



Antenna Model: **TFU-20ETT/VP-R 4C160**

Proposal Number: C-70464-5
Date: 21-Feb-18
Customer: Nexstar
Location: Chippewa Falls, WI

Electrical Specifications

Polarization: Elliptical
Azimuth Pattern: Directional
Antenna Input: 6-1/8" 75 Ohm EIA/DCA
VSWR: Channel 1.08 : 1
Bandwidth: 6 MHz
Rated Input Power: 40 kW (16.02 dBk) Maximum Average Power

Mechanical Specifications

Mounting: Top Mounted
Environmental Protection: Full Radome
Height: 46.8 ft (14.3m) less Lightning Protector 50.8 ft (15.5m) with Lightning Protector
Weight: 7150 lb (3.2t)
Effective Projected Area: 55.7 ft² (5.2m²) TIA-222-G Basic Wind Speed: 90 m/h (144.8 km/h)

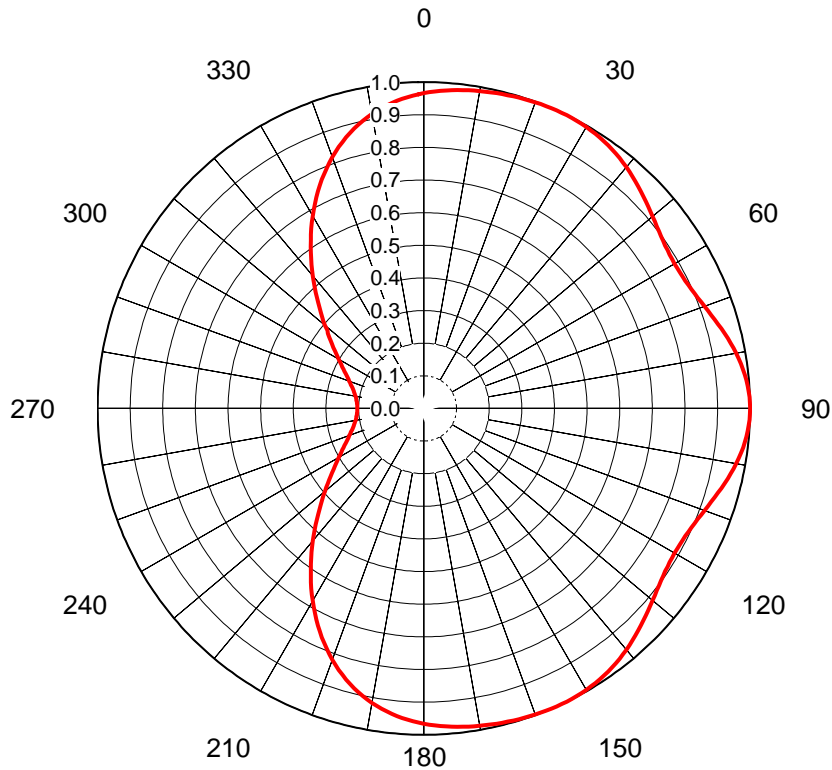
Channel Specifications

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
WEUX	21	515 MHz	1000.0 kW (30.00 dBk)	250.0 kW (23.98 dBk)	43.5 kW (16.38 dBk)	26.50 (14.23dB)	6.63 (8.21dB)	21.37 (13.30dB)	5.34 (7.28dB)

AZIMUTH PATTERN Horizontal Polarization

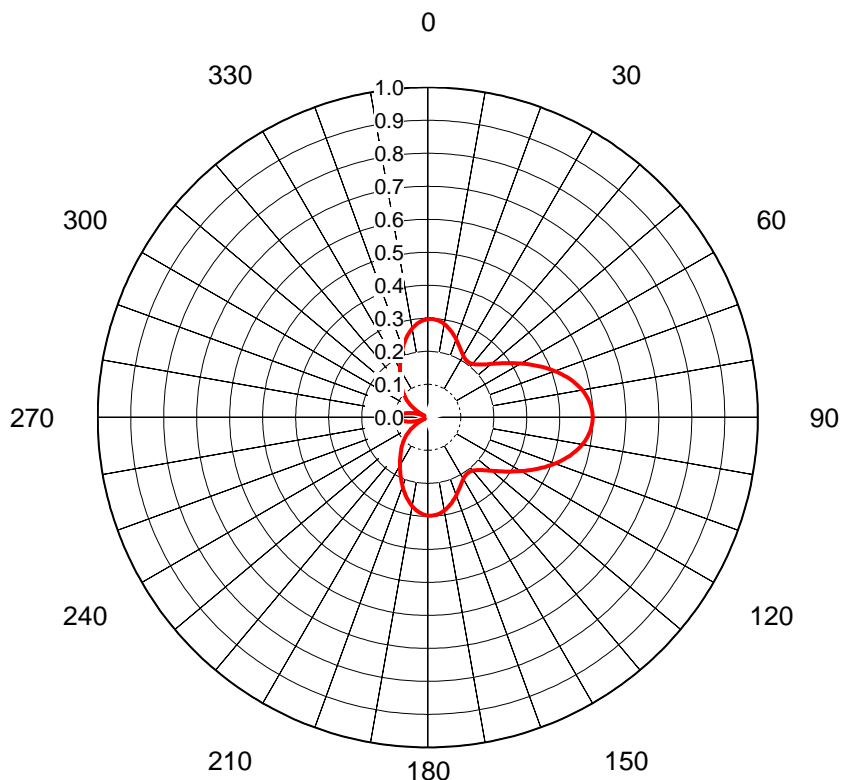
Proposal No. **C-70464-5**
 Date **21-Feb-18**
 Call Letters **WEUX**
 Channel **21**
 Frequency **515 MHz**
 Antenna Type **TFU-20ETT/VP-R 4C160**
 Gain **1.58 (2dB)**
Calculated

Drawing # **TFU-4C160-49**



Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.967	36	0.981	72	0.926	108	0.926	144	0.981	180	0.967	216	0.589	252	0.235	288	0.235	324	0.589
1	0.969	37	0.978	73	0.932	109	0.921	145	0.984	181	0.963	217	0.574	253	0.231	289	0.239	325	0.605
2	0.972	38	0.974	74	0.938	110	0.915	146	0.988	182	0.960	218	0.559	254	0.228	290	0.243	326	0.620
3	0.975	39	0.970	75	0.944	111	0.910	147	0.990	183	0.955	219	0.544	255	0.225	291	0.247	327	0.635
4	0.977	40	0.965	76	0.950	112	0.906	148	0.992	184	0.951	220	0.529	256	0.222	292	0.252	328	0.651
5	0.979	41	0.961	77	0.956	113	0.902	149	0.994	185	0.946	221	0.514	257	0.219	293	0.257	329	0.666
6	0.981	42	0.956	78	0.961	114	0.898	150	0.996	186	0.941	222	0.500	258	0.217	294	0.262	330	0.681
7	0.983	43	0.951	79	0.967	115	0.895	151	0.997	187	0.936	223	0.486	259	0.215	295	0.268	331	0.696
8	0.985	44	0.946	80	0.972	116	0.892	152	0.998	188	0.930	224	0.472	260	0.213	296	0.274	332	0.711
9	0.986	45	0.941	81	0.977	117	0.890	153	0.999	189	0.923	225	0.458	261	0.211	297	0.280	333	0.726
10	0.988	46	0.935	82	0.982	118	0.888	154	1.000	190	0.916	226	0.445	262	0.209	298	0.287	334	0.740
11	0.989	47	0.930	83	0.986	119	0.888	155	1.000	191	0.909	227	0.432	263	0.208	299	0.294	335	0.754
12	0.990	48	0.925	84	0.989	120	0.887	156	1.000	192	0.901	228	0.420	264	0.207	300	0.301	336	0.768
13	0.992	49	0.920	85	0.992	121	0.888	157	1.000	193	0.892	229	0.408	265	0.206	301	0.309	337	0.781
14	0.993	50	0.915	86	0.995	122	0.889	158	1.000	194	0.884	230	0.396	266	0.205	302	0.317	338	0.795
15	0.994	51	0.910	87	0.997	123	0.890	159	0.999	195	0.874	231	0.385	267	0.205	303	0.326	339	0.807
16	0.995	52	0.906	88	0.999	124	0.892	160	0.998	196	0.864	232	0.374	268	0.204	304	0.334	340	0.820
17	0.996	53	0.902	89	0.999	125	0.895	161	0.998	197	0.854	233	0.364	269	0.204	305	0.344	341	0.831
18	0.997	54	0.898	90	1.000	126	0.898	162	0.997	198	0.843	234	0.353	270	0.204	306	0.353	342	0.843
19	0.998	55	0.895	91	0.999	127	0.902	163	0.996	199	0.831	235	0.344	271	0.204	307	0.364	343	0.854
20	0.998	56	0.892	92	0.999	128	0.906	164	0.995	200	0.820	236	0.334	272	0.204	308	0.374	344	0.864
21	0.999	57	0.890	93	0.997	129	0.910	165	0.994	201	0.807	237	0.326	273	0.205	309	0.380	345	0.874
22	1.000	58	0.888	94	0.995	130	0.915	166	0.993	202	0.795	238	0.317	274	0.205	310	0.396	346	0.884
23	1.000	59	0.888	95	0.992	131	0.920	167	0.992	203	0.781	239	0.309	275	0.206	311	0.408	347	0.892
24	1.000	60	0.887	96	0.989	132	0.925	168	0.990	204	0.768	240	0.301	276	0.207	312	0.420	348	0.901
25	1.000	61	0.888	97	0.986	133	0.930	169	0.989	205	0.754	241	0.294	277	0.208	313	0.432	349	0.909
26	1.000	62	0.888	98	0.982	134	0.935	170	0.988	206	0.740	242	0.287	278	0.209	314	0.445	350	0.916
27	0.999	63	0.890	99	0.977	135	0.941	171	0.986	207	0.726	243	0.280	279	0.211	315	0.458	351	0.923
28	0.998	64	0.892	100	0.972	136	0.946	172	0.985	208	0.711	244	0.274	280	0.213	316	0.472	352	0.930
29	0.997	65	0.895	101	0.967	137	0.951	173	0.983	209	0.696	245	0.268	281	0.215	317	0.486	353	0.936
30	0.996	66	0.898	102	0.961	138	0.956	174	0.981	210	0.681	246	0.262	282	0.217	318	0.500	354	0.941
31	0.994	67	0.902	103	0.956	139	0.961	175	0.979	211	0.666	247	0.257	283	0.219	319	0.514	355	0.946
32	0.992	68	0.906	104	0.950	140	0.965	176	0.977	212	0.651	248	0.252	284	0.222	320	0.529	356	0.951
33	0.990	69	0.910	105	0.944	141	0.970	177	0.975	213	0.635	249	0.247	285	0.225	321	0.544	357	0.955
34	0.988	70	0.915	106	0.938	142	0.974	178	0.972	214	0.620	250	0.243	286	0.228	322	0.559	358	0.960
35	0.984	71	0.921	107	0.932	143	0.978	179	0.969	215	0.605	251	0.239	287	0.231	323	0.574	359	0.963

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AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70464-5**
 Date **21-Feb-18**
 Call Letters **WEUX**
 Channel **21**
 Frequency **515 MHz**
 Antenna Type **TFU-20ETT/VP-R 4C160**
 Gain **3.75 (5.74dB)**
Calculated

Drawing # **4C160V-D14**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.298	36	0.208	72	0.425	108	0.425	144	0.208	180	0.298	216	0.141	252	0.036	288	0.036
1	0.298	37	0.208	73	0.433	109	0.418	145	0.208	181	0.297	217	0.136	253	0.040	289	0.031
2	0.298	38	0.209	74	0.440	110	0.410	146	0.209	182	0.295	218	0.132	254	0.045	290	0.026
3	0.298	39	0.210	75	0.446	111	0.402	147	0.210	183	0.294	219	0.128	255	0.050	291	0.021
4	0.297	40	0.211	76	0.453	112	0.394	148	0.212	184	0.292	220	0.124	256	0.054	292	0.016
5	0.297	41	0.213	77	0.459	113	0.385	149	0.214	185	0.289	221	0.120	257	0.059	293	0.012
6	0.295	42	0.216	78	0.465	114	0.377	150	0.216	186	0.287	222	0.117	258	0.063	294	0.011
7	0.294	43	0.219	79	0.470	115	0.368	151	0.219	187	0.284	223	0.113	259	0.066	295	0.012
8	0.292	44	0.222	80	0.475	116	0.360	152	0.221	188	0.280	224	0.109	260	0.070	296	0.015
9	0.290	45	0.226	81	0.480	117	0.351	153	0.225	189	0.277	225	0.105	261	0.073	297	0.019
10	0.287	46	0.230	82	0.484	118	0.343	154	0.228	190	0.273	226	0.101	262	0.076	298	0.024
11	0.284	47	0.235	83	0.488	119	0.334	155	0.232	191	0.269	227	0.097	263	0.079	299	0.030
12	0.282	48	0.240	84	0.491	120	0.326	156	0.235	192	0.264	228	0.093	264	0.081	300	0.035
13	0.278	49	0.246	85	0.494	121	0.318	157	0.239	193	0.260	229	0.088	265	0.083	301	0.040
14	0.275	50	0.252	86	0.496	122	0.309	158	0.243	194	0.255	230	0.084	266	0.085	302	0.046
15	0.271	51	0.258	87	0.498	123	0.301	159	0.247	195	0.250	231	0.080	267	0.086	303	0.051
16	0.267	52	0.265	88	0.499	124	0.294	160	0.251	196	0.245	232	0.075	268	0.087	304	0.056
17	0.264	53	0.271	89	0.500	125	0.286	161	0.256	197	0.239	233	0.071	269	0.087	305	0.061
18	0.260	54	0.279	90	0.500	126	0.279	162	0.260	198	0.234	234	0.066	270	0.087	306	0.066
19	0.256	55	0.286	91	0.500	127	0.271	163	0.264	199	0.228	235	0.061	271	0.087	307	0.071
20	0.251	56	0.294	92	0.499	128	0.265	164	0.267	200	0.223	236	0.056	272	0.087	308	0.075
21	0.247	57	0.301	93	0.498	129	0.258	165	0.271	201	0.217	237	0.051	273	0.086	309	0.080
22	0.243	58	0.309	94	0.496	130	0.252	166	0.275	202	0.211	238	0.046	274	0.085	310	0.084
23	0.239	59	0.318	95	0.494	131	0.246	167	0.278	203	0.206	239	0.040	275	0.083	311	0.088
24	0.235	60	0.326	96	0.491	132	0.240	168	0.282	204	0.200	240	0.035	276	0.081	312	0.093
25	0.232	61	0.334	97	0.488	133	0.235	169	0.284	205	0.195	241	0.030	277	0.079	313	0.097
26	0.228	62	0.343	98	0.484	134	0.230	170	0.287	206	0.189	242	0.024	278	0.076	314	0.101
27	0.225	63	0.351	99	0.480	135	0.226	171	0.290	207	0.184	243	0.019	279	0.073	315	0.105
28	0.221	64	0.360	100	0.475	136	0.222	172	0.292	208	0.178	244	0.015	280	0.070	316	0.109
29	0.219	65	0.368	101	0.470	137	0.219	173	0.294	209	0.173	245	0.012	281	0.066	317	0.113
30	0.216	66	0.377	102	0.465	138	0.216	174	0.295	210	0.168	246	0.011	282	0.063	318	0.117
31	0.214	67	0.385	103	0.459	139	0.213	175	0.297	211	0.163	247	0.012	283	0.059	319	0.120
32	0.212	68	0.394	104	0.453	140	0.211	176	0.297	212	0.159	248	0.016	284	0.054	320	0.124
33	0.210	69	0.402	105	0.446	141	0.210	177	0.298	213	0.154	249	0.021	285	0.050	321	0.128
34	0.209	70	0.410	106	0.440	142	0.209	178	0.298	214	0.149	250	0.026	286	0.045	322	0.132
35	0.208	71	0.418	107	0.433	143	0.208	179	0.298	215	0.145	251	0.031	287	0.040	323	0.136

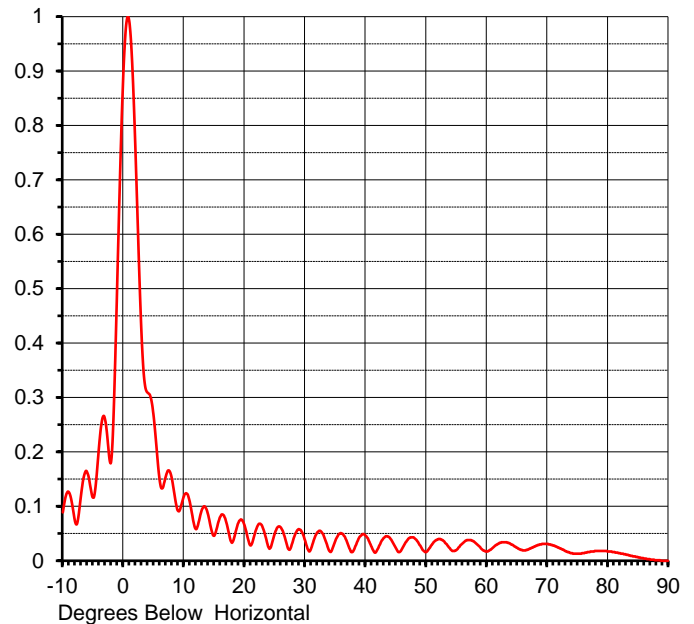
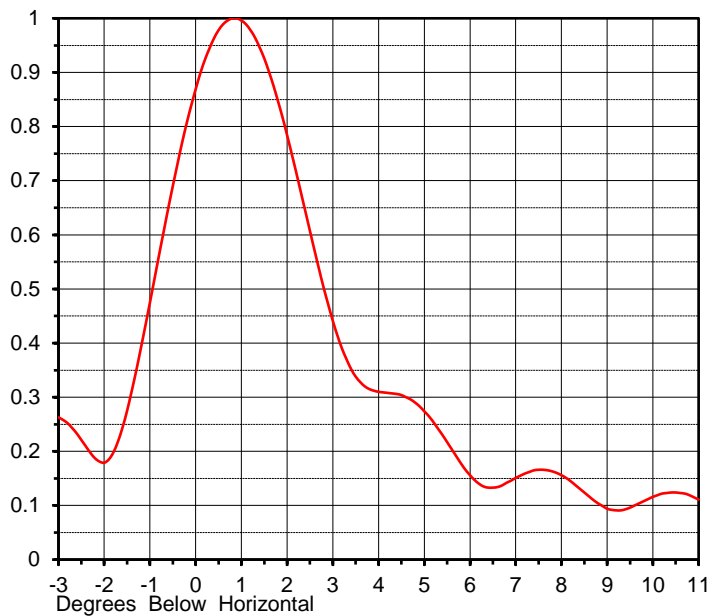
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ELEVATION PATTERN

Proposal No. **C-70464-5**
 Date **21-Feb-18**
 Call Letters **WEUX**
 Channel **21**
 Frequency **515 MHz**
 Antenna Type **TFU-20ETT/VP-R 4C160**

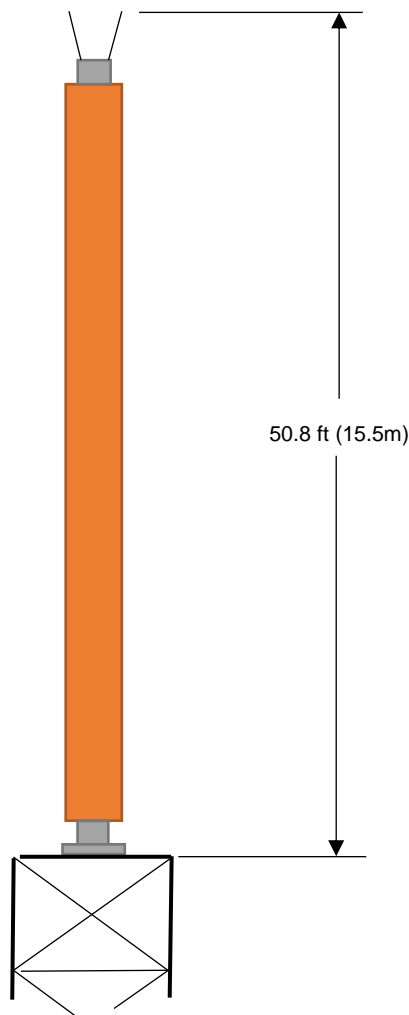
RMS Directivity at Main Lobe **18.5 (12.67 dB)**
 RMS Directivity at Horizontal **14.0 (11.46 dB)**
Calculated

Beam Tilt **0.75 deg**
 Drawing Number **20E185075**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.089	10.0	0.119	30.0	0.037	50.0	0.016	70.0	0.031
-9.0	0.126	11.0	0.106	31.0	0.023	51.0	0.031	71.0	0.028
-8.0	0.073	12.0	0.058	32.0	0.052	52.0	0.040	72.0	0.023
-7.0	0.120	13.0	0.095	33.0	0.048	53.0	0.035	73.0	0.018
-6.0	0.163	14.0	0.084	34.0	0.018	54.0	0.021	74.0	0.014
-5.0	0.116	15.0	0.046	35.0	0.037	55.0	0.020	75.0	0.013
-4.0	0.213	16.0	0.081	36.0	0.050	56.0	0.032	76.0	0.014
-3.0	0.258	17.0	0.070	37.0	0.032	57.0	0.038	77.0	0.016
-2.0	0.185	18.0	0.034	38.0	0.019	58.0	0.034	78.0	0.018
-1.0	0.519	19.0	0.070	39.0	0.044	59.0	0.023	79.0	0.018
0.0	0.898	20.0	0.065	40.0	0.046	60.0	0.017	80.0	0.017
1.0	0.989	21.0	0.028	41.0	0.025	61.0	0.024	81.0	0.016
2.0	0.750	22.0	0.060	42.0	0.022	62.0	0.032	82.0	0.014
3.0	0.414	23.0	0.061	43.0	0.042	63.0	0.034	83.0	0.011
4.0	0.309	24.0	0.024	44.0	0.042	64.0	0.030	84.0	0.009
5.0	0.265	25.0	0.050	45.0	0.023	65.0	0.024	85.0	0.006
6.0	0.147	26.0	0.061	46.0	0.022	66.0	0.019	86.0	0.004
7.0	0.155	27.0	0.029	47.0	0.040	67.0	0.022	87.0	0.002
8.0	0.151	28.0	0.037	48.0	0.042	68.0	0.027	88.0	0.001
9.0	0.092	29.0	0.058	49.0	0.028	69.0	0.030	89.0	0.000
								90.0	0.000

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MECHANICAL SPECIFICATIONS

Proposal No. **C-70464-5**
 Date **21-Feb-18**
 Call Letters **WEUX**
 Channel **21**
 Frequency **515 MHz**
 Antenna Type **TFU-20ETT/VP-R 4C160**

Preliminary Specifications

Top Mounted

With ice TIA-222-G

Height AGL(z) 472 ft (143.9 m)
 Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II
 Exposure Category C
 Topography Category 1

Design Ice 0.5 in $t_{iz} = 1.30$ in
 Wind Speed w/Ice 50 m/h (80.5 km/h)

Mechanical Specifications

		without ice	with ice
Height with Lightning Protector	H4	50.8 ft (15.5m)	
Height less Lightning Protector	H2	46.8 ft (14.3m)	
Height of Center of Radiation	H3	23.4 ft (7.1m)	
Effective Projected Area	(EPA) _S	55.7 ft² (5.2m²)	130.8 ft² (12.2m²)
Moment Arm	D1	24.9 ft (7.6m)	25.5 ft (7.8m)

Weight W 7150 lb (3.2t) 9150 lb (4.2t)

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

Prepared by: KLP
 Rev. No.5 by: JBC

Date: 21-Feb-18
 Date: 21-Feb-18

ME:
 EE:

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Summary

Proposal No.	C-70464-5
Date	21-Feb-18
Call Letters	WEUX
Channel	21
Frequency	515 MHz
Antenna Type	TFU-20ETT/VP-R 4C160

Antenna

	Hpol	Vpol
ERP:	1000.0 kW (30.00 dBk)	250.0 kW (23.98 dBk)
Peak Gain*	26.50 (14.23 dB)	6.63 (8.21 dB)

Antenna Input Power	37.7 kW (15.77 dBk)
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Transmission Line

Type:	Rigid	Attenuation:	(0.62 dB)
Size:	6-1/8"	Efficiency:	86.8%
Impedance:	75 Ohm		
Length:	560 ft	170.7 m	

Transmitter Output

43.5 kW (16.38 dBk)

Transmitter filter losses not included

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

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