



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

September 12, 2022

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
hredding@saigrp.com

RE: **EM-CING-034-220803** – New Cingular Wireless PCS, LLC (AT&T notice of intent to modify an existing telecommunications facility located at 48 Newtown Road, Danbury, Connecticut.

Dear Ms. Redding:

The Connecticut Siting Council (Council) is in receipt of your correspondence of September 8, 2022 submitted in response to the Council's August 26, 2022 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Melanie Bachman".

Melanie Bachman
Executive Director

MAB/RDM/laf

From: Hollis Redding <HRedding@saigrp.com>
Sent: Thursday, September 8, 2022 9:11 AM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-CING-034-220803 (48 Newtown Road, Danbury)

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Good morning, Evan-

Attached please find the revised structural analysis & RF Emissions report which include DISH per the Incomplete letter of August 26th. The originals will go out in the mail today. Please let me know if you have any questions. Thank you. Hollis



Hollis M. Redding
Site Acquisition Specialist
860-834-6964
hredding@saigrp.com



September 8, 2022

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

Re: Response to Incomplete Letter New Cingular Wireless PCS LLC ("AT&T") Site CT2157
48 Newtown Road, Danbury, CT 06810 (the "Property")
EM-CING-034-220803

Dear Ms. Bachman:

I am in receipt of your incomplete letter of August 26, 2022. Attached please find the revised structural analysis and RF Analysis Report which include Dish per your request. Please let me know if this deems the exempt modification complete or if you need further information. I apologize for not including Dish in the original filing. Thank you for your time.

Sincerely,

Hollis M. Redding

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
Mobile: 860-834-6964
hredding@saigrp.com

Enclosures

STRUCTURAL ANALYSIS REPORT

For

SITE NUMBER: CTL02157
SITE NAME: DANBURY EAST
FA CODE: 10035077

48 NEWTOWN ROAD
DANBURY, CT 06810

Antennas Mounted to the Monopole



Prepared for:



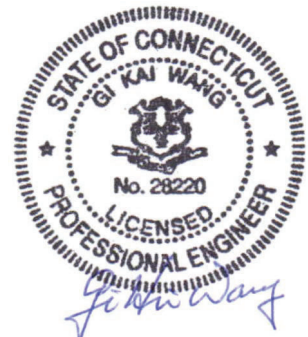
Dated: August 31, 2022

Prepared by:



HUDSON
Design Group LLC

45 Beechwood Drive
North Andover, MA 01845
(P) 978.557.5553 (F) 978.336.5586
www.hudsondesigngroupllc.com





HUDSON
Design Group LLC

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 110' monopole supporting the existing and proposed AT&T's antennas located at elevation 100' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

Record drawings of the existing monopole were not available for our use. The previous structural analysis report prepared by Centek Engineering, dated December 18, 2014, was available and obtained for our use. Tower mapping report prepared by ProVertic LLC, dated September 19, 2017, was provided to this office. The previous structural analysis report and modifications prepared by this office, dated July 22, 2016, was used for analysis.

Structural analysis report and construction drawings prepared by Tectonic Engineering, dated January 26, 2022, were provided to this office.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing monopole and foundation **are in conformance** with the ANSI/TIA-222-H Standard for the loading considered under the criteria listed in this report. The monopole structure is rated at **69.0%** - (Pole Section L4 from El.47' to El.72' Controlling).



APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
AT&T	(1) 800 10965 Antenna	100'	Sector Frame
AT&T	(2) 800 10964 Antennas	100'	Sector Frame
AT&T	(3) B14 4478	100'	Sector Frame
AT&T	(3) RRUS-32 B2	100'	Sector Frame
AT&T	(3) RRUS-32 B66	100'	Sector Frame
AT&T	(3) RRUS-32 B30	100'	Sector Frame
AT&T	(2) DC6-48-60-18-8C	100'	Sector Frame
AT&T	(1) QD6616-7 Antenna	100'	Sector Frame
AT&T	(2) QD4616-7 Antennas	100'	Sector Frame
AT&T	(3) AIR6419 B77G Antennas	101.2'	Sector Frame
AT&T	(3) AIR6449 B77D Antennas	97.6'	Sector Frame
AT&T	(3) 4449 B5/B12	100'	Sector Frame
AT&T	(1) DC9-48-60-24-8C-EV	100'	Sector Frame
VERIZON	(1) BXA-80063-6BF Antenna	90'	Platform w/handrails
VERIZON	(2) BXA-80080-6CF Antennas	90'	Platform w/handrails
VERIZON	(6) JAHH-65B-R3B Antennas	90'	Platform w/handrails
VERIZON	(3) XXDWMM Antennas	90'	Platform w/handrails
VERIZON	(3) B5/B13 RRH-BR04C	90'	Platform w/handrails
VERIZON	(3) B2/B66A RRH-BR049	90'	Platform w/handrails
VERIZON	(3) CBRS RRH-RT4401	90'	Platform w/handrails
VERIZON	(3) CBC78T-DS-43-2X	90'	Platform w/handrails
VERIZON	(2) OVP Box	90'	Platform w/handrails
Dish Wireless	(3) MX08FRO665-21 Antennas	80'	MC-PK8-DSH
Dish Wireless	(3) TA08025-B604	80'	MC-PK8-DSH
Dish Wireless	(3) TA08025-B605	80'	MC-PK8-DSH
Dish Wireless	(1) RDIDC-9181-PF-48	80'	MC-PK8-DSH

***Proposed AT&T Appurtenances shown in Bold.**

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(6) 1 5/8" Cables	100'	Outside Monopole
AT&T	(6) DC Power Cables	100'	Inside Monopole
AT&T	(2) Fiber Cables	100'	Inside Monopole
AT&T	(1) DC Power Cable	100'	Inside Monopole
AT&T	(1) Fiber Cable	100'	Inside Monopole

***Proposed AT&T Coax Cables shown in Bold.**



HUDSON
Design Group LLC

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Pole Section-L1	8.3 %	97.5 – 111	PASS	
Pole Section-L2	8.3 %	97 – 97.5	PASS	
Pole Section-L3	57.6 %	72 – 97	PASS	
Pole Section-L4	69.0 %	47 – 72	PASS	Controlling
Pole Section-L5	66.7 %	21 – 47	PASS	
Pole Section-L6	66.5 %	1 – 21	PASS	



HUDSON
Design Group LLC

DESIGN CRITERIA:

1. EIA/TIA-222-H Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures
2. Connecticut State Building Code

City/Town: Danbury
County: Fairfield
Basic Wind Speed: 120 mph
Risk Category: II
Exposure Category: B
Topographic Category: 1
Ice Thickness: 1.0 inch

3. Approximate height above grade to proposed antennas: 100'

ASSUMPTIONS:

1. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
2. The monopole and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.
4. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas, RRHs and surge arrestor be mounted on the existing sector frames supported by the monopole.



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Design Group LLC

TNX INPUT/OUTPUT

Section	1	2	3	4	5	6	
Length (ft)	13.50	0.50	25.00	25.00	30.00	20.00	
Number of Sides	1	1	18	18	18	18	
Thickness (in)	0.3750	0.3750	0.2500	0.3000	0.3650	0.3890	
Socket Length (ft)				4.00			
Top Dia (in)	16.0000	16.0000	17.4900	22.7350	26.5408	33.3920	
Bot Dia (in)	16.0000	17.4900	22.7350	27.9800	33.3920	37.0000	
Grade	A36	A36	A572-65	A572-65	A572-65	A572-65	
Weight (lb)	896.3	34.8	1421.2	2151.5	3710.9	3100.2	11315.0

111.0 ft

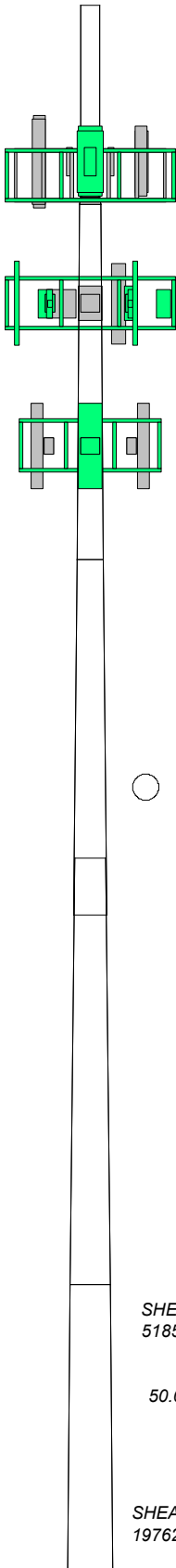
97.5 ft

72.0 ft

47.0 ft

21.0 ft

1.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AIR6419 B77G w/mount pipe	101.2	BXA-80080-6CF-EDIN w/mount pipe	90
AIR6419 B77G w/mount pipe	101.2	BXA-80080-6CF-EDIN w/mount pipe	90
AIR6419 B77G w/mount pipe	101.2	JAHH-65B-R3B w/ Mount Pipe	90
800 10965 w/ Mount Pipe	100	JAHH-65B-R3B w/ Mount Pipe	90
800 10964 w/ Mount Pipe	100	JAHH-65B-R3B w/ Mount Pipe	90
800 10964 w/ Mount Pipe	100	JAHH-65B-R3B w/ Mount Pipe	90
B14 4478	100	JAHH-65B-R3B w/ Mount Pipe	90
B14 4478	100	JAHH-65B-R3B w/ Mount Pipe	90
B14 4478	100	JAHH-65B-R3B w/ Mount Pipe	90
B14 4478	100	RxxDC-3315-PF-48	90
RRUS-32 B2	100	RxxDC-3315-PF-48	90
RRUS-32 B2	100	XXDWMM (Verizon)	90
RRUS-32 B2	100	XXDWMM	90
RRUS-32 B66	100	XXDWMM	90
RRUS-32 B66	100	B5/B13 RRH-BR04C	90
RRUS-32 B66	100	B5/B13 RRH-BR04C	90
RRUS-32 B30	100	B5/B13 RRH-BR04C	90
RRUS-32 B30	100	B2/B66A RRH-BR049	90
RRUS-32 B30	100	B2/B66A RRH-BR049	90
DC6-48-60-18-8C	100	B2/B66A RRH-BR049	90
DC6-48-60-18-8C	100	CBRS RRH-RT4401	90
QD6616-7 w/mount pipe (ATI - proposed)	100	CBRS RRH-RT4401	90
QD4616-7 w/mount pipe	100	CBRS RRH-RT4401	90
QD4616-7 w/mount pipe	100	CBC78T-DS-43-2X	90
4449 B5/B12	100	CBC78T-DS-43-2X	90
4449 B5/B12	100	CBC78T-DS-43-2X	90
4449 B5/B12	100	MC-PK8-DSH (DISH WIRELESS)	80
DC9-48-60-24-8C-EV	100	MX08FRO665-21 w/mount pipe	80
Sabre 12' V-Boom (ATI - existing)	99	MX08FRO665-21 w/mount pipe	80
Sabre 12' V-Boom	99	TA08025-B604	80
Sabre 12' V-Boom	99	TA08025-B604	80
AIR6449 B77D w/mount pipe	97.6	TA08025-B604	80
AIR6449 B77D w/mount pipe	97.6	TA08025-B605	80
AIR6449 B77D w/mount pipe	97.6	TA08025-B605	80
PIROD 13' Platform w/handrail (Verizon)	90	TA08025-B605	80
BXA-80063-6BF-EDIN w/mount pipe	90	RDIIC-9181-PF-48	80

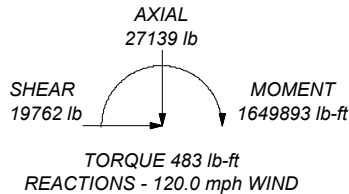
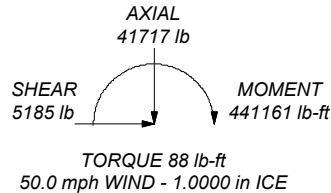
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120.0 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 69%

ALL REACTION
ARE FACTORED



Hudson Design Group LLC
45 Beechwood Drive
North Andover, MA 01845
Phone: 978.557.5553
FAX: 978.336.5586

Job: **CT2157**

Project: **110 ft Monopole**

Client: AT&T

Drawn by: kw

App'd:

Code: TIA-222-H

Date: 08/30/22

Scale: NTS

Path: C:\CT2157\CT2157.dwg Dwg No. E-1

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: 978.557.5553 FAX: 978.336.5586	Job	CT2157	Page	1 of 12
	Project	110 ft Monopole	Date	15:11:05 08/30/22
	Client	AT&T	Designed by	kw

Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Tower base elevation above sea level: 1.00 ft.

Basic wind speed of 120.0 mph.

Risk Category II.

Exposure Category B.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56.0 pcf.

A wind speed of 50.0 mph is used in combination with ice.

Temperature drop of 50.0 °F.

Deflections calculated using a wind speed of 60.0 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

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	111.00-97.50	13.50	0.00	Round	16.0000	16.0000	0.3750		A36 (36 ksi)
L2	97.50-97.00	0.50	0.00	Round	16.0000	17.4900	0.3750		A36 (36 ksi)
L3	97.00-72.00	25.00	0.00	18	17.4900	22.7350	0.2500	1.0000	A572-65 (65 ksi)
L4	72.00-47.00	25.00	4.00	18	22.7350	27.9800	0.3000	1.2000	A572-65 (65 ksi)
L5	47.00-21.00	30.00	0.00	18	26.5408	33.3920	0.3650	1.4600	A572-65 (65 ksi)
L6	21.00-1.00	20.00		18	33.3920	37.0000	0.3890	1.5560	A572-65 (65 ksi)

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 plf
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tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: 978.557.5553 FAX: 978.336.5586	Job	CT2157	Page	2 of 12
	Project	110 ft Monopole	Date	15:11:05 08/30/22
	Client	AT&T	Designed by	kw

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 plf
1 5/8 (AT&T)	B	Yes	Surface Ar (CaAa)	100.00 - 16.00	6	6	0.000 0.000	1.9800		1.04

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		CAAA ft ² /ft	Weight plf
DC Power Cable	B	No	Yes	Inside Pole	100.00 - 16.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.58 0.58 0.58
FB-L98B-002	B	No	Yes	Inside Pole	100.00 - 16.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25

DC Power Cable (AT&T)	B	No	Yes	Inside Pole	100.00 - 16.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.58 0.58 0.58
FB-L98B-002	B	No	Yes	Inside Pole	100.00 - 16.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25

1 5/8 (Verizon)	C	No	Yes	Inside Pole	90.00 - 16.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
1 5/8 Fiber Cable	C	No	Yes	Inside Pole	90.00 - 16.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04

1 5/8 Fiber Cable (DISH)	C	No	Yes	Inside Pole	80.00 - 16.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		CAAA Front ft ²	CAAA Side ft ²	Weight lb
Sabre 12' V-Boom (AT&T - existing)	A	From Face	2.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	558.00 741.00 924.00
Sabre 12' V-Boom	B	From Face	2.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	558.00 741.00 924.00
Sabre 12' V-Boom	C	From Face	2.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice	15.40 21.30 27.20	14.00 20.81 27.62	558.00 741.00 924.00
800 10965 w/ Mount Pipe	A	From Face	3.50	0.0000	100.00	No Ice	13.92	7.50	134.55

tnxTower Hudson Design Group LLC 45 Beechwood Drive North Andover, MA 01845 Phone: 978.557.5553 FAX: 978.336.5586	Job	Page
	CT2157	3 of 12
	Project	Date
	110 ft Monopole	15:11:05 08/30/22
	Client	Designed by
	AT&T	kw

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0.00			1/2" Ice	14.50	8.71	229.58
			0.00			1" Ice	15.07	9.65	333.52
800 10964 w/ Mount Pipe	B	From Face	3.50	0.0000	100.00	No Ice	10.25	5.53	112.90
			0.00			1/2" Ice	10.77	6.41	187.51
			0.00			1" Ice	11.27	7.16	269.56
800 10964 w/ Mount Pipe	C	From Face	3.50	0.0000	100.00	No Ice	10.25	5.53	112.90
			0.00			1/2" Ice	10.77	6.41	187.51
			0.00			1" Ice	11.27	7.16	269.56
B14 4478	A	From Face	2.50	0.0000	100.00	No Ice	1.65	0.93	60.00
			0.00			1/2" Ice	1.81	1.05	74.37
			0.00			1" Ice	1.98	1.19	91.23
B14 4478	B	From Face	2.50	0.0000	100.00	No Ice	1.65	0.93	60.00
			0.00			1/2" Ice	1.81	1.05	74.37
			0.00			1" Ice	1.98	1.19	91.23
B14 4478	C	From Face	2.50	0.0000	100.00	No Ice	1.65	0.93	60.00
			0.00			1/2" Ice	1.81	1.05	74.37
			0.00			1" Ice	1.98	1.19	91.23
RRUS-32 B2	A	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B2	B	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B2	C	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B66	A	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B66	B	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B66	C	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B30	A	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B30	B	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
RRUS-32 B30	C	From Face	2.50	0.0000	100.00	No Ice	2.74	1.67	60.00
			0.00			1/2" Ice	2.96	1.86	81.11
			0.00			1" Ice	3.19	2.05	105.42
DC6-48-60-18-8C	A	From Face	1.00	0.0000	100.00	No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57
DC6-48-60-18-8C	B	From Face	1.00	0.0000	100.00	No Ice	0.79	0.79	20.00
			0.00			1/2" Ice	1.27	1.27	35.12
			0.00			1" Ice	1.45	1.45	52.57

QD6616-7 w/mount pipe (AT&T - proposed)	A	From Face	3.50	0.0000	100.00	No Ice	13.82	8.46	100.55
			0.00			1/2" Ice	14.43	9.66	203.01
			0.00			1" Ice	15.00	10.55	314.26
QD4616-7 w/mount pipe	B	From Face	3.50	0.0000	100.00	No Ice	10.08	6.22	116.55
			0.00			1/2" Ice	10.78	7.28	197.35
			0.00			1" Ice	11.37	8.05	285.62

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
QD4616-7 w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	10.08 10.78 11.37	6.22 7.28 8.05	116.55 197.35 285.62
AIR6419 B77G w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	101.20	No Ice 1/2" Ice 1" Ice	4.48 4.83 5.19	2.88 3.34 3.81	109.60 149.47 194.34
AIR6419 B77G w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	101.20	No Ice 1/2" Ice 1" Ice	4.48 4.83 5.19	2.88 3.34 3.81	109.60 149.47 194.34
AIR6419 B77G w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	101.20	No Ice 1/2" Ice 1" Ice	4.48 4.83 5.19	2.88 3.34 3.81	109.60 149.47 194.34
AIR6449 B77D w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	97.60	No Ice 1/2" Ice 1" Ice	4.35 4.70 5.06	3.01 3.47 3.94	117.60 157.89 203.17
AIR6449 B77D w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	97.60	No Ice 1/2" Ice 1" Ice	4.35 4.70 5.06	3.01 3.47 3.94	117.60 157.89 203.17
AIR6449 B77D w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	97.60	No Ice 1/2" Ice 1" Ice	4.35 4.70 5.06	3.01 3.47 3.94	117.60 157.89 203.17
4449 B5/B12	A	From Face	2.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.55 1.71 1.88	73.00 92.52 114.92
4449 B5/B12	B	From Face	2.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.55 1.71 1.88	73.00 92.52 114.92
4449 B5/B12	C	From Face	2.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.55 1.71 1.88	73.00 92.52 114.92
DC9-48-60-24-8C-EV	C	From Face	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.81 1.30 1.48	0.81 1.30 1.48	33.00 48.38 66.11

PIROD 13' Platform w/handrail (Verizon)	A	None		0.0000	90.00	No Ice 1/2" Ice 1" Ice	31.30 40.20 49.10	31.30 40.20 49.10	1822.00 2452.00 3082.00
BXA-80063-6BF-EDIN w/mount pipe	A	From Leg	4.00 2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	7.33 7.79 8.25	5.46 6.38 7.18	41.10 98.38 163.05
BXA-80080-6CF-EDIN w/mount pipe	B	From Leg	4.00 2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	6.26 6.93 7.57	6.46 7.73 8.85	47.20 104.60 169.77
BXA-80080-6CF-EDIN w/mount pipe	C	From Leg	4.00 2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	6.26 6.93 7.57	6.46 7.73 8.85	47.20 104.60 169.77
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00 6.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	9.90 10.56 11.19	7.65 8.83 9.73	88.85 165.42 250.16
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00 -6.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	9.90 10.56 11.19	7.65 8.83 9.73	88.85 165.42 250.16
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00 6.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	9.90 10.56 11.19	7.65 8.83 9.73	88.85 165.42 250.16
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00 -6.00	0.0000	90.00	No Ice 1/2" Ice	9.90 10.56	7.65 8.83	88.85 165.42

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	0.00 4.00 6.00 0.00	0.0000	90.00	1" Ice No Ice 1/2" Ice 1" Ice	11.19 9.90 10.56 11.19	9.73 7.65 8.83 9.73	250.16 88.85 165.42 250.16
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00 -6.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	9.90 10.56 11.19	7.65 8.83 9.73	88.85 165.42 250.16
RxxDC-3315-PF-48	A	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.59 4.86 5.14	2.52 2.73 2.95	32.00 67.82 107.61
RxxDC-3315-PF-48	B	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.59 4.86 5.14	2.52 2.73 2.95	32.00 67.82 107.61

XXDWMM (Verizon)	A	From Leg	4.00 -2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.40 2.60 2.81	20.00 59.31 102.70
XXDWMM	B	From Leg	4.00 -2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.40 2.60 2.81	20.00 59.31 102.70
XXDWMM	C	From Leg	4.00 -2.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.40 2.60 2.81	20.00 59.31 102.70
B5/B13 RRH-BR04C	A	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B5/B13 RRH-BR04C	B	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B5/B13 RRH-BR04C	C	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	82.00 98.43 117.53
B2/B66A RRH-BR049	A	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
B2/B66A RRH-BR049	B	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
B2/B66A RRH-BR049	C	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.25 1.39 1.54	97.50 115.84 136.97
CBRS RRH-RT4401	A	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
CBRS RRH-RT4401	B	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
CBRS RRH-RT4401	C	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
CBC78T-DS-43-2X	A	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	22.00 28.34 36.37
CBC78T-DS-43-2X	B	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	22.00 28.34 36.37
CBC78T-DS-43-2X	C	From Leg	2.50 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.53	0.51 0.60 0.70	22.00 28.34 36.37

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft²	CAAA Side ft²	Weight lb
			0.00		1/2" Ice	0.45	0.60	28.34
			0.00		1" Ice	0.53	0.70	36.37

MC-PK8-DSH (DISH WIRELESS)	A	None		0.0000	80.00	No Ice 30.10	30.10	1590.00
						1/2" Ice 40.80	40.80	2030.00
						1" Ice 51.50	51.50	2470.00
MX08FRO665-21 w/mount pipe	A	From Face	3.50 0.00 0.00	0.0000	80.00	No Ice 12.73	7.53	108.05
						1/2" Ice 13.33	8.72	200.33
						1" Ice 13.89	9.62	301.17
MX08FRO665-21 w/mount pipe	B	From Face	3.50 0.00 0.00	0.0000	80.00	No Ice 12.73	7.53	108.05
						1/2" Ice 13.33	8.72	200.33
						1" Ice 13.89	9.62	301.17
MX08FRO665-21 w/mount pipe	C	From Face	3.50 0.00 0.00	0.0000	80.00	No Ice 12.73	7.53	108.05
						1/2" Ice 13.33	8.72	200.33
						1" Ice 13.89	9.62	301.17
TA08025-B604	A	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	0.97	63.90
						1/2" Ice 2.12	1.10	80.49
						1" Ice 2.30	1.24	99.77
TA08025-B604	B	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	0.97	63.90
						1/2" Ice 2.12	1.10	80.49
						1" Ice 2.30	1.24	99.77
TA08025-B604	C	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	0.97	63.90
						1/2" Ice 2.12	1.10	80.49
						1" Ice 2.30	1.24	99.77
TA08025-B605	A	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	1.12	74.95
						1/2" Ice 2.12	1.25	92.77
						1" Ice 2.30	1.40	113.35
TA08025-B605	B	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	1.12	74.95
						1/2" Ice 2.12	1.25	92.77
						1" Ice 2.30	1.40	113.35
TA08025-B605	C	From Face	2.50 0.00 0.00	0.0000	80.00	No Ice 1.95	1.12	74.95
						1/2" Ice 2.12	1.25	92.77
						1" Ice 2.30	1.40	113.35
RDIDC-9181-PF-48	A	From Leg	1.50 0.00 0.00	0.0000	80.00	No Ice 1.87	1.07	21.85
						1/2" Ice 2.04	1.20	38.15
						1" Ice 2.21	1.35	57.11

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

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Comb. No.	Description
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 Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	27	41717.06	13.74	5178.33
	Max. H _x	20	27139.26	19616.99	90.77
	Max. H _z	2	27139.26	90.77	19704.49
	Max. M _x	2	1643769.49	90.77	19704.49
	Max. M _z	8	1636625.98	-19616.99	-90.77
	Max. Torsion	7	482.60	-16943.42	9773.64
	Min. Vert	19	20354.45	16943.42	-9773.64
	Min. H _x	9	20354.45	-19617.00	-90.77
	Min. H _z	15	20354.45	-90.77	-19704.50
	Min. M _x	14	-1643599.19	-90.77	-19704.49
	Min. M _z	20	-1636473.10	19616.99	90.77
	Min. Torsion	19	-482.64	16943.42	-9773.64

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Tower Mast Reaction Summary

<i>Load Combination</i>	<i>Vertical</i>	<i>Shear_x</i>	<i>Shear_z</i>	<i>Overturning Moment, M_x</i>	<i>Overturning Moment, M_z</i>	<i>Torque</i>
	<i>lb</i>	<i>lb</i>	<i>lb</i>	<i>lb-ft</i>	<i>lb-ft</i>	<i>lb-ft</i>
Dead Only	22616.05	0.00	0.00	-65.47	-58.59	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	27139.26	-90.77	-19704.49	-1643769.49	9038.13	-247.61
0.9 Dead+1.0 Wind 0 deg - No Ice	20354.45	-90.77	-19704.49	-1621804.42	8928.27	-246.90
1.2 Dead+1.0 Wind 30 deg - No Ice	27139.26	9729.88	-17019.21	-1419030.59	-810468.46	-421.27
0.9 Dead+1.0 Wind 30 deg - No Ice	20354.45	9729.88	-17019.21	-1400069.04	-799630.02	-421.25
1.2 Dead+1.0 Wind 60 deg - No Ice	27139.26	16943.42	-9773.64	-814050.12	-1412839.60	-481.95
0.9 Dead+1.0 Wind 60 deg - No Ice	20354.45	16943.42	-9773.64	-803169.93	-1393951.47	-482.60
1.2 Dead+1.0 Wind 90 deg - No Ice	27139.26	19616.99	90.77	9039.92	-1636625.98	-413.41
0.9 Dead+1.0 Wind 90 deg - No Ice	20354.45	19617.00	90.77	8929.37	-1614741.39	-414.58
1.2 Dead+1.0 Wind 120 deg - No Ice	27139.26	17034.19	9930.86	829648.83	-1421894.26	-234.26
0.9 Dead+1.0 Wind 120 deg - No Ice	20354.45	17034.19	9930.86	818585.91	-1402879.51	-235.61
1.2 Dead+1.0 Wind 150 deg - No Ice	27139.26	9887.56	17110.77	1428002.73	-826270.68	7.45
0.9 Dead+1.0 Wind 150 deg - No Ice	20354.45	9887.56	17110.77	1408956.90	-815206.89	6.30
1.2 Dead+1.0 Wind 180 deg - No Ice	27139.26	90.77	19704.49	1643599.19	-9200.58	247.25
0.9 Dead+1.0 Wind 180 deg - No Ice	20354.45	90.77	19704.50	1621674.16	-9046.89	246.57
1.2 Dead+1.0 Wind 210 deg - No Ice	27139.26	-9729.88	17019.21	1418867.13	810303.56	421.00
0.9 Dead+1.0 Wind 210 deg - No Ice	20354.45	-9729.88	17019.21	1399949.22	799509.55	420.97
1.2 Dead+1.0 Wind 240 deg - No Ice	27139.26	-16943.42	9773.64	813892.24	1412679.49	482.00
0.9 Dead+1.0 Wind 240 deg - No Ice	20354.45	-16943.42	9773.64	803054.17	1393834.42	482.64
1.2 Dead+1.0 Wind 270 deg - No Ice	27139.26	-19616.99	-90.77	-9199.07	1636473.10	413.78
0.9 Dead+1.0 Wind 270 deg - No Ice	20354.45	-19616.99	-90.77	-9046.06	1614635.09	414.91
1.2 Dead+1.0 Wind 300 deg - No Ice	27139.26	-17034.19	-9930.86	-829814.81	1421743.82	234.57
0.9 Dead+1.0 Wind 300 deg - No Ice	20354.45	-17034.19	-9930.86	-818707.46	1402769.48	235.90
1.2 Dead+1.0 Wind 330 deg - No Ice	27139.26	-9887.56	-17110.77	-1428174.29	826115.46	-7.53
0.9 Dead+1.0 Wind 330 deg - No Ice	20354.45	-9887.56	-17110.77	-1409082.50	815093.44	-6.35
1.2 Dead+1.0 Ice+1.0 Temp	41717.06	-0.00	-0.00	-528.24	47.01	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	41717.06	-13.74	-5178.33	-440436.53	1482.53	-59.71
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	41717.06	2566.84	-4477.61	-380802.30	-217695.77	-85.08
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	41717.06	4459.63	-2577.22	-219289.22	-378528.31	-87.65

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Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	41717.06	5157.57	13.74	818.90	-437913.40	-66.72
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	41717.06	4473.37	2601.01	220543.76	-379956.20	-27.92
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	41717.06	2590.63	4491.35	381010.59	-220169.83	18.35
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	41717.06	13.74	5178.33	439216.85	-1374.77	59.71
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	41717.06	-2566.84	4477.61	379582.98	217803.67	85.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	41717.06	-4459.63	2577.22	218069.99	378636.63	87.64
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	41717.06	-5157.57	-13.74	-2038.42	438022.01	66.73
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	41717.06	-4473.37	-2601.01	-221763.71	380064.68	27.94
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	41717.06	-2590.63	-4491.35	-382230.62	220277.87	-18.34
Dead+Wind 0 deg - Service	22616.05	-20.30	-4413.30	-365707.20	1960.47	-56.10
Dead+Wind 30 deg - Service	22616.05	2179.28	-3811.88	-315711.62	-180335.19	-95.56
Dead+Wind 60 deg - Service	22616.05	3794.92	-2189.07	-181137.26	-314327.27	-109.41
Dead+Wind 90 deg - Service	22616.05	4393.73	20.30	1953.73	-364109.62	-93.94
Dead+Wind 120 deg - Service	22616.05	3815.23	2224.23	184501.84	-316350.74	-53.29
Dead+Wind 150 deg - Service	22616.05	2214.55	3832.36	317611.70	-183851.19	1.62
Dead+Wind 180 deg - Service	22616.05	20.30	4413.30	365565.58	-2088.15	56.10
Dead+Wind 210 deg - Service	22616.05	-2179.28	3811.88	315570.28	180207.40	95.55
Dead+Wind 240 deg - Service	22616.05	-3794.92	2189.07	180996.15	314199.69	109.40
Dead+Wind 270 deg - Service	22616.05	-4393.73	-20.30	-2094.89	363982.33	93.94
Dead+Wind 300 deg - Service	22616.05	-3815.23	-2224.23	-184643.28	316223.56	53.31
Dead+Wind 330 deg - Service	22616.05	-2214.55	-3832.36	-317753.38	183723.81	-1.61

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-22616.05	0.00	0.00	22616.05	0.00	0.000%
2	-90.77	-27139.26	-19704.49	90.77	27139.26	19704.49	0.000%
3	-90.77	-20354.45	-19704.49	90.77	20354.45	19704.49	0.000%
4	9729.88	-27139.26	-17019.21	-9729.88	27139.26	17019.21	0.000%
5	9729.88	-20354.45	-17019.21	-9729.88	20354.45	17019.21	0.000%
6	16943.42	-27139.26	-9773.64	-16943.42	27139.26	9773.64	0.000%
7	16943.42	-20354.45	-9773.64	-16943.42	20354.45	9773.64	0.000%
8	19616.99	-27139.26	90.77	-19616.99	27139.26	-90.77	0.000%
9	19616.99	-20354.45	90.77	-19617.00	20354.45	-90.77	0.000%
10	17034.19	-27139.26	9930.86	-17034.19	27139.26	-9930.86	0.000%
11	17034.19	-20354.45	9930.86	-17034.19	20354.45	-9930.86	0.000%
12	9887.56	-27139.26	17110.77	-9887.56	27139.26	-17110.77	0.000%
13	9887.56	-20354.45	17110.77	-9887.56	20354.45	-17110.77	0.000%
14	90.77	-27139.26	19704.49	-90.77	27139.26	-19704.49	0.000%
15	90.77	-20354.45	19704.49	-90.77	20354.45	-19704.50	0.000%
16	-9729.88	-27139.26	17019.21	9729.88	27139.26	-17019.21	0.000%
17	-9729.88	-20354.45	17019.21	9729.88	20354.45	-17019.21	0.000%
18	-16943.42	-27139.26	9773.64	16943.42	27139.26	-9773.64	0.000%
19	-16943.42	-20354.45	9773.64	16943.42	20354.45	-9773.64	0.000%
20	-19616.99	-27139.26	-90.77	19616.99	27139.26	90.77	0.000%
21	-19616.99	-20354.45	-90.77	19616.99	20354.45	90.77	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
22	-17034.19	-27139.26	-9930.86	17034.19	27139.26	9930.86	0.000%
23	-17034.19	-20354.45	-9930.86	17034.19	20354.45	9930.86	0.000%
24	-9887.56	-27139.26	-17110.77	9887.56	27139.26	17110.77	0.000%
25	-9887.56	-20354.45	-17110.77	9887.56	20354.45	17110.77	0.000%
26	0.00	-41717.06	0.00	0.00	41717.06	0.00	0.000%
27	-13.74	-41717.06	-5178.22	13.74	41717.06	5178.33	0.000%
28	2566.83	-41717.06	-4477.60	-2566.84	41717.06	4477.61	0.000%
29	4459.62	-41717.06	-2577.21	-4459.63	41717.06	2577.22	0.000%
30	5157.45	-41717.06	13.74	-5157.57	41717.06	-13.74	0.000%
31	4473.35	-41717.06	2601.00	-4473.37	41717.06	-2601.01	0.000%
32	2590.62	-41717.06	4491.33	-2590.63	41717.06	-4491.35	0.000%
33	13.74	-41717.06	5178.22	-13.74	41717.06	-5178.33	0.000%
34	-2566.83	-41717.06	4477.60	2566.84	41717.06	-4477.61	0.000%
35	-4459.62	-41717.06	2577.21	4459.63	41717.06	-2577.22	0.000%
36	-5157.45	-41717.06	-13.74	5157.57	41717.06	13.74	0.000%
37	-4473.35	-41717.06	-2601.00	4473.37	41717.06	2601.01	0.000%
38	-2590.62	-41717.06	-4491.33	2590.63	41717.06	4491.35	0.000%
39	-20.30	-22616.05	-4413.30	20.30	22616.05	4413.30	0.000%
40	2179.28	-22616.05	-3811.88	-2179.28	22616.05	3811.88	0.000%
41	3794.92	-22616.05	-2189.07	-3794.92	22616.05	2189.07	0.000%
42	4393.72	-22616.05	20.30	-4393.73	22616.05	-20.30	0.000%
43	3815.23	-22616.05	2224.23	-3815.23	22616.05	-2224.23	0.000%
44	2214.55	-22616.05	3832.36	-2214.55	22616.05	-3832.36	0.000%
45	20.30	-22616.05	4413.30	-20.30	22616.05	-4413.30	0.000%
46	-2179.28	-22616.05	3811.88	2179.28	22616.05	-3811.88	0.000%
47	-3794.92	-22616.05	2189.07	3794.92	22616.05	-2189.07	0.000%
48	-4393.72	-22616.05	-20.30	4393.73	22616.05	20.30	0.000%
49	-3815.23	-22616.05	-2224.23	3815.23	22616.05	2224.23	0.000%
50	-2214.55	-22616.05	-3832.36	2214.55	22616.05	3832.36	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	111 - 97.5	18.7780	50	1.4016	0.0025
L2	97.5 - 97	14.8174	50	1.3978	0.0023
L3	97 - 72	14.6711	50	1.3970	0.0022
L4	72 - 47	7.9123	50	1.1143	0.0009
L5	51 - 21	3.8222	50	0.7346	0.0004
L6	21 - 1	0.5809	50	0.2793	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
101.20	AIR6419 B77G w/mount pipe	50	15.9013	1.4018	0.0025	98553
100.00	800 10965 w/ Mount Pipe	50	15.5496	1.4008	0.0025	66587
99.00	Sabre 12' V-Boom	50	15.2566	1.3998	0.0024	45978
97.60	AIR6449 B77D w/mount pipe	50	14.8467	1.3980	0.0023	27710
90.00	PiROD 13' Platform w/handrail	50	12.6471	1.3606	0.0018	7526
80.00	MC-PK8-DSH	50	9.9023	1.2435	0.0013	4072

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Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	111 - 97.5 (1)	TP16x16x0.375	13.50	0.00	0.0	18.4078	-5222.30	596412.00	0.009
L2	97.5 - 97 (2)	TP17.49x16x0.375	0.50	0.00	0.0	18.4078	-5223.05	596412.00	0.009
L3	97 - 72 (3)	TP22.735x17.49x0.25	25.00	0.00	0.0	17.8418	-13631.60	1043750.00	0.013
L4	72 - 47 (4)	TP27.98x22.735x0.3	25.00	0.00	0.0	25.5578	-16685.70	1495130.00	0.011
L5	47 - 21 (5)	TP33.392x26.5408x0.365	30.00	0.00	0.0	38.2621	-22875.30	2238330.00	0.010
L6	21 - 1 (6)	TP37x33.392x0.389	20.00	0.00	0.0	45.2031	-27128.60	2644380.00	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} lb-ft	φM _{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M _{uy} lb-ft	φM _{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	111 - 97.5 (1)	TP16x16x0.375	17901.42	247240.00	0.072	0.00	247240.00	0.000
L2	97.5 - 97 (2)	TP17.49x16x0.375	17900.33	247240.00	0.072	0.00	247240.00	0.000
L3	97 - 72 (3)	TP22.735x17.49x0.25	342159.17	610917.50	0.560	0.00	610917.50	0.000
L4	72 - 47 (4)	TP27.98x22.735x0.3	707803.33	1044583.33	0.678	0.00	1044583.33	0.000
L5	47 - 21 (5)	TP33.392x26.5408x0.365	1261958.33	1924491.67	0.656	0.00	1924491.67	0.000
L6	21 - 1 (6)	TP37x33.392x0.389	1649891.67	2521400.00	0.654	0.00	2521400.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u lb	φV _n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T _u lb-ft	φT _n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	111 - 97.5 (1)	TP16x16x0.375	7228.14	178924.00	0.040	0.04	245791.67	0.000
L2	97.5 - 97 (2)	TP17.49x16x0.375	7251.99	195986.00	0.037	0.02	245791.67	0.000
L3	97 - 72 (3)	TP22.735x17.49x0.25	16995.20	313124.00	0.054	7.50	616580.83	0.000
L4	72 - 47 (4)	TP27.98x22.735x0.3	17851.80	448540.00	0.040	7.54	1054333.33	0.000
L5	47 - 21 (5)	TP33.392x26.5408x0.365	19046.60	671500.00	0.028	7.53	1942208.33	0.000
L6	21 - 1 (6)	TP37x33.392x0.389	19776.70	793314.00	0.025	7.53	2543533.33	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	111 - 97.5 (1)	0.009	0.072	0.000	0.040	0.000	0.083 ✓	1.000	4.8.2 ✓
L2	97.5 - 97 (2)	0.009	0.072	0.000	0.037	0.000	0.083	1.000	4.8.2 ✓

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Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	97 - 72 (3)	0.013	0.560	0.000	0.054	0.000	0.576 ✓	1.000	4.8.2 ✓
L4	72 - 47 (4)	0.011	0.678	0.000	0.040	0.000	0.690 ✓	1.000	4.8.2 ✓
L5	47 - 21 (5)	0.010	0.656	0.000	0.028	0.000	0.667 ✓	1.000	4.8.2 ✓
L6	21 - 1 (6)	0.010	0.654	0.000	0.025	0.000	0.665 ✓	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	111 - 97.5	Pole	TP16x16x0.375	1	-5222.30	596412.00	8.3	Pass
L2	97.5 - 97	Pole	TP17.49x16x0.375	2	-5223.05	596412.00	8.3	Pass
L3	97 - 72	Pole	TP22.735x17.49x0.25	3	-13631.60	1043750.00	57.6	Pass
L4	72 - 47	Pole	TP27.98x22.735x0.3	4	-16685.70	1495130.00	69.0	Pass
L5	47 - 21	Pole	TP33.392x26.5408x0.365	5	-22875.30	2238330.00	66.7	Pass
L6	21 - 1	Pole	TP37x33.392x0.389	6	-27128.60	2644380.00	66.5	Pass
							Summary	
							Pole (L4)	69.0 Pass
							RATING =	69.0 Pass



HUDSON
Design Group LLC

ADDITIONAL CALCULATIONS

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

Site Data

BU#:	
Site Name:	CT2157
App #:	
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	45	in

Plate Data

Diam:	51	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	14.68	in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	37	in
Thick:	0.389	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions

Mu:	1100	ft-kips
Axial, Pu:	20	kips
Shear, Vu:	15	kips
Eta Factor, η	0.55	

If No stiffeners, Criteria: AISC LRFD <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Max Rod ($C_u + V_u/\eta$): 152.6 Kips
 Allowable Axial, $\Phi^*F_u \cdot A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 58.7% **Pass**

Non-Rigid
AISC LRFD
Φ^*T_n

Base Plate Results

Base Plate Stress: 43.8 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 81.1% **Pass**

Flexural Check

Non-Rigid
AISC LRFD
Φ^*F_y
Y.L. Length: 25.61

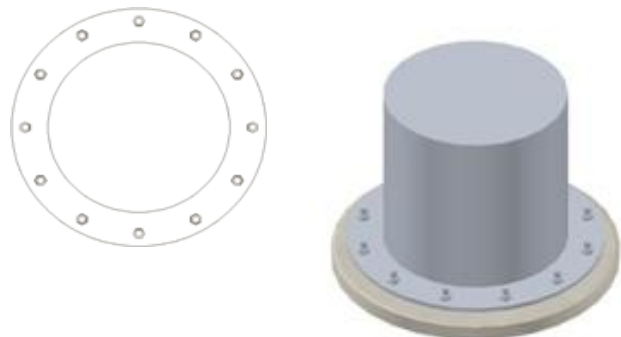
n/a

Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Site Data

BU#:	
Site Name:	CT2157
App #:	
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	6	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	55	in

Plate Data

Diam:	61	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	19.57	in

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	37	in
Thick:	0.389	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions

Mu:	550	ft-kips
Axial, Pu:	8	kips
Shear, Vu:	5	kips
Eta Factor, η	0.55	(Fig. 4-4)

If No stiffeners, Criteria: AISC LRFD <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Max Rod ($C_u + V_u/\eta$): 82.8 Kips
 Allowable Axial, $\Phi^*F_u \cdot A_{net}$: 260.0 Kips
 Anchor Rod Stress Ratio: 31.9% **Pass**

Non-Rigid
AISC LRFD
Φ^*T_n

Base Plate Results

Base Plate Stress: 24.1 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 44.6% **Pass**

Flexural Check

Non-Rigid
AISC LRFD
Φ^*F_y
Y.L. Length: 40.69

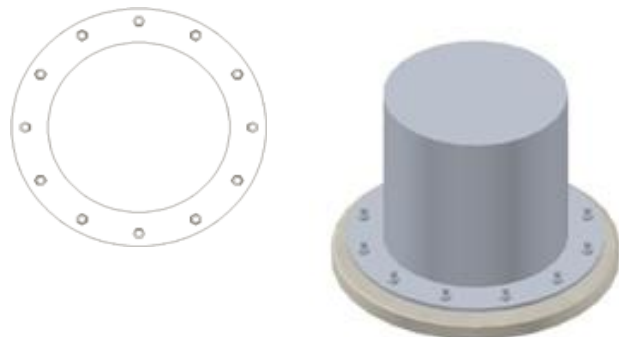
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Stiffener Results

Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

BU:	
Site Name:	CT2157
App Number:	N/A
Work Order:	

Monopole Drilled Pier

Input

Criteria	
TIA Revision:	H
ACI 318 Revision:	2008
Seismic Category:	B

Forces

Compression	27.1 kips
Shear	19.8 kips
Moment	1650 k-ft
Swelling Force	0 kips

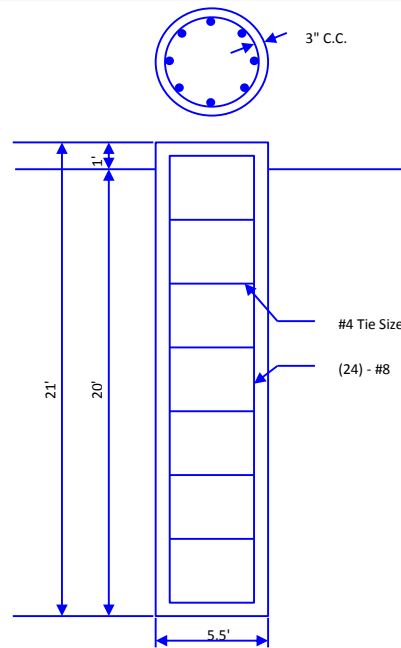
Foundation Dimensions

Pier Diameter:	5.5 ft
Ext. above grade:	1 ft
Depth below grade:	20 ft

Material Properties

Number of Rebar:	24
Rebar Size:	8
Tie Size	4
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in

Soil Profile: Profile 1

[illegible]

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	3.37	ft
Max Moment, Mu:	1713.97	k-ft
Soil Safety Factor:	2.59	
Safety Factor Req'd:	1.33	
RATING:	51.4%	

Soil Axial Capacity

Skin Friction (k):	119.78 kips
End Bearing (k):	0.00 kips
Comp. Capacity (k), ϕC_n :	119.78 kips
Comp. (k), C_u :	27.10 kips
RATING:	22.6%

Concrete/Steel Check

Mu (from soil analysis)	1713.97	k-ft
ϕ Mn	2365.21	k-ft
	RATING:	72.5%

rho provided	0.55	
rho required	0.33	OK

Rebar Spacing	6.59	
Spacing required	16.00	OK

Dev. Length required	16.38	
Dev. Length provided	43.82	OK

Overall Foundation Rating: 72.5%



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Calculated Radio Frequency Exposure



CT2157

48 Newtown Road, Danbury, CT

September 7, 2022

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modification of AT&T antenna arrays on the existing monopole located at 48 Newtown Road in Danbury, CT. The coordinates of the existing monopole are 41-24-11.88 N, 73-25-27.84 W

AT&T is proposing the following:

- 1) Install twelve (12) multi-band antennas (four (4) per sector) to support its commercial LTE network and the FirstNet National Public Safety Broadband Network (“NPSBN”).

This report considers the planned antenna configuration for AT&T¹ to derive the resulting % Maximum Permissible Exposure of its proposed installation.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm²). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

¹ As referenced to AT&T’s Radio Frequency Design Sheet dated 04/07/22.

3. RF Exposure Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

ERP = Effective Radiated Power

$R = \text{Radial Distance} = \sqrt{H^2 + V^2}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final installations.

4. Calculation Results

Table 1 below outlines the cumulative power density information for the AT&T modification to the existing monopole facility at the site. The proposed antennas are directional in nature; therefore, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	% MPE
Dish	80	600	1	1637	0.1075	0.4000	2.69%
Dish	80	2000	1	6011	0.3948	1.0000	3.95%
Dish	80	2100	1	7567	0.4969	1.0000	4.97%
Verizon	90	751	4	642	0.1309	0.5007	2.61%
Verizon	90	877.26	2	463	0.0472	0.5848	0.81%
Verizon	90	874	4	742	0.1513	0.5827	2.60%
Verizon	90	1980	4	1514	0.3087	1.0000	3.09%
Verizon	90	2120	4	1447	0.2950	1.0000	2.95%
Verizon	90	3625	4	11	0.0022	1.0000	0.02%
Verizon	90	3730.08	4	6531	1.3315	1.0000	13.31%
MetroPCS	108	2140	3	443.61	0.0460	1.0000	0.46%
Clearwire	78	2496	2	153	0.0212	1.0000	0.21%
Clearwire	78	11 GHz	1	211	0.0146	1.0000	0.15%
Nextel iDEN	78	851	12	100	0.0832	0.5673	1.47%
Sprint	78	2657	3	562	0.1170	1.0000	1.17%
Sprint	78	22500	2	4.42	0.0006	1.0000	0.01%
AT&T	100	739	2	2878	0.0234	0.4927	4.76%
AT&T	100	763	2	2878	0.0234	0.5087	4.61%
AT&T	100	885	1	3382	0.0138	0.5900	2.33%
AT&T	100	1900	3	5118	0.0625	1.0000	6.25%
AT&T	100	2100	2	8614	0.0701	1.0000	7.01%
AT&T	100	2300	1	9445	0.0385	1.0000	3.85%
AT&T	101.2	3500	1	24286	0.0964	1.0000	9.64%
AT&T	97.7	3500	1	24286	0.1039	1.0000	10.39%
						Total	89.30%

Table 1: Carrier Information²

² The existing record in the CSC Power Density Table for AT&T should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for Dish, Verizon, MetroPCS, Clearwire, Nextel, and Sprint was taken directly from the CSC Power Density database. Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

5. Conclusion

The above analysis concludes that RF exposure at ground level from the proposed facility will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using conservative calculation methods, the highest expected percent of Maximum Permissible Exposure at ground level for AT&T's equipment is **89.30% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, ANSI/IEEE Std. C95.1 and ANSI/IEEE Std. C95.3.



September 7, 2022

Date

Reviewed/Approved By: Martin J. Lavin
Senior RF Engineer
C Squared Systems, LLC

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure³

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure⁴

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

³ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

⁴ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

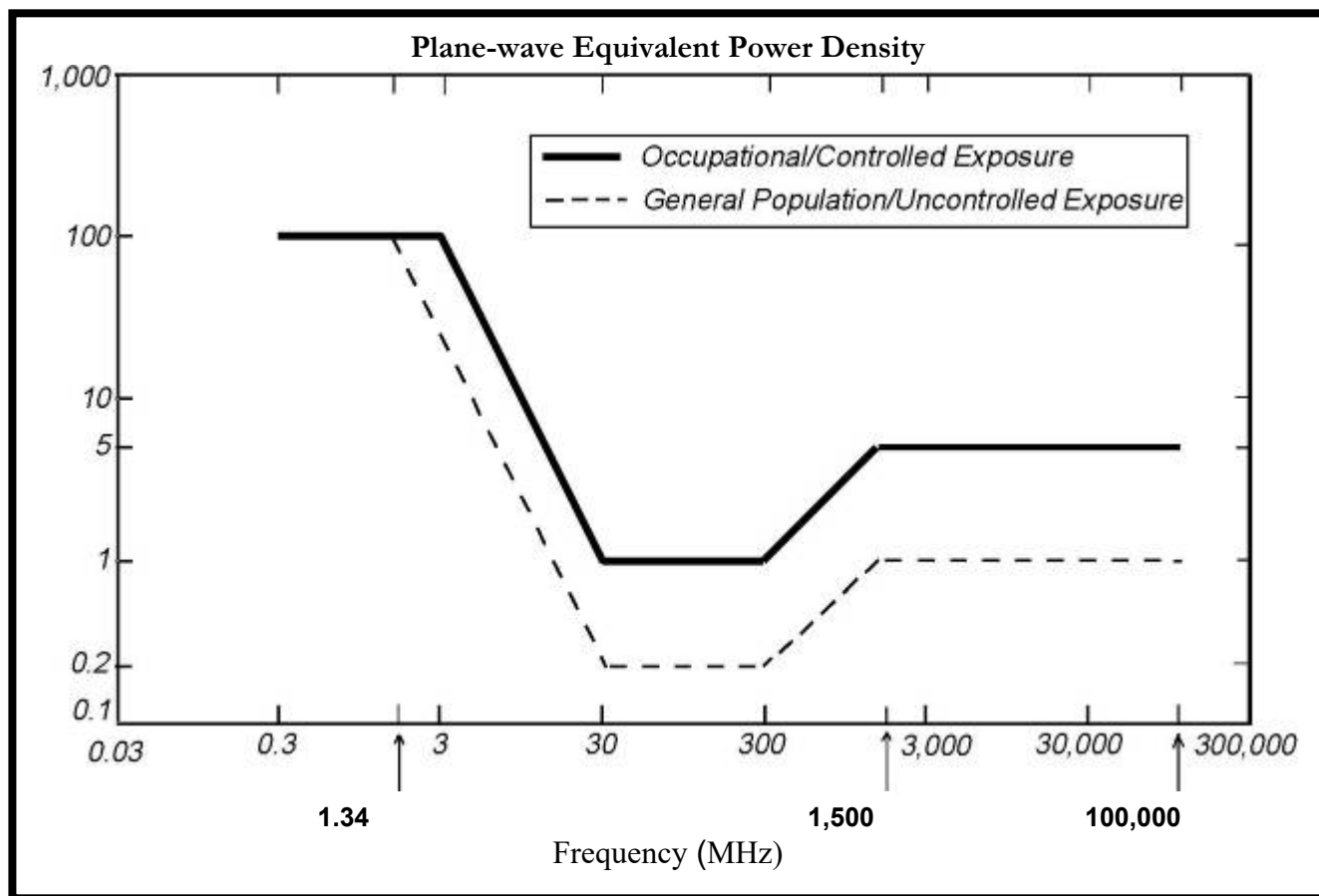
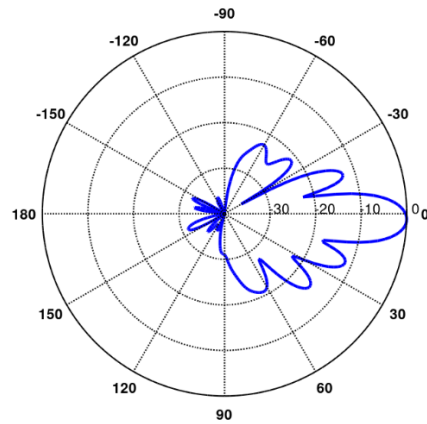


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

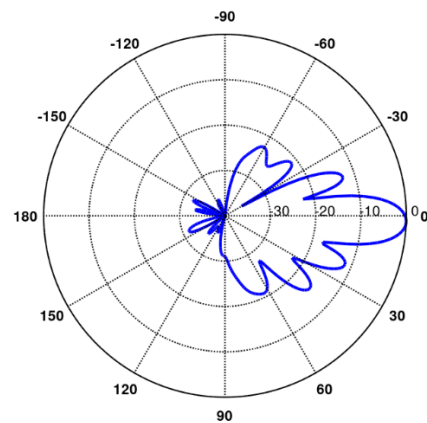
700 MHz

Manufacturer: Quintel
 Model #: QD6616-7
 Frequency Band: 698-728 MHz
 Gain: 14.2 dBi
 Vertical Beamwidth: 12.5°
 Horizontal Beamwidth: 71°
 Polarization: 45°
 Size L x W x D: 72" x 22" x 9.6"



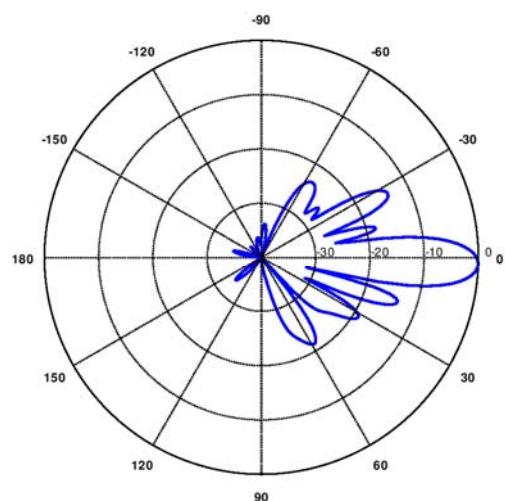
700 MHz

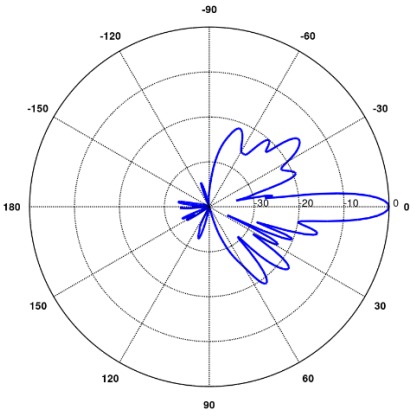
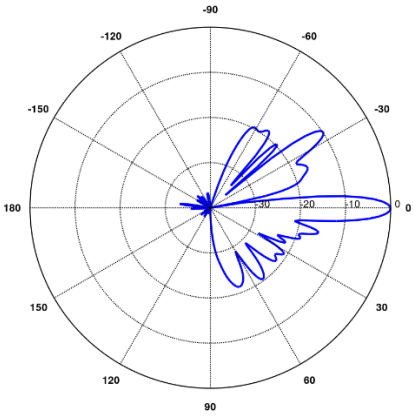
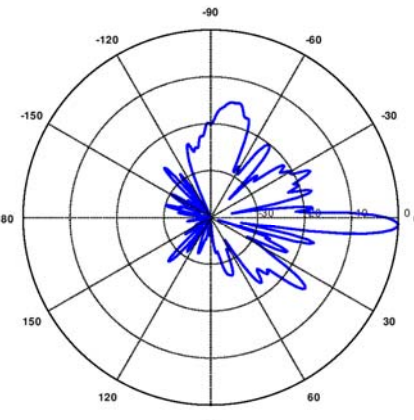
Manufacturer: Quintel
 Model #: QD6616-7
 Frequency Band: 758-798 MHz
 Gain: 14.7 dBi
 Vertical Beamwidth: 11.3°
 Horizontal Beamwidth: 65°
 Polarization: 2x 45°
 Size L x W x D: 72" x 22" x 9.6"



885 MHz

Manufacturer: Kathrein
 Model #: 80010965
 Frequency Band: 790-862 MHz
 Gain: 15.5 dBi
 Vertical Beamwidth: 10.7°
 Horizontal Beamwidth: 62°
 Polarization: 45°
 Size L x W x D: 78.7" x 20" x 6.9"



1900 MHz Manufacturer: Quintel Model #: QD6616-7 Frequency Band: 1850-1990 MHz Gain: 17.2 dBi Vertical Beamwidth: 6.5° Horizontal Beamwidth: 67° Polarization: 4x 45° Size L x W x D: 72" x 22" x 9.6"	 A polar plot for the 1900 MHz antenna. The plot shows a main lobe centered at 0 degrees with a peak gain of approximately 17.2 dBi. There are several side lobes, with the most prominent ones at approximately 30, 60, 120, and 150 degrees. The plot is a circular grid with concentric circles representing gain levels and radial lines representing angles from 0 to 180 degrees in 30-degree increments.
2100 MHz Manufacturer: Quintel Model #: QD6616-7 Frequency Band: 2110-2180 MHz Gain: 17.7 dBi Vertical Beamwidth: 5.7° Horizontal Beamwidth: 62° Polarization: 4x 45° Size L x W x D: 72" x 22" x 9.6"	 A polar plot for the 2100 MHz antenna. The plot shows a main lobe centered at 0 degrees with a peak gain of approximately 17.7 dBi. There are several side lobes, with the most prominent ones at approximately 30, 60, 120, and 150 degrees. The plot is a circular grid with concentric circles representing gain levels and radial lines representing angles from 0 to 180 degrees in 30-degree increments.
2300 MHz Manufacturer: Kathrein Model #: 80010965 Frequency Band: 2300-2400 MHz Gain: 18.1 dBi Vertical Beamwidth: 4.8° Horizontal Beamwidth: 56° Polarization: 45° Size L x W x D: 78.7" x 20" x 6.9"	 A polar plot for the 2300 MHz antenna. The plot shows a main lobe centered at 0 degrees with a peak gain of approximately 18.1 dBi. There are several side lobes, with the most prominent ones at approximately 30, 60, 120, and 150 degrees. The plot is a circular grid with concentric circles representing gain levels and radial lines representing angles from 0 to 180 degrees in 30-degree increments.