

THOMAS M. ECKELS, PE  
STEPHEN S. LOCKWOOD, PE  
DAVID J. PINION, PE  
ERIK C. SWANSON, PE

---

THOMAS S. GORTON, PE

---

JAMES B. HATFIELD, PE  
BENJAMIN F. DAWSON III, PE  
CONSULTANTS

HATFIELD & DAWSON  
CONSULTING ELECTRICAL ENGINEERS  
9500 GREENWOOD AVE. N.  
SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151  
FACSIMILE (206) 789-9834  
E-MAIL [hatdaw@hatdaw.com](mailto:hatdaw@hatdaw.com)

---

MAURY L. HATFIELD, PE  
(1942-2009)  
PAUL W. LEONARD, PE  
(1925-2011)

INTERMODULATION MEASUREMENTS  
AT DEER POINT FM & TV TRANSMITTER SITE

Prepared for Lotus Boise Corp.

KJOT 105.1 MHz & KTHI 107.1 MHz

BOISE, IDAHO

September 2019

## INTRODUCTION

Spectrum measurements intended to detect unwanted intermodulation products (spurious emissions) were made on the combined FM Shively Labs 6810 antenna system located at the communications site on Deer Point, Boise, Idaho. These measurements were made between 1:00 PM and 2:00 PM on 12 September 2019. The measurements were made with both stations operating into the combined antenna system. Both stations were operating with licensed power with normal modulation while measurements were being made. Spectrum measurements were made to confirm that all operating stations comply with “§73.317 FM Transmission System Requirements” as required by the Construction Permits and to ensure that the combiner was operating correctly.

## STATIONS

The following stations will operate via this antenna system.

Callsign	Frequency	Power (ERP)
KJOT(FM)	105.1 MHz	53 kW
KTHI(FM)	107.1 MHz	52 kW

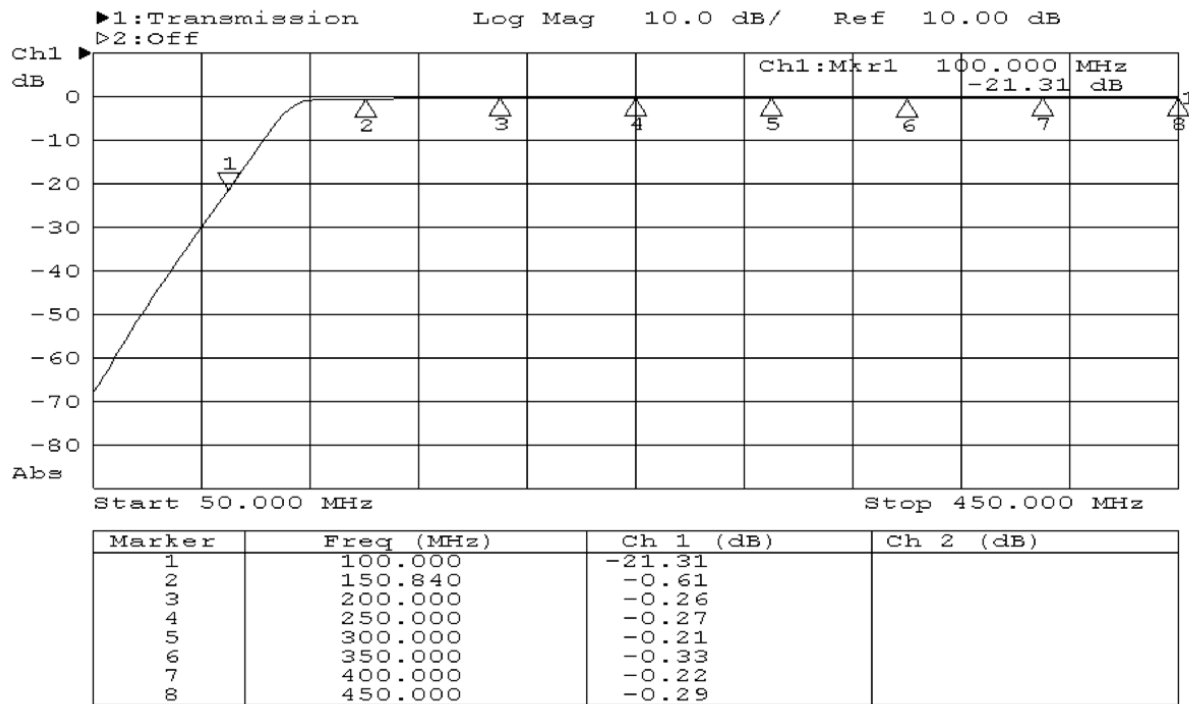
## COMBINED ANTENNA MEASUREMENTS PROCEDURE

The measurements were made using a Rohde & Schwarz FSH3 Spectrum Analyzer from the directional coupler sample port (60 dB) in the combined 6-1/8” transmission line. An additional filter and attenuators were used to ensure that the Spectrum Analyzer was not producing any internal intermodulation products.

Frequencies above 108 MHz were swept for any observable intermodulation or harmonic products. Particular attention was given to 118.1 MHz where there has historically been a mix product has occurred  $[105.1 \text{ MHz} + 107.1 \text{ MHz} - 94.1 \text{ MHz} = 118.1 \text{ MHz}]$ . For products that were close in frequency to operating transmitters, the specific carriers were turned off to observe these intermodulation products. Measurements were made with full FM modulation under normal programming. Enclosed are example spectral graphs of the measurements of the occupied bandwidth of each station. There were no harmonics or mix products that exceed the requirements as set forth in §73.317 and no evidence of any emissions on 118.1 MHz.

Component A		Component B	Mix Product Frequency
3 x 105.1 MHz	-	2 x 107.1 MHz	101.1 MHz
2 x 105.1 MHz	-	1 x 107.1 MHz	103.1 MHz
1 x 105.1 MHz	-	2 x 107.1 MHz	109.1 MHz
2 x 105.1 MHz	-	3 x 107.1 MHz	111.1 MHz
3 x 105.1 MHz	-	1 x 107.1 MHz	208.2 MHz
2 x 105.1 MHz			210.2 MHz
1 x 105.1 MHz	+	1 x 107.1 MHz	212.2 MHz
		2 x 107.1 MHz	214.2 MHz
1 x 105.1 MHz	-	3 x 107.1 MHz	216.2 MHz

## Mini-Circuits BHP-150 Highpass Filter



## CONCLUSION

Both stations at this facility comply with the requirements set forth in §73.317.

## STATEMENT OF ENGINEER

This Engineering Report regarding radiofrequency field measurements around the Deer Point FM and TV transmitter site located northeast of Boise, Idaho, has been prepared by the undersigned or under my direct supervision. All representations contained herein are true to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission. I am a partner in the firm of Hatfield and Dawson Consulting Engineers and am Registered as a Professional Engineer in the States of Washington, Alaska, and Wyoming.

Stephen S. Lockwood, P.E.



13 September 2019