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Engineering Statement
Modification of K30CV Houston, TX
For Operation on Channel 30z
August 2005

This Engineering Statement has been prepared on behalf of Broadcasting Systems, Inc., licensee of LPTV station K30CV at Houston, TX. This material has been prepared in connection with a minor modification application for this station.
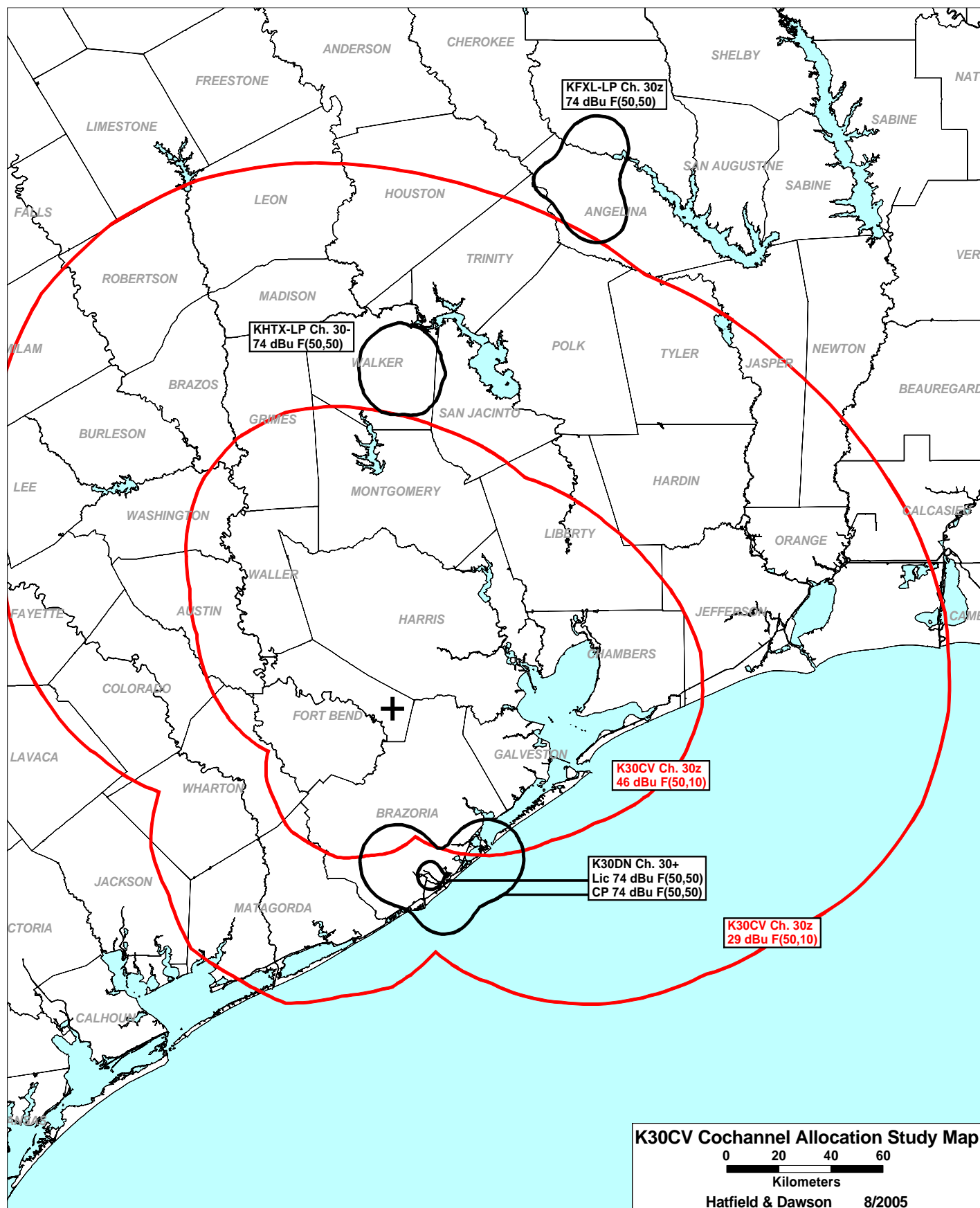
I. Allocation Study

Analog Cochannel

Study has been made of all analog cochannel operations within 400 km of the proposed Ch. 30+ operation. The attached allocation study map demonstrates that there will be no prohibited contour overlap with any authorized analog cochannel facilities other than K30DN Freeport (CP facility BPTTL-20020819AAE), KFXL-LP Lufkin, and KHTX-LP Huntsville.

(The attached allocation study map demonstrates that contour protection is provided to the K30DN license facility BLTTL-19940817IC. It is understood by this firm that the K30DN licensee has agreed to return the construction permit BMPTTL-20050520ACY, which was apparently granted in error as it did not in fact protect the prior-approved K30CV construction permit BPTTL-20010116ACJ.)

A detailed Longley-Rice interference analysis has been conducted with respect to the K30DN CP facility, KFXL-LP, and KHTX-LP. This study was conducted in accordance with OET Bulletin No.

KFXL-LP Ch. 30z
74 dBu F(50,50)

KHTX-LP Ch. 30-
74 dBu F(50,50)

K30CV Ch. 30z
46 dBu F(50,10)

K30DN Ch. 30+
Lic 74 dBu F(50,50)
CP 74 dBu F(50,50)

K30CV Ch. 30z
29 dBu F(50,10)

K30CV Cochannel Allocation Study Map

0   20   40   60

Kilometers

Hatfield & Dawson   8/2005

69, using a 0.5 km grid spacing. The results of the study indicate that no interference is predicted to be caused to the population served by either KFXL-LP or KHTX-LP.

The results of the study indicate that interference is predicted to 816 of the 77,626 persons served by the K30DN CP facility BPTTL-20020819AAE. It should be noted, however, that the K30DN CP facility BPTTL-20020819AAE was granted subsequent to the grant of the K30CV CP facility BPTTL-20010116ACJ, and that the K30DN CP facility is also subject to interference from the K30CV CP facility, amounting to 2,399 persons. Therefore, grant of the instant application will result in a <u>decrease</u> in the K30DN CP facility population which is predicted to be subject to interference from K30CV.

Analog First-Adjacent

There are no analog first-adjacent-channel facilities close enough to require detailed study.

Analog N±2,3,4

The only analog television station on Channels 26-28 or 32-34 within 32 km of the proposed facility is KRIV-TV Ch. 26 Houston. KRIV-TV operates with 5000 kW ERP from a transmitter site located just 2 km from the proposed K30CV transmitter site, and therefore the received signal from K30CV would not be expected to exceed the -23 dB D/U threshold specified in OET Bulletin No. 69. A Longley-Rice study of the interference caused to KRIV-TV (discussed below) has been conducted, and shows that no interference is predicted to be caused to that station.

Analog N+7

There are no analog television stations on Channel 37 within 100 km of the proposed facility.

Analog N-14 and N-15

There are no analog stations on Channels 15 or 16 close enough to require detailed study.

Longley-Rice Study into Digital Stations and KRIV-TV

With regard to KRIV-TV as well as the following cochannel and first-adjacent-channel digital stations, a detailed Longley-Rice interference study has been conducted to demonstrate that the proposed operation will not cause interference to these facilities:

KRIV-TV	Houston	Ch. 26
KYLE-DT	Bryan	Ch. 29
KVHP-DT	Lake Charles	Ch. 30
KMPX-DT	Decatur	Ch. 30
KABB–DT	San Antonio	Ch. 30
KHOU-DT	Houston	Ch. 31
KFXK-DT	Longview	Ch. 31

The time-shared "HDTV" computer program offered by the National Telecommunications and Information Administration's *TA Services* in Boulder, Colorado was employed as the method for coverage and interference protection. The HDTV computer program has been developed in close coordination with the Commission's OET staff, and utilizes similar methodology as the computer program used by the Commission to develop the DTV Table of Allotments. Predictions included "clipping" the extent of protected coverage as specified under §73.623(c)(2) at the Grade B contour distance for analog stations, and at the DTV coverage contour distance for DTV assignments per §73.625(b). It is believed that the HDTV program offered by *TA Services* is compliant with the FCC's OET Bulletin 69 <u>Longley-Rice Methodology for Evaluating TV Coverage and Interference</u> ("OET-69").

Study was made using the K30CV Ch. 30z technical facility described herein, including the proposed horizontal pattern. The vertical pattern used in this study comports with the Commission's Report and Order in MB Docket No. 03-185, released on September 30, 2004.

```
Undesired Station Name: K30CV    Station Type: NTSC
                 City: HOUSTON     State: TX Channel: 30

Stations that are actually interfered with.
Name            NTSC Int        HDTV Int        Population(1990)
DKVHP-DTC       4.56  sq km        0.00  sq km        21.
DKABB-DTC       0.92  sq km        0.00  sq km        64.
```

Hatfield & Dawson Consulting Engineers

The results indicate that the proposed K30CV facility is predicted to cause only *de minimus* interference to the analog and digital television stations. Specifically, no interference is predicted to be caused to KRIV-TV Houston, KYLE-DT Bryan, KMPX-DT Decatur, KHOU-DT Houston, or KFXK-DT Longview. Interference is predicted to 21 persons served by KVHP-DT and to 64 persons served by KABB-DT, but both of these figures are less than 0.5% of the population served by those stations and therefore considered to round to zero per Commission policy.

Conclusion

Based on the foregoing allocation and interference study, it is believed that the K30CV facility can operate without risk of interference to other stations. Waiver of §74.705, §74.706, and §73.707 is respectfully requested to the extent required.

II. NIER Study

OET Bulletin 65 <u>Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields</u> (Edition 97-01) states in part that:

> When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . .For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed LPTV operation will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

Power density levels produced by the proposed Channel 30 facility were calculated for an elevation of 2 meters above ground (315 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.1 at these angles, which is greater than that indicated on the manufacturer's vertical plane pattern for the horizontally-polarized SWR SWMP24MCS/30 antenna proposed in this application. This relative field value yields a worst-case adjusted peak effective radiated power of 1500 Watts at depression angles between 45 and 90 degrees below the horizontal. Assuming an average effective radiated power of 750 Watts, and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down), the highest calculated power density from the proposed antenna alone occurs at the base of the antenna support structure. At this point the power density is calculated to be 0.3 μW/cm², which is less than 1% of 378 μW/cm² (the FCC maximum at the Channel 30 visual carrier frequency for uncontrolled environments).

These calculations show that the maximum calculated worst-case power density produced at two meters above ground level by the proposed translator operation alone is less than 5% of the

applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 et seq and no further analysis of non-ionizing radiation at this site is required in this application.

Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken. The site and tower will be posted with warning signs.

The permittee/licensee in coordination with other users of the site agrees to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

III. Beam Tilt Antenna

The proposed K30CV facility will operate with an SWR SWMP24MCS/30 directional antenna with 0.98 degrees of electrical beam tilt and 1.1 degrees of mechanical beam tilt. The mechanical beam tilt is applied at an azimuth of zero degrees on the unrotated azimuth pattern for the antenna (i.e. at 30 degrees True on the rotated pattern). The manufacturer's azimuth pattern without rotation and prior to the application of mechanical beam tilt is attached as Exhibit 1.

The antenna manufacturer has calculated the effect of the mechanical beam tilt upon the azimuth pattern at the radio horizon (0.5 degrees below the horizontal at the proposed HAAT). That pattern is attached as Exhibit 2, and is the azimuth pattern specified in this application.

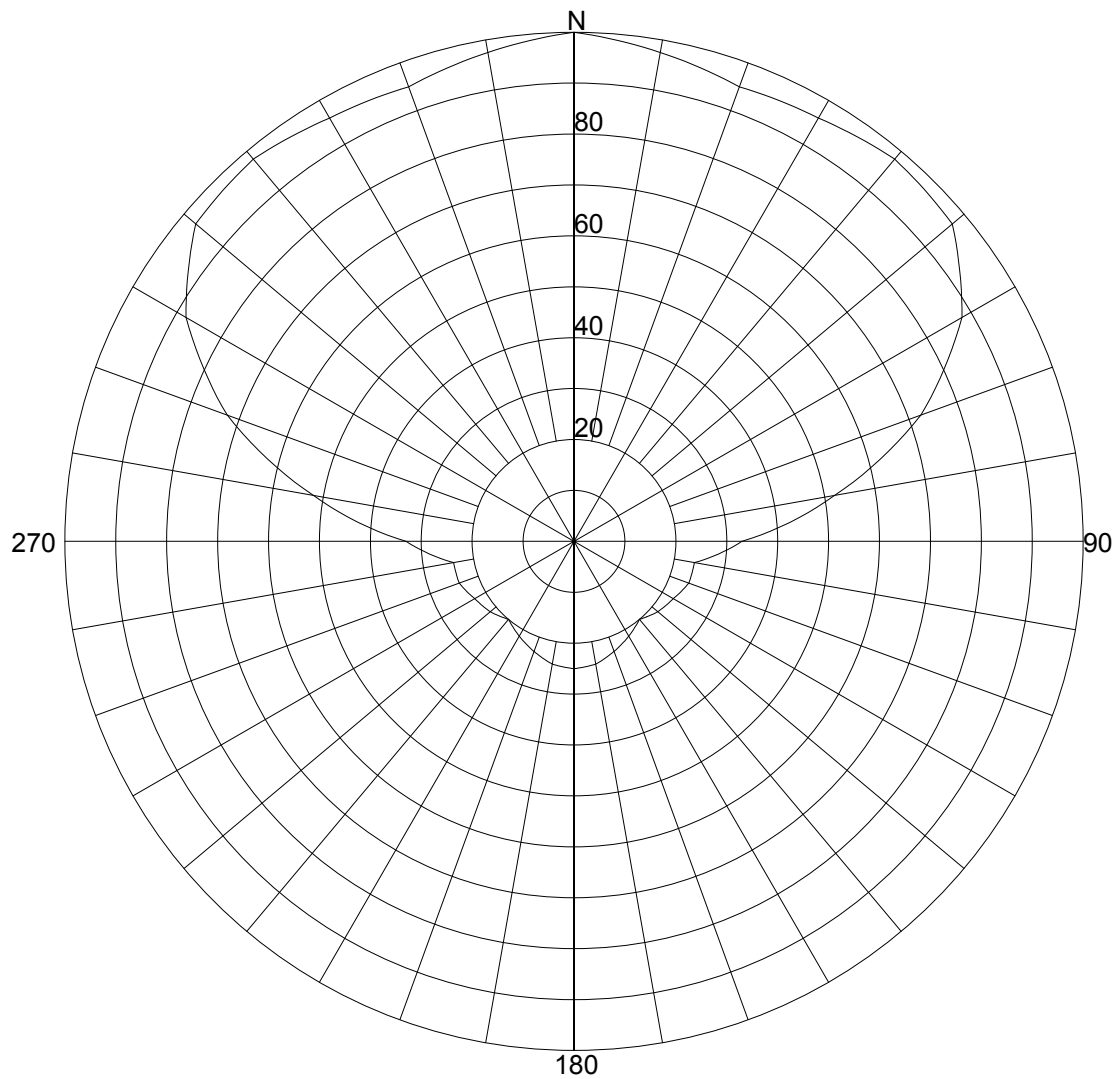Hatfield & Dawson Consulting Engineers

The peak ERP of the proposed facility at beam tilt is 150 kW (21.76 dBk), which occurs at zero degrees on the unrotated pattern (i.e. 30 degrees True on the rotated pattern). It should be noted, however, that due to the effect of the mechanical beam tilt the maximum ERP at the radio horizon does not occur at this same azimuth, occurring instead at 50 and 310 degrees on the unrotated pattern (i.e. 80 and 340 degrees True on the rotated pattern). The maximum ERP at the radio horizon is 70 kW.

Attached as Exhibits 3 and 4 are the vertical plane radiation patterns at maximum beam tilt (zero degrees on the unrotated pattern) and at the azimuth of maximum ERP at the radio horizon (50 and 310 degrees on the unrotated pattern).

It is noted that the application of 1.1 degrees of mechanical beam tilt to the 0.98 degrees electrical beam tilt antenna will result in the vertical main lobe being pointed above the radio horizon at some azimuths. However, at these azimuths (approximately 120 to 240 degrees on the unrotated pattern) the "native" relative field values of the standard azimuth pattern are particularly low, no higher than 0.250 or only 6.25% of full power. Therefore, the elevated main beam at these azimuths is not believed to have any detrimental effect on other stations, and will only result in a slight loss of power over the horizon. A waiver is not believed to be explicitly required to permit the elevated main beam at these azimuths, but is respectfully requested if so required.

August 16, 2005
Erik C. Swanson

Azimuth Pattern

N
80
60
40
20

270

90

180

Systems With Reliability

CLIENT: *K30CV*	Date: 7/15/2005
ANTENNA TYPE: SWMP24MCS/30	
FREQUENCY: 569	
PATTERN POL.: Horizontal	CIRCULARITY(+/-dB):
AZ. DIRECTIVITY: 2.47329 / 3.93dB	PATTERN RMS: *0.636*

Micro-Tek Eng. Ver. 2000

Relative Field Tabulation(Azimuth)

Azimuth Heading	Relative Field(dB)	Azimuth Heading	Relatve Field(dB)
0	1.0000 (0.01)	180	.2500 (-12.01)
5	.9875 (-0.1)	185	.2475 (-12.09)
10	.9750 (-0.21)	190	.2450 (-12.18)
15	.9625 (-0.32)	195	.2375 (-12.45)
20	.9500 (-0.44)	200	.2300 (-12.73)
25	.9550 (-0.39)	205	.2225 (-13.01)
30	.9600 (-0.35)	210	.2150 (-13.31)
35	.9700 (-0.26)	215	.2075 (-13.62)
40	.9800 (-0.17)	220	.2000 (-13.94)
45	.9750 (-0.21)	225	.2075 (-13.62)
50	.9700 (-0.26)	230	.2150 (-13.31)
55	.9250 (-0.67)	235	.2200 (-13.11)
60	.8800 (-1.1)	240	.2250 (-12.92)
65	.8025 (-1.9)	245	.2325 (-12.63)
70	.7250 (-2.78)	250	.2400 (-12.36)
75	.6225 (-4.1)	255	.2400 (-12.36)
80	.5200 (-5.66)	260	.2400 (-12.36)
85	.4250 (-7.41)	265	.2850 (-10.87)
90	.3300 (-9.6)	270	.3300 (-9.6)
95	.2850 (-10.87)	275	.4250 (-7.41)
100	.2400 (-12.36)	280	.5200 (-5.66)
105	.2400 (-12.36)	285	.6225 (-4.1)
110	.2400 (-12.36)	290	.7250 (-2.78)
115	.2325 (-12.63)	295	.8025 (-1.9)
120	.2250 (-12.92)	300	.8800 (-1.1)
125	.2200 (-13.11)	305	.9250 (-0.67)
130	.2150 (-13.31)	310	.9700 (-0.26)
135	.2075 (-13.62)	315	.9750 (-0.21)
140	.2000 (-13.94)	320	.9800 (-0.17)
145	.2075 (-13.62)	325	.9700 (-0.26)
150	.2150 (-13.31)	330	.9600 (-0.35)
155	.2225 (-13.01)	335	.9550 (-0.39)
160	.2300 (-12.73)	340	.9500 (-0.44)
165	.2375 (-12.45)	345	.9625 (-0.32)
170	.2450 (-12.18)	350	.9750 (-0.21)
175	.2475 (-12.09)	355	.9875 (-0.1)

Systems With Reliability

CLIENT: *K30CV*	Date: 7/15/2005
ANTENNA TYPE: SWMP24MCS/30	
FREQUENCY: 569	
PATTERN POL.: Horizontal	CIRCULARITY(+/-dB):
AZ. DIRECTIVITY: 2.47329 / 3.93dB	PATTERN RMS: *0.636*
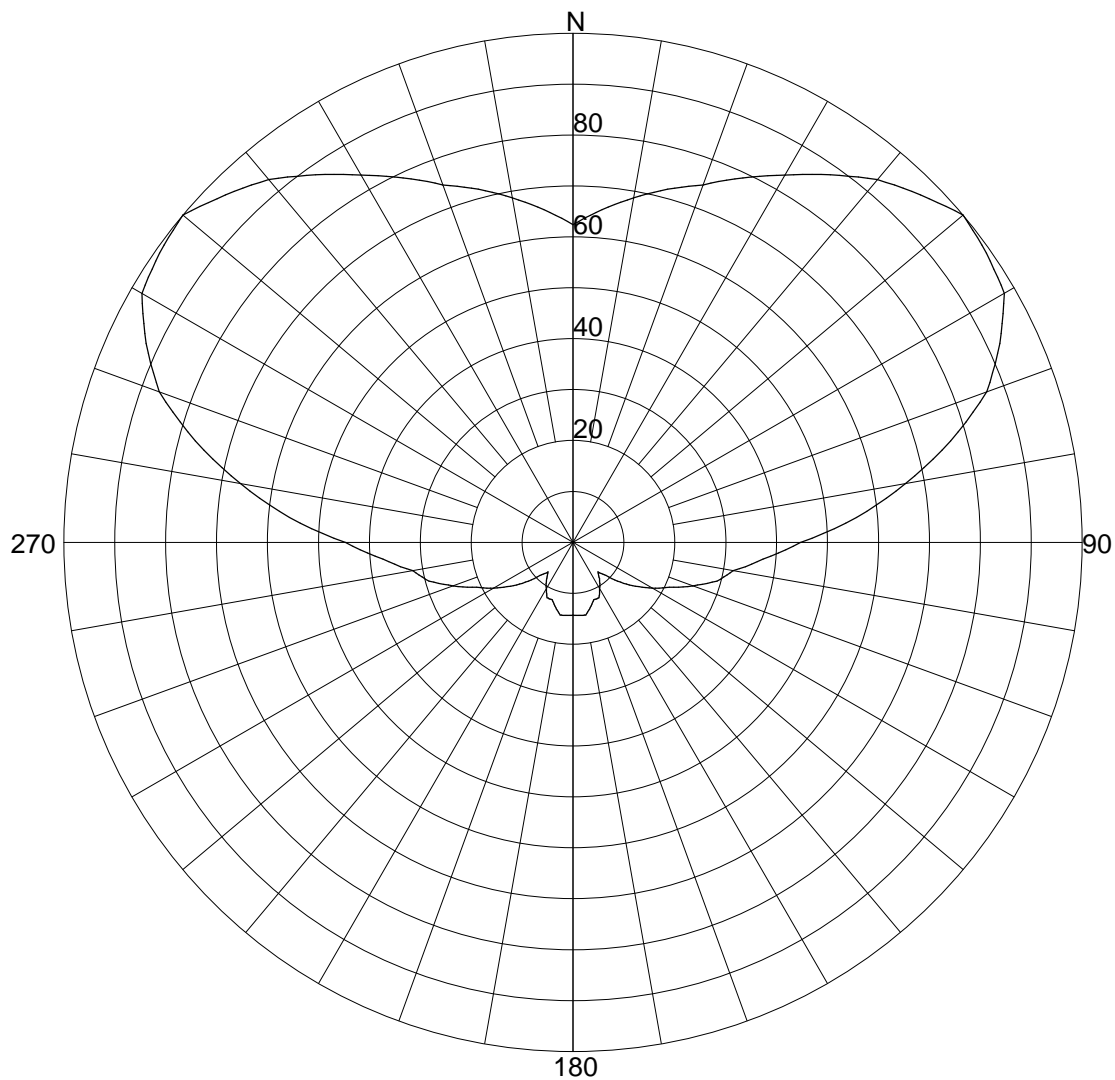
Azimuth Pattern

Scale: Linear

Systems With Reliability LLP

Unit: Relative Field

Date: 08/16/2005

CLIENT: *KC30CV*

ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Radio Horizon]

FREQUENCY: 569

PATTERN POL.: Horizontal

CIRCULARITY(+/-dB): *NA*

AZ. DIRECTIVITY: 2.81951 / 4.502dB

PATTERN RMS: *0.596*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation(Azimuth)

Azimuth Heading	Normalized Field(dB)	Azimuth Heading	Normalized Field(dB)
0	.6240 (-4.1)	180	.1430 (-16.89)
5	.6560 (-3.66)	185	.1440 (-16.83)
10	.6870 (-3.26)	190	.1450 (-16.77)
15	.7180 (-2.88)	195	.1320 (-17.59)
20	.7470 (-2.53)	200	.1200 (-18.42)
25	.7900 (-2.05)	205	.1200 (-18.42)
30	.8330 (-1.59)	210	.1050 (-19.58)
35	.8810 (-1.1)	215	.0910 (-20.82)
40	.9300 (-0.63)	220	.0760 (-22.38)
45	.9650 (-0.31)	225	.0920 (-20.72)
50	1.0000 (0)	230	.1220 (-18.27)
55	.9910 (-0.08)	235	.1500 (-16.48)
60	.9780 (-0.19)	240	.1800 (-14.89)
65	.9250 (-0.68)	245	.2086 (-13.61)
70	.8650 (-1.26)	250	.2500 (-12.04)
75	.7680 (-2.29)	255	.2930 (-10.66)
80	.6630 (-3.57)	260	.3200 (-9.9)
85	.5590 (-5.05)	265	.3750 (-8.52)
90	.4470 (-6.99)	270	.4470 (-6.99)
95	.3750 (-8.52)	275	.5590 (-5.05)
100	.3200 (-9.9)	280	.6630 (-3.57)
105	.2930 (-10.66)	285	.7680 (-2.29)
110	.2500 (-12.04)	290	.8650 (-1.26)
115	.2086 (-13.61)	295	.9250 (-0.68)
120	.1800 (-14.89)	300	.9780 (-0.19)
125	.1500 (-16.48)	305	.9910 (-0.08)
130	.1220 (-18.27)	310	1.0000 (0)
135	.0920 (-20.72)	315	.9650 (-0.31)
140	.0760 (-22.38)	320	.9300 (-0.63)
145	.0910 (-20.82)	325	.8810 (-1.1)
150	.1050 (-19.58)	330	.8330 (-1.59)
155	.1200 (-18.42)	335	.7900 (-2.05)
160	.1200 (-18.42)	340	.7470 (-2.53)
165	.1320 (-17.59)	345	.7180 (-2.88)
170	.1450 (-16.77)	350	.6870 (-3.26)
175	.1440 (-16.83)	355	.6560 (-3.66)

Systems With Reliability LLP

CLIENT: *KC30CV*

Date: 08/16/2005

ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Radio Horizon]

FREQUENCY: 569

PATTERN POL.: Horizontal

AZ. DIRECTIVITY: 2.81951 / 4.502dB

CIRCULARITY(+/-dB): *NA*

PATTERN RMS: *0.596*

Relative Field

Elevation Pattern

Scale: Linear

Systems With Reliability LLP

Units: Field, Relative

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Meh. Tilt PK]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd   Beam Tilt (Deg.) : *-2.08*

DIRECTIVITY(Horiz): 0.668/-1.754 dBd   Null Fill(s)(%) : *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
90.0	.101 (-19.894)	52.0	.019 (-34.28)	14.0	.053 (-25.586)
89.0	.117 (-18.627)	51.0	.024 (-32.541)	13.0	.01 (-39.767)
88.0	.133 (-17.524)	50.0	.043 (-27.297)	12.0	.052 (-25.664)
87.0	.149 (-16.556)	49.0	.039 (-28.235)	11.0	.048 (-26.438)
86.0	.164 (-15.707)	48.0	.015 (-36.467)	10.0	.027 (-31.445)
85.0	.178 (-14.973)	47.0	.027 (-31.493)	9.8	.042 (-27.528)
84.0	.191 (-14.362)	46.0	.041 (-27.758)	9.6	.055 (-25.168)
83.0	.202 (-13.885)	45.0	.029 (-30.813)	9.4	.065 (-23.71)
82.0	.21 (-13.566)	44.0	.012 (-38.451)	9.2	.072 (-22.909)
81.0	.213 (-13.434)	43.0	.032 (-29.942)	9.0	.074 (-22.671)
80.0	.211 (-13.532)	42.0	.03 (-30.392)	8.8	.071 (-22.982)
79.0	.201 (-13.918)	41.0	.003 (-50.493)	8.6	.064 (-23.907)
78.0	.185 (-14.675)	40.0	.028 (-31.196)	8.4	.052 (-25.626)
77.0	.16 (-15.929)	39.0	.035 (-29.228)	8.2	.037 (-28.601)
76.0	.127 (-17.894)	38.0	.011 (-39.313)	8.0	.019 (-34.369)
75.0	.089 (-20.975)	37.0	.023 (-32.78)	7.8	.003 (-50.989)
74.0	.05 (-25.963)	36.0	.035 (-29.02)	7.6	.022 (-33.187)
73.0	.03 (-30.559)	35.0	.014 (-37.148)	7.4	.042 (-27.545)
72.0	.052 (-25.717)	34.0	.021 (-33.371)	7.2	.06 (-24.413)
71.0	.078 (-22.115)	33.0	.035 (-29.002)	7.0	.075 (-22.466)
70.0	.094 (-20.579)	32.0	.013 (-37.669)	6.8	.086 (-21.288)
69.0	.093 (-20.639)	31.0	.023 (-32.616)	6.6	.092 (-20.717)
68.0	.076 (-22.356)	30.0	.035 (-29.046)	6.4	.092 (-20.698)
67.0	.048 (-26.347)	29.0	.009 (-41.225)	6.2	.087 (-21.257)
66.0	.026 (-31.686)	28.0	.028 (-30.989)	6.0	.075 (-22.508)
65.0	.042 (-27.507)	27.0	.034 (-29.403)	5.8	.058 (-24.743)
64.0	.063 (-24.036)	26.0	.00 (-67.91)	5.6	.036 (-28.789)
63.0	.067 (-23.419)	25.0	.035 (-29.217)	5.4	.011 (-38.808)
62.0	.053 (-25.578)	24.0	.029 (-30.668)	5.2	.016 (-35.9)
61.0	.025 (-32.138)	23.0	.012 (-38.452)	5.0	.043 (-27.243)
60.0	.023 (-32.644)	22.0	.04 (-27.931)	4.8	.07 (-23.145)
59.0	.048 (-26.396)	21.0	.019 (-34.336)	4.6	.093 (-20.651)
58.0	.056 (-25.036)	20.0	.027 (-31.3)	4.4	.111 (-19.074)
57.0	.042 (-27.553)	19.0	.041 (-27.751)	4.2	.124 (-18.162)
56.0	.016 (-35.915)	18.0	.002 (-53.589)	4.0	.129 (-17.819)
55.0	.03 (-30.541)	17.0	.041 (-27.646)	3.8	.125 (-18.034)
54.0	.048 (-26.361)	16.0	.031 (-30.228)	3.6	.114 (-18.879)
53.0	.043 (-27.245)	15.0	.025 (-32.098)	3.4	.094 (-20.553)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Meh. Tilt PK]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd
DIRECTIVITY(Horiz): 0.668/-1.754 dBd

Beam Tilt (Deg.) :   *-2.08*

Null Fill(s)(%) :   *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.066 (-23.58)	-4.4	.192 (-14.33)	-12.0	.045 (-27.003)
3.0	.032 (-29.858)	-4.6	.16 (-15.931)	-12.2	.044 (-27.207)
2.8	.007 (-42.669)	-4.8	.165 (-15.665)	-12.4	.05 (-25.994)
2.6	.049 (-26.235)	-5.0	.19 (-14.443)	-12.6	.06 (-24.439)
2.4	.091 (-20.824)	-5.2	.216 (-13.307)	-12.8	.069 (-23.162)
2.2	.131 (-17.659)	-5.4	.235 (-12.57)	-13.0	.077 (-22.31)
2.0	.166 (-15.598)	-5.6	.244 (-12.262)	-13.2	.08 (-21.889)
1.8	.193 (-14.267)	-5.8	.241 (-12.357)	-13.4	.081 (-21.882)
1.6	.211 (-13.518)	-6.0	.228 (-12.833)	-13.6	.077 (-22.282)
1.4	.216 (-13.308)	-6.2	.207 (-13.672)	-13.8	.07 (-23.096)
1.2	.207 (-13.671)	-6.4	.181 (-14.855)	-14.0	.061 (-24.334)
1.0	.183 (-14.743)	-6.6	.153 (-16.314)	-14.2	.05 (-25.962)
.8	.143 (-16.872)	-6.8	.128 (-17.845)	-14.4	.041 (-27.741)
.6	.088 (-21.123)	-7.0	.112 (-18.987)	-14.6	.036 (-28.904)
.4	.018 (-35.108)	-7.2	.109 (-19.231)	-14.8	.037 (-28.567)
.2	.066 (-23.601)	-7.4	.117 (-18.647)	-15.0	.044 (-27.167)
.0	.161 (-15.874)	-7.6	.129 (-17.782)	-15.2	.052 (-25.673)
-.2	.264 (-11.57)	-7.8	.14 (-17.047)	-15.4	.06 (-24.508)
-.4	.372 (-8.585)	-8.0	.148 (-16.613)	-15.6	.065 (-23.759)
-.6	.482 (-6.339)	-8.2	.149 (-16.533)	-15.8	.067 (-23.423)
-.8	.59 (-4.588)	-8.4	.144 (-16.827)	-16.0	.067 (-23.488)
-1.0	.691 (-3.207)	-8.6	.133 (-17.511)	-16.2	.063 (-23.95)
-1.2	.783 (-2.121)	-8.8	.117 (-18.611)	-16.4	.057 (-24.817)
-1.4	.862 (-1.286)	-9.0	.098 (-20.147)	-16.6	.05 (-26.094)
-1.6	.925 (-0.673)	-9.2	.079 (-22.078)	-16.8	.041 (-27.718)
-1.8	.97 (-0.261)	-9.4	.063 (-24.055)	-17.0	.034 (-29.37)
-2.0	.996 (-0.039)	-9.6	.056 (-25.057)	-17.2	.031 (-30.217)
-2.2	1.00 (0)	-9.8	.061 (-24.339)	-17.4	.033 (-29.596)
-2.4	.984 (-0.143)	-10.0	.072 (-22.807)	-17.6	.039 (-28.14)
-2.6	.947 (-0.47)	-10.2	.085 (-21.403)	-17.8	.046 (-26.695)
-2.8	.893 (-0.987)	-10.4	.095 (-20.415)	-18.0	.053 (-25.591)
-3.0	.822 (-1.707)	-10.6	.101 (-19.874)	-18.2	.057 (-24.892)
-3.2	.737 (-2.647)	-10.8	.103 (-19.762)	-18.4	.059 (-24.592)
-3.4	.643 (-3.832)	-11.0	.099 (-20.067)	-18.6	.058 (-24.681)
-3.6	.543 (-5.298)	-11.2	.091 (-20.792)	-18.8	.055 (-25.16)
-3.8	.442 (-7.087)	-11.4	.08 (-21.95)	-19.0	.05 (-26.037)
-4.0	.345 (-9.245)	-11.6	.067 (-23.538)	-19.2	.043 (-27.314)
-4.2	.258 (-11.759)	-11.8	.054 (-25.419)	-19.4	.036 (-28.921)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Meh. Tilt PK]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd   Beam Tilt (Deg.) :   *-2.08*
DIRECTIVITY(Horiz): 0.668/-1.754 dBd   Null Fill(s)(%) :   *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.03 (-30.511)	-27.2	.03 (-30.396)	-54.0	.019 (-34.528)
-19.8	.027 (-31.228)	-27.4	.024 (-32.455)	-55.0	.009 (-40.452)
-20.0	.03 (-30.491)	-27.6	.016 (-35.738)	-56.0	.03 (-30.487)
-20.2	.036 (-28.985)	-27.8	.008 (-41.834)	-57.0	.037 (-28.683)
-20.4	.042 (-27.521)	-28.0	.00 (-66.844)	-58.0	.027 (-31.304)
-20.6	.048 (-26.401)	-28.2	.009 (-41.026)	-59.0	.009 (-41.293)
-20.8	.052 (-25.683)	-28.4	.017 (-35.502)	-60.0	.019 (-34.232)
-21.0	.054 (-25.367)	-28.6	.024 (-32.481)	-61.0	.035 (-29.202)
-21.2	.053 (-25.449)	-28.8	.03 (-30.602)	-62.0	.038 (-28.453)
-21.4	.05 (-25.951)	-29.0	.034 (-29.439)	-63.0	.028 (-30.933)
-21.6	.045 (-26.925)	-29.2	.036 (-28.811)	-64.0	.012 (-38.36)
-21.8	.038 (-28.489)	-29.4	.037 (-28.636)	-65.0	.015 (-36.55)
-22.0	.029 (-30.894)	-29.6	.036 (-28.89)	-66.0	.031 (-30.282)
-22.2	.018 (-34.782)	-29.8	.033 (-29.593)	-67.0	.04 (-28.055)
-22.4	.007 (-42.733)	-30.0	.029 (-30.821)	-68.0	.039 (-28.109)
-22.6	.004 (-48.44)	-31.0	.007 (-43.335)	-69.0	.031 (-30.209)
-22.8	.014 (-36.905)	-32.0	.034 (-29.404)	-70.0	.018 (-35.091)
-23.0	.024 (-32.478)	-33.0	.025 (-32.073)	-71.0	.01 (-40.248)
-23.2	.032 (-29.958)	-34.0	.009 (-40.782)	-72.0	.02 (-33.797)
-23.4	.038 (-28.428)	-35.0	.033 (-29.592)	-73.0	.032 (-29.847)
-23.6	.042 (-27.563)	-36.0	.024 (-32.349)	-74.0	.04 (-27.985)
-23.8	.044 (-27.226)	-37.0	.008 (-42.088)	-75.0	.043 (-27.374)
-24.0	.043 (-27.366)	-38.0	.032 (-29.915)	-76.0	.041 (-27.677)
-24.2	.04 (-27.988)	-39.0	.026 (-31.577)	-77.0	.037 (-28.752)
-24.4	.035 (-29.157)	-40.0	.003 (-50.893)	-78.0	.03 (-30.561)
-24.6	.028 (-31.033)	-41.0	.029 (-30.641)	-79.0	.022 (-33.107)
-24.8	.02 (-34.006)	-42.0	.031 (-30.214)	-80.0	.015 (-36.248)
-25.0	.011 (-39.26)	-43.0	.007 (-43.337)	-81.0	.011 (-38.873)
-25.2	.001 (-56.955)	-44.0	.023 (-32.761)	-82.0	.011 (-38.872)
-25.4	.008 (-41.948)	-45.0	.035 (-29.116)	-83.0	.014 (-37.288)
-25.6	.017 (-35.477)	-46.0	.021 (-33.713)	-84.0	.016 (-35.913)
-25.8	.025 (-32.157)	-47.0	.01 (-40.107)	-85.0	.018 (-35.1)
-26.0	.031 (-30.141)	-48.0	.034 (-29.271)	-86.0	.018 (-34.792)
-26.2	.036 (-28.908)	-49.0	.038 (-28.479)	-87.0	.018 (-34.907)
-26.4	.039 (-28.248)	-50.0	.018 (-34.7)	-88.0	.017 (-35.387)
-26.6	.04 (-28.068)	-51.0	.011 (-38.862)	-89.0	.015 (-36.21)
-26.8	.038 (-28.341)	-52.0	.033 (-29.68)	-90.0	.014 (-37.386)
-27.0	.035 (-29.089)	-53.0	.035 (-29.057)	90.0	.00 (-50)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [Pattern @ Meh. Tilt PK]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd
DIRECTIVITY(Horiz): 0.668/-1.754 dBd

Beam Tilt (Deg.) :   *-2.08*
Null Fill(s)(%) :   *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field

Elevation Pattern

Scale: Linear

Systems With Reliability LLP

Units: Field, Relative

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [@ Peak of Radio Horizon]
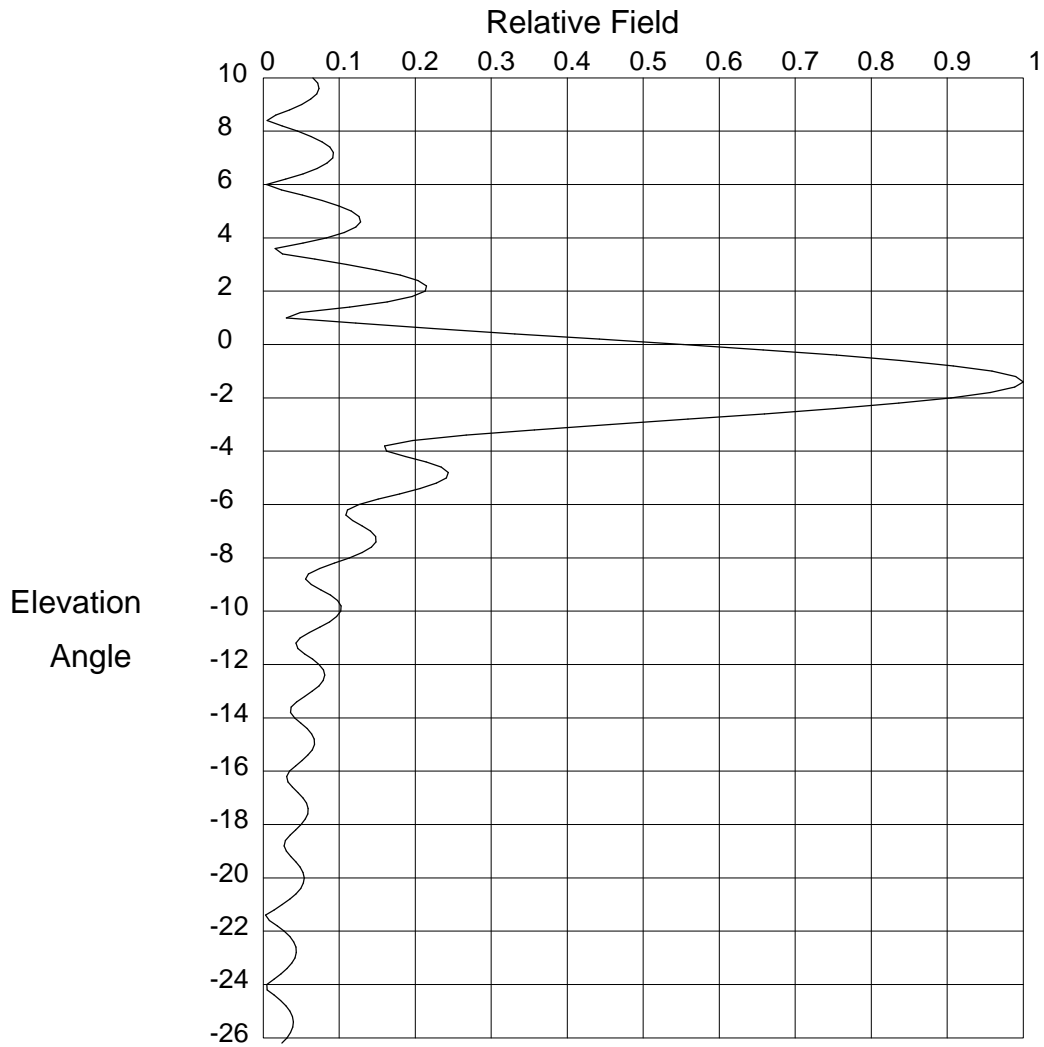FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd   Beam Tilt (Deg.) :   *-1.34*

DIRECTIVITY(Horiz): 7.8108/8.926 dBd   Null Fill(s)(%) :   *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
90.0	.101 (-19.907)	52.0	.014 (-37.112)	14.0	.036 (-28.974)
89.0	.117 (-18.64)	51.0	.03 (-30.466)	13.0	.03 (-30.472)
88.0	.133 (-17.537)	50.0	.044 (-27.065)	12.0	.06 (-24.384)
87.0	.148 (-16.569)	49.0	.033 (-29.617)	11.0	.007 (-43.227)
86.0	.164 (-15.721)	48.0	.012 (-38.475)	10.0	.066 (-23.664)
85.0	.178 (-14.989)	47.0	.033 (-29.676)	9.8	.072 (-22.896)
84.0	.191 (-14.381)	46.0	.04 (-27.995)	9.6	.073 (-22.699)
83.0	.202 (-13.909)	45.0	.021 (-33.515)	9.4	.07 (-23.066)
82.0	.209 (-13.598)	44.0	.018 (-34.934)	9.2	.063 (-24.072)
81.0	.212 (-13.478)	43.0	.034 (-29.277)	9.0	.051 (-25.923)
80.0	.209 (-13.594)	42.0	.023 (-32.643)	8.8	.035 (-29.154)
79.0	.199 (-14.005)	41.0	.008 (-41.687)	8.6	.016 (-35.703)
78.0	.182 (-14.799)	40.0	.033 (-29.541)	8.4	.005 (-45.93)
77.0	.156 (-16.11)	39.0	.029 (-30.724)	8.2	.025 (-31.966)
76.0	.124 (-18.166)	38.0	.002 (-55.219)	8.0	.045 (-26.896)
75.0	.085 (-21.405)	37.0	.031 (-30.141)	7.8	.063 (-23.999)
74.0	.046 (-26.663)	36.0	.031 (-30.23)	7.6	.078 (-22.2)
73.0	.03 (-30.377)	35.0	.00 (-74.698)	7.4	.088 (-21.142)
72.0	.055 (-25.222)	34.0	.031 (-30.211)	7.2	.092 (-20.686)
71.0	.08 (-21.886)	33.0	.03 (-30.358)	7.0	.091 (-20.794)
70.0	.094 (-20.555)	32.0	.002 (-53.084)	6.8	.084 (-21.51)
69.0	.091 (-20.821)	31.0	.033 (-29.664)	6.6	.071 (-22.983)
68.0	.072 (-22.815)	30.0	.028 (-31.1)	6.4	.052 (-25.599)
67.0	.043 (-27.248)	29.0	.009 (-41.363)	6.2	.03 (-30.554)
66.0	.026 (-31.718)	28.0	.036 (-28.871)	6.0	.004 (-47.12)
65.0	.046 (-26.782)	27.0	.022 (-33.078)	5.8	.024 (-32.306)
64.0	.065 (-23.804)	26.0	.018 (-34.701)	5.6	.052 (-25.725)
63.0	.066 (-23.635)	25.0	.038 (-28.38)	5.4	.077 (-22.228)
62.0	.048 (-26.409)	24.0	.012 (-38.623)	5.2	.099 (-20.055)
61.0	.02 (-34.073)	23.0	.03 (-30.35)	5.0	.116 (-18.707)
60.0	.028 (-30.964)	22.0	.036 (-28.911)	4.8	.126 (-17.994)
59.0	.051 (-25.862)	21.0	.005 (-46.893)	4.6	.128 (-17.85)
58.0	.054 (-25.276)	20.0	.041 (-27.728)	4.4	.122 (-18.294)
57.0	.036 (-28.813)	19.0	.025 (-31.896)	4.2	.107 (-19.441)
56.0	.014 (-37.177)	18.0	.025 (-32.061)	4.0	.083 (-21.588)
55.0	.035 (-29.067)	17.0	.044 (-27.191)	3.8	.053 (-25.591)
54.0	.049 (-26.207)	16.0	.003 (-51.028)	3.6	.016 (-35.948)
53.0	.038 (-28.294)	15.0	.048 (-26.328)	3.4	.025 (-31.891)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [@ Peak of Radio Horizon]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd
DIRECTIVITY(Horiz): 7.8108/8.926 dBd

Beam Tilt (Deg.) : *-1.34*
Null Fill(s)(%) : *15, 10, 5*

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
3.2	.068 (-23.344)	-4.4	.214 (-13.376)	-12.0	.074 (-22.667)
3.0	.11 (-19.174)	-4.6	.234 (-12.603)	-12.2	.079 (-22.029)
2.8	.148 (-16.573)	-4.8	.243 (-12.274)	-12.4	.081 (-21.828)
2.6	.18 (-14.874)	-5.0	.241 (-12.363)	-12.6	.079 (-22.051)
2.4	.203 (-13.831)	-5.2	.228 (-12.845)	-12.8	.073 (-22.699)
2.2	.215 (-13.351)	-5.4	.206 (-13.703)	-13.0	.065 (-23.784)
2.0	.213 (-13.432)	-5.6	.18 (-14.916)	-13.2	.054 (-25.302)
1.8	.196 (-14.156)	-5.8	.151 (-16.414)	-13.4	.044 (-27.123)
1.6	.163 (-15.758)	-6.0	.126 (-17.973)	-13.6	.037 (-28.675)
1.4	.114 (-18.879)	-6.2	.111 (-19.096)	-13.8	.036 (-28.892)
1.2	.049 (-26.202)	-6.4	.109 (-19.262)	-14.0	.041 (-27.684)
1.0	.03 (-30.372)	-6.6	.117 (-18.606)	-14.2	.05 (-26.105)
.8	.122 (-18.282)	-6.8	.13 (-17.715)	-14.4	.058 (-24.795)
.6	.223 (-13.025)	-7.0	.141 (-16.992)	-14.6	.064 (-23.91)
.4	.331 (-9.598)	-7.2	.148 (-16.594)	-14.8	.067 (-23.458)
.2	.442 (-7.088)	-7.4	.148 (-16.567)	-15.0	.067 (-23.425)
.0	.552 (-5.156)	-7.6	.142 (-16.929)	-15.2	.065 (-23.804)
-.2	.658 (-3.64)	-7.8	.13 (-17.7)	-15.4	.059 (-24.602)
-.4	.754 (-2.448)	-8.0	.113 (-18.905)	-15.6	.051 (-25.827)
-.6	.839 (-1.527)	-8.2	.094 (-20.565)	-15.8	.042 (-27.44)
-.8	.908 (-0.84)	-8.4	.074 (-22.599)	-16.0	.035 (-29.174)
-1.0	.959 (-0.365)	-8.6	.06 (-24.503)	-16.2	.031 (-30.223)
-1.2	.99 (-0.087)	-8.8	.056 (-25.075)	-16.4	.033 (-29.755)
-1.4	1.00 (0)	-9.0	.063 (-23.971)	-16.6	.038 (-28.296)
-1.6	.989 (-0.099)	-9.2	.076 (-22.375)	-16.8	.046 (-26.793)
-1.8	.957 (-0.386)	-9.4	.089 (-21.056)	-17.0	.052 (-25.636)
-2.0	.905 (-0.867)	-9.6	.098 (-20.194)	-17.2	.057 (-24.899)
-2.2	.836 (-1.552)	-9.8	.102 (-19.79)	-17.4	.059 (-24.58)
-2.4	.753 (-2.46)	-10.0	.102 (-19.824)	-17.6	.058 (-24.665)
-2.6	.66 (-3.615)	-10.2	.097 (-20.289)	-17.8	.055 (-25.155)
-2.8	.559 (-5.051)	-10.4	.087 (-21.194)	-18.0	.05 (-26.06)
-3.0	.456 (-6.814)	-10.6	.075 (-22.553)	-18.2	.043 (-27.383)
-3.2	.357 (-8.952)	-10.8	.061 (-24.332)	-18.4	.035 (-29.042)
-3.4	.267 (-11.47)	-11.0	.049 (-26.246)	-18.6	.029 (-30.642)
-3.6	.197 (-14.121)	-11.2	.043 (-27.364)	-18.8	.027 (-31.244)
-3.8	.16 (-15.919)	-11.4	.046 (-26.789)	-19.0	.03 (-30.343)
-4.0	.162 (-15.789)	-11.6	.055 (-25.248)	-19.2	.036 (-28.77)
-4.2	.187 (-14.558)	-11.8	.065 (-23.757)	-19.4	.043 (-27.315)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [@ Peak of Radio Horizon]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd   Beam Tilt (Deg.) :   *-1.34*

DIRECTIVITY(Horiz): 7.8108/8.926 dBd   Null Fill(s)(%) :   *15, 10, 5*

Micro-Tek Eng. Ve. 2.5

Relative Field Tabulation

Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)	Elev. Angle	Rel. Fld(dB)
-19.6	.049 (-26.241)	-27.2	.017 (-35.346)	-54.0	.036 (-28.987)
-19.8	.053 (-25.588)	-27.4	.024 (-32.301)	-55.0	.037 (-28.73)
-20.0	.054 (-25.353)	-27.6	.03 (-30.426)	-56.0	.019 (-34.227)
-20.2	.053 (-25.536)	-27.8	.034 (-29.284)	-57.0	.011 (-38.835)
-20.4	.049 (-26.167)	-28.0	.037 (-28.69)	-58.0	.032 (-29.769)
-20.6	.043 (-27.317)	-28.2	.037 (-28.568)	-59.0	.041 (-27.758)
-20.8	.035 (-29.14)	-28.4	.036 (-28.896)	-60.0	.033 (-29.717)
-21.0	.025 (-31.987)	-28.6	.033 (-29.706)	-61.0	.013 (-37.442)
-21.2	.014 (-36.873)	-28.8	.028 (-31.09)	-62.0	.018 (-35.003)
-21.4	.003 (-50.242)	-29.0	.022 (-33.267)	-63.0	.037 (-28.721)
-21.6	.008 (-41.792)	-29.2	.014 (-36.779)	-64.0	.045 (-26.959)
-21.8	.019 (-34.64)	-29.4	.007 (-43.599)	-65.0	.04 (-27.997)
-22.0	.028 (-31.164)	-29.6	.002 (-56.265)	-66.0	.024 (-32.292)
-22.2	.035 (-29.112)	-29.8	.01 (-40.414)	-67.0	.011 (-39.498)
-22.4	.04 (-27.897)	-30.0	.017 (-35.393)	-68.0	.026 (-31.829)
-22.6	.043 (-27.291)	-31.0	.036 (-28.962)	-69.0	.042 (-27.507)
-22.8	.044 (-27.201)	-32.0	.015 (-36.404)	-70.0	.051 (-25.845)
-23.0	.042 (-27.603)	-33.0	.021 (-33.594)	-71.0	.051 (-25.857)
-23.2	.037 (-28.536)	-34.0	.034 (-29.311)	-72.0	.043 (-27.32)
-23.4	.031 (-30.119)	-35.0	.012 (-38.288)	-73.0	.03 (-30.409)
-23.6	.023 (-32.636)	-36.0	.022 (-33.244)	-74.0	.018 (-35.037)
-23.8	.014 (-36.866)	-37.0	.034 (-29.417)	-75.0	.018 (-34.987)
-24.0	.005 (-46.545)	-38.0	.013 (-37.631)	-76.0	.029 (-30.798)
-24.2	.005 (-45.947)	-39.0	.02 (-34.037)	-77.0	.04 (-28.049)
-24.4	.014 (-36.854)	-40.0	.035 (-29.234)	-78.0	.047 (-26.545)
-24.6	.023 (-32.853)	-41.0	.018 (-34.785)	-79.0	.051 (-25.879)
-24.8	.03 (-30.511)	-42.0	.014 (-36.911)	-80.0	.051 (-25.821)
-25.0	.035 (-29.08)	-43.0	.035 (-29.128)	-81.0	.049 (-26.23)
-25.2	.039 (-28.285)	-44.0	.027 (-31.352)	-82.0	.045 (-27.013)
-25.4	.04 (-28.006)	-45.0	.004 (-48.242)	-83.0	.039 (-28.1)
-25.6	.039 (-28.202)	-46.0	.032 (-29.794)	-84.0	.034 (-29.426)
-25.8	.036 (-28.888)	-47.0	.04 (-28.058)	-85.0	.028 (-30.925)
-26.0	.031 (-30.141)	-48.0	.02 (-33.773)	-86.0	.024 (-32.525)
-26.2	.025 (-32.149)	-49.0	.012 (-38.628)	-87.0	.02 (-34.15)
-26.4	.017 (-35.37)	-50.0	.035 (-29.201)	-88.0	.016 (-35.732)
-26.6	.009 (-41.33)	-51.0	.035 (-29.007)	-89.0	.014 (-37.226)
-26.8	.00 (-72.49)	-52.0	.015 (-36.387)	-90.0	.012 (-38.628)
-27.0	.009 (-40.971)	-53.0	.016 (-36.066)	90.0	.00 (-50)

Systems With Reliability LLP

Date: 08/15/2005

CLIENT: *K30CV*
ANTENNA TYPE: SWMP24MCS/30 [@ Peak of Radio Horizon]
FREQUENCY: 569
PATTERN POL.: Horizontal
DIRECTIVITY(Peak): 25.821/14.12 dBd
DIRECTIVITY(Horiz): 7.8108/8.926 dBd

Beam Tilt (Deg.) :   *-1.34*

Null Fill(s)(%) :   *15, 10, 5*