

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
A PETITION OF CELLCO PARTNERSHIP	:	PETITION NO. 1494
D/B/A VERIZON WIRELESS FOR A	:	
DECLARATORY RULING ON THE NEED TO	:	
OBTAIN A SITING COUNCIL CERTIFICATE	:	
FOR THE INSTALLATION OF A WIRELESS	:	
TELECOMMUNICATIONS FACILITY AT 24	:	
TOWNHOUSE ROAD, DURHAM,	:	
CONNECTICUT	:	APRIL 5, 2022

**RESPONSES OF CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS
TO CONNECTICUT SITING COUNCIL INTERROGATORIES, SET ONE**

On March 22, 2022, the Connecticut Siting Council (“Council”) issued Interrogatories, Set One, to Cellco Partnership d/b/a Verizon Wireless (“Cellco”), relating to Petition No. 1494.

Below are Cellco’s responses.

Question No. 1

What is the estimated cost of the proposed facility?

Response

The estimated cost for the proposed facility is approximately \$250,000

Wood Pole/Set	\$10,000
Civil Site Work	\$10,000
Compound/concrete/Fence Installation	\$20,000
Electrical	\$10,000
Antennas and Equipment Costs	\$200,000

Question No. 2

Page 2 of the Petition states that six Remote Radio Heads (RRH) will be installed behind

Verizon's antennas. However, sheet C-2 depicts RRHs mounted on a rack within the equipment compound. Please clarify. Also, if RRHs are proposed to be installed behind antennas, at what height would they be installed?

Response

The RRHs will be rack-mounted on the ground and within the fenced compound. We apologize for the confusion.

Question No. 3

Would the proposed facility have backup power? If yes, for how long could it support the facility during a power outage?

Response

Yes, Cellco intends to install a battery cabinet within the equipment compound. The batteries would provide backup power to the facility for approximately eight (8) hours.

Question No. 4

What is the distance from the existing Verizon facility (Petition No. 1117) on the property and the proposed facility?

Response

The proposed facility is located approximately 1,235 feet south of the existing pole-mounted facility approved in Petition No. 1117. Please see the Proposed Facility and Existing Small Cell Facilities Locations map included in Attachment 1.

Question No. 5

What is the distance and direction of the nearest wetland area to the proposed facility?

Response

The nearest wetland area is located approximately 510 feet to the south of the proposed

facility, associated with the Coginchaug River floodplain. Please refer to the Preliminary Wetland Map provided in [Attachment 2](#).

Question No. 6

Would the proposed facility be located within a 100-year or 500-year flood zone?

Response

No. The proposed facility is located within an unshaded Flood Zone X, outside of the 100-year and 500-year flood hazard zones. The nearest flood hazard zone is a Zone AE 100-year flood hazard zone located approximately 395 feet to the west, associated with the Coginchaug River. Please refer to the FEMA Flood Map provided in [Attachment 3](#).

Question No. 7

Is the proposed facility located within a Natural Diversity Database (NDDB) buffered area?

Response

Yes, the proposed facility is located in a buffer area on the most recent (December 2021) NDDB map. Previous consultation with NDDB revealed in a June 10, 2021 Determination letter (NDDB Determination No. 202107632) that no negative impacts to State-listed species would result from the proposed facility. Please refer to the NDDB Determination letter and map provided in [Attachment 4](#).

Question No. 8

Provide a structural analysis stamped by a Professional Engineer duly licensed in the State of Connecticut to certify that the proposed pole can support the proposed loading.

Response

The Structural Analysis requested is included in Attachment 5.

Question No. 9

Provide the proposed construction hours and days of the week.

Response

Construction hours would be limited to 7 a.m. to 7 p.m. Monday to Saturday. Cellco anticipates that construction of the proposed facility can be completed within approximately 8 weeks.

Question No. 10

Referencing the Cumulative Power Density table under Attachment 4 of the Petition, did Verizon include a 6-foot deduction to account for a person's height? Please provide a rigorous far-field analysis taking into account the actual antenna pattern and accounting for a 6-foot person standing on the ground.

Response

Far field calculations requested are included in Attachment 6.

ATTACHMENT 1



Legend

- Proposed Verizon Wireless Facility
- Verizon Wireless Durham Fairgrounds Small Cell/Petition No. 1117
- Subject Property
- Approximate Parcel Boundary

Map Notes:
 Base Map Source: 2019 CT ECO Imagery
 Map Scale: 1 inch = 200 feet
 Map Date: March 2022



Connecticut Siting Council Petition No. 1494 Proposed Facility and Existing Small Cell Facility Locations

Proposed Wireless
 Telecommunications Facility
 Durham Fair 2 CT
 Durham Fairgrounds
 24 Townhouse Road
 Durham, Connecticut



ATTACHMENT 2



Proposed Verizon Wireless Facility (Petition No. 1494)

47-510 Feet

VILLAGE ST

Legend

- Proposed Verizon Wireless Facility
- Approximate Wetland Boundary
- Wetlands (CTDEEP)
- Subject Property
- Approximate Parcel Boundary

Map Notes:
 Base Map Source: 2019 CT Aerial Imagery (CTECO)
 Approximate wetland boundary based on desktop review and interpretation of aerial and LIDAR topographic data by APT Professional Soil Scientist.
 Map Scale: 1 inch = 150 feet
 Map Date: March 2022



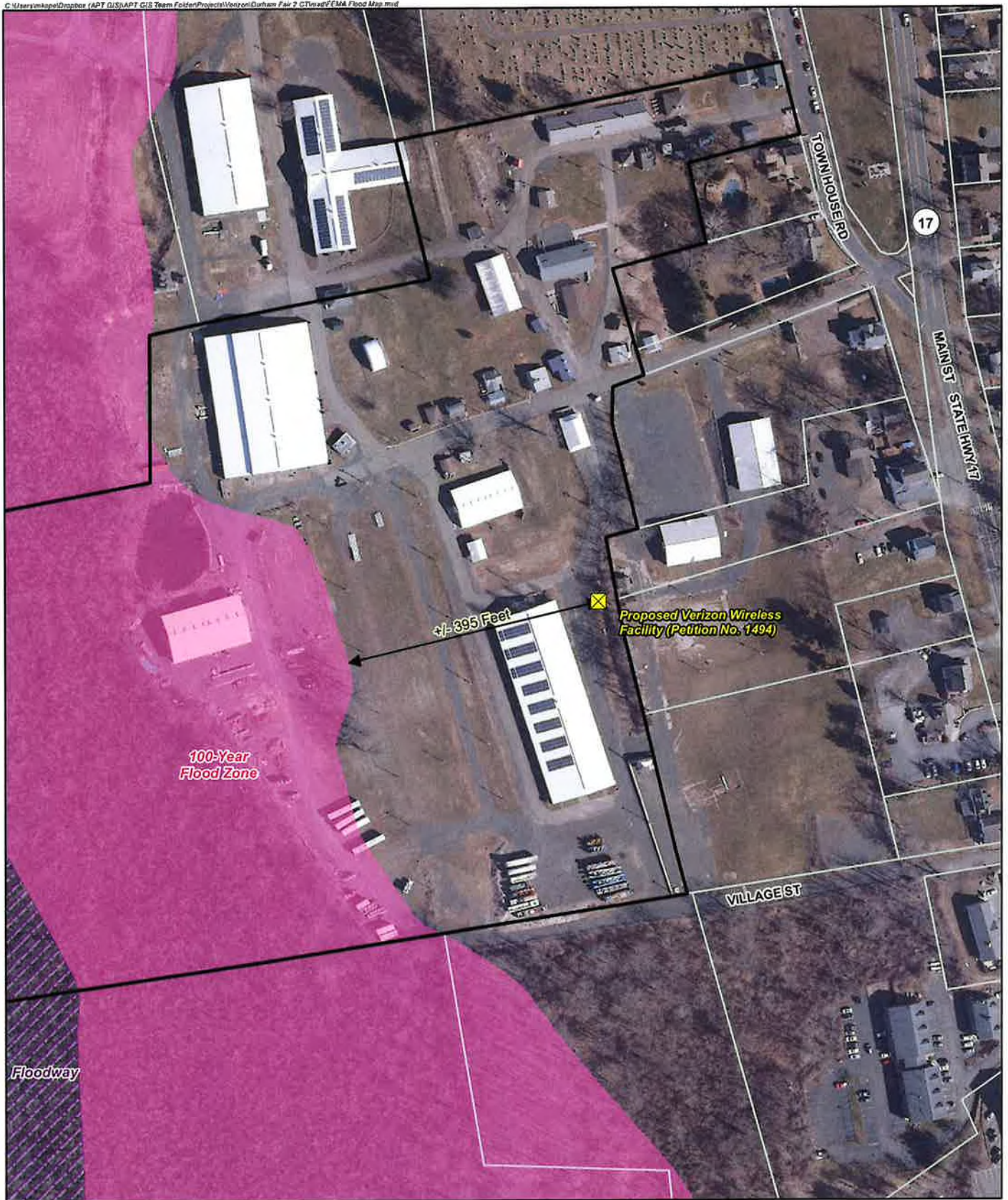
Connecticut Siting Council Petition No. 1494 Preliminary Wetland Map

Proposed Wireless Telecommunications Facility
 Durham Fair 2 CT
 Durham Fairgrounds
 24 Townhouse Road
 Durham, Connecticut

verizon



ATTACHMENT 3



Legend

- Proposed Verizon Wireless Facility
- 100-Year Flood Zone
- Subject Property
- 500-Year Flood Zone
- Floodway
- Approximate Parcel Boundary

Map Notes:
 Base Map Source: 2019 CT ECO Imagery
 Flood Zones obtained from FEMA Flood Map Service Center
 Map Scale: 1 inch = 200 feet
 Map Date: March 2022



Connecticut Siting Council Petition No. 1494 FEMA Flood Map

Proposed Wireless
 Telecommunications Facility
 Durham Fair 2 CT
 Durham Fairgrounds
 24 Townhouse Road
 Durham, Connecticut



ATTACHMENT 4



June 10, 2021

Jessica Cilento
Trileaf Corporation
1051 Winderley Place, Suite 201
Maitland FL 32835
j.cilento@trileaf.com

Project: Verizon Wireless Durham Fair 2 CT, 24 Townhouse Road, Durham, CT
NDDB Determination No.: 202107632

Dear Ms. Cilento,

I have reviewed Natural Diversity Database (NDDB) maps and files regarding the area of work provided for the proposed installation of a new telecommunications facility at 24 Townhouse Road in Durham, Connecticut. I do not anticipate negative impacts to State-listed species (RCSA Sec. 26-306) resulting from your proposed activity at the site based upon the information contained within the NDDB. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits. This determination is good for two years. Please re-submit a new NDDB Request for Review if the scope of work changes or if work has not begun on this project by June 10, 2023.

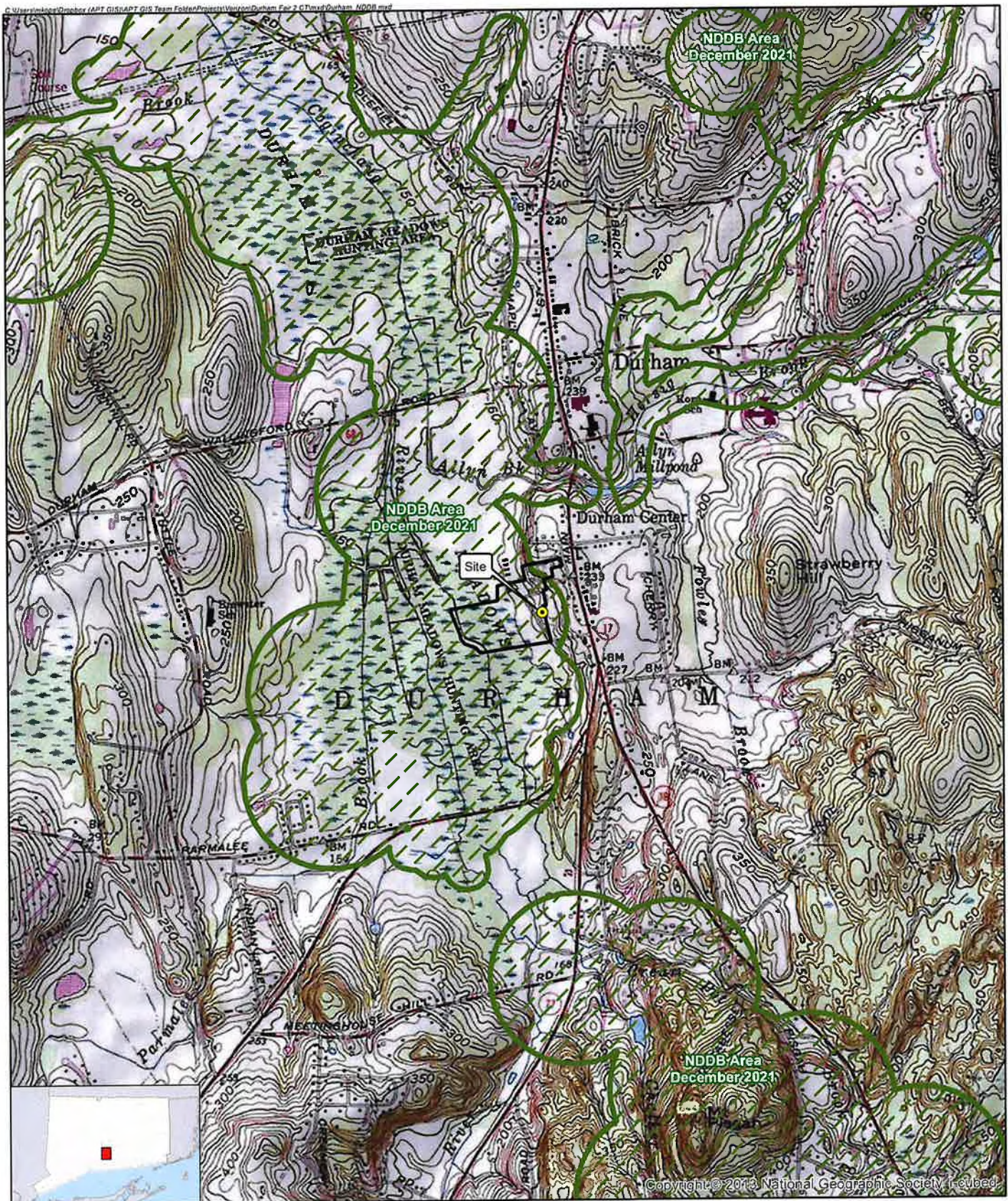
Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey, cooperating units of DEEP, landowners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDB should not be substitutes for on-site surveys necessary for a thorough environmental impact assessment. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the database as it becomes available.

Please contact me if you have further questions at (860) 424-3378, or karen.zyko@ct.gov. Thank you for consulting the Natural Diversity Database.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karen Zyko".

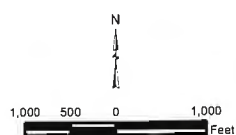
Karen Zyko
Environmental Analyst



Legend

- Proposed Verizon Wireless Wood Pole
- Subject Property
- NDDB CTDEEP Natural Diversity Database (updated Dec 2021)

Map Notes:
 Base Map Source: USGS 7.5 Minute
 Topographic Quadrangle Map: Durham, CT (1984)
 Map Scale: 1:24,000
 Map Date: March 2022



Connecticut Siting Council Petition No. 1494 NDDB Map

Proposed Wireless
 Telecommunications Facility
 Durham Fair 2 CT
 Durham Fairgrounds
 24 Townhouse Road
 Durham, Connecticut

verizon



ATTACHMENT 5

Report Date: April 4, 2022

Client: On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
Attn: David Weinpahl, P.E.
(201) 456-4624
dweinpahl@onaireng.com

Structure: Proposed 38.5-ft Monopole
Site Name: Durham Fair 2 CT
Site Address: 24 Townhouse Rd.
City, County, State: Durham, Middlesex County, CT
Latitude, Longitude: 41.468380, -72.682021

PJF Project: A42920-0009.001.7805

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the tower stress level.

Analysis Criteria:

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Proposed Appurtenance Loads:

The structure was analyzed with the proposed loading configuration shown in Table 1 of this report.

Summary of Analysis Results:

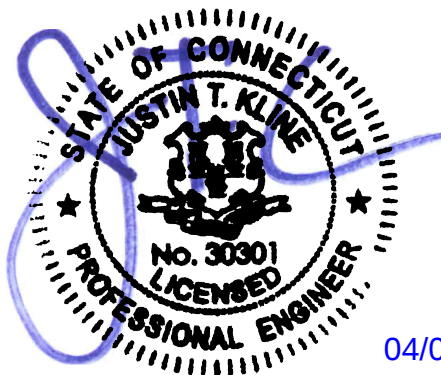
Proposed Structure: Pass - 91.1%
Proposed Foundation: Pass - 99.0%

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and On Air Engineering, LLC. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Nathan C. Miller

Nathan C. Miller, P.E.
Project Engineer
nmiller@pauljford.com



04/04/2022

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1) INTRODUCTION

This tower is a proposed 38.5 ft Wood Monopole tower.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
37.0	37.0	1	pole mounts	Mount Collar	2	1-5/8
		3	samsung telecommunications	MT6407-77A		
34.0	34.0	3	pole mounts	2.5" OD x 12' Mount Pipe	---	---
		3	samsung telecommunications	XXDWMM-12.5-65-8T-RRH w/ RT4401-48A w/ mount pipe		
30.0	30.0	1	pole mounts	Mount Collar	---	---
		3	samsung telecommunications	MF1601D-25A		
27.0	27.0	1	raycap	RHSDC-6627-PF-48	---	---

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
RFDS	Verizon Wireless, 09/15/2021	FUZE: 2054637	On Air Engineering, LLC
Zoning Drawings	On Air Engineering, LLC, 12/29/2019	Durham Fair 2 CT	
Mount Analysis	Paul J. Ford and Company, 12/15/2021	A42920-0009.002.7190	PJF

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) At the time of analysis, a site-specific geotechnical report was not available. See the recommendations section for further information.
- 4) The wood structure was analyzed in tnxTower for obtaining the reactions at critical elevations in the structure. This analysis should be considered as an approximation of the pole behavior since the pole is wood and tnxTower is intended for steel poles.
- 5) The new pole wood species is assumed to be Southern Pine with an allowable bending stress (Fb) of 1950psi, but alternatives that meet or exceed this allowable bending stress would be acceptable.

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

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Section No.	Elevation (ft)	Description	% Capacity	Pass / Fail
L1	38.5 - 35	Round Wooden Pole	2.2	Pass
L2	35 - 30	Round Wooden Pole	13.6	Pass
L3	30 - 25	Round Wooden Pole	31.4	Pass
L4	25 - 20	Round Wooden Pole	46.9	Pass
L5	20 - 15	Round Wooden Pole	60.6	Pass
L6	15 - 10	Round Wooden Pole	72.5	Pass
L7	10 - 5	Round Wooden Pole	83.0	Pass
L8	5 - 0	Round Wooden Pole	91.1	Pass
			Summary	
		Pole (L8)	91.1	Pass
		Rating =	91.1	Pass

Table 4 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation (Structure)	0	99.0	Pass
1	Base Foundation (Soil Interaction)	0	82.2	Pass

Structure Rating (max from all components) =	99.0%
---	--------------

Notes:

- 1) See additional documentation in "Appendix B – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. In order for the results of this analysis to be considered valid, the following must be completed:

- Geotechnical observation and testing to confirm the site soil values meet or exceed the values assumed as part of this design.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON
EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

- 1) Paul J. Ford and Company has not made a field inspection to verify the monopole dimensions or the antenna/coax loading. If the existing conditions are not as represented on these sketches, we should be contacted immediately to reevaluate any conclusions stated in this report.
- 2) No allowance was made for any damaged, missing, or rusted material. The analysis of this monopole assumes that no physical deterioration has occurred in any of the structural components of the monopole and that all the structural members have the same load carrying capacity as the day the monopole was erected.
- 3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing monopole. The structural analysis provided by Paul J. Ford and Company verifies the adequacy of the main structural members of the monopole. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate, connection detail, etc.
- 4) The structural integrity of the existing tower foundation can only be verified if exact foundation sizes and soil conditions are known. Paul J. Ford and Company will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.
- 5) The monopole has been analyzed according to the minimum basic design wind velocity recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-H. If the owner or local or state agencies require a higher design wind velocity, Paul J. Ford and Company should be made aware of this requirement.

APPENDIX A
TNXTOWER OUTPUT

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 1) Tower is located in Middlesex County, Connecticut.
- 2) Tower base elevation above sea level: 187.5600 ft.
- 3) Basic wind speed of 120 mph.
- 4) Risk Category II.
- 5) Exposure Category C.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.0000 ft.
- 9) Nominal ice thickness of 1.0000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56.00 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.
- 18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist.
		Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice
		Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No
		Appurtenances
		Outside and Inside Corner Radii Are
		Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	38.5000- 35.0000	3.5000	0.00	Round	12.0000	12.4100	6.2050		Southern Pine (3 ksi)
L2	35.0000- 30.0000	5.0000	0.00	Round	12.4100	12.9900	6.4950		Southern Pine (3 ksi)
L3	30.0000- 25.0000	5.0000	0.00	Round	12.9900	13.5700	6.7850		Southern Pine (3 ksi)
L4	25.0000- 20.0000	5.0000	0.00	Round	13.5700	14.1600	7.0800		Southern Pine (3 ksi)
L5	20.0000- 15.0000	5.0000	0.00	Round	14.1600	14.7400	7.3700		Southern Pine (3 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L6	15.0000- 10.0000	5.0000	0.00	Round	14.7400	15.3200	7.6600		Southern Pine (3 ksi)
L7	10.0000- 5.0000	5.0000	0.00	Round	15.3200	15.9000	7.9500		Southern Pine (3 ksi)
L8	5.0000-0.0000	5.0000		Round	15.9000	16.4900	8.2450		Southern Pine (3 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	12.0000	112.9653	1017.8746	3.0018	6.0000	169.6458	2035.7493	56.4489	0.0000	0
	12.4100	120.9577	1164.2789	3.1025	6.2050	187.6356	2328.5578	60.4427	0.0000	0
L2	12.4100	120.6935	1164.2733	3.1059	6.2050	187.6347	2328.5467	60.3107	0.0000	0
	12.9900	132.5282	1397.6760	3.2475	6.4950	215.1926	2795.3520	66.2245	0.0000	0
L3	12.9900	132.2640	1397.6704	3.2507	6.4950	215.1918	2795.3409	66.0925	0.0000	0
	13.5700	144.6271	1664.5210	3.3925	6.7850	245.3237	3329.0421	72.2704	0.0000	0
L4	13.5700	144.3537	1664.5151	3.3957	6.7850	245.3228	3329.0302	72.1338	0.0000	0
	14.1600	157.4767	1973.4354	3.5400	7.0800	278.7338	3946.8708	78.6914	0.0000	0
L5	14.1600	157.2125	1973.4298	3.5430	7.0800	278.7330	3946.8597	78.5593	0.0000	0
	14.7400	170.6416	2317.1803	3.6850	7.3700	314.4071	4634.3607	85.2699	0.0000	0
L6	14.7400	170.3774	2317.1748	3.6879	7.3700	314.4063	4634.3495	85.1378	0.0000	0
	15.3200	184.3348	2703.9892	3.8300	7.6600	353.0012	5407.9785	92.1124	0.0000	0
L7	15.3200	184.0706	2703.9837	3.8327	7.6600	353.0005	5407.9674	91.9804	0.0000	0
	15.9000	198.5565	3137.3170	3.9750	7.9500	394.6311	6274.6339	99.2190	0.0000	0
L8	15.9000	198.2831	3137.3110	3.9777	7.9500	394.6303	6274.6220	99.0824	0.0000	0
	16.4900	213.5655	3629.5478	4.1225	8.2450	440.2120	7259.0956	106.7190	0.0000	0

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 38.5000- 35.0000				1	1	1			
L2 35.0000- 30.0000				1	1	1			
L3 30.0000- 25.0000				1	1	1			
L4 25.0000- 20.0000				1	1	1			
L5 20.0000- 15.0000				1	1	1			
L6 15.0000- 10.0000				1	1	1			
L7 10.0000- 5.0000				1	1	1			
L8 5.0000- 0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
HCS 6X12 4AWG(1- 5/8")	C	No	Surface Ar (CaAa)	37.0000 - 0.0000	2	2	0.000 0.000	1.6600		0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	38.5000-35.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.664	0.000	0.01
L2	35.0000-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L3	30.0000-25.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L4	25.0000-20.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L5	20.0000-15.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L6	15.0000-10.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L7	10.0000-5.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02
L8	5.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.660	0.000	0.02

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	38.5000-35.0000	A	1.011	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.335	0.000	0.02
L2	35.0000-30.0000	A	0.998	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.323	0.000	0.05
L3	30.0000-25.0000	A	0.982	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.302	0.000	0.05
L4	25.0000-20.0000	A	0.962	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.278	0.000	0.05
L5	20.0000-15.0000	A	0.938	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.248	0.000	0.05
L6	15.0000-10.0000	A	0.907	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.209	0.000	0.05
L7	10.0000-5.0000	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.153	0.000	0.04
L8	5.0000-0.0000	A	0.772	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.040	0.000	0.04

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	38.5000-35.0000	0.0000	1.6545	0.0000	1.2877
L2	35.0000-30.0000	0.0000	2.4651	0.0000	1.8414
L3	30.0000-25.0000	0.0000	2.4900	0.0000	1.8704

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L4	25.0000-20.0000	0.0000	2.5137	0.0000	1.8970
L5	20.0000-15.0000	0.0000	2.5360	0.0000	1.9206
L6	15.0000-10.0000	0.0000	2.5570	0.0000	1.9402
L7	10.0000-5.0000	0.0000	2.5769	0.0000	1.9536
L8	5.0000-0.0000	0.0000	2.5960	0.0000	1.9508

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	1	HCS 6X12 4AWG(1-5/8")	35.00 - 37.00	1.0000	1.0000
L2	1	HCS 6X12 4AWG(1-5/8")	30.00 - 35.00	1.0000	1.0000
L3	1	HCS 6X12 4AWG(1-5/8")	25.00 - 30.00	1.0000	1.0000
L4	1	HCS 6X12 4AWG(1-5/8")	20.00 - 25.00	1.0000	1.0000
L5	1	HCS 6X12 4AWG(1-5/8")	15.00 - 20.00	1.0000	1.0000
L6	1	HCS 6X12 4AWG(1-5/8")	10.00 - 15.00	1.0000	1.0000
L7	1	HCS 6X12 4AWG(1-5/8")	5.00 - 10.00	1.0000	1.0000
L8	1	HCS 6X12 4AWG(1-5/8")	0.00 - 5.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
MT6407-77A	A	From Leg	1.0000 0.00 0.00	0.0000	37.0000	No Ice 1/2" Ice 1" Ice	4.6922 4.9799 5.2750	1.8402 2.0626 2.2920	0.08 0.11 0.14
MT6407-77A	B	From Leg	1.0000 0.00 0.00	0.0000	37.0000	No Ice 1/2" Ice 1" Ice	4.6922 4.9799 5.2750	1.8402 2.0626 2.2920	0.08 0.11 0.14
MT6407-77A	C	From Leg	1.0000 0.00 0.00	0.0000	37.0000	No Ice 1/2" Ice 1" Ice	4.6922 4.9799 5.2750	1.8402 2.0626 2.2920	0.08 0.11 0.14
Mount Collar	C	None		0.0000	37.0000	No Ice 1/2" Ice 1" Ice	5.0000 7.0000 9.0000	5.0000 7.0000 9.0000	0.12 0.20 0.28

XXDWMM-12.5-65-8T- RRH w/ RT4401-48A w/ mount pipe	A	From Leg	1.0000 0.00 0.00	0.0000	34.0000	No Ice 1/2" Ice 1" Ice	3.1184 3.9638 4.6875	9.3925 10.6227 11.7049	0.06 0.14 0.23
XXDWMM-12.5-65-8T- RRH w/ RT4401-48A w/ mount pipe	B	From Leg	1.0000 0.00 0.00	0.0000	34.0000	No Ice 1/2" Ice 1" Ice	3.1184 3.9638 4.6875	9.3925 10.6227 11.7049	0.06 0.14 0.23
XXDWMM-12.5-65-8T- RRH w/ RT4401-48A w/	C	From Leg	1.0000 0.00	0.0000	34.0000	No Ice 1/2"	3.1184 3.9638	9.3925 10.6227	0.06 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
mount pipe			0.00			Ice	4.6875	11.7049	0.23
2.5" OD x 12' Mount Pipe	A	None		0.0000	34.0000	1" Ice No Ice	3.0000 4.2350	3.0000 4.2350	0.06 0.08
						1/2" Ice	5.4900 5.4900	5.4900 5.4900	0.10
2.5" OD x 12' Mount Pipe	B	None		0.0000	34.0000	1" Ice No Ice	3.0000 4.2350	3.0000 3.5292	0.06 0.08
						1/2" Ice	5.4900 5.4900	4.5750 4.5750	0.10
2.5" OD x 12' Mount Pipe	C	None		0.0000	34.0000	1" Ice No Ice	3.0000 4.2350	3.0000 3.5292	0.06 0.08
						1/2" Ice	5.4900 5.4900	4.5750 4.5750	0.10
***						1" Ice			
MF1601D-25A	A	From Leg	1.0000 0.00 0.00	0.0000	30.0000	No Ice 1/2" Ice	7.0130 7.4166 7.8298	3.2437 3.7799 4.3232	0.16 0.21 0.27
MF1601D-25A	B	From Leg	1.0000 0.00 0.00	0.0000	30.0000	1" Ice No Ice 1/2" Ice	7.0130 7.0130 7.4166 7.8298	3.2437 3.2437 3.7799 4.3232	0.16 0.21 0.27
MF1601D-25A	C	From Leg	1.0000 0.00 0.00	0.0000	30.0000	No Ice 1/2" Ice	7.0130 7.4166 7.8298	3.2437 3.7799 4.3232	0.16 0.21 0.27
Mount Collar	C	None		0.0000	30.0000	1" Ice No Ice 1/2" Ice	5.0000 5.0000 7.0000 9.0000	5.0000 5.0000 7.0000 9.0000	0.12 0.20 0.28
***						1" Ice			
RHSDC-6627-PF-48	C	None		0.0000	27.0000	No Ice 1/2" Ice	4.0563 4.3155 4.5822	3.0975 3.3351 3.5801	0.03 0.07 0.11
						1" Ice			

Tower Pressures - No Ice

$$G_H = 1.100$$

Section Elevation ft	z ft	K _Z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 38.5000- 35.0000	36.7402	1.025	0.036	3.560	A	0.000	3.560	3.560	100.00	0.000	0.000
					B	0.000	3.560		100.00	0.000	0.000
					C	0.000	3.560		100.00	0.664	0.000
L2 35.0000- 30.0000	32.4810	0.999	0.035	5.292	A	0.000	5.292	5.292	100.00	0.000	0.000
					B	0.000	5.292		100.00	0.000	0.000
					C	0.000	5.292		100.00	1.660	0.000
L3 30.0000- 25.0000	27.4818	0.964	0.034	5.533	A	0.000	5.533	5.533	100.00	0.000	0.000
					B	0.000	5.533		100.00	0.000	0.000
					C	0.000	5.533		100.00	1.660	0.000
L4 25.0000- 20.0000	22.4823	0.924	0.032	5.777	A	0.000	5.777	5.777	100.00	0.000	0.000
					B	0.000	5.777		100.00	0.000	0.000
					C	0.000	5.777		100.00	1.660	0.000
L5 20.0000- 15.0000	17.4833	0.877	0.030	6.021	A	0.000	6.021	6.021	100.00	0.000	0.000
					B	0.000	6.021		100.00	0.000	0.000
					C	0.000	6.021		100.00	1.660	0.000
L6 15.0000- 10.0000	12.4839	0.85	0.030	6.263	A	0.000	6.263	6.263	100.00	0.000	0.000
					B	0.000	6.263		100.00	0.000	0.000
					C	0.000	6.263		100.00	1.660	0.000
L7 10.0000-	7.4845	0.85	0.030	6.504	A	0.000	6.504	6.504	100.00	0.000	0.000

Section Elevation ft	z ft	K _Z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
5.0000					B	0.000	6.504		100.00	0.000	0.000
L8 5.0000- 0.0000	2.4848	0.85	0.030	6.748	C	0.000	6.504		100.00	1.660	0.000
					A	0.000	6.748	6.748	100.00	0.000	0.000
					B	0.000	6.748		100.00	0.000	0.000
					C	0.000	6.748		100.00	1.660	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K _Z	q _z ksf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 38.5000- 35.0000	36.7402	1.025	0.006	1.0108	4.149	A	0.000	4.149	4.149	100.00	0.000	0.000
						B	0.000	4.149		100.00	0.000	0.000
						C	0.000	4.149		100.00	1.335	0.000
L2 35.0000- 30.0000	32.4810	0.999	0.006	0.9984	6.124	A	0.000	6.124	6.124	100.00	0.000	0.000
						B	0.000	6.124		100.00	0.000	0.000
						C	0.000	6.124		100.00	3.323	0.000
L3 30.0000- 25.0000	27.4818	0.964	0.006	0.9819	6.352	A	0.000	6.352	6.352	100.00	0.000	0.000
						B	0.000	6.352		100.00	0.000	0.000
						C	0.000	6.352		100.00	3.302	0.000
L4 25.0000- 20.0000	22.4823	0.924	0.006	0.9623	6.579	A	0.000	6.579	6.579	100.00	0.000	0.000
						B	0.000	6.579		100.00	0.000	0.000
						C	0.000	6.579		100.00	3.278	0.000
L5 20.0000- 15.0000	17.4833	0.877	0.005	0.9384	6.803	A	0.000	6.803	6.803	100.00	0.000	0.000
						B	0.000	6.803		100.00	0.000	0.000
						C	0.000	6.803		100.00	3.248	0.000
L6 15.0000- 10.0000	12.4839	0.85	0.005	0.9074	7.019	A	0.000	7.019	7.019	100.00	0.000	0.000
						B	0.000	7.019		100.00	0.000	0.000
						C	0.000	7.019		100.00	3.209	0.000
L7 10.0000- 5.0000	7.4845	0.85	0.005	0.8621	7.223	A	0.000	7.223	7.223	100.00	0.000	0.000
						B	0.000	7.223		100.00	0.000	0.000
						C	0.000	7.223		100.00	3.153	0.000
L8 5.0000- 0.0000	2.4848	0.85	0.005	0.7721	7.391	A	0.000	7.391	7.391	100.00	0.000	0.000
						B	0.000	7.391		100.00	0.000	0.000
						C	0.000	7.391		100.00	3.040	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K _Z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 38.5000- 35.0000	36.7402	1.025	0.008	3.560	A	0.000	3.560	3.560	100.00	0.000	0.000
					B	0.000	3.560		100.00	0.000	0.000
					C	0.000	3.560		100.00	0.664	0.000
L2 35.0000- 30.0000	32.4810	0.999	0.008	5.292	A	0.000	5.292	5.292	100.00	0.000	0.000
					B	0.000	5.292		100.00	0.000	0.000
					C	0.000	5.292		100.00	1.660	0.000
L3 30.0000- 25.0000	27.4818	0.964	0.008	5.533	A	0.000	5.533	5.533	100.00	0.000	0.000
					B	0.000	5.533		100.00	0.000	0.000
					C	0.000	5.533		100.00	1.660	0.000
L4 25.0000- 20.0000	22.4823	0.924	0.007	5.777	A	0.000	5.777	5.777	100.00	0.000	0.000
					B	0.000	5.777		100.00	0.000	0.000
					C	0.000	5.777		100.00	1.660	0.000
L5 20.0000- 15.0000	17.4833	0.877	0.007	6.021	A	0.000	6.021	6.021	100.00	0.000	0.000
					B	0.000	6.021		100.00	0.000	0.000
					C	0.000	6.021		100.00	1.660	0.000
L6 15.0000- 10.0000	12.4839	0.85	0.007	6.263	A	0.000	6.263	6.263	100.00	0.000	0.000
					B	0.000	6.263		100.00	0.000	0.000
					C	0.000	6.263		100.00	1.660	0.000
L7 10.0000- 5.0000	7.4845	0.85	0.007	6.504	A	0.000	6.504	6.504	100.00	0.000	0.000

Section Elevation ft	z ft	K _z	q _z ksf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
5.0000					B	0.000	6.504		100.00	0.000	0.000
L8 5.0000- 0.0000	2.4848	0.85	0.007	6.748	C	0.000	6.504		100.00	1.660	0.000
					A	0.000	6.748	6.748	100.00	0.000	0.000
					B	0.000	6.748		100.00	0.000	0.000
					C	0.000	6.748		100.00	1.660	0.000

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	38.5 - 35	Pole	Max Tension	36	0.00	-0.00	0.00
			Max. Compression	26	-1.02	0.00	-0.01
			Max. Mx	8	-0.55	-1.34	-0.01
			Max. My	14	-0.56	0.00	-1.31
			Max. Vy	8	0.68	-1.34	-0.01
			Max. Vx	14	0.66	0.00	-1.31
			Max. Torque	18			0.00
L2	35 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-2.46	0.00	-0.05
			Max. Mx	8	-1.16	-9.38	-0.03
			Max. My	14	-1.19	0.00	-8.79
			Max. Vy	8	1.96	-9.38	-0.03
			Max. Vx	14	1.75	0.00	-8.79
			Max. Torque	9			-0.04
L3	30 - 25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-4.17	0.00	-0.08
			Max. Mx	8	-2.13	-23.77	-0.07
			Max. My	14	-2.19	0.00	-21.65
			Max. Vy	8	3.13	-23.77	-0.07
			Max. Vx	14	2.73	0.00	-21.65
			Max. Torque	9			-0.08
L4	25 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-4.59	0.00	-0.12
			Max. Mx	8	-2.45	-40.17	-0.09
			Max. My	14	-2.51	0.00	-35.59
			Max. Vy	8	3.43	-40.17	-0.09
			Max. Vx	14	2.85	0.00	-35.59
			Max. Torque	9			-0.11
L5	20 - 15	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-5.04	0.00	-0.15
			Max. Mx	8	-2.82	-58.03	-0.12
			Max. My	14	-2.87	0.00	-50.10
			Max. Vy	8	3.72	-58.03	-0.12
			Max. Vx	14	2.96	0.00	-50.10
			Max. Torque	9			-0.15
L6	15 - 10	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-5.51	0.00	-0.19
			Max. Mx	8	-3.22	-77.27	-0.14
			Max. My	14	-3.27	0.00	-65.13
			Max. Vy	8	3.99	-77.27	-0.14
			Max. Vx	14	3.05	0.00	-65.13
			Max. Torque	9			-0.19
L7	10 - 5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-6.00	0.00	-0.22
			Max. Mx	8	-3.66	-97.86	-0.15
			Max. My	14	-3.69	0.00	-80.63
			Max. Vy	8	4.25	-97.86	-0.15
			Max. Vx	14	3.14	0.00	-80.63
			Max. Torque	9			-0.22
L8	5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-6.51	0.00	-0.25
			Max. Mx	8	-4.14	-119.74	-0.15
			Max. My	14	-4.15	0.00	-96.55
			Max. Vy	8	4.51	-119.74	-0.15
			Max. Vx	14	3.23	0.00	-96.55
			Max. Torque	9			-0.26

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	6.51	0.00	0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H _x	21	3.11	4.50	-0.00
	Max. H _z	3	3.11	0.00	3.22
	Max. M _x	2	96.26	0.00	3.22
	Max. M _z	8	119.74	-4.50	-0.00
	Max. Torsion	21	0.26	4.50	-0.00
	Min. Vert	15	3.11	0.00	-3.22
	Min. H _x	9	3.11	-4.50	-0.00
	Min. H _z	15	3.11	0.00	-3.22
	Min. M _x	14	-96.55	0.00	-3.22
	Min. M _z	20	-119.74	4.50	-0.00
	Min. Torsion	9	-0.26	-4.50	-0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	3.46	0.00	0.00	0.12	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	4.15	0.00	-3.22	-96.26	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	3.11	0.00	-3.22	-95.45	0.00	0.00
1.2 Dead+1.0 Wind 30 deg - No Ice	4.15	1.61	-2.79	-83.35	-48.21	0.00
0.9 Dead+1.0 Wind 30 deg - No Ice	3.11	1.61	-2.79	-82.65	-47.78	0.00
1.2 Dead+1.0 Wind 60 deg - No Ice	4.15	2.79	-1.61	-48.06	-83.49	0.00
0.9 Dead+1.0 Wind 60 deg - No Ice	3.11	2.79	-1.61	-47.67	-82.76	0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	4.15	4.50	0.00	0.14	-119.74	0.26
0.9 Dead+1.0 Wind 90 deg - No Ice	3.11	4.50	0.00	0.11	-118.73	0.26
1.2 Dead+1.0 Wind 120 deg - No Ice	4.15	2.79	1.61	48.35	-83.49	0.00
0.9 Dead+1.0 Wind 120 deg - No Ice	3.11	2.79	1.61	47.89	-82.76	0.00
1.2 Dead+1.0 Wind 150 deg - No Ice	4.15	1.61	2.79	83.64	-48.21	0.00
0.9 Dead+1.0 Wind 150 deg - No Ice	3.11	1.61	2.79	82.87	-47.78	0.00
1.2 Dead+1.0 Wind 180 deg - No Ice	4.15	0.00	3.22	96.55	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	3.11	0.00	3.22	95.67	0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	4.15	-1.61	2.79	83.64	48.21	-0.00
0.9 Dead+1.0 Wind 210 deg - No Ice	3.11	-1.61	2.79	82.87	47.78	-0.00
1.2 Dead+1.0 Wind 240 deg - No Ice	4.15	-2.79	1.61	48.35	83.49	-0.00
0.9 Dead+1.0 Wind 240 deg - No Ice	3.11	-2.79	1.61	47.89	82.76	-0.00
1.2 Dead+1.0 Wind 270 deg - No Ice	4.15	-4.50	0.00	0.14	119.74	-0.26
0.9 Dead+1.0 Wind 270 deg - No Ice	3.11	-4.50	0.00	0.11	118.73	-0.26
1.2 Dead+1.0 Wind 300 deg - No Ice	4.15	-2.79	-1.61	-48.06	83.49	-0.00
0.9 Dead+1.0 Wind 300 deg - No Ice	3.11	-2.79	-1.61	-47.67	82.76	-0.00
1.2 Dead+1.0 Wind 330 deg - No Ice	4.15	-1.61	-2.79	-83.35	48.21	-0.00
0.9 Dead+1.0 Wind 330 deg - No Ice	3.11	-1.61	-2.79	-82.65	47.78	-0.00

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Ice+1.0 Temp	6.51	0.00	-0.00	0.25	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	6.51	0.00	-0.99	-29.26	-0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	6.51	0.50	-0.86	-25.30	-14.76	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	6.51	0.86	-0.50	-14.50	-25.57	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	6.51	1.10	-0.00	0.26	-31.61	0.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	6.51	0.86	0.50	15.03	-25.57	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	6.51	0.50	0.86	25.83	-14.76	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	6.51	-0.00	0.99	29.79	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	6.51	-0.50	0.86	25.83	14.76	-0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	6.51	-0.86	0.50	15.03	25.57	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	6.51	-1.10	-0.00	0.26	31.61	-0.04
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	6.51	-0.86	-0.50	-14.50	25.57	-0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	6.51	-0.50	-0.86	-25.30	14.76	-0.00
Dead+Wind 0 deg - Service	3.46	0.00	-0.75	-22.14	0.00	0.00
Dead+Wind 30 deg - Service	3.46	0.38	-0.65	-19.16	-11.13	0.00
Dead+Wind 60 deg - Service	3.46	0.65	-0.38	-11.01	-19.28	0.00
Dead+Wind 90 deg - Service	3.46	1.01	0.00	0.12	-26.88	0.06
Dead+Wind 120 deg - Service	3.46	0.65	0.38	11.25	-19.28	0.00
Dead+Wind 150 deg - Service	3.46	0.38	0.65	19.40	-11.13	0.00
Dead+Wind 180 deg - Service	3.46	0.00	0.75	22.38	0.00	0.00
Dead+Wind 210 deg - Service	3.46	-0.38	0.65	19.40	11.13	-0.00
Dead+Wind 240 deg - Service	3.46	-0.65	0.38	11.25	19.28	-0.00
Dead+Wind 270 deg - Service	3.46	-1.01	0.00	0.12	26.88	-0.06
Dead+Wind 300 deg - Service	3.46	-0.65	-0.38	-11.01	19.28	-0.00
Dead+Wind 330 deg - Service	3.46	-0.38	-0.65	-19.16	11.13	-0.00

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-3.46	0.00	0.00	3.46	-0.00	0.000%
2	0.00	-4.15	-3.22	0.00	4.15	3.22	0.005%
3	0.00	-3.11	-3.22	0.00	3.11	3.22	0.004%
4	1.61	-4.15	-2.79	-1.61	4.15	2.79	0.001%
5	1.61	-3.11	-2.79	-1.61	3.11	2.79	0.000%
6	2.79	-4.15	-1.61	-2.79	4.15	1.61	0.001%
7	2.79	-3.11	-1.61	-2.79	3.11	1.61	0.000%
8	4.50	-4.15	0.00	-4.50	4.15	-0.00	0.001%
9	4.50	-3.11	0.00	-4.50	3.11	-0.00	0.000%
10	2.79	-4.15	1.61	-2.79	4.15	-1.61	0.001%
11	2.79	-3.11	1.61	-2.79	3.11	-1.61	0.000%
12	1.61	-4.15	2.79	-1.61	4.15	-2.79	0.001%
13	1.61	-3.11	2.79	-1.61	3.11	-2.79	0.000%
14	0.00	-4.15	3.22	0.00	4.15	-3.22	0.005%
15	0.00	-3.11	3.22	0.00	3.11	-3.22	0.004%
16	-1.61	-4.15	2.79	1.61	4.15	-2.79	0.001%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
17	-1.61	-3.11	2.79	1.61	3.11	-2.79	0.000%
18	-2.79	-4.15	1.61	2.79	4.15	-1.61	0.001%
19	-2.79	-3.11	1.61	2.79	3.11	-1.61	0.000%
20	-4.50	-4.15	0.00	4.50	4.15	-0.00	0.001%
21	-4.50	-3.11	0.00	4.50	3.11	-0.00	0.000%
22	-2.79	-4.15	-1.61	2.79	4.15	1.61	0.001%
23	-2.79	-3.11	-1.61	2.79	3.11	1.61	0.000%
24	-1.61	-4.15	-2.79	1.61	4.15	2.79	0.001%
25	-1.61	-3.11	-2.79	1.61	3.11	2.79	0.000%
26	0.00	-6.51	0.00	0.00	6.51	0.00	0.005%
27	0.00	-6.51	-0.99	-0.00	6.51	0.99	0.006%
28	0.50	-6.51	-0.86	-0.50	6.51	0.86	0.006%
29	0.86	-6.51	-0.50	-0.86	6.51	0.50	0.006%
30	1.10	-6.51	0.00	-1.10	6.51	0.00	0.007%
31	0.86	-6.51	0.50	-0.86	6.51	-0.50	0.007%
32	0.50	-6.51	0.86	-0.50	6.51	-0.86	0.007%
33	0.00	-6.51	0.99	0.00	6.51	-0.99	0.007%
34	-0.50	-6.51	0.86	0.50	6.51	-0.86	0.007%
35	-0.86	-6.51	0.50	0.86	6.51	-0.50	0.007%
36	-1.10	-6.51	0.00	1.10	6.51	0.00	0.007%
37	-0.86	-6.51	-0.50	0.86	6.51	0.50	0.006%
38	-0.50	-6.51	-0.86	0.50	6.51	0.86	0.006%
39	0.00	-3.46	-0.75	0.00	3.46	0.75	0.004%
40	0.38	-3.46	-0.65	-0.38	3.46	0.65	0.004%
41	0.65	-3.46	-0.38	-0.65	3.46	0.38	0.004%
42	1.01	-3.46	0.00	-1.01	3.46	-0.00	0.004%
43	0.65	-3.46	0.38	-0.65	3.46	-0.38	0.004%
44	0.38	-3.46	0.65	-0.38	3.46	-0.65	0.004%
45	0.00	-3.46	0.75	0.00	3.46	-0.75	0.004%
46	-0.38	-3.46	0.65	0.38	3.46	-0.65	0.004%
47	-0.65	-3.46	0.38	0.65	3.46	-0.38	0.004%
48	-1.01	-3.46	0.00	1.01	3.46	-0.00	0.004%
49	-0.65	-3.46	-0.38	0.65	3.46	0.38	0.004%
50	-0.38	-3.46	-0.65	0.38	3.46	0.65	0.004%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00000001	0.00009466
3	Yes	13	0.00000001	0.00007588
4	Yes	15	0.00000001	0.00008306
5	Yes	15	0.00000001	0.00006310
6	Yes	15	0.00000001	0.00008301
7	Yes	15	0.00000001	0.00006307
8	Yes	15	0.00000001	0.00008470
9	Yes	15	0.00000001	0.00006370
10	Yes	15	0.00000001	0.00008368
11	Yes	15	0.00000001	0.00006345
12	Yes	15	0.00000001	0.00008364
13	Yes	15	0.00000001	0.00006343
14	Yes	13	0.00000001	0.00009495
15	Yes	13	0.00000001	0.00007606
16	Yes	15	0.00000001	0.00008364
17	Yes	15	0.00000001	0.00006343
18	Yes	15	0.00000001	0.00008368
19	Yes	15	0.00000001	0.00006345
20	Yes	15	0.00000001	0.00008470
21	Yes	15	0.00000001	0.00006370
22	Yes	15	0.00000001	0.00008301
23	Yes	15	0.00000001	0.00006307
24	Yes	15	0.00000001	0.00008306
25	Yes	15	0.00000001	0.00006310
26	Yes	6	0.00000001	0.00003176
27	Yes	12	0.00000001	0.00006256
28	Yes	12	0.00000001	0.00007842

29	Yes	12	0.00000001	0.00007855
30	Yes	12	0.00000001	0.00011901
31	Yes	12	0.00000001	0.00008067
32	Yes	12	0.00000001	0.00008078
33	Yes	12	0.00000001	0.00006384
34	Yes	12	0.00000001	0.00008078
35	Yes	12	0.00000001	0.00008067
36	Yes	12	0.00000001	0.00011901
37	Yes	12	0.00000001	0.00007855
38	Yes	12	0.00000001	0.00007842
39	Yes	12	0.00000001	0.00007263
40	Yes	12	0.00000001	0.00006344
41	Yes	12	0.00000001	0.00006373
42	Yes	12	0.00000001	0.00012408
43	Yes	12	0.00000001	0.00006380
44	Yes	12	0.00000001	0.00006409
45	Yes	12	0.00000001	0.00007349
46	Yes	12	0.00000001	0.00006409
47	Yes	12	0.00000001	0.00006380
48	Yes	12	0.00000001	0.00012408
49	Yes	12	0.00000001	0.00006373
50	Yes	12	0.00000001	0.00006344

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	38.5 - 35	5.12	42	0.9521	0.0178
L2	35 - 30	4.43	42	0.9505	0.0178
L3	30 - 25	3.44	42	0.9257	0.0171
L4	25 - 20	2.50	42	0.8553	0.0154
L5	20 - 15	1.66	42	0.7396	0.0129
L6	15 - 10	0.97	42	0.5886	0.0100
L7	10 - 5	0.44	42	0.4107	0.0068
L8	5 - 0	0.11	42	0.2126	0.0034

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
37.0000	MT6407-77A	42	4.82	0.9521	0.0178	15120
34.0000	XXDWMM-12.5-65-8T-RRH w/ RT4401-48A w/ mount pipe	42	4.23	0.9483	0.0177	15120
30.0000	MF1601D-25A	42	3.44	0.9257	0.0171	6132
27.0000	RHSDC-6627-PF-48	42	2.87	0.8893	0.0162	3813

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	38.5 - 35	22.80	8	4.2371	0.0781
L2	35 - 30	19.70	8	4.2299	0.0781
L3	30 - 25	15.31	8	4.1209	0.0752
L4	25 - 20	11.14	8	3.8087	0.0675
L5	20 - 15	7.41	8	3.2944	0.0567
L6	15 - 10	4.30	8	2.6223	0.0439
L7	10 - 5	1.96	8	1.8298	0.0299
L8	5 - 0	0.50	8	0.9472	0.0151

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
37.0000	MT6407-77A	8	21.47	4.2371	0.0783	3475
34.0000	XXDWMM-12.5-65-8T-RRH w/ RT4401-48A w/ mount pipe	8	18.81	4.2205	0.0779	3475
30.0000	MF1601D-25A	8	15.31	4.1209	0.0752	1401
27.0000	RHSDC-6627-PF-48	8	12.77	3.9595	0.0710	867

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K
L1	38.5 - 35 (1)	TP12.41x12x6.205	3.5000	0.0000	0.0	120.9580	-0.55
L2	35 - 30 (2)	TP12.99x12.41x6.495	5.0000	0.0000	0.0	132.5280	-1.16
L3	30 - 25 (3)	TP13.57x12.99x6.785	5.0000	0.0000	0.0	144.6270	-2.13
L4	25 - 20 (4)	TP14.16x13.57x7.08	5.0000	0.0000	0.0	157.4770	-2.45
L5	20 - 15 (5)	TP14.74x14.16x7.37	5.0000	0.0000	0.0	170.6420	-2.82
L6	15 - 10 (6)	TP15.32x14.74x7.66	5.0000	0.0000	0.0	184.3350	-3.22
L7	10 - 5 (7)	TP15.9x15.32x7.95	5.0000	0.0000	0.0	198.5570	-3.66
L8	5 - 0 (8)	TP16.49x15.9x8.245	5.0000	0.0000	0.0	213.5660	-4.14

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	M _{uy} kip-ft
L1	38.5 - 35 (1)	TP12.41x12x6.205	1.34	0.00
L2	35 - 30 (2)	TP12.99x12.41x6.495	9.38	0.00
L3	30 - 25 (3)	TP13.57x12.99x6.785	23.77	0.00
L4	25 - 20 (4)	TP14.16x13.57x7.08	40.17	0.00
L5	20 - 15 (5)	TP14.74x14.16x7.37	58.03	0.00
L6	15 - 10 (6)	TP15.32x14.74x7.66	77.27	0.00
L7	10 - 5 (7)	TP15.9x15.32x7.95	97.86	0.00
L8	5 - 0 (8)	TP16.49x15.9x8.245	119.74	0.00

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	Actual T _u kip-ft
L1	38.5 - 35 (1)	TP12.41x12x6.205	0.68	0.00
L2	35 - 30 (2)	TP12.99x12.41x6.495	1.96	0.04
L3	30 - 25 (3)	TP13.57x12.99x6.785	3.13	0.08
L4	25 - 20 (4)	TP14.16x13.57x7.08	3.43	0.11
L5	20 - 15 (5)	TP14.74x14.16x7.37	3.72	0.15
L6	15 - 10 (6)	TP15.32x14.74x7.66	3.99	0.19
L7	10 - 5 (7)	TP15.9x15.32x7.95	4.25	0.22
L8	5 - 0 (8)	TP16.49x15.9x8.245	4.51	0.26

APPENDIX B
ADDITIONAL CALCULATIONS

SOLID ROUND TIMBER POLE CALCUATIONS (35 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	35.00	ft
Critical Diameter	12.41	in.
Critical Cross Sectional Area	120.91	in. ²
Critical Section Modulus	187.53	in. ³
Critical Moment of Inertia	1163.44	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	1.34
Shear (kips)	0.68
Axial (kips)	0.55

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	1.00			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4194.4	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (35 ft)

Applied Compression Stress (fc)	4.55	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	85.74	psi
Fb1'	4194.45	psi
Fce1	155.64	psi
1 - fc / Fce1	0.97	
% Capacity	2.2%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCULATIONS (30 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	30.00	ft
Critical Diameter	12.99	in.
Critical Cross Sectional Area	132.53	in. ²
Critical Section Modulus	215.21	in. ³
Critical Moment of Inertia	1397.80	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	9.38
Shear (kips)	1.96
Axial (kips)	1.16

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.99			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4173.1	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (30 ft)

Applied Compression Stress (fc)	8.75	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	523.03	psi
Fb1'	4173.12	psi
Fce1	155.64	psi
1 - fc / Fce1	0.94	
% Capacity	13.6%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCUATIONS (25 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	25.00	ft
Critical Diameter	13.57	in.
Critical Cross Sectional Area	144.69	in. ²
Critical Section Modulus	245.48	in. ³
Critical Moment of Inertia	1665.90	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	23.77
Shear (kips)	3.13
Axial (kips)	2.13

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	1.00			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4208.9	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (25 ft)

Applied Compression Stress (fc)	14.72	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	1161.99	psi
Fb1'	4208.94	psi
Fce1	155.64	psi
1 - fc / Fce1	0.91	
% Capacity	31.4%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCULATIONS (20 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	20.00	ft
Critical Diameter	14.16	in.
Critical Cross Sectional Area	157.37	in. ²
Critical Section Modulus	278.46	in. ³
Critical Moment of Inertia	1970.84	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	40.17
Shear (kips)	3.43
Axial (kips)	2.45

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	1.00			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4189.3	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (20 ft)

Applied Compression Stress (fc)	15.57	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	1731.10	psi
Fb1'	4189.33	psi
Fce1	155.64	psi
1 - fc / Fce1	0.90	
% Capacity	46.9%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCULATIONS (15 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	15.00	ft
Critical Diameter	14.74	in.
Critical Cross Sectional Area	170.59	in. ²
Critical Section Modulus	314.27	in. ³
Critical Moment of Inertia	2315.84	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	58.03
Shear (kips)	3.72
Axial (kips)	2.82

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.99			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F_b 4170.6 psi

Adjusted F_v 345.6 psi

Adjusted F_c 154.2 psi

Calculated Capacities (15 ft)

Applied Compression Stress (fc)	16.53	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	2215.80	psi
Fb1'	4170.60	psi
Fce1	155.64	psi
1 - fc / Fce1	0.89	
% Capacity	60.6%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCUATIONS (10 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	10.00	ft
Critical Diameter	15.32	in.
Critical Cross Sectional Area	184.34	in. ²
Critical Section Modulus	353.03	in. ³
Critical Moment of Inertia	2704.26	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	77.27
Shear (kips)	3.99
Axial (kips)	3.22

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.99			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4152.7	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (10 ft)

Applied Compression Stress (fc)	17.47	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	2626.53	psi
Fb1'	4152.68	psi
Fce1	155.64	psi
1 - fc / Fce1	0.89	
% Capacity	72.5%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCULATIONS (5 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	5.00	ft
Critical Diameter	15.90	in.
Critical Cross Sectional Area	198.63	in. ²
Critical Section Modulus	394.85	in. ³
Critical Moment of Inertia	3139.62	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	97.86
Shear (kips)	4.25
Axial (kips)	3.66

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.98			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F_b 4135.5 psi

Adjusted F_v 345.6 psi

Adjusted F_c 154.2 psi

Calculated Capacities (5 ft)

Applied Compression Stress (fc)	18.43	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	2974.11	psi
Fb1'	4135.49	psi
Fce1	155.64	psi
1 - fc / Fce1	0.88	
% Capacity	83.0%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCUATIONS (0 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	0.00	ft
Critical Diameter	16.49	in.
Critical Cross Sectional Area	213.45	in. ²
Critical Section Modulus	439.85	in. ³
Critical Moment of Inertia	3625.53	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	119.74
Shear (kips)	4.51
Axial (kips)	4.14

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.98			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F_b 4119.0 psi

Adjusted F_v 345.6 psi

Adjusted F_c 165.7 psi

Calculated Capacities (0 ft)

Applied Compression Stress (fc)	19.40	psi
Adjusted Allowable Stress (F' _c)	165.69	psi
fb1	3266.77	psi
Fb1'	4118.99	psi
Fce1	167.31	psi
1 - fc / Fce1	0.88	
% Capacity	91.1%	

[2012 NDS Section 3.9.2]

SOLID ROUND TIMBER POLE CALCUATIONS (-3.5 FT)

Wood Pole Geometry

Total Pole Length	51.50	ft (38.5 ft AGL)
Embedment	13.00	ft
Top Pole Diameter	12.00	in.
Btm Pole Diameter	18.00	in.
Elev. Of Critical Section	-3.50	ft
Critical Diameter	16.89	in.
Critical Cross Sectional Area	224.14	in. ²
Critical Section Modulus	473.30	in. ³
Critical Moment of Inertia	3997.77	in. ⁴

Code

2012 NDS (LRFD)

Maximum Capacity Ratio

100%

Applied Loading (From TnxTower)

Moment (kip*ft)	133.88
Shear (kips)	2.71
Axial (kips)	5.12

Wood Pole Information

Species	Southern Pine
F _b	1950 psi
F _v	160 psi
F _c	1250 psi
E	1500000 psi
E _{min}	600000 psi

*Assumed pole has been Air Dried

*Lu (in) = 462.00

* Conservative: occurs further up the tower leg.

**Based on square section with equivalent area

Calculate the Adjusted Design Stresses (2012 NDS)

	Factor	Flexure	Shear	Axial	
(ASD)	C _d	1.00	1.00	1.00	(Load Duration Factor)
	C _t	1.00	1.00	1.00	(Temperature Factor)
	C _{ct}	1.00	1.00	1.00	(Condition Treatment Factor)
	C _F	0.98			(Size Factor)
	C _P			0.06	(Column Stability Factor)
	C _{cs}			1.00	(Critical Section Factor)
	C _b				(Bearing Area Factor)
	C _{ls}	1.00		1.00	(Loading Sharing Factor)
(LRFD)	K _F	2.54	2.88	2.40	(Format Conversion Factor)
(LRFD)	Φ	0.85	0.75	0.90	(Resistance Factor)
(LRFD)	λ	1.00	1.00	1.00	(Time Effect Factor)

Adjusted F _b	4107.8	psi
Adjusted F _v	345.6	psi
Adjusted F _c	154.2	psi

Calculated Capacities (-3.5 ft)

Applied Compression Stress (fc)	22.84	psi
Adjusted Allowable Stress (F' _c)	154.24	psi
fb1	3394.38	psi
Fb1'	4107.83	psi
Fce1	155.64	psi
1 - fc / Fce1	0.85	
% Capacity	99.0%	

[2012 NDS Section 3.9.2]

DIRECT EMBED SOIL AND STEEL ANALYSIS - TIA-222-H

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	119.7		k-ft
Shear, Vu =	4.1		kips
Axial Load, Pu =	4.5		kips (from 1.2D + 1.6W)*
OTMu =	119.7	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DE
ACI Code =	ACI 318-08
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Direct Embed Concrete / Gravel Parameters

Diameter =	3	ft
Height Above Grade =	0	ft, Assumed 0 ft
Depth Below Grade =	13	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	4.33	
Mat Fdn. Cap Width =		ft
Mat Fdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-H

- (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
- (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	
Rebar Size =	
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	
Side Clear Cover to Ties =	in

Soil Parameters

Water Table Depth =	99.00	ft
Depth to Ignore Soil =	3.00	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	
Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)		
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)		

Direct Embed Pole Shaft Parameters

Dia @ Grade =	16.49	in
Dia @ Depth Below Grade =	18	in
Number of Sides =	Round	
Thickness =	9	in
Fy =	1.95	ksi
Backfill Condition =	Gravel Exterior	

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

*Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based on the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	13	110	0	30	Sand	4000	500		13
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	9.68	ft, from Grade
Bending Moment, Mu =	159.82	k-ft, from COR
Resisting Moment, ΦMn =	194.37	k-ft, from COR

Shear, Vu =	4.14	kips
Resisting Shear, ΦVn =	5.04	kips

MOMENT RATIO = 82.2% OK

Shear Ratio = 82.2% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	2.85	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression*

Compression, Cu =	4.51	kips
Comp. Capacity, ΦCn =	20.78	kips

COMPRESSION RATIO = 21.7% OK

*Compression Ratio based on diameter used for overturning calculation.

Pole Capacity Results:

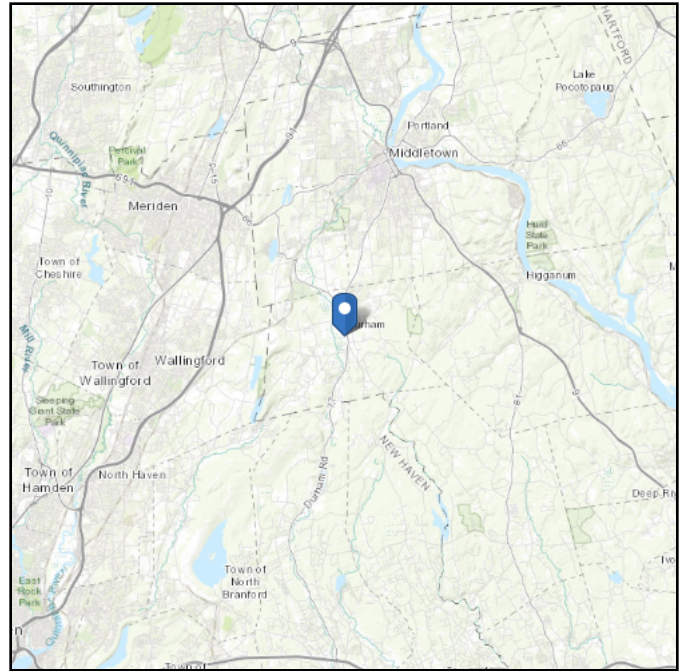
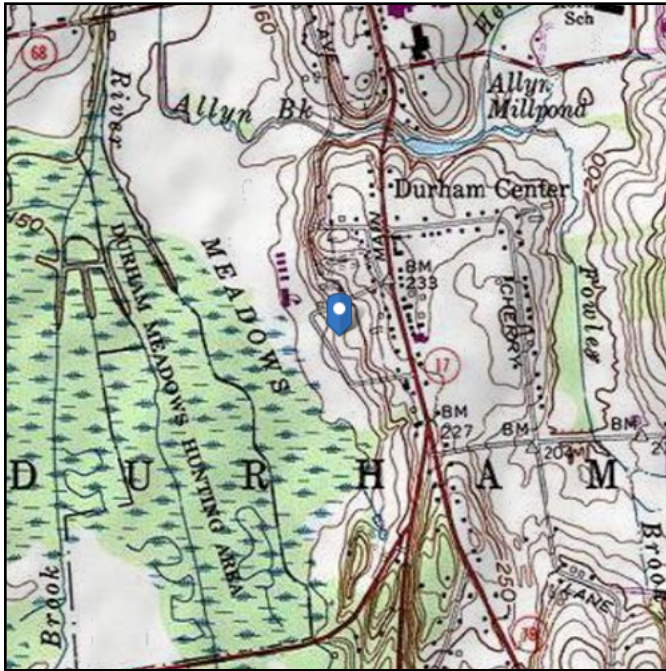
Axial Load, Pu =	5.12	kips @ 3.50 ft Below Grade
Shear, Vu =	2.71	kips @ 3.50 ft Below Grade
Moment, Mu =	133.88	k-ft @ 3.50 ft Below Grade

ASCE 7 Hazards Report

Address:
No Address at This
Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see
Section 11.4.3)

Elevation: 187.56 ft (NAVD 88)
Latitude: 41.468422
Longitude: -72.681983



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	92 Vmph
100-year MRI	99 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Nov 09 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

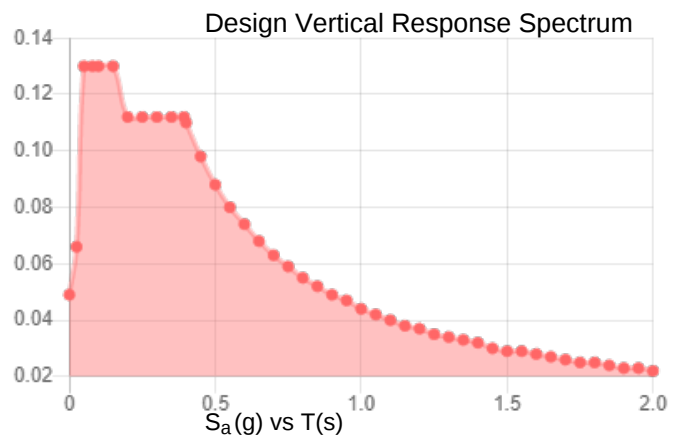
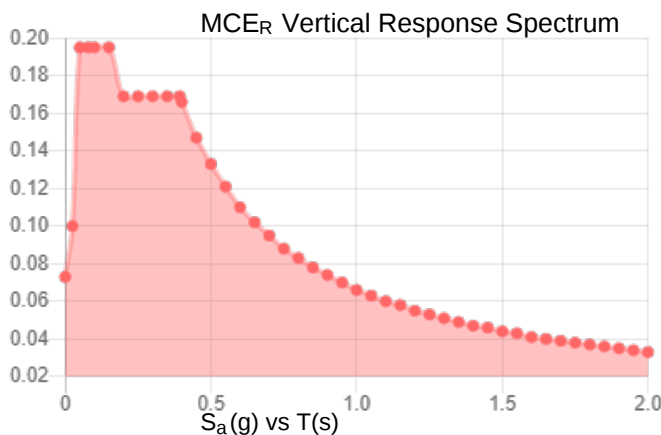
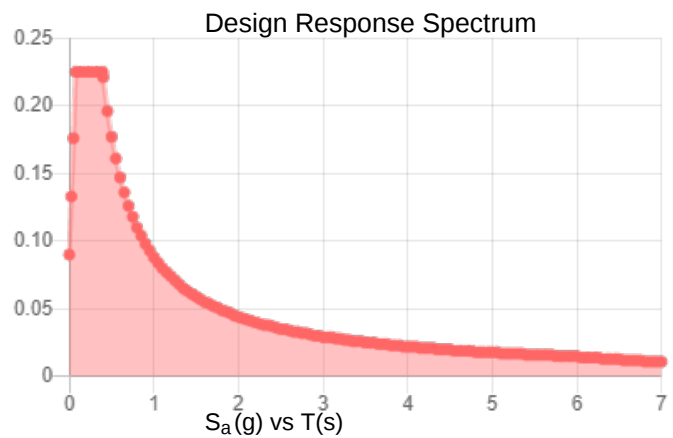
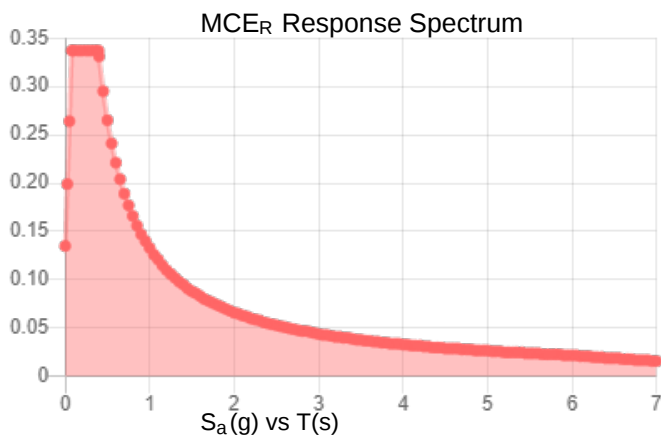
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	0.211	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.118
F_v :	2.4	PGA _M :	0.185
S_{MS} :	0.337	F_{PGA} :	1.564
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.225	C_v :	0.722

Seismic Design Category B



Data Accessed:

Tue Nov 09 2021

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 15 F
Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Tue Nov 09 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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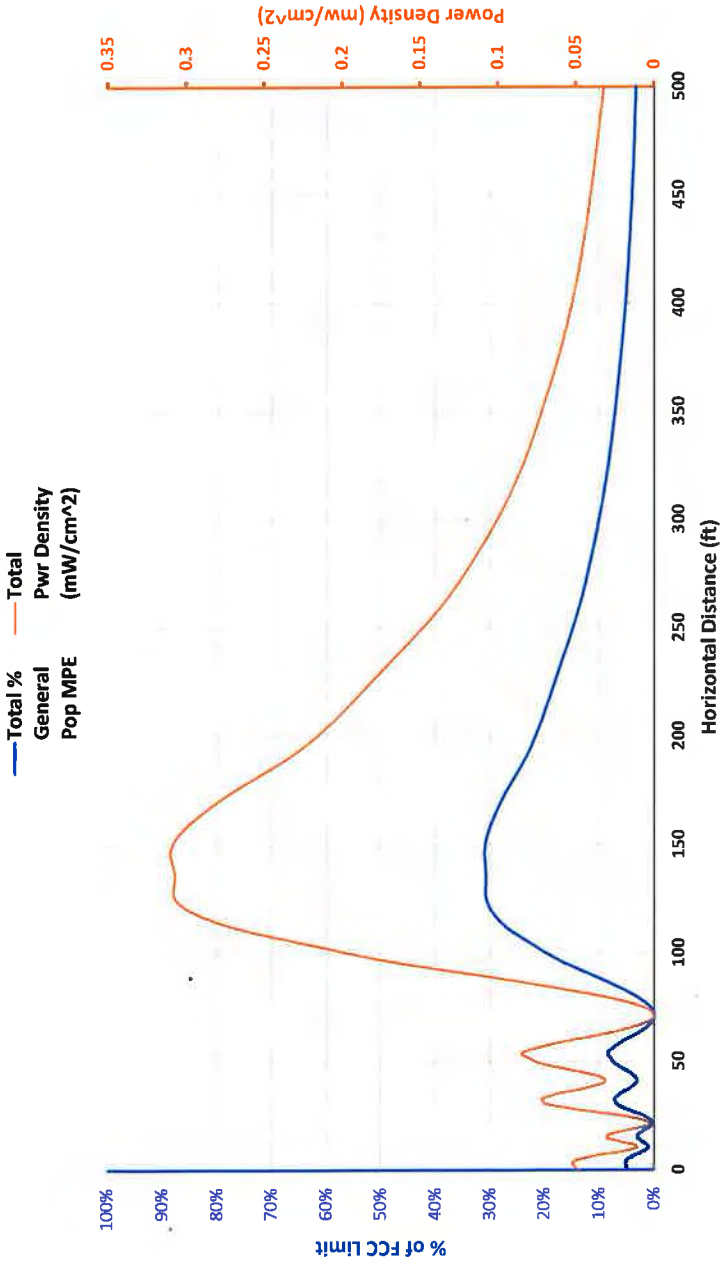
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ATTACHMENT 6

Location	Durham Fair 2 CT
Date	3/28/2022
Band	C-Band
Operating Frequency (MHz)	3,700
General Population MPE (mW/cm ²)	1
ERP Per Transmitter (Watts)	6,531
Number of Transmitters	4
Antenna Centerline (feet)	37
Total ERP (Watts)	26,124
Total ERP (dBm)	74
Maximum % of General Population Limit	30.9%

RF Exposure 6ft Above Ground Level
Far Field Formula (per FCC OET65)



Angle Below Horizon	Power Density (mW/cm²)		Percent of General Population MPE										Total Pwr Density (mW/cm²)		Total % General Pop MPE
	C-Band	C-Band	39GHz	28GHz	C-Band	EBUS	AWS	PCS	Cellular	CDMA	700 MHz	Distance			
90	0.048323694	0.048323694	0.00%	0.00%	4.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0	0.048323694	0.048323694	4.83%
89	0.048314871	0.048314871	0.00%	0.00%	4.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.418921558	0.048314871	0.048314871	4.83%
88	0.04941318	0.04941318	0.00%	0.00%	4.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.838098468	0.04941318	0.04941318	4.94%
87	0.050054804	0.050054804	0.00%	0.00%	5.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.257786703	0.050054804	0.050054804	5.01%
86	0.051155125	0.051155125	0.00%	0.00%	5.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.678243487	0.051155125	0.051155125	5.12%
85	0.05107075	0.05107075	0.00%	0.00%	5.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.099727925	0.05107075	0.05107075	5.11%
84	0.05215477	0.05215477	0.00%	0.00%	5.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.52501646	0.05215477	0.05215477	5.22%
83	0.052029945	0.052029945	0.00%	0.00%	5.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.946829462	0.052029945	0.052029945	5.20%
82	0.051885838	0.051885838	0.00%	0.00%	5.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.372980033	0.051885838	0.051885838	5.19%
81	0.051722416	0.051722416	0.00%	0.00%	5.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.801226568	0.051722416	0.051722416	5.17%
80	0.050366456	0.050366456	0.00%	0.00%	5.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.231847537	0.050366456	0.050366456	5.04%
79	0.049026911	0.049026911	0.00%	0.00%	4.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.665127419	0.049026911	0.049026911	4.90%
78	0.046618239	0.046618239	0.00%	0.00%	4.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.10135748	0.046618239	0.046618239	4.66%
77	0.043301488	0.043301488	0.00%	0.00%	4.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.540836587	0.043301488	0.043301488	4.33%
76	0.041140783	0.041140783	0.00%	0.00%	4.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.983872068	0.041140783	0.041140783	4.11%
75	0.03818229	0.03818229	0.00%	0.00%	3.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.430780618	0.03818229	0.03818229	3.82%
74	0.034615271	0.034615271	0.00%	0.00%	3.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.881889258	0.034615271	0.034615271	3.46%
73	0.030653931	0.030653931	0.00%	0.00%	3.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.337536355	0.030653931	0.030653931	3.07%
72	0.025912743	0.025912743	0.00%	0.00%	2.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.79807271	0.025912743	0.025912743	2.59%
71	0.02164438	0.02164438	0.00%	0.00%	2.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.263862719	0.02164438	0.02164438	2.16%
70	0.018280032	0.018280032	0.00%	0.00%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.735285622	0.018280032	0.018280032	1.83%
69	0.01508009	0.01508009	0.00%	0.00%	1.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.212736841	0.01508009	0.01508009	1.51%
68	0.012434288	0.012434288	0.00%	0.00%	1.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.69662942	0.012434288	0.012434288	1.24%
67	0.010656691	0.010656691	0.00%	0.00%	1.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.18739559	0.010656691	0.010656691	1.07%
66	0.010799471	0.010799471	0.00%	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.68548845	0.010799471	0.010799471	1.08%
65	0.011993747	0.011993747	0.00%	0.00%	1.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.1913838	0.011993747	0.011993747	1.20%
64	0.013623008	0.013623008	0.00%	0.00%	1.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.70558213	0.013623008	0.013623008	1.36%
63	0.016918028	0.016918028	0.00%	0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.22861079	0.016918028	0.016918028	1.69%
62	0.020567313	0.020567313	0.00%	0.00%	2.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.76102636	0.020567313	0.020567313	2.06%
61	0.023321073	0.023321073	0.00%	0.00%	2.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.30341723	0.023321073	0.023321073	2.33%
60	0.02588536	0.02588536	0.00%	0.00%	2.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.8540646	0.02588536	0.02588536	2.59%
59	0.029314711	0.029314711	0.00%	0.00%	2.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.42065486	0.029314711	0.029314711	2.93%
58	0.030257516	0.030257516	0.00%	0.00%	3.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.99686445	0.030257516	0.030257516	3.03%
57	0.029736312	0.029736312	0.00%	0.00%	2.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.58578224	0.029736312	0.029736312	2.97%
56	0.029270927	0.029270927	0.00%	0.00%	2.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.1882044	0.029270927	0.029270927	2.93%
55	0.026258509	0.026258509	0.00%	0.00%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.80498092	0.026258509	0.026258509	2.63%
54	0.022634762	0.022634762	0.00%	0.00%	2.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.43702067	0.022634762	0.022634762	2.26%
53	0.018490189	0.018490189	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.0852972	0.018490189	0.018490189	1.85%
52	0.01363807	0.01363807	0.00%	0.00%	1.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.75085504	0.01363807	0.01363807	1.36%
51	0.009251163	0.009251163	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.4348168	0.009251163	0.009251163	0.93%
50	0.005460802	0.005460802	0.00%	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.13839115	0.005460802	0.005460802	0.55%
49	0.003372231	0.003372231	0.00%	0.00%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.86288171	0.003372231	0.003372231	0.34%
48	0.003077242	0.003077242	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.60969706	0.003077242	0.003077242	0.31%
47	0.004655557	0.004655557	0.00%	0.00%	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	22.38036207	0.004655557	0.004655557	0.47%
46	0.008171989	0.008171989	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.1765306	0.008171989	0.008171989	0.82%
45	0.013219336	0.013219336	0.00%	0.00%	1.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24	0.013219336	0.013219336	1.32%
44	0.01979682	0.01979682	0.00%	0.00%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.85272753	0.01979682	0.01979682	1.98%
43	0.027826711	0.027826711	0.00%	0.00%	2.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.73684904	0.027826711	0.027826711	2.78%
42	0.037220665	0.037220665	0.00%	0.00%	3.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	26.65470036	0.037220665	0.037220665	3.72%
41	0.04650886	0.04650886	0.00%	0.00%	4.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27.60884177	0.04650886	0.04650886	4.65%
40	0.055550529	0.055550529	0.00%	0.00%	5.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	28.60208622	0.055550529	0.055550529	5.56%
39	0.063857406	0.063857406	0.00%	0.00%	6.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	30.63753176	0.063857406	0.063857406	6.39%
38	0.069834875	0.069834875	0.00%	0.00%	6.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	30.71859917	0.069834875	0.069834875	6.98%
37	0.070507686	0.070507686	0.00%	0.00%	7.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	31.84907572	0.070507686	0.070507686	7.05%

[illegible]

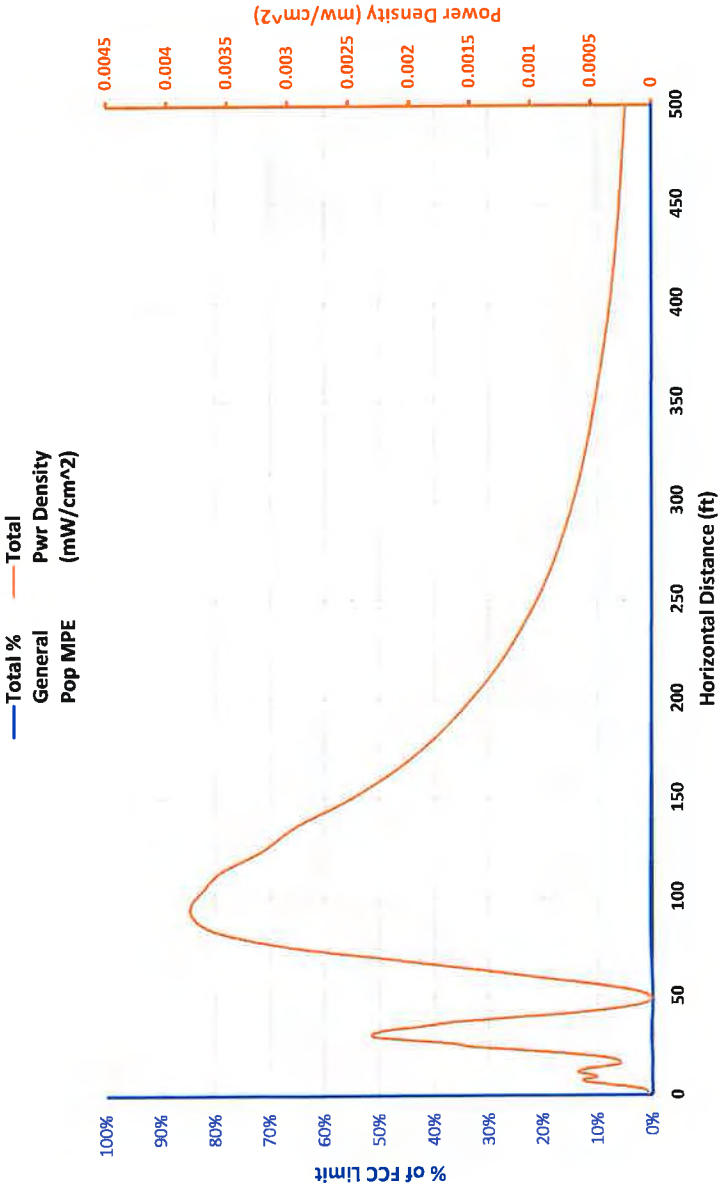
degree below horizon	AT1K02 (39GHz)	AT1K01 (28GHz)	MT6407-77A (3,730MHz)	XXDWMM- 12.5-65 (3,550MHz)	AWS (2,155MHz)	PCS (1,962MHz)	850-LTE (880MHz)	850-CDMA (869MHz)	700-LTE (746MHz)
0	0.08	0.08	3.28	1.8	0	0.5	0	0	0.1
1	0.39	0.39	2.19	1.3	0	0.6	0.1	0.1	0.1
2	0.3	0.3	1.29	0.8	0	0.8	0.1	0.1	0.1
3	0	0	0.58	0.5	0.1	1	0.1	0.1	0.2
4	0.31	0.31	0.25	0.2	0.1	1.2	0.1	0.1	0.2
5	0.42	0.42	0.05	0.1	0.2	1.4	0.2	0.2	0.2
6	0.13	0.13	0	0	0.3	1.7	0.2	0.2	0.3
7	0.44	0.44	0.3	0	0.4	2	0.3	0.3	0.3
8	0.36	0.36	0.5	0.1	0.6	2.2	0.3	0.3	0.4
9	0.09	0.09	1.06	0.2	0.7	2.5	0.4	0.4	0.4
10	0.4	0.4	1.96	0.3	0.8	2.8	0.5	0.5	0.5
11	0.52	0.52	2.79	0.7	1	3.1	0.5	0.5	0.5
12	0.26	0.26	3.98	1	1.1	3.4	0.6	0.6	0.6
13	0.57	0.57	5.58	1.5	1.3	3.7	0.7	0.7	0.7
14	0.51	0.51	7.33	2	1.5	4	0.8	0.8	0.8
15	0.26	0.26	9.78	2.6	1.7	4.3	0.9	0.9	0.9
16	0.58	0.58	12.92	3.3	1.9	4.6	1	1	1
17	1.07	1.07	17.49	4.2	2.1	4.9	1.2	1.2	1.1
18	0.55	0.55	26.19	5.3	2.4	5.2	1.3	1.3	1.2
19	0.58	0.58	31.65	6.7	2.7	5.4	1.4	1.4	1.3
20	1.08	1.08	21.32	8.2	2.9	5.6	1.6	1.6	1.4
21	0.59	0.59	17.7	9.9	3.1	5.8	1.7	1.7	1.6
22	0.65	0.65	15.7	11.8	3.4	6	1.9	1.9	1.7
23	1.22	1.22	14.89	14.5	3.6	6.2	2	2	1.8
24	0.99	0.99	14.59	18.2	3.9	6.3	2.2	2.2	2
25	0.8	0.8	15.18	23.8	4.1	6.4	2.4	2.4	2.2
26	1.11	1.11	15.83	33.9	4.4	6.6	2.6	2.6	2.3
27	1.12	1.12	16.93	27.7	4.6	6.7	2.8	2.8	2.5
28	0.95	0.95	18.33	21.5	4.9	6.8	3	3	2.7

29	1.25	1.25	19.62	18	5.2	6.9	3.2	3.2	2.9
30	2.03	2.03	20.49	15.7	5.4	7.1	3.4	3.4	3.1
31	3.32	3.32	20.49	14.1	5.7	7.2	3.6	3.6	3.3
32	5.21	5.21	19.83	13	5.9	7.3	3.9	3.9	3.5
33	7.88	7.88	19.23	12.3	6.1	7.5	4.1	4.1	3.8
34	11.74	11.74	18.52	12.1	6.3	7.6	4.4	4.4	4
35	16.19	16.19	18.29	11.9	6.4	7.7	4.6	4.6	4.2
36	14.94	14.94	18.06	11.7	6.7	7.9	4.9	4.9	4.5
37	15.07	15.07	18.29	11.7	6.9	8.1	5.2	5.2	4.7
38	16.33	16.33	18.49	11.8	7.2	8.2	5.5	5.5	5
39	15.38	15.38	19.03	12	7.5	8.5	5.9	5.9	5.2
40	15.03	15.03	19.78	12.5	7.8	8.7	6.2	6.2	5.5
41	15.75	15.75	20.69	13.1	8.1	9	6.5	6.5	5.8
42	17.49	17.49	21.79	13.7	8.5	9.3	6.8	6.8	6.1
43	20.55	20.55	23.18	14.2	8.7	9.5	7.2	7.2	6.3
44	21.87	21.87	24.78	14.5	9.1	9.9	7.5	7.5	6.6
45	20.56	20.56	26.65	15.1	9.4	10.2	7.9	7.9	6.9
46	20.35	20.35	28.85	15.9	9.7	10.5	8.2	8.2	7.2
47	21.02	21.02	31.4	16.8	10.1	10.8	8.5	8.5	7.5
48	21.62	21.62	33.3	17.8	10.5	11.2	8.9	8.9	7.8
49	20.49	20.49	33	18.7	10.9	11.4	9.2	9.2	8.1
50	20.28	20.28	31	19.7	11.3	11.8	9.5	9.5	8.4
51	20.83	20.83	28.8	20.7	11.6	12.1	9.8	9.8	8.7
52	22.1	22.1	27.2	21.6	11.9	12.4	10	10	9
53	22.84	22.84	25.96	22.4	12.2	12.8	10.3	10.3	9.3
54	23.96	23.96	25.16	22.9	12.4	13.2	10.6	10.6	9.6
55	25.61	25.61	24.59	23.3	12.7	13.5	10.9	10.9	10
56	24.75	24.75	24.19	23.4	13	13.9	11.1	11.1	10.3
57	24.54	24.54	24.19	23.3	13.1	14.3	11.4	11.4	10.6
58	24.84	24.84	24.18	22.7	13.4	14.7	11.6	11.6	10.9
59	25.6	25.6	24.38	21.9	13.6	15	11.9	11.9	11.2
60	25.03	25.03	24.98	21.2	13.6	15.3	12.2	12.2	11.5

61	24.18	24.18	25.49	20.7	13.9	15.7	12.5	12.5	11.8
62	23.83	23.83	26.09	20.5	14.1	16.1	12.7	12.7	12.1
63	23.88	23.88	26.99	20.3	14.3	16.3	13	13	12.4
64	24.25	24.25	27.98	20.3	14.7	16.7	13.4	13.4	12.7
65	24.7	24.7	28.58	20.5	15	17	13.7	13.7	13
66	24.47	24.47	29.08	20.9	15.3	17.2	14.1	14.1	13.3
67	24.47	24.47	29.18	21.3	15.7	17.6	14.4	14.4	13.6
68	24.68	24.68	28.55	21.7	15.8	17.8	14.8	14.8	13.9
69	25.07	25.07	27.75	21.8	16.1	18.1	15.1	15.1	14.2
70	25.64	25.64	26.95	21.6	16.4	18.5	15.5	15.5	14.5
71	26.36	26.36	26.25	21.2	16.6	18.8	15.8	15.8	14.8
72	27.24	27.24	25.5	21	16.9	19.2	16.1	16.1	15.1
73	28.26	28.26	24.8	21	17.2	19.6	16.4	16.4	15.4
74	28.68	28.68	24.3	21.2	17.3	19.8	16.7	16.7	15.7
75	28.98	28.98	23.9	21.6	17.5	20.3	16.9	16.9	16
76	29.37	29.37	23.6	22.1	17.6	20.8	17.2	17.2	16.3
77	29.83	29.83	23.4	22.8	17.5	21.1	17.4	17.4	16.7
78	30.36	30.36	23.1	23.5	17.8	21.8	17.6	17.6	17
79	30.94	30.94	22.9	24.5	17.9	22.4	17.8	17.8	17.4
80	30.89	30.89	22.8	25.6	18.1	22.9	18.1	18.1	17.8
81	30.44	30.44	22.7	26.8	18.5	23.6	18.4	18.4	18.1
82	30.13	30.13	22.7	28.2	18.8	24	18.7	18.7	18.5
83	29.93	29.93	22.7	29.7	19	24.4	19.1	19.1	18.9
84	29.81	29.81	22.7	31.1	19.4	24.7	19.5	19.5	19.4
85	29.76	29.76	22.8	31.9	19.5	24.8	19.9	19.9	19.8
86	29.78	29.78	22.8	32.5	19.8	24.9	20.4	20.4	20.2
87	29.85	29.85	22.9	32.9	20.3	25.1	21	21	20.6
88	29.97	29.97	22.96	33.3	20.6	25.1	21.7	21.7	21
89	30.13	30.13	23.06	33.6	21.1	25.4	22.4	22.4	21.4
90	30.33	30.33	23.06	34.4	21.7	25.7	23.3	23.3	21.8

Location	Durham Fair 2 CT
Date	3/28/2022
Band	CBRS
Operating Frequency (MHz)	3,550
General Population MPE (mW/cm ²)	1
ERP Per Transmitter (Watts)	42
Number of Transmitters	4
Antenna Centerline (feet)	34
Total ERP (Watts)	168
Total ERP (dBm)	52
Maximum % of General Population Limit	0.4%

RF Exposure 6ft Above Ground Level Far Field Formula (per FCC OET65)



Angle Below Horizon	Power Density (mW/cm²)		Percent of General Population MPE								Distance	Total Pwr Density (mW/cm²2)	Total % General Pop MPE
	CBRS	39GHz	28GHz	C-Band	CBRS	AWS	PCS	Cellular	CDMA	700 MHz			
90	2.80593E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0	2.80593E-05	0.00%
89	3.37271E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.418921558	3.37271E-05	0.00%
88	3.6115E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.838098468	3.6115E-05	0.00%
87	3.95549E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.257786703	3.95549E-05	0.00%
86	4.33031E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.678243487	4.33031E-05	0.00%
85	4.96182E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.099727925	4.96182E-05	0.00%
84	5.95067E-05	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.522501646	5.95067E-05	0.01%
83	8.19016E-05	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.946829462	8.19016E-05	0.01%
82	0.000115297	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.372980033	0.000115297	0.01%
81	0.000158542	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.801226568	0.000158542	0.02%
80	0.000208098	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.231847537	0.000208098	0.02%
79	0.000266799	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.665127419	0.000266799	0.03%
78	0.000334114	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.10135748	0.000334114	0.03%
77	0.000390296	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.540836587	0.000390296	0.04%
76	0.000455702	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.983872068	0.000455702	0.05%
75	0.000507869	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.430780618	0.000507869	0.05%
74	0.000552844	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.881889258	0.000552844	0.06%
73	0.000574422	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.337536355	0.000574422	0.06%
72	0.000569683	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.79807271	0.000569683	0.06%
71	0.000539267	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.263862719	0.000539267	0.05%
70	0.000487236	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.735285622	0.000487236	0.05%
69	0.000460718	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.212736841	0.000460718	0.05%
68	0.000466536	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.69662942	0.000466536	0.05%
67	0.000505924	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.18739559	0.000505924	0.05%
66	0.000548314	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.68548845	0.000548314	0.05%
65	0.000593896	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.1913838	0.000593896	0.06%
64	0.000613936	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.70558213	0.000613936	0.06%
63	0.000605703	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.22861079	0.000605703	0.06%
62	0.000570314	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.76102636	0.000570314	0.06%
61	0.000536633	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.30341723	0.000536633	0.05%
60	0.000470915	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.85640646	0.000470915	0.05%
59	0.000394367	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.42065486	0.000394367	0.04%
58	0.000322509	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.99686445	0.000322509	0.03%
57	0.000275967	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.58578224	0.000275967	0.03%
56	0.00026475	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.1882044	0.00026475	0.03%
55	0.000265747	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.80498092	0.000265747	0.03%
54	0.00028559	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.43702067	0.00028559	0.03%
53	0.000313796	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.0852972	0.000313796	0.03%
52	0.000369121	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.75085504	0.000369121	0.04%
51	0.000443909	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.4348168	0.000443909	0.04%
50	0.000545768	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.13839115	0.000545768	0.05%
49	0.000670341	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.86288171	0.000670341	0.07%
48	0.000803789	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.60969706	0.000803789	0.08%
47	0.000985211	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	22.38036207	0.000985211	0.10%
46	0.001178798	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.1765306	0.001178798	0.12%
45	0.001376744	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24	0.001376744	0.14%
44	0.001533734	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.85272753	0.001533734	0.15%
43	0.001592605	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.73684904	0.001592605	0.16%
42	0.001729434	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	26.65470036	0.001729434	0.17%
41	0.001919168	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27.60884177	0.001919168	0.19%
40	0.00212671	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	28.60208622	0.00212671	0.21%
39	0.002299646	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	29.63753176	0.002299646	0.23%

38	0.002317079	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	30.71859917	0.002317079	0.23%
37	0.002277795	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	31.84907572	0.002277795	0.23%
36	0.002184474	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	33.03316609	0.002184474	0.22%
35	0.001997097	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	34.27555216	0.001997097	0.20%
34	0.001822341	0.00%	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35.58146324	0.001822341	0.18%
33	0.001659563	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	36.95675913	0.001659563	0.17%
32	0.001344132	0.00%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	38.4080287	0.001344132	0.13%
31	0.000990652	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	39.94270758	0.000990652	0.10%
30	0.000649191	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	41.56921938	0.000649191	0.06%
29	0.000361187	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	43.29714613	0.000361187	0.04%
28	0.00015203	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	45.13743517	0.00015203	0.02%
27	3.42678E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	47.10265213	3.42678E-05	0.00%
26	7.70044E-06	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	49.2072922	7.70044E-06	0.00%
25	7.35736E-05	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	51.46816609	7.35736E-05	0.01%
24	0.00024854	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	53.90488257	0.00024854	0.02%
23	0.000540032	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	56.54045678	0.000540032	0.05%
22	0.000928223	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	59.40208448	0.000928223	0.09%
21	0.001321113	0.00%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	62.52213755	0.001321113	0.13%
20	0.001786918	0.00%	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	65.93945807	0.001786918	0.18%
19	0.002295836	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	69.70106106	0.002295836	0.23%
18	0.00286557	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	73.86440489	0.00286557	0.29%
17	0.003316173	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	78.50046284	0.003316173	0.33%
16	0.003638239	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	83.69794665	0.003638239	0.36%
15	0.003780783	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	89.56921938	0.003780783	0.38%
14	0.00380397	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	96.2587424	0.00380397	0.38%
13	0.003700679	0.00%	0.00%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	103.955421	0.003700679	0.37%
12	0.003556318	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	112.9111226	0.003556318	0.36%
11	0.003217324	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	123.4692964	0.003217324	0.32%
10	0.002928241	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	136.1107637	0.002928241	0.29%
9	0.002436765	0.00%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	151.5300364	0.002436765	0.24%
8	0.001977212	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	170.7688733	0.001977212	0.20%
7	0.001553945	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	195.4643143	0.001553945	0.16%
6	0.001144797	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	228.3447469	0.001144797	0.11%
5	0.000778703	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	274.3212553	0.000778703	0.08%
4	0.000487951	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	343.2159902	0.000487951	0.05%
3	0.000256531	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	457.9472805	0.000256531	0.03%
2	0.000106517	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	687.2700788	0.000106517	0.01%
1	2.37483E-05	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1374.959079	2.37483E-05	0.00%

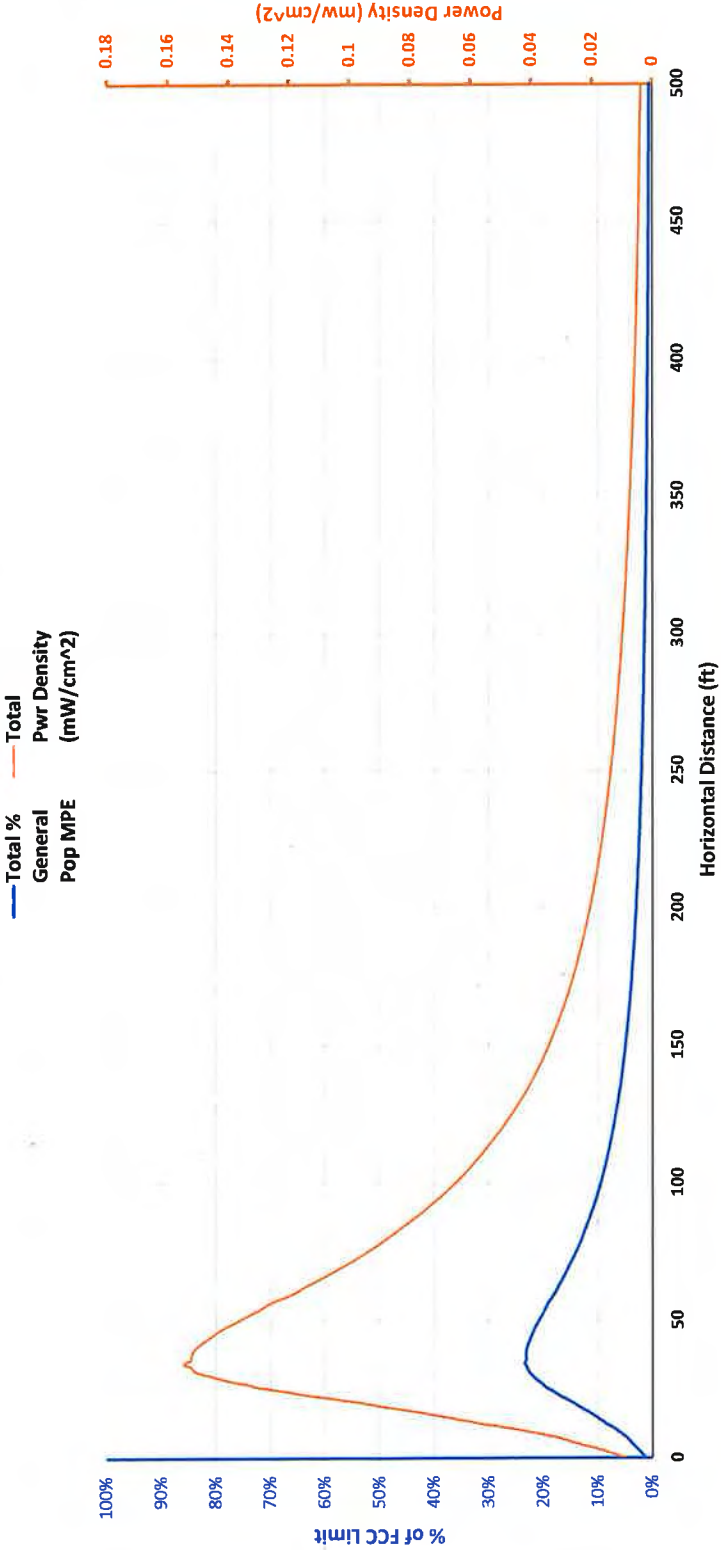
degree below horizon	AT1K02 (39GHz)	AT1K01 (28GHz)	MT6407-77A (3,730MHz)	XXDWM- 12.5-65 (3,550MHz)	AWS (2,155MHz)	PCS (1,962MHz)	850-LTE (880MHz)	850-CDMA (869MHz)	700-LTE (746MHz)
0	0.08	0.08	3.28	1.8	0	0.5	0	0	0.1
1	0.39	0.39	2.19	1.3	0	0.6	0.1	0.1	0.1
2	0.3	0.3	1.29	0.8	0	0.8	0.1	0.1	0.1
3	0	0	0.58	0.5	0.1	1	0.1	0.1	0.2
4	0.31	0.31	0.25	0.2	0.1	1.2	0.1	0.1	0.2
5	0.42	0.42	0.05	0.1	0.2	1.4	0.2	0.2	0.2
6	0.13	0.13	0	0	0.3	1.7	0.2	0.2	0.3
7	0.44	0.44	0.3	0	0.4	2	0.3	0.3	0.3
8	0.36	0.36	0.5	0.1	0.6	2.2	0.3	0.3	0.4
9	0.09	0.09	1.06	0.2	0.7	2.5	0.4	0.4	0.4
10	0.4	0.4	1.96	0.3	0.8	2.8	0.5	0.5	0.5
11	0.52	0.52	2.79	0.7	1	3.1	0.5	0.5	0.5
12	0.26	0.26	3.98	1	1.1	3.4	0.6	0.6	0.6
13	0.57	0.57	5.58	1.5	1.3	3.7	0.7	0.7	0.7
14	0.51	0.51	7.33	2	1.5	4	0.8	0.8	0.8
15	0.26	0.26	9.78	2.6	1.7	4.3	0.9	0.9	0.9
16	0.58	0.58	12.92	3.3	1.9	4.6	1	1	1
17	1.07	1.07	17.49	4.2	2.1	4.9	1.2	1.2	1.1
18	0.55	0.55	26.19	5.3	2.4	5.2	1.3	1.3	1.2
19	0.58	0.58	31.65	6.7	2.7	5.4	1.4	1.4	1.3
20	1.08	1.08	21.32	8.2	2.9	5.6	1.6	1.6	1.4
21	0.59	0.59	17.7	9.9	3.1	5.8	1.7	1.7	1.6
22	0.65	0.65	15.7	11.8	3.4	6	1.9	1.9	1.7
23	1.22	1.22	14.89	14.5	3.6	6.2	2	2	1.8
24	0.99	0.99	14.59	18.2	3.9	6.3	2.2	2.2	2
25	0.8	0.8	15.18	23.8	4.1	6.4	2.4	2.4	2.2
26	1.11	1.11	15.83	33.9	4.4	6.6	2.6	2.6	2.3
27	1.12	1.12	16.93	27.7	4.6	6.7	2.8	2.8	2.5
28	0.95	0.95	18.33	21.5	4.9	6.8	3	3	2.7

29	1.25	1.25	19.62	18	5.2	6.9	3.2	3.2	2.9
30	2.03	2.03	20.49	15.7	5.4	7.1	3.4	3.4	3.1
31	3.32	3.32	20.49	14.1	5.7	7.2	3.6	3.6	3.3
32	5.21	5.21	19.83	13	5.9	7.3	3.9	3.9	3.5
33	7.88	7.88	19.23	12.3	6.1	7.5	4.1	4.1	3.8
34	11.74	11.74	18.52	12.1	6.3	7.6	4.4	4.4	4
35	16.19	16.19	18.29	11.9	6.4	7.7	4.6	4.6	4.2
36	14.94	14.94	18.06	11.7	6.7	7.9	4.9	4.9	4.5
37	15.07	15.07	18.29	11.7	6.9	8.1	5.2	5.2	4.7
38	16.33	16.33	18.49	11.8	7.2	8.2	5.5	5.5	5
39	15.38	15.38	19.03	12	7.5	8.5	5.9	5.9	5.2
40	15.03	15.03	19.78	12.5	7.8	8.7	6.2	6.2	5.5
41	15.75	15.75	20.69	13.1	8.1	9	6.5	6.5	5.8
42	17.49	17.49	21.79	13.7	8.5	9.3	6.8	6.8	6.1
43	20.55	20.55	23.18	14.2	8.7	9.5	7.2	7.2	6.3
44	21.87	21.87	24.78	14.5	9.1	9.9	7.5	7.5	6.6
45	20.56	20.56	26.65	15.1	9.4	10.2	7.9	7.9	6.9
46	20.35	20.35	28.85	15.9	9.7	10.5	8.2	8.2	7.2
47	21.02	21.02	31.4	16.8	10.1	10.8	8.5	8.5	7.5
48	21.62	21.62	33.3	17.8	10.5	11.2	8.9	8.9	7.8
49	20.49	20.49	33	18.7	10.9	11.4	9.2	9.2	8.1
50	20.28	20.28	31	19.7	11.3	11.8	9.5	9.5	8.4
51	20.83	20.83	28.8	20.7	11.6	12.1	9.8	9.8	8.7
52	22.1	22.1	27.2	21.6	11.9	12.4	10	10	9
53	22.84	22.84	25.96	22.4	12.2	12.8	10.3	10.3	9.3
54	23.96	23.96	25.16	22.9	12.4	13.2	10.6	10.6	9.6
55	25.61	25.61	24.59	23.3	12.7	13.5	10.9	10.9	10
56	24.75	24.75	24.19	23.4	13	13.9	11.1	11.1	10.3
57	24.54	24.54	24.19	23.3	13.1	14.3	11.4	11.4	10.6
58	24.84	24.84	24.18	22.7	13.4	14.7	11.6	11.6	10.9
59	25.6	25.6	24.38	21.9	13.6	15	11.9	11.9	11.2
60	25.03	25.03	24.98	21.2	13.6	15.3	12.2	12.2	11.5

61	24.18	24.18	25.49	20.7	13.9	15.7	12.5	12.5	11.8
62	23.83	23.83	26.09	20.5	14.1	16.1	12.7	12.7	12.1
63	23.88	23.88	26.99	20.3	14.3	16.3	13	13	12.4
64	24.25	24.25	27.98	20.3	14.7	16.7	13.4	13.4	12.7
65	24.7	24.7	28.58	20.5	15	17	13.7	13.7	13
66	24.47	24.47	29.08	20.9	15.3	17.2	14.1	14.1	13.3
67	24.47	24.47	29.18	21.3	15.7	17.6	14.4	14.4	13.6
68	24.68	24.68	28.55	21.7	15.8	17.8	14.8	14.8	13.9
69	25.07	25.07	27.75	21.8	16.1	18.1	15.1	15.1	14.2
70	25.64	25.64	26.95	21.6	16.4	18.5	15.5	15.5	14.5
71	26.36	26.36	26.25	21.2	16.6	18.8	15.8	15.8	14.8
72	27.24	27.24	25.5	21	16.9	19.2	16.1	16.1	15.1
73	28.26	28.26	24.8	21	17.2	19.6	16.4	16.4	15.4
74	28.68	28.68	24.3	21.2	17.3	19.8	16.7	16.7	15.7
75	28.98	28.98	23.9	21.6	17.5	20.3	16.9	16.9	16
76	29.37	29.37	23.6	22.1	17.6	20.8	17.2	17.2	16.3
77	29.83	29.83	23.4	22.8	17.5	21.1	17.4	17.4	16.7
78	30.36	30.36	23.1	23.5	17.8	21.8	17.6	17.6	17
79	30.94	30.94	22.9	24.5	17.9	22.4	17.8	17.8	17.4
80	30.89	30.89	22.8	25.6	18.1	22.9	18.1	18.1	17.8
81	30.44	30.44	22.7	26.8	18.5	23.6	18.4	18.4	18.1
82	30.13	30.13	22.7	28.2	18.8	24	18.7	18.7	18.5
83	29.93	29.93	22.7	29.7	19	24.4	19.1	19.1	18.9
84	29.81	29.81	22.7	31.1	19.4	24.7	19.5	19.5	19.4
85	29.76	29.76	22.8	31.9	19.5	24.8	19.9	19.9	19.8
86	29.78	29.78	22.8	32.5	19.8	24.9	20.4	20.4	20.2
87	29.85	29.85	22.9	32.9	20.3	25.1	21	21	20.6
88	29.97	29.97	22.96	33.3	20.6	25.1	21.7	21.7	21
89	30.13	30.13	23.06	33.6	21.1	25.4	22.4	22.4	21.4
90	30.33	30.33	23.06	34.4	21.7	25.7	23.3	23.3	21.8

Location		Durham Fair 2 CT			
Date		3/28/2022			
Band		AWS	PCS	850-LTE	700
Operating Frequency (MHz)		2,145	1,970	880	746
General Population MPE (mW/cm ²)		1	1	0.586666667	0.497333333
ERP Per Transmitter (Watts)		385	359	343	285
Number of Transmitters		2	2	2	2
Antenna Centerline (feet)		30	30	30	30
Total ERP (Watts)		769	718	686	570
Total ERP (dBm)		59	59	58	58
Maximum % of General Population Limit		23.4%			

RF Exposure 6ft Above Ground Level
Far Field Formula (per FCC OET65)



Power Density (mW/cm²)				Percent of General Population MPE								Distance	Total Pwr Density (mW/cm²)	Total % General Pop MPE	
AWS	PCS	850-LTE	700 MHz	350MHz	285MHz	C-Band	CRBS	AWS	PCS	Cellular	CDMA				700 MHz
0.003246754	0.001206282	0.002001954	0.002352061	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.12%	0.00%	0.34%	0	0.008807051	1.26%
0.003726637	0.001292161	0.002462192	0.002578198	0.00%	0.00%	0.00%	0.00%	0.00%	0.37%	0.13%	0.00%	0.42%	0.418921558	0.010059187	1.44%
0.004177535	0.001383311	0.00289018	0.002824355	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.14%	0.00%	0.49%	0.838098468	0.011275538	1.62%
0.004469492	0.001381204	0.003390494	0.003092127	0.00%	0.00%	0.00%	0.00%	0.00%	0.45%	0.14%	0.00%	0.58%	1.257786703	0.012333317	1.78%
0.005004157	0.001443214	0.003884505	0.003383219	0.00%	0.00%	0.00%	0.00%	0.00%	0.50%	0.14%	0.00%	0.66%	1.678243487	0.013715095	1.99%
0.00534734	0.001472779	0.004346529	0.003699449	0.00%	0.00%	0.00%	0.00%	0.00%	0.53%	0.15%	0.00%	0.74%	2.099727925	0.014866096	2.17%
0.005453534	0.001502027	0.004749882	0.004042754	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%	0.15%	0.00%	0.81%	2.52501646	0.015748197	2.32%
0.005955946	0.001603062	0.00518747	0.004518039	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%	0.16%	0.00%	0.88%	2.946829462	0.017264517	2.55%
0.006208045	0.001749664	0.005661868	0.004931217	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.17%	0.00%	0.97%	3.372980033	0.018550794	2.75%
0.006617427	0.001908485	0.006035233	0.005378837	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.19%	0.00%	1.03%	3.801226568	0.0199939983	2.96%
0.00713603	0.002229215	0.006429202	0.005729959	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%	0.22%	0.00%	1.10%	4.231847537	0.021601979	3.19%
0.007504858	0.00248509	0.006844588	0.006242258	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.25%	0.00%	1.17%	4.665127419	0.023076794	3.42%
0.007625321	0.002833073	0.007116442	0.006796062	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%	0.28%	0.00%	1.21%	5.10135748	0.024370899	3.63%
0.008107691	0.003302911	0.007394384	0.007225975	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.33%	0.00%	1.26%	5.540836587	0.026030961	3.85%
0.007857015	0.003509597	0.007678253	0.007857001	0.00%	0.00%	0.00%	0.00%	0.00%	0.79%	0.35%	0.00%	1.31%	5.983872068	0.026901865	4.03%
0.007967772	0.003902443	0.008153456	0.008343267	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.39%	0.00%	1.39%	6.430780618	0.028366937	4.25%
0.008262902	0.004336429	0.008455464	0.008853843	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.43%	0.00%	1.44%	6.881889258	0.029908639	4.48%
0.008368391	0.004494089	0.008966992	0.009389473	0.00%	0.00%	0.00%	0.00%	0.00%	0.84%	0.45%	0.00%	1.53%	7.337536355	0.031218944	4.70%
0.00868741	0.004873732	0.009503133	0.009950874	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%	0.49%	0.00%	1.62%	7.79807271	0.03319648	4.99%
0.009392679	0.005281887	0.010064548	0.01053874	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	0.53%	0.00%	1.72%	8.263862719	0.035277854	5.30%
0.009714512	0.005590114	0.010651868	0.011153732	0.00%	0.00%	0.00%	0.00%	0.00%	0.97%	0.56%	0.00%	1.82%	8.735285622	0.037110225	5.59%
0.010274313	0.00604996	0.011528037	0.011796456	0.00%	0.00%	0.00%	0.00%	0.00%	1.03%	0.60%	0.00%	1.97%	9.212736841	0.03964884	5.97%
0.010658781	0.006394119	0.012138887	0.012467526	0.00%	0.00%	0.00%	0.00%	0.00%	1.09%	0.64%	0.00%	2.08%	9.69662942	0.041904313	6.31%
0.010952203	0.00659935	0.013167591	0.013167421	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.66%	0.00%	2.24%	10.18739559	0.043886566	6.65%
0.011827955	0.007127042	0.013896789	0.013896611	0.00%	0.00%	0.00%	0.00%	0.00%	1.18%	0.71%	0.00%	2.37%	10.68548845	0.046748397	7.06%
0.012473857	0.007545146	0.014997041	0.014655478	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.73%	0.00%	2.56%	11.1913838	0.049471522	7.49%
0.013145276	0.007740507	0.015804423	0.015444325	0.00%	0.00%	0.00%	0.00%	0.00%	1.31%	0.77%	0.00%	2.69%	11.70558213	0.052134381	7.89%
0.014164821	0.008340859	0.01703005	0.016263362	0.00%	0.00%	0.00%	0.00%	0.00%	1.42%	0.83%	0.00%	2.90%	12.22861079	0.055799093	8.42%
0.014565292	0.008576673	0.017919422	0.017112695	0.00%	0.00%	0.00%	0.00%	0.00%	1.46%	0.86%	0.00%	3.05%	12.76102636	0.058174083	8.81%
0.014965384	0.009227574	0.018411648	0.017992317	0.00%	0.00%	0.00%	0.00%	0.00%	1.50%	0.92%	0.00%	3.14%	13.30341723	0.060596922	9.18%
0.015721202	0.009919968	0.019342625	0.01890209	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.99%	0.00%	3.30%	13.85640646	0.063886785	9.66%
0.015404121	0.010413104	0.020304175	0.01984174	0.00%	0.00%	0.00%	0.00%	0.00%	1.54%	1.04%	0.00%	3.46%	14.42065486	0.06596114	10.03%
0.015786662	0.010921693	0.021295857	0.020810836	0.00%	0.00%	0.00%	0.00%	0.00%	1.58%	1.09%	0.00%	3.63%	14.99686445	0.068815048	10.49%
0.016543681	0.01171202	0.021809061	0.02180878	0.00%	0.00%	0.00%	0.00%	0.00%	1.65%	1.17%	0.00%	3.72%	15.58578224	0.071873541	10.93%
0.016542371	0.012548662	0.022835082	0.022834788	0.00%	0.00%	0.00%	0.00%	0.00%	1.65%	1.25%	0.00%	3.89%	16.1882044	0.074760904	11.39%
0.01730527	0.013433156	0.023344426	0.023388788	0.00%	0.00%	0.00%	0.00%	0.00%	1.73%	1.34%	0.00%	3.98%	16.80498092	0.077970731	11.86%
0.01808692	0.014039909	0.024398855	0.024398855	0.00%	0.00%	0.00%	0.00%	0.00%	1.81%	1.40%	0.00%	4.16%	17.43702067	0.082074093	12.51%
0.018456382	0.015001899	0.025477182	0.026677541	0.00%	0.00%	0.00%	0.00%	0.00%	1.85%	1.50%	0.00%	4.34%	18.0852972	0.085613004	13.05%
0.019253674	0.016014497	0.026577764	0.027829977	0.00%	0.00%	0.00%	0.00%	0.00%	1.93%	1.60%	0.00%	4.53%	18.75085504	0.089675913	13.65%
0.02006571	0.016689918	0.027068198	0.029003723	0.00%	0.00%	0.00%	0.00%	0.00%	2.01%	1.67%	0.00%	4.61%	19.4348168	0.092827549	14.12%
0.020890906	0.017376285	0.028181369	0.030196492	0.00%	0.00%	0.00%	0.00%	0.00%	2.09%	1.74%	0.00%	4.80%	20.13839115	0.096645053	14.70%
0.022233563	0.018493058	0.029309869	0.031405687	0.00%	0.00%	0.00%	0.00%	0.00%	2.22%	1.85%	0.00%	5.00%	20.86288171	0.101442177	15.38%
0.023637212	0.018775691	0.030405096	0.032628378	0.00%	0.00%	0.00%	0.00%	0.00%	2.36%	1.88%	0.00%	5.19%	21.60969706	0.105492246	15.99%
0.025101765	0.019939026	0.032337697	0.03386129	0.00%	0.00%	0.00%	0.00%	0.00%	2.51%	1.99%	0.00%	5.51%	22.38036207	0.111239777	16.82%
0.026626711	0.020668892	0.033521414	0.035100778	0.00%	0.00%	0.00%	0.00%	0.00%	2.66%	2.07%	0.00%	5.71%	23.1765306	0.115917795	17.50%
0.027568894	0.021400258	0.034707566	0.036342816	0.00%	0.00%	0.00%	0.00%	0.00%	2.76%	2.14%	0.00%	5.92%	24	0.120019534	18.12%
0.02850965	0.022130517	0.036727951	0.037582791	0.00%	0.00%	0.00%	0.00%	0.00%	2.85%	2.21%	0.00%	6.26%	24.85272753	0.124951089	18.88%
0.03013117	0.023389216	0.037933316	0.0388816398	0.00%	0.00%	0.00%	0.00%	0.00%	3.01%	2.34%	0.00%	6.47%	25.73684904	0.1302701	19.62%
0.030371842	0.023576037	0.040038329	0.0391126442	0.00%	0.00%	0.00%	0.00%	0.00%	3.04%	2.36%	0.00%	6.82%	26.65470036	0.133112649	20.09%
0.032013648	0.024284817	0.041242026	0.040302724	0.00%	0.00%	0.00%	0.00%	0.00%	3.20%	2.43%	0.00%	7.03%	27.60884177	0.137843215	20.76%
0.032929439	0.024979515	0.042421805	0.041455634	0.00%	0.00%	0.00%	0.00%	0.00%	3.29%	2.50%	0.00%	7.23%	28.60208622	0.141786393	21.36%
0.033821506	0.02507221	0.043571023	0.042578678	0.00%	0.00%	0.00%	0.00%	0.00%	3.38%	2.51%	0.00%	7.43%	29.63753176	0.145043418	21.88%
0.034684329	0.025711829	0.045723357	0.042670971	0.00%	0.00%	0.00%	0.00%	0.00%	3.47%	2.57%	0.00%	7.79%	30.71859917	0.148790485	22.41%
0.035512021	0.025714056	0.04681448	0.043689253	0.00%	0.00%	0.00%	0.00%	0.00%	3.55%	2.51%	0.00%	7.98%	31.84907572	0.15115632	22.83%
0.035472084	0.025512294	0.047851056	0.043640412	0.00%	0.00%	0.00%	0.00%	0.00%	3.55%	2.51%	0.00%	8.16%	33.03316609	0.152075554	22.99%

0.036193613	0.025039844	0.048824382	0.044527793	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.62%	2.50%	8.32%	0.00%	8.95%	34.2755216	0.154585632	23.40%
0.03520243	0.024354113	0.048593419	0.044317155	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.52%	2.44%	8.28%	0.00%	8.91%	35.58146324	0.152467116	23.15%
0.034967684	0.023641038	0.049393714	0.044021628	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.50%	2.36%	8.42%	0.00%	8.85%	36.95675913	0.152024063	23.13%
0.034663208	0.023435187	0.048963626	0.044654783	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.47%	2.34%	8.35%	0.00%	8.98%	38.4080287	0.151716803	23.13%
0.034286883	0.022653102	0.049560174	0.044169984	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.43%	2.27%	8.45%	0.00%	8.88%	39.94270758	0.150670143	23.02%
0.034624965	0.02184686	0.048909606	0.043590171	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.46%	2.18%	8.34%	0.00%	8.76%	41.56921938	0.148971602	22.75%
0.034087237	0.021507576	0.048150035	0.042913212	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.41%	2.15%	8.21%	0.00%	8.63%	43.29714613	0.14665806	22.40%
0.034250579	0.020637999	0.047279485	0.042137343	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.43%	2.06%	8.06%	0.00%	8.47%	45.13743517	0.144305406	22.02%
0.034319651	0.019748883	0.046296449	0.041261223	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.43%	1.97%	7.89%	0.00%	8.30%	47.10265213	0.141626206	21.59%
0.033506824	0.018842257	0.045199963	0.040283991	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.35%	1.88%	7.70%	0.00%	8.10%	49.2072922	0.137833035	21.04%
0.033369205	0.018337728	0.043989667	0.038312905	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.34%	1.83%	7.50%	0.00%	7.70%	51.46816609	0.134009505	20.37%
0.032365024	0.017381034	0.042665884	0.037159954	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.24%	1.74%	7.27%	0.00%	7.47%	53.90488257	0.129571897	19.72%
0.032004081	0.016413645	0.0412297	0.035909106	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.08%	1.58%	7.03%	0.00%	7.22%	55.54045678	0.125556532	19.09%
0.030803507	0.015797918	0.038779748	0.033775314	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.02%	1.51%	6.61%	0.00%	6.79%	59.40208448	0.119156488	18.06%
0.030207004	0.015139354	0.037163146	0.031630561	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.02%	1.44%	6.33%	0.00%	6.36%	62.52213755	0.114140065	17.23%
0.028810627	0.014439507	0.034638376	0.030168376	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.88%	1.44%	5.90%	0.00%	6.07%	65.93945807	0.108056886	16.30%
0.027335887	0.013700387	0.032865329	0.027972572	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.73%	1.37%	5.60%	0.00%	5.62%	69.70106106	0.101874176	15.33%
0.026388461	0.0129245	0.030298343	0.025787741	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.64%	1.29%	5.16%	0.00%	5.19%	73.86440489	0.095399045	14.28%
0.025311624	0.012397088	0.027753952	0.02362214	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.53%	1.24%	4.73%	0.00%	4.32%	83.69794665	0.089084805	13.25%
0.023557299	0.011806608	0.025830351	0.021484474	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.36%	1.18%	4.40%	0.00%	4.32%	89.56921938	0.082678731	12.26%
0.021749125	0.011154278	0.023304866	0.019383894	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.17%	1.12%	3.97%	0.00%	3.90%	96.2587424	0.075592164	11.16%
0.019897554	0.010442377	0.020835528	0.017330014	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.99%	1.04%	3.55%	0.00%	3.48%	103.955421	0.068505473	10.07%
0.018014632	0.009674423	0.018434451	0.015332912	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.80%	0.97%	3.14%	0.00%	3.08%	112.9111226	0.061456418	8.99%
0.016114141	0.008855372	0.01611432	0.013403135	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.89%	2.75%	0.00%	2.70%	123.4692964	0.054486968	7.94%
0.013888234	0.007991838	0.013888388	0.011551709	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.39%	0.80%	2.37%	0.00%	2.32%	136.1107637	0.047320217	6.88%
0.012044528	0.007092339	0.011502563	0.009567292	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.20%	0.71%	1.96%	0.00%	1.92%	151.5300364	0.040206722	5.80%
0.01000263	0.006167567	0.009552544	0.007945358	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.62%	1.63%	0.00%	1.60%	170.7688733	0.033668099	4.84%
0.008101398	0.005230698	0.00773686	0.006288675	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.52%	1.32%	0.00%	1.26%	195.4643143	0.027357631	3.92%
0.006504865	0.00419989	0.005932573	0.004934436	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	0.42%	1.01%	0.00%	0.99%	228.3447469	0.021571764	3.07%
0.004896869	0.003310687	0.004466047	0.003630093	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	0.33%	0.76%	0.00%	0.73%	274.3212553	0.016303695	2.31%
0.003483705	0.002466272	0.00310489	0.002582502	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%	0.25%	0.53%	0.00%	0.52%	343.2159902	0.011637368	1.64%
0.002283591	0.001654314	0.002035275	0.001654313	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.17%	0.35%	0.00%	0.33%	457.9472805	0.007627494	1.07%
0.001285434	0.0009751	0.001145657	0.000931213	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%	0.10%	0.20%	0.00%	0.19%	687.2700788	0.004337403	0.61%
0.000584908	0.000454033	0.000509439	0.000423728	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.05%	0.09%	0.00%	0.09%	1374.959079	0.001972108	0.28%
0.000146272	0.000118894	0.000127399	0.000105964	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.00%	0.02%		0.000498528	0.07%

degree below horizon	AT1K02 (39GHz)	AT1K01 (28GHz)	MT6407-77A (3,730MHz)	XXDWMM- 12.5-65 (3,550MHz)	AWS (2,155MHz)	PCS (1,962MHz)	850-LTE (880MHz)	850-CDMA (869MHz)	700-LTE (746MHz)
0	0.08	0.08	3.28	1.8	0	0.5	0	0	0.1
1	0.39	0.39	2.19	1.3	0	0.6	0.1	0.1	0.1
2	0.3	0.3	1.29	0.8	0	0.8	0.1	0.1	0.1
3	0	0	0.58	0.5	0.1	1	0.1	0.1	0.2
4	0.31	0.31	0.25	0.2	0.1	1.2	0.1	0.1	0.2
5	0.42	0.42	0.05	0.1	0.2	1.4	0.2	0.2	0.2
6	0.13	0.13	0	0	0.3	1.7	0.2	0.2	0.3
7	0.44	0.44	0.3	0	0.4	2	0.3	0.3	0.3
8	0.36	0.36	0.5	0.1	0.6	2.2	0.3	0.3	0.4
9	0.09	0.09	1.06	0.2	0.7	2.5	0.4	0.4	0.4
10	0.4	0.4	1.96	0.3	0.8	2.8	0.5	0.5	0.5
11	0.52	0.52	2.79	0.7	1	3.1	0.5	0.5	0.5
12	0.26	0.26	3.98	1	1.1	3.4	0.6	0.6	0.6
13	0.57	0.57	5.58	1.5	1.3	3.7	0.7	0.7	0.7
14	0.51	0.51	7.33	2	1.5	4	0.8	0.8	0.8
15	0.26	0.26	9.78	2.6	1.7	4.3	0.9	0.9	0.9
16	0.58	0.58	12.92	3.3	1.9	4.6	1	1	1
17	1.07	1.07	17.49	4.2	2.1	4.9	1.2	1.2	1.1
18	0.55	0.55	26.19	5.3	2.4	5.2	1.3	1.3	1.2
19	0.58	0.58	31.65	6.7	2.7	5.4	1.4	1.4	1.3
20	1.08	1.08	21.32	8.2	2.9	5.6	1.6	1.6	1.4
21	0.59	0.59	17.7	9.9	3.1	5.8	1.7	1.7	1.6
22	0.65	0.65	15.7	11.8	3.4	6	1.9	1.9	1.7
23	1.22	1.22	14.89	14.5	3.6	6.2	2	2	1.8
24	0.99	0.99	14.59	18.2	3.9	6.3	2.2	2.2	2
25	0.8	0.8	15.18	23.8	4.1	6.4	2.4	2.4	2.2
26	1.11	1.11	15.83	33.9	4.4	6.6	2.6	2.6	2.3
27	1.12	1.12	16.93	27.7	4.6	6.7	2.8	2.8	2.5
28	0.95	0.95	18.33	21.5	4.9	6.8	3	3	2.7

29	1.25	1.25	19.62	18	5.2	6.9	3.2	3.2	2.9
30	2.03	2.03	20.49	15.7	5.4	7.1	3.4	3.4	3.1
31	3.32	3.32	20.49	14.1	5.7	7.2	3.6	3.6	3.3
32	5.21	5.21	19.83	13	5.9	7.3	3.9	3.9	3.5
33	7.88	7.88	19.23	12.3	6.1	7.5	4.1	4.1	3.8
34	11.74	11.74	18.52	12.1	6.3	7.6	4.4	4.4	4
35	16.19	16.19	18.29	11.9	6.4	7.7	4.6	4.6	4.2
36	14.94	14.94	18.06	11.7	6.7	7.9	4.9	4.9	4.5
37	15.07	15.07	18.29	11.7	6.9	8.1	5.2	5.2	4.7
38	16.33	16.33	18.49	11.8	7.2	8.2	5.5	5.5	5
39	15.38	15.38	19.03	12	7.5	8.5	5.9	5.9	5.2
40	15.03	15.03	19.78	12.5	7.8	8.7	6.2	6.2	5.5
41	15.75	15.75	20.69	13.1	8.1	9	6.5	6.5	5.8
42	17.49	17.49	21.79	13.7	8.5	9.3	6.8	6.8	6.1
43	20.55	20.55	23.18	14.2	8.7	9.5	7.2	7.2	6.3
44	21.87	21.87	24.78	14.5	9.1	9.9	7.5	7.5	6.6
45	20.56	20.56	26.65	15.1	9.4	10.2	7.9	7.9	6.9
46	20.35	20.35	28.85	15.9	9.7	10.5	8.2	8.2	7.2
47	21.02	21.02	31.4	16.8	10.1	10.8	8.5	8.5	7.5
48	21.62	21.62	33.3	17.8	10.5	11.2	8.9	8.9	7.8
49	20.49	20.49	33	18.7	10.9	11.4	9.2	9.2	8.1
50	20.28	20.28	31	19.7	11.3	11.8	9.5	9.5	8.4
51	20.83	20.83	28.8	20.7	11.6	12.1	9.8	9.8	8.7
52	22.1	22.1	27.2	21.6	11.9	12.4	10	10	9
53	22.84	22.84	25.96	22.4	12.2	12.8	10.3	10.3	9.3
54	23.96	23.96	25.16	22.9	12.4	13.2	10.6	10.6	9.6
55	25.61	25.61	24.59	23.3	12.7	13.5	10.9	10.9	10
56	24.75	24.75	24.19	23.4	13	13.9	11.1	11.1	10.3
57	24.54	24.54	24.19	23.3	13.1	14.3	11.4	11.4	10.6
58	24.84	24.84	24.18	22.7	13.4	14.7	11.6	11.6	10.9
59	25.6	25.6	24.38	21.9	13.6	15	11.9	11.9	11.2
60	25.03	25.03	24.98	21.2	13.6	15.3	12.2	12.2	11.5

61	24.18	24.18	25.49	20.7	13.9	15.7	12.5	12.5	11.8
62	23.83	23.83	26.09	20.5	14.1	16.1	12.7	12.7	12.1
63	23.88	23.88	26.99	20.3	14.3	16.3	13	13	12.4
64	24.25	24.25	27.98	20.3	14.7	16.7	13.4	13.4	12.7
65	24.7	24.7	28.58	20.5	15	17	13.7	13.7	13
66	24.47	24.47	29.08	20.9	15.3	17.2	14.1	14.1	13.3
67	24.47	24.47	29.18	21.3	15.7	17.6	14.4	14.4	13.6
68	24.68	24.68	28.55	21.7	15.8	17.8	14.8	14.8	13.9
69	25.07	25.07	27.75	21.8	16.1	18.1	15.1	15.1	14.2
70	25.64	25.64	26.95	21.6	16.4	18.5	15.5	15.5	14.5
71	26.36	26.36	26.25	21.2	16.6	18.8	15.8	15.8	14.8
72	27.24	27.24	25.5	21	16.9	19.2	16.1	16.1	15.1
73	28.26	28.26	24.8	21	17.2	19.6	16.4	16.4	15.4
74	28.68	28.68	24.3	21.2	17.3	19.8	16.7	16.7	15.7
75	28.98	28.98	23.9	21.6	17.5	20.3	16.9	16.9	16
76	29.37	29.37	23.6	22.1	17.6	20.8	17.2	17.2	16.3
77	29.83	29.83	23.4	22.8	17.5	21.1	17.4	17.4	16.7
78	30.36	30.36	23.1	23.5	17.8	21.8	17.6	17.6	17
79	30.94	30.94	22.9	24.5	17.9	22.4	17.8	17.8	17.4
80	30.89	30.89	22.8	25.6	18.1	22.9	18.1	18.1	17.8
81	30.44	30.44	22.7	26.8	18.5	23.6	18.4	18.4	18.1
82	30.13	30.13	22.7	28.2	18.8	24	18.7	18.7	18.5
83	29.93	29.93	22.7	29.7	19	24.4	19.1	19.1	18.9
84	29.81	29.81	22.7	31.1	19.4	24.7	19.5	19.5	19.4
85	29.76	29.76	22.8	31.9	19.5	24.8	19.9	19.9	19.8
86	29.78	29.78	22.8	32.5	19.8	24.9	20.4	20.4	20.2
87	29.85	29.85	22.9	32.9	20.3	25.1	21	21	20.6
88	29.97	29.97	22.96	33.3	20.6	25.1	21.7	21.7	21
89	30.13	30.13	23.06	33.6	21.1	25.4	22.4	22.4	21.4
90	30.33	30.33	23.06	34.4	21.7	25.7	23.3	23.3	21.8