

ORIGINAL	
N.H.P.F.C. Case No.	DT 07-027
Exhibit No.	Bailey 65
Witness	Michael Reed Daniel Fawcett
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Kearsarge Telephone Company  
Merrimack County Telephone Company  
Docket No. DT 07-027  
Company Responses  
To Bailey Phase II, Set 1 Data Requests  
PUBLIC  
May 22, 2009

**BAILEY 1.27:** Please provide any articles or cases that discuss Received Signal Strength Indication tests, as referenced on page 5 of Reed Supplemental Testimony, lines 6 - 11.

**RESPONSE:** Please see response to Bailey 1.22.

Michael C. Reed is responsible for this response.

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**BAILEY 1.22:** Provide any cases and articles that discuss the difference in wireless signal inside a home versus outside home, both in the signal strength "Received Signal Strength Indication" tests and the call quality "Ec/Io," "SQE" and "RxQual" tests.

**RESPONSE:** While we are not referencing any specific cases or articles documenting the differences in wireless signal inside a home versus outside a home, C Squared Systems, LLC explained that carriers use different receive thresholds for RSSI, Received Signal Strength Indication, respective to each environment. There have been numerous studies done by infrastructure vendors, i.e., Lucent Technologies, Nortel and Ericsson, regarding the radio frequency link budgets by morphology class, which includes "in-building" and "in-vehicle" thresholds. Access to these documents is provided to the wireless services providers as customers of the infrastructure vendor. For competitive reasons, this information is proprietary and confidential. Ec/Io, SQE and RxQual thresholds would fall into the same category.

Michael C. Reed is responsible for this response.

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Merrimack County Telephone Company  
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**BAILEY 2.3:** Please refer to TDS response to Bailey 1.25. Please identify any case (i.e. decisions of cases litigated in court or before an administrative tribunal like the N.H. Public Utilities Commission and as described on the accompanying instructions page) where C Squared, LLC has provided similar analysis for a party and/or provided testimony in a case as described above.

**RESPONSE:**

C Squared Systems has not provided testimony in court or before an administrative tribunal regarding a similar analysis.

Dan Goulet is responsible for this response.

**BAILEY 2.2:** Please refer to TDS response to Bailey 1.22, relating to the difference in wireless signals inside a home versus outside a home. TDS responds: "There have been numerous studies done by infrastructure vendors, i.e. Lucent Technologies, Nortel and Ericsson, regarding the radio frequency link budgets by morphology class, which includes "in-building" and "in-vehicle" thresholds. Access to these documents is provided to the wireless services providers as customers of the infrastructure vendor. For competitive reasons, this information is proprietary and confidential. Ec/Io, SQE and RxQual thresholds would fall into the same category."

- a) What is meant by "the same category" in the last sentence of the response?
- b) Please confirm whether "Received Signal Strength Indication" tests also fall into "the same category," as referred to in the last sentence of the response.
- c) Please identify and provide copies of any specific "cases" (i.e. decisions in cases litigated in court or before an administrative tribunal like the N.H. Public Utilities Commission, and as defined on the accompanying instructions page) or specific articles, as defined on the accompanying instructions page, that discuss the information requested in Bailey 1-22.
- d) Please identify any "case," as described above, or any article, as defined on the accompanying instructions page, that supports the use of the:
  - i. "Received Signal Strength Indication" test,
  - ii. "Ec/Io" test,
  - iii. "SQE" test,
  - iv. "RxQual" test.
- e) Please refer to the third to last sentence of the response to Bailey 1-22. Is C Squared, LLC a "customer" of an "infrastructure vendor"?
- f) Please identify by title any cases or articles, as described above, that C Squared, LLC has been provided access to by any "infrastructure vendor" with respect to the:
  - i. "Received Signal Strength Indication" test,
  - ii. "Ec/Io" test,
  - iii. "SQE" test,

- iv. "RxQual" test.
- g) Would C Squared, LLC execute a confidentiality agreement in order to enable Bailey's counsel (who would also execute an appropriate confidentiality agreement) to review a full copy of any articles, as described above, identified in response to this question (Bailey 2-2)?
- h) Please provide any marketing materials provided to C Squared, LLC by any infrastructure vendor for equipment C Squared, LLC has purchased to perform each of the following tests for TDS in this case:
  - i. "Received Signal Strength Indication" test,
  - ii. "Ec/Io" test,
  - iii. "SQE" test,
  - iv. "RxQual" test.

**RESPONSE:**

- a) "The same category" references "of the same proprietary nature". Each carrier, while utilizing the same applicable key metrics to measure network performance (Ec/Io, SQE and RxQual, based on their individual technology platform CDMA, GSM or iDEN), may not be using the same exact thresholds. The thresholds used are proprietary in nature and dependent upon many factors, including the individual licensed carrier's business model and marketing strategies.
- b) Yes.
- c) There has been extensive research and study concerning the effects of man-made and natural impairments affecting path loss in a radio frequency environment. These studies include building penetration, fading and dispersion. The Okumura/Hata model is probably one of the most widely used path loss models in the world for cellular applications.

Provided below are just a few of the many publications used in the wireless industry:

Fundamentals of Telecommunications

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Roger Freeman  
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Reference Data for Engineers: Radio, Electronics, Computer and  
Communications  
Seventh Edition, Fifth Printing 1989  
Federal Telephone & Radio Corp

Wireless Telecom FAQ's  
Clint Smith  
General Dynamics Wireless Services  
McGraw-Hill 2000

Wireless Communications, Principles and Practice  
Second Edition  
Theodore S. Rappaport  
2002, 1996 Prentice Hall PTR  
Library of Congress Catalog-in-Publication Data

- d) The textbooks noted in c) above support the use of Receive Signal Strength. We cannot specifically point to any cases or articles that support the use of  $E_c/I_0$ , SQE or RxQual. The applicability of these metrics and their functionality are based on technical experience and customer demand. While C Squared Systems may not perform as extensive a benchmark for our existing clients as we did for TDS, the metrics measured, the tools used and the methodology remains the same. That is, the same subscriber units are used in conjunction with our software and hardware, almost daily, to collect data and baseline information for localized areas based on the specific needs of our customers.
- e) No.
- f) C Squared Systems, LLC does not purchase networks, base stations or associated equipment from the infrastructure vendors as we are not a licensed carrier. We are engineering consultants contracted by the carriers to provide them with RF engineering services and support. We, therefore, do not have direct access to

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the infrastructure vendor's network guidelines. Our knowledge of the parameters and thresholds used by the carriers is obtained through our support of those carriers. It is proprietary and confidential and is governed by nondisclosure agreements.

- g) No.
- h) As explained in f) above, C Squared Systems, LLC has no infrastructure vendor-provided marketing materials associated with the performance of the testing for TDS.

Dan Goulet is responsible for this response.