



# 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

December 2, 2011

Karina Fournier  
Real Estate Consultant  
New Cingular Wireless PCS, LLC  
960 Turnpike Street, Suite 28  
Canton, MA 02021

RE: **EM-CING-118-111107** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 845 Ethan Allen Highway, Ridgefield, Connecticut.

Dear Ms. Fournier:

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

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated November 3, 2011. 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/laf

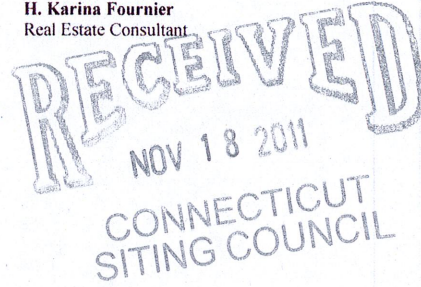
c: The Honorable Rudolph P. Marconi, First Selectman, Town of Ridgefield  
Betty Brosius, Town Planner, Town of Ridgefield  
Hans Fiedler, T-Mobile  
Julie Kohler, Esq., Cohen and Wolf P.C.





New Cingular Wireless PCS, LLC  
960 Turnpike Street, Suite 28  
Canton, MA 02021  
Phone: (860) 796-3988  
Fax: (617) 249-0819

H. Karina Fournier  
Real Estate Consultant



November 18, 2011

Honorable Robert Stein, Chairman,  
and Members of the Connecticut Siting Council  
Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051

**Re: Request by New Cingular Wireless PCS, LLC for an Order Approving Shared Use of an Existing Tower located at 845 Ethan Allen Highway Ridgefield, CT**

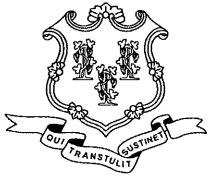
Dear Chairman Stein and Members of the Council:

Pursuant to Connecticut General Statutes Section 16-50aa, Cingular has requested an order approving shared use of the tower from the Connecticut Siting Council. The request should have been for an exempt modification pursuant to R.C.S.A 16-50j-73.

Please accept this letter as a request for the proper review. If you have any questions please contact me at 860-796-3988.

Sincerely,

H. Karina Fournier  
Real Estate Consultant



# 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

November 10, 2011

The Honorable Rudolph P. Marconi  
First Selectman  
Town of Ridgefield  
Town Hall  
400 Main Street  
Ridgefield, CT 06877

RE: **EM-CING-118-111107** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 845 Ethan Allen Highway, Ridgefield, Connecticut.

Dear First Selectman Marconi:

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 November 25, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

A handwritten signature in black ink that reads "Linda Roberts" with a stylized flourish at the end.

Linda Roberts  
Executive Director

LR/jbw

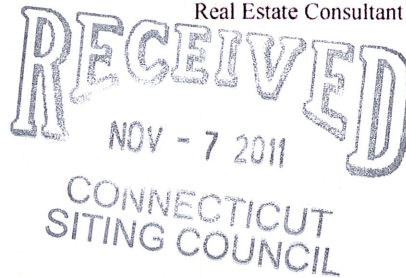
Enclosure: Notice of Intent

c: Betty Brosius, Town Planner, Town of Ridgefield



New Cingular Wireless PCS, LLC  
960 Turnpike Street, Suite 28  
Canton, MA 02021  
Phone: (860) 796-3988  
Fax: (617) 249-0819

Karina Fournier  
Real Estate Consultant



November 3, 2011

Honorable Robert Stein, Chairman,  
and Members of the Connecticut Siting Council  
Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051

**Re: Request by New Cingular Wireless PCS, LLC for an Order Approving Shared Use of an Existing tower at 845 Ethan Allen Highway Ridgefield, CT.**

Dear Chairman Stein and Members of the Council:

In order to accommodate technological changes, implement Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell 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 chief elected official of the municipality in which the affected cell site is located.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations of the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications 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 or altered. 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.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments
3. The proposed changes will not increase the noise level at the existing facility by six

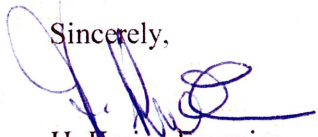
decibels or more.

4. LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes 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.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A Section 16-50j-72(b)(2).

Please feel free to contact me at 860-796-3988 with questions concerning this matter. Thank you for your consideration.

Sincerely,



H. Karina Fournier  
Real Estate Consultant

Attachments

# Exhibit 1

# NEW CINGULAR WIRELESS PCS, LLC WIRELESS COMMUNICATIONS FACILITY CT5244 RIDGEFIELD NE

## 845 ETHAN ALLEN HIGHWAY RIDGEFIELD, CONNECTICUT

### PROJECT SUMMARY

**SITE NUMBER:** CT5244  
**SITE NAME:** RIDGEFIELD NE  
**SITE ADDRESS:** 845 ETHAN ALLEN HIGHWAY  
 RIDGEFIELD, CT 06877  
**STRUCTURE OWNER:** T-MOBILE  
**APPLICANT:** NEW CINGULAR WIRELESS PCS, LLC  
 100 ENTERPRISE DRIVE  
 ROCKY HILL, CT 06867  
**CONTACT:** MICHAEL D. FOLEY  
 (203) 414-1184  
**COORDINATES:** 41° 16' 46.77" N  
 73° 28' 21.00" W  
**HORIZONTAL DATUM:** NAD 83  
**ENGINEER:** CHA, INC.  
 375A SULLY BEAKS HIGHWAY  
 ROCKY HILL, CT 06867  
**CONTACT:** PAUL LISIANSKI  
 (860) 257-4527

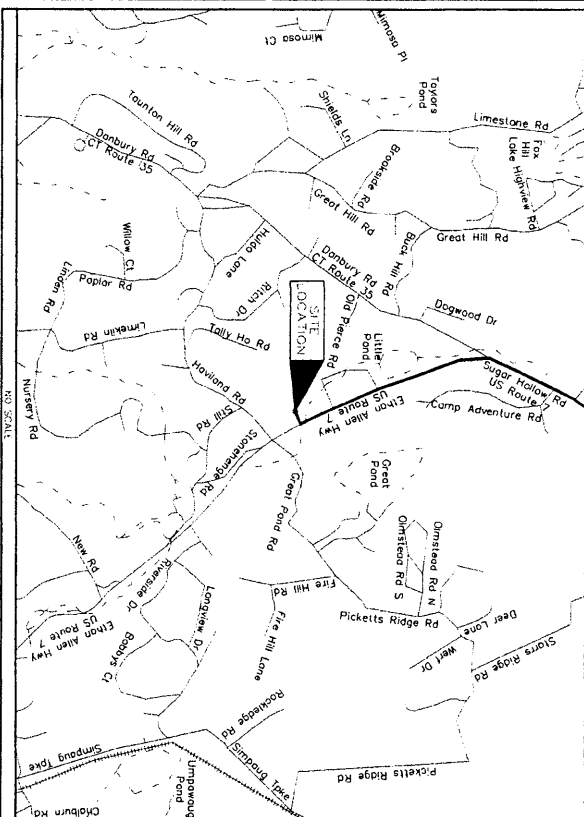
### DRIVING DIRECTIONS

1. FROM HART DAM:
2. TAKE RIGHT HAND DISBURGANCE 4, KEEP LEFT TO
3. MERGE ONTO US 75
4. TURN LEFT TO 845 ETHAN ALLEN HIGHWAY
5. TURN RIGHT AND TURN INTO BUILDING

### PROJECT DESCRIPTION

THIS PROJECT ADDS THREE ANTENNAS, ONE FOR SURGE  
 PROTECTION, AND A RADIO CABINET TO AN EXISTING  
 TELECOMMUNICATIONS SITE

### VICINITY MAP



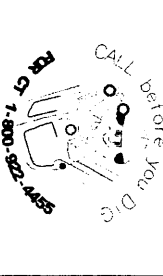
APRIL 15, 2011

### SHEET INDEX

SHEET NO.	TITLE	REVISION NO.	DATE
01	TITLE SHEET	1	04 / 15 / 11
02	EQUIPMENT PLAN	1	04 / 15 / 11
03	ELEVATION AND ANTENNA PLAN	1	04 / 15 / 11
04	STRUCTURAL DETAILS	1	04 / 15 / 11
05	STRUCTURAL DETAILS & PILING DIAGRAM	1	04 / 15 / 11
06	GENERAL NOTES	1	04 / 15 / 11
07	GENERAL NOTES	1	04 / 15 / 11

**DO NOT SCALE DRAWINGS**

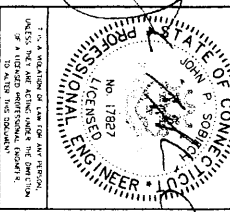
CONTRACTOR SHALL VERIFY ALL PLANS & ELEVATIONS ON THE JOB SITE & SIGNIFY ON DRAWINGS TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR PROBLEMS WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR THE WORK.



NEW CINGULAR WIRELESS PCS, LLC  
 500 ENTERPRISE DRIVE  
 ROCKY HILL, CT 06867

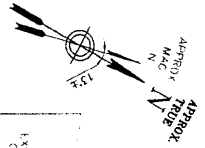


2730 Main Street, Suite 212, Rocky Hill, CT 06871  
 (860) 257-4527 • www.chainc.com  
 23702 - 1028 - 43000

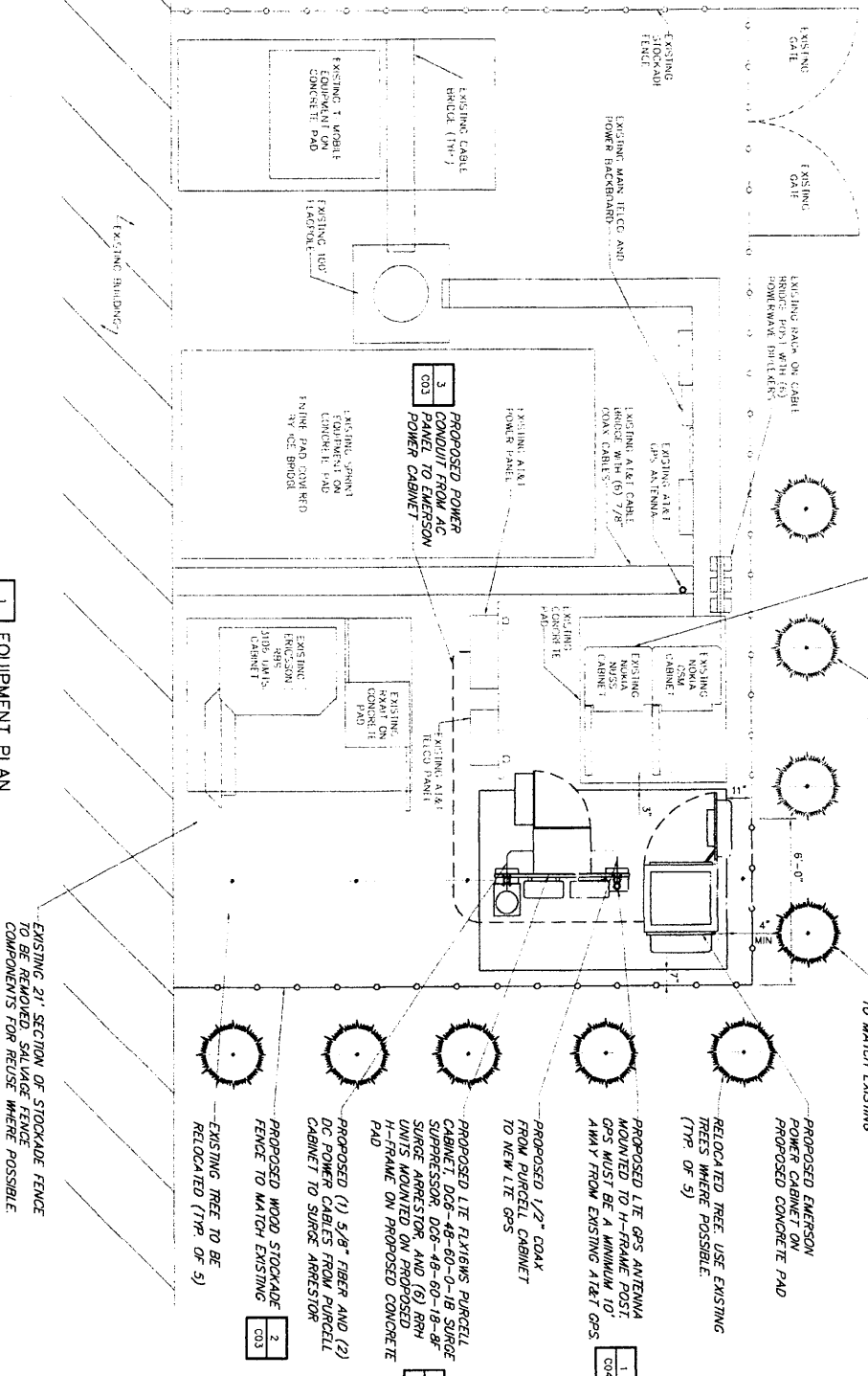


SITE ID: CT5244  
 SITE NAME: RIDGEFIELD NE  
 SITE ADDRESS: 845 ETHAN ALLEN HWY  
 RIDGEFIELD, CT 06877  
 FAIRFIELD COUNTY

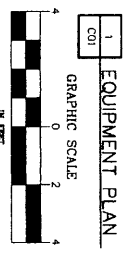
SHEET TITLE: TITLE SHEET  
 SHEET NUMBER: T01




REMOVE EXISTING NOKIA NUSS CABINET AFTER INSTALLATION OF EMERSON POWER CABINET.



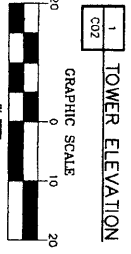
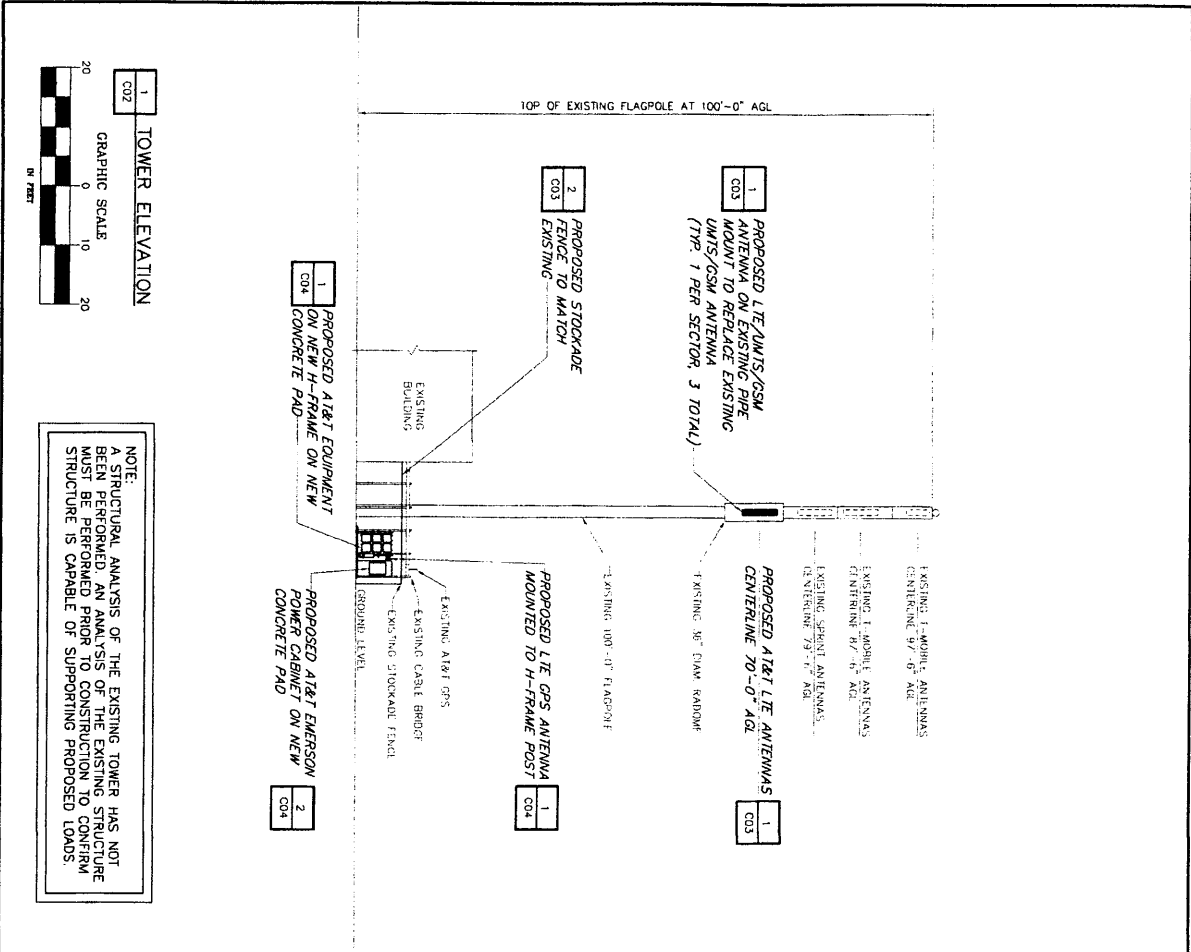
NOTE:  
1. PLANS BASED ON A SITE VISIT BY CHA ON MARCH 09, 2011, AND DRAWINGS PREPARED BY HUDSON DESIGN GROUP LLC, LAST DATED 08/13/08.



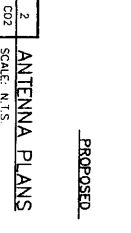
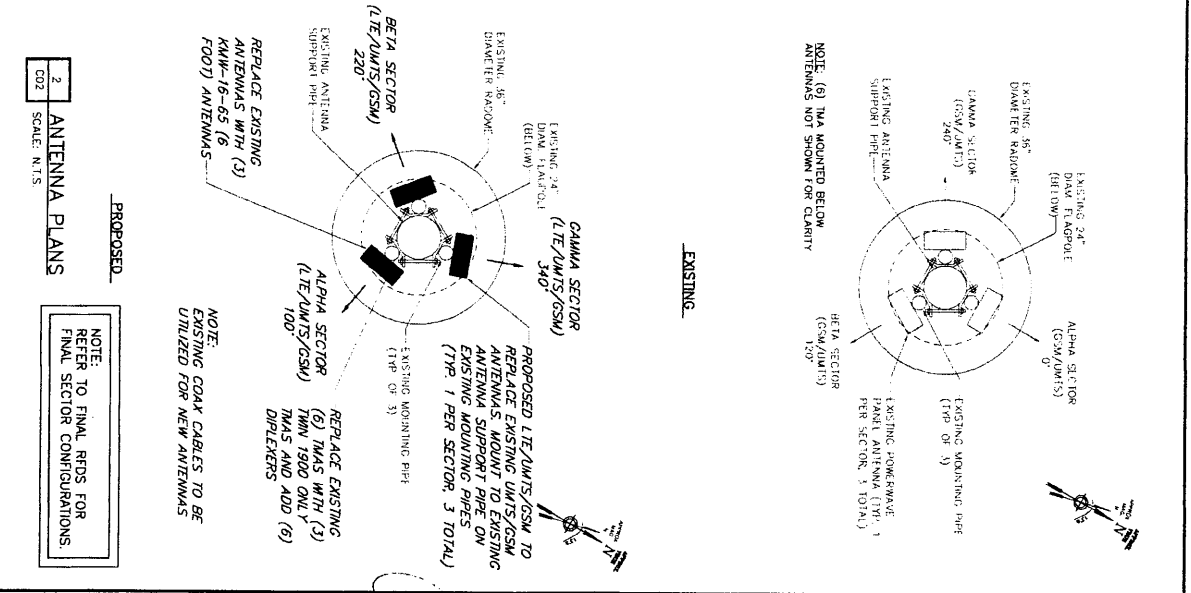
EXISTING 21' SECTION OF STOCKADE FENCE TO BE REMOVED. SALVAGE FENCE COMPONENTS FOR REUSE WHERE POSSIBLE.

 <p>at&amp;t Your world Delivered</p> <p>NEW ENGLAND WIRELESS PCS, LLC ROCKY HILL, CT 06867</p>	<p>CHA 218 Main Street, Suite 211, Rocky Hill, CT 06867 Tel: 860.261.1111 Fax: 860.261.1112 www.cha.com</p>	<table border="1"> <thead> <tr> <th>No.</th> <th>Quantity</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>PROPOSED LITE GPS ANTENNA MOUNTED TO H-FRAME POST. GPS MUST BE A MINIMUM 10' AWAY FROM EXISTING AT&amp;T GPS.</td> </tr> <tr> <td>2</td> <td>1</td> <td>PROPOSED 1/2" COAX FROM PURCELL CABINET TO NEW LITE GPS.</td> </tr> <tr> <td>3</td> <td>1</td> <td>PROPOSED LITE EXTRINS PURCELL CABINET, D06-48-60-0-18 SURGE SUPPRESSOR, D06-48-60-18-9F SURGE ARRESTOR, AND (6) BRH UNITS MOUNTED ON PROPOSED H-FRAME ON PROPOSED CONCRETE PAD.</td> </tr> <tr> <td>4</td> <td>1</td> <td>PROPOSED (1) 5/8" FIBER AND (2) DC POWER CABLES FROM PURCELL CABINET TO SURGE ARRESTOR.</td> </tr> <tr> <td>5</td> <td>1</td> <td>PROPOSED WOOD STOCKADE FENCE TO MATCH EXISTING.</td> </tr> <tr> <td>6</td> <td>1</td> <td>EXISTING TREE TO BE RELOCATED (TR OF 5).</td> </tr> </tbody> </table>	No.	Quantity	Description	1	1	PROPOSED LITE GPS ANTENNA MOUNTED TO H-FRAME POST. GPS MUST BE A MINIMUM 10' AWAY FROM EXISTING AT&T GPS.	2	1	PROPOSED 1/2" COAX FROM PURCELL CABINET TO NEW LITE GPS.	3	1	PROPOSED LITE EXTRINS PURCELL CABINET, D06-48-60-0-18 SURGE SUPPRESSOR, D06-48-60-18-9F SURGE ARRESTOR, AND (6) BRH UNITS MOUNTED ON PROPOSED H-FRAME ON PROPOSED CONCRETE PAD.	4	1	PROPOSED (1) 5/8" FIBER AND (2) DC POWER CABLES FROM PURCELL CABINET TO SURGE ARRESTOR.	5	1	PROPOSED WOOD STOCKADE FENCE TO MATCH EXISTING.	6	1	EXISTING TREE TO BE RELOCATED (TR OF 5).	<p>STATE OF CONNECTICUT Professional Engineer No. 17827 John P. Sobel Professional Engineer</p>	<p>SITE ID: CT5244 SITE NAME: RIDGEFIELD NE SITE ADDRESS: 845 ETHAN ALLEN HWY, RIDGEFIELD, CT 06877, FAIRFIELD COUNTY</p> <p>SHEET TITLE: EQUIPMENT PLAN SHEET NUMBER: C01</p>
No.	Quantity	Description																							
1	1	PROPOSED LITE GPS ANTENNA MOUNTED TO H-FRAME POST. GPS MUST BE A MINIMUM 10' AWAY FROM EXISTING AT&T GPS.																							
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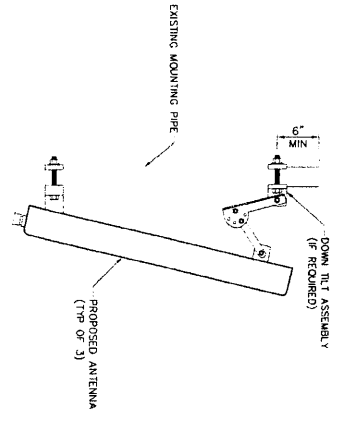


**NOTE:**  
A STRUCTURAL ANALYSIS OF THE EXISTING TOWER HAS NOT BEEN PERFORMED. ANALYSIS OF THE EXISTING STRUCTURE MUST BE PERFORMED PRIOR TO CONSTRUCTION. THE STRUCTURE IS CAPABLE OF SUPPORTING PROPOSED LOADS.



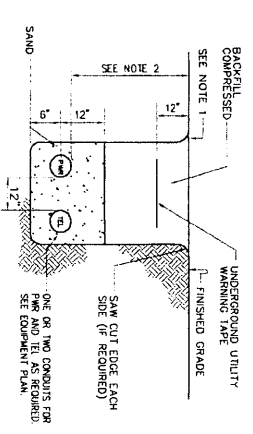
**NOTE:**  
EXISTING COAX CABLES TO BE UTILIZED FOR NEW ANTENNAS.

<p>NEW CIRCULAR WIRELESS PCS, LLC 500 ENTERPRISE DRIVE ROCKY HILL, CT 06865</p>	<p>210 New Britain Highway, Suite 213, Rocky Hill, CT 06865 Tel: (860) 261-1000 Fax: (860) 261-1001 www.cia-engineering.com</p>	<table border="1"> <thead> <tr> <th>No.</th> <th>REVISION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>ISSUED FOR PERMIT</td> <td>08/21/13</td> </tr> <tr> <td>1</td> <td>ISSUED FOR CONSTRUCTION</td> <td>08/21/13</td> </tr> <tr> <td>2</td> <td>ISSUED FOR CONSTRUCTION</td> <td>08/21/13</td> </tr> </tbody> </table>	No.	REVISION	DATE	0	ISSUED FOR PERMIT	08/21/13	1	ISSUED FOR CONSTRUCTION	08/21/13	2	ISSUED FOR CONSTRUCTION	08/21/13	<p>STATE OF CONNECTICUT JOHN P. SOPER No. 17887 PROFESSIONAL ENGINEER</p>	<p>175 S. MAIN STREET, SUITE 200 ROCKY HILL, CT 06865 TEL: (860) 261-1000 WWW.CIA-ENGINEERING.COM</p> <p>SITE ID: C15244 SITE NAME: RIDGEFIELD NE SITE ADDRESS: 845 EDWIN ALLEN HWY RIDGEBLD, CT 06867 FAIRFIELD COUNTY</p>	<p>SHEET TITLE: ELEVATION AND ANTENNA PLAN SHEET NUMBER: C02</p>
No.	REVISION	DATE															
0	ISSUED FOR PERMIT	08/21/13															
1	ISSUED FOR CONSTRUCTION	08/21/13															
2	ISSUED FOR CONSTRUCTION	08/21/13															



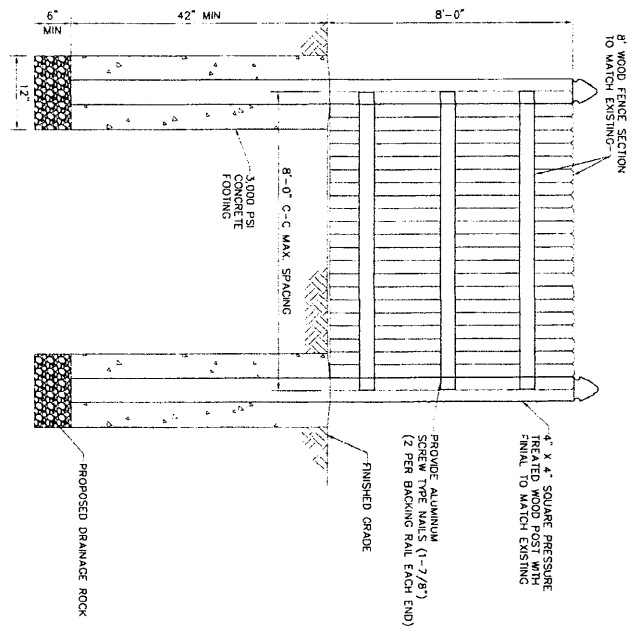
NOTE:  
1. MOUNT ANTENNA IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED PROCEDURE.

1 TYPICAL ANTENNA MOUNTING DETAIL  
SCALE: NTS



NOTES:  
1. REPLACE EXISTING SURFACE CONDITIONS IN KIND TO INCLUDE: GRAVEL, ASPHALT, TOPSOIL AND GRASS.  
2. 36\"/>

3 UNDERGROUND CONDUITS  
SCALE: NTS



NOTE: RE-USE EXISTING FENCE COMPONENTS WHERE APPLICABLE

2 WOOD FENCE DETAIL  
NO SCALE



NEW CIRCULAR WIRELESS PCS, LLC  
ROOMY HILL, CT 06883



27102 - 1023 - 43000

NO.	SYMBOL	DESCRIPTION
1	01/23/01	SOLID FINE RIFLE
2	01/23/01	SOLID FINE RIFLE
3	01/23/01	SOLID FINE RIFLE
4	01/23/01	SOLID FINE RIFLE
5	01/23/01	SOLID FINE RIFLE
6	01/23/01	SOLID FINE RIFLE
7	01/23/01	SOLID FINE RIFLE
8	01/23/01	SOLID FINE RIFLE
9	01/23/01	SOLID FINE RIFLE
10	01/23/01	SOLID FINE RIFLE

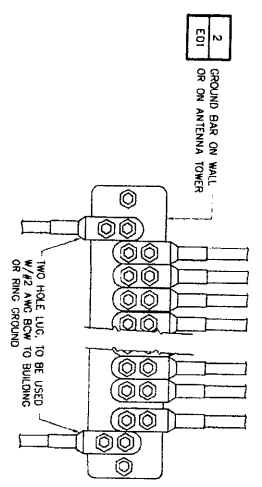
1. AS A SOLUTION OF LAW FOR AND BEHALF OF THE CLIENT, THE ENGINEER HAS REVIEWED THE DRAWINGS AND SPECIFICATIONS AND HAS FOUND THEM TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF A PROFESSIONAL ENGINEER.

PROFESSIONAL ENGINEER  
No. 17827  
LICENSED  
JOHN P. SOBIECHOWSKI  
P.E.  
STATE OF CONNECTICUT

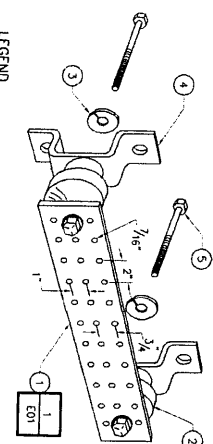
SITE NO. CTS244  
SITE NAME RIDGEFIELD NE  
SITE ADDRESS 845 ETHAN ALLEN HWY  
RIDGEFIELD, CT 06877  
FAIRFIELD COUNTY

SHEET TITLE STRUCTURAL DETAILS  
SHEET NUMBER C03

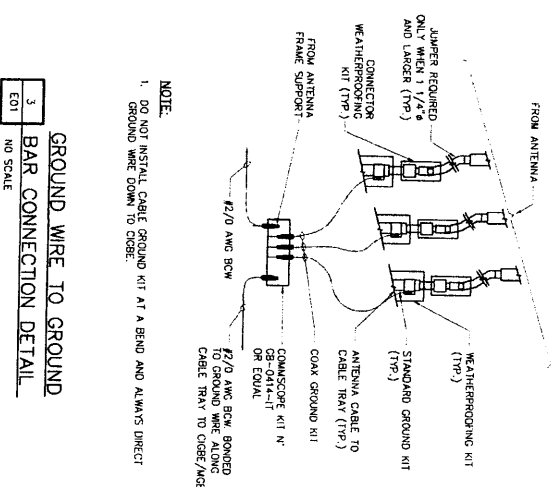




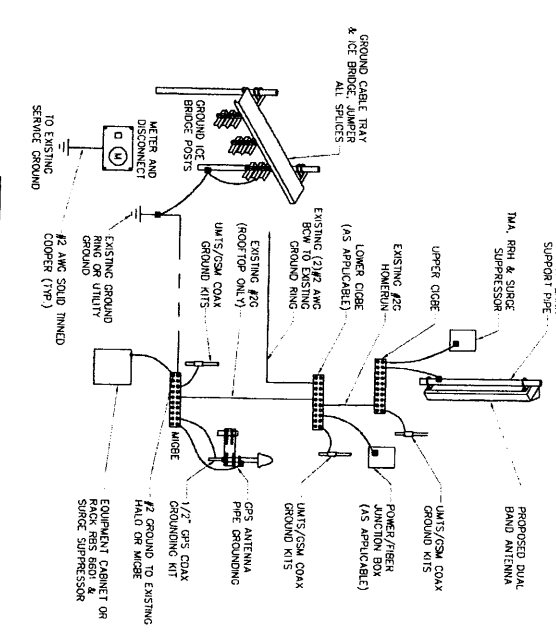
1 GROUND BAR ON WALL OR ON ANTENNA TOWER  
E01  
NO SCALE



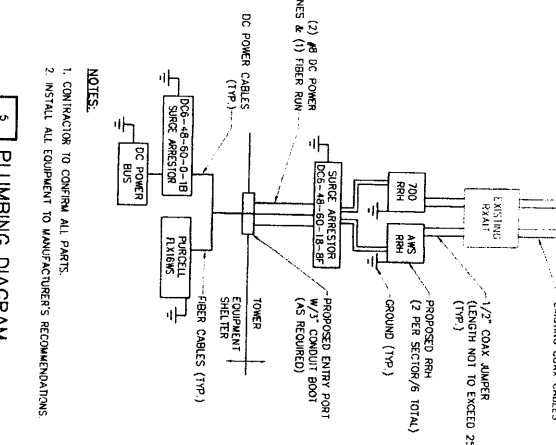
2 GROUND BAR  
E01  
NO SCALE



3 GROUND WIRE TO GROUND BAR CONNECTION DETAIL  
E01  
NO SCALE



4 GROUNDING RISER DIAGRAM  
E01  
NO SCALE



5 PLUMBING DIAGRAM  
E01  
NO SCALE

Your World Defined
   
 NEW CONQUAN WIRELESS, INC. LLC
   
 500 ENTERPRISE DRIVE
   
 ROCKY HILL, CT 06067

CHA
   
 2100 Main Street, Rocky Hill, CT 06067
   
 860.273.1440

PROFESSIONAL ENGINEER
   
 No. 17827
   
 STATE OF CONNECTICUT
   
 JAMES A. JOHNSON, P.E.

SHEET TITLE
   
 GROUNDING DETAILS & PLUMBING DIAGRAM
   
 SHEET NUMBER
   
 E01

SITE ID: C15244
   
 SITE NAME: RIDGEFIELD NE
   
 SITE ADDRESS: 845 ETHAN ALLEN HWY
   
 RIDGEFIELD, CT 06877
   
 FAIRFIELD COUNTY





## Exhibit 2

**APPROVED**

By Aaron T. Chandler at 2:21 pm, Oct 28, 2011

Date: **August 4, 2011**

Kenny Fann  
T-Mobile Towers  
12920 SE 38<sup>th</sup> Street  
Bellevue, WA 98006  
(425) 383-3978



Tower Engineering Professionals  
3703 Junction Blvd  
Raleigh, NC 27603  
(919) 661-6351  
[icox@tepgroup.net](mailto:icox@tepgroup.net)

**Subject: Structural Analysis Report**

**Carrier Designation:**

**AT&T Collocation**  
**AT&T Site Number:** CT5244  
**AT&T Site Name:** Ridgefield

**T-Mobile Designation:**

**T-Mobile Site Number:** CT11112H  
**T-Mobile Site Name:** Redding/ Rt 7

**Engineering Firm Designation:**

**TEP Project Number:** 112828

**Site Data:**

**845 Ethan Allen Highway**  
**Ridgefield, Fairfield County, CT 06877**  
**Latitude 41° 18' 47.13" Longitude -73° 28' 20.80"**  
**100 ft – Stealth Flagpole**

Dear Mr. Fann,

*Tower Engineering Professionals* is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower.

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

LC1: Existing + Proposed Equipment

Note: See Table 1 for the existing and proposed loading.

**Sufficient Capacity**

Structure Capacity	Controlling Component
96.2 %	Pole: 36" Canister (62 – 74 ft)

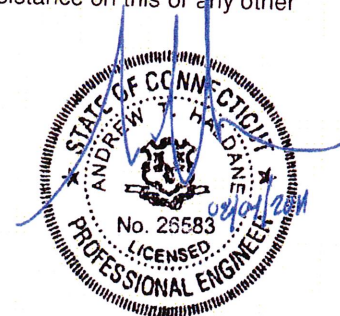
The analysis has been performed in accordance with ANSI/TIA-222-F-1996 Structural Standard for Steel Antenna Supporting Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code with 2007 Amendments.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *T-Mobile Towers*. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Andrew T. Haldane, P.E.





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**1) INTRODUCTION**

This tower is a 100-ft stealth flagpole tower designed by Pirod in February of 2001. The tower was originally designed per ANSI/TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph without ice and 63.75 mph with 1/2 inch radial ice for the appurtenances listed in Table 2. TEP did not visit the site. All information provided to TEP was assumed accurate and complete.

**2) ANALYSIS CRITERIA**

The structural analysis was performed for this tower in accordance with the requirements of ANSI/TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph without ice, 37.6 mph with 0.75 inch ice increasing in thickness with height, and 60 mph under service loads for a rigorous Structural Analysis.

**Table 1 - Existing and Proposed Antenna and Cable Information**

Existing/ Proposed	Elevation (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant	
	100	1	12.0' x 20' Flag/ Ball Carrier	-	-	-	-	-	
Existing	97.5	3	Andrew TMBXX-6516-R2M	Inside	6	7/8	Inside	T-Mobile	
		6	Andrew ETW190VS12UB TMA	Stealth					
	87.5	3	Andrew TMBXX-6516-R2M	Inside					
		6	Andrew ETW190VS12UB TMA	Stealth					
Proposed	79.5	3	EMS FR65-17-00DP	Inside	6	1-1/4	Inside	Sprint	
		3	KMW AM-X-CD-16-65-00T-RET	Inside					
	70	3	CCI DTMAP7819VG12A	36" x 12'	6	1-1/4			AT&T
		6	Kaelus TBC0020FxVx	Shroud					

**Table 2 - Design Antenna and Cable Information**

Mounting Level (ft)	Elevation (ft)	Number of Antennas	Antenna Model	Mount Type	Coax Size (in)	Coax Location
100	100	1	12' x 20' Flag	-	-	-
62 - 100	62 - 100	1	38' Concealment Section	-	-	-

**3) ANALYSIS PROCEDURE**

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
Design Drawings	Pirod dated February 14, 2001 Job No. A-118156	-	T-Mobile
Geotechnical Investigation	Dr. Clarence Welti dated May 1, 2000	-	T-Mobile
Correspondence	Correspondence with T-Mobile with regard to the existing and proposed loadings. SAW dated 6/20/11.	-	T-Mobile

### 3.1) Analysis Method

RISATower (version 5.4.2.0), 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 Table 1.
- 4) Serviceability with respect to antenna twist, tilt, roll, or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
- 5) This report is not a construction document.
- 6) Interior shroud pipe assumed to be 6" Double-Extra Strong pipes of A53-B-42 steel.

**Table 4 - Section Capacity Summary**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail	
L1	100 - 74	Pole	TEP#112828 24" Canister	1	-1862.530	525281.958	48.5	Pass	
L2	74 - 62	Pole	TEP#112828 36" Canister	2	-2981.660	525281.958	96.2	Pass	
L3	62 - 30	Pole	P24x3/8	3	-6401.820	934939.501	32.8	Pass	
L4	30 - 0	Pole	P24x3/8	4	-9672.360	934939.501	60.4	Pass	
							Summary		
							Pole (L2)	96.2	Pass
							<b>RATING =</b>	<b>96.2</b>	<b>Pass</b>

**Table 5 - Component Stresses vs. Capacity - Foundation**

Note	Component	Elevation (ft)	% Capacity	Pass / Fail
-	Anchor Rods	-	37.5	Pass
-	Foundation – Soil Interaction	-	15.4	Pass
-	Foundation – Structural	-	73.2	Pass

<b>Structure Rating (max from all components) =</b>	<b>96.2 %</b>
---	---------------

### 4.1) Recommendations - TEP recommends the following:

- 1) If the load differs from that described in Table 1 of this report, or the provisions of this analysis are found to be invalid, another structural analysis should be performed.

**APPENDIX A**  
**RISA TOWER OUTPUT**

Section	Size	Length (ft)	Grade	Weight (lb)	Elevation (ft)
1	TEP#112828 24" Canister	26.000	1383.5		100.0
2	TEP#112828 36" Canister	12.000	638.5		74.0
3	P24x3/8	32.000	3020.7		62.0
4	P24x3/8	30.000	2841.3		30.0
			7893.9		0.0

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
Ball Truck 14" DIA	100	24" Canister	87
TMBXX-6516-R2M (T-Mobile)	97.5	FR65-17-DP (Sprint)	79.5
TMBXX-6516-R2M (T-Mobile)	97.5	FR65-17-DP (Sprint)	79.5
TMBXX-6516-R2M (T-Mobile)	97.5	FR65-17-DP (Sprint)	79.5
ETW190VS12UB (T-Mobile)	97.5	AM-X-CD-16-65-00T-RET (ATTI)	70
ETW190VS12UB (T-Mobile)	97.5	AM-X-CD-16-65-00T-RET (ATTI)	70
ETW190VS12UB (T-Mobile)	97.5	DTMABP7819VG12A	70
Flag	94	DTMABP7819VG12A	70
TMBXX-6516-R2M (T-Mobile)	87.5	DTMABP7819VG12A	70
TMBXX-6516-R2M (T-Mobile)	87.5	TMA0002FxV1	70
TMBXX-6516-R2M (T-Mobile)	87.5	TMA0002FxV1	70
ETW190VS12UB (T-Mobile)	87.5	TMA0002FxV1	70
ETW190VS12UB (T-Mobile)	87.5	AM-X-CD-16-65-00T-RET (ATTI)	70
ETW190VS12UB (T-Mobile)	87.5	36" Canister	68

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield 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 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 96.2%

AXIAL  
14279 lb

SHEAR 1083 lb      MOMENT 62589 lb-ft

TORQUE 40 lb-ft  
38 mph WIND - 0.750 in ICE

AXIAL  
9675 lb

SHEAR 5011 lb      MOMENT 295547 lb-ft

TORQUE 597 lb-ft  
REACTIONS - 85 mph WIND

 Tower Engineering Professionals	<b>Tower Engineering Professional</b>		Job: <b>CT11112H</b>
	3703 Junction Boulevard		Project: <b>TEP#112828</b>
	Raleigh, NC 26603		Client: <b>T-Mobile Towers</b>
	Phone: (919) 661-6351		Drawn by: <b>jcox</b>
	FAX: (919) 661-6350		Date: <b>08/04/11</b>
			App'd: _____
			Scale: <b>NTS</b>
			Dwg No <b>E-1</b>

<b>RISATower</b>		Job	CT11112H	Page	1 of 9
<b>Tower Engineering Professional</b> 1703 Junction Boulevard Raleigh, NC 26603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10-43:01 08/04/11
		Client	T-Mobile Towers	Designed by	JCOX

<b>RISATower</b>		Job	CT11112H	Page	2 of 9
<b>Tower Engineering Professional</b> 1703 Junction Boulevard Raleigh, NC 26603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10-43:01 08/04/11
		Client	T-Mobile Towers	Designed by	JCOX

### Tower Input Data

This is a pole section.  
 This tower is designed using the TIA/EIA-222-F standard.  
 The following design criteria apply:  
 Tower is located in Fairfield County, Connecticut.  
 Basic wind speed of 85 mph.  
 Nominal ice thickness of 0.750 in.  
 Ice thickness is considered to increase with height.  
 Ice density of 56 pcf.  
 A wind speed of 38 mph is used in combination with ice.  
 Temperature drop of 50 °F.  
 Deflections calculated using a wind speed of 60 mph.  
 A non-linear (P-delta) analysis was used.  
 Pressures are calculated at each section.  
 Stress ratio used in pole design is 1.333.  
 Local bending stresses due to climbing supports, and appurtenance mounts are not considered.

### Options

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Modification</li> <li>Use Code Stress Ratios</li> <li>Use Code Safety Factors - Gaps</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Leg Bolts - At Top Of Section</li> <li>SR Capacity Reports By Component</li> <li>Use Diagonal Inner Bracing (4 Sided)</li> <li>Add B/C, 6D-AW Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Load As Uniform</li> <li>Assume Legs Printed</li> <li>Use Top Inner Pole</li> <li>Use Clear Space For Wind Area</li> <li>Use Clear Spans For K1/z</li> <li>Retention Gaps To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>Use Armath Dish Coefficients</li> <li>Protect Wind Area of Appurt.</li> <li>Anticall Torque Arm Area</li> <li>Leg Bolts - At Top Of Section</li> <li>SR Capacity Reports By Component</li> <li>Trangle/Br Diagonal Inner Bracing</li> </ul> |
|--|---|

### Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Sec	Pole Grade	Socket Length ft
L1	100,000-74,000	26,000	TEP#112828 24"	A53-B-42 (42 ksi)	
L2	74,000-62,000	12,000	TEP#112828 36"	A53-B-42 (42 ksi)	
L3	62,000-30,000	32,000	P2A,3/8	A53-B-42 (42 ksi)	
L4	30,000-0,000	30,000	P2A,3/8	A53-B-42 (42 ksi)	

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face Leg	Allow or Shield	Component Type	Placement H	Total Number	C.S.A. ft <sup>2</sup> /ft	Weight ppl
LDF6-S0A (7/8 FOAM) (T-Mobile)	C	No	Inside Pole	97,500 - 0,000	6	No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.300 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330
LDF6-S0A (7/8 FOAM) (T-Mobile)	C	No	Inside Pole	87,500 - 0,000	6	No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.300 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330 0.330
LDF6-S0A (1-1/4 FOAM) (T-Mobile)	C	No	Inside Pole	79,500 - 0,000	6	No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660
LDF6-S0A (1-1/4 FOAM) (T-Mobile)	C	No	Inside Pole	70,000 - 0,000	6	No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660 0.660
Safety Line 3/8	C	No	CAAs (Out Of Face)	100,000 - 0,000	1	No Ice 1/2" Ice 1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.250 0.250 0.250 0.250 0.250 0.250 0.250 0.250

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face A	Face B	Face C	Face D	C.S.A. In Face ft <sup>2</sup>	C.S.A. Out Face ft <sup>2</sup>	Weight lb
L1	100,000-74,000	A 0.000	B 0.000	C 0.000	D 0.000	0.000	0.000	0.000
L2	74,000-62,000	A 0.000	B 0.000	C 0.000	D 0.000	0.000	0.000	0.000

<b>RISATower</b>		Job	CT11112H	Page	3 of 9
<b>Tower Engineering Professionals!</b> 1703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10:43:01 08/04/11
Client		T-Mobile Towers			
Designed by		jcox			

<b>RISATower</b>		Job	CT11112H	Page	4 of 9
<b>Tower Engineering Professionals!</b> 1703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10:43:01 08/04/11
Client		T-Mobile Towers			
Designed by		jcox			

Tower Section	Tower Elevation ft	Face	A <sub>x</sub>	A <sub>y</sub>	A <sub>z</sub>	C/A <sub>x</sub> In Face	C/A <sub>y</sub> Out Face	Weight lb
1.3	62,000-30,000	C	0.000	0.000	0.000	0.550	129,460	
		A	0.000	0.000	0.000	0.000	0.000	
		B	0.000	0.000	0.000	0.000	0.000	
1.4	30,000-0.000	C	0.000	0.000	0.000	1.200	387,200	
		A	0.000	0.000	0.000	0.000	0.000	
		B	0.000	0.000	0.000	0.000	0.000	
		C	0.000	0.000	0.000	1.125	363,000	

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face	Leg	Ice Thickness in	A <sub>x</sub>	A <sub>y</sub>	A <sub>z</sub>	C/A <sub>x</sub> In Face	C/A <sub>y</sub> Out Face	Weight lb
1.1	100,000-74,000	A		0.843	0.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.2	74,000-62,000	A		0.818	0.000	0.000	0.000	5.356	123,980	
		B		0.000	0.000	0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.3	62,000-30,000	A		0.781	0.000	0.000	0.000	2.413	139,765	
		B		0.000	0.000	0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.4	30,000-0.000	A		0.750	0.000	0.000	0.000	0.290	413,702	
		B		0.000	0.000	0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000	0.000	0.000

### Feed Line Center of Pressure

Section	Elevation ft	C/P <sub>x</sub> in	C/P <sub>y</sub> in	C/P <sub>z</sub> in	C/P <sub>x</sub> Ice in	C/P <sub>y</sub> Ice in	C/P <sub>z</sub> Ice in
1.1	100,000-74,000	-0.048	0.028	-0.228	0.132	0.136	0.122
1.2	74,000-62,000	-0.048	0.028	-0.235	0.136	0.125	0.122
1.3	62,000-30,000	-0.048	0.028	-0.217	0.125	0.122	0.122
1.4	30,000-0.000	-0.048	0.028	-0.211	0.122	0.122	0.122

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horiz. Lateral Ver. ft	Acimuth Adjustment	Placement	C/A <sub>x</sub> Front	C/A <sub>y</sub> Side	Weight lb
Flag	C	From Leg	0.500 0.000 0.000	0.000	94.000	8.120 0.000 0.000	8.120 0.000 0.000	14,640 0.000 0.000

Description	Face or Leg	Offset Type	Offsets: Horiz. Lateral Ver. ft	Acimuth Adjustment	Placement	C/A <sub>x</sub> Front	C/A <sub>y</sub> Side	Weight lb
Ball Track 14" DIA	C	From Leg	0.250 0.000 0.000	0.000	100.000	0.000 1.244 1.417	0.000 1.417 1.417	0.000 14,000 31,537
***	A	None		0.000	97.500	0.000	0.000	34,600
TMBXX-6516-R2M (T-Mobile)	A	None		0.000	97.500	0.000	0.000	74,363
	B	None		0.000	97.500	0.000	0.000	119,324
	C	None		0.000	97.500	0.000	0.000	225,618
TMBXX-6516-R2M (T-Mobile)	B	None		0.000	97.500	0.000	0.000	509,140
	C	None		0.000	97.500	0.000	0.000	34,600
	A	None		0.000	97.500	0.000	0.000	74,363
	B	None		0.000	97.500	0.000	0.000	119,324
	C	None		0.000	97.500	0.000	0.000	225,618
TMBXX-6516-R2M (T-Mobile)	C	None		0.000	97.500	0.000	0.000	34,600
	A	None		0.000	97.500	0.000	0.000	74,363
	B	None		0.000	97.500	0.000	0.000	119,324
	C	None		0.000	97.500	0.000	0.000	225,618
ETW-190VS12UB (T-Mobile)	A	None		0.000	97.500	0.000	0.000	14,600
	B	None		0.000	97.500	0.000	0.000	34,600
	C	None		0.000	97.500	0.000	0.000	107,818
ETW-190VS12UB (T-Mobile)	B	None		0.000	97.500	0.000	0.000	14,600
	C	None		0.000	97.500	0.000	0.000	34,600
	A	None		0.000	97.500	0.000	0.000	107,818
ETW-190VS12UB (T-Mobile)	C	None		0.000	97.500	0.000	0.000	14,600
	A	None		0.000	97.500	0.000	0.000	34,600
	B	None		0.000	97.500	0.000	0.000	107,818
***	A	None		0.000	87.500	0.000	0.000	34,600
TMBXX-6516-R2M (T-Mobile)	A	None		0.000	87.500	0.000	0.000	74,363
	B	None		0.000	87.500	0.000	0.000	119,324
	C	None		0.000	87.500	0.000	0.000	225,618
TMBXX-6516-R2M (T-Mobile)	B	None		0.000	87.500	0.000	0.000	34,600
	C	None		0.000	87.500	0.000	0.000	74,363
	A	None		0.000	87.500	0.000	0.000	119,324
	B	None		0.000	87.500	0.000	0.000	225,618
	C	None		0.000	87.500	0.000	0.000	34,600
TMBXX-6516-R2M (T-Mobile)	C	None		0.000	87.500	0.000	0.000	74,363
	A	None		0.000	87.500	0.000	0.000	119,324
	B	None		0.000	87.500	0.000	0.000	225,618
	C	None		0.000	87.500	0.000	0.000	34,600
ETW-190VS12UB (T-Mobile)	A	None		0.000	87.500	0.000	0.000	14,600
	B	None		0.000	87.500	0.000	0.000	34,600
	C	None		0.000	87.500	0.000	0.000	107,818

<b>RISATower</b>		Job	CT11112H	Page	5 of 9
<b>Tower Engineering Professional</b>		Project	TEP#112828	Date	10-43-01 08/04/11
3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Client	T-Mobile Towers	Designed by	JCOX

Description	Face or Leg	Offset Type	Azimuth Adjustment	Placement	Offsets:			C.A. Front	C.A. Side	Weight
					Horz	Lateral	Vert			
					B	H	H	B	H	
ETW190VSI2UB (T-Mobile)	B	None	0.000	87.500	4" Ice	0.000	0.000	107.848	14.600	17.848
					No Ice	0.000	0.000	14.600	0.000	15.432
					12" Ice	0.000	0.000	19.541	0.000	19.978
					2" Ice	0.000	0.000	26.012	0.000	25.986
					4" Ice	0.000	0.000	34.600	0.000	34.600
ETW190VSI2UB (T-Mobile)	C	None	0.000	87.500	No Ice	0.000	0.000	19.541	0.000	19.541
					12" Ice	0.000	0.000	26.012	0.000	26.012
					2" Ice	0.000	0.000	44.320	0.000	44.320
					4" Ice	0.000	0.000	107.848	0.000	107.848
FR65-17-DP (Sprint)	A	None	0.000	79.500	No Ice	0.000	0.000	18.000	0.000	40.418
					12" Ice	0.000	0.000	40.418	0.000	40.418
					1" Ice	0.000	0.000	135.574	0.000	135.574
					2" Ice	0.000	0.000	18.000	0.000	18.000
					4" Ice	0.000	0.000	334.815	0.000	334.815
FR65-17-DP (Sprint)	B	None	0.000	79.500	No Ice	0.000	0.000	18.000	0.000	40.418
					12" Ice	0.000	0.000	40.418	0.000	40.418
					1" Ice	0.000	0.000	135.574	0.000	135.574
					2" Ice	0.000	0.000	18.000	0.000	18.000
					4" Ice	0.000	0.000	334.815	0.000	334.815
FR65-17-DP (Sprint)	C	None	0.000	79.500	No Ice	0.000	0.000	18.000	0.000	40.418
					12" Ice	0.000	0.000	40.418	0.000	40.418
					1" Ice	0.000	0.000	135.574	0.000	135.574
					2" Ice	0.000	0.000	18.000	0.000	18.000
					4" Ice	0.000	0.000	334.815	0.000	334.815
AM-X-CD-16-65-90T-RET (AT&T)	A	None	0.000	70.000	No Ice	0.000	0.000	48.500	0.000	94.996
					12" Ice	0.000	0.000	94.996	0.000	94.996
					1" Ice	0.000	0.000	147.499	0.000	147.499
					2" Ice	0.000	0.000	271.310	0.000	271.310
					4" Ice	0.000	0.000	48.500	0.000	48.500
AM-X-CD-16-65-90T-RET (AT&T)	B	None	0.000	70.000	No Ice	0.000	0.000	48.500	0.000	94.996
					12" Ice	0.000	0.000	94.996	0.000	94.996
					1" Ice	0.000	0.000	147.499	0.000	147.499
					2" Ice	0.000	0.000	271.310	0.000	271.310
					4" Ice	0.000	0.000	48.500	0.000	48.500
AM-X-CD-16-65-90T-RET (AT&T)	C	None	0.000	70.000	No Ice	0.000	0.000	48.500	0.000	94.996
					12" Ice	0.000	0.000	94.996	0.000	94.996
					1" Ice	0.000	0.000	147.499	0.000	147.499
					2" Ice	0.000	0.000	271.310	0.000	271.310
					4" Ice	0.000	0.000	48.500	0.000	48.500
DTMABF7819VGI2A	A	None	0.000	70.000	No Ice	0.000	0.000	19.541	0.000	19.541
					12" Ice	0.000	0.000	26.012	0.000	26.012
					1" Ice	0.000	0.000	44.320	0.000	44.320
					2" Ice	0.000	0.000	107.848	0.000	107.848
DTMABF7819VGI2A	B	None	0.000	70.000	No Ice	0.000	0.000	19.541	0.000	19.541
					12" Ice	0.000	0.000	26.012	0.000	26.012
					1" Ice	0.000	0.000	44.320	0.000	44.320
					2" Ice	0.000	0.000	107.848	0.000	107.848
DTMABF7819VGI2A	C	None	0.000	70.000	No Ice	0.000	0.000	19.541	0.000	19.541
					12" Ice	0.000	0.000	26.012	0.000	26.012
					1" Ice	0.000	0.000	44.320	0.000	44.320
					2" Ice	0.000	0.000	107.848	0.000	107.848

<b>RISATower</b>		Job	CT11112H	Page	6 of 9
<b>Tower Engineering Professional</b>		Project	TEP#112828	Date	10-43-01 08/04/11
3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Client	T-Mobile Towers	Designed by	JCOX

Description	Face or Leg	Offset Type	Azimuth Adjustment	Placement	Offsets:			C.A. Front	C.A. Side	Weight
					Horz	Lateral	Vert			
					B	H	H	B	H	
TMA002FXV1	A	None	0.000	70.000	4" Ice	0.000	0.000	107.848	0.000	107.848
					No Ice	0.000	0.000	15.432	0.000	15.432
					12" Ice	0.000	0.000	19.978	0.000	19.978
					2" Ice	0.000	0.000	25.986	0.000	25.986
					4" Ice	0.000	0.000	103.639	0.000	103.639
TMA002FXV1	B	None	0.000	70.000	No Ice	0.000	0.000	19.978	0.000	19.978
					12" Ice	0.000	0.000	25.986	0.000	25.986
					1" Ice	0.000	0.000	103.639	0.000	103.639
					2" Ice	0.000	0.000	15.432	0.000	15.432
					4" Ice	0.000	0.000	43.986	0.000	43.986
TMA002FXV1	C	None	0.000	70.000	No Ice	0.000	0.000	19.978	0.000	19.978
					12" Ice	0.000	0.000	25.986	0.000	25.986
					1" Ice	0.000	0.000	103.639	0.000	103.639
					2" Ice	0.000	0.000	15.432	0.000	15.432
					4" Ice	0.000	0.000	43.986	0.000	43.986
36" Camster	C	None	0.000	68.000	No Ice	0.000	0.000	76.944	0.000	76.944
					12" Ice	0.000	0.000	344.503	0.000	344.503
					2" Ice	0.000	0.000	612.063	0.000	612.063
					4" Ice	0.000	0.000	1147.181	0.000	1147.181
24" Camster	C	None	0.000	87.000	No Ice	0.000	0.000	499.557	0.000	499.557
					12" Ice	0.000	0.000	888.789	0.000	888.789
					1" Ice	0.000	0.000	1667.042	0.000	1667.042
					2" Ice	0.000	0.000	3223.527	0.000	3223.527
					4" Ice	0.000	0.000		0.000	

### Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp



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<b>Tower Engineering Professional</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10-43:01 08/04/11
		Client	T-Mobile Towers	Designed by	jcox

Description

Comb. No.	Description	Elevation ft	Horz. Deflection in	Gen. Load Comb.	Tilt	Twist °	Radius of Curvature ft
20	Dead+Wind 150 deg+Ice+Temp	100-74	20.940	35	2.291	0.086	4886
21	Dead+Wind 180 deg+Ice+Temp	74-62	17.976	35	2.305	0.054	4886
22	Dead+Wind 210 deg+Ice+Temp	62-30	9.231	35	1.752	0.023	4000
23	Dead+Wind 240 deg+Ice+Temp	30-0	5.963	35	0.735	0.003	4000
24	Dead+Wind 270 deg+Ice+Temp		1.706	35	0.494	0.002	1859
25	Dead+Wind 300 deg+Ice+Temp						1178
26	Dead+Wind 150 deg+Ice+Temp						1095
27	Dead+Wind 180 deg - Service						1201
28	Dead+Wind 210 deg - Service						
29	Dead+Wind 240 deg - Service						
30	Dead+Wind 270 deg - Service						
31	Dead+Wind 300 deg - Service						
32	Dead+Wind 120 deg - Service						
33	Dead+Wind 150 deg - Service						
34	Dead+Wind 180 deg - Service						
35	Dead+Wind 210 deg - Service						
36	Dead+Wind 240 deg - Service						
37	Dead+Wind 270 deg - Service						
38	Dead+Wind 300 deg - Service						

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gen. Load Comb.	Tilt	Twist °	Radius of Curvature ft
L1	100-74	20.940	35	2.291	0.086	4886
L2	74-62	17.976	35	2.305	0.054	4886
L3	62-30	9.231	35	1.752	0.023	4000
L4	30-0	5.963	35	0.735	0.003	4000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appearance	Gen. Load Comb.	Horz. Deflection in	Twist °	Radius of Curvature ft
100,000	Ball Tower 14" DIA	35	20.940	0.086	4886
97,500	TMBXX-6516-R2M	35	17.976	0.054	4886
94,000	Flag	35	14.772	0.023	4000
87,500	TMBXX-6516-R2M	35	14.539	0.042	4000
87,000	24" Camster	35	11.274	0.032	1178
79,500	ER65-17-DP	35	7.977	0.016	1095
70,000	AMX-CD-16-65-001-RET	35	7.417	0.013	1201
68,000	36" Camster	35			

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gen. Load Comb.	Tilt	Twist °
L1	100-74	41.923	11	4.584	0.113
L2	74-62	18.503	11	3.908	0.046

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<b>Tower Engineering Professional</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP#112828	Date	10-43:01 08/04/11
		Client	T-Mobile Towers	Designed by	jcox

Description

Section No.	Elevation ft	Horz. Deflection in	Gen. Load Comb.	Tilt	Twist °	Radius of Curvature ft
L1	62-30	11.957	11	1.475	0.107	2442
L4	30-0	3.422	10	0.990	0.093	2442

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appearance	Gen. Load Comb.	Horz. Deflection in	Tilt	Twist °	Radius of Curvature ft
100,000	Ball Tower 14" DIA	11	41.923	4.584	0.113	2442
97,500	TMBXX-6516-R2M	11	38.583	4.013	0.107	2442
94,000	Flag	11	35.883	3.422	0.107	2442
87,500	TMBXX-6516-R2M	11	29.588	4.579	0.084	2055
87,000	24" Camster	11	29.122	4.566	0.083	938
79,500	ER65-17-DP	11	22.590	4.149	0.063	593
70,000	AMX-CD-16-65-001-RET	11	15.991	2.842	0.032	559
68,000	36" Camster	11	14.871	2.478	0.025	603

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	L ft	L <sub>0</sub> ft	Klbr	F <sub>c</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P lb	Ratio F <sub>c</sub> /P	
L1	100-74 (1)	TEP#112828-24 Camster	26,000	0.000	0.0	25,200	15,637	-1862,530	39,400,000	0.005
L2	74-62 (2)	TEP#112828-36" Camster	12,000	0.000	0.0	25,200	15,637	-2981,660	39,400,000	0.008
L3	62-30 (3)	P24x36	32,000	0.000	0.0	25,200	27,833	-6,401,870	701,380,000	0.009
L4	30-0 (4)	P24x36	30,000	0.000	0.0	25,200	27,833	-6,672,360	701,380,000	0.014

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M lb-ft	Actual K ksi	Allow. K ksi	Ratio M/K	Actual I <sub>b</sub> in <sup>4</sup>	Allow. I <sub>b</sub> in <sup>4</sup>	Ratio I <sub>b</sub> /I <sub>allow</sub>
L1	100-74 (1)	TEP#112828-24 Camster	27144.5	16,186	25,200	0.642	0.000	25,200	0.000
L2	74-62 (2)	TEP#112828-36" Camster	53865.4	42,131	25,200	1.275	0.000	25,200	0.000
L3	62-30 (3)	P24x36	160168	11,875	27,720	0.428	0.000	27,720	0.000
L4	30-0 (4)	P24x36	295337	21,911	27,720	0.790	0.000	27,720	0.000

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Tower Engineering Professional 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 691-6351 FAX: (919) 691-6350		CT11112H	9 of 9
Project		TEP#112828	Date
Client		T-Mobile Towers	10:43:01 08/04/11
			Designed by
			JCOX

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual		Allow.		Actual		Allow.		Ratio
			V lb	T kft	V kft	T kft	V kft	T kft			
L1	100-74 (1)	TEP#112828 24" Camster	1830.91	0.116	16.800	0.007	0.001	0.000	0.000	16.800	0.000
L2	74-62 (2)	TEP#112828 36" Camster	2618 (1.3)	0.367	16.800	0.010	0.001	0.000	0.000	16.800	0.000
L3	62-30 (3)	P24A308	302.67	0.286	16.800	0.017	296.199	0.011	16.800	0.001	
L4	30-0 (4)	P24A308	5016.52	0.360	16.800	0.021	298.722	0.011	16.800	0.001	

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio		Ratio		Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\frac{P}{F_c}$	$\frac{V}{F_v}$	$\frac{P}{F_c}$	$\frac{V}{F_v}$			
L1	100-74 (1)	0.005	0.642	0.000	0.007	0.000	0.647	1.333
L2	74-62 (2)	0.008	1.275	0.000	0.010	0.000	1.283	1.333
L3	62-30 (3)	0.009	0.428	0.000	0.017	0.001	0.438	1.333
L4	30-0 (4)	0.014	0.730	0.000	0.023	0.001	0.805	1.333

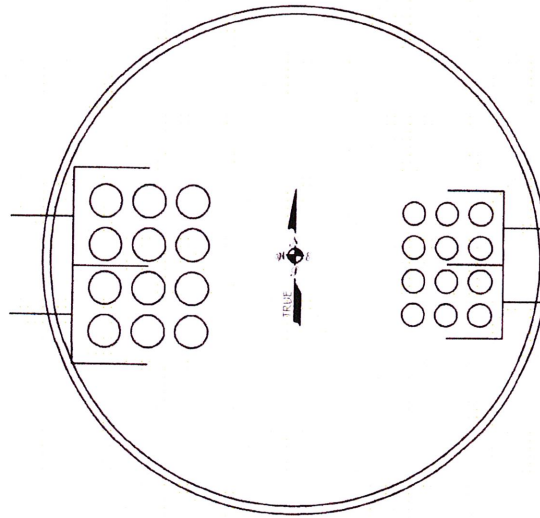
### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF=Pr/Pr	Capacity %	Pass/Fail
L1	100-74	Pole	TEP#112828 24" Camster	1	-1862.530	525281.058	48.5	Pass
L2	74-62	Pole	TEP#112828 36" Camster	2	-2081.660	525281.058	96.2	Pass
L3	62-30	Pole	P24A308	3	-6403.820	933939.501	32.8	Pass
L4	30-0	Pole	P24A308	4	-9672.960	933939.501	60.4	Pass
							Pole (1,2)	Summary
							RATING =	96.2

**APPENDIX B**  
**COAX CONFIGURATION PLAN**

(SPRINT - EXISTING)  
(6) 1 1/4" TO 79.5 FT

(AT&T - PROPOSED)  
(6) 1 1/4" TO 70 FT



(T-MOBILE - EXISTING)  
(6) 7/8" TO 97.5 FT

(T-MOBILE - EXISTING)  
(6) 7/8" TO 87.5 FT

**COAX PLAN - N.T.S.**

PREPARED BY:

**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
(919) 661-6351  
www.tepgroup.net

PREPARED FOR:

**T-Mobile**  
T-MOBILE TOWERS  
12920 SE 38TH STREET  
BELLEVUE, WA 98006

PROJECT INFORMATION:

**SITE # CT11112H**  
**Redding/ Rt 7**  
845 ETHAN ALLEN HIGHWAY  
RIDGEFIELD, CT 06877  
(FAIRFIELD COUNTY)

REVISION: 0

TEP JOB #: 112828

SHEET NUMBER:

**M-1**

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

\*\*\*\*\*  
 \* CAISSON - Pier Foundations Analysis and Design - Copyright Power Line Systems, Inc. 1993-2010 \*  
 \*\*\*\*\*

Project Title: CT11112H - Caisson - TIA-G  
 Project Notes: TRP Job #: 112828

Calculation Method: Full &CD

\*\*\*\*\* INPUT DATA

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
3.50	0.50	4.00	60.00

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	3.33	0.00	100.0			
2	Sand	3.67	3.33	135.0		4.204	38.00
3	Sand	28.00	7.00	75.0		4.204	38.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
295.5	9.7	5.01	0.66

\*\*\*\*\* RESULTS

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
20.500	29.585	1005.6

1.33/0.66 = 15.4 %

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.50	3.33	100.0			0.00	2.17
Sand	3.83	3.67	135.0		4.204	94.00	5.93
Sand	7.50	7.26	75.0		4.204	352.59	11.43
Sand	14.76	5.74	75.0		4.204	-402.45	17.76

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)
0.00	44.1	2560.5	5.1	295.7
2.05	44.1	2651.0	5.1	306.1
4.10	40.0	2740.9	4.6	316.5
6.15	-5.9	2780.1	-0.7	321.0
8.20	-76.3	2699.6	-8.8	311.7
10.25	-162.9	2456.8	-18.8	283.7
12.30	-263.5	2022.1	-30.4	233.5
14.35	-378.0	1366.9	-43.6	157.8
16.40	-296.5	631.0	-34.5	72.9
18.45	-156.2	162.5	-18.0	18.8
20.50	0.0	-0.0	0.0	-0.0

## Exhibit 3



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

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Calculated Radio Frequency Emissions



CT2113

845 Ethan Allen Highway, Ridgefield, CT 06877

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October 26, 2011



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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 existing monopole tower located at 845 Ethan Allen Highway in Ridgefield, CT. Sprint and VoiceStream also have antennas mounted on the tower.

The coordinates of the tower are 41° 18' 46.77" N, -73° 28' 21" W.

AT&T is proposing the following modifications:

- 1) Replace existing dual-band antennas with three dual-band (800 MHz/1900 MHz) antennas (one per sector);
- 2) Add UMTS PCS frequencies.

## 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 ( $\text{mW}/\text{cm}^2$ ). 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. All information for Sprint and VoiceStream comes directly from the current CSC database. 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 <sup>2</sup> )	Limit	%MPE
Sprint	79.5	1962.5	11	395	0.2470	1.0000	24.70%
VoiceStream	97.5	1930			0.0147	1.0000	1.47%
VoiceStream	87.5	1930			0.0190	1.0000	1.90%
AT&T UMTS	70	880	1	500	0.0367	0.5867	0.63%
AT&T UMTS	70	1900	1	500	0.0367	1.0000	0.37%
AT&T GSM	70	880	3	296	0.0652	0.5867	1.11%
AT&T GSM	70	1900	1	427	0.0313	1.0000	0.31%
						<b>Total</b>	<b>30.49%</b>

Table 1: Carrier Information<sup>1 2</sup>

<sup>1</sup> Calculated values for AT&T include a -10 dB off-beam loss factor. Antenna specifics for Sprint and VoiceStream were unavailable and therefore do not include any off-beam loss factor.

<sup>2</sup> Blank spaces indicate where information was unavailable from the CSC database.

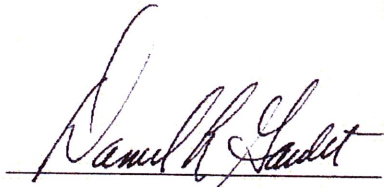
## 5. Conclusion

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 and existing transmit antennas at the existing facility is below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 30.49% 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

October 26, 2011

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<sup>3</sup>

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	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<sup>4</sup>

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	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)**

<sup>3</sup> 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

<sup>4</sup> 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

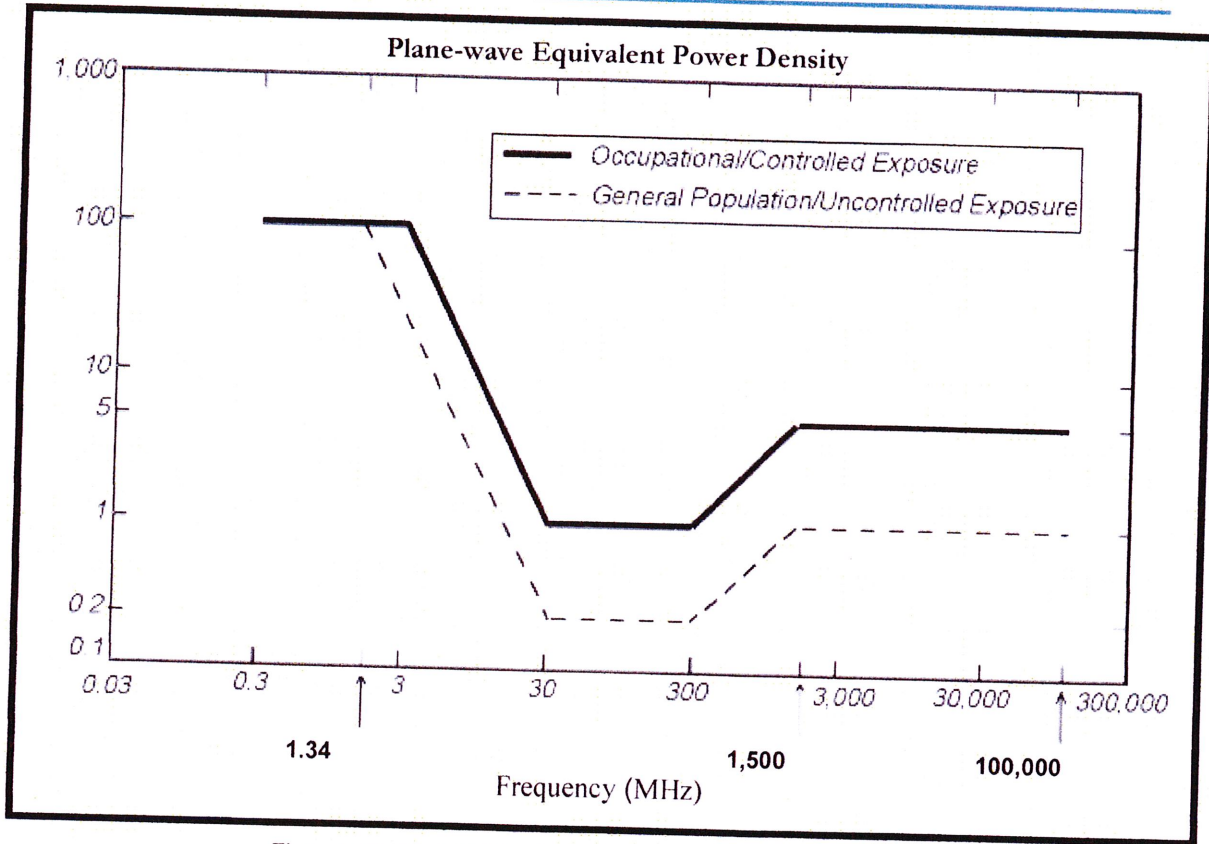
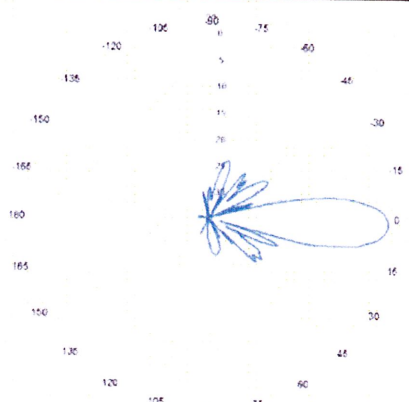
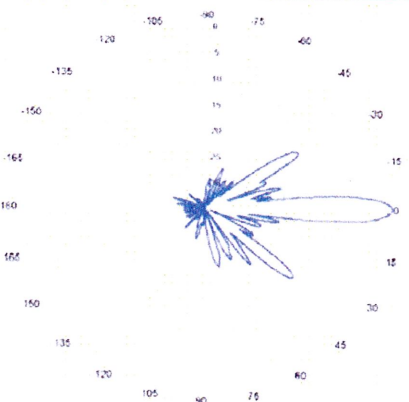
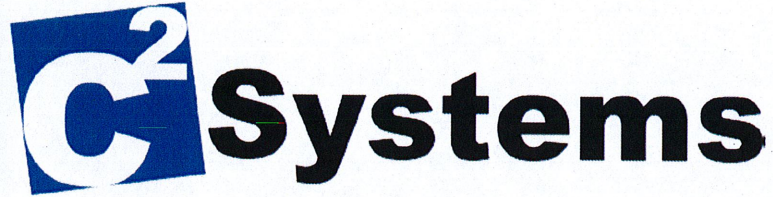


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)



### Attachment C: AT&T's Antenna Model Data Sheets and Electrical Patterns

<p><b>850 MHz</b></p> <p>Manufacturer: KMW            Model #: AM-X-CD-16-65-00T-RET            Frequency Band: 698-894 MHz            Gain: 13.85 dBd            Vertical Beamwidth: 11.5 deg            Horizontal Beamwidth: 63 deg            Polarization: Dual Slant +/- 45 deg            Size L x W x D: 72" x 11.8" x 5.9"</p>	 <p>The diagram shows the radiation pattern for the 850 MHz antenna. It is a polar plot with a vertical axis from -180 to 180 degrees and a horizontal axis from -120 to 120 degrees. The main lobe is centered at 0 degrees and extends to approximately 63 degrees horizontally. There are several side lobes on both sides of the main lobe.</p>
<p><b>1900 MHz</b></p> <p>Manufacturer: KMW            Model #: AM-X-CD-16-65-00T-RET            Frequency Band: 1710-2170 MHz            Gain: 15.25 dBd            Vertical Beamwidth: 6 deg            Horizontal Beamwidth: 67 deg            Polarization: Dual Slant +/- 45 deg            Size L x W x D: 72" x 11.8" x 5.9"</p>	 <p>The diagram shows the radiation pattern for the 1900 MHz antenna. It is a polar plot with a vertical axis from -180 to 180 degrees and a horizontal axis from -120 to 120 degrees. The main lobe is centered at 0 degrees and extends to approximately 67 degrees horizontally. There are several side lobes on both sides of the main lobe.</p>



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Calculated Radio Frequency Emissions



at&t

CT5244

845 Ethan Allen Highway, Ridgefield, CT 06877

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November 17, 2011

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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 existing stealth flagpole tower located at 845 Ethan Allen Highway in Ridgefield, CT. Sprint and T-Mobile also have antennas mounted within the tower. The coordinates of the tower are 41° 18' 46.69" N, 73° 28' 20.42" W.

AT&T is proposing the following modifications:

- 1) Add 1900 MHz UMTS frequencies;
- 2) Add 700 MHz LTE frequencies;
- 3) Replace the existing dual-band antennas with tri-band (750/850/1900 MHz) antennas.

## 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 ( $\text{mW}/\text{cm}^2$ ). 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. All information for Sprint and T-Mobile comes directly from the current CSC database. 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 <sup>2</sup> )	Limit	%MPE
Sprint	79.5	1962.5	11	395	0.2470	1.0000	24.70%
T-Mobile	97.5	1930			0.0147	1.0000	1.47%
T-Mobile	87.5	1930			0.0190	1.0000	1.90%
AT&T LTE	70	734	1	1117	0.0820	0.4893	1.68%
AT&T UMTS	70	880	2	565	0.0829	0.5867	1.41%
AT&T UMTS	70	1900	2	875	0.1284	1.0000	1.28%
AT&T GSM	70	880	1	296	0.0217	0.5867	0.37%
AT&T GSM	70	1900	4	525	0.1541	1.0000	1.54%
<b>Total</b>							<b>34.36%</b>

**Table 1: Carrier Information<sup>1 2</sup>**

<sup>1</sup> The nominal 10 dB off-beam loss factor for AT&T is derived from the specific AT&T antennas for this site and their associated antenna patterns which are presented in Attachment C. Antenna specifics for Sprint and T-Mobile were unavailable and therefore do not include any off-beam loss factor.

<sup>2</sup> Blank spaces indicate where information was unavailable from the CSC database.

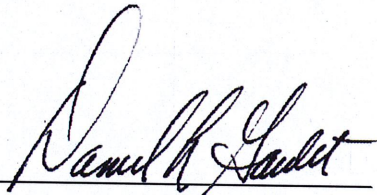
## 5. Conclusion

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 and existing transmit antennas at the existing facility is below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 34.36% of the FCC limit.

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

## 6. Statement of Certification

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



Daniel L. Goulet  
C Squared Systems, LLC

November 17, 2011

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

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

**(A) Limits for Occupational/Controlled Exposure<sup>3</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	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<sup>4</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	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)**

<sup>3</sup> 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

<sup>4</sup> 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

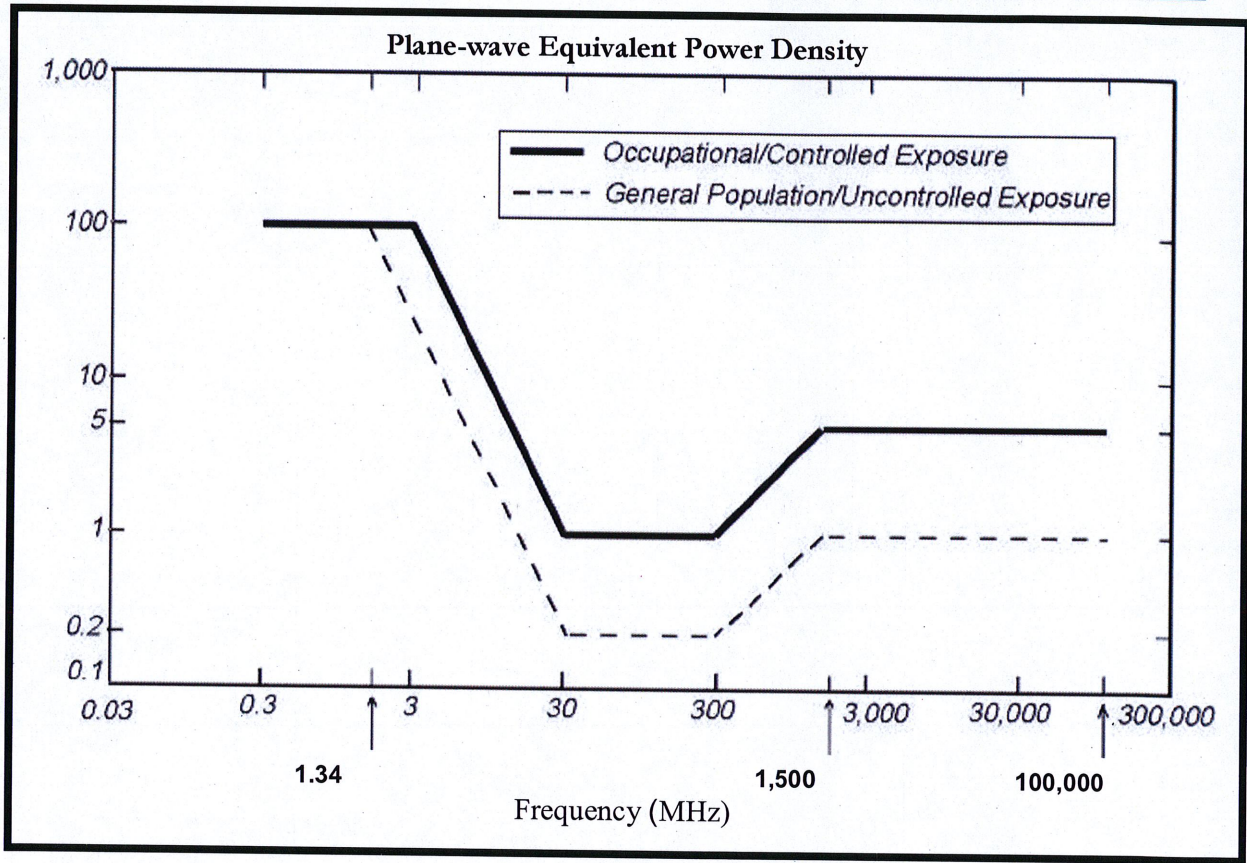
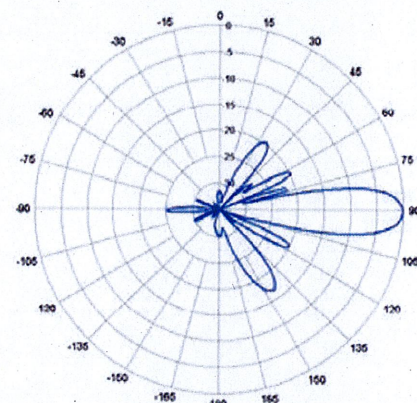
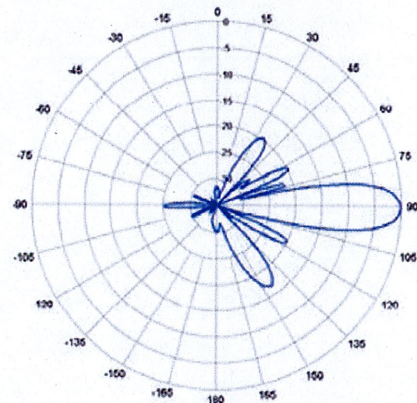


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: AT&T's Antenna Model Data Sheets and Electrical Patterns**

<p><b>750 MHz</b></p> <p>Manufacturer: KMW            Model #: AM-X-CD-16-65-00T-RET            Frequency Band: 698-894 MHz            Gain: 11.9 dBd            Vertical Beamwidth: 15°            Horizontal Beamwidth: 65°            Polarization: Dual Slant ±45°            Size L x W x D: 54.0" x 12.6" x 7.9"</p>	
<p><b>850 MHz</b></p> <p>Manufacturer: KMW            Model #: AM-X-CD-16-65-00T-RET            Frequency Band: 698-894 MHz            Gain: 11.9 dBd            Vertical Beamwidth: 15°            Horizontal Beamwidth: 65°            Polarization: Dual Slant ±45°            Size L x W x D: 54.0" x 12.6" x 7.9"</p>	
<p><b>1900 MHz</b></p> <p>Manufacturer: KMW            Model #: AM-X-CD-16-65-00T-RET            Frequency Band: 1710-2170 MHz            Gain: 14.4 dBd            Vertical Beamwidth: 7.5°            Horizontal Beamwidth: 65°            Polarization: Dual Slant ±45°            Size L x W x D: 54.0" x 12.6" x 7.9"</p>	