



May 21 2015

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification  
3114 Albany Ave., West Hartford, CT 06117  
Longitude: -72 47 48  
Latitude: 41 47 47  
T-Mobile Site#: CT11765A\_VOLTE

Members of the Siting Council:

On behalf of T-Mobile, Northeast Site Solutions (NSS) is submitting an exempt modification application to the Connecticut Siting Council for modification of existing equipment at a tower facility located at 3114 Albany Ave., West Hartford, CT 06117

The 3114 Albany Ave., West Hartford, CT 06117 facility consists of a 346.3' Guyed Tower owned and operated by SBA. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

As part of T-Mobile's VOLTE Project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of \$625.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes significantly changed or altered. Rather, the planned changes to



the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than the new equipment cabinet.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.
4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, Northeast Site Solutions (NSS) on behalf of T-Mobile, respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 860.209.4690 with any questions you may have concerning this matter.

Sincerely,

**Denise Sabo**

**Mobile:** 860-209-4690

**Fax:** 413-521-0558

**Office:** 199 Brickyard Rd, Farmington, CT 06032

**Email:** [denise@northeastsitesolutions.com](mailto:denise@northeastsitesolutions.com)

cc: West Hartford Town Hall  
SBA Communications Corporation  
EDUCATIONAL MEDIA FOUNDATION



T-MOBILE USA, INC.  
 12920 SE 38TH STREET  
 BELLEVUE, WA 98006  
 (425) 378-4000

3086784  
 4/21/2015  
 2000011160

Invoice Number	Inv. Date	Description	Deductions	Voucher	Amount Paid
CT11765A-1	4/17/2015	Exempt Mod Filing Fees	0.00	1100664134	625.00

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW.



T-MOBILE USA, INC.  
 12920 SE 38th Street  
 Bellevue, WA 98006  
 (425) 378-4000

The Bank of New York Mellon  
 Pittsburgh, PA  
 60-160/433

3086784  
 4/21/2015  
 VID 2000011160

PAY \$625.00  
SIX TWO FIVE CTS CTS

**\*\$625.00**

\*\*\*Six Hundred Twenty Five Dollars Only\*\*\*\*\*

To  
 The  
 Order  
 Of

CONNECTICUT SITING COUNCIL  
 10 FRANKLIN SQ  
 NEW BRITAIN, CT 06051

VOID AFTER 180 DAYS  
 THIS CHECK CLEARS THROUGH POSITIVE PAY

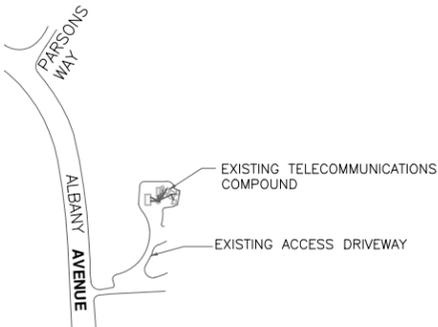
*David [Signature]*

⑈0003086784⑈ ⑆043301601⑆ 013⑈8430⑈

# Exhibit A



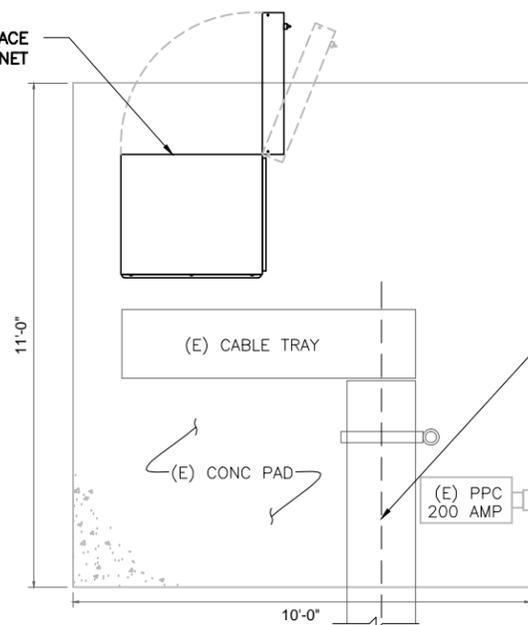




**KEY PLAN**  
SCALE: NOT TO SCALE

2  
A-2

(P) 6201 CABINET TO REPLACE  
(E) S8000 CABINET

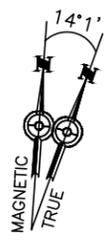


(E) (12) 1-5/8" COAX CABLES TO REMAIN  
IN (E) ICE BRIDGE

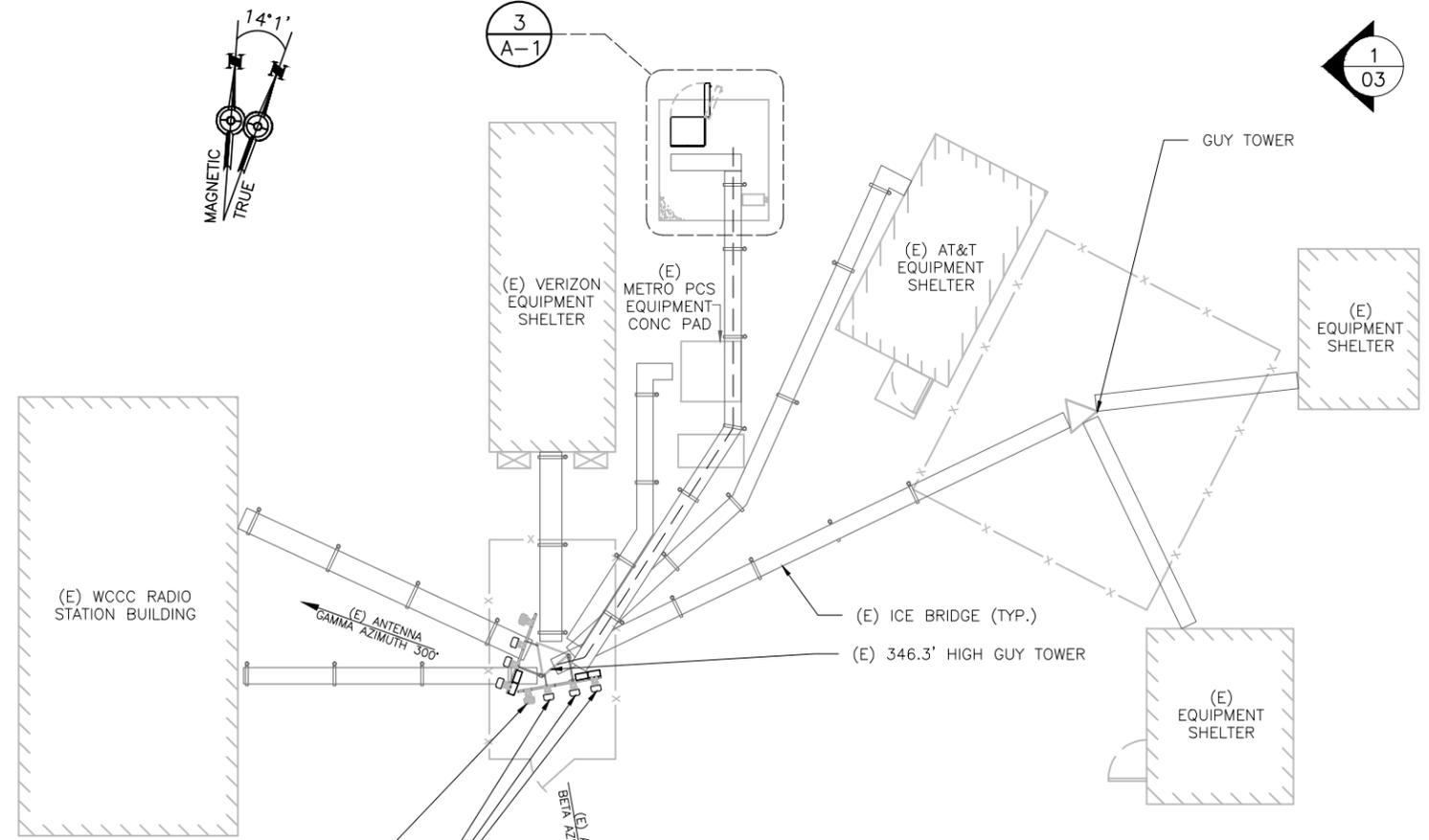
**EQUIPMENT PLAN**  
SCALE: 1/4" = 1'-0" (11x17)  
1/2" = 1'-0" (24x36)



REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED,  
"STRUCTURAL ANALYSIS FOR SBA NETWORK SERVICES, INC."  
PREPARED BY FDH VELOCITEL, "T-MOBILE SITE ID CT11765A",  
DATED MAY 04, 2015



3  
A-1



(E) RFS (APX16DWV\_16DWVS) ANTENNA TO REMAIN  
(TYP 1/SECTOR, TOTAL OF 2)  
(P) (1) ddB2 AND (1) ddB4 TMAS TO REPLACE  
(E) (4) dB2 TMAS ON (E) PIPE MAST  
(TYP 2/SECTOR, TOTAL OF 4)  
RESERVED FOR FUTURE ANTENNAS  
(TYP 3/SECTOR, TOTAL OF 6)

**COMPOUND PLAN**  
SCALE: 1/16" = 1'-0" (11x17)  
1/8" = 1'-0" (24x36)



**GENERAL SITE NOTES**

1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.
5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL BEFORE YOU DIG THREE WORKING DAYS PRIOR TO COMMENCING WORK.
7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

**SITE LEGEND**

- SITE PROPERTY LINE
- STREET OR ROAD
- x-x-x- CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- BOARD ON BOARD FENCE
- ⊗ DECIDUOUS TREES/SHRUBS
- ⊗ EVERGREEN TREES/SHRUBS
- ~ TREE LINE
- ⊗ UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE
- ⊗ PROP. LTE ANTENNA
- ⊗ PROP. UMS/GSM ANTENNA
- ⊗ EX. GSM ANTENNA
- ⊗ EX. UMS ANTENNA

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

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

SUBMITTALS		
DATE	DESCRIPTION	REVISION
03/11/15	ISSUED FOR REVIEW	A
03/13/15	REVISED PER COMMENTS	0
03/13/15	REVISED PER COMMENTS	1
05/07/15	FINAL CD	2
03/21/15	REVISED PER COMMENTS	3

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11765A  
DRAWN BY: MB  
CHECKED BY: SM

PROFESSIONAL SEAL

THIS DOCUMENT IS THE CREATION,  
DESIGN, PROPERTY AND COPYRIGHTED  
WORK OF T-MOBILE. ANY DUPLICATION  
OR USE WITHOUT EXPRESS WRITTEN  
CONSENT IS STRICTLY PROHIBITED.

SITE NUMBER  
**CT11765A**  
SITE NAME  
CT765/MARLIN GUYED TOWER  
SITE ADDRESS  
3114 ALBANY AVE  
WEST HARTFORD, CT, 06117

SHEET TITLE  
**SITE PLAN**

SHEET NUMBER  
**A-1**

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS FOR SBA NETWORK SERVICES, INC." PREPARED BY FDH VELOCITEL, "T-MOBILE SITE ID CT11765A", DATED MAY 04, 2015

**T-Mobile**  
**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
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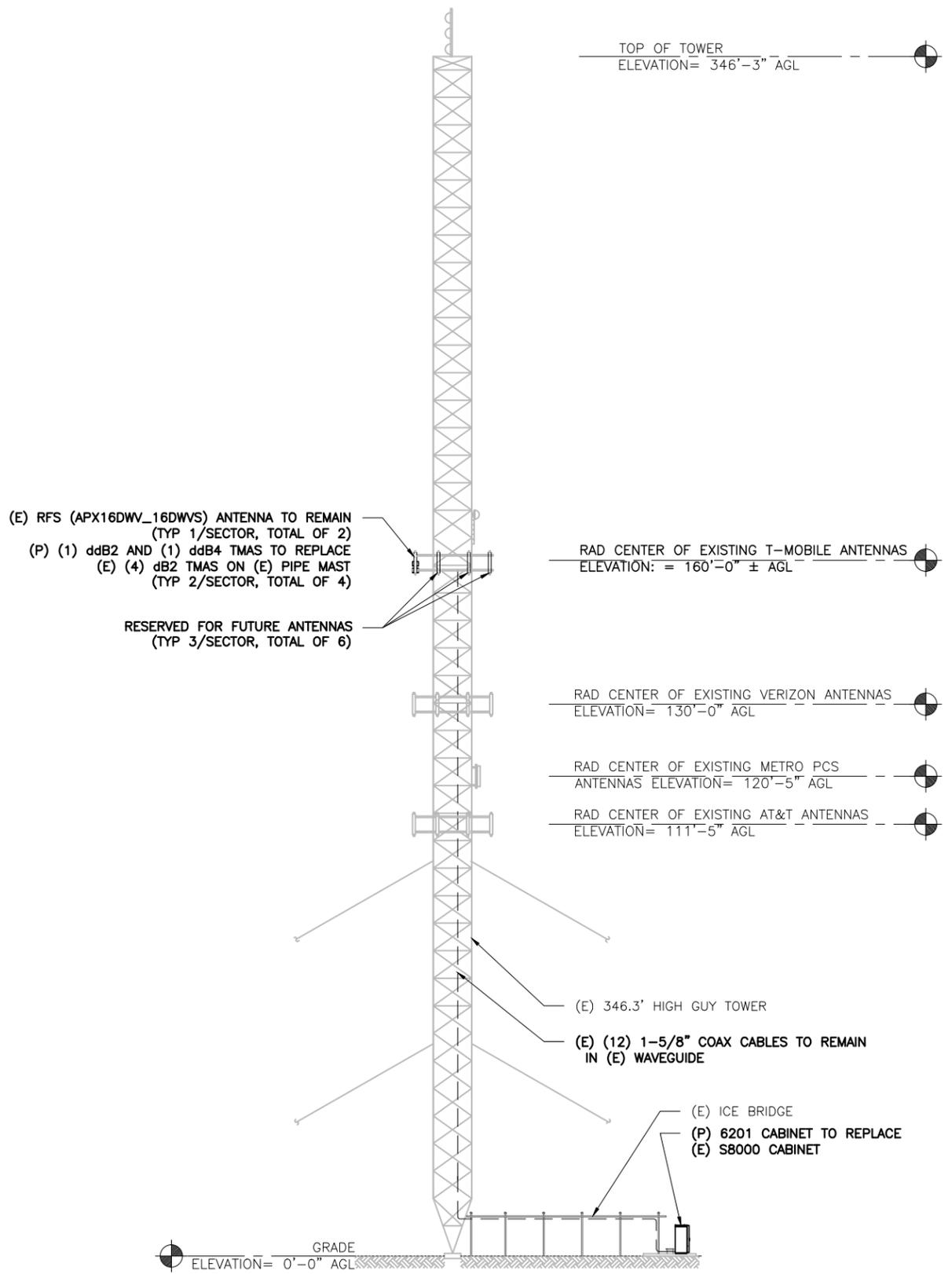
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 SITE ADDRESS  
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 WEST HARTFORD, CT, 06117

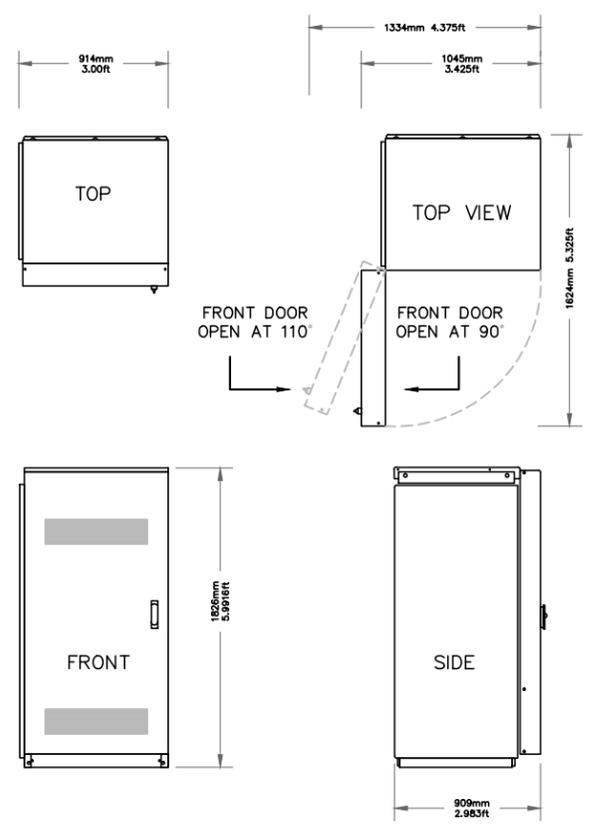
SHEET TITLE  
 ELEVATION

SHEET NUMBER  
**A-2**

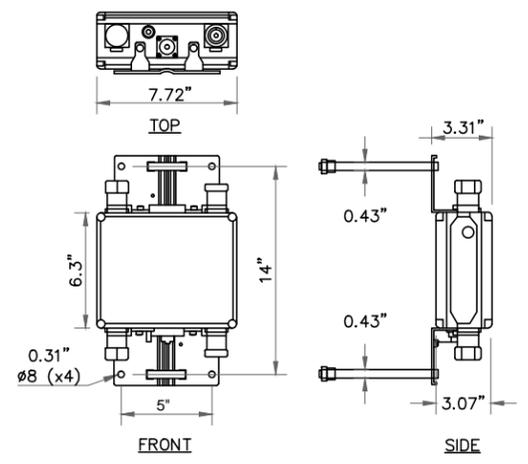


**ELEVATION VIEW** 1  
 SCALE: 1" = 30'-0" (11x17)  
 1" = 15'-0" (24x36)

SCALE 1"=30' (11x17)  
 1"=15' (24x36)



**ERICSSON RBS 6201 EQUIPMENT CABINET** 2  
 SCALE: N.T.S. A-2



ddB2 AND ddB4  
**TMA DETAILS** 3  
 SCALE: N.T.S. A-2

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SITE AC.			

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CHECKED BY:	SM

PROFESSIONAL SEAL

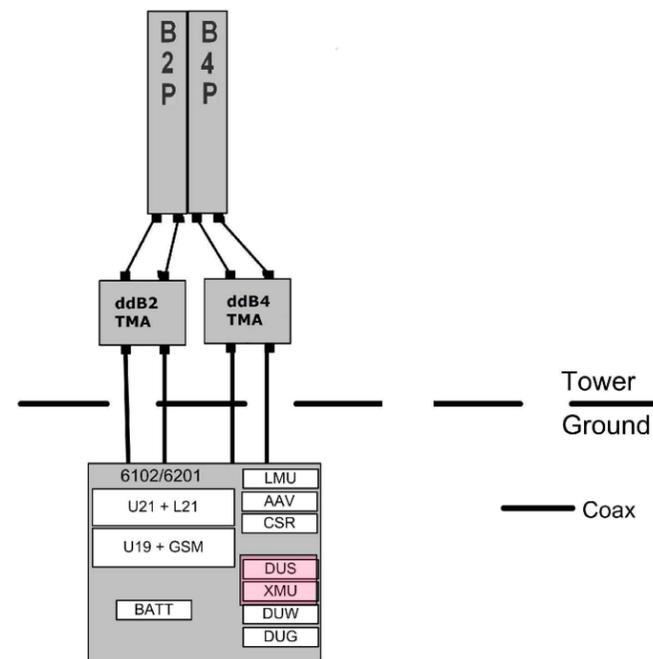
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 SITE NAME  
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 SITE ADDRESS  
 3114 ALBANY AVE  
 WEST HARTFORD, CT, 06117

SHEET TITLE  
**GROUNDING DIAGRAM AND POWER ONE LINE DIAGRAM**

SHEET NUMBER

**E-1**



**TRUNK FIBER NOTES:**

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO 3/8" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
2. THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN 3/4" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOVEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM.
10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
11. MAXIMUM HANGER SPACING 3FT (0.9 M).

**HYBRID FIBER/POWER JUMPER NOTES:**

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A 3/8" COAXIAL CABLE.
2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN 3/4" (19MM) RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS.
4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N) LONG TERM.
9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

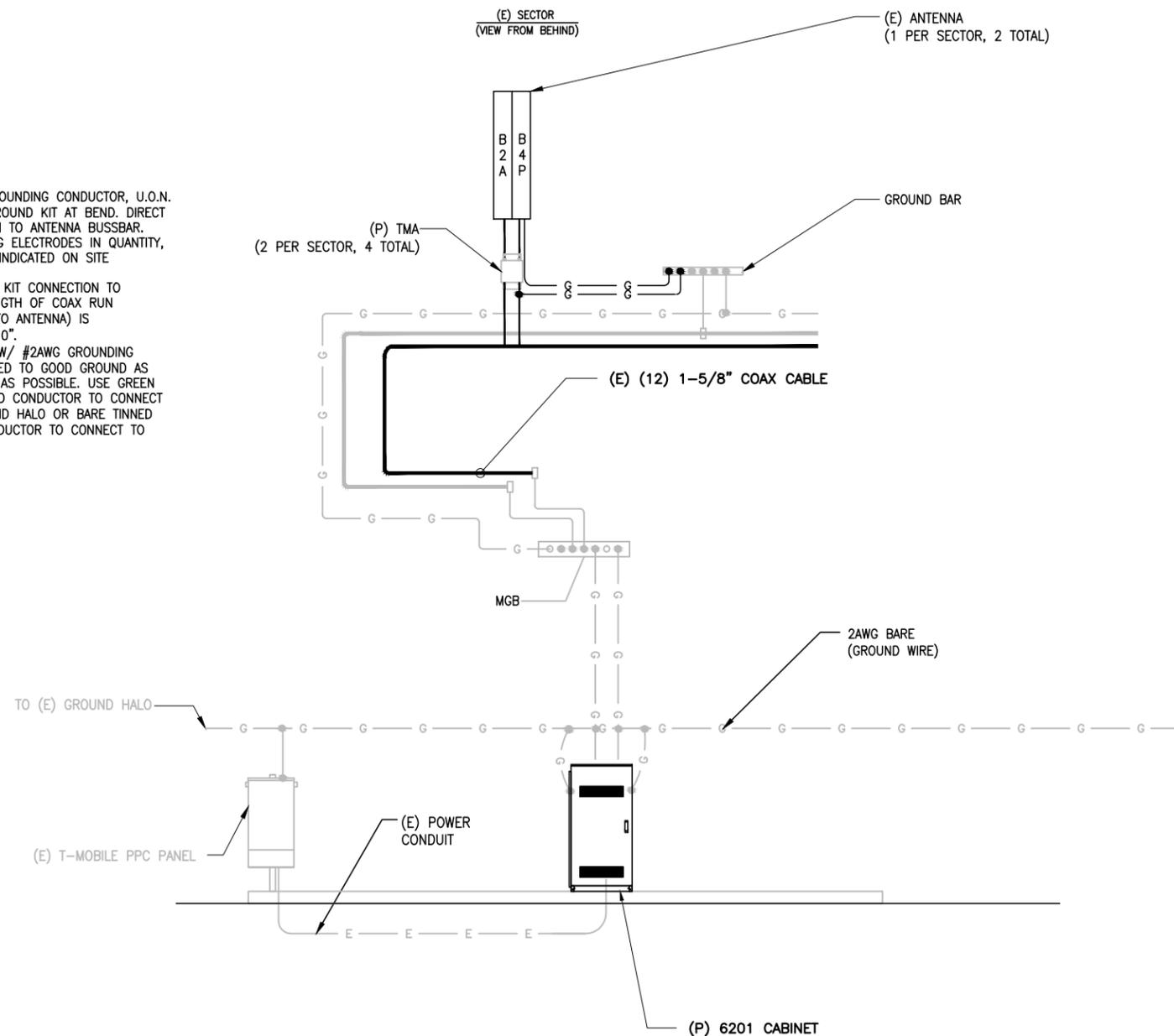
**4E-GU19 CONFIGURATION COAX/FIBER PLUMBING DIAGRAM**

SCALE: N.T.S

2  
E-1

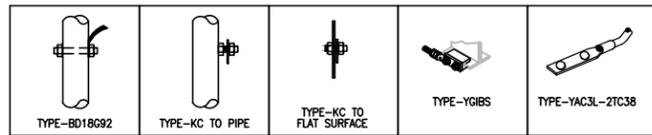
**NOTES:**

1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSSBAR.
3. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
4. ADD COAX GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT TO ANTENNA) IS GREATER THAN 20'-0".
5. GROUND HCS BOX W/ #2AWG GROUNDING CONDUCTOR ATTACHED TO GOOD GROUND AS DIRECT AND SHORT AS POSSIBLE. USE GREEN STRANDED INSULATED CONDUCTOR TO CONNECT TO BUSSBAR/GROUND HALO OR BARE TINNED SOLID COPPER CONDUCTOR TO CONNECT TO GROUND RING.



**GROUNDING DIAGRAM**  
 SCALE: N.T.S

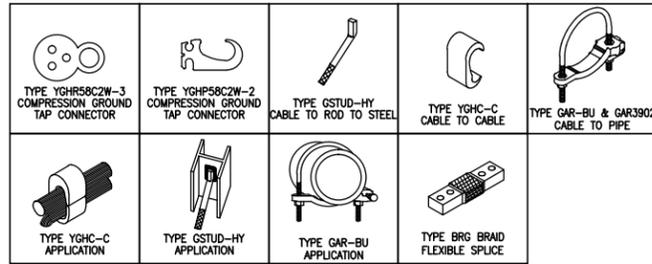
1  
E-1



**BURNDY GROUNDING DETAILS**

SCALE: N.T.S.

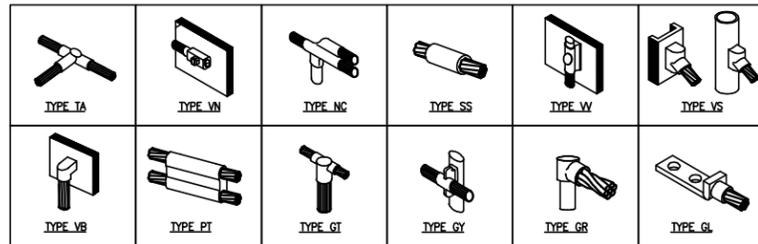
1  
E-2



**BURNDY GROUNDING PRODUCTS**

SCALE: N.T.S.

2  
E-2



**CADWELD GROUNDING CONNECTION PRODUCTS**

SCALE: N.T.S.

3  
E-2

**TERMINATION TYPES:**

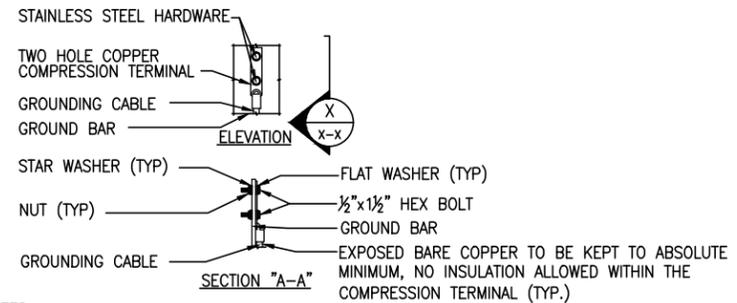
- A. MECHANICAL COMPRESSION LUG
- B. DOUBLE BARRELL COMPRESSION CONNECTOR
- C. EXOTHERMIC TERMINATION
- D. BEAM CLAMP

	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/0 STRANDED MAIN DOWN CONDUCTOR	MASTER GRND BAR	STRUCTURAL OR TOWER STEEL	BLDG SERVICE ENTR OR GRND RING	GROUND ROD
SOLID #2 TINNED COPPER	B OR C	B OR C		C	A, C, OR D		C
#6 GROUND LEAD	B OR C			A	A, C, OR D		
#2/0 STRANDED GRNDG ELECTRODE CONDUCTOR				A	A, C, OR D	A	
MASTER GROUND BAR	C	A	A				
STRUCTURAL OR TOWER STEEL GROUND RING	A, C, OR D	A, C, OR D	A, C, OR D				

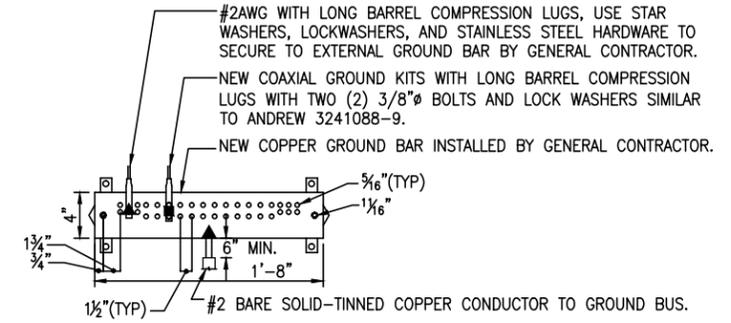
**GROUNDING TERMINATION MARTIX**

SCALE: N.T.S.

4  
E-2



- NOTES:
- OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

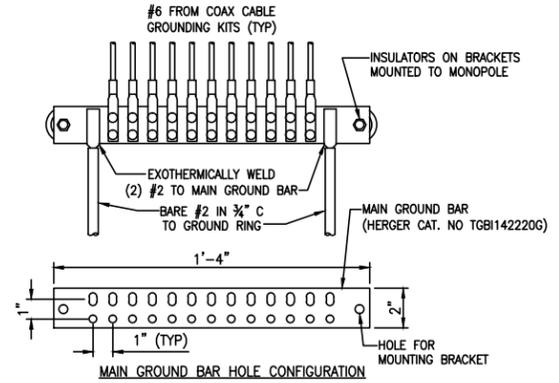


- NOTES:
- ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
  - FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
  - ALL HOLES ARE COUNTERSUNK 1/8".

**TYPICAL GROUND BAR CONNECTIONS DETAIL**

SCALE: N.T.S.

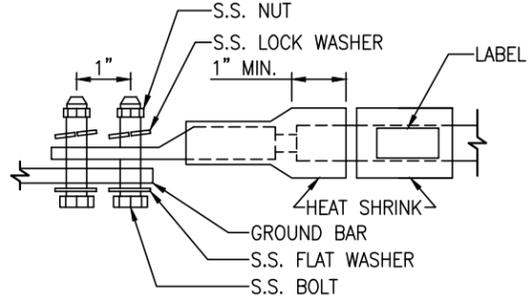
5  
E-2



**GROUND BAR DETAIL**

SCALE: N.T.S.

6  
E-2



- LUG NOTES:
- ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.
  - ALL HARDWARE SHALL BE S.S. 3/8"Ø OR LARGER.
  - FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

**GROUND BAR DETAIL**

SCALE: N.T.S.

7  
E-2

**T-Mobile**  
**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
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PROJECT NO:	CT11765A
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PROFESSIONAL SEAL

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**CT11765A**  
 SITE NAME  
 CT765/MARLIN GUYED TOWER  
 SITE ADDRESS  
 3114 ALBANY AVE  
 WEST HARTFORD, CT, 06117

SHEET TITLE  
**GROUNDING DETAILS**

SHEET NUMBER  
**E-2**

# Exhibit B



ENGINEERING INNOVATION

FDH Velocitel, 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

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

**346.3' Guyed Tower**

**SBA Site Name: West Hartford**

**SBA Site ID: CT15879-A-07**

**T-Mobile Site ID: CT11765A**

**Site Address: 3114 Albany Avenue, West Hartford, CT 06117**

FDH Velocitel Project Number 15BORH2400

**Analysis Results**

Tower Components	51.9%	Sufficient
Foundation	38.0%	Sufficient

Prepared By:

Robert Spivey, EI  
Project Engineer

Reviewed By:

Dennis D. Abel  
Director – Structural Engineering  
CT PE License No. 23247

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

6521 Meridien Drive

Raleigh, NC 27616

(919) 755-1012

info@fdhvelocitel.com



05-04-2015

May 4, 2015

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

**TABLE OF CONTENTS**

EXECUTIVE SUMMARY .....3

    Conclusions.....3

    Recommendations .....3

APPURTENANCE LISTING .....4

RESULTS .....6

GENERAL COMMENTS .....9

LIMITATIONS.....9

APPENDIX .....10

## EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Velocitel performed a structural analysis of the existing guyed tower located in West Hartford, 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 the *2005 CT State Building Code*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, and foundation dimensions was obtained from:

- Tower Engineering Professionals (Project No. 112343) Steel and Appurtenance Mapping dated July 12, 2011
- Tower Engineering Professionals (Project No. 112343) Structural Analysis Report dated October 23, 2012
- FDH Engineering, Inc. (Project No. 1462OE1500) Dispersive Wave Propagation Testing of an Existing Tower Foundation dated May 8, 2014
- Dr. Clarence Welti, PE Geotechnical Engineering geotechnical report dated May 22, 2000
- FDH Engineering, Inc. (Project No. 1308391800) TIA Inspection Report dated December 4, 2013
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards is 80 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 160 ft., the tower meets the requirements of the *TIA/EIA-222-F* standards provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations dimensions (FDH Engineering, Inc. Project No. 1462OE1500) and utilizing existing soil parameters (see Dr. Clarence Welti, PE Geotechnical Engineering geotechnical report dated May 22, 2000), the foundations should have the necessary capacity to support the existing and proposed 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 CT State Building Code* are met with the existing and proposed loading in place, we have the following recommendations:

1. Feed lines must be installed as shown in the **Appendix**.
2. RRH/RRU Stipulation: The proposed equipment may be installed in any configuration 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	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
332	(1) ERI 3 Bay FM	(1) 3"	WCCC	332	Direct
308.3	(1) Scala SCA 4DR-8S	(1) 3"	ZGS Hartford	308.3	(1) Pipe Mount
261	(1) Decibel DB420-B	(1) 7/8"	Master Combiner	251	(1) Standoff
251.8	(1) Antenna Concepts ACB16A	(1) 1-5/8" (1) 3/8"	WRDM	251.8	(1) Pipe Mount
243	(1) Antel WPA-800120 (1) 18" x 6" x 6" TMA	(2) 7/8"	Town of West Hartford	243	Direct
235	(1) Scala 6-ft x 3-ft Grid Dish	(1) 7/8"	WCCC	235	Direct
232	(1) Radiowaves SP2-4.7NS (1) 12" x 2" x 2" TMA	(2) 1/4" (1) 3/8"	Town of West Hartford	232	Direct
220	(1) Antel WPA-800120	(1) 1-5/8"	Town of West Hartford	220	Direct
220	Unknown Panel 34" x 7" x 24"	(2) 3/8"	SNEW ISP	220	(1) Pipe Mount
213	(1) Decibel DB420-B	(1) 1/2"	Master Combiner	203	(1) Standoff
196	(1) T.S. 3" x 3" x 6.5" (1) Cablewave PA6-112	(1) EW71	WRDM	196	(1) Standoff
180	(6) Kathrein 601417	(1) 1-5/8"	WRNT	180	(1) Pipe Mount
165	(1) Antel BCD-80010	(1) 1-5/8"	Town of West Hartford	165	(1) Standoff
164.5	(1) 6810 1 Bay FM	(1) 1/2"	91.9 FM	164.5	(1) Pipe Mount
160	(4) RFS APX16DWV_16DWVS (4) RFS ATMAA1412D-1A20	(12) 1-5/8"	T-Mobile	160	(3) T-Frames
146.5	(1) 12" x 4.5" x 6.25" TMA (1) 2-ft MW Dish	(1) 3/8"	SNEW ISP	146.5	(1) Pipe Mount
145	(1) 12-ft x 1" Omni	(1) 1-5/8"	Ham Radio	145	(1) Standoff
---	---	(1) 1-5/8"	---	142.5	---
---	---	(1) 1-5/8"	---	140.5	---
136.5	(1) 5' x 10" Detuner	(1) 1/4"	Ham Radio	136.5	Direct
130	(2) Andrew HBX-6517DS (2) Andrew LNX-6514DS (2) Swedcom SLCP 2x6015 (2) Swedcom SACP 2x5516 (4) RFS FD9R6004/2C (2) Alcatel Lucent RRH2x40-AWS (1) RFS DB-T1-6Z-8AB-OZ	(8) 1-5/8" (1) 1-5/8" Fiber	Verizon	129.5	(3) T-Frames
120.5	(3) RFS APXV18-206517S	(6) 1-5/8"	Metro PCS	120.5	(1) Pipe Mount
112	(2) KMW AM-X-CD-16-65-00T-RET (4) Andrew SBNH-1D6565C (3) Kathrein 800 10121 (6) CCI DTMABP7819VG12A (6) Ericsson RRUS 11	(12) 1-5/8"	AT&T	111.5	(3) T-Frames
48	(1) GPS	(1) 3/8"	Metro PCS	48	Direct
21	(1) 14-Element 4.5 ft Yagi	(1) 1/2"	Ham Radio	21	(1) Standoff

### Proposed Carrier Final Loading:

Antenna Elevation (ft)	Description	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
160	(4) RFS APX16DWV_16DWVS (4) Ericsson KRY 112 71	(12) 1-5/8"	T-Mobile	160	(3) 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 and 50 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 105% are considered acceptable.* **Table 4** displays the maximum foundation reactions. **Table 5** displays maximum rotations at service wind speeds (dishes only).

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	310.04 - 309.04	Leg	2 3/4	10.5	Pass
T2	309.04 - 299.416	Leg	2 3/4	38.1	Pass
T3	299.416 - 297.873	Leg	2 3/4	18.2	Pass
T4	297.873 - 279.123	Leg	2 3/4	5.8	Pass
T5	279.123 - 277.873	Leg	2 3/4	9.1	Pass
T6	277.873 - 259.123	Leg	2 3/4	9.6	Pass
T7	259.123 - 257.873	Leg	2 3/4	10.4	Pass
T8	257.873 - 239.123	Leg	2 3/4	16.8	Pass
T9	239.123 - 237.873	Leg	2 3/4	19.4 21.6 (b)	Pass
T10	237.873 - 219.123	Leg	2 3/4	21.9	Pass
T11	219.123 - 217.873	Leg	2 3/4	25.1	Pass
T12	217.873 - 199.123	Leg	2 3/4	25.7	Pass
T13	199.123 - 197.873	Leg	2 3/4	27.5 30.2 (b)	Pass
T14	197.873 - 179.123	Leg	2 3/4	29.9	Pass
T15	179.123 - 177.873	Leg	2 3/4	34.1 36.2 (b)	Pass
T16	177.873 - 159.123	Leg	2 3/4	35.0	Pass
T17	159.123 - 157.873	Leg	2 3/4	35.8 37.9 (b)	Pass
T18	157.873 - 139.123	Leg	3	36.5	Pass
T19	139.123 - 137.873	Leg	3	36.5 38.7 (b)	Pass
T20	137.873 - 119.123	Leg	3	36.2	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T21	119.123 - 117.873	Leg	3	36.7 38.9 (b)	Pass
T22	117.873 - 99.123	Leg	3	35.8 38.0 (b)	Pass
T23	99.123 - 97.873	Leg	3	41.2	Pass
T24	97.873 - 79.123	Leg	3	21.0	Pass
T25	79.123 - 77.873	Leg	3	20.5	Pass
T26	77.873 - 59.123	Leg	3	16.7	Pass
T27	59.123 - 57.873	Leg	3	30.1	Pass
T28	57.873 - 39.123	Leg	3	39.7	Pass
T29	39.123 - 37.873	Leg	3	37.8	Pass
T30	37.873 - 19.123	Leg	3	25.8	Pass
T31	19.123 - 17.873	Leg	3	39.1	Pass
T32	17.873 - 15.4147	Leg	3	32.7	Pass
T33	15.4147 - 13.1022	Leg	3	45.2	Pass
T34	13.1022 - 10.5189	Leg	3	47.8	Pass
T35	10.5189 - 5.85417	Leg	3	49.5	Pass
T36	5.85417 - 0	Leg	3	34.1	Pass
T2	309.04 - 299.416	Diagonal	7/8	22.3	Pass
T3	299.416 - 297.873	Diagonal	7/8	25.3	Pass
T4	297.873 - 279.123	Diagonal	7/8	18.0	Pass
T5	279.123 - 277.873	Diagonal	7/8	18.5	Pass
T6	277.873 - 259.123	Diagonal	7/8	7.4	Pass
T7	259.123 - 257.873	Diagonal	7/8	9.6	Pass
T8	257.873 - 239.123	Diagonal	7/8	44.8	Pass
T9	239.123 - 237.873	Diagonal	7/8	1.4	Pass
T10	237.873 - 219.123	Diagonal	7/8	11.7	Pass
T11	219.123 - 217.873	Diagonal	7/8	14.0	Pass
T12	217.873 - 199.123	Diagonal	7/8	7.2	Pass
T13	199.123 - 197.873	Diagonal	7/8	2.4	Pass
T14	197.873 - 179.123	Diagonal	7/8	2.2	Pass
T15	179.123 - 177.873	Diagonal	7/8	2.2	Pass
T16	177.873 - 159.123	Diagonal	7/8	1.1	Pass
T17	159.123 - 157.873	Diagonal	7/8	6.3	Pass
T18	157.873 - 139.123	Diagonal	1	9.7	Pass
T19	139.123 - 137.873	Diagonal	1	5.1	Pass
T20	137.873 - 119.123	Diagonal	1	5.4	Pass
T21	119.123 - 117.873	Diagonal	1	5.7	Pass
T22	117.873 - 99.123	Diagonal	1	9.8	Pass
T23	99.123 - 97.873	Diagonal	1	0.7	Pass
T24	97.873 - 79.123	Diagonal	1	9.2	Pass
T25	79.123 - 77.873	Diagonal	1	4.4	Pass
T26	77.873 - 59.123	Diagonal	1	1.1	Pass
T27	59.123 - 57.873	Diagonal	1	1.2	Pass
T28	57.873 - 39.123	Diagonal	1	1.5	Pass
T29	39.123 - 37.873	Diagonal	1	5.2	Pass
T30	37.873 - 19.123	Diagonal	1	9.1	Pass
T31	19.123 - 17.873	Diagonal	1	1.9	Pass
T32	17.873 - 15.4147	Diagonal	1	1.0	Pass

**Structural Analysis Report**

SBA Network Services, Inc.

SBA Site ID: CT15879-A-07

May 4, 2015

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T33	15.4147 - 13.1022	Diagonal	1	7.7	Pass
T34	13.1022 - 10.5189	Diagonal	1	9.3	Pass
T35	10.5189 - 5.85417	Diagonal	1	5.0	Pass
T36	5.85417 - 0	Diagonal	1	1.0	Pass
T2	309.04 - 299.416	Horizontal	7/8	8.3	Pass
T3	299.416 - 297.873	Horizontal	1 1/4	4.8	Pass
T4	297.873 - 279.123	Horizontal	7/8	1.3	Pass
T5	279.123 - 277.873	Horizontal	1	8.4	Pass
T6	277.873 - 259.123	Horizontal	7/8	5.8	Pass
T7	259.123 - 257.873	Horizontal	1	1.8	Pass
T8	257.873 - 239.123	Horizontal	7/8	1.2	Pass
T9	239.123 - 237.873	Horizontal	1	1.5	Pass
T10	237.873 - 219.123	Horizontal	7/8	6.3	Pass
T11	219.123 - 217.873	Horizontal	1	0.5	Pass
T12	217.873 - 199.123	Horizontal	7/8	0.4	Pass
T13	199.123 - 197.873	Horizontal	1	0.5	Pass
T14	197.873 - 179.123	Horizontal	7/8	17.2	Pass
T15	179.123 - 177.873	Horizontal	1	0.9	Pass
T16	177.873 - 159.123	Horizontal	7/8	1.0	Pass
T17	159.123 - 157.873	Horizontal	1	1.0	Pass
T18	157.873 - 139.123	Horizontal	7/8	14.5	Pass
T19	139.123 - 137.873	Horizontal	1 1/4	2.2	Pass
T20	137.873 - 119.123	Horizontal	7/8	1.6	Pass
T21	119.123 - 117.873	Horizontal	1	20.6	Pass
T22	117.873 - 99.123	Horizontal	7/8	1.9	Pass
T23	99.123 - 97.873	Horizontal	1	1.9	Pass
T24	97.873 - 79.123	Horizontal	7/8	2.0	Pass
T25	79.123 - 77.873	Horizontal	1	4.8	Pass
T26	77.873 - 59.123	Horizontal	7/8	8.8	Pass
T27	59.123 - 57.873	Horizontal	1	9.7	Pass
T28	57.873 - 39.123	Horizontal	7/8	11.9	Pass
T29	39.123 - 37.873	Horizontal	1	37.9	Pass
T30	37.873 - 19.123	Horizontal	7/8	41.3	Pass
T31	19.123 - 17.873	Horizontal	1	47.2	Pass
T33	15.4147 - 13.1022	Horizontal	7/8	44.7	Pass
T34	13.1022 - 10.5189	Horizontal	7/8	46.9	Pass
T35	10.5189 - 5.85417	Horizontal	6 x 3/4	46.9	Pass
T36	5.85417 - 0	Horizontal	6 x 3/4	45.8	Pass
T1	310.04 - 309.04	Top Girt	6 x 1	41.2	Pass
T2	309.04 - 299.416	Top Girt	1 1/4	44.3	Pass
T4	297.873 - 279.123	Top Girt	1	44.5	Pass
T6	277.873 - 259.123	Top Girt	1	43.6	Pass
T8	257.873 - 239.123	Top Girt	1	39.2	Pass
T10	237.873 - 219.123	Top Girt	1	10.5	Pass
T12	217.873 - 199.123	Top Girt	1	38.1	Pass
T14	197.873 - 179.123	Top Girt	1	18.2	Pass
T16	177.873 - 159.123	Top Girt	1	5.8	Pass
T18	157.873 - 139.123	Top Girt	1 1/4	9.1	Pass
T20	137.873 - 119.123	Top Girt	1	9.6	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T22	117.873 - 99.123	Top Girt	1	10.4	Pass
T24	97.873 - 79.123	Top Girt	1	16.8	Pass
T26	77.873 - 59.123	Top Girt	1	19.4 21.6 (b)	Pass
T28	57.873 - 39.123	Top Girt	1	21.9	Pass
T30	37.873 - 19.123	Top Girt	1	25.1	Pass
T32	17.873 - 15.4147	Top Girt	1 1/4	25.7	Pass
T35	10.5189 - 5.85417	Bottom Girt	6 x 3/4	27.5 30.2 (b)	Pass
T4	297.873 - 279.123	Guy A@297.873	3/4	29.9	Pass
T10	237.873 - 219.123	Guy A@228.498	13/16	34.1 36.2 (b)	Pass
T18	157.873 - 139.123	Guy A@148.498	7/8	35.0	Pass
T24	97.873 - 79.123	Guy A@88.498	13/16	35.8 37.9 (b)	Pass
T4	297.873 - 279.123	Guy B@297.873	3/4	36.5	Pass
T10	237.873 - 219.123	Guy B@228.498	13/16	36.5 38.7 (b)	Pass
T18	157.873 - 139.123	Guy B@148.498	7/8	36.2	Pass
T24	97.873 - 79.123	Guy B@88.498	13/16	36.7 38.9 (b)	Pass
T4	297.873 - 279.123	Guy C@297.873	3/4	35.8 38.0 (b)	Pass
T10	237.873 - 219.123	Guy C@228.498	13/16	41.2	Pass
T18	157.873 - 139.123	Guy C@148.498	7/8	21.0	Pass
T24	97.873 - 79.123	Guy C@88.498	13/16	20.5	Pass

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

**Table 4 - Maximum Base Reactions**

Reaction	Current Analysis* (TIA/EIA-222-F)	
	Horizontal	Vertical
Tower Base	3 k	201 k
Anchor	55 k	43 k

\*Foundations determined adequate per independent analysis.

**Table 5 – Maximum Antenna Rotations at Service Wind Speed**

Centerline Elevation (ft)	Dish	Tilt (deg)*	Twist (deg)*
235	(1) Scala 6-ft x 3-ft Grid Dish	0.0507	0.5971
232	(1) Radiowaves SP2-4.7NS	0.0508	0.5923
196	(1) Cablewave PA6-112	0.0505	0.5387
146.5	(1) 2-ft MW Dish	0.0459	0.4326

\*Tilt & Twist values to be determined acceptable by carrier.

## **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

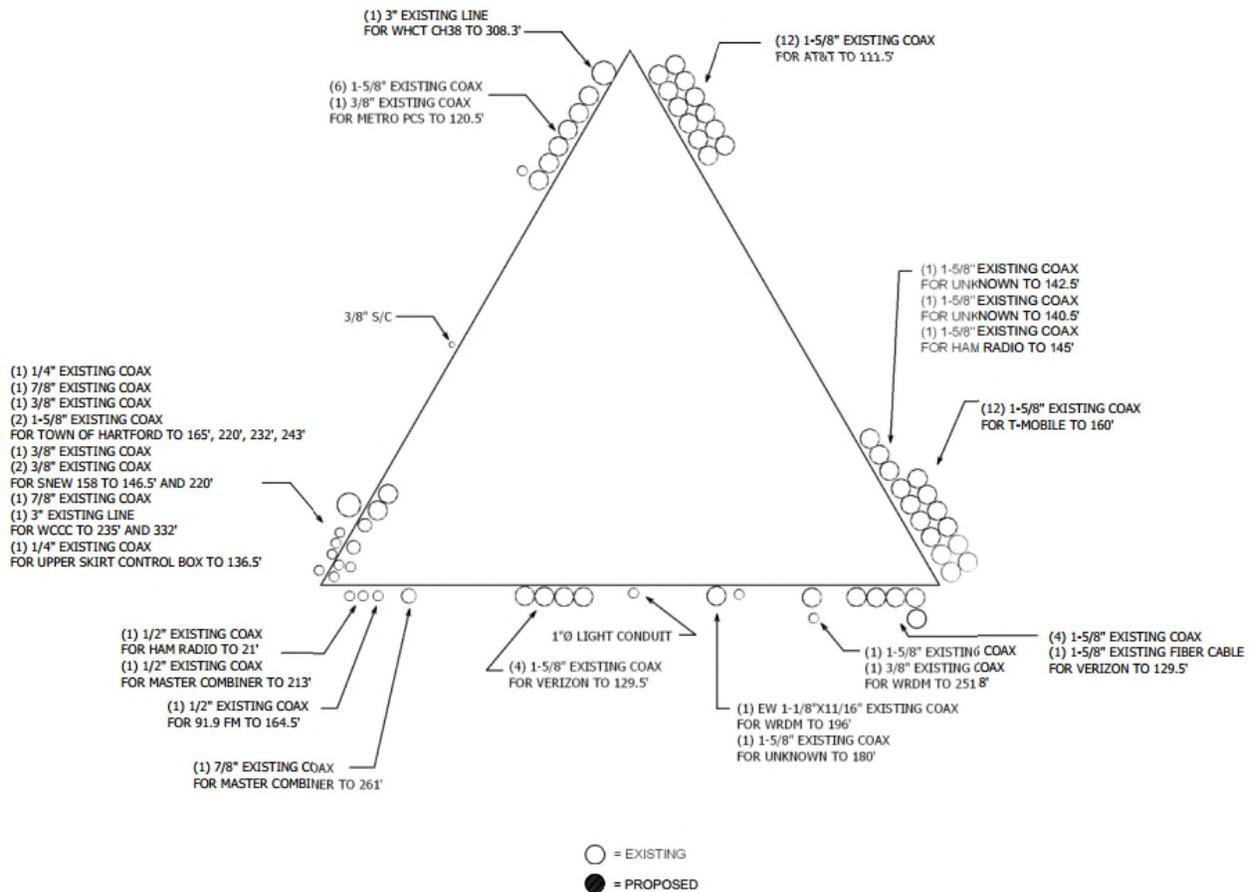
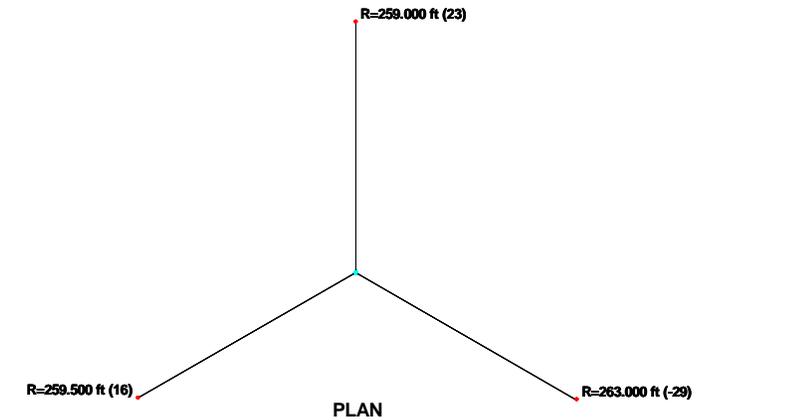
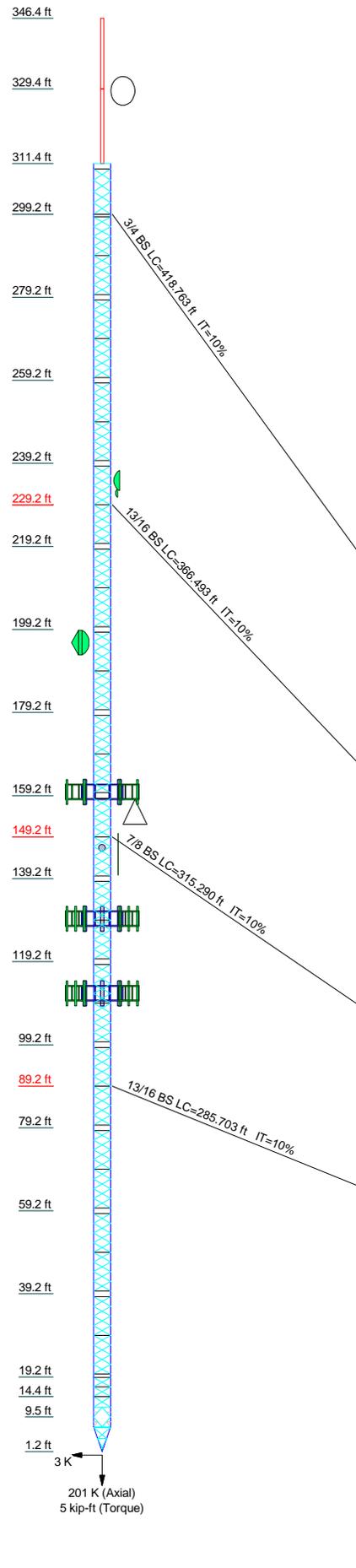


Figure 1 – Feed Line Layout

L1	L2	L3	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30	T31	T32	T33	T34	T35	T36	T37	T38	T39	T40	T41	T42	T43	T44	T45	T46	T47	T48	T49	T50	T51	T52	T53	T54	T55	T56	T57	T58	T59	T60	T61	T62	T63	T64	T65	T66	T67	T68	T69	T70	T71	T72	T73	T74	T75	T76	T77	T78	T79	T80	T81	T82	T83	T84	T85	T86	T87	T88	T89	T90	T91	T92	T93	T94	T95	T96	T97	T98	T99	T100	T101	T102	T103	T104	T105	T106	T107	T108	T109	T110	T111	T112	T113	T114	T115	T116	T117	T118	T119	T120	T121	T122	T123	T124	T125	T126	T127	T128	T129	T130	T131	T132	T133	T134	T135	T136	T137	T138	T139	T140	T141	T142	T143	T144	T145	T146	T147	T148	T149	T150	T151	T152	T153	T154	T155	T156	T157	T158	T159	T160	T161	T162	T163	T164	T165	T166	T167	T168	T169	T170	T171	T172	T173	T174	T175	T176	T177	T178	T179	T180	T181	T182	T183	T184	T185	T186	T187	T188	T189	T190	T191	T192	T193	T194	T195	T196	T197	T198	T199	T200	T201	T202	T203	T204	T205	T206	T207	T208	T209	T210	T211	T212	T213	T214	T215	T216	T217	T218	T219	T220	T221	T222	T223	T224	T225	T226	T227	T228	T229	T230	T231	T232	T233	T234	T235	T236	T237	T238	T239	T240	T241	T242	T243	T244	T245	T246	T247	T248	T249	T250	T251	T252	T253	T254	T255	T256	T257	T258	T259	T260	T261	T262	T263	T264	T265	T266	T267	T268	T269	T270	T271	T272	T273	T274	T275	T276	T277	T278	T279	T280	T281	T282	T283	T284	T285	T286	T287	T288	T289	T290	T291	T292	T293	T294	T295	T296	T297	T298	T299	T300	T301	T302	T303	T304	T305	T306	T307	T308	T309	T310	T311	T312	T313	T314	T315	T316	T317	T318	T319	T320	T321	T322	T323	T324	T325	T326	T327	T328	T329	T330	T331	T332	T333	T334	T335	T336	T337	T338	T339	T340	T341	T342	T343	T344	T345	T346	T347	T348	T349	T350	T351	T352	T353	T354	T355	T356	T357	T358	T359	T360	T361	T362	T363	T364	T365	T366	T367	T368	T369	T370	T371	T372	T373	T374	T375	T376	T377	T378	T379	T380	T381	T382	T383	T384	T385	T386	T387	T388	T389	T390	T391	T392	T393	T394	T395	T396	T397	T398	T399	T400	T401	T402	T403	T404	T405	T406	T407	T408	T409	T410	T411	T412	T413	T414	T415	T416	T417	T418	T419	T420	T421	T422	T423	T424	T425	T426	T427	T428	T429	T430	T431	T432	T433	T434	T435	T436	T437	T438	T439	T440	T441	T442	T443	T444	T445	T446	T447	T448	T449	T450	T451	T452	T453	T454	T455	T456	T457	T458	T459	T460	T461	T462	T463	T464	T465	T466	T467	T468	T469	T470	T471	T472	T473	T474	T475	T476	T477	T478	T479	T480	T481	T482	T483	T484	T485	T486	T487	T488	T489	T490	T491	T492	T493	T494	T495	T496	T497	T498	T499	T500	T501	T502	T503	T504	T505	T506	T507	T508	T509	T510	T511	T512	T513	T514	T515	T516	T517	T518	T519	T520	T521	T522	T523	T524	T525	T526	T527	T528	T529	T530	T531	T532	T533	T534	T535	T536	T537	T538	T539	T540	T541	T542	T543	T544	T545	T546	T547	T548	T549	T550	T551	T552	T553	T554	T555	T556	T557	T558	T559	T560	T561	T562	T563	T564	T565	T566	T567	T568	T569	T570	T571	T572	T573	T574	T575	T576	T577	T578	T579	T580	T581	T582	T583	T584	T585	T586	T587	T588	T589	T590	T591	T592	T593	T594	T595	T596	T597	T598	T599	T600	T601	T602	T603	T604	T605	T606	T607	T608	T609	T610	T611	T612	T613	T614	T615	T616	T617	T618	T619	T620	T621	T622	T623	T624	T625	T626	T627	T628	T629	T630	T631	T632	T633	T634	T635	T636	T637	T638	T639	T640	T641	T642	T643	T644	T645	T646	T647	T648	T649	T650	T651	T652	T653	T654	T655	T656	T657	T658	T659	T660	T661	T662	T663	T664	T665	T666	T667	T668	T669	T670	T671	T672	T673	T674	T675	T676	T677	T678	T679	T680	T681	T682	T683	T684	T685	T686	T687	T688	T689	T690	T691	T692	T693	T694	T695	T696	T697	T698	T699	T700	T701	T702	T703	T704	T705	T706	T707	T708	T709	T710	T711	T712	T713	T714	T715	T716	T717	T718	T719	T720	T721	T722	T723	T724	T725	T726	T727	T728	T729	T730	T731	T732	T733	T734	T735	T736	T737	T738	T739	T740	T741	T742	T743	T744	T745	T746	T747	T748	T749	T750	T751	T752	T753	T754	T755	T756	T757	T758	T759	T760	T761	T762	T763	T764	T765	T766	T767	T768	T769	T770	T771	T772	T773	T774	T775	T776	T777	T778	T779	T780	T781	T782	T783	T784	T785	T786	T787	T788	T789	T790	T791	T792	T793	T794	T795	T796	T797	T798	T799	T800	T801	T802	T803	T804	T805	T806	T807	T808	T809	T810	T811	T812	T813	T814	T815	T816	T817	T818	T819	T820	T821	T822	T823	T824	T825	T826	T827	T828	T829	T830	T831	T832	T833	T834	T835	T836	T837	T838	T839	T840	T841	T842	T843	T844	T845	T846	T847	T848	T849	T850	T851	T852	T853	T854	T855	T856	T857	T858	T859	T860	T861	T862	T863	T864	T865	T866	T867	T868	T869	T870	T871	T872	T873	T874	T875	T876	T877	T878	T879	T880	T881	T882	T883	T884	T885	T886	T887	T888	T889	T890	T891	T892	T893	T894	T895	T896	T897	T898	T899	T900	T901	T902	T903	T904	T905	T906	T907	T908	T909	T910	T911	T912	T913	T914	T915	T916	T917	T918	T919	T920	T921	T922	T923	T924	T925	T926	T927	T928	T929	T930	T931	T932	T933	T934	T935	T936	T937	T938	T939	T940	T941	T942	T943	T944	T945	T946	T947	T948	T949	T950	T951	T952	T953	T954	T955	T956	T957	T958	T959	T960	T961	T962	T963	T964	T965	T966	T967	T968	T969	T970	T971	T972	T973	T974	T975	T976	T977	T978	T979	T980	T981	T982	T983	T984	T985	T986	T987	T988	T989	T990	T991	T992	T993	T994	T995	T996	T997	T998	T999	T1000
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**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
30" x 18" Dia	346.3	2-ft Dish w/o Radome	146.5
3 bay / 20' Length / Dielectric DCR	331.8	12" x 4.5" x 6.25" TMA	146.5
2.4" Dia x 18" Pipe	331.8	30" Sidearm Mount	145
L2.5x2.5x0.25, 10-ft Length	309.5	12-ft x 1" Omni	145
Scala SCA 4DR-8S	308.3	Control Box 12" x 13.5" x 6.5"	141.5
2.9" x 22-ft Mt. Pipe	297	Detuner	136.5
2.4" x 25' Mount Pipe	251.8	(3) T-Frames	129.5
Antenna Concepts ACB16A w/ Mount	251.8	SLCP 2x6015 w/ Mount Pipe	129.5
(1) Side Arm Mount	251	SLCP 2x6015 w/ Mount Pipe	129.5
DB420-B	251	SACP 2x5516 w/ Mount Pipe	129.5
TMA 18" x 6" x 6"	243	SACP 2x5516 w/ Mount Pipe	129.5
Antel WPA-800120	243	(2) Andrew HBX-6517DS w/ Mount Pipe	129.5
CC806-12	236.5	(2) Andrew LNX-6514DS w/ Mount Pipe	129.5
6-ft x 3-ft Grid	235	FD9R6004/2C Diplexer	129.5
TMA 12" x 12" x 2"	232	FD9R6004/2C Diplexer	129.5
SP2-4.7NS	232	(2) FD9R6004/2C Diplexer	129.5
TMA 6" x 6" x 2"	225.5	RRH2x40-AWS	129.5
TMA 6" x 6" x 2"	225.5	RRH2x40-AWS	129.5
2'10" x 7" x 2" Panel w/ 48" Mount Pipe	225.5	DB-T1-6Z-8AB-0Z	129.5
2'10" x 7" x 2" Panel w/ 48" Mount Pipe	225.5	APXV18-206517S w/Mount Pipe	120.5
(2) 1" x 8" Pipe	225.5	APXV18-206517S w/Mount Pipe	120.5
(2) 1" x 8" Pipe	225.5	APXV18-206517S w/Mount Pipe	120.5
Antel WPA-800120	220	APXV18-206517S w/Mount Pipe	120.5
(1) Side Arm Mount	203	2.4" Dia x 5-ft Pipe	111.5
DB420-B	203	(2) DTMABP7819VG12A TMA's	111.5
4.5" Dia x 6" Dish Mount	196	2.4" Dia x 5-ft Pipe	111.5
T.S. 3" x 3" x 6.5"	196	(2) RRRUS 11	111.5
2.4" Dia x 6.5" Mount Pipe	196	800 10121 w/ Mount Pipe	111.5
6-ft MW w/ Radome	196	(2) DTMABP7819VG12A TMA's	111.5
2.4" x 25' Mount Pipe	180	(2) SBNH-1D6565C w/ Mount Pipe	111.5
(6) Kathrein 601417	180	(2) SBNH-1D6565C w/ Mount Pipe	111.5
36" Standoff	165	800 10121 w/ Mount Pipe	111.5
BCD-80010	165	800 10121 w/ Mount Pipe	111.5
2.4" Dia x 10-ft Mount Pipe	164.5	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	111.5
6810 (1) Bay FM	164.5	(3) T-Frames	111.5
(2) 2.4" x 7-ft Pipe	160	2.4" Dia x 5-ft Pipe	111.5
2.4" x 7-ft Pipe	160	(2) RRRUS 11	111.5
(2) KRY 112 71	160	(2) RRRUS 11	111.5
(2) 2.4" x 7-ft Pipe	160	(2) DTMABP7819VG12A TMA's	111.5
KRY 112 71	160	1" dia x 16" Pipe	48
KRY 112 71	160	GPS	48
APX16DWV_16DWVS w/ Mount Pipe	160	14-Element 4.5 ft Yagi	21
(2) APX16DWV_16DWVS w/ Mount Pipe	160	1-ft Side Arm	21
Pipe	160	Detuning Box 29" x 24" x 12"	10.5
(3) T-Frames	160	Control Box 12" x 13.5" x 6.5"	5.7
APX16DWV_16DWVS w/ Mount Pipe	160		
2.4" Dia x 4-ft Mount Pipe	146.5		

**SYMBOL LIST**

MARK	SIZE	MARK	SIZE
A	SR 1 1/4	F	4 @ 2.71933
B	SR 7/8	G	2 @ 2.30217
C	6 x 3/4	H	1 @ 2.581
D	6 x 1	I	2 @ 2.33073
E	1 @ 1	J	2 @ 2.60416

**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 Hartford County, Connecticut

<p>ENGINEERING INNOVATION</p> <p>Tower Analysis</p>	<p><b>Velocitel, Inc., d.b.a. FDH Velocitel</b></p> <p>6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031</p>	<p>Job: <b>West Hartford, CT15879-A</b></p>		
		<p>Project: <b>15BORH2400</b></p> <p>Client: <b>SBA Network Services, Inc.</b></p> <p>Code: <b>TIA/EIA-222-F</b></p> <p>Path:</p>	<p>Drawn by: <b>Robert Spivey</b></p> <p>Date: <b>05/04/15</b></p>	<p>App'd:</p> <p>Scale: <b>NTS</b></p> <p>Dwg No. <b>E-1</b></p>

# Exhibit C

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

T-Mobile Existing Facility

Site ID: CT11765A

CT765/ Marlin Guyed Tower  
3114 Albany Avenue  
West Hartford, CT 06117

**May 12, 2015**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>16.35 %</b>

May 12, 2015

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

Emissions Analysis for Site: **CT11765A – CT765/ Marlin Guyed Tower**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **3114 Albany Avenue, West Hartford, 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 both 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 **3114 Albany Avenue, West Hartford, 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) 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.

- 5) 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.
- 6) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) 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 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.
- 7) The antenna mounting height centerline of the proposed antennas is **160 feet** above ground level (AGL).
- 8) 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):	160	Height (AGL):	160	Height (AGL):	160
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):	10,237.91	ERP (W):	10,237.91	ERP (W):	10,237.91
Antenna A1 MPE%	1.55	Antenna B1 MPE%	1.55	Antenna C1 MPE%	1.55

<b>Site Composite MPE%</b>	
Carrier	MPE%
T-Mobile	<b>4.66</b>
On Site Measurements Per CSC Database	11.69 %
<b>Site Total MPE %:</b>	<b>16.35 %</b>

T-Mobile Sector 1 Total:	1.55 %
T-Mobile Sector 2 Total:	1.55 %
T-Mobile Sector 3 Total:	1.55 %
<b>Site Total:</b>	<b>16.35 %</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:	1.55 %
Sector 2:	1.55 %
Sector 3 :	1.55 %
T-Mobile Total:	4.66 %
Site Total:	16.35 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **16.35%** 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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