

# **Proof of Performance Report**

KLCX Pueblo, CO

FIN: 25526

106.9 MHz

December 19, 2014

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## Introduction

The licensee for the KLCX Construction Permit is Educational Media Foundation. KLCX has been constructed to combine with KRYE which is owned by Untied States CP, LLC. Steve Wilde is a Broadcast Engineer employed by Education Media Foundation. Steve Wilde completed the KLCX emissions proof on December 19, 2014.

## Test Equipment

- Agilent N9912A 2-Port Network Analyzer
- Agilent N9912A Spectrum Analyzer
- Bird 3-1/8" 2-Port Directional Coupler
- Shively FM 3-Cavity Band Pass Filters
- Mini Circuits High Pass filters

## Station Equipment

- BE35B FM Transmitter
- Bext 2-Channel Constant Impedance FM Combiner
- Shively 2524-3A Band Pass Filter
- Dielectric DCR-M8CFE92-8 FM Antenna
- Andrew 4" Air Coaxial line

## Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth Emissions measurements were made for KLCX and KRYE at the output of the Bext FM Combiner filter with KLCX and KRYE operating at 100% power. These measurements provide proof that KLCX and KRYE are in compliance with the requirements of FCC Part 73.317.

Affidavit

STATE OF CALIFORNIA  
Sacramento County

I, Steve Wilde, do affirm that:

1. I have been engaged in the RF engineering and installation of broadcast facilities since 2005.
2. I further declare, under penalty of perjury, that the statements contained herein are true and correct to the best of my knowledge.

Steve Wilde  
Educational Media Foundation  
January 4, 2015

1/4/2015

X

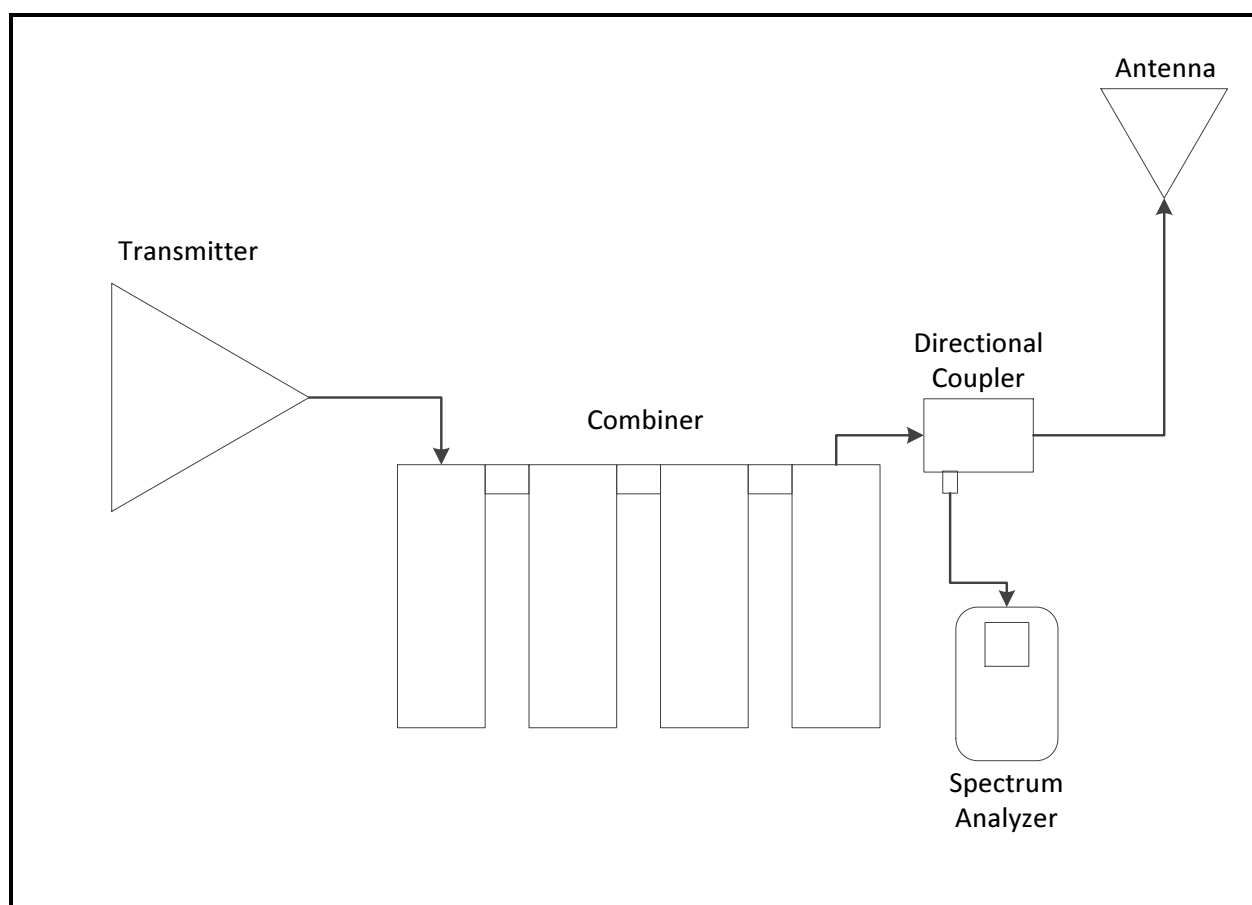


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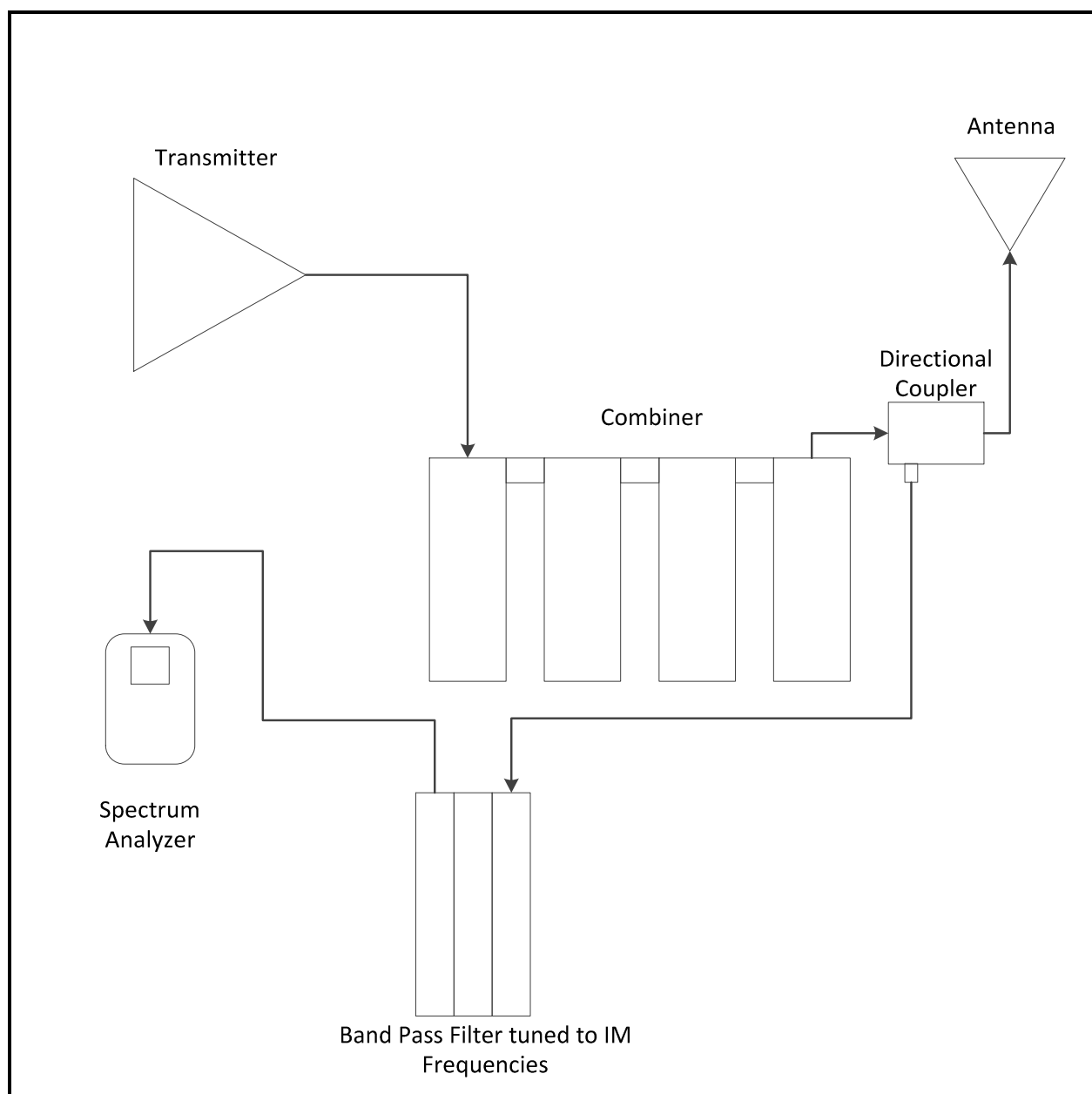
Steve Wilde  
Broadcast Engineer  
Signed by: swilde

## Measurement Diagrams

Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration



Intermodulation frequency measurement configuration



## Measurement Results

### Frequency Measurement

Assigned Frequency	106.9000000	MHz	Variance in Hz
Measured Frequency	106.8995475	MHz	452.5

### TPO Calculation

Transmitter output KW	Shively Band Pass Filter Efficiency	Combiner Efficiency	Andrew 4'' Coax Power Efficiency	Antenna Power Gain	ERP KW
28.444	0.950	0.994	0.917	4.06	100

### Measurement Methodology

To ensure accurate measurements, the frequency response of all couplers, RF filters, and sample ports were determined prior to taking any measurements. The resulting dB reductions at each frequency were then added to the recorded measurements to ensure accurate calculations.

The spectrum analyzer reference point of the fundamental frequency is -0.28 dBm. The directional coupler forward power sample port has less loss at the second harmonic frequency and more loss at all other harmonic frequencies in reference to the fundamental frequency. The losses and gains are a dB reference relative to the fundamental frequency; therefore the directional coupler forward port loss or gain, high pass filter loss, and dB reference point are then added to the instrument measurement to provide the resulting dBc calculation.

### Harmonic Emissions Measurement

Harmonic	Frequency (MHz)	Directional Coupler (dB)	High Pass Filter (dB)	106.9 MHz Reference Level (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
X2	213.8	-0.40	0.50	0.28	-121.90	<b>-121.52</b>	-80	<b>41.52</b>
X3	320.7	1.00	0.40	0.28	-119.00	<b>-117.32</b>	-80	<b>37.32</b>
X4	427.6	3.80	0.30	0.28	-130.90	<b>-126.52</b>	-80	<b>46.52</b>
X5	534.5	6.30	0.10	0.28	-144.30	<b>-137.62</b>	-80	<b>57.62</b>
X6	641.4	9.40	0.10	0.28	-130.40	<b>-120.62</b>	-80	<b>40.62</b>
X7	748.3	7.90	0.10	0.28	-132.30	<b>-124.02</b>	-80	<b>44.02</b>
X8	855.2	10.33	0.10	0.28	-125.50	<b>-114.79</b>	-80	<b>34.79</b>
X9	962.1	15.00	0.20	0.28	-121.60	<b>-106.12</b>	-80	<b>26.12</b>

### Intermodulation Emissions Measurement

Due to the relationship between the fundamental frequencies, intermodulation products were evaluated 2.0 MHz above and below each fundamental frequency.

IM Product Frequency (MHz)	Bandpass Filter (dB)	106.9 MHz Reference Level (dB)	Directional Coupler (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
102.9	4.39	0.28	0.00	-97.72	<b>-93.05</b>	-80	<b>13.05</b>
108.9	3.43	0.28	0.00	-96.33	<b>-92.62</b>	-80	<b>12.62</b>



### Spurious Emissions Measurement

The KLCX transmitter emissions were thoroughly analyzed using an Agilent N9912A spectrum analyzer. The KLCX transmitter and RF circuit are free of spurious emissions.

### Occupied Bandwidth Measurement

The occupied bandwidth was measured with an Agilent N9912A spectrum analyzer utilizing fourteen mask segments to determine the occupied bandwidth. Measurements were made over twenty minutes using a max-hold spectrum sweep, and demonstrate that KLCX is operating within the permissible bandwidth.

