



November 20, 2012

ORIGINAL

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 CONNECTICUT
 SITING COUNCIL

VIA OVERNIGHT COURIER

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

Re: New Cingular Wireless PCS, LLC – Exempt Modification
44 Gavitt Road, Barkhamsted

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 Section 16-50j-73 of the Regulations of Connecticut State Agencies (“R.S.C.A.”), 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, Town of Barkhamsted.

AT&T plans to modify the existing wireless communications facility owned by SBA Towers Co. and located at 44 Gavitt Road, Barkhamsted (coordinates 41° -56'-45.9" N, 72°54'-41.3" 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) LTE panel antennas on new pipe mounts attached to the existing platform, at a centerline height of approximately 167". Six (6) RRUs (remote radio units) will be placed on new mounts behind the LTE antennas, and a Surge Arrestor

will be placed on a new mounting pipe attached to the platform, all also at a centerline height of approximately 167'. AT&T will also place DC power and fiber runs along the existing coaxial cable run. These changes will not extend the height of the approximately 170' structure.

2. AT&T will place related equipment in an existing Equipment Shelter and mount a new GPS antenna on the existing Ice Bridge Post. 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 (6) 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 1.23%; the combined site operations will result in a total power density of approximately 22.64%.

Please do not hesitate to contact me by phone at (203) 610-1071, or by e-mail at mjhowlett@optonline.net, if there are any questions concerning this matter. Thank you for your consideration.

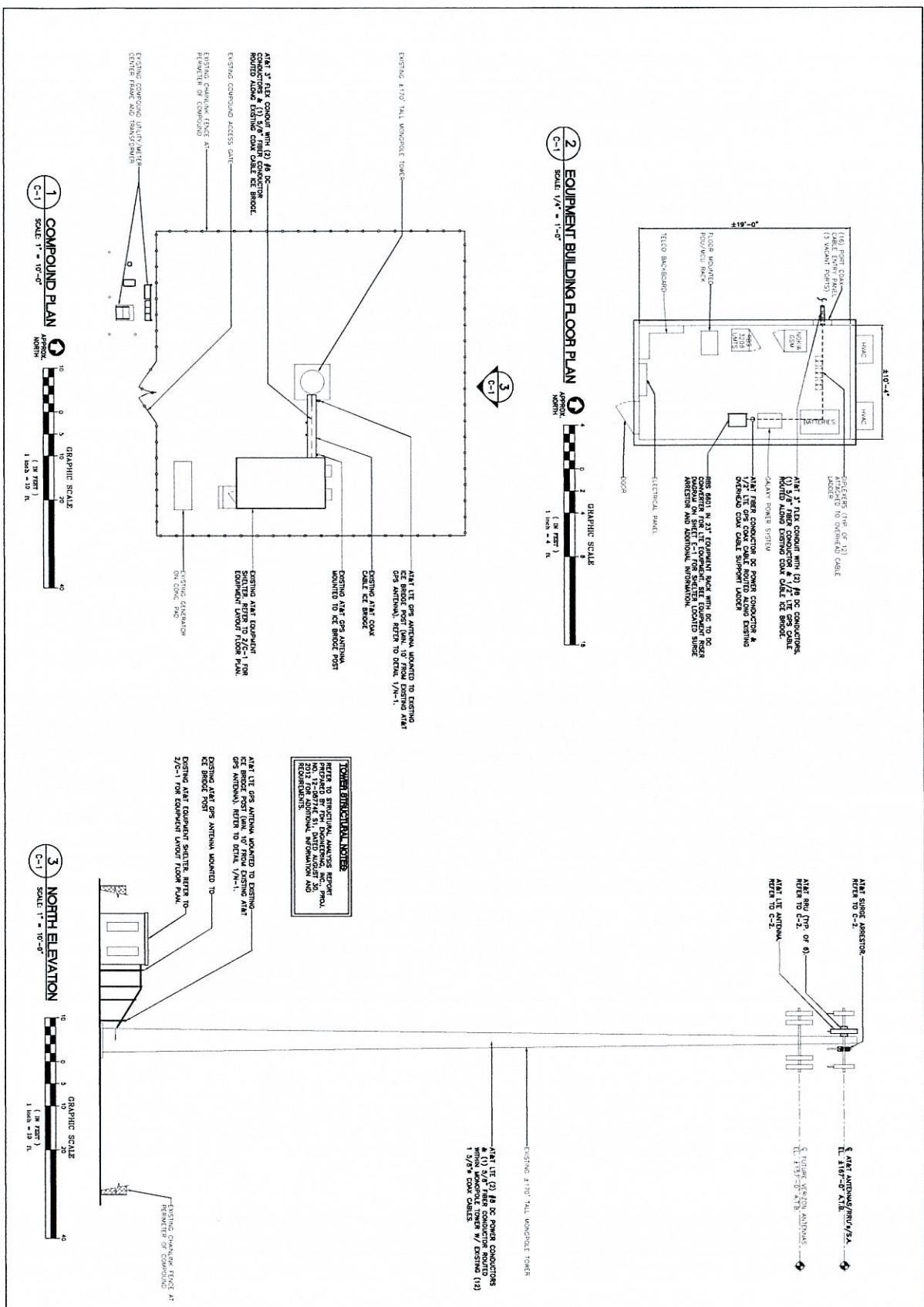
Respectfully yours,

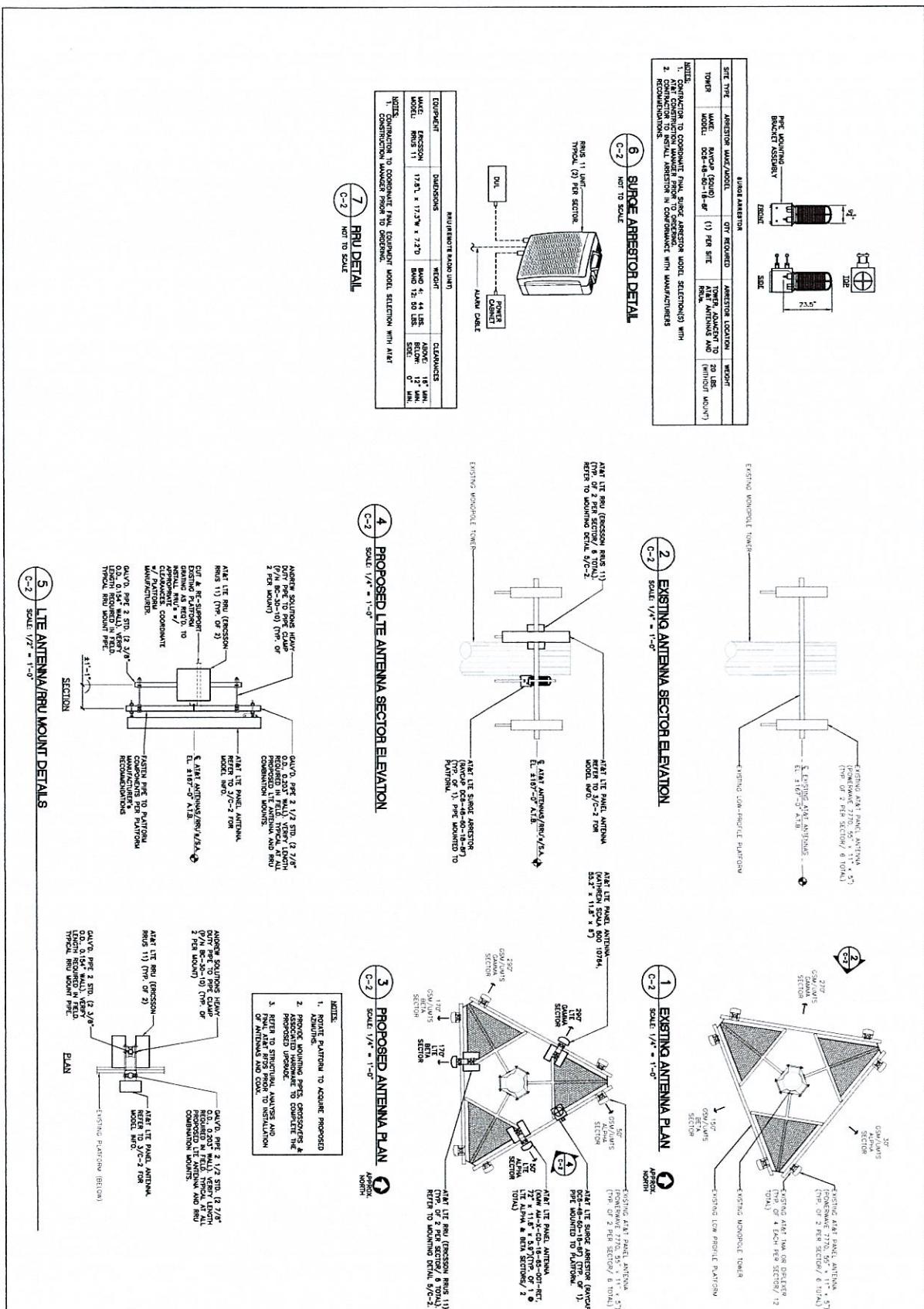


Melanie J. Howlett

Attachments

cc: Honorable Donald S. Stein, First Selectman, Town of Barkhamsted
Richard Langer (underlying property owner)





AT&T MOBILITY		DISPOSED BY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE		DRWNR BY
CT1280		NAME
BARKHAMSTED GAVITT ROAD		CHG'D BY
44 GAVITT ROAD		CR
BARKHAMSTED, CT 06006		
DATE: 10/29/12		CONSTRUCTION
SHEET NO. 1000404		CONSTRUCTION - CLIENT REVIEW
AS MEASURED		
SCALE: 1/4" = 1'-0"		
ATT&T		INSTRUMENTS CHECKED
CENTEK		TELECOM CHECKED
www.Centek.com		WIRELESS COMMUNICATIONS FACILITY
C-2		AT&T GAVITT ROAD



C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions



CT1280 - Barkhamsted Gavitt Road
44 Gavitt Road, Barkhamsted, CT 06063
(a.k.a. Barkhamsted – 44 Gavitt Road)

November 9, 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 44 Gavitt Road in Barkhamsted, CT. The coordinates of the tower are 41°56'46.05"N, 72°54'41.26"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:

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

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

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

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical 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
AT&T GSM	167	1900	2	427	0.0110	1.0000	1.10%
AT&T UMTS	167	1900	1	500	0.0064	1.0000	0.64%
AT&T GSM	167	880	4	296	0.0153	0.5867	2.60%
AT&T UMTS	167	880	1	500	0.0064	0.5867	1.10%
Verizon PCS	157	1900	14	482.35	0.0985	1.0000	9.85%
Verizon Cellular	157	869	9	403.25	0.0529	0.5793	9.14%
Verizon LTE	157	746	1	825.05	0.0120	0.4973	2.42%
AT&T UMTS	167	880	2	592	0.0015	0.5867	0.26%
AT&T UMTS	167	1900	2	982	0.0025	1.0000	0.25%
AT&T LTE	167	734	1	1313	0.0017	0.4893	0.35%
AT&T GSM	167	880	1	296	0.0004	0.5867	0.07%
AT&T GSM	167	1900	4	589	0.0030	1.0000	0.30%
Total							22.64%

Table 1: Carrier Information^{1 2 3}

¹ The existing CSC filing for AT&T should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for 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 FDH Engineering, Inc. Structural Analysis report dated August 30, 2012.

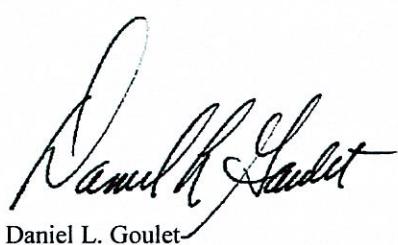
5. Conclusion

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 **22.64% 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

November 9, 2012

Date

Attachment A: References

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

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

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

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

(A) Limits for Occupational/Controlled Exposure⁴

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

(B) Limits for General Population/Uncontrolled Exposure⁵

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

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

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

⁴ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

⁵ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

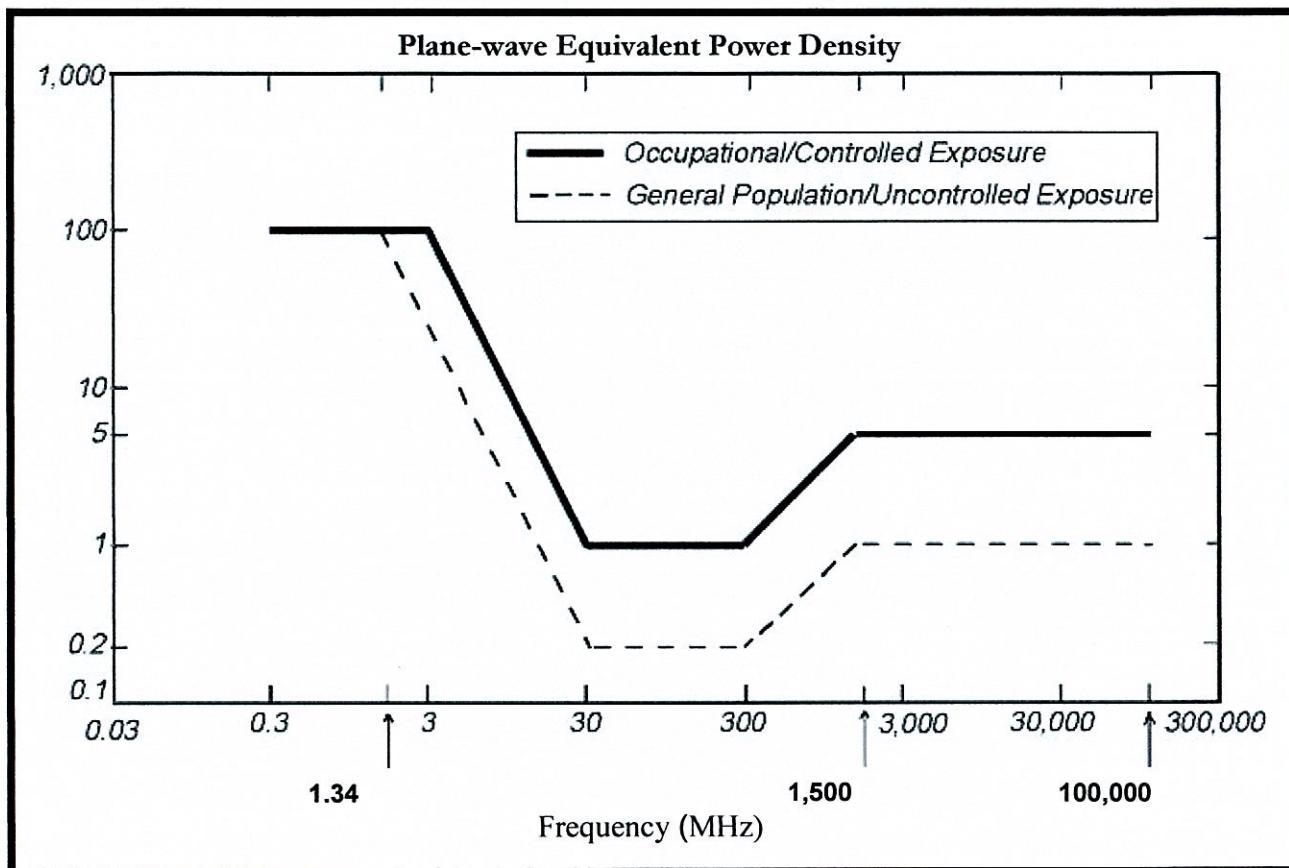
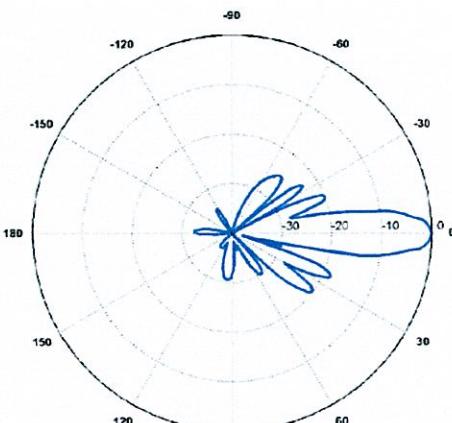
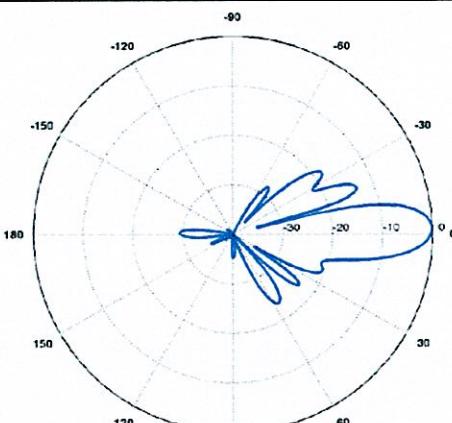
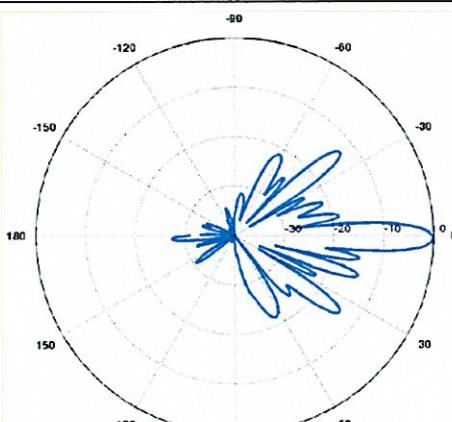


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

700 MHz <p> Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 698-806 MHz Gain: 13.35 dBd Vertical Beamwidth: 12.3° Horizontal Beamwidth: 65° Polarization: Dual Slant ± 45° Size L x W x D: 72" x 11.8" x 5.9" </p>	
850 MHz <p> Manufacturer: Powerwave Model #: P90-15-XLH-RR Frequency Band: 806-894 MHz Gain: 12.4 dBd Vertical Beamwidth: 12° Horizontal Beamwidth: 84° Polarization: Dual Linear ± 45° Size L x W x D: 72" x 12" x 7.3" </p>	
1900 MHz <p> Manufacturer: Powerwave Model #: P90-15-XLH-RR Frequency Band: 1850-1990 MHz Gain: 13.9 dBd Vertical Beamwidth: 6.5° Horizontal Beamwidth: 80° Polarization: Dual Linear ± 45° Size L x W x D: 72" x 12" x 7.3" </p>	

FDH Engineering, Inc., 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

**Structural Analysis for
SBA Network Services, Inc.**

170' Monopole Tower

**SBA Site Name: Barkhamsted
SBA Site ID: CT11709-S
AT&T Site ID: CT1280
AT&T Site Name: Barkhamsted Gavitt Road**

FDH Project Number 12-08774E S1

Analysis Results

Tower Components	70.5%	Sufficient
Foundation	70.5%	Sufficient

Prepared By:

W-G-P-II

William G. Price II, EI
Project Engineer I

Reviewed By:

Christopher M. Murphy

Christopher M Murphy, PE
President
CT PE License No. 25842

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012
info@fdh-inc.com



August 30, 2012

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code

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EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Barkhamsted, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F* and *2005 Connecticut State Building Code*. Information pertaining to the existing/proposed antenna loading, current tower geometry, geotechnical data, and member sizes was obtained from:

- Fred A. Nudd Corporation (Project No. 110-13059) original design drawings dated April 5, 2010
- Tower Engineering Professionals, Inc. (Project No. 100484.01) Subsurface Exploration Report dated February 3, 2010
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 Connecticut State Building Code* is 80 mph without ice and 28 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from AT&T in place at 167 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 Connecticut State Building Code* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Fred A. Nudd Corporation Project No. 110-130590), the foundation should have the necessary capacity to support both the proposed and existing loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards and *2005 Connecticut State Building Code* are met with the existing and proposed loading in place, we have the following recommendations:

1. Proposed coax should be installed inside the pole's shaft.
2. RRU/RRH Stipulation: The equipment may be installed in any arrangement as determined by the client.

APPURTEINANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

Antenna Elevation (ft)	Description	Coax and Lines ¹	Carrier	Mount Elevation (ft)	Mount Type
167	(9) Powerwave P90-15-XLH-RR (6) Powerwave TT08-19DB111-001 TMAs	(12) 1-5/8"	AT&T	167	(1) 12' Low Profile Platform
157	(6) Antel LPA-80080/6CF (3) Antel BXA-185080/12CF (3) Antel BXA-70080/6CF	(18) 1-5/8"	Verizon	157	(1) 12' Platform w/ Handrails (CA _A = 30.1ft ² max)

1. Coax installed inside the pole's shaft unless otherwise noted.

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
167 ¹	(9) Powerwave P90-15-XLH-RR (6) Powerwave TT08-19DB111-001 TMAs (2) KMW AM-X-CD-16-65-00T-RET (1) Kathrein 800 10764 (6) Ericsson RRUS 11 RRUs (1) Andrew ABT-DFDM-ADBH Surge Arrestor (1) Raycap DC6-48-60-18-8F Surge Arrestor	(12) 1-5/8" (1) 7/16" Fiber (2) 3/4" DC Cables	AT&T	167	(1) 12' Low Profile Platform

1. (1) 7/16" Fiber and (2) 3/4" DC Cables will be installed inside a 3" flex conduit inside the pole's shaft.

RESULTS

The following yield strength of steel for individual members was used for analysis:

Table 2 - Material Strength

Member Type	Yield Strength
Tower Shaft Sections	65 ksi
Base Plate	50 ksi
Anchor Bolts	105 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
L1	170 - 120	Pole	TP39.721x31.096x0.25	38.7	Pass
L2	120 - 111.5	Pole	TP40.688x38.2723x0.25	51.8	Pass
L3	111.5 - 86.5	Pole	TP45x40.688x0.3125	50.0	Pass
L4	86.5 - 42.75	Pole	TP52.547x43.297x0.3125	69.5	Pass
L5	42.75 - 0	Pole	TP58.671x50.5808x0.375	70.5	Pass
		Anchor Bolts	(18) 2" Ø w/ BC = 66"	68.0	Pass
		Base Plate	72" Ø PL x 2.5" thk.	52.7	Pass

* Capacities include 1/3 allowable increase for wind.

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	38 k	51 k
Shear	25 k	33 k
Moment	2,961 k-ft	4,200 k-ft

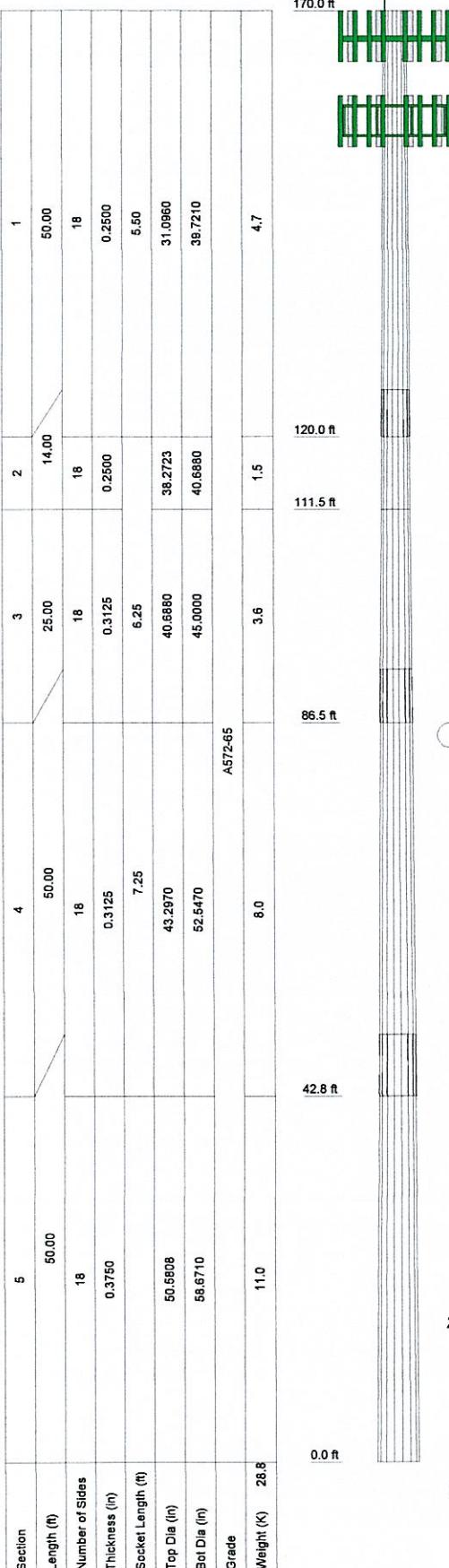
GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

APPENDIX



DESIGNED APPURTEINANCE LOADING

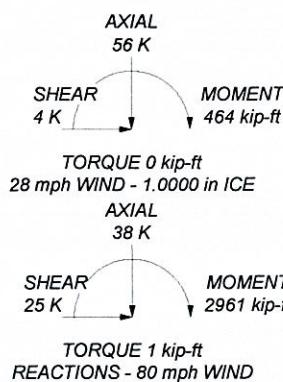
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	170	(2) RRUS 11	167
12' Low Profile Platform MNT	167	(2) RRUS 11	167
(3) P90-15-XLH-RR w/Mount Pipe	167	ABT-DFDM-ADBH	167
(3) P90-15-XLH-RR w/Mount Pipe	167	DC6-48-60-18-8F Surge Arrestor	167
(3) P90-15-XLH-RR w/Mount Pipe	167	12' Platform w/ Handrails MNT	157
(2) TT08-19DB111-001 TMA	167	(2) LPA-80080/6CF w/ Mount Pipe	157
(2) TT08-19DB111-001 TMA	167	(2) LPA-80080/6CF w/ Mount Pipe	157
(2) TT08-19DB111-001 TMA	167	(2) LPA-80080/6CF w/ Mount Pipe	157
AM-X-CD-16-65-00T-RET w/ Mount Pipe	167	BXA-185080/12CF w/ Mount Pipe	157
AM-X-CD-16-65-00T-RET w/ Mount Pipe	167	BXA-185080/12CF w/ Mount Pipe	157
800 10764 w/ Mount Pipe	167	BXA-185080/12CF w/ Mount Pipe	157
(2) RRUS 11	167	BXA-70080/6CF w/ Mount Pipe	157
		BXA-70080/6CF w/ Mount Pipe	157

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.5%



FDH Engineering, Inc.



Tower Analysis

6521 Meridien Drive

Raleigh, NC 27616

Phone: (919) 755-1012

FAX: (919) 755-1031

Job: **Barkhamsted, CT11709-S**

Project: **12-08774E S1**

Client: **SBA Network Services, Inc.** Drawn by: **William Price** App'd:

Code: **TIA/EIA-222-F** Date: **08/30/12** Scale: **NTS**

Path: **FDH-Service-Vessel-2012-1-Final.v3** Attributed to: **CT11709-S** Dwg No: **E-1**