



Proposal #: **DCA-7957-3**    Antenna Type: **TFU-26GTH-R O4**    Channel: **21 DTV**  
 Call Letters: **WBNS-DT**    Location: **Columbus, OH**

Electrical Specifications		Value		Remarks
		Ratio	dB	
RMS Gain at Main Lobe over Halfwave Dipole	Hpol	23.5	13.71	
	Vpol			
RMS Gain at Horizontal over Halfwave Dipole	Hpol	18.2	12.60	
	Vpol			
Peak Directional Gain over Halfwave Dipole	Hpol			
	Vpol			
Peak Directional Gain at Horizontal over Halfwave Dipole	Hpol			
	Vpol			
Circularity		+/- 1.0 dB		
Axial Ratio		dB		
Beam Tilt		0.75 deg		
Average Power	DTV	60 kW	17.78 dBk	
Antenna Input:	T/L	6-1/8 in	50.0 ohm	Type: EIA/DCA
Maximum Antenna Input VSWR		Channel 1.08 : 1		
Patterns	Azimuth	TFU-O4-21		
	Elevation	26G235075	26G235075-90	
Mechanical Specifications		Metric	English	
Height with Lightning Protector	H4	16.9 m	55.6 ft	
Height Less Lightning Protector	H2	15.8 m	52.0 ft	
Height of Center of Radiation	H3	8.0 m	26.3 ft	Above base flange
Basic Wind Speed	V	128.7 km/h	80 mi/h	TIA/EIA-222-F.
Force Coeff. x Projected Area	CaAc	5.95 m <sup>2</sup>	64.0 ft <sup>2</sup>	Above base flange
Moment Arm	D1	8.7 m	28.7 ft	Above base flange
Force Coeff. x Projected Area	CaAc	m <sup>2</sup>	ft <sup>2</sup>	
Moment Arm	D3	m	ft	
Pole Bury Length	D2	m	ft	
Weight	W	3.5 t	7,700 lbs	Includes wedding cake adapter
Radome				
Antenna designed in accordance with AISC specifications for design of structural steel for building as prescribed by TIA/EIA-222-F.				

NOTE: **DTV Antenna supported by Ch. 14, TFU-26GBH-R O6 (DCA-7958-2).**  
 Prepared By : EHM    DKL    Approved By : AJS  
 Original Date : 18-Jun-98    Revision: 3    Rev. Date: 24-Jan-02



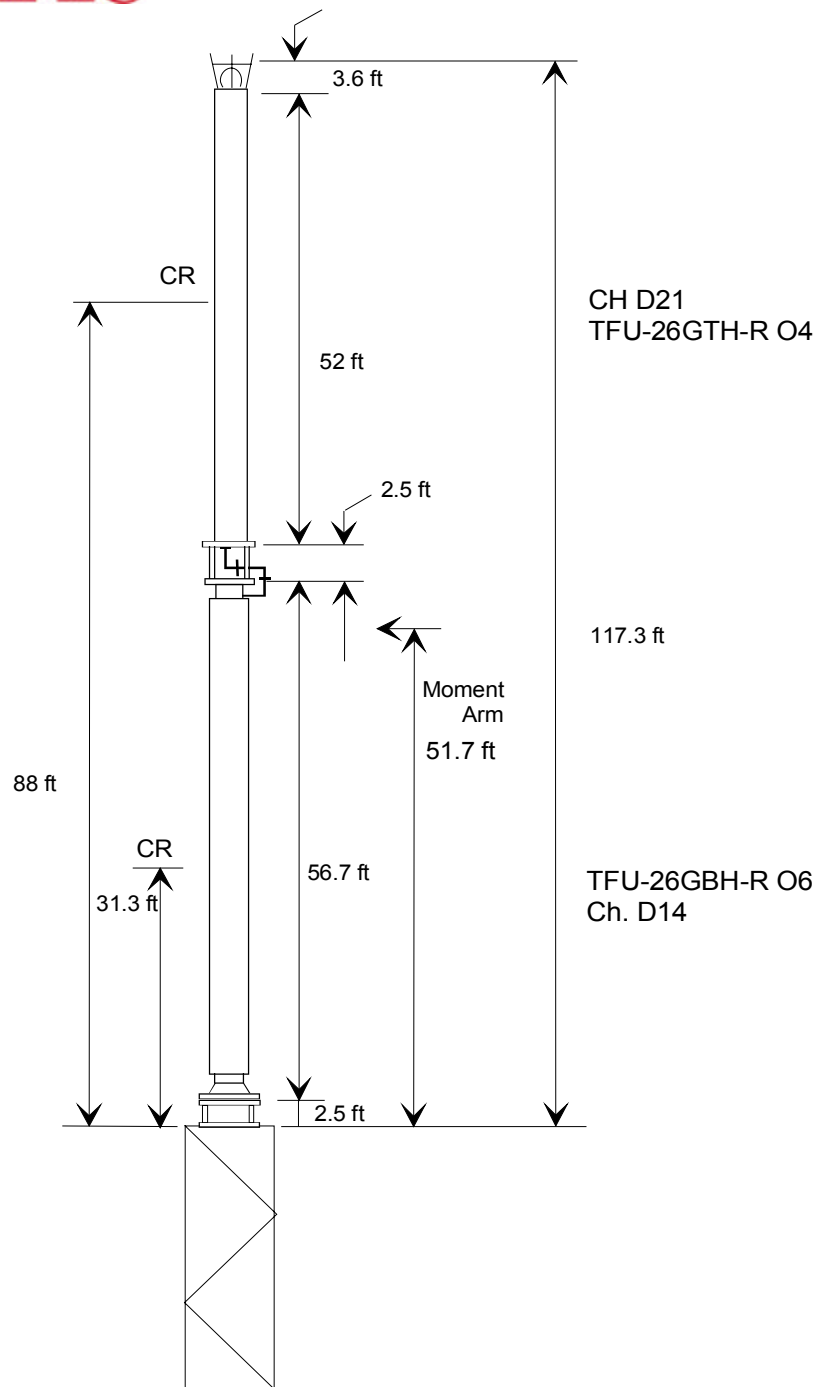
**DTV/DTV ANTENNA STACK**  
**TFU-26GTH-R O4 over TFU-26GBH-R O6**  
**COLUMBUS, OHIO**

**STACK MECHANICAL DATA**

CaAc = 178 ft<sup>2</sup>

Weight = 27,100 lbs

EIA-222-F Specification  
(80 mph basic wind speed)





Proposal Number  
Date  
Call Letters  
Location  
Customer  
Antenna Type

**DCA-7957**  
**24-Jan-02**  
**WBNS-DT**  
**Columbus, OH**  
**WBNS**  
**TFU-26GTH-R O4**

Revision: **3**  
Channel **21**

## SYSTEM SUMMARY

### Antenna:

Type:	<b>TFU-26GTH-R O4</b>	ERP:	<b>1000 kW</b>	<b>( 30.00 dBk )</b>
Channel:	<b>21</b>	RMS Gain*:	<b>23.5</b>	<b>( 13.71 dB )</b>
Location:	<b>Columbus, OH</b>	Input Power:	<b>42.6 kW</b>	<b>( 16.29 dBk )</b>

H Pol

### Transmission Line:

Type:	<b>digiTLine</b>	Attenuation:	<b>1.30 dB</b>
Size:	<b>6-1/8 in</b>	Efficiency:	<b>74.1%</b>
Impedance:	<b>50 ohm</b>		
Length:	<b>1,100 ft</b>		<b>335.3 m</b>

### Tower Top to Antenna Input Transmission Line:

Type:	<b>DCA</b>	Attenuation:	<b>0.07 dB</b>
Size:	<b>6 1/8 in</b>	Efficiency:	<b>98.3%</b>
Impedance:	<b>50 ohm</b>		
Length:	<b>63 ft</b>		<b>19.1 m</b>

### Transmitter:

Power Required: **58.4 kW ( 17.67 dBk )**

\* Gain is with respect to half wave dipole.

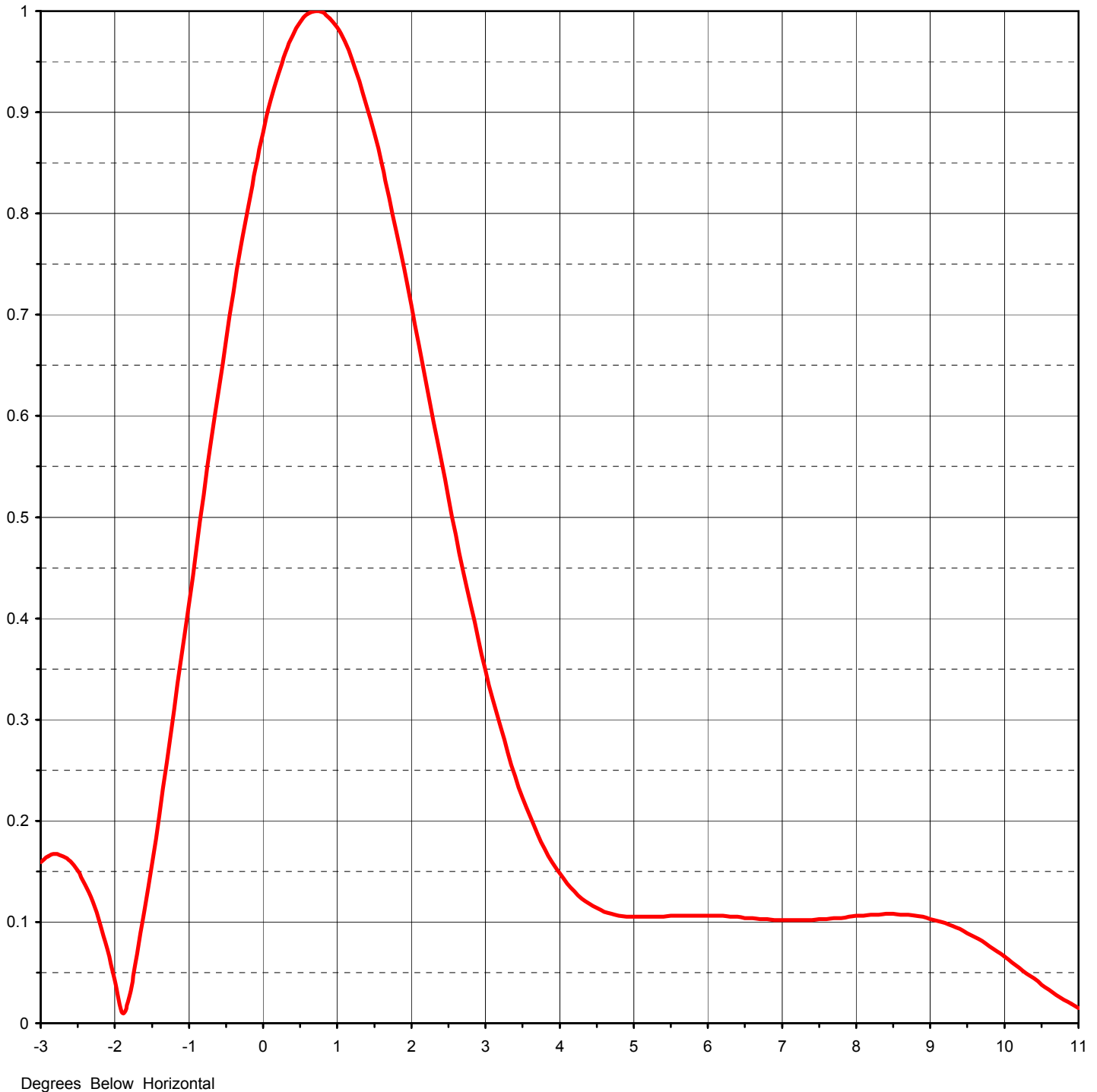


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Date	<b>24-Jan-02</b>		
Call Letters	<b>WBNS-DT</b>	Channel	<b>21</b>
Location	<b>Columbus, OH</b>		
Customer	<b>WBNS</b>		
Antenna Type	<b>TFU-26GTH-R 04</b>		

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>23.50 ( 13.71 dB )</b>
RMS Gain at Horizontal	<b>18.20 ( 12.60 dB )</b>
Calculated / Measured	<b>Calculated</b>

Beam Tilt	<b>0.75 deg</b>
Frequency	<b>515.00 MHz</b>
Drawing #	<b>26G235075</b>



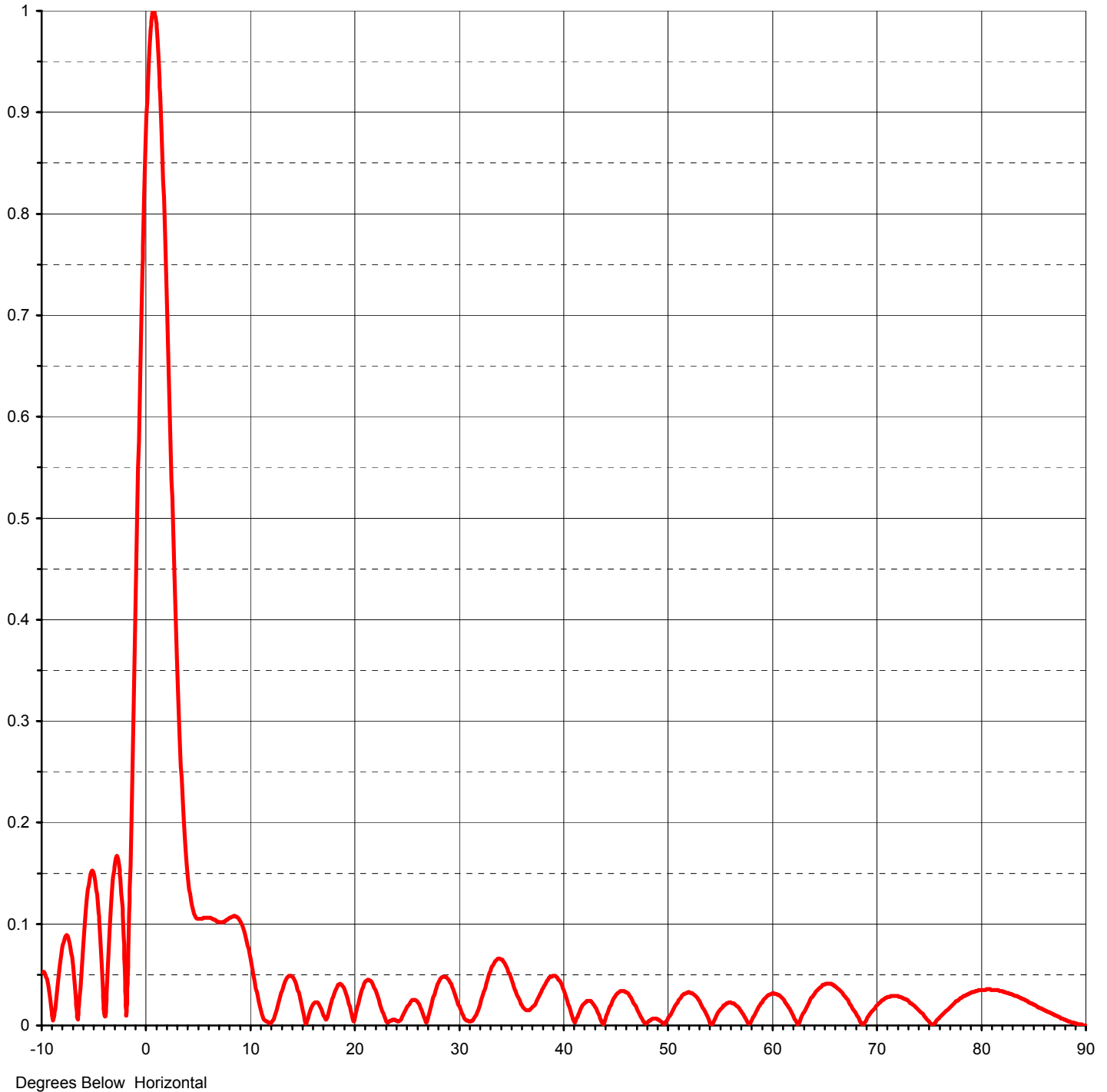


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Date	<b>24-Jan-02</b>		
Call Letters	<b>WBNS-DT</b>	Channel	<b>21</b>
Location	<b>Columbus, OH</b>		
Customer	<b>WBNS</b>		
Antenna Type	<b>TFU-26GTH-R 04</b>		

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>23.50</b>	<b>( 13.71 dB )</b>
RMS Gain at Horizontal	<b>18.20</b>	<b>( 12.60 dB )</b>
Calculated / Measured	<b>Calculated</b>	

Beam Tilt	<b>0.75 deg</b>
Frequency	<b>515.00 MHz</b>
Drawing #	<b>26G235075-90</b>





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 Antenna Type **TFU-26GTH-R 04**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **26G235075-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.052	2.4	0.557	10.6	0.038	30.5	0.009	51.0	0.023	71.5	0.029
-9.5	0.046	2.6	0.483	10.8	0.028	31.0	0.004	51.5	0.030	72.0	0.029
-9.0	0.012	2.8	0.413	11.0	0.019	31.5	0.007	52.0	0.033	72.5	0.027
-8.5	0.037	3.0	0.349	11.5	0.005	32.0	0.018	52.5	0.031	73.0	0.024
-8.0	0.077	3.2	0.293	12.0	0.002	32.5	0.035	53.0	0.025	73.5	0.020
-7.5	0.088	3.4	0.244	12.5	0.012	33.0	0.052	53.5	0.016	74.0	0.015
-7.0	0.059	3.6	0.204	13.0	0.030	33.5	0.063	54.0	0.006	74.5	0.009
-6.5	0.006	3.8	0.172	13.5	0.045	34.0	0.066	54.5	0.005	75.0	0.004
-6.0	0.081	4.0	0.148	14.0	0.049	34.5	0.060	55.0	0.014	75.5	0.002
-5.5	0.138	4.2	0.130	14.5	0.040	35.0	0.048	55.5	0.020	76.0	0.008
-5.0	0.150	4.4	0.118	15.0	0.020	35.5	0.034	56.0	0.023	76.5	0.013
-4.5	0.104	4.6	0.110	15.5	0.003	36.0	0.021	56.5	0.021	77.0	0.018
-4.0	0.012	4.8	0.106	16.0	0.019	36.5	0.015	57.0	0.015	77.5	0.023
-3.5	0.091	5.0	0.105	16.5	0.023	37.0	0.017	57.5	0.007	78.0	0.027
-3.0	0.159	5.2	0.105	17.0	0.013	37.5	0.024	58.0	0.003	78.5	0.030
-2.8	0.167	5.4	0.105	17.5	0.009	38.0	0.034	58.5	0.013	79.0	0.032
-2.6	0.160	5.6	0.106	18.0	0.028	38.5	0.044	59.0	0.022	79.5	0.034
-2.4	0.137	5.8	0.106	18.5	0.040	39.0	0.049	59.5	0.028	80.0	0.035
-2.2	0.098	6.0	0.106	19.0	0.038	39.5	0.047	60.0	0.031	80.5	0.036
-2.0	0.043	6.2	0.106	19.5	0.023	40.0	0.037	60.5	0.031	81.0	0.035
-1.8	0.028	6.4	0.105	20.0	0.004	40.5	0.023	61.0	0.027	81.5	0.035
-1.6	0.111	6.6	0.104	20.5	0.025	41.0	0.006	61.5	0.020	82.0	0.034
-1.4	0.206	6.8	0.103	21.0	0.041	41.5	0.011	62.0	0.011	82.5	0.032
-1.2	0.309	7.0	0.102	21.5	0.044	42.0	0.021	62.5	0.001	83.0	0.030
-1.0	0.415	7.2	0.102	22.0	0.036	42.5	0.024	63.0	0.011	83.5	0.028
-0.8	0.522	7.4	0.102	22.5	0.021	43.0	0.020	63.5	0.021	84.0	0.026
-0.6	0.626	7.6	0.103	23.0	0.007	43.5	0.010	64.0	0.030	84.5	0.023
-0.4	0.722	7.8	0.104	23.5	0.005	44.0	0.004	64.5	0.037	85.0	0.021
-0.2	0.808	8.0	0.106	24.0	0.005	44.5	0.018	65.0	0.040	85.5	0.018
0.0	0.880	8.2	0.107	24.5	0.006	45.0	0.028	65.5	0.041	86.0	0.015
0.2	0.937	8.4	0.108	25.0	0.016	45.5	0.034	66.0	0.039	86.5	0.013
0.4	0.976	8.6	0.107	25.5	0.024	46.0	0.033	66.5	0.034	87.0	0.010
0.6	0.997	8.8	0.106	26.0	0.024	46.5	0.028	67.0	0.028	87.5	0.008
0.8	0.999	9.0	0.103	26.5	0.015	47.0	0.019	67.5	0.020	88.0	0.006
1.0	0.984	9.2	0.099	27.0	0.004	47.5	0.008	68.0	0.011	88.5	0.004
1.2	0.952	9.4	0.093	27.5	0.023	48.0	0.002	68.5	0.002	89.0	0.002
1.4	0.906	9.6	0.085	28.0	0.040	48.5	0.006	69.0	0.006	89.5	0.001
1.6	0.849	9.8	0.081	28.5	0.048	49.0	0.007	69.5	0.014	90.0	0.000
1.8	0.782	10.0	0.071	29.0	0.046	49.5	0.003	70.0	0.020		
2.0	0.709	10.2	0.060	29.5	0.036	50.0	0.005	70.5	0.025		
2.2	0.633	10.4	0.049	30.0	0.021	50.5	0.014	71.0	0.028		

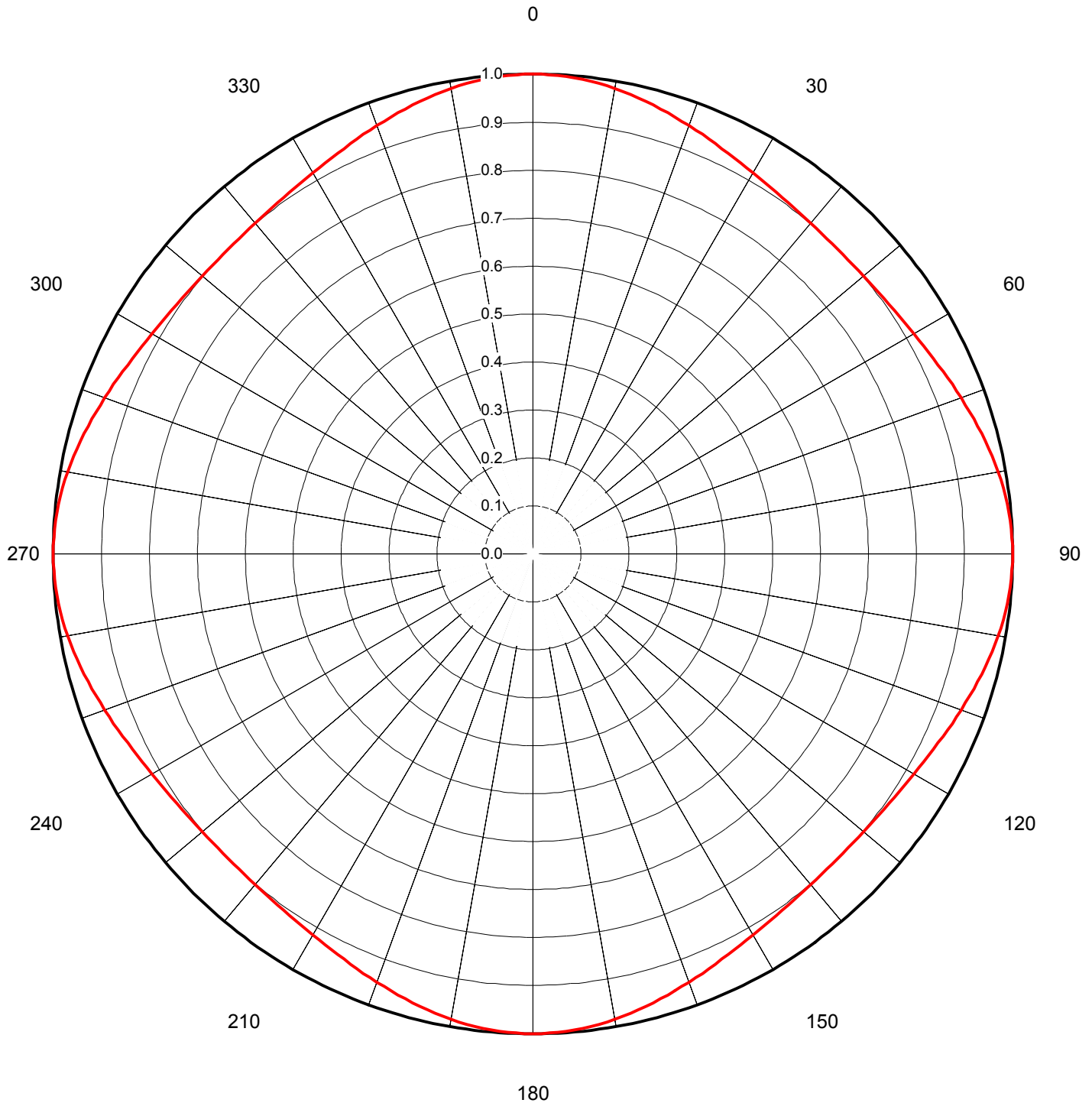


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Location	<b>Columbus, OH</b>		
Customer	<b>WBNS</b>		
Antenna Type	<b>TFU-26GTH-R 04</b>		

## AZIMUTH PATTERN

Gain **1.10** **( 0.41 dB)**  
Calculated / Measured **Calculated**

Frequency **515.00 MHz**  
Drawing # **TFU-04-21**





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Antenna Type	<b>TFU-26GTH-R 04</b>		

## TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing #: **TFU-O4-21**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	1.000	45	0.898	90	1.000	135	0.898	180	1.000	225	0.898	270	1.000	315	0.898
1	1.000	46	0.898	91	1.000	136	0.898	181	1.000	226	0.898	271	1.000	316	0.898
2	0.999	47	0.899	92	0.999	137	0.899	182	0.999	227	0.899	272	0.999	317	0.899
3	0.998	48	0.899	93	0.998	138	0.899	183	0.998	228	0.899	273	0.998	318	0.899
4	0.997	49	0.900	94	0.997	139	0.900	184	0.997	229	0.900	274	0.997	319	0.900
5	0.996	50	0.900	95	0.996	140	0.900	185	0.996	230	0.900	275	0.996	320	0.900
6	0.994	51	0.901	96	0.994	141	0.901	186	0.994	231	0.901	276	0.994	321	0.901
7	0.992	52	0.902	97	0.992	142	0.902	187	0.992	232	0.902	277	0.992	322	0.902
8	0.990	53	0.904	98	0.990	143	0.903	188	0.990	233	0.903	278	0.990	323	0.904
9	0.987	54	0.905	99	0.987	144	0.905	189	0.987	234	0.905	279	0.987	324	0.905
10	0.985	55	0.907	100	0.985	145	0.907	190	0.985	235	0.907	280	0.985	325	0.907
11	0.982	56	0.908	101	0.982	146	0.908	191	0.982	236	0.908	281	0.982	326	0.908
12	0.979	57	0.910	102	0.979	147	0.910	192	0.979	237	0.910	282	0.979	327	0.910
13	0.975	58	0.912	103	0.975	148	0.912	193	0.975	238	0.912	283	0.975	328	0.912
14	0.972	59	0.915	104	0.972	149	0.915	194	0.972	239	0.915	284	0.972	329	0.915
15	0.968	60	0.917	105	0.968	150	0.917	195	0.968	240	0.917	285	0.968	330	0.917
16	0.965	61	0.920	106	0.965	151	0.920	196	0.965	241	0.920	286	0.965	331	0.920
17	0.961	62	0.923	107	0.961	152	0.923	197	0.961	242	0.923	287	0.961	332	0.923
18	0.957	63	0.926	108	0.957	153	0.926	198	0.957	243	0.926	288	0.957	333	0.926
19	0.954	64	0.929	109	0.954	154	0.929	199	0.954	244	0.929	289	0.954	334	0.929
20	0.950	65	0.932	110	0.950	155	0.932	200	0.950	245	0.932	290	0.950	335	0.932
21	0.946	66	0.935	111	0.946	156	0.935	201	0.946	246	0.935	291	0.946	336	0.935
22	0.942	67	0.939	112	0.942	157	0.939	202	0.942	247	0.939	292	0.942	337	0.939
23	0.939	68	0.942	113	0.939	158	0.942	203	0.939	248	0.942	293	0.939	338	0.942
24	0.935	69	0.946	114	0.935	159	0.946	204	0.935	249	0.946	294	0.935	339	0.946
25	0.932	70	0.950	115	0.932	160	0.950	205	0.932	250	0.950	295	0.932	340	0.950
26	0.929	71	0.954	116	0.929	161	0.954	206	0.929	251	0.954	296	0.929	341	0.954
27	0.926	72	0.957	117	0.926	162	0.957	207	0.926	252	0.957	297	0.926	342	0.957
28	0.923	73	0.961	118	0.923	163	0.961	208	0.923	253	0.961	298	0.923	343	0.961
29	0.920	74	0.965	119	0.920	164	0.965	209	0.920	254	0.965	299	0.920	344	0.965
30	0.917	75	0.968	120	0.917	165	0.968	210	0.917	255	0.968	300	0.917	345	0.968
31	0.915	76	0.972	121	0.915	166	0.972	211	0.915	256	0.972	301	0.915	346	0.972
32	0.912	77	0.975	122	0.912	167	0.975	212	0.912	257	0.975	302	0.912	347	0.975
33	0.910	78	0.979	123	0.910	168	0.979	213	0.910	258	0.979	303	0.910	348	0.979
34	0.908	79	0.982	124	0.908	169	0.982	214	0.908	259	0.982	304	0.908	349	0.982
35	0.907	80	0.985	125	0.907	170	0.985	215	0.907	260	0.985	305	0.907	350	0.985
36	0.905	81	0.987	126	0.905	171	0.987	216	0.905	261	0.987	306	0.905	351	0.987
37	0.904	82	0.990	127	0.903	172	0.990	217	0.903	262	0.990	307	0.904	352	0.990
38	0.902	83	0.992	128	0.902	173	0.992	218	0.902	263	0.992	308	0.902	353	0.992
39	0.901	84	0.994	129	0.901	174	0.994	219	0.901	264	0.994	309	0.901	354	0.994
40	0.900	85	0.996	130	0.900	175	0.996	220	0.900	265	0.996	310	0.900	355	0.996
41	0.900	86	0.997	131	0.900	176	0.997	221	0.900	266	0.997	311	0.900	356	0.997
42	0.899	87	0.998	132	0.899	177	0.998	222	0.899	267	0.998	312	0.899	357	0.998
43	0.899	88	0.999	133	0.899	178	0.999	223	0.899	268	0.999	313	0.899	358	0.999
44	0.898	89	1.000	134	0.898	179	1.000	224	0.898	269	1.000	314	0.898	359	1.000