

# **Proof of Performance Report**

K260BA Coon Rapids, MN

FIN: 141753

99.9 MHz

February 05, 2015

Steve Wilde  
Broadcast Engineer  
Educational Media Foundation  
5700 West Oaks Blvd  
Rocklin, CA 95765

## TABLE OF CONTENTS

Introduction .....	3
Test Equipment .....	3
Station Equipment .....	3
Summary .....	3
Affidavit .....	4
Measurement Diagrams .....	5
Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration .....	5
Intermodulation frequency measurement configuration .....	6
Measurement Results .....	7
Frequency Measurement .....	7
TPO Calculation .....	7
Measurement Methodology .....	7
Harmonic Emissions Measurement .....	8
Intermodulation Emissions Measurement .....	8
Spurious Emissions Measurement .....	9
Occupied Bandwidth Measurement .....	9

## Introduction

The licensee for the K260BA Construction Permit is Educational Media Foundation. K260BA has been constructed to combine with W225AP and K214DF which is also owned by Educational Media Foundation. Steve Wilde is a Broadcast Engineer employed by Education Media Foundation. Steve Wilde completed the K260BA emissions proof on February 06, 2015.

## Test Equipment

- Agilent N9912A 2-Port Network Analyzer
- Agilent N9912A Spectrum Analyzer
- ERI 1-5/8" 2-Port Directional Coupler
- Telewave Band Pass Filters
- Mini Circuits High Pass filters

## Station Equipment

- Nautel VS1 FM Transmitter
- Shively 2914-3 Three Station FM branch Combiner
- Nicom BKG-77 FM Antenna
- RFS LCF78-50A 7/8" Foam Coax

## Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth Emissions measurements were made for K260BA, W225AP, and K214DF at the output of the Shively combiner filter with K260BA, W225AP, and K214DF operating at 100% power. These measurements provide proof that K260BA, W225AP, and K214DF 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  
February 11, 2015

2/11/2015

X

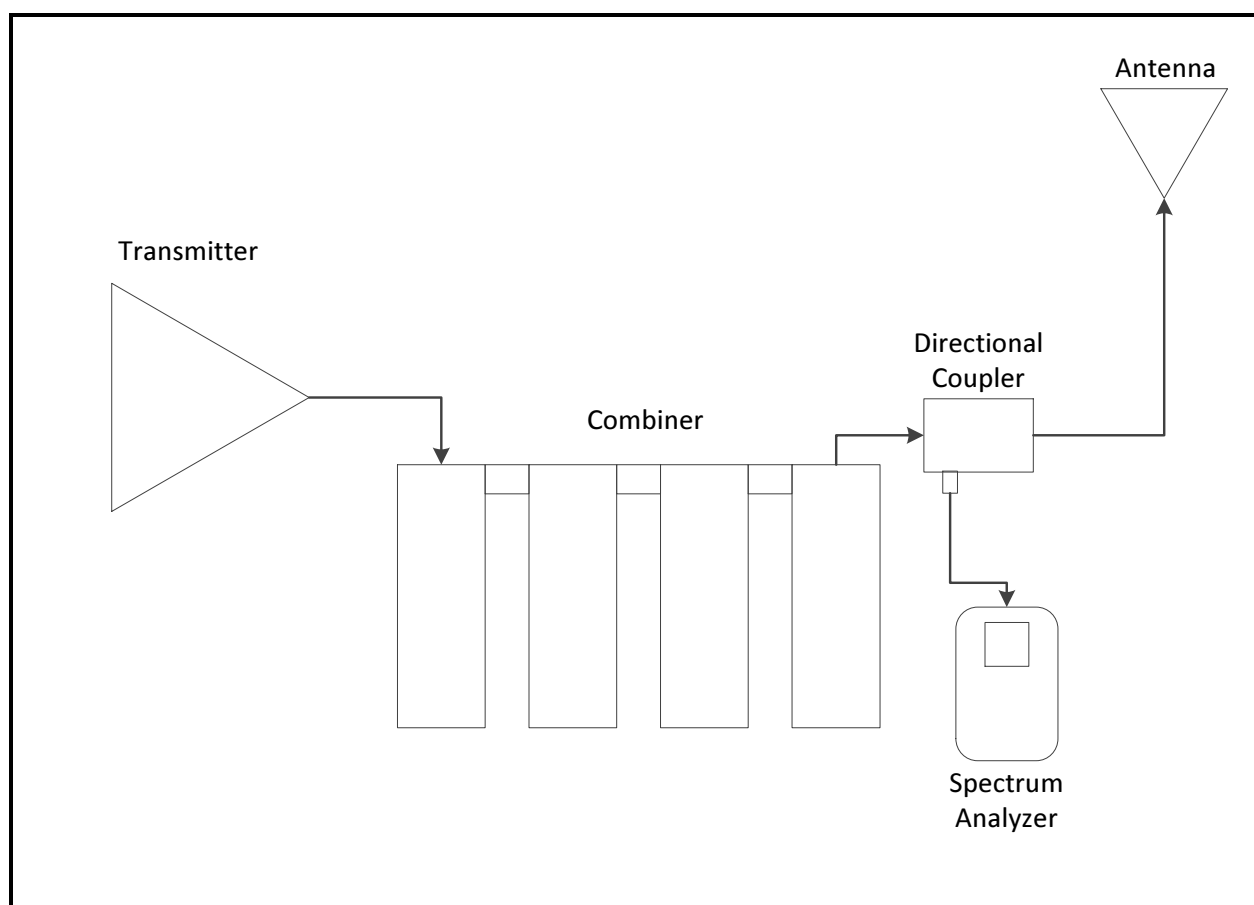


---

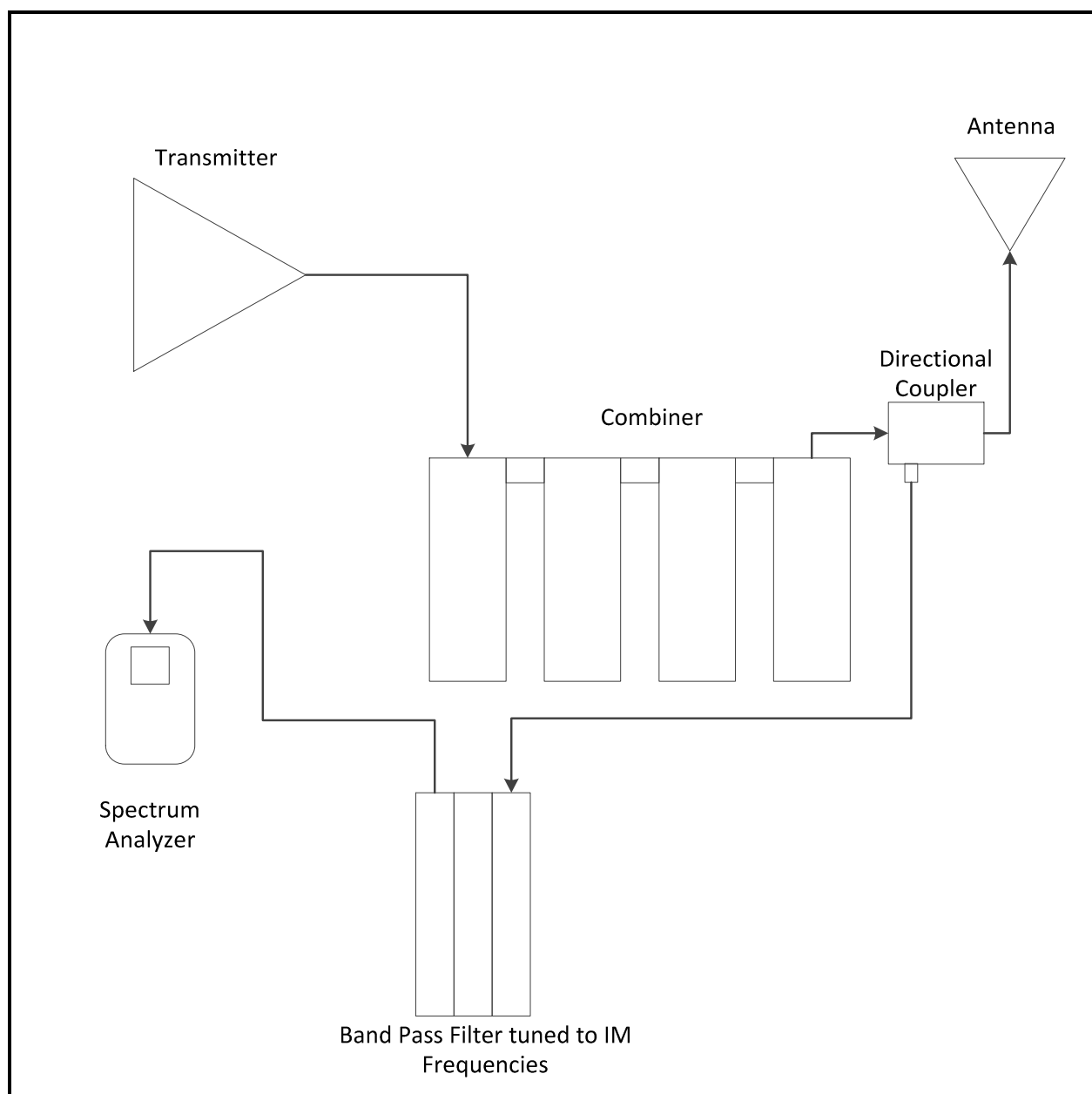
Steve Wilde  
Broadcast Engineer  
Signed by: swilde

## Measurement Diagrams

Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration



Intermodulation frequency measurement configuration



## Measurement Results

### Frequency Measurement

Assigned Frequency	99.9000000	MHz	Variance in Hz
Measured Frequency	99.9001391	MHz	139.1

### TPO Calculation

Transmitter output Watts	Andrew FSJ4-50 Jumper	Combiner Efficiency	RFS 7/8" Coax Power Efficiency	Antenna Power Gain	ERP Watts
779.5573	0.976	0.782	0.894	0.47	250

### 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 0.00 dBm. The directional coupler forward power sample port has less loss at all the 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)	99.9 MHz Reference Level (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
X2	199.8	-5.44	0.50	0.00	-119.35	<b>-124.29</b>	-66.98	<b>57.31</b>
X3	299.7	-9.00	0.40	0.00	-93.19	<b>-101.79</b>	-66.98	<b>34.81</b>
X4	399.6	-10.50	0.30	0.00	-125.01	<b>-135.21</b>	-66.98	<b>68.23</b>
X5	499.5	-13.40	0.10	0.00	-106.24	<b>-119.54</b>	-66.98	<b>52.56</b>
X6	599.4	-14.80	0.10	0.00	-115.64	<b>-130.34</b>	-66.98	<b>63.36</b>
X7	699.3	-15.87	0.10	0.00	-122.13	<b>-137.90</b>	-66.98	<b>70.92</b>
X8	799.2	-16.60	0.10	0.00	-123.19	<b>-139.69</b>	-66.98	<b>72.71</b>
X9	899.1	-17.20	0.20	0.00	-117.70	<b>-134.70</b>	-66.98	<b>67.72</b>

### Intermodulation Emissions Measurement

Due to the relationship between the fundamental frequencies, intermodulation products were evaluated at 106.9 MHz, 85.9 MHz, 109.1 MHz, 81.5 MHz, 95.1 MHz, and 88.5 MHz.

IM Product Frequency (MHz)	Bandpass Filter (dB)	Reference Level (dB)	Directional Coupler (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
106.9	0.37	0.00	0.00	-90.90	<b>-90.53</b>	-66.98	<b>23.55</b>
85.9	0.72	0.00	0.00	-101.30	<b>-100.58</b>	-66.98	<b>33.60</b>
109.1	5.02	0.00	0.00	-92.41	<b>-87.39</b>	-66.98	<b>20.41</b>
81.5	1.32	0.00	0.00	-101.20	<b>-99.88</b>	-66.98	<b>32.90</b>
95.1	0.72	0.00	0.00	-97.13	<b>-96.41</b>	-66.98	<b>29.43</b>
88.5	1.07	0.00	0.00	-112.60	<b>-111.53</b>	-66.98	<b>44.55</b>



### Spurious Emissions Measurement

The K260BA transmitter emissions were thoroughly analyzed using an Agilent N9912A spectrum analyzer. The K260BA 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 K260BA is operating within the permissible bandwidth.

