

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

RECEIVED  
JUN 23 2012  
CONNECTICUT  
SITING COUNCIL

June 27, 2012

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

Re: **EM-VER-119-120514 – 699 Old Main Street, Rocky Hill, Connecticut**  
**EM-VER-011-120123 – 785 Park Avenue, Bloomfield, Connecticut**  
**EM-VER-014-120110 – 405 Brushy Hill Road, Branford, Connecticut**  
**EM-VER-014-120106 – 180 North Main Street, Branford, Connecticut**  
**EM-VER-030-120106 – 330 Middletown Road, Columbia, Connecticut**  
**EM-VER-054-111108 – 374 Three Mile Road, Glastonbury, 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



Law Offices

BOSTON

PROVIDENCE

HARTFORD

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STAMFORD

WHITE PLAINS

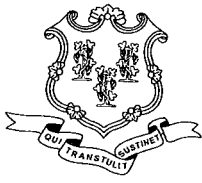
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11754237-v1



# 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

February 10, 2012

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

RE: **EM-VER-011-120123**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 785 Park Avenue, Bloomfield, 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 January 19, 2012. 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,

Linda Roberts  
Executive Director

LR/CDM/laf

c: The Honorable Sydney Schulman, Mayor, Town of Bloomfield  
Louie Chapman, Jr., Town Manager, Town of Bloomfield  
Thomas B. Hooper, Director of Planning, Town of Bloomfield

**Martin, David C.**

---

**From:** Mayo, Rachel [rmayo@RC.com]  
**Sent:** Tuesday, January 31, 2012 9:52 AM  
**To:** Martin, David C.  
**Cc:** Baldwin, Kenneth; Mayo, Rachel  
**Subject:** revised RF tables  
**Attachments:** 20120131094057\_00001\_00000000\_00000001.PDF; ATT00001..txt

Dave, here are the revised tables for those sites that you emailed me about

206 Everett Road, Easton  
691 Oxford Road, Oxford  
785 Park Avenue, Bloomfield  
400 Main Street, Somers  
197 North Chestnut Hill Road, Killingworth  
Titicus Mountain Road, New Fairfield  
125 Mile Creek Road Old Lyme  
126 Pioneer Heights Road in Somers.

The RF engineers over at Verizon had to correct a formula in the table...so you should come up with the same numbers now...please let me know if you have any other problems.

Thank you, Rachel

**Rachel A. Mayo**  
Land Use Analyst

**Robinson & Cole LLP**  
280 Trumbull Street  
Hartford, CT 06103-3597  
Direct 860-275-8213 | Fax 860-275-8299  
[rmayo@rc.com](mailto:rmayo@rc.com) | [www.rc.com](http://www.rc.com)  
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General Power Density

Site Name: BLOOMFIELD 3, CT  
 Cumulative Power Density

Operator	Operating Frequency (MHz)	Number of Trans	ERP/Power Trans (watts)	Total ERP (watts)	Distance to Target (feet)	Calculated Power Density (mW/cm <sup>2</sup> )	Maximum Permissible Exposure (mW/cm <sup>2</sup> )	Fraction of MPE (%)
VZW PCS	1970	7	379	2653	105	0.0865	1.0	8.65%
VZW Cellular	869	9	314	2826	105	0.0922	0.579333333	15.91%
VZW AWS	2145	1	948	948	105	0.0309	1.0	3.09%
VZW 700	698	1	821	821	105	0.0268	0.465333333	5.75%

**Total Percentage of Maximum Permissible Exposure**

33.41%

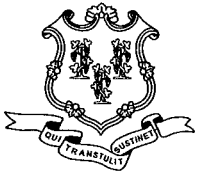
\*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz

mW/cm<sup>2</sup> = milliwatts per square centimeter

ERP = Effective Radiated Power

Absolute worst case maximum values used.



STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

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[www.ct.gov/csc](http://www.ct.gov/csc)

January 24, 2012

The Honorable Sydney Schulman  
Mayor  
Town of Bloomfield  
Town Hall  
800 Bloomfield Avenue  
P. O. Box 337  
Bloomfield, CT 06002-0337

RE: **EM-VER-011-120123**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 785 Park Avenue, Bloomfield, Connecticut.

Dear Mayor Schulman:

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 February 7, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

A handwritten signature in black ink that reads "L. Roberts".

Linda Roberts  
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Louie Chapman, Jr., Town Manager, Town of Bloomfield  
Thomas B. Hooper, Director of Planning, Town of Bloomfield

280 Trumbull Street  
 Hartford, CT 06103-3597  
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 Direct (860) 275-8345

January 19, 2012

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

**RECEIVED**  
 JAN 23 2012

CONNECTICUT  
 SITING COUNCIL

Re: **Notice of Exempt Modification – Antenna Swap**  
**785 Park Avenue, Bloomfield, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 105-foot level on an existing 140-foot tower at the above-referenced address. The tower and underlying property are owned by the Town of Bloomfield. Cellco’s use of the tower was approved by the Council in 2002. Cellco now intends to replace all of its existing antennas with two (2) model LPA-80080-6CF cellular antennas; two (2) model LPA-80063-4CF cellular antennas; two (2) LPA-80080-4CF cellular antennas; two (2) model BXA-171085-12BF PCS antennas; one (1) model BXA-171063-12BF PCS antenna; two (2) model SCLP 2x6014 LTE antennas; and one (1) model BXA-70063-6CF LTE antenna, all at the 105-foot level. Cellco also intends to install six (6) coax cable diplexers to its existing antenna platform. Attached behind Tab 1 are the specifications for the 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 Louis Chapman, Jr., Town Manager of the Town of Bloomfield.

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 height of the existing tower. Cellco’s replacement antennas and diplexers will be located at the 105-foot level on the existing 140-foot tower.



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Linda Roberts  
January 19, 2012  
Page 2

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

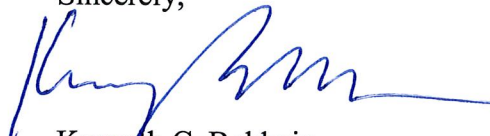
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

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 modifications. (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:

Louie Chapman, Jr., Bloomfield Town Manager  
Sandy M. Carter



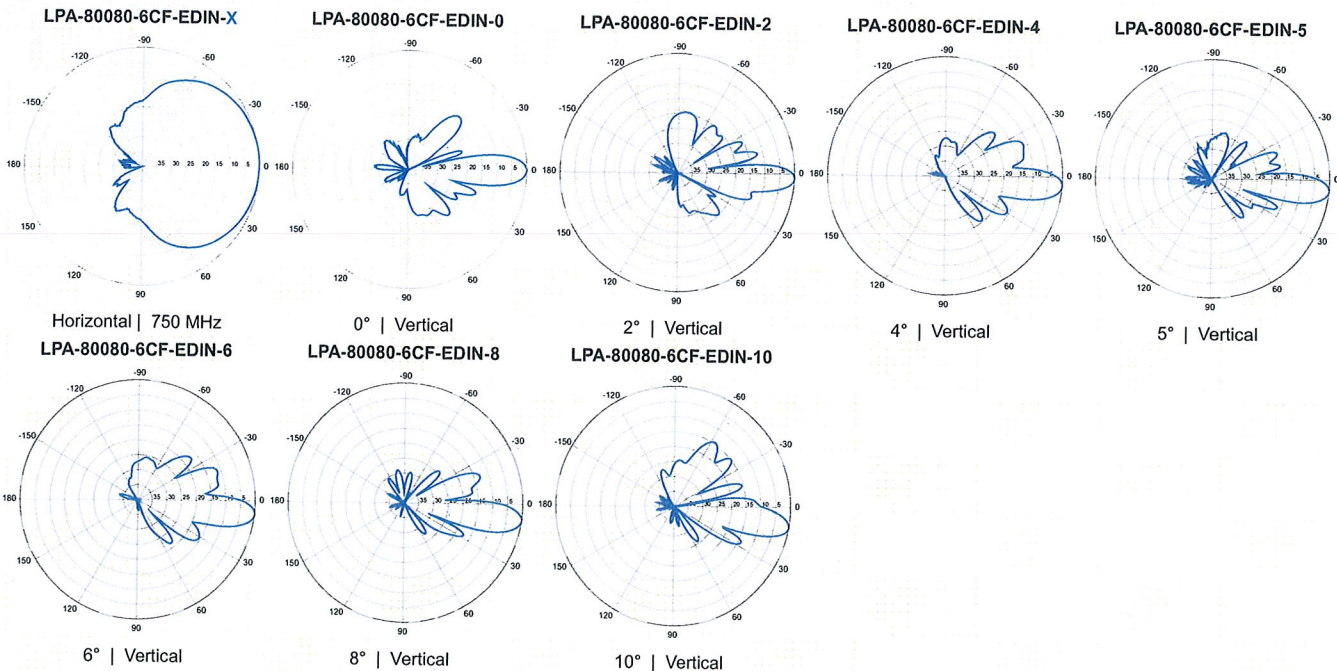
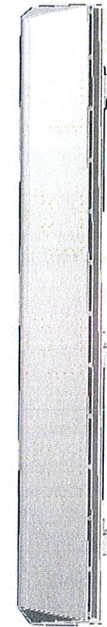
# LPA-80080-6CF-EDIN-X

V-Pol | Log Periodic | 80° | 14.0 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	80°	
Vertical beamwidth	10°	
Gain	14.0 dBd (16.1 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-22.6 dB	
Null fill	10% (-20.0 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	1800 x 140 x 335 mm      70.9 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm      14.8 in	
Weight without mounting brackets	9.5 kg      21.0 lbs	
Survival wind speed	> 201 km/hr      > 125 mph	
Wind area	Front: 0.25 m <sup>2</sup> Side: 0.61 m <sup>2</sup> Front: 2.7 ft <sup>2</sup> Side: 6.6 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 415 N    Side: 878 N      Front: 93 lbf    Side: 198 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.	



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.



### 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
Weight <sup>4)</sup>	9.1 kg	20 lbs
Wind Area Fore/Aft	0.47 m <sup>2</sup>	5.0 ft <sup>2</sup>
Wind Area Side	0.40 m <sup>2</sup>	4.4 ft <sup>2</sup>
Max Wind Survivability	>201 km/hr	>125 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	665 N	150 lbf
Side	577 N	130 lbf

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

### Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mounting & Downtilt Bracket Kit 21699999

### Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
Connector <sup>3)</sup>	NE or E-DIN Female 1 port / Center
VSWR <sup>1)</sup>	≤ 1.4:1
Polarization	Vertical
Gain <sup>1)</sup>	13.0 dBd 15.0 dBi
Power Rating <sup>2)</sup>	500 W
Half Power Angle <sup>1)</sup>	
Horizontal Beamwidth	63°
Vertical Beamwidth	15°
Electrical downtilt <sup>5)</sup>	0°
Null fill <sup>1)</sup>	10%
Lightning protection	Direct ground

1) Typical values.

2) Power rating limited by connector only.

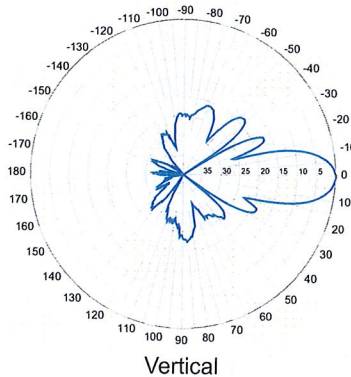
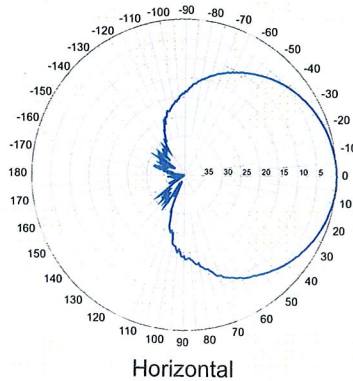
3) NE indicates an elongated N connector.  
E-DIN indicates an elongated DIN connector.

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<sup>1)</sup>

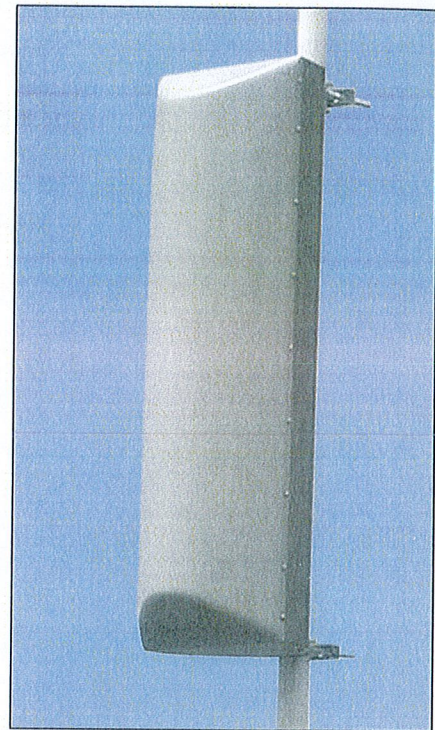


Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the front-to-back ratio.

### LPA-80063/4CF

When ordering replace "\_\_\_" with connector type.



Featuring our Exclusive  
3T 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 bandwidth 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: 12/26/08

806-960 MHz

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



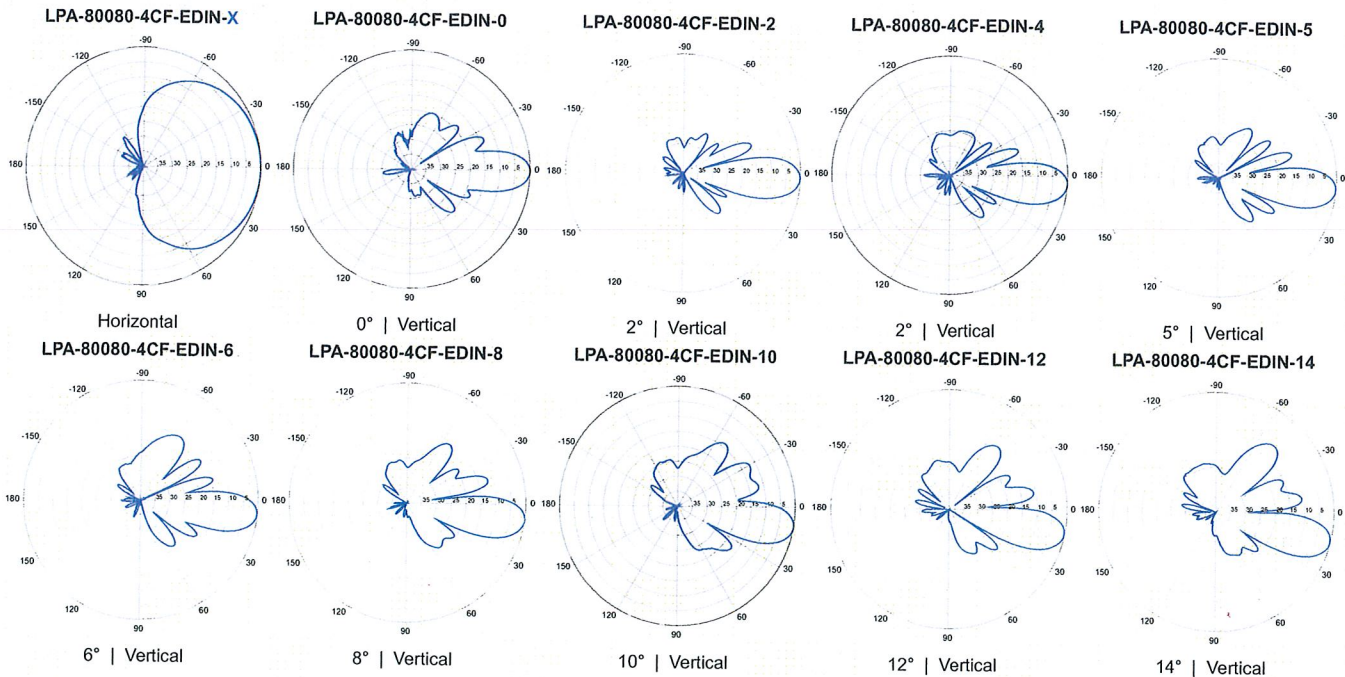
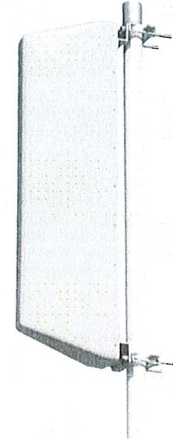
# LPA-80080-4CF-EDIN-X

V-Pol | Log Periodic | 80° | 12.5 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	80°						
Vertical beamwidth	15°						
Gain	12.5 dBd (14.6 dBi)						
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14						
Impedance	50Ω						
VSWR	≤1.4:1						
Upper sidelobe suppression (0°)	-14.2 dB						
Front-to-back ratio (+/-30°)	-34.7 dB						
Null fill	15% (-16.48 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	1200 x 140 x 335 mm      47.2 x 5.5 x 13.2 in						
Depth of antenna with z-bracket	375 mm      14.8 in						
Weight without mounting brackets	5.4 kg      12 lbs						
Survival wind speed	> 201 km/hr      > 125 mph						
Wind area	Front: 0.17 m <sup>2</sup> Side: 0.40 m <sup>2</sup> Front: 1.8 ft <sup>2</sup> Side: 4.3 ft <sup>2</sup>						
Wind load @ 161 km/hr (100 mph)	Front: 254 N    Side: 574 N      Front: 57 lbf    Side: 129 lbf						
Mounting Options							
2-Point Mounting & Downtilt Bracket Kit (0-20°)	<table border="1"> <thead> <tr> <th>Part Number</th> <th>Fits Pipe Diameter</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>21699999</td> <td>50-102 mm    2.0-4.0 in</td> <td>5.4 kg    12 lbs</td> </tr> </tbody> </table>	Part Number	Fits Pipe Diameter	Weight	21699999	50-102 mm    2.0-4.0 in	5.4 kg    12 lbs
Part Number	Fits Pipe Diameter	Weight					
21699999	50-102 mm    2.0-4.0 in	5.4 kg    12 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.						



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-171085-12BF-EDIN-X

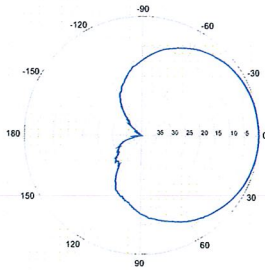
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

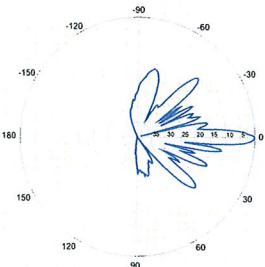


Electrical Characteristics	1710-2170 MHz				
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz		
Polarization	±45°	±45°	±45°		
Horizontal beamwidth	88°	85°	80°		
Vertical beamwidth	4.5°	4.5°	4.5°		
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi		
Electrical downtilt (X)		0, 2, 4			
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 m <sup>2</sup> Side: 0.19 m <sup>2</sup>	Front: 3.1 ft <sup>2</sup> Side: 2.1 ft <sup>2</sup>			
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-171085-12BF-EDIN-X-FP				

**BXA-171085-12BF-EDIN-X**

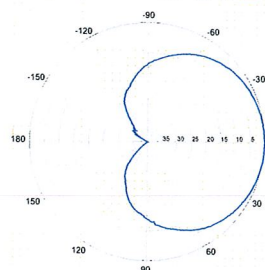


Horizontal | 1710-1880 MHz  
**BXA-171085-12BF-EDIN-0**

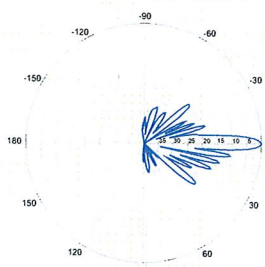


0° | Vertical | 1710-1880 MHz

**BXA-171085-12BF-EDIN-X**

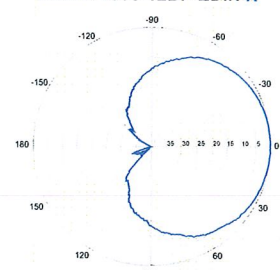


Horizontal | 1850-1990 MHz  
**BXA-171085-12BF-EDIN-0**

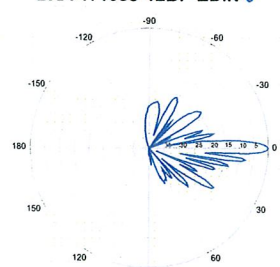


0° | Vertical | 1850-1990 MHz

**BXA-171085-12BF-EDIN-X**



Horizontal | 1920-2170 MHz  
**BXA-171085-12BF-EDIN-0**



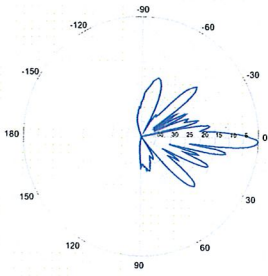
0° | Vertical | 1920-2170 MHz

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-171085-12BF-EDIN-X**

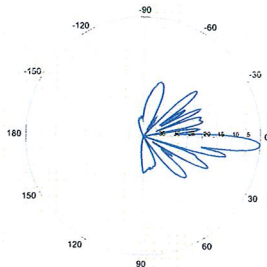
X-Pol | FET Panel | 85° | 18.0 dBi

**BXA-171085-12BF-EDIN-2**



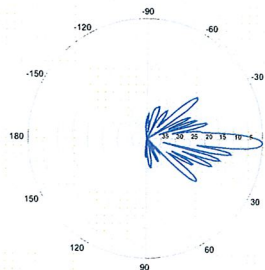
2° | Vertical | 1710-1880 MHz

**BXA-171085-12BF-EDIN-4**



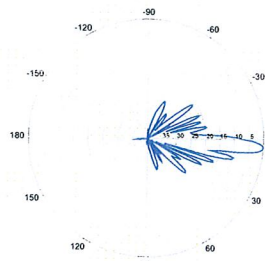
4° | Vertical | 1710-1880 MHz

**BXA-171085-12BF-EDIN-2**



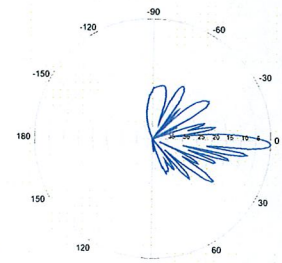
2° | Vertical | 1850-1990 MHz

**BXA-171085-12BF-EDIN-4**



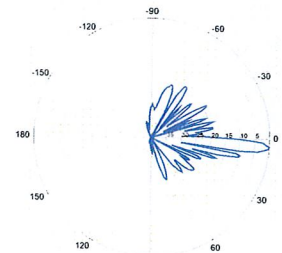
4° | Vertical | 1850-1990 MHz

**BXA-171085-12BF-EDIN-2**



2° | Vertical | 1920-2170 MHz

**BXA-171085-12BF-EDIN-4**



4° | 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

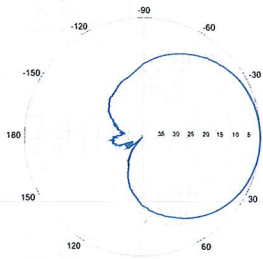
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

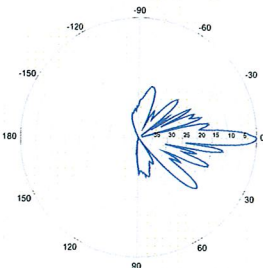
Electrical Characteristics	1710-2170 MHz			
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Polarization	±45°	±45°	±45°	
Horizontal beamwidth	68°	65°	60°	
Vertical beamwidth	4.5°	4.5°	4.5°	
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 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 m <sup>2</sup> Side: 0.19 m <sup>2</sup>	Front: 3.1 ft <sup>2</sup> Side: 2.1 ft <sup>2</sup>		
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**

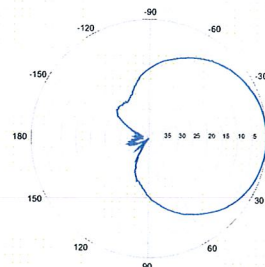


Horizontal | 1710-1880 MHz  
**BXA-171063-12BF-EDIN-0**

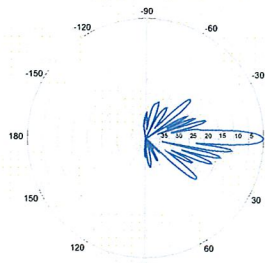


0° | Vertical | 1710-1880 MHz

**BXA-171063-12BF-EDIN-X**

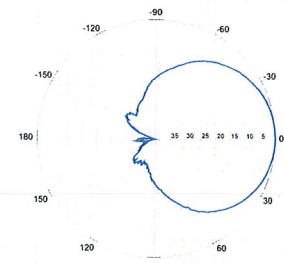


Horizontal | 1850-1990 MHz  
**BXA-171063-12BF-EDIN-0**

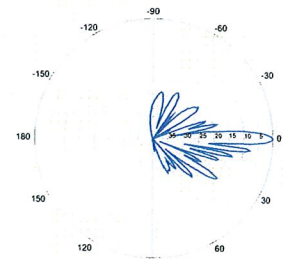


0° | Vertical | 1850-1990 MHz

**BXA-171063-12BF-EDIN-X**



Horizontal | 1920-2170 MHz  
**BXA-171063-12BF-EDIN-0**



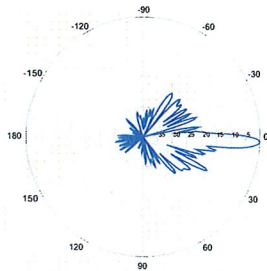
0° | Vertical | 1920-2170 MHz

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**BXA-171063-12BF-EDIN-X**

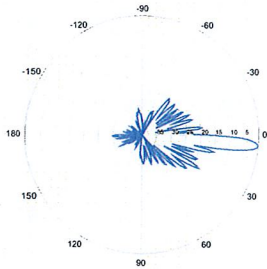
X-Pol | FET Panel | 63° | 19.0 dBi

**BXA-171063-12BF-EDIN-2**



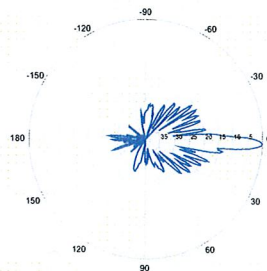
2° | Vertical | 1710-1880 MHz

**BXA-171063-12BF-EDIN-5**



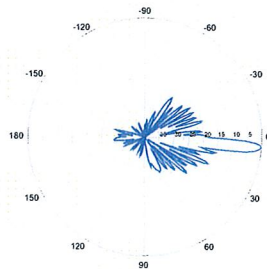
5° | Vertical | 1710-1880 MHz

**BXA-171063-12BF-EDIN-2**



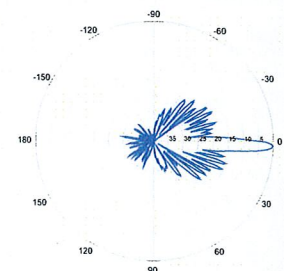
2° | Vertical | 1850-1990 MHz

**BXA-171063-12BF-EDIN-5**



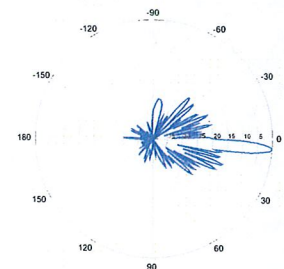
5° | Vertical | 1850-1990 MHz

**BXA-171063-12BF-EDIN-2**



2° | Vertical | 1920-2170 MHz

**BXA-171063-12BF-EDIN-5**



5° | Vertical | 1920-2170 MHz

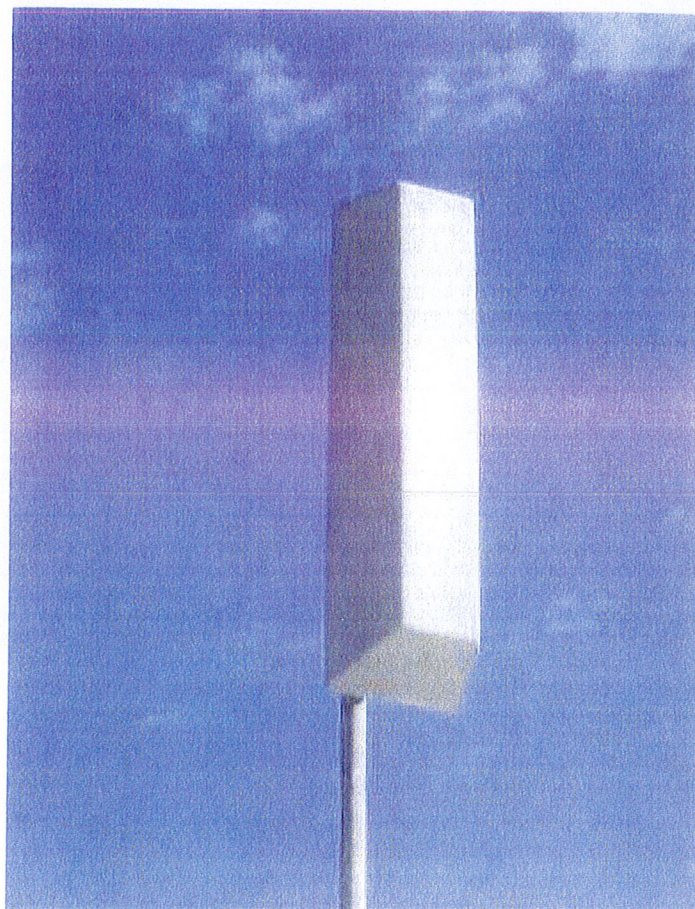
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# SLCP 2x6014

Dual (2x) Circularly Polarized log-periodic antenna

## Features

- Transmit Diversity Gain
- Can be configured to combine space & polarization diversity
- Outstanding performance over the entire band (700 - 800 MHz)
- Excellent Axial Ratio
- Optimized for 4G & 3G systems
- Low intermodulation
- Improved Side-to-side rejection
- Fading reduction
- Excellent isolation between ports



## Electrical specifications

Frequency range:	<b>700-800 MHz</b>
Impedance:	<b>50 ohm</b>
Connector type:	<b>7/16 Din</b>
Return loss:	<b>18 dB</b>
Polarization:	<b>Circular</b>
Gain ea. port [Circular]:	<b>2x14 dBdC</b>
Gain ea. port [Linear]:	<b>2x11 dBdL</b>
Axial Ratio:	<b>2 dB</b>
Isolation between ports (TX band):	<b>30 dB</b>
Front-to-back ratio:	<b>30 dB</b>
Intermodulation (2x20W):	<b>IM3 150 dB</b>
	<b>IM5 160 dB</b>
	<b>IM7/9 170 dB</b>
Power rating:	<b>2x 500 W</b>
H-plane (-3 dB point):	<b>2x 55°</b>
V-plane (-3 dB point):	<b>2x 16°</b>
Lightning protection:	<b>DC grounded</b>

## Mechanical specifications

Overall height:	<b>53 in</b>	<b>[1346 mm]</b>
Width:	<b>14 in</b>	<b>[356 mm]</b>
Depth:	<b>11 in</b>	<b>[279 mm]</b>
Weight (excluding brackets):	<b>20 lbs</b>	<b>[9 Kg]</b>
Wind load measured up to:	<b>150 mph</b>	<b>[240 Km/h]</b>
Wind area (side of antenna):	<b>5.15 sq. ft.</b>	<b>[0.48 sq.m]</b>
Lateral thrust at 113 mph/ 180 Km/h (worst case):	<b>263 lbs</b>	<b>[1171 N]</b>

## Materials

Radiating Elements:	<b>Aluminum</b>
Transformer (Power distribution)	<b>Ceramic PCB</b>
Chassis:	<b>Aluminum</b>
Radome:	<b>Grey Fiberglass/PVC</b>
Mounting bolts:	<b>Stainless steel</b>

*The SLCP 2x6014 is made in the U.S.A.*

## BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

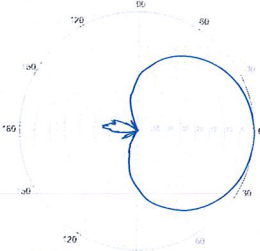
Replace "X" with desired electrical downtilt.

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



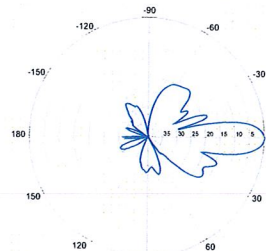
Electrical Characteristics	696-900 MHz		
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	65°	63°	
Vertical beamwidth	13°	11°	
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe 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 m <sup>2</sup> Side: 0.24 m <sup>2</sup>	Front: 5.5 ft <sup>2</sup> Side: 2.6 ft <sup>2</sup>	
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



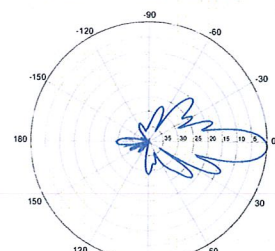
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

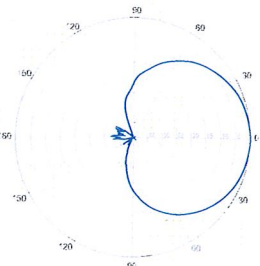


0° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-2



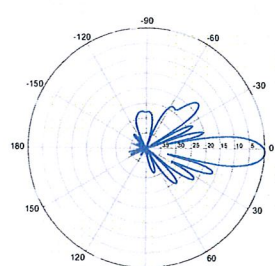
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

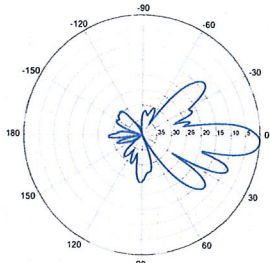
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**BXA-70063-6CF-EDIN-X**

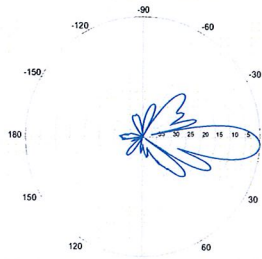
X-Pol | FET Panel | 63° | 14.5 dBd

**BXA-70063-6CF-EDIN-3**



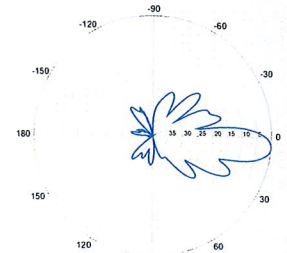
3° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-4**

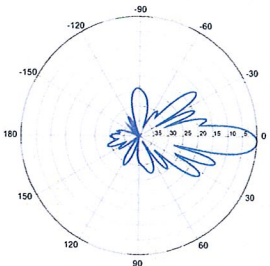


4° | Vertical | 750 MHz

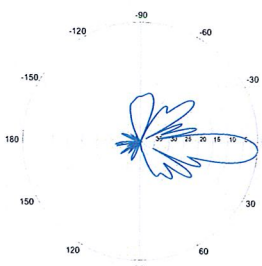
**BXA-70063-6CF-EDIN-5**



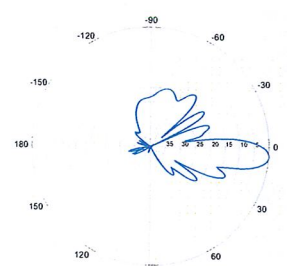
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

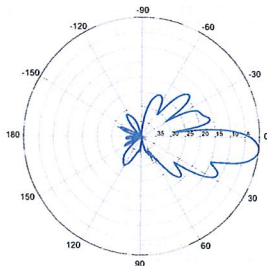


4° | Vertical | 850 MHz



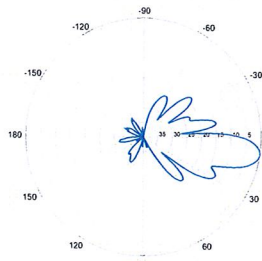
5° | Vertical | 850 MHz

**BXA-70063-6CF-EDIN-6**



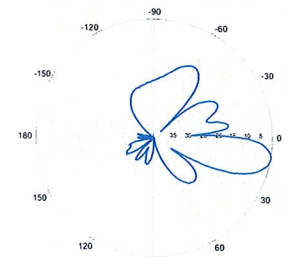
6° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-8**

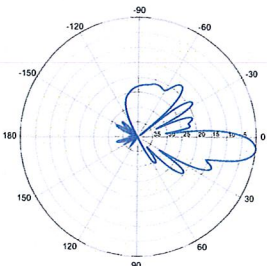


8° | Vertical | 750 MHz

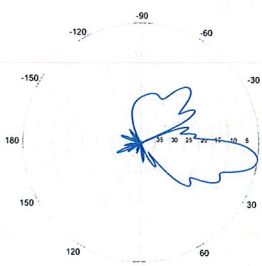
**BXA-70063-6CF-EDIN-10**



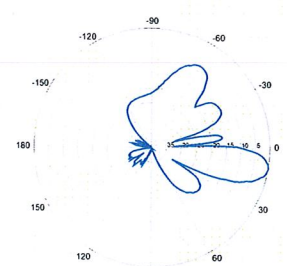
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

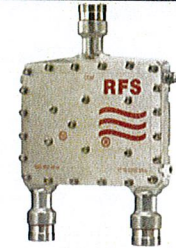
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## ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

### 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

All information contained in the present datasheet is subject to confirmation at time of ordering

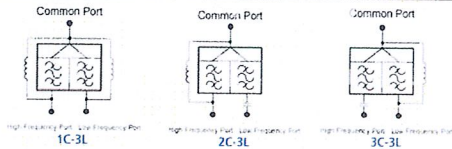


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband\_Diplexer\_Installation\_Rev5.pdf

Selection Guide Diplexer 698-960 / 1710-2200MHz		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 FD9R6004/1C-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)

All information contained in the present datasheet is subject to confirmation at time of ordering

		General		Power		Density							
Site Name: Bloomfield 3													
Tower Height: Verizon @ 105ft													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*Police UHF	1.25	74.82	143.5	0.0016	406	0.2707	0.60%						
*Police Back up repeater	1	161.2	144	0.0028	453.83	0.3026	0.92%						
*Hartford Co. Fire	1	86.35	147.2	0.0014	33.94	0.2000	0.72%						
*State Police	1	89.36	72.8	0.0061	45.86	0.2000	3.03%						
*NPSAC	1	34.98	141.5	0.0006	821.01	0.5473	0.11%						
*RAFS	2	39.02	94	0.0032	460.06	0.3067	1.04%						
*Pocket	3	631	125	0.0436	2130	1.0000	4.36%						
*Nextel	12	100	89	0.0545	851	0.5673	9.60%						
*Clearwire	2	153	115	0.0083	2496	1.0000	0.83%						
*Clearwire	1	211	115	0.0057	11 GHz	1.0000	0.57%						
*T-Mobile GSM	8	166	135	0.0262	1945	1.0000	2.62%						
*T-Mobile UMTS	2	692	135	0.0273	2100	1.0000	2.73%						
<b>Verizon PCS</b>	<b>7</b>	<b>379</b>	<b>105</b>	<b>0.0803</b>	<b>1970</b>	<b>1.0000</b>	<b>8.03%</b>						
<b>Verizon Cellular</b>	<b>9</b>	<b>314</b>	<b>105</b>	<b>0.0855</b>	<b>869</b>	<b>0.5793</b>	<b>14.76%</b>						
<b>Verizon AWS</b>	<b>1</b>	<b>948</b>	<b>105</b>	<b>0.0203</b>	<b>2145</b>	<b>1.0000</b>	<b>2.03%</b>						
<b>Verizon 700</b>	<b>2</b>	<b>821</b>	<b>105</b>	<b>0.0249</b>	<b>698</b>	<b>0.4653</b>	<b>5.35%</b>						
								<b>57.31%</b>					
* Source: Siting Council													

**Structural Analysis Report**

*138-ft Existing Summit Monopole*

*Proposed Verizon Wireless  
Antenna Upgrade*

*Verizon Site Ref: Bloomfield 3*

*785 Park Avenue  
Bloomfield, CT*

*Centek Project No. 12001.C07*

*Date: January 3, 2012*



**Prepared for:**  
Verizon Wireless  
99 East River Road, 9<sup>th</sup> Floor  
East Hartford, CT 06108

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## Introduction

The purpose of this report is to summarize the results of the non-linear, P- $\Delta$  structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing monopole (tower) located in Bloomfield, CT.

The host tower is a 138-ft, three-section, eighteen sided, tapered monopole, originally manufactured by PennSummit Tubular, LLC and designed by Paul J. Ford and Company job no; 29202-0288, dated August 20, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned design documents. Antenna and appurtenance information were obtained from a previous structural report prepared by Centek job no. 10011 dated March 17, 2010, visual verification from grade conducted by Centek personnel on December 28, 2011 and a Verizon RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A607-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 24.00-in at the top and 43.58-in at the base.

Verizon proposes the removal of twelve (12) panel antennas and the installation of twelve (12) panel antennas and six (6) diplexers mounted to the existing low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

## Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (EXISTING):  
Antennas: One (1) 20-ft 8-bay dipole antenna mounted with an elevation of 143-ft above existing grade.  
Coax Cables: Three (3) 1-5/8"  $\varnothing$  coax cables running on the inside of the existing tower.
- TOWN (EXISTING):  
Antennas: One (1) Motorola PTP400 microwave antenna pipe mounted with an elevation of 142-ft above existing grade.  
Coax Cables: One (1) Category 5e cable running on the inside of the existing tower.
- T-MOBILE (EXISTING):  
Antennas: Three (3) RFS APX16PV-16PVL-X panel antennas, three (3) RFS APX16DWV-16DWVS-E-ACU panel antennas, six (6) G200057A1 TMA's and three (3) RFS Twin AWS TMA's mounted on three (3) dual standoff mounts with a RAD center elevation of 138-ft above existing grade.  
Coax Cables: Twelve (12) 1-5/8"  $\varnothing$  coax cables running on the inside of the existing tower and six (6) 1-5/8"  $\varnothing$  coax cables running on the exterior of the tower.
- METROPCS (EXISTING):  
Antennas: Three (3) Kathrein 742-213 panel antenna flush mounted with a RAD center elevation of 125-ft above existing grade.  
Coax Cables: Six (6) 1-5/8"  $\varnothing$  coax cables running on the inside of the existing tower.

- **CLEARWIRE (EXISTING):**  
Antennas: Two (2) Argus LLPX310R and one (1) Kathrein 840-10054 panel antennas, three (3) Andrew VHLP1-23 microwave dishes, one (1) GPS antenna and six (6) RRU's mounted on a universal tri-bracket assembly with three (3) dual standoff mounts with an elevation of 115-ft above existing grade.  
Coax Cables: Four (4) 5/16", three (3) 5/8" and three (3) 1/2" Ø coax cables running on the exterior of the tower as specified in Section 3 of this report.
- **NEXTEL (Existing):**  
Antennas: Twelve (12) Decibel DB844G65ZAXY panel antennas mounted on a 13-ft low profile platform with a RAD center elevation of 95-ft above the existing grade.  
Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on the exterior of the tower as specified in Section 3 of this report.
- **TOWN (Existing):**  
Antennas: Three (3) Motorola PTP400 microwave antennas on three (3) 4'-6" by 3" Ø pipe mounts with an elevation of 83-ft above the existing grade.  
Coax Cables: Three (3) Category 5e (1 Wire) cables running on the inside of the existing tower.
- **VERIZON (EXISTING TO REMAIN):**  
Coax Cables: Twelve (12) 1-5/8" Ø coax cables running on the inside of the existing tower.
- **VERIZON (EXISTING TO REMOVE):**  
Antennas: Six (6) Andrew DB844G90A-XC and six (6) Andrew DB948F85T2E-M panel antennas mounted on a low profile platform with a RAD center elevation of 105-ft above existing grade.
- **VERIZON (PROPOSED):**  
Antennas: One (1) Antel BXA-70063-6CF panel antenna, two (2) Swedcom SLCP 2X6014 panel antennas, two (2) Antel LPA-80080-6CF panel antennas, two (2) Antel LPA-80063-4CF panel antennas, two (2) Antel LPA-80080-4CF panel antennas, one (1) Antel BXA-171063-12BF panel antenna, two (2) Antel BXA-171085-12BF panel antennas and six (6) RFS FD9R6004/2C-3L Diplexers mounted on a low profile platform with a RAD center elevation of 105-ft above existing grade.



### Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

## Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 80 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled “Structural Standards for Steel Antenna Towers and Antenna Supporting Structures”, the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

## Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½” radial ice tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile) Bloomfield; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile) <i>TIA/EIA wind speed controls.</i>	<i>[Section 16 of TIA/EIA-222-F-96]</i> <i>[Appendix K of the 2005 CT Building Code Supplement]</i>
Load Cases:	<u>Load Case 1</u> ; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.  <u>Load Case 2</u> ; 69 mph wind speed w/ ½” radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed. This load case typically controls the design of lattice towers.  <u>Load Case 3</u> ; Seismic – not checked	<i>[Section 2.3.16 of TIA/EIA-222-F-96]</i> <i>[Section 2.3.16 of TIA/EIA-222-F-96]</i> <i>[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type</i>

## Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **71.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	0.00'-46.00'	71.5%	<b>PASS</b>

## Foundation and Anchors

The existing foundation consists of a 6.0-ft  $\varnothing$  x 45.5-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned PJF design report; project no. 29202-0288 dated August 20, 2002. The base of the tower is connected to the foundation by means of (16) 2.25"  $\varnothing$ , ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	21 kips
	Compression	30 kips
	Moment	1943 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	59.1%	<b>PASS</b>
	Lateral Deflection	1.17 in <sup>(1)</sup>	

Note 1: Lateral deflection limited to 1.86" per Paul J. Ford L-Pile report dated August 20, 2002.

CENTEK Engineering, Inc.  
Structural Analysis - 138-ft Summit Monopole  
Verizon Wireless Antenna Upgrade – Bloomfield 3  
Bloomfield, CT  
January 3, 2012

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Compression	60.4%	PASS
Base Plate	Bending	56.7%	PASS

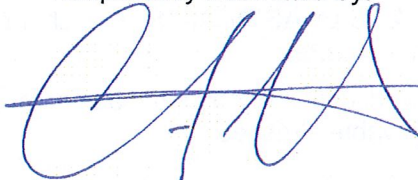
### Conclusion

This analysis shows that the subject tower is adequate to support the proposed modified antenna configuration.

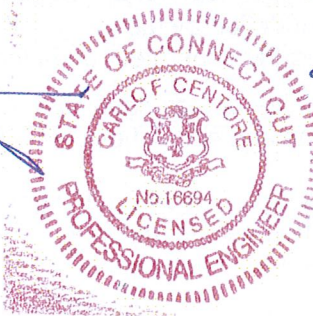
The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Carlo F. Centore, PE  
Principal ~ Structural Engineer



Prepared by:



Timothy J. Lynn, EIT  
Structural Engineer

*Standard Conditions for Furnishing of  
Professional Engineering Services on  
Existing Structures*

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

### RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

**DESIGNED APPURTENANCE LOADING**

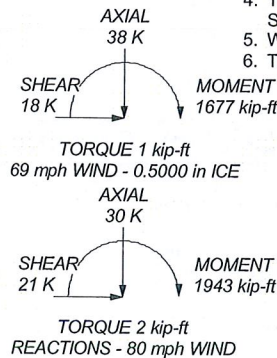
TYPE	ELEVATION	TYPE	ELEVATION
20' 8 Bay Di-Pole (Town - Existing)	143	Dual Standoff Mount B1827 (Clearwire - Existing)	115
PTP400 (Town - Existing)	142	Dual Standoff Mount B1827 (Clearwire - Existing)	115
4'6"x3" Pipe Mount (Town - Existing)	140	Dual Standoff Mount B1827 (Clearwire - Existing)	115
APX16PV-16PVL-X (T-Mobile - Existing)	138	Dual Standoff Mount B1827 (Clearwire - Existing)	115
(2) G20057A1 TMA (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
APX16PV-16PVL-X (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
(2) G20057A1 TMA (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
APX16PV-16PVL-X (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
(2) G20057A1 TMA (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
APX16PV-16PVL-X (T-Mobile - Existing)	138	6'x3" Pipe Mount (Clearwire - Existing)	115
(2) G20057A1 TMA (T-Mobile - Existing)	138	VHLP1-23 (Clearwire - Existing)	115
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	138	VHLP1-23 (Clearwire - Existing)	115
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	138	VHLP1-23 (Clearwire - Existing)	115
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	138	LPA-80080-6CF (Verizon - Proposed)	105
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	138	LPA-80063/4CF (Verizon - Proposed)	105
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	138	LPA-80080-4CF (Verizon - Proposed)	105
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	138	BXA-171085-12BF (Verizon - Proposed)	105
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	138	SLCP 2x6014 (Verizon - Proposed)	105
Valmont Uni-Tri Bracket (T-Mobile - Existing)	138	LPA-80063/4CF (Verizon - Proposed)	105
Dual Standoff Mount B1827 (T-Mobile - Existing)	138	LPA-80080-4CF (Verizon - Proposed)	105
Dual Standoff Mount B1827 (T-Mobile - Existing)	138	(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	105
Dual Standoff Mount B1827 (T-Mobile - Existing)	138	(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	105
Dual Standoff Mount B1827 (T-Mobile - Existing)	138	(2) FD9R6004/2C-3L Diplexer (Verizon - Proposed)	105
742 213 w/mount pipe (MetroPCS - Existing)	125	13' Low Profile Platform (Verizon)	105
742 213 w/mount pipe (MetroPCS - Existing)	125	LPA-80080-6CF (Verizon - Proposed)	105
742 213 w/mount pipe (MetroPCS - Existing)	125	BXA-171085-12BF (Verizon - Proposed)	105
742 213 w/mount pipe (MetroPCS - Existing)	125	BXA-70063/6CF (Verizon - Proposed)	105
LLPX310R (Clearwire - Existing)	115	13' Low Profile Platform (Nextel - Existing)	95
LLPX310R (Clearwire - Existing)	115	(4) DB844G65ZAXY (Nextel - Existing)	95
840-10054 (Clearwire - Existing)	115	(4) DB844G65ZAXY (Nextel - Existing)	95
(2) RRU (Clearwire - Existing)	115	(4) DB844G65ZAXY (Nextel - Existing)	95
(2) RRU (Clearwire - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
(2) RRU (Clearwire - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
GPS (Clearwire - Existing)	115	4'6"x3" Pipe Mount (Town - Existing)	83
Valmont Uni-Tri Bracket (Clearwire - Existing)	115	PTP400 (Town - Existing)	83
		PTP400 (Town - Existing)	83

**MATERIAL STRENGTH**

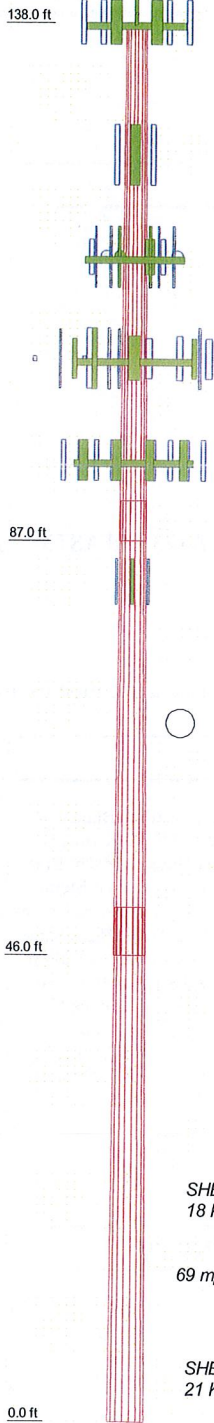
GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
5. Welds are fabricated with ER-70S-6 electrodes.
6. TOWER RATING: 71.5%



Section	1	2	3
Length (ft)	51.00	45.00	50.75
Number of Sides	18	18	18
Thickness (in)	0.1875	0.3750	0.4375
Socket Length (ft)	4.00	4.75	
Top Dia (in)	24.0000	30.6768	35.9654
Bot Dia (in)	31.6520	37.4280	43.5800
Grade		A607-65	
Weight (K)	2.9	6.1	9.4



<b>Centek Engineering Inc.</b> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: <b>12001.CO7 - Bloomfield 3</b>		
	Project: <b>138' Summit Monopole - 785 Park Ave., Bloomfield, CT</b>		
	Client: Verizon Wireless	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 01/03/12	Scale: NTS
Path: J:\Jobs\1200100.W\CO7 - Bloomfield 3\Cals\ERI Files\138' Summit Monopole Bloomfield er		Dwg No. E-1	

<b>RISATower</b>  <b>Centek Engineering Inc.</b> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 12001.CO7 - Bloomfield 3	<b>Page</b> 1 of 21
	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

## Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56.0 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

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

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> </ul> | <ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="padding-left: 20px;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	138.00-87.00	51.00	4.00	18	24.0000	31.6520	0.1875	0.7500	A607-65 (65 ksi)
L2	87.00-46.00	45.00	4.75	18	30.6768	37.4280	0.3750	1.5000	A607-65 (65 ksi)
L3	46.00-0.00	50.75		18	35.9654	43.5800	0.4375	1.7500	A607-65 (65 ksi)



<b>RISATower</b>  <b>Centek Engineering Inc.</b> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 12001.CO7 - Bloomfield 3	<b>Page</b> 2 of 21
	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	24.3702	14.1714	1015.2211	8.4534	12.1920	83.2694	2031.7780	7.0871	3.8940	20.768
	32.1403	18.7253	2342.1146	11.1699	16.0792	145.6610	4687.3111	9.3644	5.2408	27.951
L2	31.7594	36.0668	4183.9142	10.7572	15.5838	268.4778	8373.3337	18.0368	4.7391	12.638
	38.0054	44.1023	7649.7241	13.1538	19.0134	402.3328	15309.5138	22.0554	5.9273	15.806
L3	37.2439	49.3349	7867.3820	12.6124	18.2704	430.6078	15745.1161	24.6721	5.5599	12.708
	44.2523	59.9088	14087.6435	15.3156	22.1386	636.3374	28193.8239	29.9601	6.9001	15.772

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 138.00-87.00				1	1	1		
L2 87.00-46.00				1	1	1		
L3 46.00-0.00				1	1	1		

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>AA</sub>	Weight plf
1 5/8 (T-Mobile - Existing)	A	No	Inside Pole	138.00 - 3.00	12	No Ice 1/2" Ice	0.00 1.04
1 5/8 (Verizon - Existing)	B	No	Inside Pole	105.00 - 3.00	12	No Ice 1/2" Ice	0.00 1.04
1 5/8 (Nextel - Existing)	A	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.20 2.55
1 5/8 (Nextel - Existing)	A	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.00 2.55
1 5/8 (Nextel - Existing)	B	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.20 2.55
1 5/8 (Nextel - Existing)	B	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.00 2.55
1 5/8 (Nextel - Existing)	C	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.20 2.55
1 5/8 (Nextel - Existing)	C	No	CaAa (Out Of Face)	95.00 - 85.00	2	No Ice 1/2" Ice	0.00 2.55
1 5/8 (Nextel - Existing)	C	No	Inside Pole	85.00 - 3.00	12	No Ice 1/2" Ice	0.00 1.04
1 5/8 CATEGORY 5e (1 WIRE) (Town - Existing)	C	No	Inside Pole	138.00 - 3.00	1	No Ice 1/2" Ice	0.00 0.21
1 5/8 CATEGORY 5e (1 WIRE) (Town - Existing)	A	No	Inside Pole	85.00 - 3.00	3	No Ice 1/2" Ice	0.00 0.21
1 5/8 (Town - Existing)	B	No	Inside Pole	138.00 - 3.00	3	No Ice 1/2" Ice	0.00 1.04
1 5/8 (Town - Existing)	C	No	Inside Pole	126.00 - 3.00	6	No Ice 1/2" Ice	0.00 1.04
1 5/8 (MetroPCS - Existing)						No Ice 1/2" Ice	0.00 1.04
1 5/8 (T-Mobile - Existing)	A	No	CaAa (Out Of Face)	138.00 - 3.00	1	No Ice 1/2" Ice	0.20 2.55
1 5/8 (T-Mobile - Existing)	A	No	CaAa (Out Of Face)	138.00 - 3.00	5	No Ice 1/2" Ice	0.00 2.55

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	Verizon Wireless	TJL

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>AA</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
Clearwire Bundle (Clearwire - Existing)	C	No	CaAa (Out Of Face)	115.00 - 3.00	1	No Ice	2.50
						1/2" Ice	3.00

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	138.00-87.00	A	0.000	0.000	0.000	13.266	0.99
		B	0.000	0.000	0.000	3.168	0.42
		C	0.000	0.000	0.000	11.568	0.36
L2	87.00-46.00	A	0.000	0.000	0.000	8.910	0.80
		B	0.000	0.000	0.000	0.792	0.65
		C	0.000	0.000	0.000	13.092	0.86
L3	46.00-0.00	A	0.000	0.000	0.000	8.514	0.83
		B	0.000	0.000	0.000	0.000	0.67
		C	0.000	0.000	0.000	12.900	0.92

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight
	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
L1	138.00-87.00	A	0.500	0.000	0.000	0.000	19.966	1.50
		B		0.000	0.000	0.000	4.768	0.47
		C		0.000	0.000	0.000	15.968	0.42
L2	87.00-46.00	A	0.500	0.000	0.000	0.000	13.410	1.18
		B		0.000	0.000	0.000	1.192	0.66
		C		0.000	0.000	0.000	17.592	0.89
L3	46.00-0.00	A	0.500	0.000	0.000	0.000	12.814	1.22
		B		0.000	0.000	0.000	0.000	0.67
		C		0.000	0.000	0.000	17.200	0.94

### Feed Line Center of Pressure

Section	Elevation	CP <sub>X</sub>	CP <sub>Z</sub>	CP <sub>X</sub> Ice	CP <sub>Z</sub> Ice
	ft	in	in	in	in
L1	138.00-87.00	-0.1837	-0.1341	-0.2195	-0.1971
L2	87.00-46.00	-0.3263	-0.0603	-0.3987	-0.1128
L3	46.00-0.00	-0.3180	-0.0587	-0.3959	-0.1120

### Discrete Tower Loads

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	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
20' 8 Bay Di-Pole (Town - Existing)	C	From Face	1.00	0.0000	143.00	No Ice	4.00	4.00	0.06
			0.00			1/2" Ice	6.00	6.00	0.10
			10.00						
PTP400 (Town - Existing)	C	From Face	1.00	0.0000	142.00	No Ice	2.04	0.53	0.01
			0.00			1/2" Ice	2.24	0.65	0.02
			0.00						
4'6"x3" Pipe Mount (Town - Existing)	C	From Face	1.00	0.0000	140.00	No Ice	1.30	1.30	0.03
			0.00			1/2" Ice	1.57	1.57	0.05
			0.00						
APX16PV-16PVL-X (T-Mobile - Existing)	A	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
(2) G20057A1 TMA (T-Mobile - Existing)	A	From Face	4.00	0.0000	138.00	No Ice	0.82	0.39	0.01
			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
APX16PV-16PVL-X (T-Mobile - Existing)	B	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
(2) G20057A1 TMA (T-Mobile - Existing)	B	From Face	4.00	0.0000	138.00	No Ice	0.82	0.39	0.01
			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
APX16PV-16PVL-X (T-Mobile - Existing)	C	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
(2) G20057A1 TMA (T-Mobile - Existing)	C	From Face	4.00	0.0000	138.00	No Ice	0.82	0.39	0.01
			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	A	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			-2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	B	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			-2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
APX16DWV-16DWV-S-E-A CU (T-Mobile - Existing)	C	From Face	4.00	0.0000	138.00	No Ice	6.70	2.00	0.04
			-2.00			1/2" Ice	7.13	2.33	0.07
			0.00						
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	A	From Face	4.00	0.0000	138.00	No Ice	1.17	0.47	0.01
			0.00			1/2" Ice	1.31	0.57	0.02
			0.00						
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	B	From Face	4.00	0.0000	138.00	No Ice	1.17	0.47	0.01
			0.00			1/2" Ice	1.31	0.57	0.02
			0.00						
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	C	From Face	4.00	0.0000	138.00	No Ice	1.17	0.47	0.01
			0.00			1/2" Ice	1.31	0.57	0.02
			0.00						
Valmont Uni-Tri Bracket (T-Mobile - Existing)	C	From Face	2.00	0.0000	138.00	No Ice	1.75	1.75	0.29
			0.00			1/2" Ice	1.94	1.94	0.31
			0.00						
Dual Standoff Mount B1827 (T-Mobile - Existing)	A	From Face	2.00	0.0000	138.00	No Ice	1.40	1.40	0.10
			0.00			1/2" Ice	1.75	1.75	0.13
			0.00						
Dual Standoff Mount B1827 (T-Mobile - Existing)	B	From Face	2.00	0.0000	138.00	No Ice	1.40	1.40	0.10
			0.00			1/2" Ice	1.75	1.75	0.13
			0.00						
Dual Standoff Mount B1827 (T-Mobile - Existing)	C	From Face	2.00	0.0000	138.00	No Ice	1.40	1.40	0.10
			0.00			1/2" Ice	1.75	1.75	0.13
			0.00						

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	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
742 213 w/mount pipe (MetroPCS - Existing)	A	From Face	1.00	0.0000	125.00	No Ice	5.20	4.45	0.05
			0.00	1/2" Ice		5.71	5.72	0.09	
			0.00						
742 213 w/mount pipe (MetroPCS - Existing)	B	From Face	1.00	0.0000	125.00	No Ice	5.20	4.45	0.05
			0.00	1/2" Ice		5.71	5.72	0.09	
			0.00						
742 213 w/mount pipe (MetroPCS - Existing)	C	From Face	1.00	0.0000	125.00	No Ice	5.20	4.45	0.05
			0.00	1/2" Ice		5.71	5.72	0.09	
			0.00						
LLPX310R (Clearwire - Existing)	A	From Face	3.00	0.0000	115.00	No Ice	4.83	1.95	0.03
			-1.50	1/2" Ice		5.18	2.21	0.05	
			0.00						
LLPX310R (Clearwire - Existing)	B	From Face	3.00	0.0000	115.00	No Ice	4.83	1.95	0.03
			-1.50	1/2" Ice		5.18	2.21	0.05	
			0.00						
840-10054 (Clearwire - Existing)	C	From Face	3.00	0.0000	115.00	No Ice	5.19	1.36	0.00
			-1.50	1/2" Ice		5.54	1.62	0.02	
			0.00						
(2) RRU (Clearwire - Existing)	A	From Face	3.00	0.0000	115.00	No Ice	1.80	0.78	0.03
			0.00	1/2" Ice		2.00	0.92	0.04	
			0.00						
(2) RRU (Clearwire - Existing)	B	From Face	3.00	0.0000	115.00	No Ice	1.80	0.78	0.03
			0.00	1/2" Ice		2.00	0.92	0.04	
			0.00						
(2) RRU (Clearwire - Existing)	C	From Face	3.00	0.0000	115.00	No Ice	1.80	0.78	0.03
			0.00	1/2" Ice		2.00	0.92	0.04	
			0.00						
GPS (Clearwire - Existing)	A	From Face	3.00	0.0000	115.00	No Ice	1.00	1.00	0.01
			0.00	1/2" Ice		1.50	1.50	0.01	
			0.00						
Valmont Uni-Tri Bracket (Clearwire - Existing)	C	None		0.0000	115.00	No Ice	1.75	1.75	0.29
				1/2" Ice		1.94	1.94	0.31	
Dual Standoff Mount B1827 (Clearwire - Existing)	A	None		0.0000	115.00	No Ice	1.40	1.40	0.10
				1/2" Ice		1.75	1.75	0.13	
Dual Standoff Mount B1827 (Clearwire - Existing)	B	None		0.0000	115.00	No Ice	1.40	1.40	0.10
				1/2" Ice		1.75	1.75	0.13	
Dual Standoff Mount B1827 (Clearwire - Existing)	C	None		0.0000	115.00	No Ice	1.40	1.40	0.10
				1/2" Ice		1.75	1.75	0.13	
6'x3" Pipe Mount (Clearwire - Existing)	A	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
6'x3" Pipe Mount (Clearwire - Existing)	B	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
6'x3" Pipe Mount (Clearwire - Existing)	C	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
6'x3" Pipe Mount (Clearwire - Existing)	A	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			-1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
6'x3" Pipe Mount (Clearwire - Existing)	B	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			-1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
6'x3" Pipe Mount (Clearwire - Existing)	C	From Face	2.50	0.0000	115.00	No Ice	1.77	1.77	0.03
			-1.50	1/2" Ice		2.13	2.13	0.05	
			0.00						
LPA-80080-6CF	A	From Face	4.00	0.0000	105.00	No Ice	4.33	9.09	0.02

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	<b>Project</b>						<b>Date</b>	
138' Summit Monopole - 785 Park Ave., Bloomfield, CT						09:20:11 01/03/12		
<b>Client</b>						<b>Designed by</b>		
Verizon Wireless						TJL		

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAA Front	CAA Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
(Verizon - Proposed)			6.00			1/2" Ice	4.76	9.64	0.07
BXA-171085-12BF	A	From Face	4.00		0.0000	No Ice	4.73	3.57	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	4.01	0.04
BXA-70063/6CF	A	From Face	4.00		0.0000	No Ice	7.73	4.16	0.02
(Verizon - Proposed)			0.00			1/2" Ice	8.27	4.60	0.06
LPA-80080-6CF	A	From Face	4.00		0.0000	No Ice	4.33	9.09	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	4.76	9.64	0.07
LPA-80063/4CF	B	From Face	4.00		0.0000	No Ice	7.00	6.08	0.02
(Verizon - Proposed)			6.00			1/2" Ice	7.41	6.48	0.07
BXA-171063-12BF	B	From Face	4.00		0.0000	No Ice	4.73	3.57	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	4.01	0.04
SLCP 2x6014	B	From Face	4.00		0.0000	No Ice	7.21	5.67	0.02
(Verizon - Proposed)			0.00			1/2" Ice	7.65	6.09	0.07
LPA-80063/4CF	B	From Face	4.00		0.0000	No Ice	7.00	6.08	0.02
(Verizon - Proposed)			-6.00			1/2" Ice	7.41	6.48	0.07
LPA-80080-4CF	C	From Face	4.00		0.0000	No Ice	2.62	6.06	0.01
(Verizon - Proposed)			6.00			1/2" Ice	2.92	6.45	0.05
BXA-171085-12BF	C	From Face	4.00		0.0000	No Ice	4.73	3.57	0.02
(Verizon - Proposed)			4.00			1/2" Ice	5.18	4.01	0.04
SLCP 2x6014	C	From Face	4.00		0.0000	No Ice	7.21	5.67	0.02
(Verizon - Proposed)			0.00			1/2" Ice	7.65	6.09	0.07
LPA-80080-4CF	C	From Face	4.00		0.0000	No Ice	2.62	6.06	0.01
(Verizon - Proposed)			-6.00			1/2" Ice	2.92	6.45	0.05
(2) FD9R6004/2C-3L Diplexer	A	From Face	4.00		0.0000	No Ice	0.37	0.08	0.00
(Verizon - Proposed)			-6.00			1/2" Ice	0.45	0.14	0.01
(2) FD9R6004/2C-3L Diplexer	A	From Face	4.00		0.0000	No Ice	0.37	0.08	0.00
(Verizon - Proposed)			-6.00			1/2" Ice	0.45	0.14	0.01
(2) FD9R6004/2C-3L Diplexer	A	From Face	4.00		0.0000	No Ice	0.37	0.08	0.00
(Verizon - Proposed)			-6.00			1/2" Ice	0.45	0.14	0.01
13' Low Profile Platform (Verizon)	C	None			0.0000	No Ice	15.70	15.70	1.30
(4) DB844G65ZAXY (Nextel - Existing)	A	From Face	4.00		0.0000	No Ice	4.67	3.73	0.02
			0.00			1/2" Ice	5.05	4.10	0.05
(4) DB844G65ZAXY (Nextel - Existing)	B	From Face	4.00		0.0000	No Ice	4.67	3.73	0.02
			0.00			1/2" Ice	5.05	4.10	0.05
(4) DB844G65ZAXY (Nextel - Existing)	C	From Face	4.00		0.0000	No Ice	4.67	3.73	0.02
			0.00			1/2" Ice	5.05	4.10	0.05
13' Low Profile Platform (Nextel - Existing)	C	None			0.0000	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76

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	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
PTP400 (Town - Existing)	A	From Face	1.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.01 0.02
PTP400 (Town - Existing)	B	From Face	1.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.01 0.02
PTP400 (Town - Existing)	C	From Face	1.00 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.01 0.02
4'6"x3" Pipe Mount (Town - Existing)	A	From Face	0.50 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	1.30 1.57	1.30 1.57	0.03 0.05
4'6"x3" Pipe Mount (Town - Existing)	B	From Face	0.50 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	1.30 1.57	1.30 1.57	0.03 0.05
4'6"x3" Pipe Mount (Town - Existing)	C	From Face	0.50 0.00 0.00	0.0000	83.00	No Ice 1/2" Ice	1.30 1.57	1.30 1.57	0.03 0.05

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K	
VHLP1-23 (Clearwire - Existing)	A	Paraboloid w/o Radome	From Face	3.00 1.50 0.00	Worst		115.00	1.27	No Ice 1/2" Ice	1.28 1.45	0.01 0.01
VHLP1-23 (Clearwire - Existing)	B	Paraboloid w/o Radome	From Face	3.00 1.50 0.00	Worst		115.00	1.27	No Ice 1/2" Ice	1.28 1.45	0.01 0.01
VHLP1-23 (Clearwire - Existing)	C	Paraboloid w/o Radome	From Face	3.00 1.50 0.00	Worst		115.00	1.27	No Ice 1/2" Ice	1.28 1.45	0.01 0.01

### Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> psf	A <sub>G</sub> ft <sup>2</sup>	F <sub>a</sub> c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
L1 138.00-87.00	111.74	1.417	23.16	118.260	A B C	0.000 0.000 0.000	118.260 118.260 118.260	118.260	100.00 100.00 100.00	0.000 0.000 0.000	13.266 3.168 11.568



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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	4.10	80.48	C
			B	1	0.65	1	1	118.260				
			C	1	0.65	1	1	118.260				
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	3.33	81.33	C
			B	1	0.65	1	1	117.371				
			C	1	0.65	1	1	117.371				
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	3.38	73.47	C
			B	1	0.65	1	1	153.828				
			C	1	0.65	1	1	153.828				
Sum Weight:	6.50	18.43						OTM	755.62 kip-ft	10.82		

**Tower Forces - No Ice - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	4.10	80.48	C
			B	1	0.65	1	1	118.260				
			C	1	0.65	1	1	118.260				
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	3.33	81.33	C
			B	1	0.65	1	1	117.371				
			C	1	0.65	1	1	117.371				
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	3.38	73.47	C
			B	1	0.65	1	1	153.828				
			C	1	0.65	1	1	153.828				
Sum Weight:	6.50	18.43						OTM	755.62 kip-ft	10.82		

**Tower Forces - No Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	4.10	80.48	C
			B	1	0.65	1	1	118.260				
			C	1	0.65	1	1	118.260				
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	3.33	81.33	C
			B	1	0.65	1	1	117.371				
			C	1	0.65	1	1	117.371				
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	3.38	73.47	C
			B	1	0.65	1	1	153.828				
			C	1	0.65	1	1	153.828				
Sum Weight:	6.50	18.43						OTM	755.62 kip-ft	10.82		



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**Tower Forces - No Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	4.10	80.48	C
			B	1	0.65	1	1	1	118.260			
			C	1	0.65	1	1	1	118.260			
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	3.33	81.33	C
			B	1	0.65	1	1	1	117.371			
			C	1	0.65	1	1	1	117.371			
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	3.38	73.47	C
			B	1	0.65	1	1	1	153.828			
			C	1	0.65	1	1	1	153.828			
Sum Weight:	6.50	18.43						OTM	755.62 kip-ft	10.82		

**Tower Forces - With Ice - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	2.38	3.75	A	1	0.65	1	1	1	122.510	3.53	69.26	C
			B	1	0.65	1	1	1	122.510			
			C	1	0.65	1	1	1	122.510			
L2 87.00-46.00	2.74	7.02	A	1	0.65	1	1	1	120.788	2.79	68.15	C
			B	1	0.65	1	1	1	120.788			
			C	1	0.65	1	1	1	120.788			
L3 46.00-0.00	2.84	10.59	A	1	0.65	1	1	1	157.661	2.77	60.14	C
			B	1	0.65	1	1	1	157.661			
			C	1	0.65	1	1	1	157.661			
Sum Weight:	7.96	21.35						OTM	642.08 kip-ft	9.09		

**Tower Forces - With Ice - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	2.38	3.75	A	1	0.65	1	1	1	122.510	3.53	69.26	C
			B	1	0.65	1	1	1	122.510			
			C	1	0.65	1	1	1	122.510			
L2 87.00-46.00	2.74	7.02	A	1	0.65	1	1	1	120.788	2.79	68.15	C
			B	1	0.65	1	1	1	120.788			
			C	1	0.65	1	1	1	120.788			
L3 46.00-0.00	2.84	10.59	A	1	0.65	1	1	1	157.661	2.77	60.14	C
			B	1	0.65	1	1	1	157.661			
			C	1	0.65	1	1	1	157.661			
Sum Weight:	7.96	21.35						OTM	642.08 kip-ft	9.09		

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**Tower Forces - With Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	2.38	3.75	A	1	0.65	1	1	1	122.510	3.53	69.26	C
			B	1	0.65	1	1	1	122.510			
			C	1	0.65	1	1	1	122.510			
L2 87.00-46.00	2.74	7.02	A	1	0.65	1	1	1	120.788	2.79	68.15	C
			B	1	0.65	1	1	1	120.788			
			C	1	0.65	1	1	1	120.788			
L3 46.00-0.00	2.84	10.59	A	1	0.65	1	1	1	157.661	2.77	60.14	C
			B	1	0.65	1	1	1	157.661			
			C	1	0.65	1	1	1	157.661			
Sum Weight:	7.96	21.35						OTM	642.08 kip-ft	9.09		

**Tower Forces - With Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	2.38	3.75	A	1	0.65	1	1	1	122.510	3.53	69.26	C
			B	1	0.65	1	1	1	122.510			
			C	1	0.65	1	1	1	122.510			
L2 87.00-46.00	2.74	7.02	A	1	0.65	1	1	1	120.788	2.79	68.15	C
			B	1	0.65	1	1	1	120.788			
			C	1	0.65	1	1	1	120.788			
L3 46.00-0.00	2.84	10.59	A	1	0.65	1	1	1	157.661	2.77	60.14	C
			B	1	0.65	1	1	1	157.661			
			C	1	0.65	1	1	1	157.661			
Sum Weight:	7.96	21.35						OTM	642.08 kip-ft	9.09		

**Tower Forces - Service - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	1.60	31.44	C
			B	1	0.65	1	1	1	118.260			
			C	1	0.65	1	1	1	118.260			
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	1.30	31.77	C
			B	1	0.65	1	1	1	117.371			
			C	1	0.65	1	1	1	117.371			
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	1.32	28.70	C
			B	1	0.65	1	1	1	153.828			
			C	1	0.65	1	1	1	153.828			
Sum Weight:	6.50	18.43						OTM	295.17	4.23		

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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e						ft <sup>2</sup>	K	plf	

**Tower Forces - Service - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e						ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	1.60	31.44	C
			B	1	0.65	1	1	1	118.260			
			C	1	0.65	1	1	1	118.260			
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	1.30	31.77	C
			B	1	0.65	1	1	1	117.371			
			C	1	0.65	1	1	1	117.371			
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	1.32	28.70	C
			B	1	0.65	1	1	1	153.828			
			C	1	0.65	1	1	1	153.828			
Sum Weight:	6.50	18.43						OTM	295.17 kip-ft	4.23		

**Tower Forces - Service - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e						ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	1.60	31.44	C
			B	1	0.65	1	1	1	118.260			
			C	1	0.65	1	1	1	118.260			
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	1.30	31.77	C
			B	1	0.65	1	1	1	117.371			
			C	1	0.65	1	1	1	117.371			
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	1.32	28.70	C
			B	1	0.65	1	1	1	153.828			
			C	1	0.65	1	1	1	153.828			
Sum Weight:	6.50	18.43						OTM	295.17 kip-ft	4.23		

**Tower Forces - Service - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e						ft <sup>2</sup>	K	plf	
L1 138.00-87.00	1.76	2.85	A	1	0.65	1	1	1	118.260	1.60	31.44	C
			B	1	0.65	1	1	1	118.260			
			C	1	0.65	1	1	1	118.260			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K							ft <sup>2</sup>	K	plf	
L2 87.00-46.00	2.31	6.14	A	1	0.65	1	1	1	117.371	1.30	31.77	C
			B	1	0.65	1	1	117.371				
			C	1	0.65	1	1	117.371				
L3 46.00-0.00	2.42	9.43	A	1	0.65	1	1	1	153.828	1.32	28.70	C
			B	1	0.65	1	1	153.828				
			C	1	0.65	1	1	153.828				
Sum Weight:	6.50	18.43						OTM	295.17 kip-ft	4.23		

### Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M <sub>x</sub>	Sum of Overturning Moments, M <sub>z</sub>	Sum of Torques
	K	K	K	kip-ft	kip-ft	kip-ft
Leg Weight	18.43					
Bracing Weight	0.00					
Total Member Self-Weight	18.43					
Total Weight	30.34			-0.11	0.57	
Wind 0 deg - No Ice		0.13	-20.86	-1872.80	-12.83	-1.49
Wind 30 deg - No Ice		10.58	-18.12	-1628.61	-950.63	-1.10
Wind 45 deg - No Ice		14.90	-14.84	-1333.78	-1337.69	-0.78
Wind 60 deg - No Ice		18.20	-10.54	-948.06	-1633.55	-0.41
Wind 90 deg - No Ice		20.94	-0.13	-13.52	-1878.61	0.39
Wind 120 deg - No Ice		18.07	10.32	924.62	-1620.15	1.08
Wind 135 deg - No Ice		14.72	14.66	1314.60	-1318.73	1.33
Wind 150 deg - No Ice		10.36	18.00	1614.98	-927.41	1.48
Wind 180 deg - No Ice		-0.13	20.86	1872.57	13.97	1.49
Wind 210 deg - No Ice		-10.58	18.12	1628.38	951.77	1.10
Wind 225 deg - No Ice		-14.90	14.84	1333.55	1338.83	0.78
Wind 240 deg - No Ice		-18.20	10.54	947.84	1634.69	0.41
Wind 270 deg - No Ice		-20.94	0.13	13.29	1879.76	-0.39
Wind 300 deg - No Ice		-18.07	-10.32	-924.85	1621.29	-1.08
Wind 315 deg - No Ice		-14.72	-14.66	-1314.83	1319.88	-1.33
Wind 330 deg - No Ice		-10.36	-18.00	-1615.21	928.56	-1.48
Member Ice	2.93					
Total Weight Ice	37.50			-1.71	0.69	
Wind 0 deg - Ice		0.10	-17.69	-1602.95	-9.33	-1.36
Wind 30 deg - Ice		8.96	-15.37	-1393.44	-811.21	-0.98
Wind 45 deg - Ice		12.63	-12.58	-1141.04	-1142.32	-0.68
Wind 60 deg - Ice		15.43	-8.93	-811.00	-1395.54	-0.33
Wind 90 deg - Ice		17.76	-0.10	-11.72	-1605.75	0.41
Wind 120 deg - Ice		15.34	8.76	790.24	-1385.52	1.03
Wind 135 deg - Ice		12.49	12.44	1123.46	-1128.16	1.25
Wind 150 deg - Ice		8.80	15.27	1380.01	-793.86	1.38
Wind 180 deg - Ice		-0.10	17.69	1599.54	10.70	1.36
Wind 210 deg - Ice		-8.96	15.37	1390.02	812.58	0.98
Wind 225 deg - Ice		-12.63	12.58	1137.63	1143.69	0.68
Wind 240 deg - Ice		-15.43	8.93	807.59	1396.91	0.33
Wind 270 deg - Ice		-17.76	0.10	8.31	1607.13	-0.41
Wind 300 deg - Ice		-15.34	-8.76	-793.66	1386.90	-1.03
Wind 315 deg - Ice		-12.49	-12.44	-1126.88	1129.53	-1.25
Wind 330 deg - Ice		-8.80	-15.27	-1383.42	795.23	-1.38
Total Weight	30.34			-0.11	0.57	
Wind 0 deg - Service		0.05	-8.15	-730.66	-5.02	-0.58
Wind 30 deg - Service		4.13	-7.08	-635.27	-371.35	-0.43

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Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Wind 45 deg - Service		5.82	-5.80	-520.10	-522.54	-0.30
Wind 60 deg - Service		7.11	-4.12	-369.43	-638.11	-0.16
Wind 90 deg - Service		8.18	-0.05	-4.37	-733.84	0.15
Wind 120 deg - Service		7.06	4.03	362.09	-632.88	0.42
Wind 135 deg - Service		5.75	5.73	514.42	-515.14	0.52
Wind 150 deg - Service		4.05	7.03	631.76	-362.28	0.58
Wind 180 deg - Service		-0.05	8.15	732.38	5.45	0.58
Wind 210 deg - Service		-4.13	7.08	636.99	371.78	0.43
Wind 225 deg - Service		-5.82	5.80	521.83	522.97	0.30
Wind 240 deg - Service		-7.11	4.12	371.15	638.54	0.16
Wind 270 deg - Service		-8.18	0.05	6.10	734.27	-0.15
Wind 300 deg - Service		-7.06	-4.03	-360.36	633.31	-0.42
Wind 315 deg - Service		-5.75	-5.73	-512.70	515.57	-0.52
Wind 330 deg - Service		-4.05	-7.03	-630.03	362.71	-0.58

## 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 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service

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Comb. No.	Description
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	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	138 - 87	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-13.60	0.34	-0.16
			Max. Mx	14	-8.78	302.17	-2.42
			Max. My	10	-8.79	2.12	-303.95
			Max. Vy	14	-14.09	302.17	-2.42
			Max. Vx	10	14.00	2.12	-303.95
			Max. Torque	9			-1.38
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-22.95	0.48	0.63
L2	87 - 46	Pole	Max. Mx	14	-16.94	947.50	-7.46
			Max. My	10	-16.95	7.58	-945.27
			Max. Vy	14	-17.73	947.50	-7.46
			Max. Vx	10	17.64	7.58	-945.27
			Max. Torque	9			-1.44
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-37.50	0.69	1.71
			Max. Mx	14	-30.32	1932.53	-13.69
			Max. My	2	-30.32	-13.20	1925.42
L3	46 - 0	Pole	Max. Vy	14	-20.97	1932.53	-13.69
			Max. Vx	2	-20.88	-13.20	1925.42
			Max. Torque	9			-1.51
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-37.50	0.69	1.71
			Max. Mx	14	-30.32	1932.53	-13.69
			Max. My	2	-30.32	-13.20	1925.42
			Max. Vy	14	-20.97	1932.53	-13.69
			Max. Vx	2	-20.88	-13.20	1925.42

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	31	37.50	17.76	-0.10
	Max. H <sub>x</sub>	14	30.34	20.94	-0.13
	Max. H <sub>z</sub>	2	30.34	-0.13	20.86
	Max. M <sub>x</sub>	2	1925.42	-0.13	20.86
	Max. M <sub>z</sub>	6	1931.34	-20.94	0.13
	Max. Torsion	17	1.50	10.36	18.00
	Min. Vert	1	30.34	0.00	0.00
	Min. H <sub>x</sub>	6	30.34	-20.94	0.13
	Min. H <sub>z</sub>	10	30.34	0.13	-20.86

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M <sub>x</sub>	10	-1925.22	0.13	-20.86
	Min. M <sub>z</sub>	14	-1932.53	20.94	-0.13
	Min. Torsion	9	-1.51	-10.36	-18.00

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	30.34	0.00	0.00	-0.11	0.57	-0.00
Dead+Wind 0 deg - No Ice	30.34	0.13	-20.86	-1925.42	-13.20	-1.48
Dead+Wind 30 deg - No Ice	30.34	10.58	-18.12	-1674.35	-977.31	-1.06
Dead+Wind 45 deg - No Ice	30.34	14.90	-14.84	-1371.24	-1375.23	-0.73
Dead+Wind 60 deg - No Ice	30.34	18.20	-10.54	-974.69	-1679.39	-0.35
Dead+Wind 90 deg - No Ice	30.34	20.94	-0.13	-13.88	-1931.34	0.46
Dead+Wind 120 deg - No Ice	30.34	18.07	10.32	950.63	-1665.64	1.14
Dead+Wind 135 deg - No Ice	30.34	14.72	14.66	1351.57	-1355.76	1.38
Dead+Wind 150 deg - No Ice	30.34	10.36	18.00	1660.40	-953.45	1.51
Dead+Wind 180 deg - No Ice	30.34	-0.13	20.86	1925.22	14.37	1.47
Dead+Wind 210 deg - No Ice	30.34	-10.58	18.12	1674.16	978.49	1.04
Dead+Wind 225 deg - No Ice	30.34	-14.90	14.84	1371.04	1376.41	0.71
Dead+Wind 240 deg - No Ice	30.34	-18.20	10.54	974.49	1680.58	0.34
Dead+Wind 270 deg - No Ice	30.34	-20.94	0.13	13.69	1932.53	-0.45
Dead+Wind 300 deg - No Ice	30.34	-18.07	-10.32	-950.83	1666.82	-1.13
Dead+Wind 315 deg - No Ice	30.34	-14.72	-14.66	-1351.77	1356.94	-1.36
Dead+Wind 330 deg - No Ice	30.34	-10.36	-18.00	-1660.60	954.63	-1.50
Dead+Ice+Temp	37.50	0.00	0.00	-1.71	0.69	0.00
Dead+Wind 0 deg+Ice+Temp	37.50	0.10	-17.69	-1664.80	-9.69	-1.35
Dead+Wind 30 deg+Ice+Temp	37.50	8.96	-15.37	-1447.19	-842.48	-0.94
Dead+Wind 45 deg+Ice+Temp	37.50	12.63	-12.58	-1185.06	-1186.35	-0.62
Dead+Wind 60 deg+Ice+Temp	37.50	15.43	-8.93	-842.29	-1449.33	-0.26
Dead+Wind 90 deg+Ice+Temp	37.50	17.76	-0.10	-12.16	-1667.65	0.48
Dead+Wind 120 deg+Ice+Temp	37.50	15.34	8.76	820.76	-1438.94	1.10
Dead+Wind 135 deg+Ice+Temp	37.50	12.49	12.44	1166.85	-1171.65	1.30
Dead+Wind 150 deg+Ice+Temp	37.50	8.80	15.27	1433.29	-824.46	1.42
Dead+Wind 180 deg+Ice+Temp	37.50	-0.10	17.69	1661.30	11.12	1.35
Dead+Wind 210 deg+Ice+Temp	37.50	-8.96	15.37	1443.69	843.92	0.92
Dead+Wind 225 deg+Ice+Temp	37.50	-12.63	12.58	1181.55	1187.79	0.61
Dead+Wind 240 deg+Ice+Temp	37.50	-15.43	8.93	838.78	1450.77	0.25
Dead+Wind 270 deg+Ice+Temp	37.50	-17.76	0.10	8.65	1669.10	-0.48
Dead+Wind 300 deg+Ice+Temp	37.50	-15.34	-8.76	-824.27	1440.38	-1.09
Dead+Wind 315 deg+Ice+Temp	37.50	-12.49	-12.44	-1170.36	1173.08	-1.29
Dead+Wind 330 deg+Ice+Temp	37.50	-8.80	-15.27	-1436.80	825.89	-1.41
Dead+Wind 0 deg - Service	30.34	0.05	-8.15	-752.62	-4.79	-0.58
Dead+Wind 30 deg - Service	30.34	4.13	-7.08	-654.49	-381.62	-0.41
Dead+Wind 45 deg - Service	30.34	5.82	-5.80	-536.02	-537.16	-0.28
Dead+Wind 60 deg - Service	30.34	7.11	-4.12	-381.02	-656.04	-0.14
Dead+Wind 90 deg - Service	30.34	8.18	-0.05	-5.49	-754.51	0.18
Dead+Wind 120 deg - Service	30.34	7.06	4.03	371.50	-650.65	0.45
Dead+Wind 135 deg - Service	30.34	5.75	5.73	528.20	-529.54	0.54
Dead+Wind 150 deg - Service	30.34	4.05	7.03	648.91	-372.29	0.59
Dead+Wind 180 deg - Service	30.34	-0.05	8.15	752.42	5.98	0.58
Dead+Wind 210 deg - Service	30.34	-4.13	7.08	654.30	382.81	0.41
Dead+Wind 225 deg - Service	30.34	-5.82	5.80	535.82	538.34	0.28
Dead+Wind 240 deg - Service	30.34	-7.11	4.12	380.83	657.23	0.13
Dead+Wind 270 deg - Service	30.34	-8.18	0.05	5.29	755.70	-0.18
Dead+Wind 300 deg - Service	30.34	-7.06	-4.03	-371.69	651.84	-0.44

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>y</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>y</sub> kip-ft	Torque kip-ft
Dead+Wind 315 deg - Service	30.34	-5.75	-5.73	-528.40	530.73	-0.53
Dead+Wind 330 deg - Service	30.34	-4.05	-7.03	-649.11	373.48	-0.59

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-30.34	0.00	0.00	30.34	0.00	0.000%
2	0.13	-30.34	-20.86	-0.13	30.34	20.86	0.000%
3	10.58	-30.34	-18.12	-10.58	30.34	18.12	0.000%
4	14.90	-30.34	-14.84	-14.90	30.34	14.84	0.000%
5	18.20	-30.34	-10.54	-18.20	30.34	10.54	0.000%
6	20.94	-30.34	-0.13	-20.94	30.34	0.13	0.000%
7	18.07	-30.34	10.32	-18.07	30.34	-10.32	0.000%
8	14.72	-30.34	14.66	-14.72	30.34	-14.66	0.000%
9	10.36	-30.34	18.00	-10.36	30.34	-18.00	0.000%
10	-0.13	-30.34	20.86	0.13	30.34	-20.86	0.000%
11	-10.58	-30.34	18.12	10.58	30.34	-18.12	0.000%
12	-14.90	-30.34	14.84	14.90	30.34	-14.84	0.000%
13	-18.20	-30.34	10.54	18.20	30.34	-10.54	0.000%
14	-20.94	-30.34	0.13	20.94	30.34	-0.13	0.000%
15	-18.07	-30.34	-10.32	18.07	30.34	10.32	0.000%
16	-14.72	-30.34	-14.66	14.72	30.34	14.66	0.000%
17	-10.36	-30.34	-18.00	10.36	30.34	18.00	0.000%
18	0.00	-37.50	0.00	0.00	37.50	0.00	0.000%
19	0.10	-37.50	-17.69	-0.10	37.50	17.69	0.000%
20	8.96	-37.50	-15.37	-8.96	37.50	15.37	0.000%
21	12.63	-37.50	-12.58	-12.63	37.50	12.58	0.000%
22	15.43	-37.50	-8.93	-15.43	37.50	8.93	0.000%
23	17.76	-37.50	-0.10	-17.76	37.50	0.10	0.000%
24	15.34	-37.50	8.76	-15.34	37.50	-8.76	0.000%
25	12.49	-37.50	12.44	-12.49	37.50	-12.44	0.000%
26	8.80	-37.50	15.27	-8.80	37.50	-15.27	0.000%
27	-0.10	-37.50	17.69	0.10	37.50	-17.69	0.000%
28	-8.96	-37.50	15.37	8.96	37.50	-15.37	0.000%
29	-12.63	-37.50	12.58	12.63	37.50	-12.58	0.000%
30	-15.43	-37.50	8.93	15.43	37.50	-8.93	0.000%
31	-17.76	-37.50	0.10	17.76	37.50	-0.10	0.000%
32	-15.34	-37.50	-8.76	15.34	37.50	8.76	0.000%
33	-12.49	-37.50	-12.44	12.49	37.50	12.44	0.000%
34	-8.80	-37.50	-15.27	8.80	37.50	15.27	0.000%
35	0.05	-30.34	-8.15	-0.05	30.34	8.15	0.000%
36	4.13	-30.34	-7.08	-4.13	30.34	7.08	0.000%
37	5.82	-30.34	-5.80	-5.82	30.34	5.80	0.000%
38	7.11	-30.34	-4.12	-7.11	30.34	4.12	0.000%
39	8.18	-30.34	-0.05	-8.18	30.34	0.05	0.000%
40	7.06	-30.34	4.03	-7.06	30.34	-4.03	0.000%
41	5.75	-30.34	5.73	-5.75	30.34	-5.73	0.000%
42	4.05	-30.34	7.03	-4.05	30.34	-7.03	0.000%
43	-0.05	-30.34	8.15	0.05	30.34	-8.15	0.000%
44	-4.13	-30.34	7.08	4.13	30.34	-7.08	0.000%
45	-5.82	-30.34	5.80	5.82	30.34	-5.80	0.000%
46	-7.11	-30.34	4.12	7.11	30.34	-4.12	0.000%
47	-8.18	-30.34	0.05	8.18	30.34	-0.05	0.000%
48	-7.06	-30.34	-4.03	7.06	30.34	4.03	0.000%
49	-5.75	-30.34	-5.73	5.75	30.34	5.73	0.000%
50	-4.05	-30.34	-7.03	4.05	30.34	7.03	0.000%



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### Non-Linear Convergence Results

<u>Load Combination</u>	<u>Converged?</u>	<u>Number of Cycles</u>	<u>Displacement Tolerance</u>	<u>Force Tolerance</u>
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00025676
3	Yes	5	0.00000001	0.00010781
4	Yes	5	0.00000001	0.00012553
5	Yes	5	0.00000001	0.00011202
6	Yes	4	0.00000001	0.00008674
7	Yes	5	0.00000001	0.00011228
8	Yes	5	0.00000001	0.00012234
9	Yes	5	0.00000001	0.00010240
10	Yes	4	0.00000001	0.00037471
11	Yes	5	0.00000001	0.00011528
12	Yes	5	0.00000001	0.00012592
13	Yes	5	0.00000001	0.00011061
14	Yes	4	0.00000001	0.00019090
15	Yes	5	0.00000001	0.00010333
16	Yes	5	0.00000001	0.00012228
17	Yes	5	0.00000001	0.00011366
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00009359
20	Yes	5	0.00000001	0.00024473
21	Yes	5	0.00000001	0.00028011
22	Yes	5	0.00000001	0.00024929
23	Yes	5	0.00000001	0.00009239
24	Yes	5	0.00000001	0.00024768
25	Yes	5	0.00000001	0.00027363
26	Yes	5	0.00000001	0.00023557
27	Yes	5	0.00000001	0.00009451
28	Yes	5	0.00000001	0.00025293
29	Yes	5	0.00000001	0.00028011
30	Yes	5	0.00000001	0.00024775
31	Yes	5	0.00000001	0.00009289
32	Yes	5	0.00000001	0.00023740
33	Yes	5	0.00000001	0.00027458
34	Yes	5	0.00000001	0.00025017
35	Yes	4	0.00000001	0.00006200
36	Yes	4	0.00000001	0.00028082
37	Yes	4	0.00000001	0.00034495
38	Yes	4	0.00000001	0.00030398
39	Yes	4	0.00000001	0.00002858
40	Yes	4	0.00000001	0.00031644
41	Yes	4	0.00000001	0.00033735
42	Yes	4	0.00000001	0.00026131
43	Yes	4	0.00000001	0.00007128
44	Yes	4	0.00000001	0.00032409
45	Yes	4	0.00000001	0.00034791
46	Yes	4	0.00000001	0.00029658
47	Yes	4	0.00000001	0.00003603
48	Yes	4	0.00000001	0.00026570
49	Yes	4	0.00000001	0.00033730
50	Yes	4	0.00000001	0.00032517

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### Maximum Tower Deflections - Service Wind

Section No.	Elevation <i>ft</i>	Horz. Deflection <i>in</i>	Gov. Load Comb.	Tilt <i>°</i>	Twist <i>°</i>
L1	138 - 87	26.047	45	1.4968	0.0052
L2	91 - 46	12.288	45	1.1865	0.0024
L3	50.75 - 0	4.038	45	0.7165	0.0010

### Critical Deflections and Radius of Curvature - Service Wind

Elevation <i>ft</i>	Appurtenance	Gov. Load Comb.	Deflection <i>in</i>	Tilt <i>°</i>	Twist <i>°</i>	Radius of Curvature <i>ft</i>
143.00	20' 8 Bay Di-Pole	45	26.047	1.4968	0.0053	51696
142.00	PTP400	45	26.047	1.4968	0.0053	51696
140.00	4'6"x3" Pipe Mount	45	26.047	1.4968	0.0053	51696
138.00	APX16PV-16PVL-X	45	26.047	1.4968	0.0053	51696
125.00	742 213 w/mount pipe	45	22.037	1.4262	0.0043	19883
115.00	VHLP1-23	45	19.016	1.3673	0.0037	11237
105.00	LPA-80080-6CF	45	16.101	1.3004	0.0031	7832
95.00	(4) DB844G65ZAXY	45	13.339	1.2219	0.0026	6010
83.00	PTP400	45	10.291	1.1081	0.0020	4853

### Maximum Tower Deflections - Design Wind

Section No.	Elevation <i>ft</i>	Horz. Deflection <i>in</i>	Gov. Load Comb.	Tilt <i>°</i>	Twist <i>°</i>
L1	138 - 87	66.481	12	3.8144	0.0131
L2	91 - 46	31.398	12	3.0320	0.0060
L3	50.75 - 0	10.324	12	1.8320	0.0025

### Critical Deflections and Radius of Curvature - Design Wind

Elevation <i>ft</i>	Appurtenance	Gov. Load Comb.	Deflection <i>in</i>	Tilt <i>°</i>	Twist <i>°</i>	Radius of Curvature <i>ft</i>
143.00	20' 8 Bay Di-Pole	12	66.481	3.8144	0.0138	20520
142.00	PTP400	12	66.481	3.8144	0.0138	20520
140.00	4'6"x3" Pipe Mount	12	66.481	3.8144	0.0138	20520
138.00	APX16PV-16PVL-X	12	66.481	3.8144	0.0138	20520
125.00	742 213 w/mount pipe	12	56.259	3.6381	0.0112	7891
115.00	VHLP1-23	12	48.558	3.4900	0.0095	4459
105.00	LPA-80080-6CF	12	41.126	3.3209	0.0079	3106
95.00	(4) DB844G65ZAXY	12	34.081	3.1220	0.0066	2382
83.00	PTP400	12	26.301	2.8323	0.0052	1918

<b>RISATower</b>  <b>Centek Engineering Inc.</b> 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 12001.CO7 - Bloomfield 3	<b>Page</b> 20 of 21
	<b>Project</b> 138' Summit Monopole - 785 Park Ave., Bloomfield, CT	<b>Date</b> 09:20:11 01/03/12
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

### Compression Checks

### Pole Design Data

Section No.	Elevation <i>ft</i>	Size	L <i>ft</i>	L <sub>u</sub> <i>ft</i>	Kl/r	F <sub>a</sub> <i>ksi</i>	A <i>in<sup>2</sup></i>	Actual P K	Allow. P <sub>a</sub> K	Ratio P P <sub>a</sub>
L1	138 - 87 (1)	TP31.652x24x0.1875	51.00	0.00	0.0	37.373	18.3681	-8.77	686.46	0.013
L2	87 - 46 (2)	TP37.428x30.6768x0.375	45.00	0.00	0.0	39.000	43.2541	-16.94	1686.91	0.010
L3	46 - 0 (3)	TP43.58x35.9654x0.4375	50.75	0.00	0.0	39.000	59.9088	-30.32	2336.44	0.013

### Pole Bending Design Data

Section No.	Elevation <i>ft</i>	Size	Actual M <sub>x</sub> <i>kip-ft</i>	Actual f <sub>bx</sub> <i>ksi</i>	Allow. F <sub>bx</sub> <i>ksi</i>	Ratio f <sub>bx</sub> F <sub>bx</sub>	Actual M <sub>y</sub> <i>kip-ft</i>	Actual f <sub>by</sub> <i>ksi</i>	Allow. F <sub>by</sub> <i>ksi</i>	Ratio f <sub>by</sub> F <sub>by</sub>
L1	138 - 87 (1)	TP31.652x24x0.1875	305.25	26.138	37.373	0.699	0.00	0.000	37.373	0.000
L2	87 - 46 (2)	TP37.428x30.6768x0.375	953.69	29.577	39.000	0.758	0.00	0.000	39.000	0.000
L3	46 - 0 (3)	TP43.58x35.9654x0.4375	1942.75	36.636	39.000	0.939	0.00	0.000	39.000	0.000

### Pole Shear Design Data

Section No.	Elevation <i>ft</i>	Size	Actual V K	Actual f <sub>v</sub> <i>ksi</i>	Allow. F <sub>v</sub> <i>ksi</i>	Ratio f <sub>v</sub> F <sub>v</sub>	Actual T <i>kip-ft</i>	Actual f <sub>vt</sub> <i>ksi</i>	Allow. F <sub>vt</sub> <i>ksi</i>	Ratio f <sub>vt</sub> F <sub>vt</sub>
L1	138 - 87 (1)	TP31.652x24x0.1875	14.14	0.770	26.000	0.059	0.87	0.036	26.000	0.001
L2	87 - 46 (2)	TP37.428x30.6768x0.375	17.82	0.412	26.000	0.032	0.63	0.009	26.000	0.000
L3	46 - 0 (3)	TP43.58x35.9654x0.4375	21.05	0.351	26.000	0.027	0.71	0.007	26.000	0.000

### Pole Interaction Design Data

Section No.	Elevation <i>ft</i>	Ratio P P <sub>a</sub>	Ratio f <sub>bx</sub> F <sub>bx</sub>	Ratio f <sub>by</sub> F <sub>by</sub>	Ratio f <sub>v</sub> F <sub>v</sub>	Ratio f <sub>vt</sub> F <sub>vt</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	138 - 87 (1)	0.013	0.699	0.000	0.059	0.001	0.713	1.333	H1-3+VT ✓
L2	87 - 46 (2)	0.010	0.758	0.000	0.032	0.000	0.769	1.333	H1-3+VT ✓
L3	46 - 0 (3)	0.013	0.939	0.000	0.027	0.000	0.953	1.333	H1-3+VT ✓

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### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail
L1	138 - 87	Pole	TP31.652x24x0.1875	1	-8.77	915.06	53.5	Pass
L2	87 - 46	Pole	TP37.428x30.6768x0.375	2	-16.94	2248.65	57.7	Pass
L3	46 - 0	Pole	TP43.58x35.9654x0.4375	3	-30.32	3114.47	71.5	Pass
Summary								
Pole (L3)							71.5	Pass
<b>RATING =</b>							<b>71.5</b>	<b>Pass</b>

**Anchor Bolt and Base Plate Analysis:****Input Data:**Tower Reactions:

Overturing Moment =	OM := 1943-ft-kips	(Input From RisaTower)
Shear Force =	Shear := 21-kips	(Input From RisaTower)
Axial Force =	Axial := 30-kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75		
Number of Anchor Bolts =	N := 16	(User Input)
Bolt "Column" Distance =	l := 3.0-in	(User Input)
Bolt Ultimate Strength =	F <sub>u</sub> := 100-ksi	(User Input)
Bolt Yield Strength =	F <sub>y</sub> := 75-ksi	(User Input)
Bolt Modulus =	E := 29000-ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25-in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 Gr. 55		
Plate Yield Strength =	F <sub>ybp</sub> := 55-ksi	(User Input)
Base Plate Thickness =	t <sub>bp</sub> := 3.0-in	(User Input)

**Geometric Layout Data:**

Distance from Bolts to Centroid of Pole:

$d_1 := 24.875\text{in}$  (User Input)

$d_2 := 23.375\text{in}$  (User Input)

$d_3 := 8.875\text{in}$  (User Input)

$d_4 := 3.0\text{in}$  (User Input)

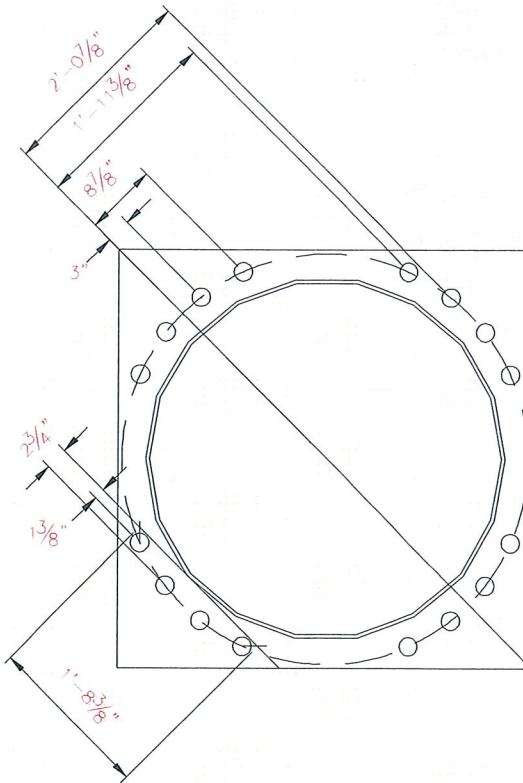
Critical Distances For Bending in Plate:

$ma_1 := 2.75\text{in}$  (User Input)

$ma_2 := 1.375\text{in}$  (User Input)

Effective Width of Baseplate for Bending =

$B_{\text{eff}} := 20.375\text{in}$  (User Input)



**ANCHOR BOLT AND PLATE GEOMETRY**

**Anchor Bolt Analysis:**

Calculated Anchor Bolt Properties:

Polar Moment of Inertia =  $I_p := [(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4] = 5012 \cdot \text{in}^2$

Gross Area of Bolt =  $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot \text{in}^2$

Net Area of Bolt =  $A_n := \frac{\pi}{4} \cdot \left( D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 = 3.248 \cdot \text{in}^2$

Net Diameter =  $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot \text{in}$

Radius of Gyration of Bolt =  $r := \frac{D_n}{4} = 0.508 \cdot \text{in}$

Section Modulus of Bolt =  $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot \text{in}^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force =  $T_{\text{Max}} := OM \cdot \frac{d_1}{I_p} - \frac{\text{Axial}}{N} = 113.9 \cdot \text{kips}$

Allowable Tensile Force (Gross Area) =  $T_{\text{ALL.Gross}} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) = 174.9 \cdot \text{kips}$  (1.333 increase allowed per TIA/EIA)

Allowable Tensile Force (Net Area) =  $T_{\text{ALL.Net}} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) = 194.812 \cdot \text{kips}$  (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity =  $\frac{T_{\text{Max}}}{T_{\text{ALL.Net}}} = 58.4\%$  Bolts are "upset bolts". Use net area per AISC

Condition1 =  $\text{Condition1} := \text{if} \left( \frac{T_{\text{Max}}}{T_{\text{ALL.Net}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$

Condition1 = "OK" Note Shear stress is negligible

Check Anchor Bolt Bending Stress:

Maximum Bending Moment =  $M_x := \left( \frac{\text{Shear}}{N} \right) \cdot l = 0.328 \cdot \text{ft} \cdot \text{kips}$

Maximum Bending Stress =  $f_{bx} := \frac{M_x}{S_x} = 4.8 \cdot \text{ksi}$

Allowable Bending Stress =  $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot \text{ksi}$  (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n = 0 \text{ in} \\ 0 & \text{otherwise} \end{cases}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n = 0 \text{ ksi} \\ 0 & \text{otherwise} \end{cases}$$

Check Anchor Bolt Compression/Combined Stress:

Applied Compressive Force =

$$C_{Max} := OM \cdot \frac{d_1}{I_p} + \frac{Axial}{N} = 117.6 \text{ kips}$$

Applied Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 36.2 \text{ ksi}$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \frac{\left[ 1 - \frac{\left( \frac{K \cdot l}{r} \right)^2}{2 \cdot C_c^2} \right] \cdot F_y}{\frac{5}{3} + \frac{3 \cdot \left( \frac{K \cdot l}{r} \right)}{8 \cdot C_c} - \frac{\left( \frac{K \cdot l}{r} \right)^3}{8 \cdot C_c^3}} & \text{if } \frac{K \cdot l}{r} \leq C_c = 45 \text{ ksi} \\ \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left( \frac{K \cdot l}{r} \right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases}$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \text{ ksi} \quad (1.333 \text{ increase allowed per TIA/EIA})$$

Combined Stress % of Capacity =

$$\left( \frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \right) = 60.4 \%$$

Condition 2 =

$$\text{Condition2} := \text{if} \left( \frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition2 = "OK"



**Base Plate Analysis:**

Force from Bolts =  $C_1 := \frac{OM \cdot d_1}{I_p} + \frac{Axial}{N} = 117.602 \cdot \text{kips}$

$C_2 := \frac{OM \cdot d_2}{I_p} + \frac{Axial}{N} = 110.623 \cdot \text{kips}$

Applied Bending Stress in Plate =  $f_{bp} := \frac{6 \cdot (2C_1 \cdot ma_1 + 2C_2 \cdot ma_2)}{B_{eff} \cdot t_{bp}^2} = 31.12 \cdot \text{ksi}$

Allowable Bending Stress in Plate =  $F_{bp} := 1.33 \cdot 0.75 \cdot F_y = 54.9 \cdot \text{ksi}$

Plate Bending Stress % of Capacity =  $\frac{f_{bp}}{F_{bp}} = 56.7\%$

Condition3 =  $\text{Condition3} := \text{if} \left( \frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"} \right)$

Condition3 = "Ok"

**Caisson Foundation:**

Input Data:

Shear Force =	S := 21k	USER INPUT-FROM RISATower
Overtuning Moment =	M := 1943ft-k	USER INPUT-FROM RISATower
Applied Axial Load =	A1 := 30k	USER INPUT-FROM RISATower
Bending Moment =	Mu := 2129ft-k	USER INPUT-FROM LPILE
Moment Capacity =	Mn := 4619ft-k	USER INPUT-FROM LPILE
Foundation Diameter =	d := 6.0ft	USER INPUT
Overall Length of Caisson =	Lc := 45.5ft	USER INPUT
Depth From Top of Caisson to Grade =	Lpag := 0.5ft	USER INPUT
Number of Rebar =	n := 20	USER INPUT
Area of Rebar =	Ar := 1.560in <sup>2</sup>	USER INPUT
Rebar Yield Strength =	fy := 60ksi	USER INPUT
Concrete Comp Strength =	fc := 3ksi	USER INPUT

Check Foundation Depth:

Depth of Caisson Below Ground Level =	LD := Lc - Lpag = 45 ft	(TIA/EIA-222-F 7.2.5)
Depth Required =	$LD1 := 2.0ft + \left( \frac{S \cdot ft^2}{3k \cdot d} \right) + 2ft^5 \left( \frac{M \cdot ft}{3k \cdot d} + \frac{S \cdot ft}{2k} + \frac{S^2 \cdot ft^3}{18k^2 \cdot d^2} \right)^{.5} = 25ft$	
	DepthCheck := if(LD1 ≤ LD, "OK", "NO GOOD")	
	DepthCheck = "OK"	

Check Moment Capacity:

Factor of Safety =	FS := $\frac{Mn}{Mu} = 2.2$
Factor of Safety Required =	FSreqd := 1.3
	FOSCheck := if(FS ≥ FSreqd, "OK", "NO GOOD")
	FOSCheck = "OK"

Check Axial Capacity:

Concrete Weight =	A2 := $.150 \frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 190.9 \cdot kips$
Total Axial Load =	AT := A1 + A2 = 220.9 kips
Area of Concrete =	Ag := $\pi \cdot \frac{d^2}{4} = 28.27 ft^2$
Axial Capacity =	Po := n · Ar · fy + (Ag - n · Ar) · 0.85 · fc = 12174.8 kips
	AxialCheck := if(AT ≤ Po, "OK", "NO GOOD")
	AxialCheck = "OK"

Bloomfield Caisson Analysis.lpo

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

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TJL  
Centek Engineering Inc

Path to file locations: J:\Jobs\1200100.WI\CO7 - Bloomfield 3\Calcs\MathCad\Foundation\  
Name of input data file: Bloomfield Caisson Analysis.lpd  
Name of output file: Bloomfield Caisson Analysis.lpo  
Name of plot output file: Bloomfield Caisson Analysis.lpp  
Name of runtime file: Bloomfield Caisson Analysis.lpr

Time and Date of Analysis

Date: January 3, 2012 Time: 9:23:15

Problem Title

12001.CO7 - Bloomfield 3

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:

- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:

- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 546.00 in  
Depth of ground surface below top of pile = 66.00 in  
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
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Bloomfield Caisson Analysis.lpo

1	0.0000	72.00000000	1319167.	4071.0000	3122019.
2	546.0000	72.00000000	1319167.	4071.0000	3122019.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974  
 Distance from top of pile to top of layer = 66.000 in  
 Distance from top of pile to bottom of layer = 126.000 in  
 p-y subgrade modulus k for top of soil layer = 60.000 lbs/in\*\*3  
 p-y subgrade modulus k for bottom of layer = 60.000 lbs/in\*\*3

Layer 2 is sand, p-y criteria by Reese et al., 1974  
 Distance from top of pile to top of layer = 126.000 in  
 Distance from top of pile to bottom of layer = 900.000 in  
 p-y subgrade modulus k for top of soil layer = 60.000 lbs/in\*\*3  
 p-y subgrade modulus k for bottom of layer = 60.000 lbs/in\*\*3

(Depth of lowest layer extends 354.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 4 points

Point No.	Depth X in	Eff. Unit weight lbs/in**3
1	66.00	.03300
2	126.00	.03300
3	126.00	.03900
4	900.00	.03900

Shear Strength of Soils

Shear strength parameters with depth defined using 4 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	66.000	.00000	30.00	-----	-----
2	126.000	.00000	30.00	-----	-----
3	126.000	.00000	22.00	-----	-----
4	900.000	.00000	22.00	-----	-----

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k\_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Bloomfield Caisson Analysis.lpo

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 21000.000 lbs  
 Bending moment at pile head = 23316000.000 in-lbs  
 Axial load at pile head = 30000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 72.0000 in

Material Properties:

Compressive Strength of Concrete = 3.000 kip/in\*\*2  
 Yield Stress of Reinforcement = 60. kip/in\*\*2  
 Modulus of Elasticity of Reinforcement = 29000. kip/in\*\*2  
 Number of Reinforcing Bars = 20  
 Area of Single Bar = 1.56000 in\*\*2  
 Number of Rows of Reinforcing Bars = 11  
 Area of Steel = 31.200 in\*\*2  
 Area of Shaft = 4071.504 in\*\*2  
 Percentage of Steel Reinforcement = .766 percent  
 Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 12174.78 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	32.000
2	3.120	30.434
3	3.120	25.889
4	3.120	18.809
5	3.120	9.889
6	3.120	0.000
7	3.120	-9.889
8	3.120	-18.809
9	3.120	-25.889
10	3.120	-30.434
11	1.560	-32.000

Axial Thrust Force = 30000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
3834921.	4.601906E+12	8.333333E-07	.00003231	38.77291811	99.20095085	840.34552
7626439.	4.575863E+12	.00000167	.00006243	37.45522606	189.78433	1617.00259
11374806.	4.549922E+12	.00000250	.00009258	37.03247559	278.78449	2394.85448
15078942.	4.523683E+12	.00000333	.00012270	36.80867207	365.95346	3171.50497
15078942.	3.618946E+12	.00000417	.00008219	19.72549188	244.79932	5833.16973
15078942.	3.015788E+12	.00000500	.00009702	19.40427482	287.51509	7046.38015
15078942.	2.584961E+12	.00000583	.00011200	19.19999993	330.26276	8255.33335
15078942.	2.261841E+12	.00000667	.00012695	19.04208434	372.51136	9465.19703
15078942.	2.010526E+12	.00000750	.00014180	18.90652549	414.07872	10677.83071
15078942.	1.809473E+12	.00000833	.00015667	18.80080354	455.31032	11889.80581
15078942.	1.644975E+12	.00000917	.00017157	18.71680319	496.20482	13101.11648
15078942.	1.507894E+12	.00001000	.00018649	18.64911282	536.76083	14311.75728
15078942.	1.391902E+12	.00001083	.00020143	18.59398592	576.97691	15521.72276
15078942.	1.292481E+12	.00001167	.00021640	18.54874885	616.85172	16731.00664
15078942.	1.206315E+12	.00001250	.00023139	18.51143610	656.38367	17939.60441
15078942.	1.130921E+12	.00001333	.00024641	18.48057997	695.57142	19147.50908
15078942.	1.064396E+12	.00001417	.00026145	18.45505607	734.41351	20354.71446
15078942.	1.005263E+12	.00001500	.00027651	18.43398678	772.90834	21561.21575
15640585.	9.878264E+11	.00001583	.00029160	18.41668332	811.05443	22767.00624
16423099.	9.853859E+11	.00001667	.00030671	18.40259206	848.85019	23972.08050
17204486.	9.831135E+11	.00001750	.00032185	18.39127100	886.29427	25176.42997
17984734.	9.809855E+11	.00001833	.00033701	18.38235104	923.38491	26380.05003



Bloomfield Caisson Analysis.lpo

55423428.	2.692636E+11	.00020583	.00285713	13.88077176	2535.82667	60000.00000
55423428.	2.649726E+11	.00020917	.00289299	13.83100712	2538.89421	60000.00000
55423428.	2.608161E+11	.00021250	.00292948	13.78577006	2541.70176	60000.00000
55423428.	2.567881E+11	.00021583	.00296677	13.74564207	2544.22168	60000.00000
55423428.	2.528826E+11	.00021917	.00300412	13.70700753	2546.29400	60000.00000
55423428.	2.490941E+11	.00022250	.00304153	13.66980851	2547.91357	60000.00000
55423428.	2.454174E+11	.00022583	.00307901	13.63397849	2549.07478	60000.00000
55423428.	2.418477E+11	.00022917	.00311654	13.59946597	2549.77216	60000.00000
55423428.	2.383803E+11	.00023250	.00315415	13.56623232	2549.94835	60000.00000
55438355.	2.317980E+11	.00023917	.00322985	13.50460804	2544.38741	60000.00000
55468759.	2.256356E+11	.00024583	.00330569	13.44689119	2538.80211	60000.00000
55498867.	2.197975E+11	.00025250	.00338168	13.39278138	2533.19204	60000.00000
55528676.	2.142586E+11	.00025917	.00345780	13.34201038	2527.55674	60000.00000
55558174.	2.089963E+11	.00026583	.00353408	13.29433572	2525.48534	60000.00000
55571856.	2.039334E+11	.00027250	.00361409	13.26270926	2533.37197	60000.00000
55575764.	1.990774E+11	.00027917	.00369648	13.24111855	2540.20278	60000.00000
55578949.	1.944453E+11	.00028583	.00377917	13.22158349	2545.27805	60000.00000
55581377.	1.900218E+11	.00029250	.00386217	13.20400321	2548.54498	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 55423.42750 in-kip

-----  
 Computed Values of Load Distribution and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head boundary conditions are Shear and Moment (BC Type 1)  
 Specified shear force at pile head = 21000.000 lbs  
 Specified moment at pile head = 23316000.000 in-lbs  
 Specified axial load at pile head = 30000.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	1.165	2.33E+07	21000.	-.007643	643.662	9.69E+11	0.000	0.000
43.680	.854801	2.42E+07	21000.	-.006571	668.948	9.67E+11	0.000	0.000
87.360	.592020	2.51E+07	18184.	-.005454	693.683	9.66E+11	-264.832	2442.454
131.040	.378843	2.55E+07	-4330.202	-.004304	704.065	9.65E+11	-563.924	8127.444
174.720	.215944	2.47E+07	-33138.	-.003162	682.576	9.66E+11	-724.151	18310.
218.400	.101663	2.26E+07	-64656.	-.002088	624.236	9.70E+11	-691.145	37119.
262.080	.031605	1.92E+07	-90128.	-.001147	530.828	9.78E+11	-401.618	69382.
305.760	-.001155	1.50E+07	-97460.	-.000418	417.164	4.14E+12	17.703	83692.
349.440	-.016515	1.09E+07	-91505.	-.000293	303.695	4.55E+12	210.104	69462.
393.120	-.027308	7.09E+06	-80149.	-.000207	200.972	4.58E+12	304.988	60980.
436.800	-.035122	3.91E+06	-64737.	-.000156	114.135	4.60E+12	412.802	64173.
480.480	-.041286	1.52E+06	-43747.	-.000131	48.866	4.60E+12	550.729	72834.
524.160	-.046782	1.82E+05	-16362.	-.000123	12.348	4.60E+12	706.537	82460.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.16540067 in  
 Computed slope at pile head = -.00764345  
 Maximum bending moment = 25543898. lbs-in  
 Maximum shear force = -97460.46069 lbs  
 Depth of maximum bending moment = 125.58000 in  
 Depth of maximum shear force = 305.76000 in  
 Number of iterations = 45  
 Number of zero deflection points = 1

-----  
 Summary of Pile Response(s)  
 -----

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacement in

Bloomfield Caisson Analysis.lpo

Type 2 = Shear and Slope, M = Pile-head Moment lbs-in  
 Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs  
 Type 4 = Deflection and Moment, S = Pile-head Slope, radians  
 Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V=	21000. M=	2.33E+07	30000.0000	1.1654	2.5544E+07 -97460.4607

Computed Pile-head Stiffness Matrix Members  
 K22, K23, K32, K33 for Superstructure

Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00218548	2100.00003	358529.15037	960888.24150	1.640507E+08
.00657894	6321.62991	1079280.	960888.24150	1.640507E+08
.01042738	10019.54635	1710619.	960888.24150	1.640507E+08
.01315789	12643.25982	2158561.	960888.24150	1.640507E+08
.01527583	14678.37009	2506011.	960888.24150	1.640507E+08
.01700632	16341.17626	2789899.	960888.24150	1.640507E+08
.01846943	17747.05884	3029923.	960888.24150	1.640507E+08
.01973683	18964.88973	3237841.	960888.24150	1.640507E+08
.02085476	20039.09270	3421238.	960888.24150	1.640507E+08
.02185478	21000.00000	3585291.	960888.24150	1.640507E+08

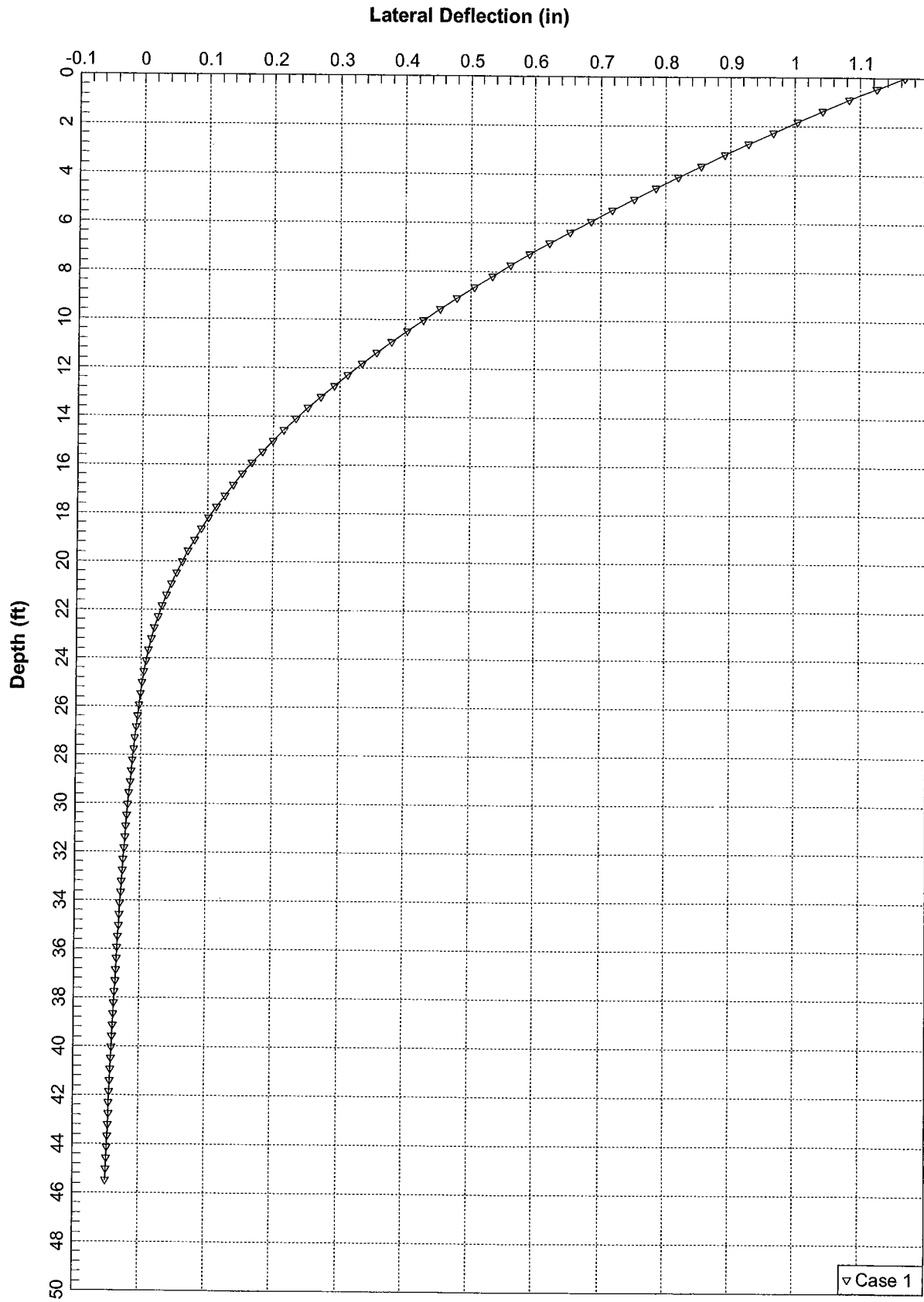
  

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00005550	9104.39205	2331600.	1.640507E+08	4.201275E+10
.00016746	27412.66299	7018815.	1.637013E+08	4.191453E+10
.00026648	43460.78632	11124559.	1.630908E+08	4.174597E+10
.00033801	54830.32202	14037631.	1.622174E+08	4.153081E+10
.00040549	63669.39644	16297185.	1.570184E+08	4.019132E+10
.00086424	73212.15968	18143375.	84712849.	2.099347E+10
.00111318	82170.98980	19704306.	73816505.	1.770093E+10
.00129436	89993.98020	21056446.	69527831.	1.626786E+10
.00146172	97483.42806	22249118.	66690871.	1.522118E+10
.00158238	103538.35559	23316000.	65431914.	1.473474E+10

K22 = abs(Shear Reaction/Top y)  
 K23 = abs(Shear Reaction/Top Rotation)  
 K32 = abs(Moment Reaction/Top y)  
 K33 = abs(Moment Reaction/Top Rotation)

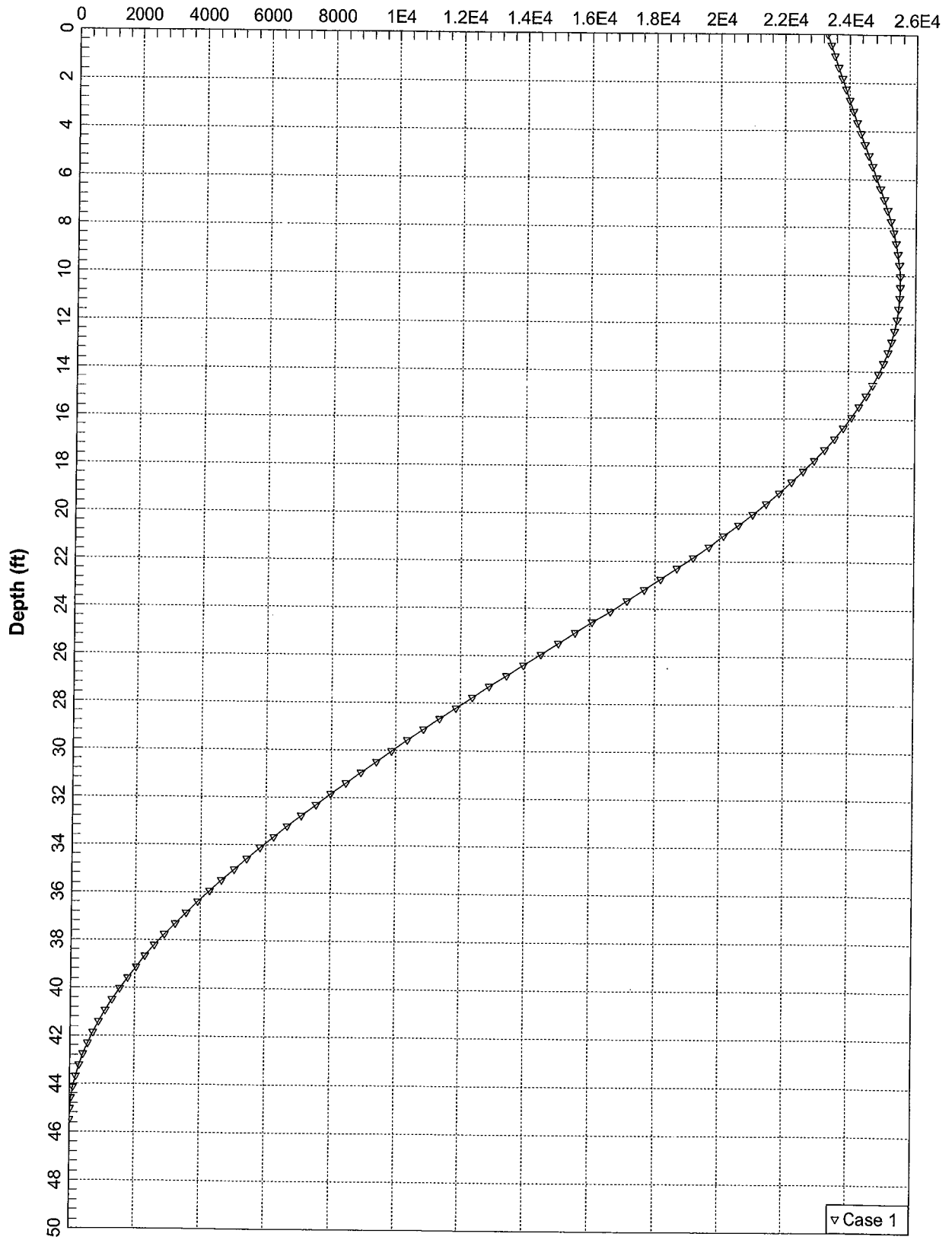
The analysis ended normally.

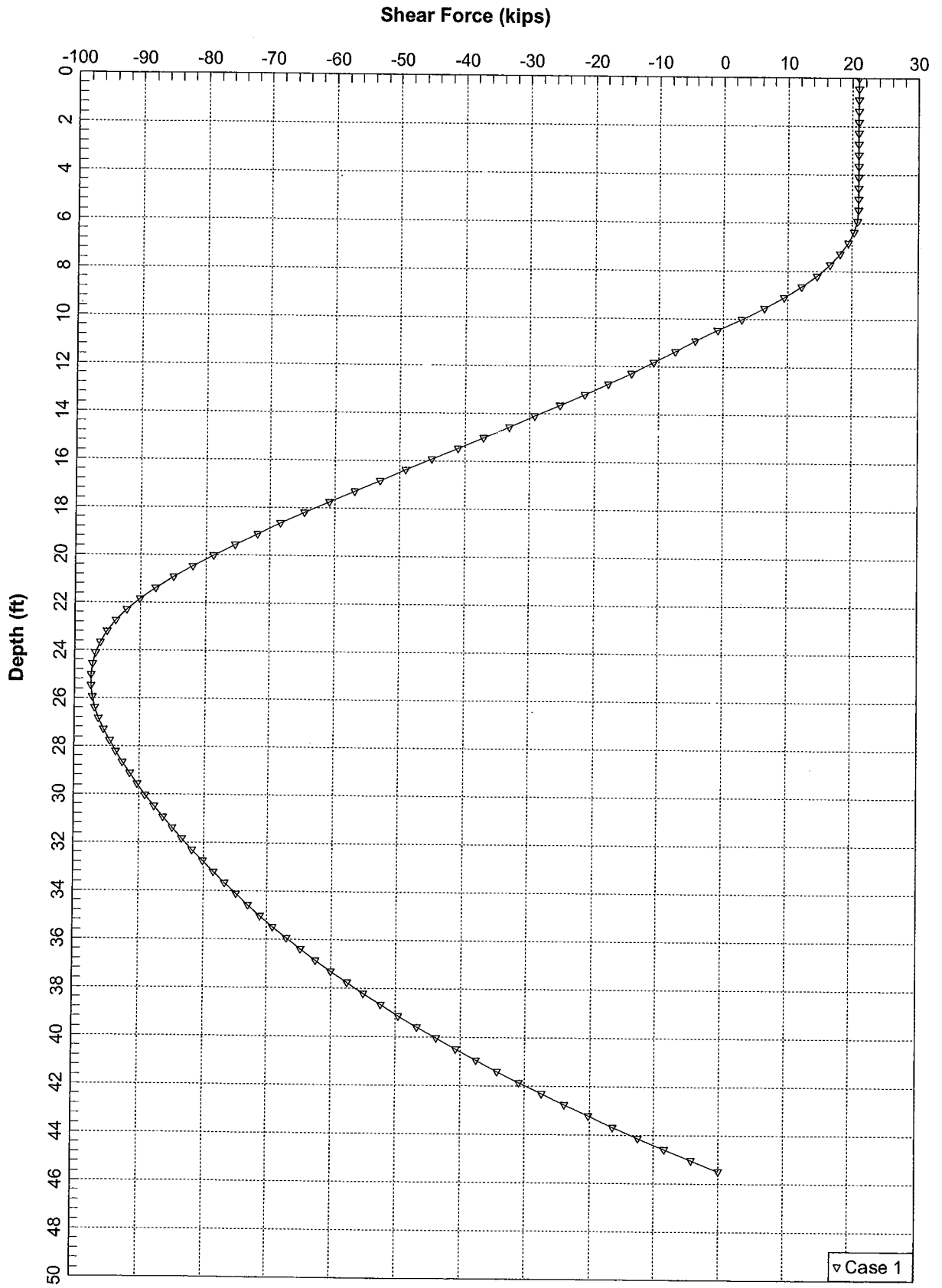




▽ Case 1

### Bending Moment (in-kips)

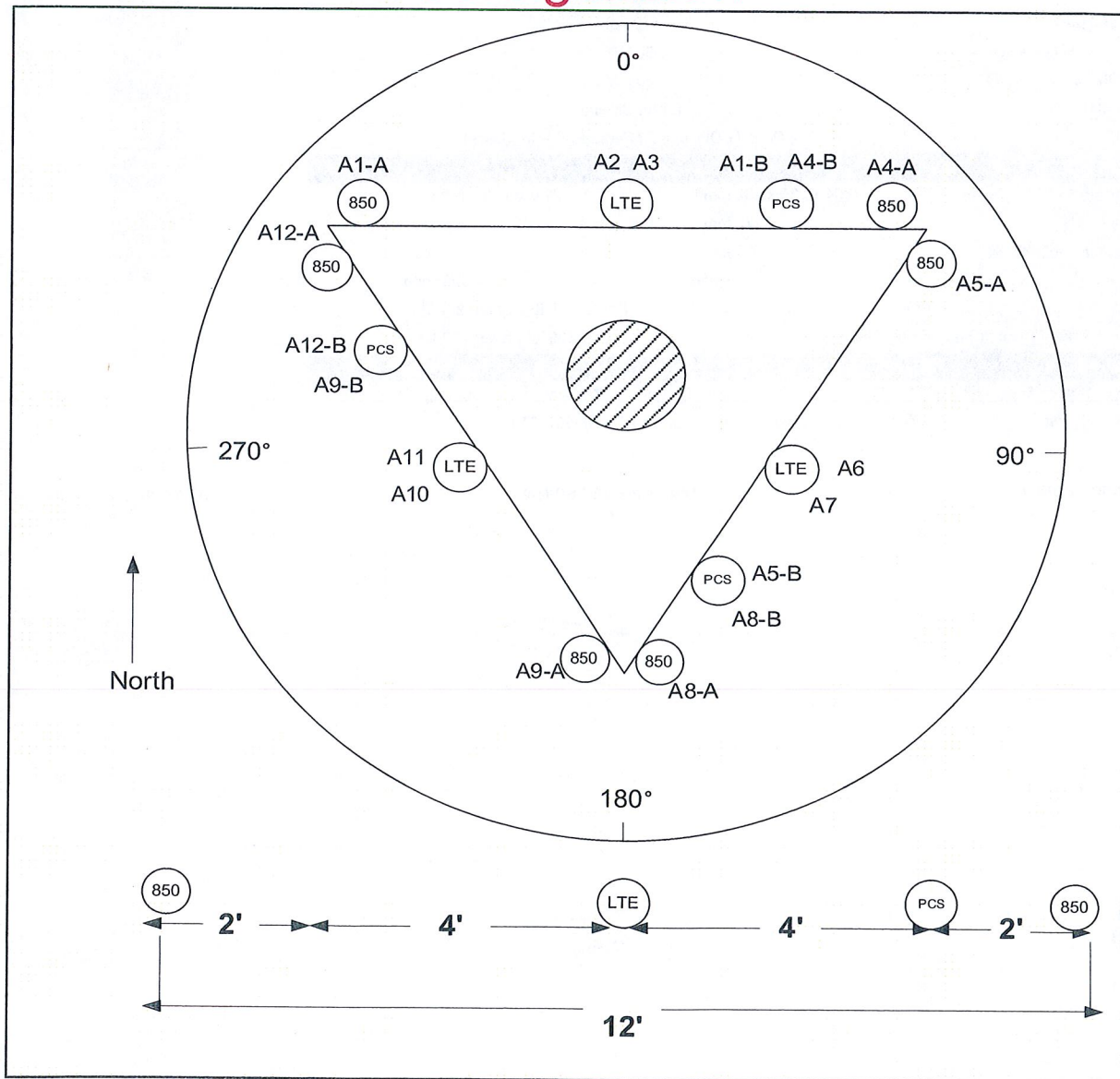




<b>SITE NAME</b>	<b>BLOOMFIELD 3 CT</b>			<b>ECP - CELL #</b>	<b>8</b>	<b>96</b>
<b>LATITUDE</b>	<b>41-49-42.55 N</b>			<b>LONGITUDE</b>	<b>72-43-59.64 W</b>	
Additional Comments:				<b>SAVE BUTTON</b>		
				<b>STRUCTURE TYPE</b>	<b>MONOPOLE</b>	
<b>700 Mhz - LTE ANTENNA ADD</b>	<b>ALPHA</b>		<b>BETA</b>		<b>GAMMA</b>	
EQUIPMENT TYPE	eNodeB		eNodeB		eNodeB	
ANTENNA TYPE	<b>BXA-70063/6CF - 2°</b>		<b>SLCP 2X6014</b>		<b>SLCP 2X6014</b>	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	0		120		240	
DOWN TILT ( MECH/DEG )	0		0		0	
RAD CTR (FT AGL)	109		109		109	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
<b>850 Cellular - Current Config</b>	<b>ALPHA</b>		<b>BETA</b>		<b>GAMMA</b>	
EQUIPMENT TYPE	Cellular Modcell 4.0		Cellular Modcell 4.0		Cellular Modcell 4.0	
ANTENNA TYPE	DB844G90A-XC_0		DB844G90A-XC_0		DB844G90A-XC_0	
QTY OF ANTENNAS PER FACE	2		2		2	
ORIENTATION (DEG)	0		120		240	
DOWN TILT ( MECH/DEG )	0		0		0	
RAD CTR (FT AGL)	109		109		109	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
<b>850 Cellular - Future Config</b>	<b>ALPHA</b>		<b>BETA</b>		<b>GAMMA</b>	
EQUIPMENT TYPE	Cellular Modcell 4.0		Cellular Modcell 4.0		Cellular Modcell 4.0	
ANTENNA TYPE	<b>LPA-80080/6CF - 2°</b>		<b>LPA-80063/4CF</b>		<b>LPA-80080/4CF</b>	
QTY OF ANTENNAS PER FACE	2		2		2	
ORIENTATION (DEG)	0		120		240	
DOWN TILT ( MECH/DEG )	0		0		0	
RAD CTR (FT AGL)	109		109		109	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL	2	FD9R6004/2C-3L	2	FD9R6004/2C-3L	2	FD9R6004/2C-3L
DIPLEX WITH LTE CABLE						
<b>1900 PCS - Current Config</b>	<b>ALPHA</b>		<b>BETA</b>		<b>GAMMA</b>	
EQUIPMENT TYPE	PCS Modcell		PCS Modcell		PCS Modcell	
ANTENNA TYPE	DB844G90A-XC_0		DB844G90A-XC_0		DB844G90A-XC_0	
QTY OF ANTENNAS PER FACE	2		2		2	
ORIENTATION (DEG)	0		120		240	
DOWN TILT ( MECH/DEG )	0		0		0	
RAD CTR (FT AGL)	109		109		109	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
<b>1900 PCS - Future Config</b>	<b>ALPHA</b>		<b>BETA</b>		<b>GAMMA</b>	
EQUIPMENT TYPE	PCS Modcell		PCS Modcell		PCS Modcell	
ANTENNA TYPE	<b>BXA-171085/12BF</b>		<b>BXA-171063/12BF</b>		<b>BXA-171085/12BF</b>	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	0		120		240	
DOWN TILT ( MECH/DEG )	0		0		0	
RAD CTR (FT AGL)	109		109		109	
TMA - QTY / MODEL						
DIPLEX WITH CELLULAR CABLE	DIPLEX with Cellular Cable		DIPLEX with Cellular Cable		DIPLEX with Cellular Cable	
<b>NUMBER OF CABLE'S NEEDED</b>				<b>ESTIMATED CABLE LENGTH</b>		
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES	12	MAINLINE (FT)		
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS	18	TOP JUMPER (FT)		12
<b>Equipment Cable Ordering</b>	<b>MAIN CABLE</b>	12	+	<b>TOP JUMPER #</b>	12	+
						<b>6</b>
<b>TX / RX FREQUENCIES</b>				<b>TX POWER OUTPUT</b>		
<b>Cellular A-Band</b>		<b>PCS F / AWS-Band</b>		<b>700 Mhz C - B</b>		
TX - 869-880,890-891.5 MHz		TX - 1970-1975 / 2145-21		TX - 746-757		Cellular (Watts)
RX - 824-835,845-846.5 MHz		RX - 1890-1895 / 1745-17		RX - 776-787		PCS (Watts)
						LTE (Watts)
						20
						16
						40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/ WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/ WHITE
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ ORANGE
A3	700	Tx4/Rx1	RED/ RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/ BLUE/ ORANGE	A11	700	Tx6/Rx1	GREEN/ GREEN/ ORANGE
A4-B	1900	Tx4/Rx1	RED/ RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/ BLUE/ WHITE	A12-B	1900	Tx6/Rx1	GREEN/ GREEN/ WHITE
A4-A	800	Tx4/Rx1	RED/ RED	A8-A	800	Tx5/Rx1	BLUE/ BLUE	A12-A	800	Tx6/Rx1	GREEN/ GREEN
<b>RF ENGINEER</b>				<b>RF MANAGER</b>				<b>INITIALS</b>		<b>DATE</b>	
Prepared By: Dany Bustamante				Steve Weatherbee				DB		8/19/2011	

## Site Configuration



## BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

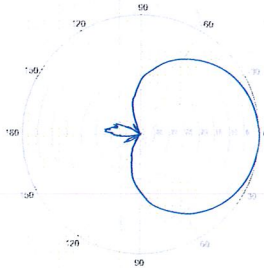
Replace "X" with desired electrical downtilt.

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 m <sup>2</sup>	Side: 0.24 m <sup>2</sup>	Front: 5.5 ft <sup>2</sup>	Side: 2.6 ft <sup>2</sup>
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			

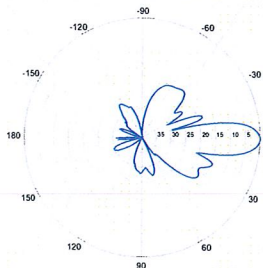


BXA-70063-6CF-EDIN-X



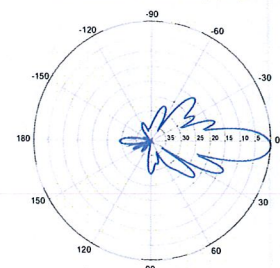
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

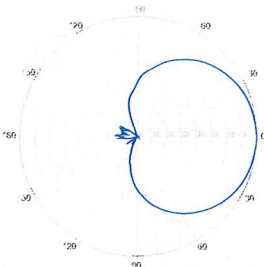


0° | Vertical | 750 MHz

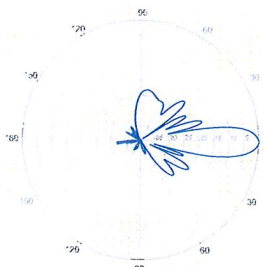
BXA-70063-6CF-EDIN-2



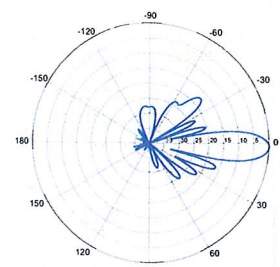
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

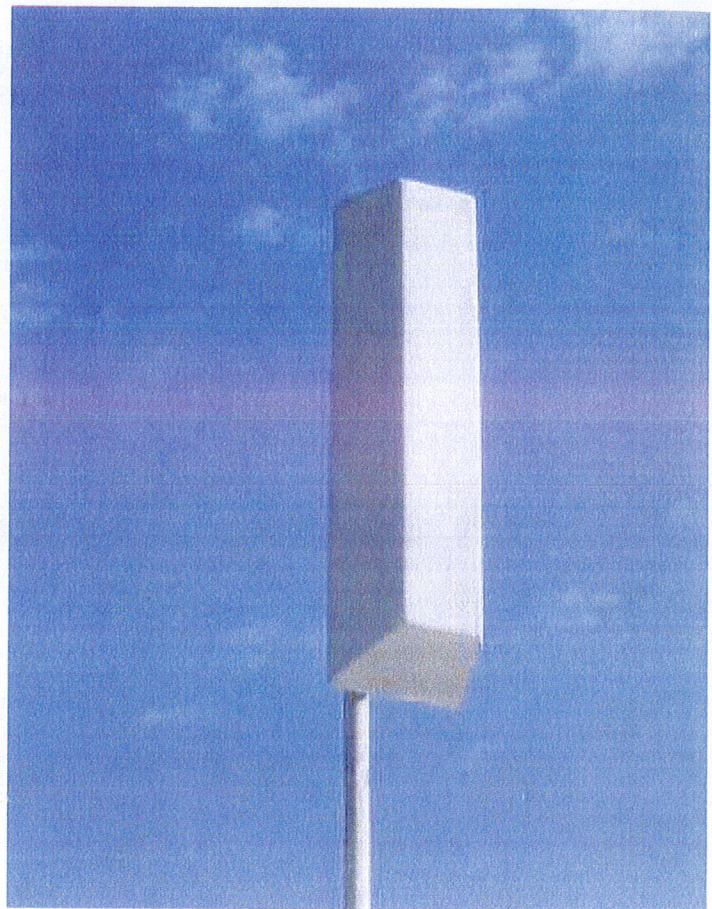
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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

# SLCP 2x6014

Dual (2x) Circularly Polarized log-periodic antenna

## Features

- ❑ Transmit Diversity Gain
- ❑ Can be configured to combine space & polarization diversity
- ❑ Outstanding performance over the entire band (700 - 800 MHz)
- ❑ Excellent Axial Ratio
- ❑ Optimized for 4G & 3G systems
- ❑ Low intermodulation
- ❑ Improved Side-to-side rejection
- ❑ Fading reduction
- ❑ Excellent isolation between ports



## Electrical specifications

Frequency range:	<b>700-800 MHz</b>
Impedance:	<b>50 ohm</b>
Connector type:	<b>7/16 Din</b>
Return loss:	<b>18 dB</b>
Polarization:	<b>Circular</b>
Gain ea. port [Circular]:	<b>2x14 dBdC</b>
Gain ea. port [Linear]:	<b>2x11 dBdL</b>
Axial Ratio:	<b>2 dB</b>
Isolation between ports (TX band):	<b>30 dB</b>
Front-to-back ratio:	<b>30 dB</b>
Intermodulation (2x20W):	<b>IM3 150 dB</b>
	<b>IM5 160 dB</b>
	<b>IM7/9 170 dB</b>
Power rating:	<b>2x 500 W</b>
H-plane (-3 dB point):	<b>2x 55°</b>
V-plane (-3 dB point):	<b>2x 16°</b>
Lightning protection:	<b>DC grounded</b>

## Mechanical specifications

Overall height:	<b>53 in</b>	<b>[1346 mm]</b>
Width:	<b>14 in</b>	<b>[356 mm]</b>
Depth:	<b>11 in</b>	<b>[279 mm]</b>
Weight (excluding brackets):	<b>20 lbs</b>	<b>[9 Kg]</b>
Wind load measured up to:	<b>150 mph</b>	<b>[240 Km/h]</b>
Wind area (side of antenna):	<b>5.15 sq. ft.</b>	<b>[0.48 sq.m]</b>
Lateral thrust at 113 mph/ 180 Km/h (worst case):	<b>263 lbs</b>	<b>[1171 N]</b>

## Materials

Radiating Elements:	<b>Aluminum</b>
Transformer (Power distribution)	<b>Ceramic PCB</b>
Chassis:	<b>Aluminum</b>
Radome:	<b>Grey Fiberglass/PVC</b>
Mounting bolts:	<b>Stainless steel</b>

*The SLCP 2x6014 is made in the U.S.A.*

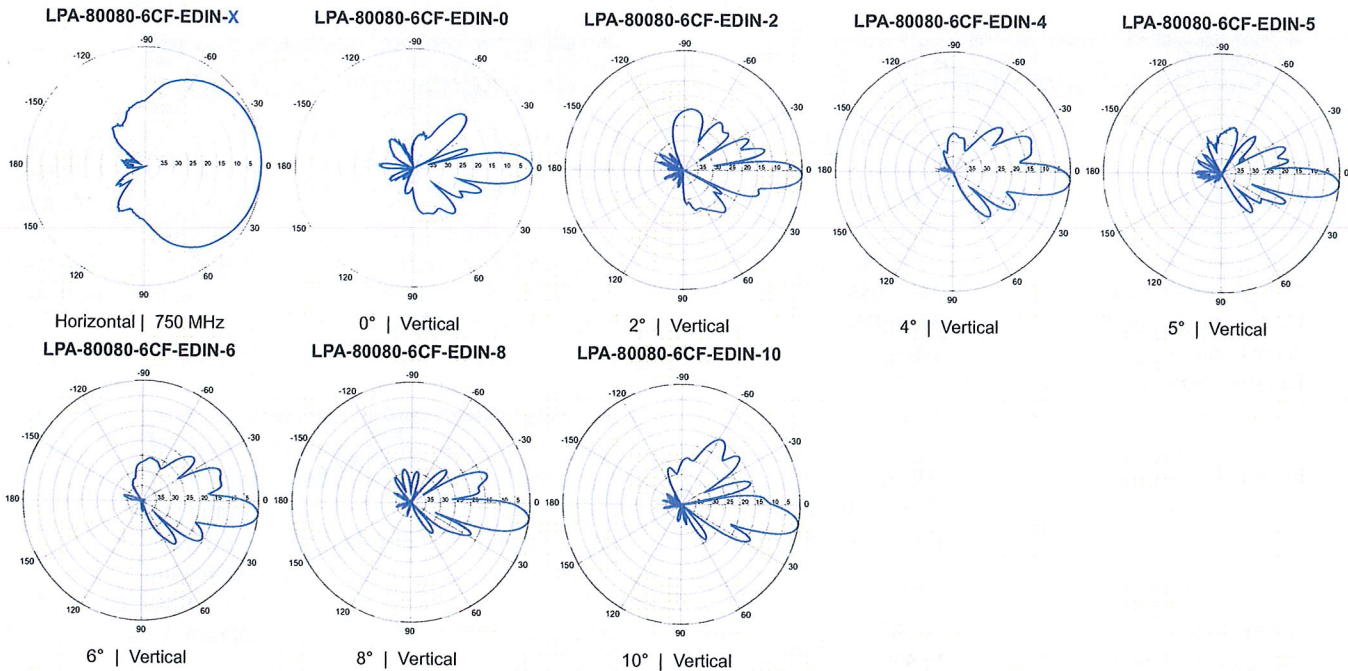
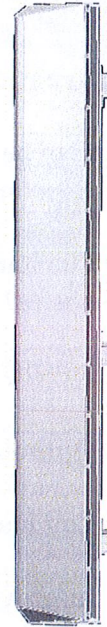
## LPA-80080-6CF-EDIN-X

V-Pol | Log Periodic | 80° | 14.0 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	80°	
Vertical beamwidth	10°	
Gain	14.0 dBd (16.1 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-22.6 dB	
Null fill	10% (-20.0 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	1800 x 140 x 335 mm      70.9 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm      14.8 in	
Weight without mounting brackets	9.5 kg      21.0 lbs	
Survival wind speed	> 201 km/hr      > 125 mph	
Wind area	Front: 0.25 m <sup>2</sup> Side: 0.61 m <sup>2</sup> Front: 2.7 ft <sup>2</sup> Side: 6.6 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 415 N    Side: 878 N      Front: 93 lbf    Side: 198 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.	



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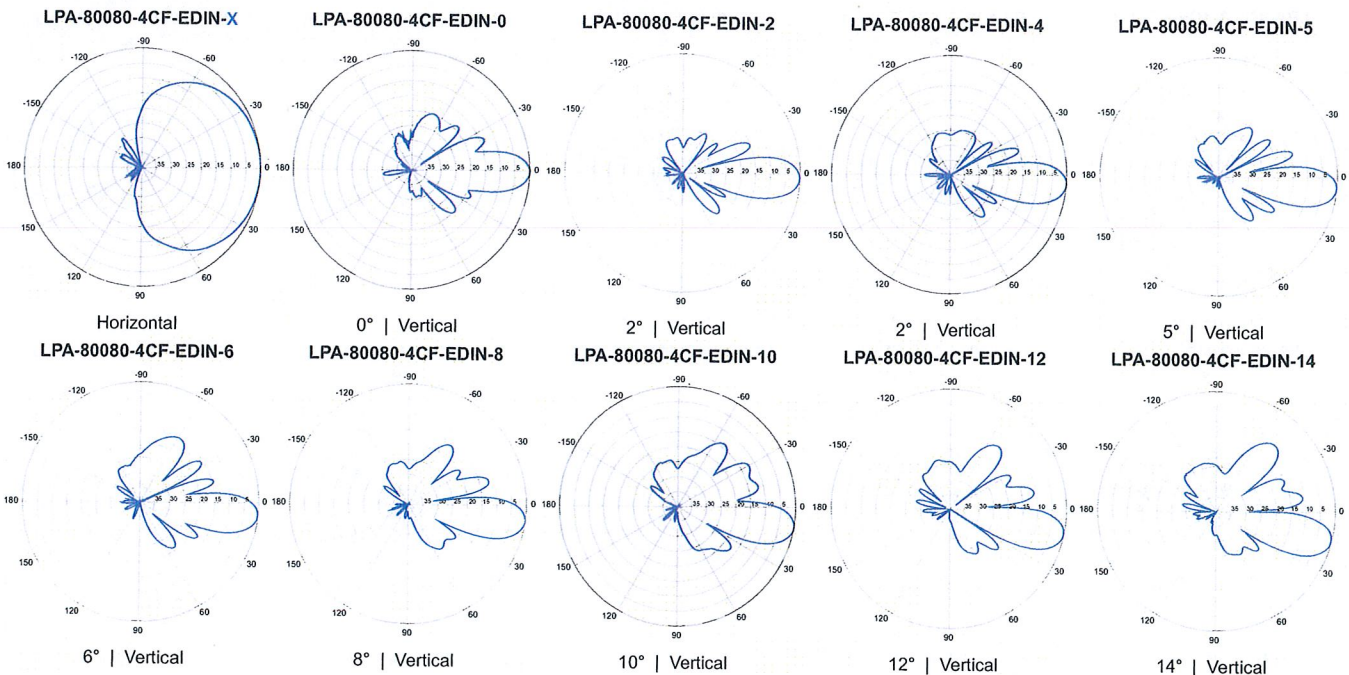
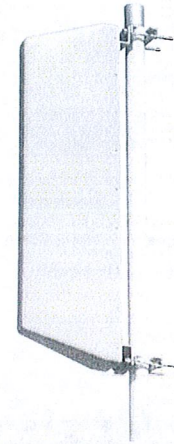
## LPA-80080-4CF-EDIN-X

V-Pol | Log Periodic | 80° | 12.5 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	80°	
Vertical beamwidth	15°	
Gain	12.5 dBd (14.6 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-14.2 dB	
Front-to-back ratio (+/-30°)	-34.7 dB	
Null fill	15% (-16.48 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	1200 x 140 x 335 mm      47.2 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm      14.8 in	
Weight without mounting brackets	5.4 kg      12 lbs	
Survival wind speed	> 201 km/hr      > 125 mph	
Wind area	Front: 0.17 m <sup>2</sup> Side: 0.40 m <sup>2</sup> Front: 1.8 ft <sup>2</sup> Side: 4.3 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 254 N    Side: 574 N      Front: 57 lbf    Side: 129 lbf	
Mounting Options		
Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm    2.0-4.0 in      5.4 kg    12 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.	



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.

# LPA-80063-4CF-EDIN-X

V-Pol | Log Periodic | 63° | 13.0 dBd

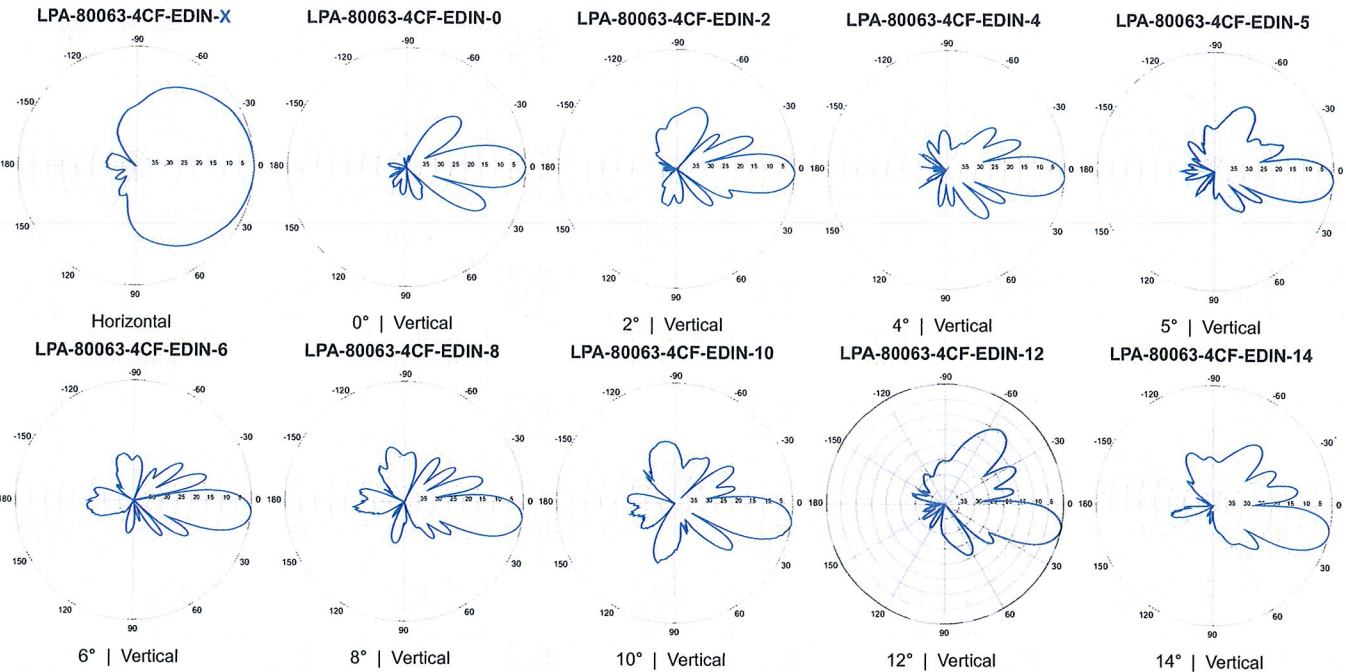
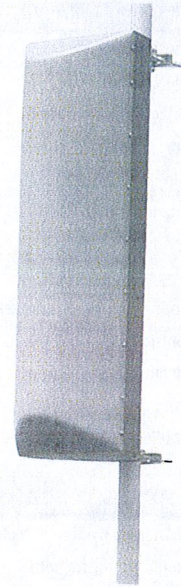
Replace "X" with desired electrical downtilt.

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	15°
Gain	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-15.7 dB
Front-to-back ratio (+/-30°)	-31.7 dB
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	1205 x 385 x 332 mm	47.4 x 15.2 x 13.1 in	
Depth of antenna with z-bracket	372 mm	14.6 in	
Weight without mounting brackets	9.1 kg	20 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.46 m <sup>2</sup> Side: 0.39 m <sup>2</sup>	Front: 5.0 ft <sup>2</sup> Side: 4.2 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 660 N Side: 550 N	Front: 149 lbf Side: 124 lbf	

Mounting Options	Part Number	Fits Pipe Diameter		Weight	
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm	2.0-4.0 in	5.4 kg	12 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.				



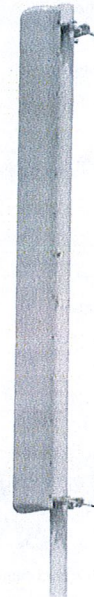
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## BXA-171085-12BF-EDIN-X

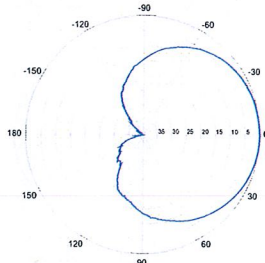
Replace 'X' with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz			
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Polarization	±45°	±45°	±45°	
Horizontal beamwidth	88°	85°	80°	
Vertical beamwidth	4.5°	4.5°	4.5°	
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi	
Electrical downtilt (X)	0, 2, 4			
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 m <sup>2</sup> Side: 0.19 m <sup>2</sup>	Front: 3.1 ft <sup>2</sup> Side: 2.1 ft <sup>2</sup>		
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-171085-12BF-EDIN-X-FP			

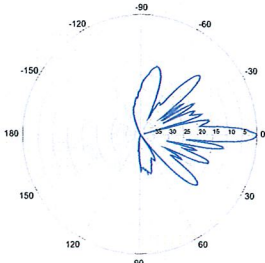


**BXA-171085-12BF-EDIN-X**



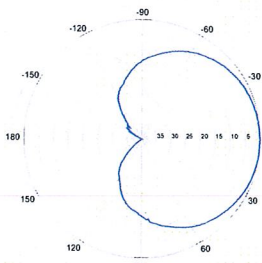
Horizontal | 1710-1880 MHz

**BXA-171085-12BF-EDIN-0**



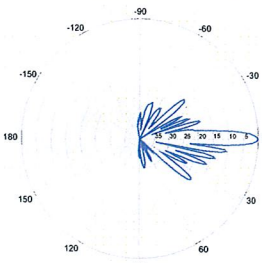
0° | Vertical | 1710-1880 MHz

**BXA-171085-12BF-EDIN-X**



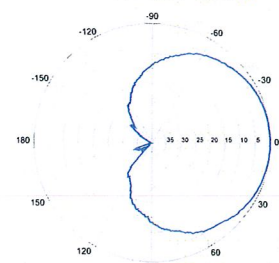
Horizontal | 1850-1990 MHz

**BXA-171085-12BF-EDIN-0**



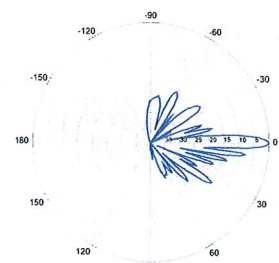
0° | Vertical | 1850-1990 MHz

**BXA-171085-12BF-EDIN-X**



Horizontal | 1920-2170 MHz

**BXA-171085-12BF-EDIN-0**



0° | Vertical | 1920-2170 MHz

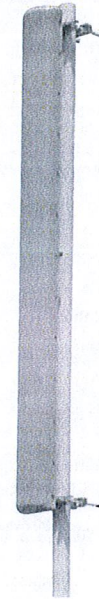
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## BXA-171063-12BF-EDIN-X

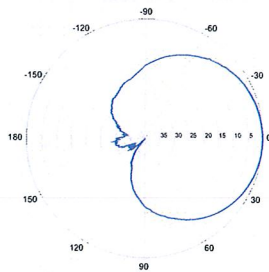
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

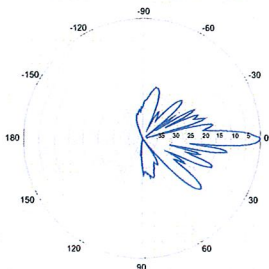
Electrical Characteristics	1710-2170 MHz		
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
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 m <sup>2</sup> Side: 0.19 m <sup>2</sup>	Front: 3.1 ft <sup>2</sup> Side: 2.1 ft <sup>2</sup>	
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**

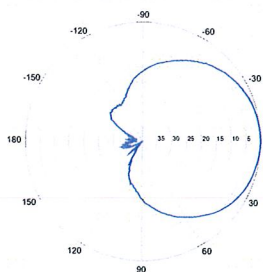


Horizontal | 1710-1880 MHz  
**BXA-171063-12BF-EDIN-0**

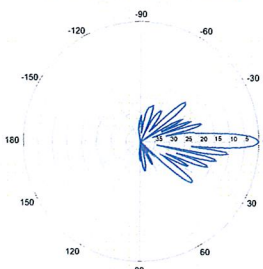


0° | Vertical | 1710-1880 MHz

**BXA-171063-12BF-EDIN-X**

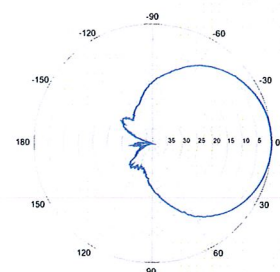


Horizontal | 1850-1990 MHz  
**BXA-171063-12BF-EDIN-0**

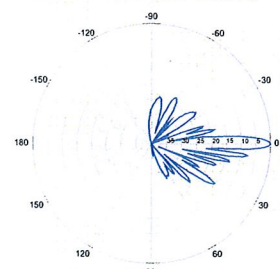


0° | Vertical | 1850-1990 MHz

**BXA-171063-12BF-EDIN-X**



Horizontal | 1920-2170 MHz  
**BXA-171063-12BF-EDIN-0**



0° | Vertical | 1920-2170 MHz

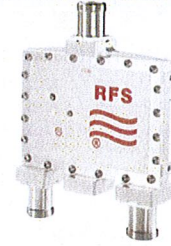
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## ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

### 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)
- 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 Band, MHz	698-2200
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710 - 2170 MHz path, with mounting hardware SEM2-1A
Mounting	Wall, pole
Frequency Range Low Frequency Path, MHz	698-960
Frequency Range High Frequency Path, MHz	1710-2200
Return Loss All Ports, Min, dB	19
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 698-960 MHz Path, Typ, dB	0.07
Insertion Loss 1710-2200MHz path, Typ, dB	0.13
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
Rejection between Bands, Min, dB	60
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
Application	LTE 700MHz, GSM900/3G/UMTS, GSM900/GSM1800, Cellular 800/PCS
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

**RFS The Clear Choice ®**

**FD9R6004/2C-3L**

Rev: --

Print Date: 17.03.2010

Radio Frequency Systems