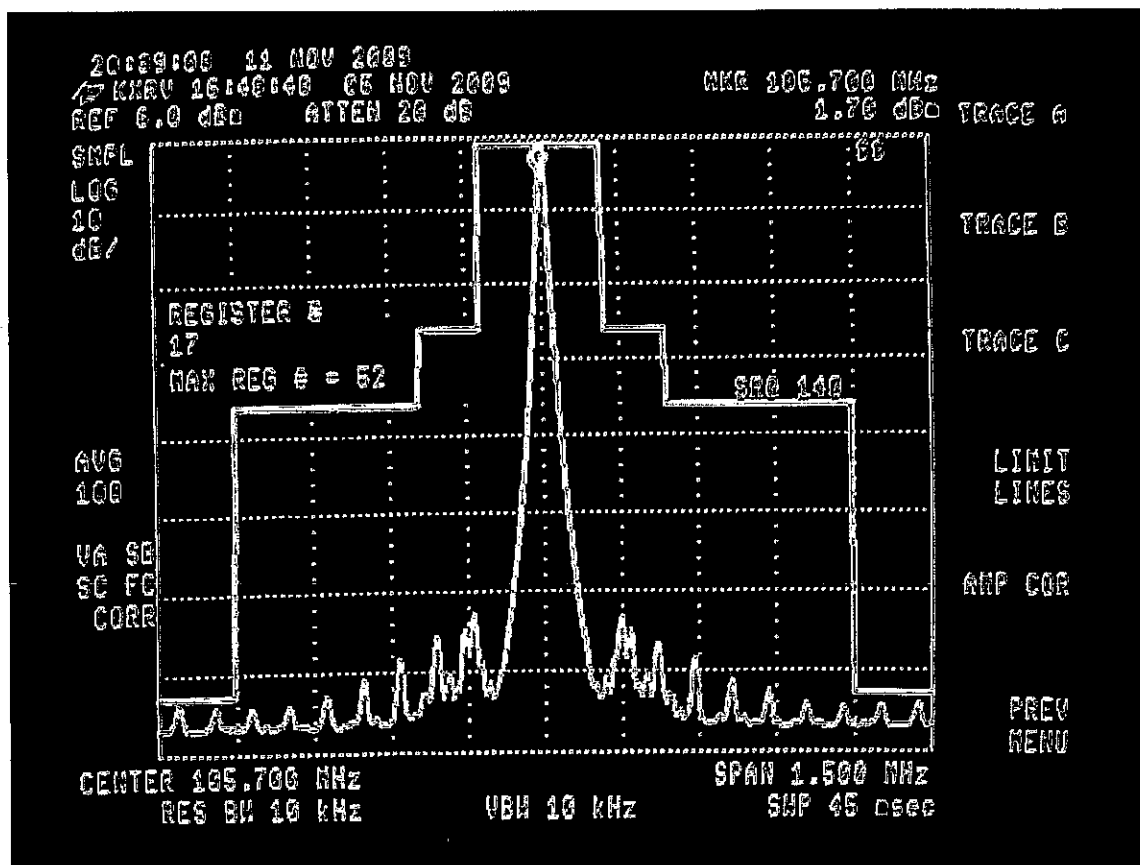


FIGURE 9: Spectrum Display of KNRS-FM1 (formerly KXRV-FM1).

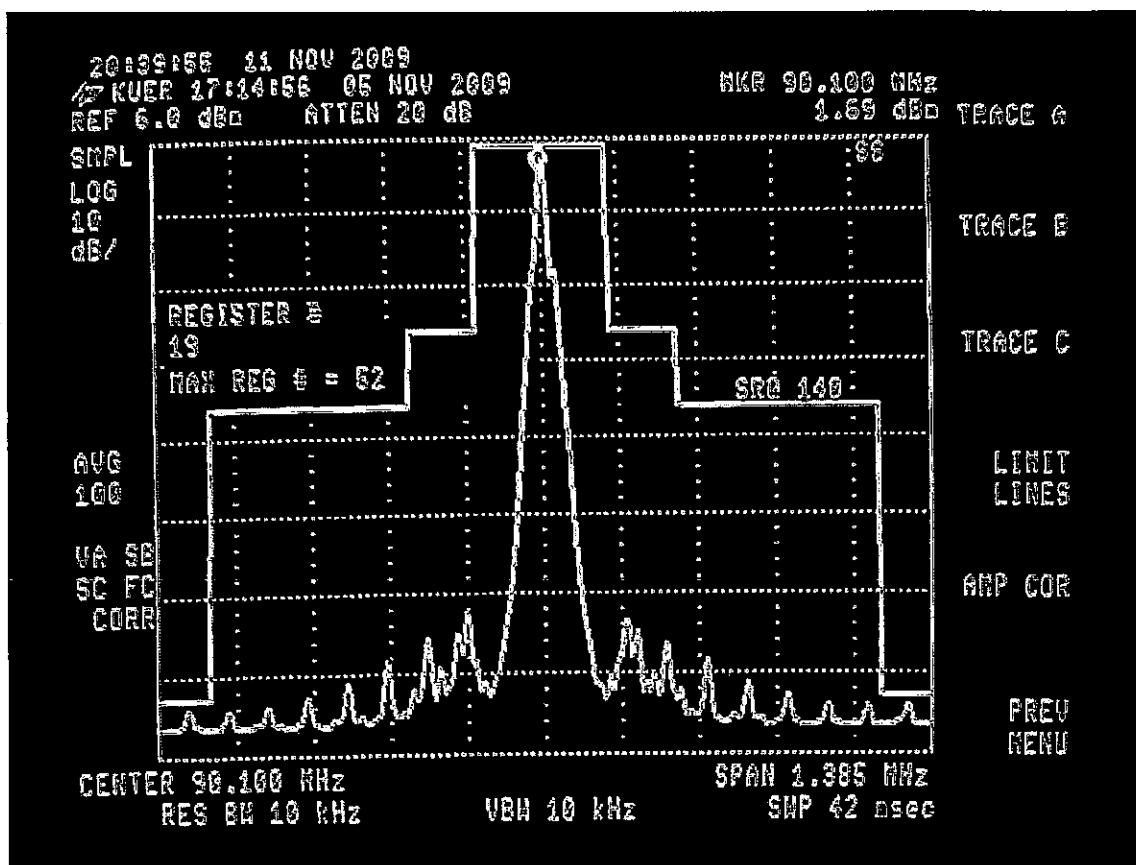


FIGURE 10: Spectrum Display of KUER-FM2.

47 CFR 73.317 (d) states that “Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \log_{10}$ (Power, in watts) dB below the level of the un-modulated carrier, or 80 dB, whichever is the lesser attenuation.”

CALL	FREQ	HARMONIC LEVEL (dBm)									
		FND	2	3	4	5	6	7	8	9	10
KNRS-FM1	105.7	3	-70	-70	-70	-71	-70	-70	-70	-69	-71
KOSY-FM1	106.5	3	-70	-70	-70	-71	-70	-70	-70	-70	-71
KODJ-FM1	94.1	2	-71	-70	-70	-71	-70	-71	-70	-70	-70
KJMY-FM2	99.5	2	-70	-70	-70	-71	-70	-71	-70	-70	-70
KZHT-FM1	97.1	4	-71	-70	-70	-71	-70	-71	-70	-70	-70
KRCL-FM1	90.9	-7	-80	-80	-80	-80	-80	-80	-81	-80	-80
KUER-FM2	90.1	2	-71	-71	-71	-71	-71	-72	-71	-71	-71

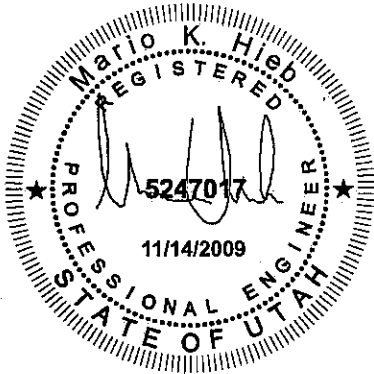
TABLE 2. Summary of Harmonic Measurements.

These measurements confirm that the constructed stations are in compliance with 47 CFR 73.317 regarding emission and bandwidth and FM transmission system requirements.

CERTIFICATION

Mario K. Hieb, P.E., hereby states that:

- He is a graduate Electrical Engineer and a Registered Professional Engineer in the State of Utah;
- His qualifications are a matter of record with the Federal Communications Commission;
- The attached engineering report was prepared by him or under his supervision and direction.



Mario K. Hieb

Professional Engineer