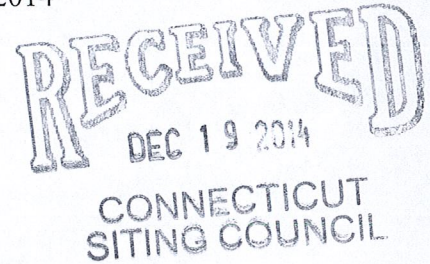


KENNETH C. BALDWIN

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

Also admitted in Massachusetts

December 17, 2014



Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-002-130607 – 401 Wakelee Avenue, Ansonia, Connecticut**
EM-VER-043-130916 – 866 Main Street, East Hartford, Connecticut
EM-VER-034-140123 – 48 Newtown Road, Danbury, Connecticut
EM-VER-064-131120 – 305 West Service Road, Hartford, Connecticut
EM-VER-064-130220 – 439-455 Homestead Avenue, Hartford, Connecticut
EM-VER-064-131108 – 223 Brainard Road, Hartford, Connecticut
EM-VER-078-131004 – 82 North Eagleville Road, Mansfield, Connecticut
EM-VER-155-130806 – 570 New Park Avenue, West Hartford, Connecticut
EM-VER-156-130524 – 668 Jones Hill Road, West Haven, Connecticut
EM-VER-159-131017 – 100 Great Meadow Road, Wethersfield, Connecticut

Completion of Construction Activity

Dear Ms. Bachman:

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 these facilities please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin".

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

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

Also admitted in Massachusetts

June 20, 2014

RECEIVED
JUN 26 2014

CONNECTICUT
SITING COUNCIL

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Completion of Construction Activity**

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the Cellco Partnership d/b/a Verizon Wireless telecommunications facility modifications listed below has been completed.

EM-VER-007-130226 – 260 Beckley Road, Berlin, Connecticut
EM-VER-011-130125 – 811 Blue Hills Avenue, Bloomfield, Connecticut
EM-VER-011-130214 – 785 Park Avenue, Bloomfield, Connecticut
EM-VER-012-130107 – 130 Vernon Road, Bolton, Connecticut
EM-VER-043-130220 – 148 Roberts Road, East Hartford, Connecticut
EM-VER-057-130214 – Bitternut Hollow Road, Greenwich, Connecticut
EM-VER-059-130220 – 68 Groton Long Point Road, Groton, Connecticut
EM-VER-062-130128 – 265 Benham Street, Hamden, Connecticut
EM-VER-062-130220 – 890 Evergreen Avenue, Hamden, Connecticut
EM-VER-064-130125 – 590-600 Asylum Avenue, Hartford, Connecticut
EM-VER-064-130220 – 439-455 Homestead Avenue, Hartford, Connecticut
EM-VER-077-130220A – 60 Adams Street, Manchester, Connecticut
EM-VER-077-130220B – 266 Center Street, Manchester, Connecticut
EM-VER-080-130128 – 38 Elm Street, Meriden, Connecticut
EM-VER-096-130125 – 586 Danbury Road, New Milford, Connecticut
EM-VER-094-130114 – 605 Willard Avenue, Newington, Connecticut
EM-VER-094-130220 – 123 Costello Road, Newington, Connecticut
EM-VER-144-130227 – Indian Ledge Road, Trumbull, Connecticut
EM-VER-146-130123 – 777 Talcottville Road, Vernon, Connecticut
EM-VER-152-130301 – 41 Manitock Hill Road, Waterford, Connecticut
EM-VER-156-130227 – 85 Plainfield Avenue, West Haven, Connecticut



Law Offices

BOSTON

HARTFORD

NEW YORK

PROVIDENCE

STAMFORD

ALBANY

LOS ANGELES

NEW LONDON

SARASOTA

www.rc.com

12984950-v1

Melanie A. Bachman
June 20, 2014
Page 2

EM-VER-164-130128 – 482 Pigeon Hill Road, Windsor, Connecticut
EM-VER-169-130220 – 445 Prospect Street, Woodstock, Connecticut

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

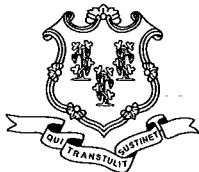
Sincerely,



Kenneth C. Baldwin

Copy to:
Sandy M. Carter





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 12, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-064-130220** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 439-455 Homestead Avenue, Hartford, 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;
- Within 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 20, 2013. 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.

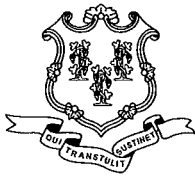
This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies 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/jb

c: The Honorable Pedro E. Segarra, Mayor, City of Hartford
Sandra Kee Borges, Acting Chief Operating Officer, City of Hartford
Crown Castle



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

February 25, 2013

The Honorable Pedro E. Segarra
Mayor
City of Hartford
Municipal Building
550 Main Street
Hartford, CT 06103

RE: **EM-VER-064-130220** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 439-455 Homestead Avenue, Hartford, Connecticut.

Dear Mayor Segarra:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by March 11, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jb

c: Sandra Kee Borges, Acting Chief Operating Officer, City of Hartford

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

Also admitted in Massachusetts

February 20, 2013

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



Re: **Notice of Exempt Modification – Antenna Swap**
439-455 Homestead Avenue, Hartford, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the top of the existing 140-foot tower at the above-referenced address. The tower is owned by Crown. The Council approved Cellco’s use of this tower in 1990 (Docket No. 126). Cellco now intends to replace six (6) of its antennas with three (3) model BXA-80063-4BF cellular antennas and three (3) model BXA-171063-8CF AWS antennas, at the same level on the tower. Cellco also intends to install three (3) remote radio heads (“RRHs”) behind its antennas and one (1) HYBRIFLEX™ fiber cable. Attached behind Tab 1 are the specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

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 Pedro E. Segarra, Mayor for the City of Hartford. A copy of this letter is also being sent to Talar Properties, LLC, 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).



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

12085340-v1

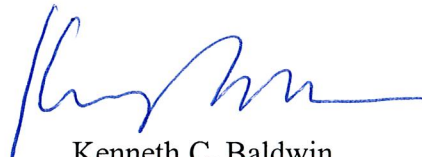
ROBINSON & COLE_{LLP}

Linda Roberts
February 20, 2013
Page 2

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be located at the top of the 140-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 boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions 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.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report attached behind 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:

Pedro E. Segarra, Mayor
Talar Properties, LLC
Sandy M. Carter



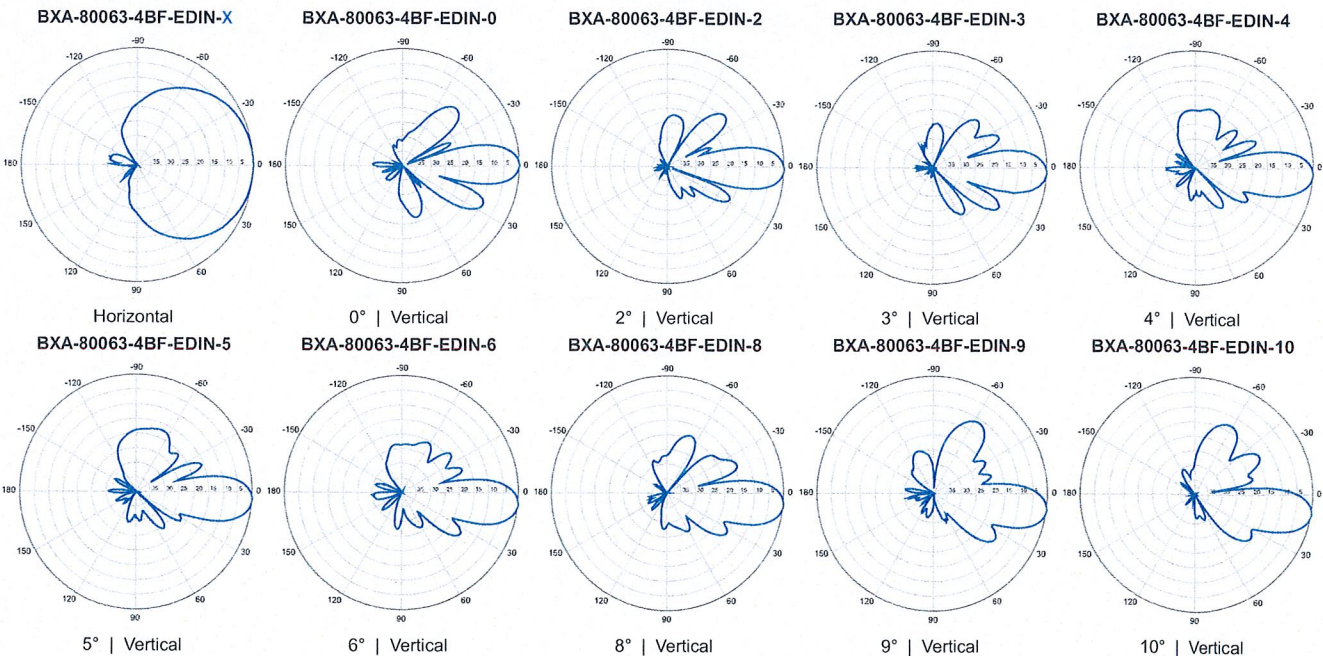
BXA-80063-4BF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

Replace "X" with desired electrical downtilt.

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

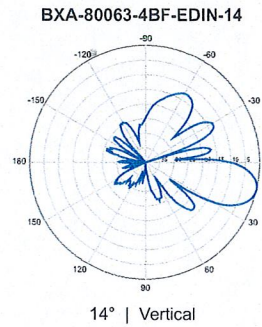
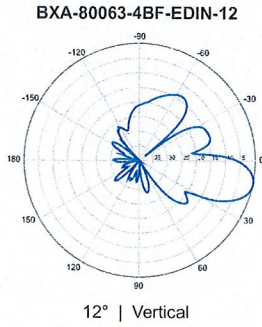
Electrical Characteristics	
Frequency bands	806-900 MHz*
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)
Polarization	±45°
Horizontal beamwidth	63°
Vertical beamwidth	15°
Gain	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-22.1 dB
Front-to-back ratio (+/-30°)	-34.9 dB
Null fill	5% (-26.02 dB)
Isolation between ports	< -30 dB
Input power with EDIN connectors	500 W
Input power with N connectors	300 W
Lightning protection	Direct Ground
Connector(s)	2 Ports / EDIN or N / Female / Bottom
Mechanical Characteristics	
Dimensions Length x Width x Depth	1134 x 285 x 135 mm 44.6 x 11.2 x 5.3 in
Depth with z-brackets	175 mm 6.9 in
Weight without mounting brackets	5.7 kg 12.6 lbs
Survival wind speed	> 201 km/hr > 125 mph
Wind area	Front: 0.32 m ² Side: 0.15 m ² Front: 3.5 ft ² Side: 1.7 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 469 N Side: 249 N Front: 104 lbf Side: 53 lbf
Mounting Options	
	Part Number Fits Pipe Diameter Weight
2-Point Mounting & Downtilt Bracket Kit	36210006 40-115 mm 1.57-4.5 in 4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-4BF-EDIN-X-FP



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-80063-4BF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd



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-171063-8CF-EDIN-X

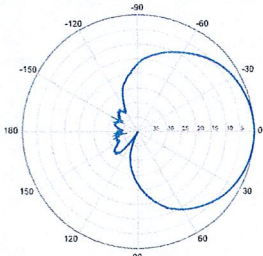
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 17.4 dBi

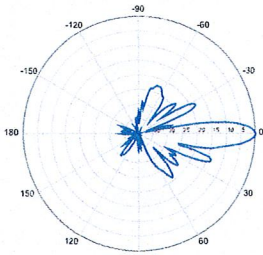
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Center (Back)		
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 l-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-171063-8CF-EDIN-X-FP		



BXA-171063-8CF-EDIN-X

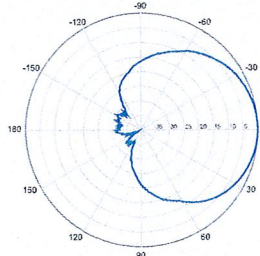


Horizontal | 1710-1880 MHz
BXA-171063-8CF-EDIN-0

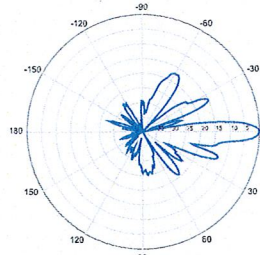


0° | Vertical | 1710-1880 MHz

BXA-171063-8CF-EDIN-X

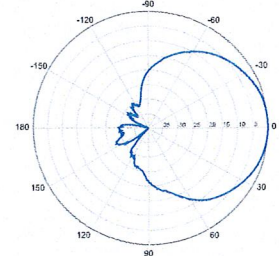


Horizontal | 1850-1990 MHz
BXA-171063-8CF-EDIN-0

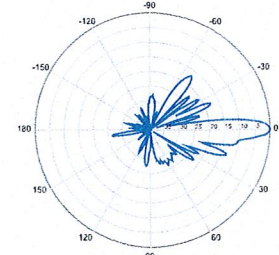


0° | Vertical | 1850-1990 MHz

BXA-171063-8CF-EDIN-X



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



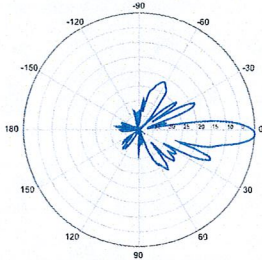
0° | Vertical | 1920-2170 MHz

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.

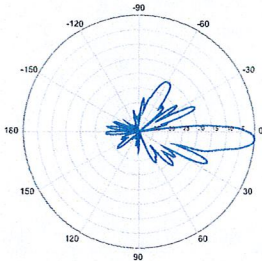
BXA-171063-8CF-EDIN-X

X-Pol | FET Panel | 63° | 17.4 dBi

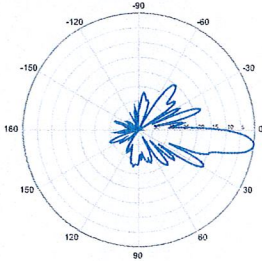
BXA-171063-8CF-EDIN-2



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

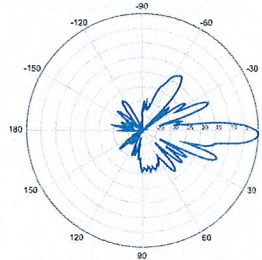


4° | Vertical | 1710-1880 MHz
BXA-171063-8CF-EDIN-8

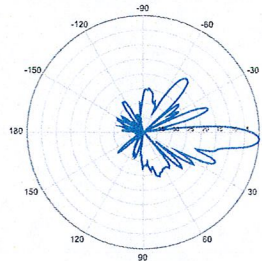


8° | Vertical | 1710-1880 MHz

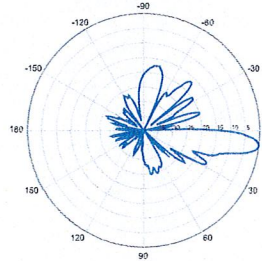
BXA-171063-8CF-EDIN-2



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

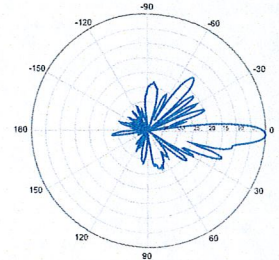


4° | Vertical | 1850-1990 MHz
BXA-171063-8CF-EDIN-8

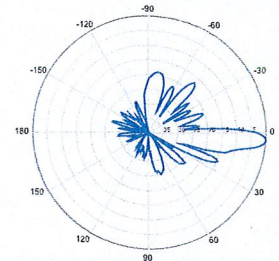


8° | Vertical | 1850-1990 MHz

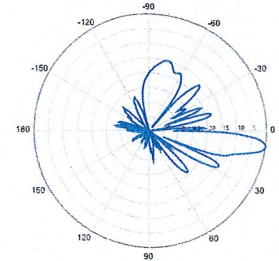
BXA-171063-8CF-EDIN-2



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



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



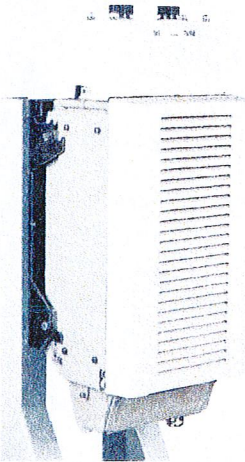
8° | Vertical | 1920-2170 MHz

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.

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low

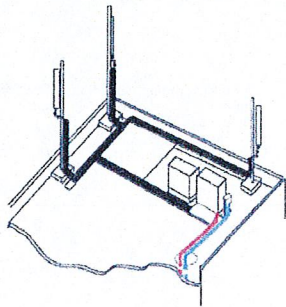
capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

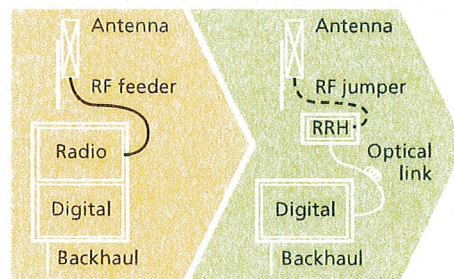
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.



Macro

Features

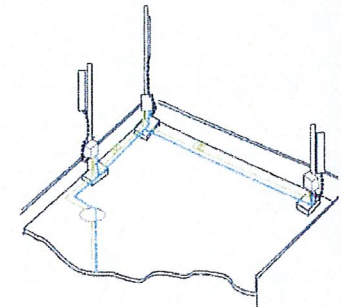
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption



RRH for space-constrained cell sites

Benefits

- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170mm (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
 - With solar load: -40°C to +50°C (-40°F to +122°F)
 - Without solar load: -40°C to +55°C (-40°F to +131°F)

- Passive convection cooling (no fans)
- Enclosure protection
 - IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
 - TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
 - One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
 - Single mode dual fiber (SM/DF)
- Multi-mode variant
 - Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

www.alcatel-lucent.com Alcatel, Lucent, Alcatel-Lucent and the Alcatel-Lucent logo are trademarks of Alcatel-Lucent. All other trademarks are the property of their respective owners. The information presented is subject to change without notice. Alcatel-Lucent assumes no responsibility for inaccuracies contained herein. Copyright © 2010 Alcatel-Lucent. All rights reserved. CPG2809100912 (09)

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

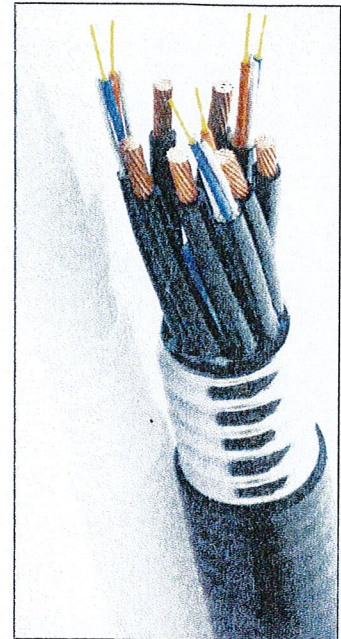


Figure 1: HYBRIFLEX Series

Technical Specifications

Structure

Outer Conductor Armor:	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection:	Individual and External Jacket		Yes

Mechanical Properties

Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)

Electrical Properties

DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)

Fiber Optic Properties

Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[μm]	50/125
Primary Coating (Acrylate)		[μm]	245
Buffer Diameter, Nominal		[μm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant

DC Power Cable Properties

Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant

Environment

Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

* This data is provisional and subject to change.

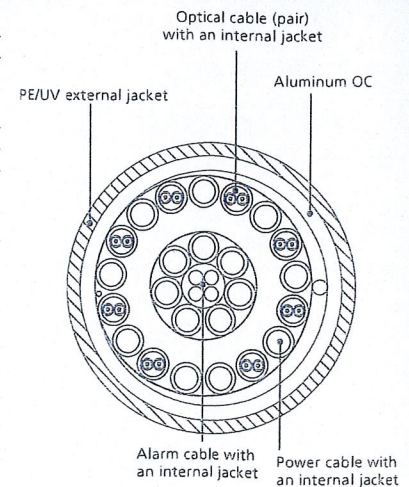


Figure 2: Construction Detail

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

		General		Power		Density							
Site Name: Hartford NW													
Tower Height: Verizon @ 142ft													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*Sprint	11	609	104	0.2227	1962.5	1.0000	22.27%						
*Clearwire	2	153	104	0.0102	2496	1.0000	1.02%						
*Clearwire	1	211	108	0.0065	11 GHz	1.0000	0.65%						
*Sensus (CL&P)	1	200	74	0.0131	940.1125	0.6267	2.10%						
*MetroPCS CDMA	3	727	94	0.0888	2135	1.0000	8.88%						
*MetroPCS LTE	1	1200	94	0.0488	2130	1.0000	4.88%						
*T-Mobile GSM/UMTS	2	12	128	0.0005	1950	1.0000	0.05%						
*T-Mobile UMTS	2	12	128	0.0005	2100	1.0000	0.05%						
*T-Mobile LTE	2	24	128	0.0011	2100	1.0000	0.11%						
*AT&T UMTS	2	875	120	0.0437	1900	1.0000	0.44%						
*AT&T UMTS	2	565	120	0.0282	880	0.5867	0.48%						
*AT&T GSM	4	525	120	0.0524	1900	1.0000	0.52%						
*AT&T GSM	1	283	120	0.0071	880	0.5867	0.12%						
*AT&T LTE	1	1615	120	0.0403	734	0.4893	0.82%						
Verizon PCS	11	264	142	0.0518	1970	1.0000	5.18%						
Verizon Cellular	9	266	142	0.0427	869	0.5793	7.37%						
Verizon AWS	1	1750	142	0.0312	2145	1.0000	3.12%						
Verizon 700	1	1050	142	0.0187	698	0.4653	4.02%						
								62.08%					
* Source: Siting Council													

Date: December 21, 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: N/A
Carrier Site Name: Hartford NW, CT

Crown Castle Designation: Crown Castle BU Number: 806369
Crown Castle Site Name: HRT 094 943225
Crown Castle JDE Job Number: 214506
Crown Castle Work Order Number: 561543
Crown Castle Application Number: 172925 Rev. 3

Engineering Firm Designation: Crown Castle Project Number: 561543

Site Data: 439-455 HOMESTEAD AVE, HARTFORD, Hartford County, CT
Latitude 41° 47' 1.61", Longitude -72° 42' 13.66"
140 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 561543, in accordance with application 172925, revision 3.

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:

LC7: 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 2005 CT State Building Code based upon a wind speed of 80 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: Drew Stephens /IS
Respectfully submitted by:

Reza Jenabzadeh, P.E.
Engineer II

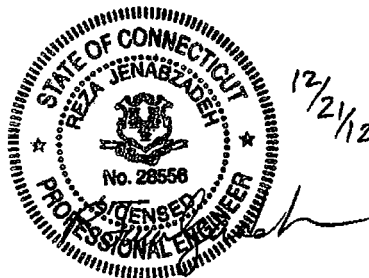


TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 - Tower Components vs. Capacity

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by VALMONT in August of 1999. The tower was originally designed for a wind speed of 125 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 80 mph with no ice, 37.6 mph with 1 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
142.0	142.0	3	amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe	13	1-5/8	-
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-171063/8CF-EDIN-2 w/ Mount Pipe			
	140.0	3	alcatel lucent	RRH2x40-AWS			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

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
142.0	142.0	3	antel	BXA-185090/8CF w/ Mount Pipe	12	7/8	3
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		3	antel	BXA-70063/6CF w/ Mount Pipe	-	-	1
		6	rfs celwave	FD9R6004/1C-3L			
		1	tower mounts	Platform Mount (LP 101-1)			
126.0	128.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
	126.0	1	tower mounts	Platform Mount [LP 1001-1]	12	1-5/8	1
115.0	117.0	6	ericsson	RRUS-11	12	1-5/8	1
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	116.0	6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 712-1]			
102.0	108.0	1	andrew	VHLP2-180	3	1/2	1
		1	andrew	VHLP2.5-11			
		2	dragonwave	HORIZON COMPACT			
	104.0	1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe	3	1-1/4	2
		2	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
	102.0	3	samsung telecommunications	WIMAX DAP HEAD	3	1/4	1
	102.0	1	tower mounts	Platform Mount [LP 602-1]			
100.0	100.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	2
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Collar Mount [SO 102-3]			
94.0	94.0	3	kathrein	742 213	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 602-3]			
74.0	80.0	1	antel	BCD-87010	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 701-1]			
40.0	41.0	1	lucent	KS24019-L112A	1	1/2	1
	40.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) Equipment To Be Removed, Not Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
137	137	12	swedcom	ALP 9212-N	-	-
124	124	6	rfs celwave	APN199015	-	-
114	114	9	allgon	7184.15	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tower Engineering Professionals	2294838	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals (Mapping)	2294380	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals (Mapping)	2294379	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Valmont Industries, Inc.	823121	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), 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.
- 5) The existing base plate grout was not considered in this analysis.

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	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-17.80	1962.96	44.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-30.79	3294.14	63.4	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-48.81	4900.57	63.7	Pass
							Summary	
						Pole (L3)	63.7	Pass
						Rating =	63.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.1	Pass
1	Base Plate	0	31.8	Pass
1	Base Foundation	0	48.6	Pass

Structure Rating (max from all components) =	68.1%
---	--------------

Notes:

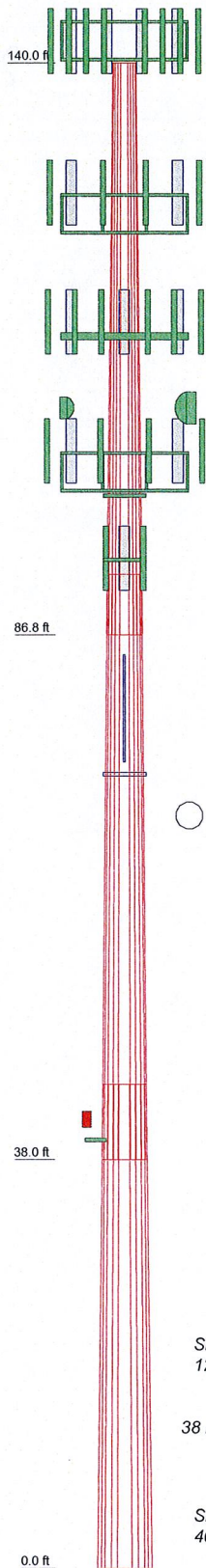
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

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
Length (ft)	532'-1/32"	548'	45'
Number of Sides	12	12	12
Thickness (in)	0.3125	0.4063	0.5000
Socket Length (ft)	5'-9-1/32"	7'	48.0330
Top Dia (in)	26.2160	37.2117	59.0500
Bot Dia (in)	39.2230	50.5600	
Grade		A572-65	
Weight (K)	5.9	10.5	13.1



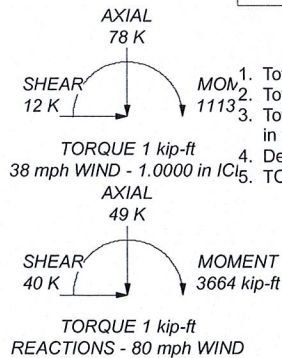
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-70063/6CF w/ Mount Pipe	142	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
BXA-70063/6CF w/ Mount Pipe	142	P65-17-XLH-RR w/ Mount Pipe	115
BXA-70063/6CF w/ Mount Pipe	142	(2) RRUS-11	115
(2) FD9R6004/1C-3L	142	(2) RRUS-11	115
(2) FD9R6004/1C-3L	142	(2) RRUS-11	115
(2) FD9R6004/1C-3L	142	(2) RRUS-11	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(4) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(4) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	(4) LGP21401	115
BXA-80063-4BF-EDIN-X w/ Mount Pipe	142	DC6-48-60-18-8F	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	8'x2" Antenna Mount Pipe	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	8'x2" Antenna Mount Pipe	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	8'x2" Antenna Mount Pipe	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	Platform Mount [LP 712-1]	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	APXVSP18-C-A20 w/ Mount Pipe	102
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	P40-16-XLPP-RR-A w/ Mount Pipe	102
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	142	APXVSP18-C-A20 w/ Mount Pipe	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900BB-1	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900BB-1	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900BB-1	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900HG-2A	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900HG-2A	102
BXA-171063-8CF-EDIN-2 w/ Mount Pipe	142	IBC1900HG-2A	102
RRH2x40-AWS	142	IBX1900HG-2A	102
RRH2x40-AWS	142	LLPX310R-V1 w/ Mount Pipe	102
RRH2x40-AWS	142	LLPX310R-V1 w/ Mount Pipe	102
DB-T1-6Z-8AB-OZ	142	LLPX310R-V1 w/ Mount Pipe	102
Platform Mount (LP 101-1)	142	WIMAX DAP HEAD	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	WIMAX DAP HEAD	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	WIMAX DAP HEAD	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	HORIZON COMPACT	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	HORIZON COMPACT	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	HORIZON COMPACT	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	(2) 5' x 2" Pipe Mount	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	(2) 5' x 2" Pipe Mount	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	(2) 5' x 2" Pipe Mount	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	Platform Mount [LP 602-1]	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	VHLP2.5-11	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	VHLP2-180	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	800MHz 2X50W RRH W/FILTER	100
ATMAA1412D-1A20	126	(2) PCS 1900MHz 4x45W-65MHz	100
ATMAA1412D-1A20	126	(2) PCS 1900MHz 4x45W-65MHz	100
ATMAA1412D-1A20	126	(2) PCS 1900MHz 4x45W-65MHz	100
(2) 5' x 2" Pipe Mount	126	Collar Mount [SO 102-3]	100
(2) 5' x 2" Pipe Mount	126	800MHz 2X50W RRH W/FILTER	100
(2) 5' x 2" Pipe Mount	126	800MHz 2X50W RRH W/FILTER	100
(2) 5' x 2" Pipe Mount	126	800MHz 2X50W RRH W/FILTER	100
Platform Mount [LP 1001-1]	126	742 213	94
(2) 7770.00 w/ Mount Pipe	115	Pipe Mount (PM 602-3)	94
(2) 7770.00 w/ Mount Pipe	115	742 213	94
(2) 7770.00 w/ Mount Pipe	115	742 213	94
(2) 7770.00 w/ Mount Pipe	115	742 213	94
P65-17-XLH-RR w/ Mount Pipe	115	BCD-87010	74
		Side Arm Mount [SO 701-1]	74
		KS24019-L112A	40
		Side Arm Mount [SO 701-1]	40

MATERIAL STRENGTH

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

TOWER DESIGN NOTES



1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 63.7%

<p>Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:</p>	<p>Job: BU# 806369</p>								
	<p>Project:</p> <table border="1"> <tr> <td>Client: Crown Castle</td> <td>Drawn by: DStephens</td> <td>App'd:</td> </tr> <tr> <td>Code: TIA/EIA-222-F</td> <td>Date: 12/19/12</td> <td>Scale: NTS</td> </tr> <tr> <td>Path:</td> <td colspan="2">R:\ISA Models - Letters\Work Area\DStephens\806369\806369.eri</td> </tr> </table>	Client: Crown Castle	Drawn by: DStephens	App'd:	Code: TIA/EIA-222-F	Date: 12/19/12	Scale: NTS	Path:	R:\ISA Models - Letters\Work Area\DStephens\806369\806369.eri
Client: Crown Castle	Drawn by: DStephens	App'd:							
Code: TIA/EIA-222-F	Date: 12/19/12	Scale: NTS							
Path:	R:\ISA Models - Letters\Work Area\DStephens\806369\806369.eri								
<p>We Are Solutions</p>	<p>Dwg No: E-1</p>								

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 Hartford County, Connecticut.
- 5) Basic wind speed of 80 mph.
- 6) Nominal ice thickness of 1.0000 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
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 | 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 | 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
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	140'-86'9-31/32"	53'2-1/32"	5'8-1/32"	12	26.2160	39.2230	0.3125	1.2500	A572-65 (65 ksi)
L2	86'9-31/32"-38'	54'6"	7'	12	37.2117	50.5600	0.4063	1.6250	A572-65 (65 ksi)
L3	38'-0'	45'		12	48.0330	59.0500	0.5000	2.0000	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	I/Q in ²	w in	w/t
L1	27.1408	26.0654	2232.3752	9.2735	13.5799	164.3883	4523.3974	12.8286	6.1884	19.803
	40.6066	39.1537	7566.4519	13.9300	20.3175	372.4103	15331.683	19.2703	9.6743	30.958

0

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
L2	39.9612	48.1461	8324.7399	13.1763	19.2756	431.8786	16868.179	23.6960	8.8840	21.868
	52.3436	65.6074	21064.222	17.9550	26.1901	804.2825	42681.825	32.2900	12.4613	30.674
L3	51.5017	76.5282	22069.804	17.0168	24.8811	887.0104	44719.407	37.6648	11.5329	23.066
	61.1331	94.2655	41247.015	20.9609	30.5879	1348.4749	83577.635	46.3946	14.4854	28.971

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	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 140'-86'9-31/32"				1	1	1		
L2 86'9-31/32"-38'				1	1	1		
L3 38'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Face Offset	Lateral Offset (Frac FW)	#	C _{AA}	Weight	
				ft	in			ft ² /ft	k/ft	
HJ5-50A(7/8")	B	No	Inside Pole	140' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
LDF7-50A(1-5/8")	B	No	Inside Pole	140' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
HB158-1-08U8-S8J18(1-5/8)	B	No	CaAa (Out Of Face)	140' - 0'	0.0000	0	1	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.00
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
*** FLC 158-50J(1-5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
LCF158-50JA-A0(1-5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	8	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	A	No	CaAa (Out Of Face)	126' - 0'	0.0000	0	1	No Ice	0.16	0.00
								1/2" Ice	0.26	0.00
								1" Ice	0.36	0.00
								2" Ice	0.56	0.01
								4" Ice	0.96	0.03
*** LDF7-50A(1-5/8")	C	No	Inside Pole	115' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	115' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00

Description	Face or Shield Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C _A A _A ft ² /ft	Weight klf
WR- VG86ST- BRD(3/4)	C	No	Inside Pole	115' - 0'	0.0000	0	2	4" Ice	0.00	0.00
								No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
4" Ice	0.00	0.00								

FSJ4- 50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
FSJ4- 50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
LDF1- 50A(1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
ATCB-B01- 005(5/16)	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.01
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
HB114-1- 08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.15	0.00
								1/2" Ice	0.25	0.00
								1" Ice	0.35	0.00
								2" Ice	0.55	0.01
								4" Ice	0.95	0.03
HB114-1- 08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03

AVA7-50(1- 5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.00
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
AVA7-50(1- 5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03

LDF5- 50A(7/8")	B	No	CaAa (Out Of Face)	74' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03

LDF4- 50A(1/2")	C	No	Inside Pole	40' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00

Thin Flat Bar Climbing Ladder	C	No	CaAa (Out Of Face)	115' - 105'	30.0000	0	1	No Ice	0.33	0.00
								1/2" Ice	0.44	0.01
								1" Ice	0.56	0.01

Description	Face Allow or Shield Leg	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	C _{AA} A ft ² /ft	Weight klf
						2" Ice	0.78	0.01
						4" Ice	1.22	0.02

Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	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	140'-86'9"-31/32"	A	0.000	0.000	0.000	14.767	0.36
		B	0.000	0.000	0.000	13.408	1.60
		C	0.000	0.000	0.000	3.333	0.35
L2	86'9"-31/32"-38'	A	0.000	0.000	0.000	34.989	0.74
		B	0.000	0.000	0.000	29.300	1.66
		C	0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	0.000	0.000	0.000	27.227	0.57
		B	0.000	0.000	0.000	22.800	1.30
		C	0.000	0.000	0.000	0.000	0.43

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Sectio n	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	140'-86'9"-31/32"	A	1.158	0.000	0.000	0.000	34.376	1.16
		B		0.000	0.000	0.000	29.042	2.05
		C		0.000	0.000	0.000	5.907	0.39
L2	86'9"-31/32"-38'	A	1.079	0.000	0.000	0.000	80.230	3.01
		B		0.000	0.000	0.000	63.231	3.37
		C		0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	1.000	0.000	0.000	0.000	60.017	2.12
		B		0.000	0.000	0.000	47.393	2.51
		C		0.000	0.000	0.000	0.000	0.43

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	140'-86'9"-31/32"	0.2104	-0.1769	0.3794	-0.3605
L2	86'9"-31/32"-38'	0.5755	-0.4613	0.9128	-0.8104
L3	38'-0'	0.6040	-0.4842	0.9741	-0.8620

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t	Placement ft	C _{AA} A Front ft ²	C _{AA} A Side ft ²	Weight K	
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00	0.0000	142'	No Ice	7.98	5.70	0.04
			0'			1/2"	8.62	6.85	0.10
			0'			Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	13.08	13.26	0.80
						4" Ice			
						No Ice	7.98	5.70	0.04
						1/2" Ice	8.62	6.85	0.10
						Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	13.08	13.26	0.80
						4" Ice			
						No Ice	7.98	5.70	0.04
						1/2" Ice	8.62	6.85	0.10
						Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
(2) FD9R6004/1C-3L	A	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	13.08	13.26	0.80
						4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
(2) FD9R6004/1C-3L	B	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	1.28	0.74	0.06
						4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
(2) FD9R6004/1C-3L	C	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	1.28	0.74	0.06
						4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	8.82	8.89	0.55
						4" Ice			
						No Ice	5.09	3.47	0.03
						1/2" Ice	5.52	4.04	0.07
						Ice	5.95	4.64	0.11
						1" Ice	6.86	5.96	0.23
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	8.82	8.89	0.55
						4" Ice			
						No Ice	5.09	3.47	0.03
						1/2" Ice	5.52	4.04	0.07
						Ice	5.95	4.64	0.11
						1" Ice	6.86	5.96	0.23
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	8.82	8.89	0.55
						4" Ice			
						No Ice	5.09	3.47	0.03
						1/2" Ice	5.52	4.04	0.07
						Ice	5.95	4.64	0.11
						1" Ice	6.86	5.96	0.23
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	6.77	8.89	0.49
						4" Ice			
						No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						Ice	3.96	4.60	0.10
						1" Ice	4.85	5.89	0.19
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	6.77	8.89	0.49
						4" Ice			
						No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						Ice	3.96	4.60	0.10
						1" Ice	4.85	5.89	0.19
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	142'	2" Ice	6.77	8.89	0.49
						4" Ice			
						No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						Ice	3.96	4.60	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _{Front} ft ²	C _A A _{Side} ft ²	Weight K	
						1" Ice	4.85	5.89	0.19
						2" Ice	6.77	8.89	0.49
						4" Ice			
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	142'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	142'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
BXA-171063/8CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	142'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
RRH2x40-AWS	A	From Leg	4.00 0' -2'	0.0000	142'	No Ice	2.52	1.59	0.04
						1/2"	2.75	1.80	0.06
						Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
RRH2x40-AWS	B	From Leg	4.00 0' -2'	0.0000	142'	No Ice	2.52	1.59	0.04
						1/2"	2.75	1.80	0.06
						Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
RRH2x40-AWS	C	From Leg	4.00 0' -2'	0.0000	142'	No Ice	2.52	1.59	0.04
						1/2"	2.75	1.80	0.06
						Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0' -2'	0.0000	142'	No Ice	5.60	2.33	0.04
						1/2"	5.92	2.56	0.08
						Ice	6.24	2.79	0.12
						1" Ice	6.91	3.28	0.21
						2" Ice	8.37	4.37	0.45
						4" Ice			
Platform Mount (LP 101-1)	C	None		0.0000	142'	No Ice	36.21	36.21	1.50
						1/2"	42.82	42.82	2.30
						Ice	49.43	49.43	3.10
						1" Ice	62.65	62.65	4.70
						2" Ice	89.09	89.09	7.89
						4" Ice			

ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	6.83	5.64	0.11
						1/2"	7.35	6.48	0.17
						Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice	6.83	5.64	0.11
						1/2"	7.35	6.48	0.17
						Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B2A	C	From Leg	4.00	0.0000	126'	No Ice	6.83	5.64	0.11

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Vert	Lateral					
B4P w/ Mount Pipe			0'				1/2"	7.35	6.48	0.17
			2'				Ice	7.86	7.26	0.23
							1" Ice	8.93	8.86	0.38
							2" Ice	11.18	12.29	0.81
							4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	126'	No Ice	6.83	5.64	0.11	
			0'			1/2"	7.35	6.48	0.17	
			2'			Ice	7.86	7.26	0.23	
						1" Ice	8.93	8.86	0.38	
						2" Ice	11.18	12.29	0.81	
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	126'	No Ice	6.83	5.64	0.11	
			0'			1/2"	7.35	6.48	0.17	
			2'			Ice	7.86	7.26	0.23	
						1" Ice	8.93	8.86	0.38	
						2" Ice	11.18	12.29	0.81	
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	126'	No Ice	6.83	5.64	0.11	
			0'			1/2"	7.35	6.48	0.17	
			2'			Ice	7.86	7.26	0.23	
						1" Ice	8.93	8.86	0.38	
						2" Ice	11.18	12.29	0.81	
ATMAA1412D-1A20	A	From Leg	4.00	0.0000	126'	No Ice	0.47	1.17	0.01	
			0'			1/2"	0.57	1.31	0.02	
			2'			Ice	0.69	1.47	0.03	
						1" Ice	0.95	1.81	0.06	
						2" Ice	1.57	2.58	0.14	
ATMAA1412D-1A20	B	From Leg	4.00	0.0000	126'	No Ice	0.47	1.17	0.01	
			0'			1/2"	0.57	1.31	0.02	
			2'			Ice	0.69	1.47	0.03	
						1" Ice	0.95	1.81	0.06	
						2" Ice	1.57	2.58	0.14	
ATMAA1412D-1A20	C	From Leg	4.00	0.0000	126'	No Ice	0.47	1.17	0.01	
			0'			1/2"	0.57	1.31	0.02	
			2'			Ice	0.69	1.47	0.03	
						1" Ice	0.95	1.81	0.06	
						2" Ice	1.57	2.58	0.14	
(2) 5' x 2" Pipe Mount	A	From Leg	4.00	0.0000	126'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			0'			Ice	1.70	1.70	0.05	
						1" Ice	2.35	2.35	0.08	
						2" Ice	3.78	3.78	0.20	
(2) 5' x 2" Pipe Mount	B	From Leg	4.00	0.0000	126'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			0'			Ice	1.70	1.70	0.05	
						1" Ice	2.35	2.35	0.08	
						2" Ice	3.78	3.78	0.20	
(2) 5' x 2" Pipe Mount	C	From Leg	4.00	0.0000	126'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			0'			Ice	1.70	1.70	0.05	
						1" Ice	2.35	2.35	0.08	
						2" Ice	3.78	3.78	0.20	
Platform Mount [LP 1001-1]	C	None		0.0000	126'	No Ice	47.70	47.70	3.02	
						1/2"	59.50	59.50	3.62	
						Ice	71.30	71.30	4.22	
						1" Ice	94.90	94.90	5.43	
						2" Ice	142.10	142.10	7.85	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement		C_{AA}	C_{AA}	Weight
			Horz Lateral	Vert				Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K	

(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0'	0.0000	115'	No Ice	6.12	4.25	0.06
							1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0'	0.0000	115'	No Ice	6.12	4.25	0.06
							1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0'	0.0000	115'	No Ice	6.12	4.25	0.06
							1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
							2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.00	0'	0.0000	115'	No Ice	11.70	8.94	0.09
							1/2" Ice	12.42	10.45	0.17
							1" Ice	13.15	11.99	0.27
							2" Ice	14.64	14.31	0.50
							4" Ice	17.91	19.14	1.13
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0'	0.0000	115'	No Ice	8.50	6.30	0.07
							1/2" Ice	9.15	7.48	0.14
							1" Ice	9.77	8.37	0.21
							2" Ice	11.03	10.18	0.38
							4" Ice	13.68	14.02	0.87
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.00	0'	0.0000	115'	No Ice	11.70	8.94	0.09
							1/2" Ice	12.42	10.45	0.17
							1" Ice	13.15	11.99	0.27
							2" Ice	14.64	14.31	0.50
							4" Ice	17.91	19.14	1.13
(2) RRUS-11	A	From Leg	4.00	0'	0.0000	115'	No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
							4" Ice	5.43	3.04	0.31
(2) RRUS-11	B	From Leg	4.00	0'	0.0000	115'	No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
							4" Ice	5.43	3.04	0.31
(2) RRUS-11	C	From Leg	4.00	0'	0.0000	115'	No Ice	3.25	1.37	0.05
							1/2" Ice	3.49	1.55	0.07
							1" Ice	3.74	1.74	0.09
							2" Ice	4.27	2.14	0.15
							4" Ice	5.43	3.04	0.31
(4) LGP21401	A	From Leg	4.00	0'	0.0000	115'	No Ice	1.29	0.23	0.01
							1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
							4" Ice	2.79	1.12	0.14
(4) LGP21401	B	From Leg	4.00	0'	0.0000	115'	No Ice	1.29	0.23	0.01
							1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
							4" Ice	2.79	1.12	0.14

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
(4) LGP21401	C	From Leg	4.00	0'	0.0000	115'	2" Ice	2.79	1.12	0.14
							4" Ice			
							No Ice	1.29	0.23	0.01
							1/2" Ice	1.45	0.31	0.02
							1" Ice	1.61	0.40	0.03
							2" Ice	1.97	0.61	0.05
DC6-48-60-18-8F	A	From Leg	4.00	0'	0.0000	115'	4" Ice	2.79	1.12	0.14
							No Ice	1.27	1.27	0.02
							1/2" Ice	1.46	1.46	0.04
							1" Ice	1.66	1.66	0.05
							2" Ice	2.09	2.09	0.10
							4" Ice	3.10	3.10	0.21
8'x2" Antenna Mount Pipe	A	From Leg	4.00	0'	0.0000	115'	No Ice	1.90	1.90	0.03
							1/2" Ice	2.73	2.73	0.04
							1" Ice	3.40	3.40	0.06
							2" Ice	4.40	4.40	0.12
							4" Ice	6.50	6.50	0.30
							8'x2" Antenna Mount Pipe	B	From Leg	4.00
1/2" Ice	2.73	2.73	0.04							
1" Ice	3.40	3.40	0.06							
2" Ice	4.40	4.40	0.12							
4" Ice	6.50	6.50	0.30							
8'x2" Antenna Mount Pipe	C	From Leg	4.00	0'	0.0000	115'	No Ice			
1/2" Ice							2.73	2.73	0.04	
1" Ice							3.40	3.40	0.06	
2" Ice							4.40	4.40	0.12	
4" Ice							6.50	6.50	0.30	
Platform Mount [LP 712-1]							C	None		
1/2" Ice	29.94	29.94	1.65							
1" Ice	35.35	35.35	1.96							
2" Ice	46.17	46.17	2.58							
4" Ice	67.81	67.81	3.82							
***	A	From Leg	4.00	0'	0.0000	102'				
1/2" Ice							9.15	8.13	0.15	
1" Ice							9.77	9.02	0.22	
2" Ice							11.03	10.84	0.41	
4" Ice							13.68	14.85	0.91	
P40-16-XLPP-RR-A w/ Mount Pipe							B	From Leg	4.00	0'
1/2" Ice	11.29	5.57	0.14							
1" Ice	11.85	6.27	0.21							
2" Ice	12.99	7.80	0.39							
4" Ice	15.39	11.11	0.86							
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0'	0.0000	102'				
1/2" Ice							9.15	8.13	0.15	
1" Ice							9.77	9.02	0.22	
2" Ice							11.03	10.84	0.41	
4" Ice							13.68	14.85	0.91	
IBC1900BB-1							A	From Leg	4.00	0'
	1/2" Ice	1.27	0.65	0.03						
	1" Ice	1.43	0.77	0.04						
	2" Ice	1.76	1.04	0.06						
	4" Ice	2.53	1.69	0.15						
	IBC1900BB-1	B	From Leg	4.00	0'	0.0000				
1/2" Ice							1.27	0.65	0.03	

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
					2'					
							Ice	1.43	0.77	0.04
							1" Ice	1.76	1.04	0.06
							2" Ice	2.53	1.69	0.15
							4" Ice			
IBC1900BB-1	C	From Leg	4.00	0.0000	102'		No Ice	1.13	0.53	0.02
			0'				1/2"	1.27	0.65	0.03
			2'				Ice	1.43	0.77	0.04
							1" Ice	1.76	1.04	0.06
							2" Ice	2.53	1.69	0.15
							4" Ice			
IBC1900HG-2A	A	From Leg	4.00	0.0000	102'		No Ice	1.13	0.53	0.02
			0'				1/2"	1.27	0.65	0.03
			2'				Ice	1.43	0.77	0.04
							1" Ice	1.76	1.04	0.06
							2" Ice	2.53	1.69	0.15
							4" Ice			
IBC1900HG-2A	B	From Leg	4.00	0.0000	102'		No Ice	1.13	0.53	0.02
			0'				1/2"	1.27	0.65	0.03
			2'				Ice	1.43	0.77	0.04
							1" Ice	1.76	1.04	0.06
							2" Ice	2.53	1.69	0.15
							4" Ice			
IBC1900HG-2A	C	From Leg	4.00	0.0000	102'		No Ice	1.13	0.53	0.02
			0'				1/2"	1.27	0.65	0.03
			2'				Ice	1.43	0.77	0.04
							1" Ice	1.76	1.04	0.06
							2" Ice	2.53	1.69	0.15
							4" Ice			
*										
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00	0.0000	102'		No Ice	5.07	2.98	0.05
			0'				1/2"	5.48	3.53	0.08
			2'				Ice	5.91	4.09	0.13
							1" Ice	6.79	5.31	0.23
							2" Ice	8.70	8.13	0.54
							4" Ice			
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00	0.0000	102'		No Ice	5.07	2.98	0.05
			0'				1/2"	5.48	3.53	0.08
			2'				Ice	5.91	4.09	0.13
							1" Ice	6.79	5.31	0.23
							2" Ice	8.70	8.13	0.54
							4" Ice			
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00	0.0000	102'		No Ice	5.07	2.98	0.05
			0'				1/2"	5.48	3.53	0.08
			2'				Ice	5.91	4.09	0.13
							1" Ice	6.79	5.31	0.23
							2" Ice	8.70	8.13	0.54
							4" Ice			
WIMAX DAP HEAD	A	From Leg	4.00	0.0000	102'		No Ice	1.80	0.78	0.03
			0'				1/2"	1.99	0.92	0.04
			2'				Ice	2.18	1.07	0.06
							1" Ice	2.59	1.39	0.09
							2" Ice	3.51	2.14	0.20
							4" Ice			
WIMAX DAP HEAD	B	From Leg	4.00	0.0000	102'		No Ice	1.80	0.78	0.03
			0'				1/2"	1.99	0.92	0.04
			2'				Ice	2.18	1.07	0.06
							1" Ice	2.59	1.39	0.09
							2" Ice	3.51	2.14	0.20
							4" Ice			
WIMAX DAP HEAD	C	From Leg	4.00	0.0000	102'		No Ice	1.80	0.78	0.03
			0'				1/2"	1.99	0.92	0.04
			2'				Ice	2.18	1.07	0.06
							1" Ice	2.59	1.39	0.09
							2" Ice	3.51	2.14	0.20
							4" Ice			

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
HORIZON COMPACT	B	From Leg	4.00	0.0000	102'	No Ice	0.84	0.43	0.01	
			0'			1/2"	0.97	0.52	0.02	
			6'			Ice	1.10	0.63	0.03	
			1" Ice			1.39	0.86	0.05		
			2" Ice			2.08	1.43	0.12		
			4" Ice							
HORIZON COMPACT	C	From Leg	4.00	0.0000	102'	No Ice	0.84	0.43	0.01	
			0'			1/2"	0.97	0.52	0.02	
			6'			Ice	1.10	0.63	0.03	
			1" Ice			1.39	0.86	0.05		
			2" Ice			2.08	1.43	0.12		
			4" Ice							
(2) 5' x 2" Pipe Mount	A	From Leg	4.00	0.0000	102'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			2'			Ice	1.70	1.70	0.05	
			1" Ice			2.35	2.35	0.08		
			2" Ice			3.78	3.78	0.20		
			4" Ice							
(2) 5' x 2" Pipe Mount	B	From Leg	4.00	0.0000	102'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			2'			Ice	1.70	1.70	0.05	
			1" Ice			2.35	2.35	0.08		
			2" Ice			3.78	3.78	0.20		
			4" Ice							
(2) 5' x 2" Pipe Mount	C	From Leg	4.00	0.0000	102'	No Ice	1.00	1.00	0.03	
			0'			1/2"	1.39	1.39	0.04	
			2'			Ice	1.70	1.70	0.05	
			1" Ice			2.35	2.35	0.08		
			2" Ice			3.78	3.78	0.20		
			4" Ice							
Platform Mount [LP 602-1]	C	None		0.0000	102'	No Ice	32.03	32.03	1.34	
						1/2"	38.71	38.71	1.80	
						Ice	45.39	45.39	2.26	
						1" Ice	58.75	58.75	3.17	
						2" Ice	85.47	85.47	5.00	
						4" Ice				
*** 800MHz 2X50W RRH W/FILTER	A	From Leg	2.00	0.0000	100'	No Ice	2.40	2.25	0.06	
			0'			1/2"	2.61	2.46	0.09	
			0'			Ice	2.83	2.68	0.11	
			1" Ice			3.30	3.13	0.17		
			2" Ice			4.34	4.15	0.34		
			4" Ice							
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00	0.0000	100'	No Ice	2.40	2.25	0.06	
			0'			1/2"	2.61	2.46	0.09	
			0'			Ice	2.83	2.68	0.11	
			1" Ice			3.30	3.13	0.17		
			2" Ice			4.34	4.15	0.34		
			4" Ice							
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00	0.0000	100'	No Ice	2.40	2.25	0.06	
			0'			1/2"	2.61	2.46	0.09	
			0'			Ice	2.83	2.68	0.11	
			1" Ice			3.30	3.13	0.17		
			2" Ice			4.34	4.15	0.34		
			4" Ice							
(2) PCS 1900MHz 4x45W- 65MHz	A	From Leg	2.00	0.0000	100'	No Ice	2.71	2.61	0.06	
			0'			1/2"	2.95	2.85	0.08	
			0'			Ice	3.20	3.09	0.11	
			1" Ice			3.72	3.61	0.17		
			2" Ice			4.86	4.74	0.35		
			4" Ice							
(2) PCS 1900MHz 4x45W- 65MHz	B	From Leg	2.00	0.0000	100'	No Ice	2.71	2.61	0.06	
			0'			1/2"	2.95	2.85	0.08	
			0'			Ice	3.20	3.09	0.11	
			1" Ice			3.72	3.61	0.17		
			2" Ice			4.86	4.74	0.35		
			4" Ice							

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
						2" Ice 4" Ice	4.86 4.74	0.35	
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
Collar Mount [SO 102-3]	C	None		0.0000	100'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32

742 213	A	From Leg	0.50 0' 0'	0.0000	94'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.14 5.61 6.09 7.07 9.13	2.87 3.48 3.95 4.89 6.88	0.02 0.05 0.08 0.16 0.39
742 213	B	From Leg	0.50 0' 0'	0.0000	94'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.14 5.61 6.09 7.07 9.13	2.87 3.48 3.95 4.89 6.88	0.02 0.05 0.08 0.16 0.39
742 213	C	From Leg	0.50 0' 0'	0.0000	94'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.14 5.61 6.09 7.07 9.13	2.87 3.48 3.95 4.89 6.88	0.02 0.05 0.08 0.16 0.39
Pipe Mount [PM 602-3]	C	None		0.0000	94'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.68 9.50 11.32 14.96 22.24	7.68 9.50 11.32 14.96 22.24	0.28 0.35 0.43 0.58 0.87

BCD-87010	A	From Leg	2.00 0' 6'	0.0000	74'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.90 4.05 5.21 7.01 9.85	2.90 4.05 5.21 7.01 9.85	0.03 0.05 0.08 0.16 0.41
Side Arm Mount [SO 701-1]	A	From Leg	1.00 0' 0'	0.0000	74'	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

KS24019-L112A	C	From Leg	2.00 0' 1'	0.0000	40'	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]	C	From Leg	1.00 0' 0'	0.0000	40'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
				ft	ft	°	°	ft	ft	ft ²	K
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00	-20.0000	102'	2.92	No Ice	6.68	0.03	
				0'				1/2" Ice	7.07	0.04	
				6'				1" Ice	7.46	0.05	
								2" Ice	8.23	0.07	
								4" Ice	9.78	0.11	
VHLP2-180	C	Paraboloid w/Shroud (HP)	From Leg	4.00	10.0000	102'	2.00	No Ice	3.14	0.03	
				0'				1/2" Ice	3.41	0.04	
				6'				1" Ice	3.67	0.06	
								2" Ice	4.21	0.09	
								4" Ice	5.28	0.16	

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
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	140 - 86.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.40	-0.15	1.83
			Max. Mx	11	-17.80	655.85	1.12
			Max. My	2	-17.81	0.47	658.56
			Max. Vy	11	-24.88	655.85	1.12
			Max. Vx	8	24.73	-0.91	-657.99
			Max. Torque	4			1.18
L2	86.8333 - 38	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.85	-3.00	5.47
			Max. Mx	11	-30.79	2024.73	5.51
			Max. My	2	-30.80	2.47	2020.62
			Max. Vy	11	-32.77	2024.73	5.51
			Max. Vx	8	32.60	-5.37	-2018.60
			Max. Torque	5			1.24
L3	38 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-78.17	-6.00	8.60
			Max. Mx	11	-48.81	3657.74	9.83
			Max. My	2	-48.81	4.81	3646.88
			Max. Vy	11	-39.76	3657.74	9.83
			Max. Vx	8	39.60	-9.91	-3643.92
			Max. Torque	5			1.46

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	17	78.17	-10.16	5.82
	Max. H _x	11	48.83	39.73	0.08
	Max. H _z	2	48.83	0.06	39.57
	Max. M _x	2	3646.88	0.06	39.57
	Max. M _z	5	3655.17	-39.70	-0.06
	Max. Torsion	5	1.46	-39.70	-0.06
	Min. Vert	1	48.83	0.00	0.00
	Min. H _x	5	48.83	-39.70	-0.06
	Min. H _z	8	48.83	-0.09	-39.57
	Min. M _x	8	-3643.92	-0.09	-39.57
	Min. M _z	11	-3657.74	39.73	0.08
	Min. Torsion	11	-1.39	39.73	0.08

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	48.83	0.00	0.00	-1.93	-0.63	0.00
Dead+Wind 0 deg - No Ice	48.83	-0.06	-39.57	-3646.88	4.81	0.28
Dead+Wind 30 deg - No Ice	48.83	19.86	-34.21	-3152.98	-1830.46	-0.31
Dead+Wind 60 deg - No Ice	48.83	34.38	-19.68	-1813.88	-3165.93	-1.21
Dead+Wind 90 deg - No Ice	48.83	39.70	0.06	3.64	-3655.17	-1.46
Dead+Wind 120 deg - No Ice	48.83	34.44	19.80	1820.92	-3171.71	-1.38
Dead+Wind 150 deg - No Ice	48.83	19.97	34.26	3153.98	-1840.13	-0.65
Dead+Wind 180 deg - No Ice	48.83	0.09	39.57	3643.92	-9.91	-0.22
Dead+Wind 210 deg - No Ice	48.83	-19.87	34.17	3145.17	1830.08	0.41
Dead+Wind 240 deg - No Ice	48.83	-34.41	19.67	1809.04	3167.82	1.17
Dead+Wind 270 deg - No Ice	48.83	-39.73	-0.08	-9.83	3657.74	1.39

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 300 deg - No Ice	48.83	-34.49	-19.83	-1828.16	3175.28	1.20
Dead+Wind 330 deg - No Ice	48.83	-20.04	-34.27	-3158.75	1846.25	0.41
Dead+Ice+Temp	78.17	0.00	-0.00	-8.60	-6.00	-0.00
Dead+Wind 0 deg+Ice+Temp	78.17	-0.02	-11.69	-1111.21	-4.33	0.18
Dead+Wind 30 deg+Ice+Temp	78.17	5.87	-10.11	-961.87	-559.46	-0.14
Dead+Wind 60 deg+Ice+Temp	78.17	10.16	-5.82	-556.92	-963.88	-0.52
Dead+Wind 90 deg+Ice+Temp	78.17	11.74	0.02	-6.91	-1112.20	-0.68
Dead+Wind 120 deg+Ice+Temp	78.17	10.18	5.85	542.91	-965.82	-0.67
Dead+Wind 150 deg+Ice+Temp	78.17	5.90	10.13	946.05	-562.64	-0.41
Dead+Wind 180 deg+Ice+Temp	78.17	0.03	11.70	1093.95	-8.88	-0.17
Dead+Wind 210 deg+Ice+Temp	78.17	-5.87	10.10	943.34	547.45	0.16
Dead+Wind 240 deg+Ice+Temp	78.17	-10.17	5.81	539.16	952.44	0.51
Dead+Wind 270 deg+Ice+Temp	78.17	-11.75	-0.03	-11.20	1100.92	0.66
Dead+Wind 300 deg+Ice+Temp	78.17	-10.19	-5.86	-561.28	954.81	0.63
Dead+Wind 330 deg+Ice+Temp	78.17	-5.92	-10.13	-963.77	552.34	0.35
Dead+Wind 0 deg - Service	48.83	-0.02	-15.46	-1426.26	1.49	0.11
Dead+Wind 30 deg - Service	48.83	7.76	-13.36	-1233.26	-715.66	-0.12
Dead+Wind 60 deg - Service	48.83	13.43	-7.69	-709.99	-1237.50	-0.47
Dead+Wind 90 deg - Service	48.83	15.51	0.02	0.22	-1428.68	-0.57
Dead+Wind 120 deg - Service	48.83	13.45	7.73	710.34	-1239.76	-0.54
Dead+Wind 150 deg - Service	48.83	7.80	13.38	1231.25	-719.44	-0.26
Dead+Wind 180 deg - Service	48.83	0.04	15.46	1422.69	-4.26	-0.09
Dead+Wind 210 deg - Service	48.83	-7.76	13.35	1227.80	714.73	0.16
Dead+Wind 240 deg - Service	48.83	-13.44	7.68	705.69	1237.46	0.46
Dead+Wind 270 deg - Service	48.83	-15.52	-0.03	-5.04	1428.91	0.55
Dead+Wind 300 deg - Service	48.83	-13.47	-7.74	-715.57	1240.38	0.47
Dead+Wind 330 deg - Service	48.83	-7.83	-13.39	-1235.52	721.05	0.16

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-48.83	0.00	0.00	48.83	0.00	0.000%
2	-0.06	-48.83	-39.57	0.06	48.83	39.57	0.000%
3	19.86	-48.83	-34.21	-19.86	48.83	34.21	0.000%
4	34.38	-48.83	-19.68	-34.38	48.83	19.68	0.000%
5	39.70	-48.83	0.06	-39.70	48.83	-0.06	0.000%
6	34.44	-48.83	19.80	-34.44	48.83	-19.80	0.000%
7	19.97	-48.83	34.26	-19.97	48.83	-34.26	0.000%
8	0.09	-48.83	39.57	-0.09	48.83	-39.57	0.000%
9	-19.87	-48.83	34.17	19.87	48.83	-34.17	0.000%
10	-34.41	-48.83	19.67	34.41	48.83	-19.67	0.000%
11	-39.73	-48.83	-0.08	39.73	48.83	0.08	0.000%
12	-34.49	-48.83	-19.83	34.49	48.83	19.83	0.000%
13	-20.04	-48.83	-34.27	20.04	48.83	34.27	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
14	0.00	-78.17	0.00	-0.00	78.17	0.00	0.000%
15	-0.02	-78.17	-11.69	0.02	78.17	11.69	0.000%
16	5.87	-78.17	-10.11	-5.87	78.17	10.11	0.000%
17	10.16	-78.17	-5.82	-10.16	78.17	5.82	0.000%
18	11.74	-78.17	0.02	-11.74	78.17	-0.02	0.000%
19	10.18	-78.17	5.85	-10.18	78.17	-5.85	0.000%
20	5.90	-78.17	10.13	-5.90	78.17	-10.13	0.000%
21	0.03	-78.17	11.70	-0.03	78.17	-11.70	0.000%
22	-5.87	-78.17	10.10	5.87	78.17	-10.10	0.000%
23	-10.17	-78.17	5.81	10.17	78.17	-5.81	0.000%
24	-11.75	-78.17	-0.03	11.75	78.17	0.03	0.000%
25	-10.19	-78.17	-5.86	10.19	78.17	5.86	0.000%
26	-5.92	-78.17	-10.13	5.92	78.17	10.13	0.000%
27	-0.02	-48.83	-15.46	0.02	48.83	15.46	0.000%
28	7.76	-48.83	-13.36	-7.76	48.83	13.36	0.000%
29	13.43	-48.83	-7.69	-13.43	48.83	7.69	0.000%
30	15.51	-48.83	0.02	-15.51	48.83	-0.02	0.000%
31	13.45	-48.83	7.73	-13.45	48.83	-7.73	0.000%
32	7.80	-48.83	13.38	-7.80	48.83	-13.38	0.000%
33	0.04	-48.83	15.46	-0.04	48.83	-15.46	0.000%
34	-7.76	-48.83	13.35	7.76	48.83	-13.35	0.000%
35	-13.44	-48.83	7.68	13.44	48.83	-7.68	0.000%
36	-15.52	-48.83	-0.03	15.52	48.83	0.03	0.000%
37	-13.47	-48.83	-7.74	13.47	48.83	7.74	0.000%
38	-7.83	-48.83	-13.39	7.83	48.83	13.39	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	0.00002786
3	Yes	5	0.00000001	0.00002672
4	Yes	5	0.00000001	0.00002753
5	Yes	4	0.00000001	0.00005572
6	Yes	5	0.00000001	0.00002640
7	Yes	5	0.00000001	0.00002718
8	Yes	4	0.00000001	0.00002676
9	Yes	5	0.00000001	0.00002725
10	Yes	5	0.00000001	0.00002611
11	Yes	4	0.00000001	0.00006057
12	Yes	5	0.00000001	0.00002754
13	Yes	5	0.00000001	0.00002734
14	Yes	4	0.00000001	0.0000689
15	Yes	4	0.00000001	0.00062999
16	Yes	4	0.00000001	0.00068697
17	Yes	4	0.00000001	0.00068774
18	Yes	4	0.00000001	0.00062843
19	Yes	4	0.00000001	0.00067912
20	Yes	4	0.00000001	0.00067853
21	Yes	4	0.00000001	0.00061893
22	Yes	4	0.00000001	0.00067173
23	Yes	4	0.00000001	0.00067166
24	Yes	4	0.00000001	0.00062357
25	Yes	4	0.00000001	0.00068547
26	Yes	4	0.00000001	0.00068581
27	Yes	4	0.00000001	0.00001404
28	Yes	4	0.00000001	0.00009173
29	Yes	4	0.00000001	0.00009825
30	Yes	4	0.00000001	0.00001753
31	Yes	4	0.00000001	0.00008962
32	Yes	4	0.00000001	0.00009432
33	Yes	4	0.00000001	0.00001398
34	Yes	4	0.00000001	0.00009534
35	Yes	4	0.00000001	0.00008817

36	Yes	4	0.00000001	0.00001758
37	Yes	4	0.00000001	0.00009739
38	Yes	4	0.00000001	0.00009518

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	19.812	38	1.1734	0.0016
L2	92.5 - 38	8.997	37	0.9169	0.0006
L3	45 - 0	2.113	37	0.4231	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142'	BXA-70063/6CF w/ Mount Pipe	38	19.812	1.1734	0.0016	58407
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	37	16.426	1.1157	0.0013	20859
115'	(2) 7770.00 w/ Mount Pipe	37	13.841	1.0637	0.0011	11681
108'	VHLP2.5-11	37	12.257	1.0250	0.0009	9125
102'	APXVSP18-C-A20 w/ Mount Pipe	37	10.949	0.9872	0.0008	7684
100'	800MHz 2X50W RRH W/FILTER	37	10.525	0.9736	0.0008	7300
94'	742 213	37	9.295	0.9290	0.0007	6372
74'	BCD-87010	37	5.704	0.7406	0.0005	5376
40'	KS24019-L112A	37	1.710	0.3712	0.0002	5041

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	50.642	12	2.9988	0.0043
L2	92.5 - 38	23.010	12	2.3451	0.0017
L3	45 - 0	5.407	12	1.0825	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142'	BXA-70063/6CF w/ Mount Pipe	12	50.642	2.9988	0.0043	22966
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12	41.996	2.8516	0.0034	8201
115'	(2) 7770.00 w/ Mount Pipe	12	35.390	2.7189	0.0028	4591
108'	VHLP2.5-11	12	31.341	2.6206	0.0024	3586
102'	APXVSP18-C-A20 w/ Mount Pipe	12	28.000	2.5247	0.0021	3019
100'	800MHz 2X50W RRH W/FILTER	12	26.916	2.4899	0.0020	2868
94'	742 213	12	23.770	2.3760	0.0018	2503
74'	BCD-87010	12	14.589	1.8944	0.0012	2108
40'	KS24019-L112A	12	4.375	0.9497	0.0006	1971

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	140 - 86.8333 (1)	TP39.223x26.216x0.3125	53'2- 1/32"	0'	0.0	39.000	37.7587	-17.80	1472.59	0.012
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	54'6"	0'	0.0	39.000	63.3646	-30.79	2471.22	0.012
L3	38 - 0 (3)	TP59.05x48.033x0.5	45'	0'	0.0	39.000	94.2655	-48.81	3676.35	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	658.92	22.837	39.000	0.586	0.00	0.000	39.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	2028.6 3	32.457	39.000	0.832	0.00	0.000	39.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	3663.9 5	32.605	39.000	0.836	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} F _{vt}
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	24.85	0.658	26.000	0.051	0.63	0.010	26.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	32.81	0.518	26.000	0.040	0.89	0.007	26.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	39.80	0.422	26.000	0.033	1.20	0.005	26.000	0.000

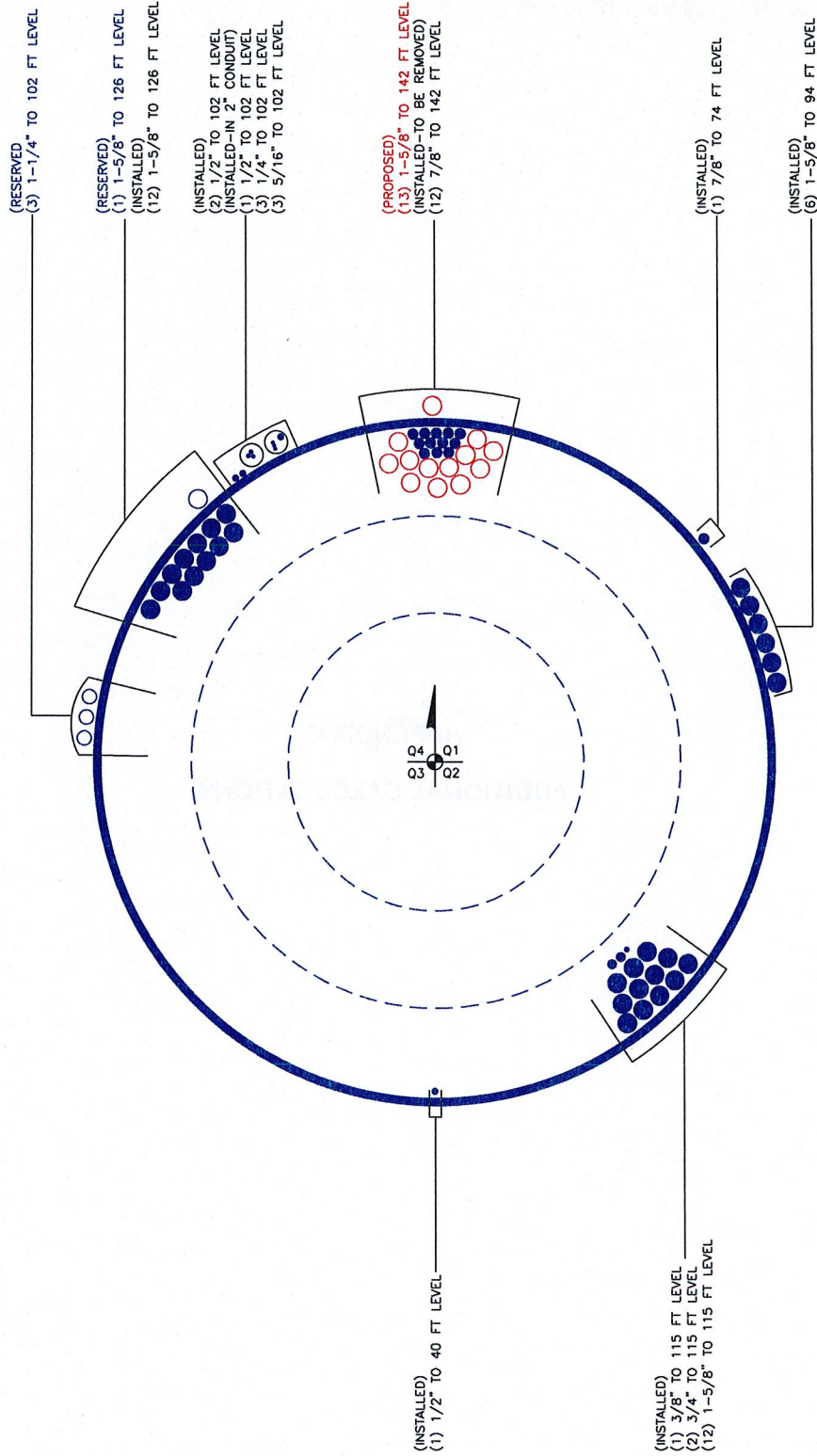
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P _a	Ratio f _{bx} F _{bx}	Ratio f _{by} F _{by}	Ratio f _v F _v	Ratio f _{vt} F _{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 86.8333 (1)	0.012	0.586	0.000	0.051	0.000	0.598	1.333	H1-3+VT ✓
L2	86.8333 - 38 (2)	0.012	0.832	0.000	0.040	0.000	0.845	1.333	H1-3+VT ✓
L3	38 - 0 (3)	0.013	0.836	0.000	0.033	0.000	0.850	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF \cdot P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-17.80	1962.96	44.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-30.79	3294.14	63.4	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-48.81	4900.57	63.7	Pass
Summary								
Pole (L3)							63.7	Pass
RATING =							63.7	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: 806369
Site Name: HRT 094 943225
App #: 172925 - Rev 3
Pole Manufacturer: <i>Other</i>

Reactions

Moment:	3664	ft-kips
Axial:	49	kips
Shear:	40	kips

Anchor Rod Data

Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	65.05	in

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

Anchor Rod Results

Maximum Rod Tension: 132.7 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 68.1% **Pass**

Rigid
Service ASD
Fty*ASIF

Plate Data

Diam:	71.05	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	9.49	in

Base Plate Results

Base Plate Stress: 19.1 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 31.8% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length: 27.29

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 Results

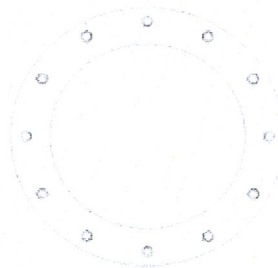
Pole Punching Shear Check: n/a

Pole Data

Diam:	59.05	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
-------	-------



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

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

Monopole Drilled Pier

Checks capacity of a single drilled shaft foundation for a monopole

BU#: 806369

Site Name: HRT 094 943225

App Number: 172925 - Rev 3



ACI 318 Version: 2002

Design Reactions		
Shear, S:	40.00	kips
Moment, Mt:	3664.00	ft-kips
Tower Weight, Wt:	49.00	kips
Tower Height, H:	140	ft
Base Diameter, BD:	59.1	in

Foundation Dimensions		
Caisson Diameter, CD:	7.5	ft
Ext. Above Grade, E:	0.0	ft
Depth Below Grade, L:	47.0	ft
Neglected Depth, N:	5.0	ft
Rebar Size, Sp:	10	
Rebar Quantity, mp:	52	
Tie Size, tp:	3	

Material Properties		
Rebar Tensile, Fy:	60	ksi
Concrete Strength, F'c:	3000	psi
Concrete Density, δx:	101	pcf
Clear Cover, cc:	3	in

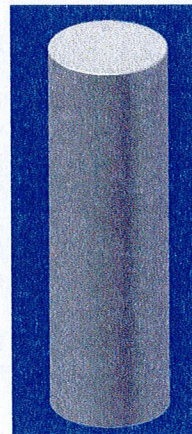
Soil Properties		
Soil Unit Weight, γ:	52	pcf
Allowable Bearing, Bc:	4.500	ksf
Seismic Design Cat, z:	B	

Caisson Analysis		
Depth to Zero Shear:	8.1	ft
Max Factored Moment:	5189.85	ft-kips
Overturning FOS:	6.53	

Depth	Shear	Moment
0 ft	40.1 kips	3666.1 ft-kips
4.7 ft	40.1 kips	3854.4 ft-kips
9.4 ft	-14.7 kips	3922.3 ft-kips

Design Checks			
	Capacity/Availability	Demand/Limits	Check
Minimum Req'd Dia. 1 (ft):	7.50	3.72	OK
Minimum Req'd Dia. 2 (ft):	7.50	6.42	OK
Bearing (ksf):	4.50	1.11	OK
Rebar Area (in ²):	66.04	21.21	OK
Pier moment capacity (k-ft):	10677.34	5189.85	OK
Rebar spacing (in):	3.80	2 < Bs < 18	OK
Development Length (in):	463.33	12.00	OK
Soil moment capacity (FOS):	6.53	2.00	OK

Assume 0.33% Minimum Steel?



Bearing: 24.6%

Steel: 48.6%

Soil: 30.6%

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#: 806369
Site Name: HRT 094 943225
App #: 172925 - Rev 3

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 in ²
Reinforcement:	
Clear Cover to Tie =	3.00 in
Horiz. Tie Bar Size =	3
Vert. Cage Diameter =	6.83 ft
Vert. Cage Diameter =	81.98 in
Vertical Bar Size =	10
Bar Diameter =	1.27 in
Bar Area =	1.27 in ²
Number of Bars =	52
As Total =	66.04 in ²
A s/ Aconc, Rho:	0.0104 1.04%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
 Min As for Flexural, Tension Controlled, Shafts:
 $(3) \cdot (\sqrt{f'c}) / F_y = 0.0027$
 $200 / F_y = 0.0033$

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.04%	OK

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	3992.189	ft-kips (* Note)
Max. Service Shaft P:	49	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:	5189.846 ft-kips
1.30	Pu:	63.7 kips

Material Properties

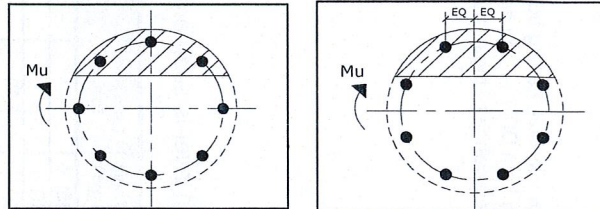
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code =	2002	
Seismic Properties		
Seismic Design Category =	B	
Seismic Risk =	Low	

Solve
(Run)

<-- Press Upon Completing All Input

Results:

Governing Orientation Case: 1



Case 1

Case 2

Dist. From Edge to Neutral Axis: 18.75 in

Extreme Steel Strain, ϵ_t : 0.0108

$\epsilon_t > 0.0050$, Tension Controlled

Reduction Factor, ϕ : 0.90

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = ($\phi=0.65$) Pn,		
Pn per ACI 318 (10-2)	10408.53	kips
at Mu=($\phi=0.65$)Mn=	6794.66	ft-kips
Max Tu, ($\phi=0.9$) Tn =	3566.16	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, ϕ Pn = Pu: 63.70 kips
 Drilled Shaft Moment Capacity, ϕ Mn: 10677.34 ft-kips
 Drilled Shaft Superimposed Mu: 5189.85 ft-kips

(Mu/ϕMn, Drilled Shaft Flexure CSR):	48.6%
---	--------------

Equivalent Silty Soil Parameter Tool



Note:

This tool determines the equivalent soil parameters for silty soil (having both cohesion and angle of friction), according to the CCI Foundations ongoing discussions (2010), Criteria Item DS-7. The equivalent parameters results are to be input in the PLS-Caisson Software to account for the combined resistance of the granular and cohesive parameters simultaneously present in silty and similar soils

Site Data

BU#: 806369
 Site Name: HRT 094 943225
 App #: 172925 - Rev 3

Neglect Top Layer: Y N
 # of Layers: 8

Input the data in the "shaded" columns. If soil layer is submerged, then enter the saturated density (buoyant unit weight)

Layer:	Layer Thickness (ft)	From (ft)	To (ft)	Unit Weight of Soil (pcf)	Cohesion (psf)	Internal Friction Angle (deg)	K _p	Depth to Mid-Layer (ft)	Overburden (psf)	Sand Resistance (ksf)	Clay Resistance (ksf)	P _p total (ksf)	Equivalent Parameters for PLS Caisson Input	
													Equivalent Cohesion (psf)	Equivalent K _p
1	2	0	2	105			0.000	1	105	0.000	0.00	0.000	0	0.00
2	3	2	5	100			0.000	3.5	360	0.000	0.00	0.000	0	0.00
3	5	5	10	100	500	30	3.000	7.5	760	6.840	4.00	10.840	1355	4.75
4	5	10	15	36	100	27	2.663	12.5	1100	8.788	0.80	9.588	1198	2.91
5	5	15	20	36	100	27	2.663	17.5	1280	10.226	0.80	11.026	1378	2.87
6	5	20	25	36	100	27	2.663	22.5	1460	11.664	0.80	12.464	1558	2.85
7	5	25	30	36	100	27	2.663	27.5	1640	13.102	0.80	13.902	1738	2.83
8	5	30	35	36	100	27	2.663	32.5	1820	14.540	0.80	15.340	1917	2.81

Calculation Notes:

- 1- Sand Resistance = 3 * K_p * Overburden -----> (Per equations used in PLS-Caisson Software)
- 2- Cohesion Resistance = 8 * C -----> (Per equations used in PLS-Caisson Software, Full 8CD approach)
- 3- Total Resistance = Sand Resistance + Cohesion Resistance
- 4- Equivalent K_p = Total / Overburden / 3
- 5- Equivalent C = Total / 8

 * CAISSON - Pier Foundations Analysis and Design - Copyright Power Line Systems, Inc. 1993-2010 *

Project Title: BU# 806369
 Project Notes:
 Calculation Method: Full 8CD

***** I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
7.50	0.00	3.00	60.00

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	2.00	0.00	105.0			
2	Clay	3.00	2.00	100.0			
3	Clay	5.00	5.00	100.0	1355.0		
4	Clay	5.00	10.00	36.0	1198.0		
5	Clay	5.00	15.00	36.0	1378.0		
6	Clay	5.00	20.00	36.0	1558.0		
7	Clay	5.00	25.00	36.0	1738.0		
8	Clay	5.00	30.00	36.0	1917.0		
9	Clay	10.00	35.00	41.0	200.0	3.255	32.00
10	Sand	2.00	45.00	41.0			

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against soil Failure
3664.0	49.0	40.00	6.53

***** R E S U L T S

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
47.000	311.459	1109.1

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.00	2.00	105.0			0.00	1.00
Clay	2.00	3.00	100.0			0.00	3.50
Clay	5.00	5.00	100.0	1355.0		406.50	7.50
Clay	10.00	5.00	36.0	1198.0		359.40	12.50
Clay	15.00	5.00	36.0	1378.0		413.40	17.50
Clay	20.00	5.00	36.0	1558.0		467.40	22.50
Clay	25.00	0.85	36.0	1738.0		88.64	25.43
Clay	25.85	4.15	36.0	1738.0		-432.76	27.93
Clay	30.00	5.00	36.0	1917.0		-575.10	32.50
Clay	35.00	10.00	41.0	200.0	3.255	-120.00	40.00
Sand	45.00	2.00	41.0			-345.83	46.01

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with safety Factor) (kips)	Moment (with safety Factor) (ft-k)	Shear (without safety Factor) (kips)	Moment (without safety Factor) (ft-k)
0.00	261.6	23939.8	40.1	3666.1
4.70	261.6	25169.6	40.1	3854.4
9.40	-96.1	25612.3	-14.7	3922.3
14.10	-439.6	24342.0	-67.3	3727.7
18.80	-818.4	21404.2	-125.3	3277.8
23.50	-1244.8	16578.2	-190.6	2538.8
28.20	-1228.6	10215.6	-188.2	1564.4
32.90	-707.4	5638.0	-108.3	863.4
37.60	-434.6	3235.5	-66.6	495.5
42.30	-378.2	1325.3	-57.9	203.0
47.00	-321.8	-319.8	-49.3	-49.0