



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-064-120910B** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 66 Wall 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 and equipment shall be installed in accordance with the recommendations made in the Structural Analysis Report prepared by FDH Engineering dated August 27, 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.

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



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

September 10, 2012

The Honorable Jeffrey P. Watt
Chairman Board Of Selectmen
Town of Hebron
Town Office Building
15 Gilead Street
Hebron, CT 06248

RE: **EM-AT&T-064-120910B** -- AT&T Mobility notice of intent to modify an existing telecommunications facility located at 66 Wall Street, Hebron, Connecticut.

Dear Chairman Board Of Selectmen Watt:

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 September 24, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Andrew J. Tierney, Interim Town Manager, Town of Hebron
Michael O'Leary, Town Planner, Town of Hebron



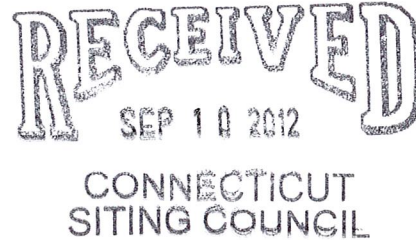
EM-AT&T-064-120910B

ORI

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
66 Wall 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°39’52.71”N, -72°21’40.60”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 3.49%; the combined site operations will result in a total power density of 12.21%.

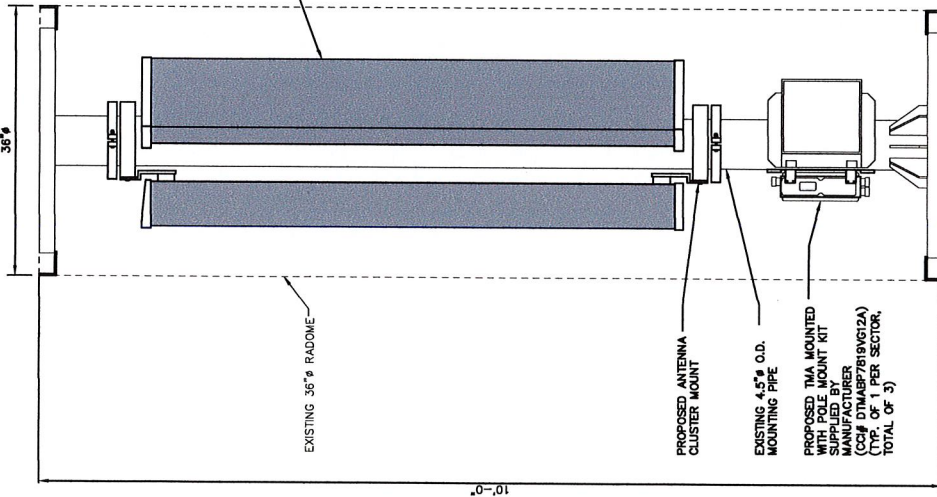
Please feel free to call me with any questions or concerns regarding this matter. Thank you for your consideration.

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



PROPOSED LITE ANTENNA MOUNTED WITHIN RADOME
(TYP. OF 1 PER SECTOR, TOTAL OF 3)
ALPHA SECTOR: 872-2111.8-206.9
BETA SECTOR: 872-2111.8-206.9
GAMMA SECTOR: 872-2111.8-206.9

CENTER OF PROPOSED AT&T LITE ANTENNAS
ELEV. 116'-0"± (AGL)

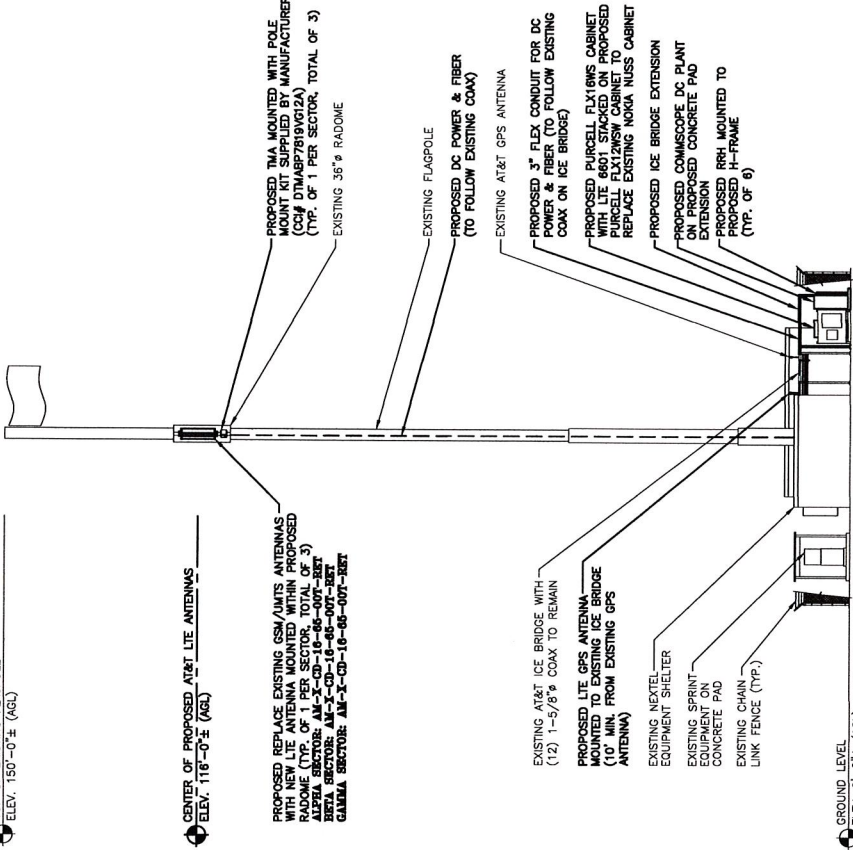
TOP OF EXISTING FLAGPOLE
ELEV. 150'-0"± (AGL)

CENTER OF PROPOSED AT&T LITE ANTENNAS
ELEV. 116'-0"± (AGL)

PROPOSED REPLACE EXISTING GSM/LITE ANTENNAS WITH NEW LITE ANTENNA MOUNTED WITHIN PROPOSED RADOME (TYP. OF 1 PER SECTOR, TOTAL OF 3)
ALPHA SECTOR: AM-3-CB-16-66-007-RET
BETA SECTOR: AM-3-CB-16-66-007-RET
GAMMA SECTOR: AM-3-CB-16-66-007-RET

EXISTING 36" RADOME
PROPOSED ANTENNA CLUSTER MOUNT
EXISTING 4.5" O.D. MOUNTING PIPE
PROPOSED TMA MOUNTED WITH POLE MOUNT KIT SUPPLIED BY MANUFACTURER (COP# DT148P7819V612A) (TYP. OF 1 PER SECTOR, TOTAL OF 3)

NOTES:
1. REFER TO RFDS & SECTOR SCHEMATICS FOR ANTENNA MODEL TYPE & QUANTITY REQUIRED PER SECTOR



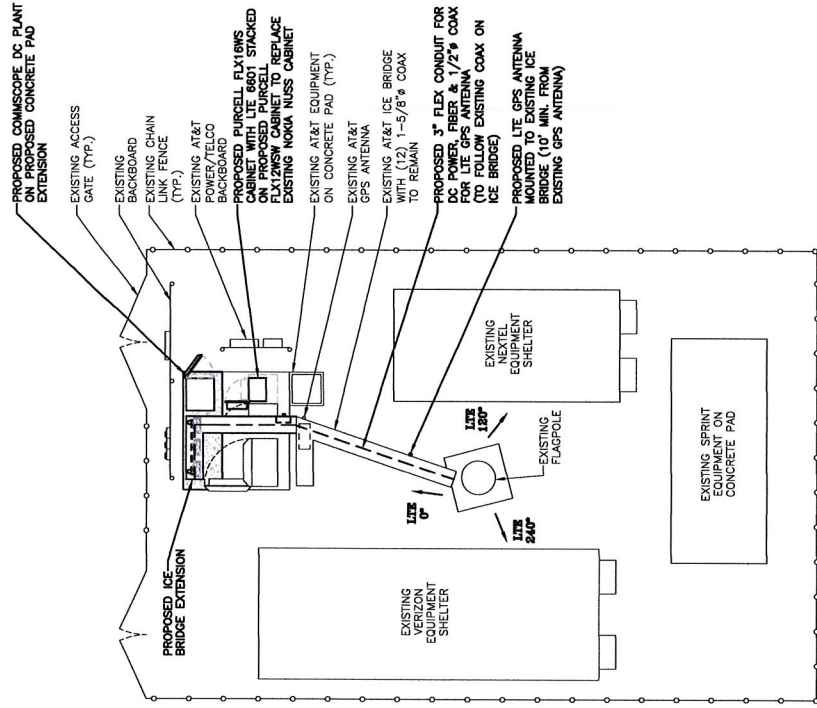
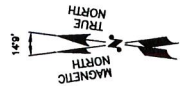
EAST ELEVATION
SCALE: 3/32" = 1'-0"

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

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

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

 HUDSON Design Group 1800 GORDON STREET, SUITE 2101 N. ANDOVER, MA 01854 TEL: (978) 552-5255 FAX: (978) 552-3266	 MEXLINK GLOBAL SERVICES COMPANY 800 MARSHALL PHELPS ROAD UNIT# 2A WINDSOR, CT 06095	 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067	DESIGNED BY: DC DRAWN BY: RM	SCALE: AS SHOWN	NO. DATE 0 08/28/12 ISSUED FOR REVIEW	REVISIONS BY: CHM/APP	RM DC DPH	ELEVATION AND ANTENNA MOUNTING DETAIL	JOB NUMBER: 55865.01	DRAWING NUMBER: A-2	SHEET: 0
			SITE NUMBER: CT5865 SITE NAME: CENTRAL HEBRON 66 WALL STREET HEBRON, CT 06248 TOLLAND COUNTY	AT&T	JOB NUMBER: 55865.01	DRAWING NUMBER: A-2	SHEET: 0				



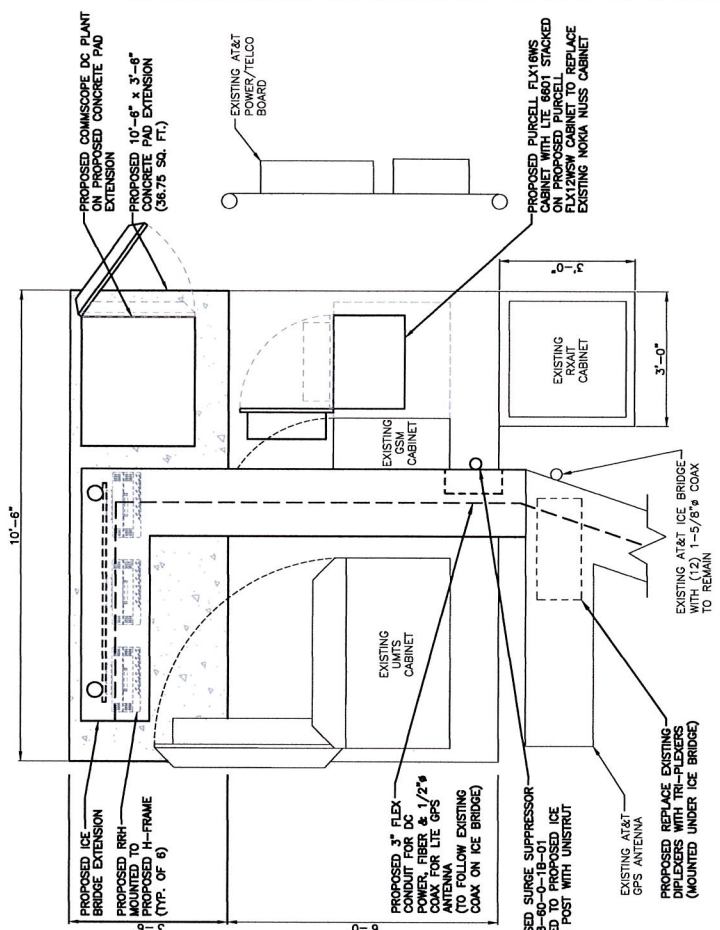
COMPOUND PLAN
SCALE: 3/16" = 1'-0"



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

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

NOTE:
PROPOSED COMMISSIO DC PLANT TO BE INSTALLED AND LIVE PRIOR TO NOKIA NUSS REMOVAL AND PURCELL INSTALLATION.



EQUIPMENT PLAN
SCALE: 3/4" = 1'-0"



JOB NUMBER		5585.01
DRAWING NUMBER		A-1
COMPONENT AND EQUIPMENT PLAN		
DATE		01/28/13
ISSUED FOR REVIEW		REVISIONS
BY	CHK	APP
DATE	DATE	DATE
SCALE	AS SHOWN	ISSUED BY: DC
DRAWN BY: RM		

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06867

SITE NUMBER: CT5865
SITE NAME: CENTRAL HEBRON
66 WALL STREET
HEBRON, CT 06248
TOLLAND COUNTY

NETLINK
A World's Class Service Company
800 MARSHALL PHELPS ROAD UNIT# 2A
WINDSOR, CT 06095

Hudson
Design Group
1400 GOSWOLD STREET
WINDSOR, CT 06095
TEL: 860 534 5500
FAX: 860 534 5506



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

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

150' Monopole Tower

**SBA Site Name: Central Hebron
SBA Site ID: CT04374-S
Cingular Site Name: AWE-Andover South
Cingular Site ID: CT5865**

FDH Project Number 12-01291E S2

Analysis Results

Tower Components	92.3%	Sufficient
Foundation	96.8%	Sufficient

Prepared By:

Heather W Jones

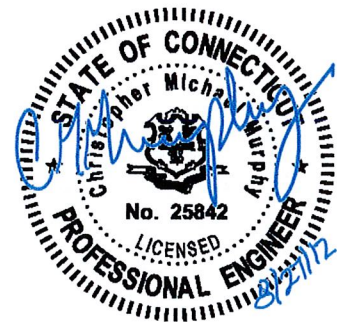
Heather W. Jones, EI
Project Engineer

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 27, 2012

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures & the 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 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 the *2005 Connecticut State Building Code*. Information pertaining to the existing/proposed antenna loading, current tower geometry, geotechnical data, and member sizes was obtained from:

- Pirod Inc. (Eng. File No. A-117319) original design drawings dated July 19, 2000
- FDH Engineering, Inc. (12-01291E G1) Geotechnical Evaluation of Subsurface Conditions dated February 14, 2012
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and the *2005 Connecticut State Building Code* is 85 mph without ice and 38 mph with 1 - 1/4" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from Cingular in place at 115 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 Connecticut State Building Code* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was constructed per the original design drawings (see Pirod Eng. File No. A-117319) and per the soil parameters (see FDH Engineering, Inc. Project No. 12-01291E G1), the foundation should have the necessary capacity to support the existing and proposed 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 the *2005 Connecticut State Building Code* are met with the existing and proposed loading in place, we have the following recommendations:

1. The proposed coax should be installed inside the pole's shaft.
2. The proposed loading must be installed inside the canister.

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 ¹	Carrier	Mount Elevation (ft)	Mount Type
145	(6) EMS RR90-12-00DA2	(6) 7/8"	Nextel	145	Inside Flagpole Canister
140	(1) 10' x 15' Flag	---	---	---	---
135	(3) Antel QXW-634X638XBF-EDIN (6) RFS FD9R6004/2C-3L Diplexers	(12) 7/8"	Verizon	135	Inside Flagpole Canister
125	(3) EMS RR90-17-00DP	(6) 7/8"	Sprint	125	Inside Flagpole Canister
115	(3) Powerwave 7770.00 (6) Powerwave LGP21401 TMA's	(6) 1-5/8"	Cingular	115	Inside Flagpole Canister

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
115	(3) KMW AM-X-CD-17-65-00T (3) CCI DTMABP7819VG12A TMA's (6) Ericsson RRUS-11 RRUs (6) TPX 070821 Diplexers	(6) 1-5/8"	Cingular	115	Inside Flagpole 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	42 ksi
Flange Plate	36 ksi
Flange Bolts	Fu = 120 ksi
Base Plate	36 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. *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	150 - 120	Flagpole Canister	24" Ø	---	---
L1	120 - 110	Flagpole Canister	36" Ø	---	---
	110	Flange Bolts	(16) 1"Ø w/ BC = 21"	20.9	Pass
	110	Flange	23.25" Ø PL x 1.25" thk.	26.7	Pass
L2	110 - 80	Pole	P24x3/8	39.8	Pass
	80	Flange Bolts	(16) 1"Ø w/ BC = 21"	59.3	Pass
	80	Flange	23.25" Ø PL x 1.25" thk.	74.2	Pass
L3	80 - 50	Pole	P24x3/8	74.1	Pass
	50	Flange Bolts	(18) 1"Ø w/ BC = 27"	76.6	Pass
	50	Flange	30.375" Ø PL x 1.25" thk.	87.8	Pass
L4	50 - 20	Pole	P30x3/8	81.5	Pass
	20	Flange Bolts	(22) 1"Ø w/ BC = 33"	80.4	Pass
	20	Flange	36.375" Ø PL x 1.25" thk.	92.3	Pass
L5	20 - 0	Pole	P36x3/8	76.4	Pass
		Anchor Bolts	(28) 1"Ø w/ BC = 39"	60.7	Pass
		Base Plate	42.375" Ø PL x 1.25" thk.	81.6	Pass

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis* (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	18 k	17 k
Shear	8 k	8 k
Moment	730 k-ft	667 k-ft

* Foundation determined adequate based on independent analysis.

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.

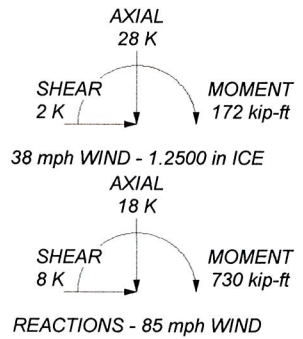
LIMITATIONS

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

	P24x1/4	30.00	1.9	120.0 ft
	P 36x 1/4	10.00	1.0	110.0 ft
	P24x3/8	30.00	2.8	80.0 ft
	P24x3/8	30.00	2.8	50.0 ft
	P30x3/8	30.00	3.6	20.0 ft
	P36x3/8	20.00	2.9	0.0 ft
			15.0	

A53-B-42



DESIGNED APPURTENANCE LOADING


TYPE	ELEVATION	TYPE	ELEVATION
(2) RR90-12-00DA2	145	(2) RRU-11	115
(2) RR90-12-00DA2	145	(2) RRU-11	115
(2) RR90-12-00DA2	145	(2) RRU-11	115
10'x15' Flag	140	(2) TPX 070821	115
QXW-634X638XBF-EDIN	135	(2) TPX 070821	115
QXW-634X638XBF-EDIN	135	(2) TPX 070821	115
QXW-634X638XBF-EDIN	135	DTMABP7819VG12A TMA	115
(2) FD9R6004/2C-3L Diplexer	135	DTMABP7819VG12A TMA	115
(2) FD9R6004/2C-3L Diplexer	135	DTMABP7819VG12A TMA	115
(2) FD9R6004/2C-3L Diplexer	135	AM-X-CD-17-65-00T w/ Mount Pipe	115
RR90-17-00DP	125	AM-X-CD-17-65-00T w/ Mount Pipe	115
RR90-17-00DP	125	AM-X-CD-17-65-00T w/ Mount Pipe	115
RR90-17-00DP	125		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 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 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.

 FDH Engineering, Inc. 6521 Meridian Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031 Tower Analysis	Job: Central Hebron, CT04374-S
	Project: 12-01291E S2
	Client: SBA Network Services, Inc. Drawn by: Heather Jones App'd:
	Code: TIA/EIA-222-F Date: 08/27/12 Scale:
	Path:



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

Calculated Radio Frequency Emissions



CT5865

(Central Hebron)

66 Wall Street, Hebron, CT 06248

September 5, 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 within the flagpole tower located at 66 Wall Street in Hebron, CT. The coordinates of the tower are 41° 39' 52.71" N, 72° 21' 40.60" W.

AT&T is proposing the following modifications:

- 1) Remove three existing antennas (one per sector);
- 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

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

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

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	%MPE
AT&T UMTS	116	880	1	500	0.0134	0.5867	2.28%
AT&T GSM	116	1900	2	427	0.0228	1.0000	2.28%
AT&T GSM	116	880	4	296	0.0316	0.5867	5.39%
Verizon	135	874.5	19	100	0.0375	0.5830	6.43%
Sprint	145	1962.5	11	122	0.0230	1.0000	2.30%
AT&T UMTS	115	880	2	982	0.0053	0.5867	0.91%
AT&T UMTS	115	1900	2	1355	0.0074	1.0000	0.74%
AT&T LTE	115	734	1	1313	0.0036	0.4893	0.73%
AT&T GSM	115	880	1	491	0.0013	0.5867	0.23%
AT&T GSM	115	1900	4	813	0.0088	1.0000	0.88%
Total							12.21%

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 Structural Analysis dated August 27, 2012.

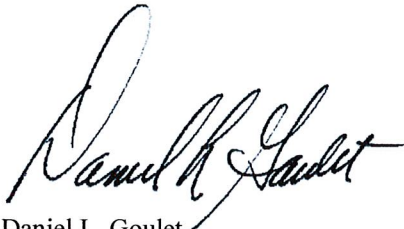
5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **12.21% 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.

A handwritten signature in black ink, appearing to read 'Daniel L. Goulet', written in a cursive style.

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 Exposure⁴

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

(B) Limits for General Population/Uncontrolled Exposure⁵

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

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

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

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

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

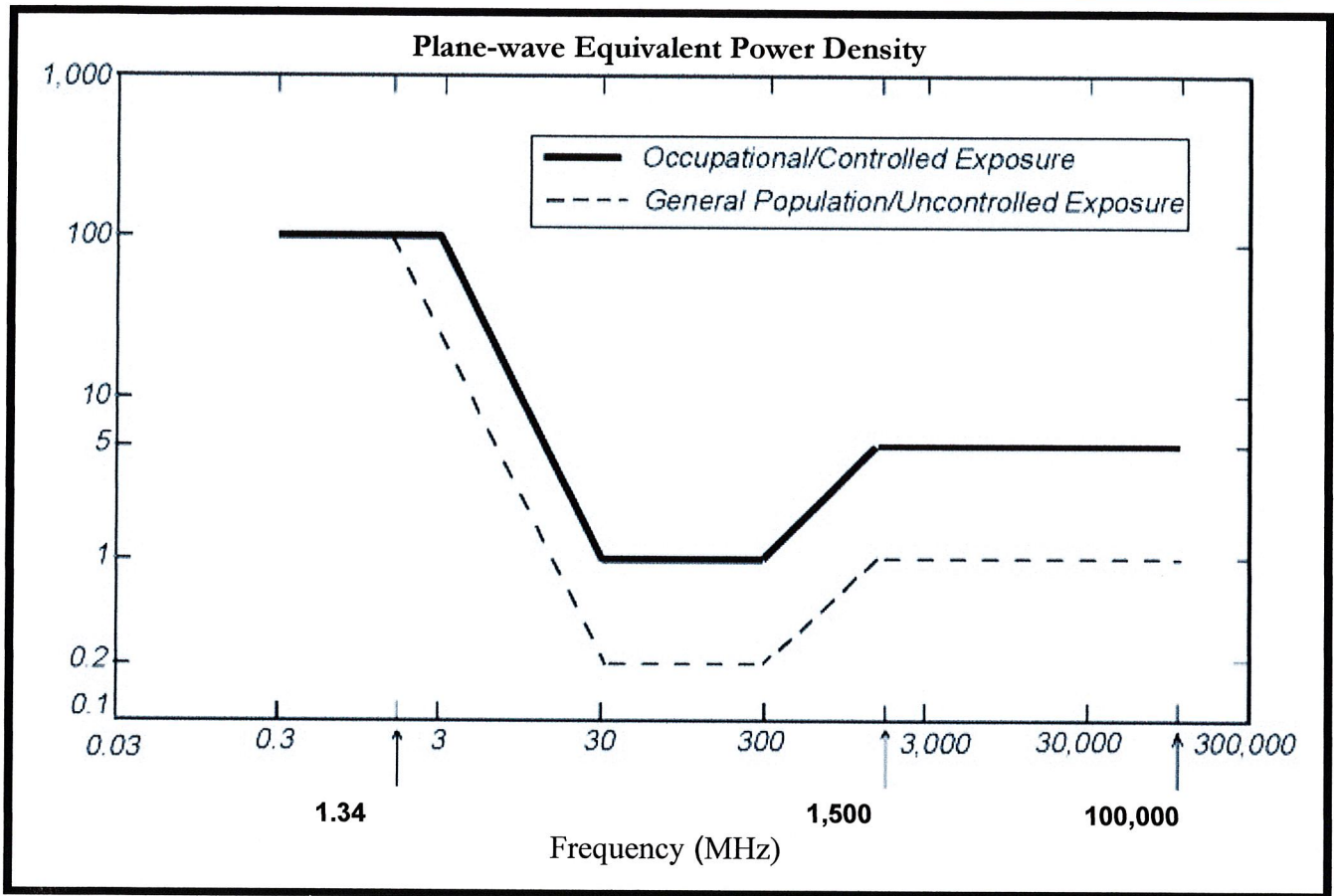
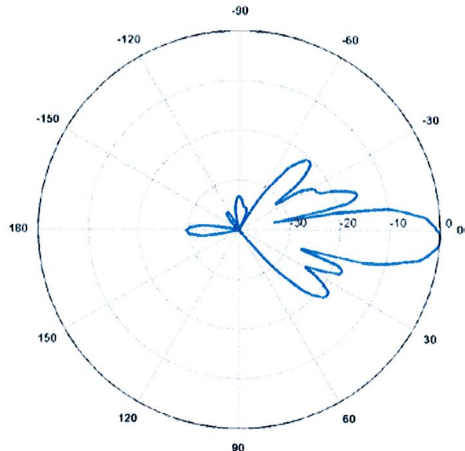
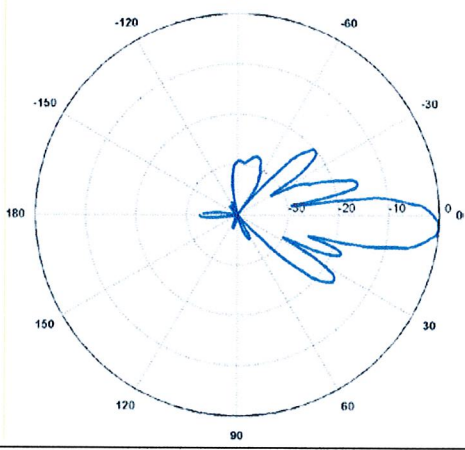
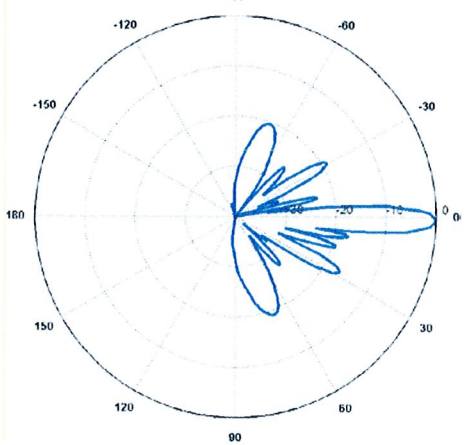


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

<p>700 MHz</p> <p>Manufacturer: KMW Model #: AM-X-CD-16-65-00T-RET Frequency Band: 698-806 MHz Gain: 13.4 dBd Vertical Beamwidth: 12.3° Horizontal Beamwidth: 65° Polarization: Dual Slant ± 45° Size L x W x D: 72.0" x 11.8" x 5.9"</p>	 <p>A polar plot showing the radiation pattern for 700 MHz. The plot is circular with concentric dashed lines representing dBd values from 0 to -30. Radial lines indicate angles from 0 to 180 degrees in 30-degree increments. The main beam is centered at 0 degrees, extending to approximately -10 dBd. There are several side lobes, with the largest being at approximately 150 degrees, reaching about -15 dBd.</p>
<p>850 MHz</p> <p>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"</p>	 <p>A polar plot showing the radiation pattern for 850 MHz. The plot is circular with concentric dashed lines representing dBd values from 0 to -30. Radial lines indicate angles from 0 to 180 degrees in 30-degree increments. The main beam is centered at 0 degrees, extending to approximately -10 dBd. There are several side lobes, with the largest being at approximately 150 degrees, reaching about -15 dBd.</p>
<p>1900 MHz</p> <p>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"</p>	 <p>A polar plot showing the radiation pattern for 1900 MHz. The plot is circular with concentric dashed lines representing dBd values from 0 to -30. Radial lines indicate angles from 0 to 180 degrees in 30-degree increments. The main beam is centered at 0 degrees, extending to approximately -10 dBd. There are several side lobes, with the largest being at approximately 150 degrees, reaching about -15 dBd.</p>