



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

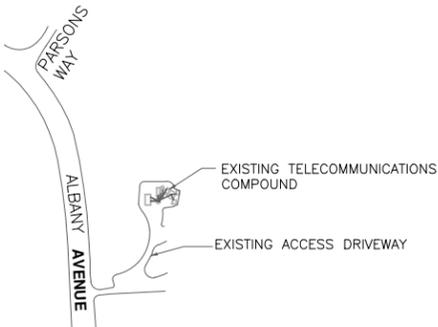
Fax: 413-521-0558

Office: 199 Brickyard Rd, Farmington, CT 06032

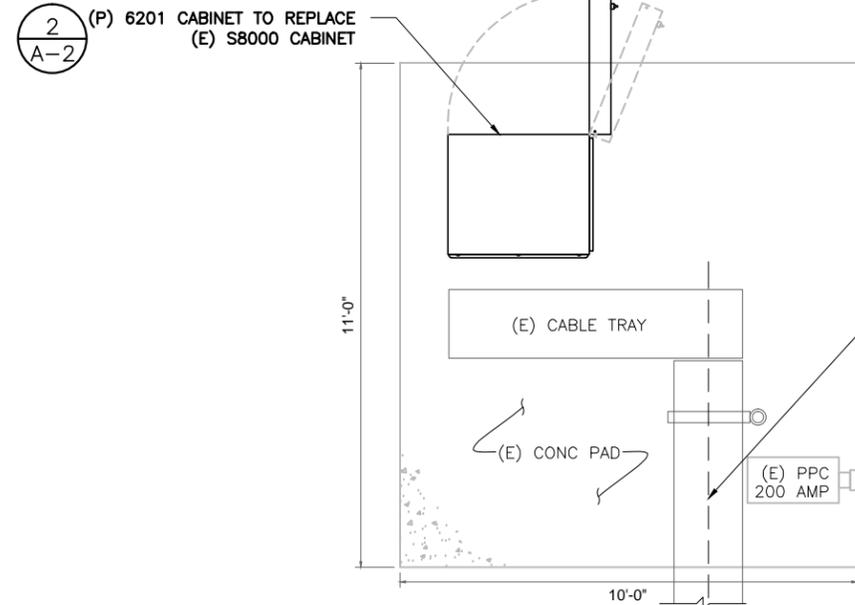
Email: denise@northeastsitesolutions.com

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

Exhibit A



KEY PLAN
SCALE: NOT TO SCALE



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

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.

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
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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

SITE LEGEND

- SITE PROPERTY LINE
- STREET OR ROAD
- 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

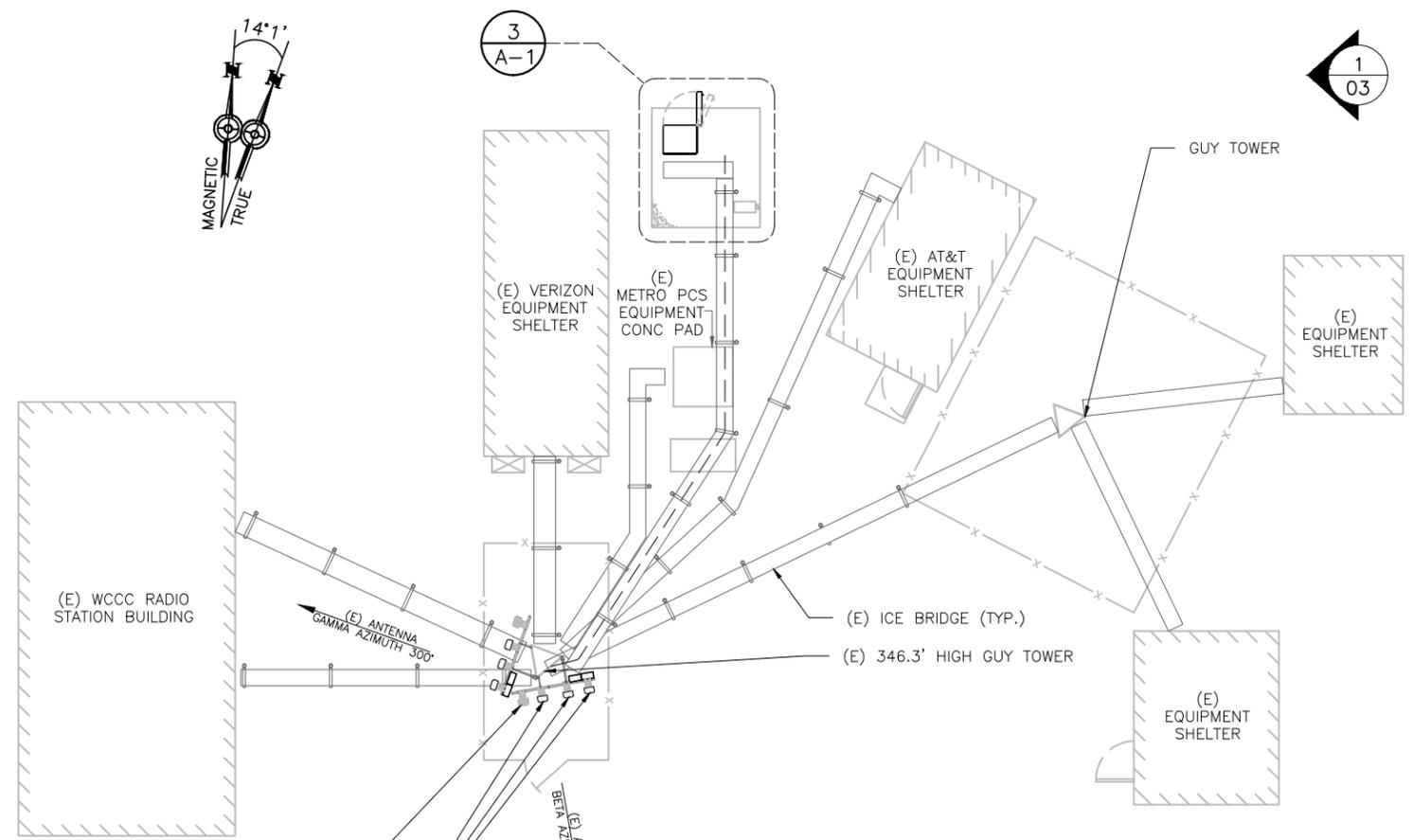
PROFESSIONAL SEAL

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

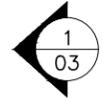
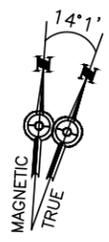
SHEET TITLE
SITE PLAN

SHEET NUMBER
A-1



- (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)



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

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

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

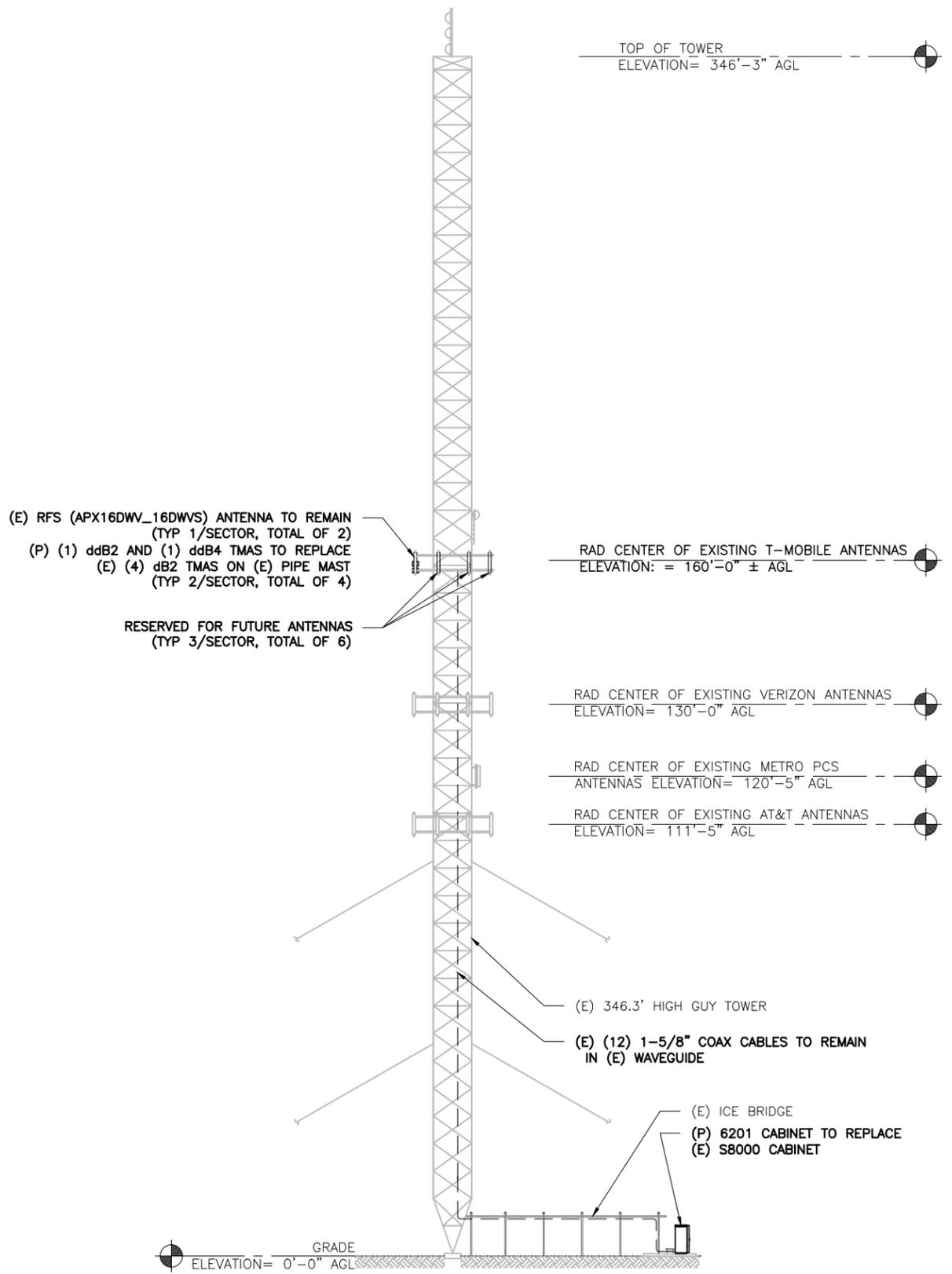
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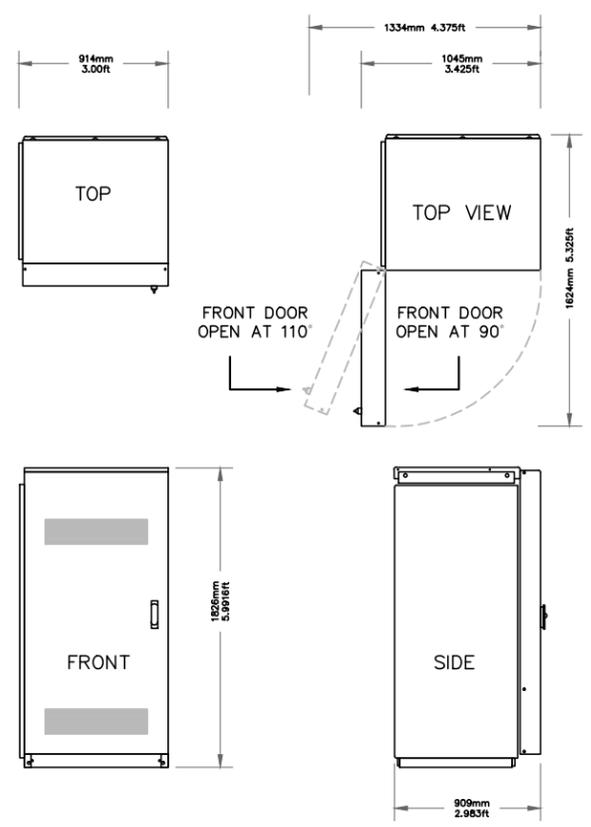
SHEET TITLE
 ELEVATION

SHEET NUMBER
A-2



ELEVATION VIEW

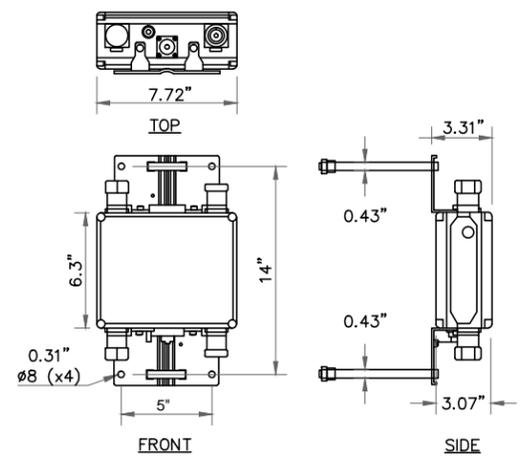
SCALE: 1" = 30'-0" (11x17)
 1" = 15'-0" (24x36)



ERICSSON RBS 6201 EQUIPMENT CABINET

SCALE: N.T.S.

2
 A-2



ddB2 AND ddB4

TMA DETAILS

SCALE: N.T.S.

3
 A-2

SUBMITTALS

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CHECKED BY:	SM

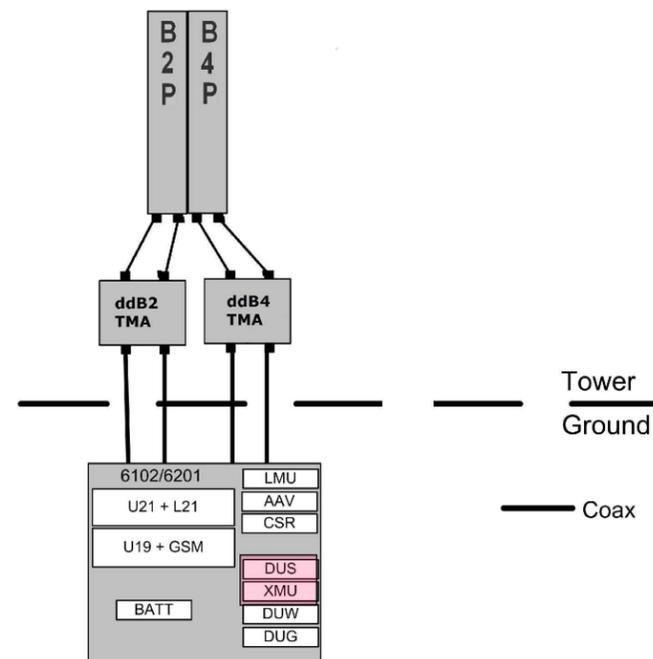
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 3114 ALBANY AVE
 WEST HARTFORD, CT, 06117

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 7/8" 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).

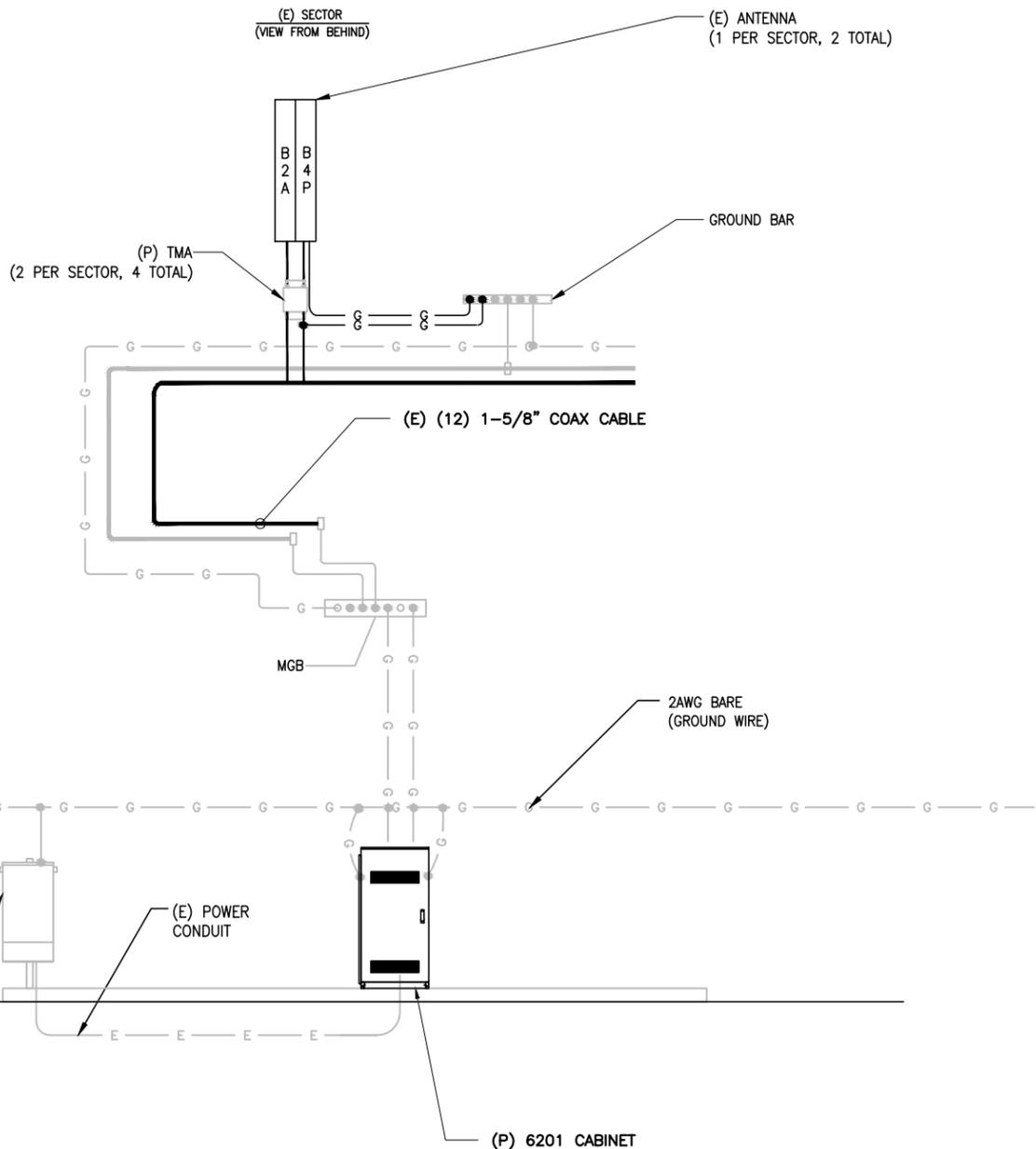
HYBRID FIBER/POWER JUMPER NOTES:

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

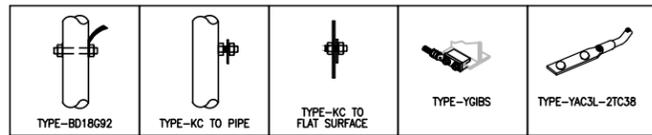


GROUNDING DIAGRAM
 SCALE: N.T.S

1
E-1

NOTES:

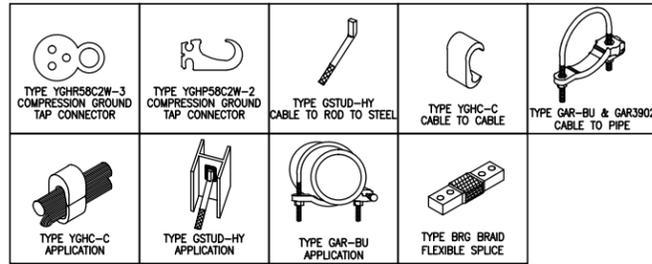
1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSSBAR.
3. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
4. ADD COAX GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT 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.



BURNDY GROUNDING DETAILS

SCALE: N.T.S.

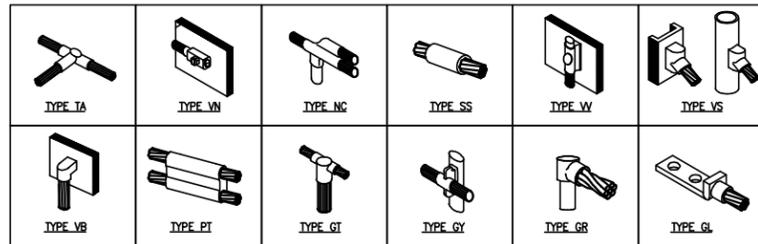
1
E-2



BURNDY GROUNDING PRODUCTS

SCALE: N.T.S.

2
E-2



CADWELD GROUNDING CONNECTION PRODUCTS

SCALE: N.T.S.

3
E-2

TERMINATION TYPES:

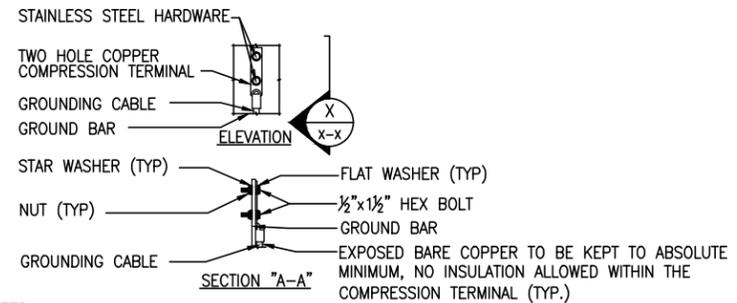
- A. MECHANICAL COMPRESSION LUG
- B. DOUBLE BARRELL COMPRESSION CONNECTOR
- C. EXOTHERMIC TERMINATION
- D. BEAM CLAMP

	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/0 STRANDED GRNDG 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	A, C, OR D	A, C, OR D	A, C, OR D				
GROUND RING	C		C				C

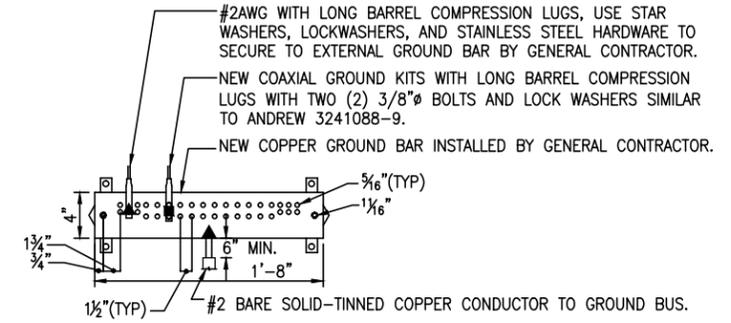
GROUNDING TERMINATION MARTIX

SCALE: N.T.S.

4
E-2



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

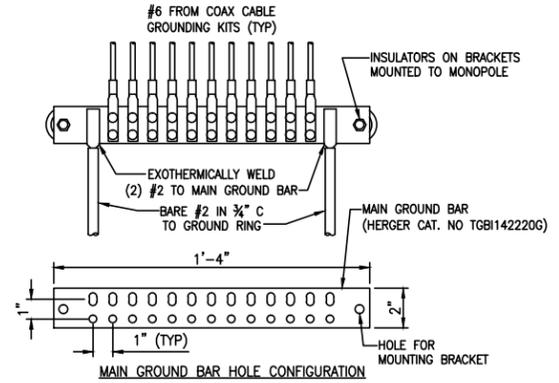


- NOTES:
- ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
 - FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
 - ALL HOLES ARE COUNTERSUNK 1/8".

TYPICAL GROUND BAR CONNECTIONS DETAIL

SCALE: N.T.S.

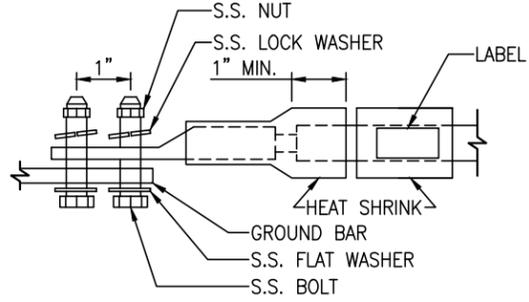
5
E-2



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
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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



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

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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

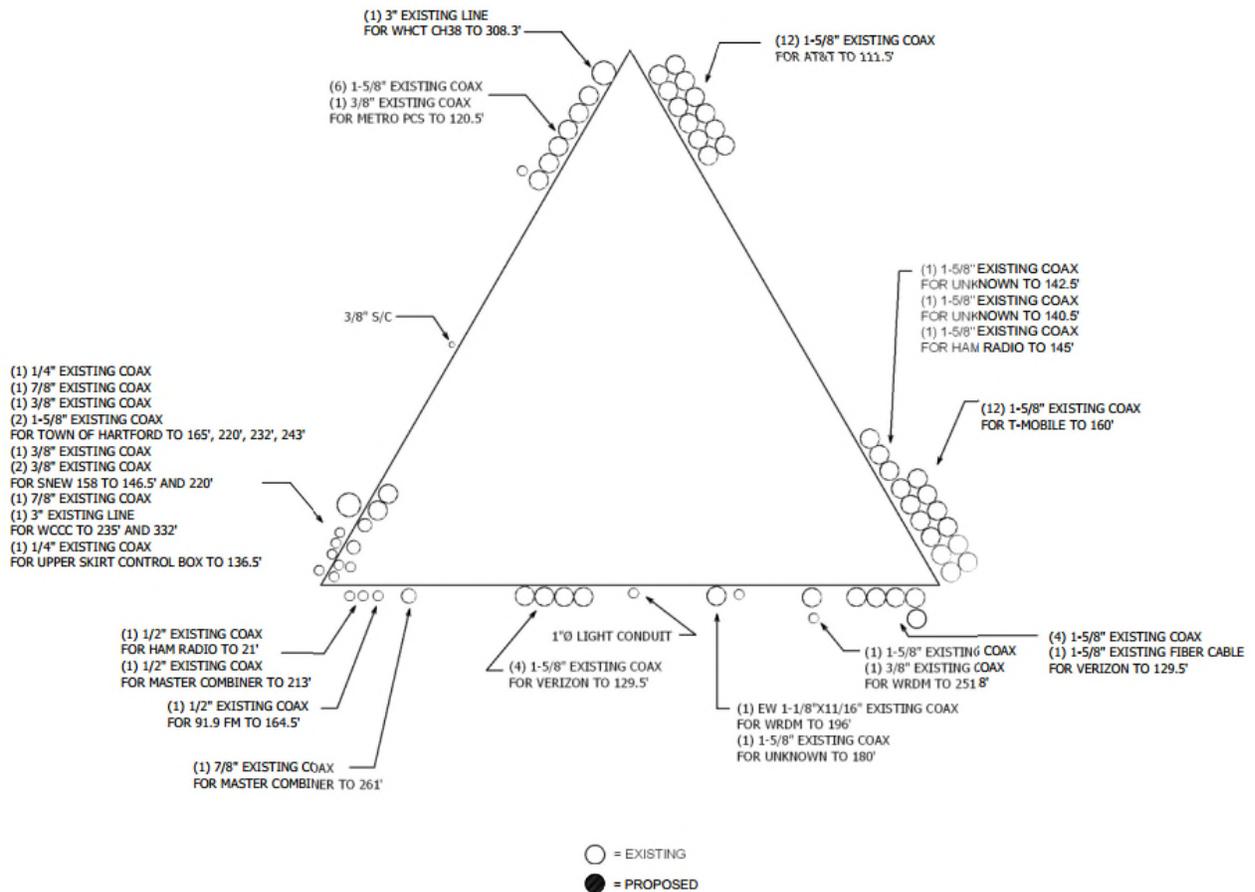


Figure 1 – Feed Line Layout

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:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	16.35 %

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

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

T-Mobile Sector 1 Total:	1.55 %
T-Mobile Sector 2 Total:	1.55 %
T-Mobile Sector 3 Total:	1.55 %
Site Total:	16.35 %

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:	COMPLIANT

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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