Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

August 23, 2016

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

Re: **Request of Cellco Partnership d/b/a Verizon Wireless for an Order to Approve the Shared Use of an Existing Tower at 350 Route 198, Woodstock, Connecticut**

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by Cellco of an existing telecommunications tower on a 128 acre parcel at 350 Route 198 in Woodstock, Connecticut (the "Property"). The existing 110-foot tower is owned by American Tower Corporation ("ATC"). The Property is owned by Woodstock Tower Partners. Cellco identifies this site as its "Woodstock Valley Facility".

Cellco requests that the Council find that the proposed shared use of the ATC tower satisfies the criteria of C.G.S § 16-50aa and issue an order approving the proposed shared use. A copy of this filing is being sent to Allan D. Walker, Jr., Woodstock's First Selectman, ATC, the tower owner and Woodstock Tower Partners, the Property owner.

Background

On June 21, 2012, the Council approved an application by North American Towers, LLC and New Cingular Wireless PCS, LLC ("AT&T") to construct a 110-foot tower on the Property (Docket No. 423). In 2015, the Docket No. 423 certificate was transferred to ATC. AT&T

intends to install antennas at the 105-foot level on the ATC tower. Equipment associated with AT&T's antennas would be located in the southwest corner of the tower compound.

Cellco is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. Cellco and ATC have agreed to the proposed shared use of the Route 198 tower pursuant to mutually acceptable terms and conditions. Likewise, ATC and Cellco have agreed to the proposed installation of equipment on the ground within the existing tower compound. ATC has authorized Cellco to apply for all necessary permits and approvals that may be required to share the existing tower. (*See* Owner's authorization letters included in Attachment 1).

Cellco proposes to install twelve (12) antennas and nine (9) remote radio heads (RRHs) behind its antennas at a height of 95 feet above ground level. Cellco will also install two (2) equipment cabinets and a diesel fueled (15 kW) back-up generator on a 10' x 20' concrete pad, beneath a metal frame canopy structure, within the existing fenced compound. Included in Attachment 2 are Cellco's project plans showing the location of all proposed site improvements. Attachment 3 contains specifications for Cellco's proposed antennas, RRHs and backup generator.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such shared use." Cellco respectfully submits that the shared use of the tower satisfies these criteria.

A. Technical Feasibility. The existing ATC tower is structurally capable of supporting Cellco's proposed improvements. The proposed shared use of this tower is, therefore, technically feasible. A Structural Analysis Report ("Structural Report") prepared for this project confirms that the tower can support both AT&T's and Cellco's tower loading. A copy of the Structural Analysis Report is included in Attachment 4.

B. Legal Feasibility. Under C.G.S. § 16-50aa, the Council has been authorized to issue orders approving the shared use of an existing tower such as the ATC tower. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of

existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

C. Environmental Feasibility. The proposed shared use of the ATC tower would have a minimal environmental effect, for the following reasons:

1. The proposed installation of twelve (12) antennas and nine (9) remote radio heads at the 95-foot level on the existing 110-foot tower would have an insignificant incremental visual impact on the area around the existing tower. Cellco's equipment cabinets and generator would be installed within the existing fenced compound. Cellco's shared use of this tower would therefore, not cause any significant change or alteration in the physical or environmental characteristics of the existing site.

2. There are no fans, motors, or other mechanical devices included as a part of Cellco's radio equipment that would create any noise from the Cellco facility. Noise associated with Cellco's emergency back-up generator is exempt from State and local noise standards.

3. Operation of Cellco's antennas at this site would not exceed the RF emissions standards adopted by the Federal Communications Commission ("FCC"). Included in Attachment 5 of this filing is a cumulative worst case General Power Density table that demonstrates that the facility, with AT&T and Cellco's antennas, will operate well within the FCC RF emissions safety standards.

4. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the ATC facility other than periodic (monthly) maintenance visits to the cell site.

The proposed shared use of the ATC tower would, therefore, have a minimal environmental effect, and is environmentally feasible.

D. **Economic Feasibility.** As previously mentioned, Cellco has entered into an agreement with ATC for the shared use of the existing facility subject to mutually agreeable terms. The proposed tower sharing is, therefore, economically feasible.

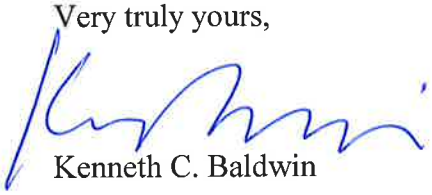
E. **Public Safety Concerns.** As discussed above, the tower is structurally capable of supporting Cellco's full array of twelve (12) antennas, nine (9) remote radio heads and all related equipment. Cellco is not aware of any public safety concerns relative to the proposed sharing of the existing ATC tower. In fact, the provision of new and improved wireless service through shared use of the existing tower is expected to enhance the safety and welfare of area residents and members of the general public traveling through the Town of Woodstock.

Conclusion

For the reasons discussed above, the proposed shared use of the existing ATC tower at 350 Route 198 satisfies the criteria stated in C.G.S. § 16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use.

Thank you for your consideration of this matter.

Very truly yours,



Kenneth C. Baldwin

Enclosures
Copy to:
Allan D. Walker, Jr., First Selectman, Town of Woodstock
Woodstock Tower Partners
ATC
Elizabeth Jamieson, Verizon Wireless

ATTACHMENT 1

AMERICAN TOWER®
CORPORATION

LETTER OF AUTHORIZATION

ATC SITE # / NAME: 283425 / Woodstock 2 CT
SITE ADDRESS: 350 Route 198, Woodstock Valley, CT
LICENSEE: Cellco Partnership d/b/a Verizon Wireless

I, Margaret Robinson, Senior Counsel for American Tower*, owner of the tower facility located at the address identified above (the "Tower Facility"), do hereby authorize **Cellco Partnership d/b/a Verizon Wireless,** its successors and assigns, and/or its agent, (collectively, the "Licensee") to act as American Tower's non-exclusive agent for the sole purpose of filing and consummating any land-use or building permit application(s) as may be required by the applicable permitting authorities for Licensee's telecommunications' installation.

We understand that this application may be denied, modified or approved with conditions. The above authorization is limited to the acceptance by Licensee only of conditions related to Licensee's installation and any such conditions of approval or modifications will be Licensee's sole responsibility.

Signature:

Print Name: Margaret Robinson
Senior Counsel
American Tower*

NOTARY BLOCK

Commonwealth of MASSACHUSETTS
County of Middlesex

This instrument was acknowledged before me by Margaret Robinson, Senior Counsel for American Tower*, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

WITNESS my hand and official seal, this 18 day of August, 2016.

NOTARY SEAL

ANGELICA R. LEMOS-BARTHELEMY
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
April 10, 2020

Notary Public
My Commission Expires: April 10, 2020

*American Tower includes all affiliates and subsidiaries of American Tower Corporation.

ATTACHMENT 2

verizon

WIRELESS COMMUNICATIONS FACILITY

WOODSTOCK VALLEY

350 ROUTE 198

WOODSTOCK, CT 06281

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 350 ROUTE 198, WOODSTOCK, CT 06281

1. Head East on E River Dr	335 ft
2. Turn left onto the CT-2 E ramp to Norwich	0.2 mi
3. Merge onto I-84 E	30.1 mi
4. Take exit 73 for CT-190 toward Union	0.2 mi
5. Turn right onto CT-190 E	1.9 mi
6. Turn right onto CT-171 E	6.8 mi
7. Turn left onto CT-171 E/CT-198 N	0.3 mi

GENERAL NOTES

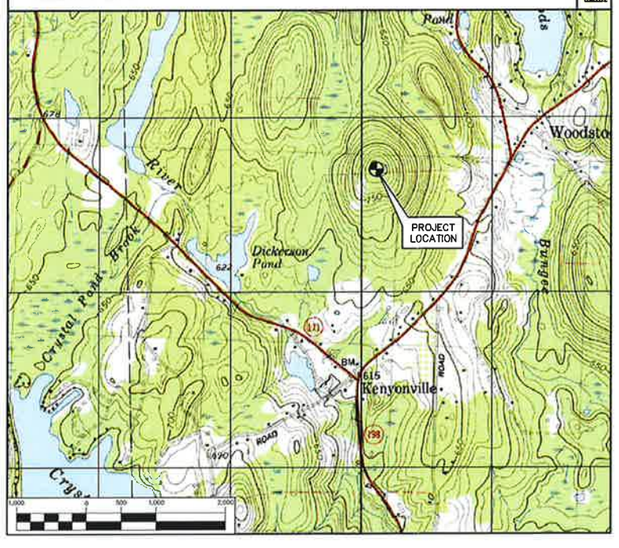
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES INSTALLATION OF A 12'x20' CONCRETE PAD WITH CANOPY ROOF LOCATED WITHIN THE EXISTING WIRELESS COMMUNICATIONS LEASE AREA.
2. A TOTAL OF TWELVE (12) DIRECTIONAL PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED ON AN EXISTING 110' TALL MONOPOLE TOWER AT A CENTERLINE ELEVATION OF 95' ABOVE FINISHED GRADE.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE PROPOSED EQUIPMENT PAD FROM AN EXISTING UTILITY BACKBOARD LOCATED ADJACENT TO FENCED COMPOUND.
4. FINAL DESIGN FOR TOWER AND ANTENNA MOUNTS SHALL BE INCLUDED IN THE CONSTRUCTION DRAWINGS.
5. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.
6. THERE WILL NOT BE ANY LIGHTING UNLESS REQUIRED BY THE FCC OR THE FAA.
7. THERE WILL NOT BE ANY SIGNS OR ADVERTISING ON THE ANTENNAS OR EQUIPMENT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	WOODSTOCK VALLEY
SITE ADDRESS:	350 ROUTE 198 WOODSTOCK, CT 06281
LESSEE/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
VERIZON SITE ACQUISITION CONTACT:	STEVE SCHADLER CELLCO PARTNERSHIP (508) 887-0357
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN, ESQ. ROBINSON & COLE LLP (860) 257-8345
TOWER COORDINATES:	LATITUDE: 41°-56'-21.60" LONGITUDE: 72°-04'-54.61" GROUND ELEVATION: 810'± A.M.S.L. COORDINATES & GROUND ELEVATION ARE BASED ON CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
C-1	ABUTTERS MAP	1
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTIGN CONFIGURATION	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	08/10/16	HWR	CPC	ISSUED FOR CT SITING COUNCIL
0	07/21/16	LGL	DWD	ISSUED FOR CT SITING COUNCIL - CLIENT REVIEW

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CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

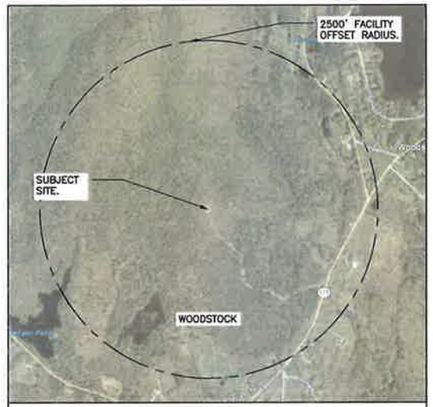
Cellco Partnership d/b/a Verizon Wireless
WIRELESS COMMUNICATIONS FACILITY
WOODSTOCK VALLEY
350 ROUTE 198
WOODSTOCK, CT 06281

DATE: 07/13/2016
SCALE: AS NOTED
JOB NO. 15226.00

TITLE SHEET

T-1

Sheet No. 1 of 3



MUNICIPALITY NOTIFICATION LIMIT MAP

N/F
WOODSTOCK TOWER PARTNERS LLC
C/O THOMAS HARNEY
RT 198
MA: 39 KENNEDY DR
PUTNAM, CT 06260

N/F
WROBEL ROSERT S & JOHN R
384 RT 198
WOODSTOCK, CT 06282

N/F
150 ACRE WOOD LLC
RT 171
MA: 139 SLATER RD
GLASTONBURY, CT 06033

SUBJECT PROPERTY
N/F
150 ACRE WOOD LLC
350 RT 198
MA: 139 SLATER RD
GLASTONBURY, CT 06033

N/F
HOSMER RICHARD B & HOSMER DAVID A
365 RT 198
WOODSTOCK, CT 06282

RT. 198

N/F
FROEHLICH DONALD A
351 RT 198
MA: 40 BARBIER RD
WOODSTOCK, CT 06281

N/F
PAULUS JOSEPH G & BARBARA A
341 RT 198
WOODSTOCK VALLEY, CT 06282

N/F
CAMPBELL LEO J & PATRICIA
276 RT 198
M.A.: 270 RT 198
WOODSTOCK VALLEY, CT 06282

N/F
STEHLIK WILLIAM JR & BEVERLY A
RT 171
MA: 294 RT 198
WOODSTOCK VALLEY, CT 06282

RT. 171

N/F
DEFREITAS ROBERT F & MARIA C
329 RT 198
MA: P.O. BOX 42
WOODSTOCK, CT 06281

N/F
MORIN ROY M & DEBRA L
312 RT 198
WOODSTOCK VALLEY, CT 06282

1 / C-1 ABUTTERS MAP
SCALE: 1" = 200'

APPROXIMATE NORTH

GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft

MAP REFERENCE NOTE:

PROPERTY LINES AND PROPERTY OWNER INFORMATION SHOWN HEREIN ARE REFERENCED FROM THE TOWN OF WOODSTOCK ONLINE GIS SERVICES.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	08/10/16	HMR	CFC	ISSUED FOR CT SITING COUNCIL
0	07/21/16	LGL	DMD	ISSUED FOR CT SITING COUNCIL - CLIENT REVIEW

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WOODSTOCK, CT 06281

DATE: 07/13/2016
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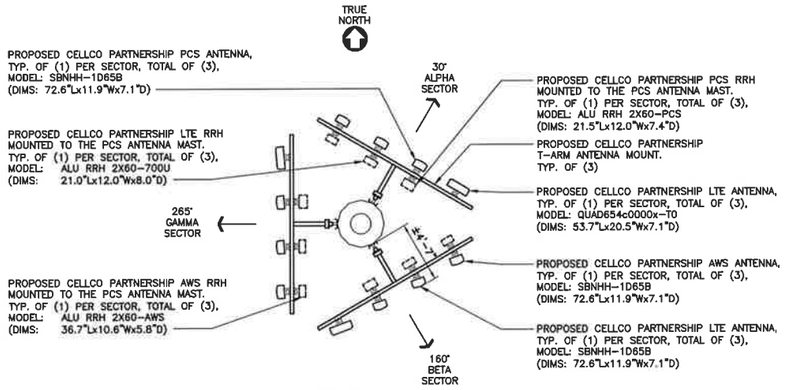
JOB NO. 15226.00

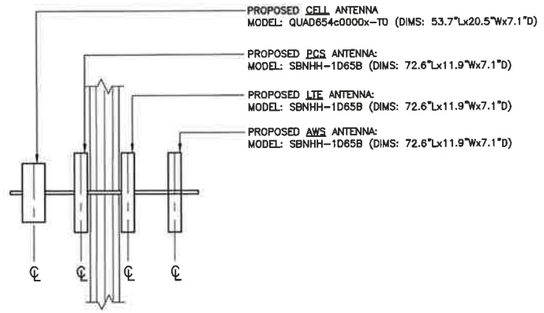
ABUTTERS MAP

C-1

Sheet No. 2 of 3

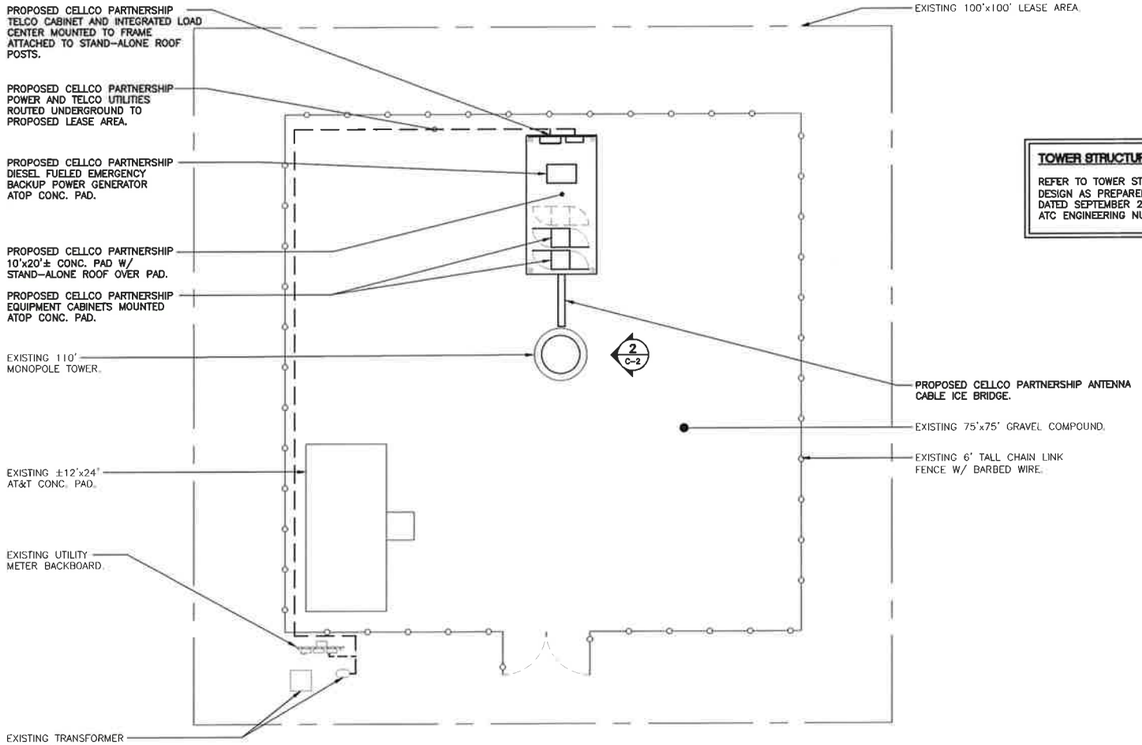


PLAN



ELEVATION

3 / C-2 **ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE



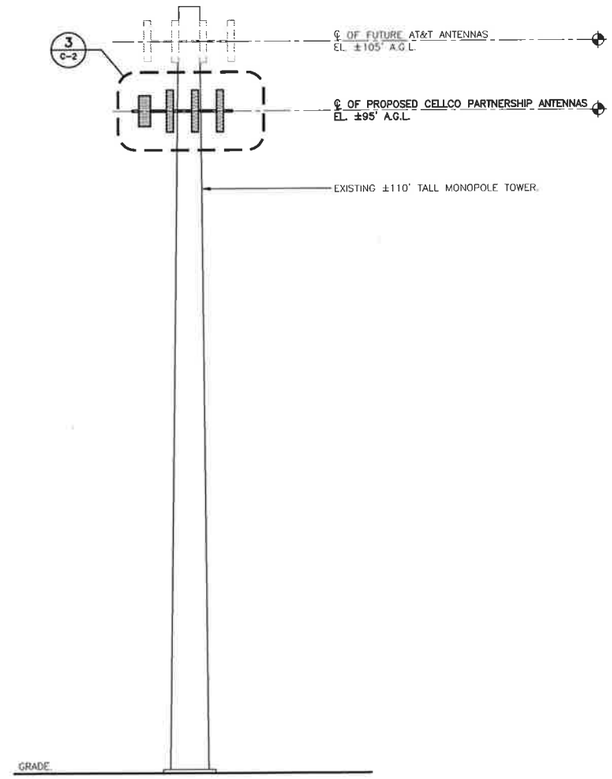
TOWER STRUCTURAL ANALYSIS NOTE:

REFER TO TOWER STRUCTURAL ANALYSIS AND MODIFICATION DESIGN AS PREPARED BY AMERICAN TOWER CORPORATION (ATC). DATED SEPTEMBER 23, 2015. ATC SITE NUMBER: 283425, ATC ENGINEERING NUMBER: 63688023.

1 / C-2 **COMPOUND PLAN**
SCALE: 1" = 10'

APPROXIMATE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.



2 / C-2 **EAST ELEVATION**
SCALE: 1" = 10'

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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0	07/21/16	LGL	DMD	ISSUED FOR CT SITING COUNCIL - CLIENT REVIEW

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WOODSTOCK VALLEY
350 ROUTE 198
WOODSTOCK, CT 06281

DATE: 07/13/2016
SCALE: AS NOTED
JOB NO. 15226.00

COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

Sheet No. 3 of 3

ATTACHMENT 3

Product Specifications

COMMSCOPE®

SBNHH-1D65B

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

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

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, 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	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

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

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.

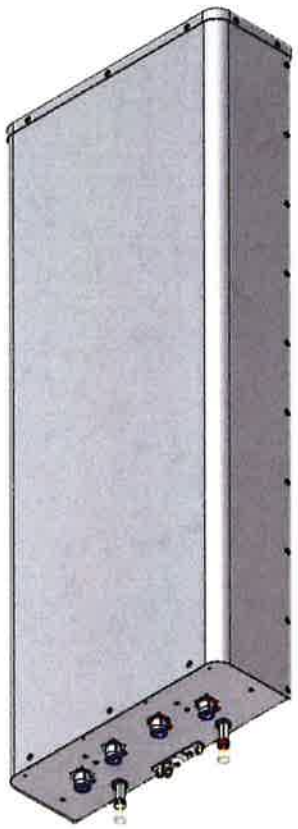
* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

QUAD654C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 14.0 / 14.0 dBi | Variable Tilt

- Twin band, quad-port panel antenna with variable electrical tilt
- 4x4 MIMO
- Patented internal RET actuator adds no additional length to the antenna



Ordering Options	Model Number
When ordering, replace "x" in the model number with one of the options listed below.	
Manual Electrical Tilt	QUAD654C0000M
Remote Electrical Tilt AISG v2.0 / 3GPP with an MDCU RET Actuator	QUAD654C0000G
Remote Electrical Tilt AISG v2.0 / 3GPP with an MDDU RET Actuator	QUAD654C0000L
Mounting bracket kits and other accessories are ordered separately.	

Electrical Characteristics		(2x) 696-900 MHz	
Frequency Bands		696-806 MHz	806-900 MHz
Polarization		(2x) ±45° (Quad-Pol)	
Horizontal Beamwidth		72°	65°
Vertical Beamwidth		19°	16°
Gain		13.2 dBi	14.0 dBi
Electrical Downtilt		0-14°	
Impedance		50Ω	
VSWR		≤ 1.5:1	
Upper Sidelobe Suppression		17 dB	17 dB
Front-to-Back Ratio		> 25 dB	> 25 dB
Inband Isolation		25 dB	
Isolation Between Bands		28 dB	
IM3 (2x20W carrier)		< -153 dBc	
Input Power		(4x) 500 W	
Total Number of Connectors		Antennas has 4 connectors located at the bottom	
Connectors Per Band	696-900 MHz	(2x) 7/16-DIN Female	
	696-900 MHz	(2x) 7/16-DIN Female	
Diplexed		No	
Lightning Protection		Direct Ground	
Operating Temperature		-40° to +60° C (-40° to +140° F)	

Mechanical Characteristics			
Dimensions (Length x Width x Depth)		1365 x 520 x 180 mm	53.7 x 20.5 x 7.1 in
Depth with Z-Brackets		227 mm	8.9 in
Weight without Mounting Brackets: MET		18.1 kg	40.0 lbs
Weight without Mounting Brackets: RET		18.8 kg	41.4 lbs
Survival Wind Speed		> 241 km/hr	> 150 mph
Wind Area	Front	0.71 m^2	7.7 ft^2
	Side	0.25 m^2	2.6 ft^2
Wind Loads (160 km/hr or 100 mph)	Front	869 N	195 lbf
	Side	300 N	67 lbf

Quoted performance parameters are provided to offer typical, peak or range values only and may vary as a result of normal testing, manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to products may be made without notice.

QUAD654C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 14.0 / 14.0 dBi | Variable Tilt

Electrical Downtilt Control		
Electrical downtilt for each band can be controlled separately. Tilt indicator(s) are covered by removable transparent cap(s).		
Manual Electrical Tilt (MET) Control	A colored knob at the end of the tilt indicator allows change of the tilt without need of a tool. The knob color is identical to the corresponding connector ring color. To access the knob, remove the cap by turning it counter-clockwise. It is re-installed by opposite rotation. Do not remove the transparent cap(s) from the antenna.	
Remote Electrical Tilt (RET) Control	The remote control of the electrical tilt is managed by either a Multi-Device Control Unit (MDCU) or a Multi-Device Dual Unit (MDDU) inserted in the bottom of the antenna. A single actuator individually controls the tilt of each band (no need for daisy chain cables between the bands). This module does not add any additional length to the antenna. For RET control, the transparent caps must be in place and locked. The tilt angle indicators always remain visible and the antenna still has manual tilt control (manual override).	
RET Actuator	Select one of the following RET actuators when ordering this antenna.	
	Multi-Device Control Unit (MCDU)	The MDCU is an electronic module that allows the remote control of the electrical downtilt (RET) in Amphenol antennas with factory embedded motors. The MDCU is factory installed. Refer to ordering options.
	Multi-Device Dual Unit (MDDU)	The MDDU allows two separate RET Controllers to independently drive the RETs in Amphenol antennas with factory installed motors (for antenna sharing). The MDDU is factory installed. Refer to ordering options.
Important Installation Instructions 	In order to operate RET control, the transparent caps covering the tilt adjustment indicators must be engaged and locked. Do not cut them from the antenna.	
	Do not install the antenna with the connectors facing upward.	

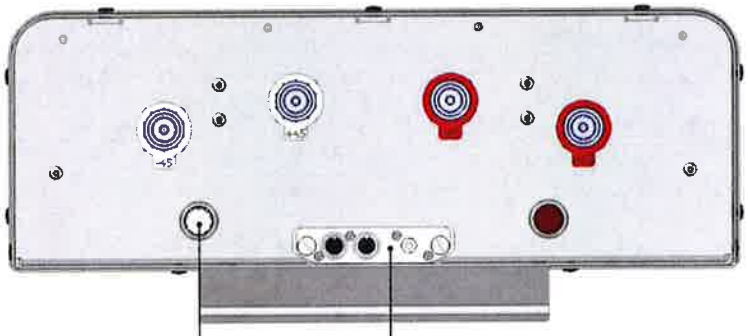
Mounting Options	Part Number	Image	Fits Pipe Diameter	Weight
All mounting bracket kits are ordered separately unless otherwise indicated. Select from the options listed below.				
2-Point Mounting and Downtilt Bracket Kit	36210006		40-115 mm 1.6-4.5 in	4.1 kg 9 lbs

Configuration Options
This antenna model **cannot** be used with Amphenol's UNICELL 3-sector antenna enclosures.

QUAD654C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 14.0 / 14.0 dBi | Variable Tilt

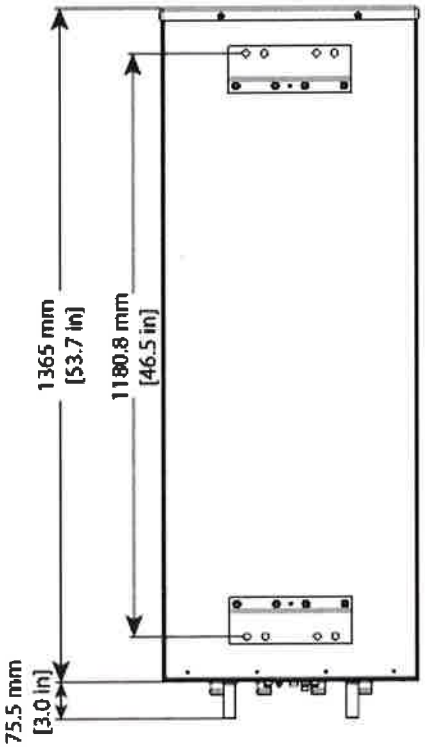
Bottom View of Antenna

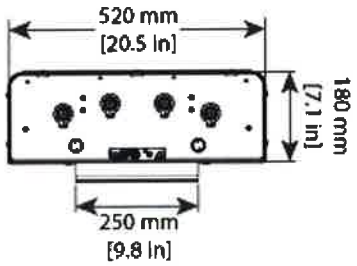


Location of the MDCU or MDDU for RET Control *(MDCU shown)*

Tilt indicators covered by transparent caps.
Manual adjustment is accessed by removing the caps.
Knob colors are the same as the connectors.

Dimensions



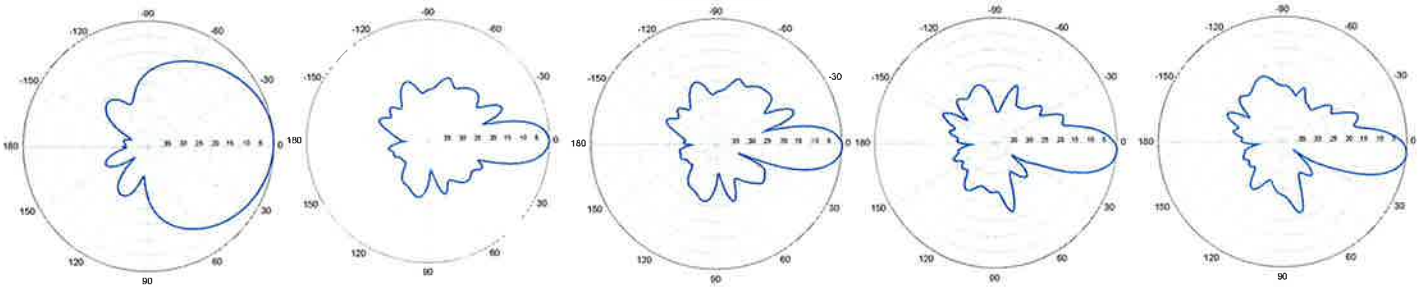


In order to operate RET control, the transparent caps covering the tilt adjustment indicators must be engaged and locked. Do not cut them from the antenna.

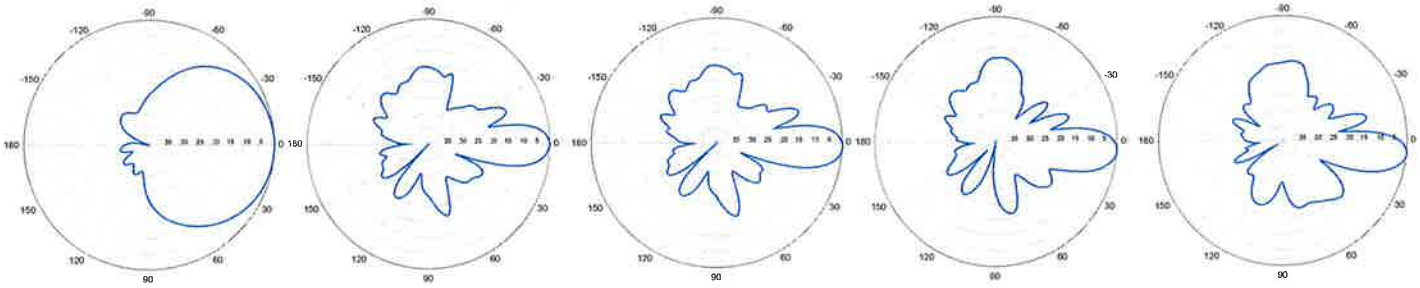
QUAD654C0000x

Twin Band | Quad Port | Panel Antenna | (2x) X-Pol | 65° / 65° | 14.0 / 14.0 dBi | Variable Tilt

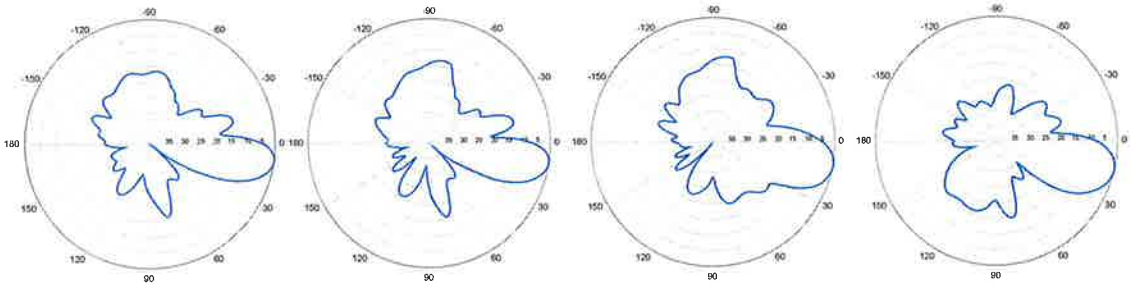
696-900 MHz



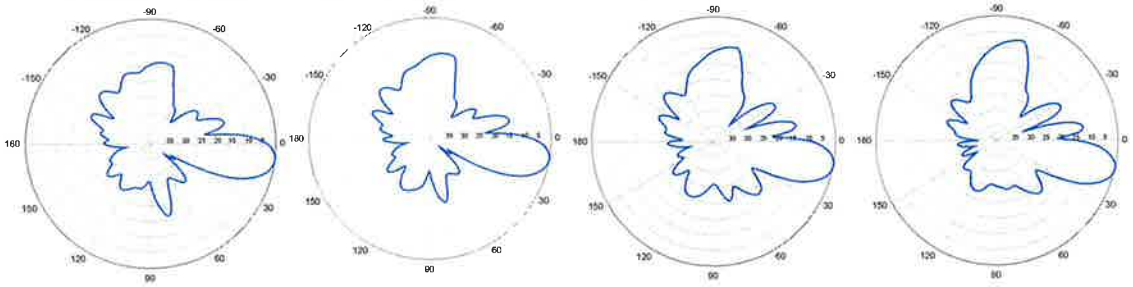
Horizontal | 750 MHz | 0° | Vertical | 750 MHz | 2° | Vertical | 750 MHz | 4° | Vertical | 750 MHz | 6° | Vertical | 750 MHz



Horizontal | 850 MHz | 0° | Vertical | 850 MHz | 2° | Vertical | 850 MHz | 4° | Vertical | 850 MHz | 6° | Vertical | 850 MHz



8° | Vertical | 750 MHz | 10° | Vertical | 750 MHz | 12° | Vertical | 750 MHz | 14° | Vertical | 750 MHz



8° | Vertical | 850 MHz | 10° | Vertical | 850 MHz | 12° | Vertical | 850 MHz | 14° | Vertical | 850 MHz

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.

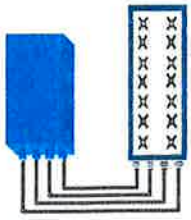
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

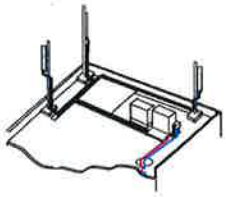
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

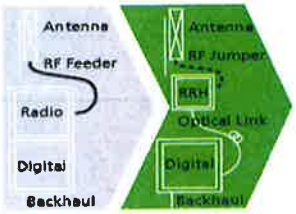
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

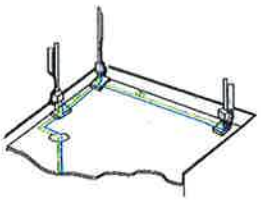
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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)

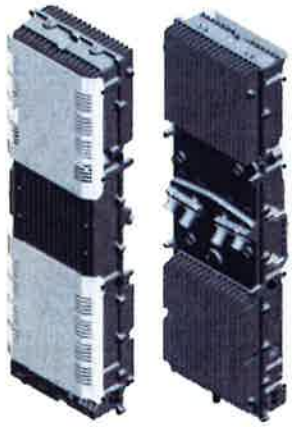
Safety and Regulatory Data

- 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
WIRELESS PRODUCT DATASHEET
B4 RRH2X60-4R FOR AWS BAND APPLICATIONS

The Alcatel-Lucent B4 RRH2x60-4R 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 B4 RRH2x60-4R 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 B4 RRH2x60-4R 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.

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

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

OPTIMIZED TCO

The Alcatel-Lucent B4 RRH2x60-4R 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 B4 RRH2x60-4R is a very cost-effective solution to deploy LTE MIMO.

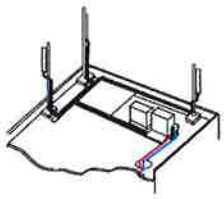
EASY INSTALLATION

The B4 RRH2x60-4R 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.

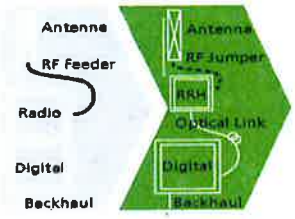
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent B4 RRH2x60-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent B4 RRH2x60-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

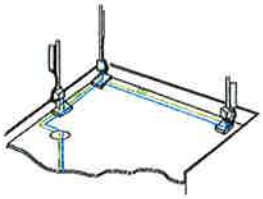
Installation can easily be done by a single person as the Alcatel–Lucent B4 RRH2x60-4R is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- B4 RRH2x60-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- B4 RRH2x60-4R is optimized for LTE operation
- B4 RRH2x60-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 930x270x146 mm (with solar shield)
- Weight : 25 kg (55 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-38 to -57V)
- Power Consumption: 346W typ. @2x30W (100%RF), 560W typ. @2x60W (100%RF)

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 (3-6) 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 300m using MM fiber, up to 15km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Four 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
- Health : EN 50385

Alcatel·Lucent

8220-603 series

Reliability through Simplicity

POLAR POWER INC.

Back-up Diesel DC Generator Set

Founded in 1979 Polar Power specialized in solar photovoltaic systems, solar air conditioning and refrigeration. We developed and provided photovoltaic charging controls for telecommunications in the 1980s along with DC generators for the military. In 1994 we were first to provide DC generators with remote control and monitoring to the telecommunications industry.

Polar's success is based on engineering generators to meet the very specific needs of each application. Telecom site optimization is best met with the DC generator technology as the loads and batteries are DC. It makes no sense to install an AC generator and convert the output to DC. The AC generators are designed for a wide range of applications and they are not specifically produced for telecom applications so there are issues with reliability, space, and fuel efficiency.

Polar can save you considerable time and cost in permitting, installing, purchasing, and maintaining a backup generator. We reduce CAPEX and OPEX costs while improving backup reliability.

Available Models:

- **8220-603-D-10** Diesel 10 kW, -48 VDC
- **8220-603-D-15** Diesel 15 kW -48 VDC

Intertek 4003706
Conforms to UL STD 2200
Certified to CSA STD C22.2 No. 100
Fuel tank is UL 142 Listed

Meets EPA Emission Regulations
CA/MA Emissions Compliant

Made in USA

2 year standard warranty, extended 5-10 year warranty available

The concepts and features behind Polar's backup generator for telecommunications include:

SMALL FOOTPRINT. Polar's DC generator is considerably smaller in size than an AC generator. You can now backup sites that could not accommodate an AC generator. Smaller also means less cost for space leasing.

LONG RESERVE. 48 to 72 hour reserve. Polar's DC generator can provide long reserve times because of very low fuel consumption. This generator should be the first choice for sites exposed to natural disasters requiring backup for weeks or months at a time (fuel consumption 1.02 gallon per hour).

LOW ACOUSTIC NOISE. <66 dBA @ 7 meters, and low vibration so as not to disturb the local residents or building landlords. Quieter than other generators with lower noise ratings.

LIGHTWEIGHT. Up to 1/3 the weight of a comparable AC generator. Facilitates roof top installations.

CORROSION RESISTANT. All-aluminum enclosure with stainless hardware for low maintenance, and long service life.

RODENT RESISTANT. Small animals can quickly destroy a generator set by gnawing on wires, fuel lines, radiator hoses, etc. Cooling air inlets and outlets have perforated aluminum screens to keep small rodents and large insects out. Stainless steel wire braid is placed over fuel and radiator lines for increased reliability and safety.

SUPERCAPACITOR STARTER. Failure to start is the number one problem plaguing generator reliability. Polar's unique design has replaced the starting battery with a Super Capacitor. Capacitors are more reliable and last longer than batteries (10-15 year life).

LONG LIFE. Controls and wire harnesses are designed to exceed a 20 year life. Higher grade, longer life electrical wire (UL 3173), weather tight connectors, gold plated connector pins on signal circuits. Controls and wire harness are easily replaceable.

ADVANCED MONITORING. Remote diagnostics, control, and monitoring. Ethernet and RS232 standard, with optional SNMP.

SIMPLICITY. Transfer switch, rectifier, and starting battery are not required.

249 E. Gardena Blvd, Gardena CA, 90248 | 310.830.9153 | www.polarpower.com | info@polarpowerinc.com

POLAR POWER INC.
application and engineering data

COMPARING THE COST OF AC vs DC

	AC	DC
Transfer switch required	Yes	No
Permitting costs	$$	$
Shipping to site and installation cost	$$	$
Site preparation/reinforcing structures	$$$	$
Ethernet/RS232 remote control and monitoring	Extra	Standard

PERMITTING IS FACILITATED

- Small engine horsepower
- Small 54 gallon diesel fuel tank meets UL 142
- DC generator is fully isolated from the utility grid
- No transfer switch
- Low acoustic noise
- Incorporates all requirements made by local Fire Marshals

8220 ALTERNATOR FEATURES

- No mechanical adjustments
- Very lightweight
- High quality electrical output
- Voltage and current regulation
- Up to 94% efficiency
- Class 220° C insulation
- Anodized type III process for aluminum parts
- Nickel plating for steel parts
- Stator is varnished

8220 ALTERNATOR SPECIFICATIONS

Type	Permanent Magnets, NdFeB
Weight (lb/kg)	46.5/21
Regulation Type	Variable engine speed
Stator	3 phase/32 poles
Overcurrent Protection (A)	10 kW - 250 15 kW - 350
Disconnect Means	Pull fuse block, sized for each generator kW
Voltage Range (VDC)	44 to 62
Alternator Exhaust Flow (cfm/cmm)	130 to 180 / 3.68 to 5.1
MTBF (hr)	100,000+

STARTER SUPERCAPACITOR SPECIFICATIONS

Model	20-16-0001
Storage Rating (Farads)	500
Voltage (VDC)	13-14.4
Weight (lb/kg)	12.1/5.5
Operating Temperature (°C/°F)	-40 to 65 / -40 to 149
Service Life (year)	10 to 15

CHARGER SPECIFICATIONS

Model	00-10-0015
Input Voltage (VDC)	28.8 to 60
Output Voltage (VDC)	14 to 14.4
Recharge time from 0 VDC (min)	10
Recharge time from 8 VDC (min)	2
Weight (lb/kg)	2.2/1

ENCLOSURE

Model	88-25-0603
Type	Weather Protective
Materials	Marine Grade Aluminum
Door Hardware	Three Point with Padlock Hasp, and Removable Side Panels
Mounting	Secure Mounting Tabs

SOUND EMISSIONS

Contact us for current sound data.

WEIGHTS AND DIMENSIONS

	10 kW	15 kW
Dry Weight (lb/kg)	1106/502	1248/566
Dimensions (LxWxH) (in/cm)	32 x 50 x 72 / 81.3 x 127 x 183	

ENGINE SPECIFICATIONS: 10 KW DIESEL

Engine Model	Isuzu 3CA1 or Yanmar 3TNV74
Cylinders	3 In-line
Displacement (L)	0.993
Bore (in./mm)	2.91/74
Stroke (in./mm)	3.03/77
Intake Air System	Naturally Aspirated
Engine HP	18
Emissions Compliance	EPA and CARB Certified
Variable RPM	2300 to 2600

ENGINE SPECIFICATIONS: 15 KW DIESEL

Engine Model	Yanmar 3TNV88
Cylinders	3 In-line
Displacement (L)	1.642
Bore (in./mm)	3.4/88
Stroke (in./mm)	3.5/90
Intake Air System	Naturally Aspirated
Engine HP	24
Emissions Compliance	EPA and CARB Certified
Variable RPM	1500 to 1850

ENVIRONMENTAL

Operating Temperature (°C/°F)	-40 to 72 / -40 to 162
Operating Humidity %	100
Cold Start Aids	Glow Plugs

ENGINE FUEL CONSUMPTION

	Output (kW)	gal/hr	L/hr
3CA1/3TNV74	4	0.35	1.32
	5	0.44	1.66
	6	0.53	2
	7	0.615	2.33
	8	0.7	2.65
	9	0.79	2.99
	10	0.88	3.33
3TNV88	15	1.02	3.86

ENGINE LUBRICATION SYSTEM

Oil Filter Type	Full flow spin-on canister
Oil Capacity	2.8 L - 3CA1/3TNV74 6.7 L - 3TNV88
Oil Pressure Switch	Yes
Oil Pressure Transducer	Optional

ENGINE COOLING SYSTEM

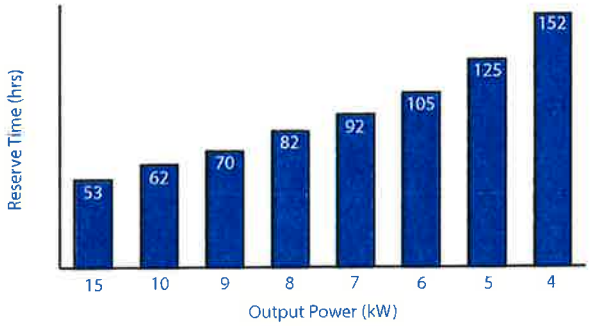
Type	Pressurized Aluminum Radiator
Water Pump	Belt-driven, Pre-lubed, self-sealing
Fan Type	Electric Fans
Airflow CFM or M³/hr	1300 or 2200
Fan Mode	Pusher
Temperature Switch	Yes

DIESEL FUEL SYSTEM

Type	Diesel
Fuel Pump Type	Electrical
Injector Type	Mechanical
Fuel Filtering	Paper element

FUEL TANK SPECIFICATIONS

UL Rated Capacity (gal/L)	54/204
Run Time	see table below
Tank Alarms	Yes
Visual Gages	Yes
Catch Basin (gal/L)	5/19
Listings	UL 142 (double wall)



POWER ADJUSTMENT FOR AMBIENT CONDITIONS

Temperature Deration	1% derate for every 5.6 °C (10 °F) above 25 °C (77 °F)
Altitude Deration	3% derate for every 300 m (1000 ft) above 91 m (300 ft)

POLAR POWER INC.
operating data

ENGINE COOLING

	10 kW	15 kW
System coolant capacity (gal/L)	2.2/8.3	
Maximum operation air temperature on radiator (°C/°F)	50/122	57/135
Maximum ambient temperature (°C/°F)	60/140	60/140

COMBUSTION REQUIREMENTS

	10 kW	15 kW
Flow at rated power (cfm/cmm)	47/1.34	68/1.92

EXHAUST

	10 kW	15 kW
Exhaust flow at rated output (cfm/cmm)	90/2.55	135/3.82
Exhaust temperature at rated output (°C/°F)	480/900	

CONTROLLER FEATURES

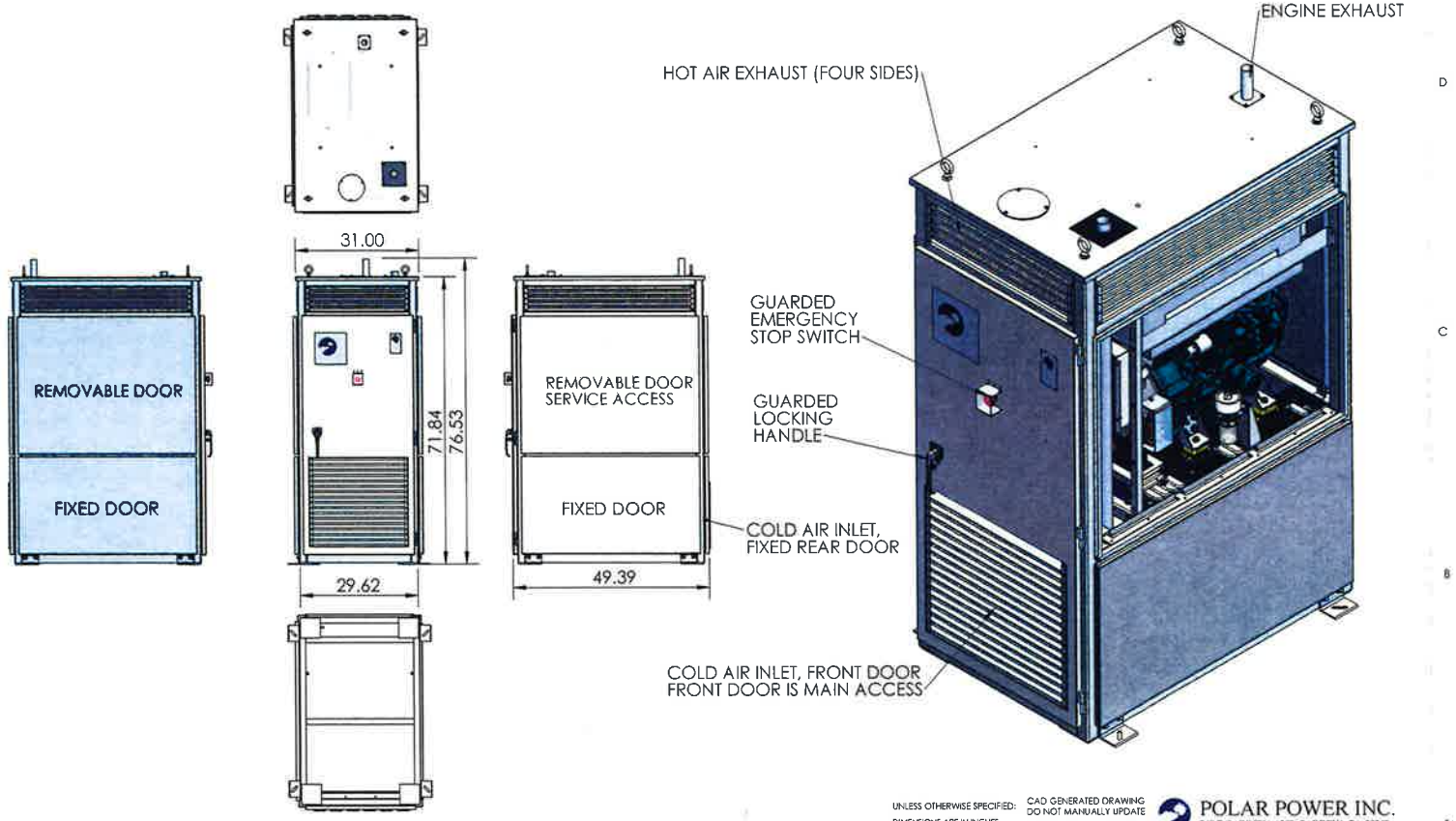
Controller Type.....Supra Model 250
4-Line Plain Text LCD Display.....Simple user interface for ease of operation
Engine Run Hours Indication.....Standard
Programmable Start Delay.....Standard
Run/Alarm/Maintenance Logs.....Standard
Engine Start Sequence.....Cyclic cranking: 5 sec on, 45 sec rest (3 attempts maximum)
Starter Supercapacitor Charger.....Standard
Automatic Voltage Regulation with Over and Under Voltage Protection.....Standard
Automatic Low Oil Pressure/High Oil Temperature Shutdown.....Standard
Overcrank/Overspeed.....Standard
Automatic High Engine Temperature Shutdown.....Standard
Field Upgradeable Firmware.....Standard
Glow Plug Delay .....Automatic With Temperature
Engine Start Delay.....Adjustable, Set at 60 sec
Return to Utility Delay.....Adjustable, Set at 60 sec
Engine Cool-down.....Adjustable, Set at 60 sec
Exerciser.....Programmable, weekly/bi-weekly

WARNING ALARMS

Low Diesel Fuel Level.....Standard
Diesel Fuel Tank Rapture Basin.....Standard
Low/High Supercapacitor Voltage.....Standard
High Water Temperature.....Standard
Low Oil Pressure.....Standard

CONTACT CLOSURE FOR REMOTE INDICATION (PN 84-12-0640)

Shutdown Alarm.....Optional
Warning Alarm.....Optional
Engine Run.....Optional
Low Diesel Fuel Level.....Optional
Diesel Fuel Leak.....Optional
E-Stop Depressed.....Optional
Fuel Level Over 90%.....Optional



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ±1/32" DECIMALS X ±0.1" X XX±0.03" X XXX±0.010 ANGLES ±1/2°
MATERIAL
FINISH
DO NOT SCALE DRAWING

CAD GENERATED DRAWING
DO NOT MANUALLY UPDATE
APPROVALS DATE
DRAWN 1/22/2015
CHECKED
ENG APPR.
MFG APPR.
Q.A.

POLAR POWER INC.
249 E GARDENA AVE, GARDENA CA. 90248

TITLE: ALUMINUM VERTICAL ENCLOSURE, 72 IN

SIZE B | DWG. NO. 88-25-0603 | REV A-1

SCALE: 1:24 WEIGHT: SHEET 1 OF 4

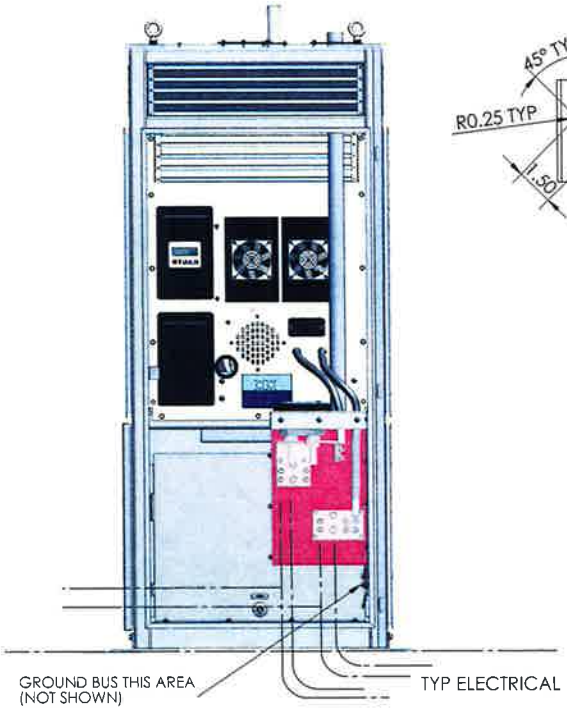
NEXT ASSY USED ON
APPLICATION

COMMENTS:

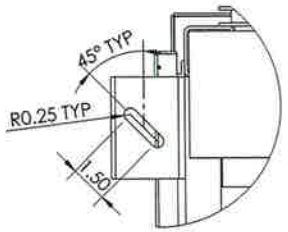
REV DESCRIPTION ECO# BY DATE
INITIAL RELEASE

249 E. Gardena Blvd, Gardena CA, 90248 | 310.830.9153 | www.polarpower.com | info@polarpowerinc.com

POLAR POWER INC.
installation layout

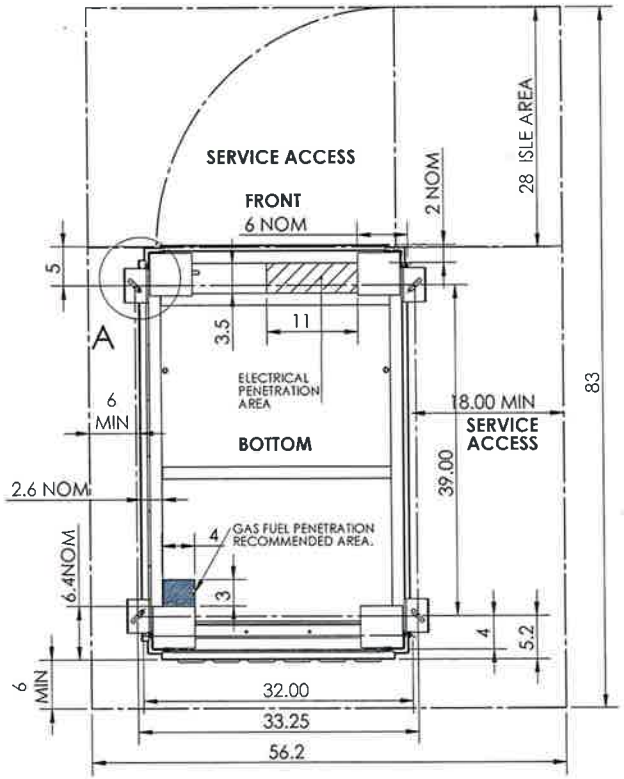


FRONT DOOR REMOVED FOR CLARITY



DETAIL A
SCALE 1 : 4

INSTALLATION FOOTPRINT, BOTTOM VIEW



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ±1/32" DECIMALS X XX±0.1" X XX±0.02 X XX±0.010" ANGLES ±1/2°
MATERIAL
FINISH
NEXT ASSY USED ON
APPLICATION
DO NOT SCALE DRAWING

CAD GENERATED DRAWING
DO NOT MANUALLY UPDATE
APPROVALS DATE
DRAWN 1/22/2015
CHECKED
ENG APPR.
MFG APPR.
Q.A

COMMENTS:

REV	DESCRIPTION	ECO #	BY	DATE
	INITIAL RELEASE			

POLAR POWER INC.
249 E GARDENA AVE, GARDENA CA. 90248

TITLE: ALUMINUM VERTICAL ENCLOSURE, 72 IN

SIZE	DWG. NO.	REV
B	88-25-0603	A-1

SCALE: 1:24 WEIGHT: SHEET 2 OF 4

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POLAR POWER INC.
installation layout

ATTACHMENT 4

AMERICAN TOWER®
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Structural Analysis Report

Structure	:	**110 ft Monopole**
ATC Site Name	:	**Woodstock 2 CT, CT**
ATC Site Number	:	**283425**
Engineering Number	:	**63688023**
Proposed Carrier	:	**Verizon Wireless**
Carrier Site Name	:	**Woodstock Valley, CT**
Carrier Site Number	:	**N/A**
Site Location	:	**350 Route 198** **Woodstock, CT 06282-2425** **41.939436,-72.082017**
County	:	**Windham**
Date	:	**September 23, 2015**
Max Usage	:	**41%**
Result	:	**Pass**

Reviewed by:
Raphael Mohamed, PE
Senior Strategic
Implementation Lead

Prepared By:
Nupur Khadilkar

Nupur S. Khadilkar

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

Sep 23 2015 4:43 PM

COA: PEC.0001553

AMERICAN TOWER®
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Table of Contents

AMERICAN TOWER®
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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 110 ft monopole to reflect the change in loading by Verizon Wireless.

Supporting Documents

Tower Drawings	Nello Corproation Drawing #182019, dated August 22, 2012
Foundation Drawing	Nello Corproation Drawing #182020, dated November 2, 2009
Geotechnical Report	Berkshire Geo-Technologies Tower #Route 198, dated July 16, 2012

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	100 mph (3-Second Gust)
Basic Wind Speed w/ Ice:	50 mph (3-Second Gust) w/ 1" radial ice concurrent
Code:	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
Structure Class:	II
Exposure Category:	B
Topographic Category:	1
Crest Height:	0 ft
Spectral Response:	Ss = 0.17, S_1 = 0.06
Site Class:	D - Stiff Soil

Conclusion

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

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
105.0	105.0	4	Raycap DC6-48-60-0-8F	Low Profile Platform	(3) 1/2" Coax (8) 0.78" 8 AWG 6 (2) 0.40" Fiber	AT&T Mobility
		6	Ericsson RRUS A2 Module			
		3	Ericsson RRUS 32			
		9	Ericsson RRUS 11 (Band 5)			
		6	Ericsson RRUS 12			
		3	Ericsson RRUS E2 B29			
		12	CCI HPA-65R-BUU-H8			

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
No loading considered as to be removed						

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
93.0	93.0	3	Alcatel-Lucent RRH2X60-1900A-4R	Low Profile Platform	(2) 1.58" Hybrid	Verizon
		3	Alcatel-Lucent RRH2x60 700			
		3	Alcatel-Lucent RRH2X60-AWS Band 4			
		2	RFS DB-T1-6Z-8AB-0Z			
		9	Andrew SBNHH-1D65B			

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

Install proposed coax inside the pole shaft.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	33%	Pass
Shaft	41%	Pass
Base Plate	16%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	1,576.6	34%
Axial (Kips)	53.0	18%
Shear (Kips)	19.0	15%

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

The foundation and anchorages for this tower have factors of safety exceeding 2.0 with respect to wind.

Deflection and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
93.0	Alcatel-Lucent RRH2X60-1900A-4R	Verizon Wireless	0.397	0.444
	Alcatel-Lucent RRH2x60 700			
	Alcatel-Lucent RRH2X60-AWS Band 4			
	RFS DB-T1-6Z-8AB-0Z			
	Andrew SBNHH-1D65B			

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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Standard Conditions

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

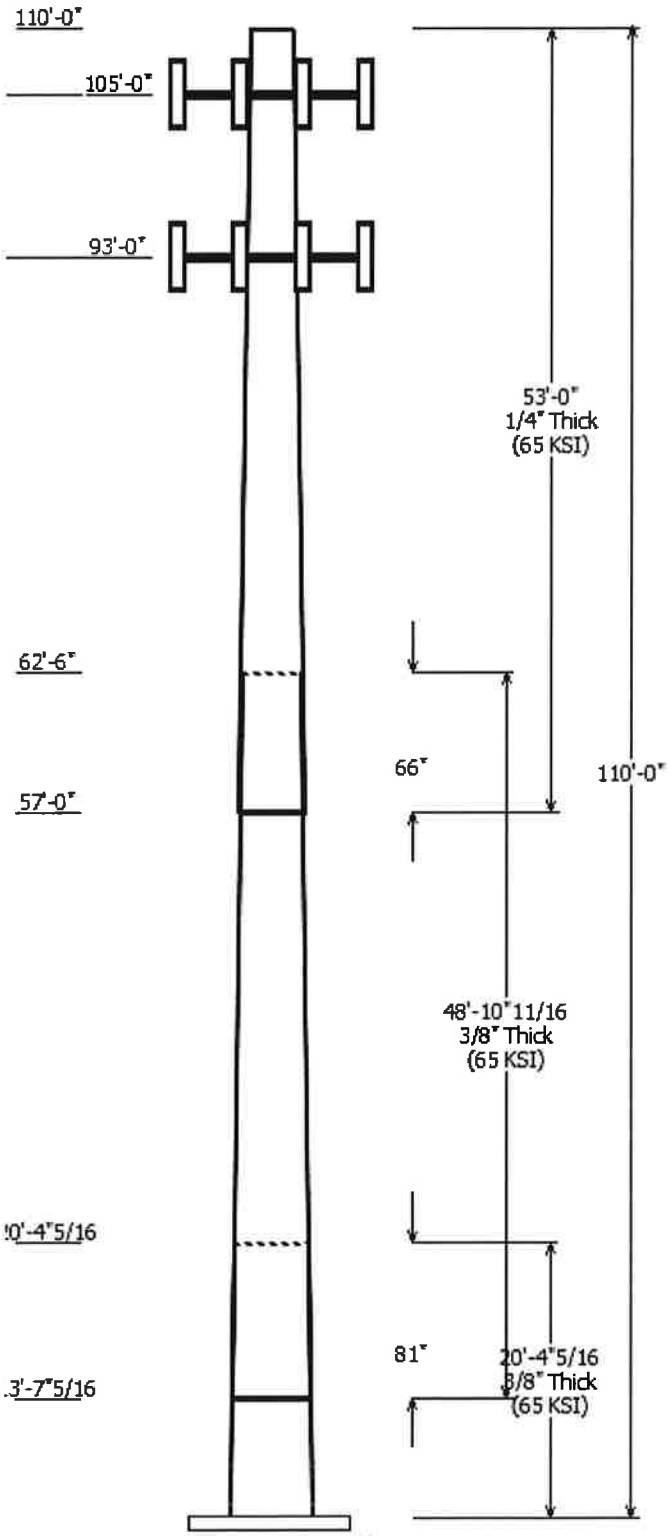
-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

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

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

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

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



Job Information

Pole :	283425	Code:	ANSI/TIA-222-G
Description :			
Client :	VERIZON WIRELESS	Struct Class :	II
Location :	WOODSTOCK 2 CT, CT		
Shape :	18 Sides	Exposure :	B
Height :	110.00 (ft)	Topo :	1
Base Elev (ft):	0.00		
Taper:	0.18500(in/ft)		

Sections Properties

Shaft Section	Length (ft)	Diameter (in) Accross Flats Top	Bottom	Thick (in)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)
1	20.360	44.73	48.50	0.375		0.000	0.185000	65
2	48.890	37.68	46.73	0.375	Slip Joint	81.000	0.185000	65
3	53.000	29.40	39.20	0.250	Slip Joint	66.000	0.185000	65

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
105.000	105.000	1	Flat Low Profile Platform
105.000	105.000	12	CCI HPA-65R-BUU-H8
105.000	105.000	3	Ericsson RRUS E2 B29
105.000	105.000	6	Ericsson RRUS 12
105.000	105.000	9	Ericsson RRUS 11 (Band 5)
105.000	105.000	3	Ericsson RRUS 32
105.000	105.000	6	Ericsson RRUS A2 Module
105.000	105.000	4	Raycap DC6-48-60-0-8F
93.000	93.000	1	Flat Low Profile Platform
93.000	93.000	2	RFS DB-T1-6Z-8AB-0Z
93.000	93.000	9	Andrew SBNHH-1D65B
93.000	93.000	3	Alcatel-Lucent RRH2X60-AWS
93.000	93.000	3	Alcatel-Lucent RRH2x60 700
93.000	93.000	3	Alcatel-Lucent RRH2X60-1900A-

Linear Appurtenance

Elev (ft) From	To	Description	Exposed To Wind
0.000	93.000	1.58" Hybrid	No
0.000	105.0	0.40" Fiber Cable	No
0.000	105.0	0.78" 8 AWG 6	No
0.000	105.0	1/2" Coax	No

Load Cases

1.2D + 1.6W	100 mph with No Ice
0.9D + 1.6W	100 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 1.00 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph

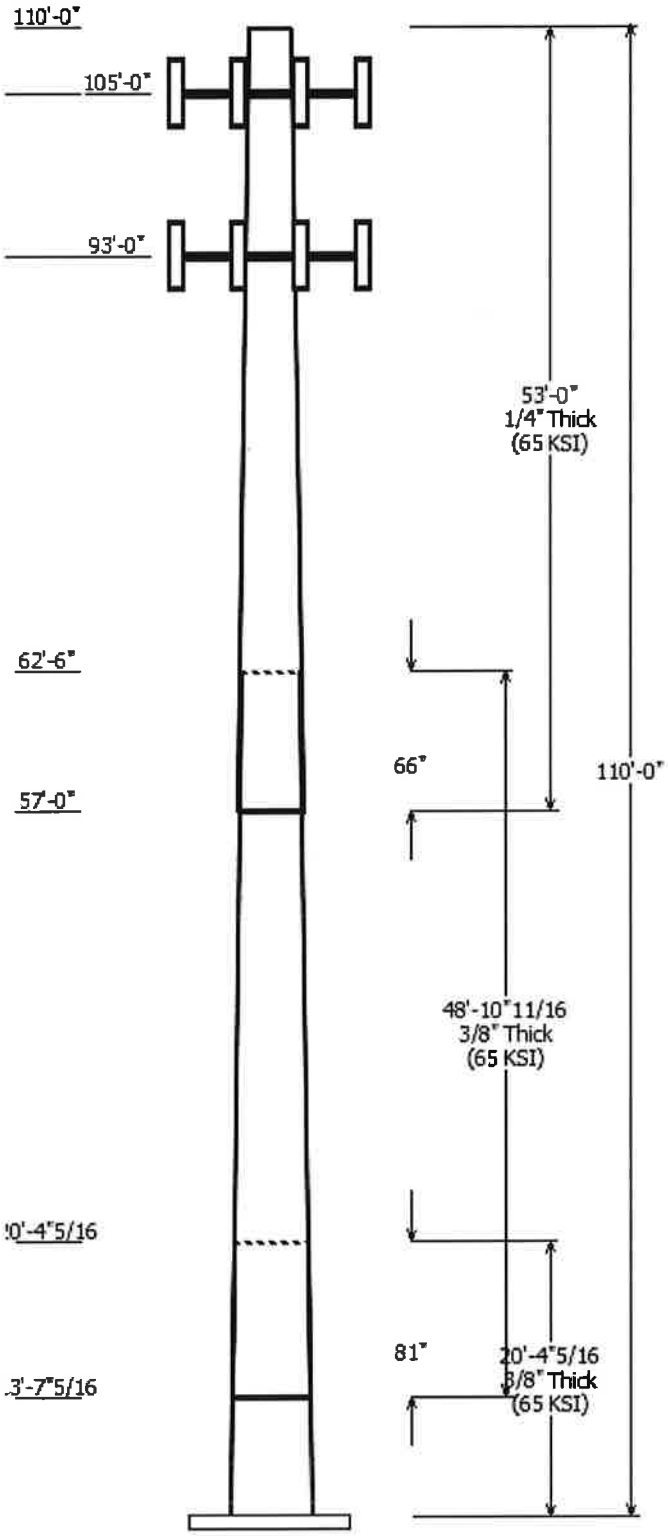
Reactions

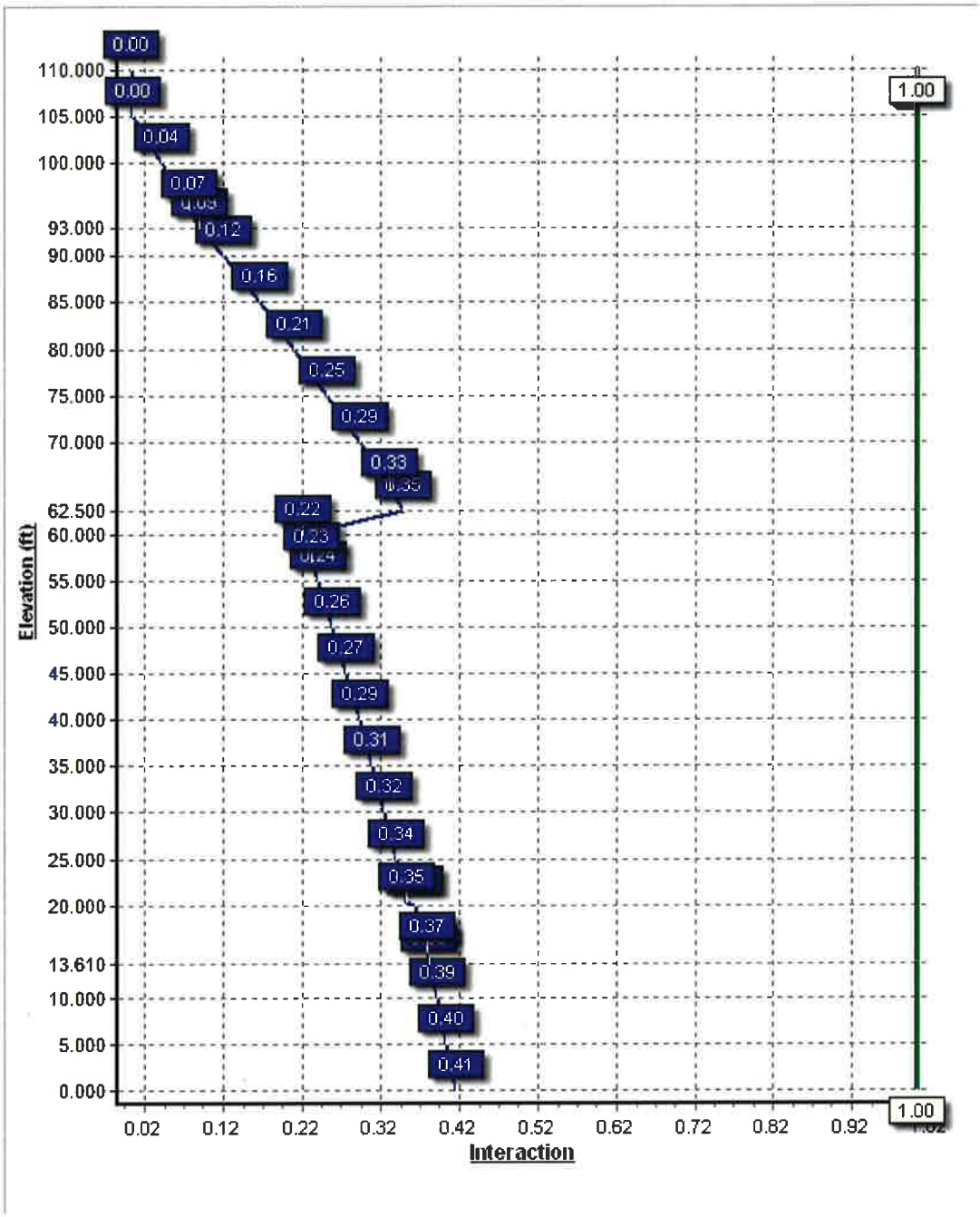
Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	1576.57	18.99	28.79
0.9D + 1.6W	1569.32	18.99	21.59
1.2D + 1.0Di + 1.0Wi	399.28	4.95	53.04

(1.2 + 0.2Sds) * DL + E ELFM	138.88	1.64	28.45
(1.2 + 0.2Sds) * DL + E EMAM	163.24	1.84	28.45
(0.9 - 0.2Sds) * DL + E ELFM	138.14	1.64	19.86
(0.9 - 0.2Sds) * DL + E EMAM	162.33	1.83	19.86
1.0D + 1.0W	353.68	4.27	24.01

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
	0.00	0.000	0.000




0.00
0.00
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0.32
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0.35
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0.39
0.40
0.41
1.00
1.00
110.000
105.000
100.000
93.000
90.000
85.000
80.000
75.000
70.000
62.500
60.000
55.000
50.000
45.000
40.000
35.000
30.000
25.000
20.000
13.610
10.000
5.000
0.000
Elevation (ft)
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Interaction

Site Number:	**283425**	**Code: ANSI/TIA-222-G**	
Site Name:	**WOODSTOCK 2 CT, CT**	**Engineering Number: 63688023**	**9/23/2015 4:22:33 PM**
Customer:	**VERIZON WIRELESS**		

Analysis Parameters

Location:	**WINDHAM County, CT**		
Code:	**ANSI/TIA-222-G**	**Height (ft):**	**110**
Shape:	**18 Sides**	**Base Diameter (in):**	**48.50**
Pole Type:	**Taper**	**Top Diameter (in):**	**29.40**
Pole Manfacturer:	**Nello Corp**	**Taper (in/ft) :**	**0.185**

Ice & Wind Parameters

Structure Class:	**II**	**Design Wind Speed Without Ice:**	**100 mph**
Exposure Catagory:	**B**	**Design Wind Speed With Ice:**	**50 mph**
Topographic Catagory:	**1**	**Operational Wind Speed:**	**60 mph**
Crest Height:	**0.0 ft**	**Design Ice Thickness:**	**0.00 in**

Seismic Parameters

Analysis Method:	**Equivalent Modal Analysis & Equivalent Lateral Force Methods**				
Site Class:	**D - Stiff Soil**				
Period Based on Rayleigh Method (sec):	**1.28**				
T_L (sec):	**6**	**p:**	**1.3**	**C_s:**	**0.052**
S_s:	**0.172**	**S_1:**	**0.063**	**C_s Max:**	**0.052**
F_a:	**1.600**	**F_v:**	**2.400**	**C_s Min:**	**0.030**
S_{ds}:	**0.183**	**S_{d1}:**	**0.101**		

Load Cases

1.2D + 1.6W	**100 mph with No Ice**
0.9D + 1.6W	**100 mph with No Ice (Reduced DL)**
1.2D + 1.0Di + 1.0Wi	**50 mph with 1.00 in Radial Ice**
(1.2 + 0.2Sds) * DL + E ELFM	**Seismic Equivalent Lateral Forces Method**
(1.2 + 0.2Sds) * DL + E EMAM	**Seismic Equivalent Modal Analysis Method**
(0.9 - 0.2Sds) * DL + E ELFM	**Seismic (Reduced DL) Equivalent Lateral Forces Method**
(0.9 - 0.2Sds) * DL + E EMAM	**Seismic (Reduced DL) Equivalent Modal Analysis Method**
1.0D + 1.0W	**Serviceability 60 mph**

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:33 PM

Customer: VERIZON WIRELESS

Shaft Section Properties

							Bottom						Top					
Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Slip Joint Type	Slip Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-18	20.360	0.3750	65		0.00	3,813	48.50	0.00	57.28	16760.5	21.39	129.33	44.73	20.36	52.80	13125.1	19.62	119.29	0.185000
2-18	48.890	0.3750	65	Slip	81.00	8,284	46.73	13.61	55.17	14980.5	20.56	124.62	37.68	62.50	44.41	7811.6	16.31	100.50	0.185000
3-18	53.000	0.2500	65	Slip	66.00	4,873	39.20	57.00	30.91	5926.2	26.24	156.82	29.40	110.00	23.13	2483.1	19.33	117.60	0.185000
				Shaft Weight		16,969													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice EPAa (sf)	No Ice Orientation Factor	Ice Weight (lb)	Ice EPAa (sf)	Ice Orientation Factor	Distance From Face (ft)	Vert Ecc (ft)
105.00	CCI HPA-65R-BUU-H8	12	68.00	12.980	0.79	459.17	15.089	0.79	0.000	0.000
105.00	Ericsson RRUS 11 (Band 5)	9	50.70	2.790	0.67	169.07	3.684	0.67	0.000	0.000
105.00	Ericsson RRUS 12	6	50.00	3.150	0.67	139.69	4.643	0.67	0.000	0.000
105.00	Ericsson RRUS 32	3	50.80	2.690	0.67	171.36	3.588	0.67	0.000	0.000
105.00	Ericsson RRUS A2 Module	6	21.20	1.600	0.50	86.02	2.304	0.50	0.000	0.000
105.00	Ericsson RRUS E2 B29	3	60.00	3.150	0.67	187.15	4.116	0.67	0.000	0.000
105.00	Flat Low Profile Platform	1	1500.00	26.100	1.00	2,333.29	50.655	1.00	0.000	0.000
105.00	Raycap DC6-48-60-0-8F	4	32.80	1.190	1.00	152.94	2.856	1.00	0.000	0.000
93.00	Alcatel-Lucent RRH2x60 700	3	56.70	2.150	0.67	170.27	3.000	0.67	0.000	0.000
93.00	Alcatel-Lucent RRH2X60-	3	46.00	1.870	0.50	137.25	2.638	0.50	0.000	0.000
93.00	Alcatel-Lucent RRH2X60-	3	55.00	3.350	0.67	185.76	4.380	0.67	0.000	0.000
93.00	Andrew SBNHH-1D65B	9	50.70	8.170	0.83	322.30	9.858	0.83	0.000	0.000
93.00	Flat Low Profile Platform	1	1500.00	26.100	1.00	2,323.88	50.378	1.00	0.000	0.000
93.00	RFS DB-T1-6Z-8AB-0Z	2	44.00	4.800	0.67	227.75	5.929	0.67	0.000	0.000
	Totals	65	6180.50			19,566.49			Number of Loadings :	14

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Flat	Projected Width (in)	Exposed To Wind	Carrier
0.00	105.00	2	0.40" Fiber Cable	0.40	0.09	N	0.00	N	AT&T Mobility
0.00	105.00	8	0.78" 8 AWG 6	0.78	0.59	N	0.00	N	AT&T Mobility
0.00	105.00	3	1/2" Coax	0.63	0.15	N	0.00	N	AT&T Mobility
0.00	93.00	2	1.58" Hybrid	1.58	1.61	N	0.00	N	Verizon Wireless

Segment Properties (Max Len : 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	S (in^3)	Z (in^3)	Weight (lb)
0.00		0.3750	48.500	57.279	16,760.5	21.39	129.33	76.2	680.7	0.0	0.0
5.00		0.3750	47.575	56.178	15,812.5	20.96	126.87	76.7	654.6	0.0	965.2
10.00		0.3750	46.650	55.077	14,901.0	20.52	124.40	77.3	629.1	0.0	946.4
13.61	Bot - Section 2	0.3750	45.982	54.282	14,265.1	20.21	122.62	77.6	611.0	0.0	671.7
15.00		0.3750	45.725	53.976	14,025.1	20.09	121.93	77.8	604.1	0.0	516.3
20.00		0.3750	44.800	52.875	13,184.3	19.65	119.47	78.3	579.6	0.0	1,833.1
20.36	Top - Section 1	0.3750	45.483	53.688	13,802.2	19.98	121.29	77.9	597.7	0.0	130.5
25.00		0.3750	44.625	52.667	13,029.1	19.57	119.00	78.4	575.1	0.0	839.6
30.00		0.3750	43.700	51.566	12,229.0	19.14	116.53	78.9	551.2	0.0	886.7
35.00		0.3750	42.775	50.465	11,462.3	18.70	114.07	79.4	527.8	0.0	868.0
40.00		0.3750	41.850	49.364	10,728.4	18.27	111.60	79.9	504.9	0.0	849.2
45.00		0.3750	40.925	48.263	10,026.5	17.83	109.13	80.4	482.5	0.0	830.5
50.00		0.3750	40.000	47.162	9,355.9	17.40	106.67	80.9	460.7	0.0	811.8
55.00		0.3750	39.075	46.061	8,715.8	16.96	104.20	81.4	439.3	0.0	793.0
57.00	Bot - Section 3	0.3750	38.705	45.621	8,468.2	16.79	103.21	81.7	430.9	0.0	312.0
60.00		0.3750	38.150	44.960	8,105.7	16.53	101.73	82.0	418.5	0.0	775.6
62.50	Top - Section 2	0.2500	38.187	30.102	5,473.8	25.52	152.75	71.4	282.3	0.0	637.8
65.00		0.2500	37.725	29.735	5,276.1	25.20	150.90	71.8	275.5	0.0	254.5
70.00		0.2500	36.800	29.001	4,894.9	24.54	147.20	72.5	262.0	0.0	499.7
75.00		0.2500	35.875	28.267	4,532.6	23.89	143.50	73.3	248.9	0.0	487.2
80.00		0.2500	34.950	27.533	4,188.6	23.24	139.80	74.1	236.1	0.0	474.7
85.00		0.2500	34.025	26.799	3,862.5	22.59	136.10	74.8	223.6	0.0	462.2
90.00		0.2500	33.100	26.066	3,553.8	21.94	132.40	75.6	211.5	0.0	449.7
93.00		0.2500	32.545	25.625	3,376.7	21.54	130.18	76.1	204.4	0.0	263.8
95.00		0.2500	32.175	25.332	3,261.9	21.28	128.70	76.4	199.7	0.0	173.4
100.0		0.2500	31.250	24.598	2,986.5	20.63	125.00	77.1	188.2	0.0	424.7
105.0		0.2500	30.325	23.864	2,727.1	19.98	121.30	77.9	177.1	0.0	412.3
110.0		0.2500	29.400	23.130	2,483.1	19.33	117.60	78.7	166.4	0.0	399.8
											16,969.4

Load Case: 1.2D + 1.6W — 100 mph with No Ice — 18 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces Wind FX (lb)	Shaft Forces Dead Load (lb)	Discrete Forces Wind FX (lb)	Discrete Forces Torsion MY (lb-ft)	Discrete Forces Moment MZ (lb-ft)	Discrete Forces Dead Load (lb)	Linear Forces Wind FX (lb)	Linear Forces Dead Load (lb)	Sum of Forces Wind FX (lb)	Sum of Forces Dead Load (lb)	Sum of Forces Torsion MY (lb-ft)	Sum of Forces Moment MZ (lb)
0.00		197.9	0.0					0.0	0.0	197.9	0.0	0.0	0.0
5.00		392.0	1,158.2					0.0	51.4	392.0	1,209.6	0.0	0.0
10.00		331.9	1,135.7					0.0	51.4	331.9	1,187.1	0.0	0.0
13.61	Bot - Section 2	191.2	806.0					0.0	37.1	191.2	843.1	0.0	0.0
15.00		242.9	619.5					0.0	14.3	242.9	633.8	0.0	0.0
20.00		203.1	2,199.8					0.0	51.4	203.1	2,251.2	0.0	0.0
20.36	Top - Section 1	185.8	156.6					0.0	3.7	185.8	160.4	0.0	0.0
25.00		354.2	1,007.5					0.0	47.7	354.2	1,055.3	0.0	0.0
30.00		364.4	1,064.0					0.0	51.4	364.4	1,115.5	0.0	0.0
35.00		368.4	1,041.6					0.0	51.4	368.4	1,093.0	0.0	0.0
40.00		374.5	1,019.1					0.0	51.4	374.5	1,070.5	0.0	0.0
45.00		378.8	996.6					0.0	51.4	378.8	1,048.0	0.0	0.0
50.00		381.6	974.1					0.0	51.4	381.6	1,025.5	0.0	0.0
55.00		268.0	951.7					0.0	51.4	268.0	1,003.1	0.0	0.0
57.00	Bot - Section 3	193.2	374.4					0.0	20.6	193.2	394.9	0.0	0.0
60.00		213.7	930.8					0.0	30.9	213.7	961.6	0.0	0.0
62.50	Top - Section 2	194.2	765.3					0.0	25.7	194.2	791.0	0.0	0.0
65.00		290.8	305.4					0.0	25.7	290.8	331.1	0.0	0.0
70.00		386.5	599.6					0.0	51.4	386.5	651.0	0.0	0.0
75.00		384.3	584.6					0.0	51.4	384.3	636.0	0.0	0.0
80.00		381.4	569.6					0.0	51.4	381.4	621.1	0.0	0.0
85.00		377.8	554.6					0.0	51.4	377.8	606.1	0.0	0.0
90.00		299.6	539.7					0.0	51.4	299.6	591.1	0.0	0.0
93.00	Appertunance(s)	185.6	316.6	3,776.8	0.0	0.0	3,020.9	0.0	30.9	3,962.4	3,368.3	0.0	0.0
95.00		257.1	208.1					0.0	12.8	257.1	220.9	0.0	0.0
100.00		363.5	509.7					0.0	32.1	363.5	541.8	0.0	0.0
105.00	Appertunance(s)	357.7	494.7	7,084.6	0.0	0.0	4,395.7	0.0	32.1	7,442.3	4,922.5	0.0	0.0
110.00		177.3	479.7					0.0	0.0	177.3	479.7	0.0	0.0
								Totals:		19,158.4	28,813.3	0.00	0.00

Site Number: 283425 Code: ANSI/TIA-222-G

Site Name: WOODSTOCK 2 CT, CT Engineering Number: 63688023 9/23/2015 4:22:34 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W 100 mph with No Ice 18 Iterations

Gust Response Factor : 1.10 Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-28.79	-18.99	0.00	-1,576.57	0.00	1,576.57	3,930.09	1,965.04	7,772.13	3,891.84	0.00	0.00	0.413
5.00	-27.54	-18.66	0.00	-1,481.61	0.00	1,481.61	3,880.41	1,940.21	7,525.26	3,768.22	0.07	-0.13	0.400
10.00	-26.32	-18.38	0.00	-1,388.30	0.00	1,388.30	3,829.72	1,914.86	7,280.26	3,645.54	0.28	-0.26	0.388
13.61	-25.46	-18.21	0.00	-1,321.96	0.00	1,321.96	3,792.50	1,896.25	7,104.60	3,557.58	0.51	-0.35	0.378
15.00	-24.80	-18.00	0.00	-1,296.64	0.00	1,296.64	3,778.02	1,889.01	7,037.26	3,523.86	0.62	-0.39	0.375
20.00	-22.53	-17.80	0.00	-1,206.65	0.00	1,206.65	3,725.30	1,862.65	6,796.37	3,403.23	1.09	-0.52	0.361
20.36	-22.35	-17.64	0.00	-1,200.24	0.00	1,200.24	3,764.35	1,882.17	6,974.13	3,492.25	1.13	-0.52	0.350
25.00	-21.26	-17.32	0.00	-1,118.38	0.00	1,118.38	3,715.22	1,857.61	6,751.04	3,380.54	1.70	-0.64	0.337
30.00	-20.12	-16.98	0.00	-1,031.78	0.00	1,031.78	3,661.29	1,830.65	6,512.81	3,261.25	2.44	-0.76	0.322
35.00	-19.00	-16.64	0.00	-946.86	0.00	946.86	3,606.36	1,803.18	6,276.95	3,143.14	3.29	-0.87	0.307
40.00	-17.90	-16.28	0.00	-863.68	0.00	863.68	3,550.41	1,775.20	6,043.58	3,026.28	4.27	-0.99	0.291
45.00	-16.83	-15.91	0.00	-782.28	0.00	782.28	3,493.45	1,746.72	5,812.80	2,910.72	5.36	-1.10	0.274
50.00	-15.78	-15.54	0.00	-702.71	0.00	702.71	3,435.47	1,717.73	5,584.74	2,796.52	6.57	-1.20	0.256
55.00	-14.77	-15.27	0.00	-625.01	0.00	625.01	3,376.48	1,688.24	5,359.51	2,683.74	7.88	-1.30	0.237
57.00	-14.37	-15.08	0.00	-594.47	0.00	594.47	3,352.60	1,676.30	5,270.24	2,639.04	8.43	-1.34	0.230
60.00	-13.40	-14.85	0.00	-549.23	0.00	549.23	3,316.47	1,658.24	5,137.23	2,572.43	9.29	-1.40	0.218
62.50	-12.60	-14.65	0.00	-512.10	0.00	512.10	1,933.85	966.93	3,018.41	1,511.45	10.04	-1.45	0.346
65.00	-12.25	-14.37	0.00	-475.47	0.00	475.47	1,920.55	960.27	2,960.86	1,482.63	10.81	-1.49	0.327
70.00	-11.59	-13.99	0.00	-403.63	0.00	403.63	1,893.17	946.58	2,846.13	1,425.18	12.44	-1.61	0.290
75.00	-10.94	-13.60	0.00	-333.69	0.00	333.69	1,864.78	932.39	2,732.02	1,368.04	14.18	-1.72	0.250
80.00	-10.31	-13.22	0.00	-265.67	0.00	265.67	1,835.38	917.69	2,618.63	1,311.26	16.03	-1.81	0.208
85.00	-9.70	-12.83	0.00	-199.57	0.00	199.57	1,804.96	902.48	2,506.10	1,254.91	17.97	-1.89	0.165
90.00	-9.11	-12.52	0.00	-135.40	0.00	135.40	1,773.53	886.76	2,394.52	1,199.04	19.99	-1.95	0.118
93.00	-5.88	-8.45	0.00	-97.83	0.00	97.83	1,754.18	877.09	2,328.08	1,165.77	21.22	-1.98	0.087
95.00	-5.66	-8.19	0.00	-80.93	0.00	80.93	1,741.08	870.54	2,284.02	1,143.71	22.05	-1.99	0.074
100.00	-5.13	-7.81	0.00	-40.00	0.00	40.00	1,707.62	853.81	2,174.72	1,088.98	24.16	-2.02	0.040
105.00	-0.47	-0.19	0.00	-0.97	0.00	0.97	1,673.15	836.57	2,066.73	1,034.90	26.28	-2.03	0.001
110.00	0.00	-0.18	0.00	0.00	0.00	0.00	1,637.66	818.83	1,960.16	981.54	28.41	-2.03	0.000

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:34 PM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W — 100 mph with No Ice (Reduced DL) — 18 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		197.9	0.0					0.0	0.0	197.9	0.0	0.0	0.0
5.00		392.0	868.7					0.0	38.6	392.0	907.2	0.0	0.0
10.00		331.9	851.8					0.0	38.6	331.9	890.4	0.0	0.0
13.61	Bot - Section 2	191.2	604.5					0.0	27.8	191.2	632.4	0.0	0.0
15.00		242.9	464.6					0.0	10.7	242.9	475.4	0.0	0.0
20.00		203.1	1,649.8					0.0	38.6	203.1	1,688.4	0.0	0.0
20.36	Top - Section 1	185.8	117.5					0.0	2.8	185.8	120.3	0.0	0.0
25.00		354.2	755.7					0.0	35.8	354.2	791.4	0.0	0.0
30.00		364.4	798.0					0.0	38.6	364.4	836.6	0.0	0.0
35.00		368.4	781.2					0.0	38.6	368.4	819.7	0.0	0.0
40.00		374.5	764.3					0.0	38.6	374.5	802.9	0.0	0.0
45.00		378.8	747.5					0.0	38.6	378.8	786.0	0.0	0.0
50.00		381.6	730.6					0.0	38.6	381.6	769.2	0.0	0.0
55.00		268.0	713.7					0.0	38.6	268.0	752.3	0.0	0.0
57.00	Bot - Section 3	193.2	280.8					0.0	15.4	193.2	296.2	0.0	0.0
60.00		213.7	698.1					0.0	23.1	213.7	721.2	0.0	0.0
62.50	Top - Section 2	194.2	574.0					0.0	19.3	194.2	593.3	0.0	0.0
65.00		290.8	229.1					0.0	19.3	290.8	248.3	0.0	0.0
70.00		386.5	449.7					0.0	38.6	386.5	488.3	0.0	0.0
75.00		384.3	438.5					0.0	38.6	384.3	477.0	0.0	0.0
80.00		381.4	427.2					0.0	38.6	381.4	465.8	0.0	0.0
85.00		377.8	416.0					0.0	38.6	377.8	454.6	0.0	0.0
90.00		299.6	404.7					0.0	38.6	299.6	443.3	0.0	0.0
93.00	Appertunance(s)	185.6	237.5	3,776.8	0.0	0.0	2,265.7	0.0	23.1	3,962.4	2,526.3	0.0	0.0
95.00		257.1	156.1					0.0	9.6	257.1	165.7	0.0	0.0
100.00		363.5	382.3					0.0	24.1	363.5	406.3	0.0	0.0
105.00	Appertunance(s)	357.7	371.0	7,084.6	0.0	0.0	3,296.8	0.0	24.1	7,442.3	3,691.9	0.0	0.0
110.00		177.3	359.8					0.0	0.0	177.3	359.8	0.0	0.0
								Totals:		19,158.4	21,610.0	0.00	0.00

Site Number: 283425 Code: ANSI/TIA-222-G

Site Name: WOODSTOCK 2 CT, CT Engineering Number: 63688023 9/23/2015 4:22:35 PM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W 100 mph with No Ice (Reduced DL) 18 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-21.59	-18.99	0.00	-1,569.32	0.00	1,569.32	3,930.09	1,965.04	7,772.13	3,891.84	0.00	0.00	0.409
5.00	-20.64	-18.64	0.00	-1,474.40	0.00	1,474.40	3,880.41	1,940.21	7,525.26	3,768.22	0.07	-0.13	0.397
10.00	-19.71	-18.34	0.00	-1,381.21	0.00	1,381.21	3,829.72	1,914.86	7,280.26	3,645.54	0.27	-0.26	0.384
13.61	-19.06	-18.17	0.00	-1,315.00	0.00	1,315.00	3,792.50	1,896.25	7,104.60	3,557.58	0.51	-0.35	0.375
15.00	-18.56	-17.95	0.00	-1,289.74	0.00	1,289.74	3,778.02	1,889.01	7,037.26	3,523.86	0.61	-0.39	0.371
20.00	-16.86	-17.75	0.00	-1,200.00	0.00	1,200.00	3,725.30	1,862.65	6,796.37	3,403.23	1.09	-0.51	0.357
20.36	-16.72	-17.58	0.00	-1,193.61	0.00	1,193.61	3,764.35	1,882.17	6,974.13	3,492.25	1.13	-0.52	0.346
25.00	-15.90	-17.25	0.00	-1,112.02	0.00	1,112.02	3,715.22	1,857.61	6,751.04	3,380.54	1.69	-0.64	0.333
30.00	-15.03	-16.91	0.00	-1,025.75	0.00	1,025.75	3,661.29	1,830.65	6,512.81	3,261.25	2.42	-0.75	0.319
35.00	-14.18	-16.56	0.00	-941.20	0.00	941.20	3,606.36	1,803.18	6,276.95	3,143.14	3.28	-0.87	0.303
40.00	-13.35	-16.20	0.00	-858.41	0.00	858.41	3,550.41	1,775.20	6,043.58	3,026.28	4.25	-0.98	0.287
45.00	-12.55	-15.83	0.00	-777.44	0.00	777.44	3,493.45	1,746.72	5,812.80	2,910.72	5.33	-1.09	0.271
50.00	-11.76	-15.45	0.00	-698.30	0.00	698.30	3,435.47	1,717.73	5,584.74	2,796.52	6.53	-1.19	0.253
55.00	-10.99	-15.18	0.00	-621.05	0.00	621.05	3,376.48	1,688.24	5,359.51	2,683.74	7.84	-1.29	0.235
57.00	-10.69	-14.99	0.00	-590.69	0.00	590.69	3,352.60	1,676.30	5,270.24	2,639.04	8.39	-1.33	0.227
60.00	-9.96	-14.77	0.00	-545.72	0.00	545.72	3,316.47	1,658.24	5,137.23	2,572.43	9.24	-1.39	0.215
62.50	-9.36	-14.57	0.00	-508.81	0.00	508.81	1,933.85	966.93	3,018.41	1,511.45	9.98	-1.44	0.342
65.00	-9.10	-14.28	0.00	-472.39	0.00	472.39	1,920.55	960.27	2,960.86	1,482.63	10.75	-1.48	0.324
70.00	-8.59	-13.90	0.00	-400.98	0.00	400.98	1,893.17	946.58	2,846.13	1,425.18	12.37	-1.60	0.286
75.00	-8.10	-13.52	0.00	-331.49	0.00	331.49	1,864.78	932.39	2,732.02	1,368.04	14.10	-1.71	0.247
80.00	-7.63	-13.13	0.00	-263.91	0.00	263.91	1,835.38	917.69	2,618.63	1,311.26	15.94	-1.80	0.206
85.00	-7.17	-12.75	0.00	-198.25	0.00	198.25	1,804.96	902.48	2,506.10	1,254.91	17.87	-1.88	0.162
90.00	-6.73	-12.44	0.00	-134.51	0.00	134.51	1,773.53	886.76	2,394.52	1,199.04	19.87	-1.94	0.116
93.00	-4.34	-8.39	0.00	-97.19	0.00	97.19	1,754.18	877.09	2,328.08	1,165.77	21.10	-1.97	0.086
95.00	-4.18	-8.13	0.00	-80.40	0.00	80.40	1,741.08	870.54	2,284.02	1,143.71	21.93	-1.98	0.073
100.00	-3.78	-7.76	0.00	-39.74	0.00	39.74	1,707.62	853.81	2,174.72	1,088.98	24.02	-2.01	0.039
105.00	-0.35	-0.19	0.00	-0.95	0.00	0.95	1,673.15	836.57	2,066.73	1,034.90	26.13	-2.02	0.001
110.00	0.00	-0.18	0.00	0.00	0.00	0.00	1,637.66	818.83	1,960.16	981.54	28.25	-2.02	0.000

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:35 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi — 50 mph with 1.00 in Radial Ice — 17 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.00

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00
Ice Importance Factor : 1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		60.7	0.0					0.0	0.0	60.7	0.0	0.0	0.0
5.00		120.7	1,633.6					0.0	51.4	120.7	1,685.0	0.0	0.0
10.00		102.8	1,658.2					0.0	51.4	102.8	1,709.7	0.0	0.0
13.61	Bot - Section 2	59.4	1,196.0					0.0	37.1	59.4	1,233.1	0.0	0.0
15.00		75.7	774.3					0.0	14.3	75.7	788.6	0.0	0.0
20.00		63.3	2,757.3					0.0	51.4	63.3	2,808.7	0.0	0.0
20.36	Top - Section 1	58.1	197.3					0.0	3.7	58.1	201.0	0.0	0.0
25.00		111.0	1,528.7					0.0	47.7	111.0	1,576.4	0.0	0.0
30.00		114.5	1,625.7					0.0	51.4	114.5	1,677.1	0.0	0.0
35.00		116.1	1,601.5					0.0	51.4	116.1	1,652.9	0.0	0.0
40.00		118.4	1,575.7					0.0	51.4	118.4	1,627.1	0.0	0.0
45.00		120.1	1,548.6					0.0	51.4	120.1	1,600.1	0.0	0.0
50.00		121.4	1,520.6					0.0	51.4	121.4	1,572.0	0.0	0.0
55.00		85.4	1,491.8					0.0	51.4	85.4	1,543.2	0.0	0.0
57.00	Bot - Section 3	61.7	589.9					0.0	20.6	61.7	610.5	0.0	0.0
60.00		68.3	1,255.1					0.0	30.9	68.3	1,286.0	0.0	0.0
62.50	Top - Section 2	62.2	1,033.9					0.0	25.7	62.2	1,059.6	0.0	0.0
65.00		93.3	572.0					0.0	25.7	93.3	597.7	0.0	0.0
70.00		124.4	1,123.5					0.0	51.4	124.4	1,174.9	0.0	0.0
75.00		124.1	1,100.0					0.0	51.4	124.1	1,151.4	0.0	0.0
80.00		123.6	1,076.0					0.0	51.4	123.6	1,127.4	0.0	0.0
85.00		122.8	1,051.7					0.0	51.4	122.8	1,103.1	0.0	0.0
90.00		97.7	1,027.0					0.0	51.4	97.7	1,078.4	0.0	0.0
93.00	Appertunance(s)	60.7	605.8	846.0	0.0	0.0	7,463.4	0.0	30.9	906.7	8,100.0	0.0	0.0
95.00		84.4	399.4					0.0	12.8	84.4	412.2	0.0	0.0
100.00		119.6	976.8					0.0	32.1	119.6	1,008.9	0.0	0.0
105.00	Appertunance(s)	118.2	951.4	1,507.0	0.0	0.0	12,752.0	0.0	32.1	1,625.2	13,735.4	0.0	0.0
110.00		58.7	925.7					0.0	0.0	58.7	925.7	0.0	0.0
								Totals:		5,000.17	53,046.1	0.00	0.00

Site Number: 283425 Code: ANSI/TIA-222-G

Site Name: WOODSTOCK 2 CT, CT Engineering Number: 63688023 9/23/2015 4:22:35 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 1.00 in Radial Ice 17 Iterations

Gust Response Factor : 1.10 Ice Dead Load Factor : 1.00 Wind Importance Factor : 1.00

Dead Load Factor : 1.20 Ice Importance Factor : 1.00

Wind Load Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-53.04	-4.95	0.00	-399.28	0.00	399.28	3,930.09	1,965.04	7,772.13	3,891.84	0.00	0.00	0.116
5.00	-51.36	-4.86	0.00	-374.51	0.00	374.51	3,880.41	1,940.21	7,525.26	3,768.22	0.02	-0.03	0.113
10.00	-49.65	-4.78	0.00	-350.20	0.00	350.20	3,829.72	1,914.86	7,280.26	3,645.54	0.07	-0.07	0.109
13.61	-48.41	-4.74	0.00	-332.94	0.00	332.94	3,792.50	1,896.25	7,104.60	3,557.58	0.13	-0.09	0.106
15.00	-47.62	-4.68	0.00	-326.36	0.00	326.36	3,778.02	1,889.01	7,037.26	3,523.86	0.16	-0.10	0.105
20.00	-44.81	-4.62	0.00	-302.98	0.00	302.98	3,725.30	1,862.65	6,796.37	3,403.23	0.28	-0.13	0.101
20.36	-44.61	-4.57	0.00	-301.32	0.00	301.32	3,764.35	1,882.17	6,974.13	3,492.25	0.29	-0.13	0.098
25.00	-43.03	-4.48	0.00	-280.10	0.00	280.10	3,715.22	1,857.61	6,751.04	3,380.54	0.43	-0.16	0.094
30.00	-41.35	-4.38	0.00	-257.69	0.00	257.69	3,661.29	1,830.65	6,512.81	3,261.25	0.61	-0.19	0.090
35.00	-39.70	-4.28	0.00	-235.79	0.00	235.79	3,606.36	1,803.18	6,276.95	3,143.14	0.83	-0.22	0.086
40.00	-38.07	-4.17	0.00	-214.39	0.00	214.39	3,550.41	1,775.20	6,043.58	3,026.28	1.08	-0.25	0.082
45.00	-36.47	-4.06	0.00	-193.53	0.00	193.53	3,493.45	1,746.72	5,812.80	2,910.72	1.35	-0.27	0.077
50.00	-34.89	-3.95	0.00	-173.22	0.00	173.22	3,435.47	1,717.73	5,584.74	2,796.52	1.65	-0.30	0.072
55.00	-33.35	-3.86	0.00	-153.48	0.00	153.48	3,376.48	1,688.24	5,359.51	2,683.74	1.98	-0.33	0.067
57.00	-32.74	-3.81	0.00	-145.75	0.00	145.75	3,352.60	1,676.30	5,270.24	2,639.04	2.12	-0.34	0.065
60.00	-31.45	-3.74	0.00	-134.33	0.00	134.33	3,316.47	1,658.24	5,137.23	2,572.43	2.33	-0.35	0.062
62.50	-30.39	-3.67	0.00	-124.99	0.00	124.99	1,933.85	966.93	3,018.41	1,511.45	2.52	-0.36	0.098
65.00	-29.79	-3.59	0.00	-115.80	0.00	115.80	1,920.55	960.27	2,960.86	1,482.63	2.71	-0.37	0.094
70.00	-28.62	-3.47	0.00	-97.86	0.00	97.86	1,893.17	946.58	2,846.13	1,425.18	3.12	-0.40	0.084
75.00	-27.47	-3.35	0.00	-80.52	0.00	80.52	1,864.78	932.39	2,732.02	1,368.04	3.55	-0.43	0.074
80.00	-26.34	-3.23	0.00	-63.77	0.00	63.77	1,835.38	917.69	2,618.63	1,311.26	4.01	-0.45	0.063
85.00	-25.24	-3.10	0.00	-47.65	0.00	47.65	1,804.96	902.48	2,506.10	1,254.91	4.49	-0.47	0.052
90.00	-24.16	-3.00	0.00	-32.14	0.00	32.14	1,773.53	886.76	2,394.52	1,199.04	4.99	-0.48	0.040
93.00	-16.07	-2.03	0.00	-23.14	0.00	23.14	1,754.18	877.09	2,328.08	1,165.77	5.30	-0.49	0.029
95.00	-15.65	-1.94	0.00	-19.09	0.00	19.09	1,741.08	870.54	2,284.02	1,143.71	5.50	-0.49	0.026
100.00	-14.65	-1.81	0.00	-9.39	0.00	9.39	1,707.62	853.81	2,174.72	1,088.98	6.02	-0.50	0.017
105.00	-0.93	-0.07	0.00	-0.33	0.00	0.33	1,673.15	836.57	2,066.73	1,034.90	6.55	-0.50	0.001
110.00	0.00	-0.06	0.00	0.00	0.00	0.00	1,637.66	818.83	1,960.16	981.54	7.07	-0.50	0.000

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:36 PM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W | Serviceability 60 mph | 17 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		44.5	0.0					0.0	0.0	44.5	0.0	0.0	0.0
5.00		88.2	965.2					0.0	42.8	88.2	1,008.0	0.0	0.0
10.00		74.7	946.4					0.0	42.8	74.7	989.3	0.0	0.0
13.61	Bot - Section 2	43.0	671.7					0.0	30.9	43.0	702.6	0.0	0.0
15.00		54.7	516.3					0.0	11.9	54.7	528.2	0.0	0.0
20.00		45.7	1,833.1					0.0	42.8	45.7	1,876.0	0.0	0.0
20.36	Top - Section 1	41.8	130.5					0.0	3.1	41.8	133.6	0.0	0.0
25.00		79.7	839.6					0.0	39.8	79.7	879.4	0.0	0.0
30.00		82.0	886.7					0.0	42.8	82.0	929.5	0.0	0.0
35.00		82.9	868.0					0.0	42.8	82.9	910.8	0.0	0.0
40.00		84.3	849.2					0.0	42.8	84.3	892.1	0.0	0.0
45.00		85.2	830.5					0.0	42.8	85.2	873.4	0.0	0.0
50.00		85.8	811.8					0.0	42.8	85.8	854.6	0.0	0.0
55.00		60.3	793.0					0.0	42.8	60.3	835.9	0.0	0.0
57.00	Bot - Section 3	43.5	312.0					0.0	17.1	43.5	329.1	0.0	0.0
60.00		48.1	775.6					0.0	25.7	48.1	801.3	0.0	0.0
62.50	Top - Section 2	43.7	637.8					0.0	21.4	43.7	659.2	0.0	0.0
65.00		65.4	254.5					0.0	21.4	65.4	275.9	0.0	0.0
70.00		87.0	499.7					0.0	42.8	87.0	542.5	0.0	0.0
75.00		86.5	487.2					0.0	42.8	86.5	530.0	0.0	0.0
80.00		85.8	474.7					0.0	42.8	85.8	517.5	0.0	0.0
85.00		85.0	462.2					0.0	42.8	85.0	505.1	0.0	0.0
90.00		67.4	449.7					0.0	42.8	67.4	492.6	0.0	0.0
93.00	Appertunance(s)	41.8	263.8	849.8	0.0	0.0	2,517.4	0.0	25.7	891.5	2,806.9	0.0	0.0
95.00		57.8	173.4					0.0	10.7	57.8	184.1	0.0	0.0
100.00		81.8	424.7					0.0	26.7	81.8	451.5	0.0	0.0
105.00	Appertunance(s)	80.5	412.3	1,594.0	0.0	0.0	3,663.1	0.0	26.7	1,674.5	4,102.1	0.0	0.0
110.00		39.9	399.8					0.0	0.0	39.9	399.8	0.0	0.0
								Totals:		4,310.65	24,011.1	0.00	0.00

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:36 PM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W | Serviceability 60 mph | 17 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-24.01	-4.27	0.00	-353.68	0.00	353.68	3,930.09	1,965.04	7,772.13	3,891.84	0.00	0.00	0.097
5.00	-23.00	-4.19	0.00	-332.32	0.00	332.32	3,880.41	1,940.21	7,525.26	3,768.22	0.02	-0.03	0.094
10.00	-22.01	-4.13	0.00	-311.34	0.00	311.34	3,829.72	1,914.86	7,280.26	3,645.54	0.06	-0.06	0.091
13.61	-21.31	-4.09	0.00	-296.44	0.00	296.44	3,792.50	1,896.25	7,104.60	3,557.58	0.11	-0.08	0.089
15.00	-20.78	-4.04	0.00	-290.75	0.00	290.75	3,778.02	1,889.01	7,037.26	3,523.86	0.14	-0.09	0.088
20.00	-18.90	-4.00	0.00	-270.54	0.00	270.54	3,725.30	1,862.65	6,796.37	3,403.23	0.24	-0.12	0.085
20.36	-18.76	-3.96	0.00	-269.10	0.00	269.10	3,764.35	1,882.17	6,974.13	3,492.25	0.25	-0.12	0.082
25.00	-17.88	-3.89	0.00	-250.73	0.00	250.73	3,715.22	1,857.61	6,751.04	3,380.54	0.38	-0.14	0.079
30.00	-16.95	-3.81	0.00	-231.29	0.00	231.29	3,661.29	1,830.65	6,512.81	3,261.25	0.55	-0.17	0.076
35.00	-16.04	-3.73	0.00	-212.24	0.00	212.24	3,606.36	1,803.18	6,276.95	3,143.14	0.74	-0.20	0.072
40.00	-15.15	-3.65	0.00	-193.59	0.00	193.59	3,550.41	1,775.20	6,043.58	3,026.28	0.96	-0.22	0.068
45.00	-14.27	-3.57	0.00	-175.33	0.00	175.33	3,493.45	1,746.72	5,812.80	2,910.72	1.20	-0.25	0.064
50.00	-13.42	-3.48	0.00	-157.49	0.00	157.49	3,435.47	1,717.73	5,584.74	2,796.52	1.47	-0.27	0.060
55.00	-12.58	-3.42	0.00	-140.08	0.00	140.08	3,376.48	1,688.24	5,359.51	2,683.74	1.77	-0.29	0.056
57.00	-12.25	-3.38	0.00	-133.23	0.00	133.23	3,352.60	1,676.30	5,270.24	2,639.04	1.89	-0.30	0.054
60.00	-11.45	-3.33	0.00	-123.09	0.00	123.09	3,316.47	1,658.24	5,137.23	2,572.43	2.08	-0.31	0.051
62.50	-10.79	-3.28	0.00	-114.77	0.00	114.77	1,933.85	966.93	3,018.41	1,511.45	2.25	-0.32	0.082
65.00	-10.51	-3.22	0.00	-106.56	0.00	106.56	1,920.55	960.27	2,960.86	1,482.63	2.42	-0.33	0.077
70.00	-9.97	-3.13	0.00	-90.46	0.00	90.46	1,893.17	946.58	2,846.13	1,425.18	2.79	-0.36	0.069
75.00	-9.44	-3.05	0.00	-74.78	0.00	74.78	1,864.78	932.39	2,732.02	1,368.04	3.18	-0.38	0.060
80.00	-8.92	-2.96	0.00	-59.54	0.00	59.54	1,835.38	917.69	2,618.63	1,311.26	3.59	-0.41	0.050
85.00	-8.42	-2.88	0.00	-44.73	0.00	44.73	1,804.96	902.48	2,506.10	1,254.91	4.03	-0.42	0.040
90.00	-7.92	-2.81	0.00	-30.35	0.00	30.35	1,773.53	886.76	2,394.52	1,199.04	4.48	-0.44	0.030
93.00	-5.12	-1.89	0.00	-21.93	0.00	21.93	1,754.18	877.09	2,328.08	1,165.77	4.76	-0.44	0.022
95.00	-4.94	-1.83	0.00	-18.14	0.00	18.14	1,741.08	870.54	2,284.02	1,143.71	4.94	-0.45	0.019
100.00	-4.49	-1.75	0.00	-8.96	0.00	8.96	1,707.62	853.81	2,174.72	1,088.98	5.42	-0.45	0.011
105.00	-0.40	-0.04	0.00	-0.22	0.00	0.22	1,673.15	836.57	2,066.73	1,034.90	5.89	-0.46	0.000
110.00	0.00	-0.04	0.00	0.00	0.00	0.00	1,637.66	818.83	1,960.16	981.54	6.37	-0.46	0.000

Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period (S_s):	0.17
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Long-Period Transition Period (T_L):	6
Importance Factor (I_E):	1.00
Site Coefficient F_a:	1.60
Site Coeffiecient F_v:	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.18
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10
Seismic Response Coefficient (C_s):	0.05
Upper Limit C_s	0.05
Lower Limit C_s	0.03
Period based on Rayleigh Method (sec):	1.28
Redundancy Factor (p):	1.30
Seismic Force Distribution Exponent (k):	1.39
Total Unfactored Dead Load:	24.01 k
Seismic Base Shear (E):	1.63 k

Site Number: 283425 | Code: ANSI/TIA-222-G |

Site Name: WOODSTOCK 2 CT, CT | Engineering Number: 63688023 | 9/23/2015 4:22:36 PM

Customer: VERIZON WIRELESS

Equivalent Modal Forces Analysis

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period (S_s):	0.17
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Importance Factor (I_E):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.18
Desing Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10
Period Based on Rayleigh Method (sec):	1.28
Redundancy Factor (p):	1.30

Load Case (1.2 + 0.2Sds) * DL + E ELFM — Seismic Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
27	107.50	400	1.805	1.562	0.986	0.321	111	345
26	102.50	439	1.641	0.911	0.727	0.233	89	379
25	97.50	451	1.485	0.464	0.525	0.161	63	390
24	94.00	184	1.380	0.247	0.412	0.119	19	159
23	91.50	290	1.308	0.131	0.343	0.094	24	250
22	87.50	493	1.196	0.001	0.252	0.061	26	425
21	82.50	505	1.063	-0.088	0.165	0.033	15	436
20	77.50	518	0.938	-0.120	0.103	0.018	8	447
19	72.50	530	0.821	-0.115	0.060	0.013	6	458
18	67.50	543	0.712	-0.090	0.032	0.016	7	468
17	63.75	276	0.635	-0.065	0.019	0.021	5	238
16	61.25	659	0.586	-0.048	0.013	0.025	14	569
15	58.50	801	0.535	-0.029	0.009	0.029	20	692
14	56.00	329	0.490	-0.012	0.007	0.033	9	284
13	52.50	836	0.431	0.008	0.006	0.037	27	722
12	47.50	855	0.352	0.032	0.009	0.041	30	738
11	42.50	873	0.282	0.049	0.014	0.042	32	754
10	37.50	892	0.220	0.060	0.021	0.041	32	770
9	32.50	911	0.165	0.067	0.028	0.039	31	786
8	27.50	930	0.118	0.070	0.035	0.036	29	802
7	22.68	879	0.080	0.072	0.040	0.034	26	759
6	20.18	134	0.064	0.072	0.041	0.032	4	115
5	17.50	1,876	0.048	0.071	0.042	0.031	50	1,620
4	14.31	528	0.032	0.069	0.041	0.029	13	456
3	11.81	703	0.022	0.065	0.039	0.027	16	607
2	7.50	989	0.009	0.053	0.031	0.022	19	854
1	2.50	1,008	0.001	0.024	0.013	0.010	9	870
Raycap DC6-48-60-0-8	105.00	131	1.722	1.208	0.849	0.275	31	113
Ericsson RRUS A2 Mod	105.00	127	1.722	1.208	0.849	0.275	30	110
Ericsson RRUS 32	105.00	152	1.722	1.208	0.849	0.275	36	132
Ericsson RRUS 11 (Ba	105.00	456	1.722	1.208	0.849	0.275	109	394
Ericsson RRUS 12	105.00	300	1.722	1.208	0.849	0.275	72	259
Ericsson RRUS E2 B29	105.00	180	1.722	1.208	0.849	0.275	43	155
CCI HPA-65R-BUU-H8	105.00	816	1.722	1.208	0.849	0.275	195	704

Flat Low Profile Pla	105.00	1,500	1.722	1.208	0.849	0.275	358	1,295
Alcatel-Lucent RRH2X	93.00	138	1.351	0.197	0.383	0.109	13	119
Alcatel-Lucent RRH2x	93.00	170	1.351	0.197	0.383	0.109	16	147
Alcatel-Lucent RRH2X	93.00	165	1.351	0.197	0.383	0.109	16	142
RFS DB-T1-6Z-8AB-0Z	93.00	88	1.351	0.197	0.383	0.109	8	76
Andrew SBNHH-1D65B	93.00	456	1.351	0.197	0.383	0.109	43	394
Flat Low Profile Pla	93.00	1,500	1.351	0.197	0.383	0.109	141	1,295
		24,011	38.300	14.305	13.098	4.446	1,842	20,729

Load Case (1.2 + 0.2Sds) * DL + E EMAM **Seismic Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
27	107.50	400	1.805	1.562	0.986	0.321	111	345
26	102.50	439	1.641	0.911	0.727	0.233	89	379
25	97.50	451	1.485	0.464	0.525	0.161	63	390
24	94.00	184	1.380	0.247	0.412	0.119	19	159
23	91.50	290	1.308	0.131	0.343	0.094	24	250
22	87.50	493	1.196	0.001	0.252	0.061	26	425
21	82.50	505	1.063	-0.088	0.165	0.033	15	436
20	77.50	518	0.938	-0.120	0.103	0.018	8	447
19	72.50	530	0.821	-0.115	0.060	0.013	6	458
18	67.50	543	0.712	-0.090	0.032	0.016	7	468
17	63.75	276	0.635	-0.065	0.019	0.021	5	238
16	61.25	659	0.586	-0.048	0.013	0.025	14	569
15	58.50	801	0.535	-0.029	0.009	0.029	20	692
14	56.00	329	0.490	-0.012	0.007	0.033	9	284
13	52.50	836	0.431	0.008	0.006	0.037	27	722
12	47.50	855	0.352	0.032	0.009	0.041	30	738
11	42.50	873	0.282	0.049	0.014	0.042	32	754
10	37.50	892	0.220	0.060	0.021	0.041	32	770
9	32.50	911	0.165	0.067	0.028	0.039	31	786
8	27.50	930	0.118	0.070	0.035	0.036	29	802
7	22.68	879	0.080	0.072	0.040	0.034	26	759
6	20.18	134	0.064	0.072	0.041	0.032	4	115
5	17.50	1,876	0.048	0.071	0.042	0.031	50	1,620
4	14.31	528	0.032	0.069	0.041	0.029	13	456
3	11.81	703	0.022	0.065	0.039	0.027	16	607
2	7.50	989	0.009	0.053	0.031	0.022	19	854
1	2.50	1,008	0.001	0.024	0.013	0.010	9	870
Raycap DC6-48-60-0-8	105.00	131	1.722	1.208	0.849	0.275	31	113
Ericsson RRUS A2 Mod	105.00	127	1.722	1.208	0.849	0.275	30	110
Ericsson RRUS 32	105.00	152	1.722	1.208	0.849	0.275	36	132
Ericsson RRUS 11 (Ba	105.00	456	1.722	1.208	0.849	0.275	109	394
Ericsson RRUS 12	105.00	300	1.722	1.208	0.849	0.275	72	259
Ericsson RRUS E2 B29	105.00	180	1.722	1.208	0.849	0.275	43	155
CCI HPA-65R-BUU-H8	105.00	816	1.722	1.208	0.849	0.275	195	704
Flat Low Profile Pla	105.00	1,500	1.722	1.208	0.849	0.275	358	1,295
Alcatel-Lucent RRH2X	93.00	138	1.351	0.197	0.383	0.109	13	119
Alcatel-Lucent RRH2x	93.00	170	1.351	0.197	0.383	0.109	16	147
Alcatel-Lucent RRH2X	93.00	165	1.351	0.197	0.383	0.109	16	142
RFS DB-T1-6Z-8AB-0Z	93.00	88	1.351	0.197	0.383	0.109	8	76
Andrew SBNHH-1D65B	93.00	456	1.351	0.197	0.383	0.109	43	394
Flat Low Profile Pla	93.00	1,500	1.351	0.197	0.383	0.109	141	1,295
		24,011	38.300	14.305	13.098	4.446	1,842	20,729

Load Case (0.9 - 0.2Sds) * DL + E ELFM — **Seismic (Reduced DL) Equivalent Lateral Forces Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
27	107.50	400	1.805	1.562	0.986	0.321	111	345
26	102.50	439	1.641	0.911	0.727	0.233	89	379
25	97.50	451	1.485	0.464	0.525	0.161	63	390
24	94.00	184	1.380	0.247	0.412	0.119	19	159
23	91.50	290	1.308	0.131	0.343	0.094	24	250
22	87.50	493	1.196	0.001	0.252	0.061	26	425
21	82.50	505	1.063	-0.088	0.165	0.033	15	436
20	77.50	518	0.938	-0.120	0.103	0.018	8	447
19	72.50	530	0.821	-0.115	0.060	0.013	6	458
18	67.50	543	0.712	-0.090	0.032	0.016	7	468
17	63.75	276	0.635	-0.065	0.019	0.021	5	238
16	61.25	659	0.586	-0.048	0.013	0.025	14	569
15	58.50	801	0.535	-0.029	0.009	0.029	20	692
14	56.00	329	0.490	-0.012	0.007	0.033	9	284
13	52.50	836	0.431	0.008	0.006	0.037	27	722
12	47.50	855	0.352	0.032	0.009	0.041	30	738
11	42.50	873	0.282	0.049	0.014	0.042	32	754
10	37.50	892	0.220	0.060	0.021	0.041	32	770
9	32.50	911	0.165	0.067	0.028	0.039	31	786
8	27.50	930	0.118	0.070	0.035	0.036	29	802
7	22.68	879	0.080	0.072	0.040	0.034	26	759
6	20.18	134	0.064	0.072	0.041	0.032	4	115
5	17.50	1,876	0.048	0.071	0.042	0.031	50	1,620
4	14.31	528	0.032	0.069	0.041	0.029	13	456
3	11.81	703	0.022	0.065	0.039	0.027	16	607
2	7.50	989	0.009	0.053	0.031	0.022	19	854
1	2.50	1,008	0.001	0.024	0.013	0.010	9	870
Raycap DC6-48-60-0-8	105.00	131	1.722	1.208	0.849	0.275	31	113
Ericsson RRUS A2 Mod	105.00	127	1.722	1.208	0.849	0.275	30	110
Ericsson RRUS 32	105.00	152	1.722	1.208	0.849	0.275	36	132
Ericsson RRUS 11 (Ba	105.00	456	1.722	1.208	0.849	0.275	109	394
Ericsson RRUS 12	105.00	300	1.722	1.208	0.849	0.275	72	259
Ericsson RRUS E2 B29	105.00	180	1.722	1.208	0.849	0.275	43	155
CCI HPA-65R-BUU-H8	105.00	816	1.722	1.208	0.849	0.275	195	704
Flat Low Profile Pla	105.00	1,500	1.722	1.208	0.849	0.275	358	1,295
Alcatel-Lucent RRH2X	93.00	138	1.351	0.197	0.383	0.109	13	119
Alcatel-Lucent RRH2x	93.00	170	1.351	0.197	0.383	0.109	16	147
Alcatel-Lucent RRH2X	93.00	165	1.351	0.197	0.383	0.109	16	142
RFS DB-T1-6Z-8AB-0Z	93.00	88	1.351	0.197	0.383	0.109	8	76
Andrew SBNHH-1D65B	93.00	456	1.351	0.197	0.383	0.109	43	394
Flat Low Profile Pla	93.00	1,500	1.351	0.197	0.383	0.109	141	1,295
		24,011	38.300	14.305	13.098	4.446	1,842	20,729

Load Case (0.9 - 0.2Sds) * DL + E EMAM — **Seismic (Reduced DL) Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
27	107.50	400	1.805	1.562	0.986	0.321	111	345
26	102.50	439	1.641	0.911	0.727	0.233	89	379
25	97.50	451	1.485	0.464	0.525	0.161	63	390
24	94.00	184	1.380	0.247	0.412	0.119	19	159

23	91.50	290	1.308	0.131	0.343	0.094	24	250
22	87.50	493	1.196	0.001	0.252	0.061	26	425
21	82.50	505	1.063	-0.088	0.165	0.033	15	436
20	77.50	518	0.938	-0.120	0.103	0.018	8	447
19	72.50	530	0.821	-0.115	0.060	0.013	6	458
18	67.50	543	0.712	-0.090	0.032	0.016	7	468
17	63.75	276	0.635	-0.065	0.019	0.021	5	238
16	61.25	659	0.586	-0.048	0.013	0.025	14	569
15	58.50	801	0.535	-0.029	0.009	0.029	20	692
14	56.00	329	0.490	-0.012	0.007	0.033	9	284
13	52.50	836	0.431	0.008	0.006	0.037	27	722
12	47.50	855	0.352	0.032	0.009	0.041	30	738
11	42.50	873	0.282	0.049	0.014	0.042	32	754
10	37.50	892	0.220	0.060	0.021	0.041	32	770
9	32.50	911	0.165	0.067	0.028	0.039	31	786
8	27.50	930	0.118	0.070	0.035	0.036	29	802
7	22.68	879	0.080	0.072	0.040	0.034	26	759
6	20.18	134	0.064	0.072	0.041	0.032	4	115
5	17.50	1,876	0.048	0.071	0.042	0.031	50	1,620
4	14.31	528	0.032	0.069	0.041	0.029	13	456
3	11.81	703	0.022	0.065	0.039	0.027	16	607
2	7.50	989	0.009	0.053	0.031	0.022	19	854
1	2.50	1,008	0.001	0.024	0.013	0.010	9	870
Raycap DC6-48-60-0-8	105.00	131	1.722	1.208	0.849	0.275	31	113
Ericsson RRUS A2 Mod	105.00	127	1.722	1.208	0.849	0.275	30	110
Ericsson RRUS 32	105.00	152	1.722	1.208	0.849	0.275	36	132
Ericsson RRUS 11 (Ba	105.00	456	1.722	1.208	0.849	0.275	109	394
Ericsson RRUS 12	105.00	300	1.722	1.208	0.849	0.275	72	259
Ericsson RRUS E2 B29	105.00	180	1.722	1.208	0.849	0.275	43	155
CCI HPA-65R-BUU-H8	105.00	816	1.722	1.208	0.849	0.275	195	704
Flat Low Profile Pla	105.00	1,500	1.722	1.208	0.849	0.275	358	1,295
Alcatel-Lucent RRH2X	93.00	138	1.351	0.197	0.383	0.109	13	119
Alcatel-Lucent RRH2x	93.00	170	1.351	0.197	0.383	0.109	16	147
Alcatel-Lucent RRH2X	93.00	165	1.351	0.197	0.383	0.109	16	142
RFS DB-T1-6Z-8AB-0Z	93.00	88	1.351	0.197	0.383	0.109	8	76
Andrew SBNHH-1D65B	93.00	456	1.351	0.197	0.383	0.109	43	394
Flat Low Profile Pla	93.00	1,500	1.351	0.197	0.383	0.109	141	1,295
		24,011	38.300	14.305	13.098	4.446	1,842	20,729

Analysis Summary

	Reactions						Max Usage	
Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	18.99	0.00	28.79	0.00	0.00	1576.57	0.00	0.41
0.9D + 1.6W	18.99	0.00	21.59	0.00	0.00	1569.32	0.00	0.41
1.2D + 1.0Di + 1.0Wi	4.95	0.00	53.04	0.00	0.00	399.28	0.00	0.12
(1.2 + 0.2Sds) * DL + E ELFM	1.64	0.00	28.45	0.00	0.00	138.88	0.00	0.04
(1.2 + 0.2Sds) * DL + E EMAM	1.84	0.00	28.45	0.00	0.00	163.24	0.00	0.05
(0.9 - 0.2Sds) * DL + E ELFM	1.64	0.00	19.86	0.00	0.00	138.14	0.00	0.04
(0.9 - 0.2Sds) * DL + E EMAM	1.83	0.00	19.86	0.00	0.00	162.33	0.00	0.05
1.0D + 1.0W	4.27	0.00	24.01	0.00	0.00	353.68	0.00	0.10

Base/Flange Plate	Plate Type	***Baseplate***	
	Pole Diameter	48.5	in
	Pole Thickness	0.375	in
	Plate Diameter	61.5	in
	Plate Thickness	3	in
	Plate Fy	50	ksi
	Weld Length	0.3125	in
	ϕ_s Resistance	1037.10	k-in
	Applied	163.05	k-in
Stiffeners	#	***8***	*Show*
	Thickness	0.375	in
	Length	3	in
	Height	6	in
	Chamfer	0	in
	Offset Angle	0	°
	Fy	36	ksi

Bolts	#	***16***	
	Bolt Circle	55.5	in
	(R)adial / (S)quare	R	
●	Diameter	2.25	in
	Hole Diameter	2.625	in
	Type	A615-75	
	Fy	75	ksi
	Fu	100	ksi
	ϕ_s Resistance	259.82	k
	Applied	86.96	k
Reinforcement ●	#	***0***	
Extra Bolts O	#	***0***	

Code Rev. **G**

Moment 1576.6 k-ft
Axial 28.8 k

Date	9/22/2015
Engineer	NSK
Site #	283425
Carrier	Verizon Wireless

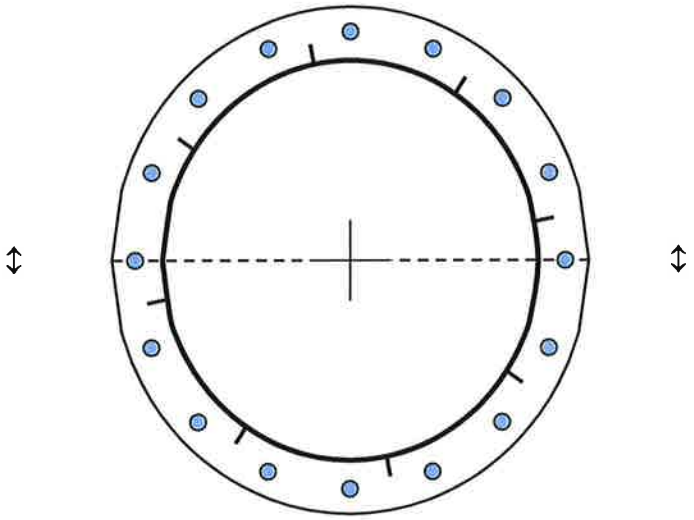
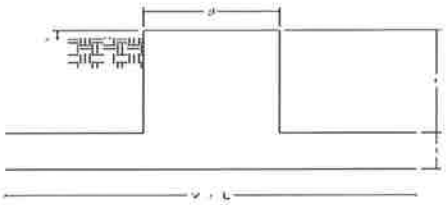


Plate Stress Ratio:
0.16 (Pass)

Bolt Stress Ratio:
0.33 (Pass)

Site Name:	Woodstock 2 CT, CT
Site Number:	283425
Engineering Number:	63688023
Engineer:	NSK
Date:	09/22/15
Tower Type:	MP

Program Last Updated: *5/13/2014*



Design Loads (Factored) - Analysis per TIA-222-G Standards

Design / Analysis / Mapping:	Analysis				
Compression/Leg:	28.8	k	Concrete Strength (f'_c):	4000	psi
Uplift/Leg:	0.0	k	Pad Tension Steel Depth:	23.00	in
Total Shear:	19.0	k	ϕ_{Shear}:	0.75	
Moment:	1576.6	k-ft	$\phi_{Flexure\ /\ Tension}$:	0.90	
Tower + Appurtenance Weight:	28.8	k	$\phi_{Compression}$:	0.65	
Depth to Base of Foundation (l + t - h):	6.50	ft	β:	0.85	
Diameter of Pier (d):	6.50	ft	Bottom Pad Rebar Size #:	8	
Height of Pier above Ground (h):	0.50		# of Bottom Pad Rebar:	26	
Width of Pad (W):	23.00	ft	Pad Bottom Steel Area:	20.54	in^2
Length of Pad (L):	23.00	ft	Pad Steel F_y:	60000	psi
Thickness of Pad (t):	2.25	ft	Top Pad Rebar Size #:	8	
Tower Leg Center to Center:	0.00	ft	# of Top Pad Rebar:	26	
Number of Tower Legs:	1.0	(1 if MP or GT)	Pad Top Steel Area:	20.54	in^2
Tower Center from Mat Center:	0.00	ft	Pier Rebar Size #:	9	
Depth Below Ground Surface to Water Table:	8.00	ft	Pier Steel Area (Single Bar):	1.00	in^2
Unit Weight of Concrete:	150.0	pcf	# of Pier Rebar:	51	
Unit Weight of Soil Above Water Table:	120.0	pcf	Pier Steel F_y:	60000	psi
Unit Weight of Water:	62.4	pcf	Pier Cage Diameter:	70.0	in
Unit Weight of Soil Below Water Table:	50.0	pcf	Rebar Strain Limit:	0.008	
Friction Angle of Uplift:	0.0	Degrees	Steel Elastic Modulus:	29000	ksi
Ultimate Coefficient of Shear Friction:	0.35		Tie Rebar Size #:	4	
Ultimate Compressive Bearing Pressure:	10000.0	psf	Tie Steel Area (Single Bar):	0.20	in^2
Ultimate Passive Pressure on Pad Face:	0.0	psf	Tie Spacing:	18	in
$\phi_{Soil\ and\ Concrete\ Weight}$:	0.9		Tie Steel F_y:	60000	psi
ϕ_{Soil}:	0.75				

Overturning Moment Usage

Design OTM:	1709.5	k-ft
OTM Resistance:	4958.1	k-ft
Design OTM / OTM Resistance:	0.34	Result: OK

Soil Bearing Pressure Usage

Net Bearing Pressure:	1331	psf
Factored Nominal Bearing Pressure:	7500	psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.18	Result: OK
Load Direction Controling Design Bearing Pressure:	Diagonal to Pad Edge	

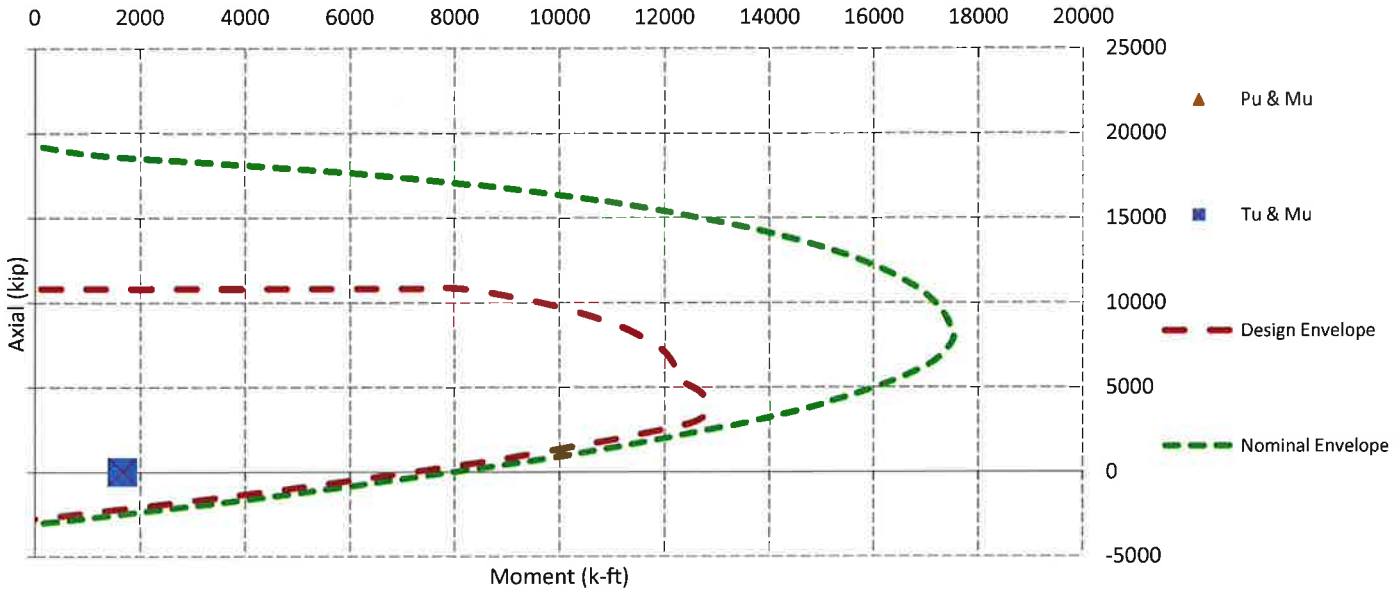
Sliding Factor of Safety

Total Factored Sliding Resistance:	125.7	k
Sliding Design / Sliding Resistance:	0.15	Result: OK

One Way Shear, Flexual Capacity, and Punching Shear

Factored One Way Shear (V_u):	116.4	k
One Way Shear Capacity (ϕV_c):	602.2	k - ACI11.3.1.1
$V_u / \phi V_c$:	0.19	Result: OK
Load Direction Controling Shear Capacity:	Parallel to Pad Edge	
Lower Steel Pad Factored Moment (M_u):	649.1	k-ft
Lower Steel Pad Moment Capacity (ϕM_n):	2074.3	k-ft - ACI10.3
$M_u / \phi M_n$:	0.31	Result: OK
Load Direction Controling Flexural Capacity:	Parallel to Pad Edge	
Upper Steel Pad Factored Moment (M_u):	419.1	k-ft
Upper Steel Pad Moment Capacity (ϕM_n):	2074.3	k-ft
$M_u / \phi M_n$:	0.20	Result: OK
Lower Pad Flexural Reinforcement Ratio:	0.0032	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0032	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Reinforcement Spacing:	11	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Reinforcement Spacing:	11	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Factored Punching Shear (V_u):	0.0	k
Nominal Punching Shear Capacity ($\phi_c V_n$):	1384.7	k - ACI11.12.2.1
$V_u / \phi V_c$:	0.00	Result: OK
Factored Moment in Pier (M_u):	1666.8	k-ft
Pier Moment Capacity (ϕM_n):	7542.7	k-ft
$M_u / \phi M_n$:	0.22	Result: OK
Factored Shear in Pier (V_u):	19.0	k
Pier Shear Capacity (ϕV_n):	454.7	k
$V_u / \phi V_c$:	0.04	Result: OK
Pier Shear Reinforcement Ratio:	0.0004	No Ties Necessary for Shear - ACI11.5.6.1
Factored Tension in Pier (T_u):	0.0	k
Pier Tension Capacity (ϕT_n):	2754.0	k
$T_u / \phi T_n$:	0.00	Result: OK
Factored Compression in Pier (P_u):	28.8	k
Pier Compression Capacity (ϕP_n):	8358.0	k - ACI10.3.6.2
$P_u / \phi P_n$:	0.00	Result: OK
Pier Compression Reinforcement Ratio:	0.011	OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.22	Result: OK

Nominal and Design Moment Capacity and Factored Design Loads



ATTACHMENT 5

	General	Power	Density					
Site Name: Woodstock Valley								
Tower Height: 110Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS .EXP.**	**FRACTION MPE**	**Total**
*AT&T	2	500	105	880	0.0367	0.5867	0.63%	
*AT&T	1	500	105	1900	0.0183	1.0000	0.18%	
*AT&T	1	500	105	700	0.0183	0.4667	0.39%	
*AT&T	1	500	105	1900	0.0183	1.0000	0.18%	
*AT&T	1	500	105	2300	0.0183	1.0000	0.18%	
Verizon PCS	**1**	**3582**	**95**	**0.1427**	**1970**	**1.0000**	**14.27%**	
Verizon Cellular	**9**	**245**	**95**	**0.0878**	**869**	**0.5793**	**15.16%**	
Verizon AWS	**1**	**1750**	**95**	**0.0697**	**2145**	**1.0000**	**6.97%**	
Verizon 700	**1**	**1050**	**95**	**0.0418**	**746**	**0.4973**	**8.41%**	
								46.39%
* Source: Siting Council								