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Also admitted in Massachusetts

June 19, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
3114 Albany Avenue, West Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains eight (8) wireless telecommunications antennas at the 130-foot level on an existing 346-foot guyed-lattice tower at 3114 Albany Avenue in West Hartford, Connecticut (the "Property"). The tower is owned by SBA. Cellco's use of the tower was approved by the Council in 2001. Cellco now intends to modify its facility by removing four (4) 850 MHz antennas and replacing them with two (2) model LNX-6514DS-VTM, 850 MHz antennas and two (2) model HBX-6517DS-VTM, 2100 MHz antennas. Cellco also intends to install two (2) remote radio heads ("RRHs") behind its new 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

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 notice is being sent to Ronald Van Winkle, Town Manager of the Town of West Hartford. A copy of this letter is also being sent to Marlin Tower LLC, 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. Cellco's new and replacement antennas and RRHs will be installed at the 130-foot level on the existing 346-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. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions safety limits established by the FCC.

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:
Ronald Van Winkle, West Hartford Town Manager
Marlin Tower LLC
Sandy M. Carter

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	15.7	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°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

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

Product Specifications

LNX-6514DS-VTM

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	17.6 kg | 38.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
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.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBX-6517DS-VTM

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

- Superior azimuth tracking and pattern symmetry to minimize any sector overlap
- Rugged, reliable design with excellent passive intermodulation suppression
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.9
Gain by all Beam Tilts Tolerance, dB	±0.2	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.3	0 ° | 18.4	0 ° | 18.8
	3 ° | 18.6	3 ° | 18.7	3 ° | 19.1
	6 ° | 18.4	6 ° | 18.6	6 ° | 18.7
Beamwidth, Horizontal, degrees	67	66	64
Beamwidth, Horizontal Tolerance, degrees	±1.8	±0.9	±2.8
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.2	±0.2	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	19	19	18
Front-to-Back Total Power at 180° ± 30°, dB	26	26	26
CPR at Boresight, dB	22	22	22
CPR at Sector, dB	11	11	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°
Impedance	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz
Number of Ports, all types	2

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom

Product Specifications

HBX-6517DS-VTM

RF Connector Quantity, total	2
Wind Loading, maximum	393.0 N @ 150 km/h 88.3 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	83.0 mm | 3.3 in
Length	1902.0 mm | 74.9 in
Width	166.0 mm | 6.5 in
Net Weight	6.2 kg | 13.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	HBX-6517DS-R2M
Model with Factory Installed AISG 2.0 Actuator	HBX-6517DS-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

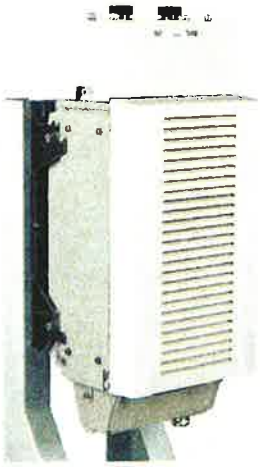
DB390 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Use for narrow panel antennas. Includes two pipe mounts.

DB5098E — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-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. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

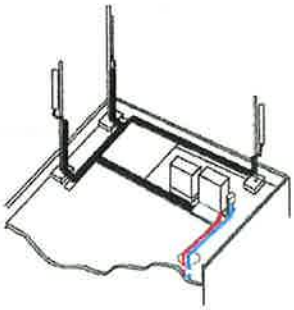
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

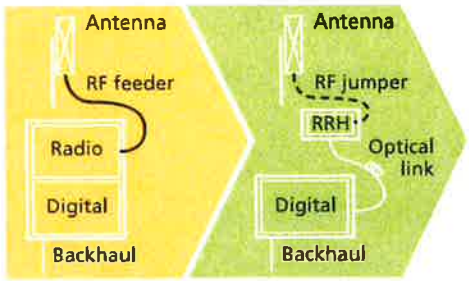
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

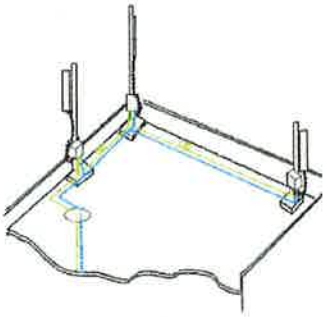
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

CPG2809100912 (09)

Alcatel·Lucent

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
Mechanical Properties			
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 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Fiber Optic 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)			UL94-V0, UL1666 RoHS Compliant
DC 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)

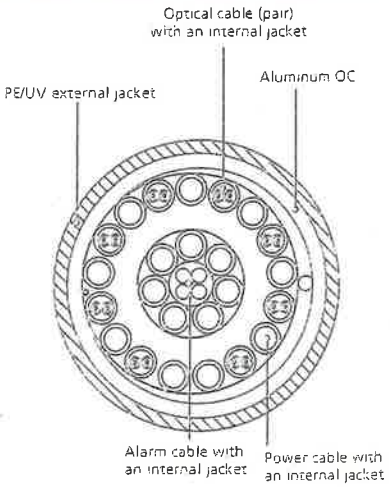


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

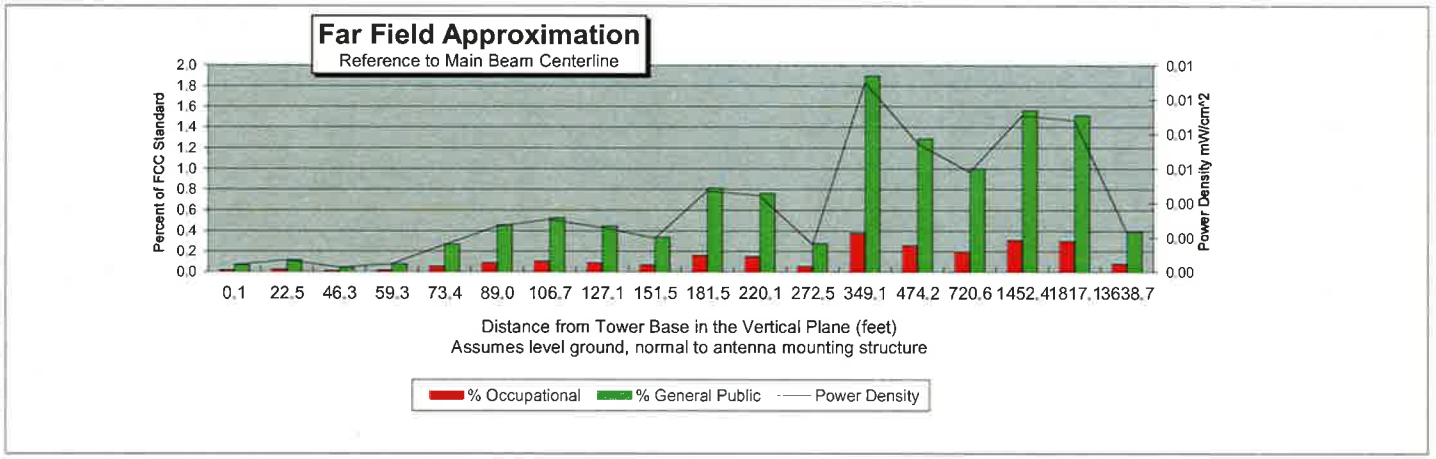
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Talcott 2, CT
Site #:	8-0032
Date:	06/18/14
Name:	Mark Brauer
File Name:	Talcott 2, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**130.0**
Antenna Gain (dBi):	**15.9**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**3577.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	127.0	129.0	135.2	140.2	146.7	155.1	165.8	179.7	197.7	221.5	254.1	300.7	371.5	490.9	731.7	1457.9	1821.5	3640.9	
Distance from Antenna Structure Base in Horizontal plane	0.1	22.5	46.3	59.3	73.4	89.0	106.7	127.1	151.5	181.5	220.1	272.5	349.1	474.2	720.6	1452.4	1817.1	3638.7	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.3	0.3	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.5	0.4	0.3	0.8	0.8	0.3	1.9	1.3	1.0	1.6	1.5	0.4	

Antenna Type LNX-6514DS-A1M
Max% 1.90%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pow
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

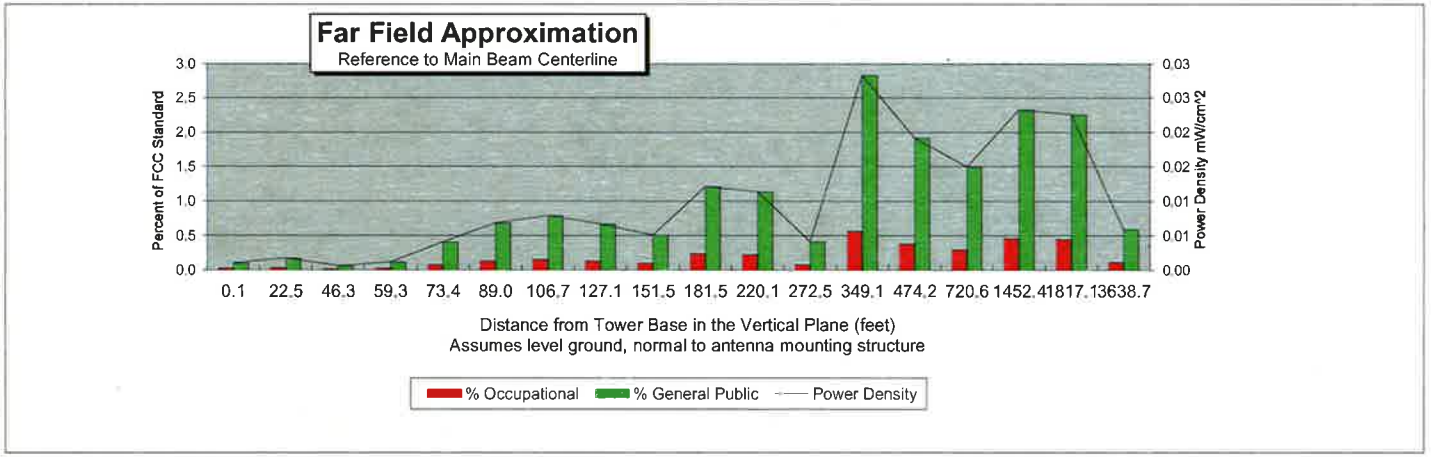
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Talcott 2, CT
Site #:	8-0032
Date:	06/18/14
Name:	Mark Brauer
File Name:	Talcott 2, CT - FF Power

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**130.0**
Antenna Gain (dBi):	**18.8**
Antenna Size (in.):	**56.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**4709.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	127.0	129.0	135.2	140.2	146.7	155.1	165.8	179.7	197.7	221.5	254.1	300.7	371.5	490.9	731.7	1457.9	1821.5	3640.9	
Distance from Antenna Structure Base in Horizontal plane	0.1	22.5	46.3	59.3	73.4	89.0	106.7	127.1	151.5	181.5	220.1	272.5	349.1	474.2	720.6	1452.4	1817.1	3638.7	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.01	0.02	0.02	0.01	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.6	0.4	0.3	0.5	0.5	0.1	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.7	0.5	1.2	1.1	0.4	2.8	1.9	1.5	2.3	2.3	0.6	

Antenna Type SACP 2x5516
Max% 2.83%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pov
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

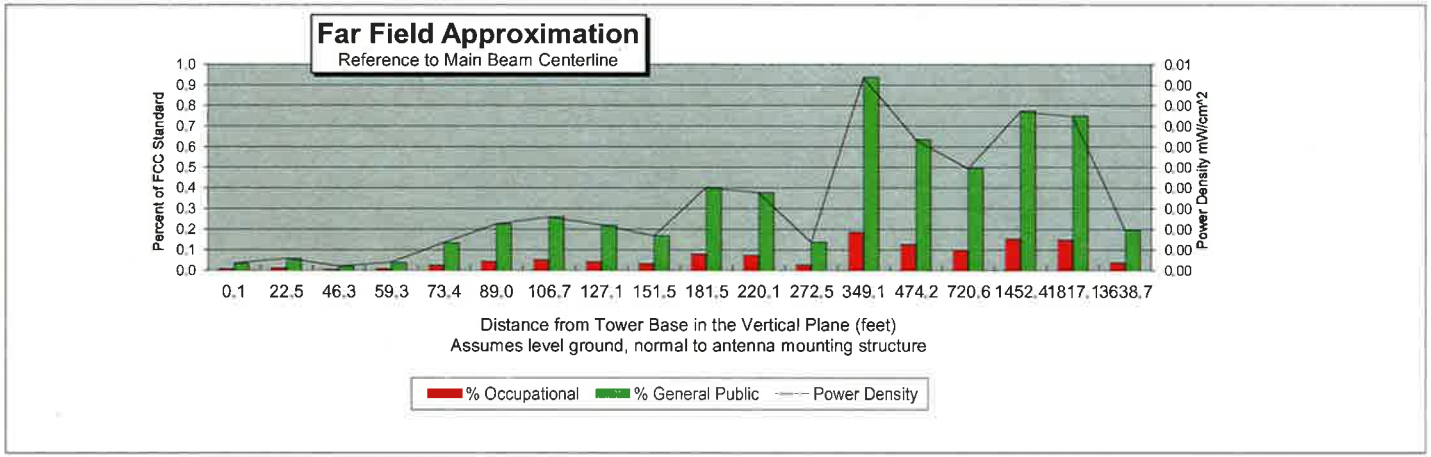
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Talcott 2, CT
Site #:	8-0032
Date:	06/18/14
Name:	Mark Brauer
File Name:	Talcott 2, CT - FF Power

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**130.0**
Antenna Gain (dBi):	**17.5**
Antenna Size (in.):	**77.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1050.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	127.0	129.0	135.2	140.2	146.7	155.1	165.8	179.7	197.7	221.5	254.1	300.7	371.5	490.9	731.7	1457.9	1821.5	3640.9	
Distance from Antenna Structure Base in Horizontal plane	0.1	22.5	46.3	59.3	73.4	89.0	106.7	127.1	151.5	181.5	220.1	272.5	349.1	474.2	720.6	1452.4	1817.1	3638.7	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.0	
Percent of General Population Standard	0.0	0.1	0.0	0.0	0.1	0.2	0.3	0.2	0.2	0.4	0.4	0.1	0.9	0.6	0.5	0.8	0.7	0.2	

Antenna Type SLCP 2x6015
Max% 0.94%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pov
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

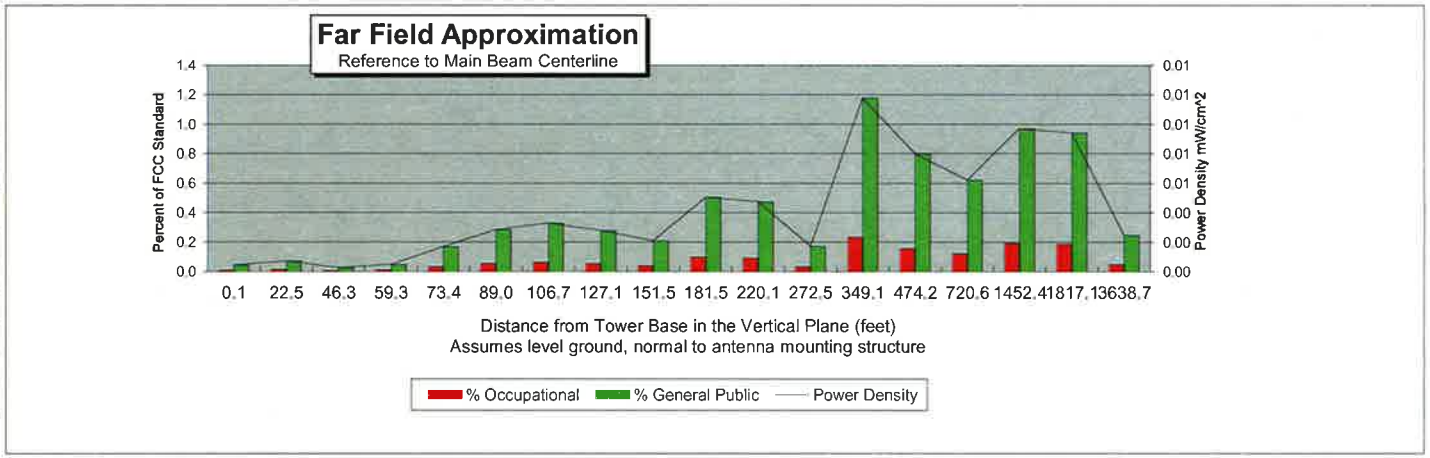
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Talcott 2, CT
Site #:	8-0032
Date:	06/18/14
Name:	Mark Brauer
File Name:	Talcott 2, CT - FF Power

Operating Freq. (MHz)	**2145.0**
Antenna Height (ft):	**130.0**
Antenna Gain (dBi):	**19.3**
Antenna Size (in.):	**75.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	127.0	129.0	135.2	140.2	146.7	155.1	165.8	179.7	197.7	221.5	254.1	300.7	371.5	490.9	731.7	1457.9	1821.5	3640.9	
Distance from Antenna Structure Base in Horizontal plane	0.1	22.5	46.3	59.3	73.4	89.0	106.7	127.1	151.5	181.5	220.1	272.5	349.1	474.2	720.6	1452.4	1817.1	3638.7	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.2	0.0	
Percent of General Population Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	0.9	0.2	

Antenna Type HBX-6517DS-A2M
Max% 1.18%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pov
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

Structural Analysis for
SBA Network Services, Inc.

346.3' Guyed Tower

SBA Site Name: West Hartford
SBA Site ID: CT15879-A
Verizon Site ID: Talcott 2

FDH Project Number 1424GB1400 (R1)

Analysis Results

Tower Components	51.7%	Sufficient
Foundation	80.7%	Sufficient

Prepared By:

Robert Kitsteiner, EI
Project Engineer

Reviewed By:

J. Darrin Holt, PhD, PE
Principal
CT PE License No. 22988

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Raleigh, NC 27616
(919) 755-1012
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STATE OF CONNECTICUT
J. DARRIN HOLT
LICENSED PROFESSIONAL ENGINEER

3/21/14

March 21, 2014

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the existing guyed tower located in West Hartford, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, and foundation dimensions was obtained from:

- ❑ Tower Engineering Professionals (Project No. 112343) Steel and Appurtenance Mapping dated July 12, 2011
- ❑ Tower Engineering Professionals (Project No. 112343) Structural Analysis Report dated October 23, 2012
- ❑ SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards is 80 mph without ice and 38 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from Verizon in place at 130 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations Were designed and constructed per the dimensions listed in the TEP Analysis (Project No. 112343), 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 are met with the existing and proposed loading in place, we have the following recommendations:

1. Feed lines must be installed as shown in **Figure 1**.
2. RRH/RRU Stipulation: The proposed equipment may be installed in any configuration as determined by the client.
3. A foundation mapping should be performed to verify the as-built foundation dimensions.
4. A geotechnical investigation should be performed to verify the existing foundation capacities.

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	Carrier	Mount Elevation (ft)	Mount Type
332	(1) ERI 3 Bay FM w/ radomes	(1) 3"	WCCC	332	Direct
308.3	(1) Scala SCA 4DR-8S	(1) 3"	ZGS Hartford	308.3	(1) Pipe Mount
261	(1) Decibel DB420-B Omni	(1) 7/8"	Master Combiner	251	(1) Standoff
251.8	(1) Antenna Concepts ACB16A	(1) 1-5/8" (1) 3/8"	WRDM	251.8	(1) Pipe Mount
243	(1) Antel WPA-800120 (1) 18" x 6" x 6" TMA	(2) 7/8"	Town of West Hartford	243	Direct
235	(1) Scala 6-ft x 3-ft Grid Dish	(1) 7/8"	WCCC	235	Direct
232	(1) Radiowaves SP2-4.7NS Dish (1) 12" x 2" x 2" TMA	(2) 1/4" (1) 3/8"	Town of West Hartford	232	Direct
220	(1) Antel WPA-800120	(1) 1-5/8"	Town of West Hartford	220	Direct
220	Unknown Panel 34" x 7" x 24"	(2) 3/8"	SNEW ISP	220	(1) Pipe Mount
213	(1) Decibel DB420-B Omni	(1) 1/2"	Master Combiner	203	(1) Standoff
196	(1) T.S. 3" x 3" x 6.5' (1) Cablewave PA6-112 Dish	(1) EW71	WRDM	196	(1) Standoff
180	(6) Kathrein 601417	(1) 1-5/8"	WRNT	180	(1) Pipe Mount
165	(1) Antel BCD-80010 Omni	(1) 1-5/8"	Town of West Hartford	165	(1) Standoff
164.5	(1) 6810 1 Bay FM	(1) 1/2"	91.9 FM	164.5	(1) Pipe Mount
160	(2) RFS APX16PV-16PVL (2) 11" x 7" x 4" TMAs	(8) 1-5/8" (1) 1/4"	T-Mobile	160	(3) T-Frames
146.5	(1) 12" x 4.5" x 6.25" TMA (1) 2-ft MW Dish w/o radome	(1) 3/8"	SNEW ISP	146.5	(1) Pipe Mount
145	(1) 12-ft x 1" Omni	(1) 1-5/8"	Ham Radio	145	(1) Standoff
---	---	(1) 1-5/8"	---	142.5	---
---	---	(1) 1-5/8"	---	140.5	---
136.5	(1) 5' x 10" Detuner	(1) 1/4"	Ham Radio	136.5	Direct
130	(4) Swedcom SC-E 6014-Rev 2 (4) RFS FD9R6004/2C-3L Diplexers (2) Swedcom SLCP 2x6015 (2) Swedcom SACP 2x5516	(8) 1-5/8"	Verizon	128	(3) T-Frames
120.5	(3) RFS APXV18-206517S	(6) 1-5/8"	Metro PCS	120.5	(1) Pipe Mount
112	(2) KMW AM-X-CD-16-65-00T-RET (4) Andrew SBNH-1D6565C (3) Kathrein 800 10121 (6) CCI DTMABP7819VG12A TMA's (6) Ericsson RRUS 11 RRUs	(12) 1-5/8"	AT&T	112	(3) T-Frames
48	(1) GPS	(1) 3/8"	Metro PCS	48	Direct
21	(1) 14-Element 4.5 ft Yagi	(1) 1/2"	Ham Radio	21	(1) Standoff

Proposed Loading:

Antenna Elevation (ft)	Description	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
130	(2) Andrew HBX-6517DS w/ Mount Pipe (2) Andrew LNX-6514DS w/ Mount Pipe (2) Swedcom SLCP 2x6015 (2) Swedcom SACP 2x5516 (4) RFS FD9R6004/2C Diplexers (2) Alcatel Lucent RRH2x40-AWS RRHs (1) RFS DB-T1-6Z-8AB-0Z Distribution Box	(8) 1-5/8" (1) 1-5/8" Fiber	Verizon	128	(3) T-Frames

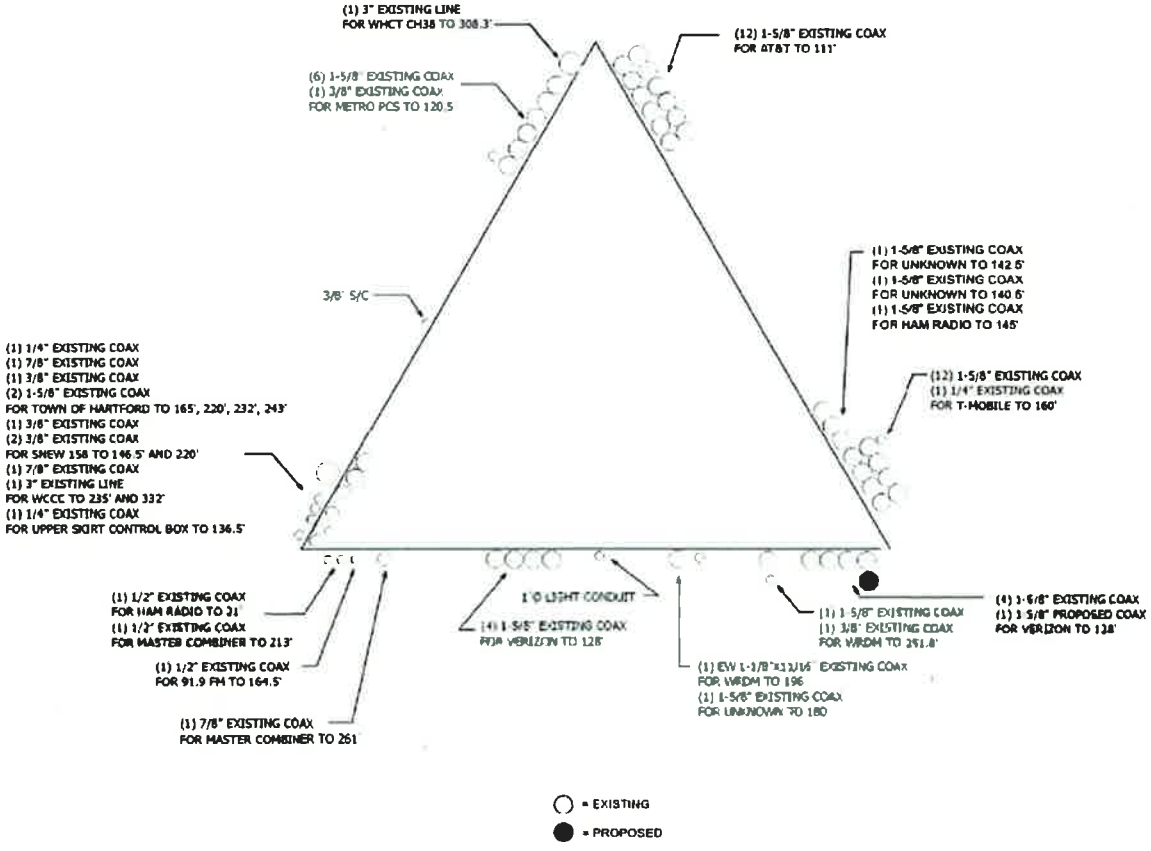


Figure 1 – Feed Line Layout

RESULTS

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

Table 2 - Material Strength

Member Type	Yield Strength
Legs	50 ksi
Bracing	36 ksi and 50 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 105% are considered acceptable.* **Table 4** displays the maximum foundation reactions. **Table 5** displays maximum rotations at service wind speeds (proposed antennas only).

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
T1	310.04 - 309.04	Leg	2 3/4	10.5	Pass
T2	309.04 - 299.416	Leg	2 3/4	38.1	Pass
T3	299.416 - 297.873	Leg	2 3/4	18.2	Pass
T4	297.873 - 279.123	Leg	2 3/4	5.8	Pass
T5	279.123 - 277.873	Leg	2 3/4	9.1	Pass
T6	277.873 - 259.123	Leg	2 3/4	9.6	Pass
T7	259.123 - 257.873	Leg	2 3/4	10.4	Pass
T8	257.873 - 239.123	Leg	2 3/4	16.7	Pass
T9	239.123 - 237.873	Leg	2 3/4	19.3 21.5 (b)	Pass
T10	237.873 - 219.123	Leg	2 3/4	21.8	Pass
T11	219.123 - 217.873	Leg	2 3/4	25.1	Pass
T12	217.873 - 199.123	Leg	2 3/4	25.7	Pass
T13	199.123 - 197.873	Leg	2 3/4	27.4 30.1 (b)	Pass
T14	197.873 - 179.123	Leg	2 3/4	29.8	Pass
T15	179.123 - 177.873	Leg	2 3/4	34.0 36.1 (b)	Pass
T16	177.873 - 159.123	Leg	2 3/4	34.9	Pass
T17	159.123 - 157.873	Leg	2 3/4	35.7 37.8 (b)	Pass
T18	157.873 - 139.123	Leg	3	36.4	Pass
T19	139.123 - 137.873	Leg	3	36.5 38.6 (b)	Pass
T20	137.873 - 119.123	Leg	3	36.2	Pass
T21	119.123 - 117.873	Leg	3	36.6 38.8 (b)	Pass
T22	117.873 - 99.123	Leg	3	35.8	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
				37.9 (b)	
T23	99.123 - 97.873	Leg	3	41.1	Pass
T24	97.873 - 79.123	Leg	3	21.0	Pass
T25	79.123 - 77.873	Leg	3	20.5	Pass
T26	77.873 - 59.123	Leg	3	16.6	Pass
T27	59.123 - 57.873	Leg	3	30.4	Pass
T28	57.873 - 39.123	Leg	3	38.8	Pass
T29	39.123 - 37.873	Leg	3	36.8	Pass
T30	37.873 - 19.123	Leg	3	25.3	Pass
T31	19.123 - 17.873	Leg	3	38.9	Pass
T32	17.873 - 15.4147	Leg	3	30.4	Pass
T33	15.4147 - 13.1022	Leg	3	45.5	Pass
T34	13.1022 - 10.5189	Leg	3	45.6	Pass
T35	10.5189 - 5.85417	Leg	3	47.4	Pass
T36	5.85417 - 0	Leg	3	31.9	Pass
T2	309.04 - 299.416	Diagonal	7/8	20.1	Pass
T3	299.416 - 297.873	Diagonal	7/8	24.3	Pass
T4	297.873 - 279.123	Diagonal	7/8	17.4	Pass
T5	279.123 - 277.873	Diagonal	7/8	18.0	Pass
T6	277.873 - 259.123	Diagonal	7/8	7.1	Pass
T7	259.123 - 257.873	Diagonal	7/8	9.3	Pass
T8	257.873 - 239.123	Diagonal	7/8	44.6	Pass
T9	239.123 - 237.873	Diagonal	7/8	1.3	Pass
T10	237.873 - 219.123	Diagonal	7/8	11.7	Pass
T11	219.123 - 217.873	Diagonal	7/8	14.0	Pass
T12	217.873 - 199.123	Diagonal	7/8	7.1	Pass
T13	199.123 - 197.873	Diagonal	7/8	2.4	Pass
T14	197.873 - 179.123	Diagonal	7/8	2.2	Pass
T15	179.123 - 177.873	Diagonal	7/8	2.2	Pass
T16	177.873 - 159.123	Diagonal	7/8	1.1	Pass
T17	159.123 - 157.873	Diagonal	7/8	6.3	Pass
T18	157.873 - 139.123	Diagonal	1	9.4	Pass
T19	139.123 - 137.873	Diagonal	1	4.8	Pass
T20	137.873 - 119.123	Diagonal	1	4.0	Pass
T21	119.123 - 117.873	Diagonal	1	5.4	Pass
T22	117.873 - 99.123	Diagonal	1	10.0	Pass
T23	99.123 - 97.873	Diagonal	1	0.7	Pass
T24	97.873 - 79.123	Diagonal	1	9.1	Pass
T25	79.123 - 77.873	Diagonal	1	4.3	Pass
T26	77.873 - 59.123	Diagonal	1	1.1	Pass
T27	59.123 - 57.873	Diagonal	1	1.2	Pass
T28	57.873 - 39.123	Diagonal	1	1.5	Pass
T29	39.123 - 37.873	Diagonal	1	5.2	Pass
T30	37.873 - 19.123	Diagonal	1	9.1	Pass
T31	19.123 - 17.873	Diagonal	1	1.9	Pass
T32	17.873 - 15.4147	Diagonal	1	0.9	Pass
T33	15.4147 - 13.1022	Diagonal	1	7.6	Pass
T34	13.1022 - 10.5189	Diagonal	1	9.0	Pass
T35	10.5189 - 5.85417	Diagonal	1	4.7	Pass
T36	5.85417 - 0	Diagonal	1	1.9	Pass
T2	309.04 - 299.416	Horizontal	7/8	8.5	Pass
T3	299.416 - 297.873	Horizontal	1 1/4	4.8	Pass
T4	297.873 - 279.123	Horizontal	7/8	1.4	Pass
T5	279.123 - 277.873	Horizontal	1	8.2	Pass
T6	277.873 - 259.123	Horizontal	7/8	5.7	Pass
T7	259.123 - 257.873	Horizontal	1	1.7	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T8	257.873 - 239.123	Horizontal	7/8	1.2	Pass
T9	239.123 - 237.873	Horizontal	1	1.5	Pass
T10	237.873 - 219.123	Horizontal	7/8	6.3	Pass
T11	219.123 - 217.873	Horizontal	1	0.5	Pass
T12	217.873 - 199.123	Horizontal	7/8	0.4	Pass
T13	199.123 - 197.873	Horizontal	1	0.5	Pass
T14	197.873 - 179.123	Horizontal	7/8	17.2	Pass
T15	179.123 - 177.873	Horizontal	1	0.9	Pass
T16	177.873 - 159.123	Horizontal	7/8	1.0	Pass
T17	159.123 - 157.873	Horizontal	1	1.0	Pass
T18	157.873 - 139.123	Horizontal	7/8	14.5	Pass
T19	139.123 - 137.873	Horizontal	1 1/4	1.6	Pass
T20	137.873 - 119.123	Horizontal	7/8	1.6	Pass
T21	119.123 - 117.873	Horizontal	1	20.6	Pass
T22	117.873 - 99.123	Horizontal	7/8	1.9	Pass
T23	99.123 - 97.873	Horizontal	1	1.9	Pass
T24	97.873 - 79.123	Horizontal	7/8	2.0	Pass
T25	79.123 - 77.873	Horizontal	1	4.8	Pass
T26	77.873 - 59.123	Horizontal	7/8	8.8	Pass
T27	59.123 - 57.873	Horizontal	1	9.7	Pass
T28	57.873 - 39.123	Horizontal	7/8	11.8	Pass
T29	39.123 - 37.873	Horizontal	1	37.9	Pass
T30	37.873 - 19.123	Horizontal	7/8	41.0	Pass
T31	19.123 - 17.873	Horizontal	1	46.8	Pass
T33	15.4147 - 13.1022	Horizontal	7/8	44.6	Pass
T34	13.1022 - 10.5189	Horizontal	7/8	46.9	Pass
T35	10.5189 - 5.85417	Horizontal	6 x 3/4	46.7	Pass
T36	5.85417 - 0	Horizontal	6 x 3/4	45.3	Pass
T1	310.04 - 309.04	Top Girt	6 x 1	41.2	Pass
T2	309.04 - 299.416	Top Girt	1 1/4	44.3	Pass
T4	297.873 - 279.123	Top Girt	1	44.2	Pass
T6	277.873 - 259.123	Top Girt	1	43.1	Pass
T8	257.873 - 239.123	Top Girt	1	39.1	Pass
T10	237.873 - 219.123	Top Girt	1	10.5	Pass
T12	217.873 - 199.123	Top Girt	1	38.1	Pass
T14	197.873 - 179.123	Top Girt	1	18.2	Pass
T16	177.873 - 159.123	Top Girt	1	5.8	Pass
T18	157.873 - 139.123	Top Girt	1 1/4	9.1	Pass
T20	137.873 - 119.123	Top Girt	1	9.6	Pass
T22	117.873 - 99.123	Top Girt	1	10.4	Pass
T24	97.873 - 79.123	Top Girt	1	16.7	Pass
T26	77.873 - 59.123	Top Girt	1	19.3 21.5 (b)	Pass
T28	57.873 - 39.123	Top Girt	1	21.8	Pass
T30	37.873 - 19.123	Top Girt	1	25.1	Pass
T32	17.873 - 15.4147	Top Girt	1 1/4	25.7	Pass
T35	10.5189 - 5.85417	Bottom Girt	6 x 3/4	27.4 30.1 (b)	Pass
T4	297.873 - 279.123	Guy A@297.873	3/4	29.8	Pass
T10	237.873 - 219.123	Guy A@228.498	13/16	34.0 36.1 (b)	Pass
T18	157.873 - 139.123	Guy A@148.498	7/8	34.9	Pass
T24	97.873 - 79.123	Guy A@88.498	13/16	35.7 37.8 (b)	Pass
T4	297.873 - 279.123	Guy B@297.873	3/4	36.4	Pass
T10	237.873 - 219.123	Guy B@228.498	13/16	36.5	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
				38.6 (b)	
T18	157.873 - 139.123	Guy B@148.498	7/8	36.2	Pass
T24	97.873 - 79.123	Guy B@88.498	13/16	36.6 38.8 (b)	Pass
T4	297.873 - 279.123	Guy C@297.873	3/4	35.8 37.9 (b)	Pass
T10	237.873 - 219.123	Guy C@228.498	13/16	41.1	Pass
T18	157.873 - 139.123	Guy C@148.498	7/8	21.0	Pass
T24	97.873 - 79.123	Guy C@88.498	13/16	20.5	Pass

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

Table 4 - Maximum Base Reactions

	Current Analysis* *(TIA/EIA-222-F)*	
Reaction	Horizontal	Vertical
Tower Base	3 k	200 k
Anchor	55 k	42 k

* *Foundations determined adequate per independent analysis.*

Table 5 – Maximum Antenna Rotations at Service Wind Speed

Centerline Elevation (ft)	Dish	Tilt (deg)*	Twist (deg)*
235	(1) Scala 6-ft x 3-ft Grid Dish	0.0509	0.5487
232	(1) Radiowaves SP2-4.7NS Dish	0.0509	0.5437
196	(1) Cablewave PA6-112 Dish	0.0508	0.4874
146.5	(1) 2-ft MW Dish w/o radome	0.0449	0.3805

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

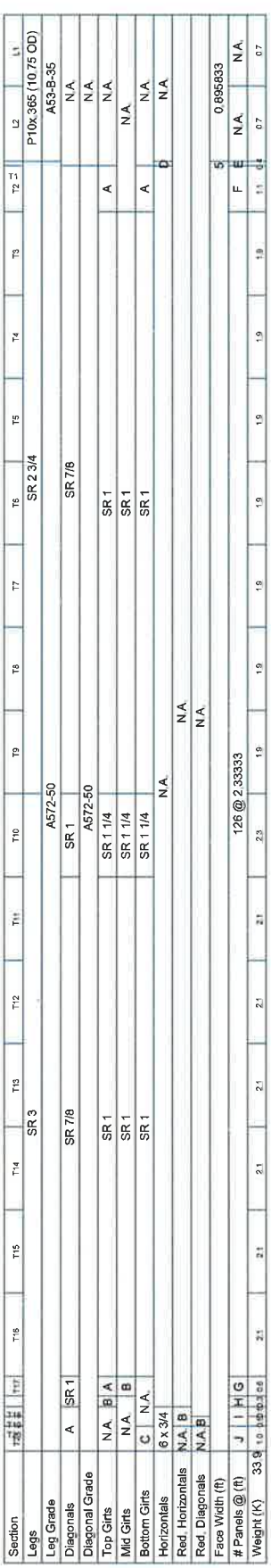
GENERAL COMMENTS

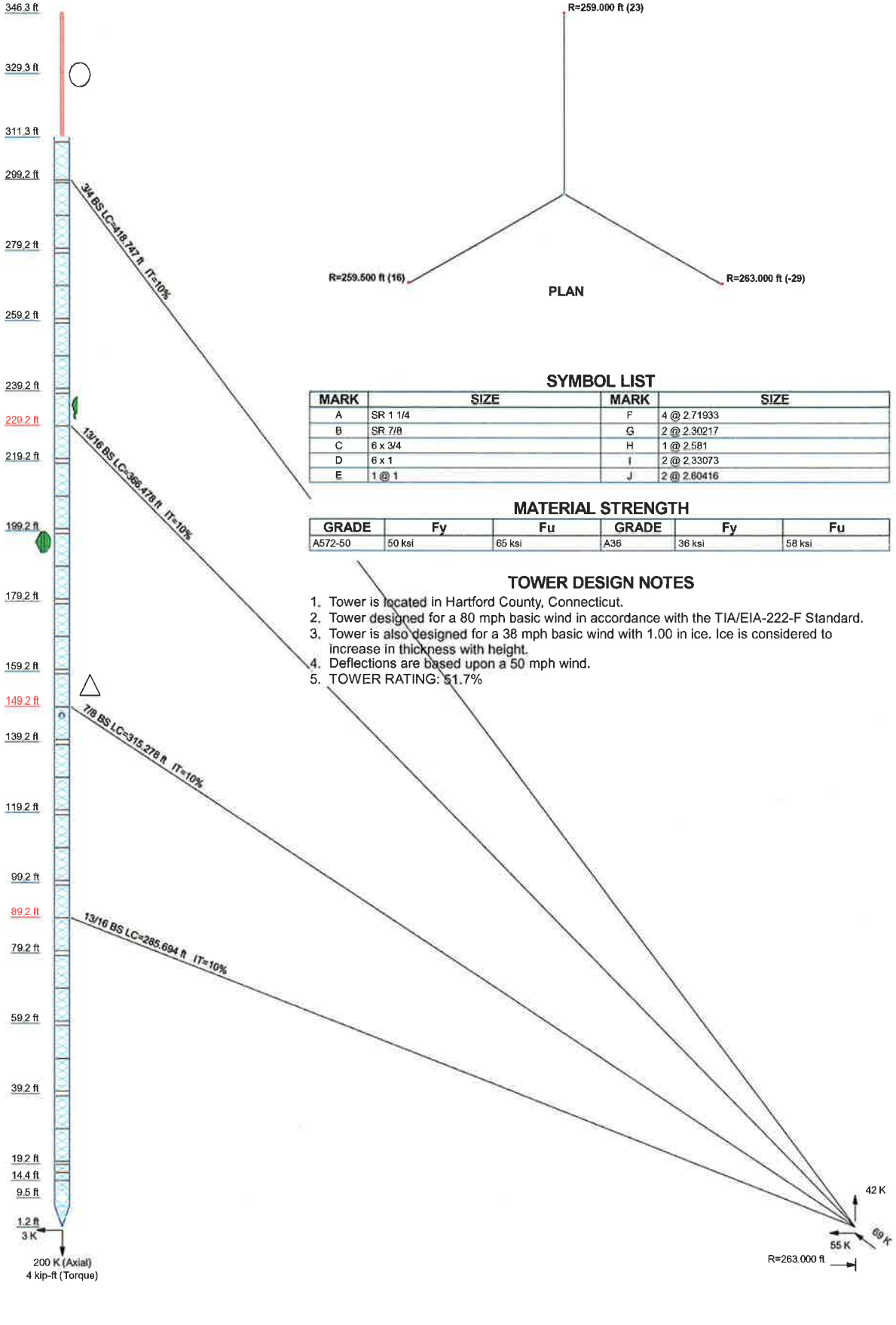
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading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





SYMBOL LIST

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

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 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: 51.7%

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Tower Analysis

Job: West Hartford, CT15879-A			
Project: 1424GB1400 (R1)			
Client: SBA	Drawn by: RKitsteiner	App'd:	
Code: TIA/EIA-222-F	Date: 03/21/14	Scale: NTS	
Path:		Dwg No. E-1	