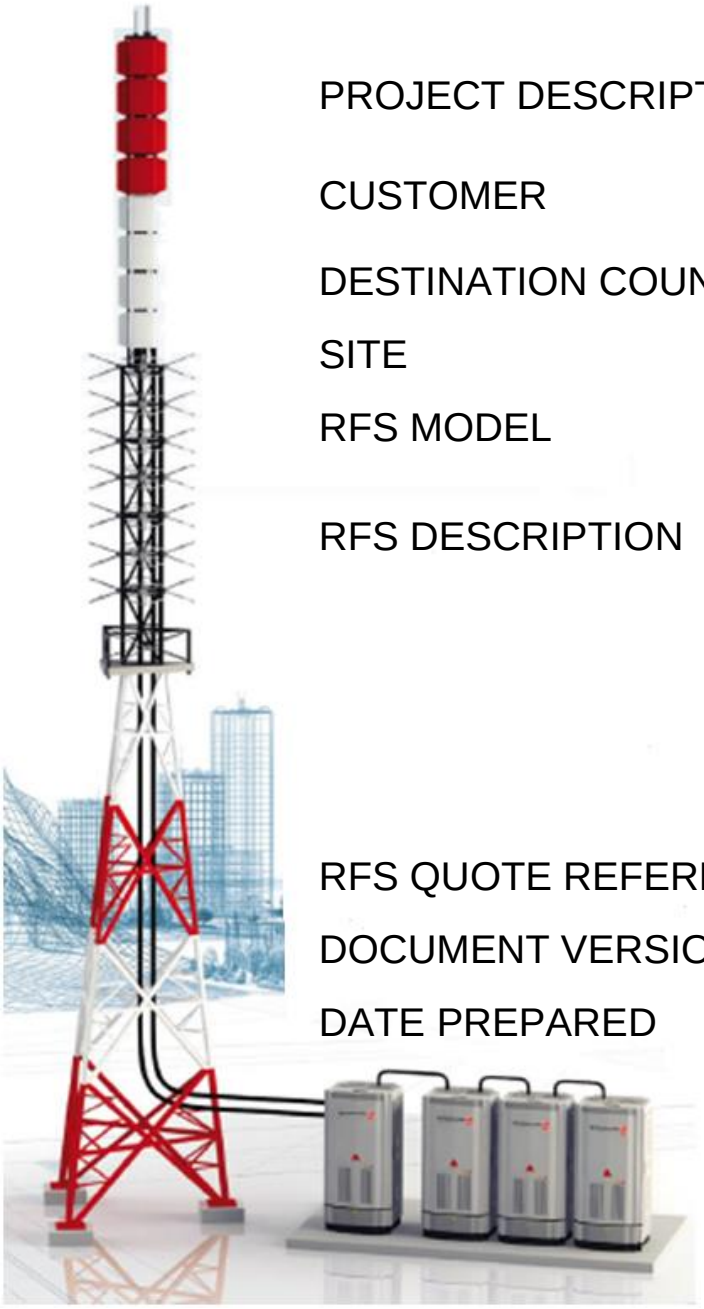
RADIO FREQUENCY SYSTEMS

TECHNICAL PROPOSAL



PROJECT DESCRIPTION	KTXH Consolidation
CUSTOMER	Station KTXH/KRIV
DESTINATION COUNTRY	USA
SITE	Houston, Texas
RFS MODEL	PEP46T
RFS DESCRIPTION	UHF Television Panel Antenna *PEP Broadband Antenna* *Elliptical Polarisation (V/H ratio: 58%)* *2x 8 3/16" 75 Ohm Rigid Coaxial Transmission Line*
RFS QUOTE REFERENCE	513085
DOCUMENT VERSION	LK_4.3
DATE PREPARED	April 19, 2021

AMENDMENT RECORD

Reference Version	Amended by	Date	Comments
MW20190823_1	Mengmeng Wu	August 23, 2019	5-sided PEP antenna with 30% Vpol Ratio
MW20190828_2	Mengmeng Wu	August 28, 2019	5-sided PEP antenna with 22% Vpol ratio for CH19 and 30% Vpol Ratio for CH26
MW20191008_3	Mengmeng Wu	October 8, 2019	5-sided PEP antenna with 47.6% Vpol ratio for CH19 and 50.0% Vpol Ratio for CH26
MW20191031_4	Mengmeng Wu	October 31, 2019	5-sided PEP antenna with 23331 power split. 78% Vpol ratio is applied to CH19 and 59.0% Vpol Ratio is applied to CH26
MB1	Mick Bennett	November 1, 2019	Updated weights and wind loads
513085_LK_1	Levy Kroiss	May 6, 2020	5-sided PEP antenna, thinned array. Changed the pattern orientation following FCC projects
513085_LK_2	Levy Kroiss	May 15, 2020	5-sided PEP antenna, thinned array. Changed the pattern orientation following FCC projects. Beam tilt 1.0 deg
513085_LK_3	Levy Kroiss	October 9, 2020	5-sided PEP antenna, thinned array. Changed the pattern configuration and orientation to improve the covered population.
513085_LK_4.0	Levy Kroiss	October 13, 2020	PEP46T antenna with 1x EWG1800 Elliptical Waveguide
513085_LK_4.1	Levy Kroiss	October 13, 2020	PEP46T antenna with 2x 8 3/16” 75 Ohm Rigid Coaxial Transmission Line option
513085_LK_4.2	Levy Kroiss	November 30, 2020	PEP46T antenna with 1x EWG1800 Elliptical Waveguide (new array orientation and phases adjustments)
513085_LK_4.3	Levy Kroiss	April 19, 2021	PEP46T antenna with 2x 8 3/16” 75 Ohm Rigid Coaxial Transmission Line (new array configuration and adjustments)

A new wave in TV and Radio Solutions

Because no two networks are the same, Radio Frequency Systems is primed and ready to provide the widest possible range of options for you.

RFS broadcast antennas are recognised throughout the broadcast industry for their quality and broadband performance. As the only supplier who can offer end-to-end passive broadcast solutions, RFS provides RF systems from the output of the transmitter, to the antennas. This provides a single point of accountability with a fully integrated solution and a complete system warranty.

We offer a vast portfolio of premium performance antenna solutions for television, radio and HF.

Broadband panel arrays
With all polarization options available, RFS broadband panel arrays support Bands I, II (87.5-108MHz), III (174-240MHz), IV and V (470-860MHz). Each array can be tailored for specific coverage and power-handling capability.

Top mount antennas
We offer a range of lightweight and low-profile antennas (including super turnstile slot, dipole, and collinear antennas) that support single or multi-channel services

Side mount antennas
Providing a range of polarization and power options, RFS' side mount antennas are an ideal alternative for television and radio applications where the tower cannot support a top mounted antenna.

New technologies
Whichever broadcast band is in use for fixed or mobile television or radio broadcast, we're fully conversant with all global broadcasting standards and emerging digital technologies, including: Television (analogue and digital) – DVB-T, DVB-T2, ATSC, ISDB-T, DMB-T/H, PAL,NTSC, etc. Radio (analogue and digital) – FM, DAB, DAB+, HD Radio, CDR, etc

HELIFLEX® – the original and still the best
Our world-renowned HELIFLEX® air-dielectric coaxial transmission line is installed easily and quickly, providing maximum strength and reliability.
HELIFLEX® is available in a wide range of sizes (3/8-inch to 9-inch diameter) and ensures a completely sealed feeder system, without the need for joining flanges or suspension hanger systems.
HELIFLEX®'s electrical performance is unsurpassed, delivering consistently low VSWR across the entire broadcast band, and low attenuation performance.
It is also one of the few flexible feeder cables that can support the high-power requirements of multiple broadcast services.

› Why RFS

Product	Best-in-class technical performance	Future proof	Bespoke/ standard designs	Cyclone rated	Low wind load	Rugged construction
VHF TV Band I	✓		✓		✓	✓
VHF FM Radio Band II	✓	✓	✓	✓	✓	✓
VHF TV Band III	✓	✓	✓	✓	✓	✓
UHF Band IV/V	✓	✓	✓	✓	✓	✓

IN-BUILDING | WIRELESS | IN-TUNNEL | TV & RADIO | HF & DEFENSE | MICROWAVE | MOBILE RADIO

ANTENNA PROPOSAL – MODEL PEP46T 10 8 10 8 10

INTRODUCTION

This proposal describes a model PEP46T 10 8 10 8 10 dual input UHF antenna system for DTV transmission. The antenna system consists of a UHF Elliptically polarised antenna with fixed V/H ratio of 58.0% at design frequency (539 MHz) and operate from 470 MHz to 700 MHz of Band.

The PEP broadband panel is designed as a building block for integration into complex antenna arrays used by single broadcasters and multiple broadcasters in a shared antenna. Panels are dual feed horizontally, vertically, circularly or elliptically polarised.

The array consists of forty-six panels unevenly deployed over five sides and 10 levels designed to operate with 80 kW max. average input power in ATSC per input.

RFS will optimise the antenna for operation specifically for Channel 26 (542-548 MHz) and Channel 19 (500-506 MHz).

The antenna will be fully assembled in a 570mm 5-sided column for a Top mounting configuration. RFS will supply 4 dummy panels additionally to provide a full array assembling in order to create the aerodynamic shape (cylindrical) that will give a full wind load reduction.

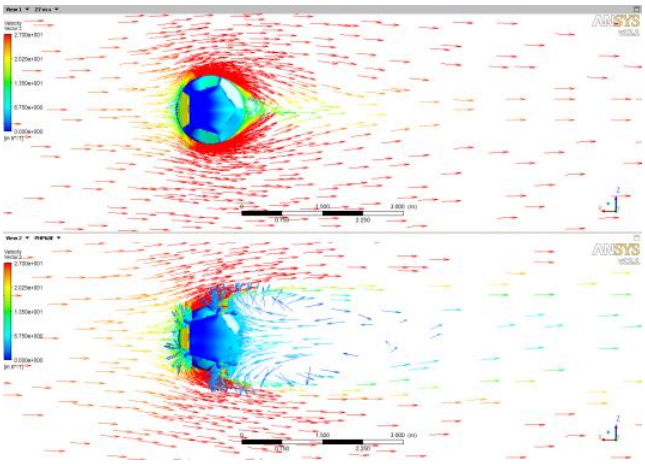
The antenna will be fed with a dual 8-3/16” EIA input including an LC81E line tuner for the return loss optimisation on site, if required.

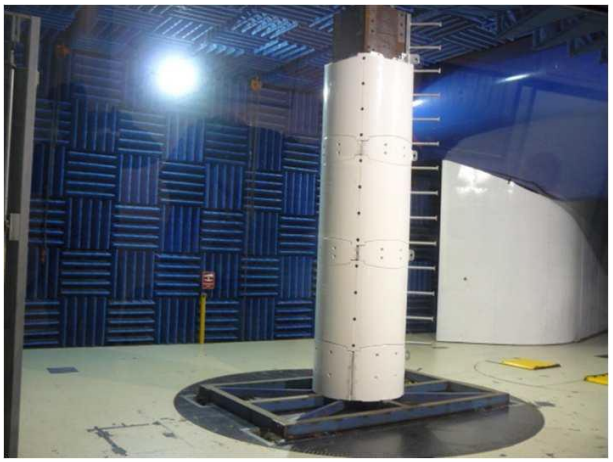
PEP antenna arrays use RFS patented VPT technology. With dual feed arrangement different broadcasters sharing the same antenna can have different polarisation ratios. The polarisation ratio can be changed post-installation by varying the phase shift of the combiner.

Tower interface steelwork is not included and is the responsibility of the installation crew.

FEATURES

- Fully engineered for Digital TV, Mobile TV, Analogue TV and MIMO applications
- Corrosion resistant aluminium construction with fibreglass radome
- Independent inputs allowing utmost polarisation and pattern flexibility.
- Horizontal / Vertical, Circular or mixed polarization
  Low wind loading
- Hurricane rated
- Unprecedented pattern circularity
- Full band operation
- High power rating
- Array design allows a variety of horizontal radiation patterns with or without vertical beam tilt and null fill
- Temperature range -40 to +60 °C available





All RFS UHF Panel antennas are designed for long life in harsh environments, with many antennas still operating reliably after more than 20 years of operation. All mechanical interfaces are designed to minimise galvanic corrosion in marine and other harsh environments (e.g. industrial).

ANTENNA SPECIFICATIONS

PANEL DATA (SINGLE PANEL)

Panel model number:	PEP-5S Streamlined profile panel
Total number of panels:	50 (46 + 4 dummy panels)
Panel type:	4 crossed dipoles per plane of polarization
Panel Gain (mid band, per plane)	15.8 (12 dBd) per polarization
Panel input power rating:	2.5 kW per input
Panel input connector:	2x 7/8” EIA Flange
Panel radomes:	Yes (Fibreglass)
Radome Color:	White/Orange

ANTENNA ARRAY SYSTEM DATA

Panel orientation:					
Direction	60°	132°	204°	276°	348°
Number of Panels	10	8	10	8	10
Power Ratio	21.74%	17.39%	21.74%	17.39%	21.74%
Vertical spacing between bays	1.15 m (3.77 ft) centre to centre				
Horizontal Radiation Pattern	(Refer HRP)				

Note: 4 dummy panels will be supplied to create a full cylindrical shape

ANTENNA MOUNTING DATA

Antenna mounting:	Top mount on 570 mm pentagonal column
Antenna system assembly (pre-installation):	Supplied assembled
Power divider network	Internal and external to array – factory tested
Tower Interface steelwork:	Supplied by installer
Aircraft warning light:	Not included

POWER DIVIDER NETWORK DATA

VSWR Tuner:	2x LC81E Line Tuner
Cable Test section for antenna measurement:	Not included
Dual Directional Coupler:	2x DCD81TE Dual Directional Coupler
Antenna Input Power Divider:	2x Equal 3 way (PD81E3E49 Power Divider)
Secondary Power Divider:	6x Equal 2 way (PD49E2E31 Power Divider)
Tertiary Power Divider:	10x Equal 8 way (PD31E8E Power Divider) 2x Equal 6 way (PD31E6E Power Divider)
Branch feeder cables:	HCA78-50J (approx. 21.7 ft / 6.6 m)

ANTENNA SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

Antenna Model:	PEP46T 10 8 10 8 10
Frequency Range:	470 - 700 MHz
Operating channels:	Ch19 (503 MHz) and Ch 26 (545 MHz)
Polarisation:	Elliptical
V/H ratio:	58.0% at design frequency (539 MHz)
Impedance:	75 ohm
VSWR:	< 1.08: 1 (Return Loss > 28.3 dB) over the operating Channels < 1.1:1 (Return Loss > 26.4 dB) across 470 MHz to 700 MHz
Antenna Input Power Rating:	2x 80.0 kW Into full antenna system
Input Connector:	2x 8-3/16” EIA flange
Input connector location:	Antenna base (approx.)
Antenna Gain:	Refer Antenna Performance Summary
Beam Tilt:	1.0°
Null fill:	1st null > 20% E/Emax

Note: Beam tilt can be modified prior to manufacture, if required. VRP is determined by antenna bay spacing and branch cable lengths.

MECHANICAL SPECIFICATIONS

Materials:	
Panel Screens:	Structural grade aluminium
Radiators:	Structural grade aluminium
Power Div. N/work:	Copper/copper alloy
Insulators:	PTFE
Operating Temperature:	-40 to +140°F
Height (aperture) (H):	(H1) 41.35 ft (H2) 44.75 ft
Diameter (D):	3.94 ft
Center of Radiation (COR) above base:	21.4 ft
Weight (antenna + external power divider):	14,590 + 1,984 lbs
Effective Projected Area (EPA=CaAa)	146 + 67 ft²

Note: Calculated weight and effective projected area (EPA) is based on preliminary antenna design and assumed site conditions. More accurate weight and EPA for the specific antenna design will be provided at the time of quotation. Site specific operating temperature (lowest monthly mean) will be considered for the antenna structural steel materials qualification in accordance with TIA-222-G standard.

FACTORY TEST DATA

Factory tests:	VSWR, Phasing, Pressurization, HRP and VRP (Both calc. from phasing). ISO 9001 Quality testing

ANTENNA SPECIFICATIONS

ANTENNA PERFORMANCE SUMMARY

Antenna Model: PEP46T 10 8 10 8 10						
Channel	**US19**			**US26**		
Frequency	**503.00 MHz**			**545.00 MHz**		
Polarisation	**H**	**V**		**H**	**V**	
Azimuth Pattern	**Directional**	**Directional**		**Directional**	**Directional**	
Number of Levels	10	10		10	10	
Peak Gain	**29.3 (14.67 dBd)**	**29.6 (14.71 dBd)**		**30.5 (14.85 dBd)**	**27.5 (14.40 dBd)**	
Polarisation Loss	0.68 (1.70 dBd)	0.32 (4.90 dBd)		0.60 (2.21 dBd)	0.40 (3.99 dBd)	
Internal Loss	0.95 (0.23 dB)	0.95 (0.23 dB)		0.95 (0.24 dB)	0.95 (0.24 dB)	
Antenna Gain	**18.8 (12.74 dBd)**	**9.1 (9.58 dBd)**		**17.4 (12.40 dBd)**	**10.4 (10.17 dBd)**	
Power into antenna	35.97 kW (15.56 dBk)	17.23 kW (12.36 dBk)		34.59 kW (15.39 dBk)	22.93 kW (13.60 dBk)	
Total Power into antenna	**53.20 kW (17.26 dBk)**			**57.53 kW (17.60 dBk)**		
Feeder Loss*	0.72 (1.42 dB)	0.72 (1.42 dB)		0.71 (1.48 dB)	0.71 (1.48 dB)	
Combiner loss / Filter (estimated)	0.94 (0.25 dB)	0.94 (0.25 dB)		0.94 (0.25 dB)	0.94 (0.25 dB)	
Switchframe loss	0.99 (0.05 dB)	0.99 (0.05 dB)		0.99 (0.05 dB)	0.99 (0.05 dB)	
Interconnect loss	0.99 (0.05 dB)	0.99 (0.05 dB)		0.99 (0.05 dB)	0.99 (0.05 dB)	
System Gain	**12.5 (10.97 dBd)**	**6.0 (7.81 dBd)**		**11.4 (10.57 dBd)**	**6.8 (8.34 dBd)**	
Transmitter power	53.99 kW (17.32 dBk)	26.09 kW (14.17 dBk)	394	54.98 kW (17.40 dBk)	32.79 kW (15.16 dBk)	
Total transmitter power - TPO	**80.09 kW (19.04 dBk)**			**87.76 kW (19.43 dBk)**		
ERP	**1000 kW (30.00 dBk)**	**483 kW (26.84 dBk)**		**1000 kW (30.00 dBk)**	**598 kW (27.76 dBk)**	
V/H ratio	**48.3%**			**59.8%**		

* Note: Feeder loss based on 1,950 ft of 8 3/16" 75 Ohm Rigid Line

ANTENNA POWER AND VOLTAGE RATINGS

Component Description	Length (ft)	No of Outputs	Loss (dB)	Operating Power (kW)	Max. Rated Power (kW)	Safety Factor Power	Operating Volts (kV)	Max Rated Voltage (kV)	Safety Factor Voltage
PEP-5S UHF panel (2x 7/8" EIA input)				1.10	2.50	2.3	1.26	2.70	2.14
HCA78 Branch feeder cables	21.7		0.19	1.15	3.55	3.1	1.29	2.70	2.09
PD31E8E Bay power divider		8.0 way		9.17	14.00	1.5	3.65	7.10	1.94
3-1/8" Rigid Phasing Section				9.17	18.65	2.0	3.65	9.60	2.63
PD49E2E31 Input Power Divider		2.0 way		18.35	40.00	2.2	5.16	12.75	2.47
4-7/8" Rigid Phasing Section				18.35	42.00	2.3	5.16	14.70	2.85
PD81E3E49 Input Power Divider		3.0 way		55.04	120.00	2.2	8.94	23.00	2.57
8-3/16" Line tuner				55.04	108.00	2.0	8.94	18.40	2.06
8-3/16" Dual Directional Coupler - DCD81TE				55.04	108.00	2.0	8.94	24.00	2.68
Main Feeder Cable - 8-3/16" 75 ohm	1,950		1.48	77.43	108.00	1.4	10.61	24.00	2.26
Switchrame (full power to half stack) - 8-3/16" EIA		2.0 way	0.05	156.65	240.00	1.5	15.09	24.00	1.59
Combiner Output Power				**156.65**			**15.09**		

Transmitter and Combiner Data

Freq. Plan U.S. Channel	Frequency (MHz)	Power (kW)	Broadcast Standard	Filter Loss (dB)	Combiner Loss (dB)	Av. Pwr (kW) at Combiner O/P	Peak Volts (kV) at Combiner O/P
19	503.000	80.087	ATSC 3.0	0.00	0.30	74.741	8.645
26	545.000	87.765	ATSC 1.0	0.00	0.30	81.907	7.189
-							
-							
-							
-							
-							
-							
-							
-							
-							

Frequency Information

Design Frequency	539.00 MHz
Frequency Span	138 MHz

Envelope Approach

Total Digital Peak to Average Power Ratio (PAPR):	12.0 dB

Summary Power and Voltage Data:

Total Average Power at Combiner O/P	156.65 kW
Total Peak Voltage at Combiner O/P	15.83 kV
RMS Voltage (Beta Distribution Av. Voltage)	2.80 kV
Beta Distribution Peak.Voltage	15.09 kV

Maximum Antenna Ratings

Maximum Average Power	84.22 kW
Maximum Peak Voltage	12.42 kV

Notes:

1. Tx powers are peak sync for analogue transmitters
2. Tx powers are average power for digital transmitters
3. Voltages are peak, instantaneous in phase voltages.
4. Voltage safety factors are calculated for limited bandwidth (beta distribution) and provide the most accurate representation of maximum peak voltages
5. Total Peak Voltage at Combiner O/P is calculated using Total Average Power at Combiner O/P and the capped PAPR of 16dB for more than 4 digital channels in the system.
6. Power safety factor of 1.0 and voltage safety factor of 1.40 are the minimum allowable for continuous operation at 40 degrees centigrade.
7. Peak to Average Power Ratios for Digital TV are shown below:

DVB-T	10 dB
DVB-T2	10 dB
ISDB-T 6MHz	10 dB
ISDB-T 8MHz	10 dB
ATSC 1.0	08 dB
ATSC 3.0	10 dB
DAB	10 dB
IBOC	08 dB

ANTENNA POWER AND VOLTAGE RATINGS

Component Description	Length (ft)	No of Outputs	Loss (dB)	Operating Power (kW)	Max. Rated Power (kW)	Safety Factor Power	Operating Volts (kV)	Max Rated Voltage (kV)	Safety Factor Voltage
PEP-5S UHF panel (2x 7/8" EIA input)				1.46	2.50	1.7	1.46	2.70	1.85
HCA78 Branch feeder cables	21.7		0.19	1.53	3.55	2.3	1.49	2.70	1.81
PD31E6E Bay power divider		6.0 way		9.17	14.00	1.5	3.65	7.50	2.05
3-1/8" Rigid Phasing Section				9.17	18.65	2.0	3.65	9.60	2.63
PD49E2E31 Input Power Divider		2.0 way		18.35	40.00	2.2	5.16	12.75	2.47
4-7/8" Rigid Phasing Section				18.35	42.00	2.3	5.16	14.70	2.85
PD81E3E49 Input Power Divider		3.0 way		55.04	120.00	2.2	8.94	23.00	2.57
8-3/16" Line tuner				55.04	108.00	2.0	8.94	18.40	2.06
8-3/16" Dual Directional Coupler - DCD81TE				55.04	108.00	2.0	8.94	24.00	2.68
Main Feeder Cable - 8-3/16" 75 ohm	1,950		1.48	77.43	108.00	1.4	10.61	24.00	2.26
Switchrame (full power to half stack) - 8-3/16" EIA		2.0 way	0.05	156.65	240.00	1.5	15.09	24.00	1.59
Combiner Output Power				**156.65**			**15.09**		

Transmitter and Combiner Data

Freq. Plan U.S. Channel	Frequency (MHz)	Power (kW)	Broadcast Standard	Filter Loss (dB)	Combiner Loss (dB)	Av. Pwr (kW) at Combiner O/P	Peak Volts (kV) at Combiner O/P
19	503.000	**80.087**	**ATSC 3.0**	**0.00**	**0.30**	74.741	8.645
26	545.000	**87.765**	**ATSC 1.0**	**0.00**	**0.30**	81.907	7.189
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Frequency Information

Design Frequency	**539.00 MHz**
Frequency Span	**138 MHz**

Envelope Approach

Total Digital Peak to Average Power Ratio (PAPR):	**12.0 dB**

Summary Power and Voltage Data:

Total Average Power at Combiner O/P	**156.65 kW**
Total Peak Voltage at Combiner O/P	**15.83 kV**
RMS Voltage (Beta Distribution Av. Voltage)	**2.80 kV**
Beta Distribution Peak.Voltage	**15.09 kV**

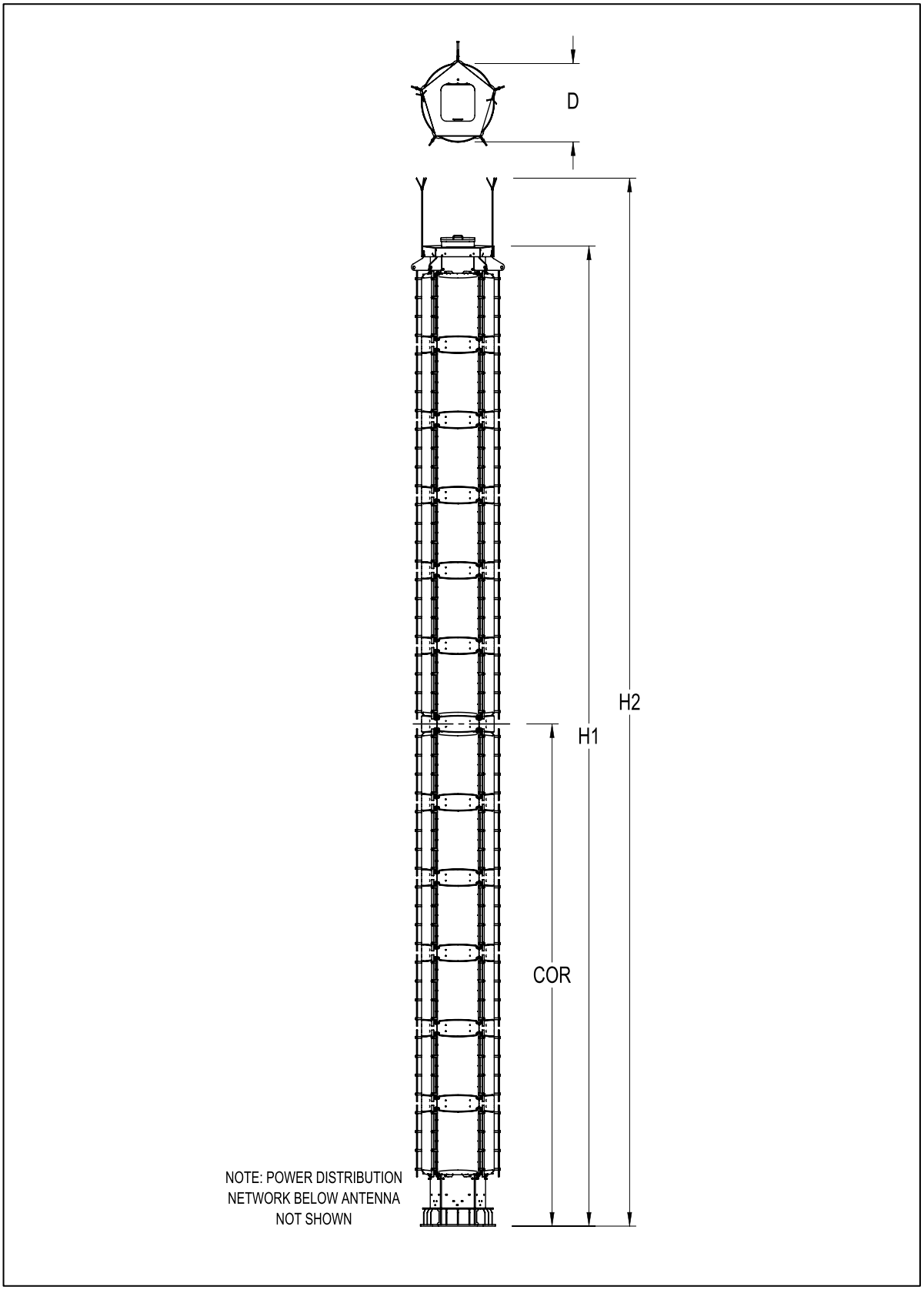
Maximum Antenna Ratings

Maximum Average Power	**84.22 kW**
Maximum Peak Voltage	**11.57 kV**

Notes:

1. Tx powers are peak sync for analogue transmitters
2. Tx powers are average power for digital transmitters
3. Voltages are peak, instantaneous in phase voltages.
4. Voltage safety factors are calculated for limited bandwidth (beta distribution) and provide the most accurate representation of maximum peak voltages
5. Total Peak Voltage at Combiner O/P is calculated using Total Average Power at Combiner O/P and the capped PAPR of 16dB for more than 4 digital channels in the system.
6. Power safety factor of 1.0 and voltage safety factor of 1.40 are the minimum allowable for continuous operation at 40 degrees centigrade.
7. Peak to Average Power Ratios for Digital TV are shown below:

DVB-T	10 dB
DVB-T2	10 dB
ISDB-T 6MHz	10 dB
ISDB-T 8MHz	10 dB
ATSC 1.0	08 dB
ATSC 3.0	10 dB
DAB	10 dB
IBOC	08 dB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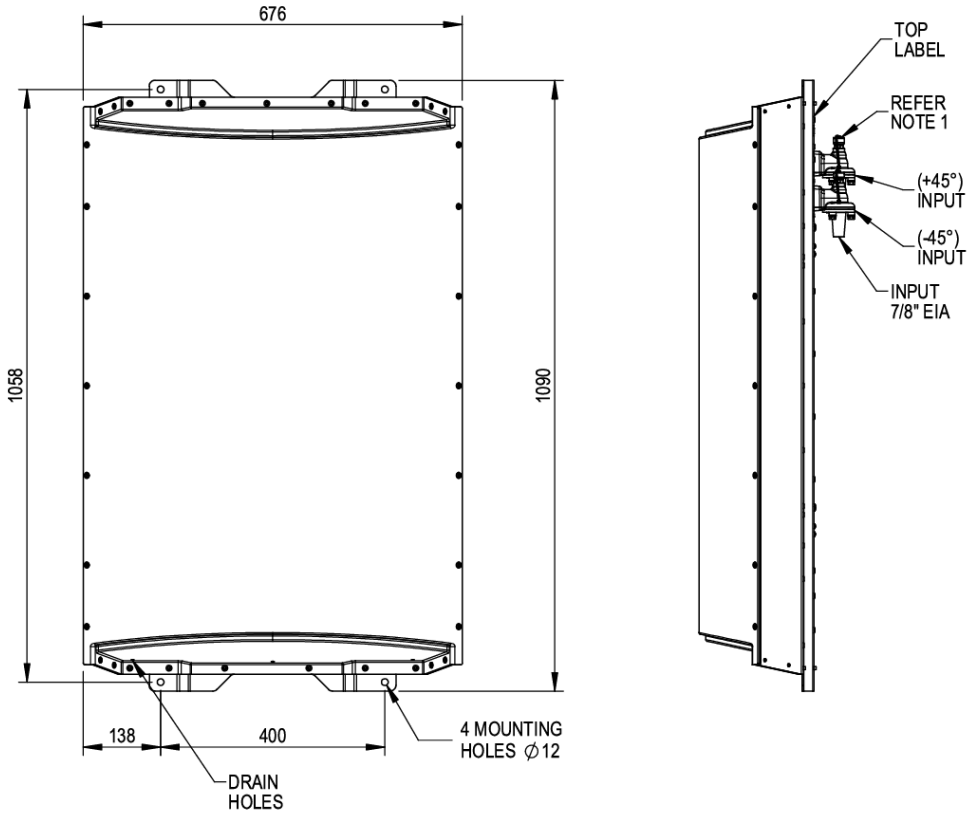
H2
H1
COR
NOTE: POWER DISTRIBUTION
NETWORK BELOW ANTENNA
NOT SHOWN

ANTENNA COMPONENTS



BOTTOM VIEW

NOTES:
1. CAPACITIVE PROBE FOR ELECTRICAL MEASUREMENT PURPOSES.

POWER RATING @ 665 MHz : 2.5 kW per input
PEAK VOLTAGE RATING : 2.7 kV per input

PART No.	RADOME COLOUR	CAPACITIVE PROBE	LIFTING LUG	PACKING INCLUDED
00.60099.001	WHITE	YES	NO	NO
00.60099.002	ORANGE	YES	NO	NO
00.60099.402	ORANGE	NO	NO	NO
00.60099.101	WHITE	YES	YES	NO
00.60099.201	WHITE	YES	NO	YES
00.60099.301	WHITE	YES	YES	YES

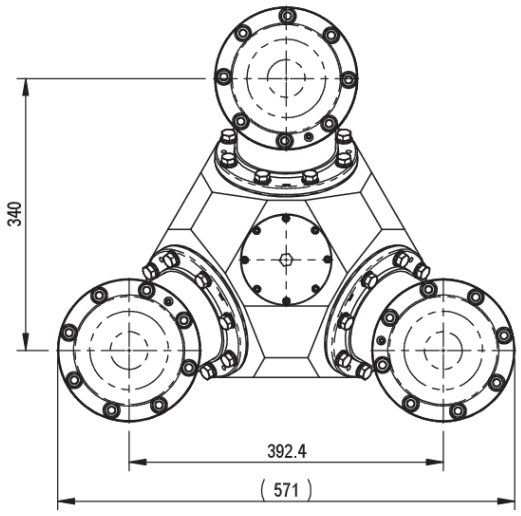
DESIGN FILE No.	008.212.00
CHECKED	B.T.
WEIGHT	16.5 kg
SHEET No.	SHEET 1 OF 1
ISSUE	09

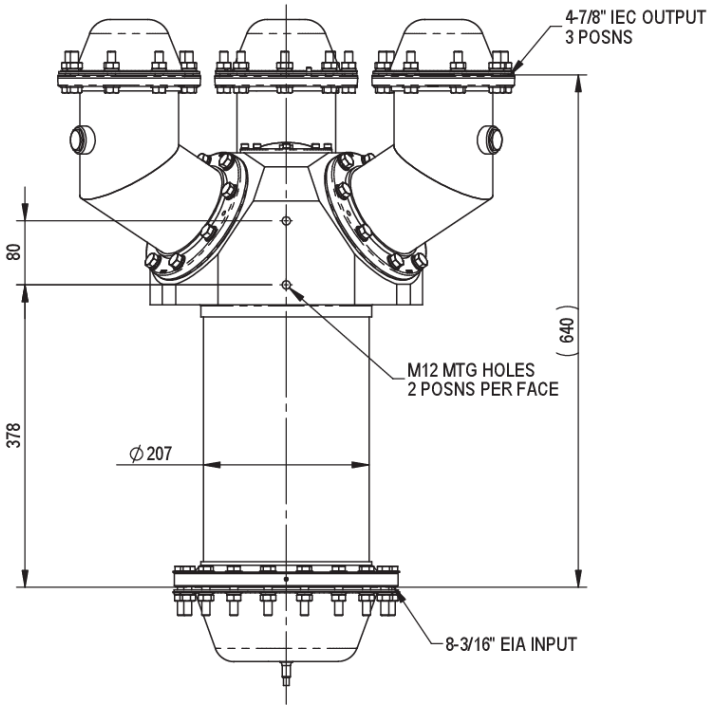
RFS RADIO FREQUENCY SYSTEMS

DIMENSIONS IN MILLIMETRES

PEP-5S UHF PANEL (TOP FEED)

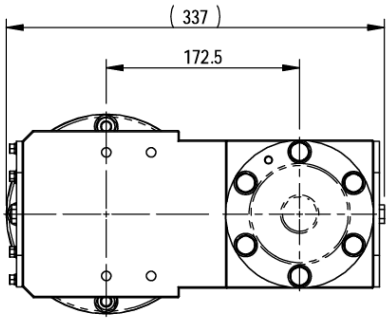
00.60099

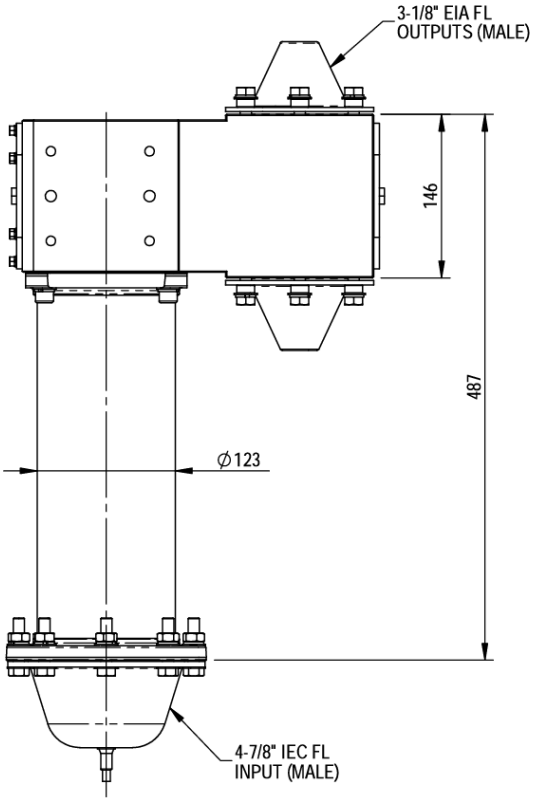




PEAK VOLTAGE RATING : 23 kV
Av. POWER RATING @ 585 MHz : 120 kW

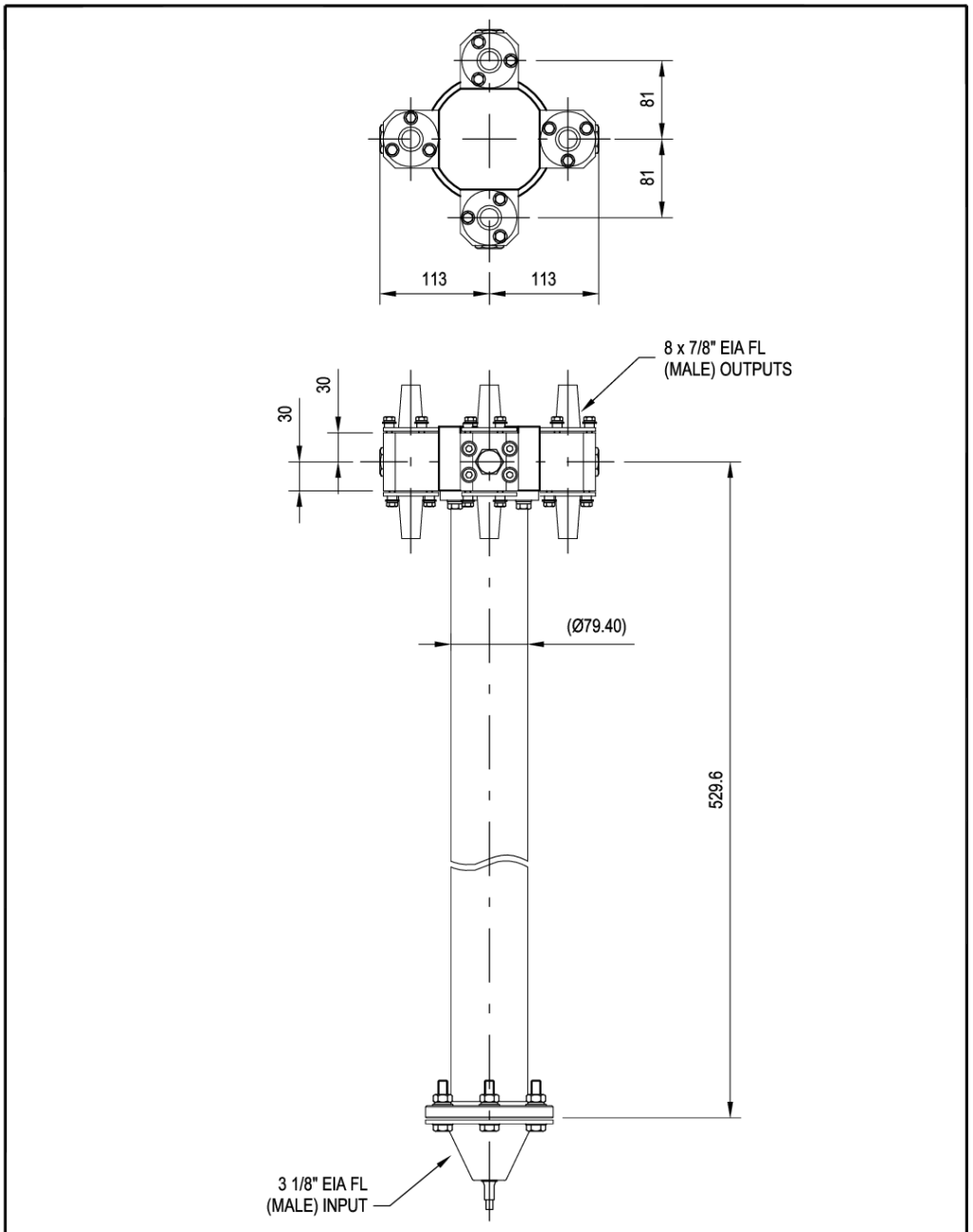
DESIGN FILE No.	013.276.00	RFS RADIO FREQUENCY SYSTEMS © COPYRIGHT 2018	PD81E3E49 POWER DIVIDER - 3 UP 470 - 700 MHz 43.00065
CHECKED	KC		
WEIGHT	98 kg approx		
SHEET No.	SHEET 1 OF 1		
ISSUE	02	DIMENSIONS IN MILLIMETRES	





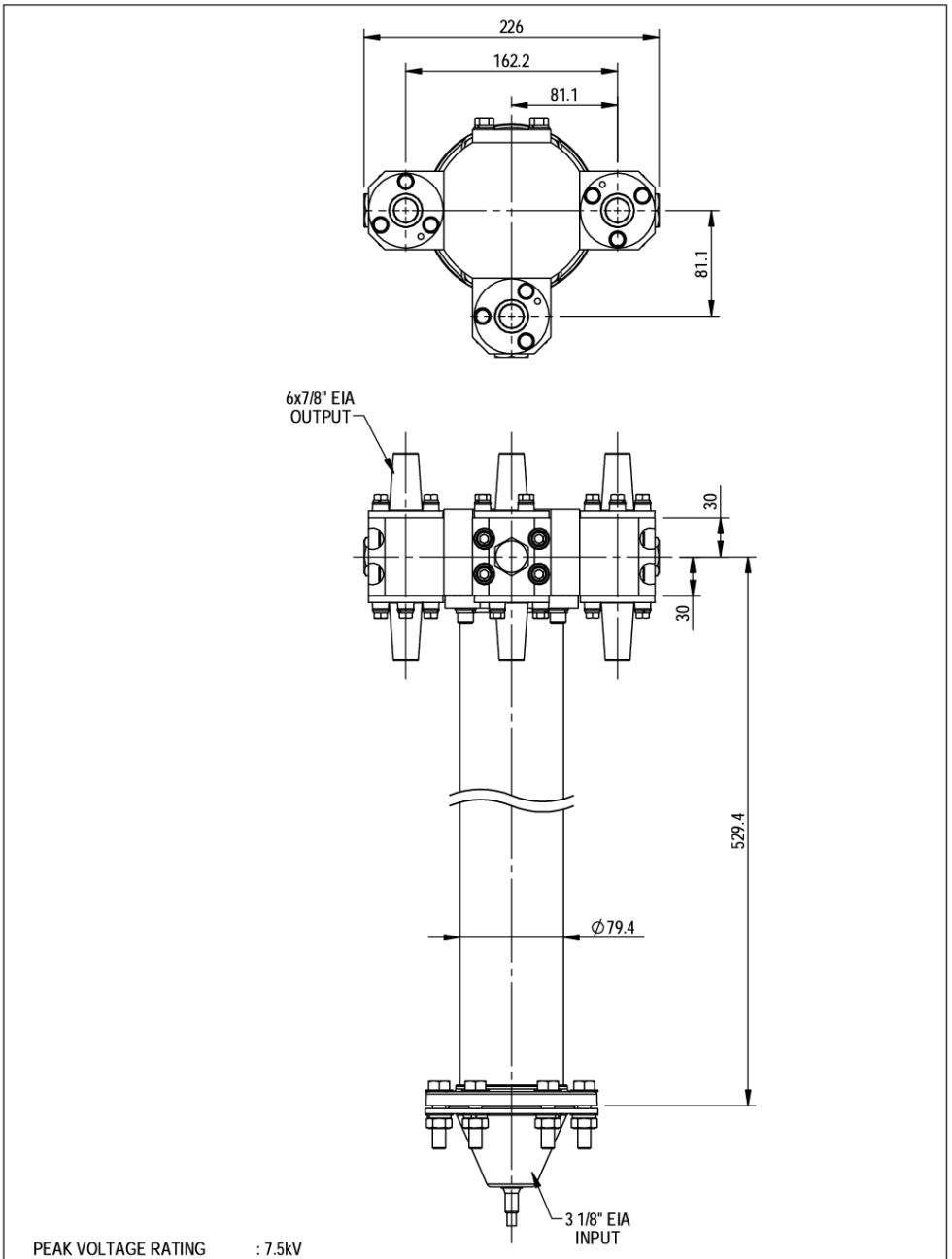
PEAK VOLTAGE RATING : 12.75 kV
Av. POWER RATING @ 655 MHz : 40 kW

DESIGN FILE No.	008.334.00	RFS RADIO FREQUENCY SYSTEMS © COPYRIGHT 2015	PD49E2E31 (470-700 MHz) POWER DIVIDER
CHECKED	KC		
WEIGHT	34 kg approx		
SHEET No.	SHEET 1 OF 1		42.00141
ISSUE	04	DIMENSIONS IN MILLIMETRES	



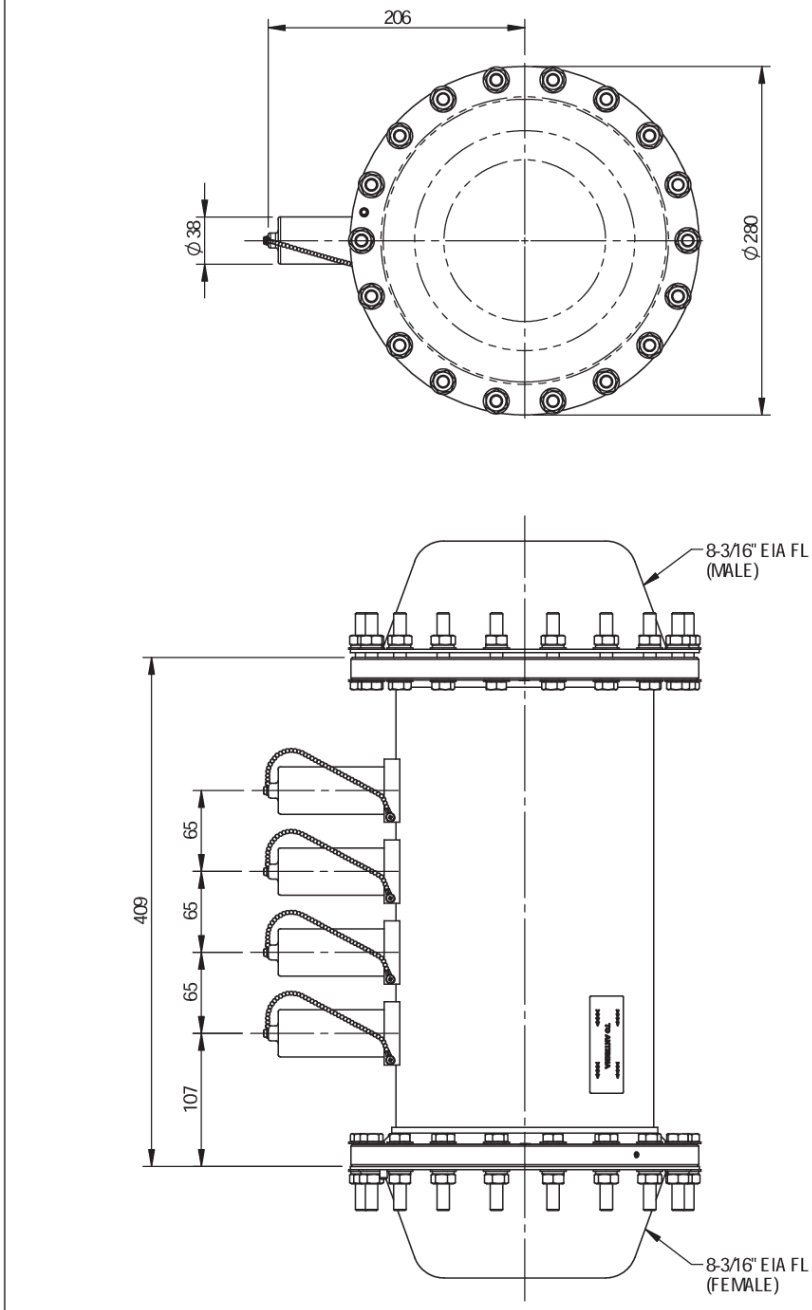
PEAK VOLTAGE RATING : 7.1kV.
Av POWER RATING @665 MHz : 14kW.

DESIGN FILE No.	013.002.00	RFS RADIO FREQUENCY SYSTEMS	PD31E8E POWER DIVIDER
CHECKED	RLG		
WEIGHT	15 kg		
SHEET No.	SHEET 1 of 1		48.00002
ISSUE	06	DIMENSIONS IN MILLIMETRES	

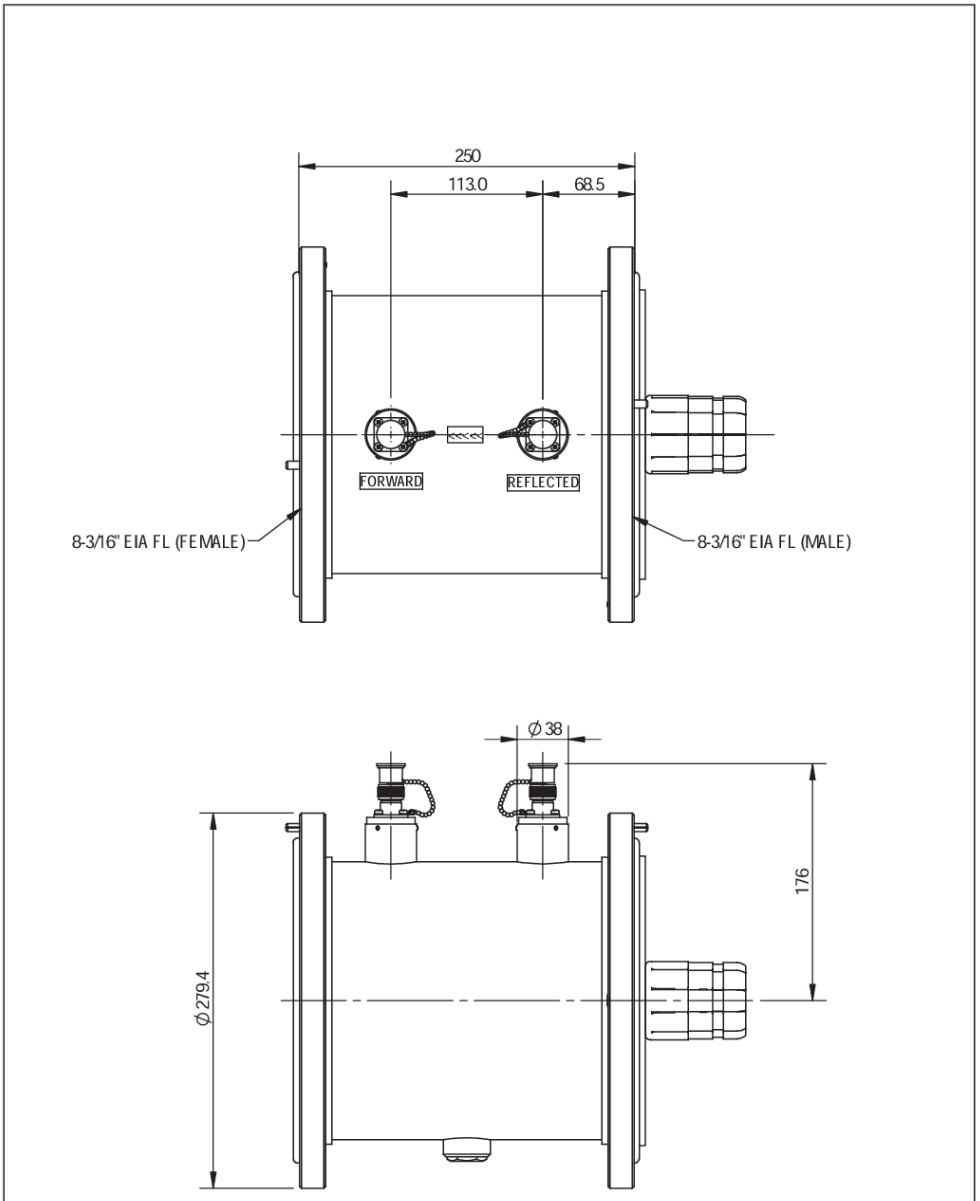


PEAK VOLTAGE RATING : 7.5kV
Av. POWER RATING @ 665MHz : 14kW

DESIGN FILE No.	013.014.00	RFS RADIO FREQUENCY SYSTEMS	PD31E6E POWER DIVIDER
CHECKED	B.T.		
WEIGHT	15kg		46.00007
SHEET No.	SHEET 1 OF 1		
ISSUE	06	DIMENSIONS IN MILLIMETRES	



DESIGN FILE No.	020.099.00	RFS RADIO FREQUENCY SYSTEMS	LC81E LINE TUNER
CHECKED	K.C.		
WEIGHT	21 kg approx		
SHEET No.	SHEET 1 OF 1		55.00001
ISSUE	02	DIMENSIONS IN MILLIMETRES	



DESIGN FILE No.	020.099.00	RFS RADIO FREQUENCY SYSTEMS © COPYRIGHT 2019	DCD81TE DUAL DIRECTIONAL COUPLER
CHECKED	K.C.		
WEIGHT	16 kg approx		34.30444
SHEET No.	SHEET 1 OF 1		
ISSUE	01	DIMENSIONS IN MILLIMETRES	

BRANCH FEEDER SPECIFICATION

PRODUCT DATASHEET
HCA78-50J

RADIO FREQUENCY SYSTEMS

7/8" HELIFLEX® Air-Dielectric Coaxial Cable

HELIFLEX® 7/8" low loss air dielectric cable

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.

7/8" HELIFLEX® Air Dielectric Coaxial Cable

Technical Features

APPLICATIONS		
Applications		UHF, VHF
STRUCTURE		
Cable Type		Air-Dielectric, Corrugated
Size		7/8"
Jacket Option		Black
Inner Conductor	mm (in)	9 (0.35) Copper Tube
Dielectric	mm (in)	20.2 (0.79) Helical Polyethylene Spacer
Outer Conductor	mm (in)	25.5 (1) Corrugated Copper
Jacket	mm (in)	28 (1.103) Polyethylene, PE
ELECTRICAL SPECIFICATIONS		
Impedance	Ω	50 +/- 0.5
Maximum Frequency	GHz	3.0
Velocity	%	93.0
Capacitance	pF/m (pF/ft)	71 (21.6)
Inductance	µH/m (µH/ft)	0.178 (0.054)
Peak Power Rating	kW	73.0
RF Peak Voltage	Volts	2700.0
Jacket Spark	Volt RMS	8000.0
Inner Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	1.1 (0.34)
Outer Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	0.88 (0.27)
Return Loss (VSWR) Performance		Standard
Min. Return Loss (Max. VSWR)	dB (VSWR)	Typical 20.8dB (1.2 VSWR) or better within the operation bands of most global frequency ranges. Premium also available. Contact factory for options in your specific frequency band.
Phase Stabilized		Phase stabilized and phase matched cables and assemblies are available upon request.
Temperature & Power		Standard
MECHANICAL SPECIFICATIONS		
Cable Weight, Nominal	kg/m (lb/ft)	0.68 (0.46)
Minimum Bending Radius, Single Bend	mm (in)	100 (4)
Minimum Bending Radius, Repeated Bends	mm (in)	250 (10)
Bending Moment	Nm (lb*ft)	27
Tensile Strength	N (lb)	1600 (360)
Recommended / Maximum Clamp Spacing	m (ft)	0.5 / 0.9 (1.8 / 3)

HCA78-50J REV: E0 REV DATE: 09.Oct.2007 www.rfsworld.com

All values nominal unless tolerances provided; information contained in the present datasheet is subject to confirmation at time of ordering

Page 1 of 2

PRODUCT DATASHEET
HCA78-50J

RADIO FREQUENCY SYSTEMS

7/8" HELIFLEX® Air-Dielectric Coaxial Cable

ATTENUATION AND POWER RATING

Frequency MHz	Attenuation dB/100m	Attenuation dB/100ft	Power kW
0.5	0.08	0.025	73.00
1	0.12	0.035	73.00
1.5	0.14	0.043	70.90
2	0.16	0.05	61.40
10	0.37	0.112	27.30
20	0.52	0.158	19.20
30	0.64	0.194	15.70
50	0.83	0.252	12.10
88	1.10	0.337	9.11
100	1.18	0.359	8.49
108	1.23	0.374	8.15
150	1.45	0.443	6.92
174	1.57	0.478	6.39
200	1.69	0.514	5.94
300	2.08	0.634	4.84
400	2.42	0.738	4.17
450	2.57	0.785	3.93
500	2.72	0.83	3.71
512	2.76	0.84	3.66
600	3.00	0.914	3.37
700	3.25	0.992	3.12
800	3.49	1.07	2.91
824	3.55	1.08	2.86
894	3.71	1.13	2.74
900	3.72	1.13	2.74
925	3.78	1.15	2.69
960	3.85	1.17	2.65
1000	3.94	1.20	2.59
1250	4.45	1.36	2.30
1500	4.91	1.50	2.10
1700	5.26	1.60	1.97
1800	5.43	1.65	1.91
2000	5.75	1.75	1.81
2200	6.07	1.85	1.72
2300	6.22	1.90	1.68
3000	7.22	2.20	1.47

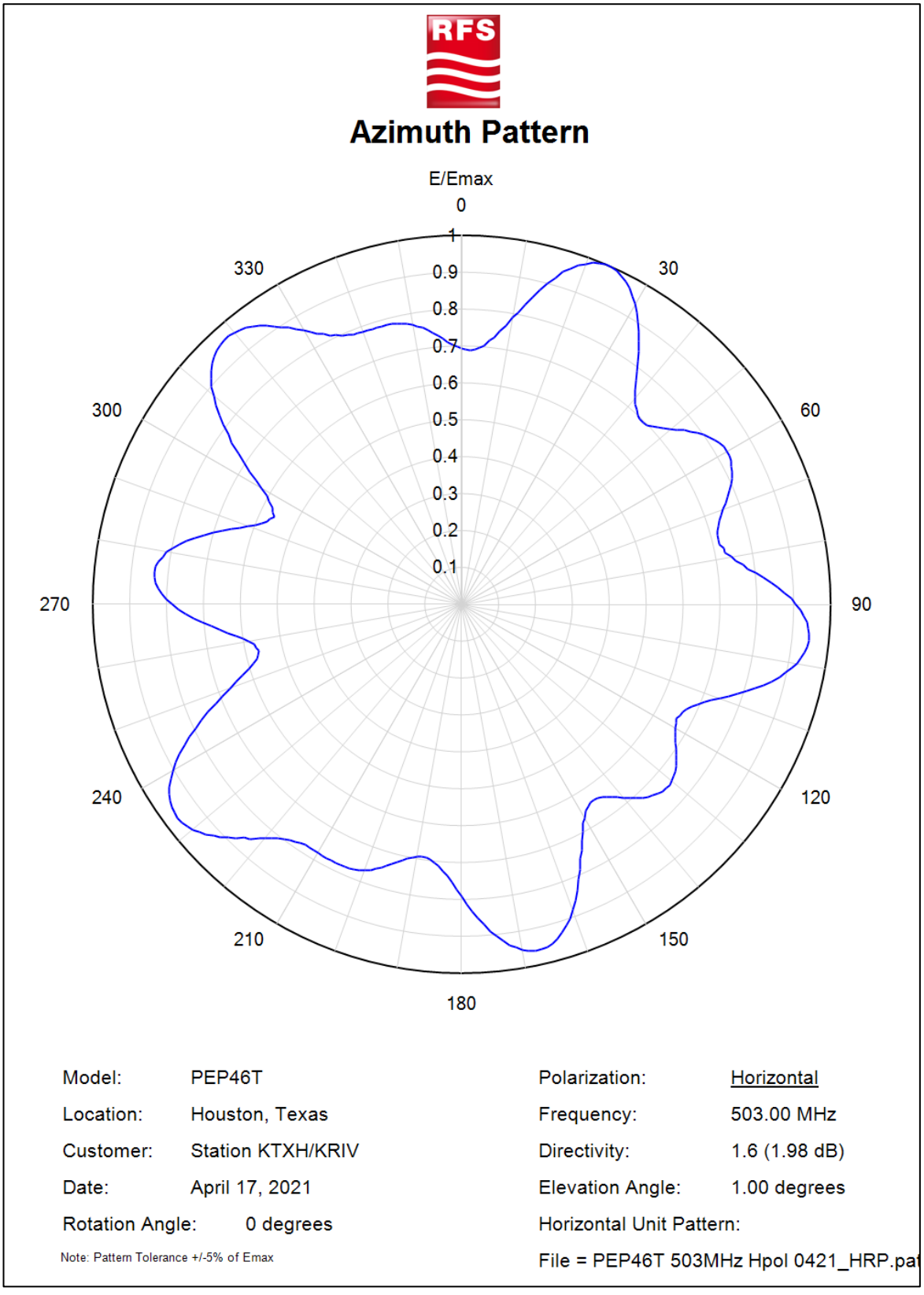
Attenuation at 20°C (68°F) cable temperature; tolerance +/- 5% max.; Mean power rating at 40°C (104°F) ambient temperature

TESTING AND ENVIRONMENTAL

Fire Performance	Halogene Free
Flame Retardant Jacket Specifications	Meets the requirements according to: IEC60754-1, IEC60754-2
Installation Temperature	-40 to 60 (-40 to 140) °C(°F)
Storage Temperature	-70 to 85 (-94 to 185) °C(°F)
Operation Temperature	-50 to 85 (-58 to 185) °C(°F)

External Document Links | **Notes**

ANTENNA RADIATION PATTERNS
KTXH - Ch 19 (503 MHz)

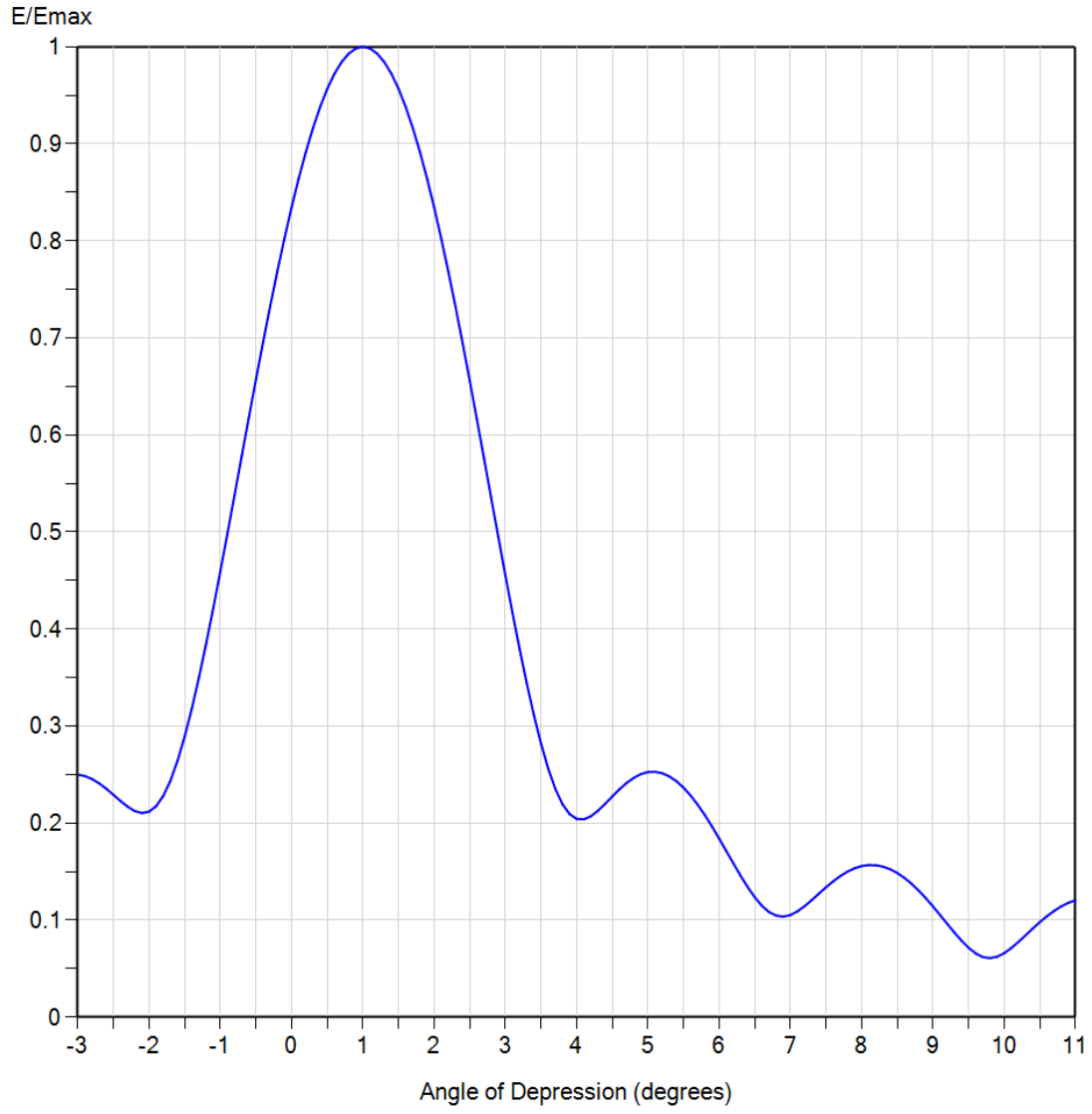

Azimuth Pattern
E/Emax
0
30
60
90
120
150
180
210
240
270
300
330
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Model: PEP46T
Location: Houston, Texas
Customer: Station KTXH/KRIV
Date: April 17, 2021
Rotation Angle: 0 degrees
Note: Pattern Tolerance +/-5% of Emax
Polarization: Horizontal
Frequency: 503.00 MHz
Directivity: 1.6 (1.98 dB)
Elevation Angle: 1.00 degrees
Horizontal Unit Pattern:
File = PEP46T 503MHz Hpol 0421_HRP.pat

Model:	**PEP46T**	Polarization:	**Horizontal**
Location:	**Houston, Texas**	Frequency (MHz):	**503.00**
Customer:	**Station KTXH/KRIV**	Directivity:	**1.6 (1.98 dB)**
Date:	**April 17, 2021**	Elevation Angle:	**1.00 degrees**
		Rotation Angle:	**0 degrees**

TABULATED AZIMUTH PATTERN

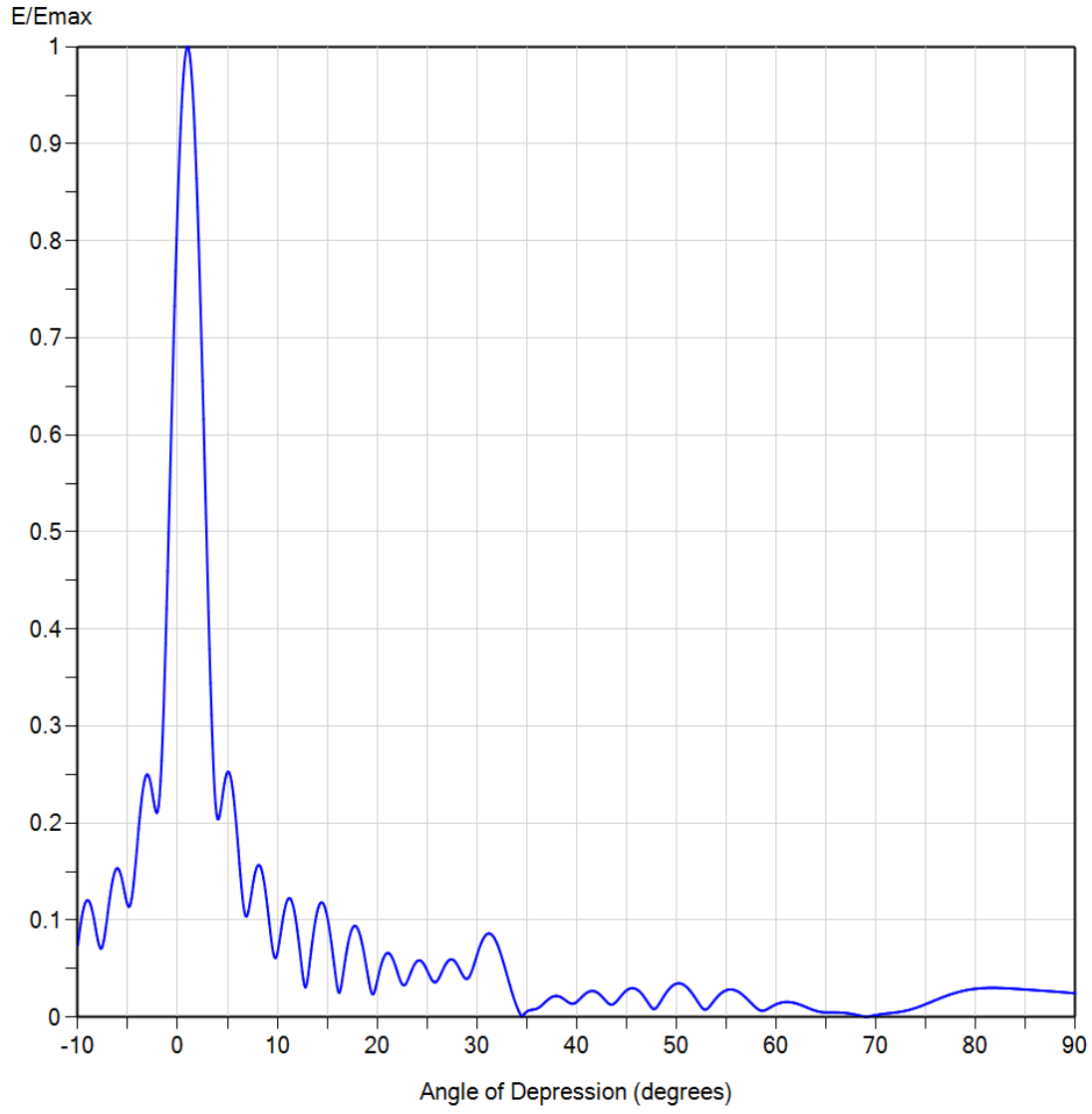
Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field
0	0.692	45	0.697	90	0.905	135	0.733	180	0.793	225	0.894	270	0.784	315	0.949
1	0.690	46	0.699	91	0.919	136	0.727	181	0.773	226	0.910	271	0.801	316	0.957
2	0.688	47	0.707	92	0.928	137	0.717	182	0.755	227	0.918	272	0.814	317	0.960
3	0.692	48	0.715	93	0.938	138	0.707	183	0.737	228	0.932	273	0.825	318	0.963
4	0.697	49	0.726	94	0.943	139	0.697	184	0.725	229	0.942	274	0.832	319	0.964
5	0.703	50	0.738	95	0.946	140	0.685	185	0.713	230	0.952	275	0.837	320	0.961
6	0.719	51	0.751	96	0.947	141	0.673	186	0.705	231	0.957	276	0.838	321	0.957
7	0.727	52	0.765	97	0.944	142	0.663	187	0.697	232	0.961	277	0.835	322	0.951
8	0.747	53	0.778	98	0.939	143	0.654	188	0.693	233	0.964	278	0.830	323	0.943
9	0.764	54	0.789	99	0.931	144	0.646	189	0.694	234	0.962	279	0.821	324	0.933
10	0.788	55	0.801	100	0.923	145	0.642	190	0.694	235	0.960	280	0.814	325	0.921
11	0.805	56	0.810	101	0.910	146	0.640	191	0.699	236	0.954	281	0.798	326	0.909
12	0.831	57	0.818	102	0.898	147	0.642	192	0.705	237	0.945	282	0.783	327	0.894
13	0.854	58	0.824	103	0.884	148	0.647	193	0.712	238	0.935	283	0.766	328	0.883
14	0.879	59	0.828	104	0.865	149	0.653	194	0.720	239	0.920	284	0.744	329	0.869
15	0.900	60	0.830	105	0.847	150	0.669	195	0.729	240	0.905	285	0.724	330	0.857
16	0.920	61	0.829	106	0.828	151	0.677	196	0.738	241	0.885	286	0.701	331	0.843
17	0.942	62	0.827	107	0.808	152	0.699	197	0.746	242	0.866	287	0.679	332	0.831
18	0.955	63	0.821	108	0.787	153	0.717	198	0.753	243	0.843	288	0.657	333	0.821
19	0.971	64	0.817	109	0.766	154	0.743	199	0.762	244	0.822	289	0.635	334	0.810
20	0.982	65	0.808	110	0.746	155	0.761	200	0.767	245	0.795	290	0.615	335	0.804
21	0.992	66	0.799	111	0.725	156	0.788	201	0.772	246	0.772	291	0.599	336	0.798
22	0.997	67	0.789	112	0.710	157	0.812	202	0.777	247	0.748	292	0.585	337	0.793
23	1.000	68	0.777	113	0.695	158	0.838	203	0.779	248	0.719	293	0.573	338	0.788
24	1.000	69	0.766	114	0.684	159	0.859	204	0.780	249	0.694	294	0.569	339	0.787
25	0.996	70	0.755	115	0.673	160	0.881	205	0.781	250	0.670	295	0.560	340	0.786
26	0.990	71	0.744	116	0.666	161	0.902	206	0.781	251	0.646	296	0.570	341	0.785
27	0.980	72	0.735	117	0.663	162	0.916	207	0.779	252	0.624	297	0.576	342	0.784
28	0.970	73	0.727	118	0.660	163	0.932	208	0.780	253	0.603	298	0.592	343	0.785
29	0.954	74	0.721	119	0.664	164	0.943	209	0.778	254	0.587	299	0.603	344	0.784
30	0.939	75	0.719	120	0.669	165	0.953	210	0.778	255	0.573	300	0.626	345	0.783
31	0.923	76	0.718	121	0.675	166	0.958	211	0.778	256	0.568	301	0.650	346	0.783
32	0.901	77	0.718	122	0.683	167	0.961	212	0.777	257	0.564	302	0.677	347	0.781
33	0.880	78	0.727	123	0.692	168	0.961	213	0.779	258	0.568	303	0.703	348	0.778
34	0.859	79	0.727	124	0.702	169	0.957	214	0.782	259	0.574	304	0.730	349	0.773
35	0.836	80	0.743	125	0.712	170	0.952	215	0.786	260	0.585	305	0.761	350	0.769
36	0.814	81	0.753	126	0.720	171	0.942	216	0.790	261	0.600	306	0.782	351	0.762
37	0.790	82	0.771	127	0.729	172	0.933	217	0.799	262	0.618	307	0.811	352	0.757
38	0.769	83	0.782	128	0.735	173	0.919	218	0.807	263	0.638	308	0.833	353	0.748
39	0.748	84	0.803	129	0.741	174	0.905	219	0.818	264	0.660	309	0.858	354	0.740
40	0.733	85	0.821	130	0.745	175	0.890	220	0.829	265	0.681	310	0.877	355	0.732
41	0.718	86	0.841	131	0.747	176	0.870	221	0.839	266	0.704	311	0.898	356	0.721
42	0.710	87	0.858	132	0.746	177	0.852	222	0.857	267	0.727	312	0.914	357	0.712
43	0.700	88	0.875	133	0.743	178	0.833	223	0.863	268	0.748	313	0.929	358	0.704
44	0.696	89	0.894	134	0.740	179	0.813	224	0.882	269	0.768	314	0.940	359	0.698

Elevation Pattern



Model:	PEP46T	Frequency:	503.00 MHz
Polarization:	Horizontal	Directivity (Main Lobe):	20.0 (13.02 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	14.0 (11.45 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	23 degrees

Elevation Pattern

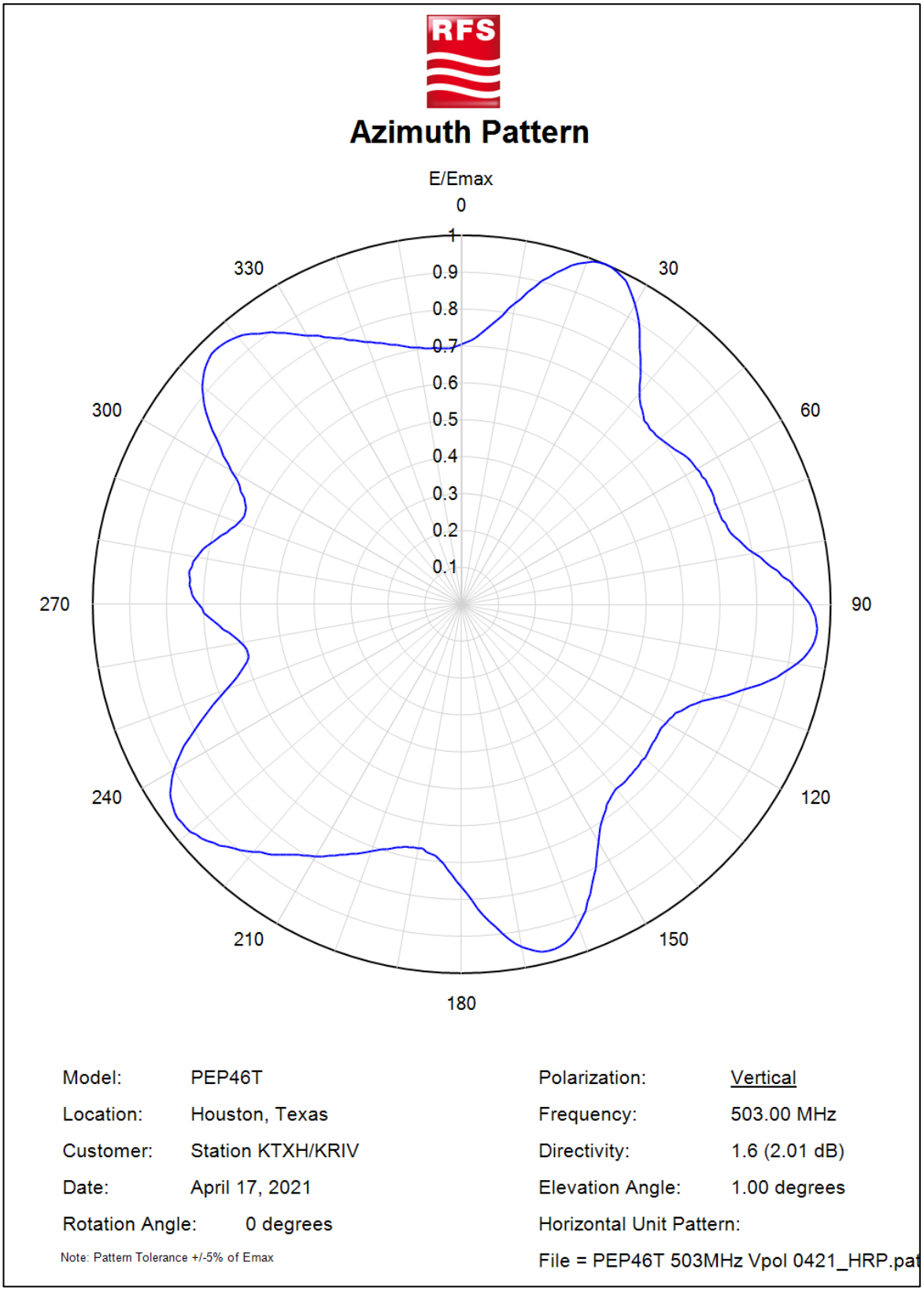


Model:	PEP46T	Frequency:	503.00 MHz
Polarization:	Horizontal	Directivity (Main Lobe):	20.0 (13.02 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	14.0 (11.45 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	23 degrees

Model:	**PEP46T**	Polarization:	**Horizontal**
Location:	**Houston, Texas**	Frequency (MHz):	**503.00**
Customer:	**Station KTXH/KRIV**	Directivity (Main Lobe):	**20.0 (13.02 dB)**
Date:	**April 17, 2021**	Directivity (At Horizon):	**14.0 (11.45 dB)**
		Beam Tilt:	**1.00 degrees**

TABULATED ELEVATION PATTERN

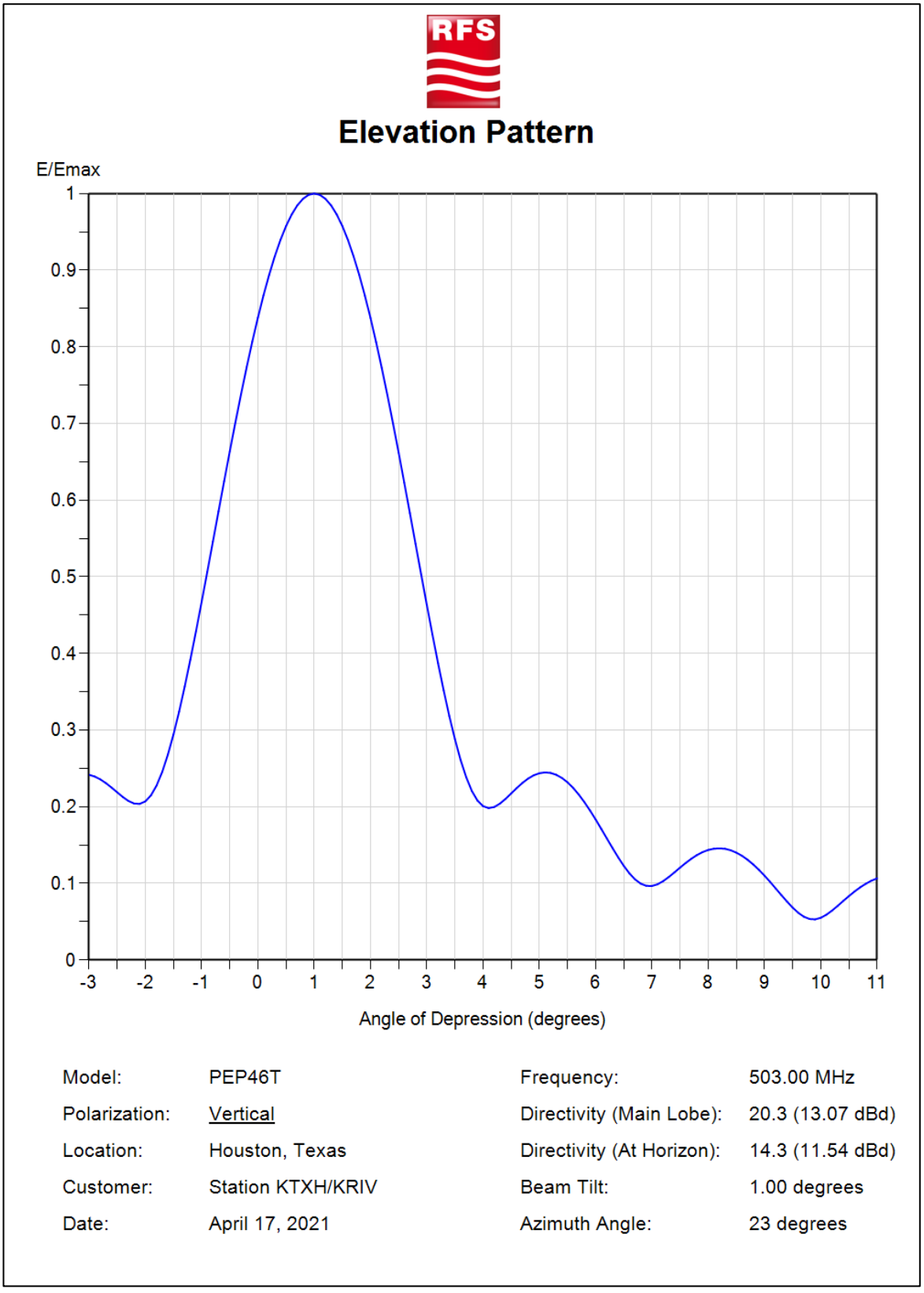
Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.074	2.4	0.695	10.6	0.104	30.5	0.078	51.0	0.031	71.5	0.004
-9.5	0.109	2.6	0.616	10.8	0.114	31.0	0.086	51.5	0.026	72.0	0.005
-9.0	0.121	2.8	0.535	11.0	0.120	31.5	0.085	52.0	0.018	72.5	0.006
-8.5	0.107	3.0	0.455	11.5	0.118	32.0	0.076	52.5	0.011	73.0	0.007
-8.0	0.079	3.2	0.379	12.0	0.089	32.5	0.062	53.0	0.008	73.5	0.008
-7.5	0.074	3.4	0.311	12.5	0.047	33.0	0.044	53.5	0.013	74.0	0.010
-7.0	0.107	3.6	0.256	13.0	0.037	33.5	0.026	54.0	0.020	74.5	0.011
-6.5	0.142	3.8	0.220	13.5	0.078	34.0	0.011	54.5	0.025	75.0	0.013
-6.0	0.153	4.0	0.204	14.0	0.109	34.5	0.000	55.0	0.028	75.5	0.016
-5.5	0.138	4.2	0.207	14.5	0.118	35.0	0.006	55.5	0.029	76.0	0.018
-5.0	0.115	4.4	0.220	15.0	0.103	35.5	0.008	56.0	0.027	76.5	0.020
-4.5	0.129	4.6	0.235	15.5	0.070	36.0	0.009	56.5	0.024	77.0	0.022
-4.0	0.183	4.8	0.247	16.0	0.031	36.5	0.012	57.0	0.020	77.5	0.023
-3.5	0.233	5.0	0.253	16.5	0.038	37.0	0.017	57.5	0.015	78.0	0.025
-3.0	0.250	5.2	0.251	17.0	0.071	37.5	0.021	58.0	0.010	78.5	0.026
-2.8	0.245	5.4	0.243	17.5	0.091	38.0	0.022	58.5	0.007	79.0	0.028
-2.6	0.235	5.6	0.228	18.0	0.092	38.5	0.020	59.0	0.008	79.5	0.029
-2.4	0.223	5.8	0.208	18.5	0.075	39.0	0.017	59.5	0.011	80.0	0.029
-2.2	0.212	6.0	0.184	19.0	0.047	39.5	0.014	60.0	0.013	80.5	0.030
-2.0	0.212	6.2	0.158	19.5	0.024	40.0	0.016	60.5	0.015	81.0	0.030
-1.8	0.228	6.4	0.134	20.0	0.037	40.5	0.021	61.0	0.016	81.5	0.030
-1.6	0.264	6.6	0.115	20.5	0.057	41.0	0.025	61.5	0.015	82.0	0.030
-1.4	0.318	6.8	0.105	21.0	0.066	41.5	0.027	62.0	0.014	82.5	0.030
-1.2	0.385	7.0	0.105	21.5	0.062	42.0	0.026	62.5	0.012	83.0	0.030
-1.0	0.459	7.2	0.114	22.0	0.048	42.5	0.022	63.0	0.010	83.5	0.030
-0.8	0.538	7.4	0.127	22.5	0.034	43.0	0.016	63.5	0.008	84.0	0.029
-0.6	0.618	7.6	0.140	23.0	0.036	43.5	0.013	64.0	0.006	84.5	0.029
-0.4	0.696	7.8	0.150	23.5	0.049	44.0	0.016	64.5	0.005	85.0	0.028
-0.2	0.769	8.0	0.156	24.0	0.058	44.5	0.022	65.0	0.005	85.5	0.028
0.0	0.835	8.2	0.157	24.5	0.057	45.0	0.028	65.5	0.005	86.0	0.028
0.2	0.892	8.4	0.152	25.0	0.049	45.5	0.030	66.0	0.005	86.5	0.027
0.4	0.938	8.6	0.144	25.5	0.038	46.0	0.029	66.5	0.005	87.0	0.027
0.6	0.972	8.8	0.130	26.0	0.037	46.5	0.024	67.0	0.004	87.5	0.027
0.8	0.993	9.0	0.114	26.5	0.047	47.0	0.017	67.5	0.003	88.0	0.026
1.0	1.000	9.2	0.096	27.0	0.056	47.5	0.010	68.0	0.002	88.5	0.026
1.2	0.993	9.4	0.079	27.5	0.060	48.0	0.010	68.5	0.001	89.0	0.025
1.4	0.972	9.6	0.066	28.0	0.055	48.5	0.017	69.0	0.000	89.5	0.025
1.6	0.938	9.8	0.061	28.5	0.045	49.0	0.025	69.5	0.001	90.0	0.024
1.8	0.892	10.0	0.066	29.0	0.039	49.5	0.031	70.0	0.002		
2.0	0.835	10.2	0.078	29.5	0.048	50.0	0.035	70.5	0.003		
2.2	0.768	10.4	0.091	30.0	0.064	50.5	0.034	71.0	0.004		

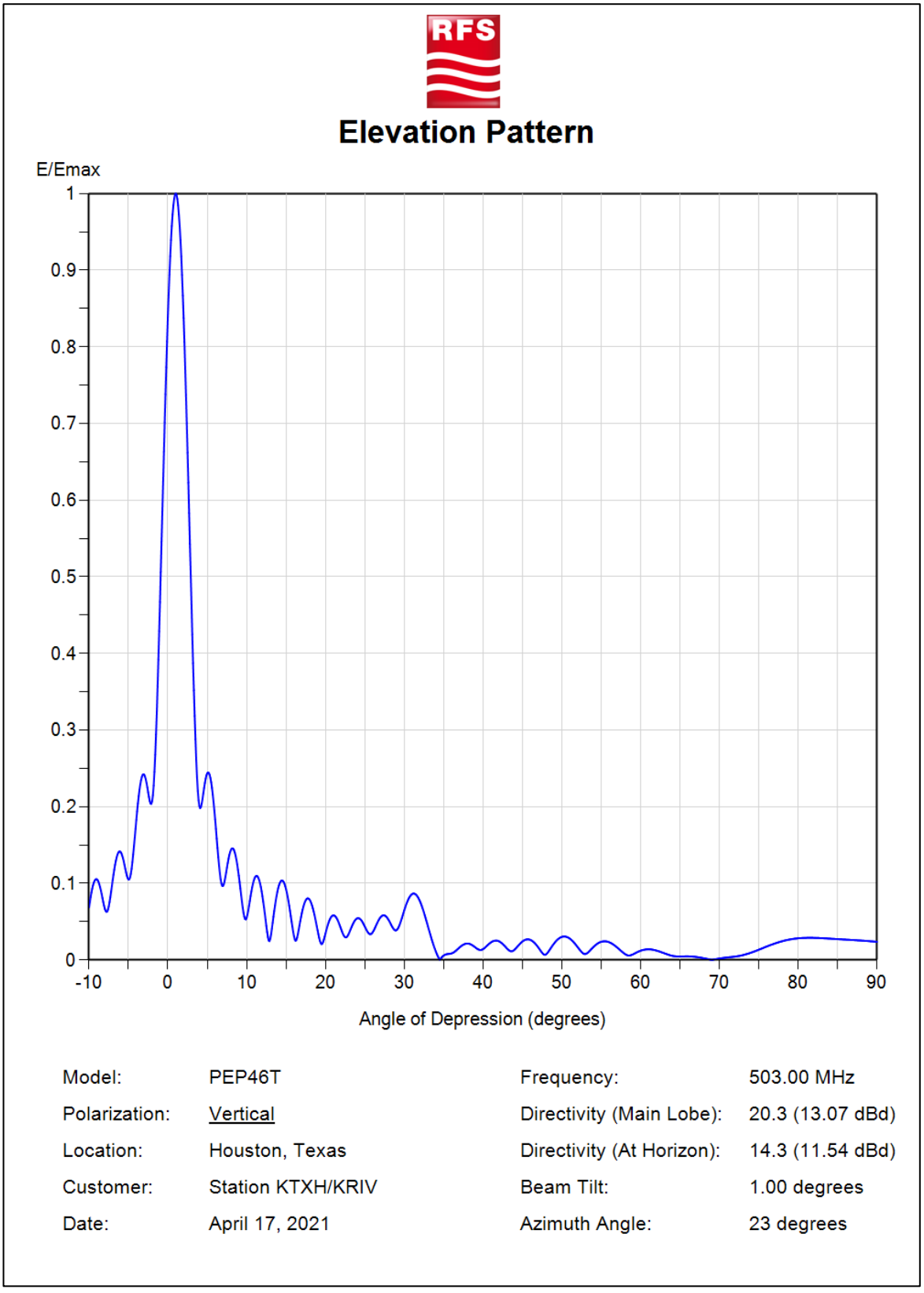

Azimuth Pattern
E/Emax
0
30
60
90
120
150
180
210
240
270
300
330
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Model: PEP46T
Location: Houston, Texas
Customer: Station KTXH/KRIV
Date: April 17, 2021
Rotation Angle: 0 degrees
Note: Pattern Tolerance +/-5% of Emax
Polarization: Vertical
Frequency: 503.00 MHz
Directivity: 1.6 (2.01 dB)
Elevation Angle: 1.00 degrees
Horizontal Unit Pattern:
File = PEP46T 503MHz Vpol 0421_HRP.pat

Model:	**PEP46T**	Polarization:	**Vertical**
Location:	**Houston, Texas**	Frequency (MHz):	**503.00**
Customer:	**Station KTXH/KRIV**	Directivity:	**1.6 (2.01 dB)**
Date:	**April 17, 2021**	Elevation Angle:	**1.00 degrees**
		Rotation Angle:	**0 degrees**

TABULATED AZIMUTH PATTERN

Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field
0	0.704	45	0.701	90	0.945	135	0.652	180	0.768	225	0.927	270	0.712	315	0.958
1	0.711	46	0.701	91	0.952	136	0.651	181	0.751	226	0.933	271	0.722	316	0.959
2	0.717	47	0.697	92	0.958	137	0.653	182	0.734	227	0.940	272	0.731	317	0.958
3	0.724	48	0.699	93	0.963	138	0.654	183	0.719	228	0.950	273	0.735	318	0.955
4	0.734	49	0.698	94	0.966	139	0.653	184	0.705	229	0.953	274	0.740	319	0.951
5	0.747	50	0.701	95	0.964	140	0.652	185	0.695	230	0.959	275	0.739	320	0.946
6	0.761	51	0.704	96	0.962	141	0.655	186	0.686	231	0.962	276	0.741	321	0.939
7	0.775	52	0.708	97	0.956	142	0.660	187	0.682	232	0.963	277	0.744	322	0.929
8	0.791	53	0.711	98	0.948	143	0.664	188	0.678	233	0.964	278	0.737	323	0.918
9	0.812	54	0.715	99	0.939	144	0.671	189	0.671	234	0.962	279	0.738	324	0.910
10	0.826	55	0.720	100	0.924	145	0.680	190	0.673	235	0.956	280	0.730	325	0.900
11	0.843	56	0.725	101	0.910	146	0.689	191	0.671	236	0.949	281	0.725	326	0.888
12	0.866	57	0.728	102	0.893	147	0.698	192	0.675	237	0.942	282	0.717	327	0.876
13	0.881	58	0.732	103	0.876	148	0.711	193	0.675	238	0.930	283	0.708	328	0.863
14	0.902	59	0.733	104	0.859	149	0.727	194	0.680	239	0.915	284	0.695	329	0.852
15	0.917	60	0.736	105	0.839	150	0.744	195	0.684	240	0.901	285	0.686	330	0.841
16	0.935	61	0.740	106	0.817	151	0.760	196	0.689	241	0.883	286	0.678	331	0.833
17	0.951	62	0.739	107	0.796	152	0.779	197	0.694	242	0.865	287	0.666	332	0.824
18	0.967	63	0.743	108	0.778	153	0.803	198	0.700	243	0.845	288	0.658	333	0.810
19	0.977	64	0.742	109	0.759	154	0.818	199	0.707	244	0.819	289	0.650	334	0.805
20	0.987	65	0.744	110	0.740	155	0.836	200	0.713	245	0.795	290	0.644	335	0.794
21	0.994	66	0.744	111	0.722	156	0.860	201	0.720	246	0.770	291	0.639	336	0.788
22	0.999	67	0.743	112	0.703	157	0.875	202	0.727	247	0.749	292	0.636	337	0.777
23	1.000	68	0.739	113	0.690	158	0.896	203	0.734	248	0.726	293	0.638	338	0.771
24	1.000	69	0.739	114	0.677	159	0.910	204	0.740	249	0.702	294	0.641	339	0.763
25	0.996	70	0.741	115	0.668	160	0.926	205	0.748	250	0.679	295	0.647	340	0.756
26	0.990	71	0.741	116	0.661	161	0.940	206	0.755	251	0.657	296	0.655	341	0.751
27	0.982	72	0.743	117	0.650	162	0.952	207	0.765	252	0.642	297	0.673	342	0.745
28	0.969	73	0.747	118	0.647	163	0.960	208	0.771	253	0.627	298	0.682	343	0.739
29	0.955	74	0.750	119	0.642	164	0.965	209	0.782	254	0.613	299	0.697	344	0.733
30	0.939	75	0.754	120	0.642	165	0.969	210	0.790	255	0.603	300	0.720	345	0.729
31	0.923	76	0.761	121	0.637	166	0.970	211	0.797	256	0.596	301	0.736	346	0.724
32	0.906	77	0.770	122	0.638	167	0.966	212	0.802	257	0.594	302	0.761	347	0.718
33	0.887	78	0.780	123	0.638	168	0.961	213	0.811	258	0.595	303	0.778	348	0.713
34	0.865	79	0.790	124	0.639	169	0.953	214	0.820	259	0.601	304	0.802	349	0.710
35	0.843	80	0.802	125	0.640	170	0.944	215	0.830	260	0.607	305	0.825	350	0.706
36	0.825	81	0.820	126	0.640	171	0.932	216	0.839	261	0.615	306	0.849	351	0.704
37	0.806	82	0.830	127	0.643	172	0.916	217	0.850	262	0.624	307	0.867	352	0.701
38	0.786	83	0.843	128	0.645	173	0.899	218	0.858	263	0.636	308	0.885	353	0.699
39	0.768	84	0.862	129	0.646	174	0.881	219	0.866	264	0.649	309	0.901	354	0.698
40	0.750	85	0.874	130	0.648	175	0.864	220	0.876	265	0.660	310	0.918	355	0.696
41	0.737	86	0.892	131	0.647	176	0.846	221	0.887	266	0.673	311	0.930	356	0.694
42	0.724	87	0.904	132	0.648	177	0.826	222	0.897	267	0.685	312	0.940	357	0.694
43	0.717	88	0.919	133	0.650	178	0.805	223	0.906	268	0.698	313	0.947	358	0.697
44	0.711	89	0.932	134	0.649	179	0.785	224	0.915	269	0.704	314	0.954	359	0.700


Elevation Pattern
E/Emax
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
Angle of Depression (degrees)
Model: PEP46T
Polarization: Vertical
Location: Houston, Texas
Customer: Station KTXH/KRIV
Date: April 17, 2021
Frequency: 503.00 MHz
Directivity (Main Lobe): 20.3 (13.07 dBd)
Directivity (At Horizon): 14.3 (11.54 dBd)
Beam Tilt: 1.00 degrees
Azimuth Angle: 23 degrees

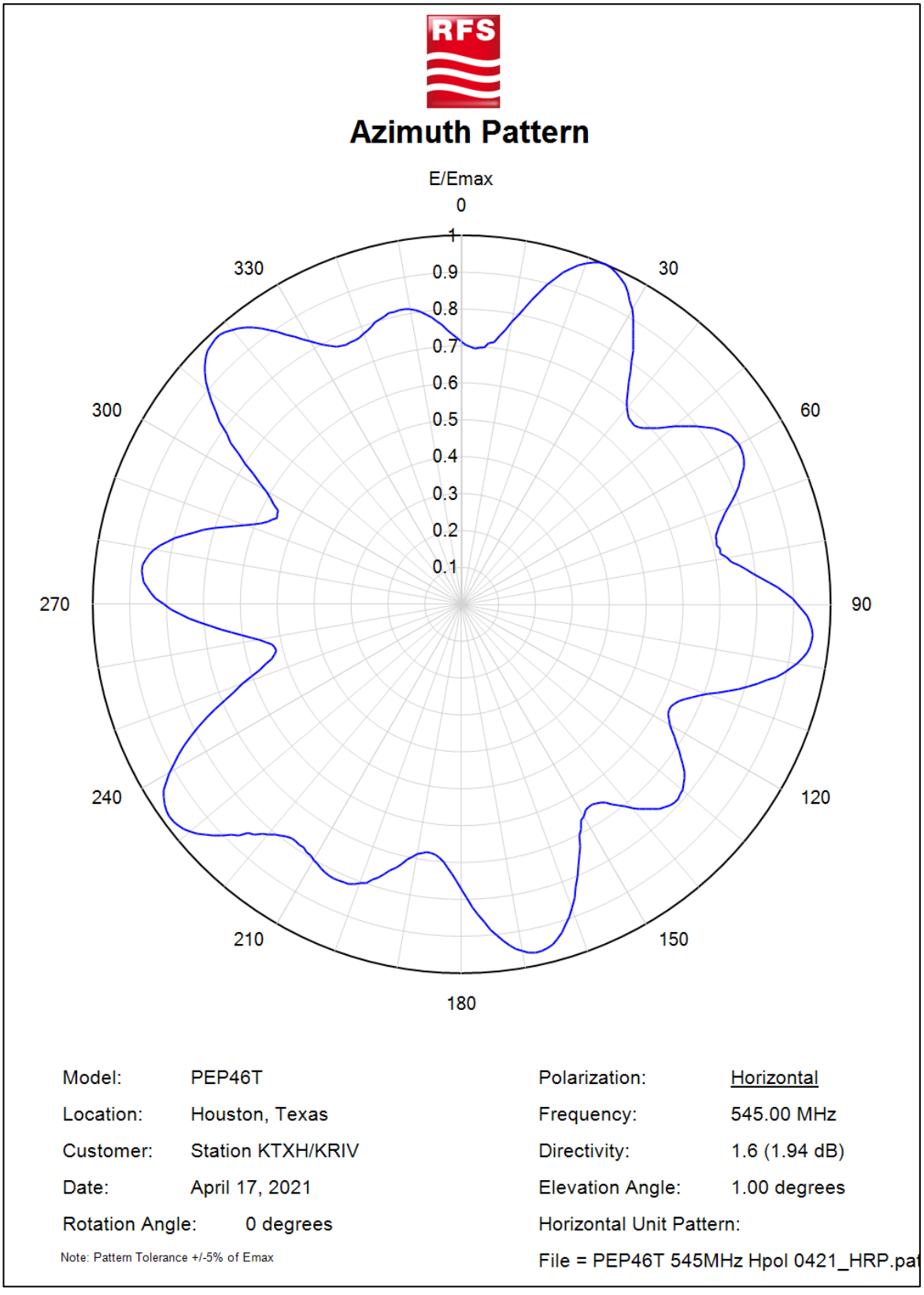

Elevation Pattern
E/Emax
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-10
0
10
20
30
40
50
60
70
80
90
Angle of Depression (degrees)
Model: PEP46T
Polarization: Vertical
Location: Houston, Texas
Customer: Station KTXH/KRIV
Date: April 17, 2021
Frequency: 503.00 MHz
Directivity (Main Lobe): 20.3 (13.07 dBd)
Directivity (At Horizon): 14.3 (11.54 dBd)
Beam Tilt: 1.00 degrees
Azimuth Angle: 23 degrees

Model:	**PEP46T**	Polarization:	**Vertical**
Location:	**Houston, Texas**	Frequency (MHz):	**503.00**
Customer:	**Station KTXH/KRIV**	Directivity (Main Lobe):	**20.3 (13.07 dB)**
Date:	**April 17, 2021**	Directivity (At Horizon):	**14.3 (11.54 dB)**
		Beam Tilt:	**1.00 degrees**

TABULATED ELEVATION PATTERN

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.069	2.4	0.700	10.6	0.089	30.5	0.079	51.0	0.028	71.5	0.004
-9.5	0.097	2.6	0.623	10.8	0.099	31.0	0.086	51.5	0.023	72.0	0.004
-9.0	0.105	2.8	0.543	11.0	0.106	31.5	0.085	52.0	0.017	72.5	0.005
-8.5	0.091	3.0	0.464	11.5	0.107	32.0	0.076	52.5	0.010	73.0	0.006
-8.0	0.067	3.2	0.387	12.0	0.083	32.5	0.062	53.0	0.008	73.5	0.008
-7.5	0.070	3.4	0.318	12.5	0.044	33.0	0.044	53.5	0.012	74.0	0.009
-7.0	0.104	3.6	0.261	13.0	0.028	33.5	0.026	54.0	0.017	74.5	0.011
-6.5	0.134	3.8	0.221	13.5	0.064	34.0	0.011	54.5	0.021	75.0	0.013
-6.0	0.141	4.0	0.201	14.0	0.094	34.5	0.000	55.0	0.024	75.5	0.015
-5.5	0.124	4.2	0.200	14.5	0.104	35.0	0.006	55.5	0.024	76.0	0.018
-5.0	0.105	4.4	0.210	15.0	0.092	35.5	0.008	56.0	0.023	76.5	0.020
-4.5	0.128	4.6	0.224	15.5	0.064	36.0	0.009	56.5	0.020	77.0	0.021
-4.0	0.183	4.8	0.237	16.0	0.031	36.5	0.012	57.0	0.016	77.5	0.023
-3.5	0.229	5.0	0.244	16.5	0.034	37.0	0.016	57.5	0.012	78.0	0.025
-3.0	0.242	5.2	0.244	17.0	0.061	37.5	0.020	58.0	0.008	78.5	0.026
-2.8	0.236	5.4	0.238	17.5	0.078	38.0	0.021	58.5	0.006	79.0	0.027
-2.6	0.225	5.6	0.225	18.0	0.078	38.5	0.020	59.0	0.007	79.5	0.028
-2.4	0.213	5.8	0.206	18.5	0.063	39.0	0.017	59.5	0.010	80.0	0.028
-2.2	0.204	6.0	0.183	19.0	0.039	39.5	0.013	60.0	0.012	80.5	0.029
-2.0	0.207	6.2	0.158	19.5	0.021	40.0	0.014	60.5	0.013	81.0	0.029
-1.8	0.228	6.4	0.134	20.0	0.034	40.5	0.019	61.0	0.014	81.5	0.029
-1.6	0.268	6.6	0.113	20.5	0.052	41.0	0.023	61.5	0.013	82.0	0.029
-1.4	0.324	6.8	0.100	21.0	0.058	41.5	0.025	62.0	0.012	82.5	0.029
-1.2	0.392	7.0	0.097	21.5	0.053	42.0	0.024	62.5	0.011	83.0	0.028
-1.0	0.467	7.2	0.103	22.0	0.040	42.5	0.021	63.0	0.009	83.5	0.028
-0.8	0.546	7.4	0.114	22.5	0.030	43.0	0.015	63.5	0.007	84.0	0.028
-0.6	0.625	7.6	0.127	23.0	0.035	43.5	0.011	64.0	0.005	84.5	0.028
-0.4	0.701	7.8	0.137	23.5	0.047	44.0	0.013	64.5	0.005	85.0	0.027
-0.2	0.773	8.0	0.144	24.0	0.054	44.5	0.019	65.0	0.005	85.5	0.027
0.0	0.838	8.2	0.146	24.5	0.052	45.0	0.024	65.5	0.005	86.0	0.027
0.2	0.894	8.4	0.143	25.0	0.043	45.5	0.027	66.0	0.005	86.5	0.026
0.4	0.939	8.6	0.136	25.5	0.035	46.0	0.026	66.5	0.005	87.0	0.026
0.6	0.973	8.8	0.125	26.0	0.036	46.5	0.023	67.0	0.004	87.5	0.026
0.8	0.993	9.0	0.110	26.5	0.047	47.0	0.016	67.5	0.003	88.0	0.025
1.0	1.000	9.2	0.093	27.0	0.056	47.5	0.009	68.0	0.002	88.5	0.025
1.2	0.993	9.4	0.076	27.5	0.058	48.0	0.007	68.5	0.001	89.0	0.025
1.4	0.973	9.6	0.062	28.0	0.052	48.5	0.014	69.0	0.000	89.5	0.024
1.6	0.939	9.8	0.053	28.5	0.043	49.0	0.021	69.5	0.001	90.0	0.024
1.8	0.894	10.0	0.055	29.0	0.039	49.5	0.027	70.0	0.002		
2.0	0.838	10.2	0.064	29.5	0.048	50.0	0.030	70.5	0.003		
2.2	0.773	10.4	0.077	30.0	0.065	50.5	0.030	71.0	0.003		

ANTENNA RADIATION PATTERNS
KRIV - Ch 26 (545 MHz)

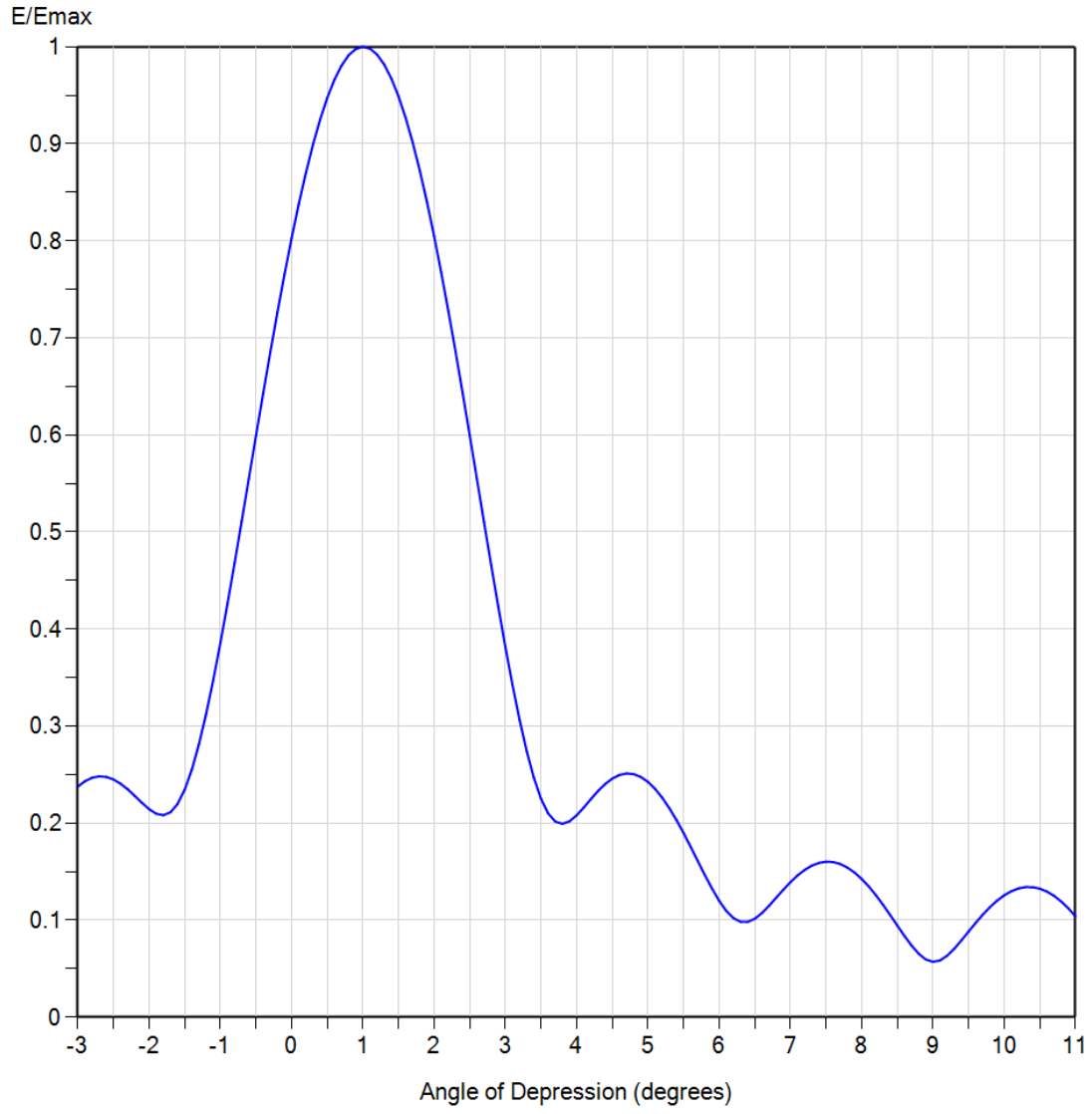

Azimuth Pattern
E/Emax
0
30
60
90
120
150
180
210
240
270
300
330
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Model: PEP46T
Location: Houston, Texas
Customer: Station KTXH/KRIV
Date: April 17, 2021
Rotation Angle: 0 degrees
Note: Pattern Tolerance +/-5% of Emax
Polarization: Horizontal
Frequency: 545.00 MHz
Directivity: 1.6 (1.94 dB)
Elevation Angle: 1.00 degrees
Horizontal Unit Pattern:
File = PEP46T 545MHz Hpol 0421_HRP.pat

Model:	**PEP46T**	Polarization:	**Horizontal**
Location:	**Houston, Texas**	Frequency (MHz):	**545.00**
Customer:	**Station KTXH/KRIV**	Directivity:	**1.6 (1.94 dB)**
Date:	**April 17, 2021**	Elevation Angle:	**1.00 degrees**
		Rotation Angle:	**0 degrees**

TABULATED AZIMUTH PATTERN

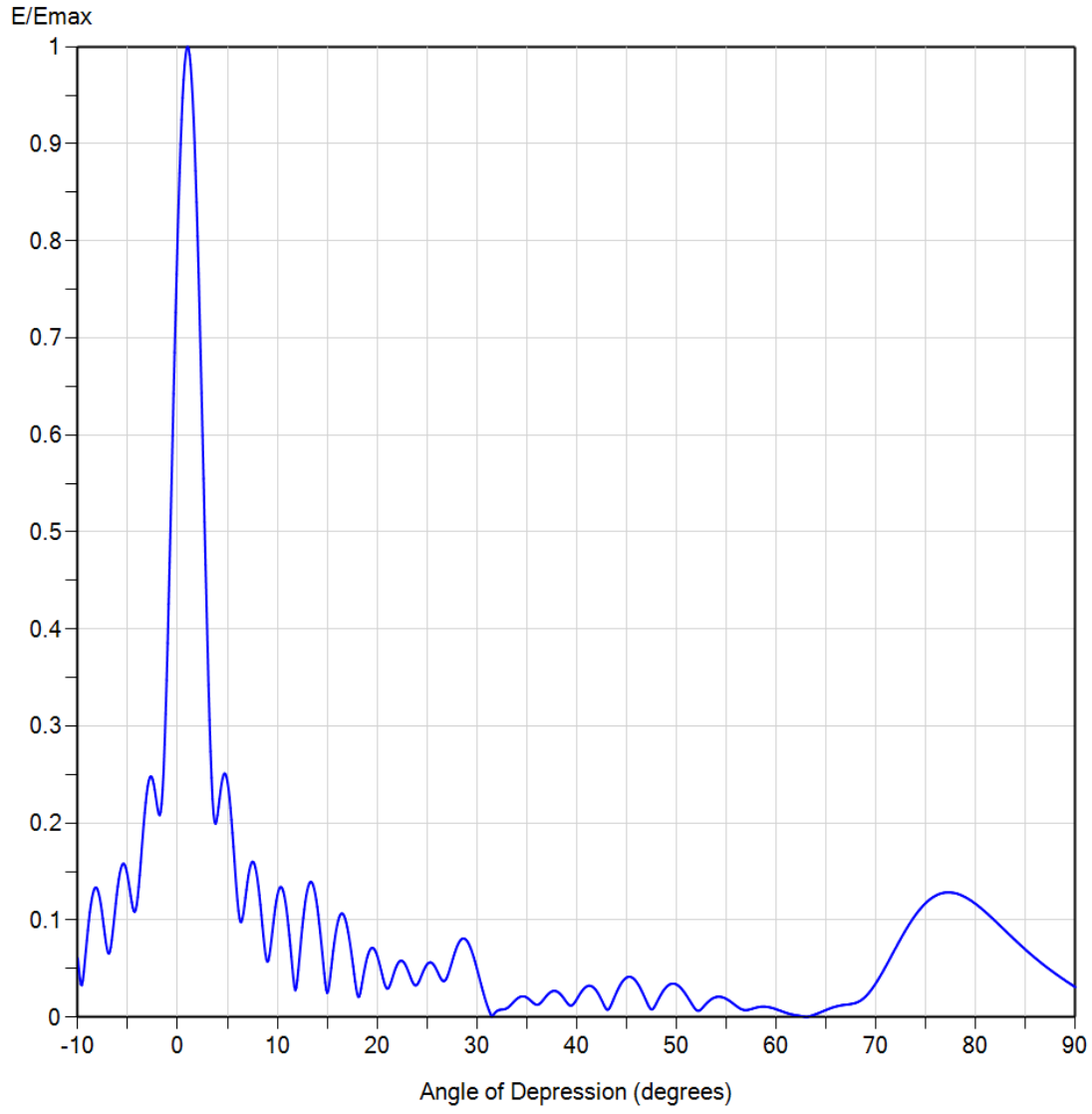
Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field
0	0.711	45	0.679	90	0.909	135	0.779	180	0.775	225	0.884	270	0.807	315	0.974
1	0.703	46	0.687	91	0.926	136	0.771	181	0.752	226	0.904	271	0.829	316	0.978
2	0.698	47	0.699	92	0.936	137	0.759	182	0.732	227	0.918	272	0.843	317	0.981
3	0.694	48	0.714	93	0.946	138	0.749	183	0.714	228	0.932	273	0.854	318	0.981
4	0.696	49	0.731	94	0.952	139	0.735	184	0.701	229	0.947	274	0.864	319	0.977
5	0.698	50	0.748	95	0.955	140	0.722	185	0.689	230	0.958	275	0.868	320	0.971
6	0.710	51	0.765	96	0.954	141	0.705	186	0.682	231	0.968	276	0.872	321	0.963
7	0.716	52	0.783	97	0.950	142	0.693	187	0.680	232	0.974	277	0.871	322	0.952
8	0.736	53	0.800	98	0.945	143	0.679	188	0.678	233	0.978	278	0.866	323	0.938
9	0.751	54	0.816	99	0.937	144	0.666	189	0.681	234	0.979	279	0.859	324	0.924
10	0.777	55	0.834	100	0.923	145	0.657	190	0.687	235	0.977	280	0.849	325	0.907
11	0.796	56	0.844	101	0.909	146	0.652	191	0.697	236	0.972	281	0.833	326	0.890
12	0.820	57	0.853	102	0.894	147	0.647	192	0.708	237	0.962	282	0.817	327	0.872
13	0.847	58	0.861	103	0.875	148	0.649	193	0.722	238	0.951	283	0.798	328	0.855
14	0.871	59	0.864	104	0.853	149	0.651	194	0.735	239	0.934	284	0.776	329	0.838
15	0.896	60	0.868	105	0.832	150	0.664	195	0.748	240	0.916	285	0.752	330	0.823
16	0.917	61	0.867	106	0.809	151	0.668	196	0.762	241	0.893	286	0.728	331	0.809
17	0.940	62	0.864	107	0.784	152	0.689	197	0.774	242	0.870	287	0.703	332	0.796
18	0.954	63	0.859	108	0.760	153	0.705	198	0.786	243	0.845	288	0.677	333	0.785
19	0.972	64	0.851	109	0.734	154	0.731	199	0.799	244	0.816	289	0.651	334	0.775
20	0.983	65	0.839	110	0.712	155	0.752	200	0.806	245	0.786	290	0.628	335	0.772
21	0.992	66	0.828	111	0.690	156	0.776	201	0.812	246	0.757	291	0.604	336	0.769
22	0.998	67	0.814	112	0.672	157	0.802	202	0.817	247	0.726	292	0.587	337	0.771
23	1.000	68	0.801	113	0.656	158	0.828	203	0.819	248	0.691	293	0.570	338	0.771
24	0.998	69	0.784	114	0.645	159	0.853	204	0.820	249	0.662	294	0.563	339	0.774
25	0.992	70	0.771	115	0.637	160	0.875	205	0.821	250	0.631	295	0.551	340	0.779
26	0.984	71	0.756	116	0.632	161	0.898	206	0.818	251	0.602	296	0.556	341	0.785
27	0.974	72	0.741	117	0.631	162	0.913	207	0.816	252	0.576	297	0.560	342	0.792
28	0.958	73	0.730	118	0.633	163	0.931	208	0.811	253	0.553	298	0.577	343	0.800
29	0.941	74	0.722	119	0.641	164	0.944	209	0.804	254	0.536	299	0.590	344	0.805
30	0.923	75	0.713	120	0.652	165	0.954	210	0.800	255	0.524	300	0.611	345	0.808
31	0.903	76	0.711	121	0.666	166	0.962	211	0.794	256	0.518	301	0.638	346	0.813
32	0.877	77	0.709	122	0.680	167	0.965	212	0.792	257	0.520	302	0.667	347	0.814
33	0.854	78	0.716	123	0.694	168	0.965	213	0.786	258	0.526	303	0.699	348	0.816
34	0.830	79	0.715	124	0.710	169	0.961	214	0.786	259	0.540	304	0.728	349	0.815
35	0.804	80	0.731	125	0.725	170	0.955	215	0.785	260	0.557	305	0.763	350	0.812
36	0.780	81	0.740	126	0.739	171	0.947	216	0.784	261	0.577	306	0.788	351	0.808
37	0.754	82	0.761	127	0.756	172	0.934	217	0.789	262	0.603	307	0.821	352	0.801
38	0.733	83	0.776	128	0.766	173	0.919	218	0.796	263	0.628	308	0.847	353	0.790
39	0.713	84	0.794	129	0.773	174	0.903	219	0.803	264	0.655	309	0.875	354	0.782
40	0.697	85	0.816	130	0.782	175	0.886	220	0.814	265	0.684	310	0.897	355	0.770
41	0.685	86	0.837	131	0.785	176	0.863	221	0.824	266	0.713	311	0.920	356	0.759
42	0.677	87	0.859	132	0.788	177	0.842	222	0.841	267	0.739	312	0.938	357	0.745
43	0.675	88	0.877	133	0.787	178	0.820	223	0.849	268	0.763	313	0.952	358	0.734
44	0.675	89	0.897	134	0.785	179	0.797	224	0.870	269	0.787	314	0.965	359	0.722

Elevation Pattern



Model:	PEP46T	Frequency:	545.00 MHz
Polarization:	Horizontal	Directivity (Main Lobe):	21.4 (13.31 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	13.8 (11.40 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	23 degrees

Elevation Pattern



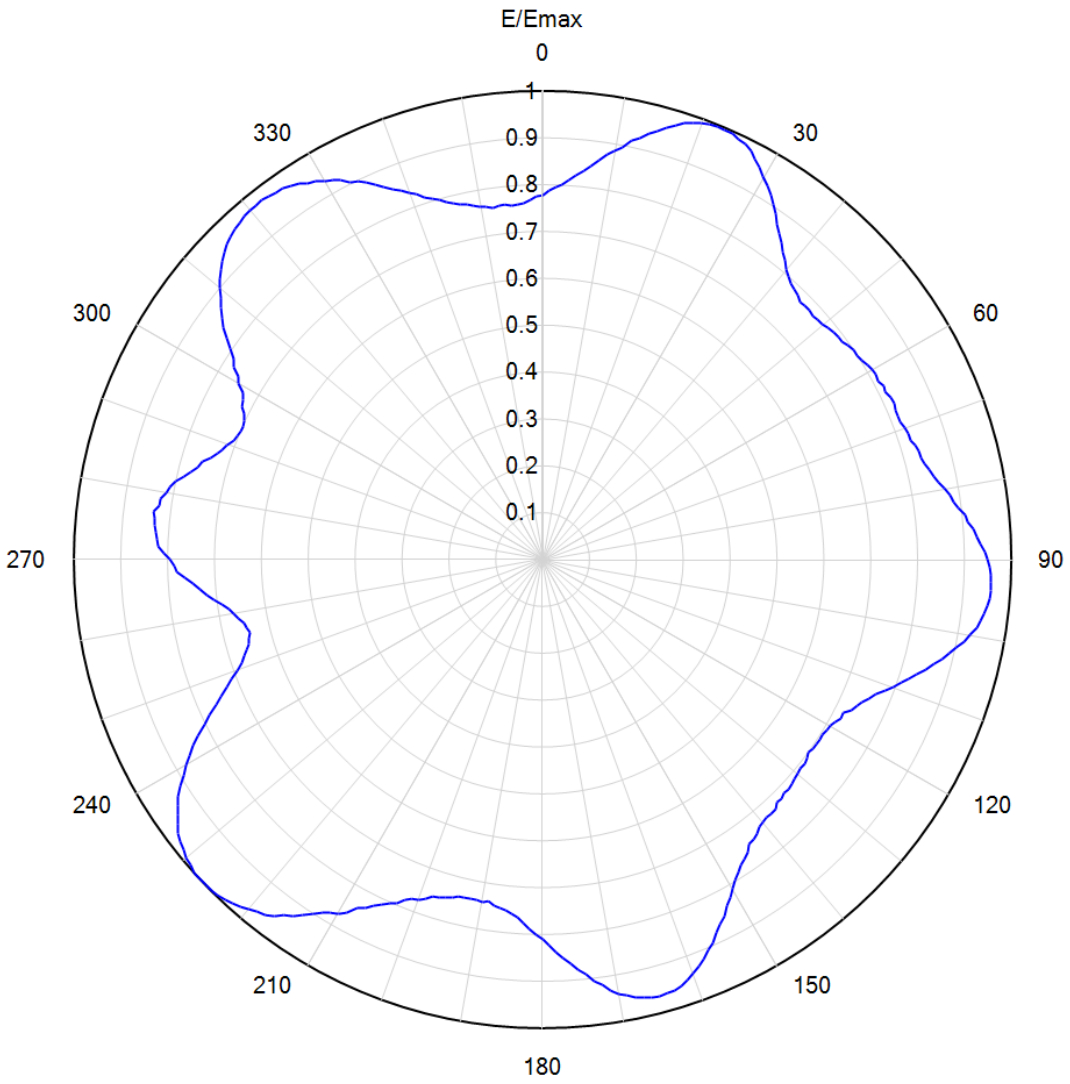
Model:	PEP46T	Frequency:	545.00 MHz
Polarization:	Horizontal	Directivity (Main Lobe):	21.4 (13.31 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	13.8 (11.40 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	23 degrees

Model:	**PEP46T**	Polarization:	**Horizontal**
Location:	**Houston, Texas**	Frequency (MHz):	**545.00**
Customer:	**Station KTXH/KRIV**	Directivity (Main Lobe):	**21.4 (13.31 dB)**
Date:	**April 17, 2021**	Directivity (At Horizon):	**13.8 (11.40 dB)**
		Beam Tilt:	**1.00 degrees**

TABULATED ELEVATION PATTERN

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.061	2.4	0.643	10.6	0.129	30.5	0.031	51.0	0.023	71.5	0.062
-9.5	0.038	2.6	0.555	10.8	0.119	31.0	0.013	51.5	0.014	72.0	0.072
-9.0	0.089	2.8	0.466	11.0	0.104	31.5	0.001	52.0	0.007	72.5	0.081
-8.5	0.127	3.0	0.382	11.5	0.051	32.0	0.006	52.5	0.008	73.0	0.090
-8.0	0.131	3.2	0.306	12.0	0.038	32.5	0.008	53.0	0.014	73.5	0.098
-7.5	0.102	3.4	0.247	12.5	0.093	33.0	0.009	53.5	0.018	74.0	0.106
-7.0	0.067	3.6	0.210	13.0	0.131	33.5	0.014	54.0	0.021	74.5	0.112
-6.5	0.088	3.8	0.199	13.5	0.138	34.0	0.019	54.5	0.021	75.0	0.118
-6.0	0.135	4.0	0.208	14.0	0.114	34.5	0.021	55.0	0.019	75.5	0.122
-5.5	0.158	4.2	0.225	14.5	0.066	35.0	0.020	55.5	0.016	76.0	0.125
-5.0	0.145	4.4	0.240	15.0	0.025	35.5	0.016	56.0	0.012	76.5	0.127
-4.5	0.113	4.6	0.250	15.5	0.060	36.0	0.013	56.5	0.008	77.0	0.128
-4.0	0.124	4.8	0.250	16.0	0.095	36.5	0.016	57.0	0.007	77.5	0.128
-3.5	0.186	5.0	0.243	16.5	0.107	37.0	0.022	57.5	0.008	78.0	0.128
-3.0	0.238	5.2	0.226	17.0	0.093	37.5	0.026	58.0	0.010	78.5	0.126
-2.8	0.247	5.4	0.203	17.5	0.060	38.0	0.027	58.5	0.011	79.0	0.123
-2.6	0.248	5.6	0.176	18.0	0.024	38.5	0.022	59.0	0.011	79.5	0.120
-2.4	0.241	5.8	0.146	18.5	0.035	39.0	0.015	59.5	0.010	80.0	0.117
-2.2	0.228	6.0	0.120	19.0	0.061	39.5	0.012	60.0	0.008	80.5	0.113
-2.0	0.214	6.2	0.102	19.5	0.071	40.0	0.018	60.5	0.006	81.0	0.108
-1.8	0.208	6.4	0.098	20.0	0.064	40.5	0.026	61.0	0.004	81.5	0.104
-1.6	0.220	6.6	0.107	20.5	0.044	41.0	0.032	61.5	0.003	82.0	0.099
-1.4	0.255	6.8	0.123	21.0	0.029	41.5	0.032	62.0	0.002	82.5	0.094
-1.2	0.312	7.0	0.139	21.5	0.039	42.0	0.027	62.5	0.001	83.0	0.089
-1.0	0.385	7.2	0.152	22.0	0.054	42.5	0.018	63.0	0.000	83.5	0.084
-0.8	0.468	7.4	0.159	22.5	0.058	43.0	0.008	63.5	0.001	84.0	0.079
-0.6	0.555	7.6	0.160	23.0	0.050	43.5	0.014	64.0	0.003	84.5	0.074
-0.4	0.642	7.8	0.154	23.5	0.037	44.0	0.026	64.5	0.005	85.0	0.070
-0.2	0.726	8.0	0.142	24.0	0.033	44.5	0.035	65.0	0.007	85.5	0.065
0.0	0.803	8.2	0.126	24.5	0.044	45.0	0.041	65.5	0.009	86.0	0.061
0.2	0.870	8.4	0.105	25.0	0.054	45.5	0.041	66.0	0.011	86.5	0.057
0.4	0.925	8.6	0.084	25.5	0.056	46.0	0.036	66.5	0.012	87.0	0.052
0.6	0.966	8.8	0.065	26.0	0.048	46.5	0.027	67.0	0.013	87.5	0.049
0.8	0.991	9.0	0.057	26.5	0.038	47.0	0.016	67.5	0.014	88.0	0.045
1.0	1.000	9.2	0.063	27.0	0.041	47.5	0.008	68.0	0.015	88.5	0.041
1.2	0.992	9.4	0.079	27.5	0.057	48.0	0.014	68.5	0.017	89.0	0.038
1.4	0.967	9.6	0.097	28.0	0.072	48.5	0.024	69.0	0.022	89.5	0.034
1.6	0.927	9.8	0.113	28.5	0.081	49.0	0.031	69.5	0.028	90.0	0.031
1.8	0.872	10.0	0.126	29.0	0.079	49.5	0.034	70.0	0.035		
2.0	0.805	10.2	0.133	29.5	0.068	50.0	0.034	70.5	0.043		
2.2	0.728	10.4	0.134	30.0	0.050	50.5	0.029	71.0	0.053		

Azimuth Pattern



Model:	PEP46T	Polarization:	Vertical
Location:	Houston, Texas	Frequency:	545.00 MHz
Customer:	Station KTXH/KRIV	Directivity:	1.4 (1.51 dB)
Date:	April 17, 2021	Elevation Angle:	1.00 degrees
Rotation Angle:	0 degrees	Horizontal Unit Pattern:	

Note: Pattern Tolerance +/-5% of Emax

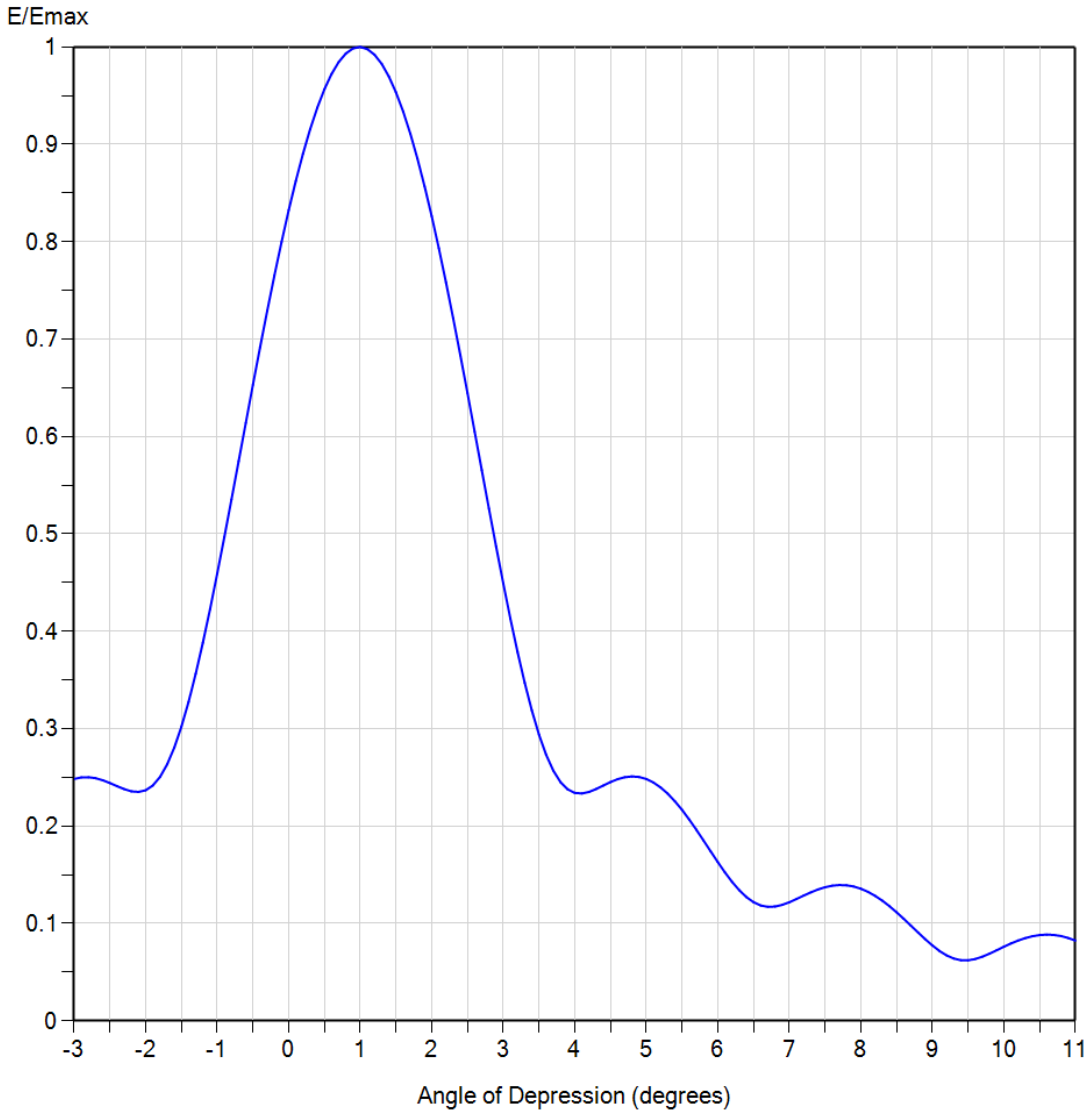
File = PEP46T 545MHz Vpol 0421_HRP.pat

Model:	**PEP46T**	Polarization:	**Vertical**
Location:	**Houston, Texas**	Frequency (MHz):	**545.00**
Customer:	**Station KTXH/KRIV**	Directivity:	**1.4 (1.51 dB)**
Date:	**April 17, 2021**	Elevation Angle:	**1.00 degrees**
		Rotation Angle:	**0 degrees**

TABULATED AZIMUTH PATTERN

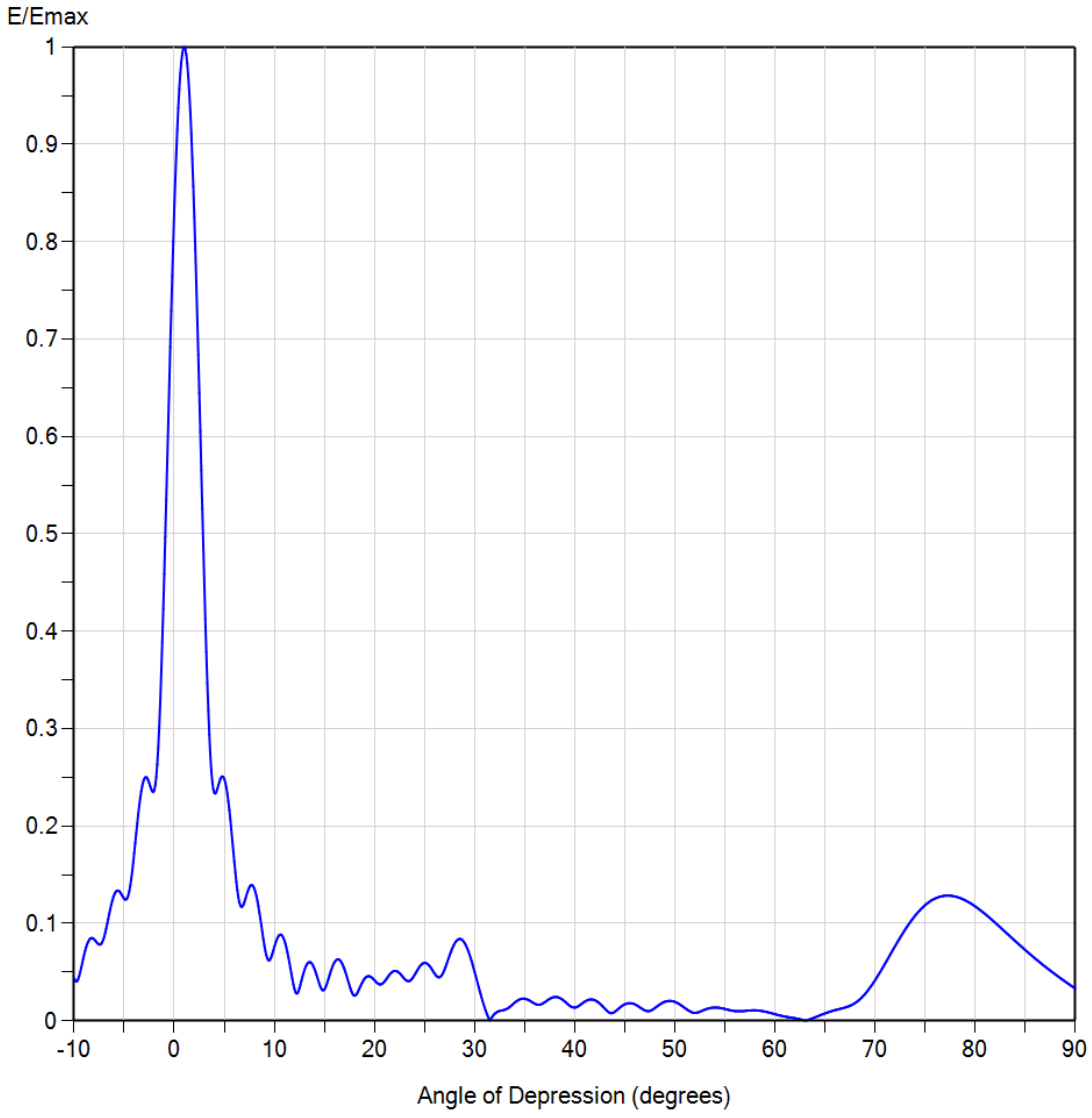
Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field	Angl	Field
0	0.778	45	0.776	90	0.950	135	0.722	180	0.810	225	1.000	270	0.795	315	0.952
1	0.788	46	0.779	91	0.954	136	0.721	181	0.800	226	1.000	271	0.809	316	0.958
2	0.796	47	0.778	92	0.957	137	0.728	182	0.789	227	1.000	272	0.820	317	0.964
3	0.801	48	0.777	93	0.958	138	0.730	183	0.778	228	1.000	273	0.823	318	0.966
4	0.811	49	0.778	94	0.959	139	0.728	184	0.766	229	0.995	274	0.828	319	0.970
5	0.822	50	0.779	95	0.957	140	0.730	185	0.760	230	0.992	275	0.831	320	0.971
6	0.835	51	0.785	96	0.955	141	0.734	186	0.753	231	0.986	276	0.833	321	0.973
7	0.846	52	0.788	97	0.949	142	0.742	187	0.750	232	0.979	277	0.835	322	0.972
8	0.859	53	0.790	98	0.944	143	0.747	188	0.746	233	0.973	278	0.825	323	0.970
9	0.875	54	0.789	99	0.937	144	0.751	189	0.739	234	0.962	279	0.826	324	0.968
10	0.885	55	0.795	100	0.925	145	0.762	190	0.742	235	0.951	280	0.816	325	0.966
11	0.896	56	0.801	101	0.915	146	0.771	191	0.741	236	0.939	281	0.809	326	0.962
12	0.913	57	0.801	102	0.902	147	0.776	192	0.739	237	0.926	282	0.800	327	0.956
13	0.922	58	0.804	103	0.891	148	0.787	193	0.740	238	0.911	283	0.786	328	0.947
14	0.937	59	0.808	104	0.878	149	0.798	194	0.741	239	0.894	284	0.773	329	0.941
15	0.947	60	0.811	105	0.864	150	0.811	195	0.747	240	0.879	285	0.763	330	0.932
16	0.958	61	0.814	106	0.850	151	0.824	196	0.750	241	0.861	286	0.754	331	0.926
17	0.970	62	0.811	107	0.835	152	0.838	197	0.754	242	0.844	287	0.740	332	0.917
18	0.979	63	0.816	108	0.821	153	0.855	198	0.756	243	0.827	288	0.729	333	0.902
19	0.985	64	0.814	109	0.809	154	0.866	199	0.764	244	0.802	289	0.722	334	0.898
20	0.990	65	0.820	110	0.796	155	0.878	200	0.772	245	0.783	290	0.716	335	0.887
21	0.994	66	0.821	111	0.782	156	0.896	201	0.777	246	0.761	291	0.707	336	0.875
22	0.997	67	0.817	112	0.767	157	0.905	202	0.785	247	0.745	292	0.701	337	0.864
23	0.995	68	0.816	113	0.757	158	0.920	203	0.796	248	0.727	293	0.700	338	0.852
24	0.995	69	0.818	114	0.747	159	0.929	204	0.804	249	0.710	294	0.700	339	0.844
25	0.990	70	0.823	115	0.740	160	0.939	205	0.814	250	0.694	295	0.703	340	0.833
26	0.985	71	0.824	116	0.732	161	0.949	206	0.822	251	0.679	296	0.708	341	0.825
27	0.979	72	0.825	117	0.720	162	0.956	207	0.834	252	0.668	297	0.719	342	0.813
28	0.966	73	0.832	118	0.720	163	0.961	208	0.843	253	0.661	298	0.724	343	0.805
29	0.957	74	0.836	119	0.715	164	0.963	209	0.861	254	0.653	299	0.731	344	0.798
30	0.942	75	0.836	120	0.710	165	0.964	210	0.872	255	0.648	300	0.749	345	0.789
31	0.931	76	0.841	121	0.707	166	0.964	211	0.879	256	0.644	301	0.757	346	0.782
32	0.918	77	0.847	122	0.704	167	0.960	212	0.889	257	0.648	302	0.776	347	0.778
33	0.903	78	0.854	123	0.706	168	0.956	213	0.901	258	0.652	303	0.787	348	0.773
34	0.889	79	0.861	124	0.705	169	0.948	214	0.917	259	0.660	304	0.803	349	0.768
35	0.873	80	0.870	125	0.704	170	0.941	215	0.929	260	0.669	305	0.822	350	0.763
36	0.859	81	0.881	126	0.701	171	0.932	216	0.938	261	0.678	306	0.841	351	0.763
37	0.847	82	0.886	127	0.705	172	0.917	217	0.952	262	0.691	307	0.855	352	0.758
38	0.833	83	0.893	128	0.709	173	0.906	218	0.962	263	0.706	308	0.871	353	0.761
39	0.821	84	0.906	129	0.707	174	0.891	219	0.966	264	0.719	309	0.884	354	0.761
40	0.807	85	0.911	130	0.710	175	0.879	220	0.974	265	0.734	310	0.900	355	0.758
41	0.800	86	0.922	131	0.713	176	0.865	221	0.981	266	0.748	311	0.912	356	0.759
42	0.792	87	0.928	132	0.715	177	0.851	222	0.988	267	0.764	312	0.924	357	0.762
43	0.788	88	0.935	133	0.718	178	0.838	223	0.993	268	0.780	313	0.933	358	0.768
44	0.784	89	0.944	134	0.716	179	0.823	224	0.997	269	0.786	314	0.943	359	0.774

Elevation Pattern



Model:	PEP46T	Frequency:	545.00 MHz
Polarization:	Vertical	Directivity (Main Lobe):	20.5 (13.12 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	14.2 (11.52 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	225 degrees

Elevation Pattern



Model:	PEP46T	Frequency:	545.00 MHz
Polarization:	Vertical	Directivity (Main Lobe):	20.5 (13.12 dBd)
Location:	Houston, Texas	Directivity (At Horizon):	14.2 (11.52 dBd)
Customer:	Station KTXH/KRIV	Beam Tilt:	1.00 degrees
Date:	April 17, 2021	Azimuth Angle:	225 degrees

Model:	**PEP46T**	Polarization:	**Vertical**
Location:	**Houston, Texas**	Frequency (MHz):	**545.00**
Customer:	**Station KTXH/KRIV**	Directivity (Main Lobe):	**20.5 (13.12 dB)**
Date:	**April 17, 2021**	Directivity (At Horizon):	**14.2 (11.52 dB)**
		Beam Tilt:	**1.00 degrees**

TABULATED ELEVATION PATTERN

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.044	2.4	0.684	10.6	0.089	30.5	0.031	51.0	0.013	71.5	0.068
-9.5	0.046	2.6	0.605	10.8	0.087	31.0	0.014	51.5	0.010	72.0	0.077
-9.0	0.068	2.8	0.526	11.0	0.082	31.5	0.001	52.0	0.008	72.5	0.085
-8.5	0.083	3.0	0.449	11.5	0.060	32.0	0.007	52.5	0.009	73.0	0.094
-8.0	0.084	3.2	0.379	12.0	0.033	32.5	0.010	53.0	0.011	73.5	0.101
-7.5	0.078	3.4	0.319	12.5	0.033	33.0	0.011	53.5	0.013	74.0	0.108
-7.0	0.086	3.6	0.273	13.0	0.052	33.5	0.014	54.0	0.014	74.5	0.114
-6.5	0.110	3.8	0.245	13.5	0.060	34.0	0.019	54.5	0.013	75.0	0.119
-6.0	0.129	4.0	0.234	14.0	0.053	34.5	0.022	55.0	0.012	75.5	0.123
-5.5	0.133	4.2	0.235	14.5	0.038	35.0	0.023	55.5	0.011	76.0	0.126
-5.0	0.125	4.4	0.242	15.0	0.032	35.5	0.021	56.0	0.010	76.5	0.128
-4.5	0.133	4.6	0.248	15.5	0.046	36.0	0.018	56.5	0.010	77.0	0.128
-4.0	0.172	4.8	0.251	16.0	0.060	36.5	0.017	57.0	0.010	77.5	0.128
-3.5	0.221	5.0	0.248	16.5	0.063	37.0	0.019	57.5	0.011	78.0	0.128
-3.0	0.248	5.2	0.240	17.0	0.053	37.5	0.023	58.0	0.011	78.5	0.126
-2.8	0.250	5.4	0.225	17.5	0.036	38.0	0.024	58.5	0.010	79.0	0.124
-2.6	0.247	5.6	0.207	18.0	0.026	38.5	0.023	59.0	0.009	79.5	0.121
-2.4	0.241	5.8	0.185	18.5	0.033	39.0	0.020	59.5	0.008	80.0	0.117
-2.2	0.236	6.0	0.163	19.0	0.043	39.5	0.015	60.0	0.007	80.5	0.114
-2.0	0.237	6.2	0.143	19.5	0.046	40.0	0.014	60.5	0.005	81.0	0.110
-1.8	0.250	6.4	0.127	20.0	0.042	40.5	0.016	61.0	0.004	81.5	0.105
-1.6	0.281	6.6	0.118	20.5	0.037	41.0	0.020	61.5	0.003	82.0	0.101
-1.4	0.328	6.8	0.117	21.0	0.040	41.5	0.022	62.0	0.003	82.5	0.096
-1.2	0.388	7.0	0.122	21.5	0.047	42.0	0.021	62.5	0.002	83.0	0.091
-1.0	0.459	7.2	0.129	22.0	0.051	42.5	0.018	63.0	0.000	83.5	0.087
-0.8	0.535	7.4	0.135	22.5	0.049	43.0	0.013	63.5	0.002	84.0	0.082
-0.6	0.614	7.6	0.139	23.0	0.043	43.5	0.008	64.0	0.004	84.5	0.077
-0.4	0.692	7.8	0.139	23.5	0.041	44.0	0.009	64.5	0.006	85.0	0.073
-0.2	0.765	8.0	0.136	24.0	0.047	44.5	0.014	65.0	0.008	85.5	0.068
0.0	0.832	8.2	0.128	24.5	0.056	45.0	0.017	65.5	0.009	86.0	0.064
0.2	0.890	8.4	0.118	25.0	0.059	45.5	0.018	66.0	0.011	86.5	0.060
0.4	0.938	8.6	0.105	25.5	0.056	46.0	0.017	66.5	0.012	87.0	0.056
0.6	0.972	8.8	0.091	26.0	0.049	46.5	0.014	67.0	0.014	87.5	0.052
0.8	0.993	9.0	0.077	26.5	0.045	47.0	0.011	67.5	0.015	88.0	0.048
1.0	1.000	9.2	0.067	27.0	0.053	47.5	0.010	68.0	0.018	88.5	0.044
1.2	0.992	9.4	0.062	27.5	0.067	48.0	0.013	68.5	0.022	89.0	0.040
1.4	0.970	9.6	0.063	28.0	0.079	48.5	0.017	69.0	0.028	89.5	0.037
1.6	0.934	9.8	0.069	28.5	0.084	49.0	0.020	69.5	0.034	90.0	0.033
1.8	0.885	10.0	0.076	29.0	0.080	49.5	0.020	70.0	0.042		
2.0	0.826	10.2	0.082	29.5	0.068	50.0	0.019	70.5	0.050		
2.2	0.758	10.4	0.087	30.0	0.050	50.5	0.017	71.0	0.059		

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