

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

May 29, 2012

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

RE: **EM-CING-007-120511** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Highway, Berlin, Connecticut.

Dear Ms. Gaudet:

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

- AT&T shall submit to the Council a Radio Frequency Exposure Report with field measurements taken in the vicinity of this facility within three months after the installation described in this notice of exempt modification has been completed;
- 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 May 9, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.



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

Very truly yours,



Linda Roberts
Executive Director

LR/cm

c: The Honorable Adam P. Salina, Mayor, Town of Berlin
Denise McNair, Town Manager, Town of Berlin
Hellyn Riggins, Town Planner, Town of Berlin

EM-CING-007-120511

HPC Wireless Services

46 Mill Plain Rd.

Floor 2

Danbury, CT, 06811

P.: 203.797.1112



ORIGINAL

May 9, 2012

VIA OVERNIGHT COURIER

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

RECEIVED
MAY 11 2012

CONNECTICUT
SITING COUNCIL

Re: New Cingular Wireless PCS, LLC – exempt modification
1684 Chamberlain Highway, Berlin, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC (“AT&T”). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of the Town of Berlin.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 1684 Chamberlain Highway in the Town of Berlin (coordinates 41°-35'-23" N, 72°-48'-20" 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 replace the existing T-arms with new sector mounts and add three (3) LTE panel antennas at a center line of approximately 66'; existing antennas and TMAs will be relocated to the new mounts, for a total of nine (9) antennas. Six (6) RRHs

Boston

Albany

Buffalo

Danbury

Philadelphia

Raleigh


Atlanta

(remote radio heads) and a surge arrestor will be mounted on pipes behind the antennas. AT&T will also place a DC power and fiber run from the equipment to the antennas along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 123' structure.

2. The proposed changes will not extend the site boundaries. AT&T will replace one cabinet with another and place an additional cabinet on a new H-frame, all on the existing AT&T equipment platform. A GPS antenna will be mounted to the ice bridge. These changes will be within the existing compound and will have no effect on the site boundaries.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.
4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 8.96%; the combined site operations will result in a total power density of approximately 59.74%.

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

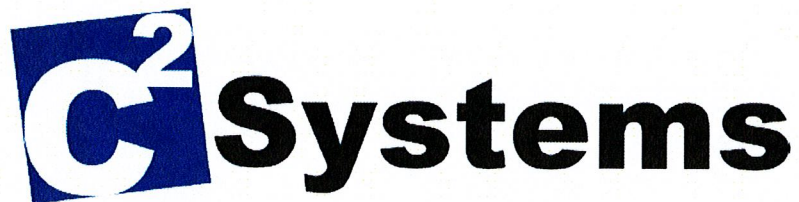
Respectfully yours,



Jennifer Young Gaudet

Attachments

cc: Honorable Adam P. Salina, Mayor, Town of Berlin
Denise McNair, Town Manager, Town of Berlin
Ronald L. and Arlene G. Laviana (underlying property owners)



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

Calculated Radio Frequency Emissions



CT1031

(Berlin-Chamberlain Highway)

1684 Chamberlain Highway, Berlin, CT 06037

May 7, 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 1684 Chamberlain Highway, Berlin, CT. The coordinates of the tower are 41-35-23.07 N, 72-48-19.2 W.

AT&T is proposing the following modifications:

- 1) Install three 700 MHz LTE antennas (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

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

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 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	65	880	1	500	0.0426	0.5867	7.25%
AT&T UMTS	65	1900	1	500	0.0426	1.0000	4.26%
AT&T GSM	65	880	4	296	0.1008	0.5867	17.18%
AT&T GSM	65	1900	2	427	0.0727	1.0000	7.27%
Town	85	2400	2	5	0.0005	1.0000	0.05%
Pocket	75	2130	3	631	0.1210	1.0000	12.10%
Clearwire	119	2496	2	153	0.0078	1.0000	0.78%
Clearwire	123	52 GHz	1	211	0.0050	1.0000	0.50%
Sprint	119	1962.5	11	630	0.1758	1.0000	17.58%
Nextel	113	851	9	100	0.0253	0.5673	4.47%
T-Mobile GSM	100	1945	8	138	0.0397	1.0000	3.97%
T-Mobile UMTS	100	2100	2	780	0.0561	1.0000	5.61%
Verizon cellular	94	869	9	399	0.0146	0.5793	2.52%
Verizon PCS	94	1970	7	494	0.0141	1.0000	1.41%
Verizon AWS	94	2145	1	1355	0.0055	1.0000	0.55%
Verizon LTE	94	698	2	711	0.0058	0.4653	1.24%
AT&T UMTS	66	880	2	728	0.0120	0.5867	2.05%
AT&T UMTS	66	1900	2	1154	0.0191	1.0000	1.91%
AT&T LTE	66	734	1	1313	0.0108	0.4893	2.21%
AT&T GSM	66	880	1	360	0.0030	0.5867	0.51%
AT&T GSM	66	1900	4	692	0.0228	1.0000	2.28%
						Total	59.74%

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 3/29/2012. 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 three 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 Paul J. Ford Company Structural Analysis Report dated 4/24/2012.

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 **59.74% 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

May 7, 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

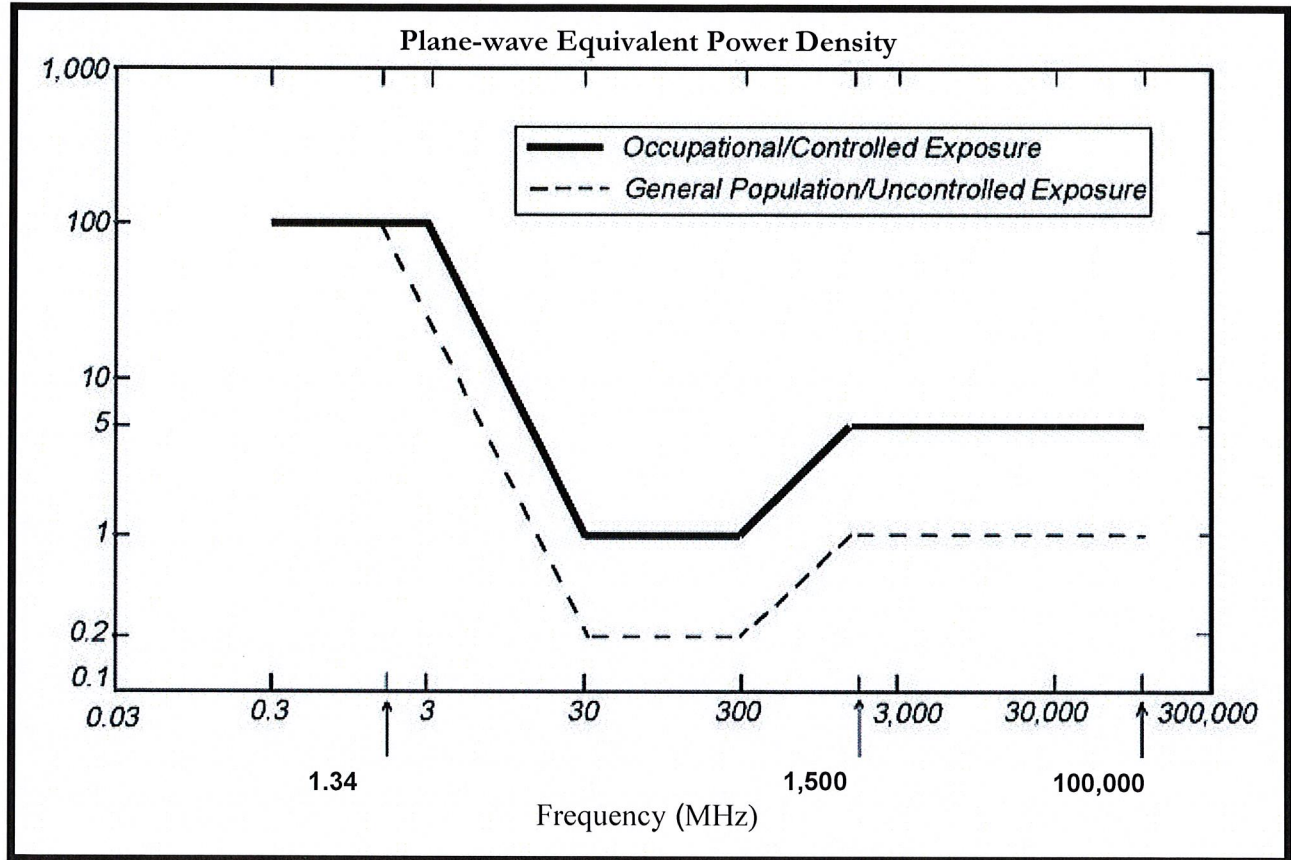
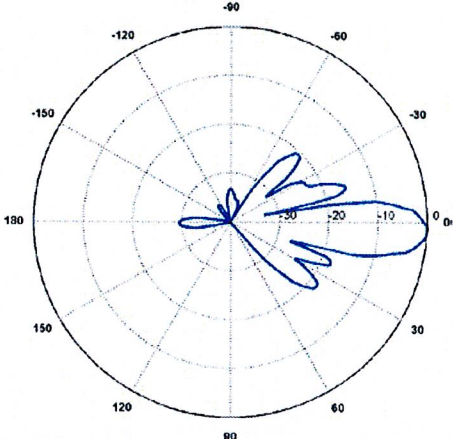
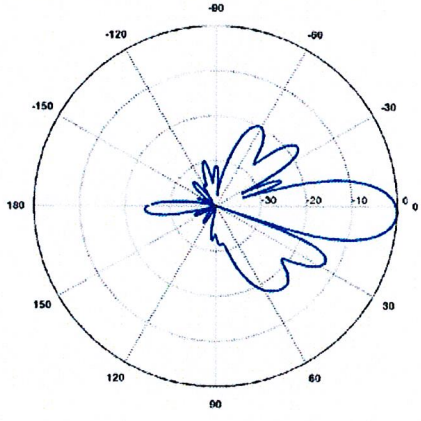
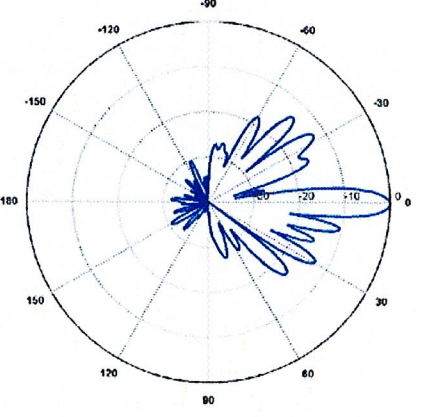


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

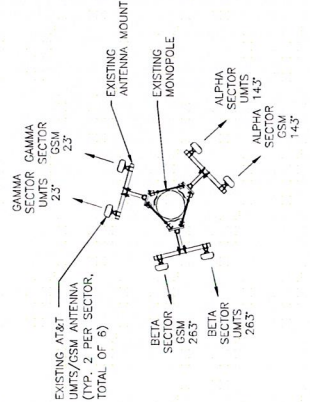
Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

<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 $\pm 45^\circ$ Size L x W x D: 72.0" x 11.8" x 5.9"</p>	
<p>850 MHz</p> <p>Manufacturer: Powerwave Model #: P65-15-XLH-RR Frequency Band: 806-894 MHz Gain: 12.6 dBd Vertical Beamwidth: 17° Horizontal Beamwidth: 63° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 51.0" x 12.0" x 6.0"</p>	
<p>1900 MHz</p> <p>Manufacturer: Powerwave Model #: P65-15-XLH-RR Frequency Band: 1850-1990 MHz Gain: 14.6 dBd Vertical Beamwidth: 7.5° Horizontal Beamwidth: 61° Polarization: Dual Linear $\pm 45^\circ$ Size L x W x D: 51.0" x 12.0" x 6.0"</p>	

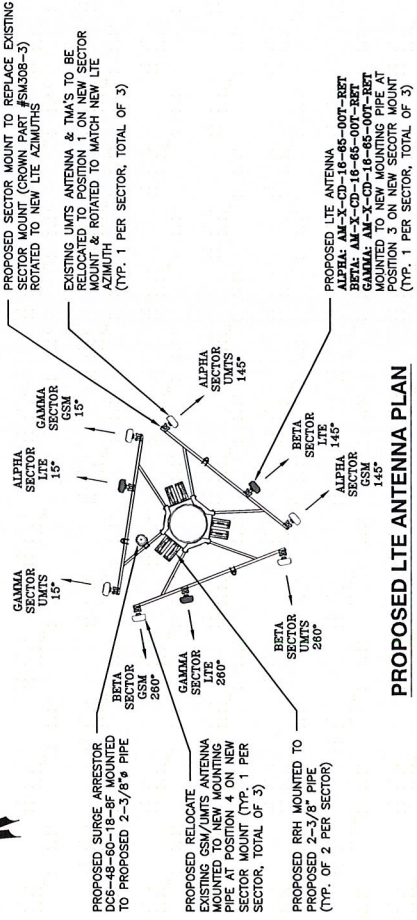


NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



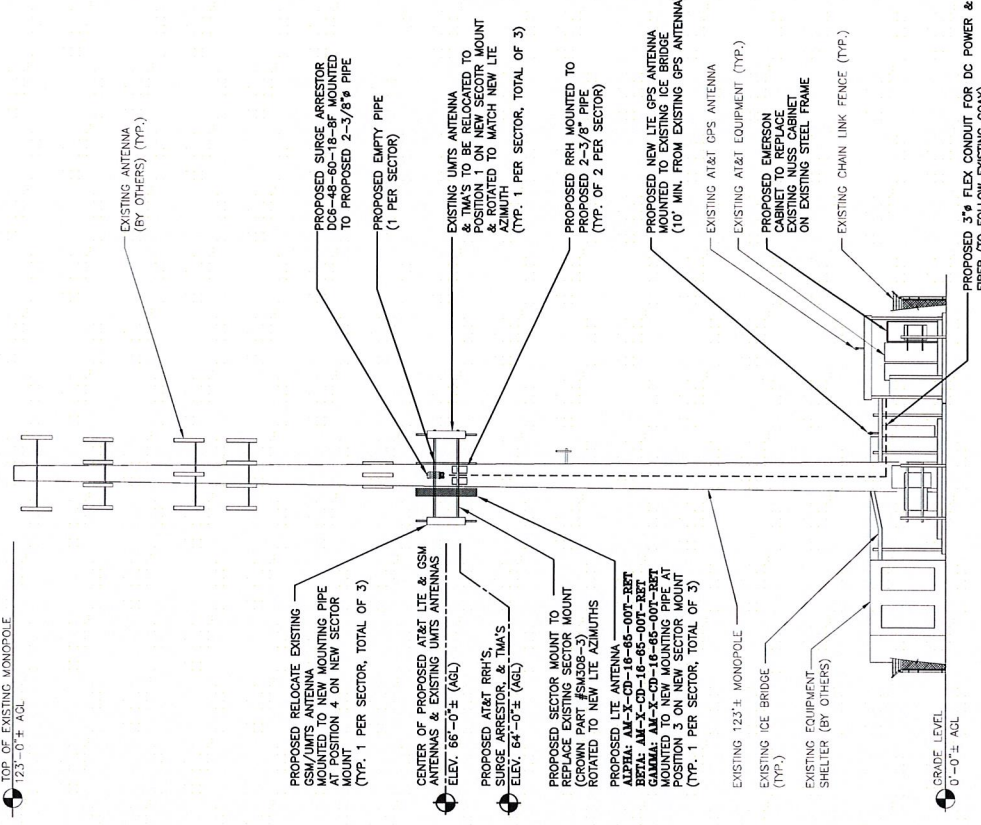
EXISTING UMTS/GSM ANTENNA PLAN
SCALE: N.T.S.



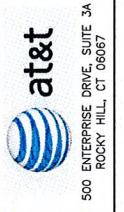
PROPOSED LTE ANTENNA PLAN
SCALE: N.T.S.

NOTES:
1. REFER TO RF CONFIG & SECTOR SCHEMATICS FOR QUANTITY REQUIRED PER SECTOR

TOP OF EXISTING MONOPOLE
723'-0" ± AGL



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



SITE NUMBER: CT1031
SITE NAME: BERLIN CHAMBERLAIN HIGHWAY CROWN CASTLE ID: 876382
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY



Unit of Global Services Company
800 MARSHALL PHELPS ROAD UNIT# 2A
WINDSOR, CT 06095



Hudson Design Group, Inc.
180 CROCODRIVER RD, SUITE 200
N ANDOVER, MA 01845
TEL: (978) 552-6500
FAX: (978) 334-5584

AT&T
ANTENNA LAYOUT AND ELEVATION (LIE)
NO. DATE REVISIONS DESIGNED BY: HC DRAWN BY: NB
CHK BY: CHK DATE: 03/02/18
JOB NUMBER: 1031.01 DRAWING NUMBER: A-2



1 04/23/18 ISSUED FOR CONSTRUCTION
2 03/02/18 ISSUED FOR REVIEW

NO.	DATE	REVISIONS	DESIGNED BY:	HC	DRAWN BY:	NB
1	04/23/18	ISSUED FOR CONSTRUCTION				
2	03/02/18	ISSUED FOR REVIEW				

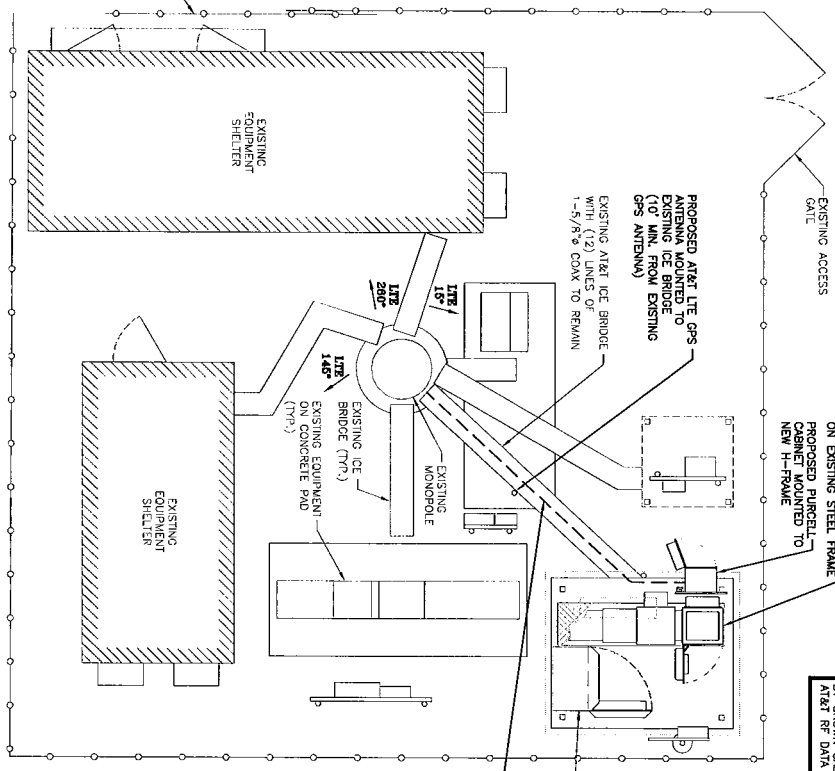
SCALE: AS SHOWN

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067



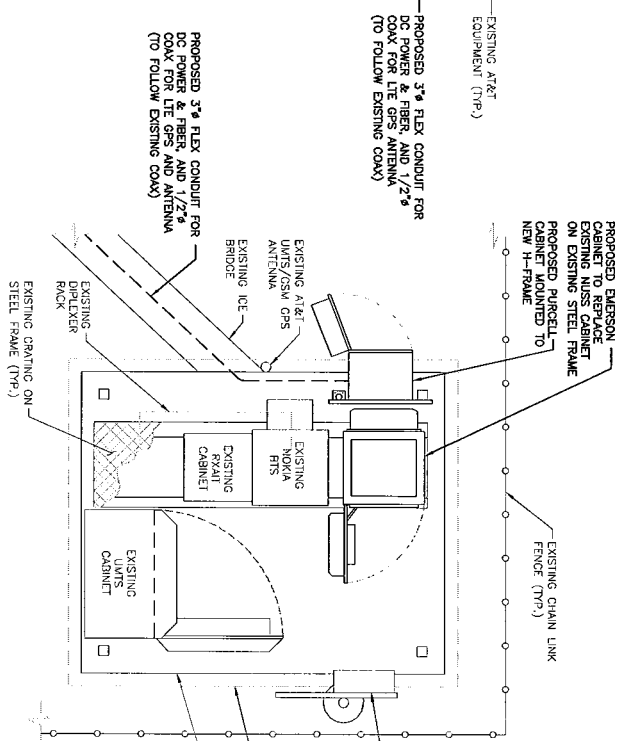
COMPOUND PLAN
SCALE: 1/8"=1'-0"



NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS AND SETTINGS LISTED BY CROWN CASTLE AND AT&T RF DATA SHEET.

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

PROPOSED EMERSON DC PLANT TO BE INSTALLED AND LIFE TO BE EXTENDED TO PRIOR TO NOKIA NUSIS REMOVAL AND PURCELL INSTALLATION



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



Hudson Design Group
1480 CROFTON DRIVE
HARTFORD, CT 06105
TEL: 878-8544
FAX: 878-3544

NEMLINK
a harsco global services company
800 MANSFIELD ROAD
MANSFIELD, CT 06250

SITE NUMBER: CT1031
SITE NAME: BERLIN
CHAMBERLAIN HIGHWAY
CROWN CASTLE ID: 8763892
1884 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY

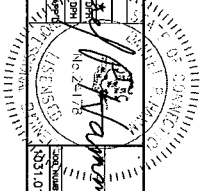
at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06867

NO.	DATE	DESCRIPTION	BY	CHK	APP
1	04/23/13	ISSUED FOR CONSTRUCTION	AS	DC	DP
0	03/02/13	ISSUED FOR REVIEW	AS	DC	DP

SCALE: AS SHOWN

DESIGNED BY: HC
DRAWN BY: NB
CHECKED BY: AS
DATE: 04/23/13

AT&T
COMPONENT & EQUIPMENT PLAN
(IE)
DRAWING NUMBER: A-1
REV: 1





PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
 250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: April 24, 2012

Marianne Dunst
 Crown Castle USA Inc.
 3530 Toringdon Way Suite 300
 Charlotte, NC 28277
 704.405.6613

Paul J Ford and Company
 250 E. Broad Street Suite 1500
 Columbus, OH 43215
 614.221.6679
 bkermode@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: CT1031
Carrier Site Name: Berlin-Chamberlain Highway

Crown Castle Designation: Crown Castle BU Number: 876382
Crown Castle Site Name: BERLIN / LAVIANA ORCHARD
Crown Castle JDE Job Number: 183506
Crown Castle Work Order Number: 484837
Crown Castle Application Number: 144112 Rev. 1

Engineering Firm Designation: Paul J Ford and Company Project Number: 37512-1129

Site Data: 1684 Chamberlain Highway, BERLIN, Hartford County, CT
 Latitude 41° 35' 23.07", Longitude -72° 48' 19.2"
 123 Foot - Monopole Tower

Dear Marianne Dunst,

Paul J Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 460497, in accordance with application 144112, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
 Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads

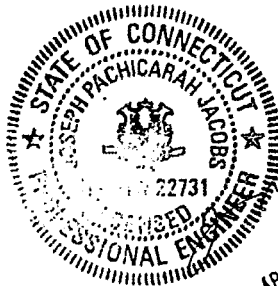
We at Paul J Ford and Company appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc.. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Brian K. Kermode

Brian K. Kermode, PE, SE
 Project Engineer

BK



Jacob
 APR 25 2012

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2) ANALYSIS CRITERIA

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3.2) Assumptions

4) ANALYSIS RESULTS

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Table 5 - Tower Component Stresses vs. Capacity

5) APPENDIX A

TNX Tower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 123 ft Monopole tower designed by SUMMIT in July of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State Building Code using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
65.0	66.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2 1	3/4 3/8	-
		1	raycap	DC6-48-60-18-8F			
	65.0	1	tower mounts	Sector Mount [SM 308-3]			
64.0	64.0	6	ericsson	RRUS-11			
	64.0	1	tower mounts	Pipe Mount [PM 601-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	121.0	6	decibel	DB980H65T2E-M w/Mount Pipe	6	1-1/4	1
	120.0	1	tower mounts	Platform Mount [LP 305-1]			
112.0	113.0	12	decibel	DB844H90E-XY w/Mount Pipe	12	7/8	1
	112.0	1	tower mounts	Platform Mount [LP 402-1]			
100.0	101.0	3	remec	Remec S20057A-1	-	-	2
		3	rfs	APX16DWV-16DWV-S-E-A20 w/ mount pipe	6	1-5/8	3
		3	rfs	RFS ATMAA-1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
	3	ems wireless	RR65-18-02DP w/Mount Pipe	6	1-5/8	1	
	100.0	1	tower mounts	T-Arm Mount [TA 602-3]			
93.0	94.0	6	decibel	DB844F90A-SX w/Mount Pipe	-	-	2
		6	decibel	DB948F85T2E-M w/ Mount Pipe			
		2	antel	BXA-171063-8BF-2 w/ Mount Pipe	-	-	3
		1	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		4	rfs celwave	APL866513-42T0 w/ Mount Pipe			
		2	rfs celwave	APL868013-42T0 w/ Mount Pipe			
	6	rfs celwave	FD9R6004/2C-3L				
93.0	1	tower mounts	Platform Mount [LP 305-1]	12	1-5/8	1	
75.0	75.0	3	rfs	RFS APXV18-206517S-C w/ mount pipe	6	1-5/8	1
		1	tower mounts	Side Arm Mount [SO 101-3]			
65.0	66.0	6	powerwave technologies	P65-15-XLH-RR w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	TT19-08BP111-001			
50.0	51.0	1	lucent	KS24019-L112A	1	1/2	1
	50.0	1	tower mounts (old cci)	Side Arm Mount [SO 702-1]			

- Notes:
 1) Existing
 2) Existing To Be Removed
 3) Reserved

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 05/05/2000	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29200-0802, 06/06/2000	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29200-0802, 06/06/2000	1629384	CCISITES
4-POST MOD BPSA	Vertical Solutions, 080828.04, 12/11/2008	2611098	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) The existing, post installed #18J reinforcing anchors have a minimum allowable load capacity of 170 kips (based on proof load testing to a minimum of 212 kips).

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.20	782.55	58.0	Pass
L2	82.25 - 58	Pole	TP31.3777x27.2139x0.25	2	-13.55	1284.07	80.0	Pass
L3	58 - 40.75	Pole	TP33.966x31.3777x0.4476	3	-16.27	1796.16	74.5	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.4332x0.4359	4	-20.17	1849.30	91.5	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.4548	5	-27.32	2343.20	97.2	Pass
							Summary	
						Pole (L5)	97.2	Pass
						Rating =	97.2	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	91.8	Pass
1	Base Plate	0	59.5	Pass
1,2	Base Foundation Soil Interaction	0	60.3	Pass
1, 2	Base Foundation Structural Steel	0	73.4	Pass

Structure Rating (max from all components) =	97.2%
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Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.