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
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

September 1, 2020

Patricia Nowak
Site Acquisition Consultant
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379

RE: **EM-CING-117-200721** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 100 Old Redding Road, Redding, Connecticut.

Dear Ms. Nowak:

The Connecticut Siting Council (Council) is in receipt of your correspondence of August 31, 2020 submitted in response to the Council's August 4, 2020 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,

s/ Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr

August 31, 2020

VIA ELECTRONIC MAIL

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

Regarding: **EM-CING-117-200721 -Notice of Exempt Modification**
AT&T Site: **CT2152**
Address: **100 Old Redding Road, Redding, Connecticut**

Dear Ms. Bachman:

In response to your letter dated August 4, 2020 regarding the Council's above referenced exempt modification identification number, please find enclosed a revised Radio Frequency Emissions Report dated August 27, 2020.

Please let me know if the enclosed document is sufficient to complete the exempt modification request for the above referenced AT&T site.

Thank you for your time and consideration.

Sincerely,

s/ *Patricia Nowak*

Patricia Nowak
Site Acquisition Consultant
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
pnowak@clinellc.com

Enclosures: Radio Frequency Emissions Report

Lawrence Behr Associates INC
www.lbagroup.com

Radio Frequency Emissions Report

SITE NAME:

302522 Redding

LOCATION:

Redding, Connecticut

COMPANY:

American Tower Corporation
Woburn, Massachusetts

August 27th, 2020

3400 Tupper Drive | Greenville, NC 27834
252-757-0279 | 800-522-4464 | lbagrp@lbagroup.com

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RADIO FREQUENCY EMISSIONS REPORT

302522 Redding

Redding, Connecticut

INTRODUCTION

Lawrence Behr Associates, Inc. (LBA) has been retained by American Tower Corporation (ATC) of Woburn, Massachusetts to evaluate the RF emissions of an existing tower at this location. AT&T is adding emitters to this site and the purpose of this study is to determine if, after the addition of the AT&T emitters, the site is in Compliance with FCC Regulations. This study determined that THIS SITE IS IN COMPLIANCE with Federal Regulations.

Details regarding the FCC Rules and the methodology used to determine compliance may be seen below.

SITE AND FACILITY CONSIDERATIONS

Site 302522 Redding is located at 100 Old Redding Road in Redding, Connecticut at coordinates 41.28708, -73.43819. The support structure is a 182' monopole.

All data used in this study was provided by one or more of the following sources:

1. ATC furnished data
2. Compiled from carrier and manufacturer standard configurations
3. Empirical data collected by LBA

AT&T proposes to add antennas to the tower at the 185' level. The structure already supports several antennas. This study only considers the new AT&T facility in detail.

The load list may be seen in Appendix 1. Appendix 2 contains the AT&T channel counts, frequency bands, and power levels. AT&T Antenna information may be seen in Appendix 3.

POWER DENSITY CALCULATIONS

Based upon the provided information and the FCC limits for exposure as outlined in 47 CFR 1.1307(b)(1) - (b)(3), the power levels and percentages of the FCC's allowable general population limit are shown in Appendix 4. Calculations were done at industry standard average head height of six feet above ground level.

A summary of the power density from all emitters may be seen in Appendix 5.

These limits are based upon the Information Relating to MPE Standards found in Appendix 6. Study methodology may be seen in Appendix 7, which describes the Non-Ionizing Radiation Prediction Models. Approximate radiation patterns may be found in Appendix 5. This site ***IS*** in compliance with FCC OET-65 MPE limits.

August 27th, 2020

Kathryn G. Tesh
Wireless Services Manager

APPENDIX 1 *Load List*

Proposed	Customer	RAD Height (ft)	Equipment Quantity	Equipment Type	Manufacturer	Model Number	Line Quantity	Line size	Mount Type	Azimuths	TX Power	ERP	TX Frequency	RX Frequency
No	AT&T MOBILITY	185	3	PANEL	Powerwave Allgon	7770.00	6	1 1/4" Coax	Sector Frame	23/143/263			1930-1935, 880-894	1850-1855, 835-849
No	AT&T MOBILITY	184	1	PANEL	CCI	HPA-65R-BUU-H8			Sector Frame	350				
No	AT&T MOBILITY	184	2	PANEL	Quintel	QS66512-2	4	1 1/4" Coax	Sector Frame	110/230			2345-2360, 716-728, 734-746	2305-2320, 704-716
No	AT&T MOBILITY	184	1	PANEL	CCI	TPA-65R-LCUUUU-H8	2	1 1/4" Coax	Sector Frame	350			2345-2360, 716-728, 734-746	2305-2320, 704-716
No	AT&T MOBILITY	184	2	PANEL	CCI	HPA-65R-BUU-H6			Sector Frame	110/230				
No	VERIZON WIRELESS	172	6	PANEL	Commscope	SBNHH-1D65B	6	1 5/8" Coax	Sector Frame	330/90/190			1970-1975, 2145-2155, 746-757	1745-1755, 1890-1895, 776-787
No	VERIZON WIRELESS	172	4	PANEL	Andrew	DB844G65ZAXY	4	1 5/8" Coax	Sector Frame	330/190			869-880, 890-892	824-835, 845-847
No	VERIZON WIRELESS	172	2	PANEL	RFS	APL868013-42T0	2	1 5/8" Coax	Sector Frame	90			869-880, 890-892	824-835, 845-847
No	SPRINT NEXTEL	160	1	PANEL	RFS	APXVSPP18-C-A20	1	1 1/4" Hybriflex Cable	Sector Frame	320			1950-1965, 1990-1995	1870-1885, 1910-1915, 1950-1965, 1990-1995
No	SPRINT NEXTEL	160	2	PANEL	RFS	APXVSPP18-C-A20	2	1 1/4" Hybriflex Cable	Sector Frame	70/210			1950-1965, 1990-1995	1870-1885, 1910-1915, 1950-1965, 1990-1995
No	SPRINT NEXTEL	160	3	PANEL	Commscope	DT465B-2XR			Sector Frame	320/70/210			2496-2690, 806-869	2496-2690, 806-869
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	148	2	OMNI		OGT9-840	2	1 5/8" Coax	Side Arm	280/70				
No	METRO PCS INC	147	3	PANEL	Ericsson	AIR 21, 1.3M, B4A B2P (90.4 lbs)	3	1 5/8" Coax	Sector Frame	60/180/310			1710-1755, 1850-1910	1930-1990, 2110-2155
No	METRO PCS INC	147	3	PANEL	Ericsson	AIR 21, 1.3M, B2A B4P (91.5 lbs)			Sector Frame	60/180/310				
No	METRO PCS INC	147	3	PANEL	Andrew	LNX-6515DS-VTM	3	1 5/8" Coax	Sector Frame	60/180/310				
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	143	1	OMNI		DB810K-XT	1	1 5/8" Coax	Side Arm	140			852	807
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	143	1	OMNI		SC479-HF1LDF	1	1 5/8" Coax	Side Arm	135			854	809
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	136	2	OMNI		OGT9-840	2	1 5/8" Coax	Side Arm	280/70				
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	132	2	PANEL	Generic	96" x 12" Panel	2	1 5/8" Coax	Side Arm	160				
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	118	3	OMNI		SC479-HF1LDF	3	1 5/8" Coax	Side Arm	360			854	809
Yes	CONNECTICUT STATE POLICE DEPT OF PUBLIC	100	1	OMNI		DS1F03P36D-D	2	7/8" Coax	Stand-Off	0			154	160
No	EVERSOURCE ENERGY	88	1	DIPOLE		SD210D	2	7/8" Coax	Side Arm	Dipole			217-218	219-220
No	OTHER	86	1	OMNI		12' Omni	1	7/8" Coax	Side Arm	Omni				
No	CONNECTICUT STATE POLICE DEPT OF PUBLIC	66	1	DIPOLE		DB264-A	1	7/8" Coax	Side Arm	310			154	154

APPENDIX 2

AT&T Channels Used

Antenna	Technology	Frequency Band	Channel Count	Transmitter Power per Channel (W)
AT&T A1	LTE	1900	3	40
AT&T A2	UMTS	850	3	40
AT&T A3	LTE	2300	2	25
AT&T A4	LTE	700	2	40
AT&T A5	LTE	700	2	40
AT&T B1	LTE	1900	3	40
AT&T B2	UMTS	850	3	40
AT&T B3	LTE	2300	2	25
AT&T B4	LTE	700	2	40
AT&T B5	LTE	700	2	40
AT&T C1	LTE	1900	3	40
AT&T C2	UMTS	850	3	40
AT&T C3	LTE	2300	1	25
AT&T C4	LTE	700	1	40
AT&T C5	LTE	700	1	40

APPENDIX 3

AT&T Antenna Information

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	AT&T A1	Powerwave Allgon 7777.00	185
A	AT&T A2	Powerwave Allgon 7777.00	185
A	AT&T A3	Quintel QS66512-2	184
A	AT&T A4	Quintel QS66512-2	184
A	AT&T A5	Quintel QS66512-2	184
B	AT&T B1	Powerwave Allgon 7777.00	185
B	AT&T B2	Powerwave Allgon 7777.00	185
B	AT&T B3	Quintel QS66512-2	184
B	AT&T B4	Quintel QS66512-2	184
B	AT&T B5	Quintel QS66512-2	184
C	AT&T C1	Powerwave Allgon 7777.00	185
C	AT&T C2	Powerwave Allgon 7777.00	185
C	AT&T C3	CCI TPA-65R-LCUUUU-H8	184
C	AT&T C4	CCI TPA-65R-LCUUUU-H8	184
C	AT&T C5	CCI TPA-65R-LCUUUU-H8	184

APPENDIX 4 *FCC OET-65 MPE Limit Study*

Antenna ID	Antenna Make / Model	Frequency Band	Antenna Gain (dBd)	Antenna Height (ft)	Channel Count	Total TX Power (W)	ERP (W)	Total Power Density (µW/cm²)	Allowable Public MPE (µW/cm²)	Public MPE%
AT&T A1	Powerwave Allgon 7777.00	1900	12.50	185	3	40	1166.97	4.5304	1000.00	0.4530%
AT&T A2	Powerwave Allgon 7777.00	850	12.00	185	3	40	1040.06	4.0377	565.00	0.7125%
AT&T A3	Quintel QS66512-2	2300	15.53	184	2	25	1465.35	1.8962	1000.00	0.1896%
AT&T A4	Quintel QS66512-2	700	11.73	184	2	40	977.37	2.5295	467.00	0.5420%
AT&T A5	Quintel QS66512-2	700	11.73	184	2	40	977.37	2.5295	467.00	0.5420%
AT&T B1	Powerwave Allgon 7777.00	1900	12.50	185	3	40	1166.97	4.5304	1000.00	0.4530%
AT&T B2	Powerwave Allgon 7777.00	850	12.00	185	3	40	1040.06	4.0377	565.00	0.7125%
AT&T B3	Quintel QS66512-2	2300	15.53	184	2	25	1465.35	1.8962	1000.00	0.1896%
AT&T B4	Quintel QS66512-2	700	11.73	184	2	40	977.37	2.5295	467.00	0.5420%
AT&T B5	Quintel QS66512-2	700	11.73	184	2	40	977.37	2.5295	467.00	0.5420%
AT&T C1	Powerwave Allgon 7777.00	1900	12.50	185	3	40	1166.97	4.5304	1000.00	0.4530%
AT&T C2	Powerwave Allgon 7777.00	850	12.00	185	3	40	1040.06	4.0377	565.00	0.7125%
AT&T C3	CCI TPA-65R-LCUUUU-H8	2300	14.45	184	1	25	1142.72	1.8962	1000.00	0.1896%
AT&T C4	CCI TPA-65R-LCUUUU-H8	700	12.95	184	1	40	1294.37	2.5295	467.00	0.5420%
AT&T C5	CCI TPA-65R-LCUUUU-H8	700	12.95	184	1	40	1294.37	2.5295	467.00	0.5420%
AT&T All Sectors									**Total:**	**7.3179%**

APPENDIX 5

Summary of Power Density

AT&T Sector	Power Density Value (% of General Population)
AT&T All Sectors:	7.3179%
Other Carriers:	7.8934%
Site Total:	15.2113%
Site Compliance Status:	Compliant

In 1985, the FCC first adopted guidelines to be used for evaluating human exposure to RF emissions. The FCC revised and updated these guidelines on August 1, 1996, as a result of a rule-making proceeding initiated in 1993. The new guidelines incorporate limits for Maximum Permissible Exposure (MPE) in terms of electric and magnetic field strength and power density for transmitters operating at frequencies between 300 kHz and 100 GHz.

The FCC's MPE limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits were developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist, they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

The FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others. The most restrictive limits occur in the frequency range of 30-300 MHz where whole-body absorption of RF energy by human beings is most efficient. At other frequencies, whole-body absorption is less efficient, and consequently, the MPE limits are less restrictive.

MPE limits are defined in terms of power density (units of milliwatts per centimeter squared: mW/cm^2), electric field strength (units of volts per meter: V/m) and magnetic field strength (units of amperes per meter: A/m). The far-field of a transmitting antenna is where the electric field vector (E), the magnetic field vector (H), and the direction of propagation can be considered to be all mutually orthogonal ("plane-wave" conditions).

The FCC guidelines define two separate tiers of exposure limits. As defined by the FCC, these limits are:

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area. Additional details can be found in FCC OET 65.

For the purposes of this study, only General population/uncontrolled exposure limits were studied.

APPENDIX 7 *MPE Standards Methodology*

This study predicts RF field strength and power density levels that emanate from communications system antennae. It considers all transmitter power levels (less filter and line losses) delivered to each active transmitting antenna at the communications site. Calculations are performed to determine power density and MPE levels for each antenna as well as composite levels from all antennas. The calculated levels are based on where a human (Observer) would be standing at various locations at the site. The point of interest where the MPE level is predicted is based on the height of the Observer.

Compliance with the FCC limits on RF emissions are determined by spatially averaging a person's exposure over the projected area of an adult human body, that is approximately six-feet or two-meters, as defined in the ANSI/IEEE C95.1 standard. The MPE limits are specified as time-averaged exposure limits. This means that exposure is averaged over an identifiable time interval. It is 30 minutes for the general population/uncontrolled RF environment and 6 minutes for the occupational/controlled RF environment. However, in the case of the general public, time averaging should not be applied because the general public is typically not aware of RF exposure and they do not have control of their exposure time. Therefore, it should be assumed that any RF exposure to the general public will be continuous.

The FCC's limits for exposure at different frequencies are shown in the following Tables.

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (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

Where:

f = frequency

* = Plane-wave equivalent power density

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.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (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

Where:

f = frequency

* = Plane-wave equivalent power density

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.

It is important to understand that these limits apply cumulatively to all sources of RF emissions affecting a given area. For example, if several different communications system antennas occupy a shared facility such as a tower or rooftop, then the total exposure from all systems at the facility must be within compliance of the FCC guidelines.

The field strength emanating from an antenna can be estimated based on the characteristics of an antenna radiating in free space. There are basically two field areas associated with a radiating antenna. When close to the antenna, the region is known as the Near Field. Within this region, the characteristics of the RF fields are very complex and the wave front is extremely curved. As you move further from the antenna, the wave front has less curvature and becomes planar. The wave front still has a curvature but it appears to occupy a flat plane in space (plane-wave radiation). This region is known as the Far Field.

Two models are utilized to predict Near and Far field power densities. They are based on the formulae in FCC OET 65. As this study is concerned only with Near Field calculations, we will only describe the model used for this study. For additional details, refer to FCC OET Bulletin 65.

Cylindrical Model (Near Field Predictions)

Spatially averaged plane-wave equivalent power densities parallel to the antenna may be estimated by dividing the antenna input power by the surface area of an imaginary cylinder surrounding the length of the radiating antenna. While the actual power density will vary along the height of the antenna, the average value along its length will closely follow the relation given by the following equation:

$$S = P \div 2\pi RL$$

Where:
S = Power Density
P = Total Power into antenna
R = Distance from the antenna
L = Antenna aperture length

For directional-type antennas, power densities can be estimated by dividing the input power by that portion of a cylindrical surface area corresponding to the angular beam width of the antenna. For example, for the case of a 120-degree azimuthal beam width, the surface area should correspond to 1/3 that of a full cylinder. This would increase the power density near the antenna by a factor of three over that for a purely omni-directional antenna. Mathematically, this can be represented by the following formula:

$$S = (180 / \theta_{BW}) P \div \pi RL$$

Where:
S = Power Density
θ_{BW} = Beam width of antenna in degrees (3 dB half-power point)
P = Total Power into antenna
R = Distance from the antenna
L = Antenna aperture length

If the antenna is a 360-degree omni-directional antenna, this formula would be equivalent to the previous formula.

Spherical Model (Far Field Predictions)

Spatially averaged plane-wave power densities in the Far Field of an antenna may be estimated by considering the additional factors of antenna gain and reflective waves that would contribute to exposure.

The radiation pattern of an antenna has developed in the Far Field region and the power gain needs to be considered in exposure predictions. Also, if the vertical radiation pattern of the antenna is considered, the exposure predictions would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels.

Additionally, to model a truly "worst case" prediction of exposure levels at or near a surface, such as at ground-level or on a rooftop, reflection off the surface of antenna radiation power can be assumed, resulting in a potential four-fold increase in power density.

These additional factors are considered and the Far Field prediction model is determined by the following equation:

$$S = EIRP \times Rc \div 4\pi R^2$$

Where:
S = Power Density
EIRP = Effective Radiated Power from antenna
Rc = Reflection Coefficient (2.56)
R = Distance from the antenna

The EIRP includes the antenna gain. If the antenna pattern is considered, the antenna gain is relative based on the horizontal and vertical pattern gain values at that particular location in space, on a rooftop or on the ground. However, it is recommended that the antenna radiation pattern characteristics not be considered to provide a conservative "worst case" prediction. This is the equation is utilized for the Far Field exposure predictions herein.