

ORIGINAL

N.H.P.U.C. Case No.	DT 07-027
Exhibit No.	W3 Bailey
Witness	Michael Reid Daniels (Court)

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1 A. Cellular telephone signal begins at its very strongest at -50dBm, which is received
2 when standing right under a tower with a cellular antenna belonging to the user's
3 provider on top. A user would literally need to be able to reach out and touch the
4 tower in order to get -50dBm. At -110dBm, cellular telephone signal exists, but is so
5 weak it is unusable.

6 It is important to remember that cellular signal strength works its way down a
7 negative list of numbers (from strong to weak).

8 **Q. What is Staff's understanding of the functionality of a cell phone at varying**
9 **dBm?**

10 A. From various phone calls and email messages Staff has found that views of signal
11 strength and what that means in terms of quality varies based on who is asked. For
12 example, a telephone call to Wilson Electronics, Inc., a manufacturer of cellular
13 handset antennae produced the following scale:

- 14 • -50dBm "crystal clear" connection
- 15 • -90dBm "a decent call" (but not necessarily a clear one)
- 16 • -110dBm gets you "nothing" or "no connection"

17 Email communications with the ConnectME Authority, Maine's state eligible
18 telecommunications carrier program, revealed the following qualifications for them:

- 19 • In determining areas that qualify as **underserved**, a map depicting -85dBm
20 must be filed with the Authority. The Authority considers any signal outside
21 of, or weaker than -85dBm **underserved**.

- 1 • In determining areas that qualify as **unserved**, a map of -95dBm must be filed
2 with the Authority. The Authority considers any signal outside of, or weaker
3 than -95dBm **unserved**.

4 Finally, Staff has found through communications with wireless providers themselves
5 that some coverage maps, which they use to market their services to the public, are
6 based on varying signal strengths. On information and belief wireless providers use
7 -85dBm to depict their strongest signal coverage. Exhibit 3, page 25 shows that
8 AT&T's "Best" coverage is, "...sufficient for most in-building coverage." It further
9 indicates, "However, in-building coverage can and will be adversely affected by the
10 thickness/construction type of walls, or your location in the building (i.e., in the
11 basement, in the middle of the building with multiple walls, etc.)". Their "Good"
12 coverage is, "not great in buildings", and their "Moderate" coverage drops when the
13 user is driving. It is also important to remember while looking at an AT&T coverage
14 map that partner coverage is equal to their "Moderate" coverage.

15 Using these standards, Maine's ConnectME Authority would consider anything less
16 than "best" coverage **underserved**.

17 **Q. Please provide examples of wireless providers' own definitions of what their**
18 **maps depict.**

19 A. Please refer to Exhibit 3 for examples of wireless providers' own definitions of what
20 is depicted on their coverage maps, and coverage map examples for both Sutton and
21 Salisbury exchanges. Many coverage maps include out of network coverage, which is
22 not reliably known by that provider to be dependable. Note that a telephone call
23 between Staff and Sprint/Nextel defined areas in dark green with white dots as areas

1 where, "signal strength information is unavailable" as shown in Exhibit 3 on pages 41
2 and 47. Sprint did not previously provide an explanation in their coverage map key
3 for any area that was dark green with white dots.

4 **Q. How reliable, in terms of quality of service, and guarantee of reliable cellular**
5 **telephone signal strength are providers' coverage maps, or online coverage**
6 **locators?**

7 A. Wireless providers' coverage maps are quite unreliable. A wireless provider wants to
8 display to a potential customer the extent to which they could receive a reliable signal
9 in an area, rather than a guarantee that they will receive a reliable signal strength.
10 Also, signal strengths are not defined on these maps. The coverage locator maps are
11 meant to be marketing tools, not a guarantee from the provider on service availability.
12 Staff has found that the provider's coverage maps depict outdoor coverage in all
13 cases, which does not necessarily represent adequate signal strength inside buildings.
14 Exhibit 3, pages 23, 25, 26, 29, 38, 53, and 57 are web page printouts of wireless
15 coverage in the Sutton and Salisbury exchanges as advertised by providers. Wireless
16 providers admit readily that obstructions such as those in Exhibit 1 (trees, exterior
17 walls; interior walls, basements, discussed below) are likely to break down signal
18 availability, suggesting that the wireless coverage depicted is not necessarily adequate
19 or reliable for in home use.

20 **Q. How far does the average cellular telephone signal project from a wireless**
21 **antenna?**

22 A. Well positioned, adequate equipment will make the difference between why one
23 signal is stronger than another, but on average Staff finds that signal propagates in

Exhibit 1 – A summary of common obstacles measured at the Portable Radio Research Group at Virginia Polytechnic Institute in Blacksburg, Virginia:

Shadowing Element	Loss
Brick house exterior	14.5 dB
Wood siding exterior	8.8 dB
Cinderblock wall	22 dB
Subterranean basement loss	31 dB
Interior wall	4.7 dB
Small deciduous tree	3.5 dB
Large deciduous tree	11 dB
Large coniferous tree	14 dB



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COVERAGE MAPS

Choose a coverage map:

Move mouse over small map for close-up view. Single-click the Viewfinder to lock/unlock it.

- National
- Wide Area
- Mobile-to-Mobile
- Prepaid Wireless
- Smartphones
- Picture Messaging
- easyedgeSM
- Download Service



National Voice Coverage

Chicagoland
- Click Here -



To print, right-click and select 'Print' from the menu.

- National Calling Area, including Night and Weekend and CALL ME MinutesSM
- No Coverage



Having trouble seeing the Map?

*The map shows an approximation of service coverage. Actual coverage may vary. Service may be interrupted or limited due to weather, terrain, customer equipment, or network limitations. Coverage indoors may also vary. U.S. Cellular does not guarantee coverage. User may incur roaming charges at borders of calling areas.



EXHIBIT 3

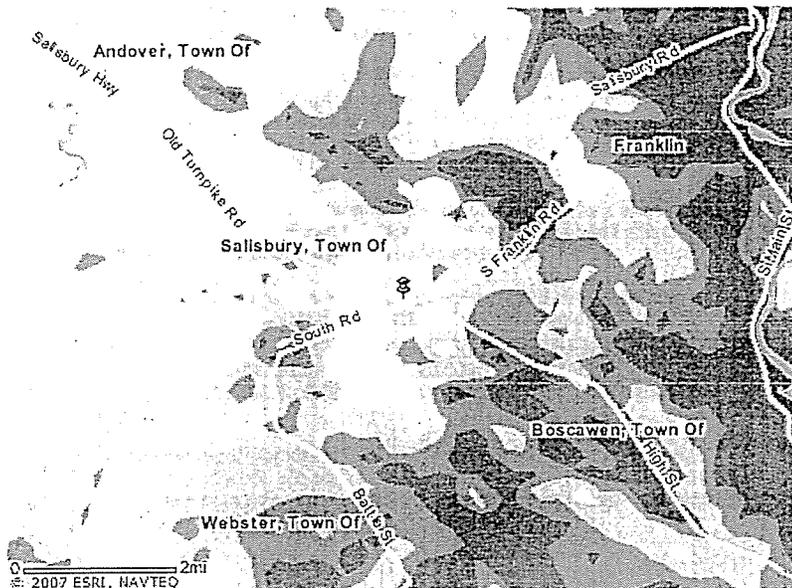


AT&T Coverage Viewer

AT&T's wireless network has the largest digital voice and data coverage in America. Enter your location to see coverage in your area. You can zoom in and re-center the map by clicking on it.

Address

Salisbury, NH



Coverage Legend

- Best
- Partner
- 3G/Mobile Broadband Coverage
- Good
- No Coverage
- Moderate

Coverage last updated on: May 31, 2007. Map depicts an approximation of coverage.

Important Information About the Coverage Map

Map may include areas served by unaffiliated carriers, and may depict their licensed area rather than an approximation of the coverage there. Actual coverage area may differ substantially from map graphics, and coverage may be affected by such things as terrain, weather, foliage, buildings and other construction, signal strength, customer equipment and other factors. AT&T does not guarantee coverage. Charges will be based on the location of the site receiving and transmitting the call, not the location of the subscriber.