ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

December 28, 2012

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-063-120423 – 185 Fiske Road, Hampton, Connecticut**
EM-VER-075-120423 – 333 Grassy Hill Road, Lyme, Connecticut
EM-VER-086-120330 – 557 Route 82, Montville, Connecticut
EM-VER-097-120522 – 201 South Main Street, Newtown, Connecticut
EM-VER-107-111219 – Ogg Meadow Road, Orange, Connecticut
EM-VER-141-120423 – 720 Quinebaug Road, Thompson, Connecticut
EM-VER-121-120229 – 399 West Road, Salem, Connecticut

Completion of Construction Activity

Dear Ms. Roberts:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facilities has been completed.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

12012142-v1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

January 6, 2012

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-107-111219** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Ogg Meadow Road, Orange, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated December 15, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable James M. Zeoli, First Selectman, Town of Orange
Paul Dinice, Zoning Enforcement Officer, Town of Orange
Crown Castle USA, Inc.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

December 20, 2011

The Honorable James M. Zeoli
First Selectman
Town of Orange
Town Hall
617 Orange Center Road
Orange, CT 06477-2423

RE: **EM-VER-107-111219** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Ogg Meadow Road, Orange, Connecticut.

Dear First Selectman Zeoli:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by January 4, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Paul Dinice, Zoning Enforcement Officer, Town of Orange

CONNECTICUT SITING COUNCIL

ROBINSON & COLE

EM-VER-107-111219

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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kbaldwin@rc.com
Direct (860) 275-8345

December 15, 2011

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
Ogg Meadow Road, Orange, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the top of the existing 160-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's use of the tower in 1997 (Docket No. 177a). Cellco now intends to modify its installation by replacing all of its existing antennas with two (2) model LPA-80063/4CF cellular antennas; two (2) model LPA-80063/6CF cellular antennas; two (2) model SC-E 6014 rev 2 cellular antennas; two (2) model BXA-171063/12BF PCS antennas; one (1) model BXA-171063/8BF PCS antenna; two (2) model BXA-70063/4CF LTE antennas; and one (1) model BXA-70063/6CF LTE antenna, all at the same level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for the proposed replacement antennas and cable diplexers.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James Zeoli, First Selectman of the Town of Orange. A copy of this letter is also being sent to South Central CT Regional Water Authority, the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco's antennas and diplexers will be located at the same level on the existing tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed modification. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
James Zeoli, Orange First Selectman
South Central CT Regional Water Authority
Sandy M. Carter

Vertically Polarized, Log Periodic 63° / 13 dBd

LPA-80063/4CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1205 mm	47.4 in
Width	386 mm	15.2 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
[4] Weight	9.1 kg	20.0 lbs
Wind Area		
Fore/Aft	0.47 m^2	5.0 ft^2
Side	0.40 m^2	4.4 ft^2
Rated Wind Velocity (Safety factor 2.0)	>265 km/hr	>165 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	665 N	149.5 lbs
Side	577 N	129.6 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

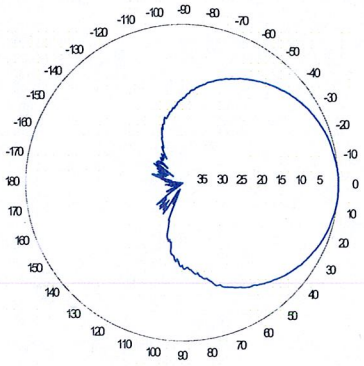
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket and Downtilt Bracket Kit #21699999

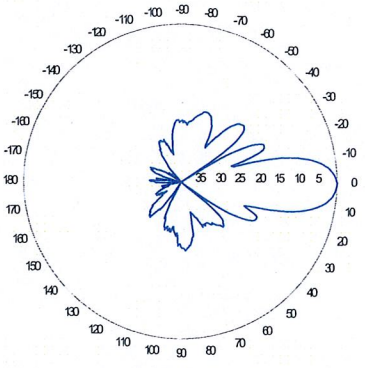
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
[3] Connector(s)	NE or E-DIN 1 port / center
[1] VSWR	≤ 1.4:1
Polarization	Vertical
[1] Gain	13 dBd
[2] Power Rating	500 W
[1] Half Power Angle	
H-Plane	63°
E-Plane	15°
[1] Electrical Downtilt	0°
[1] Null Fill	10%
Lightning Protection	Direct Ground

Radiation pattern[1]



Horizontal

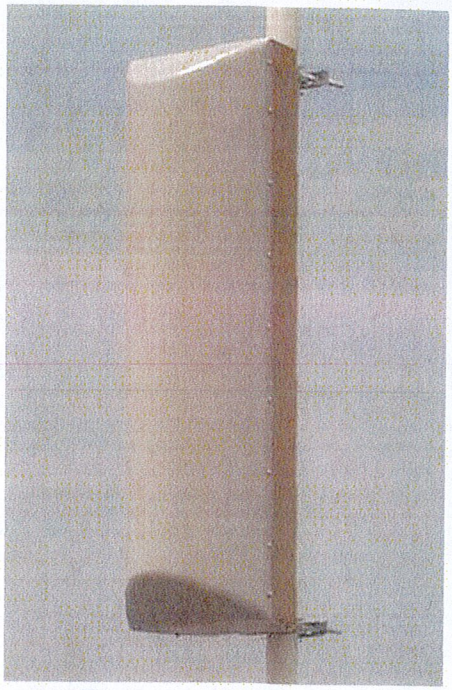


Vertical

Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

CF Denotes a Center-Fed Connector.

806-960 MHz

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 6/17/08

Amphenol ANTENNA SOLUTIONS

LPA-80063-6CF-EDIN-X

V-Pol | Log Periodic | 63° | 14.5 dBd

Replace 'X' with desired electrical downtilt.

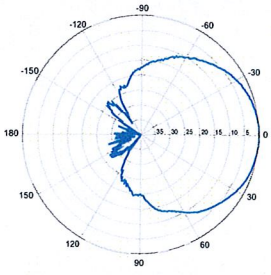
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	63°
Vertical beamwidth	10°
Gain	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Null fill	5% (-26.02 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)

Mechanical Characteristics		
Dimensions Length x Width x Depth	1805 x 385 x 332 mm	71.1 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm	14.6 in
Weight without mounting brackets	12.3 kg	27 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.70 m² Side: 0.59 m²	Front: 7.5 ft² Side: 6.3 ft²
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N	Front: 199 lbf Side: 170 lbf

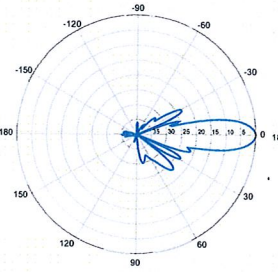
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000	50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80063-6CF-EDIN-X



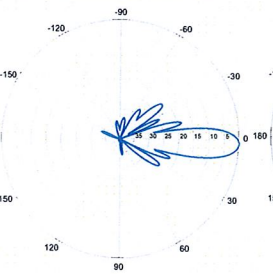
Horizontal

LPA-80063-6CF-EDIN-0



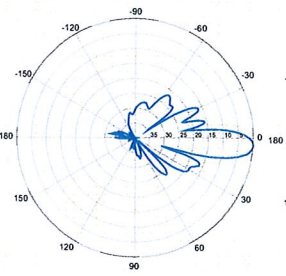
0° | Vertical

LPA-80063-6CF-EDIN-2



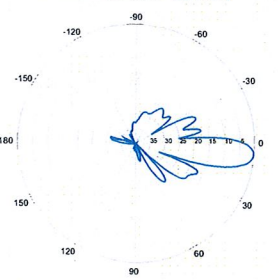
2° | Vertical

LPA-80063-6CF-EDIN-4



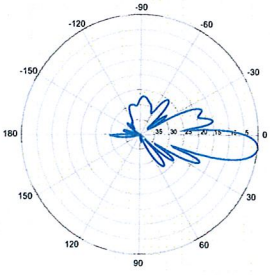
4° | Vertical

LPA-80063-6CF-EDIN-5



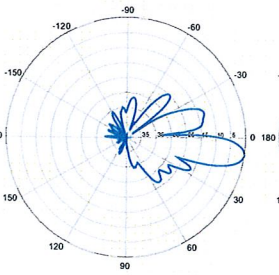
5° | Vertical

LPA-80063-6CF-EDIN-6



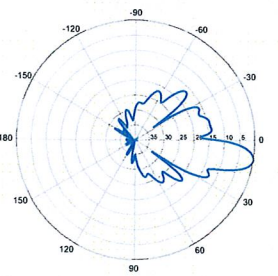
6° | Vertical

LPA-80063-6CF-EDIN-8



8° | Vertical

LPA-80063-6CF-EDIN-10

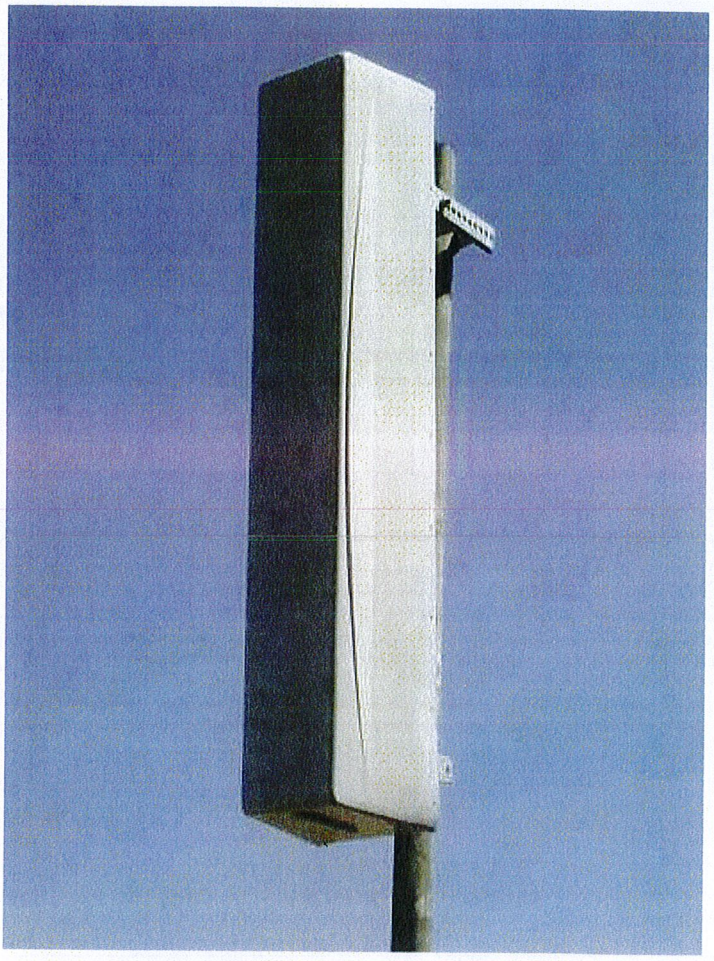


10° | Vertical

Swedcom

SC-E 6014 *rev2*

Enhanced 800 - 960 MHz log-periodic antenna



Features

- ❑ **Small size**
- ❑ **Aesthetically pleasing**
- ❑ **Suitable for TDMA/CDMA/GSM/3G**
- ❑ **High return loss**
- ❑ **Low intermodulation**
- ❑ **High front-to-back ratio**
- ❑ **Outstanding performance over the entire band (800 - 960 MHz)**
- ❑ **Upper side-lobe suppression**
- ❑ **Rugged design**
- ❑ **Dramatically improved signal to interference performance**

Electrical specifications

Frequency range:	**800-960 MHz**
Impedance:	**50 ohm**
Connector type:	**7/16 Din**
Return loss:	**20 dB**
Polarization:	**Vertical**
Gain:	**14 dBd**
Front-to-back ratio:	**> 30 dB**
Upper side-lobe suppression:	**18 dB**
Intermodulation (2x20W):	**IM5 160 dB**
	IM7/9 170 dB
Power rating:	**500 W**
H-plane (-3 dB point):	**54 - 60°**
V-plane (-3 dB point):	**16 - 18°**
Lightning protection:	**DC grounded**

Mechanical specifications

Overall height:	**43 in**	**[1092 mm]**
Width:	**8.5 in**	**[216 mm]**
Depth:	**8 in**	**[203 mm]**
Weight (excluding brackets):	**15 lbs**	**[6.8 Kg]**
Wind load measured up to:	**150 mph**	**[240 Km/h]**
Wind area (side of antenna):	**2.54 sq. ft.**	**[0.24 sq.m]**
Lateral thrust At 113 mph/ 180Km/h (worst case):	**122 lbs**	**[577 N]**

Materials

Radiating Elements:	**Aluminum**
Transformer (Power distribution)	**Ceramic PCB**
Chassis:	**Aluminum**
Radome:	**Grey Fiberglass/PVC**
Tilt-bracket:	**Hot dip galvanized steel**
Mounting bolts:	**Stainless steel**

The SC-E 6014 rev2 is made in the U.S.A.

BXA-171063-12BF-EDIN-X

Replace "X" with desired electrical downtilt.

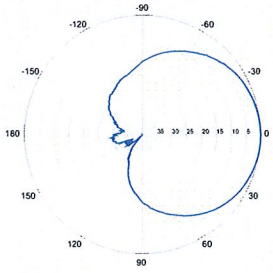
X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1820 x 154 x 105 mm	71.7 x 6.1 x 4.1 in
Depth with z-brackets	133 mm	5.2 in
Weight without mounting brackets	6.8 kg	15 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf

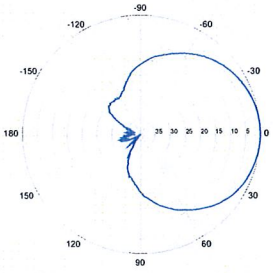
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

BXA-171063-12BF-EDIN-X



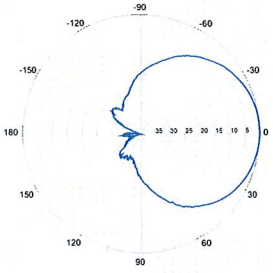
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



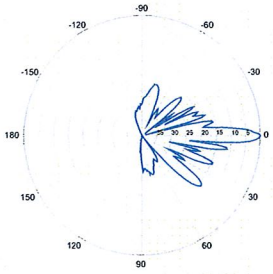
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



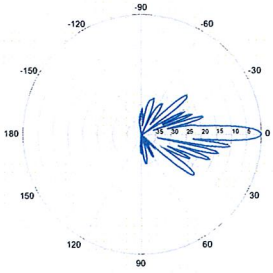
Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0



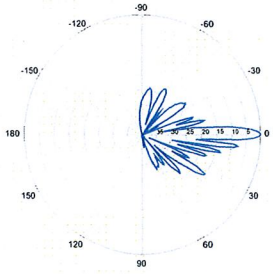
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



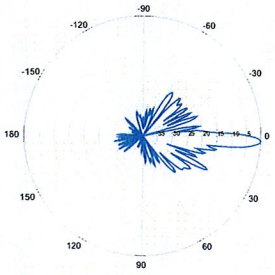
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171063-12BF-EDIN-X

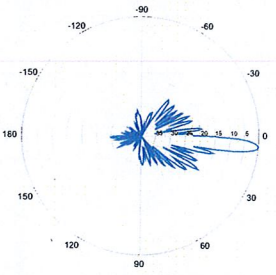
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



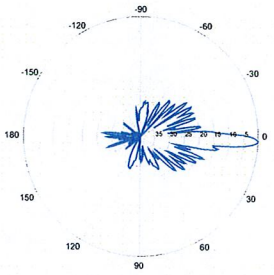
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



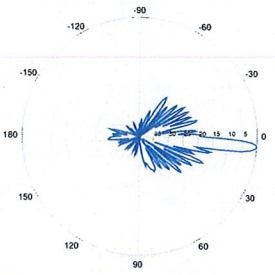
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



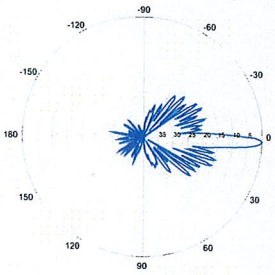
2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



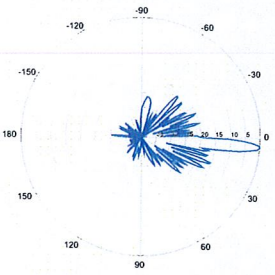
5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

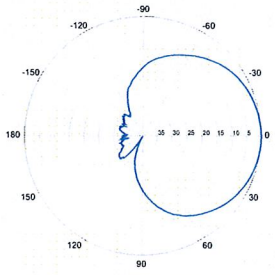
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.8 kg		10.5 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²		Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N		Front: 63 lbf Side: 50 lbf

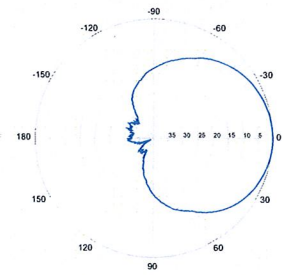
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



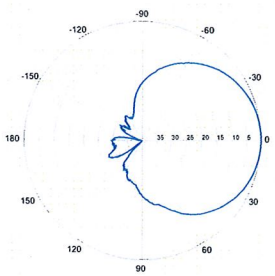
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



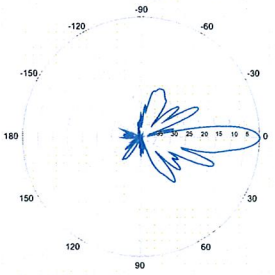
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



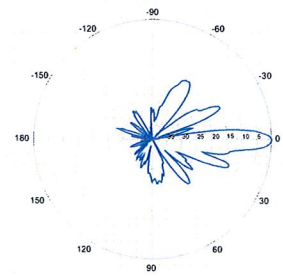
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



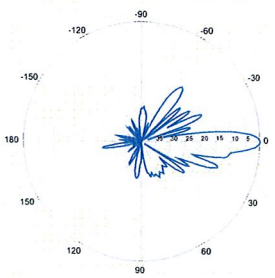
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0

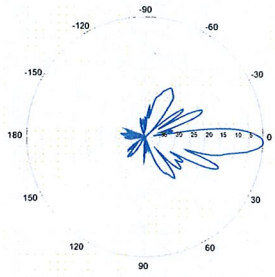


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

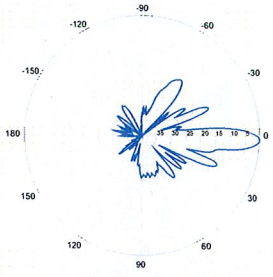
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



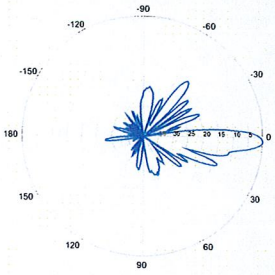
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



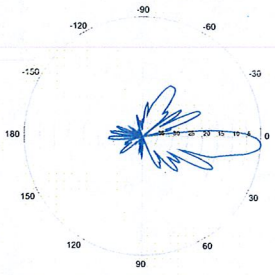
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



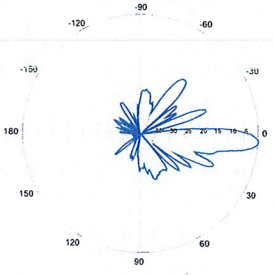
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



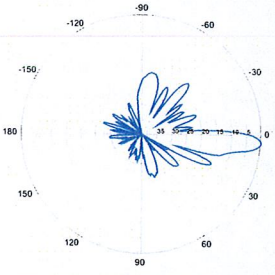
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



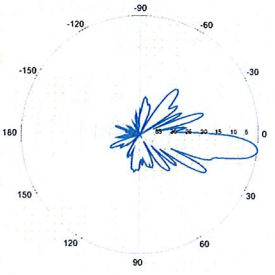
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



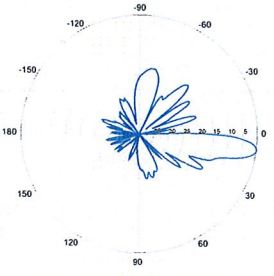
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



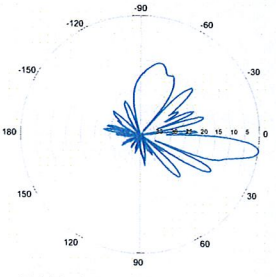
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

Slant ±45° Dual Polarized FET Panel 63° / 13 dBd
696-900 MHz

Mechanical specifications

Length	1205	mm	47.4	in
Width	285	mm	11.2	in
Depth	126	mm	5.0	in
Depth with z-bracket	166	mm	6.5	in
Weight [4]	4.5	kg	9.9	lbs
Wind Area Fore/Aft	0.36	m^2	3.9	ft^2
Wind Area Side	0.15	m^2	1.7	ft^2
Max Wind Survivability	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr)				
Fore/Aft	522	N	117	lbf
Side	244	N	55	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiber-glass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-160 mm; Ø2.0-6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

Electrical specifications

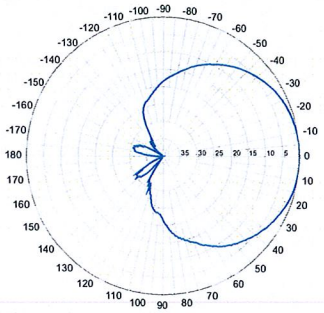
Frequency Range	696-900 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 2 ports / Center
VSWR [1]	≤ 1.4:1
Polarization	Slant ±45°
Isolation Between Ports [1]	< -30 dB
Gain [1]	13.0 dBd 15.0 dBi
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt [5]	0°
Null fill [1]	5%
Lightning protection	Direct ground

Patented Dipole Design: U.S. Patent No. 6,608,600 B2

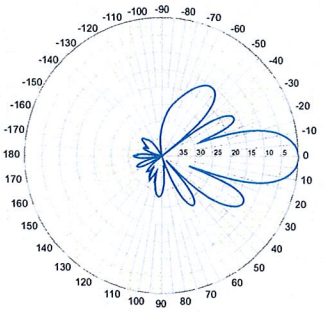
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]
750 MHz

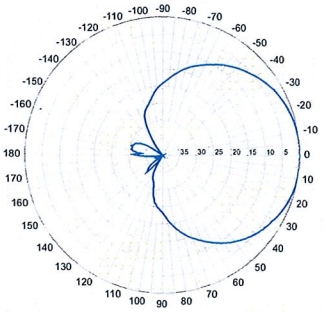


Horizontal

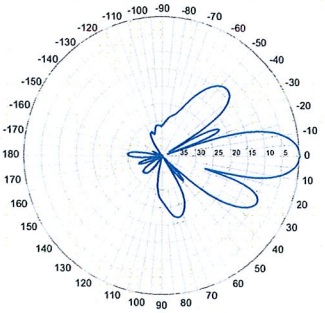


Vertical

850 MHz



Horizontal

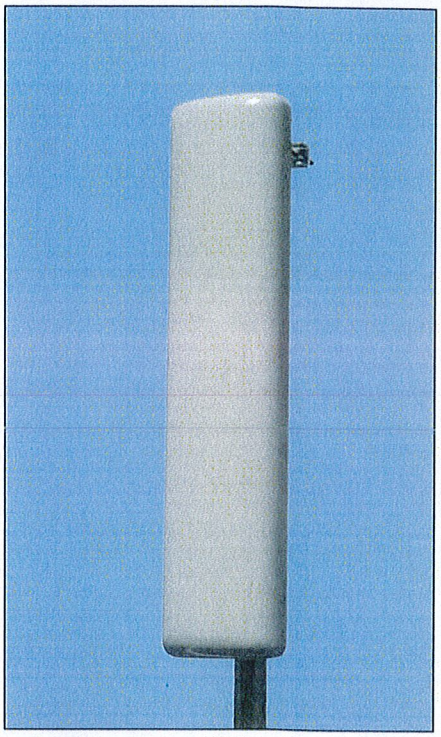


Vertical

696-900 MHz

BXA-70063/4CF __

When ordering replace "__" with connector type.



Featuring our Exclusive 3T Technology™ Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 10/27/08

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc.
The Antenna Technology Company

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt

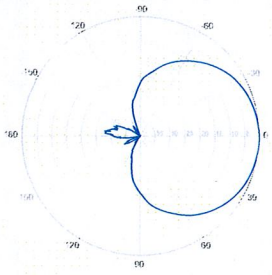
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	

Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

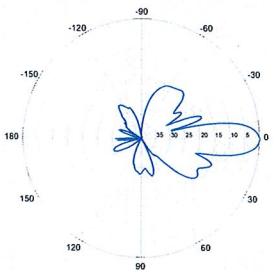
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



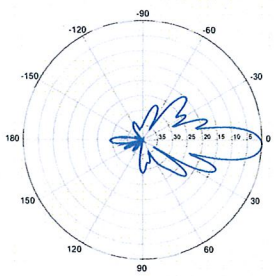
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

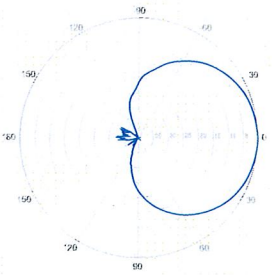


0° | Vertical | 750 MHz

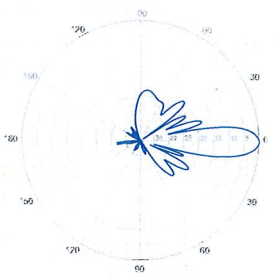
BXA-70063-6CF-EDIN-2



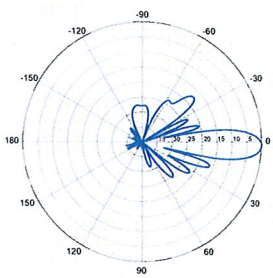
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

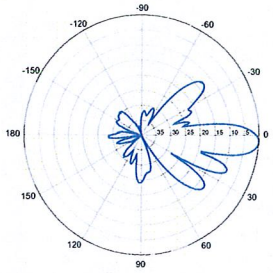


2° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-X

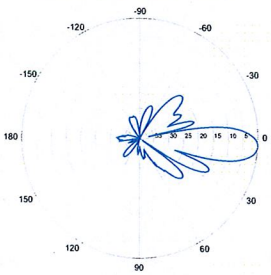
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



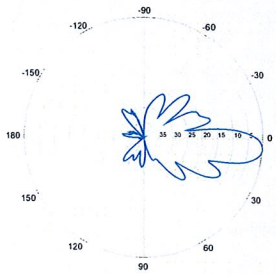
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

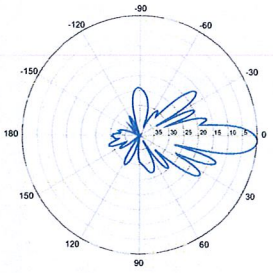


4° | Vertical | 750 MHz

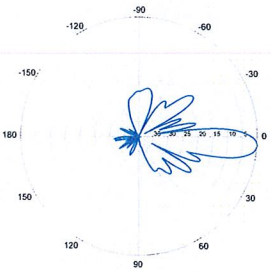
BXA-70063-6CF-EDIN-5



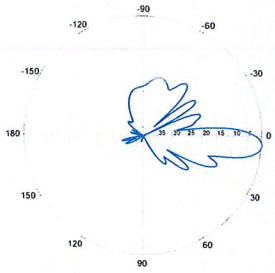
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

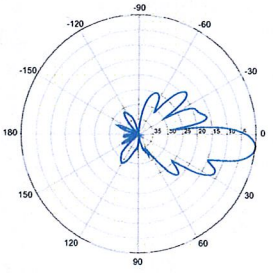


4° | Vertical | 850 MHz



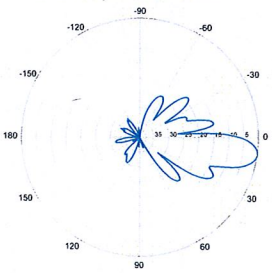
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



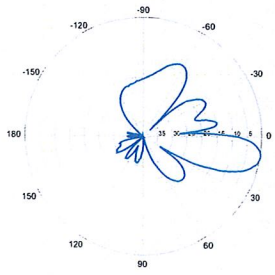
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

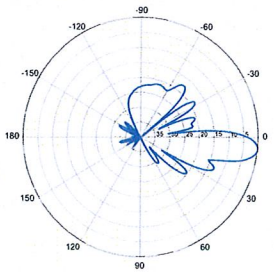


8° | Vertical | 750 MHz

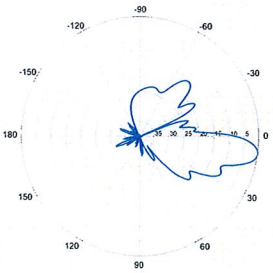
BXA-70063-6CF-EDIN-10



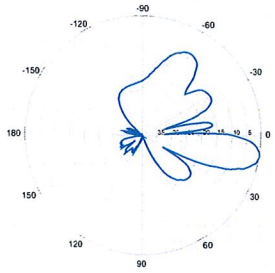
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



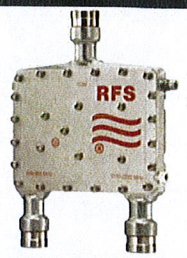
10° | Vertical | 850 MHz

Product Data Sheet **FD9R6004/2C-3L**

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- **LTE ready design**
- **Extremely Low Insertion Loss**
- **High level of Rejection between bands – Protection against interferences**
- **Extremely High Power Handling Capability**
- **Integrated DC block/bypass versions available**
- **Very compact & small size design – Easy installation and reduced tower load**
- **In-line long-neck connectors for easy connection & waterproofing**
- **Exceptional reliability & environmental protection (IP 67)**
- **Equipped with 1 * Breathable Vent – Prevent any humidity inside the product**
- **Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)**
- **Grounding already provided through the mounting bracket**
- **Kit available for easy dual mount**

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

Notes

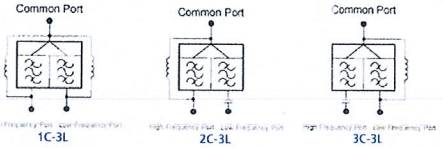
ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband_Diplexer_Installation_Rev5.pdf

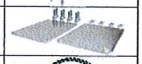
Selection Guide Diplexer 698-960 / 1710-2200MHz

	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information

Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	

	General	Power	Density					
Site Name: Orange 2								
Tower Height: Verizon @ 161ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*AT&T UMTS	1	500	152	0.0078	880	0.5867	1.33%	
*AT&T UMTS	1	500	152	0.0078	1900	1.0000	0.78%	
*AT&T GSM	11	296	152	0.0507	880	0.5867	8.64%	
*AT&T GSM	6	427	152	0.0399	1900	1.0000	3.99%	
*AT&T LTE	1	500	152	0.0078	740	0.4933	1.58%	
*Pocket	3	631	100	0.0681	2130	1.0000	6.81%	
*Clearwire	2	153	110	0.0091	2496	1.0000	0.91%	
*Clearwire	1	211	110	0.0063	11 GHz	1.0000	0.63%	
*Nextel	9	100	117	0.0236	851	0.5673	4.17%	
*Sprint	11	232	146	0.0430	1962.5	1.0000	4.30%	
*T-Mobile GSM	8	129	128	0.0226	1945	1.0000	2.26%	
*T-Mobile UMTS	2	666	128	0.0292	2100	1.0000	2.92%	
*Metricom			70	0.0004	920	0.6133	0.07%	
*Metricom			70	0.005	2400	1.0000	0.50%	
*XM Sat Radio	2	312	105	0.0204	2337.49	1.0000	2.04%	
Verizon PCS	**7**	**262**	**161**	**0.0254**	**1970**	**1.0000**	**2.54%**	
Verizon Cellular	**9**	**368**	**161**	**0.0459**	**869**	**0.5793**	**7.93%**	
Verizon AWS	**1**	**654**	**161**	**0.0091**	**2145**	**1.0000**	**0.91%**	
Verizon 700	**2**	**611**	**161**	**0.0170**	**698**	**0.4653**	**3.64%**	
								55.93%
* Source: Siting Council								

Date: **November 28, 2011**

Mitzi Parker
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277

FDH Engineering, Inc.
2730 Rowland Road
Raleigh, North Carolina
(919) 755-1012
info@fdh-inc.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Orange 2
Crown Castle Designation:	**Crown Castle BU Number:**	806939
	Crown Castle Site Name:	NHV 2071 143137
	Crown Castle JDE Job Number:	172033
	Crown Castle Work Order Number:	453067
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	11-11319E S1
Site Data:	**OFF OGG MEADOW ROAD, ORANGE, New Haven County, CT**	
	Latitude *41° 18' 28.36"*, Longitude *-73° 1' 56.22"*	
	160 Foot - Monopole Tower	

Dear Mitzi Parker,

FDH Engineering, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 439714, in accordance with application 134677, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *FDH Engineering, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Brad Smith, EI
Project Engineer

Christopher M. Murphy, PE
President
CT PE License No. 25842

STATE OF CONNECTICUT
Christopher Michael Murphy
No. 25842
LICENSED
PROFESSIONAL ENGINEER

RISA Tower Report - version 5.4.2.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by VALMONT in June of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
157	161	2	Antel	BXA-171063-12BF w/ Mount Pipe	---	---	1
		1	Antel	BXA-171063-8BF-2 w/ Mount Pipe			
		2	Antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-EDIN-6 w/ Mount Pipe			
		2	Antel	LPA-80063/4CF w/ Mount Pipe			
		2	Antel	LPA-80063/6CF w/ Mount Pipe			
		2	Swedcom	SC-E 6014 rev2 w/ Mount Pipe			
		6	RFS Celwave	FD9R6004/2C-3L			

1. Existing Equipment

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (In)	Note
	164	1	gps	GPS	1	1/2"	1
157	160	6	Decibel	DB844H90 w/ Mount Pipe	---	---	2
		6	Decibel	DB948F85T2E-M w/ Mount Pipe			
	157	1	tower mounts	Platform Mount [LP 713-1]	12	1-5/8"	1
156	170	3	EMS wireless	RR90-17-00DP w/ Mount Pipe	6	1-5/8"	3
		4	Nokia	CS72993.07			
	156	1	tower mounts	Pipe Mount [PM 601-1]			
		6	Ericsson	RRUS-11			
		3	Kathrein	800 10121 w/ Mount Pipe			
147	152	6	Powerwave technologies	P65-16-XLH-RR w/ Mount Pipe	12 2	1-1/4" 3/8"	1
		6	Powerwave technologies	TT19-08BP111-001	1	5/8"	
		1	Raycap	DC6-48-60-18-8F			
	147	1	tower mounts	Platform Mount [LP 713-1]			
		1	Andrew	VHLP2-11			
137	140	2	Decibel	DB950F85E-M w/ Mount Pipe	6	1-5/8"	1
		4	Decibel	DB980H90E-M w/ Mount Pipe	1	1/2"	
		1	Dragonwave	HORIZON DUO			
	137	1	tower mounts	Platform Mount [LP 713-1]			
		3	EMS wireless	RR90-17-02DP w/ Mount Pipe	6	1-5/8"	
127	129	3	RFS Celwave	APXV18-206516S-C-A20 w/ Mount Pipe	---	---	1
		3	RFS Celwave	ATMAA1412D-1A20			
		3	RFS Celwave	ATMPP1412D-1CWA			
	127	1	tower mounts	Platform Mount [LP 713-1]	---	---	
	118	12	Decibel	DB844H90-XY w/ Mount Pipe	12	1-1/4"	
		1	Andrew	PX2F-52			
		1	Andrew	VHLP2-11			
107	110	3	Argus technologies	LLPX310R w/ Mount Pipe	6	1/2"	1
		2	Dragonwave	HORIZON COMPACT	3	5/8"	
		3	Samsung telecommunications	WIMAX DAP HEAD			
	107	1	tower mounts	Sector Mount [SM 101-3]			
100	100	3	RFS Celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8"	1
		1	tower mounts	Pipe Mount [PM 601-3]			
80	81	1	Lucent	KS24019-L112A	1	1/2"	1
	80	2	tower mounts	Side Arm Mount [SO 701-1]			

1. Existing Equipment
2. Equipment to be removed
3. Abandoned equipment, considered in analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
166.5	166.5	3	EMS Wireless	RV90-17-XXDP	---	---
157	157	12	Swedcom	ALP 9011	---	---
147	147	12	Swedcom	ALP 110 11-N	---	---
137	137	12	Decibel	DB980H	---	---
127	127	12	Swedcom	ALP 9011	---	---
117	117	12	Swedcom	ALP 9011	---	---
100	100	2	Generic	GPS	---	---

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc. (September 26, 2006)	1257473	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont (March 26, 1998)	1060127	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont (June 15, 1998)	822032	CCISITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 121.333	Pole	TP29.77x21.65x0.25	1	-9.42	1194.39	66.3	Pass
L2	121.333 - 81.3333	Pole	TP37.67x28.29x0.375	2	-17.96	2266.46	96.6	Pass
L3	81.3333 - 41.4167	Pole	TP45.3x35.73x0.5	3	-30.15	3634.04	95.8	Pass
L4	41.4167 - 0	Pole	TP53x42.9179x0.5625	4	-49.53	4937.59	97.7	Pass
							Summary	
						Pole (L4)	97.7	Pass
						Rating =	**97.7**	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	83.9	Pass
1	Base Plate	0	67.5	Pass
1	Base Foundation	0	53.5	Pass

Structure Rating (max from all components) =	97.7%

1. See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed

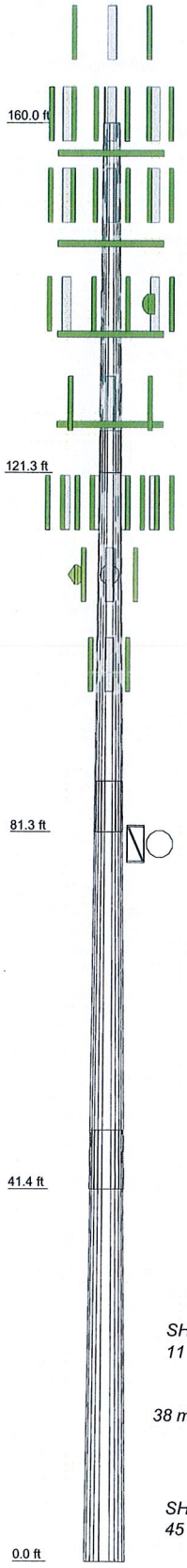
4.1) Recommendations

1. Coax must be installed as shown in Appendix B.

APPENDIX A

RISA TOWER OUTPUT

Section	1	2	3	4
Length (ft)	38.67	44.67	45.58	48.00
Number of Sides	12	12	12	12
Thickness (in)	0.2500	0.3750	0.5000	0.5625
Socket Length (ft)	4.67	5.67	6.58	
Top Dia (in)	21.6500	28.2900	35.7300	42.9179
Bot Dia (in)	29.7700	37.6700	45.3000	53.0000
Grade	A572-65			
Weight (K)	2.7	6.0	10.0	14.0



AXIAL
68 K

SHEAR
11 K

MOMENT
1319 kip-ft

TORQUE 1 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
50 K

SHEAR
45 K

MOMENT
5084 kip-ft

TORQUE 4 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	160	HORIZON DUO	137
BXA-171063-8BF-2 w/ Mount Pipe	157	Platform Mount [LP 713-1]	137
BXA-70063-4CF-EDIN-X w/ Mount Pipe	157	VHLP2-11	137
(2) LPA-80063/4CF w/ Mount Pipe	157	(4) DB844H90-XY w/ Mount Pipe	127
(2) FD9R6004/2C-3L	157	(4) DB844H90-XY w/ Mount Pipe	127
BXA-171063-12BF w/ Mount Pipe	157	RR90-17-02DP w/ Mount Pipe	127
BXA-70063-6CF-EDIN-6 w/ Mount Pipe	157	RR90-17-02DP w/ Mount Pipe	127
(2) LPA-80063/6CF w/ Mount Pipe	157	RR90-17-02DP w/ Mount Pipe	127
(2) FD9R6004/2C-3L	157	APXV18-206516S-C-A20 w/ Mount Pipe	127
GPS	157	APXV18-206516S-C-A20 w/ Mount Pipe	127
BXA-171063-12BF w/ Mount Pipe	157	APXV18-206516S-C-A20 w/ Mount Pipe	127
BXA-70063-4CF-EDIN-X w/ Mount Pipe	157	ATMAA1412D-1A20	127
(2) SC-E 6014 rev2 w/ Mount Pipe	157	ATMAA1412D-1A20	127
(2) FD9R6004/2C-3L	157	ATMAA1412D-1A20	127
Platform Mount [LP 713-1]	157	ATMPP1412D-1CWA	127
RR90-17-00DP w/ Mount Pipe	156	ATMPP1412D-1CWA	127
RR90-17-00DP w/ Mount Pipe	156	ATMPP1412D-1CWA	127
RR90-17-00DP w/ Mount Pipe	156	Platform Mount [LP 713-1]	127
CS72993.07	156	(4) DB844H90-XY w/ Mount Pipe	127
CS72993.07	156	LLPX310R w/ Mount Pipe	107
(2) CS72993.07	156	LLPX310R w/ Mount Pipe	107
Pipe Mount [PM 601-1]	156	HORIZON COMPACT	107
800 10121 w/ Mount Pipe	147	HORIZON COMPACT	107
800 10121 w/ Mount Pipe	147	WIMAX DAP HEAD	107
800 10121 w/ Mount Pipe	147	WIMAX DAP HEAD	107
(2) P65-16-XLH-RR w/ Mount Pipe	147	WIMAX DAP HEAD	107
(2) P65-16-XLH-RR w/ Mount Pipe	147	Pipe Mount	107
(2) P65-16-XLH-RR w/ Mount Pipe	147	Sector Mount [SM 101-3]	107
(2) RRUS-11	147	LLPX310R w/ Mount Pipe	107
(2) RRUS-11	147	VHLP2-11	107
(2) RRUS-11	147	PX2F-52	107
(2) TT19-08BP111-001	147	Pipe Mount [PM 601-3]	100
(2) TT19-08BP111-001	147	APXV18-206517S-C w/ Mount Pipe	100
(2) TT19-08BP111-001	147	APXV18-206517S-C w/ Mount Pipe	100
DC6-48-60-18-8F	147	APXV18-206517S-C w/ Mount Pipe	100
Platform Mount [LP 713-1]	147	KS24019-L112A	80
(2) DB980H90E-M w/ Mount Pipe	137	Side Arm Mount [SO 701-1]	80
(2) DB950F85E-M w/ Mount Pipe	137	Side Arm Mount [SO 701-1]	80
(2) DB980H90E-M w/ Mount Pipe	137		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.7%

FDH ENGINEERING
Tower Analysis

FDH Engineering, Inc.
2730 Rowland Road
Raleigh, North Carolina
Phone: (919) 755-1012
FAX: (919) 755-1031

Job: *BU 806939*		
Project: *11-11319E S1*		
Client: Crown Castle	Drawn by: Bradley Smith	App'd:
Code: TIA/EIA-222-F	Date: 11/28/11	Scale: NTS
Path: C:\Users\Bradley Smith\Desktop\NHV, CTS1 - SA, Verizon\Analysis\NHV, CT (BU 806939).eri		Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.00-121.33	38.67	4.67	12	21.6500	29.7700	0.2500	1.0000	A572-65 (65 ksi)
L2	121.33-81.33	44.67	5.67	12	28.2900	37.6700	0.3750	1.5000	A572-65 (65 ksi)
L3	81.33-41.42	45.58	6.58	12	35.7300	45.3000	0.5000	2.0000	A572-65 (65 ksi)
L4	41.42-0.00	48.00		12	42.9179	53.0000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.4137	17.2270	1006.9853	7.6612	11.2147	89.7916	2040.4253	8.4786	5.1322	20.529
	30.8202	23.7636	2643.2053	10.5682	15.4209	171.4045	5355.8505	11.6957	7.3084	29.233
L2	30.3025	33.7074	3352.6328	9.9936	14.6542	228.7828	6793.3429	16.5897	6.5767	17.538
	38.9989	45.0337	7995.1189	13.3516	19.5131	409.7317	16200.2784	22.1642	9.0906	24.241
L3	38.2221	56.7203	8985.6553	12.6123	18.5081	485.4975	18207.3738	27.9160	8.2356	16.471
	46.8980	72.1280	18477.6131	16.0384	23.4654	787.4408	37440.6536	35.4992	10.8004	21.601
L4	45.8634	76.7161	17566.6728	15.1632	22.2315	790.1721	35594.8416	37.7574	9.9945	17.768
	54.8696	94.9774	33334.2189	18.7726	27.4540	1214.1844	67544.1649	46.7450	12.6965	22.572

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 160.00-121.33				1	1	1		
L2 121.33-81.33				1	1	1		
L3 81.33-41.42				1	1	1		
L4 41.42-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
FB-L98B-002-75000(3/8")	B	Surface Ar (CaAa)	147.00 - 0.00	2	1	-0.300 -0.250	0.3937		0.06
WR-VG82ST-BRDA(5/8")	B	Surface Ar (CaAa)	147.00 - 0.00	1	1	-0.250 -0.200	0.6450		0.31
***									
FSJ4-50B(1/2")	A	Surface Ar (CaAa)	107.00 - 0.00	3	1	0.200 0.300	0.5200		0.14
HJ4.5-50(5/8")	A	Surface Ar (CaAa)	107.00 - 0.00	3	1	0.100 0.200	0.8750		0.40
EC4-50(1/2")	A	Surface Ar (CaAa)	107.00 - 0.00	3	1	0.200 0.300	0.6300		0.16
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***								
LDF4-50A(1/2")	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
						4" Ice	0.00	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	157.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	156.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF6-50A(1-1/4")	B	No	Inside Pole	147.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
***								
LDF7-50A(1-5/8")	B	No	Inside Pole	137.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
EC4-50(1/2")	B	No	Inside Pole	137.00 - 0.00	1	No Ice	0.00	0.16
						1/2" Ice	0.00	0.16
						1" Ice	0.00	0.16
						2" Ice	0.00	0.16
						4" Ice	0.00	0.16
***								
LDF6-50A(1-1/4")	A	No	Inside Pole	127.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FLC 158-50J(1-5/8")	B	No	Inside Pole	127.00 - 0.00	6	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
						1" Ice	0.00	0.92
						2" Ice	0.00	0.92
						4" Ice	0.00	0.92
***								
CR 50 1873(1-5/8")	C	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.83
						1/2" Ice	0.00	0.83
						1" Ice	0.00	0.83
						2" Ice	0.00	0.83
						4" Ice	0.00	0.83
***								
LDF4-50A(1/2")	B	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-121.33	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	2.666	0.000	0.33
		C	0.000	0.000	0.000	0.000	0.53
L2	121.33-81.33	A	0.000	0.000	5.198	0.000	0.37
		B	0.000	0.000	4.155	0.000	0.76
		C	0.000	0.000	0.000	0.000	0.69
L3	81.33-41.42	A	0.000	0.000	8.083	0.000	0.40
		B	0.000	0.000	4.146	0.000	0.76
		C	0.000	0.000	0.000	0.000	0.79
L4	41.42-0.00	A	0.000	0.000	8.387	0.000	0.41
		B	0.000	0.000	4.302	0.000	0.79
		C	0.000	0.000	0.000	0.000	0.82

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-121.33	A	0.892	0.000	0.000	0.000	0.000	0.04
		B		0.000	0.000	11.823	0.000	0.44
		C		0.000	0.000	0.000	0.000	0.53
L2	121.33-81.33	A	0.858	0.000	0.000	18.933	0.000	0.77
		B		0.000	0.000	18.425	0.000	0.94
		C		0.000	0.000	0.000	0.000	0.69
L3	81.33-41.42	A	0.808	0.000	0.000	28.621	0.000	0.98
		B		0.000	0.000	17.838	0.000	0.93
		C		0.000	0.000	0.000	0.000	0.79
L4	41.42-0.00	A	0.750	0.000	0.000	28.457	0.000	0.96
		B		0.000	0.000	17.682	0.000	0.95
		C		0.000	0.000	0.000	0.000	0.82

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-121.33	0.0555	-0.0935	0.2064	-0.3556
L2	121.33-81.33	-0.0450	-0.2967	-0.0775	-0.9294
L3	81.33-41.42	-0.1011	-0.3739	-0.2302	-1.1283
L4	41.42-0.00	-0.1001	-0.3749	-0.2281	-1.1296

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
Lightning Rod	C	From Leg	0.00 0.00 2.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.50 1.00 1.50 2.50 4.50	0.50 1.00 1.50 2.50 4.50	0.00 0.00 0.00 0.00 0.00
***									
BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.69 4.29 4.91 6.26 9.29	0.03 0.07 0.12 0.23 0.58
(2) LPA-80063/4CF w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.25 7.72 8.20 9.19 11.32	7.26 7.96 8.67 10.16 13.39	0.04 0.10 0.18 0.34 0.80
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
BXA-171063-12BF w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67
BXA-70063-6CF-EDIN-6 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.24 0.48 1.09
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
GPS	B	From Leg	4.00 0.00 7.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00
BXA-171063-12BF w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.97 5.52 6.04 7.09 9.36	5.23 6.39 7.26 9.05 12.82	0.04 0.08 0.14 0.27 0.67

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.69 4.29 4.91 6.26 9.29	0.03 0.07 0.12 0.23 0.58
(2) SC-E 6014 rev2 w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.78 4.18 4.59 5.44 7.29	4.40 5.01 5.64 6.96 9.90	0.03 0.07 0.11 0.22 0.54
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 4.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
Platform Mount [LP 713-1]	C	None		0.0000	157.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.27 39.68 48.09 64.91 98.55	31.27 39.68 48.09 64.91 98.55	1.51 1.93 2.35 3.19 4.86
***									
RR90-17-00DP w/ Mount Pipe	A	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.11 0.22 0.56
RR90-17-00DP w/ Mount Pipe	B	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.11 0.22 0.56
RR90-17-00DP w/ Mount Pipe	C	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.11 0.22 0.56
CS72993.07	A	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.59 1.76 2.13 2.98	0.42 0.54 0.66 0.93 1.59	0.02 0.03 0.04 0.06 0.15
CS72993.07	B	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.59 1.76 2.13 2.98	0.42 0.54 0.66 0.93 1.59	0.02 0.03 0.04 0.06 0.15
(2) CS72993.07	C	From Leg	4.00 0.00 14.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.59 1.76 2.13 2.98	0.42 0.54 0.66 0.93 1.59	0.02 0.03 0.04 0.06 0.15
Pipe Mount [PM 601-1]	A	None		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.74 4.48 5.96 8.92	0.90 1.12 1.34 1.78 2.66	0.07 0.08 0.09 0.12 0.18
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	0.07 0.11 0.17 0.30 0.68
800 10121 w/ Mount Pipe	B	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	0.07 0.11 0.17 0.30 0.68
800 10121 w/ Mount Pipe	C	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	0.07 0.11 0.17 0.30 0.68
(2) P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
(2) P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
(2) P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.36 7.54 8.43 10.24 14.10	0.08 0.14 0.22 0.39 0.89
(2) RRUS-11	A	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
(2) RRUS-11	B	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
(2) RRUS-11	C	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.42 4.71 5.00 5.61 6.94	1.19 1.35 1.53 1.90 2.75	0.06 0.08 0.11 0.18 0.37
(2) TT19-08BP111-001	A	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.64 0.75 0.87 1.13 1.77	0.52 0.62 0.73 0.98 1.58	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	B	From Leg	4.00 0.00 5.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.64 0.75 0.87 1.13 1.77	0.52 0.62 0.73 0.98 1.58	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	C	From Leg	4.00 0.00	0.0000	147.00	No Ice 1/2" Ice	0.64 0.75	0.52 0.62	0.02 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			5.00			1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	147.00	No Ice	2.57	4.32	0.02
			0.00			1/2" Ice	2.80	4.60	0.05
			5.00			1" Ice	3.04	4.88	0.09
						2" Ice	3.54	5.49	0.17
						4" Ice	4.66	6.80	0.38
Platform Mount [LP 713-1]	C	None		0.0000	147.00	No Ice	31.27	31.27	1.51
						1/2" Ice	39.68	39.68	1.93
						1" Ice	48.09	48.09	2.35
						2" Ice	64.91	64.91	3.19
						4" Ice	98.55	98.55	4.86
***									
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00	0.0000	137.00	No Ice	4.04	3.62	0.03
			0.00			1/2" Ice	4.50	4.48	0.06
			3.00			1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
(2) DB950F85E-M w/ Mount Pipe	B	From Leg	4.00	0.0000	137.00	No Ice	2.77	5.66	0.03
			0.00			1/2" Ice	3.22	6.55	0.07
			3.00			1" Ice	3.65	7.31	0.12
						2" Ice	4.55	8.95	0.23
						4" Ice	6.45	12.54	0.58
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00	0.0000	137.00	No Ice	4.04	3.62	0.03
			0.00			1/2" Ice	4.50	4.48	0.06
			3.00			1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
HORIZON DUO	B	From Leg	4.00	0.0000	137.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			3.00			1" Ice	0.76	0.52	0.02
						2" Ice	1.00	0.73	0.04
						4" Ice	1.60	1.25	0.10
Platform Mount [LP 713-1]	C	None		0.0000	137.00	No Ice	31.27	31.27	1.51
						1/2" Ice	39.68	39.68	1.93
						1" Ice	48.09	48.09	2.35
						2" Ice	64.91	64.91	3.19
						4" Ice	98.55	98.55	4.86
***									
(4) DB844H90-XY w/ Mount Pipe	A	From Leg	4.00	0.0000	127.00	No Ice	3.10	5.15	0.03
			0.00			1/2" Ice	3.48	5.83	0.07
			-9.00			1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
(4) DB844H90-XY w/ Mount Pipe	B	From Leg	4.00	0.0000	127.00	No Ice	3.10	5.15	0.03
			0.00			1/2" Ice	3.48	5.83	0.07
			-9.00			1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
(4) DB844H90-XY w/ Mount Pipe	C	From Leg	4.00	0.0000	127.00	No Ice	3.10	5.15	0.03
			0.00			1/2" Ice	3.48	5.83	0.07
			-9.00			1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00	0.0000	127.00	No Ice	4.59	3.32	0.03
			0.00			1/2" Ice	5.09	4.09	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.11 0.22 0.56
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.11 0.22 0.56
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.86 4.27 4.73 5.69 7.73	3.30 4.00 4.67 6.06 9.04	0.04 0.07 0.11 0.21 0.53
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.86 4.27 4.73 5.69 7.73	3.30 4.00 4.67 6.06 9.04	0.04 0.07 0.11 0.21 0.53
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.86 4.27 4.73 5.69 7.73	3.30 4.00 4.67 6.06 9.04	0.04 0.07 0.11 0.21 0.53
ATMAA1412D-1A20	A	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	B	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14
ATMPP1412D-1CWA	A	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	0.01 0.02 0.03 0.05 0.13
ATMPP1412D-1CWA	B	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	0.01 0.02 0.03 0.05 0.13
ATMPP1412D-1CWA	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.17 1.32 1.48 1.82	0.42 0.53 0.65 0.92	0.01 0.02 0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	2.61	1.57	0.13
Platform Mount [LP 713-1]	C	None		0.0000	127.00	No Ice	31.27	31.27	1.51
						1/2" Ice	39.68	39.68	1.93
						1" Ice	48.09	48.09	2.35
						2" Ice	64.91	64.91	3.19
						4" Ice	98.55	98.55	4.86
***									
LLPX310R w/ Mount Pipe	A	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
LLPX310R w/ Mount Pipe	B	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
LLPX310R w/ Mount Pipe	C	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
HORIZON COMPACT	A	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	0.84	0.43	0.01
						1/2" Ice	0.97	0.52	0.02
						1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
HORIZON COMPACT	C	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	0.84	0.43	0.01
						1/2" Ice	0.97	0.52	0.02
						1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
WIMAX DAP HEAD	A	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	B	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	C	From Leg	2.00 0.00 3.00	0.0000	107.00	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
Pipe Mount	B	From Leg	2.00 0.00 0.00	0.0000	107.00	No Ice	1.32	1.32	0.03
						1/2" Ice	1.58	1.58	0.04
						1" Ice	1.84	1.84	0.05
						2" Ice	2.46	2.46	0.10
						4" Ice	3.89	3.89	0.22
Sector Mount [SM 101-3]	C	None		0.0000	107.00	No Ice	64.90	64.90	0.57
						1/2" Ice	85.95	85.95	0.86
						1" Ice	107.00	107.00	1.16
						2" Ice	149.10	149.10	1.75
						4" Ice	233.30	233.30	2.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.09 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.09 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.09 0.15 0.28 0.68
Pipe Mount [PM 601-3]	C	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.39 5.48 6.57 8.75 13.11	4.39 5.48 6.57 8.75 13.11	0.20 0.24 0.28 0.36 0.53
***									
KS24019-L112A	B	From Leg	4.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	0.01 0.01 0.01 0.02 0.06
Side Arm Mount [SO 701-1]	A	From Leg	2.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
Side Arm Mount [SO 701-1]	B	From Leg	2.00 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
***											
VHLP2-11	B	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 3.00	0.0000		137.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.01 4.30 4.88	0.03 0.05 0.07 0.11

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
***									4" Ice	6.04	0.19
VHLP2-11	A	Paraboloid w/Shroud (HP)	From Leg	2.00 0.00 3.00	0.0000		107.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.19
PX2F-52	C	Paraboloid w/Radome	From Leg	2.00 0.00 3.00	0.0000		107.00	2.09	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.44 3.72 3.99 4.55 5.67	0.02 0.04 0.06 0.09 0.17
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service

Comb. No.	Description
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 121.333	Pole	Max Tension	27	0.00	0.00	0.02
			Max. Compression	14	-20.77	-1.34	-0.73
			Max. Mx	11	-9.45	451.16	0.99
			Max. My	8	-9.42	-1.06	-453.63
			Max. Vy	11	-24.07	451.16	0.99
			Max. Vx	2	-24.20	1.66	453.29
			Max. Torque	3			-4.08
L2	121.333 - 81.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.48	-1.03	0.08
			Max. Mx	11	-17.99	1583.28	1.60
			Max. My	2	-17.96	3.03	1592.62
			Max. Vy	11	-34.06	1583.28	1.60
			Max. Vx	2	-34.28	3.03	1592.62
			Max. Torque	3			-4.07
L3	81.3333 - 41.4167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.38	-0.84	1.42
			Max. Mx	11	-30.17	3021.52	2.04
			Max. My	2	-30.15	3.46	3039.19
			Max. Vy	11	-39.50	3021.52	2.04
			Max. Vx	2	-39.70	3.46	3039.19
			Max. Torque	9			3.97
L4	41.4167 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-67.67	-0.13	3.08
			Max. Mx	11	-49.53	5056.64	2.39
			Max. My	2	-49.53	4.18	5083.90
			Max. Vy	11	-45.17	5056.64	2.39
			Max. Vx	2	-45.36	4.18	5083.90
			Max. Torque	9			3.83

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	67.67	0.00	0.00
	Max. H_x	11	49.56	45.13	0.00
	Max. H_z	2	49.56	0.01	45.32
	Max. M_x	2	5083.90	0.01	45.32
	Max. M_z	5	5055.61	-45.13	0.05
	Max. Torsion	9	3.70	22.56	-39.32
	Min. Vert	2	49.56	0.01	45.32
	Min. H_x	5	49.56	-45.13	0.05
	Min. H_z	8	49.56	0.01	-45.31
	Min. M_x	8	-5081.95	0.01	-45.31
	Min. M_z	11	-5056.64	45.13	0.00
	Min. Torsion	3	-3.68	-22.61	39.30

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.56	0.00	0.00	-0.32	-0.25	0.00
Dead+Wind 0 deg - No Ice	49.56	-0.01	-45.32	-5083.90	4.18	3.26
Dead+Wind 30 deg - No Ice	49.56	22.61	-39.30	-4407.42	-2533.00	3.68
Dead+Wind 60 deg - No Ice	49.56	39.11	-22.72	-2546.98	-4382.42	2.86
Dead+Wind 90 deg - No Ice	49.56	45.13	-0.05	-4.32	-5055.61	1.29
Dead+Wind 120 deg - No Ice	49.56	39.01	22.67	2542.42	-4370.16	-0.38
Dead+Wind 150 deg - No Ice	49.56	22.51	39.21	4397.62	-2523.25	-2.11
Dead+Wind 180 deg - No Ice	49.56	-0.01	45.31	5081.95	-1.06	-3.34
Dead+Wind 210 deg - No Ice	49.56	-22.56	39.32	4410.13	2526.37	-3.70
Dead+Wind 240 deg - No Ice	49.56	-39.11	22.71	2544.63	4382.34	-2.88
Dead+Wind 270 deg - No Ice	49.56	-45.13	-0.00	-2.39	5056.64	-1.31
Dead+Wind 300 deg - No Ice	49.56	-39.01	-22.65	-2541.76	4371.28	0.48
Dead+Wind 330 deg - No Ice	49.56	-22.50	-39.22	-4400.32	2522.57	2.15
Dead+Ice+Temp	67.67	-0.00	-0.00	-3.08	-0.13	-0.00
Dead+Wind 0 deg+Ice+Temp	67.67	0.00	-11.41	-1318.45	-0.04	0.74
Dead+Wind 30 deg+Ice+Temp	67.67	5.69	-9.89	-1143.71	-656.06	0.73
Dead+Wind 60 deg+Ice+Temp	67.67	9.85	-5.72	-662.63	-1134.24	0.46
Dead+Wind 90 deg+Ice+Temp	67.67	11.36	-0.02	-4.91	-1308.07	0.07
Dead+Wind 120 deg+Ice+Temp	67.67	9.82	5.70	653.95	-1130.62	-0.29
Dead+Wind 150 deg+Ice+Temp	67.67	5.66	9.87	1134.44	-652.40	-0.60
Dead+Wind 180 deg+Ice+Temp	67.67	-0.01	11.41	1311.79	0.41	-0.77
Dead+Wind 210 deg+Ice+Temp	67.67	-5.68	9.90	1138.12	654.19	-0.73
Dead+Wind 240 deg+Ice+Temp	67.67	-9.85	5.72	655.89	1133.88	-0.45
Dead+Wind 270 deg+Ice+Temp	67.67	-11.36	0.00	-2.82	1307.97	-0.06
Dead+Wind 300 deg+Ice+Temp	67.67	-9.82	-5.70	-660.02	1130.53	0.31
Dead+Wind 330 deg+Ice+Temp	67.67	-5.66	-9.87	-1141.28	651.90	0.61
Dead+Wind 0 deg - Service	49.56	-0.00	-15.68	-1762.32	1.27	1.14
Dead+Wind 30 deg - Service	49.56	7.82	-13.60	-1527.89	-878.16	1.29
Dead+Wind 60 deg - Service	49.56	13.53	-7.86	-883.01	-1519.18	1.01
Dead+Wind 90 deg - Service	49.56	15.61	-0.02	-1.70	-1752.44	0.46
Dead+Wind 120 deg - Service	49.56	13.50	7.84	881.03	-1514.92	-0.13
Dead+Wind 150 deg - Service	49.56	7.79	13.57	1524.07	-874.78	-0.74
Dead+Wind 180 deg - Service	49.56	-0.00	15.68	1761.23	-0.55	-1.18
Dead+Wind 210 deg - Service	49.56	-7.81	13.61	1528.42	875.50	-1.30
Dead+Wind 240 deg - Service	49.56	-13.53	7.86	881.80	1518.80	-1.01
Dead+Wind 270 deg - Service	49.56	-15.61	-0.00	-1.03	1752.45	-0.46
Dead+Wind 300 deg - Service	49.56	-13.50	-7.84	-881.21	1514.96	0.17
Dead+Wind 330 deg - Service	49.56	-7.79	-13.57	-1525.43	874.19	0.75

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-49.56	0.00	-0.00	49.56	0.00	0.000%
2	-0.01	-49.56	-45.32	0.01	49.56	45.32	0.002%
3	22.61	-49.56	-39.30	-22.61	49.56	39.30	0.000%
4	39.11	-49.56	-22.72	-39.11	49.56	22.72	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
5	45.13	-49.56	-0.05	-45.13	49.56	0.05	0.002%
6	39.01	-49.56	22.67	-39.01	49.56	-22.67	0.000%
7	22.51	-49.56	39.21	-22.51	49.56	-39.21	0.000%
8	-0.01	-49.56	45.32	0.01	49.56	-45.31	0.002%
9	-22.56	-49.56	39.32	22.56	49.56	-39.32	0.000%
10	-39.11	-49.56	22.71	39.11	49.56	-22.71	0.000%
11	-45.13	-49.56	-0.00	45.13	49.56	0.00	0.002%
12	-39.01	-49.56	-22.65	39.01	49.56	22.65	0.000%
13	-22.50	-49.56	-39.22	22.50	49.56	39.22	0.000%
14	0.00	-67.67	0.00	0.00	67.67	0.00	0.000%
15	0.00	-67.67	-11.41	-0.00	67.67	11.41	0.001%
16	5.69	-67.67	-9.89	-5.69	67.67	9.89	0.000%
17	9.85	-67.67	-5.72	-9.85	67.67	5.72	0.000%
18	11.36	-67.67	-0.02	-11.36	67.67	0.02	0.001%
19	9.82	-67.67	5.70	-9.82	67.67	-5.70	0.000%
20	5.66	-67.67	9.87	-5.66	67.67	-9.87	0.000%
21	-0.01	-67.67	11.41	0.01	67.67	-11.41	0.001%
22	-5.68	-67.67	9.90	5.68	67.67	-9.90	0.000%
23	-9.85	-67.67	5.72	9.85	67.67	-5.72	0.000%
24	-11.36	-67.67	0.00	11.36	67.67	-0.00	0.001%
25	-9.82	-67.67	-5.70	9.82	67.67	5.70	0.000%
26	-5.66	-67.67	-9.87	5.66	67.67	9.87	0.000%
27	-0.00	-49.56	-15.68	0.00	49.56	15.68	0.003%
28	7.82	-49.56	-13.60	-7.82	49.56	13.60	0.001%
29	13.53	-49.56	-7.86	-13.53	49.56	7.86	0.001%
30	15.62	-49.56	-0.02	-15.61	49.56	0.02	0.003%
31	13.50	-49.56	7.84	-13.50	49.56	-7.84	0.001%
32	7.79	-49.56	13.57	-7.79	49.56	-13.57	0.001%
33	-0.00	-49.56	15.68	0.00	49.56	-15.68	0.003%
34	-7.81	-49.56	13.61	7.81	49.56	-13.61	0.001%
35	-13.53	-49.56	7.86	13.53	49.56	-7.86	0.001%
36	-15.62	-49.56	-0.00	15.61	49.56	0.00	0.003%
37	-13.50	-49.56	-7.84	13.50	49.56	7.84	0.001%
38	-7.79	-49.56	-13.57	7.79	49.56	13.57	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00002547	0.00010271
3	Yes	17	0.00000001	0.00009638
4	Yes	17	0.00000001	0.00008979
5	Yes	14	0.00002550	0.00006515
6	Yes	17	0.00000001	0.00009218
7	Yes	17	0.00000001	0.00009406
8	Yes	14	0.00002547	0.00011057
9	Yes	17	0.00000001	0.00008913
10	Yes	17	0.00000001	0.00009543
11	Yes	14	0.00002550	0.00006522
12	Yes	17	0.00000001	0.00009240
13	Yes	17	0.00000001	0.00009060
14	Yes	6	0.00000001	0.00000336
15	Yes	14	0.00000001	0.00011502
16	Yes	15	0.00000001	0.00007190
17	Yes	15	0.00000001	0.00006964

18	Yes	14	0.00000001	0.00011383
19	Yes	15	0.00000001	0.00006971
20	Yes	15	0.00000001	0.00007066
21	Yes	14	0.00000001	0.00011477
22	Yes	15	0.00000001	0.00006904
23	Yes	15	0.00000001	0.00007083
24	Yes	14	0.00000001	0.00011345
25	Yes	15	0.00000001	0.00006987
26	Yes	15	0.00000001	0.00006927
27	Yes	13	0.00007311	0.00007151
28	Yes	14	0.00000001	0.00011170
29	Yes	14	0.00000001	0.00008924
30	Yes	13	0.00007312	0.00006169
31	Yes	14	0.00000001	0.00009713
32	Yes	14	0.00000001	0.00010401
33	Yes	13	0.00007311	0.00007280
34	Yes	14	0.00000001	0.00008760
35	Yes	14	0.00000001	0.00010838
36	Yes	13	0.00007312	0.00006164
37	Yes	14	0.00000001	0.00009767
38	Yes	14	0.00000001	0.00009192

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	160 - 121.333 (1)	TP29.77x21.65x0.25	38.67	0.00	0.0	39.000	22.9747	-9.42	896.01	0.011
L2	121.333 - 81.3333 (2)	TP37.67x28.29x0.375	44.67	0.00	0.0	39.000	43.5968	-17.96	1700.27	0.011
L3	81.3333 - 41.4167 (3)	TP45.3x35.73x0.5	45.58	0.00	0.0	39.000	69.9028	-30.15	2726.21	0.011
L4	41.4167 - 0 (4)	TP53x42.9179x0.5625	48.00	0.00	0.0	39.000	94.9774	-49.53	3704.12	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	160 - 121.333 (1)	TP29.77x21.65x0.25	453.63	33.987	39.000	0.871	0.00	0.000	39.000	0.000
L2	121.333 - 81.3333 (2)	TP37.67x28.29x0.375	1592.62	49.785	39.000	1.277	0.00	0.000	39.000	0.000
L3	81.3333 - 41.4167 (3)	TP45.3x35.73x0.5	3039.19	49.328	39.000	1.265	0.00	0.000	39.000	0.000
L4	41.4167 - 0 (4)	TP53x42.9179x0.5625	5083.90	50.245	39.000	1.288	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	160 - 121.333 (1)	TP29.77x21.65x0.25	24.19	1.053	26.000	0.082	3.37	0.119	26.000	0.005
L2	121.333 - 81.3333 (2)	TP37.67x28.29x0.375	34.28	0.786	26.000	0.061	3.14	0.046	26.000	0.002
L3	81.3333 - 41.4167 (3)	TP45.3x35.73x0.5	39.70	0.568	26.000	0.044	3.33	0.025	26.000	0.001
L4	41.4167 - 0 (4)	TP53x42.9179x0.5625	45.36	0.478	26.000	0.037	3.26	0.015	26.000	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 121.333 (1)	0.011	0.871	0.000	0.082	0.005	0.884 ✔	1.333	H1-3+VT ✔
L2	121.333 - 81.3333 (2)	0.011	1.277	0.000	0.061	0.002	1.288 ✔	1.333	H1-3+VT ✔
L3	81.3333 - 41.4167 (3)	0.011	1.265	0.000	0.044	0.001	1.276 ✔	1.333	H1-3+VT ✔
L4	41.4167 - 0 (4)	0.013	1.288	0.000	0.037	0.001	1.302 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 121.333	Pole	TP29.77x21.65x0.25	1	-9.42	1194.39	66.3	Pass
L2	121.333 - 81.3333	Pole	TP37.67x28.29x0.375	2	-17.96	2266.46	96.6	Pass
L3	81.3333 - 41.4167	Pole	TP45.3x35.73x0.5	3	-30.15	3634.04	95.8	Pass
L4	41.4167 - 0	Pole	TP53x42.9179x0.5625	4	-49.53	4937.59	97.7	Pass
							Summary	
						Pole (L4)	97.7	Pass
						RATING =	**97.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

CROWN REGION ADDRESS

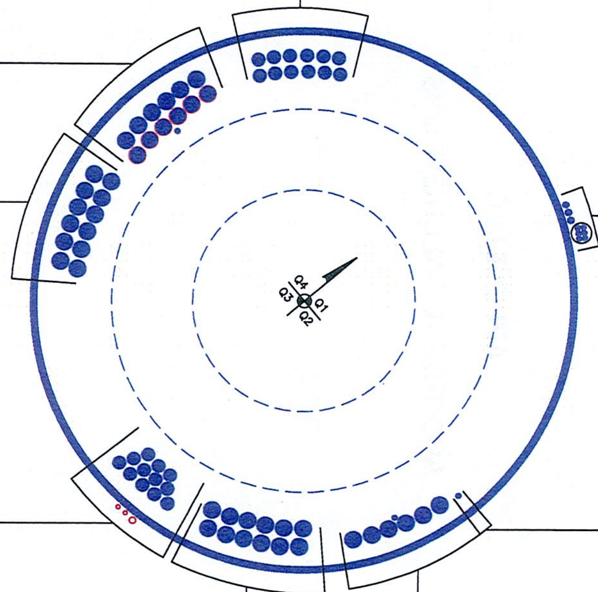
USA

(INSTALLED)
(12) 1-1/4" TO 127 FT LEVEL

(INSTALLED)
(1) 1/2" TO 161 FT LEVEL
(12) 1-5/8" TO 161 FT LEVEL

(INSTALLED)
(6) 1-5/8" TO 100 FT LEVEL

(ABANDONED)
(6) 1-5/8" TO 156 FT LEVEL



(NOT INSTALLED)
(4) 1/4" TO 107 FT LEVEL
(2) 5/16" TO 107 FT LEVEL
(INSTALLED)
(6) 1/2" TO 107 FT LEVEL
(3) 5/8" TO 107 FT LEVEL

(PROPOSED-IN ADDITION TO INSTALLED)
(1) 5/8" TO 147 FT LEVEL
(2) 3/8" TO 147 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 147 FT LEVEL

(INSTALLED-TO BE REMOVED)
(6) 1-5/8" TO 127 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 127 FT LEVEL

(INSTALLED)
(1) 1/2" TO 137 FT LEVEL

(NOT INSTALLED)
(3) 1-5/8" TO 137 FT LEVEL
(INSTALLED)
(1) 1/2" TO 80 FT LEVEL
(6) 1-5/8" TO 137 FT LEVEL

BUSINESS UNIT: 806939 TOWER ID: C_BASELEVEL

LEGEND: FEEDLINES

- ● SOLID BLUE CIRCLE DENOTES EXISTING FEEDLINE
- ○ OPEN RED CIRCLE DENOTES PROPOSED FEEDLINE
- X BLUE "X" DENOTES LOCATION NOT GIVEN

NOTE: ASSUME FEEDLINE ATTACHMENT HEIGHT TO TOWER STEEL AT 8-FEET ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED

14	08/04/10	AS-BUILT INFORMATION ADDED PER WORK ORDER # 321133	LRC
15	25/08/10	AS-BUILT INFORMATION ADDED PER WORK ORDER # 354248 / 354340	WAM
16	02/03/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 383603	BRM
17	15/04/11	APPLICATION ADDED PER WORK ORDER # 402364	LAN
18	15/04/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 402355/402358	LAN
19	25/04/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 405569	AMJ
20	12/08/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 426424	PLW
21	20/09/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 430401	DX
22	22/11/11	AS-BUILT INFORMATION ADDED PER WORK ORDER #446789	SF

DRAWN BY: ADJ
CHECKED BY:
DRAWING DATE: 02/08/06

SITE NUMBER:
SITE NAME:

SITE NAME

NHV 2071 143137

BUSINESS UNIT NUMBER

806939

SITE ADDRESS

OFF OGG MEADOW ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

NOT TO SCALE 1

PLOT DATE: 11/22/2011 FILE NAME: 806939_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

(Bearing and Stability Checks) Tool for TIA Rev F or G - Any application (MP, SST, GT)

Site Data

BU#: *806939*
Site Name: *Site-name*
App #: *####*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	9.5	ft
Pad Thickness, T:	3.5	ft
Pad Width=Length, L:	30	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	7	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	38.48	ft^2
Pier Height:	6.50	ft
Soil (above pad) Height:	6.00	ft

Soil Parameters		
Unit Weight, γ:	115.0	pcf
Ultimate Bearing Capacity, qn:	10.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	31.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	7.50	ksf
Passive Pres. Coeff., Kp	3.12	

Forces/Moments due to Wind and Lateral Soil		
Factored Pad Passive Force:	292.4	kips
Pad Force Location Above D:	1.62	ft
ϕ(Passive Pressure Moment):	354.83	ft-kips
Factored O.T. M(WL), "1.6W":	7470.9	ft-kips
Factored OT (MW-Msoil), M1	7116.07	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	3.61	ft
Sum of Soil Wedges Wt:	90.72	kips
Soil Wedges ecc, K1:	10.60	ft
Ftg+Soil above Pad wt:	1104.5	kips
Unfactored (Total ftg-soil Wt):	1195.18	kips
1.2D. **No Soil Wedges.**	1392.86	kips
0.9D. **With Soil Wedges**	1143.17	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	0	kips
Unfactored WL Axial, PW:	50	kips
Unfactored WL Shear, V:	45	kips
Unfactored WL Moment, M:	5084	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	67.5	kips
0.90	0.9D+1.6W, Pu:	67.5	kips
1.35	Vu:	60.75	kips
	Mu:	6863.4	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	1392.86	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	7116.07	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	5.11	ft
Orthogonal qu=	2.60	ksf
qu/ϕ*qn Ratio=	**34.69%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.61	ft
Diagonal qu=	3.80	ksf
qu/ϕ*qn Ratio=	**50.63%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	1143.17	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	6250.62	ft-kips

Orthogonal ecc3 = M2/P2 =	5.47	ft
Ortho Non Bearing Length,NBL=	19.06	ft
Orthogonal qu=	2.20	ksf
Diagonal qu=	3.26	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	5084.00		
M Orthogonal:	10700.39	**47.51%**	**Pass**
M Diagonal:	9496.36	**53.54%**	**Pass**

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *806939*
Site Name:
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	5084	ft-kips
Axial:	50	kips
Shear:	45	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	61.37	in

Anchor Rod Results

Maximum Rod Tension:	163.6 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	83.9% Pass	Fty*ASIF

Plate Data		
Diam:	67.37	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	7.10	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	40.5 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	67.5% Pass	Y.L. Length: 30.94

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	5	in
Height:	18	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

n/a

Stiffener Results

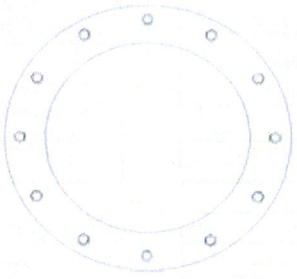
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

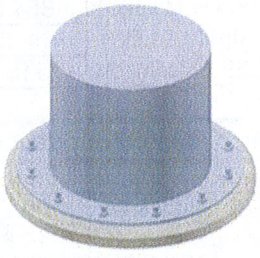
Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	53	in
Thick:	0.5625	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes