Robinson+Cole

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Also admitted in Massachusetts

December 4, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
462 West Main Street, Meriden, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 65-foot level on the existing 100-foot tower at 462 West Main Street in Meriden, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). The Council approved Cellco's use of this tower in 2014. Cellco now intends to replace six (6) of its existing antennas with three (3) model SBNHH-1D45B, 700 MHz antennas and three (3) model SBNHH-1D45B, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace six (6) remote radio heads ("RRHs"). Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

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 Manuel A. Santos, Mayor for the City of Meriden. A copy of this letter is also being sent to Hunter Family Limited Partnership, the owner of the Property and Crown, the tower owner.

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 antennas and RRHs will be located on a platform at the 65-foot level on the 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.

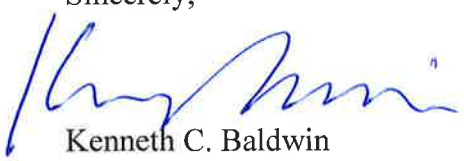
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for RF emissions at each of Cellco's operating frequencies, are included behind Attachment 2. These tables demonstrate that the modified Cellco facility will comply with the RF emissions standards 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 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:
Manuel A. Santos, Meriden Mayor
Hunter Family Limited Partnership
Crown Castle
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D45B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 45° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	16.9	17.6	19.6	20.1	20.5	21.0
Beamwidth, Horizontal, degrees	47	43	45	42	42	39
Beamwidth, Vertical, degrees	12.4	11.4	5.8	5.3	5.1	4.5
Beam Tilt, degrees	0–14	0–14	0–8	0–8	0–8	0–8
USLS, dB	19	22	18	17	17	16
Front-to-Back Ratio at 180°, dB	30	31	31	33	33	35
CPR at Boresight, dB	27	27	21	23	16	17
CPR at 10 dB Horizontal Beamwidth, dB	11	14	10	11	11	13
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	16.6	17.3	19.2	19.8	20.1	20.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.5	±0.4	±0.5	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 16.6	0 ° | 17.3	0 ° | 19.3	0 ° | 19.9	0 ° | 20.1	0 ° | 20.7
	7 ° | 16.7	7 ° | 17.4	4 ° | 19.3	4 ° | 19.9	4 ° | 20.2	4 ° | 20.9
	14 ° | 16.4	14 ° | 17.1	8 ° | 19.0	8 ° | 19.6	8 ° | 20.0	8 ° | 20.4
Beamwidth, Horizontal Tolerance, degrees	±1.5	±2.8	±2.1	±1.7	±1	±1.7
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6	±0.3	±0.2	±0.4	±0.1
USLS, dB	19	23	16	15	16	16
Front-to-Back Total Power at 180° ± 30°, dB	24	24	28	30	31	30
CPR at Boresight, dB	28	29	23	24	20	19
CPR at 10 dB Horizontal Beamwidth, dB	13	17	13	13	13	13

* 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® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D45B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	1038.0 N @ 150 km/h 233.4 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	178.0 mm | 7.0 in
Length	1829.0 mm | 72.0 in
Width	457.0 mm | 18.0 in
Net Weight	29.2 kg | 64.4 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
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

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

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.

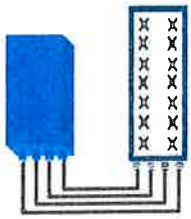
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

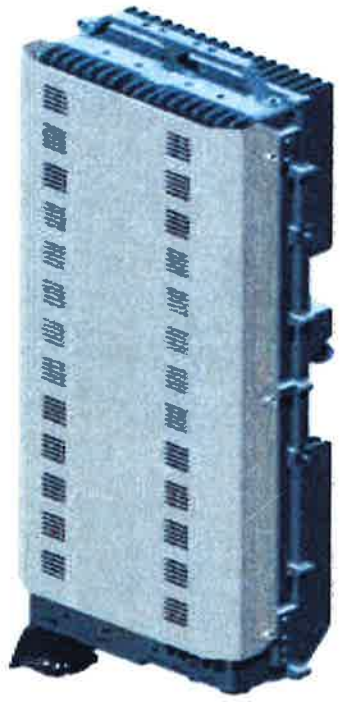
Can be switched between modes via SW w/o site visit

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

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.

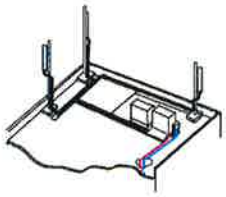
EASY INSTALLATION

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.

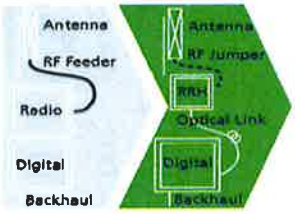
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

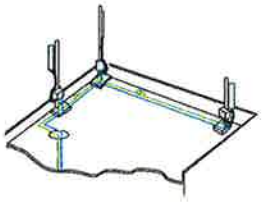
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 daisychaining 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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

ATTACHMENT 2

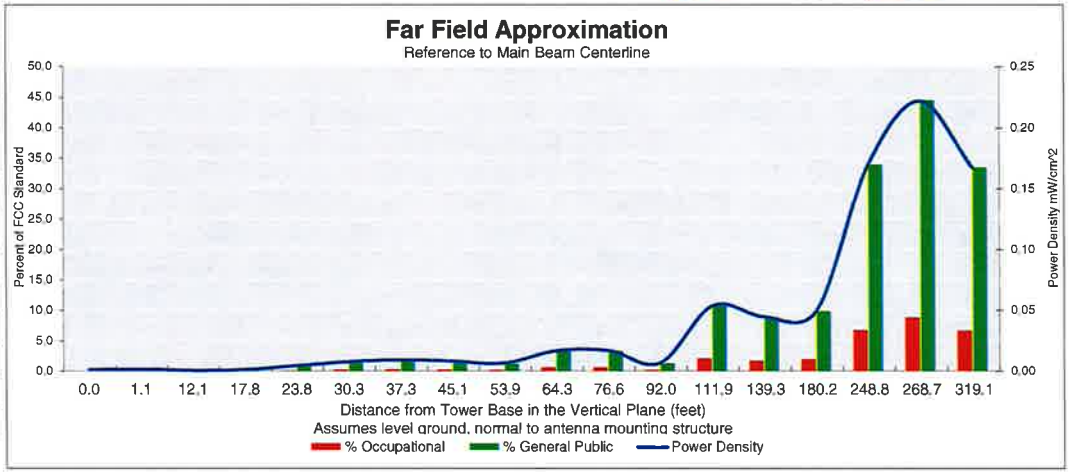
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-168
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-700).xlsx

Operating Freq. (MHz):	**746.0**
Antenna Height (ft):	**65.0**
Antenna Gain (dBi):	**16.8**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**9.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**1672.2**
No. of Channels:	**1**



Calc Angle	90.0	89.0	79.0	74.0	69.0	64.0	59.0	54.0	49.0	44.0	39.0	34.0	29.0	24.0	19.0	14.0	13.0	11.0
Solve for r, dx to antenna	62.0	62.0	63.2	64.5	66.4	69.0	72.4	76.7	82.2	89.3	98.6	110.9	127.9	152.5	190.5	256.4	275.8	325.1
Distance from Antenna Structure Base in Horizontal plane	0.0	1.1	12.1	17.8	23.8	30.3	37.3	45.1	53.9	64.3	76.6	92.0	111.9	139.3	180.2	248.8	268.7	319.1
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	0.02	0.02	0.01	0.05	0.04	0.05	0.17	0.22	0.17
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.7	0.7	0.3	2.2	1.8	2.0	6.8	8.9	6.7
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.9	1.6	1.9	1.7	1.3	3.4	3.4	1.4	10.8	9.0	10.0	34.1	44.7	33.6

Antenna Type: **SBNHH-1D45B**

Max%: **44.65%**

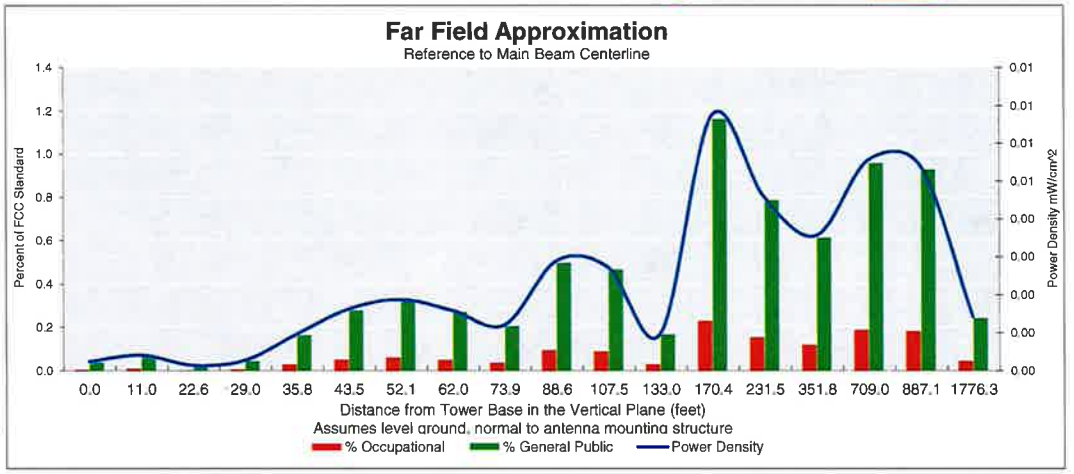
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-168
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (Cellular).xlsx

Operating Freq. (MHz):	**869.0**
Antenna Height (ft):	**65.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**71.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**437.6**
No. of Channels:	**9**



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	62.0	63.0	66.0	68.4	71.6	75.7	81.0	87.7	96.5	108.1	124.1	146.8	181.4	239.7	357.2	711.7	889.3	1777.4
Distance from Antenna Structure Base in Horizontal plane	0.0	11.0	22.6	29.0	35.8	43.5	52.1	62.0	73.9	88.6	107.5	133.0	170.4	231.5	351.8	709.0	887.1	1776.3
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	0.00	0.00	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: **BXA-70063-6CF**

Max%: **1.16%**

Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
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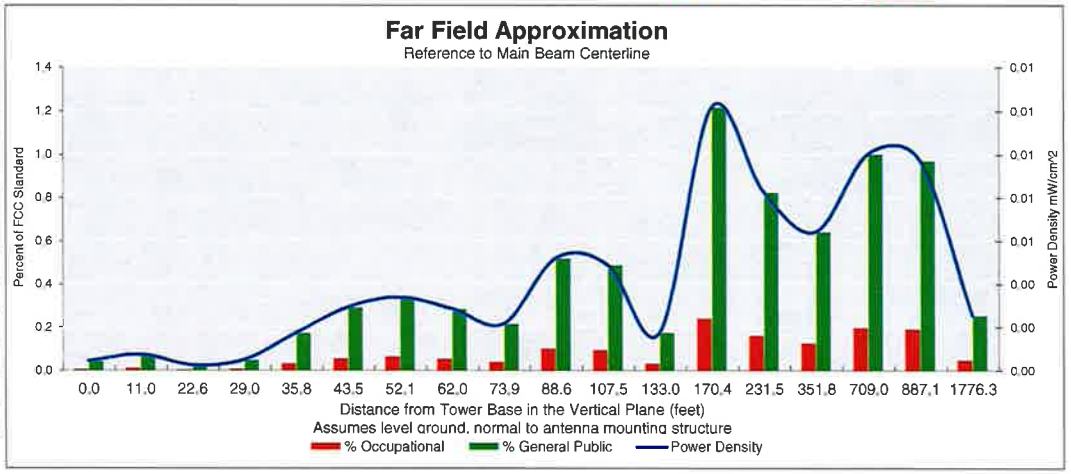
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (PCS).xlsx

Operating Freq. (MHz):	**1970.0**
Antenna Height (ft):	**65.0**
Antenna Gain (dBi):	**18.7**
Antenna Size (in.):	**72.4**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**498.7**
No. of Channels:	**7**



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	62.0	63.0	66.0	68.4	71.6	75.7	81.0	87.7	96.5	108.1	124.1	146.8	181.4	239.7	357.2	711.7	889.3	1777.4
Distance from Antenna Structure Base in Horizontal plane	0.0	11.0	22.6	29.0	35.8	43.5	52.1	62.0	73.9	88.6	107.5	133.0	170.4	231.5	351.8	709.0	887.1	1776.3
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	0.1
Percent of General Population Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	1.0	0.3

Antenna Type: **BXA-171063-12CF**

Max%: **1.22%**

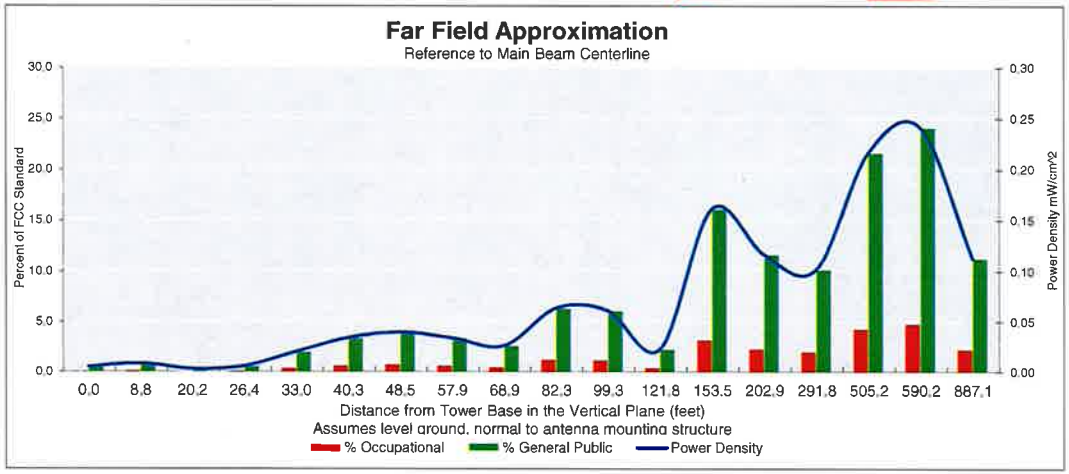
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-168
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-AWS).xlsx

Operating Freq. (MHz):	**2145.0**
Antenna Height (ft):	**65.0**
Antenna Gain (dBi):	**20.4**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**3714.9**
No. of Channels:	**1**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0
Solve for r, dx to antenna	62.0	62.6	65.2	67.4	70.2	74.0	78.7	84.8	92.7	103.1	117.1	136.6	165.6	212.2	298.4	509.0	593.4	889.3
Distance from Antenna Structure Base in Horizontal plane	0.0	8.8	20.2	26.4	33.0	40.3	48.5	57.9	68.9	82.3	99.3	121.8	153.5	202.9	291.8	505.2	590.2	887.1
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	0.01	0.00	0.01	0.02	0.03	0.04	0.03	0.03	0.06	0.06	0.02	0.16	0.12	0.10	0.22	0.24	0.11
Percent of Occupational Standard	0.1	0.2	0.1	0.1	0.4	0.7	0.8	0.7	0.5	1.3	1.2	0.5	3.2	2.3	2.0	4.3	4.8	2.2
Percent of General Population Standard	0.5	0.8	0.3	0.6	2.0	3.4	4.0	3.4	2.6	6.3	6.1	2.3	16.1	11.6	10.2	21.7	24.1	11.2

Antenna Type: **SBNHH-1D45B**

Max%: **24.12%**

ATTACHMENT 3

Date: **November 16, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

JACOBS
Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
(770) 701-2500

Subject: **Structural Analysis Report**

Carrier Designation:
***Verizon Wireless* Co-Locate**
Carrier Site Name: Meriden Hanover CT

Crown Castle Designation:
Crown Castle BU Number: 842869
Crown Castle Site Name: MERIDEN WEST CENTRAL
Crown Castle JDE Job Number: 354448
Crown Castle Work Order Number: 1149378
Crown Castle Application Number: 319180 Rev. 1

Engineering Firm Designation:
Jacobs Engineering Group, Inc. Project Number: 1149378

Site Data:
450-478 WEST MAIN STREET, MERIDEN, New Haven County, CT
Latitude *41° 32' 24.24"*, Longitude *-72° 49' 9.06"*
100 Foot - Monopole Tower

Dear Sean Dempsey,

Jacobs Engineering Group, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 844663, in accordance with application 319180, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 or the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Jacobs Engineering Group, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Antonino Badalamenti

Anthony Badalamenti, E.I.T.
Structural Engineer

Reviewed By:

11/16/15

Mathew E. Watkins, P.E.
Structural Engineer

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by Glen Martin Engineering in December of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
65.0	65.0	3	alcatel lucent	RRH2X60-AWS	-	-	-
		3	alcatel lucent	RRH2x60 700			
		6	commscope	SBNHH-1D45B w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	115.0	1	dbspectra	DS8A12F36U-N	8 6 2 1	1/2 1-1/4 3/4 3/8	1
	106.0	3	decibel	DB201-A			
		1	kmw communications	HB-X-AW-19-65-00T			
	100.0	4	decibel	DB432-A			
		3	ericsson	RRUS 11-700			
		1	raycap	DC6-48-60-18-8F			
		6	kmw communications	AM-X-CD-16-65-00T-RET			
		1	tower mounts	Platform Mount [LP 1301-1]			
		3	ericsson	RRUS A2 MODULE	2 1	3/4 3/8	2
		3	ericsson	RRUS-11 1900MHz			
		3	cci antennas	DTMABP7819VG12A			
		3	cci antennas	OPA-65R-LCUU-H6			
		1	raycap	DC6-48-60-18-8F			
86.0	90.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12 1 1	7/8 1-5/8 1/2	1
		3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	ericsson	KRY 112 71			
		3	ericsson	RRUS 11 B12			
	86.0	1	andrew	VHLP1-23			
		1	tower mounts	Platform Mount [LP 305-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
78.0	78.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-	1
		3	alcatel lucent	TME-800MHZ RRH			
		3	alcatel lucent	1900MHz RRH			
		1	tower mounts	Side Arm Mount [SO 104-3]			
76.0	79.0	3	alcatel lucent	TD-RRH8x20-25	4 3	1-1/4 5/16	1
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	76.0	1	tower mounts	Platform Mount [LP 304-1]			
65.0	65.0	3	alcatel lucent	RRH2X40-AWS	-	-	3
		3	alcatel lucent	RRH2x40 700			
		3	antel	BXA-171063/12CF w/ Mount Pipe			
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		3	antel	BXA-171063/12CF w/ Mount Pipe	2	1-5/8	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 303-1]			

Notes:
Existing Equipment
Reserved Equipment; Considered in This Analysis
Equipment To Be Removed; Not Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
99	99	6	allgon	7920	12	1-5/8
89	89	9	generic	4' Panel Antenna	9	1-5/8
79	79	9	generic	4' Panel Antenna	9	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Tectonic	4529388	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Glen Martin Engineering	4529387	CCISITES
TOWER MANUFACTURER DRAWINGS	Glen Martin Engineering	4713237	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

Tower and structures were built in accordance with the manufacturer's specifications.
The tower and structures have been maintained in accordance with the manufacturer's specification.
The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Jacobs Engineering Group, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	100 - 47	Pole	TP40.72x28x0.313	1	-16.328	2019.468	46.5	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-28.531	3171.353	67.7	Pass
							Summary	
						Pole (L2)	67.7	Pass
						Rating =	67.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	63.5	Pass
1	Base Plate	0	48.9	Pass
1	Base Foundation (Structural)	0	48.5	Pass
1	Base Foundation (Soil Interaction)	0	80.3	Pass

Structure Rating (max from all components) =	80.3%

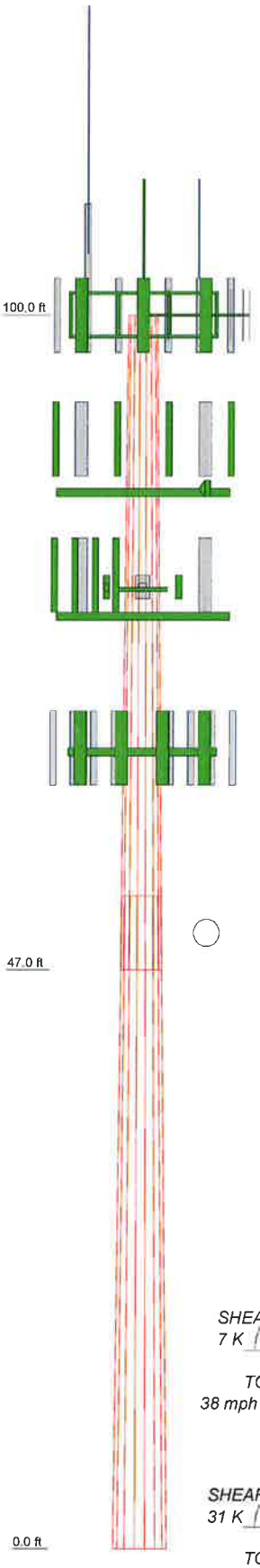
Notes:
See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

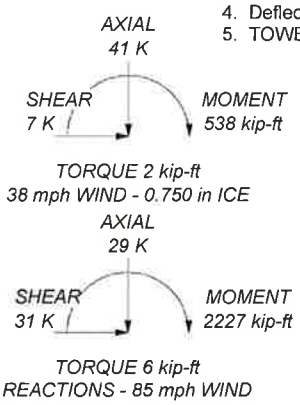
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time

APPENDIX A

TNXTOWER OUTPUT



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	53.000	16	0.313	6.000	28.000	40.720	A572-65	6.1
2	53.000	16	0.375		38.655	51.370		9.6
								15.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
OPA-65R-LCUU-H6	100	KRY 112 71	86
OPA-65R-LCUU-H6	100	6' x 2" Mount Pipe	86
OPA-65R-LCUU-H6	100	Platform Mount [LP 305-1]	86
RRUS-11 1900MHz	100	andrew VHLP1-23	86
RRUS-11 1900MHz	100	TME-800MHZ RRH	78
RRUS-11 1900MHz	100	TME-800MHZ RRH	78
RRUS A2 MODULE	100	1900MHz RRH	78
RRUS A2 MODULE	100	1900MHz RRH	78
RRUS A2 MODULE	100	1900MHz RRH	78
DTMABP7819VG12A	100	800 EXTERNAL NOTCH FILTER	78
DTMABP7819VG12A	100	800 EXTERNAL NOTCH FILTER	78
DTMABP7819VG12A	100	800 EXTERNAL NOTCH FILTER	78
DC6-48-60-18-8F	100	6' x 2" Mount Pipe	78
(2) AM-X-CD-16-65-00T-RET	100	6' x 2" Mount Pipe	78
(2) AM-X-CD-16-65-00T-RET	100	6' x 2" Mount Pipe	78
(2) AM-X-CD-16-65-00T-RET	100	Side Arm Mount [SO 104-3]	78
HB-X-AW-19-65-00T	100	TME-800MHZ RRH	78
DS8A12F36U-N	100	APXVTM14-C-120 w/ Mount Pipe	76
DB201-A	100	(2) APXVSPP18-C-A20 w/ Mount Pipe	76
DB201-A	100	(2) APXVTM14-C-120 w/ Mount Pipe	76
DB201-A	100	TD-RRH8x20-25	76
(2) DB432-A	100	(2) TD-RRH8x20-25	76
(2) DB432-A	100	(2) 6' x 2" Mount Pipe	76
RRUS 11-700	100	(4) 6' x 2" Mount Pipe	76
RRUS 11-700	100	Platform Mount [LP 304-1]	76
RRUS 11-700	100	APXVSPP18-C-A20 w/ Mount Pipe	76
DC6-48-60-18-8F	100	(2) SBNHH-1D45B w/ Mount Pipe	65
Platform Mount [LP 1301-1]	100	(2) SBNHH-1D45B w/ Mount Pipe	65
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	86	RRH2x60-700	65
		RRH2x60-700	65
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	86	RRH2x60-700	65
		RRH2x60-AWS	65
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	86	RRH2x60-AWS	65
		RRH2x60-AWS	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-70063/6CF w/ Mount Pipe	65
		BXA-70063/6CF w/ Mount Pipe	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-70063/6CF w/ Mount Pipe	65
		BXA-171063/12CF w/ Mount Pipe	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-171063/12CF w/ Mount Pipe	65
		BXA-171063/12CF w/ Mount Pipe	65
RRUS 11 B12	86	DB-T1-6Z-8AB-0Z	65
RRUS 11 B12	86	DB-T1-6Z-8AB-0Z	65
RRUS 11 B12	86	Platform Mount [LP 303-1]	65
KRY 112 71	86	(2) SBNHH-1D45B w/ Mount Pipe	65
KRY 112 71	86		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven 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.
5. TOWER RATING: 68.1%

JACOBS
Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
Phone: (770) 701-2500
FAX: (770) 701-2501

Job:	**BU# 842869 WO# 1149378**		
Project:	**MERIDEN WEST CENTRAL**		
Client: Crown Castle		Drawn by: AB	App'd:
Code: TIA/EIA-222-F		Date: 11/16/15	Scale: N
Path:			Dwg No.

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:
Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	100.000-47.000	53.000	6.000	16	28.000	40.720	0.313	1.250	A572-65 (65 ksi)
L2	47.000-0.000	53.000		16	38.655	51.370	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	28.549	27.601	2673.045	9.857	14.280	187.188	5386.564	13.647	4.950	15.84
	41.518	40.281	8308.852	14.385	20.767	400.095	16743.510	19.917	7.481	23.94
L2	40.880	45.792	8477.194	13.628	19.714	430.008	17082.742	22.642	6.946	18.523
	52.376	61.003	20040.987	18.154	26.199	764.961	40385.419	30.163	9.476	25.27

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 100.000-47.000				1	1	1		
L2 47.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*****										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
LDF4-50A(1/2")	A	No	Inside Pole	100.000 - 0.000	0.000	0	8	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
LDF6-50A(1-1/4")	A	No	Inside Pole	100.000 - 0.000	0.000	0	6	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
FB-L98B-034-XXXXXX(3/8)	A	No	Inside Pole	100.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	100.000 - 0.000	0.000	0	2	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
FB-L98B-034-XXXXXX(3/8)	A	No	Inside Pole	100.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	100.000 - 0.000	0.000	0	2	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
2" Rigid Conduit	A	No	Inside Pole	100.000 - 0.000	0.000	0	1	No Ice	0.000	0.003
								1/2" Ice	0.000	0.003
								1" Ice	0.000	0.003
								2" Ice	0.000	0.003
								4" Ice	0.000	0.003
*****										
LDF4-50A(1/2")	C	No	Inside Pole	86.000 - 0.000	0.000	0	1	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
LDF5-	C	No	Inside Pole	86.000 - 0.000	0.000	0	12	No Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
50A(7/8")								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	Inside Pole	86.000 - 0.000	0.000	0	1	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
*****										
ATCB-B01-006(5/16")	B	No	Inside Pole	76.000 - 0.000	0.000	0	3	No Ice	0.000	0.000
								1/2" Ice	0.000	0.000
								1" Ice	0.000	0.000
								2" Ice	0.000	0.000
								4" Ice	0.000	0.000
HB114-13U3M12-XXXF(1-1/4")	B	No	Inside Pole	76.000 - 0.000	0.000	0	4	No Ice	0.000	0.001
								1/2" Ice	0.000	0.001
								1" Ice	0.000	0.001
								2" Ice	0.000	0.001
								4" Ice	0.000	0.001
*****										
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	65.000 - 0.000	0.500	0	2	No Ice	0.163	0.001
								1/2" Ice	0.263	0.002
								1" Ice	0.362	0.004
								2" Ice	0.562	0.010
								4" Ice	0.962	0.029
*****										

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	100.000-47.000	A	0.000	0.000	0.000	5.850	0.590
		B	0.000	0.000	0.000	0.000	0.121
		C	0.000	0.000	0.000	0.000	0.202
L2	47.000-0.000	A	0.000	0.000	0.000	15.275	0.589
		B	0.000	0.000	0.000	0.000	0.196
		C	0.000	0.000	0.000	0.000	0.243

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	100.000-47.000	A	0.824	0.000	0.000	0.000	11.785	0.681
		B		0.000	0.000	0.000	0.000	0.121
		C		0.000	0.000	0.000	0.000	0.202
L2	47.000-0.000	A	0.750	0.000	0.000	0.000	30.773	0.828
		B		0.000	0.000	0.000	0.000	0.196
		C		0.000	0.000	0.000	0.000	0.243

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	100.000-47.000	0.000	-0.179	0.000	-0.333
L2	47.000-0.000	0.000	-0.449	0.000	-0.813

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
OPA-65R-LCUU-H6	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.360 10.927 11.502 12.680 15.137	5.517 5.971 6.434 7.380 9.574	0.073 0.131 0.196 0.345 0.728
OPA-65R-LCUU-H6	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.360 10.927 11.502 12.680 15.137	5.517 5.971 6.434 7.380 9.574	0.073 0.131 0.196 0.345 0.728
OPA-65R-LCUU-H6	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.360 10.927 11.502 12.680 15.137	5.517 5.971 6.434 7.380 9.574	0.073 0.131 0.196 0.345 0.728
RRUS-11 1900MHz	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.942 3.172 3.410 3.913 5.023	1.190 1.351 1.521 1.887 2.721	0.044 0.063 0.086 0.140 0.291
RRUS-11 1900MHz	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.942 3.172 3.410 3.913 5.023	1.190 1.351 1.521 1.887 2.721	0.044 0.063 0.086 0.140 0.291
RRUS-11 1900MHz	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.942 3.172 3.410 3.913 5.023	1.190 1.351 1.521 1.887 2.721	0.044 0.063 0.086 0.140 0.291
RRUS A2 MODULE	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.867 2.051 2.244 2.657 3.585	0.423 0.532 0.650 0.912 1.540	0.021 0.031 0.044 0.077 0.177
RRUS A2 MODULE	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.867 2.051 2.244 2.657 3.585	0.423 0.532 0.650 0.912 1.540	0.021 0.031 0.044 0.077 0.177
RRUS A2 MODULE	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.867 2.051 2.244 2.657 3.585	0.423 0.532 0.650 0.912 1.540	0.021 0.031 0.044 0.077 0.177
DTMABP7819VG12A	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.139 1.284 1.437 1.769 2.538	0.391 0.488 0.595 0.833 1.414	0.019 0.026 0.036 0.060 0.140
DTMABP7819VG12A	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.139 1.284 1.437 1.769 2.538	0.391 0.488 0.595 0.833 1.414	0.019 0.026 0.036 0.060 0.140
DTMABP7819VG12A	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	1.139 1.284 1.437	0.391 0.488 0.595	0.019 0.026 0.036

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	1.769	0.833	0.060
						4" Ice	2.538	1.414	0.140
DC6-48-60-18-8F	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.467 1.667 1.878 2.333 3.378	1.467 1.667 1.878 2.333 3.378	0.033 0.051 0.071 0.119 0.253
(2) AM-X-CD-16-65-00T-RET	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.260 8.807 9.364 10.502 12.882	4.642 5.088 5.542 6.473 8.446	0.049 0.095 0.147 0.271 0.600
(2) AM-X-CD-16-65-00T-RET	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.260 8.807 9.364 10.502 12.882	4.642 5.088 5.542 6.473 8.446	0.049 0.095 0.147 0.271 0.600
(2) AM-X-CD-16-65-00T-RET	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.260 8.807 9.364 10.502 12.882	4.642 5.088 5.542 6.473 8.446	0.049 0.095 0.147 0.271 0.600
HB-X-AW-19-65-00T	A	From Face	4.000 0.000 6.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.817 5.265 5.721 6.654 8.671	4.817 5.265 5.721 6.654 8.671	0.029 0.062 0.100 0.195 0.462
DS8A12F36U-N	A	From Face	4.000 0.000 15.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.128 7.595 10.079 15.098 25.334	5.128 7.595 10.079 15.098 25.334	0.071 0.110 0.164 0.319 0.820
DB201-A	A	From Face	4.000 0.000 6.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.100 1.980 2.860 4.620 8.140	1.100 1.980 2.860 4.620 8.140	0.025 0.033 0.040 0.055 0.085
DB201-A	B	From Face	4.000 0.000 6.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.100 1.980 2.860 4.620 8.140	1.100 1.980 2.860 4.620 8.140	0.025 0.033 0.040 0.055 0.085
DB201-A	C	From Face	4.000 0.000 6.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.100 1.980 2.860 4.620 8.140	1.100 1.980 2.860 4.620 8.140	0.025 0.033 0.040 0.055 0.085
(2) DB432-A	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.300 0.540 0.780 1.260 2.220	0.300 0.540 0.780 1.260 2.220	0.005 0.006 0.008 0.011 0.017
(2) DB432-A	C	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.300 0.540 0.780 1.260 2.220	0.300 0.540 0.780 1.260 2.220	0.005 0.006 0.008 0.011 0.017
RRUS 11-700	A	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.942 3.172 3.410 3.913 5.023	1.190 1.351 1.521 1.887 2.721	0.055 0.074 0.097 0.151 0.302
RRUS 11-700	B	From Face	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	2.942 3.172 3.410	1.190 1.351 1.521	0.055 0.074 0.097

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.913	1.887	0.151
						4" Ice	5.023	2.721	0.302
RRUS 11-700	C	From Face	4.000	0.000	100.000	No Ice	2.942	1.190	0.055
			0.000			1/2" Ice	3.172	1.351	0.074
			0.000			1" Ice	3.410	1.521	0.097
						2" Ice	3.913	1.887	0.151
						4" Ice	5.023	2.721	0.302
DC6-48-60-18-8F	A	From Face	4.000	0.000	100.000	No Ice	1.467	1.467	0.033
			0.000			1/2" Ice	1.667	1.667	0.051
			0.000			1" Ice	1.878	1.878	0.071
						2" Ice	2.333	2.333	0.119
						4" Ice	3.378	3.378	0.253
Platform Mount [LP 1301-1]	C	None		0.000	100.000	No Ice	51.700	51.700	2.262
						1/2" Ice	62.700	62.700	2.935
						1" Ice	76.000	76.000	3.808
						2" Ice	92.200	92.200	4.940
						4" Ice	111.800	111.800	6.411
*****									
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Leg	4.000	0.000	86.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			4.000			1" Ice	13.232	14.116	0.360
						2" Ice	14.735	16.471	0.606
						4" Ice	18.004	21.361	1.277
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			4.000			1" Ice	13.232	14.116	0.360
						2" Ice	14.735	16.471	0.606
						4" Ice	18.004	21.361	1.277
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Leg	4.000	0.000	86.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			4.000			1" Ice	13.232	14.116	0.360
						2" Ice	14.735	16.471	0.606
						4" Ice	18.004	21.361	1.277
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
RRUS 11 B12	A	From Leg	4.000	0.000	86.000	No Ice	3.306	1.361	0.051
			0.000			1/2" Ice	3.550	1.540	0.072
			4.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	B	From Leg	4.000	0.000	86.000	No Ice	3.306	1.361	0.051
			0.000			1/2" Ice	3.550	1.540	0.072
			4.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
RRUS 11 B12	C	From Leg	4.000	0.000	86.000	No Ice	3.306	1.361	0.051
			0.000			1/2" Ice	3.550	1.540	0.072
			4.000			1" Ice	3.802	1.728	0.095
						2" Ice	4.334	2.130	0.153
						4" Ice	5.501	3.038	0.314
KRY 112 71	A	From Leg	4.000	0.000	86.000	No Ice	0.681	0.450	0.013
			0.000			1/2" Ice	0.802	0.559	0.018

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			4.000			1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
KRY 112 71	B	From Leg	4.000	0.000	86.000	No Ice	0.681	0.450	0.013
			0.000			1/2" Ice	0.802	0.559	0.018
			4.000			1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
KRY 112 71	C	From Leg	4.000	0.000	86.000	No Ice	0.681	0.450	0.013
			0.000			1/2" Ice	0.802	0.559	0.018
			4.000			1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 305-1]	C	None		0.000	86.000	No Ice	18.010	18.010	1.121
						1/2" Ice	23.330	23.330	1.352
						1" Ice	28.650	28.650	1.584
						2" Ice	39.290	39.290	2.046
						4" Ice	60.570	60.570	2.972
*****									
TME-800MHZ RRH	A	From Leg	2.000	0.000	78.000	No Ice	2.490	2.068	0.053
			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
TME-800MHZ RRH	B	From Leg	2.000	0.000	78.000	No Ice	2.490	2.068	0.053
			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
TME-800MHZ RRH	C	From Leg	2.000	0.000	78.000	No Ice	2.490	2.068	0.053
			0.000			1/2" Ice	2.706	2.271	0.074
			0.000			1" Ice	2.931	2.481	0.098
						2" Ice	3.407	2.928	0.157
						4" Ice	4.462	3.927	0.318
1900MHz RRH	A	From Leg	2.000	0.000	78.000	No Ice	2.907	3.801	0.044
			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH	B	From Leg	2.000	0.000	78.000	No Ice	2.907	3.801	0.044
			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
1900MHz RRH	C	From Leg	2.000	0.000	78.000	No Ice	2.907	3.801	0.044
			0.000			1/2" Ice	3.145	4.065	0.075
			0.000			1" Ice	3.391	4.337	0.110
						2" Ice	3.909	4.908	0.192
						4" Ice	5.050	6.152	0.407
800 EXTERNAL NOTCH FILTER	A	From Leg	2.000	0.000	78.000	No Ice	0.770	0.375	0.011
			0.000			1/2" Ice	0.890	0.465	0.017
			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH FILTER	B	From Leg	2.000	0.000	78.000	No Ice	0.770	0.375	0.011
			0.000			1/2" Ice	0.890	0.465	0.017
			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
800 EXTERNAL NOTCH	C	From Leg	2.000	0.000	78.000	No Ice	0.770	0.375	0.011

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FILTER			0.000			1/2" Ice	0.890	0.465	0.017
			0.000			1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
6' x 2" Mount Pipe	A	From Leg	2.000	0.000	78.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	2.000	0.000	78.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	2.000	0.000	78.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Side Arm Mount [SO 104-3]	C	None		0.000	78.000	No Ice	3.300	3.300	0.287
						1/2" Ice	4.130	4.130	0.317
						1" Ice	4.960	4.960	0.347
						2" Ice	6.620	6.620	0.407
						4" Ice	9.940	9.940	0.527
*****									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	76.000	No Ice	8.498	6.946	0.083
			0.000			1/2" Ice	9.149	8.127	0.151
			3.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	76.000	No Ice	7.134	4.959	0.077
			0.000			1/2" Ice	7.662	5.754	0.131
			3.000			1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.338
						4" Ice	11.526	11.412	0.752
(2) APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000	0.000	76.000	No Ice	8.498	6.946	0.083
			0.000			1/2" Ice	9.149	8.127	0.151
			3.000			1" Ice	9.767	9.021	0.227
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
(2) APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000	0.000	76.000	No Ice	7.134	4.959	0.077
			0.000			1/2" Ice	7.662	5.754	0.131
			3.000			1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.338
						4" Ice	11.526	11.412	0.752
TD-RRH8x20-25	A	From Leg	4.000	0.000	76.000	No Ice	4.720	1.700	0.070
			0.000			1/2" Ice	5.014	1.917	0.097
			3.000			1" Ice	5.316	2.143	0.128
						2" Ice	5.948	2.620	0.200
						4" Ice	7.314	3.677	0.397
(2) TD-RRH8x20-25	C	From Leg	4.000	0.000	76.000	No Ice	4.720	1.700	0.070
			0.000			1/2" Ice	5.014	1.917	0.097
			3.000			1" Ice	5.316	2.143	0.128
						2" Ice	5.948	2.620	0.200
						4" Ice	7.314	3.677	0.397
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	76.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(4) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	76.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 304-1]	C	None		0.000	76.000	No Ice	17.460	17.460	1.349
						1/2" Ice	22.440	22.440	1.625
						1" Ice	27.420	27.420	1.900
						2" Ice	37.380	37.380	2.451
						4" Ice	57.300	57.300	3.554
*****									
(2) SBNHH-1D45B w/ Mount Pipe	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.838 13.529 14.188 15.532 18.340	6.946 8.127 9.021 10.844 14.851	0.088 0.172 0.265 0.478 1.055
(2) SBNHH-1D45B w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.838 13.529 14.188 15.532 18.340	6.946 8.127 9.021 10.844 14.851	0.088 0.172 0.265 0.478 1.055
(2) SBNHH-1D45B w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.838 13.529 14.188 15.532 18.340	6.946 8.127 9.021 10.844 14.851	0.088 0.172 0.265 0.478 1.055
RRH2x60-700	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700	B	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-AWS	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-AWS	B	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-AWS	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
BXA-70063/6CF w/ Mount Pipe	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.979 8.621 9.228 10.473 13.082	5.407 6.558 7.422 9.198 12.952	0.042 0.101 0.168 0.328 0.788
BXA-70063/6CF w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.979 8.621 9.228 10.473 13.082	5.407 6.558 7.422 9.198 12.952	0.042 0.101 0.168 0.328 0.788
BXA-70063/6CF w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice	7.979 8.621 9.228 10.473	5.407 6.558 7.422 9.198	0.042 0.101 0.168 0.328

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	13.082	12.952	0.788
BXA-171063/12CF w/ Mount Pipe	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.029 5.583 6.103 7.166 9.438	5.289 6.459 7.348 9.148 12.947	0.041 0.087 0.140 0.273 0.677
BXA-171063/12CF w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.029 5.583 6.103 7.166 9.438	5.289 6.459 7.348 9.148 12.947	0.041 0.087 0.140 0.273 0.677
BXA-171063/12CF w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.029 5.583 6.103 7.166 9.438	5.289 6.459 7.348 9.148 12.947	0.041 0.087 0.140 0.273 0.677
DB-T1-6Z-8AB-0Z	A	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
DB-T1-6Z-8AB-0Z	C	From Face	4.000 0.000 0.000	0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Platform Mount [LP 303-1]	C	None		0.000	65.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
*****									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
andrew VHLP1-23	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 0.000	-20.000		86.000	1.275	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.277 1.449 1.621 1.966 2.656	0.014 0.022 0.029 0.044 0.074
*****											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice

Comb. No.	Description
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	100 - 47	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.781	5.379	0.126
			Max. Mx	11	-16.405	734.078	-5.353
			Max. My	8	-16.405	7.455	-731.417
			Max. Vy	11	-24.787	734.078	-5.353
			Max. Vx	8	24.816	7.455	-731.417
			Max. Torque	2			6.202
L2	47 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-41.108	5.379	0.795
			Max. Mx	11	-28.609	2214.048	-14.494
			Max. My	2	-28.609	-12.085	2212.994
			Max. Vy	11	-31.161	2214.048	-14.494
			Max. Vx	8	31.192	16.557	-2212.766
			Max. Torque	2			6.200

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	41.108	6.324	-3.666
	Max. H_x	11	28.631	31.142	-0.174
	Max. H_z	2	28.631	-0.172	31.170
	Max. M_x	2	2212.994	-0.172	31.170

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	2208.070	-31.128	0.177
	Max. Torsion	2	6.197	-0.172	31.170
	Min. Vert	1	28.631	0.000	0.000
	Min. H_x	5	28.631	-31.128	0.177
	Min. H_z	8	28.631	0.168	-31.172
	Min. M_x	8	-2212.766	0.168	-31.172
	Min. M_z	11	-2214.048	31.142	-0.174
	Min. Torsion	8	-6.186	0.168	-31.172

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	28.631	0.000	0.000	-0.184	2.339	-0.000
Dead+Wind 0 deg - No Ice	28.631	0.172	-31.170	-2212.994	-12.087	-6.197
Dead+Wind 30 deg - No Ice	28.631	15.727	-27.079	-1923.652	-1116.609	-5.693
Dead+Wind 60 deg - No Ice	28.631	27.053	-15.729	-1118.660	-1919.977	-3.720
Dead+Wind 90 deg - No Ice	28.631	31.128	-0.177	-15.076	-2208.070	-0.700
Dead+Wind 120 deg - No Ice	28.631	26.871	15.429	1093.041	-1904.621	2.498
Dead+Wind 150 deg - No Ice	28.631	15.423	26.900	1908.176	-1090.988	5.054
Dead+Wind 180 deg - No Ice	28.631	-0.168	31.172	2212.766	16.556	6.186
Dead+Wind 210 deg - No Ice	28.631	-15.733	27.075	1922.933	1121.937	5.697
Dead+Wind 240 deg - No Ice	28.631	-27.065	15.729	1118.345	1925.799	3.700
Dead+Wind 270 deg - No Ice	28.631	-31.142	0.174	14.494	2214.048	0.688
Dead+Wind 300 deg - No Ice	28.631	-26.885	-15.433	-1093.760	1910.628	-2.520
Dead+Wind 330 deg - No Ice	28.631	-15.435	-26.901	-1908.696	1096.790	-5.091
Dead+Ice+Temp	41.108	-0.000	0.000	-0.795	5.379	0.000
Dead+Wind 0 deg+Ice+Temp	41.108	0.026	-7.289	-532.356	3.206	-1.515
Dead+Wind 30 deg+Ice+Temp	41.108	3.667	-6.326	-462.241	-262.357	-1.438
Dead+Wind 60 deg+Ice+Temp	41.108	6.321	-3.666	-268.419	-455.840	-0.988
Dead+Wind 90 deg+Ice+Temp	41.108	7.281	-0.027	-3.156	-525.673	-0.262
Dead+Wind 120 deg+Ice+Temp	41.108	6.293	3.620	262.867	-453.371	0.534
Dead+Wind 150 deg+Ice+Temp	41.108	3.620	6.298	458.227	-258.321	1.192
Dead+Wind 180 deg+Ice+Temp	41.108	-0.025	7.290	530.785	7.637	1.515
Dead+Wind 210 deg+Ice+Temp	41.108	-3.668	6.325	460.550	273.408	1.439
Dead+Wind 240 deg+Ice+Temp	41.108	-6.324	3.666	266.826	467.010	0.982
Dead+Wind 270 deg+Ice+Temp	41.108	-7.285	0.027	1.499	536.881	0.257
Dead+Wind 300 deg+Ice+Temp	41.108	-6.296	-3.621	-264.557	464.586	-0.539
Dead+Wind 330 deg+Ice+Temp	41.108	-3.623	-6.298	-459.868	269.487	-1.200
Dead+Wind 0 deg - Service	28.631	0.059	-10.786	-766.040	-2.616	-2.146
Dead+Wind 30 deg - Service	28.631	5.442	-9.370	-665.901	-384.893	-1.973
Dead+Wind 60 deg - Service	28.631	9.361	-5.442	-387.292	-662.940	-1.290
Dead+Wind 90 deg - Service	28.631	10.771	-0.061	-5.340	-762.648	-0.244
Dead+Wind 120 deg - Service	28.631	9.298	5.339	378.180	-657.622	0.865
Dead+Wind 150 deg - Service	28.631	5.337	9.308	660.298	-376.024	1.752
Dead+Wind 180 deg - Service	28.631	-0.058	10.786	765.718	7.297	2.145
Dead+Wind 210 deg - Service	28.631	-5.444	9.369	665.408	389.871	1.975
Dead+Wind 240 deg - Service	28.631	-9.365	5.443	386.939	668.088	1.282
Dead+Wind 270 deg - Service	28.631	-10.776	0.060	4.895	767.849	0.237
Dead+Wind 300 deg - Service	28.631	-9.303	-5.340	-378.671	662.834	-0.874
Dead+Wind 330 deg - Service	28.631	-5.341	-9.308	-660.720	381.166	-1.764

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-28.631	0.000	0.000	28.631	0.000	0.000%
2	0.172	-28.631	-31.170	-0.172	28.631	31.170	0.000%
3	15.727	-28.631	-27.079	-15.727	28.631	27.079	0.000%
4	27.053	-28.631	-15.729	-27.053	28.631	15.729	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
5	31.128	-28.631	-0.177	-31.128	28.631	0.177	0.000%
6	26.871	-28.631	15.429	-26.871	28.631	-15.429	0.000%
7	15.423	-28.631	26.900	-15.423	28.631	-26.900	0.000%
8	-0.168	-28.631	31.172	0.168	28.631	-31.172	0.000%
9	-15.733	-28.631	27.075	15.733	28.631	-27.075	0.000%
10	-27.065	-28.631	15.729	27.065	28.631	-15.729	0.000%
11	-31.142	-28.631	0.174	31.142	28.631	-0.174	0.000%
12	-26.885	-28.631	-15.433	26.885	28.631	15.433	0.000%
13	-15.435	-28.631	-26.901	15.435	28.631	26.901	0.000%
14	0.000	-41.108	0.000	0.000	41.108	0.000	0.000%
15	0.026	-41.108	-7.289	-0.026	41.108	7.289	0.000%
16	3.667	-41.108	-6.326	-3.667	41.108	6.326	0.000%
17	6.321	-41.108	-3.666	-6.321	41.108	3.666	0.000%
18	7.281	-41.108	-0.027	-7.281	41.108	0.027	0.000%
19	6.293	-41.108	3.620	-6.293	41.108	-3.620	0.000%
20	3.620	-41.108	6.298	-3.620	41.108	-6.298	0.000%
21	-0.025	-41.108	7.290	0.025	41.108	-7.290	0.000%
22	-3.668	-41.108	6.325	3.668	41.108	-6.325	0.000%
23	-6.324	-41.108	3.666	6.324	41.108	-3.666	0.000%
24	-7.285	-41.108	0.027	7.285	41.108	-0.027	0.000%
25	-6.296	-41.108	-3.621	6.296	41.108	3.621	0.000%
26	-3.623	-41.108	-6.298	3.623	41.108	6.298	0.000%
27	0.059	-28.631	-10.786	-0.059	28.631	10.786	0.000%
28	5.442	-28.631	-9.370	-5.442	28.631	9.370	0.000%
29	9.361	-28.631	-5.442	-9.361	28.631	5.442	0.000%
30	10.771	-28.631	-0.061	-10.771	28.631	0.061	0.000%
31	9.298	-28.631	5.339	-9.298	28.631	-5.339	0.000%
32	5.337	-28.631	9.308	-5.337	28.631	-9.308	0.000%
33	-0.058	-28.631	10.786	0.058	28.631	-10.786	0.000%
34	-5.444	-28.631	9.369	5.444	28.631	-9.369	0.000%
35	-9.365	-28.631	5.443	9.365	28.631	-5.443	0.000%
36	-10.776	-28.631	0.060	10.776	28.631	-0.060	0.000%
37	-9.303	-28.631	-5.340	9.303	28.631	5.340	0.000%
38	-5.341	-28.631	-9.308	5.341	28.631	9.308	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00012648
3	Yes	4	0.00000001	0.00020410
4	Yes	4	0.00000001	0.00028010
5	Yes	4	0.00000001	0.00001885
6	Yes	4	0.00000001	0.00025618
7	Yes	4	0.00000001	0.00019541
8	Yes	4	0.00000001	0.00013347
9	Yes	4	0.00000001	0.00031343
10	Yes	4	0.00000001	0.00020827
11	Yes	4	0.00000001	0.00001207
12	Yes	4	0.00000001	0.00020542
13	Yes	4	0.00000001	0.00029767
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00013726
16	Yes	4	0.00000001	0.00014185
17	Yes	4	0.00000001	0.00014130
18	Yes	4	0.00000001	0.00013291
19	Yes	4	0.00000001	0.00013925
20	Yes	4	0.00000001	0.00013998
21	Yes	4	0.00000001	0.00013694
22	Yes	4	0.00000001	0.00014612
23	Yes	4	0.00000001	0.00014519
24	Yes	4	0.00000001	0.00013812
25	Yes	4	0.00000001	0.00014401
26	Yes	4	0.00000001	0.00014483

27	Yes	4	0.00000001	0.00002377
28	Yes	4	0.00000001	0.00002061
29	Yes	4	0.00000001	0.00002609
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00002198
32	Yes	4	0.00000001	0.00001855
33	Yes	4	0.00000001	0.00002420
34	Yes	4	0.00000001	0.00003310
35	Yes	4	0.00000001	0.00001656
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00001474
38	Yes	4	0.00000001	0.00003060

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	100 - 47	9.835	35	0.763	0.008
L2	53 - 0	3.128	35	0.522	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
100.000	OPA-65R-LCUU-H6	35	9.835	0.763	0.008	44950
86.000	andrew VHLP1-23	35	7.586	0.706	0.006	16053
78.000	TME-800MHZ RRH	35	6.358	0.670	0.005	10215
76.000	APXVSPP18-C-A20 w/ Mount Pipe	35	6.061	0.660	0.005	9364
65.000	(2) SBNHH-1D45B w/ Mount Pipe	35	4.534	0.601	0.004	6421

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	100 - 47	28.311	10	2.196	0.022
L2	53 - 0	9.015	10	1.505	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
100.000	OPA-65R-LCUU-H6	10	28.311	2.196	0.022	15674
86.000	andrew VHLP1-23	10	21.842	2.031	0.018	5597
78.000	TME-800MHZ RRH	10	18.308	1.928	0.015	3561
76.000	APXVSPP18-C-A20 w/ Mount Pipe	10	17.455	1.900	0.015	3264
65.000	(2) SBNHH-1D45B w/ Mount Pipe	10	13.061	1.731	0.012	2237

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	100 - 47 (1)	TP40.72x28x0.313	53.000	0.000	0.0	39.000	38.846	-16.396	1514.980	0.011
L2	47 - 0 (2)	TP51.37x38.655x0.375	53.000	0.000	0.0	39.000	61.003	-28.609	2379.110	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	100 - 47 (1)	TP40.72x28x0.313	738.424	23.821	39.000	0.611	0.000	0.000	39.000	0.000
L2	47 - 0 (2)	TP51.37x38.655x0.375	2226.967	34.935	39.000	0.896	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	100 - 47 (1)	TP40.72x28x0.313	24.951	0.642	26.000	0.050	3.496	0.054	26.000	0.002
L2	47 - 0 (2)	TP51.37x38.655x0.375	31.324	0.513	26.000	0.040	3.700	0.028	26.000	0.001

Pole Interaction Design Data

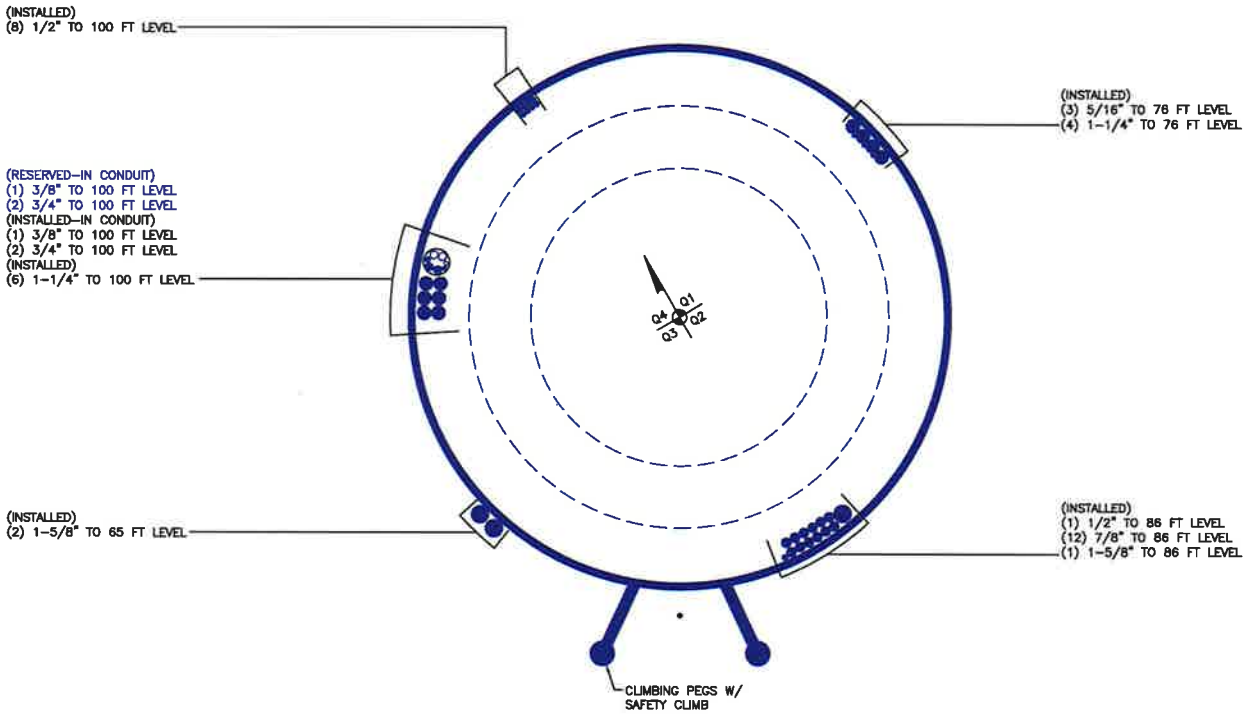
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 47 (1)	0.011	0.611	0.000	0.050	0.002	0.622 ✔	1.333	H1-3+VT ✔
L2	47 - 0 (2)	0.012	0.896	0.000	0.040	0.001	0.908 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	100 - 47	Pole	TP40.72x28x0.313	1	-16.396	2019.468	46.7	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-28.609	3171.353	68.1	Pass
							Summary	
						Pole (L2)	68.1	Pass
						RATING =	**68.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 842869 TOWER ID: C_BASELEVEL

BASE LEVEL DRAWING | 1" = 1'-0" | 1

PLOT DATE: 11/6/2015 FILE NAME: 842869_BASELEVEL.dwg
R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK SIS-HOR (LT.2).dwg

CROWN REGION ADDRESS

USA

21/04/14	UPDATED PER WORK ORDER # 780141	JF
23/06/14	UPDATED PER WORK ORDER # 790530	JF
17/10/14	UPDATED PER WORK ORDER # 848509	ALM
17/10/14	UPDATED PER WORK ORDER # 900289	APC
06/11/14	UPDATED PER WORK ORDER # 911337	DMB
17/6/2015	UPDATED PER WORK ORDER 1010256	ELM
25/6/2015	UPDATED PER WORK ORDER 1052084	CRM
6/8/2015	UPDATED PER WORK ORDER 1053749	RMH

DRAWN BY: EJB
CHECKED BY:
DRAWING DATE: 21/04/14

SITE NUMBER:
SITE NAME:

SITE NAME
MERIDEN WEST CENTRAL

BUSINESS UNIT NUMBER
842869

SITE ADDRESS
450-478 WEST MAIN STREET
MERIDEN, CT 06451
COUNTY
USA

SHEET TITLE
BASE LEVEL

SHEET NUMBER
A1-0

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *842869*
Site Name: *Meriden West Central*
App #: *319180 Rev. 1*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2227	ft-kips
Axial:	29	kips
Shear:	31	kips

Anchor Rod Data		
Qty:	20	
Diam:	2.5	in
Rod Material:	Other	
Strength (Fu):	65	ksi
Yield (Fy):	50	ksi
Bolt Circle:	59	in

Plate Data		
Diam:	69	in
Thick:	3	in
Grade:	36	ksi
Single-Rod B-eff:	8.17	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	51.37	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	16	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	89.1 Kips	Rigid
Allowable Tension:	140.4 Kips	Service, ASD
Anchor Rod Stress Ratio:	63.5% Pass	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	17.6 ksi	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	48.9% Pass	0.75*Fy*ASIF
		Y.L. Length: 29.02

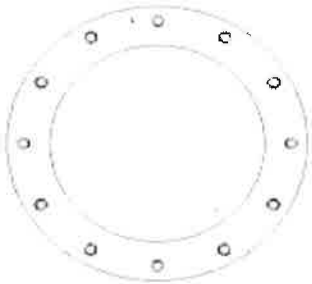
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *842869*
Site Name: *Meriden West Central*
App #: *319180 Rev. 1*

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	29	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	31	kips
Unfactored WL Moment, M:	2227	ft-kips

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	34.8	kips
0.90	0.9D+1.6W, Pu:	26.1	kips
1.35	Vu:	41.85	kips
	Mu:	3006.45	ft-kips

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	2.5	ft
Pad Width=Length, L:	20	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	8	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	64.00	ft^2
Pier Height:	6.00	ft
Soil (above pad) Height:	5.00	ft

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	505.68	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	3323.81	ft-kips

Soil Parameters		
Unit Weight, γ:	110.0	pcf
Ultimate Bearing Capacity, qn:	16.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	30.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	12.00	ksf
Passive Pres. Coeff., Kp	3.00	

Orthogonal Direction:

ecc1 = M1/P1 =	6.57	ft
Orthogonal qu=	3.69	ksf
qu/ϕ*qn Ratio=	**30.74%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	4.65	ft
Diagonal qu=	4.41	ksf
qu/ϕ*qn Ratio=	**36.77%**	**Pass**

Run <-- Press Upon Completing All Input

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	41.9	kips
Pad Force Location Above D:	1.17	ft
ϕ(Passive Pressure Moment):	48.83	ft-kips
Factored O.T. M(WL), "1.6W":	3372.6	ft-kips
Factored OT (MW-Msoil), M1	3323.81	ft-kips

Overturning Stability Check		
0.9D+1.6W Load Combination, Bearing Results:		
(**w/ Soil Wedges**) [Reaction+Conc+Soil]	417.40	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	3081.47	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.89	ft
Sum of Soil Wedges Wt:	42.38	kips
Soil Wedges ecc, K1:	6.35	ft
Ftg+Soil above Pad wt:	392.4	kips
Unfactored (Total ftg-soil Wt):	434.78	kips
1.2D. **No Soil Wedges.**	505.68	kips
0.9D. **With Soil Wedges**	417.40	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Orthogonal ecc3 = M2/P2 =	7.38	ft
Ortho Non Bearing Length,NBL=	14.77	ft
Orthogonal qu=	3.99	ksf
Diagonal qu=	4.57	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2227.00		
M Orthogonal:	2773.84	**80.29%**	**Pass**
M Diagonal:	2773.84	**80.29%**	**Pass**

Project Name:	Meriden West Central	JACOBS® Jacobs Engineering Group, Inc.	Created On: 6/3/2014
Project Number:	BU 842869		Checked By: DW
Job Number:	WO 1149378		Revised On: 3/4/2015
Date:	11/16/2015		Revision No.: 1.6

Monopole Pad & Pier Foundation

Foundation Parameters

Load		
Code	F	
Axial	29	kips
Shear	31	kips
Moment	2212	k-ft
Soil Unit Weight	110	pcf
Friction Angle	30	
Cohesion	0	psf

Material		
Concrete Strength (F'c)	4000	psi
Concrete Density	150	pcf
Rebar Tensile (Fy)	60	ksi
Clear Cover	3	in

Pad		
Thickness	2.5	ft
Bearing Depth	7.5	ft
Width	20	ft
Rebar Size	9	
Rebar Quantity	32	

Pier		
Pier type	Square	
Width	8	ft
Height above Grade	1	ft
Rebar Size	11	
Rebar Quantity	60	
Tie Size	4	
Tie C/C Spacing	12	in

Structural Checks

Pad Beam Shear Capacity	576.2	kips
Pad Beam Shear	279.6	kips
Pad Beam Shear Check	48.5%	Pass

Pad Bending Moment Capacity	3474.9	k-ft
Pad Bending Moment	1211.6	k-ft
Pad Bending Moment Check	34.9%	Pass

Punching Shear Capacity	2330.0	kips
Punching Shear	211.4	kips
Punching Shear Check	9.1%	Pass

Pad-Pier Bearing Capacity	40734.7	kips
Pad-Pier Bearing	505.7	kips
Pad-Pier Bearing Check	1.2%	Pass

Pier Beam Shear Capacity	927.8	kips
Pier Beam Shear	41.9	kips
Pier Beam Shear Check	4.5%	Pass

Pier Bending Moment Capacity	18313.5	k-ft
Pier Bending Moment	3215.2	k-ft
Pier Bending Moment Check	17.6%	Pass

Far Field Approximation
with downtilt variation

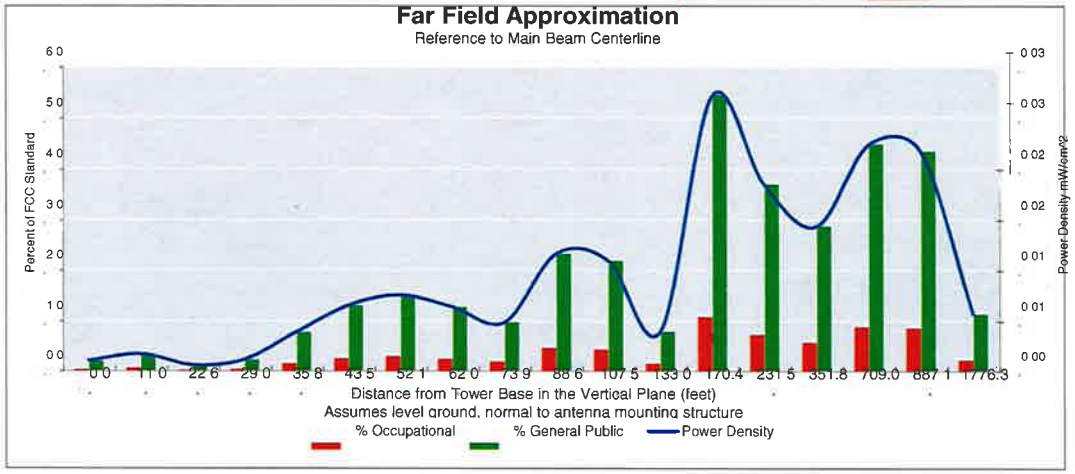
corrected pages

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizon wireless

Location:	MERIDEN HANOVER CT
Site #:	2-168
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-700) xlsx

Operating Freq. (MHz):	746.0
Antenna Height (ft):	65.0
Antenna Gain (dBi):	16.8
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
ERP (W):	1699.0
No. of Channels:	1



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	62.0	63.0	66.0	68.4	71.6	75.7	81.0	87.7	96.5	108.1	124.1	146.8	181.4	239.7	357.2	711.7	889.3	1777.4
Distance from Antenna Structure Base in Horizontal plane	0.0	11.0	22.6	29.0	35.8	43.5	52.1	62.0	73.9	88.6	107.5	133.0	170.4	231.5	351.8	709.0	887.1	1776.3
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	0.00	0.01	0.01	0.00	0.03	0.02	0.01	0.02	0.02	0.01
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.4	0.2	1.1	0.7	0.6	0.9	0.9	0.2
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.3	1.0	2.3	2.2	0.8	5.5	3.7	2.9	4.5	4.4	1.1

Antenna Type: **SBNHH-1D45B**

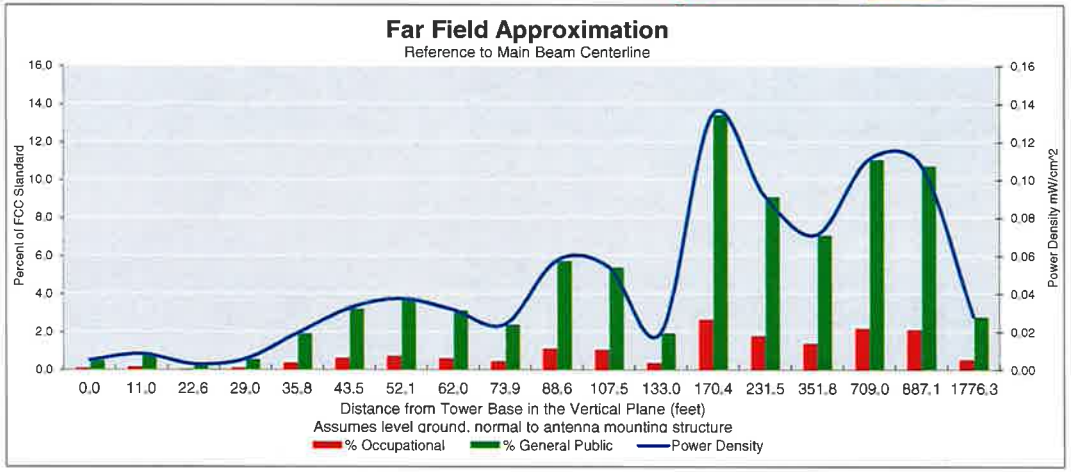
Max%: **5.47%**

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**MERIDEN HANOVER CT**
Site #:	2-168
Date:	12/03/15
Name:	Jaime Laredo
File Name:	MERIDEN HANOVER CT - FF POWER (LTE-AWS).xlsx

Operating Freq. (MHz):	**2145.0**
Antenna Height (ft):	**65.0**
Antenna Gain (dBi):	**20.4**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (W):	**3714.9**
No. of Channels:	**1**



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	62.0	63.0	66.0	68.4	71.6	75.7	81.0	87.7	96.5	108.1	124.1	146.8	181.4	239.7	357.2	711.7	889.3	1777.4
Distance from Antenna Structure Base in Horizontal plane	0.0	11.0	22.6	29.0	35.8	43.5	52.1	62.0	73.9	88.6	107.5	133.0	170.4	231.5	351.8	709.0	887.1	1776.3
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	0.01	0.00	0.01	0.02	0.03	0.04	0.03	0.02	0.06	0.05	0.02	0.13	0.09	0.07	0.11	0.11	0.03
Percent of Occupational Standard	0.1	0.2	0.1	0.1	0.4	0.6	0.7	0.6	0.5	1.2	1.1	0.4	2.7	1.8	1.4	2.2	2.1	0.6
Percent of General Population Standard	0.5	0.8	0.3	0.6	1.9	3.2	3.7	3.2	2.4	5.8	5.4	2.0	13.5	9.1	7.1	11.1	10.7	2.8

Antenna Type: **SBNHH-1D45B**

Max%: **13.46%**