

September 29, 2014

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

**Re: Notice of Exempt Modification – Facility Modification  
45 Fargo Road, Waterford, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 172-foot level of the existing 183-foot tower at 45 Fargo Road in Waterford, Connecticut (the Property”). The tower is owned by SBA. The Council approved Cellco’s use of this tower in 1999. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 172-foot level on the tower. Cellco also intends to install six (6) remote radio heads (“RRHs”) behind its 1900 MHz and 2100 MHz antennas and two (2) HYBRIFLEX™ antenna cables. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

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 Daniel Steward, First Selectman for the Town of Waterford. A copy of this letter is also being sent to Rudolph Chieka, 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).

13140914-v1

# Robinson+Cole

Melanie A. Bachman  
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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed at the 172-foot level on the existing 183-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 Report 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:

Daniel Steward, Waterford First Selectman  
Rudolph Chieka  
Sandy M. Carter

# **ATTACHMENT 1**

# Product Specifications

COMMSCOPE®

LNX-6514DS-VTM

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

POWERED BY



## Electrical Specifications

Frequency Band, MHz	698–806	806–896
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	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°

## Mechanical Specifications

Color   Radome Material	Light gray   Fiberglass, UV resistant
Connector Interface   Location   Quantity	7-16 DIN Female   Bottom   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
Antenna Dimensions, L x W x D	1847.0 mm x 301.0 mm x 181.0 mm   72.7 in x 11.9 in x 7.1 in
Net Weight	17.6 kg   38.8 lb
Model with factory installed AISG 2.0 RET	LNX-6514DS-A1M



# Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY



## Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0°   18.4 3°   18.7 6°   18.4	0°   18.4 3°   18.7 6°   18.5	0°   18.7 3°   18.9 6°   18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR   Return Loss, dB	1.4   15.6	1.4   15.6	1.4   15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

\*Values calculated using NGMN Alliance N-P-BASTA v9.6

## Mechanical Specifications

Color   Radome Material	Light gray   PVC, UV resistant
Connector Interface   Location   Quantity	7-16 DIN Female   Bottom   4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h   149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm   74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg   43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

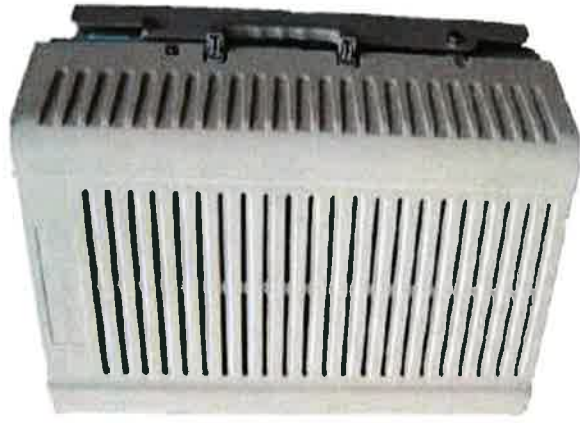


# PCS RF MODULES

## RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

<b>RRH2x60</b>	
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	1900 HW version 1900A HW version
Features	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 AISG 2.0 for RET/TMA
Power	Internal Smart Bias-T -48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (top mounted)



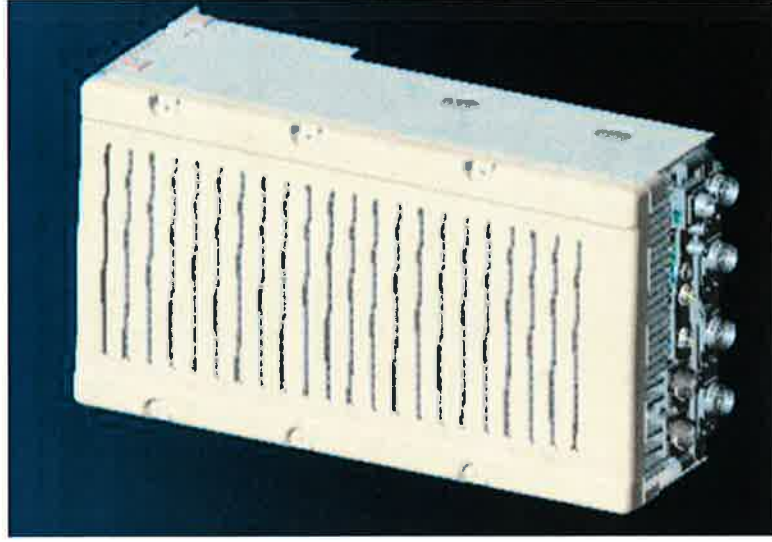
\*\* Not a Verizon Wireless deployed product

# NEW PCS RF MODULES FOR VZW

## RRH2X60 - HW CHARACTERISTICS

LR14.3

RRH2X60	
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



\*\* - Includes solar shield but not mounting brackets (8 lbs.)

# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals

along with operations, administration and maintenance (OA&M) information.

#### SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

#### OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

#### EASY INSTALLATION

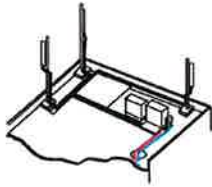
The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

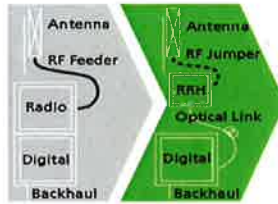
The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.

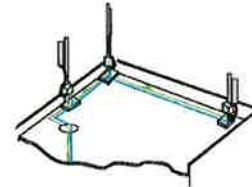




Macro



RRH for space-constrained cell sites



Distributed

**FEATURES**

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

**BENEFITS**

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

**TECHNICAL SPECIFICATIONS**

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

**Dimensions and weights**

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

**Electrical Data**

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

**RF Characteristics**

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

**Connectivity**

- Two CPRI optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

**Environmental specifications**

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

**Safety and Regulatory Data**

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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**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.

**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
<b>Mechanical Properties</b>			
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)
<b>Electrical Properties</b>			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	0.68 (0.205)
DC-Resistance Power Cable, 8 4mm <sup>2</sup> (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
<b>Optical Properties</b>			
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
<b>DC Power Cable Properties</b>			
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (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 5-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL V/W-1 IEEE-383 (1974), IEEE1292/FT4 RoHS Compliant
<b>Environmental</b>			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

\* This data is provisional and subject to change



Figure 1: HYBRIFLEX Series

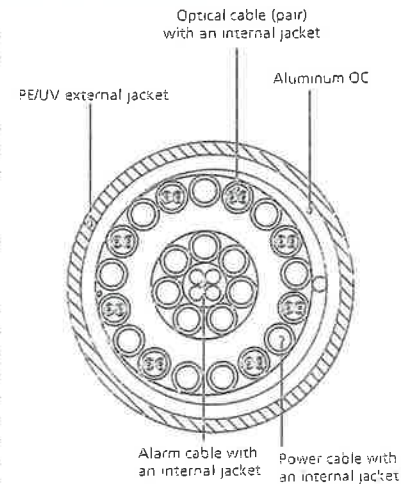


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

# **ATTACHMENT 2**

Site Name: Montville 2 Tower Height: Verizon @ 183 ft		General		Power		Density							
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*T-Mobile LTE	2	24.16	152	0.0008	2100	1.0000	0.08%						
*T-Mobile GSM/UMTS	2	12.08	152	0.0004	1950	1.0000	0.04%						
*T-Mobile UMTS	2	16.108	152	0.0005	2100	1.0000	0.05%						
*Clearwire	2	153	163	0.0041	2496	1.0000	0.41%						
*Clearwire	1	211	163	0.0029	11 GHz	1.0000	0.29%						
*AT&T GSM	2	565	143	0.0199	880	0.5867	3.39%						
*AT&T GSM	2	875	143	0.0308	1900	1.0000	3.08%						
*AT&T UMTS	1	647	143	0.0114	880	0.5867	1.94%						
*AT&T UMTS	4	934	143	0.0657	1900	1.0000	6.57%						
*AT&T LTE	1	1615	143	0.0284	734	0.4893	5.80%						
<b>Verizon</b>	<b>15</b>	<b>470</b>	<b>172</b>	<b>0.0857</b>	<b>1970</b>	<b>1.0000</b>	<b>8.57%</b>						
<b>Verizon</b>	<b>9</b>	<b>422</b>	<b>172</b>	<b>0.0462</b>	<b>869</b>	<b>0.5793</b>	<b>7.97%</b>						
<b>Verizon</b>	<b>1</b>	<b>1750</b>	<b>172</b>	<b>0.0213</b>	<b>2145</b>	<b>1.0000</b>	<b>2.13%</b>						
<b>Verizon</b>	<b>1</b>	<b>1050</b>	<b>172</b>	<b>0.0128</b>	<b>698</b>	<b>0.4973</b>	<b>2.57%</b>						<b>42.87%</b>
* Source: Siting Council													

# **ATTACHMENT 3**



FDH Engineering, Inc., 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

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

**183' Monopole Tower**

**SBA Site Name: Waterford  
SBA Site ID: CT01002-S-00  
Verizon Site Name: Montville 2**

FDH Project Number 1466T51400

**Analysis Results**

Tower Components	99.7%	Sufficient
Foundation	56.6%	Sufficient

Prepared By:

Virginia Chriscoe  
Project Engineer

Reviewed By:

Bradley R. Newman, PE  
Senior Project Engineer  
CT PE License No. 29630

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



June 17, 2014

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

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## EXECUTIVE SUMMARY

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

- A. Nudd Corp. (Project No. 6637) Design of 183' Monopole dated May 7, 1999
- Semaan Engineering Solutions, Inc. (Site No. CT-4284) Structural Analysis and Modification Package for the Original Design Loads dated May 7, 2002
- FDH Engineering, Inc. (Project No. 10-08045E S2) Modification Drawings For A 183' Monopole Tower dated November 4, 2010
- FDH Engineering, Inc. (Project No. 10-08045E S2) Post Construction Inspection Report dated February 4, 2011
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CSBC* is 85 mph without ice and 38 mph with 3/4" radial ice. Ice is considered to increase in thickness with height.

## Conclusions

With the existing and proposed antennas from Verizon in place at 172 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* provided the **Recommendations** listed below are satisfied. Furthermore, given the foundation dimensions (see Fred. A Nudd Corp. Project No. 6637) and assuming normal soil parameters per *TIA/EIA-222-F* standards, the foundation 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 Engineering, Inc. is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

## Recommendations

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

1. Proposed coax should be installed inside the monopole's shaft.
2. RRU/RRH Stipulation: the proposed equipment may be installed in any arrangement as determined by the client.



**APPURTENANCE LISTING**

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

**Table 1 - Appurtenance Loading**

**Existing Loading:**

Antenna Elevation (ft)	Description	Feedlines <sup>1</sup>	Carrier	Mount Elevation (ft)	Mount Type
183	(12) Decibel DB844H90E-XY	(12) 1-1/4"	Nextel	181	(1) Low Profile Platform
172	(3) Antel BXA-70063/6CF (4) Antel LPA-80080/4CF (6) Antel LPA-185080/8CF (2) RFS APL866513 (1) Lucent KS 24019	(18) 1-5/8"	Verizon	172	(1) Low Profile Platform
163 <sup>2</sup>	(3) Argus LLPX310R (3) Samsung DAP Radio Heads	(3) 9/16" (3) 5/16"	Clearwire	162	(1) Low Profile Platform
152	(3) Ericsson Air B2A B4P (3) Ericsson Air B4A B2P (3) Ericsson KRY112144 TMAs	(12) 1-5/8" (1) 1-5/8" Fiber	T-Mobile	152	(1) Low Profile Platform
143	(3) Powerwave 7770 (2) KMW AM-X-CD-16-65-00T (2) Andrew SBNH-1D6565C (2) Powerwave P65-17-XLH-RR (6) ADC Cleargain 850-1900 TMAs (6) Ericsson RRUS11 (3) Powerwave LGP13519 Diplexers (3) CSS DBC-750 Diplexers (1) Raycap DC6-48-60-18-8F Surge Arrestor	(12) 1-1/4" (2) 3/4" DC Power (1) 7/16" Fiber	New Cingular	143	(1) Low Profile Platform

1. Coax installed inside the pole's shaft unless otherwise noted.
2. Coax is installed inside (1) 3" conduit, inside the pole's shaft.

**Proposed Carrier – Final Loading:**

Antenna Elevation (ft)	Description	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
172	(6) Andrew HBXX-6517DS (4) Antel LPA-80080/4CF (3) Andrew LNX-6514DS (2) RFS APL866513 (1) Lucent KS24019 (3) Alcatel Lucent RRH2x60-AWS (3) Alcatel Lucent RRH2X60-PCS (2) RFS DB-T1-6Z-8AB-0Z	(18) 1-5/8" (2) 1-5/8" Hybriflex	Verizon	172	(1) Low Profile Platform

## 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	76 ksi, 65 ksi, 63 ksi, and 56 ksi
Flange Plate	65 ksi
Base Plate	50 ksi
Anchor Bolts	105 ksi and 150 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. **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. 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
L1	183 - 180	Pole	TP24x24x0.281	3.1	Pass
L2	180 - 135	Pole	TP34.125x24x0.25	71.2	Pass
L3	135 - 130	Pole	TP35.25x34.125x0.5	40.4	Pass
L4	130 - 125	Pole	TP38.625x35.25x0.25	86.1	Pass
L4	125 - 115	Pole w/ Mods	TP38.625x35.25x0.25 w/ (3) C6x10.5 Channels	75.5	Pass
L5	115 - 91	Pole	TP44.025x38.625x0.3125	94.6	Pass
L6	91 - 85	Pole w/ Mods	TP45.375x44.025x0.625 w/ (6) C6x10.5 Channels	76.0	Pass
L7	85 - 81	Pole w/ Mods	TP46.275x45.375x0.3125 w/ (6) C6x10.5 Channels	81.0	Pass
L8	81 - 71	Pole w/ Mods	TP48.525x46.275x0.375 w/ (6) C6x10.5 Channels	75.1	Pass
L9	71 - 65	Pole w/ Mods	TP53.025x48.525x0.375 w/ (6) C6x10.5 Channels	77.0	Pass
L9	65 - 51	Pole	TP53.025x48.525x0.375	93.9	Pass
L10	51 - 48	Pole	TP53.7x53.025x0.375	79.0	Pass
L11	48 - 41	Pole	TP55.275x53.7x0.75	40.5	Pass
L12	41 - 0	Pole	TP64.5x55.275x0.375	91.9	Pass
		Anchor Bolts	(24) 2" Ø on 58" BC	67.6	Pass
		Anchor Bolts	(9) 1.375" Ø on 82" BC	80.0	Pass
		Base Plate	PL 1.50" thk x 64.5" Ø	99.7	Pass

\*Capacities include a 1/3 allowable stress increase due to wind 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	52 k	---
Shear	38 k	39 k
Moment	5,013 k-ft	5,027 k-ft

\*Foundation determined to be adequate per independent analysis using normal soil parameters per TIA/EIA-222-F standards.

**GENERAL COMMENTS**

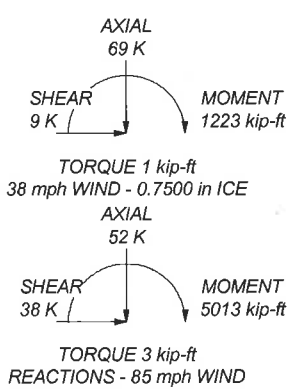
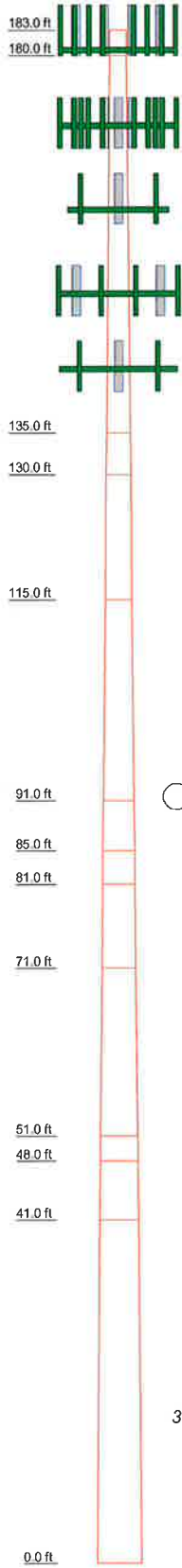
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading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

## APPENDIX

Section	1	2	3	4	5	6	7	8	9	10	11	12
Length (ft)	3.00	45.00	5.00	15.00	24.00	6.00	4.00	10.00	20.00	3.00	7.00	41.00
Number of Sides	1	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.2810	0.2500	0.5000	0.2500	0.3125	0.3125	0.3125	0.3750	0.3750	0.3750	0.3750	0.3750
Top Dia (in)	24.0000	24.0000	34.1250	35.2500	38.6250	46.2750	45.3750	48.5250	48.5250	53.7000	53.0250	55.2750
Bot Dia (in)	24.0000	34.1250	35.2500	38.6250	44.0250	46.2750	45.3750	48.5250	48.5250	53.0250	53.0250	55.2750
Grade	A36			A572-65			A500M-63			Fy = 76		
Weight (K)	0.2	3.5	0.9	1.5	3.3	1.8	0.6	1.9	4.1	0.6	3.0	9.9



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
(4) DB844H90E-XY w/ Mount Pipe	181	AIR B2A/B4P w/Mount Pipe	152
(4) DB844H90E-XY w/ Mount Pipe	181	AIR B4A/B2P w/Mount Pipe	152
(4) DB844H90E-XY w/ Mount Pipe	181	AIR B4A/B2P w/Mount Pipe	152
Low Profile Platform	181	AIR B4A/B2P w/Mount Pipe	152
Low Profile Platform	172	KRY 112 144/1	152
(2) HBXX-6517DS w/Mount Pipe	172	KRY 112 144/1	152
(2) HBXX-6517DS w/Mount Pipe	172	KRY 112 144/1	152
(2) HBXX-6517DS w/Mount Pipe	172	Low Profile Platform	152
(2) LPA-80080/4CF W/Mount Pipe	172	7770.00 w/Mount Pipe	143
LPA-80080/4CF W/Mount Pipe	172	7770.00 W/Mount Pipe	143
LPA-80080/4CF W/Mount Pipe	172	7770.00 W/Mount Pipe	143
LNX-6514DS w/ Mount Pipe	172	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
LNX-6514DS w/ Mount Pipe	172	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
LNX-6514DS w/ Mount Pipe	172	AM-X-CD-16-65-00T-RET w/ Mount Pipe	143
APL866513 w/ Mount Pipe	172	SBNH-1D6565C w/Mount Pipe	143
APL866513 w/ Mount Pipe	172	SBNH-1D6565C w/Mount Pipe	143
KS24019-L112A	172	P65-17-XLH-RR w/Mount Pipe	143
RRH-2x60-AWS	172	P65-17-XLH-RR w/Mount Pipe	143
RRH-2x60-AWS	172	(2) ADC 850-1900 Dual Band TMAs	143
RRH-2x60-AWS	172	(2) ADC 850-1900 Dual Band TMAs	143
RRH-2x60-PCS	172	(2) RRUS 11	143
RRH-2x60-PCS	172	(2) RRUS 11	143
RRH-2x60-PCS	172	(2) RRUS 11	143
DB-T1-6Z-8AB-0Z	172	(2) RRUS 11	143
DB-T1-6Z-8AB-0Z	172	LGP 13519	143
LLPX310R w/ Mount Pipe	162	LGP 13519	143
LLPX310R W/ Mount Pipe	162	LGP 13519	143
LLPX310R W/ Mount Pipe	162	DBC-750 Diplexer	143
DAP Radio Head	162	DBC-750 Diplexer	143
DAP Radio Head	162	DBC-750 Diplexer	143
DAP Radio Head	162	DC6-48-60-18-8F Surge Arrestor	143
Low Profile Platform	162	Low Profile Platform	143
AIR B2A/B4P w/Mount Pipe	152		
AIR B2A/B4P w/Mount Pipe	152		

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A500M-63	63 ksi	80 ksi
A572-65	65 ksi	80 ksi	Fy = 76	76 ksi	91 ksi
Fy = 56 ksi	56 ksi	71 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in New London 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 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.



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**Job: Waterford, CT01002-S**

Project: 1424KJ1400

Client: SBA Network Services, Inc.	Drawn by: VChriscoe	App'd:
Code: TIA/EIA-222-F	Date: 06/17/14	Scale: NTS
Path:		Dwg No. E-1