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ENGINEERING REPORT:

INTERMODULATION MEASUREMENTS
OF THE COMMON ANTENNA OPERATION OF

KISM(FM)(AUX)

KAFE(FM)(AUX)

K243BX

K250BW

K255DC

BELLINGHAM, WASHINGTON

SAGA BROADCASTING, LLC

January 2017

INTRODUCTION

Saga Broadcasting, LLC (“Saga”) has been issued construction permits for the five FM axillary and translator facilities listed below. All five will operate into a common antenna, mounted on the west tower of the KPUG(AM) antenna array. KPUG is also licensed to Saga. Construction of these facilities has been completed. This report is update to the October 2016 report due to the frequency chage of K247CM. The K247CM (97.3 MHz) changed frequency and became K250BW (97.9 MHz). The measurements contained in this report have been taken to demonstrate compliance with §73.317 of the Commissions rules, and to comply with the Special operation conditions or restrictions contained in the construction permits.

Permit No	Call Sign	Frequency	Channel	ERP (Watts)
BXPH-20161007AAM	KISM-AUX	92.9 MHz	225C	680
BXPH-20161007AAN	KAFE-AUX	104.1 MHz	281C	680
BMPFT-20160729AFD	K243BX	96.5 MHz	243D	250
BMPFT-20161114ACT	K250BW	97.9 MHz	247D	250
BMPFT-20160729AGW	K255DC	98.9 MHz	255D	250

MEASUREMENTS

All measurements contained in this report were taken from a wide-band sample element of a Thruline Bird 1 5/8" line section power meter inserted in the transmission line at the output of the Kintronic Labs combiner. Bench measurements of the line section sample demonstrated a frequency response that was flat (+/- 1 dB) to 600 MHz. All transmitters were adjusted to their calculated TPO values prior to the measurements.

The measurements were made using a Rohde & Schwarz FSH3 Spectrum Analyzer. Additional filters and attenuators were used to ensure that the Spectrum Analyzer was not producing any internal intermodulation products. Measurements were made on each potential intermodulation

product frequency from 85 MHz to 130 MHz ($2A \pm B$, $3A \pm B$ and $3A \pm 2B$). Frequencies from 85 MHz to 1,000 MHz were swept for any observable intermodulation or harmonic products. Measurements were made with full FM modulation under normal programming. Enclosed are example spectral graphs of the measurements of the reference measurements of each station.

CONCLUSION

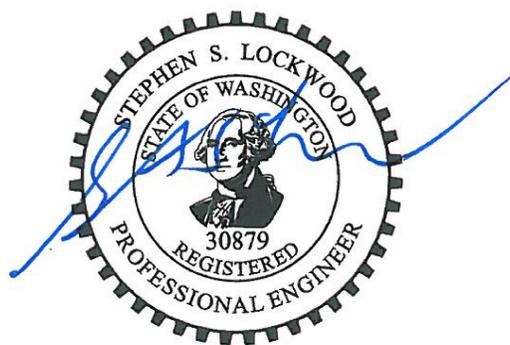
There were no observable intermodulation or harmonic products that exceeded the requirements of §73.317. All of the stations at this facility comply with requirements set forth in §73.317.

STATEMENT OF ENGINEER

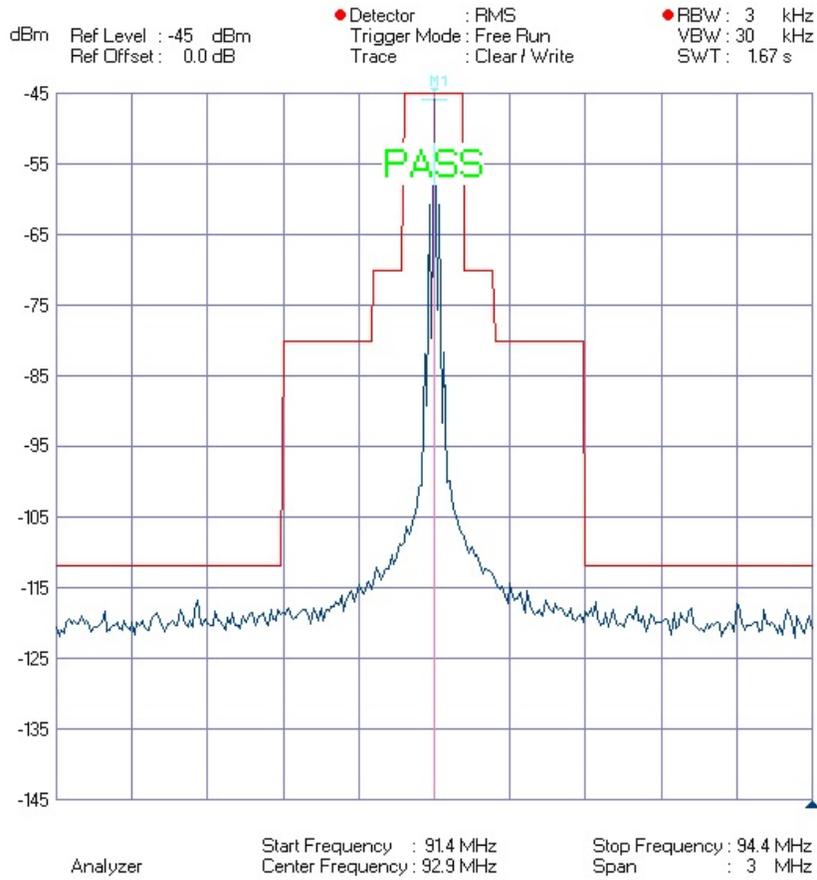
This Engineering Report, Intermodulation Measurements of the Common Antenna Operation for Saga Broadcasting, LLC, Bellingham, WA, has been prepared by me or under my direct supervision. All representations contained herein are true to the best of my knowledge. I am an experienced radio engineer whose 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.

10 January 2017

Stephen S. Lockwood, P.E.



Hatfield & Dawson Consulting Engineers

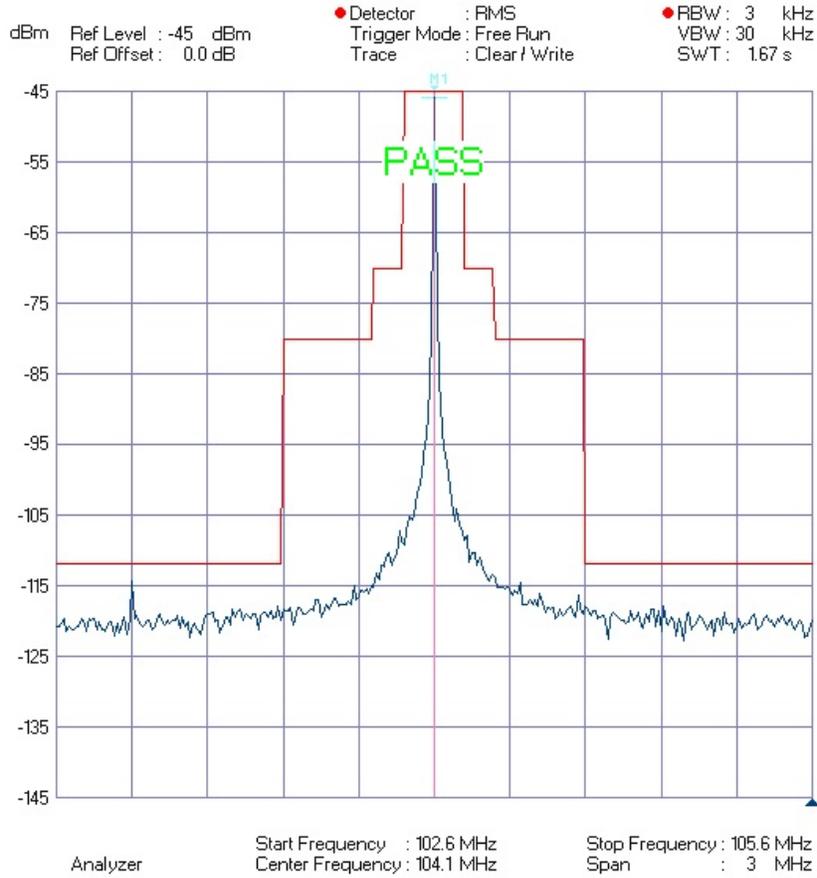


Trace	
File Name	: ---
Name	: Analyzer
Ref Level	: -45 dBm
Range	: 10 dB/div
Result	: Pass
Averaging	: ---

Status	
Channel Table	: ---
Channel	: ---
Center Frequency	: 92.9 MHz
Frequency Offset	: 0 Hz
Span	: 3 MHz
Ref Offset	: 0.0 dB
RF Attenuator	: 0 dB
Preamplifier	: On
Dynamic Range	: High Dynamic
RF Input	: 50 Ohm
VSWR-Bridge	: No Bridge
RBW	: 3 kHz
VBW	: 30 kHz
SWT	: 1.67 s
Trace Mode	: Clear / Write
Trace Math	: Off
Detector	: RMS
Trigger Mode	: Free Run
Trigger Level	: ---
Trigger Delay	: ---
Upper Limit	: FM Mask LP 250
Lower Limit	: ---
External Reference	: Disabled
Transducer	: ---
Transducer (dB)	: ---
Date	: 11/19/95
Time	: 12:13:03 AM
Instrument	: FSH23 - 100212
Operator	: lockwood

Markers	
M1	: 92.9 MHz : -45.87 dBm

KISM(AUX) Reference Signal

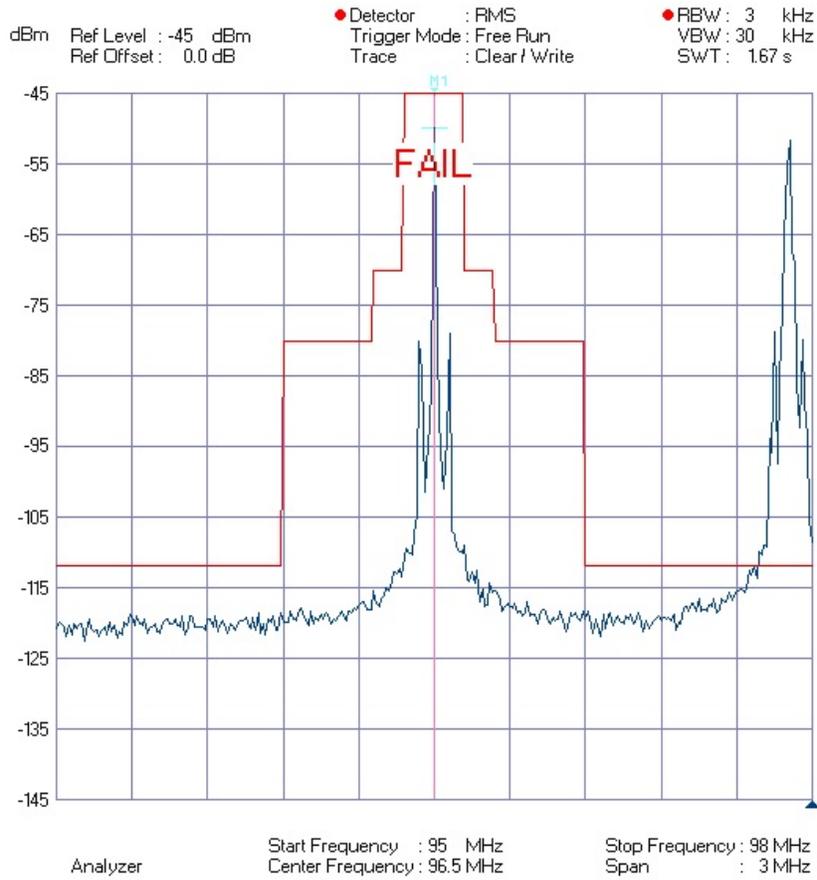


Trace	
File Name	: ---
Name	: Analyzer
Ref Level	: -45 dBm
Range	: 10 dB/div
Result	: Pass
Averaging	: ---

Status	
Channel Table	: ---
Channel	: ---
Center Frequency	: 104.1 MHz
Frequency Offset	: 0 Hz
Span	: 3 MHz
Ref Offset	: 0.0 dB
RF Attenuator	: 0 dB
Preamplifier	: On
Dynamic Range	: High Dynamic
RF Input	: 50 Ohm
VSWR-Bridge	: No Bridge
RBW	: 3 kHz
VBW	: 30 kHz
SWT	: 1.67 s
Trace Mode	: Clear / Write
Trace Math	: Off
Detector	: RMS
Trigger Mode	: Free Run
Trigger Level	: ---
Trigger Delay	: ---
Upper Limit	: FM Mask LP 250
Lower Limit	: ---
External Reference	: Disabled
Transducer	: ---
Transducer (dB)	: ---
Date	: 11/19/95
Time	: 12:14:06 AM
Instrument	: FSH23 - 100212
Operator	: lockwood

Markers	
M1	: 104.1 MHz : -45.70 dBm

KAFE(AUX) Reference Signal

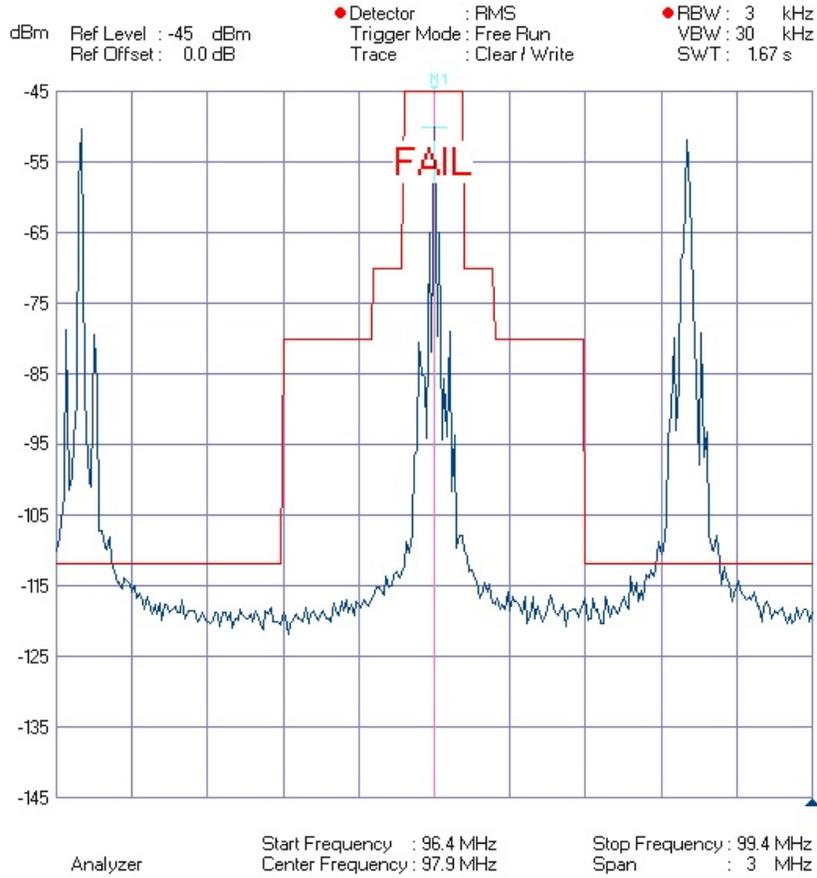


Trace	
File Name	: ---
Name	: Analyzer
Ref Level	: -45 dBm
Range	: 10 dB/div
Result	: Fail
Averaging	: ---

Status	
Channel Table	: ---
Channel	: ---
Center Frequency	: 96.5 MHz
Frequency Offset	: 0 Hz
Span	: 3 MHz
Ref Offset	: 0.0 dB
RF Attenuator	: 0 dB
Preamplifier	: On
Dynamic Range	: High Dynamic
RF Input	: 50 Ohm
VSWR-Bridge	: No Bridge
RBW	: 3 kHz
VBW	: 30 kHz
SWT	: 1.67 s
Trace Mode	: Clear / Write
Trace Math	: Off
Detector	: RMS
Trigger Mode	: Free Run
Trigger Level	: ---
Trigger Delay	: ---
Upper Limit	: FM Mask LP 250
Lower Limit	: ---
External Reference	: Disabled
Transducer	: ---
Transducer (dB)	: ---
Date	: 11/19/95
Time	: 12:15:44 AM
Instrument	: FSH23 - 100212
Operator	: lockwood

Markers	
M1	: 96.5 MHz : -49.73 dBm

K243BX Reference Signal

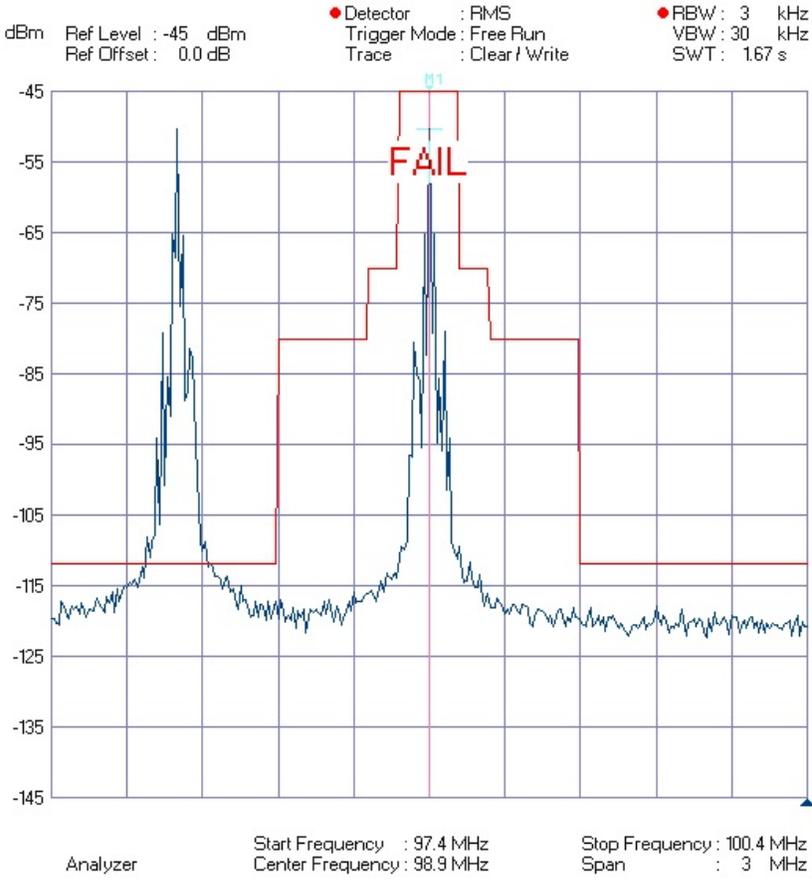


Trace	
File Name	: ---
Name	: Analyzer
Ref Level	: -45 dBm
Range	: 10 dB/div
Result	: Fail
Averaging	: ---

Status	
Channel Table	: ---
Channel	: ---
Center Frequency	: 97.9 MHz
Frequency Offset	: 0 Hz
Span	: 3 MHz
Ref Offset	: 0.0 dB
RF Attenuator	: 0 dB
Preamplifier	: On
Dynamic Range	: High Dynamic
RF Input	: 50 Ohm
VSWR-Bridge	: No Bridge
RBW	: 3 kHz
VBW	: 30 kHz
SWT	: 1.67 s
Trace Mode	: Clear / Write
Trace Math	: Off
Detector	: RMS
Trigger Mode	: Free Run
Trigger Level	: ---
Trigger Delay	: ---
Upper Limit	: FM Mask LP 250
Lower Limit	: ---
External Reference	: Disabled
Transducer	: ---
Transducer (dB)	: ---
Date	: 11/19/95
Time	: 12:16:32 AM
Instrument	: FSH23 - 100212
Operator	: lockwood

Markers	
M1	: 97.9 MHz : -50.05 dBm

K250BX Occupied Bandwidth



Trace	
File Name	: ---
Name	: Analyzer
Ref Level	: -45 dBm
Range	: 10 dB/div
Result	: Fail
Averaging	: ---

Status	
Channel Table	: ---
Channel	: ---
Center Frequency	: 98.9 MHz
Frequency Offset	: 0 Hz
Span	: 3 MHz
Ref Offset	: 0.0 dB
RF Attenuator	: 0 dB
Preamplifier	: On
Dynamic Range	: High Dynamic
RF Input	: 50 Ohm
VSWR-Bridge	: No Bridge
RBW	: 3 kHz
VBW	: 30 kHz
SWT	: 1.67 s
Trace Mode	: Clear / Write
Trace Math	: Off
Detector	: RMS
Trigger Mode	: Free Run
Trigger Level	: ---
Trigger Delay	: ---
Upper Limit	: FM Mask LP 250
Lower Limit	: ---
External Reference	: Disabled
Transducer	: ---
Transducer (dB)	: ---
Date	: 11/19/95
Time	: 12:17:45 AM
Instrument	: FSH23 - 100212
Operator	: lockwood

Markers	
M1	: 98.9 MHz : -50.22 dBm

K255 DC Reference Signal