

# EQUIPMENT PROOF OF PERFORMANCE

Occupied Bandwidth, Spurious and Harmonic Signal  
Measurements

For

Radio Translator Station K231CR 94.1 MHz

Santa Barbara, California

Conducted on April 7, 2017

Measurements Performed by Burt I. Weiner

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# FOREWORD

This report contains the results of required tests as described in §73.1590 of the Rules and Regulations of the Federal Communications Commission that were conducted on April 7, 2017 on behalf of Radio Station K231CR, which is a translator for KSPE AM-1490 Santa Barbara, California. K231CR operates on 94.1 MHz with an ERP of 250 Watts from Santa Barbara, California. The K231CR transmitter is a BW-Broadcast model TX300V2. The audio processor is an integral part of the transmitter. The K231CR transmitter feeds the antenna through a Telewave model TWPC-1005-2, 2-section cavity filter, 3-Port combiner. K231CR is co-located with the following stations:

K250BS	97.9 MHz
K274CJ	102.7 MHz
KOCP-FM	104.7 MHz
KTYD-FM	99.9 MHz

All stations were operating at licensed values at the time of these measurements.

These measurements show the extent to which K231CR complies with the occupied bandwidth and harmonic emission requirements of the Commission's rules, specifically, §73.317 regarding: FM Transmission System Requirements.

## METHODS AND EQUIPMENT USED

For these tests an Anritsu Spectrum Analyzer model MS2721B was used. A Bird Electronics model 43 wattmeter was inserted between the output of the 2-section cavity filter/combiner and the antenna. A Bird Electronics Broadband Signal Extractor was inserted into the wattmeter's line section and a 10-foot length of RG-223U was connected between the Signal Extractor, through a 20 dB attenuator to the spectrum analyzer input. For each of the attached spectrographs the analyzer was operated in the peak hold mode for numerous sweeps totaling approximately 10 minutes.

For harmonic measurements a Microwave Filter Company model 5KHP high-pass filter was inserted between the 20 dB attenuator and the spectrum analyzer's input in order to prevent overload in the analyzer by providing a measured 43.4 dB of attenuation at the fundamental frequency. The insertion loss of the 5KHP filter is less than 2 dB at any frequency between 120 MHz to 1000 MHz. Each of the harmonics were measured and compared to the measured level of the fundamental frequency prior to the insertion of the Hi-Pass filter.

## RESULTS

Table A shows the results of the measurements of harmonic and any spurious emissions which were detected and determined to be associated with, but not necessarily attributable to the K231CR broadcast facilities at the time of measurement. Figure 1 shows the Occupied Bandwidth of the modulation mask.

The Aircraft Radio Spectrum from 118 MHz to 137 MHz was examined for any related spurious signals. None were found.

All emissions attributable to the K231CR translator facilities were found to meet the requirements of §73.317(b)(c)(d) of the Commission's Rules and Regulations.

## **Qualifications of Engineer**

Burt I. Weiner, whose office is located at 210 Allen Avenue Glendale, California, hereby states that he has been actively involved in broadcast engineering since 1957; that his qualifications as a technical consultant are a matter of record with the Federal Communications Commissions; that he has prepared this report for Radio Station K231CR, Santa Barbara, California; that he made the equipment performance measurements of Radio Station K231CR shown in this report; and that all of the data contained in this report is accurate and correct to the best of his knowledge and ability.

April 7, 2017

A handwritten signature in blue ink, appearing to read "Burt I. Weiner", is written over a light yellow rectangular background.

Burt I. Weiner

## TABLE A

Harmonic and Spurious Signal emissions related to the operation of K231CR  
April 7, 2017

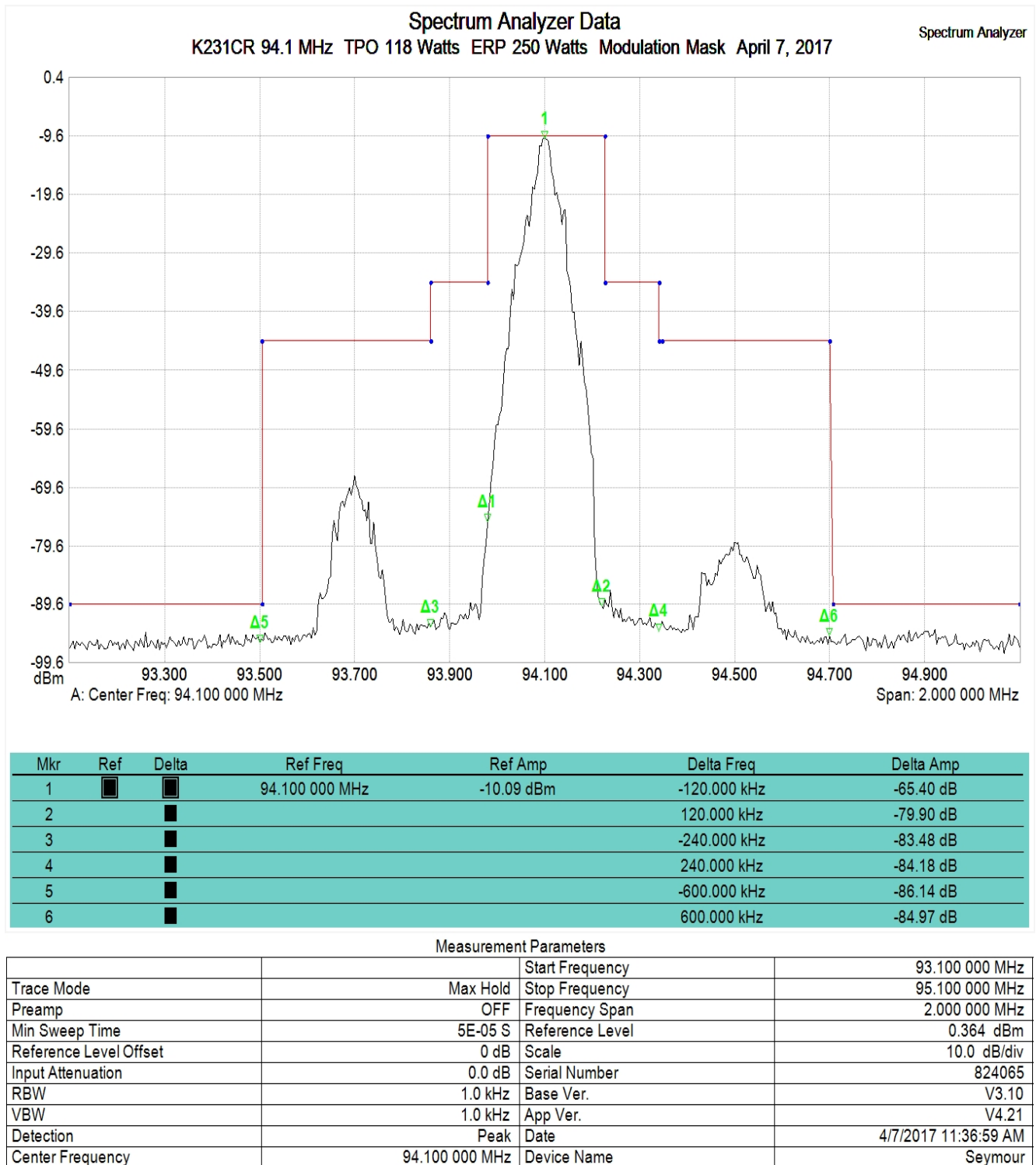
Frequency and Relationship	Signal Attenuation Relative to Carrier	Attenuation Required by 73.317
94.1 MHz Carrier (Reference)	0.0 dBc	0.0 dBc
188.2 MHz 2 <sup>nd</sup> Harmonic*	-108.1 dBc	64 dBc
282.3 MHz 3 <sup>rd</sup> Harmonic	-97.8 dBc	64 dBc
376.4 MHz 4 <sup>th</sup> Harmonic*	-109.2 dBc	64 dBc
470.5 MHz 5 <sup>th</sup> Harmonic*	-110.9 dBc	64 dBc
564.6 MHz 6 <sup>th</sup> Harmonic*	-110.6 dBc	64 dBc
648.7 MHz 7 <sup>th</sup> Harmonic*	-111.5 dBc	64 dBc
752.8 MHz 8 <sup>th</sup> Harmonic*	-110.9 dBc	64 dBc
846.9 MHz 9 <sup>th</sup> Harmonic*	-110.0 dBc	64 dBc
941.0 MHz 10 <sup>th</sup> Harmonic*	-110.1 dBc	64 dBc
94.5 MHz Mix with 93.7 KDB _/1	-68.9 dBc	35 dBc

\*At or below the noise floor.

\_/1 94.5 MHz: Mix Product with 93.7 MHz (KDB)  $2 \times 94.1 = 188.2 - 93.7 = 94.5$  MHz

No related signals were found within the Aircraft Band of 108 MHz to 137 MHz.

No other related signals were found.



**Figure 1- Modulation Mask**

Translator Station K231CR  
Date: April 7, 2017  
Center Frequency: 94.1 MHz  
Span: 2.0 MHz; Vertical: 10dB/Div; RBW: 1 kHz