



Antenna Model:

TLS4-BB/VP-R

Proposal Number: **C-71266-1**
Date: **15-Aug-19**
Customer: **Nexstar**
Location: **Spartanburg, SC**

Electrical Specifications

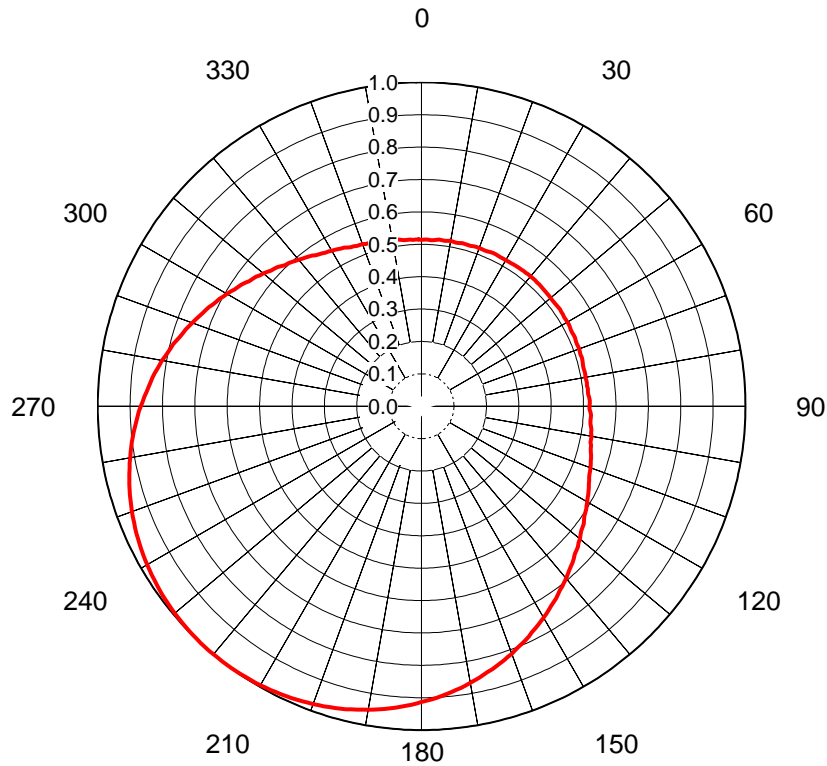
Polarization: **Elliptical**
Azimuth Pattern: **Directional**
Antenna Input: **1-5/8"** **50 Ohm** **EIA/DCA**
VSWR: **Channel** **1.25 : 1** **Band** **1.25 : 1**
Bandwidth: **174-216 MHz**
Rated Input Power: **7.5 kW** **(8.75 dBk)** **Maximum combined average power**

Mechanical Specifications

Mounting: **Side Mounted**
Environmental Protection: **Full Radome**
Height: **21.2 ft (6.5m)**
Weight: **500 lb (0.2t)**
Effective Projected Area: **18.3 ft² (1.7m²)** **TIA-222-G** **Basic Wind Speed: 89 m/h (143.2 km/h)**

Channel Specifications

| | Call | CH | Freq | Hpol ERP | Vpol ERP | TPO | Peak Main Lobe Hpol Gain | Peak Main Lobe Vpol Gain | Peak at Horizontal Hpol Gain | Peak at Horizontal Vpol Gain |
|---|------|----|---------|------------------------|------------------------|-----------------------|--------------------------------|--------------------------------|------------------------------------|------------------------------------|
| 1 | WSPA | 7 | 177 MHz | 25.7 kW (14.10 dBk) | 12.9 kW (11.09 dBk) | 5.20 kW (7.16 dBk) | 5.44 (7.35dB) | 2.72 (4.34dB) | 5.00 (6.99dB) | 2.50 (3.98dB) |
| 2 | WSPA | 11 | 201 MHz | 33.5 kW (15.25 dBk) | 16.8 kW (12.24 dBk) | 6.34 kW (8.02 dBk) | 5.85 (7.67dB) | 2.92 (4.66dB) | 5.22 (7.18dB) | 2.61 (4.17dB) |



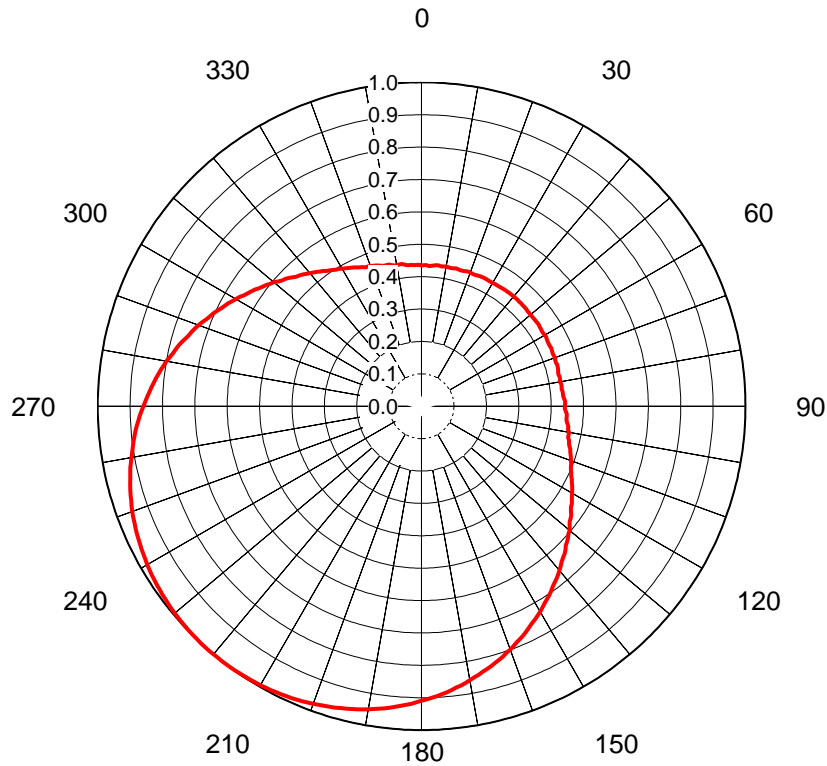
AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71266-1**
Date **15-Aug-19**
Call Letters **WSPA**
Channel **7**
Frequency **177 MHz**
Antenna Type **TLS4-BB/VP-R**
Gain **1.9 (2.79dB)**
Calculated

| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.513 | 36 | 0.523 | 72 | 0.516 | 108 | 0.549 | 144 | 0.717 | 180 | 0.913 | 216 | 0.999 | 252 | 0.945 | 288 | 0.766 |
| 1 | 0.515 | 37 | 0.523 | 73 | 0.517 | 109 | 0.552 | 145 | 0.724 | 181 | 0.918 | 217 | 0.999 | 253 | 0.942 | 289 | 0.760 |
| 2 | 0.515 | 38 | 0.523 | 74 | 0.517 | 110 | 0.555 | 146 | 0.730 | 182 | 0.922 | 218 | 1.000 | 254 | 0.938 | 290 | 0.754 |
| 3 | 0.513 | 39 | 0.523 | 75 | 0.516 | 111 | 0.558 | 147 | 0.735 | 183 | 0.926 | 219 | 1.000 | 255 | 0.934 | 291 | 0.748 |
| 4 | 0.514 | 40 | 0.523 | 76 | 0.514 | 112 | 0.559 | 148 | 0.741 | 184 | 0.930 | 220 | 1.000 | 256 | 0.930 | 292 | 0.741 |
| 5 | 0.516 | 41 | 0.523 | 77 | 0.513 | 113 | 0.562 | 149 | 0.748 | 185 | 0.934 | 221 | 1.000 | 257 | 0.926 | 293 | 0.735 |
| 6 | 0.517 | 42 | 0.523 | 78 | 0.515 | 114 | 0.566 | 150 | 0.754 | 186 | 0.938 | 222 | 1.000 | 258 | 0.922 | 294 | 0.730 |
| 7 | 0.517 | 43 | 0.523 | 79 | 0.515 | 115 | 0.570 | 151 | 0.760 | 187 | 0.942 | 223 | 0.999 | 259 | 0.918 | 295 | 0.724 |
| 8 | 0.516 | 44 | 0.523 | 80 | 0.513 | 116 | 0.575 | 152 | 0.766 | 188 | 0.945 | 224 | 0.999 | 260 | 0.913 | 296 | 0.717 |
| 9 | 0.517 | 45 | 0.522 | 81 | 0.515 | 117 | 0.578 | 153 | 0.771 | 189 | 0.948 | 225 | 0.999 | 261 | 0.909 | 297 | 0.711 |
| 10 | 0.518 | 46 | 0.522 | 82 | 0.515 | 118 | 0.582 | 154 | 0.777 | 190 | 0.951 | 226 | 0.998 | 262 | 0.905 | 298 | 0.706 |
| 11 | 0.517 | 47 | 0.522 | 83 | 0.514 | 119 | 0.586 | 155 | 0.784 | 191 | 0.955 | 227 | 0.997 | 263 | 0.901 | 299 | 0.700 |
| 12 | 0.516 | 48 | 0.521 | 84 | 0.516 | 120 | 0.591 | 156 | 0.790 | 192 | 0.957 | 228 | 0.997 | 264 | 0.896 | 300 | 0.694 |
| 13 | 0.517 | 49 | 0.521 | 85 | 0.515 | 121 | 0.595 | 157 | 0.795 | 193 | 0.961 | 229 | 0.996 | 265 | 0.892 | 301 | 0.688 |
| 14 | 0.519 | 50 | 0.520 | 86 | 0.516 | 122 | 0.599 | 158 | 0.801 | 194 | 0.964 | 230 | 0.995 | 266 | 0.887 | 302 | 0.681 |
| 15 | 0.518 | 51 | 0.520 | 87 | 0.518 | 123 | 0.603 | 159 | 0.807 | 195 | 0.967 | 231 | 0.993 | 267 | 0.882 | 303 | 0.676 |
| 16 | 0.518 | 52 | 0.521 | 88 | 0.520 | 124 | 0.606 | 160 | 0.814 | 196 | 0.969 | 232 | 0.992 | 268 | 0.878 | 304 | 0.671 |
| 17 | 0.518 | 53 | 0.521 | 89 | 0.519 | 125 | 0.612 | 161 | 0.819 | 197 | 0.972 | 233 | 0.991 | 269 | 0.873 | 305 | 0.665 |
| 18 | 0.519 | 54 | 0.522 | 90 | 0.518 | 126 | 0.618 | 162 | 0.825 | 198 | 0.974 | 234 | 0.989 | 270 | 0.867 | 306 | 0.658 |
| 19 | 0.520 | 55 | 0.522 | 91 | 0.519 | 127 | 0.622 | 163 | 0.830 | 199 | 0.976 | 235 | 0.988 | 271 | 0.861 | 307 | 0.653 |
| 20 | 0.520 | 56 | 0.521 | 92 | 0.521 | 128 | 0.626 | 164 | 0.836 | 200 | 0.979 | 236 | 0.986 | 272 | 0.857 | 308 | 0.649 |
| 21 | 0.519 | 57 | 0.520 | 93 | 0.524 | 129 | 0.632 | 165 | 0.841 | 201 | 0.981 | 237 | 0.984 | 273 | 0.850 | 309 | 0.642 |
| 22 | 0.519 | 58 | 0.519 | 94 | 0.524 | 130 | 0.638 | 166 | 0.845 | 202 | 0.983 | 238 | 0.983 | 274 | 0.845 | 310 | 0.638 |
| 23 | 0.520 | 59 | 0.519 | 95 | 0.523 | 131 | 0.642 | 167 | 0.850 | 203 | 0.984 | 239 | 0.981 | 275 | 0.841 | 311 | 0.632 |
| 24 | 0.521 | 60 | 0.520 | 96 | 0.524 | 132 | 0.649 | 168 | 0.857 | 204 | 0.986 | 240 | 0.979 | 276 | 0.836 | 312 | 0.626 |
| 25 | 0.522 | 61 | 0.520 | 97 | 0.527 | 133 | 0.653 | 169 | 0.861 | 205 | 0.988 | 241 | 0.976 | 277 | 0.830 | 313 | 0.622 |
| 26 | 0.522 | 62 | 0.519 | 98 | 0.530 | 134 | 0.658 | 170 | 0.867 | 206 | 0.989 | 242 | 0.974 | 278 | 0.825 | 314 | 0.618 |
| 27 | 0.521 | 63 | 0.518 | 99 | 0.530 | 135 | 0.665 | 171 | 0.873 | 207 | 0.991 | 243 | 0.972 | 279 | 0.819 | 315 | 0.612 |
| 28 | 0.521 | 64 | 0.518 | 100 | 0.533 | 136 | 0.671 | 172 | 0.878 | 208 | 0.992 | 244 | 0.969 | 280 | 0.814 | 316 | 0.606 |
| 29 | 0.520 | 65 | 0.518 | 101 | 0.533 | 137 | 0.676 | 173 | 0.882 | 209 | 0.993 | 245 | 0.967 | 281 | 0.807 | 317 | 0.603 |
| 30 | 0.520 | 66 | 0.519 | 102 | 0.533 | 138 | 0.681 | 174 | 0.887 | 210 | 0.995 | 246 | 0.964 | 282 | 0.801 | 318 | 0.599 |
| 31 | 0.521 | 67 | 0.517 | 103 | 0.537 | 139 | 0.688 | 175 | 0.892 | 211 | 0.996 | 247 | 0.961 | 283 | 0.795 | 319 | 0.595 |
| 32 | 0.521 | 68 | 0.516 | 104 | 0.538 | 140 | 0.694 | 176 | 0.896 | 212 | 0.997 | 248 | 0.957 | 284 | 0.790 | 320 | 0.591 |
| 33 | 0.522 | 69 | 0.517 | 105 | 0.541 | 141 | 0.700 | 177 | 0.901 | 213 | 0.997 | 249 | 0.955 | 285 | 0.784 | 321 | 0.586 |
| 34 | 0.522 | 70 | 0.518 | 106 | 0.545 | 142 | 0.706 | 178 | 0.905 | 214 | 0.998 | 250 | 0.951 | 286 | 0.777 | 322 | 0.582 |
| 35 | 0.522 | 71 | 0.517 | 107 | 0.547 | 143 | 0.711 | 179 | 0.909 | 215 | 0.999 | 251 | 0.948 | 287 | 0.771 | 323 | 0.578 |

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.



AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71266-1**
 Date **15-Aug-19**
 Call Letters **WSPA**
 Channel **11**
 Frequency **201 MHz**
 Antenna Type **TLS4-BB/VP-R**
 Gain **2.07 (3.17dB)**
 Calculated

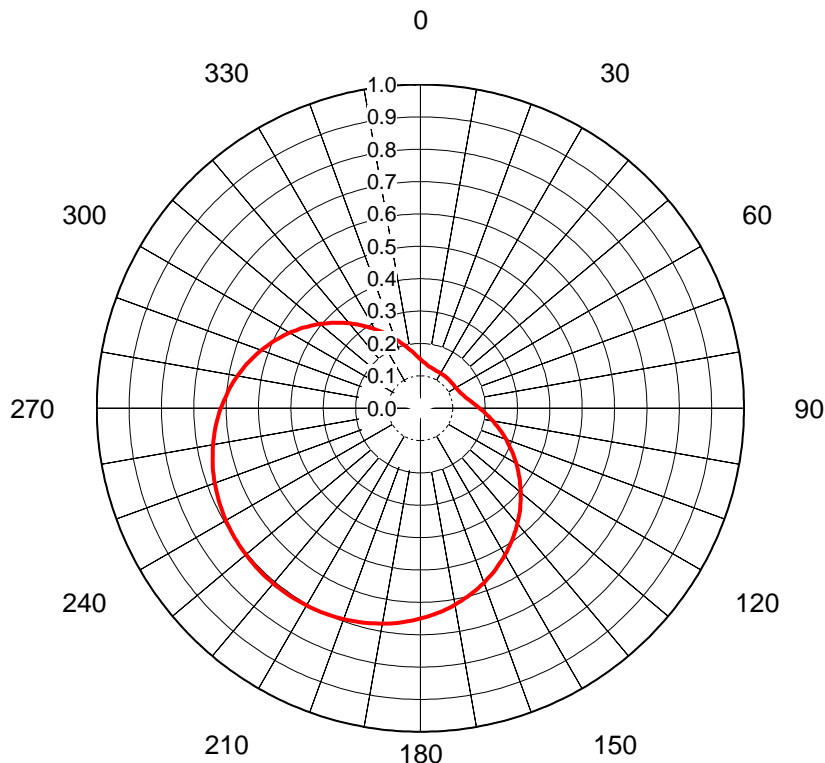
| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.434 | 36 | 0.442 | 72 | 0.436 | 108 | 0.484 | 144 | 0.689 | 180 | 0.909 | 216 | 0.999 | 252 | 0.943 | 288 | 0.746 |
| 1 | 0.435 | 37 | 0.442 | 73 | 0.438 | 109 | 0.487 | 145 | 0.697 | 181 | 0.914 | 217 | 0.999 | 253 | 0.940 | 289 | 0.739 |
| 2 | 0.436 | 38 | 0.442 | 74 | 0.438 | 110 | 0.491 | 146 | 0.704 | 182 | 0.919 | 218 | 1.000 | 254 | 0.936 | 290 | 0.732 |
| 3 | 0.434 | 39 | 0.442 | 75 | 0.436 | 111 | 0.495 | 147 | 0.710 | 183 | 0.923 | 219 | 1.000 | 255 | 0.932 | 291 | 0.725 |
| 4 | 0.435 | 40 | 0.442 | 76 | 0.435 | 112 | 0.497 | 148 | 0.717 | 184 | 0.927 | 220 | 1.000 | 256 | 0.927 | 292 | 0.717 |
| 5 | 0.436 | 41 | 0.442 | 77 | 0.434 | 113 | 0.501 | 149 | 0.725 | 185 | 0.932 | 221 | 1.000 | 257 | 0.923 | 293 | 0.710 |
| 6 | 0.438 | 42 | 0.442 | 78 | 0.436 | 114 | 0.506 | 150 | 0.732 | 186 | 0.936 | 222 | 1.000 | 258 | 0.919 | 294 | 0.704 |
| 7 | 0.438 | 43 | 0.442 | 79 | 0.435 | 115 | 0.510 | 151 | 0.739 | 187 | 0.940 | 223 | 0.999 | 259 | 0.914 | 295 | 0.697 |
| 8 | 0.436 | 44 | 0.442 | 80 | 0.434 | 116 | 0.516 | 152 | 0.746 | 188 | 0.943 | 224 | 0.999 | 260 | 0.909 | 296 | 0.689 |
| 9 | 0.437 | 45 | 0.442 | 81 | 0.437 | 117 | 0.521 | 153 | 0.751 | 189 | 0.947 | 225 | 0.999 | 261 | 0.905 | 297 | 0.682 |
| 10 | 0.438 | 46 | 0.441 | 82 | 0.437 | 118 | 0.526 | 154 | 0.758 | 190 | 0.951 | 226 | 0.998 | 262 | 0.901 | 298 | 0.676 |
| 11 | 0.437 | 47 | 0.441 | 83 | 0.436 | 119 | 0.531 | 155 | 0.767 | 191 | 0.954 | 227 | 0.997 | 263 | 0.896 | 299 | 0.669 |
| 12 | 0.436 | 48 | 0.440 | 84 | 0.438 | 120 | 0.537 | 156 | 0.774 | 192 | 0.957 | 228 | 0.997 | 264 | 0.891 | 300 | 0.662 |
| 13 | 0.437 | 49 | 0.440 | 85 | 0.438 | 121 | 0.542 | 157 | 0.779 | 193 | 0.960 | 229 | 0.996 | 265 | 0.887 | 301 | 0.655 |
| 14 | 0.439 | 50 | 0.439 | 86 | 0.438 | 122 | 0.548 | 158 | 0.785 | 194 | 0.962 | 230 | 0.995 | 266 | 0.882 | 302 | 0.646 |
| 15 | 0.438 | 51 | 0.439 | 87 | 0.441 | 123 | 0.553 | 159 | 0.793 | 195 | 0.965 | 231 | 0.993 | 267 | 0.876 | 303 | 0.640 |
| 16 | 0.437 | 52 | 0.440 | 88 | 0.444 | 124 | 0.557 | 160 | 0.800 | 196 | 0.968 | 232 | 0.992 | 268 | 0.871 | 304 | 0.635 |
| 17 | 0.437 | 53 | 0.440 | 89 | 0.443 | 125 | 0.563 | 161 | 0.805 | 197 | 0.970 | 233 | 0.991 | 269 | 0.865 | 305 | 0.628 |
| 18 | 0.438 | 54 | 0.440 | 90 | 0.442 | 126 | 0.571 | 162 | 0.813 | 198 | 0.973 | 234 | 0.989 | 270 | 0.859 | 306 | 0.619 |
| 19 | 0.440 | 55 | 0.441 | 91 | 0.443 | 127 | 0.576 | 163 | 0.818 | 199 | 0.975 | 235 | 0.988 | 271 | 0.853 | 307 | 0.614 |
| 20 | 0.439 | 56 | 0.440 | 92 | 0.446 | 128 | 0.580 | 164 | 0.825 | 200 | 0.978 | 236 | 0.986 | 272 | 0.848 | 308 | 0.609 |
| 21 | 0.438 | 57 | 0.439 | 93 | 0.449 | 129 | 0.588 | 165 | 0.831 | 201 | 0.980 | 237 | 0.984 | 273 | 0.841 | 309 | 0.601 |
| 22 | 0.438 | 58 | 0.438 | 94 | 0.449 | 130 | 0.596 | 166 | 0.836 | 202 | 0.982 | 238 | 0.982 | 274 | 0.836 | 310 | 0.596 |
| 23 | 0.439 | 59 | 0.438 | 95 | 0.449 | 131 | 0.601 | 167 | 0.841 | 203 | 0.984 | 239 | 0.980 | 275 | 0.831 | 311 | 0.588 |
| 24 | 0.440 | 60 | 0.439 | 96 | 0.451 | 132 | 0.609 | 168 | 0.848 | 204 | 0.986 | 240 | 0.978 | 276 | 0.825 | 312 | 0.580 |
| 25 | 0.441 | 61 | 0.440 | 97 | 0.454 | 133 | 0.614 | 169 | 0.853 | 205 | 0.988 | 241 | 0.975 | 277 | 0.818 | 313 | 0.576 |
| 26 | 0.440 | 62 | 0.438 | 98 | 0.457 | 134 | 0.619 | 170 | 0.859 | 206 | 0.989 | 242 | 0.973 | 278 | 0.813 | 314 | 0.571 |
| 27 | 0.440 | 63 | 0.437 | 99 | 0.458 | 135 | 0.628 | 171 | 0.865 | 207 | 0.991 | 243 | 0.970 | 279 | 0.805 | 315 | 0.563 |
| 28 | 0.440 | 64 | 0.437 | 100 | 0.462 | 136 | 0.635 | 172 | 0.871 | 208 | 0.992 | 244 | 0.968 | 280 | 0.800 | 316 | 0.557 |
| 29 | 0.439 | 65 | 0.438 | 101 | 0.462 | 137 | 0.640 | 173 | 0.876 | 209 | 0.993 | 245 | 0.965 | 281 | 0.793 | 317 | 0.553 |
| 30 | 0.439 | 66 | 0.439 | 102 | 0.463 | 138 | 0.646 | 174 | 0.882 | 210 | 0.995 | 246 | 0.962 | 282 | 0.785 | 318 | 0.548 |
| 31 | 0.440 | 67 | 0.437 | 103 | 0.467 | 139 | 0.655 | 175 | 0.887 | 211 | 0.996 | 247 | 0.960 | 283 | 0.779 | 319 | 0.542 |
| 32 | 0.440 | 68 | 0.436 | 104 | 0.469 | 140 | 0.662 | 176 | 0.891 | 212 | 0.997 | 248 | 0.957 | 284 | 0.774 | 320 | 0.537 |
| 33 | 0.441 | 69 | 0.437 | 105 | 0.472 | 141 | 0.669 | 177 | 0.896 | 213 | 0.997 | 249 | 0.954 | 285 | 0.767 | 321 | 0.531 |
| 34 | 0.441 | 70 | 0.438 | 106 | 0.477 | 142 | 0.676 | 178 | 0.901 | 214 | 0.998 | 250 | 0.951 | 286 | 0.758 | 322 | 0.526 |
| 35 | 0.442 | 71 | 0.437 | 107 | 0.480 | 143 | 0.682 | 179 | 0.905 | 215 | 0.999 | 251 | 0.947 | 287 | 0.751 | 323 | 0.521 |

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71266-1**
Date **15-Aug-19**
Call Letters **WSPA**
Channel **7**
Frequency **177 MHz**
Antenna Type **TLS4-BB/VP-R**
Gain **2.35 (3.71dB)**
Calculated



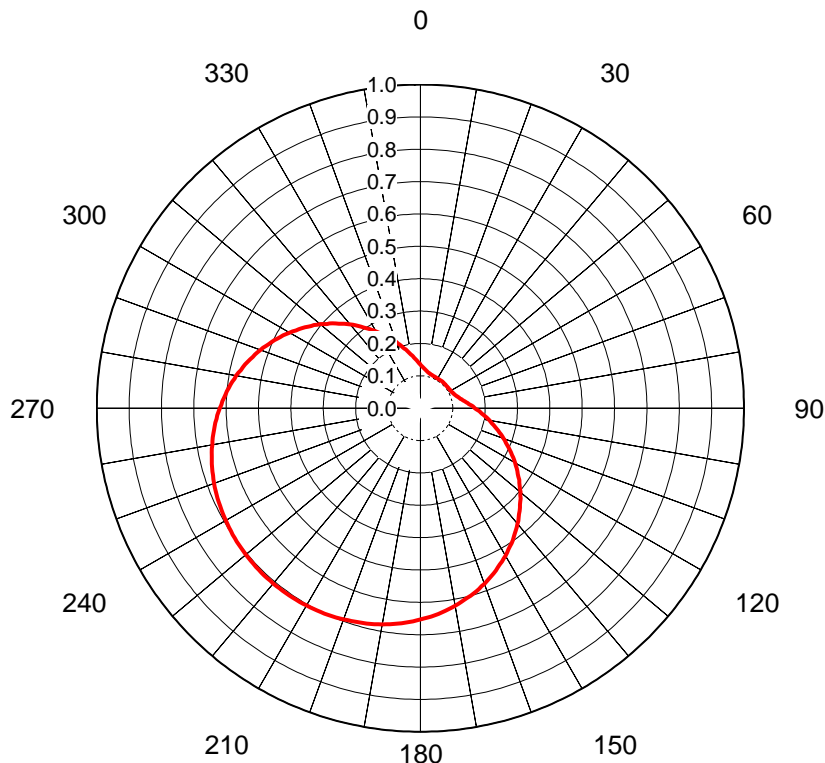
| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.151 | 36 | 0.125 | 72 | 0.137 | 108 | 0.271 | 144 | 0.489 | 180 | 0.650 | 216 | 0.707 | 252 | 0.672 | 288 | 0.534 |
| 1 | 0.149 | 37 | 0.125 | 73 | 0.138 | 109 | 0.276 | 145 | 0.496 | 181 | 0.653 | 217 | 0.707 | 253 | 0.670 | 289 | 0.529 |
| 2 | 0.147 | 38 | 0.125 | 74 | 0.140 | 110 | 0.282 | 146 | 0.502 | 182 | 0.656 | 218 | 0.707 | 254 | 0.667 | 290 | 0.523 |
| 3 | 0.145 | 39 | 0.125 | 75 | 0.141 | 111 | 0.288 | 147 | 0.506 | 183 | 0.659 | 219 | 0.707 | 255 | 0.664 | 291 | 0.518 |
| 4 | 0.143 | 40 | 0.125 | 76 | 0.143 | 112 | 0.293 | 148 | 0.512 | 184 | 0.661 | 220 | 0.707 | 256 | 0.661 | 292 | 0.512 |
| 5 | 0.141 | 41 | 0.125 | 77 | 0.145 | 113 | 0.299 | 149 | 0.518 | 185 | 0.664 | 221 | 0.707 | 257 | 0.659 | 293 | 0.506 |
| 6 | 0.140 | 42 | 0.125 | 78 | 0.147 | 114 | 0.305 | 150 | 0.523 | 186 | 0.667 | 222 | 0.707 | 258 | 0.656 | 294 | 0.502 |
| 7 | 0.138 | 43 | 0.125 | 79 | 0.149 | 115 | 0.311 | 151 | 0.529 | 187 | 0.670 | 223 | 0.707 | 259 | 0.653 | 295 | 0.496 |
| 8 | 0.137 | 44 | 0.125 | 80 | 0.151 | 116 | 0.318 | 152 | 0.534 | 188 | 0.672 | 224 | 0.707 | 260 | 0.650 | 296 | 0.489 |
| 9 | 0.135 | 45 | 0.125 | 81 | 0.154 | 117 | 0.324 | 153 | 0.539 | 189 | 0.674 | 225 | 0.706 | 261 | 0.647 | 297 | 0.484 |
| 10 | 0.134 | 46 | 0.125 | 82 | 0.157 | 118 | 0.330 | 154 | 0.544 | 190 | 0.676 | 226 | 0.706 | 262 | 0.644 | 298 | 0.479 |
| 11 | 0.133 | 47 | 0.124 | 83 | 0.159 | 119 | 0.336 | 155 | 0.550 | 191 | 0.678 | 227 | 0.705 | 263 | 0.641 | 299 | 0.472 |
| 12 | 0.132 | 48 | 0.124 | 84 | 0.163 | 120 | 0.343 | 156 | 0.555 | 192 | 0.680 | 228 | 0.705 | 264 | 0.638 | 300 | 0.466 |
| 13 | 0.131 | 49 | 0.124 | 85 | 0.165 | 121 | 0.349 | 157 | 0.560 | 193 | 0.682 | 229 | 0.704 | 265 | 0.635 | 301 | 0.460 |
| 14 | 0.130 | 50 | 0.124 | 86 | 0.169 | 122 | 0.355 | 158 | 0.564 | 194 | 0.684 | 230 | 0.704 | 266 | 0.631 | 302 | 0.454 |
| 15 | 0.129 | 51 | 0.124 | 87 | 0.172 | 123 | 0.361 | 159 | 0.569 | 195 | 0.686 | 231 | 0.703 | 267 | 0.628 | 303 | 0.448 |
| 16 | 0.128 | 52 | 0.125 | 88 | 0.176 | 124 | 0.366 | 160 | 0.575 | 196 | 0.688 | 232 | 0.702 | 268 | 0.624 | 304 | 0.443 |
| 17 | 0.128 | 53 | 0.125 | 89 | 0.180 | 125 | 0.373 | 161 | 0.579 | 197 | 0.689 | 233 | 0.701 | 269 | 0.621 | 305 | 0.436 |
| 18 | 0.128 | 54 | 0.125 | 90 | 0.183 | 126 | 0.380 | 162 | 0.584 | 198 | 0.691 | 234 | 0.701 | 270 | 0.616 | 306 | 0.429 |
| 19 | 0.127 | 55 | 0.126 | 91 | 0.187 | 127 | 0.386 | 163 | 0.588 | 199 | 0.692 | 235 | 0.700 | 271 | 0.612 | 307 | 0.423 |
| 20 | 0.127 | 56 | 0.126 | 92 | 0.191 | 128 | 0.391 | 164 | 0.592 | 200 | 0.694 | 236 | 0.699 | 272 | 0.608 | 308 | 0.418 |
| 21 | 0.126 | 57 | 0.126 | 93 | 0.196 | 129 | 0.398 | 165 | 0.596 | 201 | 0.695 | 237 | 0.697 | 273 | 0.604 | 309 | 0.411 |
| 22 | 0.126 | 58 | 0.126 | 94 | 0.200 | 130 | 0.405 | 166 | 0.600 | 202 | 0.696 | 238 | 0.696 | 274 | 0.600 | 310 | 0.405 |
| 23 | 0.126 | 59 | 0.126 | 95 | 0.204 | 131 | 0.411 | 167 | 0.604 | 203 | 0.697 | 239 | 0.695 | 275 | 0.596 | 311 | 0.398 |
| 24 | 0.126 | 60 | 0.127 | 96 | 0.208 | 132 | 0.418 | 168 | 0.608 | 204 | 0.699 | 240 | 0.694 | 276 | 0.592 | 312 | 0.391 |
| 25 | 0.126 | 61 | 0.127 | 97 | 0.213 | 133 | 0.423 | 169 | 0.612 | 205 | 0.700 | 241 | 0.692 | 277 | 0.588 | 313 | 0.386 |
| 26 | 0.125 | 62 | 0.128 | 98 | 0.218 | 134 | 0.429 | 170 | 0.616 | 206 | 0.701 | 242 | 0.691 | 278 | 0.584 | 314 | 0.380 |
| 27 | 0.125 | 63 | 0.128 | 99 | 0.223 | 135 | 0.436 | 171 | 0.621 | 207 | 0.701 | 243 | 0.689 | 279 | 0.579 | 315 | 0.373 |
| 28 | 0.125 | 64 | 0.128 | 100 | 0.228 | 136 | 0.443 | 172 | 0.624 | 208 | 0.702 | 244 | 0.688 | 280 | 0.575 | 316 | 0.366 |
| 29 | 0.124 | 65 | 0.129 | 101 | 0.233 | 137 | 0.448 | 173 | 0.628 | 209 | 0.703 | 245 | 0.686 | 281 | 0.569 | 317 | 0.361 |
| 30 | 0.124 | 66 | 0.130 | 102 | 0.237 | 138 | 0.454 | 174 | 0.631 | 210 | 0.704 | 246 | 0.684 | 282 | 0.564 | 318 | 0.355 |
| 31 | 0.124 | 67 | 0.131 | 103 | 0.243 | 139 | 0.460 | 175 | 0.635 | 211 | 0.704 | 247 | 0.682 | 283 | 0.560 | 319 | 0.349 |
| 32 | 0.124 | 68 | 0.132 | 104 | 0.248 | 140 | 0.466 | 176 | 0.638 | 212 | 0.705 | 248 | 0.680 | 284 | 0.555 | 320 | 0.343 |
| 33 | 0.124 | 69 | 0.133 | 105 | 0.253 | 141 | 0.472 | 177 | 0.641 | 213 | 0.705 | 249 | 0.678 | 285 | 0.550 | 321 | 0.336 |
| 34 | 0.125 | 70 | 0.134 | 106 | 0.260 | 142 | 0.479 | 178 | 0.644 | 214 | 0.706 | 250 | 0.676 | 286 | 0.544 | 322 | 0.330 |
| 35 | 0.125 | 71 | 0.135 | 107 | 0.265 | 143 | 0.484 | 179 | 0.647 | 215 | 0.706 | 251 | 0.674 | 287 | 0.539 | 323 | 0.324 |

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71266-1**
Date **15-Aug-19**
Call Letters **WSPA**
Channel **11**
Frequency **201 MHz**
Antenna Type **TLS4-BB/VP-R**
Gain **2.36 (3.73dB)**
Calculated



| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.135 | 36 | 0.106 | 72 | 0.119 | 108 | 0.262 | 144 | 0.491 | 180 | 0.653 | 216 | 0.707 | 252 | 0.674 | 288 | 0.537 |
| 1 | 0.133 | 37 | 0.106 | 73 | 0.121 | 109 | 0.268 | 145 | 0.498 | 181 | 0.656 | 217 | 0.707 | 253 | 0.672 | 289 | 0.532 |
| 2 | 0.130 | 38 | 0.106 | 74 | 0.123 | 110 | 0.274 | 146 | 0.504 | 182 | 0.659 | 218 | 0.707 | 254 | 0.670 | 290 | 0.526 |
| 3 | 0.127 | 39 | 0.106 | 75 | 0.124 | 111 | 0.280 | 147 | 0.508 | 183 | 0.662 | 219 | 0.707 | 255 | 0.667 | 291 | 0.521 |
| 4 | 0.126 | 40 | 0.106 | 76 | 0.126 | 112 | 0.285 | 148 | 0.514 | 184 | 0.664 | 220 | 0.707 | 256 | 0.664 | 292 | 0.514 |
| 5 | 0.124 | 41 | 0.106 | 77 | 0.127 | 113 | 0.292 | 149 | 0.521 | 185 | 0.667 | 221 | 0.707 | 257 | 0.662 | 293 | 0.508 |
| 6 | 0.123 | 42 | 0.106 | 78 | 0.130 | 114 | 0.298 | 150 | 0.526 | 186 | 0.670 | 222 | 0.707 | 258 | 0.659 | 294 | 0.504 |
| 7 | 0.121 | 43 | 0.106 | 79 | 0.133 | 115 | 0.304 | 151 | 0.532 | 187 | 0.672 | 223 | 0.707 | 259 | 0.656 | 295 | 0.498 |
| 8 | 0.119 | 44 | 0.106 | 80 | 0.135 | 116 | 0.312 | 152 | 0.537 | 188 | 0.674 | 224 | 0.707 | 260 | 0.653 | 296 | 0.491 |
| 9 | 0.117 | 45 | 0.106 | 81 | 0.138 | 117 | 0.318 | 153 | 0.541 | 189 | 0.676 | 225 | 0.706 | 261 | 0.650 | 297 | 0.485 |
| 10 | 0.116 | 46 | 0.106 | 82 | 0.141 | 118 | 0.325 | 154 | 0.547 | 190 | 0.679 | 226 | 0.706 | 262 | 0.647 | 298 | 0.480 |
| 11 | 0.115 | 47 | 0.106 | 83 | 0.143 | 119 | 0.331 | 155 | 0.553 | 191 | 0.680 | 227 | 0.706 | 263 | 0.645 | 299 | 0.473 |
| 12 | 0.113 | 48 | 0.106 | 84 | 0.147 | 120 | 0.338 | 156 | 0.558 | 192 | 0.682 | 228 | 0.705 | 264 | 0.641 | 300 | 0.467 |
| 13 | 0.113 | 49 | 0.106 | 85 | 0.150 | 121 | 0.344 | 157 | 0.563 | 193 | 0.684 | 229 | 0.705 | 265 | 0.638 | 301 | 0.461 |
| 14 | 0.112 | 50 | 0.106 | 86 | 0.153 | 122 | 0.351 | 158 | 0.567 | 194 | 0.686 | 230 | 0.704 | 266 | 0.635 | 302 | 0.453 |
| 15 | 0.111 | 51 | 0.106 | 87 | 0.158 | 123 | 0.357 | 159 | 0.573 | 195 | 0.687 | 231 | 0.703 | 267 | 0.631 | 303 | 0.447 |
| 16 | 0.110 | 52 | 0.106 | 88 | 0.162 | 124 | 0.363 | 160 | 0.578 | 196 | 0.689 | 232 | 0.703 | 268 | 0.628 | 304 | 0.442 |
| 17 | 0.109 | 53 | 0.106 | 89 | 0.165 | 125 | 0.370 | 161 | 0.582 | 197 | 0.690 | 233 | 0.702 | 269 | 0.624 | 305 | 0.436 |
| 18 | 0.109 | 54 | 0.107 | 90 | 0.169 | 126 | 0.378 | 162 | 0.587 | 198 | 0.692 | 234 | 0.701 | 270 | 0.619 | 306 | 0.428 |
| 19 | 0.109 | 55 | 0.107 | 91 | 0.173 | 127 | 0.383 | 163 | 0.591 | 199 | 0.693 | 235 | 0.700 | 271 | 0.615 | 307 | 0.422 |
| 20 | 0.108 | 56 | 0.107 | 92 | 0.178 | 128 | 0.389 | 164 | 0.596 | 200 | 0.695 | 236 | 0.699 | 272 | 0.612 | 308 | 0.417 |
| 21 | 0.108 | 57 | 0.107 | 93 | 0.183 | 129 | 0.396 | 165 | 0.600 | 201 | 0.696 | 237 | 0.698 | 273 | 0.607 | 309 | 0.410 |
| 22 | 0.107 | 58 | 0.107 | 94 | 0.187 | 130 | 0.404 | 166 | 0.604 | 202 | 0.697 | 238 | 0.697 | 274 | 0.604 | 310 | 0.404 |
| 23 | 0.107 | 59 | 0.108 | 95 | 0.191 | 131 | 0.410 | 167 | 0.607 | 203 | 0.698 | 239 | 0.696 | 275 | 0.600 | 311 | 0.396 |
| 24 | 0.107 | 60 | 0.108 | 96 | 0.196 | 132 | 0.417 | 168 | 0.612 | 204 | 0.699 | 240 | 0.695 | 276 | 0.596 | 312 | 0.389 |
| 25 | 0.107 | 61 | 0.109 | 97 | 0.201 | 133 | 0.422 | 169 | 0.615 | 205 | 0.700 | 241 | 0.693 | 277 | 0.591 | 313 | 0.383 |
| 26 | 0.107 | 62 | 0.109 | 98 | 0.207 | 134 | 0.428 | 170 | 0.619 | 206 | 0.701 | 242 | 0.692 | 278 | 0.587 | 314 | 0.378 |
| 27 | 0.106 | 63 | 0.109 | 99 | 0.211 | 135 | 0.436 | 171 | 0.624 | 207 | 0.702 | 243 | 0.690 | 279 | 0.582 | 315 | 0.370 |
| 28 | 0.106 | 64 | 0.110 | 100 | 0.217 | 136 | 0.442 | 172 | 0.628 | 208 | 0.703 | 244 | 0.689 | 280 | 0.578 | 316 | 0.363 |
| 29 | 0.106 | 65 | 0.111 | 101 | 0.222 | 137 | 0.447 | 173 | 0.631 | 209 | 0.703 | 245 | 0.687 | 281 | 0.573 | 317 | 0.357 |
| 30 | 0.106 | 66 | 0.112 | 102 | 0.226 | 138 | 0.453 | 174 | 0.635 | 210 | 0.704 | 246 | 0.686 | 282 | 0.567 | 318 | 0.351 |
| 31 | 0.106 | 67 | 0.113 | 103 | 0.232 | 139 | 0.461 | 175 | 0.638 | 211 | 0.705 | 247 | 0.684 | 283 | 0.563 | 319 | 0.344 |
| 32 | 0.106 | 68 | 0.113 | 104 | 0.238 | 140 | 0.467 | 176 | 0.641 | 212 | 0.705 | 248 | 0.682 | 284 | 0.558 | 320 | 0.338 |
| 33 | 0.106 | 69 | 0.115 | 105 | 0.244 | 141 | 0.473 | 177 | 0.645 | 213 | 0.706 | 249 | 0.680 | 285 | 0.553 | 321 | 0.331 |
| 34 | 0.106 | 70 | 0.116 | 106 | 0.250 | 142 | 0.480 | 178 | 0.647 | 214 | 0.706 | 250 | 0.679 | 286 | 0.547 | 322 | 0.325 |
| 35 | 0.106 | 71 | 0.117 | 107 | 0.256 | 143 | 0.485 | 179 | 0.650 | 215 | 0.706 | 251 | 0.676 | 287 | 0.541 | 323 | 0.318 |

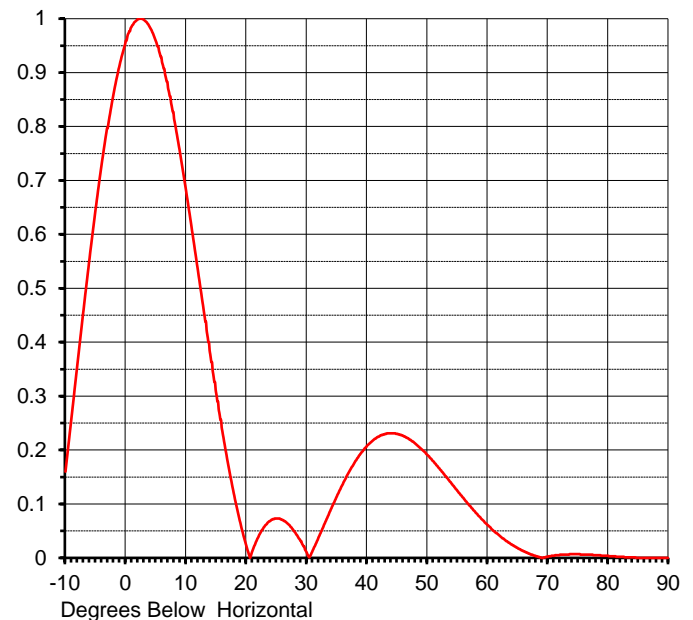
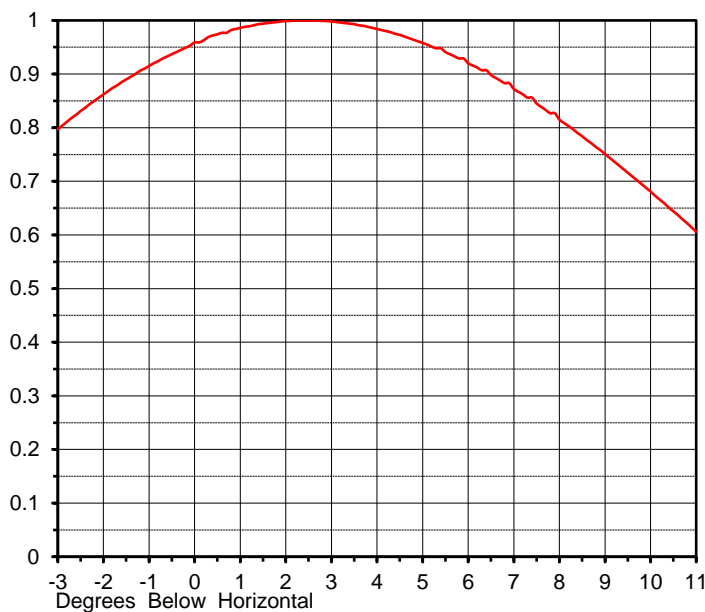
This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

ELEVATION PATTERN

Proposal No. **C-71266-1**
 Date **15-Aug-19**
 Call Letters **WSPA**
 Channel **7**
 Frequency **177 MHz**
 Antenna Type **TLS4-BB/VP-R**

RMS Directivity at Main Lobe **4.0 (6.04 dB)**
 RMS Directivity at Horizontal **3.7 (5.68 dB)**
Calculated

Beam Tilt **2.45 deg**
 Pattern Number **04T040245**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.160 | 10.0 | 0.681 | 30.0 | 0.010 | 50.0 | 0.191 | 70.0 | 0.002 |
| -9.0 | 0.260 | 11.0 | 0.606 | 31.0 | 0.014 | 51.0 | 0.179 | 71.0 | 0.004 |
| -8.0 | 0.361 | 12.0 | 0.530 | 32.0 | 0.039 | 52.0 | 0.166 | 72.0 | 0.006 |
| -7.0 | 0.460 | 13.0 | 0.453 | 33.0 | 0.064 | 53.0 | 0.152 | 73.0 | 0.006 |
| -6.0 | 0.556 | 14.0 | 0.378 | 34.0 | 0.090 | 54.0 | 0.138 | 74.0 | 0.007 |
| -5.0 | 0.647 | 15.0 | 0.305 | 35.0 | 0.114 | 55.0 | 0.124 | 75.0 | 0.007 |
| -4.0 | 0.730 | 16.0 | 0.236 | 36.0 | 0.137 | 56.0 | 0.111 | 76.0 | 0.006 |
| -3.0 | 0.797 | 17.0 | 0.172 | 37.0 | 0.159 | 57.0 | 0.097 | 77.0 | 0.006 |
| -2.0 | 0.862 | 18.0 | 0.115 | 38.0 | 0.178 | 58.0 | 0.084 | 78.0 | 0.005 |
| -1.0 | 0.915 | 19.0 | 0.065 | 39.0 | 0.194 | 59.0 | 0.072 | 79.0 | 0.004 |
| 0.0 | 0.959 | 20.0 | 0.022 | 40.0 | 0.208 | 60.0 | 0.061 | 80.0 | 0.004 |
| 1.0 | 0.986 | 21.0 | 0.013 | 41.0 | 0.218 | 61.0 | 0.050 | 81.0 | 0.003 |
| 2.0 | 0.999 | 22.0 | 0.039 | 42.0 | 0.225 | 62.0 | 0.041 | 82.0 | 0.002 |
| 3.0 | 0.998 | 23.0 | 0.058 | 43.0 | 0.230 | 63.0 | 0.032 | 83.0 | 0.001 |
| 4.0 | 0.984 | 24.0 | 0.069 | 44.0 | 0.231 | 64.0 | 0.025 | 84.0 | 0.001 |
| 5.0 | 0.958 | 25.0 | 0.073 | 45.0 | 0.230 | 65.0 | 0.018 | 85.0 | 0.000 |
| 6.0 | 0.920 | 26.0 | 0.070 | 46.0 | 0.226 | 66.0 | 0.012 | 86.0 | 0.000 |
| 7.0 | 0.872 | 27.0 | 0.062 | 47.0 | 0.220 | 67.0 | 0.007 | 87.0 | 0.000 |
| 8.0 | 0.815 | 28.0 | 0.048 | 48.0 | 0.212 | 68.0 | 0.003 | 88.0 | 0.000 |
| 9.0 | 0.751 | 29.0 | 0.031 | 49.0 | 0.202 | 69.0 | 0.000 | 89.0 | 0.000 |
| | | | | | | | | 90.0 | 0.000 |

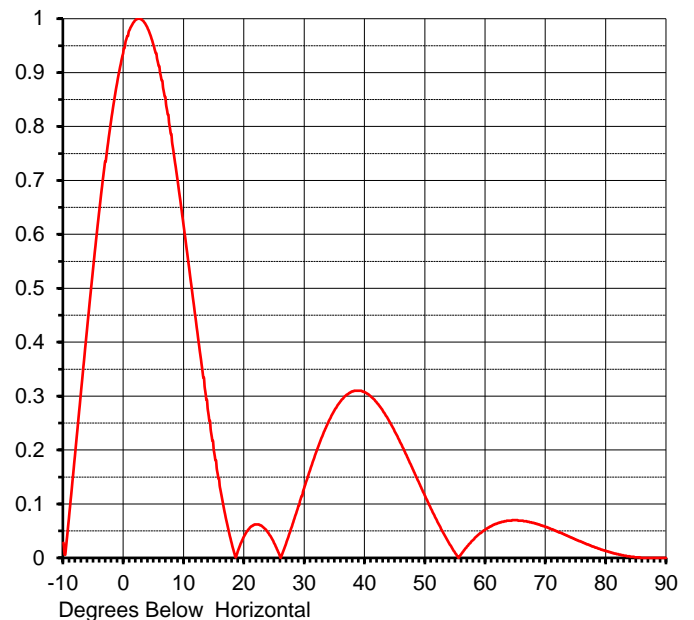
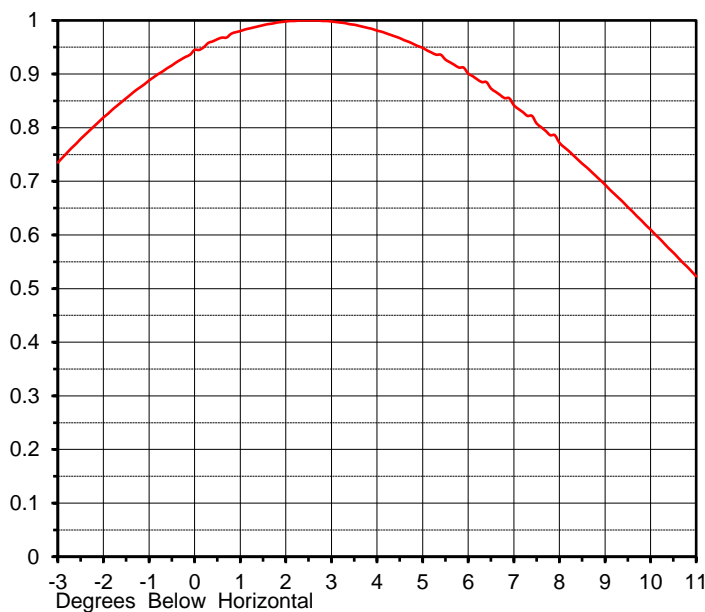
This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided.
 No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

ELEVATION PATTERN

Proposal No. **C-71266-1**
 Date **15-Aug-19**
 Call Letters **WSPA**
 Channel **11**
 Frequency **201 MHz**
 Antenna Type **TLS4-BB/VP-R**

RMS Directivity at Main Lobe **4.1 (6.09 dB)**
 RMS Directivity at Horizontal **3.6 (5.56 dB)**
Calculated

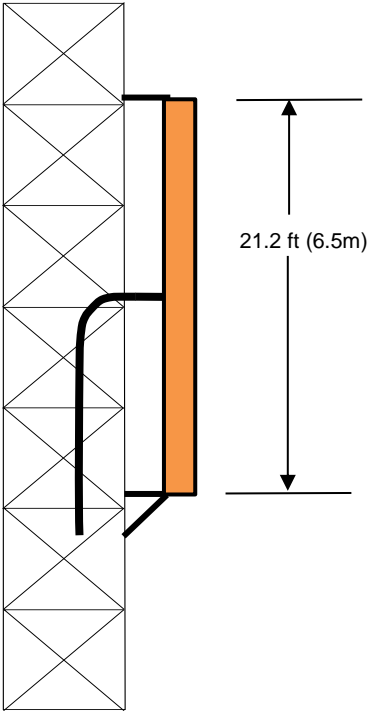
Beam Tilt **2.50 deg**
 Pattern Number **04T041250**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.028 | 10.0 | 0.610 | 30.0 | 0.133 | 50.0 | 0.114 | 70.0 | 0.057 |
| -9.0 | 0.085 | 11.0 | 0.523 | 31.0 | 0.167 | 51.0 | 0.090 | 71.0 | 0.053 |
| -8.0 | 0.201 | 12.0 | 0.436 | 32.0 | 0.199 | 52.0 | 0.067 | 72.0 | 0.048 |
| -7.0 | 0.319 | 13.0 | 0.351 | 33.0 | 0.228 | 53.0 | 0.046 | 73.0 | 0.044 |
| -6.0 | 0.435 | 14.0 | 0.270 | 34.0 | 0.254 | 54.0 | 0.026 | 74.0 | 0.039 |
| -5.0 | 0.546 | 15.0 | 0.195 | 35.0 | 0.275 | 55.0 | 0.008 | 75.0 | 0.034 |
| -4.0 | 0.650 | 16.0 | 0.128 | 36.0 | 0.291 | 56.0 | 0.008 | 76.0 | 0.029 |
| -3.0 | 0.735 | 17.0 | 0.070 | 37.0 | 0.303 | 57.0 | 0.022 | 77.0 | 0.025 |
| -2.0 | 0.819 | 18.0 | 0.022 | 38.0 | 0.309 | 58.0 | 0.034 | 78.0 | 0.020 |
| -1.0 | 0.888 | 19.0 | 0.015 | 39.0 | 0.310 | 59.0 | 0.045 | 79.0 | 0.016 |
| 0.0 | 0.945 | 20.0 | 0.041 | 40.0 | 0.307 | 60.0 | 0.053 | 80.0 | 0.013 |
| 1.0 | 0.980 | 21.0 | 0.057 | 41.0 | 0.299 | 61.0 | 0.059 | 81.0 | 0.009 |
| 2.0 | 0.998 | 22.0 | 0.062 | 42.0 | 0.287 | 62.0 | 0.064 | 82.0 | 0.007 |
| 3.0 | 0.998 | 23.0 | 0.058 | 43.0 | 0.272 | 63.0 | 0.067 | 83.0 | 0.004 |
| 4.0 | 0.981 | 24.0 | 0.046 | 44.0 | 0.254 | 64.0 | 0.069 | 84.0 | 0.002 |
| 5.0 | 0.949 | 25.0 | 0.026 | 45.0 | 0.233 | 65.0 | 0.070 | 85.0 | 0.001 |
| 6.0 | 0.901 | 26.0 | 0.000 | 46.0 | 0.211 | 66.0 | 0.069 | 86.0 | 0.000 |
| 7.0 | 0.842 | 27.0 | 0.030 | 47.0 | 0.187 | 67.0 | 0.067 | 87.0 | 0.000 |
| 8.0 | 0.772 | 28.0 | 0.063 | 48.0 | 0.163 | 68.0 | 0.065 | 88.0 | 0.000 |
| 9.0 | 0.694 | 29.0 | 0.098 | 49.0 | 0.138 | 69.0 | 0.061 | 89.0 | 0.000 |
| | | | | | | | | 90.0 | 0.000 |

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided.
 No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

MECHANICAL SPECIFICATIONS



Proposal No. **C-71266-1**
 Date **15-Aug-19**
 Call Letters **WSPA**
 Channel **7**
 Frequency **177 MHz**
 Antenna Type **TLS4-BB/VP-R**

Preliminary Specifications

Side Mounted

With ice TIA-222-G

Height AGL(z) 350 ft (106.7 m)
 Basic Wind Speed 89 m/h (143.2 km/h)

Structure Class II
 Exposure Category B
 Topography Category 5

Design Ice 0.75 in $t_{iz} = 2.13$ in
 Wind Speed w/Ice 30 m/h (48.3 km/h)

Mechanical Specifications

| | | without ice | with ice |
|-------------------------------|--------------------|---|---|
| Height | H2 | 21.2 ft (6.5m) | |
| Height of Center of Radiation | H3 | 10.6 ft (3.2m) | |
| Effective Projected Area | (EPA) _A | 18.3 ft ² (1.7m ²) | 36.4 ft ² (3.4m ²) |
| Weight | W | 500 lb (0.2t) | 1700 lb (0.8t) |

Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: JBC
 Rev. No.1 by: CAB

Date: 25-Jan-19
 Date: 15-Aug-19

ME: EE:

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric. Mechanical data is based on listed criteria and should be verified by the tower engineer.

Summary

Proposal No. **C-71266-1**
Date **15-Aug-19**
Call Letters **WSPA**
Channel **7**
Frequency **177 MHz**
Antenna Type **TLS4-BB/VP-R**

Antenna

| | Hpol | | Vpol | |
|------------|----------------|----------------------|----------------|----------------------|
| ERP: | 25.7 kW | (14.10 dBk) | 12.9 kW | (11.09 dBk) |
| Peak Gain* | 5.44 | (7.35 dB) | 2.72 | (4.34 dB) |

Antenna Input Power **4.73 kW (6.74 dBk)**

Transmission Line

| | | | |
|------------|---------------|---------------|--------------------|
| Type: | Rigid | Attenuation: | (0.41 dB) |
| Size: | 3-1/8" | Efficiency: | 90.9% |
| Impedance: | 50 Ohm | | |
| Length: | 315 ft | 96.0 m | |

Transmitter Output

5.20 kW (7.16 dBk)

Transmitter filter losses not included

* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.

Summary

| | |
|--------------|---------------------|
| Proposal No. | C-71266-1 |
| Date | 15-Aug-19 |
| Call Letters | WSPA |
| Channel | 11 |
| Frequency | 201 MHz |
| Antenna Type | TLS4-BB/VP-R |

Antenna

| | Hpol | | Vpol | |
|------------|----------------|----------------------|----------------|----------------------|
| ERP: | 33.5 kW | (15.25 dBk) | 16.8 kW | (12.24 dBk) |
| Peak Gain* | 5.85 | (7.67 dB) | 2.92 | (4.66 dB) |

| | | |
|----------------------------|----------------|---------------------|
| Antenna Input Power | 5.73 kW | (7.58 dBk) |
|----------------------------|----------------|---------------------|

Transmission Line

| | | | |
|------------|---------------|---------------|--------------------|
| Type: | Rigid | Attenuation: | (0.44 dB) |
| Size: | 3-1/8" | Efficiency: | 90.3% |
| Impedance: | 50 Ohm | | |
| Length: | 315 ft | 96.0 m | |

Transmitter Output

| | |
|----------------|---------------------|
| 6.34 kW | (8.02 dBk) |
|----------------|---------------------|

Transmitter filter losses not included

* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

This document contains proprietary and confidential information of Dielectric. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric.