

SUPPLEMENTARY ENGINEERING STATEMENT

APPLICATION FOR LICENSE

(Covering CP BPFT-20160129AUE)

WIN Radio Broadcasting Corporation

FM Translator Station W257BW

94.3 MHz (Ch. 232D) 0.25 kW H/V (DA)

Potomac, Maryland

07 May 2019

**Prepared by R. Morgan Burrow Jr., P.E.
Everett, PA 15537**

**Supplementary Engineering Statement
Application for License
WIN Radio Broadcasting Corporation
FM Translator W257BW (BPFT-20160129AUE)
Potomac, Maryland
May 2019**

- A. **General:** WIN Radio Broadcasting Corporation is the permittee of FM translator W257BW, with facilities on 94.3 MHz (Ch. 232D) serving the town of Potomac, Maryland and nearby communities. W257BW will operate with max ERP of 0.25 kW (H/V) using a directional antenna.
- B. **Transmitter and Antenna:** The FM transmitter and antenna are co-located on the WCTN (AM) northwest tower at geographic coordinates 39 02' 12" N. Lat and 77 12 09 W. Lon. The antenna center of radiation is 163 m (535 ft) AMSL and 56 m (184 ft) AGL. The BW 600 watt transmitter is located in the secure, locked WCTN-AM building and is connected to the antenna with 63.4 meters (208 ft) of FLC12-50J 1/2" coaxial line. The Jampro JLLP-2 directional antenna is installed on the existing self supporting tower in accordance with the CP and instructions from Jampro, with the azimuth alignment at 310 degrees true, as determined by special instrumentation and verified visually from landmarks and a topographic map. This alignment produces the required null area and primary lobe as required by the construction permit.

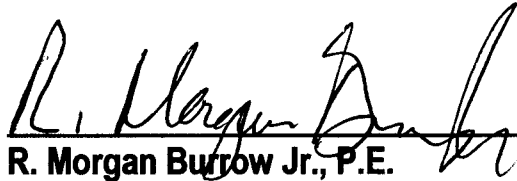
The construction permit specified the use of a Shively 6810-2 two bay, full wave spaced directional antenna. This antenna is large and heavy and was unsuitable for installation on the WCTN-AM tower. Peter Neubauer P.E. was retained for structural analysis work at WCTN, and the self supporting tower required additional bracing for adding any FM antenna and transmission line. Therefore, a lighter weight Jampro JLLP-2 two bay full wave spaced directional antenna was ordered and installed. Jampro was furnished with complete surveys, tower construction details, and details concerning the existing AM unipole antenna. Jampro assured WCTN their product would function in accordance with the construction permit constraints with installation in compliance with the instruction manual furnished with the product. The installation manual of the installation manual for this antenna is attached. US Tower Services of Frederick, MD installed the antenna.

W257BW filed a license application (BLFT-20170830ABL) covering construction permit BPFT-20160129AUE), specifying 343 watts transmitter output. Recent TDR (time domain reflectometer) measurements on the FM translator feed line revealed that 32 feet (9.75 m) of coax line was cut off rather than coiled in the transmitter building. This directly reduces the required transmitter power. The Amphenol formula for N connector insertion loss is more realistic than the assumption of 1 db for all the connectors.

The BW transmitter is a integrated, digitally controlled unit and its operation is controlled by dedicated IP (internet) or other suitable secure data connection.

- C. **Operating Power:** The output power from the transmitter to obtain the authorized radiated power is 297.5 (298) watts, determined from the following data: Antenna gain 1.175 (0.60 dBd) supplied by Jampro; efficiency of 63.4 m (208 ft) of FLC12-50J coax is 0.7226; connector insertion loss for three type N connectors (one at transmitter end and antenna end of transmission line plus type "N" to 7/8" flange adaptor) 3.03 watts. [Amphenol formula for type N connector insertion loss is $0.05 \times F$ (GHz) dB]; converting this, $10^{(.0943 \text{ GHz} \times 0.05)} = 1.01$ watt per connector. The composite power calculation is $(250 \text{ w ERP}) / 1.175 \text{ ant gain} / 0.7226 \text{ (line efficiency)} + 3.03 \text{ (loss in watts for three N connectors at 94.3 MHz)} = 297.5 \text{ (rounded 298) watts transmitter power output.}$
- D. **Environmental:** The translator antenna is located on a existing self supporting tower with radiation center 56 m above ground level. The tower is enclosed by a metal chain link fence with a locked gate. The adjacent WCTN-AM transmitter building is accessed through the locked gate, and in addition, the transmitter room is also locked. In the event tower work is necessary near the W257BW antenna, WCTN and the translator will be shut off while workmen are within the computed worst case controlled access distance to the 1 mW/cm² contour. The worst case distance calculation for 1 mW/cm² is 4.09 m (13.41 ft) and 9.14 m (29.99 ft) for 0.2 mW/cm² uncontrolled access. Using the 0.100 factor supplied by Jampro, the 1 mW/cm² contour is 1.34 ft (0.41 m) from the antenna and the uncontrolled 0.2 mW/cm² contour is 3.00 ft (0.91 m). The worst case condition is recommended since caution must be exercised when working near the antenna elements. The computed power density contours are contained high on the tower and computations indicate the contribution of W257BW near ground level is 0.0057 mW/cm², well below any controlled or uncontrolled access limits. Since the translator is co-located with WCTN-AM, the existing 2.5 kW AM fencing is compliant.

Translator W257BW is ready for license. Site photographs and manufacturer antenna data are attached to this exhibit. R. Morgan Burrow Jr., PE declares all information and calculations contained herein are true of his own knowledge, and data supplied by others is believed to be true.

A handwritten signature in black ink, appearing to read "R. Morgan Burrow Jr.", is written over a horizontal line.

R. Morgan Burrow Jr., P.E.

MD License 15811

2439 French Creek Road

Everett, PA 15537

07 May 2019