



**ENGINEERING STATEMENT**  
**OF**  
**JOHN F.X. BROWNE, P.E.**  
**IN SUPPORT OF AN APPLICATION FOR**  
**MINOR MODIFICATION OF A POST-TRANSITION CONSTRUCTION PERMIT**  
**WCML-DT**  
**ALPENA, MI**

**Background**

Central Michigan University is the licensee of WCML-DT which has been authorized to operate its post-transition DTV facility on Channel 24 (BMPEDT-20080617ABT) at Alpena, MI, with an ERP of 300 kW at a HAAT of 393m. The tower is located at the following coordinates:

(NAD27)  
45° 08' 18" N  
84° 09' 45" W

The antenna that WCML has been operating with since 2005 (Dielectric TUF P4-12/48-1-T) has erroneously been characterized as an omni-directional antenna. This application is to correct that error. All other facility parameters will remain the same.



### **Antenna System and Tower**

The antenna patterns and dBk table for the Dielectric TUF P4-12/48-1-T antenna (which has been in use since 2005) are included as exhibits 1a-1d and Table 1. The antenna is installed on a tower (ASR#1002163) that has an overall height of 734m AMSL (with appurtenances). The antenna has a center-of-radiation of 673m AMSL (with a calculated HAAT of 393m). No modifications of the tower are necessary to effect this antenna change since the antenna has been in use since 2005.

### **Coverage**

The entire principal community of Alpena, MI is well within the predicted F(50,90) 48 dBu contour based on the proposed 300 kW ERP. The facility using the directional antenna is predicted to serve 86 percent of the population predicted to be served by the maximized omni-directional facility (BMPEDT-20080617ABT) and is predicted to serve 99 percent of the population predicted to be served by the "Appendix B" facility. In fact, no viewers that have been receiving the WCML digital signal since 2005 will be adversely affected by this change.

### **Interference**

There would be no increase in interference caused by this change since the currently authorized CP specifies operation at 300 kW from the same tower and the same radiation center height with an omni-directional antenna. The directional radiation pattern does not exceed the authorized pattern in any azimuth.



### **Environmental/RFR**

The proposed construction does not require preparation of an Environmental Assessment as it does not involve any of the factors listed in Section 1.1306.

The additional ground level RFR contributed to the site by this proposal in public areas is calculated to be 0.0009073 mW/cm<sup>2</sup> which is less than 5% of the MPE for public exposure (0.36 mW/cm<sup>2</sup>) at the proposed frequency and, therefore, the proposal is excluded from further consideration.

WCML agrees to comply with the Commission's requirements regarding power adjustments or cessation of operation as may be necessary to ensure a compliant environment for worker access. Workers will be encouraged to wear personal RFR monitors when on the structure and will receive instruction on the presence of RFR and its mitigation. The tower base is enclosed by a locked security fence and appropriate signage warning of RFR hazards is posted.

### **Certification**

I hereby certify that the foregoing report or statement was prepared by me but may include work performed by others under my supervision or direction. The statements of fact contained therein are believed to be true and correct based on personal knowledge, information and belief unless otherwise stated; with respect to facts not known of my own personal knowledge, I believe them to be true and correct based on their origin from sources known to me to be generally reliable and accurate. I have prepared this document with due care and in accordance with applicable standards of professional practice.

John F. X. Browne, P.E.  
June 23, 2008



Proposal Number

Revision

Date

**07 May 2009**

Call Letters

**WCML**

Channel

**24**

Location

**Atlanta, MI**

Customer

Antenna Type

**TUF-P4-12/48-1-T**

Exhibit 1a

**ELEVATION PATTERN**

RMS Gain at Main Lobe

**23.1 (13.64 dB)**

Beam Tilt

**0.80 Degrees**

RMS Gain at Horizontal

**14.3 (11.55 dB)**

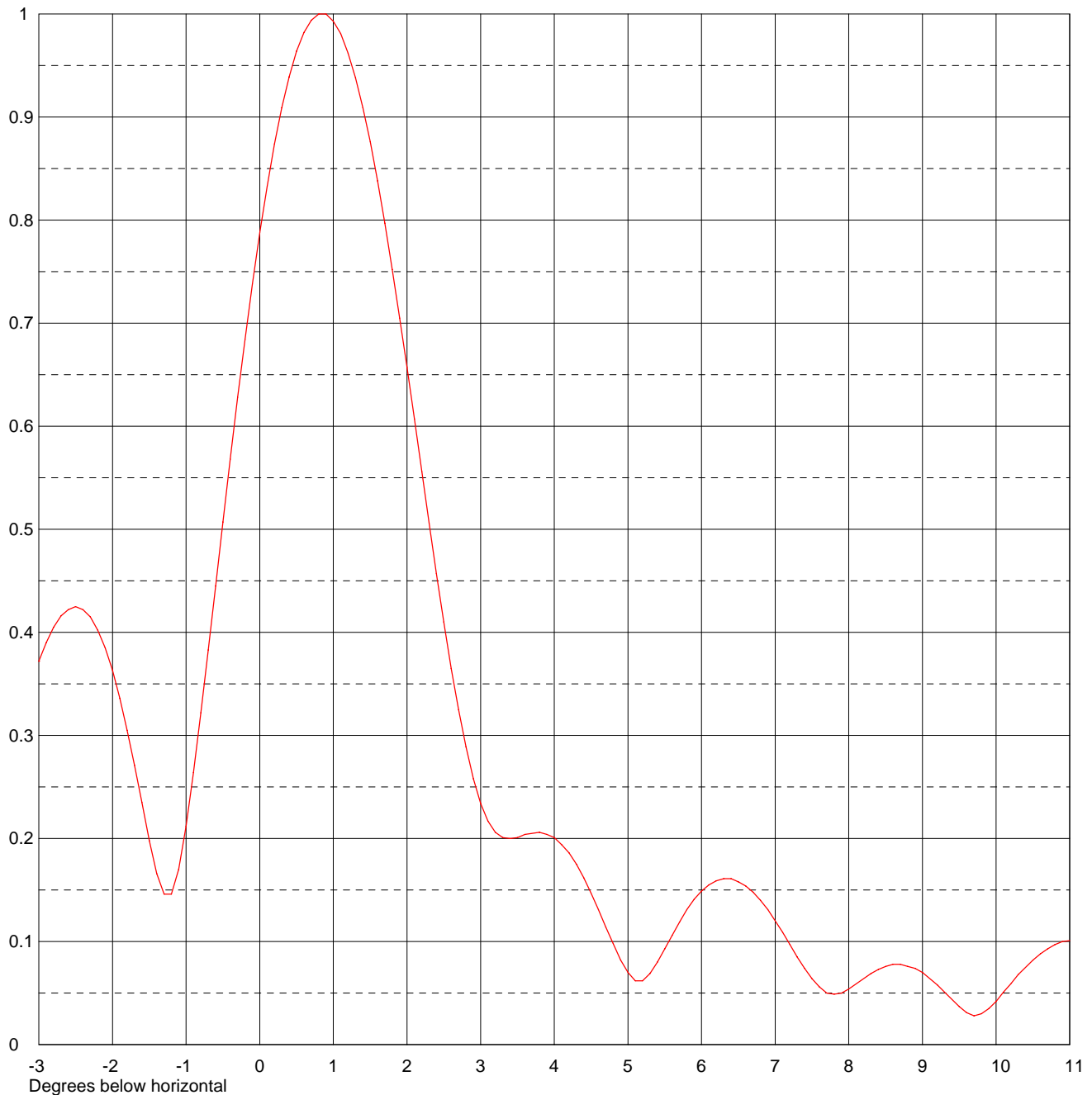
Frequency

**533.00 MHz**

Calculated / Measured

**Calculated**

Drawing #

**12U231075-5330**

Remarks:



Proposal Number  
 Date **07 May 2009**  
 Call Letters **WCML**  
 Location **Atlanta, MI**  
 Customer  
 Antenna Type **TUF-P4-12/48-1-T**

Revision  
 Channel **24**

Exhibit 1b

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing # **12U231075-5330-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.062	2.4	0.457	10.6	0.088	30.5	0.082	51.0	0.013	71.5	0.020
-9.5	0.058	2.6	0.365	10.8	0.097	31.0	0.063	51.5	0.007	72.0	0.020
-9.0	0.036	2.8	0.289	11.0	0.101	31.5	0.045	52.0	0.010	72.5	0.027
-8.5	0.069	3.0	0.234	11.5	0.089	32.0	0.028	52.5	0.016	73.0	0.036
-8.0	0.123	3.2	0.206	12.0	0.055	32.5	0.017	53.0	0.018	73.5	0.045
-7.5	0.149	3.4	0.200	12.5	0.028	33.0	0.014	53.5	0.018	74.0	0.054
-7.0	0.131	3.6	0.204	13.0	0.044	33.5	0.016	54.0	0.014	74.5	0.063
-6.5	0.071	3.8	0.206	13.5	0.053	34.0	0.015	54.5	0.010	75.0	0.070
-6.0	0.034	4.0	0.201	14.0	0.040	34.5	0.012	55.0	0.012	75.5	0.076
-5.5	0.092	4.2	0.186	14.5	0.023	35.0	0.007	55.5	0.020	76.0	0.081
-5.0	0.112	4.4	0.162	15.0	0.046	35.5	0.010	56.0	0.028	76.5	0.085
-4.5	0.077	4.6	0.131	15.5	0.070	36.0	0.017	56.5	0.034	77.0	0.087
-4.0	0.104	4.8	0.098	16.0	0.075	36.5	0.022	57.0	0.037	77.5	0.089
-3.5	0.243	5.0	0.070	16.5	0.057	37.0	0.023	57.5	0.037	78.0	0.090
-3.0	0.372	5.2	0.062	17.0	0.028	37.5	0.018	58.0	0.034	78.5	0.090
-2.8	0.405	5.4	0.080	17.5	0.019	38.0	0.012	58.5	0.027	79.0	0.089
-2.6	0.422	5.6	0.106	18.0	0.036	38.5	0.009	59.0	0.019	79.5	0.088
-2.4	0.422	5.8	0.131	18.5	0.038	39.0	0.013	59.5	0.010	80.0	0.086
-2.2	0.402	6.0	0.149	19.0	0.025	39.5	0.016	60.0	0.007	80.5	0.084
-2.0	0.363	6.2	0.159	19.5	0.025	40.0	0.015	60.5	0.013	81.0	0.081
-1.8	0.305	6.4	0.161	20.0	0.049	40.5	0.009	61.0	0.019	81.5	0.078
-1.6	0.235	6.6	0.154	20.5	0.067	41.0	0.007	61.5	0.023	82.0	0.075
-1.4	0.166	6.8	0.140	21.0	0.067	41.5	0.014	62.0	0.024	82.5	0.072
-1.2	0.146	7.0	0.120	21.5	0.049	42.0	0.022	62.5	0.022	83.0	0.069
-1.0	0.212	7.2	0.097	22.0	0.021	42.5	0.027	63.0	0.017	83.5	0.067
-0.8	0.322	7.4	0.074	22.5	0.016	43.0	0.027	63.5	0.013	84.0	0.064
-0.6	0.445	7.6	0.056	23.0	0.034	43.5	0.022	64.0	0.014	84.5	0.061
-0.4	0.568	7.8	0.049	23.5	0.036	44.0	0.015	64.5	0.022	85.0	0.059
-0.2	0.684	8.0	0.054	24.0	0.023	44.5	0.009	65.0	0.032	85.5	0.056
0.0	0.788	8.2	0.064	24.5	0.024	45.0	0.011	65.5	0.043	86.0	0.054
0.2	0.874	8.4	0.073	25.0	0.052	45.5	0.016	66.0	0.052	86.5	0.051
0.4	0.939	8.6	0.078	25.5	0.078	46.0	0.018	66.5	0.060	87.0	0.049
0.6	0.982	8.8	0.076	26.0	0.088	46.5	0.016	67.0	0.065	87.5	0.047
0.8	1.000	9.0	0.070	26.5	0.080	47.0	0.010	67.5	0.068	88.0	0.046
1.0	0.993	9.2	0.058	27.0	0.056	47.5	0.009	68.0	0.068	88.5	0.044
1.2	0.962	9.4	0.044	27.5	0.026	48.0	0.015	68.5	0.065	89.0	0.042
1.4	0.909	9.6	0.031	28.0	0.037	48.5	0.023	69.0	0.060	89.5	0.041
1.6	0.838	9.8	0.030	28.5	0.069	49.0	0.029	69.5	0.053	90.0	0.040
1.8	0.752	10.0	0.042	29.0	0.090	49.5	0.030	70.0	0.045		
2.0	0.657	10.2	0.059	29.5	0.100	50.0	0.028	70.5	0.035		
2.2	0.556	10.4	0.075	30.0	0.095	50.5	0.021	71.0	0.026		

Remarks:



Proposal Number

Revision

Date

**07 May 2009**

Call Letters

**WCML**

Channel

**24**

Location

**Atlanta, MI**

Customer

Antenna Type

**TUF-P4-12/48-1-T**

Exhibit 1c

### AZIMUTH PATTERN

Gain

**2.60 (4.15 dB)**

Frequency

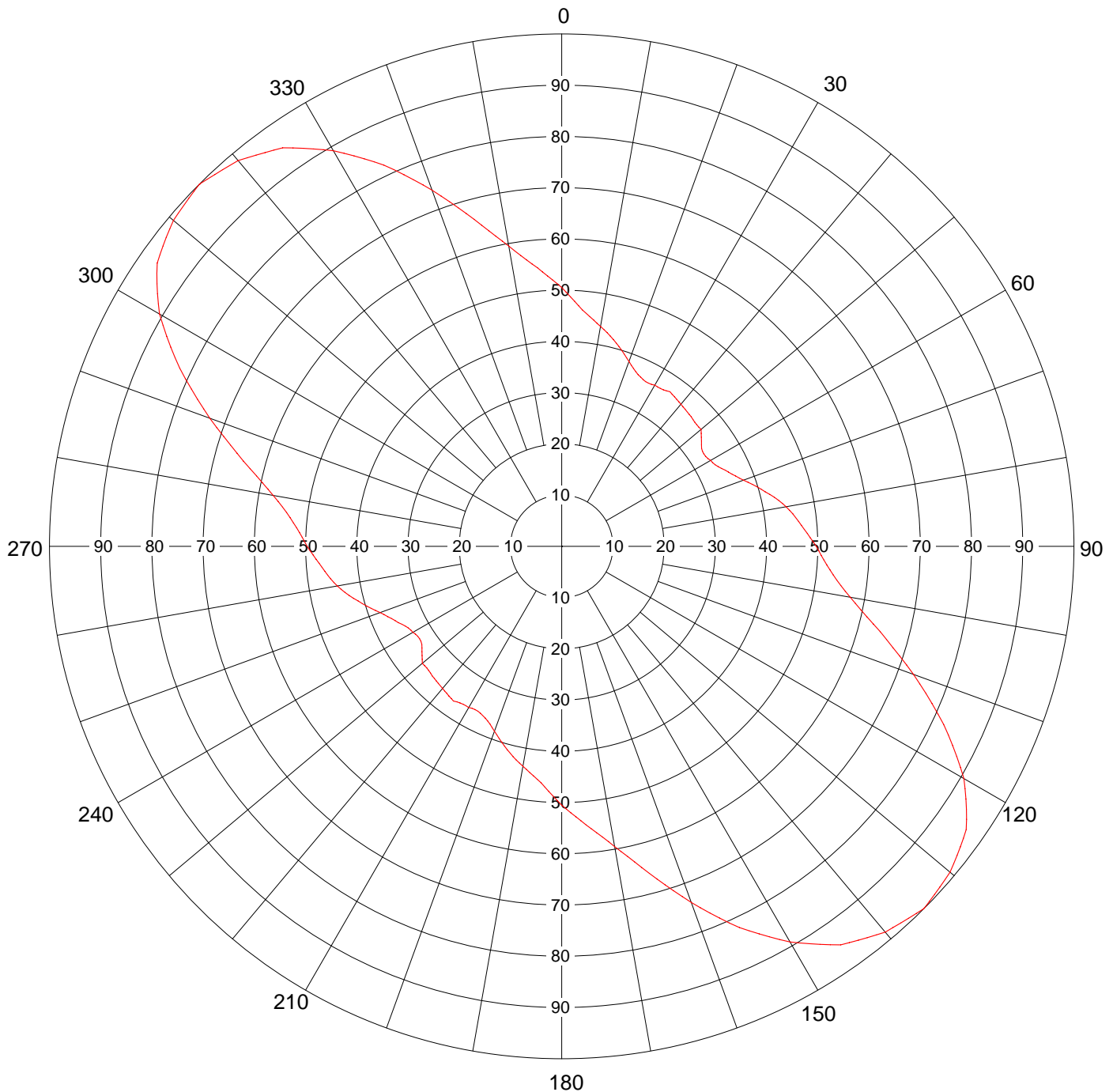
**533 MHz**

Calculated / Measured

**Calculated**

Drawing #

**TUF-P4-5330**



Remarks:



Proposal Number  
 Date **07 May 2009**  
 Call Letters **WCML**  
 Location **Atlanta, MI**  
 Customer  
 Antenna Type **TUF-P4-12/48-1-T**

Revision  
 Channel **24**

Exhibit 1d

## TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing # **TUF-P4-5330**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.505	45	0.358	90	0.497	135	1.000	180	0.505	225	0.358	270	0.497	315	1.000
1	0.496	46	0.356	91	0.502	136	0.996	181	0.496	226	0.356	271	0.502	316	0.996
2	0.487	47	0.355	92	0.507	137	0.992	182	0.487	227	0.355	272	0.507	317	0.992
3	0.479	48	0.355	93	0.513	138	0.989	183	0.479	228	0.355	273	0.513	318	0.989
4	0.471	49	0.355	94	0.519	139	0.986	184	0.471	229	0.355	274	0.519	319	0.986
5	0.463	50	0.355	95	0.526	140	0.983	185	0.463	230	0.355	275	0.526	320	0.983
6	0.457	51	0.351	96	0.533	141	0.976	186	0.457	231	0.351	276	0.533	321	0.976
7	0.451	52	0.346	97	0.541	142	0.969	187	0.451	232	0.346	277	0.541	322	0.969
8	0.446	53	0.342	98	0.550	143	0.962	188	0.446	233	0.342	278	0.550	323	0.962
9	0.441	54	0.337	99	0.560	144	0.956	189	0.441	234	0.337	279	0.560	324	0.956
10	0.436	55	0.333	100	0.572	145	0.950	190	0.436	235	0.333	280	0.572	325	0.950
11	0.431	56	0.332	101	0.584	146	0.938	191	0.431	236	0.332	281	0.584	326	0.938
12	0.426	57	0.331	102	0.597	147	0.926	192	0.426	237	0.331	282	0.597	327	0.926
13	0.421	58	0.331	103	0.611	148	0.915	193	0.421	238	0.331	283	0.611	328	0.915
14	0.416	59	0.333	104	0.627	149	0.903	194	0.416	239	0.333	284	0.627	329	0.903
15	0.411	60	0.335	105	0.644	150	0.891	195	0.411	240	0.335	285	0.644	330	0.891
16	0.406	61	0.337	106	0.660	151	0.877	196	0.406	241	0.337	286	0.660	331	0.877
17	0.400	62	0.339	107	0.676	152	0.863	197	0.400	242	0.339	287	0.676	332	0.863
18	0.395	63	0.343	108	0.694	153	0.849	198	0.395	243	0.343	288	0.694	333	0.849
19	0.389	64	0.347	109	0.712	154	0.835	199	0.389	244	0.347	289	0.712	334	0.835
20	0.384	65	0.352	110	0.731	155	0.821	200	0.384	245	0.352	290	0.731	335	0.821
21	0.379	66	0.356	111	0.749	156	0.804	201	0.379	246	0.356	291	0.749	336	0.804
22	0.374	67	0.361	112	0.767	157	0.788	202	0.374	247	0.361	292	0.767	337	0.788
23	0.370	68	0.366	113	0.785	158	0.772	203	0.370	248	0.366	293	0.785	338	0.772
24	0.367	69	0.372	114	0.804	159	0.756	204	0.367	249	0.372	294	0.804	339	0.756
25	0.365	70	0.378	115	0.823	160	0.740	205	0.365	250	0.378	295	0.823	340	0.740
26	0.362	71	0.384	116	0.840	161	0.723	206	0.362	251	0.384	296	0.840	341	0.723
27	0.361	72	0.391	117	0.857	162	0.707	207	0.361	252	0.391	297	0.857	342	0.707
28	0.361	73	0.398	118	0.873	163	0.691	208	0.361	253	0.398	298	0.873	343	0.691
29	0.361	74	0.405	119	0.890	164	0.676	209	0.361	254	0.405	299	0.890	344	0.676
30	0.363	75	0.411	120	0.907	165	0.661	210	0.363	255	0.411	300	0.907	345	0.661
31	0.363	76	0.419	121	0.919	166	0.646	211	0.363	256	0.419	301	0.919	346	0.646
32	0.363	77	0.426	122	0.930	167	0.632	212	0.363	257	0.426	302	0.930	347	0.632
33	0.364	78	0.433	123	0.942	168	0.619	213	0.364	258	0.433	303	0.942	348	0.619
34	0.366	79	0.439	124	0.953	169	0.607	214	0.366	259	0.439	304	0.953	349	0.607
35	0.368	80	0.445	125	0.964	170	0.595	215	0.368	260	0.445	305	0.964	350	0.595
36	0.367	81	0.450	126	0.969	171	0.584	216	0.367	261	0.450	306	0.969	351	0.584
37	0.366	82	0.455	127	0.974	172	0.573	217	0.366	262	0.455	307	0.974	352	0.573
38	0.364	83	0.460	128	0.980	173	0.563	218	0.364	263	0.460	308	0.980	353	0.563
39	0.363	84	0.465	129	0.985	174	0.554	219	0.363	264	0.465	309	0.985	354	0.554
40	0.362	85	0.470	130	0.990	175	0.546	220	0.362	265	0.470	310	0.990	355	0.546
41	0.361	86	0.475	131	0.991	176	0.537	221	0.361	266	0.475	311	0.991	356	0.537
42	0.360	87	0.480	132	0.993	177	0.529	222	0.360	267	0.480	312	0.993	357	0.529
43	0.359	88	0.485	133	0.996	178	0.521	223	0.359	268	0.485	313	0.996	358	0.521
44	0.358	89	0.491	134	0.998	179	0.513	224	0.358	269	0.491	314	0.998	359	0.513

Remarks:

**DIRECTIONAL ANTENNA DATA**  
**WCML-DT**  
**Table #1**

<u>Actual Bearing</u>	<u>Pattern Azimuth</u>	<u>Relative Field</u>	<u>ERP (dBk)</u>	<u>CONTOURS(km)</u>	
				<u>41 dBu</u>	<u>48 dBu</u>
N000E	0	0.505	18.84	85.9	75.4
	10	0.436	17.56		
	20	0.384	16.46		
	30	0.363	15.97		
	40	0.362	15.95		
N045E	45	0.358	15.85	81.1	70.4
	50	0.355	15.78		
	60	0.335	15.27		
	70	0.378	16.32		
N090E	80	0.445	17.74	85.3	74.6
	90	0.497	18.70		
	100	0.572	19.92		
	110	0.731	22.05		
	120	0.907	23.92		
N135E	130	0.990	24.68	94.6	83.2
	135	1.000	24.77		
	140	0.983	24.62		
	150	0.891	23.77		
	160	0.740	22.16		
N180E	170	0.595	20.26	84.7	74.0
	180	0.505	18.84		
	190	0.436	17.56		
	200	0.384	16.46		
	210	0.363	15.97		
N225E	220	0.362	15.95	79.7	69.0
	225	0.358	15.85		
	230	0.355	15.78		
	240	0.335	15.27		
	250	0.378	16.32		
N270E	260	0.445	17.74	84.1	73.2
	270	0.497	18.70		
	280	0.572	19.92		
	290	0.731	22.05		
	300	0.907	23.92		
N315E	310	0.990	24.68	95.6	84.1
	315	1.000	24.77		
	320	0.983	24.62		
	330	0.891	23.77		
	340	0.740	22.16		
	350	0.595	20.26		

**Maxima:** N135E 24.77 dBk  
N315E 24.77 dBk  
**Minima:** N058E 15.17 dBk  
N238E 15.17 dBk