

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

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

June 2, 2009

Mark R. Richard
UMTS Project Manager
T-Mobile USA, Inc.
35 Griffin Road South
Bloomfield, CT 06002

RE: **EM-T-MOBILE-025-090429** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 1119 Summit Road, aka 1121 Summit Road, Cheshire, Connecticut.

Dear Mr. Richard:

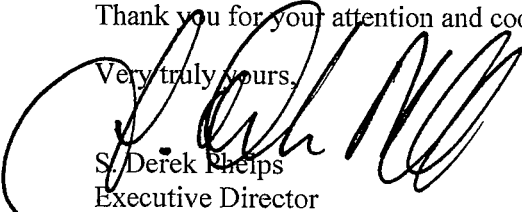
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated April 29, 2009, including the placement of all necessary equipment and shelters within the tower compound. 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. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,


S. Derek Phelps
Executive Director

SDP/MP/laf

- c: The Honorable Matt Hall, Council Chairman, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire
Carrie L. Larson, Esq., Pullman & Comley, LLC
Crown Castle USA, Inc.



CONNECTICUT SITING COUNCIL

Affirmative Action / Equal Opportunity Employer



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

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Internet: ct.gov/csc

Daniel F. Caruso
Chairman

May 5, 2009

The Honorable Matt Hall
Council Chairman
Town of Cheshire
Town Hall
84 South Main Street
Cheshire, CT 06410

RE: **EM-T-MOBILE-025-090429** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 1119 Summit Road aka 1121 Summit Road, Cheshire, Connecticut.

Dear Mr. Hall:

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 May 19, 2009.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jb

Enclosure: Notice of Intent

c: William S. Voelker, AICP, Town Planner, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire



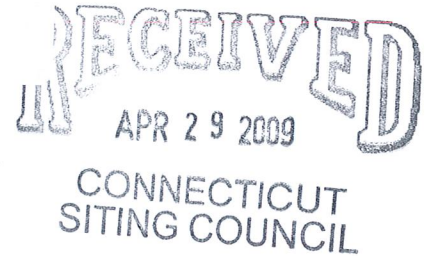
April 29, 2009

EM-T-MOBILE-025-090429

Via Federal Express

S. Derek Phelps, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

ORIGINAL



**Re: Notice of Exempt Modification
Crown Castle USA, Inc. Telecommunications Facility
1119 Summit Road aka 1121 Summit Road, Cheshire, Connecticut
T-Mobile Site CT11352C**

Dear Mr. Phelps:

Omnipoint Communications, a subsidiary of T-Mobile USA, Inc. ("T-Mobile"), intends to replace existing antennas, install additional antennas and replace existing ground equipment at the existing 167-foot Monopole facility owned by Crown Castle USA, Inc. and located at 1119 Summit Road aka 1121 Summit Road, Cheshire, Connecticut ("Facility"). T-Mobile is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation. This installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g *et seq.* (PUESA), and Section 16-50j-72(b)(2) of the Regulations of the Connecticut State Agencies adopted pursuant to PUESA. In accordance with R.C.S.A. Section 16-50j-73, a copy of this notice has been sent to, Michael A. Milone, Town Manager, Town of Cheshire.

The existing Facility consists of a 167-foot self-supporting Monopole tower capable of supporting multiple carriers within a fenced compound and was previously approved by the Town of Cheshire. The coordinates for the Facility are approximately **Lat: 41°-32'-11" and Long: 72°-57'-28"**. The tower is located in the northwest portion of Cheshire. The town is approximately 1200 feet west of Summit Road and roughly 700 feet south east of Interstate 84 (see Site Map, attached as Exhibit A). The tower currently supports Pocket antennas at the one hundred eighteen foot (118') level centerline AGL (above ground level), Nextel antennas at the one hundred twenty eight foot (128') level centerline AGL (above ground level), T-Mobile antennas at the one hundred thirty-nine foot level (139') AGL, Sprint antennas at the one hundred forty-seven foot level (147') AGL, AT&T antennas at the one hundred sixty foot level (160') AGL, and Verizon antennas at the one hundred sixty-seven foot level (167') AGL. The current T-Mobile antenna configuration is one per sector, for a total of three antennas. T-Mobile proposes to add an additional three antennas (one per sector), for a total of six antennas at their current elevation on the tower. T-Mobile proposes to install three RFS APX16DWV-S-E antennas on existing pipe mounts at the same elevation, one hundred thirty-eight foot (138') level centerline AGL. T-Mobile also intends to add one UMTS 3206 equipment cabinet. Two existing S8000 equipment cabinets will remain. The three cabinets will all be mounted on T-Mobile's existing equipment pad contained within T-Mobile's existing lease area. T-Mobile intends to run new coaxial cable on its existing ice bridge from its current equipment to the

T-Mobile USA, Inc.
Office: (860) 692-7100
Fax: (860) 692-7159
35 Griffin Rd S
Bloomfield, CT 06002

existing tower. Utilities will be run via a proposed underground conduit from existing utility sources at the Facility (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

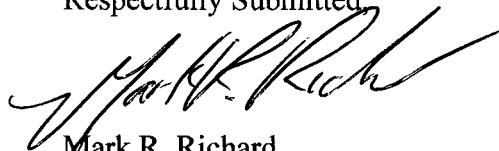
For the following reasons, the proposed modifications to the Summit Road Facility meet the exempt modification criteria set forth in R.C.S.A. Section 16-50j-72(b)(2):

1. The proposed modification will not increase the height of the tower as T-Mobile seeks to add to its existing antenna configuration and install additional antennas at a center line height of approximately 138 feet.
2. The installation and replacement of T-Mobile's antennas and ground equipment will not require an extension of the site boundaries.
3. The proposed modifications will not increase the noise levels at the existing Facility by six decibels or more.
4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. The worst-case RF power density calculations for the proposed T-Mobile antennas would be 35.1179% of the FCC standard (see general power density calculations table, attached as Exhibit D).

Also attached, Exhibit E, is a structural assessment confirming that the tower can support the existing and proposed antennas and associated equipment. Of note, because all antennas are internally mounted in the flagpole, the additional three antennas will not increase the ice and winding loading for the tower.

For the foregoing reasons, T-Mobile respectfully submits that the proposed antenna installation and equipment at the Cheshire Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Respectfully Submitted,



Mark R. Richard
UMTS Project Manager
Agent for T-Mobile

cc: Michael A. Milone, Town Manager, Town of Cheshire
Ms. Joanne M. Didomizio, underlying property owner

Exhibit A

Site Map

T-Mobile Site CT11352C

1119 Summit Road

aka 1121 Summit Road

Cheshire, Connecticut

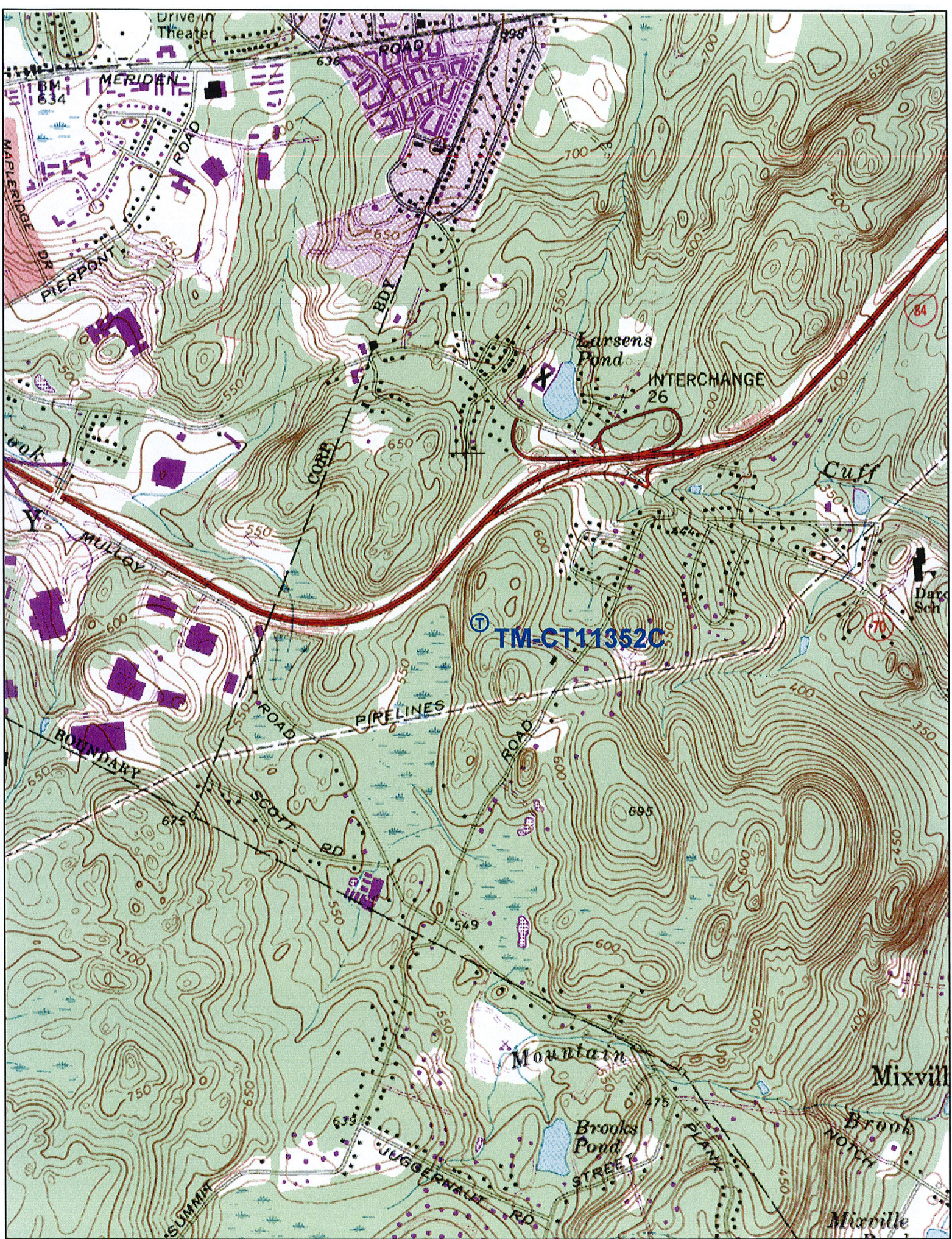


Exhibit B

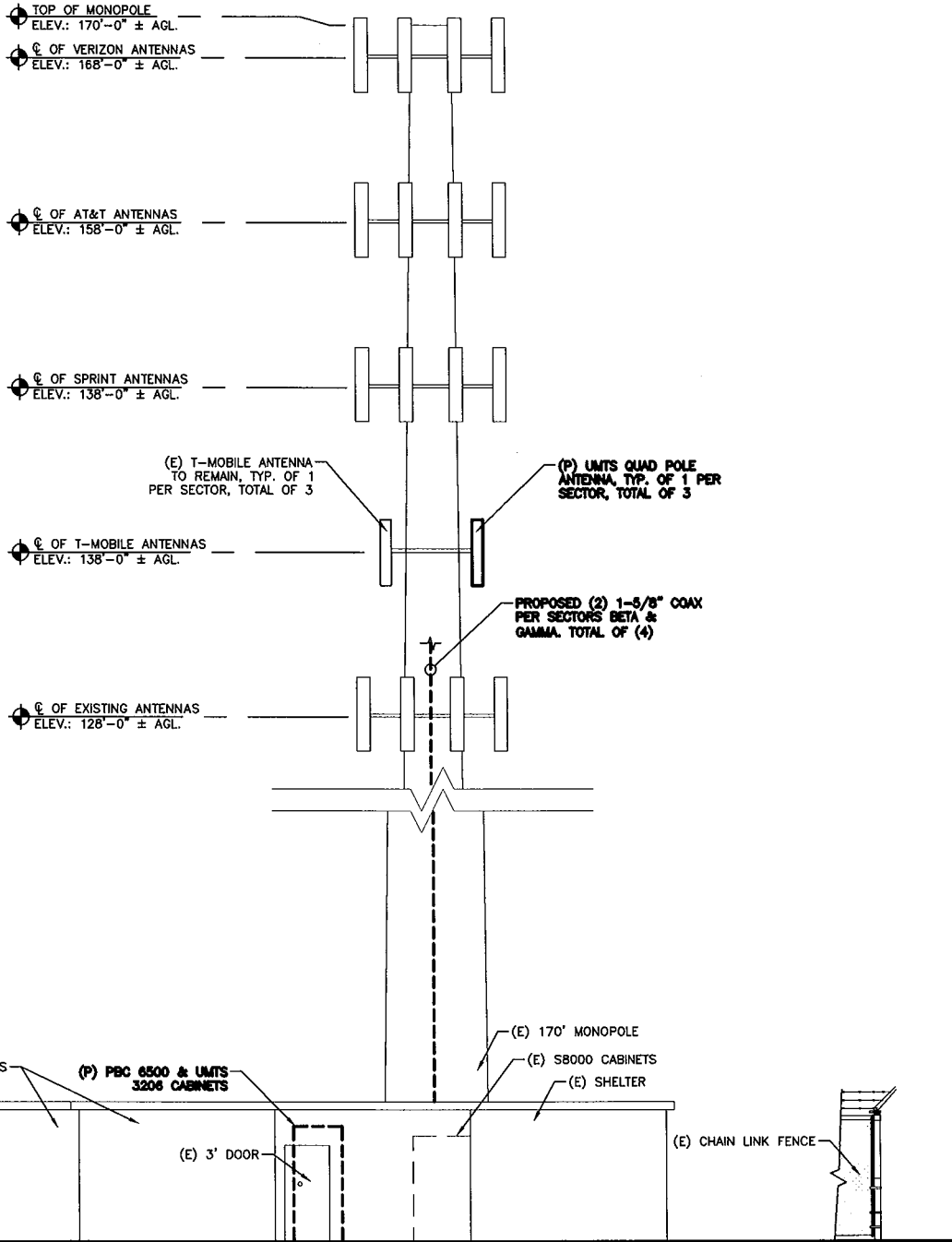
Design Drawings

T-Mobile Site CT11352C

1119 Summit Road

aka 1121 Summit Road

Cheshire, Connecticut

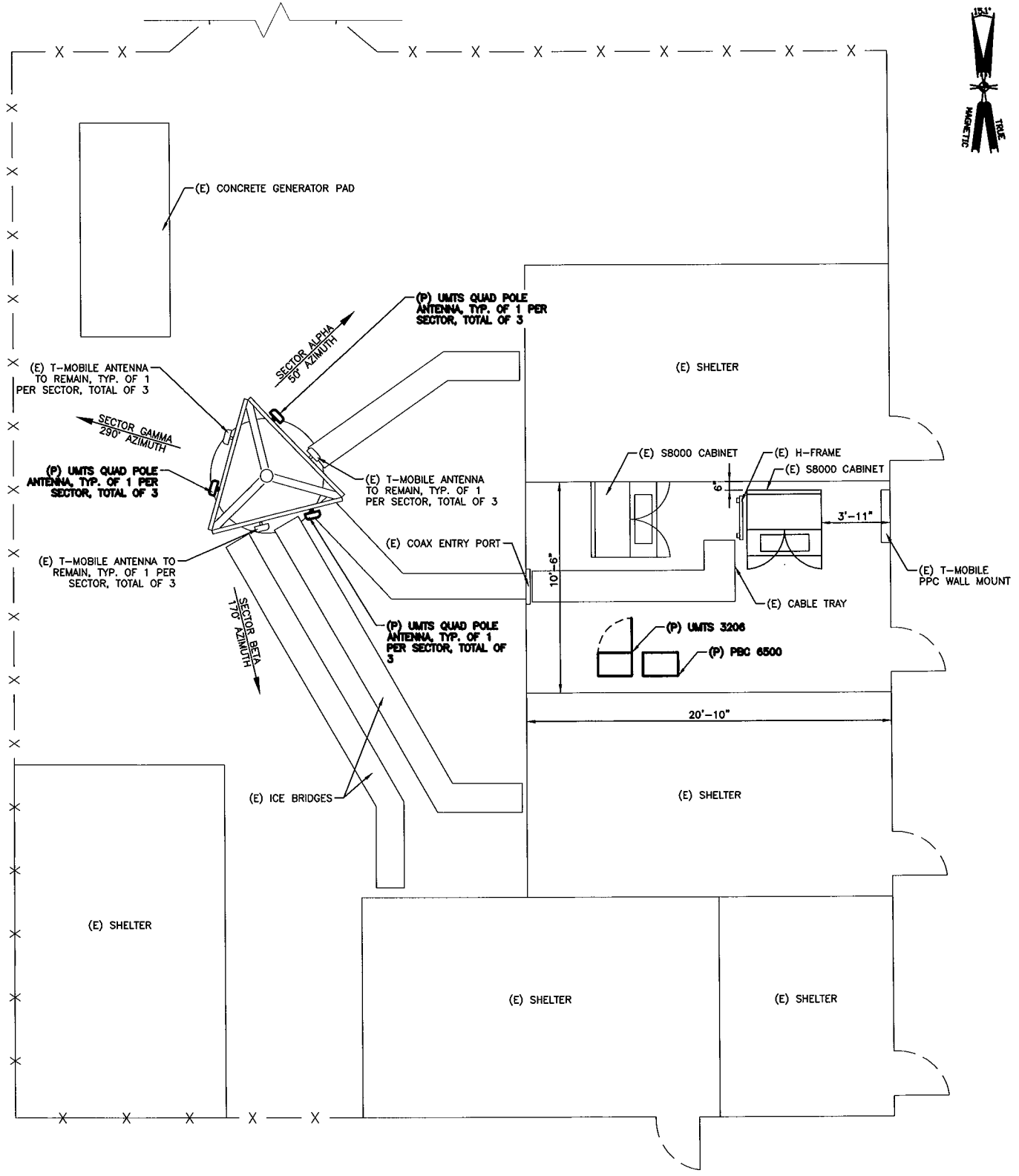


ELEVATION

SCALE: N.T.S.



<p>35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002</p>	<p>50 Eastman St. South Easton, MA 02375 Phone: (508) 636-6363 Fax: (508) 936-6365</p>	PROJECT LOCATION:	PROJECT MANAGER:	DRAWN BY:	BSDA PROJ. #:
		CHESHIRE	KB	AP	2898.265
		CT11352C			
		CROWN MONOPOLE			
		SUMMIT ROAD			
		CHESHIRE, CT 06410	REV 1		
		APPROVED BY:	01/13/09		



ROOFTOP LAYOUT PLAN

SCALE: NTS

1

T-Mobile
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

MAXTON
50 Eastman St.
South Easton, MA 02375
Phone: (508) 636-8363
Fax: (508) 636-8365

PROJECT LOCATION:
CHESHIRE
CT11352C
CROWN MONOPOLE
SUMMIT ROAD
CHESHIRE, CT 06410

PROJECT MANAGER:
KB

DRAWN BY:
AP

BSDA PROJ. #:
2898.265

APPROVED BY:

REV 1
01/13/09

**ROOFTOP
LAYOUT
PLAN**

SHEET:

L1

Exhibit C

Equipment Specifications

T-Mobile Site CT11352C

1119 Summit Road

aka 1121 Summit Road

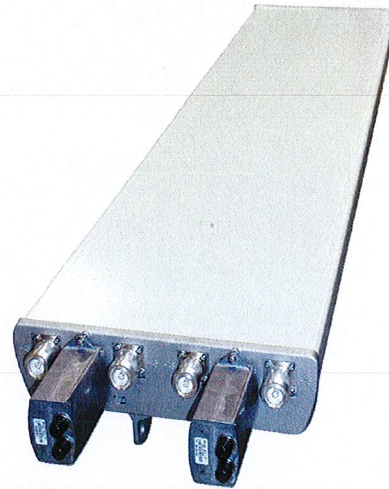
Cheshire, Connecticut

Optimizer® Panel Dual Polarized Antenna equipped with (2) ACU motors

Product Description

Gathering two X-Polarized antennas in a single radome this pair of variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range with optional remote tilt.

This antenna is optimized for performance across the entire AWS frequency band (1710-2170 MHz). The antenna comes pre-connected with the antenna control unit (ACU).



Features/Benefits

- Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.
- High Suppression of all Upper Sidelobes (Typically <-20dB).
- Gain difference between UL and DL <1dB.
- Two X-Polarised panels in a single radome.
- Azimuth horizontal beamwidth difference <7deg between UL and DL (1710-1755 & 2110-2155).
- Low profile for low visual impact.
- Dual polarization; Broadband design.

Technical Features

Frequency Band	3G/UMTS
Horizontal Pattern	Directional
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable
Gain, dBi (dBd)	18.0 (16.0) Avg. across band
Frequency Range, MHz	1710-2170

All information contained in the present datasheet is subject to confirmation at time of ordering.



Optimizer® Panel Dual Polarized Antenna equipped with (2) ACU motors

Connector Type	(4) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt Kit w/Scissor Kit
Electrical Downtilt, deg	0-10 , 0-10
Horizontal Beamwidth, deg	65 ±5 (65.9 average across band)
Mounting Hardware	APM40-2 + APM40-E2
Rated Wind Speed, km/h (mph)	160 (100)
VSWR	< 1.4:1
Vertical Beamwidth, deg	5.8 to 7.8 across band
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	>28
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Overall Length, m (ft)	1.35 (4.42)
Dimensions - HxWxD, mm (in)	1349 x 330 x 80 (53 x 13 x 3.15)
Radiating Element Material	Brass
Radome Material	Fiberglass
Reflector Material	Aluminum
Max Wind Loading Area, m ² (ft ²)	0.64 (6.6)
Survival Wind Speed, km/h (mph)	200 (125)
Maximum Thrust @ Rated Wind, N (lbf)	787 (177)
Front Thrust @ Rated Wind, N (lbf)	787 (177)
Shipping Weight, kg (lb)	24.1 (52.7)
Packing Dimensions, HxWxD, mm (in)	1550 x 420 x 210 (61 x 16.5 x 8.3)
Weight w/o Mtg Hardware, kg (lb)	18.0 (39.6)

All information contained in the present datasheet is subject to confirmation at time of ordering.

Note

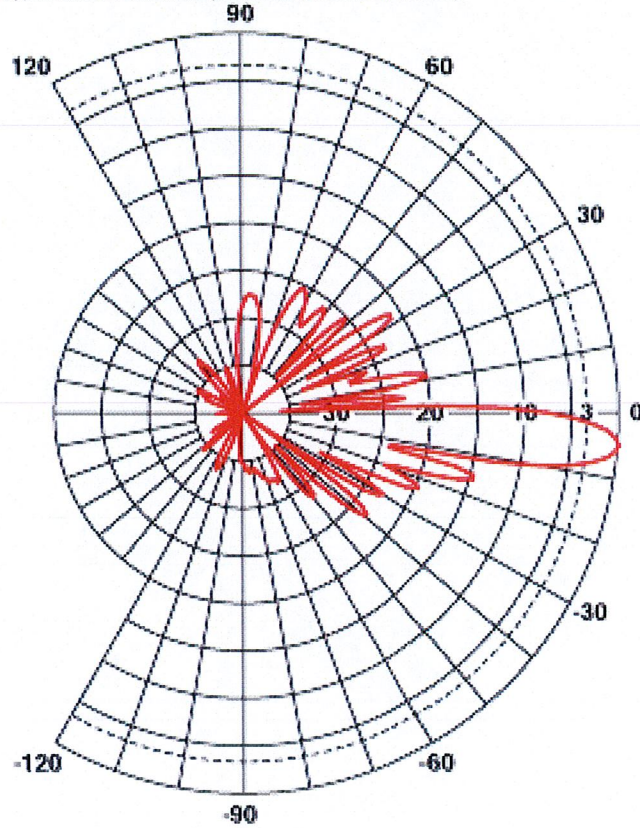
This data is provisional and subject to change.



Optimizer® Panel Dual Polarized Antenna equipped with (2) ACU motors

Vertical Pattern

(This is a general representation of the antenna family pattern. For the latest detailed pattern contact Applications Engineering. You may also download the CELplot(TM) pattern reader and antenna pattern data fields from our website.)

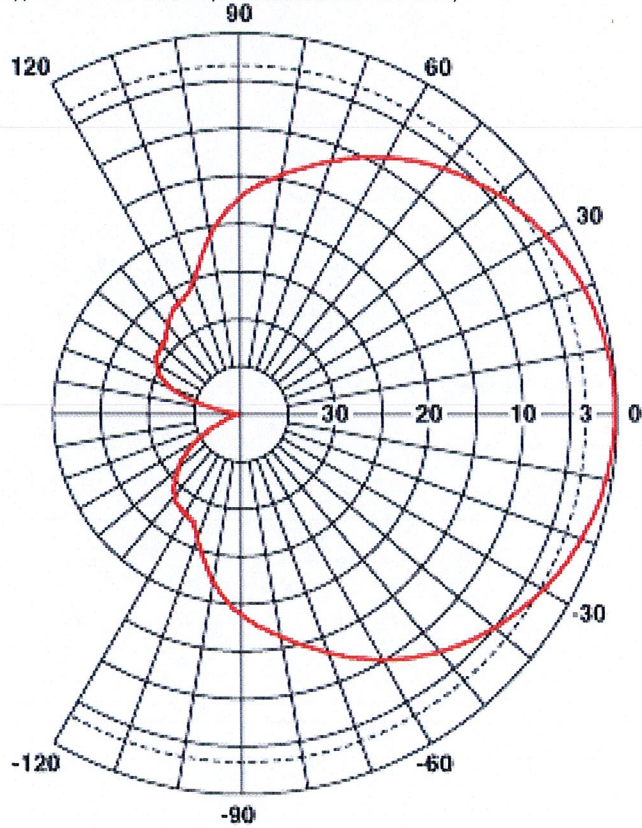


All information contained in the present datasheet is subject to confirmation at time of ordering.



Horizontal Pattern

(This is a general representation of the antenna family pattern. For the latest detailed pattern contact Applications Engineering. You may also download the CELplot(TM) pattern reader and antenna pattern data fields from our website.)



All information contained in the present datasheet is subject to confirmation at time of ordering.

The Indoor Cabinets (Two Variants Available)

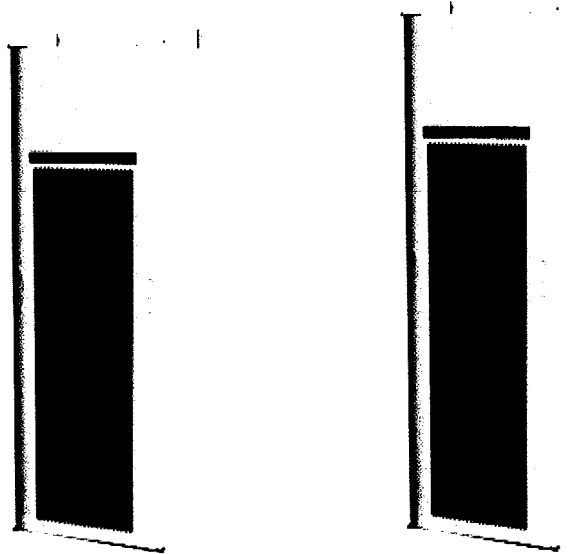
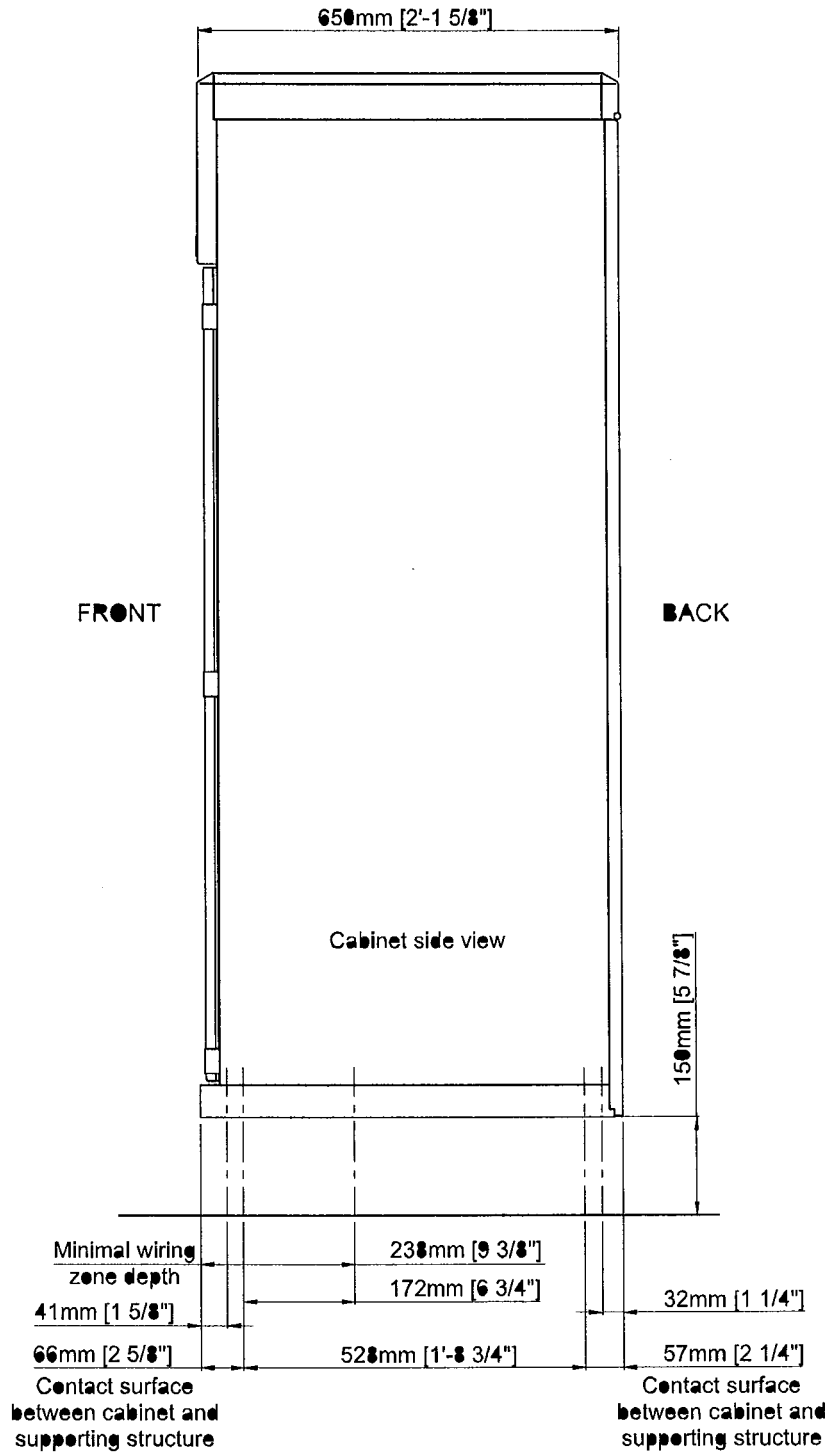


Figure 1 RBS 3206 F and E Cabinet

- Indoor specified
- RBS 3206F cabinet with slots for 6 radio units (single and dual band configurations)
- RBS 3206E cabinet with slots for 9 radio units (dual-band configurations only)
- The cabinets fulfil seismic requirements
- Minimal footprint
- Hot-spot heat management and fan control

The RBS 3206 cabinet footprint is the same as for the GSM RBS 2206 and WCDMA RBS 3202 cabinet. The RBS 3206 cabinet is intended for indoor sites with primarily high capacity and high coverage requirements. The RBS 3206 can be equipped with an optional integrated power supply voltages other than -48 VDC or a space for auxiliary transport network equipment.

Cabinet side view



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Exhibit D

Power Density Calculations

T-Mobile Site CT11352C

1119 Summit Road

aka 1121 Summit Road

Cheshire, Connecticut

Technical Memo

To: Maxton
From: Farid Marboub - Radio Frequency Engineer
cc: Jason Overbey
Subject: Power Density Report for CT11352C
Date: April 22, 2009

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile antenna installation on a Monopole at 1119 Summit Road, Cheshire, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

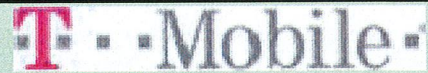
- 1) The emissions from T-Mobile transmitters are in the (1935-1944.8), (2140-2145), (2110-2120)MHz frequency Band.
- 2) The antenna array consists of three sectors, with 2 antennas per sector.
- 3) The model number for GSM antenna is APX16PV-16PVL.
- 3) The model number for UMTS antenna is APX16DWV-16DWV.
- 4) GSM antenna center line height is 139 ft.
- 4) UMTS antenna center line height is 139 ft.
- 5) The maximum transmit power from any GSM sector is 2231.1 Watts Effective Radiated Power (EIRP) assuming 8 channels per sector.
- 5) The maximum transmit power from any UMTS sector is 2330.72 Watts Effective Radiated Power (EiRP) assuming 2 channels per sector.
- 6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
- 7) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile antenna installation on a Monopole at 1119 Summit Road, Cheshire, CT, is 0.05658 mW/cm². This value represents 5.658% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm²) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area. The combined Power Density from other carriers is 29.46%. The combined Power Density for the site is 35.118% of the M.P.E. standard.

Connecticut Market



Worst Case Power Density

Site: CT11352C
Site Address: 1119 Summit Road
Town: Cheshire
Tower Height: 170 ft.
Tower Style: Monopole

GSM Data

Base Station TX output	20 W
Number of channels	8
Antenna Model	APX16PV-16PVL
Cable Size	1 5/8 in.
Cable Length	160 ft.
Antenna Height	139.0 ft.
Ground Reflection	1.6
Frequency	1945.0 MHz
Jumper & Connector loss	4.50 dB
Antenna Gain	17.8 dBi
Cable Loss per foot	0.0116 dB
Total Cable Loss	1.8560 dB
Total Attenuation	6.3560 dB
Total EIRP per Channel (In Watts)	54.45 dBm 278.89 W
Total EIRP per Sector (In Watts)	63.49 dBm 2231.10 W
nsg	11.4440

UMTS Data

Base Station TX output	40 W
Number of channels	2
Antenna Model	APX16DWW-16DWW
Cable Size	1 5/8 in.
Cable Length	160 ft.
Antenna Height	139.0 ft.
Ground Reflection	1.6
Frequency	2.1 GHz
Jumper & Connector loss	1.50 dB
Antenna Gain	18.0 dBi
Cable Loss per foot	0.0116 dB
Total Cable Loss	1.8560 dB
Total Attenuation	3.3560 dB
Total EIRP per Channel (In Watts)	60.66 dBm 1165.36 W
Total EIRP per Sector (In Watts)	63.67 dBm 2330.72 W
nsg	14.6440

Power Density (S) = 0.027672 mW/cm²

Power Density (S) = 0.028907 mW/cm²

T-Mobile Worst Case % MPE = 5.6579%

Equation Used:

$$S = \frac{(1000)(grf)^2 (Power) \cdot 10^{(nsg/10)}}{4\pi (R)^2}$$

Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997

Co-Location Total

Carrier	% of Standard
Verizon	4.6700 %
Cingular	3.0000 %
Sprint	8.6700 %
AT&T Wireless	
Nextel	4.6400 %
MetroPCS	
Pocket	8.4800 %
Other Antenna Systems	
Total Excluding T-Mobile	29.4600 %
T-Mobile	5.6579
Total % MPE for Site	35.1179%

Exhibit E

Structural Analysis

T-Mobile Site CT11352C

1119 Summit Road

aka 1121 Summit Road

Cheshire, Connecticut



Date: **March 24, 2009**

Marianne Leech
Crown Castle USA, Inc.
3530 Toringdon Way
Suite 300
Charlotte, NC 28277
(704) 405-6580

PSG Engineering, Ltd.
1006 Thompson Highway
Richmond, TX 77469

Phone: (281) 239-8490
Fax: (281) 239-8515

Subject: Structural Analysis Report

Carrier Designation

T-Mobile Co-Locate
Carrier Site Number: "CT11352C"
Carrier Site Name: "Summit Road - Cheshire"

Crown Castle Designation

Crown Castle BU Number: 801367
Crown Castle Site Name: CT NHV-2075 CAC 801367
Crown Castle JDE Job Number: 116714

Engineering Firm Designation

PSG Engineering Project Number: 0901H108-A060167

Site Data

1121 Summit Road, Cheshire, CT, New Haven County
Latitude 41° 32' 11.2", Longitude -72° 57' 26.3"
167 Foot - Monopole Tower

Dear Ms. Leech,

PSG Engineering, Ltd. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the aforementioned 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 324877, in accordance with application 77027, 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:

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table 1 and Table 2 for the proposed and existing/reserved loading.

The analysis has been performed in accordance with the TIA/EIA 222-F standard based upon a wind speed of 85 mph fastest mile (105 mph 3-second gust).

We at *PSG Engineering, Ltd.* 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,

Oscar Pedraza, P.E.
President



Date: **March 24, 2009**

Marianne Leech
Crown Castle USA, Inc.
3530 Toringdon Way
Suite 300
Charlotte, NC 28277
(704) 405-6580

PSG Engineering, Ltd.
1006 Thompson Highway
Richmond, TX 77469

Phone: (281) 239-8490
Fax: (281) 239-8515

Subject: Structural Analysis Report

Carrier Designation

T-Mobile Co-Locate
Carrier Site Number: "CT11352C"
Carrier Site Name: "Summit Road - Cheshire"

Crown Castle Designation

Crown Castle BU Number: 801367
Crown Castle Site Name: CT NHV-2075 CAC 801367
Crown Castle JDE Job Number: 116714

Engineering Firm Designation

PSG Engineering Project Number: 0901H108-A060167

Site Data

1121 Summit Road, Cheshire, CT, New Haven County
Latitude 41° 32' 11.2", Longitude -72° 57' 26.3"
167 Foot - Monopole Tower

Dear Ms. Leech,

PSG Engineering, Ltd. is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the aforementioned 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 324877, in accordance with application 77027, 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:

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Note: See Table 1 and Table 2 for the proposed and existing/reserved loading.

The analysis has been performed in accordance with the TIA/EIA 222-F standard based upon a wind speed of 85 mph fastest mile (105 mph 3-second gust).

We at PSG Engineering, Ltd. 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,

Oscar Pedraza, P.E.
President

MAR 26 2009

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RISA Tower Output

6) APPENDIX B

Base Level Drawing

1) INTRODUCTION

The tower superstructure analysis is based on the original tower design by Paul J, Ford And Company for Summit Manufacturing dated June 13, 2001 (TIA/EIA-222-F: 85 mph and 74 mph with 1/2" radial ice). The tower substructure analysis is based on a comparison to the original foundation design loads by Paul J, Ford for Summit Manufacturing dated June 06, 2001 since it is unknown if a drilled pier or a mat foundation was used and a geotechnical Report by Clough, Harbour & Associates LLP Engineers, Surveyors, Planners & Landscape Architects dated May 15, 1991.

2) ANALYSIS CRITERIA

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 74 mph is used in combination with ice.
- Deflections calculated using a wind speed of 50 mph.
- Feedline torque is considered.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.333

Table Legend
Proposed = (P)
Reserved = (R)

Table 1 – Proposed (P) Antenna and Cable Information

Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount	Number Of Feed Lines	Feed Line Size (Inches)
139	3(P)	RFS/Celwave	APX16DWV-16DWV-S-E-A20	-	4(P) (External)	1 5/8
	3(P)	Ericsson	KRY 112 89/5			
	3(P)		KRY 112 134/1			

Table 2 – Installed and Reserved (R) Antenna and Cable Information

Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount	Number Of Feed Lines	Feed Line Size (Inches)
174	1	Decibel	DB222-A	Low Profile Platform (1)	1 (Internal)	7/8
167	6	Antel	WPA-80090/4CF		12 (Internal)	1 5/8
	6	Decibel	DB948F85T2E-M		1 (Internal)	1/2
160	1	Standard	GPS	Low Profile Platform (1)	12 (Internal)	1 5/8
	6	Powerwave Technologies	7770.00			
	6		LGP21401			
	6		LGP13519			
	6(R)	Allgon	7184			
147	6+6(R)	Decibel	DB978H90T2E-M	Low Profile Platform (1)	6+6(R) (Internal)	1 5/8
*139	3	RFS/Celwave	APX16PV-16PVL-E	Low Profile Platform (1)	14 (Internal)	1 5/8
	6(R)		APX16PV-16PVL			
	9+3(R)	REMEC	S20057A-1			
128	12	Decibel	DB846G90A-XY	Low Profile Platform (1)	12 (Internal)	1 1/4
118	3	RFS/Celwave	APXV18-206517S-C	Flush Mount (3)	6 (External)	1 5/8

*Note: Proposed loads will be added to level. All shown equipment will remain.

Table 3 – Original Tower Manufacturer Design Antenna and Cable Information

Center Line Elevation (feet)	Number Of Antenna	Antenna Manufacturer	Antenna Model	Mount	Number Of Feed Lines	Feed Line Size (inches)
167	Not Available		40 Sq. Ft.	Platform w/Handrail (1)	Not Available (Internal)	
158			40 Sq. Ft.	Platform w/Handrail (1)		
148			40 Sq. Ft.	Platform w/Handrail (1)		
138			40 Sq. Ft.	Platform w/Handrail (1)		
128			40 Sq. Ft.	Platform w/Handrail (1)		
118			40 Sq. Ft.	Platform w/Handrail (1)		

3) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Reference	Source
Original Tower Design	Paul J. Ford Company	799210	Crown Site Data Manager
Original Foundation Design		842573	
Geotechnical Report		445076	
CAD Level Drawing(s)	167',160',158',148',138',128',118' Level Drawing(s)	-	Crown CAD Dept.

3.1) Analysis Method

RISATower (Version 5.3.1.0), a commercially available software program, was used to create a three-dimensional model of the tower and calculate member stresses for various dead, live, wind, and ice load cases. All loads were computed in accordance with the ANSI/EIA/TIA 222F or the local building code requirements. 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 specifications.
3. The configuration of antennas, transmission cables, mounts, and other appurtenances are as specified in Tables 1 and 2 and the Level drawing(s) listed in Table 4.
4. When applicable, transmission cables are considered to be structural components for calculating wind loads, as allowed by TIA/EIA-222F.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and PSG Engineering should be allowed to review any new information to determine its effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

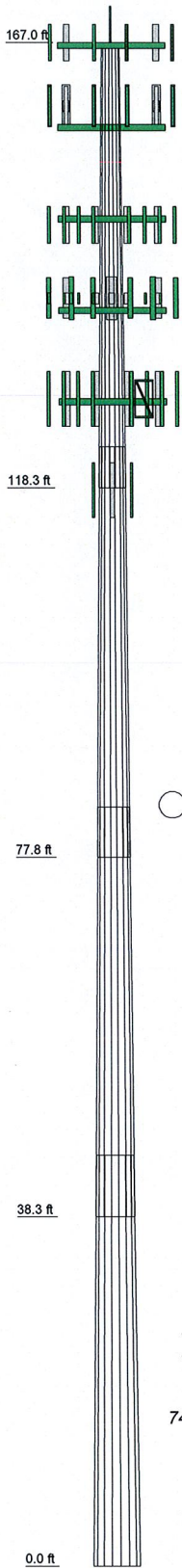
Table 5 – Tower Component Stresses vs. Capacity – LC1

Notes	Component	Elevation (ft)	% Capacity	Pass/Fail
RISA Tower Analysis Summary:(Monopole)				
			Summary	
Notes:	Component	Elevation	% Capacity	Pass/Fail
	L1	167 - 118.25	57.2	Pass
	L2	118.25 - 77.75	83.5	Pass
	L3	77.75 - 38.25	85.0	Pass
	L4	38.25 - 0	80.5	Pass
Individual Components:				
Notes:	Component	Elevation	% Capacity	Pass/Fail
	Base Plate	-	68.3	Pass
	Anchor Bolts	-	95.5	Pass
	Base Foundation (Compared with original design loads)	-	85.0	Pass
Structure Rating (max from all components) =				95.5%

4.1) Recommendations (if applicable)
 No modifications are necessary.

APPENDIX A
RISA TOWER OUTPUT

Section	1	2	3	4	30.1
Length (ft)	489"	45'	45'	45'	
Number of Sides	18	18	18	18	
Thickness (in)	0.2500	0.3125	0.3750	0.4375	
Lap Splice (ft)			6.9"	5.6"	
Top Dia (in)	24.0000	33.8114	42.3931	50.5485	
Bot Dia (in)	35.3600	44.3000	52.8700	61.0400	
Grade	A607-65	A607-65	A607-65	A607-65	A607-65
Weight (K)	3.9	5.9	8.6	11.8	



DESIGNED APPURTENANCE LOADING

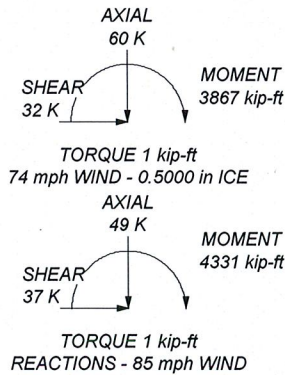
TYPE	ELEVATION	TYPE	ELEVATION
DB222-A	174	(4) S20057A-1	139
ERI---A-1 Lightning Spur	169	KRY 112 89/5	139
(2) WPA-80090/4CF w/Mount Pipe	167	KRY 112 134/1	139
(2) WPA-80090/4CF w/Mount Pipe	167	(2) APX16PV-16PVL w/Mount Pipe	139
(2) DB948F85T2E-M w/Mount Pipe	167	APX16PV-16PVL-E w/Mount Pipe	139
(2) WPA-80090/4CF w/Mount Pipe	167	APX16DWW-16DWW-S-E-A20 w/Mount Pipe	139
(2) DB948F85T2E-M w/Mount Pipe	167	(4) S20057A-1	139
GPS	167	KRY 112 89/5	139
PIROD 13' Low Profile Platform Top (Monopole)	167	KRY 112 134/1	139
(2) DB948F85T2E-M w/Mount Pipe	167	(2) APX16PV-16PVL w/Mount Pipe	139
(2) LGP2140X (TMA)	160	APX16PV-16PVL-E w/Mount Pipe	139
(2) LGP13519	160	APX16DWW-16DWW-S-E-A20 w/Mount Pipe	139
(2) 7184 w/Mount Pipe	160	(4) S20057A-1	139
(2) 7770.00 w/Mount Pipe	160	KRY 112 89/5	139
(2) LGP2140X (TMA)	160	KRY 112 134/1	139
(2) LGP13519	160	(2) APX16PV-16PVL w/Mount Pipe	139
(2) 7184 w/Mount Pipe	160	PIROD 13' Low Profile Platform (Monopole)	138
(2) 7770.00 w/Mount Pipe	160	5' Standoff T-Arm (14' face width)	128
(2) LGP2140X (TMA)	160	(4) DB846G90A-XY w/Mount Pipe	128
(2) LGP13519	160	5' Standoff T-Arm (14' face width)	128
(2) 7184 w/Mount Pipe	160	(4) DB846G90A-XY w/Mount Pipe	128
(2) 7770.00 w/Mount Pipe	160	PIROD 13' Low Profile Platform (Monopole)	128
PIROD 13' Low Profile Platform (Monopole)	158	(4) DB846G90A-XY w/Mount Pipe	128
PIROD 13' Low Profile Platform (Monopole)	148	APXV18-206517S-C w/Mount Pipe	118
(4) DB978H90T2E-M w/Mount Pipe	147	APXV18-206517S-C w/Mount Pipe	118
(4) DB978H90T2E-M w/Mount Pipe	147	APXV18-206517S-C w/Mount Pipe	118
(4) DB978H90T2E-M w/Mount Pipe	147	APXV18-206517S-C w/Mount Pipe	118
APX16PV-16PVL-E w/Mount Pipe	139		
APX16DWW-16DWW-S-E-A20 w/Mount Pipe	139		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven 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 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.5%



PSG Engineering, Ltd. 1006 Thompson Highway Richmond, TX Phone: 281.239.8490 FAX: 281.239.8515	Job: PSG Engineering Project Number: 0901H108-A06016
	Project: (801367) (CT NHV-2075 CAC 801367)
	Client: Crown Castle USA, Inc. Drawn by: JHuwe App'd:
	Code: TIA/EIA-222-F Date: 03/25/09 Scale: NTS
	Path: c:\Users\JHuwe\Documents\Work Items\0901H108\801367.eri Dwg No. E-1

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	Client Crown Castle USA, Inc.	Designed by JHuwel

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 167'-118'3"				1	1	1		
L2 118'3"-77'9"				1	1	1		
L3 77'9"-38'3"				1	1	1		
L4 38'3"-0"				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	√
Base plate is grouted	
Anchor bolt grade	A615
Anchor bolt size	2.2500 in
Number of bolts	20
Embedment length	84.0000 in
f_c	3 ksi
Grout space	3.0000 in
Base plate grade	A572-55
Base plate thickness	3.0000 in
Bolt circle diameter	68.0000 in
Outer diameter	67.0000 in
Inner diameter	51.0000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	in	in	plf
*										
*										
*										
*										
*										
*										
*										
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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_{AA}	Weight
				ft			ft ² /ft	plf
EL. 167' LEVEL								
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	167' - 10'	12	No Ice 1/2" Ice	0.00 0.00	0.82 0.82

RISATower PSG Engineering, Ltd. 1006 Thompson Highway Richmond, TX Phone: 281.239.8490 FAX: 281.239.8515	Job PSG Engineering Project Number: 0901H108-A060167	Page 3 of 11
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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						No Ice	1/2" Ice	plf
LDF5-50A (7/8 FOAM)	A	No	Inside Pole	167' - 10'	1	No Ice	0.00	0.33
LDF4P-50A (1/2 FOAM)	A	No	Inside Pole	167' - 10'	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.15
						1/2" Ice	0.00	0.15
EL. 158' LEVEL								
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	158' - 10'	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
EL. 148' LEVEL								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	148' - 10'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
EL. 138' LEVEL								
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	138' - 10'	14	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	138' - 10'	3	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	138' - 10'	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
EL. 128' LEVEL								
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	118' - 10'	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	118' - 10'	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
EL. 118' LEVEL								
LDF6-50A (1-1/4 FOAM)	B	No	Inside Pole	128' - 10'	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
TOWER HARDWARE								
Climbing Ladder (Ar)	C	No	CaAa (Out Of Face)	167' - 10'	1	No Ice	0.04	1.00
						1/2" Ice	0.14	1.53

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A		Weight K
					In Face ft ²	Out Face ft ²	
L1	167"-118'3"	A	0.000	0.000	0.000	3.910	0.79
		B	0.000	0.000	0.000	0.000	0.66
		C	0.000	0.000	0.000	1.828	0.34
L2	118'3"-77'9"	A	0.000	0.000	0.000	8.019	1.02
		B	0.000	0.000	0.000	7.970	1.12
		C	0.000	0.000	0.000	1.519	0.44
L3	77'9"-38'3"	A	0.000	0.000	0.000	7.821	0.99
		B	0.000	0.000	0.000	7.821	1.09
		C	0.000	0.000	0.000	1.481	0.43
L4	38'3"-0'	A	0.000	0.000	0.000	5.594	0.71
		B	0.000	0.000	0.000	5.594	0.78

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
		C	0.000	0.000	0.000	1.059	0.31

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	167'-118'3"	A	0.500	0.000	0.000	0.000	5.885	0.91
		B		0.000	0.000	0.000	0.000	0.66
		C		0.000	0.000	0.000	6.703	0.37
L2	118'3"-77'9"	A	0.500	0.000	0.000	0.000	12.069	1.26
		B		0.000	0.000	0.000	11.994	1.48
		C		0.000	0.000	0.000	5.569	0.46
L3	77'9"-38'3"	A	0.500	0.000	0.000	0.000	11.771	1.23
		B		0.000	0.000	0.000	11.771	1.45
		C		0.000	0.000	0.000	5.431	0.45
L4	38'3"-0'	A	0.500	0.000	0.000	0.000	8.418	0.88
		B		0.000	0.000	0.000	8.418	1.04
		C		0.000	0.000	0.000	3.884	0.32

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_{AA} Front ft ²	C_{AA} Side ft ²	Weight K	
EL. 167' LEVEL									
(2) WPA-80090/4CF w/Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	167'	No Ice	4.22	4.13	0.03
						1/2" Ice	4.75	4.94	0.07
(2) DB948F85T2E-M w/Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	167'	No Ice	2.62	4.92	0.03
						1/2" Ice	3.23	6.01	0.07
DB222-A	A	From Leg	4.00 0' 0'	0.0000	174'	No Ice	1.60	1.60	0.02
						1/2" Ice	2.88	2.88	0.02
(2) WPA-80090/4CF w/Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	167'	No Ice	4.22	4.13	0.03
						1/2" Ice	4.75	4.94	0.07
(2) DB948F85T2E-M w/Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	167'	No Ice	2.62	4.92	0.03
						1/2" Ice	3.23	6.01	0.07
(2) WPA-80090/4CF w/Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	167'	No Ice	4.22	4.13	0.03
						1/2" Ice	4.75	4.94	0.07
(2) DB948F85T2E-M w/Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	167'	No Ice	2.62	4.92	0.03
						1/2" Ice	3.23	6.01	0.07
GPS	C	From Leg	4.00 0' 0'	0.0000	167'	No Ice	2.70	2.70	0.05
						1/2" Ice	3.10	3.10	0.07

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	Client Crown Castle USA, Inc.	Designed by JHuwel

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
PiROD 13' Low Profile Platform Top (Monopole)	C	None			0.0000	167'	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
* ***EL. 158' LEVEL***										
(2) 7770.00 w/Mount Pipe	A	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	0.06 0.10
(2) LGP2140X (TMA)	A	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
(2) LGP13519	A	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	0.34 0.42	0.21 0.28	0.01 0.01
(2) 7184 w/Mount Pipe	A	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	3.33 3.94	3.56 4.60	0.04 0.07
(2) 7770.00 w/Mount Pipe	B	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	0.06 0.10
(2) LGP2140X (TMA)	B	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
(2) LGP13519	B	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	0.34 0.42	0.21 0.28	0.01 0.01
(2) 7184 w/Mount Pipe	B	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	3.33 3.94	3.56 4.60	0.04 0.07
(2) 7770.00 w/Mount Pipe	C	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	6.22 6.77	4.35 5.20	0.06 0.10
(2) LGP2140X (TMA)	C	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	1.23 1.38	0.37 0.48	0.02 0.02
(2) LGP13519	C	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	0.34 0.42	0.21 0.28	0.01 0.01
(2) 7184 w/Mount Pipe	C	From Leg	4.00 0' 0'		0.0000	160'	No Ice 1/2" Ice	3.33 3.94	3.56 4.60	0.04 0.07
PiROD 13' Low Profile Platform (Monopole)	A	None			0.0000	158'	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
* ***EL. 148' LEVEL***										
(4) DB978H90T2E-M w/Mount Pipe	A	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice	3.70 4.32	3.36 4.38	0.03 0.07
(4) DB978H90T2E-M w/Mount Pipe	B	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice	3.70 4.32	3.36 4.38	0.03 0.07
(4) DB978H90T2E-M w/Mount Pipe	C	From Leg	4.00 0' 0'		0.0000	147'	No Ice 1/2" Ice	3.70 4.32	3.36 4.38	0.03 0.07
PiROD 13' Low Profile Platform (Monopole)	C	None			0.0000	148'	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76

RISATower PSG Engineering, Ltd. 1006 Thompson Highway Richmond, TX Phone: 281.239.8490 FAX: 281.239.8515	Job PSG Engineering Project Number: 0901H108-A060167	Page 6 of 11
	Project (801367) (CT NHV-2075 CAC 801367)	Date 17:59:18 03/25/09
	Client Crown Castle USA, Inc.	Designed by JHuwel

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
* *									
EL. 138' LEVEL									
(2) APX16PV-16PVL w/Mount Pipe	A	From Leg	4.00	0.0000	139'	No Ice	7.02	3.41	0.06
			0'			1/2" Ice	7.59	4.23	0.11
APX16PV-16PVL-E w/Mount Pipe	A	From Leg	4.00	0.0000	139'	No Ice	7.07	3.43	0.06
			0'			1/2" Ice	7.64	4.25	0.11
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	A	From Leg	4.00	0.0000	139'	No Ice	7.55	3.57	0.06
			0'			1/2" Ice	8.11	4.41	0.11
(4) S20057A-1	A	From Leg	4.00	0.0000	139'	No Ice	0.83	0.39	0.01
			0'			1/2" Ice	0.96	0.50	0.01
KRY 112 89/5	A	From Leg	4.00	0.0000	139'	No Ice	0.64	0.43	0.02
			0'			1/2" Ice	0.76	0.53	0.02
KRY 112 134/1	A	From Leg	4.00	0.0000	139'	No Ice	1.01	0.49	0.01
			0'			1/2" Ice	1.15	0.60	0.02
(2) APX16PV-16PVL w/Mount Pipe	B	From Leg	4.00	0.0000	139'	No Ice	7.02	3.41	0.06
			0'			1/2" Ice	7.59	4.23	0.11
APX16PV-16PVL-E w/Mount Pipe	B	From Leg	4.00	0.0000	139'	No Ice	7.07	3.43	0.06
			0'			1/2" Ice	7.64	4.25	0.11
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	B	From Leg	4.00	0.0000	139'	No Ice	7.55	3.57	0.06
			0'			1/2" Ice	8.11	4.41	0.11
(4) S20057A-1	B	From Leg	4.00	0.0000	139'	No Ice	0.83	0.39	0.01
			0'			1/2" Ice	0.96	0.50	0.01
KRY 112 89/5	B	From Leg	4.00	0.0000	139'	No Ice	0.64	0.43	0.02
			0'			1/2" Ice	0.76	0.53	0.02
KRY 112 134/1	B	From Leg	4.00	0.0000	139'	No Ice	1.01	0.49	0.01
			0'			1/2" Ice	1.15	0.60	0.02
(2) APX16PV-16PVL w/Mount Pipe	C	From Leg	4.00	0.0000	139'	No Ice	7.02	3.41	0.06
			0'			1/2" Ice	7.59	4.23	0.11
APX16PV-16PVL-E w/Mount Pipe	C	From Leg	4.00	0.0000	139'	No Ice	7.07	3.43	0.06
			0'			1/2" Ice	7.64	4.25	0.11
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	C	From Leg	4.00	0.0000	139'	No Ice	7.55	3.57	0.06
			0'			1/2" Ice	8.11	4.41	0.11
(4) S20057A-1	C	From Leg	4.00	0.0000	139'	No Ice	0.83	0.39	0.01
			0'			1/2" Ice	0.96	0.50	0.01
KRY 112 89/5	C	From Leg	4.00	0.0000	139'	No Ice	0.64	0.43	0.02
			0'			1/2" Ice	0.76	0.53	0.02
KRY 112 134/1	C	From Leg	4.00	0.0000	139'	No Ice	1.01	0.49	0.01
			0'			1/2" Ice	1.15	0.60	0.02

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
PiROD 13' Low Profile Platform (Monopole)	C	None			0.0000	138'	No Ice 1/2" Ice	15.70 20.10	1.30 1.76
* ***EL. 128' LEVEL***									
(4) DB846G90A-XY w/Mount Pipe	A	From Leg	4.00 0' 0'		0.0000	128'	No Ice 1/2" Ice	5.23 8.72	0.04 0.09
5' Standoff T-Arm (14' face width)	A	From Leg	2.67 0' 0'		0.0000	128'	No Ice 1/2" Ice	6.90 8.70	0.20 0.26
(4) DB846G90A-XY w/Mount Pipe	B	From Leg	4.00 0' 0'		0.0000	128'	No Ice 1/2" Ice	5.23 8.72	0.04 0.09
5' Standoff T-Arm (14' face width)	B	From Leg	2.67 0' 0'		0.0000	128'	No Ice 1/2" Ice	6.90 8.70	0.20 0.26
(4) DB846G90A-XY w/Mount Pipe	C	From Leg	4.00 0' 0'		0.0000	128'	No Ice 1/2" Ice	5.23 8.72	0.04 0.09
PiROD 13' Low Profile Platform (Monopole)	C	None			0.0000	128'	No Ice 1/2" Ice	15.70 20.10	1.30 1.76
* ***EL. 118' LEVEL***									
APXV18-206517S-C w/Mount Pipe	A	From Leg	1.00 0' 0'		0.0000	118'	No Ice 1/2" Ice	5.40 5.96	0.05 0.09
APXV18-206517S-C w/Mount Pipe	B	From Leg	1.00 0' 0'		0.0000	118'	No Ice 1/2" Ice	5.40 5.96	0.05 0.09
APXV18-206517S-C w/Mount Pipe	C	From Leg	1.00 0' 0'		0.0000	118'	No Ice 1/2" Ice	5.40 5.96	0.05 0.09
* ***TOWER HARDWARE***									
ERI--A-1 Lightning Spur	B	None			0.0000	169'	No Ice 1/2" Ice	2.00 4.00	0.05 0.07

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

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Comb. No.	Description
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
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	167 - 118.25	35.252	29	1.8396	0.0013
L2	122.75 - 77.75	19.104	29	1.5427	0.0010
L3	83.25 - 38.25	8.423	29	0.9891	0.0004
L4	45 - 0	2.398	29	0.4864	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
174'	DB222-A	29	35.252	1.8396	0.0013	39370
169'	ERI---A-1 Lightning Spur	29	35.252	1.8396	0.0013	39370
167'	(2) WPA-80090/4CF w/Mount Pipe	29	35.252	1.8396	0.0013	39370
160'	(2) 7770.00 w/Mount Pipe	29	32.562	1.8055	0.0011	28122
158'	PiROD 13' Low Profile Platform (Monopole)	29	31.796	1.7955	0.0011	21872
148'	PiROD 13' Low Profile Platform	29	28.010	1.7414	0.0010	10360

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
	(Monopole)					
147'	(4) DB978H90T2E-M w/Mount Pipe	29	27.637	1.7355	0.0010	9842
139'	(2) APX16PV-16PVL w/Mount Pipe	29	24.700	1.6835	0.0010	7029
138'	PiROD 13' Low Profile Platform (Monopole)	29	24.340	1.6764	0.0010	6787
128'	(4) DB846G90A-XY w/Mount Pipe	29	20.846	1.5944	0.0010	5046
118'	APXV18-206517S-C w/Mount Pipe	29	17.590	1.4900	0.0010	4406

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	167 - 118.25	101.557	5	5.3025	0.0050
L2	122.75 - 77.75	55.066	5	4.4462	0.0033
L3	83.25 - 38.25	24.293	5	2.8525	0.0014
L4	45 - 0	6.920	5	1.4033	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
174'	DB222-A	5	101.557	5.3025	0.0050	13868
169'	ERI--A-1 Lightning Spur	5	101.557	5.3025	0.0050	13868
167'	(2) WPA-80090/4CF w/Mount Pipe	5	101.557	5.3025	0.0050	13868
160'	(2) 7770.00 w/Mount Pipe	5	93.812	5.2066	0.0046	9905
158'	PiROD 13' Low Profile Platform (Monopole)	5	91.608	5.1784	0.0045	7704
148'	PiROD 13' Low Profile Platform (Monopole)	5	80.709	5.0247	0.0040	3647
147'	(4) DB978H90T2E-M w/Mount Pipe	5	79.634	5.0078	0.0040	3464
139'	(2) APX16PV-16PVL w/Mount Pipe	5	71.179	4.8581	0.0037	2473
138'	PiROD 13' Low Profile Platform (Monopole)	5	70.142	4.8373	0.0036	2387
128'	(4) DB846G90A-XY w/Mount Pipe	5	60.084	4.5983	0.0035	1773
118'	APXV18-206517S-C w/Mount Pipe	5	50.706	4.2907	0.0031	1546

Base Plate Design Data

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Plate Thickness	Number of Anchor Bolts	Anchor Bolt Size	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Bolt Compression K	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
in		in						
3.0000	20	2.2500	150.41	155.28	37.573		Bolt T	1.27
			118.09	196.03	41.250			✓
			1.27	0.79	0.91			

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P/P _a
L1	167 - 118.25 (1)	TP35.36x24x0.25	48'9"	0'	0.0	39.000	27.0277	-13.10	1054.08	0.012
L2	118.25 - 77.75 (2)	TP44.3x33.8114x0.3125	45'	0'	0.0	39.000	42.3586	-21.54	1651.98	0.013
L3	77.75 - 38.25 (3)	TP52.87x42.3931x0.375	45'	0'	0.0	39.000	60.6116	-32.58	2363.85	0.014
L4	38.25 - 0 (4)	TP61.04x50.5485x0.4375	45'	0'	0.0	39.000	84.1541	-48.78	3282.01	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	167 - 118.25 (1)	TP35.36x24x0.25	554.35	-29.268	39.000	0.750	0.00	0.000	39.000	0.000
L2	118.25 - 77.75 (2)	TP44.3x33.8114x0.3125	1597.64	-42.927	39.000	1.101	0.00	0.000	39.000	0.000
L3	77.75 - 38.25 (3)	TP52.87x42.3931x0.375	2771.03	-43.638	39.000	1.119	0.00	0.000	39.000	0.000
L4	38.25 - 0 (4)	TP61.04x50.5485x0.4375	4330.58	-41.268	39.000	1.058	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio P/P _a	Ratio f _{bx} /F _{bx}	Ratio f _{by} /F _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	167 - 118.25 (1)	TP35.36x24x0.25	0.012	0.750	0.000	0.763	1.333	H1-3 ✓
L2	118.25 - 77.75 (2)	TP44.3x33.8114x0.3125	0.013	1.101	0.000	1.114	1.333	H1-3 ✓
L3	77.75 - 38.25 (3)	TP52.87x42.3931x0.375	0.014	1.119	0.000	1.133	1.333	H1-3 ✓

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Section No.	Elevation ft	Size	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
			$\frac{P}{P_a}$	$\frac{F_{bx}}{F_{bx}}$	$\frac{F_{by}}{F_{by}}$			
L4	38.25 - 0 (4)	TP61.04x50.5485x0.4375	0.015	1.058	0.000	1.073	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	167 - 118.25	Pole	TP35.36x24x0.25	1	-13.10	1405.09	57.2	Pass
L2	118.25 - 77.75	Pole	TP44.3x33.8114x0.3125	2	-21.54	2202.09	83.5	Pass
L3	77.75 - 38.25	Pole	TP52.87x42.3931x0.375	3	-32.58	3151.01	85.0	Pass
L4	38.25 - 0	Pole	TP61.04x50.5485x0.4375	4	-48.78	4374.92	80.5	Pass
Summary								
Pole (L3)							85.0	Pass
Base Plate							95.5	Pass
RATING =							95.5	Pass

*Crown Castle USA, Inc.
167 Ft Monopole Tower
PSG Project Number 0901H107-A060167*

*March 25, 2009
CCI BU No. 801367
Application 77027, Revision 1*

APPENDIX B
BASE LEVEL DRAWING

