

DELAUDER COMMUNICATIONS, INC.

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

ENGINEERING REPORT

K296HJ, Richmond, TX, Channel 296D Minor Mod

ENGINEERING STATEMENT

PROTECTION TO KOVE-FM AND KGLK

All contour non-overlap protection requirements are met with the exception of KOVE-FM, Galveston, TX (293C) and KGLK, Lake Jackson, TX (298C), discussed below.

KOVE-FM (76 kilometers at 113 degrees True) is third adjacent-channel to the proposed channel 296D facility. KGLK (66 kilometers at 118 degrees True) is second adjacent-channel to the proposed channel 296D facility. The 60 dBu F50,50 service contours of these two stations extend beyond the proposed 296D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any population is predicted to exist to KOVE-FM and KGLK.

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 KOVE-FM at the proposed 296D transmitter site is at least 66 dBu (the "desired" signal of KOVE-FM). The F50,50 signal strength from KGLK at the proposed 296D transmitter site is at least 70 dBu (the "desired" signal of KGLK). 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 the worst-case of KOVE-FM and KGLK from the proposed 296D facility is a signal of greater than or equal to 106 dBu.

The centerline for the proposed Scala CL-FM H-pol 3-bay (half wavelength spaced) antenna is 144 meters above ground level. The attached table (requested for use by the FCC for these studies) demonstrates that the 106 dBu interference signal is predicted to be at least 30 meters above ground level. (A vertical plane pattern tabulation is also attached.) There are no tall buildings near the site. Therefore, KOVE-FM and KGLK are adequately protected by the proposed facility.

74.1204(d) Showing

Richmond, TX 296D

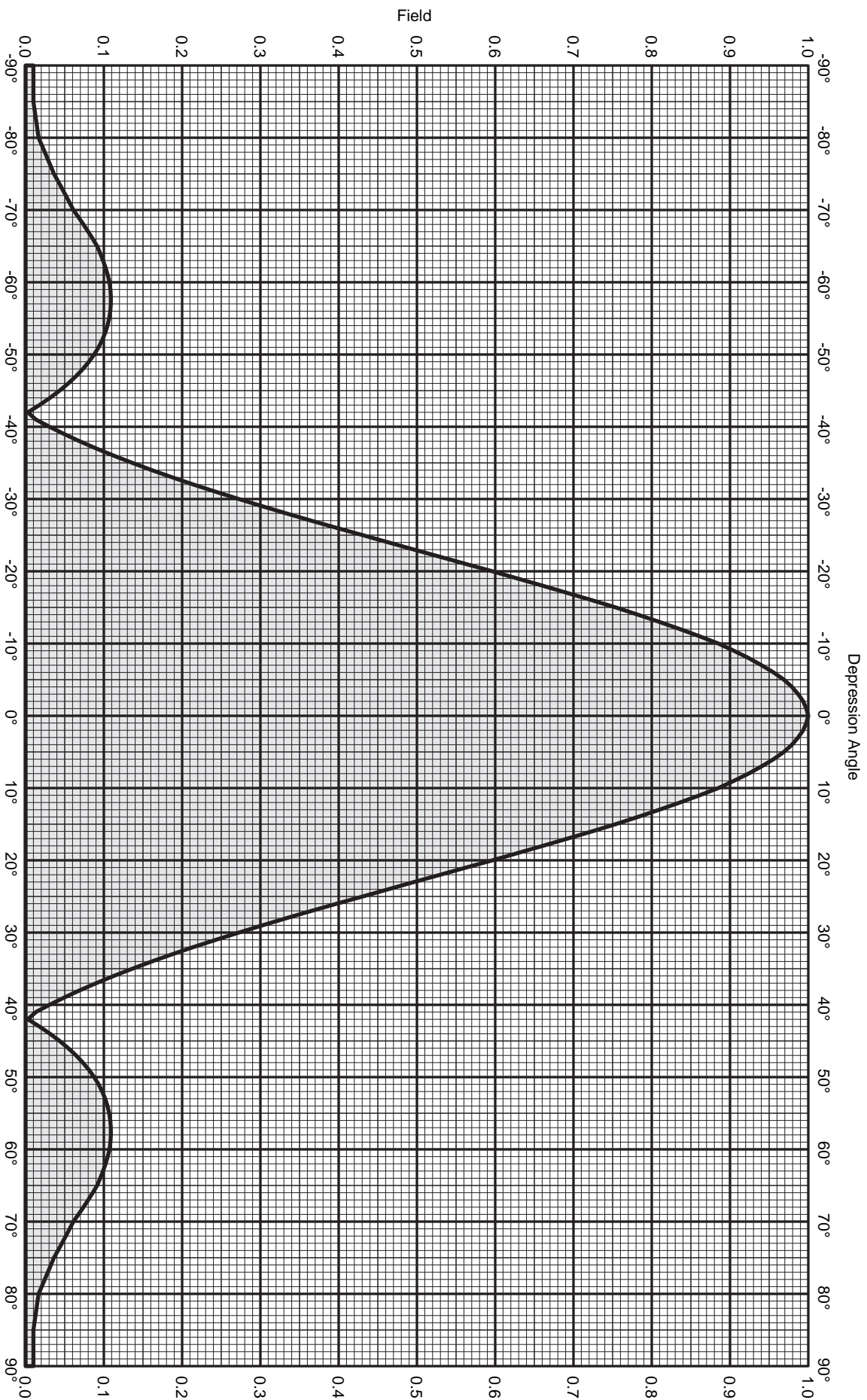
ERP (kw)
Height of Antenna above Ground (m)
Translator's IX Contour

0.25
144
106

Scala CL-FM(H) 3 bay (HW)

| <u>Depression Angle from Horizon</u> | <u>Antenna Relative Field</u> | <u>ERP (kw) from the Antenna RF</u> | <u>Dist. To IX Contour (m)</u> | <u>Height IX Contour Above Ground (m)</u> |
|--|-----------------------------------|---|--------------------------------|---|
| 0 | 1 | 0.2500 | 555.8659 | 144.000 |
| 5 | 0.969 | 0.2347 | 538.6340 | 97.055 |
| 10 | 0.885 | 0.1958 | 491.9413 | 58.575 |
| 15 | 0.754 | 0.1421 | 419.1229 | 35.523 |
| 20 | 0.596 | 0.0888 | 331.2961 | 30.690 |
| 25 | 0.431 | 0.0464 | 239.5782 | 42.750 |
| 30 | 0.273 | 0.0186 | 151.7514 | 68.124 |
| 35 | 0.136 | 0.0046 | 75.5978 | 100.639 |
| 40 | 0.031 | 0.0002 | 17.2318 | 132.924 |
| 45 | 0.043 | 0.0005 | 23.9022 | 127.099 |
| 50 | 0.055 | 0.0008 | 30.5726 | 120.580 |
| 55 | 0.107 | 0.0029 | 59.4776 | 95.279 |
| 60 | 0.107 | 0.0029 | 59.4776 | 92.491 |
| 65 | 0.091 | 0.0021 | 50.5838 | 98.156 |
| 70 | 0.061 | 0.0009 | 33.9078 | 112.137 |
| 75 | 0.036 | 0.0003 | 20.0112 | 124.671 |
| 80 | 0.017 | 0.0001 | 9.4497 | 134.694 |
| 85 | 0.01 | 0.0000 | 5.5587 | 138.462 |
| 90 | 0.01 | 0.0000 | 5.5587 | 138.441 |

Note: Input the ERP, Height of the antenna above Ground, the Calculated Translator IX contour, and the specified Antenna Relative Field Pat



KATHREIN
SCALA DIVISION

Post Office Box 4580
Medford, OR 97501 (USA)
Phone: (541) 779-6500
Fax: (541) 779-3991
<http://www.kathrein-scala.com>

Three bay CL-FM/HRM/50N Array

Frequency: 107.1 MHz

Gain: 10.9 dBi (x 12.3)

Horizontal Polarization

Vertical stacked 0.5 wavelength

Vertical plane Pattern



Three bay CL-FM/HRM/50N Array

Frequency: 107.1 MHz

Gain: 10.9 dBd (x 12.3)

Horizontal Polarization

Vertical stacked 0.5 wavelength

Vertical plane Pattern

| Angle | Field | Rel.dB | dBd | PwrMult | Angle | Field | Rel.dB | dBd | PwrMult |
|-------|-------|--------|--------|---------|-------|-------|--------|--------|---------|
| -90 | 0.010 | -40.00 | -29.10 | 0.00 | -45 | 0.043 | -27.23 | -16.33 | 0.02 |
| -89 | 0.010 | -40.00 | -29.10 | 0.00 | -44 | 0.031 | -30.11 | -19.21 | 0.01 |
| -88 | 0.010 | -40.00 | -29.10 | 0.00 | -43 | 0.018 | -35.04 | -24.14 | 0.00 |
| -87 | 0.010 | -40.00 | -29.10 | 0.00 | -42 | 0.010 | -40.00 | -29.10 | 0.00 |
| -86 | 0.010 | -40.00 | -29.10 | 0.00 | -41 | 0.013 | -37.63 | -26.73 | 0.00 |
| -85 | 0.010 | -40.00 | -29.10 | 0.00 | -40 | 0.031 | -30.31 | -19.41 | 0.01 |
| -84 | 0.011 | -38.92 | -28.02 | 0.00 | -39 | 0.049 | -26.16 | -15.26 | 0.03 |
| -83 | 0.013 | -37.95 | -27.05 | 0.00 | -38 | 0.069 | -23.22 | -12.32 | 0.06 |
| -82 | 0.014 | -37.09 | -26.19 | 0.00 | -37 | 0.090 | -20.89 | -9.99 | 0.10 |
| -81 | 0.015 | -36.30 | -25.40 | 0.00 | -36 | 0.113 | -18.96 | -8.06 | 0.16 |
| -80 | 0.017 | -35.58 | -24.68 | 0.00 | -35 | 0.136 | -17.30 | -6.40 | 0.23 |
| -79 | 0.021 | -33.72 | -22.82 | 0.01 | -34 | 0.161 | -15.85 | -4.95 | 0.32 |
| -78 | 0.025 | -32.20 | -21.30 | 0.01 | -33 | 0.187 | -14.54 | -3.64 | 0.43 |
| -77 | 0.028 | -30.91 | -20.01 | 0.01 | -32 | 0.215 | -13.37 | -2.47 | 0.57 |
| -76 | 0.032 | -29.79 | -18.89 | 0.01 | -31 | 0.243 | -12.28 | -1.38 | 0.73 |
| -75 | 0.036 | -28.81 | -17.91 | 0.02 | -30 | 0.273 | -11.29 | -0.39 | 0.91 |
| -74 | 0.041 | -27.66 | -16.76 | 0.02 | -29 | 0.303 | -10.38 | 0.52 | 1.13 |
| -73 | 0.046 | -26.66 | -15.76 | 0.03 | -28 | 0.333 | -9.54 | 1.36 | 1.37 |
| -72 | 0.051 | -25.78 | -14.88 | 0.03 | -27 | 0.365 | -8.75 | 2.15 | 1.64 |
| -71 | 0.056 | -24.99 | -14.09 | 0.04 | -26 | 0.398 | -8.01 | 2.89 | 1.95 |
| -70 | 0.061 | -24.28 | -13.38 | 0.05 | -25 | 0.431 | -7.31 | 3.59 | 2.28 |
| -69 | 0.068 | -23.40 | -12.50 | 0.06 | -24 | 0.464 | -6.68 | 4.22 | 2.64 |
| -68 | 0.074 | -22.62 | -11.72 | 0.07 | -23 | 0.496 | -6.08 | 4.82 | 3.03 |
| -67 | 0.080 | -21.93 | -11.03 | 0.08 | -22 | 0.530 | -5.52 | 5.38 | 3.45 |
| -66 | 0.086 | -21.32 | -10.42 | 0.09 | -21 | 0.563 | -4.99 | 5.91 | 3.90 |
| -65 | 0.091 | -20.78 | -9.88 | 0.10 | -20 | 0.596 | -4.49 | 6.41 | 4.38 |
| -64 | 0.095 | -20.41 | -9.51 | 0.11 | -19 | 0.629 | -4.03 | 6.87 | 4.86 |
| -63 | 0.099 | -20.09 | -9.19 | 0.12 | -18 | 0.661 | -3.60 | 7.30 | 5.37 |
| -62 | 0.102 | -19.81 | -8.91 | 0.13 | -17 | 0.692 | -3.19 | 7.71 | 5.90 |
| -61 | 0.105 | -19.58 | -8.68 | 0.14 | -16 | 0.724 | -2.81 | 8.09 | 6.44 |
| -60 | 0.107 | -19.39 | -8.49 | 0.14 | -15 | 0.754 | -2.45 | 8.45 | 6.99 |
| -59 | 0.108 | -19.30 | -8.40 | 0.14 | -14 | 0.782 | -2.13 | 8.77 | 7.53 |
| -58 | 0.109 | -19.26 | -8.36 | 0.15 | -13 | 0.810 | -1.83 | 9.07 | 8.07 |
| -57 | 0.109 | -19.26 | -8.36 | 0.15 | -12 | 0.836 | -1.56 | 9.34 | 8.60 |
| -56 | 0.108 | -19.31 | -8.41 | 0.14 | -11 | 0.861 | -1.30 | 9.60 | 9.13 |
| -55 | 0.107 | -19.42 | -8.52 | 0.14 | -10 | 0.885 | -1.06 | 9.84 | 9.64 |
| -54 | 0.105 | -19.61 | -8.71 | 0.13 | -9 | 0.905 | -0.87 | 10.03 | 10.08 |
| -53 | 0.102 | -19.85 | -8.95 | 0.13 | -8 | 0.924 | -0.69 | 10.21 | 10.50 |
| -52 | 0.098 | -20.18 | -9.28 | 0.12 | -7 | 0.940 | -0.53 | 10.37 | 10.88 |
| -51 | 0.093 | -20.61 | -9.71 | 0.11 | -6 | 0.956 | -0.39 | 10.51 | 11.24 |
| -50 | 0.088 | -21.15 | -10.25 | 0.09 | -5 | 0.969 | -0.28 | 10.62 | 11.55 |
| -49 | 0.081 | -21.83 | -10.93 | 0.08 | -4 | 0.979 | -0.18 | 10.72 | 11.79 |
| -48 | 0.073 | -22.71 | -11.81 | 0.07 | -3 | 0.987 | -0.11 | 10.79 | 11.99 |
| -47 | 0.064 | -23.81 | -12.91 | 0.05 | -2 | 0.994 | -0.06 | 10.84 | 12.14 |
| -46 | 0.055 | -25.27 | -14.37 | 0.04 | -1 | 0.997 | -0.02 | 10.88 | 12.24 |
| | | | | | 0 | 1.000 | 0.00 | 10.90 | 12.30 |



Three bay CL-FM/HRM/50N Array

Frequency: 107.1 MHz

Gain: 10.9 dBd (x 12.3)

Horizontal Polarization

Vertical stacked 0.5 wavelength

Vertical plane Pattern

| Angle | Field | Rel.dB | dBd | PwrMult | Angle | Field | Rel.dB | dBd | PwrMult |
|-------|-------|--------|--------|---------|-------|-------|--------|--------|---------|
| 0 | 1.000 | 0.00 | 10.90 | 12.30 | 45 | 0.043 | -27.23 | -16.33 | 0.02 |
| 1 | 0.997 | -0.02 | 10.88 | 12.24 | 46 | 0.055 | -25.27 | -14.37 | 0.04 |
| 2 | 0.994 | -0.06 | 10.84 | 12.14 | 47 | 0.064 | -23.81 | -12.91 | 0.05 |
| 3 | 0.987 | -0.11 | 10.79 | 11.99 | 48 | 0.073 | -22.71 | -11.81 | 0.07 |
| 4 | 0.979 | -0.18 | 10.72 | 11.79 | 49 | 0.081 | -21.83 | -10.93 | 0.08 |
| 5 | 0.969 | -0.28 | 10.62 | 11.55 | 50 | 0.088 | -21.15 | -10.25 | 0.09 |
| 6 | 0.956 | -0.39 | 10.51 | 11.24 | 51 | 0.093 | -20.61 | -9.71 | 0.11 |
| 7 | 0.940 | -0.53 | 10.37 | 10.88 | 52 | 0.098 | -20.18 | -9.28 | 0.12 |
| 8 | 0.924 | -0.69 | 10.21 | 10.50 | 53 | 0.102 | -19.85 | -8.95 | 0.13 |
| 9 | 0.905 | -0.87 | 10.03 | 10.08 | 54 | 0.105 | -19.61 | -8.71 | 0.13 |
| 10 | 0.885 | -1.06 | 9.84 | 9.64 | 55 | 0.107 | -19.42 | -8.52 | 0.14 |
| 11 | 0.861 | -1.30 | 9.60 | 9.13 | 56 | 0.108 | -19.31 | -8.41 | 0.14 |
| 12 | 0.836 | -1.56 | 9.34 | 8.60 | 57 | 0.109 | -19.26 | -8.36 | 0.15 |
| 13 | 0.810 | -1.83 | 9.07 | 8.07 | 58 | 0.109 | -19.26 | -8.36 | 0.15 |
| 14 | 0.782 | -2.13 | 8.77 | 7.53 | 59 | 0.108 | -19.30 | -8.40 | 0.14 |
| 15 | 0.754 | -2.45 | 8.45 | 6.99 | 60 | 0.107 | -19.39 | -8.49 | 0.14 |
| 16 | 0.724 | -2.81 | 8.09 | 6.44 | 61 | 0.105 | -19.58 | -8.68 | 0.14 |
| 17 | 0.692 | -3.19 | 7.71 | 5.90 | 62 | 0.102 | -19.81 | -8.91 | 0.13 |
| 18 | 0.661 | -3.60 | 7.30 | 5.37 | 63 | 0.099 | -20.09 | -9.19 | 0.12 |
| 19 | 0.629 | -4.03 | 6.87 | 4.86 | 64 | 0.095 | -20.41 | -9.51 | 0.11 |
| 20 | 0.596 | -4.49 | 6.41 | 4.38 | 65 | 0.091 | -20.78 | -9.88 | 0.10 |
| 21 | 0.563 | -4.99 | 5.91 | 3.90 | 66 | 0.086 | -21.32 | -10.42 | 0.09 |
| 22 | 0.530 | -5.52 | 5.38 | 3.45 | 67 | 0.080 | -21.93 | -11.03 | 0.08 |
| 23 | 0.496 | -6.08 | 4.82 | 3.03 | 68 | 0.074 | -22.62 | -11.72 | 0.07 |
| 24 | 0.464 | -6.68 | 4.22 | 2.64 | 69 | 0.068 | -23.40 | -12.50 | 0.06 |
| 25 | 0.431 | -7.31 | 3.59 | 2.28 | 70 | 0.061 | -24.28 | -13.38 | 0.05 |
| 26 | 0.398 | -8.01 | 2.89 | 1.95 | 71 | 0.056 | -24.99 | -14.09 | 0.04 |
| 27 | 0.365 | -8.75 | 2.15 | 1.64 | 72 | 0.051 | -25.78 | -14.88 | 0.03 |
| 28 | 0.333 | -9.54 | 1.36 | 1.37 | 73 | 0.046 | -26.66 | -15.76 | 0.03 |
| 29 | 0.303 | -10.38 | 0.52 | 1.13 | 74 | 0.041 | -27.66 | -16.76 | 0.02 |
| 30 | 0.273 | -11.29 | -0.39 | 0.91 | 75 | 0.036 | -28.81 | -17.91 | 0.02 |
| 31 | 0.243 | -12.28 | -1.38 | 0.73 | 76 | 0.032 | -29.79 | -18.89 | 0.01 |
| 32 | 0.215 | -13.37 | -2.47 | 0.57 | 77 | 0.028 | -30.91 | -20.01 | 0.01 |
| 33 | 0.187 | -14.54 | -3.64 | 0.43 | 78 | 0.025 | -32.20 | -21.30 | 0.01 |
| 34 | 0.161 | -15.85 | -4.95 | 0.32 | 79 | 0.021 | -33.72 | -22.82 | 0.01 |
| 35 | 0.136 | -17.30 | -6.40 | 0.23 | 80 | 0.017 | -35.58 | -24.68 | 0.00 |
| 36 | 0.113 | -18.96 | -8.06 | 0.16 | 81 | 0.015 | -36.30 | -25.40 | 0.00 |
| 37 | 0.090 | -20.89 | -9.99 | 0.10 | 82 | 0.014 | -37.09 | -26.19 | 0.00 |
| 38 | 0.069 | -23.22 | -12.32 | 0.06 | 83 | 0.013 | -37.95 | -27.05 | 0.00 |
| 39 | 0.049 | -26.16 | -15.26 | 0.03 | 84 | 0.011 | -38.92 | -28.02 | 0.00 |
| 40 | 0.031 | -30.31 | -19.41 | 0.01 | 85 | 0.010 | -40.00 | -29.10 | 0.00 |
| 41 | 0.013 | -37.62 | -26.72 | 0.00 | 86 | 0.010 | -40.00 | -29.10 | 0.00 |
| 42 | 0.010 | -40.00 | -29.10 | 0.00 | 87 | 0.010 | -40.00 | -29.10 | 0.00 |
| 43 | 0.018 | -35.04 | -24.14 | 0.00 | 88 | 0.010 | -40.00 | -29.10 | 0.00 |
| 44 | 0.031 | -30.11 | -19.21 | 0.01 | 89 | 0.010 | -40.00 | -29.10 | 0.00 |
| | | | | | 90 | 0.010 | -40.00 | -29.10 | 0.00 |