NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

INTERDIGITAL COMMUNICATIONS, INC., A DELAWARE CORPORATION, INTERDIGITAL TECHNOLOGY CORPORATION, A DELAWARE CORPORATION, IPR LICENSING, INC., A DELAWARE CORPORATION, INTERDIGITAL HOLDINGS, INC., A DELAWARE CORPORATION,
Plaintiffs-Appellees

v.

ZTE CORPORATION, A CHINESE CORPORATION, ZTE (USA) INC., A NEW JERSEY CORPORATION,
Defendants-Appellants

2016-2362

Appeal from the United States District Court for the District of Delaware in No. 1:13-cv-00009-RGA, Judge Richard G. Andrews.

Decided: November 3, 2017

MAXIMILIAN A. GRANT, Latham & Watkins LLP, Washington, DC, argued for plaintiffs-appellees. Also represented by GABRIEL BELL, RICHARD P. BRESS, MICHAEL J. GERARDI.

CHARLES M. MCMAHON, McDermott Will & Emery LLP, Chicago, IL, argued for defendants-appellants. Also represented by BRIAN ANDREW JONES; NATALIE A. BENNETT, JAY H. REIZISS, Washington, DC.

Before PROST, *Chief Judge,* LOURIE, and TARANTO, *Circuit Judges.*

TARANTO, *Circuit Judge*.

InterDigital Communications, Inc.; InterDigital Technology Corp.; IPR Licensing, Inc.; and InterDigital Holdings (collectively, InterDigital) brought this suit against ZTE Corp. and ZTE (USA) Inc. (collectively, ZTE) in the United States District Court for the District of Delaware. InterDigital alleged that ZTE was infringing U.S. Patent Nos. 7,190,966 and 7,286,847, which, as relevant here, claim a specified apparatus for wireless communications. InterDigital and ZTE have litigated these patents and related ones before the International Trade Commission in at least three proceedings, two of which resulted in written decisions from this court: *InterDigital Communications, LLC v. International Trade Commission* (*InterDigital I*), 690 F.3d 1318 (Fed. Cir. 2012), and *InterDigital Communications, LLC v. International Trade Commission* (*InterDigital II*), 601 F. App'x 972 (Fed. Cir. 2015).

In this case, a jury found ZTE liable for infringement of the '966 and '847 patents, and the district court denied ZTE's post-trial motion for judgment of noninfringement as a matter of law. ZTE appeals a key claim construction adopted by the district court as well as the court's denial of its post-trial motion. We have jurisdiction under 28 U.S.C. § 1295(a)(1). We affirm.

I

A

The technology described in the '966 and '847 patents is set forth in detail in our earlier decision addressing those patents, *InterDigital I*, 690 F.3d at 1320–23. Here, we cover only the aspects relevant to the issues on appeal.

The '966 and '847 patents describe how to reduce "power overshoot" when establishing a connection between a "subscriber unit," such as a cell phone, and a base station in a code division multiple access (CDMA) wireless communication system. '966 patent, col. 3, lines 32–40.[1] In order to set up a two-way communication link, the transmitter in a cell phone sends a signal to the base station, which the base station can detect if the signal is transmitted at a sufficient power level. Col. 2, lines 50–52. But the power level required to be detected is not known in advance of attempting to make the connection. Col. 2, lines 45–46. To the extent that the transmitter uses a power level that overshoots the threshold detection level, the communication conducted at that unnecessarily high power level will decrease system capacity, may interfere with communications between other cell phones and the base station, and may even cause dropped calls. Col. 2, lines 23–28, 46–50; *see also* col. 5, lines 63–67; col. 6, lines 5–6.

The specification describes two embodiments that use a "power ramp-up" process to minimize power overshoot. Col. 3, line 23. In the first embodiment, a transmitter in the cell phone transmits a code called an "access code" to the base station. Col. 6, lines 7–10, 19–20, & Fig. 4. "The access code is a known spreading code transmitted from

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[1] The '966 and '847 patent share a common specification. All patent citations hereafter are to the '966 patent, unless otherwise indicated.

[the cell phone] to the base station during initiation of communications and power ramp-up." Col. 6, lines 20–23 (internal references omitted). The access code is first transmitted at a very low power below any possible detection level, and then successively transmitted at increasing levels of power. Col. 6, lines 1–5 & Fig. 5. Once the access code is transmitted at a power level at or above that of the threshold detection level, the base station "search[es] through all possible phases (time shifts) of the access code . . . in order to find the correct phase." Col. 6, lines 23–26 (internal references omitted). The power-ramp up continues while the base station engages in this search, called the "detection process." Col. 6, lines 26–27. After detecting the correct phase of the access code, the base station sends "an access code detection acknowledgement signal" back to the cell phone. Col. 6, lines 59–67. The transmitter and base station then establish a closed power loop at the power level the transmitter has reached at the time of the phase detection, and "call setup signaling is performed" for "the two-way communication link." Col. 7, lines 2–5. By proceeding in this manner, the communication link is closer to the threshold detection level—and there is less interference and fewer dropped calls—than if the transmitter had used a higher power level. Col. 6, lines 1–6.

The power level reached in this first embodiment may still be higher than necessary. Even after the access code reaches the threshold detection level, the base station requires time to "search through all possible phases (time shifts) of the access code . . . in order to find the correct phase." Col. 6, lines 23–26. The amount of time required to detect the correct phase depends on the length of the access code; "[t]he longer the access code, the longer it takes for the base station to search through the phases and acquire the correct phase." Col. 6, lines 27–29 (internal references omitted); *see also* col. 7, lines 18–25. And during the time the base station is searching for the

correct phase, the cell phone transmitter continues to ramp up the power level at which it transmits the access code. *See* col. 7, lines 26–34. The power level being used when the base station completes its phase detection, which is the level at which communications then occur, thus exceeds the minimum threshold detection level, which is the level at which the phase search began. *See* col. 7, lines 18–34 & Fig. 5.

The second embodiment, expressly deemed "the preferred embodiment," further reduces power overshoot. Col. 7, lines 41–44; *compare* Fig. 5 *with* Fig. 7. In the second embodiment, rather than successively sending the access code during initial power ramp-up, the transmitter sends a "short code," defined as "a sequence for detection by the base station which has a much shorter period than a conventional spreading code." Col. 3, lines 23–25. Because the short code is in fact short, the base station needs less time to search for the correct phase and detect the signal than in the first embodiment (for the longer access code), thus decreasing the amount of power ramp up that occurs during the search time. *See* col. 1, lines 28–31 ("[T]he transmission of short codes from [cell phones] to a base station . . . reduce[s] the time required for the base station to detect the signal from a [cell phone]."); col. 8, lines 7–9 ("[T]he short code is much smaller" and "can be chosen to be any length that is sufficiently short to permit quick detection."). The base station sends an acknowledgment signal, after which the cell phone begins transmitting the access code at a much slower ramp-up rate, starting at the power level at which the short code was detected. Col. 8, lines 32–42 & Figs. 6A, 6B, 11A, 11B. Once the base station detects the access code, the base station sends another acknowledgment signal, and the two-way communication link is set up at that power level. Col. 8, line 66 through col. 9, line 6.

B

At issue on appeal is ZTE's liability for infringement of independent claim 1 and dependent claims 3, 6, 8, 9, and 11 of the '966 patent, and of independent claims 3 and 5 of the '847 patent. Claim 1 of the '966 patent and claim 3 of the '847 patent are representative:[2]

1. A wireless code division multiple access (CDMA) subscriber unit comprising:

> a transmitter configured such that, when the subscriber unit is first accessing a CDMA network and wants to establish communications with a base station associated with the network over a communication channel to be indicated by the base station, the transmitter *successively transmits signals* until the subscriber unit receives from the base station an indication that a transmitted one of the signals has been detected by the base station, wherein each transmission of one of the signals by the transmitter is at an increased power level with respect to a prior transmission of one of the signals;
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> the transmitter further configured such that the transmitter transmits to the base station a message indicating to the base station that the subscriber unit wants to establish the communication with the base station over the communication channel to be indicated by the base station, the message being transmitted only subsequent to the subscriber unit receiving the indication;

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[2] On appeal, ZTE does not make separate arguments as to the dependent claims or claim 5 of the '847 patent.

wherein each of the *successively transmitted signals* and the message are generated using a same code; and

wherein each of the *successively transmitted signals* is shorter than the message.

Col. 10, line 62 through col. 11, line 19 (emphases added).

3. A wireless code division multiple access (CDMA) subscriber unit comprising:

a circuit configured to synchronize to a pilot signal transmitted by a base station associated with a CDMA network wherein, if the circuit becomes unsynchronized to the pilot signal during an idle period of the subscriber unit, the circuit is further configured to re-synchronize to the pilot signal;

a transmitter configured such that, when the subscriber unit is first accessing the CDMA network, the transmitter *successively transmits signals* generated using a portion of a code until the subscriber unit receives from the base station an indication that a transmitted one of the signals has been detected by the base station, wherein each transmission of one of the signals by the transmitter, other than a transmission of a first one of the signals, is at an increased power level with respect to a prior transmission of another one of the signals;

the transmitter further configured such that, subsequent to the subscriber unit receiving the indication, the transmitter transmits a signal generated using a remainder of the code;

wherein prior to receiving the indication, the subscriber unit is not uniquely identified to the base station.

'847 patent, col. 11, line 53 through col. 12, line 9 (emphasis added).

II

A

The primary dispute on appeal is the proper construction of the claim term "successively transmits signals" or "successively transmitted signals." The district court construed the term "code" as a "sequence of chips or bits," and it construed the disputed term "successively transmits signals; successively transmitted signals" as "successively [transmits / transmitted] sequences of chips or bits"—*i.e.*, successively transmits / transmitted sequences of code. *InterDigital Commc'ns, Inc. v. ZTE Corp.*, No. 1:13-cv-00009, 2014 WL 1620733, at *2 (D. Del. Apr. 22, 2014). Because the district court did not make any factual findings based on extrinsic evidence in the course of construing the term "successively transmits signals; successively transmitted signals," we review the district court's claim construction de novo. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015); *Cardsoft, LLC v. VeriFone, Inc.*, 807 F.3d 1346, 1350 (Fed. Cir. 2015).

ZTE contends that the proper construction of "successively transmitted signals" is "successively transmitted sequences of chips or bits *not modulated by a data signal*." ZTE Br. 40. It relies on two premises—first, that "successively transmitted signals" refers only to the short codes described in the specification; second, that the short codes are not modulated by a data signal, which means that the short codes do not carry data. *See InterDigital I*, 690 F.3d at 1321, 1326 (explaining that spreading codes "carry" data by modulating, or modifying, a baseband data signal). We reject ZTE's first premise and therefore its claim construction.

The "successively transmitted signals" in the claims are the codes sent by the cell phone transmitter during the initial power ramp-up phase. The specification describes two embodiments in great detail: one embodiment in which the successively transmitted signals are the access codes, col. 6, line 1 through col. 7, line 40 & Figs. 4, 5, and a second, preferred embodiment in which the successively transmitted signals are the short codes, col. 7, line 41 through col. 9, line 35 & Figs. 6A, 6B, 7; col. 10, lines 10–53 & Figs. 11A, 11B. The specification expressly indicates that the invention is not limited to the preferred embodiment. Col. 10, lines 54–57 ("Although the invention has been described in part by making detailed reference to the preferred embodiment, such detail is intended to be instructive rather than restrictive."). Although the second embodiment is preferred and highlighted in the background and summary of the invention sections, col. 1, lines 27–31; col. 3, lines 19–23, we see no basis on which to limit the claims to that embodiment when the plain language of the claims in these patents, as well as the specification, encompass both. Indeed, ZTE makes no substantial argument based on the claim language and specification for limiting the claim phrase at issue to the short codes.[3]

ZTE relies instead on our earlier decision, *InterDigital II*, 601 F. App'x 972, involving U.S. Patent Nos. 7,706,830 and 8,009,636—which, though they have materially the

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[3] ZTE does not, for instance, argue that the claim language "each of the successively transmitted signals is shorter than the message" supports limiting the "successively transmitted signals" to short codes. In fact, ZTE admits that even in the first embodiment, after the base station detects the successively transmitted access code, the cell phone then "transmits a 'message' to the base station." ZTE Br. 10 (citing Fig. 4 (box 116)).

same specification as the '966 and '847 patents, have notably different claims. In *InterDigital II*, the International Trade Commission first construed a phrase in the '830 and '636 patents, "successively sends [or sent] transmissions," as "transmits to the base station, one after the other, codes that are shorter than a regular length code." *Id.* at 977. The Commission then "conclud[ed] that the patents 'disclose that the codes successively transmitted during the random access process (i.e., the short codes) are neither modulated with data, nor used to modulate data.'" *Id.* (quoting Commission's decision).

The first step in the Commission's conclusion in *InterDigital II* is the one relevant here. The problem for ZTE, however, is that this court in *InterDigital II* had no occasion to rule on the correctness of the Commission's conclusion at that step, *i.e.*, that the successively transmitted signals were only short codes, even in the context of the two patents at issue in *InterDigital II*. Although InterDigital disputed that point before the Commission, InterDigital did not dispute it before this court on appeal. This court therefore assumed that the phrase in the claims of those patents was limited to short codes, without independent claim-construction analysis on the point; and based on that assumption, it treated the claims at issue as dealing with the preferred (short code + access code) embodiment, not the first (access code only) embodiment. The question the court decided involved only the Commission's second step—whether "'the Commission erred in limiting the successively transmitted short codes to codes not modulated by data.'" *InterDigital II*, 601 F. App'x at 977 (quoting InterDigital's brief) (internal quotation marks omitted).

Contrary to ZTE's contention, therefore, *InterDigital II* does not establish an answer to the issue presented here, which was not contested or decided there. *See*, *e.g.*, *Automated Merchandising Sys., Inc. v. Lee*, 782 F.3d 1376, 1381 (Fed. Cir. 2015); *Lumbermens Mut. Cas. Co. v.*

United States, 654 F.3d 1305, 1317 n.10 (Fed. Cir. 2011); *United States v. Cty. of Cook, Ill.*, 170 F.3d 1084, 1088 (Fed. Cir. 1999). The court in *InterDigital II* did not decide, but merely assumed, the issue of restriction to the short-code embodiment, even as to the phrase in the particular claims in the two patents at issue in *InterDigital II*. Moreover, the claims in the present case are different from those in *InterDigital II*: surrounding claim language can affect the interpretation of a claim phrase, and the surrounding language differs between the *InterDigital II* claims and the claims at issue here. ZTE has not made any showing of the irrelevance of those differences.[4] For those reasons, *InterDigital II* does not decide whether "successively transmitted signals" in the claims of the patents at issue here are limited to short codes to the exclusion of the first embodiment.

Nor is InterDigital judicially estopped from arguing in this case that the disputed term is not limited to short codes. Judicial estoppel applies "where a party assumes a certain position in a legal proceeding, and succeeds in maintaining that position"; thereafter, "he may not . . . , simply because his interests have changed, assume a contrary position, especially if it be to the prejudice of the party who has acquiesced in the position formerly taken by him." *Davis v. Wakelee*, 156 U.S. 680, 689 (1895);

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[4] For example, claim 1 of the '830 patent, which InterDigital designated as the representative claim, Br. of Appellants, *InterDigital II*, No. 14-1176, 2014 WL 1573071, at *9 (Fed. Cir., filed Apr. 7, 2014), and which was the focus of this court's discussion in *InterDigital II*, requires that "at least two of the successively sent transmissions are produced using different sequences of chips," '830 patent, col. 11, lines 8–9, which appears to correspond to a specification passage limited to the preferred embodiment, *id.*, col. 9, lines 8–29.

accord New Hampshire v. Maine, 532 U.S. 742, 749 (2001). Here, it is true that InterDigital stated in its opening brief in *InterDigital II* that "InterDigital agrees that the only disclosure in the specification of 'successively sent transmissions' are 'short codes.'" Br. of Appellants, *InterDigital II*, No. 14-1176, 2014 WL 1573071, at *24 (Fed. Cir., filed Apr. 7, 2014). But, regardless of whether that statement must be read as contrary to InterDigital's position in this appeal, the statement does not support judicial estoppel at least for the reason that the statement did not lead to success by InterDigital. This court proceeded on the premise accepted on appeal by InterDigital and ruled against InterDigital's challenge on appeal. Judicial estoppel therefore does not apply.

ZTE also suggests that, before appealing to this court in *InterDigital II*, InterDigital admitted before the Commission that "successively sent transmissions" referred only to short codes. Not so. InterDigital disputed the matter before the administrative law judge and the Commission. And the testimony of InterDigital's expert before the Commission that "the repeated transmissions of the short code are the successively sent transmissions" indicates that short codes fall within the scope of that term, not that the scope of the term is limited to short codes. J.A. 10288.[5]

We conclude that "successively transmit / transmitted signals" refers not only to the short codes of the preferred embodiment but also to the access codes of the first em-

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[5] ZTE highlights several other purported admissions by InterDigital that relate to InterDigital's second premise—*i.e.*, that the short codes in the preferred embodiment carry data—but that do not support ZTE's argument as to the first premise—*i.e.*, that the disputed term is limited to short codes, as in the preferred embodiment.

bodiment. ZTE did not argue on appeal that the access codes of the first embodiment do not modulate data, and has therefore waived the argument that its proposed limitation, "not modulated by a data signal," would be appropriate even if the disputed term is construed as not limited to the preferred embodiment. For those reasons, we affirm the district court's construction.

B

We review de novo the district court's denial of judgment as a matter of law, "viewing the record in the light most favorable to . . . the verdict winner, and drawing all reasonable inferences in [the winner's] favor." *Pitts v. Delaware*, 646 F.3d 151, 155 (3d Cir. 2011). Judgment as a matter of law is permitted only if "there is insufficient evidence from which a jury could reasonably find liability." *Lightning Lube, Inc. v. Witco Corp.*, 4 F.3d 1153, 1166 (3d Cir. 1993). "In determining whether the evidence is sufficient to sustain liability, the court may not weigh the evidence, determine the credibility of witnesses, or substitute its version of the facts for the jury's version." *Id.*; *accord Pitts*, 646 F.3d at 155.

Many of the facts are undisputed. ZTE agrees that its products comply with the 3rd Generation Partnership Project (3GPP) telecommunications standard. According to that standard, the cell phone transmitter generates at least two types of signals: a physical random access channel (PRACH) preamble, which is a scrambling code of 4,096 chips; and a PRACH message part, which is a scrambling code of 38,400 chips. Both the PRACH preamble code and the PRACH message code are generated from the same theoretical long scrambling sequence named $c_{long,1,n}$.

InterDigital's infringement theory at trial was that ZTE's devices used the PRACH preamble code as the "successively transmitted signal" for detection by the base station, then used the PRACH message code as the sub-

sequent transmission to the base station for identification or to let the base station know that a two-way communication link is desired. ZTE argues here that, under that theory, its products do not meet two claim limitations. First, ZTE argues, the PRACH preamble and message are not "generated using a same code" (claim 1 of the '966 patent). Second, ZTE argues, it is not the case that the PRACH preamble is "generated using a portion of a code" and that the PRACH message is "generated using a remainder of the code" (claim 3 of the '847 patent). We reject ZTE's contention, concluding that the evidence permitted the jury reasonably to find otherwise.

The 2006 technical specification for the 3GPP standard, introduced as an exhibit at trial, explains that (1) there are 8,192 PRACH scrambling codes "defined" from the theoretical long scrambling sequence, $c_{long,1,n}$, and (2) each of those "defined" 8,192 PRACH scrambling codes consists of 4,096 chips (preamble) plus 38,400 chips (message). J.A. 8971–72. Design documents from Qualcomm, which manufactures operative parts used in ZTE's products, were also introduced at trial and say substantially the same thing. InterDigital's infringement expert relied on those design documents to conclude that the PRACH preamble and message were generated using a section of $c_{long,1,n}$: a series of 4,096 chips is generated, then a series of 38,400 chips "is simply continued from the end of the preamble." J.A. 7269. Based on that evidence, a reasonable jury could find that the PRACH preamble and message are generated from "a same code" or from "a portion of a code" and from "a remainder of the code."

Contrary to ZTE's argument, InterDigital's invalidity expert did not give testimony inconsistent with that infringement finding. InterDigital's invalidity expert testified that one cannot randomly select a series of chips to serve as the preamble, then randomly select a series of chips to serve as the message, and ultimately claim that the preamble and message are part of a same code. He

agreed with counsel that the two generated codes cannot be retrospectively combined but that the "same code has to be something which is somehow defined to be a sequence." J.A. 8339. His testimony is consistent with the Qualcomm documents, on which the infringement expert relied, as well as the 3GPP technical specification. The Qualcomm design documents explain that "the scrambling code for the [P]RACH message corresponds to the same scrambling code that is used in the construction of the [P]RACH preamble." J.A. 8617. Similarly, according to the 3GPP specification:

> The message part scrambling code has a one-to-one correspondence to the scrambling code used for the preamble part. For one PRACH, the same code number is used for both scrambling codes, i.e. if the PRACH preamble scrambling code used is $S_{t\text{-}pre,m}$, then the PRACH message part scrambling code is $S_{t\text{-}msg,m}$, where the number m is the same for both codes."

J.A. 8972. The PRACH preamble and the message are generated from a defined code—a portion of $c_{long,1,n}$ designated by, for example, "the number m." *Id.*

ZTE's expert testified that the PRACH preamble and message are not generated from "a same code," or from a "portion" and "remainder" of a code, because the preamble and message are different codes, of different lengths, generated at different times, and defined in different sections of the 3GPP standard. J.A. 8040–41. He (and ZTE) framed the issue as whether the mere fact that the preamble and message are generated by the same code generator was sufficient to find that the preamble and message are part of a same code. J.A. 8066–67. But the evidence, discussed above, shows that the preamble and message are not merely generated by the same code generator; they are generated one after the other from the same sequence, with a "one-to-one correspondence." J.A.

8972. The jury was entitled to reject the testimony of ZTE's expert and rely on the testimony of InterDigital's experts, the 3GPP technical specification, and the Qualcomm documents. We conclude that substantial evidence supports the verdict of infringement.

III

For the foregoing reasons, we affirm the district court's judgment.

AFFIRMED