

# Technical Engineering Report

## SPURIOUS EMISSIONS MEASUREMENTS STUDY

Pursuant to 47 C.F.R. §73.317(b) associated with the licensing of:

*W268CS.L - Portland, ME  
BLFT-20160913ABU  
(FAC ID: 148099)*

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*W277AM.L - Portland, ME  
BMLFT-20160913ABT  
(FAC ID: 149580)*

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*W288CU.L - Portland, ME  
BMLFT-20160913ABW  
(FAC ID: 150422)*

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*and*

*W296CZ.C - Portland, ME  
BPFT-20170410ACM  
(FAC ID: 145635)*

May 2017

**EXPLANATION OF STUDY:** The applicant has prepared the required Spurious Emissions Measurement Study for the quad-plexed operation of FM Translator(s) W268CS.L - Portland, ME; W277AM.L - Portland, ME; W288CU.L - Portland, ME; and W296CZ.C - Portland, ME. This study has been conducted pursuant to 47 C.F.R. §73.317(b) and is associated with, and believed to be a condition of licensing for, W296CZ.C Construction Permit File Number BPFT-20170410ACM. FM Station WYNZ(FM) - South Portland, ME is also co-located at this site but operates independently from the quad-plexed W268CS.L / W277AM.L / W288CU.L / W296CZ.C antenna.

**SUMMARY OF STATIONS:** W268CS.L operates on 101.5 MHz with a maximum effective radiated power (ERP) of 0.099 kW circular (H&V) polarization. W277AM.L operates on 103.3 MHz with a maximum effective radiated power (ERP) of 0.019 kW circular (H&V) polarization. W288CU.L operates on 105.5 MHz with a maximum effective radiated power (ERP) of 0.200 kW circular (H&V) polarization. W296CZ.C operates on 107.1 MHz with a maximum effective radiated power (ERP) of 0.250 kW circular (H&V) polarization. The common antenna is mounted on the tower bearing ASR #1219887 or tower two of the WGAN(AM) - Portland, ME, 560 kHz daytime directional array. The common FM antenna is a four (4) bay, PSI FMT-4A (NDA) "Opposed V Dipole" antenna mounted with a Center of Radiation 89 meters above ground level (AGL). The antenna is matched with a Shively Labs, Model 2930-3/4, four station VLP Branched Combiner (quad-plexer). The combiner was set using manufacturer specifications as well as information from the FCC database concerning the above mentioned operating parameters.

**MEASUREMENT RESULTS:** RF Spurious Emissions Measurements were conducted on May 3rd, 2017 during the equipment test operations associated with the W296CZ.C Construction Permit. Measurements were conducted by Mr. Andrew Armstrong, chief engineer for the Portland branch of W296CZ.C licensee, Saga Communications of New England, LLC. Measurements were conducted utilizing an Anritsu 2721b Spectrum Analyzer, Serial Number #1110054 with the FM transmitters in full operation employing the branched combiner for the multiple FM Translator operations. A broad spectral sweep found no obvious products above the analyzer noise floor. Using a computer generated mixing product chart, high resolution, low noise floor measurements were also made out to the 1st through 3rd orders. With the exception of noted carrier frequencies, nothing was observed over the noise floor of the analyzer as reported at the end of this report.

The following is a copy of the 1st through 3rd order potential mixing product measurement results for the spurious relationships associated with the 101.5 MHz, 103.3 MHz, 105.5 MHz and 107.1 MHz quad-plexed operations. As a result of these studies, it has been concluded the quad-plexed operation(s) meets or exceeds the requirements of 47 C.F.R. §73.317(b) and the special condition of licensing associated with W296CZ.C Construction Permit BPFT-20170410ACM.

For a W268CS.L operational power of 0.099 kW, the minimum attenuation level is -63 dBc.

For a W277AM.L operational power of 0.019 kW, the minimum attenuation level is -60 dBc.

For a W288CU.L operational power of 0.200 kW, the minimum attenuation level is -66 dBc.

For a W296CZ.C operational power of 0.250 kW, the minimum attenuation level is -67 dBc.

Frequency (in MHz)	Measurement (in dBc)	Frequency (in MHz)	Measurement (in dBc)	Frequency (in MHz)	Measurement (in dBc)	Frequency (in MHz)	Measurement (in dBc)
1.60 MHz	-90 dBc	101.10 MHz	-86 dBc	208.60 MHz	-85 dBc	315.70 MHz	-86 dBc
1.80 MHz	-90 dBc	101.50 MHz	W268CS Carrier*	208.80 MHz	-86 dBc	316.50 MHz	-75 dBc
2.20 MHz	-90 dBc	103.30 MHz	W277AM Carrier*	210.40 MHz	-86 dBc	317.50 MHz	-86 dBc
3.20 MHz	-90 dBc	103.90 MHz	-80 dBc	211.00 MHz	-86 dBc	318.10 MHz	-86 dBc
3.60 MHz	-90 dBc	105.10 MHz	-88 dBc	212.60 MHz	-85 dBc	319.70 MHz	-85 dBc
3.80 MHz	-88 dBc	105.50 MHz	W288CU Carrier*	214.20 MHz	-86 dBc	321.30 MHz	-86 dBc
4.00 MHz	-89 dBc	107.10 MHz	W296CZ Carrier*	304.50 MHz	-85 dBc	406.00 MHz	-86 dBc
4.40 MHz	-89 dBc	107.70 MHz	-85 dBc	306.30 MHz	-86 dBc	409.60 MHz	-85 dBc
5.60 MHz	-90 dBc	108.70 MHz	-75 dBc	308.10 MHz	-86 dBc	413.20 MHz	-83 dBc
7.60 MHz	-90 dBc	109.50 MHz	-86 dBc	308.50 MHz	-85 dBc	414.00 MHz	-86 dBc
8.00 MHz	-90 dBc	110.90 MHz	-86 dBc	309.90 MHz	-86 dBc	417.20 MHz	-86 dBc
11.20 MHz	-90 dBc	112.70 MHz	-83 dBc	310.10 MHz	-85 dBc	417.60 MHz	-86 dBc
95.90 MHz	-73 dBc	203.00 MHz	-86 dBc	312.10 MHz	-86 dBc	420.80 MHz	-87 dBc
97.50 MHz	-85 dBc	204.80 MHz	-86 dBc	312.50 MHz	-86 dBc	422.00 MHz	-86 dBc
99.50 MHz	-87 dBc	206.60 MHz	-85 dBc	313.70 MHz	-86 dBc	425.20 MHz	-85 dBc
99.70 MHz	-86 dBc	207.00 MHz	-85 dBc	314.30 MHz	-86 dBc	428.40 MHz	-86 dBc

\*No intermodulation mixing was noted on any carrier frequency

## **CITATION OF RULES:**

Title 47: Telecommunication:

PART 73 - RADIO BROADCAST SERVICES

Subpart B: FM Broadcast Stations § 73.317 FM transmission system requirements.

Title 47: Telecommunication:

PART 74 - EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER SERVICES

Subpart L: FM Broadcast Translator Stations and Broadcast Booster Stations: § 74.1236 Emission and bandwidth.

**CERTIFICATION OF TECHNICAL CONSULTANT:** *I declare, under penalty of perjury, that the contents of this report are true and accurate to the best of my knowledge and belief. I further certify I have over eighteen years of experience as a broadcast technical consultant before the Federal Communications Commission ("the FCC"); and am familiar with the Code of Federal Regulations Title 47 ("the Rules") as pertaining to this report and its contents herein. The underlying data utilized in this report was taken directly from FCC databases or indirectly through third party software vendors securing data directly from FCC databases. The information contained herein is believed accurate to the date reported below.*

  
Justin W. Asher, Technical Consultant

May 3, 2017