COHEN and WOLF P.C.
ATTORNEYS AT LAW

RACHEL A. SCHWARTZMAN

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4110
E-Mail: rschwartzman@cohenandwolf.com

September 15, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: Notice of Exempt Modification
The Berlin Volunteer Fire Department, Inc./T-Mobile co-location
Site ID CTHA231A
1657 Berlin Turnpike, Berlin, CT 06037 (aka 1657 Wilbur Cross Highway, Berlin, CT)

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, the Berlin Volunteer Fire Department, Inc. owns the existing monopole telecommunications tower and related facility at 1657 Berlin Turnpike, Berlin, CT (41.6062/ -72.7497). T-Mobile intends to replace six (6) existing antennas with six 6 new antennas, add three (3) new antennas and related equipment at this existing telecommunications facility in Berlin ("Berlin Facility"). Please accept this letter as notification, pursuant to R.C.S.A. §16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager, Denise McNair, and the property owner, The Berlin Volunteer Fire Department, Inc.

The existing Berlin Facility consists of a 176 foot monopole tower.[1] T-Mobile plans to replace six (6) existing antennas with six 6 new antennas, and add three (3) new antennas at a centerline of 160 feet. (See the plans revised to September 10, 2014 attached hereto as **Exhibit A**). T-Mobile will also install three (3) remote radio units mounted on new masts behind the antennas, remove three (3) tower mounted amplifiers ("TMAs"), replace an equipment cabinet,

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for approval of this structure, it does reference this structure in connection with a notices of intent captioned TS-AT&T-007-021025; TS-AT&T-007-021025, TS-T-MOBILE-007-051028, EM-VER-123-007-010-099-060308, EM-CING-007-062-126-135-137-070809, EM-VER-007-080305, EM-VER-007-080305, EM-POCKET-007-080918, EM-T-MOBILE-007-090417, EM-VER-007-100224, EM-CLEARWIRE-007-100305, EM-VER-007-100224, EM-AT&T-007-120427B, EM-SPRINT-007-121203, EM-METROPCS-007-130204MA, EM-VER-007-131122

install fiber cable, and reuse existing coax cable which will be consolidated inside the monopole. The existing Berlin Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated September 1, 2014, and attached hereto as **Exhibit B**.

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

1. The proposed modification will not increase the height of the tower. T- Mobile's existing antennas are at a centerline of 160 feet; the replacement/additional antennas and equipment will be installed at the same 160 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet 2 of Exhibit A. T-Mobile's equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement/additional antennas and equipment will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated September 15, 2014, T-Mobile's operations would add 5.09% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 71.02% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit C.**

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement/additional antennas and equipment at the Berlin Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, T-Mobile shall commence construction approximately sixty days from the receipt of the Council's decision.

Sincerely,

Rachel Schwartzman

Rachel A. Schwartzman, Esq.

cc: Town Manager Denise McNair, Town of Berlin
Berlin Volunteer Fire Department, Inc.
Sheldon J. Freincle, Northeast Site Solutions

T-MOBILE USA, INC.
12920 SE 38TH STREET
BELLEVUE, WA 98006
(425) 378-4000

2919753
8/19/2014
2000011160

Invoice Number	Inv. Date	Description	Deductions	Voucher	Amount Paid
CTHA231A-1	8/14/2014	Exempt Mod Filing Fees	0.00	1101616624	625.00

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW.
COPYBAN CAPTURE ANTI-FRAUD PROTECTION

T-MOBILE USA, INC.
12920 SE 38th Street
Bellevue, WA 98006
(425) 378-4000

The Bank of New York Mellon
Pittsburgh, PA
60-160/433

2919753
8/19/2014
VID 2000011160

PAY $625.00
SIX TWO FIVE CTS CTS

*$625.00

Six Hundred Twenty Five Dollars Only*******

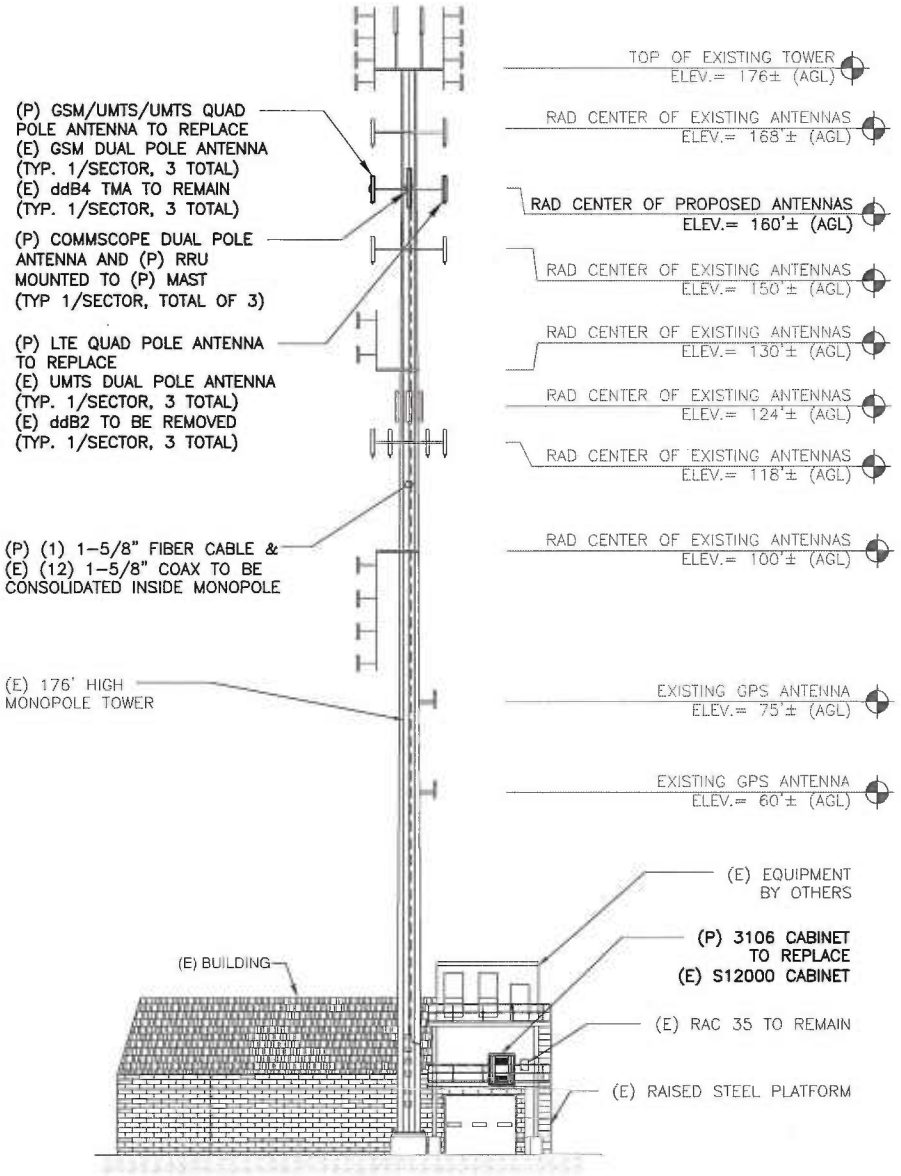
To The Order Of
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN, CT 06051

VOID AFTER 180 DAYS
THIS CHECK CLEARS THROUGH POSITIVE PAY

⑈000291975 3⑈ ⑆043301601⑆ 013⑈8430⑈

THE ORIGINAL DOCUMENT HAS A REFLECTIVE WATERMARK ON THE BACK. HOLD AT AN ANGLE TO VIEW, DO NOT CASH IF MISSING.

EXHIBIT A



ELEVATION 1
SCALE : N.T.S. LE-3

PROJECT : L700
CONFIGURATION
702CU

SUBMITTALS	
LE REV A	09.09.14
LE REV 0	09.10.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTHA231A

SITE NAME:
HA231/BERLIN FD TOWER

SITE ADDRESS:
1697 BERLIN TURNPIKE
BERLIN, CT 06037

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: EB | CHECKED BY: SM

KEY PLAN

N.T.S.

PROJECT : L700

CONFIGURATION

702CU

SUBMITTALS	
LE REV A	09.09.14
LE REV 0	09.10.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
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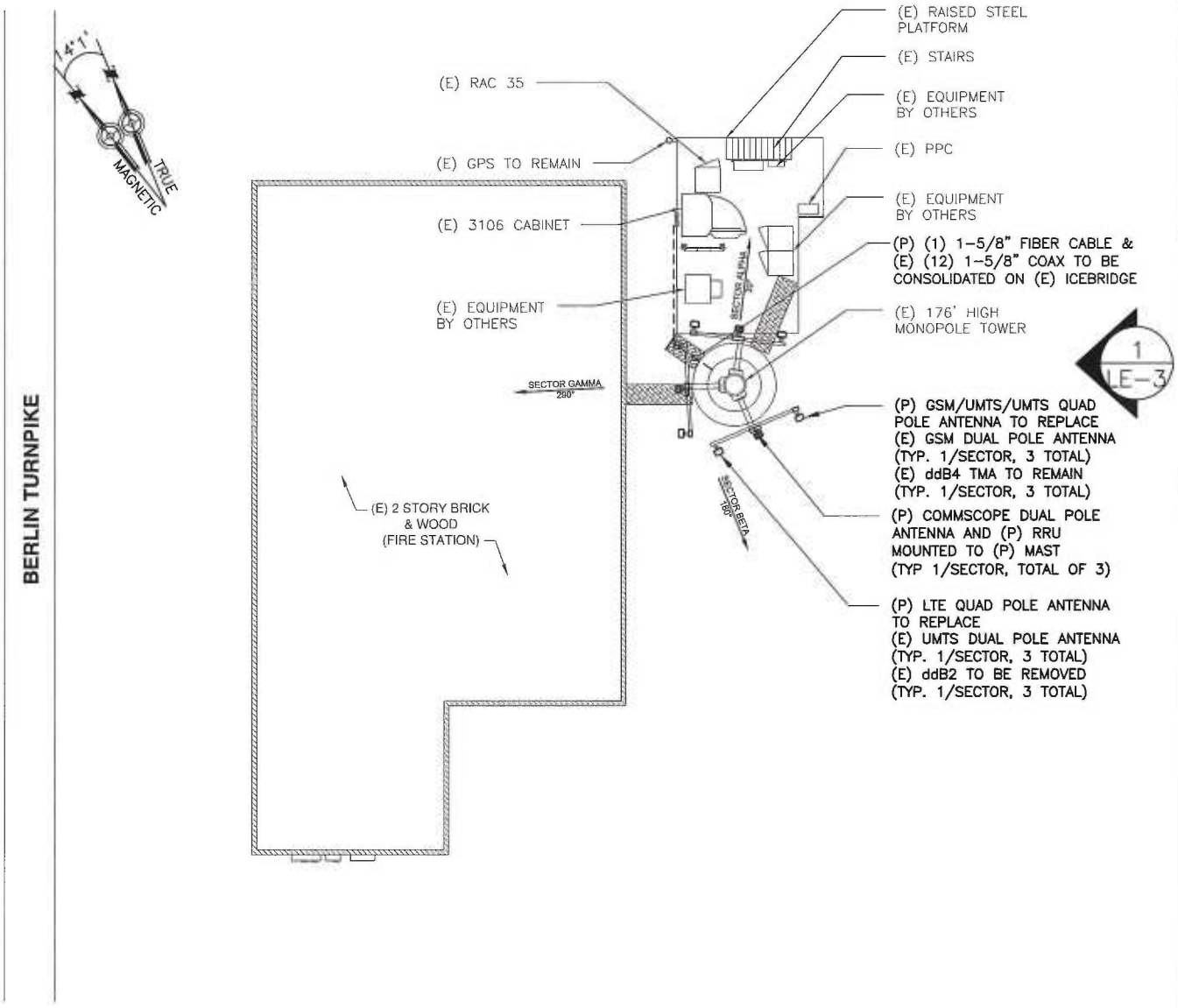

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

SITE PLAN (1 / LE-2)
N.T.S.

PROJECT : L700
CONFIGURATION
702CU

SUBMITTALS	
LE REV A	09.09.14
LE REV 0	09.10.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTHA231A

SITE NAME:
HA231/BERLIN FD TOWER

SITE ADDRESS:
1697 BERLIN TURNPIKE
BERLIN, CT 06037

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: EB | CHECKED BY: SM

EXHIBIT B

EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

STRUCTURAL ANALYSIS REPORT

September 1, 2014

T-Mobile, USA
35 Griffin Road South
Bloomfield, CT 06002
Attention: Mark Richard

Subject: 700 MHz Upgrade Project
Site #: CTHA231A
EBI Reference #: 81140835
Site Name: HA231 / Berlin FD Tower
Address: 1657 Berlin Turnpike, Hartford, CT 06037

Dear Mr. Richard:

EBI Consulting's structural engineers have prepared this structural report for the tower at the above address, in accordance with the CT State Building Code (with amendments) and ANSI/TIA/EIA-222 Revision F. Information from the following sources was utilized in our analysis:

1. Tower analysis by Ramaker & Associates, Inc. dated 8-5-14.
2. Tower modifications (gusset plates on base plate) by Ramaker & Associates, Inc. dated 8-7-14.
3. Photographs from site visit by EBI on 6-17-14 and 7-24-14.

The tower was analyzed for a wind speed of 80 mph without ice and with 1/2" radial ice at a reduced wind speed of 69 mph.

The proposed (3) Commscope LNX-6515DS-VTM panel antennas shall be installed on proposed 2-7/8" O.D. pipe masts, mounted to existing sector frames at a centerline elevation of 160' above grade level. The antennas will use existing spare fibers in the existing fiber cable. The three proposed RRUS11 B12 remote radio units are to be located behind the antennas.

Local Equipment Support:

Our inspection of the tower mounting frame shows that the structural elements HAVE ADEQUATE CAPACITY for the proposed loading. The sector frame is estimated to consist of:

- T-shaped in plan with a nominal face width between 10'-0" and 12'-0".
- Horizontal T-arm members are made from 3-1/2" outer diameter Sch. 40 pipe minimum.
- Main supporting members, spanning from the tower connection point to the center point of the horizontal T-arm, are square hollow structural section, HSS3.5x3.5x1/4" minimum, with a standoff of no more than 40".

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- Standoff arms are connected to the ring mount with at least (4) 5/8" minimum diameter A325 bolts.
- Robust ring mount with (3) 3/4" minimum diameter high-strength steel threaded rods at each connection.

Global Tower Analysis Summary of Results: (Refer to attached TNX Tower Analysis for detailed analysis results)

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	176 - 130.75	Pole	TP31.8x21x0.25	1	-11234.80	1257185.57	58.3	Pass
L2	130.75 - 86.12	Pole	TP41.82x30.226x0.3125	2	-22401.20	2070348.86	88.2	Pass
L3	86.12 - 43	Pole	TP51.36x39.8381x0.375	3	-34869.00	3052703.17	90.4	Pass
L4	43 - 1	Pole	TP60.5x48.9596x0.4375	4	-52586.70	4335942.23	84.0	Pass
							Summary	
						Pole (L3)	90.4	Pass
						Base Plate	93.5	Pass
						RATING =	**93.5**	**Pass**

The maximum stress under the proposed conditions and configurations is **93.5%** of the tower capacity, governed by the base plate, and is considered adequate.

Global Tower Analysis Foundation:

Max. corner reaction at base:	Previous Report Reactions (kips)	Proposed Loading Reactions (kips)
Axial (kips)	51.2	52.6 (no ice)
Moment (foot-kips)	4320	4438
Shear (kips)	35.1	35.8

The previous structural analysis was made available to EBI Consulting for comparing current reactions with previous reactions. It can be seen that the current moment reaction is only 3% above that of the previous analysis and that the foundation will have adequate capacity for the proposed loading, because the previous analysis had a safety factor of 2.6 which is well above the required value of 2.0. The previous foundation analysis remains valid for the proposed loading.

Limitations and Assumptions:

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are as specified in the original design documents and are in good condition.
3. All required members are in place.
4. All bolts are in place and are tightly fastened.
5. Tower is in plumb condition.

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6. All member protective coatings are in good condition.
7. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
8. Modifications listed in the previous report have been installed.

EBI is not responsible for any modifications completed prior to or hereafter in which EBI is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

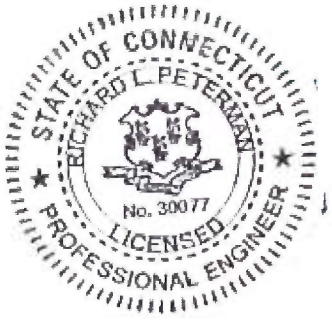
EBI hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from the original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact EBI. EBI disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

THE CONCLUSION OF THE TOWER STRUCTURAL ANALYSIS IS THAT THE TOWER HAS ADEQUATE CAPACITY FOR THE PROPOSED LOADING – provided that the base plate modifications shown in the previous analysis have been constructed. No T-Mobile equipment shall be added to the tower until these modifications have been completed. Please contact this office should you have any questions regarding this matter.

Sincerely,
EBI Consulting
September 1, 2014

Matthew Hykes, P.E.
Professional Engineer

Richard L. Peterman, P.E.
Professional Engineer



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STRUCTURAL PHOTO LOG

Photo 1: General view of top of monopole	
Photo 2: General view of the existing base plate -- stiffener plates not yet constructed.	

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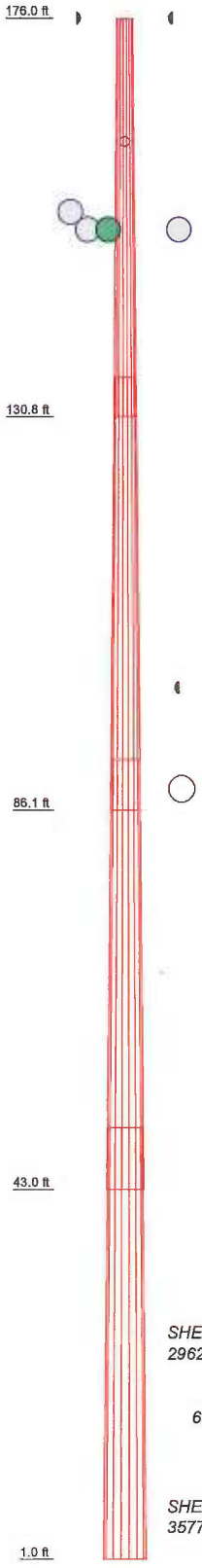
Photo 3: Overall view of tower.	

APPENDIX A

TNX Tower Results

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	45.25	18	0.2500	4.50	21.0000	31.8000	A572-65	3195.0
2	49.13	18	0.3125	5.75	30.2260	41.8200		5921.5
3	48.87	18	0.3750	7.00	39.8381	51.3600		8951.3
4	49.00	18	0.4375		48.9596	60.5000		12570.6
								30638.4



AXIAL
62474 lb

SHEAR
29626 lb

MOMENT
3759983 lb-ft

TORQUE 1105 lb-ft
69 mph WIND - 0.5000 in ICE

AXIAL
52610 lb

SHEAR
35778 lb

MOMENT
4438006 lb-ft

TORQUE 4653 lb-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' Dipole	176	800MHz 2x50W RRH	150
10' Dipole	176	800MHz 2x50W RRH	150
10' Dipole	176	800MHz 2x50W RRH	150
10' Omni	176	840 10054 w pipe	150
10' Omni	176	840 10054 w pipe	150
Vallmont 13'-5" Platform	176	840 10054 w pipe	150
MF-900B	176	nRRH	150
MF-900B	176	nRRH	150
800 10121 w Pipe	170	nRRH	150
AM-X-CD-16-65-00T-RET	170	Vallmont 13'-5" Platform	150
AM-X-CD-16-65-00T-RET	170	APXV9TM14-ALU-I20 w pipe	150
AM-X-CD-16-65-00T-RET	170	APXV9TM14-ALU-I20 w pipe	150
(2) 860-10025	170	APXV9TM14-ALU-I20 w pipe	150
(2) 860-10025	170	VHLP2.5-11	150
(2) 860-10025	170	VHLP2.5-11	150
(2) LGP214nn	170	VHLP2.5-11	150
(2) LGP214nn	170	VHLP2.5-11	150
(2) LGP214nn	170	10' Dipole	130
RRUS11	170	TMA	130
RRUS11	170	6' Standoff	130
RRUS11	170	742 213V01 w pipe	124
DC6-28-60-18-8F	170	742 213V01 w pipe	124
EEI (3) 12' Universal T-arms	170	742 213V01 w pipe	124
800 10121 w Pipe	170	LNX-6514DS-T4M w pipe	114
800 10121 w Pipe	170	LNX-6514DS-T4M w pipe	114
10' Dipole	162	BXA-185060-12CF-EDIN-X w pipe	114
6' Standoff	162	MGD3-900TX w pipe	114
MF-900B	162	MGD3-900TX w pipe	114
(4) ETD819H-12UB	160	TMA	114
(4) ETD819H-12UB	160	TMA	114
(4) ETD819H-12UB	160	TMA	114
LNX-6515DS-VTM w pipe	160	Vallmont 13'-5" Platform	114
LNX-6515DS-VTM w pipe	160	LPA-80063-6CF-EDIN-X w pipe	114
LNX-6515DS-VTM w pipe	160	LPA-80063-6CF-EDIN-X w pipe	114
RRUS11_B12	160	LPA-80063-6CF-EDIN-X w pipe	114
RRUS11_B12	160	RWA-80013 w pipe	114
RRUS11_B12	160	RWA-80013 w pipe	114
EEI (3) 12' Universal T-arms	160	LNX-6514DS-T4M w pipe	114
(2) AIR21 B4A/B2P w/ mast pipe	160	LPA-80063-6CF-EDIN-X w pipe	114
(2) AIR21 B4A/B2P w/ mast pipe	160	10' Dipole	100
(2) AIR21 B4A/B2P w/ mast pipe	160	TMA	100
TD-RRH8x20-25	150	6' Standoff	100
TD-RRH8x20-25	150	MF-900B	100
TD-RRH8x20-25	150	GPS	76
APXVSPP18-C-A20 w pipe	150	2' Standoff	76
APXVSPP18-C-A20 w pipe	150	GPS	61
APXVSPP18-C-A20 w pipe	150	2' Standoff	61
1900MHz 4x45W RRH	150	GPS	61
1900MHz 4x45W RRH	150	2' Standoff	61
1900MHz 4x45W RRH	150		

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93.5%

EBI
21 B Street
Burlington, MA 01803
Phone: (781) 425-5100
FAX: (781) 425-5141

Job: CTHA231A			
Project: 81140835			
Client: T-Mobile	Drawn by: MHykes		App'd:
Code: TIA/EIA-222-F	Date: 09/03/14		Scale: NTS
Path: C:\Misc Jobs_Turnkey TMO CT\CTHA231A\Structural\Calculations\Tower\CTHA231A tower.eri			Dwg No. E-1

tnxTower	Job	Page
	CTHA231A	1 of 16
EBI 21 B Street Burlington, MA 01803 Phone: (781) 425-5100 FAX: (781) 425-5141	Project 81140835	Date 13:52:50 09/03/14
	Client T-Mobile	Designed by MHykes

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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
	Consider Moments - Horizontals		Assume Legs Pinned
	Consider Moments - Diagonals	√	Assume Rigid Index Plate
	Use Moment Magnification	√	Use Clear Spans For Wind Area
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension
	Escalate Ice	√	Bypass Mast Stability Checks
	Always Use Max Kz	√	Use Azimuth Dish Coefficients
	Use Special Wind Profile	√	Project Wind Area of Appurt.
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption

	Treat Feedline Bundles As Cylinder
	Use ASCE 10 X-Brace Ly Rules
	Calculate Redundant Bracing Forces
	Ignore Redundant Members in FEA
	SR Leg Bolts Resist Compression
	All Leg Panels Have Same Allowable
	Offset Girt At Foundation
√	Consider Feedline Torque
	Include Angle Block Shear Check Poles
	Include Shear-Torsion Interaction
	Always Use Sub-Critical Flow
	Use Top Mounted Sockets

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	176.00-130.75	45.25	4.50	18	21.0000	31.8000	0.2500	1.0000	A572-65 (65 ksi)
L2	130.75-86.12	49.13	5.75	18	30.2260	41.8200	0.3125	1.2500	A572-65 (65 ksi)
L3	86.12-43.00	48.87	7.00	18	39.8381	51.3600	0.3750	1.5000	A572-65 (65 ksi)
L4	43.00-1.00	49.00		18	48.9596	60.5000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	32.2906	25.0349	3148.3461	11.2003	16.1544	194.8909	6300.8349	12.5198	5.1568	20.627
L2	31.7706	29.6704	3354.2440	10.6193	15.3548	218.4493	6712.9015	14.8380	4.7698	15.263
	42.4651	41.1703	8961.3641	14.7352	21.2446	421.8192	17934.5198	20.5890	6.8103	21.793
L3	41.8292	46.9709	9241.6271	14.0094	20.2377	456.6531	18495.4146	23.4899	6.3515	16.937
	52.1523	60.6849	19929.7987	18.0997	26.0909	763.8607	39885.8215	30.3482	8.3794	22.345
L4	51.3890	67.3790	20042.0460	17.2254	24.8715	805.8240	40110.4639	33.6959	7.8469	17.936
	61.4333	83.4043	38013.0437	21.3222	30.7340	1236.8401	76076.1060	41.7101	9.8780	22.578

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 176.00-130.75				1	1	1		
L2 130.75-86.12				1	1	1		
L3 86.12-43.00				1	1	1		
L4 43.00-1.00				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	48.0000 in
f'_c	4 ksi
Grout space	2.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	70.0000 in
Outer diameter	76.0000 in
Inner diameter	60.7500 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.5000 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	22.00 - 176.00	7	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	10.00 - 171.00	6	No Ice	0.00	1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	1.04
Fiber	C	No	Inside Pole	10.00 - 171.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
Power Cable	C	No	Inside Pole	10.00 - 171.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	22.00 - 163.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	10.00 - 161.00	24	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	10.00 - 151.00	4	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
CAT5e	C	No	Inside Pole	10.00 - 151.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
HJ4-50 (1/2 AIR)	C	No	Inside Pole	10.00 - 151.00	4	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	22.00 - 131.00	1	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	10.00 - 125.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	CaAa (Out Of Face)	22.00 - 115.00	2	No Ice	0.20	1.04
						1/2" Ice	0.30	2.55
HJ7-50A (1-5/8 AIR)	C	No	CaAa (Out Of Face)	22.00 - 115.00	5	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	22.00 - 115.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	22.00 - 101.00	2	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
HJ4-50 (1/2 AIR)	C	No	Inside Pole	10.00 - 76.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
HJ4-50 (1/2 AIR)	C	No	Inside Pole	22.00 - 61.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
HJ4-50 (1/2 AIR)	C	No	Inside Pole	10.00 - 61.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	176.00-130.75	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	0.000	0.000	1616.15
L2	130.75-86.12	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	0.000	11.436	3127.05
L3	86.12-43.00	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	0.000	17.076	3433.65
L4	43.00-1.00	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	0.000	8.316	2249.46

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight lb
L1	176.00-130.75	A	0.500	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	0.000	0.000	1616.15
L2	130.75-86.12	A	0.500	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	0.000	17.212	3214.56
L3	86.12-43.00	A	0.500	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	0.000	25.699	3564.30
L4	43.00-1.00	A	0.500	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	0.000	12.516	2313.09

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.00-130.75	0.0000	0.0000	0.0000	0.0000
L2	130.75-86.12	-0.3227	0.1863	-0.4562	0.2634
L3	86.12-43.00	-0.4665	0.2693	-0.6583	0.3800
L4	43.00-1.00	-0.2357	0.1361	-0.3417	0.1973

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
**									
10' Dipole	A	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	30.00 55.00
10' Dipole	B	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	30.00 55.00
10' Dipole	B	From Leg	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	30.00 55.00
10' Omni	C	From Face	5.00 0.00 5.00	0.0000	176.00	No Ice 1/2" Ice	2.50 3.53	2.50 3.53	30.00 48.64
10' Omni	C	From Face	6.00 5.00 5.00	0.0000	176.00	No Ice 1/2" Ice	2.50 3.53	2.50 3.53	30.00 48.64
Vallmont 13'-5" Platform	C	None		0.0000	176.00	No Ice 1/2" Ice	18.43 22.32	18.43 22.32	1759.00 2143.00
**									
800 10121 w Pipe	A	From Face	4.00	0.0000	170.00	No Ice	5.80	4.72	72.60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-6.00			1/2" Ice	6.35	5.56	121.39
			0.00						
800 10121 w Pipe	B	From Face	4.00	0.0000	170.00	No Ice	5.80	4.72	72.60
			-6.00			1/2" Ice	6.35	5.56	121.39
			0.00						
800 10121 w Pipe	C	From Face	4.00	0.0000	170.00	No Ice	5.80	4.72	72.60
			-6.00			1/2" Ice	6.35	5.56	121.39
			0.00						
AM-X-CD-16-65-00T-RET	A	From Face	4.00	0.0000	170.00	No Ice	8.50	6.30	74.05
			6.00			1/2" Ice	9.15	7.48	139.04
			0.00						
AM-X-CD-16-65-00T-RET	B	From Face	4.00	0.0000	170.00	No Ice	8.50	6.30	74.05
			6.00			1/2" Ice	9.15	7.48	139.04
			0.00						
AM-X-CD-16-65-00T-RET	C	From Face	4.00	0.0000	170.00	No Ice	8.50	6.30	74.05
			6.00			1/2" Ice	9.15	7.48	139.04
			0.00						
(2) 860-10025	A	From Face	4.00	0.0000	170.00	No Ice	0.14	0.23	1.16
			-6.00			1/2" Ice	0.20	0.30	3.13
			0.00						
(2) 860-10025	B	From Face	4.00	0.0000	170.00	No Ice	0.14	0.23	1.16
			-6.00			1/2" Ice	0.20	0.30	3.13
			0.00						
(2) 860-10025	C	From Face	4.00	0.0000	170.00	No Ice	0.14	0.23	1.16
			-6.00			1/2" Ice	0.20	0.30	3.13
			0.00						
(2) LGP214nn	A	From Face	4.00	0.0000	170.00	No Ice	1.30	0.23	14.10
			-6.00			1/2" Ice	1.45	0.31	21.30
			0.00						
(2) LGP214nn	B	From Face	4.00	0.0000	170.00	No Ice	1.30	0.23	14.10
			-6.00			1/2" Ice	1.45	0.31	21.30
			0.00						
(2) LGP214nn	C	From Face	4.00	0.0000	170.00	No Ice	1.30	0.23	14.10
			-6.00			1/2" Ice	1.45	0.31	21.30
			0.00						
RRUS11	A	From Leg	4.00	0.0000	170.00	No Ice	3.31	1.36	55.00
			5.00			1/2" Ice	3.55	1.54	74.32
			0.00						
RRUS11	B	From Leg	4.00	0.0000	170.00	No Ice	3.31	1.36	55.00
			5.00			1/2" Ice	3.55	1.54	74.32
			0.00						
RRUS11	C	From Leg	4.00	0.0000	170.00	No Ice	3.31	1.36	55.00
			5.00			1/2" Ice	3.55	1.54	74.32
			0.00						
DC6-28-60-18-8F	C	None		0.0000	170.00	No Ice	1.47	1.47	33.00
						1/2" Ice	1.67	1.67	50.70
EEI (3) 12' Universal T-arms	A	None		0.0000	170.00	No Ice	16.66	16.66	550.00
						1/2" Ice	21.00	21.00	710.00
***									
10' Dipole	A	From Face	6.00	0.0000	162.00	No Ice	3.00	3.00	30.00
			0.00			1/2" Ice	4.00	4.00	55.00
			4.00						
6' Standoff	A	From Face	3.00	0.0000	162.00	No Ice	4.97	4.97	70.00
			0.00			1/2" Ice	6.12	6.12	130.00
			0.00						
***									
(2) AIR21 B4A/B2P w/ mast	A	From Leg	5.00	0.0000	160.00	No Ice	6.85	5.78	126.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
pipe			-5.00 0.00			1/2" Ice	7.41	6.70	182.26
(2) AIR21 B4A/B2P w/ mast pipe	B	From Leg	5.00 -5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	6.85 7.41	5.78 6.70	126.90 182.26
(2) AIR21 B4A/B2P w/ mast pipe	C	From Leg	5.00 -5.00 0.00	0.0000	160.00	No Ice 1/2" Ice	6.85 7.41	5.78 6.70	126.90 182.26
(4) ETD819H-12UB	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.53 1.70	0.39 0.49	18.50 27.42
(4) ETD819H-12UB	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.53 1.70	0.39 0.49	18.50 27.42
(4) ETD819H-12UB	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.53 1.70	0.39 0.49	18.50 27.42
LNX-6515DS-VTM w pipe	A	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	11.45 12.06	10.00 11.42	96.62 187.36
LNX-6515DS-VTM w pipe	B	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	11.45 12.06	10.00 11.42	96.62 187.36
LNX-6515DS-VTM w pipe	C	From Face	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	11.45 12.06	10.00 11.42	96.62 187.36
RRUS11_B12	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	51.00 71.87
RRUS11_B12	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	51.00 71.87
RRUS11_B12	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	51.00 71.87
EEI (3) 12' Universal T-arms	A	None		0.0000	160.00	No Ice 1/2" Ice	16.66 21.00	16.66 21.00	550.00 710.00
**									
APXV9TM14-ALU-I20 w pipe	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	7.21 7.77	5.03 5.89	77.02 132.43
APXV9TM14-ALU-I20 w pipe	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	7.21 7.77	5.03 5.89	77.02 132.43
APXV9TM14-ALU-I20 w pipe	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	7.21 7.77	5.03 5.89	77.02 132.43
TD-RRH8x20-25	A	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	70.00 97.14
TD-RRH8x20-25	B	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	70.00 97.14
TD-RRH8x20-25	C	From Face	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice	4.72 5.01	1.70 1.92	70.00 97.14
APXVSPP18-C-A20 w pipe	A	From Face	4.00	0.0000	150.00	No Ice	8.56	6.95	82.55

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	9.21	8.13	150.82
			0.00						
APXVSPP18-C-A20 w pipe	B	From Face	4.00	0.0000	150.00	No Ice	8.56	6.95	82.55
			0.00			1/2" Ice	9.21	8.13	150.82
			0.00						
APXVSPP18-C-A20 w pipe	C	From Face	4.00	0.0000	150.00	No Ice	8.56	6.95	82.55
			0.00			1/2" Ice	9.21	8.13	150.82
			0.00						
1900MHz 4x45W RRH	A	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	82.62
			0.00			1/2" Ice	2.95	2.84	108.98
			-2.00						
1900MHz 4x45W RRH	B	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	82.62
			0.00			1/2" Ice	2.95	2.84	108.98
			-2.00						
1900MHz 4x45W RRH	C	From Face	4.00	0.0000	150.00	No Ice	2.71	2.61	82.62
			0.00			1/2" Ice	2.95	2.84	108.98
			-2.00						
800MHz 2x50W RRH	A	From Face	4.00	0.0000	150.00	No Ice	2.40	2.25	64.00
			0.00			1/2" Ice	2.61	2.46	86.12
			-2.00						
800MHz 2x50W RRH	B	From Face	4.00	0.0000	150.00	No Ice	2.40	2.25	64.00
			0.00			1/2" Ice	2.61	2.46	86.12
			-2.00						
800MHz 2x50W RRH	C	From Face	4.00	0.0000	150.00	No Ice	2.40	2.25	64.00
			0.00			1/2" Ice	2.61	2.46	86.12
			-2.00						
840 10054 w pipe	A	From Face	4.00	0.0000	150.00	No Ice	5.29	2.23	48.60
			0.00			1/2" Ice	5.68	2.73	83.42
			0.00						
840 10054 w pipe	B	From Face	4.00	0.0000	150.00	No Ice	5.29	2.23	48.60
			0.00			1/2" Ice	5.68	2.73	83.42
			0.00						
840 10054 w pipe	C	From Face	4.00	0.0000	150.00	No Ice	5.29	2.23	48.60
			0.00			1/2" Ice	5.68	2.73	83.42
			0.00						
nRRH	A	From Face	4.00	0.0000	150.00	No Ice	2.69	0.85	45.00
			0.00			1/2" Ice	2.91	1.01	60.06
			-1.00						
nRRH	B	From Face	4.00	0.0000	150.00	No Ice	2.69	0.85	45.00
			0.00			1/2" Ice	2.91	1.01	60.06
			-1.00						
nRRH	C	From Face	4.00	0.0000	150.00	No Ice	2.69	0.85	45.00
			0.00			1/2" Ice	2.91	1.01	60.06
			-1.00						
Vallmont 13'-5" Platform	C	None		0.0000	150.00	No Ice	18.43	18.43	1759.00
						1/2" Ice	22.32	22.32	2143.00
**									
10' Dipole	B	From Face	6.00	0.0000	130.00	No Ice	3.00	3.00	30.00
			0.00			1/2" Ice	4.00	4.00	55.00
			5.00						
TMA	B	From Face	2.00	0.0000	130.00	No Ice	1.40	0.70	5.00
			0.00			1/2" Ice	1.56	0.83	15.34
			0.00						
6' Standoff	B	From Face	3.00	0.0000	130.00	No Ice	4.97	4.97	70.00
			0.00			1/2" Ice	6.12	6.12	130.00
			0.00						
**									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
742 213V01 w pipe	A	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice	5.41 5.99	4.75 6.10	46.80 91.90
742 213V01 w pipe	B	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice	5.41 5.99	4.75 6.10	46.80 91.90
742 213V01 w pipe	C	From Face	0.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice	5.41 5.99	4.75 6.10	46.80 91.90
**									
LPA-80063-6CF-EDIN-X w pipe	A	From Face	4.00 6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	11.00 11.78	12.33 0.00	56.20 152.21
LPA-80063-6CF-EDIN-X w pipe	B	From Face	4.00 6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	11.00 11.78	12.33 0.00	56.20 152.21
LPA-80063-6CF-EDIN-X w pipe	A	From Face	4.00 -2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	11.00 11.78	12.33 0.00	56.20 152.21
LPA-80063-6CF-EDIN-X w pipe	B	From Face	4.00 -2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	11.00 11.78	12.33 0.00	56.20 152.21
RWA-80013 w pipe	C	From Face	4.00 6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	6.14 6.85	4.66 5.70	39.85 90.85
RWA-80013 w pipe	C	From Face	4.00 -2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	6.14 6.85	4.66 5.70	39.85 90.85
LNX-6514DS-T4M w pipe	A	From Face	4.00 -6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	8.41 8.96	6.83 7.79	60.30 126.69
LNX-6514DS-T4M w pipe	B	From Face	4.00 -6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	8.41 8.96	6.83 7.79	60.30 126.69
LNX-6514DS-T4M w pipe	C	From Face	4.00 -6.00 2.00	0.0000	114.00	No Ice 1/2" Ice	8.41 8.96	6.83 7.79	60.30 126.69
BXA-185060-12CF-EDIN-X w pipe	A	From Face	4.00 2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	5.03 5.58	5.29 6.46	38.35 84.33
MGD3-900TX w pipe	B	From Face	4.00 2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	5.19 5.74	5.01 6.18	45.40 90.70
MGD3-900TX w pipe	C	From Face	4.00 2.00 2.00	0.0000	114.00	No Ice 1/2" Ice	5.19 5.74	5.01 6.18	45.40 90.70
TMA	A	From Face	3.00 -5.00 2.00	0.0000	114.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.83	5.00 15.34
TMA	B	From Face	3.00 -5.00 2.00	0.0000	114.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.83	5.00 15.34
TMA	C	From Face	3.00 -5.00 2.00	0.0000	114.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.83	5.00 15.34
Vallmont 13'-5" Platform	C	None		0.0000	114.00	No Ice 1/2" Ice	18.43 22.32	18.43 22.32	1759.00 2143.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**									
10' Dipole	B	From Face	6.00 0.00 5.00	0.0000	100.00	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	30.00 55.00
TMA	B	From Face	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.83	5.00 15.34
6' Standoff	B	From Face	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice	4.97 6.12	4.97 6.12	70.00 130.00
GPS	A	From Face	2.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	10.00 15.00
2' Standoff	A	From Face	1.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice	1.80 3.30	1.80 3.30	33.00 59.00
GPS	A	From Face	2.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	10.00 15.00
2' Standoff	A	From Face	1.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice	1.80 3.30	1.80 3.30	33.00 59.00
GPS	B	From Face	2.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	10.00 15.00
2' Standoff	B	From Face	1.00 0.00 0.00	0.0000	61.00	No Ice 1/2" Ice	1.80 3.30	1.80 3.30	33.00 59.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
MF-900B	B	Grid	From Leg	5.00 0.00 0.00	0.0000		176.00	1.33	No Ice 1/2" Ice	1.39 1.57	13.00 21.06
MF-900B	C	Grid	From Leg	5.00 0.00 0.00	0.0000		176.00	1.33	No Ice 1/2" Ice	1.39 1.57	13.00 21.06
MF-900B	A	Grid	From Leg	5.00 0.00 0.00	0.0000		162.00	1.33	No Ice 1/2" Ice	1.39 1.57	13.00 21.06
MF-900B	B	Grid	From Leg	5.00 0.00 0.00	0.0000		100.00	1.33	No Ice 1/2" Ice	1.39 1.57	13.00 21.06
**											
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Face	5.00 -2.00	0.0000		150.00	2.92	No Ice 1/2" Ice	6.70 7.08	48.00 84.34

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
				4.00							
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Face	5.00 2.00 2.00	0.0000		150.00	2.92	No Ice 1/2" Ice	6.70 7.08	48.00 84.34
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Face	5.00 2.00 2.00	0.0000		150.00	2.92	No Ice 1/2" Ice	6.70 7.08	48.00 84.34
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Face	5.00 2.00 2.00	0.0000		150.00	2.92	No Ice 1/2" Ice	6.70 7.08	48.00 84.34

Load Combinations

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

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	18	62473.50	-29625.64	-71.52
	Max. H_x	11	52609.80	35580.62	12.00
	Max. H_z	2	52609.81	86.15	35732.72
	Max. M_x	2	4428966.47	86.15	35732.72
	Max. M_z	5	4423173.76	-35652.40	-139.90
	Max. Torsion	6	4653.46	-30895.64	-17921.29
	Min. Vert	1	52609.80	0.00	0.00
	Min. H_x	5	52609.80	-35652.40	-139.90
	Min. H_z	8	52609.81	-156.29	-35709.24
	Min. M_x	8	-4424759.36	-156.29	-35709.24
	Min. M_z	11	-4413446.80	35580.62	12.00
	Min. Torsion	12	-4388.44	30796.55	17864.03

Tower Mast Reaction Summary

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
Dead Only	52609.80	0.00	0.00	-236.79	822.04	0.00
Dead+Wind 0 deg - No Ice	52609.81	-86.15	-35732.72	-4428966.47	15734.79	835.27
Dead+Wind 30 deg - No Ice	52609.80	17698.20	-30960.91	-3837800.96	-2189949.22	-2705.92
Dead+Wind 60 deg - No Ice	52609.80	30858.38	-17719.26	-2190252.97	-3827332.28	-4063.13
Dead+Wind 90 deg - No Ice	52609.80	35652.40	139.90	23144.19	-4423173.76	-4386.36
Dead+Wind 120 deg - No Ice	52609.80	30895.64	17921.29	2223721.65	-3833999.67	-4653.46
Dead+Wind 150 deg - No Ice	52609.80	17947.13	30950.73	3836370.22	-2231179.18	-3859.58
Dead+Wind 180 deg - No Ice	52609.81	156.29	35709.24	4424759.36	-25138.93	-1313.68
Dead+Wind 210 deg - No Ice	52609.80	-17838.27	30880.04	3824384.28	2213996.10	2418.45
Dead+Wind 240 deg - No Ice	52609.80	-30843.72	17791.83	2201337.95	3826696.03	3999.30
Dead+Wind 270 deg - No Ice	52609.80	-35580.62	-12.00	-3446.49	4413446.80	4346.36
Dead+Wind 300 deg - No Ice	52609.80	-30796.55	-17864.03	-2215141.87	3820140.11	4388.44
Dead+Wind 330 deg - No Ice	52609.80	-17800.64	-30952.42	-3836957.62	2209898.92	3860.83
Dead+Ice+Temp	62473.50	-0.00	-0.00	-1172.02	855.66	0.00
Dead+Wind 0 deg+Ice+Temp	62473.50	-124.71	-28922.28	-3675186.90	18658.13	647.05
Dead+Wind 30 deg+Ice+Temp	62473.50	14737.47	-24993.47	-3174258.35	-1867951.30	37.81
Dead+Wind 60 deg+Ice+Temp	62473.50	25651.26	-14323.84	-1815879.68	-3255342.71	465.07
Dead+Wind 90 deg+Ice+Temp	62473.50	29625.64	71.52	10113.64	-3759969.28	718.75
Dead+Wind 120 deg+Ice+Temp	62473.50	25701.74	14499.28	1841702.62	-3264223.04	-58.69
Dead+Wind 150 deg+Ice+Temp	62473.50	14874.97	25034.19	3178571.07	-1889683.29	-970.89
Dead+Wind 180 deg+Ice+Temp	62473.50	128.10	28868.82	3664310.65	-20446.72	-1104.51
Dead+Wind 210 deg+Ice+Temp	62473.50	-14783.51	24966.23	3167687.03	1875710.74	-272.00
Dead+Wind 240 deg+Ice+Temp	62473.50	-25695.60	14351.73	1819063.36	3262322.77	-444.83
Dead+Wind 270 deg+Ice+Temp	62473.50	-29589.58	-84.26	-14921.69	3754685.11	-610.77
Dead+Wind 300 deg+Ice+Temp	62473.50	-25631.02	-14460.07	-1838112.98	3252939.31	-146.38
Dead+Wind 330 deg+Ice+Temp	62473.50	-14867.48	-24997.54	-3174707.78	1889426.97	837.12
Dead+Wind 0 deg - Service	52609.80	-33.65	-13958.10	-1732597.03	6680.36	325.61
Dead+Wind 30 deg - Service	52609.80	6913.36	-12094.10	-1501352.54	-856086.48	-1069.79
Dead+Wind 60 deg - Service	52609.80	12054.06	-6921.59	-856899.62	-1496562.67	-1600.45
Dead+Wind 90 deg - Service	52609.80	13926.73	54.65	8884.42	-1729645.53	-1725.22
Dead+Wind 120 deg - Service	52609.80	12068.61	7000.50	869668.13	-1499205.02	-1830.63
Dead+Wind 150 deg - Service	52609.80	7010.60	12090.13	1500480.22	-872243.08	-1519.10
Dead+Wind 180 deg - Service	52609.80	61.05	13948.92	1730617.62	-9314.54	-516.24
Dead+Wind 210 deg - Service	52609.80	-6968.07	12062.51	1495768.52	866552.74	955.82
Dead+Wind 240 deg - Service	52609.80	-12048.33	6949.93	860897.00	1497373.20	1576.42
Dead+Wind 270 deg - Service	52609.80	-13898.69	-4.69	-1520.89	1726874.08	1710.27

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 300 deg - Service	52609.80	-12029.90	-6978.14	-866642.22	1494804.66	1725.98
Dead+Wind 330 deg - Service	52609.80	-6953.38	-12090.79	-1501033.77	864946.80	1518.81

Solution Summary

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
1	0.00	-52609.80	0.00	0.00	52609.80	0.00	0.000%
2	-86.15	-52609.80	-35732.70	86.15	52609.81	35732.72	0.000%
3	17698.20	-52609.80	-30960.91	-17698.20	52609.80	30960.91	0.000%
4	30858.38	-52609.80	-17719.26	-30858.38	52609.80	17719.26	0.000%
5	35652.40	-52609.80	139.90	-35652.40	52609.80	-139.90	0.000%
6	30895.64	-52609.80	17921.29	-30895.64	52609.80	-17921.29	0.000%
7	17947.13	-52609.80	30950.73	-17947.13	52609.80	-30950.73	0.000%
8	156.29	-52609.80	35709.22	-156.29	52609.81	-35709.24	0.000%
9	-17838.27	-52609.80	30880.04	17838.27	52609.80	-30880.04	0.000%
10	-30843.72	-52609.80	17791.83	30843.72	52609.80	-17791.83	0.000%
11	-35580.62	-52609.80	-12.00	35580.62	52609.80	12.00	0.000%
12	-30796.55	-52609.80	-17864.03	30796.55	52609.80	17864.03	0.000%
13	-17800.64	-52609.80	-30952.42	17800.64	52609.80	30952.42	0.000%
14	0.00	-62473.50	0.00	0.00	62473.50	0.00	0.000%
15	-124.71	-62473.50	-28922.23	124.71	62473.50	28922.28	0.000%
16	14737.47	-62473.50	-24993.47	-14737.47	62473.50	24993.47	0.000%
17	25651.25	-62473.50	-14323.84	-25651.26	62473.50	14323.84	0.000%
18	29625.59	-62473.50	71.52	-29625.64	62473.50	-71.52	0.000%
19	25701.73	-62473.50	14499.28	-25701.74	62473.50	-14499.28	0.000%
20	14874.97	-62473.50	25034.19	-14874.97	62473.50	-25034.19	0.000%
21	128.10	-62473.50	28868.77	-128.10	62473.50	-28868.82	0.000%
22	-14783.51	-62473.50	24966.22	14783.51	62473.50	-24966.23	0.000%
23	-25695.59	-62473.50	14351.73	25695.60	62473.50	-14351.73	0.000%
24	-29589.53	-62473.50	-84.26	29589.58	62473.50	84.26	0.000%
25	-25631.01	-62473.50	-14460.07	25631.02	62473.50	14460.07	0.000%
26	-14867.48	-62473.50	-24997.54	14867.48	62473.50	24997.54	0.000%
27	-33.65	-52609.80	-13958.09	33.65	52609.80	13958.10	0.000%
28	6913.36	-52609.80	-12094.10	-6913.36	52609.80	12094.10	0.000%
29	12054.06	-52609.80	-6921.59	-12054.06	52609.80	6921.59	0.000%
30	13926.72	-52609.80	54.65	-13926.73	52609.80	-54.65	0.000%
31	12068.61	-52609.80	7000.50	-12068.61	52609.80	-7000.50	0.000%
32	7010.60	-52609.80	12090.13	-7010.60	52609.80	-12090.13	0.000%
33	61.05	-52609.80	13948.91	-61.05	52609.80	-13948.92	0.000%
34	-6968.07	-52609.80	12062.51	6968.07	52609.80	-12062.51	0.000%
35	-12048.33	-52609.80	6949.93	12048.33	52609.80	-6949.93	0.000%
36	-13898.68	-52609.80	-4.69	13898.69	52609.80	4.69	0.000%
37	-12029.90	-52609.80	-6978.14	12029.90	52609.80	6978.14	0.000%
38	-6953.38	-52609.80	-12090.79	6953.38	52609.80	12090.79	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00065503

3	Yes	6	0.00000001	0.00004913
4	Yes	6	0.00000001	0.00005346
5	Yes	5	0.00000001	0.00006255
6	Yes	6	0.00000001	0.00004971
7	Yes	6	0.00000001	0.00005363
8	Yes	4	0.00000001	0.00085058
9	Yes	6	0.00000001	0.00005309
10	Yes	6	0.00000001	0.00004900
11	Yes	5	0.00000001	0.00007880
12	Yes	6	0.00000001	0.00005341
13	Yes	6	0.00000001	0.00004973
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00039233
16	Yes	6	0.00000001	0.00011430
17	Yes	6	0.00000001	0.00011401
18	Yes	5	0.00000001	0.00039723
19	Yes	6	0.00000001	0.00011715
20	Yes	6	0.00000001	0.00011659
21	Yes	5	0.00000001	0.00039321
22	Yes	6	0.00000001	0.00011514
23	Yes	6	0.00000001	0.00011537
24	Yes	5	0.00000001	0.00039394
25	Yes	6	0.00000001	0.00011475
26	Yes	6	0.00000001	0.00011587
27	Yes	4	0.00000001	0.00016592
28	Yes	5	0.00000001	0.00010194
29	Yes	5	0.00000001	0.00011892
30	Yes	4	0.00000001	0.00032962
31	Yes	5	0.00000001	0.00010404
32	Yes	5	0.00000001	0.00011912
33	Yes	4	0.00000001	0.00018035
34	Yes	5	0.00000001	0.00011722
35	Yes	5	0.00000001	0.00010148
36	Yes	4	0.00000001	0.00035275
37	Yes	5	0.00000001	0.00011873
38	Yes	5	0.00000001	0.00010450

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	48.155	32	2.4432	0.0067
L2	135.25 - 86.12	28.215	32	2.1032	0.0049
L3	91.87 - 43	12.278	32	1.3381	0.0029
L4	50 - 1	3.431	32	0.6447	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	MF-900B	32	48.155	2.4432	0.0076	28706
170.00	800 10121 w Pipe	32	45.084	2.4075	0.0072	23921
162.00	MF-900B	32	41.020	2.3565	0.0065	10251
160.00	(2) AIR21 B4A/B2P w/ mast pipe	32	40.014	2.3427	0.0064	8970

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
154.00	VHLP2.5-11	32	37.030	2.2977	0.0059	6523
152.00	VHLP2.5-11	32	36.050	2.2812	0.0057	5979
150.00	APXV9TM14-ALU-I20 w pipe	32	35.077	2.2639	0.0056	5519
130.00	10' Dipole	32	25.935	2.0291	0.0049	3487
124.00	742 213V01 w pipe	32	23.446	1.9343	0.0047	3451
114.00	LPA-80063-6CF-EDIN-X w pipe	32	19.575	1.7583	0.0044	3391
100.00	MF-900B	32	14.752	1.4925	0.0036	3300
76.00	GPS	32	8.151	1.0550	0.0022	3212
61.00	GPS	32	5.117	0.8106	0.0015	3175

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	122.810	7	6.2387	0.0168
L2	135.25 - 86.12	72.018	7	5.3721	0.0121
L3	91.87 - 43	31.369	7	3.4193	0.0075
L4	50 - 1	8.772	7	1.6481	0.0027

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	MF-900B	7	122.810	6.2387	0.0196	11509
170.00	800 10121 w Pipe	7	114.989	6.1477	0.0183	9591
162.00	MF-900B	7	104.638	6.0179	0.0167	4108
160.00	(2) AIR21 B4A/B2P w/ mast pipe	7	102.076	5.9828	0.0163	3594
154.00	VHLP2.5-11	7	94.478	5.8680	0.0151	2612
152.00	VHLP2.5-11	7	91.980	5.8260	0.0147	2394
150.00	APXV9TM14-ALU-I20 w pipe	7	89.502	5.7819	0.0142	2209
130.00	10' Dipole	7	66.208	5.1831	0.0128	1391
124.00	742 213V01 w pipe	7	59.861	4.9411	0.0120	1373
114.00	LPA-80063-6CF-EDIN-X w pipe	7	49.989	4.4921	0.0111	1344
100.00	MF-900B	7	37.685	3.8136	0.0092	1305
76.00	GPS	7	20.832	2.6963	0.0056	1264
61.00	GPS	7	13.079	2.0719	0.0039	1246

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
2.0000	18	2.2500	163576.90	169419.87	43.050	29.921	Bolt T	1.25

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
			131210.58 1.25	217809.56 0.78	45.000 0.96	45.000 0.66		✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	45.25	0.00	0.0	39.000	24.1827	-11234.80	943125.00	0.012
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	49.13	0.00	0.0	39.000	39.8244	-22401.20	1553150.00	0.014
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	48.87	0.00	0.0	39.000	58.7205	-34869.00	2290100.00	0.015
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	49.00	0.00	0.0	39.000	83.4043	-52586.70	3252770.00	0.016

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	452290.83	-29.855	39.000	0.766	0.00	0.000	39.000	0.000
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	1489508.33	-45.298	39.000	1.161	0.00	0.000	39.000	0.000
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	2763625.00	-46.380	39.000	1.189	0.00	0.000	39.000	0.000
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	4438008.33	-43.058	39.000	1.104	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{bv}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176 - 130.75 (1)	TP31.8x21x0.25	0.012	0.766	0.000	0.777 ✔	1.333	H1-3 ✔
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	0.014	1.161	0.000	1.176 ✔	1.333	H1-3 ✔
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	0.015	1.189	0.000	1.204 ✔	1.333	H1-3 ✔

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	0.016	1.104	0.000	1.120 ✔	1.333	H1-3 ✔

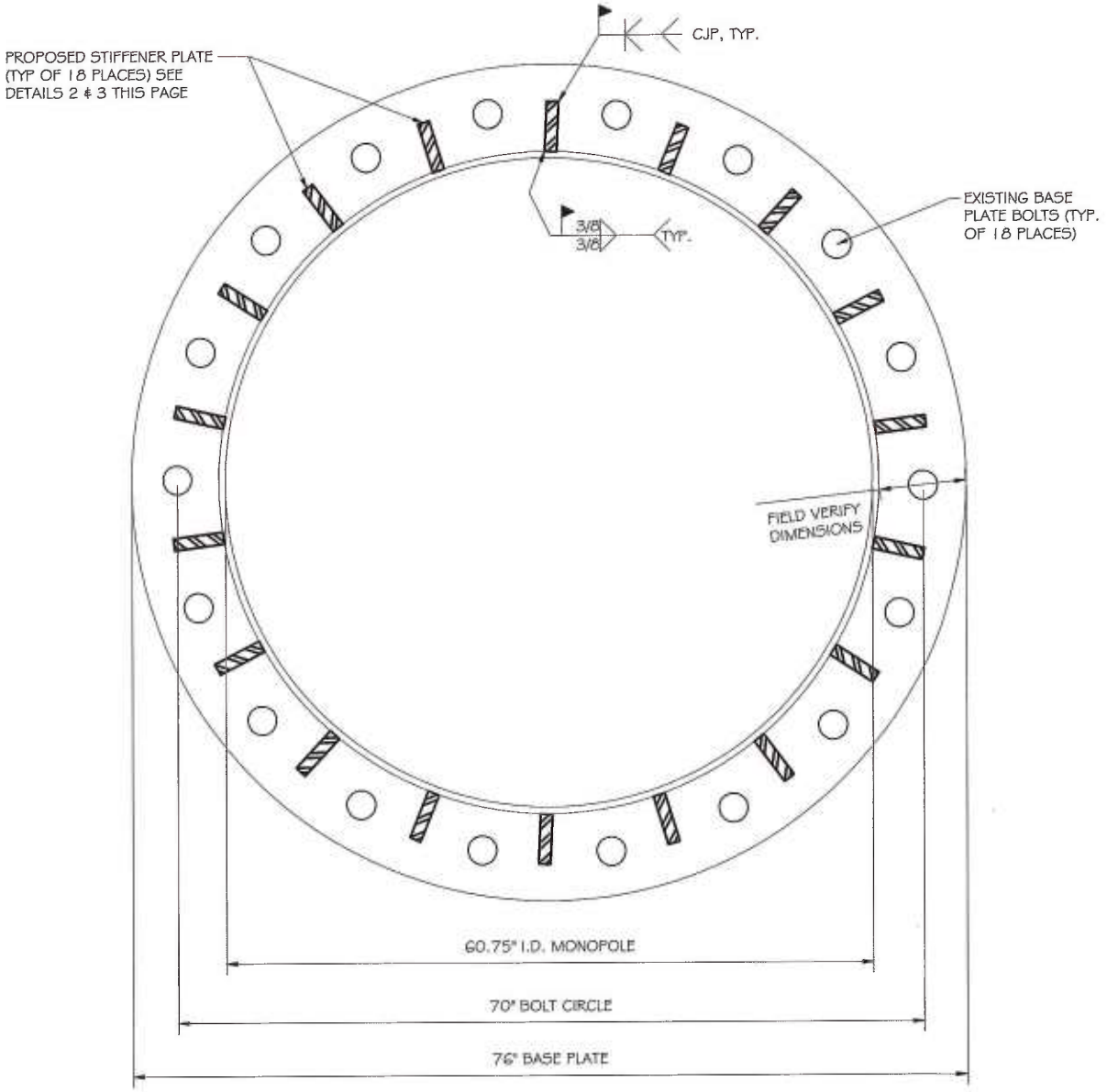
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	176 - 130.75	Pole	TP31.8x21x0.25	1	-11234.80	1257185.57	58.3	Pass
L2	130.75 - 86.12	Pole	TP41.82x30.226x0.3125	2	-22401.20	2070348.86	88.2	Pass
L3	86.12 - 43	Pole	TP51.36x39.8381x0.375	3	-34869.00	3052703.17	90.4	Pass
L4	43 - 1	Pole	TP60.5x48.9596x0.4375	4	-52586.70	4335942.23	84.0	Pass
							Summary	
						Pole (L3)	90.4	Pass
						Base Plate	93.5	Pass
						RATING =	**93.5**	**Pass**

APPENDIX B

Previous Analysis Modifications

DRAWN BY: TJN CHECKED BY: KAB



BASE PLATE MODIFICATIONS (1)
SCALE: NTS

EXHIBIT C

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RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTHA231A

Berlin FD Tower
1657 Berlin Turnpike
Berlin, CT 06037

September 15, 2014

EBI Project Number: 62144787

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	71.02 %

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September 15, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTHA231A – Berlin FD Tower**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1657 Berlin Turnpike, Berlin, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **1657 Berlin Turnpike, Berlin, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **160 feet** above ground level (AGL).

9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A1 MPE%	0.71	Antenna B1 MPE%	0.71	Antenna C1 MPE%	0.71
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	1,906.06	ERP (W):	1,906.06	ERP (W):	1,906.06
Antenna A2 MPE%	0.71	Antenna B2 MPE%	0.71	Antenna C2 MPE%	0.71
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A3 MPE%	0.28	Antenna B3 MPE%	0.28	Antenna C3 MPE%	0.28

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.09**
Police Channel	0.41 %
Fire Main	0.55 %
Fire Intercity	0.54 %
Highway	0.35 %
Fire Ground	0.05 %
SP Hotline	0.45 %
RAFS	0.11 %
960 Link	0.12 %
Sprint	4.97 %
Clearwire	0.83 %
AT&T	12.23 %
Verizon Wireless	45.32 %
Site Total MPE %:	**71.02 %**

T-Mobile Sector 1 Total:	1.70 %
T-Mobile Sector 2 Total:	1.70 %
T-Mobile Sector 3 Total:	1.70 %
Site Total:	71.02 %

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.70 %
Sector 2:	1.70 %
Sector 3 :	1.70 %
T-Mobile Total:	5.09 %
Site Total:	71.02 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **71.02%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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