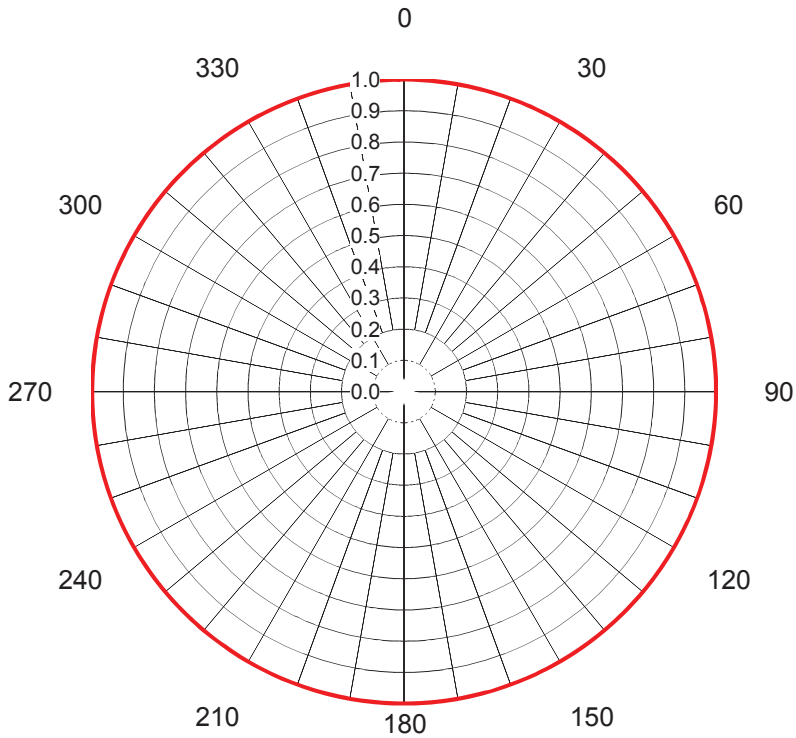


AZIMUTH PATTERN Horizontal Polarization



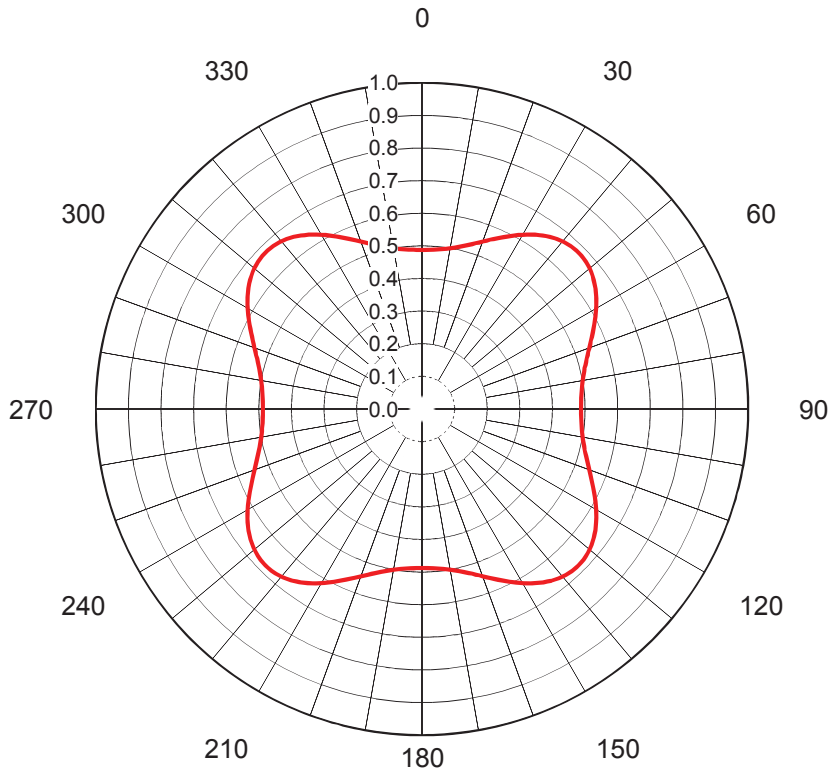
Proposal No. **C-70557-1**
 Date **9-Apr-17**
 Call Letters **WTLH**
 Channel **19**
 Frequency **503 MHz**
 Antenna Type **TFU-24ETT/VP-R 04**
 Gain **1 (0dB)**
 Circularity **Calculated
+/- 1.0 dB**

| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 1.000 | 36 | 0.999 | 72 | 1.000 | 108 | 1.000 | 144 | 0.999 | 180 | 1.000 | 216 | 0.999 | 252 | 1.000 | 288 | 1.000 | 324 | 0.999 |
| 1 | 1.000 | 37 | 0.999 | 73 | 1.000 | 109 | 1.000 | 145 | 0.999 | 181 | 1.000 | 217 | 0.999 | 253 | 1.000 | 289 | 1.000 | 325 | 0.999 |
| 2 | 1.000 | 38 | 0.999 | 74 | 1.000 | 110 | 1.000 | 146 | 0.999 | 182 | 1.000 | 218 | 0.999 | 254 | 1.000 | 290 | 1.000 | 326 | 0.999 |
| 3 | 1.000 | 39 | 0.999 | 75 | 1.000 | 111 | 1.000 | 147 | 0.999 | 183 | 1.000 | 219 | 0.999 | 255 | 1.000 | 291 | 1.000 | 327 | 0.999 |
| 4 | 1.000 | 40 | 0.999 | 76 | 1.000 | 112 | 0.999 | 148 | 0.999 | 184 | 1.000 | 220 | 0.999 | 256 | 1.000 | 292 | 0.999 | 328 | 0.999 |
| 5 | 1.000 | 41 | 0.999 | 77 | 1.000 | 113 | 0.999 | 149 | 0.999 | 185 | 1.000 | 221 | 0.999 | 257 | 1.000 | 293 | 0.999 | 329 | 0.999 |
| 6 | 1.000 | 42 | 0.999 | 78 | 1.000 | 114 | 1.000 | 150 | 0.999 | 186 | 1.000 | 222 | 0.999 | 258 | 1.000 | 294 | 0.999 | 330 | 0.999 |
| 7 | 1.000 | 43 | 0.999 | 79 | 1.000 | 115 | 0.999 | 151 | 0.999 | 187 | 1.000 | 223 | 0.999 | 259 | 1.000 | 295 | 0.999 | 331 | 0.999 |
| 8 | 1.000 | 44 | 0.999 | 80 | 1.000 | 116 | 0.999 | 152 | 0.999 | 188 | 1.000 | 224 | 0.999 | 260 | 1.000 | 296 | 0.999 | 332 | 0.999 |
| 9 | 1.000 | 45 | 0.999 | 81 | 1.000 | 117 | 0.999 | 153 | 0.999 | 189 | 1.000 | 225 | 0.999 | 261 | 1.000 | 297 | 0.999 | 333 | 0.999 |
| 10 | 1.000 | 46 | 0.999 | 82 | 1.000 | 118 | 0.999 | 154 | 0.999 | 190 | 1.000 | 226 | 0.999 | 262 | 1.000 | 298 | 0.999 | 334 | 0.999 |
| 11 | 1.000 | 47 | 0.999 | 83 | 1.000 | 119 | 0.999 | 155 | 0.999 | 191 | 1.000 | 227 | 0.999 | 263 | 1.000 | 299 | 0.999 | 335 | 0.999 |
| 12 | 1.000 | 48 | 0.999 | 84 | 1.000 | 120 | 0.999 | 156 | 0.999 | 192 | 1.000 | 228 | 0.999 | 264 | 1.000 | 300 | 0.999 | 336 | 0.999 |
| 13 | 1.000 | 49 | 0.999 | 85 | 1.000 | 121 | 0.999 | 157 | 0.999 | 193 | 1.000 | 229 | 0.999 | 265 | 1.000 | 301 | 0.999 | 337 | 0.999 |
| 14 | 1.000 | 50 | 0.999 | 86 | 1.000 | 122 | 0.999 | 158 | 0.999 | 194 | 1.000 | 230 | 0.999 | 266 | 1.000 | 302 | 0.999 | 338 | 0.999 |
| 15 | 1.000 | 51 | 0.999 | 87 | 1.000 | 123 | 0.999 | 159 | 1.000 | 195 | 1.000 | 231 | 0.999 | 267 | 1.000 | 303 | 0.999 | 339 | 1.000 |
| 16 | 1.000 | 52 | 0.999 | 88 | 1.000 | 124 | 0.999 | 160 | 1.000 | 196 | 1.000 | 232 | 0.999 | 268 | 1.000 | 304 | 0.999 | 340 | 1.000 |
| 17 | 1.000 | 53 | 0.999 | 89 | 1.000 | 125 | 0.999 | 161 | 1.000 | 197 | 1.000 | 233 | 0.999 | 269 | 1.000 | 305 | 0.999 | 341 | 1.000 |
| 18 | 1.000 | 54 | 0.999 | 90 | 1.000 | 126 | 0.999 | 162 | 1.000 | 198 | 1.000 | 234 | 0.999 | 270 | 1.000 | 306 | 0.999 | 342 | 1.000 |
| 19 | 1.000 | 55 | 0.999 | 91 | 1.000 | 127 | 0.999 | 163 | 1.000 | 199 | 1.000 | 235 | 0.999 | 271 | 1.000 | 307 | 0.999 | 343 | 1.000 |
| 20 | 1.000 | 56 | 0.999 | 92 | 1.000 | 128 | 0.999 | 164 | 1.000 | 200 | 1.000 | 236 | 0.999 | 272 | 1.000 | 308 | 0.999 | 344 | 1.000 |
| 21 | 1.000 | 57 | 0.999 | 93 | 1.000 | 129 | 0.999 | 165 | 1.000 | 201 | 1.000 | 237 | 0.999 | 273 | 1.000 | 309 | 0.999 | 345 | 1.000 |
| 22 | 0.999 | 58 | 0.999 | 94 | 1.000 | 130 | 0.999 | 166 | 1.000 | 202 | 0.999 | 238 | 0.999 | 274 | 1.000 | 310 | 0.999 | 346 | 1.000 |
| 23 | 0.999 | 59 | 0.999 | 95 | 1.000 | 131 | 0.999 | 167 | 1.000 | 203 | 0.999 | 239 | 0.999 | 275 | 1.000 | 311 | 0.999 | 347 | 1.000 |
| 24 | 1.000 | 60 | 0.999 | 96 | 1.000 | 132 | 0.999 | 168 | 1.000 | 204 | 0.999 | 240 | 0.999 | 276 | 1.000 | 312 | 0.999 | 348 | 1.000 |
| 25 | 0.999 | 61 | 0.999 | 97 | 1.000 | 133 | 0.999 | 169 | 1.000 | 205 | 0.999 | 241 | 0.999 | 277 | 1.000 | 313 | 0.999 | 349 | 1.000 |
| 26 | 0.999 | 62 | 0.999 | 98 | 1.000 | 134 | 0.999 | 170 | 1.000 | 206 | 0.999 | 242 | 0.999 | 278 | 1.000 | 314 | 0.999 | 350 | 1.000 |
| 27 | 0.999 | 63 | 0.999 | 99 | 1.000 | 135 | 0.999 | 171 | 1.000 | 207 | 0.999 | 243 | 0.999 | 279 | 1.000 | 315 | 0.999 | 351 | 1.000 |
| 28 | 0.999 | 64 | 0.999 | 100 | 1.000 | 136 | 0.999 | 172 | 1.000 | 208 | 0.999 | 244 | 0.999 | 280 | 1.000 | 316 | 0.999 | 352 | 1.000 |
| 29 | 0.999 | 65 | 0.999 | 101 | 1.000 | 137 | 0.999 | 173 | 1.000 | 209 | 0.999 | 245 | 0.999 | 281 | 1.000 | 317 | 0.999 | 353 | 1.000 |
| 30 | 0.999 | 66 | 0.999 | 102 | 1.000 | 138 | 0.999 | 174 | 1.000 | 210 | 0.999 | 246 | 0.999 | 282 | 1.000 | 318 | 0.999 | 354 | 1.000 |
| 31 | 0.999 | 67 | 0.999 | 103 | 1.000 | 139 | 0.999 | 175 | 1.000 | 211 | 0.999 | 247 | 0.999 | 283 | 1.000 | 319 | 0.999 | 355 | 1.000 |
| 32 | 0.999 | 68 | 0.999 | 104 | 1.000 | 140 | 0.999 | 176 | 1.000 | 212 | 0.999 | 248 | 0.999 | 284 | 1.000 | 320 | 0.999 | 356 | 1.000 |
| 33 | 0.999 | 69 | 1.000 | 105 | 1.000 | 141 | 0.999 | 177 | 1.000 | 213 | 0.999 | 249 | 1.000 | 285 | 1.000 | 321 | 0.999 | 357 | 1.000 |
| 34 | 0.999 | 70 | 1.000 | 106 | 1.000 | 142 | 0.999 | 178 | 1.000 | 214 | 0.999 | 250 | 1.000 | 286 | 1.000 | 322 | 0.999 | 358 | 1.000 |
| 35 | 0.999 | 71 | 1.000 | 107 | 1.000 | 143 | 0.999 | 179 | 1.000 | 215 | 0.999 | 251 | 1.000 | 287 | 1.000 | 323 | 0.999 | 359 | 1.000 |

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AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70557-1**
 Date **9-Apr-17**
 Call Letters **WTLH**
 Channel **19**
 Frequency **503 MHz**
 Antenna Type **TFU-24ETT/VP-R 04**
 Gain **1.38 (1.41dB)**
 Calculated
 Circularity **+/- 2.0 dB**



| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.488 | 36 | 0.654 | 72 | 0.534 | 108 | 0.534 | 144 | 0.654 | 180 | 0.488 | 216 | 0.654 | 252 | 0.534 | 288 | 0.534 |
| 1 | 0.488 | 37 | 0.659 | 73 | 0.529 | 109 | 0.540 | 145 | 0.649 | 181 | 0.488 | 217 | 0.659 | 253 | 0.529 | 289 | 0.540 |
| 2 | 0.488 | 38 | 0.664 | 74 | 0.523 | 110 | 0.546 | 146 | 0.643 | 182 | 0.488 | 218 | 0.664 | 254 | 0.523 | 290 | 0.546 |
| 3 | 0.489 | 39 | 0.667 | 75 | 0.519 | 111 | 0.553 | 147 | 0.637 | 183 | 0.489 | 219 | 0.667 | 255 | 0.519 | 291 | 0.553 |
| 4 | 0.490 | 40 | 0.671 | 76 | 0.514 | 112 | 0.559 | 148 | 0.631 | 184 | 0.490 | 220 | 0.671 | 256 | 0.514 | 292 | 0.559 |
| 5 | 0.491 | 41 | 0.674 | 77 | 0.510 | 113 | 0.566 | 149 | 0.624 | 185 | 0.491 | 221 | 0.674 | 257 | 0.510 | 293 | 0.566 |
| 6 | 0.492 | 42 | 0.676 | 78 | 0.507 | 114 | 0.573 | 150 | 0.617 | 186 | 0.492 | 222 | 0.676 | 258 | 0.507 | 294 | 0.573 |
| 7 | 0.494 | 43 | 0.677 | 79 | 0.503 | 115 | 0.580 | 151 | 0.610 | 187 | 0.494 | 223 | 0.677 | 259 | 0.503 | 295 | 0.580 |
| 8 | 0.496 | 44 | 0.678 | 80 | 0.500 | 116 | 0.588 | 152 | 0.602 | 188 | 0.496 | 224 | 0.678 | 260 | 0.500 | 296 | 0.588 |
| 9 | 0.498 | 45 | 0.679 | 81 | 0.498 | 117 | 0.595 | 153 | 0.595 | 189 | 0.498 | 225 | 0.679 | 261 | 0.498 | 297 | 0.595 |
| 10 | 0.500 | 46 | 0.678 | 82 | 0.496 | 118 | 0.602 | 154 | 0.588 | 190 | 0.500 | 226 | 0.678 | 262 | 0.496 | 298 | 0.602 |
| 11 | 0.503 | 47 | 0.677 | 83 | 0.494 | 119 | 0.610 | 155 | 0.580 | 191 | 0.503 | 227 | 0.677 | 263 | 0.494 | 299 | 0.610 |
| 12 | 0.507 | 48 | 0.676 | 84 | 0.492 | 120 | 0.617 | 156 | 0.573 | 192 | 0.507 | 228 | 0.676 | 264 | 0.492 | 300 | 0.617 |
| 13 | 0.510 | 49 | 0.674 | 85 | 0.491 | 121 | 0.624 | 157 | 0.566 | 193 | 0.510 | 229 | 0.674 | 265 | 0.491 | 301 | 0.624 |
| 14 | 0.514 | 50 | 0.671 | 86 | 0.490 | 122 | 0.631 | 158 | 0.559 | 194 | 0.514 | 230 | 0.671 | 266 | 0.490 | 302 | 0.631 |
| 15 | 0.519 | 51 | 0.667 | 87 | 0.489 | 123 | 0.637 | 159 | 0.553 | 195 | 0.519 | 231 | 0.667 | 267 | 0.489 | 303 | 0.637 |
| 16 | 0.523 | 52 | 0.664 | 88 | 0.488 | 124 | 0.643 | 160 | 0.546 | 196 | 0.523 | 232 | 0.664 | 268 | 0.488 | 304 | 0.643 |
| 17 | 0.529 | 53 | 0.659 | 89 | 0.488 | 125 | 0.649 | 161 | 0.540 | 197 | 0.529 | 233 | 0.659 | 269 | 0.488 | 305 | 0.649 |
| 18 | 0.534 | 54 | 0.654 | 90 | 0.488 | 126 | 0.654 | 162 | 0.534 | 198 | 0.534 | 234 | 0.654 | 270 | 0.488 | 306 | 0.654 |
| 19 | 0.540 | 55 | 0.649 | 91 | 0.488 | 127 | 0.659 | 163 | 0.529 | 199 | 0.540 | 235 | 0.649 | 271 | 0.488 | 307 | 0.659 |
| 20 | 0.546 | 56 | 0.643 | 92 | 0.488 | 128 | 0.664 | 164 | 0.523 | 200 | 0.546 | 236 | 0.643 | 272 | 0.488 | 308 | 0.664 |
| 21 | 0.553 | 57 | 0.637 | 93 | 0.489 | 129 | 0.667 | 165 | 0.519 | 201 | 0.553 | 237 | 0.637 | 273 | 0.489 | 309 | 0.667 |
| 22 | 0.559 | 58 | 0.631 | 94 | 0.490 | 130 | 0.671 | 166 | 0.514 | 202 | 0.559 | 238 | 0.631 | 274 | 0.490 | 310 | 0.671 |
| 23 | 0.566 | 59 | 0.624 | 95 | 0.491 | 131 | 0.674 | 167 | 0.510 | 203 | 0.566 | 239 | 0.624 | 275 | 0.491 | 311 | 0.674 |
| 24 | 0.573 | 60 | 0.617 | 96 | 0.492 | 132 | 0.676 | 168 | 0.507 | 204 | 0.573 | 240 | 0.617 | 276 | 0.492 | 312 | 0.676 |
| 25 | 0.580 | 61 | 0.610 | 97 | 0.494 | 133 | 0.677 | 169 | 0.503 | 205 | 0.580 | 241 | 0.610 | 277 | 0.494 | 313 | 0.677 |
| 26 | 0.588 | 62 | 0.602 | 98 | 0.496 | 134 | 0.678 | 170 | 0.500 | 206 | 0.588 | 242 | 0.602 | 278 | 0.496 | 314 | 0.678 |
| 27 | 0.595 | 63 | 0.595 | 99 | 0.498 | 135 | 0.679 | 171 | 0.498 | 207 | 0.595 | 243 | 0.595 | 279 | 0.498 | 315 | 0.679 |
| 28 | 0.602 | 64 | 0.588 | 100 | 0.500 | 136 | 0.678 | 172 | 0.496 | 208 | 0.602 | 244 | 0.588 | 280 | 0.500 | 316 | 0.678 |
| 29 | 0.610 | 65 | 0.580 | 101 | 0.503 | 137 | 0.677 | 173 | 0.494 | 209 | 0.610 | 245 | 0.580 | 281 | 0.503 | 317 | 0.677 |
| 30 | 0.617 | 66 | 0.573 | 102 | 0.507 | 138 | 0.676 | 174 | 0.492 | 210 | 0.617 | 246 | 0.573 | 282 | 0.507 | 318 | 0.676 |
| 31 | 0.624 | 67 | 0.566 | 103 | 0.510 | 139 | 0.674 | 175 | 0.491 | 211 | 0.624 | 247 | 0.566 | 283 | 0.510 | 319 | 0.674 |
| 32 | 0.631 | 68 | 0.559 | 104 | 0.514 | 140 | 0.671 | 176 | 0.490 | 212 | 0.631 | 248 | 0.559 | 284 | 0.514 | 320 | 0.671 |
| 33 | 0.637 | 69 | 0.553 | 105 | 0.519 | 141 | 0.667 | 177 | 0.489 | 213 | 0.637 | 249 | 0.553 | 285 | 0.519 | 321 | 0.667 |
| 34 | 0.643 | 70 | 0.546 | 106 | 0.523 | 142 | 0.664 | 178 | 0.488 | 214 | 0.643 | 250 | 0.546 | 286 | 0.523 | 322 | 0.664 |
| 35 | 0.649 | 71 | 0.540 | 107 | 0.529 | 143 | 0.659 | 179 | 0.488 | 215 | 0.649 | 251 | 0.540 | 287 | 0.529 | 323 | 0.659 |

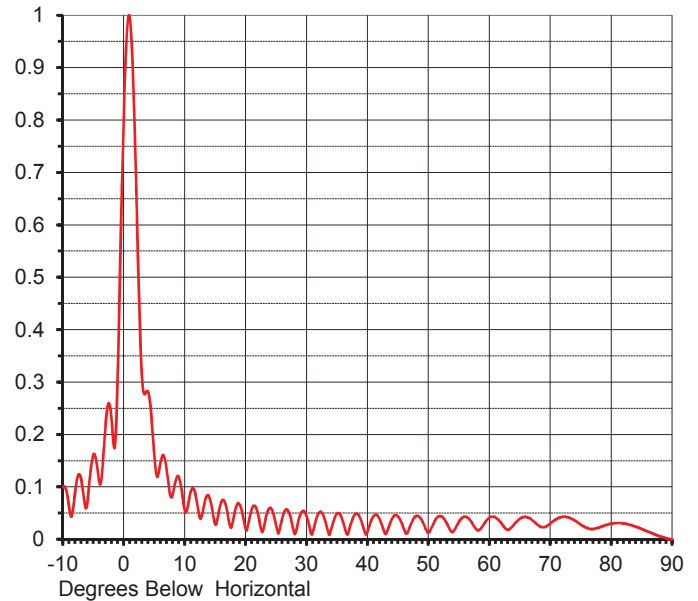
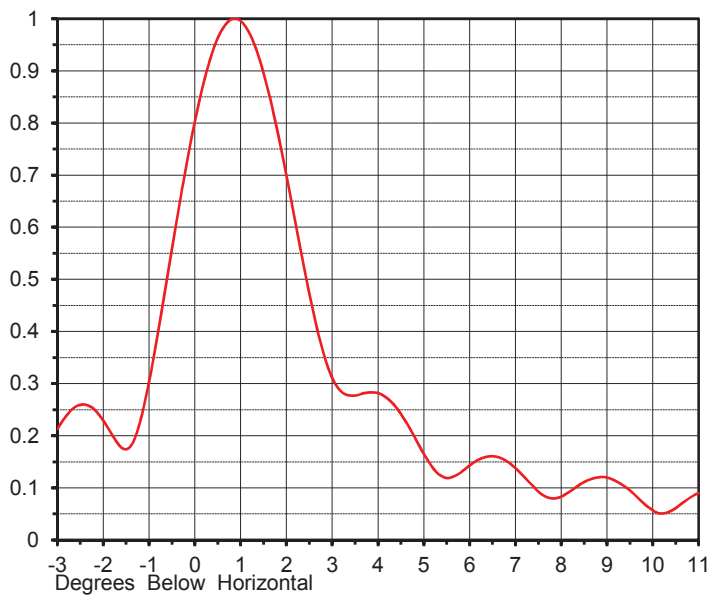
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ELEVATION PATTERN

Proposal No. **C-70557-1**
 Date **9-Apr-17**
 Call Letters **WTLH**
 Channel **19**
 Frequency **503 MHz**
 Antenna Type **TFU-24ETT/VP-R 04**

RMS Directivity at Main Lobe **23.5 (13.71 dB)**
 RMS Directivity at Horizontal **16.7 (12.23 dB)**
Calculated

Beam Tilt **0.75 deg**
 Pattern Number **24E235075**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.099 | 10.0 | 0.052 | 30.0 | 0.041 | 50.0 | 0.013 | 70.0 | 0.031 |
| -9.0 | 0.058 | 11.0 | 0.094 | 31.0 | 0.016 | 51.0 | 0.036 | 71.0 | 0.039 |
| -8.0 | 0.096 | 12.0 | 0.066 | 32.0 | 0.051 | 52.0 | 0.044 | 72.0 | 0.043 |
| -7.0 | 0.110 | 13.0 | 0.060 | 33.0 | 0.034 | 53.0 | 0.029 | 73.0 | 0.041 |
| -6.0 | 0.075 | 14.0 | 0.079 | 34.0 | 0.021 | 54.0 | 0.015 | 74.0 | 0.035 |
| -5.0 | 0.163 | 15.0 | 0.028 | 35.0 | 0.050 | 55.0 | 0.035 | 75.0 | 0.027 |
| -4.0 | 0.105 | 16.0 | 0.073 | 36.0 | 0.030 | 56.0 | 0.043 | 76.0 | 0.021 |
| -3.0 | 0.227 | 17.0 | 0.046 | 37.0 | 0.022 | 57.0 | 0.033 | 77.0 | 0.020 |
| -2.0 | 0.216 | 18.0 | 0.045 | 38.0 | 0.049 | 58.0 | 0.017 | 78.0 | 0.023 |
| -1.0 | 0.350 | 19.0 | 0.065 | 39.0 | 0.032 | 59.0 | 0.029 | 79.0 | 0.027 |
| 0.0 | 0.843 | 20.0 | 0.017 | 40.0 | 0.017 | 60.0 | 0.042 | 80.0 | 0.030 |
| 1.0 | 0.986 | 21.0 | 0.060 | 41.0 | 0.045 | 61.0 | 0.041 | 81.0 | 0.031 |
| 2.0 | 0.654 | 22.0 | 0.045 | 42.0 | 0.036 | 62.0 | 0.029 | 82.0 | 0.030 |
| 3.0 | 0.295 | 23.0 | 0.028 | 43.0 | 0.011 | 63.0 | 0.018 | 83.0 | 0.028 |
| 4.0 | 0.278 | 24.0 | 0.060 | 44.0 | 0.040 | 64.0 | 0.029 | 84.0 | 0.024 |
| 5.0 | 0.151 | 25.0 | 0.022 | 45.0 | 0.043 | 65.0 | 0.040 | 85.0 | 0.019 |
| 6.0 | 0.149 | 26.0 | 0.044 | 46.0 | 0.016 | 66.0 | 0.042 | 86.0 | 0.014 |
| 7.0 | 0.129 | 27.0 | 0.052 | 47.0 | 0.028 | 67.0 | 0.036 | 87.0 | 0.010 |
| 8.0 | 0.088 | 28.0 | 0.010 | 48.0 | 0.045 | 68.0 | 0.026 | 88.0 | 0.005 |
| 9.0 | 0.117 | 29.0 | 0.050 | 49.0 | 0.032 | 69.0 | 0.023 | 89.0 | 0.002 |
| | | | | | | | | 90.0 | 0.000 |

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