

JULIE D. KOHLER

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4157
E-Mail: jkohler@cohenandwolf.com

November 12, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

**Re: Notice of Exempt Modification
Northeast Utilities (CL&P)/T-Mobile co-location
Site ID CT11085C
1 Country Club Road, Woodbridge CT**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Northeast Utilities/Connecticut Light and Power ("CL&P") owns the existing transmissions tower (structure # 24092B) and related facility at 1 Country Club Road Woodbridge Connecticut (latitude 41.318007/longitude -73.008775). T-Mobile intends to add three (3) antennas with and related equipment at this existing telecommunications facility in Woodbridge ("Woodbridge Facility"). Please accept this letter as notification, pursuant to R.C.S.A. §16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R. C.S.A. § 16-50j-73, a copy of this letter is being sent to the Woodbridge First Selectman Ellen Scalettar and the property owner, Northeast Utilities/CL&P. Please also see the letter of authorization from Northeast Utilities attached hereto as **Exhibit A**.

The existing Woodbridge Facility consists of a 160.5 foot transmission tower.¹ T-Mobile plans to add three (3) antennas on pipe mounts at a centerline of 148 feet. T-Mobile will remove three (3) TMAs (tower mounted amplifiers) from its array at the 158 foot centerline, and install a cabinet and three (3) RRUs (remote radio units) on a proposed H-frame. Finally, T-Mobile will install coax cable and reuse existing coax cable. (See the plans revised to August 8, 2014 attached hereto as **Exhibit B**). The existing Woodbridge Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated September 29, 2014, and attached hereto as **Exhibit C**.

¹ T-Mobile last sought to modify this facility in EM-T-MOBILE-167-100909.

The planned modifications to the Woodbridge Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1 . The proposed modification will not increase the height of the tower. T-Mobile's existing antennas are at 158 feet; proposed additional antennas will be installed below those antennas at a centerline of 148 feet. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2 . The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet 2 of Exhibit B. T-Mobile's equipment will be located entirely within the existing compound area.

3 . The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4 . The operation of the replacement antennas and equipment will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI Consulting dated November 12, 2014, T-Mobile's operations would add 5.77% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 5.77% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit D**.

For the foregoing reasons, T-Mobile respectfully submits that the replacement antennas and equipment at the Woodbridge Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, T-Mobile shall commence construction approximately sixty days from the receipt of the Council's decision.

Sincerely,


Julie D. Kohler

cc: Woodbridge First Selectman Ellen Scalettar
Northeast Utilities
Sheldon Freinckle, NSS

EXHIBIT A



**Northeast
Utilities System**

56 Prospect Street, Hartford, CT 06103

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

October 30, 2014

Mr. Mark Richard
T-Mobile
35 Griffin Rd.
Bloomfield, CT 06002

RE: T-Mobile Antenna Site, CT-11 085C, 1 Country Club Rd, Woodbridge CT, structure 24092.

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis provided by Centek Engineering and, and the foundation analyses performed by Centek Engineering, we have reviewed for acceptance this modification

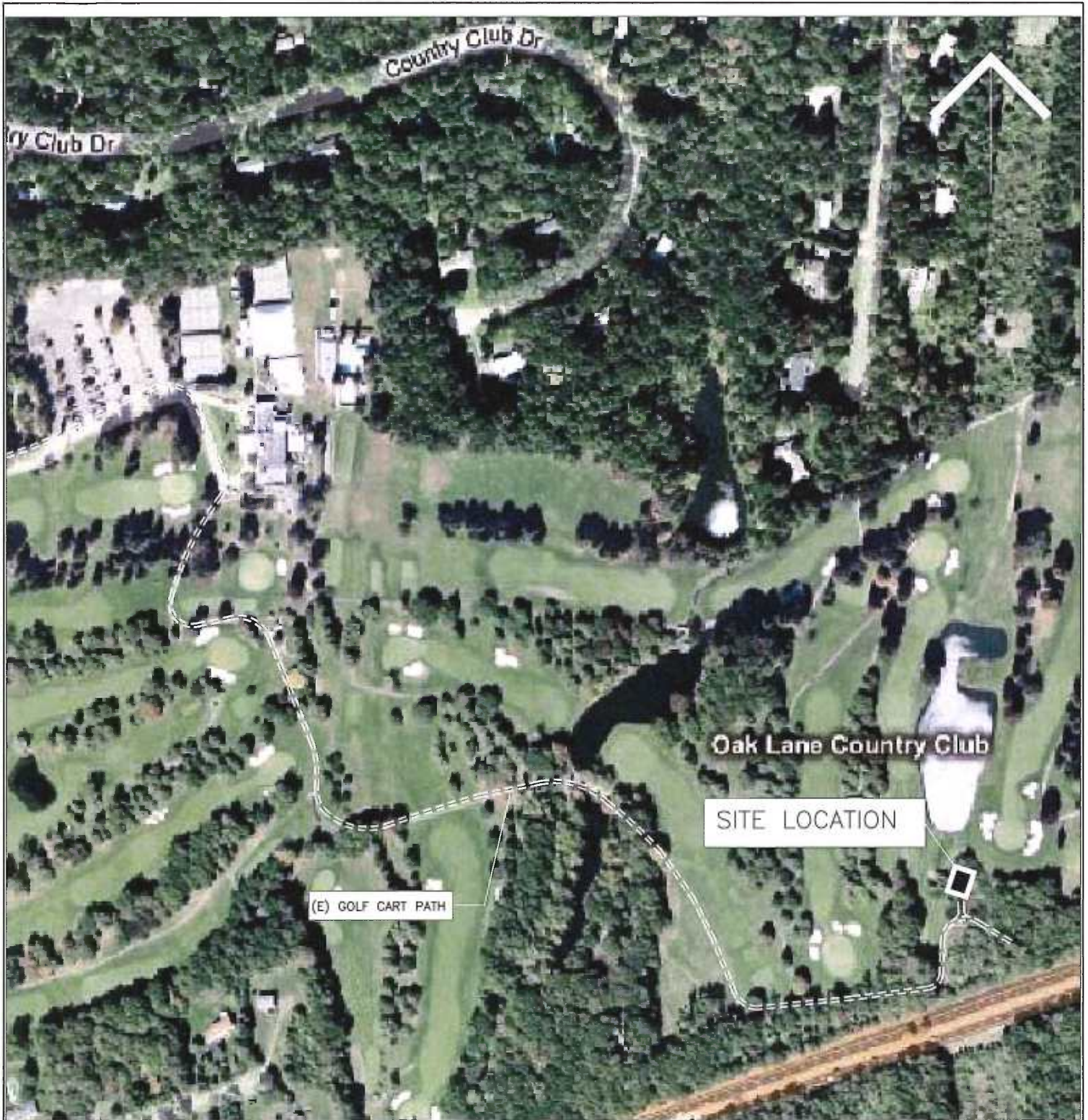
Since there are no outstanding structural or site related issues to resolve at this time, construction at these locations may begin as soon as scheduling allows. You may contact Mr. O'Brien (860-665-6987); once the lease issues are secured you may then contact Mr. John Landry directly (860-665-5425) to begin the construction arrangements

Sincerely,

Robert Gray
Transmission Line Engineering

Ref: 14025.013 - CT11085C Structural Analysis Rev0 14-09-29.pdf
CT11085C-L700-CD-V2.pdf

EXHIBIT B



OVERALL SITE PLAN

N.T.S.

1
LE-1

CONFIGURATION

704BU

SUBMITTALS

LE REV A	08.07.14
LE REV A	08.08.14

ATLANTIS GROUP
 1340 Centre Street
 Suite 212
 Newton, MA 02459
 Office: 617-965-0789
 Fax: 617-213-5056

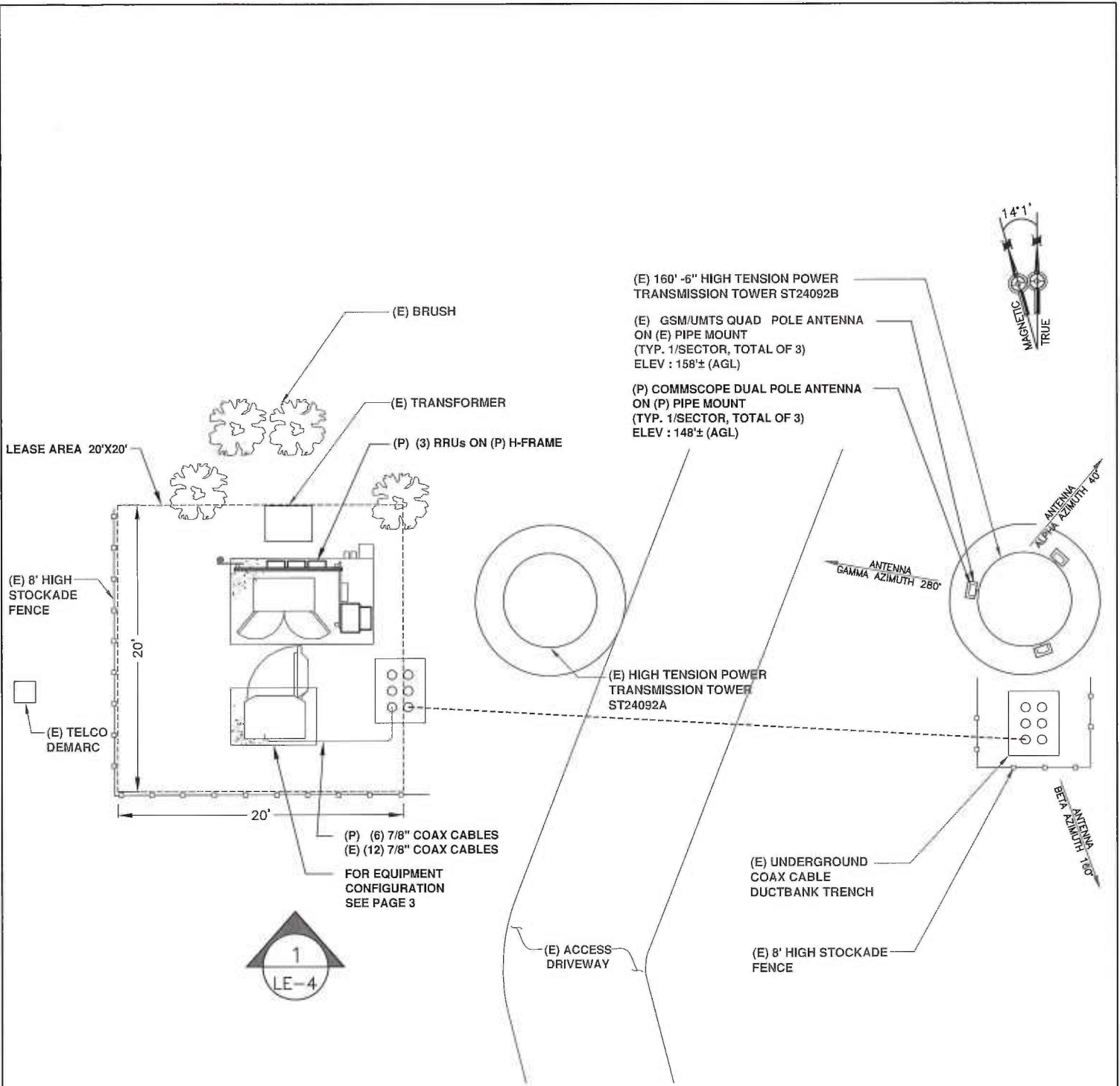
LEASE EXHIBIT

SITE NUMBER:
 CT11085C
 SITE NAME:
 WOODBRIDGE/ WC X58/ RACEB
 SITE ADDRESS:
 1 COUNTRY CLUB RD,
 WOODBRIDGE, CT 06524

NORTHEAST SITE SOLUTIONS
 54 MAIN STREET, UNIT 3
 STURBRIDGE, MA 01566
 (508) 434-5237
 FOR
T-MOBILE NORTHEAST, LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

DRAWN BY: FG

CHECKED BY: SM



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

SITE PLAN
N.T.S.



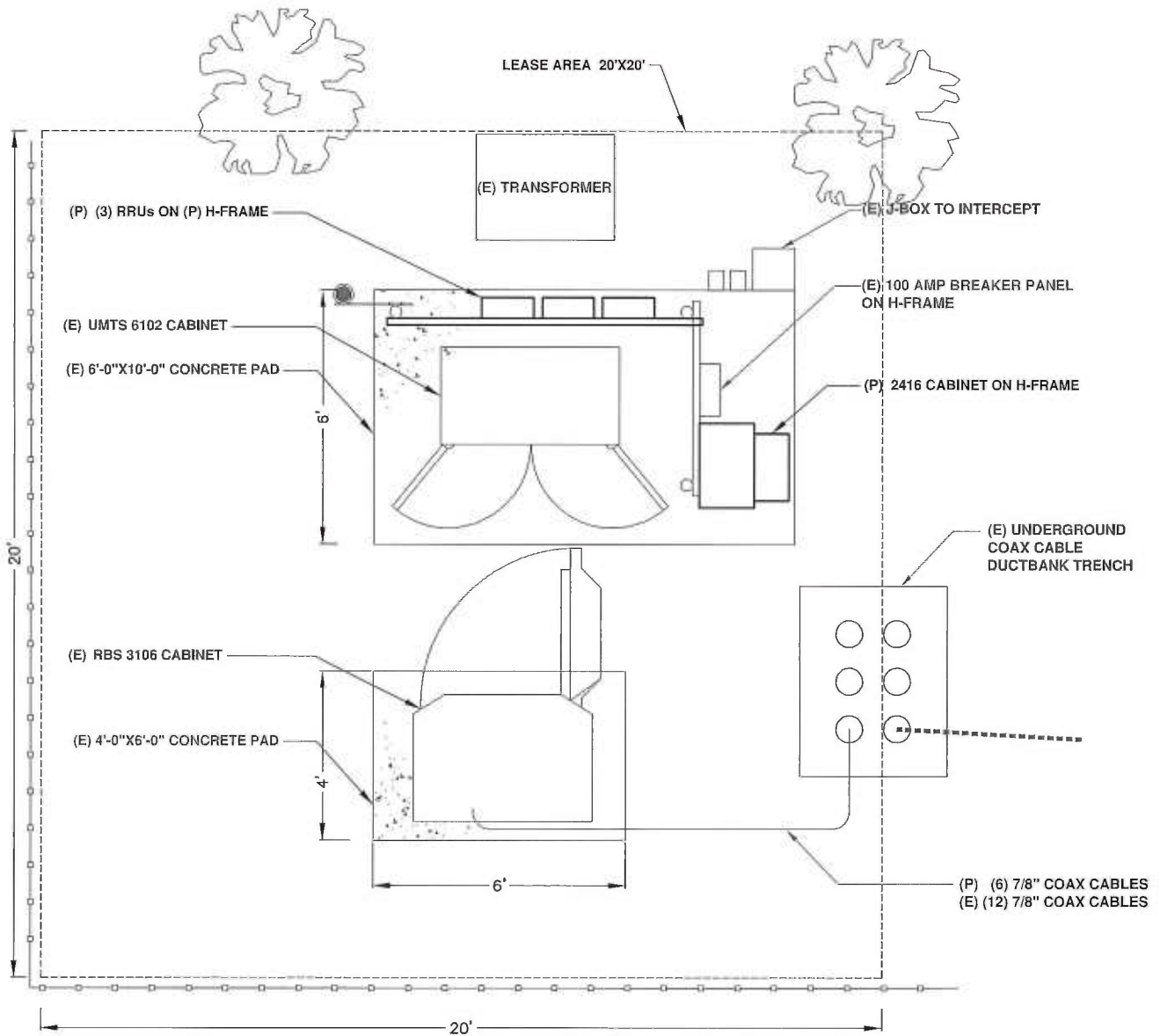
CONFIGURATION
704BU

SUBMITTALS	
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ATLANTIS GROUP
1340 Centre Street
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Office: 617-965-0789
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LEASE EXHIBIT
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SITE ADDRESS:
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FOR
T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159



EQUIPMENT LAYOUT

N.T.S.



CONFIGURATION

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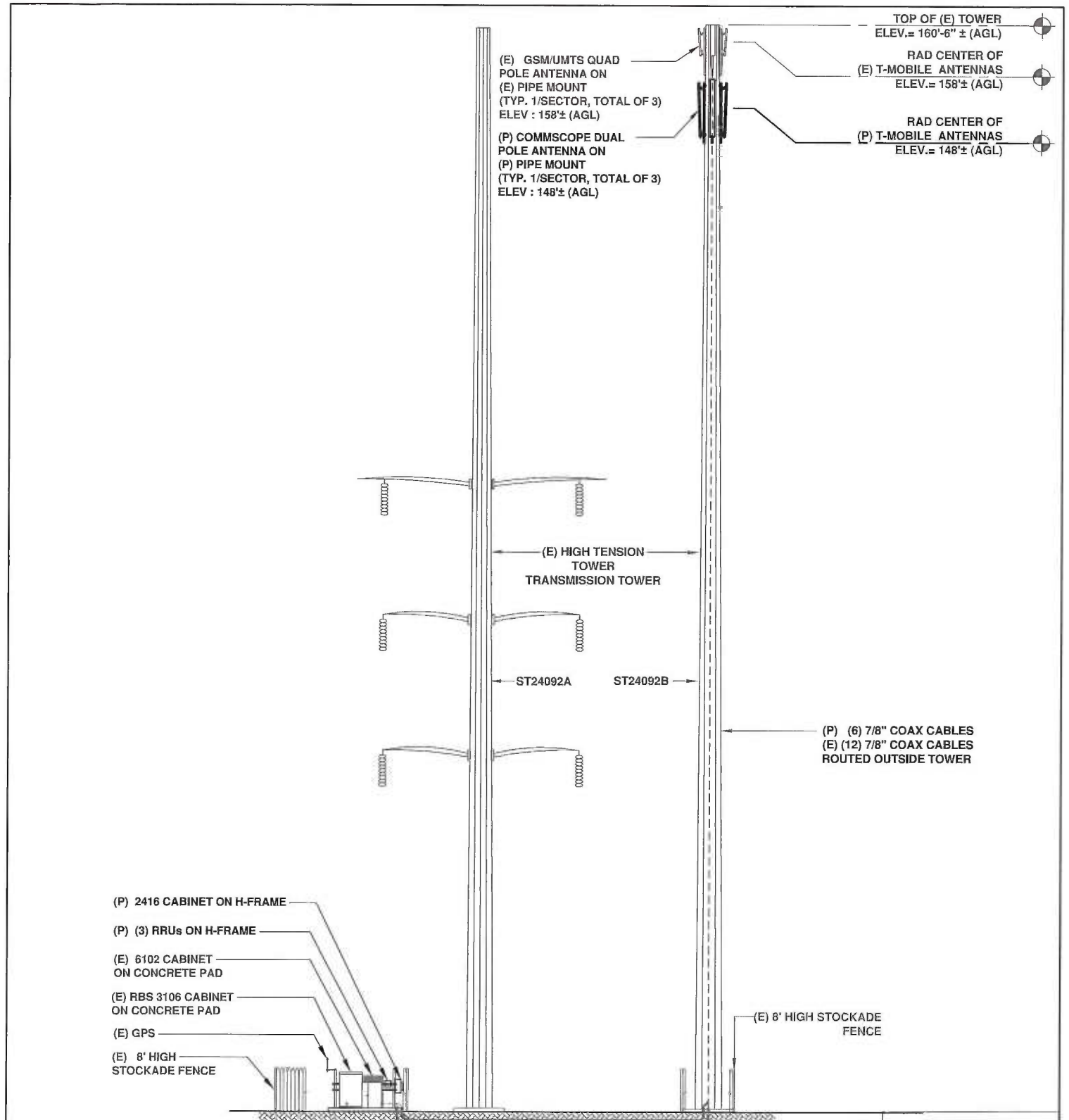
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DRAWN BY: FG

CHECKED BY: SM

PAGE 3 OF 4



SOUTH ELEVATION 1
 SCALE: N.T.S. LE-4

CONFIGURATION
704BU

SUBMITTALS	
LE REV A	08.07.14
LE REV A	08.08.14

ATLANTIS GROUP
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 FOR
T-MOBILE NORTHEAST, LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

EXHIBIT C

Structural Analysis of
CL & P Pole

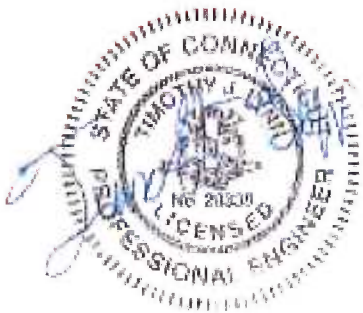
T-Mobile: CT11085C

CL&P Structure No. 24092
160.5' Electric Transmission Pole

Country Club Road,
Woodbridge, CT

CEN TEK Project No. 14025.013

Date: September 29, 2014



Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to analyze the existing 160.5' CL&P pole located at Country Club Rd., Woodbridge, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- **T-MOBILE (Existing to be removed):**
Antennas: Six (6) TMA's flush mounted to the CL&P pole with a RAD center elevation of 158-ft above tower base plate.
- **T-MOBILE (Existing to remain):**
Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas flush mounted to the CL&P pole with a RAD center elevation of 158-ft above tower base plate.
Coax Cables: Twelve (12) 1-5/8" Ø coax cables mounted to the exterior of the CL&P pole as indicated in Section 4 of this report.
- **T-MOBILE (Proposed):**
Antennas: Three (3) Andrew LNX-6515DS panel antennas flush mounted to the existing CL&P utility pole with a RAD center elevations of 148 -ft above tower base plate.
Coax Cables: Six (6) 1-5/8" Ø coax cables mounted to the outside of the CL&P pole as indicated in Section 4 of this report.

Primary assumptions used in the analysis

- ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", defines allowable steel stresses for evaluation of the CL&P utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- All utility pole members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Design Basis

Our analysis was performed in accordance with ASCE Manual No. 72 – “Design of Steel Transmission Pole Structures Second Edition”, NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P pole structure, considering existing and future conductor and shield wire loading, with the proposed T-Mobile equipment was analyzed as follows:

- UTILITY POLE ANALYSIS

The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 72.

Load cases considered:

Load Case 1: NESC Heavy Wind

Wind Pressure.....	4.0 psf
Radial Ice Thickness.....	0.5"
Vertical Overload Capacity Factor.....	1.50
Wind Overload Capacity Factor.....	2.50
Wire Tension Overload Capacity Factor.....	1.65

Load Case 2: NESC Extreme Wind

Wind Speed.....	110 mph ⁽¹⁾
Radial Ice Thickness.....	0"

Load Case 3: NESC Extreme Ice w/ Wind

Wind Pressure.....	6.4 psf
Radial Ice Thickness.....	0.75"
Vertical Overload Capacity Factor.....	1.0
Wind Overload Capacity Factor.....	1.0

Note 1: NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading,
 1.25 x Gust Response Factor (wind speed: 3-second gust)

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 72, “Design of Steel Transmission Pole Structures Second Edition”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

A maximum usage of **70.79%** occurs in the utility pole under the **NESC Heavy** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 8	0.00' -18.50' (AGL)	70.79%	PASS

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 24 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	43.84%	PASS

▪ **FOUNDATION AND ANCHORS**

The existing foundation consists of a 10-ft Ø x 47.0-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (44) 2.25"Ø, ASTM A615-75 anchor bolts embedded approximately 8.5-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01229-60001 sheet 3 of 14.

BASE REACTIONS:

From PLS-Pole analysis of CL&P pole based on NESC/NU prescribed loads.

Load Case	Shear	Axial	Moment
NESC Heavy Wind	137.65 kips	107.01 kips	13125.16 ft-kips
NESC Extreme Wind	88.11 kips	67.62 kips	8446.51 ft-kips
NESC Extreme Ice w/ Wind	93.46 kips	79.63 kips	8898.74 ft-kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	68.56%	PASS

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	71.4%	PASS
	Lateral Deflection	1.32 in. ⁽¹⁾	PASS

(1) Lateral deflection limited to L/100 per OTRM 059 Rev 4 dated 2/01/10. (L/100 = 18.5*12/100=5.64-in)

CEN TEK Engineering, Inc.
Structural Analysis – 160.5-ft CL&P Pole # 24092
T-Mobile Antenna Upgrade – CT11085C
Woodbridge, CT
September 29, 2014

C o n c l u s i o n

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Northeast Utilities and T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

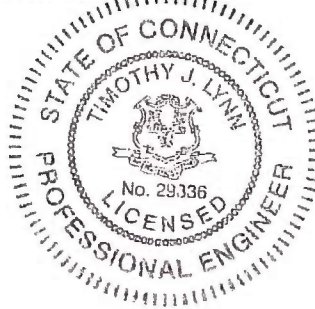


EXHIBIT D

**RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS**

T-Mobile Existing Facility

Site ID: CT11058E

**Woodbridge / WC X58 / RACEB
1 Country Club Road
Woodbridge, CT 06524**

November 12, 2014

EBI Project Number: 62145328

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.77 %

November 12, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11058E – Woodbridge / WC X58 / RACEB**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1 Country Club Road, Woodbridge, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is $467 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **1 Country Club Road, Woodbridge, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation 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.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antenna mounting height centerlines of the proposed antennas are **158 feet & 148 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	158	Height (AGL):	158	Height (AGL):	158
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	3,833.82	ERP (W):	3,833.82	ERP (W):	3,833.82
Antenna A1 MPE%	1.59	Antenna B1 MPE%	1.59	Antenna C1 MPE%	1.59
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	148	Height (AGL):	148	Height (AGL):	148
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A2 MPE%	0.33	Antenna B2 MPE%	0.33	Antenna C2 MPE%	0.33

Site Composite MPE%	
Carrier	MPE%
T-Mobile	5.77
No Additional Carriers Listed in the CSC MPE Database	
Site Total MPE %:	5.77 %

T-Mobile Sector 1 Total:	1.92 %
T-Mobile Sector 2 Total:	1.92 %
T-Mobile Sector 3 Total:	1.92 %
Site Total:	5.77 %

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.92 %
Sector 2:	1.92 %
Sector 3 :	1.92 %
T-Mobile Total:	5.77 %
Site Total:	5.77 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **5.77%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.



Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803