United States Court of Appeals for the Federal Circuit

KONINKLIJKE KPN N.V.,
Plaintiff-Appellant

v.

GEMALTO M2M GMBH, GEMALTO INC., GEMALTO IOT LLC, TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED, TCL COMMUNICATION, INC., TCT MOBILE (US) HOLDINGS, INC., TCT MOBILE (US) INC., TCT MOBILE, INC., TELIT WIRELESS SOLUTIONS, INC.,
Defendants-Appellees

LG ELECTRONICS, INC.,
Intervenor

2018-1863, 2018-1864, 2018-1865

Appeals from the United States District Court for the District of Delaware in Nos. 1:17-cv-00086-LPS, 1:17-cv-00091-LPS, 1:17-cv-00092-LPS, Chief Judge Leonard P. Stark.

Decided: November 15, 2019

ANDRES HEALY, Susman Godfrey LLP, Seattle, WA, argued for plaintiff-appellant. Also represented by HUNTER

VANCE, ALEXANDRA GISELLE WHITE, Houston, TX; LAWRENCE PERLEY COGSWELL, III, Hamilton, Brook, Smith & Reynolds, PC, Boston, MA; TIMOTHY JOSEPH MEAGHER, Concord, MA.

BRIAN ROSENTHAL, Gibson, Dunn & Crutcher LLP, New York, NY, argued for all defendants-appellees and intervenor. Defendants-appellees Gemalto M2M GmbH, Gemalto Inc., Gemalto IOT LLC, also represented by BRIAN ANDREA, Washington, DC.

WILLIAM R. PETERSON, Morgan, Lewis & Bockius LLP, Houston, TX, for defendants-appellees TCL Communication Technology Holdings Limited, TCL Communication, Inc., TCT Mobile (US) Holdings, Inc., TCT Mobile (US) Inc., TCT Mobile, Inc. Also represented by JULIE S. GOLDEMBERG, Philadelphia, PA; BRADFORD CANGRO, HANG ZHENG, Washington, DC.

DAVID A. LOEWENSTEIN, Pearl Cohen Zedek Latzer LLP, New York, NY, for defendant-appellee Telit Wireless Solutions, Inc. Also represented by CLYDE SHUMAN, GUY YONAY.

CARTER GLASGOW PHILLIPS, Sidley Austin LLP, Washington, DC, for intervenor. Also represented by RYAN C. MORRIS; PETER H. KANG, Palo Alto, CA.

Before DYK, CHEN, and STOLL, *Circuit Judges*.

CHEN, *Circuit Judge*.

Plaintiff-Appellant Koninklijke KPN N.V. (KPN) owns U.S. Patent No. 6,212,662 ('662 patent). KPN sued Gemalto M2M GmbH, Gemalto Inc., Gemalto IOT LLC, TCL Communication Technology Holdings Limited, TCL Communication, Inc., TCT Mobile, Inc., TCT Mobile (US) Inc., TCT Mobile (US) Holdings, Inc., and Telit Wireless

Solutions, Inc. (collectively "Appellees") for infringement of the '662 patent in the United States District Court for the District of Delaware. Appellees moved for judgment on the pleadings under Federal Rule of Civil Procedure 12(c) alleging that all four claims (claims 1–4) of the '662 patent were ineligible under 35 U.S.C. § 101. The district court granted Appellees' motion with respect to all four claims, concluding that the claims recite no more than mere abstract data manipulation operations, such as "reordering data and generating additional data." J.A. 23. On appeal, KPN only challenges the district court's ineligibility decision with respect to dependent claims 2–4. As to these appealed claims, we reverse. Rather than being merely directed to the abstract idea of data manipulation, these claims are directed to an improved check data generating device that enables a data transmission error detection system to detect a specific type of error that prior art systems could not.

In data transmission systems, it is common to generate something called "check data" to check whether data was accurately transmitted over a communications channel. Check data is generated based on the original data and thus serves as a shorthand representation of a particular block of data. By comparing the check data generated at both ends of the communication channel, error detection systems may be able to infer whether errors occurred during transmission. For example, if the check data from both ends match, the system infers that the content of the received data block is the same as what was transmitted and thus concludes that no errors occurred during transport.

But, as the '662 patent recognizes, matching check data is not always a reliable indicator of accurate data transmissions. According to the patent, certain generating functions coincidentally produce the same check data for a corrupted data block and an uncorrupted data block. When this happens, the check data is functionally defective, because the system will mistakenly believe that there were no errors in the data transmission. The problem of defective check data is aggravated for a particular type of persistent error, i.e., "systematic error," that repeats across data blocks in the same way. According to the '662 patent, prior art error detection systems were unable to reliably detect systematic errors. Once the prior art system generated defective check data for an initial data block with a given systematic error, the system would continue to generate defective check data for subsequent data blocks with the same systematic error, thus allowing these types of errors to persist in the system.

The '662 patent solves this problem by varying the way check data is generated by varying the permutation applied to different data blocks. Varying the permutation for each data block reduces the chances that the same systematic error will produce the same defective check data across different data blocks. Claims 2–4 thus replace the prior art check data generator with an improved, dynamic check data generator that enables increased detection of systematic errors that recur across a series of transmitted data blocks. As with other claims we have found to be patent-eligible in prior cases, the appealed claims represent a non-abstract improvement in the functionality of an existing technological process and not simply an abstract idea of manipulating data. Accordingly, we reverse the district court's grant of Appellees' Rule 12(c) motion that claims 2–4 are ineligible on the pleadings.

TECHNOLOGY BACKGROUND

In order to physically transmit information over the air from a transmitter to a receiver, that information is encoded as a series of electromagnetic pulses representing "0s" and "1s" of binary code, packaged into a series of individual data blocks. As the information travels through the air, different types of environmental factors may impact the transmission of data in different ways. Whereas variable changes in the environment may cause random errors to appear in different data blocks, persistent properties in the environment, such as an "interference signal with a certain frequency" or "equipment error," may cause certain errors to repeat themselves across each data block in the same way. '662 patent at col. 1, ll. 48–52. This type of persistent error, called a "systematic error," is the focus of the '662 patent.

A. Prior Art Check Data Generators

Conventional prior art systems detected errors in data transmissions by generating something called "check data" (or "supplementary data"). *Id.* at col. 1, ll. 10–46, col. 3, ll. 32–33. Check data is a short piece of information that is generated from the original data using a generating function. *Id.* at col. 1, ll. 55–56, col. 2, ll. 31–34. As such, check data effectively serves as a short-hand representation of the content of the original data prior to transmission. During a data transmission, check data is attached to the original data of each data block as a "redundant" piece of information to enable the detection of transmission errors by the receiver. *Id.* at col. 1, ll. 34–37. Since a receiver cannot easily tell whether a received transmission has been corrupted by looking at the data directly, it uses the appended check data as a reference point for determining whether errors were introduced during transport. *See id.* at col. 1, ll. 37–46. To do so, the receiver compares the appended check data generated based on the original data (which we refer to as "d1") with the check data generated based on the received transmission (which we refer to as "d2"). *Id.* at col. 3, ll. 39–41. If check data d1 does not match check data d2, the receiver infers that the data used to generate check data d2 has changed during transmission from the uncorrupted data used to generate check data d1. *Id.* at col. 3, ll. 43–46. This means that errors were introduced into the original data during transmission. *Id.* However, if check data d1 matches check data d2, the system infers that there were no errors. *Id.* at col. 3, ll. 41–43.

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