## 11 Bay TFLBDI 98.1MHz

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## General data of antenna System

TX station
Site Name
System of coordinates ..... WGS84
Longitude
Latitude
Ground level a.s.l. (m) ..... 1.0
Antenna system height (m) ..... 20.0
Transmitter power(Watt) ..... 1.000
Carrier wave frequency (MHz) ..... 98.100
Antenna system central frequency (MHz) ..... 98.100
Antenna base diagrams type 1 ..... TFLBDI
Polarization (H/V/C/X)
Transmitting cable attenuation (dB)VAdditional attenuations(dB)0.0
0.0Base diagrams sectors ( $\mathrm{T}=\mathrm{All}, \mathrm{F}=$ Front)
Velocity factor of cables to Antennas ( $0 \div 1$ ) ..... 1.00T
Coordinate System(C = cartesian, $\mathrm{P}=$ polar $)$ ..... P
Mast side / diameter(cm) ..... 0.0
Mast cross section (T/Q/C) ..... Q
Structure rotation w.r.t. North ( ${ }^{\circ}$ ) ..... 0.0
Mast rotation w.r.t. North ( ${ }^{\circ}$ ) ..... 0.0

## Information about antennas used in the System

|  | Antenna |
| :--- | :--- |
| Manufacturer | Telecom |
| Antenna model | TFLBDI |
| Band start(MHz) | 87 |
| Band stop(MHz) | 108 |
| diagrams Frequency(MHz) | 98.10 |
| Polariz (H/V/C/X) | V |
| Vertical dist (cm) | 260 |
| Height (cm) | 138 |
| Width (cm) | 18 |
| Thickness (cm) | 150 |
| Weight (Kg) | 9 |
| Maximum power (KW) | 3.5 |
| Gain (dBd) | 1.29 |
| North E.C. $(\mathrm{cm})$ | 0 |
| East E.C. (cm) | 0 |
| Return loss (dB) | 0 |
| R.C.Phase ( ${ }^{\circ}$ ) | 0 |

## Geometrical and electrical data of antenna System

|  | Power <br> $(\%)$ | Tilt <br> $\left({ }^{\circ}\right)$ | Az. <br> $\left({ }^{\circ} / N\right)$ | Phase <br> $\left({ }^{\circ}\right)$ | V dist. <br> $(m)$ | Scr-d <br> $(c m)$ | Scr-Az <br> $\left({ }^{\circ} / N\right)$ | Rot. <br> $(1 \div 4)$ | Type <br> $(1 \div 2)$ | L cables <br> $(c m)$ | Car. phase <br> $\left({ }^{\circ}\right)$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 9.091 | 0 | 0 | 0 | +0.0 | 13.00 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 2 | 9.091 | 0 | 0 | 0 | +0.0 | 10.40 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 3 | 9.091 | 0 | 0 | 0 | +0.0 | 7.80 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 4 | 9.091 | 0 | 0 | 0 | +0.0 | 5.20 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 5 | 9.091 | 0 | 0 | 0 | +0.0 | 2.60 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 6 | 9.091 | 0 | 0 | 0 | +0.0 | 0.00 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 7 | 9.091 | 0 | 0 | 0 | +0.0 | -2.60 | 0.0 | 0.0 | 1 | 1 | 0.0 | 0.0 |
| 8 | 9.091 | 0 | 0 | 0 | +0.0 | -5.20 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 9 | 9.091 | 0 | 0 | 0 | +0.0 | -7.80 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 10 | 9.091 | 0 | 0 | 0 | +0.0 | -10.40 | 0.0 | 0.0 | 1 | 1 | 0.0 |  |
| 11 | 9.091 | 0 | 0 | 0 | +0.0 | -13.00 | 0.0 | 0.0 | 1 | 1 | 0.0 | 0.0 |

## Plan of antenna system



## Side of antenna system



## Antennas arrays data

Note: calculation of single antennas arrays data (without taking into account mutual effects)
A. Antennas array azimuth ( ${ }^{\circ} / \mathrm{N}$ )
B. Number of antennas
C. Nominal power supply (W)
D. Losses (addit. + cables) (dB)
E. Effective power supply (W)
F. Theor. maximum gain (dBd)
G. Distribution losses (dB)
H. Nominal max gain F - G (dBd)
I. Compensation losses (dB)
J. Effec. max gain H-I (dBd)
K. Effec. max gain (times)
L. Effec. max power E * K (KW)
M. Max power depr. angle ( ${ }^{\circ}$ )
N. Max power az. angle ( ${ }^{\circ}$ )
0
11
1.00
0.0
1.00
11.70
0.00
11.70
0.06
11.64
14.60
0.0146
0.0
28

Diagram in dBK calculated at horizon

| Az. $\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az} .\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az} .\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az} .\left({ }^{\circ} / \mathrm{N}\right)$ | dBK |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | -18.5 | 90 | -19.4 | 180 | -20.8 | 270 | -20.3 |
| 10 | -18.5 | 100 | -19.7 | 190 | -20.7 | 280 | -20.1 |
| 20 | -18.4 | 110 | -20.1 | 200 | -20.7 | 290 | -19.9 |
| 30 | -18.4 | 120 | -20.6 | 210 | -20.7 | 300 | -19.6 |
| 40 | -18.5 | 130 | -20.8 | 220 | -20.7 | 310 | -19.3 |
| 50 | -18.5 | 140 | -20.9 | 230 | -20.6 | 320 | -19.1 |
| 60 | -18.7 | 150 | -20.9 | 240 | -20.5 | 330 | -19.0 |
| 70 | -18.8 | 160 | -20.9 | 250 | -20.5 | 340 | -18.8 |
| 80 | -19.0 | 170 | -20.9 | 260 | -20.4 | 350 | -18.6 |

Diagram in dBK calculated at horizon
( without -20dBl's lower limit vs maximum power )

| Az. $\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az} .\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az} .\left({ }^{\circ} / \mathrm{N}\right)$ | dBK | $\mathrm{Az}\left({ }^{\circ} / \mathrm{N}\right)$ | dBK |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | -18.5 | 90 | -19.4 | 180 | -20.8 | 270 | -20.3 |
| 10 | -18.5 | 100 | -19.7 | 190 | -20.7 | 280 | -20.1 |
| 20 | -18.4 | 110 | -20.1 | 200 | -20.7 | 290 | -19.9 |
| 30 | -18.4 | 120 | -20.6 | 210 | -20.7 | 300 | -19.6 |
| 40 | -18.5 | 130 | -20.8 | 220 | -20.7 | 310 | -19.3 |
| 50 | -18.5 | 140 | -20.9 | 230 | -20.6 | 320 | -19.1 |
| 60 | -18.7 | 150 | -20.9 | 240 | -20.5 | 330 | -19.0 |
| 70 | -18.8 | 160 | -20.9 | 250 | -20.5 | 340 | -18.8 |
| 80 | -19.0 | 170 | -20.9 | 260 | -20.4 | 350 | -18.6 |

## Horizontal diagram at $0.0^{\circ}$ tilt (Total Antenna)



Horizontal diagram at $\mathbf{0 . 0 ^ { \circ }}$ tilt (Total Antenna)

| $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0.0 | 97.7 | 14.0 | 60.0 | 96.2 | 13.6 | 120.0 | 77.4 | 8.8 |
| 1.0 | 97.7 | 14.0 | 61.0 | 96.2 | 13.6 | 121.0 | 77.1 | 8.7 |
| 2.0 | 97.3 | 13.9 | 62.0 | 96.2 | 13.6 | 122.0 | 76.7 | 8.6 |
| 3.0 | 97.5 | 13.9 | 63.0 | 96.2 | 13.6 | 123.0 | 76.6 | 8.6 |
| 4.0 | 97.7 | 14.0 | 64.0 | 95.9 | 13.5 | 124.0 | 76.6 | 8.6 |
| 5.0 | 97.7 | 14.0 | 65.0 | 95.3 | 13.3 | 125.0 | 76.2 | 8.5 |
| 6.0 | 97.9 | 14.1 | 66.0 | 95.7 | 13.4 | 126.0 | 76.2 | 8.5 |
| 7.0 | 98.2 | 14.1 | 67.0 | 95.3 | 13.3 | 127.0 | 76.1 | 8.5 |
| 8.0 | 97.9 | 14.1 | 68.0 | 94.6 | 13.1 | 128.0 | 75.9 | 8.5 |
| 9.0 | 98.2 | 14.1 | 69.0 | 94.6 | 13.1 | 129.0 | 75.7 | 8.4 |
| 10.0 | 98.4 | 14.2 | 70.0 | 94.8 | 13.2 | 130.0 | 75.5 | 8.4 |
| 11.0 | 98.2 | 14.1 | 71.0 | 94.0 | 13.0 | 131.0 | 75.1 | 8.3 |
| 12.0 | 98.4 | 14.2 | 72.0 | 94.0 | 13.0 | 132.0 | 75.0 | 8.2 |
| 13.0 | 98.4 | 14.2 | 73.0 | 93.9 | 12.9 | 133.0 | 75.0 | 8.2 |
| 14.0 | 98.6 | 14.3 | 74.0 | 93.6 | 12.9 | 134.0 | 74.8 | 8.2 |
| 15.0 | 99.1 | 14.4 | 75.0 | 93.4 | 12.8 | 135.0 | 75.0 | 8.2 |
| 16.0 | 98.6 | 14.3 | 76.0 | 93.6 | 12.9 | 136.0 | 74.8 | 8.2 |
| 17.0 | 98.9 | 14.3 | 77.0 | 93.0 | 12.7 | 137.0 | 74.7 | 8.2 |
| 18.0 | 98.4 | 14.2 | 78.0 | 93.0 | 12.7 | 138.0 | 74.3 | 8.1 |
| 19.0 | 99.3 | 14.5 | 79.0 | 92.6 | 12.6 | 139.0 | 74.3 | 8.1 |
| 20.0 | 99.1 | 14.4 | 80.0 | 92.2 | 12.5 | 140.0 | 74.2 | 8.1 |
| 21.0 | 99.8 | 14.6 | 81.0 | 91.5 | 12.3 | 141.0 | 74.3 | 8.1 |
| 22.0 | 99.5 | 14.5 | 82.0 | 91.5 | 12.3 | 142.0 | 74.2 | 8.1 |
| 23.0 | 99.8 | 14.6 | 83.0 | 90.9 | 12.1 | 143.0 | 74.3 | 8.1 |
| 24.0 | 99.3 | 14.5 | 84.0 | 90.7 | 12.1 | 144.0 | 74.2 | 8.1 |
| 25.0 | 99.1 | 14.4 | 85.0 | 90.1 | 11.9 | 145.0 | 74.4 | 8.1 |
| 26.0 | 99.1 | 14.4 | 86.0 | 90.3 | 12.0 | 146.0 | 74.4 | 8.1 |
| 27.0 | 99.1 | 14.4 | 87.0 | 89.8 | 11.8 | 147.0 | 74.5 | 8.2 |
| 28.0 | 99.8 | 14.6 | 88.0 | 89.6 | 11.8 | 148.0 | 74.4 | 8.1 |
| 29.0 | 98.9 | 14.3 | 89.0 | 89.0 | 11.6 | 149.0 | 74.4 | 8.1 |
| 30.0 | 99.1 | 14.4 | 90.0 | 88.8 | 11.6 | 150.0 | 74.2 | 8.1 |
| 31.0 | 99.3 | 14.5 | 91.0 | 88.4 | 11.5 | 151.0 | 74.4 | 8.1 |
| 32.0 | 99.3 | 14.5 | 92.0 | 87.8 | 11.3 | 152.0 | 74.6 | 8.2 |
| 33.0 | 99.5 | 14.5 | 93.0 | 87.4 | 11.2 | 153.0 | 74.2 | 8.1 |
| 34.0 | 99.5 | 14.5 | 94.0 | 87.4 | 11.2 | 154.0 | 74.6 | 8.2 |
| 35.0 | 100.0 | 14.7 | 95.0 | 86.8 | 11.1 | 155.0 | 74.2 | 8.1 |
| 36.0 | 99.8 | 14.6 | 96.0 | 87.0 | 11.1 | 156.0 | 74.1 | 8.0 |
| 37.0 | 99.1 | 14.4 | 97.0 | 86.0 | 10.9 | 157.0 | 74.4 | 8.1 |
| 38.0 | 99.8 | 14.6 | 98.0 | 86.0 | 10.9 | 158.0 | 75.1 | 8.3 |
| 39.0 | 98.9 | 14.3 | 99.0 | 85.4 | 10.7 | 159.0 | 74.4 | 8.1 |
| 40.0 | 98.4 | 14.2 | 100.0 | 85.2 | 10.7 | 160.0 | 74.6 | 8.2 |
| 41.0 | 98.4 | 14.2 | 101.0 | 84.8 | 10.6 | 161.0 | 74.8 | 8.2 |
| 42.0 | 99.3 | 14.5 | 102.0 | 85.0 | 10.6 | 162.0 | 75.0 | 8.2 |
| 43.0 | 98.6 | 14.3 | 103.0 | 83.9 | 10.3 | 163.0 | 75.1 | 8.3 |
| 44.0 | 98.6 | 14.3 | 104.0 | 83.9 | 10.3 | 164.0 | 75.1 | 8.3 |
| 45.0 | 98.6 | 14.3 | 105.0 | 83.1 | 10.1 | 165.0 | 75.3 | 8.3 |
| 46.0 | 98.6 | 14.3 | 106.0 | 82.7 | 10.0 | 166.0 | 75.7 | 8.4 |
| 47.0 | 98.9 | 14.3 | 107.0 | 82.4 | 9.9 | 167.0 | 75.9 | 8.5 |
| 48.0 | 98.4 | 14.2 | 108.0 | 82.0 | 9.9 | 168.0 | 75.1 | 8.3 |
| 49.0 | 98.6 | 14.3 | 109.0 | 81.6 | 9.8 | 169.0 | 75.7 | 8.4 |
| 50.0 | 98.4 | 14.2 | 110.0 | 81.2 | 9.7 | 170.0 | 74.6 | 8.2 |
| 51.0 | 97.9 | 14.1 | 111.0 | 81.1 | 9.6 | 171.0 | 75.7 | 8.4 |
| 52.0 | 98.2 | 14.1 | 112.0 | 80.7 | 9.5 | 172.0 | 75.9 | 8.5 |
| 53.0 | 98.2 | 14.1 | 113.0 | 80.0 | 9.4 | 173.0 | 75.7 | 8.4 |
| 54.0 | 97.5 | 13.9 | 114.0 | 80.0 | 9.4 | 174.0 | 75.7 | 8.4 |
| 55.0 | 97.3 | 13.9 | 115.0 | 79.2 | 9.2 | 175.0 | 75.5 | 8.4 |
| 56.0 | 97.1 | 13.8 | 116.0 | 79.2 | 9.2 | 176.0 | 75.7 | 8.4 |
| 57.0 | 97.1 | 13.8 | 117.0 | 78.5 | 9.0 | 177.0 | 75.8 | 8.4 |
| 58.0 | 96.8 | 13.8 | 118.0 | 78.5 | 9.0 | 178.0 | 75.9 | 8.5 |
| 59.0 | 97.1 | 13.8 | 119.0 | 77.8 | 8.9 | 179.0 | 75.5 | 8.4 |

Horizontal diagram at $0.0^{\circ}$ tilt (Total Antenna)

| $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | $\mathrm{Az}\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 180.0 | 75.7 | 8.4 | 240.0 | 77.6 | 8.8 | 300.0 | 86.4 | 10.9 |
| 181.0 | 75.8 | 8.4 | 241.0 | 77.6 | 8.8 | 301.0 | 86.6 | 11.0 |
| 182.0 | 75.9 | 8.5 | 242.0 | 77.8 | 8.9 | 302.0 | 87.0 | 11.1 |
| 183.0 | 76.3 | 8.5 | 243.0 | 77.3 | 8.8 | 303.0 | 87.0 | 11.1 |
| 184.0 | 75.7 | 8.4 | 244.0 | 77.6 | 8.8 | 304.0 | 87.4 | 11.2 |
| 185.0 | 75.7 | 8.4 | 245.0 | 77.8 | 8.9 | 305.0 | 87.8 | 11.3 |
| 186.0 | 75.8 | 8.4 | 246.0 | 77.6 | 8.8 | 306.0 | 87.8 | 11.3 |
| 187.0 | 75.2 | 8.3 | 247.0 | 78.0 | 8.9 | 307.0 | 88.0 | 11.4 |
| 188.0 | 75.7 | 8.4 | 248.0 | 77.9 | 8.9 | 308.0 | 88.4 | 11.5 |
| 189.0 | 76.1 | 8.5 | 249.0 | 77.9 | 8.9 | 309.0 | 88.4 | 11.5 |
| 190.0 | 75.8 | 8.4 | 250.0 | 78.1 | 9.0 | 310.0 | 89.0 | 11.6 |
| 191.0 | 75.9 | 8.5 | 251.0 | 78.3 | 9.0 | 311.0 | 89.0 | 11.6 |
| 192.0 | 76.1 | 8.5 | 252.0 | 78.3 | 9.0 | 312.0 | 89.2 | 11.7 |
| 193.0 | 75.8 | 8.4 | 253.0 | 78.3 | 9.0 | 313.0 | 89.6 | 11.8 |
| 194.0 | 76.1 | 8.5 | 254.0 | 78.6 | 9.1 | 314.0 | 89.8 | 11.8 |
| 195.0 | 76.1 | 8.5 | 255.0 | 78.6 | 9.1 | 315.0 | 90.1 | 11.9 |
| 196.0 | 75.9 | 8.5 | 256.0 | 78.6 | 9.1 | 316.0 | 90.3 | 12.0 |
| 197.0 | 75.9 | 8.5 | 257.0 | 78.6 | 9.1 | 317.0 | 90.9 | 12.1 |
| 198.0 | 76.6 | 8.6 | 258.0 | 78.8 | 9.1 | 318.0 | 90.7 | 12.1 |
| 199.0 | 76.6 | 8.6 | 259.0 | 78.8 | 9.1 | 319.0 | 90.9 | 12.1 |
| 200.0 | 76.3 | 8.5 | 260.0 | 78.8 | 9.1 | 320.0 | 91.3 | 12.2 |
| 201.0 | 76.1 | 8.5 | 261.0 | 78.8 | 9.1 | 321.0 | 91.5 | 12.3 |
| 202.0 | 76.1 | 8.5 | 262.0 | 79.0 | 9.2 | 322.0 | 91.7 | 12.3 |
| 203.0 | 76.4 | 8.6 | 263.0 | 79.2 | 9.2 | 323.0 | 91.9 | 12.4 |
| 204.0 | 76.6 | 8.6 | 264.0 | 79.5 | 9.3 | 324.0 | 92.2 | 12.5 |
| 205.0 | 75.9 | 8.4 | 265.0 | 79.7 | 9.3 | 325.0 | 91.9 | 12.4 |
| 206.0 | 76.4 | 8.6 | 266.0 | 79.7 | 9.3 | 326.0 | 92.6 | 12.6 |
| 207.0 | 76.2 | 8.5 | 267.0 | 79.9 | 9.4 | 327.0 | 92.8 | 12.6 |
| 208.0 | 76.2 | 8.5 | 268.0 | 79.7 | 9.3 | 328.0 | 92.6 | 12.6 |
| 209.0 | 76.4 | 8.6 | 269.0 | 79.9 | 9.4 | 329.0 | 93.0 | 12.7 |
| 210.0 | 76.6 | 8.6 | 270.0 | 80.1 | 9.4 | 330.0 | 93.0 | 12.7 |
| 211.0 | 76.2 | 8.5 | 271.0 | 80.1 | 9.4 | 331.0 | 93.4 | 12.8 |
| 212.0 | 76.5 | 8.6 | 272.0 | 79.9 | 9.4 | 332.0 | 93.4 | 12.8 |
| 213.0 | 76.7 | 8.6 | 273.0 | 80.8 | 9.6 | 333.0 | 93.6 | 12.9 |
| 214.0 | 76.9 | 8.7 | 274.0 | 80.8 | 9.6 | 334.0 | 93.9 | 12.9 |
| 215.0 | 76.9 | 8.7 | 275.0 | 81.0 | 9.6 | 335.0 | 94.0 | 13.0 |
| 216.0 | 76.7 | 8.6 | 276.0 | 81.2 | 9.7 | 336.0 | 94.4 | 13.1 |
| 217.0 | 76.7 | 8.6 | 277.0 | 81.8 | 9.8 | 337.0 | 94.4 | 13.1 |
| 218.0 | 76.9 | 8.7 | 278.0 | 81.4 | 9.7 | 338.0 | 95.1 | 13.3 |
| 219.0 | 76.7 | 8.6 | 279.0 | 81.8 | 9.8 | 339.0 | 94.0 | 13.0 |
| 220.0 | 76.0 | 8.5 | 280.0 | 81.9 | 9.8 | 340.0 | 94.6 | 13.1 |
| 221.0 | 76.5 | 8.6 | 281.0 | 82.1 | 9.9 | 341.0 | 95.3 | 13.3 |
| 222.0 | 77.2 | 8.7 | 282.0 | 82.1 | 9.9 | 342.0 | 95.3 | 13.3 |
| 223.0 | 76.8 | 8.7 | 283.0 | 82.1 | 9.9 | 343.0 | 95.5 | 13.4 |
| 224.0 | 76.8 | 8.7 | 284.0 | 82.9 | 10.1 | 344.0 | 95.5 | 13.4 |
| 225.0 | 76.6 | 8.6 | 285.0 | 82.9 | 10.1 | 345.0 | 95.7 | 13.4 |
| 226.0 | 76.6 | 8.6 | 286.0 | 82.9 | 10.1 | 346.0 | 95.9 | 13.5 |
| 227.0 | 76.8 | 8.7 | 287.0 | 83.3 | 10.2 | 347.0 | 96.2 | 13.6 |
| 228.0 | 77.0 | 8.7 | 288.0 | 83.5 | 10.2 | 348.0 | 95.9 | 13.5 |
| 229.0 | 76.8 | 8.7 | 289.0 | 83.7 | 10.3 | 349.0 | 96.4 | 13.6 |
| 230.0 | 76.8 | 8.7 | 290.0 | 83.7 | 10.3 | 350.0 | 96.8 | 13.8 |
| 231.0 | 76.6 | 8.6 | 291.0 | 84.0 | 10.4 | 351.0 | 96.6 | 13.7 |
| 232.0 | 77.0 | 8.7 | 292.0 | 84.2 | 10.4 | 352.0 | 97.1 | 13.8 |
| 233.0 | 77.1 | 8.7 | 293.0 | 84.6 | 10.5 | 353.0 | 97.1 | 13.8 |
| 234.0 | 77.1 | 8.7 | 294.0 | 84.8 | 10.6 | 354.0 | 97.3 | 13.9 |
| 235.0 | 76.9 | 8.7 | 295.0 | 85.2 | 10.7 | 355.0 | 97.9 | 14.1 |
| 236.0 | 77.3 | 8.8 | 296.0 | 85.6 | 10.7 | 356.0 | 97.5 | 13.9 |
| 237.0 | 77.3 | 8.8 | 297.0 | 85.8 | 10.8 | 357.0 | 97.5 | 13.9 |
| 238.0 | 77.5 | 8.8 | 298.0 | 85.6 | 10.7 | 358.0 | 97.5 | 13.9 |
| 239.0 | 77.8 | 8.9 | 299.0 | 86.0 | 10.8 | 359.0 | 97.3 | 13.9 |

## Vertical diagram at an azimuth of $0.0^{\circ}$



## Vertical diagram at an azimuth of $0.0^{\circ}$

| Dep $\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | Dep ( ${ }^{\circ}$ ) | Er (\%) | ERP (W) | Dep ( ${ }^{\circ}$ ) | Er (\%) | ERP (W) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0.0 | 100.0 | 14.0 | 6.0 | 2.3 | 0.0 | 12.0 | 3.0 | 0.0 |
| 0.1 | 100.0 | 14.0 | 6.1 | 0.6 | 0.0 | 12.1 | 2.1 | 0.0 |
| 0.2 | 99.9 | 14.0 | 6.2 | 1.0 | 0.0 | 12.2 | 1.3 | 0.0 |
| 0.3 | 99.7 | 13.9 | 6.3 | 2.6 | 0.0 | 12.3 | 0.4 | 0.0 |
| 0.4 | 99.4 | 13.8 | 6.4 | 4.1 | 0.0 | 12.4 | 0.4 | 0.0 |
| 0.5 | 99.1 | 13.7 | 6.5 | 5.6 | 0.0 | 12.5 | 1.3 | 0.0 |
| 0.6 | 98.6 | 13.6 | 6.6 | 7.0 | 0.1 | 12.6 | 2.1 | 0.0 |
| 0.7 | 98.1 | 13.5 | 6.7 | 8.4 | 0.1 | 12.7 | 2.8 | 0.0 |
| 0.8 | 97.4 | 13.3 | 6.8 | 9.7 | 0.1 | 12.8 | 3.6 | 0.0 |
| 0.9 | 96.7 | 13.1 | 6.9 | 10.9 | 0.2 | 12.9 | 4.4 | 0.0 |
| 1.0 | 96.0 | 12.9 | 7.0 | 12.1 | 0.2 | 13.0 | 5.1 | 0.0 |
| 1.1 | 95.1 | 12.7 | 7.1 | 13.2 | 0.2 | 13.1 | 5.8 | 0.0 |
| 1.2 | 94.1 | 12.4 | 7.2 | 14.2 | 0.3 | 13.2 | 6.5 | 0.1 |
| 1.3 | 93.0 | 12.1 | 7.3 | 15.2 | 0.3 | 13.3 | 7.1 | 0.1 |
| 1.4 | 91.9 | 11.8 | 7.4 | 16.2 | 0.4 | 13.4 | 7.8 | 0.1 |
| 1.5 | 90.7 | 11.5 | 7.5 | 17.0 | 0.4 | 13.5 | 8.4 | 0.1 |
| 1.6 | 89.5 | 11.2 | 7.6 | 17.8 | 0.4 | 13.6 | 8.9 | 0.1 |
| 1.7 | 88.1 | 10.9 | 7.7 | 18.5 | 0.5 | 13.7 | 9.5 | 0.1 |
| 1.8 | 86.7 | 10.5 | 7.8 | 19.2 | 0.5 | 13.8 | 10.0 | 0.1 |
| 1.9 | 85.2 | 10.2 | 7.9 | 19.8 | 0.5 | 13.9 | 10.5 | 0.2 |
| 2.0 | 83.7 | 9.8 | 8.0 | 20.3 | 0.6 | 14.0 | 10.9 | 0.2 |
| 2.1 | 82.1 | 9.4 | 8.1 | 20.8 | 0.6 | 14.1 | 11.3 | 0.2 |
| 2.2 | 80.4 | 9.1 | 8.2 | 21.2 | 0.6 | 14.2 | 11.7 | 0.2 |
| 2.3 | 78.7 | 8.7 | 8.3 | 21.5 | 0.6 | 14.3 | 12.1 | 0.2 |
| 2.4 | 77.0 | 8.3 | 8.4 | 21.8 | 0.7 | 14.4 | 12.4 | 0.2 |
| 2.5 | 75.1 | 7.9 | 8.5 | 22.0 | 0.7 | 14.5 | 12.7 | 0.2 |
| 2.6 | 73.3 | 7.5 | 8.6 | 22.2 | 0.7 | 14.6 | 12.9 | 0.2 |
| 2.7 | 71.4 | 7.1 | 8.7 | 22.3 | 0.7 | 14.7 | 13.1 | 0.2 |
| 2.8 | 69.4 | 6.7 | 8.8 | 22.3 | 0.7 | 14.8 | 13.3 | 0.2 |
| 2.9 | 67.4 | 6.4 | 8.9 | 22.3 | 0.7 | 14.9 | 13.4 | 0.3 |
| 3.0 | 65.4 | 6.0 | 9.0 | 22.2 | 0.7 | 15.0 | 13.5 | 0.3 |
| 3.1 | 63.3 | 5.6 | 9.1 | 22.1 | 0.7 | 15.1 | 13.6 | 0.3 |
| 3.2 | 61.2 | 5.2 | 9.2 | 21.9 | 0.7 | 15.2 | 13.6 | 0.3 |
| 3.3 | 59.1 | 4.9 | 9.3 | 21.7 | 0.7 | 15.3 | 13.7 | 0.3 |
| 3.4 | 56.9 | 4.5 | 9.4 | 21.4 | 0.6 | 15.4 | 13.6 | 0.3 |
| 3.5 | 54.8 | 4.2 | 9.5 | 21.0 | 0.6 | 15.5 | 13.6 | 0.3 |
| 3.6 | 52.6 | 3.9 | 9.6 | 20.7 | 0.6 | 15.6 | 13.5 | 0.3 |
| 3.7 | 50.4 | 3.6 | 9.7 | 20.2 | 0.6 | 15.7 | 13.3 | 0.2 |
| 3.8 | 48.1 | 3.2 | 9.8 | 19.8 | 0.5 | 15.8 | 13.2 | 0.2 |
| 3.9 | 45.9 | 3.0 | 9.9 | 19.3 | 0.5 | 15.9 | 13.0 | 0.2 |
| 4.0 | 43.7 | 2.7 | 10.0 | 18.7 | 0.5 | 16.0 | 12.8 | 0.2 |
| 4.1 | 41.4 | 2.4 | 10.1 | 18.1 | 0.5 | 16.1 | 12.6 | 0.2 |
| 4.2 | 39.2 | 2.2 | 10.2 | 17.5 | 0.4 | 16.2 | 12.3 | 0.2 |
| 4.3 | 37.0 | 1.9 | 10.3 | 16.9 | 0.4 | 16.3 | 12.0 | 0.2 |
| 4.4 | 34.8 | 1.7 | 10.4 | 16.2 | 0.4 | 16.4 | 11.7 | 0.2 |
| 4.5 | 32.6 | 1.5 | 10.5 | 15.5 | 0.3 | 16.5 | 11.3 | 0.2 |
| 4.6 | 30.4 | 1.3 | 10.6 | 14.7 | 0.3 | 16.6 | 11.0 | 0.2 |
| 4.7 | 28.2 | 1.1 | 10.7 | 14.0 | 0.3 | 16.7 | 10.6 | 0.2 |
| 4.8 | 26.0 | 0.9 | 10.8 | 13.2 | 0.2 | 16.8 | 10.2 | 0.1 |
| 4.9 | 23.9 | 0.8 | 10.9 | 12.4 | 0.2 | 16.9 | 9.7 | 0.1 |
| 5.0 | 21.7 | 0.7 | 11.0 | 11.6 | 0.2 | 17.0 | 9.3 | 0.1 |
| 5.1 | 19.6 | 0.5 | 11.1 | 10.8 | 0.2 | 17.1 | 8.8 | 0.1 |
| 5.2 | 17.5 | 0.4 | 11.2 | 9.9 | 0.1 | 17.2 | 8.3 | 0.1 |
| 5.3 | 15.5 | 0.3 | 11.3 | 9.1 | 0.1 | 17.3 | 7.8 | 0.1 |
| 5.4 | 13.5 | 0.3 | 11.4 | 8.2 | 0.1 | 17.4 | 7.3 | 0.1 |
| 5.5 | 11.5 | 0.2 | 11.5 | 7.3 | 0.1 | 17.5 | 6.8 | 0.1 |
| 5.6 | 9.6 | 0.1 | 11.6 | 6.5 | 0.1 | 17.6 | 6.2 | 0.1 |
| 5.7 | 7.7 | 0.1 | 11.7 | 5.6 | 0.0 | 17.7 | 5.7 | 0.0 |
| 5.8 | 5.9 | 0.0 | 11.8 | 4.7 | 0.0 | 17.8 | 5.1 | 0.0 |
| 5.9 | 4.1 | 0.0 | 11.9 | 3.8 | 0.0 | 17.9 | 4.6 | 0.0 |

## Vertical diagram at an azimuth of $0.0^{\circ}$

| Dep ( ${ }^{\circ}$ ) | Er (\%) | ERP (W) | Dep $\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) | Dep $\left({ }^{\circ}\right)$ | Er (\%) | ERP (W) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 18.0 | 4.0 | 0.0 | 24.0 | 5.5 | 0.0 | 30.0 | 6.9 | 0.1 |
| 18.1 | 3.5 | 0.0 | 24.1 | 5.1 | 0.0 | 30.1 | 6.7 | 0.1 |
| 18.2 | 2.9 | 0.0 | 24.2 | 4.7 | 0.0 | 30.2 | 6.5 | 0.1 |
| 18.3 | 2.3 | 0.0 | 24.3 | 4.3 | 0.0 | 30.3 | 6.2 | 0.1 |
| 18.4 | 1.8 | 0.0 | 24.4 | 3.9 | 0.0 | 30.4 | 6.0 | 0.1 |
| 18.5 | 1.2 | 0.0 | 24.5 | 3.5 | 0.0 | 30.5 | 5.7 | 0.0 |
| 18.6 | 0.6 | 0.0 | 24.6 | 3.1 | 0.0 | 30.6 | 5.5 | 0.0 |
| 18.7 | 0.1 | 0.0 | 24.7 | 2.6 | 0.0 | 30.7 | 5.2 | 0.0 |
| 18.8 | 0.5 | 0.0 | 24.8 | 2.2 | 0.0 | 30.8 | 4.9 | 0.0 |
| 18.9 | 1.1 | 0.0 | 24.9 | 1.8 | 0.0 | 30.9 | 4.6 | 0.0 |
| 19.0 | 1.6 | 0.0 | 25.0 | 1.4 | 0.0 | 31.0 | 4.3 | 0.0 |
| 19.1 | 2.1 | 0.0 | 25.1 | 0.9 | 0.0 | 31.1 | 4.0 | 0.0 |
| 19.2 | 2.7 | 0.0 | 25.2 | 0.5 | 0.0 | 31.2 | 3.7 | 0.0 |
| 19.3 | 3.2 | 0.0 | 25.3 | 0.1 | 0.0 | 31.3 | 3.4 | 0.0 |
| 19.4 | 3.7 | 0.0 | 25.4 | 0.3 | 0.0 | 31.4 | 3.1 | 0.0 |
| 19.5 | 4.2 | 0.0 | 25.5 | 0.7 | 0.0 | 31.5 | 2.7 | 0.0 |
| 19.6 | 4.6 | 0.0 | 25.6 | 1.2 | 0.0 | 31.6 | 2.4 | 0.0 |
| 19.7 | 5.1 | 0.0 | 25.7 | 1.6 | 0.0 | 31.7 | 2.1 | 0.0 |
| 19.8 | 5.5 | 0.0 | 25.8 | 2.0 | 0.0 | 31.8 | 1.8 | 0.0 |
| 19.9 | 6.0 | 0.0 | 25.9 | 2.4 | 0.0 | 31.9 | 1.4 | 0.0 |
| 20.0 | 6.4 | 0.1 | 26.0 | 2.8 | 0.0 | 32.0 | 1.1 | 0.0 |
| 20.1 | 6.8 | 0.1 | 26.1 | 3.1 | 0.0 | 32.1 | 0.7 | 0.0 |
| 20.2 | 7.1 | 0.1 | 26.2 | 3.5 | 0.0 | 32.2 | 0.4 | 0.0 |
| 20.3 | 7.5 | 0.1 | 26.3 | 3.9 | 0.0 | 32.3 | 0.1 | 0.0 |
| 20.4 | 7.8 | 0.1 | 26.4 | 4.2 | 0.0 | 32.4 | 0.3 | 0.0 |
| 20.5 | 8.1 | 0.1 | 26.5 | 4.6 | 0.0 | 32.5 | 0.6 | 0.0 |
| 20.6 | 8.4 | 0.1 | 26.6 | 4.9 | 0.0 | 32.6 | 0.9 | 0.0 |
| 20.7 | 8.7 | 0.1 | 26.7 | 5.2 | 0.0 | 32.7 | 1.3 | 0.0 |
| 20.8 | 9.0 | 0.1 | 26.8 | 5.5 | 0.0 | 32.8 | 1.6 | 0.0 |
| 20.9 | 9.2 | 0.1 | 26.9 | 5.8 | 0.0 | 32.9 | 1.9 | 0.0 |
| 21.0 | 9.4 | 0.1 | 27.0 | 6.1 | 0.1 | 33.0 | 2.2 | 0.0 |
| 21.1 | 9.6 | 0.1 | 27.1 | 6.3 | 0.1 | 33.1 | 2.5 | 0.0 |
| 21.2 | 9.7 | 0.1 | 27.2 | 6.6 | 0.1 | 33.2 | 2.8 | 0.0 |
| 21.3 | 9.8 | 0.1 | 27.3 | 6.8 | 0.1 | 33.3 | 3.1 | 0.0 |
| 21.4 | 9.9 | 0.1 | 27.4 | 7.0 | 0.1 | 33.4 | 3.4 | 0.0 |
| 21.5 | 10.0 | 0.1 | 27.5 | 7.2 | 0.1 | 33.5 | 3.7 | 0.0 |
| 21.6 | 10.1 | 0.1 | 27.6 | 7.4 | 0.1 | 33.6 | 4.0 | 0.0 |
| 21.7 | 10.1 | 0.1 | 27.7 | 7.6 | 0.1 | 33.7 | 4.2 | 0.0 |
| 21.8 | 10.1 | 0.1 | 27.8 | 7.7 | 0.1 | 33.8 | 4.5 | 0.0 |
| 21.9 | 10.1 | 0.1 | 27.9 | 7.9 | 0.1 | 33.9 | 4.7 | 0.0 |
| 22.0 | 10.1 | 0.1 | 28.0 | 8.0 | 0.1 | 34.0 | 5.0 | 0.0 |
| 22.1 | 10.0 | 0.1 | 28.1 | 8.1 | 0.1 | 34.1 | 5.2 | 0.0 |
| 22.2 | 10.0 | 0.1 | 28.2 | 8.2 | 0.1 | 34.2 | 5.4 | 0.0 |
| 22.3 | 9.9 | 0.1 | 28.3 | 8.3 | 0.1 | 34.3 | 5.6 | 0.0 |
| 22.4 | 9.8 | 0.1 | 28.4 | 8.3 | 0.1 | 34.4 | 5.8 | 0.0 |
| 22.5 | 9.6 | 0.1 | 28.5 | 8.3 | 0.1 | 34.5 | 6.0 | 0.1 |
| 22.6 | 9.5 | 0.1 | 28.6 | 8.4 | 0.1 | 34.6 | 6.2 | 0.1 |
| 22.7 | 9.3 | 0.1 | 28.7 | 8.4 | 0.1 | 34.7 | 6.3 | 0.1 |
| 22.8 | 9.1 | 0.1 | 28.8 | 8.3 | 0.1 | 34.8 | 6.5 | 0.1 |
| 22.9 | 8.9 | 0.1 | 28.9 | 8.3 | 0.1 | 34.9 | 6.6 | 0.1 |
| 23.0 | 8.7 | 0.1 | 29.0 | 8.2 | 0.1 | 35.0 | 6.8 | 0.1 |
| 23.1 | 8.4 | 0.1 | 29.1 | 8.2 | 0.1 | 35.1 | 6.9 | 0.1 |
| 23.2 | 8.1 | 0.1 | 29.2 | 8.1 | 0.1 | 35.2 | 7.0 | 0.1 |
| 23.3 | 7.9 | 0.1 | 29.3 | 8.0 | 0.1 | 35.3 | 7.0 | 0.1 |
| 23.4 | 7.5 | 0.1 | 29.4 | 7.9 | 0.1 | 35.4 | 7.1 | 0.1 |
| 23.5 | 7.2 | 0.1 | 29.5 | 7.8 | 0.1 | 35.5 | 7.2 | 0.1 |
| 23.6 | 6.9 | 0.1 | 29.6 | 7.6 | 0.1 | 35.6 | 7.2 | 0.1 |
| 23.7 | 6.6 | 0.1 | 29.7 | 7.5 | 0.1 | 35.7 | 7.2 | 0.1 |
| 23.8 | 6.2 | 0.1 | 29.8 | 7.3 | 0.1 | 35.8 | 7.3 | 0.1 |
| 23.9 | 5.8 | 0.0 | 29.9 | 7.1 | 0.1 | 35.9 | 7.3 | 0.1 |

