

November 30, 2023

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

Re: **Notice of Exempt Modification – Facility Modifications
Cellco Partnership d/b/a Verizon Wireless**

P2P Project – 426 River Road, Willington, Connecticut

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently holds a license, issued by the Federal Communications Commission (“FCC”), to provide wireless communications services in the 28 GHz frequency range. To meet its FCC license requirements for frequency use and deployment, Cellco plans to deploy a new, “Point to Point” (“P2P”) 28 GHz microwave system at numerous cell sites in Connecticut. Initially, these frequencies will help Cellco maintain certain security systems currently used to monitor cell site equipment. This notice pertains to the P2P system that will be deployed at Cellco’s existing cell site at 426 River Road in Willington, Connecticut (the “Willington West Cell Site”). The existing tower was approved by the Town of Willington (“Town”) in September of 2000. Cellco’s shared use of the site was approved by the Siting Council in May of 2015 (PE1133-VER-20150327). A copy of the Town’s approval and Council’s PE1133-VER-20150327 approval are included in Attachment 1.

To establish the referenced P2P system, Cellco will install two (2) point to point microwave dish antennas on the roof of the existing equipment shelter at the Willington West Cell Site. Unlike the broadcast antennas on the tower, the P2P dish antennas will communicate only with each other. Shelter-mounted dish antennas will be installed at opposite ends of the shelter roof, approximately 20 feet apart, at a height of approximately twelve (12) feet above grade. The antennas would be attached to a non-penetrating ballast-mounted antenna mast. A copy of the Proposed Shelter View, antenna mount illustration and dish antenna specifications are included in Attachment 2.

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

Robinson+Cole

Melanie A. Bachman, Esq.
November 30, 2023
Page 2

R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Willington's Chief Elected Official and Land Use Officer. A copy of this letter is being sent to the owner of the Property.

The planned modifications to the listed facilities 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. The proposed 28 GHz antennas will be installed on roof of the shelter at the cell site, approximately twelve (12) feet above grade.
2. The proposed modifications 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 installation of the 28 GHz antennas will not increase radio frequency ("RF") emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Included in Attachment 3 is a Calculated Radio Frequency Emissions Report verifying that RF emissions from the Willington West Cell Site with the P2P system installed will comply with the FCC Standards.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. According to the August 14, 2023, letter from Dewberry Engineers Incorporated, Cellco's existing shelter can support the proposed 28 GHz antenna installations. A copy of the Dewberry letter is included in Attachment 4.

A Certificate of Mailing verifying that this filing was sent to the municipal officials and the property owner for each location is included in Attachment 5.

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:

Peter Tanaka, First Selectman
Michael D'Amato, Zoning Agent
Willington Fire Department, Property Owner
Aleksy Tyurin, Verizon Wireless

ATTACHMENT 1

TOWN OF WILLINGTON
PLANNING AND ZONING COMMISSION

SPECIAL PERMIT

Date: 9/26/2000

This is to certify that the use: **Monopole Antenna Tower and Support Building for Wireless Communications Facility** located on **426 River Road** Assessors Map **34**, lot **10**, Zone **R80** has been approved with conditions by the Willington Planning and Zoning Commission on **8/15/2000** pursuant to **Section 13** of the Town of Willington Zoning Regulations, which findings are on file with the Commission.

Owner of Record: Willington Fire Department #1


Agent

Conditions:

- 1) Prior to the start of construction, any FCC and FAA approvals shall be provided to the zoning agent.
- 2) As stated at the public hearing, the applicant shall agree to comply with any technical revisions suggested by the town engineer and/or the zoning agent, and updated drawings to reflect those revisions shall be provided.
- 3) The driveway shall meet zoning regulations, as they may be waived by the zoning agent.
- 4) The elevation of the top of any antenna shall not exceed 642 feet above sea level.
- 5) The exterior lighting switch shall be arranged so any exterior lighting is not on all the time, but rather only when required by workers.
- 6) All easements shall be depicted on the final site plan
- 7) A gate shall be provided on the northeast access road at the location of the barbed wire fence.

Received for record October 25, 2000
At: Libby Ann Marie R

Applicant should obtain a copy of the Zoning Regulations which detail specific requirements.

TOWN OF WILLINGTON
Planning and Zoning Commission
40 Old Farms Road, Willington, CT 06279

Application for: Special Permit X Amendment Site Plan Approval Modification

Location of property: 426 River Road, Willington, Connecticut 06279

Assessors Map #: 34 Assessors Lot #: 10 Existing Zone: R-80 Area of property: 12.6 acres

Historical District Certificate of Appropriateness is attached to this application (if applicable): N/A

Special Permit Requested: Construction of monopole and support building

Names, addresses and telephone numbers of owner/owners:

Willington Fire Department, Inc. #1 c/o Chief Tyler Millix, P.O. Box 161
426 River Road, Willington, Connecticut 06279 (860-429-0288)

Name, address and telephone number of petitioner if other than owner:

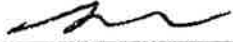
N/A

Description of existing and proposed use of land and buildings:


Existing use: Willington Fire Department, Inc. facility

Proposed use: Construction of a monopole and support building for a wireless communications facility and improvements to existing access driveway pursuant to Sections 7.06.04 and 7.06.04.06 of the zoning regulations.

Please submit with this application form all data and maps required in Section 13 of the Zoning Regulations. The undersigned owner(s) of the property hereby authorizes the Planning and Zoning Commission or their agent to enter and inspect premises at any reasonable hour.

Signature of owner(s):  Date: May 12, 2000
Tyler Millix, Chief
Willington Fire Dept., Inc. #1 Date: _____

I/we the undersigned petitioner(s) understand that the submission of inaccurate or incomplete information shall be grounds for denial of this application by the P.Z.C.

Signature(s):  Date: May 12, 2000
Tyler Millix, Chief
Willington Fire Dept., Inc. #1 Date: _____

*List of property owners within five hundred (500) feet of subject property
A: SPECIAL attached hereto as Exhibit A.



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

May 11, 2015

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **PE1133-VER-20150327** – Cellco Partnership d/b/a Verizon Wireless sub-petition for a declaratory ruling for approval of an eligible facility request for modifications to an existing telecommunications facility located at 426 River Road, Willington, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby approves your Eligible Facilities Request (EFR) to install antennas and associated equipment at the above-referenced facility pursuant to the Federal Communications Commission Wireless Infrastructure Report and Order, with the following conditions:

- The tower shall be modified in accordance with the recommendations noted in Section 4.1 of the structural analysis report prepared by AeroSolutions LLC, dated January 30, 2015 and stamped by Shraddha Dharia;
- Within 45 days following completion of the equipment installation, Cellco shall provide documentation certified by a professional engineer that its installation complied with the recommendations of the structural analysis;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed; and
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by the Petitioner shall be removed within 60 days of the date the antenna ceased to function.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the EFR dated March 27, 2015.

Thank you for your attention and cooperation.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/MP

c: Honorable Christina Beebe Mailhos, First Selectman, Town of Willington
Susan Yorgensen, Planning-Zoning/Wetlands Agent, Town of Willington

ATTACHMENT 2

Proposed shelter view



- Rohn Non-Penetrating Roof mount (not quoted HW/Logistics per RFP)
- 30-inch mast
- Quick assembly
- 8 blocks @ 32lbs = 256 lbs of ballast (TBD)
- Cable management will consist of
 - Zip ties
 - Angle adaptors with snap-ins
 - PVC pipe runs across roof top
 - Possible Fiberbond chase (still being reviewed)



- Hatch plate to be used
- Existing grounding points
- No new penetrations
 - Roof or walls
- Indoor
 - Existing rack power
 - 2 x 10amp
 - Existing cable trays



Technical Specifications
WTM 4100
ANSI with A2C+ Operation

General Specifications

General

Frequency Bands	5 - 38 GHz	
Physical Configurations	1+0, 2+0 ACCP (via A2C+), 2+0 XPIC (via external OMT)	
Modulation and Coding	<i>Fixed or Adaptive</i>	QPSK to 4096 QAM / Hittless AM
Channel Sizes	3.75, 5, 10, 20, 25, 30, 40, 50, 60, 80 and 100 MHz	
Capacity (standard single channel)	<i>Airlink Capacity</i>	up to 918 Mbit/s*
Capacity (A2C mode)	<i>Airlink Capacity</i>	up to 1836 Mbit/s*
Encryption	256-bit AES Payload Encryption	
Design Tools	<i>Recommended Supported</i>	Aviat Design™ on aviatcloud.com (includes MIMO, Multi-band) Pathloss 5 (basic support only)

Power Supply

Voltage	<i>DC</i>	±20 to 57V
	<i>PoE</i>	48Vdc (44 to 58Vdc)
Consumption	50 Watts nominal	
	65 Watts maximum	

Physical

Size (h-w-d), including antenna interfaces	11.5in x 10.5in x 4in (295mm x 270mm x 95mm)	
Weight, including antenna interfaces	12lbs (5.5 kg)	
Operating Temperature	<i>Guaranteed</i>	-27 to +131°F (-33° to +55°C)
	<i>Extended</i>	-49 to +159°F (-45° to +65°C) ^[1]
Humidity	<i>Guaranteed</i>	100%
Altitude	<i>Guaranteed</i>	15,000 ft (4500m)

Standards Compliance

EMC	FCC CFR 47, Part 15, ICES-003	
Operation	EN 300 019-2-4, Class 4.1	
Safety	UL 60950-1, UL 60950-22, UL 62368-1	
RF Performance	FCC CFR 47, Part 101	
	<i>All Federal Frequencies</i>	Manual of Regulations for Federal Radio Frequency Management
Maximum Permissible Exposure	EN 50385	
Water Ingress	IEC 60529, IP66	
Lightning Protection	Internal, compliant to IEC 61000-4-5, Class 5	
Security	FIPS 197 validated (Certificate A980)	

Transmitter / Receiver

Transmitter

Transmit Power Tolerance	5-28 GHz	± 2.0 dB
	38 GHz	± 2.5 dB
Transmitter Source	Synthesized	
Frequency Stability	± 5 ppm	
Manual Transmitter Power Control Range	Configurable in 0.1 dB steps from min to max power levels	
Automatic Transmitter Power Control Range	Configurable over the 20dB attenuation range	
	<i>Resolution / Speed</i>	0.1 dB steps / 50dB/s
Synthesizer Resolution	250 KHz	
Transmitter Mute	> 50 dB	

*[1] See notes in last page

Transmitter / Receiver

Receiver		
Receiver Source		Synthesized
Frequency Stability		± 5 ppm
Receiver Overload	<i>BER = 1E-6</i>	-20 dBm
Residual (Background) Bit Error Rate		Better than 1E-13
RSSI Accuracy ¹	-30 to -70 dBm, -27 to +131°F (-33° to +55°C)	Better than ± 2.5dB
	-20 to -30 dBm, -27 to +131°F (-33° to +55°C)	Better than ± 3.5dB
	-20 to -30 dBm, -49 to +149°F (-45° to +65°C)	Better than ± 4.5dB

Networking

CE/L2	
Switch capability	50 Gbps non-blocking
Quality of Service (QoS)	8 COS, Scheduling, Policing, Storm Control, Shaping
QoS Mapping	PCP (802.1p), DSCP, H-QoS
VLANs	IEEE 802.1Q and IEEE 802.1ad (Q-in-Q)
Spanning Tree	Rapid and multiple protocols (RSTP, MSTP)
Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
Congestion Avoidance	WRED, per queue Packet Buffer – 180 Mbyte
Jumbo frames	Up to 9600 bytes
Synchronisation	
Precision Time Protocol	IEEE 1588v2 TC or BC

General Specifications

Interfaces		
Traffic	<i>2x fixed RJ45</i>	10/100/1000BT Electrical
	<i>2x optional SFP</i>	1, 2.5 & 10Gbps speeds, both Optical (Single and Multi-mode) and Electrical
Power	<i>Direct</i>	24Vdc or 48Vdc
	<i>Power over Ethernet</i>	Via 10/100/1000BT Electrical port
USB support	<i>Management</i>	Local setup, sw/fw upgrade, config backup via Wifi
Wireless connection		Dual voltmeter pins
RSSI		
Management		
Local Management		Configuration save & load
		Wireless USB dongle to support Wifi
		Aviat OS software upgrade
Event Capture		Event and Alarm capture, time stamp and logging
Statistics		RMON 1 Ethernet and radio performance statistics
Network Management		SNMPv2c ProVision or MIB interface support
		IPv4 addressing with an In-Band Management VLAN. Telnet or SSH access Aviat Cloud – Manage Advanced
Clock		Simple Network Time Protocol (SNTP V4), embedded real time clock

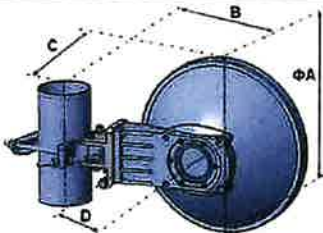
*1 See notes in last page



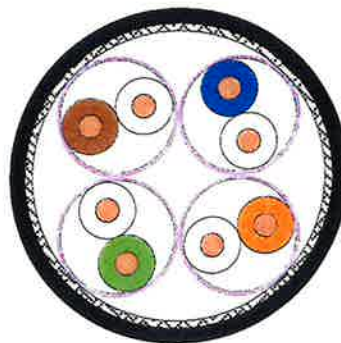
Microwave Antenna Specifications

SLA0328S3S49A20
0.3m Ultra High Performance Antenna
Flange Type Rectangular



Electrical Specifications					
Frequency (GHz)	27.5~29.5				
Polarization	Single(V or H)				
Gain , Low(dBi)	37.7				
Gain, Mid(dBi)	38				
Gain, Top(dBi)	38.3				
Beam Width	2.0°				
Cross-pol. Discrimination_XPD (dB)	30				
F/B Ratio (dB)	64				
VSWR / RL (dB)	1.3/17.7				
Regulatory Compliance	ETSI EN 302217 Range 4 Class 3				
Mechanical Specifications					
Diameter (m)	0.3				
Antenna Color	Cool Gray 1C				
Radome Options	Foam				
Interface Type	UBR320 OR Customized				
Side Struts, Included	0				
Azimuth Adjustment	Coarse : 360 ° Fine : ±15 °				
Elevation Adjustment	Fine : ±15 °				
Diameter of Mounting Pole (mm)	Φ51~Φ114				
Wind Velocity Survival Rating (km/h)	252				
Wind Velocity Operational (km/h)	200				
Ice-load (mm)	25.4				
Operational Temperature (°C)	-45~+60				
Packaging	Carton				
L×W×H (mm)	480*480*267				
Wind Load Specifications					
Axial Force (N) @ survival wind speed	444				
Side Force (N) @ survival wind speed	219				
Twisting Moment (N•m) @ survival wind speed	141				
	Dimensions (mm)	ΦA	B	C	D
		386	318	137	180
Note: 1. The values of B and C are measured at the pole diameter of 114mm 2. The thickness of the radome is not included in the dimensions of A and C					

02YSCH 4X2X0.62/1.5-100 PIMF BK Cat 6A



Design:

Wire

Bare copper wire (22AWG)
Insulation of foamed Polyethylene (PE) with skin

Ø 0.62 mm (0,024 in dia)
Ø 1.50 mm (0,059 in dia)

Screened pair

2 wires twisted to a pair
Alulaminat foil overlapped, applied longitudinally

Core:

4 screened pairs
Sequence of colors: WH/BL, WH/OR, WH/GN, WH/BR
Shield braiding of tinned copper wires
Coverage about 80%

Jacket:

Thermoplastic copolymer (FRNC)BK
Wall thickness about 0.80 mm

Ø (8.8±0.3) mm (0.346 ±0.012 in dia)

Inkjet -marking: "sequential length in metres" LEONI L * S/FTP CAT 6A SOLID CABLE 22AWG 4PR
"internal lot number"

Electrical data at 20° C

Coductor resistance	≤	65	Ohm/km
Insulation resistance	≥	5	GOhm*km
Capacitance (1kHz)		46	pF/m
Phase delay		460	ns/100 m
Skew at 100 MHz		10	ns/100 m
Characteristic impedance 100 MHz		100±10	Ohm
Operating voltage (peak)		125	V
Test voltage		1000	V

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ATTACHMENT 3



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

Calculated Radio Frequency Emissions Report



Willington West CT
426 River Road, Willington, CT 06279

November 28, 2023

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of Verizon's 28 GHz microwave antenna to be mounted at 12' AGL on roof of the equipment shelter located at 426 River Road in Willington, CT. The coordinates of the monopole tower are 41° 53' 26.37" N, 72° 17' 23.48" W.

Verizon is proposing the following:

- 1) Install one (1) 28 GHz point-to-point microwave system.

This report considers the planned¹ antenna configuration for Verizon as well as existing antenna configuration for AT&T², T-Mobile³, Unknown Carrier⁴ and Verizon⁵ to derive the resulting % MPE of its proposed installation.

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/cm²). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment C 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 C 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.

¹ As referenced to Verizon's Far Field Calculation sheet updated 06/07/2023 included in Attachment D.

² As referenced to AT&T's Connecticut Siting Council Notice of Exempt Modification – 426 River Road, Willington, Connecticut, dated December 15, 2017

³ As referenced to T-Mobile's Connecticut Siting Council Notice of Exempt Modification – 426 River Road, Willington, Connecticut, dated June 01, 2022

⁴ As referenced to T-Mobile's Connecticut Siting Council Notice of Exempt Modification – 426 River Road, Willington, Connecticut, dated June 01, 2022

⁵ As referenced to Verizon's Radio Frequency Design Sheet (RFDS), dated October 7, 2021

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:

$$\text{Power Density} = \left(\frac{\text{GRF}^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

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

Off Beam Loss is determined by the selected antenna patterns

Ground reflection factor (GRF) of 1.6

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. 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 installations.

4. Antenna Inventory

Table 1 below outlines Verizon's existing antenna configuration for the site. The associated data sheets and antenna patterns for these specific antenna models are included in Attachment C.

Operator	Sector	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)	
Verizon	Alpha	750	160	13.2	3343	NNH4-65A-R6	72	0	4.59	83	
		850	160	13.8	3838		63				
		1900	160	14.7	4722		14.7				
		2100	240	14.8	7248		14.8				
		3700	200	25.5	70963	MT6407-77A	-				0
	Beta	750	160	13.2	3343	SBNHH-1D65B	72	0	4.59	83	
		850	160	13.8	3838		63				
		1900	160	14.7	4722		14.7				
		2100	240	14.8	7248		14.8				
		3700	200	25.5	70963	MT6407-77A	-				0
	Gamma	750	160	13.2	3343	SBNHH-1D65B	72	0	4.59	83	
		850	160	13.8	3838		63				
		1900	160	14.7	4722		14.7				
		2100	240	14.8	7248		14.8				
		3700	200	25.5	70963	MT6407-77A	-				0
	P2P		28000	0.2	38	1287	SLA0328S3S49A20	2.0	0	1	12

Table 1: Proposed Antenna Inventory

5. Calculation Results

The calculated power density results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.

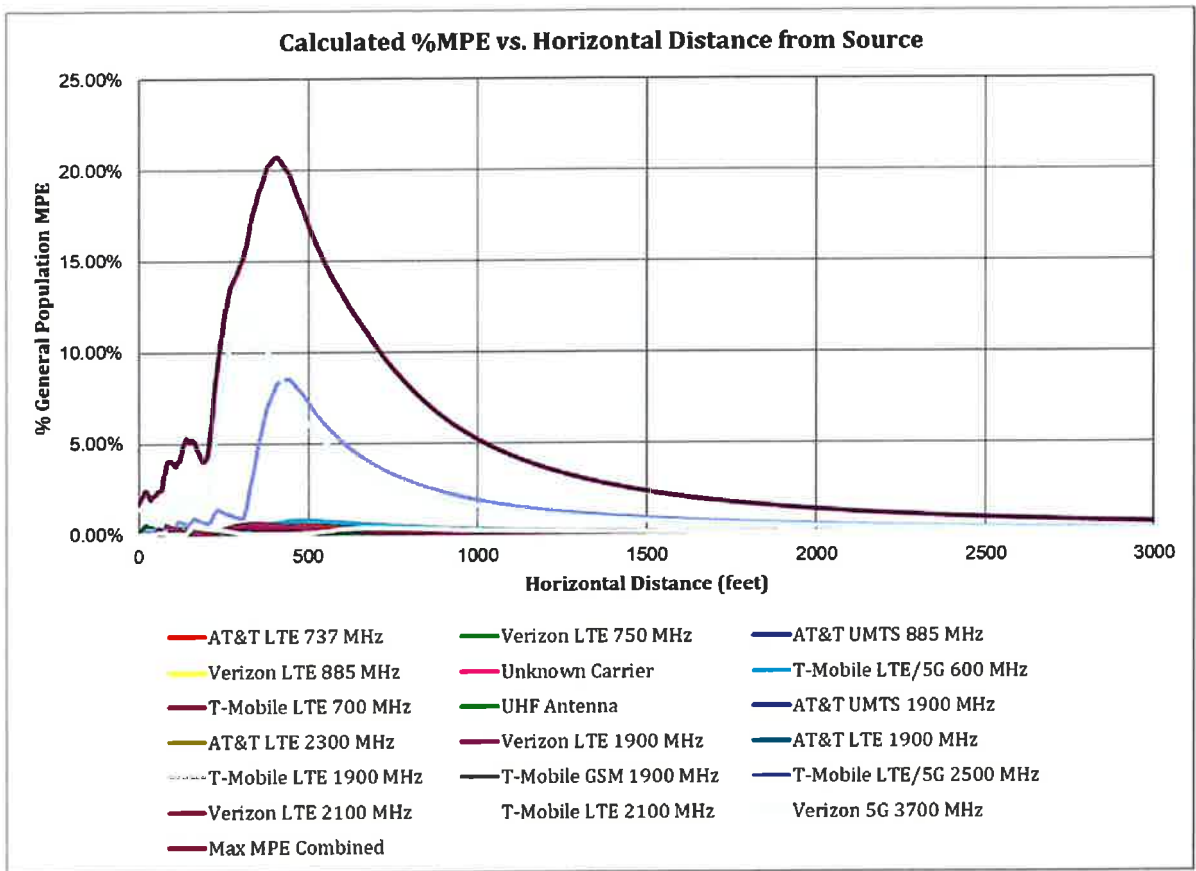


Figure 1: Graph of General Population % MPE vs. Distance

The highest combined value for % MPE for existing emitters (20.73% of the General Population limit) is calculated to occur at a horizontal distance of 407 feet from antennas. The maximum %MPE generated by the proposed 28 GHz microwave system is 0.12% and occurs at the distance of 344 feet. While the peak % MPE generated by the proposed 28 GHz microwave system does not occur at the same point as the peak cumulative %MPE for all existing emitters, as a very conservative calculation of the total %MPE, we add the 20.73% predicted at 407 feet to the 0.12% predicted for the 28 GHz system at 344 feet to arrive at a total maximum % MPE of 20.85%.

Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1500 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. The highest percent of MPE value was calculated to occur at a horizontal distance of 407 feet from the site (reference Figure 1).

As stated in Section 3, all 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. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, a six foot height offset was considered in this analysis to account for average human height. As a result, the predicted signal levels are significantly higher than the actual signal levels will be from the final configuration. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the tower out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm ²)	Limit (mW/cm ²)	% MPE
AT&T LTE 1900 MHz	1	140.0	110.0	407	0.000498	1.000	0.05%
AT&T LTE 2300 MHz	1	50.0	110.0	407	0.000217	1.000	0.02%
AT&T LTE 737 MHz	1	160.0	110.0	407	0.002390	0.491	0.49%
AT&T UMTS 1900 MHz	1	80.0	110.0	407	0.000314	1.000	0.03%
AT&T UMTS 885 MHz	1	80.0	110.0	407	0.000530	0.590	0.09%
T-Mobile GSM 1900 MHz	1	120.0	100.0	407	0.000163	1.000	0.02%
T-Mobile LTE 1900 MHz	1	120.0	100.0	407	0.000163	1.000	0.02%
T-Mobile LTE 2100 MHz	1	120.0	100.0	407	0.000268	1.000	0.03%
T-Mobile LTE 700 MHz	1	60.0	100.0	407	0.001212	0.467	0.26%
T-Mobile LTE/5G 2500 MHz	1	240.0	100.0	407	0.082938	1.000	8.29%
T-Mobile LTE/5G 600 MHz	1	140.0	100.0	407	0.002616	0.400	0.65%
UHF Antenna	1	100.0	71.0	407	0.000073	0.300	0.02%
Unknown Carrier	1	160.0	74.0	407	0.000145	0.567	0.03%
Verizon 5G 3700 MHz	1	200.0	83.0	407	0.090692	1.000	9.07%
Verizon LTE 1900 MHz	1	160.0	83.0	407	0.003271	1.000	0.33%
Verizon LTE 2100 MHz	1	240.0	83.0	407	0.005442	1.000	0.54%
Verizon LTE 750 MHz	1	160.0	83.0	407	0.001885	0.500	0.38%
Verizon LTE 885 MHz	1	160.0	83.0	407	0.002354	0.567	0.42%
Total							20.73%
Verizon LTE 28GHz	1	0.2	12.0	344	0.001248	1.000	0.12%
Grand Total							20.85%

Table 2: Maximum Percent of General Population Exposure Values

6. Conclusion

The above analysis verifies that RF exposure levels from the site with Verizon's proposed 28 GHz microwave antenna will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE in consideration of all existing transmitters and the proposed 28 GHz microwave system is calculated to be 20.85% of the FCC limit (General Population/Uncontrolled). This maximum cumulative percent of MPE value is calculated to occur 407 feet away from the site.

7. 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.



Report Prepared By: Ram Acharya
RF Engineer
C Squared Systems, LLC

November 27, 2023
Date



Reviewed/Approved By: Martin Lavin
Senior RF Engineer
C Squared Systems, LLC

November 28, 2023
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 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 Exposure⁶

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 Exposure⁷

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 3: FCC Limits for Maximum Permissible Exposure

⁶ 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.

⁷ 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.

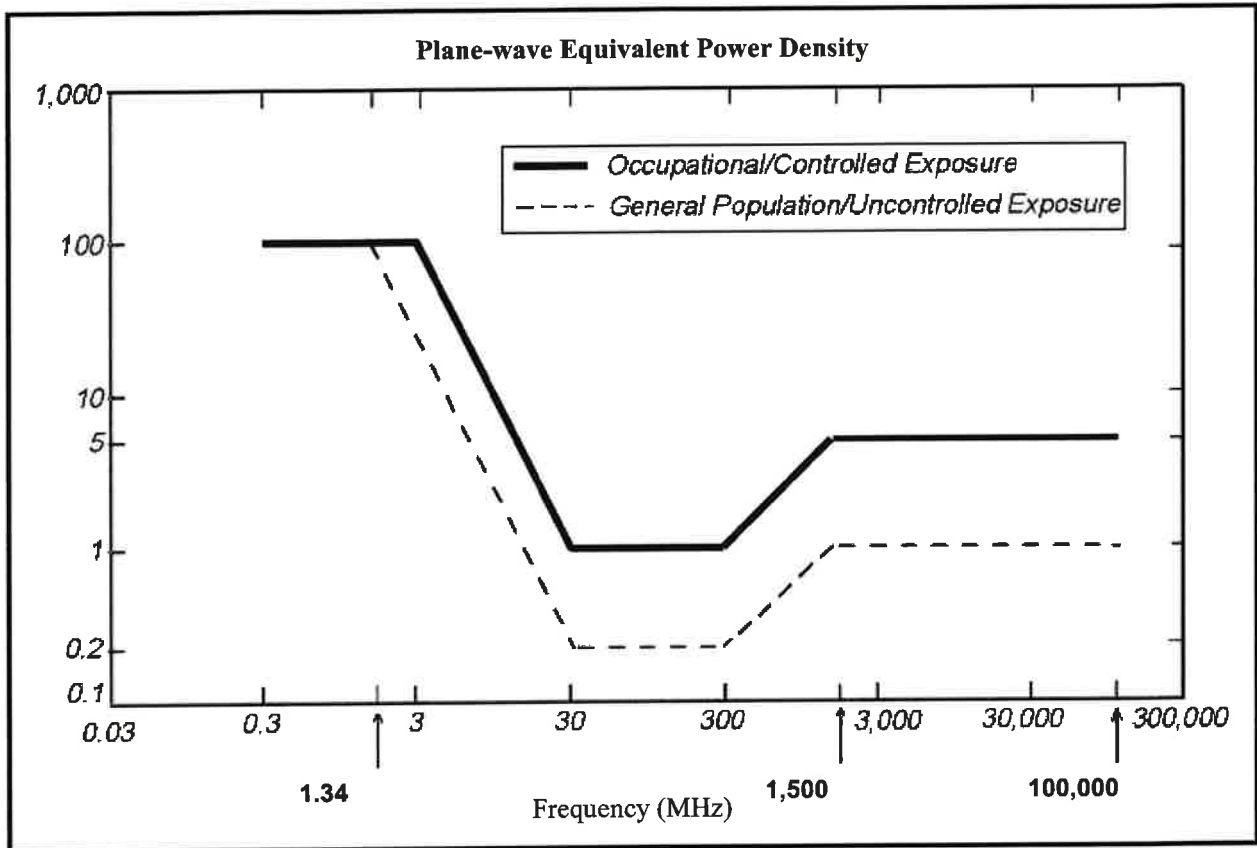
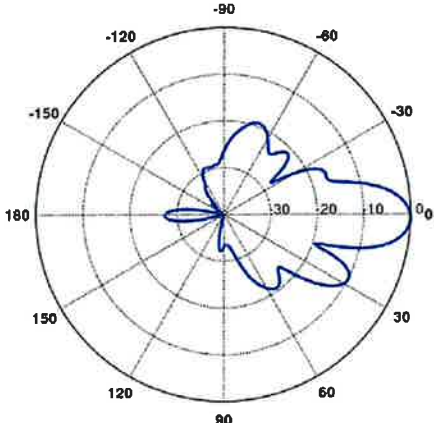
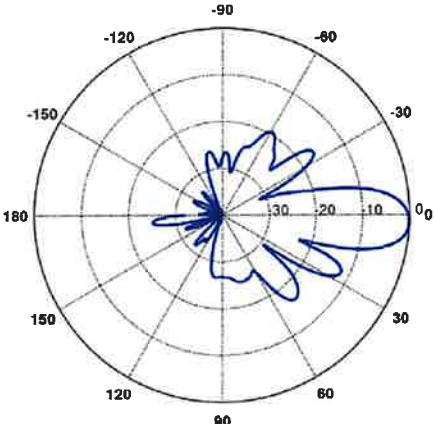


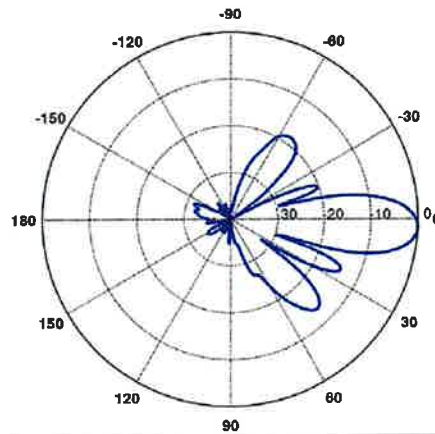
Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Verizon Antenna Model Data Sheets and Electrical Patterns

<p>LTE 750 MHz</p> <p>Manufacturer: COMMSCOPE Model #: NNH4-65A-R6 Frequency Band: 698-806 MHz Gain: 13.2 dBi Vertical Beamwidth: 16.4° Horizontal Beamwidth: 72° Polarization: ±45° Dimensions (L x W x D): 55.12" x 19.6" x 7.76"</p>	
<p>LTE 850 MHz</p> <p>Manufacturer: COMMSCOPE Model #: NNH4-65A-R6 Frequency Band: 806-896 MHz Gain: 13.8 dBi Vertical Beamwidth: 14.9° Horizontal Beamwidth: 63° Polarization: ±45° Dimensions (L x W x D): 55.12" x 19.6" x 7.76"</p>	

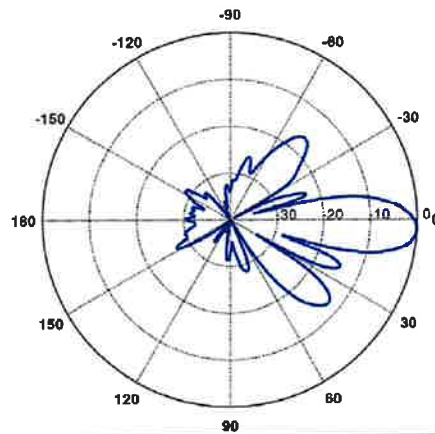
LTE 1900 MHz

Manufacturer: COMMSCOPE
 Model #: NNH4-65A-R6
 Frequency Band: 1850-1990 MHz
 Gain: 14.7 dBi
 Vertical Beamwidth: 14.6°
 Horizontal Beamwidth: 60°
 Polarization: ±45°
 Dimensions (L x W x D): 55.12" x 19.6" x 7.76"



LTE 2100 MHz

Manufacturer: COMMSCOPE
 Model #: NNH4-65A-R6
 Frequency Band: 1920-2180 MHz
 Gain: 14.8 dBi
 Vertical Beamwidth: 13.9°
 Horizontal Beamwidth: 62°
 Polarization: ±45°
 Dimensions (L x W x D): 55.12" x 19.6" x 7.76"



Attachment D: Far Field Calculation Sheet

Band	28 GHz
Operating Frequency (MHz)	27,500
General Population MPE (mW/cm²)	1.000
ERP Per Transmitter (Watts)	785
Number of Transmitters	1
Antenna Centerline (feet)	12
Total ERP (Watts)	785
Total ERP (dBm)	59
Maximum % of General Population Limit	0.12%
Distance to Maximum % of General Population Limit (feet)	344

ATTACHMENT 4



Dewberry Engineers Inc. | 817.895.3400
99 Summer Street, Suite 700 | 617.695.3310 fax
Boston, MA 02110-1200 | www.dewberry.com

August 14, 2023

Alex Tyurin
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

Dear Mr. Tyurin:

Verizon Wireless has proposed to install (2) new Rohn FRM Ballast Sleds, (2) new 0.3m Microwave Antenna, and (2) WTM4000 Radio on the rooftop of an equipment shelter at various locations in Connecticut. The proposed equipment will be mounted on the rooftop of the ground mounted equipment shelter with a maximum height of 15' to the CL of the dish. **This assessment letter is limited to Connecticut sites only.**

Dewberry Engineers Inc. (Dewberry) has reviewed the latest antenna design provided by Verizon Wireless and has determined, based on a maximum ultimate wind speed of 140 mph, exposure D, per ANSI/TIA-222-H and 2022 CT State Building Code, that **the proposed ballast sled and equipment shelter roof have adequate capacity to support the proposed equipment configuration.** Each proposed ballast sled requires (6) CMU ballast blocks (34 lb. ea.), equaling 204 lbs of ballast to be evenly distributed across both trays. The proposed ballast sled, including ballast blocks, **do not exceed the 40 psf minimum allowable roof live load of the existing shelter.** **The proposed ballast frame is controlled by overturning moment and the maximum utilization of the proposed mount is 43.0%.** Dewberry assumes that the new antennas and associated equipment are installed per the manufacturer's specifications.

This assessment is based on our assumption that the ground mounted equipment shelter, and proposed ballast mounts are in good condition and were constructed in accordance with ANSI/TIA-222-H standards and the 2022 CT State Building Code. If, during construction, any damage, deterioration, and/or discrepancies are noticed, Dewberry is to be notified to assess any deviation from the assumed condition. Any alteration in equipment loading described above and on the associated plans will void any conclusions expressed herein and will require further analysis and design. No structural qualification is made or implied by this structural letter for existing structural members not supporting the proposed installation.

If you have any questions, please do not hesitate to call me at 617-531-0744.

Sincerely,
Dewberry Engineers Inc.

Brandon Kelsey, P.E. (CT)
CT License No.: 36967
Structural Project Engineer

ATTACHMENT 5

Certificate of Mailing — Firm



<p>Name and Address of Sender</p> <p>Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103</p>	<p>TOTAL NO. of Pieces Listed by Sender</p> <p style="font-size: 2em; text-align: center;">3</p>	<p>TOTAL NO. of Pieces Received at Post Office™</p> <p style="font-size: 2em; text-align: center;">3</p>	<p>Affix Stamp Here Postmark with Date of Receipt.</p> <div style="text-align: center;"> </div>		
<p>Postmaster, per (name of receiving employee)</p> <p style="font-size: 2em; text-align: center;"><i>[Signature]</i></p>	<p>Address (Name, Street, City, State, and ZIP Code™)</p> <p>Peter Tanaka, First Selectman Willington Town Hall 40 Old Farms Road Willington, CT 06279</p>	<p>Address (Name, Street, City, State, and ZIP Code™)</p> <p>Michael D'Amato, Zoning Agent Willington Town Hall 40 Old Farms Road Willington, CT 06279</p> <p>Willington Fire Department, Inc. P.O. Box 161 Willington, CT 06279</p>			
<p>USPS® Tracking Number</p> <p>Firm-specific Identifier</p>	<p>1.</p>	<p>Postage</p>	<p>Fee</p>	<p>Special Handling</p>	<p>Parcel/Airlift</p>
<p>2.</p>	<p>3.</p>	<p>4.</p>	<p>5.</p>	<p>6.</p>	<p>7.</p>