



EM-AT&T-078-120720-
120919

September 18, 2012

VIA OVERNIGHT DELIVERY

Ms. Linda Roberts, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

ORIGINAL
RECEIVED
SEP 19 2012
CONNECTICUT
SITING COUNCIL

RE: AT&T Mobility – Notice of Exempt Modification
230 Clover Mill Road, Mansfield, CT

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility (“AT&T”). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Town Manager of Mansfield.

AT&T plans to modify the existing facility at 230 Clover Mill Road, Mansfield, owned by Global Tower (coordinates 41°46’32.97”N, -72°13’21.15”W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to AT&T’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected. AT&T proposes to add three (3) new antennas, six (6) RRU’s and one (1) surge arrestor. Additionally,

AT&T will install one (1) fiber cable and two (2) DC control cables within a 3" flex conduit inside the monopole.

2.The proposed changes will not extend the site boundaries. AT&T will install an additional cabinet on a concrete pad extension, adjacent to its existing equipment. Thus, there will be no effect on the site compound.

3.The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4.The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated in the attached power density calculations, AT&T's operations at the site will result in a power density of 1.14%; the combined site operations will result in a total power density of 34.25%.

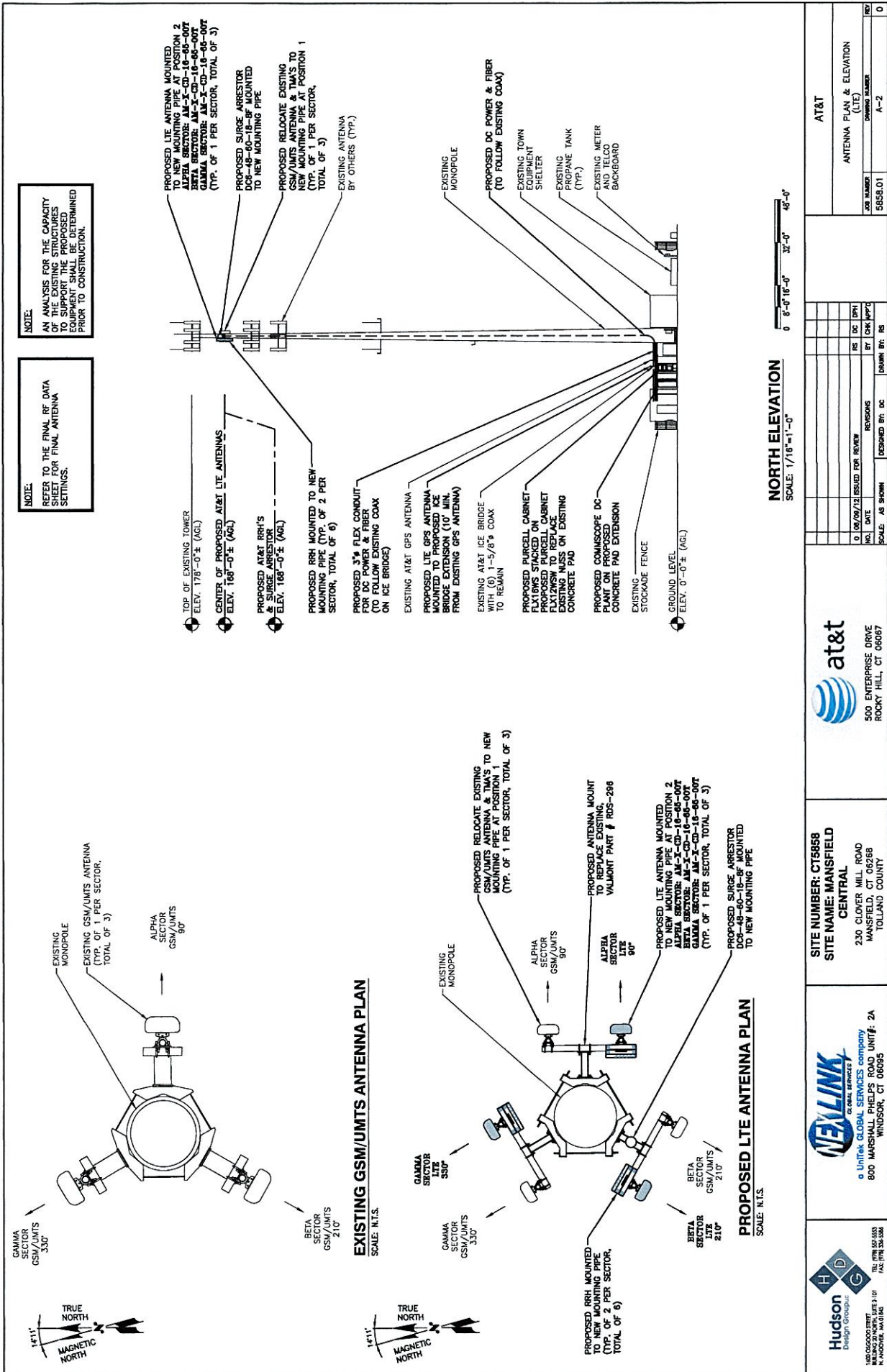
Please feel free to call me with any questions or concerns regarding this matter.
Thank you for your consideration.

Respectfully submitted,
AT&T Mobility

By: 
Eric Dahl, Consultant
edahl@comcast.net
860-227-1975

cc: Matthew W. Hart, Town Manager, Town of Mansfield

Attachments



NORTH ELEVATION
SCALE: 1/16"=1'-0"

 <p>Hudson Design Group</p>		 <p>NEXLINK GLOBAL SERVICES</p>		<p>at&t</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Structural Analysis Report

180 ft. Tapered Monopole

**230 Clover Mill Rd., Mansfield, CT 06268
Tolland County
(CT-5030, Mansfield Center I)**

Global Tower Services

750 Park of Commerce Boulevard
Suite 300
Boca Raton, FL 33487-3612

P: 605.422.1548
F: 605.422.1550

**AT&T
AT&T Site Number: CT5858
AT&T Site Name: AWE – Mansfield Central**

Prepared by:

**Global Tower Services, LLC
Michael T. De Boer, P.E.
Senior Director of Engineering**

September 12, 2012

Global Tower Services, LLC
September 12, 2012
Mansfield Center I
CT-5030

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Appendix C - Collocation Application.....	Attached

Global Tower Services, LLC
September 12, 2012
Mansfield Center I
CT-5030

INTRODUCTION

We have completed the structural analysis for the existing 180 ft. tapered monopole located in Tolland County (230 Clover Mill Rd, Mansfield), CT. The objective of the analysis is to determine if the existing tapered monopole design is in conformance / compliance with the current codes and standards for the proposed equipment installation.

TSTower written by TowerSoft was utilized in performing the analysis. This program is a commercially available software program which was used to create a non-linear three-dimensional beam model and calculate member stresses for various loading conditions.

DESCRIPTION OF STRUCTURE

The existing structure is a 180 ft. tapered monopole. The original monopole manufacturer is PennSummit Tubular, West Hazelton, PA. The existing structure consists of four (4) sections with slip connections.

Original monopole drawings provided by PennSummit Tubular were used to model the monopole steel. (PennSummit Design No. 20031, December 23, 2003) The monopole shaft is manufactured from 65 ksi steel, the base plate is 55 ksi steel and the anchor bolts are A615 Grade 75 steel.

The monopole, for the purpose of analysis, is considered to be in good condition with no defects.

DESIGN PARAMETERS

- Standard:	ANSI/TIA-222-F-1996
- Basic Wind Speed:	85 mph (fastest mile)
	105 mph (3-sec gust)
- Serviceability Wind Speed:	50 mph (fastest mile)
- Basic Wind Speed with Ice:	73.95 mph (fastest mile)
- Design Ice Thickness:	0.50 (inch)
- Allowable Stress Increase:	1/3 for wind loading conditions

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CT-5030

ANTENNA LOADING INFORMATION

Existing and Reserved Loading Information

Antenna Description/Mount	Qty	Elev. (ft.)	TX Lines	Qty	Customer
18' 16-Element Dipole / Platform Mount	4	178	7/8"	4	City of Mansfield
Antel LPA-80080-4CF / Platform Mount	6	178	1 5/8"	6	Verizon
Antel BXA-70063-6CF / Platform Mount	3	178	1 5/8"	3	Verizon
Antel BXA-185090-8CF / Platform Mount	3	178	1 5/8"	3	Verizon
RFS FD9R6004-2CL-3L / Platform Mount	6	178			Verizon
Powerwave 7770 / Flush Mount	3	168	1 5/8"	6	AT&T
LGP21401 TMA / Flush Mount	6	168			AT&T
6' x 1' Panels / LP Platform	6	158	1 5/8"	6	Sprint
RFS APX16PV-16PVL-E / LP Platform	6	148	1 5/8"	12	T-Mobile
18' 16-Element Dipole / T-Arms	4	110	7/8"	4	City of Mansfield

Proposed Loading Information

Antenna Description/Mount	Qty	Elev. (ft.)	TX Lines	Qty	Customer
KMW AM-X-CD-16-65-0-0T / Sector Mount	3	168			AT&T
Ericsson RRU-11 / Sector Mount	6	168			AT&T
Raycap DC6-48-60-18-8F / Sector Mount	1	168	Fiber Power	1 2	AT&T

Note: Final configuration for AT&T: Six (6) antennas, six (6) TMAs, six (6) RRUs, one (1) surge arrestor, one (1) 10 mm fiber line, two (2) 3/4" power lines, and six (6) 1 5/8" lines. All lines are considered inside the monopole shaft unless otherwise noted.

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Mansfield Center I
CT-5030

ANALYSIS RESULTS

Structure

The existing 180 ft. tapered monopole is **structurally capable** of supporting the proposed equipment. (See table below)

Monopole Member	% Capacity	Results
Monopole Shaft	72	Pass
Monopole Base Plate	39	Pass
Anchor Bolts	64	Pass

(105 percent is considered acceptable.)

Foundation

The existing foundation has also been evaluated. The existing foundation was found to be **acceptable** with the proposed equipment installed. (See table below)

Foundation Component	Design Reactions	Analysis Reactions	% Capacity	Results
Overtopping Moment	6250.00 Ft-Kips	4545.66 Ft-Kips	73	Pass
Shear	48.00 Kips	36.25 Kips	76	Pass

Monopole Rating: 76%

SUMMARY AND CONCLUSIONS

The existing 180 ft. tapered monopole located in Tolland County (230 Clover Mill Rd, Mansfield), CT is **structurally acceptable** based upon the EIA-222-F 1996 Standard and the local building code with the proposed equipment installed.

If any other changes are proposed, another structural analysis should be performed to assure the tower is in compliance / conformance with the applicable codes and standards.

Global Tower Services, LLC
September 12, 2012
Mansfield Center I
CT-5030

SUMMARY AND CONCLUSIONS

Should any further questions arise, please contact the Global Tower Services, LLC
Engineering Department at 941-400-2206.

Global Tower Services, LLC

Reviewed by:

Phillip Nejman, E.I.
GTS Engineering


Michael T. De Boer, P.E.
Director of Engineering



Global Tower Services, LLC
September 12, 2012
Mansfield Center I
CT-5030

Standard Conditions

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

- Information supplied by the client regarding the structure itself, the antenna and transmission line loading on the structure and its components, or relevant information.
- Information from drawings in possession of Global Tower Services, LLC, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Global Tower Services, LLC and used in the performance of our engineering services is correct and complete. In the absence of information contrary, we consider that all structures were constructed in accordance with the drawings and specifications and are in an uncorroded condition and have not deteriorated; and we, therefore, consider that their capacity has not significantly changed from the original design condition.

All services will be performed to the codes and standards specified by the client, and we do not imply to meet any other code and standard requirements unless explicitly agreed to in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes and standards, the client shall specify the exact requirements. In the absence of information to the contrary, all work will be performed in accordance with the revision of ANSI/TIA/EIA-222 requested.

All services are performed, results obtained and recommendations made in accordance with the generally accepted engineering principles and practices. Global Tower Services, LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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Contract:

Revision: 1

Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

Section H: STRUCTURE DISPLACEMENT DATA

Load Combination Max Envelope

Wind Direction		Maximum displacements				
Elev. (ft)	N-S Disp (in)	W-E Disp (in)	Vert. Disp (in)	N-S Rot (deg)	W-E Rot (deg)	Twist Rot (deg)
178.00	93.7	-93.5	-2.6	-4.76	-4.77	0.00
169.17	84.9	-84.8	-2.2	-4.73	-4.74	0.00
160.33	76.2	-76.1	-1.9	-4.62	-4.63	0.00
151.50	67.8	-67.7	-1.6	-4.45	-4.46	0.00
142.67	59.8	-59.7	-1.3	-4.20	-4.21	0.00
133.83	52.3	-52.2	-1.1	-3.90	-3.91	0.00
129.08	48.5	-48.4	-1.0	-3.72	-3.73	0.00
122.22	43.2	-43.2	-0.8	-3.53	-3.53	0.00
115.35	38.3	-38.3	-0.7	-3.33	-3.33	0.00
108.48	33.7	-33.6	-0.6	-3.12	-3.13	0.00
101.62	29.3	-29.3	-0.5	-2.92	-2.92	0.00
94.75	25.3	-25.2	-0.4	-2.70	-2.71	0.00
88.75	22.0	-21.9	-0.3	-2.52	-2.52	0.00
81.20	18.2	-18.1	-0.2	-2.27	-2.28	0.00
73.65	14.8	-14.7	-0.2	-2.03	-2.03	0.00
66.10	11.7	-11.7	-0.1	-1.79	-1.79	0.00
58.55	9.1	-9.1	-0.1	-1.55	-1.56	0.00
51.00	6.8	-6.8	-0.1	-1.32	-1.32	0.00
43.75	5.0	-5.0	0.0	-1.10	-1.10	0.00
36.46	3.4	-3.4	0.0	-0.91	-0.91	0.00
29.17	2.2	-2.2	0.0	-0.72	-0.72	0.00
21.88	1.2	-1.2	0.0	-0.53	-0.53	0.00
14.58	0.5	-0.5	0.0	-0.35	-0.35	0.00
7.29	0.1	-0.1	0.0	-0.17	-0.17	0.00
0.00	0.0	0.0	0.0	0.00	0.00	0.00

Global Tower Services, LLC

September 12, 2012

Mansfield Center I

CT-5030

Disclaimer of Warranties

The engineering services by **Global Tower Services, LLC** in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. **Global Tower Services, LLC** does not analyze the fabrication, including welding, except as included in this report.

The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines. Any mention of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from **Global Tower Services, LLC** but are beyond the scope of this report.

Global Tower Services, LLC makes no warranties, expressed or implied, in connection with this report and disclaims any liability arising from material, fabrication and erection of this tower. **Global Tower Services, LLC** will not be responsible whatsoever for or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of **Global Tower Services, LLC** pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Monopole Profile

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Contract:

Revision: 1

Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

DESIGN SPECIFICATION

Design Standard: TIA/EIA-222-F-1996

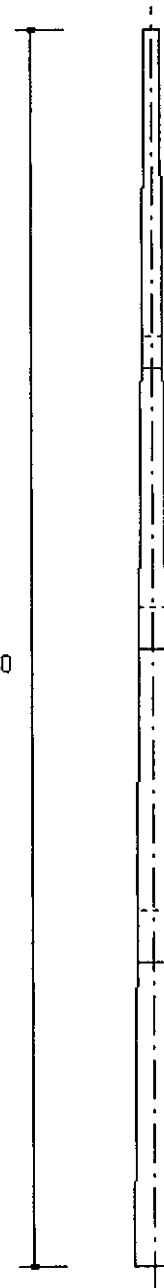
Basic Wind speed = 85.0 (mph)

Service Wind speed = 50.0 (mph)

Ice thickness = 0.50 (in)

Sct.	Length (ft)	Overlap (ft)	Top Dia. (in)	Bot Dia. (in)	Thick. (in)
1	51.00	7.25	55.51	68.36	0.4375
2	51.00	6.00	45.23	58.08	0.3750
3	45.00	4.75	36.15	47.49	0.3750
4	49.00	0.00	25.50	37.85	0.2500

178.00



MAXIMUM BASE REACTIONS

Download (Kips)	63.4
Shear (Kips)	36.3
Moment (Kipsft)	4545.7

APPENDIX B

Calculations

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Contract:

Revision: 1

Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

Section A: PROJECT DATA

Project Title: Structural Analysis of 180 ft. Monopole
Customer Name: AT&T
Site: CT-5030 (Mansfield Center I)
Contract No.:
Revision: 1
Engineer: Mike De Boer
Date: Sep 12 2012
Time: 08:51:36 AM

Design Standard: TIA/EIA-222-F-1996

GENERAL DESIGN CONDITIONS

Start Wind direction: 0.00 (Deg)
End Wind direction: 330.00 (Deg)
Increment wind direction: 30.00 (Deg)
Elevation above ground: 0.00 (ft)
Gust Response Factor Gh: 1.69
Material Density: 490.1 (lbs/ft³)
Young's Modulus: 29000.0 (ksi)
Poisson Ratio: 0.3
Weight Multiplier: 1.00
Allowable Stress Incr. Factor: 1.333
Increase allowable stress: Yes

WIND ONLY CONDITIONS:

Basic Wind Speed: 85.00 (mph)

WIND AND ICE CONDITIONS:

Basic Wind Speed: 85.00 (mph)
Ice Thickness: 0.50 (in)
Ice density: 56.19 (lbs/ft³)
Wind pressure reduction
for iced conditions: 0.75

WIND ONLY SERVICEABILITY CONDITIONS:

Operational Wind Speed: 50.00 (mph)

Analysis performed using: TowerSoft Finite Element Analysis Program

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Contract:

Revision: 1

Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

Section B: STRUCTURE GEOMETRY

Total Height (ft)	Bottom Diameter (in)	Top Diameter (in)
178.00	68.36	25.50

Sect. No	Length (ft)	Overlap (ft)	Bot Dia. (in)	Top Dia. (in)	Thick. (in)	Sides	Joint Type	Yield Stress (ksi)	Mass (lbs)	Calculated Taper (in/ft)
1	51.00	7.25	68.36	55.51	0.4375	18-sided	Flange	65.0	14820.6	0.25202
2	51.00	6.00	58.08	45.23	0.3750	18-sided	Telescopic	65.0	10593.5	0.25202
3	45.00	4.75	47.49	36.15	0.3750	18-sided	Telescopic	65.0	7554.6	0.25202
4	49.00	0.00	37.85	25.50	0.2500	18-sided	Telescopic	65.0	4157.9	0.25202

Total Mass:

37126.6

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Contract:

Revision: 1

Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

Section D: TRANSMISSION LINE DATA

Transmission Lines Position

No.	Bot El (ft)	Top El (ft)	Desc.	Radius (ft)	Az.	Orient.	No.	Shielded	Shielded Lines	Antenna
1	6.00	180.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	
2	6.00	180.00	LDF5P-50A	0.00	0.00	0.00	4	Yes	4	
3	6.00	168.00	LDF7P-50A	0.00	0.00	0.00	6	Yes	6	
4	0.00	168.00	LDF5P-50A	0.00	0.00	0.00	2	Yes	2	
5	0.00	168.00	LDF2-50	0.00	0.00	0.00	1	Yes	1	
6	6.00	160.00	LDF7P-50A	0.00	0.00	0.00	6	Yes	6	
7	6.00	150.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	
8	6.00	110.00	LDF7P-50A	0.00	0.00	0.00	4	Yes	4	

Transmission Lines Details

No.	Desc.	Width (in)	Depth (in)	Unit Mass (lb/ft)
1	LDF7P-50A	2.01	2.01	0.92
2	LDF5P-50A	1.10	1.10	0.33
3	LDF7P-50A	2.01	2.01	0.92
4	LDF5P-50A	1.10	1.10	0.33
5	LDF2-50	0.43	0.43	0.08
6	LDF7P-50A	2.01	2.01	0.92
7	LDF7P-50A	2.01	2.01	0.92
8	LDF7P-50A	2.01	2.01	0.92

Utilization of the cross-section for TX Lines: 13.41%

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Project: Structural Analysis of 180 ft. Monopole

Site: CT-5030 (Mansfield Center I)

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Engineer: Mike De Boer

Section F: POINT LOAD DATA

Structure Azimuth from North:0.00

POINT LOADS

No.	Description	Elev. (ft)	Radius (ft)	Azim. (Deg)	Orient. (Deg)	Vertical Offset (ft)	Tx Line	Comments
1	(3) Antel BXA-70063-6CF	178.00	0.00	0.0	0.0	0.00		Verizon (0.75)
2	(4) 18'x16 Element Dipole	178.00	0.00	0.0	0.0	0.00		City of Mansfield
(1.00)								
3	Platform Mount	178.00	0.00	0.0	0.0	0.00		Verizon
4	(6) Antel LPA-80080-4CF	178.00	0.00	0.0	0.0	0.00		Verizon (0.75)
5	(3) Antel BXA-185090-8CF	178.00	0.00	0.0	0.0	0.00		Verizon (0.75)
6	(6) RFS FD9R6004-2C03L	178.00	0.00	0.0	0.0	0.00		Verizon (1.00)
7	(3) Powerwave 7770	168.00	0.00	0.0	0.0	0.00		AT&T (1.00)
8	(3) KMW AM-X-CD-16-65-00T	168.00	0.00	0.0	0.0	0.00		AT&T (1.00)
9	(6) TMAs LGP 21401	168.00	0.00	0.0	0.0	0.00		AT&T (1.00)
10	(6) RRU-11	168.00	0.00	0.0	0.0	0.00		AT&T (1.00)
11	(1) DC6-48-60-18-8F	168.00	0.00	0.0	0.0	0.00		AT&T (1.00)
12	Sector Mounts	168.00	0.00	0.0	0.0	0.00		AT&T
13	(9) 6' Panels	158.00	0.00	0.0	0.0	0.00		Sprint (0.80)
14	LP Platform	158.00	0.00	0.0	0.0	0.00		Sprint (1.00)
15	(6) APX19PV-16PVL-E	148.00	0.00	0.0	0.0	0.00		T-Mobile (0.85)
16	LP Platform	148.00	0.00	0.0	0.0	0.00		T-Mobile (1.00)
17	(4) 18'x16 Element Dipole	110.00	0.00	0.0	0.0	0.00		City of Mansfield
(1.00)								
18	T-Arms	110.00	0.00	0.0	0.0	0.00		Town of Mansfield
(1.00)								

POINT LOADS WIND AREAS AND WEIGHTS

No.	Description	Frontal Bare Area (ft^2)	Lateral Bare Area (ft^2)	Frontal Iced Area (ft^2)	Lateral Iced Area (ft^2)	Weight Bare (Kips)	Weight Iced (Kips)
1	(3) Antel BXA-70063-6CF	17.39	17.39	19.21	19.21	0.05	0.17
2	(4) 18'x16 Element Dipole	16.00	16.00	24.00	24.00	0.16	1.00
3	Platform Mount	30.00	30.00	38.00	38.00	2.00	2.50
4	(6) Antel LPA-80080-4CF	27.27	27.27	29.93	29.93	0.07	0.27
5	(3) Antel BXA-185090-8CF	6.44	6.44	7.65	7.65	0.04	0.09
6	(6) RFS FD9R6004-2C03L	2.20	2.20	2.98	2.98	0.02	0.04
7	(3) Powerwave 7770	17.64	17.64	19.59	19.59	0.11	0.20
8	(3) KMW AM-X-CD-16-65-00T	24.78	24.78	27.24	27.24	0.15	0.29
9	(6) TMAs LGP 21401	7.74	7.74	9.18	9.18	0.09	0.13
10	(6) RRU-11	17.64	17.64	19.74	19.74	0.33	0.45
11	(1) DC6-48-60-18-8F	2.22	2.22	2.55	2.55	0.03	0.05
12	Sector Mounts	24.00	24.00	30.00	30.00	1.50	2.00
13	(9) 6' Panels	60.48	60.48	83.04	83.04	0.27	0.55
14	LP Platform	24.00	24.00	30.00	30.00	1.50	2.00
15	(6) APX19PV-16PVL-E	34.17	34.17	37.49	37.49	0.24	0.45
16	LP Platform	24.00	24.00	30.00	30.00	1.50	2.00
17	(4) 18'x16 Element Dipole	16.00	16.00	24.00	24.00	0.16	1.00
18	T-Arms	21.00	21.00	27.00	27.00	1.25	1.75

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Section K: POLE OUTPUT LOAD DATA

Load Combination		Max Envelope		
Wind Direction		Maximum		
Elev. (ft)	Axial Ld. (kips)	Shear Ld. (kips)	Torque (kipsft)	Bend Mom. (kipsft)
178.00	4.14	5.55	0.01	0.09
169.17	4.14	5.55	0.00	48.94
169.17	7.49	10.49	0.02	49.16
160.33	7.49	10.49	0.01	141.38
160.33	10.56	15.03	0.04	141.67
151.50	10.56	15.03	0.03	273.86
151.50	13.73	18.72	0.05	274.22
142.67	13.73	18.72	0.04	439.43
142.67	15.99	20.70	0.07	439.84
133.83	15.99	20.70	0.06	621.84
133.83	17.08	21.34	0.08	622.14
129.08	17.08	21.34	0.07	723.30
129.08	18.58	21.94	0.09	723.55
122.22	18.58	21.94	0.08	873.44
122.22	20.46	22.67	0.10	873.72
115.35	20.46	22.67	0.09	1028.54
115.35	22.63	23.76	0.10	1028.81
108.48	22.63	23.76	0.10	1191.07
108.48	26.37	25.80	0.11	1191.33
101.62	26.37	25.80	0.10	1368.41
101.62	28.10	26.53	0.11	1368.66
94.75	28.10	26.53	0.11	1549.85
94.75	29.77	27.20	0.12	1550.07
88.75	29.77	27.20	0.11	1712.80
88.75	32.16	27.94	0.12	1713.01
81.20	32.16	27.94	0.11	1923.06
81.20	34.80	28.74	0.12	1923.28
73.65	34.80	28.74	0.12	2139.38
73.65	36.95	29.51	0.12	2139.58
66.10	36.95	29.51	0.12	2361.54
66.10	39.16	30.27	0.12	2361.72
58.55	39.16	30.27	0.12	2589.49
58.55	41.45	31.03	0.12	2589.64
51.00	41.45	31.03	0.12	2824.16
51.00	43.76	31.75	0.12	2824.29
43.75	43.76	31.75	0.12	3052.90
43.75	47.20	32.46	0.12	3053.01
36.46	47.20	32.46	0.12	3289.99
36.46	50.85	33.14	0.12	3290.07
29.17	50.85	33.14	0.12	3531.04
29.17	53.57	33.80	0.12	3531.11
21.88	53.57	33.80	0.12	3776.96
21.88	56.37	34.47	0.12	3777.01
14.58	56.37	34.47	0.11	4027.79
14.58	59.25	35.14	0.11	4027.81
7.29	59.25	35.14	0.11	4284.76
7.29	62.08	35.83	0.11	4284.76
0.00	62.08	35.83	0.11	4545.66
Base	63.41	36.25	0.11	4545.66

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Section L: STRENGTH ASSESSMENT DATA

Load Combination		Max Envelope				
Wind Direction		Maximum				
Elev. (ft)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Total Stress (ksi)	Allowable Stress (ksi)	Assess.
178.00	0.01	0.21	0.26	0.50	52.00	0.010
169.17	3.71	0.19	0.24	3.92	52.00	0.075
169.17	3.99	0.21	0.48	4.28	52.00	0.082
160.33	9.81	0.19	0.44	10.03	52.00	0.193
160.33	9.83	0.29	0.64	10.18	52.00	0.196
151.50	16.44	0.27	0.59	16.73	52.00	0.322
151.50	16.46	0.36	0.74	16.86	52.00	0.324
142.67	23.04	0.33	0.69	23.40	52.00	0.450
142.67	23.06	0.40	0.76	23.50	52.00	0.452
133.83	28.72	0.37	0.72	29.13	52.00	0.560
133.83	28.74	0.41	0.74	29.17	52.00	0.561
129.08	21.69	0.30	0.50	22.01	52.00	0.423
122.22	23.88	0.28	0.48	24.18	52.00	0.465
122.22	23.89	0.32	0.49	24.23	52.00	0.466
115.35	25.76	0.31	0.47	26.08	52.00	0.502
115.35	25.76	0.34	0.49	26.12	52.00	0.502
108.48	27.42	0.33	0.47	27.76	52.00	0.534
108.48	27.42	0.38	0.51	27.82	52.00	0.535
101.62	29.06	0.36	0.49	29.43	52.00	0.566
101.62	29.06	0.39	0.51	29.47	52.00	0.567
94.75	30.45	0.38	0.49	30.84	52.00	0.593
94.75	30.45	0.41	0.50	30.87	52.00	0.594
88.75	32.55	0.44	0.51	33.00	52.00	0.635
81.20	33.71	0.42	0.49	34.14	52.00	0.657
81.20	33.71	0.46	0.50	34.19	52.00	0.657
73.65	34.70	0.45	0.48	35.16	52.00	0.676
73.65	34.70	0.48	0.49	35.19	52.00	0.677
66.10	35.55	0.46	0.48	36.02	52.00	0.693
66.10	35.55	0.49	0.49	36.05	52.00	0.693
58.55	36.27	0.48	0.47	36.75	52.00	0.707
58.55	36.27	0.51	0.48	36.79	52.00	0.707
51.00	36.90	0.49	0.47	37.40	52.00	0.719
51.00	36.90	0.52	0.48	37.43	52.00	0.720
43.75	33.01	0.48	0.41	33.50	52.00	0.644
36.46	33.38	0.46	0.40	33.85	52.00	0.651
36.46	33.38	0.51	0.41	33.89	52.00	0.652
29.17	33.67	0.49	0.39	34.17	52.00	0.657
29.17	33.68	0.52	0.40	34.20	52.00	0.658
21.88	33.92	0.51	0.39	34.43	52.00	0.662
21.88	33.92	0.53	0.40	34.46	52.00	0.663
14.58	34.13	0.52	0.39	34.65	52.00	0.666
14.58	34.13	0.55	0.39	34.68	52.00	0.667
7.29	34.31	0.53	0.38	34.85	52.00	0.670
7.29	34.31	0.56	0.39	34.88	52.00	0.671
0.00	34.45	0.55	0.38	35.00	52.00	0.673

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Engineer: Mike De Boer

Section M: SECTION PROPERTIES DATA

Elev. (ft)	Diam. (in)	Width (in)	Thick. (in)	W/t	Area (in^2)	S (in^3)
178.0	25.5	4.0	0.250	16.0	20.1	124.83
169.2	27.7	4.4	0.250	17.6	21.8	147.91
169.2	27.7	4.4	0.250	17.6	21.8	147.91
160.3	30.0	4.8	0.250	19.1	23.6	172.94
160.3	30.0	4.8	0.250	19.1	23.6	172.94
151.5	32.2	5.2	0.250	20.7	25.4	199.93
151.5	32.2	5.2	0.250	20.7	25.4	199.93
142.7	34.4	5.6	0.250	22.3	27.1	228.87
142.7	34.4	5.6	0.250	22.3	27.1	228.87
133.8	36.7	6.0	0.250	23.9	28.9	259.78
133.8	36.7	6.0	0.250	23.9	28.9	259.78
129.1	37.8	6.2	0.250	24.7	29.8	277.20
129.1	37.3	5.8	0.375	15.6	44.0	400.27
122.2	39.1	6.1	0.375	16.4	46.0	438.83
122.2	39.1	6.1	0.375	16.4	46.0	438.83
115.4	40.8	6.4	0.375	17.2	48.1	479.16
115.4	40.8	6.4	0.375	17.2	48.1	479.16
108.5	42.5	6.7	0.375	18.0	50.2	521.27
108.5	42.5	6.7	0.375	18.0	50.2	521.27
101.6	44.3	7.1	0.375	18.8	52.2	565.15
101.6	44.3	7.1	0.375	18.8	52.2	565.15
94.8	46.0	7.4	0.375	19.6	54.3	610.81
94.8	46.0	7.4	0.375	19.6	54.3	610.81
88.8	47.5	7.6	0.375	20.3	56.1	652.15
88.8	46.7	7.5	0.375	20.0	55.2	631.48
81.2	48.6	7.8	0.375	20.9	57.5	684.58
81.2	48.6	7.8	0.375	20.9	57.5	684.58
73.7	50.5	8.2	0.375	21.8	59.7	739.83
73.7	50.5	8.2	0.375	21.8	59.7	739.83
66.1	52.5	8.5	0.375	22.7	62.0	797.22
66.1	52.5	8.5	0.375	22.7	62.0	797.22
58.6	54.4	8.8	0.375	23.6	64.2	856.76
58.6	54.4	8.8	0.375	23.6	64.2	856.76
51.0	56.3	9.2	0.375	24.5	66.5	918.43
51.0	56.3	9.2	0.375	24.5	66.5	918.43
43.8	58.1	9.5	0.375	25.3	68.7	979.68
43.8	57.3	9.2	0.438	21.1	79.0	1109.71
36.5	59.2	9.6	0.438	21.8	81.6	1182.83
36.5	59.2	9.6	0.438	21.8	81.6	1182.83
29.2	61.0	9.9	0.438	22.6	84.1	1258.28
29.2	61.0	9.9	0.438	22.6	84.1	1258.28
21.9	62.8	10.2	0.438	23.3	86.7	1336.07
21.9	62.8	10.2	0.438	23.3	86.7	1336.07
14.6	64.7	10.5	0.438	24.1	89.2	1416.18
14.6	64.7	10.5	0.438	24.1	89.2	1416.18
7.3	66.5	10.9	0.438	24.8	91.8	1498.63
7.3	66.5	10.9	0.438	24.8	91.8	1498.63
0.0	68.4	11.2	0.438	25.6	94.3	1583.42

Note: w/t values marked with * (asterisk) indicate width to thickness exceeding maximum allowable values by standards.

Project: Structural Analysis of 180 ft. Monopole
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Contract:
Engineer: Mike De Boer

BASE PLATE DETAILS

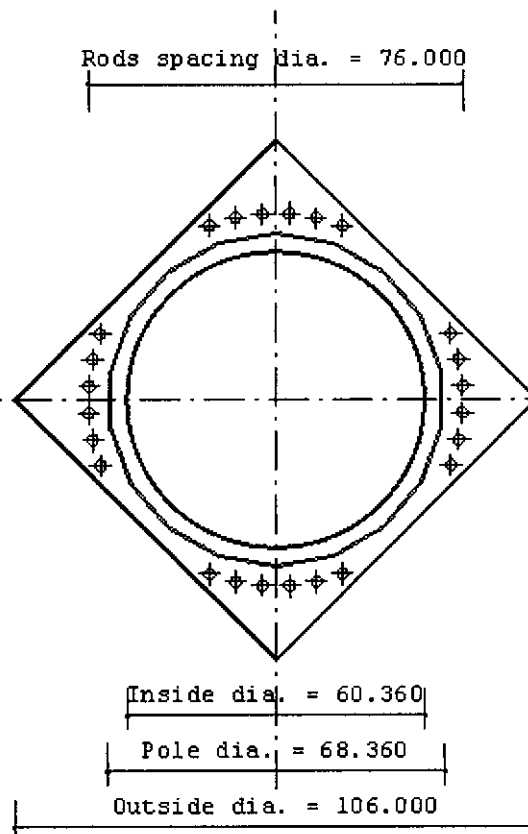
Axial Load(Kips)	= 52.67
Shear Load(Kips)	= 36.25
Bending Moment(Kipsft)	= 4545.66
Torque(Kipsft)	= 0.11

No of rods	= 24
Grade	= A615 Gr.75
Size	= 2 1/4 in
Rods Spacing(in)	= 5.500
Lar * (in)	= 3.000
Shear Load(Kips)	= 1.51
Axial Load(Kips)	= 121.82
Shear Cap. (Kips)	= 90.12
Axial Cap. (Kips)	= 194.85
Assessment Ratio	= 0.64
Allow. Stress Increase	= 1.33

Thickness (in) = 3.000
Grade = A572 gr.50
Max. Stress(ksi) = 19.7
Allow. Stress(ksi) = 50.0
Assessment Ratio = 0.4
Allow. Stress Increase= 1.33

Plate Bottom above Concrete

* Lar = Length from top of concrete
to bottom of anchor rod leveling nut.



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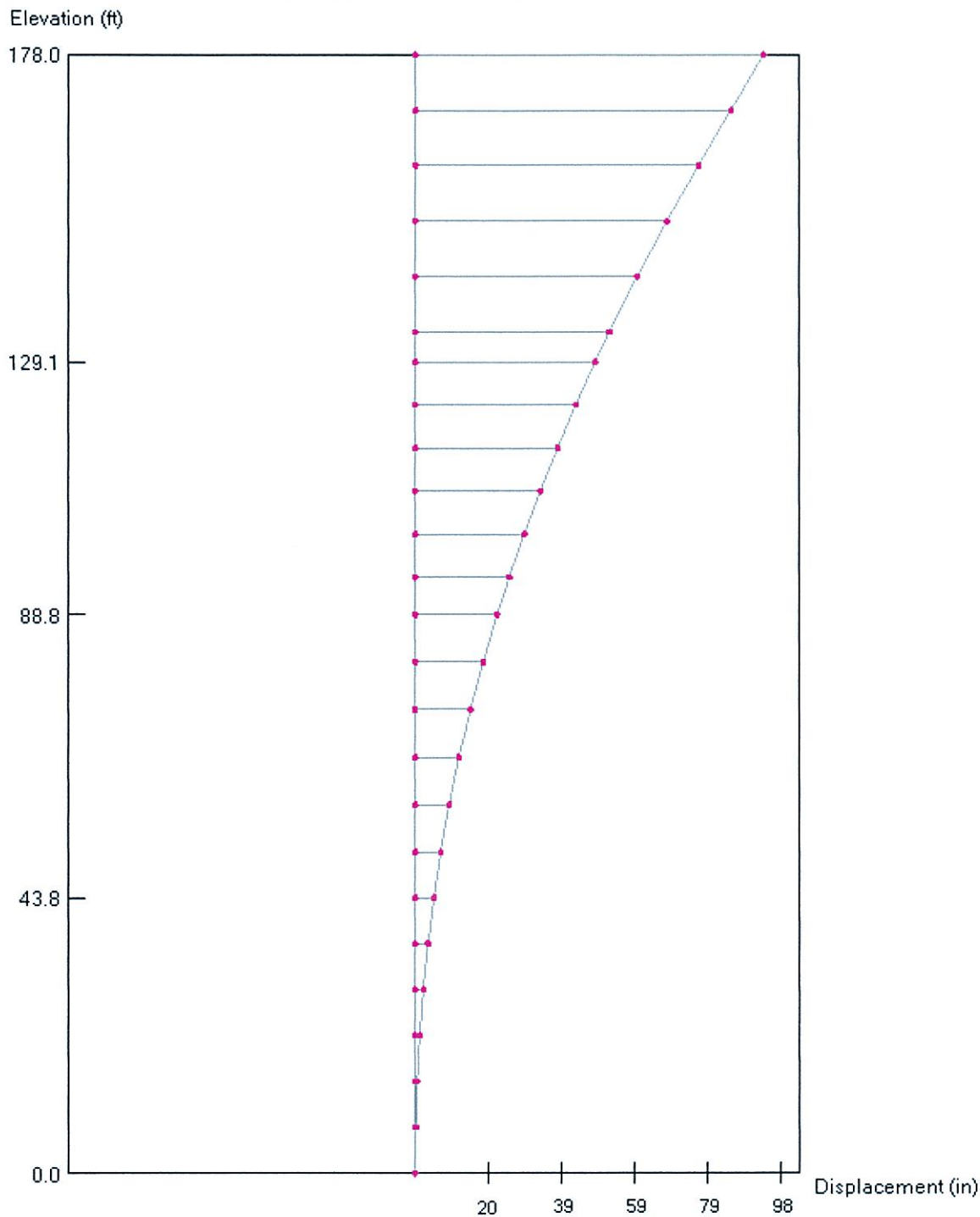
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Engineer: Mike De Boer

Horizontal Displacement Diagram

Max. Envelope (All Loading Cases)



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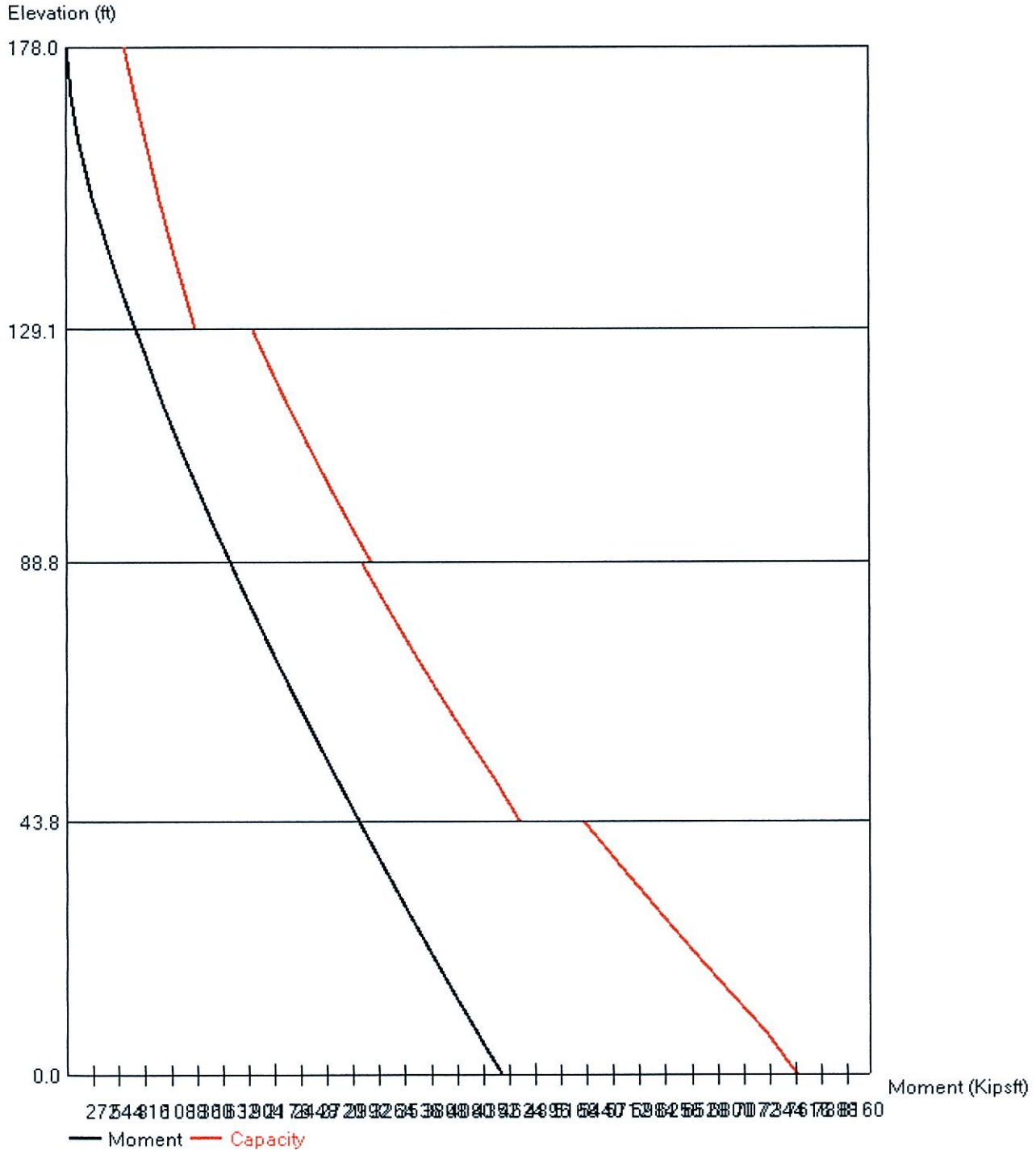
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Date and Time: 9/12/2012 9:27:52 AM

Engineer: Mike De Boer

Bending Moment Diagram

Max. Envelope (All Loading Cases)



APPENDIX C

Collocation Application

**APPLICANT/CARRIER INFORMATION**

ADDITIONAL CARRIER INFORMATION

SITE INFORMATION

Antenna Equipment Specifications

Sectors (1, 2, 3 etc. - if applicable)						
Equipment Type (Panel, Omni, RRU, TMA, RET, MW Dish etc.)	Panel	TMA		Panel	RRU	Surge Arrestor
Installation Status (Existing, Proposed etc.)	Existing (to remain)	Existing (to remain)		Proposed	Proposed	Proposed
Rad Center AGL (ft)	168	168		168	168	168
Equipment Mount Height (ft)	168	168		168	168	168
Equipment Mount Type						
Equipment Quantity	3	6		3	6	1
Equipment Manufacturer	Powerwave	Powerwave		KMW	Ericsson	Raycap
Equipment Model #	7770	LGP21401		AM-X-CD-16-65-00T	RRU-11	DC6-48-60-18-8F
Equipment Weight (per item in lbs))	35	17.5		48.5	55	20 lbs
Equipment Dimensions (HxWxD) (Indicate feet or inches)	55" x 11" x 5"	14" x 7" x 2.7"		72" x 11.8" x 5.9"	17.8" x 17" x 7.2"	23.5" x 9.7"
TOTAL # of LINES for equipment in column	6	N/A		N/A	3	N/A
Line Type	Coax			N/A	(1) Fiber trunk/ (2) WR-VG86ST-BRD DC Cables	



GLOBAL TOWER PARTNERS Collocation Application

Line Diameter/Size	1 5/8"			N/A	10mm / 3/4 "	
Orientation/Azimuth (degrees from true north)	90, 210, 330			90, 210, 330		
Mechanical Tilt (degrees)				0 - 8		
TX Frequency	880-894, 1930-1990			704-716		
RX Frequency	835-850, 1850-1910			734-746		
ERP (watts)				250		
Type of Technology (i.e. 3G, LTE, CMDA etc)	GSM/UMTS			LTE	LTE	LTE

Will RRU's be installed behind Antennas ☒ Yes ☐ No

If no, please explain:

FIBER: ☐ Yes ☐ No Who is Provider?

PLEASE NOTE - All Equipment Lines are required to be installed inside the tower when space is available. Carriers will be charged an additional \$25.00 per line per month if equipment lines are installed on the outside of the tower even though there is available space inside the tower. GTP must approve any installation of lines on the outside of towers prior to installation commencement.

GROUND SPACE REQUIREMENTS

Total Ground Area Dimensions Required (length x width x height in ft.)	16' x 7' x 10'	Generator: <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Natural Gas
Cabinet Pad Dimensions	13' x 7	Pad Dimension (L X W, ft.):
Shelter Pad Dimensions		Cabinet Manufacturer
		Shelter Manufacturer

AC POWER REQUIREMENTS.

Voltage:	Total Amperage:
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Comments:

Scope of Work:

- Add three (3) new LTE antennas
- Add six (6) RRU's
- Add One (1) Ray Cap Surge Arrestor
- Add One (1) Rosenberger FB-L98B-002 fiber trunk
- Add two (2) WR-VG86ST-BRD DC cables
- Add 1 RBS6601 cabinet.

Final Configuration:

- Six (6) Panel Antennas:
 - Three (3) KMW AM-X-CD-16-65-00T (NEW)
 - Three (3) Powerwave 7770
- Six (6) RFS 1 5/8" coax
- Six (6) Powerwave LGP21401 TMA's
- Six (6) Ericsson RRU-11 RRU's
- One (1) Raycap DC6-48-60-18-8F surge arrestor
- One (1) Rosenberger FB-L98B-002 fiber trunk 10 mm
- Two (2) WR-VG86ST-BRD DC cables @ 3/4"



GLOBAL TOWER PARTNERS
Collocation Application



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Calculated Radio Frequency Emissions



CT5858

(AWE - Mansfield Central)

230 Clover Mill Rd., Mansfield, CT 06268

September 13, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 230 Clover Mill Road in Mansfield, CT. The coordinates of the tower are 41° 46' 32.97" N, 72° 13' 21.15" W.

AT&T is proposing the following modifications:

- 1) Install three multi-band (700/850/1900/2100 MHz) antennas (one per sector) for their LTE network.

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/cm^2). 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.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \frac{1.6^2 \cdot \text{EIRP}}{4\pi \cdot R^2} \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

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 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 take into account 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 finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, 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
<i>Cingular GSM</i>	168	880	4	296	0.0151	0.5867	2.57%
<i>Cingular GSM</i>	168	1900	2	427	0.0109	1.0000	1.09%
<i>Cingular UMTS</i>	168	880	1	500	0.0064	0.5867	1.09%
Sprint	157.5	1962.5	11	205.9	0.0328	1.0000	3.28%
Verizon	178	869	9	267	0.0273	0.5793	4.71%
Verizon	178	1970	11	395	0.0493	1.0000	4.93%
Verizon	178	757	1	703	0.0080	0.5047	1.58%
T-Mobile	148	1935	8	169	0.0222	1.0000	2.22%
Fire Svcs & EMS	187	420	1	500	0.0051	0.2800	1.84%
Fire Svcs & EMS	187	420	1	500	0.0051	0.2800	1.84%
Fire Svcs & EMS	188	152	1	500	0.0051	0.2000	2.54%
Emergency Mgmt	188	153	1	500	0.0051	0.2000	2.54%
Public Works	188	152	1	500	0.0051	0.2000	2.54%
Fire Svcs & EMS	188	150	1	500	0.0051	0.2000	2.54%
Fire Svcs & EMS	188	150	1	500	0.0051	0.2000	2.54%
AT&T UMTS	168	880	2	565	0.0014	0.5867	0.25%
AT&T UMTS	168	1900	2	875	0.0022	1.0000	0.22%
AT&T LTE	168	734	1	1313	0.0017	0.4893	0.34%
AT&T GSM	168	880	1	283	0.0004	0.5867	0.06%
AT&T GSM	168	1900	4	525	0.0027	1.0000	0.27%
						Total	34.25%

Table 1: Carrier Information^{1 2 3}

¹ The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 7/26/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

² In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

³ Antenna height listed for AT&T is in reference to the GDP Group Structural Analysis dated September 12, 2012.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **34.25% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal 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 ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

September 13, 2012

Date

Attachment A: References

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

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

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

(A) Limits for Occupational/Controlled 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)
0.3-3.0	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 Exposure⁵

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)

⁴ 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

⁵ 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

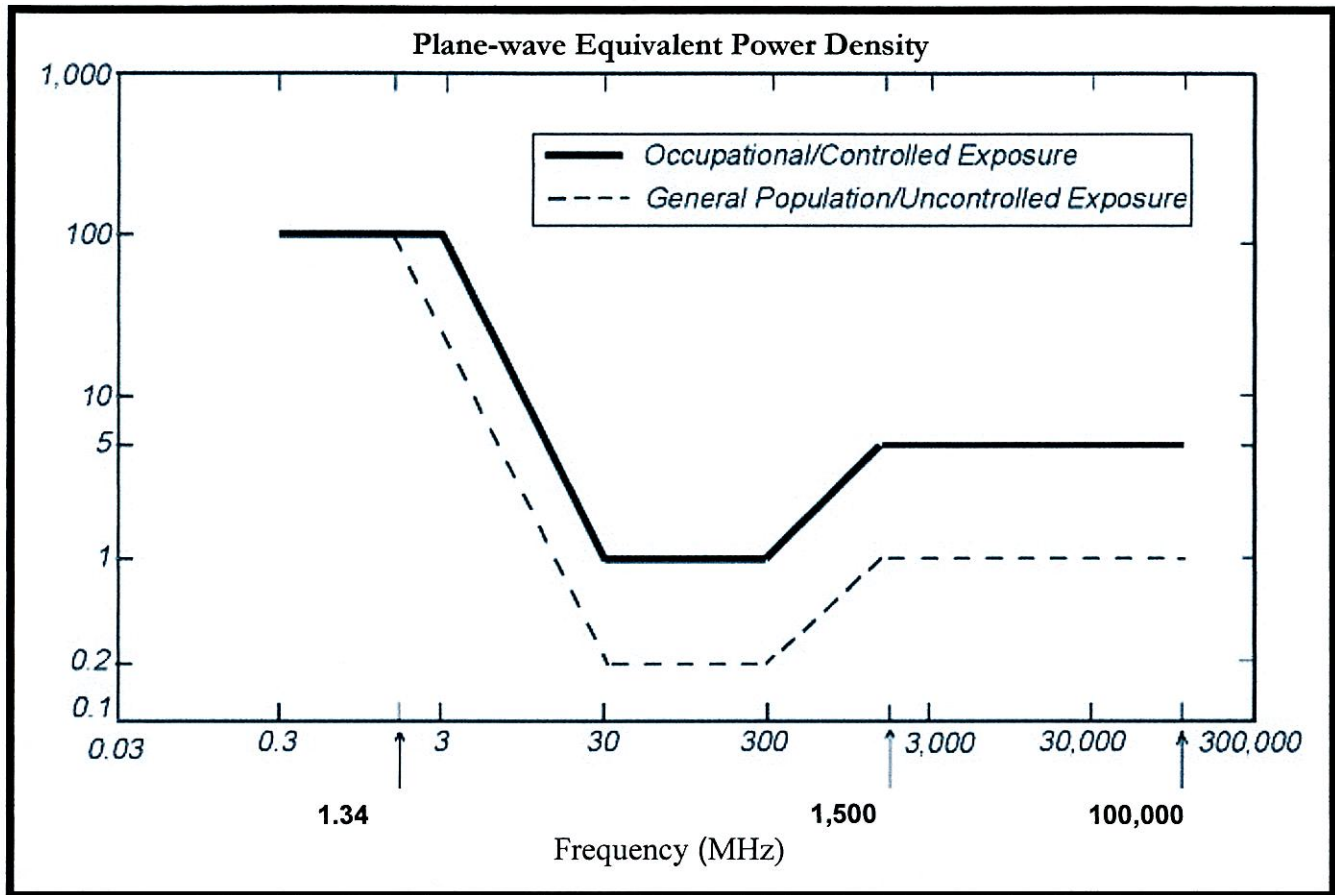
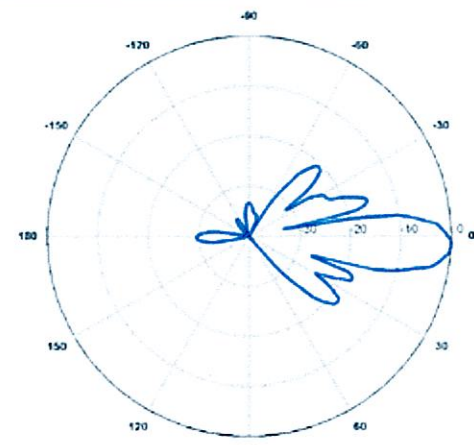
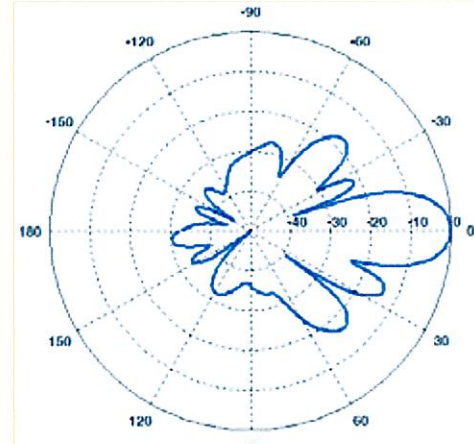


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

<p>700 MHz</p> <p>Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 698-806 MHz Gain: 13.4 dBd Vertical Beamwidth: 12.3° Horizontal Beamwidth: 65° Polarization: Dual Slant $\pm 45^\circ$ Size L x W x D: 72.0" x 11.8" x 5.9"</p>	
<p>850 MHz</p> <p>Manufacturer: Powerwave Model #: 7770.00 Frequency Band: 824-896 MHz Gain: 11.5 dBd Vertical Beamwidth: 15° Horizontal Beamwidth: 82° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 55.0" x 11.0" x 5.0"</p>	
<p>1900 MHz</p> <p>Manufacturer: Powerwave Model #: 7770.00 Frequency Band: 1850-1990 MHz Gain: 13.4 dBd Vertical Beamwidth: 7° Horizontal Beamwidth: 86° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 55.0" x 11.0" x 5.0"</p>	