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**ENGINEERING REPORT**

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**K286BW, Midland, TX, Channel 286D FM Translator Application**

**ENGINEERING STATEMENT**

Juan Alberto Ayala ("Applicant") submits this technical minor change to K286BW that proposes a site change to Midland, TX.

All required protections are met by contour non-overlap pursuant to Section 74.1204, with the exception of protection to KTXC, Lamesa, TX, 284C1 (protected, as discussed below).

**PROTECTION TO KTXC**

KTXC is a second adjacent-channel station to the proposed channel 286D facility. The 60 dBu F50,50 service contour of this station extends well beyond the proposed 286D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any population is predicted to exist to KTXC.

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.

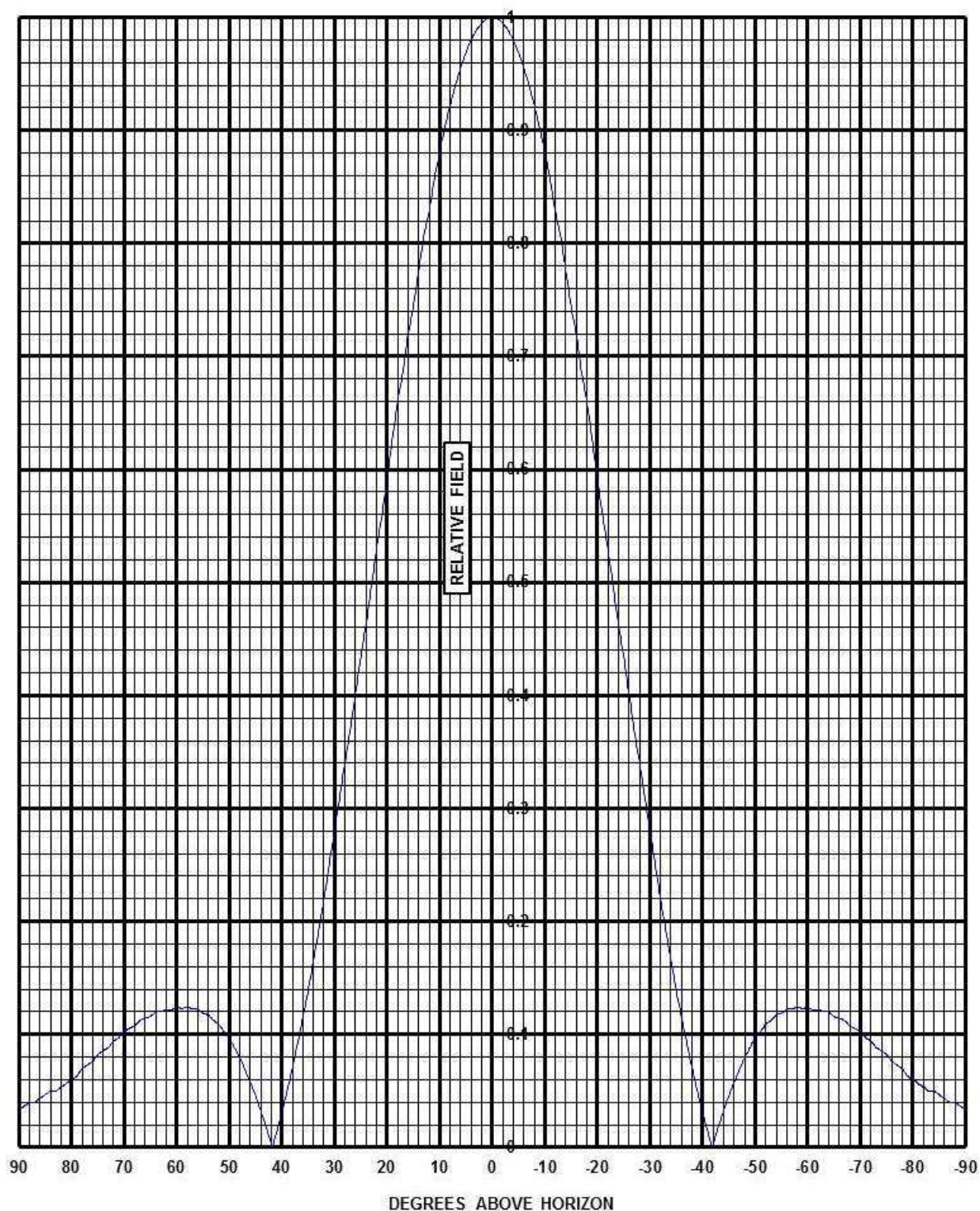
The F50,50 signal strength from KTXC at the proposed 286D transmitter site is 68 dBu (the "desired" signal). The second/third adjacent-channel protection of Section 74.1204 is an undesired-to-desired ("U/D") dB signal strength ratio of 40:1. Therefore, predicted interference to KTXC from the proposed 286D facility is a signal of greater than or equal to 108 dBu.

Figure EE1 is the vertical plane relative field pattern for the proposed Jampro JLLP three-bay halfwave spaced antenna. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 108 dBu interfering signal (using a free space field determination) does not exist at any point a ground level. (Actually, the study is made to 2 meters above ground level to account for a person's height.)

Attached as Figure EE2 is a tabulation of various points (at 2 meters above ground level) from the proposed translator tower base. (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. (In other words, the interfering signal does not make it to 2 meters any point.) The clearance is at least 39 meters in all cases. The attached aerial photo demonstrates that there are no large buildings within 444 meters—the worst case distance for a free space signal of 108 dBu. Therefore, pursuant to Section 74.1204(d) of the FCC Rules, KTXC is adequately protected by the proposed facility.



FIGURE EE1 (Page 1 of 3)

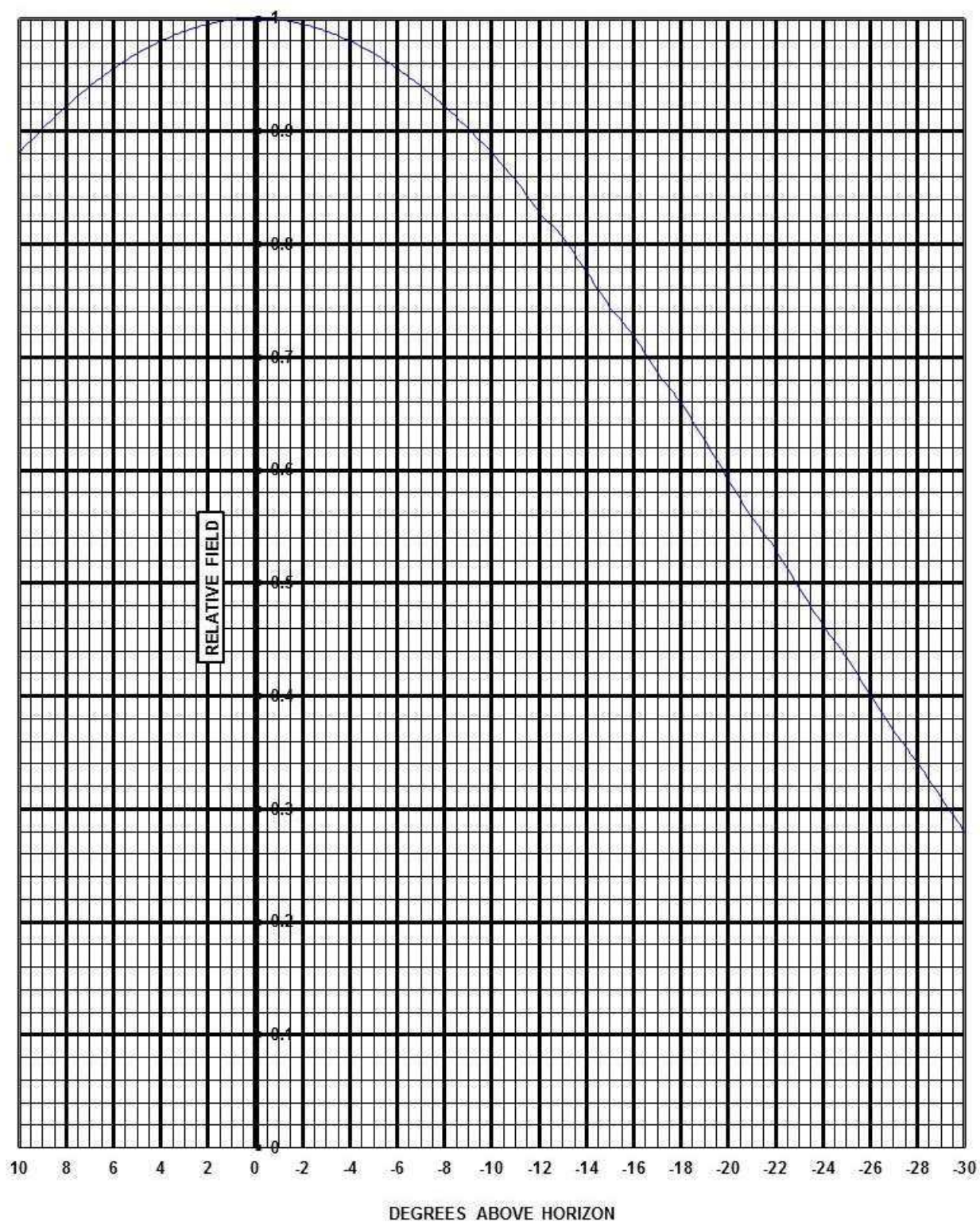


Frequency: 105.1 MHz

Model: JLLP-3 RFR.5  
Description: FM Sidemount Antenna  
**-0° Beam Tilt, 0% Null Fill**



FIGURE EE1 (Page 2 of 3)



Frequency: 105.1 MHz

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FIGURE EE1 (Page 3 of 3)

## Elevation Pattern Tabulation

### RELATIVE FIELD VS ELEVATION ANGLE

| <u>ELEVATION<br/>ANGLE</u> | <u>RELATIVE<br/>FIELD</u> | <u>ELEVATION<br/>ANGLE</u> | <u>RELATIVE<br/>FIELD</u> | <u>ELEVATION<br/>ANGLE</u> | <u>RELATIVE<br/>FIELD</u> |
|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| 10                         | 0.881                     | -26                        | 0.402                     | -61                        | 0.121                     |
| 9                          | 0.903                     | -27                        | 0.369                     | -62                        | 0.121                     |
| 8                          | 0.922                     | -28                        | 0.342                     | -63                        | 0.121                     |
| 7                          | 0.940                     | -29                        | 0.310                     | -64                        | 0.120                     |
| 6                          | 0.956                     | -30                        | 0.280                     | -65                        | 0.116                     |
| 5                          | 0.969                     | -31                        | 0.251                     | -66                        | 0.114                     |
| 4                          | 0.980                     | -32                        | 0.219                     | -67                        | 0.113                     |
| 3                          | 0.989                     | -33                        | 0.192                     | -68                        | 0.107                     |
| 2                          | 0.995                     | -34                        | 0.166                     | -69                        | 0.105                     |
| 1                          | 0.999                     | -35                        | 0.139                     | -70                        | 0.103                     |
| 0                          | 1.000                     | -36                        | 0.115                     | -71                        | 0.097                     |
| -1                         | 0.999                     | -37                        | 0.093                     | -72                        | 0.094                     |
| -2                         | 0.995                     | -38                        | 0.070                     | -73                        | 0.088                     |
| -3                         | 0.989                     | -39                        | 0.050                     | -74                        | 0.085                     |
| -4                         | 0.980                     | -40                        | 0.031                     | -75                        | 0.082                     |
| -5                         | 0.969                     | -41                        | 0.014                     | -76                        | 0.076                     |
| -6                         | 0.956                     | -42                        | 0.003                     | -77                        | 0.073                     |
| -7                         | 0.940                     | -43                        | 0.018                     | -78                        | 0.070                     |
| -8                         | 0.922                     | -44                        | 0.033                     | -79                        | 0.063                     |
| -9                         | 0.903                     | -45                        | 0.046                     | -80                        | 0.060                     |
| -10                        | 0.881                     | -46                        | 0.058                     | -81                        | 0.057                     |
| -11                        | 0.857                     | -47                        | 0.069                     | -82                        | 0.053                     |
| -12                        | 0.828                     | -48                        | 0.079                     | -83                        | 0.050                     |
| -13                        | 0.807                     | -49                        | 0.088                     | -84                        | 0.050                     |
| -14                        | 0.776                     | -50                        | 0.097                     | -85                        | 0.047                     |
| -15                        | 0.744                     | -51                        | 0.102                     | -86                        | 0.043                     |
| -16                        | 0.719                     | -52                        | 0.109                     | -87                        | 0.040                     |
| -17                        | 0.686                     | -53                        | 0.112                     | -88                        | 0.040                     |
| -18                        | 0.660                     | -54                        | 0.117                     | -89                        | 0.037                     |
| -19                        | 0.626                     | -55                        | 0.119                     | -90                        | 0.033                     |
| -20                        | 0.592                     | -56                        | 0.122                     |                            |                           |
| -21                        | 0.558                     | -57                        | 0.122                     |                            |                           |
| -22                        | 0.530                     | -58                        | 0.124                     |                            |                           |
| -23                        | 0.496                     | -59                        | 0.123                     |                            |                           |
| -24                        | 0.463                     | -60                        | 0.124                     |                            |                           |
| -25                        | 0.435                     |                            |                           |                            |                           |

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## FIGURE EE2

### FREE SPACE FIELD STRENGTH AT A DISTANCE STUDY RESULTS

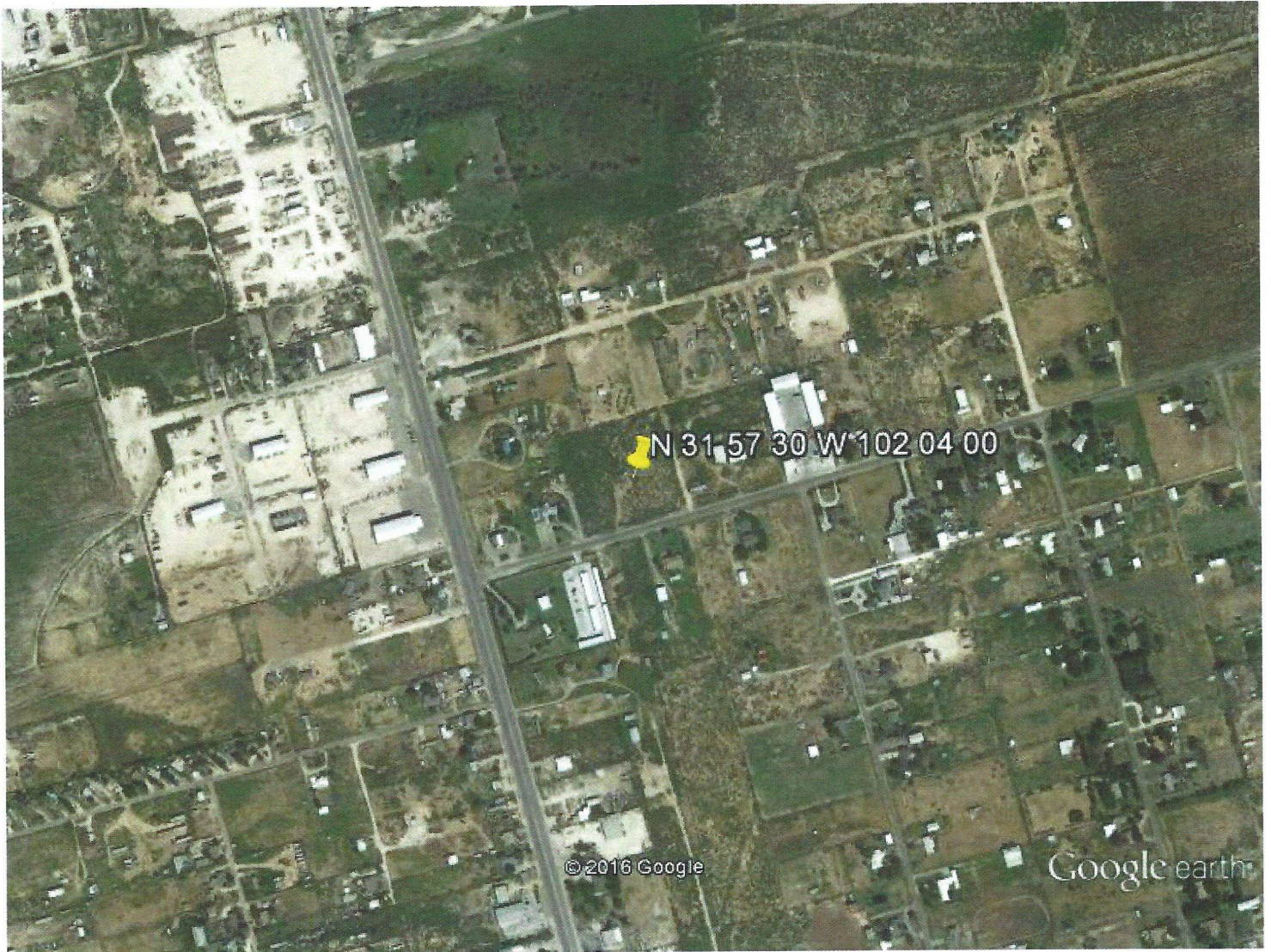
PROJECT: MIDLAND, TX, CHANNEL 286D

13-Apr-16

| Pt | Column A<br>Vert<br>Dist<br>From<br>Ant<br>Bottom<br>(meters) | Column B<br>Horiz<br>Dist<br>From<br>Tower<br>Base<br>(meters) | Column C<br>Hypot-<br>enuse<br>Dist<br>fr Ant<br>Bottom<br>(meters) | Column D<br>Down-<br>ward<br>Angle<br>fr Ant<br>Bottom<br>(degrees) | Column E<br>Max<br>ERP<br>(watts) | Column F<br>Max<br>ERP<br>(dBmw) | Column G<br>Pattern<br>Relative<br>Field at<br>Down-<br>ward<br>Angle | Column H<br>Free<br>Space<br>Inter-<br>ferring<br>Signal<br>(dBu) | Column I<br>Adjusted<br>ERP in<br>Down-<br>ward<br>Angle<br>(dBmW) | Column J<br>Interf<br>Distance<br>along<br>Hypot-<br>enuse<br>(meters) | Column K<br>Vert<br>Interf<br>Distance<br>below<br>Antenna<br>(meters) |
|----|---|--|---|---|-----------------------------------|----------------------------------|---|---|--|--|--|
| 1  | 133   | 0.1  | 133.0   | <a href="#">90.0</a>  | 250                               | <a href="#">53.98</a>            | 0.037   | 108.0   | <a href="#">25.34</a>  | 16.4   | <a href="#">16.4</a>   |
| 2  | 133   | 20   | 134.5   | <a href="#">81.4</a>  | 250                               | <a href="#">53.98</a>            | 0.057   | 108.0   | <a href="#">29.10</a>  | 25.3   | <a href="#">25.0</a>   |
| 3  | 133   | 40   | 138.9   | <a href="#">73.3</a>  | 250                               | <a href="#">53.98</a>            | 0.088   | 108.0   | <a href="#">32.87</a>  | 39.0   | <a href="#">37.3</a>   |
| 4  | 133   | 60   | 145.9   | <a href="#">65.7</a>  | 250                               | <a href="#">53.98</a>            | 0.116   | 108.0   | <a href="#">35.27</a>  | 51.4   | <a href="#">46.8</a>   |
| 5  | 133   | 80   | 155.2   | <a href="#">59.0</a>  | 250                               | <a href="#">53.98</a>            | 0.123   | 108.0   | <a href="#">35.78</a>  | 54.5   | <a href="#">46.7</a>   |
| 6  | 133   | 100  | 166.4   | <a href="#">53.1</a>  | 250                               | <a href="#">53.98</a>            | 0.117   | 108.0   | <a href="#">35.34</a>  | 51.8   | <a href="#">41.4</a>   |
| 7  | 133   | 120  | 179.1   | <a href="#">47.9</a>  | 250                               | <a href="#">53.98</a>            | 0.079   | 108.0   | <a href="#">31.93</a>  | 35.0   | <a href="#">26.0</a>   |
| 8  | 133   | 160  | 208.1   | <a href="#">39.7</a>  | 250                               | <a href="#">53.98</a>            | 0.050   | 108.0   | <a href="#">27.96</a>  | 22.2   | <a href="#">14.2</a>   |
| 9  | 133   | 200  | 240.2   | <a href="#">33.6</a>  | 250                               | <a href="#">53.98</a>            | 0.192   | 108.0   | <a href="#">39.65</a>  | 85.1   | <a href="#">47.1</a>   |
| 10 | 133   | 250  | 283.2   | <a href="#">28.0</a>  | 250                               | <a href="#">53.98</a>            | 0.342   | 108.0   | <a href="#">44.66</a>  | 151.5  | <a href="#">71.2</a>   |
| 11 | 133   | 300  | 328.2   | <a href="#">23.9</a>  | 250                               | <a href="#">53.98</a>            | 0.496   | 108.0   | <a href="#">47.89</a>  | 219.8  | <a href="#">89.1</a>   |
| 12 | 133   | 350  | 374.4   | <a href="#">20.8</a>  | 250                               | <a href="#">53.98</a>            | 0.592   | 108.0   | <a href="#">49.43</a>  | 262.3  | <a href="#">93.2</a>   |
| 13 | 133   | 400  | 421.5   | <a href="#">18.4</a>  | 250                               | <a href="#">53.98</a>            | 0.660   | 108.0   | <a href="#">50.37</a>  | 292.4  | <a href="#">92.3</a>   |
| 14 | 133   | 450  | 469.2   | <a href="#">16.5</a>  | 250                               | <a href="#">53.98</a>            | 0.719   | 108.0   | <a href="#">51.11</a>  | 318.6  | <a href="#">90.3</a>   |

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, INTERFERRING SIGNAL DOES NOT EXIST AT ANY LOCATION (TWO METERS OR LESS ABOVE GROUND LEVEL)**



Google earth

