STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 26, 2012

Eric Dahl
Nexlink Global Services
55 Lynn Road
Ivoryton, CT 06442

RE: **EM-AT&T-041-121009** - AT&T Mobility notice of intent to modify an existing telecommunications facility located at 126 Parker Road, East Haddam, Connecticut.

Dear Mr. Dahl:

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

- Prior to antenna installation, the modifications identified in the Structural Analysis Report prepared by Hudson Design Group dated September 27, 2012 (Rev1), and stamped by Gi Kai Wang shall be implemented; and
- Following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation do not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 8, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency

emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Mark B. Walter, First Selectman, Town of East Haddam
Crary H. Brownell, Chm, Planning and Zoning Comm, Town of East Haddam

EM-AT&T-041-121009

ORIGINAL

October 8, 2012

VIA OVERNIGHT DELIVERY

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

RE: AT&T Mobility – Notice of Exempt Modification
126 Parker Road, East Haddam, 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 First Selectman of the Town of East Haddam.

AT&T plans to modify the existing facility at 126 Parker Road, East Haddam, CT owned by CTI Towers (coordinates 41°27'39.3"N, -72°23'42.8"W). Attached are drawings depicting the planned changes, including the replacement of existing guy wires, 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 alongside the existing coax on the tower.

2.The proposed changes will not extend the site boundaries. AT&T will install additional equipment within its existing equipment shelter. 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 0.94%; the combined site operations will result in a total power density of 0.94%.

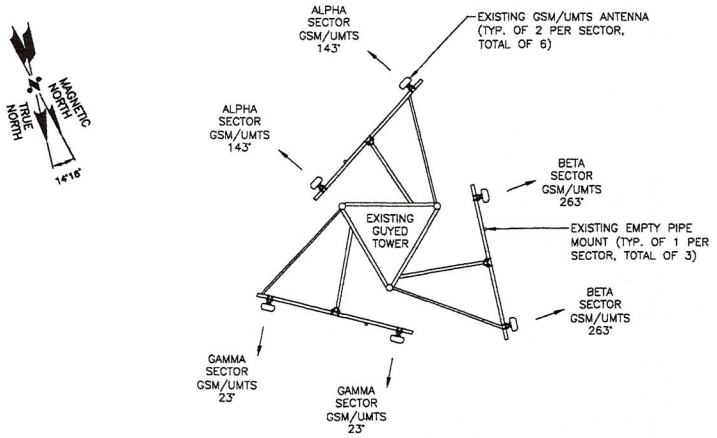
Please feel free to call me with any questions or concerns regarding this matter. Thank you for your consideration.

Respectfully submitted,
AT&T Mobility

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

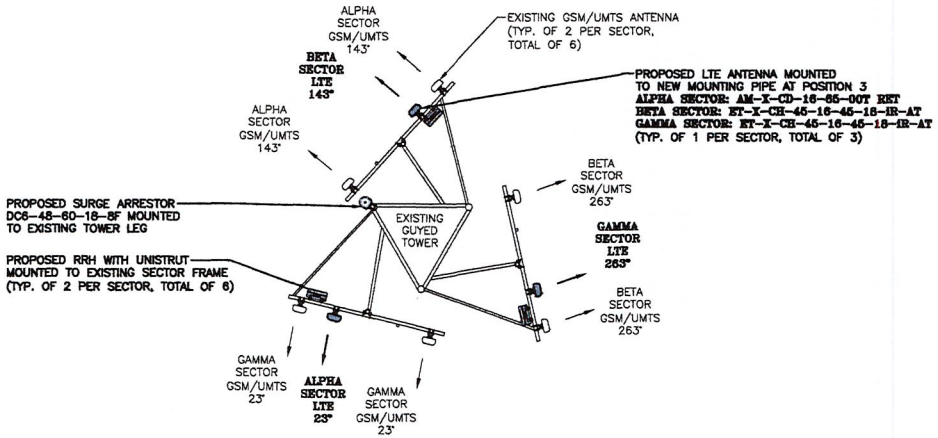
cc: Honorable Mark B. Walter, First Selectman, Town of East Haddam

Attachments



EXISTING GSM/UMTS ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

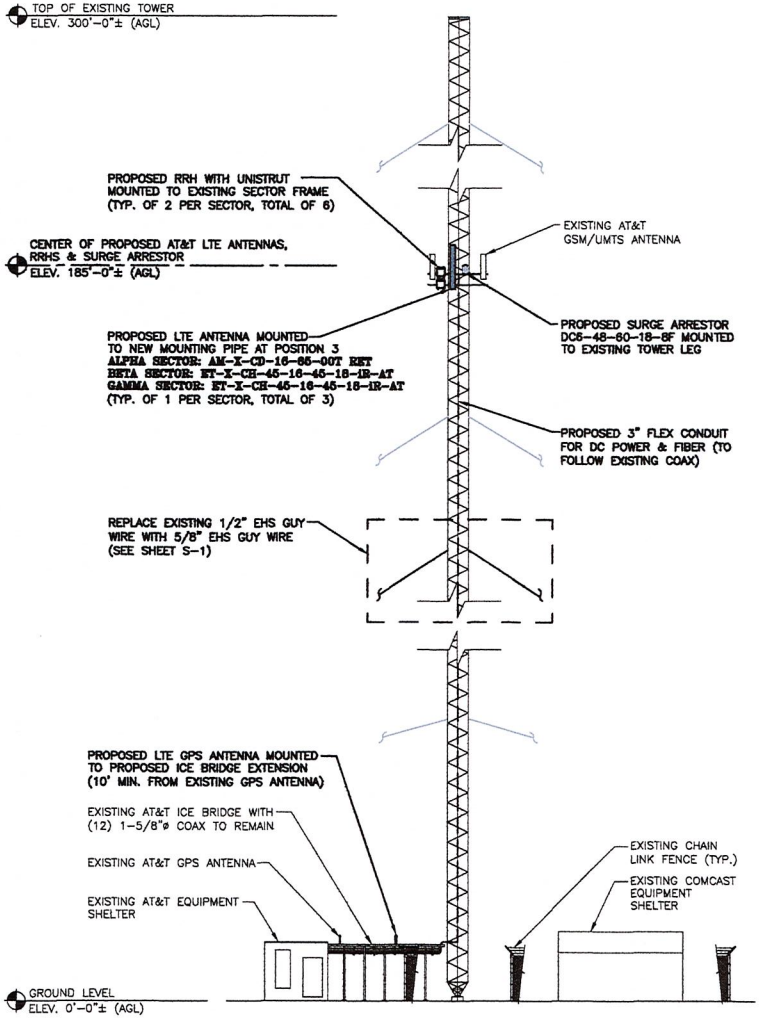
SCALE: N.T.S.

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP LLC, DATED: SEPTEMBER 27, 2012 (REV1) FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.



NORTH ELEVATION

SCALE: 3/32"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

SITE NUMBER: CT2053
SITE NAME: E. HADDAM

126 PARKER ROAD
EAST HADDAM, CT 06423
MIDDLESEX COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/01/12	ISSUED FOR CONSTRUCTION	RM	DC	DPH
0	07/13/12	ISSUED FOR REVIEW	RM	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RM

DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

AT&T

ELEVATION & ANTENNA PLAN (LTE)

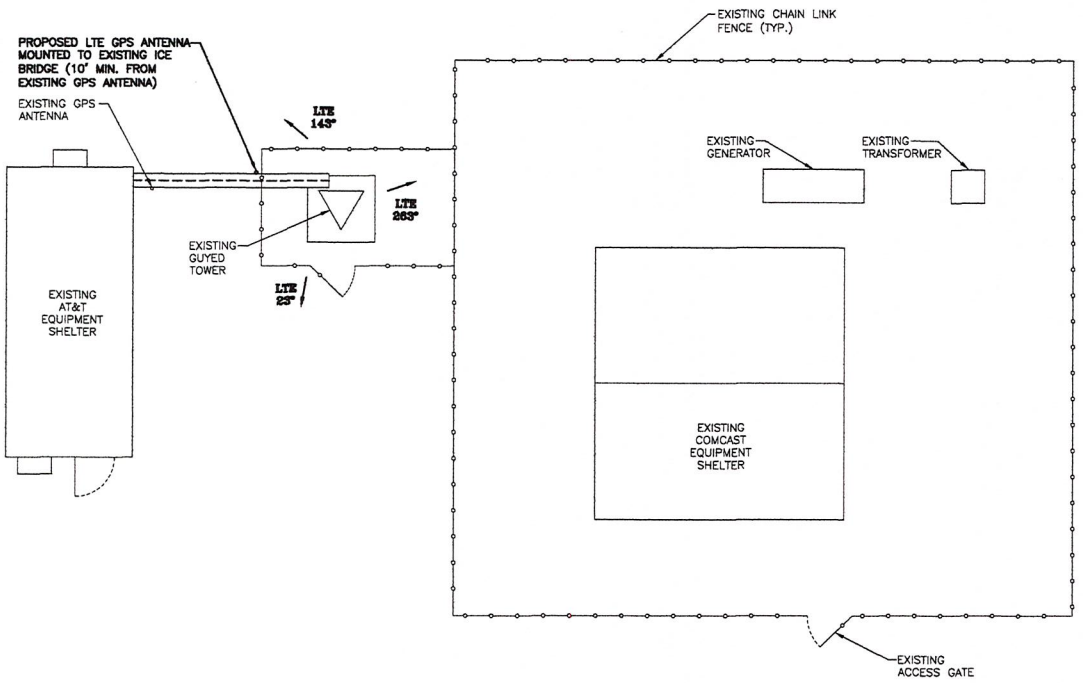
JOB NUMBER	DRAWING NUMBER	REV
2053.01	A-2	1

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP LLC, DATED: SEPTEMBER 27, 2012 (REV1) FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.



COMPOUND PLAN

SCALE: 3/16"= 1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"

EQUIPMENT PLAN

SCALE: 1/2"= 1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

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1	10/01/12	ISSUED FOR CONSTRUCTION	DC	DPH
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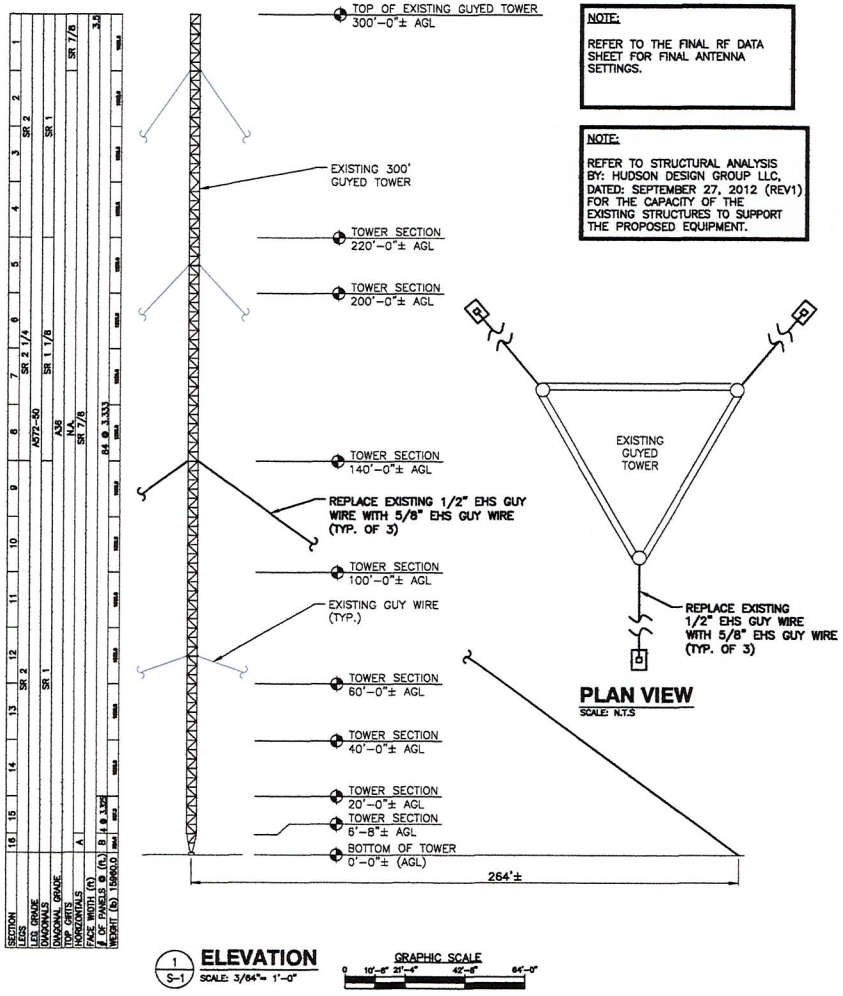
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RM

STATE OF CONNECTICUT DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND AND EQUIPMENT PLAN (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2053.01	A-1	1



NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP LLC, DATED: SEPTEMBER 27, 2012 (REV1) FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

PLAN VIEW
SCALE: N.T.S

1 S-1 **ELEVATION**
SCALE: 3/64"= 1'-0"

GRAPHIC SCALE
0 10'-6" 21'-0" 42'-0" 64'-0"

GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS NECESSARY TO COMPLETE THE PROJECT AND ABIDE BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO HUDSON DESIGN GROUP FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREA.
3. INCORRECTLY FABRICATED, DAMAGED, OTHERWISE MISFITTING, OR NON-CONFORMING MATERIALS AND CONDITIONS SHALL BE REPORTED TO HUDSON DESIGN GROUP PRIOR TO ANY REMEDIAL OR CORRECTIVE ACTION. ALL ACTIONS SHALL REQUIRE HUDSON DESIGN GROUP, LLC APPROVAL.
4. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AFTER COMPLETION OF THE PROJECT.
5. CONTRACTOR SHALL INSPECT ALL GUY ANCHOR SHAFTS FOR RUST OR DAMAGE BY CAREFULLY TRENCHING ALONG SHAFT UNTIL REACHING CONCRETE. CONTRACTOR SHALL DOCUMENT SHAFT CONDITION WITH SKETCHES, PHOTOS AND DIMENSIONS. COMPACT BACKFILL SOIL TO 95% PROCTOR.
6. CLEAN SUPPORT BEAMS AS REQUIRED AND RE-COAT WITH BITUMASTIC MATERIAL (IN IN GOOD CONDITION OR SURFACE RUST ONLY.
7. CONTRACTOR SHALL PROMPTLY REMOVE ANY AND ALL DEBRIS FROM SITE AND RESTORE AS BEST AS POSSIBLE TO PRE-CONSTRUCTION CONDITION.

STEEL:

1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE AND ASTM SPECIFICATIONS.
2. ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED WELDS WITH WELDING ELECTRODES E-70XX OR SPECIFIED HIGH STRENGTH BOLTS TO BE ASTM A325N, THREAD INCLUDED WITH SHEAR PLANE (UNLESS OTHERWISE NOTED)
3. ALL BOLTED CONNECTIONS TO BE INSTALLED TO A SNUG-TIGHTENED CONDITION IN ACCORDANCE WITH AISC 13 PART 16.2, "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", SECTION 8.1, UNLESS OTHERWISE NOTED.
4. ALL STEEL (EXCEPT A490 BOLTS), AFTER FABRICATION, SHALL BE HOT DIPPED GALVANIZED PER ASTM A-123. ALL DAMAGED SURFACES, WELDED AREAS AND AUTHORIZED NON-GALVANIZED MEMBERS OR PARTS (EXISTING OR NEW) SHALL BE PAINTED WITH 2 COATS OF ZRC COLD GALVANIZING COMPOUND.
5. ALL SHOP AND FIELD WELDING SHALL BE DONE BY WELDERS QUALIFIED AS DESCRIBED IN THE "AMERICAN WELDING SOCIETY'S STANDARD QUALIFICATION PROCEDURE" TO PERFORM THE TYPE OF WORK REQUIRED.
6. STRUCTURAL STEEL MAY NOT BE TORCH CUT FOR FABRICATION. ALL STEEL FABRICATION MUST FOLLOW AISC STANDARDS.

TABLE (GUY TENSION)

ELEVATION	ANCHOR DIRECTION	GUY GRADE	GUY SIZE	10% INITIAL TENSION (LBS)
140'	A	(P) EHS	5/8"	4,240
140'	B	(P) EHS	5/8"	4,240
140'	C	(P) EHS	5/8"	4,240

MISC. NOTES:

1. ALL MODIFICATIONS ARE ASSUMED TO BE MADE ON AN EMPTY TOWER. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS AND TRANSMISSION LINES. MODIFICATIONS MUST BE CONTINUOUS THROUGH ALL AREAS SHOWN.
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.

FABRICATION NOTES:

1. ALL DIMENSIONS ARE PRELIMINARY UNTIL FIELD VERIFIED BY CONTRACTOR. ANY CHANGES MUST BE APPROVED BY ENGINEER OF RECORD IN WRITING PRIOR TO FABRICATION AND INSTALLATION.
2. NEW STEEL MEMBERS MUST HAVE SINGLE DRILLED HOLES. SLOTTED AND DOUBLE DRILLED HOLES ARE NOT ACCEPTABLE MEANS OF FABRICATION.

CONTRACTOR QUALIFICATION NOTES:

1. ALL REPAIRS SHALL BE PERFORMED BY A TOWER CONTRACTOR WITH A MINIMUM OF 5 YEARS EXPERIENCE IN TOWER ERECTION AND RETROFIT AND WITH WORKING KNOWLEDGE OF THE ANSI/TIA-222-G "STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS"
2. CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MEANS AND METHODS. SHOULD THE CONTRACTOR REQUIRE DIRECT CONSULTATION, HUDSON DESIGN GROUP, LLC IS WILLING TO OFFER SERVICES BASED UPON AN AGREED FEE FOR THE WORK REQUIRED.
3. ALL SUBMITTAL INFORMATION MUST BE SENT TO HUDSON DESIGN GROUP, LLC 1600 OSGOOD ST. BUILDING 20N, SUITE 2-101 NORTH ANDOVER, MA 01845 TEL: (978)557-5553, FAX: (978)336-5586. ANY VARIATION OF THESE SPECIFICATIONS OR DRAWINGS WITHOUT CONSENT FROM HUDSON DESIGN GROUP WILL VOID ANY RESPONSIBILITY OR LIABILITY FOR DAMAGE (MATERIAL OR PHYSICAL) TOWARDS HUDSON DESIGN GROUP, LLC

JOB SITE SAFETY AND NOTES:

NEITHER THE PROFESSIONAL ACTIVITIES OF HUDSON DESIGN GROUP, LLC NOR THE PRESENCE OF HUDSON DESIGN GROUP, LLC OR EMPLOYEES AND SUB-CONSULTANTS AT THE CONSTRUCTION SITE, SHALL RELIEVE THE GENERAL CONTRACTOR AND/OR SUBCONTRACTORS AND ANY OTHER ENTITY OF THEIR OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES, OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ANY HEALTH OR SAFETY PRECAUTIONS REQUIRED BY ANY REGULATORY AGENCIES. THE GENERAL CONTRACTOR AND/OR SUBCONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SAFETY, AND WARRANTS THAT THIS INTENT IS EVIDENT BY ACCEPTING THIS WORK.

SUBSTITUTES AND/OR EQUALS:

IF CONTRACTOR WISHES TO FURNISH OR USE A SUBSTITUTE ITEM OF MATERIAL OR EQUIPMENT, CONTRACTOR SHALL MAKE WRITTEN APPLICATION TO ENGINEER FOR ACCEPTANCE THEREOF, CERTIFYING THAT THE PROPOSED SUBSTITUTE WILL ADEQUATELY PERFORM THE FUNCTIONS AND ACHIEVE THE RESULTS CALLED FOR BY THE GENERAL DESIGN, BE SIMILAR IN SUBSTANCE TO THAT SPECIFIED, AND SUITED TO THE SAME USE AS THAT SPECIFIED. ALL VARIATIONS OF THE PROPOSED SUBSTITUTE FROM THAT SPECIFIED WILL BE IDENTIFIED IN THE APPLICATION AND AVAILABLE MAINTENANCE, REPAIR, AND REPLACEMENT SERVICE WILL BE INDICATED. THE APPLICATION WILL ALSO CONTAIN AN ITEMIZED ESTIMATE OF ALL COSTS OR CREDITS THAT WILL RESULT DIRECTLY OR INDIRECTLY FROM ACCEPTANCE OF SUCH SUBSTITUTE INCLUDING COSTS OF REDESIGN AND CLAIMS OF OTHER CONTRACTORS AFFECTED BY THE RESULTING CHANGE, ALL OF WHICH WILL BE CONSIDERED BY ENGINEER IN EVALUATION OF THE PROPOSED SUBSTITUTE. ENGINEER MAY REQUIRE CONTRACTOR TO FURNISH ADDITIONAL DATA ABOUT THE PROPOSED SUBSTITUTE.

Hudson Design Group LLC
1400 OSGOOD STREET
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N. ANDOVER, MA 01845
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NEXLINK GLOBAL SERVICES
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800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

SITE NUMBER: CT2053
SITE NAME: E. HADDAM
126 PARKER ROAD
EAST HADDAM, CT 06423
MIDDLESEX COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	10/01/12	ISSUED FOR CONSTRUCTION	RM	DC	DPH
0	07/13/12	ISSUED FOR REVIEW	RM	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: RM

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 26178 · LICENSED PROFESSIONAL ENGINEER

AT&T
TOWER ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2053.01	S-1	1

(Revised)
STRUCTURAL ANALYSIS REPORT

For

CT2053
E. HADDAM
126 Parker Road
East Haddam, CT 06423

Antennas Mounted to the Tower

Prepared for:

NEXLINK GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

Dated: September 27, 2012 (Rev1)

STATE OF CONNECTICUT
GI KAJ WANG
No. 28220
LICENSED PROFESSIONAL ENGINEER
Gi Kaj Wang 9/27/12

Prepared by:

Hudson Design Group LLC
1600 Osgood Street Building 20 North, Suite 2-101
North Andover, MA 01845
Phone: (978) 557-5553
www.hudsondesigngroupllc.com

SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by AT&T to conduct a structural evaluation of the 300' guyed tower supporting the proposed AT&T antennas located at elevation 185' above the ground level.

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

Record drawings of the existing tower were not available for our use. The previous structural analysis report prepared by GPD Associates, dated April 22, 2009 was available and obtained for our use.

CONCLUSION SUMMARY:

HDG performed a structural analysis of the existing tower with the following modifications:

1. Replace the existing 1/2" EHS guy wire with 5/8" EHS guy wire at EL. 140'

Based on our evaluation, we have determined that the existing tower with modifications **are in conformance** with the ANSI/TIA-222-F Standard for the loading considered under the criteria listed in this report. The tower structure is rated at **88.1%** - (Guy wires at Tower Section T9 at EL.140.0' Controlling).

Hudson Design Group LLC

APPURTENANCES CONFIGURATION:

Tenant	Appurtenances	Elev.	Mount
	6' Omni	198'	4' Side Mount Standoff
AT&T	(6) Powerwave 7770 Antennas	185'	12' T-Frame
AT&T	(6) LGP 21400 TMA	185'	12' T-Frame
AT&T	(6) LGP 21900	185'	12' T-Frame
AT&T	***AM-X-CD-16-65-00 Antenna***	185'	12' T-Frame
AT&T	***(2) ET-X-CH-45-16-45-18 Antennas***	185'	12' T-Frame
AT&T	***(6) RRUs***	185'	12' T-Frame
AT&T	***Surge Arrestor DC6-48-60-18-8F***	185'	Tower Leg
	4' Yagi	165'	Tower Leg
	4' Yagi	160'	Tower Leg
	4' Yagi	143'	Tower Leg
	4' Yagi	130'	Tower Leg
	4' Yagi	125'	Tower Leg

Proposed AT&T Appurtenances shown in Bold.

AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(12) 1 5/8" Cables	185'	Face of Tower
AT&T	***Fiber Cable***	185'	Face of Tower
AT&T	***(2) DC Power Cables***	185'	Face of Tower

Proposed AT&T Coax Cables shown in Bold.

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Legs	59.7 %	100 – 120	PASS	
Diagonals	71.0 %	60 – 80	PASS	
Horizontals	48.3 %	60 – 80	PASS	
Top Girt	0.3 %	280 – 300	PASS	
Guy	**88.1 %**	140	**PASS**	**Controlling**

Hudson Design Group LLC

DESIGN CRITERIA:

1. EIA/TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

   County: Middlesex
   Wind Load: 90 mph (fastest mile)
   110 mph (3 second gust)
   Nominal Ice Thickness: 1/2 inch

2. Approximate height above grade to proposed antennas: 185'

***Calculations and referenced documents are attached.**

ASSUMPTIONS:

1. The tower dimensions, member sizes and strength of material are as indicated in the previous structural analysis prepared by GPD Associates, dated April 22, 2009.

2. The existing appurtenances configuration is as stated in the previous structural analysis prepared by GPD Associates, dated April 22, 2009. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.

3. The tower and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.

4. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.

5. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.

Hudson Design Group LLC

SUPPORT RECOMMENDATIONS:

HDG recommends that the proposed antennas and RRHs be mounted on the existing T-frame supported by the tower; the proposed surge arrestor be mounted on the tower leg.

Reference HDG's Latest Construction Drawings for all component and connection requirements (attached).

Hudson Design Group LLC

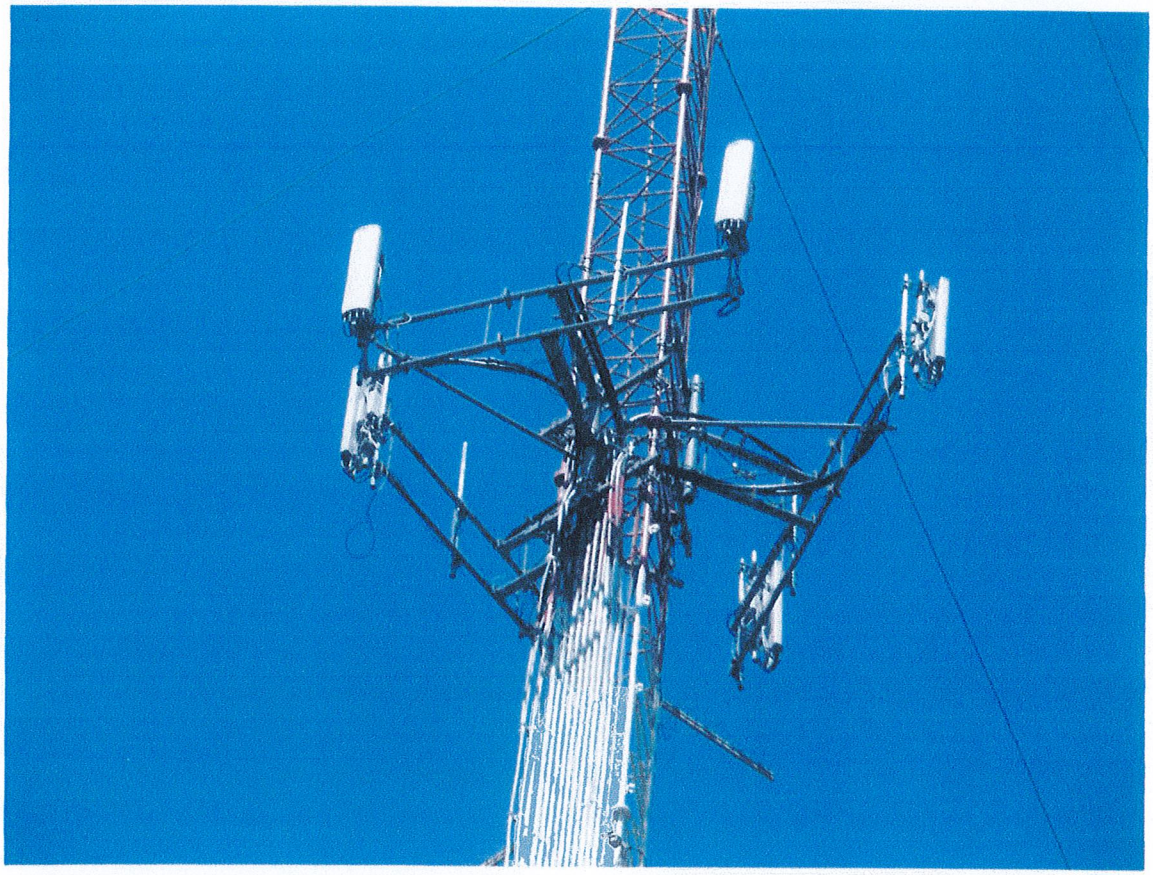
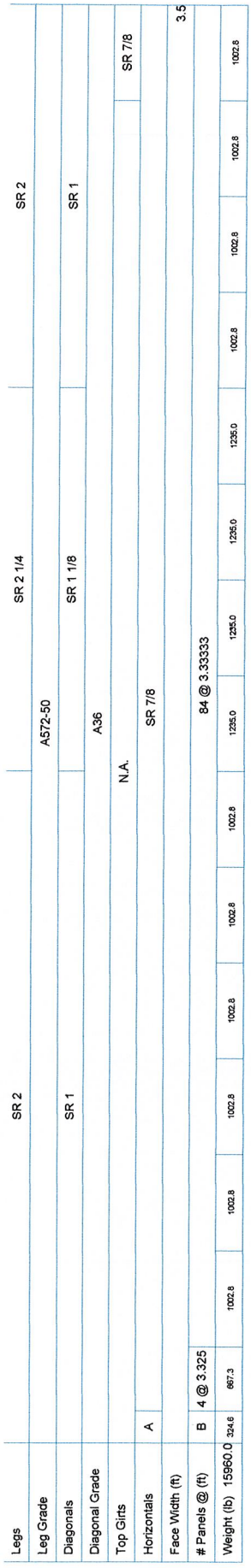
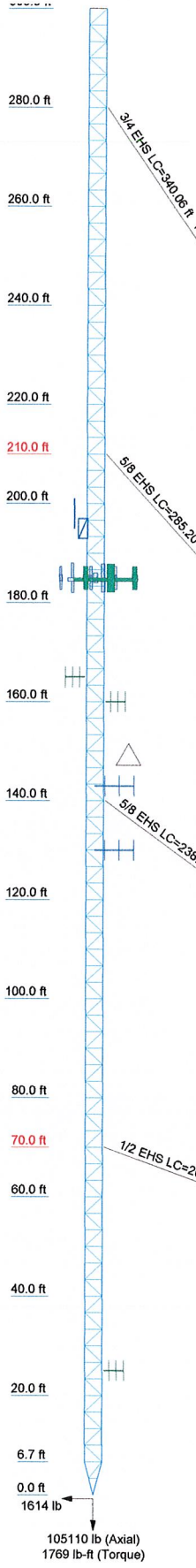


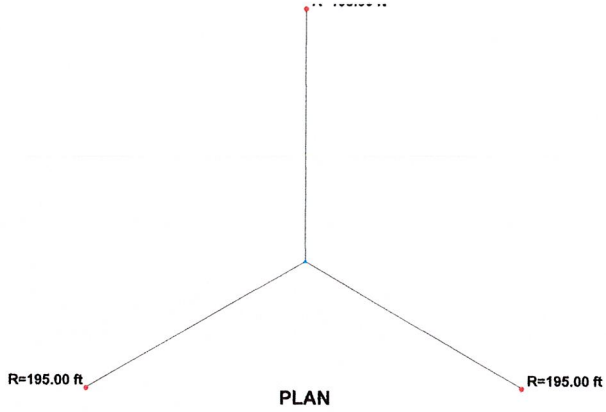
Photo 1: Photo illustrating the Tower with Appurtenances shown.

Hudson Design Group LLC

CALCULATIONS







DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Omni 3"x6'	198	(2) Powerwave TMA LGP21400 (ATT - Existing)	185
Pirod 4' Side Mount Standoff (1)	195	KMW AM-X-CD-16-65-00T-RET w/mount pipe (ATT - Proposed)	185
PiROD 12' T-Frame (ATT - Existing)	185	ET-X-CH-45-16-45-18-IR-AT w/mount pipe (ATT - Proposed)	185
PiROD 12' T-Frame (ATT - Existing)	185	ET-X-CH-45-16-45-18-IR-AT w/mount pipe (ATT - Proposed)	185
PiROD 12' T-Frame (ATT - Existing)	185	(2) Ericsson RRU (ATT - Proposed)	185
(2) Powerwave 7770 w/mount pipe (ATT - Existing)	185	(2) Ericsson RRU (ATT - Proposed)	185
(2) Powerwave 7770 w/mount pipe (ATT - Existing)	185	(2) Ericsson RRU (ATT - Proposed)	185
(2) Powerwave 7770 w/mount pipe (ATT - Existing)	185	Surge Arrestor (DC6-48-60-18-8F) (ATT - Proposed)	185
(2) Powerwave LGP21900 (ATT - Existing)	185	4' Yagi antenna	165
(2) Powerwave LGP21900 (ATT - Existing)	185	4' Yagi antenna	160
(2) Powerwave LGP21900 (ATT - Existing)	185	4' Yagi antenna	143
(2) Powerwave TMA LGP21400 (ATT - Existing)	185	4' Yagi antenna	130
(2) Powerwave TMA LGP21400 (ATT - Existing)	185	4' Yagi antenna	25

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	SR 1 1/4	B	2 @ 3.35

MATERIAL STRENGTH

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

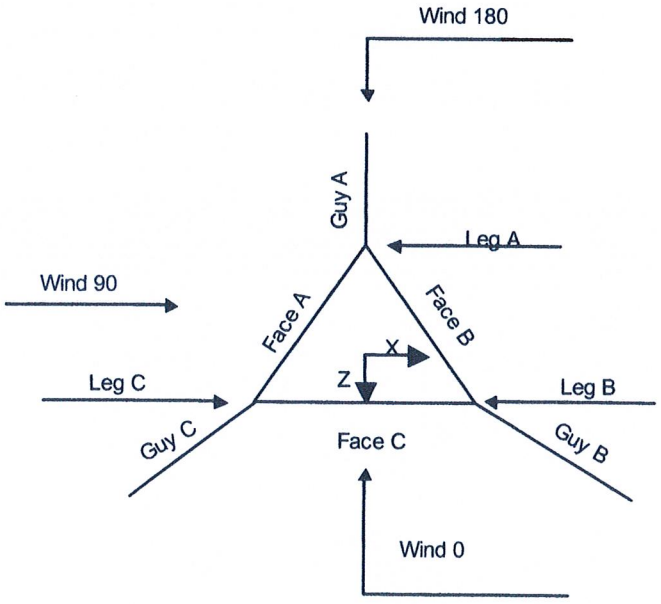
Hudson Design Group, LLC
1600 Osgood Street, Building 20 North, Suite 2-101
North Andover, MA 01845
Phone: (978) 557-5553
FAX: (978) 226-5586

Job: ***CT 2053 East Haddam, CT-MOD***		
Project: ***300 ft Guyed Tower***		
Client: AT&T	Drawn by: kw	App'd:
Code: TIA/EIA-222-F	Date: 09/27/12	Scale:
Path:		Dwg N

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 300.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.50 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 78 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.



Corner & Starmount Guyed Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	300.00-280.00			3.50	1	20.00
T2	280.00-260.00			3.50	1	20.00
T3	260.00-240.00			3.50	1	20.00
T4	240.00-220.00			3.50	1	20.00
T5	220.00-200.00			3.50	1	20.00
T6	200.00-180.00			3.50	1	20.00
T7	180.00-160.00			3.50	1	20.00
T8	160.00-140.00			3.50	1	20.00
T9	140.00-120.00			3.50	1	20.00
T10	120.00-100.00			3.50	1	20.00
T11	100.00-80.00			3.50	1	20.00
T12	80.00-60.00			3.50	1	20.00
T13	60.00-40.00			3.50	1	20.00
T14	40.00-20.00			3.50	1	20.00
T15	20.00-6.70			3.50	1	13.30
T16	6.70-0.00			3.50	1	6.70

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	300.00-280.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T2	280.00-260.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T3	260.00-240.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T4	240.00-220.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T5	220.00-200.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T6	200.00-180.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T7	180.00-160.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T8	160.00-140.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T9	140.00-120.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T10	120.00-100.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T11	100.00-80.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T12	80.00-60.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T13	60.00-40.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T14	40.00-20.00	3.33	K Brace Right	No	Yes	0.0000	0.0000
T15	20.00-6.70	3.33	K Brace Right	No	Yes	0.0000	0.0000
T16	6.70-0.00	3.35	K Brace Right	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 300.00-280.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T2 280.00-260.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T3 260.00-240.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T4 240.00-220.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T5 220.00-200.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1 1/8	A36 (36 ksi)
T6 200.00-180.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1 1/8	A36 (36 ksi)
T7 180.00-160.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1 1/8	A36 (36 ksi)
T8 160.00-140.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1 1/8	A36 (36 ksi)
T9 140.00-120.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T10 120.00-100.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T11 100.00-80.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T12 80.00-60.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T13 60.00-40.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T14 40.00-20.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T15 20.00-6.70	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T16 6.70-0.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 300.00-280.00	Solid Round	7/8	A36 (36 ksi)	Pipe		A618-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 300.00-280.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 280.00-260.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 260.00-240.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 240.00-220.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 220.00-200.00	None	Pipe		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T6 200.00-180.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T7 180.00-160.00	None	Pipe		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T8 160.00-140.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T9 140.00-120.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T10 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T11 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T12 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T13 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T14 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T15 20.00-6.70	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T16 6.70-0.00	None	Flat Bar		A36 (36 ksi)	Solid Round	1 1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 300.00-280.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T2 280.00-260.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T3 260.00-240.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T4 240.00-220.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T5 220.00-200.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T6 200.00-180.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T7 180.00-160.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T8 160.00-140.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T9 140.00-120.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T10 120.00-100.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T11 100.00-80.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T12 80.00-60.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T13	0.00	0.6250	A36	1	1	1	Mid-Pt	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
60.00-40.00			(36 ksi)					
T14 40.00-20.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T15 20.00-6.70	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T16 6.70-0.00	0.00	0.6250	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
300.00-280.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
280.00-260.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
260.00-240.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
240.00-220.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1	1	1	1	1	1
T14	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1	1	1	1	1
T15	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
20.00-6.70				1	1	1	1	1	1	1	1	1	1	1	1
T16 6.70-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 300.00-280.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 280.00-260.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 260.00-240.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 240.00-220.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 220.00-200.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 200.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 20.00-6.70	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 6.70-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
280	EHS	A	3/4	5830.00	10%	19000	1.155	339.76	195.00	0.0000	0.00	100%
		B	3/4	5830.00	10%	19000	1.155	339.76	195.00	0.0000	0.00	100%
		C	3/4	5830.00	10%	19000	1.155	339.76	195.00	0.0000	0.00	100%
210	EHS	A	5/8	4240.00	10%	21000	0.813	284.97	195.00	0.0000	0.00	100%
		B	5/8	4240.00	10%	21000	0.813	284.97	195.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	284.97	195.00	0.0000	0.00	100%
140	EHS	A	5/8	4240.00	10%	21000	0.813	238.22	195.00	0.0000	0.00	100%
		B	5/8	4240.00	10%	21000	0.813	238.22	195.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	238.22	195.00	0.0000	0.00	100%
70	EHS	A	1/2	2690.00	10%	21000	0.517	205.12	195.00	0.0000	0.00	100%
		B	1/2	2690.00	10%	21000	0.517	205.12	195.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	205.12	195.00	0.0000	0.00	100%

Guy Data(cont'd)

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
280	Corner						
210	Corner						
140	Corner						
70	Corner						

Guy Data (cont'd)

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
280.00	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Equal Angle	
210.00	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	
140.00	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	
70.00	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
280	392.42	392.42	392.42		11.14 5.8 sec/pulse	11.14 5.8 sec/pulse	11.14 5.8 sec/pulse	
210	231.68	231.68	231.68		7.64 4.8 sec/pulse	7.64 4.8 sec/pulse	7.64 4.8 sec/pulse	
140	193.67	193.67	193.67		5.37 4.0 sec/pulse	5.37 4.0 sec/pulse	5.37 4.0 sec/pulse	
70	106.05	106.05	106.05		4.02 3.5 sec/pulse	4.02 3.5 sec/pulse	4.02 3.5 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
280	No	No			1	1	1	1

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
210	No	No			1	1	1	1
140	No	No			1	1	1	1
70	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
280	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
210	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
140	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
70	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
280	A	140.00	31	24	0.5000
	B	140.00	31	24	0.5000
	C	140.00	31	24	0.5000
210	A	105.00	29	22	0.5000
	B	105.00	29	22	0.5000
	C	105.00	29	22	0.5000
140	A	70.00	26	19	0.5000
	B	70.00	26	19	0.5000
	C	70.00	26	19	0.5000
70	A	35.00	21	16	0.5000
	B	35.00	21	16	0.5000
	C	35.00	21	16	0.5000

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM)	B	Yes	Af(CfAe)	185.00 - 8.00	0.0000	0	6	6	1.0000 1.9800	1.9800	6.2172	0.82
HJ7-50A (1-5/8 AIR)	B	Yes	Af(CfAe)	185.00 - 8.00	0.0000	-0.45	1	1	1.0000 1.9800	1.9800	6.2172	1.04
LDF5-50A (7/8 FOAM)	B	Yes	Af(CfAe)	195.00 - 8.00	0.0000	0.45	3	3	1.0000 1.0900	1.0900	3.4226	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (AT&T - existing)	C	Yes	Ar (CfAe)	185.00 - 8.00	0.0000	0	6	6	1.0000 1.9800	1.9800		0.82
Feedline Ladder (Af) **********	B	Yes	Af (CfAe)	185.00 - 8.00	0.0000	0	1	1	3.0000	3.0000	12.0000	8.40
FB-L98B-002 (AT&T - proposed)	A	Yes	Ar (CfAe)	185.00 - 8.00	0.0000	0	1	1	0.0000	0.4000		0.25
WR-VG122ST-BRDA (AT&T - proposed)	A	Yes	Ar (CfAe)	185.00 - 8.00	0.0000	0	2	2	0.0000	0.4000		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
T1	300.00-280.00	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	0.000	0.00
T2	280.00-260.00	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	0.000	0.00
T3	260.00-240.00	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	0.000	0.00
T4	240.00-220.00	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	0.000	0.00
T5	220.00-200.00	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	0.000	0.00
T6	200.00-180.00	A	0.500	0.000	0.000	0.000	3.75
		B	0.000	11.113	0.000	0.000	86.65
		C	4.950	0.000	0.000	0.000	24.60
T7	180.00-160.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T8	160.00-140.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T9	140.00-120.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T10	120.00-100.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T11	100.00-80.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T12	80.00-60.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T13	60.00-40.00	A	2.000	0.000	0.000	0.000	15.00

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
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T14	40.00-20.00	A	2.000	0.000	0.000	0.000	15.00
		B	0.000	33.550	0.000	0.000	307.00
		C	19.800	0.000	0.000	0.000	98.40
T15	20.00-6.70	A	1.200	0.000	0.000	0.000	9.00
		B	0.000	20.130	0.000	0.000	184.20
		C	11.880	0.000	0.000	0.000	59.04
T16	6.70-0.00	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	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	300.00-280.00	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	0.000	0.00
T2	280.00-260.00	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	0.000	0.00
T3	260.00-240.00	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	0.000	0.00
T4	240.00-220.00	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	0.000	0.00
T5	220.00-200.00	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	0.000	0.00
T6	200.00-180.00	A	0.500	1.167	0.167	0.000	0.000	10.09
		B		0.000	17.363	0.000	0.000	203.01
		C		1.242	6.208	0.000	0.000	88.58
T7	180.00-160.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T8	160.00-140.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T9	140.00-120.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T10	120.00-100.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T11	100.00-80.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T12	80.00-60.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T13	60.00-40.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73
		C		4.967	24.833	0.000	0.000	354.31
T14	40.00-20.00	A	0.500	4.667	0.667	0.000	0.000	40.37
		B		0.000	49.661	0.000	0.000	646.73

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
		C		4.967	24.833	0.000	0.000	354.31
T15	20.00-6.70	A	0.500	2.800	0.400	0.000	0.000	24.22
		B		0.000	29.797	0.000	0.000	388.04
		C		2.980	14.900	0.000	0.000	212.58
T16	6.70-0.00	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	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft²	A_R Ice ft²	A_F ft²	A_F Ice ft²
T1	300.00-280.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	280.00-260.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	260.00-240.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	240.00-220.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T5	220.00-200.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T6	200.00-180.00	A	0.030	0.160	0.000	0.000
		B	0.675	2.188	0.000	0.000
		C	0.301	0.896	0.000	0.000
T7	180.00-160.00	A	0.121	0.641	0.000	0.000
		B	2.037	6.238	0.000	0.000
		C	1.202	3.583	0.000	0.000
T8	160.00-140.00	A	0.121	0.641	0.000	0.000
		B	2.037	6.238	0.000	0.000
		C	1.202	3.583	0.000	0.000
T9	140.00-120.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T10	120.00-100.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T11	100.00-80.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T12	80.00-60.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T13	60.00-40.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T14	40.00-20.00	A	0.113	0.618	0.000	0.000
		B	1.892	6.014	0.000	0.000
		C	1.117	3.454	0.000	0.000
T15	20.00-6.70	A	0.068	0.372	0.000	0.000
		B	1.137	3.615	0.000	0.000

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
		C	0.671	2.076	0.000	0.000
T16	6.70-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	300.00-280.00	0.0000	0.0000	0.0000	0.0000
T2	280.00-260.00	0.0000	0.0000	0.0000	0.0000
T3	260.00-240.00	0.0000	0.0000	0.0000	0.0000
T4	240.00-220.00	0.0000	0.0000	0.0000	0.0000
T5	220.00-200.00	0.0000	0.0000	0.0000	0.0000
T6	200.00-180.00	2.7682	0.8370	2.6774	0.7616
T7	180.00-160.00	4.0205	0.7382	3.8245	0.5066
T8	160.00-140.00	4.0205	0.7382	3.8245	0.5066
T9	140.00-120.00	4.1868	0.7688	3.9291	0.5219
T10	120.00-100.00	4.1864	0.7687	3.9285	0.5218
T11	100.00-80.00	4.1864	0.7687	3.9285	0.5218
T12	80.00-60.00	4.1864	0.7687	3.9285	0.5218
T13	60.00-40.00	4.1864	0.7687	3.9285	0.5218
T14	40.00-20.00	4.1864	0.7687	3.9285	0.5218
T15	20.00-6.70	4.0220	0.7385	3.7575	0.4990
T16	6.70-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	lb
Pirod 4' Side Mount Standoff (1)	A	From Face	2.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
Omni 3"x6'	A	From Face	4.00 0.00 0.00	0.0000	198.00	No Ice 1/2" Ice	1.77 2.13	1.77 2.13	20.00 33.24
PiROD 12' T-Frame (AT&T - Existing)	A	From Face	1.29 -1.53 0.00	-50.0000	185.00	No Ice 1/2" Ice	12.20 17.60	12.20 17.60	360.00 490.00
PiROD 12' T-Frame (AT&T - Existing)	B	From Face	1.29 -1.53 0.00	-50.0000	185.00	No Ice 1/2" Ice	12.20 17.60	12.20 17.60	360.00 490.00
PiROD 12' T-Frame (AT&T - Existing)	C	From Face	1.29 -1.53 0.00	-50.0000	185.00	No Ice 1/2" Ice	12.20 17.60	12.20 17.60	360.00 490.00
(2) Powerwave 7770 w/mount	A	From Face	2.57	-50.0000	185.00	No Ice	6.02	4.10	57.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
pipe			-3.06			1/2" Ice	6.47	4.75	101.14
(AT&T - Existing)			0.00						
(2) Powerwave 7770 w/mount	B	From Face	2.57	-50.0000	185.00	No Ice	6.02	4.10	57.25
pipe			-3.06			1/2" Ice	6.47	4.75	101.14
(AT&T - Existing)			0.00						
(2) Powerwave 7770 w/mount	C	From Face	2.57	-50.0000	185.00	No Ice	6.02	4.10	57.25
pipe			-3.06			1/2" Ice	6.47	4.75	101.14
(AT&T - Existing)			0.00						
(2) Powerwave LGP21900	A	From Face	2.57	-50.0000	185.00	No Ice	0.23	0.12	5.50
(AT&T - Existing)			-3.06			1/2" Ice	0.30	0.17	7.70
			0.00						
(2) Powerwave LGP21900	B	From Face	2.57	-50.0000	185.00	No Ice	0.23	0.12	5.50
(AT&T - Existing)			-3.06			1/2" Ice	0.30	0.17	7.70
			0.00						
(2) Powerwave LGP21900	C	From Face	2.57	-50.0000	185.00	No Ice	0.23	0.12	5.50
(AT&T - Existing)			-3.06			1/2" Ice	0.30	0.17	7.70
			0.00						
(2) Powerwave TMA	A	From Face	2.57	-50.0000	185.00	No Ice	1.23	0.41	14.10
LGP21400			-3.06			1/2" Ice	1.38	0.52	21.29
(AT&T - Existing)			0.00						
(2) Powerwave TMA	B	From Face	2.57	-50.0000	185.00	No Ice	1.23	0.41	14.10
LGP21400			-3.06			1/2" Ice	1.38	0.52	21.29
(AT&T - Existing)			0.00						
(2) Powerwave TMA	C	From Face	2.57	-50.0000	185.00	No Ice	1.23	0.41	14.10
LGP21400			-3.06			1/2" Ice	1.38	0.52	21.29
(AT&T - Existing)			0.00						
**********									
KMW	A	From Face	2.57	-50.0000	185.00	No Ice	8.50	6.30	74.05
AM-X-CD-16-65-00T-RET			-3.06			1/2" Ice	9.15	7.48	136.21
w/mount pipe			0.00						
(AT&T - Proposed)									
ET-X-CH-45-16-45-18-IR-A	B	From Face	2.57	-50.0000	185.00	No Ice	12.28	6.64	74.55
T w/mount pipe			-3.06			1/2" Ice	12.98	7.80	152.97
(AT&T - Proposed)			0.00						
ET-X-CH-45-16-45-18-IR-A	C	From Face	2.57	-50.0000	185.00	No Ice	12.28	6.64	74.55
T w/mount pipe			-3.06			1/2" Ice	12.98	7.80	152.97
(AT&T - Proposed)			0.00						
(2) Ericsson RRU	A	From Face	2.57	-50.0000	185.00	No Ice	2.07	1.08	44.00
(AT&T - Proposed)			-3.06			1/2" Ice	2.26	1.23	58.64
			0.00						
(2) Ericsson RRU	B	From Face	2.57	-50.0000	185.00	No Ice	2.07	1.08	44.00
(AT&T - Proposed)			-3.06			1/2" Ice	2.26	1.23	58.64
			0.00						
(2) Ericsson RRU	C	From Face	2.57	-50.0000	185.00	No Ice	2.07	1.08	44.00
(AT&T - Proposed)			-3.06			1/2" Ice	2.26	1.23	58.64
			0.00						
Surge Arrestor	A	From Leg	0.50	0.0000	185.00	No Ice	1.27	1.27	20.00
(DC6-48-60-18-8F)			0.00			1/2" Ice	1.46	1.46	35.12
(AT&T - Proposed)			0.00						
**********									
4' Yagi antenna	C	From Leg	0.50	0.0000	165.00	No Ice	0.93	0.47	10.00
			0.00			1/2" Ice	1.26	0.64	54.43
			0.00						
4' Yagi antenna	B	From Leg	0.50	0.0000	160.00	No Ice	0.93	0.47	10.00
			0.00			1/2" Ice	1.26	0.64	54.43
			0.00						
4' Yagi antenna	A	From Leg	0.50	0.0000	143.00	No Ice	0.93	0.47	10.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	1.26	0.64	54.43
			0.00						
4' Yagi antenna	A	From Leg	0.50	0.0000	130.00	No Ice	0.93	0.47	10.00
			0.00			1/2" Ice	1.26	0.64	54.43
			0.00						
4' Yagi antenna	B	From Leg	0.50	0.0000	25.00	No Ice	0.93	0.47	10.00
			0.00			1/2" Ice	1.26	0.64	54.43
			0.00						

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 90 deg - No Ice+Guy
4	Dead+Wind 180 deg - No Ice+Guy
5	Dead+Ice+Temp+Guy
6	Dead+Wind 0 deg+Ice+Temp+Guy
7	Dead+Wind 90 deg+Ice+Temp+Guy
8	Dead+Wind 180 deg+Ice+Temp+Guy
9	Dead+Wind 0 deg - Service+Guy
10	Dead+Wind 90 deg - Service+Guy
11	Dead+Wind 180 deg - Service+Guy

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	6	105110.18	22.00	1602.33
	Max. H_x	8	100997.53	31.09	-1411.84
	Max. H_z	2	81031.84	7.97	1614.02
	Max. M_x	1	0.00	13.35	-3.00
	Max. M_z	1	0.00	13.35	-3.00
	Max. Torsion	4	1758.79	14.72	-1384.39
	Min. Vert	1	57915.25	13.35	-3.00
	Min. H_x	3	76993.22	-1383.14	55.19
	Min. H_z	8	100997.53	31.09	-1411.84
	Min. M_x	1	0.00	13.35	-3.00
	Min. M_z	1	0.00	13.35	-3.00
	Min. Torsion	2	-1769.32	7.97	1614.02
Guy C @ 195 ft Elev 0 ft Azimuth 240 deg	Max. Vert	11	-9417.04	-8797.55	4775.89
	Max. H_x	4	-9487.90	-8293.11	3798.60
	Max. H_z	7	-35658.75	-38406.96	21161.66
	Min. Vert	7	-35658.75	-38406.96	21161.66

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. H_x	7	-35658.75	-38406.96	21161.66
	Min. H_z	4	-9487.90	-8293.11	3798.60
Guy B @ 195 ft Elev 0 ft Azimuth 120 deg	Max. Vert	3	-5340.76	3405.72	2439.46
	Max. H_x	6	-31039.02	32558.81	20848.40
	Max. H_z	6	-31039.02	32558.81	20848.40
	Min. Vert	6	-31039.02	32558.81	20848.40
	Min. H_x	3	-5340.76	3405.72	2439.46
	Min. H_z	3	-5340.76	3405.72	2439.46
Guy A @ 195 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-3823.41	1.07	-2649.32
	Max. H_x	6	-5469.54	1.39	-3842.42
	Max. H_z	2	-3823.41	1.07	-2649.32
	Min. Vert	8	-37128.58	-14.52	-45137.54
	Min. H_x	7	-21777.90	-2071.19	-25151.30
	Min. H_z	8	-37128.58	-14.52	-45137.54

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	57915.25	-13.35	3.00	0.00	0.00	-7.73
Dead+Wind 0 deg - No Ice+Guy	81031.84	-7.97	-1614.02	0.00	0.00	1769.32
Dead+Wind 90 deg - No Ice+Guy	76993.22	1383.14	-55.19	0.00	0.00	43.34
Dead+Wind 180 deg - No Ice+Guy	73361.12	-14.72	1384.39	0.00	0.00	-1758.79
Dead+Ice+Temp+Guy	77024.79	-29.48	-3.77	0.00	0.00	-12.62
Dead+Wind 0 deg+Ice+Temp+Guy	105110.18	-22.00	-1602.33	0.00	0.00	1643.60
Dead+Wind 90 deg+Ice+Temp+Guy	102422.72	1359.30	-112.04	0.00	0.00	-104.63
Dead+Wind 180 deg+Ice+Temp+Guy	100997.53	-31.09	1411.84	0.00	0.00	-1538.58
Dead+Wind 0 deg - Service+Guy	59294.01	-12.73	-589.56	0.00	0.00	775.57
Dead+Wind 90 deg - Service+Guy	59095.48	488.19	7.96	0.00	0.00	14.39
Dead+Wind 180 deg - Service+Guy	59115.78	-13.81	472.25	0.00	0.00	-671.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-24629.97	0.00	-0.02	24629.96	-0.00	0.000%
2	0.00	-24847.58	-33030.59	-0.01	24847.51	33027.71	0.007%
3	30535.15	-24629.97	-0.00	-30533.63	24629.94	1.12	0.005%
4	-0.00	-24412.36	29716.04	-0.24	24412.36	-29716.35	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
5	0.00	-37108.96	0.00	0.22	37108.94	0.00	0.001%
6	0.00	-37534.56	-39440.99	-0.01	37534.51	39438.92	0.004%
7	36665.17	-37108.96	-0.00	-36664.09	37108.94	0.92	0.003%
8	-0.00	-36683.37	35766.72	0.03	36683.34	-35765.17	0.003%
9	-0.00	-24697.13	-10194.63	-0.03	24697.13	10194.19	0.002%
10	9424.43	-24629.97	-0.00	-9423.35	24629.96	1.12	0.006%
11	-0.00	-24562.81	9171.62	-0.02	24562.80	-9171.60	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00003448
2	Yes	18	0.00008298	0.00008919
3	Yes	18	0.00000001	0.00006141
4	Yes	13	0.00000001	0.00005761
5	Yes	8	0.00000001	0.00003566
6	Yes	19	0.00005830	0.00004881
7	Yes	19	0.00000001	0.00003236
8	Yes	12	0.00000001	0.00005969
9	Yes	13	0.00000001	0.00003692
10	Yes	11	0.00000001	0.00008851
11	Yes	13	0.00000001	0.00001872

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	300 - 280	0.601	11	0.1221	0.9274
T2	280 - 260	1.006	11	0.1236	0.9160
T3	260 - 240	1.411	11	0.1169	0.9444
T4	240 - 220	1.762	11	0.1047	0.9618
T5	220 - 200	2.047	11	0.0957	0.9791
T6	200 - 180	2.301	9	0.0854	1.0037
T7	180 - 160	2.573	9	0.0321	1.0317
T8	160 - 140	2.579	9	0.0456	1.0474
T9	140 - 120	2.439	9	0.0476	1.0405
T10	120 - 100	2.351	9	0.0428	1.0656
T11	100 - 80	2.164	9	0.0607	1.0662
T12	80 - 60	1.846	9	0.0829	1.0548
T13	60 - 40	1.498	9	0.0834	1.0415
T14	40 - 20	1.118	9	0.1054	1.0230
T15	20 - 6.7	0.612	9	0.1345	0.9951
T16	6.7 - 0	0.211	9	0.1467	0.9589

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
280.00	Guy	11	1.006	0.1236	0.9160	64684
210.00	Guy	11	2.181	0.0948	0.9906	80352
198.00	Omni 3"x6'	9	2.337	0.0813	1.0065	33789
195.00	Pirod 4' Side Mount Standoff (1)	9	2.388	0.0739	1.0107	28155
185.00	PiROD 12' T-Frame	9	2.527	0.0447	1.0249	17588
165.00	4' Yagi antenna	9	2.600	0.0333	1.0466	22411
160.00	4' Yagi antenna	9	2.579	0.0456	1.0474	28293
143.00	4' Yagi antenna	9	2.458	0.0497	1.0398	38140
140.00	Guy	9	2.439	0.0476	1.0405	31795
130.00	4' Yagi antenna	9	2.394	0.0427	1.0518	107420
70.00	Guy	9	1.673	0.0831	1.0486	249233
25.00	4' Yagi antenna	9	0.751	0.1282	1.0048	37359

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
T1	300 - 280	7.097	8	0.6678	1.9321
T2	280 - 260	8.182	8	0.6726	1.9177
T3	260 - 240	9.260	8	0.6384	1.9760
T4	240 - 220	10.531	6	0.5654	2.0201
T5	220 - 200	12.643	6	0.4822	2.0642
T6	200 - 180	14.516	6	0.3931	2.1287
T7	180 - 160	15.778	6	0.1716	2.2125
T8	160 - 140	15.975	6	0.2170	2.2572
T9	140 - 120	15.473	6	0.2169	2.2408
T10	120 - 100	14.916	6	0.2234	2.3282
T11	100 - 80	13.711	6	0.3800	2.3487
T12	80 - 60	11.750	6	0.5212	2.3301
T13	60 - 40	9.460	6	0.5694	2.3115
T14	40 - 20	6.874	6	0.6905	2.2879
T15	20 - 6.7	3.674	6	0.8258	2.2333
T16	6.7 - 0	1.257	6	0.8795	2.1598

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
280.00	Guy	8	8.182	0.6726	1.9177	18772
210.00	Guy	6	13.622	0.4509	2.0932	12171
198.00	Omni 3"x6'	6	14.679	0.3747	2.1367	6899
195.00	Pirod 4' Side Mount Standoff (1)	6	14.912	0.3454	2.1491	6038
185.00	PiROD 12' T-Frame	6	15.554	0.2296	2.1920	4240
165.00	4' Yagi antenna	6	16.019	0.1857	2.2550	5154
160.00	4' Yagi antenna	6	15.975	0.2170	2.2572	6092
143.00	4' Yagi antenna	6	15.555	0.2233	2.2377	10209
140.00	Guy	6	15.473	0.2169	2.2408	8631
130.00	4' Yagi antenna	6	15.226	0.2004	2.2797	18934
70.00	Guy	6	10.632	0.5463	2.3206	22329
25.00	4' Yagi antenna	6	4.531	0.7975	2.2533	8309

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T_a lb	Required S.F.	Actual S.F.
T2	280.00 (A) (588)	3/4 EHS	5830.00	58299.92	15490.00	29150.00	2.000	3.764 ✔
	280.00 (B) (587)	3/4 EHS	5830.00	58299.92	12602.80	29150.00	2.000	4.626 ✔
	280.00 (C) (586)	3/4 EHS	5830.00	58299.92	14590.90	29150.00	2.000	3.996 ✔
T5	210.00 (A) (591)	5/8 EHS	4240.00	42399.99	15979.50	21200.00	2.000	2.653 ✔
	210.00 (B) (590)	5/8 EHS	4240.00	42399.99	12730.30	21200.00	2.000	3.331 ✔
	210.00 (C) (589)	5/8 EHS	4240.00	42399.99	15174.10	21200.00	2.000	2.794 ✔
T9	140.00 (A) (594)	5/8 EHS	4240.00	42399.99	18666.80	21200.00	2.000	2.271 ✔
	140.00 (B) (593)	5/8 EHS	4240.00	42399.99	16300.60	21200.00	2.000	2.601 ✔
	140.00 (C) (592)	5/8 EHS	4240.00	42399.99	18373.70	21200.00	2.000	2.308 ✔
T12	70.00 (A) (597)	1/2 EHS	2690.00	26900.04	10644.40	13450.00	2.000	2.527 ✔
	70.00 (B) (596)	1/2 EHS	2690.00	26900.04	10170.80	13450.00	2.000	2.645 ✔
	70.00 (C) (595)	1/2 EHS	2690.00	26900.04	10693.90	13450.00	2.000	2.515 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	300 - 280	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-2686.98	59729.20	0.045 ✔
T2	280 - 260	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-17158.30	59729.20	0.287 ✔
T3	260 - 240	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-19948.70	59729.20	0.334 ✔
T4	240 - 220	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-19759.40	59729.20	0.331 ✔
T5	220 - 200	2 1/4	20.00	3.33	71.1 K=1.00	1.00	20.731	3.9761	-36570.10	82428.30	0.444 ✔
T6	200 - 180	2 1/4	20.00	3.33	71.1 K=1.00	1.00	20.731	3.9761	-58617.80	82428.30	0.711 ✔
T7	180 - 160	2 1/4	20.00	3.33	71.1 K=1.00	1.00	20.731	3.9761	-56104.20	82428.30	0.681 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T8	160 - 140	2 1/4	20.00	3.33	71.1 K=1.00	1.00	20.731	3.9761	-36660.20	82428.30	0.445
T9	140 - 120	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-39855.00	59729.20	0.667
T10	120 - 100	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-44187.20	59729.20	0.740
T11	100 - 80	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-43392.70	59729.20	0.726
T12	80 - 60	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-39081.00	59729.20	0.654
T13	60 - 40	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-46217.40	59729.20	0.774
T14	40 - 20	2	20.00	3.33	80.0 K=1.00	1.00	19.012	3.1416	-47517.30	59729.20	0.796
T15	20 - 6.7	2	13.30	3.33	79.8 K=1.00	1.00	19.052	3.1416	-44610.20	59854.70	0.745
T16	6.7 - 0	2	7.00	3.50	84.0 K=1.00	1.00	18.206	3.1416	-41015.10	57194.40	0.717

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	300 - 280	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-654.17	4902.84	0.133
T2	280 - 260	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-1720.63	4902.84	0.351
T3	260 - 240	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-1162.62	4902.84	0.237
T4	240 - 220	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-1296.65	4902.84	0.264
T5	220 - 200	1 1/8	4.83	4.57	136.6 K=0.70	8.000	0.9940	-5306.80	7952.49	0.667
T6	200 - 180	1 1/8	4.83	4.57	136.6 K=0.70	8.000	0.9940	-5020.72	7952.49	0.631
T7	180 - 160	1 1/8	4.83	4.57	136.6 K=0.70	8.000	0.9940	-4024.57	7952.49	0.506
T8	160 - 140	1 1/8	4.83	4.57	136.6 K=0.70	8.000	0.9940	-6045.19	7952.49	0.760
T9	140 - 120	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-4639.56	4902.84	0.946
T10	120 - 100	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-2078.28	4902.84	0.424
T11	100 - 80	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-3098.70	4902.84	0.632
T12	80 - 60	1	4.83	4.60	154.7	6.242	0.7854	-3880.95	4902.84	0.792

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 $\frac{P}{P_a}$
					K=0.70					✓
T13	60 - 40	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-2599.13	4902.84	0.530 ✓
T14	40 - 20	1	4.83	4.60	154.7 K=0.70	6.242	0.7854	-2151.41	4902.84	0.439 ✓
T15	20 - 6.7	1	4.83	4.60	154.5 K=0.70	6.257	0.7854	-3762.80	4914.51	0.766 ✓
T16	6.7 - 0	1	4.29	4.02	135.0 K=0.70	8.191	0.7854	-1329.82	6432.94	0.207 ✓

Horizontal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	300 - 280	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-66.00	5480.71	0.012 ✓
T2	280 - 260	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-24.83	5480.71	0.005 ✓
T3	260 - 240	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-3.95	5480.71	0.001 ✓
T4	240 - 220	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-3.41	5480.71	0.001 ✓
T5	220 - 200	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-17.52	5480.71	0.003 ✓
T6	200 - 180	7/8	3.50	3.31	127.2 K=0.70	9.229	0.6013	-1183.01	5549.87	0.213 ✓
T7	180 - 160	7/8	3.50	3.31	127.2 K=0.70	9.229	0.6013	-117.24	5549.87	0.021 ✓
T8	160 - 140	7/8	3.50	3.31	127.2 K=0.70	9.229	0.6013	-132.34	5549.87	0.024 ✓
T9	140 - 120	7/8	3.50	3.31	127.2 K=0.70	9.229	0.6013	-120.40	5549.87	0.022 ✓
T10	120 - 100	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-82.09	5480.71	0.015 ✓
T11	100 - 80	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-74.87	5480.71	0.014 ✓
T12	80 - 60	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-39.46	5480.71	0.007 ✓
T13	60 - 40	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-17.14	5480.71	0.003 ✓
T14	40 - 20	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-11.21	5480.71	0.002 ✓
T15	20 - 6.7	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-178.48	5480.71	0.033 ✓
T16	6.7 - 0	1 1/4	1.75	1.58	66.9 K=1.10	16.750	1.2272	-359.04	20555.90	0.017 ✓

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	300 - 280	7/8	3.50	3.33	128.0 K=0.70	9.114	0.6013	-22.92	5480.71	0.004 ✔

Tension Checks

Leg Design Data (Tension)

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 $\frac{P}{P_a}$
T1	300 - 280	2	20.00	3.33	80.0	30.000	3.1416	1899.62	94247.80	0.020 ✔
T2	280 - 260	2	20.00	3.33	80.0	30.000	3.1416	1478.26	94247.80	0.016 ✔
T3	260 - 240	2	20.00	3.33	80.0	30.000	3.1416	5655.83	94247.80	0.060 ✔
T4	240 - 220	2	20.00	3.33	80.0	30.000	3.1416	6269.40	94247.80	0.067 ✔
T5	220 - 200	2 1/4	20.00	3.33	71.1	30.000	3.9761	16140.50	119282.00	0.135 ✔
T6	200 - 180	2 1/4	20.00	3.33	71.1	30.000	3.9761	40500.00	119282.00	0.340 ✔
T7	180 - 160	2 1/4	20.00	3.33	71.1	30.000	3.9761	37501.20	119282.00	0.314 ✔
T8	160 - 140	2 1/4	20.00	3.33	71.1	30.000	3.9761	16229.20	119282.00	0.136 ✔
T10	120 - 100	2	20.00	3.33	80.0	30.000	3.1416	3060.03	94247.80	0.032 ✔
T11	100 - 80	2	20.00	3.33	80.0	30.000	3.1416	1505.37	94247.80	0.016 ✔

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	300 - 280	1	4.83	4.60	221.0	21.600	0.7854	626.92	16964.60	0.037 ✔
T2	280 - 260	1	4.83	4.60	221.0	21.600	0.7854	1595.01	16964.60	0.094 ✔
T3	260 - 240	1	4.83	4.60	221.0	21.600	0.7854	961.30	16964.60	0.057 ✔

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 $\frac{P}{P_a}$
T4	240 - 220	1	4.83	4.60	221.0	21.600	0.7854	1003.31	16964.60	0.059 ✔
T5	220 - 200	1 1/8	4.83	4.57	195.2	21.600	0.9940	5145.30	21470.80	0.240 ✔
T6	200 - 180	1 1/8	4.83	4.57	195.2	21.600	0.9940	4625.15	21470.80	0.215 ✔
T7	180 - 160	1 1/8	4.83	4.57	195.2	21.600	0.9940	3691.66	21470.80	0.172 ✔
T8	160 - 140	1 1/8	4.83	4.57	195.2	21.600	0.9940	5690.26	21470.80	0.265 ✔
T9	140 - 120	1	4.83	4.60	221.0	21.600	0.7854	4044.77	16964.60	0.238 ✔
T10	120 - 100	1	4.83	4.60	221.0	21.600	0.7854	1643.55	16964.60	0.097 ✔
T11	100 - 80	1	4.83	4.60	221.0	21.600	0.7854	2275.39	16964.60	0.134 ✔
T12	80 - 60	1	4.83	4.60	221.0	21.600	0.7854	3777.61	16964.60	0.223 ✔
T13	60 - 40	1	4.83	4.60	221.0	21.600	0.7854	1829.07	16964.60	0.108 ✔
T14	40 - 20	1	4.83	4.60	221.0	21.600	0.7854	1336.19	16964.60	0.079 ✔
T15	20 - 6.7	1	4.83	4.60	220.7	21.600	0.7854	2634.50	16964.60	0.155 ✔
T16	6.7 - 0	1	4.29	4.02	192.9	21.600	0.7854	883.85	16964.60	0.052 ✔

Horizontal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	300 - 280	7/8	3.50	3.33	182.9	21.600	0.6013	56.09	12988.50	0.004 ✔
T2	280 - 260	7/8	3.50	3.33	182.9	21.600	0.6013	4625.80	12988.50	0.356 ✔
T3	260 - 240	7/8	3.50	3.33	182.9	21.600	0.6013	117.64	12988.50	0.009 ✔
T4	240 - 220	7/8	3.50	3.33	182.9	21.600	0.6013	119.47	12988.50	0.009 ✔
T5	220 - 200	7/8	3.50	3.33	182.9	21.600	0.6013	6314.94	12988.50	0.486 ✔
T6	200 - 180	7/8	3.50	3.31	181.7	21.600	0.6013	1315.51	12988.50	0.101 ✔
T7	180 - 160	7/8	3.50	3.31	181.7	21.600	0.6013	384.97	12988.50	0.030 ✔
T8	160 - 140	7/8	3.50	3.31	181.7	21.600	0.6013	356.12	12988.50	0.027 ✔
T9	140 - 120	7/8	3.50	3.31	181.7	21.600	0.6013	8370.76	12988.50	0.644 ✔

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 $\frac{P}{P_a}$
T10	120 - 100	7/8	3.50	3.33	182.9	21.600	0.6013	322.48	12988.50	0.025
T11	100 - 80	7/8	3.50	3.33	182.9	21.600	0.6013	319.48	12988.50	0.025
T12	80 - 60	7/8	3.50	3.33	182.9	21.600	0.6013	6065.46	12988.50	0.467
T13	60 - 40	7/8	3.50	3.33	182.9	21.600	0.6013	311.60	12988.50	0.024
T14	40 - 20	7/8	3.50	3.33	182.9	21.600	0.6013	312.72	12988.50	0.024
T15	20 - 6.7	7/8	3.50	3.33	182.9	21.600	0.6013	476.71	12988.50	0.037
T16	6.7 - 0	1 1/4	3.50	3.33	128.0	21.600	1.2272	7133.80	26507.20	0.269

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	300 - 280	7/8	3.50	3.33	182.9	21.600	0.6013	23.37	12988.50	0.002

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	300 - 280	Leg	2	3	-2686.98	79619.02	3.4	Pass
T2	280 - 260	Leg	2	42	-17158.30	79619.02	21.6	Pass
T3	260 - 240	Leg	2	81	-19948.70	79619.02	25.1	Pass
T4	240 - 220	Leg	2	120	-19759.40	79619.02	24.8	Pass
T5	220 - 200	Leg	2 1/4	157	-36570.10	109876.92	33.3	Pass
T6	200 - 180	Leg	2 1/4	198	-58617.80	109876.92	53.3	Pass
T7	180 - 160	Leg	2 1/4	237	-56104.20	109876.92	51.1	Pass
T8	160 - 140	Leg	2 1/4	274	-36660.20	109876.92	33.4	Pass
T9	140 - 120	Leg	2	314	-39855.00	79619.02	50.1	Pass
T10	120 - 100	Leg	2	352	-44187.20	79619.02	55.5	Pass
T11	100 - 80	Leg	2	391	-43392.70	79619.02	54.5	Pass
T12	80 - 60	Leg	2	431	-39081.00	79619.02	49.1	Pass
T13	60 - 40	Leg	2	471	-46217.40	79619.02	58.0	Pass
T14	40 - 20	Leg	2	510	-47517.30	79619.02	59.7	Pass
T15	20 - 6.7	Leg	2	547	-44610.20	79786.31	55.9	Pass
T16	6.7 - 0	Leg	2	574	-41015.10	76240.13	53.8	Pass
T1	300 - 280	Diagonal	1	7	-654.17	6535.49	10.0	Pass
T2	280 - 260	Diagonal	1	77	-1720.63	6535.49	26.3	Pass
T3	260 - 240	Diagonal	1	116	-1162.62	6535.49	17.8	Pass
T4	240 - 220	Diagonal	1	126	-1296.65	6535.49	19.8	Pass
T5	220 - 200	Diagonal	1 1/8	170	-5306.80	10600.67	50.1	Pass
T6	200 - 180	Diagonal	1 1/8	233	-5020.72	10600.67	47.4	Pass
T7	180 - 160	Diagonal	1 1/8	243	-4024.57	10600.67	38.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T8	160 - 140	Diagonal	1 1/8	280	-6045.19	10600.67	57.0	Pass
T9	140 - 120	Diagonal	1	350	-4639.56	6535.49	71.0	Pass
T10	120 - 100	Diagonal	1	389	-2078.28	6535.49	31.8	Pass
T11	100 - 80	Diagonal	1	398	-3098.70	6535.49	47.4	Pass
T12	80 - 60	Diagonal	1	461	-3880.95	6535.49	59.4	Pass
T13	60 - 40	Diagonal	1	505	-2599.13	6535.49	39.8	Pass
T14	40 - 20	Diagonal	1	515	-2151.41	6535.49	32.9	Pass
T15	20 - 6.7	Diagonal	1	554	-3762.80	6551.04	57.4	Pass
T16	6.7 - 0	Diagonal	1	585	-1329.82	8575.11	15.5	Pass
T1	300 - 280	Horizontal	7/8	17	-66.00	7305.79	0.9	Pass
T2	280 - 260	Horizontal	7/8	43	4625.80	17313.67	26.7	Pass
T3	260 - 240	Horizontal	7/8	96	117.64	17313.67	0.7	Pass
T4	240 - 220	Horizontal	7/8	135	119.47	17313.67	0.7	Pass
T5	220 - 200	Horizontal	7/8	179	6314.94	17313.67	36.5	Pass
T6	200 - 180	Horizontal	7/8	212	-1183.01	7397.98	16.0	Pass
T7	180 - 160	Horizontal	7/8	268	384.97	17313.67	2.2	Pass
T8	160 - 140	Horizontal	7/8	278	356.12	17313.67	2.1	Pass
T9	140 - 120	Horizontal	7/8	316	8370.76	17313.67	48.3	Pass
T10	120 - 100	Horizontal	7/8	368	322.48	17313.67	1.9	Pass
T11	100 - 80	Horizontal	7/8	395	319.48	17313.67	1.8	Pass
T12	80 - 60	Horizontal	7/8	452	6065.46	17313.67	35.0	Pass
T13	60 - 40	Horizontal	7/8	485	311.60	17313.67	1.8	Pass
T14	40 - 20	Horizontal	7/8	524	312.72	17313.67	1.8	Pass
T15	20 - 6.7	Horizontal	7/8	556	476.71	17313.67	2.8	Pass
T16	6.7 - 0	Horizontal	1 1/4	577	7133.80	35334.10	20.2	Pass
T1	300 - 280	Top Girt	7/8	5	-22.92	7305.79	0.3	Pass
T2	280 - 260	Guy A@280	3/4	588	15490.00	29150.00	53.1	Pass
T5	220 - 200	Guy A@210	5/8	591	15979.50	21200.00	75.4	Pass
T9	**140 - 120**	**Guy A@140**	**5/8**	**594**	**18666.80**	**21200.00**	**88.1**	**Pass**
T12	80 - 60	Guy A@70	1/2	597	10644.40	13450.00	79.1	Pass
T2	280 - 260	Guy B@280	3/4	587	12602.80	29150.00	43.2	Pass
T5	220 - 200	Guy B@210	5/8	590	12730.30	21200.00	60.0	Pass
T9	140 - 120	Guy B@140	5/8	593	16300.60	21200.00	76.9	Pass
T12	80 - 60	Guy B@70	1/2	596	10170.80	13450.00	75.6	Pass
T2	280 - 260	Guy C@280	3/4	586	14590.90	29150.00	50.1	Pass
T5	220 - 200	Guy C@210	5/8	589	15174.10	21200.00	71.6	Pass
T9	**140 - 120**	**Guy C@140**	**5/8**	**592**	**18373.70**	**21200.00**	**86.7**	**Pass**
T12	80 - 60	Guy C@70	1/2	595	10693.90	13450.00	79.5	Pass

Summary		
Leg (T14)	59.7	Pass
Diagonal (T9)	71.0	Pass
Horizontal (T9)	48.3	Pass
Top Girt (T1)	0.3	Pass
Guy A (T9)	88.1	Pass
Guy B (T9)	76.9	Pass
Guy C (T9)	86.7	Pass
RATING =	88.1	Pass

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Calculated Radio Frequency Emissions

CT2053

(East Haddam)

126 Parker Road, East Haddam, CT 06423

October 3, 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 guyed tower located at 126 Parker Road in East Haddam, CT. The coordinates of the tower are 41° 27' 39.3" N, 72° 23' 42.8" W.

AT&T is proposing the following modifications:

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

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:

$$\text{Power Density} = \left(\frac{1.6^2 \cdot EIRP}{4\pi \cdot R^2} \right) \text{ x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = 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 patterns 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
Cingular UMTS	185	880	1	500	0.0053	0.5867	0.90%
Cingular GSM	185	880	4	296	0.0124	0.5867	2.12%
Cingular GSM	185	1930	2	427	0.0090	1.0000	0.90%
Century Cable Mgmt	No RF Information Available						
AT&T UMTS	185	880	2	565	0.0012	0.5867	0.20%
AT&T UMTS	185	1900	2	875	0.0018	1.0000	0.18%
AT&T LTE	185	734	1	1313	0.0014	0.4893	0.28%
AT&T GSM	185	880	1	283	0.0003	0.5867	0.05%
AT&T GSM	185	1900	4	525	0.0022	1.0000	0.22%
						Total	**0.94%**

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 Hudson Design Group Structural Analysis dated September 27, 2012.

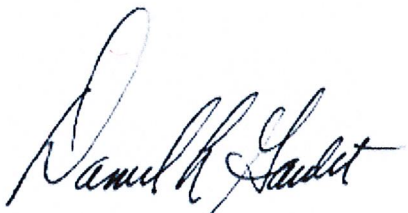
5. Conclusion

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 **0.94% 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

October 3, 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 Exposure[4]

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 Exposure[5]

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.

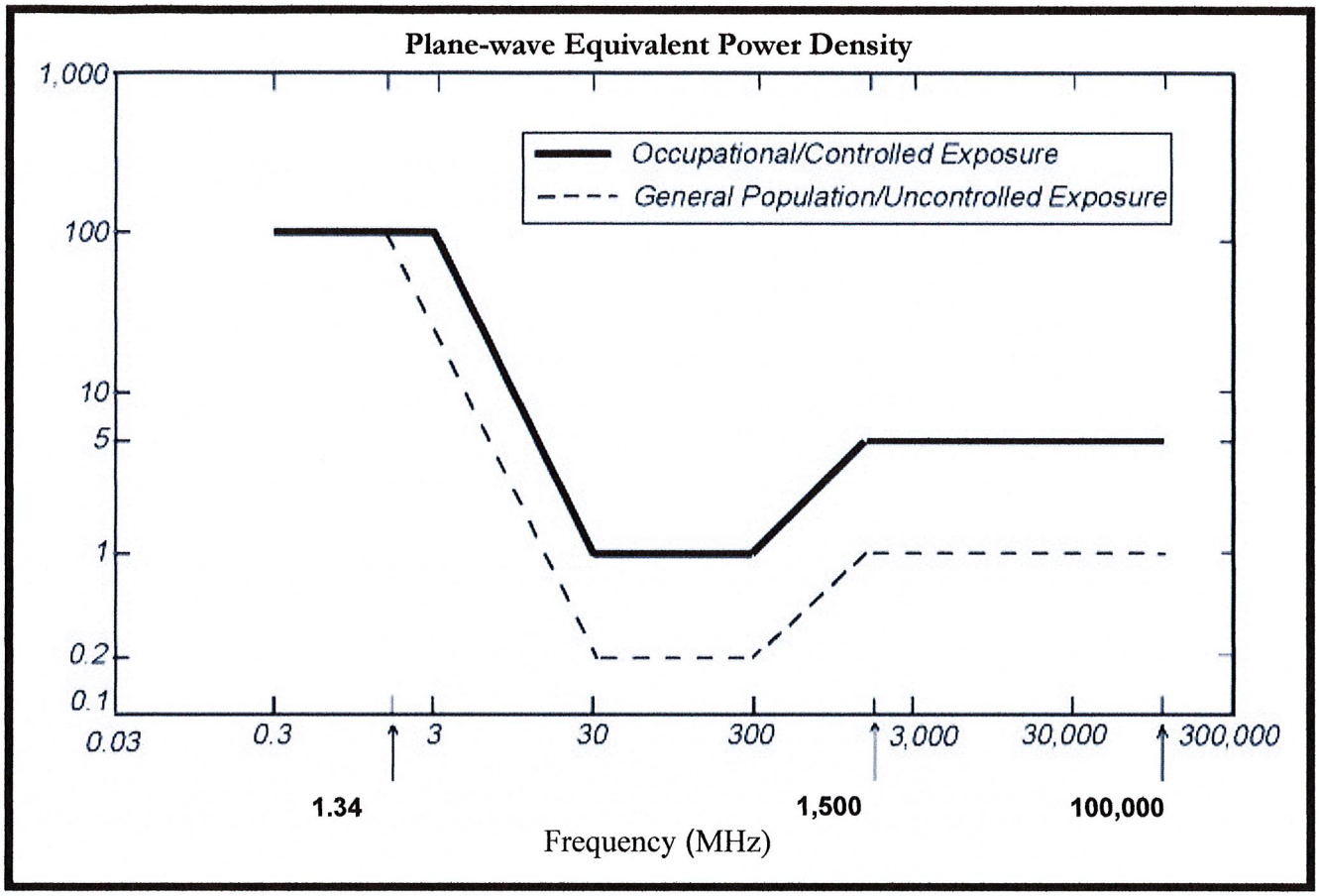
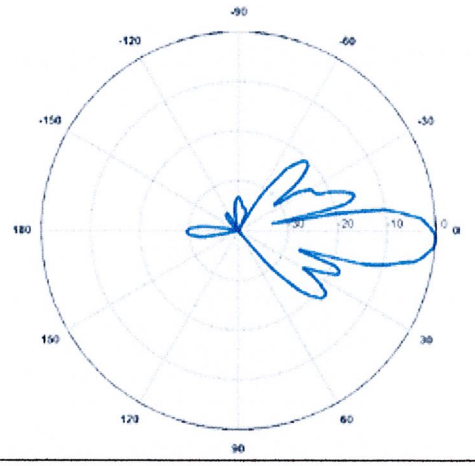


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

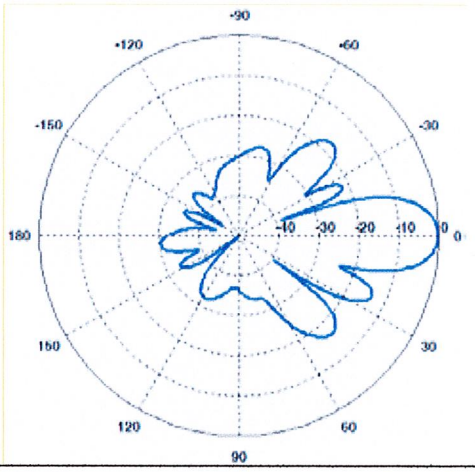
700 MHz

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 ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



850 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"