

Proof of Performance Report

W221BG Toledo, OH

FIN: 138974

92.1 MHz

October 20, 2015

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

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Introduction

The licensee for the W221BG Construction Permit(file number BMPFT-20141010ACB) is Educational Media Foundation. Steve Wilde is a RF Engineer employed by Educational Media Foundation. Steve Wilde completed the W221BG spurious emissions proof on October 20, 2015.

Test Equipment

- Agilent N9912A 2-Port Network Analyzer
- Agilent N9912A Spectrum Analyzer
- ERI 4-Port Directional Coupler
- Mini Circuits High Pass filters

Station Equipment

- GatesAir FAX 300FM Transmitter
- Shively 2930-3/3 FM Combiner
- Nicom BKG-77-HW 2 Bay FM Antenna
- RFS LCF78-50A 7/8'' Foam Coax

Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth Emissions measurements were made for W221BG transmission circuit at the output of the Shively Combiner network with W221BG and all other transmissions operating at 100% power. These measurements provide proof that W221BG 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 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
October 21, 2015

10/21/2015

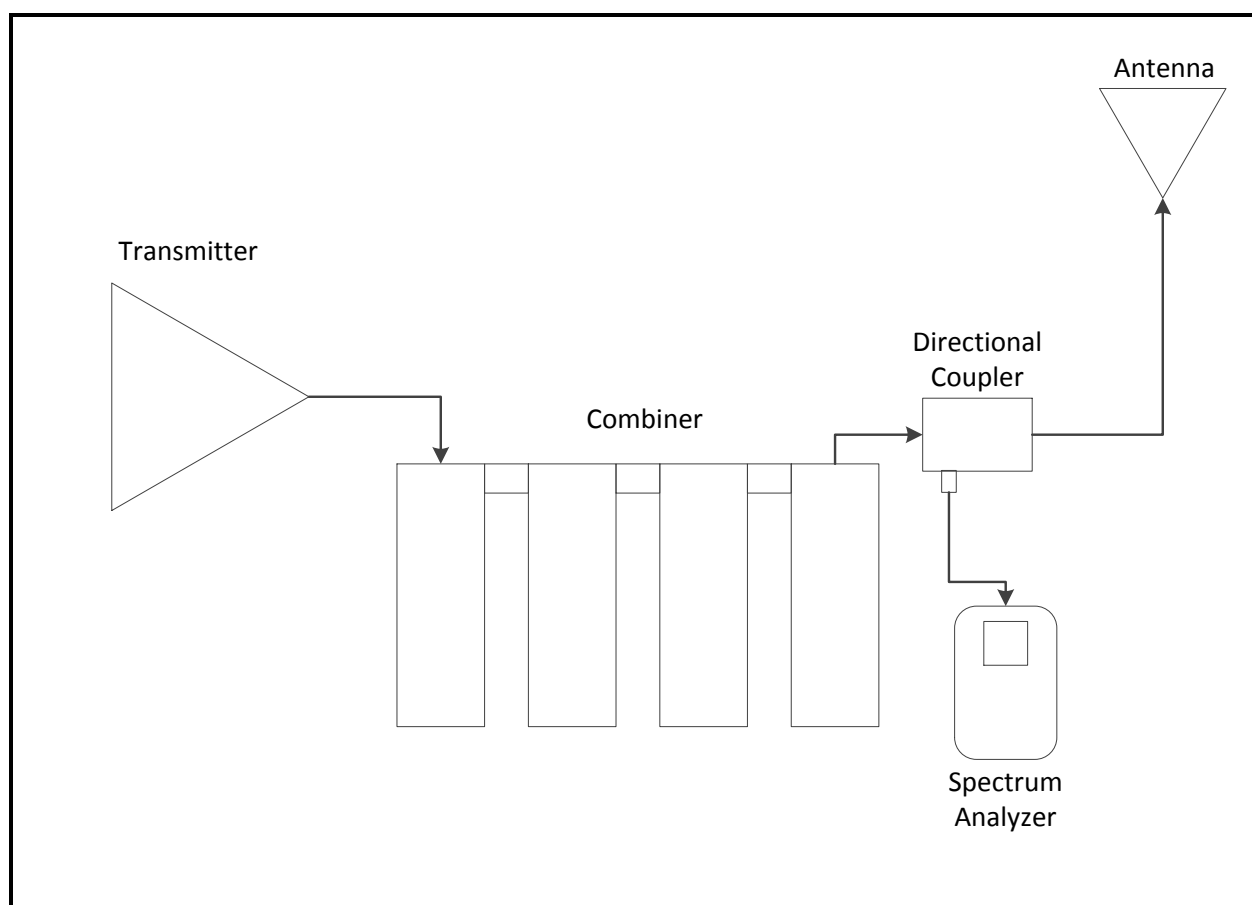
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Steve Wilde
Broadcast Engineer
Signed by: swilde

Measurement Diagrams

Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration



Measurement Results

Frequency Measurement

Assigned Frequency	92.1000000	MHz	Variance in Hz
Measured Frequency	92.1000743	MHz	74.3

TPO Calculation

Transmitter output Watts	Combiner Efficiency	7/8" Foam Coax Efficiency	Antenna Power Gain	ERP Watts
253.2907	0.743	0.668	0.70	88

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 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	184.20	-1.94	0.50	0.00	-105.00	-106.44	-62.44	44.00
X3	276.30	-3.27	0.40	0.00	-98.13	-101.00	-62.44	38.56
X4	368.40	-9.20	0.30	0.00	-104.50	-113.40	-62.44	50.96
X5	460.50	-12.40	0.10	0.00	-103.20	-115.50	-62.44	53.06
X6	552.60	-13.27	0.10	0.00	-104.20	-117.37	-62.44	54.93
X7	644.70	-14.16	0.10	0.00	-102.40	-116.46	-62.44	54.02
X8	736.80	-16.05	0.10	0.00	-105.00	-120.95	-62.44	58.51
X9	828.90	-17.94	0.20	0.00	-105.10	-122.84	-62.44	60.40

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)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
89.3	0.00	0.00	-81.98	-81.98	-62.44	19.54
90.9	0.00	0.00	-79.33	-79.33	-62.44	16.89
91.3	0.00	0.00	-76.59	-76.59	-62.44	14.15
93.7	0.00	0.00	-81.29	-81.29	-62.44	18.85
96.9	0.00	0.00	-79.80	-79.80	-62.44	17.36
97.7	0.00	0.00	-77.35	-77.35	-62.44	14.91

Spurious Emissions Measurement

The W221BG transmitter emissions were thoroughly analyzed using an Agilent N9912A spectrum analyzer. The W221BG 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 W221BG is operating within the permissible bandwidth.

