

**JULIE D. KOHLER**

PLEASE REPLY TO: Bridgeport  
WRITER'S DIRECT DIAL: (203) 337-4157  
E-Mail Address: jkohler@cohenandwolf.com

September 9, 2014

Attorney Melanie Bachman  
Acting Executive Director  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

**Re: Notice of Exempt Modification  
Verizon Wireless/T-Mobile co-location  
Site ID CTNH417A  
31 New Hartford Road/Rust Road, Barkhamsted, 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, Cellco Partnership, d/b/a Verizon Wireless owns the existing monopine telecommunications tower and related facility located at 31 New Hartford Road/Rust Road, Barkhamsted, Connecticut (Latitude: 41 – 89361111, Longitude: -72.9966667). T-Mobile intends to add three antennas and related equipment at this existing telecommunications facility in Barkhamsted ("Barkhamsted 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 also being sent to the First Selectman, Donald S. Stein, and the property owner, Regional Refuse Disposal District 1.

The existing Barkhamsted Facility consists of a 145 foot tall monopine tower, approved by the Council in Docket No. 182A.<sup>1</sup> T-Mobile plans to add three antennas mounted on T-Arms at a centerline of 102 feet. (See the plans revised to August 28, 2014 attached hereto as Exhibit A). T-Mobile will also install an H-Frame to which three RRUs will be attached, replace an existing equipment cabinet, install coax cable and reuse existing coax cable. The existing Barkhamsted Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated August 25, 2014 and attached hereto as Exhibit B.

The planned modifications to the Barkhamsted Facility fall squarely within those

<sup>1</sup> The Decision and Order in this docket (dated May 7, 2002 respectively) contain no relevant requirements or limitations on the configuration of the T-Mobile's proposed equipment at the Barkhamsted Facility.

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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 proposed antennas will be installed at a centerline of 102 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 of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and leased area as shown on Sheet A-1 of Exhibit A.

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

4 . The operation of the proposed antennas 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 dated September 3, 2014 T-Mobile's operations would add 14.15% 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 67.74% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

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

Sincerely,



Julie D. Kohler, Esq.

cc: Town of Barkhamsted, First Selectman Donald S. Stein  
Cellco Partnership, d/b/a Verizon Wireless  
Regional Refuse Disposal District 1  
Elizabeth Jamieson, Transcend Wireless

# **EXHIBIT A**

# SITE NAME: NEW HARTFORD-VERIZON COLO

**31 NEW HARTFORD ROAD  
BARKHAMSTED, CT 06063  
LITCHFIELD COUNTY  
SITE NUMBER: CTNH417A  
L700 - 704BU CONFIGURATION**

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
OFFICE: (860) 648-1116

**Transcend Wireless**

TRANSCEND WIRELESS  
10 INDUSTRIAL AVE  
MAYFAH, NJ 07430  
TEL: (201) 684-0055  
FAX: (201) 684-0066

**Hudson Design Group**  
180 DSGOOD STREET  
BLOOMFIELD, NJ 07003  
TEL: (973) 557-5533  
FAX: (973) 336-5534



**APPROVALS**

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	CTNH417A
DRAWN BY:	AS
CHECKED BY:	DR

REVISION	DATE	DESCRIPTION
3	08/28/14	ISSUED FOR REVIEW
2	08/12/14	ISSUED FOR REVIEW
1	08/05/14	ISSUED FOR REVIEW
0	08/01/14	ISSUED FOR REVIEW

**SITE NUMBER: CTNH417A**  
**SITE NAME:**  
**NEW HARTFORD - VERIZON COLO**  
31 NEW HARTFORD ROAD  
BARKHAMSTED, CT 06063  
LITCHFIELD COUNTY

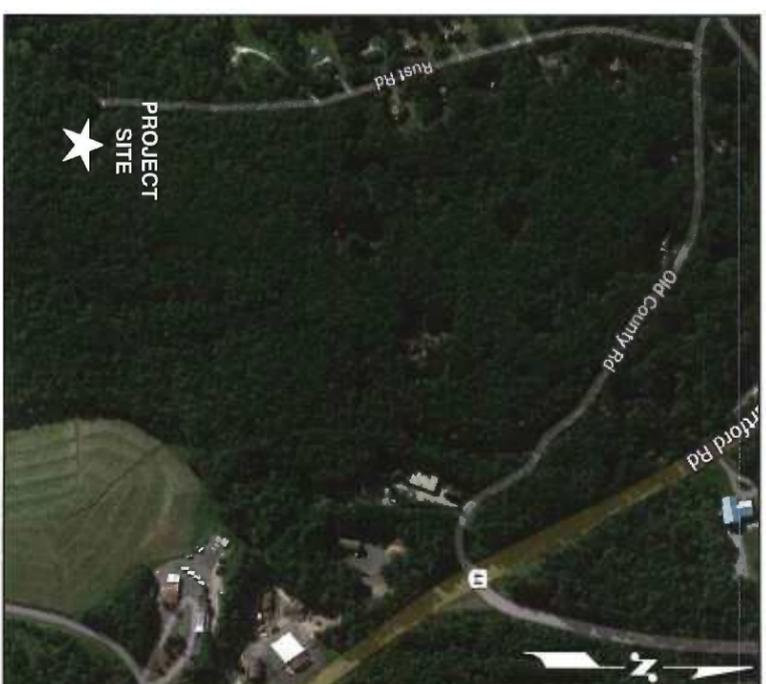
SHEET TITLE

TITLE SHEET

SHEET NUMBER

**PROJECT INFORMATION**

SCOPE OF WORK: UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION  
ZONING JURISDICTION: BASED ON INFORMATION PROVIDED BY T-MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).  
SITE ADDRESS: 31 NEW HARTFORD ROAD BARKHAMSTED, CT 06063  
LATITUDE: 41° 53' 36.996" N  
LONGITUDE: 72° 59' 48.0114" W  
JURISDICTION: NATIONAL, STATE & LOCAL CODES OR ORDINANCES  
CURRENT USE: TELECOMMUNICATIONS FACILITY  
PROPOSED USE: TELECOMMUNICATIONS FACILITY



**GENERAL NOTES**

- THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
- THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
- CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

**SPECIAL STRUCTURAL NOTES**

- STRUCTURAL DESIGNS AND DETAILS FOR ANTENNA MOUNTS COMPLETED BY HUDSON DESIGN ON BEHALF OF T-MOBILE ARE INCLUSIVE OF THE ENTIRE ANTENNA SUPPORT STRUCTURE (GLOBAL STRUCTURAL STABILITY ANALYSIS BY OTHERS), EXISTING TOWER PLATFORM, EXISTING ANTENNA MOUNTS AND ALL OTHER ASPECTS OF THE STRUCTURE THAT WILL SUPPORT THE T-MOBILE MODERNIZATION EQUIPMENT DEPLOYMENT AS DEPICTED HEREIN.
- HUDSON DESIGN ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES

**T-MOBILE TECHNICIAN SITE SAFETY NOTES**

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NUU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE



**CALL BEFORE YOU DIG**  
CALL TOLL FREE 800-922-4455  
OR CALL 811  
UNDERGROUND SERVICE ALERT

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# **EXHIBIT B**

**Structural Analysis Report**

*145-ft Existing Summit Monopine*

*Proposed T-Mobile  
Antenna Upgrade*

*T-Mobile Site Ref: CTNH417A*

*Verizon Site Ref: Barkhamsted South*

*31 New Hartford Road (Rust Road)  
Barkhamsted, CT*

*Centek Project No. 14033.014*

*Date: August 25, 2014*



**Prepared for:**  
*T-Mobile Towers  
4 Sylvan Way  
Parsippany, NJ 07054*

*CEN TEK Engineering, Inc.*  
*Structural Analysis – 145' Summit Monopine*  
*T-Mobile Antenna Upgrade – CTNH417A*  
*Barkhamsted, CT*  
*August 25, 2014*

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*CENTEK Engineering, Inc.*  
*Structural Analysis – 145' Summit Monopine*  
*T-Mobile Antenna Upgrade – CTNH417A*  
*Barkhamsted, CT*  
*August 25, 2014*

## *I n t r o d u c t i o n*

The purpose of this report is to summarize the results of the non-linear, P- $\Delta$  structural analysis of the antenna installation proposed by T-Mobile on the existing monopine (tower) owned and operated by Verizon Wireless, located in Barkhamsted, CT.

The host tower is a 125-ft tall, three-section, eighteen sided, tapered monopine, originally manufactured by Summit Manufacturing and designed by Paul J. Ford and Company job no; 29200-1316, dated September 7, 2000 with a 20-ft extension manufactured by Summit design no; 10916-D6 dated April 12, 2001. The tower geometry, structure member sizes and foundation system information were obtained from a previous structural report prepared by Centek job no. 12115.CO1 dated October 9, 2012.

Antenna and appurtenance information were obtained from the aforementioned Centek structural report, a tower mapping report prepared by JWB Tower Services, LLC dated February 28, 2014 and a T-Mobile RF data sheet.

The tower consists of four (4) tapered vertical steel sections conforming to ASTM A607-65 (65ksi). The bottom three (3) sections are slip joint connected and the top section is flange connected. The diameter of the pole (flat-flat) is 25.41-in at the top and 66.05-in at the base.

T-Mobile proposes the removal of three (3) panel antennas and three (3) TMA's and the installation of six (6) panel antennas mounted to the existing three (3) T-Arms. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

## *A n t e n n a   a n d   A p p u r t e n a n c e   S u m m a r y*

The existing, proposed and future loads considered in this analysis consist of the following:

- **SPRINT (Existing):**  
Antennas: Three (3) RFS APXVSP18-C-A20 panel antennas, three (3) ALU 1900 MHz RRH's and three (3) ALU 800 MHz RRH's mounted on three (3) existing T-Arms with a RAD center elevation of 140-ft above grade.  
Coax Cables: Three (3) 1-1/4"  $\varnothing$  Hybriflex cables running on the inside of the existing tower.
- **VERIZON (Existing/Reserved):**  
Antennas: Six (6) Antel LPA-80063-6CF panel antennas, six (6) Antel BXA-70063-6CF panel antennas, six (6) LPA-171063-12CF panel antennas, six (6) RFS FD9R6004/2C-3L Diplexers, six (6) RRH's and one (1) main distribution box mounted on three (3) existing T-Arms with a RAD center elevation of 133-ft above grade.  
Coax Cables: Eighteen (18) 1-5/8"  $\varnothing$  coax cables and two (2) 1-5/8"  $\varnothing$  fiber cable running on the inside of the existing tower.

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*Structural Analysis – 145' Summit Monopine*  
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- **AT&T (Existing):**  
Antennas: Six (6) Powerwave 7770 panel antennas, six (6) Powerwave TT19-08BP111-001 TMA's, two (2) KMW AM-X-CD-16-65-00T-RET panel antennas, one (1) Kathrein Scala 800-10764 panel antenna, six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrester mounted on three (3) existing T-Arms with a RAD center elevation of 113-ft above grade.  
Coax Cables: Twelve (12) 1-1/4" Ø coax cables, one (1) fiber cable and two (2) dc control cables running on the inside of the existing tower.
- **METROPCS (EXISTING):**  
Antennas: Three (3) RFS APXV18-206517-C panel antennas flush mounted with a RAD center elevation of 92-ft above grade.  
Coax Cables: Six (6) 1-5/8" Ø coax cables running on the inside of the existing tower.
- **T-MOBILE (Existing to Remain):**  
Antenna: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) RFS AMAA1412D-1A20 TMA's and three (3) Ericsson KRY 112 TMA's mounted on three (3) existing T-Arms with a RAD center elevation of 102-ft above grade.  
Coax Cable: Twelve (12) 1-5/8" Ø coax cables running on the inside of the existing tower.
- **T-MOBILE (Proposed):**  
Antennas: Three (3) Andrew LNX-6515DS panel antennas mounted to three (3) T-Arms with a RAD center elevation of 102-ft above exiting grade.  
Coax Cable: Six (6) 1-5/8" Ø coax cables running on the exterior of the existing tower.

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*Structural Analysis – 145' Summit Monopine*  
*T-Mobile Antenna Upgrade – CTNH417A*  
*Barkhamsted, CT*  
*August 25, 2014*

### *Primary Assumptions Used in the Analysis*

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

## Analysis

The existing tower was analyzed using a comprehensive computer program entitled trnTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC<sup>1</sup> and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

## Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Litchfield; v = 80 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	Barkhamsted; v = 90 mph (3 second gust) equivalent to v = 75 mph (fastest mile) <i>TIA-EIA-222-F wind speed controls.</i>	[Appendix K of the 2005 CT Building Code Supplement]
Load Cases:	<u>Load Case 1</u> ; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 2</u> ; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type

<sup>1</sup> The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

## Tower Capacity

Tower stresses were calculated utilizing the structural analysis software trnTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per trnTower "Section Capacity Table", the maximum tower steel usage was found to be at **78.7%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	125.00'-146.00'	30.8%	<b>PASS</b>
Pole Shaft (L2)	82.25'-125.00'	62.6%	<b>PASS</b>
Pole Shaft (L3)	43.00'-82.25'	77.2%	<b>PASS</b>
Pole Shaft (L4)	1.0'-43.00'	78.7%	<b>PASS</b>

## Foundation and Anchors

The existing foundation consists of a 8-ft square x 5.5-ft long reinforced concrete pier on a 31.5-ft square x 4.0-ft thick reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned Centek structural report. The base of the tower is connected to the foundation by means of (24) 2.25"Ø, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	56 kips
	Compression	55 kips
	Moment	5663 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS) <sup>(1)</sup>	Proposed Loading (FS) <sup>(1)</sup>	Result
Reinforced Concrete Pad and Pier	OTM <sup>(2)</sup>	2.0	2.51	<b>PASS</b>

Note 1: FS denotes Factor of Safety.

Note 2: OTM denotes Overturning Moment

**CENTEK** Engineering, Inc.  
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 Barkhamsted, CT  
 August 25, 2014

- The flange bolts and flange plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	66.0%	<b>PASS</b>
Flange Plate	Bending	25.4%	<b>PASS</b>

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	79.6%	<b>PASS</b>
Base Plate	Bending	63.9%	<b>PASS</b>

Conclusion

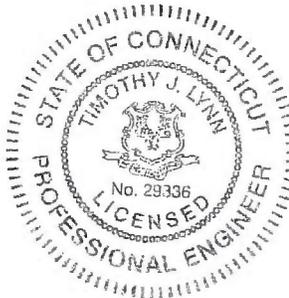
This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by 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 C**

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

T-Mobile Existing Facility

Site ID: CTNH417A

New Hartford - VZW Colo  
31 New Hartford Road  
Barkhamsted, CT 06063

**September 3, 2014**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>67.74 %</b>

September 3, 2014

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

Emissions Analysis for Site: **CTNH417A – New Hartford - VZW Colo**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **31 New Hartford Road, Barkhamsted, 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 **31 New Hartford Road, Barkhamsted, 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 centerline of the proposed antennas is **102 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):	102	Height (AGL):	102	Height (AGL):	102
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%	3.99	Antenna B1 MPE%	3.99	Antenna C1 MPE%	3.99
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):	102	Height (AGL):	102	Height (AGL):	102
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%	0.72	Antenna B2 MPE%	0.72	Antenna C2 MPE%	0.72

Site Composite MPE%	
Carrier	MPE%
T-Mobile	14.15
AT&T	24.74 %
Sprint	6.35 %
Nextel	3.54 %
Verizon Wireless	18.96 %
<b>Site Total MPE %:</b>	<b>67.74 %</b>

T-Mobile Sector 1 Total:	4.72 %
T-Mobile Sector 2 Total:	4.72 %
T-Mobile Sector 3 Total:	4.72 %
<b>Site Total:</b>	<b>67.74 %</b>

## Summary

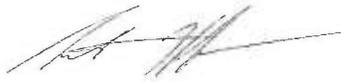
All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

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:	4.72 %
Sector 2:	4.72 %
Sector 3 :	4.72 %
T-Mobile Total:	14.15 %
Site Total:	67.74 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **67.74%** 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`