Synopsis Regarding Installation of
T-Mobile Cellular Tower in
Steeple of Medford United Methodist Church
Medford, New Jersey

April 2008

SUMMARY

Medford United Methodist Church ("MUMC") contracted with T-Mobile in late 2007 for the installation of a cellular tower base in the steeple of the MUMC church after significant research into T-Mobile's proposal. From the outset, it has been the Trustees belief and understanding that the proposed facility would operate at RF levels multiple orders of magnitude below the Federal Guidelines. A level of concern was expressed by a few nearby residents and then by some parents of children attending the Pre-K within MUMC with respect to potential radiofrequency ("RF) and electromagnetic field ("EMF") levels from the cell tower base station. Although this concern was not initially expected, it was believed to be an understandable and healthy response to an issue which has received a good deal of press regarding the debate of low level effects of RF exposure typically associated with handheld electronic devices.

In an effort to help educate and alleviate these concerns, the Trustees of MUMC have compiled (with the assistance of T-Mobile, its experts and church associated RF engineering consultants) the associated material which addresses, in various forms, the questions which have been raised regarding this cellular tower base station installation. The material is briefly synopsized, individually by paper, below:

- A number of surrounding churches and schools have implemented just this type of installation. *Appendix A* lists 27 such locations in the tri-state Pennsylvania, New Jersey and Delaware vicinity where successful installations have occurred involving T-Mobile. Other installations involving other carriers are not listed.

- *Appendix B* is specific to the actual installation at MUMC and provides data with respect to the actual antenna and transmitter power output levels in watts.

- *Appendix C* is a 4 page analysis of the specific MUMC installation prepared by Professor Kenneth Foster, a Bioengineering Professor associated with the University of Pennsylvania. Professor Foster regularly participates with the Institute of Electrical and Electronics Engineers ("IEEE") and other educational and institutional organizations which contribute to the study and establishment of the safety standards for human exposure to both RF and EMF levels from electronic emitters in the United States. Professor Foster additionally participates in the international discussion and decision making processes associated with the establishment of these standards.

In his analysis, Professor Foster states *very conservatively* that the maximum exposure to RF energy from the T-Mobile base station at locations in and around the church is calculated to be less than 1.5 microwatts per centimeter squared or close to 1/1000th of the current allowable FCC guideline of 1000 uw/cm squared. Additional information on this guideline can be found in OET-Bulletin No. 65 at http://www.fcc.gov/oet/rfsafety/.

Following the 4 page statement is a one page letter opinion and summary resume, dated April 2, 2008, which addresses an 11 page informational handout, circulated through the Pre-K. Professor Foster describes the material and then addresses well documented and respected informational sources to which interested parties may refer.

Following the two page letter opinion is a graph which depicts maximum exposure level to RF signals compared to distance from the steeple. This more specific calculation of RF levels shows that the power density is far less than 1/1000 of the FCC guideline within a 400' radius of the steeple. A map figure depicts various distances from the steeple.

- *Appendix D* is a compilation of data extracted from Wikipedia online encyclopedia research tool including, among others, conclusions reached by the World Health Organization ("WHO") that serious health effects from the minimal exposure of cellular phones or their bases stations are very unlikely. The paper does, however, recommend the use of hands-free devices to minimize this additional level of exposure.

- *Appendix E* is a paper authored by Professor Kenneth Foster (referred to in *Appendix C*, above) studying the RF exposure associated with the use of what is commonly known as "WI-FI" (wireless) technology. This paper is included for the purpose of demonstrating that many more forms of higher potential RF exposure exist which are in common use in many households, such as by the use of a laptop computer.

It is noted that additional materials have been relied upon by the Trustees in their evaluation of the proposal. One example is a study conducted by the Scinetics Corporation, an engineering consultancy firm based in New Rochelle, NY, which conducted extensive study in 2006 on behalf of multiple wireless communications services companies including Omnipoint Communications, Inc., Cingular Wireless and Verizon Wireless. The studies concluded, when considering the extremely conservative, worst case EMF levels that could be emitted from a typical wireless system, that the exposure levels are calculated to be hundreds of times lower than the maximum FCC General Public (or uncontrolled) permitted exposure levels. ***In fact, in all cases, it was determined that the EMF level resulting from an operating appliance or device typically used in homes and schools (i.e., microwave ovens, cordless phones, motion detectors, baby monitors and AM/FM radios) is much greater in magnitude than those from a typical wireless Radio Antenna Facility in a given community.*** .

A number of highly regarded sources were used as references in the study, among them Narda RF Safety Products, Carnegie Mellon University and Oak Ridge National Laboratory.

In conclusion, an important point of reference for those interested in the specific MUMC facility and its characteristics is that the facility design is associated with levels of RF exposure fractions of the FCC Guideline value. Thus, the facility's existence is not part of an argument as to whether the current guidelines are adequate. Further, although believed not to be required, other inexpensive treatments, such as use of foil backed insulation in the ceiling of the church can further reduce RF levels below the already small values described herein.

Additional reference material on this subject is listed on the following pages of this handout. In addition, the church office can e-mail PDF files of recent studies from Ireland , "Health Effects of Electromagnetic Fields" and the United Kingdom "Mobile Telecommunications and Health Research Programme", which describe study results for subject areas such as brain function, electrical hypersensitivity and biological mechanisms.

A number of the papers noted below are available at the following link:

http://www.seas.upenn.edu/~kfoster/kfoster.htm

K. R. Foster. Peering Into the Brain. Hale Lecture in Ethics, Rochester Institute of Technology, Jan. 2008

Mobile phones and health, Argentine Physics Society, Salta Argentina Sept 2007

K. R. Foster, Potential artifacts in studies of effects of electromagnetic fields on brain function, FGF conference, Stuttgart, Germany, Nov. 2007

K. R. Foster and R. Glaser, Thermal Mechanisms of Interaction of Radiofrequency Energy with Biological Systems With Relevance to Exposure Guidelines. Health Physics 92 (6): 609-620 JUN 2007

R. Giegengack and K. R. Foster. Physical Constraints on Rebuilding New Orleans. In Rebuilding Urban Places After Disaster, E. Birch and S. Wachter, eds. Univ of Pennsylvania Press (2006)

K. R. Foster, Radiofrequency Exposure from Wireless LANs, Health Physics 92:289-289 (2007)

Should children use mobile phones? FGF conference, Stuttgart, Germany, Dec. 2006

K. R. Foster Mechanisms of Interaction of RF Fields With Biological Systems as Related to Modulation, FGF conference, Rostock Germany, September 2006

K. R. Foster, health effects of powerline fields (three lectures). Brasilia,Brazil, Aug 2006

K. R. Foster. One third of a century of research on the biological effects of radiofrequency energy: what have we learned? Workshop on RF dosimetry, Tokyo August 2006

Mechanisms of interaction of radiofrequency fields with biological systems 2006 PIERS conference, Tokyo 2006

R. Giegengack and K. R. Foster. Physical Constraints on Rebuilding New Orleans. In Rebuilding Urban Places After Disaster, E. Birch and S. Wachter, eds. Univ of Pennsylvania Press (anticipated publication Aug 2006)

K. R. Foster, Mechanisms of interaction of electromagnetic fields with biological systems: implications for exposure guidelines. ICNIRP conference, Berlin, 3/06

K. R. Foster, Radiofrequency field surveys on WLANS, COST 281 conference, Graz Austria 4/06

T. T. Chau and K. R. Foster, Should Children Use Mobile Phones? IEEE Microwave Magazine, 6(4):18-30,2005. http://repository.upenn.edu/be_papers/68

K. R. Foster and I. A. Lerch, Collateral Damage to American Science from the War on Terrorism, IEEE Technology and Society Magazine, 24:45-52 (2005).

K. R. Foster, Engineering the Brain, in Neuroethics, Oxford University Press, 2005, pp. 185-200.

K. R. Foster. The Mechanisms paradox. Bioelectromagnetics, S. Arapetyan and M. S. Markov, eds.NATO Advanced Science Series, 2006. Pp. 17-29.

K. R. Foster and R. Giegengack. Katrina: Planning For a City on the Brink, in D. Kettl et al, eds. Katrina, Risk and Responsibility, University of Pennsylvania Press (2006).

Catastrophe (book review) Science 307:1205 (2005)

Dark Light (book review) IEEE Spectrum (Feb. 2005)

K. R. Foster, Modeling The Thermal Response of the Body to RF Energy Exposure (COST 281/ICES workshop, Paris, Sept. 2004)

K. R. Foster and M. Repacholi, Biological Effects of Radiofrequency Fields: Does Modulation Matter?, Radiation Research 162:219-225 (2004)

P. Douglas, C. Morgan, H. Lee, K. R. Foster LVAD As Destination Therapy - The Economic Dilemma. Technology in Society Magazine, 23(2):23-27 (2004)

K. R. Foster, Bioelectromagenetics and Microwaves, International Microwave Power Symposium, Toronto CA July 2004m (keynote presentation)

K. R. Foster, Security Concerns, Scientific Societies, and Globalization. IEEE Society on Social Implications of Technology conference (ISTAS), Worcester MA June 2004

Q Balzano, AR Sheppard, KR Foster, ML Swicord, Field and temperature gradients in tissues near resonant short wires. Bioelectromagnetics Society Annual Meeting, Washington DC June 2004

K. R. Foster, Hot Topics in Non-Ionizing Radiation, American Industrial Hygiene Association, Atlanta, May 2004

Foster KR, Adair ER Modeling thermal responses in human subjects following extended exposure to radiofrequency energy, BioMedical Engineering OnLine 2004, 3:4 (28 February 2004)

K. R. Foster, Health effects of powerline fields and precautionary approaches to EM field regulation. Seminario Internacional sobre campos electromagneticos de baixa frequencia e sues efeitos, Brasilia, November 2003 Portugese translation of paper

K. R. Foster, Mechanisms of Interaction of ELF Fields and Biological Systems, Radiat. Prot. Dosim. 106(4), pp 301-310 (2003)

K. R. Foster, P.R. Wolpe, A. L. Caplan, **Bioethics and the Brain** IEEE Spectrum June 2003

<http://www.spectrum.ieee.org/WEBONLY/publicfeature/jun03/bio.html>

Can Electromagnetic Fields Trigger the Precautionary Principle? Presentation at WHO/NIEHS/EC Conference on the Precautionary Principle, Luxembourg, February 2003.

Laurence JA, McKenzie DR, Foster KR. Application of the heat equation to the calculation of temperature rises from pulsed microwave exposure.J Theor Biol. 222(3):403-5 (2003).

K. R. Foster, J. A. D'Andrea, S Chalfin, DJ Hatcher. Thermal modeling of millimeter wave damage to the primate cornea at 35 GHz and 94 GHz. Health Physics 84 (6): 764-769 (2003)

Is the Precautionary Principle an Appropriate Mechanism for Addressing Health Concerns About Electromagnetic Fields?

Risk and Reason (book review) Science 299:348-9 (January 17, 2003).