

# **Proof of Performance Report**

KXRK (Auxiliary) Provo, UT

FIN: 406

96.3 MHz

February 9th, 2020

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## Introduction

The permittee for the KXRK Auxiliary Provo, UT (file number 0000085022) construction permit is Broadway Media LS, LLC. Stephen Wilde completed the KXRK combiner proof of performance on February 9th 2020.

## Test Equipment

- Agilent N9912A Spectrum Analyzer, Serial Number MY51464885
- AAT Directional Coupler
- Mini-Circuits High Pass filters
- FM 2-Cavity Bandpass Filter

## Station Equipment

- FM Transmitter
- AAT FM Combiner System
- ERI SHPX-2E-HW FM Antenna

## Summary

Harmonics, Intermodulation, Spurious, and Occupied Bandwidth emissions measurements were completed at the output of the transmission network. The KXRK transmitter was operating at 100% power during the time of measurements. The measurements were completed in order to ensure 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  
SWE Services, LLC  
February 9<sup>th</sup> 2020

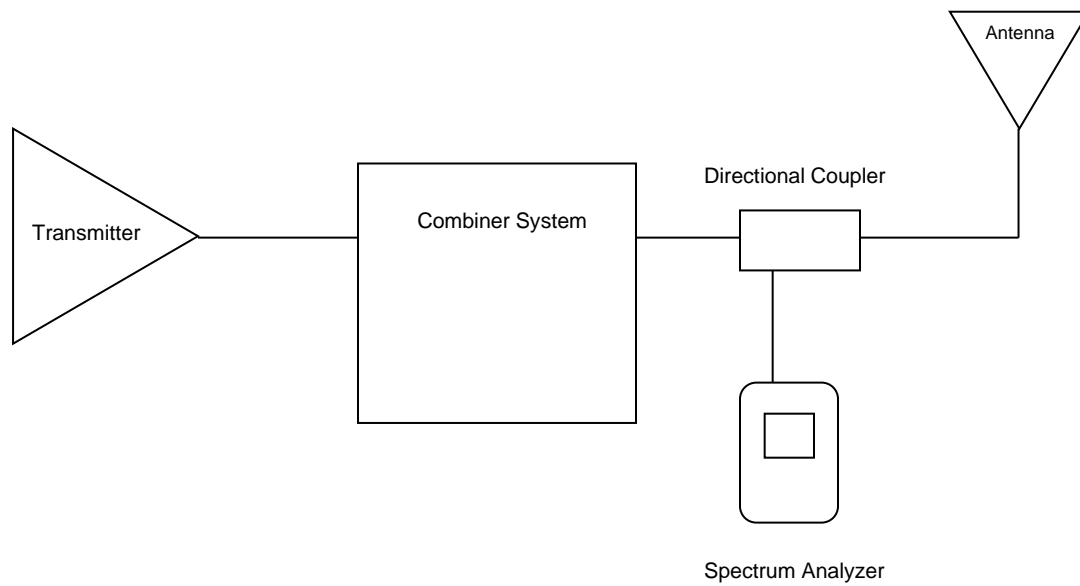
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Stephen Wilde

# Measurement Diagrams

## Harmonic Emissions & Spurious Emissions Measurement Configuration



## Measurement Results

### Fundamental Frequency Measurement

Assigned Frequency	96.3000000	MHz	Variance in Hz
Measured Frequency	96.3001962	MHz	196.2

### Measurement Methodology

To ensure accurate measurements, the frequency response of all couplers, RF filters, and sample ports were measured. The resulting dB characteristics were added to the recorded spectrum analysis measurements to ensure accurate calculations.

The test instrument reference point of the fundamental frequency is 0.11 dBm. The characteristics of the directional coupler forward sample-port is a dB reference relative to the fundamental frequency. Therefore, the directional coupler forward sample-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	192.60	-4.74	0.50	-0.11	-92.55	<b>-96.90</b>	-70.78	<b>26.12</b>
X3	288.90	-8.14	0.40	-0.11	-94.65	<b>-102.50</b>	-70.78	<b>31.72</b>
X4	385.20	-10.76	0.30	-0.11	-99.33	<b>-109.90</b>	-70.78	<b>39.12</b>
X5	481.50	-12.56	0.10	-0.11	-90.23	<b>-102.80</b>	-70.78	<b>32.02</b>
X6	577.80	-13.66	0.10	-0.11	-89.75	<b>-103.42</b>	-70.78	<b>32.64</b>
X7	674.10	-14.56	0.10	-0.11	-94.56	<b>-109.13</b>	-70.78	<b>38.35</b>
X8	770.40	-15.16	0.10	-0.11	-98.11	<b>-113.28</b>	-70.78	<b>42.50</b>
X9	866.70	-15.23	0.20	-0.11	-97.01	<b>-112.15</b>	-70.78	<b>41.37</b>

Intermodulation Emissions Measurements

The KXRK transmission circuit was analyzed using an Agilent N9912A spectrum analyzer while all combiner circuits operated at 100% power. The KXRK transmission circuit meets the intermodulation spurious emissions requirements.

IM Frequency (MHz)	Directional Coupler (dB)	Band Pass Filter (dB)	Reference Level (dB)	Instrument Reading (dB)	Corrected Measurement (dBc)	FCC Limit (dBc)	Clearance (dB)
72.7	0.00	0.00	-0.11	-91.19	<b>-91.30</b>	-70.78	<b>20.52</b>
74.3	0.00	0.00	-0.11	-99.71	<b>-99.82</b>	-70.78	<b>29.04</b>
74.7	0.00	0.00	-0.11	-95.06	<b>-95.17</b>	-70.78	<b>24.39</b>
75.1	0.00	0.00	-0.11	-92.22	<b>-92.33</b>	-70.78	<b>21.55</b>
76.3	0.00	0.00	-0.11	-98.05	<b>-98.16</b>	-70.78	<b>27.38</b>
76.7	0.00	0.00	-0.11	-98.75	<b>-98.86</b>	-70.78	<b>28.08</b>
77.5	0.00	0.00	-0.11	-96.34	<b>-96.45</b>	-70.78	<b>25.67</b>
79.5	0.00	0.00	-0.11	-98.75	<b>-98.86</b>	-70.78	<b>28.08</b>
79.9	0.00	0.00	-0.11	-97.00	<b>-97.11</b>	-70.78	<b>26.33</b>
83.9	0.00	0.00	-0.11	-100.70	<b>-100.81</b>	-70.78	<b>30.03</b>
85.1	0.00	1.00	-0.11	-92.80	<b>-91.91</b>	-70.78	<b>21.13</b>
85.5	0.00	1.00	-0.11	-99.56	<b>-98.67</b>	-70.78	<b>27.89</b>
87.1	0.00	1.00	-0.11	-91.73	<b>-90.84</b>	-70.78	<b>20.06</b>
87.5	0.00	1.00	-0.11	-98.33	<b>-97.44</b>	-70.78	<b>26.66</b>
87.7	0.00	1.00	-0.11	-94.77	<b>-93.88</b>	-70.78	<b>23.10</b>
88.7	0.00	1.00	-0.11	-95.56	<b>-94.67</b>	-70.78	<b>23.89</b>
89.3	0.00	1.00	-0.11	-92.89	<b>-92.00</b>	-70.78	<b>21.22</b>
89.3	0.00	1.00	-0.11	-92.55	<b>-91.66</b>	-70.78	<b>20.88</b>

**SWE Services, LLC**

91.7	0.00	1.00	-0.11	-91.77	<b>-90.88</b>	-70.78	<b>20.10</b>
94.1	0.00	1.00	-0.11	-93.66	<b>-92.77</b>	-70.78	<b>21.99</b>
94.9	0.00	1.00	-0.11	-93.09	<b>-92.20</b>	-70.78	<b>21.42</b>
100.1	0.00	1.00	-0.11	-90.70	<b>-89.81</b>	-70.78	<b>19.03</b>
101.7	0.00	1.00	-0.11	-97.28	<b>-96.39</b>	-70.78	<b>25.61</b>
102.5	0.00	1.00	-0.11	-96.49	<b>-95.60</b>	-70.78	<b>24.82</b>
102.7	0.00	1.00	-0.11	-84.10	<b>-83.21</b>	-70.78	<b>12.43</b>
103.5	0.00	1.00	-0.11	-85.41	<b>-84.52</b>	-70.78	<b>13.74</b>
104.7	0.00	1.00	-0.11	-89.61	<b>-88.72</b>	-70.78	<b>17.94</b>
105.9	0.00	1.00	-0.11	-85.08	<b>-84.19</b>	-70.78	<b>13.41</b>
109.5	0.00	1.00	-0.11	-89.70	<b>-88.81</b>	-70.78	<b>18.03</b>
109.9	0.00	1.00	-0.11	-92.67	<b>-91.78</b>	-70.78	<b>21.00</b>
113.9	0.00	1.00	-0.11	-97.31	<b>-96.42</b>	-70.78	<b>25.64</b>
114.7	0.00	1.00	-0.11	-94.47	<b>-93.58</b>	-70.78	<b>22.80</b>
117.7	0.00	1.00	-0.11	-95.93	<b>-95.04</b>	-70.78	<b>24.26</b>
118.5	0.00	0.00	-0.11	-95.70	<b>-95.81</b>	-70.78	<b>25.03</b>
118.7	0.00	0.00	-0.11	-94.91	<b>-95.02</b>	-70.78	<b>24.24</b>
119.3	0.00	0.00	-0.11	-97.39	<b>-97.50</b>	-70.78	<b>26.72</b>
120.1	0.00	0.00	-0.11	-95.63	<b>-95.74</b>	-70.78	<b>24.96</b>
120.9	0.00	0.00	-0.11	-98.54	<b>-98.65</b>	-70.78	<b>27.87</b>
122.5	0.00	0.00	-0.11	-93.48	<b>-93.59</b>	-70.78	<b>22.81</b>
124.1	0.00	0.00	-0.11	-91.55	<b>-91.66</b>	-70.78	<b>20.88</b>
124.9	0.00	0.00	-0.11	-92.99	<b>-93.10</b>	-70.78	<b>22.32</b>