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Paper No. 38
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC., TELEFONAKTIEBOLAGET
LM ERICSSON AND AT&T MOBILITY, LLC,
Petitioner,

v.

INTELLECTUAL VENTURES I LLC,
Patent Owner.

Case IPR2016-01169
Case IPR2017-00681
Patent 5,960,032

Before KRISTEN L. DROESCH, BRIAN J. McNAMARA, and DAVID C. McKONE, *Administrative Patent Judges*.

McNAMARA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and
37C.F.R. § 42.73

BACKGROUND

On December 14, 2016, we instituted an *inter partes* review of claims 1–9 of U. S. Patent No. 5,960,032 ("the '032 patent"). Paper 9 ("Dec. to Inst."). On March 16, 2017, we granted a motion to join IPR2017-00681 to this proceeding. Paper 18. Patent Owner filed a Patent Owner Response (Paper 21, "PO Resp."), Petitioner filed a Petitioner Reply (Paper 25, "Pet. Reply") and a transcript of an oral hearing held on September 11, 2017 (Paper 37, "Tr.") has been entered into the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). We base our decision on the preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

Having reviewed the arguments of the parties and the supporting evidence, we conclude that Petitioner has demonstrated by a preponderance of the evidence that all challenged claims are unpatentable.

THE '032 PATENT (EXHIBIT 1001)

The '032 patent concerns a method for high speed wireless data transmission using expanded bit durations in multiple parallel coded data streams. Ex. 1001, 1:1–8. The '032 patent addresses issues arising from signal propagation characteristics that cause different time delays on multiple propagation paths to a receiver, i.e., a spread in delay times, thereby scattering signals and limiting maximum transmission times. *Id*. at 1:12–30. These characteristics manifest themselves as intersymbol interference (ISI) that creates an irreducible error floor. *Id.* at 1:31–33.

One conventional approach to addressing such issues is multicarrier modulation in which transmitted data is divided into several interleaved bit

streams that are used to modulate several sub-carriers. *Id.* at 1:39–43. A training waveform can be sent through the channel so that channel information is fed back from the receiver to the transmitter to allocate power to the various sub-channels. *Id*. at 1:56–61. Another conventional option is to send sub-carrier pilots along with transmitted information to estimate channel parameters to cancel interference between the sub-channels. *Id.* at 2:3–25.

In contrast to the multicarrier method, the '032 patent discloses as its invention a method of dividing high rate data streams into a plurality of parallel low rate bit streams, in which each low rate bit stream is modulated using direct-sequence spread spectrum (DSSS) as a single carrier. *Id.* at Abstract, 2:29–34. "By selecting the processing gain properly the total required bandwidth will be of the same order as the original high-rate data stream, thereby gaining the inherent benefit of multipath rejection without expanding the bandwidth of the original high-rate data stream." *Id.* at Abstract. Preferably, each low rate bit stream is subject to a processing gain of the order of the number of low rate bit streams, making it possible to obtain high rate spread spectrum modulation within the bandwidth of the original high rate transmission stream while maintaining the advantages of DSSS such as multipath rejection. *Id.* at 2:65–3:4.

ILLUSTRATIVE CLAIM

Claim 1 is illustrative:

> 1. A method for transmitting digital data in a wireless communication environment comprising:
>
> dividing an incoming stream of serial data bits having a first bit duration (T_b) into a plurality (K) of parallel data bit streams;

expanding by K times the bit duration of the incoming data so that the resulting symbol duration in said parallel data streams equals KT_b;

modulating said expanded parallel data streams with modulating sequences, each said modulating sequence having a processing gain N, having a sequence period equal to the symbol duration KT_b of said expanded data streams, and having N binary chips within each period so that each chip has a chip duration of $T_c=KT_b/N$, wherein K and N are integers and N>K; and

summing the modulated parallel data streams for transmission.

GROUNDS OF INSTITUTION

In our Decision to Institute, we instituted trial on the following challenges to patentability:

Claims 1–3, 7, and 9 as obvious under 35 U.S.C. § 103(a) over Sasaki 1994[1] in view of Sasaki 1991[2];

Claim 4 as obvious under 35 U.S.C. § 103(a) over Sasaki 1994, in view of Sasaki 1991, and further in view of Rice[3];

Claims 5 and 6 as obvious under 35 U.S.C. § 103(a) over Sasaki 1994, in view of Sasaki 1991,and further in view of Kato[4]; and

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[1] Shigenobu Sasaki, et. al, *Performance Evaluation of Parallel Combinatory SSMA Systems in Rayleigh Fading Channel*, IEEE ISSSTA 4, IEEE THIRD INTERNATIONAL SYMPOSIUM ON SPREAD SPECTRUM TECHNIQUES AND APPLICATIONS, July 4, 1994. Ex. 1002.

[2] Shigenobu Sasaki, et. al., *Performance of Combinatory Spread Spectrum Multiple Access Communication Systems*, IEEE SYMPOSIUM ON PERSONAL, INDOOR, AND MOBILE RADIO COMMUNICATIONS, Sept. 23–25, 1991. Ex. 1003.

[3] U.S. Patent No. 5,210,770 issued May 11, 1993. Ex. 1004.

[4] U.S. Patent No. 5,583,851 issued Dec. 10, 1996. Ex. 1006.

Claim 8 as obvious under 35 U.S.C. § 103(a) over Sasaki 1994, in view of Sasaki 1991, in further view of Fattouche[5].

Dec. to Inst. 31.

CLAIM CONSTRUCTION

In our Decision to Institute, we applied the ordinary and customary meaning to the terms not construed. We noted Petitioner's comments concerning the term "the system performance" and "the ratio of K to N" as potentially lacking antecedent basis, but determined that the terms did not require explicit construction and that we could determine the scope and meaning of the claims as well as the differences between the challenged claims and the prior art. Dec. to Inst. 8–9. *See BlackBerry Corp. v. MobileMedia Ideas, LLC*, Case IPR2013-00036, slip op. at 19–20 (PTAB Mar. 7, 2014) (Paper 65) (citing *In re Steele*, 305 F.2d 859, 862–63 (CCPA 1962)). In our decision, we addressed the construction of the following terms:

Chip Duration

Claim 1 of the '032 patent recites that "each chip has a chip duration of $T_c=KT_b/N$, wherein K and N are integers and N>K." Although the term "chip duration" is not used in the specification, the specification states "[t]he chip length" is "$T_c=T/N$ where T is the symbol interval duration." Ex. 1001, 4:12–15. Thus, the terms "chip length" and "chip duration" are used interchangeably in the '032 patent. The '032 patent uses other terms interchangeably, as well. For example, claim 1 defines N as a processing

[5] U.S. Patent No. 5,555,268 issued Sep. 10, 1996. Ex. 1005.

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