

Proof of Performance Report

KVRA Sisters, OR

FIN: 88436

89.3 MHz

September 1, 2016

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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 KVRA Construction Permit(file number BPED-20160330AAL) is Educational Media Foundation. Steve Wilde is a Broadcast Engineer employed by Educational Media Foundation. Steve Wilde completed the KVRA spurious emissions proof on September 1, 2016.

Test Equipment

- Agilent N9912A 2-Port Network Analyzer
- Agilent N9912A Spectrum Analyzer
- Bird B series Directional Coupler
- Shively FM 2-Cavity Band Pass Filters
- Mini Circuits High Pass filters

Station Equipment

- Crown 2000E FM Transmitter
- Shively Branch FM Combiner
- Shively 6513-4 .6 FM Antenna

Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth Emissions measurements were completed at output of the Shively Combiner network with KVRA and all other transmissions operating at 100% power. These measurements provide proof that KVRA is 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 hold Bachelor of Science degree in Electrical Engineering from DeVry University Chicago, IL.
3. 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
September 14, 2016

9/14/2016

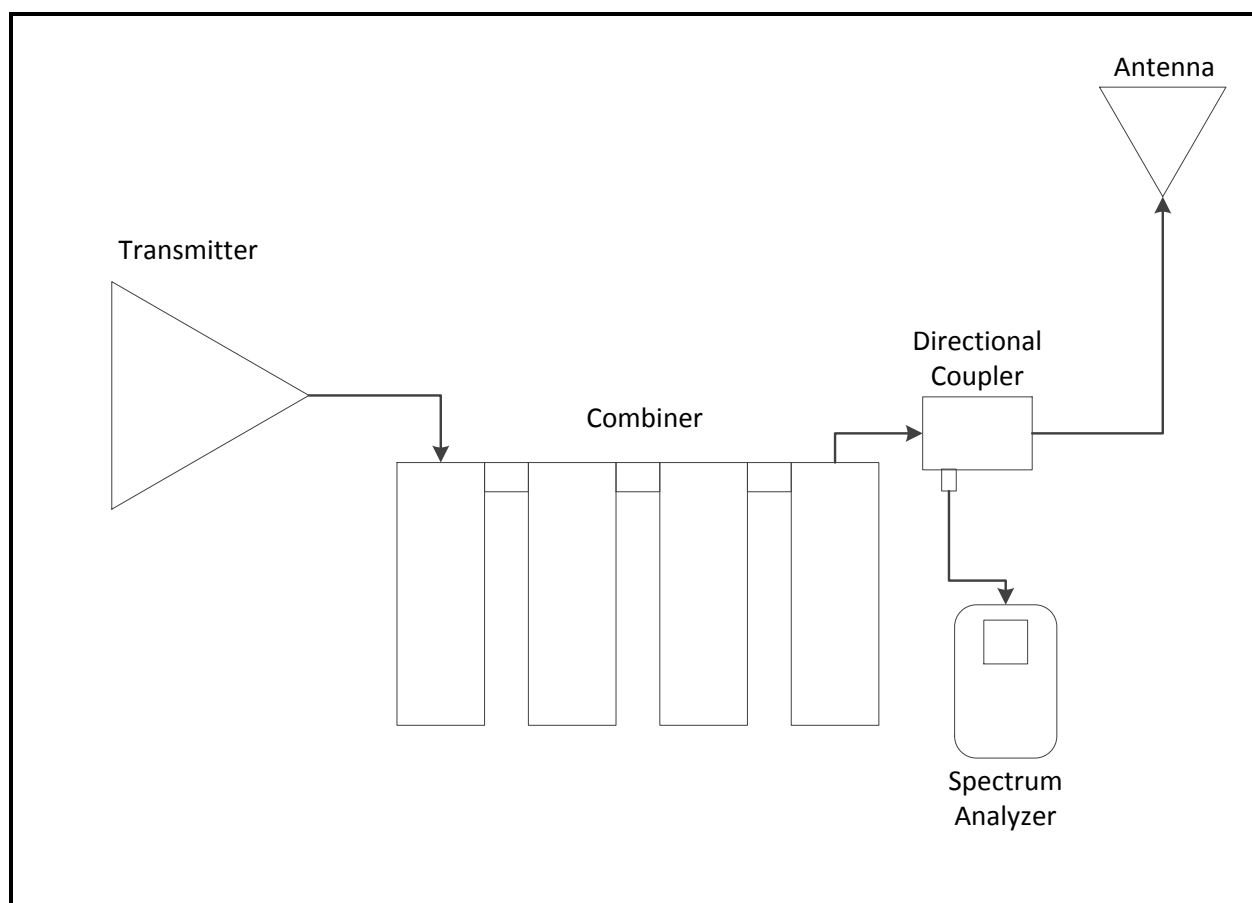
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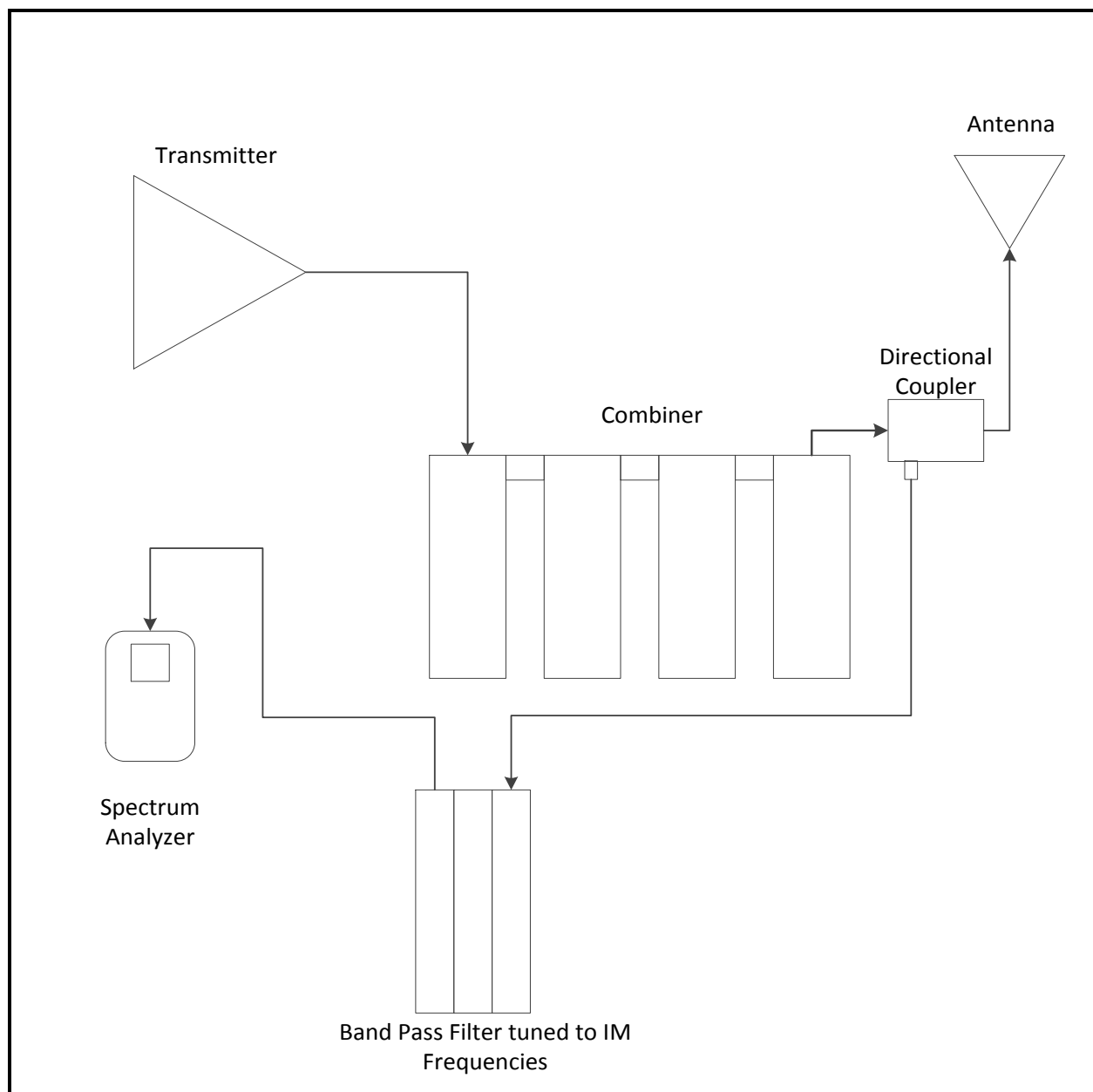
Steve Wilde
Broadcast Engineer
Signed by: swilde

Measurement Diagrams

Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration



Intermodulation frequency measurement configuration



Measurement Results

Frequency Measurement

Assigned Frequency	89.3000000	MHz	Variance in Hz
Measured Frequency	89.2998341	MHz	165.9

TPO Calculation

Transmitter output KW	1-5/8" Coaxial Jumper Efficiency	Combiner Efficiency	1-5/8" Coax Efficiency	Antenna Power Gain	ERP KW
1.9567	0.993	0.883	0.941	3.097	5.0

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 0.15 dBm. The directional coupler forward power sample port has less loss at the harmonic frequencies relative 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 added to the instrument measurement to provide the resulting dBc calculation.

Harmonic Emissions Measurement

Harmonic	Frequency (MHz)	Directional Coupler (dB)	High Pass Filter (dB)	Reference Level (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
X2	178.60	0.06	0.50	-0.15	-106.20	-105.79	-79.99	25.80
X3	267.90	1.26	0.40	-0.15	-85.06	-83.55	-79.99	3.56
X4	357.20	3.86	0.30	-0.15	-112.40	-108.39	-79.99	28.40
X5	446.50	6.66	0.10	-0.15	-103.50	-96.89	-79.99	16.90
X6	535.80	8.96	0.10	-0.15	-98.64	-89.73	-79.99	9.74
X7	625.10	11.16	0.10	-0.15	-101.50	-90.39	-79.99	10.40
X8	714.40	11.96	0.10	-0.15	-110.10	-98.19	-79.99	18.20
X9	803.70	13.26	0.20	-0.15	-102.80	-89.49	-79.99	9.50

Intermodulation Emissions Measurement

The intermodulation products were measured with all fundamental frequencies operating at 100% power.

IM Product Frequency (MHz)	Reference Level (dB)	Directional Coupler (dB)	Bandpass Filter (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
88.1	-0.15	0.00	1.21	-87.67	-86.61	-79.99	6.62
91.7	-0.15	0.00	1.31	-89.93	-88.77	-79.99	8.78

Spurious Emissions Measurement

The KVRA transmitter emissions were thoroughly analyzed using an Agilent N9912A spectrum analyzer. The KVRA 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 five minutes using a max-hold spectrum sweep, and demonstrate that KVRA is operating within the permissible bandwidth.

