

DELAWDER COMMUNICATIONS, INC.

P.O. Box 1095
Ashburn, Virginia 20146-1095
(703) 299-9222

ENGINEERING REPORT

K291CE, Houston, TX, Channel 291D FM Translator Minor Mod

ENGINEERING STATEMENT

PROTECTION TO KOVE-FM AND KHCB-FM

All contour non-overlap protection requirements are met with the exception of Houston, TX stations KOVE-FM, Galveston, TX (293C) and KHCB-FM, Houston, TX (289C), discussed below.

KOVE-FM (56.6 kilometers at 154 degrees True) and KHCB-FM (25.0 kilometers at 212 degrees True) are second adjacent-channel to the proposed channel 291D facility. The 60 dBu F50,50 service contour extends well beyond the proposed 291D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any population is predicted to exist to KHCB-FM or KOVE-FM.

Note that a rule waiver of Section 74.1204 for this second/third adjacent-channel protection using the well-established *Living Way Ministries* Methodology is respectfully requested if such a rule waiver is deemed necessary for protection to any station.

The F50,50 signal strength from KHCB-FM at the proposed 291D transmitter site is at least 88 dBu (the “desired” signal to KHCB-FM). The F50,50 signal strength from KOVE-FM at the proposed 291D transmitter site is at least 90 dBu (the other “desired” signal). The second/third adjacent-channel protection of Section 74.1204 is an undesired-to-desired (“U/D”) dB signal strength ratio of 40:1. Therefore, predicted interference to KHCB-FM and KOVE-FM from the proposed 291D facility is a signal of greater than or equal to 128 dBu.

Figure EE1 is the vertical plane relative field pattern for the proposed Nicom BKG-77 three bay (half-wave spaced) antenna. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 128 dBu interfering signal (using a free space field determination) does not exist at any point where the public has access within the building or on the building rooftop. (The nearest floor with public access is at least 40 feet, or 12 meters, below the bottom bay of the proposed antenna.)

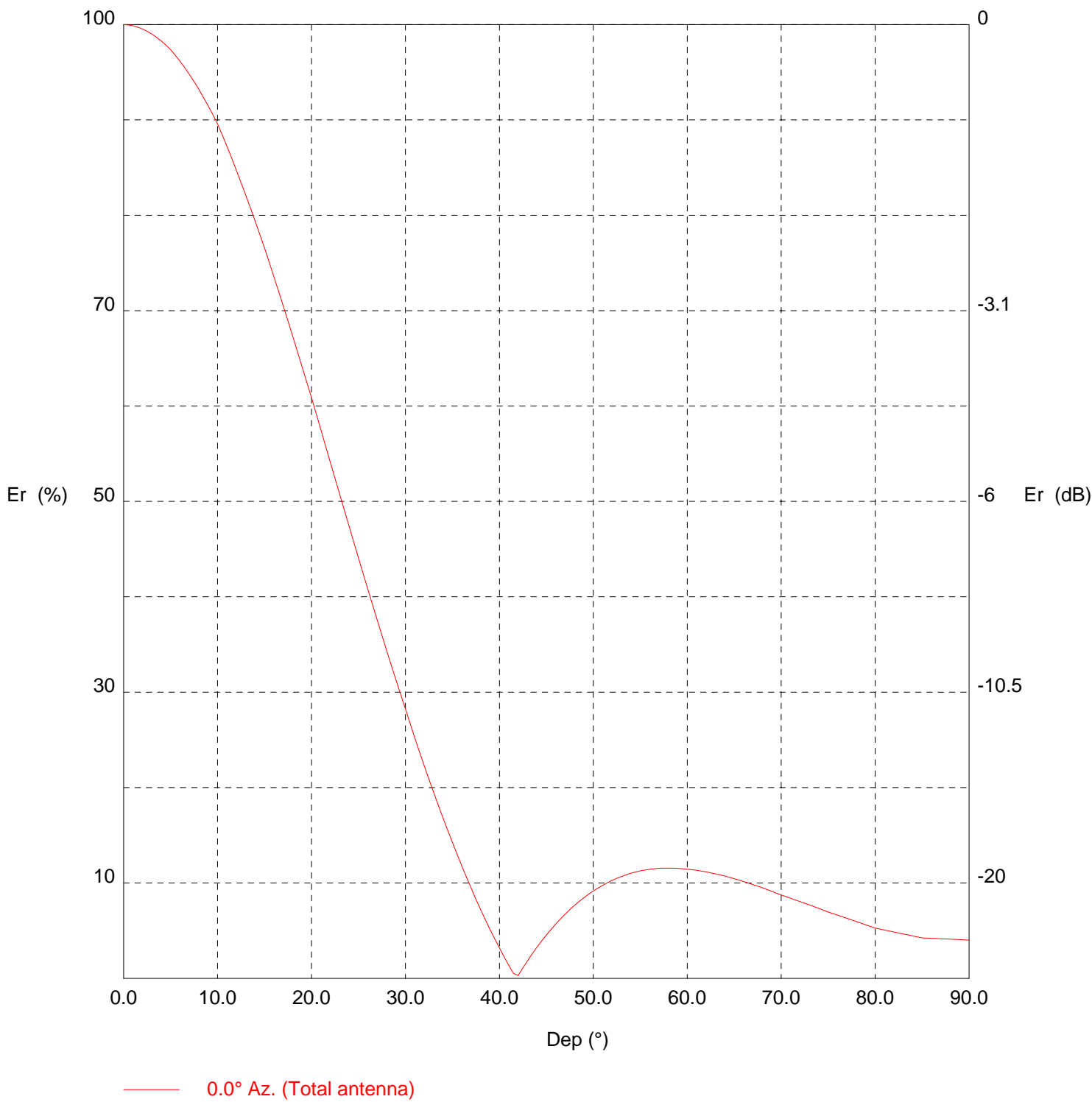
Attached as Figure EE2 is a tabulation of various points on the top public access floor. (Note that the horizontal distance studied is to 45 meters—the worst-case distance for a possible 128 dBu Free Space Loss signal when using the maximum ERP of 245 watts.) (Column B is the different distances from the tower base to each studied point.) The actual distance from the antenna to each point is listed in Column C, the hypotenuse of the vertical height (Column A) and the horizontal distance (Column B). Also, the vertical distance from the antenna bottom to the calculated interference signal for each studied point is provided in Column K. Because the calculated distance to the free space interfering signal (Column J) is less than the hypotenuse distance (Column C) and the interfering signal vertical distance (Column K) is less than the vertical distance (Column A) for each studied point, the interfering signal does not reach any studied point. Therefore, pursuant to Section 74.1204(d) of the FCC Rules, KHCB-FM and KOVE-FM are adequately protected by the proposed facility.

TX station: BKG77/3 GENERIC
Frequency: 100.00 MHz

Site name:

FIGURE EE1 (1 of 2)

Vertical diagram



TX station: BKG77/3 GENERIC

Site name:

Frequency: 100.00 MHz

FIGURE EE1 (2 of 2)

Vertical diagram at an azimuth of 0° degrees

| Dep (°) | Er (%) | ERP (KW) | Dep (°) | Er (%) | ERP (KW) | Dep (°) | Er (%) | ERP (KW) |
|---------|--------|----------|---------|--------|----------|---------|--------|----------|
| 0.0 | 100.0 | 1.37 | 30.0 | 28.2 | 0.11 | 60.0 | 11.4 | 0.02 |
| 0.5 | 100.0 | 1.37 | 30.5 | 26.7 | 0.10 | 60.5 | 11.4 | 0.02 |
| 1.0 | 99.9 | 1.37 | 31.0 | 25.2 | 0.09 | 61.0 | 11.3 | 0.02 |
| 1.5 | 99.7 | 1.36 | 31.5 | 23.7 | 0.08 | 61.5 | 11.2 | 0.02 |
| 2.0 | 99.5 | 1.36 | 32.0 | 22.3 | 0.07 | 62.0 | 11.2 | 0.02 |
| 2.5 | 99.3 | 1.35 | 32.5 | 20.9 | 0.06 | 62.5 | 11.1 | 0.02 |
| 3.0 | 99.0 | 1.34 | 33.0 | 19.5 | 0.05 | 63.0 | 11.0 | 0.02 |
| 3.5 | 98.7 | 1.34 | 33.5 | 18.1 | 0.05 | 63.5 | 10.8 | 0.02 |
| 4.0 | 98.3 | 1.32 | 34.0 | 16.8 | 0.04 | 64.0 | 10.7 | 0.02 |
| 4.5 | 97.8 | 1.31 | 34.5 | 15.5 | 0.03 | 64.5 | 10.6 | 0.02 |
| 5.0 | 97.4 | 1.30 | 35.0 | 14.2 | 0.03 | 65.0 | 10.4 | 0.01 |
| 5.5 | 96.8 | 1.28 | 35.5 | 13.0 | 0.02 | 65.5 | 10.3 | 0.01 |
| 6.0 | 96.2 | 1.27 | 36.0 | 11.8 | 0.02 | 66.0 | 10.1 | 0.01 |
| 6.5 | 95.5 | 1.25 | 36.5 | 10.6 | 0.02 | 66.5 | 10.0 | 0.01 |
| 7.0 | 94.8 | 1.23 | 37.0 | 9.4 | 0.01 | 67.0 | 9.8 | 0.01 |
| 7.5 | 94.0 | 1.21 | 37.5 | 8.3 | 0.01 | 67.5 | 9.7 | 0.01 |
| 8.0 | 93.2 | 1.19 | 38.0 | 7.2 | 0.01 | 68.0 | 9.5 | 0.01 |
| 8.5 | 92.4 | 1.17 | 38.5 | 6.1 | 0.01 | 68.5 | 9.3 | 0.01 |
| 9.0 | 91.5 | 1.15 | 39.0 | 5.1 | 0.00 | 69.0 | 9.1 | 0.01 |
| 9.5 | 90.6 | 1.12 | 39.5 | 4.1 | 0.00 | 69.5 | 8.9 | 0.01 |
| 10.0 | 89.6 | 1.10 | 40.0 | 3.2 | 0.00 | 70.0 | 8.7 | 0.01 |
| 10.5 | 88.4 | 1.07 | 40.5 | 2.3 | 0.00 | 70.5 | 8.6 | 0.01 |
| 11.0 | 87.2 | 1.04 | 41.0 | 1.4 | 0.00 | 71.0 | 8.4 | 0.01 |
| 11.5 | 86.0 | 1.01 | 41.5 | 0.5 | 0.00 | 71.5 | 8.2 | 0.01 |
| 12.0 | 84.7 | 0.98 | 42.0 | 0.3 | 0.00 | 72.0 | 8.1 | 0.01 |
| 12.5 | 83.4 | 0.95 | 42.5 | 1.1 | 0.00 | 72.5 | 7.9 | 0.01 |
| 13.0 | 82.1 | 0.92 | 43.0 | 1.8 | 0.00 | 73.0 | 7.7 | 0.01 |
| 13.5 | 80.8 | 0.89 | 43.5 | 2.6 | 0.00 | 73.5 | 7.5 | 0.01 |
| 14.0 | 79.4 | 0.86 | 44.0 | 3.3 | 0.00 | 74.0 | 7.3 | 0.01 |
| 14.5 | 78.0 | 0.83 | 44.5 | 3.9 | 0.00 | 74.5 | 7.1 | 0.01 |
| 15.0 | 76.6 | 0.80 | 45.0 | 4.5 | 0.00 | 75.0 | 6.9 | 0.01 |
| 15.5 | 75.1 | 0.77 | 45.5 | 5.1 | 0.00 | 75.5 | 6.8 | 0.01 |
| 16.0 | 73.5 | 0.74 | 46.0 | 5.7 | 0.00 | 76.0 | 6.6 | 0.01 |
| 16.5 | 72.0 | 0.71 | 46.5 | 6.2 | 0.01 | 76.5 | 6.5 | 0.01 |
| 17.0 | 70.4 | 0.68 | 47.0 | 6.7 | 0.01 | 77.0 | 6.3 | 0.01 |
| 17.5 | 68.9 | 0.65 | 47.5 | 7.2 | 0.01 | 77.5 | 6.1 | 0.01 |
| 18.0 | 67.3 | 0.62 | 48.0 | 7.7 | 0.01 | 78.0 | 6.0 | 0.00 |
| 18.5 | 65.7 | 0.59 | 48.5 | 8.1 | 0.01 | 78.5 | 5.8 | 0.00 |
| 19.0 | 64.1 | 0.56 | 49.0 | 8.5 | 0.01 | 79.0 | 5.6 | 0.00 |
| 19.5 | 62.5 | 0.54 | 49.5 | 8.8 | 0.01 | 79.5 | 5.4 | 0.00 |
| 20.0 | 60.9 | 0.51 | 50.0 | 9.2 | 0.01 | 80.0 | 5.3 | 0.00 |
| 20.5 | 59.2 | 0.48 | 50.5 | 9.5 | 0.01 | 80.5 | 5.2 | 0.00 |
| 21.0 | 57.5 | 0.45 | 51.0 | 9.8 | 0.01 | 81.0 | 5.1 | 0.00 |
| 21.5 | 55.8 | 0.43 | 51.5 | 10.0 | 0.01 | 81.5 | 5.0 | 0.00 |
| 22.0 | 54.1 | 0.40 | 52.0 | 10.3 | 0.01 | 82.0 | 4.9 | 0.00 |
| 22.5 | 52.4 | 0.38 | 52.5 | 10.5 | 0.02 | 82.5 | 4.8 | 0.00 |
| 23.0 | 50.7 | 0.35 | 53.0 | 10.7 | 0.02 | 83.0 | 4.7 | 0.00 |
| 23.5 | 49.1 | 0.33 | 53.5 | 10.9 | 0.02 | 83.5 | 4.6 | 0.00 |
| 24.0 | 47.4 | 0.31 | 54.0 | 11.0 | 0.02 | 84.0 | 4.4 | 0.00 |
| 24.5 | 45.7 | 0.29 | 54.5 | 11.2 | 0.02 | 84.5 | 4.3 | 0.00 |
| 25.0 | 44.1 | 0.27 | 55.0 | 11.3 | 0.02 | 85.0 | 4.2 | 0.00 |
| 25.5 | 42.4 | 0.25 | 55.5 | 11.4 | 0.02 | 85.5 | 4.2 | 0.00 |
| 26.0 | 40.8 | 0.23 | 56.0 | 11.4 | 0.02 | 86.0 | 4.2 | 0.00 |
| 26.5 | 39.2 | 0.21 | 56.5 | 11.5 | 0.02 | 86.5 | 4.2 | 0.00 |
| 27.0 | 37.5 | 0.19 | 57.0 | 11.5 | 0.02 | 87.0 | 4.1 | 0.00 |
| 27.5 | 35.9 | 0.18 | 57.5 | 11.6 | 0.02 | 87.5 | 4.1 | 0.00 |
| 28.0 | 34.4 | 0.16 | 58.0 | 11.6 | 0.02 | 88.0 | 4.1 | 0.00 |
| 28.5 | 32.8 | 0.15 | 58.5 | 11.6 | 0.02 | 88.5 | 4.1 | 0.00 |
| 29.0 | 31.3 | 0.13 | 59.0 | 11.5 | 0.02 | 89.0 | 4.1 | 0.00 |
| 29.5 | 29.7 | 0.12 | 59.5 | 11.5 | 0.02 | 89.5 | 4.0 | 0.00 |

FIGURE EE2

FREE SPACE FIELD STRENGTH AT A DISTANCE STUDY RESULTS

PROJECT: HOUSTON, TX, CHANNEL 291D

15-Mar-17

| Pt | Column A Vert Dist From Ant Bottom (meters) | Column B Horiz Dist From Tower Base (meters) | Column C Hypot- enuse Dist fr Ant Bottom (meters) | Column D Down- ward Angle fr Ant Bottom (degrees) | Column E Max ERP (watts) | Column F Max ERP (dBmw) | Column G Pattern Relative Field at Down- ward Angle | Column H Free Space Inter- ferring Signal (dBu) | Column I Adjusted ERP in Down- ward Angle (dBmW) | Column J Interf Distance along Hypot- enuse (meters) | Column K Vert Interf Distance below Antenna (meters) |
|----|---|--|---|---|-----------------------------------|----------------------------------|---|---|--|--|--|
| 1 | 10 | 0.1 | 10.0 | 89.4 | 245 | 53.89 | 0.040 | 128.0 | 25.93 | 1.8 | 1.8 |
| 2 | 10 | 4 | 10.8 | 68.2 | 245 | 53.89 | 0.095 | 128.0 | 33.45 | 4.2 | 3.9 |
| 3 | 10 | 6 | 11.7 | 59.0 | 245 | 53.89 | 0.115 | 128.0 | 35.11 | 5.0 | 4.3 |
| 4 | 10 | 8 | 12.8 | 51.3 | 245 | 53.89 | 0.100 | 128.0 | 33.89 | 4.4 | 3.4 |
| 5 | 10 | 10 | 14.1 | 45.0 | 245 | 53.89 | 0.045 | 128.0 | 26.96 | 2.0 | 1.4 |
| 6 | 10 | 12 | 15.6 | 39.8 | 245 | 53.89 | 0.041 | 128.0 | 26.15 | 1.8 | 1.2 |
| 7 | 10 | 14 | 17.2 | 35.5 | 245 | 53.89 | 0.130 | 128.0 | 36.17 | 5.7 | 3.3 |
| 8 | 10 | 16 | 18.9 | 32.0 | 245 | 53.89 | 0.223 | 128.0 | 40.86 | 9.8 | 5.2 |
| 9 | 10 | 18 | 20.6 | 29.1 | 245 | 53.89 | 0.313 | 128.0 | 43.80 | 13.7 | 6.7 |
| 10 | 10 | 20 | 22.4 | 26.6 | 245 | 53.89 | 0.392 | 128.0 | 45.76 | 17.2 | 7.7 |
| 11 | 10 | 25 | 26.9 | 21.8 | 245 | 53.89 | 0.558 | 128.0 | 48.82 | 24.5 | 9.1 |
| 12 | 10 | 30 | 31.6 | 18.4 | 245 | 53.89 | 0.673 | 128.0 | 50.45 | 29.5 | 9.3 |
| 13 | 10 | 35 | 36.4 | 15.9 | 245 | 53.89 | 0.735 | 128.0 | 51.22 | 32.2 | 8.9 |
| 14 | 10 | 40 | 41.2 | 14.0 | 245 | 53.89 | 0.794 | 128.0 | 51.89 | 34.8 | 8.4 |
| 15 | 10 | 45 | 46.1 | 12.5 | 245 | 53.89 | 0.834 | 128.0 | 52.31 | 36.6 | 7.9 |

NOTE: Study point at 2 meters above ground (or rooftop, see write-up) level.

RESULTS: COLUMN J DISTANCES ARE LESS THAN COLUMN C AND COLUMN K DISTANCES ARE LESS THAN COLUMN A DISTANCES IN ALL INSTANCES; THEREFORE, INTERFERING SIGNAL DOES NOT EXIST AT ANY LOCATION (TWO METERS OR LESS ABOVE GROUND LEVEL)