



# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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Daniel F. Caruso  
Chairman

March 10, 2010

Kenneth C. Baldwin, Esq.  
Robinson & Cole LLP  
280 Trumbull Street  
Hartford, CT 06103-3597

RE: **EM-VER-080-100114** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 38 Elm Street, Meriden, Connecticut.

Dear Attorney Baldwin:

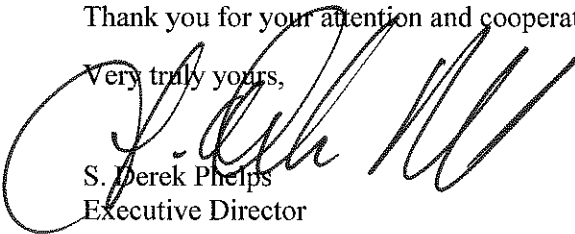
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated January 14, 2010 and additional information received January 20, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

  
S. Derek Phelps  
Executive Director

SDP/MP/laf

c: The Honorable Michael S. Rohde, Mayor, City of Meriden  
Lawrence Kendzior, City Manager, City of Meriden  
Dominick Caruso, City Planner, City of Meriden  
John Arnold

G:\EM\BAM-VERIZON\Meriden\dc031010\EmpireAve.DOC

280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

ORIGINAL

April 21, 2010

RECEIVED  
APR 22 2010  
CONNECTICUT  
SITING COUNCIL

Michael Perrone  
Siting Analyst  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

Re: **Cellco Partnership d/b/a Verizon Wireless**  
**EM-VER-080-100114 – 38 Elm Street, Meriden, Connecticut**

Dear Mr. Perrone:

On January 14, 2010, the Siting Council acknowledged receipt of Cellco's notice of exempt modification for the above-referenced telecommunications facility. This modification involved the replacement of six (6) existing PCS antennas with three (3) newer model PCS antennas and three (3) LTE antennas. In addition to the antenna modifications, Cellco has decided that it will install six (6) coax cable diplexers on the antenna mounting platform. Attached is an updated Structural Analysis for the antenna modifications and the installation of the diplexers. This analysis confirms that the tower can support the proposed additional loading.

If you have any questions regarding any of these materials, please do not hesitate to contact me or Rachel Mayo.

Sincerely,



Kenneth C. Baldwin



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

Attachment

Copy to:

Sandy M. Carter  
Brian Ragozzine  
Mark Gauger

10333842-v1





## Structural Analysis Report

*45' Existing Lattice Tower*

*Proposed Verizon Wireless  
LTE Antenna Installation*

*Verizon Site Ref: Meriden East*

*38 Elm Street  
Meriden, CT*

*Natcomm Project No. 10001-CO13*

~~*Date: December 18, 2009*~~

~~*Rev. 1: January 13, 2010*~~

~~*Rev. 2: April 19, 2010*~~



**Prepared for:**

**Verizon Wireless  
99 East River Road, 9<sup>th</sup> Floor  
East Hartford, CT 06108**

p: 203.488.0580

f: 203.488.8587

w: nat-eng.com

63-2 N. Branford Rd.

Branford, CT 06405

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## Introduction

The purpose of this report is to summarize the results of the non-linear, P- $\Delta$  structural analysis of the antenna installation proposed by Verizon Wireless on the existing self supporting lattice tower located in Meriden, Connecticut.

The host tower is a 65-ft AGL (45-ft tower mounted on a  $\pm 24'$  steel dunage frame), three legged, tapered lattice tower originally designed and manufactured by ROHN eng. file no. 31065JC, dated November 1994. The tower geometry and structure member sizes were obtained from the aforementioned ROHN design documents.

Antenna and appurtenance inventory were taken from the aforementioned ROHN design documents and a Verizon RF data sheet.

The tower is made of three (3) tapered vertical sections consisting of pipe legs and diagonal lateral support bracing consisting of structural steel angle shapes. The vertical tower sections are connected by bolted flange plates while legs and bracing are connected by bolted gusset connections. The width of the tower face is 6.52-ft at the top and 8.56-ft at the base.

Verizon Wireless proposes the removal of three (3) panel antennas and the installation of three (3) panel antennas. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

## Antenna and Appurtenance Summary

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

- **VERIZON (Existing to Remain):**  
Antennas: Four (4) Antel LPA-80080/6CF, two (2) Antel LPA-80063/6CF and six (6) Decibel 948F85T2E-M panel antennas mounted on three (3) 15' Boom Gates with a RAD center elevation of  $\pm 66$ -ft above finished grade ( $\pm 42$ -ft above tower base).  
Coax Cables: Twelve (12) 1-5/8"  $\varnothing$  coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **TOWN (Reserved):**  
Antennas: One (1) 8-ft parabolic dish mounted on one (1) 6-ft x 3-in pipe with a RAD center elevation of  $\pm 55$ -ft above finished grade ( $\pm 31$ -ft above tower base).  
Coax Cables: One (1) WE65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (Existing to Remove):**  
Antennas: Three (3) Swedcom ALP9212-N panel antennas mounted on three (3) 15' Boom Gates with a RAD center elevation of  $\pm 66$ -ft above finished grade ( $\pm 42$ -ft above tower base).  
Coax Cables: Three (3) 1-5/8"  $\varnothing$  coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **VERIZON (Proposed):**  
**Antennas:** Three (3) Powerwave P65-16-XL-2 panel antennas and six (6) Diplexers mounted on three (3) existing 15' Boom Gates with a RAD center elevation of ±66-ft above finished grade (±42-ft above tower base).

### Primary Assumptions Used in the Analysis

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

### Analysis

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

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

## Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of 1/2" radial ice tower structure and its components.

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



## Tower Capacity

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

Calculated stresses were found to be within allowable limits. In Load Case 2, per RISATower "Section Capacity Table", this tower was found to be at **81.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T3)	20'-0"-40'-0"	67.5%	<b>PASS</b>
Diagonal (T2)	40'-0"-60'-0"	81.4%	<b>PASS</b>

## Steel Dunnage Frame and Anchors

The existing steel dunnage frame consists of W beams and bracing bearing on four (4) HSS14x14 steel columns.

Tower legs are connected to the steel dunnage frame by means of (4) 5/8" Ø, ASTM A325 anchor bolts per leg via a 5"x5"x3/4" base plate.

Review of the steel dunnage frame and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower leg reactions developed from the governing Load Case 2 were used in the verification of the steel dunnage frame. The steel dunnage frame was found to be within allowable limits

Reactions	Design Loading <sup>(1)</sup>	Proposed Loading	Result
Compression	50.9 kips	46.7 kips	<b>PASS</b>
Tension	46.3 kips	43.5 kips	<b>PASS</b>
Total Shear	10.7 kips	10.5 kips	<b>PASS</b>
Overturning Moment	356.3 ft-kips	334 kip-ft	<b>PASS</b>

Note: (1) Design loading taken from ROHN design documents eng. file no. 31065JC, drawing no. C941513 dated November 1994.

Natcomm, Inc.  
Verizon Wireless LTE Antenna Installation  
Structural Analysis - 45-ft Existing SSV Lattice Tower  
Meriden, CT  
Rev.2 ~ April 19, 2010

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	57.3%	PASS

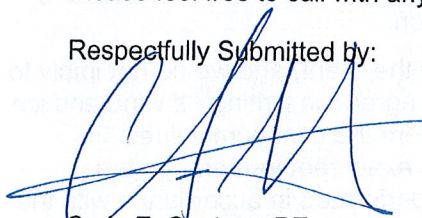
### Conclusion

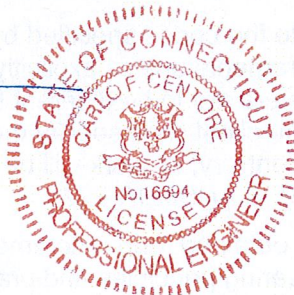
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

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

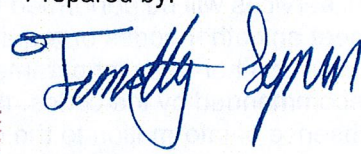
Please feel free to call with any questions or comments.

Respectfully Submitted by:

  
Carlo F. Centore, PE  
Principal ~ Structural Engineer



Prepared by:

  
Timothy J. Lynn, EIT  
Structural Engineer

Natcomm, Inc.  
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Structural Analysis - 45-ft Existing SSV Lattice Tower  
Meriden, CT  
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Standard Conditions for Furnishing of  
Professional Engineering Services on  
Existing Structures

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

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

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

### RISATower Features:

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

**DESIGNED APPURTENANCE LOADING**

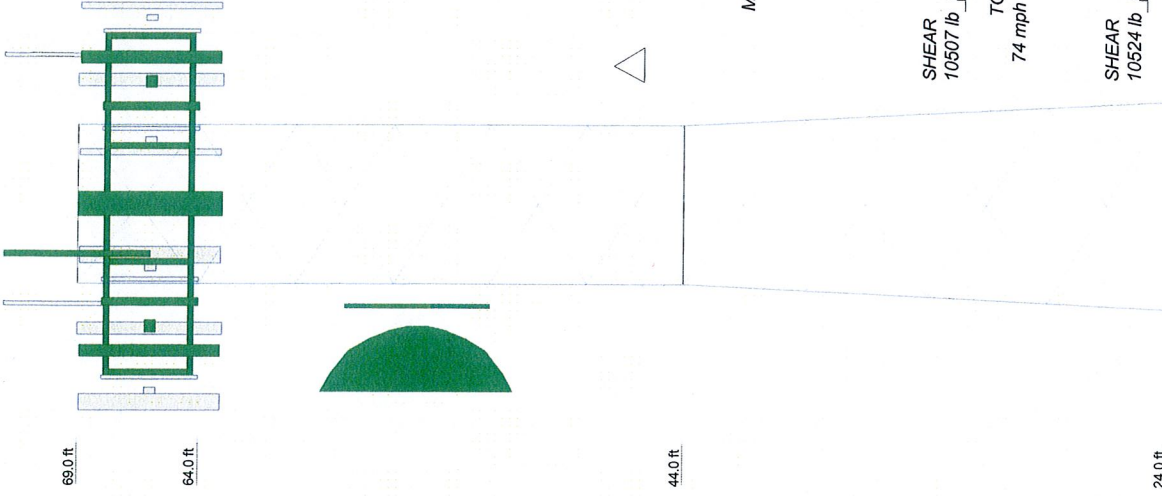
TYPE	ELEVATION	TYPE	ELEVATION
6x3" Pipe Mount (Empty)	69	LPA-80080-6CF (Verizon)	66
6x3" Pipe Mount (Empty)	69	LPA-80080-6CF (Verizon)	66
6x3" Pipe Mount (Empty)	69	DB948F85T2E-M (Verizon)	66
LPA-80063/6CF (Verizon)	66	P65-16-XL-2 (Verizon Proposed)	66
DB948F85T2E-M (Verizon)	66	DB948F85T2E-M (Verizon)	66
P65-16-XL-2 (Verizon Proposed)	66	LPA-80080-6CF (Verizon)	66
DB948F85T2E-M (Verizon)	66	(2) Diplexer (Verizon Proposed)	66
LPA-80063/6CF (Verizon)	66	(2) Diplexer (Verizon Proposed)	66
LPA-80080-6CF (Verizon)	66	Rohn 6x15 Boom Gate (3) (Verizon)	66
DB948F85T2E-M (Verizon)	66	6x4" Pipe Mount (Town Reserved)	55
P65-16-XL-2 (Verizon Proposed)	66	8 FT DISH (Town Reserved)	55
DB948F85T2E-M (Verizon)	66		

**MATERIAL STRENGTH**

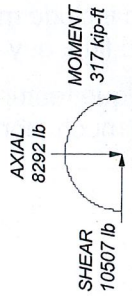
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

**TOWER DESIGN NOTES**

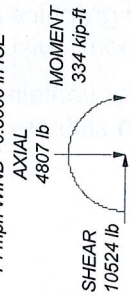
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 81.4%



MAX. CORNER REACTIONS AT BASE:  
 DOWN: 46689 lb  
 UPLIFT: -43479 lb  
 SHEAR: 6200 lb



TORQUE 12 kip-ft  
 74 mph WIND - 0.5000 in ICE



TORQUE 15 kip-ft  
 REACTIONS - 85 mph WIND

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (lb)
T1	ROHN 2.5 EH	A572-50	L1 1/2x1 1/2x3/16	A36	L1 1/2x1 1/2x3/16	6.521	1 @ 5	194.9
T2	ROHN 2 X-STR	A572-50	L1 1/2x1 1/2x3/16	A36	L1 1/2x1 1/2x3/16	6.563	5 @ 4	691.7
T3	ROHN 2.5 EH	A572-50	L1 3/4x1 3/4x3/16	A36	L1 1/2x1 1/2x3/16	8.563	4 @ 5	955.5
T4	ROHN 2.5 EH	A572-50	L1 3/4x1 3/4x3/16	A36	L1 1/2x1 1/2x3/16	8.563	4 @ 5	955.5

**NATCOMM**  
 63-2 North Branford Road  
 Branford, CT 06405  
 Phone: 203.488.0580  
 FAX: 203.488.8587

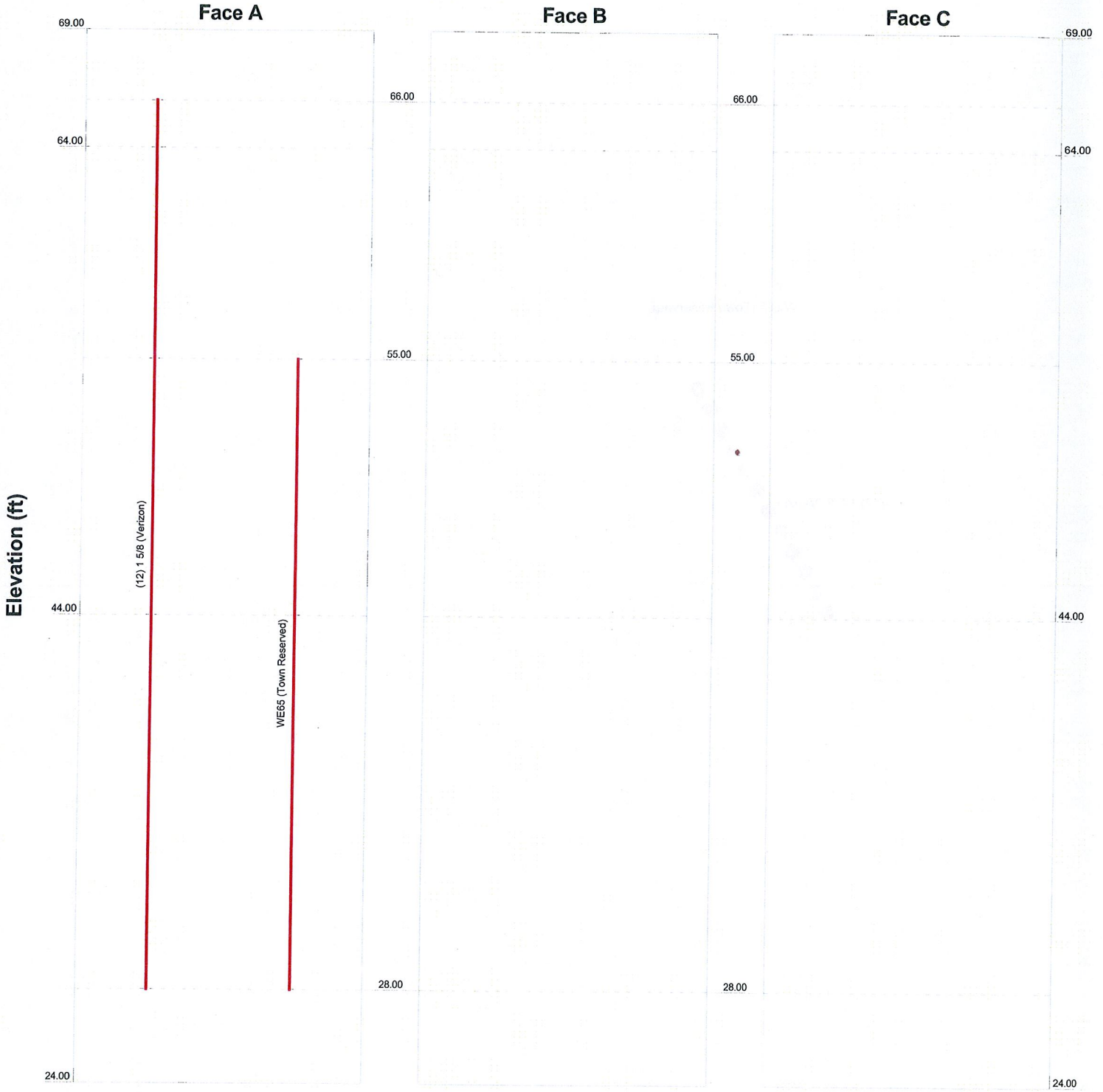
Job: **45ft ROHN SSV Lattice Tower - Rev 2**  
 Project: **10001.CO13-38 Elm St, Meriden, CT**  
 Client: Verizon Wireless  
 Code: TIA/EIA-222-F  
 Path: **10001.CO13-38 Elm St, Meriden, CT**  
 Drawn by: T-JL  
 Date: 04/19/10  
 Scale: NTS  
 Dwg No. E-1



# Feedline Distribution Chart

## 24' - 69'

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



<b>NATCOMM</b>		
63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587		
<b>Job: 45ft ROHN SSV Lattice Tower - Rev 2</b>		
Project: 10001.CO13 -38 Elm St., Meriden, CT		
Client: Verizon Wireless	Drawn by: T.JL	App'd:
Code: TIA/EIA-222-F	Date: 04/19/10	Scale: NTS
Path:	Dwg No. E-7	

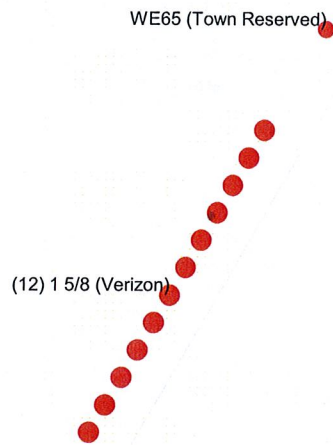
# Feedline Plan

Round \_\_\_\_\_

Flat \_\_\_\_\_

App In Face \_\_\_\_\_

App Out Face \_\_\_\_\_



## NATCOMM

63-2 North Branford Road  
Branford, CT 06405  
Phone: 203.488.0580  
FAX: 203.488.8587

Job: <b>45ft ROHN SSV Lattice Tower - Rev 2</b>		
Project: <b>10001.CO13 -38 Elm St., Meriden, CT</b>		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 04/19/10	Scale: NTS
Path:		Dwg No: E-7

Z:\Inet\1000100\100010013 - Meriden Feed 38 Elm St. Meriden CT Rev 2\21041910\100010013 - Meriden Feed 38 Elm St. Meriden CT Rev 2.dwg

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 1 of 23
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 18:29:19 04/19/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 69.00 ft above the ground line.  
 The base of the tower is set at an elevation of 24.00 ft above the ground line.  
 The face width of the tower is 6.52 ft at the top and 8.56 ft at the base.  
 This tower is designed using the TIA/EIA-222-F standard.

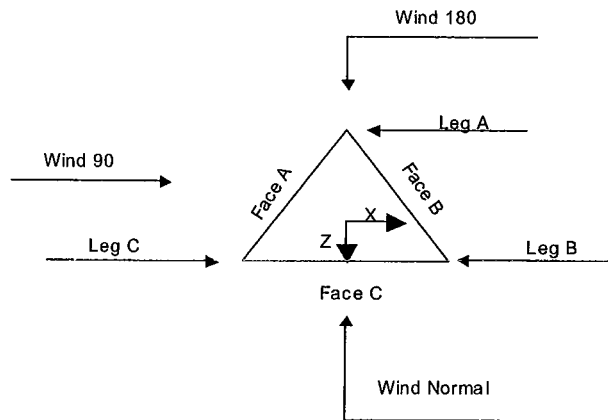
The following design criteria apply:

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

## Options

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> </ul> | <ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="padding-left: 40px;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 2 of 23
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 18:29:19 04/19/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL



**Triangular Tower**

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	69.00-64.00			6.52	1	5.00
T2	64.00-44.00			6.52	1	20.00
T3	44.00-24.00			6.56	1	20.00

**Tower Section Geometry (cont'd)**

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	69.00-64.00	5.00	X Brace	No	No	0.0000	0.0000
T2	64.00-44.00	4.00	X Brace	No	No	0.0000	0.0000
T3	44.00-24.00	5.00	X Brace	No	No	0.0000	0.0000

**Tower Section Geometry (cont'd)**

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 3 of 23
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Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 69.00-64.00	Pipe	ROHN 2 EH	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 64.00-44.00	Pipe	ROHN 2 X-STR	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 44.00-24.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 69.00-64.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 44.00-24.00	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 69.00-64.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 64.00-44.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 44.00-24.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors <sup>1</sup>						
				X Brace Diags	X Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace
T1 69.00-64.00	Yes	No	1	1	1	1	1	1	1	1
T2 64.00-44.00	Yes	No	1	1	1	1	1	1	1	1
T3 44.00-24.00	Yes	No	1	1	1	1	1	1	1	1

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



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**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 69.00-64.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 64.00-44.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 44.00-24.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
in	in	in	in	in	in	in	in	
T1 69.00-64.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 64.00-44.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 44.00-24.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
		T1 69.00-64.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 64.00-44.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 44.00-24.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon) WE65	A	Yes	Ar (CfAe)	66.00 - 28.00	3.0000	0	12	12	1.0000 1.9800	1.9800		1.04
	A	Yes	Ar (CfAe)	55.00 - 28.00	3.0000	0.28	1	1	1.5836	1.5836		0.53

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Description	Face Allow or Shield Leg	Component Type	Placement	Face Offset	Lateral Offset	#	# Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
			ft	in	(Frac FW)			in	in	in	plf
(Town Reserved)											

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	lb
T1	69.00-64.00	A	3.960	0.000	0.000	0.000	24.96
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	64.00-44.00	A	41.052	0.000	0.000	0.000	255.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	44.00-24.00	A	33.791	0.000	0.000	0.000	208.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight
	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	lb
T1	69.00-64.00	A	0.500	0.497	5.463	0.000	0.000	77.62
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	64.00-44.00	A	0.500	7.335	54.633	0.000	0.000	796.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	44.00-24.00	A	0.500	7.418	43.707	0.000	0.000	649.83
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

### Feed Line Shielding

Section	Elevation	Face	A <sub>R</sub>	A <sub>R</sub> Ice	A <sub>F</sub>	A <sub>F</sub> Ice
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
T1	69.00-64.00	A	0.000	0.350	0.349	0.525
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	64.00-44.00	A	0.000	3.026	3.007	4.540
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	44.00-24.00	A	0.000	2.260	2.579	3.903
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

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**Feed Line Center of Pressure**

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub>	CP <sub>z</sub>
	ft	in	in	Ice in	Ice in
T1	69.00-64.00	-4.6697	-2.6960	-3.8736	-2.2364
T2	64.00-44.00	-9.7015	-5.9855	-8.3772	-5.2326
T3	44.00-24.00	-8.3360	-5.4138	-7.4528	-4.9421

**Discrete Tower Loads**

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight lb	
6'x3" Pipe Mount (Empty)	A	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00			1/2" Ice	2.13	2.13	47.98
			0.00						
6'x3" Pipe Mount (Empty)	B	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00			1/2" Ice	2.13	2.13	47.98
			0.00						
6'x3" Pipe Mount (Empty)	C	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00			1/2" Ice	2.13	2.13	47.98
			0.00						
LPA-80063/6CF (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	10.31	9.01	27.00
			-6.00			1/2" Ice	10.87	9.55	100.95
			0.00						
DB948F85T2E-M (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			-4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
P65-16-XL-2 (Verizon Proposed)	A	From Face	4.00	0.0000	66.00	No Ice	8.40	4.12	20.00
			0.00			1/2" Ice	8.95	4.56	64.53
			0.00						
DB948F85T2E-M (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
LPA-80063/6CF (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	10.31	9.01	27.00
			6.00			1/2" Ice	10.87	9.55	100.95
			0.00						
LPA-80080-6CF (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			-6.00			1/2" Ice	4.76	9.64	69.24
			0.00						
DB948F85T2E-M (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			-4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
P65-16-XL-2 (Verizon Proposed)	B	From Face	4.00	0.0000	66.00	No Ice	8.40	4.12	20.00
			0.00			1/2" Ice	8.95	4.56	64.53
			0.00						
DB948F85T2E-M (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
LPA-80080-6CF (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			6.00			1/2" Ice	4.76	9.64	69.24
			0.00						

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
LPA-80080-6CF (Verizon)	C	From Face	4.00 -6.00 0.00		0.0000	66.00	No Ice 1/2" Ice 4.76	4.33 9.64	21.00 69.24
DB948F85T2E-M (Verizon)	C	From Face	4.00 -4.00 0.00		0.0000	66.00	No Ice 1/2" Ice 2.22	1.92 3.62	8.50 27.57
P65-16-XL-2 (Verizon Proposed)	C	From Face	4.00 0.00 0.00		0.0000	66.00	No Ice 1/2" Ice 8.95	8.40 4.56	20.00 64.53
DB948F85T2E-M (Verizon)	C	From Face	4.00 4.00 0.00		0.0000	66.00	No Ice 1/2" Ice 2.22	1.92 3.62	8.50 27.57
LPA-80080-6CF (Verizon)	C	From Face	4.00 6.00 0.00		0.0000	66.00	No Ice 1/2" Ice 4.76	4.33 9.64	21.00 69.24
(2) Diplexer (Verizon Proposed)	A	From Face	4.00 0.00 0.00		0.0000	66.00	No Ice 1/2" Ice 0.43	0.35 0.17	8.00 10.43
(2) Diplexer (Verizon Proposed)	B	From Face	4.00 0.00 0.00		0.0000	66.00	No Ice 1/2" Ice 0.43	0.35 0.17	8.00 10.43
(2) Diplexer (Verizon Proposed)	C	From Face	4.00 0.00 0.00		0.0000	66.00	No Ice 1/2" Ice 0.43	0.35 0.17	8.00 10.43
Rohn 6'x15' Boom Gate (3) (Verizon)	A	None			0.0000	66.00	No Ice 1/2" Ice 63.30	53.20 63.30	1790.00 2230.00
6'x4" Pipe Mount (Town Reserved)	C	From Leg	1.00 0.00 0.00		0.0000	55.00	No Ice 1/2" Ice 2.46	2.09 2.46	54.72 71.85

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz	Vert						
				ft	ft	°	°	ft	ft	ft <sup>2</sup>	lb
8 FT DISH (Town Reserved)	C	Paraboloid w/o Radome	From Leg	2.00 0.00 0.00		Worst		55.00	8.00	No Ice 1/2" Ice 51.29	251.00 514.30

### Tower Pressures - No Ice

$G_H = 1.224$

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 8 of 23
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Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	23	33.597	A	2.398	5.943	1.983	23.78	0.000	0.000
					B	2.747	1.983	41.93	0.000	0.000	
					C	2.747	1.983	41.93	0.000	0.000	
T2 64.00-44.00	54.00	1.151	21	134.798	A	6.050	48.968	7.917	14.39	0.000	0.000
					B	9.058	7.917	46.64	0.000	0.000	
					C	9.058	7.917	46.64	0.000	0.000	
T3 44.00-24.00	34.00	1.009	19	156.058	A	8.321	43.391	9.599	18.56	0.000	0.000
					B	10.900	9.599	46.83	0.000	0.000	
					C	10.900	9.599	46.83	0.000	0.000	

**Tower Pressure - With Ice**

$G_H = 1.224$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	t <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	in	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	17	0.5000	34.013	A	7.686	4.795	2.817	22.57	0.000	0.000
						B	2.747	4.648	38.09	0.000	0.000	
						C	2.747	4.648	38.09	0.000	0.000	
T2 64.00-44.00	54.00	1.151	16	0.5000	136.465	A	59.151	21.597	11.250	13.93	0.000	0.000
						B	9.058	17.288	42.70	0.000	0.000	
						C	9.058	17.288	42.70	0.000	0.000	
T3 44.00-24.00	34.00	1.009	14	0.5000	157.726	A	50.704	24.400	12.938	17.23	0.000	0.000
						B	10.900	19.243	42.92	0.000	0.000	
						C	10.900	19.243	42.92	0.000	0.000	

**Tower Pressure - Service**

$G_H = 1.224$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	8	33.597	A	2.398	5.943	1.983	23.78	0.000	0.000
					B	2.747	1.983	41.93	0.000	0.000	
					C	2.747	1.983	41.93	0.000	0.000	
T2 64.00-44.00	54.00	1.151	7	134.798	A	6.050	48.968	7.917	14.39	0.000	0.000
					B	9.058	7.917	46.64	0.000	0.000	
					C	9.058	7.917	46.64	0.000	0.000	
T3 44.00-24.00	34.00	1.009	6	156.058	A	8.321	43.391	9.599	18.56	0.000	0.000
					B	10.900	9.599	46.83	0.000	0.000	
					C	10.900	9.599	46.83	0.000	0.000	

**Tower Forces - No Ice - Wind Normal To Face**



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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	1	1	5.973	403.51	80.70	A
			B	0.141	2.806	0.58	1	1	3.897			
			C	0.141	2.806	0.58	1	1	3.897			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	1	1	38.123	2034.68	101.73	A
			B	0.126	2.862	0.578	1	1	13.634			
			C	0.126	2.862	0.578	1	1	13.634			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	1	1	35.483	1795.31	89.77	A
			B	0.131	2.841	0.579	1	1	16.456			
			C	0.131	2.841	0.579	1	1	16.456			
Sum Weight:	488.55	1822.13						OTM	96.14 kip-ft	4233.50		

### Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.825	1	5.553	375.15	75.03	A
			B	0.141	2.806	0.58	0.825	1	3.417			
			C	0.141	2.806	0.58	0.825	1	3.417			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.825	1	37.064	1978.17	98.91	A
			B	0.126	2.862	0.578	0.825	1	12.049			
			C	0.126	2.862	0.578	0.825	1	12.049			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.825	1	34.027	1721.63	86.08	A
			B	0.131	2.841	0.579	0.825	1	14.549			
			C	0.131	2.841	0.579	0.825	1	14.549			
Sum Weight:	488.55	1822.13						OTM	92.51 kip-ft	4074.96		

### Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.8	1	5.493	371.10	74.22	A
			B	0.141	2.806	0.58	0.8	1	3.348			
			C	0.141	2.806	0.58	0.8	1	3.348			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.8	1	36.913	1970.09	98.50	A
			B	0.126	2.862	0.578	0.8	1	11.823			
			C	0.126	2.862	0.578	0.8	1	11.823			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.8	1	33.819	1711.11	85.56	A
			B	0.131	2.841	0.579	0.8	1	14.276			
			C	0.131	2.841	0.579	0.8	1	14.276			
Sum Weight:	488.55	1822.13						OTM	91.99 kip-ft	4052.31		

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 10 of 23
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 18:29:19 04/19/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

**Tower Forces - No Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.85	1	5.613	379.20	75.84	A
			B	0.141	2.806	0.58	0.85	1	3.485			
			C	0.141	2.806	0.58	0.85	1	3.485			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.85	1	37.215	1986.24	99.31	A
			B	0.126	2.862	0.578	0.85	1	12.275			
			C	0.126	2.862	0.578	0.85	1	12.275			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.85	1	34.235	1732.16	86.61	A
			B	0.131	2.841	0.579	0.85	1	14.821			
			C	0.131	2.841	0.579	0.85	1	14.821			
Sum Weight:	488.55	1822.13						OTM	93.03 kip-ft	4097.60		

**Tower Forces - With Ice - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	1	1	10.748	475.58	95.12	A
			B	0.217	2.539	0.594	1	1	5.508			
			C	0.217	2.539	0.594	1	1	5.508			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	1	1	75.318	2663.51	133.18	A
			B	0.193	2.619	0.589	1	1	19.241			
			C	0.193	2.619	0.589	1	1	19.241			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	1	1	67.434	2232.10	111.60	A
			B	0.191	2.626	0.589	1	1	22.227			
			C	0.191	2.626	0.589	1	1	22.227			
Sum Weight:	1523.52	2910.19						OTM	122.44 kip-ft	5371.19		

**Tower Forces - With Ice - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.825	1	9.403	416.07	83.21	A
			B	0.217	2.539	0.594	0.825	1	5.028			
			C	0.217	2.539	0.594	0.825	1	5.028			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.825	1	64.967	2297.45	114.87	A
			B	0.193	2.619	0.589	0.825	1	17.656			
			C	0.193	2.619	0.589	0.825	1	17.656			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.825	1	58.561	1938.39	96.92	A
			B	0.191	2.626	0.589	0.825	1	20.319			
			C	0.191	2.626	0.589	0.825	1	20.319			
Sum Weight:	1523.52	2910.19						OTM	105.99 kip-ft	4651.90		

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 11 of 23
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	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

**Tower Forces - With Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.8	1	9.211	407.57	81.51	A
			B	0.217	2.539	0.594	0.8	1	4.959			
			C	0.217	2.539	0.594	0.8	1	4.959			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.8	1	63.488	2245.15	112.26	A
			B	0.193	2.619	0.589	0.8	1	17.429			
			C	0.193	2.619	0.589	0.8	1	17.429			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.8	1	57.293	1896.43	94.82	A
			B	0.191	2.626	0.589	0.8	1	20.047			
			C	0.191	2.626	0.589	0.8	1	20.047			
Sum Weight:	1523.52	2910.19					OTM	103.64	4549.15			

**Tower Forces - With Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.85	1	9.595	424.57	84.91	A
			B	0.217	2.539	0.594	0.85	1	5.096			
			C	0.217	2.539	0.594	0.85	1	5.096			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.85	1	66.445	2349.74	117.49	A
			B	0.193	2.619	0.589	0.85	1	17.882			
			C	0.193	2.619	0.589	0.85	1	17.882			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.85	1	59.828	1980.35	99.02	A
			B	0.191	2.626	0.589	0.85	1	20.592			
			C	0.191	2.626	0.589	0.85	1	20.592			
Sum Weight:	1523.52	2910.19					OTM	108.34	4754.66			

**Tower Forces - Service - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	1	1	5.973	139.62	27.92	A
			B	0.141	2.806	0.58	1	1	3.897			
			C	0.141	2.806	0.58	1	1	3.897			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	1	1	38.123	704.04	35.20	A
			B	0.126	2.862	0.578	1	1	13.634			
			C	0.126	2.862	0.578	1	1	13.634			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	1	1	35.483	621.21	31.06	A
			B	0.131	2.841	0.579	1	1	16.456			
			C	0.131	2.841	0.579	1	1	16.456			
Sum Weight:	488.55	1822.13					OTM	33.27 kip-	1464.88			

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	Job	45ft ROHN SSV Lattice Tower - Rev 2	Page	12 of 23
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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	

**Tower Forces - Service - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.825	1	5.553	129.81	25.96	A
			B	0.141	2.806	0.58	0.825	1	3.417			
			C	0.141	2.806	0.58	0.825	1	3.417			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.825	1	37.064	684.49	34.22	A
			B	0.126	2.862	0.578	0.825	1	12.049			
			C	0.126	2.862	0.578	0.825	1	12.049			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.825	1	34.027	595.72	29.79	A
			B	0.131	2.841	0.579	0.825	1	14.549			
			C	0.131	2.841	0.579	0.825	1	14.549			
Sum Weight:	488.55	1822.13						OTM	32.01 kip-ft	1410.02		

**Tower Forces - Service - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.8	1	5.493	128.41	25.68	A
			B	0.141	2.806	0.58	0.8	1	3.348			
			C	0.141	2.806	0.58	0.8	1	3.348			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.8	1	36.913	681.69	34.08	A
			B	0.126	2.862	0.578	0.8	1	11.823			
			C	0.126	2.862	0.578	0.8	1	11.823			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.8	1	33.819	592.08	29.60	A
			B	0.131	2.841	0.579	0.8	1	14.276			
			C	0.131	2.841	0.579	0.8	1	14.276			
Sum Weight:	488.55	1822.13						OTM	31.83 kip-ft	1402.18		

**Tower Forces - Service - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.85	1	5.613	131.21	26.24	A
			B	0.141	2.806	0.58	0.85	1	3.485			
			C	0.141	2.806	0.58	0.85	1	3.485			

<b>RISA Tower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 13 of 23
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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb	e						ft <sup>2</sup>	lb	plf	
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.85	1	37.215	687.28	34.36	A
			B	0.126	2.862	0.578	0.85	1	12.275			
			C	0.126	2.862	0.578	0.85	1	12.275			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.85	1	34.235	599.36	29.97	A
			B	0.131	2.841	0.579	0.85	1	14.821			
			C	0.131	2.841	0.579	0.85	1	14.821			
Sum Weight:	488.55	1822.13						OTM	32.19 kip-ft	1417.86		

**Force Totals**

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M <sub>x</sub>	Sum of Overturning Moments, M <sub>z</sub>	Sum of Torques
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Leg Weight	838.05					
Bracing Weight	984.08					
Total Member Self-Weight	1822.13					
Total Weight	4807.62			0.23	2.51	
Wind 0 deg - No Ice		-144.93	-10272.22	-325.26	8.60	-14.22
Wind 30 deg - No Ice		5026.33	-8705.86	-275.91	-156.92	-9.93
Wind 45 deg - No Ice		7167.31	-7048.97	-223.05	-225.74	-6.71
Wind 60 deg - No Ice		8811.56	-4920.01	-155.17	-278.82	-3.03
Wind 90 deg - No Ice		10303.68	144.93	6.32	-326.89	4.62
Wind 120 deg - No Ice		9113.40	5261.62	168.25	-288.50	11.06
Wind 135 deg - No Ice		7372.27	7253.93	232.12	-234.35	13.25
Wind 150 deg - No Ice		5277.35	8850.79	282.46	-167.46	14.54
Wind 180 deg - No Ice		144.93	10091.04	321.56	-3.58	14.10
Wind 210 deg - No Ice		-5026.33	8705.86	276.37	161.94	9.93
Wind 225 deg - No Ice		-7167.31	7048.97	223.51	230.76	6.71
Wind 240 deg - No Ice		-8968.47	5010.60	157.70	287.44	3.16
Wind 270 deg - No Ice		-10303.68	-144.93	-5.86	331.91	-4.62
Wind 300 deg - No Ice		-8956.49	-5171.03	-165.71	289.93	-11.07
Wind 315 deg - No Ice		-7372.27	-7253.93	-231.66	239.37	-13.25
Wind 330 deg - No Ice		-5277.35	-8850.79	-282.00	172.48	-14.54
Member Ice	1088.05					
Total Weight Ice	8294.23			-0.38	6.21	
Wind 0 deg - Ice		-110.91	-10314.58	-311.87	10.87	-11.97
Wind 30 deg - Ice		4817.01	-8343.30	-255.60	-141.14	-8.50
Wind 45 deg - Ice		6797.03	-6706.47	-205.71	-202.92	-5.95
Wind 60 deg - Ice		8276.23	-4650.22	-142.69	-249.60	-3.01
Wind 90 deg - Ice		9826.11	110.91	4.28	-296.56	3.05
Wind 120 deg - Ice		9099.05	5253.34	159.40	-270.53	8.41
Wind 135 deg - Ice		6953.87	6863.32	211.54	-209.51	10.33
Wind 150 deg - Ice		5009.10	8454.21	259.49	-149.21	11.55
Wind 180 deg - Ice		110.91	9492.54	292.31	1.55	11.45
Wind 210 deg - Ice		-4817.01	8343.30	254.83	153.56	8.50
Wind 225 deg - Ice		-6797.03	6706.47	204.95	215.34	5.95
Wind 240 deg - Ice		-8988.14	5061.24	151.33	278.29	3.56
Wind 270 deg - Ice		-9826.11	-110.91	-5.04	308.97	-3.05
Wind 300 deg - Ice		-8387.14	-4842.32	-150.76	266.67	-8.44
Wind 315 deg - Ice		-6953.87	-6863.32	-212.30	221.93	-10.33
Wind 330 deg - Ice		-5009.10	-8454.21	-260.25	161.62	-11.55
Total Weight	4807.62			0.23	2.51	
Wind 0 deg - Service		-50.15	-3554.40	-111.81	3.65	-4.92
Wind 30 deg - Service		1739.21	-3012.41	-94.73	-53.62	-3.43

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 14 of 23
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	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Wind 45 deg - Service		2480.04	-2439.09	-76.44	-77.44	-2.32
Wind 60 deg - Service		3048.98	-1702.42	-52.95	-95.80	-1.05
Wind 90 deg - Service		3565.29	50.15	2.93	-112.44	1.60
Wind 120 deg - Service		3153.43	1820.63	58.96	-99.15	3.83
Wind 135 deg - Service		2550.96	2510.01	81.06	-80.42	4.59
Wind 150 deg - Service		1826.07	3062.56	98.48	-57.27	5.03
Wind 180 deg - Service		50.15	3491.71	112.01	-0.56	4.88
Wind 210 deg - Service		-1739.21	3012.41	96.37	56.71	3.43
Wind 225 deg - Service		-2480.04	2439.09	78.08	80.52	2.32
Wind 240 deg - Service		-3103.28	1733.77	55.31	100.13	1.09
Wind 270 deg - Service		-3565.29	-50.15	-1.29	115.52	-1.60
Wind 300 deg - Service		-3099.13	-1789.28	-56.60	100.99	-3.83
Wind 315 deg - Service		-2550.96	-2510.01	-79.42	83.50	-4.59
Wind 330 deg - Service		-1826.07	-3062.56	-96.84	60.36	-5.03

### Load Combinations

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



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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	69 - 64	Leg	Max Tension	32	15.07	-0.01	-0.01
			Max. Compression	30	-1280.48	0.69	-0.39
			Max. Mx	6	-786.81	1.19	-0.03
			Max. My	10	-775.43	-0.15	1.09
			Max. Vy	6	968.46	-0.91	-0.13
			Max. Vx	2	-934.17	-0.00	0.93
		Diagonal	Max Tension	14	1094.63	0.00	0.00
			Max. Compression	6	-1099.74	0.00	0.00
			Max. Mx	32	-811.85	0.01	-0.00
			Max. My	6	-576.54	0.00	0.00
			Max. Vy	32	6.86	0.01	-0.00
			Max. Vx	6	-0.51	0.00	0.00
		Top Girt	Max Tension	15	452.27	0.00	0.00
			Max. Compression	7	-457.66	0.00	0.00
			Max. Mx	18	5.42	-0.02	0.00
			Max. My	34	-9.29	0.00	0.00
			Max. Vy	18	10.90	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
T2	64 - 44	Leg	Max Tension	15	20929.67	-0.59	0.16
			Max. Compression	7	-22937.12	0.61	-0.16
			Max. Mx	7	-11380.43	0.75	-0.29
			Max. My	9	-1113.42	-0.00	1.10
			Max. Vy	7	-420.64	0.75	-0.29
			Max. Vx	17	1335.43	-0.01	0.23
		Diagonal	Max Tension	10	4045.76	0.00	0.00
			Max. Compression	2	-4125.08	0.00	0.00
			Max. Mx	30	2456.40	0.01	0.00
			Max. My	2	-3544.49	-0.00	0.01
			Max. Vy	30	-8.48	0.01	0.00
			Max. Vx	2	1.91	-0.00	0.01
T3	44 - 24	Leg	Max Tension	15	41263.72	0.42	-0.12
			Max. Compression	7	-44293.31	0.53	-0.12
			Max. Mx	24	-26748.54	0.83	-0.13
			Max. My	17	-2270.19	0.00	0.54
			Max. Vy	24	-305.36	0.83	-0.13
			Max. Vx	17	-203.61	0.00	0.54
		Diagonal	Max Tension	19	3580.65	0.00	0.00
			Max. Compression	19	-3747.27	0.00	0.00
			Max. Mx	33	1968.69	0.03	0.00
			Max. My	10	-3336.32	-0.00	-0.01



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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max. Vy	33	12.79	0.03	0.00
			Max. Vx	10	2.75	0.00	0.00
			Max Tension	32	283.08	0.00	0.00
			Max. Compression	7	-68.07	0.00	0.00
			Max. Mx	18	262.35	-0.02	0.00
			Max. My	34	259.61	0.00	0.00
			Max. Vy	18	10.97	0.00	0.00
			Max. Vx	34	-0.32	0.00	0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	13	45852.23	5108.27	-3183.89
	Max. H <sub>x</sub>	13	45852.23	5108.27	-3183.89
	Max. H <sub>z</sub>	20	-31007.70	-4068.27	3520.05
	Min. Vert	5	-41467.57	-4827.29	3010.81
	Min. H <sub>x</sub>	22	-36069.32	-5051.74	3134.94
Leg B	Min. H <sub>z</sub>	11	39190.94	3858.07	-3539.22
	Max. Vert	7	46688.76	-5702.33	-2435.03
	Max. H <sub>x</sub>	32	-38612.58	5550.61	2549.11
	Max. H <sub>z</sub>	33	-37535.38	5384.30	2566.60
	Min. Vert	15	-43478.60	5437.01	2273.30
Leg A	Min. H <sub>x</sub>	7	46688.76	-5702.33	-2435.03
	Min. H <sub>z</sub>	7	46688.76	-5702.33	-2435.03
	Max. Vert	2	45512.73	-945.76	6010.87
	Max. H <sub>x</sub>	11	-35706.08	1126.13	-4898.76
	Max. H <sub>z</sub>	2	45512.73	-945.76	6010.87
	Min. Vert	10	-41808.29	943.34	-5690.96
	Min. H <sub>x</sub>	3	38851.19	-1138.85	5105.63
Min. H <sub>z</sub>	27	-36719.90	756.69	-5952.30	

### Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	4807.29	0.01	-0.00	0.23	2.51	0.00
Dead+Wind 0 deg - No Ice	4807.18	-144.92	-10273.05	-325.63	8.63	-14.23
Dead+Wind 30 deg - No Ice	4807.28	5026.80	-8706.57	-276.23	-157.08	-9.93
Dead+Wind 45 deg - No Ice	4807.35	7167.96	-7049.57	-223.31	-225.98	-6.71
Dead+Wind 60 deg - No Ice	4807.38	8812.35	-4920.44	-155.34	-279.12	-3.03
Dead+Wind 90 deg - No Ice	4807.27	10304.55	144.91	6.34	-327.25	4.62
Dead+Wind 120 deg - No Ice	4807.17	9114.14	5262.04	168.45	-288.82	11.07
Dead+Wind 135 deg - No Ice	4807.24	7372.97	7254.51	232.40	-234.60	13.26
Dead+Wind 150 deg - No Ice	4807.26	5277.78	8851.54	282.79	-167.63	14.55
Dead+Wind 180 deg - No Ice	4807.36	144.95	10091.92	321.92	-3.56	14.10
Dead+Wind 210 deg - No Ice	4807.27	-5026.71	8706.61	276.67	162.13	9.93
Dead+Wind 225 deg - No Ice	4807.21	-7167.86	7049.57	223.75	231.03	6.71
Dead+Wind 240 deg - No Ice	4807.18	-8969.17	5011.00	157.88	287.76	3.16
Dead+Wind 270 deg - No Ice	4807.27	-10304.53	-144.98	-5.86	332.28	-4.62
Dead+Wind 300 deg - No Ice	4807.37	-8957.27	-5171.48	-165.88	290.26	-11.07

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Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>y</sub> lb	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>y</sub> kip-ft	Torque kip-ft
Dead+Wind 315 deg - No Ice	4807.34	-7372.92	-7254.55	-231.91	239.65	-13.26
Dead+Wind 330 deg - No Ice	4807.27	-5277.81	-8851.51	-282.31	172.70	-14.55
Dead+Ice+Temp	8291.97	-0.00	0.00	-0.38	6.22	0.00
Dead+Wind 0 deg+Ice+Temp	8280.83	-110.91	-10314.84	-312.36	10.90	-11.98
Dead+Wind 30 deg+Ice+Temp	8280.82	4817.11	-8343.51	-256.01	-141.35	-8.51
Dead+Wind 45 deg+Ice+Temp	8280.81	6797.18	-6706.64	-206.04	-203.23	-5.96
Dead+Wind 60 deg+Ice+Temp	8280.81	8276.43	-4650.33	-142.92	-249.98	-3.02
Dead+Wind 90 deg+Ice+Temp	8280.82	9826.36	110.93	4.30	-297.02	3.05
Dead+Wind 120 deg+Ice+Temp	8280.83	9099.28	5253.48	159.67	-270.95	8.42
Dead+Wind 135 deg+Ice+Temp	8280.82	6954.06	6863.49	211.89	-209.83	10.34
Dead+Wind 150 deg+Ice+Temp	8280.82	5009.24	8454.41	259.92	-149.41	11.56
Dead+Wind 180 deg+Ice+Temp	8280.80	110.91	9492.76	292.78	1.57	11.46
Dead+Wind 210 deg+Ice+Temp	8280.82	-4817.14	8343.50	255.24	153.81	8.51
Dead+Wind 225 deg+Ice+Temp	8280.82	-6797.21	6706.64	205.27	215.69	5.96
Dead+Wind 240 deg+Ice+Temp	8280.83	-8988.37	5061.37	151.56	278.73	3.57
Dead+Wind 270 deg+Ice+Temp	8280.81	-9826.35	-110.89	-5.04	309.46	-3.05
Dead+Wind 300 deg+Ice+Temp	8280.72	-8387.31	-4842.40	-150.99	267.10	-8.44
Dead+Wind 315 deg+Ice+Temp	8280.80	-6954.03	-6863.49	-212.63	222.29	-10.34
Dead+Wind 330 deg+Ice+Temp	8280.82	-5009.21	-8454.42	-260.65	161.91	-11.56
Dead+Wind 0 deg - Service	4807.28	-50.14	-3554.68	-112.52	4.63	-4.92
Dead+Wind 30 deg - Service	4807.29	1739.37	-3012.65	-95.43	-52.71	-3.44
Dead+Wind 45 deg - Service	4807.29	2480.26	-2439.29	-77.12	-76.55	-2.32
Dead+Wind 60 deg - Service	4807.29	3049.24	-1702.57	-53.60	-94.94	-1.05
Dead+Wind 90 deg - Service	4807.29	3565.58	50.14	2.34	-111.59	1.60
Dead+Wind 120 deg - Service	4807.28	3153.68	1820.77	58.44	-98.29	3.83
Dead+Wind 135 deg - Service	4807.27	2551.16	2510.20	80.56	-79.53	4.59
Dead+Wind 150 deg - Service	4807.28	1826.23	3062.80	98.00	-56.36	5.04
Dead+Wind 180 deg - Service	4807.29	50.17	3491.99	111.54	0.41	4.88
Dead+Wind 210 deg - Service	4807.28	-1739.33	3012.65	95.89	57.74	3.44
Dead+Wind 225 deg - Service	4807.28	-2480.26	2439.28	77.58	81.58	2.32
Dead+Wind 240 deg - Service	4807.28	-3103.50	1733.90	54.78	101.22	1.09
Dead+Wind 270 deg - Service	4807.28	-3565.56	-50.16	-1.88	116.62	-1.60
Dead+Wind 300 deg - Service	4807.29	-3099.37	-1789.43	-57.25	102.08	-3.83
Dead+Wind 315 deg - Service	4807.28	-2551.15	-2510.22	-80.10	84.57	-4.59
Dead+Wind 330 deg - Service	4807.28	-1826.21	-3062.80	-97.54	61.40	-5.04

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-4807.62	0.00	-0.01	4807.29	0.00	0.007%
2	-144.93	-4807.62	-10272.22	144.92	4807.18	10273.05	0.008%
3	5026.33	-4807.62	-8705.86	-5026.80	4807.28	8706.57	0.008%
4	7167.31	-4807.62	-7048.97	-7167.96	4807.35	7049.57	0.008%
5	8811.56	-4807.62	-4920.01	-8812.35	4807.38	4920.44	0.008%
6	10303.68	-4807.62	144.93	-10304.55	4807.27	-144.91	0.008%
7	9113.40	-4807.62	5261.62	-9114.14	4807.17	-5262.04	0.008%
8	7372.27	-4807.62	7253.93	-7372.97	4807.24	-7254.51	0.009%
9	5277.35	-4807.62	8850.79	-5277.78	4807.26	-8851.54	0.008%
10	144.93	-4807.62	10091.04	-144.95	4807.36	-10091.92	0.008%
11	-5026.33	-4807.62	8705.86	5026.71	4807.27	-8706.61	0.008%
12	-7167.31	-4807.62	7048.97	7167.86	4807.21	-7049.57	0.008%
13	-8968.47	-4807.62	5010.60	8969.17	4807.18	-5011.00	0.008%
14	-10303.68	-4807.62	-144.93	10304.53	4807.27	144.98	0.008%
15	-8956.49	-4807.62	-5171.03	8957.27	4807.37	5171.48	0.008%
16	-7372.27	-4807.62	-7253.93	7372.92	4807.34	7254.55	0.008%
17	-5277.35	-4807.62	-8850.79	5277.81	4807.27	8851.51	0.008%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
18	-0.00	-8294.23	0.00	0.00	8291.97	-0.00	0.027%
19	-110.91	-8294.23	-10314.58	110.91	8280.83	10314.84	0.101%
20	4817.01	-8294.23	-8343.30	-4817.11	8280.82	8343.51	0.106%
21	6797.03	-8294.23	-6706.47	-6797.18	8280.81	6706.64	0.106%
22	8276.23	-8294.23	-4650.22	-8276.43	8280.81	4650.33	0.107%
23	9826.11	-8294.23	110.91	-9826.36	8280.82	-110.93	0.104%
24	9099.05	-8294.23	5253.34	-9099.28	8280.83	-5253.48	0.100%
25	6953.87	-8294.23	6863.32	-6954.06	8280.82	-6863.49	0.105%
26	5009.10	-8294.23	8454.21	-5009.24	8280.82	-8454.41	0.104%
27	110.91	-8294.23	9492.54	-110.91	8280.80	-9492.76	0.107%
28	-4817.01	-8294.23	8343.30	4817.14	8280.82	-8343.50	0.106%
29	-6797.03	-8294.23	6706.47	6797.21	8280.82	-6706.64	0.106%
30	-8988.14	-8294.23	5061.24	8988.37	8280.83	-5061.37	0.101%
31	-9826.11	-8294.23	-110.91	9826.35	8280.81	110.89	0.104%
32	-8387.14	-8294.23	-4842.32	8387.31	8280.72	4842.40	0.106%
33	-6953.87	-8294.23	-6863.32	6954.03	8280.80	6863.49	0.105%
34	-5009.10	-8294.23	-8454.21	5009.21	8280.82	8454.42	0.104%
35	-50.15	-4807.62	-3554.40	50.14	4807.28	3554.68	0.007%
36	1739.21	-4807.62	-3012.41	-1739.37	4807.29	3012.65	0.007%
37	2480.04	-4807.62	-2439.09	-2480.26	4807.29	2439.29	0.008%
38	3048.98	-4807.62	-1702.42	-3049.24	4807.29	1702.57	0.008%
39	3565.29	-4807.62	50.15	-3565.58	4807.29	-50.14	0.008%
40	3153.43	-4807.62	1820.63	-3153.68	4807.28	-1820.77	0.007%
41	2550.96	-4807.62	2510.01	-2551.16	4807.27	-2510.20	0.008%
42	1826.07	-4807.62	3062.56	-1826.23	4807.28	-3062.80	0.007%
43	50.15	-4807.62	3491.71	-50.17	4807.29	-3491.99	0.007%
44	-1739.21	-4807.62	3012.41	1739.33	4807.28	-3012.65	0.007%
45	-2480.04	-4807.62	2439.09	2480.22	4807.28	-2439.28	0.007%
46	-3103.28	-4807.62	1733.77	3103.50	4807.28	-1733.90	0.007%
47	-3565.29	-4807.62	-50.15	3565.56	4807.28	50.16	0.007%
48	-3099.13	-4807.62	-1789.28	3099.37	4807.29	1789.43	0.007%
49	-2550.96	-4807.62	-2510.01	2551.15	4807.28	2510.22	0.007%
50	-1826.07	-4807.62	-3062.56	1826.21	4807.28	3062.80	0.007%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00064813
2	Yes	4	0.00000001	0.00084072
3	Yes	4	0.00000001	0.00084856
4	Yes	4	0.00000001	0.00085640
5	Yes	4	0.00000001	0.00086030
6	Yes	4	0.00000001	0.00085190
7	Yes	4	0.00000001	0.00084289
8	Yes	4	0.00000001	0.00084641
9	Yes	4	0.00000001	0.00085338
10	Yes	4	0.00000001	0.00086523
11	Yes	4	0.00000001	0.00085699
12	Yes	4	0.00000001	0.00085119
13	Yes	4	0.00000001	0.00084969
14	Yes	4	0.00000001	0.00086489
15	Yes	4	0.00000001	0.00087444
16	Yes	4	0.00000001	0.00086915
17	Yes	4	0.00000001	0.00085876
18	Yes	7	0.00000001	0.00056348

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19	Yes	5	0.0000001	0.00040210
20	Yes	5	0.0000001	0.00042792
21	Yes	5	0.0000001	0.00043285
22	Yes	5	0.0000001	0.00043492
23	Yes	5	0.0000001	0.00042187
24	Yes	5	0.0000001	0.00040016
25	Yes	5	0.0000001	0.00041675
26	Yes	5	0.0000001	0.00041485
27	Yes	5	0.0000001	0.00042338
28	Yes	5	0.0000001	0.00041750
29	Yes	5	0.0000001	0.00041730
30	Yes	5	0.0000001	0.00039624
31	Yes	5	0.0000001	0.00040306
32	Yes	5	0.0000001	0.00040574
33	Yes	5	0.0000001	0.00040448
34	Yes	5	0.0000001	0.00040572
35	Yes	4	0.0000001	0.00083290
36	Yes	4	0.0000001	0.00082807
37	Yes	4	0.0000001	0.00082900
38	Yes	4	0.0000001	0.00082992
39	Yes	4	0.0000001	0.00082837
40	Yes	4	0.0000001	0.00082855
41	Yes	4	0.0000001	0.00083262
42	Yes	4	0.0000001	0.00083788
43	Yes	4	0.0000001	0.00084844
44	Yes	4	0.0000001	0.00085237
45	Yes	4	0.0000001	0.00085370
46	Yes	4	0.0000001	0.00085529
47	Yes	4	0.0000001	0.00086256
48	Yes	4	0.0000001	0.00086281
49	Yes	4	0.0000001	0.00085770
50	Yes	4	0.0000001	0.00084982

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	69 - 64	0.563	48	0.0779	0.0490
T2	64 - 44	0.475	48	0.0779	0.0490
T3	44 - 24	0.137	48	0.0481	0.0268

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	6'x3" Pipe Mount	48	0.563	0.0779	0.0490	72405
66.00	LPA-80063/6CF	48	0.511	0.0782	0.0492	72405
55.00	8 FT DISH	48	0.310	0.0694	0.0422	51498

### Maximum Tower Deflections - Design Wind



<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 20 of 23
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 18:29:19 04/19/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	69 - 64	1.603	15	0.2210	0.1416
T2	64 - 44	1.354	15	0.2210	0.1417
T3	44 - 24	0.391	7	0.1369	0.0776

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	6'x3" Pipe Mount	15	1.603	0.2210	0.1416	25239
66.00	LPA-80063/6CF	15	1.455	0.2217	0.1423	25239
55.00	8 FT DISH	15	0.883	0.1971	0.1220	18414

### Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	69	Leg	A325N	0.6250	4	3.77	13491.80	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1099.74	4123.34	0.267 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	452.27	6117.19	0.074 ✓	1.333	Member Bearing
T2	64	Leg	A325N	0.6250	4	5232.42	13498.10	0.388 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4125.08	4123.34	1.000 ✓	1.333	Bolt Shear
T3	44	Leg	A325N	0.6250	4	10315.90	13498.60	0.764 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3747.27	4123.34	0.909 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	283.08	6117.19	0.046 ✓	1.333	Member Bearing

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P / P <sub>a</sub>
T1	69 - 64	ROHN 2 EH	5.00	5.00	78.1 K=1.00	19.390	1.4807	-1214.16	28710.10	0.042* ✓
T2	64 - 44	ROHN 2 X-STR	20.00	4.00	62.6 K=1.00	22.265	1.4773	-22937.10	32890.90	0.697 ✓

<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 21 of 23
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	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJJ

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T3	44 - 24	ROHN 2.5 EH	20.03	5.01	65.0 K=1.00	21.839	2.2535	-44293.30	49214.50	0.900 ✓

\* DL controls

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	7.83	3.80	155.4 K=1.00	6.185	0.5273	-1099.74	3261.42	0.337 ✓
T2	64 - 44	L1 1/2x1 1/2x3/16	7.26	3.52	143.9 K=1.00	7.211	0.5273	-4125.08	3802.92	1.085 ✓
T3	44 - 24	L1 3/4x1 3/4x3/16	9.28	4.66	162.9 K=1.00	5.625	0.6211	-3318.74	3493.47	0.950 ✓

### Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	6.52	6.05	247.6 K=1.00	2.437	0.5273	-457.66	1284.94	0.356 ✓
T3	44 - 24	KL/R > 200 (C) - 6 L1 1/2x1 1/2x3/16	6.56	6.09	249.3 K=1.00	2.403	0.5273	-68.07	1267.12	0.054 ✓
		KL/R > 200 (C) - 51								

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	ROHN 2 EH	5.00	5.00	78.1	30.000	1.4807	15.07	44420.50	0.000 ✓
T2	64 - 44	ROHN 2 X-STR	20.00	4.00	62.6	30.000	1.4773	20929.70	44317.80	0.472 ✓
T3	44 - 24	ROHN 2.5 EH	20.03	5.01	65.0	30.000	2.2535	41263.70	67606.20	0.610 ✓



<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 22 of 23
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### Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	7.83	3.80	102.8	29.000	0.3076	1094.63	8920.90	0.123
T2	64 - 44	L1 1/2x1 1/2x3/16	7.26	3.52	95.4	29.000	0.3076	4045.76	8920.90	0.454
T3	44 - 24	L1 3/4x1 3/4x3/16	8.45	4.26	97.7	29.000	0.3779	3580.65	10960.00	0.327

✓  
✓  
✓

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	6.52	6.05	166.1	29.000	0.2900	452.27	8411.13	0.054
T3	44 - 24	L1 1/2x1 1/2x3/16	6.56	6.09	167.3	29.000	0.2900	262.40	8411.13	0.031*

✓  
✓

\* DL controls

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail
T1	69 - 64	Leg	ROHN 2 EH	2	-1067.02	28710.10	6.7	Pass
T2	64 - 44	Leg	ROHN 2 X-STR	14	-22937.10	43843.57	52.3	Pass
T3	44 - 24	Leg	ROHN 2.5 EH	47	-44293.30	65602.93	67.5	Pass
T1	69 - 64	Diagonal	L1 1/2x1 1/2x3/16	9	-1099.74	4347.47	25.3	Pass
T2	64 - 44	Diagonal	L1 1/2x1 1/2x3/16	20	-4125.08	5069.29	81.4	Pass
T3	44 - 24	Diagonal	L1 3/4x1 3/4x3/16	56	-3318.74	4656.80	71.3	Pass
T1	69 - 64	Top Girt	L1 1/2x1 1/2x3/16	6	-457.66	1712.82	26.7	Pass
T3	44 - 24	Top Girt	L1 1/2x1 1/2x3/16	51	-68.07	1689.07	4.0	Pass
<b>Summary</b>								
Leg (T3)							67.5	Pass
Diagonal (T2)							81.4	Pass
Top Girt (T1)							26.7	Pass
Bolt Checks							75.1	Pass
<b>RATING =</b>							<b>81.4</b>	<b>Pass</b>

### Element Map



<b>RISATower</b>  <b>NATCOMM</b> 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	<b>Job</b> 45ft ROHN SSV Lattice Tower - Rev 2	<b>Page</b> 23 of 23
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Section No.	Section Elevation ft	Component Type	Element List
T1	69.00-64.00	Leg Diagonal Top Girt	1-3 7-12 4-6
T2	64.00-44.00	Leg Diagonal	13-15 16-45
T3	44.00-24.00	Leg Diagonal Top Girt	46-48 52-75 49-51
			Total number of elements: 75

Program Version 5.3.1.0 - 10/3/2008 File:J:/Jobs/1000100.WI/CO13 - Meriden East; 38 Elm St., Meriden, CT/Rev (2)/Calcs/ERI Files/45-ft\_Rohn\_SSV\_Lattice.eri

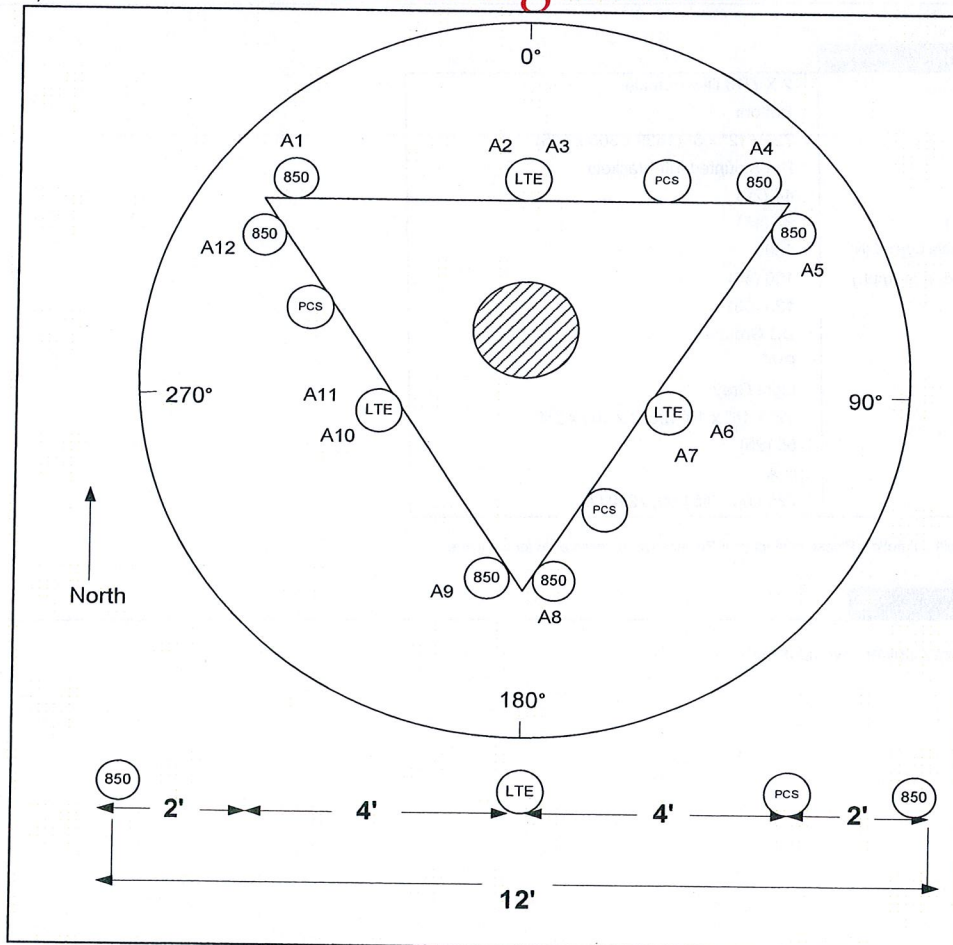


SITE NAME	MERIDEN E CT		ECP - CELL #	2	151
LATITUDE	41-32-03.35 N		LONGITUDE	72-47-47.35 W	
The 3 Swedcom antennas 9212 will be removed to install 3 LTE Antennas.			SAVE BUTTON		
			STRUCTURE TYPE	LATTICE ON ROOF	
700 Mhz - LTE ANTENNA ADD	ALPHA	BETA	GAMMA		
EQUIPMENT TYPE	Lucent	Lucent	Lucent		
ANTENNA TYPE	P65-16-XL-2	P65-16-XL-2	P65-16-XL-2		
QTY OF ANTENNAS PER FACE	1	1	1		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
850 Cellular - Current Config	ALPHA	BETA	GAMMA		
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD		
ANTENNA TYPE	LPA-80080/6CF	LPA-80063/6CF	LPA-80080/6CF		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
850 Cellular - Future Config	ALPHA	BETA	GAMMA		
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD		
ANTENNA TYPE	LPA-80080/6CF	LPA-80063/6CF	LPA-80080/6CF		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
1900 Cellular - Current Config	ALPHA	BETA	GAMMA		
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B		
ANTENNA TYPE	948F85T2E-M_2	948F85T2E-M_2	948F85T2E-M_2		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
1900 Cellular - Future Config	ALPHA	BETA	GAMMA		
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B		
ANTENNA TYPE	948F85T2E-M_2	948F85T2E-M_2	948F85T2E-M_2		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					



NUMBER OF CABLE'S NEEDED						ESTIMATED CABLE LENGTH							
MAINLINE SIZE		1 5/8"		TOTAL # OF MAINLINES		12		MAINLINE (FT)		90			
JUMPER SIZE		1/2 "		TOTAL # OF TOP JUMPERS		12		TOP JUMPER (FT)		10			
TX/RX FREQUENCIES						TX POWER OUTPUT							
Cellular A-Band			PCS F-Band			700 Mhz C - Blo			Cellular (Watts)			20	
TX - 869-880,890-891.5 MHz			TX - 1970-1975			TX - 746-757			PCS (Watts)			16	
RX - 824-835,845-846.5 MHz			RX - 1890-1895			RX - 776-787			LTE (Watts)			40	
ALPHA				BETA				GAMMA					
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code		
A1	800	Tx1/Rx0	RED	A5	800	Tx2/Rx0	BLUE	A9	800	Tx3/Rx0	GREEN		
	1900	Tx1/Rx0	RED/WHITE		1900	Tx2/Rx0	BLUE/WHITE		1900	Tx3/Rx0	GREEN/WHITE		
A2	700	Tx1/Rx0	RED/ORANGE	A6	700	Tx2/Rx0	BLUE/ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE		
A3	700	Tx4/Rx1	RED/RED/ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ORANGE		
	1900	Tx4/Rx1	RED/RED/WHITE		1900	Tx5/Rx1	BLUE/BLUE/WHITE		1900	Tx6/Rx1	GREEN/GREEN/WHITE		
A4	800	Tx4/Rx1	RED/RED	A8	800	Tx5/Rx1	BLUE/BLUE	A12	800	Tx6/Rx1	GREEN/GREEN		
RF ENGINEER				RF MANAGER				INITIALS		DATE			
Prepared By : Dany Bustamante				Steve Weatherbee				DB		1/6/2010			

## Site Configuration



# P65-16-XL

## Very Low Broadband Antennas

### -2

POLARIZATION: Dual linear  $\pm 45^\circ$   
 FREQUENCY (MHz): 698-894  
 HORIZONTAL BEAM WIDTH ( $^\circ$ ): 65  
 GAIN (dBi/dBd): 16.0/13.9  
 TILT: 2  
 LENGTH: 72"

#### ELECTRICAL SPECIFICATIONS\*

	698-806	698-894	806-894
Frequency range (MHz)			
Frequency band (MHz)	698-806		806-894
Gain (dBi/dBd)	15.5/13.4		16.0/13.9
Polarization			
Nominal Impedance ( $\Omega$ )			
VSWR			
Horizontal beam width, -3 dB ( $^\circ$ )	68		65
Vertical beam width, -3 dB ( $^\circ$ )	10.5		9.5
Electrical down tilt ( $^\circ$ )			
Side lobe suppression, vertical 1st upper (dB)	> 15		> 15
Isolation between inputs (dB)	> 30		> 30
Tracking, horizontal plane $\pm 60^\circ$ (dB)	< 2		< 2
First null fill (dB)	-		-
Vertical beam squint ( $^\circ$ )	< 0.5		< 0.5
Front to back ratio (dB)	> 30		> 30
Front to back ratio, total power (dB)	> 25		> 25
Cross polar discrimination (XPD) $0^\circ$ (dB)	> 15	> 15	
Cross polar discrimination (XPD) $\pm 60^\circ$ (dB)	> 10		> 10
Far field coupling			
IM3, 2xTx@43dBm (dBc)	-153		
IM7, 2xTx@43dBm (dBc)			
Power handling, average per input (W)			
Power handling, average total (W)			

#### MECHANICAL SPECIFICATIONS\*

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 5" (1829 x 305 x 125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	44 (20)
Weight, without brackets, kg (lbs)	33 (15)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Radome colour	Light Grey
Package size, HxWxD, mm (ft)	82" x 16" x 10" (2082 x 400 x 255)
Shipping weight, kg (lbs)	55 (25)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

\*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

#### ANTENNA PATTERNS\*

For detailed patterns visit <http://www.powerwave.com/rpa/>.



# Vertically Polarized, Log Periodic 80° / 14 dBd

## LPA-80080/6CF

When ordering replace "\_\_\_" with connector type.

### Mechanical specifications

Length	1800 mm	70.9 in
Width	140 mm	5.5 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
4) Weight	9.5 kg	21.0 lbs
Wind Area		
Fore/Aft	0.25 m <sup>2</sup>	2.7 ft <sup>2</sup>
Side	0.60 m <sup>2</sup>	6.5 ft <sup>2</sup>
Rated Wind Velocity (Safety factor 2.0)	>295 km/hr	>183 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	415 N	93.3 lbs
Side	870 N	195.6 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

### Mounting and Downtilting

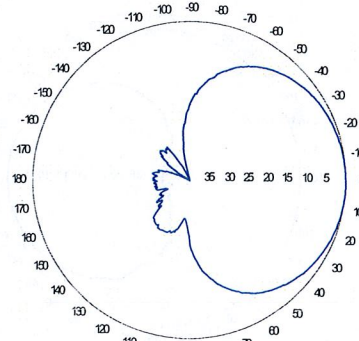
Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit  
#21699999

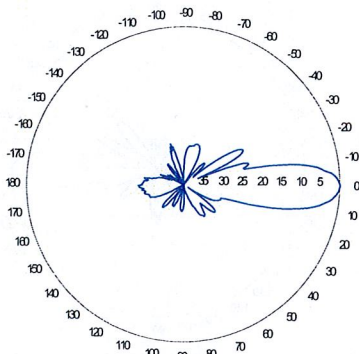
### Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
3) Connector(s)	NE or E-DIN 1 port / center
1) VSWR	≤ 1.4:1
Polarization	Vertical
1) Gain	14 dBd
2) Power Rating	500 W
1) Half Power Angle	
H-Plane	80°
E-Plane	10°
1) Electrical Downtilt	0°
1) Null Fill	10%
Lightning Protection	Direct Ground

### Radiation pattern<sup>1)</sup>



Horizontal

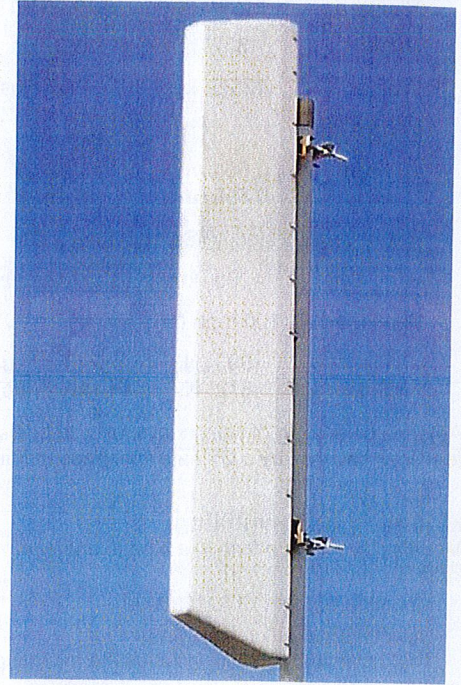


Vertical

### Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



**Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:**

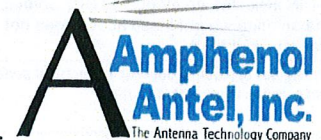
- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

*This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.*

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

**806-960 MHz**



Revision Date: 7/5/07

1) Typical values.  
2) Power rating limited by connector only.  
3) NE indicates an elongated N connector.  
E-DIN indicates an elongated DIN connector.  
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.



# Vertically Polarized, Log Periodic 63° / 14.5 dBd

## Mechanical specifications

Length	1800 mm	70.87 in
Width	380 mm	14.96 in
Depth	332 mm	13.07 in
<sup>4)</sup> Weight	12.25 kg	27 lbs
Wind Area		
Front	0.684 m <sup>2</sup>	7.39 ft <sup>2</sup>
Side	0.598 m <sup>2</sup>	6.45 ft <sup>2</sup>
Rated Wind Velocity (Safety factor 2.0)		
	>235 km/hr	>146 mph
Wind load @ 100 mph (161 km/hr)		
Front	993 N	223.3 lbs
Side	872 N	196.1 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

## Mounting & Downtilting:

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

Mounting bracket kit #21699999

Downtilt bracket kit #21699999

The downtilt bracket kit includes the mounting bracket kit.

## Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
<sup>3)</sup> Connector	NE, E-DIN
<sup>1)</sup> VSWR	≤1.4:1
Polarization	Vertical
<sup>1)</sup> Gain	14.5 dBd
<sup>2)</sup> Power Rating	500 W
<sup>1)</sup> Half Power Angle	
H-Plane	63°
E-Plane	10°
<sup>1)</sup> Electrical Downtilt	0°
<sup>1)</sup> Null Fill	10%
Lightning Protection	Direct Ground

<sup>1)</sup> Typical Values

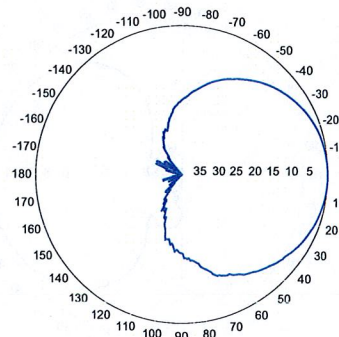
<sup>2)</sup> Power Rating limited by connector only.

<sup>3)</sup> NE indicates an elongated N Connector.  
E-DIN indicates an elongated DIN Connector.

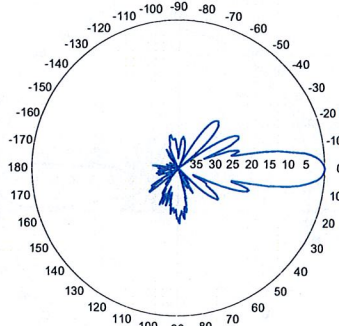
<sup>4)</sup> The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

## Radiation-pattern <sup>1)</sup>



Horizontal



Vertical

## Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

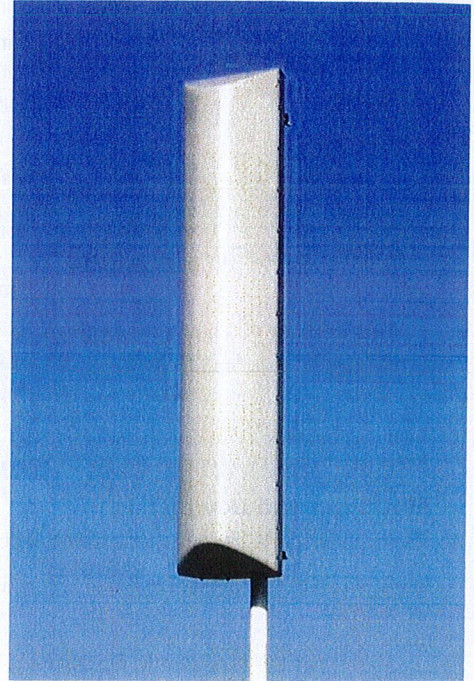
Mounting on a metal pole will typically improve the Front-to-Back Ratio.

CF Denotes a Center-Fed Connector.

## 806-960 MHz

## LPA-80063/6CF

When ordering, replace "\_\_\_" with connector type.



Amphenol Antel's  
Exclusive 3T (True  
Transmission Line  
Technology)  
Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Every Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

**Amphenol  
Antel, Inc.**  
The Antenna Technology Company

Revision Date: 12/1/05



**DECIBEL®**  
Base Station Antennas

**948F85T2E-M**

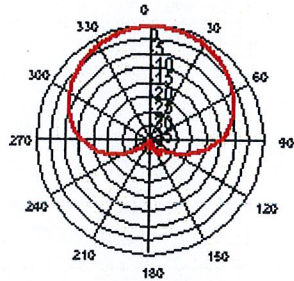
16.1 dBi, Directed Dipole Antenna  
1850-1990 MHz

**1850-1990 MHz**

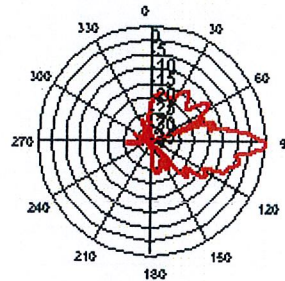
**MaxFill™**  
**dB Director®**

- Exceptional azimuth roll-off reducing soft hand-offs and improving capacity
- Excellent upper side lobe suppression
- Deep null filling below the horizon assures improved signal intensity
- Low profile appearance and low wind loading profile for easier zoning approvals

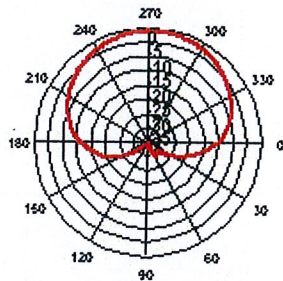
**85°**



Azimuth 1850 MHz (Tilt=2)



Vertical 1850 MHz (Tilt=2)



Horizontal 1850 MHz (Tilt=2)



**ELECTRICAL**

Frequency (MHz):	1850-1990
Polarization:	Vertical
Gain (dBd/dBi):	14/16.1
Azimuth BW:	85°
Elevation BW:	8°
Beam Tilt:	2°
USLS* (dB):	>18
Null Fill* (dB):	15
Front-to-Back Ratio* (dB):	40
VSWR:	<1.33:1
IM Suppression - Two 20 Watt Carriers:	-150 dBc
Impedance:	50 Ohms
Max Input Power:	250 Watts
Lightning Protection:	DC Ground
Opt Electrical Tilt:	0°, 4°, 6°

**MECHANICAL**

Weight:	8.5 lbs (3.9 kg)
Dimensions (LxWxD):	48 X 3.5 X 7 in (1219 X 89 X 178 mm)
Max. Wind Area:	1.18 ft² (0.11 m²)
Max. Wind Load (@ 100mph):	65 lbf (289 N)
Max. Wind Speed:	125 mph (201 km/h)
Radiator Material:	Low Loss Circuit Board
Reflector Material:	Aluminum
Radome Material:	ABS, UV Resistant
Mounting Hardware Material:	Galvanized Steel
Connector Type:	7-16 DIN - Female (Bottom)
Color:	Light Gray
Standard Mounting Hardware:	DB390 Pipe Mount Kit, included
Downtilt Mounting Hardware:	DB5098, optional
Opt. Mounting Hardware:	DB5094-AZ Azimuth Wall Mount



Andrew Corporation  
8635 Stemmons Freeway  
Dallas, Texas U.S.A 75247-3701  
Tel: 214.631.0310

Fax: 214.631.4706  
Toll Free Tel: 1.800.676.5342  
Fax: 1.800.229.4706  
www.andrew.com

Date: 4/29/2004  
\* - Indicates Typical Values

dbtech@andrew.com





# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

Internet: [ct.gov/csc](http://ct.gov/csc)

Daniel F. Caruso  
Chairman

March 10, 2010

Kenneth C. Baldwin, Esq.  
Robinson & Cole LLP  
280 Trumbull Street  
Hartford, CT 06103-3597

RE: **EM-VER-080-100114** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 38 Elm Street, Meriden, Connecticut.

Dear Attorney Baldwin:

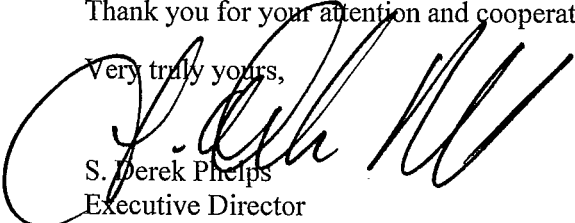
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated January 14, 2010 and additional information received January 20, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

  
S. Derek Phelps  
Executive Director

SDP/MP/laf

c: The Honorable Michael S. Rohde, Mayor, City of Meriden  
Lawrence Kendzior, City Manager, City of Meriden  
Dominick Caruso, City Planner, City of Meriden  
John Arnold

**Perrone, Michael**

---

**From:** Mayo, Rachel [rmayo@RC.com]  
**Sent:** Wednesday, January 20, 2010 3:41 PM  
**To:** Perrone, Michael  
**Cc:** Alexandria.Carter@VerizonWireless.com; Baldwin, Kenneth; Mayo, Rachel  
**Subject:** Verizon- 38 Elm Street, Meriden

Mike, as discussed, I went back through our file and found that Verizon will be removing only the 3 Swedcom panel antennas and replacing them with the LTE antennas. Our cover letter filed January 14, 2010 mistakenly said that Verizon would be removing its 6 PCS antennas and replacing them with 3 newer model PCS antennas and 3 LTE antennas instead of saying they would be removing 3 Swedcom antennas and replacing them with 3 LTE antennas. The structural submitted with the filing is correct.

Sorry for the confusion.

**Rachel A. Mayo**

Land Use Analyst

**Robinson & Cole LLP**  
280 Trumbull Street  
Hartford, CT 06103-3597  
Direct 860-275-8213 | Fax 860-275-8299  
[rmayo@rc.com](mailto:rmayo@rc.com) | [www.rc.com](http://www.rc.com)  
[Bio](#) | [Contact Card](#)

Boston Providence Hartford New London  
Stamford New York Albany White Plains Sarasota



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STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

January 19, 2010

The Honorable Michael S. Rohde  
Mayor  
City of Meriden  
City Hall  
142 East Main Street  
Room 124  
Meriden, CT 06450

RE: **EM-VER-080-100114** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 38 Elm Street, Meriden, Connecticut.

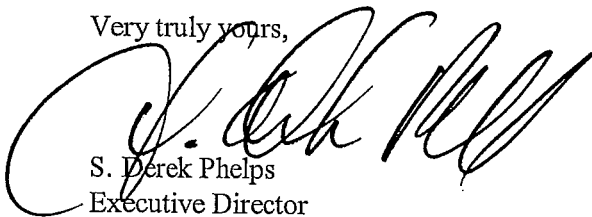
Dear Mayor Rohde:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by February 2, 2010.

Thank you for your cooperation and consideration.

Very truly yours,



S. Derek Phelps  
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Lawrence Kendzior, City Manager, City of Meriden  
Dominick Caruso, City Planner, City of Meriden

EM-VER-080-100114

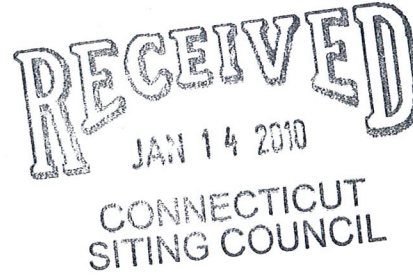
280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

ORIGINAL

January 14, 2010

*Via Hand Delivery*

S. Derek Phelps  
Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051



Re: **Notice of Exempt Modification – Antenna Swap  
38 Elm Street, Meriden, Connecticut**

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the top of the existing 45-foot roof-mounted tower at the above-referenced address. The overall centerline height of the Cellco antennas is 66 feet above ground level. The Council approved Cellco’s shared use of the existing tower in 1995. Cellco now intends to modify its installation by replacing six of its PCS antennas with three (3) model BXA 185063/8CF PCS antennas and three (3) model P65-16-XL-2 LTE (700 MHz) antennas, all at the same level on the tower. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Michael S. Rohde, Mayor for the City of Meriden. A copy of this letter is also being sent to Ashley Harriman LLC, the owner of the roof-mounted tower and underlying property.

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

1. The proposed modifications will not result in any increase in the overall height of the existing tower. Cellco’s antennas will be located at the same level on the existing tower.



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www.rc.com

S. Derek Phelps  
January 14, 2010  
Page 2

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Michael S. Rohde, Meriden Mayor  
Ashley Harriman LLC  
Sandy M. Carter





# LPA-185063/8CF

When ordering replace "\_\_\_" with connector type.

## Mechanical specifications

Length	1200 mm	47.2 in
Width	167 mm	6.6 in
Depth	148 mm	5.8 in
Depth with t-bracket	176 mm	6.9 in
4) Weight	4.1 kg	9.0 lbs
Wind Area		
Fore/Aft	0.20 m <sup>2</sup>	2.2 ft <sup>2</sup>
Side	0.18 m <sup>2</sup>	1.9 ft <sup>2</sup>
Rated Wind Velocity (Safety factor 2.0)	>548 km/hr >341 mph	
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	299 N	67.2 lbs
Side	267 N	60.0 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

## Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

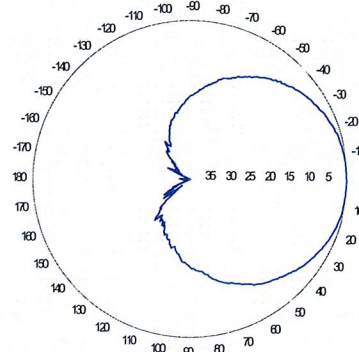
Mounting bracket kit #26799997  
Downtilt bracket kit #26799999

The downtilt bracket kit includes the mounting bracket kit.

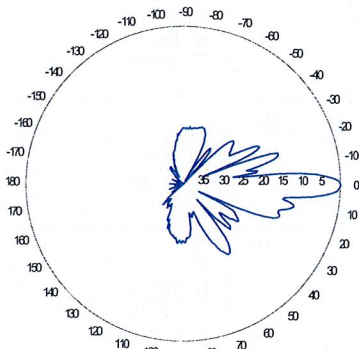
## Electrical specifications

Frequency Range	1850-1990 MHz
Impedance	50Ω
3) Connector(s)	NE or E-DIN 1 port / center
1) VSWR	≤ 1.4:1
Polarization	Vertical
1) Gain	18 dBi
2) Power Rating	250 W
1) Half Power Angle	
H-Plane	63°
E-Plane	8°
1) Electrical Downtilt	0°
1) Null Fill	10-20%
Lightning Protection	Direct Ground

## Radiation pattern<sup>1)</sup>



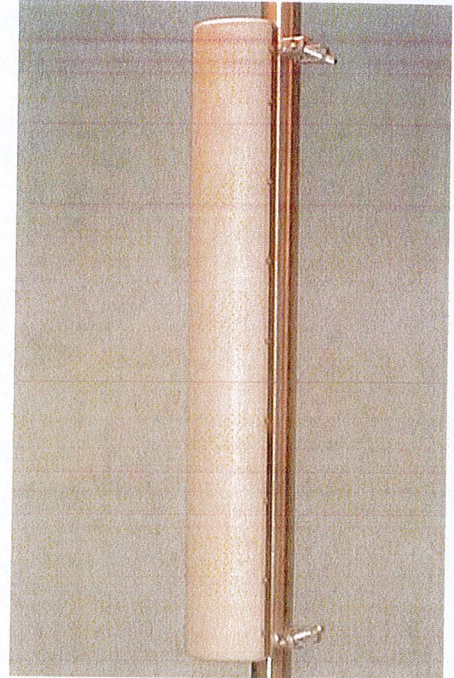
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



**Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:**

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

*This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.*

**Antenna available with center-fed connector only.**

1) Typical values.  
2) Power rating limited by connector only.  
3) NE indicates an elongated N connector.  
E-DIN indicates an elongated DIN connector.  
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

**CF Denotes a Center-Fed Connector.**

**1850-1990 MHz**

# P65-16-XL

## Very Low Broadband Antennas

### -2

POLARIZATION: Dual linear  $\pm 45^\circ$   
 FREQUENCY (MHz): 698-894  
 HORIZONTAL BEAM WIDTH ( $^\circ$ ): 65  
 GAIN (dBi/dBd): 16.0/13.9  
 TILT: 2  
 LENGTH: 72"

#### ELECTRICAL SPECIFICATIONS\*

	698-806	698-894	806-894
Frequency range (MHz)	698-806	698-894	806-894
Frequency band (MHz)	698-806	698-894	806-894
Gain (dBi/dBd)	15.5/13.4		16.0/13.9
Polarization			
Nominal Impedance ( $\Omega$ )			
VSWR			
Horizontal beam width, -3 dB ( $^\circ$ )	68		65
Vertical beam width, -3 dB ( $^\circ$ )	10.5		9.5
Electrical down tilt ( $^\circ$ )			
Side lobe suppression, vertical 1st upper (dB)	> 15		> 15
Isolation between inputs (dB)	> 30		> 30
Tracking, horizontal plane $\pm 60^\circ$ (dB)	< 2		< 2
First null fill (dB)	-		-
Vertical beam squint ( $^\circ$ )	< 0.5		< 0.5
Front to back ratio (dB)	> 30		> 30
Front to back ratio, total power (dB)	> 25		> 25
Cross polar discrimination (XPD) $0^\circ$ (dB)	> 15	> 15	> 25
Cross polar discrimination (XPD) $\pm 60^\circ$ (dB)	> 10		> 10
Far field coupling			
IM3, 2xTx@43dBm (dBc)	-153		
IM7, 2xTx@43dBm (dBc)			
Power handling, average per input (W)			
Power handling, average total (W)			

#### MECHANICAL SPECIFICATIONS\*

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 5" (1829 x 305 x 125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	44 (20)
Weight, without brackets, kg (lbs)	33 (15)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Radome colour	Light Grey
Package size, HxWxD, mm (ft)	82" x 16" x 10" (2082 x 400 x 255)
Shipping weight, kg (lbs)	55 (25)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

\*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

#### ANTENNA PATTERNS\*

For detailed patterns visit <http://www.powerwave.com/rpa/>.



General Power Density

Site Name: MERIDEN EAST, CT  
 Cumulative Power Density

Operator	Operating Frequency (MHz)	Number of Trans.	ERP Per Trans. (watts)	Total ERP (watts)	Distance to Target (feet)	Calculated Power Density (mW/cm <sup>2</sup> )	Maximum Permissible Exposure* (mW/cm <sup>2</sup> )	Fraction of MPE (%)
VZW PCS	1970	3	483	1449	66	0.1196	1.0	11.96%
VZW Cellular	869	9	428	3852	66	0.3180	0.579333	54.89%
VZW 700	757	1	682	682	66	0.0563	0.497333	11.32%
<b>Total Percentage of Maximum Permissible Exposure</b>								<b>78.18%</b>

\*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz

mW/cm<sup>2</sup> = milliwatts per square centimeter

ERP = Effective Radiated Power

Absolute worst case maximum values used.



## Structural Analysis Report

*45' Existing Lattice Tower*

*Proposed Verizon Wireless  
LTE Antenna Installation*

*Verizon Site Ref: Meriden East*

*38 Elm Street  
Meriden, CT*

*Natcomm Project No. 10001-CO13*

*~~Date: December 18, 2009~~  
Rev. 1: January 13, 2010*



**Prepared for:**

*Verizon Wireless  
99 East River Road, 9<sup>th</sup> Floor  
East Hartford, CT 06108*

p: 203.488.0580  
f: 203.488.8587  
w: nat-eng.com  
63-2 N. Branford Rd.  
Branford, CT 06405

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- TOWER LOADING.
- TOWER CAPACITY.
- STEEL DUNAGE FRAME AND ANCHORS.
- CONCLUSION.

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- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM.

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- RISATower FEED LINE DISTRIBUTION CHART.
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- VERIZON RF DATA SHEET.
- ANTENNA CUT SHEETS.

## Introduction

The purpose of this report is to summarize the results of the non-linear, P- $\Delta$  structural analysis of the antenna installation proposed by Verizon Wireless on the existing self supporting lattice tower located in Meriden, Connecticut.

The host tower is a 65-ft AGL (45-ft tower mounted on a  $\pm 24'$  steel dunage frame), three legged, tapered lattice tower originally designed and manufactured by ROHN eng. file no. 31065JC, dated November 1994. The tower geometry and structure member sizes were obtained from the aforementioned ROHN design documents.

Antenna and appurtenance inventory were taken from the aforementioned ROHN design documents and a Verizon RF data sheet.

The tower is made of three (3) tapered vertical sections consisting of pipe legs and diagonal lateral support bracing consisting of structural steel angle shapes. The vertical tower sections are connected by bolted flange plates while legs and bracing are connected by bolted gusset connections. The width of the tower face is 6.52-ft at the top and 8.56-ft at the base.

Verizon Wireless proposes the removal of three (3) panel antennas and the installation of three (3) panel antennas. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

## Antenna and Appurtenance Summary

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

- **VERIZON (Existing to Remain):**  
Antennas: Four (4) Antel LPA-80080/6CF, two (2) Antel LPA-80063/6CF and six (6) Decibel 948F85T2E-M panel antennas mounted on three (3) 15' Boom Gates with a RAD center elevation of  $\pm 66$ -ft above finished grade ( $\pm 42$ -ft above tower base).  
Coax Cables: Twelve (12) 1-5/8"  $\varnothing$  coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **TOWN (Reserved):**  
Antennas: One (1) 8-ft parabolic dish mounted on one (1) 6-ft x 3-in pipe with a RAD center elevation of  $\pm 55$ -ft above finished grade ( $\pm 31$ -ft above tower base).  
Coax Cables: One (1) WE65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (Existing to Remove):**  
Antennas: Three (3) Swedcom ALP9212-N panel antennas mounted on three (3) 15' Boom Gates with a RAD center elevation of  $\pm 66$ -ft above finished grade ( $\pm 42$ -ft above tower base).  
Coax Cables: Three (3) 1-5/8"  $\varnothing$  coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **VERIZON (Proposed):**  
**Antennas:** Three (3) Powerwave P65-16-XL-2 panel antennas mounted on three (3) existing 15' Boom Gates with a RAD center elevation of  $\pm 66$ -ft above finished grade ( $\pm 42$ -ft above tower base).

### Primary Assumptions Used in the Analysis

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

### Analysis

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

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with  $\frac{1}{2}$  inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

## Tower Loading

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

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



## Tower Capacity

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

Calculated stresses were found to be within allowable limits. In Load Case 2, per RISATower "Section Capacity Table", this tower was found to be at **81.1%** of its total capacity.

<b>Tower Section</b>	<b>Elevation</b>	<b>Stress Ratio (percentage of capacity)</b>	<b>Result</b>
Leg (T3)	20'-0"-40'-0"	72.3%	<b>PASS</b>
Diagonal (T2)	40'-0"-60'-0"	81.1%	<b>PASS</b>

## Steel Dunnage Frame and Anchors

The existing steel dunnage frame consists of W beams and bracing bearing on four (4) HSS14x14 steel columns.

Tower legs are connected to the steel dunnage frame by means of (4) 5/8" Ø, ASTM A325 anchor bolts per leg via a 5"x5"x3/4" base plate.

Review of the steel dunnage frame and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower leg reactions developed from the governing Load Case 2 were used in the verification of the steel dunnage frame. The steel dunnage frame was found to be within allowable limits

<b>Reactions</b>	<b>Design Loading <sup>(1)</sup></b>	<b>Proposed Loading</b>	<b>Result</b>
Compression	50.9 kips	46.5 kips	<b>PASS</b>
Tension	46.3 kips	43.3 kips	<b>PASS</b>
Total Shear	10.7 kips	10.5 kips	<b>PASS</b>
Overturning Moment	356.3 ft-kips	333 kip-ft	<b>PASS</b>

Note: (1) Design loading taken from ROHN design documents eng. file no. 31065JC, drawing no. C941513 dated November 1994.

Natcomm, Inc.  
Verizon Wireless LTE Antenna Installation  
Structural Analysis - 45-ft Existing SSV Lattice Tower  
Meriden, CT  
Rev 1 ~ January 13, 2010

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	57.1%	PASS

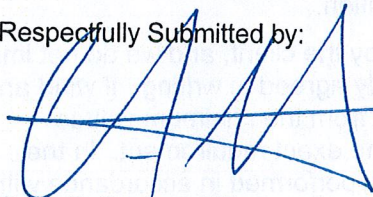
### Conclusion

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

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

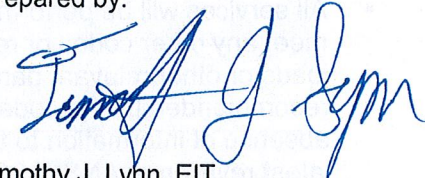
Please feel free to call with any questions or comments.

Respectfully Submitted by:

  
Carlo F. Centore, PE  
Principal ~ Structural Engineer



Prepared by:

  
Timothy J. Lynn, EIT  
Structural Engineer

*Standard Conditions for Furnishing of  
Professional Engineering Services on  
Existing Structures*

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

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

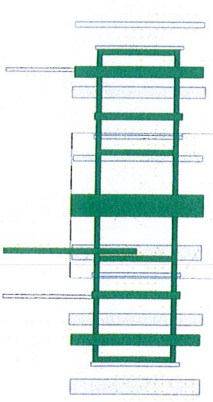
## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

### RISATower Features:

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

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Chfs	Face Width (ft)	# Panels @ (ft)	Weight (lb)
11	ROHN 2.5 EH	A572-50	L1 3/4x1 3/4x1/16	L1 1/2x1 1/2x3/16	L1 1/2x1 1/2x3/16	8.563	4 @ 5	1822.1
12	ROHN 2 X-STR	A572-50	L1 3/4x1 3/4x1/16	L1 1/2x1 1/2x3/16	N/A	6.563	5 @ 4	835
13	ROHN 2 EH	A572-50	L1 3/4x1 3/4x1/16	L1 1/2x1 1/2x3/16	L1 1/2x1 1/2x3/16	8.563	1 @ 5	1822.1



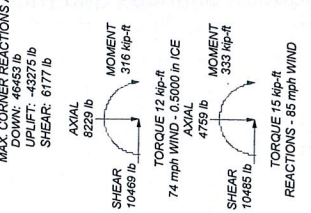
ELEVATION	TYPE	GRADE	Fy	Fu	GRADE	Fy	Fu
66	DB84RF872E-M (Verizon)	A572-50	50 ksi	65 ksi	A55	36 ksi	50 ksi
66	LPA-800B-OCF (Verizon)						
66	6x3" Pipe Mount (Emery)						
66	6x3" Pipe Mount (Emery)						
66	LPA-800B-OCF (Verizon)						
66	DB84RF872E-M (Verizon)						
66	PRE-16-XL-2 (Verizon Proposed)						
66	DB84RF872E-M (Verizon)						
66	LPA-800B-OCF (Verizon)						
66	6x4" Pipe Mount (Town Reserved)						
66	8 FT DISH (Town Reserved)						

ELEVATION	TYPE	GRADE	Fy	Fu
66	DB84RF872E-M (Verizon)	A55	36 ksi	50 ksi
66	LPA-800B-OCF (Verizon)			
66	6x3" Pipe Mount (Emery)			
66	6x3" Pipe Mount (Emery)			
66	LPA-800B-OCF (Verizon)			
66	DB84RF872E-M (Verizon)			
66	PRE-16-XL-2 (Verizon Proposed)			
66	DB84RF872E-M (Verizon)			
66	LPA-800B-OCF (Verizon)			
66	6x4" Pipe Mount (Town Reserved)			
66	8 FT DISH (Town Reserved)			

**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATINGS: 81.1%

**MAX. CORNER REACTIONS AT BASE:**

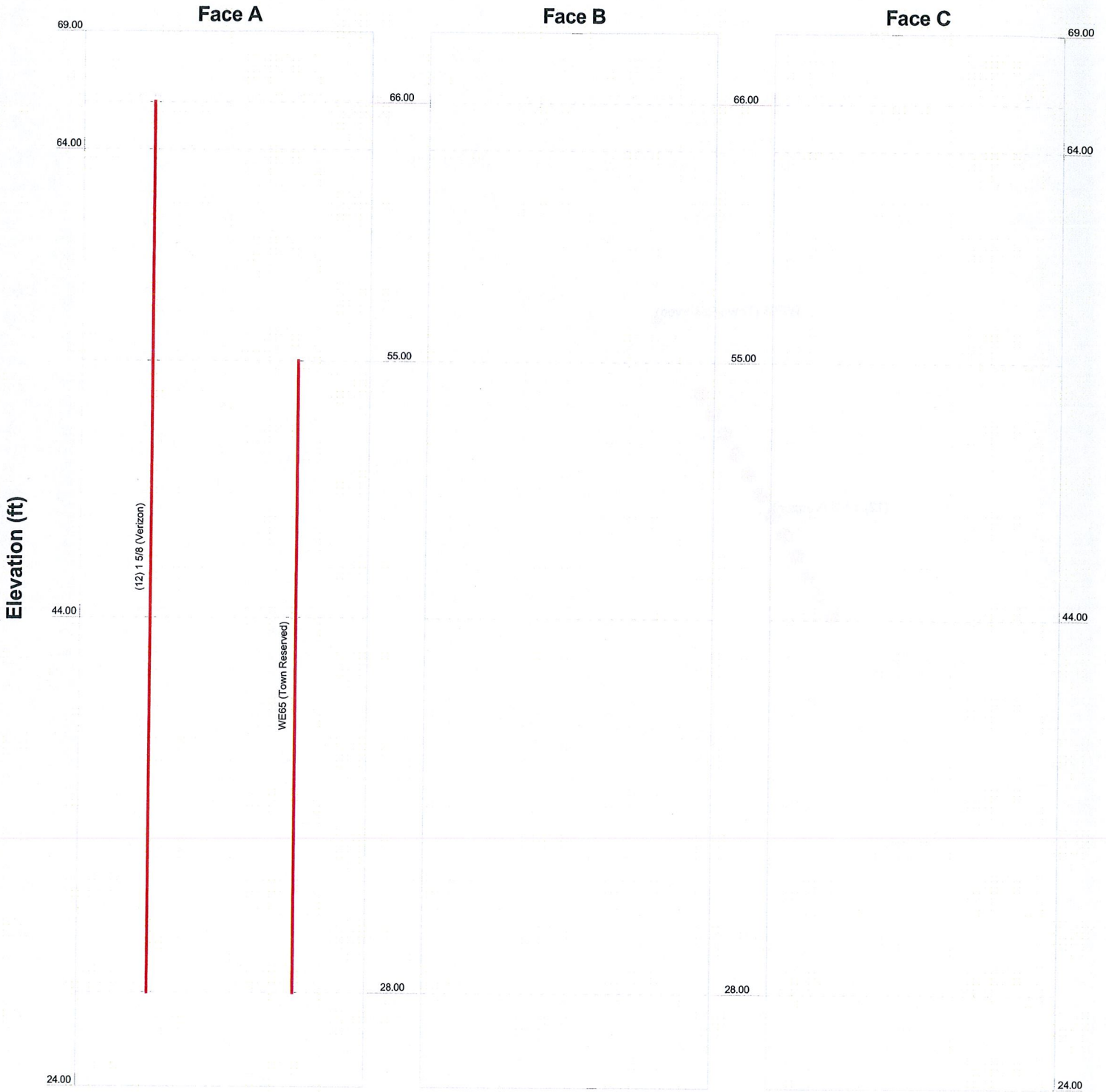




# Feedline Distribution Chart

## 24' - 69'

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

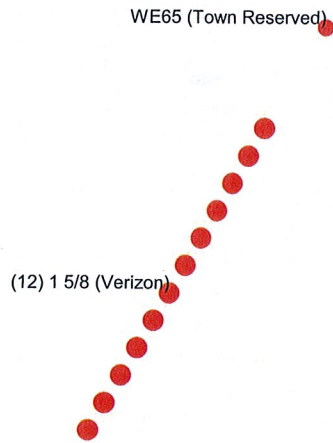


<b>NATCOMM</b>		<b>Job: 45ft ROHN SSV Lattice Tower</b>	
Project: <b>10001.CO13 -38 Elm St., Meriden, CT</b>			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 01/13/10	Scale: NTS	
Path:	Dwg No. E-7		



# Feedline Plan

Round \_\_\_\_\_ Flat \_\_\_\_\_ App In Face \_\_\_\_\_ App Out Face \_\_\_\_\_



<b>NATCOMM</b>		<b>Job: 45ft ROHN SSV Lattice Tower</b>	
63-2 N. Branford Rd.		Project: 10001.CO13 -38 Elm St., Meriden, CT	
Branford, CT 06405		Client: Verizon Wireless	Drawn by: TJL
Phone: (203) 488-0580		Code: TIA/EIA-222-F	Date: 01/13/10
FAX: (203) 488-8587		Path:	Scale: NTS
		Dwg No. E-7	

<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 1 of 22
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 13:35:58 01/13/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> T.JL

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 69.00 ft above the ground line.  
 The base of the tower is set at an elevation of 24.00 ft above the ground line.  
 The face width of the tower is 6.52 ft at the top and 8.56 ft at the base.  
 This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

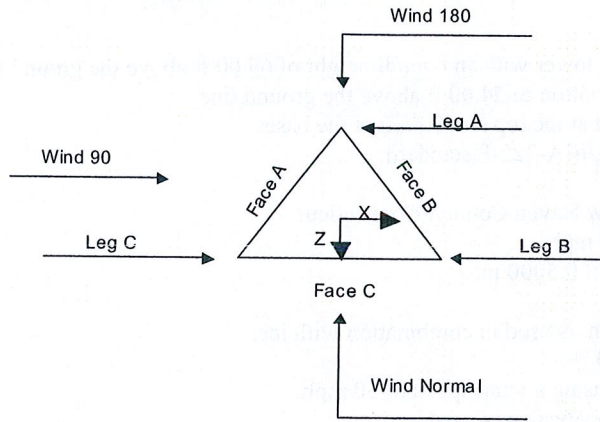
- Tower is located in New Haven County, Connecticut.
- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 74 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 50 mph.
- A non-linear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

## Options

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> </ul> | <ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="padding-left: 20px;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 2 of 22
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 13:35:58 01/13/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL



Triangular Tower

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	69.00-64.00			6.52	1	5.00
T2	64.00-44.00			6.52	1	20.00
T3	44.00-24.00			6.56	1	20.00

**Tower Section Geometry (cont'd)**

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	69.00-64.00	5.00	X Brace	No	No	0.0000	0.0000
T2	64.00-44.00	4.00	X Brace	No	No	0.0000	0.0000
T3	44.00-24.00	5.00	X Brace	No	No	0.0000	0.0000

**Tower Section Geometry (cont'd)**



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 3 of 22
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	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 69.00-64.00	Pipe	ROHN 2 EH	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 64.00-44.00	Pipe	ROHN 2 X-STR	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 44.00-24.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 69.00-64.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 44.00-24.00	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 69.00-64.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 64.00-44.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 44.00-24.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

### Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors <sup>1</sup>							
				X Brace Diags	X Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
T1 69.00-64.00	Yes	No	1	1	1	1	1	1	1	1	1
T2 64.00-44.00	Yes	No	1	1	1	1	1	1	1	1	1
T3 44.00-24.00	Yes	No	1	1	1	1	1	1	1	1	1

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



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 4 of 22
	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 13:35:58 01/13/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 69.00-64.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 64.00-44.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 44.00-24.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
in	in	in	in	in	in	in	in	
T1 69.00-64.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 64.00-44.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 44.00-24.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	No.	Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
				Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
				T1 69.00-64.00	Flange	0.6250	4	0.5000	1	0.6250	1	0.6250	0	0.6250	0
T2 64.00-44.00	Flange	0.6250	4	0.5000	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T3 44.00-24.00	Flange	0.6250	4	0.5000	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Per Row	#	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon)	A	Yes	Ar (CfAe)	66.00 - 28.00	3.0000	0	12	12	1.0000	1.9800		1.04
WE65	A	Yes	Ar (CfAe)	55.00 - 28.00	3.0000	0.28	1	1	1.5836	1.5836		0.53



# RISATower

**NATCOMM**  
63-2 N. Branford Rd.  
Branford, CT 06405  
Phone: (203) 488-0580  
FAX: (203) 488-8587

<b>Job</b>	45ft ROHN SSV Lattice Tower	<b>Page</b>	5 of 22
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<b>Client</b>	Verizon Wireless	<b>Designed by</b>	TJL

Description	Face or Leg	Allow or Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Per Row	#	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(Town Reserved)												

## Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
T1	69.00-64.00	A	3.960	0.000	0.000	0.000	24.96
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	64.00-44.00	A	41.052	0.000	0.000	0.000	255.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	44.00-24.00	A	33.791	0.000	0.000	0.000	208.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

## Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
T1	69.00-64.00	A	0.500	0.497	5.463	0.000	0.000	77.62
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	64.00-44.00	A	0.500	7.335	54.633	0.000	0.000	796.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	44.00-24.00	A	0.500	7.418	43.707	0.000	0.000	649.83
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

## Feed Line Shielding

Section	Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>R</sub> Ice ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	A <sub>F</sub> Ice ft <sup>2</sup>
T1	69.00-64.00	A	0.000	0.350	0.349	0.525
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	64.00-44.00	A	0.000	3.026	3.007	4.540
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	44.00-24.00	A	0.000	2.260	2.579	3.903
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 6 of 22
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### Feed Line Center of Pressure

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
T1	69.00-64.00	-4.6697	-2.6960	-3.8736	-2.2364
T2	64.00-44.00	-9.7015	-5.9855	-8.3772	-5.2326
T3	44.00-24.00	-8.3360	-5.4138	-7.4528	-4.9421

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz Lateral	Vert					
6'x3" Pipe Mount (Empty)	A	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00	0.0000		1/2" Ice	2.13	2.13	47.98
			0.00	0.0000					
6'x3" Pipe Mount (Empty)	B	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00	0.0000		1/2" Ice	2.13	2.13	47.98
			0.00	0.0000					
6'x3" Pipe Mount (Empty)	C	From Face	4.00	0.0000	69.00	No Ice	1.77	1.77	34.74
			2.00	0.0000		1/2" Ice	2.13	2.13	47.98
			0.00	0.0000					
LPA-80063/6CF (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	10.31	9.01	27.00
			-6.00	0.0000		1/2" Ice	10.87	9.55	100.95
			0.00	0.0000					
DB948F85T2E-M (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			-4.00	0.0000		1/2" Ice	2.22	3.62	27.57
			0.00	0.0000					
P65-16-XL-2 (Verizon Proposed)	A	From Face	4.00	0.0000	66.00	No Ice	8.40	4.12	20.00
			0.00	0.0000		1/2" Ice	8.95	4.56	64.53
			0.00	0.0000					
DB948F85T2E-M (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			4.00	0.0000		1/2" Ice	2.22	3.62	27.57
			0.00	0.0000					
LPA-80063/6CF (Verizon)	A	From Face	4.00	0.0000	66.00	No Ice	10.31	9.01	27.00
			6.00	0.0000		1/2" Ice	10.87	9.55	100.95
			0.00	0.0000					
LPA-80080-6CF (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			-6.00	0.0000		1/2" Ice	4.76	9.64	69.24
			0.00	0.0000					
DB948F85T2E-M (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			-4.00	0.0000		1/2" Ice	2.22	3.62	27.57
			0.00	0.0000					
P65-16-XL-2 (Verizon Proposed)	B	From Face	4.00	0.0000	66.00	No Ice	8.40	4.12	20.00
			0.00	0.0000		1/2" Ice	8.95	4.56	64.53
			0.00	0.0000					
DB948F85T2E-M (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			4.00	0.0000		1/2" Ice	2.22	3.62	27.57
			0.00	0.0000					
LPA-80080-6CF (Verizon)	B	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			6.00	0.0000		1/2" Ice	4.76	9.64	69.24
			0.00	0.0000					



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 7 of 22
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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
LPA-80080-6CF (Verizon)	C	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			-6.00			1/2" Ice	4.76	9.64	69.24
			0.00						
DB948F85T2E-M (Verizon)	C	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			-4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
P65-16-XL-2 (Verizon Proposed)	C	From Face	4.00	0.0000	66.00	No Ice	8.40	4.12	20.00
			0.00			1/2" Ice	8.95	4.56	64.53
			0.00						
DB948F85T2E-M (Verizon)	C	From Face	4.00	0.0000	66.00	No Ice	1.92	3.26	8.50
			4.00			1/2" Ice	2.22	3.62	27.57
			0.00						
LPA-80080-6CF (Verizon)	C	From Face	4.00	0.0000	66.00	No Ice	4.33	9.09	21.00
			6.00			1/2" Ice	4.76	9.64	69.24
			0.00						
Rohn 6'x15' Boom Gate (3) (Verizon)	A	None		0.0000	66.00	No Ice	53.20	53.20	1790.00
6'x4" Pipe Mount (Town Reserved)	C	From Leg	1.00	0.0000	55.00	No Ice	2.09	2.09	54.72
			0.00			1/2" Ice	2.46	2.46	71.85
			0.00						

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz	Lateral Vert							
			ft	ft	°	°	ft	ft	ft <sup>2</sup>	lb		
8 FT DISH (Town Reserved)	C	Paraboloid w/o Radome	From Leg	2.00	0.0000	Worst		55.00	8.00	No Ice	50.30	251.00
				0.00						1/2" Ice	51.29	514.30
				0.00								

### Tower Pressures - No Ice

$G_H = 1.224$

Section Elevation	z	K <sub>z</sub>	q <sub>z</sub>	A <sub>G</sub>	F <sub>a</sub>	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face
ft	ft		psf	ft <sup>2</sup>	c	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	%	ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	23	33.597	A	2.398	5.943	1.983	23.78	0.000	0.000
					B	2.747	1.983	41.93	0.000	0.000	
					C	2.747	1.983	41.93	0.000	0.000	
T2 64.00-44.00	54.00	1.151	21	134.798	A	6.050	48.968	7.917	14.39	0.000	0.000
					B	9.058	7.917	46.64	0.000	0.000	
					C	9.058	7.917	46.64	0.000	0.000	
T3 44.00-24.00	34.00	1.009	19	156.058	A	8.321	43.391	9.599	18.56	0.000	0.000

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Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face
ft	ft		psf	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
					B	10.900	9.599		46.83	0.000	0.000
					C	10.900	9.599		46.83	0.000	0.000

**Tower Pressure - With Ice**

$G_H = 1.224$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	t <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face
ft	ft		psf	in	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	17	0.5000	34.013	A	7.686	4.795	2.817	22.57	0.000	0.000
						B	2.747	4.648		38.09	0.000	0.000
						C	2.747	4.648		38.09	0.000	0.000
T2 64.00-44.00	54.00	1.151	16	0.5000	136.465	A	59.151	21.597	11.250	13.93	0.000	0.000
						B	9.058	17.288		42.70	0.000	0.000
						C	9.058	17.288		42.70	0.000	0.000
T3 44.00-24.00	34.00	1.009	14	0.5000	157.726	A	50.704	24.400	12.938	17.23	0.000	0.000
						B	10.900	19.243		42.92	0.000	0.000
						C	10.900	19.243		42.92	0.000	0.000

**Tower Pressure - Service**

$G_H = 1.224$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face
ft	ft		psf	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 69.00-64.00	66.50	1.222	8	33.597	A	2.398	5.943	1.983	23.78	0.000	0.000
					B	2.747	1.983		41.93	0.000	0.000
					C	2.747	1.983		41.93	0.000	0.000
T2 64.00-44.00	54.00	1.151	7	134.798	A	6.050	48.968	7.917	14.39	0.000	0.000
					B	9.058	7.917		46.64	0.000	0.000
					C	9.058	7.917		46.64	0.000	0.000
T3 44.00-24.00	34.00	1.009	6	156.058	A	8.321	43.391	9.599	18.56	0.000	0.000
					B	10.900	9.599		46.83	0.000	0.000
					C	10.900	9.599		46.83	0.000	0.000

**Tower Forces - No Ice - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb	e						ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	1	1	5.973	403.51	80.70	A
			B	0.141	2.806	0.58	1	1	3.897			
			C	0.141	2.806	0.58	1	1	3.897			
T2 64.00-	255.43	691.69	A	0.408	2.048	0.655	1	1	38.123	2034.68	101.73	A

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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
44.00			B	0.126	2.862	0.578	1	1	13.634			
			C	0.126	2.862	0.578	1	1	13.634			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	1	1	35.483	1795.31	89.77	A
			B	0.131	2.841	0.579	1	1	16.456			
			C	0.131	2.841	0.579	1	1	16.456			
Sum Weight:	488.55	1822.13						OTM	96.14 kip-ft	4233.50		

**Tower Forces - No Ice - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.825	1	5.553	375.15	75.03	A
			B	0.141	2.806	0.58	0.825	1	3.417			
			C	0.141	2.806	0.58	0.825	1	3.417			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.825	1	37.064	1978.17	98.91	A
			B	0.126	2.862	0.578	0.825	1	12.049			
			C	0.126	2.862	0.578	0.825	1	12.049			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.825	1	34.027	1721.63	86.08	A
			B	0.131	2.841	0.579	0.825	1	14.549			
			C	0.131	2.841	0.579	0.825	1	14.549			
Sum Weight:	488.55	1822.13						OTM	92.51 kip-ft	4074.96		

**Tower Forces - No Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.8	1	5.493	371.10	74.22	A
			B	0.141	2.806	0.58	0.8	1	3.348			
			C	0.141	2.806	0.58	0.8	1	3.348			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.8	1	36.913	1970.09	98.50	A
			B	0.126	2.862	0.578	0.8	1	11.823			
			C	0.126	2.862	0.578	0.8	1	11.823			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.8	1	33.819	1711.11	85.56	A
			B	0.131	2.841	0.579	0.8	1	14.276			
			C	0.131	2.841	0.579	0.8	1	14.276			
Sum Weight:	488.55	1822.13						OTM	91.99 kip-ft	4052.31		

**Tower Forces - No Ice - Wind 90 To Face**



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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.85	1	5.613	379.20	75.84	A
			B	0.141	2.806	0.58	0.85	1	3.485			
			C	0.141	2.806	0.58	0.85	1	3.485			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.85	1	37.215	1986.24	99.31	A
			B	0.126	2.862	0.578	0.85	1	12.275			
			C	0.126	2.862	0.578	0.85	1	12.275			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.85	1	34.235	1732.16	86.61	A
			B	0.131	2.841	0.579	0.85	1	14.821			
			C	0.131	2.841	0.579	0.85	1	14.821			
Sum Weight:	488.55	1822.13						OTM	93.03 kip-ft	4097.60		

### Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	1	1	10.748	475.58	95.12	A
			B	0.217	2.539	0.594	1	1	5.508			
			C	0.217	2.539	0.594	1	1	5.508			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	1	1	75.318	2663.51	133.18	A
			B	0.193	2.619	0.589	1	1	19.241			
			C	0.193	2.619	0.589	1	1	19.241			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	1	1	67.434	2232.10	111.60	A
			B	0.191	2.626	0.589	1	1	22.227			
			C	0.191	2.626	0.589	1	1	22.227			
Sum Weight:	1523.52	2910.19						OTM	122.44 kip-ft	5371.19		

### Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.825	1	9.403	416.07	83.21	A
			B	0.217	2.539	0.594	0.825	1	5.028			
			C	0.217	2.539	0.594	0.825	1	5.028			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.825	1	64.967	2297.45	114.87	A
			B	0.193	2.619	0.589	0.825	1	17.656			
			C	0.193	2.619	0.589	0.825	1	17.656			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.825	1	58.561	1938.39	96.92	A
			B	0.191	2.626	0.589	0.825	1	20.319			
			C	0.191	2.626	0.589	0.825	1	20.319			
Sum Weight:	1523.52	2910.19						OTM	105.99 kip-ft	4651.90		

<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 11 of 22
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**Tower Forces - With Ice - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.8	1	9.211	407.57	81.51	A
			B	0.217	2.539	0.594	0.8	1	4.959			
			C	0.217	2.539	0.594	0.8	1	4.959			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.8	1	63.488	2245.15	112.26	A
			B	0.193	2.619	0.589	0.8	1	17.429			
			C	0.193	2.619	0.589	0.8	1	17.429			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.8	1	57.293	1896.43	94.82	A
			B	0.191	2.626	0.589	0.8	1	20.047			
			C	0.191	2.626	0.589	0.8	1	20.047			
Sum Weight:	1523.52	2910.19						OTM	103.64 kip-ft	4549.15		

**Tower Forces - With Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	77.62	324.34	A	0.367	2.133	0.639	0.85	1	9.595	424.57	84.91	A
			B	0.217	2.539	0.594	0.85	1	5.096			
			C	0.217	2.539	0.594	0.85	1	5.096			
T2 64.00-44.00	796.07	1133.67	A	0.592	1.809	0.749	0.85	1	66.445	2349.74	117.49	A
			B	0.193	2.619	0.589	0.85	1	17.882			
			C	0.193	2.619	0.589	0.85	1	17.882			
T3 44.00-24.00	649.83	1452.18	A	0.476	1.933	0.686	0.85	1	59.828	1980.35	99.02	A
			B	0.191	2.626	0.589	0.85	1	20.592			
			C	0.191	2.626	0.589	0.85	1	20.592			
Sum Weight:	1523.52	2910.19						OTM	108.34 kip-ft	4754.66		

**Tower Forces - Service - Wind Normal To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	1	1	5.973	139.62	27.92	A
			B	0.141	2.806	0.58	1	1	3.897			
			C	0.141	2.806	0.58	1	1	3.897			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	1	1	38.123	704.04	35.20	A
			B	0.126	2.862	0.578	1	1	13.634			
			C	0.126	2.862	0.578	1	1	13.634			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	1	1	35.483	621.21	31.06	A
			B	0.131	2.841	0.579	1	1	16.456			
			C	0.131	2.841	0.579	1	1	16.456			
Sum Weight:	488.55	1822.13						OTM	33.27 kip-ft	1464.88		

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**Tower Forces - Service - Wind 45 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.825	1	5.553	129.81	25.96	A
			B	0.141	2.806	0.58	0.825	1	3.417			
			C	0.141	2.806	0.58	0.825	1	3.417			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.825	1	37.064	684.49	34.22	A
			B	0.126	2.862	0.578	0.825	1	12.049			
			C	0.126	2.862	0.578	0.825	1	12.049			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.825	1	34.027	595.72	29.79	A
			B	0.131	2.841	0.579	0.825	1	14.549			
			C	0.131	2.841	0.579	0.825	1	14.549			
Sum Weight:	488.55	1822.13						OTM	32.01 kip-ft	1410.02		

**Tower Forces - Service - Wind 60 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.8	1	5.493	128.41	25.68	A
			B	0.141	2.806	0.58	0.8	1	3.348			
			C	0.141	2.806	0.58	0.8	1	3.348			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.8	1	36.913	681.69	34.08	A
			B	0.126	2.862	0.578	0.8	1	11.823			
			C	0.126	2.862	0.578	0.8	1	11.823			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.8	1	33.819	592.08	29.60	A
			B	0.131	2.841	0.579	0.8	1	14.276			
			C	0.131	2.841	0.579	0.8	1	14.276			
Sum Weight:	488.55	1822.13						OTM	31.83 kip-ft	1402.18		

**Tower Forces - Service - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 69.00-64.00	24.96	194.95	A	0.248	2.443	0.601	0.85	1	5.613	131.21	26.24	A
			B	0.141	2.806	0.58	0.85	1	3.485			
			C	0.141	2.806	0.58	0.85	1	3.485			
T2 64.00-44.00	255.43	691.69	A	0.408	2.048	0.655	0.85	1	37.215	687.28	34.36	A
			B	0.126	2.862	0.578	0.85	1	12.275			
			C	0.126	2.862	0.578	0.85	1	12.275			
T3 44.00-24.00	208.16	935.50	A	0.331	2.216	0.626	0.85	1	34.235	599.36	29.97	A
			B	0.131	2.841	0.579	0.85	1	14.821			
			C	0.131	2.841	0.579	0.85	1	14.821			
Sum Weight:	488.55	1822.13						OTM	32.19 kip-ft	1417.86		

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Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
									ft			

**Force Totals**

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M <sub>x</sub>	Sum of Overturning Moments, M <sub>z</sub>	Sum of Torques
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Leg Weight	838.05					
Bracing Weight	984.08					
Total Member Self-Weight	1822.13			0.23	2.51	
Total Weight	4759.62			0.23	2.51	
Wind 0 deg - No Ice		-144.93	-10233.59	-323.64	8.60	-14.22
Wind 30 deg - No Ice		5007.01	-8672.40	-274.51	-156.11	-9.93
Wind 45 deg - No Ice		7139.99	-7021.65	-221.91	-224.59	-6.71
Wind 60 deg - No Ice		8778.10	-4900.69	-154.36	-277.41	-3.03
Wind 90 deg - No Ice		10265.05	144.93	6.32	-325.27	4.62
Wind 120 deg - No Ice		9079.94	5242.31	167.43	-287.10	11.06
Wind 135 deg - No Ice		7344.95	7226.61	230.97	-233.20	13.25
Wind 150 deg - No Ice		5258.03	8817.33	281.05	-166.65	14.54
Wind 180 deg - No Ice		144.93	10052.40	319.94	-3.58	14.10
Wind 210 deg - No Ice		-5007.01	8672.40	274.96	161.13	9.93
Wind 225 deg - No Ice		-7139.99	7021.65	222.36	229.62	6.71
Wind 240 deg - No Ice		-8935.01	4991.28	156.89	286.03	3.16
Wind 270 deg - No Ice		-10265.05	-144.93	-5.86	330.29	-4.62
Wind 300 deg - No Ice		-8923.03	-5151.71	-164.90	288.52	-11.07
Wind 315 deg - No Ice		-7344.95	-7226.61	-230.51	238.22	-13.25
Wind 330 deg - No Ice		-5258.03	-8817.33	-280.59	171.67	-14.54
Member Ice	1088.05					
Total Weight Ice	8231.65			-0.38	6.21	
Wind 0 deg - Ice		-110.91	-10277.02	-310.29	10.87	-11.97
Wind 30 deg - Ice		4798.23	-8310.77	-254.23	-140.35	-8.50
Wind 45 deg - Ice		6770.47	-6679.91	-204.59	-201.81	-5.95
Wind 60 deg - Ice		8243.70	-4631.44	-141.90	-248.23	-3.01
Wind 90 deg - Ice		9788.55	110.91	4.28	-294.98	3.05
Wind 120 deg - Ice		9066.52	5234.56	158.61	-269.17	8.41
Wind 135 deg - Ice		6927.31	6836.76	210.42	-208.40	10.33
Wind 150 deg - Ice		4990.32	8421.68	258.13	-148.42	11.55
Wind 180 deg - Ice		110.91	9454.97	290.73	1.55	11.45
Wind 210 deg - Ice		-4798.23	8310.77	253.47	152.77	8.50
Wind 225 deg - Ice		-6770.47	6679.91	203.83	214.22	5.95
Wind 240 deg - Ice		-8955.61	5042.46	150.54	276.93	3.56
Wind 270 deg - Ice		-9788.55	-110.91	-5.04	307.40	-3.05
Wind 300 deg - Ice		-8354.61	-4823.53	-149.97	265.30	-8.44
Wind 315 deg - Ice		-6927.31	-6836.76	-211.18	220.81	-10.33
Wind 330 deg - Ice		-4990.32	-8421.68	-258.89	160.84	-11.55
Total Weight	4759.62			0.23	2.51	
Wind 0 deg - Service		-50.15	-3541.03	-111.25	3.65	-4.92
Wind 30 deg - Service		1732.53	-3000.83	-94.24	-53.34	-3.43
Wind 45 deg - Service		2470.58	-2429.64	-76.04	-77.04	-2.32
Wind 60 deg - Service		3037.40	-1695.74	-52.67	-95.32	-1.05
Wind 90 deg - Service		3551.92	50.15	2.93	-111.88	1.60
Wind 120 deg - Service		3141.85	1813.95	58.68	-98.67	3.83
Wind 135 deg - Service		2541.50	2500.56	80.66	-80.02	4.59
Wind 150 deg - Service		1819.39	3050.98	97.99	-56.99	5.03
Wind 180 deg - Service		50.15	3478.34	111.45	-0.56	4.88



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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Wind 210 deg - Service		-1732.53	3000.83	95.88	56.43	3.43
Wind 225 deg - Service		-2470.58	2429.64	77.68	80.13	2.32
Wind 240 deg - Service		-3091.70	1727.09	55.03	99.65	1.09
Wind 270 deg - Service		-3551.92	-50.15	-1.29	114.96	-1.60
Wind 300 deg - Service		-3087.55	-1782.60	-56.32	100.51	-3.83
Wind 315 deg - Service		-2541.50	-2500.56	-79.02	83.10	-4.59
Wind 330 deg - Service		-1819.39	-3050.98	-96.35	60.08	-5.03

## Load Combinations

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



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Comb. No.	Description
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

## Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	69 - 64	Leg	Max Tension	32	14.88	-0.01	-0.01
			Max. Compression	30	-1259.38	0.68	-0.38
			Max. Mx	6	-770.93	1.18	-0.03
			Max. My	10	-759.40	-0.15	1.08
			Max. Vy	6	958.91	-0.90	-0.13
			Max. Vx	2	-924.60	-0.00	0.92
		Diagonal	Max Tension	14	1086.07	0.00	0.00
			Max. Compression	6	-1091.15	0.00	0.00
			Max. Mx	32	-804.69	0.01	-0.00
			Max. My	6	-572.17	0.00	0.00
			Max. Vy	32	6.85	0.01	-0.00
			Max. Vx	6	-0.51	0.00	0.00
		Top Girt	Max Tension	15	448.62	0.00	0.00
			Max. Compression	7	-454.12	0.00	0.00
			Max. Mx	18	5.44	-0.02	0.00
			Max. My	34	-9.24	0.00	0.00
			Max. Vy	18	10.90	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
T2	64 - 44	Leg	Max Tension	15	20809.97	-0.59	0.16
			Max. Compression	7	-22786.12	0.61	-0.16
			Max. Mx	7	-11284.20	0.75	-0.29
			Max. My	9	-1097.51	-0.00	1.10
			Max. Vy	7	-419.39	0.75	-0.29
			Max. Vx	17	1335.96	-0.01	0.23
		Diagonal	Max Tension	10	4032.10	0.00	0.00
			Max. Compression	2	-4110.95	0.00	0.00
			Max. Mx	30	2445.87	0.01	0.00
			Max. My	2	-3530.28	-0.00	0.01
			Max. Vy	30	-8.46	0.01	0.00
			Max. Vx	2	1.91	-0.00	0.01
T3	44 - 24	Leg	Max Tension	15	41066.82	0.42	-0.12
			Max. Compression	7	-44064.71	0.53	-0.12
			Max. Mx	24	-26571.52	0.83	-0.13
			Max. My	17	-2254.13	0.00	0.54
			Max. Vy	24	-304.34	0.83	-0.13
			Max. Vx	17	-203.18	0.00	0.54
		Diagonal	Max Tension	19	3572.67	0.00	0.00
			Max. Compression	19	-3738.40	0.00	0.00
			Max. Mx	33	1963.36	0.03	0.00
			Max. My	10	-3328.12	-0.00	-0.01
			Max. Vy	33	12.78	0.03	0.00
			Max. Vx	10	2.74	0.00	0.00
		Top Girt	Max Tension	32	282.88	0.00	0.00
			Max. Compression	7	-67.25	0.00	0.00
			Max. Mx	18	262.58	-0.02	0.00
			Max. My	34	259.83	0.00	0.00
			Max. Vy	18	10.97	0.00	0.00



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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	34	-0.32	0.00	0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	13	45616.40	5087.55	-3171.94
	Max. H <sub>x</sub>	13	45616.40	5087.55	-3171.94
	Max. H <sub>z</sub>	20	-30843.26	-4053.01	3509.80
	Min. Vert	5	-41263.76	-4808.09	2999.72
	Min. H <sub>x</sub>	22	-35876.21	-5033.30	3124.28
	Min. H <sub>z</sub>	11	38984.57	3840.79	-3527.61
Leg B	Max. Vert	7	46452.91	-5681.64	-2423.04
	Max. H <sub>x</sub>	32	-38419.40	5532.15	2538.48
	Max. H <sub>z</sub>	33	-37349.52	5366.85	2555.87
	Min. Vert	15	-43274.75	5417.79	2262.25
	Min. H <sub>x</sub>	7	46452.91	-5681.64	-2423.04
	Min. H <sub>z</sub>	7	46452.91	-5681.64	-2423.04
Leg A	Max. Vert	2	45276.91	-945.80	5986.96
	Max. H <sub>x</sub>	11	-35531.72	1124.82	-4879.62
	Max. H <sub>z</sub>	2	45276.91	-945.80	5986.96
	Min. Vert	10	-41604.47	943.29	-5668.79
	Min. H <sub>x</sub>	3	38644.82	-1137.44	5084.86
	Min. H <sub>z</sub>	27	-36526.77	756.65	-5931.00

### Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	4759.30	0.01	-0.00	0.23	2.51	0.00
Dead+Wind 0 deg - No Ice	4759.19	-144.92	-10234.41	-324.00	8.63	-14.23
Dead+Wind 30 deg - No Ice	4759.29	5007.48	-8673.11	-274.82	-156.26	-9.93
Dead+Wind 45 deg - No Ice	4759.36	7140.64	-7022.25	-222.15	-224.83	-6.71
Dead+Wind 60 deg - No Ice	4759.39	8778.88	-4901.12	-154.53	-277.71	-3.03
Dead+Wind 90 deg - No Ice	4759.28	10265.91	144.91	6.34	-325.62	4.62
Dead+Wind 120 deg - No Ice	4759.17	9080.68	5242.72	167.64	-287.41	11.07
Dead+Wind 135 deg - No Ice	4759.20	7345.54	7227.21	231.24	-233.44	13.26
Dead+Wind 150 deg - No Ice	4759.26	5258.46	8818.07	281.37	-166.82	14.55
Dead+Wind 180 deg - No Ice	4759.36	144.95	10053.28	320.29	-3.56	14.10
Dead+Wind 210 deg - No Ice	4759.28	-5007.39	8673.14	275.26	161.32	9.93
Dead+Wind 225 deg - No Ice	4759.22	-7140.53	7022.24	222.60	229.87	6.71
Dead+Wind 240 deg - No Ice	4759.19	-8935.71	4991.68	157.06	286.35	3.16
Dead+Wind 270 deg - No Ice	4759.28	-10265.89	-144.98	-5.86	330.65	-4.62
Dead+Wind 300 deg - No Ice	4759.37	-8923.81	-5152.16	-165.07	288.85	-11.07
Dead+Wind 315 deg - No Ice	4759.34	-7345.60	-7227.22	-230.75	238.50	-13.26
Dead+Wind 330 deg - No Ice	4759.28	-5258.49	-8818.05	-280.89	171.88	-14.55
Dead+Ice+Temp	8229.39	-0.00	0.00	-0.38	6.22	0.00
Dead+Wind 0 deg+Ice+Temp	8218.25	-110.91	-10277.28	-310.78	10.90	-11.98
Dead+Wind 30 deg+Ice+Temp	8218.24	4798.33	-8310.98	-254.63	-140.56	-8.51
Dead+Wind 45 deg+Ice+Temp	8218.23	6770.62	-6680.08	-204.92	-202.11	-5.96
Dead+Wind 60 deg+Ice+Temp	8218.23	8243.90	-4631.55	-142.12	-248.61	-3.02



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 17 of 22
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Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead+Wind 90 deg+Ice+Temp	8218.24	9788.79	110.93	4.30	-295.44	3.05
Dead+Wind 120 deg+Ice+Temp	8218.25	9066.75	5234.69	158.87	-269.57	8.42
Dead+Wind 135 deg+Ice+Temp	8218.24	6927.50	6836.93	210.77	-208.71	10.34
Dead+Wind 150 deg+Ice+Temp	8218.24	4990.46	8421.88	258.55	-148.62	11.56
Dead+Wind 180 deg+Ice+Temp	8218.22	110.91	9455.19	291.19	1.57	11.46
Dead+Wind 210 deg+Ice+Temp	8218.24	-4798.36	8310.97	253.86	153.02	8.51
Dead+Wind 225 deg+Ice+Temp	8218.24	-6770.65	6680.08	204.15	214.57	5.96
Dead+Wind 240 deg+Ice+Temp	8218.25	-8955.84	5042.59	150.77	277.36	3.57
Dead+Wind 270 deg+Ice+Temp	8218.23	-9788.79	-110.89	-5.04	307.88	-3.05
Dead+Wind 300 deg+Ice+Temp	8218.14	-8354.78	-4823.62	-150.20	265.73	-8.44
Dead+Wind 315 deg+Ice+Temp	8218.22	-6927.47	-6836.92	-211.51	221.16	-10.34
Dead+Wind 330 deg+Ice+Temp	8218.24	-4990.43	-8421.89	-259.28	161.11	-11.56
Dead+Wind 0 deg - Service	4759.29	-50.14	-3541.31	-111.96	4.63	-4.92
Dead+Wind 30 deg - Service	4759.29	1732.69	-3001.07	-94.94	-52.43	-3.44
Dead+Wind 45 deg - Service	4759.30	2470.80	-2429.84	-76.72	-76.15	-2.32
Dead+Wind 60 deg - Service	4759.30	3037.67	-1695.88	-53.32	-94.45	-1.05
Dead+Wind 90 deg - Service	4759.29	3552.21	50.14	2.34	-111.03	1.60
Dead+Wind 120 deg - Service	4759.29	3142.10	1814.08	58.15	-97.81	3.83
Dead+Wind 135 deg - Service	4759.28	2541.71	2500.74	80.16	-79.14	4.59
Dead+Wind 150 deg - Service	4759.29	1819.54	3051.22	97.51	-56.08	5.04
Dead+Wind 180 deg - Service	4759.29	50.17	3478.62	110.98	0.41	4.88
Dead+Wind 210 deg - Service	4759.29	-1732.65	3001.07	95.40	57.46	3.44
Dead+Wind 225 deg - Service	4759.29	-2470.76	2429.83	77.18	81.18	2.32
Dead+Wind 240 deg - Service	4759.29	-3091.92	1727.22	54.50	100.73	1.09
Dead+Wind 270 deg - Service	4759.29	-3552.19	-50.16	-1.88	116.06	-1.60
Dead+Wind 300 deg - Service	4759.29	-3087.79	-1782.75	-56.97	101.59	-3.83
Dead+Wind 315 deg - Service	4759.29	-2541.70	-2500.76	-79.70	84.17	-4.59
Dead+Wind 330 deg - Service	4759.29	-1819.53	-3051.22	-97.05	61.11	-5.04

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-4759.62	0.00	-0.01	4759.30	0.00	0.007%
2	-144.93	-4759.62	-10233.59	144.92	4759.19	10234.41	0.008%
3	5007.01	-4759.62	-8672.40	-5007.48	4759.29	8673.11	0.008%
4	7139.99	-4759.62	-7021.65	-7140.64	4759.36	7022.25	0.008%
5	8778.10	-4759.62	-4900.69	-8778.88	4759.39	4901.12	0.008%
6	10265.05	-4759.62	144.93	-10265.91	4759.28	-144.91	0.008%
7	9079.94	-4759.62	5242.31	-9080.68	4759.17	-5242.72	0.008%
8	7344.95	-4759.62	7226.61	-7345.54	4759.20	-7227.21	0.008%
9	5258.03	-4759.62	8817.33	-5258.46	4759.26	-8818.07	0.008%
10	144.93	-4759.62	10052.40	-144.95	4759.36	-10053.28	0.008%
11	-5007.01	-4759.62	8672.40	5007.39	4759.28	-8673.14	0.008%
12	-7139.99	-4759.62	7021.65	7140.53	4759.22	-7022.24	0.008%
13	-8935.01	-4759.62	4991.28	8935.71	4759.19	-4991.68	0.008%
14	-10265.05	-4759.62	-144.93	10265.89	4759.28	144.98	0.008%
15	-8923.03	-4759.62	-5151.71	8923.81	4759.37	5152.16	0.008%
16	-7344.95	-4759.62	-7226.61	7345.60	4759.34	7227.22	0.008%
17	-5258.03	-4759.62	-8817.33	5258.49	4759.28	8818.05	0.008%
18	-0.00	-8231.65	0.00	0.00	8229.39	-0.00	0.027%
19	-110.91	-8231.65	-10277.02	110.91	8218.25	10277.28	0.102%
20	4798.23	-8231.65	-8310.77	-4798.33	8218.24	8310.98	0.106%
21	6770.47	-8231.65	-6679.91	-6770.62	8218.23	6680.08	0.107%
22	8243.70	-8231.65	-4631.44	-8243.90	8218.23	4631.55	0.107%
23	9788.55	-8231.65	110.91	-9788.79	8218.24	-110.93	0.105%
24	9066.52	-8231.65	5234.56	-9066.75	8218.25	-5234.69	0.101%



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 18 of 22
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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
25	6927.31	-8231.65	6836.76	-6927.50	8218.24	-6836.93	0.105%
26	4990.32	-8231.65	8421.68	-4990.46	8218.24	-8421.88	0.105%
27	110.91	-8231.65	9454.97	-110.91	8218.22	-9455.19	0.107%
28	-4798.23	-8231.65	8310.77	4798.36	8218.24	-8310.97	0.106%
29	-6770.47	-8231.65	6679.91	6770.65	8218.24	-6680.08	0.107%
30	-8955.61	-8231.65	5042.46	8955.84	8218.25	-5042.59	0.102%
31	-9788.55	-8231.65	-110.91	9788.79	8218.23	110.89	0.105%
32	-8354.61	-8231.65	-4823.53	8354.78	8218.14	4823.62	0.107%
33	-6927.31	-8231.65	-6836.76	6927.47	8218.22	6836.92	0.105%
34	-4990.32	-8231.65	-8421.68	4990.43	8218.24	8421.89	0.105%
35	-50.15	-4759.62	-3541.03	50.14	4759.29	3541.31	0.007%
36	1732.53	-4759.62	-3000.83	-1732.69	4759.29	3001.07	0.007%
37	2470.58	-4759.62	-2429.64	-2470.80	4759.30	2429.84	0.007%
38	3037.40	-4759.62	-1695.74	-3037.67	4759.30	1695.88	0.007%
39	3551.92	-4759.62	50.15	-3552.21	4759.29	-50.14	0.007%
40	3141.85	-4759.62	1813.95	-3142.10	4759.29	-1814.08	0.007%
41	2541.50	-4759.62	2500.56	-2541.71	4759.28	-2500.74	0.007%
42	1819.39	-4759.62	3050.98	-1819.54	4759.29	-3051.22	0.007%
43	50.15	-4759.62	3478.34	-50.17	4759.29	-3478.62	0.007%
44	-1732.53	-4759.62	3000.83	1732.65	4759.29	-3001.07	0.007%
45	-2470.58	-4759.62	2429.64	2470.76	4759.29	-2429.83	0.007%
46	-3091.70	-4759.62	1727.09	3091.92	4759.29	-1727.22	0.007%
47	-3551.92	-4759.62	-50.15	3552.19	4759.29	50.16	0.007%
48	-3087.55	-4759.62	-1782.60	3087.79	4759.29	1782.75	0.007%
49	-2541.50	-4759.62	-2500.56	2541.70	4759.29	2500.76	0.007%
50	-1819.39	-4759.62	-3050.98	1819.53	4759.29	3051.22	0.007%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00064863
2	Yes	4	0.00000001	0.00083953
3	Yes	4	0.00000001	0.00084730
4	Yes	4	0.00000001	0.00085509
5	Yes	4	0.00000001	0.00085899
6	Yes	4	0.00000001	0.00085067
7	Yes	4	0.00000001	0.00084173
8	Yes	4	0.00000001	0.00084523
9	Yes	4	0.00000001	0.00085215
10	Yes	4	0.00000001	0.00086393
11	Yes	4	0.00000001	0.00085578
12	Yes	4	0.00000001	0.00085005
13	Yes	4	0.00000001	0.00084857
14	Yes	4	0.00000001	0.00086375
15	Yes	4	0.00000001	0.00087322
16	Yes	4	0.00000001	0.00086792
17	Yes	4	0.00000001	0.00085755
18	Yes	7	0.00000001	0.00056866
19	Yes	5	0.00000001	0.00040412
20	Yes	5	0.00000001	0.00043027
21	Yes	5	0.00000001	0.00043525
22	Yes	5	0.00000001	0.00043735
23	Yes	5	0.00000001	0.00042414
24	Yes	5	0.00000001	0.00040217
25	Yes	5	0.00000001	0.00041895



**RISATower**

**NATCOMM**  
 63-2 N. Branford Rd.  
 Branford, CT 06405  
 Phone: (203) 488-0580  
 FAX: (203) 488-8587

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26	Yes	5	0.00000001	0.00041702
27	Yes	5	0.00000001	0.00042564
28	Yes	5	0.00000001	0.00041970
29	Yes	5	0.00000001	0.00041951
30	Yes	5	0.00000001	0.00039820
31	Yes	5	0.00000001	0.00040508
32	Yes	5	0.00000001	0.00040775
33	Yes	5	0.00000001	0.00040650
34	Yes	5	0.00000001	0.00040776
35	Yes	4	0.00000001	0.00083189
36	Yes	4	0.00000001	0.00082695
37	Yes	4	0.00000001	0.00082784
38	Yes	4	0.00000001	0.00082877
39	Yes	4	0.00000001	0.00082727
40	Yes	4	0.00000001	0.00082750
41	Yes	4	0.00000001	0.00083157
42	Yes	4	0.00000001	0.00083682
43	Yes	4	0.00000001	0.00084721
44	Yes	4	0.00000001	0.00085141
45	Yes	4	0.00000001	0.00085278
46	Yes	4	0.00000001	0.00085441
47	Yes	4	0.00000001	0.00086166
48	Yes	4	0.00000001	0.00086187
49	Yes	4	0.00000001	0.00085673
50	Yes	4	0.00000001	0.00084884

**Maximum Tower Deflections - Service Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	69 - 64	0.560	48	0.0775	0.0490
T2	64 - 44	0.473	48	0.0774	0.0490
T3	44 - 24	0.136	48	0.0478	0.0268

**Critical Deflections and Radius of Curvature - Service Wind**

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	6'x3" Pipe Mount	48	0.560	0.0775	0.0490	72729
66.00	LPA-80063/6CF	48	0.508	0.0777	0.0492	72729
55.00	8 FT DISH	48	0.308	0.0690	0.0422	51852

**Maximum Tower Deflections - Design Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	69 - 64	1.594	15	0.2197	0.1416
T2	64 - 44	1.346	15	0.2197	0.1417



<b>RISA Tower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 20 of 22
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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	44 - 24	0.389	7	0.1362	0.0776

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
69.00	6'x3" Pipe Mount	15	1.594	0.2197	0.1416	25352
66.00	LPA-80063/6CF	15	1.447	0.2204	0.1423	25352
55.00	8 FT DISH	15	0.879	0.1960	0.1220	18544

### Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load Allowable	Allowable Ratio	Criteria
T1	69	Leg	A325N	0.6250	4	3.72	13492.00	0.000 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1091.15	4123.34	0.265 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	448.62	6117.19	0.073 ✓	1.333	Member Bearing
T2	64	Leg	A325N	0.6250	4	5202.49	13498.10	0.385 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4110.95	4123.34	0.997 ✓	1.333	Bolt Shear
T3	44	Leg	A325N	0.6250	4	10266.70	13498.60	0.761 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3738.40	4123.34	0.907 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	1	282.88	6117.19	0.046 ✓	1.333	Member Bearing

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	69 - 64	ROHN 2 EH	5.00	5.00	78.1 K=1.00	19.390	1.4807	-1193.25	28710.10	0.042*
T2	64 - 44	ROHN 2 X-STR	20.00	4.00	62.6 K=1.00	22.265	1.4773	-22786.10	32890.90	0.693 ✓
T3	44 - 24	ROHN 2.5 EH	20.03	5.01	65.0 K=1.00	21.839	2.2535	-44064.70	49214.50	0.895 ✓



<b>RISATower</b>  <b>NATCOMM</b> 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	<b>Job</b> 45ft ROHN SSV Lattice Tower	<b>Page</b> 21 of 22
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\* DL controls

**Diagonal Design Data (Compression)**

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>F<sub>a</sub></i> <i>ksi</i>	<i>A</i> <i>in<sup>2</sup></i>	Actual <i>P</i> <i>lb</i>	Allow. <i>P<sub>a</sub></i> <i>lb</i>	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	7.83	3.80	155.4 K=1.00	6.185	0.5273	-1091.15	3261.42	0.335
T2	64 - 44	L1 1/2x1 1/2x3/16	7.26	3.52	143.9 K=1.00	7.211	0.5273	-4110.95	3802.92	1.081
T3	44 - 24	L1 3/4x1 3/4x3/16	9.28	4.66	162.9 K=1.00	5.625	0.6211	-3311.65	3493.47	0.948

**Top Girt Design Data (Compression)**

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>F<sub>a</sub></i> <i>ksi</i>	<i>A</i> <i>in<sup>2</sup></i>	Actual <i>P</i> <i>lb</i>	Allow. <i>P<sub>a</sub></i> <i>lb</i>	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	6.52	6.05	247.6 K=1.00	2.437	0.5273	-454.12	1284.94	0.353
T3	44 - 24	KL/R > 200 (C) - 6 L1 1/2x1 1/2x3/16	6.56	6.09	249.3 K=1.00	2.403	0.5273	-67.25	1267.12	0.053
		KL/R > 200 (C) - 51								

**Tension Checks**

**Leg Design Data (Tension)**

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>F<sub>a</sub></i> <i>ksi</i>	<i>A</i> <i>in<sup>2</sup></i>	Actual <i>P</i> <i>lb</i>	Allow. <i>P<sub>a</sub></i> <i>lb</i>	Ratio $\frac{P}{P_a}$
T1	69 - 64	ROHN 2 EH	5.00	5.00	78.1	30.000	1.4807	14.88	44420.50	0.000
T2	64 - 44	ROHN 2 X-STR	20.00	4.00	62.6	30.000	1.4773	20810.00	44317.80	0.470
T3	44 - 24	ROHN 2.5 EH	20.03	5.01	65.0	30.000	2.2535	41066.80	67606.20	0.607

**Diagonal Design Data (Tension)**

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	<b>Project</b> 10001.CO13 -38 Elm St., Meriden, CT	<b>Date</b> 13:35:58 01/13/10
	<b>Client</b> Verizon Wireless	<b>Designed by</b> TJL

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	7.83	3.80	102.8	29.000	0.3076	1086.07	8920.90	0.122
T2	64 - 44	L1 1/2x1 1/2x3/16	7.26	3.52	95.4	29.000	0.3076	4032.10	8920.90	0.452
T3	44 - 24	L1 3/4x1 3/4x3/16	8.45	4.26	97.7	29.000	0.3779	3572.67	10960.00	0.326

✓  
✓  
✓

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	69 - 64	L1 1/2x1 1/2x3/16	6.52	6.05	166.1	29.000	0.2900	448.62	8411.13	0.053
T3	44 - 24	L1 1/2x1 1/2x3/16	6.56	6.09	167.3	29.000	0.2900	262.64	8411.13	0.031*

✓  
✓

\* DL controls

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail	
T1	69 - 64	Leg	ROHN 2 EH	2	-1046.12	28710.10	6.7	Pass	
T2	64 - 44	Leg	ROHN 2 X-STR	14	-22786.10	43843.57	52.0	Pass	
T3	44 - 24	Leg	ROHN 2.5 EH	47	-44064.70	65602.93	67.2	Pass	
T1	69 - 64	Diagonal	L1 1/2x1 1/2x3/16	9	-1091.15	4347.47	25.1	Pass	
T2	64 - 44	Diagonal	L1 1/2x1 1/2x3/16	20	-4110.95	5069.29	81.1	Pass	
T3	44 - 24	Diagonal	L1 3/4x1 3/4x3/16	56	-3311.65	4656.80	71.1	Pass	
T1	69 - 64	Top Girt	L1 1/2x1 1/2x3/16	6	-454.12	1712.82	26.5	Pass	
T3	44 - 24	Top Girt	L1 1/2x1 1/2x3/16	51	-67.25	1689.07	4.0	Pass	
							Summary		
							Leg (T3)	67.2	Pass
							Diagonal (T2)	81.1	Pass
							Top Girt (T1)	26.5	Pass
							Bolt Checks	74.8	Pass
							<b>RATING =</b>	<b>81.1</b>	<b>Pass</b>

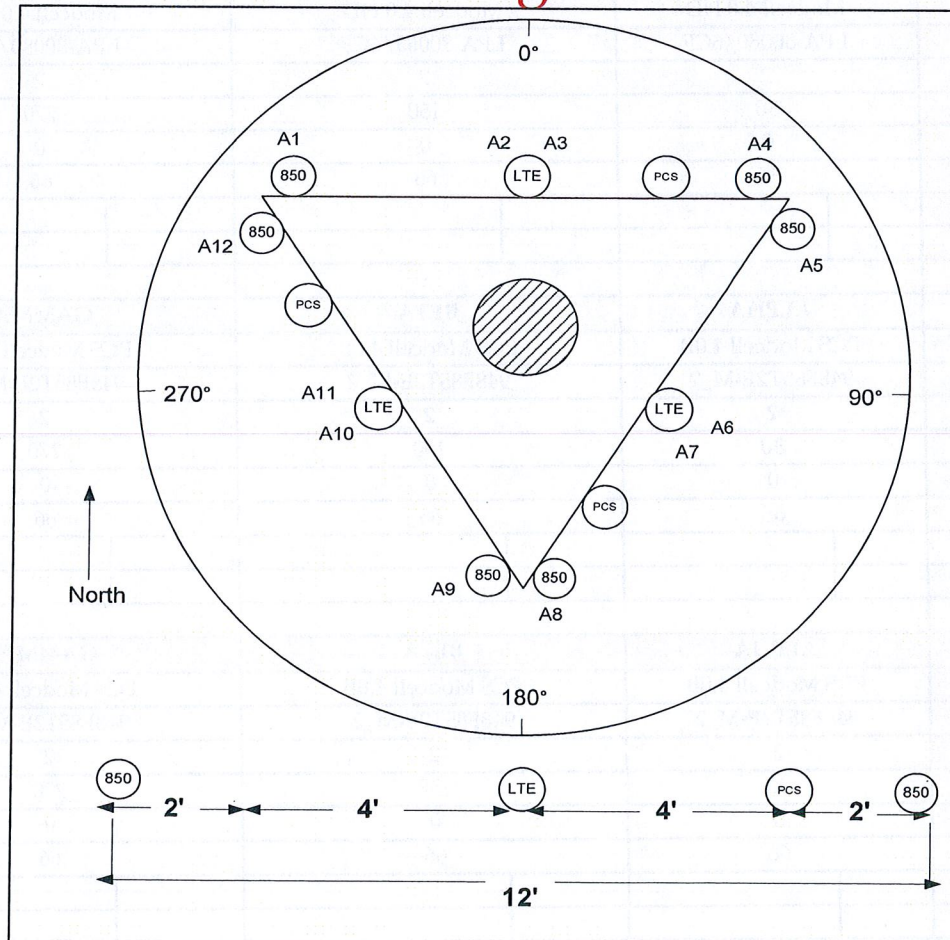


<b>SITE NAME</b>	<b>MERIDEN E CT</b>		<b>ECP - CELL #</b>	<b>2</b>	<b>151</b>
<b>LATITUDE</b>	<b>41-32-03.35 N</b>		<b>LONGITUDE</b>	<b>72-47-47.35 W</b>	
The 3 Swedcom antennas 9212 will be removed to install 3 LTE Antennas.			<b>SAVE BUTTON</b>		
			<b>STRUCTURE TYPE</b>	<b>LATTICE ON ROOF</b>	
<b>700 Mhz - LTE ANTENNA ADD</b>	<b>ALPHA</b>	<b>BETA</b>	<b>GAMMA</b>		
EQUIPMENT TYPE	Lucent	Lucent	Lucent		
ANTENNA TYPE	P65-16-XL-2	P65-16-XL-2	P65-16-XL-2		
QTY OF ANTENNAS PER FACE	1	1	1		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
<b>850 Cellular - Current Config</b>	<b>ALPHA</b>	<b>BETA</b>	<b>GAMMA</b>		
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD		
ANTENNA TYPE	LPA-80080/6CF	LPA-80063/6CF	LPA-80080/6CF		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
<b>850 Cellular - Future Config</b>	<b>ALPHA</b>	<b>BETA</b>	<b>GAMMA</b>		
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD		
ANTENNA TYPE	LPA-80080/6CF	LPA-80063/6CF	LPA-80080/6CF		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
<b>1900 Cellular - Current Config</b>	<b>ALPHA</b>	<b>BETA</b>	<b>GAMMA</b>		
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B		
ANTENNA TYPE	948F85T2E-M_2	948F85T2E-M_2	948F85T2E-M_2		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					
<b>1900 Cellular - Future Config</b>	<b>ALPHA</b>	<b>BETA</b>	<b>GAMMA</b>		
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B		
ANTENNA TYPE	948F85T2E-M_2	948F85T2E-M_2	948F85T2E-M_2		
QTY OF ANTENNAS PER FACE	2	2	2		
ORIENTATION (DEG)	30	150	270		
DOWN TILT ( MECH/DEG )	0	0	0		
RAD CTR (FT AGL)	66	66	66		
TMA - QTY / MODEL					
DIPLEXER - QTY / MODEL					
MCPA BRICKS (QTY)					



NUMBER OF CABLE'S NEEDED					ESTIMATED CABLE LENGTH						
MAINLINE SIZE		1 5/8"	TOTAL # OF MAINLINES		12	MAINLINE (FT)		90			
JUMPER SIZE		1/2 "	TOTAL # OF TOP JUMPERS		12	TOP JUMPER (FT)		10			
TX/RX FREQUENCIES					TX POWER OUTPUT						
Cellular A-Band			PCS F-Band		700 Mhz C - Blo	Cellular (Watts)		20			
TX - 869-880,890-891.5 MHz			TX - 1970-1975		TX - 746-757	PCS (Watts)		16			
RX - 824-835,845-846.5 MHz			RX - 1890-1895		RX - 776-787	LTE (Watts)		40			
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A5	800	Tx2/Rx0	BLUE	A9	800	Tx3/Rx0	GREEN
	1900	Tx1/Rx0	RED/WHITE		1900	Tx2/Rx0	BLUE/WHITE		1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ORANGE	A6	700	Tx2/Rx0	BLUE/ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ORANGE
	1900	Tx4/Rx1	RED/RED/WHITE		1900	Tx5/Rx1	BLUE/BLUE/WHITE		1900	Tx6/Rx1	GREEN/GREEN/WHITE
A4	800	Tx4/Rx1	RED/RED	A8	800	Tx5/Rx1	BLUE/BLUE	A12	800	Tx6/Rx1	GREEN/GREEN
RF ENGINEER				RF MANAGER				INITIALS		DATE	
Prepared By : Dany Bustamante				Steve Weatherbee				DB		1/6/2010	

## Site Configuration



# P65-16-XL

## Very Low Broadband Antennas

### -2

POLARIZATION: Dual linear  $\pm 45^\circ$   
 FREQUENCY (MHz): 698-894  
 HORIZONTAL BEAM WIDTH ( $^\circ$ ): 65  
 GAIN (dBi/dBd): 16.0/13.9  
 TILT: 2  
 LENGTH: 72"

#### ELECTRICAL SPECIFICATIONS\*

	698-806	698-894	806-894
Frequency range (MHz)			
Frequency band (MHz)	698-806		806-894
Gain (dBi/dBd)	15.5/13.4		16.0/13.9
Polarization			
Nominal Impedance ( $\Omega$ )			
VSWR			
Horizontal beam width, -3 dB ( $^\circ$ )	68		65
Vertical beam width, -3 dB ( $^\circ$ )	10.5		9.5
Electrical down tilt ( $^\circ$ )			
Side lobe suppression, vertical 1st upper (dB)	> 15		> 15
Isolation between inputs (dB)	> 30		> 30
Tracking, horizontal plane $\pm 60^\circ$ (dB)	< 2		< 2
First null fill (dB)	-		-
Vertical beam squint ( $^\circ$ )	< 0.5		< 0.5
Front to back ratio (dB)	> 30		> 30
Front to back ratio, total power (dB)	> 25		> 25
Cross polar discrimination (XPD) $0^\circ$ (dB)	> 15	> 15	> 15
Cross polar discrimination (XPD) $\pm 60^\circ$ (dB)	> 10		> 10
Far field coupling			
IM3, 2xTx@43dBm (dBc)	-153		
IM7, 2xTx@43dBm (dBc)			
Power handling, average per input (W)			
Power handling, average total (W)			

#### MECHANICAL SPECIFICATIONS\*

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 5" (1829 x 305 x 125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	44 (20)
Weight, without brackets, kg (lbs)	33 (15)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Radome colour	Light Grey
Package size, HxWxD, mm (ft)	82" x 16" x 10" (2082 x 400 x 255)
Shipping weight, kg (lbs)	55 (25)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

\*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

#### ANTENNA PATTERNS\*

For detailed patterns visit <http://www.powerwave.com/rpa/>.



# LPA-80080/6CF

When ordering replace "\_\_\_" with connector type.

## Mechanical specifications

Length	1800 mm	70.9 in
Width	140 mm	5.5 in
Depth	335 mm	13.2 in
Depth with z-bracket	375 mm	14.8 in
4) Weight	9.5 kg	21.0 lbs
Wind Area		
Fore/Aft	0.25 m <sup>2</sup>	2.7 ft <sup>2</sup>
Side	0.60 m <sup>2</sup>	6.5 ft <sup>2</sup>
Rated Wind Velocity (Safety factor 2.0)	>295 km/hr >183 mph	
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	415 N	93.3 lbs
Side	870 N	195.6 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

## Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in). If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in)

Mounting Bracket & Downtilt Bracket Kit  
#21699999

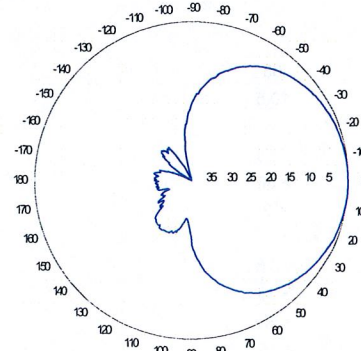
## Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
3) Connector(s)	NE or E-DIN 1 port / center
1) VSWR	≤ 1.4:1
Polarization	Vertical
1) Gain	14 dBd
2) Power Rating	500 W
1) Half Power Angle	
H-Plane	80°
E-Plane	10°
1) Electrical Downtilt	0°
1) Null Fill	10%
Lightning Protection	Direct Ground

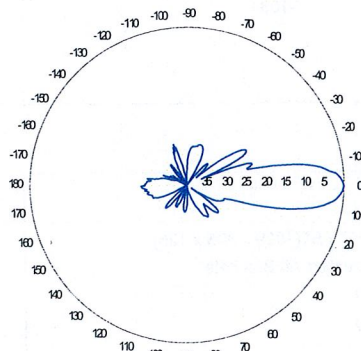
- 1) Typical values.  
2) Power rating limited by connector only.  
3) NE indicates an elongated N connector.  
E-DIN indicates an elongated DIN connector.  
4) The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

## Radiation pattern<sup>1)</sup>



Horizontal

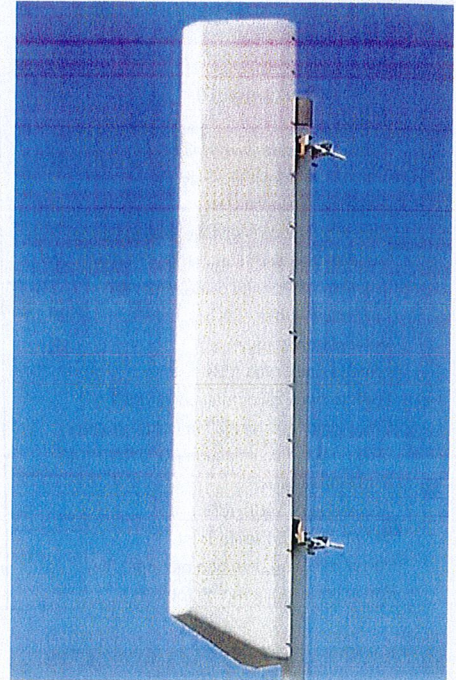


Vertical

## Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



**Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:**

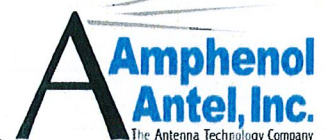
- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

*This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.*

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

806-960 MHz



Revision Date: 7/5/07



# Vertically Polarized, Log Periodic 63° / 14.5 dBd

## LPA-80063/6CF

When ordering, replace "\_\_\_" with connector type.

### Mechanical specifications

Length	1800 mm	70.87 in
Width	380 mm	14.96 in
Depth	332 mm	13.07 in
4) Weight	12.25 kg	27 lbs

#### Wind Area

Front	0.684 m <sup>2</sup>	7.39 ft <sup>2</sup>
Side	0.598 m <sup>2</sup>	6.45 ft <sup>2</sup>

#### Rated Wind Velocity (Safety factor 2.0)

>235 km/hr >146 mph

#### Wind load @ 100 mph (161 km/hr)

Front	993 N	223.3 lbs
Side	872 N	196.1 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

### Mounting & Downtilting:

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

Mounting bracket kit #21699999

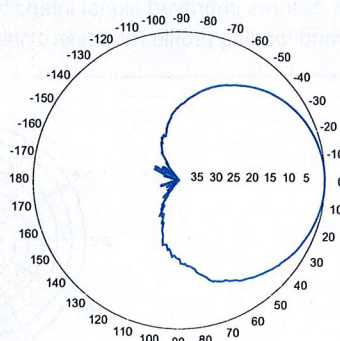
Downtilt bracket kit #21699999

The downtilt bracket kit includes the mounting bracket kit.

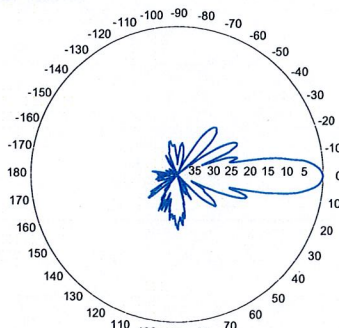
### Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
3) Connector	NE, E-DIN
1) VSWR	≤1.4:1
Polarization	Vertical
1) Gain	14.5 dBd
2) Power Rating	500 W
1) Half Power Angle	
H-Plane	63°
E-Plane	10°
1) Electrical Downtilt	0°
1) Null Fill	10%
Lightning Protection	Direct Ground

### Radiation-pattern<sup>1)</sup>



Horizontal



Vertical

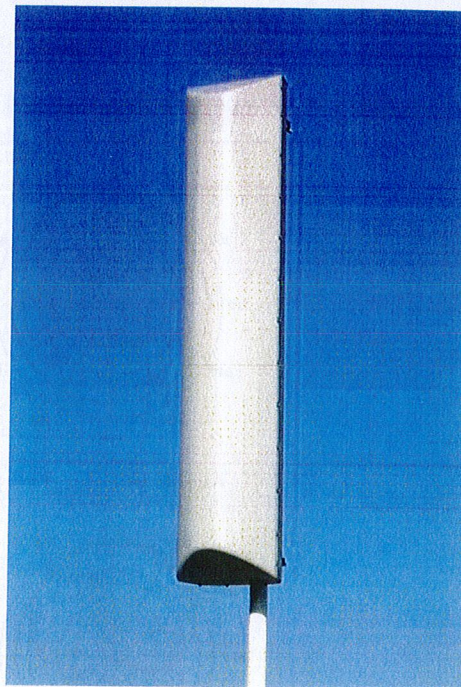
### Featuring upper side lobe suppression.

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back Ratio.

CF Denotes a Center-Fed Connector.

## 806-960 MHz



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Every Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.



Revision Date: 12/1/05

<sup>1)</sup> Typical Values

<sup>2)</sup> Power Rating limited by connector only.

<sup>3)</sup> NE indicates an elongated N Connector.

E-DIN indicates an elongated DIN Connector.

<sup>4)</sup> The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.



**DECIBEL®**  
Base Station Antennas

**948F85T2E-M**

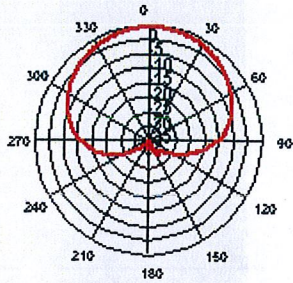
16.1 dBi, Directed Dipole Antenna  
1850-1990 MHz

**1850-1990 MHz**

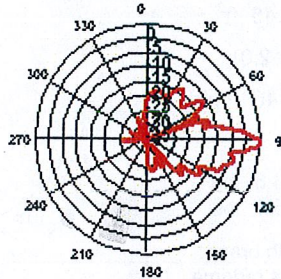
**MaxFill™**  
**dB Director®**

- Exceptional azimuth roll-off reducing soft hand-offs and improving capacity
- Excellent upper side lobe suppression
- Deep null filling below the horizon assures improved signal intensity
- Low profile appearance and low wind loading profile for easier zoning approvals

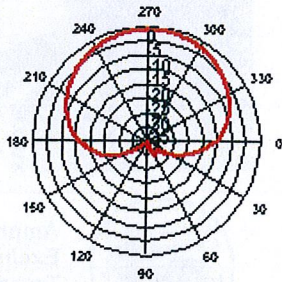
850



Azimuth 1850 MHz (Tilt=2)



Vertical 1850 MHz (Tilt=2)



Horizontal 1850 MHz (Tilt=2)



ELECTRICAL		MECHANICAL	
Frequency (MHz):	1850-1990	Weight:	8.5 lbs (3.9 kg)
Polarization:	Vertical	Dimensions (LxWxD):	48 X 3.5 X 7 in (1219 X 89 X 178 mm)
Gain (dBd/dBi):	14/16.1	Max. Wind Area:	1.18 ft <sup>2</sup> (0.11 m <sup>2</sup> )
Azimuth BW:	85°	Max. Wind Load (@ 100mph):	65 lbf (289 N)
Elevation BW:	8°	Max. Wind Speed:	125 mph (201 km/h)
Beam Tilt:	2°	Radiator Material:	Low Loss Circuit Board
USLS* (dB):	>18	Reflector Material:	Aluminum
Null Fill* (dB):	15	Radome Material:	ABS, UV Resistant
Front-to-Back Ratio* (dB):	40	Mounting Hardware Material:	Galvanized Steel
VSWR:	<1.33:1	Connector Type:	7-16 DIN - Female (Bottom)
IM Suppression - Two 20 Watt Carriers:	-150 dBc	Color:	Light Gray
Impedance:	50 Ohms	Standard Mounting Hardware:	DB390 Pipe Mount Kit, included
Max Input Power:	250 Watts	Downtilt Mounting Hardware:	DB5098, optional
Lightning Protection:	DC Ground	Opt. Mounting Hardware:	DB5094-AZ Azimuth Wall Mount
Opt Electrical Tilt:	0°, 4°, 6°		



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Tel: 214.631.0310

Fax: 214.631.4706  
Toll Free Tel: 1.800.676.5342  
Fax: 1.800.229.4706  
www.andrew.com

Date: 4/29/2004  
\* - Indicates Typical Values

dbtech@andrew.com