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Also admitted in Massachusetts

July 26, 2013

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

Re: **Notice of Exempt Modification – Facility Modification**
Farmdale Drive, Waterbury, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at the 129-foot level of the existing 150-foot tower at the above-referenced address. The tower and underlying property are owned by the American Tower Corporation. The Council approved Cellco's shared use of this tower in 1994. Cellco now intends to replace three (3) of its existing antennas with two (2) model BXA-70063-6CF LTE antennas and one (1) model BXA-70080-6CF LTE antenna, at the same 129-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its antennas and attach one (1) HYBRIFLEX™ antenna cable to the outside the monopole tower. Attached behind Tab 1 are the specifications for Cellco's 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 Neil M. O'Leary, Mayor for the City of Waterbury.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's proposed antennas and RRHs will be located at the 129-foot level of the 150-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 modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General 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:
Neil M. O'Leary, Mayor
Sandy M. Carter

TAB 1

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

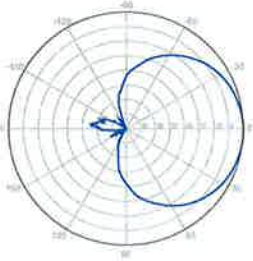
Replace 'X' with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

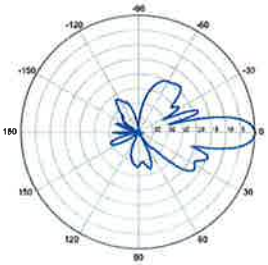
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0



0° | Vertical | 750 MHz

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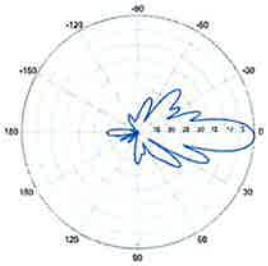
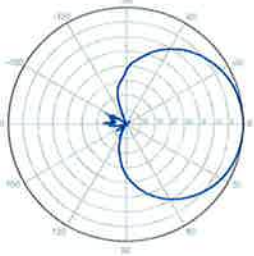
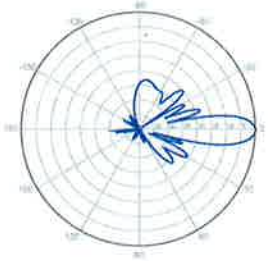


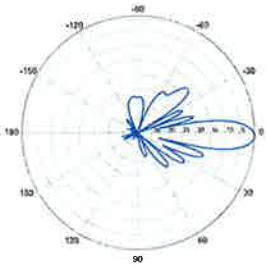
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

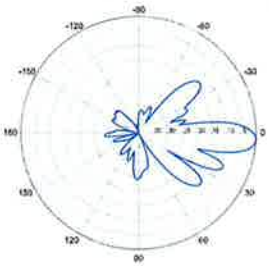


2° | Vertical | 850 MHz

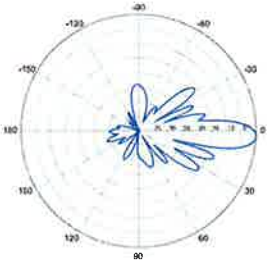
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

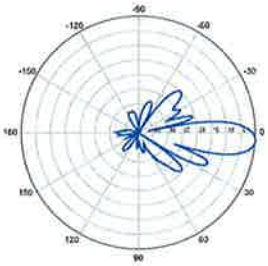


3° | Vertical | 750 MHz

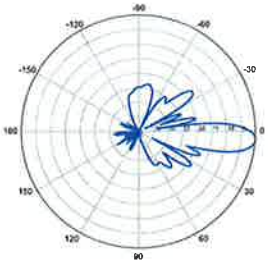


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

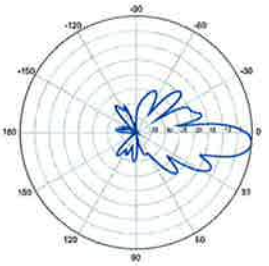


4° | Vertical | 750 MHz

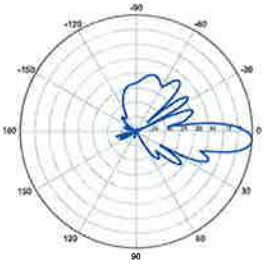


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

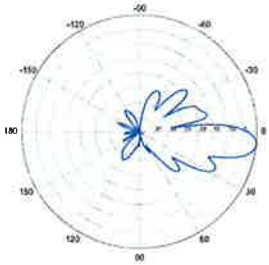


5° | Vertical | 750 MHz

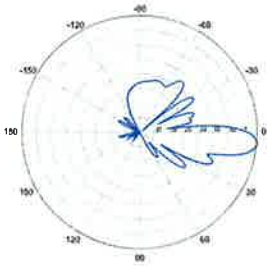


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

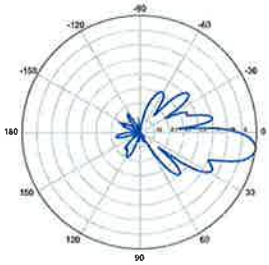


6° | Vertical | 750 MHz

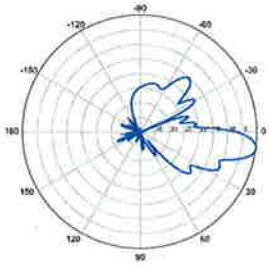


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

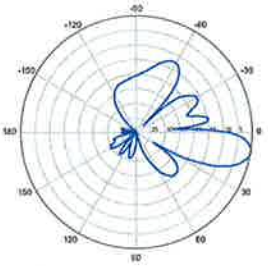


8° | Vertical | 750 MHz

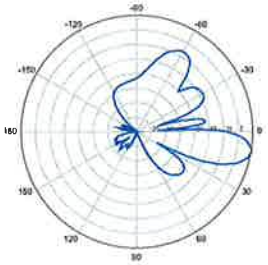


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70080-6CF-EDIN-X

X-Pol | FET Panel | 80° | 13.5 dBd

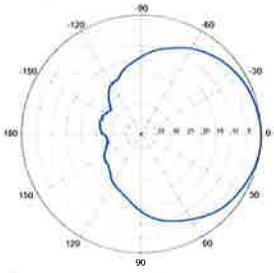
Replace "X" with desired electrical downtilt

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	82°	80°
Vertical beamwidth	12°	10°
Gain	13.0 dBd (15.1 dBi)	13.5 dBd (15.6 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.6 dB
Front-to-back ratio (+/-30°)	-26.9 dB	-25.6 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 204 x 151 mm	71.0 x 8.0 x 5.9 in
Depth with z-brackets	191 mm	7.5 in
Weight without mounting brackets	8.2 kg	18 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.37 m^2 Side: 0.27 m^2	Front: 3.9 ft^2 Side: 2.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 531 N Side: 475 N	Front: 119 lbf Side: 104 lbf

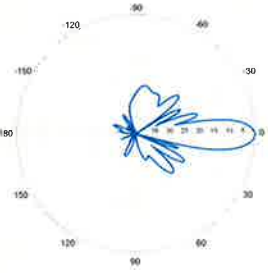
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-6CF-EDIN-X-FP		

BXA-70080-6CF-EDIN-X



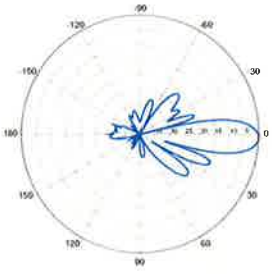
Horizontal | 750 MHz

BXA-70080-6CF-EDIN-0



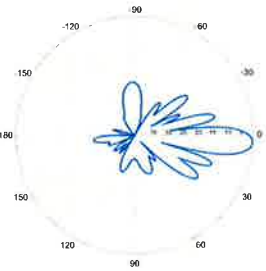
0° | Vertical | 750 MHz

BXA-70080-6CF-EDIN-2

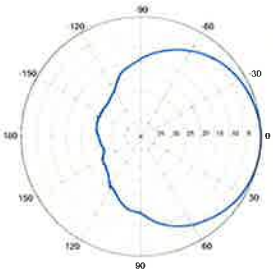


2° | Vertical | 750 MHz

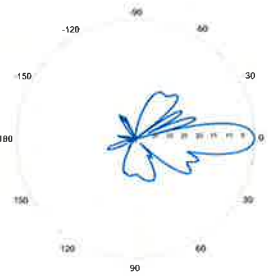
BXA-70080-6CF-EDIN-4



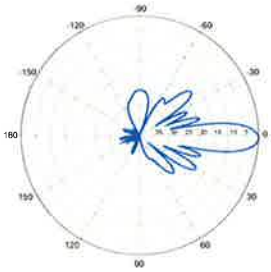
4° | Vertical | 750 MHz



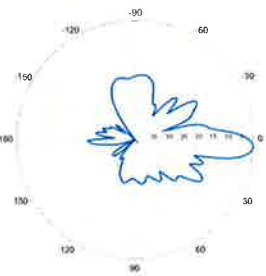
Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

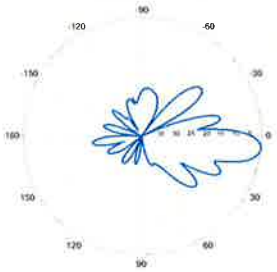


4° | Vertical | 850 MHz

BXA-70080-6CF-EDIN-X

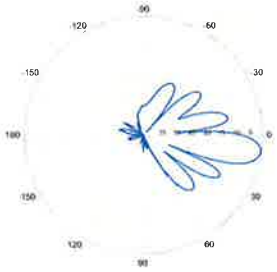
X-Pol | FET Panel | 80° | 13.5 dBd

BXA-70080-6CF-EDIN-6



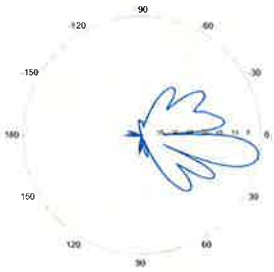
6° | Vertical | 750 MHz

BXA-70080-6CF-EDIN-8

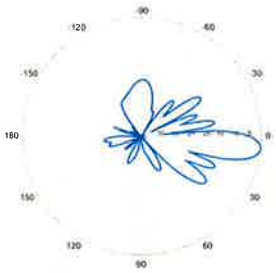


8° | Vertical | 750 MHz

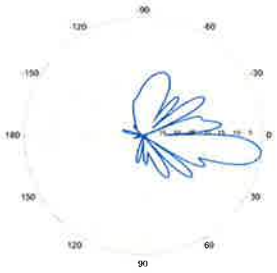
BXA-70080-6CF-EDIN-10



10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

10° | Vertical | 850 MHz

Alcatel-Lucent RRH2x40-07-U

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-07-U is a high-power, small form-factor Remote Radio Head (RRH) operating in the North American Digital Dividend / 700MHz frequency band (3GPP Band 13). The Alcatel-Lucent RRH2x40-07-U 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 RRH2x40-07-U 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 RRH2x40-07-U has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to two-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 10 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-07-U 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 RRH2x40-07-U 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 RRH2x40-07-U 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 RRH2x40-07-U is compact and weights less than 23 kg (50 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

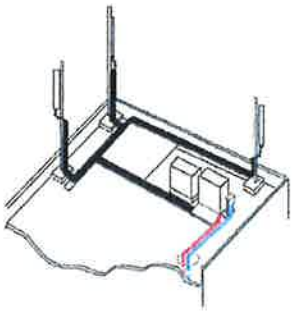
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and 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 RRH2x40-07-U provides more RF power while at the same time consuming less electricity.

Features

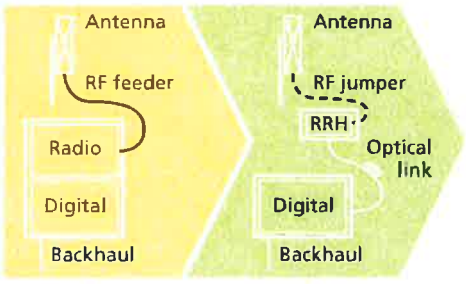
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly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

Benefits

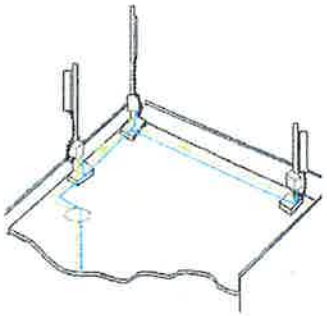
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 390 mm (15.4 in.)
- Width: 380 mm (15 in.)
- Depth: 210 mm (8.2 in.)
- Weight (without mounting kit): less than 23 kg (50 lb)

Power

- Power supply: -48V

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: 700 MHz; 3GPP Band 13
- Bandwidth: up to 10 MHz
- RF output power at antenna port:
  - ¬ 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way
- Noise figure: below 2.5 dB typical
- ALD features
  - ¬ TMA
  - ¬ Remote electrical tilt (RET) support (AISG v2.0)

Optical characteristics

Type/number of fibers

- Up to 3.12 Gb/s line bit rate
- Single-mode variant
  - ¬ One SM fiber (9/125 µm) per RRH2x, carrying UL and DL using CWDM (at 1550/1310 nm)
- Multi-mode variant
  - ¬ Two MM fibers (50/125 µm) per RRH2x: one carrying UL, the other carrying DL (at 850 nm)

Optical fiber length

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

Alarms and ports

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

Alcatel·Lucent

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

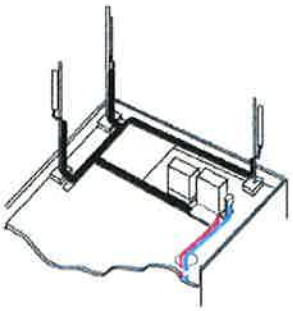
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation 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.

Features

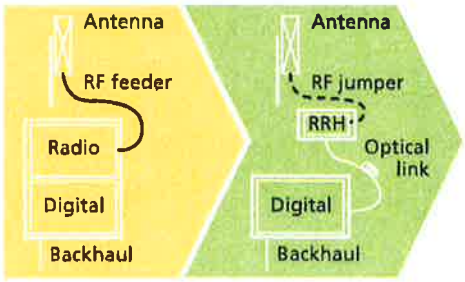
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

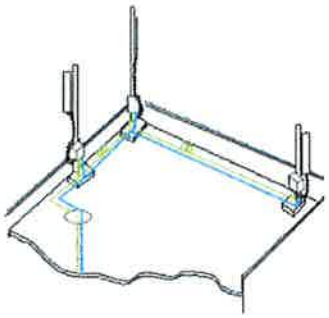
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (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

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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.

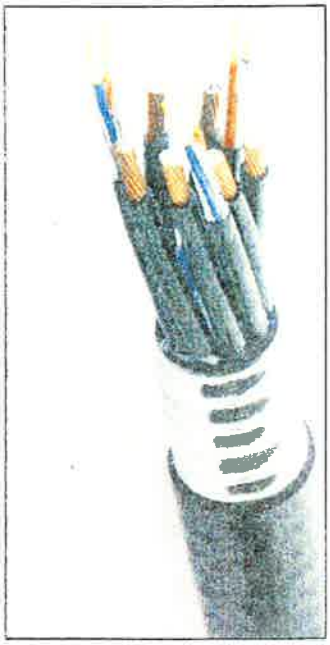


Figure 1: HYBRIFLEX Series

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

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-93-658 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 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

* This data is provisional and subject to change

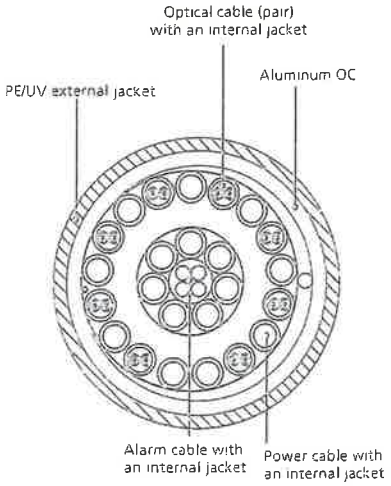


Figure 2: Construction Detail

TAB 2

	General	Power	Density					
Site Name: Waterbury								
Tower Height: Verizon @ 129ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	152	0.0176	880	0.5867	3.00%	
*AT&T UMTS	2	875	152	0.0272	1900	1.0000	2.72%	
*AT&T GSM	1	647	152	0.0101	880	0.5867	1.72%	
*AT&T GSM	4	934	152	0.0581	1900	1.0000	5.81%	
*AT&T LTE	1	1615	152	0.0251	734	0.4893	5.14%	
*Arch Paging	1	1990	161	0.0276	931.19	0.6208	4.45%	
Verizon PCS	**7**	**298**	**129**	**0.0451**	**1970**	**1.0000**	**4.51%**	
Verizon Cellular	**9**	**282**	**129**	**0.0548**	**869**	**0.5793**	**9.47%**	
Verizon AWS	**1**	**1750**	**129**	**0.0378**	**2145**	**1.0000**	**3.78%**	
Verizon 700	**1**	**826**	**129**	**0.0178**	**698**	**0.4653**	**3.84%**	
								44.43%
* Source: Siting Council								

TAB 3

AMERICAN TOWER®
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Structural Analysis Report

Structure	:	**150 ft Monopole**
ATC Site Name	:	**Wtbr - Waterbury, CT**
ATC Site Number	:	**302476**
Engineering Number	:	**53056625**
Proposed Carrier	:	**Verizon**
Carrier Site Name	:	**Waterbury**
Carrier Site Number	:	**117803**
Site Location	:	**106 Lamont Street** **Waterbury, CT 06704-2833** **41.570667, -73.017600**
County	:	**New Haven**
Date	:	**June 27, 2013**
Max Usage	:	**100%**
Result	:	**Pass**

Michael B. Davenport
Project Engineer

Michael Davenport

STATE OF CONNECTICUT
RAPHAEL I. MOHAMED
No. 25112
LICENSED
PROFESSIONAL ENGINEER

7/9/13

AMERICAN TOWER®
CORPORATION

Eng. Number 53056625
June 27, 2013

Table of Contents

AMERICAN TOWER®
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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 150 ft monopole to reflect the change in loading by Verizon.

Supporting Documents

Tower Drawings	ITT Meyer Type "B" Specifications (AT&T Spec. AT-8935, dated April 13, 1984) Smith Cullum Mapping: Acquisition #CT-0012, dated June 7, 2001
Foundation Drawing	Girard & Co. Engineers Job #38926, dated July 10, 1984
Modifications	SpectraSite Communications Drawing #CT-0012-M1, dated January 12, 2005

Analysis

The tower was analyzed using tnxTower version 6.0 tower analysis software and RISA 3-D. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	85 mph (Fastest Mile) Note- Basic wind speed reduced to 73 mph to account for reduced Gh. See conclusion section of report for additional information.
Basic Wind Speed w/ Ice:	74 mph (Fastest Mile) w/ 1/2" radial ice concurrent
Code:	ANSI/TIA-222-F, 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

Basic wind speed was reduced to 73 mph to account for reduced Gh. Per ANSI/TIA-222-F, applicable Gh (gust factor) for monopole is 1.69 and applicable Gh (gust factor) for a guyed tower is 1-1.25. As this is a guyed monopole, RISA 3-D was used to calculate the actual fundamental frequency (F) of the guyed pole in order to calculate an accurate Gh. From analysis, F=.957 Hz. Using an assumed typical damping ratio of .05, an applicable Gh, based on a 3-Second gust wind speed, of .947 was calculated. The applicable Gh is therefore .947*1.3 or 1.23, with 1.3 multiplied by the calculated Gh to account for the fastest mile wind speed. Thus, the wind speed was reduced as follows: 85 mph x $(1.23 / 1.69)^{\wedge 1/2}$ = 73 mph. Note, wind speed had to be reduced as a Gh of 1.69 is hardcoded into the tnxTower software.

If you have any questions or require additional information, please contact me via email at michael.davenport@americantower.com or call 919-466-5147.

Existing and Reserved Equipment

Mount Elev.[1] (ft)	Qty.	Antenna	Mount Type	Lines	Carrier
154.0	3	Powerwave 7770.00	Platform w/ Handrails	(12) 1 1/4" Coax (2) 0.78" 8 AWG 6 (1) 0.39" Cable	AT&T Mobility
	9	ADC DD1900			
	2	KMW AM-X-CD-16-65-00T-RET			
	2	Powerwave P65-17-XLH-RR			
	2	Andrew SBNH-1D6565C			
	6	Ericsson RRUS 11 (Band 12)			
	3	CCI DTMABP7819VG12A			
	1	Raycap DC6-48-60-18-8F			
145.0	6	Powerwave 7250.03 /XM-1900-65-18.5I-2-D	Platform w/ Handrails	(12) 1 5/8" Coax	

Proposed Equipment

Elevation[1] (ft)		Qty.	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
129.0	129.0	3	Andrew DB948F85E-M	Platform w/ Handrails	(15) 1 5/8" Coax (1) 1 5/8" Hybriflex	Verizon Wireless
		2	Antel BXA-70063-6CF-EDIN-X			
		1	Antel BXA-70080-6CF-EDIN-X			
		3	Antel BXA-80063-4CF-EDIN-X			
		3	Antel BXA-171063/8CF			
		3	Alcatel-Lucent RRH2x40-AWS			
		1	RFS DB-T1-6Z-8AB-0Z			
		6	RFS FD9R6004/2C-3L			
		3	Antel BXA-171063-8BF-EDIN-X			

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Install proposed coax outside the pole shaft. Stacking coax is not allowed.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	15%	Pass
Shaft	100%	Pass
Base Plate	9%	Pass
Flanges	53%	Pass

Foundations

Reaction Component	Analysis Reactions
Moment (Kips-Ft)	155.8
Shear (Kips)	3.9
Axial (Kips)	69.4
Guy Tension (Kips)	28.9

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection and Sway*

Antenna Elevation (ft)	Deflection (ft)	Sway (Rotation) (°)
129.0	0.426	0.935

***Deflection and Sway was evaluated considering a design wind speed of 50 mph (3-Second Gust) per ANSI/TIA-222-F**

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CORPORATION

Standard Conditions

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

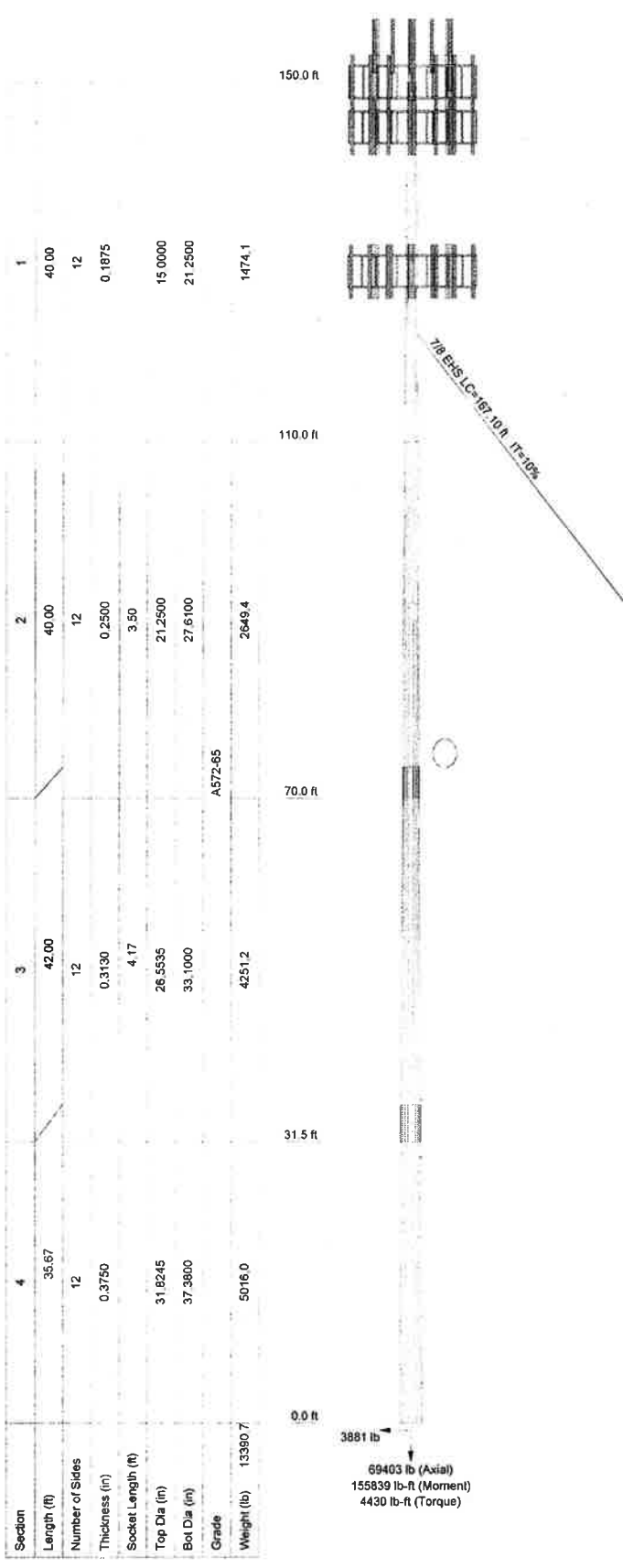
-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to ATC Tower Services and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

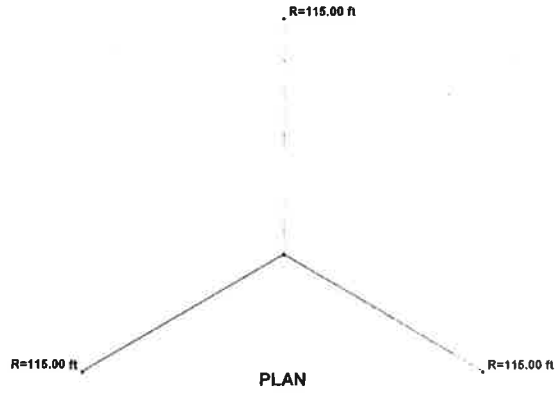
Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. ATC Tower Services is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.



Section	1	2	3	4
Length (ft)	40.00	40.00	42.00	35.67
Number of Sides	12	12	12	12
Thickness (in)	0.1875	0.2500	0.3130	0.3750
Socket Length (ft)		3.50	4.17	
Top Dia (in)	15.0000	21.2500	26.5535	31.8245
Bot Dia (in)	21.2500	27.6100	33.1000	37.3800
Grade		A572-65		
Weight (lb)	1474.1	2649.4	4251.2	5016.0

Total Weight: 13390.7



DESIGNED APPURTENANCE LOADING

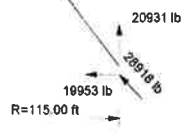
TYPE	ELEVATION	TYPE	ELEVATION
7770.00 (ATI Mobility)	150	Round T-Arms (ATT Mobility)	145
7770.00 (ATI Mobility)	150	Round T-Arms (ATT Mobility)	145
7770.00 (ATI Mobility)	150	Round T-Arms (ATT Mobility)	145
SBNH-1D6565C (ATI Mobility)	150	BXA-70063-6CF-EDIN-X (Verizon)	129
SBNH-1D6565C (ATI Mobility)	150	BXA-70063-6CF-EDIN-X (Verizon)	129
P65-17-XLH-RR (ATI Mobility)	150	BXA-70080-6CF-EDIN-X (Verizon)	129
AM-X-CD-16-65-00T-RET (ATI Mobility)	150	Flat Platform w/ Handrails (Verizon)	129
		DB948F85E-M (Verizon)	129
AM-X-CD-16-65-00T-RET (ATI Mobility)	150	DB948F85E-M (Verizon)	129
		DB948F85E-M (Verizon)	129
P65-17-XLH-RR (ATI Mobility)	150	BXA-171063-8BF-EDIN-X (Verizon)	129
DC6-48-60-18-8F (ATI Mobility)	150	BXA-171063-8BF-EDIN-X (Verizon)	129
(2) RRUS 11 (ATI Mobility)	150	BXA-171063-8BF-EDIN-X (Verizon)	129
(2) RRUS 11 (ATT Mobility)	150	BXA-80063/4CF (Verizon)	129
(2) RRUS 11 (ATT Mobility)	150	BXA-80063/4CF (Verizon)	129
DTMABP7819VG12A (ATI Mobility)	150	BXA-80063/4CF (Verizon)	129
DTMABP7819VG12A (ATI Mobility)	150	(2) FD9R6004/2C-3L (Verizon)	129
DTMABP7819VG12A (ATI Mobility)	150	(2) FD9R6004/2C-3L (Verizon)	129
(3) DD1900 (ATI Mobility)	150	(2) FD9R6004/2C-3L (Verizon)	129
(3) DD1900 (ATI Mobility)	150	DB-T1-6Z-8AB-0Z (Verizon)	129
(3) DD1900 (ATI Mobility)	150	BXA-171063/8CF (Verizon)	129
Flat Platform w/ Handrails (ATI Mobility)	150	BXA-171063/8CF (Verizon)	129
		BXA-171063/8CF (Verizon)	129
(2) 7250.3 (ATI Mobility)	145	RRH2x40-AWS (Verizon)	129
(2) 7250.3 (ATI Mobility)	145	RRH2x40-AWS (Verizon)	129
(2) 7250.3 (ATI Mobility)	145	RRH2x40-AWS (Verizon)	129

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 73 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 63 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 100%



ATC Tower Services
400 Regency Forest Drive
Cary, NC 27518
Phone: (919) 466-5147
FAX:

Job: *53056625*			
Project: *302476 - Wtbr-Waterbury, CT*			
Client: Verizon	Drawn by: michael.davenport	App'd:	
Code: TIA/EIA-222-F	Date: 06/28/13	Scale: NTS	
Path: C:\Users\michael.davenport\Desktop\302476-53056625(Rev-F).eri		Dwg No. E-1	

tnxTower	Job	Page
	53056625	1 of 21
ATC Tower Services 400 Regency Forest Drive Cary, NC 27518 Phone: (919) 466-5147 FAX:	Project 302476 - Wtbr-Waterbury, CT	Date 16:43:56 06/28/13
	Client Verizon	Designed by michael.davenport

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 73 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 63 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Safety factor used in guy design is 2.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-110.00	40.00	0.00	12	15.0000	21.2500	0.1875	4.0000	A572-65 (65 ksi)
L2	110.00-70.00	40.00	3.50	12	21.2500	27.6100	0.2500	4.0000	A572-65 (65 ksi)
L3	70.00-31.50	42.00	4.17	12	26.5535	33.1000	0.3130	4.0000	A572-65 (65 ksi)
L4	31.50-0.00	35.67		12	31.8245	37.3800	0.3750	4.0000	A572-65 (65 ksi)

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ATC Tower Services 400 Regency Forest Drive Cary, NC 27518 Phone: (919) 466-5147 FAX:	Project 302476 - Wtbr-Waterbury, CT	Date 16:43:56 06/28/13
	Client Verizon	Designed by michael.davenport

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.5291	8.9430	250.4541	5.3029	7.7700	32.2335	507.4880	4.4015	3.5175	18.76
	21.9996	12.7165	720.0669	7.5404	11.0075	65.4160	1459.0508	6.2587	5.1925	27.693
L2	21.9996	16.9050	951.5678	7.5180	11.0075	86.4472	1928.1342	8.3201	5.0250	20.1
	28.5840	22.0248	2104.4088	9.7949	14.3020	147.1411	4264.1028	10.8399	6.7295	26.918
L3	28.0550	26.4468	2324.3551	9.3941	13.7547	168.9861	4709.7736	13.0163	6.2775	20.056
	34.2676	33.0447	4534.1011	11.7377	17.1458	264.4438	9187.3181	16.2636	8.0320	25.661
L4	33.6191	37.9753	4794.1771	11.2589	16.4851	290.8190	9714.3026	18.6903	7.5240	20.064
	38.6986	44.6835	7810.0590	13.2478	19.3628	403.3530	15825.2970	21.9919	9.0128	24.034

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 150.00-110.00				1	1	1		
L2 110.00-70.00				1	1	1		
L3 70.00-31.50				1	1	1		
L4 31.50-0.00				1	1	1		

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_m ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
122	EHS	A	7/8	7970.00	10%	19000	1.581	166.95	115.00	0.0000	0.00	100%
		B	7/8	7970.00	10%	19000	1.581	166.95	115.00	0.0000	0.00	100%
		C	7/8	7970.00	10%	19000	1.581	166.95	115.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
122	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
122.00	A572-50 (50 ksi)	Solid Round			No	A572-50 (50 ksi)	Solid Round	1 1/4

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
122	263.95	263.95	263.95		2.73 2.9 sec/pulse	2.73 2.9 sec/pulse	2.73 2.9 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
122	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
122	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
122	A	61.00	16	12	0.5000
	B	61.00	16	12	0.5000
	C	61.00	16	12	0.5000

Guy-Tensioning Information

Temperature At Time Of Tensioning

Guy Elevation ft		H ft	V ft	0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
122	A	114.19	122.00	9507	2.30	8992	2.43	8479	2.57	7970	2.73	7465	2.92	6966	3.12	6473	3.36
	B	114.19	122.00	9507	2.30	8992	2.43	8479	2.57	7970	2.73	7465	2.92	6966	3.12	6473	3.36
	C	114.19	122.00	9507	2.30	8992	2.43	8479	2.57	7970	2.73	7465	2.92	6966	3.12	6473	3.36

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon)	A	Surface Ar (CaAa)	129.00 - 5.00	2	2	0.000 0.500	1.9800		1.04
1 5/8" Hybriflex (Verizon)	C	Surface Ar (CaAa)	0.00 - 0.00	1	1	0.000 0.250	1.9800		1.30

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 1/4 (AT&T Mobility)	A	No	Inside Pole	150.00 - 5.00	12	No Ice 1/2" Ice	0.00 0.00	0.66 0.66
10 mm Cable (AT&T Mobility)	A	No	Inside Pole	150.00 - 5.00	1	No Ice 1/2" Ice	0.00 0.00	0.07 0.07
19.7 mm Cable (AT&T Mobility) **	A	No	Inside Pole	150.00 - 5.00	2	No Ice 1/2" Ice	0.00 0.00	0.59 0.59
1 5/8 (AT&T Mobility) **	A	No	Inside Pole	145.00 - 5.00	12	No Ice 1/2" Ice	0.00 0.00	1.04 1.04
1 5/8 (Verizon)	A	No	Inside Pole	129.00 - 5.00	13	No Ice 1/2" Ice	0.00 0.00	1.04 1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	150.00-110.00	A	0.000	0.000	7.524	0.000	1100.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	110.00-70.00	A	0.000	0.000	15.840	0.000	1490.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	70.00-31.50	A	0.000	0.000	15.246	0.000	1434.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L4	31.50-0.00	A	0.000	0.000	10.494	0.000	987.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	150.00-110.00	A	0.500	0.000	0.000	21.369	0.000	1149.63
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	110.00-70.00	A	0.500	0.000	0.000	44.987	0.000	1594.49
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	70.00-31.50	A	0.500	0.000	0.000	43.300	0.000	1534.69
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L4	31.50-0.00	A	0.500	0.000	0.000	29.804	0.000	1056.35
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
7770.00 (AT&T Mobility)	A	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	5.88 4.73	1.70 1.99	35.00 67.63
7770.00 (AT&T Mobility)	B	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	5.88 4.73	1.70 1.99	35.00 67.63
7770.00 (AT&T Mobility)	C	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	5.88 4.73	1.70 1.99	35.00 67.63
SBNH-1D6565C (AT&T Mobility)	A	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	60.80 126.67
SBNH-1D6565C (AT&T Mobility)	B	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	60.80 126.67
P65-17-XLH-RR (AT&T Mobility)	C	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	11.47 12.08	6.80 7.38	59.00 121.06
AM-X-CD-16-65-00T-RET (AT&T Mobility)	A	From Leg	2.50 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice	6.62 7.05	2.37 2.72	33.00 74.55
AM-X-CD-16-65-00T-RET (AT&T Mobility)	B	From Leg	2.50 0.00 2.00	0.0000	150.00	No Ice 1/2" Ice	6.62 7.05	2.37 2.72	33.00 74.55
P65-17-XLH-RR (AT&T Mobility)	C	From Leg	2.50 0.00 4.00	0.0000	150.00	No Ice 1/2" Ice	11.47 12.08	6.80 7.38	59.00 121.06
DC6-48-60-18-8F (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	2.57 2.80	2.57 2.80	31.80 54.36

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) RRUS 11 (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
(2) RRUS 11 (AT&T Mobility)	B	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
(2) RRUS 11 (AT&T Mobility)	C	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	55.00 74.32
DTMABP7819VG12A (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.00 0.00	0.39 0.49	19.20 26.49
DTMABP7819VG12A (AT&T Mobility)	B	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.00 0.00	0.39 0.49	19.20 26.49
DTMABP7819VG12A (AT&T Mobility)	C	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	0.00 0.00	0.39 0.49	19.20 26.49
(3) DD1900 (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.27 1.43	0.30 0.40	12.10 19.21
(3) DD1900 (AT&T Mobility)	B	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.27 1.43	0.30 0.40	12.10 19.21
(3) DD1900 (AT&T Mobility)	C	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	1.27 1.43	0.30 0.40	12.10 19.21
Flat Platform w/ Handrails (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	36.00 48.40	42.40 57.40	2000.00 2450.00
**									
(2) 7250.3 (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.00 4.39	1.87 2.33	15.40 35.03
(2) 7250.3 (AT&T Mobility)	B	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.00 4.39	1.87 2.33	15.40 35.03
(2) 7250.3 (AT&T Mobility)	C	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	4.00 4.39	1.87 2.33	15.40 35.03
Round T-Arms (AT&T Mobility)	A	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	6.50 8.00	6.50 8.00	2000.00 2450.00
Round T-Arms (AT&T Mobility)	B	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	6.50 8.00	6.50 8.00	2000.00 2450.00
Round T-Arms (AT&T Mobility)	C	From Leg	2.50 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	6.50 8.00	6.50 8.00	2000.00 2450.00
**									
BXA-70063-6CF-EDIN-X (Verizon)	A	From Leg	2.50 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	17.00 59.49
BXA-70063-6CF-EDIN-X (Verizon)	B	From Leg	2.50 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	17.00 59.49
BXA-70080-6CF-EDIN-X	C	From Leg	2.50	0.0000	129.00	No Ice	5.77	4.56	18.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Verizon)			0.00			1/2" Ice	6.22	5.00	54.30
			0.00						
Flat Platform w/ Handrails	B	From Leg	2.50	0.0000	129.00	No Ice	42.40	42.40	2000.00
(Verizon)			0.00			1/2" Ice	48.40	57.40	2450.00
			0.00						
DB948F85E-M	A	From Leg	2.50	0.0000	129.00	No Ice	1.89	3.27	8.50
(Verizon)			0.00			1/2" Ice	2.19	3.63	27.56
			0.00						
DB948F85E-M	B	From Leg	2.50	0.0000	129.00	No Ice	1.89	3.27	8.50
(Verizon)			0.00			1/2" Ice	2.19	3.63	27.56
			0.00						
DB948F85E-M	C	From Leg	2.50	0.0000	129.00	No Ice	1.89	3.27	8.50
(Verizon)			0.00			1/2" Ice	2.19	3.63	27.56
			0.00						
BXA-171063-8BF-EDIN-X	A	From Leg	2.50	0.0000	129.00	No Ice	2.94	2.16	10.50
(Verizon)			0.00			1/2" Ice	3.26	2.46	29.28
			0.00						
BXA-171063-8BF-EDIN-X	B	From Leg	2.50	0.0000	129.00	No Ice	2.94	2.16	10.50
(Verizon)			0.00			1/2" Ice	3.26	2.46	29.28
			0.00						
BXA-171063-8BF-EDIN-X	C	From Leg	2.50	0.0000	129.00	No Ice	2.94	2.16	10.50
(Verizon)			0.00			1/2" Ice	3.26	2.46	29.28
			0.00						
BXA-80063/4CF	A	From Leg	2.50	0.0000	129.00	No Ice	5.16	2.25	9.90
(Verizon)			0.00			1/2" Ice	5.55	2.55	37.73
			0.00						
BXA-80063/4CF	B	From Leg	2.50	0.0000	129.00	No Ice	5.16	2.25	9.90
(Verizon)			0.00			1/2" Ice	5.55	2.55	37.73
			0.00						
BXA-80063/4CF	C	From Leg	2.50	0.0000	129.00	No Ice	5.16	2.25	9.90
(Verizon)			0.00			1/2" Ice	5.55	2.55	37.73
			0.00						
(2) FD9R6004/2C-3L	A	From Leg	2.50	0.0000	129.00	No Ice	0.37	0.08	3.10
(Verizon)			0.00			1/2" Ice	0.45	0.14	5.40
			0.00						
(2) FD9R6004/2C-3L	B	From Leg	2.50	0.0000	129.00	No Ice	0.37	0.08	3.10
(Verizon)			0.00			1/2" Ice	0.45	0.14	5.40
			0.00						
(2) FD9R6004/2C-3L	C	From Leg	2.50	0.0000	129.00	No Ice	0.37	0.08	3.10
(Verizon)			0.00			1/2" Ice	0.45	0.14	5.40
			0.00						
DB-T1-6Z-8AB-0Z	C	From Leg	2.50	0.0000	129.00	No Ice	5.60	2.33	44.00
(Verizon)			0.00			1/2" Ice	5.92	2.56	80.13
			0.00						
BXA-171063/8CF	A	From Leg	2.50	0.0000	129.00	No Ice	2.90	2.31	10.50
(Verizon)			0.00			1/2" Ice	3.22	2.62	29.82
			0.00						
BXA-171063/8CF	B	From Leg	2.50	0.0000	129.00	No Ice	2.90	2.31	10.50
(Verizon)			0.00			1/2" Ice	3.22	2.62	29.82
			0.00						
BXA-171063/8CF	C	From Leg	2.50	0.0000	129.00	No Ice	2.90	2.31	10.50
(Verizon)			0.00			1/2" Ice	3.22	2.62	29.82
			0.00						
RRH2x40-AWS	A	From Leg	2.50	0.0000	129.00	No Ice	2.51	1.59	44.00
(Verizon)			0.00			1/2" Ice	2.75	1.80	61.37
			0.00						
RRH2x40-AWS	B	From Leg	2.50	0.0000	129.00	No Ice	2.51	1.59	44.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Verizon)			0.00 0.00			1/2" Ice	2.75	1.80	61.37
RRH2x40-AWS	C	From Leg	2.50	0.0000	129.00	No Ice	2.51	1.59	44.00
(Verizon)			0.00 0.00			1/2" Ice	2.75	1.80	61.37

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	129.07	1.476	20	60.417	A	0.000	60.417	60.417	100.00	7.524	0.000
150.00-110.00					B	0.000	60.417		100.00	0.000	0.000
					C	0.000	60.417		100.00	0.000	0.000
L2	89.45	1.33	18	81.433	A	0.000	81.433	81.433	100.00	15.840	0.000
110.00-70.00					B	0.000	81.433		100.00	0.000	0.000
					C	0.000	81.433		100.00	0.000	0.000
L3 70.00-31.50	50.64	1.13	15	96.569	A	0.000	96.569	96.569	100.00	15.246	0.000
					B	0.000	96.569		100.00	0.000	0.000
					C	0.000	96.569		100.00	0.000	0.000
L4 31.50-0.00	15.38	1	14	91.683	A	0.000	91.683	91.683	100.00	10.494	0.000
					B	0.000	91.683		100.00	0.000	0.000
					C	0.000	91.683		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	129.07	1.476	15	0.5000	63.750	A	0.000	63.750	63.750	100.00	21.369	0.000
150.00-110.00						B	0.000	63.750		100.00	0.000	0.000
						C	0.000	63.750		100.00	0.000	0.000
L2 110.00-70.00	89.45	1.33	14	0.5000	84.767	A	0.000	84.767	84.767	100.00	44.987	0.000
						B	0.000	84.767		100.00	0.000	0.000
						C	0.000	84.767		100.00	0.000	0.000
L3 70.00-31.50	50.64	1.13	11	0.5000	99.778	A	0.000	99.778	99.778	100.00	43.300	0.000
						B	0.000	99.778		100.00	0.000	0.000
						C	0.000	99.778		100.00	0.000	0.000
L4 31.50-0.00	15.38	1	10	0.5000	94.308	A	0.000	94.308	94.308	100.00	29.804	0.000
						B	0.000	94.308		100.00	0.000	0.000
						C	0.000	94.308		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	129.07	1.476	9	60.417	A	0.000	60.417	60.417	100.00	7.524	0.000
150.00-110.00					B	0.000	60.417		100.00	0.000	0.000
					C	0.000	60.417		100.00	0.000	0.000
L2	89.45	1.33	8	81.433	A	0.000	81.433	81.433	100.00	15.840	0.000
110.00-70.00					B	0.000	81.433		100.00	0.000	0.000
					C	0.000	81.433		100.00	0.000	0.000
L3 70.00-31.50	50.64	1.13	7	96.569	A	0.000	96.569	96.569	100.00	15.246	0.000
					B	0.000	96.569		100.00	0.000	0.000
					C	0.000	96.569		100.00	0.000	0.000
L4 31.50-0.00	15.38	1	6	91.683	A	0.000	91.683	91.683	100.00	10.494	0.000
					B	0.000	91.683		100.00	0.000	0.000
					C	0.000	91.683		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	2371.89	59.30	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	3049.85	76.25	C
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	2968.78	77.11	C
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	2419.14	76.80	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								10809.66		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	2371.89	59.30	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	3049.85	76.25	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	2968.78	77.11	C
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	2419.14	76.80	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								10809.66		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	2371.89	59.30	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	3049.85	76.25	C
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	2968.78	77.11	C
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	2419.14	76.80	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								10809.66		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1149.63	1940.51	A	1	1.03	1	1	1	63.750	2219.56	55.49	C
150.00-110.00			B	1	1.03	1	1	1	63.750			
			C	1	1.03	1	1	1	63.750			
L2	1594.49	3273.76	A	1	1.03	1	1	1	84.767	3034.74	75.87	C
110.00-70.00			B	1	1.03	1	1	1	84.767			
			C	1	1.03	1	1	1	84.767			
L3	1534.69	4988.79	A	1	1.03	1	1	1	99.778	2835.26	73.64	C
70.00-31.50			B	1	1.03	1	1	1	99.778			
			C	1	1.03	1	1	1	99.778			
L4 31.50-0.00	1056.35	5714.75	A	1	1.03	1	1	1	94.308	2195.00	69.68	C
			B	1	1.03	1	1	1	94.308			
			C	1	1.03	1	1	1	94.308			
Sum Weight:	5335.15	15917.80								10284.57		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1149.63	1940.51	A	1	1.03	1	1	1	63.750	2219.56	55.49	C
150.00-110.00			B	1	1.03	1	1	1	63.750			
			C	1	1.03	1	1	1	63.750			
L2	1594.49	3273.76	A	1	1.03	1	1	1	84.767	3034.74	75.87	C
110.00-70.00			B	1	1.03	1	1	1	84.767			
			C	1	1.03	1	1	1	84.767			
L3	1534.69	4988.79	A	1	1.03	1	1	1	99.778	2835.26	73.64	C
70.00-31.50			B	1	1.03	1	1	1	99.778			
			C	1	1.03	1	1	1	99.778			
L4 31.50-0.00	1056.35	5714.75	A	1	1.03	1	1	1	94.308	2195.00	69.68	C
			B	1	1.03	1	1	1	94.308			
			C	1	1.03	1	1	1	94.308			
Sum Weight:	5335.15	15917.80								10284.57		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1149.63	1940.51	A	1	1.03	1	1	1	63.750	2219.56	55.49	C
150.00-110.00			B	1	1.03	1	1	1	63.750			
			C	1	1.03	1	1	1	63.750			
L2	1594.49	3273.76	A	1	1.03	1	1	1	84.767	3034.74	75.87	C
110.00-70.00			B	1	1.03	1	1	1	84.767			
			C	1	1.03	1	1	1	84.767			
L3	1534.69	4988.79	A	1	1.03	1	1	1	99.778	2835.26	73.64	C
70.00-31.50			B	1	1.03	1	1	1	99.778			
			C	1	1.03	1	1	1	99.778			
L4 31.50-0.00	1056.35	5714.75	A	1	1.03	1	1	1	94.308	2195.00	69.68	C
			B	1	1.03	1	1	1	94.308			
			C	1	1.03	1	1	1	94.308			
Sum Weight:	5335.15	15917.80								10284.57		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	1112.73	27.82	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	1430.78	35.77	C
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	1392.75	36.18	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	1134.89	36.03	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								5071.15		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	1112.73	27.82	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	1430.78	35.77	C
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	1392.75	36.18	C
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	1134.89	36.03	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								5071.15		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	1100.00	1474.06	A	1	1.03	1	1	1	60.417	1112.73	27.82	C
150.00-110.00			B	1	1.03	1	1	1	60.417			
			C	1	1.03	1	1	1	60.417			
L2	1490.00	2649.40	A	1	1.03	1	1	1	81.433	1430.78	35.77	C
110.00-70.00			B	1	1.03	1	1	1	81.433			
			C	1	1.03	1	1	1	81.433			
L3	1434.13	4251.18	A	1	1.03	1	1	1	96.569	1392.75	36.18	C
70.00-31.50			B	1	1.03	1	1	1	96.569			
			C	1	1.03	1	1	1	96.569			
L4 31.50-0.00	987.13	5016.04	A	1	1.03	1	1	1	91.683	1134.89	36.03	C
			B	1	1.03	1	1	1	91.683			
			C	1	1.03	1	1	1	91.683			
Sum Weight:	5011.25	13390.68								5071.15		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Leg Weight	13390.68			
Bracing Weight	0.00			
Total Member Self-Weight	13390.68			
Guy Weight	791.86			
Total Weight	30589.89			
Wind 0 deg - No Ice		34.30	-19835.56	3470.14
Wind 30 deg - No Ice		10081.00	-17195.25	1860.34
Wind 60 deg - No Ice		17426.50	-9947.48	-247.94
Wind 90 deg - No Ice		20102.59	-34.30	-2289.79
Wind 120 deg - No Ice		17392.20	9888.08	-3718.08
Wind 150 deg - No Ice		10021.59	17160.95	-4150.12
Wind 180 deg - No Ice		-34.30	19835.56	-3470.14
Wind 210 deg - No Ice		-10081.00	17195.25	-1860.34
Wind 240 deg - No Ice		-17426.50	9947.48	247.94
Wind 270 deg - No Ice		-20102.59	34.30	2289.79
Wind 300 deg - No Ice		-17392.20	-9888.08	3718.08
Wind 330 deg - No Ice		-10021.59	-17160.95	4150.12
Member Ice	2527.13			
Guy Ice	420.69			
Total Weight Ice	37368.87			
Wind 0 deg - Ice		124.69	-18187.47	3651.22
Wind 30 deg - Ice		9278.76	-15813.15	1990.87
Wind 60 deg - Ice		15946.60	-9201.72	-202.93
Wind 90 deg - Ice		18341.56	-124.69	-2342.35
Wind 120 deg - Ice		15821.91	8985.75	-3854.14
Wind 150 deg - Ice		9062.80	15688.47	-4333.22
Wind 180 deg - Ice		-124.69	18187.47	-3651.22
Wind 210 deg - Ice		-9278.76	15813.15	-1990.87
Wind 240 deg - Ice		-15946.60	9201.72	202.93
Wind 270 deg - Ice		-18341.56	124.69	2342.35
Wind 300 deg - Ice		-15821.91	-8985.75	3854.14
Wind 330 deg - Ice		-9062.80	-15688.47	4333.22
Total Weight	30589.89			
Wind 0 deg - Service		16.09	-9305.48	1627.95
Wind 30 deg - Service		4729.31	-8066.83	872.74
Wind 60 deg - Service		8175.31	-4666.67	-116.32
Wind 90 deg - Service		9430.75	-16.09	-1074.21
Wind 120 deg - Service		8159.22	4638.80	-1744.27
Wind 150 deg - Service		4701.44	8050.74	-1946.95
Wind 180 deg - Service		-16.09	9305.48	-1627.95
Wind 210 deg - Service		-4729.31	8066.83	-872.74
Wind 240 deg - Service		-8175.31	4666.67	116.32
Wind 270 deg - Service		-9430.75	16.09	1074.21
Wind 300 deg - Service		-8159.22	-4638.80	1744.27
Wind 330 deg - Service		-4701.44	-8050.74	1946.95

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 30 deg - No Ice+Guy

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	150 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-51309.14	118966.07	-66267.52
			Max. Mx	5	-12721.44	-226853.92	3511.97
			Max. My	2	-12725.62	-6861.26	217075.26
			Max. Vy	5	11376.29	-226853.92	3511.97
			Max. Vx	2	-11114.84	-6861.26	217075.26
			Max. Torque	18			5333.72
		Guy A	Bottom Tension	7	28231.03		
			Top Tension	7	28422.30		
			Top Cable Vert	7	20835.96		
			Top Cable Norm	7	19331.05		
			Top Cable Tan	7	8.61		
			Bot Cable Vert	7	-20432.21		
			Bot Cable Norm	7	19480.42		
			Bot Cable Tan	7	170.40		
		Guy B	Bottom Tension	11	28621.66		
			Top Tension	11	28812.92		
			Top Cable Vert	11	21119.72		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Top Cable Norm	11	19599.53		
			Top Cable Tan	11	9.55		
			Bot Cable Vert	11	-20715.96		
			Bot Cable Norm	11	19748.89		
			Bot Cable Tan	11	171.34		
		Guy C	Bottom Tension	5	28918.33		
			Top Tension	5	29109.57		
			Top Cable Vert	5	21335.14		
			Top Cable Norm	5	19803.51		
			Top Cable Tan	5	11.49		
			Bot Cable Vert	5	-20931.38		
			Bot Cable Norm	5	19952.87		
			Bot Cable Tan	5	173.27		
L2	110 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-55655.44	44678.11	-25000.56
			Max. Mx	5	-46578.95	-163520.28	-1034.26
			Max. My	2	-49383.30	-5766.92	158536.06
			Max. Vy	5	-4042.68	-163520.28	-1034.26
			Max. Vx	8	-4254.78	-4207.16	-141840.51
			Max. Torque	20			4432.05
L3	70 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-61911.24	50707.98	-30332.34
			Max. Mx	23	-61911.24	50707.98	-30332.34
			Max. My	15	-61660.88	2663.66	55489.39
			Max. Vy	4	-1632.55	-22220.85	10778.75
			Max. Vx	8	-1604.67	-1275.16	-20217.26
			Max. Torque	20			4430.18
L4	31.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-69403.21	133760.86	-79962.19
			Max. Mx	24	-66867.02	136681.72	-30570.50
			Max. My	15	-69152.37	7537.25	148454.89
			Max. Vy	24	-3787.58	136681.72	-30570.50
			Max. Vx	2	-3818.36	6189.07	139628.77
			Max. Torque	20			4430.12

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	23	69403.21	3341.38	-1974.42
	Max. H_x	24	66867.02	3787.58	-183.71
	Max. H_z	2	65134.27	105.40	3818.36
	Max. M_x	15	148454.89	131.76	3780.60
	Max. M_z	18	123323.09	-3561.13	-222.04
	Max. Torsion	20	4430.05	-1856.70	-3283.44
	Min. Vert	1	47860.43	90.98	-51.72
	Min. H_x	5	62331.35	-3595.07	-212.79
	Min. H_z	21	61000.78	96.01	-3730.75
	Min. M_x	21	-110005.12	96.01	-3730.75
	Min. M_z	24	-136681.72	3787.58	-183.71
	Min. Torsion	26	-4322.88	1847.70	3286.27
Guy C @ 115 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-52.82	-26.89	15.53
	Max. H_x	10	-52.82	-26.89	15.53
	Max. H_z	3	-20653.60	-16967.38	9991.16

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. Vert	5	-20931.38	-17366.33	9826.38
	Min. H_x	5	-20931.38	-17366.33	9826.38
	Min. H_z	10	-52.82	-26.89	15.53
Guy B @ 115 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-52.43	26.59	15.36
	Max. H_x	11	-20715.96	17188.71	9726.06
	Max. H_z	13	-20443.10	16795.15	9891.10
	Min. Vert	11	-20715.96	17188.71	9726.06
	Min. H_x	6	-52.43	26.59	15.36
	Min. H_z	6	-52.43	26.59	15.36
Guy A @ 115 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-53.57	-0.00	-31.71
	Max. H_x	24	-9755.59	381.23	-9338.41
	Max. H_z	2	-53.57	-0.00	-31.71
	Min. Vert	7	-20432.21	-170.40	-19480.42
	Min. H_x	18	-9584.99	-380.86	-9177.93
	Min. H_z	7	-20432.21	-170.40	-19480.42

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	47860.43	-90.98	51.72	3027.46	5325.55	-11.97
Dead+Wind 0 deg - No Ice+Guy	65134.27	-105.40	-3818.36	-139628.77	6189.07	3276.92
Dead+Wind 30 deg - No Ice+Guy	61785.54	1613.93	-3301.34	-116999.57	-29190.00	1525.61
Dead+Wind 60 deg - No Ice+Guy	54424.10	2983.35	-1760.60	-40505.64	-69170.61	-697.55
Dead+Wind 90 deg - No Ice+Guy	62331.35	3595.07	212.79	31874.24	-113505.60	-2765.52
Dead+Wind 120 deg - No Ice+Guy	65630.30	3170.06	2001.48	75977.02	-114571.71	-4039.51
Dead+Wind 150 deg - No Ice+Guy	61965.96	1887.41	3277.63	97286.42	-77835.88	-4226.71
Dead+Wind 180 deg - No Ice+Guy	54075.99	-73.74	3717.09	94131.10	4092.15	-3310.16
Dead+Wind 210 deg - No Ice+Guy	61848.58	-2044.26	3264.25	96438.16	86975.40	-1488.86
Dead+Wind 240 deg - No Ice+Guy	65478.75	-3338.74	1977.14	74458.94	124324.08	729.33
Dead+Wind 270 deg - No Ice+Guy	62120.66	-3776.92	182.59	29897.34	123808.65	2736.86
Dead+Wind 300 deg - No Ice+Guy	54251.66	-3176.65	-1787.62	-42212.99	80137.30	3971.42
Dead+Wind 330 deg - No Ice+Guy	61692.69	-1820.95	-3314.53	-117442.31	41350.84	4149.31
Dead+Ice+Temp+Guy	51947.92	-111.84	65.23	3820.09	6552.08	-18.28
Dead+Wind 0 deg+Ice+Temp+Guy	69152.37	-131.76	-3780.60	-148454.89	7537.25	3435.63
Dead+Wind 30 deg+Ice+Temp+Guy	66808.22	1588.90	-3269.66	-126938.12	-33742.93	1626.21
Dead+Wind 60 deg+Ice+Temp+Guy	61382.19	2959.09	-1748.73	-48239.12	-80190.69	-708.09

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 90 deg+Ice+Temp+Guy	66966.90	3561.13	222.04	32289.84	-123323.09	-2889.31
Dead+Wind 120 deg+Ice+Temp+Guy	69299.33	3132.51	2005.95	81077.96	-120622.95	-4225.30
Dead+Wind 150 deg+Ice+Temp+Guy	66614.21	1856.70	3283.44	108060.57	-81846.62	-4430.05
Dead+Wind 180 deg+Ice+Temp+Guy	61000.78	-96.01	3730.75	110005.12	6356.09	-3490.26
Dead+Wind 210 deg+Ice+Temp+Guy	66786.04	-2051.75	3266.32	107670.77	94540.50	-1599.74
Dead+Wind 240 deg+Ice+Temp+Guy	69403.21	-3341.38	1974.42	79962.19	133760.86	738.18
Dead+Wind 270 deg+Ice+Temp+Guy	66867.02	-3787.58	183.71	30570.50	136681.72	2864.67
Dead+Wind 300 deg+Ice+Temp+Guy	61056.75	-3202.95	-1778.81	-48986.07	94147.61	4144.84
Dead+Wind 330 deg+Ice+Temp+Guy	66536.63	-1847.70	-3286.27	-126851.41	48596.64	4322.88
Dead+Wind 0 deg - Service+Guy	49181.34	-97.22	-1673.97	-39178.03	5709.26	1551.97
Dead+Wind 30 deg - Service+Guy	48739.31	728.28	-1432.22	-31989.32	-11986.02	720.85
Dead+Wind 60 deg - Service+Guy	48464.57	1337.57	-795.64	-15935.77	-25524.50	-333.39
Dead+Wind 90 deg - Service+Guy	48826.95	1570.92	65.41	4676.90	-32120.55	-1302.60
Dead+Wind 120 deg - Service+Guy	49314.95	1363.02	921.49	24734.68	-29365.76	-1900.27
Dead+Wind 150 deg - Service+Guy	48764.01	751.04	1536.03	37410.14	-14607.41	-1989.02
Dead+Wind 180 deg - Service+Guy	48425.50	-83.90	1757.68	41691.95	4952.37	-1572.83
Dead+Wind 210 deg - Service+Guy	48698.72	-919.86	1529.01	36953.10	24474.30	-739.51
Dead+Wind 240 deg - Service+Guy	49181.51	-1535.65	908.88	23875.44	39298.09	312.15
Dead+Wind 270 deg - Service+Guy	48741.16	-1750.92	51.35	3795.79	42565.76	1274.47
Dead+Wind 300 deg - Service+Guy	48441.17	-1525.16	-807.13	-16582.18	36531.97	1870.07
Dead+Wind 330 deg - Service+Guy	48723.64	-920.91	-1438.51	-32300.45	23298.44	1963.48

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-30589.87	0.00	0.23	30589.76	-0.19	0.001%
2	34.30	-30631.87	-20658.20	-34.30	30631.87	20658.19	0.000%
3	10491.95	-30589.87	-17907.05	-10491.94	30589.87	17907.04	0.000%
4	18138.93	-30547.86	-10358.81	-18138.93	30547.86	10358.80	0.000%
5	20924.50	-30589.87	-34.30	-20924.49	30589.87	34.29	0.000%
6	18104.63	-30631.87	10299.40	-18104.61	30631.87	-10299.39	0.000%
7	10432.55	-30589.87	17872.75	-10432.54	30589.87	-17872.73	0.000%
8	-34.30	-30547.86	20658.20	34.30	30547.86	-20658.20	0.000%
9	-10491.95	-30589.87	17907.05	10491.95	30589.87	-17907.03	0.000%
10	-18138.93	-30631.87	10358.81	18138.91	30631.87	-10358.80	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
11	-20924.50	-30589.87	34.30	20924.49	30589.87	-34.31	0.000%
12	-18104.63	-30547.86	-10299.40	18104.63	30547.86	10299.40	0.000%
13	-10432.55	-30589.87	-17872.75	10432.54	30589.87	17872.74	0.000%
14	0.00	-37368.84	0.00	0.12	37368.84	-0.10	0.000%
15	124.69	-37436.34	-19509.58	-124.68	37436.35	19509.34	0.001%
16	9939.23	-37368.84	-16957.12	-9939.13	37368.84	16956.98	0.000%
17	17091.58	-37301.33	-9862.77	-17091.52	37301.33	9862.74	0.000%
18	19662.49	-37368.84	-124.69	-19662.32	37368.84	124.67	0.000%
19	16966.89	-37436.34	9646.81	-16966.68	37436.35	-9646.69	0.001%
20	9723.27	-37368.84	16832.43	-9723.19	37368.84	-16832.28	0.000%
21	-124.69	-37301.33	19509.58	124.68	37301.33	-19509.52	0.000%
22	-9939.23	-37368.84	16957.12	9939.15	37368.84	-16956.97	0.000%
23	-17091.58	-37436.34	9862.77	17091.37	37436.34	-9862.65	0.001%
24	-19662.49	-37368.84	124.69	19662.33	37368.84	-124.70	0.000%
25	-16966.89	-37301.33	-9646.81	16966.84	37301.33	9646.78	0.000%
26	-9723.27	-37368.84	-16832.43	9723.18	37368.84	16832.29	0.000%
27	16.09	-30609.57	-9691.41	-16.09	30609.56	9691.40	0.000%
28	4922.10	-30589.87	-8400.75	-4922.10	30589.87	8400.74	0.000%
29	8509.54	-30570.16	-4859.64	-8509.53	30570.16	4859.63	0.000%
30	9816.34	-30589.87	-16.09	-9816.32	30589.87	16.09	0.000%
31	8493.45	-30609.57	4831.77	-8493.44	30609.56	-4831.76	0.000%
32	4894.23	-30589.87	8384.66	-4894.23	30589.87	-8384.65	0.000%
33	-16.09	-30570.16	9691.41	16.09	30570.16	-9691.40	0.000%
34	-4922.10	-30589.87	8400.75	4922.10	30589.87	-8400.74	0.000%
35	-8509.54	-30609.57	4859.64	8509.53	30609.56	-4859.63	0.000%
36	-9816.34	-30589.87	16.09	9816.32	30589.87	-16.09	0.000%
37	-8493.45	-30570.16	-4831.77	8493.44	30570.16	4831.76	0.000%
38	-4894.23	-30589.87	-8384.66	4894.23	30589.87	8384.65	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00018560
2	Yes	6	0.00000001	0.00053627
3	Yes	6	0.00000001	0.00037167
4	Yes	6	0.00000001	0.00016027
5	Yes	6	0.00000001	0.00044590
6	Yes	6	0.00000001	0.00068051
7	Yes	6	0.00000001	0.00070078
8	Yes	6	0.00000001	0.00013330
9	Yes	6	0.00000001	0.00032867
10	Yes	6	0.00000001	0.00033672
11	Yes	6	0.00000001	0.00043422
12	Yes	6	0.00000001	0.00026006
13	Yes	6	0.00000001	0.00044898
14	Yes	4	0.00000001	0.00030709
15	Yes	6	0.00000001	0.00072072
16	Yes	6	0.00000001	0.00045744
17	Yes	6	0.00000001	0.00023486
18	Yes	6	0.00000001	0.00054776
19	Yes	6	0.00000001	0.00090777
20	Yes	6	0.00000001	0.00088106
21	Yes	6	0.00000001	0.00021038
22	Yes	6	0.00000001	0.00040293
23	Yes	6	0.00000001	0.00051571

24	Yes	6	0.00000001	0.00053308
25	Yes	6	0.00000001	0.00035996
26	Yes	6	0.00000001	0.00065927
27	Yes	5	0.00000001	0.00066455
28	Yes	5	0.00000001	0.00024985
29	Yes	5	0.00000001	0.00023927
30	Yes	5	0.00000001	0.00051379
31	Yes	5	0.00000001	0.00089509
32	Yes	5	0.00000001	0.00057208
33	Yes	5	0.00000001	0.00026412
34	Yes	5	0.00000001	0.00017057
35	Yes	5	0.00000001	0.00033243
36	Yes	5	0.00000001	0.00043643
37	Yes	5	0.00000001	0.00043735
38	Yes	5	0.00000001	0.00048106

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	11.069	30	1.7902	0.0962
L2	110 - 70	1.506	35	0.3691	0.0311
L3	73.5 - 31.5	0.451	35	0.0455	0.0120
L4	35.667 - 0	0.156	35	0.0329	0.0039

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	7770.00	30	11.069	1.7902	0.0971	10820
145.00	(2) 7250.3	30	9.558	1.5772	0.0872	10820
129.00	BXA-70063-6CF-EDIN-X	31	5.108	0.9346	0.0573	2575
122.00	Guy	31	3.498	0.6909	0.0458	1931

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	30.056	6	3.9966	0.2115
L2	110 - 70	6.729	10	1.1375	0.0694
L3	73.5 - 31.5	2.443	23	0.3039	0.0264
L4	35.667 - 0	0.647	23	0.1539	0.0086

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	7770.00	6	30.056	3.9966	0.2132	5225
145.00	(2) 7250.3	6	26.529	3.5733	0.1916	5225
129.00	BXA-70063-6CF-EDIN-X	6	15.913	2.2931	0.1261	1242
122.00	Guy	6	11.936	1.8131	0.1011	931

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
L1	122.00 (A) (7)	7/8 EHS	7970.00	79699.84	28422.30	39850.00	2.000	2.804 ✔
	122.00 (B) (6)	7/8 EHS	7970.00	79699.84	28812.90	39850.00	2.000	2.766 ✔
	122.00 (C) (5)	7/8 EHS	7970.00	79699.84	29109.60	39850.00	2.000	2.738 ✔

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	150 - 110 (1)	TP21.25x15x0.1875	40.00	28.00	48.9	30.454	11.5845	-45906.70	352794.00	0.130
L2	110 - 70 (2)	TP27.61x21.25x0.25	40.00	122.00	194.7	3.938	16.9050	-49972.90	66571.60	0.751
L3	70 - 31.5 (3)	TP33.1x26.5535x0.313	42.00	122.00	152.7	6.407	26.9966	-56470.90	172966.00	0.326
L4	31.5 - 0 (4)	TP37.38x31.8245x0.375	35.67	122.00	110.5	12.228	44.6835	-69403.20	546391.00	0.127

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 110 (1)	TP21.25x15x0.1875	211935.00	-46.888	39.000	1.202	0.00	0.000	39.000	0.000
L2	110 - 70 (2)	TP27.61x21.25x0.25	163525.00	-22.699	39.000	0.582	0.00	0.000	39.000	0.000
L3	70 - 31.5 (3)	TP33.1x26.5535x0.313	49327.50	-3.361	39.000	0.086	0.00	0.000	39.000	0.000
L4	31.5 - 0 (4)	TP37.38x31.8245x0.375	155839.17	-4.636	39.000	0.119	0.00	0.000	39.000	0.000

Pole Interaction Design Data

tnxTower	Job	Page
	53056625	21 of 21
ATC Tower Services 400 Regency Forest Drive Cary, NC 27518 Phone: (919) 466-5147 FAX:	Project 302476 - Wtbr-Waterbury, CT	Date 16:43:56 06/28/13
	Client Verizon	Designed by michael.davenport

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110 (1)	TP21.25x15x0.1875	0.130	1.202	0.000	1.332 ✔	1.333	H1-3 ✔
L2	110 - 70 (2)	TP27.61x21.25x0.25	0.751	0.582	0.000	1.333 ✔	1.333	H1-3 ✔
L3	70 - 31.5 (3)	TP33.1x26.5535x0.313	0.326	0.086	0.000	0.413 ✔	1.333	H1-3 ✔
L4	31.5 - 0 (4)	TP37.38x31.8245x0.375	0.127	0.119	0.000	0.246 ✔	1.333	H1-3 ✔

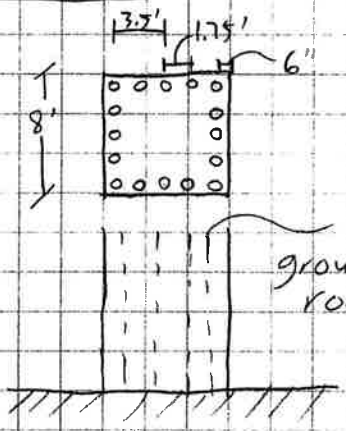
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	150 - 110	Pole	TP21.25x15x0.1875	1	-45906.70	470274.38	100.0	Pass
		Guy A@122	7/8	7	28422.30	39850.00	71.3	Pass
		Guy B@122	7/8	6	28812.90	39850.00	72.3	Pass
		Guy C@122	7/8	5	29109.60	39850.00	73.0	Pass
L2	110 - 70	Pole	TP27.61x21.25x0.25	2	-49972.90	88739.94	100.0	Pass
L3	70 - 31.5	Pole	TP33.1x26.5535x0.313	3	-56470.90	230563.67	31.0	Pass
L4	31.5 - 0	Pole	TP37.38x31.8245x0.375	4	-69403.20	728339.17	18.4	Pass
							Summary	
						Pole (L2)	100.0	Pass
						Guy A (L1)	71.3	Pass
						Guy B (L1)	72.3	Pass
						Guy C (L1)	73.0	Pass
						RATING =	**100.0**	**Pass**

AMERICAN TOWER®
CORPORATION

302476 W4bc - Waterbury, CT 4/29/2013

Fdn. Check



$Capacity_{bolt} = 60k$

Overturning Moment capacity = (60k)(7')(5) = 2100 k-ft (0.5) = 1050 k-ft

usage = $\frac{178.1 \text{ k-ft}}{1050 \text{ k-ft}}$ = 0.17, OK

Anchor Rods

$T_{applied}$ = 28.2k

$T_{cap} = \left(\frac{4}{3}\right)(0.6)(36ksi)\left(\frac{4}{4}\right)(1.5)^2 = 50.9k$

usage = 28.2k / 50.9k = 0.55, OK

Base/Flange Plate	Plate Type	***Baseplate***
	Pole Diameter	37.38 in
	Pole Thickness	0.375 in
	Plate Length	44 in
	Plate Thickness	2.5 in
	Plate Fy	60 ksi
	Weld Length	0.3125 in
	Allowable	1023.98 k-in
	Applied	96.38 k-in
Stiffeners	#	***0***

Bolts ●	#	***8***
	Bolt Circle	44 in
	(R)adial / (S)quare	S
	Bolt Gap	6 in
	Diameter	2.25 in
	Hole Diameter	2.75 in
	Type	A615-75
	Fy	75 ksi
	Fu	100 ksi
	Allowable	194.86 k
	Applied	29.70 k
Reinforcement ●	#	***0***
Extra Bolts O	#	***0***

Code Rev.	*F*
A.S.I.	1.33
Moment	155.8 k-ft
Axial	69.4 k

Date	6/27/2013
Engineer	BD
Site #	302476
Carrier	Verizon

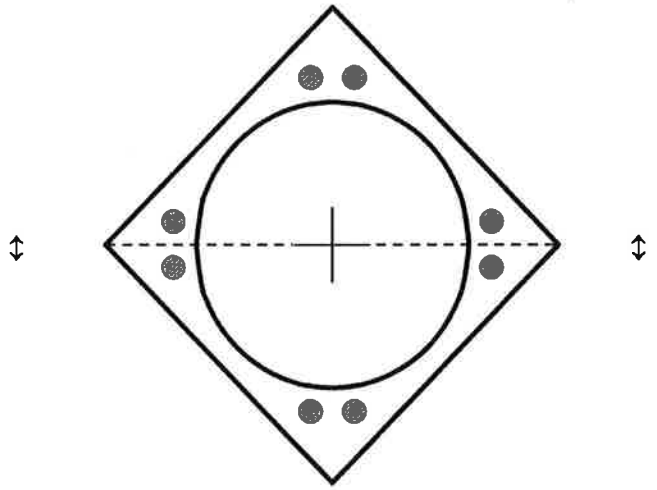


Plate Stress Ratio:
0.09 (Pass)

Bolt Stress Ratio:
0.15 (Pass)

Base/Flange Plate	Plate Type	*Flange @ 110.0 ft*
	Pole Diameter	21.267 in
	Pole Thickness	0.1875 in
	Plate Diameter	28.5 in
	Plate Thickness	1 in
	Plate Fy	60 ksi
	Weld Length	0.3125 in
	Allowable	55.68 k-in
	Applied	29.45 k-in
Stiffeners	#	*0*

Bolts ●	#	*12*
	Bolt Circle	25.75 in
	(R)adial / (S)quare	R
	Diameter	1 in
	Hole Diameter	1.125 in
	Type	A325
	Fy	92 ksi
	Fu	120 ksi
	Allowable	46.08 k
	Applied	21.55 k
Reinforcement ●	#	*0*
Extra Bolts O	#	*0*

Code Rev.	F
A.S.I.	1.33
Moment	163.5 k-ft
Axial	45.9 k

Date	6/27/2013
Engineer	BD
Site #	302476
Carrier	Verizon

Required Flange Thickness:
0.73 in OK

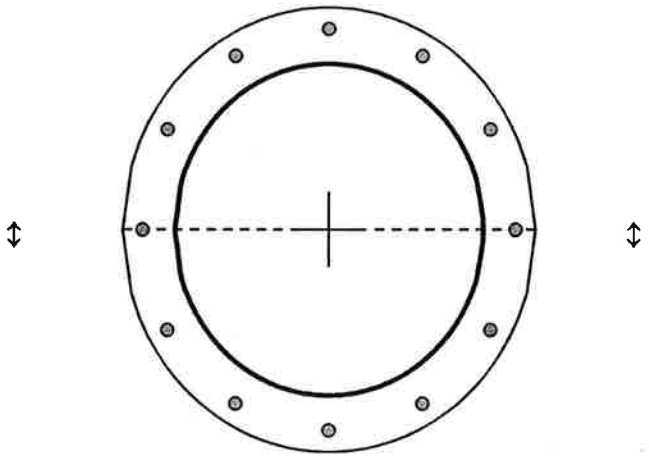


Plate Stress Ratio:
0.53 (Pass)

Bolt Stress Ratio:
0.47 (Pass)