Structural Analysis Report

T-Mobile – Stamford / Dwtn Site #CT11410A

Owner: Frontier Communications - Stamford #1 Co Site

Stamford, Connecticut

May 22, 2017

MEI PROJECT ID: CT02768S-17V0

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 ▪ DALLAS, TEXAS 75252 ▪ TEL. 972-783-2578 FAX 972-783-2583

www.maloufengineering.com

PROFESSIONAL MEMBER

ACEC MEMBER

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

May 22, 2017

Mr. Kyle Richers
Transcend Wireless
Mahwah, NJ 04730

STRUCTURAL ANALYSIS

Structure/Make/Model:	125 ft **Self-Supporting Tower** (onto 106.5ft Rooftop)		Not Known / Not Known	
Client/Site Name/#:	**T-Mobile**		**Stamford / Dwtn #CT11410A**	
Owner/Site Name/#:	Frontier Communications		Stamford #1 Co	
MEI Project ID:	**CT02768S-17V0**			
Location:	555 Main St Stamford, CT 06901		Fairfield County FCC #1046319	
	LAT	41-03-12.74 N	LON	73-32-8.09 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a structural analysis of the above mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA-**222-G** Standard for the loading considered under the criteria listed and referenced in the report sections – tower rated at 93.5% - Legs.

The installation of the proposed changed condition as noted in Table 1 is structurally acceptable. Please refer to Appendix 1 for Schematic Lines Layout.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects please contact us.

Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Luan Nguyen, PE
Sr. Project Engineer

Reviewed & Approved by:

E. Mark Malouf, PE
Connecticut #17715
972-783-2578 ext. 106
mmalouf@maloufengineering.com

5/22/2017

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1. INTRODUCTION & SCOPE

A structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Kyle Richers, Transcend Wireless, on behalf of T-Mobile, to determine the acceptance of the proposed changed conditions in conformance with the IBC / ANSI/TIA-222-G Standard, "*Structural Standard for Antenna Supporting Structures and Antennas*".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not within the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	MEI Records	Previous Structural Analysis	ID CT02768S-16V3 Dated 10/10/2016
Base Support	Tower is on a building rooftop – building members to be reviewed by others.		
Material Grade	Not available from supplied documents-Assumed based on typical towers of this type-refer to Appendix		
CURRENT APPURTENANCES			
	MEI Records	Previous Structural Analysis	ID CT02768S-16V3 Dated 10/10/2016
CHANGED CONDITION			
	Frontier Comm. / Ms. Elissa McOmber	Preliminary Data Questionnaire (PDQ)	Dated 03/14/2017

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Not Known / Not Known
ORIGINAL DESIGN CRITERIA	TIA/EIA 222-Unknown
PRIOR STRUCTURAL MODIFICATIONS	Mods as per MEI CT02768S-11V1; CT02768S-15V2 dated 06/24/2015 – considered properly installed.

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2016 CT St Bldg Code / 2012 Int'l Building Code / ANSI/TIA-222-G-2 Standard	
LOADING CASES	*Full Wind*:	140 Mph ultimate gust [equiv. 110 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 0.75" Radial Ice
	Service:	60 Mph
	Seismic:	S_s = 0.248 / S_1 = 0.069 / Site Class: D – Stiff Soil
STRUCTURE CRITERIA	*Risk Category (Structural Class)*: 2	
	Exposure Category: 'B' – *Topographic Category:* 1	

Appurtenances Configuration

The following appurtenances configuration is denoted by the *summation of Tables 1 & 2*:

Table 1: Tenant with Changed Condition Appurtenances Configuration

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
210	T-Mobile	3	RRUS-32 B2 Boxes	[Existing Mounts]	1	1-1/4" Hybrid / Fiber Cable-(FZ)
		3	AIR-32 B4A/B2P Panel Antennas			
Current Appurtenances To Remain						
210	T-Mobile	3	AIR21 B2A/B4P Panel Antennas	(3) Sector Frame Mounts	29	1-5/8"
		3	KRY 112 71/2 TMAs		1	1-5/8" Hybrid / Fiber Cable-(FZ)
		3	RRUS-11 B12 Boxes			
203	T-Mobile	3	LNX-6515DS-A1M Panel Antennas	(3) Sector Frame Mounts		
To Be Removed (See Below)						
210	T-Mobile	3	AIR21 B4A/B2P Panel Antennas		1	1-5/8"-(FZ)

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
245.17		2	Top Small Beacons	13ft T-Beam Mount	1	1-1/4" R.C.
244.5		1	Top Lightning Rod			
235	AT&T	1	P65-15-XLH-RR Panel Antennas	Top Square Platform Mount	12	1-5/8"
		2	OPA-65R-LCUU-H4 Panel Antenna		4	0.75" DCPower Trunk Cables
		6	LGP21401 TMAs			
		3	RRUS-11 Boxes		2	0.625" Fiber Trunk Cable
		3	RRUS-32 Boxes			
		3	RRUS-12 w/ A2 Backpacks		1	RET Cable-(FZ)
	AT&T	6	HPA-45R-BUU-H6 Panel Antennas			
233	AT&T	2	Raycap DC6-48-60-18-8F DC Surge Box			
231.5				Unused I-Beam Mount		
229	AT&T	1	1.5ft (2-Elem) Yagi Antenna	[Onto Platform]	1	1/2"-(FZ)
223.5		1	10ft Dia. HP Dish (Az. 210°±)	Dish Pipe Mount-DA Face	2	EW90-(FZ)
221.5	[Unused]				2	3/8"-(FZ)
221		1	1ft Dia. HP Dish (Windstar 43029) (Az. 210°±)	Dish Pipe Mount-BC Face	1	3/8"-(FZ)
216.5				(2) 4'Lx6'W Rest Platforms		
132	AT&T	1	4ft (7-Elem) Yagi Antenna	2ft Sidearm Mount	1	1/2"-(FZ)

Notes:

1. **Tower Base elevation is at 106.5ft Above Ground Level - All above elevations are measured from AGL.**
2. **As per 2012 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
3. Please note appurtenances not listed above are to be removed/not present as per data supplied.
4. (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222-G.
5. The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.

4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, tnxTower (ver. 7.07), a commercially available program by Tower Numerics Inc. The latticed structures members are modeled using beam/truss and cable members and the pole members using tubular beam elements. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the program for the different wind directions and then applied as external loads on the structure. Any applicable exemptions, as per Section 15.6 of the TIA-222-G Standard for existing structures originally designed in accordance with a previous revision of the TIA-222 Standard, have been taken.

Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The supporting structure and interface system are assumed to support the tower with its new reactions.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalided, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Note: The Wind loading controls over the Seismic loading as per TIA Section 2.7.

Table 3: Stress Analysis Results

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
LEGS	**93.5%**	**131.5 - 119**	**Pass**	
DIAGONALS	89.0%	151.5 - 141.5	**Pass**	
HORIZONTALS	31.5%	141.5 - 131.5	**Pass**	
SECONDARY HORIZONTALS	18.9%	151.5 - 141.5	**Pass**	
GIRTS	47.8%	161.5 - 151.5	**Pass**	
BRACINGS	68.4%	131.5 - 119	**Pass**	
BASE SUPPORT	N/A	-	**-**	Tower is on top of building. Scope is limited to tower. Building members to be reviewed by others. Refer to Appendix 1 for reactions

Table 4: Serviceability Requirements

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.1086 Deg.	4.425 Deg.	**Pass**	1ft HP Dish (Windstar 43029) Elev. 221.00ft
	0.1098 Deg.	0.2957 Deg.	**Pass**	10ft HP Dish Elev. 223.50ft
	0.1118 Deg.	4 Deg. from Vert. or Horiz. Axis	**Pass**	
HORIZONTAL DISPLACEMENT	1.741 In./ 0.11% of Ht.	3.0% of Height	**Pass**	

Notes:

1. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
2. Refer to the Appendix 1 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the stress analysis results, the subject structure is **rated at 93.5%** of its support capacity (controlling component: Legs) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 1 for more details of the analysis results.
- Based on the stress analysis performed, the existing structure **is in conformance** with the IBC / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.
- Please note that the tower is mounted on top of a building rooftop. Building rooftop is to be evaluated by others to determine its adequacy for the new base loads (not within scope). Refer to Appendix for tower base reactions.
- ***The installation of the proposed changed condition as noted in Table 1 is structurally acceptable***. Please refer to Appendix 1 for Schematic Lines Layout.
- This superstructure (above tower base) is near its support capacity for the appurtenances and loading criteria considered. Therefore, no changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by **M**alouf **E**ngineering **I**nternational*,* Inc. *('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.*

The analysis performed and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

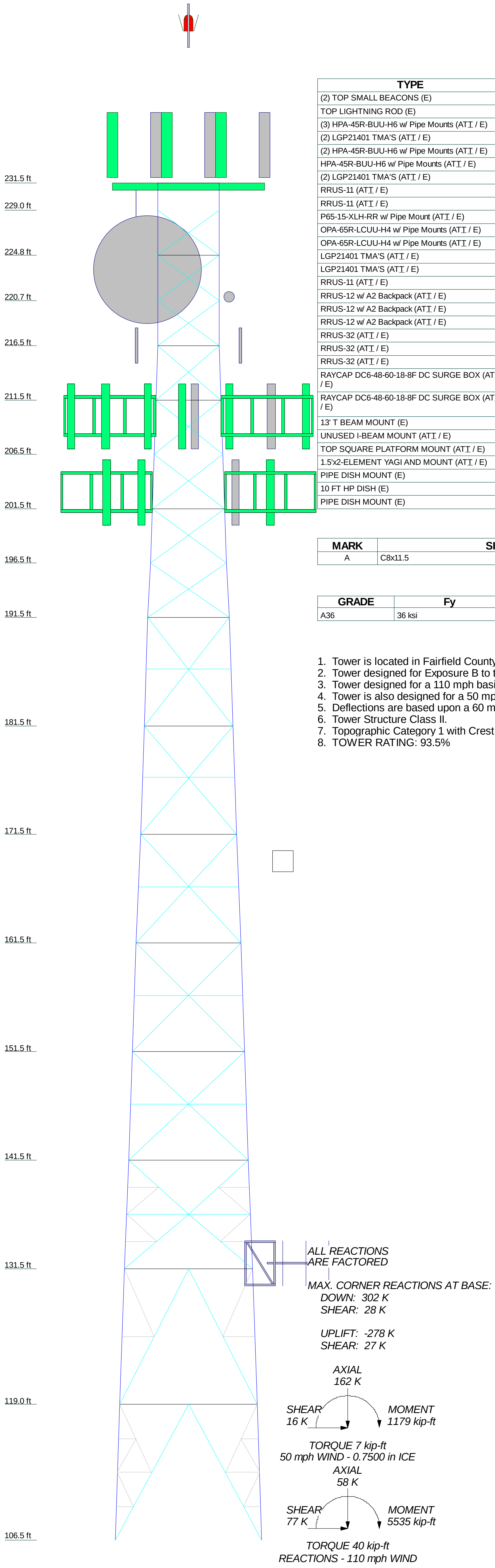
Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Horizontals	Sec. Horizontals	Red. Horizontals	Red. Diagonals	Red. Sub-Horizs	Red. Sub-Diags	Inner Bracing	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	L4x4x3/8	A36	N.A.	N.A.	A	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	5.60417	1 @ 2.5	0.4
T2	L4x4x3/8	A36	2L2 1/2x2x1/4x3/8	A36	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		3 @ 4.1667	0.6
T3	L4x4x3/8	A36	2L2 1/2x2x1/4x3/8	A36	B	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		3 @ 4.1667	0.7
T4	L4x4x3/8	A36	2L2 1/2x2x1/4x3/8	A36	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		3 @ 4.1667	0.6
T5	L5x5x1/2	A36	L2 1/2x2x1/4	A36	C7x9.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	5.96685	5 @ 5	0.8
T6	L5x5x1/2	A36	L2 1/2x2x1/4	A36	L2 1/2x2x1/4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	6.32954	5 @ 5	0.7
T7	L5x5x1/2	A36	L2 1/2x2x1/4	A36	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	6.69223	5 @ 5	0.6
T8	L5x5x1/2	A36	L2 1/2x2x1/4	A36	B	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	7.05492	5 @ 5	0.7
T9	L5x5x1/2	A36	L2 1/2x2x1/4	A36	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	7.41761	5 @ 5	0.6
T10	L6x6x5/8	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	N.A.	L2 1/2x2x1/4	N.A.	N.A.	N.A.	N.A.	L2 1/2x2 1/2x3/16	8.14298	5 @ 10	1.9
T11	L6x6x5/8	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	N.A.	L2 1/2x2x1/4	N.A.	N.A.	N.A.	N.A.	N.A.	8.86836	5 @ 10	1.8
T12	L6x6x5/8	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	N.A.	L2 1/2x2x3/16	N.A.	N.A.	N.A.	N.A.	L2 1/2x2 1/2x3/16	9.59373	5 @ 10	1.9
T13	L6x6x5/8	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	N.A.	L2 1/2x2 1/2x1/4	N.A.	N.A.	N.A.	N.A.	N.A.	10.3191	5 @ 10	1.9
T14	L6x6x3/4	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	N.A.	L2 1/2x2x1/4	N.A.	N.A.	N.A.	N.A.	L2x2 1/2x3/16	11.0445	5 @ 10	2.3
T15	L6x6x3/4	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	L2 1/2x2x1/4	N.A.	L2 1/2x2x3/16	L2 1/2x2x3/16	N.A.	N.A.	N.A.	11.7699	2 @ 5	2.6
T16	L6x6x7/8	A36	2L2 1/2x2 1/2x1/4x3/8	A36	2L2 1/2x2 1/2x1/4x3/8	N.A.	N.A.	L2 1/2x2x3/16	L2 1/2x2x3/16	N.A.	N.A.	L3x3x3/16	12.6766	1 @ 12.5	3.5
T17	L6x6x7/8	A36	2L2 1/2x2 1/2x1/4x3/8	A36	2L2 1/2x2 1/2x1/4x3/8	N.A.	N.A.	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L3x3x3/16	13.5833	1 @ 12.4999	4.0
															25.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) TOP SMALL BEACONS (E)	245.17	1 FT HP DISH (WINDSTAR 43029) (E)	221
TOP LIGHTNING ROD (E)	244.5	4'Lx6'W REST PLATFORM (E)	216.5
(3) HPA-45R-BUU-H6 w/ Pipe Mounts (ATT / E)	235	4'Lx6'W REST PLATFORM (E)	216.5
(2) LGP21401 TMA'S (ATT / E)	235	AIR21 B2A B4P w/ pipe Mount (T-MOBILE / E)	210
(2) HPA-45R-BUU-H6 w/ Pipe Mounts (ATT / E)	235	AIR-32 B4A/B2P Panel w/ Pipe Mount (T-MOBILE / P)	210
HPA-45R-BUU-H6 w/ Pipe Mounts (ATT / E)	235	AIR-32 B4A/B2P Panel w/ Pipe Mount (T-MOBILE / P)	210
(2) LGP21401 TMA'S (ATT / E)	235	AIR-32 B4A/B2P Panel w/ Pipe Mount (T-MOBILE / P)	210
RRUS-11 (ATT / E)	235	KRY 112 71/2 (T-MOBILE / E)	210
RRUS-11 (ATT / E)	235	KRY 112 71/2 (T-MOBILE / E)	210
P65-15-XLH-RR w/ Pipe Mount (ATT / E)	235	KRY 112 71/2 (T-MOBILE / E)	210
OPA-65R-LCUU-H4 w/ Pipe Mounts (ATT / E)	235	RRUS-11 B12 (T-MOBILE / E)	210
OPA-65R-LCUU-H4 w/ Pipe Mounts (ATT / E)	235	RRUS-11 B12 (T-MOBILE / E)	210
LGP21401 TMA'S (ATT / E)	235	RRUS-11 B12 (T-MOBILE / E)	210
LGP21401 TMA'S (ATT / E)	235	RRUS-32 B2 (T-MOBILE / P)	210
RRUS-11 (ATT / E)	235	RRUS-32 B2 (T-MOBILE / P)	210
RRUS-12 w/ A2 Backpack (ATT / E)	235	RRUS-32 B2 (T-MOBILE / P)	210
RRUS-12 w/ A2 Backpack (ATT / E)	235	SECTOR FRAME MOUNT (T-MOBILE / E)	210
RRUS-12 w/ A2 Backpack (ATT / E)	235	SECTOR FRAME MOUNT (T-MOBILE / E)	210
RRUS-32 (ATT / E)	235	SECTOR FRAME MOUNT (T-MOBILE / E)	210
RRUS-32 (ATT / E)	235	AIR21 B2A B4P w/ pipe Mount (T-MOBILE / E)	210
RRUS-32 (ATT / E)	235	AIR21 B2A B4P w/ pipe Mount (T-MOBILE / E)	210
RAYCAP DC6-48-60-18-8F DC SURGE BOX (ATT / E)	233	LNX-6515DS-VTM w/ Pipe Mnt. (T-MOBILE / E)	203
RAYCAP DC6-48-60-18-8F DC SURGE BOX (ATT / E)	233	SECTOR FRAME MOUNT (T-MOBILE / E)	203
13' T BEAM MOUNT (E)	231.5	SECTOR FRAME MOUNT (T-MOBILE / E)	203
UNUSED I-BEAM MOUNT (ATT / E)	231.5	SECTOR FRAME MOUNT (T-MOBILE / E)	203
TOP SQUARE PLATFORM MOUNT (ATT / E)	231.5	LNX-6515DS-VTM w/ Pipe Mnt. (T-MOBILE / E)	203
1.5'x2-ELEMENT YAGI AND MOUNT (ATT / E)	229	LNX-6515DS-VTM w/ Pipe Mnt. (T-MOBILE / E)	203
PIPE DISH MOUNT (E)	223.5	4'x7-ELEMENT YAGI (ATT / E)	132
10 FT HP DISH (E)	223.5	2FT SIDEARM MOUNT (ATT / E)	132
PIPE DISH MOUNT (E)	221		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	C8x11.5	B	L2 1/2x2 1/2x1/4

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 110 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 93.5%

MALOUF ENGINEERING INTL., INC. STRUCTURAL CONSULTANTS
maloufengineering.com
Malouf Engineering Int'l, Inc.
17950 Preston Road, Suite #720
Dallas, TX 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Job: ***125 FT SST, STAMFORD / DWTN SITE #CT11410A***			
Project: ***CT02768S-17V0***			
Client: TRANSCEND WIRELESS / T-MOBILE	Drawn by: LNguyen	App'd:	
Code: TIA-222-G	Date: 05/22/17	Scale: NTS	
Path: D:\MEIProjects\17 DATA\SS\CT02768S-17V0\CT02768S-17V0.eri		Dwg No. E-1	

No.	QTY.	DESCRIPTION	ELEV.	TENANT
1	1	Safety Climb & Climbing Ladder	125'	E
2	1	1 1/4" Rigid Conduit	125'	E
3	12	1 5/8"	125'	AT&T / E
4	1	0.30"	125'	AT&T / E
5	4	0.75" DC POWER TRUNK CABLES	125'	AT&T / E
6	2	0.625" FIBER TRUNK CABLE	125'	AT&T / E
7	2	3/8" (UNUSED)	115'	E
8	1	3/8"	114.5'	E
9	1	1/2"	122.5'	E
10	2	EW90	117'	E
11	1	1/2"	25.5'	E
12	29	1 5/8"	103.5'	T-MOBILE / E
13	1	1 5/8" HYBRID FIBER CABLE	103.5'	T-MOBILE / E
14	1	1 5/8" (TO BE REMOVED)	103.5'	T-MOBILE / R
15	1	1 1/4" HYBRID FIBER CABLE	103.5'	T-MOBILE / P

LEGEND:

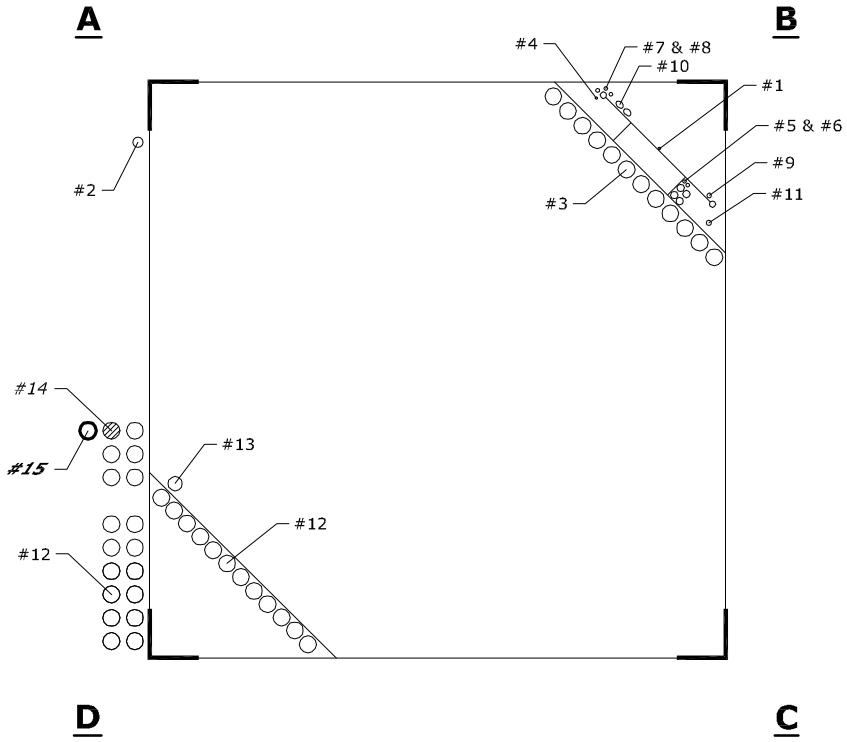
E = EXISTING #X

P = PROPOSED #X

F = FUTURE #X

R = REMOVE #X

TO RELOCATE



101 PLAN: SCHEMATIC Tx-LINE LAYOUT

SCALE: NOT TO SCALE

NOTE:
1. Tx LINE LAYOUT IS SCHEMATIC ONLY, BASED UPON MEI RECORDS. NO NEW SITE PHOTOS PROVIDED.
2. ELEVATIONS SHOWN ARE ABOVE ROOF LINE.

MAY 22, 2017

MALOUF ENGINEERING INTERNATIONAL, INC.
STRUCTURAL CONSULTANTS
17950 PRESTON ROAD SUITE 720
DALLAS, TEXAS 75252-5635
972-783-2578 (fax: 2583)
www.maloufengineering.com

T-Mobile

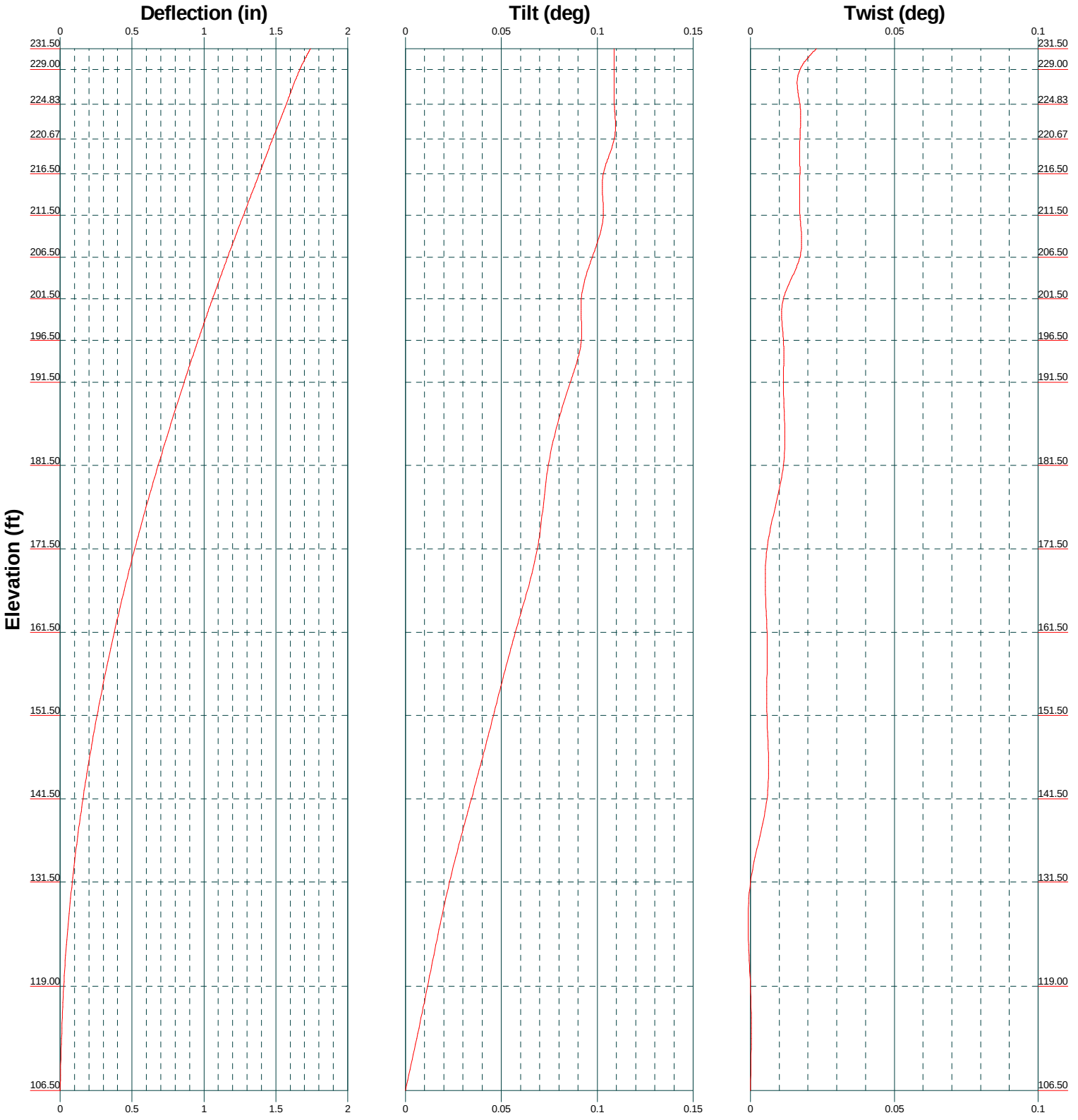
STAMFORD / DWTN SITE #CT11410A

TOWER TxLINE LAYOUT

MEI PROJECT ID	SHEET NUMBER	REV.
CT02768S-17V0	**L01**	0

TIA-222-G - Service - 60 mph

Maximum Values



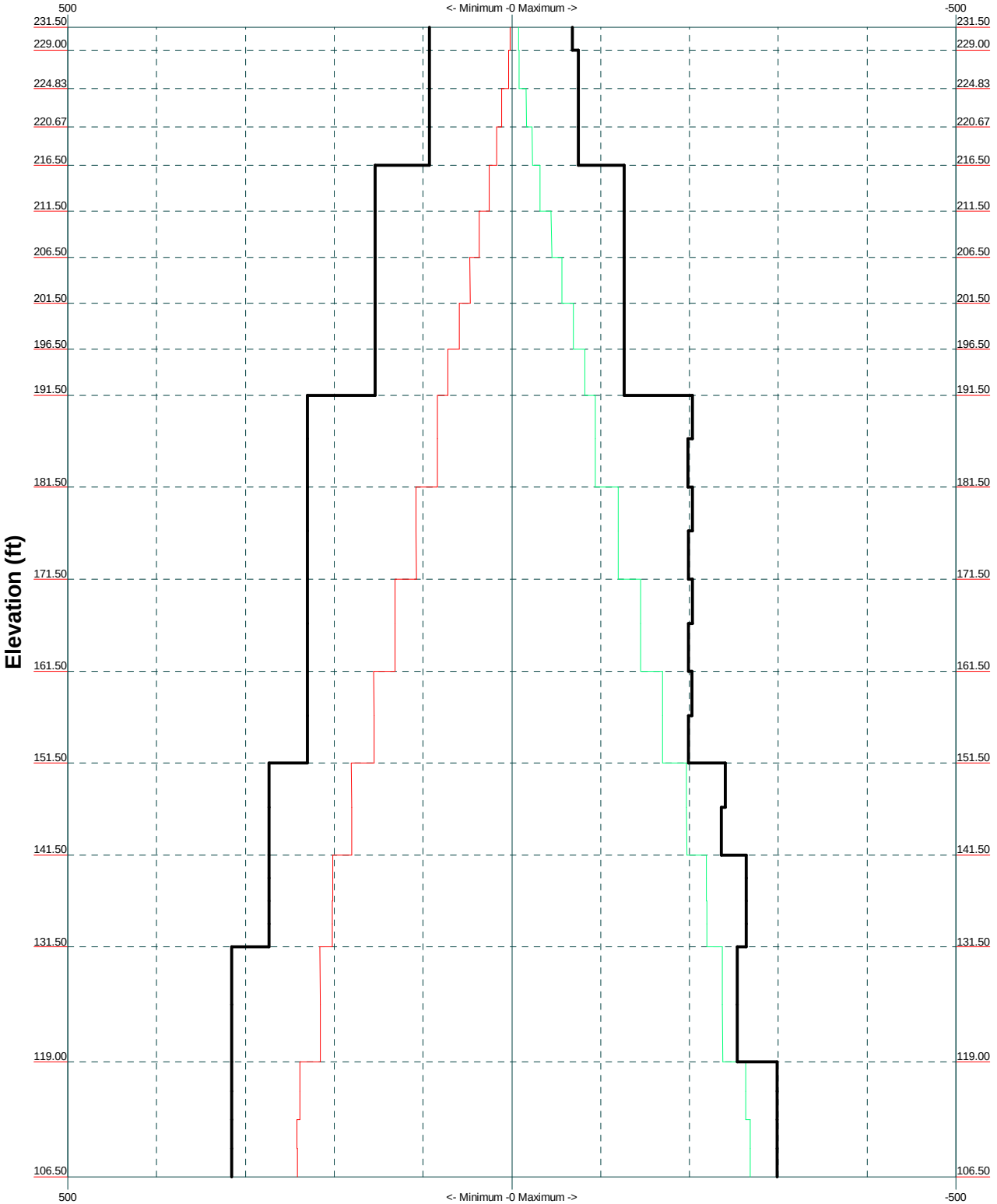
MALOUF ENGINEERING INTL., INC.
STRUCTURAL CONSULTANTS
maloufengineering.com

Malouf Engineering Int'l, Inc.
17950 Preston Road, Suite #720
Dallas, TX 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Job:	***125 FT SST, STAMFORD / DWTN SITE #CT11410A***		
Project:	***CT02768S-17V0***		
Client: TRANSCEND WIRELESS / T-MOBILE		Drawn by: LNguyen	App'd:
Code: TIA-222-G		Date: 05/22/17	Scale: NTS
Path: D:\MEIProjects\17 DAT A\SS\CT02768S-17V0\CT02768S-17V0.eri			Dwg No. E-5

TIA-222-G - 110 mph/50 mph 0.7500 in Ice Exposure B

Leg Capacity ——— **Leg Compression (K)**



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Job:	***125 FT SST, STAMFORD / DWTN SITE #CT11410A***		
Project:	***CT02768S-17V0***		
Client: TRANSCEND WIRELESS / T-MOBILE		Drawn by: LNguyen	App'd:
Code: TIA-222-G		Date: 05/22/17	Scale: NTS
Path: D:\MEIProjects\17 DATA\SS\CT02768S-17V0\CT02768S-17V0.eri			Dwg No. E-3

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 231.50 ft above the ground line.
The base of the tower is set at an elevation of 106.50 ft above the ground line.
The face width of the tower is 5.60 ft at the top and 13.58 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 110 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Placement	#
	ft	
Safety Line 3/8 (E)	231.50 - 106.50	1
Climbing Ladder (E)	231.50 - 106.50	1
W/G LADDER "A" (E)	212.50 - 106.50	1
W/G LADDER "B" (E)	206.50 - 106.50	1
W/G LADDER "C" (E)	200.50 - 106.50	1
1 1/4" Rigid Conduit (E)	231.50 - 106.50	1
0.625" Fiber Trunk Cable (AT&T / E)	231.50 - 106.50	2
0.75" DC Power Trunk Cable (AT&T / E)	231.50 - 106.50	4
1 5/8 (AT&T / E)	231.50 - 106.50	12
0.30 (AT&T / E)	231.50 - 106.50	1
1/2 (E)	229.00 - 106.50	1
EW90 (E)	223.50 - 106.50	2
3/8 (E (UNUSED))	221.50 - 106.50	2
3/8 (E)	221.00 - 106.50	1
1 5/8 (T-MOBILE / E)	210.00 - 106.50	12
1 1/4 Hybrid Fiber Cable (T-MOBILE / P)	210.00 - 106.50	1
1 5/8 (T-MOBILE / E)	210.00 - 106.50	5
1 5/8 (T-MOBILE / E)	210.00 - 106.50	11
1 5/8 Hybrid Fiber Cable (T-MOBILE /	210.00 - 106.50	1

Description	Placement	#
	ft	
E) 1/2 (E)	132.00 - 106.50	1

Feed Line/Linear Appurtenances - Entered As Area

Description	Placement	Total Number
	ft	
MISCELLANEOUS (E)	231.50 - 106.50	2
MISCELLANEOUS WEIGHT (E)	231.50 - 106.50	1

Discrete Tower Loads

Description	Placement	Weight
	ft	K
(2) TOP SMALL BEACONS	245.17	0.06
(E)		0.09
		0.12
TOP LIGHTNING ROD	244.50	0.05
(E)		0.07
		0.10
13' T BEAM MOUNT	231.50	0.10
(E)		0.15
		0.20
(3) HPA-45R-BUU-H6 w/	235.00	0.08
Pipe Mounts		0.17
(AT&T / E)		0.27
(2) LGP21401 TMA'S	235.00	0.02
(AT&T / E)		0.03
		0.04
(2) HPA-45R-BUU-H6 w/	235.00	0.08
Pipe Mounts		0.17
(AT&T / E)		0.27
HPA-45R-BUU-H6 w/ Pipe	235.00	0.08
Mounts		0.17
(AT&T / E)		0.27
(2) LGP21401 TMA'S	235.00	0.02
(AT&T / E)		0.03
		0.04
RRUS-11	235.00	0.05
(AT&T / E)		0.07
		0.10
RRUS-11	235.00	0.05
(AT&T / E)		0.07
		0.10
RAYCAP DC6-48-60-18-8F	233.00	0.03
DC SURGE BOX		0.06
(AT&T / E)		0.09
P65-15-XLH-RR w/ Pipe	235.00	0.07
Mount		0.12
(AT&T / E)		0.18
OPA-65R-LCUU-H4 w/ Pipe	235.00	0.08

Description	Placement	Weight
	ft	K
Mounts		0.13
(AT&T / E)		0.20
OPA-65R-LCUU-H4 w/ Pipe	235.00	0.08
Mounts		0.13
(AT&T / E)		0.20
LGP21401 TMA'S	235.00	0.02
(AT&T / E)		0.03
		0.04
LGP21401 TMA'S	235.00	0.02
(AT&T / E)		0.03
		0.04
RRUS-11	235.00	0.05
(AT&T / E)		0.07
		0.10
RRUS-12 w/ A2 Backpack	235.00	0.08
(AT&T / E)		0.11
		0.14
RRUS-12 w/ A2 Backpack	235.00	0.08
(AT&T / E)		0.11
		0.14
RRUS-12 w/ A2 Backpack	235.00	0.08
(AT&T / E)		0.11
		0.14
RAYCAP DC6-48-60-18-8F	233.00	0.03
DC SURGE BOX		0.06
(AT&T / E)		0.09
RRUS-32	235.00	0.08
(AT&T / E)		0.10
		0.14
RRUS-32	235.00	0.08
(AT&T / E)		0.10
		0.14
RRUS-32	235.00	0.08
(AT&T / E)		0.10
		0.14
UNUSED I-BEAM MOUNT	231.50	0.10
(AT&T / E)		0.15

Description	Placement	Weight
	ft	K
		0.20
1.5'x2-ELEMENT YAGI	229.00	0.07
AND MOUNT		0.13
(AT&T / E)		0.17
TOP SQUARE PLATFORM	231.50	5.50
MOUNT		7.50
(AT&T / E)		9.50
PIPE DISH MOUNT	223.50	0.15
(E)		0.23
		0.30
PIPE DISH MOUNT	221.00	0.07
(E)		0.10
		0.13
4'Lx6'W REST PLATFORM	216.50	0.75
(E)		1.25
		1.75
4'Lx6'W REST PLATFORM	216.50	0.75
(E)		1.25
		1.75
AIR21 B2A B4P w/ pipe	210.00	0.13
Mount		0.18
(T-MOBILE / E)		0.25
AIR21 B2A B4P w/ pipe	210.00	0.13
Mount		0.18
(T-MOBILE / E)		0.25
AIR21 B2A B4P w/ pipe	210.00	0.13
Mount		0.18
(T-MOBILE / E)		0.25
AIR-32 B4A/B2P Panel w/	210.00	0.13
Pipe Mount		0.19
(T-MOBILE / P)		0.26
AIR-32 B4A/B2P Panel w/	210.00	0.13
Pipe Mount		0.19
(T-MOBILE / P)		0.26
AIR-32 B4A/B2P Panel w/	210.00	0.13
Pipe Mount		0.19
(T-MOBILE / P)		0.26
KRY 112 71/2	210.00	0.01
(T-MOBILE / E)		0.02
		0.03
KRY 112 71/2	210.00	0.01
(T-MOBILE / E)		0.02
		0.03
KRY 112 71/2	210.00	0.01
(T-MOBILE / E)		0.02
		0.03
RRUS-11 B12	210.00	0.05
(T-MOBILE / E)		0.07
		0.10
RRUS-11 B12	210.00	0.05

Description	Placement	Weight
	ft	K
(T-MOBILE / E)		0.07
		0.10
RRUS-11 B12	210.00	0.05
(T-MOBILE / E)		0.07
		0.10
RRUS-32 B2	210.00	0.05
(T-MOBILE / P)		0.07
		0.10
RRUS-32 B2	210.00	0.05
(T-MOBILE / P)		0.07
		0.10
RRUS-32 B2	210.00	0.05
(T-MOBILE / P)		0.07
		0.10
SECTOR FRAME MOUNT	210.00	0.40
(T-MOBILE / E)		0.60
		0.80
SECTOR FRAME MOUNT	210.00	0.40
(T-MOBILE / E)		0.60
		0.80
SECTOR FRAME MOUNT	210.00	0.40
(T-MOBILE / E)		0.60
		0.80
LNX-6515DS-VTM w/ Pipe	203.00	0.08
Mnt.		0.17
(T-MOBILE / E)		0.26
LNX-6515DS-VTM w/ Pipe	203.00	0.08
Mnt.		0.17
(T-MOBILE / E)		0.26
LNX-6515DS-VTM w/ Pipe	203.00	0.08
Mnt.		0.17
(T-MOBILE / E)		0.26
SECTOR FRAME MOUNT	203.00	0.40
(T-MOBILE / E)		0.60
		0.80
SECTOR FRAME MOUNT	203.00	0.40
(T-MOBILE / E)		0.60
		0.80
SECTOR FRAME MOUNT	203.00	0.40
(T-MOBILE / E)		0.60
		0.80
4'x7-ELEMENT YAGI	132.00	0.03
(AT&T / E)		0.04
		0.06
2FT SIDEARM MOUNT	132.00	0.10
(AT&T / E)		0.15
		0.20

Dishes

Description	Dish Type	Elevation	Outside Diameter	Weight
		ft	ft	K
10 FT HP DISH	Paraboloid	223.50	10.00	0.40
(E)	w/Shroud (HP)			0.81
				1.22
1 FT HP DISH	Paraboloid	221.00	1.00	0.03
(WINDSTAR 43029)	w/Shroud (HP)			0.04

Description	Dish Type	Elevation	Outside Diameter	Weight
		ft	ft	K
(E)				0.06

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	12	297.50	18.66	-20.01
	Max. H_x	12	297.50	18.66	-20.01
	Max. H_z	5	-277.66	-18.00	19.54
	Min. Vert	5	-277.66	-18.00	19.54
	Min. H_x	5	-277.66	-18.00	19.54
	Min. H_z	12	297.50	18.66	-20.01
Leg C	Max. Vert	8	285.03	-19.23	-18.32
	Max. H_x	17	-262.10	18.34	17.57
	Max. H_z	17	-262.10	18.34	17.57
	Min. Vert	17	-262.10	18.34	17.57
	Min. H_x	8	285.03	-19.23	-18.32
	Min. H_z	8	285.03	-19.23	-18.32
Leg B	Max. Vert	4	301.96	-20.28	18.89
	Max. H_x	13	-272.86	19.07	-17.94
	Max. H_z	4	301.96	-20.28	18.89
	Min. Vert	13	-272.86	19.07	-17.94
	Min. H_x	4	301.96	-20.28	18.89
	Min. H_z	13	-272.86	19.07	-17.94
Leg A	Max. Vert	16	286.98	18.25	19.35
	Max. H_x	16	286.98	18.25	19.35
	Max. H_z	16	286.98	18.25	19.35
	Min. Vert	9	-260.75	-17.36	-18.53
	Min. H_x	9	-260.75	-17.36	-18.53
	Min. H_z	9	-260.75	-17.36	-18.53

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	231.5 - 229	1.741	28	0.1099	0.0206
T2	229 - 224.833	1.667	28	0.1095	0.0187
T3	224.833 - 220.667	1.572	28	0.1087	0.0186
T4	220.667 - 216.5	1.477	28	0.1069	0.0181
T5	216.5 - 211.5	1.385	28	0.1043	0.0175
T6	211.5 - 206.5	1.274	28	0.1019	0.0162
T7	206.5 - 201.5	1.165	28	0.0985	0.0148
T8	201.5 - 196.5	1.060	28	0.0945	0.0134
T9	196.5 - 191.5	0.959	28	0.0896	0.0121
T10	191.5 - 181.5	0.863	28	0.0841	0.0109

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T11	181.5 - 171.5	0.682	28	0.0764	0.0088
T12	171.5 - 161.5	0.519	28	0.0672	0.0072
T13	161.5 - 151.5	0.377	28	0.0569	0.0058
T14	151.5 - 141.5	0.257	28	0.0455	0.0046
T15	141.5 - 131.5	0.159	28	0.0352	0.0036
T16	131.5 - 119	0.084	28	0.0244	0.0027
T17	119 - 106.5	0.025	28	0.0125	0.0013

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
245.17	(2) TOP SMALL BEACONS	28	1.741	0.1099	0.0206	12839
244.50	TOP LIGHTNING ROD	28	1.741	0.1099	0.0206	12839
235.00	(3) HPA-45R-BUU-H6 w/ Pipe Mounts	28	1.741	0.1099	0.0206	12839
233.00	RAYCAP DC6-48-60-18-8F DC SURGE BOX	28	1.741	0.1099	0.0206	12839
231.50	13' T BEAM MOUNT	28	1.741	0.1099	0.0206	12839
229.00	1.5'x2-ELEMENT YAGI AND MOUNT	28	1.667	0.1095	0.0187	12839
223.50	10 FT HP DISH	28	1.542	0.1082 (3 dB) 0.2957	0.0185 (3 dB) 0.2957	171126
221.00	1 FT HP DISH (WINDSTAR 43029)	28	1.485	0.1071	0.0182	362387
216.50	4'Lx6'W REST PLATFORM	28	1.385	0.1043	0.0175	250323
210.00	AIR21 B2A B4P w/ pipe Mount	28	1.241	0.1010	0.0158	87704
203.00	LNX-6515DS-VTM w/ Pipe Mnt.	28	1.091	0.0957	0.0139	71041
132.00	4'x7-ELEMENT YAGI	28	0.087	0.0249	0.0028	47544

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	231.5 - 229	Leg	L4x4x3/8	4	-5.41	68.29	64.9	Pass
T2	229 - 224.833	Leg	L4x4x3/8	12	-8.35	74.97	11.1	Pass
T3	224.833 - 220.667	Leg	L4x4x3/8	24	-16.53	74.97	22.1	Pass
T4	220.667 - 216.5	Leg	L4x4x3/8	37	-23.17	74.97	30.9	Pass
T5	216.5 - 211.5	Leg	L5x5x1/2	51	-31.92	126.43	25.2	Pass
T6	211.5 - 206.5	Leg	L5x5x1/2	67	-44.90	126.43	35.5	Pass
T7	206.5 - 201.5	Leg	L5x5x1/2	83	-56.61	126.43	44.8	Pass
T8	201.5 - 196.5	Leg	L5x5x1/2	95	-69.09	126.43	54.6	Pass
T9	196.5 - 191.5	Leg	L5x5x1/2	111	-82.39	126.43	65.2	Pass
T10	191.5 - 181.5	Leg	L6x6x5/8	123	-94.14	198.38	47.5	Pass
T11	181.5 - 171.5	Leg	L6x6x5/8	148	-119.68	198.60	60.3	Pass
T12	171.5 - 161.5	Leg	L6x6x5/8	168	-144.90	198.79	72.9	Pass
T13	161.5 - 151.5	Leg	L6x6x5/8	193	-169.91	198.95	85.4	Pass
T14	151.5 - 141.5	Leg	L6x6x3/4	213	-196.93	235.74	83.5	Pass
T15	141.5 - 131.5	Leg	L6x6x3/4	238	-219.71	264.13	83.2	Pass
T16	131.5 - 119	Leg	L6x6x7/8	306	-237.35	253.78	93.5	Pass
T17	119 - 106.5	Leg	L6x6x7/8	347	-268.64	298.61	90.0	Pass
T2	229 - 224.833	Diagonal	2L2 1/2x2x1/4x3/8	20	3.80	55.22	6.9 9.1 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T3	224.833 - 220.667	Diagonal	2L2 1/2x2x1/4x3/8	36	4.78	55.22	8.7 11.4 (b)	Pass
T4	220.667 - 216.5	Diagonal	2L2 1/2x2x1/4x3/8	47	-6.31	53.51	11.8 15.0 (b)	Pass
T5	216.5 - 211.5	Diagonal	L2 1/2x2x1/4	63	-6.29	18.95	33.2	Pass
T6	211.5 - 206.5	Diagonal	L2 1/2x2x1/4	79	-6.95	18.34	37.9	Pass
T7	206.5 - 201.5	Diagonal	L2 1/2x2x1/4	91	-7.83	17.71	44.2	Pass
T8	201.5 - 196.5	Diagonal	L2 1/2x2x1/4	107	-8.31	17.08	48.7	Pass
T9	196.5 - 191.5	Diagonal	L2 1/2x2x1/4	119	-8.52	16.43	51.8	Pass
T10	191.5 - 181.5	Diagonal	L3x3x1/4	138	-14.30	20.33	70.3	Pass
T11	181.5 - 171.5	Diagonal	L3x3x1/4	158	-14.46	19.45	74.3	Pass
T12	171.5 - 161.5	Diagonal	L3x3x1/4	183	-14.95	18.53	80.7	Pass
T13	161.5 - 151.5	Diagonal	L3x3x1/4	203	-15.45	17.55	88.1	Pass
T14	151.5 - 141.5	Diagonal	L3x3x1/4	228	-14.75	16.58	89.0	Pass
T15	141.5 - 131.5	Diagonal	L3x3x1/4	260	-17.01	26.01	65.4 71.7 (b)	Pass
T16	131.5 - 119	Diagonal	2L2 1/2x2 1/2x1/4x3/8	337	-23.52	26.68	88.2	Pass
T17	119 - 106.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	404	-23.28	55.95	41.6 57.9 (b)	Pass
T15	141.5 - 131.5	Horizontal	L2 1/2x2x1/4	251	-3.30	10.48	31.5	Pass
T10	191.5 - 181.5	Secondary Horizontal	L2 1/2x2x1/4	144	-1.41	19.40	7.3	Pass
T11	181.5 - 171.5	Secondary Horizontal	L2 1/2x2x1/4	164	-1.80	18.47	9.7	Pass
T12	171.5 - 161.5	Secondary Horizontal	L2 1/2x2x3/16	189	-2.17	13.49	16.1	Pass
T13	161.5 - 151.5	Secondary Horizontal	L2 1/2x2 1/2x1/4	209	-2.55	21.77	11.7 11.8 (b)	Pass
T14	151.5 - 141.5	Secondary Horizontal	L2 1/2x2x1/4	234	-2.96	15.64	18.9	Pass
T1	231.5 - 229	Top Girt	C8x11.5	8	-0.62	63.87	17.0	Pass
T3	224.833 - 220.667	Top Girt	L2 1/2x2 1/2x1/4	27	-1.11	18.34	6.0	Pass
T5	216.5 - 211.5	Top Girt	C7x9.8	53	-1.22	49.83	2.4 3.1 (b)	Pass
T6	211.5 - 206.5	Top Girt	L2 1/2x2x1/4	69	-1.03	13.17	7.8	Pass
T8	201.5 - 196.5	Top Girt	L2 1/2x2 1/2x1/4	97	-0.90	15.06	6.0	Pass
T10	191.5 - 181.5	Top Girt	L2 1/2x2 1/2x1/4	125	-3.38	26.23	12.9 18.7 (b)	Pass
T11	181.5 - 171.5	Top Girt	L2 1/2x2 1/2x1/4	150	-6.28	18.97	33.1 35.2 (b)	Pass
T12	171.5 - 161.5	Top Girt	L2 1/2x2 1/2x1/4	170	-6.89	24.97	27.6 38.2 (b)	Pass
T13	161.5 - 151.5	Top Girt	L2 1/2x2 1/2x1/4	195	-7.67	16.04	47.8	Pass
T14	151.5 - 141.5	Top Girt	L2 1/2x2 1/2x1/4	215	-7.19	23.61	30.4 39.7 (b)	Pass
T15	141.5 - 131.5	Top Girt	L2 1/2x2 1/2x1/4	240	-7.57	16.84	45.0	Pass
T16	131.5 - 119	Top Girt	2L2 1/2x2 1/2x1/4x3/8	311	-11.66	53.02	22.0 28.3 (b)	Pass
T17	119 - 106.5	Top Girt	2L2 1/2x2 1/2x1/4x3/8	352	-11.28	40.69	27.7	Pass
T15	141.5 - 131.5	Redund Horz 1 Bracing	L2 1/2x2x3/16	261	-3.30	16.04	20.6	Pass
T16	131.5 - 119	Redund Horz 1 Bracing	L2 1/2x2x3/16	327	-3.56	15.84	22.5	Pass
T17	119 - 106.5	Redund Horz 1 Bracing	L2 1/2x2x3/16	376	-4.03	15.20	26.5	Pass
T15	141.5 - 131.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	287	-2.23	13.94	16.0	Pass
T16	131.5 - 119	Redund Diag 1 Bracing	L2 1/2x2x3/16	328	-4.13	6.03	68.4	Pass
T17	119 - 106.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	360	6.36	26.21	24.3	Pass
T15	141.5 - 131.5	Redund Hip 1 Bracing	L2x2x1/4	258	-0.03	13.57	0.3	Pass
T16	131.5 - 119	Redund Hip 1	L2x2x1/4	344	-0.17	12.88	1.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T17	119 - 106.5	Bracing Redund Hip 1 Bracing	L2x2x1/4	402	-0.23	11.20	2.1	Pass
T17	119 - 106.5	Redund Hip Diagonal 1 Bracing	L2x2x1/4	419	-0.14	2.48	5.7	Pass
T17	119 - 106.5	Redund Sub Horz Bracing	L2 1/2x2x3/16	365	-4.65	24.34	19.1	Pass
T17	119 - 106.5	Redund Sub Diagonal Bracing	L2 1/2x2x3/16	394	-5.36	17.87	30.0	Pass
T10	191.5 - 181.5	Inner Bracing	L2 1/2x2 1/2x3/16	133	-0.05	6.30	0.8	Pass
T12	171.5 - 161.5	Inner Bracing	L2 1/2x2 1/2x3/16	178	-0.10	4.41	2.3	Pass
T14	151.5 - 141.5	Inner Bracing	L2x2 1/2x3/16	223	-0.11	2.17	5.0	Pass
T16	131.5 - 119	Inner Bracing	L3x3x3/16	316	-0.17	4.38	3.9	Pass
T17	119 - 106.5	Inner Bracing	L3x3x3/16	357	-0.16	3.78	4.2	Pass
							Summary	
						Leg (T16)	93.5	Pass
						Diagonal (T14)	89.0	Pass
						Horizontal (T15)	31.5	Pass
						Secondary Horizontal (T14)	18.9	Pass
						Top Girt (T13)	47.8	Pass
						Redund Horz 1 Bracing (T17)	26.5	Pass
						Redund Diag 1 Bracing (T16)	68.4	Pass
						Redund Hip 1 Bracing (T17)	2.1	Pass
						Redund Hip Diagonal 1 Bracing (T17)	5.7	Pass
						Redund Sub Horz Bracing (T17)	19.1	Pass
						Redund Sub Diagonal Bracing (T17)	30.0	Pass
						Inner Bracing (T14)	5.0	Pass
						Bolt Checks	71.7	Pass
						RATING =	**93.5**	**Pass**

APPENDIX 2 – SOURCE / CHANGED CONDITION

Preliminary Data Questionnaire (PDQ)

Application Date: 3/14/2017

Name and Mailing Address of Applicant:
(Street, City, State, Zip Code)

T-Mobile USA
12920 SE 38th Street
Bellevue, WA 98006
Telephone Number:

Requested Site:

Frontier Site Name: Stamford #1 CO
555 Main Street, Stamford, CT

Applicant Site Name: CT11410A

Contact Information: (if different from applicant)

Name: Kyle Richers
Phone #: 908-447-4716
Email: krichers@transcendwireless.com

Project Description:

Replacing (3) AIR 21 antennas with (3) AIR 32 antennas, adding (3) RRUs, replacing (1) coax with (1) hybrid

Are copies of all necessary permits attached?

USFS, BLM, Municipality Permits:

Yes
No X

FCC License:

Yes X
No

If no, have they been applied for?

Yes ⇨ ⇨ Application Date:
No

Additional Notes on Permits:

Tower / Radio Information - Call Sign information needs to be tied to a specific antenna(s). Adjust letters as needed.

A	Call Sign	KNLF202
	Class of Station	CW - PCS
	Emission Designator	15M07W7
	Transmit Frequency	1930-1945 MHz
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	1850-1865 MHz

A	Call Sign	WQJQ696
	Class of Station	WY- Block A
	Emission Designator	5M007W7
	Transmit Frequency	728-734
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	698-704

A	Call Sign	WQGA731
	Class of Station	AW- AWS
	Emission Designator	10M07W7
	Transmit Frequency	2135-2140
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	1735-1740

A	Call Sign	WQKF358
	Class of Station	AW - AWS
	Emission Designator	10M07W7
	Transmit Frequency	2130-2135
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	1730-1735

A	Call Sign	WQGB373
	Class of Station	AW - AWS
	Emission Designator	10M07W7
	Transmit Frequency	2140-2145
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	1740-1745

Please attach frequency coordination data (PCN)

A	Call Sign	WQPZ969
	Class of Station	AW - AWS
	Emission Designator	10M07W7
	Transmit Frequency	2145-2155
	Output Power (watts)	40W
	Transmitter ERP (dBm)	2 X 62.5 dBm
	Receive Frequency	1745-1755

Coax / Waveguide / Cable Feedline Information

Type:	Coax
Size:	1-5/8"
Length:	180'
# of runs:	30 (E) - removing 1 for 29
Type:	Hybrid/Fiber
Size:	1-5/8"
Length:	180'
# of runs:	1 (E)
Type:	Hybrid/Fiber
Size:	1-1/4"
Length:	180'
# of runs:	1 (P)
Type:	Cabling 105' on tower
Size:	
Length:	
# of runs:	

	Antenna & Ancillary Equipment Information		**Check one**					**Heights** - Above Ground Level (feet)			**Notes:** (including removals, ice shields, etc.)
@	Make	Model	Existing	Proposed	Size / Dimensions	Weight	Azimuth	RAD Center	Attachment	Tip	
A	Ericsson (panel)	KRD901044/ AIR32 B4A/B2P		X	56.6" x 12.9" x 8.7"	105.8	100	210'	208', 212'	212.3'	
A	Ericsson (panel)	KRD901044/ AIR32 B4A/B2P		X	56.6" x 12.9" x 8.7"	105.8	220	210'	208', 212'	212.3'	
A	Ericsson (panel)	KRD901044/ AIR32 B4A/B2P		X	56.6" x 12.9" x 8.7"	105.8	330	210'	208', 212'	212.3'	
A	Commscope (panel)	LNX-6515DS-A1M	X		96.4" x 11.9" x 7.1"	50.3 lbs	100	203'	201', 205'	207'	
A	Commscope (panel)	LNX-6515DS-A1M	X		96.4" x 11.9" x 7.1"	50.3 lbs	220	203'	201', 205'	207'	
A	Commscope (panel)	LNX-6515DS-A1M	X		96.4" x 11.9" x 7.1"	50.3 lbs	330	203'	201', 205'	207'	
A	Ericsson (panel)	AIR21 B4A/B2P	X		56" x 12" x 8"	91 lbs	100	210'	208', 212'	212.3'	to be removed
A	Ericsson (panel)	AIR21 B4A/B2P	X		56" x 12" x 8"	91 lbs	220	210'	208', 212'	212.3'	to be removed
A	Ericsson (panel)	AIR21 B4A/B2P	X		56" x 12" x 8"	91 lbs	330	210'	208', 212'	212.3'	to be removed
A	Ericsson (panel)	AIR21 B2A/B4P	X		56" x 12" x 8"	91 lbs	100	210'	208', 212'	212.3'	
A	Ericsson (panel)	AIR21 B2A/B4P	X		56" x 12" x 8"	91 lbs	220	210'	208', 212'	212.3'	
A	Ericsson (panel)	AIR21 B2A/B4P	X		56" x 12" x 8"	91 lbs	330	210'	208', 212'	212.3'	
A	Ericsson	KRY 112 71	X		12.5" X 5.6" X 3.7"	13.2 lbs	100/220/330	210'	208', 212'		Three (3) TMA Units
A	Ericsson	RRUS11 B12	X		19.69" X 16.97" X 7.17"	50.7 lbs	100/220/330	210'	208', 212'		Three (3) RRU Units
A	Ericsson	RRUS32 B2		X	27.1" X 12" X 7"	52.9 lbs	100/220/330	210'	208', 212'		Three (3) RRU Units