State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
EBA343	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
SHELLY MURRAY
304-558-8801

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
*820163637 814-472-5540
Propagation Systems, Inc.
719 Pensacola Road
PO Box 113
Ebensburg, PA 15931

SHIP TO
EDUCATIONAL BROADCASTING AUTHORITY
600 CAPITOL STREET
CHARLESTON, WV
25301-1223 304-558-3400

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
04/14/2011				

BID OPENING DATE: 05/18/2011 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT

THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, THE WEST VIRGINIA EDUCATIONAL BROADCASTING AUTHORITY, IS SOLICITING BIDS FOR A ONE (1) CHANNEL 29 DIGITAL TELEVISION SYSTEM PER THE ATTACHED SPECIFICATIONS.

TECHNICAL QUESTIONS MUST BE SUBMITTED IN WRITING TO SHELLY MURRAY IN THE WEST VIRGINIA PURCHASING DIVISION VIA MAIL AT THE ADDRESS SHOWN AT THE TOP OF THIS RFQ, VIA FAX AT 304-558-4115, OR VIA E-MAIL AT SHELLY.L.MURRAY@WV.GOV. DEADLINE FOR ALL TECHNICAL QUESTIONS IS 05/02/2011 AT THE CLOSE OF BUSINESS. ALL TECHNICAL QUESTIONS RECEIVED, IF ANY, WILL BE ADDRESSED BY ADDENDUM AFTER THE DEADLINE.

0001	1	LS		840-10		

ANTENNAS AND ACCESSORIES, TELEVISION

CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM WITH THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.

BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.

THE MODEL/BRAND/SPECIFICATIONS NAMED HEREIN ESTABLISH

RECEIVED
2011 MAY 18 AM 10:00
WV PURCHASING DIVISION

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 814-472-5540 DATE May 17, 2011

TITLE President FEIN 23-2876660 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.

2. The State may accept or reject in part, or in whole, any bid.

3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required $125 fee.

4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.

5. Payment may only be made after the delivery and acceptance of goods or services.

6. Interest may be paid for late payment in accordance with the ***West Virginia Code***.

7. Vendor preference will be granted upon written request in accordance with the ***West Virginia Code***.

8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.

10. The laws of the State of West Virginia and the ***Legislative Rules*** of the Purchasing Division shall govern the purchasing process.

11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.

12. BANKRUPTCY: In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.

13. HIPAA BUSINESS ASSOCIATE ADDENDUM: The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at **www.state.wv.us/admin/purchase/vrc/hipaa.htm** and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

14. CONFIDENTIALITY: The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf.

15. LICENSING: Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

16. ANTITRUST: In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.

2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.

3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.

4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
EBA343	2

ADDRESS CORRESPONDENCE TO ATTENTION OF:
SHELLY MURRAY
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VENDOR
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TYPE NAME/ADDRESS HERE
*820163637 814-472-5540
Propagation Systems, Inc.
719 Pensacola Road
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SHIP TO
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600 CAPITOL STREET

CHARLESTON, WV
25301-1223 304-558-3400

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
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BID OPENING DATE: 05/18/2011 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

THE ACCEPTABLE LEVEL OF QUALITY ONLY AND ARE NOT INTENDED TO REFLECT A PREFERENCE OR FAVOR ANY PARTICULAR BRAND OR VENDOR. VENDORS WHO ARE BIDDING ALTERNATES SHOULD SO STATE AND INCLUDE PERTINENT LITERATURE AND SPECIFICATIONS. FAILURE TO PROVIDE INFORMATION FOR ANY ALTERNATES MAY BE GROUNDS FOR REJECTION OF THE BID. THE STATE RESERVES THE RIGHT TO WAIVE MINOR IRREGULARITIES IN BIDS OR SPECIFICATIONS IN ACCORDANCE WITH SECTION 148-1-4(F) OF THE WEST VIRGINIA LEGISLATIVE RULES AND REGULATIONS.

NOTICE

A SIGNED BID MUST BE SUBMITTED TO:

DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
BUILDING 15
2019 WASHINGTON STREET, EAST
CHARLESTON, WV 25305-0130

THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:

SEALED BID

BUYER: SHELLY MURRAY

RFQ. NO.: EBA343

BID OPENING DATE: 05/18/2011

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
[signature]	814-472-5540	May 17, 2011

TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
President	23-2876660	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
Department of Administration
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LINE	QUANTITY	UOP	CAT. NO	ITEM NUMBER	UNIT PRICE	AMOUNT

BID OPENING TIME: 1:30 PM

PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:
FAX: 814-472-5676

CONTACT PERSON (PLEASE PRINT CLEARLY):
DOUG ROSS

****** THIS IS THE END OF RFQ EBA343 ****** TOTAL:

ANTENNA OPTION 1 - DEHYDRATOR OPTION A: $ 16,969
ANTENNA OPTION 1 - DEHYDRATOR OPTION B: $ 15,474

ANTENNA OPTION 2 - DEHYDRATOR OPTION A: $ 26,374
ANTENNA OPTION 2 - DEHYDRATOR OPTION B: $ 24,879

ANTENNA OPTION 3 - DEHYDRATOR OPTION A: $ 31,355
ANTENNA OPTION 3 - DEHYDRATOR OPTION B: $ 29,860

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 814-472-5540 DATE May 17, 2011

TITLE President FEIN 23-2876660 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Request for Quotations
EBA343

Digital television antenna system and associated hardware

The West Virginia Educational Broadcasting Authority (WVEBA) is conducting a request for quotations for one (1) channel 29 digital television antenna system and associated hardware according to the enclosed specifications, a SPX/Dielectric TLP-12A, or equivalent.

WVEBA operates a statewide network of television transmitters. This project will add a digital translator to the WSWP transmitter at Welch, WV. Antenna pattern and power level are addressed below. The bid shall be awarded to a single vendor.

Respondents to this request must have manufactured low power UHF antennas for a minimum of ten years.

1. General Mechanical Specifications

COMPLY 1.1. All structural elements shall be designed and fabricated in accordance with TIA/EIA standard RS-222-F, Structural Standards for Steel Antenna, Towers, and Supporting Structures.

COMPLY 1.2. All hardware shall be constructed of non-ferrous material (brass, copper, stainless steel, etc.) or be galvanized.

COMPLY 1.2.1. Steel elements shall be hot-dip galvanized in accordance with ASTM A123

COMPLY 1.2.2. Zinc coating shall be applied with a minimum thickness of 0.002 inches (0.05 mm)

COMPLY 1.2.3. Antenna shall be structural strength, light weight aluminum manufacture. Refer to 1.1 and 1.6.

COMPLY 1.2.4. Bidders are requested to state materials used in antenna manufacture.

COMPLY 1.3. Vendor shall provide mounting adapters for the antenna.

UNDERSTOOD 1.3.1. The antenna shall be side mounted

COMPLY 1.3.2. Tower is designed with angle steel, straight legs, and three faces approximately 42 inches each, mounting adaptors shall be constructed accordingly to side mount the antenna.

COMPLY 1.4. The antenna, transmission line, and connectors shall be rated for at least 3kW average power.

COMPLY 1.5. All materials shall be new, no surplus or refurbished components will be allowed

COMPLY-OPTIONS 1 & 2 1.6. Antenna dimensions shall not exceed length of 23ft, weight 160 lb, and windload CaAc 15.4 sq ft

2. Transmission Line

COMPLY 2.1. Vendor shall provide transmission line

COMPLY 2.1.1. Transmission line shall be 1 5/8" air dielectric flexible coax (Dielectric Flexline or equal)

COMPLY 2.1.2. Impedance shall be 50 Ohms

COMPLY 2.2. Vendor shall provide connectors for the transmission line

COMPLY 2.2.1. Connector size (transmitter end) shall be 1-5/8" EIA, Antenna connector size shall be 1-5/8" EIA flange.

COMPLY 2.2.2. The line shall be shipped with one flange connector (the antenna end) attached from the factory, and the other end to be attached in the field

COMPLY 2.3. The line shall be pressurized

COMPLY 2.3.1. All necessary gas barriers and connectors shall be provided

COMPLY 2.4. Vendor shall provide all hangers, clamps, grounding kits, hoisting grips, and all other hardware necessary for installation.

COMPLY 2.4.1. A dehydrator shall be provided with the following specifications:

Normal Capacity: 200 SCFD (160 SCFD @ 50Hz)
Maximum Capacity: 300 SCFD (240 SCFD @ 50 Hz)
Dew Point: -40 degrees F (-40 degrees C)
Operating Voltage: 115V/60-50Hz
Operating Amps: 2.0 Amps (115V)
Circuit Protection: (manual reset) 5 Amp (115V)
Compressor: 1/8 H.P.
Air Outlet: ¼" NPT Fitting
Dielectric Technologies, SPX Model 300TLS or equivalent.

3. Antenna

COMPLY 3.1. The antenna shall be side mounted

COMPLY 3.2. The antenna shall be of structural strength light weight aluminum manufacture

COMPLY 3.3. The antenna shall be equipped with a radome, heaters for anti-icing are not acceptable

COMPLY 3.4. The UHF antenna shall be a horizontally polarized, omni directional, side mounted slotted cylinder type designed for digital channel 29.

COMPLY 3.5. There shall be no external radiating elements which would be susceptible to icing affecting both antenna patterns and wind load

COMPLY 3.6. Vendor shall certify the pattern and gain for the antenna.

COMPLY 3.7. Antenna shall have a main lobe power gain of 12.0 (10.79 dB) at channel 29 with smooth elevation pattern including null fill (see Exhibit E2). Elevation and azimuth patterns shall be supplied with the bid.

COMPLY 3.8. The antenna input shall be 1-5/8" EIA flange.

COMPLY 3.9. Antenna beam tilt shall be 1.0 degree.

COMPLY 3.10. Input Power handling capabilities of the antenna shall be 3kW average or greater.

COMPLY-OPTIONS 1 & 2 3.11. Antenna dimensions shall not exceed length of 23ft, weight 160 lb, and windload CaAc 15.4 sq ft

COMPLY 3.12. During factory assembly of the antenna the antenna elevation patterns and gain shall be determined through anechoic chamber or scaled field measurement techniques. For the purposes of pattern verification, filing, and record keeping, measurement results shall be supplied before antenna shipment. WVEBA reserves the right to request the vendor to make modifications to the antenna to match specifications.

COMPLY 3.13. Antenna VSWR shall not exceed 1.10:1

UNDERSTOOD 3.13.1. Field tuning of the antenna will not be allowed

4. Specific Site Requirements

4.1. Welch, WV

UNDERSTOOD 4.1.1. The transmitter shall operate on digital channel 29

UNDERSTOOD 4.1.2. Transmitter power output (TPO) shall be 1706 Watts average measured at the output of the mask filter

COMPLY 4.1.3. The antenna shall exhibit a peak gain of 12 (10.79 dB)

COMPLY 4.1.4. ERP for the site shall be 15kW

COMPLY 4.1.5. The transmission line length shall be 300 feet

UNDERSTOOD 4.1.6. Transmission line run shall be approximately 260 feet vertical and 40 feet horizontal

COMPLY 4.1.7. The connection to the transmitter shall be 1-5/8" EIA flange

4.2. Directional tabulation

COMPLY 4.2.1. Antenna shall be omni directional

5. Warranty

COMPLY 5.1. All products shall be warranted for a minimum of one year.

COMPLY 5.2. Bidders shall state their warranty policy.

6. Support

EXCEPTION 6.1. Vendor shall offer toll free technical support for the antenna for a minimum of five years PSI does not maintain a toll free telephone line but we are always available via email.

7. Engineering Specifications Overview Exhibit E1

8. Coverage Contour Map Exhibit E3

9. Options

UNDERSTOOD 9.1. The following options will not be part of the winning bid decision making. The options may or may not be purchased.

COMPLY 9.1.1. Vendor is requested to perform an electrical system check of the antenna and transmission line after installation to verify that the system was installed properly. The pricing for this option shall be listed as an item separate from the main antenna system pricing.

10. Shipping and delivery

COMPLY 10.1. Vendor shall provide shipping

COMPLY 10.2. Shipping charges shall be included in the equipment price

COMPLY 10.3. Delivery shall be FOB Destination

UNDERSTOOD 10.4. The receiving facility shall be WSWP studios

WV Educational Broadcasting Authority
124 Industrial Park Road
Beaver, WV 25813
Attn: Jeremy Scott
304-254-7865

COMPLY 10.5. Shipper shall provide 24 hours notice to arrange off-loading

COMPLY 10.6. Shipper shall provide off-loading equipment and be responsible for off-loading antenna and associated hardware.

11. Invoicing and Billing

COMPLY 11.1. Invoices shall be itemized.

UNDERSTOOD 11.2. The billing address is:

Tammy Treadway
WV Educational Broadcasting Authority
PO Box 9004
Beckley, WV 25802
304-254-7840

****Exhibit E1****

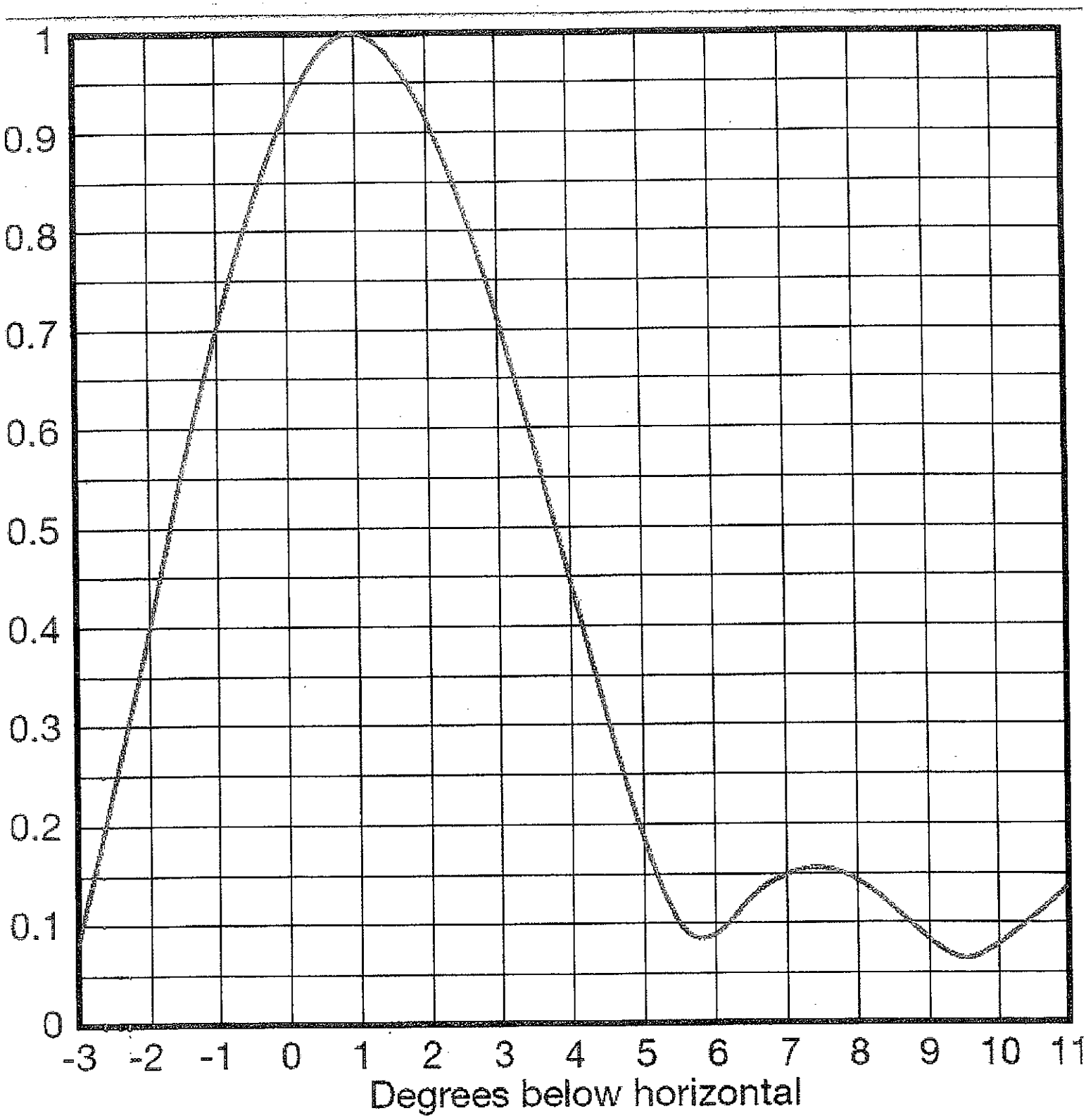
W29DP-D

Welch, West Virginia

Engineering Specifications

A.	Transmitter Site (NAD 27)		
		North Latitude	37° 25' 52.1"
		West Longitude	81° 35' 35.2"
	Tower Registration Number		1200717
	FAA Study Number:		99-AEA-1735-OE
B.	Proposed Facility		
	DTV Channel		
		Number	29
		Frequency	560 - 566MHZ
		Emission Mask	Stringent
C.	Elevations		
	Height of Site Above Mean Sea Level (AMSL)		620.2 m
	Overall height of Structure above Ground (including all appurtenances)		88.0 m
	Overall Height of Structure Above Mean Sea Level (including all appurtenances)		708.2 m
	Effective Height of Antenna Above Ground		75.0 m
	Effective Height of Antenna Above Average Terrain		140.5 m
	Effective Height of Antenna Above Mean Sea Level		695.2 m
D.	Antenna Parameters: -Horizontal Polarization		
	Maximum Antenna Gain in Beam Maximum		10.79 dB
	Maximum Antenna Gain in Horizontal Plane		10.04 dB
	Maximum Effective Radiated Power		11.76 dBk
	In Beam Maximum		15 KW
	Average TPO Required		1.706 KW
	Average TPO Required		2.32 dBk

Exhibit E2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0.8
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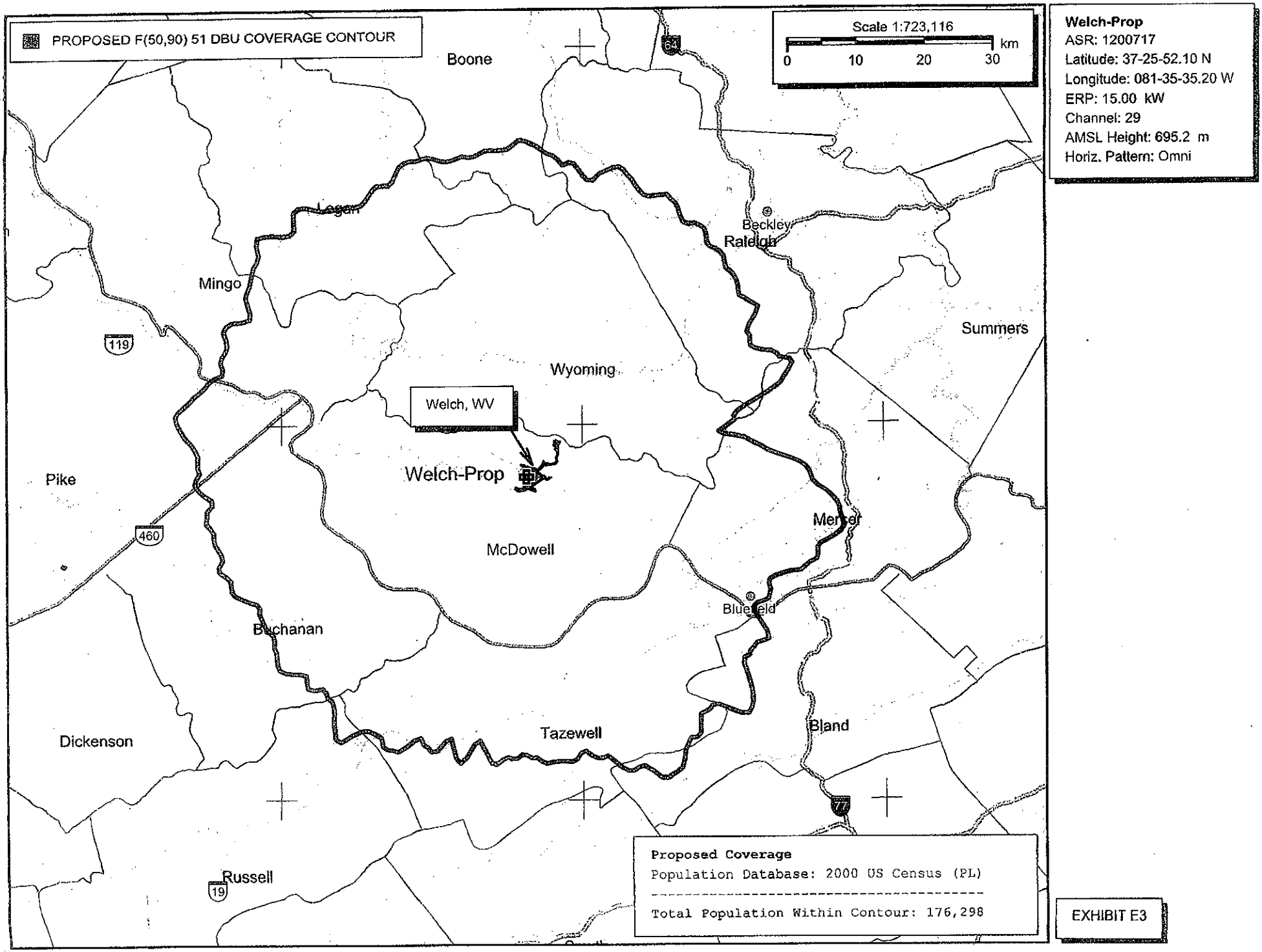

PROPOSED F(50,90) 51 DBU COVERAGE CONTOUR
Scale 1:723,116
0 10 20 30 km
Welch-Prop
ASR: 1200717
Latitude: 37-25-52.10 N
Longitude: 081-35-35.20 W
ERP: 15.00 kW
Channel: 29
AMSL Height: 695.2 m
Horiz. Pattern: Omni
Boone
Logan
Mingo
Beckley
Raleigh
Summers
Wyoming
Welch, WV
Welch-Prop
Pike
McDowell
Mercer
Bluefield
Buchanan
Tazewell
Bland
Dickenson
Russell
119
460
19
77
Proposed Coverage
Population Database: 2000 US Census (PL)
Total Population Within Contour: 176,298
EXHIBIT E3

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 1: PSILP12-29
DEHYDRATOR OPTION A: SPX MODEL 300TLS

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 7,350	$ 7,350
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 500	$ 500
4	1	Dehydrator	$ 3,150	$3, 150
5	1	Transmission Line & Connectors	$ 5,969	$ 5,969
TOTAL			$ 16,969	$ 16,969

The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.				
1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

Signature of Vendor Representative Submitting Bid

May 17, 2011
Date

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 1: PSILP12-29
DEHYDRATOR OPTION B: RFS MODEL APD20-C

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 7,350	$ 7,350
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 500	$ 500
4	1	Dehydrator	$ 1,655	$ 1,655
5	1	Transmission Line & Connectors	$ 5,969	$ 5,969
TOTAL			$ 15,474	$ 15,474
The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.				
1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

Douglas A Pratt May 17, 2011

Signature of Vendor Representative Submitting Bid Date

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 2: PSILP12OIM-29
DEHYDRATOR OPTION A: SPX MODEL 300TLS

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 16,449	$ 16,449
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 850	$ 850
4	1	Dehydrator	$ 3,150	$3, 150
5	1	Transmission Line & Connectors	$ 5,925	$ 5,925
TOTAL			$ 26,374	$ 26,374

The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.

1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

May 17, 2011

Signature of Vendor Representative Submitting Bid — Date

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 2: PSILP12OIM-29
DEHYDRATOR OPTION B: RFS MODEL APD20-C

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 16,449	$ 16,449
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 850	$ 850
4	1	Dehydrator	$ 1,655	$ 1,655
5	1	Transmission Line & Connectors	$ 5,925	$ 5,925
TOTAL			$ 24,879	$ 24,879

The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.				
1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

Signature of Vendor Representative Submitting Bid — May 17, 2011 — Date

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 3: PSILP12OM-29
DEHYDRATOR OPTION A: SPX MODEL 300TLS

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 21,030	$ 21,030
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 1,250	$ 1,250
4	1	Dehydrator	$ 3,150	$ 3,150
5	1	Transmission Line & Connectors	$ 5,925	$ 5,925
TOTAL			$ 31,355	$ 31,355

The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.

1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

May 17, 2011

Signature of Vendor Representative Submitting Bid — Date

EBA343 – WV EBA Pricing Page

Digital television antenna system and associated hardware. Shipping charges shall be included in product pricing.

ANTENNA OPTION 3: PSILP12OM-29
DEHYDRATOR OPTION B: RFS MODEL APD20-C

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Antenna & Accessories	$ 21,030	$ 21,030
2	1	Miscellaneous Hardware (nuts, bolts, washers, etc.)	$ 0	$ 0
3	1	Mounting Adapters	$ 1,250	$ 1,250
4	1	Dehydrator	$ 1,655	$ 1,655
5	1	Transmission Line & Connectors	$ 5,925	$ 5,925
TOTAL			$ 29,860	$ 29,860

The following option WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.				
1	1	Electrical system check of the antenna and transmission line after installation to verify that the system was installed properly.	$2, 125	$ 2,125
TOTAL			$ 2,125	$2,125

May 17, 2011

Signature of Vendor Representative Submitting Bid — Date

RFQ No. EBA343

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:
"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (***West Virginia Code*** §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: PROPAGATION SYSTEMS, INC.

Authorized Signature: _____ Date: May 17, 2011

State of Pennsylvania

County of Cambria, to-wit:

Taken, subscribed, and sworn to before me this 17 day of May, 2011.

My Commission expires 5-27, 2015

AFFIX SEAL HERE

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Donna M. Zerbee, Notary Public
Ebensburg Boro, Cambria County
My Commission Expires May 27, 2015
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

NOTARY PUBLIC Donna M Zerbee

Bid Response to RFQ No. EBA343

Channel 29 Digital Television System
May 17, 2011

Propagation Systems, Inc. is offering three antenna options in response to RFQ: EBA343.

ANTENNA OPTION 1: PSILP12-29

The proposed antenna is a standard 12-Bay single slot type antenna producing an omnioid type pattern. The azimuth pattern radiation characteristics of this type of antenna is accepted by the FCC as omnidirectional.

The antenna is constructed of aluminum with a fiberglass cover over the slot radiators. The azimuth radiation pattern is a function of the pipe diameter used and there are no external pattern directors.

The antenna is end fed with a 1-5/8" EIA input connector rated at 5 kW of average power. This antenna is the lowest cost option that meets the bid requirements.

Corresponding Transmission Line & Accessories

Qty	Model No.	Description
300	HCA158-50J	1-5/8" Air dielectric coaxial cable
1	HCA158-50J	1-5/8" EIA gas block connector installed
1	158EIA-HCA158-002	1-5/8" EIA gas block connector, loose
9	CLAMP-158	Standard hanger kits
9	RMA-CI	Round member adapter kits 3-4"
9	ANGLE-CLPI	Angle member adapter kit
2	HOIST1-158L	Hoisting grips
3	GKFORM60-158	Grounding kits
1	921248-158	Wall Feed Thru

ANTENNA OPTION 2: PSILP12OIM-29

The proposed antenna is a 12-Bay single slot type antenna producing a slightly more omnidirectional pattern than Option 1.

The antenna is constructed of aluminum. This option includes a full radome that encloses the antenna and can be pressurized through the feeding transmission line.

The antenna is end fed with a 1-5/8" EIA input connector rated at 5 kW of average power.

This antenna provides greater ice and snow protection than Option 1.

Corresponding Transmission Line & Accessories

Qty	Model No.	Description
300	HCA158-50J	1-5/8" Air dielectric coaxial cable
1	158EIAP-HCA158-001	1-5/8" EIA gas pass connector, installed
1	158EIA-HCA158-002	1-5/8" EIA gas block connector, loose
9	CLAMP-158	Standard hanger kits
9	RMA-CI	Round member adapter kits 3-4"
9	ANGLE-CLPI	Angle member adapter kit
2	HOIST1-158L	Hoisting grips
3	GKFORM60-158	Grounding kits
1	921248-158	Wall Feed Thru

ANTENNA OPTION 3: PSILP12OM-29

The proposed antenna is a 12-Bay multi slot type antenna producing a true omnidirectional pattern.

Like Option 2, the antenna is fully enclosed in a fiberglass radome. Option 3 utilizes a larger pipe diameter and multiple slots around the pipe for a true omnidirectional pattern. The benefit to this option is that a true omni pattern is achieved without using pattern shaping elements that are susceptible to icing which would result in the detuning of the pattern.

The antenna is constructed of aluminum. This option includes a full radome that encloses the antenna and can be pressurized through the feeding transmission line.

The antenna is end fed with a 1-5/8" EIA input connector rated at 5 kW of average power.

It should be noted that this option does exceed the weight and wind load specifications.

Corresponding Transmission Line & Accessories

Qty	Model No.	Description
300	HCA158-50J	1-5/8" Air dielectric coaxial cable
1	158EIAP-HCA158-001	1-5/8" EIA gas pass connector, installed
1	158EIA-HCA158-002	1-5/8" EIA gas block connector, loose
9	CLAMP-158	Standard hanger kits
9	RMA-CI	Round member adapter kits 3-4"
9	ANGLE-CLPI	Angle member adapter kit
2	HOIST1-158L	Hoisting grips
3	GKFORM60-158	Grounding kits
1	921248-158	Wall Feed Thru

INCLUDED IN ALL OPTIONS

All antenna options include hot dip galvanized brackets and stiff arms designed for leg mounting. All antenna hardware is either hot dip galvanized or stainless steel.

DEHYDRATOR

Propagation Systems, Inc. is offering two choices for the dehydrator. Option A is the Dielectric Technologies, SPX Model 300TLS as specified in the RFQ and Option B is RFS Model APD20-C.

A specification sheet for Option B is included with this bid.

Antenna Specifications

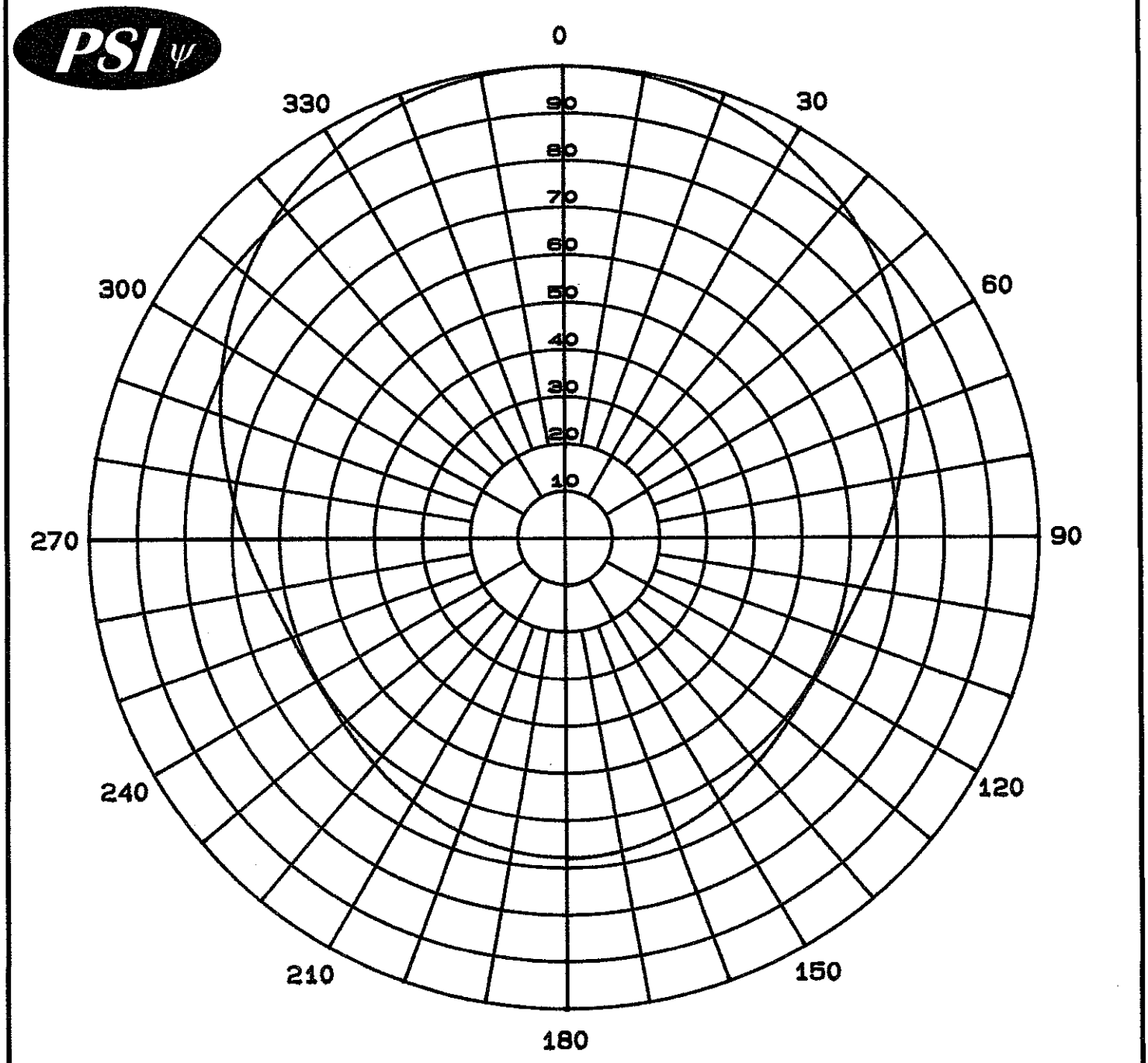
PROPOSAL NUMBER:	P051611-1	**DATE:**	3/16/11
CUSTOMER:	WVEBA	**ANTENNA TYPE:**	PSILP12-29
CALL LETTERS:	WSWP	**CHANNEL:**	29
LOCATION:	Welch, WV	**OPTION:**	1.0

Electrical Specifications

RMS GAIN MAIN LOBE	12.6	11.0	**dB**
RMS GAIN AT HORIZONTAL	11.3	10.5	**dB**
AZIMUTH DIRECTIVITY	Omnioid	omnioid	**dB**
PEAK GAIN	12.6	11.0	**dB**
ELEVATION PATTERN	P051611-elevation		
AZIMUTH PATTERN	Standard omnioid		
BEAM TILT	1.0 Degree		
AVERAGE INPUT POWER RATING	5 kW		
INPUT SIZE	1-5/8" EIA end fed		
INPUT IMPEDANCE	50 Ohm		

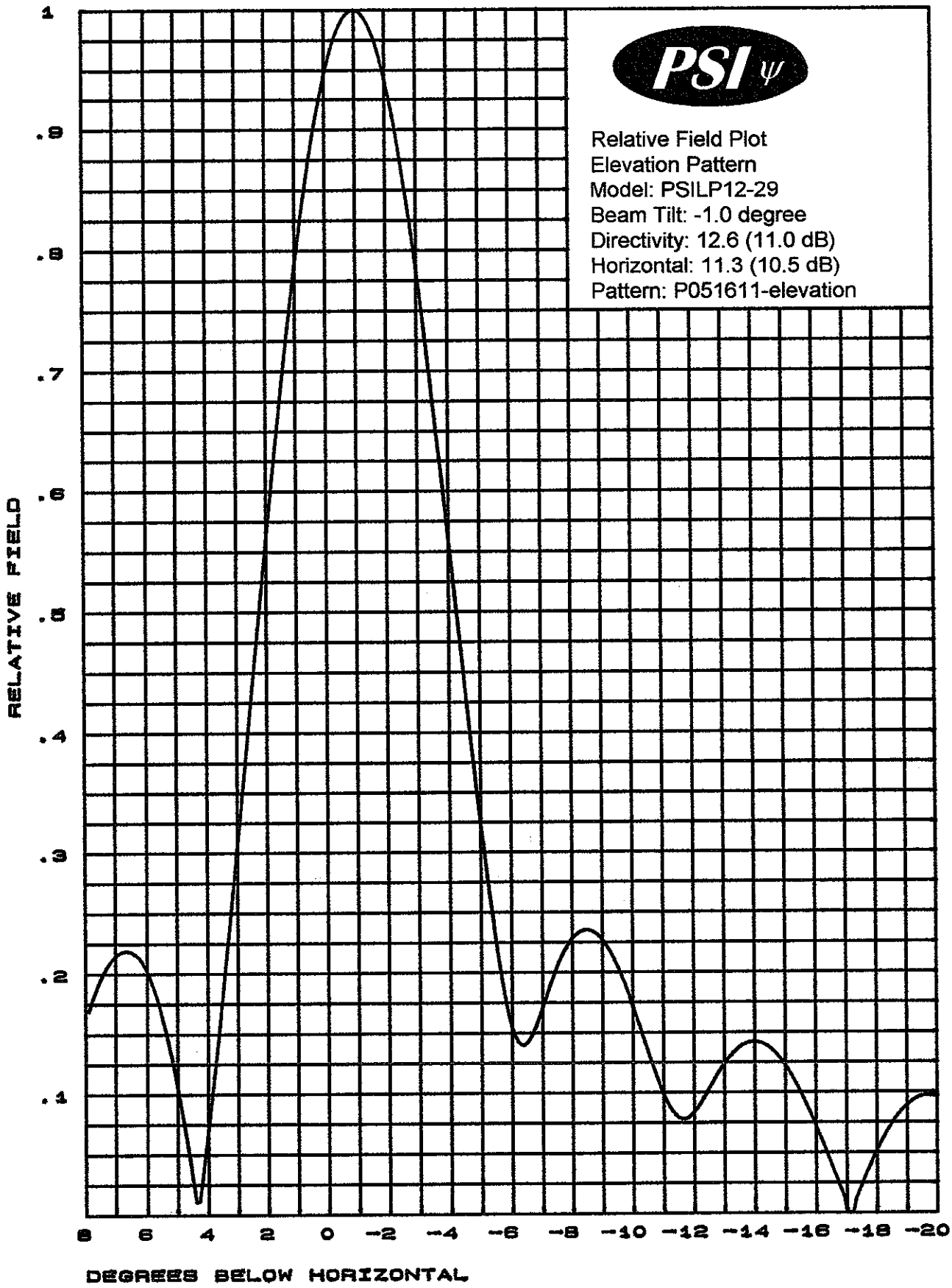
Mechanical Specifications

HEIGHT WITH LIGHTNING PROTECTION	NA	**Ft**	NA	**M**
ANTENNA LENGTH	22.6	**Ft**	6.89	**M**
CENTER OF RADIATION	11.3	**Ft**	2.6	**M**
WIND AREA (CaAa) No Ice	13.05	**Sq. Ft**	1.24	**Sq. M**
OVERTURN MOMENT	NA	**Ft LB**	NA	**Kg M**
WEIGHT	106	**LB**	48	**Kg**



Calculated Relative Field
Azimuth Plane Pattern
Antenna: PSILP12-29
Channel: 29
Polarization: Horizontal
Gain: 12.6 (11.0 dB)
Station: WSWP
Option 1

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931


PSI
Relative Field Plot
Elevation Pattern
Model: PSILP12-29
Beam Tilt: -1.0 degree
Directivity: 12.6 (11.0 dB)
Horizontal: 11.3 (10.5 dB)
Pattern: P051611-elevation
RELATIVE FIELD
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DEGREES BELOW HORIZONTAL

Antenna Specifications

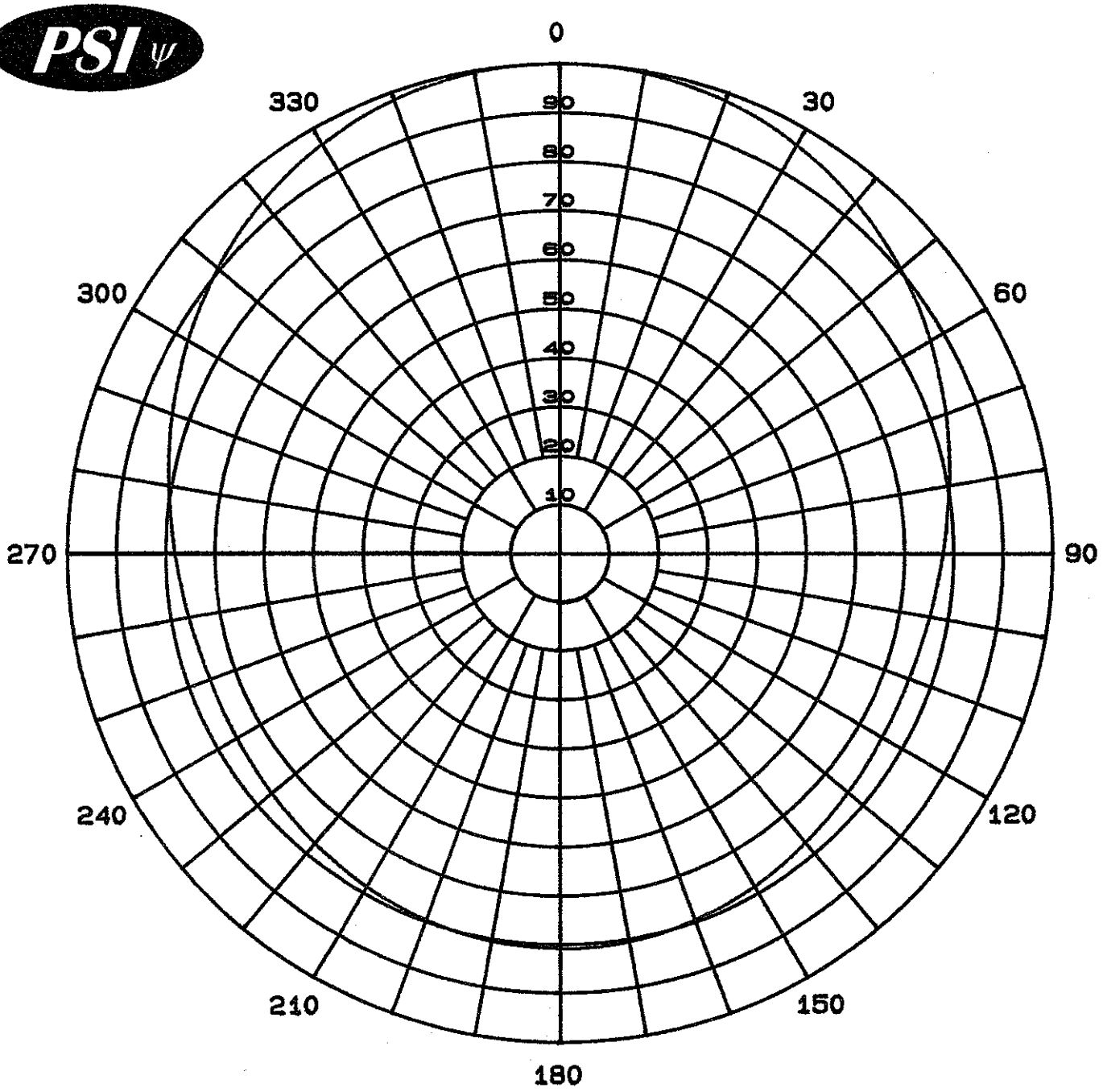
PROPOSAL NUMBER:	P051611-1	**DATE:**	3/16/11
CUSTOMER:	WVEBA	**ANTENNA TYPE:**	PSILP12OIM-29
CALL LETTERS:	WSWP	**CHANNEL:**	29
LOCATION:	Welch, WV	**OPTION:**	2.0

Electrical Specifications

RMS GAIN MAIN LOBE	12.6	11.0	**dB**
RMS GAIN AT HORIZONTAL	11.3	10.5	**dB**
AZIMUTH DIRECTIVITY	Omnioid	omnioid	**dB**
PEAK GAIN	12.6	11.0	**dB**
ELEVATION PATTERN	P051611-elevation		
AZIMUTH PATTERN	Modified omnioid		
BEAM TILT	1.0 Degree		
AVERAGE INPUT POWER RATING	5 kW		
INPUT SIZE	1-5/8" EIA end fed		
INPUT IMPEDANCE	50 Ohm		

Mechanical Specifications

HEIGHT WITH LIGHTNING PROTECTION	NA	**Ft**	NA	**M**
ANTENNA LENGTH	22.3	**Ft**	6.80	**M**
CENTER OF RADIATION	11.15	**Ft**	3.4	**M**
WIND AREA (CaAa) No Ice	14.1	**Sq. Ft**	1.34	**Sq. M**
OVERTURN MOMENT	NA	**Ft LB**	NA	**Kg M**
WEIGHT	125	**LB**	56.7	**Kg**



Calculated Relative Field
Azimuth Plane Pattern
Antenna: PSILP12OIM-29
Channel: 29
Polarization: Horizontal
Gain: 12.6 (11.0 dB)
Station: WSWP
Option 2

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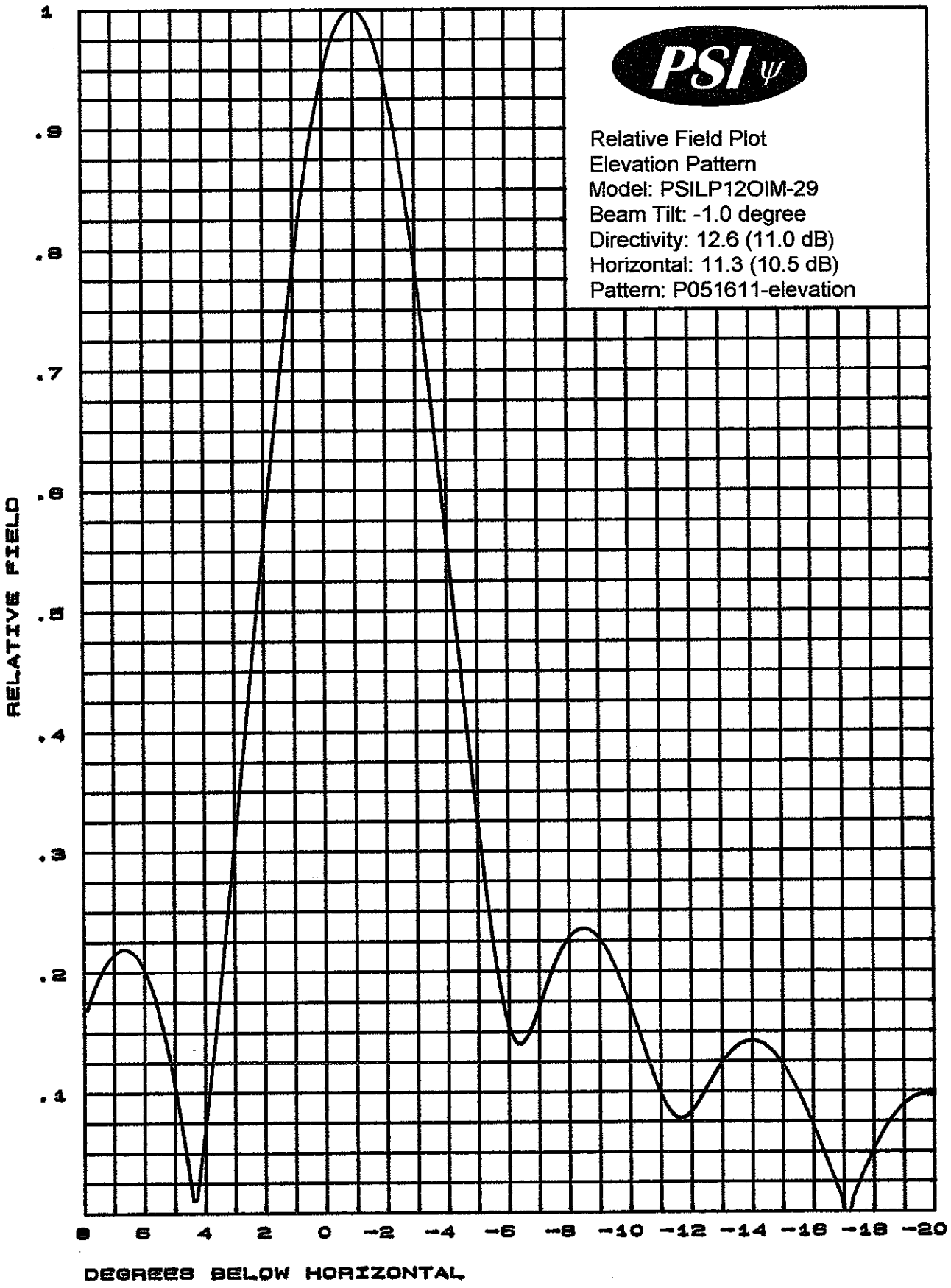
Ebensburg, PA 15931


PSI
Relative Field Plot
Elevation Pattern
Model: PSILP12OIM-29
Beam Tilt: -1.0 degree
Directivity: 12.6 (11.0 dB)
Horizontal: 11.3 (10.5 dB)
Pattern: P051611-elevation
RELATIVE FIELD
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8 6 4 2 0 -2 -4 -6 -8 -10 -12 -14 -16 -18 -20
DEGREES BELOW HORIZONTAL

Antenna Specifications

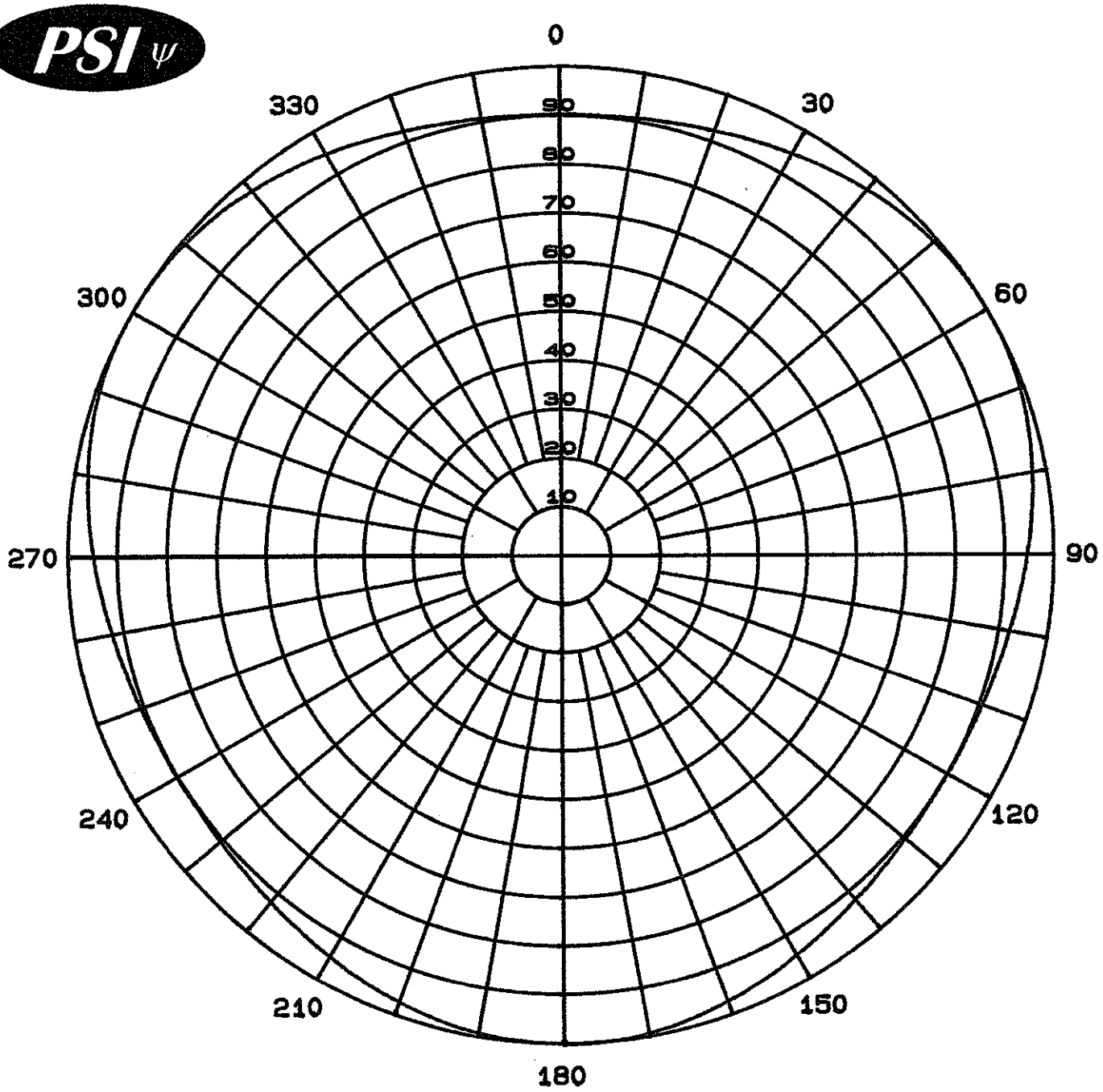
PROPOSAL NUMBER:	P051611-1	**DATE:**	3/16/11
CUSTOMER:	WVEBA	**ANTENNA TYPE:**	PSILP12OM-29
CALL LETTERS:	WSWP	**CHANNEL:**	29
LOCATION:	Welch, WV	**OPTION:**	3.0

Electrical Specifications

RMS GAIN MAIN LOBE	12.6	11.0	**dB**
RMS GAIN AT HORIZONTAL	11.3	10.5	**dB**
AZIMUTH DIRECTIVITY	Omni	omni	**dB**
PEAK GAIN	12.6	11.0	**dB**
ELEVATION PATTERN	P051611-elevation		
AZIMUTH PATTERN	Omni directional		
BEAM TILT	1.0 Degree		
AVERAGE INPUT POWER RATING	5 kW		
INPUT SIZE	1-5/8" EIA end fed		
INPUT IMPEDANCE	50 Ohm		

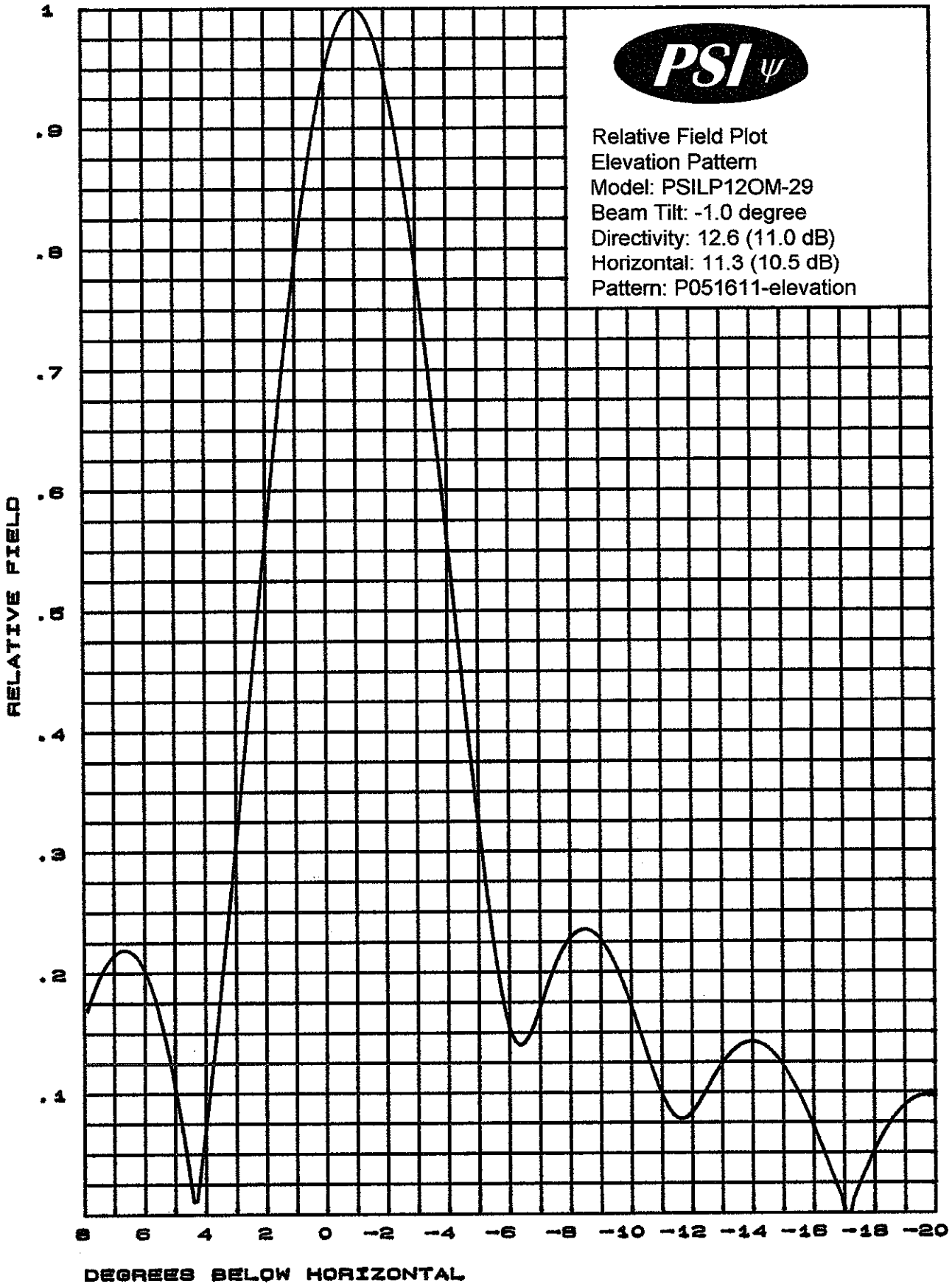
Mechanical Specifications

HEIGHT WITH LIGHTNING PROTECTION	NA	**Ft**	NA	**M**
ANTENNA LENGTH	22.3	**Ft**	6.80	**M**
CENTER OF RADIATION	11.15	**Ft**	3.4	**M**
WIND AREA (CaAa) No Ice	22.3	**Sq. Ft**	2.07	**Sq. M**
OVERTURN MOMENT	NA	**Ft LB**	NA	**Kg M**
WEIGHT	250	**LB**	113.4	**Kg**



Calculated Relative Field
Azimuth Plane Pattern
Antenna: PSILP12OM-29
Channel: 29
Polarization: Horizontal
Gain: 12.6 (11.0 dB)
Station: WSWP
Option 3

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931


PSI
Relative Field Plot
Elevation Pattern
Model: PSILP12OM-29
Beam Tilt: -1.0 degree
Directivity: 12.6 (11.0 dB)
Horizontal: 11.3 (10.5 dB)
Pattern: P051611-elevation
RELATIVE FIELD
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8 6 4 2 0 -2 -4 -6 -8 -10 -12 -14 -16 -18 -20
DEGREES BELOW HORIZONTAL

Propagation Systems, Inc.

Quality Broadcast Antenna Systems

TERMS AND CONDITIONS OF SALE

PRICES AND PAYMENT

Prices listed are FOB Shipping Point, subject to crating charge at cost. Unless otherwise arranged, Seller will select carrier and ship freight prepaid. Any applicable federal, state or local sales, excise, or use taxes are not included, and are the responsibility of Buyer. Unless otherwise agreed in advance in writing, payment from foreign orders will be U.S. Dollars and paid in full prior to shipment, or covered by a confirmed irrevocable letter of credit from a U.S. bank, and issued with terms satisfactory to Seller. Orders shipped open account shall become overdue 30 days after billing. Thereafter, all overdue unpaid amounts shall be subject to 1-1/2% per month interest charge until the date payment is received by Seller. Buyer agrees to reimburse Seller for any costs associated with collection.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Unless otherwise specifically offered in writing, Seller warrants its products to be free of defects in material and workmanship for a period of one year (FMR and FHR series antennas will be two years) from the date of shipment, and to conform to its standard specifications at the time of shipment. Seller agrees to service, adjust and/or replace at its option any defective parts of any equipment, returned to its Ebensburg, PA plant, freight pre-paid, within the specified warranty period. This warranty is subject to the conditions that, notice of any defect must be received by the Seller in writing within 30 days of the discovery of the defect, within the warranty period, and that Seller's inspection of the returned equipment substantiates to Seller's satisfaction the claimed defect. Seller is not liable for warranty work if notice of defect is given after the warranty period, even though Buyer deems the defect to have occurred during the warranty period.

THE SOLE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES AND THE SOLE REMEDIES FOR SELLER'S LIABILITY OF ANY KIND WITH RESPECT TO PRODUCTS OR SERVICES PROVIDED UNDER THE PURCHASE ORDER OR ANY OTHER PERFORMANCE BY SELLER SHALL BE LIMITED TO THE REMEDIES PROVIDED HEREIN. BUYER AGREES THAT SELLER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR FOR ANY LOSS OF PROFIT, REVENUE OR DATA, EVEN IF SELLER SHALL HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH POTENTIAL LOSS OR DAMAGE. SELLER SHALL NOT BE LIABLE FOR ANY CLAIM AGAINST BUYER BY AN OTHER PARTY. EXCEPT AS SPECIFICALLY PROVIDED HEREIN, SELLER DOES NOT MAKE ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PATICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE LIMITATION OR EXCULSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

OTHER TERMS AND CONDITIONS

These Terms and Conditions of Sale will form an integral part of the Buyer's Purchase Order, and thereby be incorporated therein by reference. In accepting the Seller's offer, Buyer understands and agrees to the Terms and Conditions of Sale stated herein. Any terms and conditions of Buyer's Purchase Order which are inconsistent with or in addition to these Terms and Conditions of Sale shall not be binding on Seller, unless agreed to in advance in writing by Seller.

Title to goods and liability and risk for their loss or damage in transit or thereafter shall pass to buyer upon departure from Seller's plant.

The Purchase Order and these Terms and Conditions of Sale are made under and shall be governed by the laws of the State of Pennsylvania, and any action arising thereunder shall be maintained only in a court having jurisdiction with the State of Pennsylvania.

Failure or delay on the part of Seller to exercise any right, power or privilege stated in these Terms and Conditions of Sale shall not operate as a wavier thereof. Failure of any part of these Terms and Conditions of Sale shall not abrogate the remainder. These Terms and Conditions of Sale are made part of the Offer and Acceptance to which it is attached.

Product Data Sheet APD20-C

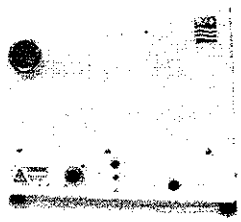
APD20-C Automatic Dehydrator, with LP alarm, 0.2 SCFM, 115V 50/60 Hz

Product Description

The APD20-C series Automatic Pressurization Dehydrator is designed for reliable pressurization of elliptical waveguide, coaxial cable and rigid transmission line systems. The dehydrator includes a self contained completely automated air drying system that utilizes a pressure swing moisture absorption cycle to provide pressurized dry air while continuously purging the collected moisture to the atmosphere. This eliminates the need for replacement or manual reactivation of the desiccant and makes our APD20-C and APD70-C series dehydrators ideal for unattended operation at even remote sites. Dehydrators are also suitable for the average manned working environment since they typically run less than 5% of the time. In most normal applications, APD series dehydrators can be expected to operate for up to five years before any maintenance activities are required.

The APD-20 is rated at .2 SCFM(.09 liter/sec) and -40°F (-40°C) dry air dew point output at a 95°F (35°C) 95% relative humidity input. For normal room environments the dehydrator output air has a typical dew point of -55°F (-46°C). System pressure is controlled by the dehydrator pressure switch settings. Normally, this is factory adjusted to 3 psig (20.7kPa) "on" and 5 psig (34.5 kPa) "off", but may be readjusted in the field to operate anywhere between 1.5 and 10 psig (10.3 kPa and 68.9 kPa). An internal 40 psig check valve guarantees that the customer system stays isolated from the dehydrator's internal system and prevents loss of system pressure due to leakage in the dehydrator. For additional safety, a standard low pressure alarm switch factory-set at 1 psig (6.9 kPa), is installed in the dehydrator. The alarm switch contains a set of SPST contacts that can be used for both local and remote monitoring or alarming. Additional standard features include a 0-15 psig pressure gauge, indicating power light, and a visual moisture monitor which is dark blue when dry and turns pink when wet.

The units may be shelf mounted or placed in a 19" EIA relay rack. A vented back cover for the dehydrator may be ordered as an optional accessory.



Dehydrator

Features/Benefits

Technical Specifications

Product	Dehydrator
Dehydrator Type	Automatic
System Capacity	Standard
Operating Voltage	115V 50/60 Hz
60 Hz Output Capacity, liters/sec (SCFM)	0.09 (0.2)
50 Hz Output Capacity, liters/sec (SCFM)	0.08 (0.17)
Output Dew Point	-40°C (-40°F)
Ambient Inlet Temperature, °C (°F)	1 - 49 (33 -120)
Ambient Humidity % maximum	95
Factory Set Output Pressure (on/off), kPa (psig)	20.7-34.5 (3/5)
Field Adjustable Output Pressure (on/off), kPa (psig)	10.3-68.9 (1.5-10)
Output Differential Output Pressure (on/off), kPa (psig)	13.8 (2) minimum
Compressor Rating	1/12 hp
Pumping Power Consumption, Watts	350
Idle Power Consumption, Watts	10
Low Pressure Alarm	Factory set for 1 psig. (P/N 916814-001) 0.5 psig differential.
Output Fitting	1/8" FPT to 3/8" plastic tube fitting
Dimensions, H x W x D, mm (in)	297 x 382 x 203 (11.7 x 15 x 8)
Net Weight, kg (lb)	14.1 (31)

Notes

Other Documentation

APD20-C Automatic Dehydrator, with LP alarm, 0.2 SCFM, 115V 50/60 Hz

APD-20/22 Maximum Dehydrator Capacity Ratings

Transmission Line	Approximate Length Feet (m)
7/8"	21,000 (6,400)
1-5/8"	7,000 (2,100)
3-1/8"	2,100 (600)
6-1/8"	500 (150)
6 to 12 GHz Waveguide	8,000 (2,400)
4 to 5 GHz Waveguide	4,000 (1,200)

Based on 2 psi leakage in 24 hours and 5% running time for 60 Hz operation. For 50 Hz operation, multiply capacity ratings by 5/6 (a reduction of 17%).

Capacity Ratings

Product Data Sheet **HCA158-50J**

1-5/8" HELIFLEX® Air-Dielectric Coaxial Cable

Product Description

HELIFLEX® 1-5/8" low loss air dielectric cable

Application: Wireless Communication, TV & Radio, HF Defense, Mobile Radio

Features/Benefits

- **Low Attenuation**

The low attenuation of HELIFLEX® coaxial cable results in highly efficient signal transfer in your RF system.

- **Complete Shielding**

The solid outer conductor of HELIFLEX® coaxial cable creates a continuous RFI/EMI shield that minimizes system interference.

- **Low VSWR**

Special low VSWR versions of HELIFLEX® coaxial cables contribute to low system noise.

- **Outstanding Intermodulation Performance**

HELIFLEX® coaxial cable's solid inner and outer conductors virtually eliminate intermods. Intermodulation performance is also confirmed with state-of-the-art equipment at the RFS factory.

- **High Power Rating**

Due to their low attenuation, outstanding heat transfer properties and temperature stabilized dielectric materials, HELIFLEX® cable provides safe long term operating life at high transmit power levels.

- **Wide Range of Application**

Typical areas of application are: feedlines for broadcast and terrestrial microwave antennas, wireless cellular, PCS and ESMR base stations, cabling of antenna arrays, and radio equipment interconnects.

Technical Features

Structure

Inner conductor:	Corrugated Copper Tube	[mm (in)]	18.6 (0.73)
Dielectric:		[mm (in)]	39.8 (1.56)
Outer conductor:	Corrugated Copper	[mm (in)]	46.6 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.4 (1.984)

Mechanical Properties

Weight, approximately	[kg/m (lb/ft)]	1.30 (0.89)
Minimum bending radius, single bending	[mm (in)]	180 (7)
Minimum bending radius, repeated bending	[mm (in)]	550 (22)
Bending moment	[Nm (lb-ft)]	42.0 (31.0)
Max. tensile force	[N (lb)]	1500 (337)
Recommended / maximum clamp spacing	[m (ft)]	0.8 / 1.2 (2.75 / 4.0)

Electrical Properties

Characteristic impedance	[Ω]	50 +/- 0.5
Relative propagation velocity	[%]	95
Capacitance	[pF/m (pF/ft)]	70.0 (21.3)
Inductance	[µH/m (µH/ft)]	0.175 (0.053)
Max. operating frequency	[GHz]	3
Jacket spark test RMS	[V]	8000
Peak power rating	[kW]	270
RF Peak voltage rating	[V]	5200
DC-resistance inner conductor	[Ω/km (Ω/1000ft)]	1.06 (0.33)
DC-resistance outer conductor	[Ω/km (Ω/1000ft)]	0.34 (0.11)

Recommended Temperature Range

Storage temperature	[°C (°F)]	-70 to +85 (-94 to +185)
Installation temperature	[°C (°F)]	-40 to +60 (-40 to +140)
Operation temperature	[°C (°F)]	-50 to +85 (-58 to +185)

Other Characteristics

Fire Performance: Halogene Free

VSWR Performance: Standard [dB (VSWR)] Contact RFS for your VSWR performance specification for your required frequency band.

Other Options: Phase stabilized and phase matched cables and assemblies are available upon request.

Datasheet Revision

Revision: F0

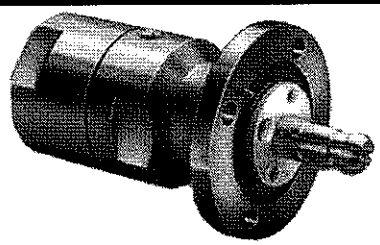
Attenuation Table			
Frequency	Attenuation		Power
[MHz]	[dB/100m]	[dB/100ft]	[kW]
0.5	0.0437	0.0133	270
1.0	0.0618	0.0188	196
1.5	0.0757	0.0231	160
2.0	0.0875	0.0267	138
10	0.197	0.0599	61.4
20	0.279	0.0850	43.4
30	0.342	0.104	35.4
50	0.444	0.135	27.3
88	0.592	0.180	20.5
100	0.632	0.193	19.2
108	0.657	0.200	18.4
150	0.778	0.237	15.6
174	0.840	0.256	14.4
200	0.902	0.275	13.5
300	1.11	0.339	11.0
400	1.29	0.394	9.44
450	1.38	0.419	8.83
500	1.45	0.443	8.41
512	1.47	0.449	8.30
600	1.60	0.488	7.64
700	1.74	0.529	7.03
800	1.86	0.568	6.59
824	1.89	0.577	6.49
894	1.98	0.603	6.20
900	1.98	0.605	6.20
925	2.01	0.614	6.11
960	2.05	0.626	6.00
1000	2.10	0.640	5.86
1250	2.37	0.722	5.21
1500	2.61	0.797	4.75
1700	2.80	0.853	4.44
1800	2.89	0.880	4.31
2000	3.06	0.932	4.08
2200	3.22	0.982	3.89
2300	3.30	1.01	3.81
3000	3.83	1.17	3.32

Attenuation at 20°C (68°F) cable temperature
Mean power rating at 40°C (104°F) ambient temperature

Product Data Sheet **158EIAP-HCA158-001**

1-5/8" EIA Connector for 1-5/8" Coaxial Cable, Gas Pass O-ring sealing, Brass/Silver

Product Description



Radio Frequency Systems' line of high performance coaxial cable connectors are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up the attachment of connectors to HELIFLEX® coaxial cables. RFS connectors are fully tested for mechanical and electrical compliance specifications. They are available in all popular cable sizes in a variety of mating interfaces. To join two cables with EIA connectors, two identical socket connectors are installed on either end of the cables to be joined, and a coupling element is used to make the connection of the center conductor. The coupling element must be ordered separately with the exception of the S-Line male versions that have a captivated coupling element. Connectors are available in sizes matching the nominal cable size. EIA connectors provide optimal power handling for the complete transmission line system.

Features/Benefits

- **Solderless**

Captivated spring finger contacts permit quick, easy and precise solderless installation utilizing only basic hand tools. Avoids the high impedance risk associated with soldering.

- **Corrosion-Proof Silver Plated Contacts**

Featured even on standard connectors. Provide improved contact resistance and lower intermodulation.

- **Outstanding Electrical Performance**

Metal to Metal contact between cable and connector - no plastic parts used. Secure connection highly resistant to pull-off or twist-off provides long-term mechanical integrity. Resistant to intermodulation after temperature cycling.

- **Easy to Install**

No special tools needed. Only basic hand tools required. No additional costs to the installer.

Technical Specifications

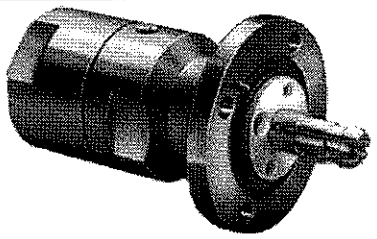
Transmission Line Type	Coaxial Cable
Cable Size	1-5/8"
Cable Type	Air Dielectric
Mating Interface	1-5/8" EIA
Connector Type	Gas Pass
Sealing Method	O-ring
Gender	None
Plating Outer/Inner	Brass/Silver
Length, mm (in)	116 (4.55)
Outer Diameter, mm (in)	89 (3.5)
Weight, kg (lb)	1.91 (4.2)
Inner Contact Attachment	Threaded
Outer Contact Attachment	Tab Flare
Wrench size front, mm (in)	29 (1-1/8)
Wrench size rear, mm (in)	58 (2-1/4)

Notes

Product Data Sheet **158EIA-HCA158-002**

1-5/8" EIA Connector for 1-5/8" Coaxial Cable, Gas Barrier O-ring sealing, Brass/Silver

Product Description



Radio Frequency Systems' line of high performance coaxial cable connectors are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up the attachment of connectors to HELIFLEX® coaxial cables. RFS connectors are fully tested for mechanical and electrical compliance specifications. They are available in all popular cable sizes in a variety of mating interfaces. To join two cables with EIA connectors, two identical socket connectors are installed on either end of the cables to be joined, and a coupling element is used to make the connection of the center conductor. The coupling element must be ordered separately with the exception of the S-Line male versions that have a captivated coupling element. Connectors are available in sizes matching the nominal cable size. EIA connectors provide optimal power handling for the complete transmission line system.

Features/Benefits

- **Solderless**

Captivated spring finger contacts permit quick, easy and precise solderless installation utilizing only basic hand tools. Avoids the high impedance risk associated with soldering.

- **Corrosion-Proof Silver Plated Contacts**

Featured even on standard connectors. Provide improved contact resistance and lower intermodulation.

- **Outstanding Electrical Performance**

Metal to Metal contact between cable and connector - no plastic parts used. Secure connection highly resistant to pull-off or twist-off provides long-term mechanical integrity. Resistant to intermodulation after temperature cycling.

- **Easy to Install**

No special tools needed. Only basic hand tools required. No additional costs to the installer.

Technical Specifications

Transmission Line Type	Coaxial Cable
Cable Size	1-5/8"
Cable Type	Air Dielectric
Mating Interface	1-5/8" EIA
Connector Type	Gas Barrier
Sealing Method	O-ring
Gender	None
Plating Outer/Inner	Brass/Silver
Length, mm (in)	116 (4.55)
Outer Diameter, mm (in)	89 (3.5)
Weight, kg (lb)	1.91 (4.2)
Inner Contact Attachment	Threaded
Outer Contact Attachment	Tab Flare
Wrench size front, mm (in)	29 (1-1/8)
Wrench size rear, mm (in)	58 (2-1/4)

Notes

Product Data Sheet **CLAMP-158**

Cable hanger, non-insulated, bolt-on, for 1 5/8" coaxial cable

Product Description

Hanger, non-insulated, bolt-on for coaxial cable
LCF158, made of stainless steel, kit of 10

Features/Benefits

Stainless steel hangers for supporting coaxial cable to tower. Recommended spacing 1m (3 feet). Hanger may be attached to angle adapters, tower standoffs, member mounting holes with up to M10 or 3/8"-16 hardware or to round member adapters through slot

Technical Specifications

Product Line	Coaxial Cable Accessories
Product Type	Hanger
Hanger Type	Bolt-On, non-insulated
Transmission Line Type	LCF158
Coaxial Cable Type	Foam Dielectric
Cable Size	1-5/8"
Material	Stainless Steel
Package Quantity	10

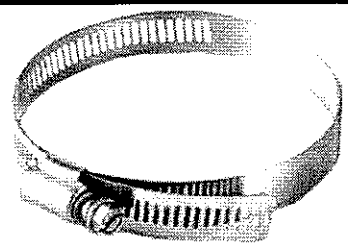
Notes

Product Data Sheet **RMA-CI**

Round member adapter, 3" - 4"

Product Description

Used to fasten hangers to round members. Adapter kit consists of ten stainless steel hose clamps with screwdriver adjustment.



Features/Benefits

Technical Specifications

Product Line	Elliptical Waveguide Accessories|Coaxial Cable Accessories
Product Type	Installation Hardware
Installation Hardware Type	Round Member Adapter Kit
Coaxial Cable Type	Air Dielectric|Foam Dielectric
Configuration	Imperial
Tower Member Diameter, mm (in)	76 - 102 (3 - 4)
Package Quantity	10

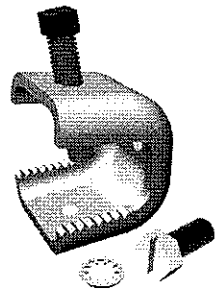
Notes

Product Data Sheet **ANGLE-CLPI**

Angle Member Adapter Kit 3/8" (SS) (Kit of 10)

Product Description

Angle Member Adapter Stainless steel, 3/8" thread incl. screw
Kit of 10



Features/Benefits

Fastens hangers to tower angle members without drilling. Angle adapter includes a tower member set screw and a 3/8" hanger mounting screw. The hanger mounting screw may be located in either of two mounting holes.

Technical Specifications

Product Line	Elliptical Waveguide Accessories|Coaxial Cable Accessories
Product Type	Installation Hardware
Installation Hardware Type	Angle Member Adapter Kit 3/8"
Coaxial Cable Type	Air Dielectric|Foam Dielectric
Thread	3/8"
Material	Stainless Steel
Mounting Screw	3/8"-16 x 3/8"
Package Quantity	10
Weight per piece, kg (lb)	2.0 (4.35)
Box Dimensions (Bulk Shipping), mm (in)	203 x 178 x 127 (8 x 7 x 5)

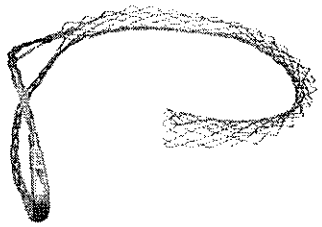
Notes

Product Data Sheet **HOIST1-158L**

Hoisting Grip for Coaxial Cable and Elliptical Waveguide, Lace-Up

Product Description

The hoisting grip consists of a wire mesh with 1 hoisting eye, lace up version



Features/Benefits

Antenna Transmission Line installation –

- Hoisting stockings distribute the force during installation
- It holds the antenna transmission line by means of friction over their complete length
- The closed version (C-Type) is used when top connector is installed after the antenna transmission line is hoisted
- The open version (L-Type) is used where the top connector is installed prior to the hoisting

Technical Specifications

Product Line	Coaxial Cable Accessories|Elliptical Waveguide Accessories
Product Type	Hoisting Grip
Transmission Line Type	LCF158|HCA158|E60|EP60|EP58|EP65|EO11
Coaxial Cable Type	Air Dielectric|Foam Dielectric
Configuration	1 loop attachment
Style	Lace-Up
Material	Tinned bronze
Package Quantity	1

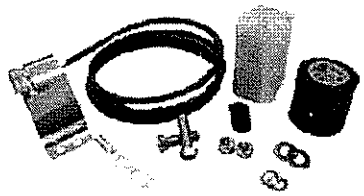
Notes

Product Data Sheet **GKFORM60-158**

Pre-formed grounding kit, 1.5m (60") for CELLFLEX® 1-5/8" Cable

Product Description

The pre-formed tin-plated copper strap facilitates a proper attachment to the coaxial cable, ensuring that the performance of the coax is not being compromised. This kit has been verified by independent labs to withstand the damaging effects of lightning current in excess of 100kA 10/350µs The 6-AWG, 13.2mm², 7 strand copper wire provides the most practical and effective low inductance transfer of lightning induced current from your coax to your system ground. Also included is the required mastic and electrical tape for weatherproofing. Installation of ground kits is recommended as a minimum at the top and bottom of each vertical run, at regular intervalls in long vertical runs and just prior to building entry. As international and national regulations apply for potential qualifation please make sure to comply with them.



Features/Benefits

- **Compatible with both copper and aluminium cable types i.e. one Grounding Kit for both outer conductor materials eliminates the risk of faulty Grounding Kit installation and helps to keep inventory down.**
- **This kit has been verified by independent labs to withstand the damaging effects of lightning current in excess of 100kA 10/350µs according to EN 50164. The copper wire provides the most practical and effective low inductance transfer of lightning induced current to ground.**
- **No influence on the electrical transmission characteristics of the coaxial cable**
- **Compliant to RoHS (EU 2002/95/EC) and CRoHS (China SJ/T11363-2006) i.e. usable on a global basis**

Technical Specifications

Product Line	Coaxial Cable Accessories
Product Type	Grounding Kit
Type of Grounding Kit	Pre-Formed Copper Strap
Transmission Line Type	LCF158
Coaxial Cable Type	Foam Dielectric
Cable Size	1-5/8"
Lug Attachment Method	Field Attachable
Lug Style Size	2-hole Ø 10.2mm (3/8") crimp-on, tin-plated
Grounding Wire Length, m (in)	1.5 (60)
Grounding Wire Size	6 AWG (7 strand)
Grounding Wire Color	Black
Grounding Body Color	Black
Package Quantity	1
Weight per piece, kg (lb)	0.3 (0.66)

Notes