Robinson+Cole

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Also admitted in Massachusetts

November 11, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
1925-1931 East Main Street, Torrington, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at the 123-foot level of the existing 153-foot tower at 1925-1931 East Main Street in Torrington, Connecticut (the "Property"). The tower is owned by SBA Communications Corporation ("SBA"). The Council approved Cellco's use of the existing tower in 2003. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 123-foot level on the tower. Cellco also intends to install nine (9) remote radio heads ("RRHs") behind its antennas and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

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 Elinor Carbone, Mayor of the City of Torrington. A copy of this letter is also being sent to TEP Incorporated, the Property owner and SBA, the tower owner.

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. The replacement antennas and RRHs will be located at the 123-foot level on the 153-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 Attachment 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 included in Attachment 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:
Elinor Carbone, Torrington Mayor
TEP Incorporated
SBA
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

Product Specifications

SBNHH-1D65B

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

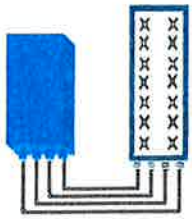
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

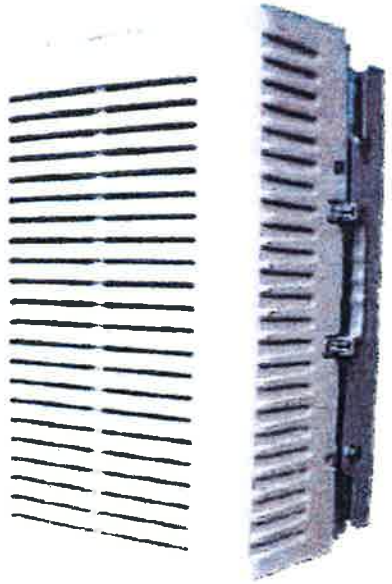
Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)



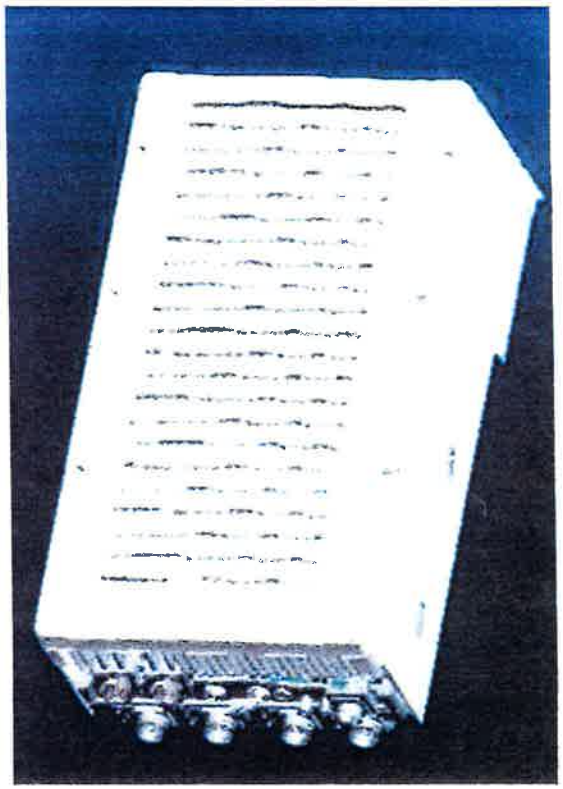
** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

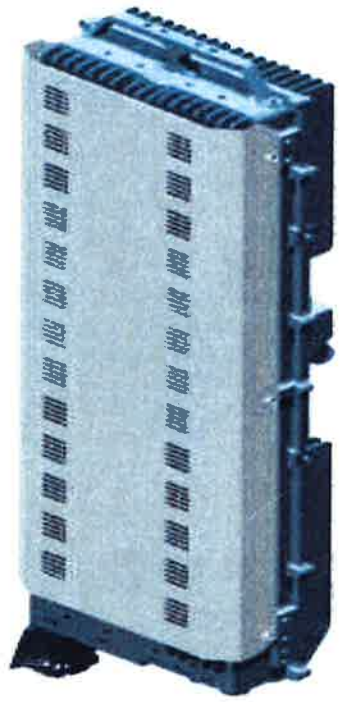
	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



**- Includes solar shield but not mounting brackets (8 lbs.)

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the 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 a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-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.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

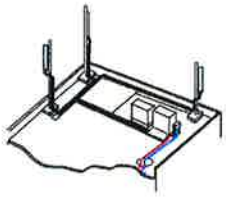
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

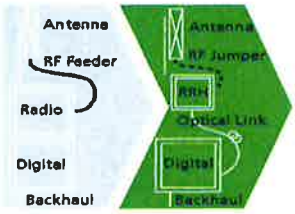
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

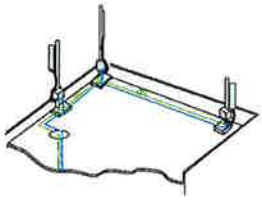
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

AT THE SPEED OF IDEAS™

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

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
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)
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)
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
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-99-689 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

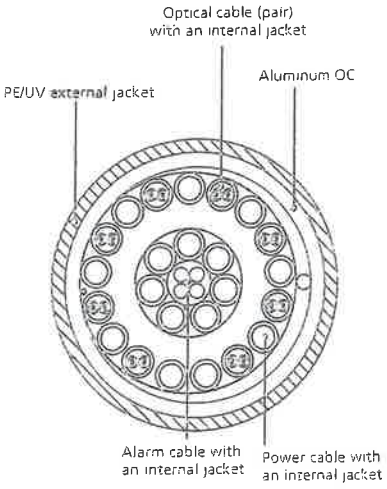


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Torrington E								
Tower Height: 153'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Nextel	9	100	143	0.0172	851	0.5673	0.30%	
*VoiceStream	4	294	133	0.0262	1930	1.0000	0.26%	
*Sprint CDMA/LTE	4	13	153	0.0009	1900	1.0000	0.01%	
*Sprint CDMA/LTE	1	12	153	0.0002	850	0.5667	0.00%	
*Sprint CDMA/LTE	2	13	153	0.0004	2500	1.0000	0.00%	
*Pocket (now MetroPCS)	3	631	85	0.1091	2130	1.0000	1.09%	
*Town	no RF information available %MPE estimated						5.00%	
*AT&T GSM/UMTS	4		95	0.0000	850/1900		1.27%	
*AT&T LTE/GSM/WCS	8		95	0.0000	700/850/2300		5.40%	
*AT&T LTE-AWS	2		95	0.0000	2100		1.76%	
*AT&T LTE	2		95	0.0000	700		1.85%	
Verizon	**14**	**1000**	**123**	**0.3327**	**1970**	**1.0000**	**33.27%**	
Verizon	**9**	**474**	**123**	**0.1014**	**869**	**0.5793**	**17.50%**	
Verizon	**1**	**1000**	**123**	**0.0238**	**2145**	**1.0000**	**2.38%**	
Verizon	**1**	**1000**	**123**	**0.0238**	**746**	**0.4973**	**4.78%**	
								74.9%
* Source: Siting Council								

ATTACHMENT 3

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 153 ft Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT01499-S-06

Customer Site Name: Torrington

Carrier Name: Verizon

Carrier Site ID / Name: Torrington East

Site Location: 1925-1931 East Main Street

Torrington, Connecticut

Litchfield County

Latitude: 41.822991

Longitude: -73.077199

Analysis Result:

Max Structural Usage: 82.1% [Pass]

Max Foundation Usage: 94% [Pass]

Report Prepared By : Jie Chen

Introduction

The purpose of this report is to summarize the analysis results on the 153 ft Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Fred A. Nudd Corporation (Project No. 7783) original design drawings dated August 18, 2000
Foundation Drawing	Fred A. Nudd Corporation (Project No. 7783) foundation design drawings dated August 18, 2000
Geotechnical Report	N/A
Modification Drawings	Vertical Structures, Inc., Site: Torrington, CT, Dated 9/9/2003 FDH Engineering, Inc. (Project No. 15BFJD1400) Modification Drawings for a 153' Monopole dated March 10, 2015

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F. In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Basic Wind Speed Used in the Analysis:	80.0 mph (fastest mile)
Basic Wind Speed with Ice:	69 mph (fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-F / 2005 Connecticut State Building Code

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	153.0	3	ALU 1900 MHz RRUs	Low Profile Platform	(4) 1 1/4"	Sprint
2		3	ALU 800 MHz Filters			
3		3	ALU 800 MHz RRUs			
4		4	RFS ACU-A20-N RETs			
5		3	RFS APXVSPP18-C-A20 - Panel			
6		3	RFS APXVTM14-C-I20 - Panel			
7		3	TD-RRH8x20-25 RRHs			
8	133.0	6	EMS - RR90-17-02DP - Panel	Low Profile Platform	(12) 1 5/8"	T-Mobile
-	123.0	6	Antel LPA-171063-12CF - Panel	Low Profile Platform	(18) 1 5/8"	Verizon
-		3	Antel BXA-70063-6CF-EDIN-5 - Panel			
-		6	Antel LPA-80063/6CF - Panel			
15	110.0	1	10' Omni	(1) Standoff	(1) 1/2"	Torrington PD
16	95.0	3	Polyphaser 1000860	(3) Sector Frame	(12) 1 5/8" (2) 1/2" Fiber (4) 3/4" DC	AT&T
17		3	Powerwave 7770 - Panel			
18		4	CCI/HPA-65R-BUU H6 - Panel			
19		6	Powerwave LGP21401			
20		6	Powerwave LGP21903			
21		3	CCI OPA-65R-LCUU-H6 - Panel			
22		2	Raycap/Squid			
23		6	Ericsson RRUS-11			
24		3	Ericsson RRUS-12			
25		3	Ericsson RRUS-32			
26		3	Ericsson RRUS-A2			
27		3	Ericsson RRUS-E2			
28		2	Andrew SBNH-1D65A - Panel			
29	70.0	1	GPS	(1) Standoff	(1) 1/2"	Unknown

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
9	126.0	3	Alcatel Lucent RRH2x60-700	Low Profile Platform	(16) 1 5/8" (2) 1 5/8" Fiber	Verizon
10	123.0	9	Commscope SBNHH-1D65B - Panel			
11		6	Antel LPA-80063/6CF - Panel			
12		3	Alcatel Lucent RRH2x60-AWS			
13		3	Alcatel Lucent RRH2X60-PCS			
14		2	Rfs DB-T1-6Z-8AB-0Z Distribution Box			

The proposed (6) 1 5/8" transmission lines are considered running outside of the pole shafts. These lines shall be strapped tightly to the face of the pole shafts. Stacking lines is not allowed.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**82.1%**	**67.0%**	**62.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)
Original Design Reactions	3692.0
Analysis Reactions	3471.5
% of Design Reactions	94.0%

No geotechnical report is available for the analysis of the existing foundation. Since the reactions calculated from the current analysis are less than those indicated on the original structural design drawing, the foundations are assumed to be adequate to resist the reactions from the current analysis.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 1.3916 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-F Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed or/and ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Stress 82.1% at 45.0ft

Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

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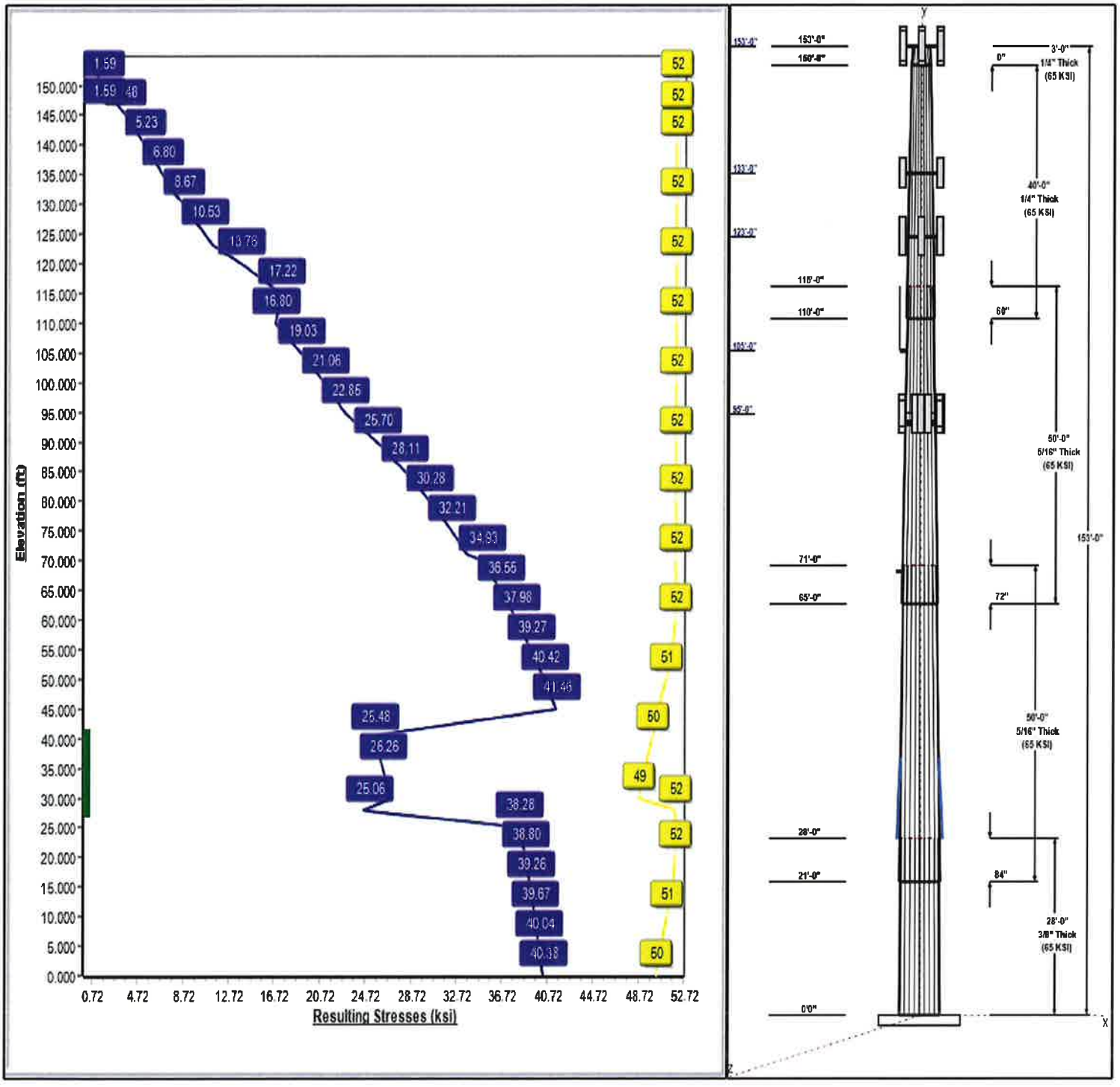
Dead Load Factor:	1.00
Wind Load Factor:	1.00

51 Alllowable Stress

41 Resulting Stress

Load Case : 80 mph Wind with 0 in Ice

Iterations: 22



Structure: CT01499-S-SBA

Type: Tapered
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.24673

9/16/2015

Tower Engineering Solutions

Shaft Properties

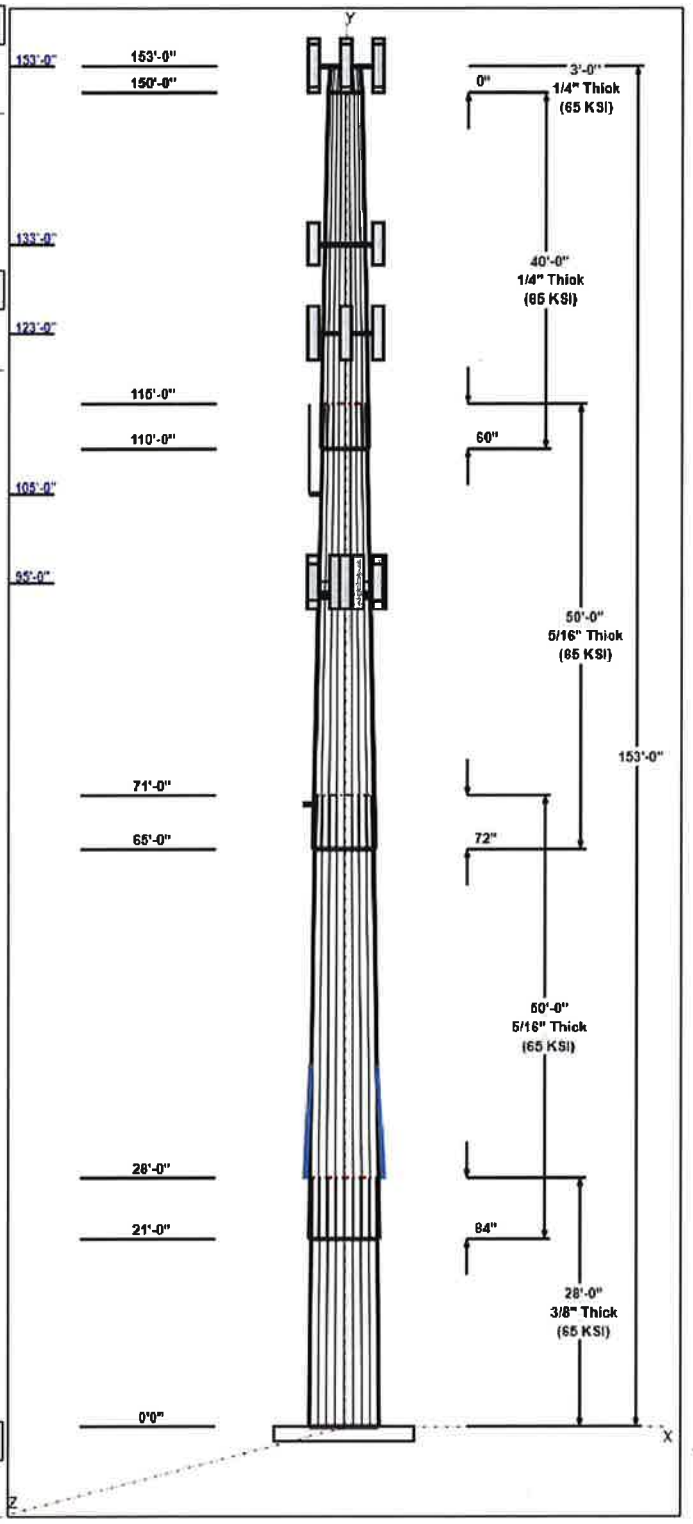
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	28.00	53.09	60.00	0.375		0.24673	65
2	50.00	43.11	55.44	0.313	Slip	0.24673	65
3	50.00	32.88	45.21	0.313	Slip	0.24673	65
4	40.00	24.74	34.61	0.250	Slip	0.24673	65
5	3.00	24.00	24.74	0.250	Butt	0.24673	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
153.00	153.00	3	1900 MHz RRUs	Sprint
153.00	153.00	3	800 MHz Filters	Sprint
153.00	153.00	3	800 MHz RRUs	Sprint
153.00	153.00	4	ACU-A20-N	Sprint
153.00	153.00	3	APXVSPP18-C-A20	Sprint
153.00	153.00	3	APXVTM14-C-I20	Sprint
153.00	153.00	1	Lightning Rod	
153.00	153.00	1	Low Profile Platform	Sprint
153.00	153.00	3	TD-RRH8x20-25	Sprint
133.00	133.00	1	Low Profile Platform	T-Mobile
133.00	133.00	6	RR90-17-02DP	T-Mobile
123.00	123.00	2	DB-T1-6Z-8AB-0Z	Verizon
123.00	123.00	1	Low Profile Platform	Verizon
123.00	123.00	6	LPA-80063/6CF	Verizon
123.00	126.00	3	RRH2x60-700	Verizon
123.00	123.00	3	RRH2X60-AWS	Verizon
123.00	123.00	3	RRH2X60-PCS	Verizon
123.00	123.00	9	SBNHH-1D65B	Verizon
105.00	110.00	1	10' Omni	Torrington PD
105.00	105.00	1	Standoff	Torrington PD
95.00	95.00	3	1000860	AT&T
95.00	95.00	3	7770	AT&T
95.00	95.00	4	HPA-65R-BUU-H6	AT&T
95.00	95.00	6	LGP21401	AT&T
95.00	95.00	6	LGP21903	AT&T
95.00	95.00	3	OPA-65R-LCUU-H6	AT&T
95.00	95.00	2	Raycap/Squid	AT&T
95.00	95.00	6	RRUS-11	AT&T
95.00	95.00	3	RRUS-12	AT&T
95.00	95.00	3	RRUS-32	AT&T
95.00	95.00	3	RRUS-A2	AT&T
95.00	95.00	3	RRUS-E2	AT&T
95.00	95.00	2	SBNH-1D65A	AT&T
95.00	95.00	3	Sector Frame	AT&T
70.00	70.00	1	GPS	Unknown
70.00	70.00	1	Standoff	Unknown

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	153.00	Inside	1 1/4" Coax	Sprint
0.00	153.00	Outside	Safety Cable	
0.00	133.00	Inside	1 5/8" Coax	T-Mobile
0.00	123.00	Outside	1 5/8" Coax	Verizon
0.00	123.00	Inside	1 5/8" Coax	Verizon



0.00	123.00	Inside	1 5/8" Fiber	Verizon
0.00	105.00	Inside	1/2" Coax	Torrington PD
0.00	95.00	Outside	1 5/8" Coax	AT&T
0.00	95.00	Outside	1/2" Fiber	AT&T
0.00	95.00	Outside	3/4" DC	AT&T
24.25	44.25	Outside	1.25" Reinforcing plate	

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
18	2.00" F1554 105	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	73.0	50.0	Round

Reactions

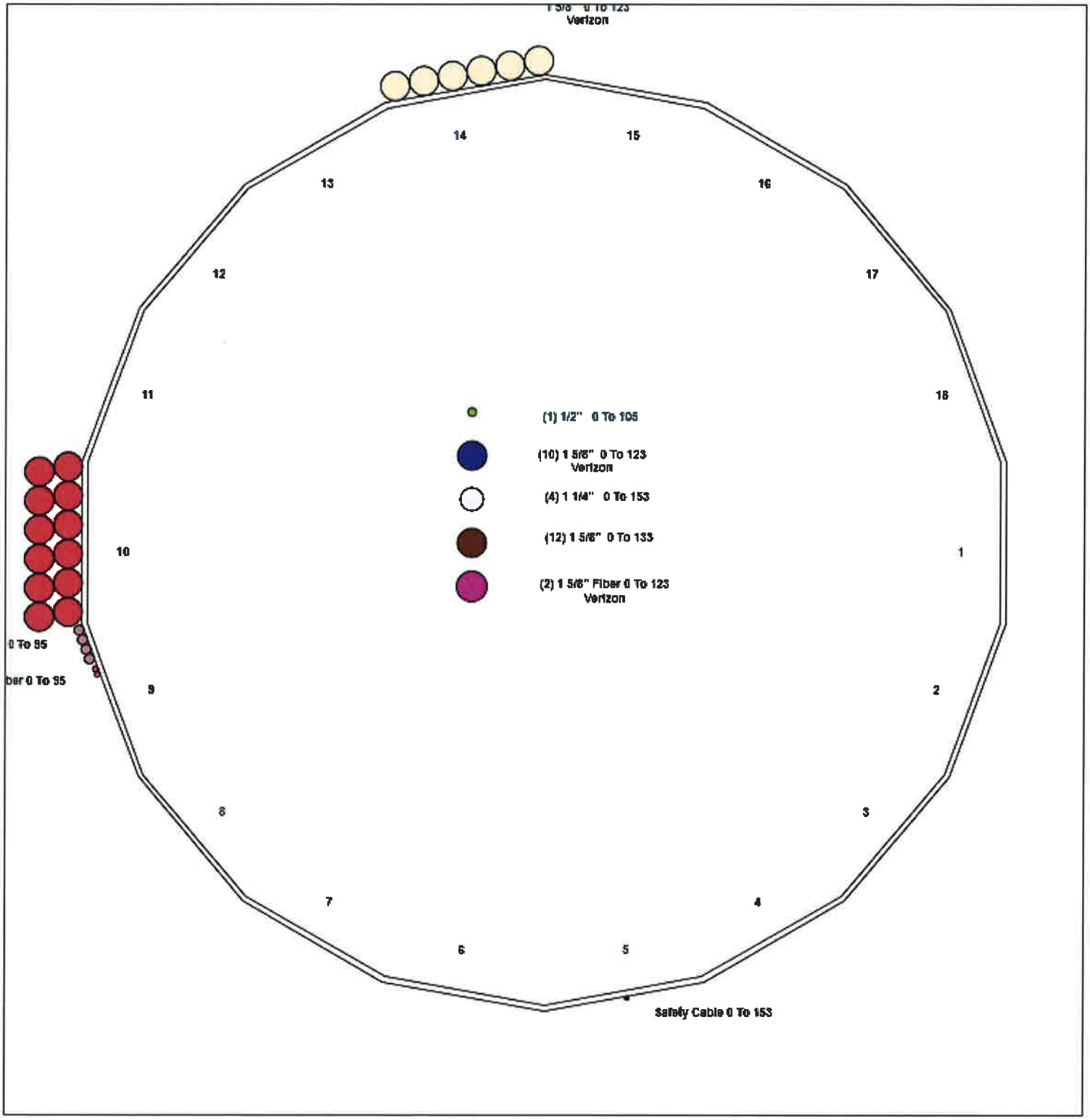
Load Case	Moment	Shear	Axial
80 mph Wind with 0" Ice	3471.5	33.9	37.6
69.28 mph Wind with 0.5" Ice	2919.7	28.4	45.8
50 mph Wind with 0" Ice	1356.7	13.3	37.6

Structure: CT01499-S-SBA - Coax Line Placement

Type: Monopole
Site Name: Torrington
Height: 153.00 (ft)

9/16/2015

Tower Engineering Solutions



Shaft Properties

Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

TES Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	28.000	0.3750	65		0.00	6,370
2	18	50.000	0.3125	65	Slip	84.00	8,262
3	18	50.000	0.3125	65	Slip	72.00	6,536
4	18	40.000	0.2500	65	Slip	60.00	3,178
5	18	3.000	0.2500	65	Flange	0.00	195
					Total Shaft Weight:		**24,542**

	Bottom						Top						
Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	60.00	0.00	70.97	31875.78	26.80	160	53.09	28.00	62.74	22030.0	23.55	141.5	0.246732
2	55.44	21.00	54.68	20998.34	29.87	177.4	43.11	71.00	42.45	9821.08	22.91	137.9	0.246732
3	45.21	65.00	44.53	11343.08	24.10	144.6	32.88	115.0	32.30	4326.93	17.13	105.2	0.246732
4	34.61	110.0	27.26	4066.53	22.99	138.4	24.74	150.0	19.43	1472.52	16.03	98.96	0.246732
5	24.74	150.0	19.43	1472.52	16.03	98.96	24.00	153.0	18.84	1343.00	15.51	96	0.246732

Additional Steel

							Intermediate Connectors		Termination Connectors			
Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Fu (ksi)	Offset (in)	Description	Spacing (in)	Description	Spacing (in)	Lower Qty	Upper Qty
27.75	40.75	3	PLT 8"x1.25"(1.25Hole)	65	80	0.00	AJM20&sleeve	18.00	AJM20&sleeve	3.00	14	14

Loading Summary

Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 6	

TES Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	153.0	1900 MHz RRUs	3	44.00	3.80	0.88	75.20	4.200	0.88	0.00	0.00
2	153.0	800 MHz Filters	3	8.80	0.78	0.69	13.80	0.960	0.69	0.00	0.00
3	153.0	800 MHz RRUs	3	53.00	2.49	0.92	74.10	2.820	0.92	0.00	0.00
4	153.0	ACU-A20-N	4	1.00	0.14	0.90	2.30	0.220	0.90	0.00	0.00
5	153.0	APXVSPP18-C-A20	3	57.00	8.26	0.83	106.50	9.080	0.83	0.00	0.00
6	153.0	APXVTM14-C-I20	3	56.00	6.90	0.79	91.90	7.290	0.79	0.00	0.00
7	153.0	Lightning Rod	1	5.00	0.50	1.00	11.00	1.000	1.00	0.00	0.00
8	153.0	Low Profile Platform	1	1200.00	25.00	1.00	1500.00	31.00	1.00	0.00	0.00
9	153.0	TD-RRH8x20-25	3	70.00	4.72	0.69	92.00	4.970	0.69	0.00	0.00
10	133.0	Low Profile Platform	1	1200.00	25.00	1.00	1500.00	31.00	1.00	0.00	0.00
11	133.0	RR90-17-02DP	6	13.50	4.36	0.68	0.00	4.990	0.68	0.00	0.00
12	123.0	DB-T1-6Z-8AB-0Z	2	18.90	5.60	0.90	46.00	5.870	0.90	0.00	0.00
13	123.0	Low Profile Platform	1	1200.00	25.00	1.00	1500.00	31.00	1.00	0.00	0.00
14	123.0	LPA-80063/6CF	6	27.00	10.34	0.94	0.00	11.18	0.94	0.00	0.00
15	123.0	RRH2x60-700	3	60.00	3.96	0.76	80.10	4.230	0.76	0.00	3.00
16	123.0	RRH2X60-AWS	3	60.00	3.96	0.76	80.10	4.230	0.76	0.00	0.00
17	123.0	RRH2X60-PCS	3	55.00	2.57	0.89	70.90	2.760	0.89	0.00	0.00
18	123.0	SBNHH-1D65B	9	40.60	8.33	0.83	87.00	8.800	0.83	0.00	0.00
19	105.0	10' Omni	1	25.00	3.00	1.00	46.70	4.030	1.00	0.00	5.00
20	105.0	Standoff	1	40.00	2.63	1.00	63.00	4.340	1.00	0.00	0.00
21	95.00	1000860	3	2.00	0.06	1.00	2.80	0.120	1.00	0.00	0.00
22	95.00	7770	3	35.00	5.88	0.73	0.00	6.530	0.73	0.00	0.00
23	95.00	HPA-65R-BUU-H6	4	51.00	10.36	0.90	108.40	10.58	0.90	0.00	0.00
24	95.00	LGP21401	6	14.10	1.29	0.67	21.20	1.530	0.67	0.00	0.00
25	95.00	LGP21903	6	5.50	0.27	0.84	7.90	0.380	0.84	0.00	0.00
26	95.00	OPA-65R-LCUU-H6	3	80.00	10.36	0.79	134.00	10.85	0.79	0.00	0.00
27	95.00	Raycap/Squid	2	31.80	1.47	0.90	49.50	1.670	0.90	0.00	0.00
28	95.00	RRUS-11	6	55.00	4.42	0.68	80.70	4.850	0.68	0.00	0.00
29	95.00	RRUS-12	3	60.00	3.15	0.67	81.20	3.510	0.67	0.00	0.00
30	95.00	RRUS-32	3	77.00	3.87	0.87	103.50	4.300	0.87	0.00	0.00
31	95.00	RRUS-A2	3	21.20	1.86	0.62	31.40	2.150	0.62	0.00	0.00
32	95.00	RRUS-E2	3	57.30	3.27	0.70	73.00	3.480	0.70	0.00	0.00
33	95.00	SBNH-1D65A	2	38.40	5.87	0.90	74.70	6.490	0.90	0.00	0.00
34	95.00	Sector Frame	3	500.00	17.50	0.75	700.00	21.50	0.75	0.00	0.00
35	70.00	GPS	1	10.00	1.00	1.00	18.00	1.250	1.00	0.00	0.00
36	70.00	Standoff	1	40.00	2.63	1.00	63.00	4.340	1.00	0.00	0.00
		Totals:	**112**	**9,051.10**			**12,358.20**				

Linear Appurtenances

			No Ice		Ice		
Bottom Elev. (ft)	Top Elev. (ft)	Description	Weight (lb/ft)	CaAa (sf/ft)	Weight (lb/ft)	CaAa (sf/ft)	Exposed
0.00	153.0	(4) 1 1/4" Coax	1.98	0.00	0.00	0.00	Inside
0.00	153.0	(1) Safety Cable	0.27	0.00	0.00	0.00	Outside
0.00	133.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
0.00	123.0	(6) 1 5/8" Coax		1.04	0.20		2.55	0.34	Outside		
0.00	123.0	(10) 1 5/8" Coax		1.04	0.00		0.00	0.00	Inside		
0.00	123.0	(2) 1 5/8" Fiber		9.90	0.00		0.00	0.00	Inside		
0.00	105.0	(1) 1/2" Coax		0.16	0.00		0.00	0.00	Inside		
0.00	95.00	(12) 1 5/8" Coax		3.12	0.40		4.80	0.55	Outside		
0.00	95.00	(2) 1/2" Fiber		0.32	0.00		0.00	0.00	Outside		
0.00	95.00	(4) 3/4" DC		1.20	0.00		0.00	0.00	Outside		
24.25	44.25	(3) 1.25" Reinforcing plate		0.00	0.18		38.00	0.31	Outside		
		Totals:		**2,414.17**			**1,529.65**				

Shaft Section Properties

Structure: CT01499-S-SBA
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/16/2015

Tower Engineering Solutions

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Ixp (in^4)	Iyp (in^4)	Weight (lb)
0.00		0.3750	60.000	70.966	31875.8	26.80	160.00	65	50	0.0	0.00	0.0	0.0	0.0
5.00		0.3750	58.766	69.498	29937.9	26.22	156.71	65	51	1194.9				
10.00		0.3750	57.533	68.029	28080.1	25.64	153.42	65	51	1169.9				
15.00		0.3750	56.299	66.561	26300.9	25.06	150.13	65	52	1145.0				
20.00		0.3750	55.065	65.093	24598.5	24.48	146.84	65	52	1120.0				
21.00	Bot - Section 2	0.3750	54.819	64.799	24267.0	24.37	146.18	65	52	221.0				
25.00		0.3750	53.832	63.625	22971.1	23.90	143.55	65	52	1611.6				
27.75	RB1	0.3750	53.153	62.817	22107.5	23.58	141.74	65	52	1091.0	30.00	11437.3	11437.	280.7
28.00	Top - Section 1	0.3125	53.717	52.968	19086.0	28.90	171.89	65	52	98.5	30.00	11411.9	11411.	25.5
30.00		0.3125	53.223	52.479	18561.8	28.62	170.31	65	49	358.8	30.00	11209.4	11209.	204.2
35.00		0.3125	51.989	51.255	17293.5	27.92	166.37	65	49	882.5	30.00	10711.1	10711.	510.5
40.00		0.3125	50.756	50.032	16084.3	27.23	162.42	65	50	861.6	30.00	10224.2	10224.	510.5
40.75	RT1	0.3125	50.571	49.848	15908.0	27.12	161.83	65	50	127.5	30.00	10152.1	10152.	76.6
45.00		0.3125	49.522	48.808	14932.9	26.53	158.47	65	51	713.4				
50.00		0.3125	48.288	47.584	13837.7	25.84	154.52	65	51	820.0				
55.00		0.3125	47.055	46.361	12797.4	25.14	150.58	65	52	799.2				
60.00		0.3125	45.821	45.137	11810.7	24.44	146.63	65	52	778.4				
65.00	Bot - Section 3	0.3125	44.587	43.914	10876.0	23.75	142.68	65	52	757.6				
70.00		0.3125	43.354	42.690	9991.9	23.05	138.73	65	52	1484.0				
71.00	Top - Section 2	0.3125	43.732	43.065	10257.7	23.27	139.94	65	52	291.8				
75.00		0.3125	42.745	42.086	9574.0	22.71	136.78	65	52	579.5				
80.00		0.3125	41.511	40.863	8763.0	22.01	132.84	65	52	705.6				
85.00		0.3125	40.278	39.639	7999.1	21.32	128.89	65	52	684.8				
90.00		0.3125	39.044	38.416	7281.0	20.62	124.94	65	52	664.0				
95.00		0.3125	37.810	37.192	6607.2	19.92	120.99	65	52	643.2				
100.00		0.3125	36.577	35.968	5976.3	19.23	117.05	65	52	622.4				
105.00		0.3125	35.343	34.745	5386.9	18.53	113.10	65	52	601.6				
110.00	Bot - Section 4	0.3125	34.109	33.521	4837.6	17.84	109.15	65	52	580.7				
115.00	Top - Section 3	0.2500	33.376	26.284	3644.0	22.13	133.50	65	52	1015.4				
120.00		0.2500	32.142	25.306	3251.9	21.26	128.57	65	52	438.9				
123.00		0.2500	31.402	24.718	3030.7	20.74	125.61	65	52	255.3				
125.00		0.2500	30.908	24.327	2888.9	20.39	123.63	65	52	166.9				
130.00		0.2500	29.675	23.348	2554.0	19.52	118.70	65	52	405.6				
133.00		0.2500	28.935	22.760	2366.1	19.00	115.74	65	52	235.3				
135.00		0.2500	28.441	22.369	2246.1	18.65	113.76	65	52	153.6				
140.00		0.2500	27.208	21.390	1963.9	17.78	108.83	65	52	372.3				
145.00		0.2500	25.974	20.411	1706.4	16.91	103.90	65	52	355.6				
150.00	Top - Section 4	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	338.9				
150.00	Bot - Section 5	0.2500	24.740	19.432	1472.5	16.04	98.96	65	52					
153.00		0.2500	24.000	18.845	1343.0	15.52	96.00	65	52	195.4				
									Total Weight	**24541.5**				**1607.9**

Wind Loading - Shaft

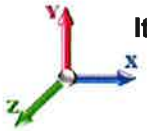
Structure: CT01499-S-SBA
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/16/2015
Page: 9

TES Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	16.384	27.69	400.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	16.384	27.69	391.78	0.650	0.000	5.00	24.743	16.08	445.3	0.0	1194.9
10.00		0.00	1.00	16.384	27.69	383.55	0.650	0.000	5.00	24.229	15.75	436.1	0.0	1169.9
15.00		0.00	1.00	16.384	27.69	375.33	0.650	0.000	5.00	23.715	15.41	426.8	0.0	1145.0
20.00		0.00	1.00	16.384	27.69	367.10	0.650	0.000	5.00	23.201	15.08	417.6	0.0	1120.0
21.00	Bot - Section 2	0.00	1.00	16.384	27.69	365.46	0.650	0.000	1.00	4.578	2.98	82.4	0.0	221.0
25.00		0.00	1.00	16.384	27.69	358.88	0.650	0.000	4.00	18.317	11.91	329.7	0.0	1611.6
27.75	RB1	0.00	1.00	16.384	27.69	354.35	0.650	0.000	2.75	12.402	8.06	223.2	0.0	1652.5
28.00	Top - Section 1	0.00	1.00	16.384	27.69	353.94	0.650	0.000	0.25	1.120	0.73	20.2	0.0	149.5
30.00		0.00	1.00	16.384	27.69	354.82	0.650	0.000	2.00	8.912	5.79	160.4	0.0	767.2
35.00		0.00	1.02	16.662	28.16	349.52	0.650	0.000	5.00	21.919	14.25	401.2	0.0	1903.4
40.00		0.00	1.06	17.310	29.25	347.80	0.650	0.000	5.00	21.405	13.91	407.0	0.0	1882.5
40.75	RT1	0.00	1.06	17.402	29.41	347.45	0.650	0.000	0.75	3.166	2.06	60.5	0.0	280.6
45.00		0.00	1.09	17.902	30.25	345.10	0.650	0.000	4.25	17.725	11.52	348.6	0.0	713.4
50.00		0.00	1.13	18.449	31.18	341.61	0.650	0.000	5.00	20.377	13.25	413.0	0.0	820.0
55.00		0.00	1.16	18.959	32.04	337.45	0.650	0.000	5.00	19.863	12.91	413.7	0.0	799.2
60.00		0.00	1.19	19.436	32.85	332.71	0.650	0.000	5.00	19.349	12.58	413.1	0.0	778.4
65.00	Bot - Section 3	0.00	1.21	19.885	33.61	327.47	0.650	0.000	5.00	18.835	12.24	411.4	0.0	757.6
70.00	Appurtenance(s)	0.00	1.24	20.311	34.33	321.80	0.650	0.000	5.00	18.581	12.08	414.6	0.0	1484.0
71.00	Top - Section 2	0.00	1.24	20.393	34.46	320.62	0.650	0.000	1.00	3.655	2.38	81.9	0.0	291.8
75.00		0.00	1.26	20.715	35.01	320.43	0.650	0.000	4.00	14.413	9.37	328.0	0.0	579.5
80.00		0.00	1.29	21.101	35.66	314.06	0.650	0.000	5.00	17.553	11.41	406.9	0.0	705.6
85.00		0.00	1.31	21.469	36.28	307.38	0.650	0.000	5.00	17.039	11.08	401.9	0.0	684.8
90.00		0.00	1.33	21.823	36.88	300.41	0.650	0.000	5.00	16.525	10.74	396.2	0.0	664.0
95.00	Appurtenance(s)	0.00	1.35	22.163	37.45	293.17	0.650	0.000	5.00	16.011	10.41	389.8	0.0	643.2
100.00		0.00	1.37	22.490	38.01	285.69	0.650	0.000	5.00	15.497	10.07	382.9	0.0	622.4
105.00	Appurtenance(s)	0.00	1.39	22.806	38.54	277.99	0.650	0.000	5.00	14.983	9.74	375.4	0.0	601.6
110.00	Bot - Section 4	0.00	1.41	23.111	39.06	270.07	0.650	0.000	5.00	14.469	9.41	367.3	0.0	580.7
115.00	Top - Section 3	0.00	1.43	23.406	39.56	261.96	0.650	0.000	5.00	14.164	9.21	364.2	0.0	1015.4
120.00		0.00	1.45	23.692	40.04	257.68	0.650	0.000	5.00	13.650	8.87	355.2	0.0	438.9
123.00	Appurtenance(s)	0.00	1.46	23.860	40.32	252.63	0.650	0.000	3.00	7.943	5.16	208.2	0.0	255.3
125.00		0.00	1.46	23.970	40.51	249.24	0.650	0.000	2.00	5.193	3.38	136.7	0.0	166.9
130.00		0.00	1.48	24.241	40.97	240.63	0.650	0.000	5.00	12.622	8.20	336.1	0.0	405.6
133.00	Appurtenance(s)	0.00	1.49	24.399	41.23	235.40	0.650	0.000	3.00	7.326	4.76	196.4	0.0	235.3
135.00		0.00	1.50	24.503	41.41	231.88	0.650	0.000	2.00	4.781	3.11	128.7	0.0	153.6
140.00		0.00	1.51	24.759	41.84	222.98	0.650	0.000	5.00	11.593	7.54	315.3	0.0	372.3
145.00		0.00	1.53	25.009	42.26	213.93	0.650	0.000	5.00	11.079	7.20	304.4	0.0	355.6
150.00	Top - Section 4	0.00	1.54	25.252	42.68	204.76	0.650	0.000	5.00	10.565	6.87	293.1	0.0	338.9
153.00	Appurtenance(s)	0.00	1.55	25.395	42.92	199.20	0.650	0.000	3.00	6.093	3.96	170.0	0.0	195.4
								Totals:	**153.00**			**11,763.0**		**27,757.4**

Discrete Appurtenance Forces

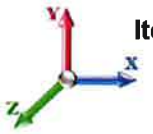
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	153.00	ACU-A20-N	4	25.395	42.918	0.90	0.50	4.00	0.000	0.000	21.63	0.00	0.00
2	153.00	1900 MHz RRUs	3	25.395	42.918	0.88	10.03	132.00	0.000	0.000	430.56	0.00	0.00
3	153.00	800 MHz Filters	3	25.395	42.918	0.69	1.61	26.40	0.000	0.000	69.30	0.00	0.00
4	153.00	800 MHz RRUs	3	25.395	42.918	0.92	6.87	159.00	0.000	0.000	294.95	0.00	0.00
5	153.00	TD-RRH8x20-25	3	25.395	42.918	0.69	9.77	210.00	0.000	0.000	419.33	0.00	0.00
6	153.00	APXVTM14-C-I20	3	25.395	42.918	0.79	16.35	168.00	0.000	0.000	701.84	0.00	0.00
7	153.00	Lightning Rod	1	25.395	42.918	1.00	0.50	5.00	0.000	0.000	21.46	0.00	0.00
8	153.00	Low Profile Platform	1	25.395	42.918	1.00	25.00	1200.00	0.000	0.000	1072.96	0.00	0.00
9	153.00	APXVSPP18-C-A20	3	25.395	42.918	0.83	20.57	171.00	0.000	0.000	882.72	0.00	0.00
10	133.00	RR90-17-02DP	6	24.399	41.234	0.68	17.79	81.00	0.000	0.000	733.51	0.00	0.00
11	133.00	Low Profile Platform	1	24.399	41.234	1.00	25.00	1200.00	0.000	0.000	1030.86	0.00	0.00
12	123.00	LPA-80063/6CF	6	23.860	40.324	0.94	58.32	162.00	0.000	0.000	2351.59	0.00	0.00
13	123.00	DB-T1-6Z-8AB-0Z	2	23.860	40.324	0.90	10.08	37.80	0.000	0.000	406.46	0.00	0.00
14	123.00	Low Profile Platform	1	23.860	40.324	1.00	25.00	1200.00	0.000	0.000	1008.09	0.00	0.00
15	123.00	SBNHH-1D65B	9	23.860	40.324	0.83	62.23	365.40	0.000	0.000	2509.15	0.00	0.00
16	123.00	RRH2x60-700	3	24.025	40.602	0.76	9.03	180.00	0.000	3.000	366.59	0.00	1099.77
17	123.00	RRH2X60-AWS	3	23.860	40.324	0.76	9.03	180.00	0.000	0.000	364.08	0.00	0.00
18	123.00	RRH2X60-PCS	3	23.860	40.324	0.89	6.86	165.00	0.000	0.000	276.70	0.00	0.00
19	105.00	Standoff	1	22.806	38.541	1.00	2.63	40.00	0.000	0.000	101.36	0.00	0.00
20	105.00	10' Omni	1	23.111	39.057	1.00	3.00	25.00	0.000	5.000	117.17	0.00	585.86
21	95.00	1000860	3	22.163	37.455	1.00	0.18	6.00	0.000	0.000	6.74	0.00	0.00
22	95.00	7770	3	22.163	37.455	0.73	12.88	105.00	0.000	0.000	482.32	0.00	0.00
23	95.00	HPA-65R-BUU-H6	4	22.163	37.455	0.90	37.30	204.00	0.000	0.000	1396.92	0.00	0.00
24	95.00	LGP21401	6	22.163	37.455	0.67	5.19	84.60	0.000	0.000	194.23	0.00	0.00
25	95.00	LGP21903	6	22.163	37.455	0.84	1.36	33.00	0.000	0.000	50.97	0.00	0.00
26	95.00	OPA-65R-LCUU-H6	3	22.163	37.455	0.79	24.55	240.00	0.000	0.000	919.64	0.00	0.00
27	95.00	Raycap/Squid	2	22.163	37.455	0.90	2.65	63.60	0.000	0.000	99.11	0.00	0.00
28	95.00	RRUS-11	6	22.163	37.455	0.68	18.03	330.00	0.000	0.000	675.45	0.00	0.00
29	95.00	RRUS-12	3	22.163	37.455	0.67	6.33	180.00	0.000	0.000	237.15	0.00	0.00
30	95.00	RRUS-32	3	22.163	37.455	0.87	10.10	231.00	0.000	0.000	378.32	0.00	0.00
31	95.00	RRUS-A2	3	22.163	37.455	0.62	3.46	63.60	0.000	0.000	129.58	0.00	0.00
32	95.00	RRUS-E2	3	22.163	37.455	0.70	6.87	171.90	0.000	0.000	257.20	0.00	0.00
33	95.00	SBNH-1D65A	2	22.163	37.455	0.90	10.57	76.80	0.000	0.000	395.75	0.00	0.00
34	95.00	Sector Frame	3	22.163	37.455	0.75	39.38	1500.00	0.000	0.000	1474.79	0.00	0.00
35	70.00	Standoff	1	20.311	34.325	1.00	2.63	40.00	0.000	0.000	90.28	0.00	0.00
36	70.00	GPS	1	20.311	34.325	1.00	1.00	10.00	0.000	0.000	34.33	0.00	0.00
						Totals:		**9,051.10**			**20,003.08**		

Total Applied Force Summary

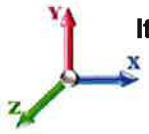
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		528.39	1295.28	0.00	0.00
10.00		519.14	1270.30	0.00	0.00
15.00		509.88	1245.32	0.00	0.00
20.00		500.63	1220.34	0.00	0.00
21.00		99.02	241.07	0.00	0.00
25.00		399.85	1691.90	0.00	0.00
27.75		282.60	1426.92	0.00	0.00
28.00		25.55	129.03	0.00	0.00
30.00		203.58	603.14	0.00	0.00
35.00		511.00	1493.27	0.00	0.00
40.00		521.10	1472.46	0.00	0.00
40.75		77.73	219.07	0.00	0.00
45.00		444.78	798.68	0.00	0.00
50.00		506.51	920.37	0.00	0.00
55.00		509.79	899.55	0.00	0.00
60.00		511.65	878.73	0.00	0.00
65.00		512.25	857.92	0.00	0.00
70.00	(2) appurtenances	642.16	1634.38	0.00	0.00
71.00		102.55	311.88	0.00	0.00
75.00		412.00	659.80	0.00	0.00
80.00		513.86	806.01	0.00	0.00
85.00		510.71	785.19	0.00	0.00
90.00		506.80	764.37	0.00	0.00
95.00	(50) appurtenances	7200.33	4033.05	0.00	0.00
100.00		420.87	699.54	0.00	0.00
105.00	(2) appurtenances	632.44	743.72	0.00	585.86
110.00		406.39	657.10	0.00	0.00
115.00		403.73	1091.81	0.00	0.00
120.00		395.29	515.24	0.00	0.00
123.00	(27) appurtenances	7515.04	2591.35	0.00	1099.77
125.00		136.73	173.47	0.00	0.00
130.00		336.09	422.03	0.00	0.00
133.00	(7) appurtenances	1960.73	1526.22	0.00	0.00
135.00		128.70	158.07	0.00	0.00
140.00		315.32	383.52	0.00	0.00
145.00		304.38	366.87	0.00	0.00
150.00		293.08	350.21	0.00	0.00
153.00	(24) appurtenances	4084.71	2277.53	0.00	0.00
	Totals:	**33,885.37**	**37,614.70**	**0.00**	**1,685.63**

Resulting Forces and Deflections

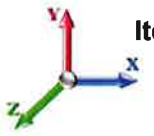
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-33.936	-37.568	0.000	0.000	0.000	-3471.4	0.000	0.000	0.000	0.000	0.000
5.00	-33.502	-36.185	0.000	0.000	0.000	-3301.8	-0.082	0.000	0.082	-0.151	0.000
10.00	-33.071	-34.828	0.000	0.000	0.000	-3134.3	-0.323	0.000	0.323	-0.304	0.000
15.00	-32.644	-33.498	0.000	0.000	0.000	-2968.9	-0.725	0.000	0.725	-0.459	0.000
20.00	-32.185	-32.230	0.000	0.000	0.000	-2805.7	-1.290	0.000	1.290	-0.615	0.000
21.00	-32.128	-31.945	0.000	0.000	0.000	-2773.5	-1.422	0.000	1.422	-0.647	0.000
25.00	-31.764	-30.199	0.000	0.000	0.000	-2645.0	-2.020	0.000	2.020	-0.774	0.000
27.75	-31.484	-28.751	0.000	0.000	0.000	-2557.6	-2.492	0.000	2.492	-0.863	0.000
28.00	-31.468	-28.609	0.000	0.000	0.000	-2549.8	-2.538	0.000	2.538	-0.868	0.000
30.00	-31.294	-27.965	0.000	0.000	0.000	-2486.8	-2.911	0.000	2.911	-0.911	0.000
35.00	-30.811	-26.419	0.000	0.000	0.000	-2330.4	-3.927	0.000	3.927	-1.026	0.000
40.00	-30.291	-24.922	0.000	0.000	0.000	-2176.3	-5.064	0.000	5.064	-1.141	0.000
40.75	-30.233	-24.674	0.000	0.000	0.000	-2153.6	-5.245	0.000	5.245	-1.158	0.000
45.00	-29.831	-23.811	0.000	0.000	0.000	-2025.1	-6.320	0.000	6.320	-1.255	0.000
50.00	-29.377	-22.808	0.000	0.000	0.000	-1875.9	-7.735	0.000	7.735	-1.441	0.000
55.00	-28.914	-21.829	0.000	0.000	0.000	-1729.1	-9.345	0.000	9.345	-1.626	0.000
60.00	-28.443	-20.875	0.000	0.000	0.000	-1584.5	-11.148	0.000	11.148	-1.810	0.000
65.00	-27.966	-19.946	0.000	0.000	0.000	-1442.3	-13.143	0.000	13.143	-1.993	0.000
70.00	-27.299	-18.286	0.000	0.000	0.000	-1302.5	-15.327	0.000	15.327	-2.172	0.000
71.00	-27.213	-17.935	0.000	0.000	0.000	-1275.2	-15.786	0.000	15.786	-2.209	0.000
75.00	-26.821	-17.221	0.000	0.000	0.000	-1166.3	-17.699	0.000	17.699	-2.350	0.000
80.00	-26.319	-16.364	0.000	0.000	0.000	-1032.2	-20.249	0.000	20.249	-2.514	0.000
85.00	-25.815	-15.534	0.000	0.000	0.000	-900.66	-22.967	0.000	22.967	-2.670	0.000
90.00	-25.309	-14.731	0.000	0.000	0.000	-771.58	-25.845	0.000	25.845	-2.819	0.000
95.00	-17.940	-11.025	0.000	0.000	0.000	-645.04	-28.873	0.000	28.873	-2.958	0.000
100.00	-17.505	-10.310	0.000	0.000	0.000	-555.34	-32.040	0.000	32.040	-3.087	0.000
105.00	-16.853	-9.568	0.000	0.000	0.000	-467.23	-35.338	0.000	35.338	-3.209	0.000
110.00	-16.426	-8.905	0.000	0.000	0.000	-382.97	-38.759	0.000	38.759	-3.321	0.000
115.00	-15.972	-7.813	0.000	0.000	0.000	-300.84	-42.291	0.000	42.291	-3.421	0.000
120.00	-15.555	-7.304	0.000	0.000	0.000	-220.98	-45.921	0.000	45.921	-3.507	0.000
123.00	-7.898	-5.175	0.000	0.000	0.000	-173.22	-48.142	0.000	48.142	-3.559	0.000
125.00	-7.755	-5.004	0.000	0.000	0.000	-157.42	-49.639	0.000	49.639	-3.590	0.000
130.00	-7.397	-4.597	0.000	0.000	0.000	-118.65	-53.434	0.000	53.434	-3.658	0.000
133.00	-5.344	-3.197	0.000	0.000	0.000	-96.464	-55.744	0.000	55.744	-3.694	0.000
135.00	-5.207	-3.045	0.000	0.000	0.000	-85.776	-57.295	0.000	57.295	-3.716	0.000
140.00	-4.869	-2.679	0.000	0.000	0.000	-59.741	-61.210	0.000	61.210	-3.762	0.000
145.00	-4.543	-2.331	0.000	0.000	0.000	-35.395	-65.167	0.000	65.167	-3.796	0.000
150.00	-4.227	-2.000	0.000	0.000	0.000	-12.682	-69.153	0.000	69.153	-3.816	0.000
153.00	-4.085	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.551	-3.820	0.000

Resulting Stresses

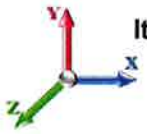
Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.53	0.96	0.00	0.00	0.00	39.81	40.38	50.3	0.803
5.00	0.52	0.97	0.00	0.00	0.00	39.49	40.04	50.8	0.789
10.00	0.51	0.98	0.00	0.00	0.00	39.13	39.67	51.3	0.774
15.00	0.50	0.99	0.00	0.00	0.00	38.72	39.26	51.8	0.758
20.00	0.50	1.00	0.00	0.00	0.00	38.27	38.80	52.0	0.746
21.00	0.49	1.00	0.00	0.00	0.00	38.17	38.70	52.0	0.745
25.00	0.47	1.01	0.00	0.00	0.00	37.76	38.28	52.0	0.736
27.75	0.46	1.01	0.00	0.00	0.00	24.60	25.06	52.0	0.482
28.00	0.54	1.20	0.00	0.00	0.00	24.57	24.57	52.0	0.473
30.00	0.53	1.20	0.00	0.00	0.00	26.98	26.98	48.7	0.554
35.00	0.52	1.21	0.00	0.00	0.00	26.26	26.26	49.3	0.532
40.00	0.50	1.22	0.00	0.00	0.00	25.48	25.48	49.9	0.510
40.75	0.49	1.22	0.00	0.00	0.00	25.37	25.86	50.0	0.517
45.00	0.49	1.23	0.00	0.00	0.00	40.92	41.46	50.5	0.821
50.00	0.48	1.24	0.00	0.00	0.00	39.89	40.42	51.1	0.791
55.00	0.47	1.26	0.00	0.00	0.00	38.74	39.27	51.7	0.760
60.00	0.46	1.27	0.00	0.00	0.00	37.45	37.98	52.0	0.731
65.00	0.45	1.28	0.00	0.00	0.00	36.03	36.55	52.0	0.703
70.00	0.43	1.29	0.00	0.00	0.00	34.43	34.93	52.0	0.672
71.00	0.42	1.27	0.00	0.00	0.00	33.12	33.61	52.0	0.647
75.00	0.41	1.28	0.00	0.00	0.00	31.73	32.21	52.0	0.620
80.00	0.40	1.30	0.00	0.00	0.00	29.79	30.28	52.0	0.582
85.00	0.39	1.31	0.00	0.00	0.00	27.63	28.11	52.0	0.541
90.00	0.38	1.33	0.00	0.00	0.00	25.21	25.70	52.0	0.494
95.00	0.30	0.97	0.00	0.00	0.00	22.49	22.85	52.0	0.440
100.00	0.29	0.98	0.00	0.00	0.00	20.71	21.06	52.0	0.405
105.00	0.28	0.98	0.00	0.00	0.00	18.68	19.03	52.0	0.366
110.00	0.27	0.99	0.00	0.00	0.00	16.45	16.80	52.0	0.323
115.00	0.30	1.22	0.00	0.00	0.00	16.79	17.22	52.0	0.331
120.00	0.29	1.24	0.00	0.00	0.00	13.31	13.76	52.0	0.265
123.00	0.21	0.64	0.00	0.00	0.00	10.94	11.20	52.0	0.215
125.00	0.21	0.64	0.00	0.00	0.00	10.26	10.53	52.0	0.203
130.00	0.20	0.64	0.00	0.00	0.00	8.40	8.67	52.0	0.167
133.00	0.14	0.47	0.00	0.00	0.00	7.19	7.37	52.0	0.142
135.00	0.14	0.47	0.00	0.00	0.00	6.62	6.80	52.0	0.131
140.00	0.13	0.46	0.00	0.00	0.00	5.04	5.23	52.0	0.101
145.00	0.11	0.45	0.00	0.00	0.00	3.28	3.48	52.0	0.067
150.00	0.10	0.44	0.00	0.00	0.00	1.30	1.59	52.0	0.031
150.00	0.10	0.44	0.00	0.00	0.00	1.30	1.59	52.0	0.031
153.00	0.00	0.44	0.00	0.00	0.00	0.00	0.76	52.0	0.015

Wind Loading - Shaft

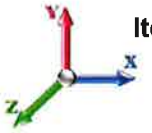
Structure: CT01499-S-SBA
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/16/2015
Page: 14

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	12.287	20.77	346.40	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	12.287	20.77	339.28	0.650	0.500	5.00	25.160	16.35	339.6	182.9	1377.8
10.00		0.00	1.00	12.287	20.77	332.16	0.650	0.500	5.00	24.646	16.02	332.7	179.1	1349.0
15.00		0.00	1.00	12.287	20.77	325.03	0.650	0.500	5.00	24.132	15.69	325.7	175.3	1320.2
20.00		0.00	1.00	12.287	20.77	317.91	0.650	0.500	5.00	23.618	15.35	318.8	171.5	1291.4
21.00	Bot - Section 2	0.00	1.00	12.287	20.77	316.49	0.650	0.500	1.00	4.662	3.03	62.9	34.1	255.1
25.00		0.00	1.00	12.287	20.77	310.79	0.650	0.500	4.00	18.650	12.12	251.7	135.7	1747.3
27.75	RB1	0.00	1.00	12.287	20.77	306.87	0.650	0.500	2.75	12.631	8.21	170.5	92.1	1744.6
28.00	Top - Section 1	0.00	1.00	12.287	20.77	306.51	0.650	0.500	0.25	1.141	0.74	15.4	8.4	157.9
30.00		0.00	1.00	12.287	20.77	307.27	0.650	0.500	2.00	9.078	5.90	122.5	66.3	833.5
35.00		0.00	1.02	12.496	21.12	302.69	0.650	0.500	5.00	22.336	14.52	306.6	162.0	2065.3
40.00		0.00	1.06	12.982	21.94	301.19	0.650	0.500	5.00	21.822	14.18	311.2	158.2	2040.7
40.75	RT1	0.00	1.06	13.051	22.06	300.89	0.650	0.500	0.75	3.229	2.10	46.3	23.6	304.2
45.00		0.00	1.09	13.426	22.69	298.86	0.650	0.500	4.25	18.079	11.75	266.6	131.2	844.6
50.00		0.00	1.13	13.836	23.38	295.83	0.650	0.500	5.00	20.794	13.52	316.0	150.5	970.6
55.00		0.00	1.16	14.218	24.03	292.23	0.650	0.500	5.00	20.280	13.18	316.7	146.7	945.9
60.00		0.00	1.19	14.576	24.63	288.13	0.650	0.500	5.00	19.766	12.85	316.5	142.9	921.3
65.00	Bot - Section 3	0.00	1.21	14.913	25.20	283.59	0.650	0.500	5.00	19.252	12.51	315.4	139.1	896.7
70.00	Appurtenance(s)	0.00	1.24	15.232	25.74	278.68	0.650	0.500	5.00	18.998	12.35	317.9	137.2	1621.3
71.00	Top - Section 2	0.00	1.24	15.294	25.85	277.66	0.650	0.500	1.00	3.738	2.43	62.8	27.3	319.1
75.00		0.00	1.26	15.536	26.26	277.49	0.650	0.500	4.00	14.746	9.59	251.7	106.8	686.3
80.00		0.00	1.29	15.825	26.74	271.98	0.650	0.500	5.00	17.970	11.68	312.4	129.6	835.3
85.00		0.00	1.31	16.101	27.21	266.19	0.650	0.500	5.00	17.456	11.35	308.7	125.8	810.7
90.00		0.00	1.33	16.366	27.66	260.15	0.650	0.500	5.00	16.942	11.01	304.6	122.0	786.0
95.00	Appurtenance(s)	0.00	1.35	16.621	28.09	253.89	0.650	0.500	5.00	16.428	10.68	299.9	118.2	761.4
100.00		0.00	1.37	16.866	28.50	247.41	0.650	0.500	5.00	15.914	10.34	294.9	114.4	736.8
105.00	Appurtenance(s)	0.00	1.39	17.103	28.90	240.74	0.650	0.500	5.00	15.400	10.01	289.3	110.6	712.2
110.00	Bot - Section 4	0.00	1.41	17.332	29.29	233.88	0.650	0.500	5.00	14.886	9.68	283.4	106.8	687.5
115.00	Top - Section 3	0.00	1.43	17.554	29.67	226.86	0.650	0.500	5.00	14.580	9.48	281.1	104.5	1120.0
120.00		0.00	1.45	17.768	30.03	223.15	0.650	0.500	5.00	14.066	9.14	274.6	100.7	539.6
123.00	Appurtenance(s)	0.00	1.46	17.894	30.24	218.78	0.650	0.500	3.00	8.193	5.33	161.0	59.1	314.4
125.00		0.00	1.46	17.977	30.38	215.84	0.650	0.500	2.00	5.359	3.48	105.8	38.8	205.7
130.00		0.00	1.48	18.179	30.72	208.39	0.650	0.500	5.00	13.038	8.47	260.4	93.1	498.7
133.00	Appurtenance(s)	0.00	1.49	18.298	30.92	203.86	0.650	0.500	3.00	7.576	4.92	152.3	54.5	289.8
135.00		0.00	1.50	18.376	31.06	200.81	0.650	0.500	2.00	4.948	3.22	99.9	35.7	189.3
140.00		0.00	1.51	18.568	31.38	193.10	0.650	0.500	5.00	12.010	7.81	245.0	85.5	457.8
145.00		0.00	1.53	18.755	31.70	185.27	0.650	0.500	5.00	11.496	7.47	236.9	81.7	437.3
150.00	Top - Section 4	0.00	1.54	18.938	32.01	177.32	0.650	0.500	5.00	10.982	7.14	228.5	77.9	416.8
153.00	Appurtenance(s)	0.00	1.55	19.045	32.19	172.51	0.650	0.500	3.00	6.343	4.12	132.7	45.4	240.7
								Totals:	**153.00**			**9,038.9**		**31,732.6**

Discrete Appurtenance Forces

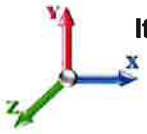
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 15	

TES Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	153.00	ACU-A20-N	4	19.045	32.187	0.90	0.79	9.20	0.000	0.000	25.49	0.00	0.00
2	153.00	1900 MHz RRUs	3	19.045	32.187	0.88	11.09	225.60	0.000	0.000	356.89	0.00	0.00
3	153.00	800 MHz Filters	3	19.045	32.187	0.69	1.99	41.40	0.000	0.000	63.96	0.00	0.00
4	153.00	800 MHz RRUs	3	19.045	32.187	0.92	7.78	222.30	0.000	0.000	250.52	0.00	0.00
5	153.00	TD-RRH8x20-25	3	19.045	32.187	0.69	10.29	276.00	0.000	0.000	331.14	0.00	0.00
6	153.00	APXVTM14-C-I20	3	19.045	32.187	0.79	17.28	275.70	0.000	0.000	556.10	0.00	0.00
7	153.00	Lightning Rod	1	19.045	32.187	1.00	1.00	11.00	0.000	0.000	32.19	0.00	0.00
8	153.00	Low Profile Platform	1	19.045	32.187	1.00	31.00	1500.00	0.000	0.000	997.79	0.00	0.00
9	153.00	APXVSPP18-C-A20	3	19.045	32.187	0.83	22.61	319.50	0.000	0.000	727.72	0.00	0.00
10	133.00	RR90-17-02DP	6	18.298	30.924	0.68	20.36	0.00	0.000	0.000	629.59	0.00	0.00
11	133.00	Low Profile Platform	1	18.298	30.924	1.00	31.00	1500.00	0.000	0.000	958.64	0.00	0.00
12	123.00	LPA-80063/6CF	6	17.894	30.241	0.94	63.06	0.00	0.000	0.000	1906.86	0.00	0.00
13	123.00	DB-T1-6Z-8AB-0Z	2	17.894	30.241	0.90	10.57	92.00	0.000	0.000	319.53	0.00	0.00
14	123.00	Low Profile Platform	1	17.894	30.241	1.00	31.00	1500.00	0.000	0.000	937.47	0.00	0.00
15	123.00	SBNHH-1D65B	9	17.894	30.241	0.83	65.74	783.00	0.000	0.000	1987.93	0.00	0.00
16	123.00	RRH2x60-700	3	18.018	30.450	0.76	9.64	240.30	0.000	3.000	293.67	0.00	881.02
17	123.00	RRH2X60-AWS	3	17.894	30.241	0.76	9.64	240.30	0.000	0.000	291.66	0.00	0.00
18	123.00	RRH2X60-PCS	3	17.894	30.241	0.89	7.37	212.70	0.000	0.000	222.85	0.00	0.00
19	105.00	Standoff	1	17.103	28.904	1.00	4.34	63.00	0.000	0.000	125.45	0.00	0.00
20	105.00	10' Omni	1	17.332	29.291	1.00	4.03	46.70	0.000	5.000	118.04	0.00	590.22
21	95.00	1000860	3	16.621	28.090	1.00	0.36	8.40	0.000	0.000	10.11	0.00	0.00
22	95.00	7770	3	16.621	28.090	0.73	14.30	0.00	0.000	0.000	401.70	0.00	0.00
23	95.00	HPA-65R-BUU-H6	4	16.621	28.090	0.90	38.09	433.60	0.000	0.000	1069.88	0.00	0.00
24	95.00	LGP21401	6	16.621	28.090	0.67	6.15	127.20	0.000	0.000	172.77	0.00	0.00
25	95.00	LGP21903	6	16.621	28.090	0.84	1.92	47.40	0.000	0.000	53.80	0.00	0.00
26	95.00	OPA-65R-LCUU-H6	3	16.621	28.090	0.79	25.71	402.00	0.000	0.000	722.31	0.00	0.00
27	95.00	Raycap/Squid	2	16.621	28.090	0.90	3.01	99.00	0.000	0.000	84.44	0.00	0.00
28	95.00	RRUS-11	6	16.621	28.090	0.68	19.79	484.20	0.000	0.000	555.84	0.00	0.00
29	95.00	RRUS-12	3	16.621	28.090	0.67	7.06	243.60	0.000	0.000	198.17	0.00	0.00
30	95.00	RRUS-32	3	16.621	28.090	0.87	11.22	310.50	0.000	0.000	315.25	0.00	0.00
31	95.00	RRUS-A2	3	16.621	28.090	0.62	4.00	94.20	0.000	0.000	112.33	0.00	0.00
32	95.00	RRUS-E2	3	16.621	28.090	0.70	7.31	219.00	0.000	0.000	205.28	0.00	0.00
33	95.00	SBNH-1D65A	2	16.621	28.090	0.90	11.68	149.40	0.000	0.000	328.14	0.00	0.00
34	95.00	Sector Frame	3	16.621	28.090	0.75	48.38	2100.00	0.000	0.000	1358.83	0.00	0.00
35	70.00	Standoff	1	15.232	25.743	1.00	4.34	63.00	0.000	0.000	111.72	0.00	0.00
36	70.00	GPS	1	15.232	25.743	1.00	1.25	18.00	0.000	0.000	32.18	0.00	0.00
						Totals:		**12,358.20**			**16,866.23**		

Total Applied Force Summary

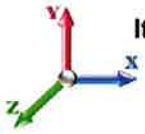
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		432.00	1485.15	0.00	0.00
10.00		425.06	1456.36	0.00	0.00
15.00		418.12	1427.57	0.00	0.00
20.00		411.19	1398.78	0.00	0.00
21.00		81.40	276.61	0.00	0.00
25.00		330.48	1861.65	0.00	0.00
27.75		239.02	1627.38	0.00	0.00
28.00		21.62	147.25	0.00	0.00
30.00		172.37	748.24	0.00	0.00
35.00		433.30	1852.23	0.00	0.00
40.00		442.82	1827.60	0.00	0.00
40.75		66.14	272.26	0.00	0.00
45.00		377.07	1068.82	0.00	0.00
50.00		420.10	1077.90	0.00	0.00
55.00		423.67	1053.28	0.00	0.00
60.00		426.10	1028.65	0.00	0.00
65.00		427.54	1004.03	0.00	0.00
70.00	(2) appurtenances	576.35	1809.61	0.00	0.00
71.00		85.80	340.57	0.00	0.00
75.00		345.12	772.14	0.00	0.00
80.00		431.39	942.63	0.00	0.00
85.00		429.84	918.00	0.00	0.00
90.00		427.67	893.38	0.00	0.00
95.00	(50) appurtenances	6013.79	5587.25	0.00	0.00
100.00		343.31	820.13	0.00	0.00
105.00	(2) appurtenances	581.96	905.20	0.00	590.22
110.00		333.21	770.08	0.00	0.00
115.00		331.58	1202.52	0.00	0.00
120.00		325.60	622.15	0.00	0.00
123.00	(27) appurtenances	6151.86	3432.22	0.00	881.02
125.00		105.83	211.70	0.00	0.00
130.00		260.37	513.77	0.00	0.00
133.00	(7) appurtenances	1740.52	1798.90	0.00	0.00
135.00		99.88	193.25	0.00	0.00
140.00		244.98	467.65	0.00	0.00
145.00		236.85	447.19	0.00	0.00
150.00		228.47	426.73	0.00	0.00
153.00	(24) appurtenances	3474.49	3127.37	0.00	0.00
	Totals:	**28,316.89**	**45,816.22**	**0.00**	**1,471.23**

Resulting Forces and Deflections

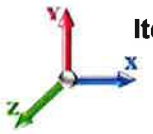
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-28.369	-45.784	0.000	0.000	0.000	-2919.7	0.000	0.000	0.000	0.000	0.000
5.00	-28.034	-44.237	0.000	0.000	0.000	-2777.8	-0.069	0.000	0.069	-0.127	0.000
10.00	-27.700	-42.719	0.000	0.000	0.000	-2637.7	-0.272	0.000	0.272	-0.256	0.000
15.00	-27.369	-41.232	0.000	0.000	0.000	-2499.2	-0.610	0.000	0.610	-0.386	0.000
20.00	-27.001	-39.799	0.000	0.000	0.000	-2362.3	-1.085	0.000	1.085	-0.517	0.000
21.00	-26.964	-39.491	0.000	0.000	0.000	-2335.3	-1.197	0.000	1.197	-0.545	0.000
25.00	-26.673	-37.591	0.000	0.000	0.000	-2227.5	-1.699	0.000	1.699	-0.652	0.000
27.75	-26.439	-35.949	0.000	0.000	0.000	-2154.1	-2.097	0.000	2.097	-0.726	0.000
28.00	-26.428	-35.793	0.000	0.000	0.000	-2147.5	-2.135	0.000	2.135	-0.731	0.000
30.00	-26.287	-35.016	0.000	0.000	0.000	-2094.7	-2.450	0.000	2.450	-0.767	0.000
35.00	-25.883	-33.126	0.000	0.000	0.000	-1963.2	-3.305	0.000	3.305	-0.864	0.000
40.00	-25.441	-31.282	0.000	0.000	0.000	-1833.8	-4.262	0.000	4.262	-0.960	0.000
40.75	-25.397	-30.989	0.000	0.000	0.000	-1814.7	-4.414	0.000	4.414	-0.975	0.000
45.00	-25.064	-29.874	0.000	0.000	0.000	-1706.8	-5.320	0.000	5.320	-1.057	0.000
50.00	-24.701	-28.738	0.000	0.000	0.000	-1581.5	-6.511	0.000	6.511	-1.213	0.000
55.00	-24.329	-27.628	0.000	0.000	0.000	-1458.0	-7.867	0.000	7.867	-1.370	0.000
60.00	-23.949	-26.546	0.000	0.000	0.000	-1336.3	-9.386	0.000	9.386	-1.525	0.000
65.00	-23.561	-25.492	0.000	0.000	0.000	-1216.6	-11.066	0.000	11.066	-1.679	0.000
70.00	-22.967	-23.665	0.000	0.000	0.000	-1098.8	-12.907	0.000	12.907	-1.830	0.000
71.00	-22.901	-23.297	0.000	0.000	0.000	-1075.8	-13.293	0.000	13.293	-1.861	0.000
75.00	-22.581	-22.486	0.000	0.000	0.000	-984.27	-14.905	0.000	14.905	-1.980	0.000
80.00	-22.167	-21.507	0.000	0.000	0.000	-871.37	-17.054	0.000	17.054	-2.118	0.000
85.00	-21.749	-20.557	0.000	0.000	0.000	-760.54	-19.345	0.000	19.345	-2.251	0.000
90.00	-21.327	-19.636	0.000	0.000	0.000	-651.80	-21.771	0.000	21.771	-2.376	0.000
95.00	-15.109	-14.281	0.000	0.000	0.000	-545.16	-24.324	0.000	24.324	-2.493	0.000
100.00	-14.754	-13.449	0.000	0.000	0.000	-469.62	-26.994	0.000	26.994	-2.602	0.000
105.00	-14.153	-12.548	0.000	0.000	0.000	-395.26	-29.775	0.000	29.775	-2.705	0.000
110.00	-13.802	-11.773	0.000	0.000	0.000	-324.49	-32.660	0.000	32.660	-2.800	0.000
115.00	-13.425	-10.569	0.000	0.000	0.000	-255.49	-35.640	0.000	35.640	-2.886	0.000
120.00	-13.079	-9.952	0.000	0.000	0.000	-188.36	-38.702	0.000	38.702	-2.959	0.000
123.00	-6.761	-6.840	0.000	0.000	0.000	-148.24	-40.576	0.000	40.576	-3.003	0.000
125.00	-6.649	-6.629	0.000	0.000	0.000	-134.72	-41.839	0.000	41.839	-3.030	0.000
130.00	-6.366	-6.125	0.000	0.000	0.000	-101.48	-45.043	0.000	45.043	-3.088	0.000
133.00	-4.533	-4.421	0.000	0.000	0.000	-82.386	-46.993	0.000	46.993	-3.118	0.000
135.00	-4.425	-4.232	0.000	0.000	0.000	-73.322	-48.303	0.000	48.303	-3.137	0.000
140.00	-4.156	-3.776	0.000	0.000	0.000	-51.199	-51.609	0.000	51.609	-3.177	0.000
145.00	-3.896	-3.341	0.000	0.000	0.000	-30.417	-54.952	0.000	54.952	-3.206	0.000
150.00	-3.645	-2.927	0.000	0.000	0.000	-10.935	-58.319	0.000	58.319	-3.223	0.000
153.00	-3.474	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.345	-3.227	0.000

Resulting Stresses

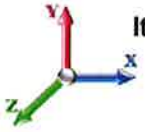
Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 18	

TES Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

	Applied Stresses								
Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.65	0.81	0.00	0.00	0.00	33.48	34.16	50.3	0.679
5.00	0.64	0.81	0.00	0.00	0.00	33.22	33.89	50.8	0.667
10.00	0.63	0.82	0.00	0.00	0.00	32.93	33.58	51.3	0.655
15.00	0.62	0.83	0.00	0.00	0.00	32.59	33.24	51.8	0.642
20.00	0.61	0.84	0.00	0.00	0.00	32.22	32.86	52.0	0.632
21.00	0.61	0.84	0.00	0.00	0.00	32.14	32.78	52.0	0.631
25.00	0.59	0.84	0.00	0.00	0.00	31.80	32.43	52.0	0.624
27.75	0.57	0.85	0.00	0.00	0.00	20.72	21.29	52.0	0.410
28.00	0.68	1.01	0.00	0.00	0.00	20.69	20.69	52.0	0.398
30.00	0.67	1.01	0.00	0.00	0.00	22.73	22.73	48.7	0.466
35.00	0.65	1.02	0.00	0.00	0.00	22.12	22.12	49.3	0.448
40.00	0.63	1.02	0.00	0.00	0.00	21.47	21.47	49.9	0.430
40.75	0.62	1.03	0.00	0.00	0.00	21.37	22.00	50.0	0.440
45.00	0.61	1.03	0.00	0.00	0.00	34.49	35.14	50.5	0.696
50.00	0.60	1.05	0.00	0.00	0.00	33.62	34.28	51.1	0.671
55.00	0.60	1.06	0.00	0.00	0.00	32.66	33.31	51.7	0.644
60.00	0.59	1.07	0.00	0.00	0.00	31.59	32.23	52.0	0.620
65.00	0.58	1.08	0.00	0.00	0.00	30.39	31.03	52.0	0.597
70.00	0.55	1.08	0.00	0.00	0.00	29.05	29.66	52.0	0.571
71.00	0.54	1.07	0.00	0.00	0.00	27.95	28.55	52.0	0.549
75.00	0.53	1.08	0.00	0.00	0.00	26.77	27.37	52.0	0.527
80.00	0.53	1.09	0.00	0.00	0.00	25.15	25.75	52.0	0.495
85.00	0.52	1.11	0.00	0.00	0.00	23.33	23.93	52.0	0.460
90.00	0.51	1.12	0.00	0.00	0.00	21.30	21.89	52.0	0.421
95.00	0.38	0.82	0.00	0.00	0.00	19.01	19.44	52.0	0.374
100.00	0.37	0.83	0.00	0.00	0.00	17.51	17.94	52.0	0.345
105.00	0.36	0.82	0.00	0.00	0.00	15.80	16.22	52.0	0.312
110.00	0.35	0.83	0.00	0.00	0.00	13.94	14.36	52.0	0.276
115.00	0.40	1.03	0.00	0.00	0.00	14.26	14.77	52.0	0.284
120.00	0.39	1.04	0.00	0.00	0.00	11.34	11.87	52.0	0.228
123.00	0.28	0.55	0.00	0.00	0.00	9.36	9.68	52.0	0.186
125.00	0.27	0.55	0.00	0.00	0.00	8.78	9.10	52.0	0.175
130.00	0.26	0.55	0.00	0.00	0.00	7.18	7.51	52.0	0.144
133.00	0.19	0.40	0.00	0.00	0.00	6.14	6.37	52.0	0.123
135.00	0.19	0.40	0.00	0.00	0.00	5.66	5.89	52.0	0.113
140.00	0.18	0.39	0.00	0.00	0.00	4.32	4.55	52.0	0.088
145.00	0.16	0.38	0.00	0.00	0.00	2.82	3.06	52.0	0.059
150.00	0.15	0.38	0.00	0.00	0.00	1.12	1.43	52.0	0.027
150.00	0.15	0.38	0.00	0.00	0.00	1.12	1.43	52.0	0.027
153.00	0.00	0.37	0.00	0.00	0.00	0.00	0.64	52.0	0.012

Wind Loading - Shaft

Structure: CT01499-S-SBA
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.000 (ft)

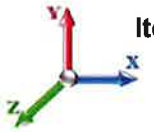
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/16/2015

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 21

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	6.400	10.82	250.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	244.86	0.650	0.000	5.00	24.743	16.08	174.0	0.0	1194.9
10.00		0.00	1.00	6.400	10.82	239.72	0.650	0.000	5.00	24.229	15.75	170.3	0.0	1169.9
15.00		0.00	1.00	6.400	10.82	234.58	0.650	0.000	5.00	23.715	15.41	166.7	0.0	1145.0
20.00		0.00	1.00	6.400	10.82	229.44	0.650	0.000	5.00	23.201	15.08	163.1	0.0	1120.0
21.00	Bot - Section 2	0.00	1.00	6.400	10.82	228.41	0.650	0.000	1.00	4.578	2.98	32.2	0.0	221.0
25.00		0.00	1.00	6.400	10.82	224.30	0.650	0.000	4.00	18.317	11.91	128.8	0.0	1611.6
27.75	RB1	0.00	1.00	6.400	10.82	221.47	0.650	0.000	2.75	12.402	8.06	87.2	0.0	1652.5
28.00	Top - Section 1	0.00	1.00	6.400	10.82	221.21	0.650	0.000	0.25	1.120	0.73	7.9	0.0	149.5
30.00		0.00	1.00	6.400	10.82	221.76	0.650	0.000	2.00	8.912	5.79	62.7	0.0	767.2
35.00		0.00	1.02	6.509	11.00	218.45	0.650	0.000	5.00	21.919	14.25	156.7	0.0	1903.4
40.00		0.00	1.06	6.762	11.43	217.37	0.650	0.000	5.00	21.405	13.91	159.0	0.0	1882.5
40.75	RT1	0.00	1.06	6.798	11.49	217.16	0.650	0.000	0.75	3.166	2.06	23.6	0.0	280.6
45.00		0.00	1.09	6.993	11.82	215.69	0.650	0.000	4.25	17.725	11.52	136.2	0.0	713.4
50.00		0.00	1.13	7.207	12.18	213.51	0.650	0.000	5.00	20.377	13.25	161.3	0.0	820.0
55.00		0.00	1.16	7.406	12.52	210.90	0.650	0.000	5.00	19.863	12.91	161.6	0.0	799.2
60.00		0.00	1.19	7.592	12.83	207.94	0.650	0.000	5.00	19.349	12.58	161.4	0.0	778.4
65.00	Bot - Section 3	0.00	1.21	7.768	13.13	204.67	0.650	0.000	5.00	18.835	12.24	160.7	0.0	757.6
70.00	Appurtenance(s)	0.00	1.24	7.934	13.41	201.13	0.650	0.000	5.00	18.581	12.08	161.9	0.0	1484.0
71.00	Top - Section 2	0.00	1.24	7.966	13.46	200.39	0.650	0.000	1.00	3.655	2.38	32.0	0.0	291.8
75.00		0.00	1.26	8.092	13.68	200.27	0.650	0.000	4.00	14.413	9.37	128.1	0.0	579.5
80.00		0.00	1.29	8.242	13.93	196.29	0.650	0.000	5.00	17.553	11.41	158.9	0.0	705.6
85.00		0.00	1.31	8.387	14.17	192.11	0.650	0.000	5.00	17.039	11.08	157.0	0.0	684.8
90.00		0.00	1.33	8.525	14.41	187.75	0.650	0.000	5.00	16.525	10.74	154.7	0.0	664.0
95.00	Appurtenance(s)	0.00	1.35	8.657	14.63	183.23	0.650	0.000	5.00	16.011	10.41	152.3	0.0	643.2
100.00		0.00	1.37	8.785	14.85	178.56	0.650	0.000	5.00	15.497	10.07	149.6	0.0	622.4
105.00	Appurtenance(s)	0.00	1.39	8.908	15.06	173.74	0.650	0.000	5.00	14.983	9.74	146.6	0.0	601.6
110.00	Bot - Section 4	0.00	1.41	9.028	15.26	168.80	0.650	0.000	5.00	14.469	9.41	143.5	0.0	580.7
115.00	Top - Section 3	0.00	1.43	9.143	15.45	163.73	0.650	0.000	5.00	14.164	9.21	142.3	0.0	1015.4
120.00		0.00	1.45	9.255	15.64	161.05	0.650	0.000	5.00	13.650	8.87	138.8	0.0	438.9
123.00	Appurtenance(s)	0.00	1.46	9.320	15.75	157.90	0.650	0.000	3.00	7.943	5.16	81.3	0.0	255.3
125.00		0.00	1.46	9.363	15.82	155.77	0.650	0.000	2.00	5.193	3.38	53.4	0.0	166.9
130.00		0.00	1.48	9.469	16.00	150.40	0.650	0.000	5.00	12.622	8.20	131.3	0.0	405.6
133.00	Appurtenance(s)	0.00	1.49	9.531	16.11	147.12	0.650	0.000	3.00	7.326	4.76	76.7	0.0	235.3
135.00		0.00	1.50	9.572	16.18	144.92	0.650	0.000	2.00	4.781	3.11	50.3	0.0	153.6
140.00		0.00	1.51	9.672	16.35	139.36	0.650	0.000	5.00	11.593	7.54	123.2	0.0	372.3
145.00		0.00	1.53	9.769	16.51	133.71	0.650	0.000	5.00	11.079	7.20	118.9	0.0	355.6
150.00	Top - Section 4	0.00	1.54	9.864	16.67	127.98	0.650	0.000	5.00	10.565	6.87	114.5	0.0	338.9
153.00	Appurtenance(s)	0.00	1.55	9.920	16.76	124.50	0.650	0.000	3.00	6.093	3.96	66.4	0.0	195.4
								Totals:	**153.00**			**4,594.9**		**27,757.4**

Discrete Appurtenance Forces

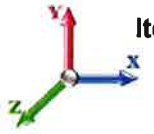
Structure: CT01499-S-SB
Site Name: Torrington
Height: 153.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

9/16/2015
Page: 20

TES Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 21

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	153.00	ACU-A20-N	4	9.920	16.765	0.90	0.50	4.00	0.000	0.000	8.45	0.00	0.00
2	153.00	1900 MHz RRUs	3	9.920	16.765	0.88	10.03	132.00	0.000	0.000	168.19	0.00	0.00
3	153.00	800 MHz Filters	3	9.920	16.765	0.69	1.61	26.40	0.000	0.000	27.07	0.00	0.00
4	153.00	800 MHz RRUs	3	9.920	16.765	0.92	6.87	159.00	0.000	0.000	115.22	0.00	0.00
5	153.00	TD-RRH8x20-25	3	9.920	16.765	0.69	9.77	210.00	0.000	0.000	163.80	0.00	0.00
6	153.00	APXVTM14-C-I20	3	9.920	16.765	0.79	16.35	168.00	0.000	0.000	274.16	0.00	0.00
7	153.00	Lightning Rod	1	9.920	16.765	1.00	0.50	5.00	0.000	0.000	8.38	0.00	0.00
8	153.00	Low Profile Platform	1	9.920	16.765	1.00	25.00	1200.00	0.000	0.000	419.12	0.00	0.00
9	153.00	APXVSPP18-C-A20	3	9.920	16.765	0.83	20.57	171.00	0.000	0.000	344.81	0.00	0.00
10	133.00	RR90-17-02DP	6	9.531	16.107	0.68	17.79	81.00	0.000	0.000	286.53	0.00	0.00
11	133.00	Low Profile Platform	1	9.531	16.107	1.00	25.00	1200.00	0.000	0.000	402.68	0.00	0.00
12	123.00	LPA-80063/6CF	6	9.320	15.751	0.94	58.32	162.00	0.000	0.000	918.59	0.00	0.00
13	123.00	DB-T1-6Z-8AB-0Z	2	9.320	15.751	0.90	10.08	37.80	0.000	0.000	158.77	0.00	0.00
14	123.00	Low Profile Platform	1	9.320	15.751	1.00	25.00	1200.00	0.000	0.000	393.79	0.00	0.00
15	123.00	SBNHH-1D65B	9	9.320	15.751	0.83	62.23	365.40	0.000	0.000	980.14	0.00	0.00
16	123.00	RRH2x60-700	3	9.385	15.860	0.76	9.03	180.00	0.000	3.000	143.20	0.00	429.60
17	123.00	RRH2X60-AWS	3	9.320	15.751	0.76	9.03	180.00	0.000	0.000	142.22	0.00	0.00
18	123.00	RRH2X60-PCS	3	9.320	15.751	0.89	6.86	165.00	0.000	0.000	108.09	0.00	0.00
19	105.00	Standoff	1	8.908	15.055	1.00	2.63	40.00	0.000	0.000	39.60	0.00	0.00
20	105.00	10' Omni	1	9.028	15.257	1.00	3.00	25.00	0.000	5.000	45.77	0.00	228.85
21	95.00	1000860	3	8.657	14.631	1.00	0.18	6.00	0.000	0.000	2.63	0.00	0.00
22	95.00	7770	3	8.657	14.631	0.73	12.88	105.00	0.000	0.000	188.40	0.00	0.00
23	95.00	HPA-65R-BUU-H6	4	8.657	14.631	0.90	37.30	204.00	0.000	0.000	545.67	0.00	0.00
24	95.00	LGP21401	6	8.657	14.631	0.67	5.19	84.60	0.000	0.000	75.87	0.00	0.00
25	95.00	LGP21903	6	8.657	14.631	0.84	1.36	33.00	0.000	0.000	19.91	0.00	0.00
26	95.00	OPA-65R-LCUU-H6	3	8.657	14.631	0.79	24.55	240.00	0.000	0.000	359.23	0.00	0.00
27	95.00	Raycap/Squid	2	8.657	14.631	0.90	2.65	63.60	0.000	0.000	38.71	0.00	0.00
28	95.00	RRUS-11	6	8.657	14.631	0.68	18.03	330.00	0.000	0.000	263.85	0.00	0.00
29	95.00	RRUS-12	3	8.657	14.631	0.67	6.33	180.00	0.000	0.000	92.64	0.00	0.00
30	95.00	RRUS-32	3	8.657	14.631	0.87	10.10	231.00	0.000	0.000	147.78	0.00	0.00
31	95.00	RRUS-A2	3	8.657	14.631	0.62	3.46	63.60	0.000	0.000	50.62	0.00	0.00
32	95.00	RRUS-E2	3	8.657	14.631	0.70	6.87	171.90	0.000	0.000	100.47	0.00	0.00
33	95.00	SBNH-1D65A	2	8.657	14.631	0.90	10.57	76.80	0.000	0.000	154.59	0.00	0.00
34	95.00	Sector Frame	3	8.657	14.631	0.75	39.38	1500.00	0.000	0.000	576.09	0.00	0.00
35	70.00	Standoff	1	7.934	13.408	1.00	2.63	40.00	0.000	0.000	35.26	0.00	0.00
36	70.00	GPS	1	7.934	13.408	1.00	1.00	10.00	0.000	0.000	13.41	0.00	0.00
						Totals:		**9,051.10**			**7,813.70**		

Total Applied Force Summary

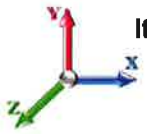
Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 21

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		206.40	1295.28	0.00	0.00
10.00		202.79	1270.30	0.00	0.00
15.00		199.17	1245.32	0.00	0.00
20.00		195.56	1220.34	0.00	0.00
21.00		38.68	241.07	0.00	0.00
25.00		156.19	1691.90	0.00	0.00
27.75		110.39	1426.92	0.00	0.00
28.00		9.98	129.03	0.00	0.00
30.00		79.53	603.14	0.00	0.00
35.00		199.61	1493.27	0.00	0.00
40.00		203.56	1472.46	0.00	0.00
40.75		30.36	219.07	0.00	0.00
45.00		173.74	798.68	0.00	0.00
50.00		197.86	920.37	0.00	0.00
55.00		199.14	899.55	0.00	0.00
60.00		199.86	878.73	0.00	0.00
65.00		200.10	857.92	0.00	0.00
70.00	(2) appurtenances	250.84	1634.38	0.00	0.00
71.00		40.06	311.88	0.00	0.00
75.00		160.94	659.80	0.00	0.00
80.00		200.73	806.01	0.00	0.00
85.00		199.50	785.19	0.00	0.00
90.00		197.97	764.37	0.00	0.00
95.00	(50) appurtenances	2812.63	4033.05	0.00	0.00
100.00		164.40	699.54	0.00	0.00
105.00	(2) appurtenances	247.05	743.72	0.00	228.85
110.00		158.75	657.10	0.00	0.00
115.00		157.71	1091.81	0.00	0.00
120.00		154.41	515.24	0.00	0.00
123.00	(27) appurtenances	2935.56	2591.35	0.00	429.60
125.00		53.41	173.47	0.00	0.00
130.00		131.28	422.03	0.00	0.00
133.00	(7) appurtenances	765.91	1526.22	0.00	0.00
135.00		50.27	158.07	0.00	0.00
140.00		123.17	383.52	0.00	0.00
145.00		118.90	366.87	0.00	0.00
150.00		114.48	350.21	0.00	0.00
153.00	(24) appurtenances	1595.59	2277.53	0.00	0.00
	Totals:	**13,236.47**	**37,614.70**	**0.00**	**658.45**

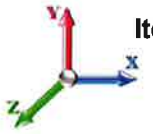
Resulting Forces and Deflections

Structure:	CT01499-S-SB	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 21

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-13.255	-37.608	0.000	0.000	0.000	-1356.7	0.000	0.000	0.000	0.000	0.000
5.00	-13.086	-36.299	0.000	0.000	0.000	-1290.4	-0.032	0.000	0.032	-0.059	0.000
10.00	-12.918	-35.015	0.000	0.000	0.000	-1225.0	-0.126	0.000	0.126	-0.119	0.000
15.00	-12.751	-33.757	0.000	0.000	0.000	-1160.4	-0.283	0.000	0.283	-0.179	0.000
20.00	-12.572	-32.529	0.000	0.000	0.000	-1096.6	-0.504	0.000	0.504	-0.240	0.000
21.00	-12.550	-32.282	0.000	0.000	0.000	-1084.0	-0.556	0.000	0.556	-0.253	0.000
25.00	-12.408	-30.582	0.000	0.000	0.000	-1033.8	-0.789	0.000	0.789	-0.303	0.000
27.75	-12.299	-29.151	0.000	0.000	0.000	-999.76	-0.974	0.000	0.974	-0.337	0.000
28.00	-12.293	-29.020	0.000	0.000	0.000	-996.69	-0.992	0.000	0.992	-0.339	0.000
30.00	-12.225	-28.411	0.000	0.000	0.000	-972.10	-1.138	0.000	1.138	-0.356	0.000
35.00	-12.037	-26.910	0.000	0.000	0.000	-910.98	-1.535	0.000	1.535	-0.401	0.000
40.00	-11.834	-25.434	0.000	0.000	0.000	-850.80	-1.979	0.000	1.979	-0.446	0.000
40.75	-11.811	-25.210	0.000	0.000	0.000	-841.92	-2.050	0.000	2.050	-0.453	0.000
45.00	-11.655	-24.402	0.000	0.000	0.000	-791.72	-2.470	0.000	2.470	-0.491	0.000
50.00	-11.478	-23.468	0.000	0.000	0.000	-733.45	-3.024	0.000	3.024	-0.563	0.000
55.00	-11.298	-22.557	0.000	0.000	0.000	-676.06	-3.653	0.000	3.653	-0.636	0.000
60.00	-11.115	-21.667	0.000	0.000	0.000	-619.57	-4.358	0.000	4.358	-0.708	0.000
65.00	-10.930	-20.798	0.000	0.000	0.000	-563.99	-5.138	0.000	5.138	-0.779	0.000
70.00	-10.670	-19.159	0.000	0.000	0.000	-509.35	-5.992	0.000	5.992	-0.849	0.000
71.00	-10.636	-18.842	0.000	0.000	0.000	-498.68	-6.171	0.000	6.171	-0.863	0.000
75.00	-10.484	-18.174	0.000	0.000	0.000	-456.13	-6.919	0.000	6.919	-0.919	0.000
80.00	-10.289	-17.360	0.000	0.000	0.000	-403.71	-7.916	0.000	7.916	-0.983	0.000
85.00	-10.093	-16.568	0.000	0.000	0.000	-352.26	-8.979	0.000	8.979	-1.044	0.000
90.00	-9.896	-15.797	0.000	0.000	0.000	-301.80	-10.105	0.000	10.105	-1.102	0.000
95.00	-7.015	-11.814	0.000	0.000	0.000	-252.32	-11.289	0.000	11.289	-1.156	0.000
100.00	-6.846	-11.112	0.000	0.000	0.000	-217.24	-12.528	0.000	12.528	-1.207	0.000
105.00	-6.592	-10.369	0.000	0.000	0.000	-182.78	-13.818	0.000	13.818	-1.255	0.000
110.00	-6.425	-9.711	0.000	0.000	0.000	-149.82	-15.156	0.000	15.156	-1.298	0.000
115.00	-6.248	-8.619	0.000	0.000	0.000	-117.70	-16.538	0.000	16.538	-1.338	0.000
120.00	-6.085	-8.105	0.000	0.000	0.000	-86.463	-17.958	0.000	17.958	-1.371	0.000
123.00	-3.090	-5.584	0.000	0.000	0.000	-67.778	-18.827	0.000	18.827	-1.392	0.000
125.00	-3.034	-5.411	0.000	0.000	0.000	-61.598	-19.412	0.000	19.412	-1.404	0.000
130.00	-2.894	-4.991	0.000	0.000	0.000	-46.429	-20.897	0.000	20.897	-1.430	0.000
133.00	-2.091	-3.484	0.000	0.000	0.000	-37.747	-21.801	0.000	21.801	-1.444	0.000
135.00	-2.037	-3.327	0.000	0.000	0.000	-33.565	-22.408	0.000	22.408	-1.453	0.000
140.00	-1.905	-2.946	0.000	0.000	0.000	-23.378	-23.939	0.000	23.939	-1.471	0.000
145.00	-1.778	-2.582	0.000	0.000	0.000	-13.851	-25.488	0.000	25.488	-1.485	0.000
150.00	-1.654	-2.235	0.000	0.000	0.000	-4.963	-27.047	0.000	27.047	-1.492	0.000
153.00	-1.596	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.986	-1.494	0.000

Resulting Stresses

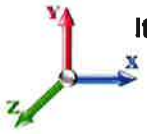
Structure:	CT01499-S-SBA	**Code:**	EIA/TIA-222-F	9/16/2015	
Site Name:	Torrington	**Exposure:**	C		
Height:	153.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 21

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.53	0.38	0.00	0.00	0.00	15.56	16.10	50.3	0.320
5.00	0.52	0.38	0.00	0.00	0.00	15.43	15.97	50.8	0.314
10.00	0.51	0.38	0.00	0.00	0.00	15.29	15.82	51.3	0.309
15.00	0.51	0.39	0.00	0.00	0.00	15.13	15.66	51.8	0.302
20.00	0.50	0.39	0.00	0.00	0.00	14.96	15.47	52.0	0.298
21.00	0.50	0.39	0.00	0.00	0.00	14.92	15.43	52.0	0.297
25.00	0.48	0.39	0.00	0.00	0.00	14.76	15.26	52.0	0.294
27.75	0.46	0.39	0.00	0.00	0.00	9.61	10.08	52.0	0.194
28.00	0.55	0.47	0.00	0.00	0.00	9.60	9.60	52.0	0.185
30.00	0.54	0.47	0.00	0.00	0.00	10.55	10.55	48.7	0.216
35.00	0.53	0.47	0.00	0.00	0.00	10.26	10.26	49.3	0.208
40.00	0.51	0.48	0.00	0.00	0.00	9.96	9.96	49.9	0.200
40.75	0.51	0.48	0.00	0.00	0.00	9.92	10.42	50.0	0.208
45.00	0.50	0.48	0.00	0.00	0.00	16.00	16.52	50.5	0.327
50.00	0.49	0.49	0.00	0.00	0.00	15.59	16.11	51.1	0.315
55.00	0.49	0.49	0.00	0.00	0.00	15.14	15.65	51.7	0.303
60.00	0.48	0.50	0.00	0.00	0.00	14.64	15.15	52.0	0.291
65.00	0.47	0.50	0.00	0.00	0.00	14.09	14.59	52.0	0.281
70.00	0.45	0.50	0.00	0.00	0.00	13.46	13.94	52.0	0.268
71.00	0.44	0.50	0.00	0.00	0.00	12.95	13.42	52.0	0.258
75.00	0.43	0.50	0.00	0.00	0.00	12.41	12.87	52.0	0.248
80.00	0.42	0.51	0.00	0.00	0.00	11.65	12.11	52.0	0.233
85.00	0.42	0.51	0.00	0.00	0.00	10.81	11.26	52.0	0.217
90.00	0.41	0.52	0.00	0.00	0.00	9.86	10.31	52.0	0.198
95.00	0.32	0.38	0.00	0.00	0.00	8.80	9.14	52.0	0.176
100.00	0.31	0.38	0.00	0.00	0.00	8.10	8.44	52.0	0.162
105.00	0.30	0.38	0.00	0.00	0.00	7.31	7.63	52.0	0.147
110.00	0.29	0.39	0.00	0.00	0.00	6.44	6.76	52.0	0.130
115.00	0.33	0.48	0.00	0.00	0.00	6.57	6.95	52.0	0.134
120.00	0.32	0.48	0.00	0.00	0.00	5.21	5.59	52.0	0.108
123.00	0.23	0.25	0.00	0.00	0.00	4.28	4.53	52.0	0.087
125.00	0.22	0.25	0.00	0.00	0.00	4.02	4.26	52.0	0.082
130.00	0.21	0.25	0.00	0.00	0.00	3.29	3.53	52.0	0.068
133.00	0.15	0.19	0.00	0.00	0.00	2.81	2.98	52.0	0.057
135.00	0.15	0.18	0.00	0.00	0.00	2.59	2.76	52.0	0.053
140.00	0.14	0.18	0.00	0.00	0.00	1.97	2.13	52.0	0.041
145.00	0.13	0.18	0.00	0.00	0.00	1.28	1.44	52.0	0.028
150.00	0.12	0.17	0.00	0.00	0.00	0.51	0.69	52.0	0.013
150.00	0.12	0.17	0.00	0.00	0.00	0.51	0.69	52.0	0.013
153.00	0.00	0.17	0.00	0.00	0.00	0.00	0.30	52.0	0.006

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
80 mph Wind with 0" Ice	33.9	0.00	37.57	0.00	0.00	3471.48
69.28 mph Wind with 0.5" Ice	28.4	0.00	45.78	0.00	0.00	2919.73
50 mph Wind with 0" Ice	13.3	0.00	37.61	0.00	0.00	1356.71

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
80 mph Wind with 0" Ice	0.49	1.23	0.00	0.00	0.00	40.92	41.46	50.5	45.00	0.821
69.28 mph Wind with 0.5" Ice	0.61	1.03	0.00	0.00	0.00	34.49	35.14	50.5	45.00	0.696
50 mph Wind with 0" Ice	0.50	0.48	0.00	0.00	0.00	16.00	16.52	50.5	45.00	0.327

Additional Steel Summary

						Intermediate Connectors			Upper Termination			Lower Termination			Max Member			
Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	V (kips)	Shear Allow (kips)	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Ta (kips)	Pa (kips)	Ratio
27.8	40.8	(3) PLT-8"x1.25"(1.25Hole)	300.6	5.41	33.0	256.9	8	14	251.7	1	14	273.0	450.0	473.9	0.607