Robinson+Cole

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Also admitted in Massachusetts

October 24, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
119 Empire Avenue, Meriden, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top of the existing 125-foot tower at 119 Empire Avenue in Meriden, Connecticut (the "Property"). The tower and underlying property are owned by 119 Empire Avenue LLC. The Council approved Cellco's use of this tower in 2005. Cellco now intends to modify its facility by replacing six (6) of its antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas and adding three (3) model SBNHH-1D65B, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") and install six (6) new RRHs and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being sent Kevin Scarpati, Mayor of the City of Meriden. A copy of this letter is also being sent to 119 Empire Avenue LLC, the owner of the Property and the tower.

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

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1. The proposed modifications will not result in an increase in the height of the existing structure. Cellco's new and replacement antennas and RRHs will be installed on Cellco's existing antenna platform at the top of the 125-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 included in Attachment 3).

A copy of the Town Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Kevin Scarpati, Mayor
119 Empire Avenue LLC
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

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

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

Product Specifications

SBNHH-1D65B

Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

Depth	296.0 mm | 11.7 in
Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

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

Product Specifications

SBNHH-1D65B

Included Products

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

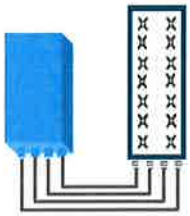
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

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

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25
APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. 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 RRH2x60-1900A-4R 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 RRH2x60-1900A-4R integrates all the latest technologies. This allows operators 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.

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 RRH2x60-1900A-4R 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).

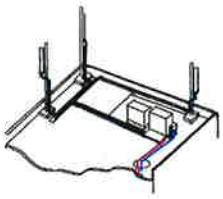
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

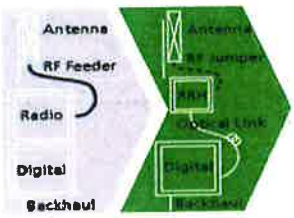
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

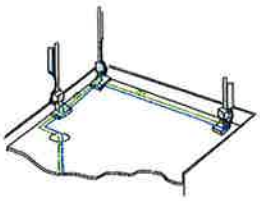
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO deployment and/or WCDMA and LTE simultaneous 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 : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -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 15km 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: ETS300-019-1-4 class4.1E
- 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
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

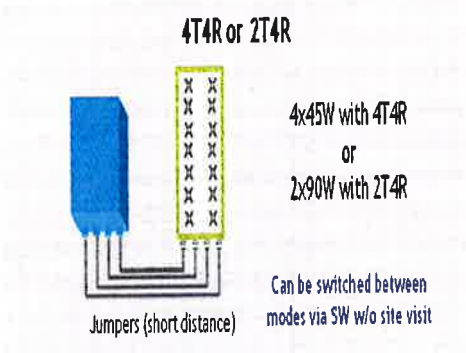
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

The Alcatel-Lucent B66a RRH4x45 is a compact (near zero-footprint) solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports



BENEFITS

- Compact to reduce additional footprint when adding LTE in AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall

TECHNICAL SPECIFICATIONS

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz – 4 LTE MIMO carriers (in 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure – RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.) Volume in Liters Weight in kg (lb) (w/o mounting HW)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield) 35.5 (with solar shield) 29.7 (without solar shield) 25.8kg (56.8lb) (with solar shield)
DC voltage range DC power consumption	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) UL50E Type 4 Enclosure 250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.3-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

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.

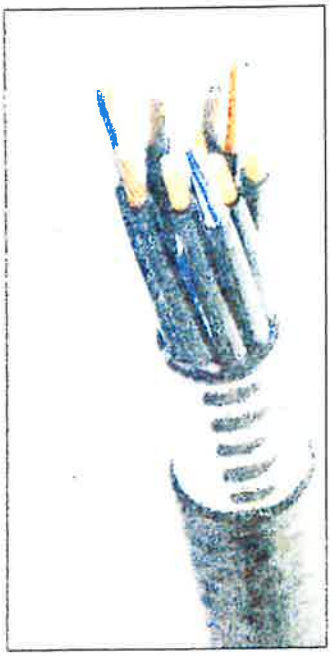


Figure 1: HYBRIFLEX Series

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)

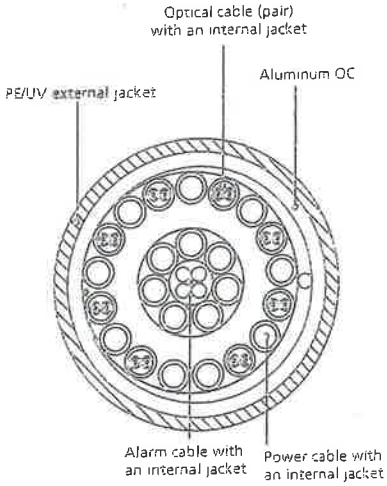


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Meriden N								
Tower Height: 125ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Clearwire	2	153	105	2496	0.0112	1.0000	0.11%	
*Clearwire	1	211	110	11 GHz	0.0070	1.0000	0.07%	
*T-Mobile	2	2334	115	2100	0.1413	1.0000	1.41%	
*T-Mobile	1	865	115	700	0.0262	0.4667	0.56%	
*T-Mobile	2	1167	115	1900	0.0707	1.0000	0.71%	
*T-Mobile	2	1167	115	2100	0.0707	1.0000	0.71%	
*Cingular	19	100	95	880	0.0863	0.5867	1.47%	
*AT&T	25	76	85	1945	0.1095	1.0000	1.09%	
*Nextel	24	100	75	851	0.1813	0.5673	3.20%	
*Sprint	2	693	105.3	1900	0.0505	1.0000	0.51%	
*Sprint	1	390	105.3	850	0.0142	0.5667	0.25%	
Verizon PCS	**1**	**4777**	**125**	**0.1099**	**1970**	**1.0000**	**10.99%**	
Verizon Cellular	**9**	**346**	**125**	**0.0717**	**869**	**0.5793**	**12.37%**	
Verizon AWS	**1**	**7166**	**125**	**0.1649**	**2145**	**1.0000**	**16.49%**	
Verizon 700	**1**	**1063**	**125**	**0.0245**	**698**	**0.4653**	**5.26%**	
								55.20%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

125-ft Existing EEI Monopole

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Meriden North

119 Empire Avenue
Meriden, CT

CENTEK Project No. 15001.146

~~Date: February 10, 2016~~
Rev 1: October 21, 2016

Prepared for:

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

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 monopole (tower) located in Meriden, Connecticut.

The host tower is a 125-ft tall, four-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 13454 dated October 20, 2005. The tower geometry and structure member sizes were obtained from the original manufacturers design documents. Foundation information was taken from foundation analysis conducted by Gibble Norden Champion Brown Consulting Engineers Inc., project no. 05060; dated May 31, 2005.

Antenna and appurtenance information were obtained a previous structural analysis report prepared by Destek Engineering; job no;.1517038 dated September 17, 2015 and a Verizon RF data sheet.

The tower is made up of four (4) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 30.0-in at the top and 70.0-in at the base.

Verizon proposes the removal of six (6) panel antennas and nine (9) panel antennas, nine (9) remote radio heads and two (2) main distribution boxes mounted to the existing low profile platform. 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, proposed and future loads considered in this analysis consist of the following:

- TOWN (EXISTING):
  Antennas: One (1) lighting rod mounted with an elevation of 125-ft above grade level.
- T-MOBILE (EXISTING):
  Antennas: Six (6) Ericsson AIR21 panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) TMA's and three (3) Ericsson RRUS-11 remote radio heads mounted on a low profile platform with a RAD center elevation of 115-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable inside the monopole.
- VERIZON (EXISTING TO REMAIN):
  Antennas: Six (6) Antel LPA-80080-4CF panel antennas mounted on a low profile platform with a RAD center elevation of 125-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running inside the monopole.
- VERIZON (EXISTING TO REMOVE):
  Antennas: Three (3) Antel BXA-70063-6CF panel antennas, three (3) RYMSA MG D3-800T0 panel antennas and six (6) RFS FD9R6004/2C-3L Diplexers mounted on a low profile platform with a RAD center elevation of 125-ft above grade level.

- **VERIZON (PROPOSED):**
  Antennas: Nine (9) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH4x30-B13 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on a 13-ft low profile platform with a RAD center elevation of 125-ft above grade level.
  Coax Cables: Two (2) 1-5/8" ∅ fiber cables running inside the monopole.

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 or reinforcement drawings.
- 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 to be installed as indicated in 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, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	New Haven; v = 95-115 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Meriden; v = 97 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **25.6%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	26.06'-69.84'	25.6%	**PASS**

Foundation and Anchors

The existing foundation consists of a four (4) 7-ft x 4-ft x 4-ft and one (1) 7-ft x 10-ft x 10-ft concrete piers bearing on a 50.0 square x 2.5-ft thick reinforced concrete mat. The existing foundation properties were obtained from the aforementioned GNCB design report; project no. 05060; dated May 31, 2005. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	25 kips
	Compression	46 kips
	Moment	2080 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinforced Concrete Pad and Pier	OTM[(2)]	1.0	6.6	**PASS**

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

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	43.2%	**PASS**
Base Plate	Bending	57.6%	**PASS**

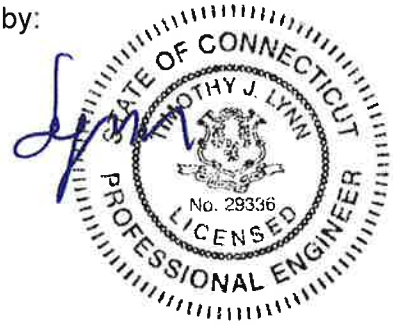
Conclusion

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:

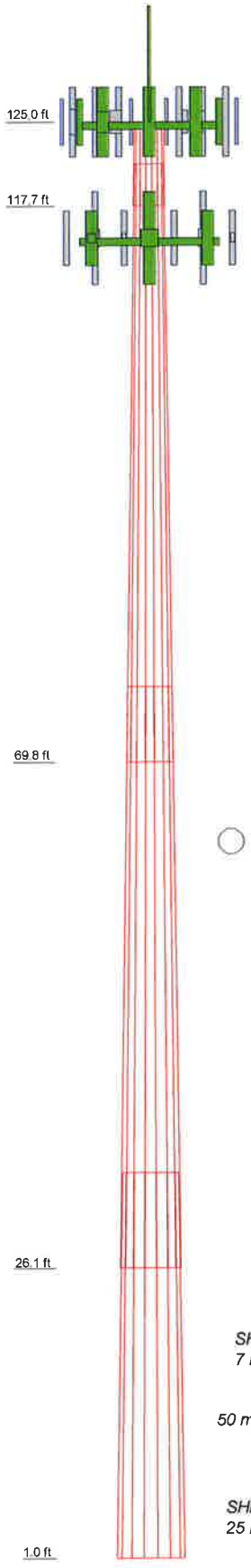
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or 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 ERITower, 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	1	2	3	4
Length (ft)	7.28	51.52	50.28	33.31
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3750	0.3750	0.4375
Socket Length (ft)	3.64	6.50	8.25	
Top Dia (in)	30.0000	30.7300	45.0012	58.5277
Bot Dia (in)	32.4600	47.9200	62.0800	70.0000
Grade	A572-65			
Weight (K)	0.6	8.1	10.8	10.0

ALL REACTIONS ARE FACTORED

AXIAL 71 K

SHEAR 7 K *MOMENT 581 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 46 K

SHEAR 25 K *MOMENT 2080 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x10'	130	RRH4x30-B13 (Verizon Proposed)	125
LPA-80080-4CF (Verizon Existing)	125	RRH2x60-PCS (Verizon Proposed)	125
SBNHH-1D65B (Verizon Proposed)	125	RRH2x60-PCS (Verizon Proposed)	125
SBNHH-1D65B (Verizon Proposed)	125	RRH2x60-PCS (Verizon Proposed)	125
SBNHH-1D65B (Verizon Proposed)	125	DB-T1-6Z-8AB-0Z (Verizon Proposed)	125
LPA-80080-4CF (Verizon Existing)	125	DB-T1-6Z-8AB-0Z (Verizon Proposed)	125
LPA-80080-4CF (Verizon Existing)	125	EEI Low Profile Platform (Verizon)	125
SBNHH-1D65B (Verizon Proposed)	125	AIR21 B2A/B4P (T-Mobile Existing)	115
SBNHH-1D65B (Verizon Proposed)	125	LNX-6515DS (T-Mobile Existing)	115
SBNHH-1D65B (Verizon Proposed)	125	AIR21 B4A/B2P (T-Mobile Existing)	115
LPA-80080-4CF (Verizon Existing)	125	AIR21 B2A/B4P (T-Mobile Existing)	115
LPA-80080-4CF (Verizon Existing)	125	LNX-6515DS (T-Mobile Existing)	115
SBNHH-1D65B (Verizon Proposed)	125	AIR21 B4A/B2P (T-Mobile Existing)	115
SBNHH-1D65B (Verizon Proposed)	125	AIR21 B2A/B4P (T-Mobile Existing)	115
SBNHH-1D65B (Verizon Proposed)	125	LNX-6515DS (T-Mobile Existing)	115
LPA-80080-4CF (Verizon Existing)	125	AIR21 B4A/B2P (T-Mobile Existing)	115
RRH4x45/2x90-AWS (Verizon Proposed)	125	TMA 10"x8"x3" (T-Mobile Existing)	115
		TMA 10"x8"x3" (T-Mobile Existing)	115
RRH4x45/2x90-AWS (Verizon Proposed)	125	TMA 10"x8"x3" (T-Mobile Existing)	115
		RRUS-11 (T-Mobile Existing)	115
RRH4x45/2x90-AWS (Verizon Proposed)	125	RRUS-11 (T-Mobile Existing)	115
		RRUS-11 (T-Mobile Existing)	115
RRH4x30-B13 (Verizon Proposed)	125	EEI Low Profile Platform (T-Mobile)	115
RRH4x30-B13 (Verizon Proposed)	125		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 25.6%

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

Job:	15001.146 - Meriden North		
Project:	125' EEI Monopole - 119 Empire Ave., Meriden,		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 10/21/16	Scale: N
Path:			Dwg No. E

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	125.00-117.72	7.28	3.64	18	30.0000	32.4600	0.2500	1.0000	A572-65 (65 ksi)
L2	117.72-69.84	51.52	6.50	18	30.7300	47.9200	0.3750	1.5000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	69.84-26.06	50.28	8.25	18	45.0012	62.0800	0.3750	1.5000	(65 ksi) A572-65 (65 ksi)
L4	26.06-1.00	33.31		18	58.5277	70.0000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	30.4628	23.6066	2639.6436	10.5612	15.2400	173.2050	5282.7605	11.8056	4.8400	19.36
	32.9607	25.5586	3350.0906	11.4346	16.4897	203.1629	6704.5894	12.7817	5.2730	21.092
L2	32.4373	36.1300	4205.9718	10.7760	15.6108	269.4264	8417.4778	18.0685	4.7485	12.663
	48.6592	56.5904	16161.8174	16.8785	24.3434	663.9107	32344.9009	28.3006	7.7739	20.73
L3	47.9374	53.1164	13364.3012	15.8423	22.8606	584.5991	26746.1875	26.5632	7.2602	19.361
	63.0377	73.4444	35329.4365	21.9053	31.5366	1120.2663	70705.3603	36.7292	10.2661	27.376
L4	62.3158	80.6655	34389.9033	20.6220	29.7321	1156.6603	68825.0577	40.3404	9.5309	21.785
	71.0799	96.5962	59053.8172	24.6947	35.5600	1660.6810	118185.338 8	48.3073	11.5500	26.4

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	Double Angle Stitch Bolt Spacing Redundants in
L1 125.00-117.72				1	1	1			
L2 117.72-69.84				1	1	1			
L3 69.84-26.06				1	1	1			
L4 26.06-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (Verizon Existing)	C	No	Inside Pole	125.00 - 1.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8 (T-Mobile Existing)	C	No	Inside Pole	115.00 - 1.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
HYBRIFLEX 1-5/8" (T-Mobile Existing)	C	No	Inside Pole	115.00 - 1.00	1	No Ice	0.00	1.90
						1/2" Ice	0.00	1.90
						1" Ice	0.00	1.90
HYBRIFLEX 1-5/8" (Verizon Proposed)	C	No	Inside Pole	125.00 - 1.00	2	No Ice	0.00	1.90
						1/2" Ice	0.00	1.90
						1" Ice	0.00	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
L1	125.00-117.72	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.12
L2	117.72-69.84	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.43
L3	69.84-26.06	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.34
L4	26.06-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.77

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
L1	125.00-117.72	A	1.709	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.12
L2	117.72-69.84	A	1.663	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.43
L3	69.84-26.06	A	1.556	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.34
L4	26.06-1.00	A	1.369	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.77

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	125.00-117.72	0.0000	0.0000	0.0000	0.0000
L2	117.72-69.84	0.0000	0.0000	0.0000	0.0000
L3	69.84-26.06	0.0000	0.0000	0.0000	0.0000
L4	26.06-1.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 1"x10'	C	None		0.0000	130.00	No Ice	1.00	1.00	0.04
						1/2" Ice	2.02	2.02	0.05
						1" Ice	3.05	3.05	0.06
LPA-80080-4CF (Verizon Existing)	A	From Face	4.00 -6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
SBNHH-1D65B (Verizon Proposed)	A	From Face	4.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	A	From Face	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	A	From Face	4.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
LPA-80080-4CF (Verizon Existing)	A	From Face	4.00 6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
LPA-80080-4CF (Verizon Existing)	B	From Face	4.00 -6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
SBNHH-1D65B (Verizon Proposed)	B	From Face	4.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	B	From Face	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	B	From Face	4.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
LPA-80080-4CF (Verizon Existing)	B	From Face	4.00 6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
LPA-80080-4CF (Verizon Existing)	C	From Face	4.00 -6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
SBNHH-1D65B (Verizon Proposed)	C	From Face	4.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	C	From Face	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
SBNHH-1D65B (Verizon Proposed)	C	From Face	4.00 4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.08 8.53 9.00	5.34 5.79 6.26	0.04 0.09 0.15
LPA-80080-4CF (Verizon Existing)	C	From Face	4.00 6.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.62 2.92 3.23	5.40 5.73 6.06	0.01 0.05 0.08
RRH4x45/2x90-AWS (Verizon Proposed)	A	From Face	4.00 -4.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	2.58 2.79 3.01	1.69 1.87 2.06	0.08 0.10 0.12
RRH4x45/2x90-AWS	A	From Face	4.00	0.0000	125.00	No Ice	2.58	1.69	0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft²	*C_AA_A Side* ft²	*Weight* K
(Verizon Proposed)			-4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	A	From Face	4.00	0.0000	125.00	No Ice	2.58	1.69	0.08
(Verizon Proposed)			-4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x30-B13	B	From Face	4.00	0.0000	125.00	No Ice	2.16	1.62	0.06
(Verizon Proposed)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	B	From Face	4.00	0.0000	125.00	No Ice	2.16	1.62	0.06
(Verizon Proposed)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	B	From Face	4.00	0.0000	125.00	No Ice	2.16	1.62	0.06
(Verizon Proposed)			0.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH2x60-PCS	C	From Face	4.00	0.0000	125.00	No Ice	2.15	1.35	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	4.00	0.0000	125.00	No Ice	2.15	1.35	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	4.00	0.0000	125.00	No Ice	2.15	1.35	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
DB-T1-6Z-8AB-0Z	A	From Face	2.00	0.0000	125.00	No Ice	4.80	2.00	0.04
(Verizon Proposed)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	B	From Face	2.00	0.0000	125.00	No Ice	4.80	2.00	0.04
(Verizon Proposed)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
EEI Low Profile Platform	C	None		0.0000	125.00	No Ice	22.50	22.50	1.50
(Verizon)						1/2" Ice	28.20	28.20	2.25
						1" Ice	33.90	33.90	3.00
AIR21 B2A/B4P	A	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08
(T-Mobile Existing)			-5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
LNX-6515DS	A	From Face	4.00	0.0000	115.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
AIR21 B4A/B2P	A	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08
(T-Mobile Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	B	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08
(T-Mobile Existing)			-5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
LNX-6515DS	B	From Face	4.00	0.0000	115.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
AIR21 B4A/B2P	B	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08
(T-Mobile Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	C	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08
(T-Mobile Existing)			-5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
LNX-6515DS	C	From Face	4.00	0.0000	115.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
AIR21 B4A/B2P	C	From Face	4.00	0.0000	115.00	No Ice	6.05	4.36	0.08

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
(T-Mobile Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
TMA 10"x8"x3"	A	From Face	4.00	0.0000	115.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			5.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	B	From Face	4.00	0.0000	115.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			5.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	C	From Face	4.00	0.0000	115.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			5.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
RRUS-11	A	From Face	4.00	0.0000	115.00	No Ice	2.57	1.07	0.05
(T-Mobile Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Face	4.00	0.0000	115.00	No Ice	2.57	1.07	0.05
(T-Mobile Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	4.00	0.0000	115.00	No Ice	2.57	1.07	0.05
(T-Mobile Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
EEI Low Profile Platform	C	None		0.0000	115.00	No Ice	22.50	22.50	1.50
(T-Mobile)						1/2" Ice	28.20	28.20	2.25
						1" Ice	33.90	33.90	3.00

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	121.31	1.318	30	19.238	A	0.000	19.238	19.238	100.00	0.000	0.000
125.00-117.72					B	0.000	19.238		100.00	0.000	0.000
					C	0.000	19.238		100.00	0.000	0.000
L2	92.50	1.245	28	161.788	A	0.000	161.788	161.788	100.00	0.000	0.000
117.72-69.84					B	0.000	161.788		100.00	0.000	0.000
					C	0.000	161.788		100.00	0.000	0.000
L3 69.84-26.06	47.49	1.082	25	202.437	A	0.000	202.437	202.437	100.00	0.000	0.000
					B	0.000	202.437		100.00	0.000	0.000
					C	0.000	202.437		100.00	0.000	0.000
L4 26.06-1.00	13.26	0.85	19	139.287	A	0.000	139.287	139.287	100.00	0.000	0.000
					B	0.000	139.287		100.00	0.000	0.000
					C	0.000	139.287		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.100$

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
L1	121.31	1.318	8	1.7086	21.312	A	0.000	21.312	21.312	100.00	0.000	0.000
125.00-117.72						B	0.000	21.312		100.00	0.000	0.000
						C	0.000	21.312		100.00	0.000	0.000
L2 117.72-69.84	92.50	1.245	8	1.6629	175.422	A	0.000	175.422	175.422	100.00	0.000	0.000
						B	0.000	175.422		100.00	0.000	0.000
						C	0.000	175.422		100.00	0.000	0.000
L3 69.84-26.06	47.49	1.082	7	1.5556	214.570	A	0.000	214.570	214.570	100.00	0.000	0.000
						B	0.000	214.570		100.00	0.000	0.000
						C	0.000	214.570		100.00	0.000	0.000
L4 26.06-1.00	13.26	0.85	5	1.3692	145.785	A	0.000	145.785	145.785	100.00	0.000	0.000
						B	0.000	145.785		100.00	0.000	0.000
						C	0.000	145.785		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	121.31	1.318	10	19.238	A	0.000	19.238	19.238	100.00	0.000	0.000
125.00-117.72					B	0.000	19.238		100.00	0.000	0.000
					C	0.000	19.238		100.00	0.000	0.000
L2	92.50	1.245	10	161.788	A	0.000	161.788	161.788	100.00	0.000	0.000
117.72-69.84					B	0.000	161.788		100.00	0.000	0.000
					C	0.000	161.788		100.00	0.000	0.000
L3 69.84-26.06	47.49	1.082	8	202.437	A	0.000	202.437	202.437	100.00	0.000	0.000
					B	0.000	202.437		100.00	0.000	0.000
					C	0.000	202.437		100.00	0.000	0.000
L4 26.06-1.00	13.26	0.85	7	139.287	A	0.000	139.287	139.287	100.00	0.000	0.000
					B	0.000	139.287		100.00	0.000	0.000
					C	0.000	139.287		100.00	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	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	30	1	1	19.238	0.41	56.99	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	28	1	1	161.788	3.29	68.69	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	25	1	1	202.437	3.56	81.29	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	19	1	1	139.287	1.94	77.30	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	540.06 kip-ft	9.20		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	30	1	1	19.238	0.41	56.99	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	28	1	1	161.788	3.29	68.69	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	25	1	1	202.437	3.56	81.29	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	19	1	1	139.287	1.94	77.30	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	540.06 kip-ft	9.20		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	30	1	1	19.238	0.41	56.99	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	28	1	1	161.788	3.29	68.69	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	25	1	1	202.437	3.56	81.29	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	19	1	1	139.287	1.94	77.30	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	540.06 kip-ft	9.20		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	30	1	1	19.238	0.41	56.99	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	28	1	1	161.788	3.29	68.69	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	25	1	1	202.437	3.56	81.29	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	19	1	1	139.287	1.94	77.30	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	540.06 kip-ft	9.20		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	1.11	A	1	1.2	8	1	1	21.312	0.23	30.97	C
125.00-117.72			B	1	1.2		1	1	21.312			
			C	1	1.2		1	1	21.312			
L2	1.43	12.22	A	1	1.2	8	1	1	175.422	1.75	36.53	C
117.72-69.84			B	1	1.2		1	1	175.422			
			C	1	1.2		1	1	175.422			
L3	1.34	15.55	A	1	1.2	7	1	1	214.570	1.85	42.27	C
69.84-26.06			B	1	1.2		1	1	214.570			
			C	1	1.2		1	1	214.570			
L4 26.06-1.00	0.77	12.89	A	1	1.2	5	1	1	145.785	0.99	39.69	C
			B	1	1.2		1	1	145.785			
			C	1	1.2		1	1	145.785			
Sum Weight:	3.66	41.77						OTM	285.40 kip-ft	4.82		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	1.11	A	1	1.2	8	1	1	21.312	0.23	30.97	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
125.00-117.72			B	1	1.2		1	1	21.312			
			C	1	1.2		1	1	21.312			
L2	1.43	12.22	A	1	1.2	8	1	1	175.422	1.75	36.53	C
117.72-69.84			B	1	1.2		1	1	175.422			
			C	1	1.2		1	1	175.422			
L3	1.34	15.55	A	1	1.2	7	1	1	214.570	1.85	42.27	C
69.84-26.06			B	1	1.2		1	1	214.570			
			C	1	1.2		1	1	214.570			
L4 26.06-1.00	0.77	12.89	A	1	1.2	5	1	1	145.785	0.99	39.69	C
			B	1	1.2		1	1	145.785			
			C	1	1.2		1	1	145.785			
Sum Weight:	3.66	41.77						OTM	285.40 kip-ft	4.82		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	1.11	A	1	1.2	8	1	1	21.312	0.23	30.97	C
125.00-117.72			B	1	1.2		1	1	21.312			
			C	1	1.2		1	1	21.312			
L2	1.43	12.22	A	1	1.2	8	1	1	175.422	1.75	36.53	C
117.72-69.84			B	1	1.2		1	1	175.422			
			C	1	1.2		1	1	175.422			
L3	1.34	15.55	A	1	1.2	7	1	1	214.570	1.85	42.27	C
69.84-26.06			B	1	1.2		1	1	214.570			
			C	1	1.2		1	1	214.570			
L4 26.06-1.00	0.77	12.89	A	1	1.2	5	1	1	145.785	0.99	39.69	C
			B	1	1.2		1	1	145.785			
			C	1	1.2		1	1	145.785			
Sum Weight:	3.66	41.77						OTM	285.40 kip-ft	4.82		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	1.11	A	1	1.2	8	1	1	21.312	0.23	30.97	C
125.00-117.72			B	1	1.2		1	1	21.312			
			C	1	1.2		1	1	21.312			
L2	1.43	12.22	A	1	1.2	8	1	1	175.422	1.75	36.53	C
117.72-69.84			B	1	1.2		1	1	175.422			
			C	1	1.2		1	1	175.422			
L3	1.34	15.55	A	1	1.2	7	1	1	214.570	1.85	42.27	C
69.84-26.06			B	1	1.2		1	1	214.570			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	1	1.2		1	1	214.570			
L4 26.06-1.00	0.77	12.89	A	1	1.2	5	1	1	145.785	0.99	39.69	C
			B	1	1.2		1	1	145.785			
			C	1	1.2		1	1	145.785			
Sum Weight:	3.66	41.77						OTM	285.40 kip-ft	4.82		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	10	1	1	19.238	0.14	19.51	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	10	1	1	161.788	1.13	23.51	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	8	1	1	202.437	1.22	27.83	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	7	1	1	139.287	0.66	26.46	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	184.88 kip-ft	3.15		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	10	1	1	19.238	0.14	19.51	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	10	1	1	161.788	1.13	23.51	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	8	1	1	202.437	1.22	27.83	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	7	1	1	139.287	0.66	26.46	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	184.88 kip-ft	3.15		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	10	1	1	19.238	0.14	19.51	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	10	1	1	161.788	1.13	23.51	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	8	1	1	202.437	1.22	27.83	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	7	1	1	139.287	0.66	26.46	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	184.88 kip-ft	3.15		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.12	0.61	A	1	0.65	10	1	1	19.238	0.14	19.51	C
125.00-117.72			B	1	0.65		1	1	19.238			
			C	1	0.65		1	1	19.238			
L2	1.43	8.13	A	1	0.65	10	1	1	161.788	1.13	23.51	C
117.72-69.84			B	1	0.65		1	1	161.788			
			C	1	0.65		1	1	161.788			
L3	1.34	10.83	A	1	0.65	8	1	1	202.437	1.22	27.83	C
69.84-26.06			B	1	0.65		1	1	202.437			
			C	1	0.65		1	1	202.437			
L4 26.06-1.00	0.77	10.05	A	1	0.65	7	1	1	139.287	0.66	26.46	C
			B	1	0.65		1	1	139.287			
			C	1	0.65		1	1	139.287			
Sum Weight:	3.66	29.61						OTM	184.88 kip-ft	3.15		

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

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	29.61					
Bracing Weight	0.00					
Total Member Self-Weight	29.61			0.54	1.47	
Total Weight	38.28			0.54	1.47	
Wind 0 deg - No Ice		-0.01	-15.34	-1276.31	2.99	-1.13
Wind 30 deg - No Ice		7.69	-13.28	-1104.49	-639.84	-0.77
Wind 45 deg - No Ice		10.89	-10.84	-901.26	-906.27	-0.51
Wind 60 deg - No Ice		13.34	-7.66	-636.57	-1110.83	-0.21
Wind 90 deg - No Ice		15.41	0.01	2.06	-1283.78	0.41
Wind 120 deg - No Ice		13.35	7.68	640.28	-1112.35	0.92
Wind 135 deg - No Ice		10.90	10.86	904.49	-908.41	1.09
Wind 150 deg - No Ice		7.72	13.29	1107.09	-642.46	1.18
Wind 180 deg - No Ice		0.01	15.34	1277.40	-0.04	1.13
Wind 210 deg - No Ice		-7.69	13.28	1105.58	642.79	0.77
Wind 225 deg - No Ice		-10.89	10.84	902.35	909.21	0.51
Wind 240 deg - No Ice		-13.34	7.66	637.66	1113.78	0.21
Wind 270 deg - No Ice		-15.41	-0.01	-0.97	1286.73	-0.41
Wind 300 deg - No Ice		-13.35	-7.68	-639.20	1115.29	-0.92
Wind 315 deg - No Ice		-10.90	-10.86	-903.40	911.35	-1.09
Wind 330 deg - No Ice		-7.72	-13.29	-1106.00	645.41	-1.18
Member Ice	12.16					
Total Weight Ice	61.31			0.74	2.82	
Wind 0 deg - Ice		-0.00	-7.14	-563.57	3.28	-0.39
Wind 30 deg - Ice		3.58	-6.18	-487.73	-280.14	-0.27
Wind 45 deg - Ice		5.06	-5.05	-397.96	-397.58	-0.18
Wind 60 deg - Ice		6.20	-3.57	-281.01	-487.74	-0.07
Wind 90 deg - Ice		7.16	0.00	1.20	-563.89	0.14
Wind 120 deg - Ice		6.21	3.57	283.29	-488.20	0.32
Wind 135 deg - Ice		5.07	5.05	400.09	-398.23	0.38
Wind 150 deg - Ice		3.58	6.19	489.68	-280.93	0.41
Wind 180 deg - Ice		0.00	7.14	565.05	2.36	0.39
Wind 210 deg - Ice		-3.58	6.18	489.22	285.78	0.27
Wind 225 deg - Ice		-5.06	5.05	399.44	403.22	0.18
Wind 240 deg - Ice		-6.20	3.57	282.50	493.38	0.07
Wind 270 deg - Ice		-7.16	-0.00	0.28	569.54	-0.14
Wind 300 deg - Ice		-6.21	-3.57	-281.81	493.84	-0.32
Wind 315 deg - Ice		-5.07	-5.05	-398.61	403.88	-0.38
Wind 330 deg - Ice		-3.58	-6.19	-488.19	286.58	-0.41
Total Weight	38.28			0.54	1.47	
Wind 0 deg - Service		-0.00	-5.25	-436.57	1.99	-0.39
Wind 30 deg - Service		2.63	-4.55	-377.75	-218.07	-0.26
Wind 45 deg - Service		3.73	-3.71	-308.18	-309.28	-0.17
Wind 60 deg - Service		4.57	-2.62	-217.57	-379.31	-0.07
Wind 90 deg - Service		5.28	0.00	1.06	-438.52	0.14
Wind 120 deg - Service		4.57	2.63	219.55	-379.83	0.32
Wind 135 deg - Service		3.73	3.72	310.00	-310.01	0.37
Wind 150 deg - Service		2.64	4.55	379.36	-218.97	0.40
Wind 180 deg - Service		0.00	5.25	437.66	0.95	0.39
Wind 210 deg - Service		-2.63	4.55	378.84	221.02	0.26
Wind 225 deg - Service		-3.73	3.71	309.27	312.23	0.17
Wind 240 deg - Service		-4.57	2.62	218.65	382.26	0.07
Wind 270 deg - Service		-5.28	-0.00	0.03	441.46	-0.14
Wind 300 deg - Service		-4.57	-2.63	-218.46	382.77	-0.32
Wind 315 deg - Service		-3.73	-3.72	-308.91	312.96	-0.37
Wind 330 deg - Service		-2.64	-4.55	-378.27	221.92	-0.40

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service

Comb. No.	Description
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	125 - 117.72	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-10.10	3.12	-0.85
			Max. Mx	26	-3.47	24.53	-0.57
			Max. My	18	-3.47	1.66	-23.01
			Max. Vy	26	-6.35	24.53	-0.57
			Max. Vx	18	6.24	1.66	-23.01
			Max. Torque	16			-1.93
L2	117.72 - 69.84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-31.88	3.14	-0.86
			Max. Mx	26	-16.44	571.78	0.31
			Max. My	18	-16.44	0.82	-565.31
			Max. Vy	26	-15.28	571.78	0.31
			Max. Vx	18	15.17	0.82	-565.31
			Max. Torque	32			1.93
L3	69.84 - 26.06	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-50.55	3.14	-0.86
			Max. Mx	26	-30.12	1324.93	1.13
			Max. My	18	-30.12	0.00	-1313.83
			Max. Vy	26	-20.60	1324.93	1.13
			Max. Vx	18	20.49	0.00	-1313.83
			Max. Torque	32			1.93
L4	26.06 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-70.91	3.14	-0.86
			Max. Mx	26	-45.93	2079.78	1.79
			Max. My	18	-45.93	-0.65	-2065.05
			Max. Vy	26	-24.66	2079.78	1.79
			Max. Vx	18	24.55	-0.65	-2065.05
			Max. Torque	32			1.93

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	70.91	0.00	0.00
	Max. H_x	26	45.93	24.65	0.02
	Max. H_z	2	45.93	0.02	24.55
	Max. M_x	2	2063.72	0.02	24.55
	Max. M_z	10	2076.18	-24.65	-0.02
	Max. Torsion	32	1.93	12.34	21.27
	Min. Vert	7	34.45	-17.42	17.34
	Min. H_x	10	45.93	-24.65	-0.02

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	18	45.93	-0.02	-24.55
	Min. M_x	18	-2065.05	-0.02	-24.55
	Min. M_z	26	-2079.78	24.65	0.02
	Min. Torsion	16	-1.93	-12.34	-21.27

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	38.28	0.00	0.00	0.54	1.47	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	45.93	-0.02	-24.55	-2063.72	4.25	-1.84
0.9 Dead+1.6 Wind 0 deg - No Ice	34.45	-0.02	-24.55	-2058.45	3.79	-1.83
1.2 Dead+1.6 Wind 30 deg - No Ice	45.93	12.31	-21.25	-1785.92	-1035.06	-1.26
0.9 Dead+1.6 Wind 30 deg - No Ice	34.45	12.31	-21.25	-1781.38	-1032.79	-1.25
1.2 Dead+1.6 Wind 45 deg - No Ice	45.93	17.42	-17.34	-1457.34	-1465.82	-0.82
0.9 Dead+1.6 Wind 45 deg - No Ice	34.45	17.42	-17.34	-1453.67	-1462.41	-0.82
1.2 Dead+1.6 Wind 60 deg - No Ice	45.93	21.34	-12.26	-1029.40	-1796.55	-0.34
0.9 Dead+1.6 Wind 60 deg - No Ice	34.45	21.34	-12.26	-1026.86	-1792.27	-0.33
1.2 Dead+1.6 Wind 90 deg - No Ice	45.93	24.65	0.02	3.12	-2076.18	0.67
0.9 Dead+1.6 Wind 90 deg - No Ice	34.45	24.65	0.02	2.94	-2071.16	0.67
1.2 Dead+1.6 Wind 120 deg - No Ice	45.93	21.36	12.29	1034.98	-1799.01	1.50
0.9 Dead+1.6 Wind 120 deg - No Ice	34.45	21.36	12.29	1032.09	-1794.72	1.49
1.2 Dead+1.6 Wind 135 deg - No Ice	45.93	17.45	17.37	1462.14	-1469.28	1.78
0.9 Dead+1.6 Wind 135 deg - No Ice	34.45	17.45	17.37	1458.12	-1465.86	1.77
1.2 Dead+1.6 Wind 150 deg - No Ice	45.93	12.34	21.27	1789.70	-1039.31	1.93
0.9 Dead+1.6 Wind 150 deg - No Ice	34.45	12.34	21.27	1784.82	-1037.02	1.92
1.2 Dead+1.6 Wind 180 deg - No Ice	45.93	0.02	24.55	2065.05	-0.65	1.84
0.9 Dead+1.6 Wind 180 deg - No Ice	34.45	0.02	24.55	2059.44	-1.10	1.83
1.2 Dead+1.6 Wind 210 deg - No Ice	45.93	-12.31	21.25	1787.25	1038.67	1.26
0.9 Dead+1.6 Wind 210 deg - No Ice	34.45	-12.31	21.25	1782.37	1035.48	1.25
1.2 Dead+1.6 Wind 225 deg - No Ice	45.93	-17.42	17.34	1458.67	1469.42	0.82
0.9 Dead+1.6 Wind 225 deg - No Ice	34.45	-17.42	17.34	1454.66	1465.10	0.82
1.2 Dead+1.6 Wind 240 deg - No Ice	45.93	-21.34	12.26	1030.73	1800.16	0.34

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
0.9 Dead+1.6 Wind 240 deg - No Ice	34.45	-21.34	12.26	1027.85	1794.96	0.33
1.2 Dead+1.6 Wind 270 deg - No Ice	45.93	-24.65	-0.02	-1.79	2079.78	-0.67
0.9 Dead+1.6 Wind 270 deg - No Ice	34.45	-24.65	-0.02	-1.95	2073.85	-0.67
1.2 Dead+1.6 Wind 300 deg - No Ice	45.93	-21.36	-12.29	-1033.65	1802.61	-1.50
0.9 Dead+1.6 Wind 300 deg - No Ice	34.45	-21.36	-12.29	-1031.09	1797.41	-1.49
1.2 Dead+1.6 Wind 315 deg - No Ice	45.93	-17.45	-17.37	-1460.81	1472.89	-1.78
0.9 Dead+1.6 Wind 315 deg - No Ice	34.45	-17.45	-17.37	-1457.13	1468.55	-1.77
1.2 Dead+1.6 Wind 330 deg - No Ice	45.93	-12.34	-21.27	-1788.37	1042.92	-1.93
0.9 Dead+1.6 Wind 330 deg - No Ice	34.45	-12.34	-21.27	-1783.82	1039.71	-1.92
1.2 Dead+1.0 Ice+1.0 Temp	70.91	0.00	0.00	0.86	3.14	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	70.91	-0.00	-7.14	-574.60	3.72	-0.41
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	70.91	3.58	-6.18	-497.26	-285.32	-0.28
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	70.91	5.06	-5.05	-405.71	-405.09	-0.19
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	70.91	6.20	-3.57	-286.45	-497.04	-0.08
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	70.91	7.16	0.00	1.36	-574.70	0.15
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	70.91	6.21	3.57	289.04	-497.51	0.33
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	70.91	5.07	5.05	408.15	-405.76	0.39
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	70.91	3.58	6.19	499.51	-286.14	0.43
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	70.91	0.00	7.14	576.37	2.78	0.41
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	70.91	-3.58	6.18	499.04	291.82	0.28
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	70.91	-5.06	5.05	407.48	411.59	0.19
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	70.91	-6.20	3.57	288.22	503.53	0.08
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	70.91	-7.16	-0.00	0.41	581.20	-0.15
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	70.91	-6.21	-3.57	-287.27	504.01	-0.33
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	70.91	-5.07	-5.05	-406.38	412.26	-0.39
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	70.91	-3.58	-6.19	-497.74	292.63	-0.43
Dead+Wind 0 deg - Service	38.28	-0.00	-5.25	-440.39	2.02	-0.39
Dead+Wind 30 deg - Service	38.28	2.63	-4.55	-381.05	-219.97	-0.27
Dead+Wind 45 deg - Service	38.28	3.73	-3.71	-310.87	-311.98	-0.18
Dead+Wind 60 deg - Service	38.28	4.57	-2.62	-219.46	-382.62	-0.07
Dead+Wind 90 deg - Service	38.28	5.28	0.00	1.08	-442.35	0.14
Dead+Wind 120 deg - Service	38.28	4.57	2.63	221.48	-383.15	0.32
Dead+Wind 135 deg - Service	38.28	3.73	3.72	312.72	-312.72	0.38
Dead+Wind 150 deg - Service	38.28	2.64	4.55	382.68	-220.88	0.41
Dead+Wind 180 deg - Service	38.28	0.00	5.25	441.49	0.97	0.39
Dead+Wind 210 deg - Service	38.28	-2.63	4.55	382.16	222.97	0.27

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 225 deg - Service	38.28	-3.73	3.71	311.98	314.97	0.18
Dead+Wind 240 deg - Service	38.28	-4.57	2.62	220.57	385.62	0.07
Dead+Wind 270 deg - Service	38.28	-5.28	-0.00	0.03	445.34	-0.14
Dead+Wind 300 deg - Service	38.28	-4.57	-2.63	-220.37	386.14	-0.32
Dead+Wind 315 deg - Service	38.28	-3.73	-3.72	-311.61	315.71	-0.38
Dead+Wind 330 deg - Service	38.28	-2.64	-4.55	-381.58	223.87	-0.41

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	-38.28	0.00	0.00	38.28	0.00	0.000%
2	-0.02	-45.93	-24.55	0.02	45.93	24.55	0.000%
3	-0.02	-34.45	-24.55	0.02	34.45	24.55	0.000%
4	12.31	-45.93	-21.25	-12.31	45.93	21.25	0.000%
5	12.31	-34.45	-21.25	-12.31	34.45	21.25	0.000%
6	17.42	-45.93	-17.34	-17.42	45.93	17.34	0.000%
7	17.42	-34.45	-17.34	-17.42	34.45	17.34	0.000%
8	21.34	-45.93	-12.26	-21.34	45.93	12.26	0.000%
9	21.34	-34.45	-12.26	-21.34	34.45	12.26	0.000%
10	24.65	-45.93	0.02	-24.65	45.93	-0.02	0.000%
11	24.65	-34.45	0.02	-24.65	34.45	-0.02	0.000%
12	21.36	-45.93	12.29	-21.36	45.93	-12.29	0.000%
13	21.36	-34.45	12.29	-21.36	34.45	-12.29	0.000%
14	17.45	-45.93	17.37	-17.45	45.93	-17.37	0.000%
15	17.45	-34.45	17.37	-17.45	34.45	-17.37	0.000%
16	12.34	-45.93	21.27	-12.34	45.93	-21.27	0.000%
17	12.34	-34.45	21.27	-12.34	34.45	-21.27	0.000%
18	0.02	-45.93	24.55	-0.02	45.93	-24.55	0.000%
19	0.02	-34.45	24.55	-0.02	34.45	-24.55	0.000%
20	-12.31	-45.93	21.25	12.31	45.93	-21.25	0.000%
21	-12.31	-34.45	21.25	12.31	34.45	-21.25	0.000%
22	-17.42	-45.93	17.34	17.42	45.93	-17.34	0.000%
23	-17.42	-34.45	17.34	17.42	34.45	-17.34	0.000%
24	-21.34	-45.93	12.26	21.34	45.93	-12.26	0.000%
25	-21.34	-34.45	12.26	21.34	34.45	-12.26	0.000%
26	-24.65	-45.93	-0.02	24.65	45.93	0.02	0.000%
27	-24.65	-34.45	-0.02	24.65	34.45	0.02	0.000%
28	-21.36	-45.93	-12.29	21.36	45.93	12.29	0.000%
29	-21.36	-34.45	-12.29	21.36	34.45	12.29	0.000%
30	-17.45	-45.93	-17.37	17.45	45.93	17.37	0.000%
31	-17.45	-34.45	-17.37	17.45	34.45	17.37	0.000%
32	-12.34	-45.93	-21.27	12.34	45.93	21.27	0.000%
33	-12.34	-34.45	-21.27	12.34	34.45	21.27	0.000%
34	0.00	-70.91	0.00	0.00	70.91	0.00	0.000%
35	-0.00	-70.91	-7.14	0.00	70.91	7.14	0.000%
36	3.58	-70.91	-6.18	-3.58	70.91	6.18	0.000%
37	5.06	-70.91	-5.05	-5.06	70.91	5.05	0.000%
38	6.20	-70.91	-3.57	-6.20	70.91	3.57	0.000%
39	7.16	-70.91	0.00	-7.16	70.91	-0.00	0.000%
40	6.21	-70.91	3.57	-6.21	70.91	-3.57	0.000%
41	5.07	-70.91	5.05	-5.07	70.91	-5.05	0.000%
42	3.58	-70.91	6.19	-3.58	70.91	-6.19	0.000%
43	0.00	-70.91	7.14	-0.00	70.91	-7.14	0.000%
44	-3.58	-70.91	6.18	3.58	70.91	-6.18	0.000%
45	-5.06	-70.91	5.05	5.06	70.91	-5.05	0.000%
46	-6.20	-70.91	3.57	6.20	70.91	-3.57	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
47	-7.16	-70.91	-0.00	7.16	70.91	0.00	0.000%
48	-6.21	-70.91	-3.57	6.21	70.91	3.57	0.000%
49	-5.07	-70.91	-5.05	5.07	70.91	5.05	0.000%
50	-3.58	-70.91	-6.19	3.58	70.91	6.19	0.000%
51	-0.00	-38.28	-5.25	0.00	38.28	5.25	0.000%
52	2.63	-38.28	-4.55	-2.63	38.28	4.55	0.000%
53	3.73	-38.28	-3.71	-3.73	38.28	3.71	0.000%
54	4.57	-38.28	-2.62	-4.57	38.28	2.62	0.000%
55	5.28	-38.28	0.00	-5.28	38.28	-0.00	0.000%
56	4.57	-38.28	2.63	-4.57	38.28	-2.63	0.000%
57	3.73	-38.28	3.72	-3.73	38.28	-3.72	0.000%
58	2.64	-38.28	4.55	-2.64	38.28	-4.55	0.000%
59	0.00	-38.28	5.25	-0.00	38.28	-5.25	0.000%
60	-2.63	-38.28	4.55	2.63	38.28	-4.55	0.000%
61	-3.73	-38.28	3.71	3.73	38.28	-3.71	0.000%
62	-4.57	-38.28	2.62	4.57	38.28	-2.62	0.000%
63	-5.28	-38.28	-0.00	5.28	38.28	0.00	0.000%
64	-4.57	-38.28	-2.63	4.57	38.28	2.63	0.000%
65	-3.73	-38.28	-3.72	3.73	38.28	3.72	0.000%
66	-2.64	-38.28	-4.55	2.64	38.28	4.55	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	0.00001874
3	Yes	4	0.00000001	0.00001219
4	Yes	4	0.00000001	0.00003479
5	Yes	4	0.00000001	0.00002266
6	Yes	4	0.00000001	0.00004487
7	Yes	4	0.00000001	0.00002941
8	Yes	4	0.00000001	0.00004009
9	Yes	4	0.00000001	0.00002629
10	Yes	4	0.00000001	0.00000961
11	Yes	4	0.00000001	0.00000564
12	Yes	4	0.00000001	0.00004714
13	Yes	4	0.00000001	0.00003110
14	Yes	4	0.00000001	0.00004776
15	Yes	4	0.00000001	0.00003139
16	Yes	4	0.00000001	0.00003481
17	Yes	4	0.00000001	0.00002266
18	Yes	4	0.00000001	0.00001856
19	Yes	4	0.00000001	0.00001206
20	Yes	4	0.00000001	0.00004543
21	Yes	4	0.00000001	0.00002988
22	Yes	4	0.00000001	0.00004531
23	Yes	4	0.00000001	0.00002961
24	Yes	4	0.00000001	0.00003770
25	Yes	4	0.00000001	0.00002455
26	Yes	4	0.00000001	0.00000949
27	Yes	4	0.00000001	0.00000554
28	Yes	4	0.00000001	0.00003508
29	Yes	4	0.00000001	0.00002278
30	Yes	4	0.00000001	0.00004777
31	Yes	4	0.00000001	0.00003134

32	Yes	4	0.00000001	0.00004986
33	Yes	4	0.00000001	0.00003294
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00014701
36	Yes	4	0.00000001	0.00014719
37	Yes	4	0.00000001	0.00014743
38	Yes	4	0.00000001	0.00014707
39	Yes	4	0.00000001	0.00014630
40	Yes	4	0.00000001	0.00014796
41	Yes	4	0.00000001	0.00014857
42	Yes	4	0.00000001	0.00014845
43	Yes	4	0.00000001	0.00014811
44	Yes	4	0.00000001	0.00015032
45	Yes	4	0.00000001	0.00015118
46	Yes	4	0.00000001	0.00015119
47	Yes	4	0.00000001	0.00015033
48	Yes	4	0.00000001	0.00015089
49	Yes	4	0.00000001	0.00015072
50	Yes	4	0.00000001	0.00014966
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 117.72	3.554	63	0.2495	0.0014
L2	121.36 - 69.84	3.364	63	0.2481	0.0012
L3	76.34 - 26.06	1.318	63	0.1694	0.0004
L4	34.31 - 1	0.250	63	0.0659	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lightning Rod 1"x10'	63	3.554	0.2495	0.0014	68526
125.00	LPA-80080-4CF	63	3.554	0.2495	0.0014	68526
115.00	AIR21 B2A/B4P	63	3.038	0.2434	0.0009	53364

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 117.72	16.545	26	1.1548	0.0067
L2	121.36 - 69.84	15.666	26	1.1501	0.0057
L3	76.34 - 26.06	6.151	26	0.7899	0.0018
L4	34.31 - 1	1.167	26	0.3077	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lightning Rod 1"x10'	26	16.545	1.1548	0.0067	15768
125.00	LPA-80080-4CF	26	16.545	1.1548	0.0067	15768
115.00	AIR21 B2A/B4P	26	14.153	1.1311	0.0044	12080

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	125 - 117.72 (1)	TP32.46x30x0.25	7.28	124.00	135.3	24.5826	-10.09	303.38	0.033
L2	117.72 - 69.84 (2)	TP47.92x30.73x0.375	51.52	124.00	92.4	54.0091	-16.44	1429.93	0.011
L3	69.84 - 26.06 (3)	TP62.08x45.0012x0.375	50.28	124.00	71.2	70.1089	-30.12	2643.67	0.011
L4	26.06 - 1 (4)	TP70x58.5277x0.4375	33.31	124.00	60.3	96.5962	-45.93	4209.67	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	125 - 117.72 (1)	TP32.46x30x0.25	8.84	1093.65	0.008	0.00	1093.65	0.000
L2	117.72 - 69.84 (2)	TP47.92x30.73x0.375	571.78	3546.06	0.161	0.00	3546.06	0.000
L3	69.84 - 26.06 (3)	TP62.08x45.0012x0.375	1324.93	5415.07	0.245	0.00	5415.07	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L4	26.06 - 1 (4)	TP70x58.5277x0.4375	2079.78	8762.17	0.237	0.00	8762.17	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	125 - 117.72 (1)	TP32.46x30x0.25	1.56	858.55	0.002	0.15	2189.98	0.000
L2	117.72 - 69.84 (2)	TP47.92x30.73x0.375	15.28	1900.95	0.008	0.67	7100.80	0.000
L3	69.84 - 26.06 (3)	TP62.08x45.0012x0.375	20.60	2232.04	0.009	0.67	10843.42	0.000
L4	26.06 - 1 (4)	TP70x58.5277x0.4375	24.66	3057.98	0.008	0.67	17545.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	125 - 117.72 (1)	0.033	0.008	0.000	0.002	0.000	0.041 ✔	1.000	4.8.2 ✔
L2	117.72 - 69.84 (2)	0.011	0.161	0.000	0.008	0.000	0.173 ✔	1.000	4.8.2 ✔
L3	69.84 - 26.06 (3)	0.011	0.245	0.000	0.009	0.000	0.256 ✔	1.000	4.8.2 ✔
L4	26.06 - 1 (4)	0.011	0.237	0.000	0.008	0.000	0.248 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	125 - 117.72	Pole	TP32.46x30x0.25	1	-10.09	303.38	4.1	Pass
L2	117.72 - 69.84	Pole	TP47.92x30.73x0.375	2	-16.44	1429.93	17.3	Pass
L3	69.84 - 26.06	Pole	TP62.08x45.0012x0.375	3	-30.12	2643.67	25.6	Pass
L4	26.06 - 1	Pole	TP70x58.5277x0.4375	4	-45.93	4209.67	24.8	Pass
							Summary	
						Pole (L3)	25.6	Pass
						RATING =	**25.6**	**Pass**

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Subject:		Anchor Bolt and Baseplate Analysis
Location:		125-FT EEI Monopole Meriden, CT
Rev. 1: 10/21/16		Prepared by: T.J.L. Checked by: C.F.C. Job No. 15001.146

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 2080·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 25·kips	(Input From RisaTower)
Axial Force =	Axial := 46·kips	(Input From RisaTower)

Anchor Bolt Data:

ASTM A615 Grade 75

Number of Anchor Bolts =	N := 12	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Base Plate Data:

Use ASTM A572 Grade 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.25·in	(User Input)
Base Plate Diameter =	D_{bp} := 86.5·in	(User Input)
Outer Pole Diameter =	D_{pole} := 70·in	(User Input)
	η := 0.5	per TIA-222-G Section 4.9.9

Geometric Layout Data:

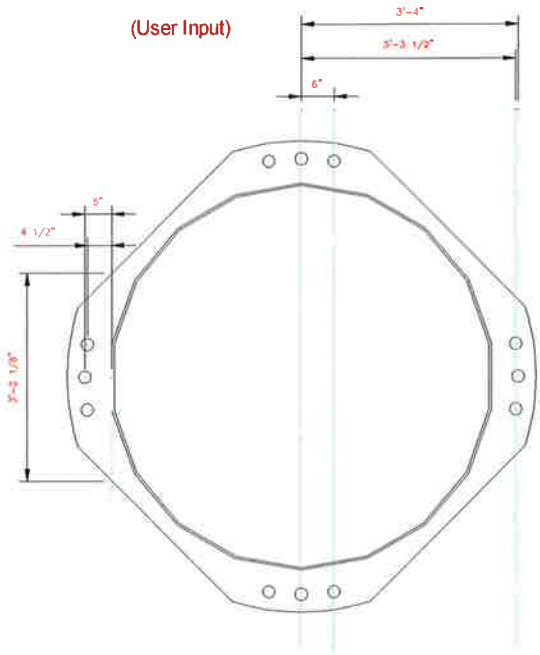
Distance from Bolts to Centroid of Pole:

$d_1 := 40in$ $d_2 := 39.5in$ $d_3 := 6in$ (User Input)

Critical Distances For Bending in Plate: (User Input)

$ma_1 := 5in$ $ma_2 := 4.5in$

Effective Width of Baseplate for Bending = $B_{eff} := 38.125in$ (User Input)



Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 2 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4\right] = 9585 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_1}{l_p} - \frac{Axial}{N} = 100.3 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{d_1}{l_p} + \frac{Axial}{N} = 108 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2.1 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 43.2$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right] \cdot 100 = 17.3$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2 \le 1.00, "OK", "Overstressed"\right]$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts =

$$C_1 := \frac{OM \cdot d_1}{I_p} + \frac{Axial}{N} = 107.996 \cdot kips$$

$$C_2 := \frac{OM \cdot d_2}{I_p} + \frac{Axial}{N} = 106.694 \cdot kips$$

Applied Bending Stress in Plate =

$$f_{bp} := \frac{4 \cdot \left(C_1 \cdot ma_1 + 2C_2 \cdot ma_2\right)}{B_{eff} t_{bp}^{\ 2}} = 31.09 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 57.6 \cdot \%$$

Condition2= =

$$Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$$

Condition2 = "Ok"

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Subject: FOUNDATION ANALYSIS

Location: Meriden, CT

Rev. 1: 10/21/16

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 15001.146

Mat Foundation Analysis:

Input Data:

Monopole Base Reactions			
Overturning Moment =	$OM_t := 2080 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 25 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 46 \cdot kip$	(User Input from tnxTower)	
Water Tank Base Reactions			
Overturning Moment =	$OM_{wt} := 4825 \cdot ft \cdot kips$		
Shear Force =	$S_{wt} := 34 \cdot kip$		
Axial Force =	$WT_{wt} := 187 \cdot kip$		
Footing Data:			
Overall Depth of Footing =	$D_f := 8 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 2.5 \cdot ft$	(User Input)	
Length of Footing Side =	$a := 20.708 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 50 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 1.5 \cdot ft$	(User Input)	
Height of Monopole Pier =	$H_{mp} := 7 \cdot ft$	(User Input)	
Width of Monopole Pier =	$W_{mp} := 10 \cdot ft$	(User Input)	
Height of Water Tank Pier =	$H_{wtp} := 7 \cdot ft$	(User Input)	
Width of Water Tank Pier Top =	$W_{wtpt} := 3.67 \cdot ft$	(User Input)	
Length of Water Tank Pier Bot =	$L_{wtp} := 5 \cdot ft$	(User Input)	
Width of Water Tank Pier Bot =	$W_{wtp} := 6 \cdot ft$	(User Input)	
Material Properties:			
Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(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 =	$q_s := 5000 \cdot psf$	(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 =	$n := 1 \cdot ft$	(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)	

Stability of Footing:

Area of Concrete Pad = $A_{pad} := 2\cdot\left(1+\sqrt{2}\right)\cdot a^2 = 2071\cdot ft^3$

Weight of Concrete Pad = $WT_{pad} := 2\cdot\left(1+\sqrt{2}\right)\cdot a^2\cdot T_f\cdot\gamma_{conc} = 776.45\cdot kip$

Weight of Water Tank Piers = $WT_{pier.wt} := 4\cdot\left[\frac{1}{3}\cdot H_{wtp}\cdot\left[W_{wtpt}^2 + L_{wtp}\cdot W_{wtp} + \sqrt{W_{wtpt}^2\cdot\left(L_{wtp}\cdot W_{wtp}\right)}\right]\cdot\gamma_{conc}\right] = 88.998\cdot kip$

Weight of Monopole Pier = $WT_{pier.m} := H_{mp}\cdot W_{mp}^2\cdot\gamma_{conc} = 105\cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier.wt} + WT_{pier.m} = 970\cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[A_{pad}\cdot\left(D_f - T_f\right) - \frac{\left(WT_{pier.wt} + WT_{pier.m}\right)}{\gamma_{conc}}\right]\cdot\gamma_{soil} = 1211\cdot kip$

Resisting Moment = $M_r := \left(0.9WT_c + 0.75WT_{s1} + 0.75WT_t + 0.75\cdot WT_{wt}\right)\cdot\frac{W_f}{2} = 48917\cdot kip\cdot ft$

Overturning Moment = $M_{ot} := OM_t + OM_{wt} + \left(S_t + S_{wt}\right)\cdot\left(H_{mp} + T_f\right) = 7465.5\cdot kip\cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 6.6$

Factor of Safety Required = $FS_{req} := 1$

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

OverTurning_Moment_Check = "Okay"

SITE NAME	MERIDEN NORTH CT	ECP & CELL #	2	0193
Note: AWS carrier add. PCS RRH for leasing only. Do not order PCS RRH equipment.		LATITUDE	41-34-21.95 N	
		LONGITUDE	72-46-43.95 W	
		STRUCTURE TYPE	Watertank	

2100 MHz AWS LTE - ANTENNA ADD	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	LTE-AWS BBU+RRH	LTE-AWS BBU+RRH	LTE-AWS BBU+RRH
ANTENNA TYPE	SBNHH-1D65B_PORT 2 - +45_02DT_2130	SBNHH-1D65B_PORT 2 - +45_02DT_2130	SBNHH-1D65B_PORT 2 - +45_02DT_2130
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	160	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEX WITH LTE CABLE			
RRH - QTY/MODEL	1 ALU RH_2X60-AWS	1 ALU RH_2X60-AWS	1 ALU RH_2X60-AWS
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

700 MHz LTE - CURRENT CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	LTE-700U eNodeB	LTE-700U eNodeB	LTE-700U eNodeB
ANTENNA TYPE	BXA-70063-6CF-2-750MHZ	BXA-70063-6CF-4-750MHZ	BXA-70063-6CF-2-750MHZ
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	160	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
RRH - QTY/MODEL			
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

700 MHz LTE - FUTURE CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	LTE-700U BBU+RRH	LTE-700U BBU+RRH	LTE-700U BBU+RRH
ANTENNA TYPE	SBNHH-1D65B_PORT 1 - +45_02DT_0725	SBNHH-1D65B_PORT 1 - +45_04DT_0725	SBNHH-1D65B_PORT 1 - +45_02DT_0725
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	160	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
RRH - QTY/MODEL	1 ALU RH_2X60-700U	1 ALU RH_2X60-700U	1 ALU RH_2X60-700U
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z

850 MHz CELLULAR - CURRENT CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LPA-80080/4CF	LPA-80080/4CF	LPA-80080/4CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	2
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

850 MHz CELLULAR - FUTURE CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LPA-80080/4CF	LPA-80080/4CF	LPA-80080/4CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	0	0	2
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

1900 MHz PCS - CURRENT CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	N/A	N/A	N/A
ANTENNA TYPE	MG D3-800T0	MG D3-800T0	MG D3-800T0
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	270
DOWN TILT (MECH/DEG)	2	2	2
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE			
RRH - QTY / MODEL			
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

1900 MHz PCS - FUTURE CONFIG	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	N/A	N/A	N/A
ANTENNA TYPE	SBNHH-1D65B_PORT 2 - +45_02DT_1950	SBNHH-1D65B_PORT 2 - +45_02DT_1950	SBNHH-1D65B_PORT 2 - +45_02DT_1950
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	160	270
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	125	125	125
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE			
RRH - QTY / MODEL	1 ALU RH_2X60-PCS*	1 ALU RH_2X60-PCS*	1 ALU RH_2X60-PCS*
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

NUMBER OF CABLES NEEDED				FIBER LINES MODEL NUMBER			
TOTAL # FIBER LINES	2	TOTAL # OF MAINLINES	12	FIBER LINE MODEL #		HB158-1-08U8-S8J18	
TOTAL # TOP JUMPERS	6	TOTAL # OF TOP JUMPERS	24	FIBER TOP JUMPER MODEL #		HB114-1-08U4-S4J18	
EQUIPMENT CABLE ORDERING		MAIN CABLE #	12	+	0	TOP JUMPER #	18 + 6*

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular-A Band	PCS-F/AWS Band	700 MHz C-Block	Cellular (Watts)	20
TX: 869-880/890-891.5 MHz	TX: 1970-1975/2145-2155 MHz	TX: 746-757 MHz	PCS (Watts)	16
RX: 824-835/845-846.5 MHz	RX: 1890-1895/1745-1755 MHz	RX: 776-787 MHz	LTE/AWS/PCS (Watts)	60/60/60

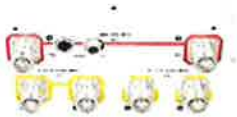
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A12-B	1900	Tx6/Rx1	GREEN/GREEN/WHITE
A4-A	800	Tx4/Rx1	RED/RED	A8-A	800	Tx5/Rx1	BLUE/BLUE	A12-A	800	Tx6/Rx1	GREEN/GREEN
F1-A	1700	Tx/Rx	RED/BROWN	F1-B	1700	Tx/Rx	BLUE/BROWN	F1-C	1700	Tx/Rx	GREEN/BROWN
F1-D	1700	Tx/Rx	RED/RED/BROWN	F1-E	1700	Tx/Rx	BLUE/BLUE/BROWN	F1-F	1700	Tx/Rx	GREEN/GREEN/BROWN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared by: Jaime Laredo	Alex Restrepo	JL	10/15/2015

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

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

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Product Specifications

SBNHH-1D65B

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1828.0 mm | 72.0 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

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

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

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

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

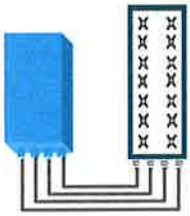
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

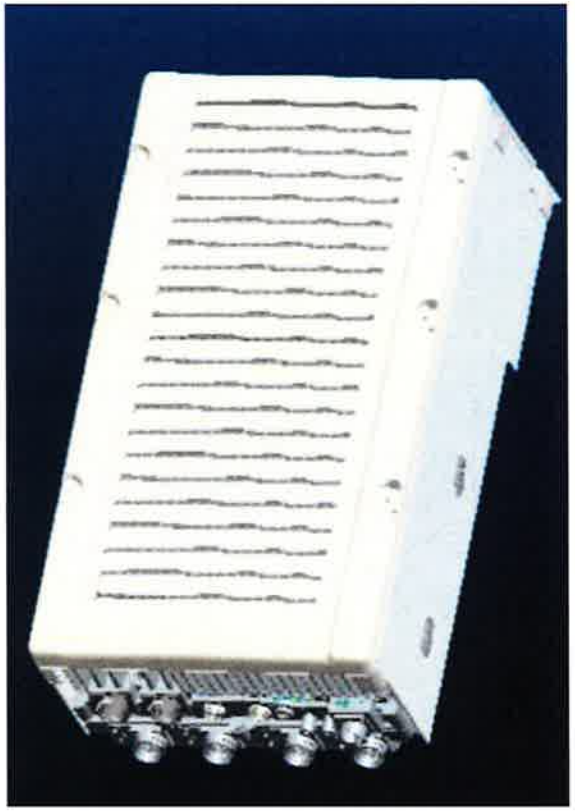
TECHNICAL SPECIFICATIONS

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

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.)

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent		Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)		Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.		
*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [L_{WAd}]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	

*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled

Power Reporting					
Power Input	-48V	No. Power Supplies	N/A (Customer provided power plant)	Number of Inputs per Power Supply	1
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)	Maximum Input (each power supply in Watts)	N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)	58W (to AISG port, 29V/2A)
Power Supply Connection Type	DC entry via Conduit Box	Power Supply Make & Model	N/A (Customer provided power plant)		
Input Protection	no input fuse	Input Protection Make & Model	N/A (Customer provided power plant)		
Redundancy Scheme	N/A				
Nominal Voltage	-48VDC	Maximum Voltage	-57V	Minimum Voltage	-38V
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)	*25)Max Current at Maximum Voltage	14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage	21.7A (add 1.5A if AISG port loaded 2A*29V)

Return completed forms to Engineering and Operations Support (EOS)
Richard.damiano@verizonwireless.com

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.

ATTACHMENT 4

CITY OF MERIDEN
GIS Services, MIS Department
142 East Main St, Meriden, CT
203 630 4110

CITY OF MERIDEN, CT GIS

119 EMPIRE AVE

1 inch = 200 feet

Date: 10/21/2016

CITY OF MERIDEN
GIS Services

NOTE: Due to our on-going revaluation, appraisal information is current to October 2015.

Property Information: Address: 119 EMPIRE AVE Map/Lot: 0417-0154-0007-0000 Card Number: 1

Owner Information: 119 EMPIRE AVENUE LLC Owner Address: 1150 OLD COLONY RD
MERIDEN, CT 06451

Building Information:

Units: 1
Living Area: 160720
Year Built: 1976
Eff. Age:
Rooms:
Bedrooms:
Full Bath:
Full Bath Rating:
Half Bath:
Half Bath Rating:
Heat Type: Steam w/Boil
Style: ColdStgWhse
Ext Wall:
Roof Mat:
Roof Struct:
Fireplaces:
Grade: C-

Special Features:

Description	Condition	YearBuilt	AssessedValue
FENCE-10 CHAIN	AV	1976	$40,000
PAVING ASPHALT	AV	1976	$75,000
SHED	AV	1976	$2,300

Appraisal Information:
NOTE: Due to our on-going revaluation, appraisal information is current to October 2015.

Tax District: 1 **District Name:** OUTER DISTRICT **District Mill Rate:** 37.47

Current Building Value: $2,446,000
Current Yard Items: $121,600
Current Land Value: $713,800
Current Total: $3,281,400
Assessment: $2,296,980
(Assessment is 70% of appraised value)

Special Land Value: $0

Previous Year: 2014
Previous Building Value: $2,446,000
Previous Yard Items: $121,600
Previous Land Value: $713,800
Previous Total: $3,281,400

Land Information:

Type	Lot Size	Lot Unit	Zoning*
Commercial Building	541,015.00	SF	M-2

Total Acreage:12.42
*Confirm zoning with Planning Office. Zoning map is the official document.

Sales Information:

Book	Page	Grantor	Sale Date	Sale Price	Deed Type
4985	258	ATLAS CONTAINER LLC,	4/8/2016	$1,200,000	Warranty Deed
2756	182	WEYERHAEUSER COMPANY	10/19/2001	$2,450,000	
2142	136		12/2/1995	$0	

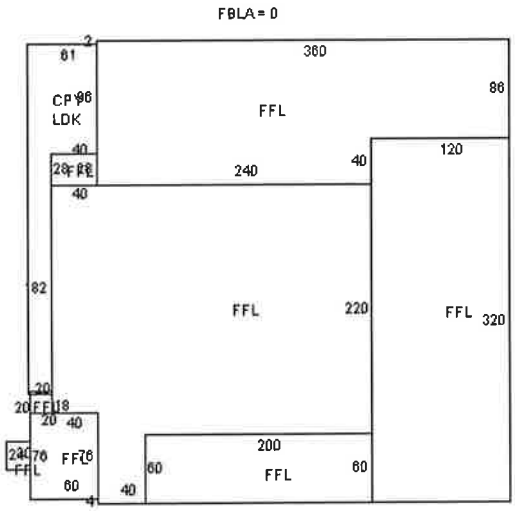
Assessor's Permit History:

Date	Permit Number	Notes	Type
		GAS PIPING TO CONNECT OWNER SUPPLIED RADIANT HEAT	

1/20/2016	P-16-16	PANELS.Approved by Bldg Dept.	
11/23/2015	B-15-965	NEW ANTENNAE ON NEW PIPE MOUNTS.Approved by Bldg Dept.	
7/23/2015	E-15-322	FIT-OUT LOGAN STEEL.INSTALL NEW LIGHTING AT WAREHOUSE AND OFFICE/WIRE NEW MACHINE TO EXISTING BUSDUCT.	
3/24/2015	B-15-71	NEW ANTENNA W/NEW MASTS/RELOCATE EXISTING TMA.Est complete.	
1/26/2015	E-14-154	CELL TOWER/RUN DC CIRCUITS TO INVERTERS/RADIO HEADS ON CABINETS.Est complete.	
7/26/2013	2377	CELL TOWER.Est complete.	
3/8/2013	611	SPRINT - MODIF. OF TELECOMM. INST. ON WATER TANK, REPL. 3 ANTS. & CABLES AND ADD RRH`S AND NOTCH FILTERS BEHIND ANTS. ON WATER TANK, ADD CIENA EQUIP. ENCL. & FIBER JUNC. BOX & EITHER RETROFIT OR REPL. BTS CABINET WITHIN SPRINT`S EXISTING EQUIP. SHELTER	
6/12/2012	1847	AT&T REMOVE AND REPLACE 9 EXISTING ANTENNAS INSTALL 6 REMOTE RED HEADS AND INSTALL 1 3" CONDUIT TO HOUSE FIBER AND DC POWER ALL TO CODE	C
3/3/2010	503	VERIZON REMOVAL OF EXISTING ANTENNAE ON MONOPOLE& REPLACE WITH 6 LTE ANTENNAE PER PLAN (WILL BE PAINTED TO MATCH EXISTING)	R
3/3/2010	504	SPRINT- MODIFICATIONS TO EXISTING TELECOMMUNICATIONS SITE PER PLANS AND TO CODE(REQUIRES SEPARATE ELECTRICAL PERMIT)	
9/23/2009	2822	REROOF BLDG W/ RUBBER ROOF	
5/29/2009	1586	SWAP EXISTING ANTENNAS ON EXISTING TOWER, ADD ONE TELE CABINET	
7/18/2006	2672	GAS PIPE FOR GENERATOR	CA
3/9/2006	734	NEW AMP SERV ,1PH WIRE	CA
3/9/2006	734	1VERIZON, 1TMOBILE SERV	CA
3/9/2006	734	1VERIZON,1T MOBILE SERV	CA
3/9/2006	734	REVAMP EX SERV	CA
3/9/2006	741	400 AMPS 1PH 3WIRE SERV	CA
11/30/2005	4507	INSTALL VERIZON 12X30 PRE	CA
11/30/2005	4507	T-MOBILE MOUNTED EQUIP	CA
11/30/2005	4507	128' MONOPOLE FOR WIRELES	CA
5/24/2005	1786	INSTALL POWER & GROUNDING	CA
5/24/2005	1786	PREWIRED NEXTEL COMM SHEL	CA
5/13/2005	1626	INSTALL PRE FAB SHELTER,A	CA
5/13/2005	1626	ANTENNAS ON EX WATER TANK	CA
9/9/2003	3154	WIRE CELLULAR EQUIP	CA
7/25/2003	2591	AT&T COMMUN TOWER	CA
4/16/2003	1140	INSTALL 400 AMP SERV	CA
4/16/2003	1140	ALSO INSTALL 200 AMP SERV	CA
11/15/2002	3802	INSTALL PC ANTENNAS ON WA	CA
11/15/2002	3802	SPRINT RADIO EQUIP ON GRO	CA

11/28/2001	3843	3000 AMP SERV UPGRADE	CA
11/28/2001	3843	2000AMP SERV BACKFEED	CA

Property Images



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