

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent of: Katagishi et al.  
U.S. Pat. No.: 6,973,334 Attorney Docket No.: 35548-0082IP1  
Issue Date: Dec. 6, 2005  
Appl. Serial No.: 10/142,051  
Filing Date: May 10, 2002  
Title: CELLULAR TELEPHONE

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**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 6,973,334**  
**PURSUANT TO 35 U.S.C. §§ 311-319, 37 C.F.R. § 42**

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## EXHIBITS

- EX1001 U.S. Pat. No. 6,973,334 to Katagishi et al. (“the ’334 patent”)
- EX1002 Prosecution History of the ’334 patent (Serial No. 10/142,051)
- EX1003 Declaration of Mark R. Lanning
- EX1004 U.S. Pat. No. 5,452,473 to Weiland et al. (“Weiland”)
- EX1005 U.S. Pat. No. 5,430,760 to Dent (“Dent”)
- EX1006 U.S. Pat. No. 5,752,172 to Matero (“Matero”)
- EX1007 U.S. Pat. No. 5,392,460 to Mattila (“Mattila”)
- EX1008 U.S. Pat. No. 5,841,768 to Ozluturk et al. (“Ozluturk”)
- EX1009 U.S. Pat. No. 5,799,010 to Lomp et al. (“Lomp”)
- EX1010 U.S. Pat. No. 5,589,796 to Alberth, Jr. et al. (“Alberth”)
- EX1011 Plaintiff Maxell, Ltd.’s Patent Rule 3-1 and 3-2 Disclosure of  
Asserted Claims and Infringement Contentions Against the Huawei  
Defendants in *Maxell, Ltd., v. Huawei Device USA Inc. and Huawei  
Device Co., Ltd.* (Case No. 5:18-cv-00033) (E.D.Texas)
- EX1012 Defendants’ Invalidity Contentions in *Maxell, Ltd., v. Huawei Device  
USA Inc. and Huawei Device Co., Ltd.* (Case No. 5:18-cv-00033)  
(E.D.Texas)

## **I. INTRODUCTION**

Huawei Technologies Co., Ltd. (“Huawei” or “Petitioner”) petitions for *Inter Partes* Review (“IPR”) of claims 4 and 6 of U.S. Patent 6,973,334 (“the ’334 patent”). The specification of the ’334 patent describes “a cellular telephone used in Code Division Multiple Access (CDMA) system.” EX1001, 1:9-11. The method claimed in the ’334 patent was not innovative at the time of the alleged priority date, and Grounds 1-2 set forth in this Petition raise prior art combinations never previously considered by the Patent Office in any examination/proceeding involving the ’334 patent.

## **II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8**

### **A. Real Parties-In-Interest Under 37 C.F.R. §42.8(b)(1)**

Huawei Technologies Co., Ltd.; Huawei Device USA, Inc.; Huawei Investment & Holding Co., Ltd.; Huawei Device (Shenzhen) Co., Ltd.; Huawei Device Co., Ltd.; Huawei Tech. Investment Co., Ltd.; and Huawei Device (Hong Kong) Co., Ltd. are the real parties-in-interest. No other parties had access to or control over the present Petition, and no other parties funded the present Petition.

### **B. Related Matters Under 37 C.F.R. §42.8(b)(2)**

Maxell Ltd.—the alleged Patent Owner—filed a complaint on March 2, 2018 in the U.S. District Court for the Eastern District of Texas (Case No. 5:18-cv-00033) against Huawei Device USA, Inc. and Huawei Device Co., Ltd., asserting

10 patents, including the '334 patent. The complaint was served on March 7, 2018.

Maxell has sued multiple other parties at different times. Months before Huawei was served with the above-mentioned complaint alleging infringement of the '334 patent, Patent Owner filed a complaint on October 13, 2017 in the U.S. District Court for the District of Delaware (Case No. 1:17-cv-1446) alleging that BlackBerry Corp. and BlackBerry Ltd. infringed the '334 patent. At that time, Patent Owner also filed another complaint on October 13, 2017 in the U.S. District Court for the Central District of California (Case No. 2-17-cv-07528) alleging that ASUSTeK Computer Inc. and ASUS Computer Int'l infringed the '334 patent, which was transferred to the Northern District of California (Case No. 3-18-cv-01788). Later, Patent Owner filed a complaint on March 2, 2018 in the Eastern District of Texas (Case No. 5:18-cv-00034) alleging that ZTE Corp. and ZTE USA, Inc. infringed the '334 patent. (Note that the complaint against ZTE Corp. and ZTE USA, Inc. was filed on the same date as the complaint against Petitioner here.) Huawei is not a real party-in-interest to any of these above-listed district court proceedings. Also, none of the parties in these district court proceedings is a real party-in-interest in the proceedings involving Huawei or in privity with Huawei.

The '334 patent is in the same family as U.S. Patent 6,408,193 and U.S.

Patent 6,917,823.

Other petitioners have filed IPR petitions (“earlier IPR proceedings”) against the ’334 patent:

- *ASUSTeK Computer Inc. et al. v. Maxell Ltd.*, IPR2019-00070; and
- *BlackBerry Corporation v. Maxell, Ltd.*, IPR2019-00088.

Huawei is not a real party-in-interest to any of these earlier IPR proceedings. Also, none of the parties in those earlier IPR proceedings is a real party-in-interest in this proceeding or in privity with Huawei. The petitioners in the earlier IPR proceedings are unrelated to Huawei and raised entirely different grounds than the present Petition.

**C. Lead And Back-Up Counsel Under 37 C.F.R. §42.8(b)(3)**

Petitioner provides the following designation of counsel.

LEAD COUNSEL	BACK-UP COUNSEL
Michael T. Hawkins, Reg. No. 57,867 3200 RBC Plaza, 60 South Sixth Street Minneapolis, MN 55402 Tel: 612-337-2569 / Fax 612-288-9696	Kim Leung, Reg. No. 64,399 Tel: 858-678-4713 Patrick J. Bisenius, Reg. No. 63,893 Tel: 612-776-2048 Stuart A. Nelson, Reg. No. 63,947 Tel: 612-337-2538

	Nicholas Stephens, Reg. No. 74,320  Tel: 612-776-2018
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**D. Service Information**

Please address all correspondence to the address above. Petitioner consents to electronic service by email at IPR35548-0082IP1@fr.com (referencing No. 35548-0082IP1 and cc'ing PTABInbound@fr.com, hawkins@fr.com, leung@fr.com, bisenius@fr.com, snelson@fr.com, and nstephens@fr.com).

**III. PAYMENT OF FEES – 37 C.F.R. §42.103**

Petitioner authorizes the Office to charge Deposit Account No. 06-1050 for the petition fee set in 37 C.F.R. §42.15(a) and for any other required fees.

**IV. REQUIREMENTS FOR IPR UNDER 37 C.F.R. §42.104**

**A. Grounds for Standing Under 37 C.F.R. §42.104(a)**

Petitioner certifies that the '334 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

**B. Challenge Under 37 C.F.R. §42.104(b) and Relief Requested**

Petitioner requests IPR of claims 4 and 6 of the '334 patent on the grounds listed below. In support, this petition includes a declaration of Mark R. Lanning (EX1003).

Grounds	Claims	Basis for Rejection
<b>Ground 1</b>	4, 6	Obvious under §103 based upon U.S. Patent 5,452,473 (“Weiland”) in view of U.S. Patent 5,430,760 (“Dent”)
<b>Ground 2</b>	4, 6	Obvious under §103 based upon U.S. Patent 5,752,172 (“Matero”) in view of U.S. Patent 5,841,768 (“Ozluturk”) and U.S. Patent 5,589,796 (“Alberth”)

Weiland (issued Sept. 19, 1995), Dent (issued July 4, 1995), Matero (issued May 12, 1998), and Alberth (issued Dec. 31, 1996) qualify as prior art under at least §102(b) because they were published over a year before the earliest filing date of the ’334 patent “in the United States.”<sup>1</sup> Moreover, Matero was filed in the United States and published long before the alleged priority date of its related Japanese application (Nov. 10, 1998), thereby also qualifying as prior art under §102(a) and §102(e).

Ozluturk (filed June 27, 1996) qualifies as prior art under §102(e) because it was filed prior to the earliest possible priority date of the ’334 patent.

None of Dent, Matero, Ozluturk, and Alberth was considered during

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<sup>1</sup> The ’334 patent claims priority to U.S. Application Serial No. 09/436,502, which was filed on November 9, 1999.



prosecution of the '334 patent, and Weiland was cited in an IDS but never specifically addressed in any Office Action or Response.

**V. THE PETITION SHOULD BE CONSIDERED ON THE MERITS NOTWITHSTANDING ANY PRIOR PETITIONS FOR IPR AGAINST THE '334 PATENT**

In *General Plastic Industrial Co. v. Canon Kabushiki Kaisha*, the Board identified seven nonexclusive factors that bear on the issue of whether the Board should invoke its discretion under §314(a) to deny a follow-on petition on the same patent by the same petitioner. IPR2016-01357, Paper 19, 9-10, 16 (PTAB Sept. 16, 2017) (precedential). The *General Plastic* holding is directed to determining whether to allow “multiple petitions by *the same petitioner* against the same claims of a patent.” *Id.*, 18 (emphasis added). Here, the instant Petition is the first and the only petition that Huawei has filed against the '334 patent. Thus, this is not a follow-on petition like that considered in *General Plastic*.

Even if the present Petition was considered a “follow-on” petition such that the *General Plastic* factors (listed at IPR2016-01357, Paper 19, 16) should be applied here, the totality of those seven factors weigh against using the Board’s discretion to deny this Petition. As set forth below, the application of the factors to the present circumstances demonstrates that the filing of the instant Petition is not abusive. *Samsung Electronics America, Inc. v. Uniloc 2017 LLC*, IPR2017-01797, Paper 8, 33 (Feb. 6, 2018) (“Patent Owner’s complaint about the multiple *inter*

*partes* review petitions filed against the [challenged] patent is not persuasive when the volume appears to be a direct result of its own litigation activity.” (emphasis added)).

Critically, the Board has previously held that where a new petitioner presents new prior art for consideration by the Board, the *General Plastics* factor weigh against the Board exercising its discretion to deny the new petition. *Acronis, Inc., v. Realtime Data LLC*, IPR2018-00706, Paper 11, 15-16 (PTAB Oct. 1, 2018) (declining to exercise discretion to deny a sixth petition filed against the same claims because “[n]one of the previous challenges, however, involves the same Petitioner or same primary reference at issue in this case”); *Cisco Systems, Inc. v. Fatpipe Networks Private Limited*, IPR2017-01846, Paper 12, 12-13 (PTAB Feb. 6, 2018) (“because the prior art references relied upon in the Petition are different”). Petitioner here seeks fairness and to be treated in the same manner as the petitioners in *Acronis* and *Cisco Systems*. See *Acronis*, Paper 11, 15-16 (“On the whole, we find the weight of the factors is in favor of allowing this proceeding to move forward.”). Again, Petitioner has a due process interest to be heard on the merits, and §314(a) should not be used to wrongly deprive Petitioner of such a critical interest.

**Factor 1:** The first factor weighs heavily in favor of considering this Petition on the merits because, as stated above, Huawei has not previously filed any

petition challenging the '334 patent. Indeed, the instant Petition is the first and the only IPR petition filed by Huawei against the '334 patent. Thus, this is not a follow-on petition. *Acronis, Inc.*, Paper 11, 15-16; see *Alcatel-Lucent USA Inc. v. Oyster Optics, LLC*, IPR2017-02146, Paper 12, 12 (PTAB Feb. 28, 2018) (“Once resolution of factor 1 indicates that Petitioner had not previously filed a petition against the same patent, factors 2-5 bear little relevance unless there is evidence in the record of extenuating circumstances.”).

**Factor 2:** The second factor also weighs in favor of considering this Petition because, similar to factor 1, it is directed to situations in which the same petitioner files two separate petitions at different times. That is not the case here. *Id.*

**Factor 3:** The third factor weighs in favor of considering this Petition because this factor is directed to situations in which a petitioner delays filing a subsequent petition so that it can tailor its arguments to address issues identified by the patent owner and/or the Board during a prior proceeding. Here, however, Huawei did not delay filing this Petition in order to use the earlier Board decisions or Patent Owner filings as a roadmap for arguments now presented. Indeed, Patent Owner has not submitted preliminary responses in the earlier IPR proceedings, so there are no earlier preliminary responses or Board decisions that would have impacted the present Petition.

**Factors 4 and 5:** The fourth factor relates to the length of time that elapsed

between the time a petitioner learned of prior art and the filing of the petition. The fifth factor relates to the time elapsed between filing two petitions. These factors also weigh in favor of considering this Petition.

Petitioner filed its Invalidity Disclosures (EX1012) on November 15, 2018 and first analyzed the primary references Weiland and Matero (in comparison to the '334 patent) for those Disclosures. The '334 patent was one of ten asserted patents in the dispute with Patent Owner, each citing volumes of prior art that occupied significant time to review and consider in comparison to the '334 patent. Also, Petitioner sought an independent analysis of Mr. Lanning and worked diligently on the present Petition.

The time between Patent Owner's Complaint, its disclosures of infringement contentions on September 6, 2018 (EX1011), and the filing of this Petition is marginal at best. *Cisco Systems, Inc.*, Paper 12, 14-15. The fifth factor weighs in favor of Huawei because Huawei has not filed multiple petitions. For the reasons set forth above, Huawei has also provided an adequate explanation for any elapsed time. As such, factors 4 and 5 weigh in favor of considering this Petition on the merits.

**Factors 6 and 7:** The sixth and seventh factors also weigh in favor of considering this Petition when considering the limited resources of the Board, balanced against the usefulness of invalidating patents in view of the relevant prior

art. Here, this Petition presents newly cited Grounds 1-2 that are based on combinations of prior art never previously considered by the Board in any proceeding such that coordination with previous proceedings would have been impractical.

The public interest also weighs in favor of considering this Petition. There is great public interest and usefulness in evaluating the '334 patent on the merits in comparison to the highly pertinent prior art combinations that were never previously considered by the Office, especially where the evidence (cited below) shows that the '334 patent should never have been issued. The claimed method of the '334 patent was not innovative and worthy of a patent monopoly, as evidenced by the prior art references cited here. Yet, Patent Owner is litigious and repeatedly asserts the '334 patent against multiple defendants, costing members of the public and the courts valuable resources. There is also no prejudice to Patent Owner here because the multiple petitions filed against the '334 patent are "a direct result of its own litigation activity." *Samsung*, Paper 8, 33 (emphasis added).

Because the grounds of challenge presented here to the Board are not duplicative or substantially the same as prior art and arguments presented before, and because Petitioner has a meaningful due process interest to be heard in this forum on the merits, these factors weigh in favor of instituting IPR.

## **VI. SUMMARY OF THE '334 PATENT**

### **A. Brief Description**

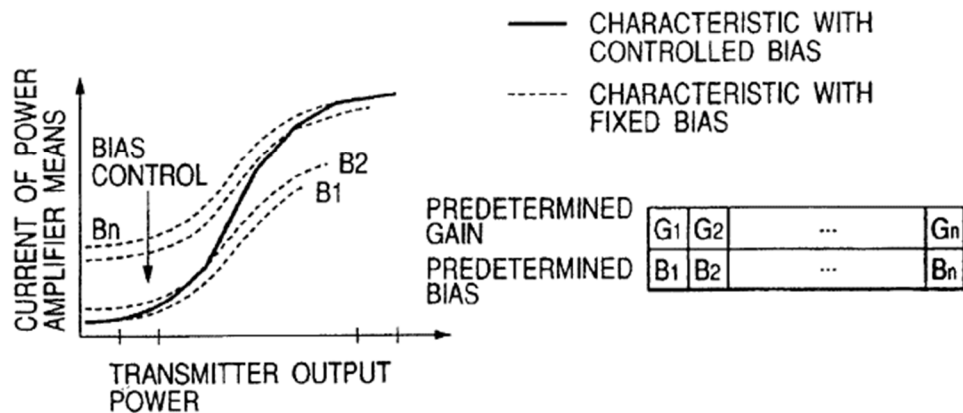
The '334 patent relates to “a cellular telephone used in Code Division Multiple Access (CDMA) system.” EX1001, 1:9-11. The '334 patent describes a cellular telephone including a transmitter, which is shown in FIG. 1. EX1001, 4:49-60, 5:1-34, FIG. 1; EX1003, ¶34. The '334 patent admitted that prior art transmitters included a control processor to control and adjust transmission power level. EX1001, 1:13-19. In particular, the '334 patent describes a transmitter applying the IS-95 standard for the CDMA cellular telephone system. EX1001, 1:26-47. As shown in FIG. 11, the prior art IS-95 transmitter includes a variable amplitude amplifier, a power amplifier, a controller, and a level detector. EX1001, 1:26-47, FIG. 11; EX1003, ¶37. Referring to the IS-95 transmitter, the '334 patent concedes that controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier was known before the '334 patent. EX1001, 1:34-46, FIG. 12. As shown in FIG. 12, the bias of the power amplifier changes from a value B1 to a value B2 when the gain control signal crosses a threshold value. EX1001, 1:41-47, FIG. 12; EX1003, ¶41.

The '334 patent also concedes that conventional techniques provide for open-loop power control and closed-loop power control. In particular, the '334 patent explains that the prior art IS-95 standard employs open-loop power control

and closed-loop power control such that “the transmitter performs the open-loop power control at first, then it performs the closed-loop power control for the transmitted power to converge into a desired value which the cell-site station requires.” EX1001, 1:47-61.

Similar to the prior art IS-95 transmitter, the '334 patent's transmitter includes a variable amplitude amplifier, a power amplifier, and a controller, as shown in FIG. 2. EX1001, 6:5-60, FIG. 2; EX1003, ¶37. The controller uses bias values for the power amplifier corresponding to each gain value, and as the value of the gain increases, the value of the bias increases. EX1001, 6:5-60. According to the '334 patent, the current of the power amplifier increases when the output power increases, as shown in FIG. 4 below:

**FIG. 4**



EX1001, FIG. 4. The bias values are based on predetermined gain values of the variable amplitude amplifier stored in a memory. EX1001, 6:40-51, 7:25-43.

## **B. Summary of the Prosecution**

The claims of the '334 patent were allowed after a brief examination involving prior art references that did not accurately portray the state of the art. In a first office action, the original claims were rejected based on obviousness-type double patenting. EX1002, 94-97. The applicant filed a terminal disclaimer and new claims 11-17 (the latter claims 15 and 17 ultimately issued as claims 4 and 6, which are challenged here). EX1002, 105-114. In a second office action, claims 8-10 and new claims 15-17 were allowed, while new claims 11-14 were rejected over prior art. EX1002, 120-131. In the statement of reasons for the indication of allowable subject matter, the examiner copied and pasted the language of the independent claims in their entirety. EX1002, 126-129. Thereafter, the rejected claims 11-14 were canceled, and then remaining claims were allowed on July 13, 2005. EX1002, 147-150.

## **VII. CLAIM CONSTRUCTION UNDER 37 C.F.R. §42.104(B)(3)**

Petitioner submits that all claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. § 42.100; EX1003, ¶25 (level of ordinary skill for a “POSITA”). Here, based on the evidence below and the prior art’s description of the claimed elements being similar to that of the '334 patent specification, no formal claim constructions are necessary in this proceeding because “claim terms need only be construed to



the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

**VIII. THERE IS A REASONABLE LIKELIHOOD THAT AT LEAST ONE CLAIM OF THE '334 PATENT IS UNPATENTABLE**

**A. Ground 1: Claims 4 and 6 are Obvious under §103 based on Weiland in view of Dent**

Weiland describes a method of controlling a cellular telephone in a manner noticeably similar to the '334 patent. EX1003, ¶¶49-50. The cellular telephone includes a transmitter having a variable amplitude amplifier and a power amplifier. EX1004, 3:4-13, 4:19-43, FIG. 2. To control the transmitter power, Weiland discloses that the radiotelephone uses open loop power control and closed loop power control to index a set of correction tables that indicate the desired power amplifier biasing for a particular operating point. EX1004, 2:27-35, 3:66-4:13, 5:24-32. The transmit gain and power amplifier biasing of the cellular telephone are adjusted to correct the undesired error and maintain the desired output power. EX1004, 2:38-41.

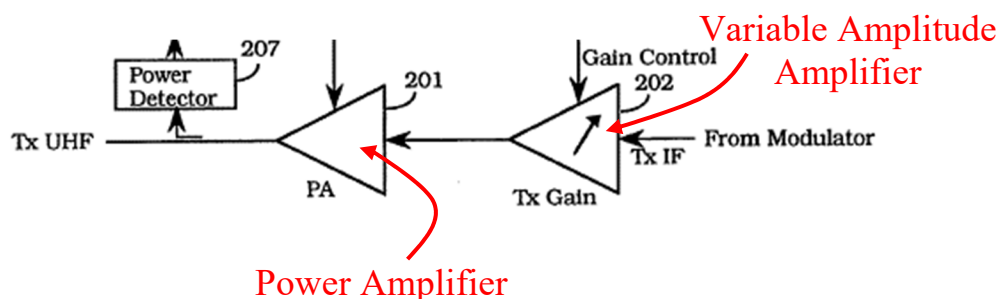
Dent is similar to Weiland yet provides a further description of the prior art practice where, for a random access call set-up, an open-loop power control is performed first to connect to a base station and then closed-loop control of the transmitter power level is performed between the cellular telephone and the base station to fix the transmitter's power at a level specified by the base station.

EX1005, 8:1-6, 8:8-11, 8:13-23, 10:36-44, 12:7-16, 13:9-14:19, 16:5-12, 16:14-19; EX1003, ¶¶51-54. During open-loop power control and closed-loop power control, the transmitter adjusts the power level, which includes controlling the bias of the power amplifier, gradually in small increments according to a ramp function until the target power level is reached. *Id.*

As articulated in detail below, all elements of claims 4 and 6 are provided by Weiland in view of Dent, and a POSITA would have been prompted to combine the features described in these references for purposes of achieving known benefits. EX1003, ¶¶48-87.

***[4.P] A method of controlling a cellular telephone used in a CDMA system, said cellular telephone including a transmitter having a variable amplitude amplifier and a power amplifier, said method comprising the steps of:***

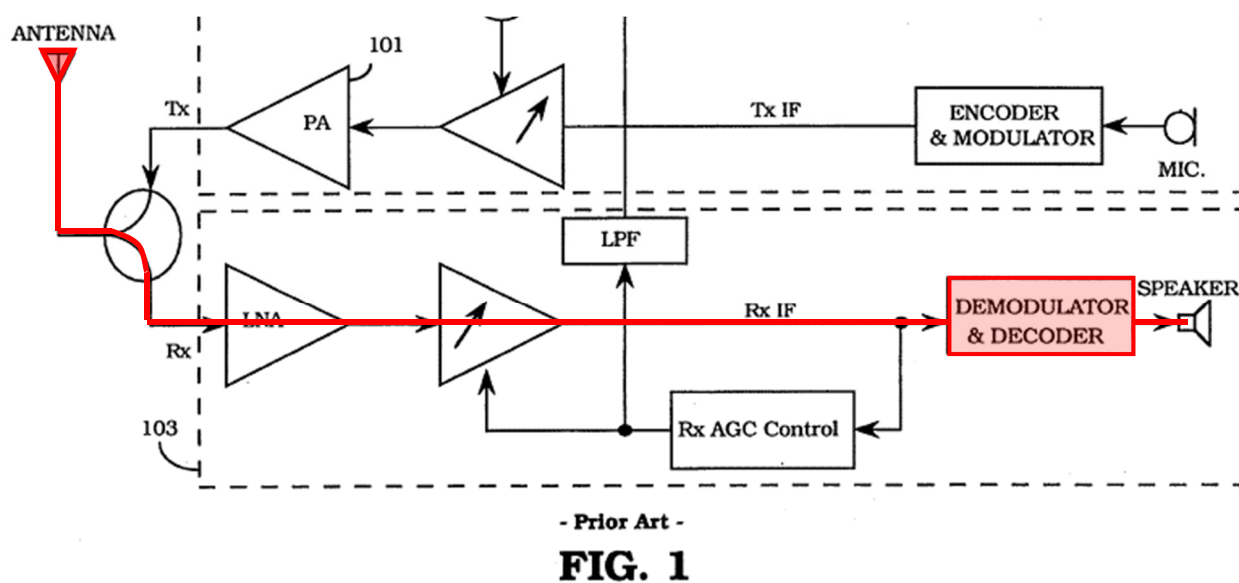
Weiland discloses the method as recited in the preamble. EX1003, ¶56. For example, Weiland discloses a process for providing power control correction for a CDMA radiotelephone. EX1004, 3:4-13. Weiland's CDMA radiotelephone includes a transmitter having a variable amplitude amplifier and a power amplifier, which are shown in FIG. 2 below as variable gain amplifier 202 and transmit power amplifier 201. EX1004, 3:11-13, 4:19-43.



EX1004, FIG. 2 (cropped and annotated); EX1003, ¶56.

*[4.1] receiving a first communication signal and a transmitting power control signal from a cell-site station,*

Weiland discloses this element. EX1003, ¶¶57-58. For example, Weiland is directed to a radiotelephone and discloses that “FIG. 1 shows a typical prior cellular radiotelephone.” EX1004, 1:51, 2:23-27.



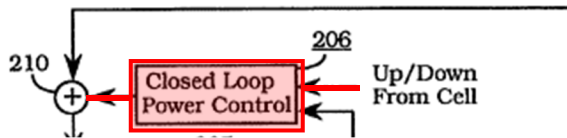
EX1004, FIG. 1 (cropped, color added); EX1003, ¶57. As shown in FIG. 1, Weiland discloses receiving a first communication signal because Weiland’s radiotelephone includes an antenna that receives a communication signal from a

cell site. EX1003, ¶57.

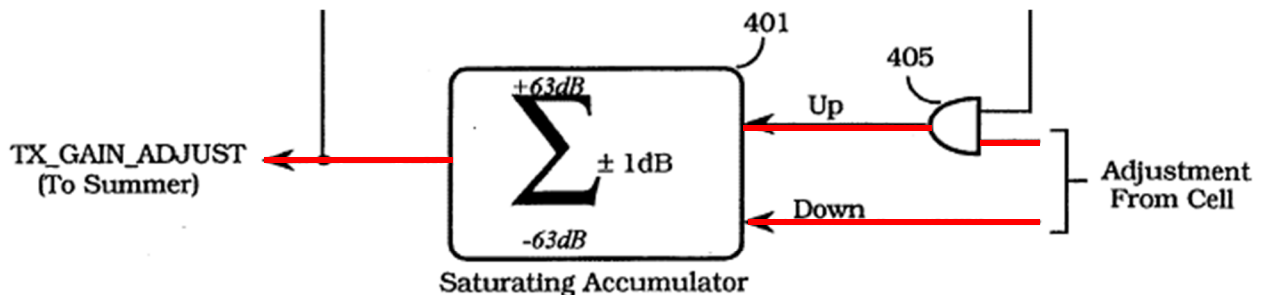
Weiland also discloses receiving a transmitting power control signal from a cell-site station because Weiland shows in FIG. 2 that the radiotelephone includes a “closed loop power control section (206)” that “accumulates the power control commands sent on the forward link by the controlling radiotelephone cell site.”

EX1004, 5:24-32 (emphasis added).

**FIG. 2**



EX1004, FIG. 2 (cropped, color added); EX1003, ¶58. FIG. 4 shows a detailed block diagram of the closed-loop power control section that receives the power control commands from the cell site. EX1004, 2:51-52, 5:24-32, EX1003, ¶58.



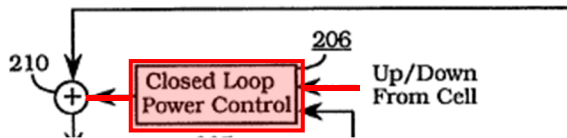
206  
**FIG. 4**

EX1004, FIG. 4 (cropped, color added), EX1003, ¶58.

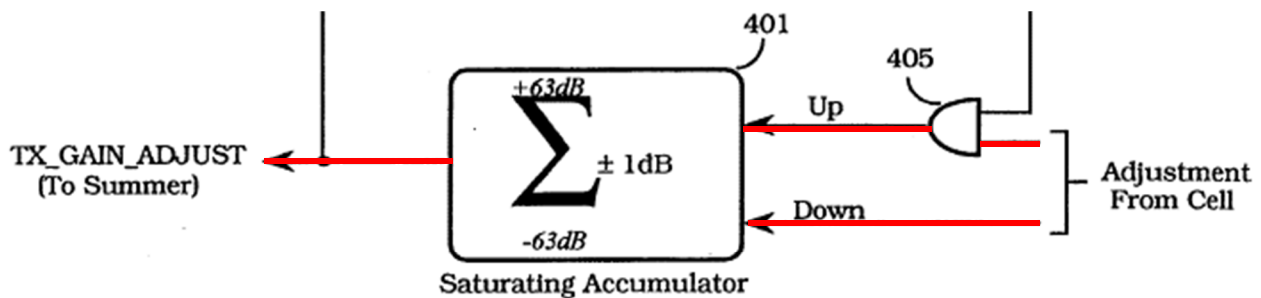
***[4.2] generating a power control signal derived from said transmitting power control signal received from said cell-site station,***

Weiland discloses this element. EX1003, ¶59. For example, Weiland shows in FIG. 2 that the radiotelephone includes a “closed loop power control section (206)” that “accumulates the power control commands sent on the forward link by the controlling radiotelephone cell site and outputs a gain adjust signal.” EX1004, 5:24-32 (emphasis added).

**FIG. 2**



EX1004, FIG. 2 (cropped, color added); EX1003, ¶59. FIG. 4 shows a detailed block diagram of the closed-loop power control section that receives the power control commands from the cell site and generates a gain adjust signal derived from the power control commands. EX1004, 2:51-52, 5:24-32, EX1003, ¶59.

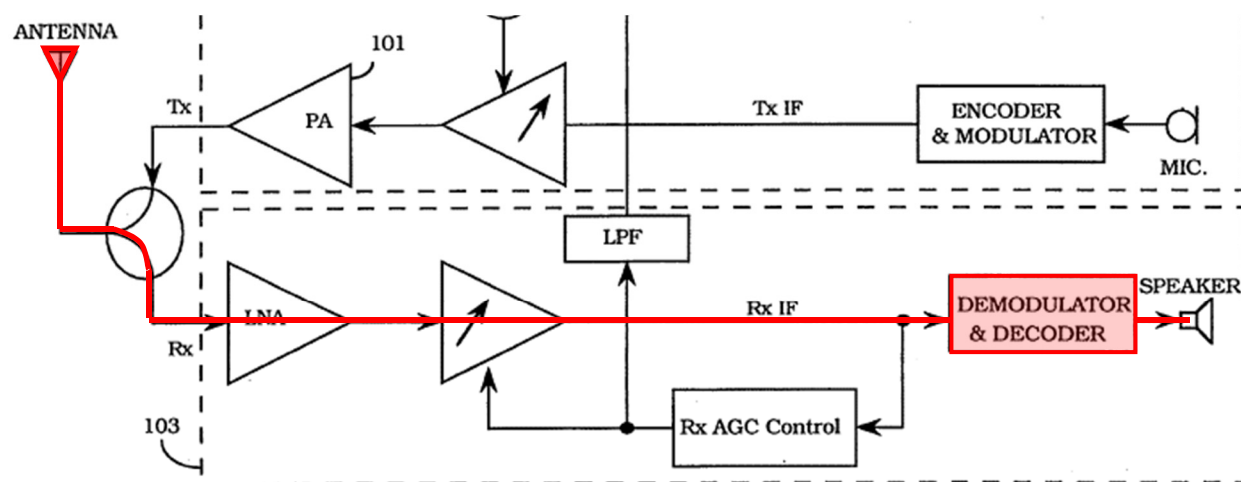


206  
**FIG. 4**

EX1004, FIG. 4 (cropped, color added), EX1003, ¶59.

***[4.3] converting said first communication signal received from a cell-site station into a voice signal code,***

Weiland discloses this element. EX1003, ¶60. For example, Weiland shows in FIG. 1 the conventional arrangement of a radiotelephone where the antenna, which receives the communication signal from the cell site, is coupled with a demodulator and decoder that converts the received communication signal into a voice signal code. *Id.*



- Prior Art -

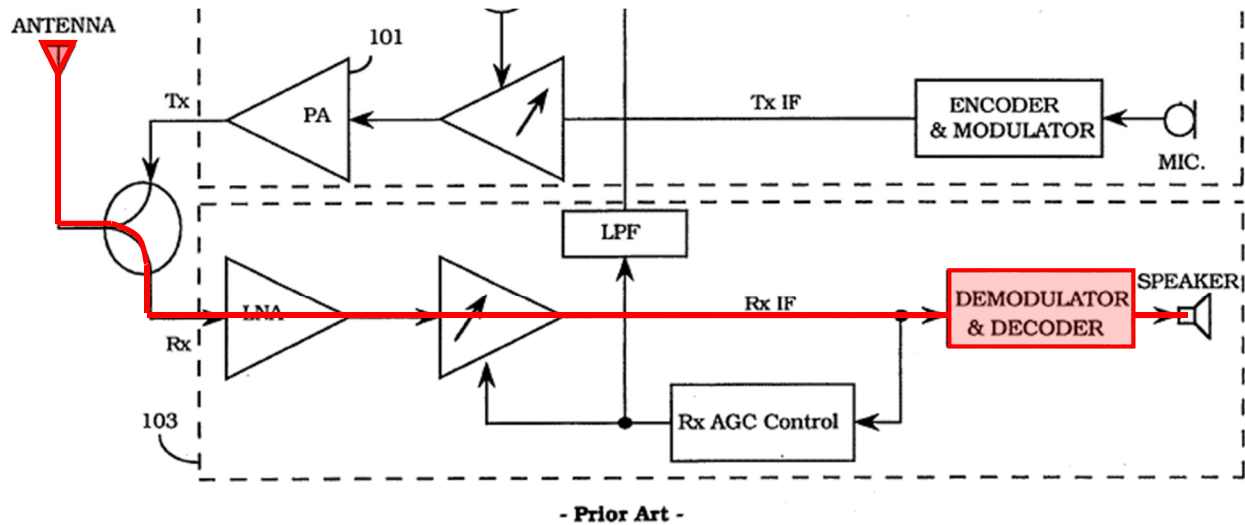
**FIG. 1**

EX1004, FIG. 1 (cropped, color added); EX1003, ¶60. Similarly, the '334 patent describes the receiver 100 including demodulators that demodulate the communication signal and convert the demodulated signal into a voice code signal. EX1001, 4:49-60, 5:1-13.

***[4.4] converting said voice signal code into an audio signal for driving an acoustic transducer of said cellular telephone,***

Weiland discloses this element. EX1003, ¶61. For example, Weiland's

FIG. 1 shows that the demodulator and decoder that converts the received communication signal into a voice signal code also converts the voice signal code into an audio signal for driving a speaker. *Id.*

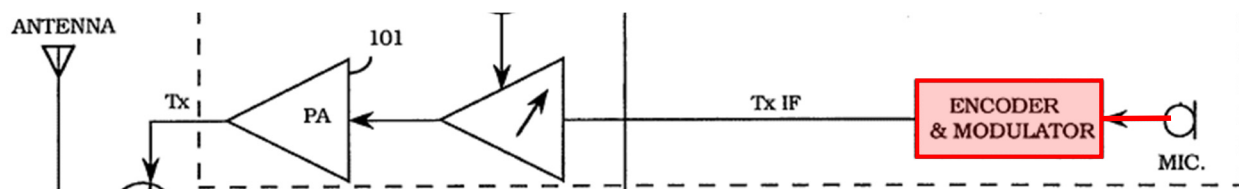


**FIG. 1**

EX1004, FIG. 1 (cropped, color added); EX1003, ¶61. Similarly, the '334 patent describes the receiver 100 including an encoder/decoder apparatus that converts the voice signal code to an audio signal for driving a speaker. EX1001, 4:49-60, 5:1-13.

***[4.5] converting an audio input signal from said acoustic transducer into an input voice code signal,***

Weiland discloses this element. EX1003, ¶62. For example, Weiland's FIG. 1 also shows that the radiotelephone includes an encoder and modulator that converts an audio input signal from a microphone into an input voice code signal.



EX1004, FIG. 1 (cropped, color added), 1:51; EX1003, ¶62. Similarly, the '334 patent describes the encoder/decoder apparatus converting an audio signal from a microphone to a voice code signal. EX1001, 5:14-34.

***[4.6] converting said input voice code signal into a second communication signal,***

Weiland discloses this element. EX1003, ¶63. For example, the encoder and modulator shown in Weiland's FIG. 1 also converts the input voice code signal into a communication signal.



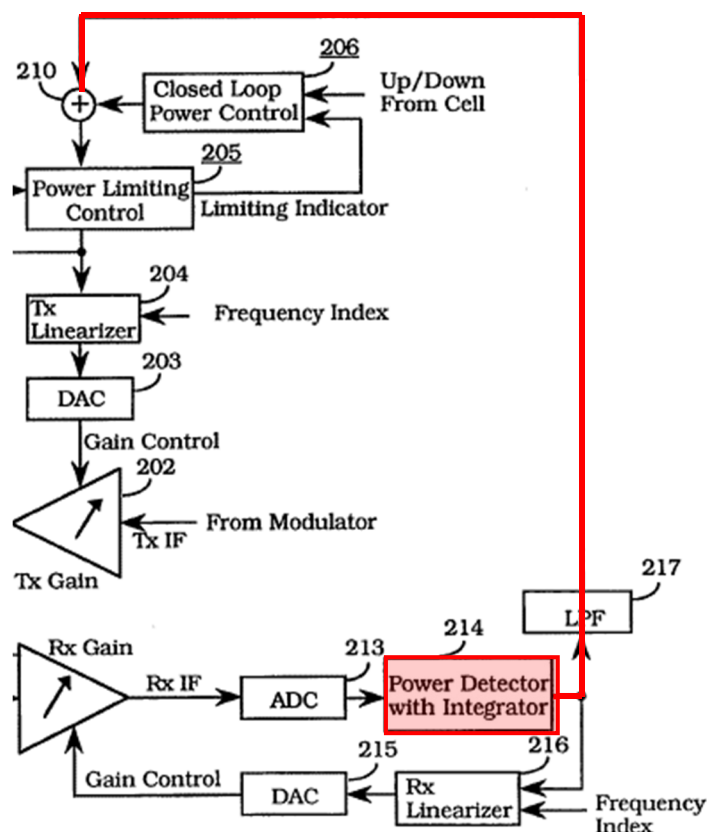
EX1004, FIG. 1 (cropped, color added), 1:51; EX1003, ¶63. Similarly, the '334 patent describes the transmitter 200 including modulators that modulate the voice code signal into a communication signal. EX1001, 5:14-34.

***[4.7] controlling said transmitter in such a manner that an open-loop power control is performed at first and then a closed-loop power control is performed according to said power control signal so as to control transmitted power to converge into a range required by said cell site station, and***

Weiland in view of Dent provides this element. EX1003, ¶¶64-74. For



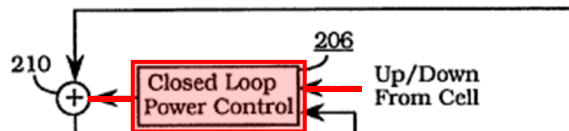
example, Weiland describes controlling the transmitter in such a manner that open-loop power control is performed. EX1003, ¶¶64-65. In particular, Weiland discloses using “detected power levels” to generate “an AGC setpoint,” which is “the open loop power control signal for the radio.” EX1004, 2:23-41, 3:26-38, 3:66-4:13. Weiland discloses that “the open loop power control” is “the power control performed by the radio by itself without control input from the cells.” *Id.*, 3:66-4:13. The open loop power control signal is used to adjust the transmit gain and power amplifier biasing of the radiotelephone to correct the reverse link transmit power error and maintain the desired output power. *Id.*, 2:23-41; EX1003, ¶64. Weiland’s FIG. 2 shows the open loop power control performed by the radio.



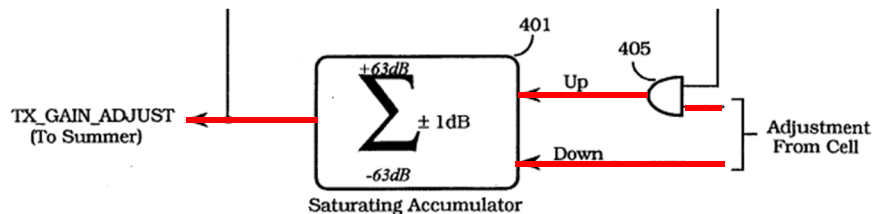
EX1004, FIG. 2 (cropped, color added); EX1003, ¶65.

Weiland also describes controlling the transmitter in such a manner that closed-loop power control is performed according to the power control signal so as to control transmitted power to converge into a range required by the cell site station. EX1003, ¶¶64, 66. In particular, Weiland's FIG. 2 shows a "closed loop power control section (206)" that "accumulates the power control commands sent on the forward link by the controlling radiotelephone cell site and outputs a gain adjust signal." EX1004, 4:6-13.

**FIG. 2**



EX1004, FIG. 2 (cropped, color added), EX1003, ¶66. FIG. 4 shows a more detailed block diagram of the closed-loop power control section (206) of FIG. 2.



**FIG. 4**

EX1004, FIG. 4 (cropped, color added); EX1003, ¶66. The gain adjust signal generated by the closed loop power control section (206) is used to adjust the transmit gain and power amplifier biasing of the radiotelephone to correct the

reverse link transmit power error and maintain the desired output power. EX1004, 2:23-41; EX1003, ¶64.

Even if Weiland's teachings of open-loop power control and closed-loop power control were considered to not explicitly disclose that the open-loop power control is performed at first and then the closed-loop power control is performed, this was a conventional feature of similar prior art methods of controlling a cellular telephone. EX1003, ¶¶67-68. Indeed, the '334 patent concedes that this was a well-known feature in the prior art IS-95 standard for the CDMA cellular telephone system. EX1001, 1:26-27, 1:47-61. The '334 patent explicitly states that "[i]n IS-95, open-loop power control and closed-loop power control are employed in order to regulate a receiving power at the cell-site station" and "the transmitter performs the open-loop power control at first, then it performs the closed-loop power control for the transmitted power to converge into a desired value which the cell-site station requires." EX1001, 1:47-61. In fact, the '334 patent describes this feature in only the "Description of the Related Art" section. EX1003, ¶67.

In addition, Dent describes a prior art method that includes controlling the transmitter in such a manner that an open-loop power control is performed at first and then a closed-loop power control is performed. EX1003, ¶68. For example, Dent describes controlling a mobile station's transmission power level for

performing random access. EX1005, 1:15-23, 2:52-3:30. Dent discloses setting “[t]he power level of the initial random access message ... at a low power level” and “gradually increase[ing] the transmission power in small increments, e.g., 0.1 dB, ... according to a ramp function.” EX1005, 8:1-23 (emphasis added), *see also* 2:52-3:30, 12:7-16, 13:48-14:19. Dent’s mobile station increases the transmission power for each successive codeword until the base station detects the access message and transmits a reply message to the mobile station. *Id.* After the mobile station receives the reply message, “a closed-loop control of timing and power level is formed between the mobile station 10 and the base station 20.” *Id.*, 16:5-23. As stated by Mr. Lanning, “a POSITA would have recognized that increasing the transmission power in small increments according to a ramp function prior to receiving the reply message from the base station is an example of open-loop power control.” EX1003, ¶68. Mr. Lanning’s testimony is supported by Weiland, which discloses that open-loop power control is “the power control performed by the radio by itself without control input from the cells.” EX1004, 3:66-4:1. Thus, Dent teaches performing open-loop power control at first and then closed-loop power control to control transmitted power to converge into a range required by the cell site station. EX1003, ¶68.

The predictable combination of Weiland and Dent would have resulted in Weiland’s method for controlling the transmitter including Dent’s suggested

functionality for performing open-loop power control at first and then closed-loop power control for random access. EX1003, ¶69. Mr. Lanning explains that applying Dent's teachings to Weiland's system would have led to Weiland's system performing open-loop power control for a random access call set-up, which includes gradually increasing the bias condition of the power amplifier using the set of correction tables and the ramp function until a connection to a base station is made. *Id.* Thereafter, the system would perform a closed-loop power control using the set of correction tables and the ramp function to fix the transmitter's power at a level specified by the base station. *Id.*

According to Mr. Lanning, a POSITA would have been prompted to combine Weiland's method with Dent's suggested functionality to achieve this advantageous feature in Weiland's radiotelephone. *Id.*, ¶¶71-74. As an initial matter, the evidence here shows the high degree of predictability and reasonable expectation of success in doing so. *Id.*, ¶70. Indeed, both Weiland and Dent describe a CDMA radiotelephone including a transmitter having a variable gain amplifier and a power amplifier. EX1004, 3:11-13, 4:19-43, FIG. 2; EX1005, 4:23-27, 5:49-6:39, FIG. 5. Both Weiland and Dent describe controlling the transmitter's power by controlling the gain of the variable gain amplifier and controlling the bias of the power amplifier. EX1004, 4:14-43, FIG. 2; EX1005, 5:49-6:39, FIG. 5.

The evidence also shows a POSITA would have recognized the benefits of Dent's suggested technique for performing open-loop power control at first and then closed-loop power control for random access and would have been motivated to achieve these benefits of Dent in Weiland for several reasons. EX1003, ¶¶71-74. First, as explained by Mr. Lanning, a POSITA would have been motivated to combine Dent's teachings with Weiland's method to use Weiland's already present transmitter circuitry for random access in a manner that "ensure[s] that the radiated emissions are maintained within acceptable levels to avoid interfering with other radiotelephones" by "controlling a radiotelephone's transmission power by gradually increasing the power level from an initial low power level (e.g., open-loop power control) until a reply message is received from a base station (e.g., closed-loop power control)", which "provides the benefit of minimizing the interference cause by radio communications initiated between a radiotelephone and a base station." EX1003, ¶72 (citing EX1004, 1:15-21; EX1005, 1:10-13, 2:40-46, 2:52-65, 4:28-33, 7:57-68, 8:34-37).

Second, the evidence here also shows that a POSITA would have been motivated to modify Weiland's method to incorporate Dent's suggested improvement to "advantageously allow a base station communicating with Weiland's radiotelephone to detect random access messages transmitted at a power level too low to interfere with ongoing traffic, decode every codeword after

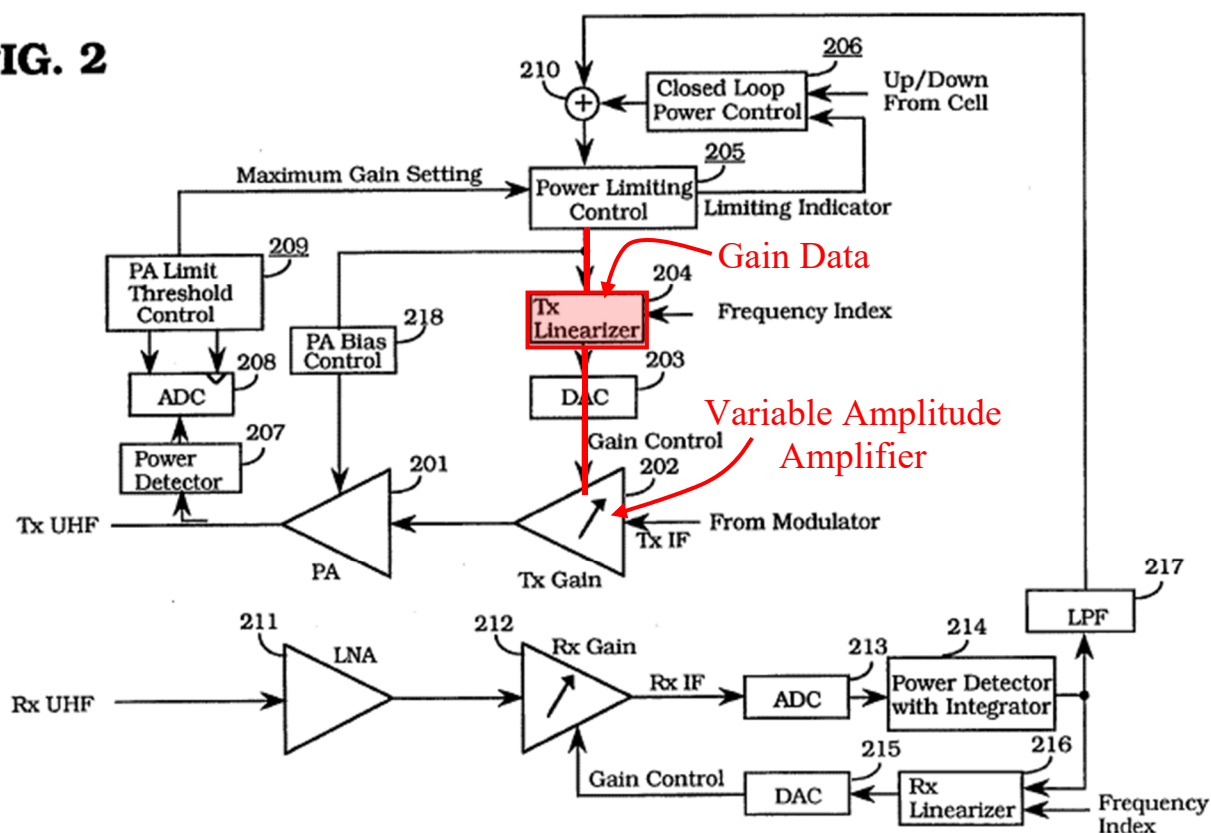
detecting a random access attempt, track small changes of power level between codewords, and provide the radiotelephone with consistent instructions for the radiotelephone to more accurately control the time advance and power level of the transmitter.” EX1003, ¶73 (citing EX1005, 9:3-21, 13:9-14:38).

Third, the evidence here also shows that a POSITA would have been motivated to modify Weiland’s radiotelephone to incorporate Dent’s suggestion because doing so would have been merely the “application of a known technique (e.g., Dent’s suggestion for performing open-loop power control at first and then closed-loop power control for random access) to a known system (e.g., Weiland’s radiotelephone) ready for improvement to yield predictable results.” EX1003, ¶74. The law is clear: “when a patent ‘simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Here, both Weiland and Dent disclose power control of CDMA mobile telephones (EX1004, 3:11-13, 4:14-43, FIG. 2; EX1005, 4:23-27, 5:49-6:39, FIG. 5) and a POSITA would have recognized that applying Dent’s teachings to Weiland’s radiotelephone would have led to predictable results without significantly altering or hindering the functions performed by Weiland’s radiotelephone. EX1003, ¶74.

***[4.8] controlling a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between bias data and gain data stored in said memory,***

Weiland discloses this element. EX1003, ¶¶75-77. For example, Weiland discloses controlling a gain of the variable amplitude amplifier using gain data stored in a memory by disclosing that the “the output of the power control limiting section (205) ... are used to address values stored in a transmitter linearizing table (204)” and the selected value “controls a variable gain amplifier (202).” EX1004, 4:14-34; EX1003, ¶75. FIG. 2 shows control of the gain of the variable gain amplifier 202 using values stored in the transmitter linearizing table 204.

**FIG. 2**



EX1004, FIG. 2 (annotated); EX1003, ¶75. According to Mr. Lanning, the

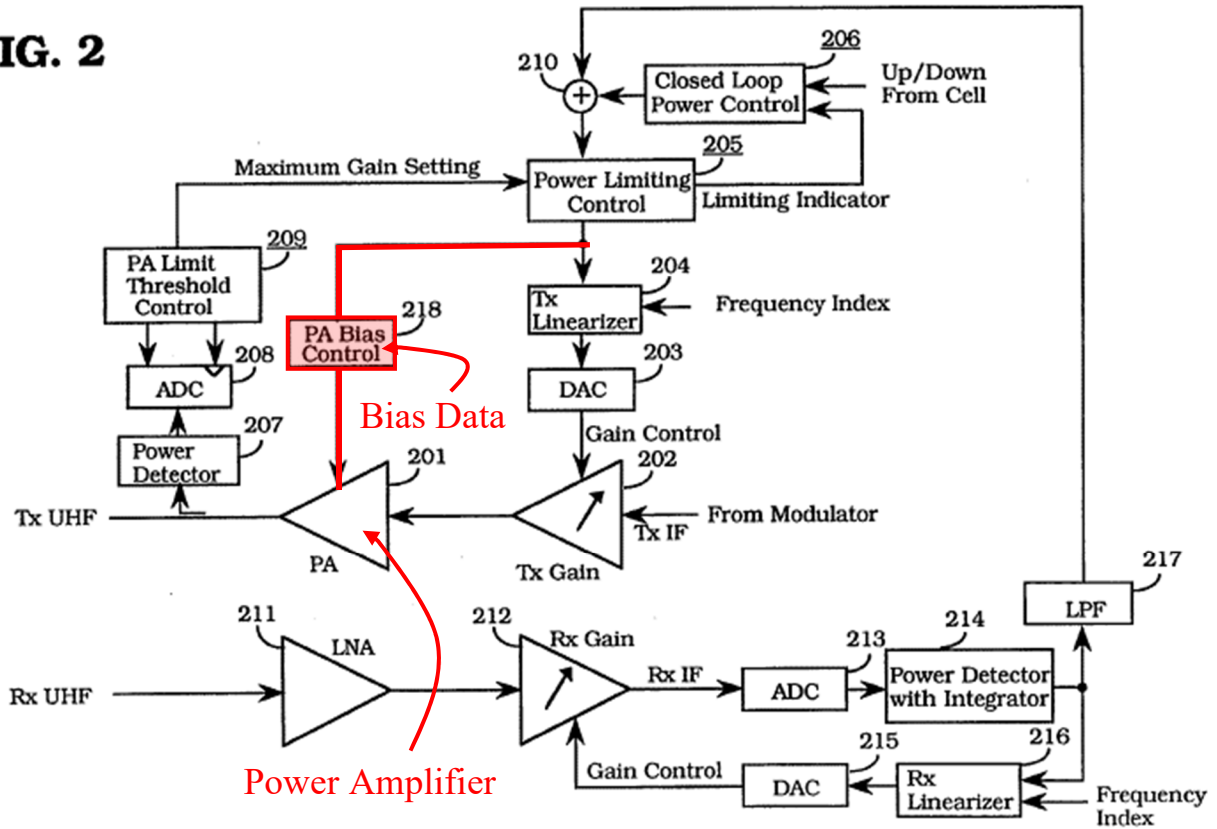


transmitter linearizing table 204 includes gain data, e.g., values for adjusting the variable gain amplifier, and is a type of data structure stored in a memory.

EX1003, ¶75.

Weiland also discloses controlling a bias condition of the power amplifier using bias data stored in a memory by disclosing that the radiotelephone indexes a correction table that indicates the “desired power amplifier biasing for the particular operating point” and adjusts “power amplifier biasing of the radiotelephone.” EX1004, 2:23-41; EX1003, ¶76. This functionality is provided by the “power control limiting section (205)” that “controls ... transmit gain settings,” and the “power amplifier (PA) bias control section (218)” that “controls the bias point of the transmit PA (201) based on the transmit gain setting” from the power limiting control section 205. EX1004, 4:35-50. FIG. 2 shows control of the bias of the power amplifier 201 by the bias control section 218.

**FIG. 2**

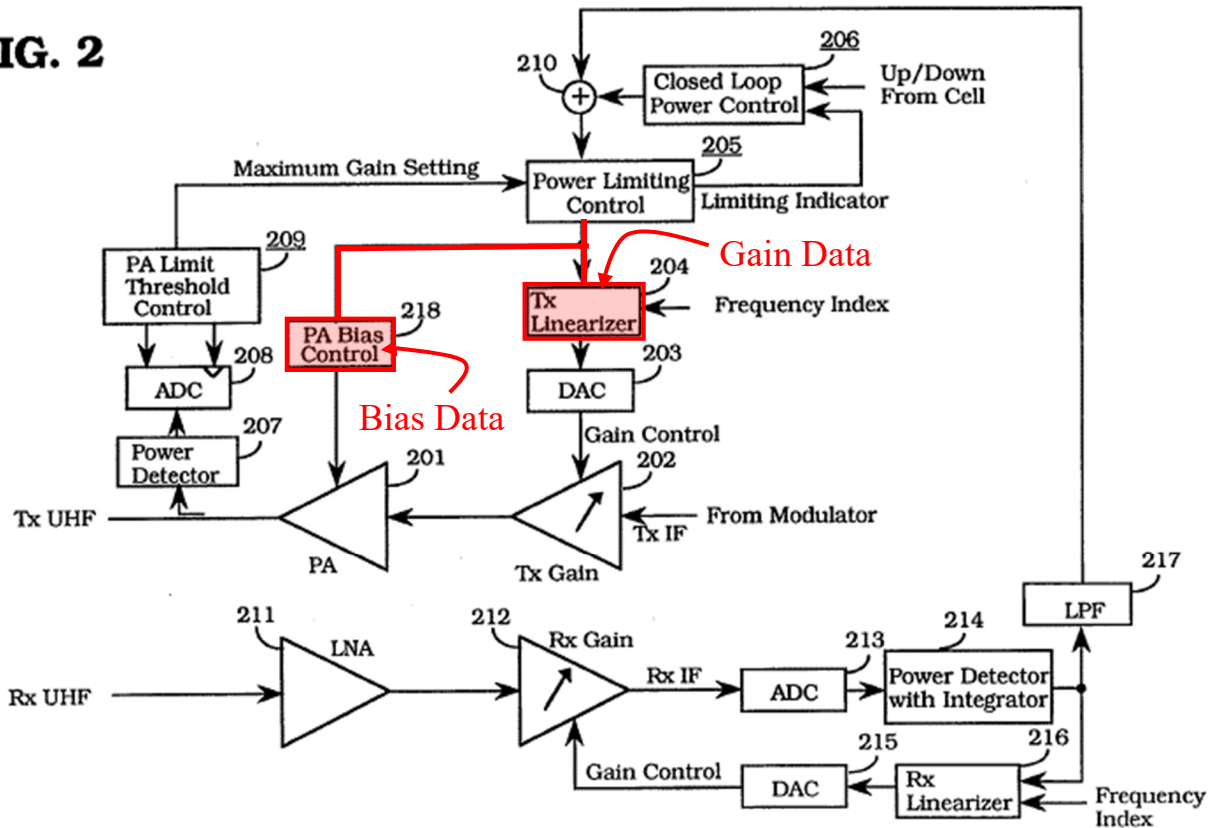


EX1004, FIG. 2 (annotated); EX1003, ¶76. According to Mr. Lanning, the bias control section 218 uses a correction table that includes bias data, e.g., “desired power amplifier biasing for the particular operating point,” and that is a data structure stored in a memory. EX1003, ¶76.

As described by Weiland, the “power control limiting section (205)” “controls ... transmit gain settings,” “the output of the power control limiting section (205) ... are used to address values stored in a transmitter linearizing table (204),” and the “power amplifier (PA) bias control section (218)” “controls the bias point of the transmit PA (201) based on the transmit gain setting” from the power limiting control section 205 by indexing a correction table that indicates the

“desired power amplifier biasing for the particular operating point.” EX1004, 2:23-41, 4:14-34, 4:35-50. Thus, the transmit gain setting from the power limiting control section 205 is used to select a stored gain value from the transmitter linearizing table 204 and a stored bias value in a correction table indexed by the PA bias control section 218. EX1004, 4:14-22, 2:23-41, 4:35-43; EX1003, ¶77. This is shown in Weiland’s FIG. 2.

**FIG. 2**



EX1004, FIG. 2 (annotated); EX1003, ¶77. Because the output of the power limiting control section 205 (i.e., the transmit gain setting) is used to select a stored gain value from the transmitter linearizing table 204 for adjusting the variable gain amplifier 202 and a stored bias value from a correction table indexed by the PA

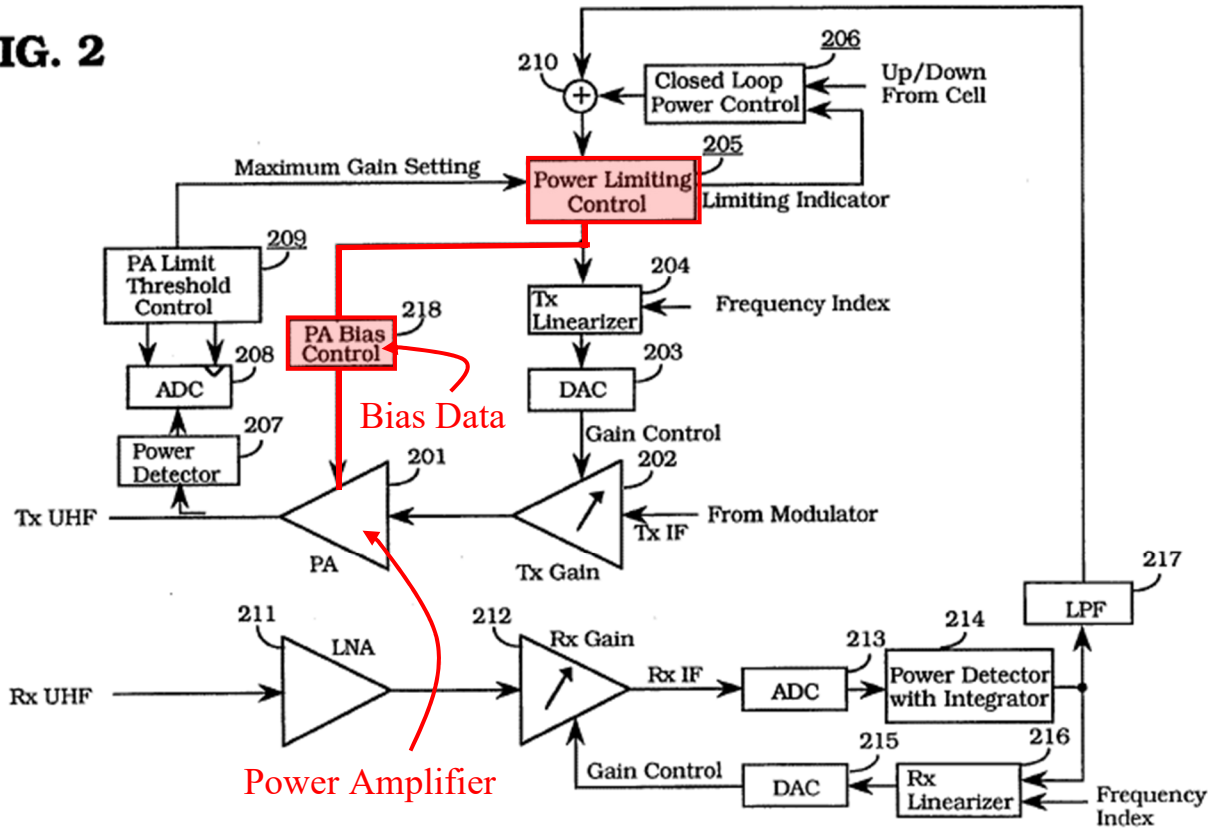
bias control section 218 to control the bias point of the transmit PA 201, each stored gain value has a corresponding stored bias value, and thus the bias values are a function of the gain values. EX1004, 2:23-41, 4:14-34, 4:35-50; EX1003, ¶77. According to Mr. Lanning, the function is represented by the tables storing the bias data and the gain data and defines a relation between the stored bias data and the stored gain data, and a POSITA would have understood that the gain of the variable amplitude amplifier and the bias condition of the power amplifier is controlled using the function that is represented by the tables. EX1003, ¶77. Similarly, the '334 patent discloses an embodiment where gain values and bias values, including a bias value corresponding to each gain value, are stored in memory and are determined according to transmit power. EX1001, 6:4-51. Thus, Weiland discloses controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier using a function defining a relation between bias data and gain data stored in memory in the same manner as the '334 patent and as required by this element of claim 4.

***[4.9] in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and***

Weiland discloses this element. EX1003, ¶¶78-79. For example, Weiland describes a “transmitter linearizing table” that is used for the full range of output power settings—lowest to highest, that “follows a predetermined straight line with respect to transmitted RF output power.” Ex. 1004 at 4:14-34. Weiland also

discloses that the transmit power has a “maximum operating point” and that the power control limiting section 205 “prohibits the transmitter from exceeding its maximum operating point.” EX1004, 2:35-38, 4:44-5:23. The “maximum operating point” has a corresponding “maximum gain setting” provided by the power limiting control 205 to the PA bias control section 218. EX1004, 2:23-41, 4:35-43; EX1003, ¶79. As discussed above in the analysis of element [4.8], Weiland discloses that the PA bias control section 218 controls the bias condition of the power amplifier by indexing a correction table that indicates the “desired power amplifier biasing for the particular operating point” and adjusts “power amplifier biasing of the radiotelephone.” EX1004, 2:23-41, 4:35-43; EX1003, ¶79. FIG. 2 shows the control of the bias of the power amplifier 201 by the bias control section 218 based on the transmit gain setting determined by the power control limiting section 205.

**FIG. 2**



EX1004, FIG. 2 (annotated); EX1003, ¶79. Based on Weiland’s disclosures, a POSITA would have recognized that the “maximum gain setting” corresponding to the “maximum operating point” would have a corresponding maximum bias voltage value stored in the correction table that is used to bias the power amplifier 201 for the maximum operating point. EX1003, ¶79. A POSITA would have also recognized that each bias value is a ratio of the maximum bias voltage value because Weiland describes that “a set of correction tables ... are generated during the production testing of each radiotelephone,” that “during factory calibration of the radiotelephone, the linearizers are loaded with ... calibration values,” and that “biasing ... is adjusted by the analog calibration value.” EX1004, 3:7-10, 3:57-65,

4:23-34; EX1003, ¶79. Thus, Weiland teaches that the function, which is represented by the tables of gain and bias values and used to control the gain of the variable amplitude amplifier and the bias condition of the power amplifier, uses bias values defined in a ratio to the maximum bias voltage value. EX1003, ¶79.

***[4.10] [in such a manner] that said bias condition increases gradually to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station.***

Weiland in view of Dent provides this element. EX1003, ¶¶80-84. For example, Weiland discloses “biasing ... is adjusted ... to a point such that the input to the transmitter linearizing table (204) follows a predetermined straight line with respect to transmitted RF output power.” EX1004, 4:23-34. As discussed above in the analysis of element [4.8], “the input to the transmitter linearizing table (204)” is the “output of the power control limiting section (205),” also referred to as the “transmit gain setting,” which is used by the PA bias control section (218) to control “the bias point of the transmit PA (201).” EX1004, 2:23-41, 4:14-34, 4:35-50. Because the input to the linearizing table (204) (i.e., the transmit gain setting), which is used to control the bias point of the transmit PA, “follows a predetermined straight line with respect to transmitted RF output power,” the bias point of the transmit PA would also follow a predetermined straight line with respect to transmitted RF output power. EX1003, ¶80. As discussed above in the analysis of element [4.9], Weiland also describes that the “transmitter linearizing

table” is used until the maximum power output is reached. Ex. 1004 at 4:14-34, 4:44-5:2. Once the maximum output power is reached, Weiland’s “power control limiting section” is activated to ensure the transmitted output power does not exceed the “maximum set point.” *Id.*

Even if Weiland’s teachings of controlling the gain of the variable amplitude amplifier and the bias condition of the power amplifier were considered to not explicitly disclose that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station, this was a conventional feature of similar prior art methods of controlling a cellular telephone. EX1003, ¶¶81-83. For example, Dent discloses that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station. *Id.* Dent discloses that the bias condition increases gradually by disclosing that the transmission power “gradually increases ... in small increments, e.g., 0.1 dB, ... according to a ramp function.” EX1005, 8:1-23, *see also* 3:13-24, 12:7-16, 13:9-36, 13:48-68; EX1003, ¶82. Dent also discloses “controlling the bias of the power amplifier 100 to achieve the commanded power level when transmitting each codeword.” Ex.1005, 5:49-58, *see also* 6:5-39. As explained by Mr. Lanning, to achieve the gradual increase of the transmission power through control of the bias of the power



amplifier, the bias of the power amplifier is gradually increased to cause the corresponding gradual increase of the transmission power. EX1003, ¶81.

Dent further discloses that output intensity can increase to the value taken when the cellular telephone is very far from the cell-site station. EX1003, ¶83. In particular, Dent discloses that “the power levels reach[ing] much higher values without an acknowledgement from the base station 20[ indicates] that the mobile station 10 is at a significant distance.” EX1005, 13:9-36. Dent also states that “[t]he greater the power level required, the greater the distance between the mobile station 10 and the base station 20.” EX1005, 14:28-30. In Dent, the bias of the power amplifier is gradually increased to cause the transmission power to gradually increase, and thus the bias condition increases gradually to the maximum value when the transmission power increases to the value taken when the mobile station is very far from the base station. EX1003, ¶83. Thus, Dent teaches controlling the gain of the variable amplitude amplifier and the bias condition of the power amplifier in such a manner that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station. *Id.*, ¶¶81-83.

Combining Weiland with Dent would have predictably resulted in Weiland’s control of the bias condition of the power amplifier including Dent’s suggestion for controlling the bias condition such that the bias condition gradually increases to the

maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station. EX1003, ¶84. As discussed above in the analysis of element [4.7], it would have been obvious to a POSITA to combine Weiland with Dent to include this feature in Weiland's radiotelephone, and the evidence here articulates several reasons that would have motivated a POSITA to do so, including:

- “ensure that the radiated emissions are maintained within acceptable levels to avoid interfering with other radiotelephones,”
- “minimizing the interference cause by radio communications initiated between a radiotelephone and a base station,”
- “allow a base station communicating with Weiland's radiotelephone to detect random access messages transmitted at a power level too low to interfere with ongoing traffic, decode every codeword after detecting a random access attempt, track small changes of power level between codewords, and provide the radiotelephone with consistent instructions for the radiotelephone to more accurately control the time advance and power level of the transmitter,” and
- because doing so was an “application of a known technique (e.g., Dent's suggestion for performing open-loop power control at first and then closed-loop power control for random access) to a known system (e.g., Weiland's

radiotelephone) ready for improvement to yield predictable results.”

EX1003, ¶¶69-74 (citing EX1004, 1:15-21; EX1005, 1:10-13, 2:40-46, 2:52-65, 4:28-33, 7:57-68, 8:34-37, 9:3-21, 13:9-14:38).

***[6] A method according to claim 4 wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.***

Weiland in view of Dent provides the elements of claim 6. EX1003, ¶¶85-86. As discussed above in the analysis of element [4.10], combining Weiland with Dent provides that the bias condition increases gradually to the maximum value when the output intensity increases. EX1005, 3:13-24, 5:49-58, 6:5-39, 8:1-23, 12:7-16, 13:9-36, 13:48-68, 14:28-30; EX1003, ¶¶80-85. Dent further discloses that the output intensity increases within the range of -50 dB to 0 dB. EX1003, ¶85. For example, Dent discloses that the mobile station has “a suitably wide transmission power level control range, e.g., 60 dB” and “a wide variety of combinations are known.” EX1005, 5:49-58, *see also* 6:5-39 (“a total transmission power control range of 0-60 dB”). Because Dent’s transmission power control range of 60 dB is greater than the ’334 patent’s range of 50 dB, Dent’s bias condition increases gradually to the maximum value when the transmission power increases within the range of -50 dB to 0 dB. EX1003, ¶85.

The evidence here shows the predictable combination of Weiland with Dent would have resulted in Weiland’s control of the bias condition of the power

amplifier including Dent's suggestion for controlling the bias condition such that the bias condition gradually increases to the maximum value when the transmission power increases within the range of -50 dB to 0 dB. EX1003, ¶86.

As discussed above in the analysis of element [4.7], it would have been obvious to a POSITA to combine Weiland with Dent to include this feature in Weiland's radiotelephone and a number of reasons would have motivated a POSITA to do so. EX1003, ¶¶69-74 (citing EX1004, 1:15-21; EX1005, 1:10-13, 2:40-46, 2:52-65, 4:28-33, 7:57-68, 8:34-37, 9:3-21, 13:9-14:38) ("ensure that the radiated emissions are maintained within acceptable levels to avoid interfering with other radiotelephones," "minimizing the interference cause by radio communications initiated between a radiotelephone and a base station," "allow a base station communicating with Weiland's radiotelephone to detect random access messages transmitted at a power level too low to interfere with ongoing traffic, decode every codeword after detecting a random access attempt, track small changes of power level between codewords, and provide the radiotelephone with consistent instructions for the radiotelephone to more accurately control the time advance and power level of the transmitter," and "application of a known technique (e.g., Dent's suggestion for performing open-loop power control at first and then closed-loop power control for random access) to a known system (e.g., Weiland's radiotelephone) ready for improvement to yield predictable results").

**B. Ground 2: Claims 4 and 6 are Obvious under §103 based on Matero in view of Ozluturk and Alberth**

Matero also describes a method of controlling a cellular telephone used in a CDMA system. EX1006, 1:6-9, 1:36-45, 2:25-31, 3:56-62, FIG. 3. The cellular telephone includes a transmitter having a variable amplitude amplifier and a power amplifier. EX1006, 4:13-18, FIG. 3. Matero discloses the basic features of a CDMA cellular telephone. EX1003, ¶¶89-91.

Ozluturk provides a straightforward teaching that, during establishment of a channel, an open-loop power control is performed first to connect to a base station and then closed-loop control of the transmitter power level is performed between the cellular telephone and the base station to adjust the transmitter's power according to information received from the base station. EX1008, 3:7-28, 4:56-58, 10:11-41, FIGS. 11A, 11B; EX1003, ¶¶92-94. During open-loop power control, the cellular telephone performs power ramp-up of the transmitter until it receives an acknowledgement from the base station. EX1008, 3:13-18, 5:54-58, 6:44-54, 7:53-59, 8:17-19, 10:11-26. Upon receiving the acknowledgement, the cellular telephone performs closed-loop power control. EX1008, 6:54-59, 8:55-62, 10:37-41.

Alberth is similar to Matero and Ozluturk yet further describes the prior art practice in which values for setting the gain of the variable amplitude amplifier are normally stored in a memory, the gain of the variable amplitude amplifier and the

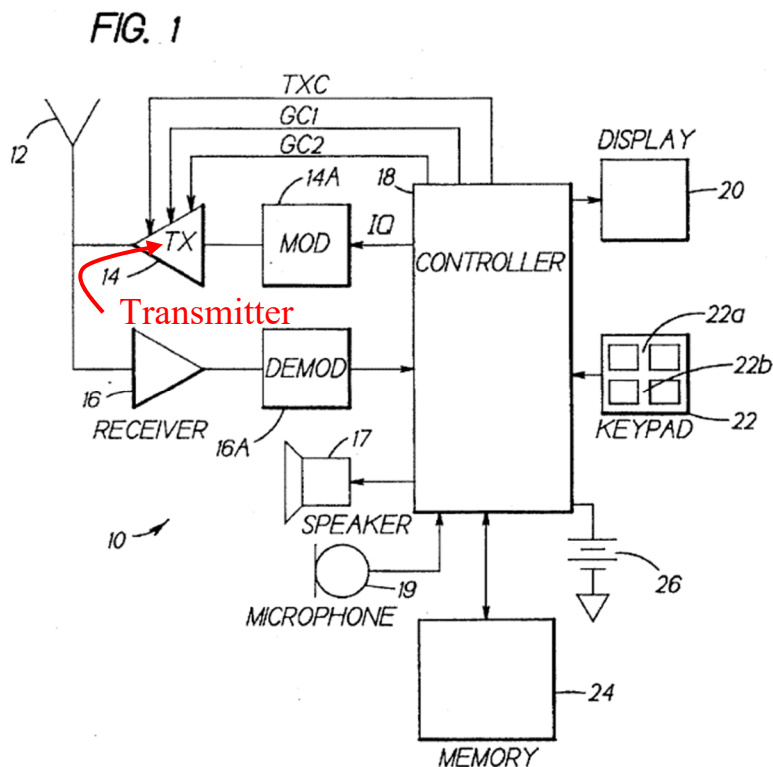
bias condition of the power amplifier are interrelated, and the bias condition of said power amplifier is dependent on the gain of the variable amplitude amplifier.

EX1010, 6:21-54, 6:63-67, 7:66-8:3, 8:11-25, 9:31-51; EX1003, ¶¶95.

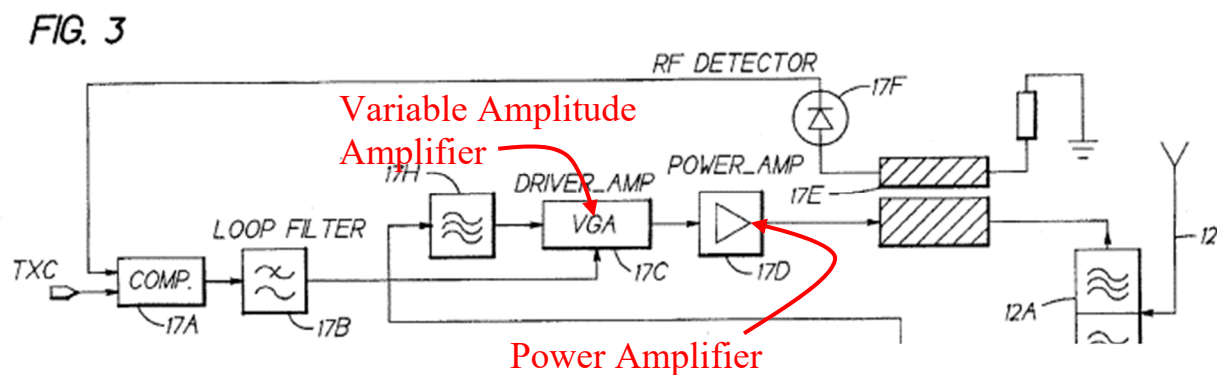
As articulated in detail below, all elements of claims 4 and 6 are taught by Matero in view of Ozluturk and Alberth, and a POSITA would have been prompted to combine the features described in these references for purposes of achieving known benefits (articulated below). EX1003, ¶¶88-144.

***[4.P] A method of controlling a cellular telephone used in a CDMA system, said cellular telephone including a transmitter having a variable amplitude amplifier and a power amplifier, said method comprising the steps of:***

Matero discloses the method as recited in the preamble. EX1003, ¶¶97-98. For example, Matero discloses methods for “gain control function over the transmitter chain” of “a wireless user terminal or mobile station 10” “capable of operating with ... IS-95 (CDMA).” EX1006, 1:60-67, 3:7-10, 3:56-62, FIG. 2; EX1003, ¶¶97. Matero’s mobile station includes a transmitter, shown as transmitter 14 in FIG. 1 below, having a variable amplitude amplifier and a power amplifier, which are shown as variable gain driver amplifier 17C and power amplifier 17D in FIG. 3 below. EX1006, 1:6-9, 1:36-45 (“a VGA that precedes the power amplifier”), 2:25-31 (“the transmitter circuit including a power amplifier [and] a variable gain driver amplifier”).



EX1006, FIG. 1 (annotated); EX1003, ¶98.

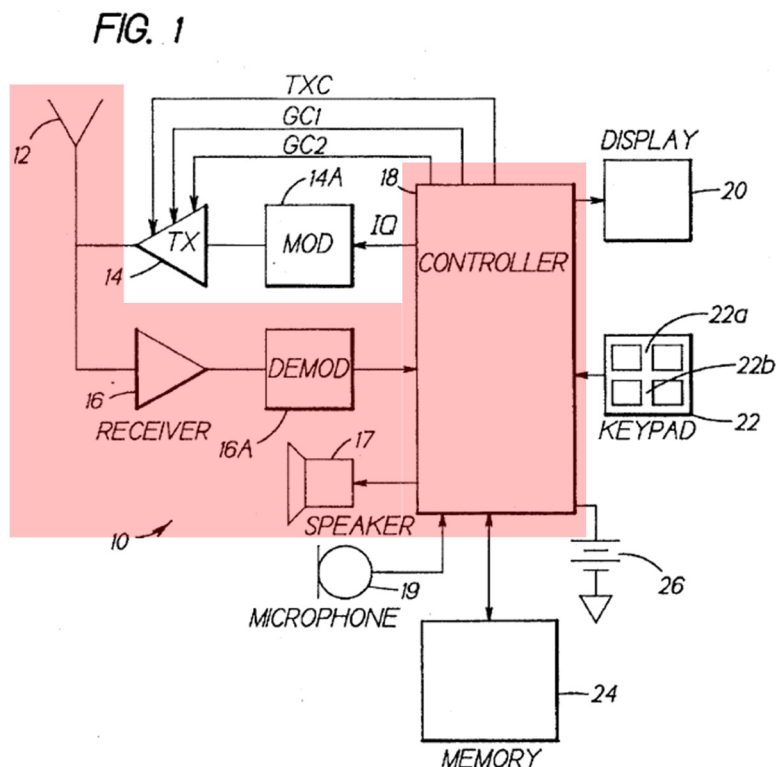


EX1006, FIG. 3 (cropped, annotated); EX1003, ¶98.

**[4.1] receiving a first communication signal and a transmitting power control signal from a cell-site station,**

Matro in view of Ozluturk provides this element. EX1003, ¶¶99-108. For

example, Matero's FIG. 1 shows a block diagram of the mobile station. EX1006, 2:63-64, 3:7-13.

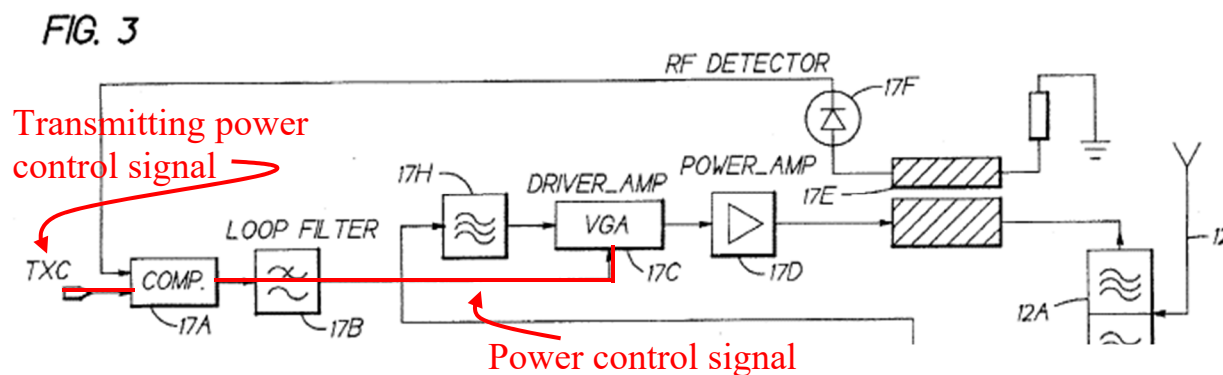


EX1006, FIG. 1 (color added); EX1003, ¶99. As shown in FIG. 1, Matero's mobile station includes "an antenna 12 ... for receiving signals from a base site." EX1006, 3:7-13. These signals include "signalling information in accordance with the air interface standard of the applicable cellular system or systems, and also user speech and/or user generated data." EX1006, 3:19-26.

Matero also discloses that "[t]he transmitter 14 includes a closed power control loop circuit comprising an input transmitter power control (TXC) signal, a comparator 17A, a loop filter 17B, a driver VGA 17C whose output is controlled



by the filtered comparator signal.” EX1006, 4:13-28. Matero’s FIG. 3 shows the power control signal (e.g., the filtered comparator signal that controls the driver VGA 17C) generated from the transmitting power control signal (e.g., input transmitter power control (TXC) signal). According to Mr. Lanning, the TXC signal can be received from a base station. EX1003, ¶100.



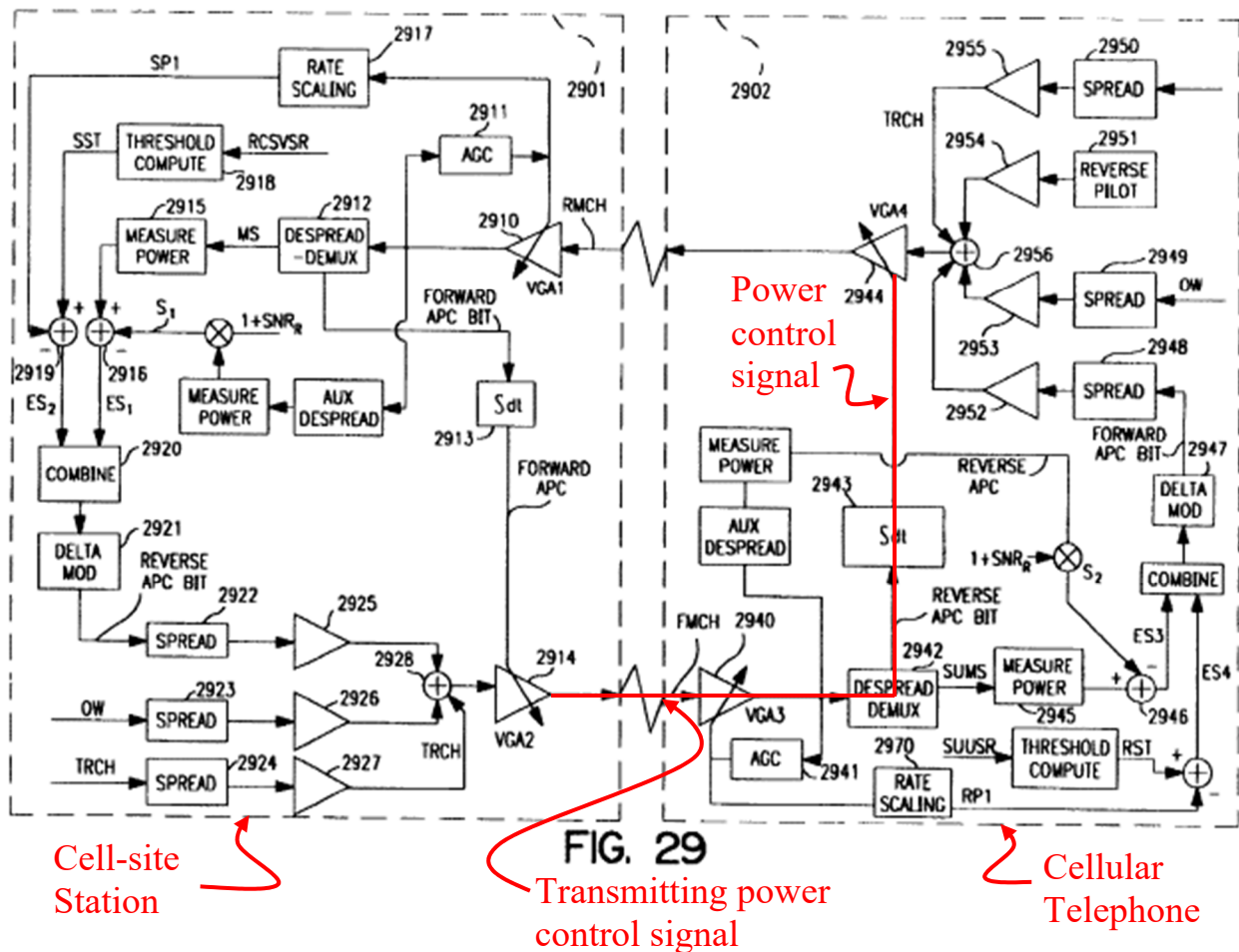
EX1006, FIG. 3 (cropped, annotated); EX1003, ¶100.

Even if Matero’s teachings of closed loop power control were considered to not explicitly disclose receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from said transmitting power control signal received from said cell-site station (*see* element [4.2]), this was a conventional feature of similar prior art methods of closed loop power control for a cellular telephone. EX1003, ¶¶101-102. For instance, Ozluturk discloses that a subscriber unit in a CDMA communication system performs closed loop power control. EX1008, 2:18-30, 6:54-59, 8:60-62, 10:38-41, FIGS. 5, 7, 11B. Ozluturk expressly incorporates by reference Lomp, which describes closed loop power

control in more detail, and thus Lomp's disclosure is considered part of Ozluturk's prior art teaching. EX1008, 1:7-10, 2:18-26.

Lomp discloses that closed loop power control includes receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from the transmitting power control signal received from the cell-site station. EX1003, ¶102. In particular, Lomp discloses that "for closed loop automatic power control (AC) for the RCS [radio carrier station] and SUs [subscriber units] of the spread-spectrum communication system," "the RCS transmits a plurality of forward channel information signals to the SUs as a plurality of forward channel spread-spectrum signals having a respective forward transmit power level." EX1009, 6:59-7:2, *see also* 61:12-16 ("the RCS ... continues to transmit power control signals to the SU to maintain SU transmit power level"), 61:35-60 ("AC data is transferred from the RCS to an SU"), 67:39-54 ("The forward link RF channel signal including the spread forward APC signal is received by the RF antenna of the SU"), 69:18-34. "Each SU includes an ARPC [automatic forward power control] receiver for receiving the forward channel information signal and extracting the respective reverse error signal from the forward channel information signal. The SU adjusts the reverse transmit power level of the respective reverse spread-spectrum signal responsive to the respective reverse error signal." EX1009, 7:24-37, *see also* 12:13-19, 67:39-54 ("reverse

APC control signal is provided to the Reverse APCVGA42944 to maintain the Reverse link RF channel signal at a minimum power level”), 69:18-34. FIG. 29 shows the subscriber unit receiving the transmitting power control signal (e.g., automatic power control data) from the radio carrier station and generating a power control signal (e.g., reverse APC control signal for maintaining the reverse link RF channel signal at a minimal power level) derived from the transmitting power control signal received from the radio carrier station. EX1003, ¶102.



EX1009, FIG. 29 (annotated), *see also* FIG. 30; EX1003, ¶102.

The predictable combination of Matero with Ozluturk (which incorporates Lomp) would have resulted in Matero's mobile station including Ozluturk's suggestion for receiving a transmitting power control signal from a cell-site station, generating a power control signal derived from the transmitting power control signal received from the cell-site station, and performing a closed-loop power control according to the power control signal so as to control transmitted power to converge into a range required by the cell site station. EX1003, ¶103. According to Mr. Lanning, a POSITA would have been prompted to combine Matero's method with Ozluturk's suggested functionality to achieve this advantageous feature in Matero's mobile station. *Id.*, ¶¶105-108. As an initial matter, the evidence here shows the high degree of predictability and reasonable expectation of success in doing so. *Id.*, ¶104. Indeed, both Matero and Ozluturk relate to mobile stations that perform closed loop power control. EX1006, 4:13-28, FIG. 3; EX1008, 2:18-30, 6:54-59, 8:60-62, 10:38-41, FIGS. 5, 7, 11B; EX1009, 6:59-7:2, 7:24-37, 12:13-19, 61:12-16, 61:35-60, 67:39-54, 69:18-34, FIGS. 29, 30. From Matero and Ozluturk's disclosures, a POSITA would have recognized that Ozluturk provides a more detailed teaching regarding conventional functionalities for closed loop power control that includes receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from the transmitting power control signal received from the cell-site station. EX1003,

¶104.

According to Mr. Lanning, a POSITA would have recognized the known benefits of Ozluturk's suggested technique for closed loop power control that includes receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from the transmitting power control signal received from the cell-site station, and would have been motivated to achieve these benefits of Ozluturk in Matero's system for several reasons. EX1003, ¶¶105-108. First, as explained by Mr. Lanning, a POSITA would have been motivated to combine Ozluturk's teachings with Matero's method to use Matero's already present closed loop power control circuitry to provide a closed loop power control that includes receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from the transmitting power control signal received from the cell-site station because such closed loop power control "maintains the transmitter's output power at a minimum to stabilize and conserve output power." EX1003, ¶106 (citing EX1009, 13:24-29, 61:46-53, 64:5-12).

Second, the evidence here also shows that a POSITA would have been motivated to modify Matero's closed loop control method to incorporate Ozluturk's suggested improvement to "allow Matero's mobile station to maintain sufficient signal power to interference noise power ratio (SIR) and ensure that the

transmit power maintains an acceptable bit-error rate (BER).” EX1003, ¶107 (citing EX1009, 13:24-29, 61:46-53, 64:5-12).

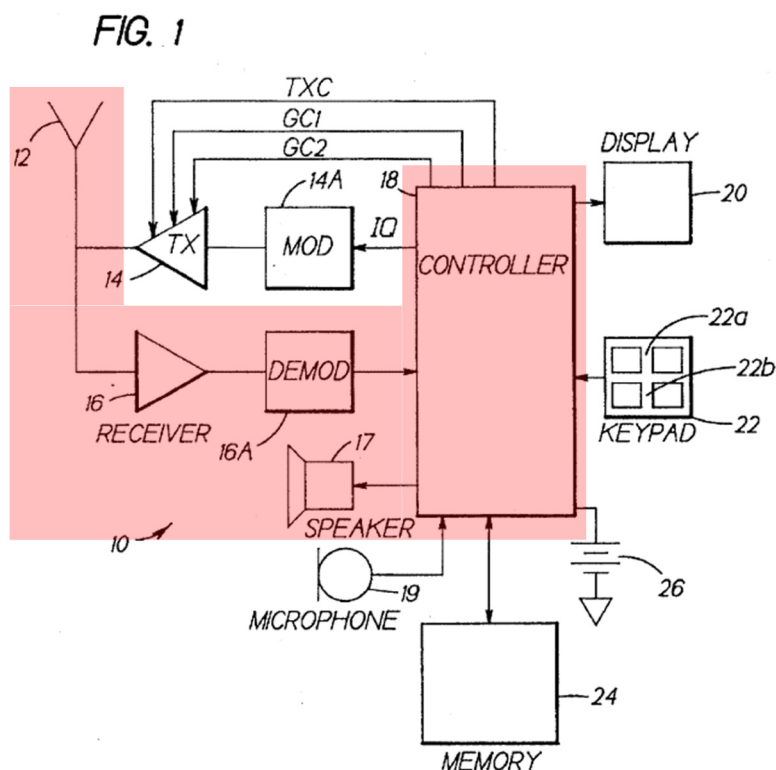
Third, the evidence here also shows that a POSITA would have been motivated to modify Matero’s mobile station to incorporate Ozluturk’s suggestion because doing so would have been merely the “application of a known technique (e.g., Ozluturk’s suggestion that closed loop power control includes receiving a transmitting power control signal from a cell-site station and generating a power control signal derived from the transmitting power control signal received from the cell-site station) to a known system (e.g., Matero’s mobile station that performs closed loop power control) ready for improvement to yield predictable results.” EX1003, ¶108; *KSR*, 550 U.S. at 417 (“simply arranges old elements with each performing the same function it had been known to perform”).

***[4.2] generating a power control signal derived from said transmitting power control signal received from said cell-site station,***

Matero in view of Ozluturk provides this element, as discussed in the analysis of element [4.1]. EX1003, ¶¶99-109; EX1006, 3:19-26, 4:13-28, FIG. 3; EX1008, 1:7-10, 2:18-30, 6:54-59, 8:60-62, 10:38-41, FIGS. 5, 7, 11B; EX1009, 6:59-7:2, 7:24-37, 12:13-19, 13:24-29, 61:12-16, 61:35-60, 64:5-12, 67:39-54, 69:18-34, FIGS. 29, 30.

***[4.3] converting said first communication signal received from a cell-site station into a voice signal code,***

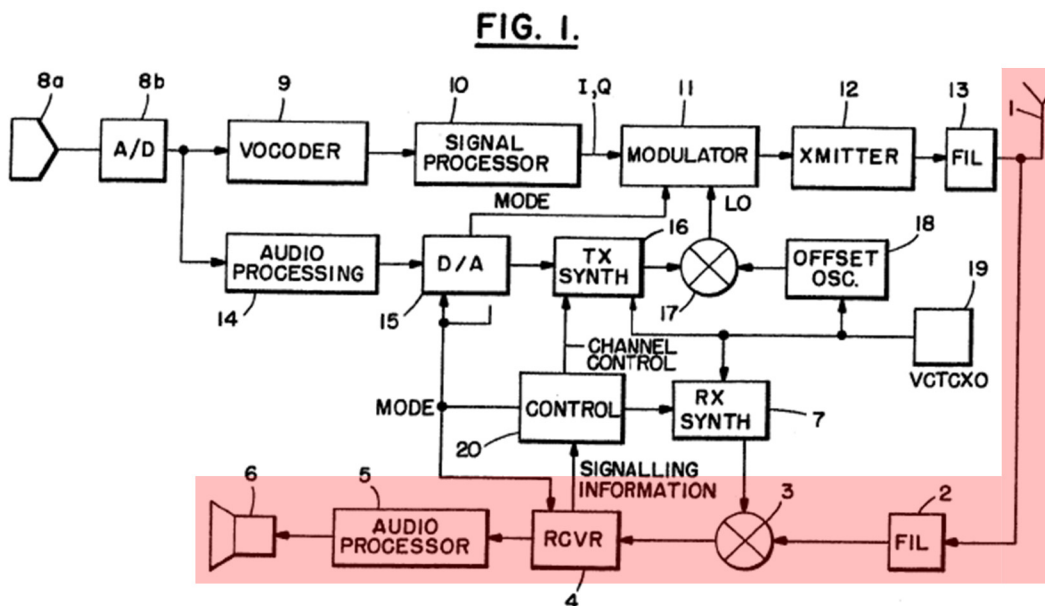
Matero discloses this element. EX1003, ¶¶110-111. For example, Matero's FIG. 1 shows that the antenna 12 is coupled to "a receiver 16, a demodulator (DEMOM) 16A, and a controller 18 that ... receives signals from ... receiver 16." EX1006, 3:19-26, 3:33-36.



EX1006, FIG. 1 (color added); EX1003, ¶110.

Matero incorporates by reference Mattila. EX1006, 4:49-62. Mattila provides a more detailed disclosure regarding the components of the mobile station that convert the communication signal received from the cell-site station into a voice signal code. For example, Mattila's FIG. 1 shows a block diagram of a

mobile terminal. EX1007, 3:36-39.

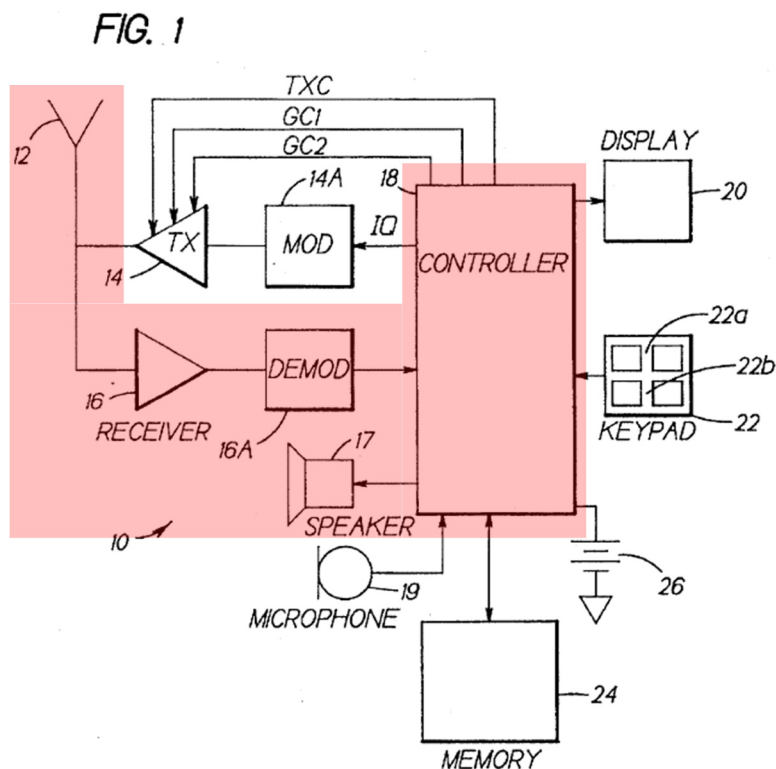


EX1007, FIG. 1 (color added); EX1003, ¶111. As shown in Mattila's FIG. 1 of the mobile terminal, the antenna (1) is coupled with a "receiver block (4) that demodulates and processes the received signal." EX1007, 3:45-52. Similarly, the '334 patent describes the receiver 100 including demodulators that demodulate the communication signal and convert the demodulated signal into a voice code signal. EX1001, 4:49-60, 5:1-13.

***[4.4] converting said voice signal code into an audio signal for driving an acoustic transducer of said cellular telephone,***

Matero discloses this element. EX1003, ¶¶112-113. For example, Matero's FIG. 1 shows that the antenna 12 is coupled to "a receiver 16, a demodulator (DEMOM) 16A, and a controller 18 that ... receives signals from ... receiver 16," and the controller 18 is coupled to the speaker 17. EX1006, 3:19-26, 3:33-36.

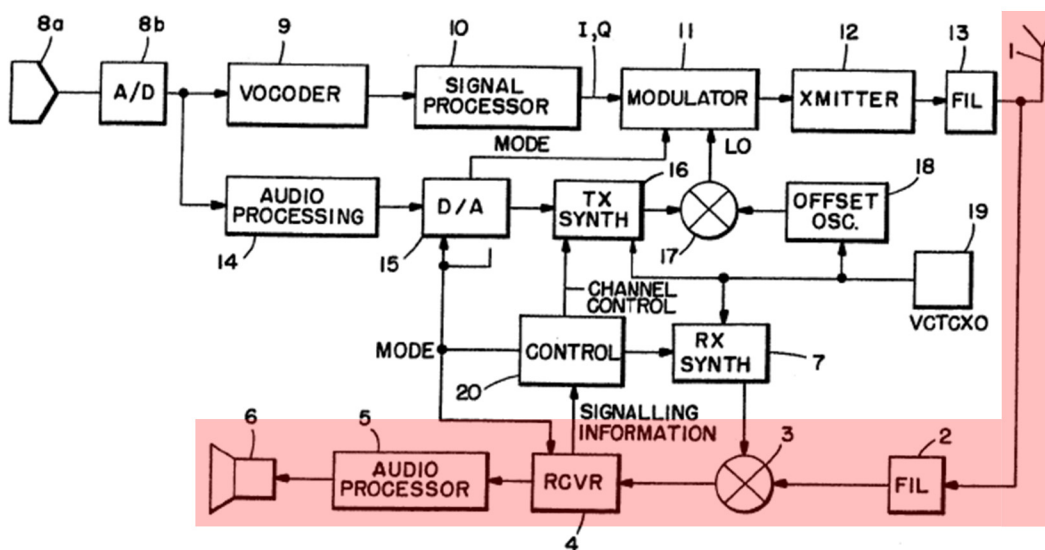




EX1006, FIG. 1 (color added); EX1003, ¶112.

Matero incorporates by reference Mattila. EX1006, 4:49-62. Mattila provides a more detailed disclosure regarding the components of the mobile station that convert the voice signal code into an audio signal for driving the speaker. For example, Mattila's FIG. 1 shows that "the receiver block (4) demodulates and processes the received signal and provides the processed received signal to an audio processing block (5). ... The output of the audio processor 5 drives a loudspeaker (6) whereby a user is enabled to hear the speech of another party during a conversation." EX1007, 3:45-52.

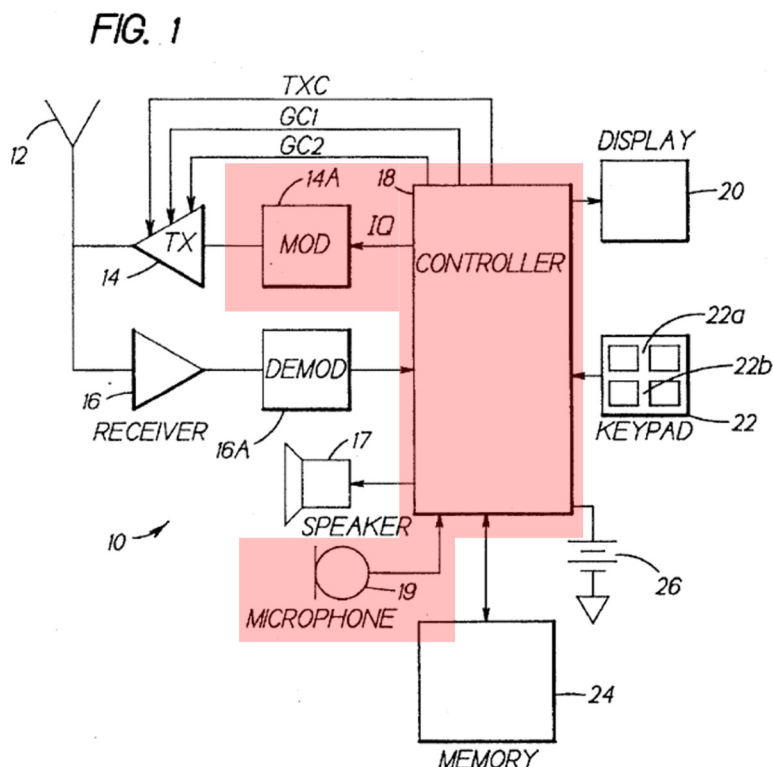
**FIG. 1.**



EX1007, FIG. 1 (color added); EX1003, ¶113. Similarly, the '334 patent describes the receiver 100 including an encoder/decoder apparatus that converts the voice signal code to an audio signal for driving a speaker. EX1001, 4:49-60, 5:1-13.

**[4.5] converting an audio input signal from said acoustic transducer into an input voice code signal,**

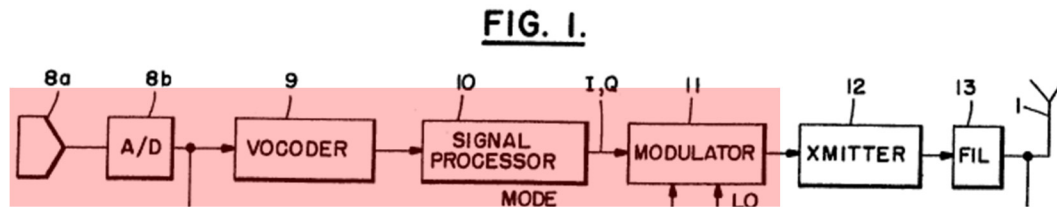
Matero discloses this element. EX1003, ¶¶114-115. For example, Matero's FIG. 1 also shows that the "mobile station includes a modulator (MOD) 14A, a transmitter 14 (described in further detail below and in FIG. 3), ... and a controller 18 that provides signals to ... the transmitter 14," and the controller 18 is coupled to "a conventional microphone 19." EX1006, 3:19-26, 3:33-35. These signals include "user speech and/or user generated data." EX1006, 3:19-26.



EX1006, FIG. 1 (color added); EX1003, ¶114. Matero also discloses that the modulator 14A receives “In-phase and Quadrature (I/Q) signals” and provides “a  $\pi/4$ -DQPSK modulated speech ... that is intended to be transmitted to the base station.” EX1006, 4:3-12 (emphasis added), *see also* 5:10-21.

Matero incorporates by reference Mattila. EX1006, 4:49-62. Mattila provides a more detailed disclosure regarding the components of the mobile station that convert an audio input signal from a microphone into an input voice code signal. For example, Mattila’s FIG. 1 also shows that “a voice signal is fed from a microphone (8) ... to a vocoder (9)” and “the vocoded digital signal is ... fed to a dual-mode modulator (11) ... [and] then fed to the antenna (1) for transmission,

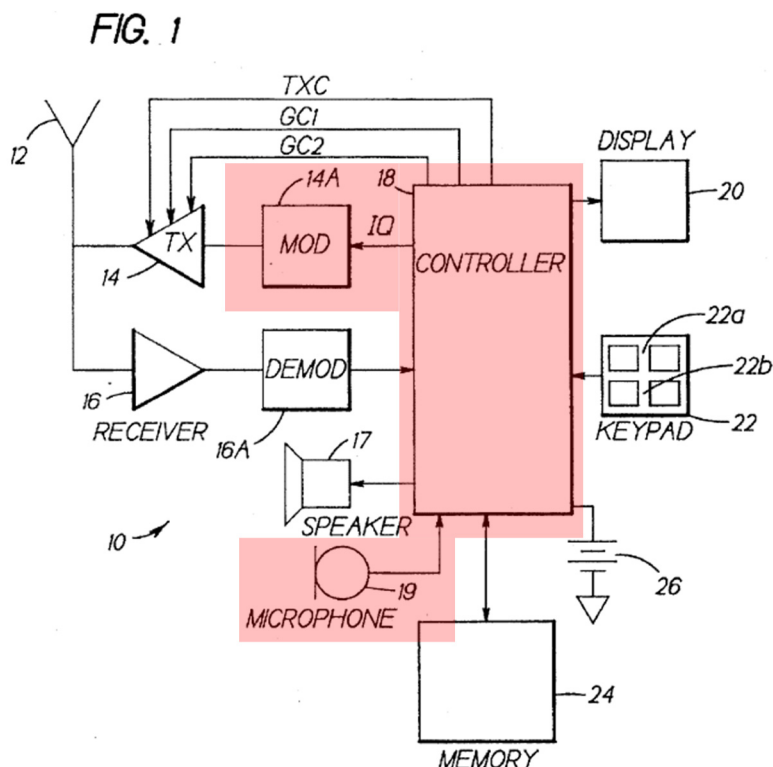
typically, to the base station that serves the cell within which the mobile terminal is located.” EX1007, 3:55-59.



EX1007, FIG. 1 (cropped, color added); EX1003, ¶115. Similarly, the '334 patent discloses that a microphone provides an audio signal to an encoder/decoder apparatus, which converts the audio signal to a voice code signal. EX1001, 5:14-34.

***[4.6] converting said input voice code signal into a second communication signal,***

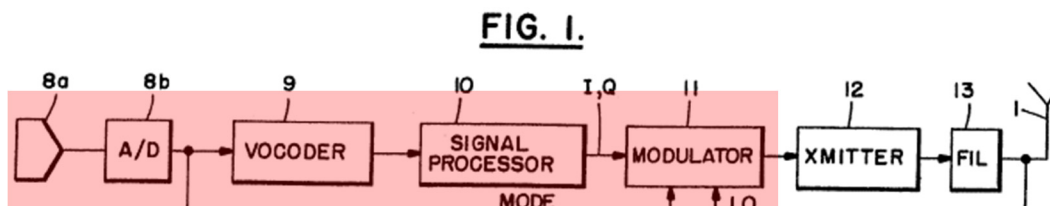
Matero discloses this element. EX1003, ¶¶116-117. For example, Matero's FIG. 1 also shows that the "mobile station includes a modulator (MOD) 14A, a transmitter 14 (described in further detail below and in FIG. 3)." EX1006, 3:19-26, 3:33-35.



EX1006, FIG. 1 (color added); EX1003, ¶116. Matero also discloses that the modulator 14A receives “In-phase and Quadrature (I/Q) signals” and provides “a  $\pi/4$ -DQPSK modulated speech ... that is intended to be transmitted to the base station.” EX1006, 4:3-12 (emphasis added), *see also* 5:10-21.

Matero incorporates by reference Mattila. EX1006, 4:49-62. Mattila provides a more detailed disclosure regarding the components of the mobile station that convert the input voice code signal into a second communication signal. For example, Mattila’s FIG. 1 also shows that “the vocoded digital signal is ... fed to a dual-mode modulator (11) ... [and] then fed to the antenna (1) for transmission, typically, to the base station that serves the cell within which the mobile terminal is

located.” EX1007, 3:55-59.



EX1007, FIG. 1 (cropped and annotated); EX1003, ¶117. Similarly, the '334 patent discloses that the voice code signal is modulated by modulators into a communication signal. EX1001, 5:14-34.

***[4.7] controlling said transmitter in such a manner that an open-loop power control is performed at first and then a closed-loop power control is performed according to said power control signal so as to control transmitted power to converge into a range required by said cell site station, and***

Matro in view of Ozluturk provides this element. EX1003, ¶¶118-123. For the reasons discussed above in the analysis of elements [4.1]-[4.2], Matro in view of Ozluturk provides controlling the transmitter to perform a closed-loop power control according to the power control signal so as to control transmitted power to converge into a range required by the cell site station. EX1006, 3:19-26, 4:13-28, FIG. 3; EX1008, 1:7-10, 2:18-30, 6:54-59, 8:60-62, 10:38-41, FIGS. 5, 7, 11B; EX1009, 6:59-7:2, 7:24-37, 12:13-19, 61:12-16, 61:35-60, 67:39-54, 69:18-34, FIGS. 29, 30; EX1003, ¶¶99-109.

Even if Matro's teachings are considered to not explicitly disclose controlling the transmitter in such a manner that an open-loop power control is

performed at first and then the closed-loop power control is performed, this was a conventional feature of similar prior art methods of controlling a cellular telephone. EX1003, ¶¶119-120. Indeed, the '334 patent concedes that this was a well-known feature in the prior art IS-95 standard for the CDMA cellular telephone system. EX1001, 1:26-27, 1:47-61. The '334 patent explicitly states that “[i]n IS-95, open-loop power control and closed-loop power control are employed in order to regulate a receiving power at the cell-site station” and “the transmitter performs the open-loop power control at first, then it performs the closed-loop power control for the transmitted power to converge into a desired value which the cell-site station requires.” EX1001, 1:47-61. In fact, the '334 patent describes this feature in only the “Description of the Related Art” section. EX1003, ¶119.

In addition, Ozluturk discloses controlling the transmitter in such a manner that an open-loop power control is performed at first and then the closed-loop power control is performed. EX1003, ¶120. Ozluturk discloses that the subscriber unit controls transmission power before a channel is established between the subscriber unit and the base station. EX1008, 3:7-20, 6:44-59, 8:60-62, 10:11-41, FIGS. 5, 7, 11A, 11B. Ozluturk discloses “controlling transmission power during the establishment of a channel in a CDMA communication system by utilizing the transmission of a short code from a subscriber unit to a base station during initial

power ramp-up” that “starts from a power level that is guaranteed to be lower than the required power level for detection by the base station” and “increases transmission power while repeatedly transmitting the short code until the signal is detected by the base station.” EX1008, 3:7-20, *see also* 5:54-58, 6:44-59, 7:53-59, 10:11-41. “Reception of [an] acknowledgment [from the base station] by the subscriber unit 16 concludes the ramp-up process” and a “closed loop power control is established.” EX1008, 10:11-41, *see also* 3:7-20, 5:54-58, 6:44-59, 7:53-59, 8:60-62. As stated by Mr. Lanning, “a POSITA would have recognized that Ozluturk’s ramp-up process prior to receiving the acknowledgment message from the base station is an example of open-loop power control.” EX1003, ¶120 (citing EX1004, 3:66-4:1 (“open-loop power control ... is the power control performed by the radio by itself without control input from the cells.”)). Thus, Ozluturk teaches performing open-loop power control at first and then closed-loop power control to control transmitted power to converge into a range required by the cell site station.

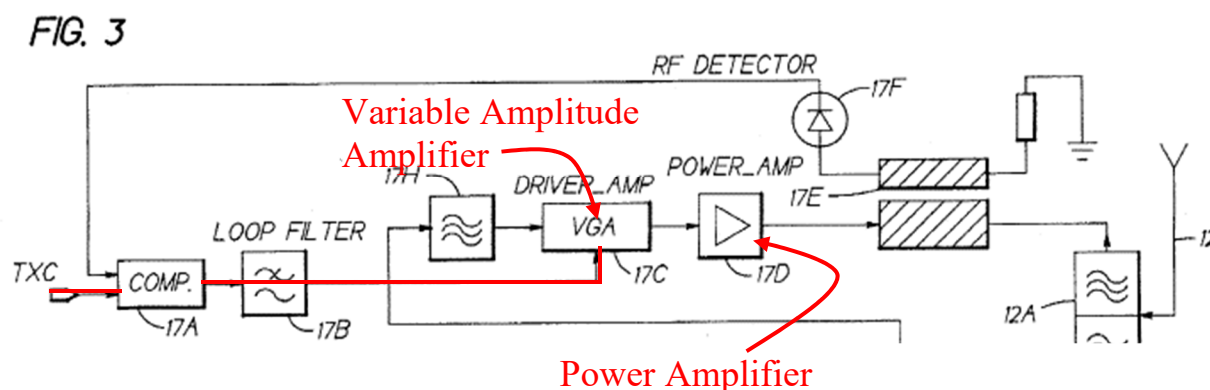
The predictable combination of Matero with Ozluturk would have resulted in Matero’s method for controlling the transmitter including Ozluturk’s suggestion for performing open-loop power control at first and then closed-loop power control during establishment of a channel. EX1003, ¶121. Mr. Lanning explains that applying Ozluturk’s teachings to Matero’s system would have led to Matero’s



system first performing, during establishment of a channel, an open-loop power control in which the power is ramped up to connect to a base station and then performing a closed-loop control of the transmitter power level. *Id.* According to Mr. Lanning, a POSITA would have been prompted to combine Matero's method with Ozluturk's suggested functionality to achieve this advantageous feature in Matero's mobile station for several reasons, including "to maintain the transmitter's output power at a minimum to stabilize and conserve output power" and "to maintain sufficient signal power to interference noise power ratio (SIR) and ensure that the transmit power maintains an acceptable bit-error rate (BER).". *Id.*, ¶¶103-108 (citing EX1009, 13:24-29, 61:46-53, 64:5-12), ¶¶122-123. In addition, as explained by Mr. Lanning, a POSITA would have been motivated to modify Matero's method to include Ozluturk's suggestion for controlling a subscriber unit's transmission power during channel establishment by ramping up the power level from an initial low power level (e.g., open-loop power control) until an acknowledgment message is received from a base station (e.g., closed-loop power control) because "[t]he control of transmission power is particularly critical when a subscriber unit is attempting to initiate communications with a base station and a power control loop has not yet been established" and doing so "provides the benefit of avoiding sudden introduction of a strong interference, which improves system capacity." EX1003, ¶123 (citing EX1008, 2:27-41, 5:54-58).

***[4.8] controlling a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between bias data and gain data stored in said memory,***

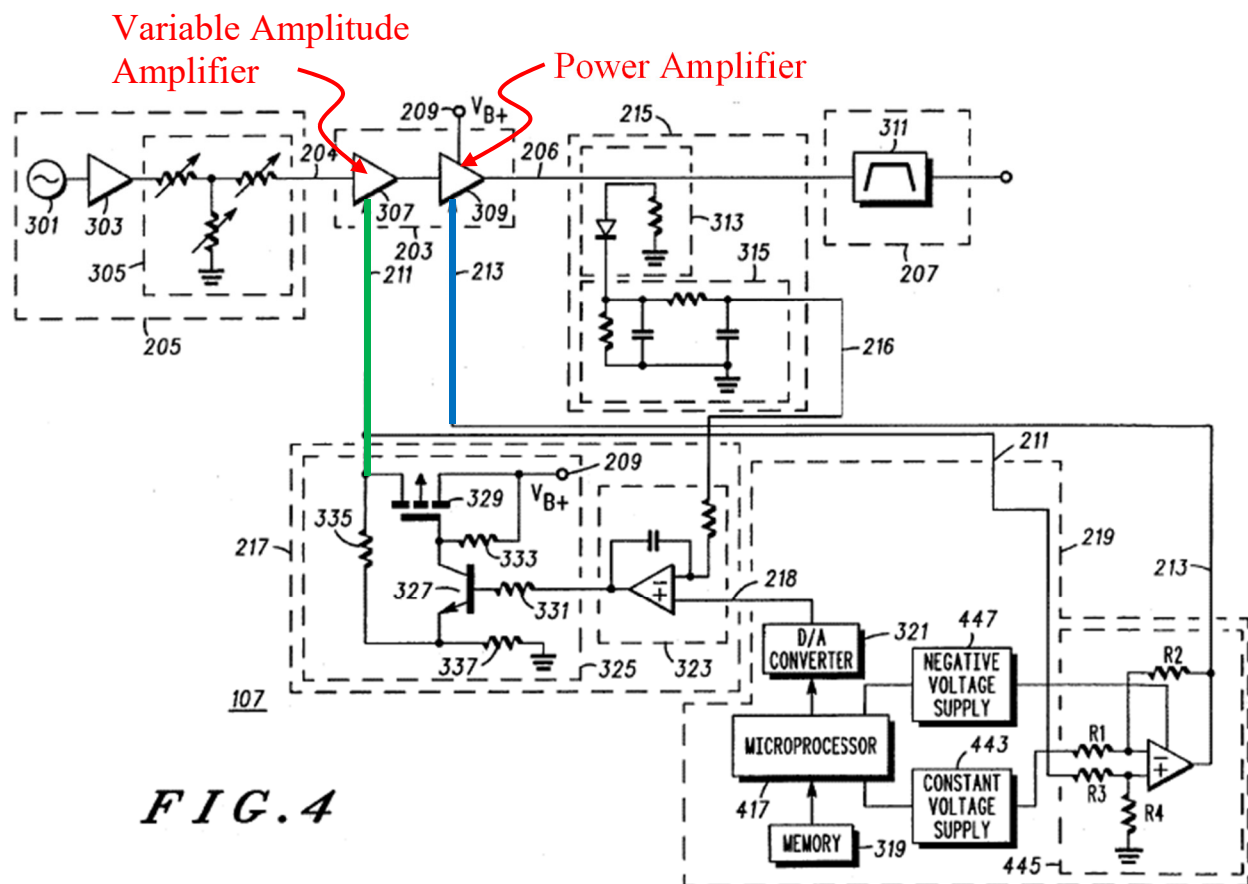
The combination of Matero in view of Ozluturk and Alberth provides this element. EX1003, ¶¶124-135. As discussed above in the analysis of element [4.P], Matero's FIG. 3 discloses a transmitter having a variable amplitude amplifier and a power amplifier. EX1006, 1:6-9, 1:36-45, 2:25-31, FIG. 3; EX1003, ¶¶97-98, 124.



EX1006, FIG. 3 (cropped, annotated); EX1003, ¶124. As shown in FIG. 3, Matero discloses controlling the gain of the variable amplitude amplifier. EX1006, 4:13-28 (“driver VGA 17C ... output is controlled by the filtered comparator signal”).

Even if Matero's teachings are considered to not explicitly disclose controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier using a function defining a relation between bias data and gain data stored in the memory, this was a conventional feature of similar prior art

methods of controlling a cellular telephone. EX1003, ¶¶125-129. For instance, Alberth discloses controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier using a function defining a relation between bias data and gain data stored in the memory. *Id.* In particular, Alberth discloses controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier by disclosing that the “RF input signal 204 is coupled to a power amplifier driver 307 that ... amplifies the RF input signal 204 to a magnitude dictated by the amplifier control signal 211” and a “power amplifier 309 is coupled to an output of the power amplifier driver 307 and ... is biased into operation via the application of the gate voltage signal 213.” EX1010, 5:38-55, *see also* 2:13-37, 3:18-32, 3:39-4:8, 5:11-15, 5:66-6:2, FIGS. 2, 3, 4. Alberth’s FIG. 4 shows that the amplifying circuitry 203 includes a power amplifier driver 307 that is controlled by amplifier control signal 211 (highlighted in green) and a power amplifier 309 that is biased into operation via the application of a gate voltage signal 213 (highlighted in blue). EX1003, ¶¶125-126.



EX1010, FIG. 4 (annotated); EX1003, ¶125.

Alberth also discloses gain data stored in a memory by disclosing “phasing values stored in an associated memory 319,” which “typically consist of the plurality of predetermined power output levels” that are each “associated with an actual power value that defines the amount of power that should be contained in the RF output signal 206 after amplification in accordance with the particular predetermined power output level.” EX1010, 6:21-54. To control the gain of the power amplifier driver 307, “[t]he microprocessor 317 ... retrieve[s] the actual power value from among the phasing values stored in the memory 319 by

referencing the predetermined power output level with the power output level dictated by the power control instruction” and “sets the voltage of the power output control signal 218 to correspond to the retrieved actual power value.” EX1010, 6:21-54. The power output control signal 218 is used to vary the amplifier control signal 211 to control the gain of the power amplifier driver 307, which controls the amount of power in the RF output signal 206. EX1010, 6:63-67. Thus, the amplifier control signal 211 for controlling the gain of the power amplifier driver 307 is determined based on the actual power values stored in memory. EX1003, ¶127. Similarly, the ’334 patent discloses that “the controller 300 controls the variable amplitude amplifier 230 ... according to the predetermined gain value [stored in the MEM 300] for the variable amplitude amplifier 230.” EX1001, 6:6-17, 7:34-37. Thus, Alberth discloses controlling a gain of the variable amplitude amplifier using gain data stored in the memory in a similar manner as the ’334 patent.

Alberth also teaches or suggests controlling a bias condition of the power amplifier using a function defining a relation between bias data and gain data stored in the memory. EX1003, ¶¶128-129. For example, Alberth discloses “[t]he gate voltage signal 213 is generated ... in direct response to the changing voltage of the amplifier control signal 211.” EX1010, 8:61-65. In particular, Alberth discloses that the gate voltage signal 213 is dependent on the amplifier control

signal 211 according to the following equation:

$$V_{\text{gate}} = V_{\text{control}} \times [0.182] - 4.75$$

EX1010, 9:31-51, *see also* 7:66-8:3. Alberth's equation is a function that defines a relation of the gate voltage signal 213 and the amplifier control signal 211.

EX1003, ¶128. Because the amplifier control signal 211 is based on actual power values stored in memory, the function also defines a relation of the gate voltage signal 213 and the actual power values stored in memory. *Id.* Alberth thus discloses that the gate voltage signal 213 for biasing the power amplifier is a value based on a corresponding pre-stored value in memory (actual power values) and the detected power output. *Id.*; EX1010, 3:63-4:3, 6:63-67; *cf.* EX1001, 6:46-48, 7:34-39.

Because Alberth's gate voltage signal 213 for biasing the power amplifier is a value based on the actual power values stored in memory (and the detected power output), the pre-stored set of actual power values has corresponding sets of values for the gate voltage signal 213. EX1003, ¶129. The same set of values for the gate voltage signal 213 is used to bias the power amplifier each time the corresponding actual power value is accessed from the memory. *Id.* As such, the same predictable result would have been provided regardless of whether values for the gate voltage signal 213 were pre-stored in memory (like the actual power values) or were generated based on the actual power values stored in memory—

and the evidence here shows that a POSITA would have recognized the known interchangeability of these two traditional options by the relatively late time frame leading up to November 1998. *Id.* Even if Alberth's teachings do not *explicitly* disclose that the bias data is stored in the same memory as the actual power values, a POSITA would have understood that such a solution was not an innovation at the time, and instead would have been a simple substitution of one known option (e.g., Alberth's hardware component that determines the bias data as a relationship to values stored in memory) for another (e.g., memory component that pre-stores the values for the bias data according to the same relationship) to achieve known benefits. *Id.* According to Mr. Lanning, "a POSITA would have been prompted to use Alberth's memory (already present in the circuit) to store the bias data in addition to the gain data to advantageously reduce the number of hardware components (e.g., hardware used to generate the bias data) in the transmitter and reduce the complexity of the transmitter circuitry, which would further achieve Alberth's suggestion to reduce/optimize power consumption." EX1003, ¶129 (citing EX1010, 1:23-25).

The predictable combination of Matero (as modified by Ozluturk, described above) with Alberth would have resulted in Matero's mobile station including Alberth's suggestion for controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier using a function defining a relation between

bias data and gain data stored in memory. EX1003, ¶130. According to Mr. Lanning, a POSITA would have been prompted to combine Matero's method with Alberth's suggested functionality to achieve this advantageous feature in Matero's mobile station. *Id.*, ¶¶132-135. As an initial matter, the evidence here shows the high degree of predictability and reasonable expectation of success in doing so. *Id.*, ¶131. Indeed, both Matero and Alberth describe a radiotelephone including a transmitter having a variable gain amplifier and a power amplifier. EX1006, 1:6-9, 1:36-45, 2:25-31, FIG. 3; EX1010, 2:13-37, 3:18-32, 3:39-4:8, 5:11-15, 5:38-55, 5:66-6:2, FIGS. 2, 3, 4. Both Matero and Alberth describe controlling the transmitter's power that includes controlling the gain of the variable gain amplifier. EX1006, 4:13-28; EX1010, 5:38-55, 5:66-6:2, 6:21-54, 6:63-67, FIG. 4.

According to Mr. Lanning, a POSITA would have recognized the benefits of Alberth's suggestion for controlling a gain of the variable amplitude amplifier and a bias condition of the power amplifier using a function defining a relation between bias data and gain data stored in memory and would have been motivated to achieve these benefits of Alberth in Matero for several reasons. EX1003, ¶¶132-135. First, as explained by Mr. Lanning, a POSITA would have been motivated to combine Alberth's teachings with Matero's method to control Matero's already present variable amplitude amplifier and power amplifier to "dynamically vary the bias condition of the power amplifier as a function of the gain of the variable



amplitude amplifier” to advantageously “increase current savings and optimize power consumption.” EX1003, ¶133 (citing EX1010, 4:26-29, 9:52-62, 11:58-63).

Second, the evidence here also shows that a POSITA would have been motivated to modify Matero’s transmission power control method to incorporate Alberth’s suggested improvement to beneficially “allow Matero’s mobile station to increase efficiency of the amplifying circuitry and make it less difficult for the amplifying circuitry to maintain a constant amount of power in the RF output signal.” EX1003, ¶134 (citing EX1010, 2:20-30, 3:27-30, 4:66-5:5, 5:11-15, 7:60-65, 9:15-51, 11:63-12:7).

Third, the evidence here also shows that a POSITA would have been motivated to modify Matero’s mobile station to incorporate Alberth’s suggestion because doing so would have been merely the “application of a known technique (e.g., Alberth’s suggestion for dynamically varying the bias condition of the power amplifier as a function of the gain of the variable amplitude amplifier) to a known system (e.g., Matero’s mobile station as modified by Ozluturk, described above) ready for improvement to yield predictable results.” EX1003, ¶135; KSR, 550 U.S. at 417.

***[4.9] in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and***

Matero in view of Ozluturk and Alberth provides this element. EX1003, ¶¶136-137. Even if Matero does not explicitly disclose a function that uses bias

conditions defined in a ratio to the maximum bias voltage value, such a function was a conventional feature in similar prior art methods of controlling a cellular telephone. *Id.*, ¶136. For instance, Alberth discloses a maximum bias voltage value corresponding to when “the gate voltage signal 213 is approximately equal to the cutoff voltage defining the saturation point of the amplifying circuitry 203.” EX1010, 4:18-55, *see also* 7:51-65. A POSITA would have recognized that each bias value is a ratio of the maximum bias voltage value. EX1003, ¶136. Thus, the function defining a relation of the gate voltage signal 213 and the amplifier control signal 211 uses bias values for the gate voltage signal 213 that are defined in a ratio to the maximum bias voltage value corresponding to the cutoff voltage defining the saturation point of the power amplifier. *Id.*

The predictable combination of Matero (as modified by Ozluturk, described above) with Alberth would have resulted in Matero’s control of transmission power including Alberth’s suggestion for the function to use bias conditions (e.g., value of the gate voltage signal 213) defined in a ratio to the maximum bias voltage value (e.g., the cutoff voltage defining the saturation point of the power amplifier). EX1003, ¶137. According to Mr. Lanning, a POSITA would have been prompted to combine Matero’s method with Alberth’s suggested functionality to achieve this advantageous feature in Matero’s mobile station for several reasons, including “to increase current savings and optimize power consumption” and “to

increase efficiency of the amplifying circuitry and make it less difficult for the amplifying circuitry to maintain a constant amount of power in the RF output signal.” *Id.*, ¶¶130-135 (citing EX1010, 2:20-30, 3:27-30, 4:26-29, 4:66-5:5, 5:11-15, 7:60-65, 9:15-51, 9:52-62, 11:58-12:7).

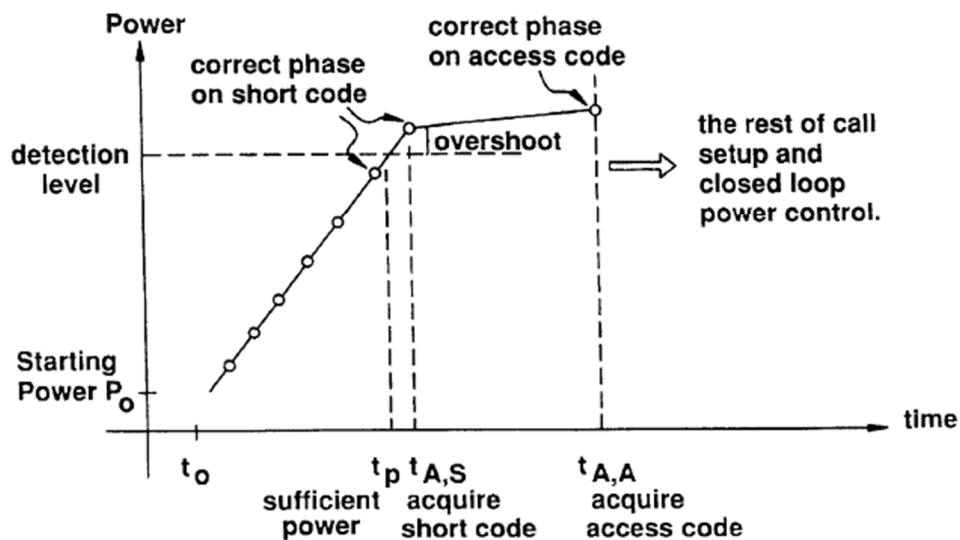
***[4.10] [in such a manner] that said bias condition increases gradually to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station.***

Matero in view of Ozluturk and Alberth provides this element. EX1003, ¶¶138-142. For example, Matero discloses that “[a] mobile telephone does not operate with a constant transmitter power level, but is instead transmitter power controlled as a function of ... a distance from a base station.” EX1006, 1:18-21. Based on Matero’s disclosure, a POSITA would have recognized that the transmitter power output intensity increases as the distance between the mobile telephone and the base station increases. EX1003, ¶138. Matero also discloses that the radio telephone performs power ramping. EX1006, 4:29-35; EX1003, ¶139.

Even if Matero’s teachings of power ramping were considered to not explicitly disclose that the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station, this was a conventional feature of similar prior art methods of controlling a cellular telephone. EX1003, ¶¶140-141.

For example, Ozluturk describes gradually increasing transmission power. *Id.*, ¶140. In particular, Ozluturk discloses that “during initial power ramp-up ... [t]he subscriber unit quickly increases transmission power while repeatedly transmitting the short code.” EX1008, 3:7-20, *see also* 5:54-59, 6:44-59, 7:53-59, 10:11-41. Ozluturk’s “power ramp-up rate using the short code is 1 dB per millisecond” and “[t]he ramp-up rate with the access code is preferably 0.05 dB per millisecond.” EX1008, 8:18-30. Ozluturk’s FIG. 7 shows the transmission power increasing gradually to the maximum value.

FIG.7



EX1008, FIG. 7; EX1003, ¶140. The predictable combination here teaches transmission power output intensity gradually increasing to a value taken when the cellular telephone is very far from the cell-site station. EX1003, ¶140.

In addition, the combination of Matero, Ozluturk, and Alberth provides that

the bias condition increases gradually to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station. EX1003, ¶¶138-142. For example, Alberth discloses that the gate bias control loop, which dynamically varies the gate voltage signal 213 for biasing the power amplifier, “may be executed every time there is a power level change, a channel change, or an initial power-up of the radiotelephone.” EX1010, 4:14-17, 4:56-65. Alberth also discloses “when the cellular radiotelephone 103 is operating at, or outside of, the boundary of coverage of the transceiver 101 (which has no bordering transceiver), the radiotelephone 103 may momentarily boost power above the largest one of the plurality of the predetermined power output levels to maintain communication with the transceiver 101.” EX1010, 11:23-42. “This is accomplished through an increase of the power output control signal 218 by the processor circuitry 219, which, in turn, causes an increase in both the amplifier control signal 211 and the amplification of the amplifying circuitry 203.”

*Id.*

As discussed above in the analysis of element [4.8], Alberth discloses that the gate voltage signal 213 for biasing the power amplifier is calculated as a function of the amplifier control signal 211. EX1010, 7:66-8:3, 8:61-65, 9:31-51; EX1003, ¶¶125-129, 141. Thus, Alberth discloses increasing the amount of power in the RF output signal “due to lack of proximity” to a base station (EX1010,

11:23-42) by increasing in the amplifier control signal 211, which causes a corresponding increase in the gate voltage signal 213 for biasing the power amplifier. EX1003, ¶141. Based on Alberth's disclosure, Alberth teaches controlling the gain of the variable amplitude amplifier and the bias condition of the power amplifier in such a manner that the bias condition increases to the maximum value when output intensity increases to the value taken when the cellular telephone is very far from the cell-site station.

As such, the predictable combination of Matero with Ozluturk and Alberth would have resulted in Matero's control of transmission power including Ozluturk's suggestion for gradually increasing the transmission power to a value taken when said cellular telephone is very far from the cell-site station and Alberth's suggestion for controlling the bias condition such that the bias condition increases to the maximum value when the transmission power output intensity increases to the value taken when said cellular telephone is very far from the cell-site station. EX1003, ¶142. As Mr. Lanning explains, the resulting combination would result in Matero's control of transmission power including a gradual increase of the transmission power output intensity (as suggested by Ozluturk) accomplished through a gradual increase in the gain of the variable amplitude amplifier which causes an corresponding gradual increase in the bias condition of the power amplifier (as suggested by Alberth) to a maximum value when output

intensity increases to the value taken when said cellular telephone is very far from the cell-site station (as suggested by Matero and Alberth). *Id.* According to Mr. Lanning, a POSITA would have been prompted to combine Matero's method with Ozluturk's and Alberth's suggested functionalities to achieve this advantageous feature in Matero's mobile station for several reasons. *Id.*, ¶¶103-108, 123 (citing EX1009, 13:24-29, 61:46-53, 64:5-12 and articulating the known benefits from implementing Ozluturk's suggestion such as "to maintain the transmitter's output power at a minimum to stabilize and conserve output power," "to maintain sufficient signal power to interference noise power ratio (SIR) and ensure that the transmit power maintains an acceptable bit-error rate (BER)," and "avoiding sudden introduction of a strong interference, which improves system capacity"), ¶¶130-135 (citing EX1010, 2:20-30, 3:27-30, 4:26-29, 4:66-5:5, 5:11-15, 7:60-65, 9:15-51, 9:52-62, 11:58-12:7 and articulating the predictable advantages from implementing Alberth's suggestion such as "to increase current savings and optimize power consumption" and "to increase efficiency of the amplifying circuitry and make it less difficult for the amplifying circuitry to maintain a constant amount of power in the RF output signal").

***[6] A method according to claim 4 wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.***

Matero in view of Ozluturk and Alberth provides the elements of claim 6.

EX1003, ¶143. As discussed above in the analysis of element [4.10], the combination of Matero in view of Ozluturk and Alberth provides that the bias condition increases gradually to the maximum value when the output intensity increases. EX1006, 1:18-21, 4:29-35; EX1008, 3:7-20, 5:54-59, 6:44-59, 7:53-59, 8:18-30, 10:11-41, FIG. 7; EX1010, 4:14-17, 4:56-65, 7:66-8:3, 8:61-65, 9:31-51, 11:23-42; EX1003, ¶¶138-142. Matero further discloses that “the variable gain driver amplifier [is] required to output the modulated RF signal within a predetermined dynamic power range having a maximum value” and “the maximum predetermined dynamic range value is in excess of 60 dB.” EX1005, 2:25-43. Because Matero teaches a transmission power control range of 60 dB which is greater than 50 dB, Matero in view of Ozluturk and Alberth teaches that the bias condition increases gradually to the maximum value when the output intensity increases within the range of -50 dB to 0 dB. EX1003, ¶143.

## IX. CONCLUSION

Accordingly, Petitioner requests *inter partes* review of claims 4 and 6 pursuant to Grounds 1-2 set forth above.

Respectfully submitted,

Dated: January 16, 2019

(Trial No. IPR2019-00576)

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**CERTIFICATION UNDER 37 CFR § 42.24(d)**

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for Inter Partes Review totals 13,773 words, which is less than the 14,000 allowed under 37 CFR § 42.24(a)(i).

Respectfully submitted,

Dated: January 16, 2019

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## CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on January 16, 2019, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express, cost prepaid, to the Patent Owner by serving the correspondence address of record as follows:

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