



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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VIA ELECTRONIC MAIL

May 5, 2022

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
hredding@saigrp.com

RE: EM-CING-011-220404 – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 1021 Blue Hills Avenue, Bloomfield, Connecticut.

Dear Ms. Redding:

The Connecticut Siting Council (Council) is in receipt of your correspondence of May 5, 2022 submitted in response to the Council's April 29, 2022 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/CMW/emr

From: Hollis Redding <HRedding@saigrp.com>
Sent: Thursday, May 5, 2022 11:52 AM
To: Fontaine, Lisa <Lisa.Fontaine@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-CING-011-220404 Blue Hills Ave., Bloomfield

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Good morning-

Attached please find an updated Cumulative Power Density report in response to the incomplete letter from April 29th. A copy is in the mail to your office as well. Thank you. Please let me know if you have any questions. Thank you. Have a great day. Hollis

From: Fontaine, Lisa <Lisa.Fontaine@ct.gov>
Sent: Friday, April 29, 2022 4:33 PM
To: Hollis Redding <HRedding@saigrp.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Council Incomplete Letter for EM-CING-011-220404 Blue Hills Ave., Bloomfield

Please see the attached correspondence.

Lisa Fontaine
Fiscal Administrative Officer
CONNECTICUT SITING COUNCIL
Ten Franklin Square
New Britain, CT 06051
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May 5, 2022

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

Re: EM-CING-011-220404 New Cingular Wireless PCS LLC ("AT&T") Site CT1148
1021 Blue Hills Avenue, Bloomfield, CT 06002

Dear Ms. Bachman:

I am in receipt of your incomplete letter of April 29, 2022. Attached please find a revised Cumulative Power Density report per your request. Please let me know if the revised report deems the exempt modification complete or if you need further information. Thank you for your time.

Sincerely,

Hollis M. Redding

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
Mobile: 860-834-6964
hredding@saigrp.com

Enclosure



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

Calculated Radio Frequency Emissions Report



CT1148

1021 Blue Hills Avenue, Bloomfield, CT

May 3, 2022

Table of Contents

1. Introduction.....	1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits	1
3. RF Exposure Calculation Methods	2
4. Calculated % MPE Results based on Antenna Patterns.....	3
5. Conclusion.....	6
6. Statement of Certification.....	6
Attachment A: References.....	7
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)	8

List of Figures

Figure 1: Graph of General Population % MPE vs. Distance for AT&T	3
Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE).....	9

List of Tables

Table 1: Maximum Percent of General Population Exposure Values for AT&T.....	4
Table 2: Combined %MPE for all operators.....	5
Table 3: FCC Limits for Maximum Permissible Exposure	8

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed New Cingular Wireless (AT&T) wireless communications facility on the existing tower located at 1021 Blue Hills Avenue in Bloomfield, CT. The coordinates of the existing tower are 41° 49' 12.37" N, 72° 41' 47.49" W.

AT&T is proposing to install ground-based equipment cabinets and antennas mounted at 98 feet AGL on the existing tower. This report uses the planned antenna configuration for AT&T¹ to derive the resulting % MPE (Maximum Permissible Exposure), once the proposed installation has been completed.

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 AT&T's preliminary Radio Frequency Design Sheet dated 1/24/2022.

3. RF Exposure Calculation Methods

The calculated ground-level power density 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:

ERP = Effective Radiated Power

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

H = Horizontal Distance from antenna

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 transmitters are operating at full power and 100 percent capacity and that all radio 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 consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual signal levels will be from the final installation.

4. Calculated % MPE Results based on Antenna Patterns

The calculated % MPE 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.

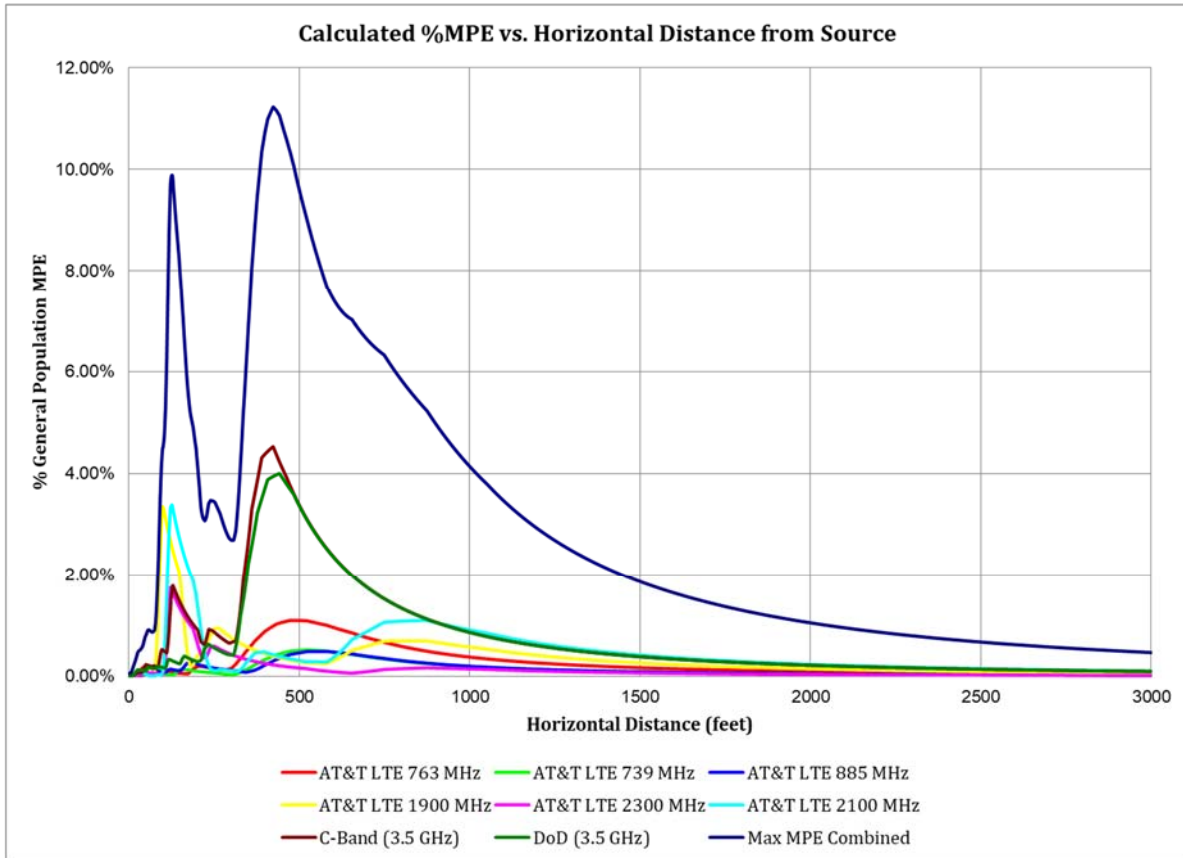


Figure 1: Graph of General Population % MPE vs. Distance for AT&T

The highest percent of MPE (11.23% of the General Population limit) is calculated to occur at a horizontal distance of 424 feet from antennas. 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 900 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. As stated in Section 3, all calculations assume that the antennas are operating at full power and 100 percent capacity, and that all antenna channels are transmitting simultaneously. 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 calculated % MPE levels are significantly higher than the actual signal levels will be from the final installation. 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	4	160.0	98.0	424	0.003985	1.000	0.40%
AT&T LTE 2100 MHz	2	240.0	98.0	424	0.004281	1.000	0.43%
AT&T LTE 2300 MHz	1	160.0	98.0	424	0.002272	1.000	0.23%
AT&T LTE 739 MHz	1	160.0	98.0	424	0.001976	0.493	0.40%
AT&T LTE 763 MHz	1	160.0	98.0	424	0.005055	0.509	0.99%
AT&T LTE 885 MHz	1	160.0	98.0	424	0.001788	0.590	0.30%
C-Band (3.5 GHz)	1	108.5	96.0	424	0.045255	1.000	4.53%
DoD (3.5 GHz)	1	108.5	100.0	424	0.039515	1.000	3.95%
						Total	11.23%

Table 1: Maximum Percent of General Population Exposure Values for AT&T

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm ²)	Limit	% MPE
DISH	77	600	4	224	0.0639	0.400	1.60%
DISH	77	1900	4	543	0.1549	1.000	1.55%
DISH	77	2100	4	543	0.1549	1.000	1.55%
Verizon	110	751	4	689	0.0916	0.5007	1.83%
Verizon	110	874	4	700	0.0931	0.5827	1.60%
Verizon	110	1975	4	1500	0.1995	1.0000	1.99%
Verizon	110	2120	4	1496	0.1990	1.0000	1.99%
Verizon	110	3560	4	103	0.0137	1.0000	0.14%
Verizon	110	3730	2	21627	1.4381	1.0000	14.38%
T-Mobile	125	2500	1	19239	0.4886	1.0000	4.89%
T-Mobile	125	2500	1	19239	0.4886	1.0000	4.89%
T-Mobile	125	600	2	592	0.0301	0.4000	0.75%
T-Mobile	125	600	1	1578	0.0401	0.4000	1.00%
T-Mobile	125	700	2	649	0.0330	0.4667	0.71%
T-Mobile	125	1900	2	2204	0.1119	1.0000	1.12%
T-Mobile	125	2100	2	1295	0.0658	1.0000	0.66%
T-Mobile	125	1900	4	1028	0.1044	1.0000	1.04%
T-Mobile	125	1900	2	2057	0.1045	1.0000	1.04%
T-Mobile	125	2100	2	2308	0.1172	1.0000	1.17%
MetroPCS CDMA	75	2135	3	727	0.1647	1.0000	1.65%
MetroPCS LTE	75	2130	1	1200	0.0906	1.0000	0.91%
Clearwire	120	2496	2	153	0.0085	1.0000	0.08%
Clearwire	115	11 GHz	1	211	0.0064	1.0000	0.06%
Sprint	87	1900	4	693	0.1519	1.0000	1.52%
Sprint	87	850	1	390	0.0214	0.5667	0.38%
Sprint	87	2500	1	779	0.0427	1.0000	0.43%
Nextel	120	851	9	100	0.0249	0.5673	0.44%
XM Sat Radio	125	2340	2	321.78	0.0163	1.0000	0.16%
Page Net	110	900	1	150	0.0050	0.6000	0.08%
Blue Hills FD	140	452	1	75	0.0015	0.3013	0.05%
Blue Hills FD	110	452	1	75	0.0025	0.3013	0.08%
Blue Hills FD	60	33	1	250	0.0308	0.2000	1.54%
Blue Hills FD	40	173	1	5	0.0016	0.2000	0.08%
AT&T	98	700	1	3305	0.0020	0.4927	0.40%
AT&T	98	700	1	3084	0.0051	0.5087	0.99%
AT&T	98	885	1	3794	0.0018	0.5900	0.30%
AT&T	98	1900	4	5877	0.0040	1.0000	0.40%
AT&T	98	2100	2	8039	0.0043	1.0000	0.43%
AT&T	98	2300	1	6297	0.0023	1.0000	0.23%
AT&T	100	3500	1	24286	0.0395	1.0000	3.95%
AT&T	96	3500	1	24286	0.0453	1.0000	4.53%
Total							62.59%

Table 2: Combined %MPE for all operators²

² The existing record in the CSC Power Density Table for AT&T should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for Blue Hills FD, Verizon, Sprint, Nextel, Clearwire, Metro PCS, PageNet, XM Satellite Radio and T-Mobile was taken directly from the CSC Power Density database. Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

5. Conclusion

The above analysis verifies that RF exposure levels from the site with AT&T's proposed antenna configuration 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 at 6' above ground level and in consideration of AT&T's proposed antenna installation in conjunction with the other installations on the tower is calculated to be **62.59% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value for AT&T's transmitters is calculated to occur 424 feet away from the site.

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 FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, IEEE Std. C95.3, and IEEE Std. C95.7.



Reviewed/Approved By: _____

Senior RF Engineer
C Squared Systems, LLC

May 3, 2022

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

IEEE C95.7-2005 (R2014), IEEE Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz, 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 3: FCC Limits for Maximum Permissible Exposure

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.

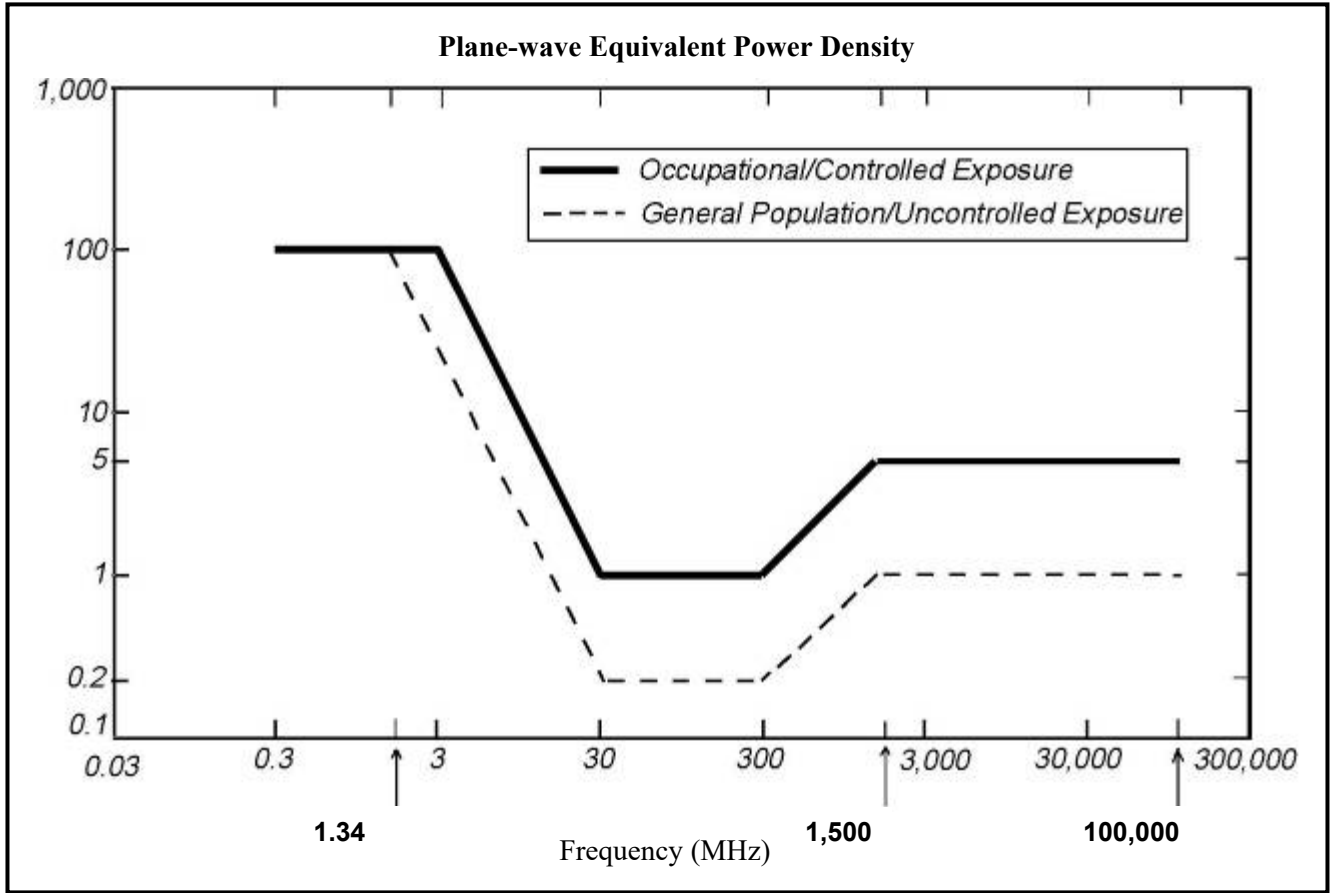


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)