

**NASHVILLE PUBLIC RADIO**  
**ENGINEERING EXHIBIT**  
**FCC FORM 302 FM**  
**REPORTING MINOR LICENSE CHANGES TO WPLN-FM**  
**MAIN ANTENNA AND TRANSMISSION LINE**

This application reports minor changes to the licensed (BLED-19840320AA) WPLN-FM main antenna and transmission line.

The changes are as follows.

1. Replacement of the current 10-bay ERI SHPX-10AC circular polarized antenna with a new 10-bay ERI SHPX-10AC. The replacement antenna is identical in characteristics to the former antenna and was located within 2 meters of the former antenna's position on the tower. The antenna maximum power gain remains the same at 5.1910. The new antenna has the same beam tilt of -0.5 degrees and the same null fills of 15% for the first and 5% for the second.
2. The antenna radiation center above average terrain remains the same at 345 meters.
3. The 3-1/2 inch HCC312-50J Cablewave Wellflex transmission line will be replaced with 3-1/8 inch HJ8-50B Andrew Commscope. The resultant line efficiency changes from 76.90% to 70.78%.
4. The transmitter TPO will change from the current licensed 20 kw to 21.774 kw because of the reduced transmission line efficiency.
5. The ERP remains unchanged at 80 kw.
6. This application additionally seeks to change the coordinates for the WPLN main antenna license, which are listed in the license as (36-02-08 N; 86-50-56 W), to match the correct coordinates which are listed in the FCC Antenna Structure Registration # 1042766 as 36-02-08 N; 86-50-55 W (in NAD83 and NAD27). This results in a 1 second change from the licensed coordinates.

The new antenna's power gain, beam tilt, and null fill remain unchanged from that of the replaced antenna. The replacement of the WPLN FM licensed main antenna will result in no change to the 1mV contour or other contour protections and there are no changes in the RF exposure compliance protections. There is a 1 second change in antenna coordinates.

Please see the attached documents that list the new antenna's power gain, beam tile and null fill characteristics and the new transmission line's attenuation per 100 meters.



# ROTOTILLER® X Series

## Circularly Polarized FM Antenna

### SHPX Model - Super High Power

#### Electrical Specifications

| Type Number | Number of Bays | Power Gain | dB Gain | Input Type               | Feed Configuration | Input Power Rating kW | Bay to Bay Spacing |
|-------------|----------------|------------|---------|--------------------------|--------------------|-----------------------|--------------------|
| SHPX-1AE    | 1              | 0.461      | -3.3623 | 3 1/8 inch 50 Ohm Female | End                | 32.0                  | Full Wave          |
| SHPX-1BE    | 1              | 0.461      | -3.3623 | 6 1/8 inch 50 Ohm Female | End                | 40.0                  | Full Wave          |
| SHPX-2AC    | 2              | 0.997      | -0.0128 | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-2AC6   | 2              | 0.997      | -0.0128 | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-2AE    | 2              | 0.997      | -0.0128 | 3 1/8 inch 50 Ohm Female | End                | 32.0                  | Full Wave          |
| SHPX-2BC    | 2              | 0.997      | -0.0128 | 6 1/8 inch 50 Ohm Female | Center             | 80.0                  | Full Wave          |
| SHPX-2BE    | 2              | 0.997      | -0.0128 | 6 1/8 inch 50 Ohm Female | End                | 56.0                  | Full Wave          |
| SHPX-2CE    | 2              | 0.997      | -0.0128 | 6 1/8 inch 50 Ohm Female | End                | 80.0                  | Full Wave          |
| SHPX-3AC    | 3              | 1.559      | 1.9278  | 3 1/8 inch 50 Ohm Female | Off Center         | 39.0                  | Full Wave          |
| SHPX-3AC6   | 3              | 1.559      | 1.9278  | 6 1/8 inch 50 Ohm Female | Off Center         | 64.0                  | Full Wave          |
| SHPX-3AE    | 3              | 1.559      | 1.9278  | 3 1/8 inch 50 Ohm Female | End                | 32.0                  | Full Wave          |
| SHPX-3BC    | 3              | 1.559      | 1.9278  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-3BE    | 3              | 1.559      | 1.9278  | 6 1/8 inch 50 Ohm Female | End                | 56.0                  | Full Wave          |
| SHPX-4AC    | 4              | 2.133      | 3.2903  | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-4AC6   | 4              | 2.133      | 3.2903  | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-4AE    | 4              | 2.133      | 3.2903  | 3 1/8 inch 50 Ohm Female | End                | 32.0                  | Full Wave          |
| SHPX-4BC    | 4              | 2.133      | 3.2903  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-4BE    | 4              | 2.133      | 3.2903  | 6 1/8 inch 50 Ohm Female | End                | 56.0                  | Full Wave          |
| SHPX-4CE    | 4              | 2.133      | 3.2903  | 6 1/8 inch 50 Ohm Female | End                | 120.0                 | Full Wave          |
| SHPX-5AC    | 5              | 2.715      | 4.3384  | 3 1/8 inch 50 Ohm Female | Off Center         | 39.0                  | Full Wave          |
| SHPX-5AC6   | 5              | 2.715      | 4.3384  | 6 1/8 inch 50 Ohm Female | Off Center         | 64.0                  | Full Wave          |
| SHPX-5AE    | 5              | 2.715      | 4.3384  | 3 1/8 inch 50 Ohm Female | End                | 32.0                  | Full Wave          |
| SHPX-5BC    | 5              | 2.715      | 4.3384  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-5BE    | 5              | 2.715      | 4.3384  | 6 1/8 inch 50 Ohm Female | End                | 56.0                  | Full Wave          |
| SHPX-6AC    | 6              | 3.303      | 5.1888  | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-6AC6   | 6              | 3.303      | 5.1888  | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-6BC    | 6              | 3.303      | 5.1888  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-6CE    | 6              | 3.303      | 5.1888  | 6 1/8 inch 50 Ohm Female | End                | 120.0                 | Full Wave          |
| SHPX-7AC    | 7              | 3.894      | 5.9034  | 3 1/8 inch 50 Ohm Female | Off Center         | 39.0                  | Full Wave          |
| SHPX-7AC6   | 7              | 3.894      | 5.9034  | 6 1/8 inch 50 Ohm Female | Off Center         | 64.0                  | Full Wave          |
| SHPX-7BC    | 7              | 3.894      | 5.9034  | 6 1/8 inch 50 Ohm Female | Off Center         | 112.0                 | Full Wave          |
| SHPX-8AC    | 8              | 4.487      | 6.5197  | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-8AC6   | 8              | 4.487      | 6.5197  | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-8BC    | 8              | 4.487      | 6.5197  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-9AC    | 9              | 5.083      | 7.0608  | 6 1/8 inch 50 Ohm Female | Off Center         | 39.0                  | Full Wave          |
| SHPX-9AC6   | 9              | 5.083      | 7.0608  | 6 1/8 inch 50 Ohm Female | Off Center         | 64.0                  | Full Wave          |
| SHPX-9BC    | 9              | 5.083      | 7.0608  | 6 1/8 inch 50 Ohm Female | Off Center         | 112.0                 | Full Wave          |
| SHPX-10AC   | 10             | 5.680      | 7.5435  | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-10AC6  | 10             | 5.680      | 7.5435  | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-10BC   | 10             | 5.680      | 7.5435  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |
| SHPX-11AC   | 11             | 6.278      | 7.9785  | 6 1/8 inch 50 Ohm Female | Off Center         | 39.0                  | Full Wave          |
| SHPX-11AC6  | 11             | 6.278      | 7.9785  | 6 1/8 inch 50 Ohm Female | Off Center         | 64.0                  | Full Wave          |
| SHPX-11BC   | 11             | 6.278      | 7.9785  | 6 1/8 inch 50 Ohm Female | Off Center         | 112.0                 | Full Wave          |
| SHPX-12AC   | 12             | 6.878      | 8.3747  | 3 1/8 inch 50 Ohm Female | Center             | 39.0                  | Full Wave          |
| SHPX-12AC6  | 12             | 6.878      | 8.3747  | 6 1/8 inch 50 Ohm Female | Center             | 64.0                  | Full Wave          |
| SHPX-12BC   | 12             | 6.878      | 8.3747  | 6 1/8 inch 50 Ohm Female | Center             | 112.0                 | Full Wave          |

## Attenuation

| Frequency (MHz) | Attenuation (dB/100 m) | Attenuation (dB/100 ft) | Average Power (kW) |
|-----------------|------------------------|-------------------------|--------------------|
| 0.5             | 0.029                  | 0.009                   | 640.00             |
| 1               | 0.041                  | 0.013                   | 475.54             |
| 1.5             | 0.051                  | 0.015                   | 387.10             |
| 2               | 0.059                  | 0.018                   | 334.39             |
| 10              | 0.135                  | 0.041                   | 146.12             |
| 20              | 0.194                  | 0.059                   | 101.58             |
| 30              | 0.24                   | 0.073                   | 81.88              |
| 50              | 0.317                  | 0.096                   | 62.16              |
| 85              | 0.424                  | 0.129                   | 46.43              |
| 88              | 0.432                  | 0.132                   | 45.55              |
| 100             | 0.464                  | 0.141                   | 42.41              |
| 108             | 0.484                  | 0.148                   | 40.62              |
| 150             | 0.584                  | 0.178                   | 33.72              |
| 174             | 0.635                  | 0.194                   | 30.96              |
| 200             | 0.689                  | 0.21                    | 28.56              |
| 204             | 0.697                  | 0.212                   | 28.24              |
| 300             | 0.874                  | 0.266                   | 22.50              |
| 400             | 1.039                  | 0.317                   | 18.93              |
| 450             | 1.117                  | 0.34                    | 17.62              |
| 500             | 1.192                  | 0.363                   | 16.51              |
| 512             | 1.209                  | 0.369                   | 16.27              |
| 600             | 1.335                  | 0.407                   | 14.74              |
| 700             | 1.47                   | 0.448                   | 13.38              |
| 800             | 1.601                  | 0.488                   | 12.29              |
| 824             | 1.631                  | 0.497                   | 12.06              |
| 894             | 1.719                  | 0.524                   | 11.45              |
| 960             | 1.8                    | 0.549                   | 10.93              |
| 1000            | 1.849                  | 0.563                   | 10.64              |
| 1218            | 2.104                  | 0.641                   | 9.35               |
| 1250            | 2.14                   | 0.652                   | 9.19               |
| 1500            | 2.418                  | 0.737                   | 8.14               |

## Regulatory Compliance/Certifications

| Agency        | Classification   |
|---------------|--|
| ISO 9001:2008 | Designed, manufactured and/or distributed under this quality management system |