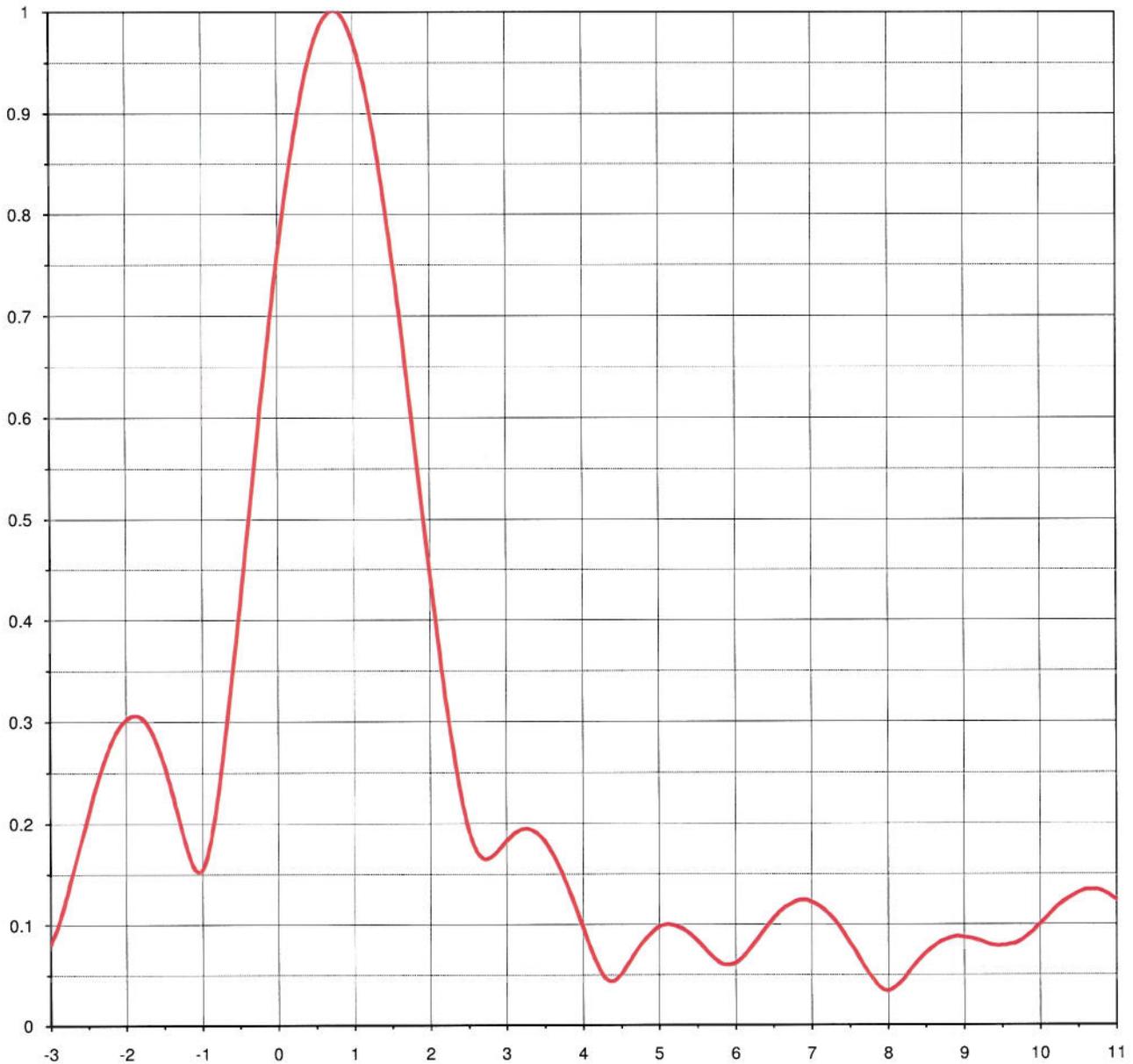




Proposal Number	C-03812	Revision:	4
Date	14-Oct-09		
Call Letters	WCCO-DT	Channel	32
Location	St Paul, MN		
Customer			
Antenna Type	TUM20-C4SP-14/50-1-R-S		

ELEVATION PATTERN

RMS Gain at Main Lobe	28.40 (14.53 dB)	Beam Tilt	0.70 deg
RMS Gain at Horizontal	16.30 (12.12 dB)	Frequency	581.00 MHz
Calculated / Measured	Calculated	Drawing #	14U284070



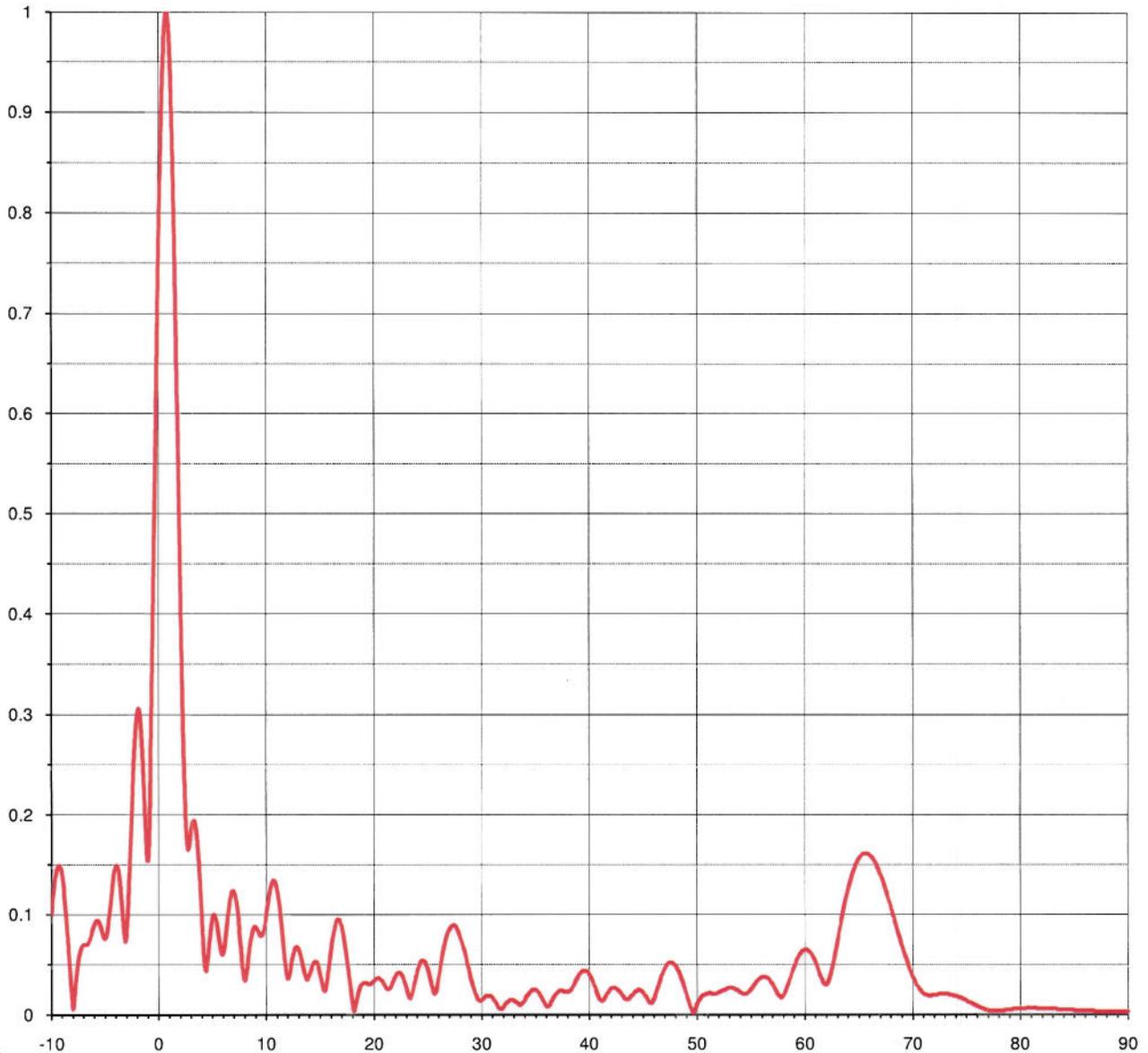
Degrees Below Horizontal



Proposal Number **C-03812** Revision: **4**
Date **14-Oct-09**
Call Letters **WCCO-DT** Channel **32**
Location **St Paul, MN**
Customer
Antenna Type **TUM20-C4SP-14/50-1-R-S**

ELEVATION PATTERN

RMS Gain at Main Lobe	28.40 (14.53 dB)	Beam Tilt	0.70 deg
RMS Gain at Horizontal	16.30 (12.12 dB)	Frequency	581.00 MHz
Calculated / Measured	Calculated	Drawing #	14U284070-90



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Proposal Number **C-03812** Revision: **4**
 Date **14-Oct-09**
 Call Letters **WCCO-DT** Channel **32**
 Location **St Paul, MN**
 Customer
 Antenna Type **TUM20-C4SP-14/50-1-R-S**

TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **14U284070-90**

Angle	Field										
-10.0	0.100	2.4	0.228	10.6	0.131	30.5	0.019	51.0	0.021	71.5	0.019
-9.5	0.145	2.6	0.173	10.8	0.134	31.0	0.018	51.5	0.021	72.0	0.020
-9.0	0.138	2.8	0.167	11.0	0.129	31.5	0.010	52.0	0.022	72.5	0.021
-8.5	0.080	3.0	0.183	11.5	0.088	32.0	0.006	52.5	0.024	73.0	0.021
-8.0	0.006	3.2	0.194	12.0	0.038	32.5	0.013	53.0	0.027	73.5	0.020
-7.5	0.054	3.4	0.190	12.5	0.055	33.0	0.015	53.5	0.026	74.0	0.019
-7.0	0.070	3.6	0.170	13.0	0.067	33.5	0.011	54.0	0.023	74.5	0.017
-6.5	0.073	3.8	0.137	13.5	0.048	34.0	0.013	54.5	0.021	75.0	0.014
-6.0	0.090	4.0	0.097	14.0	0.037	34.5	0.022	55.0	0.024	75.5	0.011
-5.5	0.090	4.2	0.058	14.5	0.052	35.0	0.025	55.5	0.031	76.0	0.009
-5.0	0.076	4.4	0.044	15.0	0.045	35.5	0.020	56.0	0.037	76.5	0.006
-4.5	0.112	4.6	0.062	15.5	0.024	36.0	0.010	56.5	0.037	77.0	0.004
-4.0	0.149	4.8	0.084	16.0	0.057	36.5	0.012	57.0	0.032	77.5	0.004
-3.5	0.117	5.0	0.098	16.5	0.090	37.0	0.021	57.5	0.022	78.0	0.004
-3.0	0.081	5.2	0.099	17.0	0.091	37.5	0.024	58.0	0.018	78.5	0.004
-2.8	0.124	5.4	0.091	17.5	0.062	38.0	0.023	58.5	0.029	79.0	0.005
-2.6	0.180	5.6	0.076	18.0	0.019	38.5	0.027	59.0	0.045	79.5	0.006
-2.4	0.235	5.8	0.062	18.5	0.016	39.0	0.037	59.5	0.058	80.0	0.006
-2.2	0.278	6.0	0.062	19.0	0.031	39.5	0.044	60.0	0.064	80.5	0.006
-2.0	0.302	6.2	0.077	19.5	0.031	40.0	0.042	60.5	0.063	81.0	0.007
-1.8	0.304	6.4	0.097	20.0	0.033	40.5	0.030	61.0	0.055	81.5	0.006
-1.6	0.279	6.6	0.114	20.5	0.037	41.0	0.016	61.5	0.040	82.0	0.006
-1.4	0.232	6.8	0.123	21.0	0.031	41.5	0.016	62.0	0.030	82.5	0.006
-1.2	0.175	7.0	0.122	21.5	0.026	42.0	0.025	62.5	0.041	83.0	0.006
-1.0	0.154	7.2	0.112	22.0	0.037	42.5	0.027	63.0	0.066	83.5	0.005
-0.8	0.222	7.4	0.094	22.5	0.042	43.0	0.022	63.5	0.094	84.0	0.005
-0.6	0.345	7.6	0.070	23.0	0.030	43.5	0.016	64.0	0.119	84.5	0.005
-0.4	0.487	7.8	0.046	23.5	0.017	44.0	0.019	64.5	0.143	85.0	0.004
-0.2	0.628	8.0	0.034	24.0	0.038	44.5	0.024	65.0	0.156	85.5	0.004
0.0	0.758	8.2	0.045	24.5	0.054	45.0	0.023	65.5	0.161	86.0	0.004
0.2	0.866	8.4	0.064	25.0	0.048	45.5	0.015	66.0	0.160	86.5	0.004
0.4	0.946	8.6	0.078	25.5	0.027	46.0	0.014	66.5	0.153	87.0	0.003
0.6	0.991	8.8	0.086	26.0	0.031	46.5	0.029	67.0	0.141	87.5	0.003
0.8	1.000	9.0	0.087	26.5	0.062	47.0	0.044	67.5	0.125	88.0	0.003
1.0	0.971	9.2	0.084	27.0	0.083	47.5	0.052	68.0	0.107	88.5	0.003
1.2	0.908	9.4	0.079	27.5	0.090	48.0	0.050	68.5	0.088	89.0	0.003
1.4	0.815	9.6	0.080	28.0	0.080	48.5	0.040	69.0	0.069	89.5	0.003
1.6	0.701	9.8	0.082	28.5	0.064	49.0	0.024	69.5	0.053	90.0	0.003
1.8	0.574	10.0	0.093	29.0	0.041	49.5	0.007	70.0	0.038		
2.0	0.445	10.2	0.108	29.5	0.021	50.0	0.008	70.5	0.028		
2.2	0.324	10.4	0.122	30.0	0.014	50.5	0.018	71.0	0.021		

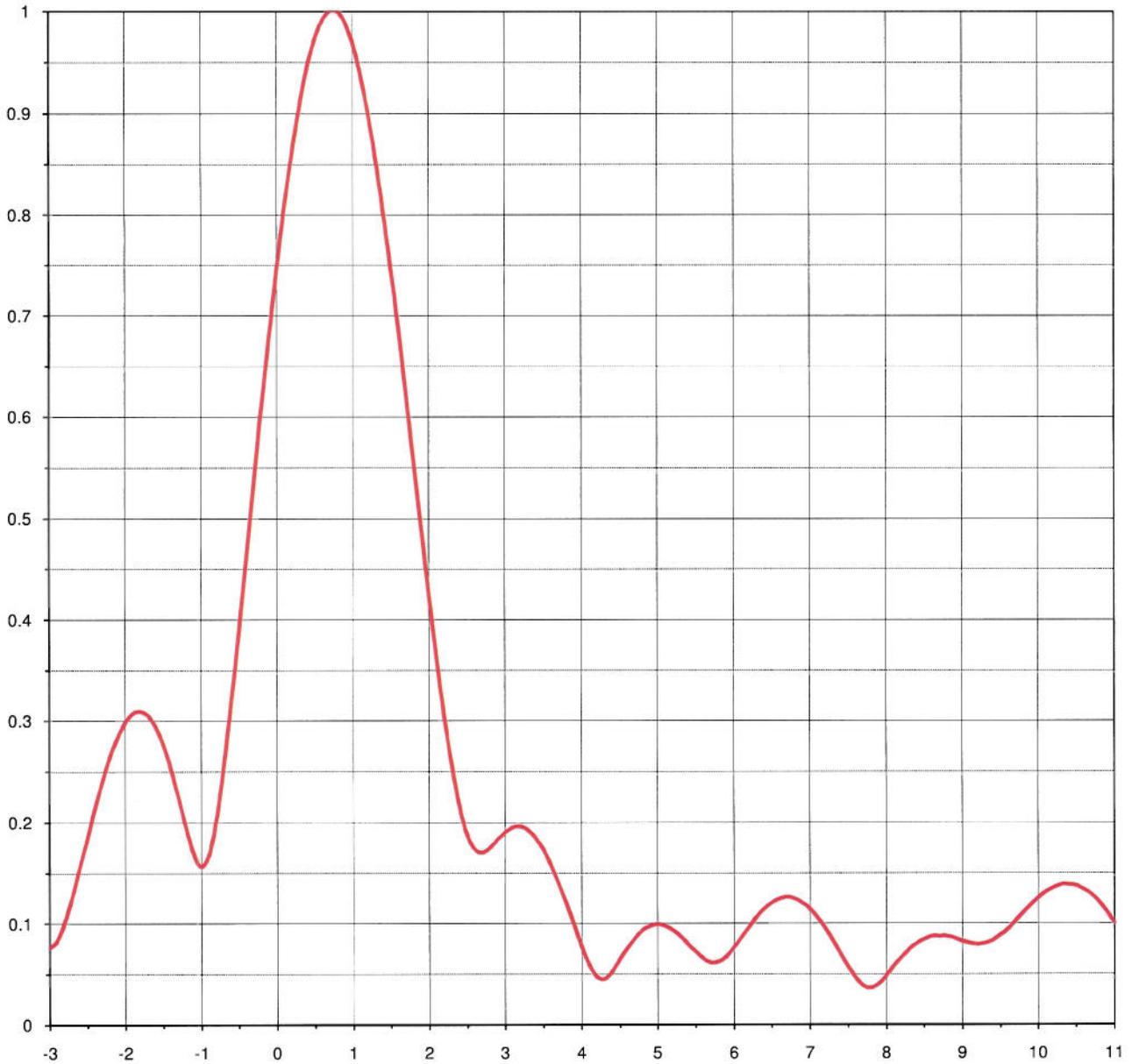
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Proposal Number **C-03812** Revision: **4**
Date **14-Oct-09**
Call Letters **KSTP-DT** Channel **35**
Location **St Paul, MN**
Customer
Antenna Type **TUM20-C4SP-14/50-1-R-S**

ELEVATION PATTERN

RMS Gain at Main Lobe	28.80 (14.59 dB)	Beam Tilt	0.70 deg
RMS Gain at Horizontal	15.90 (12.01 dB)	Frequency	599.00 MHz
Calculated / Measured	Calculated	Drawing #	14U288070



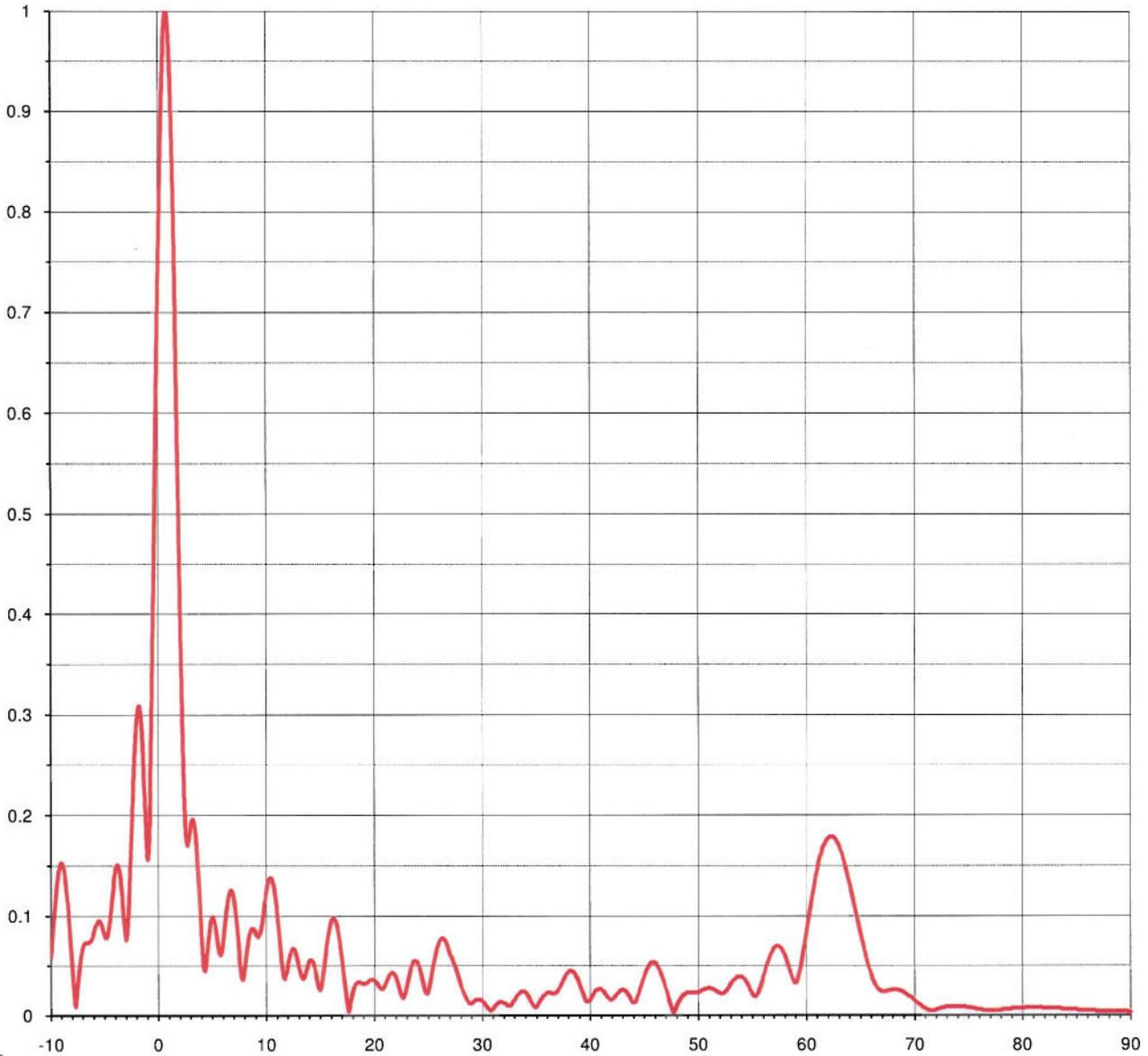
Degrees Below Horizontal



Proposal Number **C-03812** Revision: **4**
Date **14-Oct-09**
Call Letters **KSTP-DT** Channel **35**
Location **St Paul, MN**
Customer
Antenna Type **TUM20-C4SP-14/50-1-R-S**

ELEVATION PATTERN

RMS Gain at Main Lobe	28.80 (14.59 dB)	Beam Tilt	0.70 deg
RMS Gain at Horizontal	15.90 (12.01 dB)	Frequency	599.00 MHz
Calculated / Measured	Calculated	Drawing #	14U288070-90





Proposal Number **C-03812** Revision: **4**
 Date **14-Oct-09**
 Call Letters **KSTP-DT** Channel **35**
 Location **St Paul, MN**
 Customer
 Antenna Type **TUM20-C4SP-14/50-1-R-S**

TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **14U288070-90**

Angle	Field										
-10.0	0.059	2.4	0.215	10.6	0.137	30.5	0.009	51.0	0.028	71.5	0.005
-9.5	0.125	2.6	0.173	10.8	0.128	31.0	0.006	51.5	0.026	72.0	0.006
-9.0	0.153	2.8	0.175	11.0	0.111	31.5	0.012	52.0	0.023	72.5	0.007
-8.5	0.120	3.0	0.190	11.5	0.053	32.0	0.013	52.5	0.023	73.0	0.009
-8.0	0.045	3.2	0.196	12.0	0.045	32.5	0.010	53.0	0.030	73.5	0.009
-7.5	0.032	3.4	0.184	12.5	0.067	33.0	0.015	53.5	0.037	74.0	0.009
-7.0	0.070	3.6	0.157	13.0	0.054	33.5	0.022	54.0	0.039	74.5	0.009
-6.5	0.073	3.8	0.119	13.5	0.037	34.0	0.024	54.5	0.034	75.0	0.008
-6.0	0.084	4.0	0.077	14.0	0.053	34.5	0.016	55.0	0.023	75.5	0.007
-5.5	0.095	4.2	0.047	14.5	0.051	35.0	0.008	55.5	0.020	76.0	0.006
-5.0	0.080	4.4	0.052	15.0	0.026	35.5	0.016	56.0	0.035	76.5	0.005
-4.5	0.098	4.6	0.075	15.5	0.054	36.0	0.022	56.5	0.053	77.0	0.005
-4.0	0.146	4.8	0.093	16.0	0.091	36.5	0.022	57.0	0.066	77.5	0.005
-3.5	0.134	5.0	0.099	16.5	0.095	37.0	0.024	57.5	0.070	78.0	0.005
-3.0	0.076	5.2	0.093	17.0	0.064	37.5	0.033	58.0	0.063	78.5	0.006
-2.8	0.101	5.4	0.079	17.5	0.019	38.0	0.043	58.5	0.047	79.0	0.007
-2.6	0.155	5.6	0.065	18.0	0.019	38.5	0.044	59.0	0.033	79.5	0.007
-2.4	0.213	5.8	0.062	18.5	0.033	39.0	0.034	59.5	0.046	80.0	0.007
-2.2	0.264	6.0	0.076	19.0	0.032	39.5	0.019	60.0	0.077	80.5	0.008
-2.0	0.298	6.2	0.096	19.5	0.034	40.0	0.015	60.5	0.111	81.0	0.008
-1.8	0.309	6.4	0.114	20.0	0.036	40.5	0.024	61.0	0.141	81.5	0.008
-1.6	0.294	6.6	0.124	20.5	0.029	41.0	0.027	61.5	0.163	82.0	0.007
-1.4	0.253	6.8	0.124	21.0	0.029	41.5	0.021	62.0	0.176	82.5	0.007
-1.2	0.195	7.0	0.114	21.5	0.041	42.0	0.016	62.5	0.179	83.0	0.007
-1.0	0.156	7.2	0.095	22.0	0.040	42.5	0.021	63.0	0.172	83.5	0.007
-0.8	0.202	7.4	0.070	22.5	0.023	43.0	0.026	63.5	0.157	84.0	0.006
-0.6	0.319	7.6	0.046	23.0	0.025	43.5	0.022	64.0	0.136	84.5	0.006
-0.4	0.462	7.8	0.036	23.5	0.048	44.0	0.013	64.5	0.107	85.0	0.006
-0.2	0.609	8.0	0.048	24.0	0.054	44.5	0.020	65.0	0.082	85.5	0.005
0.0	0.744	8.2	0.066	24.5	0.038	45.0	0.037	65.5	0.059	86.0	0.005
0.2	0.858	8.4	0.080	25.0	0.022	45.5	0.050	66.0	0.041	86.5	0.005
0.4	0.942	8.6	0.087	25.5	0.048	46.0	0.053	66.5	0.028	87.0	0.004
0.6	0.990	8.8	0.087	26.0	0.071	46.5	0.046	67.0	0.024	87.5	0.004
0.8	1.000	9.0	0.082	26.5	0.077	47.0	0.030	67.5	0.025	88.0	0.004
1.0	0.970	9.2	0.079	27.0	0.065	47.5	0.011	68.0	0.026	88.5	0.004
1.2	0.903	9.4	0.083	27.5	0.051	48.0	0.007	68.5	0.025	89.0	0.004
1.4	0.806	9.6	0.094	28.0	0.034	48.5	0.018	69.0	0.023	89.5	0.004
1.6	0.687	9.8	0.102	28.5	0.019	49.0	0.023	69.5	0.019	90.0	0.003
1.8	0.556	10.0	0.118	29.0	0.012	49.5	0.023	70.0	0.015		
2.0	0.424	10.2	0.131	29.5	0.016	50.0	0.023	70.5	0.011		
2.2	0.305	10.4	0.138	30.0	0.015	50.5	0.026	71.0	0.007		

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