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 1, 2012

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

RE: **EM-AT&T-064-120910A** – AT&T Mobility notice of intent to modify an existing
        telecommunications facility located at 768 Gilead Street, Hebron, 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:

- The coax lines shall be installed in accordance with the recommendations made in the
  Structural Analysis Report prepared by FDH Engineering dated August 23, 2012 and
  stamped by Christopher Murphy; and
- Following the installation of the proposed equipment, AT&T shall provide
  documentation certifying that the installation complied with the engineer's
  recommendation.
- 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
September 7, 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.

CSC
CONNECTICUT SITING COUNCIL

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 Jeffrey P. Watt, Chairman Board Of Selectmen, Town of Hebron
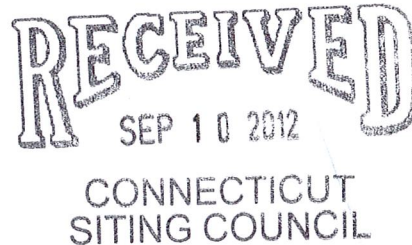   Michael O'Leary, Town Planner, Town of Hebron

NEXLINK
GLOBAL SERVICES

September 7, 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
        768 Gilead Street, Hebron, CT

Dear Ms. Roberts:

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

        AT&T plans to modify the existing facility at 66 Wall Street, Hebron, owned by
SBA Communications (coordinates 41°41'10.77"N, -72°24'54.19"W). Attached are
drawings depicting the planned changes, and documentation of the structural sufficiency
of the tower to accommodate the revised antenna configuration. Also included is a power
density calculation reflecting the modification to AT&T's operations at the site.

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

        1.The height of the overall structure will be unaffected. AT&T proposes to
        replace three (3) existing antennas and three (3) existing TMA's. Additionally,

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

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

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

4. The changes to the facility will not increase the calculated "worst case" power
density for the combined operations at the site to a level at or above the applicable
standard for uncontrolled environments as calculated for a mixed frequency site.
As indicated in the attached power density calculations, AT&T's operations at the
site will result in a power density of 2.19%; the combined site operations will
result in a total power density of 15.76%.

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: Mr. Andrew Tierney, Town Manager, Town of Hebron

Attachments

TOP OF EXISTING FLAGPOLE
ELEV. 160'-0"± (AGL)
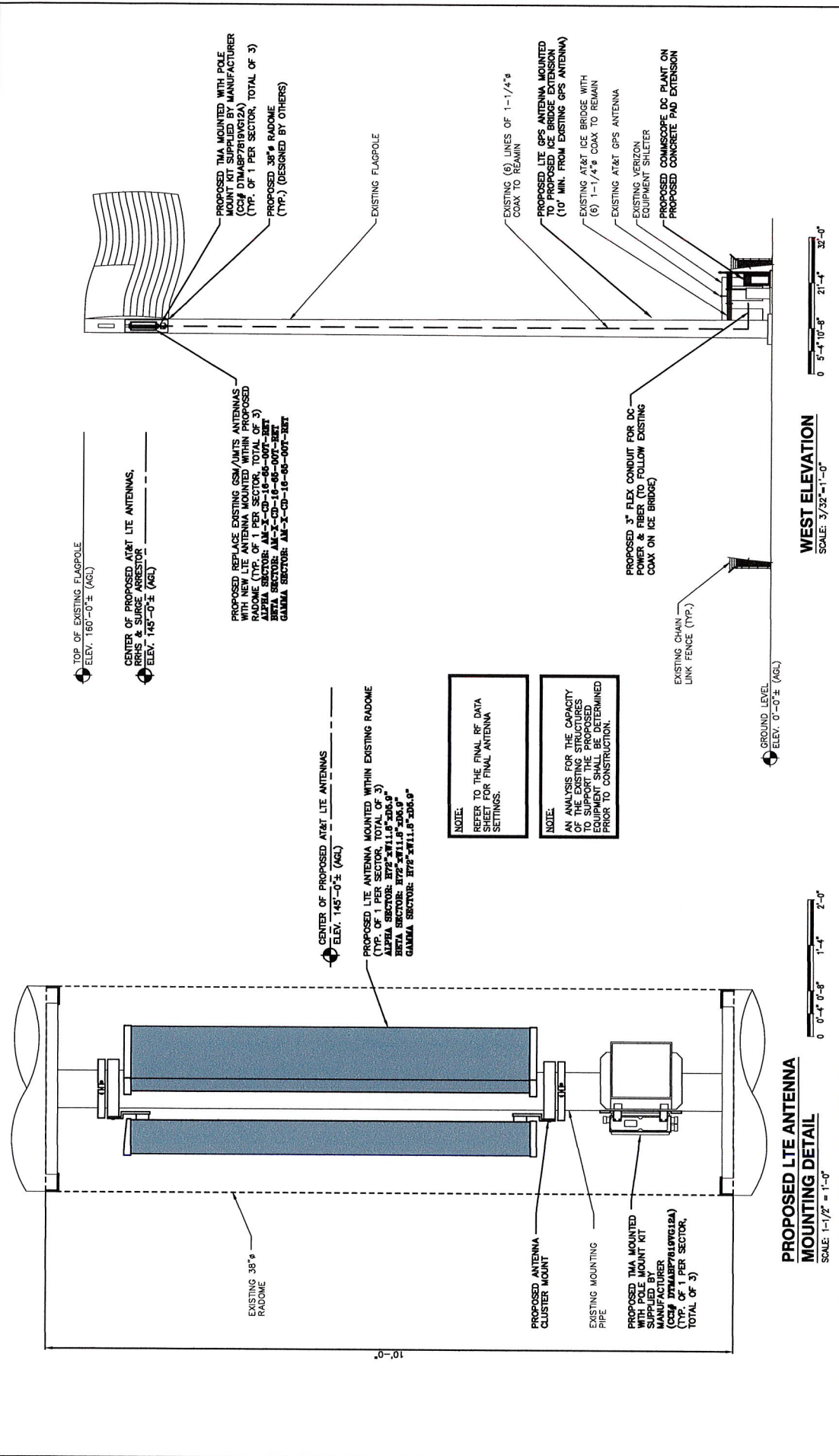
CENTER OF PROPOSED AT&T LTE ANTENNAS,
RRHS & SURGE ARRESTOR
ELEV. 145'-0"± (AGL)

PROPOSED TMA MOUNTED WITH POLE
MOUNT KIT SUPPLIED BY MANUFACTURER
(CCI# DTMABP7819VG12A)
(TYP. OF 1 PER SECTOR, TOTAL OF 3)

PROPOSED 38"φ RADOME
(TYP.) (DESIGNED BY OTHERS)

PROPOSED REPLACE EXISTING GSM/UMTS ANTENNAS
WITH NEW LTE ANTENNA MOUNTED WITHIN PROPOSED
RADOME (TYP. OF 1 PER SECTOR, TOTAL OF 3)
ALPHA SECTOR: AM-X-CD-16-65-00T-RET
BETA SECTOR: AM-X-CD-16-65-00T-RET
GAMMA SECTOR: AM-X-CD-16-65-00T-RET

EXISTING FLAGPOLE

EXISTING (6) LINES OF 1-1/4"φ
COAX TO REMAIN

PROPOSED LTE GPS ANTENNA MOUNTED
TO PROPOSED ICE BRIDGE EXTENSION
(10' MIN. FROM EXISTING GPS ANTENNA)

EXISTING AT&T ICE BRIDGE WITH
(6) 1-1/4"φ COAX TO REMAIN

EXISTING AT&T GPS ANTENNA

EXISTING VERIZON
EQUIPMENT SHELTER

PROPOSED COMMSCOPE DC PLANT ON
PROPOSED CONCRETE PAD EXTENSION

PROPOSED 3" FLEX CONDUIT FOR DC
POWER & FIBER (TO FOLLOW EXISTING
COAX ON ICE BRIDGE)

EXISTING CHAIN
LINK FENCE (TYP.)

GROUND LEVEL
ELEV. 0'-0"± (AGL)

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

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

CENTER OF PROPOSED AT&T LTE ANTENNAS
ELEV. 145'-0"± (AGL)

PROPOSED LTE ANTENNA MOUNTED WITHIN EXISTING RADOME
(TYP. OF 1 PER SECTOR, TOTAL OF 3)
ALPHA SECTOR: B72"xW11.8"xD5.9"
BETA SECTOR: B72"xW11.8"xD5.9"
GAMMA SECTOR: B72"xW11.8"xD5.9"

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

NOTE:
AN ANALYSIS FOR THE CAPACITY
OF THE EXISTING STRUCTURES
TO SUPPORT THE PROPOSED
EQUIPMENT SHALL BE DETERMINED
PRIOR TO CONSTRUCTION.

EXISTING 38"φ
RADOME

PROPOSED ANTENNA
CLUSTER MOUNT

EXISTING MOUNTING
PIPE

PROPOSED TMA MOUNTED
WITH POLE MOUNT KIT
SUPPLIED BY
MANUFACTURER
(CCI# DTMABP7819VG12A)
(TYP. OF 1 PER SECTOR,
TOTAL OF 3)

10'-0"

0   0'-4" 0'-8"   1'-4"   2'-0"

**PROPOSED LTE ANTENNA
MOUNTING DETAIL**
SCALE: 1-1/2"=1'-0"

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

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

PROPOSED COMMSCOPE DC PLANT TO BE INSTALLED AND LIVE PRIOR TO NOKIA NUSS REMOVAL AND PURCELL INSTALLATION.

TRUE NORTH
MAGNETIC NORTH
14°9'

EQUIPMENT PLAN

EXISTING 6'-0"x11'-0" CONCRETE PAD
EXISTING RXAIT CABINET
PROPOSED SURGE SUPPRESSOR DC6-48-60-0-1B-01 MOUNTED TO PROPOSED ICE BRIDGE POST WITH UNISTRUT
EXISTING NUSS TO BE REMOVED, RELOCATE EXISTING BOOSTER AS NECESSARY
PROPOSED PURCELL FLX16WS CABINET WITH LTE 6601 STACKED ON PROPOSED PURCELL FLX12WSW CABINET TO REPLACE EXISTING NUSS
PROPOSED CONCRETE PAD EXTENSION (18 SQ. FT.)
EXISTING AT&T POWER/TELCO BOARD

EXISTING UMTS CABINET
EXISTING BTS CABINET
EXISTING FLAGPOLE

EXISTING AT&T ICE BRIDGE WITH (6) 1-1/4"Ø COAX TO REMAIN
PROPOSED REPLACE EXISTING DIPLEXERS WITH TRI-PLEXERS (MOUNTED UNDER ICE BRIDGE)
EXISTING AT&T GPS ANTENNA
PROPOSED COMMSCOPE DC PLANT ON PROPOSED CONCRETE PAD EXTENSION
PROPOSED ICE BRIDGE EXTENSION (TO MATCH EXISTING)
PROPOSED RRH MOUNTED TO PROPOSED H-FRAME (TYP. OF 6)
PROPOSED LTE GPS ANTENNA MOUNTED TO PROPOSED ICE BRIDGE EXTENSION (10' MIN. FROM EXISTING GPS ANTENNA)

3'-0"
9'-0"
4'-0"
1'-2"

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

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

COMPOUND PLAN

EXISTING TRANSFORMER
EXISTING TELCO BACKBOARD

EXISTING ACCESS GATE
EXISTING CHAIN LINK FENCE (TYP.)

EXISTING AT&T EQUIPMENT ON CONCRETE PAD (TYP.)
EXISTING ICE BRIDGE (TYP.)
EXISTING VERIZON EQUIPMENT SHELTER
EXISTING AT&T POWER/TELCO BOARD
PROPOSED PURCELL FLX16WS CABINET WITH LTE 6601 STACKED ON PROPOSED PURCELL FLX12WSW CABINET TO REPLACE EXISTING NUSS

EXISTING FLAGPOLE
PROPOSED CONCRETE PAD EXTENSION (18 SQ. FT.)
PROPOSED COMMSCOPE DC PLANT ON PROPOSED CONCRETE PAD EXTENSION
PROPOSED ICE BRIDGE EXTENSION (TO MATCH EXISTING)

LTE 30°
LTE 150°
LTE 270°

COMPOUND PLAN
SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"

TRUE NORTH
MAGNETIC NORTH
14°9'

Hudson Design Group LLC
1400 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
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: CT5866
SITE NAME: HEBRON
768 GILEAD STREET
HEBRON, CT 06248
TOLLAND COUNTY

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

NO.	DATE	REVISIONS	DESIGNED BY: DC	DRAWN BY: DC
0	08/29/12	ISSUED FOR REVIEW		

SCALE: AS SHOWN
BY CHK APP'D
RW DC DPH
DRAWN BY: RW

AT&T
COMPOUND AND EQUIPMENT PLAN (LTE)

JOB NUMBER: 5866.01
DRAWING NUMBER: A-1
REV: 0

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

160' Monopole Tower

**SBA Site Name: Hebron
SBA Site ID: CT01001-S
New Cingular Site ID: CT5866
New Cingular Site Name: AWE-Hebron North Central**

FDH Project Number 12-01292E S2

Analysis Results

Tower Components	75.3 %	Sufficient
Foundation	87.6 %	Sufficient

Prepared By:

Joe W. Fulk, EI
Project Engineer

Reviewed By:

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

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

August 23, 2012

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Hebron, 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 (CSBC)*. Information pertaining to the existing/proposed antenna loading, foundation dimensions, current tower geometry, geotechnical data, and member sizes was obtained from:

- ❑ Armour Tower (Project No. 4283B) structural design report dated October 24, 2001
- ❑ Jaworski Geotech, Inc (Project No. 00839G) Geotechnical Evaluation dated August 31, 2001
- ❑ SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CSBC* is 85 mph without ice and 38 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from New Cingular in place at 145 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* provided the **Recommendation** listed below is satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Armour Tower Project No. 4283B), 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.

Recommendation

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

1. The existing coax installed inside the monopole's shaft should be used with the proposed loading.

APPURTENANCE 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	Carrier	Mount Elevation (ft)	Mount Type
155	(3) Amphenol QXW-634X638XBF (6) RFS FD9R6004/2C-3L Diplexers	(12) 1-5/8"	Verizon	155	Inside Canister
145	(6) Powerwave 7770 (6) Powerwave LGP21401 TMAs (6) Diplexers	(6) 1-5/8"	New Cingular	145	Inside Canister

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
145	(3) KMW AM-X-CD-17-65-00T (3) CCI DTMABP7819VG12A TMAs (6) Ericsson RRUS-11 RRUs (6) TPX 070821 Diplexers	(6) 1-5/8"	New Cingular	145	Inside Canister

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
Flange Plate	36 ksi (assumed)
Flange Bolts	Fu=120 ksi
Base Plate	36 ksi
Anchor Bolts	Fu=125 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. *Note: Capacities up to 100% are considered acceptable.* **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	160 - 150	Concealment Shroud	38"Ø	OK	Pass
L2	150 - 140	Concealment Shroud	38"Ø	OK	Pass
L3	140 - 130	Concealment Shroud	38"Ø	OK	Pass
	130	Flange Bolts	(16) 0.75"Ø on a 22"Ø BC	33.0	Pass
	130	Flange Plate	37.25"Ø x 0.75" thk PL	75.3	Pass
L4	130 - 120	Concealment Shroud	38"Ø	OK	Pass
L5	120 - 110	Concealment Shroud	38"Ø	OK	Pass
	110	Flange Plate	39" Ø x 2" thk PL	39.7	Pass
L6	110 - 80	Pole	TP39.1409x34x0.25	27.2	Pass
L7	80 - 37	Pole	TP45.947x37.9508x0.3125	34.9	Pass
L8	37 - 0	Pole	TP51.6x44.3225x0.375	39.1	Pass
		Anchor Bolts	(12) 2"Ø on a 59"Ø BC	48.8	Pass
		Base Plate	62"Ø x 2" thk PL	67.4	Pass

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	27 k	33 k
Shear	15 k	16 k
Moment	1,276 k-ft	1,456 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

Length (ft)	43.00	48.00	30.00	0.50	9.50	10.00	10.00	10.00	10.00	10.00
Number of Sides	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.3750	0.3125	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Socket Length (ft)	6.00	6.00	5.00							
Top Dia (in)	44.3016	37.7841	34.0000	34.0000	38.0000	38.0000	38.0000	38.0000	38.0000	38.0000
Bot Dia (in)	51.6000	45.9470	39.1409	38.0000	38.0000	38.0000	38.0000	38.0000	38.0000	38.0000
Grade		A572-65								
Weight (K)	8.3	6.7	2.9	0.0	1.0	1.0	1.0	1.0	1.0	1.0

Weight (K): 23.1

Elevations marked: 160.0 ft, 150.0 ft, 140.0 ft, 130.0 ft, 120.0 ft, 110.5 ft, 80.0 ft, 37.0 ft, 0.0 ft

AXIAL 39 K
SHEAR 3 K — *MOMENT* 267 kip-ft
38 mph WIND - 1.0000 in ICE

AXIAL 27 K
SHEAR 15 K — *MOMENT* 1276 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
15' x 25' American Flag	160	KMW AM-X-CD-17-65-00T w/ Mount Pipe	145
QXW-634X638XBF	155	CCI DTMABP7819VG12A TMA	145
QXW-634X638XBF	155	CCI DTMABP7819VG12A TMA	145
(2) FD9R6004/2C-3L Diplexer	155	CCI DTMABP7819VG12A TMA	145
(2) FD9R6004/2C-3L Diplexer	155	(2) Ericsson RRUS-11	145
(2) FD9R6004/2C-3L Diplexer	155	(2) Ericsson RRUS-11	145
KMW AM-X-CD-17-65-00T w/ Mount Pipe	145	(2) Ericsson RRUS-11	145
KMW AM-X-CD-17-65-00T w/ Mount Pipe	145	(2) TPX 070821 Diplexer	145
		(2) TPX 070821 Diplexer	145
		(2) TPX 070821 Diplexer	145

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 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: 39.1%

Calculated Radio Frequency Emissions

at&t

CT5866

(Hebron)

768 Gilead Street, Hebron, CT 06248

September 5, 2012

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List of Tables

List of Figures

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 within the flagpole tower located at 768 Gilead Street in Hebron, CT. The coordinates of the tower are 41° 41' 10.77" N, 72° 24' 54.19" W.

AT&T is proposing the following modifications:

    1) Remove three existing antennas;
    2) Install three multi-band antennas (700/850/1900/2100 MHz) 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:

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

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/cm²)	Limit	%MPE
AT&T UMTS	145	880	1	500	0.0086	0.5867	1.46%
AT&T GSM	145	1900	2	427	0.0146	1.0000	1.46%
AT&T GSM	145	880	4	296	0.0202	0.5867	3.45%
Verizon Cellular	155	869	9	253	0.0341	0.5793	5.88%
Verizon PCS	155	1970	11	244	0.0402	1.0000	4.02%
Verizon AWS	155	2145	1	665	0.0100	1.0000	1.00%
Verizon LTE	155	698	1	831	0.0124	0.4653	2.67%
AT&T UMTS	145	880	2	982	0.0034	0.5867	0.57%
AT&T UMTS	145	1900	2	1355	0.0046	1.0000	0.46%
AT&T LTE	145	734	1	1313	0.0022	0.4893	0.46%
AT&T GSM	145	880	1	491	0.0008	0.5867	0.14%
AT&T GSM	145	1900	4	813	0.0056	1.0000	0.56%
						Total	**15.76%**

Table 1: Carrier Information[1] [2] [3]

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[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 Structural Analysis dated August 23, 2012.
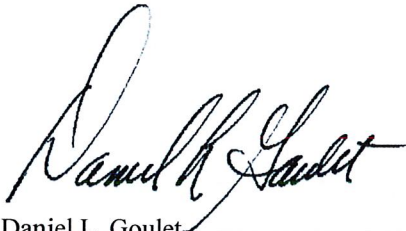
5. Conclusion

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 **15.76% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

September 5, 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)

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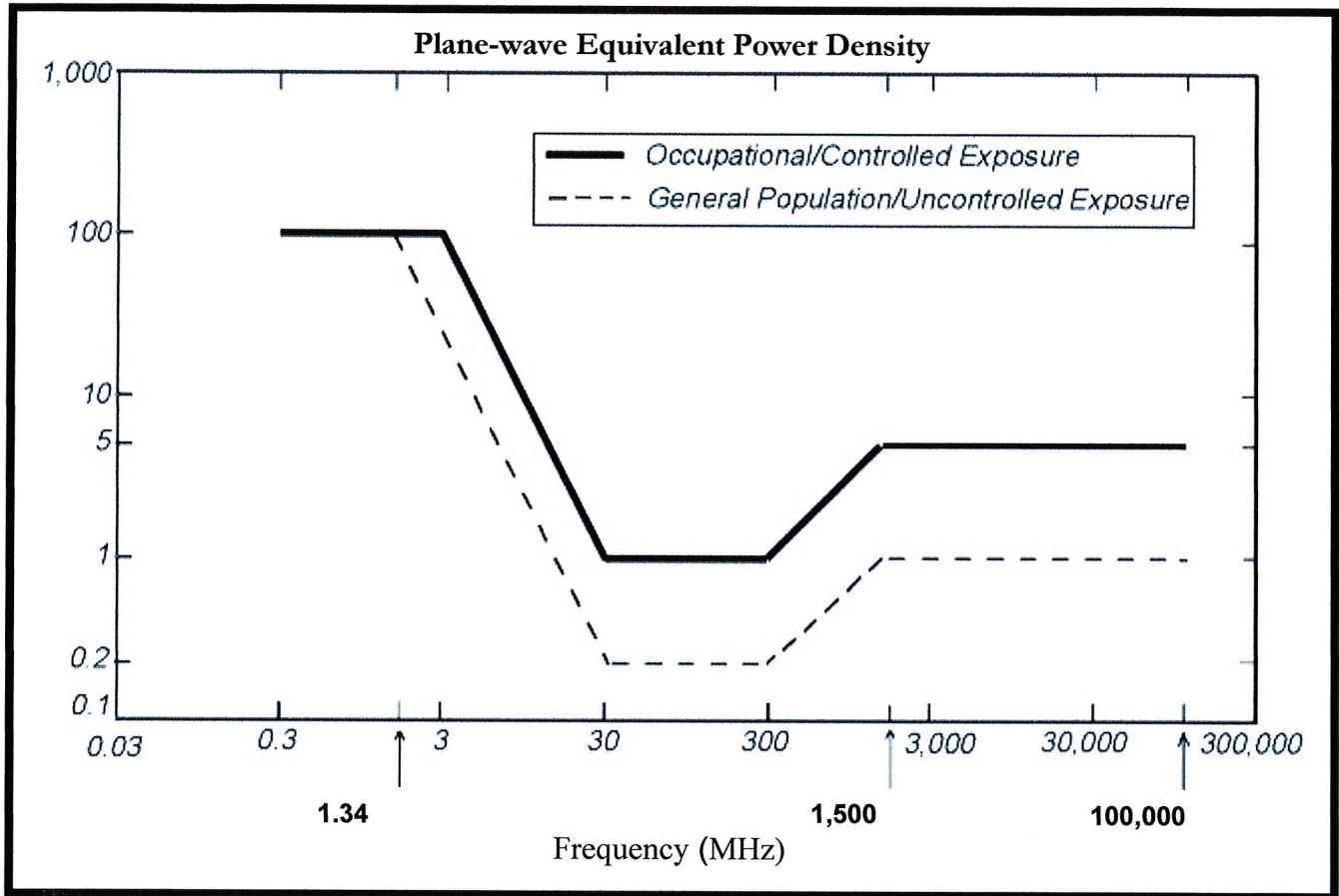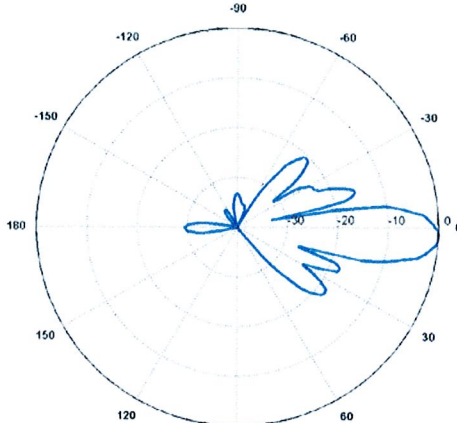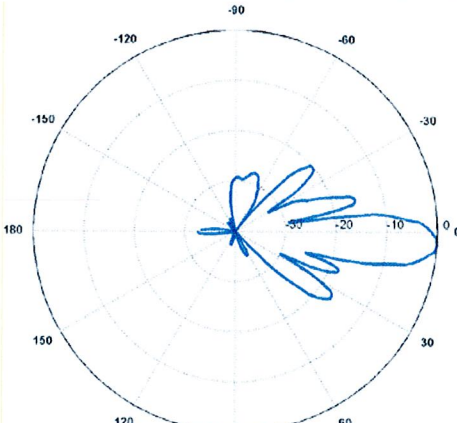
Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	824-894 MHz
Gain:	13.9 dBd
Vertical Beamwidth:	11.5°
Horizontal Beamwidth:	63°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"

1900 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	1850-1900 MHz
Gain:	15.3 dBd
Vertical Beamwidth:	6°
Horizontal Beamwidth:	67°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"