Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

June 22, 2015

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
246 East Franklin Street, Killingly, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the top level of the existing 155-foot tower at 246 East Franklin Street in Danielson (Town of Killingly), Connecticut (the "Property"). The tower is owned by SBA. Cellco's use of the tower was approved by the Council in 1999. Cellco now intends to modify its facility by replacing three (3) of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas, at the same level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs"), one (1) each behind its 700 MHz antennas and two (2) HYBRIFLEX™ antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables inside the tower shaft.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Sean Hendricks, Town Manager for the Town of Killingly. A copy of this letter is also being sent to Charles R. Hutchins, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the top level on the 155-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

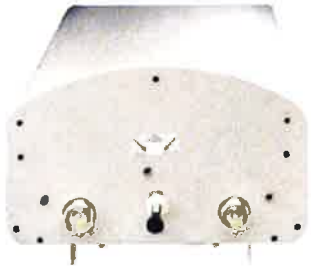
Enclosures
Copy to:
Sean Hendricks, Killingly Town Manager
Charles R. Hutchins
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 15.7	0 ° | 15.9
	5 ° | 15.7	5 ° | 15.8
	10 ° | 15.3	10 ° | 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®

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All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: April 14, 2015

Product Specifications

LNX-6514DS-VTM

Operating Frequency Band	698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	180.5 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	14.2 kg | 31.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

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All specifications are subject to change without notice. See www.commscope.com for the most current information. Revised: April 14, 2015

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

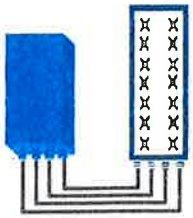
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

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Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.295)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Optical Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL34-V0, UL1666 RoHS Compliant
Power Cable Properties			
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

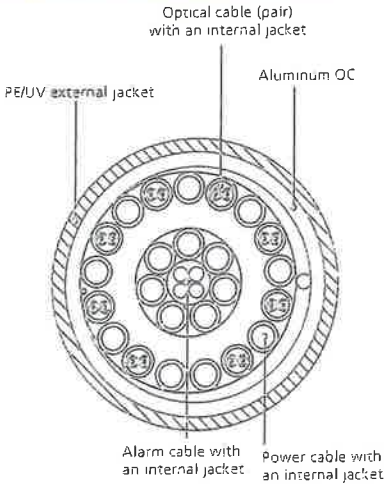


Figure 2: Construction Detail

* This data is provisional and subject to change

All information contained in the present datasheet is subject to confirmation at time of ordering.
Please visit us on the internet at http://www.rfsworld.com
Radio Frequency Systems

ATTACHMENT 2

	General	Power	Density					
Site Name: Danielson (Killingly)								
Tower Height: 155Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	127	0.0252	880	0.5867	4.29%	
*AT&T UMTS	2	875	127	0.0390	1900	1.0000	3.90%	
*AT&T GSM	1	283	127	0.0063	880	0.5867	1.08%	
*AT&T GSM	4	525	127	0.0468	1900	1.0000	4.68%	
*AT&T LTE	1	1771	127	0.0395	734	0.4893	8.07%	
*MetroPCS	3	443.61	117	0.0350	2140	1.0000	3.50%	
*Sprint CDMA/LTE	3	693	147	0.0346	1900	1.0000	3.46%	
*Sprint CDMA/LTE	1	390	147	0.0065	850	0.5667	1.15%	
*Sprint CDMA/LTE	2	693	147	0.0231	2500	1.0000	2.31%	
*V'Stream	2	449	137	0.0172	1930	1.0000	1.72%	
Verizon PCS	**11**	**425**	**155**	**0.0700**	**1970**	**1.0000**	**7.00%**	
Verizon Cellular	**9**	**229**	**155**	**0.0308**	**869**	**0.5793**	**5.32%**	
Verizon AWS	**1**	**2806**	**155**	**0.0420**	**2145**	**1.0000**	**4.20%**	
Verizon 700	**1**	**1051**	**155**	**0.0157**	**746**	**0.4973**	**3.16%**	
								53.83%
* Source: Siting Council								

ATTACHMENT 3

FDH VELOCITEL

ENGINEERING INNOVATION

Velocitel, Inc., d.b.a. FDH Velocitel , 6521 Meridien Dr. Raleigh, NC 27616, Ph. 919.755.1012, Fax 919.755.1031

Structural Analysis for SBA Network Services, Inc.

155' Monopole Tower

SBA Site Name: Danielson
SBA Site ID: CT00302-S-01
Verizon Site Name: Danielson

FDH Velocitel Project Number: 15BRUH1400

Analysis Results

Tower Components	99.9 %	Sufficient
Foundation	60.4 %	Sufficient

Prepared By:

Kelsey L Sargent

Kelsey Sargent
Project Engineer

Reviewed By:

Christopher M. Murphy

Christopher M. Murphy, PE
President
CT PE License No. 25842

Velocitel, Inc., d.b.a. FDH Velocitel
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012
info@fdh-inc.com

6/10/2015

June 9, 2015

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Velocitel performed a structural analysis of the monopole located in Danielson, 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 Connecticut Building Code (CBC)*. Information pertaining to the existing/proposed antenna loading, current tower geometry, geotechnical data, foundation dimensions, and member sizes was obtained from:

- Fred A. Nudd Corporation (Project No. 6410) Design of 155' Monopole dated October 27, 1998
- Jaworksi Geotech, Inc. (Project No. C98423G) Geotechnical Evaluation dated October 14, 1998
- Vertical Structures, Inc. (Job No. TA2009-007-021) 2009 Modifications Tower Rework For A 155' Nudd M-200 Monopole dated July 16, 2009
- Vertical Structures, Inc. (Job No. TA2008-007-031) 2008 Modifications Tower Rework For A 155' Nudd M-200 Monopole dated November 10, 2008
- Vertical Structures, Inc. (Job No. 2002-007-001) 2002 Modifications Tower Rework For A 155' Monopole dated October 7, 2002
- FDH Engineering, Inc. (Project No. 12-01571E S4) Modification Drawings for a 155' Monopole dated January 23, 2013
- FDH, Inc. (Project No. 1301411700) Modification Inspection Report dated July 23, 2013
- FDH, Inc. (Job No. 1301411700) TIA Inspection Report dated July 25, 2013
- FDH Engineering, Inc. (Project No. 1466VA1400) Modification Drawings for a 155' Monopole dated July 8, 2014
- SBA Network Services, Inc.

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

Conclusions

With the existing and proposed antennas from Verizon in place at 155 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 CBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was constructed per the original design drawings (see Fred A. Nudd Project No. 6410) and using the existing soil parameters (see Jaworksi Geotech, Inc. Project No. C98423G), the foundation should have the necessary capacity to support both the proposed and existing loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

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

Recommendations

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

1. The proposed feed lines should be installed inside of the monopole's shaft.
2. RRU/RRH Stipulation: The proposed equipment may be installed in any arrangement as determined by the client.
3. The proposed/existing diplexers should be installed directly behind the proposed/existing panel antennas.
4. Modifications listed in the FDH Engineering, Inc. Modification Drawings for a 155' Monopole (see FDH Velocitel Project No. 1466VA1400) dated July 8, 2014 must be installed correctly per the referenced drawings for this analysis to be valid.

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	Feed Lines[1]	Carrier	Mount Elevation (ft)	Mount Type
155	(3) Antel BXA-70063/6CF-2 (3) Antel BXA-70080/4BF (6) Commscope HBXX-6517DS-A2M (3) Alcatel Lucent RRH2x60-AWS (3) Alcatel Lucent RRH2x60-PCS (6) RFS Celwave FD9R6004-2C-3L (1) RFS DB-T1-6Z-8AB-0Z	(12) 1-5/8" (1) 1-5/8" Fiber	Verizon	155	(3) T-Frame w/ Walkways
147	(3) RFS APXVSPP18-C-A20 (3) RFS APXVTM14-C-I20 (3) ALU TD-RRH8x20-25 (3) ALU 1900 MHz RRHs (3) ALU 800 MHz RRHs (3) ALU 800 MHz Filters (4) RFS ACU-A20-N	(4) 1-1/4"	Sprint	147.5	(3) T-Frame w/ Walkways
137	(6) Dapa 59212	(6) 1-5/8"	T-Mobile	137	(3) T-Frame w/ Walkways
127	(6) Powerwave 7770.00 (3) KMW AM-X-CD-17-65-00T (6) Powerwave LGP21401 (6) Powerwave LGP21903	(12) 1-5/8" (2) 3/4" DC (1) 7/16" Fiber	New Cingular	125	(1) Low Profile Platform
125	(6) Ericsson RRUS-11 (1) Raycap DC2-48-60-18-8F				(1) Universal Ring Mount (Part No. LWRM)
117	(6) Kathrein 742 351	(12) 1-5/8" (1) 3/8"	Metro PCS	117	(3) 12' T-Frames
35	(1) Decibel DB589	(2) 7/8"	American Messaging	31	(1) Standoff

1. Feed lines installed inside the monopole shaft unless otherwise noted.

Proposed Carrier Final Loading:

Antenna Elevation (ft)	Description	Feed Lines	Carrier	Mount Elevation (ft)	Mount Type
155	(3) Commscope LNX-6514DS-A1M (3) BXA-70080-4BF (6) Commscope HBXX-6517DS-A2M (3) Alcatel Lucent RRH2x60-AWS (3) Alcatel Lucent RRH2x60-PCS (3) Alcatel Lucent RRH2x60-700 (6) RFS Celwave FD9R6004/2C-3L (1) RFS DB-T1-6Z-8AB-0Z	(6) 1-5/8" (2) 1-5/8" Fiber	Verizon	155	(3) T-Frame w/ Walkways

RESULTS

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

Table 2 - Material Strength

Member Type	Yield Strength
Tower Shaft Sections	53 ksi & 50 ksi
Base Plate	36 ksi
Anchor Bolts	90 ksi & 105 ksi

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

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

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

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity*	Pass Fail
L1	155 - 150	Pole	TP27.1x26.125x0.25	Pole	7.6%	Pass
L2	150 - 145	Pole	TP28.075x27.1x0.25	Pole	16.5%	Pass
L3	145 - 140	Pole	TP29.05x28.075x0.25	Pole	26.8%	Pass
L4	140 - 135	Pole	TP30.025x29.05x0.25	Pole	37.3%	Pass
L5	135 - 130	Pole	TP31x30.025x0.25	Pole	47.8%	Pass
L6	130 - 125	Pole	TP31.975x31x0.25	Pole	57.5%	Pass
L7	125 - 120	Pole	TP33.925x31.975x0.25	Pole	70.9%	Pass
L8	120 - 114	Pole + Reinf.	TP33.657x32.45x0.3875	Reinf. 7 Tension Rupture	69.0%	Pass
L9	114 - 109	Pole + Reinf.	TP34.663x33.657x0.3813	Reinf. 7 Tension Rupture	79.0%	Pass
L10	109 - 104	Pole + Reinf.	TP35.669x34.663x0.375	Reinf. 7 Tension Rupture	88.2%	Pass
L11	104 - 100	Pole + Reinf.	TP36.474x35.669x0.375	Reinf. 7 Tension Rupture	95.2%	Pass
L12	100 - 96	Pole + Reinf.	TP37.153x36.474x0.4375	Reinf. 7 Tension Rupture	87.8%	Pass
L13	96 - 95.75	Pole + Reinf.	TP37.196x37.153x0.475	Reinf. 6 Tension Rupture	72.2%	Pass
L14	95.75 - 90.75	Pole + Reinf.	TP38.045x37.196x0.4625	Reinf. 6 Tension Rupture	78.2%	Pass
L15	90.75 - 85.75	Pole + Reinf.	TP38.895x38.045x0.4625	Reinf. 6 Tension Rupture	84.0%	Pass
L16	85.75 - 80.75	Pole + Reinf.	TP39.744x38.895x0.4625	Reinf. 6 Tension Rupture	89.5%	Pass
L17	80.75 - 76	Pole + Reinf.	TP41.57x39.744x0.4563	Reinf. 6 Tension Rupture	94.5%	Pass
L18	76 - 69	Pole + Reinf.	TP41.226x39.926x0.5375	Reinf. 5 Tension Rupture	85.2%	Pass
L19	69 - 64	Pole + Reinf.	TP42.155x41.226x0.525	Reinf. 5 Tension Rupture	88.8%	Pass
L20	64 - 59	Pole + Reinf.	TP43.084x42.155x0.525	Reinf. 5 Tension Rupture	91.9%	Pass
L21	59 - 58.25	Pole + Reinf.	TP43.224x43.084x0.525	Reinf. 5 Tension Rupture	92.8%	Pass
L22	58.25 - 58	Pole + Reinf.	TP43.27x43.224x0.65	Reinf. 5 Tension Rupture	78.3%	Pass
L23	58 - 57.75	Pole + Reinf.	TP43.317x43.27x0.5125	Pole	91.6%	Pass
L24	57.75 - 56	Pole + Reinf.	TP43.828x43.317x0.5	Pole	95.4%	Pass
L25	56 - 55.75	Pole + Reinf.	TP43.874x43.828x0.625	Pole	75.9%	Pass
L26	55.75 - 50.75	Pole + Reinf.	TP44.803x43.874x0.625	Pole	79.3%	Pass
L27	50.75 - 45.75	Pole + Reinf.	TP45.732x44.803x0.6125	Pole	81.3%	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity*	Pass Fail
L28	45.75 - 42	Pole + Reinf.	TP47.358x45.732x0.6125	Pole	83.5%	Pass
L29	42 - 35	Pole + Reinf.	TP46.894x45.493x0.6831	Pole	78.8%	Pass
L30	35 - 30	Pole + Reinf.	TP47.895x46.894x0.6706	Pole	82.3%	Pass
L31	30 - 25	Pole + Reinf.	TP48.896x47.895x0.6706	Pole	82.6%	Pass
L32	25 - 20	Pole + Reinf.	TP49.897x48.896x0.6581	Pole	85.9%	Pass
L33	20 - 16.25	Pole + Reinf.	TP50.647x49.897x0.6456	Pole	88.0%	Pass
L34	16.25 - 16	Pole + Reinf.	TP50.697x50.647x0.7331	Pole	81.8%	Pass
L35	16 - 15.75	Pole + Reinf.	TP50.747x50.697x0.6206	Pole	96.3%	Pass
L36	15.75 - 13	Pole + Reinf.	TP51.498x50.747x0.6081	Pole	99.9%	Pass
L37	13 - 12.75	Pole + Reinf.	TP51.548x51.498x0.7206	Pole	84.1%	Pass
L38	12.75 - 11.75	Pole + Reinf.	TP51.598x51.548x0.6456	Pole	88.3%	Pass
L39	11.75 - 11.5	Pole + Reinf.	TP52.599x51.598x0.6456	Pole	89.9%	Pass
L40	11.5 - 6.5	Pole + Reinf.	TP53.199x52.599x0.6331	Pole	92.1%	Pass
L41	6.5 - 3.5	Pole + Reinf.	TP53.249x53.199x0.8706	Reinf. 10 Compression	77.8%	Pass
L42	3.5 - 3.25	Pole + Reinf.	TP53.3x53.249x0.8706	Reinf. 10 Compression	77.9%	Pass
L43	3.25 - 3	Pole + Reinf.	TP53.35x53.3x0.9581	Reinf. 10 Compression	69.5%	Pass
L44	3 - 2.75	Pole + Reinf.	TP53.6x53.35x0.9581	Reinf. 10 Compression	69.8%	Pass
L45	2.75 - 1.5	Pole + Reinf.	TP53.65x53.6x0.8456	Reinf. 10 Compression	78.4%	Pass
L46	1.5 - 1.25	Pole + Reinf.	TP53.9x53.65x0.8456	Reinf. 10 Compression	78.8%	Pass
L47	1.25 - 0	Pole + Reinf.	TP27.1x26.125x0.25	Pole	7.6%	Pass
-	0	Anchor Bolts	(18) 2" Ø on 61" Ø BC	(18) 2" Ø on 61" Ø BC	82.7%	Pass
	0		(6) 2" Ø on 69" BC	(6) 2" Ø on 69" BC	90.1%	Pass
-	0	Base Plate	67" Ø x 1.75" thk.	67" Ø x 1.75" thk.	34.1%	Pass
-	0	Base Stiffeners	(12) 6" x 0.75" thk.	(12) 6" x 0.75" thk.	68.2%	Pass

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

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis* *(TIA/EIA-222-F)*	Original Design *(TIA/EIA-222-F)*
Axial	54 k	29 k
Shear	42 k	38 k
Moment	4,478 k-ft	3,559 k-ft

*Foundation determined to be adequate per independent analysis.

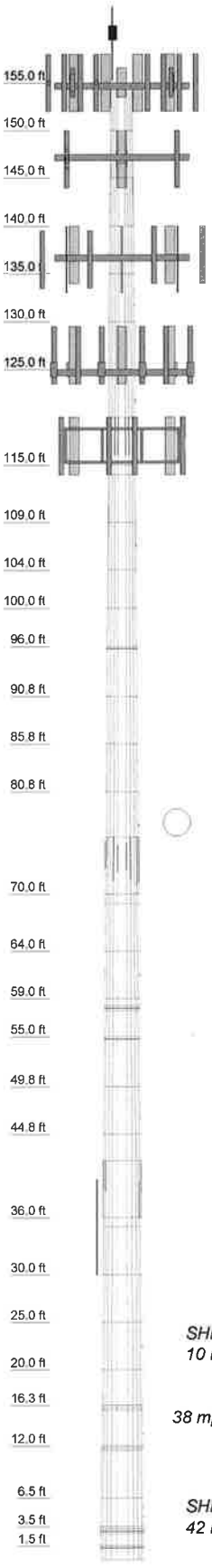
GENERAL COMMENTS

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.

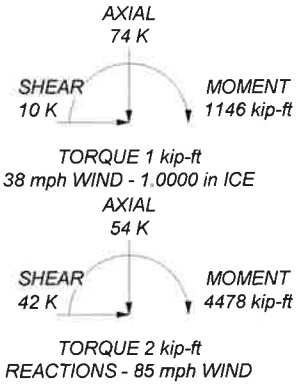
LIMITATIONS

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



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	10.00	5.00	5.00	5.00	4.00	5.00	5.00	5.00	5.00	5.00	10.75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	7.75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.3125	0.3750	0.3750	0.4375	0.4375	0.4375	0.4625	0.4625	0.4562	0.5250	0.5625	0.5625	0.6125	0.6250	0.6250	0.6250	0.6250	0.6250	0.6250	0.6250	0.6250	0.6250	0.6706	0.6581	0.6456	0.6456	0.6456	0.6456	0.6456	0.6456	0.6456	0.6456	0.6456
Socket Length (ft)							5.00										6.00											6.00														
Top Dia (in)	31.1250	31.1000	31.0750	31.0500	31.0250	31.0000	30.9750	30.9500	30.9234	30.8972	30.8715	30.8465	30.8220	30.7980	30.7745	30.7515	30.7290	30.7070	30.6855	30.6645	30.6440	30.6240	30.6045	30.5855	30.5670	30.5490	30.5315	30.5145	30.4980	30.4820	30.4665	30.4515	30.4370	30.4230	30.4095	30.3965	30.3840	30.3720	30.3605	30.3495	30.3390
Bot Dia (in)	31.1000	31.0750	31.0500	31.0250	31.0000	30.9750	30.9500	30.9234	30.8972	30.8715	30.8465	30.8220	30.7980	30.7745	30.7515	30.7290	30.7070	30.6855	30.6645	30.6440	30.6240	30.6045	30.5855	30.5670	30.5490	30.5315	30.5145	30.4980	30.4820	30.4665	30.4515	30.4370	30.4230	30.4095	30.3965	30.3840	30.3720	30.3605	30.3495	30.3390	30.3290
Grade	A36M-50																				A36M-53																						
Weight (K)	0.4	0.4	0.4	0.4	0.4	0.4	0.9	0.8	0.7	0.7	0.6	0.7	0.0	0.9	0.9	1.0	2.1	1.6	1.2	1.2	1.6	1.5	0.1	0.2	2.8	2.4	1.7	1.8	1.8	1.4	1.1	1.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	155	800 MHz Filler	147.5
GPS	155	800 MHz Filler	147.5
4.5' x 1.64" Pipe Mount	155	800 MHz Filler	147.5
RRH2x60-700	155	(2) ACU-A20-N RET	147.5
RRH2x60-700	155	ACU-A20-N RET	147.5
RRH2x60-700	155	ACU-A20-N RET	147.5
RRH2X60-PCS	155	(3) T-Frames w/ Walkway	147.5
RRH2X60-PCS	155	(2) 59212 w/ Mount Pipe	137
RRH2X60-PCS	155	RR90-17-02DP w/Mount Pipe	137
RRH2X60-AWS	155	RR90-17-02DP w/Mount Pipe	137
RRH2X60-AWS	155	Empty Mount Pipe	137
RRH2X60-AWS	155	(2) Empty Mount Pipe	137
(2) HBXX-6517DS-A2M w/ Mount Pipe	155	(2) Empty Mount Pipe	137
(2) HBXX-6517DS-A2M w/ Mount Pipe	155	(3) T-Frames w/ Walkway	137
(2) HBXX-6517DS-A2M w/ Mount Pipe	155	(2) 7770.00 w/Mount Pipe	125
BXA-70080-4BF w/ Mount Pipe	155	(2) 7770.00 w/Mount Pipe	125
BXA-70080-4BF w/ Mount Pipe	155	(2) 7770.00 w/Mount Pipe	125
BXA-70080-4BF w/ Mount Pipe	155	AM-X-CD-17-65-00T-RET w/ Mount Pipe	125
LNX-6514DS-AIM w/ Mount Pipe	155		
LNX-6514DS-AIM w/ Mount Pipe	155	AM-X-CD-17-65-00T-RET w/ Mount Pipe	125
LNX-6514DS-AIM w/ Mount Pipe	155		
(2) FD9R6004/2C-3L Diplexer	155	AM-X-CD-17-65-00T-RET w/ Mount Pipe	125
(2) FD9R6004/2C-3L Diplexer	155		
(2) FD9R6004/2C-3L Diplexer	155	(2) LGP21401 TMA	125
DB-T1-6Z-8AB-0Z Distribution Box	155	(2) LGP21401 TMA	125
(3) T-Frames w/ Walkway	155	(2) LGP21401 TMA	125
APXVSPP18-C-A20 w/Mount Pipe	147.5	(2) LGP21903 Diplexer	125
APXVSPP18-C-A20 w/Mount Pipe	147.5	(2) LGP21903 Diplexer	125
APXVSPP18-C-A20 w/Mount Pipe	147.5	(2) LGP21903 Diplexer	125
APXVTM14-C-I20 w/Mount Pipe	147.5	(2) RRUS-11	125
APXVTM14-C-I20 w/Mount Pipe	147.5	(2) RRUS-11	125
APXVTM14-C-I20 w/Mount Pipe	147.5	(2) RRUS-11	125
TD-RRH8x20-25	147.5	DC2-48-60-18-8F	125
TD-RRH8x20-25	147.5	(1) Low Profile Platform	125
TD-RRH8x20-25	147.5	Universal Ring Mount	125
1900 MHz RRH	147.5	(2) 742 351 w/ Mount Pipe	117
1900 MHz RRH	147.5	(2) 742 351 w/ Mount Pipe	117
1900 MHz RRH	147.5	(2) 742 351 w/ Mount Pipe	117
800 MHz RRH	147.5	(3) T-Frames	117
800 MHz RRH	147.5	DB589	31
800 MHz RRH	147.5	3.58' Standoff	31

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-50	50 ksi	65 ksi	A36M-53	53 ksi	60 ksi

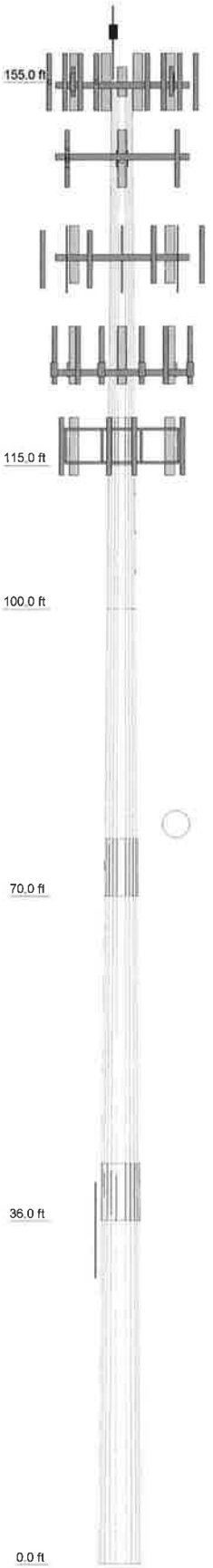
TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 92.7%

FDH VELOCITEL
ENGINEERING INNOVATION
Tower Analysis

Velocitel, Inc. d.b.a. FDH Velocitel
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
Phone: 9197551012
FAX: 9197551031

Job:	*Danielson, CT00302-S-01*		
Project:	*15BRUH1400*		
Client:	SBA Network Services, Inc.	Drawn by: KSargent	App'd:
Code:	TIA/EIA-222-F	Date: 06/09/15	Scale: N
Path:			Dwg No.



Section	1	2	3	4	5
Length (ft)	40.00	20.00	30.00	40.00	42.00
Number of Sides	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.3125	0.3750	0.4331
Socket Length (ft)	5.00		6.00	6.00	
Top Dia (in)	26.1250	32.4500	36.4740	39.9258	45.4932
Bot Dia (in)	33.9250	36.4740	41.5700	47.3580	53.9000
Grade	A36M-50			A36M-53	
Weight (K)	3.3	1.9	4.0	7.1	9.8

Total Weight (K) 26.0

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	155	800 MHz Filter	147.5
GPS	155	800 MHz Filter	147.5
4.5' x 1.64" Pipe Mount	155	800 MHz Filter	147.5
RRH2x60-700	155	(2) ACU-A20-N RET	147.5
RRH2x60-700	155	ACU-A20-N RET	147.5
RRH2x60-700	155	ACU-A20-N RET	147.5
RRH2X60-PCS	155	(3) T-Frames w/ Walkway	147.5
RRH2X60-PCS	155	(2) 59212 w/ Mount Pipe	137
RRH2X60-PCS	155	RR90-17-02DP w/Mount Pipe	137
RRH2X60-AWS	155	RR90-17-02DP w/Mount Pipe	137
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LNX-6514DS-AIM w/ Mount Pipe	155	(2) LGP21401 TMA	125
(2) FD9R6004/2C-3L Diplexer	155	(2) LGP21401 TMA	125
(2) FD9R6004/2C-3L Diplexer	155	(2) LGP21401 TMA	125
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DB-T1-6Z-8AB-0Z Distribution Box	155	(2) LGP21903 Diplexer	125
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APXVTM14-C-I20 w/Mount Pipe	147.5	DC2-48-60-18-8F	125
APXVTM14-C-I20 w/Mount Pipe	147.5	(1) Low Profile Platform	125
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Tower Analysis

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Job: *Danielson, CT00302-S-01*			
Project: *15BRUH1400*			
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