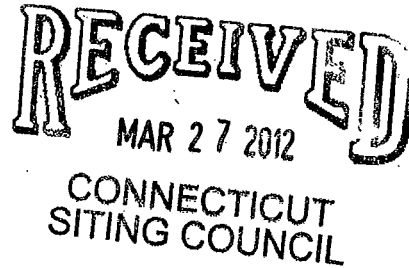


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

March 26, 2012



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

Re: **Completion of Construction Activity**
EM-VER-097-11110 – Rt. 34, Newtown, Connecticut
EM-VER-085-111219 – 474 Main Street, Monroe, Connecticut
EM-VER-082-111209 – 484 Meriden Road, Middlefield, Connecticut
EM-VER-054-120106 – 175 Dickson Road, Glastonbury, Connecticut
EM-VER-067-111108 – 107 Buck Road, Hebron, Connecticut
EM-VER-079-111110 – 43 North Main Street, Marlborough, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you and the Connecticut Siting Council that construction activity associated with each of the above-referenced facility modification filings has now been completed.

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



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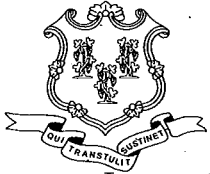
www.rc.com

Sincerely,

A handwritten signature in black ink that appears to read "Kenneth C. Baldwin".

Kenneth C. Baldwin

Copy to:
Sandy M. Carter



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

January 6, 2012

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

RE: **EM-VER-085-111219** - Celco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 474 Main Street, Monroe, Connecticut.

Dear Attorney Baldwin:



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

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

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

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

Very truly yours,


Linda Roberts
Executive Director 

LR/CDM/laf

c: The Honorable Stephen Vavrek, First Selectman, Town of Monroe
David Killeen, Planning Administrator, Town of Monroe
Crown Castle USA, Inc.





STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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

December 20, 2011

The Honorable Stephen Vavrek
First Selectman
Town of Monroe
Town Hall
7 Fan Hill Road
Monroe, CT 06468-1800

RE: **EM-VER-085-111219** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 474 Main Street, Monroe, Connecticut.

Dear First Selectman Vavrek:

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

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

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: David Killeen, Planning Administrator, Town of Monroe

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

December 15, 2011

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

Re: **Notice of Exempt Modification – Antenna Swap
474 Main Street, Monroe, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 160-foot level on the existing 191.5-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of the tower in 2007. Cellco now intends to modify its installation by replacing ten of its twelve existing antennas with four (4) model LPA-80063/6CF cellular antennas; two (2) model BXA-171063/12BF PCS antennas; one (1) model BXA-171063/8BF PCS antenna; one (1) model BXA-70063/4CF LTE antenna; and two (2) model BXA-70063/6CF LTE antennas, all at the same 160-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for the replacement antennas and cable diplexers.



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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 Steve Vavrek, First Selectman of the Town of Monroe. A copy of this letter is also being sent to Global Site Acquisitions, LLC, the owners 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).

Linda Roberts
December 15, 2011
Page 2

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco's replacement antennas and diplexers will be located at the 160-foot level on the existing 191.5-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:

Steve Vavrek, Monroe First Selectman
Global Site Acquisitions, LLC
Sandy M. Carter



LPA-80063-6CF-EDIN-X

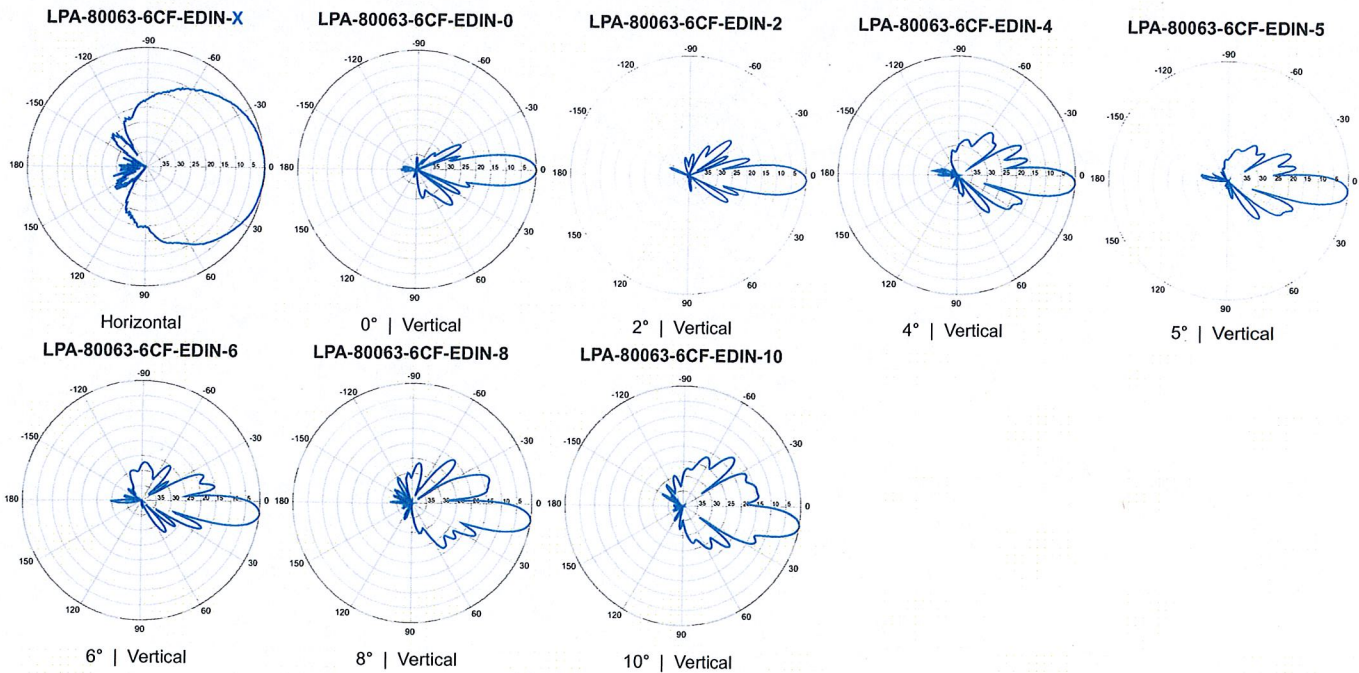
V-Pol | Log Periodic | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

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



Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	63°
Vertical beamwidth	10°
Gain	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Null fill	5% (-26.02 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)
Mechanical Characteristics	
Dimensions Length x Width x Depth	1805 x 385 x 332 mm 71.1 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm 14.6 in
Weight without mounting brackets	12.3 kg 27 lbs
Survival wind speed	> 201 km/hr > 125 mph
Wind area	Front: 0.70 m ² Side: 0.59 m ² Front: 7.5 ft ² Side: 6.3 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N Front: 199 lbf Side: 170 lbf
Mounting Options	
	Part Number Fits Pipe Diameter Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000 50-102 mm 2.0-4.0 in 11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.



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

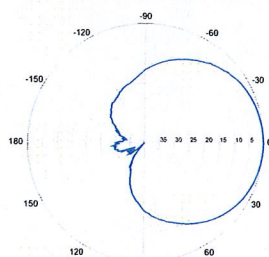
Replace 'X' with desired electrical downtilt.

X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics		1710-2170 MHz			
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 ²	Side: 0.19 m ²	Front: 3.1 ft ²	Side: 2.1 ft ²
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				

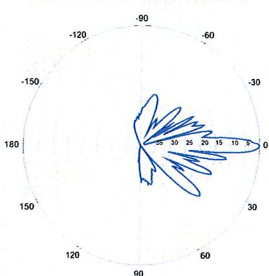


BXA-171063-12BF-EDIN-X



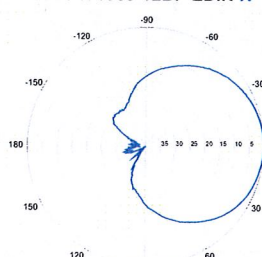
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



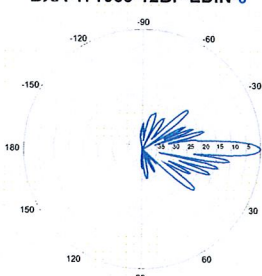
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



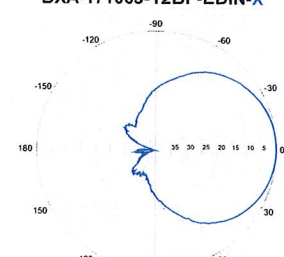
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



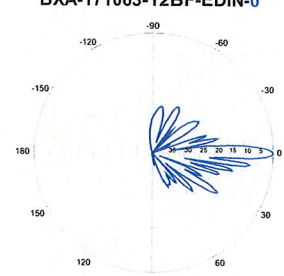
0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0



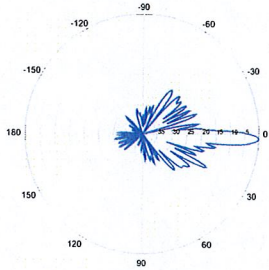
0° | Vertical | 1920-2170 MHz

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

BXA-171063-12BF-EDIN-X

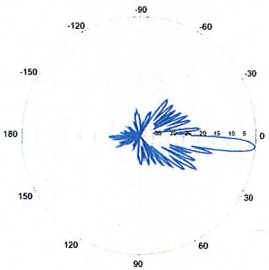
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



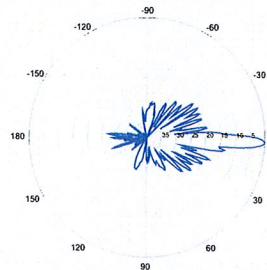
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



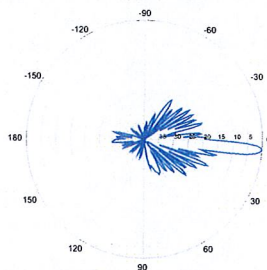
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



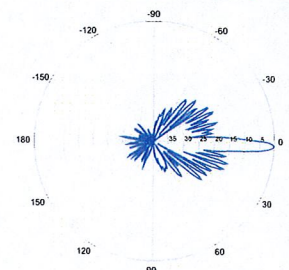
2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



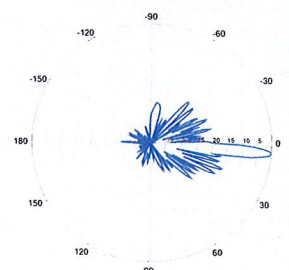
5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

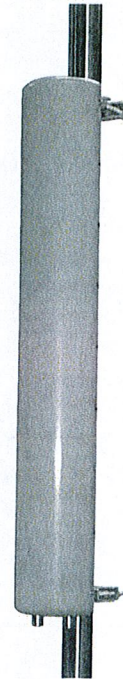
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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

BXA-171063-8BF-EDIN-X

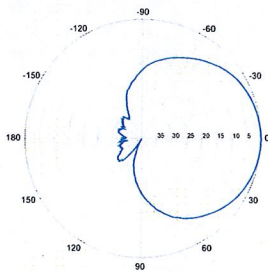
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 17.4 dBi

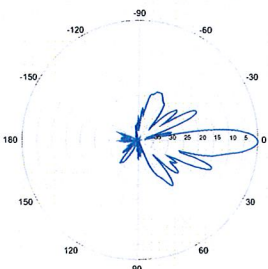
Electrical Characteristics	1710-2170 MHz		
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.8 kg		10.5 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options			
	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		



BXA-171063-8BF-EDIN-X

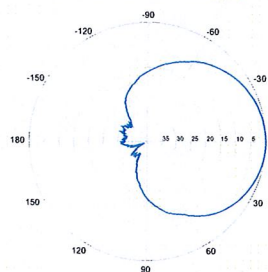


Horizontal | 1710-1880 MHz
BXA-171063-8BF-EDIN-0

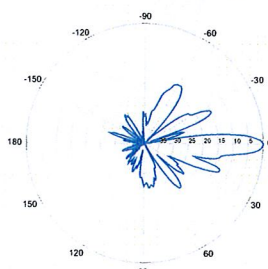


0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-X

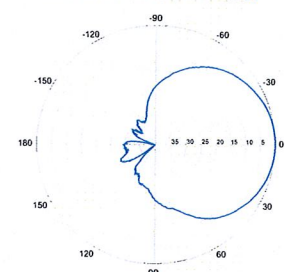


Horizontal | 1850-1990 MHz
BXA-171063-8BF-EDIN-0

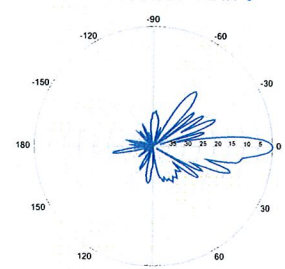


0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171063-8BF-EDIN-0



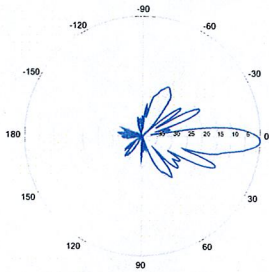
0° | Vertical | 1920-2170 MHz

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

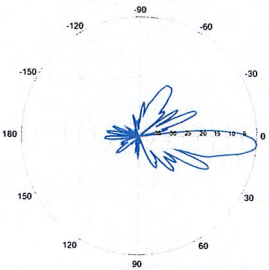
BXA-171063-8BF-EDIN-X

X-Pol | FET Panel | 63° | 17.4 dBi

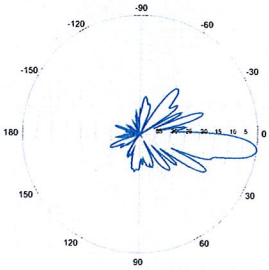
BXA-171063-8BF-EDIN-2



2° | Vertical | 1710-1880 MHz
BXA-171063-8BF-EDIN-4

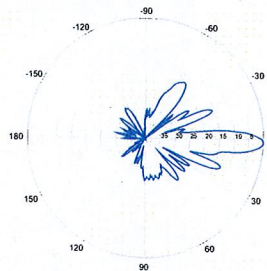


4° | Vertical | 1710-1880 MHz
BXA-171063-8BF-EDIN-8

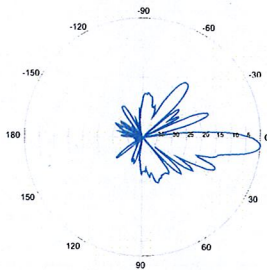


8° | Vertical | 1710-1880 MHz

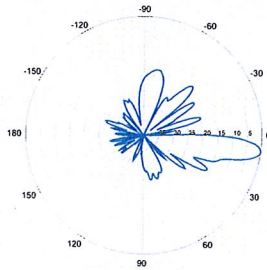
BXA-171063-8BF-EDIN-2



2° | Vertical | 1850-1990 MHz
BXA-171063-8BF-EDIN-4

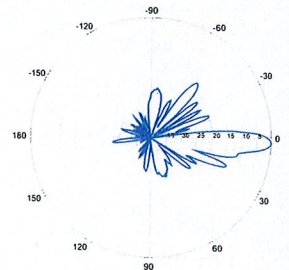


4° | Vertical | 1850-1990 MHz
BXA-171063-8BF-EDIN-8

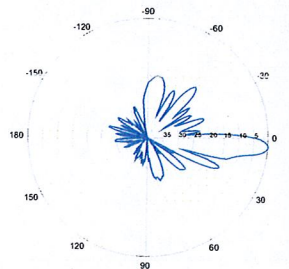


8° | Vertical | 1850-1990 MHz

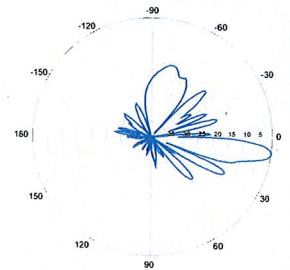
BXA-171063-8BF-EDIN-2



2° | Vertical | 1920-2170 MHz
BXA-171063-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz
BXA-171063-8BF-EDIN-8



8° | 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.

Mechanical specifications

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

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

Mounting & Downtilting

Mounting hardware attaches to pipe diameter $\varnothing 50$ -160 mm; $\varnothing 2.0$ -6.3 in.

Mounting Bracket Kit	36210002
Downtilt Bracket Kit	36114003

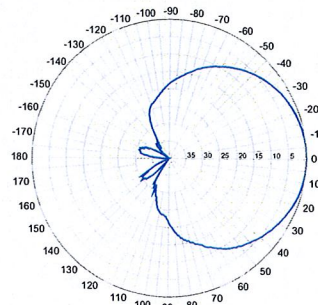
Electrical specifications

Frequency Range	696-900 MHz
Impedance	50 Ω
Connector ³⁾	NE or E-DIN Female 2 ports / Center
VSWR ¹⁾	$\leq 1.4:1$
Polarization	Slant $\pm 45^\circ$
Isolation Between Ports ¹⁾	< -30 dB
Gain ¹⁾	13.0 dBd 15.0 dBi
Power Rating ²⁾	500 W
Half Power Angle ¹⁾	
Horizontal Beamwidth	63 $^\circ$
Vertical Beamwidth	15 $^\circ$
Electrical downtilt ⁵⁾	0 $^\circ$
Null fill ¹⁾	5%
Lightning protection	Direct ground
Patented Dipole Design: U.S. Patent No. 6,608,600 B2	

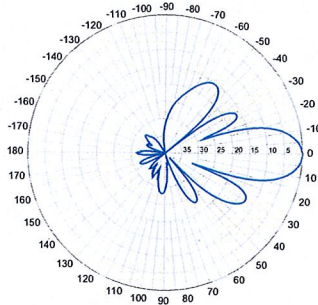
- 1) Typical values.
- 2) Power rating limited by connector only.
- 3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
- 4) Antenna weight does not include brackets.
- 5) Add'l downtilts may be available. Check website for details.

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

Radiation-pattern¹⁾
750 MHz

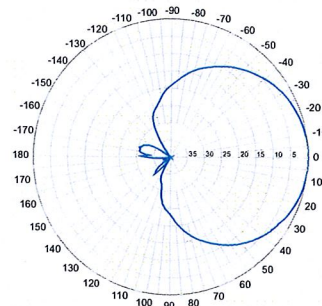


Horizontal

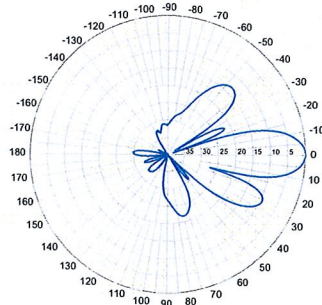


Vertical

850 MHz



Horizontal

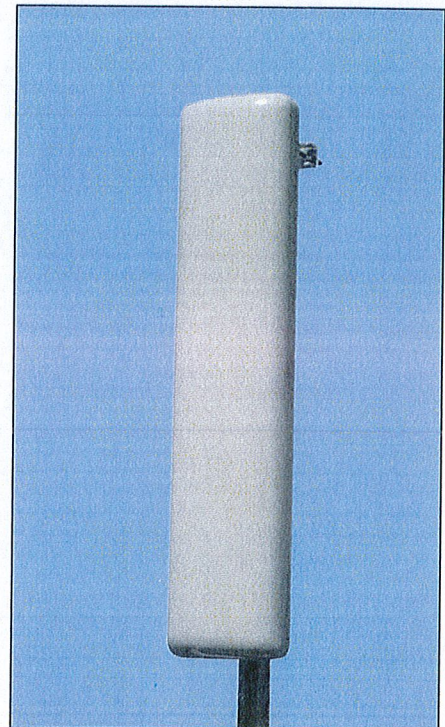


Vertical

696-900 MHz

BXA-70063/4CF

When ordering replace "___" with connector type.



Featuring our Exclusive
3T Technology™
Antenna Design:

- Watercut brass feedline assembly for consistent performance.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad 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: 10/27/08

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

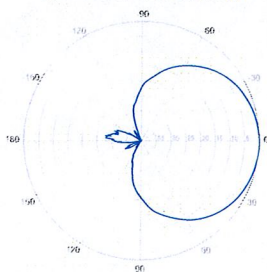
Replace "X" with desired electrical downtilt

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



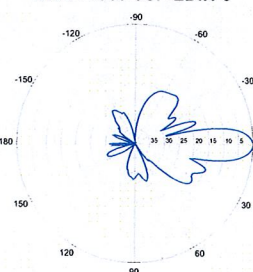
Electrical Characteristics	696-900 MHz		
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	65°	63°	
Vertical beamwidth	13°	11°	
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe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



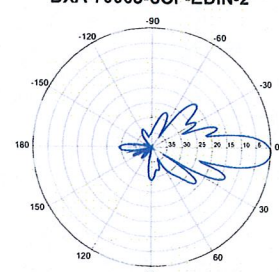
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

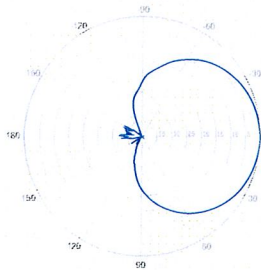


0° | Vertical | 750 MHz

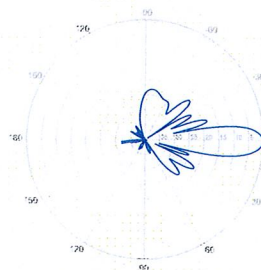
BXA-70063-6CF-EDIN-2



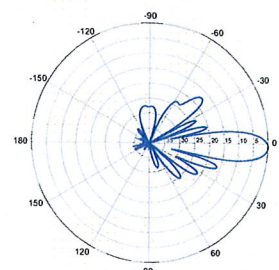
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



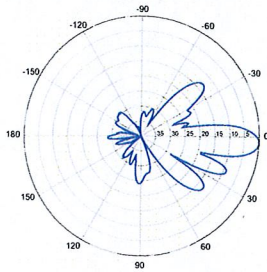
2° | Vertical | 850 MHz

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.

BXA-70063-6CF-EDIN-X

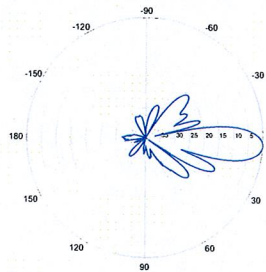
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



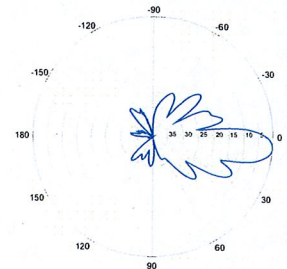
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

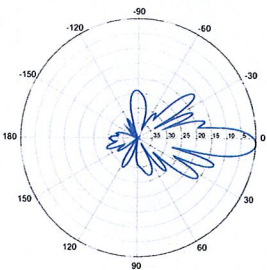


4° | Vertical | 750 MHz

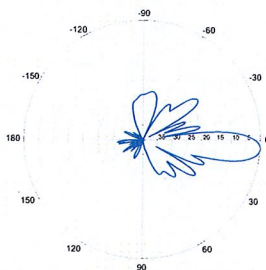
BXA-70063-6CF-EDIN-5



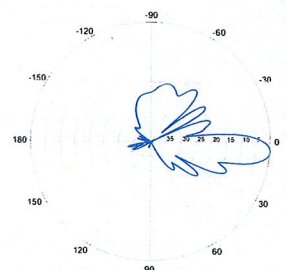
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

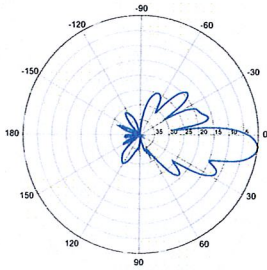


4° | Vertical | 850 MHz



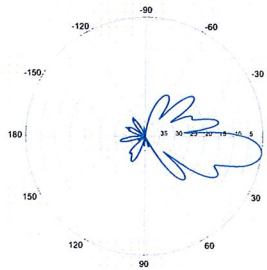
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



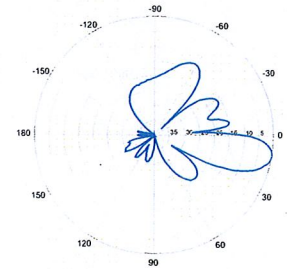
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

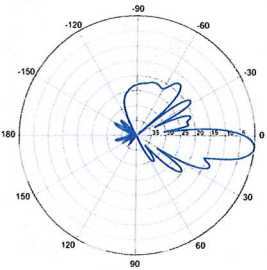


8° | Vertical | 750 MHz

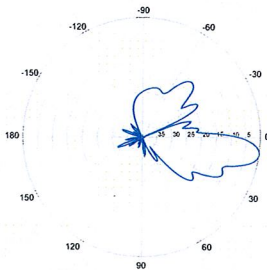
BXA-70063-6CF-EDIN-10



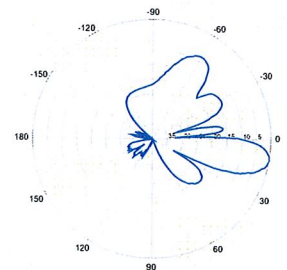
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

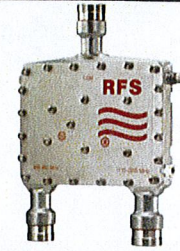
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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



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

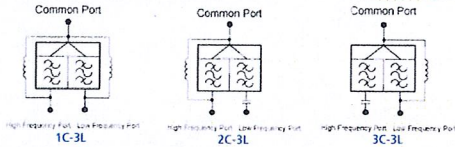


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

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

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	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 o40-110mm (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)

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

		General		Power		Density							
Site Name: Monroe W		Tower Height: Verizon @ 160ft											
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T GSM	1	296	140	0.0054	880	0.5867	0.93%						
*AT&T GSM	6	427	140	0.0470	1900	1.0000	4.70%						
*AT&T UMTS	1	500	140	0.0092	880	0.5867	1.56%						
*AT&T UMTS	1	500	140	0.0092	1900	1.0000	0.92%						
*AT&T LTE	1	500	140	0.0092	740	0.4933	1.86%						
*Sprint	11	126	150	0.0221	1900	1.0000	2.21%						
Verizon PCS	15	262	160	0.0552	1970	1.0	5.52%						
Verizon Cellular	9	368	160	0.0465	869	0.5793	8.03%						
Verizon AWS	1	654	160	0.0092	2145	1.0	0.92%						
Verizon 700	2	686	160	0.0193	698	0.4653	4.14%						
								30.79%					
* Source: Siting Council													

Date: **September 27, 2011**

Veronica Harris
Crown Castle USA Inc.
1200 McArthur Blvd.
Mahwah, NJ 07430
(201) 236-9094



Tower Engineering Professionals, Inc.
3703 Junction Blvd.
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:

Verizon Co-Locate Final
Carrier Site Number:
Carrier Site Name:

N/A
Monroe West, CT

Crown Castle Designation:

Crown Castle BU Number:
Crown Castle Site Name:
Crown Castle JDE Job Number:
Crown Castle Work Order Number:

876355
Upper Stepney - TLC
167083
439094

Engineering Firm Designation:

TEP Project Number:

113416

Site Data:

474-480 Main St., Monroe, Fairfield County, CT 06468
Latitude N 41° 19' 31.99", Longitude W 73° 15' 57.05"
191.5 Foot - Monopole Tower

Dear Ms. Harris,

Tower Engineering Professionals, Inc. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 432339, in accordance with application 131380, revision 0.

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

Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

Sufficient Capacity

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2003 International Building Code based upon a basic wind speed of 85 mph.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 for the determined available structural capacity to be effective.

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

Analysis prepared by: Jordan Shelley, E.I.

Respectfully submitted by:

Pete Jernigan, P.E.

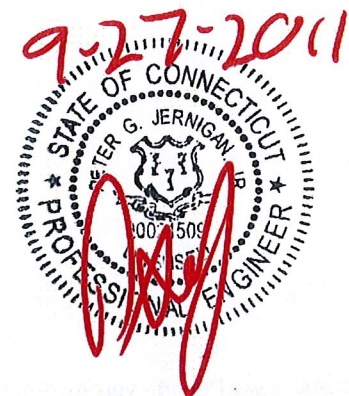


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Table 6 - Tower Component Stresses vs. Capacity - LC1

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RISATower Output

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7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 191.5-ft monopole tower designed by EEI in October of 2000. The tower was originally designed for a fastest mile wind speed of 90 mph with 0.5 inch of ice and 50 mph under service loads per TIA/EIA-222-F for the loading in Table 3. TEP did not visit the site. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating 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
160	160	4	Antel	LPA-80063/6CF	-	-	1
		2	Antel	BXA-70063-6CF-2			
		1	Antel	BXA-70063-4CF			
		1	Antel	BXA-171063-8BF-2			
		2	Antel	BXA-171063-12BF			
		6	RFS/Celwave	FD9R6004/2C-3L			

Notes:

- 1) Proposed equipment to reuse existing feed lines

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
192	194	12	EMS Wireless	RV90-17-02DP w/Mount Pipe	24	1-5/8	1
		6	Unknown	TMA			
160	192	1	Tower Mounts	T-Arm Mount [TA 602-3]	12	1 5/8	2
		2	Antel	LPA-80080/4CF w/Mount Pipe			
		4	Antel	LPA-80080/4CF w/Mount Pipe			
		6	Antel	LPA-185080/8CFx2 w/Mount Pipe			
		1	Tower Mounts	Platform Mount [LP 303-1]			
150	152	6	Decibel	DB980H65E-M w/Mount Pipe	6	1 5/8	1
		9	Sprint MLA	Sprint MLA_Antenna w/Mount Pipe	9	1 5/8	3
	150	1	Tower Mounts	Platform Mount [LP 601-1]	-	-	1
		3	Powerwave Tech	7770.00 w/Mount Pipe	6	1 1/4	1
	6	Powerwave Tech	LGP21401				
140	140	3	Powerwave Tech	P65-16-XLH-RR w/Mount Pipe	2	5/8	4
		6	Ericsson	RRUS-11			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount [LP 601-1]			
50	52	1	Kathrein	OG-860/1920/GPS-A	1	1/2	1
	50	1	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment.
- 2) Existing equipment to be removed, feed lines to be reused
- 3) MLA loading controls; considered in this analysis
- 4) Reserved equipment

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)
191.5	191.5	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
181.5	181.5	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
171.5	171.5	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
161.5	161.5	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
150	150	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
140	140	12	Dapa	48000	Unknown	Unknown
		1	Tower Mounts	Low Profile Platform		
50	50	1	Unknown	GPS Antenna	Unknown	Unknown

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Dr. Clarence Welti, PE dated October 6, 2000 Site No. CT03XC365	1531885	CCISites
Tower Design Drawings	EEL dated October 27, 2000 Job No. 8023	1631582	CCISites
Foundation Design Drawings	EEL dated October 13, 2000 Job No. 8023	1631625	CCISites
Previous Structural Analysis	B&T dated May 15, 2008 Project No. 78088	2254441	CCISites

3.1) Analysis Method

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

3.2) Assumptions

- 1) The tower and foundation were built in accordance with the manufacturer's specifications.
- 2) The tower and foundation 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 "Appendix B – Base Level Drawings."
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
- 5) All tower components are in sufficient condition to carry their full design capacity.
- 6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	191.5 - 172.46	Pole	TP20.46x15.5x0.188	1	-1.754	602.356	28.4	Pass
L2	172.46 - 127.753	Pole	TP31.6x19.282x0.313	2	-10.990	1553.518	63.1	Pass
L3	127.753 - 83.0833	Pole	TP42.19x29.815x0.438	3	-20.801	2908.153	69.4	Pass
L4	83.0833 - 40.4567	Pole	TP52.59x39.847x0.5	4	-34.221	4143.924	66.9	Pass
L5	40.4567 - 0	Pole	TP62x49.727x0.5	5	-39.176	4257.642	69.7	Pass
							Summary	
						Pole (L5)	69.7	Pass
						Rating =	69.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	61.8	Pass
1	Base Plate	0	83.0	Pass
1	Base Foundation	0	73.3	Pass
Structure Rating (max from all components) =				83.0%

Notes:

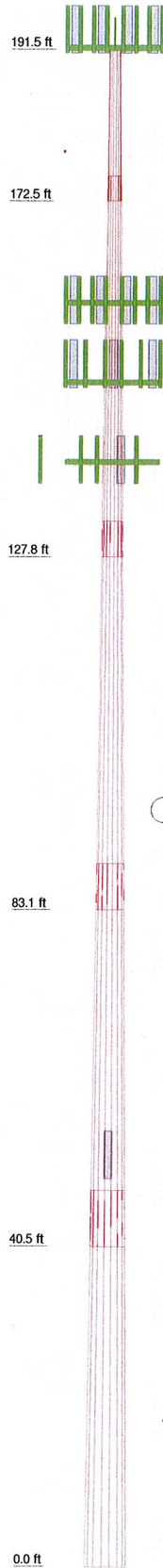
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

- 1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawings" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.

APPENDIX A
RISATOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	19,040	47,790	49,170	48,460	47,540
Number of Sides	18	18	18	18	18
Thickness (in)	0.188	0.313	0.438	0.500	0.500
Socket Length (ft)	3.083	4.500	5.833	7.083	7.083
Top Dia (in)	15.500	19.282	29.815	39.847	49.727
Bot Dia (in)	20.460	31.600	42.190	52.590	62.000
Grade			A572-65		
Weight (K)	0.7	4.1	8.3	12.0	14.2



DESIGNED APPURTENANCE LOADING

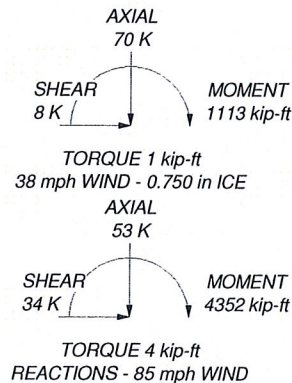
TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 4'	193.5	(2) FD9R6004 (Verizon)	160
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	192	(2) FD9R6004 (Verizon)	160
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	192	(2) FD9R6004 (Verizon)	160
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	192	Platform Mount [LP 303-1]	160
(2) TMA (T-Mobile)	192	(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	150
(2) TMA (T-Mobile)	192	(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	150
(2) TMA (T-Mobile)	192	(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	150
T-Arm Mount [TA 602-3]	192	Platform Mount [LP 601-1]	150
(2) LPA-80080/4CF w/ Mount Pipe (Verizon)	160	7770.00 w/ Mount Pipe (ATI)	140
(2) LPA-80063/6CF w/ mount pipe (Verizon)	160	(2) RRUS-11 (ATI)	140
(2) LPA-80063/6CF w/ mount pipe (Verizon)	160	(2) LGP21401 (ATI)	140
BXA-70063-6CF-2 w/ Mount Pipe (Verizon)	160	P65-16-XLH-RR w/ Mount Pipe (ATI)	140
BXA-70063-6CF-2 w/ Mount Pipe (Verizon)	160	7770.00 w/ Mount Pipe (ATI)	140
BXA-70063/4CF w/ Mount Pipe (Verizon)	160	(2) RRUS-11 (ATI)	140
BXA-171063-12BF w/ Mount Pipe (Verizon)	160	(2) LGP21401 (ATI)	140
BXA-171063-12BF w/ Mount Pipe (Verizon)	160	P65-16-XLH-RR w/ Mount Pipe (ATI)	140
BXA-171063-12BF w/ Mount Pipe (Verizon)	160	7770.00 w/ Mount Pipe (ATI)	140
BXA-171063-8BF-2 w/ Mount Pipe (Verizon)	160	(2) RRUS-11 (ATI)	140
		(2) LGP21401 (ATI)	140
		P65-16-XLH-RR w/ Mount Pipe (ATI)	140
		DC6-48-60-18-8F (ATI)	140
		Platform Mount [LP 601-1]	140
		OG-860/1920/GPS-A (Sprint)	50
		Side Arm Mount [SO 701-1]	50

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield 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: 69.7%



Tower Engineering Professionals
 3709 Junction Blvd.
 Raleigh, NC
 Phone: (919) 661-6351
 FAX: (919) 661-6350

Job: BU# 876355	Project: TEP# 113416	
Client: Crown Castle	Drawn by: Jordan Shelley	App'd:
Code: TIA/EIA-222-F	Date: 09/27/11	Scale: NTS
Path: P:\3416 Upper Stepney_TLC\Structural\RSA\876355.dwg	Dwg No. E-1	

RISATower Tower Engineering Professionals 3709 Junction Blvd. Raleigh, NC Phone: (919) 661-6351 FAX: (919) 661-6350	Job	BU# 876355	Page	1 of 12
	Project	TEP# 113416	Date	09:43:43 09/27/11
	Client	Crown Castle	Designed by	Jordan Shelley

Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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	191.500-172.460	19.040	3.083	18	15.500	20.460	0.188	0.750	A572-65 (65 ksi)
L2	172.460-127.753	47.790	4.500	18	19.282	31.600	0.313	1.250	A572-65 (65 ksi)
L3	127.753-83.083	49.170	5.833	18	29.815	42.190	0.438	1.750	A572-65 (65 ksi)
L4	83.083-40.457	48.460	7.083	18	39.847	52.590	0.500	2.000	A572-65 (65 ksi)
L5	40.457-0.000	47.540		18	49.727	62.000	0.500	2.000	A572-65 (65 ksi)

RISATower Tower Engineering Professionals 3709 Junction Blvd. Raleigh, NC Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Page
	Project	Date
	Client	Designed by
	BU# 876355	2 of 12
	TEP# 113416	09:43:43 09/27/11
	Crown Castle	Jordan Shelley

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	15.739	9.113	269.950	5.436	7.874	34.284	540.256	4.557	2.398	12.789
L2	20.776	12.065	626.423	7.197	10.394	60.270	1253.670	6.033	3.271	17.445
L3	31.425	40.794	4448.064	10.429	15.146	293.678	8901.981	20.401	4.477	10.234
L4	42.019	62.444	12213.654	13.968	20.242	603.375	24443.379	31.228	6.133	12.266
L5	52.351	78.124	23918.499	17.476	25.261	946.836	47868.471	39.069	7.872	15.744
	62.956	97.600	46637.979	21.833	31.496	1480.759	93337.326	48.810	10.032	20.064

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1				1	1	1		
191.500-172.4								
60								
L2				1	1	1		
172.460-127.7								
53								
L3				1	1	1		
127.753-83.08								
3								
L4				1	1	1		
83.083-40.457								
L5				1	1	1		
40.457-0.000								

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A	Weight
						ft ² /ft	klf
LDF7-50A(1-5/8") (T-Mobile)	A	No	Inside Pole	191.500 - 0.000	24	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.001 0.001 0.001

AVA7-50(1-5/8") (Verizon)	C	No	Inside Pole	160.000 - 0.000	12	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.000 0.000 0.001 0.001 0.001

LDF7-50A(1-5/8") (Sprint)	A	No	Inside Pole	150.000 - 0.000	9	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.001

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	Project TEP# 113416	Date 09:43:43 09/27/11
	Client Crown Castle	Designed by Jordan Shelley

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight klf
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001

LDF6-50A(1-1/4") (AT&T)	B	No	Inside Pole	140.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-002-75000(3/8") (AT&T)	B	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
WR-VG82ST-BRDA(5/8") (AT&T)	B	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.064	0.000
						1/2" Ice	0.164	0.001
						1" Ice	0.265	0.002
						2" Ice	0.464	0.007
						4" Ice	0.865	0.023
WR-VG82ST-BRDA(5/8") (AT&T)	B	No	CaAa (Out Of Face)	140.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023

LDF4-50A(1/2") (Sprint)	A	No	Inside Pole	50.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000

Step Pegs (5/8" SR) 7-in. w/30" step	A	No	CaAa (Out Of Face)	191.500 - 0.000	1	No Ice	0.029	0.000
						1/2" Ice	0.129	0.001
						1" Ice	0.229	0.002
						2" Ice	0.429	0.006
						4" Ice	0.829	0.021
Safety Line 3/8	A	No	CaAa (Out Of Face)	191.500 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	191.500-172.460	A	0.000	0.000	0.000	1.270	0.388
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	172.460-127.753	A	0.000	0.000	0.000	2.982	1.076
		B	0.000	0.000	0.000	0.790	0.057
		C	0.000	0.000	0.000	0.000	0.279
L3	127.753-83.083	A	0.000	0.000	0.000	2.979	1.240
		B	0.000	0.000	0.000	2.881	0.207
		C	0.000	0.000	0.000	0.000	0.386
L4	83.083-40.457	A	0.000	0.000	0.000	2.843	1.185
		B	0.000	0.000	0.000	2.749	0.197
		C	0.000	0.000	0.000	0.000	0.368

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	Client	Crown Castle	Designed by	Jordan Shelley

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L5	40.457-0.000	A	0.000	0.000	0.000	2.698	1.129
		B	0.000	0.000	0.000	2.609	0.187
		C	0.000	0.000	0.000	0.000	0.350

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} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	191.500-172.460	A	0.920	0.000	0.000	0.000	8.279	0.433
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	172.460-127.753	A	0.898	0.000	0.000	0.000	19.439	1.182
		B		0.000	0.000	0.000	3.044	0.119
		C		0.000	0.000	0.000	0.000	0.279
L3	127.753-83.083	A	0.861	0.000	0.000	0.000	19.034	1.343
		B		0.000	0.000	0.000	10.908	0.428
		C		0.000	0.000	0.000	0.000	0.386
L4	83.083-40.457	A	0.808	0.000	0.000	0.000	17.530	1.278
		B		0.000	0.000	0.000	10.093	0.397
		C		0.000	0.000	0.000	0.000	0.368
L5	40.457-0.000	A	0.750	0.000	0.000	0.000	15.776	1.211
		B		0.000	0.000	0.000	9.148	0.360
		C		0.000	0.000	0.000	0.000	0.350

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	191.500-172.460	0.000	-0.096	0.000	-0.468
L2	172.460-127.753	0.026	-0.081	0.079	-0.454
L3	127.753-83.083	0.080	-0.050	0.250	-0.359
L4	83.083-40.457	0.081	-0.050	0.256	-0.365
L5	40.457-0.000	0.082	-0.050	0.254	-0.358

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Lighting Rod 5/8" x 4'	C	None		0.000	193.500	No Ice	0.250	0.031
						1/2" Ice	0.664	0.034
						1" Ice	0.973	0.039
						2" Ice	1.494	0.059

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	Client Crown Castle		Designed by Jordan Shelley

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						Vert
							4" Ice	2.683	2.683	0.137
***							No Ice	4.593	3.319	0.034
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	A	From Centroid-Le g	4.000	0.000	30.000	192.000	1/2" Ice	5.088	4.089	0.069
			2.000				1" Ice	5.578	4.784	0.114
							2" Ice	6.588	6.225	0.224
							4" Ice	8.731	9.308	0.557
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	B	From Centroid-Le g	4.000	0.000	30.000	192.000	No Ice	4.593	3.319	0.034
			2.000				1/2" Ice	5.088	4.089	0.069
							1" Ice	5.578	4.784	0.114
							2" Ice	6.588	6.225	0.224
							4" Ice	8.731	9.308	0.557
(4) RR90-17-02DP w/ Mount Pipe (T-Mobile)	C	From Centroid-Le g	4.000	0.000	30.000	192.000	No Ice	4.593	3.319	0.034
			2.000				1/2" Ice	5.088	4.089	0.069
							1" Ice	5.578	4.784	0.114
							2" Ice	6.588	6.225	0.224
							4" Ice	8.731	9.308	0.557
(2) TMA (T-Mobile)	A	From Centroid-Le g	4.000	0.000	30.000	192.000	No Ice	0.681	0.450	0.013
			2.000				1/2" Ice	0.802	0.559	0.018
							1" Ice	0.932	0.677	0.025
							2" Ice	1.219	0.939	0.044
							4" Ice	1.896	1.566	0.111
(2) TMA (T-Mobile)	B	From Centroid-Le g	4.000	0.000	30.000	192.000	No Ice	0.681	0.450	0.013
			2.000				1/2" Ice	0.802	0.559	0.018
							1" Ice	0.932	0.677	0.025
							2" Ice	1.219	0.939	0.044
							4" Ice	1.896	1.566	0.111
(2) TMA (T-Mobile)	C	From Centroid-Le g	4.000	0.000	30.000	192.000	No Ice	0.681	0.450	0.013
			2.000				1/2" Ice	0.802	0.559	0.018
							1" Ice	0.932	0.677	0.025
							2" Ice	1.219	0.939	0.044
							4" Ice	1.896	1.566	0.111
T-Arm Mount [TA 602-3]	C	None			0.000	192.000	No Ice	11.590	11.590	0.774
							1/2" Ice	15.440	15.440	0.990
							1" Ice	19.290	19.290	1.206
							2" Ice	26.990	26.990	1.639
							4" Ice	42.390	42.390	2.503

(2) LPA-80080/4CF w/ Mount Pipe (Verizon)	C	From Centroid-Le g	4.000	0.000	30.000	160.000	No Ice	3.110	7.482	0.034
			0.000				1/2" Ice	3.585	8.378	0.080
							1" Ice	4.022	9.152	0.137
							2" Ice	5.013	10.752	0.270
							4" Ice	7.153	14.168	0.651
(2) LPA-80063/6CF w/ mount pipe (Verizon)	A	From Centroid-Le g	4.000	0.000	30.000	160.000	No Ice	10.805	10.905	0.056
			0.000				1/2" Ice	11.582	12.282	0.148
							1" Ice	12.328	13.512	0.253
							2" Ice	13.753	15.647	0.492
							4" Ice	16.736	20.132	1.125
(2) LPA-80063/6CF w/ mount pipe (Verizon)	B	From Centroid-Le g	4.000	0.000	30.000	160.000	No Ice	10.805	10.905	0.056
			0.000				1/2" Ice	11.582	12.282	0.148
							1" Ice	12.328	13.512	0.253
							2" Ice	13.753	15.647	0.492
							4" Ice	16.736	20.132	1.125
BXA-70063-6CF-2 w/ Mount Pipe (Verizon)	A	From Centroid-Le g	4.000	-2.000	30.000	160.000	No Ice	7.969	5.801	0.042
			0.000				1/2" Ice	8.609	6.953	0.100
							1" Ice	9.216	7.819	0.170
							2" Ice	10.459	9.601	0.335

RISATower Tower Engineering Professionals 3709 Junction Blvd. Raleigh, NC Phone: (919) 661-6351 FAX: (919) 661-6350	Job	BU# 876355	Page	6 of 12
	Project	TEP# 113416	Date	09:43:43 09/27/11
	Client	Crown Castle	Designed by	Jordan Shelley

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
BXA-70063-6CF-2 w/ Mount Pipe (Verizon)	B	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 13.066	13.366	0.803
			-2.000				No Ice 7.969	5.801	0.042
			0.000				1/2" Ice 8.609	6.953	0.100
							1" Ice 9.216	7.819	0.170
							2" Ice 10.459	9.601	0.335
BXA-70063/4CF w/ Mount Pipe (Verizon)	C	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 13.066	13.366	0.803
			-2.000				No Ice 5.286	3.464	0.026
			0.000				1/2" Ice 5.704	4.039	0.065
							1" Ice 6.131	4.631	0.112
							2" Ice 7.015	5.906	0.226
BXA-171063-12BF w/ Mount Pipe (Verizon)	A	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 8.913	8.871	0.556
			2.000				No Ice 4.971	5.228	0.040
			0.000				1/2" Ice 5.521	6.389	0.083
							1" Ice 6.036	7.261	0.137
							2" Ice 7.091	9.046	0.271
BXA-171063-12BF w/ Mount Pipe (Verizon)	B	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 9.359	12.817	0.671
			2.000				No Ice 4.971	5.228	0.040
			0.000				1/2" Ice 5.521	6.389	0.083
							1" Ice 6.036	7.261	0.137
							2" Ice 7.091	9.046	0.271
BXA-171063-8BF-2 w/ Mount Pipe (Verizon)	C	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 9.359	12.817	0.671
			2.000				No Ice 3.179	3.353	0.029
			0.000				1/2" Ice 3.555	3.971	0.059
							1" Ice 3.964	4.595	0.098
							2" Ice 4.853	5.893	0.193
(2) FD9R6004 (Verizon)	A	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 6.767	8.885	0.487
			0.000				No Ice 0.367	0.085	0.003
			0.000				1/2" Ice 0.451	0.136	0.005
							1" Ice 0.543	0.196	0.009
							2" Ice 0.755	0.343	0.020
(2) FD9R6004 (Verizon)	B	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 1.281	0.740	0.063
			0.000				No Ice 0.367	0.085	0.003
			0.000				1/2" Ice 0.451	0.136	0.005
							1" Ice 0.543	0.196	0.009
							2" Ice 0.755	0.343	0.020
(2) FD9R6004 (Verizon)	C	From Centroid-Le g	4.000	0.000	30.000	160.000	4" Ice 1.281	0.740	0.063
			0.000				No Ice 0.367	0.085	0.003
			0.000				1/2" Ice 0.451	0.136	0.005
							1" Ice 0.543	0.196	0.009
							2" Ice 0.755	0.343	0.020
Platform Mount [LP 303-1]	C	None			0.000	160.000	4" Ice 1.281	0.740	0.063
							No Ice 14.660	14.660	1.250
							1/2" Ice 18.870	18.870	1.481
							1" Ice 23.080	23.080	1.713
							2" Ice 31.500	31.500	2.175
***						4" Ice 48.340	48.340	3.101	
(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	A	From Centroid-Le g	4.000	0.000	30.000	150.000	No Ice 8.637	6.946	0.066
			0.000				1/2" Ice 9.290	8.127	0.131
			2.000				1" Ice 9.910	9.021	0.209
							2" Ice 11.176	10.844	0.391
							4" Ice 13.829	14.851	0.896
(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	B	From Centroid-Le g	4.000	0.000	30.000	150.000	No Ice 8.637	6.946	0.066
			0.000				1/2" Ice 9.290	8.127	0.131
			2.000				1" Ice 9.910	9.021	0.209
							2" Ice 11.176	10.844	0.391
							4" Ice 13.829	14.851	0.896

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	Client		Crown Castle		Designed by		Jordan Shelley	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
(3) MLA_ANTENNA w/ Mount Pipe (Sprint)	C	From Centroid-Le g	4.000	0.000	30.000	150.000	No Ice	8.637	6.946	0.066
			0.000	2.000			1/2" Ice	9.290	8.127	0.131
							1" Ice	9.910	9.021	0.209
							2" Ice	11.176	10.844	0.391
							4" Ice	13.829	14.851	0.896
Platform Mount [LP 601-1]	C	None			0.000	150.000	No Ice	28.470	28.470	1.122
							1/2" Ice	33.590	33.590	1.514
							1" Ice	38.710	38.710	1.905
							2" Ice	48.950	48.950	2.689
							4" Ice	69.430	69.430	4.255
*** 7770.00 w/ Mount Pipe (AT&T)	A	From Centroid-Le g	4.000	-6.000	0.000	140.000	No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.101
							1" Ice	7.128	5.711	0.155
							2" Ice	8.164	7.155	0.287
							4" Ice	10.360	10.412	0.665
(2) RRUS-11 (AT&T)	A	From Centroid-Le g	4.000	6.000	0.000	140.000	No Ice	4.424	1.186	0.055
			6.000	0.000			1/2" Ice	4.708	1.351	0.081
							1" Ice	5.001	1.526	0.110
							2" Ice	5.613	1.900	0.179
							4" Ice	6.940	2.753	0.368
(2) LGP21401 (AT&T)	A	From Centroid-Le g	4.000	0.000	0.000	140.000	No Ice	1.288	0.233	0.014
			0.000	0.000			1/2" Ice	1.445	0.313	0.021
							1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
P65-16-XLH-RR w/ Mount Pipe (AT&T)	A	From Centroid-Le g	4.000	6.000	30.000	140.000	No Ice	8.637	6.362	0.079
			6.000	0.000			1/2" Ice	9.290	7.538	0.141
							1" Ice	9.910	8.427	0.216
							2" Ice	11.176	10.239	0.393
							4" Ice	13.829	14.099	0.886
7770.00 w/ Mount Pipe (AT&T)	B	From Centroid-Le g	4.000	-6.000	30.000	140.000	No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.101
							1" Ice	7.128	5.711	0.155
							2" Ice	8.164	7.155	0.287
							4" Ice	10.360	10.412	0.665
(2) RRUS-11 (AT&T)	B	From Centroid-Le g	4.000	6.000	30.000	140.000	No Ice	4.424	1.186	0.055
			6.000	0.000			1/2" Ice	4.708	1.351	0.081
							1" Ice	5.001	1.526	0.110
							2" Ice	5.613	1.900	0.179
							4" Ice	6.940	2.753	0.368
(2) LGP21401 (AT&T)	B	From Centroid-Le g	4.000	-6.000	30.000	140.000	No Ice	1.288	0.233	0.014
			0.000	0.000			1/2" Ice	1.445	0.313	0.021
							1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
P65-16-XLH-RR w/ Mount Pipe (AT&T)	B	From Centroid-Le g	4.000	6.000	30.000	140.000	No Ice	8.637	6.362	0.079
			6.000	0.000			1/2" Ice	9.290	7.538	0.141
							1" Ice	9.910	8.427	0.216
							2" Ice	11.176	10.239	0.393
							4" Ice	13.829	14.099	0.886
7770.00 w/ Mount Pipe (AT&T)	C	From Centroid-Le g	4.000	-6.000	10.000	140.000	No Ice	6.119	4.254	0.055
			0.000	0.000			1/2" Ice	6.626	5.014	0.101
							1" Ice	7.128	5.711	0.155
							2" Ice	8.164	7.155	0.287
							4" Ice	10.360	10.412	0.665
(2) RRUS-11	C	From	4.000		30.000	140.000	No Ice	4.424	1.186	0.055

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			ft	°	ft	ft ²	ft ²	K
(AT&T)		Centroid-Le g	6.000 0.000		1/2" Ice	4.708	1.351	0.081
					1" Ice	5.001	1.526	0.110
					2" Ice	5.613	1.900	0.179
					4" Ice	6.940	2.753	0.368
(2) LGP21401 (AT&T)	C	From Centroid-Le g	4.000 -6.000 0.000	10.000	140.000	No Ice	1.288	0.233
					1/2" Ice	1.445	0.313	0.021
					1" Ice	1.611	0.403	0.030
					2" Ice	1.969	0.608	0.055
					4" Ice	2.788	1.121	0.135
P65-16-XLH-RR w/ Mount Pipe (AT&T)	C	From Centroid-Le g	4.000 6.000 0.000	30.000	140.000	No Ice	8.637	6.362
					1/2" Ice	9.290	7.538	0.141
					1" Ice	9.910	8.427	0.216
					2" Ice	11.176	10.239	0.393
					4" Ice	13.829	14.099	0.886
DC6-48-60-18-8F (AT&T)	C	From Centroid-Le g	4.000 0.000 0.000	0.000	140.000	No Ice	1.266	1.266
					1/2" Ice	1.456	1.456	0.035
					1" Ice	1.658	1.658	0.053
					2" Ice	2.093	2.093	0.095
					4" Ice	3.098	3.098	0.215
Platform Mount [LP 601-1]	C	None		0.000	140.000	No Ice	28.470	28.470
					1/2" Ice	33.590	33.590	1.514
					1" Ice	38.710	38.710	1.905
					2" Ice	48.950	48.950	2.689
					4" Ice	69.430	69.430	4.255

OG-860/1920/GPS-A (Sprint)	A	From Centroid-Le g	3.000 0.000 2.000	0.000	50.000	No Ice	0.144	0.144
					1/2" Ice	0.233	0.233	0.004
					1" Ice	0.333	0.333	0.006
					2" Ice	0.567	0.567	0.016
					4" Ice	1.167	1.167	0.054
Side Arm Mount [SO 701-1]	A	From Centroid-Le g	2.000 0.000 0.000	0.000	50.000	No Ice	0.850	1.670
					1/2" Ice	1.140	2.340	0.079
					1" Ice	1.430	3.010	0.093
					2" Ice	2.010	4.350	0.121
					4" Ice	3.170	7.030	0.177

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

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.5 - 172.46	42.786	27	2.145	0.010
L2	175.543 - 127.753	35.801	27	2.012	0.010
L3	132.253 - 83.0833	19.456	27	1.512	0.005
L4	88.9167 - 40.4567	8.310	27	0.915	0.002
L5	47.54 - 0	2.325	27	0.450	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.500	Lighting Rod 5/8" x 4'	27	42.786	2.145	0.010	19696
192.000	(4) RR90-17-02DP w/ Mount Pipe	27	42.786	2.145	0.010	19696
160.000	(2) LPA-80080/4CF w/ Mount Pipe	27	29.406	1.855	0.008	5146
150.000	(3) MLA_ANTENNA w/ Mount Pipe	27	25.585	1.740	0.007	4640
140.000	7770.00 w/ Mount Pipe	27	22.022	1.615	0.006	4223
50.000	OG-860/1920/GPS-A	27	2.556	0.475	0.001	4574

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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.5 - 172.46	123.244	2	6.181	0.028
L2	175.543 - 127.753	103.148	2	5.797	0.028
L3	132.253 - 83.0833	56.100	2	4.360	0.014
L4	88.9167 - 40.4567	23.974	2	2.641	0.005
L5	47.54 - 0	6.709	2	1.300	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.500	Lighting Rod 5/8" x 4'	2	123.244	6.181	0.028	6977
192.000	(4) RR90-17-02DP w/ Mount Pipe	2	123.244	6.181	0.028	6977
160.000	(2) LPA-80080/4CF w/ Mount Pipe	2	84.748	5.347	0.024	1817
150.000	(3) MLA_ANTENNA w/ Mount Pipe	2	73.747	5.015	0.021	1635
140.000	7770.00 w/ Mount Pipe	2	63.489	4.655	0.017	1485
50.000	OG-860/1920/GPS-A	2	7.375	1.372	0.002	1587

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 P/P _a
L1	191.5 - 172.46 (1)	TP20.46x15.5x0.188	19.040	0.000	0.0	39.0000	11.587	-1.754	451.880	0.004
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	47.790	0.000	0.0	39.0000	29.883	-10.990	1165.430	0.009
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	49.170	0.000	0.0	39.0000	55.940	-20.801	2181.660	0.010
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	48.460	0.000	0.0	39.0000	79.711	-34.221	3108.720	0.011
L5	40.4567 - 0 (5)	TP62x49.727x0.5	47.540	0.000	0.0	39.0000	81.898	-39.176	3194.030	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	191.5 - 172.46	TP20.46x15.5x0.188	67.668	14.6132	39.0000	0.375	0.000	0.0000	39.0000	0.000

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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 $\frac{f_{by}}{F_{by}}$
	(1)									
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	598.158	32.3906	39.0000	0.831	0.000	0.0000	39.0000	0.000
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	1650.092	35.7149	39.0000	0.916	0.000	0.0000	39.0000	0.000
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	2819.750	34.3212	39.0000	0.880	0.000	0.0000	39.0000	0.000
L5	40.4567 - 0 (5)	TP62x49.727x0.5	3102.267	35.7604	39.0000	0.917	0.000	0.0000	39.0000	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	191.5 - 172.46 (1)	TP20.46x15.5x0.188	4.275	0.3690	26.0000	0.028	0.003	0.0003	26.0000	0.000
L2	172.46 - 127.753 (2)	TP31.6x19.282x0.313	22.305	0.7464	26.0000	0.057	3.812	0.1005	26.0000	0.004
L3	127.753 - 83.0833 (3)	TP42.19x29.815x0.438	26.279	0.4698	26.0000	0.036	3.825	0.0403	26.0000	0.002
L4	83.0833 - 40.4567 (4)	TP52.59x39.847x0.5	30.204	0.3789	26.0000	0.029	3.846	0.0228	26.0000	0.001
L5	40.4567 - 0 (5)	TP62x49.727x0.5	31.282	0.3820	26.0000	0.029	3.853	0.0216	26.0000	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	191.5 - 172.46 (1)	0.004	0.375	0.000	0.028	0.000	0.379	1.333	H1-3+VT ✓
L2	172.46 - 127.753 (2)	0.009	0.831	0.000	0.057	0.004	0.841	1.333	H1-3+VT ✓
L3	127.753 - 83.0833 (3)	0.010	0.916	0.000	0.036	0.002	0.926	1.333	H1-3+VT ✓
L4	83.0833 - 40.4567 (4)	0.011	0.880	0.000	0.029	0.001	0.891	1.333	H1-3+VT ✓
L5	40.4567 - 0 (5)	0.012	0.917	0.000	0.029	0.001	0.929	1.333	H1-3+VT ✓

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Section Capacity Table

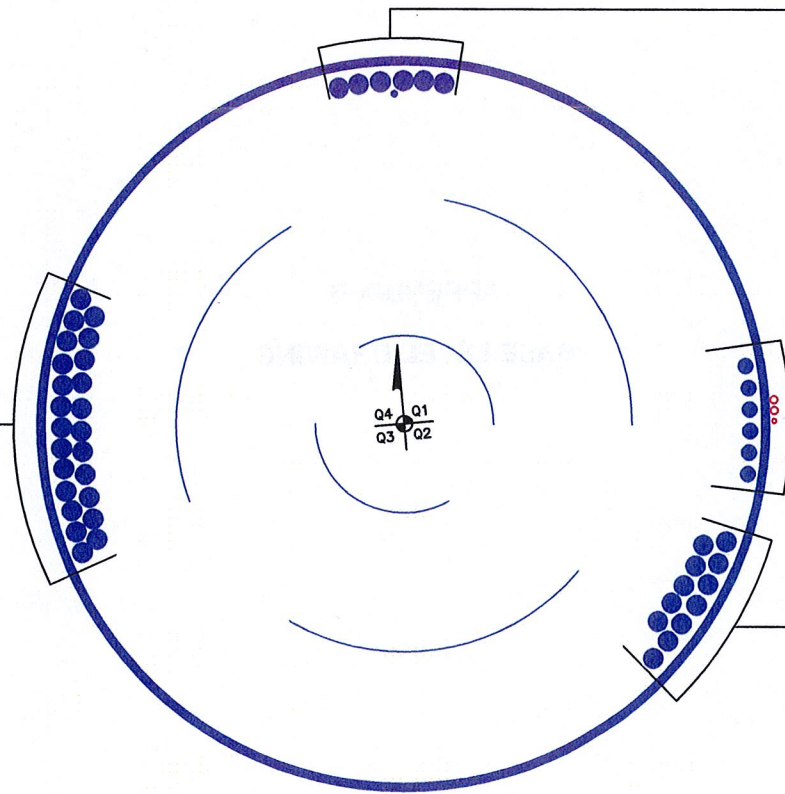
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	191.5 - 172.46	Pole	TP20.46x15.5x0.188	1	-1.754	602.356	28.4	Pass	
L2	172.46 - 127.753	Pole	TP31.6x19.282x0.313	2	-10.990	1553.518	63.1	Pass	
L3	127.753 - 83.0833	Pole	TP42.19x29.815x0.438	3	-20.801	2908.153	69.4	Pass	
L4	83.0833 - 40.4567	Pole	TP52.59x39.847x0.5	4	-34.221	4143.924	66.9	Pass	
L5	40.4567 - 0	Pole	TP62x49.727x0.5	5	-39.176	4257.642	69.7	Pass	
							Summary		
							Pole (L5)	69.7	Pass
							RATING =	69.7	Pass

APPENDIX B
BASE LEVEL DRAWING

(MLA)
(9) 1-5/8" TO 150 FT LEVEL
(INSTALLED)
(1) 1/2" TO 50 FT LEVEL
(6) 1-5/8" TO 150 FT LEVEL



(NOT INSTALLED)
(2) 7/8" TO 80 FT LEVEL
(INSTALLED)
(24) 1-5/8" TO 195 FT LEVEL



(PROPOSED-IN ADDITION)
(2) 5/8" TO 140 FT LEVEL
(1) 3/8" TO 140 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 140 FT LEVEL

(INSTALLED)
(12) 1-5/8" TO 160 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	876355
Site Name:	Upper Stepney, CT
App #:	131380
Pole Manufacturer:	Other

Reactions		
Moment:	4352	ft-kips
Axial:	53	kips
Shear:	34	kips

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	71	in

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

Anchor Rod Results

Maximum Rod Tension:	120.4 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	61.8% Pass

Rigid
Service, ASD
Fty*ASIF

Plate Data		
Diam:	77	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	8.20	in

Base Plate Results

Base Plate Stress:	49.8 ksi	Flexural Check
Allowable Plate Stress:	60.0 ksi	
Base Plate Stress Ratio:	83.0% Pass	

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
34.60

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

n/a

Stiffener Results

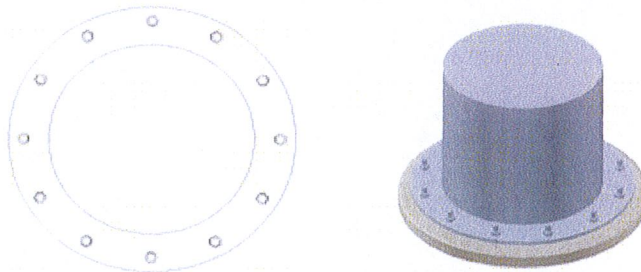
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a
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Pole Data		
Diam:	62	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



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

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

JOB: 113416
 SHEET NUMBER: 1 OF 2
 CALCULATED BY: JWS DATE 9/27/2011
 CHECKED BY: BRR DATE 9/27/2011

Pad and Pier Foundation for Monopole - TIA-222-F

Q _a , ALLOWABLE SOIL PRESS. (ksf)	12
NET or GROSS	NET
SOIL DENSITY (pcf)	170

F'c (ksi)	4
F'y (ksi)	60

Base Reactions LC1: Maximum Wind

M, MOMENT (k-ft)	4352.0
P _t , TOTAL DOWNLOAD (k)	53.0
H, HORIZONTAL SHEAR (k)	34.0

Base Reaction LC 2: Ice Wind + Ice

M (k-ft)	1113.0
P _t (k)	70.0
H (k)	8.0

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (cu.ft.)	Pier Shape
	30	30	3	2	5	7.50	3.00	Square

W _m , Weight of Mat (k) =	405.0
W _p , Weight of Pier (k) =	25.3
W _s , WEIGHT OF SOIL (k) =	286.9

Concrete Vol. (cu ft) 106.25

CHECK DESIGN CRITERIA

CHECK STABILITY:

	LC1	LC2
Mst = P * (L/2) + (Vf+s * L/2) =	11552.8 k-ft	11807.8 k-ft
Mot = M+H*(t+h) =	4556.0 k-ft	1161 k-ft
SF = Mot/Mst =	2.54 > 1.5	10.17 > 1.5

Capacity: 59.2%

CHECK BEARING PRESSURE

	LC1	LC2
P = P _t + W _f + W _s =	770.2 k	787.2 k
e = M / P =	5.92 ft	1.47 ft
L/6 =	5.00 ft	5.00 ft
Width of Wedge, L' =	27.25 ft	30.00 ft
0 Deg Wind: Q _{max} =	1.03 ksf	0.28 ksf
45 Deg Wind: Q _{max} =	1.54 ksf	0.39 ksf

Capacity: 12.9%

JOB: 113416
 SHEET NUMBER: 2 OF 2
 CALCULATED BY: JWS DATE 9/27/2011
 CHECKED BY: BRR DATE 9/27/2011

CHECK ONE WAY SHEAR

$V_u = 533.5 \text{ k}$
 $V_c = 1092.9 \text{ k}$

Capacity: 48.81%

CHECK TWO WAY SHEAR: PUNCHING + UNBALANCED MOMENT

$V_u = 28.0 \text{ psi}$
 $\phi V_c = 189.7 \text{ psi}$

Capacity: 14.78%

CALCULATE REINFORCING REQUIRED

$F'_c = 4.0 \text{ ksi}$ $F'_y = 60.0 \text{ ksi}$

Temp & Shrinkage reinforcing, $A_{s, \text{temp}} = 0.39 \text{ in}^2/\text{ft}$ (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Bar Size = 8
 Bar Spacing, c-c: 7.25
 d = 31.5 in.

$M_u = 246.5 \text{ in-k/ft}$

$\phi Mn = 0.9 \cdot A_s \cdot F_y \cdot d \cdot (1 - 0.59 \cdot A_s \cdot F_y / (b \cdot d \cdot F'_c))$

Solution: $A_{s, \text{req}} = 0.15 \text{ in}^2/\text{ft}$

Check, $A_s = 1.31 \text{ in}^2/\text{ft}$

Capacity: 29.73%
 $A_{s, \text{temp}}$ controls

TOP REINFORCING

Bar Size = 8
 Bar Spacing, c-c: 14.0
 d = 31.5 in.

$M_u = 719.9 \text{ in-k/ft}$

$\phi Mn = 0.9 \cdot A_s \cdot F_y \cdot d \cdot (1 - 0.59 \cdot A_s \cdot F_y / (b \cdot d \cdot F'_c))$

Solution: $A_{s, \text{req}} = 0.43 \text{ in}^2/\text{ft}$

$A_{s, \text{req}} > A_{s, \text{t}}$, use $A_{s, \text{req}}$

Bar Spacing, c-c:

Check, $A_s = 0.68 \text{ in}^2/\text{ft}$

Top Reinforcing O.K.

Capacity: 63.13%

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: 876355
 Site Name: Upper Stepney - TLC
 App #: 131380

Enter Load Factors Below:

For M (WL) 1.3 <---- Enter Factor
 For P (DL) 1.3 <---- Enter Factor

Pier Properties

Concrete:

Pier Diameter = 7.5 ft
 Concrete Area = 6361.7 in²

Reinforcement:

Clear Cover to Tie = 3.00 in
 Horiz. Tie Bar Size = 4
 Vert. Cage Diameter = 6.83 ft
 Vert. Cage Diameter = 82.00 in
Vertical Bar Size = 8
 Bar Diameter = 1.00 in
 Bar Area = 0.79 in²
 Number of Bars = 51
 As Total = 40.29 in²
 A s/ Aconc, Rho: 0.0063 0.63%

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4352	ft-kips (* Note)
Max. Service Shaft P:	53	kips
Max Axial Force Type:	Comp.	

(* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads	
1.30	Mu: 5657.6	ft-kips
1.30	Pu: 68.9	kips

Material Properties

Concrete Comp. strength, f'c = 4000 psi
 Reinforcement yield strength, Fy = 60 ksi
 Reinforcing Modulus of Elasticity, E = 29000 ksi
 Reinforcement yield strain = 0.00207
 Limiting compressive strain = 0.003

ACI 318 Code

Select Analysis ACI Code = 2008

Seismic Properties

Seismic Design Category = D
 Seismic Risk = High

Solve
(Run)

<-- Press Upon Completing All Input

ACI 10.5, ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy) 0.0032
 200 / Fy 0.0033
 IBC 1810.1.2: 0.0050 SDC D, E, or F
 Governing: 0.0050 0.50%

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

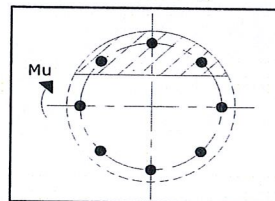
Min As: 0.0100 1.00%

Minimum Rho Check:

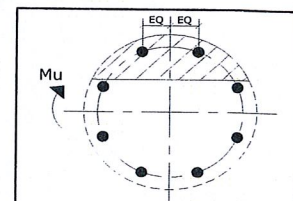
Actual Req'd Min. Rho: 0.50% Flexural
 Provided Rho: 0.63% OK

Results:

Governing Orientation Case: 1



Case 1



Case 2

Dist. From Edge to Neutral Axis: 7.47 in

Extreme Steel Strain, et: 0.0315

et > 0.0050, Tension Controlled

Reduction Factor, phi: 0.90

<-- Comment Box

Ref. Shaft Max Axial Capacities, phi Max(Pn or Tn):

Max Pu = (phi=0.65) Pn		
Pn per ACI 318 (10-2)	12433.35	kips
at Mu=(phi=0.65)Mn=	16674.29	ft-kips
Max Tu, (phi=0.9) Tn =	2175.66	kips
at Mu=phi=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension
 For Axial Compression, phi Pn = Pu: 68.90 kips
 Drilled Shaft Moment Capacity, phi Mn: 7714.80 ft-kips
 Drilled Shaft Superimposed Mu: 5657.60 ft-kips

(Mu/phi Mn, Drilled Shaft Flexure CSR: 73.33%