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

www.ct.gov/csc

VIA ELECTRONIC MAIL

August 12, 2019

Anne Marie Zsamba
Real Estate Specialist
Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

RE: **EM-T-MOBILE-086-190711** – T-Mobile notice of intent to modify an existing telecommunications facility located at 41 Beckwith Road, Montville, Connecticut.

Dear Ms. Zsamba:

The Connecticut Siting Council (Council) is in receipt of your correspondence of July 29, 2019 submitted in response to the Council's July 23, 2019 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/IN/emr

Robidoux, Evan

From: Zsamba, Anne Marie <AnneMarie.Zsamba@crowncastle.com>
Sent: Monday, July 29, 2019 2:33 PM
To: Robidoux, Evan
Cc: CSC-DL Siting Council
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-086-190711-BeckwithRd-Montville
Attachments: (737001-0023) T-Mobile CTNH032H - Crown Castle Oakdale (L600) Emissions Analysis Report 072519.pdf

Good afternoon,

Please accept this electronic response to the Council's notice of incomplete correspondence dated July 23, 2019. Attached please find an updated Radio Frequency Emissions Analysis Report which includes the proposed microwave dish, Fastback IBR 1300_CCIV2. Please confirm if the submission of this revised report now renders T-Mobile's filing complete. Thank you kindly.

Best,
Anne Marie

ANNE MARIE ZSAMBA
Real Estate Specialist
T: (201) 236-9224
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101,
Clifton Park, NY 12065
CrownCastle.com

From: Robidoux, Evan
Sent: Wednesday, July 24, 2019 4:11 PM
To: Zsamba, Anne Marie
Cc: CSC-DL Siting Council
Subject: Council Incomplete Letter for EM-T-MOBILE-086-190711-BeckwithRd-Montville

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTNH032H

Crown Castle Oakdale
41 Beckwith Road
Oakdale, CT 06370

July 25, 2019

Transcom Engineering Project Number: 737001-0023

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.641 %**

July 25, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CTNH032H – Crown Castle Oakdale**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **41 Beckwith Road, Oakdale, 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 population 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 population 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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) bands and 5 GHz 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 performed for the proposed upgrades to the T-MOBILE antenna facility located at **41 Beckwith Road, Oakdale, 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 for directional panel antennas for broadcast and microwave backhaul, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1* and *Table 1a*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	1900 MHz (PCS)	1	40
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

Microwave Backhaul Data								
Make / Model:	Gain	Height (AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
Fastback IBR1300	10.0 dBd	175	5 GHz	1	1	10.00	**0.001**	C

Table 1a: Microwave Channel Data (Sector C)

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas for broadcast and microwave backhaul, 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APX16DWV-16DWV-S-E-ACU	175
A	2	RFS APXVAARR18_43-C-NA20	175
B	1	RFS APX16DWV-16DWV-S-E-ACU	175
B	2	RFS APXVAARR18_43-C-NA20	175
C	1	RFS APX16DWV-16DWV-S-E-ACU	175
C	2	RFS APXVAARR18_43-C-NA20	175
C	3	Fastback IBR1300 (microwave backhaul)	175

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	160	6,224.72	0.780
Antenna A2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz	12.95 / 13.55	4	120	2,447.88	0.730
						Sector A Composite MPE%	**1.510**
Antenna B1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	160	6,224.72	0.780
Antenna B2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz	12.95 / 13.55	4	120	2,447.88	0.730
						Sector B Composite MPE%	**1.510**
Antenna C1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	3	160	6,224.72	0.780
Antenna C2	RFS APXVAARR18_43-C-NA20	600 MHz / 700 MHz	12.95 / 13.55	4	120	2,447.88	0.730
Antenna C3	Fastback IBR1300	5 GHz	10	1	1	10.00	0.001
						Sector C Composite MPE%	**1.511**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, the sector with the highest emissions value is **Sector C**. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value (Sector C)	**1.511 %**
Verizon Wireless	3.240 %
Sprint	1.890 %
Site Total MPE %:	**6.641 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	1.510 %
T-MOBILE Sector B Total:	1.510 %
T-MOBILE Sector C Total:	1.511 %
Site Total:	6.641 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, the sector with the highest emissions value is Sector C.

T-MOBILE _ Frequency Band / Technology Max Power Values (Sector C)	# 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 1900 MHz (PCS) UMTS	1	1,556.18	175	1.96	1900 MHz (PCS)	1000	0.200%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	175	5.88	2100 MHz (AWS)	1000	0.590%
T-Mobile 600 MHz LTE / 5G NR	2	771.01	175	1.94	600 MHz	400	0.490%
T-Mobile 700 MHz LTE	2	452.93	175	1.14	700 MHz	467	0.240%
T-Mobile 5 GHz Microwave	1	10	175	0.01	5 GHz	1000	0.001%
						Total:	**1.511%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population 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 population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	1.510 %
Sector B:	1.510 %
Sector C:	1.511 %
T-MOBILE Maximum Total (Sector C):	1.511 %
Site Total:	6.641 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.641 %** of the allowable FCC established general population 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
Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564