



KUHT-TV

ATSC-1.0

Directional

Channel: D8



THE JAMPRO JCPD 4-DIPOLE FLAT PANEL ANTENNA

The JAMPRO JCPD antenna is a circularly polarized 4-dipole flat panel antenna system. Rugged galvanized steel construction insures many years of dependable performance in even the harshest environments. Protective lightweight dipole radomes may be added as protection against heavy ice buildup. The JCPD antenna has proven to provide excellent bandwidth, with typical VSWR of $<1.1:1$ or better. Many standard and custom directional patterns are available to fit any of your coverage requirements.

Band I (54-88 mhz)

Band II (87.5-108 mhz.)

Band III (174-230 mhz.)

**Excellent for multi-frequency,
broadband applications**

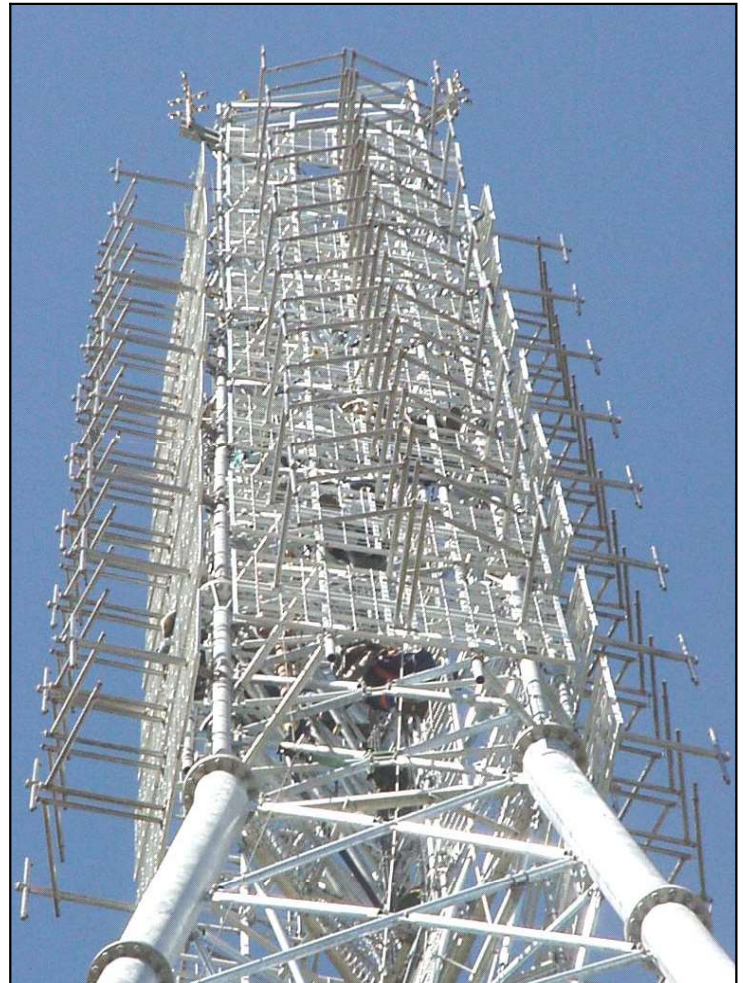
**Omni-directional or custom directional
patterns available**

**Rugged construction of stainless steel,
marine brass and hot dipped galvanized steel**

All insulators constructed from virgin Teflon

Radomes & custom mounting brackets available

Pressurized feed system and dipoles



The design of this circularly polarized antenna may be configured to include varying levels of vertical polarization, with results ranging from small amounts of elliptical polarization to full circular polarization.



# Bays	Panels per Bay	Gain (times)	Gain (dB)	Height (ft/m)	Projected Area (sq. ft)
1	2	1.6	2	7ft / 2.13m	Contact Factory
	3	1.1	0.4		
	4	0.8	-1		
2	2	3.2	5.1	17ft / 5.18m	
	3	2.2	3.4		
	4	1.6	2		
4	2	6.5	8.1	37ft / 11.27m	
	3	4.5	6.5		
	4	3.3	5.2		
6	2	9.8	9.9	57ft / 17.87m	
	3	6.8	8.3		
	4	4.9	6.9		
8	2	13.2	11.2	77ft / 23.47m	
	3	9.2	9.6		
	4	6.6	8.2		
10	2	16.5	12.17	97ft / 29.57m	
	3	11.0	10.4		
	4	8.25	9.15		
12	2	19.8	12.96	117ft / 35.66m	
	3	13.2	11.2		
	4	9.9	9.95		

*Values provided average/RMS gains; All other stated gains are Peak gains. Gains do not include losses for feed system beam tilt or null fill.

NOTES:

- Weights and wind loads contact factory
- Total area shown in feet and are subject to change.
- All inputs EIA flange, female, 50 ohm.
- Polarization is circular.
- Input power capability available in many different ratings.
- Optimized bandwidth over nominal 50 ohm VSWR of 1.1:1 available. Contact factory for details.

- Power gain is based on half wave dipole in free space.
- Radomes optional. Contact factory for details.
- Weights and wind loads calculated without ice.
- All specifications are subject to change.

OPTIONS:

Options available include FCC-Directionalization, Pattern Measurement Service, Beam tilt and Null fill, Special mounting brackets.

Non-ionizing Radiation

Since many factors contribute to a station's compliance with the FCC exposure guidelines for radio frequency radiation, JAMPRO ANTENNAS, INC. cannot accept any responsibility in this matter. The station must examine and determine its status based on each individual situation.

*All specifications are subject to change without notice.



VHF ANTENNA SPECIFICATIONS

ATSC-1.0

<u>PREPARED FOR:</u>	Houston Public Media / KUHT-TV
<u>CHANNEL:</u>	8 (180 – 186 MHz)
<u>ANTENNA DESCRIPTION:</u>	4-Dipole Circularly Polarized VHF Panel Antenna
<u>ANTENNA TYPE:</u>	JCPD-10/4 (40) BIII

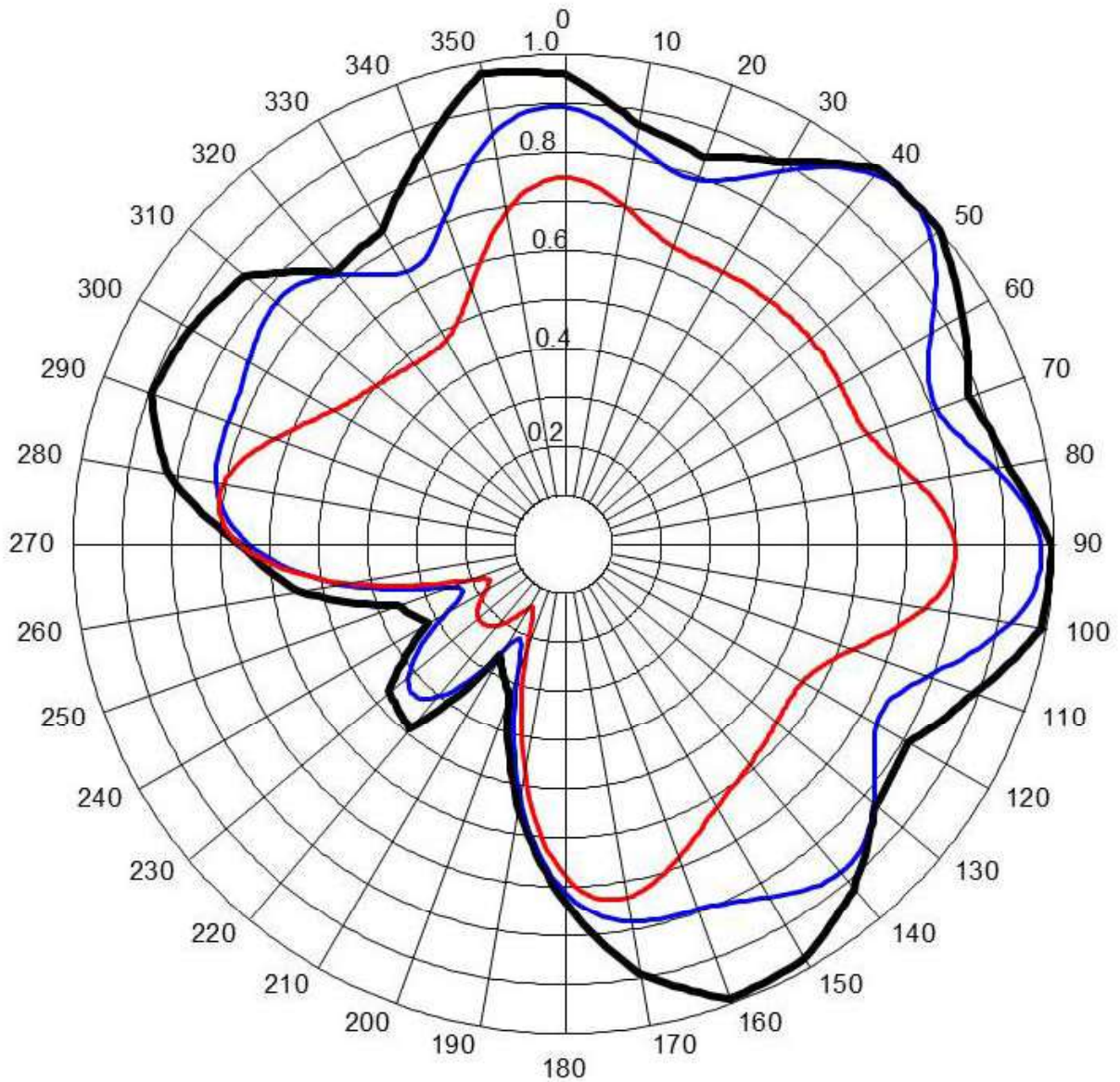
ELECTRICAL SPECIFICATIONS

Peak power gain:	9.7x / 9.86 dBd
Array Configuration:	10 bays, 4 directions (10-10-10-10, 40 panels)
Electrical beam tilt:	-1.25°
Null fill:	15%
Antenna VSWR:	1.1:1
Input power rating	40 kW Avg.
Antenna input impedance:	50 ohm

MECHANICAL SPECIFICATIONS

Overall height of antenna, est:	see mechanical drawing
Antenna net weight, est:	see mechanical drawing
Effective projected area (EPA):	see mechanical drawing
Antenna input connector size:	4-1/16" EIA

NOTE: THESE SPECIFICATIONS ARE PREDICTIONS BASED ON AVAILABLE DATA. THE ACTUAL PERFORMANCE MAY DIFFER FROM THESE DUE TO THE ELECTRICAL, MECHANICAL AND MEASURED LIMITATIONS AT YOUR FREQUENCIES.



Values in Relative Field (H-Pol & V-Pol)

Customer: Houston Public Media
Channel: 8
Site: KUHT-TV, ATSC-1.0

Model: JCPD-10/4(40) BIII
Description: VHF Panel Antenna
Notes: Black=existing; Blue=H-Pol; Red=V-Pol



Azimuth Pattern Tabulation (H-Pol)

<u>AZIMUTH</u>	<u>HPOL</u>	<u>dB</u>		<u>AZIMUTH</u>	<u>HPOL</u>	<u>dB</u>
0	0.892	-0.99		180	0.708	-3.00
5	0.870	-1.21		185	0.627	-4.05
10	0.832	-1.60		190	0.518	-5.71
15	0.799	-1.94		195	0.391	-8.15
20	0.793	-2.02		200	0.271	-11.35
25	0.822	-1.70		205	0.211	-13.51
30	0.878	-1.13		210	0.256	-11.83
35	0.941	-0.53		215	0.341	-9.33
40	0.986	-0.12		220	0.408	-7.78
45	1.000	0.00		225	0.434	-7.26
50	0.978	-0.19		230	0.412	-7.70
55	0.927	-0.66		235	0.352	-9.08
60	0.866	-1.25		240	0.274	-11.24
65	0.820	-1.72		245	0.227	-12.88
70	0.810	-1.83		250	0.262	-11.65
75	0.840	-1.52		255	0.357	-8.96
80	0.893	-0.98		260	0.465	-6.65
85	0.944	-0.50		265	0.564	-4.98
90	0.973	-0.24		270	0.641	-3.87
95	0.967	-0.29		275	0.693	-3.19
100	0.926	-0.67		280	0.720	-2.86
105	0.859	-1.32		285	0.728	-2.76
110	0.788	-2.07		290	0.728	-2.76
115	0.741	-2.61		295	0.731	-2.73
120	0.738	-2.64		300	0.743	-2.59
125	0.775	-2.21		305	0.759	-2.39
130	0.827	-1.65		310	0.767	-2.30
135	0.866	-1.25		315	0.755	-2.44
140	0.877	-1.14		320	0.719	-2.87
145	0.862	-1.29		325	0.672	-3.45
150	0.833	-1.59		330	0.643	-3.84
155	0.807	-1.86		335	0.655	-3.68
160	0.794	-2.00		340	0.709	-2.98
165	0.790	-2.05		345	0.782	-2.13
170	0.783	-2.12		350	0.847	-1.44
175	0.759	-2.40		355	0.886	-1.05

Customer: Houston Public Media
Channel: 8
Site: KUHT-TV, ATSC-1.0

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Azimuth Pattern Tabulation (V-Pol)

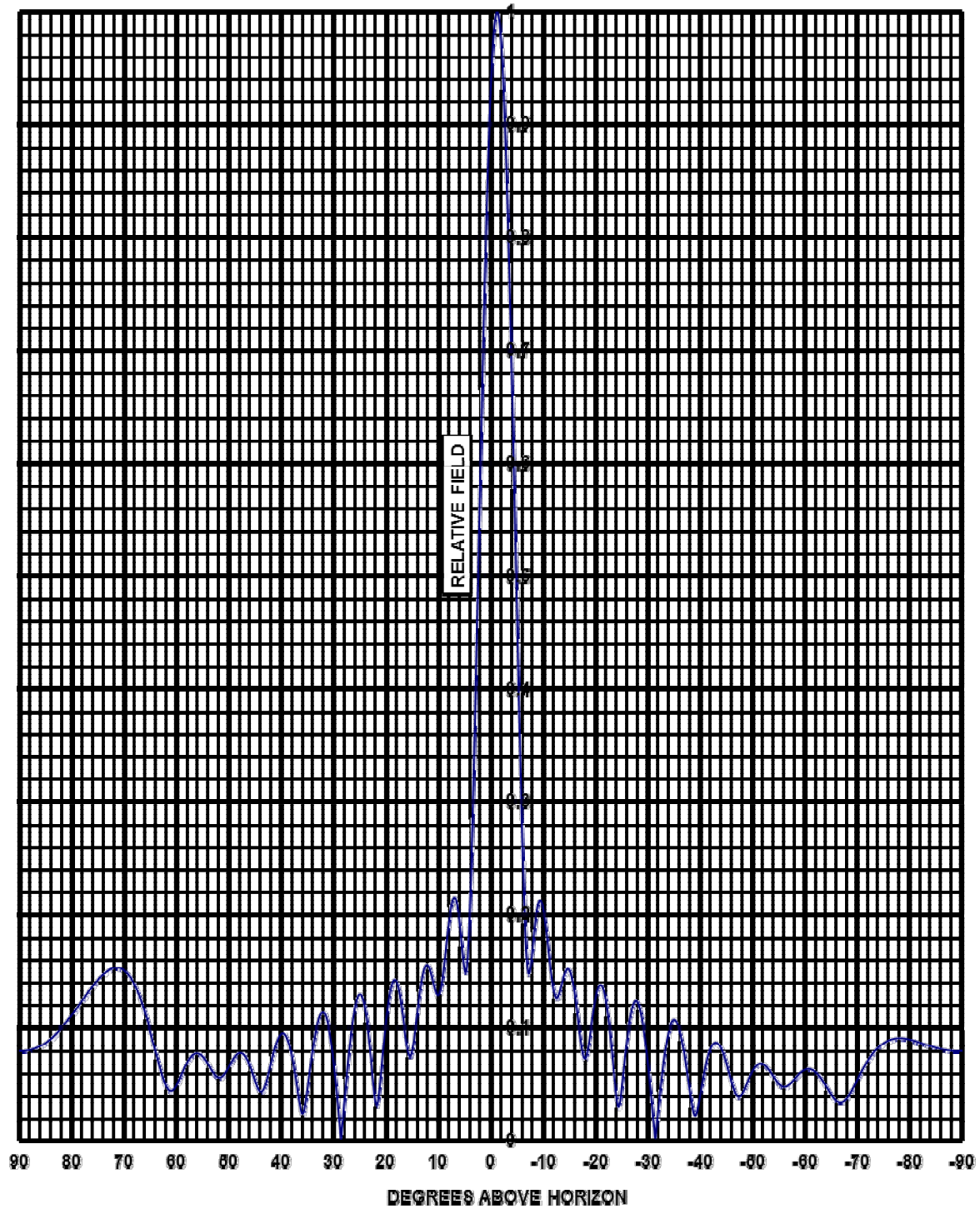
<u>AZIMUTH</u>	<u>VPOL</u>	<u>dB</u>	<u>AZIMUTH</u>	<u>VPOL</u>	<u>dB</u>
0	0.748	-0.59	180	0.674	-1.49
5	0.734	-0.75	185	0.584	-2.73
10	0.702	-1.13	190	0.463	-4.74
15	0.670	-1.54	195	0.331	-7.68
20	0.649	-1.82	200	0.213	-11.51
25	0.642	-1.91	205	0.147	-14.73
30	0.644	-1.88	210	0.154	-14.31
35	0.649	-1.82	215	0.189	-12.53
40	0.652	-1.78	220	0.217	-11.33
45	0.655	-1.74	225	0.230	-10.81
50	0.656	-1.73	230	0.228	-10.91
55	0.655	-1.74	235	0.210	-11.63
60	0.651	-1.78	240	0.181	-12.89
65	0.650	-1.80	245	0.170	-13.47
70	0.661	-1.66	250	0.219	-11.24
75	0.689	-1.30	255	0.327	-7.77
80	0.733	-0.76	260	0.456	-4.89
85	0.776	-0.27	265	0.574	-2.88
90	0.799	-0.01	270	0.661	-1.66
95	0.790	-0.11	275	0.705	-1.10
100	0.748	-0.58	280	0.705	-1.09
105	0.687	-1.32	285	0.675	-1.48
110	0.626	-2.13	290	0.628	-2.10
115	0.583	-2.75	295	0.582	-2.77
120	0.562	-3.06	300	0.544	-3.35
125	0.560	-3.10	305	0.518	-3.78
130	0.567	-2.99	310	0.501	-4.07
135	0.577	-2.83	315	0.488	-4.29
140	0.589	-2.66	320	0.479	-4.46
145	0.603	-2.45	325	0.474	-4.55
150	0.623	-2.17	330	0.481	-4.43
155	0.650	-1.80	335	0.507	-3.96
160	0.683	-1.37	340	0.557	-3.15
165	0.715	-0.98	345	0.622	-2.18
170	0.733	-0.75	350	0.686	-1.33
175	0.723	-0.87	355	0.732	-0.77

Customer: Houston Public Media
Channel: 8
Site: KUHT-TV, ATSC-1.0

Model: JCPD-10/4(40) BIII
Description: VHF Panel Antenna
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COMPUTED ELEVATION PATTERN

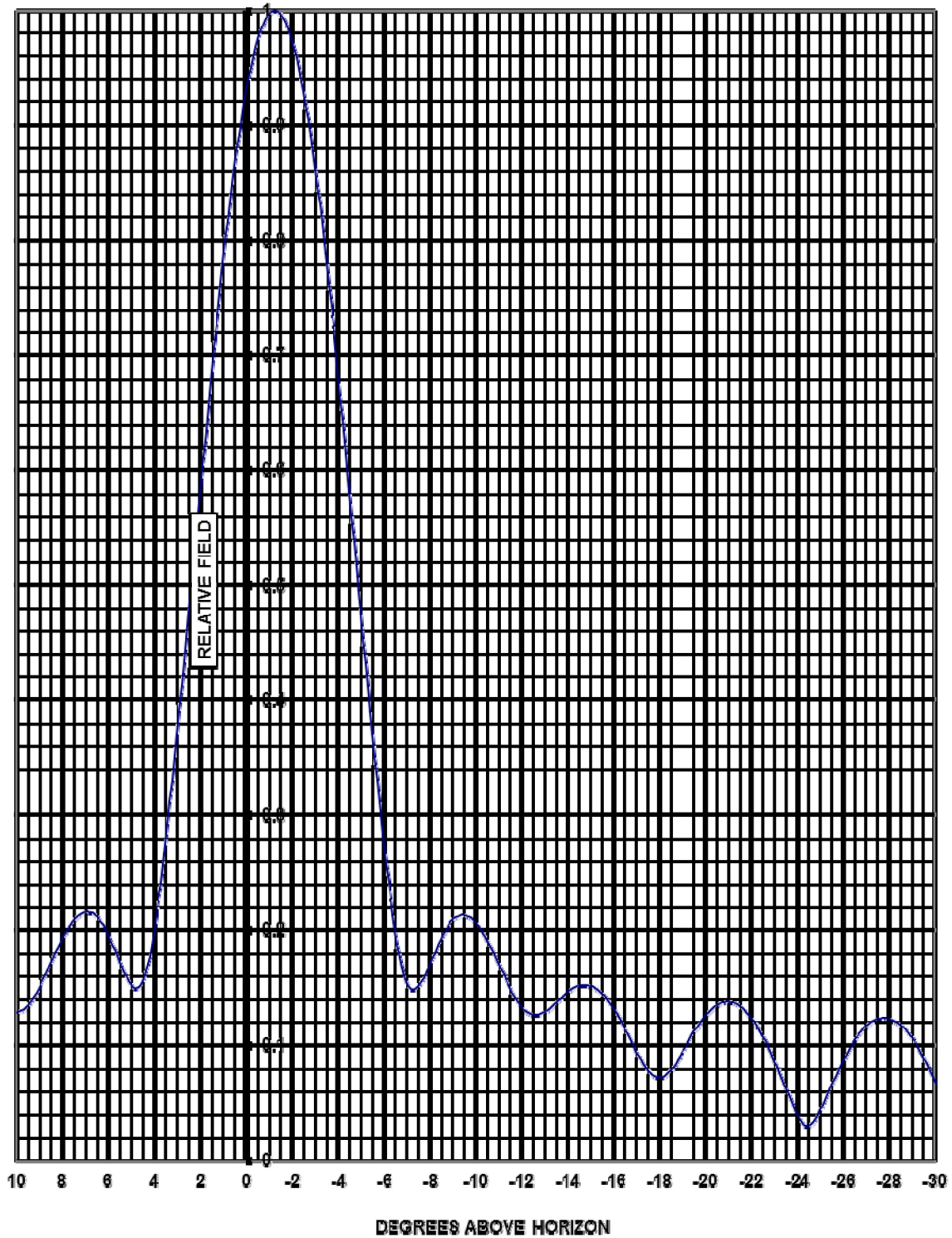


Customer: Houston Public Media
Site: KUHT-TV, Ch. 8
Bays: 10

Model: JCPD-10/4 (40) BIII
Description: VHF Panel Antenna
-1.25° Beam Tilt, 15% Null Fill



Elevation Pattern



Customer: Houston Public Media
Site: KUHT-TV, Ch. 8
Bays: 10

Model: JCPD-10/4 (40) BIII
Description: VHF Panel Antenna
-1.25° Beam Tilt, 15% Null Fill



Elevation Pattern Tabulation

RELATIVE FIELD VS ELEVATION ANGLE

<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>	<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>	<u>ELEVATION</u> <u>ANGLE</u>	<u>RELATIVE</u> <u>FIELD</u>
10	0.128	-26	0.087	-61	0.063
9	0.150	-27	0.116	-62	0.061
8	0.192	-28	0.123	-63	0.055
7	0.215	-29	0.106	-64	0.048
6	0.196	-30	0.070	-65	0.041
5	0.152	-31	0.023	-66	0.035
4	0.199	-32	0.026	-67	0.034
3	0.370	-33	0.068	-68	0.038
2	0.583	-34	0.096	-69	0.045
1	0.782	-35	0.106	-70	0.054
0	0.929	-36	0.099	-71	0.063
-1	0.997	-37	0.076	-72	0.071
-2	0.973	-38	0.045	-73	0.077
-3	0.862	-39	0.022	-74	0.082
-4	0.684	-40	0.040	-75	0.086
-5	0.474	-41	0.065	-76	0.089
-6	0.274	-42	0.082	-77	0.091
-7	0.154	-43	0.087	-78	0.091
-8	0.170	-44	0.082	-79	0.091
-9	0.208	-45	0.069	-80	0.090
-10	0.205	-46	0.052	-81	0.089
-11	0.170	-47	0.040	-82	0.087
-12	0.133	-48	0.041	-83	0.085
-13	0.129	-49	0.052	-84	0.084
-14	0.146	-50	0.062	-85	0.082
-15	0.151	-51	0.067	-86	0.081
-16	0.131	-52	0.068	-87	0.080
-17	0.095	-53	0.063	-88	0.080
-18	0.072	-54	0.057	-89	0.079
-19	0.094	-55	0.050	-90	0.079
-20	0.125	-56	0.048		
-21	0.138	-57	0.050		
-22	0.123	-58	0.055		
-23	0.086	-59	0.060		
-24	0.039	-60	0.063		
-25	0.044				

Customer: Houston Public Media
 Site: KUHT-TV, Ch. 8
 Bays: 10

Model: JCPD-10/4 (40) BIII
 Description: VHF Panel Antenna
-1.25° Beam Tilt, 15% Null Fill



Tel: (916)383-1177

6340 Sky Creek Dr.,
FAX (916) 383-1182

Sacramento, CA 95828
Web www.Jampro.com

System Gain-Loss Calculator Summary Sheet:

Description	Values*	
Frequency		183.0 MHz
Effective Radiated Power	18.10 dBk	64.60 kW
Antenna Gain	9.87 dBd	9.70 Times
Required Antenna Input Power	8.23 dBk	6.66 kW
Coax System Length	1900.0 feet	579.1 Meters
Coax Loss Per 100 Feet	0.066 dB	
Total Coax Losses	1.24 dB	2.21 kW
Coax Efficiency:	75.08 %	
Combiner Losses	0.00 dB	0.00 kW
Other Losses	0.00 dB	0.00 kW
Total System Losses	1.24 dB	2.21 kW
Required Transmitter Output	= 9.48 dBk	8.87 kW

Company Name: **KUHT-TV**
Info Line: **JCPD-10/4(40) BIII; ATSC 1.0**
Coax Type: **6" Rigid Line**
Date: **7-Sep-18**

Note: *Values are rounded to two places. Information is provide as an estimate only. Jampro accepts no responsibility for accuracy. Please verify these figures with your consulting engineer.

System Power Levels vs. Crest Factor Safety Margins

	Input you kW TPO	P(peak) or A(verage)	SERVICE : TV FM IBOC 8VSB DTVB DVB-T2	PAR (dB)	Average Power	Peak Power	Peak Volts
System Impedance in Ohms:	50						
Transmitter Power Output (kW)	9.36	A	DTVB	10.00	9.360	93.600	3,059.412
Transmitter Power Output (kW)							
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Transmitter Power Output (kW)							
Transmitter Power Output (kW)							
Transmitter Power Output (kW)							
Transmitter Power Output (kW)							
Transmitter Power Output (kW)							
Total					9,360.0		3,059.412
Equivalent Power Peak Watts						93,600.000	

COAX System							
Coax Type & Size	P618	6-1/8"	Size		20.31 kW coax loss	75.09	% coax effcy
Coax loss dB per 100 feet feet	0.066	183.00	MHz		1.24 dB total loss		
Coax Length	1,899.61	579.00	Meters				
Coax Input Rating		4,527.693	PkV				

Coax Input System Safety Factor*	PK Voltage Rating / Input Peak Voltage	1.59	times
Coax Output W	61,211.00	2,474.09	Volts Peak

POWER DIVIDER Main							
Divider Size & Outputs	PD416	2	Outputs	4-1/16"	Connector Size		
Divider Input Peak Voltage Rating		76,026	Volts Peak				

Divider Input Safety Factor*	PK Voltage Rating / Input Peak Voltage	7.91	times
Divider Output Peak Power W	30,605.50	4,805.21	Volts Peak

POWER DIVIDER Secondary							
Divider Size & Outputs	PD318	4	Outputs	3-1/8"	Connector Size		
Divider Input Peak Voltage Rating		59,833	Volts Peak				

Divider Input Safety Factor*	PK Voltage Rating / Input Peak Voltage	6.23	times
Divider Output Peak Power W	7,651.37	4,805.21	Volts Peak

POWER DIVIDER Bays							
Divider Size & Outputs	PD78	8	Outputs	7/8"	Connector Size		
Divider Input Peak Voltage Rating		32,711	Volts Peak				

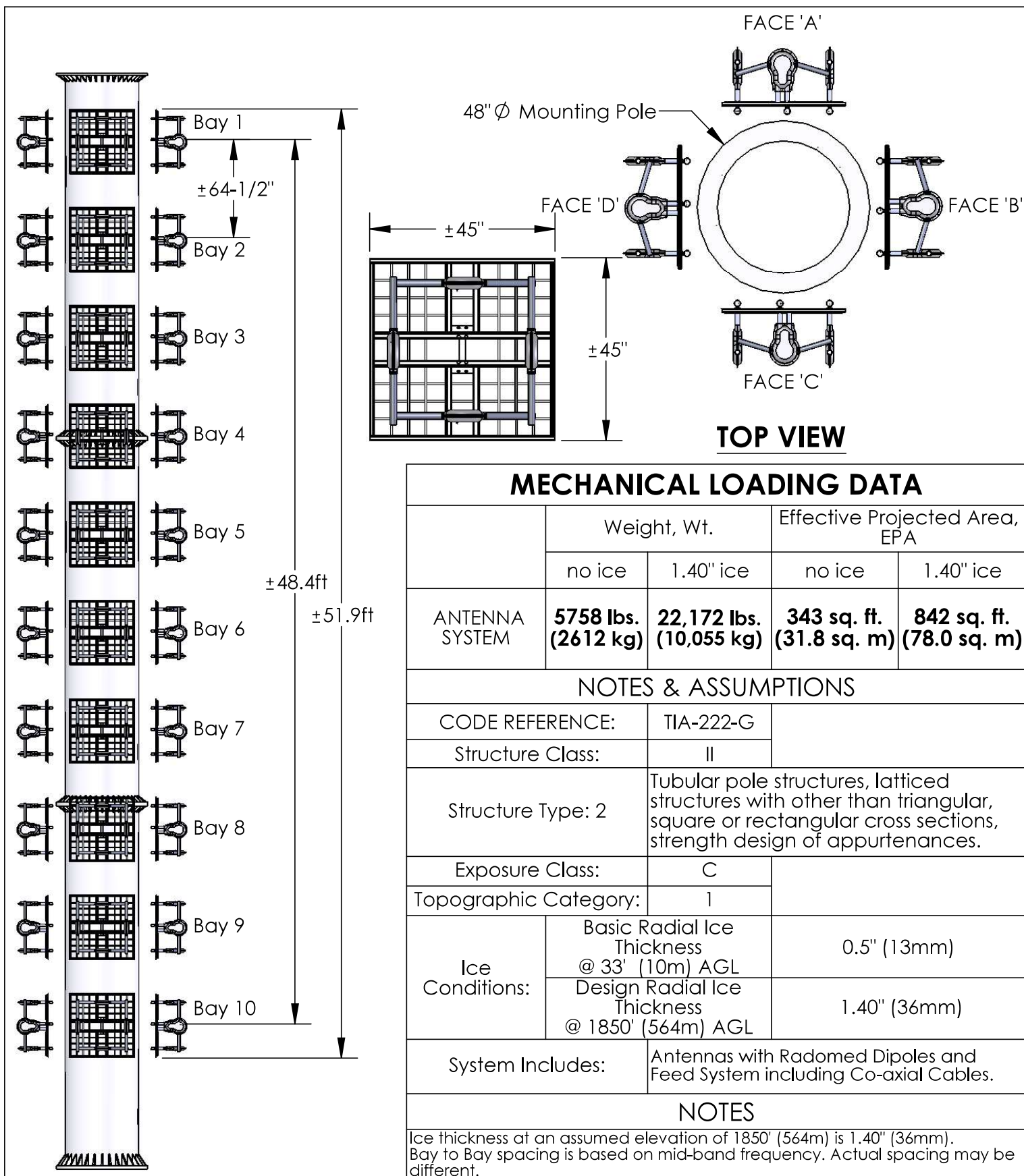
Divider Input Safety Factor*	PK Voltage Rating / Input Peak Voltage	18.70	times
Divider Output Peak Power W	956.42	874.72	Volts Peak

ANTENNA BAYS							
Antenna Type:	JCPD-10/4(40)BIII						
Antenna Single Panel Input Rating W	90,000.00	30,000.00	Volts Peak				

Antenna Panel Safety Rating*	PK Voltage Rating / Input Peak Voltage	34.30	times
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KUHT-TV
Ch. 8



PRELIMINARY DRAWINGS AND CALCULATIONS

PROPRIETARY AND CONFIDENTIAL:

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JAMPRO ANTENNAS, INC., 6340 SKY CREEK DRIVE, SACRAMENTO, CA 95828

NAME	DATE
DRAWN BY: SML	12 Apr 2018
LAST REVISED	



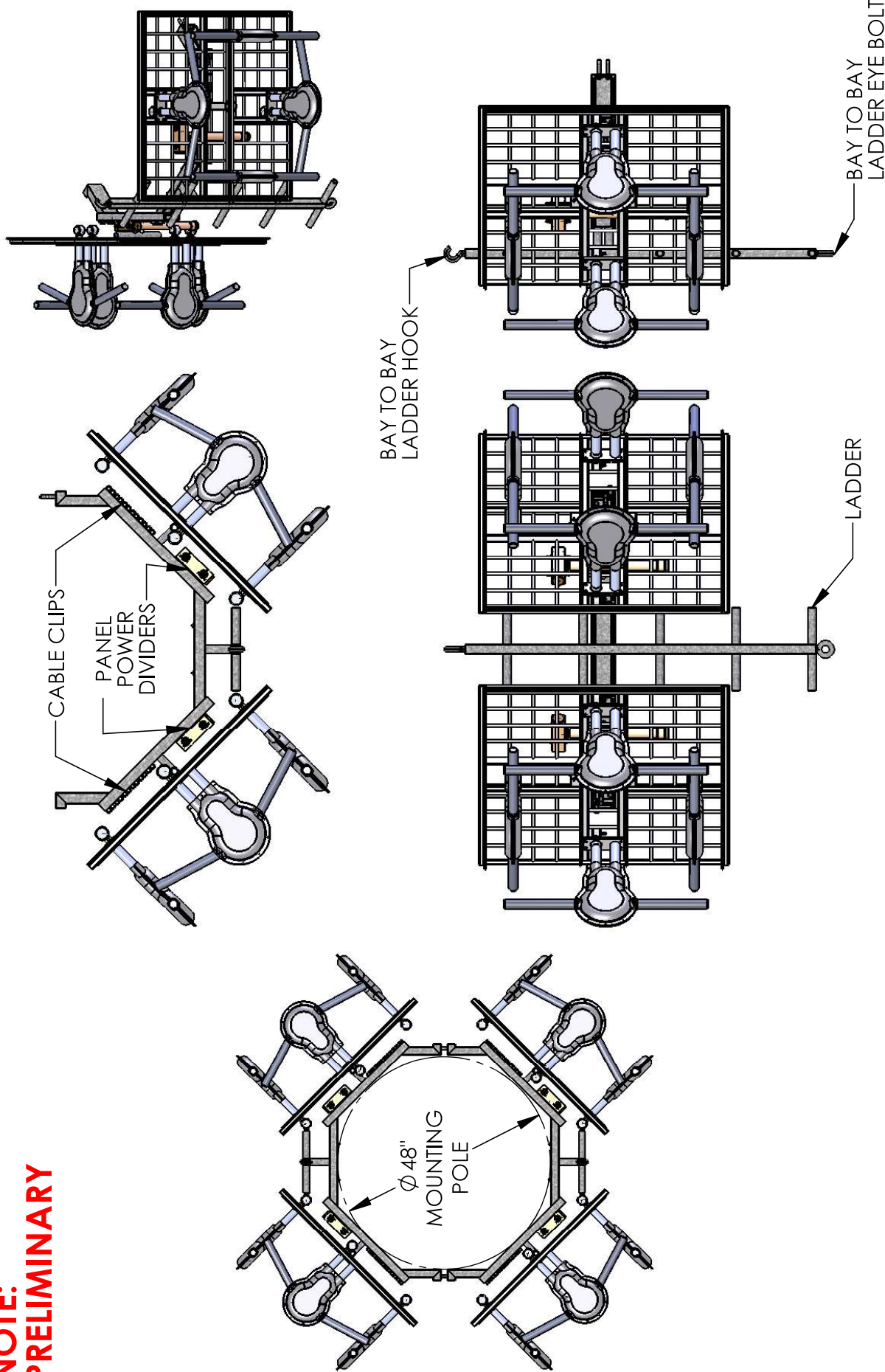
MECHANICAL LOADING DATA SHEET

JCPD-10/4 (40)-R
Ch. 8

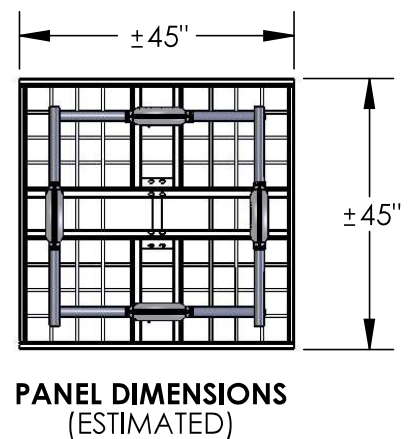
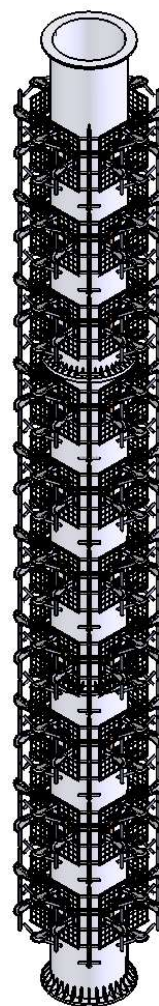
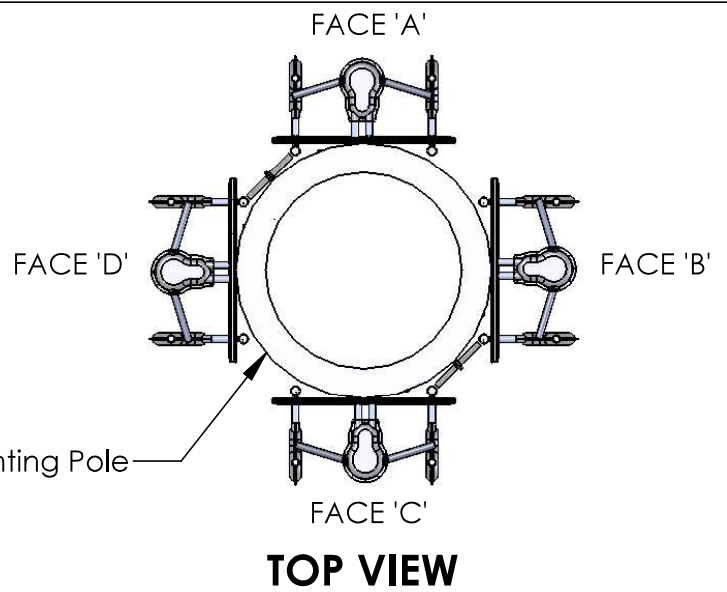
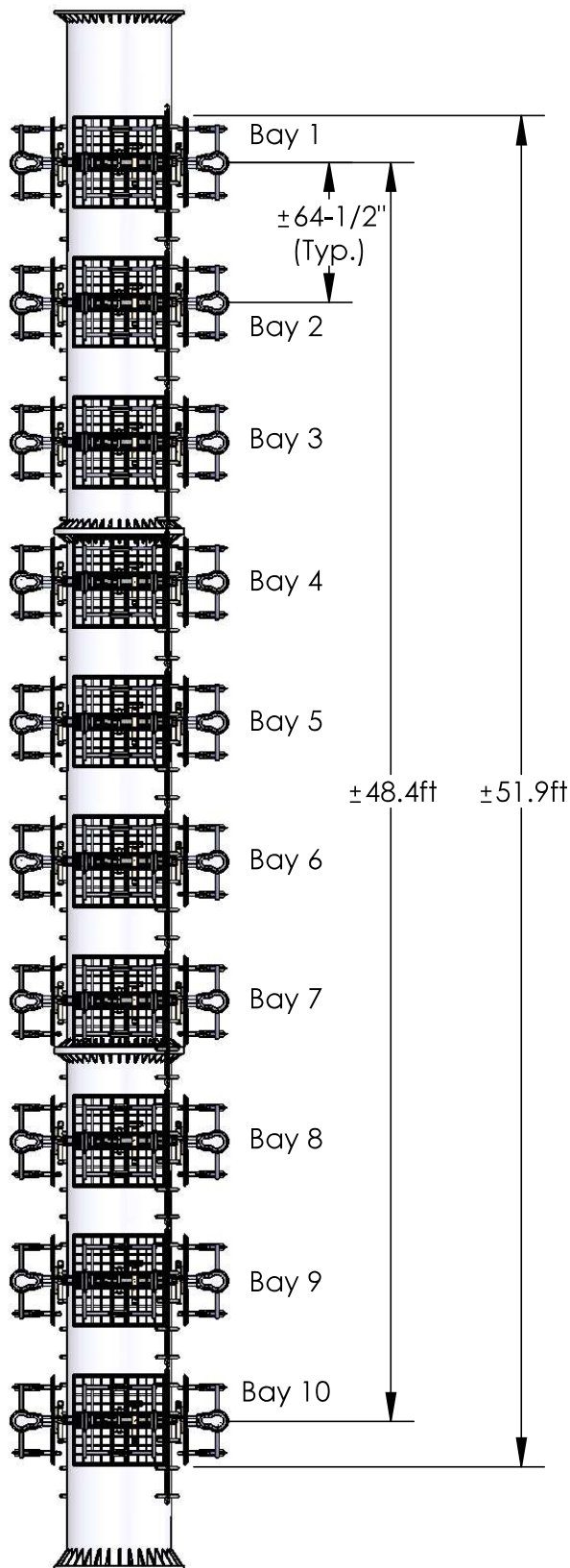
COMMENTS:

SIZE	DWG. NO.	REV.
A	JCPD-10.4 (40)-R (Ch. 8) A	

NOTE:
PRELIMINARY



DO NOT SCALE DRAWING			QUALITY CONTROL		PRODUCTION CONTROL			NAME	DATE	JAMPRO ANTENNAS KUHT JCPD(40) BAY HALF
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR: MACH $\pm 5^\circ$ BEND $\pm 1^\circ$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$			Op	INT.	Date	Comments	Job Number:			
			1st				Date:			
			2nd				Priority:			
			3rd				Run Size:			
			4th				Qty:	Date:		
			5th				Qty:	Date:		
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							SEE BILL OF MATERIALS		A	KUHT-JCPD-010 SHEET 1 OF 1



ISOMETRIC VIEW

PRELIMINARY DRAWINGS AND CALCULATIONS

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NAME	DATE
DRAWN BY: SML	12 Apr 2018
LAST REVISED: MLH	07 SEP 2018



MECHANICAL LOADING DATA SHEET

JCPD-10/4 (40)-R
Ch. 8

COMMENTS:

SIZE DWG. NO. REV. JCPD-10.4 (40)-R (Ch. 8) Prelim