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March 25, 2011

Attn: Joe O'Conner
SAI - Communications
2400 Ownby Lane
Richmond, VA 23220

Re: RF Safety FCC Compliance of Proposed Communications Facility
Site Name: Yancey Elementary School – CV433, Collocation on Existing Building
7625 Porters Road, Esmont, VA 22937 (Albemarle County)

Dear Mr. O'Conner,

I have performed an analysis to provide an independent determination and certification that the proposed AT&T communications facility at the above referenced property will comply with Federal Communications Commission (FCC) exposure limits and guidelines for human exposure to radiofrequency electromagnetic fields (Code of Federal Regulation 47 CFR 1.1307 and 1.1310). As a registered professional engineer I am under the jurisdiction of the State Registration Boards in which I am licensed to hold paramount the safety, health, and welfare of the public and to issue all public statements in an objective and truthful manner.

The proposed communications facility consists of collocation on the above referenced building. The proposed AT&T antenna configuration from the information furnished to me consists of (2) 1900 MHz (PCS) antennas (Andrew HBX-6517DS-R2M or equivalent) on each of three faces (total of 6 antennas) spaced with azimuths of 100/240/330 degrees on the horizontal plane with a centerline of 23' above ground level and no mechanical downtilt. Transmitting from these antennas initially will be (2) 1900 MHz (PCS) GSM channels at a maximum of 300 watts effective isotropic radiated power (EIRP) and (1) 1900 MHz (PCS) UMTS channel at a maximum of 400 watts EIRP on each face with a future maximum of up to (4) 1900 MHz (PCS) GSM channels and up to (2) 1900 MHz (PCS) UMTS channels on each face. The proposed AT&T antennas will be flush-mounted on the east (alpha), south (beta), and west (gamma) faces of the school gymnasium. The alpha and beta antenna faces will be mounted over the ground while the gamma antenna face will be mounted over the lower rooftop of the school approximately 11' above the lower rooftop.

The following assumptions are made for reasonable upper limit radiofrequency emissions from the proposed facility due to AT&T antennas alone:

- (1) 1900 MHz (PCS) transmit antenna (HBX-6517DS-R2M) per face at 0-10 degrees mechanical downtilt
- (4) 1900 MHz (PCS) GSM channels at a maximum power of 300 watts EIRP per channel
- (2) 1900 MHz (PCS) UMTS channels at a maximum power of 400 watts EIRP per channel
- The facility would be at or near full capacity during busy hour

Using the far-field power density equations from FCC Bulletin OET 65, the power density at any given distance from the proposed antennas is equal to $0.360(ERP)/R^2$ where R is the distance to the point at which the exposure is being calculated. This calculated power density assumes the location is in the main beam of the vertical

pattern of the antenna. After making an adjustment for the reduction in power density due to the vertical pattern of the transmit antenna, the calculated ground level power density is below $5 \mu\text{W}/\text{cm}^2$ at any distance from the antenna system of AT&T. This calculation uses parameters greater than what they have defined as their initial and typical operating parameters for this facility.

The “B Block” and “C3 Block” 1900 MHz (PCS) transmit frequencies (1950-1965, 1975-1980 MHz), which AT&T is licensed by the FCC to operate, have an uncontrolled/general population maximum permissible exposure (MPE) FCC limit of $1000 \mu\text{W}/\text{cm}^2$ or $1 \text{ mW}/\text{cm}^2$. Therefore, the exposure at ground level at any distance from the structure would be substantially below 5 % of the FCC exposure limits due to AT&T antennas alone. The extremely low ground exposure levels are due to the elevated positions of the antennas on the structure and the low power which these systems operate.

From the information furnished to me, the existing building currently contains no other commercial wireless communications licensee antenna arrays.

Since accessibility directly in front of the transmit antennas of AT&T is not possible or very limited due to the mounting locations (flush-mounted on the east (alpha), south (beta), and west (gamma) faces of the school gymnasium), the actual exposure for occupational workers, the general public that occupy the building, and pedestrians on the street is hundreds of times below the levels directly in front of the transmit antennas, due to the highly directional characteristic of the proposed wireless antennas. As one moves away from a transmit antenna, exposure is reduced substantially due to path loss of the radiofrequency signal, reduction due to moving away from the main beam, and the shielding effects of building materials. With the proposed new antenna configuration in service, the actual exposure levels for the general public that occupy the building and pedestrians on the street will be well below 5 % of the FCC exposure limits under any circumstances with the facilities in place.

Because the proposed AT&T gamma face antennas will be mounted over the lower rooftop, occupational workers on the lower rooftop can be in closer proximity to the antennas. Nevertheless, the antennas are elevated enough such that the exposure levels on the lower rooftop would still be well below the FCC exposure limits.

Since the collocation is on a building, in-building personnel or rooftop occupational workers can be in closer proximity to the wireless antennas. The rooftop is not normally occupied by the general public. Since the antennas are directional, the radiofrequency signal is projected away from the building and the power density above, below, or behind the antennas is reduced by a factor of 1000 or more. At locations away from the antenna and away from the main beam, the power density falls off extremely sharply.

In order to corroborate our calculations, we modeled the ground level around the base of the building and lower rooftop using “Roofview” which is also included at the end of this report. The model was set to the 1997 FCC occupational exposure limit standard with 100 % uptime and using the “near/far spatial average model”. The model uses green to represent exposure below 4 % occupational maximum permissible exposure (MPE), blue between 4 % and 20 % occupational MPE, yellow between 20 % and 100 % occupational MPE, and red to represent any areas above 100 % occupational MPE. In the first Roofview plot, the antennas were modeled with respect to ground level. In the second Roofview plot, only the gamma face antennas were modeled with respect to the lower rooftop.

As shown from our first Roofview plot, no areas of the ground level around the base of the building have the potential to exceed 5 % occupational maximum permissible exposure (MPE) due to the mounting locations and the lower power which these radio systems operate. As shown from our second Roofview plot, no areas of the lower rooftop below the gamma antenna face have the potential to exceed 10 % occupational maximum permissible exposure (MPE) due to the mounting locations and the lower power which these radio systems operate. Therefore, no further exposure access controls are warranted or recommended at this time.

The predictive model demonstrates that the ground level and lower rooftop exposure cannot approach the uncontrolled general population exposure limits under all upper limit conditions. Any other areas of the building including the interior will remain hundreds of times below the general population exposure limits due to the reduction in field strength from building materials and the path loss of the radio frequency signal.

From the standpoint of RF exposure, the presence of AT&T would not preclude the future addition of other tenants or licensees including emergency or other municipal services which benefit the public from collocation on this structure. There is a substantial margin of safety to allow for the addition of transmit antennas of other communications services. Keep in mind that continuous exposure at 100 % of standard is considered by the scientific community as just as safe as 1 % of standard since the exposure limits themselves contain a large margin of safety.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP), which is an association under the International Radiation Protection Association (IRPA), established exposure limits or guidelines in 1998 similar to the FCC limits. The ICNIRP is a formally recognized non-government organization in non-ionizing radiation for the World Health Organization and the International Labour Office. While the ICNIRP has no jurisdiction over FCC licensees, the composite exposure of the proposed facility will be substantially below 5 % of the ICNIRP exposure limits.

In summary, the proposed AT&T communications facility will comply with all applicable exposure limits and guidelines adopted by the FCC governing human exposure to radiofrequency electromagnetic fields (FCC Bulletin OET 65). Federal law (FCC Rule Title 47 CFR 1.1307 and 1.1310) sets the national standard for compliance with electromagnetic field safety. The FCC exposure 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 developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI). Thus, there is full compliance with the standards of the IRPA, FCC, IEEE, ANSI, and NCRP.

General Information on Electromagnetic Field Safety

AT&T facilities transmit and receive low power electromagnetic fields between base station antennas and handheld portable cell phones. The radiofrequency energy from these facilities and devices is non-ionizing electromagnetic energy. Non-ionizing, unlike X-Rays or other forms of potentially harmful energy in the microwave region, is not cumulative over time nor can the energy change the chemical makeup of atoms (e.g. strip electrons from ions). "Non-ionizing" simply means that the energy is not strong enough to break ionic bonds.

Safe levels of electromagnetic fields were determined by numerous worldwide organizations, such the International Committee for Non-Ionizing Radiation Protection, a worldwide multi-disciplinary team of researchers and scientists studying the effects of non-ionizing radiofrequency energy such as that emitted by base stations or cell phones. The FCC did not arbitrarily establish their own standards, but adopted the recommendations of all leading organizations that set standards and research the subject such as the Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), and National Council on Radiation Protection and Measurements (NCRP).

More extensive methods of determining compliance are utilized on rooftop collocations where occupational workers are in much closer proximity to wireless base station antennas. Regardless of the structure type or the particular antenna configuration, AT&T facilities are always designed to comply with the federal exposure limits and guidelines by a substantial margin. Evaluations (calculations or modeling) of proposed facilities are based on reasonable upper limits parameters for an upper limit determination of compliance. Also we take into account future growth of the facility, usage surges, and ground reflections where appropriate. All evaluations

include composite (sum total) exposure from all transmitting antenna systems collocated on a structure or in close proximity.

From a regulatory perspective, the FCC has sole jurisdiction over the regulation of electromagnetic fields from all facilities and devices. The FCC has established guidelines and limits over emissions and exposure to protect the general public. These limits are conservative and I am not aware of any evidence to date which suggests that the guidelines should be more restrictive. The FCC also has certain criteria that trigger when an environmental evaluation must be performed. The criteria are based on distance from the antennas (accessibility) and transmit power levels. The proposed facility is well below the criteria to trigger any type of routine environmental evaluation.

CONCLUSIONS:

1) The proposed AT&T communications facility will comply with electromagnetic field safety standards by a substantial margin (well below 5 %) in all publicly accessible areas. This includes the interior and base of the existing building and any areas in proximity to the existing building.

2) AT&T takes appropriate measures to ensure that all telecommunications facilities (including this proposed facility) comply with applicable exposure limits and guidelines adopted by the FCC governing human exposure to radiofrequency electromagnetic fields (FCC Bulletin OET 65).

3) In cases where such compliance exists, the subject of electromagnetic field safety is preempted. The Telecommunications Act of 1996 states that: "No state or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the [FCC's] regulations concerning such emissions." Telecommunications Act of 1996, § 332[c][7][B][iv].

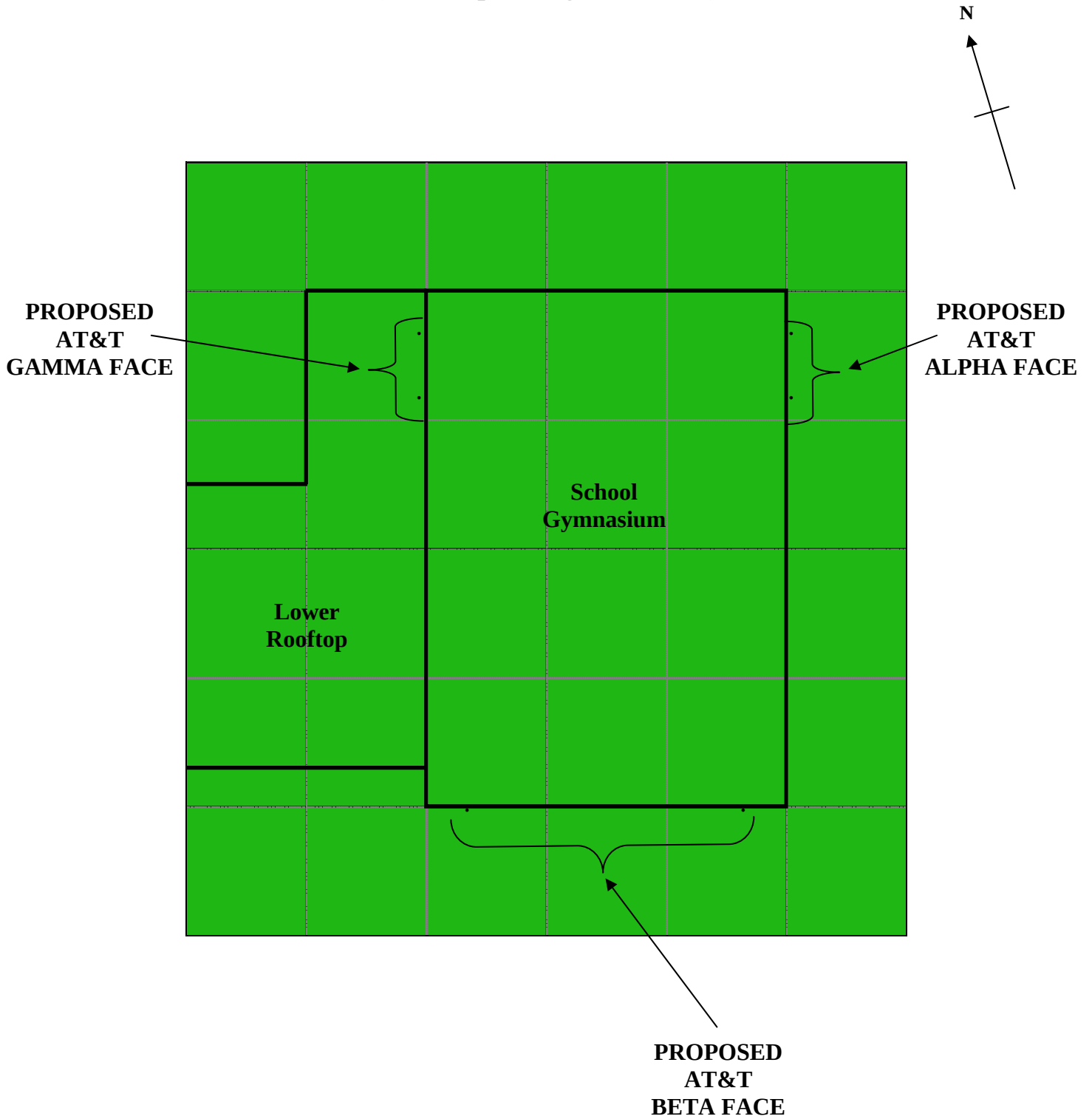
Respectfully,



Paul Dugan, P.E.
Registered Professional Engineer
Virginia License Number 36239



ROOFVIEW PREDICTION ANALYSIS I
YANCEY ELEMENTARY SCHOOL – CV433
(with respect to ground level)

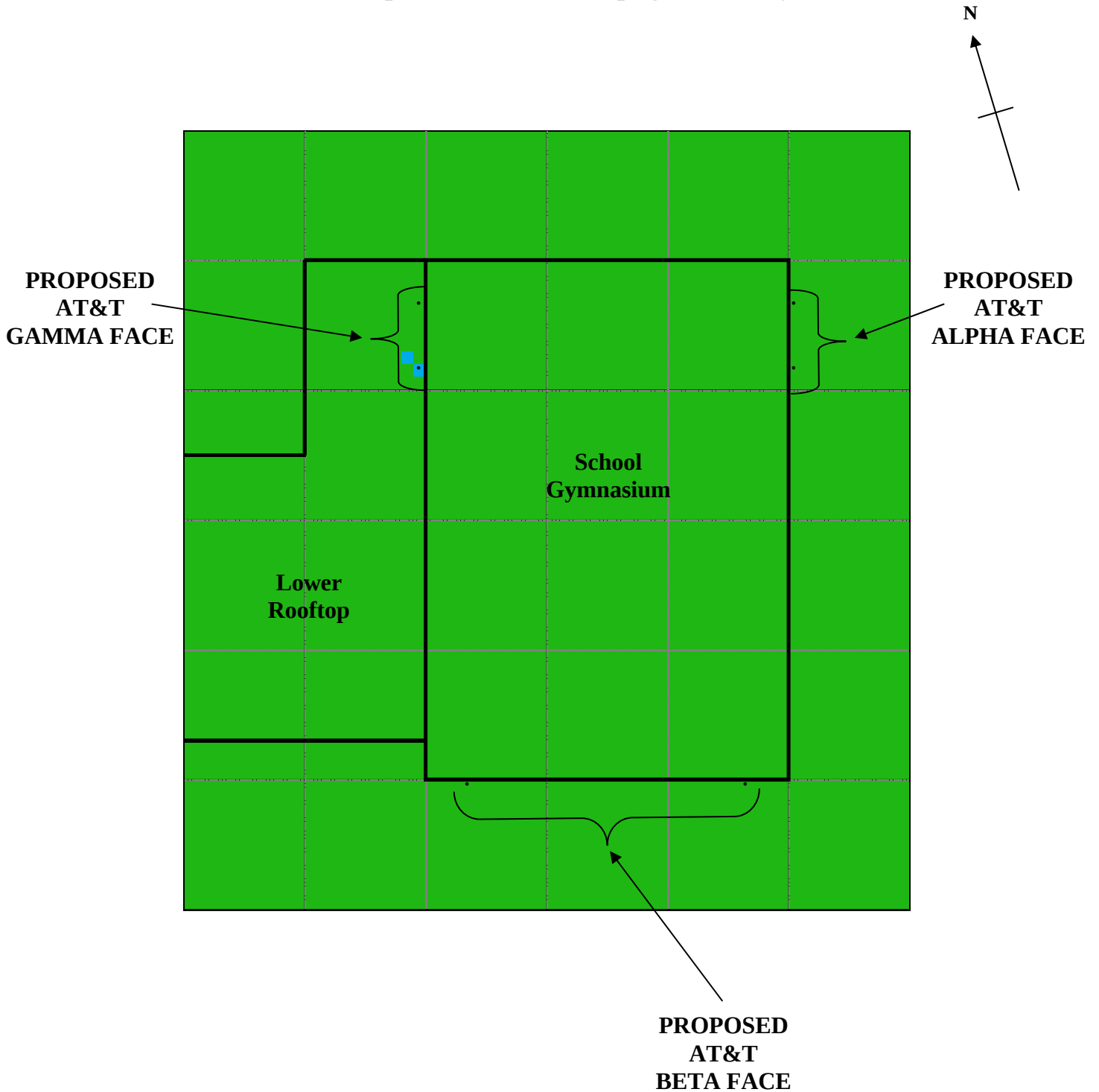


**ROOFVIEW PREDICTION ANALYSIS I
YANCEY ELEMENTARY SCHOOL – CV433
(with respect to ground level)**

Statistical Summary		
%MPE	SQ. FT	%SQ. FT.
	3600	100.00 % of total ROOF Area
0 -4	3600	100.00 % of Selected Area
5 - 20	0	0.00 % of Selected Area
21 - 100	0	0.00 % of Selected Area
> 100	0	0.00 % of Selected Area
Roof Area 3600 sq. ft. Max %MPE 1.4 % Min %MPE 0.0 % Using Near/Far Spatial Avg Model With FCC 1997 Occupational Standard		

MPE = Maximum Permissible Exposure

ROOFVIEW PREDICTION ANALYSIS II
YANCEY ELEMENTARY SCHOOL – CV433
(with respect to lower rooftop (gamma only))



ROOFVIEW PREDICTION ANALYSIS II
YANCEY ELEMENTARY SCHOOL – CV433
(with respect to lower rooftop (gamma only))

Statistical Summary		
%MPE	SQ. FT	%SQ. FT.
	3600	100.00 % of total ROOF Area
0 -4	3598	99.94 % of Selected Area
5 - 20	2	0.06 % of Selected Area
21 - 100	0	0.00 % of Selected Area
> 100	0	0.00 % of Selected Area
Roof Area 3600 sq. ft. Max %MPE 8.8 % Min %MPE 0.0 % Using Near/Far Spatial Avg Model With FCC 1997 Occupational Standard		

MPE = Maximum Permissible Exposure

DECLARATION OF ENGINEER

Paul Dugan, P.E., declares and states that he is a graduate telecommunications consulting engineer (BSE/ME Widener University 1984/1988), whose qualifications are a matter of record with the Federal Communications Commission (FCC). His firm, Millennium Engineering, P.C., has been retained by SAI – Communications on behalf of AT&T Mobility to perform power density measurements or calculations for an existing or proposed communications facility and analyze the data for compliance with FCC exposure limits and guidelines for human exposure to radiofrequency electromagnetic fields.

Mr. Dugan also states that the calculations or measurements made in the evaluation were made by himself or his technical associates under his direct supervision, and the summary letter certification of FCC compliance associated with the foregoing document was made or prepared by him personally. Mr. Dugan is a registered professional engineer in the Jurisdictions of Pennsylvania, New Jersey, Delaware, Maryland, Virginia, New York, Connecticut, District of Columbia, and Puerto Rico with 26 years of engineering experience. Mr. Dugan is also an active member of the Association of Federal Communications Consulting Engineers, the National Council of Examiners for Engineering, the National Society of Professionals Engineers, the Pennsylvania Society of Professional Engineers, and the Radio Club of America. Mr. Dugan further states that all facts and statements contained herein are true and accurate to the best of his own knowledge, except where stated to be in information or belief, and, as to those facts, he believes them to be true. He believes under penalty of perjury the foregoing is true and correct.


Paul Dugan, P.E.

Executed this the 25th day of March, 2011.

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EDUCATION: Widener University, Chester, Pennsylvania
Master of Business Administration, July 1991
Master of Science, Electrical Engineering, December 1988
Bachelor of Science, Electrical Engineering, May 1984

PROFESSIONAL ASSOCIATIONS: **Registered Professional Engineer** in the following jurisdictions:

Pennsylvania, License Number PE-045711-E
New Jersey, License Number GE41731
Maryland, License Number 24211
Delaware, License Number 11797
Virginia, License Number 36239
Connecticut, License Number 22566
New York, License Number 079144
District of Columbia, License Number PE-900355
Puerto Rico, License Number 18946

Full member of **The Association of Federal Communications Consulting Engineers**
(www.afcce.org) January 1999 to Present
Elected to serve on the Board of Directors for 2006-2007

Full member of **The National Society of Professional Engineers** (www.nspe.org) and the
Pennsylvania Society of Professional Engineers (www.pspe.org) June 2003 to Present
Currently serving as State Director on the Board of Directors of the Valley Forge Chapter and the South
East Region Vice-Chair for the "Professional Engineers in Private Practice" Executive Committee

Actively participate in **Chester County ARES/RACES** (CCAR www.w3eoc.org) which prepares and
provides emergency backup communications for Chester County Department of Emergency Services,
March 2005 to Present

Full member of **The National Council of Examiners for Engineering**
(www.ncees.org) May 2001 to Present

Full Member of **The Radio Club of America**
(www.radio-club-of-america.org) December 2003 to present

PROFESSIONAL EXPERIENCE: Millennium Engineering, P.C., Phoenixville, Pennsylvania
Position: **President**, August 1999 to Present (www.millenniumengineering.net)

Verizon Wireless, Plymouth Meeting, Pennsylvania
Position: **Cellular RF System Design/Performance Engineer**, April 1990 to August 1999

Communications Test Design, Inc., West Chester, Pennsylvania
Position: **Electrical Engineer**, May 1984 to April 1990