



Antenna Model: **TUM25-04-16/64H-R-1-T**

Proposal Number: **C-70461-3**  
Date: **13-Apr-18**  
Customer: **Nexstar**  
Location: **Joplin, MO**

### Electrical Specifications

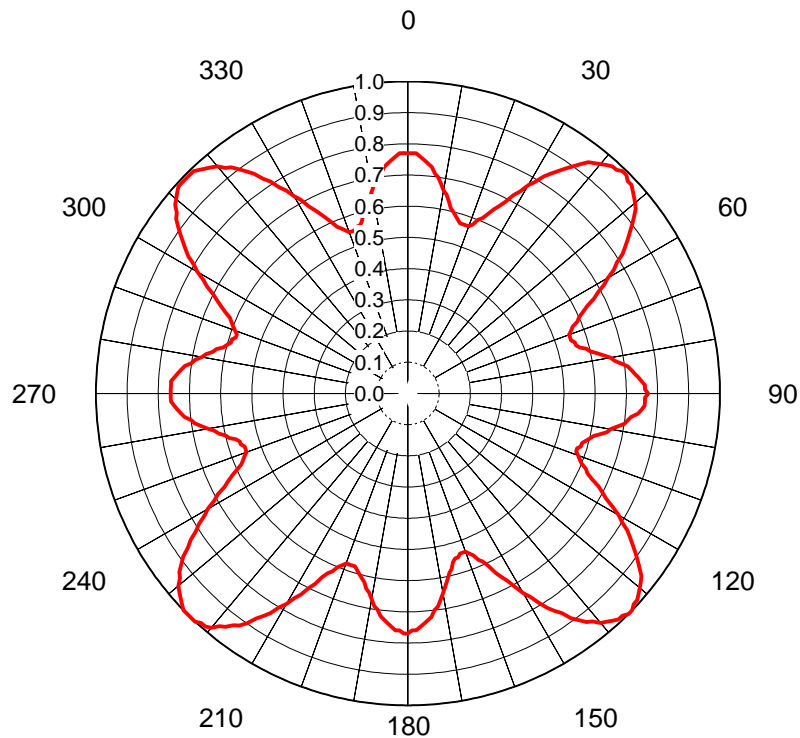
Polarization: **Elliptical**  
Azimuth Pattern: **Omni**  
Antenna Input: **8-3/16"** **75 Ohm** **EIA/DCA**  
VSWR: **Channel** **1.10 : 1** **Band** **1.15 : 1**  
Bandwidth: **120 MHz**  
Rated Input Power: **90 kW** **(19.54 dBk)** **Maximum combined average power**

### Mechanical Specifications

Mounting: **Top Mounted**  
Environmental Protection: **Full Radome**  
Height: **58.6 ft (17.9m)** less Lightning Protector **62.6 ft (19.1m)** with Lightning Protector  
Weight: **15800 lb (7.2t)**  
Effective Projected Area: **160 ft<sup>2</sup> (14.9m<sup>2</sup>)** **TIA-222-G** Basic Wind Speed: **90 m/h (144.8 km/h)**

### Channel Specifications

	Call	CH	Freq	Hpol ERP	Vpol ERP	TPO	RMS Main Lobe Hpol Gain	RMS Main Lobe Vpol Gain	RMS at Horizontal Hpol Gain	RMS at Horizontal Vpol Gain
1	KSNF	17	491 MHz	525 kW (27.20 dBk)	131 kW (21.18 dBk)	30.1 kW (14.78 dBk)	22.80 (13.58dB)	5.70 (7.56dB)	13.66 (11.35dB)	3.41 (5.33dB)
2	KODE	23	527 MHz	700.0 kW (28.45 dBk)	175.0 kW (22.43 dBk)	40.1 kW (16.03 dBk)	22.96 (13.61dB)	5.74 (7.59dB)	12.98 (11.13dB)	3.25 (5.11dB)

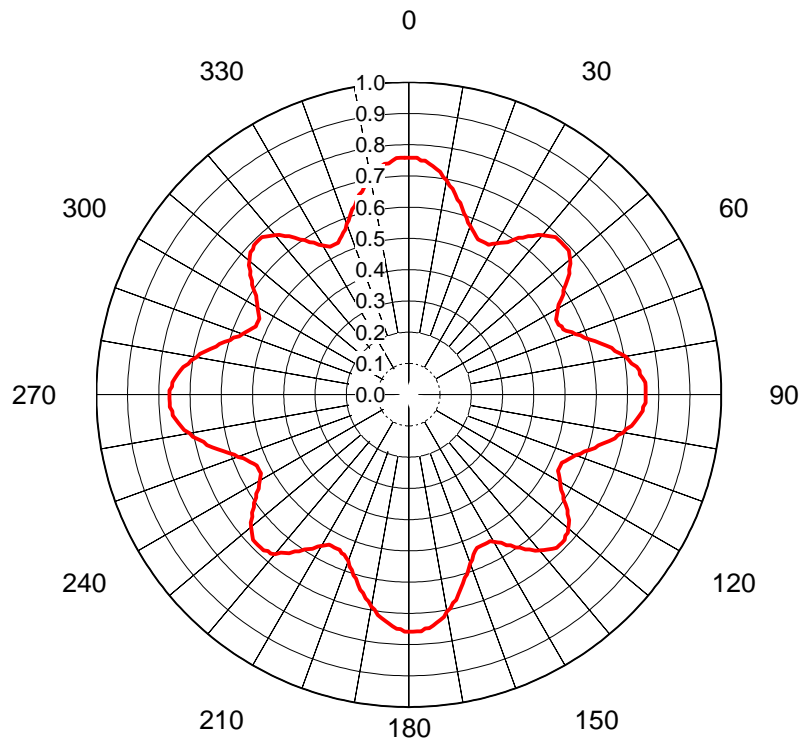


## AZIMUTH PATTERN Horizontal Polarization

Proposal No. **C-70461-3**  
 Date **13-Apr-18**  
 Call Letters **KODE**  
 Channel **23**  
 Frequency **527 MHz**  
 Antenna Type **TUM25-04-16/64H-R-1-T**  
 Gain **1.77 (2.47dB)**  
 Calculated  
 Circularity **+/- 3.0 dB**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.770	36	0.900	72	0.550	108	0.570	144	0.890	180	0.770	216	0.920	252	0.550	288	0.580
1	0.770	37	0.920	73	0.560	109	0.570	145	0.860	181	0.770	217	0.930	253	0.560	289	0.580
2	0.770	38	0.940	74	0.560	110	0.580	146	0.840	182	0.760	218	0.950	254	0.560	290	0.590
3	0.760	39	0.950	75	0.570	111	0.590	147	0.820	183	0.760	219	0.960	255	0.570	291	0.600
4	0.750	40	0.960	76	0.590	112	0.600	148	0.790	184	0.750	220	0.980	256	0.590	292	0.610
5	0.740	41	0.970	77	0.600	113	0.620	149	0.760	185	0.740	221	0.990	257	0.600	293	0.620
6	0.730	42	0.980	78	0.620	114	0.630	150	0.740	186	0.730	222	0.990	258	0.620	294	0.640
7	0.710	43	0.980	79	0.640	115	0.650	151	0.710	187	0.720	223	1.000	259	0.630	295	0.660
8	0.700	44	0.990	80	0.660	116	0.680	152	0.680	188	0.700	224	1.000	260	0.650	296	0.680
9	0.680	45	0.990	81	0.670	117	0.700	153	0.660	189	0.690	225	1.000	261	0.670	297	0.700
10	0.660	46	0.980	82	0.690	118	0.720	154	0.640	190	0.670	226	1.000	262	0.690	298	0.730
11	0.650	47	0.980	83	0.710	119	0.750	155	0.610	191	0.650	227	0.990	263	0.700	299	0.750
12	0.630	48	0.970	84	0.720	120	0.780	156	0.590	192	0.640	228	0.980	264	0.720	300	0.780
13	0.610	49	0.960	85	0.730	121	0.800	157	0.580	193	0.620	229	0.970	265	0.730	301	0.800
14	0.600	50	0.950	86	0.740	122	0.830	158	0.560	194	0.610	230	0.960	266	0.740	302	0.830
15	0.590	51	0.940	87	0.750	123	0.850	159	0.550	195	0.600	231	0.940	267	0.750	303	0.850
16	0.580	52	0.920	88	0.760	124	0.870	160	0.540	196	0.590	232	0.930	268	0.760	304	0.870
17	0.570	53	0.900	89	0.760	125	0.890	161	0.540	197	0.580	233	0.910	269	0.760	305	0.890
18	0.570	54	0.880	90	0.770	126	0.910	162	0.540	198	0.580	234	0.890	270	0.760	306	0.910
19	0.570	55	0.860	91	0.760	127	0.930	163	0.550	199	0.580	235	0.860	271	0.760	307	0.930
20	0.570	56	0.840	92	0.760	128	0.950	164	0.550	200	0.580	236	0.840	272	0.760	308	0.940
21	0.580	57	0.820	93	0.760	129	0.960	165	0.560	201	0.590	237	0.810	273	0.760	309	0.960
22	0.600	58	0.790	94	0.750	130	0.970	166	0.580	202	0.600	238	0.790	274	0.750	310	0.970
23	0.610	59	0.770	95	0.740	131	0.980	167	0.590	203	0.620	239	0.760	275	0.740	311	0.980
24	0.630	60	0.740	96	0.720	132	0.990	168	0.610	204	0.630	240	0.740	276	0.730	312	0.990
25	0.650	61	0.720	97	0.710	133	0.990	169	0.630	205	0.650	241	0.710	277	0.720	313	0.990
26	0.670	62	0.690	98	0.700	134	1.000	170	0.650	206	0.680	242	0.690	278	0.700	314	0.990
27	0.690	63	0.670	99	0.680	135	1.000	171	0.670	207	0.700	243	0.660	279	0.690	315	0.990
28	0.720	64	0.640	100	0.660	136	0.990	172	0.690	208	0.730	244	0.640	280	0.670	316	0.990
29	0.740	65	0.620	101	0.650	137	0.990	173	0.700	209	0.750	245	0.620	281	0.660	317	0.980
30	0.770	66	0.600	102	0.630	138	0.980	174	0.720	210	0.780	246	0.600	282	0.640	318	0.970
31	0.790	67	0.590	103	0.610	139	0.970	175	0.730	211	0.800	247	0.580	283	0.630	319	0.960
32	0.820	68	0.570	104	0.600	140	0.960	176	0.740	212	0.830	248	0.570	284	0.610	320	0.950
33	0.840	69	0.560	105	0.590	141	0.940	177	0.750	213	0.850	249	0.560	285	0.600	321	0.930
34	0.860	70	0.550	106	0.580	142	0.930	178	0.760	214	0.870	250	0.550	286	0.590	322	0.920
35	0.880	71	0.550	107	0.580	143	0.910	179	0.760	215	0.900	251	0.550	287	0.590	323	0.900

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## AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-70461-3**  
 Date **13-Apr-18**  
 Call Letters **KODE**  
 Channel **23**  
 Frequency **527 MHz**  
 Antenna Type **TUM25-04-16/64H-R-1-T**  
 Gain **1.42 (1.53dB)**  
 Calculated  
 Circularity **+/- 2.0 dB**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.758	36	0.620	72	0.590	108	0.590	144	0.605	180	0.758	216	0.620	252	0.605	288	0.590
1	0.758	37	0.636	73	0.605	109	0.582	145	0.597	181	0.758	217	0.636	253	0.620	289	0.574
2	0.758	38	0.643	74	0.620	110	0.567	146	0.582	182	0.751	218	0.643	254	0.636	290	0.567
3	0.751	39	0.659	75	0.636	111	0.559	147	0.574	183	0.751	219	0.651	255	0.651	291	0.559
4	0.751	40	0.666	76	0.651	112	0.551	148	0.559	184	0.743	220	0.666	256	0.666	292	0.551
5	0.743	41	0.674	77	0.666	113	0.544	149	0.551	185	0.735	221	0.674	257	0.674	293	0.544
6	0.735	42	0.682	78	0.674	114	0.536	150	0.544	186	0.728	222	0.674	258	0.689	294	0.536
7	0.728	43	0.689	79	0.689	115	0.536	151	0.536	187	0.720	223	0.682	259	0.705	295	0.536
8	0.720	44	0.689	80	0.705	116	0.536	152	0.536	188	0.712	224	0.682	260	0.712	296	0.536
9	0.705	45	0.689	81	0.712	117	0.536	153	0.536	189	0.697	225	0.682	261	0.728	297	0.536
10	0.697	46	0.689	82	0.720	118	0.544	154	0.536	190	0.689	226	0.682	262	0.735	298	0.544
11	0.682	47	0.689	83	0.735	119	0.551	155	0.536	191	0.674	227	0.682	263	0.743	299	0.551
12	0.674	48	0.689	84	0.743	120	0.559	156	0.536	192	0.666	228	0.674	264	0.751	300	0.559
13	0.659	49	0.682	85	0.743	121	0.567	157	0.544	193	0.651	229	0.666	265	0.758	301	0.567
14	0.643	50	0.674	86	0.751	122	0.574	158	0.551	194	0.643	230	0.659	266	0.758	302	0.574
15	0.636	51	0.666	87	0.758	123	0.590	159	0.567	195	0.628	231	0.651	267	0.766	303	0.582
16	0.620	52	0.651	88	0.758	124	0.597	160	0.574	196	0.613	232	0.636	268	0.766	304	0.597
17	0.605	53	0.643	89	0.758	125	0.613	161	0.590	197	0.605	233	0.628	269	0.766	305	0.613
18	0.597	54	0.628	90	0.758	126	0.628	162	0.605	198	0.590	234	0.613	270	0.766	306	0.620
19	0.582	55	0.613	91	0.758	127	0.636	163	0.613	199	0.582	235	0.605	271	0.766	307	0.636
20	0.574	56	0.597	92	0.758	128	0.651	164	0.628	200	0.567	236	0.590	272	0.758	308	0.643
21	0.567	57	0.590	93	0.751	129	0.659	165	0.643	201	0.559	237	0.582	273	0.758	309	0.659
22	0.559	58	0.574	94	0.751	130	0.666	166	0.659	202	0.551	238	0.567	274	0.751	310	0.666
23	0.551	59	0.559	95	0.743	131	0.674	167	0.674	203	0.551	239	0.559	275	0.743	311	0.674
24	0.544	60	0.551	96	0.735	132	0.674	168	0.682	204	0.544	240	0.551	276	0.735	312	0.682
25	0.544	61	0.544	97	0.728	133	0.682	169	0.697	205	0.544	241	0.544	277	0.728	313	0.682
26	0.544	62	0.536	98	0.720	134	0.682	170	0.705	206	0.544	242	0.536	278	0.712	314	0.689
27	0.544	63	0.528	99	0.705	135	0.682	171	0.720	207	0.544	243	0.536	279	0.705	315	0.689
28	0.544	64	0.528	100	0.697	136	0.682	172	0.728	208	0.544	244	0.536	280	0.689	316	0.689
29	0.551	65	0.528	101	0.682	137	0.674	173	0.735	209	0.551	245	0.536	281	0.682	317	0.689
30	0.559	66	0.536	102	0.674	138	0.666	174	0.743	210	0.559	246	0.544	282	0.666	318	0.682
31	0.567	67	0.536	103	0.659	139	0.659	175	0.751	211	0.567	247	0.551	283	0.651	319	0.674
32	0.574	68	0.544	104	0.643	140	0.651	176	0.751	212	0.582	248	0.559	284	0.636	320	0.666
33	0.582	69	0.559	105	0.628	141	0.643	177	0.758	213	0.590	249	0.567	285	0.628	321	0.659
34	0.597	70	0.567	106	0.620	142	0.628	178	0.758	214	0.597	250	0.582	286	0.613	322	0.643
35	0.613	71	0.582	107	0.605	143	0.620	179	0.758	215	0.613	251	0.590	287	0.597	323	0.636

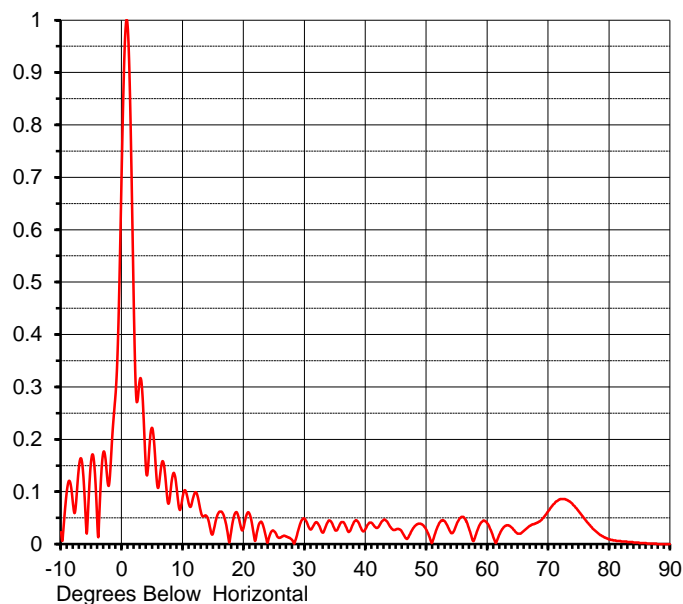
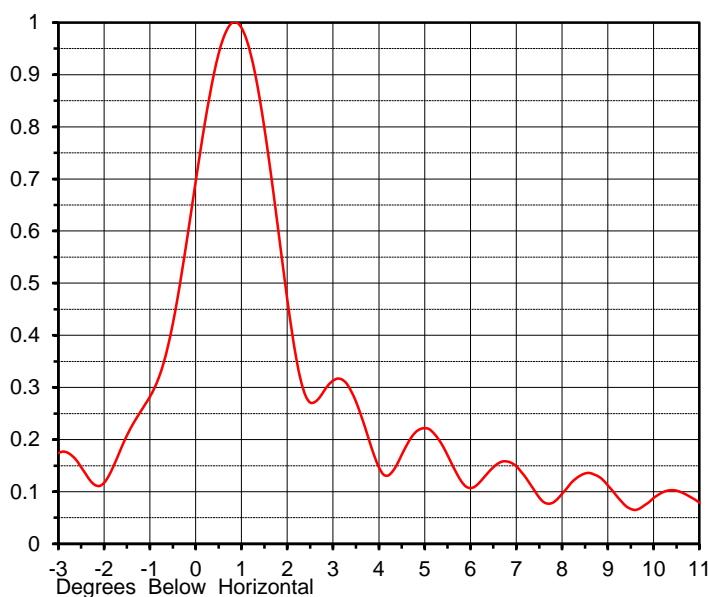
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## ELEVATION PATTERN

Proposal No. **C-70461-3**  
 Date **13-Apr-18**  
 Call Letters **KODE**  
 Channel **23**  
 Frequency **527 MHz**  
 Antenna Type **TUM25-04-16/64H-R-1-T**

RMS Directivity at Main Lobe **28.7 ( 14.58 dB )**  
 RMS Directivity at Horizontal **16.2 ( 12.10 dB )**  
**Calculated**

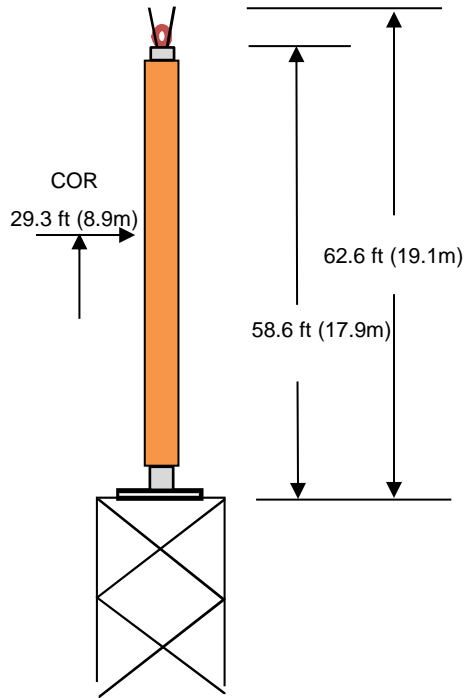
Beam Tilt **0.75 deg**  
 Pattern Number **16U287075**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.023	10.0	0.094	30.0	0.048	50.0	0.026	70.0	0.064
-9.0	0.107	11.0	0.075	31.0	0.028	51.0	0.007	71.0	0.078
-8.0	0.071	12.0	0.099	32.0	0.041	52.0	0.039	72.0	0.086
-7.0	0.155	13.0	0.058	33.0	0.022	53.0	0.043	73.0	0.084
-6.0	0.055	14.0	0.051	34.0	0.045	54.0	0.021	74.0	0.075
-5.0	0.166	15.0	0.025	35.0	0.026	55.0	0.041	75.0	0.062
-4.0	0.023	16.0	0.062	36.0	0.042	56.0	0.052	76.0	0.047
-3.0	0.177	17.0	0.041	37.0	0.026	57.0	0.027	77.0	0.033
-2.0	0.130	18.0	0.032	38.0	0.041	58.0	0.016	78.0	0.022
-1.0	0.299	19.0	0.056	39.0	0.036	59.0	0.042	79.0	0.014
0.0	0.752	20.0	0.035	40.0	0.030	60.0	0.039	80.0	0.009
1.0	0.970	21.0	0.055	41.0	0.040	61.0	0.011	81.0	0.007
2.0	0.408	22.0	0.014	42.0	0.032	62.0	0.020	82.0	0.005
3.0	0.317	23.0	0.040	43.0	0.047	63.0	0.035	83.0	0.004
4.0	0.133	24.0	0.008	44.0	0.033	64.0	0.031	84.0	0.003
5.0	0.220	25.0	0.024	45.0	0.028	65.0	0.020	85.0	0.002
6.0	0.110	26.0	0.013	46.0	0.022	66.0	0.026	86.0	0.002
7.0	0.139	27.0	0.014	47.0	0.013	67.0	0.035	87.0	0.001
8.0	0.106	28.0	0.006	48.0	0.034	68.0	0.040	88.0	0.000
9.0	0.102	29.0	0.030	49.0	0.039	69.0	0.049	89.0	0.000
								90.0	0.000

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## MECHANICAL SPECIFICATIONS



Proposal No. **C-70461-3**  
 Date **13-Apr-18**  
 Call Letters **KSNF**  
 Channel **17**  
 Frequency **491 MHz**  
 Antenna Type **TUM25-04-16/64H-R-1-T**

### Preliminary Specifications

#### Top Mounted

#### With ice TIA-222-G

Height AGL(z) 1057 ft (322.2 m)  
 Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II  
 Exposure Category C  
 Topography Category 1

Design Ice 0.75 in  $t_{iz} = 2.10$  in  
 Wind Speed w/Ice 40 m/h (64.4 km/h)

#### Mechanical Specifications

		without ice	with ice
Height with Lightning Protector	H4	62.6 ft (19.1m)	
Height less Lightning Protector	H2	58.6 ft (17.9m)	
Height of Center of Radiation	H3	29.3 ft (8.9m)	
Effective Projected Area	(EPA) <sub>S</sub>	160 ft <sup>2</sup> (14.9m <sup>2</sup> )	374.3 ft <sup>2</sup> (34.8m <sup>2</sup> )
Moment Arm	D1	29.8 ft (9.1m)	30.5 ft (9.3m)

Weight W 15800 lb (7.2t) 24200 lb (11t)

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

Prepared by: JBC

Date: 13-Apr-18

ME:

RS

EE:

Rev. No.3 by: JBC

Date: 13-Apr-18

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## Summary

Proposal No.	<b>C-70461-3</b>
Date	<b>13-Apr-18</b>
Call Letters	<b>KODE</b>
Channel	<b>23</b>
Frequency	<b>527 MHz</b>
Antenna Type	<b>TUM25-04-16/64H-R-1-T</b>

## Antenna

		Hpol		Vpol
ERP:	<b>700 kW</b>	<b>( 28.45 dBk )</b>		<b>175 kW ( 22.43 dBk )</b>
RMS Gain*	22.96	( 13.61 dB )		5.74 ( 7.59 dB)

<b>Antenna Input Power</b>	<b>30.5 kW ( 14.84 dBk )</b>
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## Transmission Line

Type:	<b>Rigid Digiline</b>	Attenuation:	<b>( 0.89 dB )</b>
Size:	<b>8-3/16"</b>	Efficiency:	<b>81.4%</b>
Impedance:	<b>75 Ohm</b>		
Length:	<b>1070 ft</b>	<b>326.1 m</b>	

## Combiner Losses

Attenuation	<b>( 0.30 dB)</b>
Efficiency	<b>93.3%</b>

## Combiner Input

<b>40.1 kW ( 16.03 dBk )</b>
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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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