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

May 11, 2012

Jennifer Young Gaudet
HPC Wireless Services
46 Mill Plain Road, Floor 2
Danbury, CT 06811

RE: **EM-CING-006-120424** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 401 Lopus Road, Beacon Falls, Connecticut.

Dear Ms. Gaudet:

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:

- 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 April 23, 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/cm

c: The Honorable Gerard F. Smith, First Selectman, Town of Beacon Falls
Brian Herb, Zoning Enforcement Officer, Town of Beacon Falls

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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E-Mail: siting.council@ct.gov
www.ct.gov/csc

April 24, 2012

The Honorable Gerard F. Smith
First Selectman
Town of Beacon Falls
10 Maple Avenue
Beacon Falls. CT 06403

RE: **EM-CING-006-120424** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 401 Lopus Road, Beacon Falls, Connecticut.

Dear First Selectman Smith:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by May 8, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Brian Herb, Zoning Enforcement Officer, Town of Beacon Falls

EM-CING-006-120424

HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

HPC WIRELESS SERVICES

ORIGINAL

April 23, 2012

RECEIVED
APR 24 2012
CONNECTICUT
SITING COUNCIL

VIA UPS

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Linda Roberts, Executive Director

Re: New Cingular Wireless PCS, LLC – exempt modification
401 Lopus Road, Beacon Falls, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that 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 Beacon Falls.

AT&T plans to modify the existing wireless communications facility owned by the Town of Beacon Falls and located at 401 Lopus Road in the Town of Beacon Falls (coordinates 41°-25'-58.18" N, 73°-04'-13.35" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report 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. AT&T will add three (3) antennas and six (6) RRHs (remote radio heads) at a 145.5' centerline. A surge arrestor will be mounted above the platform at 148'. AT&T will also place a DC power and fiber run from the equipment to the antennas, within the tower. The proposed modifications will not extend the height of the 150' monopole.

2. The proposed changes will not extend the site boundaries. AT&T will install one additional cabinet within its existing shelter and will add a GPS antenna to the shelter. These changes will be within the existing compound and will have no effect on the site boundaries.

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 on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.53%; the combined site operations will result in a total power density of approximately 11.87%.

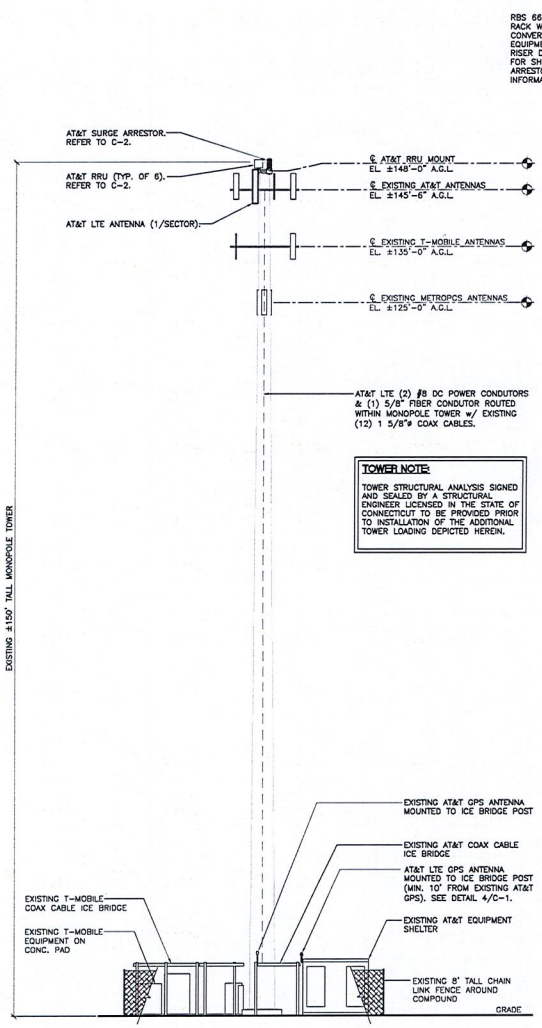
Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet

Jennifer Young Gaudet

cc: Honorable Gerard F. Smith, First Selectman, Town of Beacon Falls
(also underlying property owner)



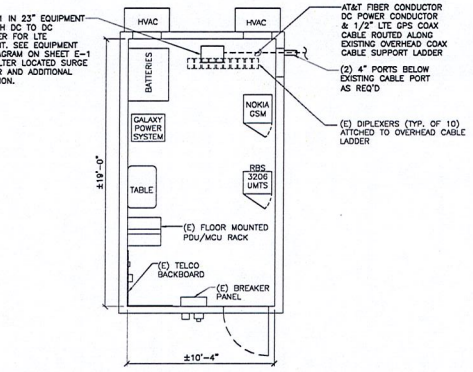
TOWER NOTE:

TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.

2 C-1 NORTH ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

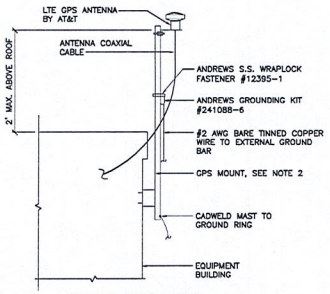


3 C-1 EQUIPMENT BUILDING FLOOR PLAN

SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.

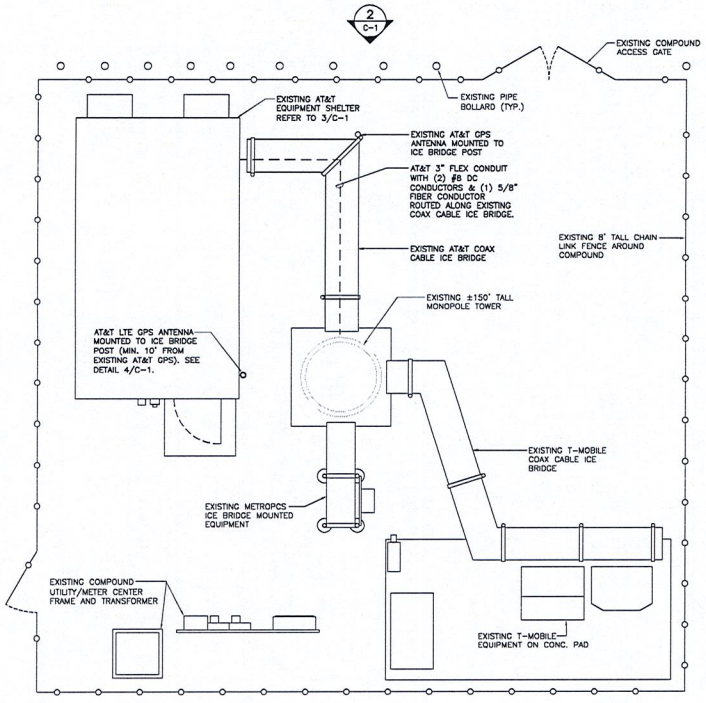


GPS ANTENNA MOUNTING NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND SHALL BE COORDINATED WITH AT&T'S CONSTRUCTION MANAGER.
2. GPS ANTENNA MOUNT, 3/4"ø THREADED MAST, 4 FEET LONG WITH (4) 7/16" MOUNTING HOLES AND 6" STANDOFF BY SITE PRO 1, INC., TELEPHONE 1-800-438-7761, PART NUMBER GPS1.
3. HOLLOW WALL KITS (HWK3B) FOR "STICK BUILD" SHELTERS AND SOLID WALL KITS (SWK3B) FOR CONCRETE SHELTERS ARE ALSO AVAILABLE FROM SITE PRO 1.

4 C-1 GPS ANTENNA MOUNTING DETAIL

NOT TO SCALE



1 C-1 COMPOUND PLAN

SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.

DESIGNED BY:	DEB
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
0	3/27/12	FLO	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

REVIEW SET
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at&t

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CENTEK engineering
Centered on Solutions℠
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Branford, CT 06405
www.CentekEng.com

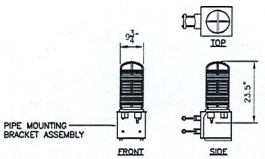
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2003
BEACON FALLS LOPUS ROAD
401 LOPUS ROAD
BEACON FALLS, CT 06403

DATE: 02/29/12
SCALE: AS NOTED
JOB NO. 11118.C001

PLANS, ELEVATION AND DETAIL

C-1

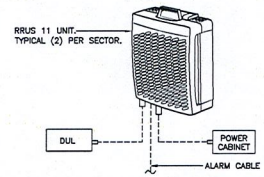
Sheet No. 3 of 8



SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	**TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.**	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

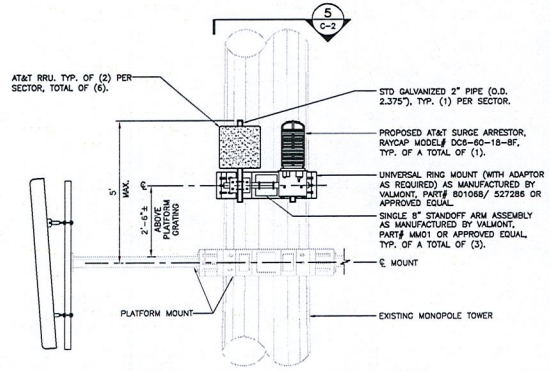
8 C-2 **SURGE ARRESTOR DETAIL**
NOT TO SCALE



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

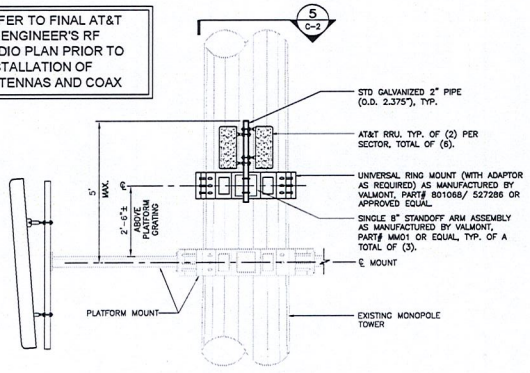
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

9 C-2 **RRU DETAIL**
NOT TO SCALE

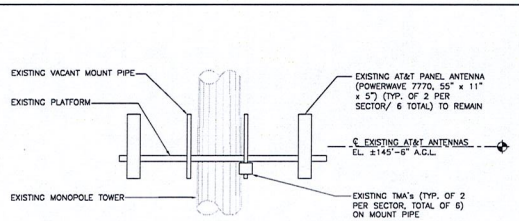


7 C-2 **RRU AND SURGE ARRESTOR MOUNTING DETAIL**
SCALE: 1/2" = 1'- 0"

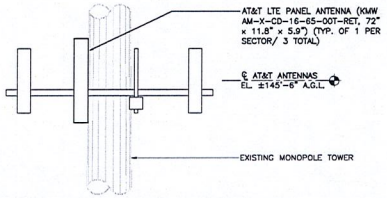
REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX



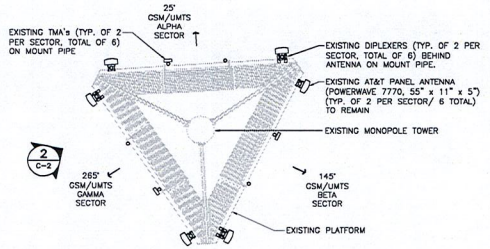
6 C-2 **RRU MOUNTING DETAIL**
SCALE: 1/2" = 1'- 0"



2 C-2 **EXISTING ANTENNA SECTOR ELEVATION**
SCALE: 1/4" = 1'-0"

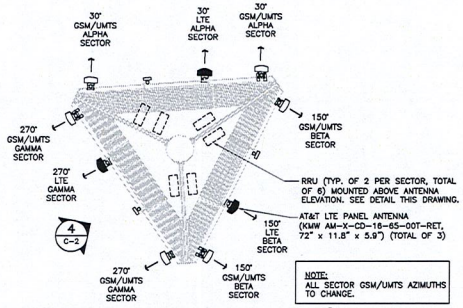


4 C-2 **PROPOSED ANTENNA SECTOR ELEVATION**
SCALE: 1/4" = 1'-0"

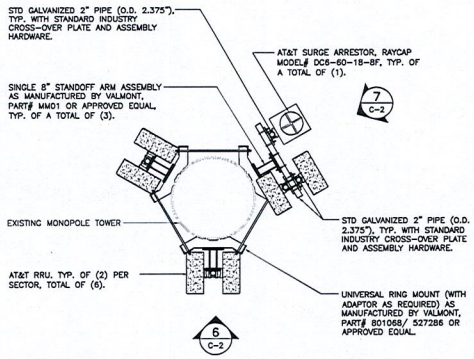


1 C-2 **EXISTING ANTENNA PLAN**
SCALE: 1/4" = 1'-0"

APPROX. NORTH



3 C-2 **PROPOSED ANTENNA PLAN**
SCALE: 1/4" = 1'-0"



5 C-2 **RRU AND SURGE ARRESTOR MOUNTING PLAN**
SCALE: 1/2" = 1'- 0"

DESIGNED BY:	CFC
DRAWN BY:	FLO
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
0	3/21/12	FLO	DEB	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

REVIEW SET
NOT FOR CONSTRUCTION

at&t

NEXLINK

CENTEK engineering
Centered on Solutions℠
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(203) 488-8587 Fax
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Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2003
BEACON FALLS LOPUS ROAD
401 LOPUS ROAD
BEACON FALLS, CT 06403

DATE:	02/29/12
SCALE:	AS NOTED
JOB NO.	11118.C001

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 6

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

150-ft Existing EEI Monopole

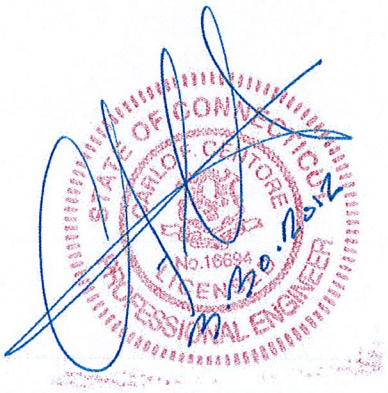
Proposed AT&T Mobility
Antenna Upgrade

AT&T Mobility Site Ref: CT2003

401 Lopus Road
Beacon Falls, CT

Centek Project No. 11118.CO1

Date: March 29, 2012



Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by AT&T Mobility on the existing monopole (tower) located in Beacon Falls, CT.

The host tower is a 150-ft tall, four-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Inc., job no; 13674, in 2005. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned EEI design documents. Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Paul J. Ford and Company project no. 42910-0003 dated October 15, 2010, visual verification from grade conducted by Centek personnel on December 6, 2011 and a RF data sheet.

The tower is made up of four (4) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 18.50-in at the top and 56.00-in at the base.

AT&T proposes the installation of three (3) panel antennas mounted to the existing low profile platform and six (6) RRU's and one (1) Surge Arrestor flush mounted. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- T-MOBILE (EXISTING):
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) RFS ATMAA1412D-1A20 TMA's and three (3) Andrew ETW190VS12UB TMA's mounted on three (3) T-Arms with a RAD center elevation of 135-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing monopole.
- T-MOBILE (RESERVED):
  Antennas: Nine (9) RFS APX16DWV-16DWVS-E-A20 panel antennas mounted on three (3) existing T-Arms with a RAD center elevation of 135-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing monopole.
- METROPCS (EXISTING):
  Antennas: Three (3) RFS APXV18-206517LS panel antennas flush mounted with a RAD center elevation of 125-ft above grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing monopole.

- AT&T (EXISTING TO REMAIN):
  Antennas: Six (6) Powerwave 7700 panel antennas, six (6) Powerwave LGP21401 TMA's and six (6) Powerwave LGP13519 Diplexers mounted on a low profile platform with a RAD center elevation of 145.5-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing monopole.
- **AT&T (PROPOSED):**
  Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas mounted on the existing low profile platform with a RAD center elevation of 145.5-ft above grade.
- **AT&T (PROPOSED):**
  Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 148-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running inside of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Beacon Falls; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed..	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **53.6%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	95.96'-126.17'	53.6%	**PASS**

Foundation and Anchors

The existing foundation consists of a 7.0-ft square x 8-ft long reinforced concrete pier on a 24.0-ft square x 3-ft thick reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural analysis report prepared by Paul J. Ford and Company project no. 42910-0003 dated October 15, 2010. The base of the tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	20 kips
	Compression	34 kips
	Moment	2024 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Pad and Pier	OTM[2]	2.0	5.84	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Compression	39.2%	**PASS**
Base Plate	Bending	35.3%	**PASS**

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

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Calculated Radio Frequency Emissions

at&t

CT2003

Beacon Falls Lopus Road

401 Lopus Road, Beacon Falls, CT 06403

April 17, 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 401 Lopus Road in Beacon Falls, CT. The coordinates of the tower are 41-25-58.18 N, 73-04-13.35 W.

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (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:

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

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 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
Cingular	*145*	*880*	*6*	*296*	*0.0304*	*0.5867*	*5.18%*
Cingular	*145*	*1930*	*3*	*427*	*0.0219*	*1.0000*	*2.19%*
Town of Beacon Falls		to be determined					
Pocket	125	2130	3	631	0.0436	1.0000	4.36%
T-Mobile	135	1935	8	190	0.0300	1.0000	3.00%
T-Mobile	135	2100	2	760	0.0300	1.0000	3.00%
AT&T UMTS	145.5	880	2	565	0.0019	0.5867	0.33%
AT&T UMTS	145.5	1900	2	875	0.0030	1.0000	0.30%
AT&T LTE	145.5	734	1	1313	0.0022	0.4893	0.46%
AT&T GSM	145.5	880	1	283	0.0005	0.5867	0.08%
AT&T GSM	145.5	1900	4	525	0.0036	1.0000	0.36%
						Total	**11.87%**

Table 1: Carrier Information[1,2]

[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 3/29/2012.

[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.

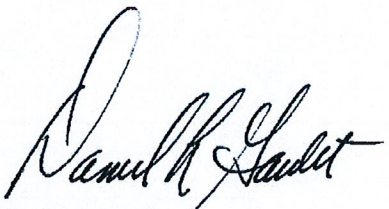
5. Conclusion

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 **11.87% 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

April 17, 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[3]

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[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)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

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

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

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

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

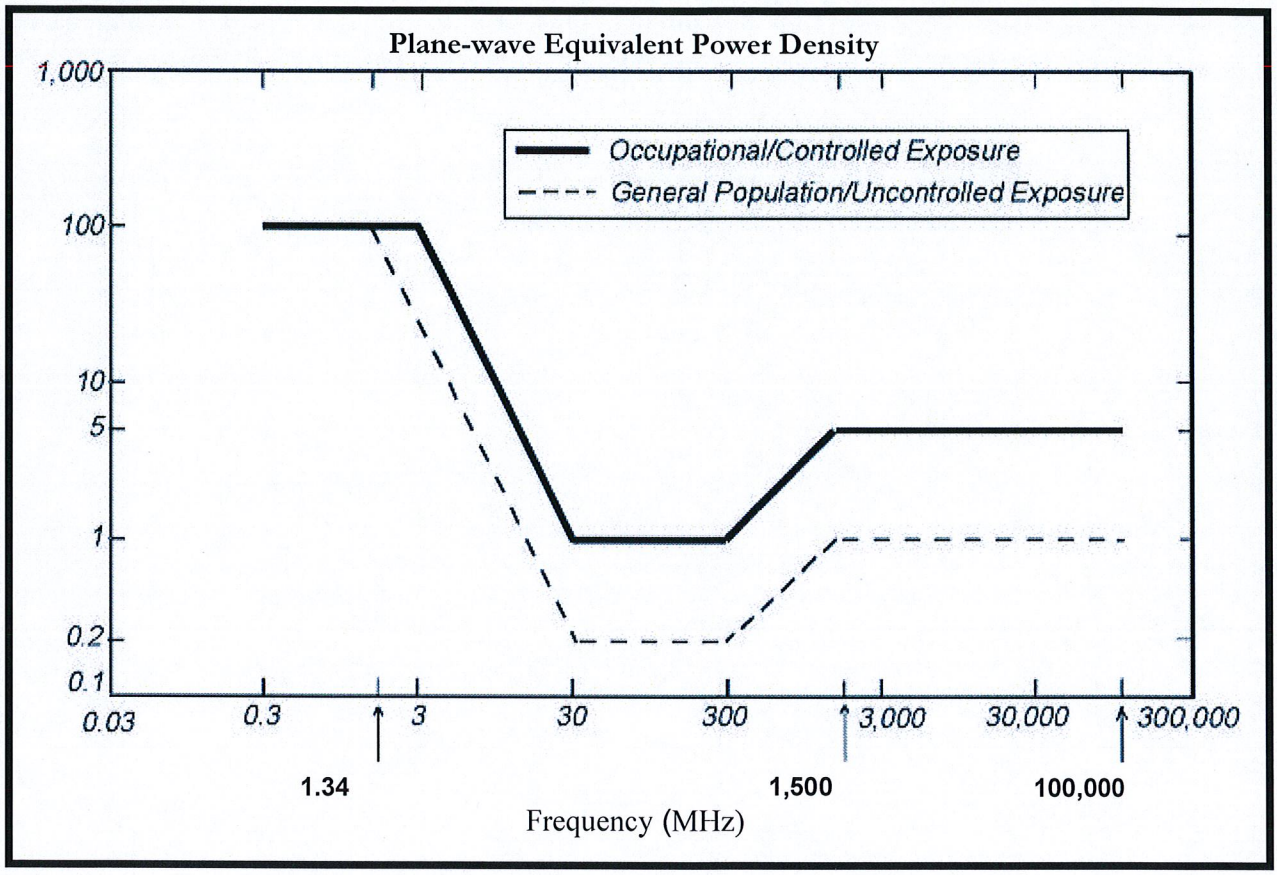
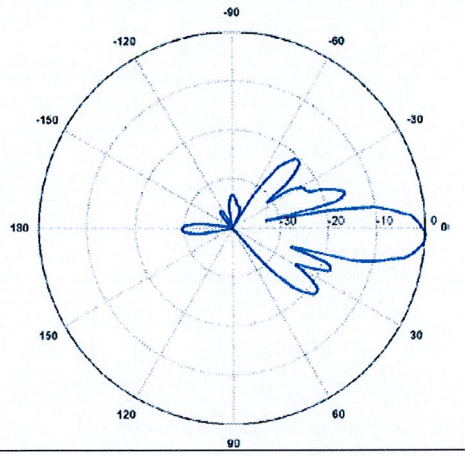


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

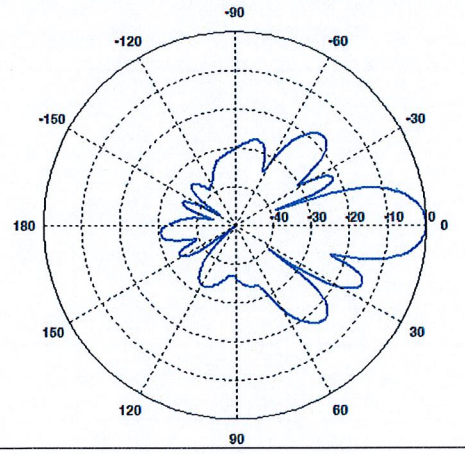
700 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T
Frequency Band:	698-806 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Linear ±45°
Size L x W x D:	72" x 11.8" x 5.9"



850 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	824-896 MHz
Gain:	11.4 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	85°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.4" 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:	90°
Polarization:	Dual Linear ±45°
Size L x W x D:	55.4" x 11.0" x 5.0"