

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
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May 21, 2015

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

**Re: Notice of Exempt Modification
SBA Communications Corporation/T-Mobile equipment upgrade
Site ID CT11505A
349R Mountain Street, Willimantic, Connecticut**

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, SBA Communications Corporation owns the existing self-supported communications tower and related facility located at 349R Mountain Street, Willimantic, Connecticut (Latitude: 41.70309/ Longitude: -72.221358). T-Mobile intends to add three (3) antennas and related equipment at this existing telecommunications facility in Willimantic ("Willimantic 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 Mayor, Earnest Eldridge. SBA Communications Corporation is also the property owner.

The existing Willimantic Facility consists of a 196 foot tall self-supported tower.¹ T-Mobile plans to replace add three (3) antennas to existing mast pipes and three (3) RRUs (remote radio units) to stand-off arms at a centerline of 168 feet. (See the plans revised to May 19, 2015 attached hereto as Exhibit A). The existing Willimantic Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated April 30, 2015 and attached hereto as Exhibit B.

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

¹ While the online docket for the Connecticut Siting Council does not provide a docket or petition number for the approval of this structure, it does reference this structure in connection with recent notices of intent captioned EM-VER-163-130729 and EM-T-MOBILE-163-140424.

May 21, 2015
Site ID CT11505A
Page 2

1. The proposed modification will not increase the height of the tower. T-Mobile's antennas and equipment will be installed at a centerline of 168 feet; its existing antennas are located at the same 168 foot elevation. 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. No changes are proposed to the compound area.

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

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the 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 May 18, 2015 T-Mobile's operations would add 4.6% 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 30.34% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

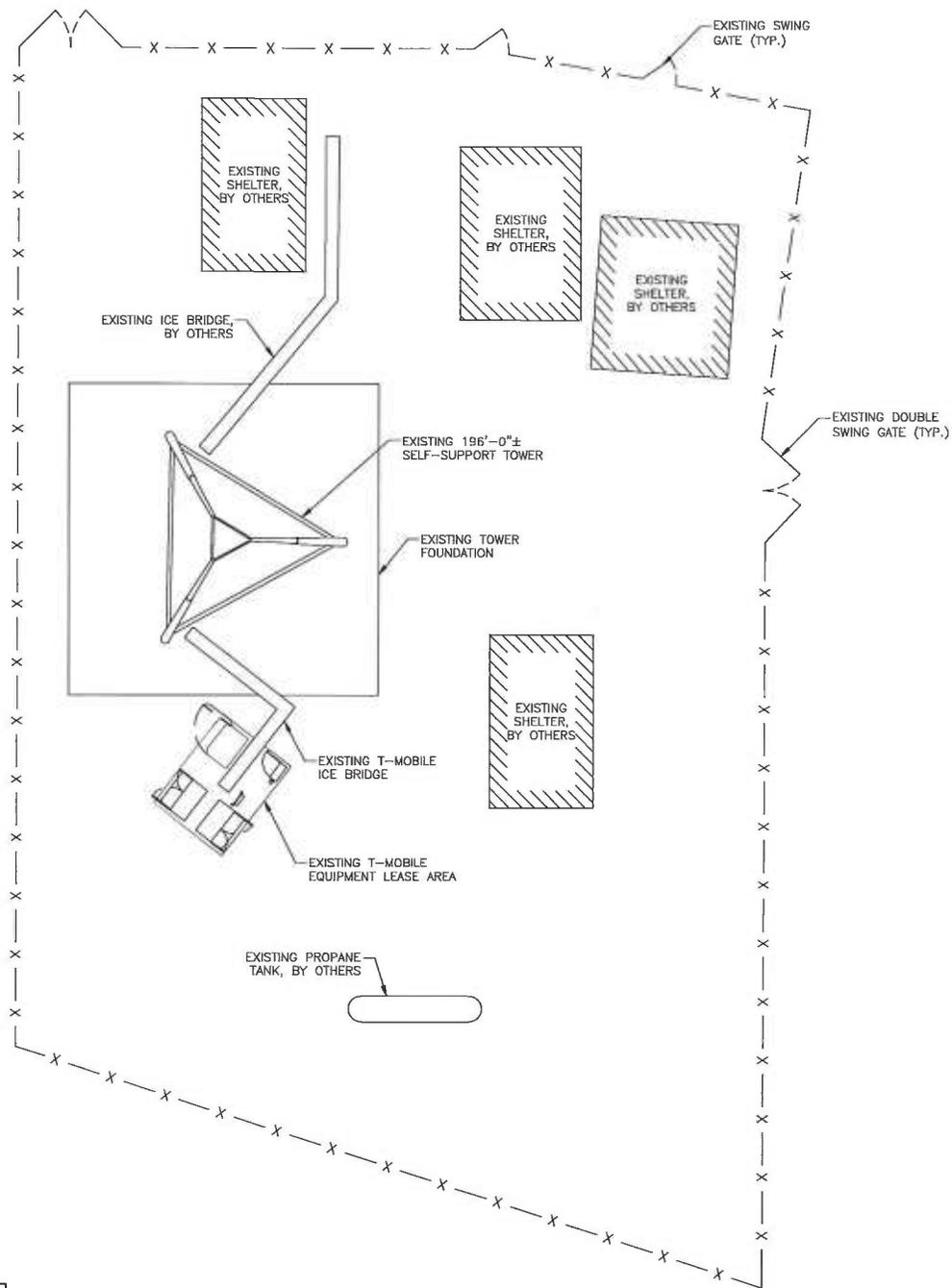
For the foregoing reasons, T-Mobile respectfully submits that the proposed additional antennas and equipment at the Willimantic Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence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

Sincerely,


Julie D. Kohler, Esq.

cc: Town of Willimantic (Windham) Mayor Earnest Eldridge
Rick Woods, SBA Communications Corporation
Jamie Ford, EBI Consulting

EXHIBIT A



APPROX. NORTH

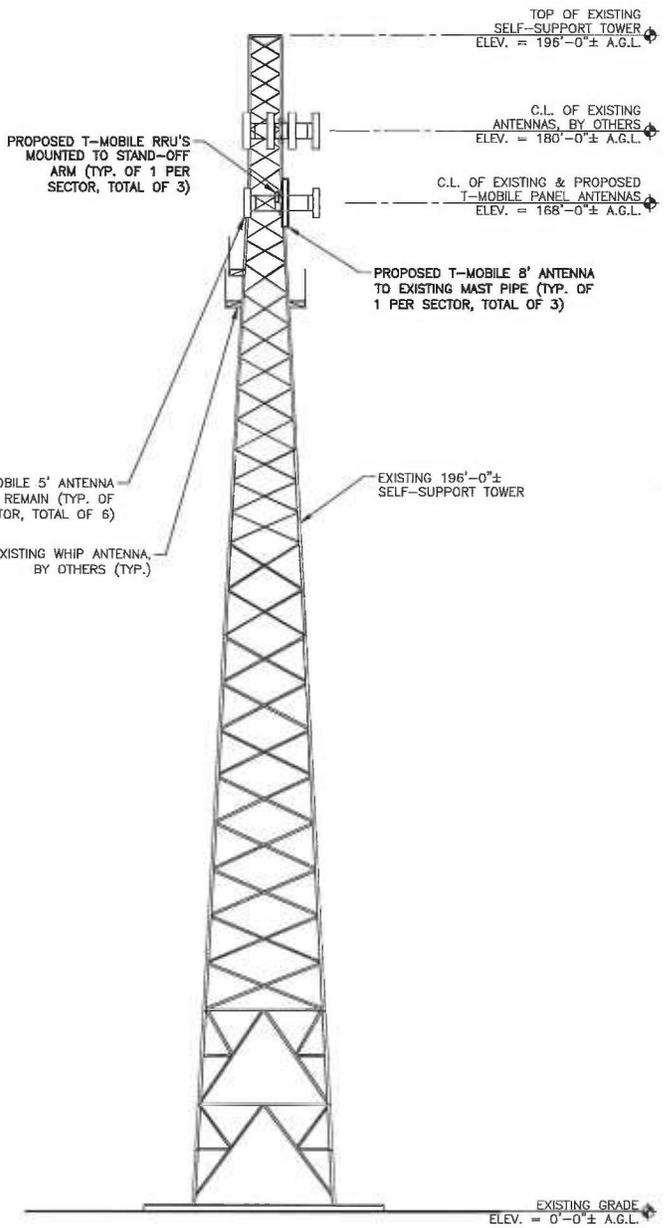
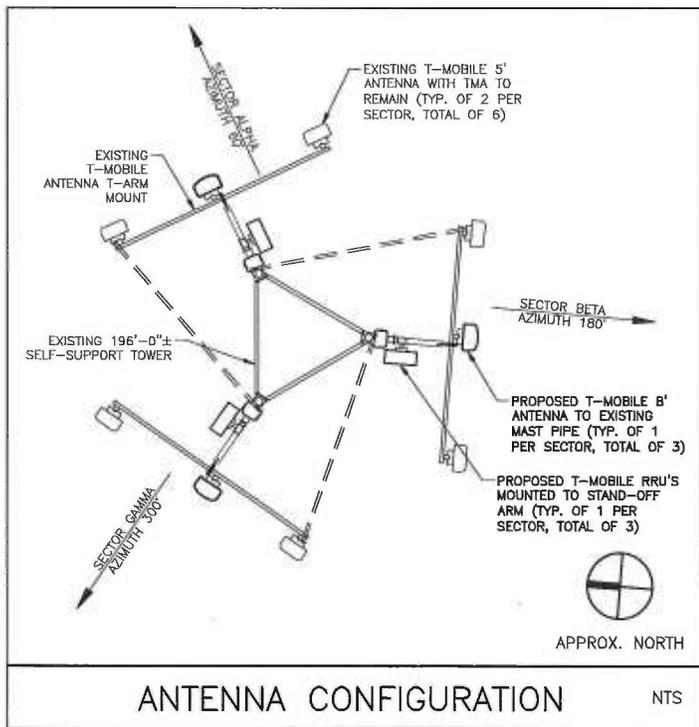
CONFIGURATION
702CU

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

SITE PLAN

SCALE: 1:20

| | | | | | | | | |
|---|--|---|------------|------|-------------|-------------------|-----------------|--------------------------|
| PREPARED BY:  21 B Street Burlington, MA 01803 Tel: (781) 273-2500 Fax: (781) 273-3311 www.ebiconsulting.com | CLIENT: T-Mobile Northeast, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860.692.7100 | SITE INFO: CT11505A WILIMANTIC - VERIZON 349R MOUNTAIN STREET WILLIMANTIC, CT 06226 | SUBMITTALS | | | | DRAWN BY: JM | SHEET NO: LE-1 |
| | | | NO. | DATE | DESCRIPTION | BY | CHECKED BY: | |
| | A | 02/25/15 | FOR REVIEW | BB | BB | | | |
| | 0 | 05/19/15 | FINAL | BB | BB | | | |
| | | | | | | DATE: 02/25/15 | | |



CONFIGURATION

702CU

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

| | | | | | | | | |
|--|--|---|------------|------|-------------|-------------------|-----------------|--------------------------|
| PREPARED BY: 21 B Street Burlington, MA 01803 Tel: (781) 273-2500 Fax: (781) 273-3311 www.ebiconsulting.com | CLIENT: T-Mobile Northeast, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860.692.7100 | SITE INFO: CT11505A WILIMANTIC - VERIZON 349R MOUNTAIN STREET WILLIMANTIC, CT 06226 | SUBMITTALS | | | | DRAWN BY: JM | SHEET NO: LE-2 |
| | | | NO. | DATE | DESCRIPTION | BY | CHECKED BY: | |
| | A | 02/25/15 | FOR REVIEW | BB | BB | | | |
| | 0 | 05/19/15 | FINAL | BB | | | | |
| | | | | | | DATE: 02/25/15 | | |

EXHIBIT B



ENGINEERING INNOVATION

Velocitel, Inc., d.b.a. FDH Velocitel, 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

**Structural Analysis for
SBA Network Services, Inc.**

196' Self-Support Tower

**SBA Site Name: Mountain Street – Twr #2
SBA Site ID: CT06462-A-02
T-Mobile Site ID: CT11505A**

FDH Velocitel Project Number 15BORD1400

Analysis Results

| | | |
|------------------|-------|------------|
| Tower Components | 77.0% | Sufficient |
| Foundation | 75.4% | Sufficient |

Prepared By:

David D. Vaughan, EI
Project Engineer

Reviewed By:

Dennis D. Abel, PE
Director of Structural Engineering
CT PE License No. 23427

Velocitel, Inc., d.b.a. FDH Velocitel

6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012
info@fdh-inc.com



04-30-2015

April 30, 2015

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut State Building Code

TABLE OF CONTENTS

EXECUTIVE SUMMARY3
 Conclusions.....3
 Recommendation3
APPURTENANCE LISTING4
RESULTS5
GENERAL COMMENTS6
LIMITATIONS6
APPENDIX7

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Velocitel performed a structural analysis of the existing self-supported tower located in Windham, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F* and *2005 Connecticut State Building Code (CSBC)*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, and foundation dimensions was obtained from:

- Rohn Industries, Inc (Eng. File No. 49204TT) original design drawings dated September 27, 2001
- Rohn Industries, Inc (Eng. File No. 49204TT) Mat Foundation Detail dated August 31, 2001
- FDH Engineering, Inc. (Job No. 1301611800) TIA Inspection Report dated May 3, 2013
- SBA Network Services, Inc

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CSBC* is 85 mph without ice and 38 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from T-Mobile in place at 168 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Rohn File No. 49204TT), the foundation should have the necessary capacity to support both the proposed and existing loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Velocitel is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. Feed lines must be installed as shown in **Figure 1**.
2. The existing TMAs should be installed directly behind the proposed panel antennas.
3. RRU/RRH Stipulation: The equipment may be installed in any arrangement as determined by the client.

APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Velocitel should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

| Antenna Elevation (ft) | Description | Coax and Lines | Carrier | Mount Elevation (ft) | Mount Type |
|------------------------|--|---------------------------------|-------------------------------------|----------------------|-------------------|
| 180 | (3) Antel BXA-80080/4CF (3) Antel BXA-70063/6CF (3) Antel BXA-171085-8BF (3) Antel BXA-171063-8CF (3) Alcatel lucent RRRH2X40-AWS (6) RFS FD9R6004/2C-3L (1) RFS DB-T1-6Z-8AB-0Z | (12) 1-5/8" (1) 1-5/8" Fiber | Verizon | 180 | (3) 10' T-Frames |
| 168 | (3) Ericsson Air B2A B4P (3) Ericsson Air B4A B2P (3) Ericsson KRY112 144 | (12) 1-5/8" (1) 1-5/8" Fiber | T-Mobile | 168 | (3) 10' T-Frames |
| 162 | (1) RFS PD1142-2B | (1) 7/8" | Connecticut Light and Power Company | 158 | (1) 1.5' Standoff |
| 157 | (1) RFS 458-2N | (1) 7/8" | | 152 | (1) 4' Standoff |
| | (1) Telewave ANT450D6-9 | (1) 7/8" | | 151 | (1) 4' Standoff |
| 140 | (1) RFS 220-7N | (3) 7/8" | | 130 | (3) 8' Standoffs |
| 139 | (1) RFS PD1142-2B | | | | |
| 135 | (1) Telewave ANT450D6-9 | | | | |

Proposed Loading:

| Antenna Elevation (ft) | Description | Coax and Lines | Carrier | Mount Elevation (ft) | Mount Type |
|------------------------|---|---------------------------------|----------|----------------------|------------------|
| 168 | (3) Ericsson Air B2A B4P (3) Ericsson Air B4A B2P (3) Ericsson KRY112 144 (3) Andrew LNX-6515DS-VTM (3) S11 B12 | (12) 1-5/8" (1) 1-5/8" Fiber | T-Mobile | 168 | (3) 10' T-Frames |

RESULTS

The following yield strength of steel for individual members was used for analysis:

Table 2 - Material Strength

| Member Type | Yield Strength |
|-------------|----------------|
| Legs | 50 ksi |
| Bracing | 36 ksi |

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 100% are considered acceptable.* **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Velocitel should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information.

Table 3 - Summary of Working Percentage of Structural Components

| Section No. | Elevation ft | Component Type | Size | % Capacity* | Pass Fail |
|-------------|-------------------|----------------|-------------------|------------------|-----------|
| T1 | 198.475 - 190.35 | Leg | ROHN 3 STD | 1.4 | Pass |
| | | Diagonal | L1 3/4x1 3/4x3/16 | 3.2 4.5 (b) | Pass |
| | | Top Girt | L1 3/4x1 3/4x3/16 | 1.3 | Pass |
| T2 | 190.35 - 170.204 | Leg | ROHN 3 STD | 20.0 | Pass |
| | | Diagonal | L2x2x1/4 | 18.5 32.1 (b) | Pass |
| T3 | 170.204 - 162.038 | Leg | ROHN 3 STD | 39.6 | Pass |
| | | Diagonal | L2x2x1/4 | 32.0 54.7 (b) | Pass |
| T4 | 162.038 - 141.871 | Leg | ROHN 3 EH | 64.4 | Pass |
| | | Diagonal | L2x2x3/16 | 66.4 72.8 (b) | Pass |
| | | Top Girt | L1 3/4x1 3/4x3/16 | 3.5 | Pass |
| T5 | 141.871 - 121.683 | Leg | ROHN 4 EH | 65.6 | Pass |
| | | Diagonal | L2 1/2x2 1/2x1/4 | 48.9 61.3 (b) | Pass |
| T6 | 121.683 - 101.475 | Leg | ROHN 5 EH | 57.5 | Pass |
| | | Diagonal | L2 1/2x2 1/2x1/4 | 66.4 | Pass |
| T7 | 101.475 - 81.2668 | Leg | ROHN 6 EHS | 62.1 | Pass |
| | | Diagonal | L3x3x1/4 | 54.6 | Pass |
| T8 | 81.2668 - 60.996 | Leg | ROHN 6 EH | 65.2 | Pass |
| | | Diagonal | L3 1/2x3 1/2x1/4 | 55.5 56.9 (b) | Pass |
| T9 | 60.996 - 40.663 | Leg | ROHN 8 EHS | 58.7 | Pass |
| | | Diagonal | L3 1/2x3 1/2x1/4 | 73.4 | Pass |

| Section No. | Elevation ft | Component Type | Size | % Capacity* | Pass Fail |
|-------------|----------------|----------------|------------|------------------|-----------|
| T10 | 40.663 - 20.33 | Leg | ROHN 8 EHS | 66.5 | Pass |
| | | Diagonal | L4x4x1/4 | 61.8 68.6 (b) | Pass |
| T11 | 20.33 - 0 | Leg | ROHN 8 EH | 57.8 | Pass |
| | | Diagonal | L4x4x1/4 | 77.0 | Pass |

* Capacities include a 1/3 allowable stress increase for wind per TIA/EIA-222-F standards.

Table 4 - Maximum Base Reactions

| Load Type | Direction | Current Analysis (TIA/EIA-222-F) | Original Design (TIA/EIA-222-F) |
|-----------------------|-------------|----------------------------------|---------------------------------|
| Individual Foundation | Horizontal | 27 k | - |
| | Uplift | 214 k | 301 k |
| | Compression | 250 k | 345 k |
| Overturning Moment | --- | 4,733 k-ft | 6,281 k-ft |

GENERAL COMMENTS

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Velocitel should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Velocitel.

APPENDIX

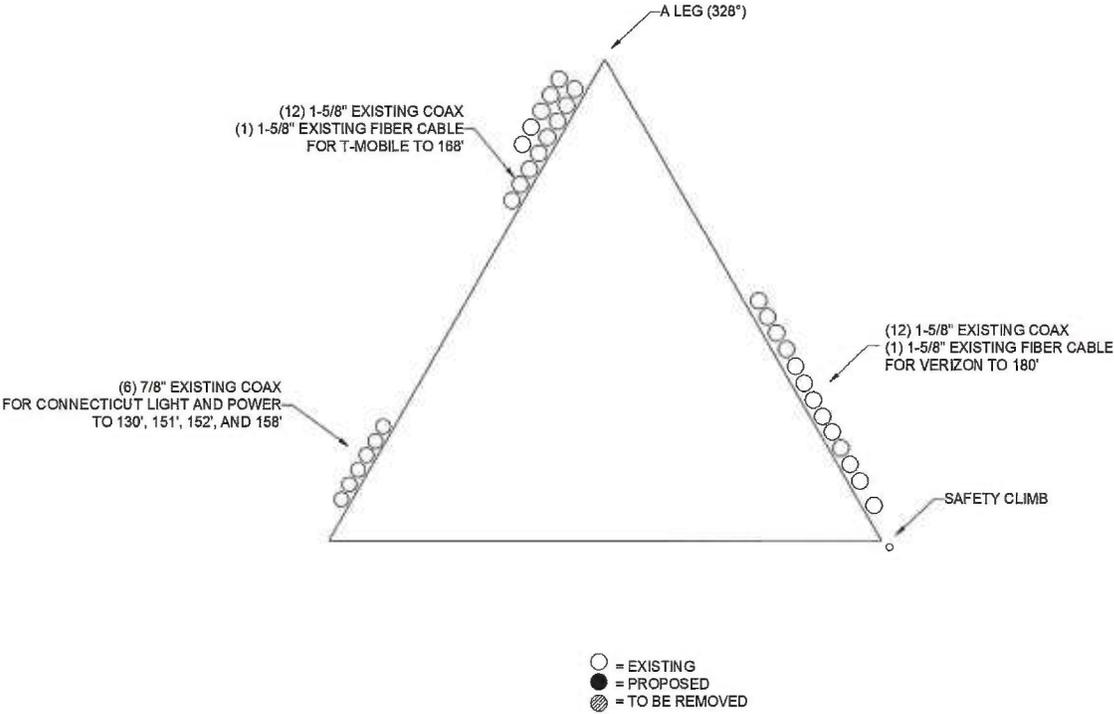
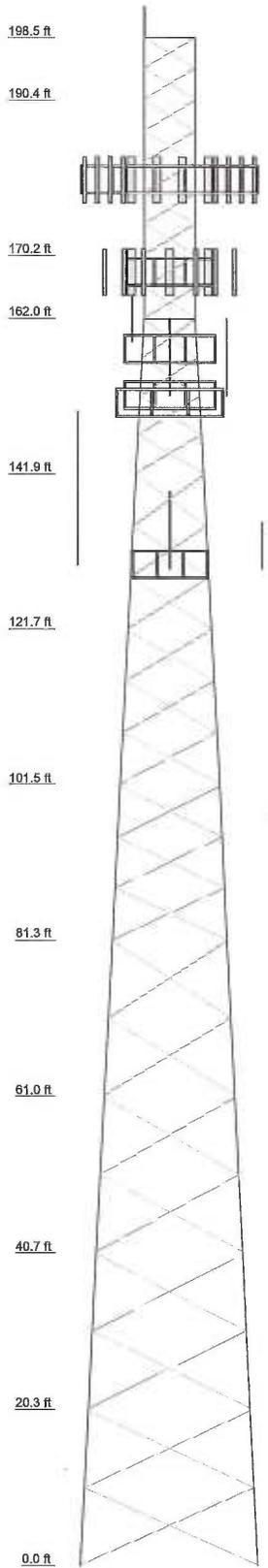


Figure 1 – Assumed Feed Line Layout

| | | | | | | | | | | | |
|-----------------|------------|------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Section | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 | T11 |
| Legs | ROHN 3 STD | ROHN 3 STD | ROHN 3 STD | ROHN 3 EH | ROHN 4 EH | ROHN 5 EH | ROHN 6 EHS | ROHN 6 EH | ROHN 8 EHS | ROHN 8 EH | ROHN 8 EH |
| Leg Grade | | | | | | | | | | | |
| Diagonals | L2x2x1/4 | L2x2x1/4 | L2x2x1/4 | L2x2x3/16 | L2x2x3/16 | L2 1/2x2 1/2x1/4 | L3x3x1/4 | L3 1/2x3 1/2x1/4 | L4x4x1/4 | L4x4x1/4 | L4x4x1/4 |
| Diagonal Grade | A | A | A | A | A | A36 | A36 | A36 | A36 | A36 | A36 |
| Top Girts | N.A. | N.A. | N.A. | L1 3/4x1 3/4x3/16 |
| Face Width (ft) | 6.604 | 6.604 | 6.604 | 6.6875 | 8.76 | 10.83 | 12.92 | 14.85 | 16.99 | 19 | 21 |
| # Panels @ (ft) | 7 @ 4 | 7 @ 4 | 7 @ 4 | 4 @ 5.00001 | 4 @ 5.00001 | 9 @ 6.66667 | 9 @ 6.66667 | 2 @ 10 | 2 @ 10 | 4 @ 9.99983 | 2 @ 9.99833 |
| Weight (K) | 0.4 | 0.4 | 0.4 | 1.2 | 1.8 | 2.3 | 2.7 | 3.0 | 3.5 | 3.8 | 4.6 |



DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|------------------------------------|-----------|------------------------------|-----------|
| Lightning Rod | 198.475 | AIR 21 B4A/B2P w/Mount Pipe | 168 |
| Antel BXA-70063/6CF w/ Mount Pipe | 180 | AIR 21 B4A/B2P w/Mount Pipe | 168 |
| Antel BXA-70063/6CF w/ Mount Pipe | 180 | KRY 112 144 TMA | 168 |
| BXA-80080/4CF w/ Mount Pipe | 180 | KRY 112 144 TMA | 168 |
| BXA-80080/4CF w/ Mount Pipe | 180 | KRY 112 144 TMA | 168 |
| BXA-80080/4CF w/ Mount Pipe | 180 | S11B12 | 168 |
| (2) FD9R6004/2C-3L Diplexers | 180 | S11B12 | 168 |
| (2) FD9R6004/2C-3L Diplexers | 180 | S11B12 | 168 |
| (2) FD9R6004/2C-3L Diplexers | 180 | LNx-6515DS-VTM w/ Mount Pipe | 168 |
| Antel BXA-171085-8BF w/ Mount Pipe | 180 | LNx-6515DS-VTM w/ Mount Pipe | 168 |
| Antel BXA-171085-8BF w/ Mount Pipe | 180 | LNx-6515DS-VTM w/ Mount Pipe | 168 |
| Antel BXA-171085-8BF w/ Mount Pipe | 180 | (3) 10' T-Frames | 168 |
| Antel BXA-171063-8CF w/Mount Pipe | 180 | AIR 21 B2A/B4P w/Mount Pipe | 168 |
| Antel BXA-171063-8CF w/Mount Pipe | 180 | (1) 1.5' Standoff | 158 |
| Antel BXA-171063-8CF w/Mount Pipe | 180 | RFS PD1142-2B Omni | 158 |
| RRH2X40-AWS | 180 | 458-2N Omni | 152 |
| RRH2X40-AWS | 180 | (1) 4' Standoff | 152 |
| RRH2X40-AWS | 180 | (1) 4' Standoff | 151 |
| DB-T1-6Z-8AB-0Z Distribution Box | 180 | ANT450D6-9 Dipole | 151 |
| (3) 10' T-Frames | 180 | RFS 220-7N Omni | 130 |
| Antel BXA-70063/6CF w/ Mount Pipe | 180 | RFS PD1142-2B Omni | 130 |
| AIR 21 B2A/B4P w/Mount Pipe | 168 | ANT450D6-9 Dipole | 130 |
| AIR 21 B2A/B4P w/Mount Pipe | 168 | (3) 8' Standoffs | 130 |
| AIR 21 B4A/B2P w/Mount Pipe | 168 | | |

SYMBOL LIST

| MARK | SIZE | MARK | SIZE |
|------|-------------------|------|------|
| A | L1 3/4x1 3/4x3/16 | | |

MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---------|--------|--------|-------|--------|--------|
| A572-50 | 50 ksi | 65 ksi | A36 | 36 ksi | 58 ksi |

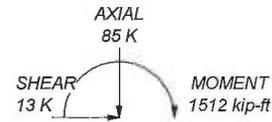
TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 77%

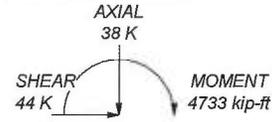
MAX. CORNER REACTIONS AT BASE:

DOWN: 250 K
SHEAR: 27 K

UPLIFT: -214 K
SHEAR: 23 K



TORQUE 5 kip-ft
38 mph WIND - 1.0000 in ICE



TORQUE 21 kip-ft
REACTIONS - 85 mph WIND

| | | | | |
|---|---|--|--|--|
| <p>ENGINEERING INNOVATION</p> <p>Tower Analysis</p> | <p>Velocitel, Inc., d.b.a. FDH Velocitel</p> <p>6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 919-755-1012 FAX: 919-755-1031</p> | | <p>Job: Mountain Street Tower #2, CT06462-A-02</p> | |
| | <p>Project: 15BORD1400</p> | | <p>Client: SBA Network Services, Inc. Drawn by: D.Vaughan App'd:</p> | |
| | <p>Code: TIA/EIA-222-F</p> | | <p>Date: 04/30/15 Scale: NTS</p> | |
| | <p>Path:</p> | | <p>Dwg No. E-1</p> | |

EXHIBIT C

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

T-Mobile Existing Facility

Site ID: CT11505A

Willimantic- Verizon
349 R Mountain Street
Willimantic, CT 06226

May 18, 2015

EBI Project Number: 6215003016

| Site Compliance Summary | |
|--|------------------|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general public allowable limit: | 30.34 % |

May 18, 2015

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

Emissions Analysis for Site: **CT11505A – Wilimantic- Verizon**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **349 R Mountain Street, Wilimantic, 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 **349 R Mountain Street, Willimantic, 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 **Ericsson AIR21 (B4A/B2P & 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 & B2A/B4P)** have a maximum gain of **15.9 dBd** at their 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 **168 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: | 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): | 168 | Height (AGL): | 168 | Height (AGL): | 168 |
| 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 | # PCS Channels: | 2 |
| Total TX Power: | 120 | Total TX Power: | 120 | # AWS Channels: | 120 |
| ERP (W): | 4,668.54 | ERP (W): | 4,668.54 | ERP (W): | 4,668.54 |
| Antenna A1 MPE% | 0.64 | Antenna B1 MPE% | 0.64 | Antenna C1 MPE% | 0.64 |
| 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): | 168 | Height (AGL): | 168 | Height (AGL): | 168 |
| 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 | 4 | Channel Count | 4 | Channel Count | 4 |
| Total TX Power: | 120 | Total TX Power: | 120 | Total TX Power: | 120 |
| ERP (W): | 4,668.54 | ERP (W): | 4,668.54 | ERP (W): | 4,668.54 |
| Antenna A2 MPE% | 0.64 | Antenna B2 MPE% | 0.64 | Antenna C2 MPE% | 0.64 |
| 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): | 168 | Height (AGL): | 168 | Height (AGL): | 168 |
| 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): | 865.21 | ERP (W): | 865.21 | ERP (W): | 865.21 |
| Antenna A3 MPE% | 0.25 | Antenna B3 MPE% | 0.25 | Antenna C3 MPE% | 0.25 |

| Site Composite MPE% | |
|--------------------------|----------------|
| Carrier | MPE% |
| T-Mobile | 4.60 |
| Verizon Wireless | 9.39 % |
| CL&P | 16.35 % |
| Site Total MPE %: | 30.34 % |

| | |
|--------------------------|----------------|
| T-Mobile Sector 1 Total: | 1.53 % |
| T-Mobile Sector 2 Total: | 1.53 % |
| T-Mobile Sector 3 Total: | 1.53 % |
| Site Total: | 30.34 % |

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: | 1.53 % |
| Sector 2: | 1.53 % |
| Sector 3 : | 1.53 % |
| T-Mobile Total: | 4.60 % |
| | |
| Site Total: | 30.34 % |
| | |
| Site Compliance Status: | COMPLIANT |

The anticipated composite MPE value for this site assuming all carriers present is **30.34%** 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.



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