Robinson+Cole

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Also admitted in Massachusetts

June 15, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
10 Northridge Drive, Windham, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 77-foot level of the existing 89-foot tower at 10 Northridge Drive in Windham, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2008. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 77-foot level. Cellco also intends to replace six (6) existing remote radio heads ("RRHs") and add three (3) new RRHs (one (1) each behind its 700 MHz, 1900 MHz and 2100 MHz antennas). Cellco also intends to add two additional coaxial cables and two (2) HYBRIFLEX™ fiber optic antenna cables, all inside the shaft of the monopole tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Ernie Eldridge, Mayor for the Town of Windham. A copy of this letter is being sent to Walmart Real Estate Business Trust LLC, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the 77-foot level on the 89-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. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Ernie Eldridge, Windham Mayor
Walmart Real Estate Business Trust LLC
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

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

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

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 15.7 5 ° | 15.7 10 ° | 15.3	0 ° | 15.9 5 ° | 15.8 10 ° | 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

* 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®
Band	Single band
Brand	DualPol® | Teletilt®

Product Specifications

LNX-6514DS-VTM

Operating Frequency Band	698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

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

Dimensions

Depth	180.5 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	14.2 kg | 31.3 lb

Remote Electrical Tilt (RET) Information

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

Regulatory Compliance/Certifications

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

Included Products

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

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

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

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* 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® quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

HBXX-6517DS-VTM

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

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

Remote Electrical Tilt (RET) Information

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

Regulatory Compliance/Certifications

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

Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

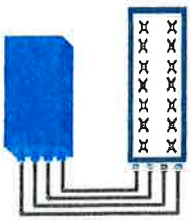
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

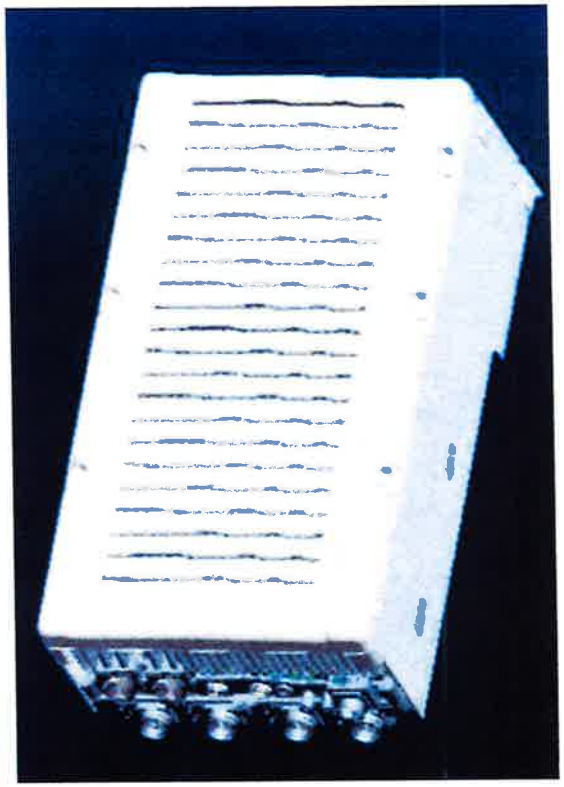
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms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

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

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



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

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ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET

RRH2x60-AWS FOR LTE BAND 4 APPLICATIONS

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

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

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

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

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

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

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

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

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

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

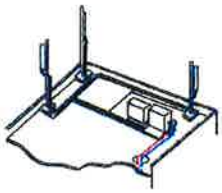
The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

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

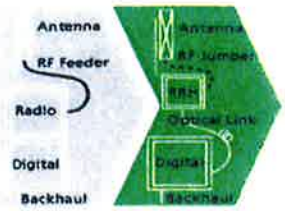
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

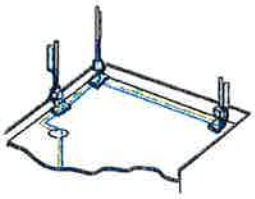
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control
- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

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

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

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

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

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

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

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-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)

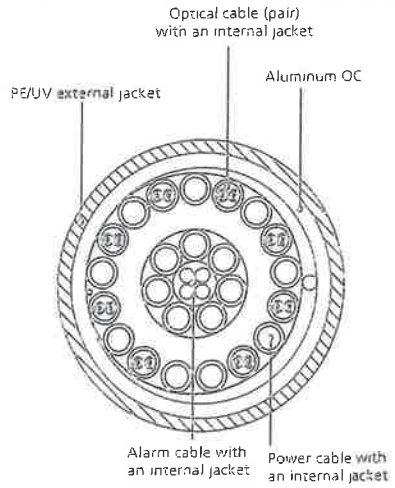


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

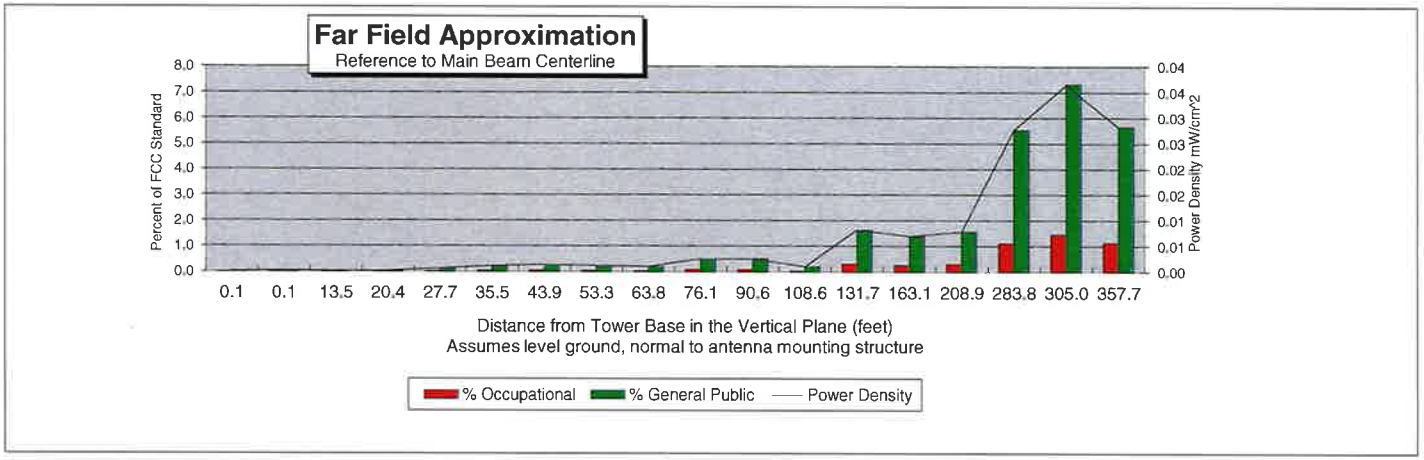
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Windham North, CT
Site #:	
Date:	06/03/15
Name:	Ray Paradis
File Name:	Windham North, CT

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**79.0**
Antenna Gain (dBi):	**13.7**
Antenna Size (in.):	**72.7**
Downtilt (degrees):	**10.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**1159.0**
Number of channels:	**1**



Calc Angle	90.0	90.0	80.0	75.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	14.0	12.0	
Solve for r, dx to antenna	76.0	76.0	77.2	78.7	80.9	83.9	87.8	92.8	99.2	107.5	118.3	132.6	152.1	179.9	222.3	293.8	314.3	365.7	
Distance from Antenna Structure Base in Horizontal plane	0.1	0.1	13.5	20.4	27.7	35.5	43.9	53.3	63.8	76.1	90.6	108.6	131.7	163.1	208.9	283.8	305.0	357.7	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.04	0.03	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.3	0.3	0.3	1.1	1.5	1.1	
Percent of General Population Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.2	0.5	0.5	0.2	1.6	1.4	1.6	5.5	7.3	5.7	

Antenna Type LNX-6514DS-A1M
Max% 7.33%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

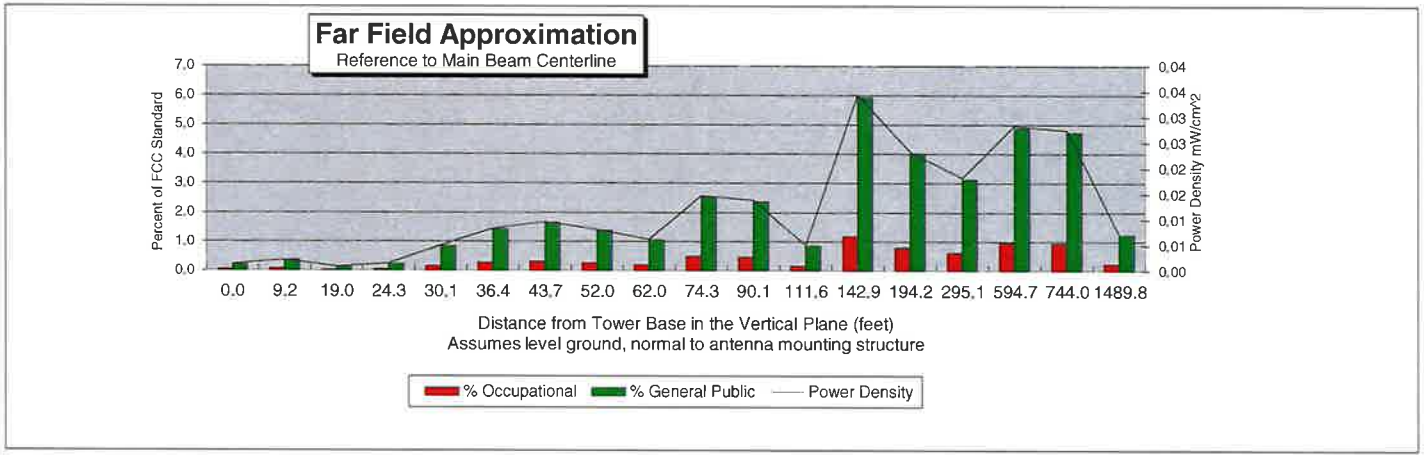
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Windham North, CT
Site #:	
Date:	06/03/15
Name:	Ray Paradis
File Name:	Windham North, CT

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**55.0**
Antenna Gain (dBi):	**14.5**
Antenna Size (in.):	**722.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**4095.0**
Number of channels:	**9**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	52.0	52.8	55.3	57.4	60.1	63.5	67.9	73.6	80.9	90.7	104.0	123.1	152.1	201.0	299.6	596.9	745.8	1490.7
Distance from Antenna Structure Base in Horizontal plane	0.0	9.2	19.0	24.3	30.1	36.4	43.7	52.0	62.0	74.3	90.1	111.6	142.9	194.2	295.1	594.7	744.0	1489.8
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.02	0.03	0.03	0.01
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	0.9	0.2
Percent of General Population Standard	0.2	0.4	0.1	0.2	0.8	1.4	1.7	1.4	1.1	2.5	2.4	0.9	5.9	4.0	3.1	4.9	4.7	1.2

Antenna Type BXA-70063-6CF-2
Max% 5.93%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

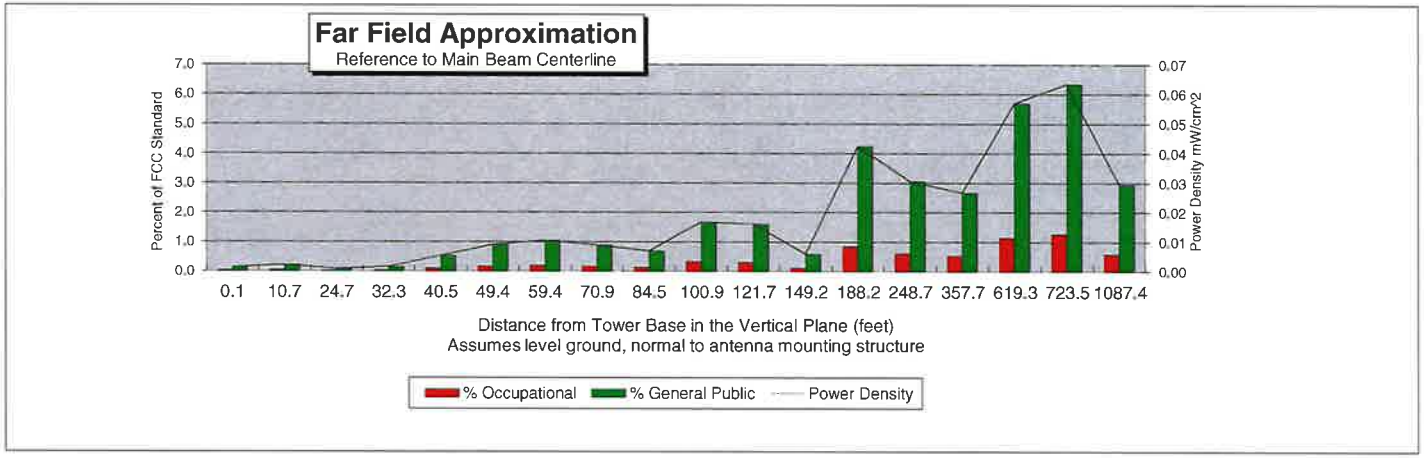
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Windham North, CT
Site #:	
Date:	06/03/15
Name:	Ray Paradis
File Name:	Windham North, CT

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**79.0**
Antenna Gain (dBi):	**16.4**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**5753.0**
Number of channels:	**11**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0	
Solve for r, dx to antenna	76.0	76.8	79.9	82.6	86.1	90.6	96.5	104.0	113.6	126.3	143.5	167.5	203.0	260.1	365.7	623.9	727.4	1090.1	
Distance from Antenna Structure Base in Horizontal plane	0.1	10.7	24.7	32.3	40.5	49.4	59.4	70.9	84.5	100.9	121.7	149.2	188.2	248.7	357.7	619.3	723.5	1087.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.03	0.03	0.06	0.06	0.03	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.8	0.6	0.5	1.1	1.3	0.6	
Percent of General Population Standard	0.1	0.2	0.1	0.2	0.5	0.9	1.0	0.9	0.7	1.7	1.6	0.6	4.2	3.1	2.7	5.7	6.3	3.0	

Antenna Type HBXX-6517DS-A2M
Max% 6.33%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pc
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

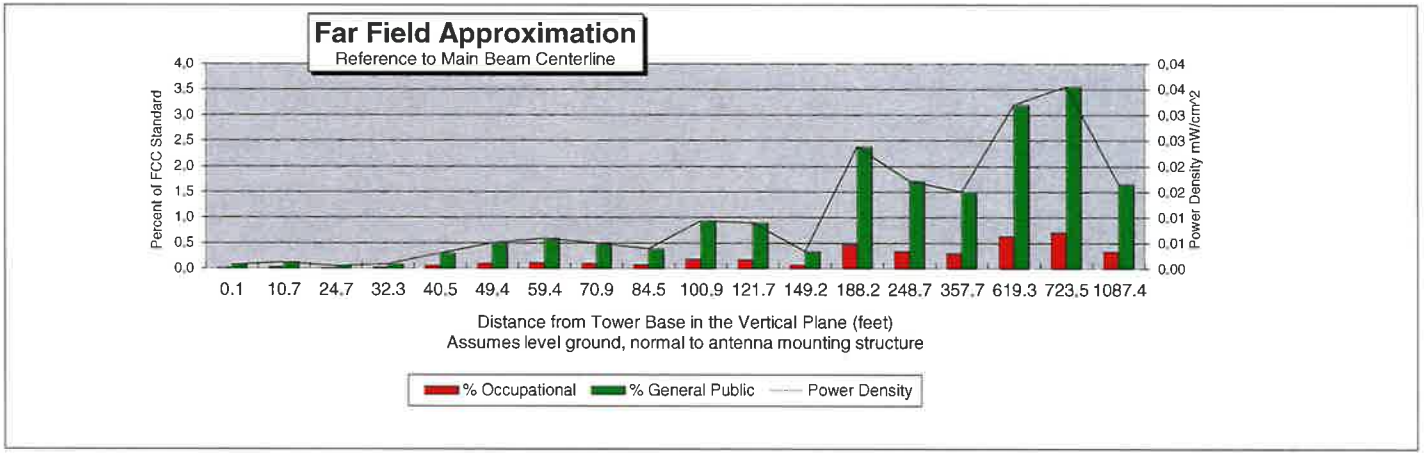
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Windham North, CT
Site #:	
Date:	06/03/15
Name:	Ray Paradis
File Name:	Windham North, CT

Operating Freq. (MHz)	**2145.0**
Antenna Height (ft):	**79.0**
Antenna Gain (dBi):	**17.0**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**2813.0**
Number of channels:	**1**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0	
Solve for r, dx to antenna	76.0	76.8	79.9	82.6	86.1	90.6	96.5	104.0	113.6	126.3	143.5	167.5	203.0	260.1	365.7	623.9	727.4	1090.1	
Distance from Antenna Structure Base in Horizontal plane	0.1	10.7	24.7	32.3	40.5	49.4	59.4	70.9	84.5	100.9	121.7	149.2	188.2	248.7	357.7	619.3	723.5	1087.4	
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dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.02	0.02	0.01	0.03	0.04	0.02	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.6	0.7	0.3	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.6	0.5	0.4	0.9	0.9	0.3	2.4	1.7	1.5	3.2	3.6	1.7	

Antenna Type DB846F65ZAXY
Max% 3.55%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

Date: **May 27, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	842423
	Crown Castle Site Name:]	WINDHAM NORTH RIDGE ROAD
	Crown Castle JDE Job Number:	334812
	Crown Castle Work Order Number:	1064264
	Crown Castle Application Number:	297446 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1064264
Site Data:	**10 NORTH RIDGE DRIVE, WINDHAM, Windham County, CT**	
	Latitude *41° 44' 23.53"*, Longitude *-72° 10' 22.47"*	
	88.7 Foot - Monopole Tower	

Dear Holly Haas,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1064264, in accordance with application 297446, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and IBC 2006 based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Kibreab Gebremariam / SRL

Respectfully submitted by:

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED
PROFESSIONAL ENGINEER

Aaron C. Poot, P.E.
Manager Engineering

tnxTower Report - version 6.1.4.1

5/28/15

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 88.7 ft Monopole tower designed by EEI in March of 2005. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
74.0	77.0	3	alcatel lucent	RRH2X60-PCS	4	1-5/8	-
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH2x60-AWS			
		6	commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
87.0	88.0	6	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe	4 1	3/4 3/8	2
		3	ericsson	RRUS A2 MODULE			
		3	ericsson	RRUS-11 1900MHz			
		1	raycap	DC6-48-60-18			
		1	raycap	DC6-48-60-18	12 2 1	1-5/8 3/4 3/8	1
		3	ericsson	RRUS 11			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
	87.0	1	tower mounts	Platform Mount [LP 712-1]			
77.0	77.0	3	alcatel lucent	RRH2X40-AWS	-	-	3
		3	alcatel lucent	RRH2x40 700			
		6	antel	BXA-70063/6CF w/ Mount Pipe			
		3	antel	BXA-171063/12CF w/ Mount Pipe			
		3	antel	BXA-70063/6CF w/ Mount Pipe	10	1-5/8	1
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed; Not considered in this Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
106	106	6	Generic	Future Directional Antennas	-	-
		6	Kathrein	AP14/17-880		
		12	Generic	Amplifiers		
96	96	6	Generic	Future Directional Antennas	-	-
		6	ems wireless	RR90-17-02DP		
86	86	6	Antel	LPA-185063/8CF	-	-
		6	Antel	LPD-6513		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors Incorporated	4943145	CCI SITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors Incorporated	4712164	CCI SITES
4-GEOTECHNICAL REPORTS	JCI Eastern, Inc.	4290426	CCI SITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	88.7 - 47.57	Pole	TP30.46x21.89x0.25	1	-8.176	1208.995	53.0	Pass
L2	47.57 - 0	Pole	TP39.75x29.058x0.313	2	-16.402	2033.585	70.4	Pass
							Summary	
						Pole (L2)	70.4	Pass
						Rating =	70.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	49.4	Pass
1	Base Plate	0	70.4	Pass
1	Base Foundation	0	52.8	Pass
1	Base Foundation – Soil Interaction	0	54.1	Pass

Structure Rating (max from all components) =	70.4%

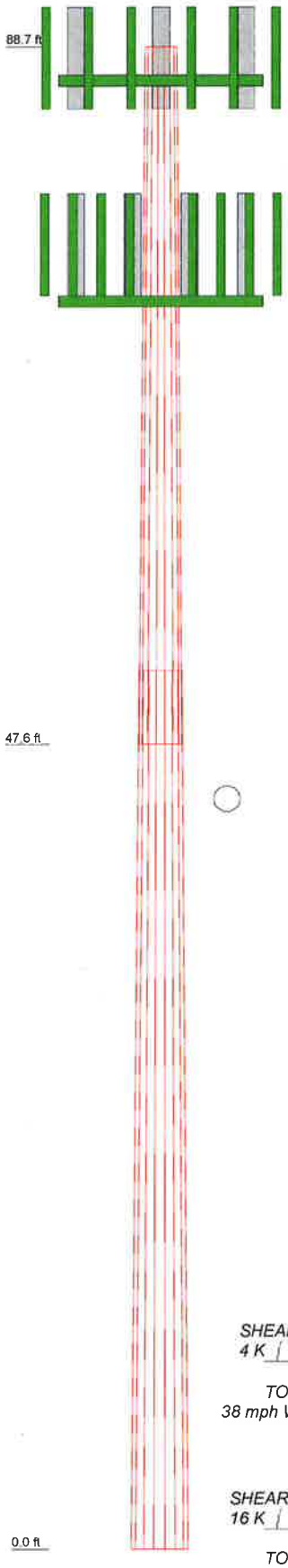
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	41.130	18	0.250	4.330	21.890	30.460	A572-65	2.9
2	51.900	18	0.313		29.058	39.750		6.0

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
7770.00 w/ Mount Pipe	87	BXA-70063/6CF w/ Mount Pipe	74
7770.00 w/ Mount Pipe	87	BXA-70063/6CF w/ Mount Pipe	74
7770.00 w/ Mount Pipe	87	BXA-70063/6CF w/ Mount Pipe	74
RRUS 11	87	DB-T1-6Z-8AB-0Z	74
RRUS 11	87	(2) HBXX-6517DS-A2M w/ Mount Pipe	74
RRUS 11	87	(2) HBXX-6517DS-A2M w/ Mount Pipe	74
DC6-48-60-18	87	(2) HBXX-6517DS-A2M w/ Mount Pipe	74
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	87	LNX-6514DS-A1M w/ Mount Pipe	74
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	87	LNX-6514DS-A1M w/ Mount Pipe	74
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	87	LNX-6514DS-A1M w/ Mount Pipe	74
RRUS A2 MODULE	87	RRH2X60-PCS	74
RRUS A2 MODULE	87	RRH2X60-PCS	74
RRUS A2 MODULE	87	RRH2X60-PCS	74
RRUS-11 1900MHz	87	RRH2x60-AWS	74
RRUS-11 1900MHz	87	RRH2x60-AWS	74
RRUS-11 1900MHz	87	RRH2x60-AWS	74
DC6-48-60-18	87	RRH2x60-700	74
6' x 2" Mount Pipe	87	RRH2x60-700	74
6' x 2" Mount Pipe	87	RRH2x60-700	74
6' x 2" Mount Pipe	87	Platform Mount [LP 303-1]	74
Platform Mount [LP 712-1]	87		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.4%

AXIAL
26 K
SHEAR
4 K
MOMENT
290 kip-ft
TORQUE 0 kip-ft
38 mph WIND - 1.000 in ICE

AXIAL
16 K
SHEAR
16 K
MOMENT
1147 kip-ft
TORQUE 1 kip-ft
REACTIONS - 85 mph WIND

CROWN CASTLE
The Foundation for a Wireless World
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: BU# 842423			
Project:			
Client: Crown Castle	Drawn by: slong		App'd:
Code: TIA/EIA-222-F	Date: 05/27/15		Scale: N
Path: \\CCICUSCAD1\Data\ENG Work Area\KGebremariam\WIP\842423\QA-SRL\842423.eri			Dwg No.

Tower Input Data

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

1) Tower is located in Windham County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 1.000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.000 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50.000 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice	
	Capacity Exemption	

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	88.700-47.570	41.130	4.330	18	21.890	30.460	0.250	1.000	A572-65 (65 ksi)
L2	47.570-0.000	51.900		18	29.058	39.750	0.313	1.250	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	22.228	17.171	1015.912	7.682	11.120	91.358	2033.161	8.587	3.413	13.651
	30.930	23.972	2763.991	10.725	15.474	178.625	5531.618	11.988	4.921	19.684
L2	30.412	28.512	2976.420	10.205	14.761	201.636	5956.757	14.259	4.564	14.605

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
	40.363	39.117	7686.392	14.000	20.193	380.646	15382.898	19.562	6.446	20.627

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 88.700-47.570				1	1	1		
L2 47.570-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	A	No	Inside Pole	87.000 - 0.000	0.000	0	12	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
9776(3/4")	A	No	Inside Pole	87.000 - 0.000	0.000	0	2	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
FB-L98B-034-XXXXXX(3/8")	A	No	Inside Pole	87.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
FB-L98B-034-XXXXXX(3/8")	A	No	Inside Pole	87.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	87.000 - 0.000	0.000	0	4	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
2" Rigid Conduit	A	No	Inside Pole	87.000 - 0.000	0.000	0	1	No Ice	0.000	0.003
								1/2" Ice	0.000	0.003
								1" Ice	0.000	0.003
								2" Ice	0.000	0.003
								4" Ice	0.000	0.003
*										
LDF7-50A(1-5/8")	C	No	Inside Pole	77.000 - 0.000	0.000	0	8	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	Inside Pole	77.000 - 0.000	0.000	0	2	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
*										
Safety Line 3/8	C	No	CaAa (Out Of Face)	88.700 - 0.000	0.000	0.1	1	No Ice	0.037	0.000
								1/2" Ice	0.137	0.001
								1" Ice	0.238	0.001
								2" Ice	0.437	0.002
								4" Ice	0.838	0.004
*										

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	C	No	Inside Pole	77.000 - 0.000	0.000	0	4	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001

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	88.700-47.570	A	0.000	0.000	0.000	0.000	0.620
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.542	0.362
L2	47.570-0.000	A	0.000	0.000	0.000	0.000	0.748
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.784	0.580

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	88.700-47.570	A	1.090	0.000	0.000	0.000	0.000	0.620
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	10.505	0.409
L2	47.570-0.000	A	1.000	0.000	0.000	0.000	0.000	0.748
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	12.150	0.635

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	88.700-47.570	-0.057	0.033	-0.332	0.192
L2	47.570-0.000	-0.058	0.033	-0.346	0.200

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
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	87.000	No Ice 1/2"	6.119 6.626	4.254 5.014	0.055 0.103

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.000			Ice	7.128	5.711	0.157
						1" Ice	8.164	7.155	0.287
						2" Ice	10.360	10.412	0.665
						4" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	87.000	No Ice	6.119	4.254	0.055
			0.000			1/2"	6.626	5.014	0.103
			1.000			Ice	7.128	5.711	0.157
						1" Ice	8.164	7.155	0.287
						2" Ice	10.360	10.412	0.665
						4" Ice			
RRUS 11	A	From Leg	4.000	0.000	87.000	No Ice	3.249	1.373	0.048
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS 11	B	From Leg	4.000	0.000	87.000	No Ice	3.249	1.373	0.048
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS 11	C	From Leg	4.000	0.000	87.000	No Ice	3.249	1.373	0.048
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
DC6-48-60-18	A	From Leg	1.000	0.000	87.000	No Ice	4.449	1.465	0.048
			0.000			1/2"	4.739	1.683	0.072
			1.000			Ice	5.038	1.909	0.100
						1" Ice	5.661	2.387	0.167
						2" Ice	7.012	3.448	0.349
						4" Ice			
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	A	From Leg	4.000	0.000	87.000	No Ice	13.216	9.319	0.120
			0.000			1/2"	14.017	10.790	0.214
			1.000			Ice	14.824	12.242	0.318
						1" Ice	16.388	14.499	0.560
						2" Ice	19.632	19.213	1.219
						4" Ice			
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	B	From Leg	4.000	0.000	87.000	No Ice	13.216	9.319	0.120
			0.000			1/2"	14.017	10.790	0.214
			1.000			Ice	14.824	12.242	0.318
						1" Ice	16.388	14.499	0.560
						2" Ice	19.632	19.213	1.219
						4" Ice			
(2) OPA-65R-LCUU-H8 w/ Mount Pipe	C	From Leg	4.000	0.000	87.000	No Ice	13.216	9.319	0.120
			0.000			1/2"	14.017	10.790	0.214
			1.000			Ice	14.824	12.242	0.318
						1" Ice	16.388	14.499	0.560
						2" Ice	19.632	19.213	1.219
						4" Ice			
RRUS A2 MODULE	A	From Leg	4.000	0.000	87.000	No Ice	1.867	0.423	0.021
			0.000			1/2"	2.051	0.532	0.031
			1.000			Ice	2.244	0.650	0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS A2 MODULE	B	From Leg	4.000	0.000	87.000	No Ice	1.867	0.423	0.021
			0.000			1/2"	2.051	0.532	0.031
			1.000			Ice	2.244	0.650	0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS A2 MODULE	C	From Leg	4.000	0.000	87.000	No Ice	1.867	0.423	0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 1.000			1/2" Ice	2.051 2.244	0.532 0.650	0.031 0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS-11 1900MHz	A	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	2.942 3.172	1.190 1.351	0.044 0.063
						1" Ice	3.410 3.913	1.521 1.887	0.086 0.140
						2" Ice	5.023	2.721	0.291
						4" Ice			
RRUS-11 1900MHz	B	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	2.942 3.172	1.190 1.351	0.044 0.063
						1" Ice	3.410 3.913	1.521 1.887	0.086 0.140
						2" Ice	5.023	2.721	0.291
						4" Ice			
RRUS-11 1900MHz	C	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	2.942 3.172	1.190 1.351	0.044 0.063
						1" Ice	3.410 3.913	1.521 1.887	0.086 0.140
						2" Ice	5.023	2.721	0.291
						4" Ice			
DC6-48-60-18	C	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	4.449 4.739	1.465 1.683	0.048 0.072
						1" Ice	5.038 5.661	1.909 2.387	0.100 0.167
						2" Ice	7.012	3.448	0.349
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
						1" Ice	2.294 3.060	2.294 3.060	0.048 0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
						1" Ice	2.294 3.060	2.294 3.060	0.048 0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	87.000	No Ice 1/2" Ice	1.425 1.925	1.425 1.925	0.022 0.033
						1" Ice	2.294 3.060	2.294 3.060	0.048 0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.000	87.000	No Ice 1/2" Ice	24.530 29.940	24.530 29.940	1.335 1.646
						1" Ice	35.350 46.170	35.350 46.170	1.956 2.577
						2" Ice	67.810	67.810	3.820
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice	7.979 8.621	5.695 6.849	0.040 0.100
						1" Ice	9.228 10.473	7.715 9.497	0.168 0.331
						2" Ice	13.082	13.262	0.798
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice	7.979 8.621	5.695 6.849	0.040 0.100
						1" Ice	9.228 10.473	7.715 9.497	0.168 0.331
						2" Ice	13.082	13.262	0.798

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.979 8.621 9.228 10.473 13.082	5.695 6.849 7.715 9.497 13.262	0.040 0.100 0.168 0.331 0.798
DB-T1-6Z-8AB-0Z	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
RRH2X60-PCS	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice	2.567 2.791 3.025 3.517	2.011 2.218 2.435 2.894	0.055 0.075 0.099 0.155

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
								2" Ice	4.606	3.915	0.313
								4" Ice			
RRH2x60-AWS	A	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
RRH2x60-AWS	B	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
RRH2x60-AWS	C	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
RRH2x60-700	A	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
RRH2x60-700	B	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
RRH2x60-700	C	From Leg	4.000	0.000	3.000	0.000	74.000	No Ice	3.957	1.816	0.060
								1/2" Ice	4.272	2.075	0.083
								1" Ice	4.596	2.360	0.109
								2" Ice	5.271	2.957	0.173
								4" Ice	6.722	4.253	0.354
Platform Mount [LP 303-1]	C	None				0.000	74.000	No Ice	14.660	14.660	1.250
								1/2" Ice	18.870	18.870	1.481
								1" Ice	23.080	23.080	1.713
								2" Ice	31.500	31.500	2.175
								4" Ice	48.340	48.340	3.101

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	88.7 - 47.57	Pole	Max Tension	14	0.000	0.000	0.000
			Max. Compression	14	-16.075	0.519	0.562
			Max. Mx	11	-8.190	374.993	-1.784
			Max. My	2	-8.176	-1.758	380.581
			Max. Vy	11	-13.153	374.993	-1.784
			Max. Vx	2	-13.349	-1.758	380.581
			Max. Torque	10			-0.504
L2	47.57 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.341	0.625	0.501
			Max. Mx	11	-16.402	1131.458	-4.610
			Max. My	2	-16.402	-4.558	1147.124
			Max. Vy	11	-16.011	1131.458	-4.610
			Max. Vx	2	-16.203	-4.558	1147.124
			Max. Torque	10			-0.504

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	26.341	-0.011	3.980
	Max. H_x	11	16.417	15.996	-0.053
	Max. H_z	2	16.417	-0.053	16.188
	Max. M_x	2	1147.124	-0.053	16.188
	Max. M_z	5	1130.983	-15.996	0.053
	Max. Torsion	4	0.502	-13.880	8.140
	Min. Vert	1	16.417	0.000	0.000
	Min. H_x	5	16.417	-15.996	0.053

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	8	16.417	0.053	-16.188
	Min. M_x	8	-1146.752	0.053	-16.188
	Min. M_z	11	-1131.458	15.996	-0.053
	Min. Torsion	10	-0.503	13.880	-8.140

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	16.417	0.000	0.000	-0.181	0.231	0.000
Dead+Wind 0 deg - No Ice	16.417	0.053	-16.188	-1147.124	-4.558	-0.284
Dead+Wind 30 deg - No Ice	16.417	8.044	-14.046	-995.860	-569.518	-0.452
Dead+Wind 60 deg - No Ice	16.417	13.880	-8.140	-577.812	-981.819	-0.502
Dead+Wind 90 deg - No Ice	16.417	15.996	-0.053	-4.981	-1130.983	-0.417
Dead+Wind 120 deg - No Ice	16.417	13.826	8.048	569.139	-977.031	-0.219
Dead+Wind 150 deg - No Ice	16.417	7.952	13.992	990.701	-561.216	0.040
Dead+Wind 180 deg - No Ice	16.417	-0.053	16.188	1146.752	5.033	0.288
Dead+Wind 210 deg - No Ice	16.417	-8.044	14.046	995.489	569.992	0.458
Dead+Wind 240 deg - No Ice	16.417	-13.880	8.140	577.440	982.293	0.503
Dead+Wind 270 deg - No Ice	16.417	-15.996	0.053	4.610	1131.458	0.413
Dead+Wind 300 deg - No Ice	16.417	-13.826	-8.048	-569.510	977.506	0.213
Dead+Wind 330 deg - No Ice	16.417	-7.952	-13.992	-991.073	561.691	-0.041
Dead+Ice+Temp	26.341	0.000	0.000	-0.501	0.625	0.000
Dead+Wind 0 deg+Ice+Temp	26.341	0.011	-3.980	-290.104	-0.348	-0.104
Dead+Wind 30 deg+Ice+Temp	26.341	1.980	-3.453	-251.812	-143.341	-0.130
Dead+Wind 60 deg+Ice+Temp	26.341	3.418	-2.000	-146.191	-247.749	-0.121
Dead+Wind 90 deg+Ice+Temp	26.341	3.941	-0.011	-1.541	-285.597	-0.079
Dead+Wind 120 deg+Ice+Temp	26.341	3.407	1.981	143.380	-246.742	-0.017
Dead+Wind 150 deg+Ice+Temp	26.341	1.961	3.442	249.738	-141.596	0.051
Dead+Wind 180 deg+Ice+Temp	26.341	-0.011	3.980	289.037	1.666	0.105
Dead+Wind 210 deg+Ice+Temp	26.341	-1.980	3.453	250.746	144.659	0.130
Dead+Wind 240 deg+Ice+Temp	26.341	-3.418	2.000	145.124	249.067	0.121
Dead+Wind 270 deg+Ice+Temp	26.341	-3.941	0.011	0.474	286.915	0.079
Dead+Wind 300 deg+Ice+Temp	26.341	-3.407	-1.981	-144.446	248.060	0.016
Dead+Wind 330 deg+Ice+Temp	26.341	-1.961	-3.442	-250.805	142.915	-0.051
Dead+Wind 0 deg - Service	16.417	0.018	-5.601	-397.228	-1.422	-0.099
Dead+Wind 30 deg - Service	16.417	2.783	-4.860	-344.865	-196.997	-0.158
Dead+Wind 60 deg - Service	16.417	4.803	-2.817	-200.145	-339.724	-0.174
Dead+Wind 90 deg - Service	16.417	5.535	-0.018	-1.847	-391.358	-0.144
Dead+Wind 120 deg - Service	16.417	4.784	2.785	196.897	-338.064	-0.075
Dead+Wind 150 deg - Service	16.417	2.751	4.842	342.832	-194.122	0.014
Dead+Wind 180 deg - Service	16.417	-0.018	5.601	396.855	1.898	0.100
Dead+Wind 210 deg - Service	16.417	-2.783	4.860	344.492	197.473	0.158
Dead+Wind 240 deg - Service	16.417	-4.803	2.817	199.772	340.199	0.174
Dead+Wind 270 deg - Service	16.417	-5.535	0.018	1.474	391.833	0.144
Dead+Wind 300 deg -	16.417	-4.784	-2.785	-197.270	338.540	0.075

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
Service Dead+Wind 330 deg - Service	16.417	-2.751	-4.842	-343.205	194.598	-0.014

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions RX K	PY K	PZ K	% Error
1	0.000	-16.417	0.000	0.000	16.417	0.000	0.000%
2	0.053	-16.417	-16.188	-0.053	16.417	16.188	0.000%
3	8.044	-16.417	-14.046	-8.044	16.417	14.046	0.000%
4	13.880	-16.417	-8.140	-13.880	16.417	8.140	0.000%
5	15.996	-16.417	-0.053	-15.996	16.417	0.053	0.000%
6	13.826	-16.417	8.048	-13.826	16.417	-8.048	0.000%
7	7.952	-16.417	13.992	-7.952	16.417	-13.992	0.000%
8	-0.053	-16.417	16.188	0.053	16.417	-16.188	0.000%
9	-8.044	-16.417	14.046	8.044	16.417	-14.046	0.000%
10	-13.880	-16.417	8.140	13.880	16.417	-8.140	0.000%
11	-15.996	-16.417	0.053	15.996	16.417	-0.053	0.000%
12	-13.826	-16.417	-8.048	13.826	16.417	8.048	0.000%
13	-7.952	-16.417	-13.992	7.952	16.417	13.992	0.000%
14	0.000	-26.341	0.000	0.000	26.341	0.000	0.000%
15	0.011	-26.341	-3.980	-0.011	26.341	3.980	0.000%
16	1.980	-26.341	-3.453	-1.980	26.341	3.453	0.000%
17	3.418	-26.341	-2.000	-3.418	26.341	2.000	0.000%
18	3.941	-26.341	-0.011	-3.941	26.341	0.011	0.000%
19	3.407	-26.341	1.981	-3.407	26.341	-1.981	0.000%
20	1.961	-26.341	3.442	-1.961	26.341	-3.442	0.000%
21	-0.011	-26.341	3.980	0.011	26.341	-3.980	0.000%
22	-1.980	-26.341	3.453	1.980	26.341	-3.453	0.000%
23	-3.418	-26.341	2.000	3.418	26.341	-2.000	0.000%
24	-3.941	-26.341	0.011	3.941	26.341	-0.011	0.000%
25	-3.407	-26.341	-1.981	3.407	26.341	1.981	0.000%
26	-1.961	-26.341	-3.442	1.961	26.341	3.442	0.000%
27	0.018	-16.417	-5.601	-0.018	16.417	5.601	0.000%
28	2.783	-16.417	-4.860	-2.783	16.417	4.860	0.000%
29	4.803	-16.417	-2.817	-4.803	16.417	2.817	0.000%
30	5.535	-16.417	-0.018	-5.535	16.417	0.018	0.000%
31	4.784	-16.417	2.785	-4.784	16.417	-2.785	0.000%
32	2.751	-16.417	4.842	-2.751	16.417	-4.842	0.000%
33	-0.018	-16.417	5.601	0.018	16.417	-5.601	0.000%
34	-2.783	-16.417	4.860	2.783	16.417	-4.860	0.000%
35	-4.803	-16.417	2.817	4.803	16.417	-2.817	0.000%
36	-5.535	-16.417	0.018	5.535	16.417	-0.018	0.000%
37	-4.784	-16.417	-2.785	4.784	16.417	2.785	0.000%
38	-2.751	-16.417	-4.842	2.751	16.417	4.842	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	0.00002633
3	Yes	4	0.00000001	0.00085030
4	Yes	4	0.00000001	0.00090513
5	Yes	4	0.00000001	0.00005794
6	Yes	4	0.00000001	0.00084115
7	Yes	4	0.00000001	0.00085268
8	Yes	4	0.00000001	0.00004513
9	Yes	4	0.00000001	0.00090635
10	Yes	4	0.00000001	0.00084728

11	Yes	4	0.00000001	0.00003906
12	Yes	4	0.00000001	0.00086852
13	Yes	4	0.00000001	0.00086108
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00032440
16	Yes	4	0.00000001	0.00036289
17	Yes	4	0.00000001	0.00036246
18	Yes	4	0.00000001	0.00031829
19	Yes	4	0.00000001	0.00035588
20	Yes	4	0.00000001	0.00035752
21	Yes	4	0.00000001	0.00032210
22	Yes	4	0.00000001	0.00036435
23	Yes	4	0.00000001	0.00036142
24	Yes	4	0.00000001	0.00032076
25	Yes	4	0.00000001	0.00036116
26	Yes	4	0.00000001	0.00036289
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00005748
29	Yes	4	0.00000001	0.00006714
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00005740
32	Yes	4	0.00000001	0.00005926
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00006725
35	Yes	4	0.00000001	0.00005714
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00006227
38	Yes	4	0.00000001	0.00006085

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	88.7 - 47.57	11.242	27	1.019	0.002
L2	51.9 - 0	4.144	27	0.723	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
87.000	7770.00 w/ Mount Pipe	27	10.874	1.007	0.001	23109
74.000	BXA-70063/6CF w/ Mount Pipe	27	8.117	0.916	0.001	7860

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	88.7 - 47.57	32.442	3	2.941	0.004
L2	51.9 - 0	11.962	3	2.089	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
87.000	7770.00 w/ Mount Pipe	3	31.381	2.908	0.004	8041
74.000	BXA-70063/6CF w/ Mount Pipe	3	23.426	2.644	0.003	2734

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	88.7 - 47.57 (1)	TP30.46x21.89x0.25	41.130	0.000	0.0	39.000	23.256	-8.176	906.973	0.009
L2	47.57 - 0 (2)	TP39.75x29.058x0.313	51.900	0.000	0.0	39.000	39.117	-16.402	1525.570	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	88.7 - 47.57 (1)	TP30.46x21.89x0.25	380.753	27.185	39.000	0.697	0.000	0.000	39.000	0.000
L2	47.57 - 0 (2)	TP39.75x29.058x0.313	1147.208	36.166	39.000	0.927	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	88.7 - 47.57 (1)	TP30.46x21.89x0.25	13.348	0.574	26.000	0.044	0.444	0.015	26.000	0.001
L2	47.57 - 0 (2)	TP39.75x29.058x0.313	16.201	0.414	26.000	0.032	0.452	0.007	26.000	0.000

Pole Interaction Design Data

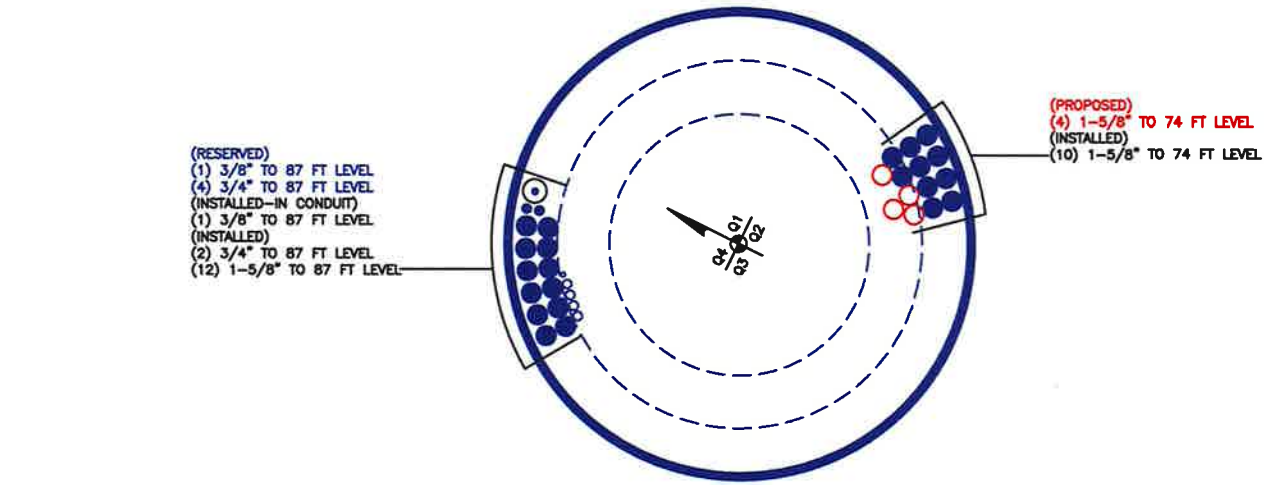
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	88.7 - 47.57 (1)	0.009	0.697	0.000	0.044	0.001	0.707 ✔	1.333	H1-3+VT ✔
L2	47.57 - 0 (2)	0.011	0.927	0.000	0.032	0.000	0.938 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	88.7 - 47.57	Pole	TP30.46x21.89x0.25	1	-8.176	1208.995	53.0	Pass
L2	47.57 - 0	Pole	TP39.75x29.058x0.313	2	-16.402	2033.585	70.4	Pass
							Summary	
						Pole (L2)	70.4	Pass
						RATING =	**70.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 842423 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *842423*
Site Name: *WINDHAM NORTH RIDGE*
App #: *297446*

Pole Manufacturer:	*Other*

Reactions		
Moment:	1147	ft-kips
Axial:	16	kips
Shear:	16	kips

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

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	47	in

Plate Data		
Diam:	53	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.51	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	39.75	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	96.3 Kips	Non-Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	49.4% Pass	Fty*ASIF

Base Plate Results

	Flexural Check	
Base Plate Stress:	42.2 ksi	Non-Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	70.4% Pass	0.75*Fy*ASIF
		Y.L. Length: 25.08

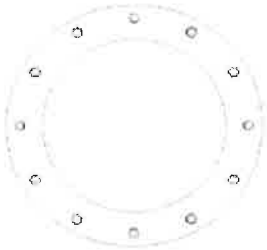
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a



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

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

Monopole Pier and Pad Foundation

BU # : 824423
Site Name: WINDHAM NORTH RIDGE F
App. Number: 297446; Rev. 1

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	16	kips
Moment, **M**:	1147	ft-kips
Tower Height, **H**:	88.7	ft
Tower Weight, **Wt**:	16	kips
Base Diameter, **BD**:	3.31	ft

Foundation Dimensions		
Depth, **D**:	6	ft
Pad Width, **W**:	20	ft
Neglected Depth, **N**:	3	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	6.00	ft
Ext. Above Grade, **E**:	1.00	ft
BP Dist. Above Pier:	4	in.
Clear Cover, **Cc**:	4.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.100	kcf
Ult. Bearing Capacity, Bc:	18.0	ksf
Angle of Friction, **Φ**:	35	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.50	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	9	
Pier Rebar Quanity, **mp**:	22	21
Pad Rebar Size, **Spad**:	9	
Pad Rebar Quanity, **mpad**:	11	8
Pier Tie Size, **St**:	3	3
Tie Quanity, **mt**:	6	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	6	4.8125	**OK**
Overturning (ft-kips)	2119.02	1147.00	**54.1%**
Shear Capacity (kips)	87.86	16.00	**18.2%**
Bearing (ksf)	13.50	2.01	**14.9%**
Pad Shear - 1-way (kips)	619.86	184.25	**29.7%**
Pad Shear - 2-way (kips)	1678.54	59.39	**3.5%**
Pad Moment Capacity (k-ft)	1529.39	487.67	**31.9%**
Pier Moment Capacity (k-ft)	2291.69	1211.00	**52.8%**

Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) = -16.00 kips

Pier Properties

Concrete:

Pier Diameter = 6.0 ft
Concrete Area = 4071.5 in^2

Reinforcement:

Clear Cover = 4.00 in
Cage Diameter = 5.24 ft
Bar Size = 9
Bar Diameter = 1.13 in
Bar Area = 1 in^2
Number of Bars = 22

Material Properties

Concrete compressive strength = 3000 psi
Reinforcement yield strength = 60000 psi
Modulus of elasticity = 29000 ksi
Reinforcement yield strain = 0.00207
Limiting compressive strain = 0.003

Seismic Properties

Seismic Zone = 1

Minimum Area of Steel

Required area of steel = 20.36 in^2
Provided area of steel = 22.00 in^2 OK

Axial Loading

Load factor = 1.3
Reduction factor = 0.9
Factored axial load = -23.1111 kips

Neutral Axis

Distance from extreme edge to neutral axis =	11.45	in
Equivalent compression zone factor =	0.85	
Distance from extreme edge to equivalent compression zone factor =	9.73	in
Distance from centroid to neutral axis =	24.55	in

Compression Zone

Area of steel in compression zone =	4.00	in^2
Angle from centroid of pier to intersection of equivalent compression zone and edge of pier =	43.14	deg
Area of concrete in compression =	329.07	in^2
Force in concrete = 0.85 * f`c * Acc =	839.12	kips
Total reinforcement forces =	-816.01	kips
Factored axial load =	-23.11	kips
Force in concrete =	-839.12	kips
Sum of the forces in concrete =	0.00	kips OK

Maximum Moment

First moment of the concrete area in compression about the centoid =	9941.54	in^3
Distance between centroid of concrete in compression and centroid of pier =	30.21	in
Moment of concrete in compression =	25350.94	in-kips
Total reinforcement moment =	14371.72	in-kips
Nominal moment strength of column =	39722.66	in-kips
Factored moment strength of column =	27500.30	in-kips

Maximum Allowable Moment = 2291.69 ft-kips

Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compressi on (in^2)	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-24.55	-26.27	-0.0064355	0.00	-60.00	-60.00
2	16.36	8.86	-15.70	-17.41	-0.0041142	0.00	-60.00	-60.00
3	32.73	17.00	-7.56	-9.28	-0.001981	0.00	-57.45	-57.45
4	49.09	23.76	-0.80	-2.51	-0.0002087	0.00	-6.05	-6.05
5	65.45	28.60	4.04	2.32	0.0010592	1.00	30.72	28.17
6	81.82	31.12	6.56	4.85	0.0017199	1.00	49.88	47.33
7	98.18	31.12	6.56	4.85	0.0017199	1.00	49.88	47.33
8	114.55	28.60	4.04	2.32	0.0010592	1.00	30.72	28.17
9	130.91	23.76	-0.80	-2.51	-0.0002087	0.00	-6.05	-6.05
10	147.27	17.00	-7.56	-9.28	-0.001981	0.00	-57.45	-57.45
11	163.64	8.86	-15.70	-17.41	-0.0041142	0.00	-60.00	-60.00
12	180.00	0.00	-24.55	-26.27	-0.0064355	0.00	-60.00	-60.00
13	196.36	-8.86	-33.41	-35.13	-0.0087567	0.00	-60.00	-60.00
14	212.73	-17.00	-41.55	-43.27	-0.0108899	0.00	-60.00	-60.00
15	229.09	-23.76	-48.31	-50.03	-0.0126623	0.00	-60.00	-60.00
16	245.45	-28.60	-53.15	-54.87	-0.0139302	0.00	-60.00	-60.00
17	261.82	-31.12	-55.67	-57.39	-0.0145909	0.00	-60.00	-60.00
18	278.18	-31.12	-55.67	-57.39	-0.0145909	0.00	-60.00	-60.00
19	294.55	-28.60	-53.15	-54.87	-0.0139302	0.00	-60.00	-60.00
20	310.91	-23.76	-48.31	-50.03	-0.0126623	0.00	-60.00	-60.00
21	327.27	-17.00	-41.55	-43.27	-0.0108899	0.00	-60.00	-60.00
22	343.64	-8.86	-33.41	-35.13	-0.0087567	0.00	-60.00	-60.00