VK5DJ's YAGI CALCULATOR

Yagi design frequency = 894.00 MHz
Wavelength = 335 mm
Parasitic elements contacting a round section metal boom 18 mm across.
Folded dipole fully insulated from boom
Director/reflector diam = 2.1 mm
Radiator diam = 2.1 mm

REFLECTOR
175.2 mm long at boom position = 30 mm (IT = 78.5 mm)

RADIATOR
Single dipole 157.4 mm tip to tip, spaced 67 mm from reflector at boom posn 97 mm (IT = 69.5 mm)
Folded dipole 160.6 mm tip to tip, spaced 67 mm from reflector at boom posn 97 mm (IT = 71.5 mm)

DIRECTORS

<table>
<thead>
<tr>
<th>Dir (no.)</th>
<th>Length (mm)</th>
<th>Spaced Boom position (mm)</th>
<th>IT (mm)</th>
<th>Gain (dBd)</th>
<th>Gain (dBi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>157.6</td>
<td>25.2</td>
<td>122.2</td>
<td>70.0</td>
<td>4.8</td>
</tr>
<tr>
<td>2</td>
<td>156.0</td>
<td>60.4</td>
<td>182.6</td>
<td>69.0</td>
<td>6.5</td>
</tr>
<tr>
<td>3</td>
<td>154.5</td>
<td>72.1</td>
<td>254.7</td>
<td>68.0</td>
<td>7.8</td>
</tr>
<tr>
<td>4</td>
<td>153.0</td>
<td>83.8</td>
<td>338.5</td>
<td>67.5</td>
<td>8.9</td>
</tr>
<tr>
<td>5</td>
<td>151.7</td>
<td>93.9</td>
<td>432.4</td>
<td>67.0</td>
<td>9.8</td>
</tr>
<tr>
<td>6</td>
<td>150.5</td>
<td>100.6</td>
<td>533.0</td>
<td>66.5</td>
<td>10.5</td>
</tr>
<tr>
<td>7</td>
<td>149.4</td>
<td>105.6</td>
<td>638.6</td>
<td>65.5</td>
<td>11.2</td>
</tr>
<tr>
<td>8</td>
<td>148.3</td>
<td>110.7</td>
<td>749.3</td>
<td>65.0</td>
<td>11.7</td>
</tr>
<tr>
<td>9</td>
<td>147.4</td>
<td>115.7</td>
<td>865.0</td>
<td>64.5</td>
<td>12.2</td>
</tr>
<tr>
<td>10</td>
<td>146.5</td>
<td>120.7</td>
<td>985.7</td>
<td>64.0</td>
<td>12.7</td>
</tr>
<tr>
<td>11</td>
<td>145.6</td>
<td>125.8</td>
<td>1111.5</td>
<td>64.0</td>
<td>13.1</td>
</tr>
<tr>
<td>12</td>
<td>144.9</td>
<td>129.1</td>
<td>1240.6</td>
<td>63.5</td>
<td>13.5</td>
</tr>
</tbody>
</table>

COMMENTS
The abbreviation "IT" means "Insert To", it is the construction distance from the element tip to the edge of the boom for through boom mounting

Spacings measured centre to centre from previous element
Tolerance for element lengths is +/- 1 mm

Boom position is the mounting point for each element as measured from the rear of the boom and includes the 30 mm overhang. The total boom length is 1271 mm including two overhangs of 30 mm

The beam's estimated 3dB beamwidth is 34 deg

FOLDED DIPOLE CONSTRUCTION
Measurements are taken from the inside of bends
Folded dipole length measured tip to tip = 161mm
Total rod length = 358mm
Centre of rod = 179mm
Distance BC = CD = 62mm
Distance HI = GF = 59mm
Distance HA = GE = 88mm
Distance HB = GD = 117mm
Distance HC = GC = 179mm
Gap at HG = 5mm
Bend diameter BI = DF = 37mm

If the folded dipole is considered as a flat plane (see ARRL Antenna Handbook) then its resonant frequency is less than the flat plane algorithm's range of 10:1
Balun for 894 MHz using 111 mm loop of RG-58 (PE)

\[ Z_1 = \frac{Z_2}{4} \]

Unbalanced to TX

\[ Z_2 \]

Folded dipole
Balun for 894 MHz using 132 mm loop of RG-58 (foam PE)
Balun for 894 MHz using 111 mm loop of RG-59 (PE)

\[ Z_1 = \frac{Z_2}{4} \]

Unbalanced to TX

111mm

Folded dipole

[Diagram of balun with labels and dimensions]
Balun for 894 MHz using 132 mm loop of RG-59 (foam PE)

\[ Z_1 = \frac{Z_2}{4} \]

Unbalanced to TX

Z2
Folded dipole

132 mm
Balun for 894 MHz using 126 mm loop of RG-6 (foam PE)

\[ Z_1 = \frac{Z_2}{4} \]

Unbalanced to TX

126mm

Z2 Folded dipole