

# 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@po.state.ct.us](mailto:siting.council@po.state.ct.us)

Web Site: [www.state.ct.us/csc/index.htm](http://www.state.ct.us/csc/index.htm)

January 9, 2003

Christopher B. Fisher, Esq.  
Cuddy & Feder & Worby LLP  
90 Maple Avenue  
White Plains, NY 10601-5196

RE: **EM-AT&T-143-021230** - Litchfield Acquisition Corporation, Inc. d/b/a AT&T Wireless notice of intent to modify an existing telecommunications facility located at 1210 Highland Avenue, Torrington, Connecticut.

Dear Attorney Fisher:

At a public meeting held on January 8, 2003, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated December 26, 2002. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

  
Mortimer A. Gelston  
Chairman

MAG/laf

c: Honorable Owen J. Quinn, Jr., Mayor, City of Torrington  
Martin Connor, City Planner, City of Torrington  
Sheila Becker, SBA, Inc.  
Thomas F. Flynn III, Nextel Communications  
Christopher B. Fisher, Esq., Cuddy & Feder & Worby  
Steve Marcus, The Marcus Group



STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

Ten Franklin Square  
New Britain, Connecticut 06051  
Phone: (860) 827-2935  
Fax: (860) 827-2950

December 30, 2002

Honorable Owen J. Quinn, Jr.  
Mayor  
City of Torrington  
Municipal Building  
140 Main Street  
Torrington, CT 06790-5245

RE: **EM-AT&T-143-021230** - Litchfield Acquisition Corporation, Inc. d/b/a AT&T Wireless notice of intent to modify an existing telecommunications facility located at 1210 Highland Avenue, Torrington, Connecticut.

Dear Mayor Quinn:

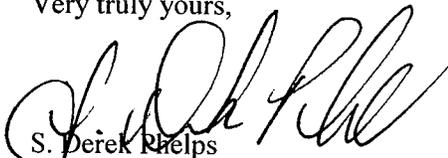
The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting tentatively scheduled for January 8, 2003, at 1:30 p.m., in Hearing Room Two, Ten Franklin Square, New Britain, Connecticut.

Please call me or inform the Council if you have any questions or comments regarding this proposal.

Thank you for your cooperation and consideration.

Very truly yours,



S. Derek Rhelms  
Executive Director

SDP/laf

Enclosure: Notice of Intent

c: Martin Connor, City Planner, City of Torrington

**CUDDY & FEDER & WORBY LLP**

90 MAPLE AVENUE  
WHITE PLAINS, NEW YORK 10601-5196

(914) 761-1300  
TELECOPIER (914) 761-5372/6405  
www.cfwlaw.com

500 FIFTH AVENUE  
NEW YORK, NEW YORK 10110  
(212) 944-2841  
TELECOPIER (212) 944-2843

WESTAGE BUSINESS CENTER  
300 SOUTH LAKE DRIVE  
FISHKILL, NEW YORK 12524  
(845) 896-2229  
TELECOPIER (845) 896-3672

STAMFORD, CONNECTICUT  
NORWALK, CONNECTICUT

**CUDDY & FEDER**  
1971-1995

WILLIAM S. NULL  
DAWN M. PORTNEY  
ELISABETH N. RADOW  
NEIL T. RIMSKY  
RUTH E. ROTH  
JENNIFER L. VAN TUYL  
CHAUNCEY L. WALKER (also CA)  
ROBERT L. WOLFE  
DAVID E. WORBY

Of Counsel  
MICHAEL R. EDELMAN  
ANDREW A. GLICKSON (also CT)  
ROBERT L. OSAR (also TX)  
MARYANN M. PALERMO  
ROBERT C. SCHNEIDER  
LOUIS R. TAFFERA

NEIL J. ALEXANDER (also CT)  
CHARLES T. BAZYDLO (also NJ)  
THOMAS R. BEIRNE (also DC)  
THOMAS M. BLOOMER  
JOSEPH P. CARLUCCI  
KENNETH J. DUBROFF  
ROBERT FEDER  
CHRISTOPHER B. FISHER (also CT)  
ANTHONY B. GIOFFRE III (also CT)  
SUSAN E.H. GORDON  
KAREN G. GRANIK  
JOSHUA J. GRAUER  
WAYNE E. HELLER (also CT)  
KENNETH F. JURIST  
MICHAEL L. KATZ (also NJ)  
JOSHUA E. KIMERLING (also CT)  
DANIEL F. LEARY (also CT)  
BARRY E. LONG

December 26, 2002

VIA FEDERAL EXPRESS

Hon. Mortimer Gelston, Chairman and Members  
of the Siting Council  
Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051

**RECEIVED**

DEC 30 2002

**CONNECTICUT  
SITING COUNCIL**

Re: AT&T Wireless  
1210 Highland Avenue  
Torrington, Connecticut  
Notice of Further Exempt Modification

Hon. Mortimer Gelston, Chairman and Members of the Siting Council:

On March 21, 2002, Litchfield Acquisition Corporation, Inc. d/b/a AT&T Wireless received the Council's acknowledgement of a notice to modify the existing facility located at 1210 Highland Avenue in the City of Torrington pursuant to Section 16-50j-72 of the Regulations of Connecticut State Agencies (EM-AT&T-064-143-148-020225) permitting it to replace two antennas and install additional equipment within the shelter at the existing facility.

This notice of further exempt modification is also being provided pursuant to Section 16-50j-72 of the Council's regulations. AT&T Wireless will be replacing four whip antennas used in its 800 MHz cellular system with six panel antennas. There will be no other infrastructure changes to AT&T's facility.

The proposed replacement antennas at AT&T Wireless' facility do not constitute a "modification" of an existing facility as defined in Connecticut General Statutes Section 16-

December 27, 2002

Page 2

50i(d). The proposed alteration to AT&T Wireless' facility will not result in an increase in the Tower's height or extend the boundaries of the existing Tower Facility. Further, there will be no increase in noise levels by six (6) decibels or more at the Tower site's boundary. AT&T has made measurements of the existing facility to confirm compliance with MPE limits and as set forth in a report prepared by Edward and Kelcey, annexed hereto as Exhibit A, the total radio frequency electromagnetic radiation power density at the Tower site's boundary will not be increased to or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes. Additionally, as evidenced in the Structural Report prepared by All-Points Technology Corporation, PC, annexed hereto as Exhibit B, AT&T has confirmed that the Tower is structurally capable of supporting the replacement antennas.

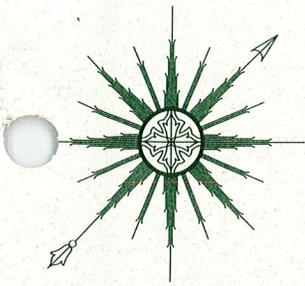
For all the foregoing reasons, addition of AT&T Wireless' equipment to its existing facility constitutes an exempt modification which will not have a substantially adverse environmental effect. AT&T Wireless respectfully submits that the proposed antenna modifications to the Highland Avenue Facility meets the Council's exemption criteria and requests an acknowledgment of same.

Respectfully Submitted,



Christopher B. Fisher, Esq.  
On behalf of AT&T Wireless

cc: Mayor, City of Torrington  
Michael Austin, AT&T

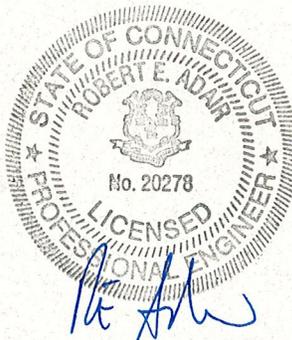


# ALL-POINTS TECHNOLOGY CORPORATION, P.C.

## **STRUCTURAL ANALYSIS REPORT 260' PIROD #36 GUYED TOWER TORRINGTON, CONNECTICUT**

Prepared for  
SBA, Inc.

December 12, 2002



APT Project #CT115121

**STRUCTURAL ANALYSIS REPORT**  
**of**  
**260' PiROD #36 GUYED TOWER**  
**TORRINGTON, CONNECTICUT**  
**prepared for**  
**SBA, Inc.**

**EXECUTIVE SUMMARY:**

All-Points Technology Corporation, P.C. (APT) performed a structural analysis of SBA, Inc.'s 260-foot guyed tower located on Highland Avenue in Torrington, Connecticut. The analysis was performed with the addition of six ALP7145.26 panel antennas on three 10' sector mounts at 200' and subsequent removal of four existing whip antennas and two sidearms currently installed at 200'. Waveguide will consist of six 1-5/8" cables.

Our analysis indicates the tower is capable of supporting the proposed antenna changes. APT recommends a safety cable be installed on the tower to facilitate future antenna installations.

**INTRODUCTION:**

A structural analysis was performed by APT on this 260' guyed tower for SBA, Inc. The tower is located at 1210 Highland Avenue in Torrington, Connecticut. The structure is a 260-foot #36 galvanized steel guyed tower manufactured by PiROD, Inc.

Robert E. Adair, P.E. previously inspected the tower on December 26, 2001 to record information regarding physical and dimensional properties of the structure and its appurtenances. Mr. Adair visited the tower site again on December 4, 2002 to re-inventory the tower for this structural analysis.

The analysis also relied on information provided by SBA, which included design drawings by PiROD and antennas proposed by AT&T Wireless.

The analysis was performed with the following antenna inventory:

---

**All-Points Technology Corporation**

150 Old Westside Road  
North Conway, NH 03860  
(603) 356-5214

711 North Mountain Road  
Newington, CT 06111  
(860) 953-4444

Antenna	Elev.	Leg	Mount	Coax.
Beacon & lightning rod	260'	NW	Top plate	1" conduit
20' whip	259'	N Face	10' candelabra	1-5/8"
12' whip	259'	E Face	10' candelabra	1-5/8"
(2) 16' whips <sup>1</sup>	259'	SW Face	10' candelabra	1/2", (2) 7/8"
Amplifier box	256'	E Face	Face	-
14' whip	222'	NW	4' sidearm	1-5/8"
10' whip	222'	NW	Leg	1-1/4"
(2) 12' whips <sup>1</sup> , 14' whip, 16' whip	218'	N Face	10' candelabra	7/8", (3) 1-1/4"
(2) 12' whips <sup>1</sup> , 10' whip, 7' whip	218'	E Face	10' candelabra	(2) 7/8", (3) 1-1/4"
(2) 12' whips <sup>1</sup> , 7' whip	218'	SW Face	10' candelabra	(3) 1-1/4"
(3) ALP7262.02 panels	203'	All	Pipe on each leg	(6) 1-5/8"
<b>(6) ALP7145.26 panels</b>	<b>200'</b>	<b>All</b>	<b>(3) 10' sector mnts</b>	<b>(6) 1-5/8"</b>
12' whip	178'	NW	2' sidearm	7/8"
12' whip	177'	NE	4' sidearm	7/8"
7' whip, 2' yagi, 4-bay FM	176'	S	3' sidearm	1-1/4", 7/8"
14' whip	167'	E Face	6' sidearm	7/8"
7' whip	163'	NW	2' sidearm	7/8"
10' whip	159'	S	1' sidearm	1-1/4"
10' whip	140'	NW	3' sidearm	7/8"
10' whip	130'	NW	2' sidearm	7/8"
3-bay Shively FM w/radome	121'	S	2' sidearm	1-5/8"
<i>2' dish and RFC</i>	<i>100'</i>	<i>Any</i>	<i>Leg</i>	<i>1/2"</i>
1-bay Shively FM w/radome	84'	S	2' sidearm	1-5/8"
2' dish and RFC	67'	S	Leg	1/2"

Notes:

- <sup>1</sup> One whip upright, one inverted
- Proposed antennas in **bold text**.
- Future antennas in *italic text*.
- Elevations listed refer to centerline of mounting point.

**All-Points Technology Corporation**

150 Old Westside Road  
North Conway, NH 03860  
(603) 356-5214

711 North Mountain Road  
Newington, CT 06111  
(860) 953-4444

## **STRUCTURAL ANALYSIS:**

### **Methodology:**

The structural analysis was done in accordance with EIA/TIA-222-F, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures; and the American Institute of Steel Construction (AISC), Manual of Steel Construction, Allowable Stress Design, Ninth Edition.

The analysis was conducted using a wind speed of 80 miles per hour and one-half inch of radial ice over the entire structure and all appurtenances. The EIA/TIA Standard requires a minimum wind speed of 80 miles per hour for Litchfield County, Connecticut.

The tower was analyzed by calculating the resultant wind loading and associated maximum bending moments, shear forces, and axial loads. The moments and forces were used to calculate stresses in leg and bracing members and combined axial and bending stresses in the tower mast, which were compared to allowable stresses according to AISC.

Two loading conditions were evaluated in accordance with EIA/TIA-222-F to determine the tower's capacity. The more demanding of the two cases is used to calculate the tower capacity:

- Case 1 = Wind Load (without ice) + Tower Dead Load
- Case 2 = 0.75 Wind Load (with ice) + Ice Load + Tower Dead Load

In addition, the TIA/EIA standard permits a one-third increase in allowable stresses for towers less than 700-feet tall. Allowable stresses of tower members were increased by one-third when computing the tower capacity values shown below.

### **Analysis Results:**

Analysis of the tower was conducted in accordance with the criteria outlined herein with antenna changes as previously described. Our analysis determined the existing tower is capable of supporting the proposed antenna changes.

The following table summarizes the results of the analysis based on combined axial and bending stresses of the tower mast and compressive stresses of individual leg members:

<b>Elevation</b>	<b>Capacity</b>
0-70'	<b>73%</b>
70'-100'	<b>72%</b>
100'-140'	<b>79%</b>
140'-198'	<b>68%</b>
198'-240'	<b>53%</b>
240'-260'	<b>27%</b>

**Lattice Bracing:**

Bracing is installed in an X-brace configuration, with each compression member paired with a corresponding tension member. Bracing was evaluated by calculating bracing members' allowable compression and tension forces and assessing each tower section's ability to resist shear forces.

Bracing members were determined to be appropriately sized based on comparison of calculated vs. allowable tower shear.

**Guy Cables:**

EIA/TIA-222-F paragraph 8.2.1 requires all guy cables to have a factor of safety of 2.0 or greater for structures less than 700-feet in height. Based on this requirement, all guys are appropriately sized.

**Base Foundation and Guy Anchors:**

Evaluation of the existing deadmen guy anchors and base foundation was performed using PiROD design drawings. The existing foundation and guy anchors are found to be adequate to support calculated reactions imposed by the proposed loads..

Base reactions imposed with the additional antennas were calculated as follows:

<u>Location</u>	<u>Vertical</u>	<u>Horizontal</u>
Base:	95.0 kips	-1.7 kips
Guy Anchor:	-32.5 kips	-43.1 kips

---

**All-Points Technology Corporation**

150 Old Westside Road  
North Conway, NH 03860  
(603) 356-5214

711 North Mountain Road  
Newington, CT 06111  
(860) 953-4444

## **CONCLUSIONS AND RECOMMENDATIONS:**

Our structural analysis indicates the 260-foot guyed tower located in Torrington, Connecticut is capable of supporting the antennas proposed by AT&T Wireless.

APT recommends a safety cable be installed to facilitate future work on the structure.

## **LIMITATIONS:**

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in new condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

All-Points Technology Corporation, P.C. (APT) is not responsible for modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Replacing or reinforcing members in any manner.
2. Adding or relocating guy cables.
3. Installing antenna mounting frames or side arms.
4. Extending tower.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which is contrary to that which is stated herein, or you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

---

### **All-Points Technology Corporation**

150 Old Westside Road  
North Conway, NH 03860  
(603) 356-5214

711 North Mountain Road  
Newington, CT 06111  
(860) 953-4444



***RF Emissions Experts***  
***AN EDWARDS AND KELCEY SERVICE***

***Analysis and Report  
of RF Exposure Levels  
and Compliance with  
FCC Regulations***

***Torrington Site  
1210 Highland Avenue  
Torrington, CT  
Site ID: L01***

***Prepared for***

***AT&T Wireless***

***December 2, 2002***

**EDWARDS AND KELCEY**  
299 Madison Avenue - PO Box 1936  
Morristown, NJ 07962-1936

Tel: 973-267-8830 Fax: 973-267-3555  
Email: [gburylo@ekmail.com](mailto:gburylo@ekmail.com)  
Internet: <http://www.ekcorp.com>

**PROPRIETARY – AT&T WIRELESS AND EDWARDS AND KELCEY**

This document has been prepared for AT&T Wireless for its use in demonstrating RF compliance, as necessary, to federal, state and/or local authorities, and/or site landlords. Distribution beyond that described is prohibited without the express written consent of Edwards and Kelcey.



**FCC RF COMPLIANCE ANALYSIS FOR**

**AT&T Wireless**

**Torrington, CT Tower**

This site compliance report is organized as follows:

- Site Technical Data
- Analysis Method and Assumptions
- The FCC RF Radiation Exposure Regulations
- Applicable Formulas
- Analysis Results
- Conclusion

***SITE TECHNICAL DATA (replacing four (4) 800 MHz whip antennas with six (6) 800 MHz panel antennas – data reflects the replacement 800 MHz antenna system)***

Facility type	Existing 260 ft. Tower
Transmit frequency band	869 - 880 MHz
Replacement Antenna type	Allgon 7145.26.00
Antenna major dimension (length)	5.9 ft.
Maximum antenna gain	12.5 dBd
Antenna centerline height	210 ft. above ground level
Total number of 1900 MHz antennas	3 antennas
Total number of 850 MHz antennas	6 antennas
Maximum ERP per sector	125 watts
Maximum antenna downtilt	0 degrees
Existing carriers on tower	See report

***ANALYSIS METHOD AND ASSUMPTIONS***

Type of analysis	Maximum / ground-level
Area analyzed	0' to 500' from tower
Classification of area	Uncontrolled (gen. pop.)
FCC Maximum Permissible Exposure (MPE) limit	0.5793 mW/ cm <sup>2</sup> (869 MHz)
Mathematical model	Point source, far field
Assumed ground reflection factor	100%
Assumed human height	6'0"
Vertical antenna discrimination included	<b>(not used in CT)</b>

## **THE FCC RF RADIATION EXPOSURE REGULATIONS**

This RF exposure analysis is based on the current FCC guidelines for human exposure to RF fields, which represent the consensus of federal agencies responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Health and Safety Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.1301 *et seq* of its Rules and Regulations. Those guidelines specify maximum permissible exposure (MPE) levels for both occupational and general population exposure on a continuous basis, as well as averaging times for each of those categories when and if exposure exceeds the specified continuous exposure limits. (The concept of averaging time will be ignored in this analysis, as the results show the potential exposure levels are far below those permitted even for continuous exposure.)

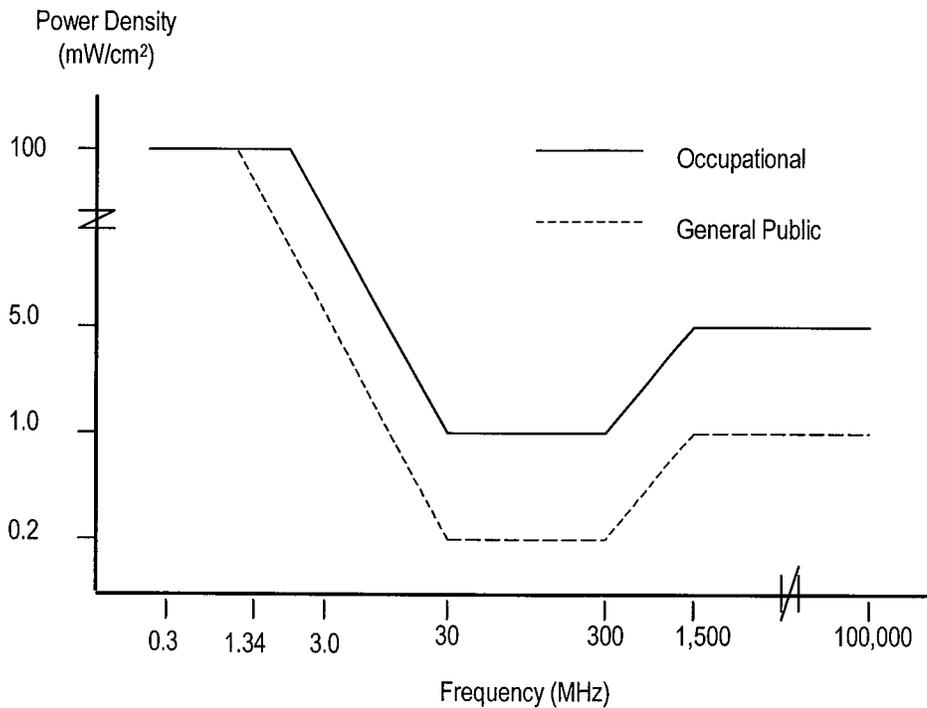
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus the general population MPE limit has a built-in safety factor of more than 50. Continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects on humans.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm<sup>2</sup>). The more popularly used reference unit is power density, as it is more easily understood. One milliwatt per square centimeter is approximately the energy impinging on an area roughly one-fourth the size of a dime from a light bulb emitting ten thousand times less than the energy of a common 100-watt bulb. The table below lists the FCC limits for both occupational and general population exposure to different radio frequencies.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm <sup>2</sup> )	General Public Exposure (mW/cm <sup>2</sup> )
0.3 - 1.34	100	100
1.34 - 3.0	100	180 / F <sup>2</sup>
3.0 - 30	900 / F <sup>2</sup>	180 / F <sup>2</sup>
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The figure below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



FCC MPE limits – graphical representation

The FCC makes it clear that the MPE limits apply only in accessible areas. Fundamentally, in areas that are considered normally inaccessible, the exposure issue is moot.

## APPLICABLE FORMULAS

According to FCC OET Bulletin 65, different mathematical models apply to different distances around an antenna. At the height of the antenna, the breakpoint is the “far-field distance”, calculated as the ratio of the square of the major dimension of the antenna divided by the signal wavelength. Beyond the far-field distance at the height of the antenna, as well as at ground-level underneath the antenna, a “far-field point source” model applies; within that distance, a “near-field cylindrical model applies. The subsections below provide background on the two applicable models in the 869 - 880 MHz band.

### Far-Field Point Source Model

$$(1) \quad S \text{ [mW/cm}^2\text{]} = ( 4 * \text{EIRP}_{\text{max}} * \text{VertAntDisc}(\phi) ) / ( 4 * \pi * R_{\text{cm}}^2 )$$

$$(2) \quad \text{FCC MPE limit} = 0.579 \text{ mW/cm}^2$$

$$(3) \quad \text{MPE}\% = 100 * (S / 0.579)$$

where:

S	=	Calculated power density
4 (in numerator)	=	100% field ground reflection effect (has $[1 + 1]^2 = 4$ effect on power density)
EIRP <sub>max</sub>	=	Maximum effective isotropically radiated power (Note: EIRP is 64% higher than ERP, which is referenced to a half-wave dipole)
VertAntDisc( $\phi$ )	=	Numeric factor for antenna discrimination (EIRP reduction) in the vertical plane, applicable at downward angle $\phi$ to a 6' human standing on ground, calculated at distances from 0' to 500' away from the antenna <b>(not used in Connecticut sites – as requested by the Connecticut Siting Council)</b>
R	=	Straight-line distance from antenna to 6' human
MPE%	=	Calculated exposure level, as a percentage of the FCC MPE limit for continuous exposure of the general population

### Near-Field Cylindrical Model

(1)  $S \text{ [mW/cm}^2\text{]} = (P_i * ACF / (2 \pi R h))$

(2) FCC MPE limit = 0.579 mW/cm<sup>2</sup>

(3) MPE% = 100 \* (S / 0.579)

where:

S	=	Calculated power density
P <sub>i</sub>	=	Total power input to the antenna, in mW
ACF	=	Antenna correction factor (adjustment to near-field power density calculation to compensate for the antenna mounting height above ground level and resulting partial-body exposure; see Richard Tell article listed in the References)
R	=	Straight-line distance from antenna to 6' human
h	=	Subtended height of the antenna, in cm
MPE%	=	Calculated exposure level, as a percentage of the FCC MPE limit for continuous exposure of the general population

### **ANALYSIS RESULTS – GROUND-LEVEL**

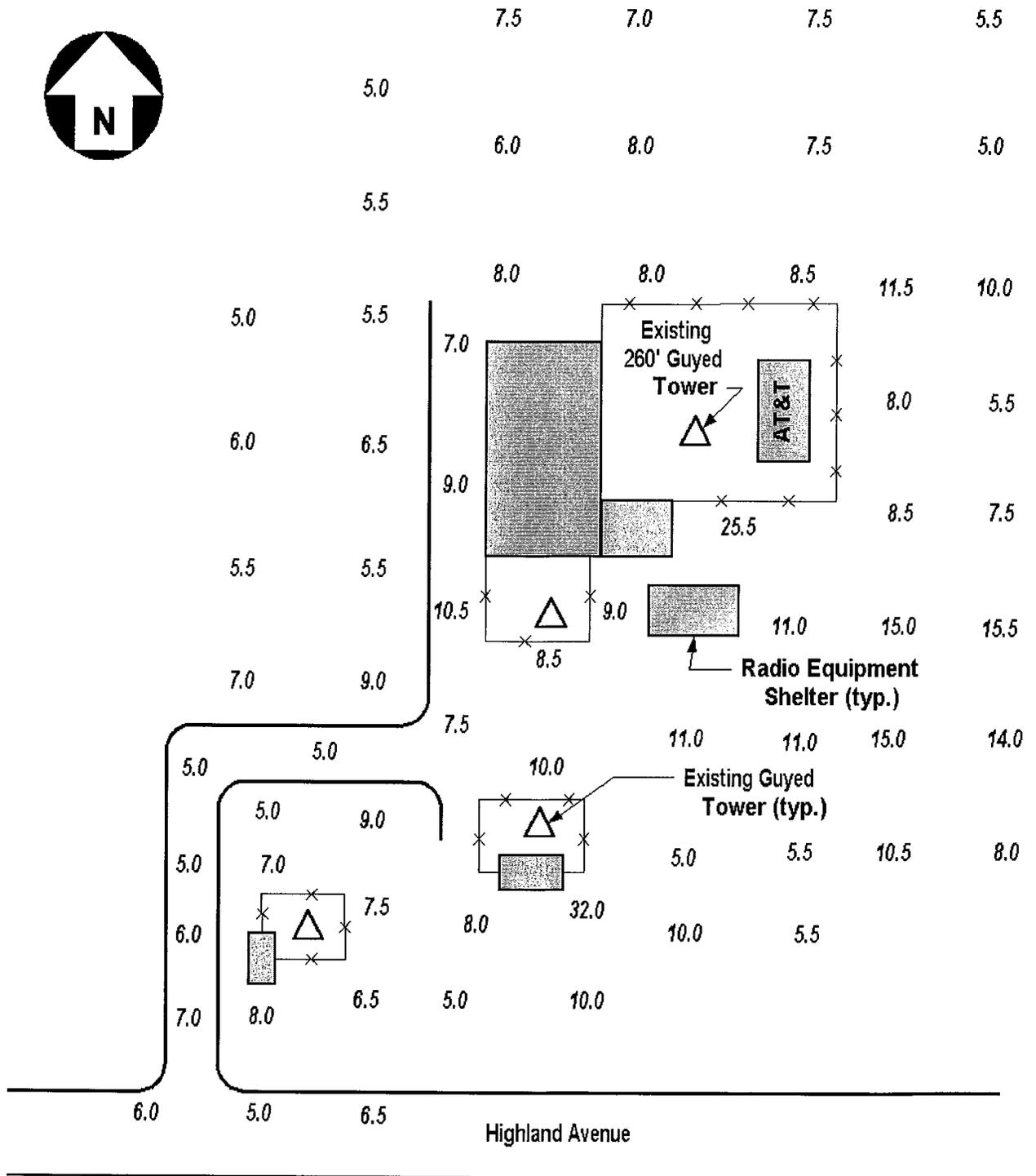
AT&T Wireless is replacing the four existing omni (whip) antennas presently transmitting in the 800 MHz band, with six new panel antenna that will transmit in the 800 MHz band. This analysis will reflect the additional RF emissions from the replacement antennas.

The table on the following page summarizes the results of the calculations using the site data, method and far-field point source formula described above. In addition, note that while the tabular distances are listed in feet, the calculations translate these units into centimeters, to match the FCC specification of MPE units. Also note that the value for 'G dist' is the distance along the ground in feet, from the base of the tower.

869 MHz Antenna Array (AT&T Wireless)					
G dist	R dist	V angle	V disc	mW/cm <sup>2</sup>	GPMPE%
0	201.0	90.0	1.000	0.0035	0.602
20	202.0	84.3	1.000	0.0035	0.596
40	204.9	78.7	1.000	0.0034	0.579
60	209.8	73.4	1.000	0.0032	0.553
80	216.3	68.3	1.000	0.0030	0.520
100	224.5	63.5	1.000	0.0028	0.483
120	234.1	59.2	1.000	0.0026	0.444
140	245.0	55.1	1.000	0.0023	0.405
160	256.9	51.5	1.000	0.0021	0.368
180	269.8	48.2	1.000	0.0019	0.334
200	283.6	45.1	1.000	0.0018	0.302
220	298.0	42.4	1.000	0.0016	0.274
240	313.1	39.9	1.000	0.0014	0.248
260	328.6	37.7	1.000	0.0013	0.225
280	344.7	35.7	1.000	0.0012	0.205
300	361.1	33.8	1.000	0.0011	0.186
320	377.9	32.1	1.000	0.0010	0.170
340	395.0	30.6	1.000	0.0009	0.156
360	412.3	29.2	1.000	0.0008	0.143
380	429.9	27.9	1.000	0.0008	0.132
400	447.7	26.7	1.000	0.0007	0.121
420	465.6	25.6	1.000	0.0006	0.112
440	483.7	24.6	1.000	0.0006	0.104
460	502.0	23.6	1.000	0.0006	0.097
480	520.4	22.7	1.000	0.0005	0.090
500	538.9	21.9	1.000	0.0005	0.084

**Table 1.** AT&T Wireless 869 MHz ground level RF power density & percent-of-MPE calculations

On February 8, 2002 Edwards & Kelcey conducted on-site RF exposure measurements. These measurements were performed using a Narda model 8722 RF probe and Narda model 8718 RF meter. Both the probe and meter are capable of broadband RF measurements, covering a range of 300 kHz to 50 GHz. The measuring equipment is designed to automatically register measured total RF exposure levels and report them as percentages of the FCC's overall occupational MPE limit. The following site plan shows measured MPE levels for general population.



**SITE PLAN**  
NOT TO SCALE

Figure 1: Field Measurements at 1210 Highland Avenue, Torrington, CT

## **CONCLUSION**

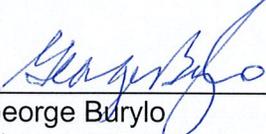
The calculations demonstrate that the maximum potential exposure level around the existing tower induced by the replacement 800 MHz AT&T Wireless system is 0.0035 mW/cm<sup>2</sup>, which represents 0.602% of the FCC limits for exposure of the general population.

The highest ground level measurement around the site was determined to be 32.0% of the FCC general population limit. Even though this level includes the emissions from the existing AT&T Wireless 800 MHz omni (whip) antennas, the calculated levels from the proposed replacement panel antennas were added to obtain a 'worst case' value. The total emission level of 32.602% is still three times below the FCC maximum permissible exposure for continuous exposure of the general population.

**Therefore, the replacement of the AT&T Wireless 800 MHz antenna system at the existing facility should not create a significant risk of cumulative exposure to RF emissions to the general population. And, according to the calculations and field measurements, the AT&T Wireless facility is in compliance with the FCC regulations (FCC OET Bulletin 65) concerning the control of potential RF exposure.**

**CERTIFICATION**

This report was prepared by George Burylo, Director – Engineering Services. The undersigned certifies that the analysis provided herein is consistent with the applicable FCC Rules and Regulations and accepted industry practice.

  
\_\_\_\_\_  
George Burylo  
Director – Engineering Services

December 2, 2002

## **REFERENCES**

47 CFR, FCC Rules and Regulations, Section 1.1301 *et seq.*

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

FCC Office of Engineering and Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, "Questions and Answers About Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields", Fourth Edition, August 1999.

Richard Tell, "CTIA's EME Design and Operation Considerations for Wireless Antenna Sites", November 15, 1996.

**Site Data**