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Zeira et al.

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(54) **COMBINED CLOSED LOOP/OPEN LOOP POWER CONTROL IN A TIME DIVISION DUPLEX COMMUNICATION SYSTEM**

(75) Inventors: **Ariela Zeira**, Huntington, NY (US); **Faith M. Ozluturk**, Port Washington, NY (US); **Sung-Hyuk Shin**, Fort Lee, NJ (US)

(73) Assignee: **InterDigital Technology Corporation**, Wilmington, DE (US)

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Related U.S. Application Data

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(51) **Int. Cl.^{7}** **H04B 1/69**; H04B 1/707
(52) **U.S. Cl.** **375/130**; 375/295; 455/522; 370/342
(58) **Field of Search** 375/130, 295, 375/140; 455/522, 69; 370/342, 252

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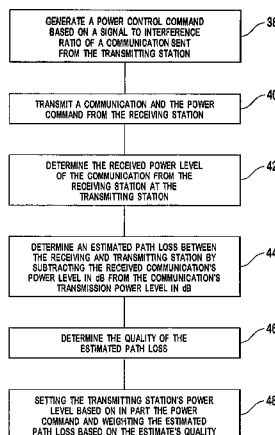
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Primary Examiner—Temesghen Ghebretinsae
(74) *Attorney, Agent, or Firm*—Volpe and Koenig, P.C.

(57) **ABSTRACT**

A spread spectrum time division duplex user equipment uses frames having time slots for communication. The user equipment receives power commands and a first communication having a transmission power level in a first time slot. A power level of the first communication is measured as received. A pathloss estimate is determined based on in part the measured received first communication power level and the first communication transmission power level. A transmission power level for the second communication in a second time slot form the user equipment is set based on in part the pathloss estimate weighted by a quality factor adjusted by the power command. The quality factor decreases as a number of time slots between the first and second time slots increases.
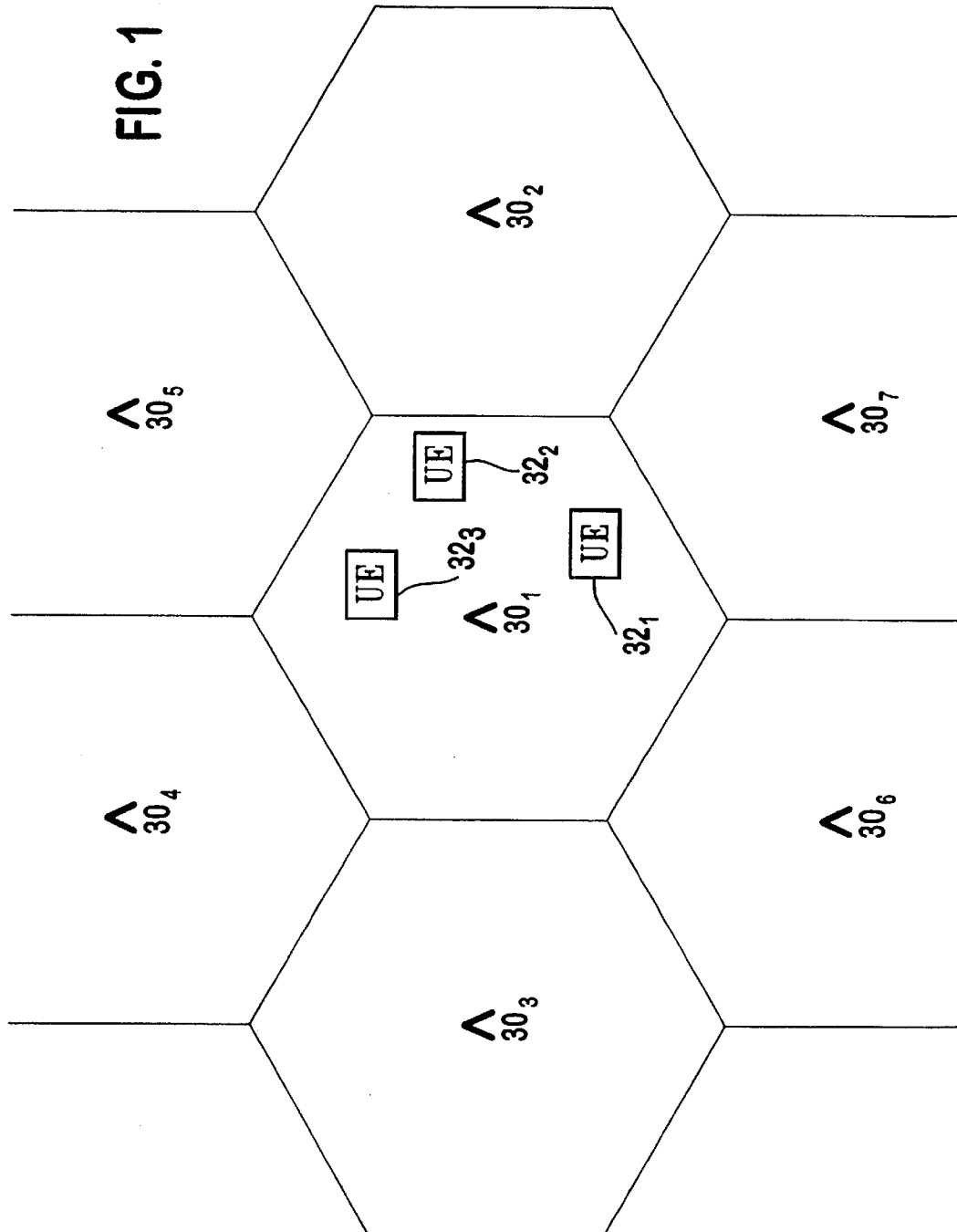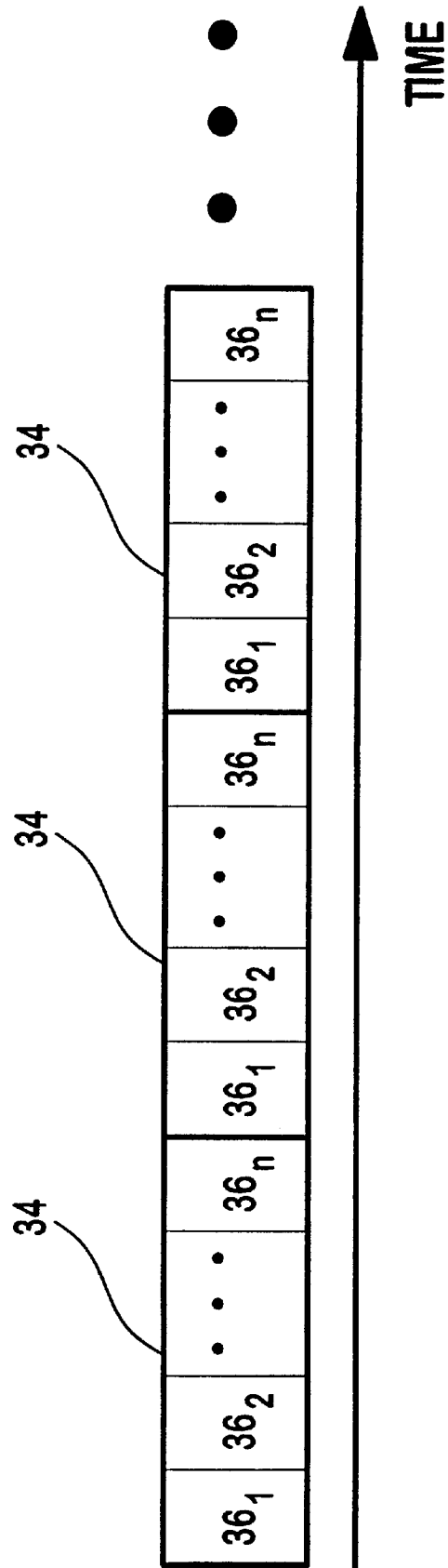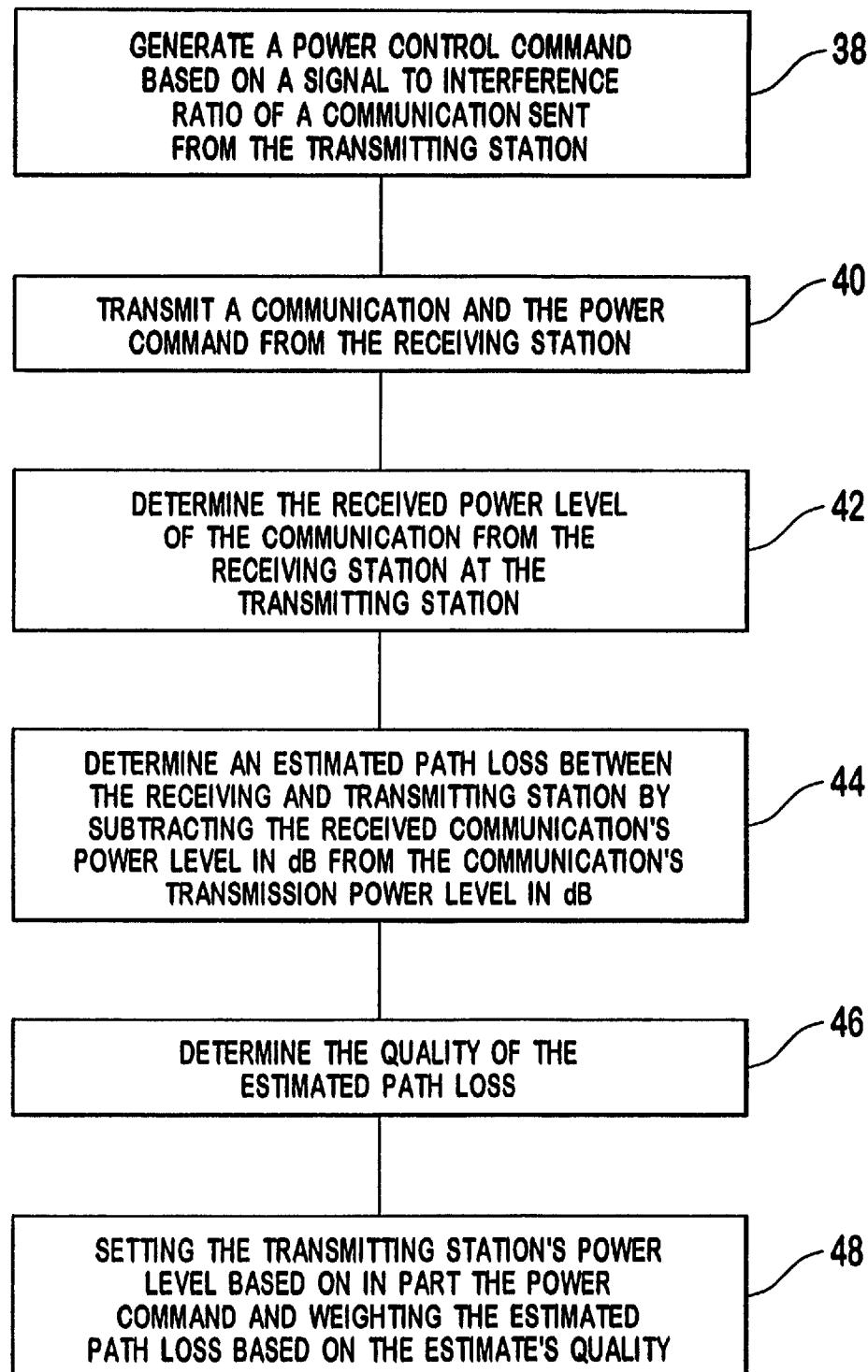
8 Claims, 7 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

GENERATE A POWER CONTROL COMMAND
BASED ON A SIGNAL TO INTERFERENCE
RATIO OF A COMMUNICATION SENT
FROM THE TRANSMITTING STATION — 38

TRANSMIT A COMMUNICATION AND THE POWER
COMMAND FROM THE RECEIVING STATION — 40

DETERMINE THE RECEIVED POWER LEVEL
OF THE COMMUNICATION FROM THE
RECEIVING STATION AT THE
TRANSMITTING STATION — 42

DETERMINE AN ESTIMATED PATH LOSS BETWEEN
THE RECEIVING AND TRANSMITTING STATION BY
SUBTRACTING THE RECEIVED COMMUNICATION'S
POWER LEVEL IN dB FROM THE COMMUNICATION'S
TRANSMISSION POWER LEVEL IN dB — 44

DETERMINE THE QUALITY OF THE
ESTIMATED PATH LOSS — 46

SETTING THE TRANSMITTING STATION'S POWER
LEVEL BASED ON IN PART THE POWER
COMMAND AND WEIGHTING THE ESTIMATED
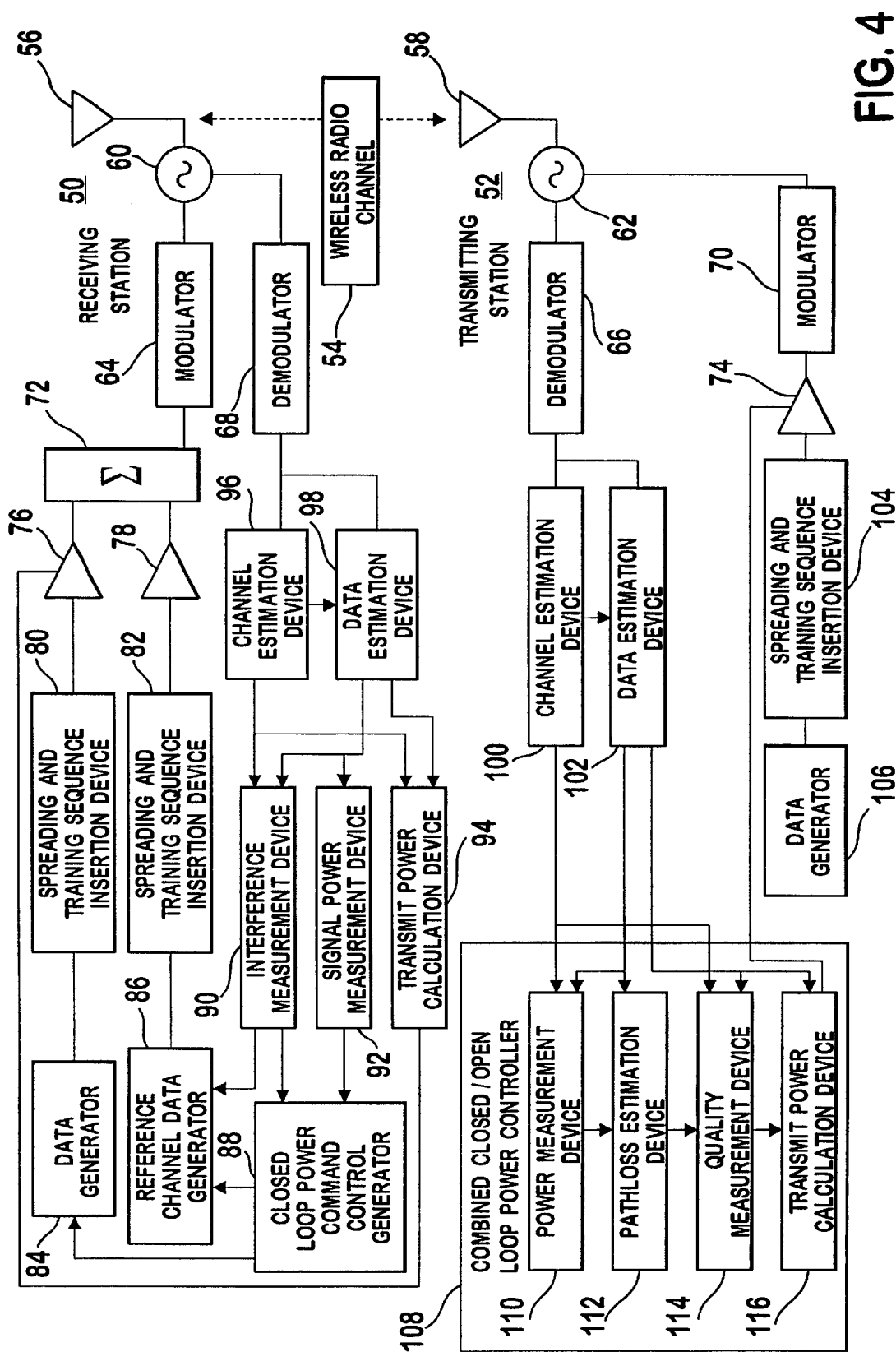PATH LOSS BASED ON THE ESTIMATE'S QUALITY — 48

FIG. 4

DOCKET ALARM

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