

Proof of Performance Report

KUUB(Aux) Sun Valley, NV

FIN: 83586

94.5 MHz

October 26, 2016

Stephen Wilde
Electrical/RF Engineer
SWE Services, LLC
steve@sweservices.net

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 permittee for the KUUB Auxiliary Construction Permit (file number BXPB-20160502ACJ) is Lotus Radio Corporation. Stephen Wilde is an Electrical RF Engineer employed by SWE Services, LLC. Stephen Wilde completed the KUUB spurious emissions proof on October 26, 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

- Nautel VS 1 KW FM Transmitter
- AAT FM Branch Combiner
- ERI LPX-4C-HW Antenna
- Andrew 2-1/4" Transmission line

Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth Emissions measurements were completed at the output of the AAT Combiner network with KUUB and all other transmissions operating at 100% power. These measurements provide proof that KUUB is in compliance with the requirements of FCC Part 73.317.

Affidavit

STATE OF CALIFORNIA
Sacramento County

I, Stephen 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.

Stephen Wilde
November 11, 2016

11/11/2016

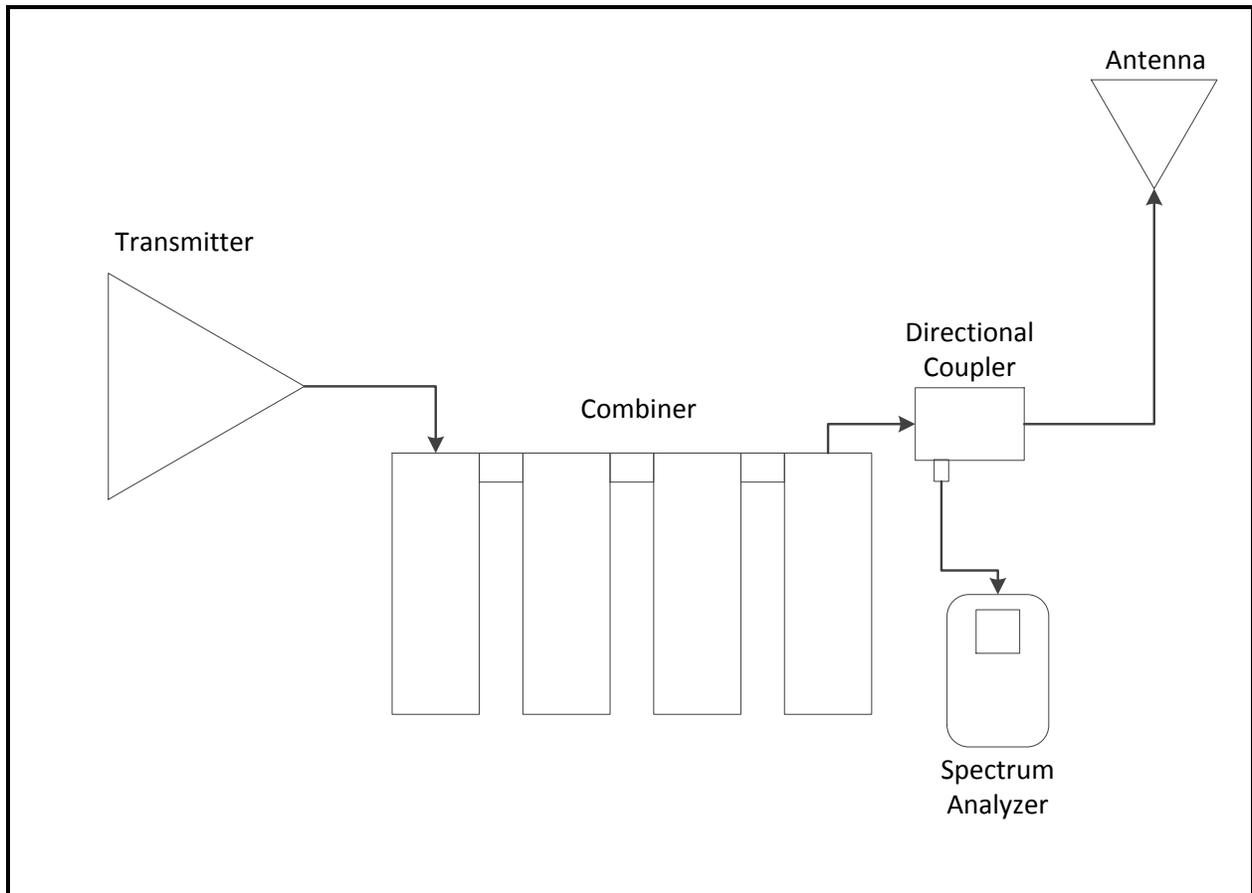
X



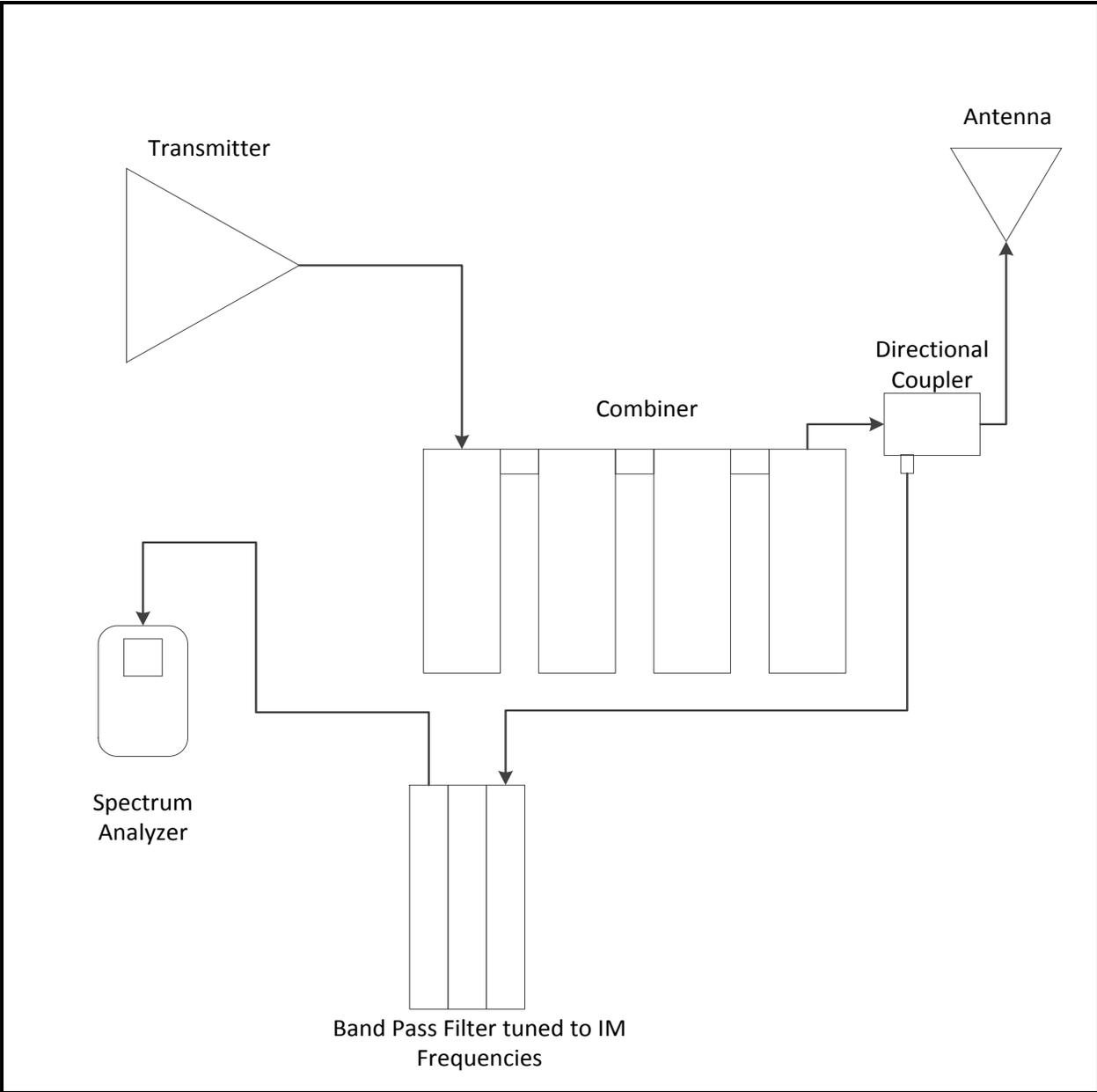
Stephen Wilde
RF Engineer
Signed by: swilde

Measurement Diagrams

Harmonic Emissions, Spurious Emissions, and Occupied Bandwidth measurement configuration



Intermodulation frequency measurement configuration



Measurement Results

Frequency Measurement

Assigned Frequency	94.500000	MHz	Variance in Hz
Measured Frequency	94.5001005	MHz	100.5

TPO Calculation

Transmitter output KW	Combiner Efficiency	Coax Efficiency	Antenna Power Gain	ERP KW
1.008	0.851	0.945	1.234	1.0

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 0.00 dBm. The directional coupler forward power sample port has less loss at all 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 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	189.00	0.06	0.50	0.00	-87.68	-87.12	-73.00	14.12
X3	283.50	1.26	0.40	0.00	-89.61	-87.95	-73.00	14.95
X4	378.00	3.86	0.30	0.00	-95.63	-91.47	-73.00	18.47
X5	472.50	6.66	0.10	0.00	-89.21	-82.45	-73.00	9.45
X6	567.00	8.96	0.10	0.00	-102.10	-93.04	-73.00	20.04
X7	661.50	11.16	0.10	0.00	-97.57	-86.31	-73.00	13.31
X8	756.00	11.96	0.10	0.00	-99.23	-87.17	-73.00	14.17
X9	850.50	13.26	0.20	0.00	-100.50	-87.04	-73.00	14.04

Intermodulation Emissions Measurement

Due to the relationship between the fundamental frequencies, the resulting intermodulation products were evaluated with all fundamental frequencies within the combiner network operating at 100% power.

IM Product Frequency (MHz)	Bandpass Filter (dB)	Reference Level (dB)	Directional Coupler (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
116.9	0.00	0.00	0.00	-91.56	-90.23	-73.00	17.23
114.5	0.00	0.00	0.00	-95.63	-91.56	-73.00	18.56
99.5	0.00	0.00	0.00	-92.13	-95.41	-73.00	22.41
84.5	0.00	0.00	0.00	-95.74	-96.52	-73.00	23.52
83.3	0.00	0.00	0.00	-94.13	-93.55	-73.00	20.55

Spurious Emissions Measurement

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

