

**Via Electronic Filing**  
July 12, 2010

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street SW  
Washington, DC 20554

|  |   |                     |
|--|---|---------------------|
| In the Matter of                         | ) |                     |
|  | ) |                     |
| A National Broadband Plan for our Future | ) | GN Docket No. 09-51 |
|  | ) |                     |
| Connect America Fund                     | ) | WC Docket No. 10-90 |

### **COMMENT**

Dear Ms. Dortch:

I, Sidney E. Shumate, as President of Givens & Bell, Inc., hereby submit these Comments with regard to the Notice of Inquiry and Notice of Proposed Rule Making (NPRM) Adopted April 21, 2010.

In the NPRM, paragraph 29, comment is sought regarding whether a propagation model would be required to accurately model the costs of wireless deployment, and the feasibility of developing such a model.

Accurate propagation models for short range, frequency reuse systems such as cell phone operations and wireless data distribution systems in the upper VHF and UHF range, are actively being pursued, and will prove to be a highly useful tool for determining coverage of wireless broadband systems at the short range utilized for cell phone and other cellularized, frequency reuse distribution systems. Any propagation prediction system developed and established by the Commission for determining coverage will be useful, whether serving as the primary determinant for new or unbuilt links, or as a supplemental methodology for user-feedback analysis of existing cellular networks.

The United States Commerce Department's National Telecommunications and Information Administration, Institute for Telecommunications Sciences (NTIA-ITS), was tasked by NTIA/OSM to review and evaluate the current propagation models and ITU-R Recommendations to determine which could be used to perform propagation analyses to

facilitate electromagnetic compatibility analyses of mobile wireless devices. After performing an exhaustive review of current models, NTIA-ITS determined that none was entirely suitable for use in analyzing mobile-to-mobile (MTOM) interference interactions. It was therefore necessary to initiate an analysis and measurement effort to develop and validate models in this parameter range<sup>1</sup>. Progress reports in 2008, 2009, and currently on the NTIA-ITS website<sup>2</sup> document the current in-progress state of development of this model. Much of the field data gathering required to develop this model has already been completed by the NTIA-ITS, and is available for use in calibrating the NTIA-ITS model.

Work has also been done by companies such as EDX<sup>3</sup> and by other institutions, including the Mobile and Portable Radio Research Group at Virginia Tech, to develop short range, three-dimensional ray tracing models for cellular use<sup>4</sup>.

Internationally, institutions including the International Telecommunications Union are proceeding on development of prediction model recommendations for short-range wireless systems.

Givens & Bell, Inc. has also been proceeding on development work to extend the range of usefulness of its improved Longley-Rice-Shumate model, the Irregular Terrain With Obstructions Model, or ITWOM. Current work is in progress to extend its range from the current minimum limit of 1 km, down to approaching the near field of the antenna. Much of the scientific research is complete at this point. The current effort is directed toward source code modification to:

1. Update the Free Space Loss equations to correctly include vertical distance in the calculation of the path distance between the transmitter and receiver<sup>5</sup>.
2. Replace geometric approximations that fail at short distances from the transmitter site with more rigorous calculations.
3. Include and correctly determine two-ray calculation “comb filter” Fresnel zone nulls near the transmitter site.
4. Extend accuracy of the clutter loss calculations to near the transmitting antenna.

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<sup>1</sup> “*Institute for Telecommunications Sciences 2008 Technical Progress Report, Telecommunications Engineering, Analysis and Modeling, Short Range Mobile-to-Mobile Propagation Model Development and Measurements*” Dr. Robert Johnk and Paul M. McKenna. January 2009.

<sup>2</sup> “*Propagation Model Development for Short-Range Mobile-to-Mobile Applications*”, Paul M. McKenna, found at [its.bldrdoc.gov](http://its.bldrdoc.gov), under “Programs and Projects, Technical Projects”.

<sup>3</sup> “*A Ray-Tracing Propagation Model for Digital Broadcast Systems in Urban Areas*” Harry R. Anderson, EDX Engineering, Inc., Eugene, OR.

<sup>4</sup> “*Propagation Measurements and Models for Wireless Communications Channels*” Jorgen Bach Andersen, Aalborg University, Aalborg, Denmark, Theodore S. Rappaport, founder of the Mobile & Portable Radio Research Group at Virginia Tech, Blacksburg, VA, and Susumu Yoshida, Kyoto University, Kyoto, Japan. IEEE Communications Magazine, p.42-48, January, 1995.

<sup>5</sup> “*Improved algorithm of atmospheric refraction error in Longley-Rice channel model*”, Wang Zuliang, Zheng Mao, Wang Juan, and Zheng Linhua, Journal of Systems Engineering and Electronics, p.683-687, Volume 19, Issue 4, August 2008.

Results of Givens & Bell's short-range modification work on the ITWOM are to be presented in September of 2010.

Therefore, not only are such models feasible, their development is in various stages of ongoing development. The development of modern 64-bit multiprocessor desktop computers, and a choice of terrain databases with 1-arc-second detail or better, allows these calculations to be performed with these new computerized propagation models quickly and with increasing accuracy. The Commission should further investigate the status and quality of these models for use in the National Broadband Plan.

Sincerely yours,

A handwritten signature in black ink that reads "Sidney E. Shumate". The signature is written in a cursive style with a large initial 'S' and a distinct 'E'.

Sidney E. Shumate, President  
Givens & Bell, Inc.  
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Haymarket, VA 20169