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KENNETH C. BALDWIN

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Also admitted in Massachusetts

December 28, 2012

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

Re: **EM-VER-082-120829 – 393 Jackson Hill Road, Middlefield, Connecticut**
EM-VER-079-120807 – 175 South Main Street, Marlborough, Connecticut
EM-VER-005-120217B – 127 New Hartford Road, Barkhamsted, Connecticut
EM-VER-086-120216 – 41 Beckwith Road, Montville, Connecticut
EM-VER-036-120627 – 15 Pent Road, Deep River, Connecticut
EM-VER-041-120405 – 135 Honey Hill Road, East Haddam, 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

12012136-v1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

March 5, 2012

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

RE: **EM-VER-086-120216** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 41 Beckwith Road, Montville, 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 February 15, 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

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Ronald K. McDaniel, Mayor, Town of Montville
Marcia Vlaun, Town Planner, Town of Montville
Crown Castle USA, Inc.

ROBINSON & COI

EM-VER-086-120216

KENNETH C. BALDWIN

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February 15, 2012

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

Re: **Notice of Exempt Modification – Antenna Swap**
41 Beckwith Road, Montville, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 167-foot level on an existing 180-foot tower at the above-referenced address. The tower is owned by Crown Castle. Cellco's use of the tower was approved by the Council in 2002. Cellco now intends to replace all of its existing antennas with six (6) model LPA-80080-4CF cellular antennas; three (3) model BXA-171085-8BF PCS antennas; and three (3) model BXA-70063-6CF LTE antennas, all at the same 167-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 Montville's Mayor, Ronald McDaniel. A copy of this letter is also being sent to Louise Healy Bond, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and cable diplexers will be located at the same 167-foot level on the existing 180-foot tower.

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

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

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

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed 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:
Ronald McDaniel, Montville Mayor
Louise Healy Bond
Sandy M. Carter

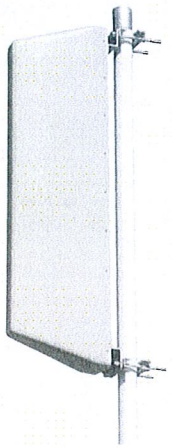
Amphenol ANTENNA SOLUTIONS

LPA-80080-4CF-EDIN-X

V-Pol | Log Periodic | 80° | 12.5 dBd

Replace "X" with desired electrical downtilt.

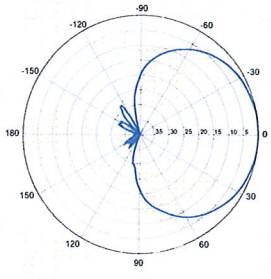
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



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 m²	Side: 0.40 m²	Front: 1.8 ft²	Side: 4.3 ft²
Wind load @ 161 km/hr (100 mph)	Front: 254 N	Side: 574 N	Front: 57 lbf	Side: 129 lbf

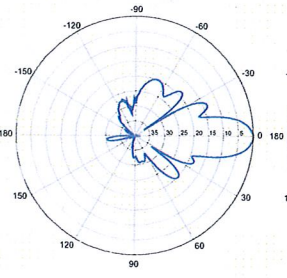
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm 2.0-4.0 in	5.4 kg 12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80080-4CF-EDIN-X



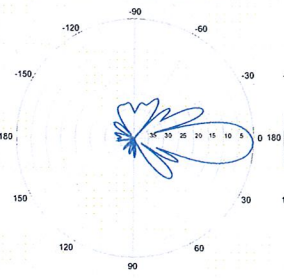
Horizontal

LPA-80080-4CF-EDIN-0



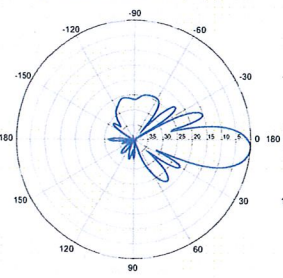
0° | Vertical

LPA-80080-4CF-EDIN-2



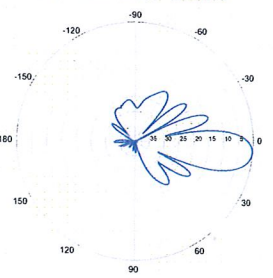
2° | Vertical

LPA-80080-4CF-EDIN-4



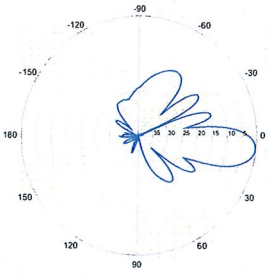
2° | Vertical

LPA-80080-4CF-EDIN-5



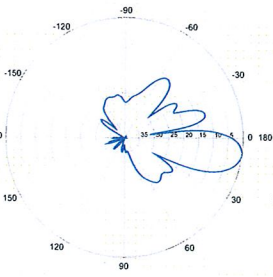
5° | Vertical

LPA-80080-4CF-EDIN-6



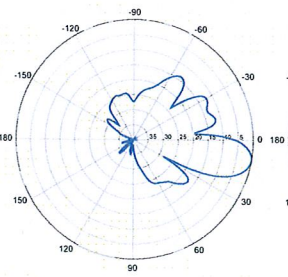
6° | Vertical

LPA-80080-4CF-EDIN-8



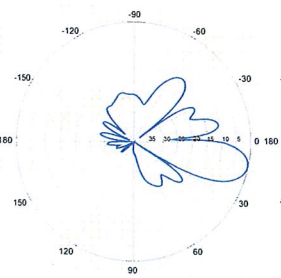
8° | Vertical

LPA-80080-4CF-EDIN-10



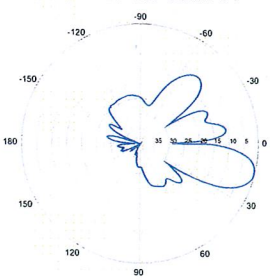
10° | Vertical

LPA-80080-4CF-EDIN-12



12° | Vertical

LPA-80080-4CF-EDIN-14



14° | Vertical

Amphenol ANTENNA SOLUTIONS

BXA-171085-8BF-EDIN-X

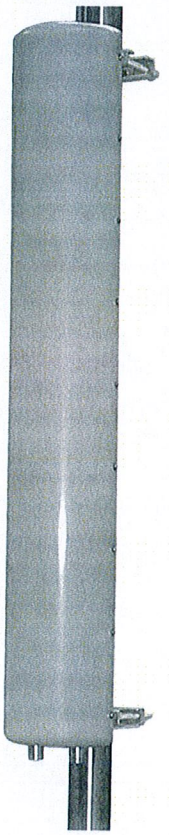
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 16.4 dBi

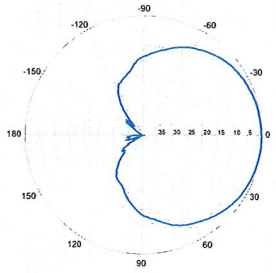
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	7°	7°	7°
Gain	13.5 dBd / 15.6 dBi	13.9 dBd / 16.0 dBi	14.3 dBd / 16.4 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm	5.2 in
Weight without mounting brackets	4.8 kg	10.5 lbs
Survival wind speed	296 km/hr	184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²	Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-8BF-EDIN-X-FP		

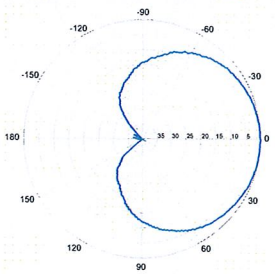


BXA-171085-8BF-EDIN-X



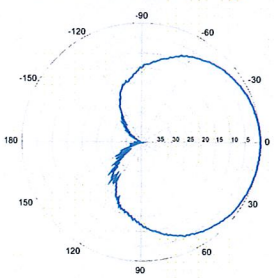
Horizontal | 1710-1880 MHz

BXA-171085-8BF-EDIN-X



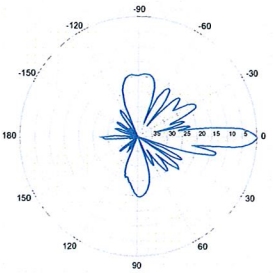
Horizontal | 1850-1990 MHz

BXA-171085-8BF-EDIN-X



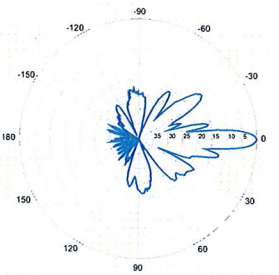
Horizontal | 1920-2170 MHz

BXA-171085-8BF-EDIN-0



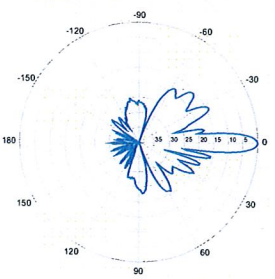
0° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-0

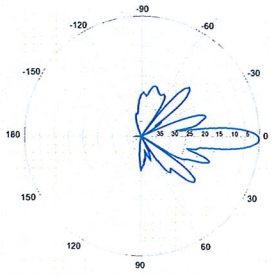


0° | Vertical | 1920-2170 MHz

BXA-171085-8BF-EDIN-X

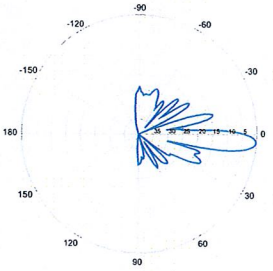
X-Pol | FET Panel | 85° | 16.4 dBi

BXA-171085-8BF-EDIN-2



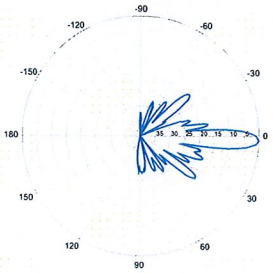
2° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-4



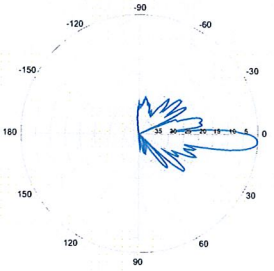
4° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-2



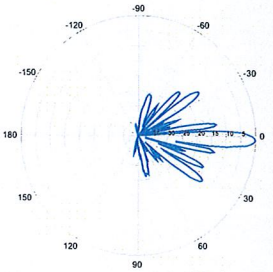
2° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-4



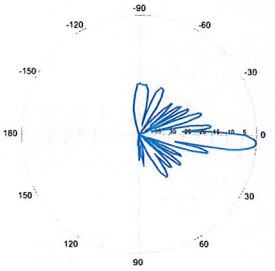
4° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

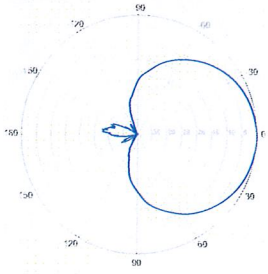
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

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

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

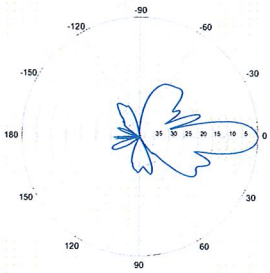
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



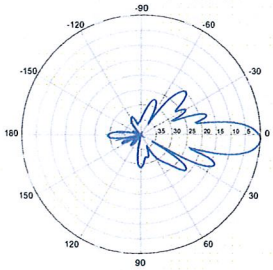
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

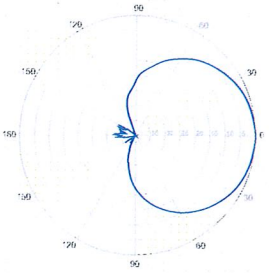


0° | Vertical | 750 MHz

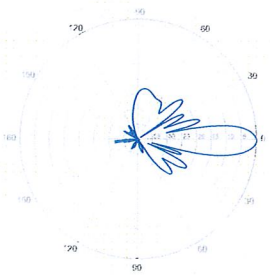
BXA-70063-6CF-EDIN-2



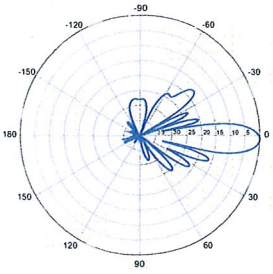
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

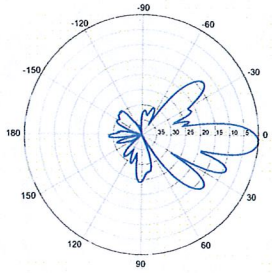


2° | Vertical | 850 MHz

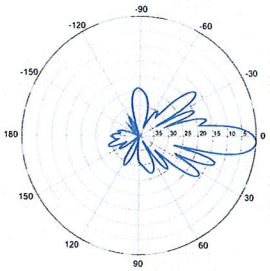
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



3° | Vertical | 750 MHz



3° | Vertical | 850 MHz

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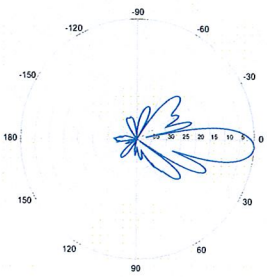
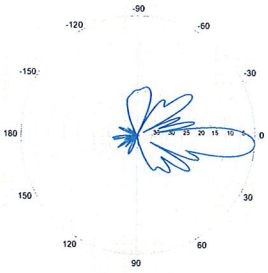
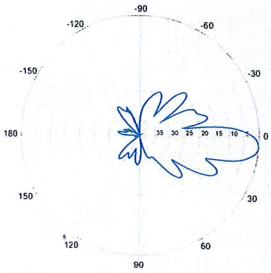


4° | Vertical | 750 MHz

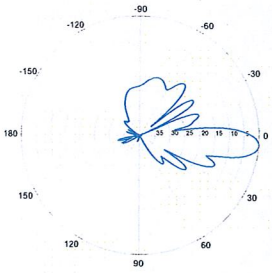


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

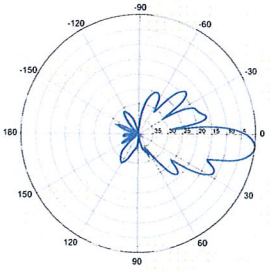


5° | Vertical | 750 MHz

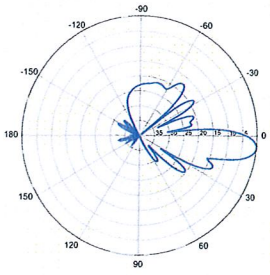


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

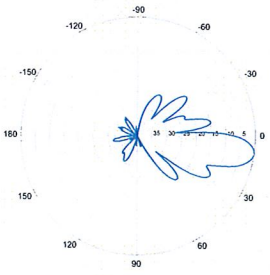


6° | Vertical | 750 MHz

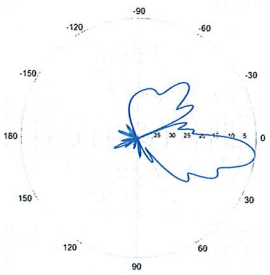


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

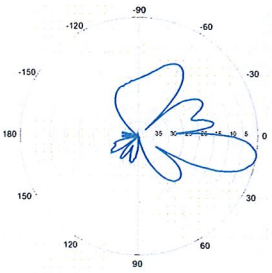


8° | Vertical | 750 MHz

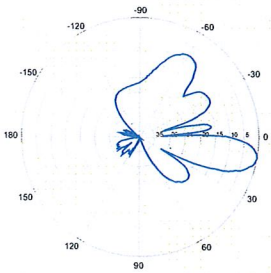


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



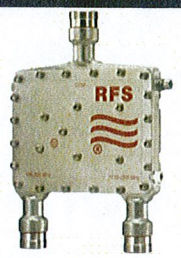
10° | Vertical | 850 MHz

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

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

Product Description

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



Features/Benefits

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

Technical Specifications

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

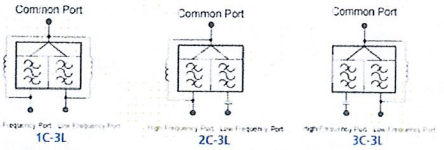
Notes

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

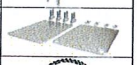
Other Documentation

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

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



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

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

	General	Power	Density					
Site Name: Chesterfield (Montville)								
Tower Height: Verizon @ 147ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Sprint	11	122	177	0.0154	1962.5	1.0000	1.54%	
Verizon PCS	**11**	**234**	**167**	**0.0332**	**1970**	**1.0000**	**3.32%**	
Verizon Cellular	**9**	**247**	**167**	**0.0287**	**869**	**0.5793**	**4.95%**	
Verizon AWS	**1**	**670**	**167**	**0.0086**	**2145**	**1.0000**	**0.86%**	
Verizon 700	**1**	**813**	**167**	**0.0105**	**698**	**0.4653**	**2.25%**	
								12.92%
* Source: Siting Council								

Date: **January 04, 2012**

Eva Morales
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
724-416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117762
	Carrier Site Name:	Chesterfield CT
Crown Castle Designation:	**Crown Castle BU Number:**	876370
	Crown Castle Site Name:	MAYBROOK / BOND
	Crown Castle JDE Job Number:	174328
	Crown Castle Work Order Number:	458224
	Crown Castle Application Number:	137641 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	458224
Site Data:	**41 Beckwith Rd., MONTVILLE, New London County, CT** **Latitude *41° 26' 7.66"*, Longitude *-72° 13' 15.07"*** **180 Foot - Monopole Tower**	

Dear Eva Morales,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 458224, in accordance with application 137641, revision 1.

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

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

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

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

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

Structural analysis prepared by: Alex Mrkajic, Engineer I / JDF
Respectfully submitted by:

Aaron C. Poot, P.E.
Engineering Supervisor

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.0.3.0

1/9/12

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by Engineered Endeavors, Inc. in September of 2000. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	167.0	3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	-	-	-
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	182.0	1	lucent	KS24019-L112A	6 1	1-5/8 1/2	1
	181.0	6	decibel	DB980H90E-M w/ Mount Pipe			
		9	sprint mla	SPRINT MLA_ANTENNA w/ Mount Pipe	9	1-5/8	2
	180.0	1	tower mounts	Platform Mount [LP 712-1]	-	-	1
167.0	168.0	6	decibel	DB844H90 w/ Mount Pipe	-	-	3
		6	decibel	DB948F85T2E-M w/ Mount Pipe			
	167.0	1	tower mounts	Platform Mount [LP 403-1]	12	1-5/8	1
75.0	76.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) MLA Equipment Controlling
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180	180	12	DAPA	48000	-	-
170	170	12	DAPA	48000	-	-
160	160	12	DAPA	48000	-	-
150	150	12	DAPA	48000	-	-
140	140	12	DAPA	48000	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors Incorporated	1532099	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 133	Pole	TP27.51x15.5x0.25	1	-6.07	1082.36	68.8	Pass
L2	133 - 87.3307	Pole	TP38.56x25.9879x0.375	2	-12.94	2279.26	58.6	Pass
L3	87.3307 - 42.6641	Pole	TP49.1x36.46x0.4375	3	-23.32	3391.30	54.0	Pass
L4	42.6641 - 0	Pole	TP59x46.5397x0.4375	4	-26.46	3449.70	56.2	Pass
							Summary	
						Pole (L1)	68.8	Pass
						Rating =	68.8	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	49.5	Pass
1	Base Plate	0	73.2	Pass
1	Base Foundation (Compared w/ Design Loads)	0	64.6	Pass
Structure Rating (max from all components) =				**73.2%**

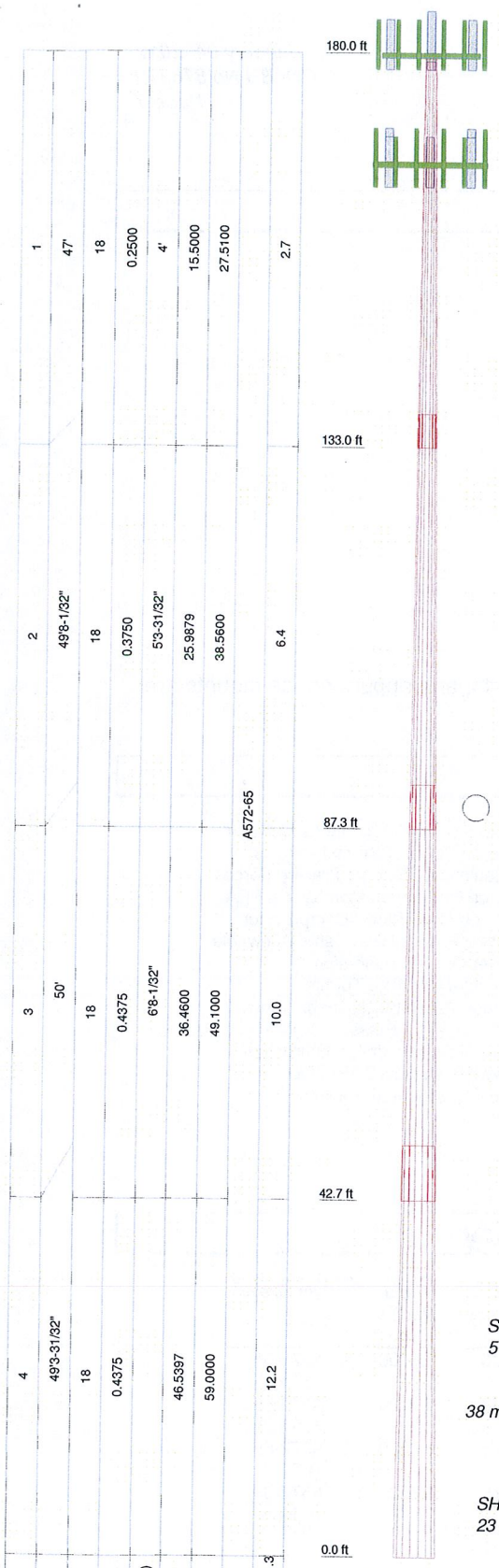
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4
Length (ft)	47'	49'8-1/32"	50'	49'3-31/32"
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3750	0.4375	0.4375
Socket Length (ft)	4'	5'3-31/32"	6'8-1/32"	
Top Dia (in)	15.5000	25.9879	36.4600	46.5397
Bot Dia (in)	27.5100	38.5600	49.1000	59.0000
Grade			A572-65	
Weight (K)	2.7	6.4	10.0	12.2

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) MLA_ANTENNA w/Mount Pipe	180	BXA-70063-6CF-2 w/ Mount Pipe	167
(3) MLA_ANTENNA w/Mount Pipe	180	(2) FD9R6004/2C-3L	167
(3) MLA_ANTENNA w/Mount Pipe	180	(2) LPA-80080/4CF w/ Mount Pipe	167
		BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167
		BXA-70063-6CF-2 w/ Mount Pipe	167
		(2) FD9R6004/2C-3L	167
Platform Mount [LP 712-1]	180		
(2) LPA-80080/4CF w/ Mount Pipe	167		
BXA-70063-6CF-2 w/ Mount Pipe	167		
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167		
(2) FD9R6004/2C-3L	167		
(2) LPA-80080/4CF w/ Mount Pipe	167	Platform Mount [LP 403-1]	167
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	167	KS24019-L112A	75
		Side Arm Mount [SO 701-1]	75

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 68.8%

CROWN CASTLE
We Are Solutions

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: 724-416-2000
FAX:

Job:	BU# 876730		
Project:			
Client: Crown Castle	Drawn by: JFesko	App'd:	
Code: TIA/EIA-222-F	Date: 01/03/12	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\AMrkajic\876370_458224\876370.eri		Dwg No. E-1	

Tower Input Data

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

4) Tower is located in New London County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	180'-133'	47'	4'	18	15.5000	27.5100	0.2500	1.0000	A572-65 (65 ksi)
L2	133'-87'3-31/32"	49'8-1/32"	5'3-31/32"	18	25.9879	38.5600	0.3750	1.5000	A572-65 (65 ksi)
L3	87'3-31/32"-42'7-29/32"	50'	6'8-1/32"	18	36.4600	49.1000	0.4375	1.7500	A572-65 (65 ksi)
L4	42'7-29/32"-0'	49'3-31/32"		18	46.5397	59.0000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	27.9344	21.6308	2030.7756	9.6773	13.9751	145.3141	4064.2233	10.8175	4.4018	17.607
L2	27.4169	30.4857	2526.6815	9.0926	13.2018	191.3886	5056.6876	15.2458	3.9139	10.437
	39.1549	45.4497	8372.4782	13.5557	19.5885	427.4185	16755.973 1	22.7292	6.1266	16.337
L3	38.3916	50.0218	8200.5987	12.7880	18.5217	442.7562	16411.987 9	25.0157	5.6470	12.907
	49.8574	67.5740	20216.486 5	17.2752	24.9428	810.5139	40459.574 4	33.7934	7.8716	17.992
L4	48.9675	64.0186	17190.424 6	16.3663	23.6422	727.1091	34403.468 8	32.0154	7.4210	16.962
	59.9102	81.3214	35235.566 2	20.7897	29.9720	1175.6161	70517.496 3	40.6684	9.6140	21.975

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 180'-133'				1	1	1		
L2 133'-87'3-31/32"				1	1	1		
L3 87'3-31/32"-42'7-29/32"				1	1	1		
L4 42'7-29/32"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	180' - 0'	0.0000	0	9	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	167' - 0'	0.0000	0	12	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
LDF4-50A(1/2")	C	No	Inside Pole	75' - 0'	0.0000	0	1	No Ice	0.00	0.15
								1/2" Ice	0.00	0.15
								1" Ice	0.00	0.15
								2" Ice	0.00	0.15
								4" Ice	0.00	0.15
Climbing Ladder (Flat)	C	No	CaAa (Out Of Face)	180' - 174'	36.0000	0	1	No Ice	0.58	4.81
								1/2" Ice	1.03	7.12
								1" Ice	1.48	10.35
								2" Ice	2.37	19.55
								4" Ice	4.15	48.96

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180'-133'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.506	0.71
L2	133'-87'3-31/32"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.79
L3	87'3-31/32"-42'7-29/32"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.77
L4	42'7-29/32"-0'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.74

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180'-133'	A	0.903	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.335	0.74
L2	133'-87'3-31/32"	A	0.866	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.79
L3	87'3-31/32"-42'7-29/32"	A	0.813	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.77
L4	42'7-29/32"-0'	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.74

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180'-133'	-0.0704	0.0406	-0.1473	0.0851
L2	133'-87'3-31/32"	0.0000	0.0000	0.0000	0.0000
L3	87'3-31/32"-42'7-29/32"	0.0000	0.0000	0.0000	0.0000
L4	42'7-29/32"-0'	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) MLA_ANTENNA w/Mount Pipe	A	From Leg	4.00	0' 1'	0.000	180'	No Ice	8.64	6.95	0.07
							1/2" Ice	9.29	8.13	0.13
							1" Ice	9.91	9.02	0.21
							2" Ice	11.18	10.84	0.39
							4" Ice	13.83	14.85	0.90
(3) MLA_ANTENNA w/Mount Pipe	B	From Leg	4.00	0' 1'	0.000	180'	No Ice	8.64	6.95	0.07
							1/2" Ice	9.29	8.13	0.13
							1" Ice	9.91	9.02	0.21
							2" Ice	11.18	10.84	0.39
							4" Ice	13.83	14.85	0.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) MLA_ANTENNA w/Mount Pipe	C	From Leg	4.00 0' 1'	0.000	180'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.29 9.91 11.18 13.83	6.95 8.13 9.02 10.84 14.85	0.07 0.13 0.21 0.39 0.90
Platform Mount [LP 712-1]	C	None		0.000	180'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.07 0.13 0.25 0.61
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
(2) FD9R6004/2C-3L	A	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.07 0.13 0.25 0.61
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	B	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.07 0.13 0.25 0.61

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
(2) FD9R6004/2C-3L	C	From Leg	4.00 0' 0'	0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
Platform Mount [LP 403-1]	C	None		0.000	167'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.85 24.30 29.75 40.65 62.45	18.85 24.30 29.75 40.65 62.45	1.50 1.80 2.09 2.69 3.87
KS24019-L112A	A	From Leg	1.50 0' 1'	0.000	75'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-1]	A	From Leg	0.75 0' 0'	0.000	75'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp

Comb. No.	Description
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 133	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-11.37	0.03	-0.02
			Max. Mx	11	-6.07	397.91	-0.01
			Max. My	8	-6.07	0.02	-397.90
			Max. Vy	11	-11.85	397.91	-0.01
			Max. Vx	2	-11.85	0.02	397.88
			Max. Torque	7			-0.02
L2	133 - 87.3307	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.72	0.03	-0.02
			Max. Mx	11	-12.94	998.49	-0.00
			Max. My	8	-12.94	0.02	-998.47
			Max. Vy	11	-15.32	998.49	-0.00
			Max. Vx	2	-15.32	0.02	998.45
			Max. Torque	7			-0.02
L3	87.3307 - 42.6641	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.99	0.03	0.22
			Max. Mx	11	-23.32	1745.31	0.17
			Max. My	2	-23.32	0.02	1744.61
			Max. Vy	11	-19.12	1745.31	0.17
			Max. Vx	2	-19.08	0.02	1744.61
			Max. Torque	11			-0.17
L4	42.6641 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.33	0.03	0.22
			Max. Mx	11	-38.26	2787.39	0.17
			Max. My	2	-38.26	0.02	2785.08
			Max. Vy	11	-23.14	2787.39	0.17
			Max. Vx	2	-23.10	0.02	2785.08
			Max. Torque	5			0.17

Maximum Reactions

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

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	49.33	5.18	0.00
	Max. H_x	11	38.27	23.12	0.00
	Max. H_z	2	38.27	0.00	23.09
	Max. M_x	2	2785.08	0.00	23.09
	Max. M_z	5	2787.35	-23.12	0.00
	Max. Torsion	5	0.17	-23.12	0.00
	Min. Vert	1	38.27	0.00	0.00
	Min. H_x	5	38.27	-23.12	0.00
	Min. H_z	8	38.27	0.00	-23.09
	Min. M_x	8	-2784.74	0.00	-23.09
	Min. M_z	11	-2787.39	23.12	0.00
	Min. Torsion	11	-0.17	23.12	0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	38.27	0.00	0.00	-0.17	0.02	0.00
Dead+Wind 0 deg - No Ice	38.27	0.00	-23.09	-2785.08	0.02	-0.02
Dead+Wind 30 deg - No Ice	38.27	11.56	-19.99	-2411.97	-1393.67	-0.10
Dead+Wind 60 deg - No Ice	38.27	20.02	-11.54	-1392.62	-2413.92	-0.15
Dead+Wind 90 deg - No Ice	38.27	23.12	0.00	-0.17	-2787.35	-0.17
Dead+Wind 120 deg - No Ice	38.27	20.02	11.54	1392.28	-2413.92	-0.14
Dead+Wind 150 deg - No Ice	38.27	11.56	19.99	2411.63	-1393.67	-0.07
Dead+Wind 180 deg - No Ice	38.27	0.00	23.09	2784.74	0.02	0.02
Dead+Wind 210 deg - No Ice	38.27	-11.56	19.99	2411.63	1393.71	0.10
Dead+Wind 240 deg - No Ice	38.27	-20.02	11.54	1392.28	2413.96	0.15
Dead+Wind 270 deg - No Ice	38.27	-23.12	0.00	-0.17	2787.39	0.17
Dead+Wind 300 deg - No Ice	38.27	-20.02	-11.54	-1392.62	2413.96	0.14
Dead+Wind 330 deg - No Ice	38.27	-11.56	-19.99	-2411.97	1393.71	0.07
Dead+Ice+Temp	49.33	0.00	0.00	-0.22	0.03	0.00
Dead+Wind 0 deg+Ice+Temp	49.33	0.00	-5.17	-662.33	0.04	-0.01
Dead+Wind 30 deg+Ice+Temp	49.33	2.59	-4.48	-573.63	-331.44	-0.03
Dead+Wind 60 deg+Ice+Temp	49.33	4.49	-2.59	-331.28	-574.10	-0.05
Dead+Wind 90 deg+Ice+Temp	49.33	5.18	0.00	-0.23	-662.92	-0.05
Dead+Wind 120 deg+Ice+Temp	49.33	4.49	2.59	330.82	-574.10	-0.04
Dead+Wind 150 deg+Ice+Temp	49.33	2.59	4.48	573.17	-331.44	-0.02
Dead+Wind 180 deg+Ice+Temp	49.33	0.00	5.17	661.87	0.04	0.01
Dead+Wind 210 deg+Ice+Temp	49.33	-2.59	4.48	573.17	331.52	0.03
Dead+Wind 240 deg+Ice+Temp	49.33	-4.49	2.59	330.82	574.18	0.05
Dead+Wind 270 deg+Ice+Temp	49.33	-5.18	0.00	-0.23	663.00	0.05
Dead+Wind 300 deg+Ice+Temp	49.33	-4.49	-2.59	-331.28	574.18	0.04
Dead+Wind 330 deg+Ice+Temp	49.33	-2.59	-4.48	-573.63	331.52	0.02
Dead+Wind 0 deg - Service	38.27	0.00	-7.99	-964.77	0.02	-0.01
Dead+Wind 30 deg - Service	38.27	4.00	-6.92	-835.54	-482.71	-0.03
Dead+Wind 60 deg - Service	38.27	6.93	-3.99	-482.47	-836.09	-0.05
Dead+Wind 90 deg - Service	38.27	8.00	0.00	-0.17	-965.44	-0.06
Dead+Wind 120 deg - Service	38.27	6.93	3.99	482.13	-836.09	-0.05
Dead+Wind 150 deg - Service	38.27	4.00	6.92	835.20	-482.71	-0.02
Dead+Wind 180 deg -	38.27	0.00	7.99	964.43	0.02	0.01

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 210 deg - Service	38.27	-4.00	6.92	835.20	482.75	0.03
Dead+Wind 240 deg - Service	38.27	-6.93	3.99	482.13	836.13	0.05
Dead+Wind 270 deg - Service	38.27	-8.00	0.00	-0.17	965.47	0.06
Dead+Wind 300 deg - Service	38.27	-6.93	-3.99	-482.47	836.13	0.05
Dead+Wind 330 deg - Service	38.27	-4.00	-6.92	-835.54	482.75	0.02

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-38.27	0.00	0.00	38.27	0.00	0.000%
2	0.00	-38.27	-23.09	0.00	38.27	23.09	0.000%
3	11.56	-38.27	-19.99	-11.56	38.27	19.99	0.000%
4	20.02	-38.27	-11.54	-20.02	38.27	11.54	0.000%
5	23.12	-38.27	0.00	-23.12	38.27	0.00	0.000%
6	20.02	-38.27	11.54	-20.02	38.27	-11.54	0.000%
7	11.56	-38.27	19.99	-11.56	38.27	-19.99	0.000%
8	0.00	-38.27	23.09	0.00	38.27	-23.09	0.000%
9	-11.56	-38.27	19.99	11.56	38.27	-19.99	0.000%
10	-20.02	-38.27	11.54	20.02	38.27	-11.54	0.000%
11	-23.12	-38.27	0.00	23.12	38.27	0.00	0.000%
12	-20.02	-38.27	-11.54	20.02	38.27	11.54	0.000%
13	-11.56	-38.27	-19.99	11.56	38.27	19.99	0.000%
14	0.00	-49.33	0.00	0.00	49.33	0.00	0.000%
15	0.00	-49.33	-5.17	0.00	49.33	5.17	0.000%
16	2.59	-49.33	-4.48	-2.59	49.33	4.48	0.000%
17	4.49	-49.33	-2.59	-4.49	49.33	2.59	0.000%
18	5.18	-49.33	0.00	-5.18	49.33	0.00	0.000%
19	4.49	-49.33	2.59	-4.49	49.33	-2.59	0.000%
20	2.59	-49.33	4.48	-2.59	49.33	-4.48	0.000%
21	0.00	-49.33	5.17	0.00	49.33	-5.17	0.000%
22	-2.59	-49.33	4.48	2.59	49.33	-4.48	0.000%
23	-4.49	-49.33	2.59	4.49	49.33	-2.59	0.000%
24	-5.18	-49.33	0.00	5.18	49.33	0.00	0.000%
25	-4.49	-49.33	-2.59	4.49	49.33	2.59	0.000%
26	-2.59	-49.33	-4.48	2.59	49.33	4.48	0.000%
27	0.00	-38.27	-7.99	0.00	38.27	7.99	0.000%
28	4.00	-38.27	-6.92	-4.00	38.27	6.92	0.000%
29	6.93	-38.27	-3.99	-6.93	38.27	3.99	0.000%
30	8.00	-38.27	0.00	-8.00	38.27	0.00	0.000%
31	6.93	-38.27	3.99	-6.93	38.27	-3.99	0.000%
32	4.00	-38.27	6.92	-4.00	38.27	-6.92	0.000%
33	0.00	-38.27	7.99	0.00	38.27	-7.99	0.000%
34	-4.00	-38.27	6.92	4.00	38.27	-6.92	0.000%
35	-6.93	-38.27	3.99	6.93	38.27	-3.99	0.000%
36	-8.00	-38.27	0.00	8.00	38.27	0.00	0.000%
37	-6.93	-38.27	-3.99	6.93	38.27	3.99	0.000%
38	-4.00	-38.27	-6.92	4.00	38.27	6.92	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00009344

3	Yes	5	0.00000001	0.00020132
4	Yes	5	0.00000001	0.00020180
5	Yes	4	0.00000001	0.00009556
6	Yes	5	0.00000001	0.00020124
7	Yes	5	0.00000001	0.00020158
8	Yes	4	0.00000001	0.00009343
9	Yes	5	0.00000001	0.00020174
10	Yes	5	0.00000001	0.00020117
11	Yes	4	0.00000001	0.00009556
12	Yes	5	0.00000001	0.00020172
13	Yes	5	0.00000001	0.00020148
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00007993
16	Yes	5	0.00000001	0.00008971
17	Yes	5	0.00000001	0.00008975
18	Yes	5	0.00000001	0.00007993
19	Yes	5	0.00000001	0.00008970
20	Yes	5	0.00000001	0.00008969
21	Yes	5	0.00000001	0.00007989
22	Yes	5	0.00000001	0.00008972
23	Yes	5	0.00000001	0.00008971
24	Yes	5	0.00000001	0.00007996
25	Yes	5	0.00000001	0.00008977
26	Yes	5	0.00000001	0.00008975
27	Yes	4	0.00000001	0.00002907
28	Yes	4	0.00000001	0.00036784
29	Yes	4	0.00000001	0.00036996
30	Yes	4	0.00000001	0.00002925
31	Yes	4	0.00000001	0.00036767
32	Yes	4	0.00000001	0.00036884
33	Yes	4	0.00000001	0.00002906
34	Yes	4	0.00000001	0.00036953
35	Yes	4	0.00000001	0.00036740
36	Yes	4	0.00000001	0.00002926
37	Yes	4	0.00000001	0.00036968
38	Yes	4	0.00000001	0.00036852

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	35.122	36	2.112	0.000
L2	137 - 87.3307	18.414	36	1.453	0.000
L3	92.6641 - 42.6641	7.777	36	0.834	0.000
L4	49.3307 - 0	2.133	36	0.402	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180'	(3) MLA_ANTENNA w/Mount Pipe	36	35.122	2.112	0.000	22496
167'	(2) LPA-80080/4CF w/ Mount Pipe	36	29.682	1.911	0.000	8652
75'	KS24019-L112A	36	4.985	0.639	0.000	5588

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	101.204	11	6.086	0.000
L2	137 - 87.3307	53.106	11	4.190	0.000
L3	92.6641 - 42.6641	22.441	11	2.406	0.000
L4	49.3307 - 0	6.157	11	1.160	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180'	(3) MLA_ANTENNA w/Mount Pipe	11	101.204	6.086	0.000	7942
167'	(2) LPA-80080/4CF w/ Mount Pipe	11	85.546	5.509	0.000	3053
75'	KS24019-L112A	11	14.385	1.845	0.000	1940

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	180 - 133 (1)	TP27.51x15.5x0.25	47'	0'	0.0	39.00	20.8198	-6.07	811.97	0.007
L2	133 - 87.3307 (2)	TP38.56x25.9879x0.375	49'8-1/32"	0'	0.0	39.00	43.8429	-12.94	1709.87	0.008
L3	87.3307 - 42.6641 (3)	TP49.1x36.46x0.4375	50'	0'	0.0	39.00	65.2337	-23.32	2544.11	0.009
L4	42.6641 - 0 (4)	TP59x46.5397x0.4375	49'3-31/32"	0'	0.0	39.00	66.3570	-26.46	2587.92	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	180 - 133 (1)	TP27.51x15.5x0.25	397.91	35.48	39.00	0.910	0.00	0.00	39.00	0.000
L2	133 - 87.3307 (2)	TP38.56x25.9879x0.375	998.49	30.14	39.00	0.773	0.00	0.00	39.00	0.000
L3	87.3307 - 42.6641 (3)	TP49.1x36.46x0.4375	1745.31	27.74	39.00	0.711	0.00	0.00	39.00	0.000
L4	42.6641 - 0 (4)	TP59x46.5397x0.4375	1874.80	28.79	39.00	0.738	0.00	0.00	39.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	180 - 133 (1)	TP27.51x15.5x0.25	11.85	0.57	26.00	0.044	0.00	0.00	26.00	0.000
L2	133 - 87.3307 (2)	TP38.56x25.9879x0.375	15.32	0.35	26.00	0.027	0.00	0.00	26.00	0.000
L3	87.3307 - 42.6641 (3)	TP49.1x36.46x0.4375	19.12	0.29	26.00	0.023	0.17	0.00	26.00	0.000
L4	42.6641 - 0 (4)	TP59x46.5397x0.4375	19.92	0.30	26.00	0.023	0.17	0.00	26.00	0.000

Pole Interaction Design Data

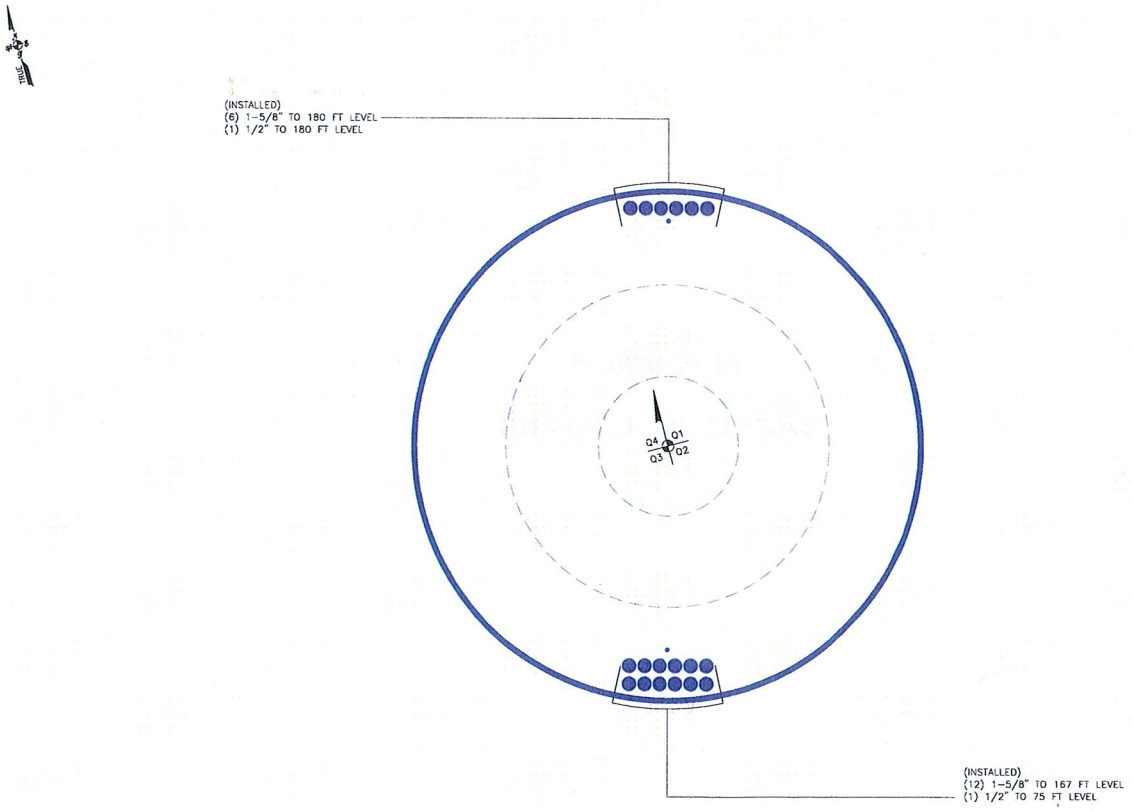
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 133 (1)	0.007	0.910	0.000	0.044	0.000	0.918 ✔	1.333	H1-3+VT ✔
L2	133 - 87.3307 (2)	0.008	0.773	0.000	0.027	0.000	0.780 ✔	1.333	H1-3+VT ✔
L3	87.3307 - 42.6641 (3)	0.009	0.711	0.000	0.023	0.000	0.720 ✔	1.333	H1-3+VT ✔
L4	42.6641 - 0 (4)	0.010	0.738	0.000	0.023	0.000	0.749 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	180 - 133	Pole	TP27.51x15.5x0.25	1	-6.07	1082.36	68.8	Pass
L2	133 - 87.3307	Pole	TP38.56x25.9879x0.375	2	-12.94	2279.26	58.6	Pass
L3	87.3307 - 42.6641	Pole	TP49.1x36.46x0.4375	3	-23.32	3391.30	54.0	Pass
L4	42.6641 - 0	Pole	TP59x46.5397x0.4375	4	-26.46	3449.70	56.2	Pass
						Summary	ELC:	Load Case 1
						Pole (L1)	68.8	Pass
						Rating =	68.8	Pass

APPENDIX B

BASE LEVEL DRAWING



0 1 2 3FT

: SCALE :

BUSINESS UNIT: 876370 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *876370*
Site Name: *Maybrook/Bond*
App #: *137641*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2787	ft-kips
Axial:	38	kips
Shear:	23	kips

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

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	68	in

Anchor Rod Results

		Rigid
Maximum Rod Tension:	96.5 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	49.5% **Pass**	

Plate Data		
Diam:	74	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.36	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	44.0 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	73.4% **Pass**	Y.L. Length: 33.81

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

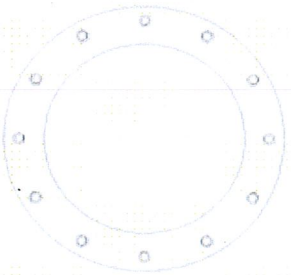
Stiffener Results

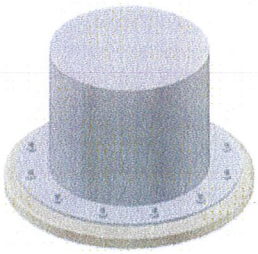
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Data		
Diam:	59	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check: n/a





Stress Increase Factor		
ASIF:	1.333	

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

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

FOUNDATION REACTION COMPARISON

BU# 877767
WO# 438768

REACTIONS	DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	4315.6	2787.0	64.6%
SHEAR (kips)	33.3	23.0	69.0%

Design loads from: CCI Sites: 1532099
Tower Manufacturer Drawings: CCI Sites: 1532099

Although the shear capacity is at 69.0%, the moment reaction is the governing criteria for a monopole drilled pier foundation. Therefore, the overall capacity for this foundation is 64.6%.