United States District Court,
E.D. Texas, Marshall Division.

TANTIVY COMMUNICATIONS INC,
v.
LUCENT TECHNOLOGIES INC.

No. Civ.A. 2:04-CV-79

Aug. 11, 2005.

D. Dudley Oldham, Linda L. Addison, Robert Stanford Harrell, Fulbright & Jaworski, Houston, TX, Franklin W. Jones, Jr., Jones & Jones, Marshall, TX, Otis W. Carroll, Jr., Ireland Carroll & Kelley, PC, Tyler, TX, Sidney Calvin Capshaw, III, Brown McCarroll, Longview, TX, Robert Wayne Turner, Jones Day, Dallas, TX, for Plaintiff.

Carl R. Roth, Marshall, TX, Deborah Savarese Sloan, Jones Day, Dallas, TX, Michael Charles Smith, The Roth Law Firm, Marshall, TX, for Defendant.

MEMORANDUM OPINION AND ORDER

WARD**, J.**

The court issues this memorandum opinion and order to resolve the parties' claim construction disputes.

1. Introduction

The plaintiff, Tantivy Communications Inc. ("Tantivy"), claims the defendant, Lucent Technologies Inc. ("Lucent"), infringes certain claims of three patents in suit, United States Patent Nos. 6,081,536 ("the '536 patent"), 6,151,332 ("the '332 patent"), and 6,526,281 B1 ("the '281 patent"). The parties filed claim construction briefs, and the court held a *Markman* hearing. For the reasons explained more fully below, the court construes the disputed terms in accordance with the rulings made in this opinion.

2. Description of the Technology

The present case involves Code Division Multiple Access ("CDMA") technology. In general, CDMA technology permits multiple wireless users to simultaneously share a band of wireless spectrum. Each user is assigned a unique code. A transmitter applies the code to the user's signal, spreads the signal across the wireless spectrum band, and a receiver applies the same unique code to the signal to decipher the signal and recover the transmitted data. By applying a unique code to each transmission and spreading the signals, the transmissions collectively share the wireless spectrum band. This increases the capacity of the wireless spectrum band.

Not all wireless data transmissions are created equal. A single voice communication, such as a wireless

telephone call, uses relatively little bandwidth to transmit the data, but it requires a steady allocation of bandwidth to accommodate the duration of the call. By contrast, the transmission of Internet data over a wireless network uses entirely different bandwidth resources. Many Internet transmissions involve large chunks of data, such as in the case of photographs or web pages. These transmissions are described as high-bandwidth, bursty transmissions. The transmissions are "high-bandwidth" because a photograph or a web page requires a large amount of bandwidth when compared to voice data. The transmission is referred to as "bursty" because the data does not constantly flow from the web site to the user. After the data is transmitted to the user, it can be stored in local memory and accessed at the pleasure of the user. When the user is ready to download more information, the next wave of data is transmitted.

Wireless communications depend on a protocol which governs how data is formatted and communicated throughout a network. In this context, a layered protocol, known as the Open System Interconnect ("OSI") protocol is used. The OSI protocol utilizes several layers, from the physical layer, which actually transmits the wireless signal from the transmitter to the receiver, to the application layer, which is displayed to the user. Each layer "communicates" with only its corresponding layer in the hierarchy.

The patents-in-suit are referred to as the Gorsuch patents. They describe inventions relating to the dynamic allocation of physical layer bandwidth during a communications session. In the preferred embodiment of the invention, the dynamic allocation of bandwidth is exemplified in an Integrated Services Digital Network ("ISDN") system. Under ISDN protocol, a network connection depends on a constant physical layer connection during a given communications session. The nature of Internet communications, however, and in particular the transmission of bursty, high-bandwidth transmissions, does not require the allocation of the entire amount of bandwidth associated with the use of a web page during the whole time a user is visiting the site. For example, the user might download a large amount of data in a high-bandwidth burst, but then an idle period, or dormant period, will ensue while the user is viewing the material at his desktop. The Gorsuch patents describe methods of dynamically allocating the available bandwidth so that the bandwidth is used on an as-needed basis during the communications session. They do so by partitioning the channel into subchannels smaller than the channel itself, and by allocating and deallocating those subchannels on an as needed basis to the various users on the network. The parties' to this case dispute the scope of the Gorsuch patent claims.

3. General Principles Governing Claim Construction

"A claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." Burke, Inc. v. Bruno Indep. Living Aids, Inc., 183 F.3d 1334, 1340 (Fed.Cir.1999). Claim construction is an issue of law for the court to decide. Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-71 (Fed.Cir.1995) (en banc), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

To ascertain the meaning of claims, the court looks to three primary sources: the claims, the specification, and the prosecution history. Markman, 52 F.3d at 979. Under patent law, the specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. A patent's claims must be read in view of the specification, of which they are a part. *Id*. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Id*. "One purpose for examining the specification is to determine if the patentee has limited the scope of the claims." Watts v. XL Sys., Inc., 232 F.3d 877, 882 (Fed.Cir.2000).

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee's claims. Otherwise, there would be no need for claims. SRI Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 (Fed.Cir.1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. Intellicall, Inc. v. Phonometrics, 952 F.2d 1384, 1388 (Fed.Cir.1992). And, although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc., 34 F.3d 1048, 1054 (Fed.Cir.1994).

This court's claim construction decision must be informed by the Federal Circuit's recent decision in Phillips v. AWH Corporation, 415 F.3d 1303, 2005 WL 1620331 (Fed.Cir. July 12, 2005)(en banc). In *Phillips,* the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the *claims* of a patent define the invention to which the patentee is entitled the right to exclude." 415 F.3d 1303, 2005 WL 1620331 at *4 (emphasis added)(*quoting* Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc., 381 F.3d 1111, 1115 (Fed.Cir.2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id*. at *5. The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e. as of the effective filing date of the patent application." *Id*. This principle of patent law flows naturally from the recognition that inventors are usually persons who are skilled in the field of the invention. The patent is addressed to and intended to be read by others skilled in the particular art. *Id*.

The primacy of claim terms notwithstanding, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id*. Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id*. at ----6-7 (*quoting* Markman, 52 F.3d at 978). Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id*. at ----7-8. As the Supreme Court stated long ago, "in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims." Bates v. Coe, 98 U.S. 31, 38, 25 L.Ed. 68 (1878). In addressing the role of the specification, the *Phillips* court quoted with approval its earlier observations from Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998):

Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. The prosecution history helps to demonstrate how the inventor and the PTO understood the patent. Phillips, 415 F.3d 1303, 2005 WL 1620331 at *9. Because the file history, however, "represents an ongoing negotiation between the PTO and the applicant," it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id*. Nevertheless, the prosecution history is intrinsic evidence. That evidence is

relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims.

Phillips rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court condemned the suggestion made by Texas Digital Systems, Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed.Cir.2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Id*. at ----13-14. The approach suggested by *Texas Digital*-the assignment of a limited role to the specification-was rejected as inconsistent with decisions holding the specification to be the best guide to the meaning of a disputed term. *Id*. According to *Phillips,* reliance on dictionary definitions at the expense of the specification had the effect of "focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of the claim terms within the context of the patent." *Id*. at *14. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id*. What is described in the claims flows from the statutory requirement imposed on the patentee to describe and particularly claim what he or she has invented. *Id*. The definitions found in dictionaries, however, often flow from the editors' objective of assembling all of the possible definitions for a word. *Id*.

Phillips does not preclude all uses of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id*. at *16. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction, bearing in mind the general rule that the claims measure the scope of the patent grant. The court now turns to a discussion of the disputed claim terms.

A. ISDN Limitation

The primary dispute between the parties is whether certain claims are limited to an ISDN environment. Lucent argues that a number of the disputed claim terms require an interpretation that incorporates ISDN-related limitations. FN1 Tantivy opposes such constructions.

FN1. Included among these terms is "subscriber unit," "base station," "maintaining the appearance of a continuous session connection," and "maintaining the appearance of a continuous connection for said communication session." The court is not persuaded that these terms require construction, other than what is provided with respect to the ISDN limitation.

ISDN refers to Integrated Services Digital Network. It is a network architecture in which the network carries voice and data information in a digital bit stream. ISDN protocol requires a continuous end-to-end connection which, according to Lucent, gave rise to the inventor's need to develop one of the primary features of the invention, known as spoofing. In the preferred embodiment described in the patents, the term spoofing describes a concept by which either the base station or subscriber unit tricks, or "spoofs," itself into believing that a continuous full bandwidth end-to-end connection exists with the other after the deallocation and reassignment of communications subchannels. Higher protocol layers may thus maintain logical connections, despite the absence of a physical connection. Lucent contends that the patent claims should be limited to ISDN architecture, and has included this specific limitation in connection with a number of its

proposed definitions. Tantivy asserts that the claims are not so limited and points to passages in the specification which suggest a broader claim scope.

Tantivy is correct. Although the preferred embodiment disclosed in the patents illustrate the invention in the ISDN environment, the language of the disputed claims is not so limited. This court is mindful of the general rule, emphasized by *Phillips,* that the claims must be read in light of the specification; however, *Phillips* also reminds the court that *claims* measure inventions. A court should not limit claims to the preferred embodiments when the claim language supports a broader scope. The specification states:

For example, *instead of ISDN,* other wireline digital protocols may be encapsulated by the EW[x] protocol, such as xDSL, Ethernet, and X.25, and therefore may advantageously use the dynamic wireless subchannel assignment scheme described herein.

'536 patent at Col. 10, ll. 50-58 (emphasis added). Contrary to Lucent's argument, the patentee was not describing various alternative *ISDN* protocols, he was describing digital protocols *other than* (i.e. instead of) ISDN. Although the preferred embodiment is shown in the ISDN setting, the claims do not require the limitations proposed by Lucent, and the court rejects them. Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed.Cir.1998)(cautioning against reading limitations from preferred embodiment into claims).

B. Site

The parties disagree on the construction of the term "site." Tantivy contends that "site" means "the functional grouping of equipment on one side of a wireless channel that supports wireless communications to/from another side of the wireless channel." Lucent incorporates the ISDN limitation and the various types of equipment disclosed in the specification within its definition of site. The court has rejected the argument that the claims are limited to an ISDN protocol. The court therefore defines "site" as "the functional grouping of equipment on one side of a wireless channel that supports wireless communications to/from another side of the wireless channel."

C. Nominal Data Rate

Next, the court considers the term "nominal data rate." Tantivy contends that a person of skill in the art reading the patents would conclude that the term "nominal data rate" refers to the "chip rate." As explained by Tantivy's expert, the term "chip rate" refers to the data rate at which chips are sent into communications channels by users. Lucent contends that the "nominal data rate" refers to the "expected data rate of one radio channel."

The patent specification supports Lucent's construction of this term. Figure 3 of the '536 patent discloses a diagram showing how subchannels are assigned within a given (i.e.nominal) radio frequency channel. The portion of the specification describing Figure 3 states: "[t]his figure illustrates one possible frequency plan for the wireless units 160 according to the invention. " '536 patent, col. 6, ll. 16-18. In the context of an ISDN system, the specification explains that it was generally understood that "in order to support an ISDN type like connection which may contain information at a rate of 128 kbps that, at best, only about (500kbps/128 kbps) or only 3 ISDN subscriber units could be supported at best." '536 patent, col. 6, ll. 39-43. By subdividing the available approximately 500-600 kbps bandwidth into a relatively large number of subchannels, however, and allocating them only on an as-needed basis, the present invention could accommodate many more subscribers on a single channel. Col. 6, ll. 43-60. These passages, read in context

of what is shown in Figure 3, suggest that the nominal data rate is the expected data rate of one radio frequency channel.

To be sure, the claim language, with its reference to the nominal data rate of the digitally modulated CDMA radio signals, is not entirely clear. As such, Tantivy's reading of this term is not without some force. Nevertheless, the term "chip rate" simply appears nowhere in the patent. *Phillips* makes clear that a district court should freely consult the specification when it is in doubt about the meaning of a disputed claim term. The term "nominal data rate" is a prime example of a claim term which merits a careful study of the invention as described in the specification. In this case, through its description of Figure 3, the specification provides strong support for Lucent's proposed construction. Unfortunately for Tantivy, the specification which supports Lucent's construction is altogether silent with respect to any reference to "chip rate."

Finally, the court has considered the prosecution history. The prosecution history also demonstrates the correctness of Lucent's construction by suggesting that "nominal data rate" refers to the data rate of the CDMA channel. Specifically, the patentee distinguished the Rudapantra system by stating in part:

We can find no notion in Rudapantra of the "*data rate of each subchannel being much less than the nominal data rate of the CDMA channel*" as now claimed.

See Amendment filed October 29, 1999, at 4. This passage refers to the expected data rate of a communications channel. The court is therefore persuaded that Lucent's proposed construction is proper and adopts it.

D. Much less than

Lucent contends that the term "much less than" when used in the context of the asserted claims, means that the data rate of each subchannel is less than or equal to approximately 1/64th of the expected data rate of one radio frequency channel. The basis for Lucent's argument is that, absent this limitation, the phrase is inherently subjective and there is no notice to the public of the scope of the phrase "much less than." Lucent suggests that a competitor would not know whether subdividing channels into, for instance, one-half of the expected data rate of a radio frequency channel would constitute a subdivision into an amount "much less" than the nominal data rate of the channel. Tantivy contends that the phrase is clear and needs no construction. After considering the arguments of the parties, the court is persuaded that "much less than" needs no construction and declines to limit the term as Lucent proposes. This ruling, however, should not be construed as a holding that the claim is definite, only that the court will reserve judgment on indefiniteness until such time as it considers motions for summary judgment.

E. Allocating available subchannels only on an as needed basis

This phrase refers to the dynamic allocation of subchannels described in the invention. Once again, Tantivy contends that this phrase needs no construction. Lucent contends that this phrase means that the phrase requires the evaluation and/or measurement of short term data rate needs.

Lucent relies on a passage in the specification to support its proposed construction. Specifically, in the '536 patent, the specification states "[i]n general, bandwidth assignments are made for each network layer session based upon measured short term data rate needs. One or more subchannels 300 are then assigned based upon these measurements and other parameters such as amount of data in queue or priority of service as assigned by the service provider. " '536 patent, col. 8, ll. 32-38. Although Lucent correctly cites the portion of the

specification, there is no warrant in the claims for implying the limitation that Lucent seeks. The claim language, standing alone, simply provides that available subchannels are allocated on an as needed basis, but it does not require the system to measure the "short term" data rate needs either exclusively or in combination with the other parameters illustrated in the description of the preferred embodiment. The court is persuaded that "only on an as needed basis" needs no construction and declines to limit the term with the additional words as Lucent proposes.

F. Allocating additional subchannels

The dispute over this phrase concerns whether claim 3 of the '536 patent and claim 12 of the '281 patent cover the allocation of a single additional subchannel, or whether use of the plural term "subchannels" requires the allocation of two or more additional subchannels. Despite Lucent's arguments to the contrary, Tantivy persuasively explains that the purpose of the invention was to maximize available bandwidth, and that a claim construction requiring the allocation of two additional subchannels when only one is necessary cuts against the purpose of the invention. The court agrees.

The term "additional subchannels" must be read in the context of the claim language. In the context of the claims at issue, additional subchannels are allocated or requested either "as a session requires additional bandwidth" ('536 patent, claim 3) or "to support a higher rate transfer of data" ('281 patent, claim 12). Thus, the number of additional subchannels allocated or requested is a function of the requirements of a given session. The allocation of only one additional subchannel might suit the needs of a session requiring only a small amount of additional bandwidth. Conversely, a plurality of additional subchannels might be necessary to satisfy the requirements of other data transfers. In the context of these claims, the patentee used the term "additional subchannels" to include both the singular and the plural (i.e. the allocation of one or more subchannels). '536 patent, col. 8, ll. 35-36 ("One or more subchannels are then assigned based upon these measurements...."). *See* Interactive Gift Express, Inc. v. Compuserve, Inc., 256 F.3d 1323, 1334 (Fed.Cir.2001)(rejecting similar argument when the claim language and specification suggested that a singular construction was appropriate). Based on the cited portions of the specification, the court rejects Lucent's proposed limitation that the phrase "allocating additional subchannels" mandates the allocation of two or more additional subchannels.

G. Subchannels are deallocated

The next issue is whether the claim language requires the deallocation of all subchannels. Tantivy contends that the phrase "subchannels are deallocated" means "withdrawing permission to use subchannels." Lucent contends that the phrase requires that "*all* channels between the subscriber units and a base station at the physical layer are released." According to Lucent, the deallocation of some but not all previously allocated subchannels would not literally satisfy the claim language.

Lucent locates its argument in a passage contained in the prosecution history. Specifically, Lucent contends that the inventor added the term "deallocated" to the claims and gave that term a specific definition when attempting to overcome certain prior art references. The court has reviewed all of the cited portions of the prosecution history and is not persuaded that the applicant clearly defined "deallocated" to require the release of all physical layer subchannels. In particular, the court concludes that the portions of the prosecution history relied on by Lucent are ambiguous. They do not specifically state that *all* physical layer subchannels *must* be released for subchannels to be "deallocated" in the context of these claims. One reading of the argument is that the applicant was contending that a novel aspect of his invention was the ability of the system to maintain the appearance of a connection at the higher protocol layers while allowing

the number of channels to change during the duration of a network session. It is not clear, however, that in every instance "deallocation" required the release of all physical layer subchannels. Absent a more explicit disclaimer, the court is persuaded to adopt a proposed construction similar to Tantivy's. The phrase "subchannels are deallocated" is construed to mean that "previously allocated subchannels are released."

H. Communication session

Next, the parties dispute the term "communication session." Tantivy contends that the term "communication session" means "a period of time during which a communication flow may occur between two entities at a given protocol layer." Lucent contends that the term "establishing a communication session" requires making a connection between the subscriber unit and the base station. Although each side notes shortcomings with the other's proposal, it appears to the court that the language of the claims and the specification contemplate a session which includes either a physical or a logical connection. The court defines "communication session" means "a period of time when communication is enabled by either a logical or a physical connection between two entities."

I. Idle connection

Next, the parties contest the construction of the term "idle connection." Tantivy sponsors two different constructions. Specifically, Tantivy states that the patent describes and claims two different idle connections: a single inactive assigned subchannel and a higher layer logical channel with no assigned subchannel. Thus, according to this argument, in claim 11 of the '281 patent, the phrase means a higher layer logical channel with no assigned subchannel. In clam 17 of the '281 patent, the phrase means either a single inactive assigned subchannel or a higher layer logical channel with no assigned subchannel. And, in claim 22 of the '281 patent, the phrase means a single inactive assigned subchannel. Lucent argues that the term "idle connection" simply means "a logical connection between a subscriber unit and a base station."

Contrary to Tantivy's suggestion, the court must endeavor to construe "idle connection" so that its meaning is consistent throughout the patents. CVI/Beta Ventures, Inc. v. Tura LP, 112 F.3d 1146, 1159 (Fed.Cir.1997); Fonar Corp. v. Johnson & Johnson, 821 F.2d 627, 632 (Fed.Cir.1987). The state diagram shown in Figure 5 suggests that, in the idle mode, there is no allocation of any subchannels. Nevertheless, one passage in the specification suggests a broader scope of the term "idle." Specifically, at col. 8, ll. 43-48, the patent states "[i]n addition, when a given session is idle, a connection is preferably still maintained end to end, although with a minimum number of, such as a single subchannel being assigned. For example, this single subchannel may eventually be dropped after a predetermined minimum idle time is observed." Bearing these passages in mind, the court defines "idle connection" to mean "a higher layer logical connection during which at most only a single inactive subchannel is allocated."

J. Spoofing a Subscriber Unit

As noted above, ISDN protocol requires a continuous end-to-end connection. One aspect of the present invention was the ability to allocate and deallocate available bandwidth on an as needed basis while maintaining logical connections between higher protocol layers. To implement the logical connection, the inventor devised a way to fool the subscriber unit and the base station into "thinking" that an end-to-end communication existed at all times, even after the deallocation of some or all of the physical layer subchannels. The inventor termed this concept "spoofing." The parties dispute precisely what that means.

Tantivy contends that the term "spoofing a subscriber unit" means "making a subscriber unit appear as if

present." Lucent contends that the term "spoofing" (1) involves the looping back of non-information bearing bits and (2) must occur at the subscriber unit. Lucent urges that, in the context of this invention, the ISDN protocol required an end-to-end connection, and the loop-back was the way the inventor fooled the subscriber unit into thinking a continuous connection existed. Moreover, because the embodiments of the specification disclosed that the subscriber unit was spoofed by operations at the subscriber unit and the base station was spoofed by operations at the base station, Lucent argues that the spoofing necessarily occurred only at the subscriber unit or at the base station, respectively, depending on which was being spoofed.

Although Lucent's arguments would carry more force if the court had limited the context of the invention to an ISDN system, the claim language simply does not impose these limitations. Lucent's arguments would effectively limit the spoofing limitation to an ISDN environment or other environments in which the protocol required a continuous end-to-end connection. The court has already rejected this argument.

Tantivy's construction is not, however, entirely correct. As Lucent points out, the claimed spoofing is "spoofing a subscriber unit" which, as the court has already explained, contemplates an action of tricking or fooling the subscriber unit. Tantivy's construction of the term to mean "making a subscriber unit appear as if present" misses the concept of some action directed toward the subscriber unit. Under Tantivy's construction, the subscriber unit need not be tricked or fooled, but rather, merely "making the subscriber unit appear as if present" to a base station or some other device would be sufficient. In the context in which the claim terms appear, the term "spoofing a subscriber unit" therefore means "an action directed at a subscriber unit that tricks or deceives the subscriber unit."

K. Means for establishing a communication session between first and second sites and for controlling said first wireless transceiver to appear to said first digital communications path as though communication bandwidth is continuously available during said communication session for wireless communication between said first and second transceivers, irrespective of a need to transport data communication signals between said first and second sites.

There are two functions associated with this limitation, which appears in claim 10 of the '332 patent. Both parties agree that a different structure is used for each function. The parties agree that the first function performed is "establishing a communication session between said first and second sites." Tantivy proposes that the corresponding structure for the first function is call processing 247 and end-to-end user signaling 228. Lucent proposes that the corresponding structure includes the communication protocols: end-to-end signaling 228, call processing 247, Q.931, and V5.2, and the structure that performs these protocols, an ISDN modem 120 of a subscriber unit 101 and the base station 140.

Proper construction of this limitation requires the court to identify the structure disclosed in the specification which is clearly linked to the performance of the claimed function, in this case, establishing a communication session between said first and second sites. The parties appear to agree that end-to-end user signaling 228 and call processing 247 are required. The difference is that Lucent seeks to identify specifically the ISDN protocols discussed in the specification as well as the ISDN modem 120 and base station 140. After considering the parties' arguments, and mindful of the rules requiring the more limiting constructions afforded means-plus-function limitations, the court identifies the corresponding structure, in the context of the example in which the invention is shown, as the ISDN modem 120, the base station 140, end-to-end signaling 228, and call processing 247. FN2

FN2. Pursuant to the statute, the claim covers the identified structure "and equivalents thereof." 35 U.S.C. s.

112 para. 6.

Next, the court considers the "controlling said first wireless receiver" function. Tantivy argues that the corresponding structure is bandwidth management 243 and forward and reverse spoofing of EW[x] 242, both in the base station 140. Lucent argues that the structure is the structure in the subscriber unit 101 that implements the EW[x] protocol 234, the ISDN reverse 422 and forward 432 spoofers cooperating to loop back non-information bearing signals, such as flag pattern, sync bits, and other necessary information, so as to spoof the data terminal equipment connected to the ISDN modem 120 into continuing to operate as though the allocated wireless connection over the CDMA transceiver 150 is continuously available.

The function at issue requires the controlling of the transceiver to appear to the communication path as though bandwidth is continuously available during the communication session, irrespective of a need to transport data communication signals between the first and second sites. Spoofing is the mechanism described in the patent by which the appearance of available bandwidth is continuously maintained. The specification describes the structure which performs this function and recites:

In particular, the reverse 422 and forward 432 spoofers cooperate to loop back non-information bearing signals, such as flag patterns, sync bits, and other necessary information, so as to spoof the data terminal equipment connected to the ISDN modem 120 into continuing to operate as though the allocated wireless path over the CDMA transceiver 150 is continuously available.

'332 patent, col. 7, ll. 48-57. The court therefore identifies the corresponding structure as the ISDN forward and reverse spoofers 432 and 422.

L. Means for making said bandwidth available for wireless communication by another wireless transceiver of said digital communication network, in the absence of said need to transmit data communication signals between said first and second sites.

This means-plus-function term, found in claim 10 of the '332 patent, recites the function of making bandwidth available for wireless communication by another wireless transceiver of said digital communication network, in the absence of a need to transmit signals between the first and second sites. In general, this limitation relates to the deallocation of subchannels for use by others on the network. The parties dispute the recited function. Tantivy would restrict the function to making bandwidth available for wireless communication by another wireless transceiver. Tantivy limits the structure to bandwidth management 243 of base station 140. Lucent, on the other hand, urges that the language "in the absence of said need to transmit data communications signals between said first and second sites" is critical to the function, and implicates structure found at both the subscriber unit and the base station. Lucent argues that, on the reverse link from the subscriber unit to the base station, the subscriber unit tells the base station that it no longer needs the bandwidth, allowing the base station to make that bandwidth available to another transceiver.

After reviewing the briefs and the arguments of the parties, the court is not persuaded that the details of the channel allocation, as set forth in the specification of the '536 patent, are necessary to construe this term. The specification of the '332 patent states that "when data is not being transmitted between the portable computer 110 and the remote node *bandwidth management function 235 deallocates initially assigned radio channel bandwidth 160 and makes it available for another transceiver and another subscriber unit 101* ."

'332 patent, col. 5, ll. 50-55 (emphasis added). Thus, the structure of the subscriber unit 101 (i.e. bandwidth management 235) is clearly implicated. The court identifies the corresponding structure as bandwidth management 235 of a subscriber unit.

M. Means for maintaining a connection at a network layer above a data link layer by establishing a lower level connection and using radio frequency bandwidth only when required

The final means-plus-function term addresses the means for maintaining a connection at the network layer. The parties agree on the function recited by the claim. They disagree on the corresponding structure. Tantivy argues that bandwidth management 243 and forward and reverse spoofing of EW[x] 242 (all in the base station) is the corresponding structure. Lucent argues that the spoofing of EW[x] 234 and ISDN reverse spoofer 422 and forward spoofer 432 (all in the subscriber unit) constitute the structure linked to the function of maintaining a connection.

The patent states that "the spoofing function performed by EW[x] 234 include the necessary functions to keep the U interface for the ISDN connection properly maintained, even without the continuous availability of a radio channel 160 of sufficient bandwidth for the duration of the network layer connection." '332 patent, col. 5, ll. 26-30. In addition, the patent provides that "the reverse 422 and forward 432 spoofers cooperate to loop back non-information bearing signals ... so as to spoof the data terminal equipment connected to the ISDN modem 120 into continuing to operate as though the allocated wireless path over the CDMA transceiver is continuously available. " '332 patent, col. 7, ll. 51-57. Moreover, as Lucent points out in its brief, the Summary of the Invention states that "the network level connection can be maintained by looping back data and removing the sync and maintenance bits at the ISDN physical layer one." '332 patent, col. 3, ll. 3-5. After considering the briefs and the arguments of the parties, the court is persuaded that the EW[x] protocol and ISDN reverse spoofer 422 and forward spoofer 432 constitute the structure necessary for maintaining a connection at the network layer.

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Tantivy Communications Inc. v. Lucent Technologies, Inc.

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