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

October 16, 2020

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

RE: **EM-CING-130-200925 –** New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located 133 Horse Fence Hill Road, Southbury, Connecticut.

Dear Ms. Iliades:

The Connecticut Siting Council (Council) is in receipt of your correspondence of October 15, 2020 submitted in response to the Council's October 15, 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/laf

October 15, 2020

VIA ELECTRONIC DELIVERY

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

Regarding: EM-CING-130-200925 Notice of Incompletion
Address: Notice of Intent to Modify an Existing Telecommunications Facility at 133 Horse Fence Hill Road, Southbury, CT (AT&T Site #: CT2126)

Dear Ms. Bachman:

Pursuant to your correspondence today, your staff has identified that the radio frequency emissions report was inadvertently left out of the package submission materials. Accordingly, enclosed herewith please find the revised report.

Please do not hesitate to contact me should you have any questions, concerns or require additional information. Thank you for your assistance to this matter.

Sincerely,

Jennifer Iliades
Site Acquisition Consultant
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
jiliades@clinellc.com

Enclosure

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

October 15, 2020

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

RE: **EM-CING-130-200925 –** New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located 133 Horse Fence Hill Road, Southbury, Connecticut.

Dear Ms. Iliades:

The Connecticut Siting Council (Council) received a notice of intent to modify the above-referenced facility on September 25, 2020.

According to Section 16-50j-71 of the Regulations of Connecticut State Agencies, "…any modification, as defined in Section 16-50j-2a of the Regulations of Connecticut State Agencies, to an existing tower site, except as specified in Sections 16-50j-72 and 16-50j-88 of the Regulations of Connecticut State Agencies, may have a substantial adverse environmental effect."

Staff has reviewed this exempt modification request for completeness and has identified a deficiency in the request. No radio frequency emissions report has been provided with the request.

Therefore, the exempt modification request is incomplete at this time. The Council recommends that Centerline Communications provide a radio frequency emissions report for the proposed modification, on or before November 13, 2020. If additional time is needed to gather the requested information, please submit a written request for an extension of time prior to November 13, 2020. **Please provide an electronic version of the requested information for the incomplete exempt modification to be rendered complete and processed. Please include the Council's exempt modification identification number referenced above with the submittal.**

This notice of incompletion shall have the effect of tolling the FCC 60-day timeframe in accordance with Paragraph 217 of the FCC Wireless Infrastructure Report and Order issued on October 21, 2014 (FCC 14-153).

Thank you for your attention to this matter. Should you have any questions, please feel free to contact me at 860-827-2951.

Sincerely,

s/Melanie Bachman

Melanie Bachman
Executive Director

MAB/IN/laf

Lawrence Behr Associates INC
www.lbagroup.com

Radio Frequency Emissions Report

SITE NAME:

302519 Southbury

LOCATION:

Southbury, Connecticut

COMPANY:

American Tower Corporation
Woburn, Massachusetts

September 14th, 2020

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

Contents

DISCLAIMER NOTICE

This work is based upon our best interpretation of available information. However, these data and their interpretation are constantly changing. Therefore, we do not warrant that any undertaking based on this report will be successful, or that others will not require further research or actions in support of this proposal or future undertaking. In the event of errors, our liability is strictly limited to replacement of this document with a corrected one. Liability for consequential damages is specifically disclaimed. Any use of this document constitutes an agreement to hold Lawrence Behr Associates, Inc. and its employees harmless and indemnify it for any and all liability, claims, demands, and litigation expenses and attorney's fees arising out of such use.

Work product documents released prior to account settlement remain the sole property of Lawrence Behr Associates, Inc. and must be returned on demand. Underlying work notes and data relating to this document remain the property of Lawrence Behr Associates, Inc. This document shall not be reproduced in whole or part without permission of Lawrence Behr Associates, Inc. Any dispute hereunder shall be adjudicated in North Carolina. Any use or retention of this document constitutes acceptance of these terms, the entire work product, and all charges associated therewith.

RADIO FREQUENCY EMISSIONS REPORT

302519 Southbury

Southbury, 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 302519 Southbury is located at 133 Horse Fence Hill Road in Southbury, Connecticut at coordinates 41.45997, -73.245. The support structure is a 151' 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 153' 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

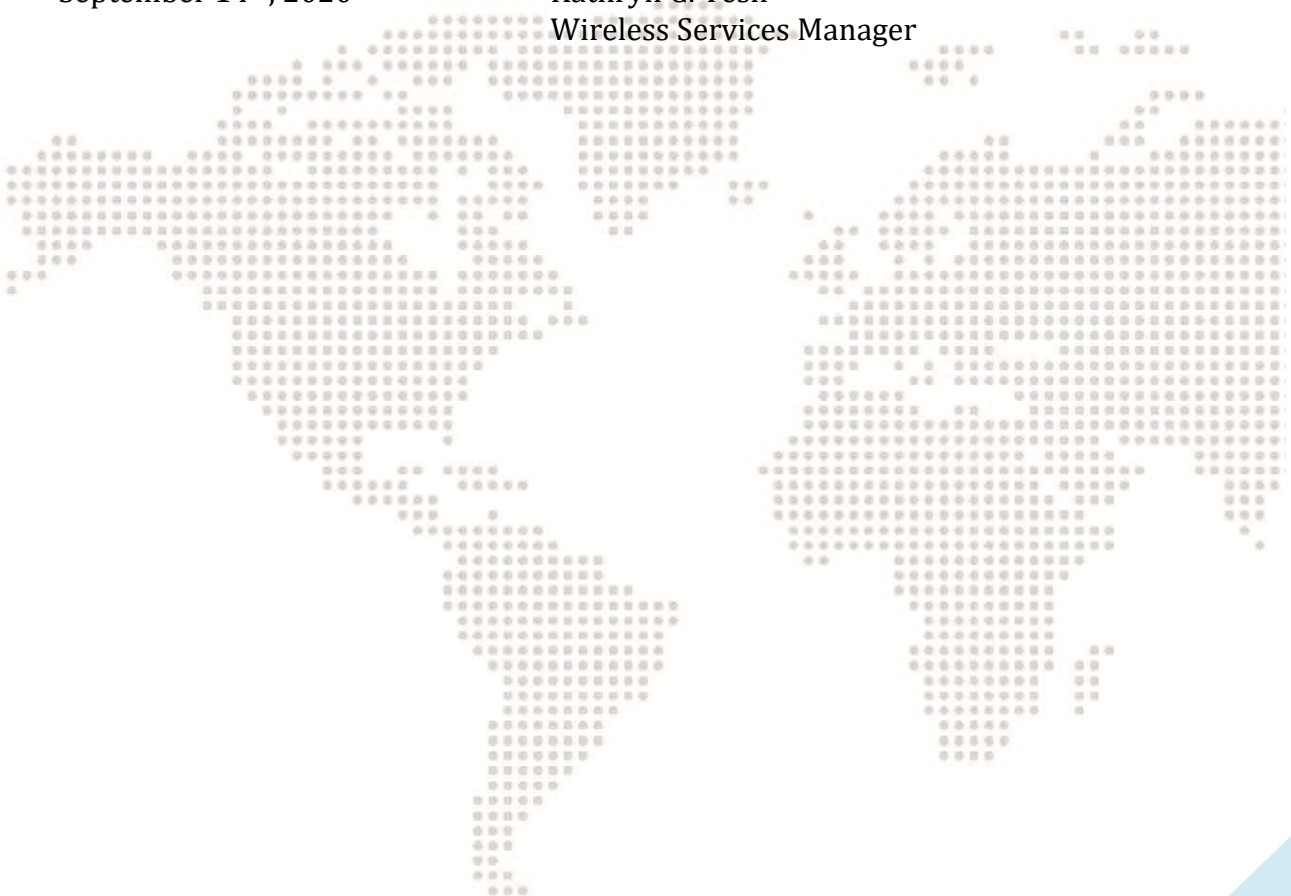
Based upon the provided information and the FCC limits for exposure as outlined in 47 CFR 1.1307(b)(1) - (b)(3), the power levels and percentages of the FCC's allowable general population limit are shown in Appendix 4. Calculations were done at industry standard average head height of six feet above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

September 14th, 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 Frequency	RX Frequency
Yes	AT&T MOBILITY	153	3	PANEL	CCI	DMP65R-BU6DA	12	1 1/4" Coax	Platform with Handrails	17/135/258	1745-1755, 1770-1780, 704-716, 824-845, 869-890	2145-2155, 2170-2180, 728-746, 845-849, 890-894
No	AT&T MOBILITY	153	3	PANEL	CCI	HPA-65R-BUU-H6			Platform with Handrails	17/135/258	1930-1945, 1985-1990, 758-768, 869-879, 890-891	1850-1910, 788-798, 824-847, 845-846
No	AT&T MOBILITY	153	3	PANEL	CCI	HPA-65R-BUU-H6			Platform with Handrails	17/135/258	1930-1945, 1985-1990, 758-768, 869-879, 890-891	1850-1910, 788-798, 824-847, 845-846
No	AT&T MOBILITY	153	3	PANEL	Powerwave Allgon	7770.00			Platform with Handrails	135/258/17	1930-1935, 1945-1950, 1965-1970, 891.6-893.8	1855, 1865-1870, 1885-1890, 846.6-848.8
No	VERIZON WIRELESS	114	3	PANEL	Andrew	LNX-6514DS-VTM (72.7" height)	3	1 5/8" Coax	T-Arm	30/150/270	869-880, 890-892	824-835, 845-847
No	VERIZON WIRELESS	114	3	PANEL	Powerwave Allgon	P65-16-XL-2	3	1 5/8" Coax	T-Arm	30/150/270	746-757	776-787
No	VERIZON WIRELESS	114	3	PANEL	Andrew	HBX-6517DS-VTM (13.2lbs)	3	1 5/8" Coax	T-Arm	30/150/270	2145-2155	1745-1755
No	VERIZON WIRELESS	114	3	PANEL	Decibel	932DG90T2E-M	3	1 5/8" Coax	T-Arm	30/150/270	1970-1975	1890-1895

APPENDIX 2

AT&T Channels Used

Antenna	Technology	Frequency Band	Channel Count	Transmitter Power per Channel (W)
AT&T A1	LTE	1700	1	40
AT&T A2	LTE	1700	1	40
AT&T A3	LTE	700	1	40
AT&T A4	UMTS	850	1	40
AT&T A5	UMTS	850	1	40
AT&T A6	LTE	1900	1	40
AT&T A7	LTE	1900	1	40
AT&T A8	LTE	700	1	40
AT&T A9	UMTS	850	1	40
AT&T A10	UMTS	850	1	40
AT&T A11	LTE	1900	1	40
AT&T A12	LTE	1900	1	40
AT&T A13	LTE	700	1	40
AT&T A14	UMTS	850	1	40
AT&T A15	UMTS	850	1	40
AT&T A16	LTE	1900	1	40
AT&T A17	LTE	1900	1	40
AT&T A18	LTE	1900	1	40
AT&T A19	UMTS	850	1	40
AT&T B1	LTE	1700	1	40
AT&T B2	LTE	1700	1	40
AT&T B3	LTE	700	1	40
AT&T B4	UMTS	850	1	40
AT&T B5	UMTS	850	1	40
AT&T B6	LTE	1900	1	40
AT&T B7	LTE	1900	1	40
AT&T B8	LTE	700	1	40
AT&T B9	UMTS	850	1	40
AT&T B10	UMTS	850	1	40
AT&T B11	LTE	1900	1	40
AT&T B12	LTE	1900	1	40
AT&T B13	LTE	700	1	40
AT&T B14	UMTS	850	1	40
AT&T B15	UMTS	850	1	40
AT&T B16	LTE	1900	1	40
AT&T B17	LTE	1900	1	40
AT&T B18	LTE	1900	1	40
AT&T B19	UMTS	850	1	40
AT&T C1	LTE	1700	1	40
AT&T C2	LTE	1700	1	40
AT&T C3	LTE	700	1	40
AT&T C4	UMTS	850	1	40
AT&T C5	UMTS	850	1	40
AT&T C6	LTE	1900	1	40
AT&T C7	LTE	1900	1	40
AT&T C8	LTE	700	1	40
AT&T C9	UMTS	850	1	40
AT&T C10	UMTS	850	1	40
AT&T C11	LTE	1900	1	40
AT&T C12	LTE	1900	1	40
AT&T C13	LTE	700	1	40
AT&T C14	UMTS	850	1	40
AT&T C15	UMTS	850	1	40
AT&T C16	LTE	1900	1	40
AT&T C17	LTE	1900	1	40
AT&T C18	LTE	1900	1	40
AT&T C19	UMTS	850	1	40

APPENDIX 3

AT&T Antenna Information

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	AT&T A1	CCI DMP65R-BU6DA	153
A	AT&T A2	CCI DMP65R-BU6DA	153
A	AT&T A3	CCI DMP65R-BU6DA	153
A	AT&T A4	CCI DMP65R-BU6DA	153
A	AT&T A5	CCI DMP65R-BU6DA	153
A	AT&T A6	CCI HPA-65R-BUU-H6	153
A	AT&T A7	CCI HPA-65R-BUU-H6	153
A	AT&T A8	CCI HPA-65R-BUU-H6	153
A	AT&T A9	CCI HPA-65R-BUU-H6	153
A	AT&T A10	CCI HPA-65R-BUU-H6	153
A	AT&T A11	CCI HPA-65R-BUU-H6	153
A	AT&T A12	CCI HPA-65R-BUU-H6	153
A	AT&T A13	CCI HPA-65R-BUU-H6	153
A	AT&T A14	CCI HPA-65R-BUU-H6	153
A	AT&T A15	CCI HPA-65R-BUU-H6	153
A	AT&T A16	Powerwave Allgon 7770.00	153
A	AT&T A17	Powerwave Allgon 7770.00	153
A	AT&T A18	Powerwave Allgon 7770.00	153
A	AT&T A19	Powerwave Allgon 7770.00	153
B	AT&T B1	CCI DMP65R-BU6DA	153
B	AT&T B2	CCI DMP65R-BU6DA	153
B	AT&T B3	CCI DMP65R-BU6DA	153
B	AT&T B4	CCI DMP65R-BU6DA	153
B	AT&T B5	CCI DMP65R-BU6DA	153
B	AT&T B6	CCI HPA-65R-BUU-H6	153
B	AT&T B7	CCI HPA-65R-BUU-H6	153
B	AT&T B8	CCI HPA-65R-BUU-H6	153
B	AT&T B9	CCI HPA-65R-BUU-H6	153
B	AT&T B10	CCI HPA-65R-BUU-H6	153
B	AT&T B11	CCI HPA-65R-BUU-H6	153
B	AT&T B12	CCI HPA-65R-BUU-H6	153
B	AT&T B13	CCI HPA-65R-BUU-H6	153
B	AT&T B14	CCI HPA-65R-BUU-H6	153
B	AT&T B15	CCI HPA-65R-BUU-H6	153
B	AT&T B16	Powerwave Allgon 7770.00	153
B	AT&T B17	Powerwave Allgon 7770.00	153
B	AT&T B18	Powerwave Allgon 7770.00	153
B	AT&T B19	Powerwave Allgon 7770.00	153
C	AT&T C1	CCI DMP65R-BU6DA	153
C	AT&T C2	CCI DMP65R-BU6DA	153
C	AT&T C3	CCI DMP65R-BU6DA	153
C	AT&T C4	CCI DMP65R-BU6DA	153
C	AT&T C5	CCI DMP65R-BU6DA	153
C	AT&T C6	CCI HPA-65R-BUU-H6	153
C	AT&T C7	CCI HPA-65R-BUU-H6	153
C	AT&T C8	CCI HPA-65R-BUU-H6	153
C	AT&T C9	CCI HPA-65R-BUU-H6	153
C	AT&T C10	CCI HPA-65R-BUU-H6	153
C	AT&T C11	CCI HPA-65R-BUU-H6	153
C	AT&T C12	CCI HPA-65R-BUU-H6	153
C	AT&T C13	CCI HPA-65R-BUU-H6	153
C	AT&T C14	CCI HPA-65R-BUU-H6	153
C	AT&T C15	CCI HPA-65R-BUU-H6	153
C	AT&T C16	Powerwave Allgon 7770.00	153
C	AT&T C17	Powerwave Allgon 7770.00	153
C	AT&T C18	Powerwave Allgon 7770.00	153
C	AT&T C19	Powerwave Allgon 7770.00	153

APPENDIX 4

FCC OET-65 MPE Limit Study

Antenna ID	Antenna Make / Model	Frequency Band	Antenna Gain (dBd)	Antenna Height (ft)	Channel Count	TX Power (W)	ERP (W) (All Channels)	Total Power Density ($\mu W/cm^2$)	Allowable Public MPE ($\mu W/cm^2$)	Public MPE%
AT&T A1	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T A2	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T A3	CCI DMP65R-BU6DA	700	11.85	153	1	40	1004.75	0.1909562	466.67	0.040919%
AT&T A4	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T A5	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T A6	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T A7	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T A8	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T A9	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T A10	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T A11	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T A12	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T A13	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T A14	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T A15	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T A16	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T A17	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T A18	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T A19	Powerwave Allgon 7770.00	850	11.45	153	1	40	916.35	0.6123806	566.67	0.108067%
AT&T B1	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T B2	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T B3	CCI DMP65R-BU6DA	700	11.85	153	1	40	1004.75	0.1909562	466.67	0.040919%
AT&T B4	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T B5	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T B6	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T B7	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T B8	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T B9	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T B10	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T B11	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T B12	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T B13	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T B14	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T B15	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T B16	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T B17	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T B18	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T B19	Powerwave Allgon 7770.00	850	11.45	153	1	40	916.35	0.6123806	566.67	0.108067%
AT&T C1	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T C2	CCI DMP65R-BU6DA	1700	15.55	153	1	40	2355.37	0.1703398	1000.00	0.017034%
AT&T C3	CCI DMP65R-BU6DA	700	11.85	153	1	40	1004.75	0.1909562	466.67	0.040919%
AT&T C4	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T C5	CCI DMP65R-BU6DA	850	12.45	153	1	40	1153.61	0.2192471	566.67	0.038691%
AT&T C6	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T C7	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T C8	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T C9	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T C10	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T C11	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T C12	CCI HPA-65R-BUU-H6	1900	14.75	153	1	40	1959.12	0.6096121	1000.00	0.060961%
AT&T C13	CCI HPA-65R-BUU-H6	700	11.95	153	1	40	1028.16	0.1954042	466.67	0.041872%
AT&T C14	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T C15	CCI HPA-65R-BUU-H6	850	12.65	153	1	40	1207.98	0.0989453	566.67	0.017461%
AT&T C16	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T C17	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T C18	Powerwave Allgon 7770.00	1900	13.35	153	1	40	1419.25	2.0255274	1000.00	0.202553%
AT&T C19	Powerwave Allgon 7770.00	850	11.45	153	1	40	916.35	0.6123806	566.67	0.108067%
AT&T All Sectors									**Total:**	**3.7966%**

APPENDIX 5

Summary of Power Density

Carriers	Power Density Value (% of General Population)
AT&T All Sectors:	3.7966%
Other Carriers:	1.4460%
Site Total:	5.2426%
Site Compliance Status:	Compliant

APPENDIX 6

Information Pertaining to MPE Studies

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.