Robinson+Cole

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Also admitted in Massachusetts

January 28, 2015

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

Re: **EM-VER-032-150108 – Amended Notice of Exempt Modification**
Facility Modification
1712 Main Street in Coventry, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 150-foot level of the existing 190-foot lattice tower at 1712 Main Street in Coventry, Connecticut (the "Property"). The tower and the Property are owned by the Town of Coventry. Cellco's shared use of this tower was approved by the Council in 2004. Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; three (3) model LNX-6514DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to John Elsesser, Town Manager for the Town of Coventry.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 150-foot level of the 190-foot tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in 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, Rev 1: December 11, 2014, included in Attachment 3). The revised structural report calls for the installation of only one fiber optic antenna cable and the removal of six (6) existing coax cables.

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:
John Elsesser, Coventry Town Manager
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1847.0 mm x 301.0 mm x 181.0 mm | 72.7 in x 11.9 in x 7.1 in
Net Weight	17.6 kg | 38.8 lb
Model with factory installed AISG 2.0 RET	LNX-6514DS-A1M

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

**Values calculated using NGMN Alliance N-P-BASTA v9.6*

Mechanical Specifications

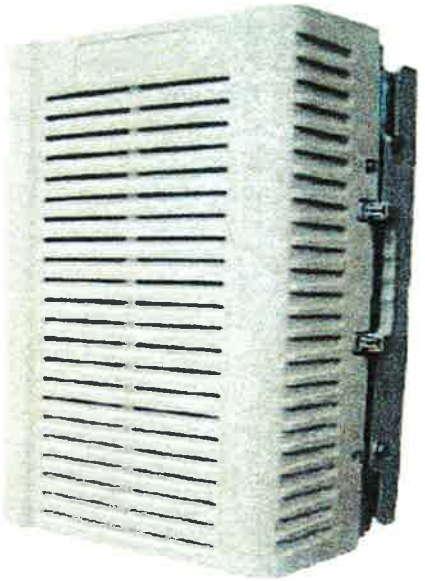
Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

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

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.

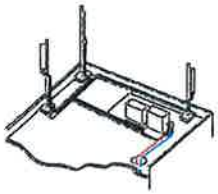
EASY INSTALLATION

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.

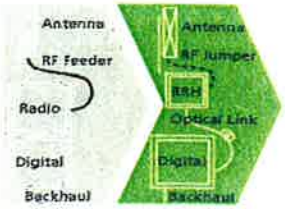
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

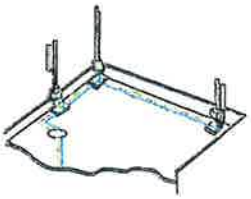
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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

AT THE SPEED OF IDEAS™

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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-95-658 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)

* This data is provisional and subject to change

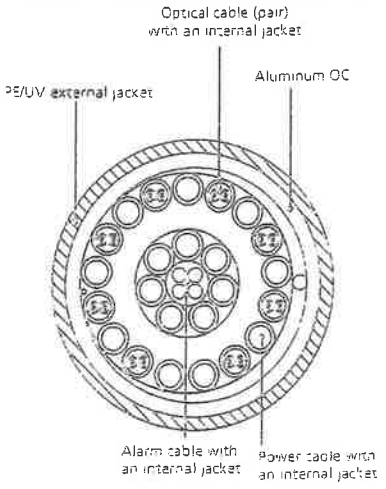


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Coventry E								
Tower Height: 190Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint	11	200	180	0.0244	1900	1.0000	2.44%	
*Nextel	12	100	130	0.0255	851	0.5673	4.50%	
*Unknown	1	80	190	0.0008	75.98	0.2000	0.40%	
*Unknown	1	1000	190	0.0100	449.875	0.2999	3.32%	
*Unknown	1	200	190	0.0020	33.8	0.2000	1.00%	
*Unknown	1	750	160	0.0105	450	0.3000	3.51%	
*Unknown	1	600	160	0.0084	450	0.3000	2.81%	
*Unknown	1	100	160	0.0014	450	0.3000	0.47%	
*Unknown	1	30	140	0.0006	145.63	0.2000	0.28%	
*Unknown	1	15	140	0.0003	440.925	0.2940	0.09%	
*Unknown	1	8	140	0.0001	173.20375	0.2000	0.07%	
*Unknown	1	30	190	0.0003	50.4	0.2000	0.15%	
*Unknown	1	2	120	0.0000	420.5	0.2803	0.02%	
*Unknown	1	250	190	0.0025	152.0075	0.2000	1.25%	
*Unknown	1	4	188	0.0000	903	0.6020	0.01%	
*Unknown	1	40	95	0.0016	33.44	0.2000	0.80%	
*Unknown	1	80	75	0.0051	45.4	0.2000	2.56%	
*Unknown	1	80	95	0.0032	45.14	0.2000	1.59%	
*Unknown	1	200	75	0.0128	33.8	0.2000	6.39%	
*Unknown	1	100	120	0.0025	153.955	0.2000	1.25%	
*Unknown	1	4	188	0.0000	903	0.6020	0.01%	
*Unknown	1	80	110	0.0024	45.14	0.2000	1.19%	
*Unknown	1	50	115	0.0014	47.54	0.2000	0.68%	
*Pocket	3	631	95	0.0754	2130	1.0000	7.54%	
Verizon PCS	**11**	**408**	**150**	**0.0717**	**1970**	**1.0000**	**7.17%**	
Verizon Cellular	**9**	**386**	**150**	**0.0555**	**869**	**0.5793**	**9.58%**	
Verizon AWS	**1**	**1750**	**150**	**0.0280**	**2145**	**1.0000**	**2.80%**	
Verizon 700	**1**	**1050**	**150**	**0.0168**	**746**	**0.4973**	**3.37%**	
								65.24%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

190' Existing Rohn Lattice Tower

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Coventry East

1712 Main Street
Coventry, CT

CENTEK Project No. 14001.057

~~Date: December 3, 2014~~

Rev 1: December 11, 2014

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing lattice tower located in Coventry, Connecticut.

The host tower is a 190-ft, three legged, lattice tower originally manufactured by ROHN eng. file no. 33814PH dated 7/24/96. The tower geometry, structure member sizes and foundation information were taken from a previous structural report prepared by Centek Engineering job no; 12001.CO64 dated May 21, 2012.

Antenna and appurtenance inventory were taken from the aforementioned Centek structural report and a Verizon RF data sheet.

The tower consists of ten (10) vertical sections consisting of steel pipe legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A572 Gr. 50 and ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 4-ft 8-in at the top and 19-ft 0-in at the bottom.

Verizon Wireless proposes the removal of twelve (12) panel antennas and the installation of twelve (12) panel antennas, six (6) remote radio heads and two (2) main distribution boxes mounted on the existing T-frames. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- UNKNOWN (Existing):
  Antenna: Two (2) obstruction lights, one (1) PD1142-3 Omni-directional whip antenna, one (1) ASP705 Omni-directional whip antenna, one (1) DB420 dipole antenna and one (1) 3' yagi pipe mounted to the top of the tower.
  Coax Cable: Two (2) 1-1/4" ∅ and two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) PD1142-2A Omni-directional whip antenna, one (1) ASP705 Omni-directional whip antenna, one (1) 4' Omni-directional whip antenna, one (1) 3' yagi, one (1) halo and one (1) paraflector grid mounted on three (3) 4-ft side arms with an elevation of ±188-ft above grade level.
  Coax Cable: Three (3) 7/8" ∅ and three (3) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- SPRINT (Existing):
  Antenna: Six (6) Andrew DB980H90E-M panel antennas mounted on three (3) 14-ft boom gates with a RAD center elevation of ±180-ft above grade level.
  Coax Cable: Six (6) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- UNKNOWN (Existing):
  Antenna: Two (2) ASP705 Omni-directional whip antennas and one (1) 3-ft dish mounted on two (2) 4-ft side arms with an elevation of ±156-ft above grade level.
  Coax Cable: Three (3) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: Two (2) paraflector grid antennas, one (1) DB264 dipole antenna and one (1) DB436 yagi mounted on two (2) 4-ft side arms with an elevation of ±142-ft above grade level.
  Coax Cable: Two (2) 7/8" ∅ and one (1) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) DB230 yagi leg mounted with an elevation of ±142-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) single dipole antenna leg mounted with an elevation of ±136-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) Dipole antenna mounted on one (1) 4-ft side arm with an elevation of ±113-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) PD320 dipole antenna leg mounted with an elevation of ±110-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 14-ft Omni-directional whip antenna mounted on one (1) 4-ft side arm with an elevation of ±109-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 14-ft Omni-directional whip antenna mounted on one (1) 4-ft side arm with an elevation of ±103-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- UNKNOWN (Existing):
  Antenna: One (1) GPS antenna mounted on a 1-ft standoff pipe with an elevation of ±102-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) DB212 single dipole antenna leg mounted with an elevation of ±94-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) single dipole antenna leg mounted with an elevation of ±92-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) PD320 dipole antenna leg mounted with an elevation of ±74-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) single dipole antenna leg mounted with an elevation of ±70-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) single dipole antenna leg mounted with an elevation of ±50-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) DB212 single dipole antenna leg mounted with an elevation of ±50-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) DB212 single dipole antenna leg mounted with an elevation of ±32-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- UNKNOWN (Existing):
  Antenna: One (1) single dipole antenna leg mounted with an elevation of ±31-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) PD 400 Omni-directional whip antenna and one (1) 3-ft yagi mounted on one (1) 4-ft side arm with an elevation of ±17-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- Nextel (Existing):
  Antenna: Twelve (12) Andrew DB844H90E-XY panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±130-ft above grade level.
  Coax Cable: Twelve (12) 1-1/4" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remove):
  Antennas: Three (3) Antel BXA-70063-6CF, two (2) Antel LPA-80080-4CF, four (4) Antel LPA-80063-4CF and three (3) Antel BXA-171085-8CF panel antennas mounted on (3) 12-ft T-Frames with a RAD center elevation of ±150-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report. **(Refer to feedline plan located in section three of this report for cables to be removed)**
- **VERIZON (Proposed):**
  Antennas: Six (6) Andrew HBXX-6517DS panel antennas, six (6) Andrew LNX-6514DS panel antennas, three (3) Alcatel-Lucent RRH-2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH-2x60-AWS remote radio heads and two (2) RFD DB-T1-6Z-8AB-0Z main distribution boxes mounted on (3) 12-ft T-Frames with a RAD center elevation of ±150-ft above grade level.
  Coax Cables: One (1) 1-5/8" Ø fiber cable mounted to the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Tolland; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Coventry; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **99.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Diagonal (T9)	20'-0"-40'-0"	98.7%	**PASS**
Leg (T8)	40'-0"-60'-0"	99.2%	**PASS**
Secondary Horizontal (T9)	20'-0"-40'-0"	84.5%	**PASS**

Foundation and Anchors

The existing foundation consists of a 32-ft square x 4.5-ft thick reinforced concrete mat. The base of the tower is connected to the foundation by means of (24) 1.00"∅, ASTM A354 Gr. BC anchor bolts embedded approximately 5.5-ft into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**47 kips**
	Compression	**56 kips**
	Moment	**4879 kip-ft**
Leg	Shear	**30 kips**
	Uplift	**274 kips**
	Compression	**315 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	77.2%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Mat	OM[2]	2.0	2.38	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: OM denotes Overturning Moment.

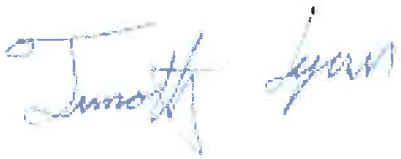
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

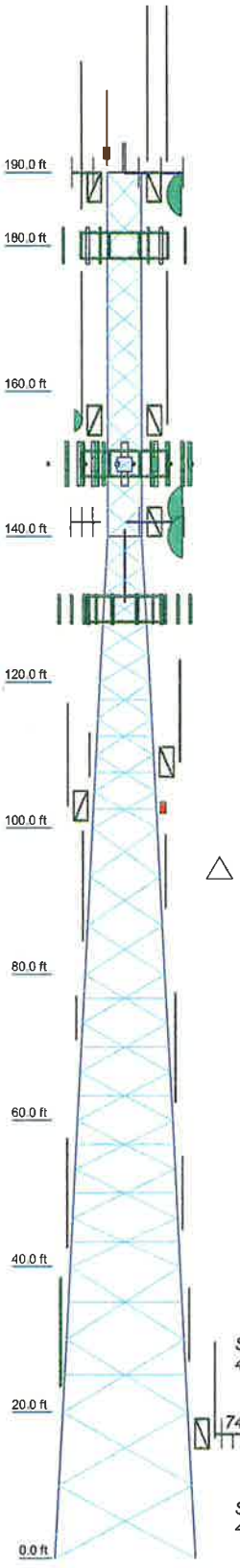
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 6 EHS	ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH	ROHN 5 EH	ROHN 4 EH	ROHN 3.5 EH	ROHN 3 EH	ROHN 2.5 STD	A
Leg Grade	A572-50									
Diagonals	L3 1/2x3 1/2x1/4	L3x3x1/4		L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x3/16	L2x2x3/16	L1 3/4x1 3/4x3/16			
Diagonal Grade	A572-50			A36						
Top Girts	N.A.						L1 3/4x1 3/4x3/16			B
Sec. Horizontals	N.A.	L3x3x5/16		L2 1/2x2 1/2x1/4	N.A.	L2x2x1/4	N.A.			
Face Width (ft)	19	16.95	14.85	12.92	10.83	8.83	6.76	4.72	4.69	4.65
# Panels @ (ft)	4 @ 10			9 @ 6.66667		4 @ 5		15 @ 4		2 @ 5
Weight (K)	19.9	3.4	3.5	2.7	1.9	1.7	1.2	1.0	0.7	0.3



MAX. CORNER REACTIONS
DOWN: 315 K
UPLIFT: -274 K
SHEAR: 30 K

AXIAL
56 K
SHEAR
47 K
MOMENT
4879 kip-ft
TORQUE 22 kip-ft
74 mph WIND - 0.5000 in ICE
AXIAL
33 K
SHEAR
44 K
MOMENT
4530 kip-ft
TORQUE 19 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) Obstruction Lights	192	RRH2x60-PCS (Verizon Proposed)	150
PD1142-3	192	RRH2x60-PCS (Verizon Proposed)	150
ASP-705	192	RRH2x60-PCS (Verizon Proposed)	150
ASP-705	192	DB-T1-6Z-8AB-0Z (Verizon Proposed)	150
DB420	192	DB-T1-6Z-8AB-0Z (Verizon Proposed)	150
Halo	192	(2) FD9R6004/2C-3L Diplexer (Verizon Proposed)	150
4' x 3" DIA Omni	190		
3' Yagi	190	(2) FD9R6004/2C-3L Diplexer (Verizon Proposed)	150
3' Yagi	190		
Pirod 4' Side Mount Standoff (1)	188	(2) FD9R6004/2C-3L Diplexer (Verizon Proposed)	150
Pirod 4' Side Mount Standoff (1)	188		
Pirod 4' Side Mount Standoff (1)	188	Paraflector	144
Paraflector	187	Pirod 4' Side Mount Standoff (1)	142
PD1142-2A	187	Pirod 4' Side Mount Standoff (1)	142
Rohn 6'x14' Boom Gate (3) (Sprint Existing)	180	DB264-A	142
		DB436-C	142
(2) DB980H90E-M (Sprint Existing)	180	DB230-2A	142
(2) DB980H90E-M (Sprint Existing)	180	Paraflector	140
(2) DB980H90E-M (Sprint Existing)	180	Single Dipole	136
Pirod 4' Side Mount Standoff (1)	156	10-ft T-Frame (Nextel Existing)	130
ASP-705	156	10-ft T-Frame (Nextel Existing)	130
Pirod 4' Side Mount Standoff (1)	156	10-ft T-Frame (Nextel Existing)	130
ASP-705	156	(4) DB844H90E-XY (Nextel Existing)	130
3-ft dish	156	(4) DB844H90E-XY (Nextel Existing)	130
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	150	(4) DB844H90E-XY (Nextel Existing)	130
		Pirod 4' Side Mount Standoff (1)	113
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	150	Dipole	113
		PD320	110
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	150	Pirod 4' Side Mount Standoff (1)	109
		14' x 3" Dia Omni	109
LNX-6514DS-T4M (Verizon Proposed)	150	Pirod 4' Side Mount Standoff (1)	103
HBXX-6517DS (Verizon Proposed)	150	14' x 3" Dia Omni	103
LNX-6514DS-T4M (Verizon Proposed)	150	GPS	102
HBXX-6517DS (Verizon Proposed)	150	1' Standoff Pipe	102
LNX-6514DS-T4M (Verizon Proposed)	150	DB212 Single Dipole	94
HBXX-6517DS (Verizon Proposed)	150	15-ft Single Dipole	92
LNX-6514DS-T4M (Verizon Proposed)	150	PD320	74
HBXX-6517DS (Verizon Proposed)	150	15-ft Single Dipole	70
LNX-6514DS-T4M (Verizon Proposed)	150	DB212 Single Dipole	50
HBXX-6517DS (Verizon Proposed)	150	15-ft Single Dipole	50
LNX-6514DS-T4M (Verizon Proposed)	150	DB212 Single Dipole	32
HBXX-6517DS (Verizon Proposed)	150	15-ft Single Dipole	31
RRH2x60-AWS (Verizon Proposed)	150	Pirod 4' Side Mount Standoff (1)	17
RRH2x60-AWS (Verizon Proposed)	150	PD400	17
RRH2x60-AWS (Verizon Proposed)	150	3' Yagi	17

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	ROHN 2 STD	B	L1 3/4x1 3/4x3/16

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

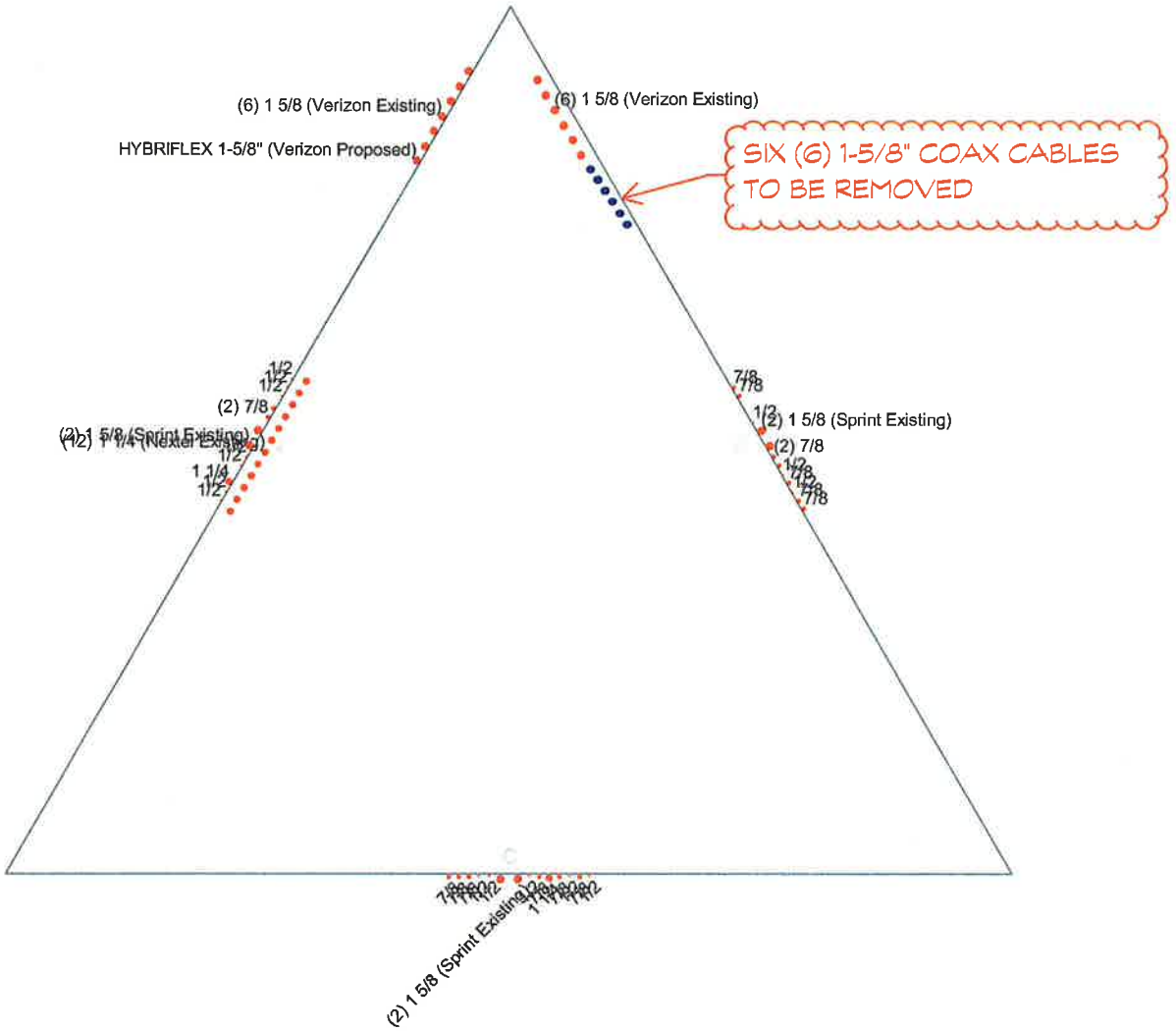
1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 99.2%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 14001.057 - Coventry East			
Project: 190' Rohn Lattice Tower - 1712 Main St., Coventry, CT			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 12/11/14	Scale: NTS	
Path:		Dwg No. E-1	

Feedline Plan

Round Flat App In Face App Out Face



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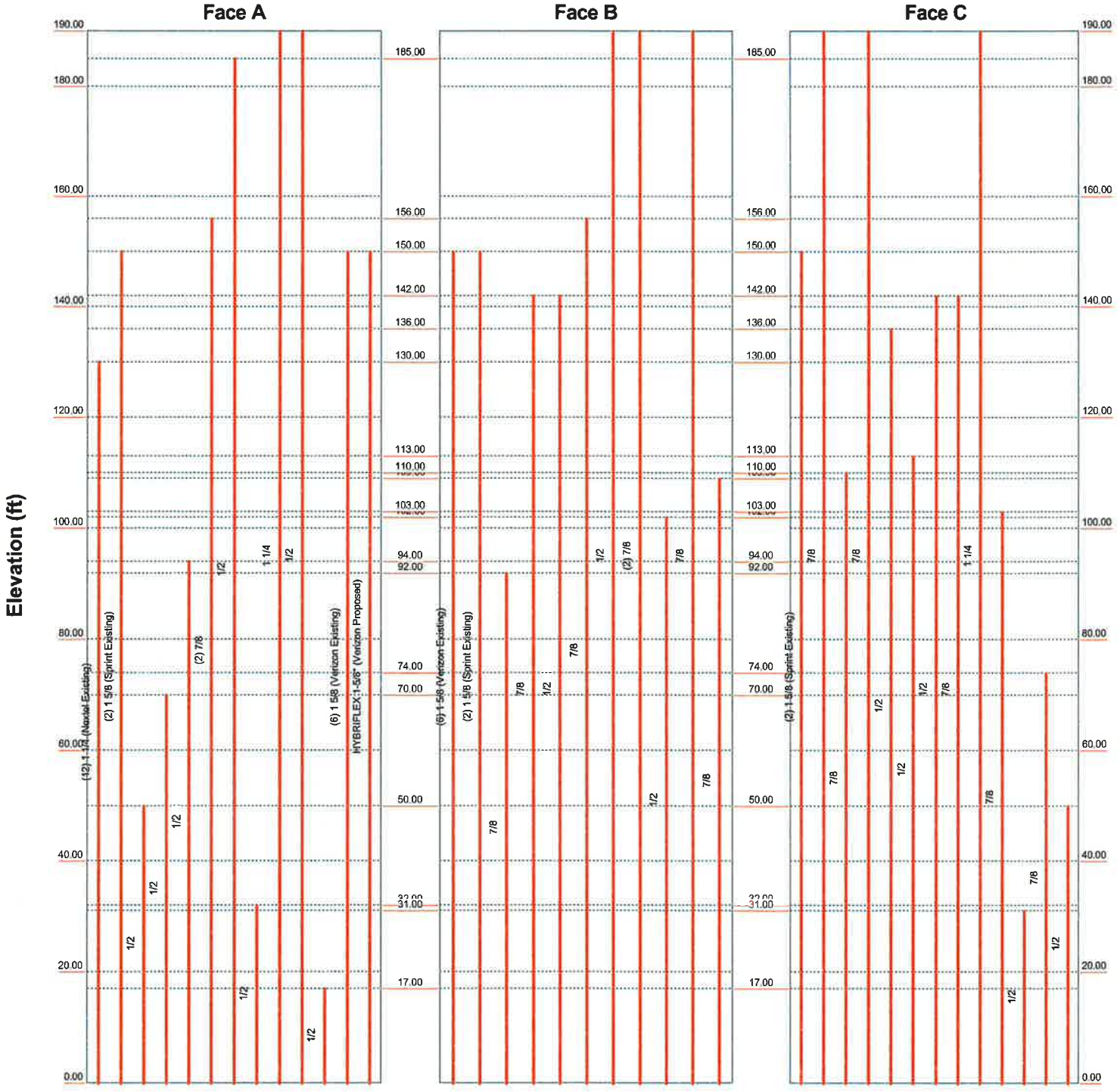
Project: 190' Rohn Lattice Tower - 1712 Main St., Coventry, CT		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 12/11/14	Scale: NTS
Path:		Dwg No. E-7

Feedline Distribution Chart
0' - 190'

Round | Flat | App In Face | App Out Face | Truss Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: **14001.057 - Coventry East**		
	Project: **190' Rohn Lattice Tower - 1712 Main St., Coventry, CT**		
	Client: Verizon Wireless	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 12/11/14	Scale: NTS
	Path:		Dwg No. E-7

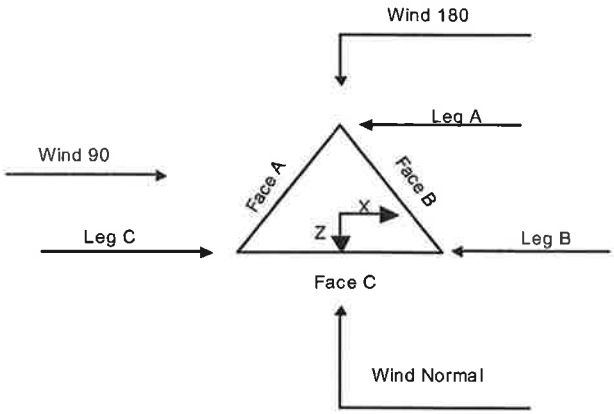
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 190.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.65 ft at the top and 19.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	190.00-180.00			4.65	1	10.00
T2	180.00-160.00			4.65	1	20.00
T3	160.00-140.00			4.69	1	20.00
T4	140.00-120.00			4.72	1	20.00
T5	120.00-100.00			6.76	1	20.00
T6	100.00-80.00			8.83	1	20.00
T7	80.00-60.00			10.83	1	20.00
T8	60.00-40.00			12.92	1	20.00
T9	40.00-20.00			14.85	1	20.00
T10	20.00-0.00			16.99	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	190.00-180.00	5.00	X Brace	No	Yes	0.0000	0.0000
T2	180.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T3	160.00-140.00	4.00	X Brace	No	Yes	0.0000	0.0000
T4	140.00-120.00	4.00	X Brace	No	Yes	0.0000	0.0000
T5	120.00-100.00	5.00	X Brace	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	100.00-80.00	6.67	X Brace	No	Yes	0.0000	0.0000
T7	80.00-60.00	6.67	X Brace	No	Yes	0.0000	0.0000
T8	60.00-40.00	6.67	X Brace	No	Yes	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T10	20.00-0.00	10.00	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190.00-180.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.00-160.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 140.00-120.00	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T5 120.00-100.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 80.00-60.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 60.00-40.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T9 40.00-20.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T10 20.00-0.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 190.00-180.00	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 140.00-120.00	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T5 120.00-100.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 80.00-60.00	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 60.00-40.00	Single Angle	L3x3x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 40.00-20.00	Single Angle	L3x3x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 190.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 190.00-180.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4	Yes	Yes	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
140.00-120.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 190.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 190.00-180.00	Flange	0.6250 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2
T6 100.00-80.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2
T8 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	2
T9 40.00-20.00	Flange	1.0000 A325N	8	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	2
T10 20.00-0.00	Flange	1.0000 A354-BC	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon Existing)	B	Yes	Ar (CfAe)	150.00 - 0.00	-2.0000	-0.38	6	6	1.9800	1.9800		1.04
1 1/4 (Nextel Existing)	A	Yes	Ar (CfAe)	130.00 - 0.00	-2.0000	0	12	12	1.5500	1.5500		0.66
1 5/8 (Sprint Existing)	A	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0	2	2	1.9800	1.9800		1.04
1 5/8 (Sprint Existing)	B	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0	2	2	1.9800	1.9800		1.04
1 5/8 (Sprint Existing)	C	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0	2	2	1.9800	1.9800		1.04
1/2	A	Yes	Ar (CfAe)	50.00 - 0.00	0.0000	0.07	1	1	0.5800	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	70.00 - 0.00	0.0000	0.06	1	1	0.5800	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	94.00 - 0.00	0.0000	0.05	1	1	0.5800	0.5800		0.25
7/8	A	Yes	Ar (CfAe)	156.00 - 0.00	0.0000	0.03	2	2	1.1100	1.1100		0.54
1/2	A	Yes	Ar (CfAe)	185.00 - 0.00	0.0000	-0.02	1	1	0.5800	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	32.00 - 0.00	0.0000	-0.03	1	1	0.5800	0.5800		0.25
1 1/4	A	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	-0.05	1	1	1.5500	1.5500		0.66
1/2	A	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	-0.06	1	1	0.5800	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	17.00 - 0.00	0.0000	-0.07	1	1	0.5800	0.5800		0.25
7/8	B	Yes	Ar (CfAe)	92.00 - 0.00	0.0000	0.08	1	1	1.1100	1.1100		0.54
7/8	B	Yes	Ar (CfAe)	142.00 - 0.00	0.0000	0.07	1	1	1.1100	1.1100		0.54
1/2	B	Yes	Ar (CfAe)	142.00 - 0.00	0.0000	0.06	1	1	0.5800	0.5800		0.25
7/8	B	Yes	Ar (CfAe)	156.00 - 0.00	0.0000	0.05	1	1	1.1100	1.1100		0.54

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1/2	B	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.04	1	1	0.5800	0.5800		0.25
7/8	B	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.025	2	2	1.1100	1.1100		0.54
1/2	B	Yes	Ar (CfAe)	102.00 - 0.00	0.0000	-0.02	1	1	0.5800	0.5800		0.25
7/8	B	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	-0.05	1	1	1.1100	1.1100		0.54
7/8	B	Yes	Ar (CfAe)	109.00 - 0.00	0.0000	-0.06	1	1	1.1100	1.1100		0.54
7/8	C	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.06	1	1	1.1100	1.1100		0.54
7/8	C	Yes	Ar (CfAe)	110.00 - 0.00	0.0000	0.05	1	1	1.1100	1.1100		0.54
7/8	C	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	0.04	1	1	1.1100	1.1100		0.54
1/2	C	Yes	Ar (CfAe)	136.00 - 0.00	0.0000	0.03	1	1	0.5800	0.5800		0.25
1/2	C	Yes	Ar (CfAe)	113.00 - 0.00	0.0000	0.02	1	1	0.5800	0.5800		0.25
1/2	C	Yes	Ar (CfAe)	142.00 - 0.00	0.0000	-0.02	1	1	0.5800	0.5800		0.25
7/8	C	Yes	Ar (CfAe)	142.00 - 0.00	0.0000	-0.03	1	1	1.1100	1.1100		0.54
1 1/4	C	Yes	Ar (CfAe)	190.00 - 0.00	0.0000	-0.04	1	1	1.5500	1.5500		0.66
7/8	C	Yes	Ar (CfAe)	103.00 - 0.00	0.0000	-0.05	1	1	1.1100	1.1100		0.54
1/2	C	Yes	Ar (CfAe)	31.00 - 0.00	0.0000	-0.06	1	1	0.5800	0.5800		0.25
7/8	C	Yes	Ar (CfAe)	74.00 - 0.00	0.0000	-0.07	1	1	1.1100	1.1100		0.54
1/2	C	Yes	Ar (CfAe)	50.00 - 0.00	0.0000	-0.08	1	1	0.5800	0.5800		0.25
1 5/8 (Verizon Existing)	A	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0.38	6	6	1.9800	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon Proposed)	A	Yes	Ar (CfAe)	150.00 - 0.00	0.0000	0.32	1	1	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	190.00-180.00	A	2.017	0.000	0.000	0.000	0.01
		B	3.258	0.000	0.000	0.000	0.02
		C	3.142	0.000	0.000	0.000	0.02
T2	180.00-160.00	A	4.517	0.000	0.000	0.000	0.02
		B	6.517	0.000	0.000	0.000	0.04
		C	6.283	0.000	0.000	0.000	0.03
T3	160.00-140.00	A	22.327	0.000	0.000	0.000	0.14
		B	21.478	0.000	0.000	0.000	0.13
		C	9.865	0.000	0.000	0.000	0.06
T4	140.00-120.00	A	53.417	0.000	0.000	0.000	0.33
		B	37.583	0.000	0.000	0.000	0.23
		C	16.473	0.000	0.000	0.000	0.10
T5	120.00-100.00	A	68.917	0.000	0.000	0.000	0.41
		B	38.513	0.000	0.000	0.000	0.24
		C	18.497	0.000	0.000	0.000	0.11
T6	100.00-80.00	A	69.593	0.000	0.000	0.000	0.41
		B	41.510	0.000	0.000	0.000	0.25
		C	21.333	0.000	0.000	0.000	0.12
T7	80.00-60.00	A	70.367	0.000	0.000	0.000	0.42
		B	42.250	0.000	0.000	0.000	0.26
		C	22.628	0.000	0.000	0.000	0.13
T8	60.00-40.00	A	71.333	0.000	0.000	0.000	0.42
		B	42.250	0.000	0.000	0.000	0.26
		C	23.667	0.000	0.000	0.000	0.14
T9	40.00-20.00	A	72.397	0.000	0.000	0.000	0.43
		B	42.250	0.000	0.000	0.000	0.26
		C	24.682	0.000	0.000	0.000	0.14

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T10	20.00-0.00	A	73.605	0.000	0.000	0.000	0.43
		B	42.250	0.000	0.000	0.000	0.26
		C	25.117	0.000	0.000	0.000	0.14

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	190.00-180.00	A	0.500	4.100	0.000	0.000	0.000	0.03
		B		6.592	0.000	0.000	0.000	0.05
		C		5.642	0.000	0.000	0.000	0.05
T2	180.00-160.00	A	0.500	9.517	0.000	0.000	0.000	0.07
		B		13.183	0.000	0.000	0.000	0.11
		C		11.283	0.000	0.000	0.000	0.10
T3	160.00-140.00	A	0.500	37.493	0.000	0.000	0.000	0.36
		B		36.478	0.000	0.000	0.000	0.34
		C		16.865	0.000	0.000	0.000	0.16
T4	140.00-120.00	A	0.500	86.750	0.000	0.000	0.000	0.84
		B		62.583	0.000	0.000	0.000	0.60
		C		29.473	0.000	0.000	0.000	0.26
T5	120.00-100.00	A	0.500	112.250	0.000	0.000	0.000	1.07
		B		64.429	0.000	0.000	0.000	0.61
		C		33.998	0.000	0.000	0.000	0.30
T6	100.00-80.00	A	0.500	114.093	0.000	0.000	0.000	1.08
		B		70.843	0.000	0.000	0.000	0.66
		C		39.667	0.000	0.000	0.000	0.35
T7	80.00-60.00	A	0.500	116.200	0.000	0.000	0.000	1.10
		B		72.250	0.000	0.000	0.000	0.68
		C		42.128	0.000	0.000	0.000	0.37
T8	60.00-40.00	A	0.500	118.833	0.000	0.000	0.000	1.12
		B		72.250	0.000	0.000	0.000	0.68
		C		44.500	0.000	0.000	0.000	0.39
T9	40.00-20.00	A	0.500	121.730	0.000	0.000	0.000	1.14
		B		72.250	0.000	0.000	0.000	0.68
		C		47.265	0.000	0.000	0.000	0.41
T10	20.00-0.00	A	0.500	125.022	0.000	0.000	0.000	1.16
		B		72.250	0.000	0.000	0.000	0.68
		C		48.450	0.000	0.000	0.000	0.41

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	190.00-180.00	A	0.000	0.235	0.202	0.411
		B	0.000	0.378	0.327	0.661
		C	0.000	0.323	0.315	0.566
T2	180.00-160.00	A	0.000	0.522	0.434	0.914
		B	0.000	0.723	0.626	1.266
		C	0.000	0.619	0.603	1.083
T3	160.00-140.00	A	0.000	2.050	2.137	3.588
		B	0.000	1.995	2.056	3.491
		C	0.000	0.922	0.944	1.614

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T4	140.00-120.00	A	0.000	4.787	5.158	8.377
		B	0.000	3.453	3.629	6.043
		C	0.000	1.626	1.591	2.846
T5	120.00-100.00	A	0.000	6.326	7.767	12.651
		B	0.000	3.631	4.341	7.262
		C	0.000	1.916	2.085	3.832
T6	100.00-80.00	A	0.000	3.451	5.262	8.627
		B	0.000	2.143	3.139	5.357
		C	0.000	1.200	1.613	2.999
T7	80.00-60.00	A	0.000	4.786	7.246	11.966
		B	0.000	2.976	4.351	7.440
		C	0.000	1.735	2.330	4.338
T8	60.00-40.00	A	0.000	4.782	8.612	14.346
		B	0.000	2.908	5.101	8.723
		C	0.000	1.791	2.857	5.372
T9	40.00-20.00	A	0.000	3.411	6.086	10.234
		B	0.000	2.025	3.552	6.074
		C	0.000	1.324	2.075	3.973
T10	20.00-0.00	A	0.000	2.384	4.913	8.345
		B	0.000	1.378	2.820	4.823
		C	0.000	0.924	1.677	3.234

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	190.00-180.00	0.3629	0.3944	0.4331	0.2891
T2	180.00-160.00	0.2511	0.3282	0.2667	0.2053
T3	160.00-140.00	-0.3016	-4.7299	-0.2800	-4.6269
T4	140.00-120.00	-1.5453	-7.9924	-1.4705	-7.6239
T5	120.00-100.00	-2.8086	-9.2692	-2.7859	-8.8762
T6	100.00-80.00	-3.1536	-11.3674	-3.1535	-11.2478
T7	80.00-60.00	-3.2363	-11.8324	-3.2658	-11.6975
T8	60.00-40.00	-3.3091	-11.8135	-3.5061	-12.0219
T9	40.00-20.00	-4.2545	-14.6921	-4.5796	-14.8028
T10	20.00-0.00	-4.8502	-16.0101	-5.5308	-16.5625

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 4' Side Mount Standoff	A	From Leg	2.00	0.0000	188.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
Pirod 4' Side Mount Standoff	B	From Leg	2.00	0.0000	188.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
Pirod 4' Side Mount Standoff	C	From Leg	2.00	0.0000	188.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
(2) Obstruction Lights	C	From Leg	0.00	0.0000	192.00	No Ice	0.18	0.18	0.01
			0.00			1/2" Ice	0.25	0.25	0.01
			0.00						
PD1142-3	C	From Leg	0.00	0.0000	192.00	No Ice	0.48	0.48	0.01
			0.00			1/2" Ice	0.55	0.55	0.01
			4.00						
3' Yagi	C	From Leg	1.00	0.0000	190.00	No Ice	2.08	2.08	0.03
			0.00			1/2" Ice	3.79	3.79	0.05
			0.00						
PD1142-2A	C	From Leg	4.00	0.0000	187.00	No Ice	0.79	0.79	0.01
			0.00			1/2" Ice	0.91	0.91	0.01
			8.00						
Pirod 4' Side Mount Standoff	C	From Leg	2.00	0.0000	156.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
ASP-705	C	From Leg	4.00	0.0000	156.00	No Ice	5.88	5.88	0.03
			0.00			1/2" Ice	8.01	8.01	0.07
			10.00						
DB230-2A	C	From Leg	1.00	0.0000	142.00	No Ice	3.00	3.00	0.11
			0.00			1/2" Ice	5.40	5.40	0.15
			0.00						
PD320	C	From Leg	1.00	0.0000	110.00	No Ice	2.03	2.03	0.01
			0.00			1/2" Ice	4.58	4.58	0.03
			0.00						
Pirod 4' Side Mount Standoff	C	From Leg	2.00	0.0000	103.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
14' x 3" Dia Omni	C	From Leg	4.00	0.0000	103.00	No Ice	4.20	4.20	0.04
			0.00			1/2" Ice	5.63	5.63	0.07
			7.00						
15-ft Single Dipole	C	From Leg	1.00	0.0000	92.00	No Ice	3.00	3.00	0.04
			0.00			1/2" Ice	6.00	6.00	0.06
			0.00						
PD320	C	From Leg	1.00	0.0000	74.00	No Ice	2.03	2.03	0.01
			0.00			1/2" Ice	4.58	4.58	0.03
			0.00						
15-ft Single Dipole	C	From Leg	1.00	0.0000	50.00	No Ice	3.00	3.00	0.04
			0.00			1/2" Ice	6.00	6.00	0.06
			0.00						
15-ft Single Dipole	C	From Leg	1.00	0.0000	31.00	No Ice	3.00	3.00	0.04
			0.00			1/2" Ice	6.00	6.00	0.06
			0.00						
ASP-705	B	From Leg	1.00	0.0000	192.00	No Ice	5.88	5.88	0.03
			0.00			1/2" Ice	8.01	8.01	0.07
			10.00						
ASP-705	B	From Leg	4.00	0.0000	192.00	No Ice	5.88	5.88	0.03
			0.00			1/2" Ice	8.01	8.01	0.07
			10.00						
Paraflector	B	From Leg	4.00	0.0000	187.00	No Ice	8.90	8.90	0.04
			0.00			1/2" Ice	10.70	10.70	0.60
			0.00						
Pirod 4' Side Mount Standoff	B	From Leg	2.00	0.0000	156.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
ASP-705	B	From Leg	4.00	0.0000	156.00	No Ice	5.88	5.88	0.03
			0.00			1/2" Ice	8.01	8.01	0.07
			10.00						
Paraflector	B	From Leg	4.00	0.0000	144.00	No Ice	8.90	8.90	0.04
			0.00			1/2" Ice	10.70	10.70	0.60
			0.00						
Paraflector	B	From Leg	4.00	0.0000	140.00	No Ice	8.90	8.90	0.04
			0.00			1/2" Ice	10.70	10.70	0.60
			0.00						
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00	0.0000	142.00	No Ice	2.72	2.72	0.05
			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00	0.0000	109.00	No Ice	2.72	2.72	0.05
			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
14' x 3" Dia Omni	B	From Leg	4.00	0.0000	109.00	No Ice	4.20	4.20	0.04
			0.00			1/2" Ice	5.63	5.63	0.07
			7.00						
GPS	B	From Leg	1.00	0.0000	102.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
1' Standoff Pipe	B	From Leg	0.50	0.0000	102.00	No Ice	0.16	0.16	0.01
			0.00			1/2" Ice	0.23	0.23	0.01
			0.00						
DB212 Single Dipole	B	From Leg	1.00	0.0000	94.00	No Ice	1.60	1.60	0.03
			0.00			1/2" Ice	3.20	3.20	0.04
			0.00						
15-ft Single Dipole	B	From Leg	1.00	0.0000	70.00	No Ice	3.00	3.00	0.04
			0.00			1/2" Ice	6.00	6.00	0.06
			0.00						
DB212 Single Dipole	B	From Leg	1.00	0.0000	50.00	No Ice	1.60	1.60	0.03
			0.00			1/2" Ice	3.20	3.20	0.04
			0.00						
DB212 Single Dipole	B	From Leg	1.00	0.0000	32.00	No Ice	1.60	1.60	0.03
			0.00			1/2" Ice	3.20	3.20	0.04
			0.00						
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00	0.0000	17.00	No Ice	2.72	2.72	0.05
			0.00			1/2" Ice	4.91	4.91	0.09
			0.00						
PD400	B	From Leg	4.00	0.0000	17.00	No Ice	3.13	3.13	0.02
			0.00			1/2" Ice	4.48	4.48	0.04
			6.00						
3' Yagi	B	From Leg	4.00	0.0000	17.00	No Ice	2.08	2.08	0.03
			0.00			1/2" Ice	3.79	3.79	0.05
			0.00						
DB420	A	From Leg	1.00	0.0000	192.00	No Ice	3.33	3.33	0.03
			0.00			1/2" Ice	5.99	5.99	0.04
			10.00						
4' x 3" DIA Omni	A	From Leg	4.00	0.0000	190.00	No Ice	1.00	1.00	0.02
			0.00			1/2" Ice	1.25	1.25	0.02
			2.00						
Halo	A	From Leg	4.00	0.0000	192.00	No Ice	4.00	4.00	0.01
			0.00			1/2" Ice	5.60	5.60	0.03
			0.00						
3' Yagi	A	From Leg	4.00	0.0000	190.00	No Ice	2.08	2.08	0.03
			0.00			1/2" Ice	3.79	3.79	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
				0.00						
Pirod 4' Side Mount Standoff (1)	A	From Leg	2.00	0.00	0.0000	142.00	No Ice	2.72	2.72	0.05
				0.00			1/2" Ice	4.91	4.91	0.09
DB264-A	A	From Leg	4.00	0.00	0.0000	142.00	No Ice	3.16	3.16	0.04
			0.00	0.00			1/2" Ice	5.69	5.69	0.05
DB436-C	A	From Leg	4.00	0.00	0.0000	142.00	No Ice	0.45	0.45	0.01
			0.00	0.00			1/2" Ice	0.81	0.81	0.01
Single Dipole	A	From Leg	1.00	0.00	0.0000	136.00	No Ice	1.60	1.60	0.03
			0.00	0.00			1/2" Ice	3.20	3.20	0.04
Pirod 4' Side Mount Standoff (1)	A	From Leg	2.00	0.00	0.0000	113.00	No Ice	2.72	2.72	0.05
				0.00			1/2" Ice	4.91	4.91	0.09
Dipole	A	From Leg	4.00	0.00	0.0000	113.00	No Ice	3.16	3.16	0.04
			0.00	3.00			1/2" Ice	5.69	5.69	0.05
Rohn 6'x14' Boom Gate (3) (Sprint Existing)	C	None			0.0000	180.00	No Ice	52.00	52.00	1.75
							1/2" Ice	61.90	61.90	2.19
(2) DB980H90E-M (Sprint Existing)	A	From Leg	4.00	0.00	0.0000	180.00	No Ice	3.80	2.19	0.01
			0.00	0.00			1/2" Ice	4.18	2.56	0.03
(2) DB980H90E-M (Sprint Existing)	B	From Leg	4.00	0.00	0.0000	180.00	No Ice	3.80	2.19	0.01
			0.00	0.00			1/2" Ice	4.18	2.56	0.03
(2) DB980H90E-M (Sprint Existing)	C	From Leg	4.00	0.00	0.0000	180.00	No Ice	3.80	2.19	0.01
			0.00	0.00			1/2" Ice	4.18	2.56	0.03
10-ft T-Frame (Nextel Existing)	A	None			0.0000	130.00	No Ice	13.60	13.60	0.38
							1/2" Ice	17.50	17.50	0.53
10-ft T-Frame (Nextel Existing)	B	None			0.0000	130.00	No Ice	13.60	13.60	0.38
							1/2" Ice	17.50	17.50	0.53
10-ft T-Frame (Nextel Existing)	C	None			0.0000	130.00	No Ice	13.60	13.60	0.38
							1/2" Ice	17.50	17.50	0.53
(4) DB844H90E-XY (Nextel Existing)	A	From Leg	4.00	0.00	0.0000	130.00	No Ice	2.87	3.73	0.01
			0.00	0.00			1/2" Ice	3.18	4.10	0.04
(4) DB844H90E-XY (Nextel Existing)	B	From Leg	4.00	0.00	0.0000	130.00	No Ice	2.87	3.73	0.01
			0.00	0.00			1/2" Ice	3.18	4.10	0.04
(4) DB844H90E-XY (Nextel Existing)	C	From Leg	4.00	0.00	0.0000	130.00	No Ice	2.87	3.73	0.01
			0.00	0.00			1/2" Ice	3.18	4.10	0.04
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	A	None			0.0000	150.00	No Ice	13.60	13.60	0.47
							1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	B	None			0.0000	150.00	No Ice	13.60	13.60	0.47
							1/2" Ice	18.40	18.40	0.60
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	C	None			0.0000	150.00	No Ice	13.60	13.60	0.47
							1/2" Ice	18.40	18.40	0.60
LNX-6514DS-T4M (Verizon Proposed)	A	From Leg	4.00	0.00	0.0000	150.00	No Ice	8.41	5.41	0.04
			-6.00	0.00			1/2" Ice	8.96	5.86	0.09

tnxTower	Job: 14001.057 - Coventry East	Page: 13 of 40
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 190' Rohn Lattice Tower - 1712 Main St., Coventry, CT	Date: 19:15:20 12/11/14
	Client: Verizon Wireless	Designed by: TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HBXX-6517DS	A	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-T4M	A	From Leg	4.00	0.0000	150.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	A	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-T4M	B	From Leg	4.00	0.0000	150.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			-6.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	B	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-T4M	B	From Leg	4.00	0.0000	150.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	B	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-T4M	C	From Leg	4.00	0.0000	150.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			-6.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	C	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-T4M	C	From Leg	4.00	0.0000	150.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	C	From Leg	4.00	0.0000	150.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
RRH2x60-AWS	A	From Leg	4.00	0.0000	150.00	No Ice	2.19	1.43	0.05
(Verizon Proposed)			4.00			1/2" Ice	2.40	1.61	0.07
			0.00						
RRH2x60-AWS	B	From Leg	4.00	0.0000	150.00	No Ice	2.19	1.43	0.05
(Verizon Proposed)			4.00			1/2" Ice	2.40	1.61	0.07
			0.00						
RRH2x60-AWS	C	From Leg	4.00	0.0000	150.00	No Ice	2.19	1.43	0.05
(Verizon Proposed)			4.00			1/2" Ice	2.40	1.61	0.07
			0.00						
RRH2x60-PCS	A	From Leg	4.00	0.0000	150.00	No Ice	2.58	2.03	0.06
(Verizon Proposed)			-4.00			1/2" Ice	2.80	2.24	0.08
			0.00						
RRH2x60-PCS	B	From Leg	4.00	0.0000	150.00	No Ice	2.58	2.03	0.06
(Verizon Proposed)			-4.00			1/2" Ice	2.80	2.24	0.08
			0.00						
RRH2x60-PCS	C	From Leg	4.00	0.0000	150.00	No Ice	2.58	2.03	0.06
(Verizon Proposed)			-4.00			1/2" Ice	2.80	2.24	0.08
			0.00						
DB-T1-6Z-8AB-0Z	A	From Leg	2.00	0.0000	150.00	No Ice	5.60	2.33	0.04
(Verizon Proposed)			0.00			1/2" Ice	5.92	2.56	0.08
			0.00						
DB-T1-6Z-8AB-0Z	B	From Leg	2.00	0.0000	150.00	No Ice	5.60	2.33	0.04
(Verizon Proposed)			0.00			1/2" Ice	5.92	2.56	0.08
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	150.00	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.01
(Verizon Proposed)			0.00						
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	150.00	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.01
(Verizon Proposed)			0.00						
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	150.00	No Ice	0.37	0.08	0.00
Diplexer			4.00			1/2" Ice	0.45	0.14	0.01
(Verizon Proposed)			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3-ft dish	C	Paraboloid w/o Radome	From Leg	4.00	0.0000		156.00	3.00	No Ice	3.14	0.08
				0.00					1/2" Ice	3.41	0.10
				0.00							

Tower Pressures - No Ice

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	185.00	1.636	30	48.479	A	4.261	5.975	3.958	38.67	0.000	0.000
190.00-180.00					B	4.136	7.217		34.87	0.000	0.000
					C	4.148	7.100		35.19	0.000	0.000
T2	170.00	1.597	30	98.192	A	8.081	14.100	9.583	43.20	0.000	0.000
180.00-160.00					B	7.889	16.100		39.95	0.000	0.000
					C	7.912	15.867		40.30	0.000	0.000
T3	150.00	1.541	29	99.933	A	6.321	33.993	11.667	28.94	0.000	0.000
160.00-140.00					B	6.402	33.145		29.50	0.000	0.000
					C	7.514	21.532		40.17	0.000	0.000
T4	130.00	1.48	27	121.475	A	5.116	66.773	13.356	18.58	0.000	0.000
140.00-120.00					B	6.645	50.940		23.19	0.000	0.000
					C	8.684	29.830		34.68	0.000	0.000
T5	110.00	1.411	26	163.410	A	8.943	83.943	15.027	16.18	0.000	0.000
120.00-100.00					B	12.370	53.539		22.80	0.000	0.000
					C	14.626	33.524		31.21	0.000	0.000
T6	90.00	1.332	25	205.883	A	8.913	88.168	18.574	19.13	0.000	0.000
100.00-80.00					B	11.037	60.084		26.12	0.000	0.000
					C	12.562	39.908		35.40	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T7 80.00-60.00	70.00	1.24	23	246.784	A	16.243	88.944	18.577	17.66	0.000	0.000
					B	19.138	60.827		23.23	0.000	0.000
					C	21.159	41.205		29.79	0.000	0.000
T8 60.00-40.00	50.00	1.126	21	288.755	A	23.596	93.451	22.118	18.90	0.000	0.000
					B	27.107	64.368		24.18	0.000	0.000
					C	29.351	45.784		29.44	0.000	0.000
T9 40.00-20.00	30.00	1	18	329.457	A	19.741	94.522	22.125	19.36	0.000	0.000
					B	22.276	64.375		25.53	0.000	0.000
					C	23.753	46.807		31.36	0.000	0.000
T10 20.00-0.00	10.00	1	18	374.293	A	18.205	102.403	28.798	23.88	0.000	0.000
					B	20.298	71.048		31.53	0.000	0.000
					C	21.442	53.915		38.22	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 190.00-180.00	185.00	1.636	23	0.5000	49.313	A	4.052	12.040	5.625	34.96	0.000	0.000
						B	3.802	14.389		30.92	0.000	0.000
						C	3.897	13.494		32.34	0.000	0.000
T2 180.00-160.00	170.00	1.597	22	0.5000	99.858	A	7.601	26.777	12.917	37.57	0.000	0.000
						B	7.249	30.243		34.45	0.000	0.000
						C	7.432	28.447		36.00	0.000	0.000
T3 160.00-140.00	150.00	1.541	21	0.5000	101.600	A	4.869	55.276	15.000	24.94	0.000	0.000
						B	4.966	54.316		25.30	0.000	0.000
						C	6.844	35.776		35.20	0.000	0.000
T4 140.00-120.00	130.00	1.48	21	0.5000	123.144	A	1.898	104.530	16.696	15.69	0.000	0.000
						B	4.231	81.697		19.43	0.000	0.000
						C	7.428	50.414		28.86	0.000	0.000
T5 120.00-100.00	110.00	1.411	20	0.5000	165.079	A	4.059	132.646	18.366	13.43	0.000	0.000
						B	9.449	87.520		18.94	0.000	0.000
						C	12.879	58.803		25.62	0.000	0.000
T6 100.00-80.00	90.00	1.332	18	0.5000	207.552	A	5.549	138.226	21.913	15.24	0.000	0.000
						B	8.819	96.284		20.85	0.000	0.000
						C	11.176	66.050		28.38	0.000	0.000
T7 80.00-60.00	70.00	1.24	17	0.5000	248.453	A	11.523	142.726	21.916	14.21	0.000	0.000
						B	16.049	100.586		18.79	0.000	0.000
						C	19.151	71.705		24.12	0.000	0.000
T8 60.00-40.00	50.00	1.126	16	0.5000	290.423	A	17.861	150.243	25.456	15.14	0.000	0.000
						B	23.485	105.535		19.73	0.000	0.000
						C	26.836	78.901		24.07	0.000	0.000
T9 40.00-20.00	30.00	1	14	0.5000	331.127	A	15.594	152.393	25.465	15.16	0.000	0.000
						B	19.754	104.300		20.53	0.000	0.000
						C	21.854	80.015		25.00	0.000	0.000
T10 20.00-0.00	10.00	1	14	0.5000	375.962	A	14.773	161.380	32.137	18.24	0.000	0.000
						B	18.296	109.615		25.12	0.000	0.000
						C	19.885	86.269		30.27	0.000	0.000

Tower Pressure - Service

$G_H = 1.117$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	185.00	1.636	10	48.479	A	4.261	5.975	3.958	38.67	0.000	0.000
190.00-180.00					B	4.136	7.217		34.87	0.000	0.000
					C	4.148	7.100		35.19	0.000	0.000
T2	170.00	1.597	10	98.192	A	8.081	14.100	9.583	43.20	0.000	0.000
180.00-160.00					B	7.889	16.100		39.95	0.000	0.000
					C	7.912	15.867		40.30	0.000	0.000
T3	150.00	1.541	10	99.933	A	6.321	33.993	11.667	28.94	0.000	0.000
160.00-140.00					B	6.402	33.145		29.50	0.000	0.000
					C	7.514	21.532		40.17	0.000	0.000
T4	130.00	1.48	9	121.475	A	5.116	66.773	13.356	18.58	0.000	0.000
140.00-120.00					B	6.645	50.940		23.19	0.000	0.000
					C	8.684	29.830		34.68	0.000	0.000
T5	110.00	1.411	9	163.410	A	8.943	83.943	15.027	16.18	0.000	0.000
120.00-100.00					B	12.370	53.539		22.80	0.000	0.000
					C	14.626	33.524		31.21	0.000	0.000
T6	90.00	1.332	9	205.883	A	8.913	88.168	18.574	19.13	0.000	0.000
100.00-80.00					B	11.037	60.084		26.12	0.000	0.000
					C	12.562	39.908		35.40	0.000	0.000
T7 80.00-60.00	70.00	1.24	8	246.784	A	16.243	88.944	18.577	17.66	0.000	0.000
					B	19.138	60.827		23.23	0.000	0.000
					C	21.159	41.205		29.79	0.000	0.000
T8 60.00-40.00	50.00	1.126	7	288.755	A	23.596	93.451	22.118	18.90	0.000	0.000
					B	27.107	64.368		24.18	0.000	0.000
					C	29.351	45.784		29.44	0.000	0.000
T9 40.00-20.00	30.00	1	6	329.457	A	19.741	94.522	22.125	19.36	0.000	0.000
					B	22.276	64.375		25.53	0.000	0.000
					C	23.753	46.807		31.36	0.000	0.000
T10 20.00-0.00	10.00	1	6	374.293	A	18.205	102.403	28.798	23.88	0.000	0.000
					B	20.298	71.048		31.53	0.000	0.000
					C	21.442	53.915		38.22	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	1	1	7.802	0.71	71.04	B
190.00-180.00			B	0.234	2.486	0.598	1	1	8.451			
			C	0.232	2.493	0.597	1	1	8.390			
T2	0.10	0.74	A	0.226	2.512	0.596	1	1	16.485	1.42	71.13	B
180.00-160.00			B	0.244	2.455	0.6	1	1	17.557			
			C	0.242	2.461	0.6	1	1	17.430			
T3	0.33	1.01	A	0.403	2.057	0.653	1	1	28.518	1.87	93.43	A
160.00-140.00			B	0.396	2.073	0.65	1	1	27.942			
			C	0.291	2.321	0.613	1	1	20.714			
T4	0.66	1.23	A	0.592	1.809	0.749	1	1	55.104	3.05	152.41	A
140.00-120.00			B	0.474	1.936	0.685	1	1	41.519			
			C	0.317	2.252	0.621	1	1	27.216			
T5	0.75	1.74	A	0.568	1.827	0.735	1	1	70.624	3.76	188.05	A
120.00-100.00			B	0.403	2.057	0.653	1	1	47.329			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.295	2.31	0.614	1	1	35.219			
T6	0.79	1.91	A	0.472	1.94	0.683	1	1	69.167	3.69	184.64	A
100.00-80.00			B	0.345	2.182	0.631	1	1	48.941			
			C	0.255	2.423	0.603	1	1	36.632			
T7	0.80	2.68	A	0.426	2.014	0.663	1	1	75.182	3.88	193.98	A
80.00-60.00			B	0.324	2.234	0.624	1	1	57.067			
			C	0.253	2.429	0.603	1	1	45.988			
T8	0.81	3.49	A	0.405	2.054	0.654	1	1	84.694	4.05	202.35	A
60.00-40.00			B	0.317	2.252	0.621	1	1	67.091			
			C	0.26	2.407	0.605	1	1	57.029			
T9	0.82	3.40	A	0.347	2.179	0.631	1	1	79.417	3.58	178.79	A
40.00-20.00			B	0.263	2.399	0.605	1	1	61.241			
			C	0.214	2.549	0.593	1	1	51.528			
T10	0.83	3.41	A	0.322	2.239	0.623	1	1	81.998	3.79	189.66	A
20.00-0.00			B	0.244	2.455	0.6	1	1	62.954			
			C	0.201	2.592	0.591	1	1	53.288			
Sum Weight:	5.94	19.91						OTM	2415.03 kip-ft	29.80		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.825	1	7.057	0.65	64.96	B
190.00-180.00			B	0.234	2.486	0.598	0.825	1	7.728			
			C	0.232	2.493	0.597	0.825	1	7.664			
T2	0.10	0.74	A	0.226	2.512	0.596	0.825	1	15.071	1.31	65.53	B
180.00-160.00			B	0.244	2.455	0.6	0.825	1	16.176			
			C	0.242	2.461	0.6	0.825	1	16.046			
T3	0.33	1.01	A	0.403	2.057	0.653	0.825	1	27.412	1.80	89.81	A
160.00-140.00			B	0.396	2.073	0.65	0.825	1	26.822			
			C	0.291	2.321	0.613	0.825	1	19.399			
T4	0.66	1.23	A	0.592	1.809	0.749	0.825	1	54.208	3.00	149.93	A
140.00-120.00			B	0.474	1.936	0.685	0.825	1	40.356			
			C	0.317	2.252	0.621	0.825	1	25.696			
T5	0.75	1.74	A	0.568	1.827	0.735	0.825	1	69.059	3.68	183.88	A
120.00-100.00			B	0.403	2.057	0.653	0.825	1	45.165			
			C	0.295	2.31	0.614	0.825	1	32.659			
T6	0.79	1.91	A	0.472	1.94	0.683	0.825	1	67.607	3.61	180.48	A
100.00-80.00			B	0.345	2.182	0.631	0.825	1	47.010			
			C	0.255	2.423	0.603	0.825	1	34.433			
T7	0.80	2.68	A	0.426	2.014	0.663	0.825	1	72.339	3.73	186.65	A
80.00-60.00			B	0.324	2.234	0.624	0.825	1	53.718			
			C	0.253	2.429	0.603	0.825	1	42.285			
T8	0.81	3.49	A	0.405	2.054	0.654	0.825	1	80.565	3.85	192.48	A
60.00-40.00			B	0.317	2.252	0.621	0.825	1	62.347			
			C	0.26	2.407	0.605	0.825	1	51.892			
T9	0.82	3.40	A	0.347	2.179	0.631	0.825	1	75.963	3.42	171.02	A
40.00-20.00			B	0.263	2.399	0.605	0.825	1	57.343			
			C	0.214	2.549	0.593	0.825	1	47.371			
T10	0.83	3.41	A	0.322	2.239	0.623	0.825	1	78.812	3.65	182.29	A
20.00-0.00			B	0.244	2.455	0.6	0.825	1	59.402			
			C	0.201	2.592	0.591	0.825	1	49.536			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.94	19.91						OTM	2324.51 kip-ft	28.69		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.8	1	6.950	0.64	64.09	B
190.00-180.00			B	0.234	2.486	0.598	0.8	1	7.624			
			C	0.232	2.493	0.597	0.8	1	7.560			
T2	0.10	0.74	A	0.226	2.512	0.596	0.8	1	14.869	1.29	64.74	B
180.00-160.00			B	0.244	2.455	0.6	0.8	1	15.979			
			C	0.242	2.461	0.6	0.8	1	15.848			
T3	0.33	1.01	A	0.403	2.057	0.653	0.8	1	27.254	1.79	89.29	A
160.00-140.00			B	0.396	2.073	0.65	0.8	1	26.662			
			C	0.291	2.321	0.613	0.8	1	19.211			
T4	0.66	1.23	A	0.592	1.809	0.749	0.8	1	54.080	2.99	149.58	A
140.00-120.00			B	0.474	1.936	0.685	0.8	1	40.190			
			C	0.317	2.252	0.621	0.8	1	25.479			
T5	0.75	1.74	A	0.568	1.827	0.735	0.8	1	68.835	3.67	183.29	A
120.00-100.00			B	0.403	2.057	0.653	0.8	1	44.855			
			C	0.295	2.31	0.614	0.8	1	32.294			
T6	0.79	1.91	A	0.472	1.94	0.683	0.8	1	67.384	3.60	179.89	A
100.00-80.00			B	0.345	2.182	0.631	0.8	1	46.734			
			C	0.255	2.423	0.603	0.8	1	34.119			
T7	0.80	2.68	A	0.426	2.014	0.663	0.8	1	71.933	3.71	185.60	A
80.00-60.00			B	0.324	2.234	0.624	0.8	1	53.239			
			C	0.253	2.429	0.603	0.8	1	41.756			
T8	0.81	3.49	A	0.405	2.054	0.654	0.8	1	79.975	3.82	191.08	A
60.00-40.00			B	0.317	2.252	0.621	0.8	1	61.670			
			C	0.26	2.407	0.605	0.8	1	51.158			
T9	0.82	3.40	A	0.347	2.179	0.631	0.8	1	75.469	3.40	169.90	A
40.00-20.00			B	0.263	2.399	0.605	0.8	1	56.786			
			C	0.214	2.549	0.593	0.8	1	46.777			
T10	0.83	3.41	A	0.322	2.239	0.623	0.8	1	78.357	3.62	181.23	A
20.00-0.00			B	0.244	2.455	0.6	0.8	1	58.894			
			C	0.201	2.592	0.591	0.8	1	49.000			
Sum Weight:	5.94	19.91						OTM	2311.58 kip-ft	28.53		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.85	1	7.163	0.66	65.83	B
190.00-180.00			B	0.234	2.486	0.598	0.85	1	7.831			
			C	0.232	2.493	0.597	0.85	1	7.768			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	0.10	0.74	A	0.226	2.512	0.596	0.85	1	15.273	1.33	66.33	B
180.00-160.00			B	0.244	2.455	0.6	0.85	1	16.373			
			C	0.242	2.461	0.6	0.85	1	16.244			
T3	0.33	1.01	A	0.403	2.057	0.653	0.85	1	27.570	1.81	90.33	A
160.00-140.00			B	0.396	2.073	0.65	0.85	1	26.982			
			C	0.291	2.321	0.613	0.85	1	19.587			
T4	0.66	1.23	A	0.592	1.809	0.749	0.85	1	54.336	3.01	150.29	A
140.00-120.00			B	0.474	1.936	0.685	0.85	1	40.522			
			C	0.317	2.252	0.621	0.85	1	25.913			
T5	0.75	1.74	A	0.568	1.827	0.735	0.85	1	69.282	3.69	184.48	A
120.00-100.00			B	0.403	2.057	0.653	0.85	1	45.474			
			C	0.295	2.31	0.614	0.85	1	33.025			
T6	0.79	1.91	A	0.472	1.94	0.683	0.85	1	67.830	3.62	181.07	A
100.00-80.00			B	0.345	2.182	0.631	0.85	1	47.286			
			C	0.255	2.423	0.603	0.85	1	34.747			
T7	0.80	2.68	A	0.426	2.014	0.663	0.85	1	72.745	3.75	187.70	A
80.00-60.00			B	0.324	2.234	0.624	0.85	1	54.196			
			C	0.253	2.429	0.603	0.85	1	42.814			
T8	0.81	3.49	A	0.405	2.054	0.654	0.85	1	81.155	3.88	193.89	A
60.00-40.00			B	0.317	2.252	0.621	0.85	1	63.025			
			C	0.26	2.407	0.605	0.85	1	52.626			
T9	0.82	3.40	A	0.347	2.179	0.631	0.85	1	76.456	3.44	172.13	A
40.00-20.00			B	0.263	2.399	0.605	0.85	1	57.899			
			C	0.214	2.549	0.593	0.85	1	47.965			
T10	0.83	3.41	A	0.322	2.239	0.623	0.85	1	79.267	3.67	183.34	A
20.00-0.00			B	0.244	2.455	0.6	0.85	1	59.909			
			C	0.201	2.592	0.591	0.85	1	50.072			
Sum Weight:	5.94	19.91						OTM	2337.44 kip-ft	28.85		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.14	0.53	A	0.326	2.228	0.624	1	1	11.569	0.70	70.21	B
190.00-180.00			B	0.369	2.129	0.639	1	1	13.003			
			C	0.353	2.165	0.633	1	1	12.445			
T2	0.28	1.18	A	0.344	2.185	0.63	1	1	24.483	1.40	69.79	B
180.00-160.00			B	0.375	2.115	0.642	1	1	26.662			
			C	0.359	2.15	0.636	1	1	25.519			
T3	0.86	1.48	A	0.592	1.809	0.749	1	1	46.256	2.00	99.95	A
160.00-140.00			B	0.583	1.815	0.744	1	1	45.358			
			C	0.419	2.027	0.66	1	1	30.446			
T4	1.70	1.78	A	0.864	1.878	0.951	1	1	101.299	4.36	218.06	A
140.00-120.00			B	0.698	1.776	0.818	1	1	71.085			
			C	0.47	1.942	0.683	1	1	41.837			
T5	1.98	2.54	A	0.828	1.839	0.92	1	1	126.060	5.07	253.47	A
120.00-100.00			B	0.587	1.812	0.746	1	1	74.736			
			C	0.434	2	0.666	1	1	52.051			
T6	2.10	2.63	A	0.693	1.776	0.815	1	1	118.165	4.33	216.58	A
100.00-80.00			B	0.506	1.892	0.701	1	1	76.293			
			C	0.372	2.122	0.641	1	1	53.488			
T7	2.14	3.72	A	0.621	1.793	0.767	1	1	120.933	4.17	208.25	A
80.00-60.00			B	0.469	1.943	0.682	1	1	84.688			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.366	2.136	0.638	1	1	64.913			
T8	2.18	4.84	A	0.579	1.819	0.741	1	1	129.172	4.10	204.99	A
60.00-40.00			B	0.444	1.983	0.671	1	1	94.262			
			C	0.364	2.14	0.638	1	1	77.143			
T9	2.22	4.54	A	0.507	1.891	0.701	1	1	122.461	3.59	179.42	A
40.00-20.00			B	0.375	2.116	0.642	1	1	86.670			
			C	0.308	2.276	0.618	1	1	71.325			
T10	2.25	4.51	A	0.469	1.944	0.682	1	1	124.828	3.76	188.07	A
20.00-0.00			B	0.34	2.195	0.629	1	1	87.247			
			C	0.282	2.344	0.611	1	1	72.565			
Sum Weight:	15.86	27.74						OTM	2823.28 kip-ft	33.47		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.14	0.53	A	0.326	2.228	0.624	0.825	1	10.860	0.67	66.61	B
190.00-180.00			B	0.369	2.129	0.639	0.825	1	12.337			
			C	0.353	2.165	0.633	0.825	1	11.763			
T2	0.28	1.18	A	0.344	2.185	0.63	0.825	1	23.153	1.33	66.47	B
180.00-160.00			B	0.375	2.115	0.642	0.825	1	25.393			
			C	0.359	2.15	0.636	0.825	1	24.219			
T3	0.86	1.48	A	0.592	1.809	0.749	0.825	1	45.404	1.96	98.11	A
160.00-140.00			B	0.583	1.815	0.744	0.825	1	44.489			
			C	0.419	2.027	0.66	0.825	1	29.249			
T4	1.70	1.78	A	0.864	1.878	0.951	0.825	1	100.966	4.35	217.35	A
140.00-120.00			B	0.698	1.776	0.818	0.825	1	70.345			
			C	0.47	1.942	0.683	0.825	1	40.537			
T5	1.98	2.54	A	0.828	1.839	0.92	0.825	1	125.349	5.04	252.04	A
120.00-100.00			B	0.587	1.812	0.746	0.825	1	73.083			
			C	0.434	2	0.666	0.825	1	49.797			
T6	2.10	2.63	A	0.693	1.776	0.815	0.825	1	117.194	4.30	214.80	A
100.00-80.00			B	0.506	1.892	0.701	0.825	1	74.750			
			C	0.372	2.122	0.641	0.825	1	51.533			
T7	2.14	3.72	A	0.621	1.793	0.767	0.825	1	118.916	4.10	204.78	A
80.00-60.00			B	0.469	1.943	0.682	0.825	1	81.880			
			C	0.366	2.136	0.638	0.825	1	61.562			
T8	2.18	4.84	A	0.579	1.819	0.741	0.825	1	126.047	4.00	200.03	A
60.00-40.00			B	0.444	1.983	0.671	0.825	1	90.152			
			C	0.364	2.14	0.638	0.825	1	72.447			
T9	2.22	4.54	A	0.507	1.891	0.701	0.825	1	119.732	3.51	175.42	A
40.00-20.00			B	0.375	2.116	0.642	0.825	1	83.214			
			C	0.308	2.276	0.618	0.825	1	67.500			
T10	2.25	4.51	A	0.469	1.944	0.682	0.825	1	122.243	3.68	184.18	A
20.00-0.00			B	0.34	2.195	0.629	0.825	1	84.045			
			C	0.282	2.344	0.611	0.825	1	69.085			
Sum Weight:	15.86	27.74						OTM	2778.61 kip-ft	32.93		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.14	0.53	A	0.326	2.228	0.624	0.8	1	10.758	0.66	66.10	B
190.00-180.00			B	0.369	2.129	0.639	0.8	1	12.242			
			C	0.353	2.165	0.633	0.8	1	11.665			
T2	0.28	1.18	A	0.344	2.185	0.63	0.8	1	22.963	1.32	66.00	B
180.00-160.00			B	0.375	2.115	0.642	0.8	1	25.212			
			C	0.359	2.15	0.636	0.8	1	24.033			
T3	0.86	1.48	A	0.592	1.809	0.749	0.8	1	45.282	1.96	97.85	A
160.00-140.00			B	0.583	1.815	0.744	0.8	1	44.365			
			C	0.419	2.027	0.66	0.8	1	29.078			
T4	1.70	1.78	A	0.864	1.878	0.951	0.8	1	100.919	4.34	217.25	A
140.00-120.00			B	0.698	1.776	0.818	0.8	1	70.239			
			C	0.47	1.942	0.683	0.8	1	40.351			
T5	1.98	2.54	A	0.828	1.839	0.92	0.8	1	125.248	5.04	251.84	A
120.00-100.00			B	0.587	1.812	0.746	0.8	1	72.847			
			C	0.434	2	0.666	0.8	1	49.475			
T6	2.10	2.63	A	0.693	1.776	0.815	0.8	1	117.055	4.29	214.55	A
100.00-80.00			B	0.506	1.892	0.701	0.8	1	74.529			
			C	0.372	2.122	0.641	0.8	1	51.253			
T7	2.14	3.72	A	0.621	1.793	0.767	0.8	1	118.628	4.09	204.28	A
80.00-60.00			B	0.469	1.943	0.682	0.8	1	81.478			
			C	0.366	2.136	0.638	0.8	1	61.083			
T8	2.18	4.84	A	0.579	1.819	0.741	0.8	1	125.600	3.99	199.32	A
60.00-40.00			B	0.444	1.983	0.671	0.8	1	89.565			
			C	0.364	2.14	0.638	0.8	1	71.776			
T9	2.22	4.54	A	0.507	1.891	0.701	0.8	1	119.342	3.50	174.85	A
40.00-20.00			B	0.375	2.116	0.642	0.8	1	82.720			
			C	0.308	2.276	0.618	0.8	1	66.954			
T10	2.25	4.51	A	0.469	1.944	0.682	0.8	1	121.873	3.67	183.62	A
20.00-0.00			B	0.34	2.195	0.629	0.8	1	83.588			
			C	0.282	2.344	0.611	0.8	1	68.588			
Sum Weight:	15.86	27.74						OTM	2772.23 kip-ft	32.85		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.14	0.53	A	0.326	2.228	0.624	0.85	1	10.961	0.67	67.13	B
190.00-180.00			B	0.369	2.129	0.639	0.85	1	12.432			
			C	0.353	2.165	0.633	0.85	1	11.860			
T2	0.28	1.18	A	0.344	2.185	0.63	0.85	1	23.343	1.34	66.94	B
180.00-160.00			B	0.375	2.115	0.642	0.85	1	25.574			
			C	0.359	2.15	0.636	0.85	1	24.405			
T3	0.86	1.48	A	0.592	1.809	0.749	0.85	1	45.525	1.97	98.37	A
160.00-140.00			B	0.583	1.815	0.744	0.85	1	44.613			
			C	0.419	2.027	0.66	0.85	1	29.420			
T4	1.70	1.78	A	0.864	1.878	0.951	0.85	1	101.014	4.35	217.45	A
140.00-120.00			B	0.698	1.776	0.818	0.85	1	70.450			
			C	0.47	1.942	0.683	0.85	1	40.722			
T5	1.98	2.54	A	0.828	1.839	0.92	0.85	1	125.451	5.04	252.25	A
120.00-100.00			B	0.587	1.812	0.746	0.85	1	73.319			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.434	2	0.666	0.85	1	50.119			
T6	2.10	2.63	A	0.693	1.776	0.815	0.85	1	117.333	4.30	215.06	A
100.00-80.00			B	0.506	1.892	0.701	0.85	1	74.970			
			C	0.372	2.122	0.641	0.85	1	51.812			
T7	2.14	3.72	A	0.621	1.793	0.767	0.85	1	119.204	4.11	205.27	A
80.00-60.00			B	0.469	1.943	0.682	0.85	1	82.281			
			C	0.366	2.136	0.638	0.85	1	62.040			
T8	2.18	4.84	A	0.579	1.819	0.741	0.85	1	126.493	4.01	200.74	A
60.00-40.00			B	0.444	1.983	0.671	0.85	1	90.739			
			C	0.364	2.14	0.638	0.85	1	73.118			
T9	2.22	4.54	A	0.507	1.891	0.701	0.85	1	120.122	3.52	175.99	A
40.00-20.00			B	0.375	2.116	0.642	0.85	1	83.707			
			C	0.308	2.276	0.618	0.85	1	68.047			
T10	2.25	4.51	A	0.469	1.944	0.682	0.85	1	122.612	3.69	184.73	A
20.00-0.00			B	0.34	2.195	0.629	0.85	1	84.503			
			C	0.282	2.344	0.611	0.85	1	69.582			
Sum Weight:	15.86	27.74						OTM	2784.99 kip-ft	33.01		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	1	1	7.802	0.25	24.58	B
190.00-180.00			B	0.234	2.486	0.598	1	1	8.451			
			C	0.232	2.493	0.597	1	1	8.390			
T2	0.10	0.74	A	0.226	2.512	0.596	1	1	16.485	0.49	24.61	B
180.00-160.00			B	0.244	2.455	0.6	1	1	17.557			
			C	0.242	2.461	0.6	1	1	17.430			
T3	0.33	1.01	A	0.403	2.057	0.653	1	1	28.518	0.65	32.33	A
160.00-140.00			B	0.396	2.073	0.65	1	1	27.942			
			C	0.291	2.321	0.613	1	1	20.714			
T4	0.66	1.23	A	0.592	1.809	0.749	1	1	55.104	1.05	52.74	A
140.00-120.00			B	0.474	1.936	0.685	1	1	41.519			
			C	0.317	2.252	0.621	1	1	27.216			
T5	0.75	1.74	A	0.568	1.827	0.735	1	1	70.624	1.30	65.07	A
120.00-100.00			B	0.403	2.057	0.653	1	1	47.329			
			C	0.295	2.31	0.614	1	1	35.219			
T6	0.79	1.91	A	0.472	1.94	0.683	1	1	69.167	1.28	63.89	A
100.00-80.00			B	0.345	2.182	0.631	1	1	48.941			
			C	0.255	2.423	0.603	1	1	36.632			
T7	0.80	2.68	A	0.426	2.014	0.663	1	1	75.182	1.34	67.12	A
80.00-60.00			B	0.324	2.234	0.624	1	1	57.067			
			C	0.253	2.429	0.603	1	1	45.988			
T8	0.81	3.49	A	0.405	2.054	0.654	1	1	84.694	1.40	70.02	A
60.00-40.00			B	0.317	2.252	0.621	1	1	67.091			
			C	0.26	2.407	0.605	1	1	57.029			
T9	0.82	3.40	A	0.347	2.179	0.631	1	1	79.417	1.24	61.87	A
40.00-20.00			B	0.263	2.399	0.605	1	1	61.241			
			C	0.214	2.549	0.593	1	1	51.528			
T10	0.83	3.41	A	0.322	2.239	0.623	1	1	81.998	1.31	65.62	A
20.00-0.00			B	0.244	2.455	0.6	1	1	62.954			
			C	0.201	2.592	0.591	1	1	53.288			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.94	19.91						OTM	835.65 kip-ft	10.31		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.825	1	7.057	0.22	22.48	B
190.00-180.00			B	0.234	2.486	0.598	0.825	1	7.728			
			C	0.232	2.493	0.597	0.825	1	7.664			
T2	0.10	0.74	A	0.226	2.512	0.596	0.825	1	15.071	0.45	22.68	B
180.00-160.00			B	0.244	2.455	0.6	0.825	1	16.176			
			C	0.242	2.461	0.6	0.825	1	16.046			
T3	0.33	1.01	A	0.403	2.057	0.653	0.825	1	27.412	0.62	31.08	A
160.00-140.00			B	0.396	2.073	0.65	0.825	1	26.822			
			C	0.291	2.321	0.613	0.825	1	19.399			
T4	0.66	1.23	A	0.592	1.809	0.749	0.825	1	54.208	1.04	51.88	A
140.00-120.00			B	0.474	1.936	0.685	0.825	1	40.356			
			C	0.317	2.252	0.621	0.825	1	25.696			
T5	0.75	1.74	A	0.568	1.827	0.735	0.825	1	69.059	1.27	63.63	A
120.00-100.00			B	0.403	2.057	0.653	0.825	1	45.165			
			C	0.295	2.31	0.614	0.825	1	32.659			
T6	0.79	1.91	A	0.472	1.94	0.683	0.825	1	67.607	1.25	62.45	A
100.00-80.00			B	0.345	2.182	0.631	0.825	1	47.010			
			C	0.255	2.423	0.603	0.825	1	34.433			
T7	0.80	2.68	A	0.426	2.014	0.663	0.825	1	72.339	1.29	64.58	A
80.00-60.00			B	0.324	2.234	0.624	0.825	1	53.718			
			C	0.253	2.429	0.603	0.825	1	42.285			
T8	0.81	3.49	A	0.405	2.054	0.654	0.825	1	80.565	1.33	66.60	A
60.00-40.00			B	0.317	2.252	0.621	0.825	1	62.347			
			C	0.26	2.407	0.605	0.825	1	51.892			
T9	0.82	3.40	A	0.347	2.179	0.631	0.825	1	75.963	1.18	59.17	A
40.00-20.00			B	0.263	2.399	0.605	0.825	1	57.343			
			C	0.214	2.549	0.593	0.825	1	47.371			
T10	0.83	3.41	A	0.322	2.239	0.623	0.825	1	78.812	1.26	63.08	A
20.00-0.00			B	0.244	2.455	0.6	0.825	1	59.402			
			C	0.201	2.592	0.591	0.825	1	49.536			
Sum Weight:	5.94	19.91						OTM	804.33 kip-ft	9.93		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.8	1	6.950	0.22	22.18	B
190.00-180.00			B	0.234	2.486	0.598	0.8	1	7.624			
			C	0.232	2.493	0.597	0.8	1	7.560			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	0.10	0.74	A	0.226	2.512	0.596	0.8	1	14.869	0.45	22.40	B
180.00-160.00			B	0.244	2.455	0.6	0.8	1	15.979			
			C	0.242	2.461	0.6	0.8	1	15.848			
T3	0.33	1.01	A	0.403	2.057	0.653	0.8	1	27.254	0.62	30.90	A
160.00-140.00			B	0.396	2.073	0.65	0.8	1	26.662			
			C	0.291	2.321	0.613	0.8	1	19.211			
T4	0.66	1.23	A	0.592	1.809	0.749	0.8	1	54.080	1.04	51.76	A
140.00-120.00			B	0.474	1.936	0.685	0.8	1	40.190			
			C	0.317	2.252	0.621	0.8	1	25.479			
T5	0.75	1.74	A	0.568	1.827	0.735	0.8	1	68.835	1.27	63.42	A
120.00-100.00			B	0.403	2.057	0.653	0.8	1	44.855			
			C	0.295	2.31	0.614	0.8	1	32.294			
T6	0.79	1.91	A	0.472	1.94	0.683	0.8	1	67.384	1.24	62.24	A
100.00-80.00			B	0.345	2.182	0.631	0.8	1	46.734			
			C	0.255	2.423	0.603	0.8	1	34.119			
T7	0.80	2.68	A	0.426	2.014	0.663	0.8	1	71.933	1.28	64.22	A
80.00-60.00			B	0.324	2.234	0.624	0.8	1	53.239			
			C	0.253	2.429	0.603	0.8	1	41.756			
T8	0.81	3.49	A	0.405	2.054	0.654	0.8	1	79.975	1.32	66.12	A
60.00-40.00			B	0.317	2.252	0.621	0.8	1	61.670			
			C	0.26	2.407	0.605	0.8	1	51.158			
T9	0.82	3.40	A	0.347	2.179	0.631	0.8	1	75.469	1.18	58.79	A
40.00-20.00			B	0.263	2.399	0.605	0.8	1	56.786			
			C	0.214	2.549	0.593	0.8	1	46.777			
T10	0.83	3.41	A	0.322	2.239	0.623	0.8	1	78.357	1.25	62.71	A
20.00-0.00			B	0.244	2.455	0.6	0.8	1	58.894			
			C	0.201	2.592	0.591	0.8	1	49.000			
Sum Weight:	5.94	19.91						OTM	799.85 kip-ft	9.87		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.05	0.31	A	0.211	2.559	0.593	0.85	1	7.163	0.23	22.78	B
190.00-180.00			B	0.234	2.486	0.598	0.85	1	7.831			
			C	0.232	2.493	0.597	0.85	1	7.768			
T2	0.10	0.74	A	0.226	2.512	0.596	0.85	1	15.273	0.46	22.95	B
180.00-160.00			B	0.244	2.455	0.6	0.85	1	16.373			
			C	0.242	2.461	0.6	0.85	1	16.244			
T3	0.33	1.01	A	0.403	2.057	0.653	0.85	1	27.570	0.63	31.25	A
160.00-140.00			B	0.396	2.073	0.65	0.85	1	26.982			
			C	0.291	2.321	0.613	0.85	1	19.587			
T4	0.66	1.23	A	0.592	1.809	0.749	0.85	1	54.336	1.04	52.00	A
140.00-120.00			B	0.474	1.936	0.685	0.85	1	40.522			
			C	0.317	2.252	0.621	0.85	1	25.913			
T5	0.75	1.74	A	0.568	1.827	0.735	0.85	1	69.282	1.28	63.83	A
120.00-100.00			B	0.403	2.057	0.653	0.85	1	45.474			
			C	0.295	2.31	0.614	0.85	1	33.025			
T6	0.79	1.91	A	0.472	1.94	0.683	0.85	1	67.830	1.25	62.66	A
100.00-80.00			B	0.345	2.182	0.631	0.85	1	47.286			
			C	0.255	2.423	0.603	0.85	1	34.747			
T7	0.80	2.68	A	0.426	2.014	0.663	0.85	1	72.745	1.30	64.95	A
80.00-60.00			B	0.324	2.234	0.624	0.85	1	54.196			

tnxTower	Job: 14001.057 - Coventry East	Page: 25 of 40
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 190' Rohn Lattice Tower - 1712 Main St., Coventry, CT	Date: 19:15:20 12/11/14
	Client: Verizon Wireless	Designed by: TJL

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.253	2.429	0.603	0.85	1	42.814			
T8	0.81	3.49	A	0.405	2.054	0.654	0.85	1	81.155	1.34	67.09	A
60.00-40.00			B	0.317	2.252	0.621	0.85	1	63.025			
			C	0.26	2.407	0.605	0.85	1	52.626			
T9	0.82	3.40	A	0.347	2.179	0.631	0.85	1	76.456	1.19	59.56	A
40.00-20.00			B	0.263	2.399	0.605	0.85	1	57.899			
			C	0.214	2.549	0.593	0.85	1	47.965			
T10	0.83	3.41	A	0.322	2.239	0.623	0.85	1	79.267	1.27	63.44	A
20.00-0.00			B	0.244	2.455	0.6	0.85	1	59.909			
			C	0.201	2.592	0.591	0.85	1	50.072			
Sum Weight:	5.94	19.91						OTM	808.80 kip-ft	9.98		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	10.31					
Bracing Weight	9.60					
Total Member Self-Weight	19.91			-10.18	1.48	
Total Weight	32.95			-10.18	1.48	
Wind 0 deg - No Ice		0.09	-43.69	-4507.14	-12.38	0.56
Wind 30 deg - No Ice		21.39	-36.98	-3831.80	-2211.79	-8.82
Wind 45 deg - No Ice		30.11	-30.08	-3121.20	-3113.98	-12.83
Wind 60 deg - No Ice		36.72	-21.20	-2205.16	-3800.33	-15.99
Wind 90 deg - No Ice		42.72	-0.04	-16.12	-4414.77	-19.33
Wind 120 deg - No Ice		37.88	21.77	2226.30	-3899.93	-17.61
Wind 135 deg - No Ice		30.15	30.05	3096.19	-3119.91	-13.93
Wind 150 deg - No Ice		21.35	36.98	3811.14	-2204.55	-10.17
Wind 180 deg - No Ice		0.03	42.38	4376.86	-2.64	-0.64
Wind 210 deg - No Ice		-21.30	36.97	3811.03	2200.73	9.15
Wind 225 deg - No Ice		-30.04	30.07	3099.46	3106.12	13.05
Wind 240 deg - No Ice		-37.77	21.81	2232.61	3886.10	17.05
Wind 270 deg - No Ice		-42.67	-0.04	-16.18	4410.37	19.00
Wind 300 deg - No Ice		-36.69	-21.22	-2207.27	3798.70	16.63
Wind 315 deg - No Ice		-30.09	-30.08	-3121.29	3114.06	13.92
Wind 330 deg - No Ice		-21.35	-36.98	-3831.32	2207.82	10.17
Member Ice	7.84					
Total Weight Ice	55.96			-20.80	-4.26	
Wind 0 deg - Ice		0.07	-46.97	-4837.80	-15.84	-1.10
Wind 30 deg - Ice		23.27	-40.24	-4154.82	-2396.96	-11.78
Wind 45 deg - Ice		32.83	-32.80	-3391.64	-3378.96	-16.15
Wind 60 deg - Ice		40.12	-23.17	-2402.59	-4129.63	-19.44
Wind 90 deg - Ice		46.49	-0.03	-25.93	-4780.77	-22.12
Wind 120 deg - Ice		40.71	23.42	2377.67	-4181.69	-18.85
Wind 135 deg - Ice		32.86	32.78	3345.85	-3383.37	-14.72
Wind 150 deg - Ice		23.23	40.24	4112.69	-2390.55	-10.06
Wind 180 deg - Ice		0.02	46.32	4739.89	-7.32	1.13
Wind 210 deg - Ice		-23.20	40.24	4112.89	2377.03	12.05
Wind 225 deg - Ice		-32.77	32.80	3348.93	3361.64	16.32
Wind 240 deg - Ice		-40.63	23.46	2383.32	4159.80	19.96
Wind 270 deg - Ice		-46.45	-0.03	-25.39	4766.27	21.85
Wind 300 deg - Ice		-40.10	-23.18	-2403.79	4117.09	18.31
Wind 315 deg - Ice		-32.81	-32.80	-3391.30	3367.69	14.71

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - Ice		-23.23	-40.24	-4154.14	2382.30	10.06
Total Weight	32.95			-10.18	1.48	
Wind 0 deg - Service		0.03	-15.12	-1553.70	-6.13	0.19
Wind 30 deg - Service		7.40	-12.79	-1320.02	-767.17	-3.05
Wind 45 deg - Service		10.42	-10.41	-1074.14	-1079.34	-4.44
Wind 60 deg - Service		12.71	-7.34	-757.17	-1316.84	-5.53
Wind 90 deg - Service		14.78	-0.01	0.28	-1529.45	-6.69
Wind 120 deg - Service		13.11	7.53	776.21	-1351.30	-6.09
Wind 135 deg - Service		10.43	10.40	1077.21	-1081.40	-4.82
Wind 150 deg - Service		7.39	12.79	1324.59	-764.66	-3.52
Wind 180 deg - Service		0.01	14.67	1520.34	-2.76	-0.22
Wind 210 deg - Service		-7.37	12.79	1324.56	759.66	3.17
Wind 225 deg - Service		-10.39	10.40	1078.34	1072.94	4.51
Wind 240 deg - Service		-13.07	7.55	778.39	1342.83	5.90
Wind 270 deg - Service		-14.77	-0.01	0.26	1524.24	6.57
Wind 300 deg - Service		-12.70	-7.34	-757.90	1312.59	5.75
Wind 315 deg - Service		-10.41	-10.41	-1074.17	1075.69	4.82
Wind 330 deg - Service		-7.39	-12.79	-1319.86	762.11	3.52

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp

Comb. No.	Description
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	190 - 180	Leg	Max Tension	22	4.83	-0.16	-0.02
			Max. Compression	24	-6.43	0.01	0.00
			Max. Mx	23	-3.95	0.27	0.07
			Max. My	27	-2.91	0.06	0.34
			Max. Vy	32	0.60	-0.00	0.00
			Max. Vx	27	-0.68	-0.00	0.00
		Diagonal	Max Tension	27	1.75	0.00	0.00
			Max. Compression	19	-1.78	0.00	0.00
			Max. Mx	24	0.21	0.02	0.00
			Max. My	3	-0.44	-0.00	-0.01
			Max. Vy	24	0.01	0.02	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	24	0.31	0.00	0.00
			Max. Compression	22	-0.35	0.00	0.00
			Max. Mx	18	0.00	-0.01	0.00
			Max. My	26	0.04	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	22	27.71	-0.06	-0.00
			Max. Compression	24	-32.10	0.11	-0.01
			Max. Mx	7	-30.09	0.11	-0.01
			Max. My	3	-0.91	0.00	0.10
			Max. Vy	13	-0.03	0.11	0.00
			Max. Vx	3	0.07	-0.00	-0.10
		Diagonal	Max Tension	34	2.91	0.00	0.00
			Max. Compression	26	-2.97	0.00	0.00
			Max. Mx	23	1.11	0.02	-0.00
			Max. My	10	-2.12	0.00	0.01
			Max. Vy	23	0.01	0.02	-0.00
			Max. Vx	10	0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	5	70.33	0.04	0.04
			Max. Compression	24	-79.48	0.80	0.08
			Max. Mx	15	46.68	0.94	-0.02
			Max. My	14	-1.25	-0.01	1.05
			Max. Vy	2	-0.85	0.75	-0.02
			Max. Vx	6	0.89	-0.02	0.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	17	6.17	0.00	0.00
			Max. Compression	17	-6.35	0.00	0.00
			Max. Mx	24	4.28	0.03	0.00
			Max. My	3	-4.98	-0.02	-0.01
			Max. Vy	24	-0.02	0.03	0.00
			Max. Vx	3	0.00	-0.02	-0.01
T4	140 - 120	Leg	Max Tension	5	106.25	-0.31	0.01
			Max. Compression	24	-119.73	0.15	0.01
			Max. Mx	24	-89.20	0.80	0.08
			Max. My	23	-5.97	-0.04	0.71
			Max. Vy	10	-0.47	-0.66	-0.00
			Max. Vx	6	-0.50	-0.02	0.60
		Diagonal	Max Tension	34	4.68	0.00	0.00
			Max. Compression	34	-4.79	0.00	0.00
			Max. Mx	23	2.04	0.03	0.00
			Max. My	27	-3.11	-0.01	0.01
			Max. Vy	24	-0.01	0.03	0.00
			Max. Vx	27	-0.00	0.00	0.00
		Top Girt	Max Tension	5	0.08	0.00	0.00
			Max. Compression	24	-0.18	0.00	0.00
			Max. Mx	18	-0.02	-0.01	0.00
			Max. My	33	-0.12	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	33	-0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	22	137.18	0.13	-0.01
			Max. Compression	24	-154.20	0.15	-0.01
			Max. Mx	24	-154.19	1.33	0.08
			Max. My	23	-7.08	-0.13	1.39
			Max. Vy	24	-0.80	1.31	-0.10
			Max. Vx	20	-0.84	-0.13	-1.32
		Diagonal	Max Tension	33	5.41	0.00	0.00
			Max. Compression	25	-5.58	0.00	0.00
			Max. Mx	24	2.83	0.03	0.00
			Max. My	33	-5.12	-0.00	-0.01
			Max. Vy	22	0.02	0.03	0.00
			Max. Vx	33	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	24	2.67	0.00	0.00
			Max. Compression	24	-2.67	0.00	0.00
			Max. Mx	30	-1.10	-0.05	0.00
			Max. My	23	2.32	0.00	0.00
			Max. Vy	30	0.02	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T6	100 - 80	Leg	Max Tension	22	167.81	-0.74	0.03
			Max. Compression	24	-187.91	0.25	0.04
			Max. Mx	24	-164.63	0.82	0.01
			Max. My	23	-10.07	-0.08	1.37
			Max. Vy	24	-0.15	0.82	0.01
			Max. Vx	23	-0.19	-0.08	1.37
		Diagonal	Max Tension	34	6.16	0.00	0.00
			Max. Compression	34	-6.37	0.00	0.00
			Max. Mx	24	4.35	0.06	0.00
			Max. My	33	-5.98	-0.01	-0.01
			Max. Vy	24	-0.02	0.06	0.00
			Max. Vx	33	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	22	195.67	0.29	0.01
			Max. Compression	19	-219.55	-0.77	0.02
			Max. Mx	19	-219.41	2.20	-0.02
			Max. My	23	-12.23	-0.07	2.34
			Max. Vy	24	-0.96	2.20	-0.01
			Max. Vx	23	-0.89	-0.07	2.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	33	6.32	0.00	0.00
			Max. Compression	25	-6.69	0.00	0.00
			Max. Mx	24	3.91	0.07	0.01
			Max. My	32	-5.31	0.02	-0.01
			Max. Vy	22	0.03	0.07	0.01
			Max. Vx	32	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	19	3.81	0.00	0.00
			Max. Compression	19	-3.81	0.00	0.00
			Max. Mx	18	0.21	-0.13	0.00
			Max. My	23	3.29	0.00	0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	22	222.88	0.72	0.01
			Max. Compression	19	-252.77	-1.51	0.02
			Max. Mx	19	-252.60	3.04	-0.01
			Max. My	23	-15.19	-0.82	2.69
			Max. Vy	19	1.35	3.04	-0.01
			Max. Vx	23	-1.01	-0.82	2.69
		Diagonal	Max Tension	33	7.63	0.00	0.00
			Max. Compression	25	-7.80	0.00	0.00
			Max. Mx	19	4.79	0.11	-0.01
			Max. My	32	-5.70	0.02	-0.01
			Max. Vy	22	0.04	0.11	0.01
			Max. Vx	32	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	19	4.38	0.00	0.00
			Max. Compression	19	-4.38	0.00	0.00
			Max. Mx	18	0.26	-0.23	0.00
			Max. My	23	3.79	0.00	0.01
			Max. Vy	18	0.06	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	22	244.32	1.75	0.06
			Max. Compression	19	-279.93	-2.18	-0.00
			Max. Mx	19	-279.65	3.93	-0.03
			Max. My	23	-17.44	0.43	3.66
			Max. Vy	24	1.20	3.91	-0.02
			Max. Vx	23	1.02	0.43	3.66
		Diagonal	Max Tension	21	8.08	0.00	0.00
			Max. Compression	29	-8.43	0.00	0.00
			Max. Mx	22	5.38	0.13	0.01
			Max. My	24	-8.34	0.02	0.02
			Max. Vy	22	0.04	0.13	0.01
			Max. Vx	24	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	19	4.86	0.00	0.00
			Max. Compression	19	-4.86	0.00	0.00
			Max. Mx	18	0.42	-0.30	0.00
			Max. My	23	4.19	0.00	0.01
			Max. Vy	18	0.07	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T10	20 - 0	Leg	Max Tension	22	266.58	0.99	0.03
			Max. Compression	19	-309.46	-0.00	0.00
			Max. Mx	24	-291.41	4.83	0.01
			Max. My	23	-21.04	2.84	3.44
			Max. Vy	30	-0.77	4.82	-0.01
			Max. Vx	23	0.44	2.84	3.44
		Diagonal	Max Tension	21	10.33	0.00	0.00
			Max. Compression	28	-9.56	0.00	0.00
			Max. Mx	22	4.10	0.21	0.01
			Max. My	21	-9.44	0.09	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	22	0.06	0.21	0.01
			Max. Vx	21	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	312.49	23.17	-14.08
	Max. H_x	13	284.75	23.55	-14.20
	Max. H_z	22	-274.19	-25.92	15.64
	Min. Vert	22	-274.19	-25.92	15.64
	Min. H_x	22	-274.19	-25.92	15.64
	Min. H_z	13	284.75	23.55	-14.20
Leg B	Max. Vert	24	313.49	-23.22	-14.08
	Max. H_x	32	-273.54	25.93	15.60
	Max. H_z	32	-273.54	25.93	15.60
	Min. Vert	32	-273.54	25.93	15.60
	Min. H_x	7	285.29	-23.59	-14.24
	Min. H_z	7	285.29	-23.59	-14.24
Leg A	Max. Vert	19	315.16	-0.02	27.19
	Max. H_x	31	20.21	3.05	-1.71
	Max. H_z	2	286.30	0.01	27.56
	Min. Vert	27	-271.87	0.03	-30.22
	Min. H_x	23	20.24	-3.05	-1.71
	Min. H_z	27	-271.87	0.03	-30.22

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	32.95	0.00	0.00	-10.18	1.48	-0.00
Dead+Wind 0 deg - No Ice	32.95	0.09	-43.69	-4530.11	-12.48	0.54
Dead+Wind 30 deg - No Ice	32.95	21.39	-36.98	-3851.37	-2223.12	-8.85
Dead+Wind 45 deg - No Ice	32.95	30.11	-30.08	-3137.16	-3129.93	-12.88
Dead+Wind 60 deg - No Ice	32.95	36.72	-21.20	-2216.47	-3819.79	-16.05
Dead+Wind 90 deg - No Ice	32.95	42.72	-0.04	-16.26	-4437.36	-19.41
Dead+Wind 120 deg - No Ice	32.95	37.88	21.77	2237.60	-3919.86	-17.67
Dead+Wind 135 deg - No Ice	32.95	30.15	30.05	3112.00	-3135.90	-13.96
Dead+Wind 150 deg - No Ice	32.95	21.35	36.98	3830.62	-2215.86	-10.18
Dead+Wind 180 deg - No Ice	32.95	0.03	42.38	4399.28	-2.69	-0.63
Dead+Wind 210 deg - No Ice	32.95	-21.30	36.97	3830.54	2211.97	9.18
Dead+Wind 225 deg - No Ice	32.95	-30.04	30.07	3115.31	3122.00	13.09
Dead+Wind 240 deg - No Ice	32.95	-37.77	21.81	2243.98	3905.93	17.12
Dead+Wind 270 deg - No Ice	32.95	-42.67	-0.04	-16.31	4432.93	19.08
Dead+Wind 300 deg - No Ice	32.95	-36.69	-21.22	-2218.61	3818.13	16.68
Dead+Wind 315 deg - No Ice	32.95	-30.09	-30.08	-3137.27	3129.97	13.95
Dead+Wind 330 deg - No Ice	32.95	-21.35	-36.98	-3850.91	2219.08	10.18
Dead+Ice+Temp	55.96	0.00	0.00	-20.79	-4.41	0.00
Dead+Wind 0 deg+Ice+Temp	55.96	0.07	-46.97	-4878.88	-16.19	-0.89
Dead+Wind 30 deg+Ice+Temp	55.96	23.27	-40.24	-4190.10	-2417.57	-11.60
Dead+Wind 45 deg+Ice+Temp	55.96	32.83	-32.80	-3420.45	-3407.93	-16.01

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 60 deg+Ice+Temp	55.96	40.12	-23.17	-2422.99	-4165.00	-19.37
Dead+Wind 90 deg+Ice+Temp	55.96	46.49	-0.03	-26.11	-4821.68	-22.17
Dead+Wind 120 deg+Ice+Temp	55.96	40.71	23.42	2397.98	-4217.50	-18.99
Dead+Wind 135 deg+Ice+Temp	55.96	32.86	32.78	3374.46	-3412.39	-14.89
Dead+Wind 150 deg+Ice+Temp	55.96	23.23	40.24	4147.87	-2411.10	-10.25
Dead+Wind 180 deg+Ice+Temp	55.96	0.02	46.32	4780.46	-7.56	0.92
Dead+Wind 210 deg+Ice+Temp	55.96	-23.20	40.24	4148.09	2397.12	11.87
Dead+Wind 225 deg+Ice+Temp	55.96	-32.77	32.80	3377.58	3390.12	16.19
Dead+Wind 240 deg+Ice+Temp	55.96	-40.63	23.46	2403.70	4195.08	19.89
Dead+Wind 270 deg+Ice+Temp	55.96	-46.45	-0.03	-25.57	4806.72	21.90
Dead+Wind 300 deg+Ice+Temp	55.96	-40.10	-23.18	-2424.23	4152.00	18.45
Dead+Wind 315 deg+Ice+Temp	55.96	-32.81	-32.80	-3420.13	3396.20	14.87
Dead+Wind 330 deg+Ice+Temp	55.96	-23.23	-40.24	-4189.43	2402.41	10.25
Dead+Wind 0 deg - Service	32.95	0.03	-15.12	-1574.30	-3.35	0.19
Dead+Wind 30 deg - Service	32.95	7.40	-12.79	-1339.42	-768.32	-3.07
Dead+Wind 45 deg - Service	32.95	10.42	-10.41	-1092.27	-1082.11	-4.46
Dead+Wind 60 deg - Service	32.95	12.71	-7.34	-773.67	-1320.83	-5.56
Dead+Wind 90 deg - Service	32.95	14.78	-0.01	-12.30	-1534.54	-6.71
Dead+Wind 120 deg - Service	32.95	13.11	7.53	767.63	-1355.47	-6.11
Dead+Wind 135 deg - Service	32.95	10.43	10.40	1070.20	-1084.18	-4.84
Dead+Wind 150 deg - Service	32.95	7.39	12.79	1318.87	-765.80	-3.53
Dead+Wind 180 deg - Service	32.95	0.01	14.67	1515.64	0.04	-0.22
Dead+Wind 210 deg - Service	32.95	-7.37	12.79	1318.84	766.40	3.19
Dead+Wind 225 deg - Service	32.95	-10.39	10.40	1071.34	1081.31	4.54
Dead+Wind 240 deg - Service	32.95	-13.07	7.55	769.83	1352.59	5.92
Dead+Wind 270 deg - Service	32.95	-14.77	-0.01	-12.32	1534.94	6.59
Dead+Wind 300 deg - Service	32.95	-12.70	-7.34	-774.40	1322.20	5.77
Dead+Wind 315 deg - Service	32.95	-10.41	-10.41	-1092.31	1084.07	4.83
Dead+Wind 330 deg - Service	32.95	-7.39	-12.79	-1339.26	768.87	3.53

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-32.95	0.00	0.00	32.95	0.00	0.000%
2	0.09	-32.95	-43.69	-0.09	32.95	43.69	0.000%
3	21.39	-32.95	-36.98	-21.39	32.95	36.98	0.000%
4	30.11	-32.95	-30.08	-30.11	32.95	30.08	0.000%
5	36.72	-32.95	-21.20	-36.72	32.95	21.20	0.000%
6	42.72	-32.95	-0.04	-42.72	32.95	0.04	0.000%
7	37.88	-32.95	21.77	-37.88	32.95	-21.77	0.000%
8	30.15	-32.95	30.05	-30.15	32.95	-30.05	0.000%
9	21.35	-32.95	36.98	-21.35	32.95	-36.98	0.000%
10	0.03	-32.95	42.38	-0.03	32.95	-42.38	0.000%
11	-21.30	-32.95	36.97	21.30	32.95	-36.97	0.000%
12	-30.04	-32.95	30.07	30.04	32.95	-30.07	0.000%
13	-37.77	-32.95	21.81	37.77	32.95	-21.81	0.000%
14	-42.67	-32.95	-0.04	42.67	32.95	0.04	0.000%
15	-36.69	-32.95	-21.22	36.69	32.95	21.22	0.000%
16	-30.09	-32.95	-30.08	30.09	32.95	30.08	0.000%
17	-21.35	-32.95	-36.98	21.35	32.95	36.98	0.000%
18	0.00	-55.96	0.00	0.00	55.96	-0.00	0.000%
19	0.07	-55.96	-46.97	-0.07	55.96	46.97	0.000%
20	23.27	-55.96	-40.24	-23.27	55.96	40.24	0.000%
21	32.83	-55.96	-32.80	-32.83	55.96	32.80	0.000%
22	40.12	-55.96	-23.17	-40.12	55.96	23.17	0.000%
23	46.49	-55.96	-0.03	-46.49	55.96	0.03	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
24	40.71	-55.96	23.42	-40.71	55.96	-23.42	0.000%
25	32.86	-55.96	32.78	-32.86	55.96	-32.78	0.000%
26	23.23	-55.96	40.24	-23.23	55.96	-40.24	0.000%
27	0.02	-55.96	46.32	-0.02	55.96	-46.32	0.000%
28	-23.20	-55.96	40.24	23.20	55.96	-40.24	0.000%
29	-32.77	-55.96	32.80	32.77	55.96	-32.80	0.000%
30	-40.63	-55.96	23.46	40.63	55.96	-23.46	0.000%
31	-46.45	-55.96	-0.03	46.45	55.96	0.03	0.000%
32	-40.10	-55.96	-23.18	40.10	55.96	23.18	0.000%
33	-32.81	-55.96	-32.80	32.81	55.96	32.80	0.000%
34	-23.23	-55.96	-40.24	23.23	55.96	40.24	0.000%
35	0.03	-32.95	-15.12	-0.03	32.95	15.12	0.000%
36	7.40	-32.95	-12.79	-7.40	32.95	12.79	0.000%
37	10.42	-32.95	-10.41	-10.42	32.95	10.41	0.000%
38	12.71	-32.95	-7.34	-12.71	32.95	7.34	0.000%
39	14.78	-32.95	-0.01	-14.78	32.95	0.01	0.000%
40	13.11	-32.95	7.53	-13.11	32.95	-7.53	0.000%
41	10.43	-32.95	10.40	-10.43	32.95	-10.40	0.000%
42	7.39	-32.95	12.79	-7.39	32.95	-12.79	0.000%
43	0.01	-32.95	14.67	-0.01	32.95	-14.67	0.000%
44	-7.37	-32.95	12.79	7.37	32.95	-12.79	0.000%
45	-10.39	-32.95	10.40	10.39	32.95	-10.40	0.000%
46	-13.07	-32.95	7.55	13.07	32.95	-7.55	0.000%
47	-14.77	-32.95	-0.01	14.77	32.95	0.01	0.000%
48	-12.70	-32.95	-7.34	12.70	32.95	7.34	0.000%
49	-10.41	-32.95	-10.41	10.41	32.95	10.41	0.000%
50	-7.39	-32.95	-12.79	7.39	32.95	12.79	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000121
4	Yes	4	0.00000001	0.00000093
5	Yes	4	0.00000001	0.00000062
6	Yes	4	0.00000001	0.00000133
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000080
9	Yes	4	0.00000001	0.00000116
10	Yes	4	0.00000001	0.00000061
11	Yes	4	0.00000001	0.00000120
12	Yes	4	0.00000001	0.00000083
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000132
15	Yes	4	0.00000001	0.00000062
16	Yes	4	0.00000001	0.00000090
17	Yes	4	0.00000001	0.00000117
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000251
20	Yes	4	0.00000001	0.00000320
21	Yes	4	0.00000001	0.00000303
22	Yes	4	0.00000001	0.00000273
23	Yes	4	0.00000001	0.00000279
24	Yes	4	0.00000001	0.00000230

25	Yes	4	0.00000001	0.00000242
26	Yes	4	0.00000001	0.00000263
27	Yes	4	0.00000001	0.00000282
28	Yes	4	0.00000001	0.00000321
29	Yes	4	0.00000001	0.00000285
30	Yes	4	0.00000001	0.00000241
31	Yes	4	0.00000001	0.00000288
32	Yes	4	0.00000001	0.00000278
33	Yes	4	0.00000001	0.00000275
34	Yes	4	0.00000001	0.00000268
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	11.264	35	0.6009	0.0834
T2	180 - 160	10.010	35	0.5924	0.0754
T3	160 - 140	7.595	35	0.5375	0.0584
T4	140 - 120	5.461	35	0.4498	0.0399
T5	120 - 100	3.769	35	0.3419	0.0226
T6	100 - 80	2.488	35	0.2534	0.0154
T7	80 - 60	1.524	35	0.1912	0.0109
T8	60 - 40	0.824	35	0.1306	0.0078
T9	40 - 20	0.360	35	0.0769	0.0050
T10	20 - 0	0.099	35	0.0351	0.0023

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.00	(2) Obstruction Lights	35	11.264	0.6009	0.0834	99318
190.00	3' Yagi	35	11.264	0.6009	0.0834	99318
188.00	Pirod 4' Side Mount Standoff (1)	35	11.013	0.5997	0.0818	99318
187.00	PD1142-2A	35	10.887	0.5991	0.0810	99318
180.00	Rohn 6'x14' Boom Gate (3)	35	10.010	0.5924	0.0754	50100
156.00	3-ft dish	35	7.139	0.5221	0.0551	15034
150.00	Pirod 12' T-Frame Sector Mount (1)	35	6.480	0.4971	0.0499	12482
144.00	Paraflector	35	5.855	0.4696	0.0442	10673

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
142.00	DB230-2A	35	5.656	0.4598	0.0421	10237
140.00	Paraflector	35	5.461	0.4498	0.0399	9981
136.00	Single Dipole	35	5.085	0.4288	0.0361	10060
130.00	10-ft T-Frame	35	4.558	0.3960	0.0307	10588
113.00	Pirod 4' Side Mount Standoff (1)	35	3.279	0.3075	0.0198	12692
110.00	PD320	35	3.083	0.2938	0.0186	13256
109.00	Pirod 4' Side Mount Standoff (1)	35	3.020	0.2894	0.0183	13455
103.00	Pirod 4' Side Mount Standoff (1)	35	2.657	0.2647	0.0163	14781
102.00	GPS	35	2.600	0.2608	0.0159	15013
94.00	DB212 Single Dipole	35	2.168	0.2331	0.0138	16369
92.00	15-ft Single Dipole	35	2.068	0.2268	0.0133	16658
74.00	PD320	35	1.288	0.1731	0.0099	19005
70.00	15-ft Single Dipole	35	1.143	0.1609	0.0093	19262
50.00	15-ft Single Dipole	35	0.565	0.1023	0.0064	21985
32.00	DB212 Single Dipole	35	0.232	0.0589	0.0039	24596
31.00	15-ft Single Dipole	35	0.218	0.0568	0.0038	24608
17.00	Pirod 4' Side Mount Standoff (1)	35	0.076	0.0296	0.0019	29196

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	33.989	24	1.8084	0.2410
T2	180 - 160	30.219	24	1.7774	0.2177
T3	160 - 140	22.995	24	1.6073	0.1688
T4	140 - 120	16.620	24	1.3477	0.1209
T5	120 - 100	11.560	19	1.0316	0.0816
T6	100 - 80	7.675	19	0.7721	0.0549
T7	80 - 60	4.718	19	0.5868	0.0401
T8	60 - 40	2.557	19	0.4030	0.0278
T9	40 - 20	1.118	19	0.2379	0.0172
T10	20 - 0	0.307	19	0.1087	0.0078

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.00	(2) Obstruction Lights	24	33.989	1.8084	0.2410	26854
190.00	3' Yagi	24	33.989	1.8084	0.2410	26854
188.00	Pirod 4' Side Mount Standoff (1)	24	33.232	1.8037	0.2364	26854
187.00	PD1142-2A	24	32.854	1.8013	0.2341	26854
180.00	Rohn 6'x14' Boom Gate (3)	24	30.219	1.7774	0.2177	13831
156.00	3-ft dish	24	21.634	1.5613	0.1591	5076
150.00	Pirod 12' T-Frame Sector Mount (1)	24	19.666	1.4871	0.1441	4243
144.00	Paraflector	24	17.799	1.4060	0.1292	3646
142.00	DB230-2A	24	17.203	1.3773	0.1252	3501
140.00	Paraflector	24	16.620	1.3477	0.1209	3417
136.00	Single Dipole	24	15.497	1.2862	0.1111	3450
130.00	10-ft T-Frame	19	13.924	1.1901	0.0983	3643
113.00	Pirod 4' Side Mount Standoff (1)	19	10.080	0.9306	0.0706	4382

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
110.00	PD320	19	9.487	0.8905	0.0662	4559
109.00	Pirod 4' Side Mount Standoff (1)	19	9.295	0.8776	0.0649	4621
103.00	Pirod 4' Side Mount Standoff (1)	19	8.193	0.8051	0.0578	5031
102.00	GPS	19	8.018	0.7938	0.0568	5102
94.00	DB212 Single Dipole	19	6.698	0.7121	0.0499	5503
92.00	15-ft Single Dipole	19	6.390	0.6934	0.0483	5586
74.00	PD320	19	3.990	0.5322	0.0363	6248
70.00	15-ft Single Dipole	19	3.543	0.4951	0.0337	6321
50.00	15-ft Single Dipole	19	1.753	0.3162	0.0223	7141
32.00	DB212 Single Dipole	19	0.721	0.1823	0.0132	7934
31.00	15-ft Single Dipole	19	0.678	0.1758	0.0128	7935
17.00	Pirod 4' Side Mount Standoff (1)	19	0.237	0.0916	0.0065	9382

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	190	Leg	A325N	0.6250	4	1.21	13.50	0.089 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	1.75	6.12	0.286 ✓	1.333	Member Bearing
		Top Girt	A325N	0.6250	1	0.35	6.44	0.054 ✓	1.333	Bolt Shear
T2	180	Leg	A325N	0.7500	4	6.93	19.44	0.356 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	2.91	6.12	0.476 ✓	1.333	Member Bearing
T3	160	Leg	A325N	0.8750	4	17.59	26.46	0.665 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6.17	6.12	1.008 ✓	1.333	Member Bearing
T4	140	Leg	A325N	0.8750	4	26.56	26.46	1.004 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4.68	6.12	0.765 ✓	1.333	Member Bearing
		Top Girt	A325N	0.6250	1	0.18	6.44	0.027 ✓	1.333	Bolt Shear
T5	120	Leg	A325N	1.0000	4	34.24	34.56	0.991 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5.41	6.12	0.884 ✓	1.333	Member Bearing
		Secondary Horizontal	A325N	0.6250	2	1.34	6.44	0.208 ✓	1.333	Bolt Shear
T6	100	Leg	A325N	1.0000	4	41.95	34.56	1.214 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6.16	6.12	1.007 ✓	1.333	Member Bearing
T7	80	Leg	A325N	1.0000	6	32.57	34.56	0.943 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6.69	6.44	1.038 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	2	1.90	6.44	0.296 ✓	1.333	Bolt Shear
T8	60	Leg	A325N	1.0000	6	37.10	34.56	1.074 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	7.80	6.44	1.211 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325N	0.6250	2	2.19	6.44	0.340 ✓	1.333	Bolt Shear
T9	40	Leg	A325N	1.0000	8	30.50	34.56	0.883 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	8.43	6.44	1.309 ✓	1.333	Bolt Shear
		Secondary	A325N	0.6250	2	2.43	6.44	0.377 ✓	1.333	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T10	20	Horizontal Leg	A354-BC	1.0000	8	33.32	32.40	1.029 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	10.33	9.28	1.114 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	190 - 180	ROHN 2 STD	10.00	5.00	76.2 K=1.00	19.756	1.0745	-6.43	21.23	0.303 ✔
T2	180 - 160	ROHN 2.5 STD	20.00	4.00	50.7 K=1.00	24.247	1.7040	-32.10	41.32	0.777 ✔
T3	160 - 140	ROHN 3 EH	20.00	4.00	42.2 K=1.00	25.514	3.0159	-79.48	76.95	1.033 ✔
T4	140 - 120	ROHN 3.5 EH	20.03	4.01	36.8 K=1.00	26.273	3.6784	-119.73	96.64	1.239 ✔
T5	120 - 100	ROHN 4 EH	20.04	2.60	21.1 K=1.00	28.182	4.4074	-154.20	124.21	1.241 ✔
T6	100 - 80	ROHN 5 EH	20.03	6.68	43.6 K=1.00	25.320	6.1120	-187.91	154.76	1.214 ✔
T7	80 - 60	ROHN 5 EH	20.04	3.44	22.5 K=1.00	28.033	6.1120	-219.55	171.34	1.281 ✔
T8	60 - 40	ROHN 6 EHS	20.03	3.42	18.4 K=1.00	28.462	6.7133	-252.77	191.07	1.323 ✔
T9	40 - 20	ROHN 6 EH	20.04	5.18	28.3 K=1.00	27.355	8.4049	-279.93	229.92	1.218 ✔
T10	20 - 0	ROHN 8 EHS	20.03	10.02	41.2 K=1.00	25.667	9.7193	-309.46	249.47	1.240 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	190 - 180	L1 3/4x1 3/4x3/16	6.83	3.13	112.1 K=1.02	11.386	0.6211	-1.78	7.07	0.252 ✔
T2	180 - 160	L1 3/4x1 3/4x3/16	6.16	2.79	103.1 K=1.06	12.579	0.6211	-2.97	7.81	0.380 ✔
T3	160 - 140	L1 3/4x1 3/4x3/16	6.18	2.77	102.5 K=1.06	12.656	0.6211	-6.35	7.86	0.808 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	140 - 120	L1 3/4x1 3/4x3/16	7.68	3.63	126.8 K=1.00	9.287	0.6211	-4.65	5.77	0.806 ✓
T5	120 - 100	L2x2x3/16	9.92	4.76	145.0 K=1.00	7.107	0.7150	-5.46	5.08	1.075 ✓
T6	100 - 80	L2 1/2x2 1/2x3/16	12.44	6.01	145.6 K=1.00	7.045	0.9020	-6.37	6.35	1.002 ✓
T7	80 - 60	L2 1/2x2 1/2x1/4	14.23	6.92	169.0 K=1.00	5.228	1.1900	-6.69	6.22	1.075 ✓
T8	60 - 40	L3x3x1/4	15.99	7.73	156.7 K=1.00	6.081	1.4400	-7.24	8.76	0.827 ✓
T9	40 - 20	L3x3x1/4	18.35	9.04	183.2 K=1.00	4.451	1.4400	-8.43	6.41	1.316 ✓
T10	20 - 0	L3 1/2x3 1/2x1/4	20.15	9.81	169.6 K=1.00	5.189	1.6900	-9.56	8.77	1.090 ✓

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	120 - 100	L2x2x1/4	8.56	7.76	196.9 K=0.83	3.853	0.9380	-2.67	3.61	0.740 ✓
T7	80 - 60	L2 1/2x2 1/2x1/4	12.56	11.67	228.6 K=0.80	2.857	1.1900	-3.81	3.40	1.120 ✓
T8	60 - 40	L3x3x5/16	14.52	13.54	222.4 K=0.81	3.020	1.7800	-4.38	5.38	0.815 ✓
T9	40 - 20	L3x3x5/16	16.44	15.46	248.4 K=0.79	2.420	1.7800	-4.86	4.31	1.127 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 3/4x1 3/4x3/16	4.65	4.18	146.1 K=1.00	6.997	0.6211	-0.35	4.35	0.080 ✓
T4	140 - 120	L1 3/4x1 3/4x3/16	4.72	4.16	145.3 K=1.00	7.077	0.6211	-0.18	4.40	0.040 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	190 - 180	ROHN 2 STD	10.00	5.00	76.2	30.000	1.0745	4.83	32.24	0.150 ✔
T2	180 - 160	ROHN 2.5 STD	20.00	4.00	50.7	30.000	1.7040	27.71	51.12	0.542 ✔
T3	160 - 140	ROHN 3 EH	20.00	4.00	42.2	30.000	3.0159	70.35	90.48	0.778 ✔
T4	140 - 120	ROHN 3.5 EH	20.03	4.01	36.8	30.000	3.6784	106.25	110.35	0.963 ✔
T5	120 - 100	ROHN 4 EH	20.04	2.60	21.1	30.000	4.4074	137.18	132.22	1.037 ✔
T6	100 - 80	ROHN 5 EH	20.03	6.68	43.6	30.000	6.1120	167.81	183.36	0.915 ✔
T7	80 - 60	ROHN 5 EH	20.04	3.44	22.5	30.000	6.1120	195.67	183.36	1.067 ✔
T8	60 - 40	ROHN 6 EHS	20.03	3.42	18.4	30.000	6.7133	222.88	201.40	1.107 ✔
T9	40 - 20	ROHN 6 EH	20.04	5.18	28.3	30.000	8.4049	244.32	252.15	0.969 ✔
T10	20 - 0	ROHN 8 EHS	20.03	10.02	41.2	30.000	9.7193	266.58	291.58	0.914 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 3/4x1 3/4x3/16	6.83	3.13	73.1	21.600	0.6211	1.75	13.42	0.131 ✔
T2	180 - 160	L1 3/4x1 3/4x3/16	6.16	2.79	65.4	21.600	0.6211	2.91	13.42	0.217 ✔
T3	160 - 140	L1 3/4x1 3/4x3/16	6.18	2.77	64.9	21.600	0.6211	6.17	13.42	0.460 ✔
T4	140 - 120	L1 3/4x1 3/4x3/16	7.34	3.46	80.3	21.600	0.6211	4.68	13.42	0.349 ✔
T5	120 - 100	L2x2x3/16	9.48	4.54	90.9	21.600	0.7150	5.41	15.44	0.350 ✔
T6	100 - 80	L2 1/2x2 1/2x3/16	12.44	6.01	94.7	21.600	0.9020	6.16	19.48	0.316 ✔
T7	80 - 60	L2 1/2x2 1/2x1/4	13.62	6.61	105.3	21.600	1.1900	6.32	25.70	0.246 ✔
T8	60 - 40	L3x3x1/4	15.99	7.73	101.5	32.500	1.2525	7.63	40.71	0.187 ✔
T9	40 - 20	L3x3x1/4	19.26	9.48	124.1	32.500	1.2525	8.08	40.71	0.198 ✔
T10	20 - 0	L3 1/2x3 1/2x1/4	21.03	10.25	114.4	32.500	1.4713	10.33	47.82	0.216 ✔

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	120 - 100	L2x2x1/4	8.56	7.76	161.3	21.600	0.9380	2.67	20.26	0.132 ✓
T7	80 - 60	L2 1/2x2 1/2x1/4	12.56	11.67	188.8	21.600	1.1900	3.81	25.70	0.148 ✓
T8	60 - 40	L3x3x5/16	14.52	13.54	181.8	21.600	1.7800	4.38	38.45	0.114 ✓
T9	40 - 20	L3x3x5/16	16.44	15.46	206.8	21.600	1.7800	4.86	38.45	0.126 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	190 - 180	L1 3/4x1 3/4x3/16	4.65	4.18	99.5	21.600	0.6211	0.31	13.42	0.023 ✓
T4	140 - 120	L1 3/4x1 3/4x3/16	4.72	4.16	99.0	21.600	0.6211	0.08	13.42	0.006 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	190 - 180	Leg	ROHN 2 STD	2	-6.43	28.30	22.7	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	20	-32.10	55.08	58.3	Pass
T3	160 - 140	Leg	ROHN 3 EH	53	-79.48	102.57	77.5	Pass
T4	140 - 120	Leg	ROHN 3.5 EH	86	-119.73	128.82	92.9	Pass
T5	120 - 100	Leg	ROHN 4 EH	122	-154.20	165.57	93.1	Pass
T6	100 - 80	Leg	ROHN 5 EH	161	-187.91	206.29	91.1	Pass
T7	80 - 60	Leg	ROHN 5 EH	183	-219.55	228.40	96.1	Pass
T8	60 - 40	Leg	ROHN 6 EHS	213	-252.77	254.70	99.2	Pass
T9	40 - 20	Leg	ROHN 6 EH	243	-279.93	306.48	91.3	Pass
T10	20 - 0	Leg	ROHN 8 EHS	264	-309.46	332.54	93.1	Pass
T1	190 - 180	Diagonal	L1 3/4x1 3/4x3/16	10	-1.78	9.43	18.9 21.5 (b)	Pass
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	24	-2.97	10.41	28.5 35.7 (b)	Pass
T3	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	58	-6.35	10.48	60.6 75.6 (b)	Pass
T4	140 - 120	Diagonal	L1 3/4x1 3/4x3/16	94	-4.65	7.69	60.4	Pass
T5	120 - 100	Diagonal	L2x2x3/16	127	-5.46	6.77	80.6	Pass
T6	100 - 80	Diagonal	L2 1/2x2 1/2x3/16	166	-6.37	8.47	75.1 75.6 (b)	Pass
T7	80 - 60	Diagonal	L2 1/2x2 1/2x1/4	186	-6.69	8.29	80.6	Pass
T8	60 - 40	Diagonal	L3x3x1/4	216	-7.24	11.67	62.0 90.9 (b)	Pass
T9	40 - 20	Diagonal	L3x3x1/4	258	-8.43	8.54	98.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T10	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	276	-9.56	11.69	81.8 83.5 (b)	Pass
T5	120 - 100	Secondary Horizontal	L2x2x1/4	130	-2.67	4.82	55.5	Pass
T7	80 - 60	Secondary Horizontal	L2 1/2x2 1/2x1/4	191	-3.81	4.53	84.0	Pass
T8	60 - 40	Secondary Horizontal	L3x3x5/16	221	-4.38	7.17	61.2	Pass
T9	40 - 20	Secondary Horizontal	L3x3x5/16	251	-4.86	5.74	84.5	Pass
T1	190 - 180	Top Girt	L1 3/4x1 3/4x3/16	5	-0.35	5.79	6.0	Pass
T4	140 - 120	Top Girt	L1 3/4x1 3/4x3/16	90	-0.18	5.86	3.0	Pass
							Summary	
						Leg (T8)	99.2	Pass
						Diagonal (T9)	98.7	Pass
						Secondary Horizontal (T9)	84.5	Pass
						Top Girt (T1)	6.0	Pass
						Bolt Checks	98.2	Pass
						RATING =	**99.2**	**Pass**

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Subject:		FOUNDATION ANALYSIS
Location:		Coventry, CT
Rev. 1: 12/11/14		Prepared by: T.J.L. Checked by: C.F.C. Job No. 14001.057

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 4879 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 47 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 56 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 293 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 253 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 190 \cdot ft$	(User Input)	
Tower Width =	$W_t := 19 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 4 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4.5 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 32.0 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 7$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 0.875 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 33$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 7$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 0.875 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 33$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pad Top Reinforcement Bar Area =

$$A_{btop} := \frac{\pi \cdot d_{btop}^{2}}{4} = 0.601 \cdot in^{2}$$

Pad Bottom Reinforcement Bar Area =

$$A_{bbot} := \frac{\pi \cdot d_{bbot}^{2}}{4} = 0.601 \cdot in^{2}$$

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 120 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = -0.18 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 0 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.44 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.72 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 4$

$A_p := W_f \cdot T_p = 128$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 92.16 \cdot kip$

Weight of Concrete = $WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c = 691.2 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{3}$

$X_t := if(Pos_t, X_{t1}, X_{t2}) = 7.773$

$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot deg))}{3} + X_t\right] = 2.742$

Total Weight = $WT_{tot} := WT_c + WT_t = 747.2 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} = 12093 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot T_f = 5090.5 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.38$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_t = 747 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 1.024 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 5461.33 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.662 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_s, "Okay", "No\ Good"\right)$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.202 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), "Okay", "No\ Good"\right]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.509$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.333$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{WT_{tot}} = 6.813$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.694 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 1.694 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_s, "Okay", "No\ Good"\right)$

Pressure_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

Maximum Moment in Pad = $M_{max} := 1188 \cdot kip \cdot ft$ (User Input)

Design Moment = $M_n := \frac{LF \cdot M_{max}}{\phi_m} = 1.76 \times 10^3 \cdot kips \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right] \cdot 0.5\right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$b_{eff} := W_t \cdot \cos(30 \cdot deg) + d_p = 197.454 \cdot in$

$d := T_f - Cvr_{pad} - d_{bbot} = 50.125 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 7.021 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{eff}} = 0.837 \cdot in$

$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2}\right)} = 7.08 \cdot in^2$

$\rho := \frac{A_s}{b_{eff} d} = 0.00072$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018 \qquad \text{(ACI -2008 7.12.2.1)}$$

Check Bottom Bars:

$$As := \begin{cases} \left(\rho \cdot b_{eff} \cdot d\right) & \text{if } \left(\rho \cdot b_{eff} \cdot d\right) > \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d \\ \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d & \text{otherwise} \end{cases} = 8.908 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 19.8 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No\ Good"\right)$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 8.9 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 19.8 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, "Okay", "No\ Good"\right)$$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 10.91 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0 \qquad \text{(ACI-2008 12.2.3)}$$

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 21 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in \qquad \text{(ACI-2008 12.2.1)}$$

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right) = "Use\ L.dbt"$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 75 \cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No\ Good"\right)$$

Lpad_Check = "Okay"

SITE NAME	COVENTRY EAST CT	ECP - CELL #	2	119
LATITUDE	41-29-35.75 N	LONGITUDE	72-00-11.17 W	
Additional Comments: 2015 AWS ADD. Diplexing to get down to 12 coax for structural reasons.		SAVE BUTTON		
		STRUCTURE TYPE	Monopole	

AWS - LTE ANTENNA ADD	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	2100 MHz BBU	2100 MHz BBU	2100 MHz BBU
ANTENNA TYPE	HBXX-6517DS-A2M	HBXX-6517DS-A2M	HBXX-6517DS-A2M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/ELEC)	0M/3E	0M/2E	0M/2E
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
RRH - QTY/MODEL	1 ALU RH_2X60-AWS	1 ALU RH_2X60-AWS	1 ALU RH_2X60-AWS
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX	2	DB-T1-6Z-8AB-0Z	

700 Mhz - LTE Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	BXA-70063-6CF_2	BXA-70063-6CF_2	BXA-70063-6CF_2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

700 Mhz - LTE Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	LNX-6514DS-A1M	LNX-6514DS-A1M	LNX-6514DS-A1M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/DEG)	0M/6E	0M/6E	0M/0E
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell 4.0B	Cellular Modcell 4.0B	Cellular Modcell 4.0B
ANTENNA TYPE	LPA-80080/4CF	LPA-80063/4CF	LPA-80063/4CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/DEG)	4	0	0
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 Celluar - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell 4.0B	Cellular Modcell 4.0B	Cellular Modcell 4.0B
ANTENNA TYPE	LNX-6514DS-A1M	LNX-6514DS-A1M	LNX-6514DS-A1M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/ELEC)	0M/4E	0M/0E	0M/0E
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL	2 FD9R6004_2C-3L	2 FD9R6004_2C-3L	2 FD9R6004_2C-3L
DIPLEX WITH LTE CABLE			

1900 PCS - Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171085-8BF_2	BXA-171085-8BF_2	BXA-171085-8BF_2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	150	150	150
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

1900 PCS - Future Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	HBXX-6517DS-A2M	HBXX-6517DS-A2M	HBXX-6517DS-A2M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	40	150	270
DOWN TILT (MECH/DEG)	0M/2E	0M/2E	0M/2E
RAD CTR (FT AGL)	150	150	150
RRH - QTY/MODEL	1 ALU RRH_2X60-PCS	1 ALU RRH_2X60-PCS	1 ALU RRH_2X60-PCS
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE	Diplex with Cell	Diplex with Cell	Diplex with Cell

NUMBER OF CABLE'S NEEDED								ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES			12			MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS			18			TOP JUMPER (FT)			12
Equipment Cable Ordering		MAIN CABLE	18	+	-6			TOP JUMPER #	18	+	0
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES			1			FIBER LINE MODEL #			HB158-1-08U8-S8J18
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS			6			TOP JUMPER MODEL #			HB058-1-08U1-S1J18
Fiber Cable Ordering		FIBER CABLE	0	+	1			TOP JUMPER #	0	+	3
TX / RX FREQUENCIES								TX POWER OUTPUT			
Cellular A-Band		PCS F / AWS-Band			700 Mhz C - E			Cellular (Watts)			20
TX - 869-880,890-891.5 MHz		TX - 1970-1975 / 2145-21			TX - 746-757			PCS (Watts)			16
RX - 824-835,845-846.5 MHz		RX - 1890-1895 / 1745-17			RX - 776-787			LTE (Watts)			60
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/ WHITE	A8	1900	Tx2/Rx0	BLUE/ WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ ORANGE	A9	700	Tx2/Rx0	BLUE/ ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A5	1900	Tx4/Rx1	RED/RED/ WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN
RF ENGINEER				RF MANAGER				INITIALS			DATE
Prepared By: Mark Brauer				Rob Hesselbach				MB			12/9/2014

Site Configuration

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® single band, quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz
Number of Ports, all types	4

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom

Product Specifications

HBXX-6517DS-VTM

RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1903.0 mm | 74.9 in
Width	305.0 mm | 12.0 in
Net Weight	19.5 kg | 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	HBXX-6517DS-R2M
Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

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

600899A-2 — 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.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity, total	2
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Product Specifications

LNX-6514DS-VTM

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	17.6 kg | 38.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

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

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

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.

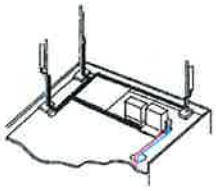
EASY INSTALLATION

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.

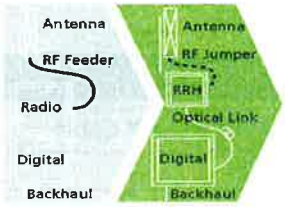
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

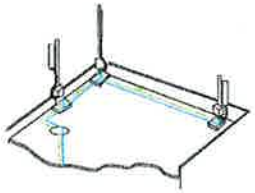
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

The RFS Distribution Box design comes with the option for pluggable over voltage protection (OVP) for up to 6 remote radios and the connection for 6 pairs of optical fiber with LC optical fiber cable management. There is a hybrid cable input with a jumper configuration for power and optical fiber to the remote radio heads (RRHs). A custom wall, a 2-inch pole, and an H-Frame mounting bracket are included. Both the compact and standard design are available with lightening protection.

Features/Benefits

- Designed to accommodate varying diameters of HYBRIFLEX™ (combined power and fiber optic) cables – up to 2 inches
- Supports Single- and Multi-Mode Optical fiber
- NEMA 4x rated enclosure – allows **flexibility for indoor or outdoor installation** on a roof or tower top
- Weatherproof enclosure and ports – **improves system reliability**
- Modular design – makes replacement or addition of OVP easy without removal of other components within the box
- Strikesorb OVP technology – protects equipment from damaging surges up to 60 kA on an 8/20 waveform and up to 5 kA on a 10/350 waveform (certain models only)
- Low residual voltage and high impedance – **ideally suited for RRH technology** – won't shut down the RRH the way spark gap technology does (certain models only)

Technical Specifications

Mechanical Specifications

Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum	
Fiber Connection Method	LC-LC Single- or Multi-mode duplex	
Environmental Rating	NEMA 4x	
Operating Temperature, °C (°F)	-40 to +80 (-40 to +176)	
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs	

Electrical Specifications

Nominal Operating Voltage	48 VDC	
Nominal Discharge Current (I_n) per UL 1449 3rd Ed	20 kA 8/20 µs	N/A
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs	N/A
Maximum Impulse (Lightning) Current (I_{imp}) per IEC 61643-1	5 kA 10/350 µs	N/A
Maximum Continuous Operating Voltage (U_c)	75 VDC	N/A
Voltage Protection Rating per UL1449 3rd Ed	400 V	N/A
Protection Class as per IEC 61643-1	Class 1	N/A
Strikesorb OVP Compliance	ANSI/UL 1449-3rd Ed	N/A
	IEEE C62.41	N/A
	NEMA LS-1	N/A
	IEC 61643-1	N/A
	IEC 61643-12	N/A
	EN 61643-11	N/A

* This data is provisional and subject to change.

Product Data Sheet FD9R6004/2C-3L

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

Product Description

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

Features/Benefits

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

Technical Specifications

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

Notes