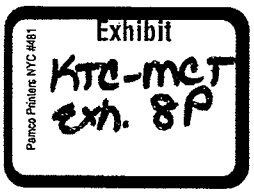

STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

DT 07-027

KEARSARGE TELEPHONE COMPANY, WILTON TELEPHONE COMPANY, INC.,
HOLLIS TELEPHONE COMPANY, INC. AND MERRIMACK COUNTY
TELEPHONE COMPANY
PETITION FOR ALTERNATIVE FORM OF REGULATION

REBUTTAL TESTIMONY OF DANIEL L. GOULET
ON BEHALF OF MERRIMACK COUNTY TELEPHONE COMPANY AND KEARSARGE TELEPHONE COMPANY

SEPTEMBER 9, 2009

Q. Please state your name and your business address.

A. My name is Daniel L. Goulet. My business address is C Squared Systems, LLC, 920 Candia Road, Manchester, NH 03109.

Q. By whom are you employed and in what capacity?

A. I am Director of RF Services for C Squared Systems, LLC. As Director of RF Services, I am responsible for providing RF engineering services to wireless carriers in support of their network design, expansion and ongoing system performance. Our role in network design planning entails: determining existing coverage levels, defining search areas, identifying potential wireless sites, determining height requirements, and evaluating the resultant coverage footprint of these new sites. We also assist carriers in obtaining the necessary federal and local approvals for new cell sites. Most recently, I was responsible for the RF network design plan for the Pocket Project, which launched their wireless service in the Hartford and New Haven, Connecticut and Springfield, Massachusetts BTA's (Basic Trading Area). The Pocket RF Design Plan consisted of some 466 cell sites. Attached as Exhibit A to my testimony is my résumé, which shows my background and experience, as well as a listing of municipalities where I have been accepted as an expert witness and provided testimony on behalf of wireless carriers.

Q. Is your company the same C Squared Systems, LLC that provided the multi-carrier benchmarking reports marked as Exhibit E and Exhibit F to the prefiled testimony of Michael C. Reed in this docket?

A. Yes.

Q. Were the multi-carrier benchmarking reports attached as Exhibit E and Exhibit F to Mr. Reed's testimony prepared by you or under your supervision?

A. Yes. Exhibit E and Exhibit F attached to Mr. Reed's Supplemental Testimony were prepared by me with the assistance of RF engineers directly under my supervision.

Q. Are the contents thereof true and accurate to the best of your knowledge and belief?

A. Yes.

Q. Have you provided responses to data requests from parties in this proceeding?

A. Yes.

Q. Have you reviewed the prefiled testimony in this proceeding entitled "Rebuttal Testimony of Ben Johnson, Ph.D." dated July 17, 2009?

A. Yes.

Q. On page 7 of Dr. Johnson's testimony, Dr. Johnson questions the conclusion "that the majority of the customers in the Sutton exchange and the majority of the customers in the Salisbury exchange have access to a good or a very good wireless signal". Please respond to the issues raised by Dr. Johnson.

A. First of all, Dr, Johnson states that the maps: "...purportedly depict where signal strength is "very good" or "good". The maps do more than "purport" to show where wireless coverage is "very good" and "good". Dr. Johnson's use of the word "purports" implies hypothetical or implied representation of the facts. We maintain that the maps depict the actual data collected through subscriber handsets, the outputs of which were extracted and geodetically coded using an industry-accepted mapping software tool.

Q. On page 8 of Dr. Johnson's testimony, Dr. Johnson questions the portions of roads covered by the C Squared analysis. Please respond to the issues raised by Dr. Johnson.

A. We performed the same type of drive test in these two exchanges that we use for wireless carriers to develop and validate their network design plans. These are the kinds of analyses on which carriers rely in making the significant investments required for network coverage expansion projects.

In assisting wireless carriers with their RF design plans, we first develop search areas, which involves an evaluation of existing structures and their availability for use in the current design, ground conditions for raw land builds, and existing

wireless tower locations. With the available information, we perform predictive analyses or propagation modeling simulations based upon existing and proposed facilities. Once the predictive design coverage has been approved, a drive test is performed wherever feasible, to "tune" the propagation models and validate the predictive coverage analyses. The type of drive test that we use provides measured data, versus predictive data and is therefore widely accepted as the most accurate information regarding wireless coverage. In this case, we drove the majority of the Class I, Class II and Class V roads in these two exchanges. There are no Class III or Class IV roads in these exchanges. We did not drive Class VI roads, as they are not town maintained, are not available for development and in some cases are impassable. The test that we performed was state-of-the-art for these two exchanges. There should be no confusion as to what portions of the roads within these exchanges were covered. In the responses FDR 1.2 and 1.3 to Mr. Bailey's follow-up data requests for "work papers" we provided spreadsheets containing the data used and the results of the calculations described below supporting the derivation of the drive route objective and the resultant drive route statistics. A database of roads derived from US Census Tiger (Topologically Integrated Geographic Encoding and Referencing system) files are the basis for the calculations. The total road length by class within the given area of interest is queried. The length of the roads driven (by class) is queried. The length of the roads driven is divided by the total road lengths to determine the percentage of roads driven. We performed the same type of drive test in these two exchanges

that we use for wireless carriers to develop and validate their network design plans.

Q. On page 9 of Dr. Johnson's testimony, he states "since a primary selling point for wireless service is the convenience it offers to consumers while they are on the go, wireless carriers focus on providing the strongest signal along the roads where customers most frequently travel (e.g. routes used for daily commutes into town)." From this discussion, he states that "it is significant that no evidence has been provided concerning how extensive the C Squared research was, relative to the total miles of roads located in these exchanges." Please respond to these comments.

A. This passage of Dr. Johnson's testimony is reflective of the wireless industry perhaps a decade ago. My interaction with wireless carrier representatives provides me with first-hand knowledge of their business objectives with regard to coverage. The days when wireless carriers were only targeting vehicular mobile customers are long gone. The business plans of all of the wireless carriers with whom I work are to deploy networks that will provide in-building residential and commercial coverage that will replace landline service initially for voice and data and ultimately, for broadband. With the metropolitan networks having been largely built out, wireless carriers have been pushing to expand and enhance their coverage into the rural areas. Dr. Johnson's testimony that wireless carriers target primarily commuter traffic is simply not correct in today's market.

In the matter of the "actual miles driven", this information was provided in our response to Bailey FDR 1.3. The reported "Total Miles Driven" for each exchange understates the actual miles driven, since we did not report any duplicated travel, on the same road, in the opposite direction. We reported mileage for one direction of travel only, occurring along the same road, with the exception of I-89, a divided highway. While there may be some minor degree of inaccuracy in the mapping software's calculations for the road mileage, that margin of error would likely be in the neighborhood of 1% and would be insignificant considering the total miles driven for each exchange.

Q. On pages 9 and 10 of Dr. Johnson's testimony, he criticizes C Squared's analysis for measuring signal along roads rather than "away from the roads, where most homes are located within the Salisbury and Sutton exchanges." Please respond to this criticism.

A. Dr. Johnson's statement here does not reflect industry practices regarding measurement of wireless coverage in general or within areas like the Sutton and Salisbury exchanges. Wireless carriers do not test for coverage by entering large numbers of homes within a given area. Such an approach would obviously be impractical. The carriers use propagation modeling validated by drive tests. It is true that when designing network coverage plans, carriers do consider commuter traffic. It is also true that they evaluate coverage along the major and secondary roads. However, a significant part of the reason for that evaluation is so that they

can then interpolate the signal quality measured along the roads to that which is needed to provide competitive service within the neighboring residences and businesses.

Q. On page 10 of Dr. Johnson's testimony, he states that "all other things being equal, one would expect the signal strength to be greater along roads than at the end of driveways, or inside buildings, away from the roads." Please state whether you agree or disagree with this statement and provide your reasons.

A. This statement provides no useful information to the Commission. It is impossible to say what he means by "all other things being equal", and his stated expectation is not valid. The areas being tested are rural, with structures largely being wooden rather than made of concrete or metal. An aerial view of the roads driven indicates that the majority of the roads are closely bordered by trees. In an area such as that under study, the primary factors contributing to signal loss are blockage by terrain and trees. In the majority of area terrain variations within a few hundred feet of the road are minimal, therefore when extrapolating signal losses it is reasonable to assume that tree cover is the primary factor. Given that the tree cover surrounding the houses is not generally closer than those near the vehicle when collecting data, it is reasonable to assume that the signal on properties near the road are close to those measured on the road. [redacted]

[redacted]

Q. Please refer to pages 10-12 of Dr. Johnson's testimony. Please describe propagation models and the usefulness thereof for purposes of the analysis requested by the Petitioners in this case.

A. Propagation models indeed are useful tools. We have such models and employ them in our work virtually every day. [redacted] Propagation models simulate likely wireless telephone coverage based upon available inputs, including tower height, tower configuration, signal output, signal direction, topography and other factors. While widely accepted in the industry as a valuable tool for network design, it is considered a "first step" in quantifying coverage and is primarily used as a tool by

RF Design engineers in defining search areas and evaluating potential candidates. Once a final candidate has been accepted by the engineer, wherever practical, a drive test is conducted prior to final approval of that candidate. The final approval of the site is most often based upon the results of the measured drive test. This measured data is also used to fine-tune propagation models which can be used to evaluate sites where drive tests may not be feasible due to access restrictions. Wireless carriers generally validate the propagation modeling by performing the kind of drive test that we performed for the TDS Companies in this case. Benchmarking is also used by carriers in established markets for competitive analyses and ongoing system performance on their networks. In no cases are these tests conducted by seeking permission to access private residences, rather they are conducted by driving the major roads using subscriber equipment.

Q. Please refer to the quotation provided on lines 4-15 on page 11 of the testimony of Dr. Johnson. Is the quoted article one with which you are acquainted in the literature relating to wireless coverage?

A. This quote was taken from excerpts of an article published in 1996. While I have reviewed this particular article, I find it of limited usefulness as it relates to the issues we are addressing. The statements are very general and are true as far as they go, and propagation models take these factors into account. However, typically in final decision making by wireless carriers regarding coverage decisions, the propagation models are validated by drive tests. Additionally, I refer to my answer above regarding differences in signal strength when in close

proximity to drive test data. Regardless, we have submitted propagation maps to address Dr. Johnson's concerns.

Q. Dr. Johnson maintains that wireless service is not competitive with wireline service because "wireless and wireline services have been, and continue to be, primarily complementary services, rather than close competitive alternatives." Please comment on this position based on your experience.

A. This statement does not square with my experience. The goal of every wireless carrier with which I work is to provide as good or better service than the landline and eventually to replace the landline. In assisting the wireless carriers in their zoning and permitting process, the affidavits submitted state that the carrier is seeking to provide a competitive alternative wireless service to landline service. The carriers are no longer just targeting the major cities and metropolitan areas but have been expanding their network plans to include rural markets. Their goal is to provide "in-building" coverage that will enable them to provide a competitive service package which would include voice, data, and broadband services.

Much of Dr. Johnson's statements on page 14 and 15 seem to stem from his personal views, with no substantiating evidence or studies.

For example, on page 14, at lines 19-22, Dr. Johnson states that, "Some consumers may stop purchasing TDS' service when they obtain a mobile phone, but even these consumers don't necessarily consider these services to be 'close substitutes' nor do they necessarily think they are functionally equivalent." He

did not reference any study that substantiates this conclusion, and I am not aware of any. In fact, the functionality of a mobile handset exceeds that of a landline telephone. Significant mobility, text messaging, e-mail, easy storage of telephone numbers and simple transmittal of photos taken by a mobile handset are examples of functionality of a mobile phone not available with a basic landline phone. Dr. Johnson also states that wireless and wireline have been and continue to be complementary services, yet at the end of 2008 more than 20% of households nationally had only wireless phones, an increase of 2.7 percent from the first half of 2008. *See,* Blumberg, Stephen J., "Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, July-December, 2008" [http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200905.htm] .

Dr. Johnson states that mobile service cannot be considered competitive unless consumers switch back and forth between wireless and wireline services. If wireless continues to provide services beyond those of a wireline service it is unlikely that consumers will switch back and forth between a superior wireless service and a landline service. This is evidenced by the growing number of households that rely only on wireless phones.

Q. **Please refer to page 21 of Dr. Johnson's testimony, lines 15-18, where he states, "while there has been a downward trend in wireless pricing, there is no evidence to suggest that wireless and TDS wireline services are currently competing in the same market, or that wireless services provide a cost-**

effective substitute for wireline basic local service for most TDS customers." Please respond to this statement based on your experience.

A. As I have stated above, the objective of wireless companies is to replace landline telephone service. It is this objective that is primarily driving the very significant investment that wireless carriers have been making in rural markets. Just as an example, I am personally involved in numerous hearings in support of wireless carriers seeking to expand their coverage in towns within the Merrimack County Telephone Company service area. Moreover, the fact that 20% of homes nationally have no landline service (see the CDC article cited above) shows that consumers are opting for wireless service instead of landline and that the two could be considered to be competing for the same market.

Q. Please refer to pages 23 and 24 of Dr. Johnson's testimony where he discusses the comparative quality of wireline and wireless calls. Do you have a comment on these statements?

A. This testimony provides a very dated view of wireless service. Both wireline and wireless are engineered for some level of blocking. Wireless systems are generally engineered for blocking at a level of two percent (2%) or less and in fact areas such as Sutton and Salisbury rarely experience congestion. Cross-talk was a problem with analog service and has not been an issue for at least 10 years, with carriers having transitioned to digital networks. Dr. Johnson's preference for use of his wireline phone appears to reflect personal preference rather than any science or study of consumer behavior, particularly if the choice is between using

wireless minutes already purchased versus making a toll call. My preference is the opposite.

According to the CDC articles cited above, one of every seven American homes (14.5%) received all or almost all calls on wireless telephones, despite having a landline telephone in the home. If one considers that approximately 20% of homes have only wireless service, it is clear that consumers do find the quality of wireless voice calls acceptable.

Q. Please refer to page 25 of Dr. Johnson's testimony. Please comment on Dr. Johnson's statements regarding atmospheric conditions.

A. Dr. Johnson's assertion that atmospheric conditions may affect the signal strength of wireless carriers is incorrect. Atmospheric effects are relevant only for very long distances and/or very high frequencies. The frequencies used by the cellular carriers at the distances between the coverage area and the surrounding cells are not significantly affected by atmospheric conditions.

Q. Have you reviewed the direct prefiled testimony of Stephen R. Eckberg dated July 17, 2009 submitted on behalf of the New Hampshire Office of Consumer Advocate?

A. Yes.

Q. Please comment on Mr. Eckberg's discussion of the C Squared analysis and its implication regarding the usefulness of CoverageRight data.

A. Unfortunately, Mr. Eckberg's testimony is not correct, although the misunderstanding may well be the result of a mistake made in the original C Squared exhibits to Mr. Reed's testimony. In Exhibits C and D to Mr. Reed's testimony, the drive routes are depicted on the first page. These depictions were of the planned drive route, which was based on maps that were available. Upon traveling to the exchanges and actually observing the routes, we determined that there were a number of Class VI roads that would not be driven for purposes of the test because (i) they are not town maintained, (ii) no development is permitted and (iii) in some instances they were not drivable. The correct drive routes are shown on page 4 of Exhibits E and F. Therefore, the areas depicted on the maps provided by Mr. Eckberg are areas that were not driven. They are not areas that were driven and produced no signal. To the extent that Mr. Eckberg then uses this conclusion as the basis to question the CoverageRight maps, I believe that he is mistaken in that regard and that the results that we obtained from the drive tests generally were consistent with the CoverageRight maps.

Q. Please comment on Mr. Eckberg's comments regarding the change between planned drive route and actual drive route.

A. As noted above, the change from the planned drive route to the actual drive route reflected conditions on the ground, namely the presence of Class VI roads which, given the nature of our assignment, we did not drive on our drive test.

Q. Please comment on Mr. Eckberg's statements regarding the availability of data with respect to wireless service availability within the home.

A. With regard to in-home coverage, I would refer to my response to Dr. Johnson's testimony set forth above and the predictive analysis exhibits. In general, the type of drive test that we performed in this case is typical for testing wireless coverage, including in-home coverage.

Q. Does this conclude your testimony?

A. Yes.

DLG Exhibit A

C² Systems

Daniel L. Goulet
C Squared Systems, LLC
920 Candia Road,
Manchester, NH 03109,
603-657-9702

SUMMARY: Over twenty-two years of working experience in the wireless telecommunications industry, with practical knowledge in the RF design and system performance of 850, 1900, and 2130 MHz digital cellular and PCS. Prior experience includes six years in microwave radio and two years in 150 and 450MHz IMTS systems.

EXPERIENCE:

C Squared Systems, LLC **11/2002 – Present**

Director of RF Services

Responsible for providing RF Management support functions to meet the needs of the customer base in providing complete wireless system design, deployment, optimization, maintenance, and other related turnkey services.

Atlantic Western Consulting, Inc., Woburn, Massachusetts **12/2000 - 11/2002**

RF Manager

Responsible for managing the RF Technical Services team to meet the needs of the customer base in providing complete wireless system design, deployment, optimization, maintenance, and other related turnkey services.

Telecorp, PCS, Nashua, NH **04/1998 - 11/2000**

RF Manager

Responsible for the RF design, integration, optimization, and ongoing system performance of the TDMA-based PCS network for the New England area.

- Achieved all objectives relevant to the build-out of 158 sites in 27 months.
- Exceeded performance objectives of 1.9% Lost Calls and 96% Established Calls.
- Established and implemented policies to facilitate the trending of system performance.
- Achieved significant cost savings by bringing outside contract functions in-house.
-

Sprint PCS, Wakefield, MA **10/1995 - 03/1998**

RF Manager

- Successfully managed the RF design, integration, and optimization of 160 sites for the CDMA-based PCS network launched in the Boston MTA, (Massachusetts and Rhode Island), expanding the build-out to 258 sites by EOY97.

KTC-MCT
Exh. 8P 017

Nynex Mobile Communications Company, Woburn, MA **1986 – 1996**

RF Manager System Performance 1993 - 1996

- Managed a staff of eight RF engineers responsible for the overall optimization of the Boston
- and Upstate NY networks to meet specific performance objectives.
- Managed technological improvements, including testing and integrating new technologies into the network.
- Established and chaired a weekly Service Committee, (an interdepartmental group), focused on resolving problems reported to Customer Service and Sales teams.

Radio Frequency Manager 1989 -1993

- Managed the RF Design and successful integration of all new sites into the network. This effort included: the issuance of initial search areas, zoning support, FCC and FAA filings, frequency coordination, and the provisioning of all technical cell parameters.
- Managed the successful design, development, and implementation of the first Tunnel RADIAX System in Boston, providing ubiquitous cellular coverage throughout the Callahan and Sumner Tunnels, major connectors to Logan International Airport.
- Managed the implementation of the first microwave/microcell in the Callahan Tunnel in Boston.
- Managed the optimization and ongoing system performance of the New England and Upstate New York Markets, exceeding performance objectives in both regions.

Radio Frequency Engineer 1986 -1989

- Implemented and integrated all new cell sites into the network by: coordinating pretest, assigning all cell technical parameters, and preparing and filing FCC and FAA applications.
- Established and implemented methods and procedures used to test the complex radio frequency characteristics of the RF link.
- Evaluated the various cellular engineering software tools available and making appropriate recommendations.

New England Telephone Company, Lawrence, MA **1972-1986**
Radio Transmission Technician

- Responsible for the maintenance and restoration of analog and digital microwave radio in northeastern Massachusetts. Provided support for southern New Hampshire, southern Vermont, Maine and western Massachusetts.

EDUCATION: Northern Essex Community College, Haverhill, MA, Associate in Science - Business Management
George Washington University, Washington, DC, Receiver Design, Fiber Optics.

CERTIFICATES: RF Site Safety Awareness Seminar – RSI University Based Safety Services
RF Train the Trainer Seminar – RSI University Based Safety Services

Attachments: Testimony Experience

KTC-MCT
Exh. 8P 018

Attachment I

The following is a partial listing of the cities and towns where I have provided testimony in behalf of the wireless carriers and/or have been accepted by the applicable Board as an expert witness.

Massachusetts & Cape Cod
Charlton
Dover
Falmouth
Fitchburg
Harvard
Harwich
Haverhill
Hopkinton
Hyannis
Lawrence
Lexington
Littleton
Marblehead
Marlborough
Nantucket
Newbury
Norton
Plainville
Plymouth
Provincetown
Rowley
Somerville
Swansea
Taunton
Vineyard Haven
Waltham
West Newbury
Weymouth
Winchester
Worcester
Yarmouth

New Hampshire
Alton
Amherst
Bow
Brookline
Concord
Dunbarton
Franklin
Gorham
Grantham
Hollis
Keene
Loudon
Milford
New Boston
New Ipswich
Plainfield
West Sqanzey
Wolfeboro
Francestown
Hinsdale

Maine
Auburn
Belfast
Belgrade
Bethel
Brownfield
Hollis
Lewiston
Limerick
North Berwick
Salmon Falls
Shapleigh
West Hollis

Rhode Island
Coventry
Cranston
East Greenwich
North Kingstown
Pawtucket
Providence
Providence
South Kingstown
Swansea
Warwick
West Warwick
Woonsocket

Connecticut
Ashland
Manchester
New London
Newington
Putnam

New York
Phillipsport

KTC-MCT
Exh. 8P 019