



56 Prospect Street
P.O. Box 270
Hartford, CT 06141-0270

John R. Morissette
Project Manager - Transmission Siting

February 10, 2015

Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Dear Chairman Stein:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") is filing the attached original and two (2) copies of a Notice of Exempt Modification for modifications to an existing wireless communications facility located on Bald Hill Road in Union, Connecticut. Eversource is requesting a determination that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to this existing wireless communication facility in Union. Also attached is a check for the filing fee in the amount of \$625.

The First Selectman of the Town of Union and the property owner of record have been provided a copy.

Sincerely,

A handwritten signature in blue ink, appearing to read "John R. Morissette".

John R. Morissette
Project Manager – Transmission Siting

Enclosures:

- Exempt Modification Notice
- CENTEK Engineering Report Summary
- Engineering drawing #23556
- C-Squared RF Emissions Report
- Antenna Structure Registration #1008224

cc: Mr. Albert L. Goodhall, Jr., First Selectman of Union
Ms. Jean Rickey, Mt. Ochepetuck LLC

THE CONNECTICUT LIGHT AND POWER COMPANY DOING BUSINESS AS EVERSOURCE ENERGY

NOTICE OF EXEMPT MODIFICATION OF A TELECOMMUNICATIONS FACILITY IN THE TOWN OF UNION, CONNECTICUT

I. Introduction

Pursuant to the Regulations of Connecticut Agencies section 16-50j-72(b), The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") hereby gives notice to the Connecticut Siting Council (the "Council") and the town of Union of its intent to make an exempt modification to an existing wireless communications facility located on Bald Hill Road, in Union, CT (41°-58'-27"N, 72°-11'-56"W). Specifically, Eversource plans to install two new antennas on the existing tower at this location. Under the Council's regulations (RCSA Sec. 16-50j-72(b), Eversource's plans do not constitute a modification that is subject to Council review because Eversource will not change the height of the tower, will not extend the boundaries of the roughly 7500 square foot compound, will not increase the noise levels at the site and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

II. Background

Eversource currently owns a 180-foot tall steel lattice tower, which was erected in 1994 on property owned by Mt. Ochepetuck, LLC on Bald Hill Road in Union, CT (the "Tower"). The Tower has been in continual use supporting Eversource's 2-way radio communication antennas. Including its top-mounted antennas, this telecommunications facility is approximately 195-feet tall.

Eversource recently employed CENTEK Engineering ("CENTEK") to conduct an analysis of the Tower to determine its structural loading capabilities. The results of this analysis indicate that the Tower in its current state complies with the TIA/EIA-222-F standard as it relates to tower loading, as required by the Connecticut General Statutes. An enclosed document contains a summary of the results of the structural analysis completed by CENTEK.

III. Proposed Modifications

An engineering drawing that depicts the existing facility and shows the proposed additions (please see R.E. Dwg.: 23556) is enclosed. Eversource proposes to install one 8-foot diameter microwave dish at 130 feet above ground and one 6-foot diameter microwave dish at 90 feet above ground. Both microwave antennas will aim toward the north. They will be mounted to the tower leg with standard 4.5" OD x 63" pipe-to-leg mounts. An ice bridge (approximately 12 feet above ground and 23 feet long) is required to protect the lateral waveguide runs from the Tower to the existing radio building. The CENTEK study also indicates that 2 whip antennas that are currently centered at 106 feet and 69 feet elevations will be replaced with a single, double-stacked antenna with center elevation of 178 feet. The antenna will be mounted on an existing 6 foot side-arm. This work will be done while the antenna contractor is installing the two new microwave dishes, but it does not add any new transmitters to the site.

The proposed additions of antennas and the ice bridge will be contained entirely within the existing compound and will not require the addition of any water or sanitary facilities. Other than the ice bridge, no external modifications will be made to the equipment shelters at this site. After construction is complete, the proposed installation would not generate any additional traffic other than for periodic maintenance visits.

The nearest residence is approximately 1125 feet northwest of the facility. No wetlands or habitats were identified near the facility. The Westford Airstrip is approximately 9,820 feet from the facility. Due to the proximity to the airstrip, a Federal Aviation Authority Obstruction Evaluation was performed and the structure was registered with the Federal Communications Commission ("FCC"), Registration #1008224. A copy of the tower registration is enclosed.

The visual impact of the modification will be minimal. The Tower cannot be seen from the road due to the tall trees lining the street and on all sides of the facility.

Radio-signal emissions from the existing and proposed equipment at this site do not exceed the total radio-frequency ("RF") electromagnetic power-density level permitted by the FCC. To ensure compliance with the applicable standard, Eversource hired C-Squared Systems to perform an analysis of the proposed additions combined with existing power density levels. The study was performed in accordance with FCC guidelines amended in August 1997 by OET Bulletin 65 Edition 97-01. The study results indicated that the new addition would add 1.58% of the Maximum Permissible Exposure ("MPE") level for public exposure (see Table 1 of the report, last line). Combined with existing levels, the entire facility would not exceed 24% of the MPE level for public exposure. The analysis is enclosed. Note that only the microwave antenna to be added at 130 feet elevation will be used for transmitting and the microwave antenna to be added at 90 feet will only receive signal.

Installation of the new antennas and the ice bridge will not begin until early spring 2015 because the antennas are long lead-time items. It is anticipated that all construction will be completed by the end of April 2015.

Eversource respectfully submits that the proposed plan to (1) add two new antennas to the Tower and (2) replace two existing antennas on the Tower with a single, double-stacked antenna, does not constitute a modification subject to the Council's jurisdiction.

Communications regarding this Notification of Exempt Modification should be directed to:

Mr. John R. Morissette
Project Manager, Transmission Siting
Eversource Energy
PO Box 270
Hartford, CT 06141-0270
Telephone: 860-728-4532

EVERSOURCE ENERGY

By:  _____

John Morissette
Project Manager - Transmission Siting

December 19, 2014

Mrs. Dorothy Wrona
IT Telecommunications Engineering
Northeast Utilities Service Company
Building NUE2, 2nd Floor
107 Selden Street
Berlin, CT 06037

Re: *Structural Certification Letter*
Northeast Utilities System ~ Union
Bald Hill Road
Union, CT 06076

Centek Project No. 14249.000

Dear Mrs. Wrona,

Centek Engineering has been authorized by Northeast Utilities System to perform a structural analysis of the proposed antenna installation on the existing 180-ft self-support lattice tower structure at the above referenced site. The results of the analysis are summarized in this letter. Refer to structural analysis prepared by Centek; Job. No. 14249.000, dated September 23, 2014 signed and sealed by Timothy Lynn, PE (CT PE License No. 29336) for detailed calculations.

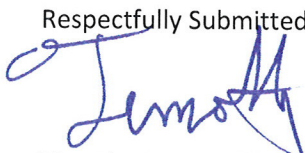
Per Section 3108 of the Connecticut State Building Code, the TIA/EIA-222-F "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" governs the structural design for this project. Additionally, Section 3108.4.2 of the CSBC requiring foundations and anchorages to resist two times the calculated wind load must also be satisfied.

The proposed antenna installation meets the requirements of the TIA/EIA-222-F Standard and NU SUB-090 considering the basic wind speed (fastest mile) of 85 mph for Tolland County which controls over the 2005 Connecticut State Building Code basic wind speed (fastest mile) of 77.5 mph for Union (equivalent to 95 mph 3-second gust wind speed as required in Appendix K of the Connecticut supplement per Table 1609.3).

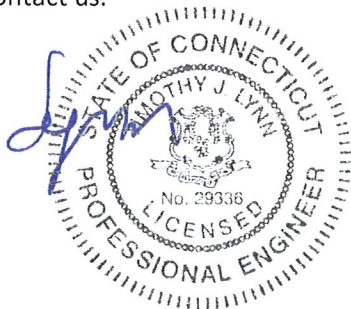
The maximum tower steel usage ratio is **0.885 (88.5%)** considering a one third increase in allowable stress as permitted by ANSI TIA-222-F. The foundation was found to be in conformance with Section 3108.4.2 of the 2005 Connecticut State Building Code.

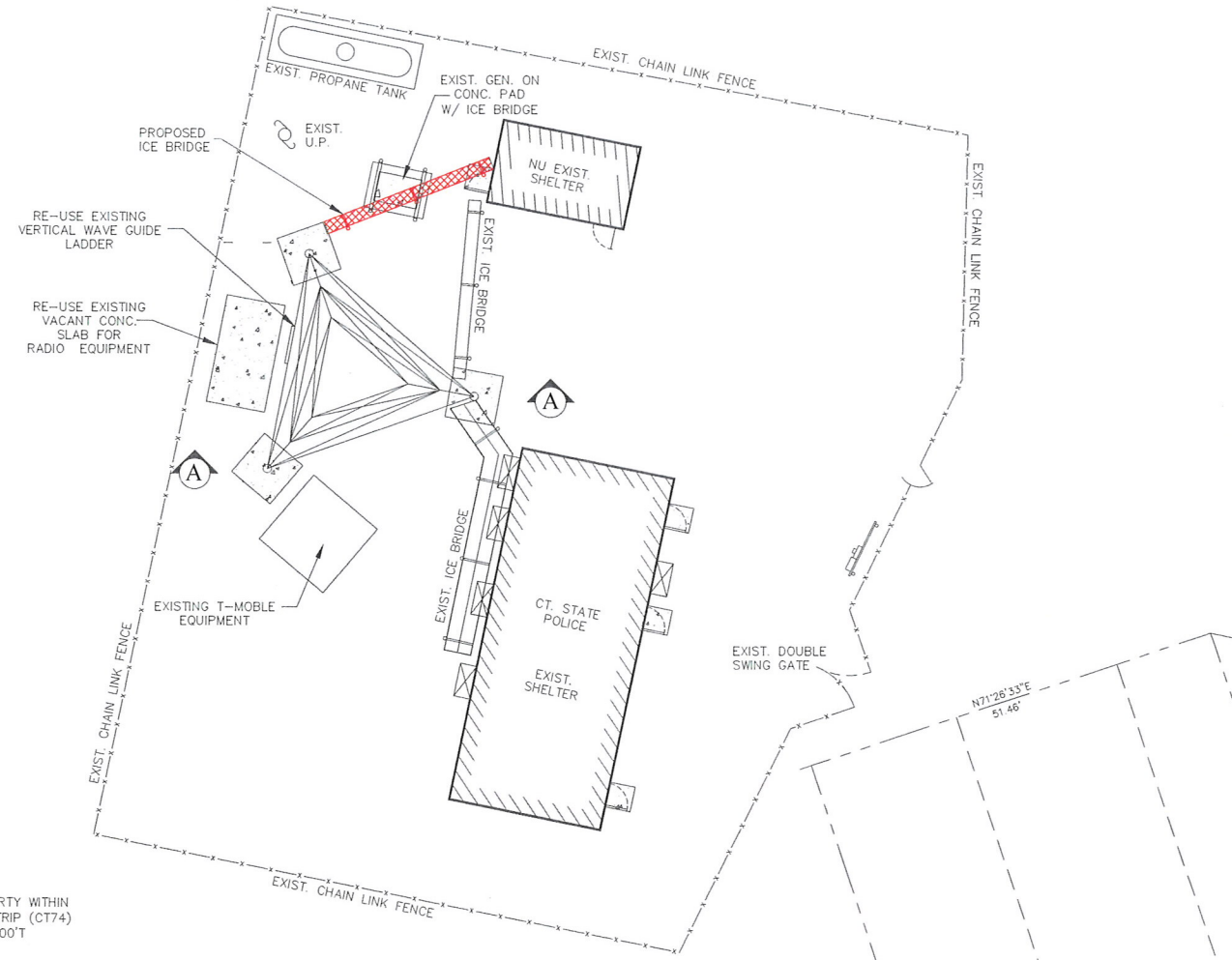
Based on our structural analysis the proposed installation is in conformance with the applicable structural requirements of the State Building Code. Should you have any questions, please do not hesitate to contact us.

Respectfully Submitted by:

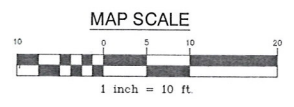


Timothy J. Lynn, PE
Structural Engineer

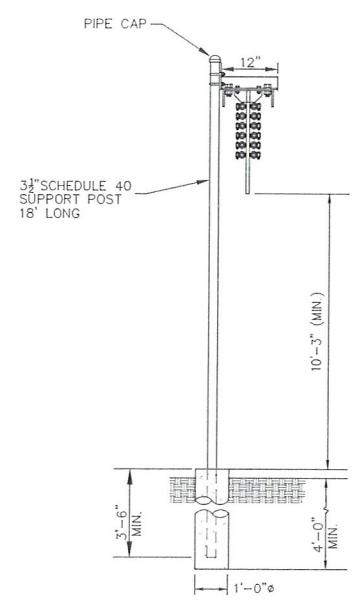




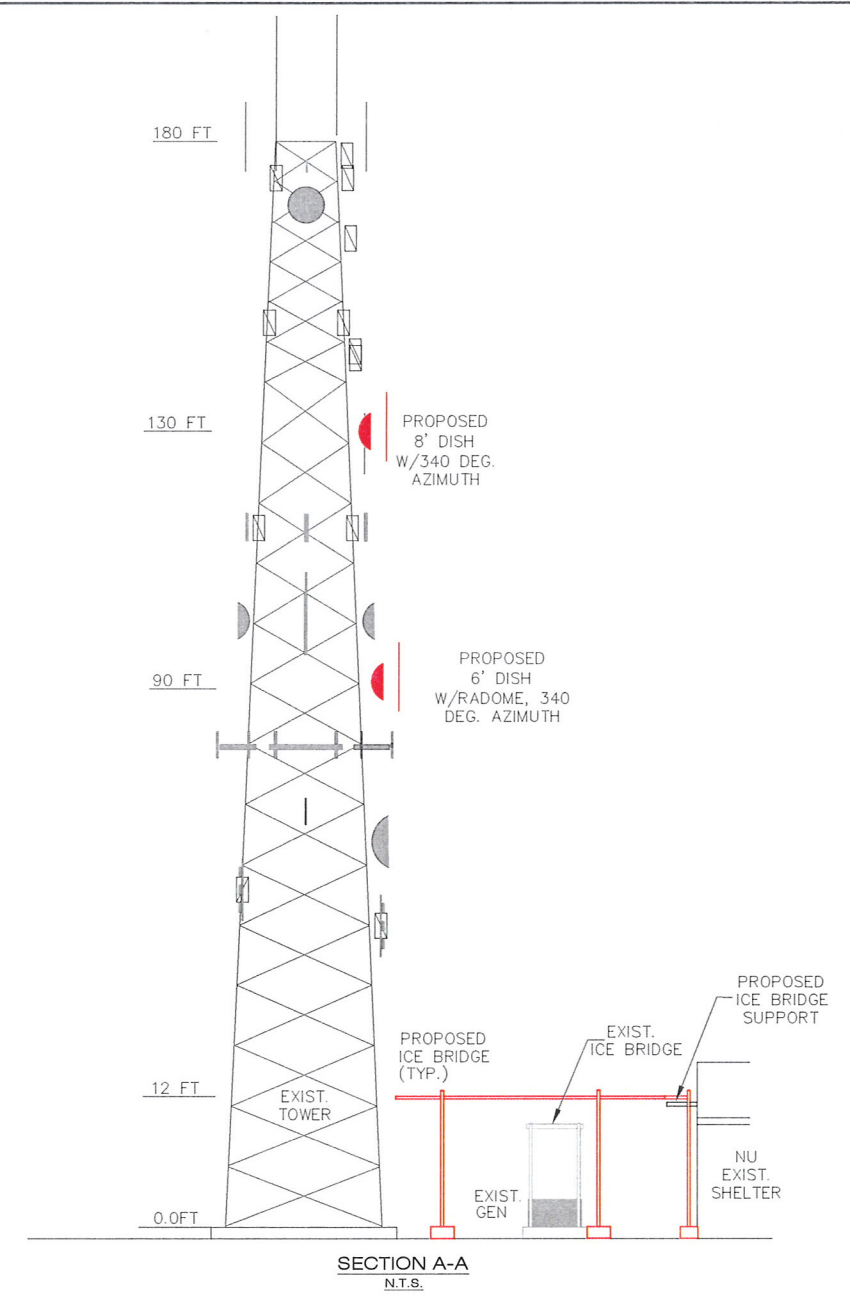
SUBJECT PROPERTY WITHIN WESTFORD AIRSTRIP (CT74) HELIPORT, R=5000'T



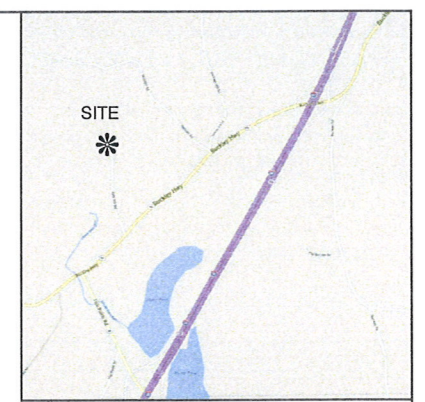
SITE PLAN



SECTION ICE BRIDGE TRAY
(2) ICE BRIDGE KIT IB12D-216D
SCALE: N.T.S.



SECTION A-A
N.T.S.



LOCUS MAP
N.T.S.

		Northeast Utilities Service Co. FOR THE CONNECTICUT LIGHT & POWER COMPANY	
TITLE: MICROWAVE TOWER SITE PLAN BALD HILL ROAD UNION, CT.			
BY: FMG	CHKD: SAS	APP: APP	DATE: DATE
DATE: 12-4-2014	DATE: 12-4-2014	DATE: DATE	DATE: DATE
H-SCALE: 1"=10'	SIZE: ARCH D	SURVEY JOB #:	
V-SCALE:	V.S.: CAD	R.E.DWG.: 23556	
R.E. PROJ. NUMBER: 145-02-007	NUSCD:		



C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report



**Northeast
Utilities**

Union

Bald Hill Road, Union, CT 06076

October 13, 2014

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for Northeast Utilities' proposed additions to the existing lattice tower located off Bald Hill Road in Union, CT. The coordinates of the tower are 41° 58' 27.09" N, 72° 11' 56.15" W.

Northeast Utilities is proposing the following:

- 1) Install one transmit/receive 6 GHz microwave dish;
- 2) Install one receive only 6 GHz microwave dish.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final site configuration.

4. Calculation Results

Table 1 below outlines the power density information for the site. The proposed Northeast Utilities microwave dish has a very narrow beamwidth which causes the majority of the RF power to be focused out towards the horizon, with respect to the vertical plane. As a result, there will be less RF power directed below the antenna relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed Northeast Utilities dish. The calculated results for Northeast Utilities in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antenna.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	%MPE
Antenna 1 (CSP)	176	6700	1	9939	0.0003	1.0000	0.03%
Antenna 2 (CSP)	100	6700	1	9939	0.0005	1.0000	0.05%
Antenna 3 (CSP)	180	866.8625	5	200	0.0016	0.5779	0.28%
Antenna 5 (CSP)	180	867.075	5	200	0.0016	0.5781	0.28%
Antenna 7 (CSP)	180	867.0125	5	200	0.0017	0.5780	0.29%
Antenna 9 (NEU)	145	37.8	1	100	0.0002	0.2000	0.12%
Antenna 10 (NEU)	137	154.4638	1	100	0.0009	0.2000	0.43%
Antenna 11 (NEU)	137	153.695	1	250	0.0021	0.2000	1.07%
Antenna 12 (NEU)	110	6700	1	9939	0.0005	1.0000	0.05%
Antenna 13 (NEU)	110	6700	1	9939	0.0005	1.0000	0.05%
Antenna 15 (NEU)	180	952	1	50	0.0001	0.6347	0.01%
Antenna 16 (NEU)	125	48.4	1	100	0.0003	0.2000	0.16%
Antenna 17 (TOU)	120	46	1	100	0.0004	0.2000	0.18%
Antenna 18 (CSP)	100	6700	1	9939	0.0005	1.0000	0.05%
MetroPCS	80	1945	3	727	0.1225	1.0000	12.25%
Voicestream	117	1930	N/A	N/A	0.0118	1.0000	1.18%
AT&T	80	1945	4	250	0.0562	1.0000	5.62%
Northeast Utilities	130	6100	1	7413	0.0158	1.0000	1.58%
						Total	23.67%

Table 1: Carrier Information^{1 2}

¹ The power density information for carriers other than Northeast Utilities was taken directly from the CSC database dated 9/5/2014. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

² The antenna height listed for the proposed microwave dish is in reference to documents provided by Northeast Utilities received on September 8, 2014.

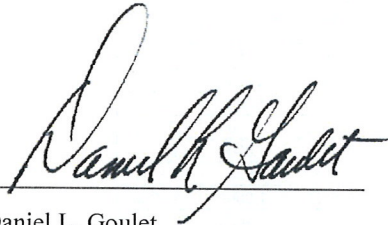
5. Conclusion

The above analysis verifies that RF emissions from the site, after the proposed modifications have been completed, will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed and existing transmit antennas is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **23.67% of the FCC General Population/Uncontrolled limit.**

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the final site configuration.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet
C Squared Systems, LLC

October 13, 2014

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure³

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure⁴

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

³ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

⁴ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

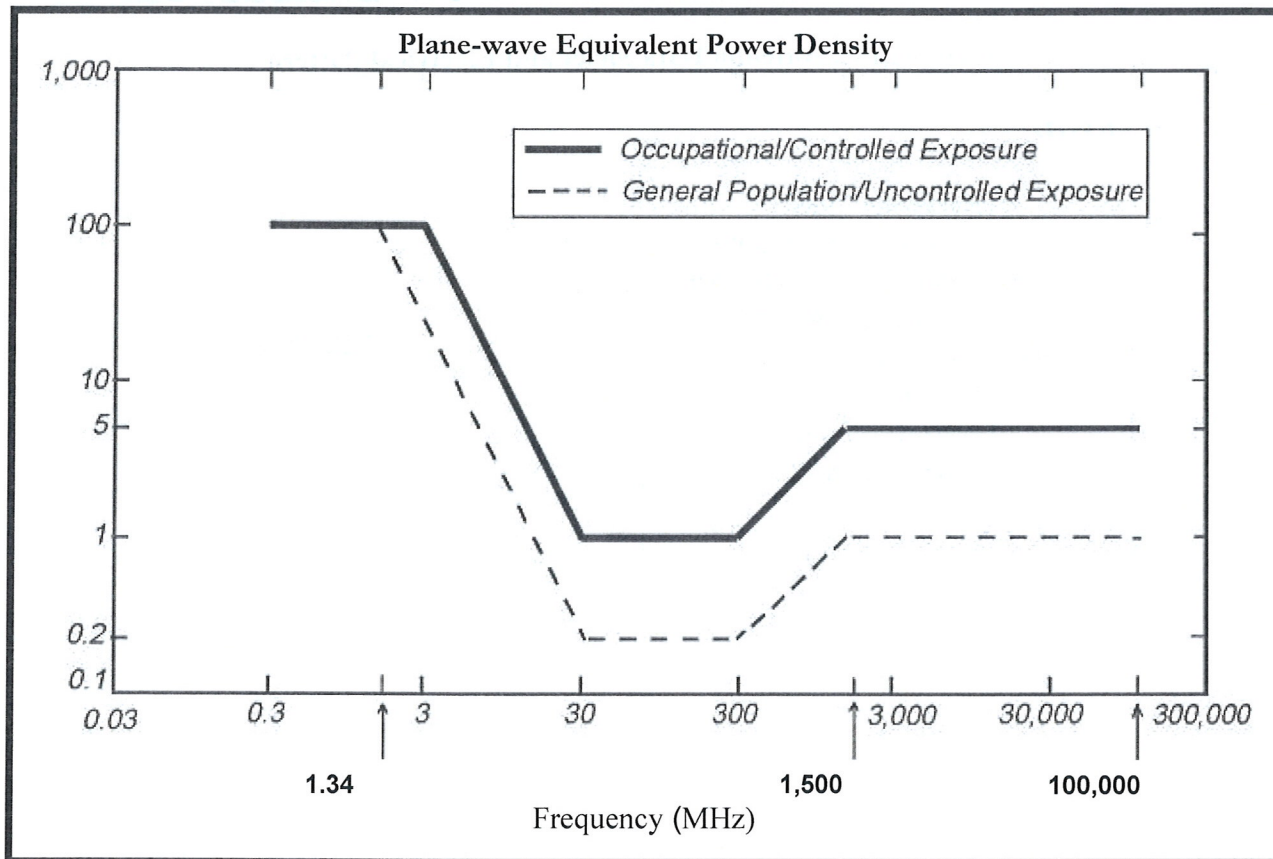
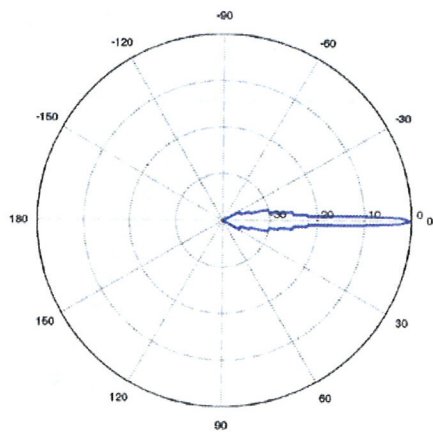


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Antenna Data Sheet and Electrical Pattern

6 GHz

Manufacturer: RFS
Model #: PADX8-W57AC
Frequency Band: 5725-6875 MHz
Gain: 39.1 dBd
Vertical Beamwidth: 1.3°
Horizontal Beamwidth: 1.3°
Polarization: Dual
Diameter: 8"





**UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
ANTENNA STRUCTURE REGISTRATION**



OWNER: NORTHEAST UTILITIES SERVICE COMPANY

FCC Registration Number (FRN): 0003583721

ATTN: TELECOM MANAGER NORTHEAST UTILITIES SERVICE COMPANY PO BOX 270 HARTFORD, CT 06141-0270	Antenna Structure Registration Number 1008224
	Issue Date 11-13-2014
Location of Antenna Structure BALD HILL RD UNION, CT County: TOLLAND	Ground Elevation (AMSL) 383.7 meters
	Overall Height Above Ground (AGL) 59.4 meters
Latitude 41-58-27.1 N	Longitude 072-11-56.2 W
Center of Array Coordinates N/A	Overall Height Above Mean Sea Level (AMSL) 443.1 meters
Painting and Lighting Requirements: NONE	Type of Structure LTOWER Lattice Tower
Conditions:	

This registration is effective upon completion of the described antenna structure and notification to the Commission. **YOU MUST NOTIFY THE COMMISSION WITHIN 24 HOURS OF COMPLETION OF CONSTRUCTION OR CANCELLATION OF YOUR PROJECT, please file FCC Form 854.** To file electronically, connect to the antenna structure registration system by pointing your web browser to <http://wireless.fcc.gov/antenna>. Electronic filing is recommended. You may also file manually by submitting a paper copy of FCC Form 854. Use purpose code "NT" for notification of completion of construction; use purpose code "CA" to cancel your registration.

The Antenna Structure Registration is not an authorization to construct radio facilities or transmit radio signals. It is necessary that all radio equipment on this structure be covered by a valid FCC license or construction permit.

You must immediately provide a copy of this Registration to all tenant licensees and permittees sited on the structure described on this Registration (although not required, you may want to use Certified Mail to obtain proof of receipt), and display your Registration Number at the site. See reverse for important information about the Commission's Antenna Structure Registration rules.

You must comply with all applicable FCC obstruction marking and lighting requirements, as set forth in Part 17 of the Commission's Rules (47 C.F.R. Part 17). These rules include, but are not limited to:

- **Posting the Registration Number:** The Antenna Structure Registration Number must be displayed in a conspicuous place so that it is readily visible near the base of the antenna structure. Materials used to display the Registration Number must be weather-resistant and of sufficient size to be easily seen at the base of the antenna structure. Exceptions exist for certain historic structures. See 47 C.F.R. 17.4(g)-(h).
- **Inspecting lights and equipment:** The obstruction lighting must be observed at least every 24 hours in order to detect any outages or malfunctions. Lighting equipment, indicators, and associated devices must be inspected at least once every three months.
- **Reporting outages and malfunctions:** When any top steady-burning light or a flashing light (in any position) burns out or malfunctions, the outage must be reported to the nearest FAA Flight Service Station, unless corrected within 30 minutes. The FAA must again be notified when the light is restored. The owner must also maintain a log of these outages and malfunctions.
- **Maintaining assigned painting:** The antenna structure must be repainted as often as necessary to maintain good visibility.
- **Complying with environmental rules:** If you certified that grant of this registration would not have a significant environmental impact, you must nevertheless maintain all pertinent records and be ready to provide documentation supporting this certification and compliance with the rules, in the event that such information is requested by the Commission pursuant to 47 C.F.R. 1.1307(d).
- **Updating information:** The owner must notify the FCC of proposed modifications to this structure; of any change in ownership; or, within 30 days of dismantlement of the structure.

Copies of the Code of Federal Regulations (which contain the FCC's antenna structure registration rules, 47 C.F.R. Part 17) are available from the Government Printing Office (GPO). To purchase CFR volumes, call (202) 512-1800. For GPO Customer Service, call (202) 512-1803. For additional FCC information, consult the Antenna Homepage on the internet at <http://wireless.fcc.gov/antenna> or call (877) 480-3201 (TTY 717-338-2824).