

STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

IN RE: :  
: :  
APPLICATION OF HOMELAND TOWERS, : DOCKET NO. 467  
LLC AND CELLCO PARTNERSHIP D/B/A :  
VERIZON WIRELESS FOR A CERTIFICATE :  
OF ENVIRONMENTAL COMPATIBILITY AND :  
PUBLIC NEED FOR THE CONSTRUCTION OF :  
A WIRELESS TELECOMMUNICATIONS :  
FACILITY AT 100 POCONO ROAD, :  
BROOKFIELD, CONNECTICUT : JULY 14, 2016

**RESPONSES OF HOMELAND TOWERS, LLC  
AND CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS  
TO CONNECTICUT SITING COUNCIL PRE-HEARING QUESTIONS**

On June 30, 2016, the Connecticut Siting Council (“Council”) issued Pre-Hearing Questions to Homeland Towers, LLC (“Homeland”) and Cellco Partnership d/b/a Verizon Wireless (“Cellco”) (collectively the “Applicant”), relating to the above-captioned docket. Below are the Applicant’s responses.

**Question No. 1**

Were return receipts received for each abutting landowner identified in the application? If not, list the abutters that did not receive notice and describe any additional effort to serve notice. When was the abutter list compiled?

**Response**

The abutters list was compiled on May 25, 2016. As of the date of this filing, the Applicant has received return receipts from 15 of the 18 abutting landowners notified. Return receipts were not received from Marcus S. Sharpe, Richard J. Hagley or Walter E. Hagley. A second notice letter was sent to each of these abutters on July 8, 2016 by regular mail. Copies of

the supplemental notice letters are included in Attachment 1. On July 12, 2016, legal Counsel for the Applicant received a call from abutting owner, Marcus Sharpe. Mr. Sharpe confirmed that he had received the second notice letter and that he did not object to the tower proposal.

Question No. 2

Does Cellco intend to install and operate all of the equipment necessary to serve the wireless frequencies identified on Application page 11 as part of the initial construction of the facility or does Cellco intend to install and operate some of this equipment at a later date?

Response

Initially, Cellco will deploy its LTE services (700 MHz and 2100 MHz) only at the Brookfield South cell site. Cellco's 1900 MHz frequencies would be added as necessary to meet future network capacity demands.

Question No. 3

Are all of the identified frequencies used to transmit voice and data services? Are all frequencies LTE capable? Please explain the use of each in Cellco's wireless network.

Response

Until recently, Cellco was generally utilizing its 850 MHz and 1900 MHz frequencies to transmit CDMA voice services and data services and its 700 MHz and 2100 MHz frequencies to transmit long-term evolution (LTE) data services only. In 2015, Cellco launched LTE voice services to those customers who may have purchased new wireless equipment and devices. Ultimately, Cellco hopes to transition all of its voice and data services to its LTE platform.

Question No. 4

What is the service level threshold for which Cellco designs its system? Is the threshold the same for each frequency?

Response

Cellco designs its LTE network using a 120 dB Reverse Link Operational Path Loss (“RLOPL”) standard. For its CDMA service, Cellco’s minimum design threshold signal strength is -85 dBm for in-vehicle service and -75 dBm for in-building service.

Question No. 5

What is the length of the existing service gaps for Cellco's baseline frequencies on Rt. 7, Rt. 202, Rt. 25, and Rt. 133?

Response

<b>Roadways</b>	<b>700 MHz</b>	<b>850 MHz</b>	<b>1900 MHz</b>	<b>2100 MHz</b>
Route 7	2.5 miles	2.8 miles	3.6 miles	3.6 miles
Route 202	1.25 miles	1.75 miles	3.2 miles	2.9 miles
Route 25	0.8 miles	1.0 miles	2.0 miles	2.3 miles
Route 133	1.0 miles	1.1 miles	3.2 miles	3.0 miles

Question No. 6

Can wireless service objectives be met by installing several small cells in the identified service area?

Response

Technically, it is possible that a series of small cell installations could provide wireless service to the area around the Brookfield South cell site. The actual number of small cell facilities that would be needed to provide coverage comparable to that from the proposed Brookfield South facility is not known but would be significant given the overall size of the area that Cellco is attempting to serve. Also, it would be difficult to penetrate some of the dense residential areas near the proposed Brookfield South Facility using small cells as it may require the installation of antennas on private residential lots and/or multi-family complexes. The use of

a macro-cell tower site, as proposed in this Application, presents the most efficient and cost effective means of enhancing wireless service in this area.

Question No. 7

When was the search area for this proposed facility issued?

Response

Homeland began its search for a site in the Brookfield area in November of 2011, and reached out to the Town about the possibility of installing a tower behind the Fire House. Verizon issued its own search area for the Brookfield South facility in February of 2014.

Question No. 8

Will the proposed facility support text-to-911 service? Is additional equipment required for this purpose? Is Cellco aware of any Public Safety Answering Points in the area of the proposed site that are able to accept text-to-911?

Response

Yes, the proposed facility will be capable of supporting text-to-911 service as soon as the Public Safety Answering Point (PSAP) is capable of receiving text-to-911. The applicant is not aware of any PSAPs in the Brookfield area and none in Connecticut that currently have the equipment to support such service.

Question No. 9

Provide power density values in accordance with methodology prescribed in the FCC Office of Engineering and Technology Bulletin No. 65E, Edition 97-01 (August 1997) for the proposed Town communication antennas.

Response

Included in Attachment 2 is a Calculated Radio Frequency Emissions Report for Cellco's and Town of Brookfield's antennas at the Brookfield South Facility.

Question No. 10

Is there an emergency power source for the Town communications equipment? Is it feasible to install a shared emergency generator at the site for both Cellco's and the Town's equipment?

Response

Currently, the Town of Brookfield has no plans to install a back-up generator at the tower site. Homeland does not provide back-up power to its tenants at any of its tower sites. As mentioned in the Application, Cellco intends to install a 10 kW propane generator to provide back-up power to its equipment. It is feasible that a properly sized generator at this site could provide back-up power to Cellco's and the Town's radio equipment.

Question No. 11

What is the projected run time of Cellco's emergency generator assuming normal cell loading?

Response

Under normal operating conditions the generator will not run at all. If commercial power to the facility is interrupted the 15 KW diesel generators, with its 54 gallon fuel tank, can run for approximately 53 hours at full power before refueling is required. At times of "normal cell loading" (approximately 60% of full load) the generator can run for approximately 60 to 65 hours before refueling is required.

Question No. 12

Is the site located within an Aquifer Protection Area? If so, what additional precautions are necessary to protect groundwater resources?

Response

No. The Site is not located within or proximate to an Aquifer Protection Area and therefore no additional precautions are necessary to protect groundwater resources.

Question No. 13

Would blasting be required to develop the site?

Response

Homeland does not anticipate the need for blasting to construct the proposed facility. If the site is approved by the Council, Homeland will commission a full geo-technical study to determine the nature of subsurface conditions to determine, more definitively, whether blasting is required.

# **ATTACHMENT 1**

KENNETH C. BALDWIN

280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

Also admitted in Massachusetts

July 8, 2016

Marcus S. Sharpe  
103 Pocono Road  
Brookfield, CT 06804

Re: **Docket No. 467 – Cellco Partnership d/b/a Verizon Wireless  
Proposed Telecommunications Facility at 100 Pocono Road  
Brookfield, Connecticut**

Dear Mr. Sharpe:

On June 2, 2016, the attached notice letter was sent to you, certified mail return receipt requested. I have not, to date, received a return receipt nor have I received the letter back indicating that the notice remains unclaimed. In an excess of caution and to ensure that you receive some notice of the above-referenced filing, I am sending this notice letter to you by regular mail.

If you have any questions regarding the Verizon Wireless application please contact me. Copies of the full Siting Council application are available for review at the Siting Council's office in New Britain, on the Siting Council's web site ([www.ct.gov/csc](http://www.ct.gov/csc)) or at Brookfield Town Hall.

Sincerely,



Kenneth C. Baldwin

KCB/kmd  
Attachment

15008155-v1



June 2, 2016

**Via Certified Mail Return Receipt Requested**

Marcus S. Sharpe  
103 Pocono Road  
Brookfield, CT 06804

**Re: Cellco Partnership d/b/a Verizon Wireless – Proposed Telecommunications Facility  
at 100 Pocono Road, Brookfield, Connecticut**

Dear Mr. Sharpe:

Homeland Towers, LLC and Cellco Partnership d/b/a Verizon Wireless (“Cellco”) will be submitting an application to the Connecticut Siting Council (“Council”) on or about June 6, 2016, for approval of the construction of a telecommunications facility in the Town of Brookfield, Connecticut.

The proposed facility would consist of a new 150-foot monopole tower in the southerly portion of an approximately 43.28 acre parcel at 100 Pocono Road in Brookfield. Cellco will install twelve (12) antennas and nine (9) remote radio heads on a platform at the top of the tower. Radio equipment associated with Cellco’s antennas and associated equipment and a natural gas-fueled back-up generator would be installed on a 12’ x 30’ steel platform at the base of the tower. Access to the facility would extend from Pocono Road along an existing gravel and paved driveway a distance of approximately 730 feet to the cell site. Site plan drawings for the proposed facility are attached for your review. The location and other features of the proposed facilities are subject to change under the provisions of Connecticut General Statutes § 16-50g et seq.

State law provides that owners of record of property which abuts a parcel on which a facility is proposed to be located must receive notice of the submission of this application. This notice is directed to you either because you may be an abutting land owner or as a courtesy notice.

# Robinson + Cole

June 2, 2016

Page 2

If you have any questions concerning the application, please direct them to either the Connecticut Siting Council or me. My address and telephone number are listed above. The Siting Council may be reached at its New Britain, Connecticut office at (860) 827-2935.

Very truly yours,

A handwritten signature in black ink, appearing to read "Kenneth C. Baldwin". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kenneth C. Baldwin

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July 8, 2016

Richard J. Hagley  
101 Pocono Road  
Brookfield, CT 06804

Re: **Docket No. 467 – Cellco Partnership d/b/a Verizon Wireless  
Proposed Telecommunications Facility at 100 Pocono Road  
Brookfield, Connecticut**

Dear Mr. Hagley:

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Sincerely,



Kenneth C. Baldwin

KCB/kmd  
Attachment

15008161-v1

June 2, 2016

**Via Certified Mail Return Receipt Requested**

Richard J. Hagley  
101 Pocono Road  
Brookfield, CT 06804

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at 100 Pocono Road, Brookfield, Connecticut**

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July 8, 2016

Walter E. Hagley  
88 Pocono Road  
Brookfield, CT 06804

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Proposed Telecommunications Facility at 100 Pocono Road  
Brookfield, Connecticut**

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Kenneth C. Baldwin

KCB/kmd  
Attachment

15008162-v1

June 2, 2016

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Walter E. Hagley  
88 Pocono Road  
Brookfield, CT 06804

**Re: Cellco Partnership d/b/a Verizon Wireless – Proposed Telecommunications Facility  
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Attachment



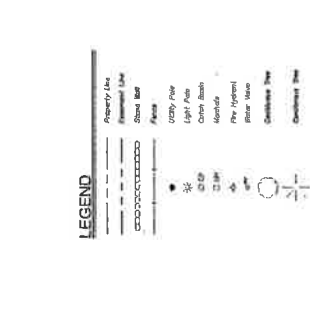






**GENERAL NOTES**

1. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED. THE BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY CONDUCTED BY THE ENGINEER AND THE "TOWN OF BROOKFIELD" RECORD MAP, VOLUME 137, PAGE 1144, AS SHOWN ON SHEET 1144 OF SAID RECORD MAP, DATED 08/27/2018.
2. THIS PLAN COMPLIES WITH THE REQUIREMENTS OF THE CONNECTICUT DEPARTMENT OF CONSTRUCTION, DIVISION OF PLANNING AND ZONING, AS SET FORTH IN THE ZONING REGULATIONS, TITLE 19-C, SUBTITLE 19-C-1, SECTION 19-C-1-1, AND THE ZONING REGULATIONS, TITLE 19-C, SUBTITLE 19-C-2, SECTION 19-C-2-1, AND THE ZONING REGULATIONS, TITLE 19-C, SUBTITLE 19-C-3, SECTION 19-C-3-1.
3. THE PLAN SHALL BE CONSIDERED TO BE A PRELIMINARY PLAN AND SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL OF THE TOWN OF BROOKFIELD. THE TOWN OF BROOKFIELD RESERVES THE RIGHT TO REVOKE OR MODIFY THIS PLAN AT ANY TIME WITHOUT NOTICE.
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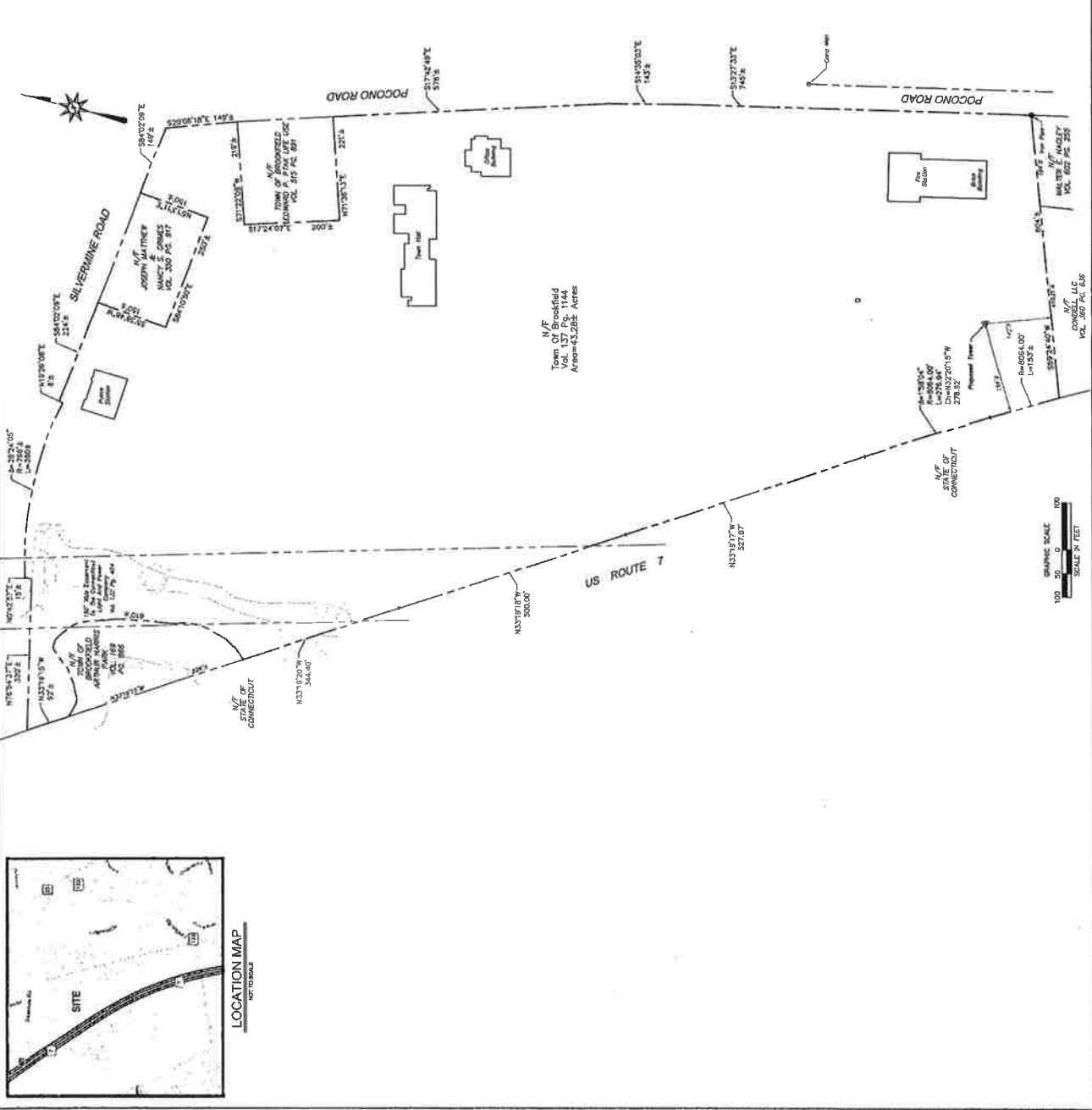
THIS PLAN IS FOR INFORMATION ONLY AND DOES NOT CONSTITUTE A CONTRACT. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE TOWN OF BROOKFIELD AND THE STATE OF CONNECTICUT. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY DELAYS OR COSTS INCURRED BY THE CLIENT IN OBTAINING SUCH PERMITS AND APPROVALS.



N/T  
 Town of Brookfield  
 Vol. 137, Page 1144  
 08/27/2018



CONVEYOR, LLC  
 100 POCONO ROAD  
 BROOKFIELD, CT 06007



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CONVEYOR, LLC  
 100 POCONO ROAD  
 BROOKFIELD, CT 06007











# **ATTACHMENT 2**





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

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Calculated Radio Frequency Emissions Report



Brookfield South CT

100 Pocono Road, Brookfield, CT 06804

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July 13, 2016

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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of a monopole tower to be located at 100 Pocono Road in Brookfield, CT. The Town of Brookfield and Verizon Wireless are both proposing to collocate on the new tower. The coordinates of the tower will be 41° 27' 46.89" N, 73° 23' 53.68" W.

## 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 ( $\text{mW}/\text{cm}^2$ ). 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:

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

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 patterns

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. 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 outlines the power density information for the site. Due to the directional nature of the panel antennas in use by Verizon Wireless and the microwave dishes in use by the Town of Brookfield, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below these antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachments C and D for the vertical patterns of each operator's antennas. The calculated results shown in Table 1 for Verizon Wireless and the Town of Brookfield microwave dishes include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas. No off-beam pattern loss was used for the Town of Brookfield 150MHz omnidirectional antennas.

In addition to the antennas listed below, the Town of Brookfield plans to install one additional omnidirectional antenna at a centerline of 75.0' AGL. This antenna will be used to receive only and is therefore not included in the calculations.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm <sup>2</sup> )	Limit	%MPE
Town of Brookfield	160.4	154.80	1	398	0.0056	0.2000	2.78%
Town of Brookfield	160.4	159.09	1	398	0.0056	0.2000	2.78%
Town of Brookfield	160.4	155.6025	1	398	0.0056	0.2000	2.78%
Town of Brookfield	150	4900	1	141	0.0002	1.0000	0.02%
Town of Brookfield	60	4900	1	141	0.0014	1.0000	0.14%
Verizon LTE	140	751	1	2625	0.0048	0.5007	0.96%
Verizon LTE	140	1900	1	4669	0.0086	1.0000	0.86%
Verizon LTE	140	2100	1	4669	0.0086	1.0000	0.86%
						<b>Total</b>	<b>11.18%</b>

**Table 1: Carrier Information<sup>1 2</sup>**

<sup>1</sup> The nominal 10 dB off-beam loss factor for Verizon Wireless and the Town of Brookfield was derived from the specific antennas for this site and their associated antenna patterns, which are presented in Attachments C and D. Antenna models for Verizon Wireless are based on the New Build Antenna Recommendation, dated January 30, 2014. Antenna models for the Town of Brookfield are based on information supplied by the Town's communications contractor, Northeast Communications.

<sup>2</sup> 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.

## 5. Conclusion

The above analysis verifies that emissions from the final site configuration will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. The highest expected percent of Maximum Permissible Exposure at the base of the tower is **11.18% of the FCC Uncontrolled/General Population limit.**

As noted in the introduction, 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/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet  
C Squared Systems, LLC

July 13, 2016

Date

## Attachment A: References

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

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE Std C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

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

**(A) Limits for Occupational/Controlled Exposure<sup>3</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	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 Exposure<sup>4</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	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)**

<sup>3</sup> 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.

<sup>4</sup> 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.



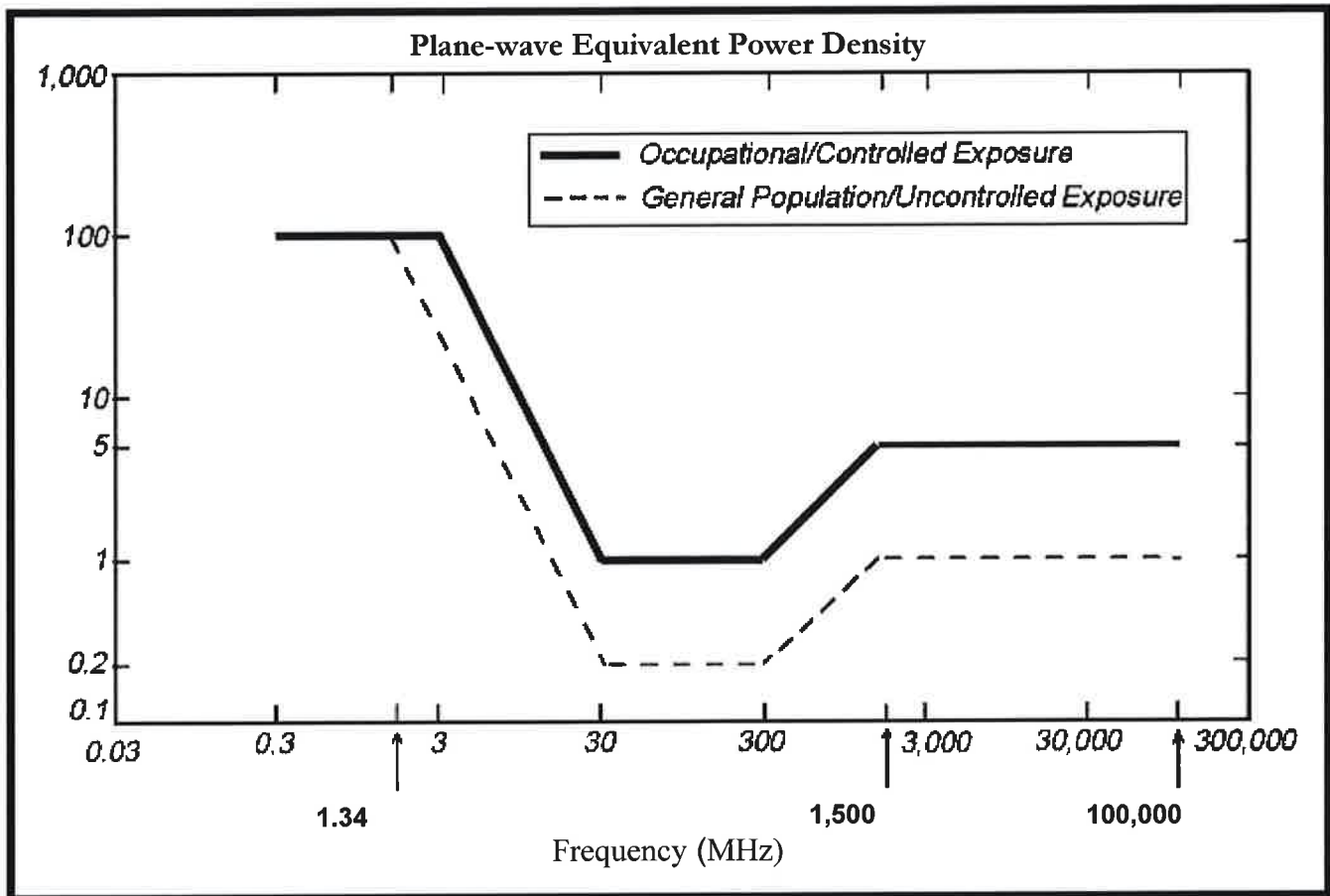
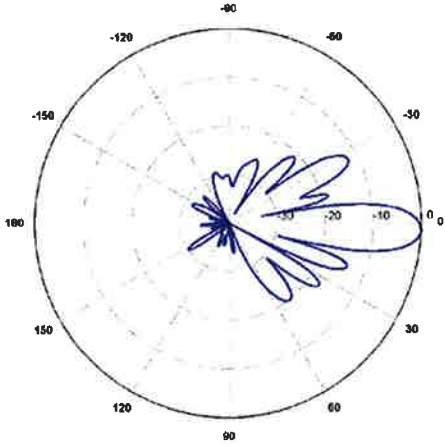
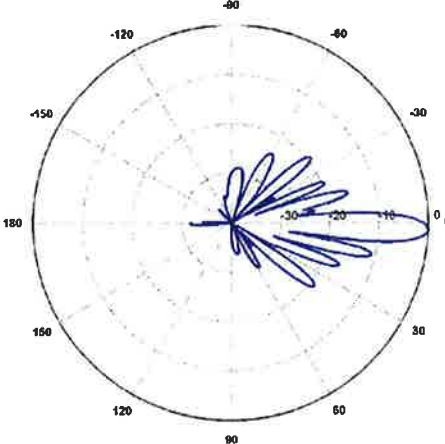
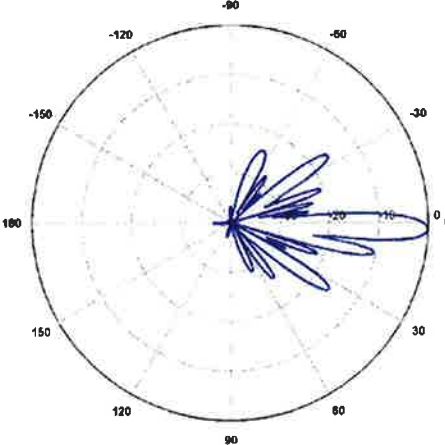
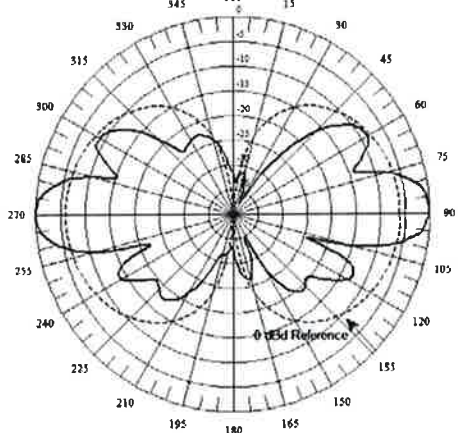
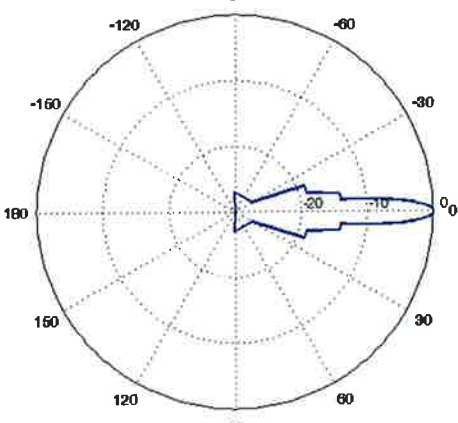


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: Verizon Wireless Antenna Model Data Sheets and Electrical Patterns**

<p><b>751 MHz LTE</b></p> <p>Manufacturer: Kathrein            Model #: 80010735V01_2            Frequency Band: 698-806 MHz            Gain: 13.4 dBd            Vertical Beamwidth: 11.3°            Horizontal Beamwidth: 67°            Polarization: ±45°            Size L x W x D: 76.1" x 11.9" x 3.9"</p>	
<p><b>1900 MHz LTE</b></p> <p>Manufacturer: Commscope            Model #: HBXX-6516DS-A2M_2            Frequency Band: 1850-1990 MHz            Gain: 15.9 dBd            Vertical Beamwidth: 7.0°            Horizontal Beamwidth: 66°            Polarization: ±45°            Size L x W x D: 51.1" x 12.0" x 6.5"</p>	
<p><b>2100 MHz LTE</b></p> <p>Manufacturer: Commscope            Model #: HBXX-6516DS-A2M_2            Frequency Band: 1920-2180 MHz            Gain: 15.9 dBd            Vertical Beamwidth: 6.6°            Horizontal Beamwidth: 64°            Polarization: ±45°            Size L x W x D: 51.1" x 12.0" x 6.5"</p>	

**Attachment D: Town of Brookfield Antenna Model Data Sheets and Electrical Patterns**

<p><b>150 MHz</b></p> <p>Manufacturer: dbSpectra          Model #: DS1G06F36U-D          Frequency Band: 160-174 MHz          Gain: 6.0 dBd          Vertical Beamwidth: 16°          Horizontal Beamwidth: 360°          Polarization: Single          Length: 249.6"</p>	 <p>A polar plot showing the radiation pattern for a 150 MHz antenna. The plot is circular with a grid of concentric circles representing gain levels (0, -10, -20, -30, -40, -50, -60 dBd) and radial lines representing angles from 0 to 360 degrees in 15-degree increments. The radiation pattern is a single, broad lobe centered at 0 dBd, with a vertical beamwidth of 16 degrees. A dashed circle indicates the 0 dBd reference level.</p>
<p><b>4900 MHz</b></p> <p>Manufacturer: Radiowaves          Model #: SPD2-4.7          Frequency Band: 4400-5000 MHz          Gain: 24.5 dBd          Vertical Beamwidth: 7.1°          Horizontal Beamwidth: 7.1°          Polarization: Dual          Diameter: 24.0"</p>	 <p>A polar plot showing the radiation pattern for a 4900 MHz antenna. The plot is circular with a grid of concentric circles representing gain levels (0, -10, -20, -30, -40, -50, -60 dBd) and radial lines representing angles from 0 to 180 degrees in 30-degree increments. The radiation pattern is a very narrow, directional beam centered at 0 dBd, with a vertical beamwidth of 7.1 degrees. A dashed circle indicates the 0 dBd reference level.</p>