August 12, 2016

VIA EMAIL AND HAND DELIVERY

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

RE: T-Mobile Northeast LLC – CTNH442A
Tower Share Application
150 Willow Street, Hamden, CT 06518
LAT: 41-26-57.98 N
LNG: -72-54-16.79 W

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile plans to install antennas and related equipment at the Sprint Sites USA site located at 150 Willow Street in Hamden, CT.

T-Mobile will install nine (9) 700/1900/2100 MHz antennas and three (3) RRH's at the 137'-6" level of the existing 157'-6" monopole. Twelve (12) 1-5/8" coax cables and one (1) hybrid cable will also be installed inside the monopole. T-Mobile's equipment and utility cabinets will be placed on a 10' x 20' concrete pad inside the existing fenced compound. Included are plans prepared by All-Points Technology Corporation dated July 21, 2016, depicting the planned changes and attached as **Exhibit A**. Also included is a structural analysis prepared by Semaan Engineering Solutions dated July 15, 2016 confirming that the existing tower is structurally capable of supporting T-Mobile's equipment. The structural analysis is attached as **Exhibit B**.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of T-Mobile's intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mayor Curt Leng, Sprint Sites USA, and the property owner, Hamden Fish & Game Protective Association. Also, please see the attached letter from Sprint Sites USA authorizing the proposed shared use of the facility attached as **Exhibit C.**

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed equipment will not result in an increase in the height of the existing structure. The top of the monopole is approximately 157'-6" AGL; T-Mobile's proposed antennas will be located at a centerline height of 137'-6" AGL.

2. The proposed modifications will not require the extension of the site boundary as depicted on the attached site plan. T-Mobile's equipment pad will be located within the existing fenced compound.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria. The incremental effect of the proposed changes will be negligible.

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, T-Mobile's operations at the site will result in a power density of 2.68%; the combined site operations will result in a total power density of 5.68% as evidenced by the power density calculations attached as **Exhibit D**.

5. The proposed equipment will not cause a change or alteration in the physical or environmental characteristics of the site.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally and economically feasible and meets the public safety concerns. As demonstrated in this letter, T-Mobile respectfully submits that the shared use of this facility satisfies these criteria:

A. Technical Feasibility. The existing monopole has been deemed to be structural capable of supporting T-Mobile's proposed loading. The structural analysis is included as **Exhibit B**.
B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this monopole in Hamden. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit T-Mobile to obtain a building permit for the proposed installation. Further, a letter of authorization from the tower owner, Sprint Sites USA, is included as **Exhibit C** authorizing T-Mobile to file this application for shared use.
C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental effect. The installation of T-Mobile's equipment at 137'-6" AGL on the existing 157'-6" monopole would have an insignificant visual impact on the area around the tower. T-Mobile's ground equipment will be installed within the existing fenced compound. Therefore, T-Mobile's shared use would not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by **Exhibit D**, the proposed antennas will not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.
D. Economic Feasibility. T-Mobile will be entering into an agreement with the owner of this facility under mutually agreeable terms.
E. Public Safety Concerns. As discussed above, the monopole is structurally

capable of supporting T-Mobile's proposed loading. T-Mobile is not aware of any public safety concerns relative to the proposed sharing of the existing monopole. T-Mobile's intent to provide new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of residents and individuals traveling through the Town of Hamden.

Respectfully submitted,

By: _____
Eric Dahl, Agent for T-Mobile
edahl@comcast.net
860-227-1975

Attachments

cc: Curt Leng, Mayor, Town of Hamden
Sprint Sites USA - as tower owner
Hamden Fish & Game Protective Association – as property owner

EXHIBIT A

T-Mobile

NORTHEAST, LLC.

NEW SITE DEVELOPMENT (NSD)
"HAMDEN"
CTNH442A
150 WILLOW STREET
HAMDEN, CT 06518

VICINITY MAP
SCALE: 1" = 500'

DRAWING INDEX

SITE INFORMATION

T-MOBILE SITE NAME:	"HAMDEN"
T-MOBILE SITE NUMBER:	CTNH442A
SITE ADDRESS:	150 WILLOW STREET HAMDEN, CT 06518
SITE TYPE/DESCRIPTION:	INSTALL (6) NEW PANEL ANTENNAS & (6) NEW RRUs ON NEW MOUNTS ON EXISTING MONOPOLE. INSTALL (1) NEW PPC (1) NEW TELCO CABINET, AND (1) NEW RBS ON NEW 10'X20' CONCRETE PAD.
PROPERTY OWNER:	HAMDEN FISH & GAME PROTECTIVE ASSOCIATION INC P.O. BOX 5619 HAMDEN, CT 06518
LEASING CONTACT:	MATTHEW BANDLE (508) 842-5921
CONSTRUCTION CONTACT:	MIKE SCORDO (203) 530-8471
ENGINEER CONTACT:	ROBERT BURNS (860) 663-1697 x206
LATITUDE:	41°26'57.9928"N
LONGITUDE:	72°54'16.7916"W
ELEVATION:	125'± AMSL
MAP:	3430
LOT:	1
MUNICIPALITY:	HAMDEN
ZONING DISTRICT:	T1 NATURAL & R2 RESIDENTIAL

APPLICANT:	POWER PROVIDER:	TELCO PROVIDER:	CALL BEFORE YOU DIG:	CODE COMPLIANCE INFORMATION:
T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002	THE UNITED ILLUMINATING COMPANY (800) 722-5584	FRONTIER (800)-921-8102	811	STATE OF CONNECTICUT BUILDING CODE, LATEST EDITION ANSI/TIA-222-F NATIONAL ELECTRIC CODE, LATEST EDITION

ALL-POINTS TECHNOLOGY CORPORATION
5 SADDLEBROOK DRIVE PHONE: (860)663-1697
KILLINGWORTH, CT 06419 FAX: (860)663-0935
WWW.ALL-POINTSTECH.COM

T-Mobile
NORTHEAST, LLC.
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002
OFFICE: (860)-692-7100

VERTICAL DEVELOPMENT

APPROVALS

LANDLORD: _____ DATE: _____
RF ENGINEER: _____ DATE: _____
CONSTRUCTION: _____ DATE: _____
OPERATIONS: _____ DATE: _____
SITE ACQ.: _____ DATE: _____

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	5/12/14	FOR REVIEW, RCB
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PREP: SCOTT M. CHASSE P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 5 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

NOTE:
THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. 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.

T-MOBILE
"HAMDEN"
SITE ADDRESS: 150 WILLOW STREET HAMDEN, CT 06518
EPT FILING NUMBER: CTNH0099
SITE NUMBER: CTNH442A

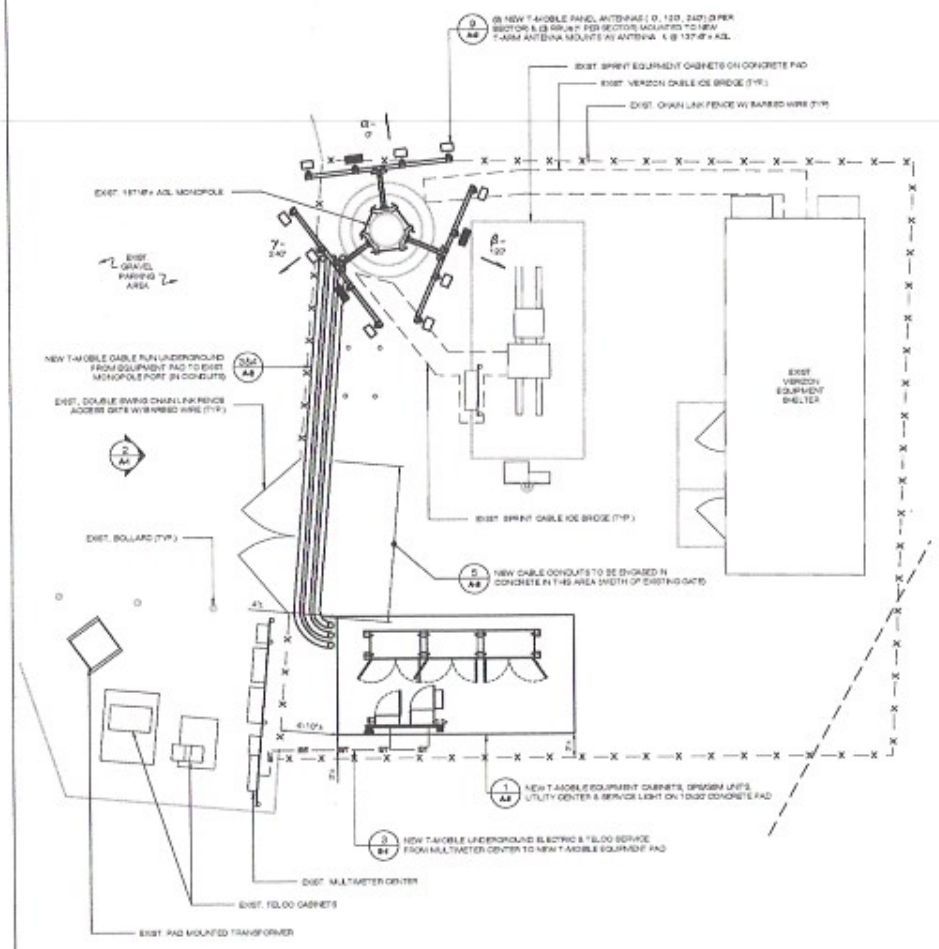
DRAWN BY: CW | CHECKED BY: RCB
DATE: 5/12/14

CONFIGURATION
702Cu

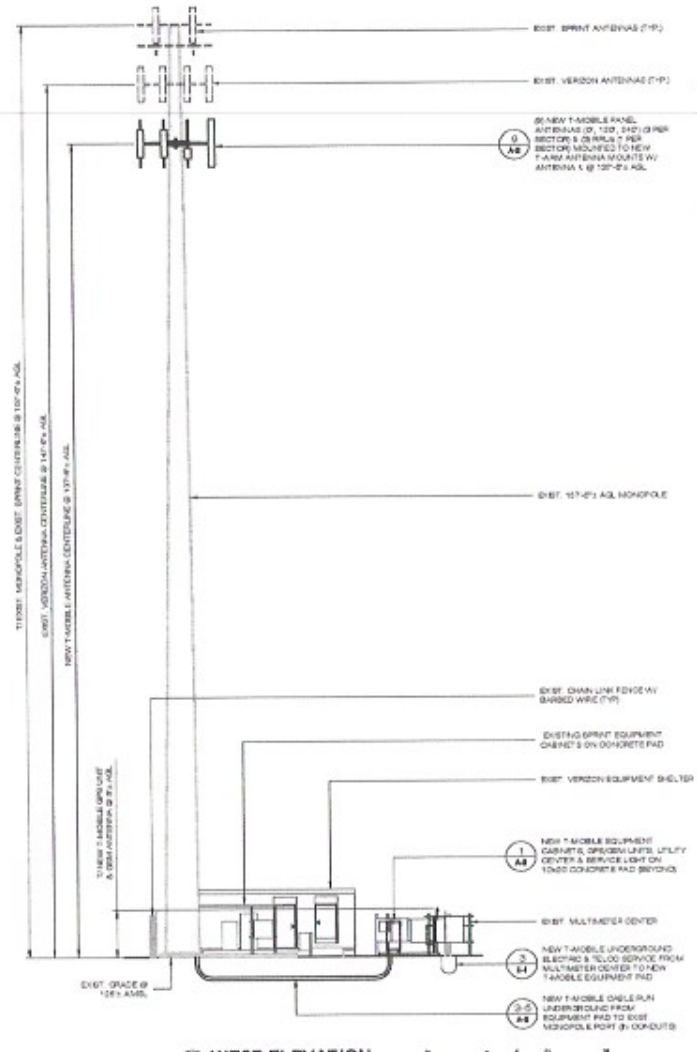
REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BOM.

SHEET TITLE:
TITLE SHEET & INDEX

SHEET NUMBER:
T-1



1 A-1 **COMPOUND PLAN**
SCALE: 1" = 5'-0"



2 A-1 **WEST ELEVATION**
SCALE: 1" = 10'-0"

NOTE:
TOWER STRUCTURAL ANALYSIS BY OTHERS AVAILABLE UNDER SEPARATE COVER

ALL-POINTS TECHNOLOGY CORPORATION
3 SADDLEBROOK DRIVE P:(860)963-1357
KILLINGWORTH, CT 06419 FAX:(860)663-0935
WWW.ALLPOINTSTECH.COM

T-Mobile
NORTHEAST, LLC.
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002
OFFICE: (860)-692-7100

VERTICAL DEVELOPMENT

APPROVALS

LANDLORD:	DATE:
RF ENGINEER:	DATE:
CONSTRUCTION:	DATE:
OPS MANAGER:	DATE:
SITE ACQ.:	DATE:

CONSTRUCTION DOCUMENTS

NO.	DATE	REVISION
0	07/31/19	FOR REVIEW ICE
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONALS OF RECORD

PROF: SCOTT M. CHASSE P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419

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T-MOBILE
"HAMDEN"

SITE ADDRESS:	100 WILLOW STREET HAMDEN, CT 06518
APT FILING NUMBER:	CT40026E
SITE NUMBER:	CT40443A
DRAWN BY:	EBH
CHECKED BY:	RCB
DATE:	07/31/19

CONFIGURATION
702Cu

REFER TO LATEST T-MOBILE RF DATA SHEET FOR FINAL RF DESIGN & BCM.

SHEET TITLE:
COMPOUND PLAN & ELEVATION

SHEET NUMBER:
A-1

EXHIBIT B

SEMAAN
ENGINEERING SOLUTIONS

Structural Analysis Report

Prepared for:

Sprint Sites USA
1765 Grassland Parkway
Suite A
Alpharetta, GA 30004

ATTN: Ms. Deborah MacMaster

Structure	:	157 ft Monopole
Site ID	:	CT54XC773
Proposed Carrier	:	T-Mobile
Site Name	:	Hamden, CT
Site Location	:	150 Willow Street Hamden, CT 41.44939, -72.90457
County	:	New Haven
Date	:	July 15, 2016
Max Usage	:	48%
Result	:	Pass

Prepared By:
Courtney Fuhrer
Structural Engineer

STATE OF CONNECTICUT
THOMAS L TAYLOR
26130
LICENSED
PROFESSIONAL ENGINEER

7.21.16

Thomas L Taylor

Digitally signed by Thomas L Taylor
DN: cn=Thomas L Taylor, o=Semaan Engineering Solutions Holdings, LLC, ou, email=tomt@semaaneng.com, c=US
Date: 2016.07.21 15:37:25 -05'00'

SEMAAN
ENGINEERING SOLUTIONS

Table of Contents

SEMAAN
ENGINEERING SOLUTIONS

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 157 ft monopole to reflect the change in loading by T-Mobile.

Supporting Documents

Tower Drawings	EEI Project #14977, dated July 17, 2007
Foundation Drawing	EEI Project #14977, dated July 17, 2007
Geotechnical Report	JGI Project #J2075344, dated June 29, 2007

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	105 mph (3-Second Gust)
Basic Wind Speed w/ Ice:	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
Code:	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
Structure Class:	II
Exposure Category:	B
Topographic Category:	1
Crest Height:	0 ft
Spectral Response:	$Ss = 0.19$, $S_1 = 0.06$
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact Semaan Engineering Solutions at 402-289-1888.

SEMAAN ENGINEERING SOLUTIONS

Existing and Reserved Equipment

Elevation[1](ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	RAD					
157.0	157.5	6	1900MHz RRH	Platform w/Rail & Pipes for RRHs	(12) 1 5/8" Fiber (3) 1 1/4" Fiber (9) RET Kit (3) RET Cable	Sprint-Nextel
		6	800 MHz notch Filter			
		3	APXVSPP18-C-A20			
		3	800MHz RRH			
		3	96" x 14" x 7" Panel			
		12	16" x 9" x 6" Combiners			
		2	26" Microwave			
		2	GPS Antenna			
		6	TD-RRH-8X20		(1) Trunk Line	Sprint 2.5
		3	APXVTM14-C-I20			
147.0	147.0	6	FD9R6004-2C-3L	Low Profile Platform	(12) 1 5/8" Fiber	Verizon
		6	LPA-80080/4CF			
		3	MG D3-800T0			
		1	BXA-70080/6CF			
		2	BXA-70063/6CF			

Equipment to be Removed

Elevation[1](ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	RAD					
147.0	147.0	4	SBNHH-1D65B	-	-	Verizon
		2	SBNHH-1D85C			
		3	2x60 PCS			
		3	2x60LTE			
		3	RRH 90W AWS			
		2	DB-T1-6Z-8AB-0Z			
137.0	137.0	3	742 213	Pipe	(6) 1 5/8"	Metro PCS

Proposed Equipment

Elevation[1](ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	RAD					
137.0	137.0	3	AIR 21 B2A/B4P	Low Profile Platform	(6) 1 5/8"	T-Mobile
		3	AIR 21 B4A/B2P			
		3	LNX-6515DS-A1M			
		3	1B-twin AWS TMA			

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Install proposed coax inside the pole shaft.

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Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	24%	Pass
Shaft	48%	Pass
Base Plate	25%	Pass

Foundations

Reaction Component	Original Design Reactions	Analysis Reactions	% of Design
Moment (Kips-Ft)	7,151.4	3,388.5	47%
Shear (Kips)	61.4	29.7	48%

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings, therefore no modification or reinforcement of the foundation will be required.

Deflection and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
157.0	26" Microwave	Sprint-Nextel	1.029	0.834
137.0	AIR 21 B2A/B4P	T-Mobile	0.753	0.716
	AIR 21 B4A/B2P			
	LNX-6515DS-A1M			
	1B-twin AWS TMA			

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

SEMAAN ENGINEERING SOLUTIONS, LLC
1079 N.205th Street
Elkhorn, NE 68022
Phone: 402-289-1888
Fax: 402-289-1861

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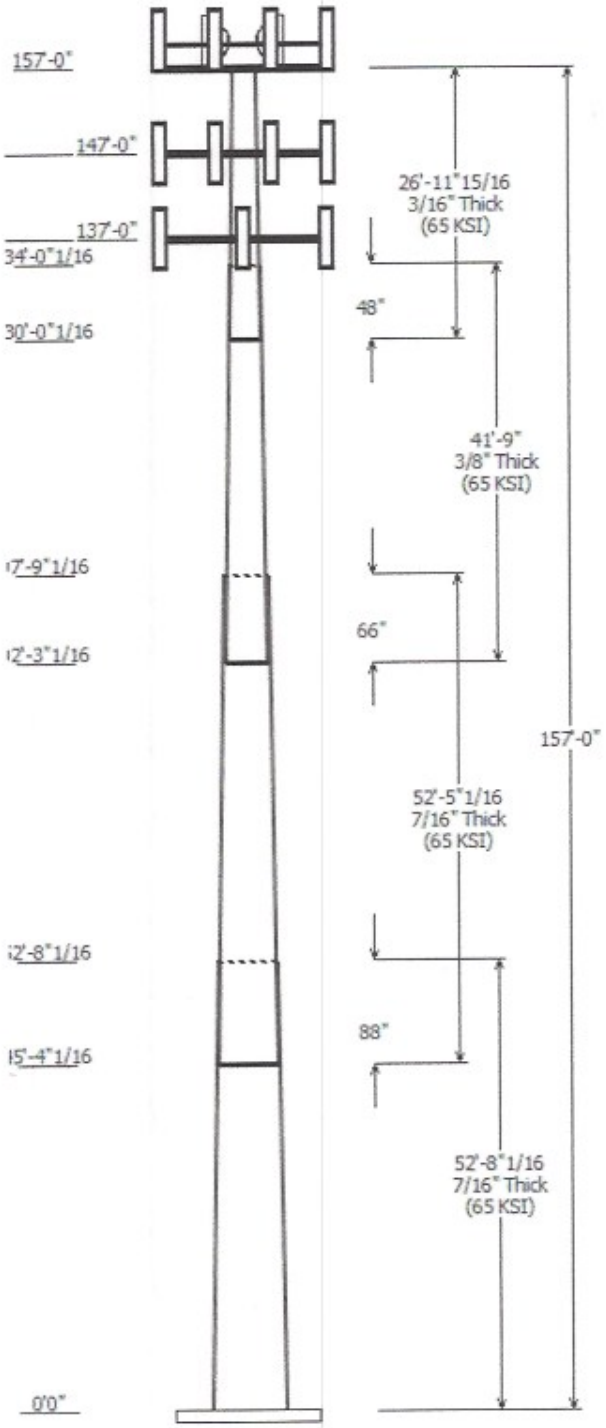

Job Information

Pole :	CT54XC773	Code:	ANSI/TIA-222-G
Description :			
Client :	Sprint Sites USA - GA 2	Struct Class :	II
Location :	Hamden, CT		
Shape :	18 Sides	Exposure :	B
Height :	157.00 (ft)	Topo :	1
Base Elev (ft):	0.00		
Taper:	0.32802(in/ft)		

Sections Properties

Shaft Section	Length (ft)	Diameter (in) Accross Flats Top	Bottom	Thick (in)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)
1	52.670	50.72	68.00	0.438		0.000	0.328026	65
2	52.420	36.80	54.00	0.438	Slip Joint	88.000	0.328026	65
3	41.750	25.66	39.36	0.375	Slip Joint	66.000	0.328026	65
4	26.993	18.50	27.35	0.188	Slip Joint	48.000	0.328026	65

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
157.000	157.500	2	GPS Antenna
157.000	157.500	2	26" Microwave
157.000	157.500	12	16" x 9" x 6" Combiners
157.000	157.500	3	96" x 14" x 7" Panel
157.000	157.500	3	APXVTM14-C-I20
157.000	157.500	6	TD-RRH-8X20
157.000	157.500	1	Collar Mount
157.000	157.500	3	800MHz RRH
157.000	157.500	3	APXVSPP18-C-A20
157.000	157.500	6	800 MHz notch Filter
157.000	158.500	1	Platform w/Rail & Pipes for RR
157.000	157.500	6	1900MHz RRH
147.000	147.000	3	MG D3-800T0
147.000	147.000	6	LPA-80080/4CF
147.000	147.000	2	BXA-70063/6CF
147.000	147.000	1	BXA-70080/6CF
147.000	147.000	1	Low Profile Platform
147.000	147.000	6	FD9R6004-2C-3L
137.000	137.000	3	1B-twin AWS TMA
137.000	137.000	3	LNX-6515DS-A1M
137.000	137.000	1	Low Profile Platform
137.000	137.000	3	AIR 21 B4A/B2P
137.000	137.000	3	AIR 21 B2A/B4P

Linear Appurtenance

Elev (ft) From	To	Description	Exposed To Wind
0.000	137.0	1 5/8" Coax	No
0.000	147.0	1 5/8" Fiber	No
0.000	157.0	1 5/8" Fiber	No
0.000	157.0	1-1/4" Fiber Cable	No
0.000	157.0	RET Cables	No
0.000	157.0	RET Kits	No
0.000	157.0	Trunk Line	No

Load Cases

1.2D + 1.6W	105 mph with No Ice
0.9D + 1.6W	105 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method

EXHIBIT C

Sprint
Together with NEXTEL

Sprint Sites USA
Mailstop KSOPHT0101-Z2650
6391 Sprint Parkway
Overland Park, KS 66251-2650
Toll Free: (800) 357-7641
Facsimile: (913) 523-9735
https://landlordsolutions.sprint.com

Sent Via U.S. Mail

July 29, 2016

Eric Dahl, Representing T-Mobile
860-227-1975
edahl@comcast.net

RE: Authorization to File for Zoning / Permits

Sprint Nextel Site ID:	CT54XC773
Carrier Name:	T-Mobile
Carrier Site ID:	CTNH442A
Site Address:	**150 Willow Street, Hamden, CT 06518**

Dear Eric,

Please be advised that T-Mobile is hereby authorized to act as applicant to file with the Connecticut Siting Council and the Town of Hamden for the necessary approvals and permits required for collocation on the above-referenced tower location.

Authorization to Act as Applicant

I, Deborah A. MacMaster, Collocation Specialist of Sprint Sites USA representing Sprint Spectrum Realty Company, LLC, authorize T-Mobile and Eric Dahl to act as applicant, representing us before the Connecticut Siting Council and the Town of Hamden to obtain zoning approval for any permit required for zoning compliance. Nevertheless, T-Mobile and Eric Dahl shall not be authorized to make any concessions or commitments to the Connecticut Siting Council and the Town of Hamden, that may affect the operations or future leasing opportunities of Sprint Spectrum Realty Company, LLC beyond what is shown on the preliminary site plan dated _____for site CT54XC773, without obtaining the prior approval and consent of Sprint Sites USA, a division of Sprint Spectrum Realty Company, LLC.

Should you have any questions please do not hesitate to contact me at 770-696-5515.

Deborah A. MacMaster — 7/29/2016
Sprint Sites USA Collocation Specialist — Date

Deborah A MacMaster
Signature

Sworn and subscribed before me this 7 day of 29, 2016.

State of Georgia County of Forsyth

Notary Public Signature Marissa Adams Wilson

Notary Public Name Printed MARISSA ADAMS WILSON

My commission expires on June 11, 2017

Affix Notary Seal:

MARISSA ADAMS WILSON
NOTARY PUBLIC
FULTON COUNTY, GEORGIA
MY COMMISSION EXPIRES JUNE 11, 2017

EXHIBIT D

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH442A

Hamden
150 Willow Street
Hamden, CT 06518

August 3, 2016

EBI Project Number: 6216003469

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.68 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

August 3, 2016

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

Emissions Analysis for Site: **CTNH442A – Hamden**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **150 Willow Street, Hamden, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. 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 **150 Willow Street, Hamden, 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 (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

4) 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

5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF path 1.59 dB of additional cable loss was calculated. This is based on manufacturers Specifications for 150 feet of 1-5/8" coax cable on each path.

7) 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.

8) For the following calculations the sample point was the top of a 6-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.

9) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** & **Ericsson AIR21 B2A/B4P** 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 **Ericsson AIR21 B4A/B2P** & **Ericsson AIR21 B2A/B4P** have a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. 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.

10) The antenna mounting height centerline of the proposed antennas is **137 feet** above ground level (AGL).

11) 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.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	137	Height (AGL):	137	Height (AGL):	137
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	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.98	Antenna B1 MPE%	0.98	Antenna C1 MPE%	0.98
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	137	Height (AGL):	137	Height (AGL):	137
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	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,287.19	ERP (W):	6,287.19	ERP (W):	6,287.19
Antenna A2 MPE%	1.32	Antenna B2 MPE%	1.32	Antenna C2 MPE%	1.32
Antenna #:	3	Antenna #:	3	Antenna #:	3
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):	137	Height (AGL):	137	Height (AGL):	137
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.39	Antenna B3 MPE%	0.39	Antenna C3 MPE%	0.39

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	2.68 %
Sprint	0.47 %
MetroPCS	0.40 %
Verizon Wireless	2.13 %
Site Total MPE %:	**5.68 %**

T-Mobile Sector A Total:	2.68 %
T-Mobile Sector B Total:	2.68 %
T-Mobile Sector C Total:	2.68 %
Site Total:	5.68 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	137	9.78	2100	1000	0.98 %
T-Mobile 2100 MHz (AWS) UMTS	2	809.32	137	3.39	2100	1000	0.34 %
T-Mobile 1900 MHz (PCS) UMTS	2	1167.14	137	4.89	1900	1000	0.49 %
T-Mobile 1900 MHz (PCS) GSM	2	1167.14	137	4.89	1900	1000	0.49 %
T-Mobile 700 MHz LTE	1	865.21	137	1.81	700	467	0.39 %
						Total:	2.68 %

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 A:	2.68 %
Sector B:	2.68 %
Sector C:	2.68 %
T-Mobile Per Sector Maximum:	2.68 %
Site Total:	5.68 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.68%** 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.