JAMPRO ANTENNAS, INC.

FAX COVER SHEET

July 17, 2020

TO: Dusty Jo Smith
CO: State of West Virginia
FAX: 304-558-3970

FROM: Cyndi Sanderson / Greg Montno
CO: Jampro Antennas, Inc.
FAX: 916-383-1182
E-MAIL: cyndi@jampro.com / greg@jampro.com

Pages: 55 (including cover)

Solicitation No.: CRFQ EBA2000000029

Dear Ms. Smith,

Thank you very much for the Invitation to bid for the State of West Virginia solicitation as indicated above. A package was sent via Federal Express for delivery today but our tracking revealed that it had yet to be delivered.

Please feel free to contact us with any questions and we look forward to hearing from you soon.

Best regards,

Cyndi Sanderson / Greg Montano

0000355 Office AU # | 11-24 1210(8)

CASHIER'S CHECK

SERIAL #: 0035504936

ACCOUNT#: 4861-511475

Remitter: JAMPRO ANTENNAS, INC.
Purchaser: CYNTHIA SANDERSON
Purchaser Account: 9845943156
Operator I.D.: u600659 u106653
Funding Source: Paper Items(s)

July 16, 2020

PAY TO THE ORDER OF ***STATE OF WEST VIRGINA/***
PURCHASING DIVISION

Nine thousand nine hundred thirty-one dollars and no cents **$9,931.00**

Payee Address:
Memo: SOLICITATION #CRFQ EGA2000000020

WELLS FARGO BANK, N.A.
6700 FOLSOM BLVD
SACRAMENTO, CA 95819
FOR INQUIRIES CALL (480) 394-3122

NOTICE TO PURCHASER–IF THIS INSTRUMENT IS LOST, STOLEN OR DESTROYED, YOU MAY REQUEST CANCELLATION AND REISSUANCE. AS A CONDITION TO CANCELLATION AND REISSUANCE, WELLS FARGO & COMPANY MAY IMPOSE A FEE AND REQUIRE AN INDEMNITY AGREEMENT AND BOND.

VOID IF OVER US $ 9,931.00

NON-NEGOTIABLE

Purchaser Copy

FB004 M4203 902377006

PRINTED ON LINEMARK PAPER - HOLD TO LIGHT TO VIEW. FOR ADDITIONAL SECURITY FEATURES SEE BACK.

0000355 Office AU # | 11-24 1210(8)

CASHIER'S CHECK

[redacted]

Remitter: JAMPRO ANTENNAS, INC.
Operator I.D.: u600659 u106653

July 16, 2020

PAY TO THE ORDER OF ***STATE OF WEST VIRGINA/***
PURCHASING DIVISION

Nine thousand nine hundred thirty-one dollars and no cents **$9,931.00**

Payee Address:
Memo: SOLICITATION #CRFQ EGA2000000020

WELLS FARGO BANK, N.A.
5700 FOLSOM BLVD
SACRAMENTO, CA 95819
FOR INQUIRIES CALL (480) 394-3122

VOID IF OVER US $ 9,931.00

Richard Lacy
CONTROLLER

Details on Back. Security Features Included.

[redacted]

JAMPRO ANTENNAS, INC

SEALED BID: HIGH POWER VHF TRANSMIT ANTENNA
BUYER: DUSTY JO SMITH
SOLICITATION NO. CRFQ EBA2000000029
BID OPENING DATE: JULY 17, 2020
BID OPENING TIME: 1:30PM
FAX NUMBER: 304-558-3970

COST PROPOSAL

Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation
13 — Equipment

Proc Folder: 739235

Doc Description: ADDENDUM 1 : HIGH POWER VHF TV TRANSMIT ANTENNA

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2020-07-10	2020-07-17 13:30:00	CRFQ 0439 EBA2000000029	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

Jampro Antennas, Inc.
6340 Sky Creek Drive
Sacramento, Calif. 95828
(916) 383-1177

FOR INFORMATION CONTACT THE BUYER

Dusty J Smith
(304) 558-2063
dusty.j.smith@wv.gov

Signature Cindi Smar **FEIN #** 68-0088519 **DATE** 7/17/2020

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

ADDENDUM 1 IS ISSUED FOR THE FOLLOWING REASONS:

1. AGENCY RESPONSES TO VENDORS QUESTIONS

2. BID OPENING IS CHANGED FROM JULY 14, 2020 TO JULY 17, 2020 TIME 1:30PM.

NO OTHER CHANGES

INVOICE TO	SHIP TO
CHIEF FINANCIAL OFFICER EDUCATIONAL BROADCASTING 124 INDUSTRIAL PARK RD BEAVER WV25813 US	SITE MANAGER EDUCATIONAL BROADCASTING WSWP-TV 124 INDUSTRIAL PARK RD BEAVER WV 25813 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	HIGH POWER VHF TV TRANSMIT ANTENNA	1.00000	EA	$198,620.00	$198,620.00

Comm Code	Manufacturer	Specification	Model #
43221703			

Extended Description :

HIGH POWER VHF TV TRANSMIT ANTENNA

SCHEDULE OF EVENTS

Line	Event	Event Date
1	TECHNICAL QUESTIONS DUE AT 10AM	2020-07-06

	Document Phase	Document Description	Page 3
EBA2000000029	Final	ADDENDUM 1 : HIGH POWER VHF TV TRANSMIT ANTENNA	of 3

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: EBA2000000029

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X] Addendum No. 1	[ ] Addendum No. 6
[ ] Addendum No. 2	[ ] Addendum No. 7
[ ] Addendum No. 3	[ ] Addendum No. 8
[ ] Addendum No. 4	[ ] Addendum No. 9
[ ] Addendum No. 5	[ ] Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Jampro Antennas, INC.
Company

Cyndi Short
Authorized Signature

7/16/20
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: EBA2000000029

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

- [x] Addendum No. 1
- [ ] Addendum No. 2
- [ ] Addendum No. 3
- [ ] Addendum No. 4
- [ ] Addendum No. 5
- [ ] Addendum No. 6
- [ ] Addendum No. 7
- [ ] Addendum No. 8
- [ ] Addendum No. 9
- [ ] Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Jampro Antennas, Inc.
Company

Cindi Sma
Authorized Signature

7/16/20
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Cyndi Sanderson Vice President
(Name, Title)

Cyndi Sanderson Vice President
(Printed Name and Title)

10340 Sky Creek Drive Sacramento, Calif 95828
(Address)

916-383-1177 FAX 916-383-1182
(Phone Number) / (Fax Number)

Cyndi@Jampro.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Jampro Antennas Inc.
(Company)

Cyndi Sanderson V.P.
(Authorized Signature) (Representative Name, Title)

Cyndi Sanderson Vice President
(Printed Name and Title of Authorized Representative)

7/16/20
(Date)

916-383-1177 Fax 916-383-1182
(Phone Number) (Fax Number)

Jampro Antennas, Inc.
6340 Sky Creek Drive
Sacramento, CA 95828
916-383-1177 Fax 916-383-1182

Proposal #
GM 070320E

Quote

Prepared For

Company State of West Virginia
Address Purchasing Divison
2019 Washington Street East
Post Office Box 50130, Charleston, WV 25305-0130
For: **WSWP-TV, Solicitation No: CRFQ EBA2000000029**

Date	7/16/2020
Valid until	11/17/2020
Rep	Greg M.
Est. Ship Date (days)	120

Item	Qty	Part #	Description	Unit Price	Total USD
1	1		**Lambda VHF Band III Elliptically Polarized Ch. 8 Omni Directional Broadcast Antenna. Comprised of 8 bays of four slant dipoles arround a pole** **Input Power: 20 kW** **Input connector: 3-1/8" EIA**		
2	1		3-1/8" Elbow Complex, Optimized for Ch. 8		
3	1 Set		**3-1/8" Rigid Transmission Line & Installation Accessories 400' Vertical / 70' Horizontal to Include the following:**		
	23	318-50-003E	3-1/8" x 20 ft. Line Section, Flanged Both Ends		
	1	318-52-120	3-1/8" x 10 ft. Line Section, Flanged Both Ends		
	2	318-50-540	3-1/8" Tower Top Fixed Hanger, Single Line		
	41	318-50-535	3-1/8" Vertical Spring Hanger, Single Line		
	8	318-50-545	3-1/8" 3-Point Horizontal Suspension Hanger, Single Line		
	4	318-50-050	3-1/8" 90° Elbow, Flanged Reinforced with bullet		
	2	318-50-525	3-1/8" Lateral Brace		
	2	318-50-500	3-1/8" Wall Anchor Plate		
	1	318-50-065	3-1/8" Gas Barrier		
	2	318-50-125	3-1/8" Hardware Set (Nuts, lock washers, bolts)		
	2	318-50-135	3-1/8" Silicone O-Ring		
4	1		**<u>Commissioning</u>** JAMPRO Field Technician to spend a maximum of 5 days at customer's transmit facility. Technician will inspect equipment installation, conduct VSWR testing, provide a report of test results, and provide factory authorized sign-off of system. Customer is to provide competent riggers to assist on the tower. Price quoted includes costs for travel, lodging, and meals. Additional days, if required or requested by customer, will be charged at a rate of $1,450.00 per day (Monday thru Friday) $1,735.00 per weekend day. Day rates apply to all days technician is out of Sacramento.		

7/16/2020

Jampro Antennas, Inc.
6340 Sky Creek Drive
Sacramento, CA 95828
916-383-1177 Fax 916-383-1182

Proposal #
GM 070320E

Quote

Prepared For

Company State of West Virginia
Address Purchasing Divison
2019 Washington Street East
Post Office Box 50130, Charleston, WV 25305-0130
For: **WSWP-TV, Solicitation No: CRFQ EBA2000000029**

Date	7/16/2020
Valid until	11/17/2020
Rep	Greg M.
Est. Ship Date (days)	120

Item	Qty	Part #	Description	Unit Price	Total USD
			NOTE: Technician schedules and the availability of equipment may require the rental of testing equipment to perform the needed field service. In this event an additional charge for equipment rental may apply. Note: If additional days are needed or required an additional fee will apply. * 2 week prior notice is required before scheduling technicians visit.		
5	1		Freight included to site. All prices are (USD) Freight included		

Any questions please contact your sales representative:
Greg Montano
E-mail: Greg@jampro.com
Office: 1 (916) 383-1177
Fax: 1 (916) 383-1182

Sub-total	$ 198,620.00
Total	**$ 198,620.00**

Accepted by:
Signature _____ Date _____
Title _____

Accepted by:
Signature _____ Date _____
Title Jampro Antennas, Inc.

Terms of Sale:

1) If applicable, freight cost is an estimate only and is subject to change, contact factory to confirm pricing

2) Delivery is an estimate, to be confirmed after receipt of required information and contingent upon backlog at the time of order. Ship time is based on business days and excludes major US Holidays.

3) **Payment Terms are as specified in tender.** All prices are in USD. Other terms and conditions/warranty of this order are at www.jampro.com, and upon acceptance of this order by Seller shall be binding upon seller & purchaser. For more information, call 916-383-1177.

WARRANTY

Jampro Antennas, Inc.
LIMITED WARRANTY AND LIMITATION ON DAMAGES

All implied warranties have been excluded - see section 5

There are conditions precedent to any warranty obligations - See sections 6 and 7

There are limitations on damages - See section 8

Definition of Jampro represents Jampro Antennas, Inc.

1. LIMITED WARRANTY

1.1 Jampro warrants to all original purchasers of Jampro products that all new parts, products, and equipment manufactured and sold by Jampro shall be free from defects in material and workmanship for twenty-four (24) months from date of shipment. If any part, product, or equipment becomes defective, malfunctions, or fails to conform to this written Limited Warranty under normal use and service, and if the original purchase complies with Sections 5 and 6 of this Limited Warranty, then Jampro will, without charge, at its option, either repair, or replace the defective or non-conforming part, product, or equipment subject to the provisions of Sections 3 and 4 of this Limited Warranty.

1.2 FCC Directional Antenna and Pattern Optimization: Jampro Antennas, Inc. warrants to those customers who have purchased FCC directional antennas or pattern optimization service that the radiation pattern requested by the customer will be reproducible under controlled conditions at the Jampro Antennas, Inc. test site in Sacramento, California. It is the sole responsibility of the customer to determine, evaluate, and compensate for any terrain, structural, climate controls, or other conditions or effects which may cause the radiation pattern at the customer's actual broadcast site to vary from controlled conditions at the Jampro Antennas, Inc. test site in Sacramento, California. No warranty is made regarding the radiation pattern at the customer's actual broadcast site.

2. PRODUCTS COVERED BY THIS WARRANTY

WARRANTY

This Limited Warranty shall extend to all parts, products, and equipment manufactured and sold by Jampro Antennas, Inc. but shall not extend to equipment supplied from other manufacturers, which shall be warranted only for the period, purposes, and conditions extended by such manufacturers to Jampro Antennas, Inc. Services provided by Jampro Antennas, Inc. and related warranties only extend to those customers who have purchased and paid for such services separate and apart from the purchase of any antenna or RF system.

3. AUTOMATIC TERMINATION OF WARRANTY OBLIGATIONS

Any obligation of Jampro Antennas, Inc., under this Limited Warranty will automatically and immediately terminate, without notice from any further action by Jampro Antennas, Inc. and Jampro Antennas, Inc. shall have no responsibility for damages of any kind, as a result of the occurrence of any of the following:

A. Warranties are null and void if customers account is not current.

B. Accident, misuse, or negligent use of any equipment.

C. Repairs or alterations made to any part, product, or equipment outside Jampro's factory except by an employee of Jampro Antennas, Inc.

D. Improper installation or operation (including both mechanical and electrical) or any equipment.

E. Failure to provide normal maintenance for any parts, products, or equipment.

F. Use of more transmitter power than specified in the rating for the equipment sold by Jampro Antennas, Inc.

G. Failure to wire or use any safety interlocking device.

4. EXCLUSIONS

This Limited Warranty shall not extend to, nor shall Jampro Antennas, Inc. be responsible for damages of any kind resulting from:

A. Signal coverage, penetration of signal, multipath effects, reduction or distortion in FM stereo operation, and signal coverage or ghosting in TV antenna systems. The sole obligation of Jampro Antennas, Inc. is to provide the part, product, or equipment specified by the customer. If the customer has ordered FCC directional antenna or pattern optimization service, then the extent of the obligation of Jampro Antennas, Inc. is limited as set forth in sections 1.2 and 2 of this Limited Warranty and in the "FCC DIRECTIONAL ANTENNA AND PATTERN OPTIMIZATION SERVICE DISCLAIMER". In no event shall Jampro Antennas, Inc. be liable to the customer for damages of any kind nor shall Jampro Antennas, Inc. be obligated to alter, adjust, or correct the radiation pattern at the customers actual broadcast site, provided the radiation pattern requested was achieved under controlled conditions at Jampro's test range in Sacramento, California.

WARRANTY

B. Failure of transmitter reflectometer trip-out circuitry to protect the antenna system or other parts, products, or equipment sold Jampro Antennas, Inc. when the VSWR exceeds 1.2:1.

C. Lightning, weather conditions or acts of God.

5. IMPLIED WARRANTIES EXCLUDED

All implied warranties of merchantability and fitness for any particular purpose are excluded. The sole warranty obligation of Jampro Antennas, Inc. is the Limited Warranty set forth in Section 1 above. Under no circumstance will Jampro Antennas, Inc. have any liability to any customer (A) as a result of the customer relying, or claiming to have relied on the skill or judgment of Jampro Antennas, Inc. to select or furnish suitable parts, products, or equipment, or (B) in the event Jampro Antennas, Inc. knows, or has reason to know, any specific needs or requirements of the customer or regarding any matters concerning the customers broadcast site or the customers intended use or application of the parts, products, or equipment.

6. CONDITION PRECEDENT TO ENFORCEMENT OF THIS LIMITED WARRANTY

As a condition precedent to enforcement of this Limited Warranty, the original purchaser must within ten days from the date of receipt of the part, product, or equipment, execute and return to Jampro Antennas, Inc. by registered mail the Limited Warranty Registration Card attached to the part, product, or equipment, or included in the Instruction Book.

7. ENFORCEMENT OF LIMITED WARRANTY

Any defective Jampro Antennas, Inc. part, product, or equipment to be repaired or replaced pursuant to Section 1 of this Limited Warranty shall be returned with transportation charges prepaid to Jampro Antennas, Inc. 6340 Sky Creek Drive,
Sacramento, California 95828 USA. All return shipments shall be made Cash on Delivery (COD) to the customer.

8. LIMITATION ON DAMAGES (CONSEQUENTIAL DAMAGES EXCLUDED)

Jampro Antennas, Inc. shall not be responsible or liable for, nor does this Limited Warranty extend to any consequential or incidental damages or expenses of any kind or nature, and regardless of the cause thereof or any knowledge which Jampro Antennas, Inc. may have regarding the probability of the occurrence of such damages or expenses, including without limitation, injury to persons or property, loss of use of the product, riggers costs (including without limitation standby fees, move-on and move-off charges, and seasonal or overtime differentials), costs of installation of any tower or related equipment, loss of broadcast revenue, loss of station license or loss of goodwill. In addition, Jampro Antennas, Inc. shall not be liable to the customer for

WARRANTY

any cost or expenses incurred in removing or reinstalling the antenna, or for engineers, consultants, or other parties hired or engaged by the customer to evaluate, test or analyze the products supplied by Jampro Antennas, Inc. or their performance.

Jampro Antennas, Inc. shall not be liable for incidental exemplary, special, or consequential damages in any action based on tortuous acts or omissions by Jampro Antennas, Inc. in any way related to this agreement.

Jampro Antennas, Inc. and customer acknowledge that such lack of liability, without limiting the generality of the foregoing, includes lack of liability for any loss of actual or anticipated revenue or profits, loss of air time, loss of actual or anticipated value of the business of both parties and damages to the business reputation of either party to this agreement.

9. NO OTHER WARRANTIES MADE

This Limited Warranty is in lieu of all other expressed or implied warranties of Jampro Antennas, Inc. and Jampro does not assume, nor does it authorize any person to assume on its behalf, any other obligation or liability, either verbally or in writing.

10. OTHER RIGHTS

This Limited Warranty gives you specific legal rights. You may also have other rights, which may vary from state to state or country to country.
By affixing their signature below, customer warrants that he or she has read and understood this agreement and agrees that Jampro Antennas, Inc. will not be liable to Customer for the failure of the FCC directional antenna and pattern optimization service to achieve the radiation pattern desired at the Customer's broadcast site. Customer further understands that this document is intended to limit Jampro Antennas, Inc.'s obligations and liability to customer and to delineate the mutual obligations and expectations of customer and Jampro Antennas, Inc.

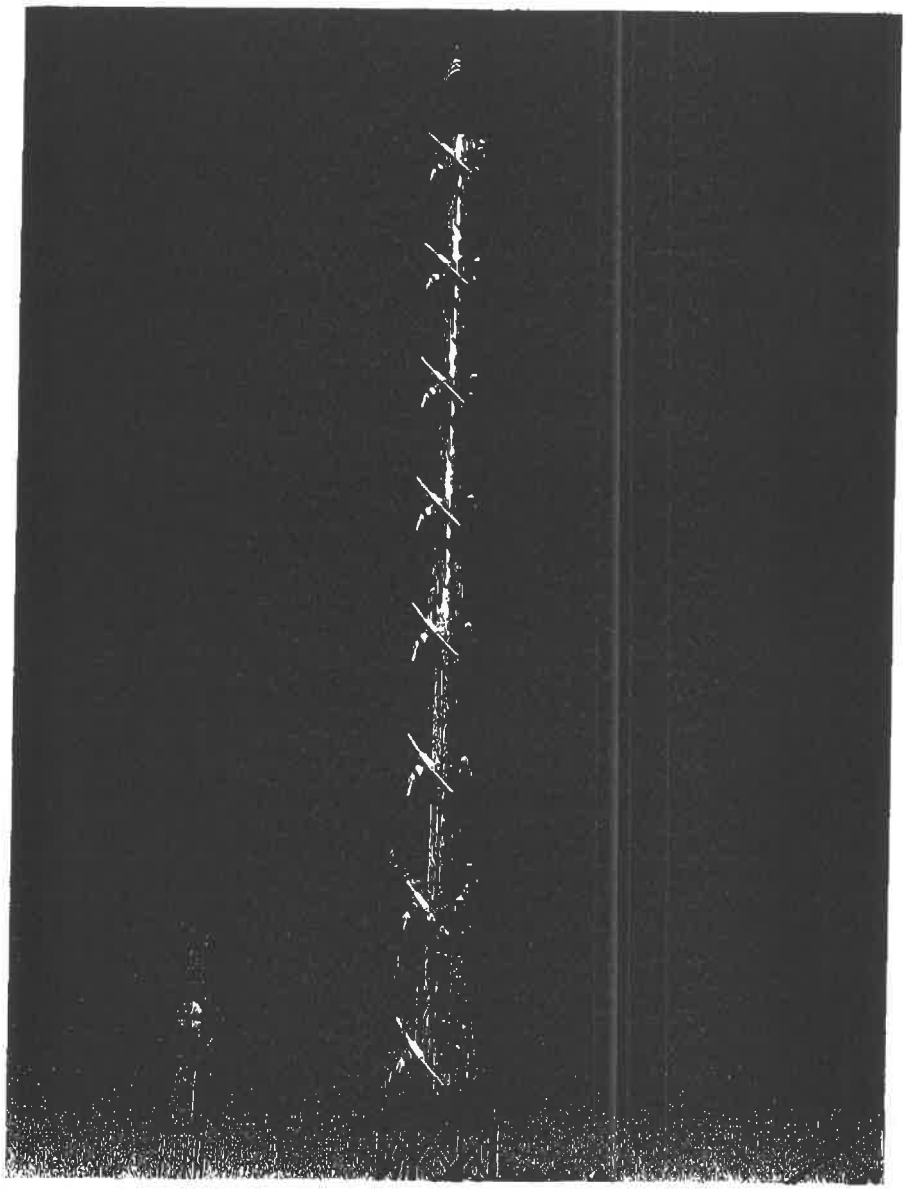
Date: _____ Customer Name: _____

Company _____

Title _____

SEALED BID: HIGH POWER VHF TRANSMIT ANTENNA
BUYER: DUSTY JO SMITH
SOLICITATION NO. CRFQ EBA2000000029
BID OPENING DATE: JULY 17, 2020
BID OPENING TIME: 1:30PM
FAX NUMBER: 304-558-3970

TECHNICAL PROPOSAL



Year 2020- High Power 8-bay Lambda Antenna for Univ. of Houston being tested at Jampro.

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification	Jampro Response

	Specification	Compliance Noted	Comments
	Specifications		
	1. Purpose and Scope: The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Educational Broadcasting Authority (Agency) to establish a contract for the one-time purchase of a High-Power VHF Television Transmit Antenna.	Comply	Jampro Antennas, Inc. is submitting a bid per the specifications outlined in this tender for its VHF broadcast antenna at WSWP-TV
	1. Definitions: The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.	Understood	
	2.1 Contract Item: means a High-Power VHF Television Transmit Antenna as more fully described by these specifications.	Comply	A high-power VHF television transmit antenna is proposed
	2.2 Elliptical Polarization: An antenna is said to be vertically polarized (linear) when its electric field is perpendicular to the Earth's surface. If the axial ratio is near 0 dB (decibel), the antenna is said to be circular polarized. If the axial ratio is greater than 1-2 dB, the polarization is often referred to as elliptical.	Comply	Antenna shall be elliptically polarized; 75 / 25 Horizontal / Vertical
	2.3 Horizontal Azimuth Pattern: horizontal angle radiation measured clockwise from any fixed reference plane or easily established base direction line.	Comply	Azimuth pattern provided in technical proposal
	2.4 Moment Arm: the length between a joint axis and the line of force acting on that joint. Every joint that is involved in an exercise has a moment arm. The longer the moment arm is the more load will be applied to the joint axis through leverage.	Understood	
	2.5 Pricing Page: the page(s), contained in wvOASIS upon which Vendor should list its proposed price for the Contract Items.	Comply	Product cost is provided on the solicitation documents - see in attached commerical propsal
	2.6 Radome: a dome or other structure protecting radar equipment and made from material transparent to radio waves, especially one on the outer surface of an aircraft.	Comply	Radome enclosures are provided

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification **Jampro Response**

	Specification	Compliance Noted	Comments
	2.7 Solicitation: means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.	Understood	
	3. General Requirements:		
	3.1 Mandatory Contract Item Requirements: Contract Item must meet or exceed the mandatory requirements listed below.	Understood	
	3.1.1 High-Power VHF Television Transmit Antenna	Comply	A high-power VHF television transmit antenna is proposed
	3.1.1.1 Mechanical Specifications		
	3.1.1.1.1 All structural elements shall be designed and fabricated in accordance with TIA/EIA standard RS-222G, Structural Standards for Steel Antenna, Towers, and Supporting structures.	Comply	Mechanical loading shall be in accordance with TIA / EIA standard RS-222G
	3.1.1.1.1 All hardware shall be constructed of non-ferrous material or be galvanized:	Comply	All hardware shall be non-ferrous material or galvanized
	3.1.1.1.1.1 Steel elements shall be hot-dip galvanized in accordance with the ASTM A123 standard	Comply	All steel shall be hot-dipped galvanized
	3.1.1.1.1.2 Zinc coating shall be applied with a minimum thickness of 0.002 inches (0.5mm)	Comply	Hot-dipped galvanized per ASTM-123
	3.1.1.1.2 Physical Antenna attributes:	Understood	
	3.1.1.1.2.1 Antenna shall be top mounted	Comply	Antenna shall be top-mounted
	3.1.1.1.2.2 Antenna shall have lifting points and directions for possible helicopter installation.	Comply	Antenna lifting points shall be provided and will be shown in the instruction manual
	3.1.1.1.2.3 Antenna shall be designed for mounting as outlined in Exhibit B, WSWP Top of Steel Drawing.	Comply	Mounting shall be as outlined in Exhibit B as reviewed by our structural engineers
	3.1.1.1.2.4 Radiating elements shall be protected from ice by being enclosed in a Radome	Comply	Radiating elements shall be protected from ice in an enclosed radome
	3.1.1.1.2.5 Vendor shall provide mechanical interface between top of steel and antenna	Comply	Interface to be included
	3.1.1.1.2.6 Weight without ice shall be less than 5000 pounds	Comply	Antenna estimated weight is 3,625 pounds. See mechanical drawing in technical proposal.

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification **Jampro Response**

	Specification	Compliance Noted	Comments
	3.1.1.1.2.7 Effective Projected Area (wind load) shall be less than 64.6 square feet (6 square meters)	Comply	Effective projected Area (EPA) shall be less than 64.6 sq ft. See mechanical drawing in technical proposal
	3.1.1.1.2.8 Moment arm shall be less than 22 feet (6.7 Meters)	Comply	
	3.1.1.1 Electrical specifications:		
	3.1.1.1.1 Antenna shall be optimized for operation on VHF Channel 8 (180-186 MHz)	Comply	Antenna shall be designed and optimized for VHF Channel 8 (180-186 MHz)
	3.1.1.1.2 Polarization shall be elliptical	Comply	Polarization shall be elliptical; 75 / 25
	3.1.1.1.3 The Horizontal Azimuth pattern shall be omnidirectional	Comply	Azimuth pattern shall be omni-directional and provided in technical proposal
	3.1.1.1.4 The antenna shall have a vertical component of 25% compared to the horizontal radiation	Comply	Antenna shall have a vertical component of 25% compared to the horizontal component
	3.1.1.1.5 Antenna and transmission line shall produce an Effective Radiated Power of 30 KW.	Comply	Antenna shall be designed to meet the licensed ERP of 30 kW. See gain loss calculation in technical proposal
	3.1.1.1.6 Antenna and transmission line must be capable of operation with a power level of 20 KW Transmitter Power Output.	Comply	Antenna and transmission line is capable of 20 kW transmitter power output (TPO)
	3.1.1.1 Transmission Line and Accessories:		
	3.1.1.1.1 Vendor shall provide Transmission Line able to operate with 20 Kilowatts DTV (Digital Television) power	Comply	Transmission line capable of 20 kW DTV power
	3.1.1.1.1.1 Current transmission line is 3 1/8" EIA.	Comply	
	3.1.1.1.2 Vendor shall provide all Transmission Line components for complete installation. Components shall include but not be limited to: Hangers, hoisting adapters, Elbows, Field terminated line sections, transformers, and pressure windows.	Comply	Jampro shall provide a 3-1/8" 50 ohm rigid transmission line package consisting of hangers, elbows for a complete installation. The horizontal run is 400 FT and vertical run is 70 FT per Addendum 1.
	4. Contract award:		

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification	Jampro Response

	Specification	Compliance Noted	Comments
	4.1 Contract Award: The Contract is intended to provide Agencies with a purchase price for the Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost as shown on the Pricing Pages (Commodity Line)	Comply	Jampro shall provide a bid that meets or exceeds the tender specifications at a competitive cost
	4.2 Pricing Page: Vendor should complete the Pricing Page (Commodity lines) by filling the line with the appropriate information. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified	Comply	Pricing page shall be completed and included in our bid
	4.2.1 If submitting a bid online, Vendors should enter the Unit Price into each commodity line and the system will sum the total amount automatically. If responding with a paper bid, Vendors should download and/or print the assembled Final Solicitation document (with the highest version number) from wvOASIS and insert their Unit Prices for each Commodity Line.	Comply	Jampro plans to submit a bid via email
	4.2.2 Shipping costs shall be included in the price of equipment.	Comply	Shipping costs from Sacramento, Calif. to Layland, WV is included in the bid
	4.2.3 Vendor must include additional documentation for all equipment and components to sufficiently demonstrate that all equipment and components meet specifications. Vendor should include this documentation with their bid.	Comply	Product data sheets for the antenna and transmission line shall be included
	4.2.4 The total cost of the bid shall be the "Total Bid Cost" as described in section 4.2.1	Comply	
	4.2.5 If no vendor submits a bid within the budget limitations of the Agency, the Agency may, at its own discretion, cancel this RFQ and purchase nothing.	Comply	
	5. PAYMENT:		
	5.1 Payment: Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.	Comply	

JAMPRO ANTENNAS, INC.
6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification	Jampro Response

	Specification	Compliance Noted	Comments
	6. DELIVERY AND RETURN:		
	6.1 Shipment and Delivery: Vendor shall deliver the Contract Items within 120 calendar days of being awarded this Contract and receiving a purchase order or notice to proceed. Contract Items must be delivered to Agency at the following address:	Comply	The products quoted shall be provided within 120 calendar days of contract award
	WV Educational Broadcasting Authority		
	Attn: Tommy Belcher, 304-254-7843, TBelcher2@WVPublic.Org		
	WVPB-Tower, #153		
	Layland, WV 25976		
	Vendor must give the Agency a minimum notice of 10 business days prior to the arrival of the Contract Items on site to permit preparation for off-loading.	Comply	10 days notice will be provided for the arrival of the products
	6.2 Late Delivery: The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.	Comply	If awarded the contract, Jampro shall notify the agency for any production delays
	Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.	Comply	Jampro does not intend to utilize a third party for this contract
	6.3 Delivery Payment/Risk of Loss: Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.	Comply	Delivery of products shall be FOB destination

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification **Jampro Response**

	Specification	Compliance Noted	Comments
	6.4 Return of Unacceptable Items: If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.	Comply	Jampro shall work with the agency for any items are unacceptable and rectify in a timely manner.
	6.5 Return Due to Agency Error: Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.	Comply	
	7. Vendor Default		
	7.1 The following shall be considered a vendor default under this Contract.	Comply	
	7.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.	Comply	
	7.1.2 Failure to comply with other specifications and requirements contained herein.	Comply	

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

Prepared for:West Virginia Educational Broadcasting Authority/WSWP Date: July 17, 2020

Item By Item Response

Customer Specification	Jampro Response

	Specification	Compliance Noted	Comments
	7.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.	Comply	
	7.1.4 Failure to remedy deficient performance upon request.	Comply	
	7.2 The following remedies shall be available to Agency upon default.	Comply	
	7.2.1 Immediate cancellation of the Contract.	Comply	
	7.2.2 Immediate cancellation of one or more release orders issued under this Contract.	Comply	
	7.2.3 Any other remedies available in law or equity.	Comply	

Jampro Antennas Technical Proposal

8 Bay Elliptically Polarized Band 3 Lambda Antenna, for WSWP, West Virginia, USA.

Alan Dick Broadcast
Chris Randall
Senior RF Engineer

Jon Watson
Senior RF Engineer

Date of issue: 14th July 2020
Document number: E50802
Version 1.0

1.)Document History & Structure

Prepared by: Chris Randall
RF Engineer

Approved by: Jon Watson
Senior RF Engineer

Version No.	Date	Change Details	Author
1.0	14th July 2020	Original Version	CCR

Structure of document
This document consists of the following sections and appendices:

Subject	Description
Technical Solution	System Data: Gains, Safety Factor Tables, Radiation Patterns, etc.
Datasheet	Radiating Element Description

2.)Gain Table

GAIN TABLE

WSWP

8 Bay Band 3 Lambda

Channel No.	8	8
Frequency MHz	183	183
Analogue or Digital (A or D)	D	D
Polarisation Plane	HP	VP
No. of Tiers	8	8
Vertical Aperture m	9.0	9.0
Vertical Aperture Wavelengths	5.49	5.49
Intrinsic Gain dB	8.15	8.15
Polarisation Loss dB	3.01	3.01
Null Fill Loss dB	0.49	0.48
Correction from 3dB	-2.04	3.98
Harness Loss dB	0.34	0.34
Mean Gain per plane dB	6.35	0.34
HRP Gain at Beam Tilt dB	0.00	0.00
Antenna Max Gain per plane at Horizontal dB	6.27	0.26
Antenna Max Gain per plane dB	6.35	0.34
Main Feeder Size	Rigid Line 3 1/8" Air	
Main Feeder Length m	143	143
Main Feeder Loss dB	0.64	0.64
System Gain per plane dB	5.71	-0.30
Transmitter Power kW	8.06	8.06
Mean ERP per plane kW	30.0	7.52
Max ERP per plane at Horizontal kW	29.5	7.38
Max ERP per plane kW	30.0	7.52
At Elevation Angle deg.	0.9	0.9

Engineer Chris R 15 Jul 2020

Des. No, 379015070 Chris Randall v8.1.1

3.)Safety Factor Table

SAFETY FACTOR TABLE

WSWP

8 Bay Band 3 Lambda

Channel No.	8	TOTAL	RATING	SAFETY
Frequency MHz	183		(2)	FACTOR
Analogue or Digital (A or D)	D			
DTV Peak/Mean Power	7			
Transmitter Power kW	6.73			
FOR RATING PURPOSES				
Transmitter Power kW (1)	6.73			
[1] Main Feeder	Rigid Line 3 1/8" Air	143m	50 Ohm	
Mean Power kW	6.73	6.73	43.40	**6.45**
Peak Volts kV	2.17	2.17	9.79	**4.51**
[2] 3dB Coupler	S1.6" - 3 1/8 M - 3 1/8 M - 3 1/8 M	Gm	RCCS332/B3	
Mean Power kW	5.81	5.81	48.00	**8.26**
Peak Volts kV	2.02	2.02	9.70	**4.81**
[3] Power Divider	S1.2Exit EQUAL	RCTQ3323/B3	3 1/8 - 3 1/8	50 - 50 Ohm
Mean Power kW	2.90	2.90	44.10	**15.19**
Peak Volts kV	1.43	1.43	9.20	**6.45**
[4] Power Divider	S1.8Exit EQUAL	RCTQ3183/B3	3 1/8 - 7/8	50 - 50 Ohm
Mean Power kW	1.45	1.45	31.79	**21.89**
Peak Volts kV	1.01	1.01	7.20	**7.14**
[5] Cable	1/2" 10m	50 Ohm		
Mean Power kW	0.181	0.181	2.86	**15.76**
Peak Volts kV	0.356	0.356	1.95	**5.47**
[6] Rigid Line	1 5/8" EIA 50 Ohm	1m		
Mean Power kW	0.169	0.169	12.96	**76.51**
Peak Volts kV	0.344	0.344	4.94	**14.36**
[7] Cable	1/2" 1m	50 Ohm		
Mean Power kW	0.169	0.169	2.86	**16.92**
Peak Volts kV	0.344	0.344	1.95	**5.67**
[8] Panel	S1.Dipole Lambda/BIII	7/8	50 Ohm	
Mean Power kW	0.168	0.168	3.98	**23.71**
Peak Volts kV	0.343	0.343	2.55	**7.44**

(1) Transmitter Power into whole antenna for power and voltage rating purposes

(2) Rating at Component Mean Power Frequency (approx. 183 MHz)

Ambient Temprature = 40deg.C

[see Key Diagram for Component Locations]

Engineer Chris R 14 Jul 2020

Des. No. 484414070 Chris Randall v8.1.1

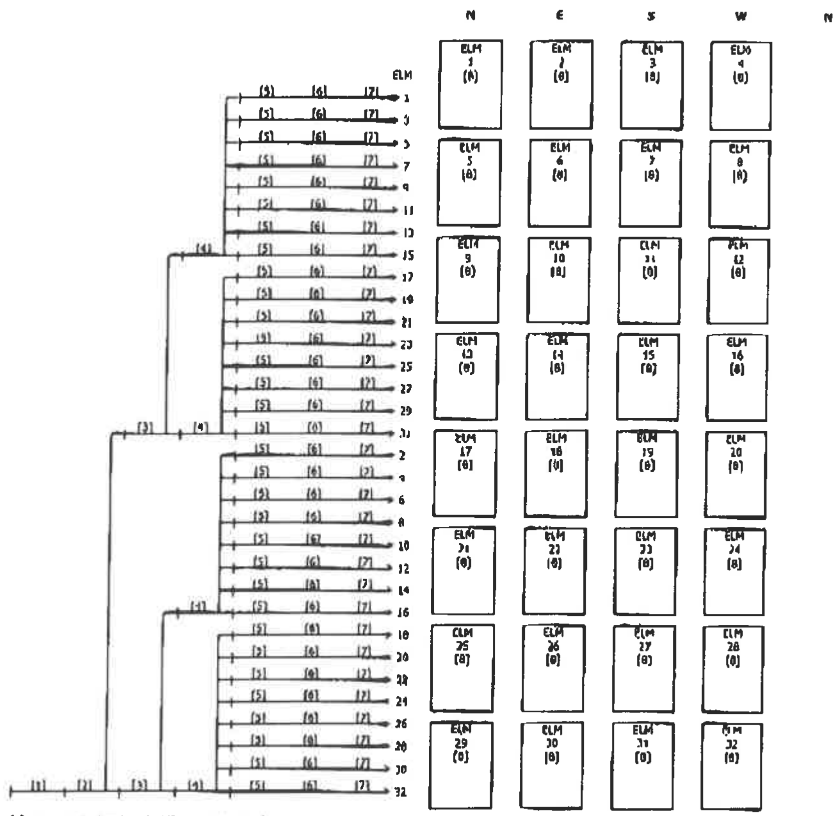
JAMPRO ANTENNAS, INC.

4.)Key Diagram

KEY DIAGRAM

WSWP

8 Bay Band 3 Lambda



(1) Main Feeder Rigid Line 3 1/8" Air 14.1m 50 Ohm
(2) 3dB Coupler S1.G" - 3 1/8 M - 3 1/8 M - 3 1/8 M - 3 1/8 M Gm RCCS332/B3
(3) Power Divider S1.2tan EQUAL RCFQ3323/B3 3 1/8 - 3 1/8 50 - 50 Ohm
(4) Power Divider S1.8tan EQUAL RCTQ3103/B3 3 1/8 - 7/8 50 - 50 Ohm
(5) Cable 1/2" 30m 50 Ohm
(6) Rigid Line 1 5/8" EIA 50 Ohm 1m
(7) Cable 1/2" 1m 50 Ohm
(8) Panel S1.Dpole Lambda/8III 7/8 50 Ohm

Engineer Chris R

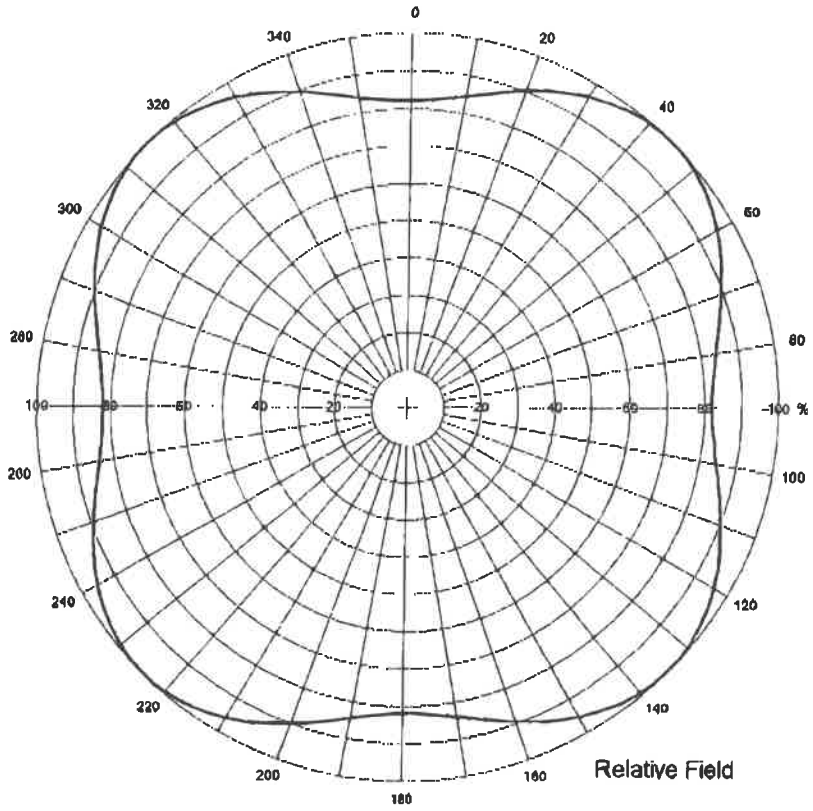
14 Jul 2020

Des. No. 484414070 Chris Randall v8.1.1

5.)Horizontal Radiation Patterns

HORIZONTAL RADIATION PATTERN

Station	***WSWP***
Frequency	***163 MHz***
Type	***8 Bay Band 3 Lambda***



Engineer ***Chris R*** Date ***14 Jul 2020***

Pat. No. 493714070 Chris Randall v8.1.1

JAMPRO ANTENNAS, INC.

Ang	Amp	dB
0	82	-1.72
2	82.16	-1.71
4	82.5	-1.67
6	83.03	-1.62
8	83.72	-1.54
10	84.56	-1.46
12	85.53	-1.36
14	86.6	-1.25
16	87.76	-1.13
18	88.98	-1.01
20	90.22	-0.89
22	91.48	-0.77
24	92.71	-0.66
26	93.91	-0.55
28	95.05	-0.44
30	96.1	-0.35
32	97.06	-0.26
34	97.9	-0.18
36	98.61	-0.12
38	99.18	-0.07
40	99.61	-0.03
42	99.89	-0.01
44	100	0
46	99.95	-0
48	99.75	-0.02
50	99.39	-0.05
52	98.88	-0.1
54	98.22	-0.16
56	97.43	-0.23
58	96.52	-0.31
60	95.5	-0.4
62	94.4	-0.5
64	93.22	-0.61
66	91.99	-0.73
68	90.74	-0.84
70	89.48	-0.97
72	88.25	-1.09
74	87.06	-1.2
76	85.95	-1.32
78	84.93	-1.42
80	84.03	-1.51
82	83.28	-1.59
84	82.69	-1.65
86	82.27	-1.7
88	82.04	-1.72
90	82	-1.72

Ang	Amp	dB
92	82.16	-1.71
94	82.5	-1.67
96	83.03	-1.62
98	83.72	-1.54
100	84.56	-1.46
102	85.53	-1.36
104	86.6	-1.25
106	87.76	-1.13
108	88.98	-1.01
110	90.22	-0.89
112	91.48	-0.77
114	92.71	-0.66
116	93.91	-0.55
118	95.05	-0.44
120	96.1	-0.35
122	97.06	-0.26
124	97.9	-0.18
126	98.61	-0.12
128	99.18	-0.07
130	99.61	-0.03
132	99.89	-0.01
134	100	0
136	99.95	-0
138	99.75	-0.02
140	99.39	-0.05
142	98.88	-0.1
144	98.22	-0.16
146	97.43	-0.23
148	96.52	-0.31
150	95.5	-0.4
152	94.4	-0.5
154	93.22	-0.61
156	91.99	-0.73
158	90.74	-0.84
160	89.48	-0.97
162	88.25	-1.09
164	87.06	-1.2
166	85.95	-1.32
168	84.93	-1.42
170	84.03	-1.51
172	83.28	-1.59
174	82.69	-1.65
176	82.27	-1.7
178	82.04	-1.72
180	82	-1.72
182	82.16	-1.71

Ang	Amp	dB
184	82.5	-1.67
186	83.03	-1.62
188	83.72	-1.54
190	84.56	-1.46
192	85.53	-1.36
194	86.6	-1.25
196	87.76	-1.13
198	88.98	-1.01
200	90.22	-0.89
202	91.48	-0.77
204	92.71	-0.66
206	93.91	-0.55
208	95.05	-0.44
210	96.1	-0.35
212	97.06	-0.26
214	97.9	-0.18
216	98.61	-0.12
218	99.18	-0.07
220	99.61	-0.03
222	99.89	-0.01
224	100	0
226	99.95	-0
228	99.75	-0.02
230	99.39	-0.05
232	98.88	-0.1
234	98.22	-0.16
236	97.43	-0.23
238	96.52	-0.31
240	95.5	-0.4
242	94.4	-0.5
244	93.22	-0.61
246	91.99	-0.73
248	90.74	-0.84
250	89.48	-0.97
252	88.25	-1.09
254	87.06	-1.2
256	85.95	-1.32
258	84.93	-1.42
260	84.03	-1.51
262	83.28	-1.59
264	82.69	-1.65
266	82.27	-1.7
268	82.04	-1.72
270	82	-1.72
272	82.16	-1.71
274	82.5	-1.67

Ang	Amp	dB
276	83.03	-1.62
278	83.72	-1.54
280	84.56	-1.46
282	85.53	-1.36
284	86.6	-1.25
286	87.76	-1.13
288	88.98	-1.01
290	90.22	-0.89
292	91.48	-0.77
294	92.71	-0.66
296	93.91	-0.55
298	95.05	-0.44
300	96.1	-0.35
302	97.06	-0.26
304	97.9	-0.18
306	98.61	-0.12
308	99.18	-0.07
310	99.61	-0.03
312	99.89	-0.01
314	100	0
316	99.95	-0
318	99.75	-0.02
320	99.39	-0.05
322	98.88	-0.1
324	98.22	-0.16
326	97.43	-0.23
328	96.52	-0.31
330	95.5	-0.4
332	94.4	-0.5
334	93.22	-0.61
336	91.99	-0.73
338	90.74	-0.84
340	89.48	-0.97
342	88.25	-1.09
344	87.06	-1.2
346	85.95	-1.32
348	84.93	-1.42
350	84.03	-1.51
352	83.28	-1.59
354	82.69	-1.65
356	82.27	-1.7
358	82.04	-1.72
360	82	-1.72

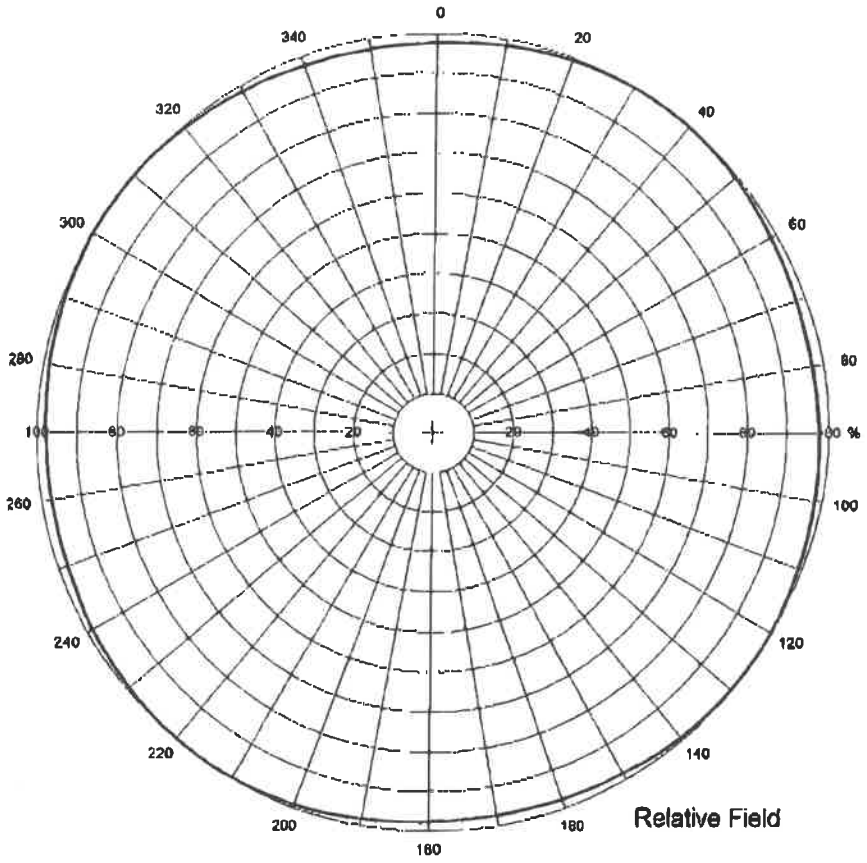
JAMPRO ANTENNAS, INC.

HORIZONTAL RADIATION PATTERN

Station ***WSWP***

Frequency ***183 MHz***

Type ***8 Bay Band 3 Lambda***



Engineer ***Chris R*** Date ***14 Jul 2020***

Pat. No. 485514070 Chris Randall v8 1.1

JAMPRO ANTENNAS, INC

Ang	Amp	dB
0	97.72	-0.2
2	97.84	-0.19
4	97.97	-0.18
6	98.12	-0.16
8	98.29	-0.15
10	98.46	-0.13
12	98.63	-0.12
14	98.81	-0.1
16	98.99	-0.09
18	99.16	-0.07
20	99.32	-0.06
22	99.47	-0.05
24	99.61	-0.03
26	99.73	-0.02
28	99.83	-0.01
30	99.91	-0.01
32	99.96	-0
34	99.99	-0
36	100	0
38	99.98	-0
40	99.94	-0.01
42	99.87	-0.01
44	99.78	-0.02
46	99.67	-0.03
48	99.54	-0.04
50	99.4	-0.05
52	99.24	-0.07
54	99.07	-0.08
56	98.9	-0.1
58	98.72	-0.11
60	98.55	-0.13
62	98.37	-0.14
64	98.21	-0.16
66	98.05	-0.17
68	97.91	-0.18
70	97.78	-0.19
72	97.67	-0.2
74	97.58	-0.21
76	97.52	-0.22
78	97.47	-0.22
80	97.46	-0.22
82	97.46	-0.22
84	97.49	-0.22
86	97.55	-0.22
88	97.62	-0.21
90	97.72	-0.2

Ang	Amp	dB
92	97.84	-0.19
94	97.97	-0.18
96	98.12	-0.16
98	98.29	-0.15
100	98.46	-0.13
102	98.63	-0.12
104	98.81	-0.1
106	98.99	-0.09
108	99.16	-0.07
110	99.32	-0.06
112	99.47	-0.05
114	99.61	-0.03
116	99.73	-0.02
118	99.83	-0.01
120	99.91	-0.01
122	99.96	-0
124	99.99	-0
126	100	0
128	99.98	-0
130	99.94	-0.01
132	99.87	-0.01
134	99.78	-0.02
136	99.67	-0.03
138	99.54	-0.04
140	99.4	-0.05
142	99.24	-0.07
144	99.07	-0.08
146	98.9	-0.1
148	98.72	-0.11
150	98.55	-0.13
152	98.37	-0.14
154	98.21	-0.16
156	98.05	-0.17
158	97.91	-0.18
160	97.78	-0.19
162	97.67	-0.2
164	97.58	-0.21
166	97.52	-0.22
168	97.47	-0.22
170	97.46	-0.22
172	97.46	-0.22
174	97.49	-0.22
176	97.55	-0.22
178	97.62	-0.21
180	97.72	-0.2
182	97.84	-0.19

Ang	Amp	dB
184	97.97	-0.18
186	98.12	-0.16
188	98.29	-0.15
190	98.46	-0.13
192	98.63	-0.12
194	98.81	-0.1
196	98.99	-0.09
198	99.16	-0.07
200	99.32	-0.06
202	99.47	-0.05
204	99.61	-0.03
206	99.73	-0.02
208	99.83	-0.01
210	99.91	-0.01
212	99.96	-0
214	99.99	-0
216	100	0
218	99.98	-0
220	99.94	-0.01
222	99.87	-0.01
224	99.78	-0.02
226	99.67	-0.03
228	99.54	-0.04
230	99.4	-0.05
232	99.24	-0.07
234	99.07	-0.08
236	98.9	-0.1
238	98.72	-0.11
240	98.55	-0.13
242	98.37	-0.14
244	98.21	-0.16
246	98.05	-0.17
248	97.91	-0.18
250	97.78	-0.19
252	97.67	-0.2
254	97.58	-0.21
256	97.52	-0.22
258	97.47	-0.22
260	97.46	-0.22
262	97.46	-0.22
264	97.49	-0.22
266	97.55	-0.22
268	97.62	-0.21
270	97.72	-0.2
272	97.84	-0.19
274	97.97	-0.18

Ang	Amp	dB
276	98.12	-0.16
278	98.29	-0.15
280	98.46	-0.13
282	98.63	-0.12
284	98.81	-0.1
286	98.99	-0.09
288	99.16	-0.07
290	99.32	-0.06
292	99.47	-0.05
294	99.61	-0.03
296	99.73	-0.02
298	99.83	-0.01
300	99.91	-0.01
302	99.96	-0
304	99.99	-0
306	100	0
308	99.98	-0
310	99.94	-0.01
312	99.87	-0.01
314	99.78	-0.02
316	99.67	-0.03
318	99.54	-0.04
320	99.4	-0.05
322	99.24	-0.07
324	99.07	-0.08
326	98.9	-0.1
328	98.72	-0.11
330	98.55	-0.13
332	98.37	-0.14
334	98.21	-0.16
336	98.05	-0.17
338	97.91	-0.18
340	97.78	-0.19
342	97.67	-0.2
344	97.58	-0.21
346	97.52	-0.22
348	97.47	-0.22
350	97.46	-0.22
352	97.46	-0.22
354	97.49	-0.22
356	97.55	-0.22
358	97.62	-0.21
360	97.72	-0.2

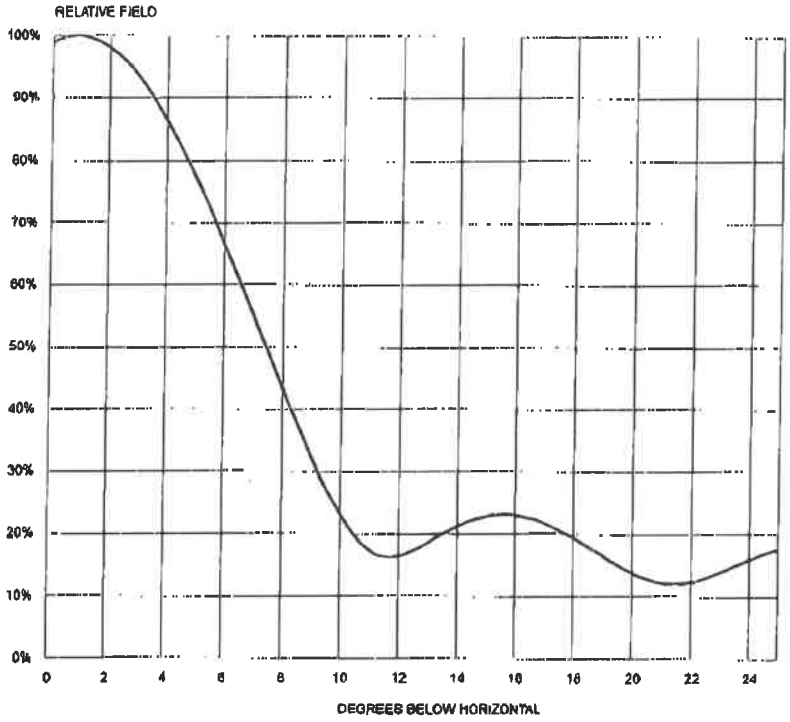
6.)Vertical Radiation Patterns

VERTICAL RADIATION PATTERN

Station ***WSWP***

Frequency ***183 MHz***

Type ***8 Bay Band 3 Lambda***



Beam Tilt ***.8 deg***

Engineer ***Chris R*** Date ***14 Jul 2020***

Pat. No. 467514070 Chris Randall v8.1.1

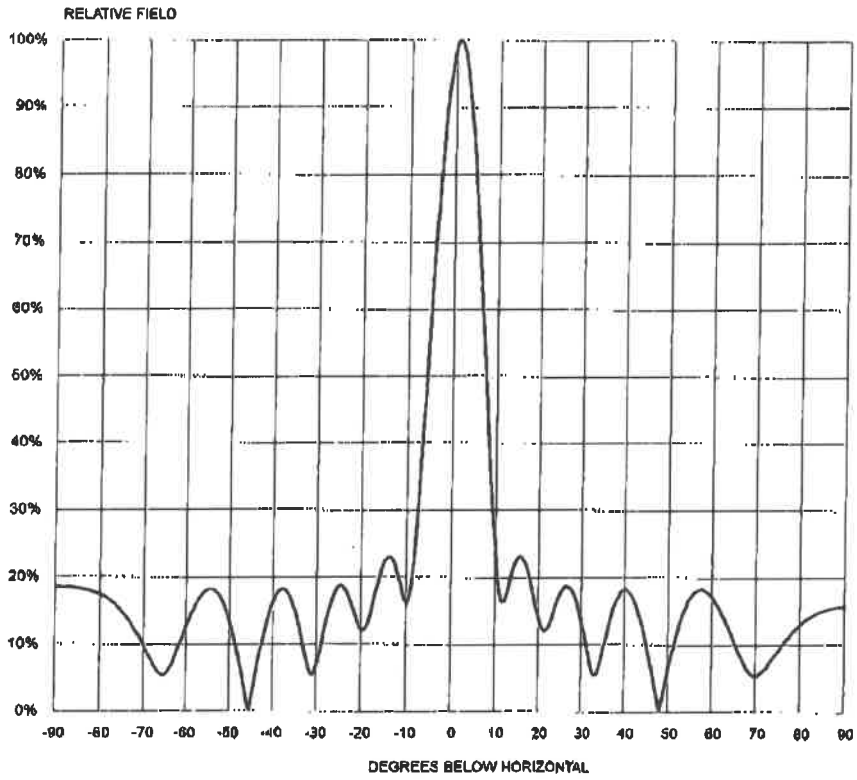
JAMPRO ANTENNAS, INC.

VERTICAL RADIATION PATTERN

Station ***WSWP***

Frequency ***183 MHz***

Type ***8 Bay Band 3 Lambda***



Beam Tilt ***.8 deg***

Engineer ***Chris R*** Date ***14 Jul 2020***

Pat. No. 486314070 Chris Randall v8.1.1

JAMPRO ANTENNAS, INC.

Ang	Amp	dB
-90	18.48	-14.7
-89	18.47	-14.7
-88	18.45	-14.7
-87	18.42	-14.7
-86	18.36	-14.7
-85	18.29	-14.8
-84	18.18	-14.8
-83	18.05	-14.9
-82	17.87	-15
-81	17.65	-15.1
-80	17.37	-15.2
-79	17.02	-15.4
-78	16.59	-15.6
-77	16.08	-15.9
-76	15.48	-16.2
-75	14.77	-16.6
-74	13.95	-17.1
-73	13.02	-17.7
-72	11.98	-18.4
-71	10.84	-19.3
-70	9.62	-20.3
-69	8.36	-21.6
-68	7.14	-22.9
-67	6.11	-24.3
-66	5.51	-25.2
-65	5.6	-25
-64	6.41	-23.9
-63	7.74	-22.2
-62	9.35	-20.6
-61	11.07	-19.1
-60	12.78	-17.9
-59	14.38	-16.8
-58	15.78	-16
-57	16.93	-15.4
-56	17.75	-15
-55	18.18	-14.8
-54	18.19	-14.8
-53	17.72	-15
-52	16.75	-15.5
-51	15.29	-16.3
-50	13.33	-17.5
-49	10.91	-19.2
-48	8.09	-21.8
-47	4.94	-26.1
-46	1.55	-36.2
-45	1.96	-34.2

Ang	Amp	dB
-44	5.45	-25.3
-43	8.78	-21.1
-42	11.82	-18.5
-41	14.4	-16.8
-40	16.4	-15.7
-39	17.71	-15
-38	18.24	-14.8
-37	17.93	-14.9
-36	16.78	-15.5
-35	14.85	-16.6
-34	12.27	-18.2
-33	9.3	-20.6
-32	6.53	-23.7
-31	5.49	-25.2
-30	7.26	-22.8
-29	10.33	-19.7
-28	13.42	-17.4
-27	16.01	-15.9
-26	17.81	-15
-25	18.64	-14.6
-24	18.46	-14.7
-23	17.33	-15.2
-22	15.51	-16.2
-21	13.5	-17.4
-20	12.18	-18.3
-19	12.49	-18.1
-18	14.52	-16.8
-17	17.39	-15.2
-16	20.19	-13.9
-15	22.22	-13.1
-14	23.04	-12.8
-13	22.41	-13
-12	20.43	-13.8
-11	17.74	-15
-10	16.24	-15.8
-9	18.79	-14.5
-8	25.94	-11.7
-7	35.97	-8.88
-6	47.38	-6.49
-5	59.16	-4.56
-4	70.49	-3.04
-3	80.69	-1.86
-2	89.15	-1
-1	95.4	-0.41
0	99.07	-0.08
1	99.95	-0

Ang	Amp	dB
2	98	-0.18
3	93.33	-0.6
4	86.22	-1.29
5	77.06	-2.26
6	66.39	-3.56
7	54.83	-5.22
8	43.13	-7.3
9	32.12	-9.86
10	22.96	-12.8
11	17.32	-15.2
12	16.44	-15.7
13	18.65	-14.6
14	21.22	-13.5
15	22.78	-12.8
16	22.93	-12.8
17	21.7	-13.3
18	19.4	-14.2
19	16.52	-15.6
20	13.81	-17.2
21	12.22	-18.3
22	12.4	-18.1
23	13.97	-17.1
24	15.98	-15.9
25	17.65	-15.1
26	18.58	-14.6
27	18.56	-14.6
28	17.56	-15.1
29	15.64	-16.1
30	13	-17.7
31	9.92	-20.1
32	6.98	-23.1
33	5.46	-25.3
34	6.68	-23.5
35	9.42	-20.5
36	12.32	-18.2
37	14.84	-16.6
38	16.73	-15.5
39	17.88	-15
40	18.24	-14.8
41	17.81	-15
42	16.64	-15.6
43	14.81	-16.6
44	12.41	-18.1
45	9.58	-20.4
46	6.43	-23.8
47	3.11	-30.1

Ang	Amp	dB
48	0.26	-51.7
49	3.55	-29
50	6.67	-23.5
51	9.52	-20.4
52	12.02	-18.4
53	14.14	-17
54	15.82	-16
55	17.06	-15.4
56	17.85	-15
57	18.21	-14.8
58	18.17	-14.8
59	17.76	-15
60	17.03	-15.4
61	16.02	-15.9
62	14.8	-16.6
63	13.4	-17.5
64	11.91	-18.5
65	10.38	-19.7
66	8.88	-21
67	7.52	-22.5
68	6.4	-23.9
69	5.67	-24.9
70	5.46	-25.3
71	5.75	-24.8
72	6.41	-23.9
73	7.28	-22.8
74	8.23	-21.7
75	9.18	-20.7
76	10.1	-19.9
77	10.95	-19.2
78	11.73	-18.6
79	12.44	-18.1
80	13.06	-17.7
81	13.61	-17.3
82	14.08	-17
83	14.48	-16.8
84	14.82	-16.6
85	15.09	-16.4
86	15.31	-16.3
87	15.48	-16.2
88	15.6	-16.1
89	15.67	-16.1
90	15.69	-16.1

7.)Antenna Summary

JAMPRO ANTENNAS AND SYSTEMS, INC.

6340 Sky Creek Dr., Sacramento, CA 95828 Web
FAX (916) 383-1182 www.Jampro.com

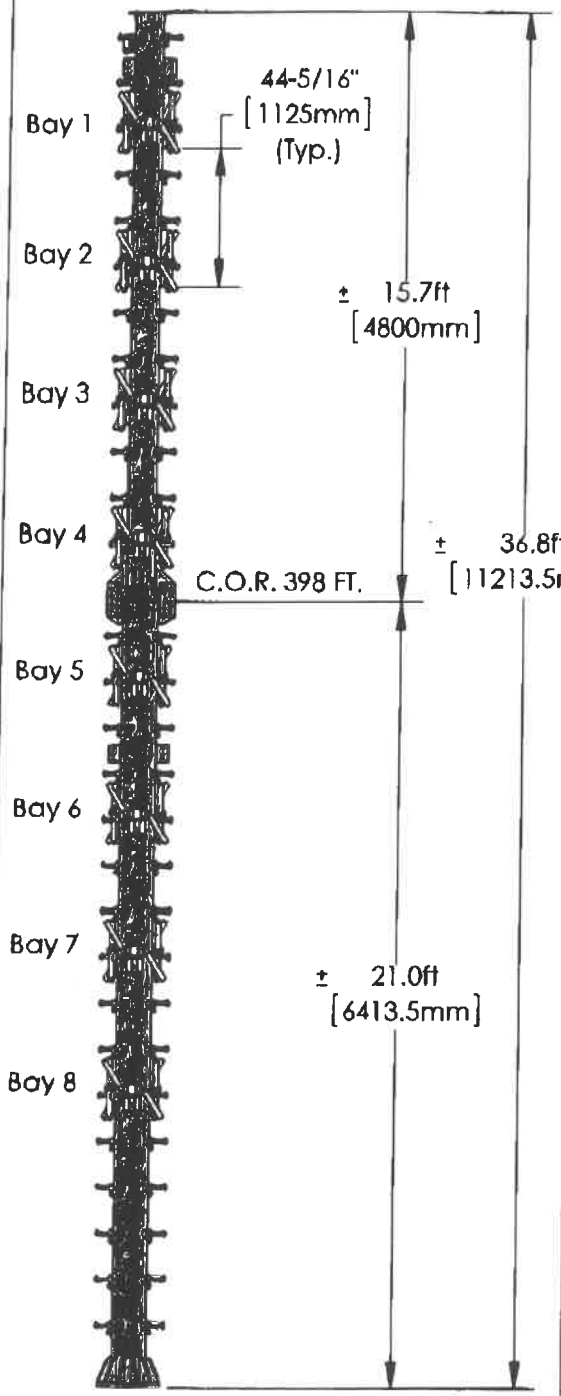
Tel: (916)383-1177

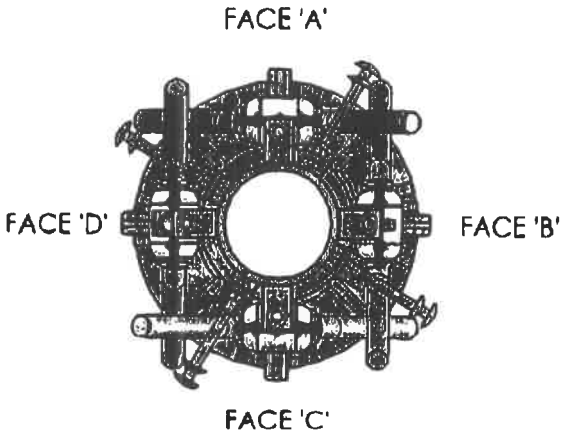
System Gain-Loss Calculator Summary Sheet:

Description	Values*	
Frequency	183MHz	
Max Effective Radiated Power	30.00 kW	
Antenna Mean Gain (Total)	6.35 dBd	4.32 times
Required Antenna Input Power	8.42 dBk	6.95 kW
Coax System Length	469.0 feet	143 Meters
Coax Loss Per 100 Meters	0.447 dB	
Total Coax Losses	0.64 dB	0.95 kW
Coax Efficiency:	86.30%	
Mask Filter Losses	0.00 dB	0.00 kW
Other Losses	0.00 dB	0.00 kW
Total System Losses	0.64 dB	1.10 kW
Required Transmitter Output Total	9.06 dBk	8.06 kW

Company Name	WSWP
Info Line:	8-bay Lambda Antenna (0.68 lambda)
Coax Type:	3 1/8" Rigid Transmission Line
Date:	14th July 2020

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.





TOP VIEW

MECHANICAL LOADING DATA

	Weight, Wt.		Effective Projected Area, EPA	
	no ice	0.5" ice	no ice	0.5" ice
ANTENNA SYSTEM	**3625 lbs. (1644 kg)**	**4903 lbs. (2225 kg)**	**63 sq. ft. (5.8 sq. m)**	**131 sq. ft. (12.1 sq. m)**

NOTES & ASSUMPTIONS

CODE REFERENCE:	TIA-222-G	
Structure Class:	II	
Structure Type: 2	Tubular pole structures, latticed structures with other than triangular, square or rectangular cross sections, strength design of appurtenances.	
Exposure Class:	C	
Topographic Category:	1	
Ice Conditions:	Basic Radial Ice Thickness @ 33' (10m) AGL	0.5" (13mm)
System Includes:	Radomed Lambda Antennas, Mounting Pole, and Pole-mounted Cables.	

NOTES

Mounts not included unless specifically noted above.

PRELIMINARY DRAWINGS AND CALCULATIONS
NOT TO SCALE

	NAME	DATE
DRAWN BY	SML	14 Jul 2020
LAST REVISED		

MECHANICAL LOADING DATA SHEET

AlanDick
Alan Dick Broadcast Ltd., Unit 1 Bay 2 Coln Park Ind. Est., Andoversford, Cheltenham, GL54 4LB

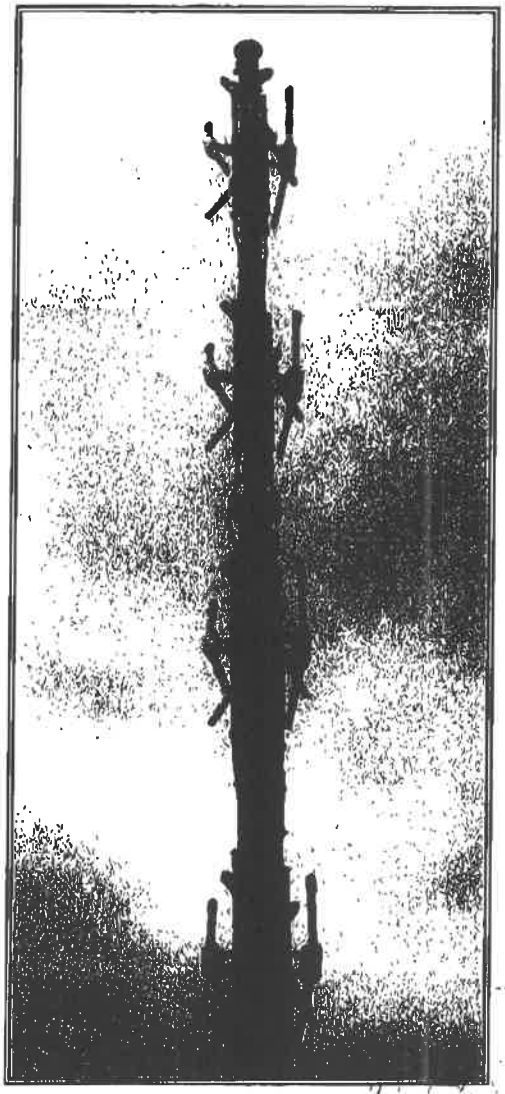
Lambda-8 (Band III)
CH. 8
WSWP-TV, Grandview, WV

SIZE	DWG. NO.	REV.
A	Lambda-8 (Band III)-001	A

AlanDick

LAMBDA

TV CP ANTENNA



Circularly polarized

Channels 2-6 Band I
Channels 7-13 Band III

Top Mounted

Omni Directional

Super-turnstile
Replacement

Grounded copper
feed lines

Radomes

Elements at DC ground
for lightning protection

Hot dipped
galvanized pole

AlanDick

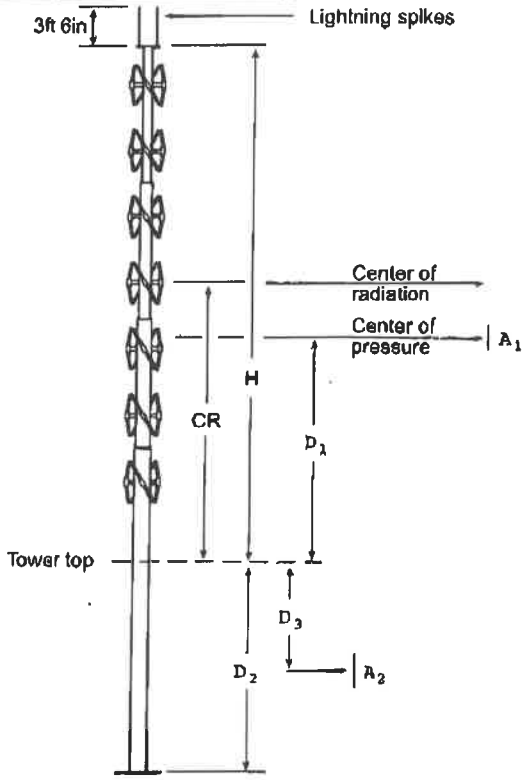


FIG. 1 KEY TO DIMENSIONS

channel	CR ℄	H ℄	A_1 ℄²	A_2 ℄²	D_1 ℄	D_2 ℄	D_3 ℄	weight lbs
2	53.9	100.1	165	55	44.5	20	10	13,000
3	48.8	90.7	150	50	41.5	20	10	12,000
4	44.6	82.8	135	40	38.5	16.4	8.2	10,000
5	38.9	72.3	125	35	36.5	16.4	8.2	10,000
6	36.2	67.2	115	33	34.5	16.4	8.2	9,500

Note: Above Specifications are for a 7 bay system. For other configurations consult the factory

FIG. 2 MECHANICAL DETAILS

Operating channels		2-6
Circularity		1.5 dB
Axial Ratio		3 dB
Beam Tilt		1 deg.
Gain, RMS, each polarization		4.7 dB
Input Impedance		50 ohms
VSWR	Visual carrier	1.05:1
	Across channel	1.10:1
Input Connector		31/8 EIA
Power Rating (peak synch)		60 kW

Note: Above Specifications are for a 7 bay system. For other configurations consult the factory

The ADC Lambda CP antenna, for Band I channels 2 through 6, and channels 7 through 13 Band III, developed specifically to provide a top-mounted circularly polarized antenna with comparable loadings to the familiar horizontally polarized Super-turnstile. The antenna is conservatively designed with a power rating to achieve 100kW ERP per plane with ample reserve capacity.

Lambda antennas are ruggedly built for long trouble free life. Great attention has been paid to optimizing both the mechanical and electrical design. Careful selection of materials has resulted in a heavy duty galvanized steel pole and radiating elements, coupled with grounded copper, brass and gun metal distribution feeder components and stainless steel hardware. Radome protection of the feed points eliminates the need for expensive electrical de-icing.

Optimized Lambda antennas are produced for each Band I channel, 2 through 6, and Band III channels 7 through 13. The antenna consists of an array of X bays of 4 slant dipoles per bay. Antennas may be provided with either single or dual 31/8 EIA input flanges as indicated on the back cover schematic diagrams. Input fine matchers are included to minimize installation and commissioning time and provide optimum antenna match to the main transmission line.

Fig. 2 shows mechanical dimensions, aerodynamic areas and weights. Fig. 3 summarizes the electrical performance. The excellent omnidirectional horizontal radiation

AlanDick

pattern performance of both the horizontally and vertically polarized components is shown in Fig. 4 which also shows the axial ratio. Fig. 5 displays the vertical radiation pattern.

The mechanical data given in Fig. 2 is appropriate for standard antennas and could vary for a specific installation; ADC should always be consulted for specific sites. Aerodynamic areas have been calculated in accordance with the RS222E standard using the appropriate force coefficients. A1and A2 are the effective areas above and below the tower top, respectively. A2 includes the main power dividers and incorporates shielding effects.

ANTENNA TYPE NUMBER

The antennas type number provides a convenient reference to its main characteristics as illustrated below. For the Lambda antenna only two items are variable: the operating channel and the number of inputs.

A channel 4 antenna fed by two transmission lines would be designated:
T4C7.4LD60ND-2

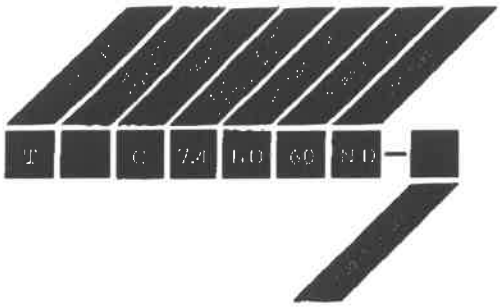


FIG. 3 ELECTRICAL PERFORMANCE

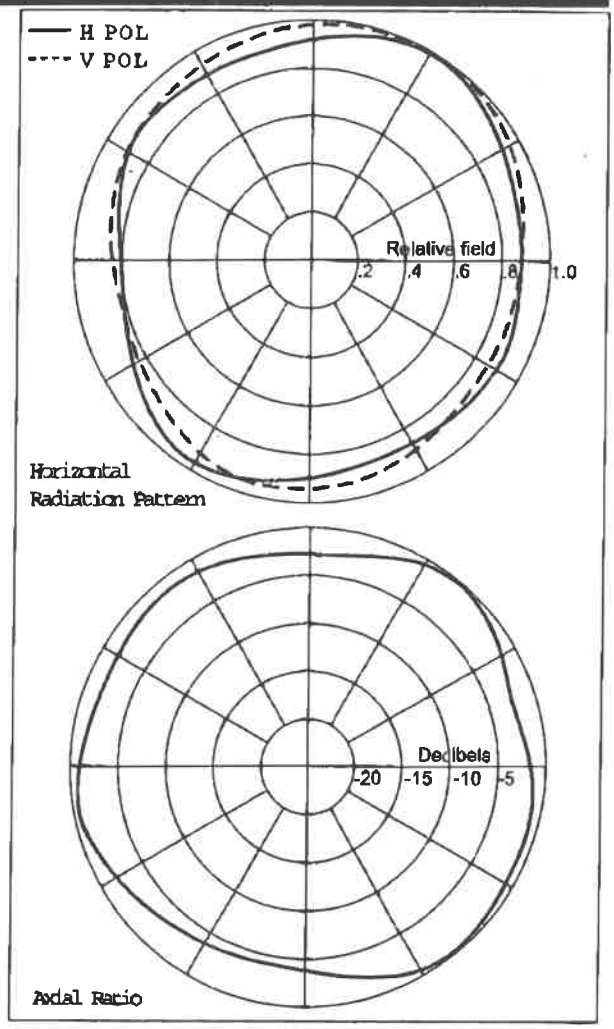


FIG. 4 HORIZONTAL PATTERN DATA

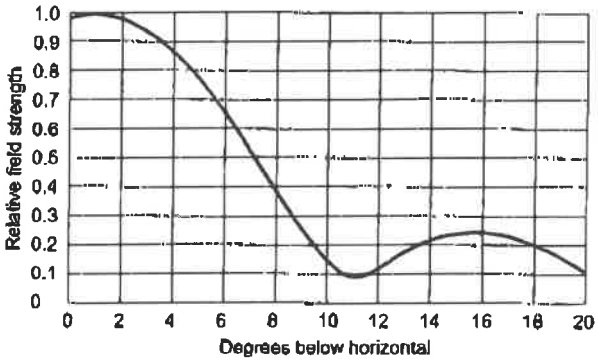
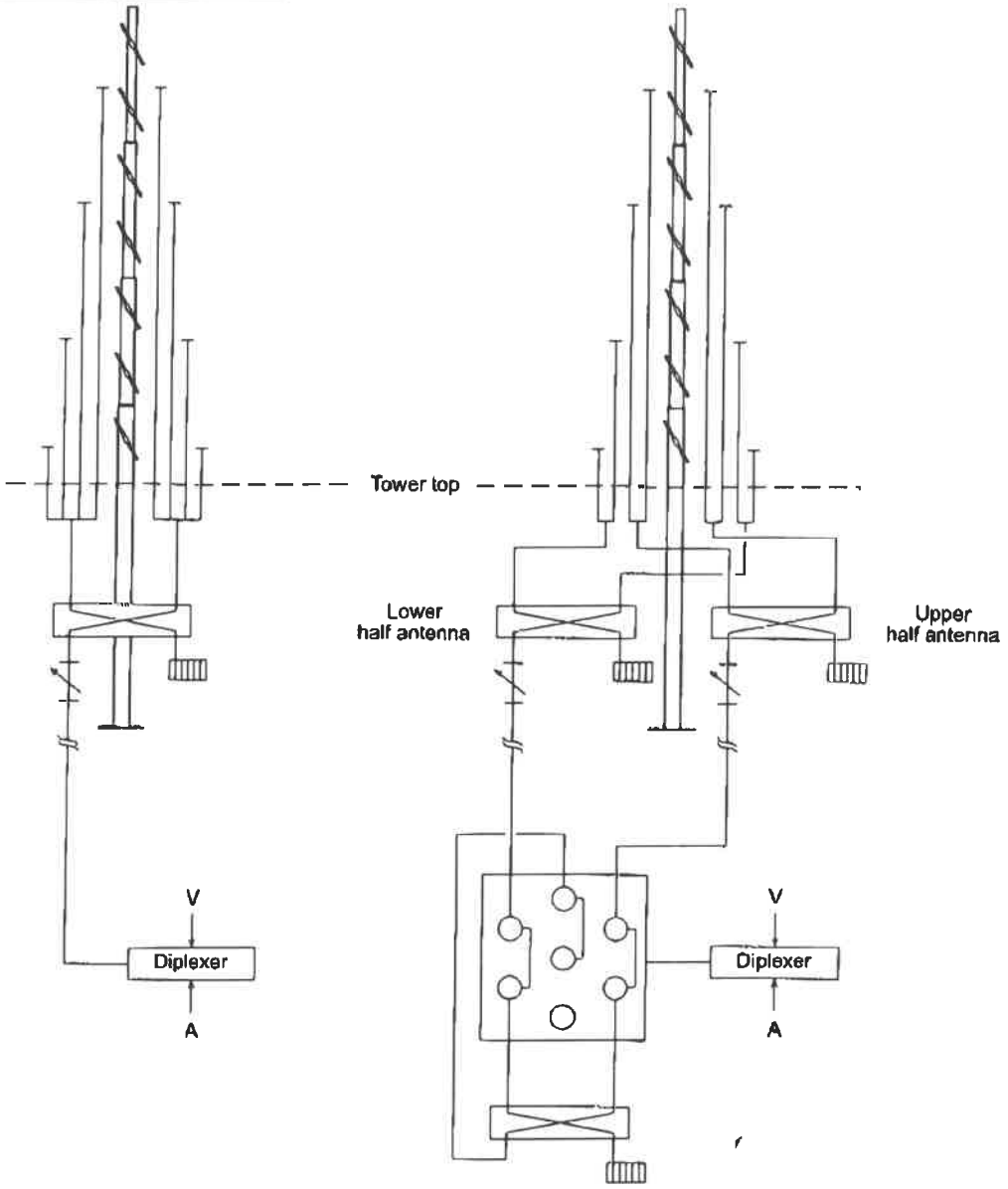


FIG. 5 VERTICAL RADIATION PATTERN

AlanDick



Single Input

Dual Input

FIG. 6 TYPICAL INSTALLATION SCHEMATICS

ADCs Products and Services include Guyed towers Self Supporting Towers Cellular Antennas AM & FM Radio Transmitting Antennas VHF & UHF TV Transmitting Antennas TV and Radio Transmitter Combining Units RF Switching Frames and Transmission Line Components Installation and Commissioning

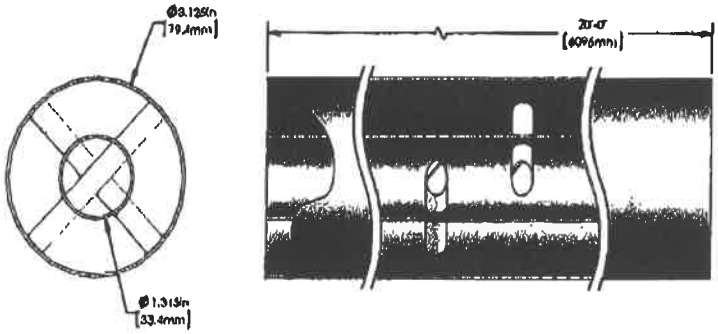
RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components

All dimensions are typical and can vary.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components



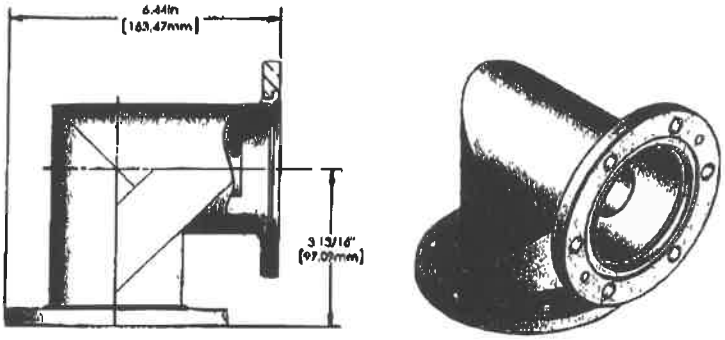
3-1/8" 20 ft. Line Section

Part # 318-50-001 (pictured)
Unflanged

Part # 318-50-002
Flanged 1 end

Part # 318-50-003
Flanged both ends

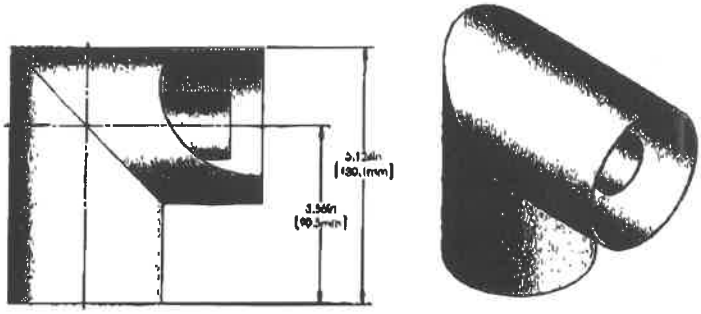
49.602-52.722lbs approx.



3-1/8" 90 degree Elbow

Part # 318-50-050 (pictured)
Flanged Reinforced.
7.071lbs approx.

Part # 318-50-055
Unequal Leg Flanged
10.935lbs approx.

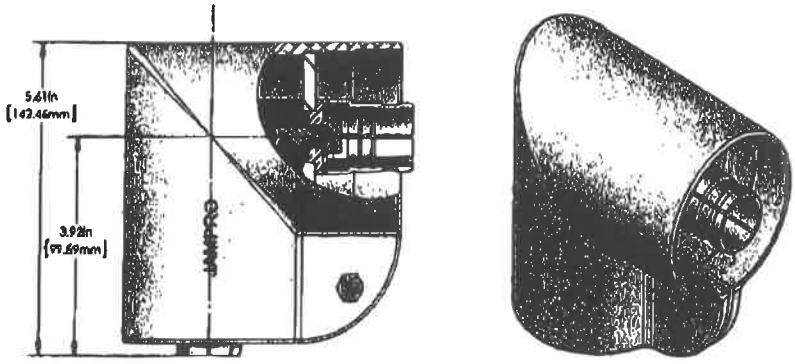


3-1/8" 90 degree Elbow

Part # 318-50-051 (pictured)

Unflanged

2.071lbs approx.



3-1/8" Aluminum Elbow

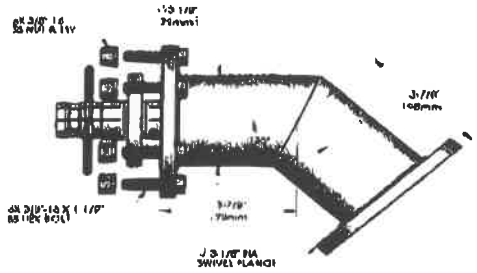
Part # 318-50-052

Unflanged with Integrated Couplings

3.333lbs approx.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components

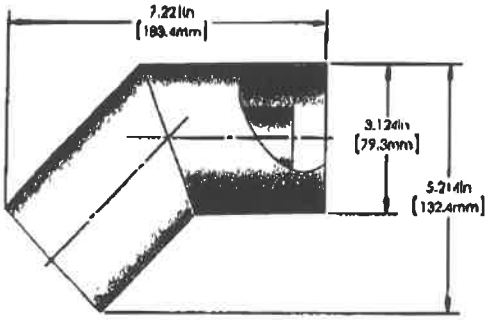


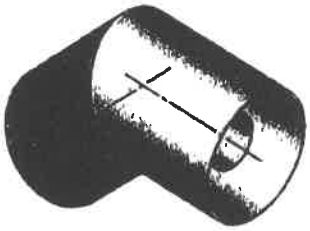
3-1/8" 45 degree Elbow

Part # 318-50-053

Flanged

6.79lbs approx.



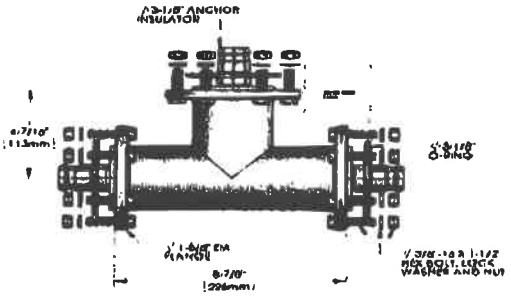


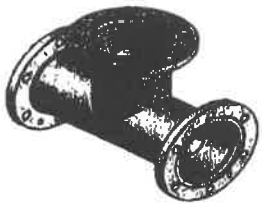
3-1/8" 45 degree Elbow

Part # 318-50-054

Unflanged

2.266lbs approx.

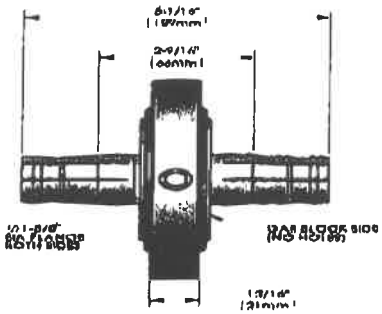


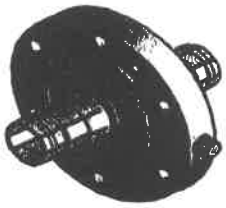


3-1/8" Tee Assembly

Part # 318-50-060

11.157lbs approx.





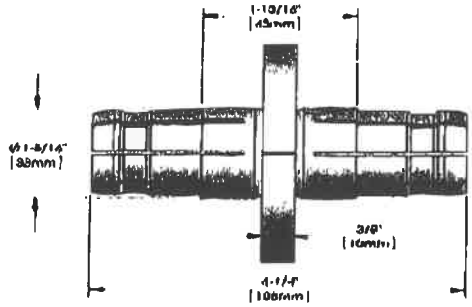
3-1/8" Gas Barrier

Part # 318-50-065

4.169lbs approx.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components

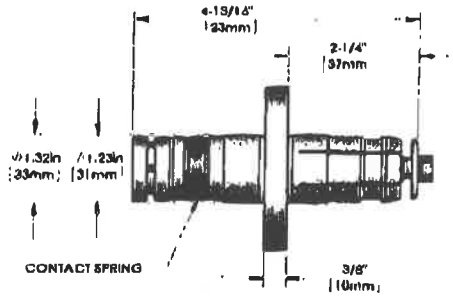


3-1/8" Anchor Insulator Connector - Bullet

Part # 318-50-100

Bullet

0.654lbs

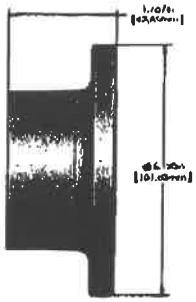


3-1/8" Anchor Insulator Connector

Part # 318-50-101

Expansion

1.421lbs approx.

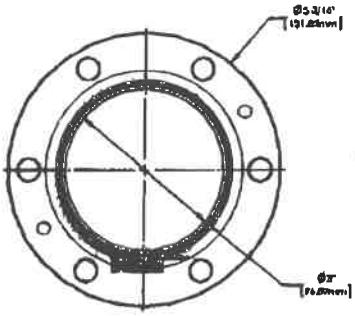


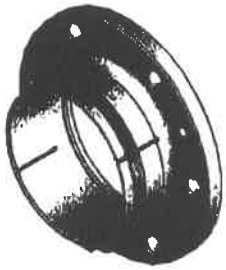
3-1/8" Field Flange

Part # 318-50-105

Includes: silicone, solder, & hardware kit.

2.338lbs approx.





3-1/8" Field Flange

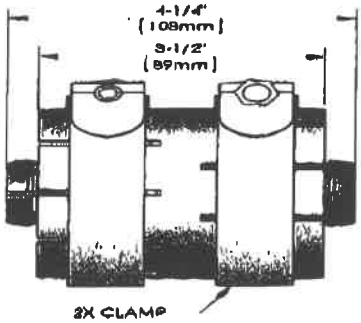
Part # 318-50-110

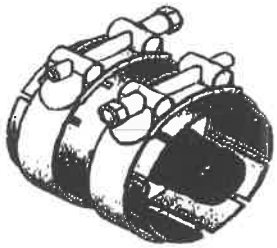
Clamp Type

2.345lbs

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components



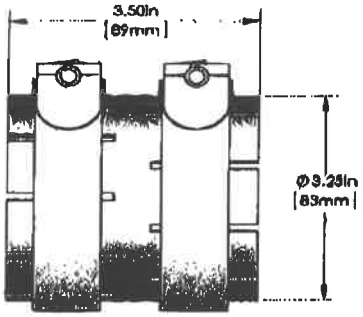


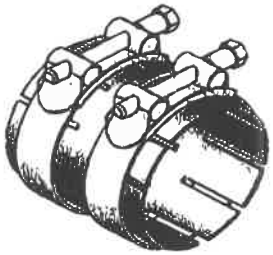
3-1/8" Unpressurized Coupling

Part # 318-50-115

With Inner Conductor

1.168lbs approx.



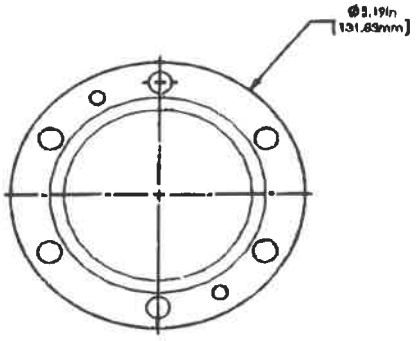


3-1/8" Unpressurized Coupling

Part # 318-50-120

Without Inner Conductor

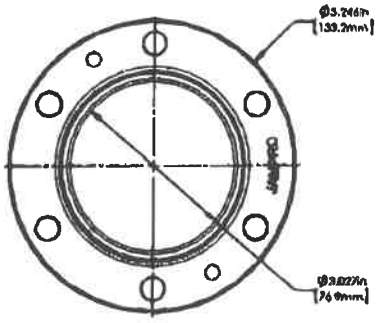
0.622lbs approx.



3-1/8" Cover Plate

Part # 318-50-130

2.088lbs approx.



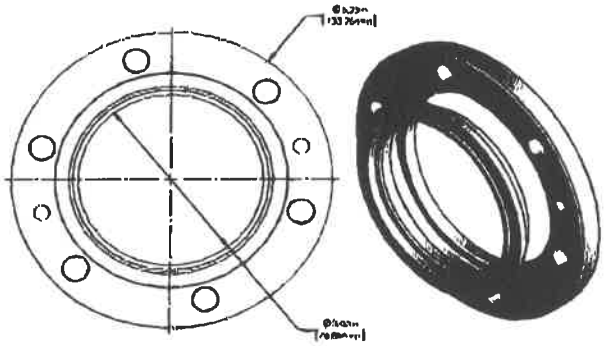
3-1/8" Fixed Flange

Part # 318-50-140

1.641lbs approx.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components

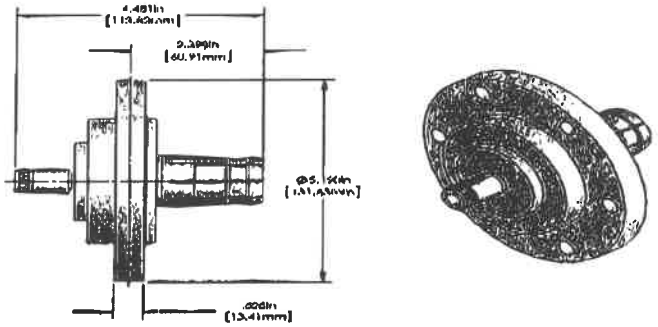


3-1/8" Swivel Flange

Part # 318-50-145

2 Part Solder On

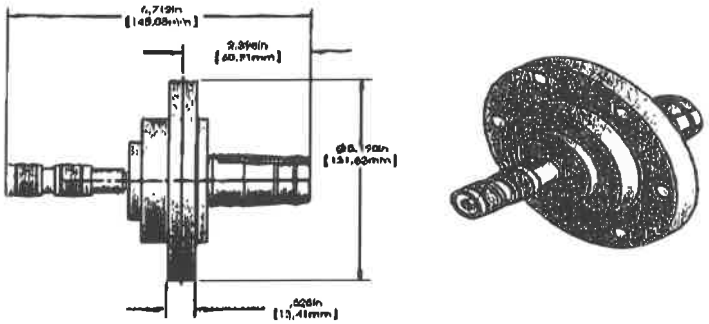
1.637lbs approx.



Reducer, 3-1/8" Male to Type-N Female

Part # 318-50-300

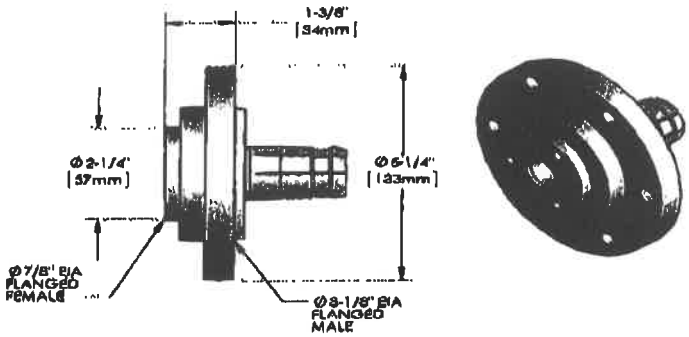
1.640lbs approx.



Reducer, 3-1/8" Male to Type-N Male

Part # 318-50-305

1.785lbs approx.



Reducer, 3-1/8" Male to 7/8" Female

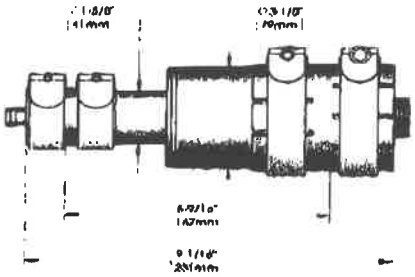
Part # 318-50-310

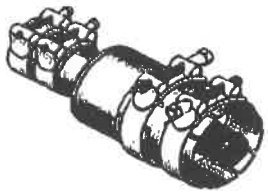
Flanged (FM Band Only)

4.393lbs approx.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components



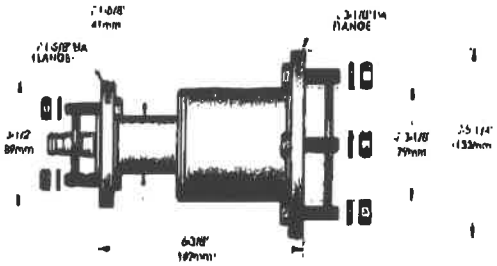


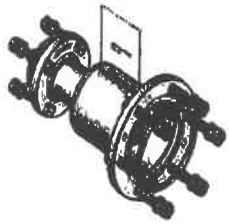
Reducer, 3-1/8" Male to 1-5/8" Male

Part # 318-50-315

Unflanged with Couplings

3.754lbs approx.



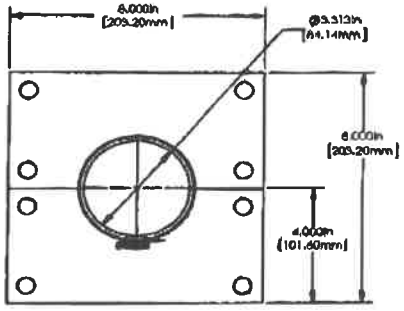


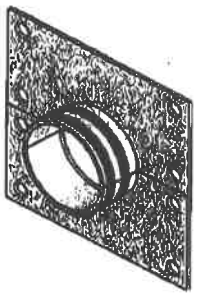
Reducer, 3-1/8" Female to 1-5/8" Male

Part # 318-50-325

Flanged

5.781lbs approx.

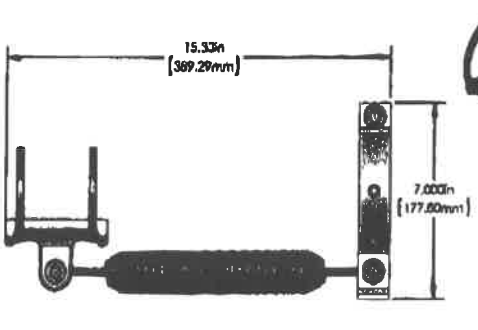


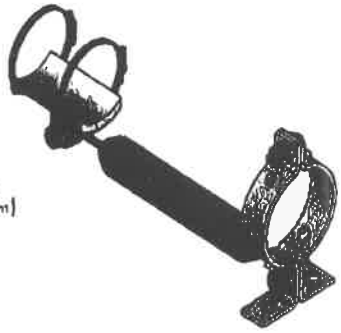


3-1/8" Wall Anchor Plate

Part # 318-50-500

2.557lbs approx.





3-1/8" Spring Hanger

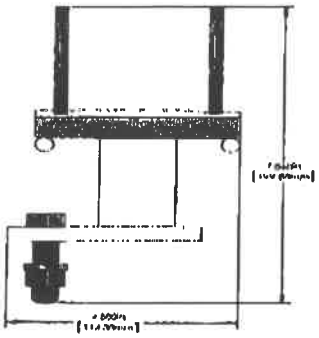
Part # 318-50-535

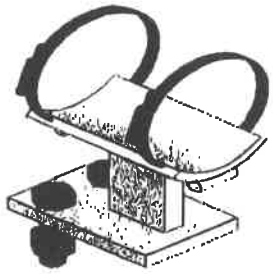
Single Line Vertical

4.358lbs approx.

RIGID TRANSMISSION LINE

3-1/8" Rigid Transmission Line & Components



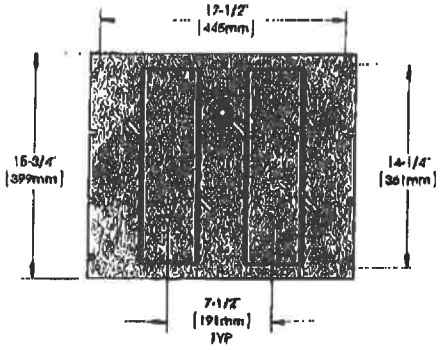


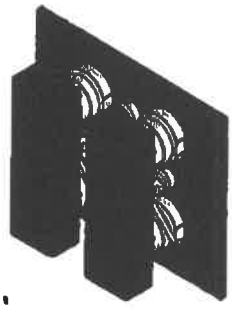
3-1/8" Fixed Hanger

Part # 318-50-540

Single Line Tower Top

2.782lbs approx.





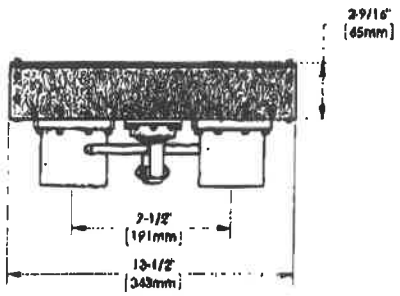
3-1/8" 4-Port Patch Panel

Part # 318-50-241 (pictured)
2 Quick Release "U" Links

Part # 318-50-240

2 "U" Links

37.988-45.791lbs approx.



3-1/8" U-Link

Part # 318-50-296 (pictured)

Quick Release U-Link

6.344lbs approx.

Part # 318-50-298
U-Link

5.515lbs approx.

Additional Patch Panels Available

Part # 318-50-231
3-1/8" 3-Port Patch Panel With 1 Quick Release "U" Link

Part # 318-50-251
3-1/8" 5-Port Patch Panel With 2 Quick Release "U" Links

Part # 318-50-261
3-1/8" 6-Port Patch Panel With 2 Quick Release "U" Links

Part # 318-50-271
3-1/8" 7-Port Patch Panel With 3 Quick Release "U" Links

*Specify interlock switch option upon ordering patch panels. Specifications/drawings available upon request

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

QUALITY CONTROL STANDARDS

1. DESIGN

JAMPRO's designs for RF equipment strictly adhere to Engineering Industry Association (EIA) Standard #225, Rigid Coaxial Transmission Line and EIA Standard #TR-117, Broadcast Antennas and other applicable EIA and CCIR standards as required. These standards regulate the mechanical and electrical quality of these products.

1.1 Mechanical

Each JAMPRO product is designed to meet the mechanical specifications of the appropriate EIA standards. All materials, whether manufactured by JAMPRO or purchased from outside suppliers are held to rigorous inspection and testing standards.

SAMPLE MATERIALS AND STANDARDS TO BE MET

EQUIPMENT/MATERIAL	STANDARD	COMPONENT
ANTENNA PANELS		
Steel	A-36	Antenna panel frame
Steel Panel Galvanizing	ASTM-153	Fabricated Parts
MOUNTING BRACKETS		
Steel	A-36	Brackets to Attach Panel to Tower
Steel Bracket Galvanizing	ASTM-153	Fabricated Parts
	ASTM-123	Hardware/Fasteners
DIPOLES		
Brass	Alloy 360	Base Section
Brass Tubing	Alloy 330	Arms/Baluns
Teflon	Virgin Teflon	Feed Insulators
Seals	Silicone Rubber	O-ring Seals
Copper	EIA RS-225	Inter-conductors/Input Flange
Stainless Steel	304	Fasteners
POWER DIVIDERS		
Brass	Alloy 360	Distribution Head
Copper	EIA RS-225	Outer/Inner
Stainless Steel	304	Fasteners
Seals	Silicone Rubber	O-ring Seals
INTERBAY CABLES		
Flexible Cables	EIA RS-225	Inter-Bay Cables
TRANSMISSION LINE		
Copper	EIA RS-225	Line Sections
Teflon	Virgin Teflon	Insulators
CAVITIES		
Aluminum	Alloy 6061	Outer Conductors

JAMPRO ANTENNAS, INC.
6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

1.2 Electrical

Each JAMPRO product is designed to meet the electrical specifications of the appropriate EIA standards. Each product is tested and verified as described in the following section "Testing and Inspection". Each product must meet strict engineering specifications for power, impedance, safety and overall performance.

2. PURCHASING

JAMPRO's purchasing process includes a detailed verification process to ensure that all vendors' products meet the appropriate design standards. Each vendor must supply ample evidence that such standards are met prior to being awarded contracts for materials and/or services. Acceptable evidence could include detailed design specifications, testing results or evidence of Quality Control procedures. Should a vendor-supplied product or material be found substandard by JAMPRO's staff, the material or product is returned to the vendor and an evaluation will be made as to whether further contracts will be awarded to that vendor.

3. PROCESS CONTROL

JAMPRO's quality control procedures encompass all aspects of business from equipment design to after-sale service support. In this section, we will discuss our quality control measures as they relate to incoming product orders and their progression through the manufacturing process.

3.1 Order Processing

Incoming orders are processed in JAMPRO's sales department by the sales person responsible for the sale. Details of the customer's purchase order are checked against any pre-administrative data gathered to date. Discrepancies are brought to the attention of the customer and resolved at this point. Once an order has been cleared through the sales department it is submitted to the customer service department. A job number is issued and two files are created; one will hold correspondence relating to accounting, shipping and documentation requirements, and the other will hold mechanical and electrical design information, including information about the customer's existing equipment, when applicable. A Proforma Invoice is issued to the customer with all pertinent information about the antenna and the job is added to JAMPRO's current job list. If any information is missing from the customer's purchase order, it is obtained at this time by the customer service department. This could include frequency, tower information, beam tilt, null fill, shipping method and address or any other information that would assist in the manufacture and service of this job.

3.2 Engineering Processing (Antennas)

Once a job has passed through sales and customer service it is given to the engineering department. Our engineers review each file and flag any questionable items or discrepancies. When they are satisfied with the contents of the files, they begin the design process. Although many of JAMPRO's products have standard guidelines for design, our products are sensitive to the individual requirements of each customer. At the very minimum, each antenna is frequency sensitive; however, individual specifications could include azimuth and elevation pattern requirements, custom feed systems, multiple frequencies or a multitude of other customized specifications.

Our engineers are responsible for designing the feed system for each antenna product; including feed lengths, sizes and configurations. Once this is done, the order is passed through to the production department.

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

4. PRODUCTION

4.1 Feed Lines & Welding (Antennas)

The first stop in production is our feed line department which is responsible for cutting the proper feed lines to the accurate lengths. Concurrently, the welding department begins the welding process of the elements, power dividers and splitters and Inter-Bay lines for the order using standard drawings and schematics as a guide. Each of these departments works from a standard set of regulations and guidelines for their particular task. These guidelines have been developed over the course of JAMPRO's more than fifty five years in business and incorporate all facets of quality including, but not limited to, inspection of workmanship.

4.2 Assembly (Antennas)

Assembly of the product is a methodical process using standard drawings and schematics as a guide that is replete with checks and double checks of quality. The assembly department works from a similar set of regulations that include standards for nut and bolt tightness, proper use of tools, safety precautions and instructions on proper assembly of each individual component and finished product.

4.3 Construction/Pressure Checking (Antennas)

Upon completion of the assembly process, each product must undergo a thorough construction and pressure check. Each component of the product is subject to yet another visual check of all welded parts. Additionally, all hardware is checked for tightness and all seals are inspected. The product is pressurized, submerged in a water-filled holding tank and is visually inspected for bubbles indicating leakage in welds or seals. Each component must hold 10-20 psi for twelve hours before receiving quality approval.

4.4 Fabrication/Welding (RF Systems)

Parts released by engineering are either made outside or fabricated in-house to standards specified on the drawings. Each part is checked against the drawing and the applicable standard when received. Numerous fixtures and custom tooling are used for fabrication and welding. This ensures maximum repeatability of the parts.

4.5 Assembly (RF Systems)

Assembly of parts is performed following parts acceptance and cleaning, de-burring processes. Subassembly of parts is performed based on written instructions on each drawing. Each subassembly is then checked as a unit to ensure that it will fit to mating parts. Pressure checking of any pressure tight units is performed as above, if required.

5. COMPLIANCE TESTING

5.1 (Antennas)

Compliance testing is performed by a team of highly trained, expert technicians and is checked and verified by a Quality Control Manager. General testing includes VSWR and impedance testing of the antenna elements, power dividers, power splitters and Inter-Bay cables and then the complete system. Standard side mount FM Band II antenna systems are mounted horizontally one wave length above ground level on a tower structure that best duplicates the customer's actual mounting structure. This arrangement eliminates ground reflection during the tuning process. Using a network analyzer and S-parameter and plotter, the technicians establish the antenna's measurements. Adjustments are made as necessary to ensure each product meets or exceeds specifications.

JAMPRO ANTENNAS, INC.
6340 Sky Creek Drive
Sacramento, California 95828 USA
Telephone (916) 383-1177
Fax (916) 383-1182

5.2 (RF Systems)
Each assembly receives a thorough test and tuning to ensure that it performs to the specifications and standards as required. Assemblies may require re-machining and/or adjustment during this process. All test equipment is rigorously checked and calibrated on a regular schedule against precision standards.

6. QUALITY RECORDS

All test results are plotted, dated and initialed and kept with the job's file folder. Notes describing adjustments made during the testing process are also well documented in the file which creates an historical record of tests, adjustments and ultimate results. Final test results proving that the antenna or RF system meets or exceeds specifications are signed by the operating technicians and the Quality Control Manager and included in the customer's Installation/Operation Manual. A copy is kept in the job's file folder.

7. PACKING

JAMPRO ships most products in pine boxes or sturdy cardboard boxes, depending on the product. Each box is labeled with box number, the job or serial number. Our shipping department is capable of preparing shipments for land, ocean or air transport, as well as consolidation in freight containers. SGS Inspections are required by certain countries prior to sealing the boxes, crates or cartons. JAMPRO coordinates the inspection to coincide with the date the product will be packed and ready to ship.

Upon completion of inspections, the shipping department seals the boxes with appropriate materials and wraps each piece with metal ties. A packing slip is securely attached to the outside of the boxes in a waterproof pouch. Freight forwarders and trucking companies come to JAMPRO to transport the goods.

8. PRODUCT IDENTIFICATION

Each JAMPRO product is given a model number that includes information about product type, number of antenna bays, cavity sections, channels, frequencies and options such as radomes, deicers, pattern directionalization, etc. This number is derived from a standard model numbering format and follows a project from the bidding stage through the life of the product. Model numbers are specified on quotations, invoices, job files, instruction manuals and packing slips. Each order received is given a job number which serves as the product's serial number. Measures are taken to ensure there is no duplication of serial numbers. Serial numbers are specified on invoices, job files, instruction manuals and packing slips. Additionally, each component of each system is marked with a corresponding part number and is tagged with the project's serial number.

9. DOCUMENTATION

Documentation includes correspondence, drafting designs, engineering notes and calculations, test results, installation and operation manuals and notes of verbal communications with customers. This information remains in the related job file and is kept in a designated file library for easy access by JAMPRO staff.

JAMPRO ANTENNAS, INC.

6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

9.1 Installation & Operation Manuals (Antennas & RF Systems)
These manuals are designed to ensure trouble free installation of JAMPRO products and include schematic diagrams (side and top view), mounting details, packing list, test results and step-by-step instructions for installation of the system. Instructions are also detailed for optional accessories and for ongoing maintenance procedures. One copy of each instruction manual is kept in JAMPRO file library for future reference.

10. HISTORICAL FILE MAINTENANCE

JAMPRO maintains and has maintained historical files for every project in our more than Fifty five years in business and has a designated file library. Each file is labeled with the customer's name, location, model number, serial number, frequency and date ordered. Inactive files are filed by call sign for domestic projects and by country and customer name for international projects. Many of our customers are repeat customers and may own ten or more JAMPRO products; the location, model number, serial number, frequency and purchase date which is shown on each file allows easy identification of individual projects.

JAMPRO also maintains a computerized list of product users which allows us to group items based on any number of specific parameters including location, purchase date, delivery date, model number or serial number. This list serves as an excellent cross-referencing tool when providing customer service for completed projects.

11. SERVICE

Each of JAMPRO's products is covered by a limited warranty. This warranty covers the original owner of the equipment for defects in materials and labor for a period of twenty-four (24) months from the date of delivery. Extended warranties available upon request.

JAMPRO employs a staff of fully trained and experienced technicians and engineers to provide after-sales support. These employees are qualified to answer customer questions and provide recommendations for concerns regarding:

- Installation
- General Equipment Operation
- Causes and Remedies for Equipment Failure
- Equipment Maintenance
- Equipment Tuning

JAMPRO also employs a staff of field technicians for problems that must be solved on-site. These field technicians are specially trained to handle any situation that arises when in the field and to have the customer's antenna equipment fully operational in a minimal amount of time. This elite corps of technicians also serve as trainers for our technical and production staff and conduct research and development for new products, further adding to their knowledge and understanding of JAMPRO equipment in particular and broadcasting in general.

6340 Sky Creek Drive
Sacramento, California 95828 USA

Telephone (916) 383-1177
Fax (916) 383-1182

In the event of an emergency, JAMPRO is accessible twenty-four (24) hours each day. We employ an answering service 365 days a year that has access to technical personnel at all times. Additionally, during non-business hours, one member of our technical staff wears a pager in case of an emergency.

JAMPRO stocks a complete inventory of spare parts and coaxial line which means that emergency orders can be processed and shipped without delay. Our proximity to an international airport allows emergency parts to be shipped worldwide on a daily basis.

CONTACT INFORMATION

JAMPRO ANTENNAS, INC.
6340 Sky Creek Drive
Sacramento, California 95828 USA
Phone +1 (916) 383-1177
Fax +1 (916) 383-1182
Toll Free +1-866-452-6770
www.jampro.com