

10/14/2002 05:10:02

BOX: PATENT APPLICATION

H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

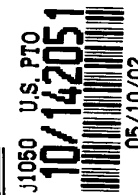
Prior Application: M. KATAGISHI et al
Serial No. 09/436,502
Filed: November 9, 1999

Group Art Unit: 2683
Examiner: K. Ferguson
For: CELLULAR TELEPHONE



24956

PATENT TRADEMARK OFFICE



J1051 U.S. PTO
10/142051
05/10/02

REQUEST FOR CONTINUATION APPLICATION
UNDER 37 C.F.R. 1.53(b)

Box: Patent Application
Assistant Commissioner of Patents
Washington, D.C. 20231

May 10, 2002

Sir:

This is a request for filing a continuation application under 37 CFR §1.53(b) of pending prior application Serial No. 09/436,502, filed on November 9, 1999, entitled CELLULAR TELEPHONE, by all of the inventors named in the prior application.

1. Enclosed is a copy of the prior application, including the Declaration as originally filed.

2. The Filing Fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION
LESS ANY CLAIMS CANCELED BY ACCOMPANYING PRELIMINARY AMENDMENT
PLUS ANY CLAIMS ADDED BY ACCOMPANYING PRELIMINARY AMENDMENT

Basic Fee									\$ 740.00
Total Claims	3	-	20	=	0	x	18	=	0.00
Independent Claims	1	-	3	=	0	x	84	=	0.00
Total Filing Fee									\$ 740.00

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3. A check including the amount of \$740.00 is enclosed to cover the Filing Fee.

4. The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment, to Deposit Account No. 50-1417.

5. New drawings are enclosed, eight (8) sheets, Figs. 1-12. These drawings incorporate the drawing corrections made in the prior application.

6. The power of attorney is set forth in the Declaration in the prior application or an associate power of attorney is hereby granted to:

John R. Mattingly, Registration No. 30,293
Jeffrey M. Ketchum, Registration No. 31,174
Shrinath Malur, Registration No. 34,663
Daniel J. Stanger, Registration No. 32,846
Gene W. Stockman, Registration No. 21,021.

There is a change in the correspondence address.

Address all future correspondence to:

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Please associate this application with Customer No. 24956.

7. The prior application is assigned to Hitachi, Ltd..

8. Priority of the following Japanese patent application is claimed under 35 U.S.C. § 119:

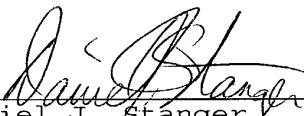
No. P10-318689, filed November 10, 1998.

Continuation Application

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The certified priority document has been filed in the prior application.

The undersigned hereby declares that no matter contained in the specification, including the claims, and drawings filed in the present continuation application would have been new matter in the prior application Serial No. 09/436,502, as originally filed on November 9, 1999.


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Date: May 10, 2002

H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Accompanying Continuation Application Under
37 CFR 1.53(b):

Prior Application: M. KATAGISHI et al
Serial No. 09/436,502
Filed: November 9, 1999

Group Art Unit: 2683
Examiner: K. Ferguson
For: CELLULAR TELEPHONE

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

May 10, 2002

Sir:

Prior to examination, please amend the above application
as follows.

IN THE SPECIFICATION

Page 1, before the first line, add the paragraph:

This is a continuation application of U.S. Serial
No. 09/436,502, filed November 9, 1999, now allowed.

IN THE ABSTRACT

Page 21, lines 1-18, replace the Abstract of the
Disclosure with:

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station. The cellular telephone includes an antenna, a duplexer, a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal. The transmitter includes a variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

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IN THE CLAIMS

Cancel claims 1-7 without prejudice or disclaimer, and add new claims 8-10, as follows:

8. (New) A cellular telephone used in CDMA system comprising:

an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station and transmitting a second communication signal to the cell-site station,

a duplexer connected to said antenna,

a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a power control signal deriving from said transmitting power control signal sent from said cell-site station,

an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into an audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into an input voice code signal,

a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and

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a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter, wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector for controlling an output power of said power amplifier, said controller includes a central processing unit and a memory, said controller controls 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 the transmitted power to converge into a range required by said cell-site station, and said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between the bias data and the gain data stored in said memory, in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and 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.

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**MARKED UP VERSION OF REPLACED
PARAGRAPH OF THE ABSTRACT OF THE DISCLOSURE**

Page 21, lines 1-18, the marked up Abstract of the
Disclosure is as follows:

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station. The cellular telephone includes an antenna, a duplexer; a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal. The transmitter includes a

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variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

[Selected drawing: Fig. 1]

CELLULAR TELEPHONE

BACKGROUND OF THE INVENTION

Technical Field of the Invention

The present invention generally relates to a cellular telephone, and more specifically, relates to a cellular telephone used in Code Division Multiple Access (CDMA) system.

Description of related art

An example of a CDMA cellular telephone system is disclosed in U.S.P. 5,056,109. In this example, a cellular telephone has transmit power control circuitries 76 and 80 connected in series between a transmit modulator 84 and an antenna 70 and controlled by a control processor 78, so as to control and adjust a power level of transmission power. The control and the adjustment of the power level are required so as to overcome deleterious terrestrial channel fading between a terrestrial base station (a cell-site station) and a mobile unit. The terrestrial channel fading is caused by a path loss in the terrestrial channel, which is on the order of over 80dB, and the power adjustment at the mobile unit is implemented by a predetermined amount, nominally 1dB.

The typical standard for the CDMA cellular telephone system enacted in the U.S. is TIA IS-95 (hereinafter IS-95). An example of a transmitter applying IS-95 is shown in Fig. 11. In this example, a modulated signal converted into a transmitting frequency band is supplied to a variable amplitude amplifier 230 and the output of the variable amplitude amplifier 230 is further amplified by a power amplifier means 250 and transmitted to an antenna 450 through a duplexer 400. A controller 380 supplies a gain control signal to the variable amplitude amplifier 230 in order to adjust the gain such that the power transmitted from the antenna 450 will satisfy the required value of transmitting power. The gain control signal is also supplied to a level detecting means 390. The level detecting means 390 supplies a bias signal to the power amplifier means 250 for adjusting the transmitting power. The level detecting

means 390 detects a level of the gain control signal, and as shown in Fig 12, when the level is high (e.g. Gn), it outputs bias value of B2. Then the level decreases, and the level crosses a threshold value, the level detecting means 390 changes the bias abruptly from B2 to B1. Current of the power amplifier means change abruptly when the gain level crosses the threshold value. In 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. The open-loop power control, which definitely determines a transmitting power according to an information indicating an intensity of electric field detected by a receiver, does not require a severe accuracy (generally within the range of 9.5 dB). On the other hand, the closed-loop power control performs fine control according to an information indicating a variation of a gain of the signal transmitted from the cell-site station (generally 1 dB step). In this case, 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.

Japanese Patent Laid-open No. Hei-9-46152 discloses a mobile unit including a receiver and a transmitter, where the transmitter has a variable amplitude amplifier for adjusting the power level of the transmission power. In this related art, the mobile unit includes a high frequency power amplifier having a field effect transistor (FET) as an amplifying element, and the variable amplitude amplifier is composed so as to control a bias condition of the FET according to a transmission power. Amount of attenuation according to the transmission power, and gate voltage of the FET corresponding to the amount of attenuation are controlled by degrees, i.e. by 4dB, according to the predetermined values. When the transmission power is low, the gate voltage is reduced so as to reduce current consumption for prolonging battery life.

A problem in the related art is that the large current consumption shortens the battery life, which shortens the hours of communication on the phone.

Another problem in the related art is that the compensation of the battery life requires an increase of volume and weight of the battery.

Further related art is also disclosed in Japanese Patent Application Laid-open Nos. Hei-04-277909 and Hei-06-252797.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to solve the problems of the related art explained above. In view of the objective of solving the problems explained above, the cellular telephone of the present invention includes an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station, a duplexer connected to the antenna, a receiver connected to the antenna through the duplexer for converting the first communication signal into a voice signal code, and for outputting a signal indicating an intensity of the first communication signal, an encoder/decoder apparatus connected to the receiver and an acoustic transducer for converting the voice signal code into audio signal for driving the acoustic transducer and converting an audio input signal from the acoustic transducer into a input voice code signal, a transmitter connected to the encoder/decoder apparatus and to the antenna through the duplexer for converting the input voice code signal into the second communication signal, and a controller connected to the receiver and the transmitter for controlling amplitude of the transmitter corresponding to the intensity of the first communication signal, wherein the transmitter includes a variable amplitude amplifier and a power amplifier, the controller includes a central processing unit and a memory, the controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier according to a function stored in the memory.

In another embodiment, the controller further includes a pulse generator. The pulse generator is connected to the power amplifier so as to supply a pulse as a bias control signal, and the controller controls a pulse width of the pulse so as to control the bias condition.

In a third embodiment, the controller further includes a pulse generator. The pulse generator is connected to the power amplifier so as to supply pulses as a bias control signal, and the controller controls a pulse density of the pulses so as to control the bias condition.

In a fourth embodiment, the power amplifier further includes a smoothing circuit for smoothing the pulse.

In a fifth embodiment, the transmitter further includes a signal generator connected to the controller. The signal generator is connected to the variable amplitude amplifier and the power amplifier so as to supply a gain control signal and a bias control signal to the variable amplitude amplifier and the power amplifier respectively.

The cellular telephone of the present invention also includes an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station, a duplexer connected to the antenna, a receiver connected to the antenna through the duplexer for converting the first communication signal into a voice signal code, and for outputting a signal indicating an intensity of the first communication signal, an encoder/decoder apparatus connected to the receiver and an acoustic transducer for converting the voice signal code into audio signal for driving the acoustic transducer and converting an audio input signal from the acoustic transducer into a input voice code signal, a transmitter connected to the encoder/decoder apparatus and to the antenna through the duplexer for converting the input voice code signal into the second communication signal, and a controller connected to the receiver and the transmitter for controlling amplitude of the transmitter corresponding to the intensity of the first communication signal, wherein the transmitter includes a variable amplitude amplifier and a power amplifier, the power amplifier includes a maximum power detector, the controller includes a central processing unit and a memory, the controller controls a gain of the variable amplitude amplifier according to a function stored in the

memory, and the maximum power detector controls an output power of the power amplifier.

As explained above, since the controller controls a gain of the variable amplitude amplifier according to a function stored in the memory, a cellular telephone capable of reducing current consumption is available. In addition, small current consumption enables prolongation of battery life, or use of small-size battery, by which a cellular phone having a long service life or that having a small size is available.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and a better understanding of the present invention will become apparent from the following detailed description of exemplary embodiments and the claims when read in connection with the accompanying drawings, all forming a part of the disclosure hereof this invention. While the foregoing and following written and illustrated disclosure focuses on disclosing exemplary embodiments of the invention, it should be clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and the scope of the present invention being limited only by the terms of the appended claims.

The following represents brief descriptions of the drawings, wherein:

Fig. 1 shows a block diagram of a cellular telephone in the first embodiment of the present invention.

Fig. 2 shows a block diagram of a main part of the cellular telephone in the first embodiment of the present invention.

Fig. 3 shows an example of variable amplitude amplifier of the cellular telephone in the first embodiment of the present invention.

Fig. 4 shows a characteristic curve of a power amplifier means in the first embodiment of the present invention.

Fig. 5 shows a block diagram of a main part of the cellular telephone in the second embodiment of the present invention.

Fig. 6 shows an example of the controller and the smoothing circuit in the second embodiment of the present invention. Fig. 6A shows a case where the CPU controls the PG in PWM mode, and Fig. 6B shows a case where the CPU controls the PG in PDM mode.

Fig. 7 shows a block diagram of a main part of the cellular telephone in the third embodiment of the present invention.

Fig. 8 shows a block diagram of a main part of the cellular telephone in the second embodiment of the present invention.

Fig. 9 shows a block diagram of a main part of the cellular telephone in the third embodiment of the present invention.

Fig. 10 shows a characteristic curve in one embodiment of the present invention. Fig. 10A shows a characteristic of output intensity vs. bias conditions comparing to that of the related art, and characteristic of output intensity vs. frequency or chance of occurring. Fig. 10B shows a characteristic of output intensity vs. current consumption comparing to that of the related art, and a characteristic of output intensity vs. product of the current consumption and the frequency.

Fig. 11 shows a block diagram of a main part of the cellular telephone in the related art.

Fig. 12 shows a characteristic curve in the related art.

DETAILED DESCRIPTION OF THE INVENTION

Before beginning a detailed description of the subject invention, mention of the following is in order. When appropriate, like reference numerals and characters are used to designate identical, corresponding or similar components in differing figure drawings.

Exemplary embodiments of the present invention will now be explained with reference to Figs. 1 to 10.

The first embodiment of the present invention is explained referring to Figs. 1, 2, 3, 4 and 10. As disclosed in Fig. 1, a cellular telephone in this embodiment includes a

receiver 100, a transmitter 200, a controller 300, an encoder/decoder apparatus 500, a duplexer 400 and an antenna 450. The antenna 450 is connected to the duplexer 400 so as to transmit or receive communication signals. The duplexer 400 is connected to the receiver 100 and transmitter 200 for transferring received signals from the antenna 450 to the receiver 100 and for suppressing signal levels outside of the receiving band. The duplexer 400 is also connected to the transmitter 200 for transferring signals from the transmitter 200 to the antenna 450.

The receiver 100 includes input amplifiers 110, filters 122 and 126, a down-converter 124, an amplifier 130, a quadrature demodulator (QDEM) 140, and a base band demodulator (DEM) 160. In the receiver 100, the signal from the duplexer 400 is amplified by the input amplifiers 110, and its frequency is lowered down by the down-converter 124. The filters 122 and 126 are band-pass filters such as Surface Acoustic Wave (SAW) filters. Then the signal is amplified by the amplifier 130 and demodulated at the QDEM 140 by a modulation signal having a phase difference of 90 degrees. The demodulated signal is supplied to the DEM 160 and converted into a voice signal code. The DEM 160 outputs not only the voice signal code but also a signal indicating intensity of electric field of the received signals (hereinafter field intensity signal). The DEM 160 has a function of adjusting its input level, which enables to detect the intensity of electric field of the received signals by watching how much adjustment was made to obtain the desired signal level.

The voice code signal is supplied to the encoder/decoder apparatus 500. The encoder/decoder apparatus 500 includes a vocoder 520 and a codec 540. The codec 540 is connected to acoustic transducer 600. The acoustic transducer 600 transduces sound or voice into electric signals or vice versa. The acoustic transducer 600 includes a speaker 620 and a microphone 640. The voice code signal is first supplied to a vocoder 520, where it is converted into a digital signal. An output of the vocoder 520 is supplied to the codec 540, where it is converted into an audio signal. This audio signal is supplied to a speaker 620 so that a user of the cellular phone can

hear the sound or voice transmitted from the cell-site station. The codec 540 is also connected to a microphone 640. The microphone 640 picks up sound or voice and convert them into an audio input signal. This audio input signal is input into the codec 540, where it is converted into a digital audio signal. The digital audio signal is supplied to the vocoder 520 and coded into an input voice code signal. The input voice code signal is supplied to the transmitter 200.

The transmitter 200 includes a base band modulator (MOD) 210, a quadrature modulator (QMOD) 220, variable amplitude amplifier 230, a filter 240, a power amplifier means 250. The variable amplitude amplifier 230 includes a first-stage amplifier 232, filters 237 and 238, an up-converter 236, a second-stage amplifier 234. The filters 237, 238 and 240 are band-pass filters such as SAW filters which are disposed for suppressing unnecessary waves for communication. In the transmitter, the input voice code signal is supplied to the MOD 210, where it is modulated into a signal suitable for wireless transmission. An output signal of the MOD 210 is supplied to QMOD 220, where it is modulated by a modulation signal having a phase difference of 90 degrees. An output signal of the QMOD 220, i.e., a modulated signal is supplied to the variable amplitude amplifier 230. In the variable amplitude amplifier 230, the modulated signal is supplied to the first-stage amplifier 232 and amplified to a suitable level. An output of the first-stage amplifier, or the amplified modulated signal is supplied to the up-converter 236 through the filter 237. A frequency of the amplified modulated signal is raised up at the up-converter 236 to a suitable value or range for wireless communication. An output of the up-converter 236 is supplied to the second-stage amplifier 234 through the filter 238, where it is amplified to a suitable level at radio frequency. An output of the second-stage amplifier 234, namely the output of the variable amplitude amplifier 230 is supplied to the power amplifier means or power amplifier 250 through the filter 240, where the power is amplified to a desired transmitting power. An output of the power amplifier means 250 is supplied to the antenna 450 through the duplexer 400.

The controller 300 is provided so as to control the power transmitted from the antenna 450. The controller 300 in this embodiment comprises a central processing unit (CPU) 310, a memory (MEM) 330 and a digital-analog converter (D/A) 350. The CPU 310 is connected to the DEM 160 of the receiver 100, and the field intensity signal is supplied to the CPU 310 from the receiver 100. The CPU 310 generates signals for controlling the variable amplitude amplifier 230, the power amplifier means 250, the amplifiers 110 and 130 in the receiver 100 and a phase-locked loop (PLL) 700. These signals are generated in such a manner that the CPU 310 processes data supplied from the receiver 100 and outputs the result through the D/A 350, or that the CPU 310 reads data stored in the MEM 330 and outputs them through the D/A 350, or that the CPU 310 processes the data stored in the MEM 330 and outputs the result through the D/A 350.

The PLL 700 controls an oscillator 750 so as to oscillate required frequency for communication according to the output signal of the CPU 310.

Details of the first embodiment is described hereinbelow. Figs. 2 shows a block diagram of a main part of the cellular telephone in this embodiment. The controller 300 controls a gain of the variable amplitude amplifier 230 in such a manner that the transmitter 200 can provide a required transmitting power to the antenna 450. In this embodiment, the gain is determined so as to vary according to the transmitting power as shown in Fig. 4. Predetermined values of the gain (n pieces of values: G1, G2, ... Gn, where "n" is an integer greater than 2) are stored in the MEM 330 within the controller 300 as shown in Fig.4. Gn is a gain which provides the maximum value of the required transmitting power, and G1 is a gain which provides the minimum value of the required transmitting power. Further, the controller 300 stores bias values (n pieces of values: B1, B2, ... Bn, where "n" is an integer greater than 2) for the power amplifier means 250 corresponding to each gain. When the bias is fixed to either one of the predetermined values, the characteristic of output power vs. current of power amplifier means varies as shown in the corresponding dotted line in Fig.4.

When the bias is fixed to B_n , it can satisfy the maximum value of the required transmitting power. However, the current of the power amplifier means is large at the minimum value of the required transmitting power. On the other hand, when the bias is fixed to B_1 , small current of the power amplifier means is available. However, the gain is too small to satisfy the maximum value of the required transmitting power. In this embodiment, a plurality of sets of the values of the gain and the bias are stored in the MEM 330, such that the value of the bias decreases corresponding to a decrease of the gain. The characteristic of output power vs. current of power amplifier means gradually decrease from that of B_n to that of B_1 when the output power decreases as shown in the curved line in Fig. 4. This satisfies both the maximum value of the required transmitting power at the maximum output power and small current of the power amplifier means at the minimum output power. In order to realize the aforementioned gradually decreasing characteristics for reducing current consumption for the required transmitting power, bias conditions of the power amplifier means 250 are defined as a function of predetermined values of the gain for the variable amplitude amplifier 230. The function is also stored in MEM 330. The bias conditions for the n pieces of the gain values are calculated using the function and stored in MEM 330. The controller 300 controls the variable amplitude amplifier 230 and the power amplifier means 250 based on the conditions stored in MEM 330. In the actual designing, the bias conditions are selected within the region where the characteristics of power leakage into adjacent channels and et al are satisfied in addition to where the transmitting power are satisfied. Since the current of power amplifier means are lower than that of the fixed bias condition B_n , a range of transmitter output power where current consumption in the power amplifier means are reduced is much broader than that of the related art.

Details of the variable amplitude amplifier is shown in Fig. 3. In this embodiment, a transistor is employed as an amplifying element Q31. An input matching circuit 2321 is provided between an input terminal T1 and a base of the transistor Q31, and

an output matching circuit 2323 is provided between a collector of the transistor Q31 and an output terminal T2 for obtaining the required gain. The input matching circuit 2321 includes capacitors C11, C12 and C13 and a coil L11. The capacitor C11 and the coil L11 are connected in series, and this series circuit of C11 and L11 is provided between the input terminal T1 and the base of the transistor Q31. One end of the capacitor C11 is connected to the input terminal T1, and the other end of the capacitor C11 is connected to the one end of the coil L11. The other end of the coil L11 is connected to the base of the transistor Q31. The capacitor C12 is provided between the other end of the capacitor C11 and the ground. The capacitor C13 is provided between the other end of the coil L11 and the ground. A control terminal Tc is connected to the base of the transistor Q31 through a resistor R31. The output matching circuit 2323 includes a coil L21 and capacitors C21, C22 and C23. The collector of the transistor Q31 is connected to the output terminal T2 through the capacitor C23. The collector of the transistor Q31 is also connected to a power source terminal Tp through the coil L21. The capacitor C21 is provided between the power source terminal Tp and the ground. The capacitor C22 is provided between the collector of the transistor Q31 and the ground. A power source voltage is supplied to the power source terminal Tp. The transistor Q31 controls the output power according to the control signal generated by the CPU 310. The higher the voltage of the control signal is, the more output power is obtained due to an increase of the collector current.

A variation of the first embodiment is explained below. In this variation, bias conditions of the power amplifier means 250 are directly defined as a function of output power of itself or as a function of predetermined value of the gain for the variable amplitude amplifier 230. The calculated values using the function is directly supplied to the power amplifier means 250 instead of n pieces of bias conditions stored in MEM 330. As an example of the function, the one that calculates the bias values by interpolating calculated results at predetermined gain values is employed.

In this case, the controller 300 controls the variable amplitude amplifier 230 and the power amplifier means 250 according to the predetermined gain value for the variable amplitude amplifier 230 and the bias controlling signal for the power amplifier means calculated by the function stored in MEM 330. Since the bias is controlled according to the calculated values by the stored function, precise control of the bias is available, which enables to decrease the current consumed in the transmitter 200.

An example of the current decrease in this embodiment is explained using Figs. 10A and 10B. Fig. 10A shows a characteristic of output intensity vs. bias conditions comparing to that of the related art, and characteristic of output intensity vs. frequency or chance of occurring. A characteristic curve plotted with quadrates shows a characteristic of output intensity vs. bias conditions in this embodiment, and that plotted with triangles shows a characteristic of output intensity vs. bias conditions in the related art. A characteristic curve of output intensity vs. frequency or chance of occurring is shown in a curve plotted with squares. Fig. 10B shows a characteristic of output intensity vs. current consumption comparing to that of the related art, and a characteristic of output intensity vs. product of the current consumption and the frequency. A characteristic curve plotted with quadrates shows a characteristic of output intensity vs. product of current and frequency in this embodiment, and that plotted with triangles shows a characteristic of output intensity vs. product of current and frequency in the related art. A characteristic curve plotted with squares shows a characteristic of output intensity vs. current consumption in this embodiment, and that plotted with 'x's shows a characteristic of output intensity vs. current consumption in the related art. In the coordinate system of Fig. 10A, a scale on the horizontal axis indicates the transmitting power P_{out} of the mobile unit using a ratio to the transmitting power value when the mobile unit is very remote from the cell-site station, a scale for frequency on the vertical axis indicates the characteristic of frequency using a ratio to the frequency value when the mobile unit

is near the cell-site station, or the P_{out} is nearly -70dB, and a scale for V_{dd} on the vertical axis indicates the bias conditions using a ratio to the bias voltage value when the mobile unit is very remote from the cell-site station, or the P_{out} is nearly 0dB. In the coordinate system of Fig. 10B, a scale on the horizontal axis indicates the transmitting power P_{out} of the mobile unit using a ratio to the transmitting power value when the mobile unit is very remote from the cell-site station, a scale for I_{dd} on the vertical axis indicates the characteristic of current using a ratio to the current value when the mobile unit is very remote from the cell-site station, or the P_{out} is nearly 0dB, and a scale for product of I_{dd} and frequency on the vertical axis indicates the actual current consumption using a ratio to the maximum current consumption value of the related art.

In a system applying IS-95, the cell-site stations are located in such a manner that their service areas overlap to some extent in order to prevent occurrence of vacant areas where the service is not available. As a result, frequency or chances of being very remote from the cell-site station (the transmitting power P_{out} of the mobile unit increases in this condition) is small as shown in Fig. 10A. This means that the current at medium to low output power contributes more to the current consumption of the mobile unit than that at high or maximum output power. In this embodiment, the bias condition V_{dd} is controlled as shown in the curve plotted with quadrates by using a function stored in MEM 330. In this embodiment, the function controls the bias condition V_{dd} to vary in 9 steps. When the mobile unit is near the cell-site, or the P_{out} is nearly up to -50 dB, the bias condition $V_{dd}(b)$ is nearly 60% of the maximum value. As the mobile unit moving away from the cell-site, $V_{dd}(b)$ increases gradually, and when the mobile unit gets very far from the cell-site, $V_{dd}(b)$ becomes the maximum value. While in the related art, $V_{dd}(a)$ is kept constant at nearly 70% of the maximum value up to the point where P_{out} is nearly -30DB. Then $V_{dd}(a)$ increases abruptly to the maximum value and kept constant up to the point where P_{out} is 0 dB. The characteristics of current corresponding to $V_{dd}(a)$ and $V_{dd}(b)$ are

indicated in Fig. 10B as $I_{dd}(a)$ and $I_{dd}(b)$, respectively. These current values are calculated using measured values obtained from power amplifier module for CDMA system in Japan. Since the current capacity is as high as some 100mA - 1000mA, converting efficiency must be considered in calculating the currents. In this embodiment, the efficiency is estimated to be approximately 90%. Actual current consumption is calculated by making a product of I_{dd} and frequency. As shown in Fig. 10B, current consumption in this embodiment is lower than that in the related art within the region where P_{out} is less than -20dB. Nearly 14% reduction in current consumption is available in comparison to the related art.

The second embodiment of the present invention is explained referring to Figs. 5 and 6. In this embodiment, pulse signals are used as a bias controlling signal for controlling the bias of the power amplifier means 250. As disclosed in Fig. 6A, the controller 300 includes a pulse generator (PG) 355 instead of the D/A 350. In this embodiment, the PG 355 generates a pulse train with pulse repetition of T . The pulse train is modulated employing a pulse width modulation (PWM) and is supplied to the power amplifier means 250. Generally, when a high resolution is required for controlling the bias signal, the D/A 350, which can perform a high resolution converting, will cost very much expensive. Since the PG 355 is available at lower cost than the D/A 350 of high resolution type, high resolution bias control is available at low cost in this embodiment. In addition, PG 355 is suitable for providing the bias voltage, when the bias condition is calculated by the function stored in the MEM 330. The CPU 310 controls the PG 355 so as to control the pulse width according to the calculated result by the function. The power amplifier means 250 includes a smoothing circuit 254 and an amplifier 252, as disclosed in Fig. 5. The smoothing circuit 254 comprises a resistor R_{250} and a capacitor C_{250} as disclosed in Fig. 6A. The pulse signal supplied from the control circuit 300 is converted into a bias voltage within the power amplifier means 250. Since the smoothing circuit 254 is provided within the power amplifier means 250, erroneous effects caused by

external noise are reduced. In this embodiment the same components as that of the first embodiment except the controller 300 and the power amplifier means 250.

A variation for the second embodiment is explained referring to Fig. 6B. In this variation, the pulse train is modulated employing a pulse density modulation (PDM). The CPU 310 controls the PG 355 so as to control the pulse density according to the calculated result by the function. The pulse signal supplied from the control circuit 300 is converted into a bias voltage within the power amplifier means 250. This variation can also reduce erroneous effects caused by external noise.

The third embodiment of the present invention is described referring to Fig. 7. In this embodiment, the variable amplitude amplifier 230, the power amplifier means 250 and a signal generator 360 are integrated together in a amplifier 280. The amplifier 280 is in the shape of an integrated circuit (IC), or in the shape of a printed circuit board. The signal generator 360 is connected to the controller 300. The signal generator 360 receives a controlling signal from the controller 300 and generates the gain control signal for the variable amplitude amplifier 230 and the bias control signal for the power amplifier means 250. The gain control signal is supplied to the variable amplitude amplifier 230 within the amplifier 280. The bias control signal is supplied to the power amplifier means 250 also within the amplifier 280. Thus, the wiring among the controller 300, the variable amplitude amplifier 230 and the power amplifier means 250 are reduced and simplified. In this embodiment, the controller can control both the power amplifier means 250 and the variable amplitude amplifier 230 by just supplying the controlling signal to the signal generator 360, which reduces steps in processes of the controller 300.

The fourth embodiment of the present embodiment is explained referring to Fig. 8. In this embodiment, an amplifier 281 having a function of detecting the maximum power is employed, and the controller 300 supplies its output only to the variable amplitude amplifier 230 and receives a feedback signal from the amplifier 281. In IS-95 standard, the transmitting power is controlled by a transmitting power controlling

signal sent from the cell-site station for performing the closed-loop power control. According to the IS-95 standard, since the cell-site station detects the transmitting power of the mobile unit, power detection in the mobile unit is basically unnecessary. However, the transmitting power controlling signal sometimes exceeds the maximum power determined to guarantee the quality of the communication by preventing inconvenient condition such as distortion etc. at the mobile unit. In order to guarantee the quality of the communication, it is necessary to detect the transmitting power for controlling or limiting the transmitting power. The amplifier 281 comprises a power amplifier 252, a coupler 283, a power detector 284 and a maximum power detector 285. The amplifier 252 and the coupler 283 is connected in series. The output of the variable amplitude amplifier 230 is supplied to the input port of the power amplifier 252. An output of the power amplifier 252 is supplied to the duplexer 400 through the coupler 283. The power detector 284 is connected to the coupler 283 and detects the output power of the power amplifier 252. An output of the power detector is supplied to the maximum power detector 285, and the maximum power detector 285 outputs the feedback signal to the controller 300 and feeds back the output to the amplifier 252 for controlling its output power. Above embodiment can reduce the quantity of the parts, even though power detection is performed.

The fifth embodiment of the present embodiment is explained referring to Fig. 9. In this embodiment, an amplifier 282 has a function of detecting current in order to detect the maximum power. Since the output power of the amplifier 282 and the current consumption thereof have a correlation, the maximum power can be detected from the current value. This embodiment employs the amplifier 282 having a current detector instead of the amplifier 281 in the fourth embodiment, and the controller 300 supplies its output only to the variable amplitude amplifier 230 and receives a feedback signal from the amplifier 282. The amplifier 282 comprises a power amplifier 252, a current detector 284 and a maximum power detecting means 285.

The output of the variable amplitude amplifier 230 is supplied to the input port of the power amplifier 252. An output of the power amplifier 252 is supplied to the duplexer 400. The current detector 286 is connected to the power amplifier 252 and detects the current of the power amplifier 252. An output of the current detector 286 is supplied to the maximum power detector 285, and the maximum power detector 285 outputs the feedback signal to the controller 300 and feeds back the output to the power amplifier 252 for controlling its output power. Above embodiment can reduce the quantity of the parts, even though power detection is performed. Since the coupler 203 is not employed, loss between the power amplifier 252 and the duplexer 400 can be reduced, which enables to reduce a current consumption in the amplifier 282. Further, by setting another threshold value, which indicates abnormal condition of the power amplifier 252, and by providing the maximum power detecting means 285 with a function which can output an alarm signal to the controller 300 and control the power amplifier 252 to stop, failure detection and protection of the amplifier 282 is available.

This concludes the description of the preferred embodiments. Although the present invention has been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this invention. More particularly, reasonable variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the foregoing disclosure, the drawings and the appended claims without departing from the spirit of the invention. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

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What is claimed is:

CLAIMS:

1. A cellular telephone comprising;
 - an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station,
 - a duplexer connected to said antenna,
 - a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a signal indicating an intensity of said first communication signal,
 - an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into a input voice code signal,
 - a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and
 - a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter corresponding to said intensity of said first communication signal,
 - wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said controller includes a central processing unit and a memory, said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier according to a function stored in said memory.
2. A cellular telephone according to claim 1, wherein said controller further includes a pulse generator, said pulse generator is connected to said power amplifier so as to supply a pulse as a bias control signal, and said controller controls a pulse width of said pulse so as to control said bias condition.

3. A cellular telephone according to claim 1, wherein said controller further includes a pulse generator, said pulse generator is connected to said power amplifier so as to supply pulses as a bias control signal, and said controller controls a pulse density of said pulses so as to control said bias condition.
4. A cellular telephone according to claim 2, wherein said power amplifier further includes a smoothing circuit for smoothing said pulse.
5. A cellular telephone according to claim 3, wherein said power amplifier further includes a smoothing circuit for smoothing said pulses.
6. A cellular telephone according to claim 1, wherein said transmitter further includes a signal generator connected to said controller, said signal generator is connected to said variable amplitude amplifier and said power amplifier so as to supply a gain control signal and a bias control signal to said variable amplitude amplifier and said power amplifier respectively.
7. A cellular telephone comprising;
 - an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station,
 - a duplexer connected to said antenna,
 - a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a signal indicating an intensity of said first communication signal,
 - an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into a input voice code signal,
 - a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and

a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter corresponding to said intensity of said first communication signal,

wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector, said controller includes a central processing unit and a memory, said controller controls a gain of said variable amplitude amplifier according to a function stored in said memory, and said maximum power detector controls an output power of said power amplifier.

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station.

The cellular telephone includes an antenna, a duplexer, a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal.

The transmitter includes a variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

Selected drawing: Fig. 1

FIG. 1

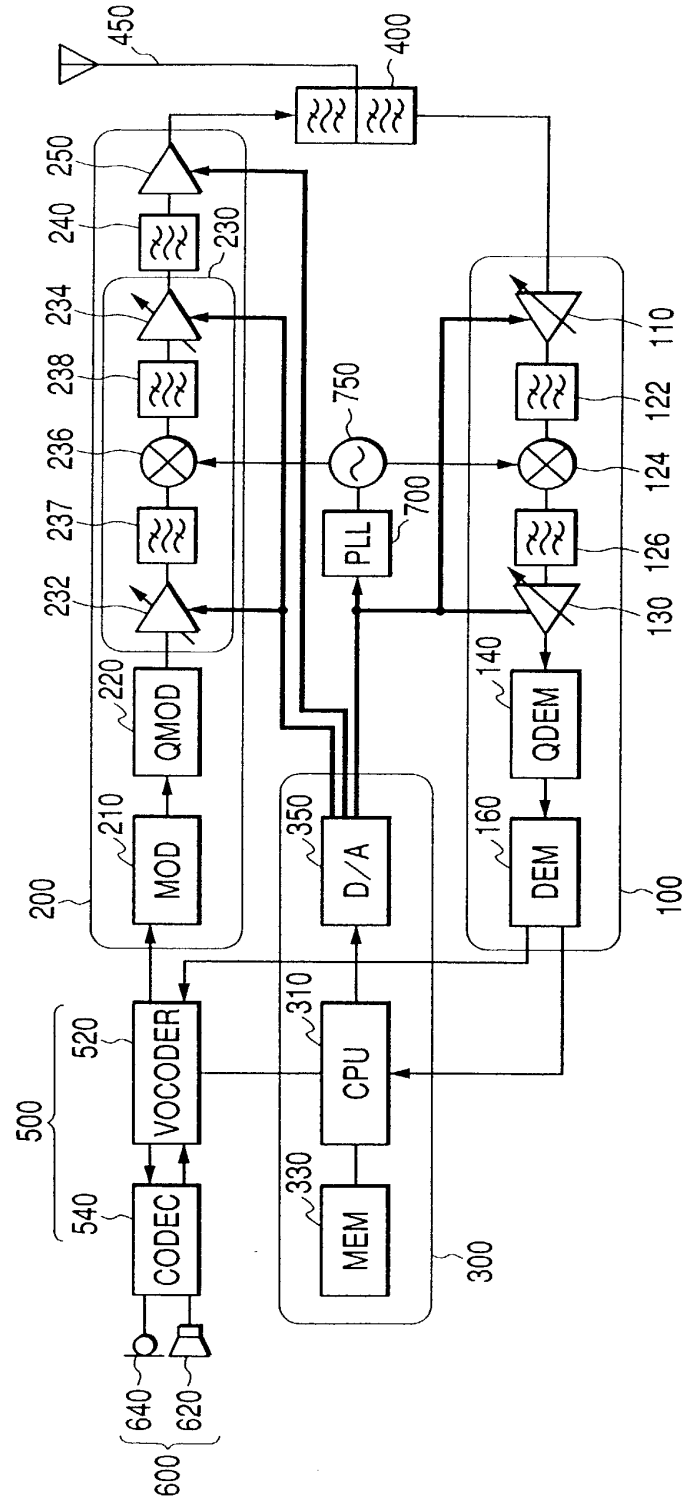


FIG. 2

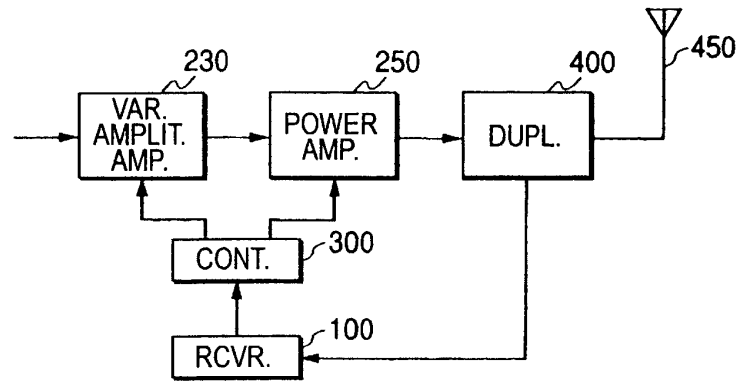


FIG. 3

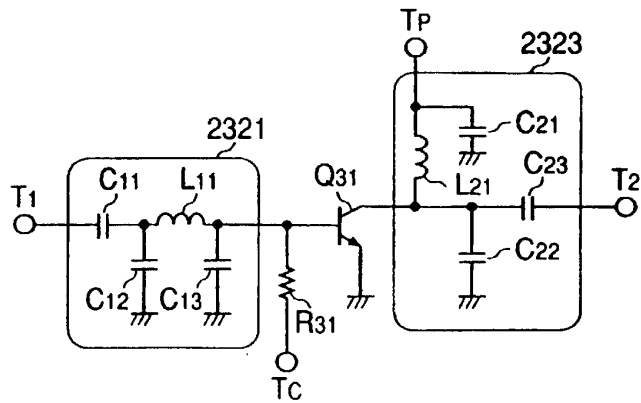


FIG. 4

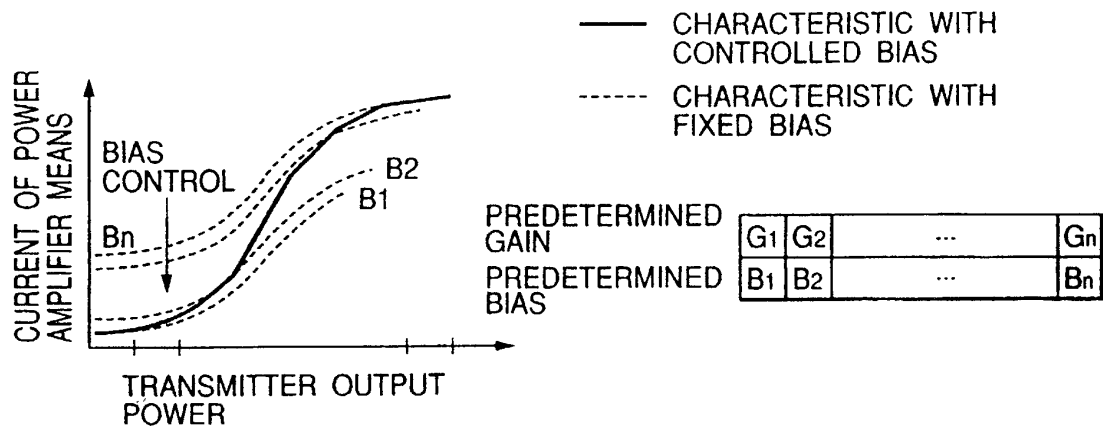
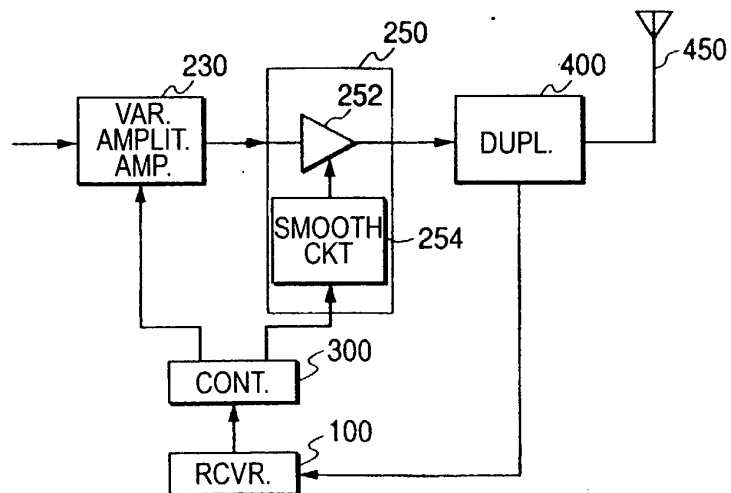


FIG. 5



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FIG. 6(a)

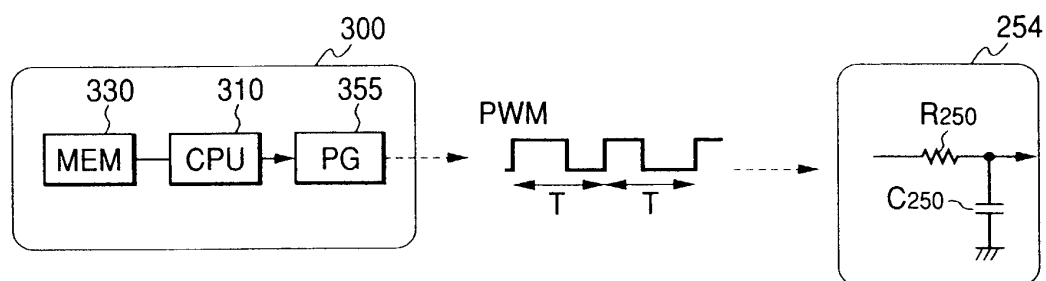


FIG. 6(b)

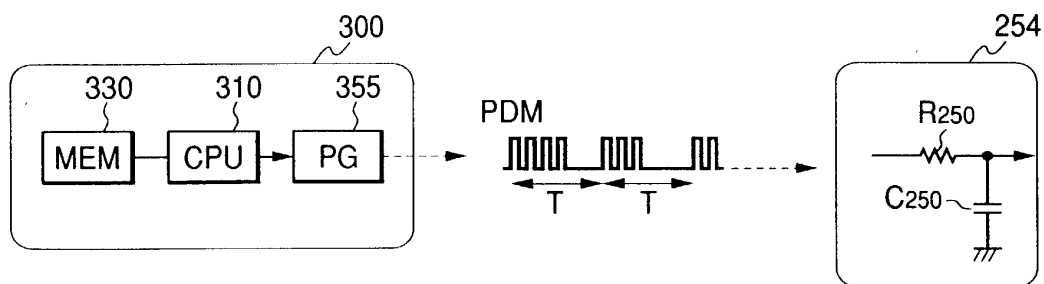


FIG. 7

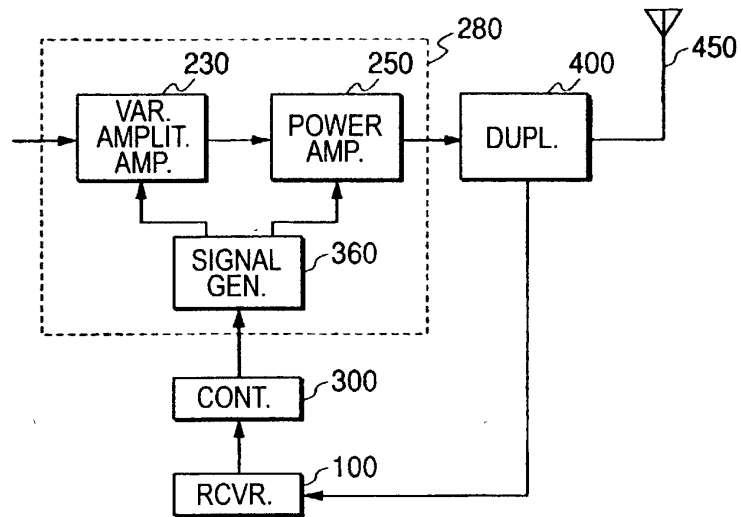


FIG. 8

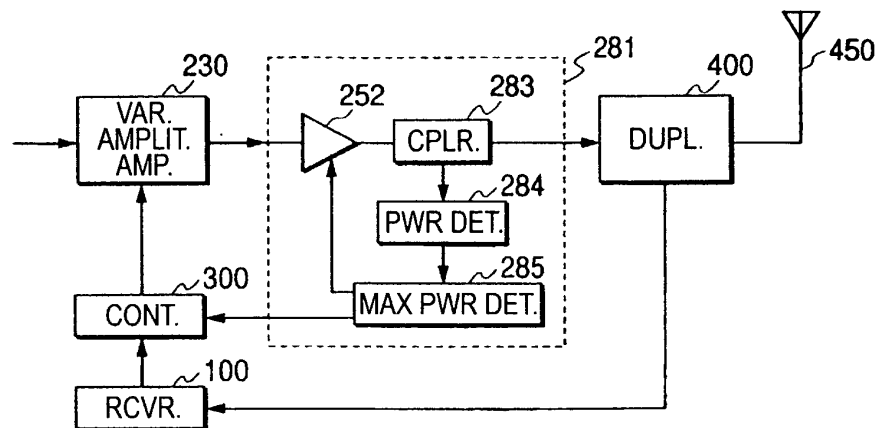
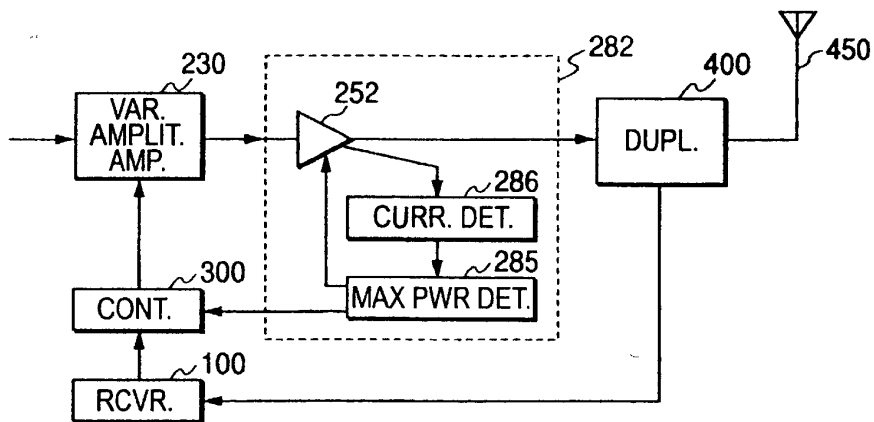


FIG. 9



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FIG. 10(a)

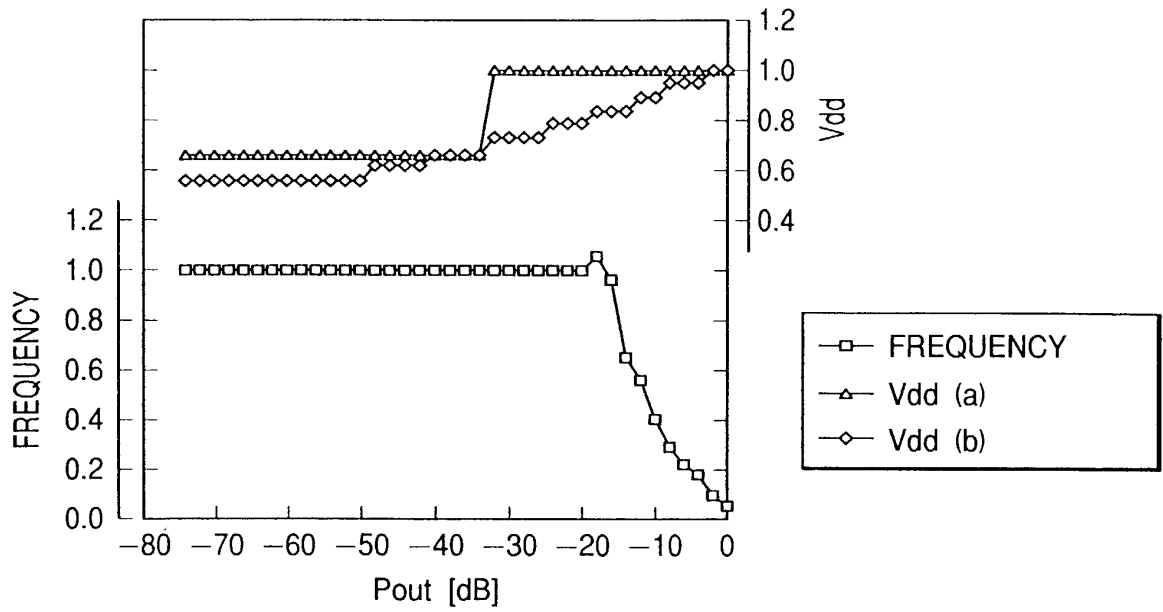
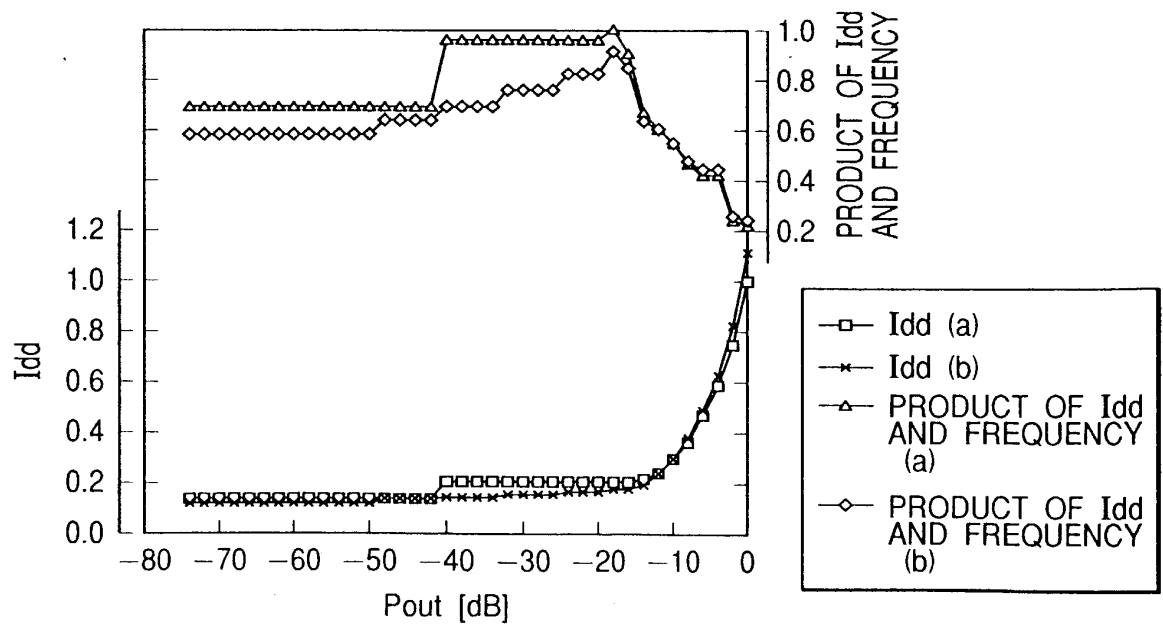


FIG. 10(b)



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FIG. 11 RELATED ART

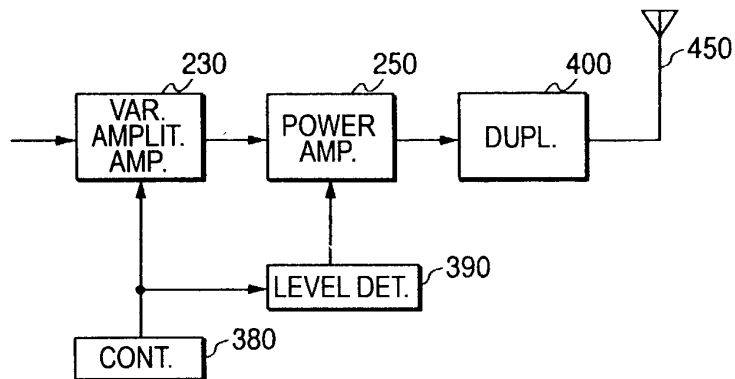
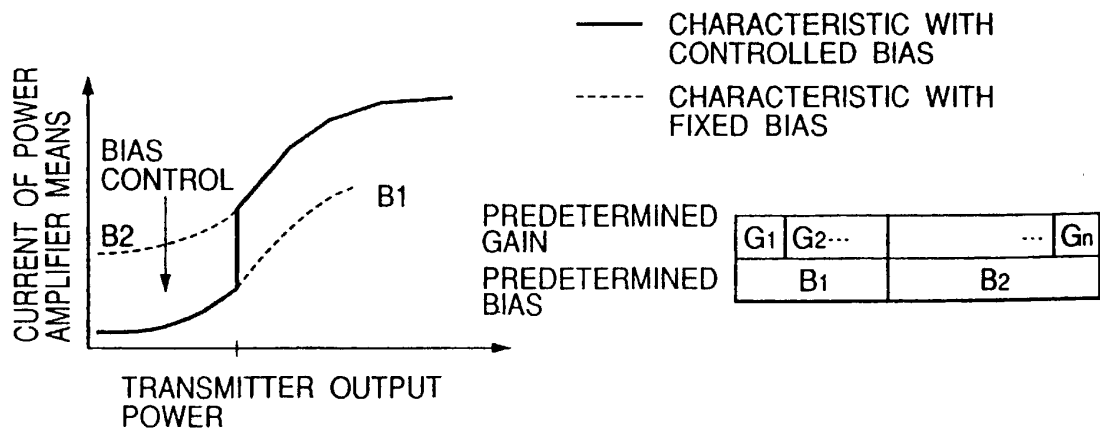


FIG. 12 RELATED ART



COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name. I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter claimed and for which a patent is sought on the invention entitled:

"CELLULAR TELEPHONE"

the specification of which: (check one) ☒ is attached hereto.

☐ was filed on _____

as Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information material to examination of this application according to Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application (s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

			Priority Claimed	
<u>P10-318689</u>	<u>Japan</u>	<u>10/11/1998</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
_____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

_____	_____	_____
(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)
_____	_____	_____
(Application Number)	(Filing Date)	(Status -- patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code, Section 120, of any United States application(s) or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby appoint the following attorneys/agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application with full power of appointment and substitution of associate attorneys and agents, and to receive all patents which may issue thereon: Thomas E. Beall, Jr., Reg. No. 22,410; John R. Mattingly, Reg. No. 30,293; Daniel J. Stanger, Reg. No. 32,846; Shrinath Malur, Reg. No. 34,663; Gene W. Stockman, Reg. No. 21,021; Jeffrey M. Ketchum, Reg. No. 31,174; Scott W. Brickner, Reg. No. 34,553. Address all correspondence to:

BEALL LAW OFFICES
104 East Hume Avenue
Alexandria, Virginia 22301
Tel. 703-684-1120

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date Oct. 14, 1999 Inventor Makoto Katagishi Makoto KATAGISHI
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Post Office Address 19-34, Honson 5-chome, Chigasaki-shi, KANAGAWA, JAPAN

Date Oct. 14, 1999 Inventor Shirou Machida Shirou MACHIDA
Residence Same as post office address (Typed Name and Signature)
Citizenship Japan
Post Office Address Asahi-ryo #146, 1545, Yoshida-cho, Totsuka-ku, Yokohama-shi, KANAGAWA, JAPAN

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PATENT NUMBER and
ISSUE DATE

U.S. UTILITY Patent Application

APPL NUM 10142051	FILING DATE 05/10/2002	CLASS 455	SUBCLASS 127.1	GAU 2683	EXAMINER Ferguson
**APPLICANTS: Katagishi Makoto; Machida Shirou;					
**CONTINUING DATA VERIFIED: THIS APPLICATION IS A CON OF 09/436,502 11/09/1999 PAT 6,408,193					
** FOREIGN APPLICATIONS VERIFIED: JAPAN P10-318689 11/10/1998					
PG-PUB <input type="checkbox"/> DO NOT PUBLISH <input type="checkbox"/> RESCIND <input type="checkbox"/>					
Foreign priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 conditions met <input type="checkbox"/> yes <input type="checkbox"/> no Verified and Acknowledged Examiners's initials				ATTORNEY DOCKET NO	
TITLE : Cellular telephone					

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NOTICE OF ALLOWANCE MAILED		CLAIMS ALLOWED	
Assistant Examiner		Total Claims	Print Claim for O.G
ISSUE FEE		DRAWING	
Amount Due	Date Paid	Sheets Drawg.	Figs. Drawg.
Primary Examiner		Print Fig.	
<input type="checkbox"/> TERMINAL DISCLAIMER		Application Examiner	
PREPARED FOR ISSUE			
WARNING: The information disclosed herein may be restricted. Unauthorized disclosure may be prohibited by the United States Code Title 35, Sections 122, 181 and 368, Possession outside the U.S. Patent & Trademark Office is restricted to authorized employees and contractors only.			

FILED WITH: ☐ DISK (CRF) ☐ CD-ROM
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SEARCH			
Class	Sub.	Date	Exmr.
455	571	8/5	KF
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	125		
	73		
	232.1		
	132.4		
	239.1		
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	550.1		
	250.1		
	251.1		
	245.1		
	422.1		
	403		
370	342		
	311		
	345		
375	345		
Search Previous C/ASS subCLASS 8/5 KF			

INTERFERENCE SEARCHED			
Class	Sub.	Date	Exmr.
455	571	8/5	KF
	574		
	126		
	127.1		
	115		
370	311		
375	345		

SEARCH NOTES		
(List databases searched. Attach search strategy inside.)		
	Date	Exmr.
East Search Notes Included	8/5	KF
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ISSUE SLIP STAPLE AREA (for additional cross-references)

ORIGINAL		CROSS REFERENCE(S)						
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
455	127.1	455	571	574	126	127.1	115	
INTERNATIONAL CLASSIFICATION		370	311					
		375	345					
R04Q	7'32							

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INDEX OF CLAIMS

✓ Rejected - (Through numeral) ... Canceled N Non-elected A Appeal
 - Allowed + Restricted I Interference O Objected

Claim	Date
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BOX: PATENT APPLICATION

H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Prior Application: M. KATAGISHI et al
Serial No. 09/436,502
Filed: November 9, 1999

Group Art Unit: 2683
Examiner: K. Ferguson
For: CELLULAR TELEPHONE



24956

PATENT TRADEMARK OFFICE



REQUEST FOR CONTINUATION APPLICATION
UNDER 37 C.F.R. 1.53(b)

Box: Patent Application
Assistant Commissioner of Patents
Washington, D.C. 20231

May 10, 2002

Sir:

This is a request for filing a continuation application under 37 CFR §1.53(b) of pending prior application Serial No. 09/436,502, filed on November 9, 1999, entitled CELLULAR TELEPHONE, by all of the inventors named in the prior application.

1. Enclosed is a copy of the prior application, including the Declaration as originally filed.

2. The Filing Fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION
LESS ANY CLAIMS CANCELED BY ACCOMPANYING PRELIMINARY AMENDMENT
PLUS ANY CLAIMS ADDED BY ACCOMPANYING PRELIMINARY AMENDMENT

Basic Fee							\$ 740.00
Total Claims	3	-	20	=	0	x	18 = 0.00
Independent Claims	1	-	3	=	0	x	84 = 0.00
Total Filing Fee							\$ 740.00

Continuation Application

H-852-02

3. A check including the amount of \$740.00 is enclosed to cover the Filing Fee.

4. The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment, to Deposit Account No. 50-1417.

5. New drawings are enclosed, eight (8) sheets, Figs. 1-12. These drawings incorporate the drawing corrections made in the prior application.

6. The power of attorney is set forth in the Declaration in the prior application or an associate power of attorney is hereby granted to:

John R. Mattingly, Registration No. 30,293
Jeffrey M. Ketchum, Registration No. 31,174
Shrinath Malur, Registration No. 34,663
Daniel J. Stanger, Registration No. 32,846
Gene W. Stockman, Registration No. 21,021.

There is a change in the correspondence address.

Address all future correspondence to:

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
(703) 684-1120

Please associate this application with Customer No. 24956.

7. The prior application is assigned to Hitachi, Ltd..

8. Priority of the following Japanese patent application is claimed under 35 U.S.C. § 119:


No. P10-318689, filed November 10, 1998.

Continuation Application

H-852-02

The certified priority document has been filed in the prior application.

The undersigned hereby declares that no matter contained in the specification, including the claims, and drawings filed in the present continuation application would have been new matter in the prior application Serial No. 09/436,502, as originally filed on November 9, 1999.



Daniel J. Stanger
Registration No. 32,846
Attorney of Record

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
Date: May 10, 2002

FIG. 1

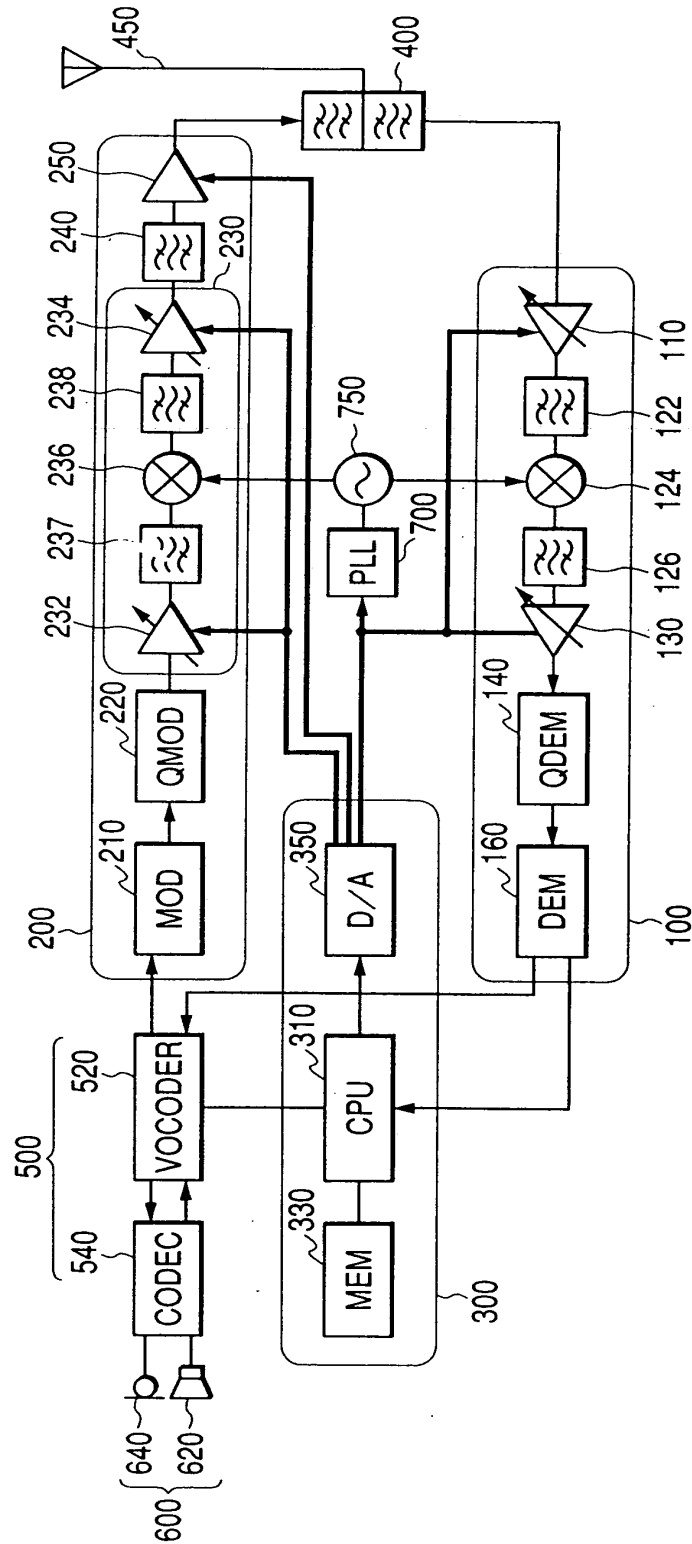


FIG. 2

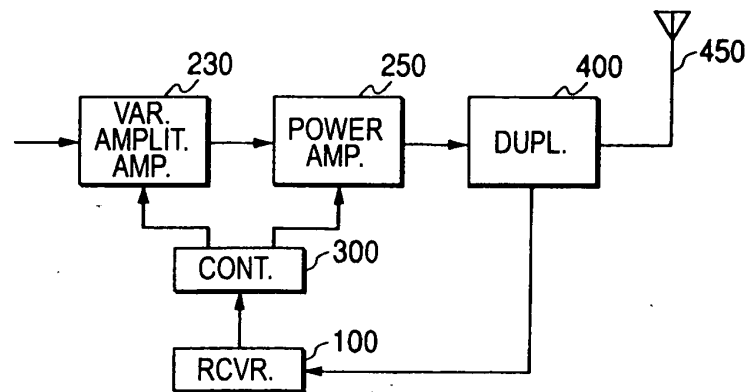


FIG. 3

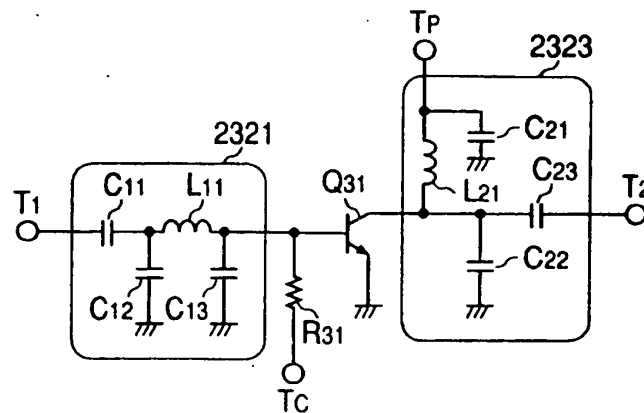


FIG. 4

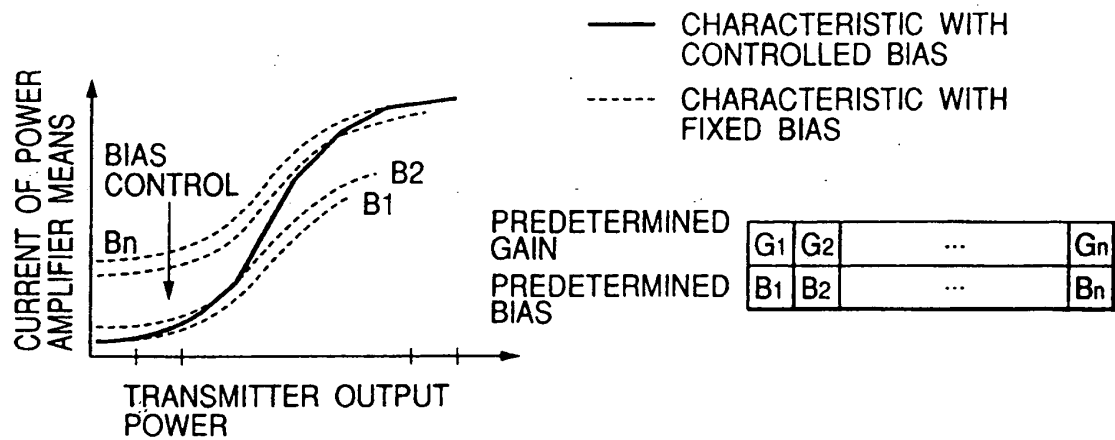
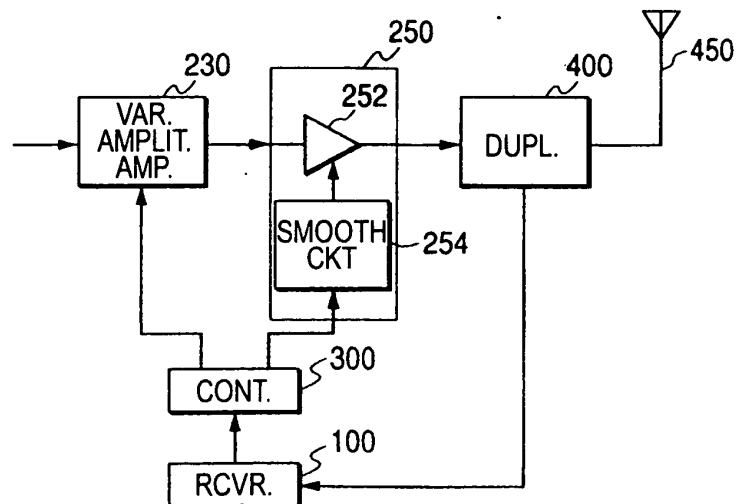


FIG. 5



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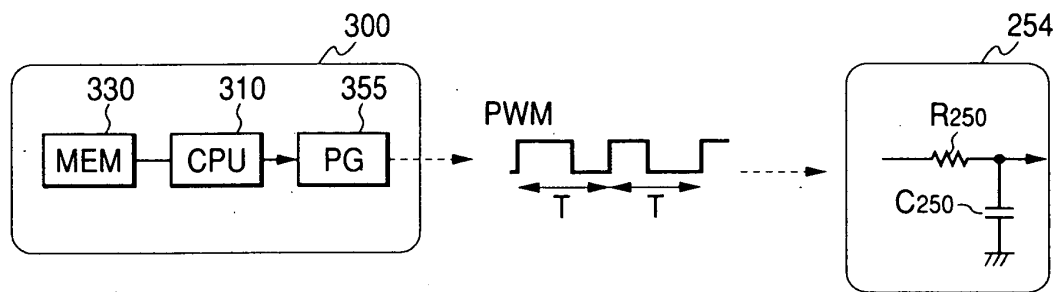
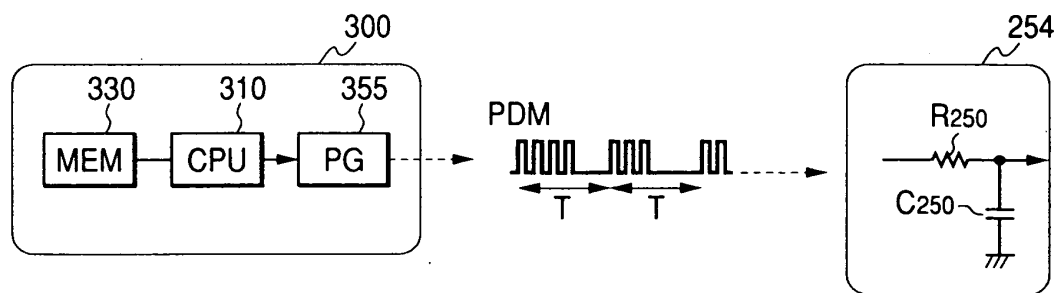
FIG. 6(a)*FIG. 6(b)*

FIG. 7

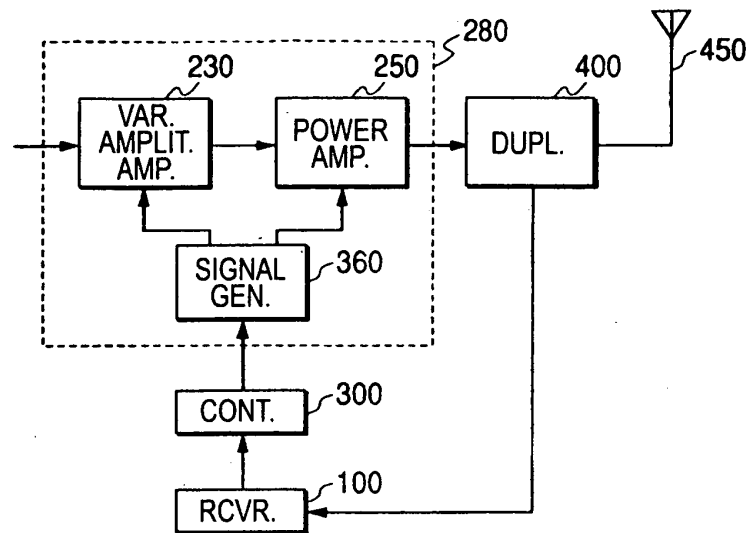


FIG. 8

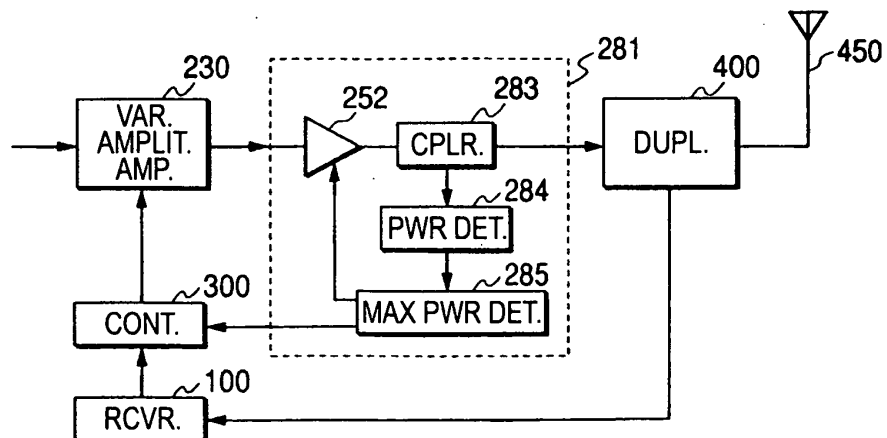
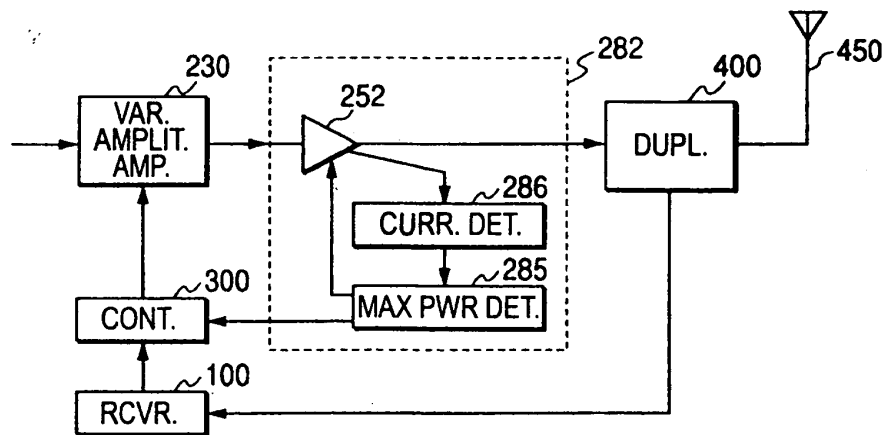


FIG. 9



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FIG. 10(a)

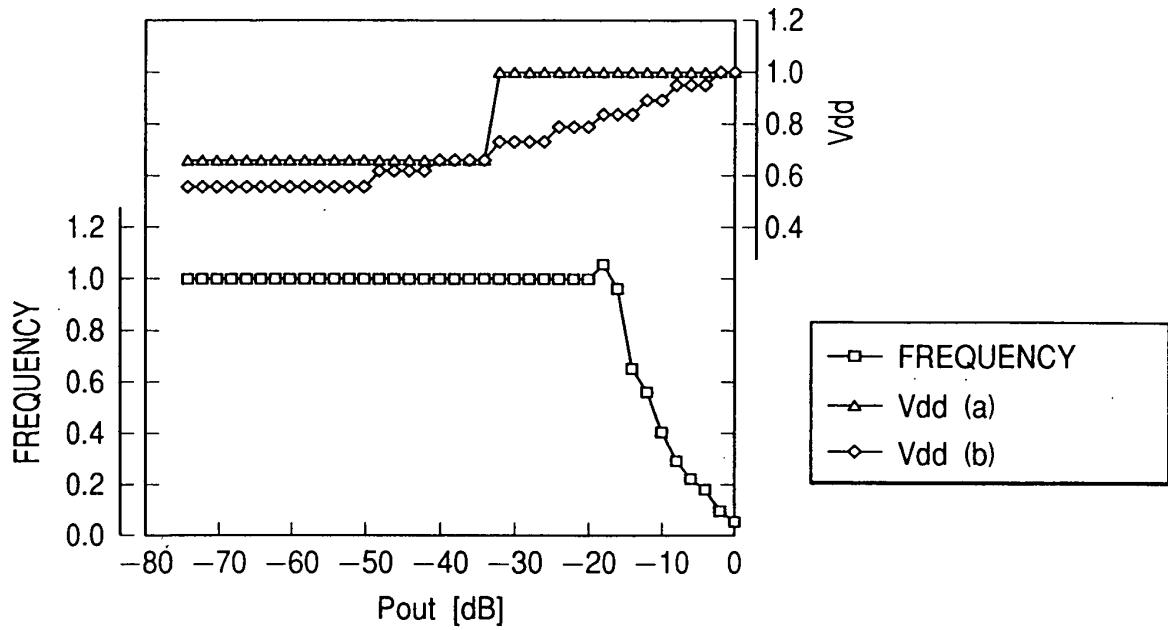
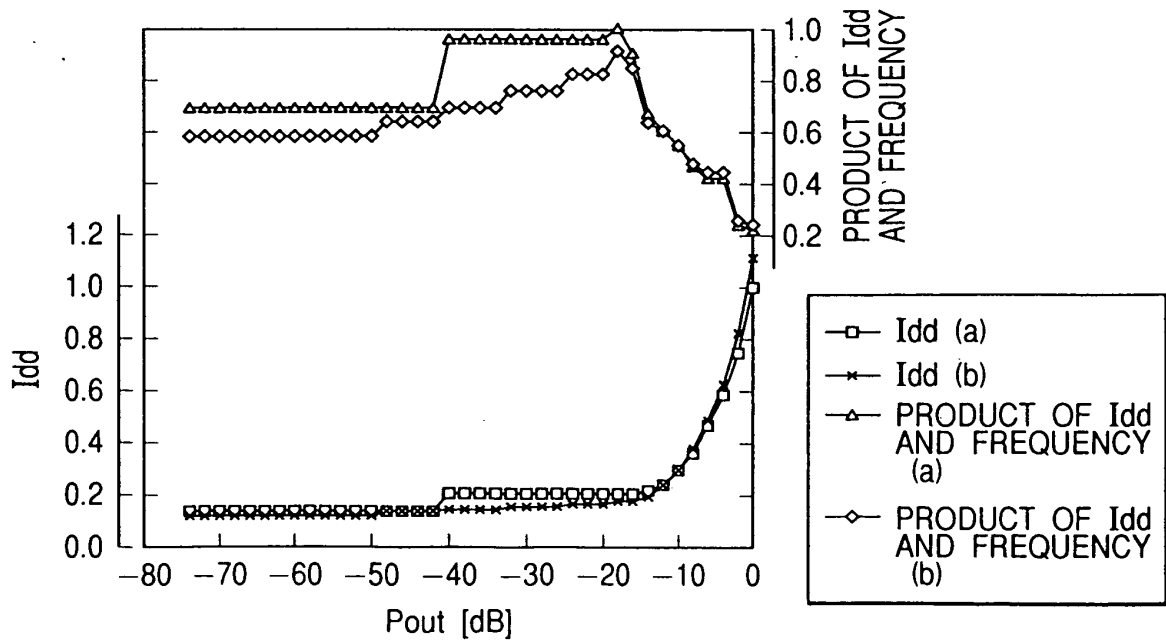


FIG. 10(b)



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FIG. 11 RELATED ART

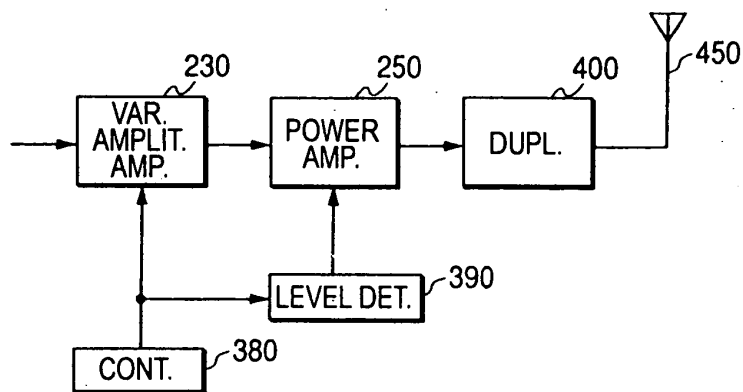
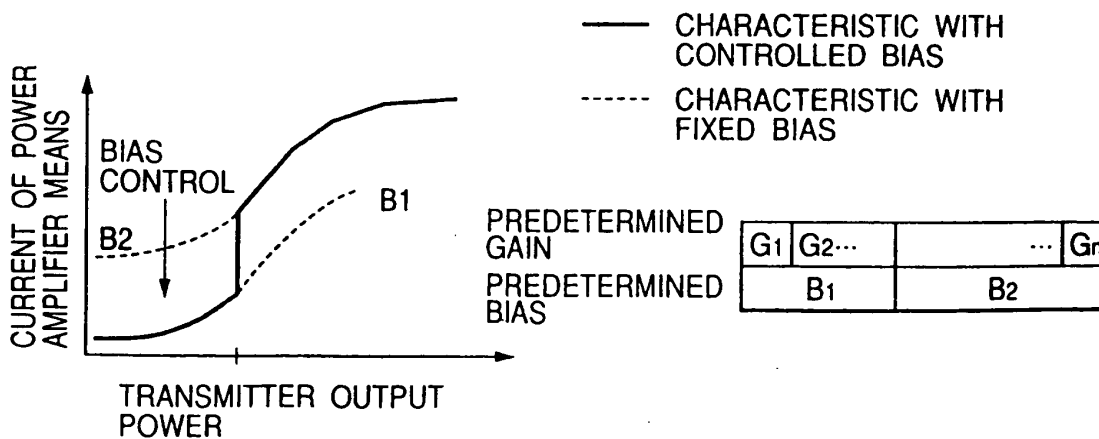


FIG. 12 RELATED ART



H-852
219801019US1

Title of the Invention

CELLULAR TELEPHONE

Inventors

**Makoto KATAGISHI,
Shirou MACHIDA.**

CELLULAR TELEPHONE

BACKGROUND OF THE INVENTION

Technical Field of the Invention

The present invention generally relates to a cellular telephone, and more specifically, relates to a cellular telephone used in Code Division Multiple Access (CDMA) system.

Description of related art

An example of a CDMA cellular telephone system is disclosed in U.S.P. 5,056,109. In this example, a cellular telephone has transmit power control circuitries 76 and 80 connected in series between a transmit modulator 84 and an antenna 70 and controlled by a control processor 78, so as to control and adjust a power level of transmission power. The control and the adjustment of the power level are required so as to overcome deleterious terrestrial channel fading between a terrestrial base station (a cell-site station) and a mobile unit. The terrestrial channel fading is caused by a path loss in the terrestrial channel, which is on the order of over 80dB, and the power adjustment at the mobile unit is implemented by a predetermined amount, nominally 1dB.

The typical standard for the CDMA cellular telephone system enacted in the U.S. is TIA IS-95 (hereinafter IS-95). An example of a transmitter applying IS-95 is shown in Fig. 11. In this example, a modulated signal converted into a transmitting frequency band is supplied to a variable amplitude amplifier 230 and the output of the variable amplitude amplifier 230 is further amplified by a power amplifier means 250 and transmitted to an antenna 450 through a duplexer 400. A controller 380 supplies a gain control signal to the variable amplitude amplifier 230 in order to adjust the gain such that the power transmitted from the antenna 450 will satisfy the required value of transmitting power. The gain control signal is also supplied to a level detecting means 390. The level detecting means 390 supplies a bias signal to the power amplifier means 250 for adjusting the transmitting power. The level detecting

means 390 detects a level of the gain control signal, and as shown in Fig. 12, when the level is high (e.g. Gn), it outputs bias value of B2. Then the level decreases, and the level crosses a threshold value, the level detecting means 390 changes the bias abruptly from B2 to B1. Current of the power amplifier means change abruptly when the gain level crosses the threshold value. In 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. The open-loop power control, which definitely determines a transmitting power according to an information indicating an intensity of electric field detected by a receiver, does not require a severe accuracy (generally within the range of 9.5 dB). On the other hand, the closed-loop power control performs fine control according to an information indicating a variation of a gain of the signal transmitted from the cell-site station (generally 1 dB step). In this case, 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.

Japanese Patent Laid-open No. Hei-9-46152 discloses a mobile unit including a receiver and a transmitter, where the transmitter has a variable amplitude amplifier for adjusting the power level of the transmission power. In this related art, the mobile unit includes a high frequency power amplifier having a field effect transistor (FET) as an amplifying element, and the variable amplitude amplifier is composed so as to control a bias condition of the FET according to a transmission power. Amount of attenuation according to the transmission power, and gate voltage of the FET corresponding to the amount of attenuation are controlled by degrees, i.e. by 4dB, according to the predetermined values. When the transmission power is low, the gate voltage is reduced so as to reduce current consumption for prolonging battery life.

A problem in the related art is that the large current consumption shortens the battery life, which shortens the hours of communication on the phone.

Another problem in the related art is that the compensation of the battery life requires an increase of volume and weight of the battery. Further related art is also disclosed in Japanese Patent Application Laid-open Nos. Hei-04-277909 and Hei-06-252797.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to solve the problems of the related art explained above. In view of the objective of solving the problems explained above, the cellular telephone of the present invention includes an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station, a duplexer connected to the antenna, a receiver connected to the antenna through the duplexer for converting the first communication signal into a voice signal code, and for outputting a signal indicating an intensity of the first communication signal, an encoder/decoder apparatus connected to the receiver and an acoustic transducer for converting the voice signal code into audio signal for driving the acoustic transducer and converting an audio input signal from the acoustic transducer into a input voice code signal, a transmitter connected to the encoder/decoder apparatus and to the antenna through the duplexer for converting the input voice code signal into the second communication signal, and a controller connected to the receiver and the transmitter for controlling amplitude of the transmitter corresponding to the intensity of the first communication signal, wherein the transmitter includes a variable amplitude amplifier and a power amplifier, the controller includes a central processing unit and a memory, the controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier according to a function stored in the memory.

In another embodiment, the controller further includes a pulse generator. The pulse generator is connected to the power amplifier so as to supply a pulse as a bias control signal, and the controller controls a pulse width of the pulse so as to control the bias condition.

In a third embodiment, the controller further includes a pulse generator. The pulse generator is connected to the power amplifier so as to supply pulses as a bias control signal, and the controller controls a pulse density of the pulses so as to control the bias condition.

In a fourth embodiment, the power amplifier further includes a smoothing circuit for smoothing the pulse.

In a fifth embodiment, the transmitter further includes a signal generator connected to the controller. The signal generator is connected to the variable amplitude amplifier and the power amplifier so as to supply a gain control signal and a bias control signal to the variable amplitude amplifier and the power amplifier respectively.

The cellular telephone of the present invention also includes an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station, a duplexer connected to the antenna, a receiver connected to the antenna through the duplexer for converting the first communication signal into a voice signal code, and for outputting a signal indicating an intensity of the first communication signal, an encoder/decoder apparatus connected to the receiver and an acoustic transducer for converting the voice signal code into audio signal for driving the acoustic transducer and converting an audio input signal from the acoustic transducer into a input voice code signal, a transmitter connected to the encoder/decoder apparatus and to the antenna through the duplexer for converting the input voice code signal into the second communication signal, and a controller connected to the receiver and the transmitter for controlling amplitude of the transmitter corresponding to the intensity of the first communication signal, wherein the transmitter includes a variable amplitude amplifier and a power amplifier, the power amplifier includes a maximum power detector, the controller includes a central processing unit and a memory, the controller controls a gain of the variable amplitude amplifier according to a function stored in the

memory, and the maximum power detector controls an output power of the power amplifier.

As explained above, since the controller controls a gain of the variable amplitude amplifier according to a function stored in the memory, a cellular telephone capable of reducing current consumption is available. In addition, small current consumption enables prolongation of battery life, or use of small-size battery, by which a cellular phone having a long service life or that having a small size is available.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and a better understanding of the present invention will become apparent from the following detailed description of exemplary embodiments and the claims when read in connection with the accompanying drawings, all forming a part of the disclosure hereof this invention. While the foregoing and following written and illustrated disclosure focuses on disclosing exemplary embodiments of the invention, it should be clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and the scope of the present invention being limited only by the terms of the appended claims.

The following represents brief descriptions of the drawings, wherein:

Fig. 1 shows a block diagram of a cellular telephone in the first embodiment of the present invention.

Fig. 2 shows a block diagram of a main part of the cellular telephone in the first embodiment of the present invention.

Fig. 3 shows an example of variable amplitude amplifier of the cellular telephone in the first embodiment of the present invention.

Fig. 4 shows a characteristic curve of a power amplifier means in the first embodiment of the present invention.

Fig. 5 shows a block diagram of a main part of the cellular telephone in the second embodiment of the present invention.

Fig. 6 shows an example of the controller and the smoothing circuit in the second embodiment of the present invention. Fig. 6A shows a case where the CPU controls the PG in PWM mode, and Fig. 6B shows a case where the CPU controls the PG in PDM mode.

Fig. 7 shows a block diagram of a main part of the cellular telephone in the third embodiment of the present invention.

Fig. 8 shows a block diagram of a main part of the cellular telephone in the second embodiment of the present invention.

Fig. 9 shows a block diagram of a main part of the cellular telephone in the third embodiment of the present invention.

Fig. 10 shows a characteristic curve in one embodiment of the present invention. Fig. 10A shows a characteristic of output intensity vs. bias conditions comparing to that of the related art, and characteristic of output intensity vs. frequency or chance of occurring. Fig. 10B shows a characteristic of output intensity vs. current consumption comparing to that of the related art, and a characteristic of output intensity vs. product of the current consumption and the frequency.

Fig. 11 shows a block diagram of a main part of the cellular telephone in the related art.

Fig. 12 shows a characteristic curve in the related art.

DETAILED DESCRIPTION OF THE INVENTION

Before beginning a detailed description of the subject invention, mention of the following is in order. When appropriate, like reference numerals and characters are used to designate identical, corresponding or similar components in differing figure drawings.

Exemplary embodiments of the present invention will now be explained with reference to Figs. 1 to 10.

The first embodiment of the present invention is explained referring to Figs. 1, 2, 3, 4 and 10. As disclosed in Fig. 1, a cellular telephone in this embodiment includes a

receiver 100, a transmitter 200, a controller 300, an encoder/decoder apparatus 500, a duplexer 400 and an antenna 450. The antenna 450 is connected to the duplexer 400 so as to transmit or receive communication signals. The duplexer 400 is connected to the receiver 100 and transmitter 200 for transferring received signals from the antenna 450 to the receiver 100 and for suppressing signal levels outside of the receiving band. The duplexer 400 is also connected to the transmitter 200 for transferring signals from the transmitter 200 to the antenna 450.

The receiver 100 includes input amplifiers 110, filters 122 and 126, a down-converter 124, an amplifier 130, a quadrature demodulator (QDEM) 140, and a base band demodulator (DEM) 160. In the receiver 100, the signal from the duplexer 400 is amplified by the input amplifiers 110, and its frequency is lowered down by the down-converter 124. The filters 122 and 126 are band-pass filters such as Surface Acoustic Wave (SAW) filters. Then the signal is amplified by the amplifier 130 and demodulated at the QDEM 140 by a modulation signal having a phase difference of 90 degrees. The demodulated signal is supplied to the DEM 160 and converted into a voice signal code. The DEM 160 outputs not only the voice signal code but also a signal indicating intensity of electric field of the received signals (hereinafter field intensity signal). The DEM 160 has a function of adjusting its input level, which enables to detect the intensity of electric field of the received signals by watching how much adjustment was made to obtain the desired signal level.

The voice code signal is supplied to the encoder/decoder apparatus 500. The encoder/decoder apparatus 500 includes a vocoder 520 and a codec 540. The codec 540 is connected to acoustic transducer 600. The acoustic transducer 600 transduces sound or voice into electric signals or vice versa. The acoustic transducer 600 includes a speaker 620 and a microphone 640. The voice code signal is first supplied to a vocoder 520, where it is converted into a digital signal. An output of the vocoder 520 is supplied to the codec 540, where it is converted into an audio signal. This audio signal is supplied to a speaker 620 so that a user of the cellular phone can

hear the sound or voice transmitted from the cell-site station. The codec 540 is also connected to a microphone 640. The microphone 640 picks up sound or voice and convert them into an audio input signal. This audio input signal is input into the codec 540, where it is converted into a digital audio signal. The digital audio signal is supplied to the vocoder 520 and coded into an input voice code signal. The input voice code signal is supplied to the transmitter 200.

The transmitter 200 includes a base band modulator (MOD) 210, a quadrature modulator (QMOD) 220, variable amplitude amplifier 230, a filter 240, a power amplifier means 250. The variable amplitude amplifier 230 includes a first-stage amplifier 232, filters 237 and 238, an up-converter 236, a second-stage amplifier 234. The filters 237, 238 and 240 are band-pass filters such as SAW filters which are disposed for suppressing unnecessary waves for communication. In the transmitter, the input voice code signal is supplied to the MOD 210, where it is modulated into a signal suitable for wireless transmission. An output signal of the MOD 210 is supplied to QMOD 220, where it is modulated by a modulation signal having a phase difference of 90 degrees. An output signal of the QMOD 220, i.e., a modulated signal is supplied to the variable amplitude amplifier 230. In the variable amplitude amplifier 230, the modulated signal is supplied to the first-stage amplifier 232 and amplified to a suitable level. An output of the first-stage amplifier, or the amplified modulated signal is supplied to the up-converter 236 through the filter 237. A frequency of the amplified modulated signal is raised up at the up-converter 236 to a suitable value or range for wireless communication. An output of the up-converter 236 is supplied to the second-stage amplifier 234 through the filter 238, where it is amplified to a suitable level at radio frequency. An output of the second-stage amplifier 234, namely the output of the variable amplitude amplifier 230 is supplied to the power amplifier means or power amplifier 250 through the filter 240, where the power is amplified to a desired transmitting power. An output of the power amplifier means 250 is supplied to the antenna 450 through the duplexer 400.

The controller 300 is provided so as to control the power transmitted from the antenna 450. The controller 300 in this embodiment comprises a central processing unit (CPU) 310, a memory (MEM) 330 and a digital-analog converter (D/A) 350. The CPU 310 is connected to the DEM 160 of the receiver 100, and the field intensity signal is supplied to the CPU 310 from the receiver 100. The CPU 310 generates signals for controlling the variable amplitude amplifier 230, the power amplifier means 250, the amplifiers 110 and 130 in the receiver 100 and a phase-locked loop (PLL) 700. These signals are generated in such a manner that the CPU 310 processes data supplied from the receiver 100 and outputs the result through the D/A 350, or that the CPU 310 reads data stored in the MEM 330 and outputs them through the D/A 350, or that the CPU 310 processes the data stored in the MEM 330 and outputs the result through the D/A 350.

The PLL 700 controls an oscillator 750 so as to oscillate required frequency for communication according to the output signal of the CPU 310.

Details of the first embodiment is described hereinbelow. Figs. 2 shows a block diagram of a main part of the cellular telephone in this embodiment. The controller 300 controls a gain of the variable amplitude amplifier 230 in such a manner that the transmitter 200 can provide a required transmitting power to the antenna 450. In this embodiment, the gain is determined so as to vary according to the transmitting power as shown in Fig. 4. Predetermined values of the gain (n pieces of values: G_1, G_2, \dots, G_n , where " n " is an integer greater than 2) are stored in the MEM 330 within the controller 300 as shown in Fig. 4. G_n is a gain which provides the maximum value of the required transmitting power, and G_1 is a gain which provides the minimum value of the required transmitting power. Further, the controller 300 stores bias values (n pieces of values: B_1, B_2, \dots, B_n , where " n " is an integer greater than 2) for the power amplifier means 250 corresponding to each gain. When the bias is fixed to either one of the predetermined values, the characteristic of output power vs. current of power amplifier means varies as shown in the corresponding dotted line in Fig. 4.

When the bias is fixed to B_n , it can satisfy the maximum value of the required transmitting power. However, the current of the power amplifier means is large at the minimum value of the required transmitting power. On the other hand, when the bias is fixed to B_1 , small current of the power amplifier means is available. However, the gain is too small to satisfy the maximum value of the required transmitting power. In this embodiment, a plurality of sets of the values of the gain and the bias are stored in the MEM 330, such that the value of the bias decreases corresponding to a decrease of the gain. The characteristic of output power vs. current of power amplifier means gradually decrease from that of B_n to that of B_1 when the output power decreases as shown in the curved line in Fig. 4. This satisfies both the maximum value of the required transmitting power at the maximum output power and small current of the power amplifier means at the minimum output power. In order to realize the aforementioned gradually decreasing characteristics for reducing current consumption for the required transmitting power, bias conditions of the power amplifier means 250 are defined as a function of predetermined values of the gain for the variable amplitude amplifier 230. The function is also stored in MEM 330. The bias conditions for the n pieces of the gain values are calculated using the function and stored in MEM 330. The controller 300 controls the variable amplitude amplifier 230 and the power amplifier means 250 based on the conditions stored in MEM 330. In the actual designing, the bias conditions are selected within the region where the characteristics of power leakage into adjacent channels and et al are satisfied in addition to where the transmitting power are satisfied. Since the current of power amplifier means are lower than that of the fixed bias condition B_n , a range of transmitter output power where current consumption in the power amplifier means are reduced is much broader than that of the related art.

Details of the variable amplitude amplifier is shown in Fig. 3. In this embodiment, a transistor is employed as an amplifying element Q31. An input matching circuit 2321 is provided between an input terminal T1 and a base of the transistor Q31, and

an output matching circuit 2323 is provided between a collector of the transistor Q31 and an output terminal T2 for obtaining the required gain. The input matching circuit 2321 includes capacitors C11, C12 and C13 and a coil L11. The capacitor C11 and the coil L11 are connected in series, and this series circuit of C11 and L11 is provided between the input terminal T1 and the base of the transistor Q31. One end of the capacitor C11 is connected to the input terminal T1, and the other end of the capacitor C11 is connected to the one end of the coil L11. The other end of the coil L11 is connected to the base of the transistor Q31. The capacitor C12 is provided between the other end of the capacitor C11 and the ground. The capacitor C13 is provided between the other end of the coil L11 and the ground. A control terminal Tc is connected to the base of the transistor Q31 through a resistor R31. The output matching circuit 2323 includes a coil L21 and capacitors C21, C22 and C23. The collector of the transistor Q31 is connected to the output terminal T2 through the capacitor C23. The collector of the transistor Q31 is also connected to a power source terminal Tp through the coil L21. The capacitor C21 is provided between the power source terminal Tp and the ground. The capacitor C22 is provided between the collector of the transistor Q31 and the ground. A power source voltage is supplied to the power source terminal Tp. The transistor Q31 controls the output power according to the control signal generated by the CPU 310. The higher the voltage of the control signal is, the more output power is obtained due to an increase of the collector current.

A variation of the first embodiment is explained below. In this variation, bias conditions of the power amplifier means 250 are directly defined as a function of output power of itself or as a function of predetermined value of the gain for the variable amplitude amplifier 230. The calculated values using the function is directly supplied to the power amplifier means 250 instead of n pieces of bias conditions stored in MEM 330. As an example of the function, the one that calculates the bias values by interpolating calculated results at predetermined gain values is employed.

In this case, the controller 300 controls the variable amplitude amplifier 230 and the power amplifier means 250 according to the predetermined gain value for the variable amplitude amplifier 230 and the bias controlling signal for the power amplifier means calculated by the function stored in MEM 330. Since the bias is controlled according to the calculated values by the stored function, precise control of the bias is available, which enables to decrease the current consumed in the transmitter 200.

An example of the current decrease in this embodiment is explained using Figs. 10A and 10B. Fig. 10A shows a characteristic of output intensity vs. bias conditions comparing to that of the related art, and characteristic of output intensity vs. frequency or chance of occurring. A characteristic curve plotted with quadrates shows a characteristic of output intensity vs. bias conditions in this embodiment, and that plotted with triangles shows a characteristic of output intensity vs. bias conditions in the related art. A characteristic curve of output intensity vs. frequency or chance of occurring is shown in a curve plotted with squares. Fig. 10B shows a characteristic of output intensity vs. current consumption comparing to that of the related art, and a characteristic of output intensity vs. product of the current consumption and the frequency. A characteristic curve plotted with quadrates shows a characteristic of output intensity vs. product of current and frequency in this embodiment, and that plotted with triangles shows a characteristic of output intensity vs. product of current and frequency in the related art. A characteristic curve plotted with squares shows a characteristic of output intensity vs. current consumption in this embodiment, and that plotted with 'x's shows a characteristic of output intensity vs. current consumption in the related art. In the coordinate system of Fig. 10A, a scale on the horizontal axis indicates the transmitting power P_{out} of the mobile unit using a ratio to the transmitting power value when the mobile unit is very remote from the cell-site station, a scale for frequency on the vertical axis indicates the characteristic of frequency using a ratio to the frequency value when the mobile unit

is near the cell-site station, or the P_{out} is nearly -70dB, and a scale for V_{dd} on the vertical axis indicates the bias conditions using a ratio to the bias voltage value when the mobile unit is very remote from the cell-site station, or the P_{out} is nearly 0dB. In the coordinate system of Fig. 10B, a scale on the horizontal axis indicates the transmitting power P_{out} of the mobile unit using a ratio to the transmitting power value when the mobile unit is very remote from the cell-site station, a scale for I_{dd} on the vertical axis indicates the characteristic of current using a ratio to the current value when the mobile unit is very remote from the cell-site station, or the P_{out} is nearly 0dB, and a scale for product of I_{dd} and frequency on the vertical axis indicates the actual current consumption using a ratio to the maximum current consumption value of the related art.

In a system applying IS-95, the cell-site stations are located in such a manner that their service areas overlap to some extent in order to prevent occurrence of vacant areas where the service is not available. As a result, frequency or chances of being very remote from the cell-site station (the transmitting power P_{out} of the mobile unit increases in this condition) is small as shown in Fig. 10A. This means that the current at medium to low output power contributes more to the current consumption of the mobile unit than that at high or maximum output power. In this embodiment, the bias condition V_{dd} is controlled as shown in the curve plotted with quadrates by using a function stored in MEM 330. In this embodiment, the function controls the bias condition V_{dd} to vary in 9 steps. When the mobile unit is near the cell-site, or the P_{out} is nearly up to -50 dB, the bias condition $V_{dd}(b)$ is nearly 60% of the maximum value. As the mobile unit moving away from the cell-site, $V_{dd}(b)$ increases gradually, and when the mobile unit gets very far from the cell-site, $V_{dd}(b)$ becomes the maximum value. While in the related art, $V_{dd}(a)$ is kept constant at nearly 70% of the maximum value up to the point where P_{out} is nearly -30DB. Then $V_{dd}(a)$ increases abruptly to the maximum value and kept constant up to the point where P_{out} is 0 dB. The characteristics of current corresponding to $V_{dd}(a)$ and $V_{dd}(b)$ are

indicated in Fig. 10B as $I_{dd}(a)$ and $I_{dd}(b)$, respectively. These current values are calculated using measured values obtained from power amplifier module for CDMA system in Japan. Since the current capacity is as high as some 100mA - 1000mA, converting efficiency must be considered in calculating the currents. In this embodiment, the efficiency is estimated to be approximately 90%. Actual current consumption is calculated by making a product of I_{dd} and frequency. As shown in Fig. 10B, current consumption in this embodiment is lower than that in the related art within the region where P_{out} is less than -20dB. Nearly 14% reduction in current consumption is available in comparison to the related art.

The second embodiment of the present invention is explained referring to Figs. 5 and 6. In this embodiment, pulse signals are used as a bias controlling signal for controlling the bias of the power amplifier means 250. As disclosed in Fig. 6A, the controller 300 includes a pulse generator (PG) 355 instead of the D/A 350. In this embodiment, the PG 355 generates a pulse train with pulse repetition of T . The pulse train is modulated employing a pulse width modulation (PWM) and is supplied to the power amplifier means 250. Generally, when a high resolution is required for controlling the bias signal, the D/A 350, which can perform a high resolution converting, will cost very much expensive. Since the PG 355 is available at lower cost than the D/A 350 of high resolution type, high resolution bias control is available at low cost in this embodiment. In addition, PG 355 is suitable for providing the bias voltage, when the bias condition is calculated by the function stored in the MEM 330. The CPU 310 controls the PG 355 so as to control the pulse width according to the calculated result by the function. The power amplifier means 250 includes a smoothing circuit 254 and an amplifier 252, as disclosed in Fig. 5. The smoothing circuit 254 comprises a resistor R_{250} and a capacitor C_{250} as disclosed in Fig. 6A. The pulse signal supplied from the control circuit 300 is converted into a bias voltage within the power amplifier means 250. Since the smoothing circuit 254 is provided within the power amplifier means 250, erroneous effects caused by

external noise are reduced. In this embodiment the same components as that of the first embodiment except the controller 300 and the power amplifier means 250.

A variation for the second embodiment is explained referring to Fig. 6B. In this variation, the pulse train is modulated employing a pulse density modulation (PDM). The CPU 310 controls the PG 355 so as to control the pulse density according to the calculated result by the function. The pulse signal supplied from the control circuit 300 is converted into a bias voltage within the power amplifier means 250. This variation can also reduce erroneous effects caused by external noise.

The third embodiment of the present invention is described referring to Fig. 7. In this embodiment, the variable amplitude amplifier 230, the power amplifier means 250 and a signal generator 360 are integrated together in a amplifier 280. The amplifier 280 is in the shape of an integrated circuit (IC), or in the shape of a printed circuit board. The signal generator 360 is connected to the controller 300. The signal generator 360 receives a controlling signal from the controller 300 and generates the gain control signal for the variable amplitude amplifier 230 and the bias control signal for the power amplifier means 250. The gain control signal is supplied to the variable amplitude amplifier 230 within the amplifier 280. The bias control signal is supplied to the power amplifier means 250 also within the amplifier 280. Thus, the wiring among the controller 300, the variable amplitude amplifier 230 and the power amplifier means 250 are reduced and simplified. In this embodiment, the controller can control both the power amplifier means 250 and the variable amplitude amplifier 230 by just supplying the controlling signal to the signal generator 360, which reduces steps in processes of the controller 300.

The fourth embodiment of the present embodiment is explained referring to Fig. 8. In this embodiment, an amplifier 281 having a function of detecting the maximum power is employed, and the controller 300 supplies its output only to the variable amplitude amplifier 230 and receives a feedback signal from the amplifier 281. In IS-95 standard, the transmitting power is controlled by a transmitting power controlling

signal sent from the cell-site station for performing the closed-loop power control. According to the IS-95 standard, since the cell-site station detects the transmitting power of the mobile unit, power detection in the mobile unit is basically unnecessary. However, the transmitting power controlling signal sometimes exceeds the maximum power determined to guarantee the quality of the communication by preventing inconvenient condition such as distortion etc. at the mobile unit. In order to guarantee the quality of the communication, it is necessary to detect the transmitting power for controlling or limiting the transmitting power. The amplifier 281 comprises a power amplifier 252, a coupler 283, a power detector 284 and a maximum power detector 285. The amplifier 252 and the coupler 283 is connected in series. The output of the variable amplitude amplifier 230 is supplied to the input port of the power amplifier 252. An output of the power amplifier 252 is supplied to the duplexer 400 through the coupler 283. The power detector 284 is connected to the coupler 283 and detects the output power of the power amplifier 252. An output of the power detector is supplied to the maximum power detector 285, and the maximum power detector 285 outputs the feedback signal to the controller 300 and feeds back the output to the amplifier 252 for controlling its output power. Above embodiment can reduce the quantity of the parts, even though power detection is performed.

The fifth embodiment of the present embodiment is explained referring to Fig. 9. In this embodiment, an amplifier 282 has a function of detecting current in order to detect the maximum power. Since the output power of the amplifier 282 and the current consumption thereof have a correlation, the maximum power can be detected from the current value. This embodiment employs the amplifier 282 having a current detector instead of the amplifier 281 in the fourth embodiment, and the controller 300 supplies its output only to the variable amplitude amplifier 230 and receives a feedback signal from the amplifier 282. The amplifier 282 comprises a power amplifier 252, a current detector 284 and a maximum power detecting means 285.

The output of the variable amplitude amplifier 230 is supplied to the input port of the power amplifier 252. An output of the power amplifier 252 is supplied to the duplexer 400. The current detector 286 is connected to the power amplifier 252 and detects the current of the power amplifier 252. An output of the current detector 286 is supplied to the maximum power detector 285, and the maximum power detector 285 outputs the feedback signal to the controller 300 and feeds back the output to the power amplifier 252 for controlling its output power. Above embodiment can reduce the quantity of the parts, even though power detection is performed. Since the coupler 203 is not employed, loss between the power amplifier 252 and the duplexer 400 can be reduced, which enables to reduce a current consumption in the amplifier 282. Further, by setting another threshold value, which indicates abnormal condition of the power amplifier 252, and by providing the maximum power detecting means 285 with a function which can output an alarm signal to the controller 300 and control the power amplifier 252 to stop, failure detection and protection of the amplifier 282 is available.

This concludes the description of the preferred embodiments. Although the present invention has been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this invention. More particularly, reasonable variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the foregoing disclosure, the drawings and the appended claims without departing from the spirit of the invention. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

What is claimed is:

CLAIMS:

1. A cellular telephone comprising;
an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station,
a duplexer connected to said antenna,
a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a signal indicating an intensity of said first communication signal,
an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into a input voice code signal,
a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and
a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter corresponding to said intensity of said first communication signal,
wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said controller includes a central processing unit and a memory, said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier according to a function stored in said memory.
2. A cellular telephone according to claim 1, wherein said controller further includes a pulse generator, said pulse generator is connected to said power amplifier so as to supply a pulse as a bias control signal, and said controller controls a pulse width of said pulse so as to control said bias condition.

3. A cellular telephone according to claim 1, wherein said controller further includes a pulse generator, said pulse generator is connected to said power amplifier so as to supply pulses as a bias control signal, and said controller controls a pulse density of said pulses so as to control said bias condition.
4. A cellular telephone according to claim 2, wherein said power amplifier further includes a smoothing circuit for smoothing said pulse.
5. A cellular telephone according to claim 3, wherein said power amplifier further includes a smoothing circuit for smoothing said pulses.
6. A cellular telephone according to claim 1, wherein said transmitter further includes a signal generator connected to said controller, said signal generator is connected to said variable amplitude amplifier and said power amplifier so as to supply a gain control signal and a bias control signal to said variable amplitude amplifier and said power amplifier respectively.
7. A cellular telephone comprising;
 - an antenna for receiving a first communication signal from a cell-site station and transmitting a second communication signal to the cell-site station,
 - a duplexer connected to said antenna,
 - a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a signal indicating an intensity of said first communication signal,
 - an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into a input voice code signal,
 - a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and

a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter corresponding to said intensity of said first communication signal,

wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector, said controller includes a central processing unit and a memory, said controller controls a gain of said variable amplitude amplifier according to a function stored in said memory, and said maximum power detector controls an output power of said power amplifier.

ADD
AD

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station.

The cellular telephone includes an antenna, a duplexer, a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal.

The transmitter includes a variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

Selected drawing: Fig. 1

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name. I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter claimed and for which a patent is sought on the invention entitled:

"CELLULAR TELEPHONE"

the specification of which: (check one) ☒ is attached hereto.

☐ was filed on _____

as Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information material to examination of this application according to Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application (s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

<u>P10-318689</u> (Number)	<u>Japan</u> (Country)	<u>10/11/1998</u> (Day/Month/Year Filed)	<input checked="" type="checkbox"/> <input type="checkbox"/> Yes No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/> <input type="checkbox"/> Yes No
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/> <input type="checkbox"/> Yes No

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

_____ (Application Number)	_____ (Filing Date)	_____ (Status -- patented, pending, abandoned)
_____ (Application Number)	_____ (Filing Date)	_____ (Status -- patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code, Section 120, of any United States application(s) or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby appoint the following attorneys/agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application with full power of appointment and substitution of associate attorneys and agents, and to receive all patents which may issue thereon: Thomas E. Beall, Jr., Reg. No. 22,410; John R. Mattingly, Reg. No. 30,293; Daniel J. Stanger, Reg. No. 32,846; Shrinath Malur, Reg. No. 34,663; Gene W. Stockman, Reg. No. 21,021; Jeffrey M. Ketchum, Reg. No. 31,174; Scott W. Brickner, Reg. No. 34,553. Address all correspondence to:

BEALL LAW OFFICES
104 East Hume Avenue
Alexandria, Virginia 22301
Tel. 703-684-1120

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date Oct. 14, 1999 Inventor Makoto Katagishi Makoto KATAGISHI
(Typed Name and Signature)
Residence Same as post office address Citizenship Japan
Post Office Address 9-34, Honson 5-chome, Chigasaki-shi, KANAGAWA, JAPAN

Date Oct. 14, 1999 Inventor Shirou Machida Shirou MACHIDA
(Typed Name and Signature)
Residence Same as post office address Citizenship Japan
Post Office Address Asahi-ryo #146, 1545, Yoshida-cho, Totsuka-ku, Yokohama-shi, KANAGAWA, JAPAN



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov



Bib Data Sheet

CONFIRMATION NO. 3869

SERIAL NUMBER 10/142,051	FILING DATE 05/10/2002 RULE	CLASS 455	GROUP ART UNIT 2683	ATTORNEY DOCKET NO.
APPLICANTS Makoto Katagishi, Kanagawa, JAPAN; Shirou Machida, Kanagawa, JAPAN;				
** CONTINUING DATA ***** THIS APPLICATION IS A CON OF 09/436,502 11/09/1999 PAT 6,408,193 <i>YES</i>				
** FOREIGN APPLICATIONS ***** <i>YES</i> JAPAN P10-318689 11/10/1998				
IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 06/07/2002				
Foreign Priority claimed <input checked="" type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions met <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance Verified and Acknowledged <i>[Signature]</i> Examiner's Signature Initials		STATE OR COUNTRY JAPAN	SHEETS DRAWING 8	TOTAL CLAIMS 3
				INDEPENDENT CLAIMS 1
ADDRESS				
24956				
TITLE				
Cellular telephone				
FILING FEE RECEIVED 740	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

05/13/2002 T6EDAMU1 00000114 10142051

01 FC:101

740.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2001 — 481-697/59173

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number

10142051

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	3	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	3 - minus 20 = *	—
INDEPENDENT CLAIMS	1 - minus 3 = *	—
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>		

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>		

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY
TYPE ☐

OTHER THAN SMALL ENTITY

RATE	FEE	OR	RATE	FEE
BASIC FEE	370.00		BASIC FEE	740.00
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	740

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

CLAIMS ONLY								SERIAL NO. <div style="border-bottom: 1px solid black; width: 100px; margin: 0;"></div> 10142051	FILING DATE <div style="border-bottom: 1px solid black; width: 100px; margin: 0;"></div> 5/10				
								APPLICANT(S)					
CLAIMS													
	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT			*		*		*	
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TOTAL DEP.	2	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓	↓
TOTAL CLAIMS	3	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓	↓

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

D.J. 71002
#5
IDS/Statement

H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Accompanying Continuation Application Under
37 CFR 1.53(b):

Prior Application: M. KATAGISHI et al
Serial No. 09/436,502
Filed: November 9, 1999

Group Art Unit: 2683
Examiner: K. Ferguson
For: CELLULAR TELEPHONE



INFORMATION DISCLOSURE STATEMENT (IDS)
UNDER § 1.97 AND § 1.98

Commissioner for Patents
Washington, D.C. 20231

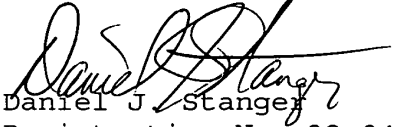
May 10, 2002

Sir:

The documents listed on the attached PTO-1449 Form
constitute the art of record in the parent application
identified above.

The Applicants request the Examiner to initial and return
a copy of the attached PTO-1449 Form as an indication that the
references have been considered.

Respectfully submitted,


Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
Date: May 10, 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Accompanying Continuation Application Under
37 CFR 1.53(b):

Prior Application: M. KATAGISHI et al
Serial No. 09/436,502
Filed: November 9, 1999

Group Art Unit: 2683
Examiner: K. Ferguson
For: CELLULAR TELEPHONE

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

May 10, 2002

Sir:

Prior to examination, please amend the above application
as follows.

IN THE SPECIFICATION

Page 1, before the first line, add the paragraph:

a1 This is a continuation application of U.S. Serial
No. 09/436,502, filed November 9, 1999, now allowed.

IN THE ABSTRACT

Page 21, lines 1-18, replace the Abstract of the
Disclosure with:

10/142051

Continuation Application

H-852-02

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station. The cellular telephone includes an antenna, a duplexer, a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal. The transmitter includes a variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

Continuation Application

H-852-02

IN THE CLAIMS

Cancel claims 1-7 without prejudice or disclaimer, and add new claims 8-10, as follows:

8. (New) A cellular telephone used in CDMA system comprising:

an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station and transmitting a second communication signal to the cell-site station,

a duplexer connected to said antenna,

A2 a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a power control signal deriving from said transmitting power control signal sent from said cell-site station,

an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into an audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into an input voice code signal,

a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and

Continuation Application

H-852-02

A2 a controller connected to said receiver and said transmitter for controlling amplitude of said transmitter, wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector for controlling an output power of said power amplifier, said controller includes a central processing unit and a memory, said controller controls 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 the transmitted power to converge into a range required by said cell-site station, and said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between the bias data and the gain data stored in said memory, in such a manner that said function// uses bias conditions defined in a ratio to the maximum bias voltage value and 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.

Continuation Application

H-852-02

9. (New) A cellular telephone according to claim 8, wherein said bias condition is nearly 60 percent of the maximum value when said output intensity is nearly up to


A2 -50 dB.

10. (New) A cellular telephone according to claim 8, wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.

REMARKS

The Applicants request entry of the foregoing amendments, claim cancellations and new claims 8-10. Claims 8-10 are now pending.

Respectfully submitted,


Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)

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Date: May 10, 2002

Continuation Application

H-852-02

**MARKED UP VERSION OF REPLACED
PARAGRAPH OF THE ABSTRACT OF THE DISCLOSURE**

Page 21, lines 1-18, the marked up Abstract of the
Disclosure is as follows:

ABSTRACT OF THE DISCLOSURE

A cellular telephone receives a first communication signal from a cell-site station and transmits a second communication signal to the cell-site station. The cellular telephone includes an antenna, a duplexer; a receiver, an encoder/decoder apparatus, an acoustic transducer, a transmitter and a controller. The receiver is connected to the antenna through the duplexer. The receiver converts the first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The transmitter is connected to the encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into the second communication signal. The controller is connected to the receiver and the transmitter. The controller controls amplitude of the transmitter corresponding to said intensity of the first communication signal. The transmitter includes a

Continuation Application

H-852-02

variable amplitude amplifier and a power amplifier means, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier means according to a function stored in the memory.

[Selected drawing: Fig. 1]

L Number	Hits	Search Text	DB	Time stamp
-	4547	power near2 amplifier same pulse	USPAT	2001/07/25 07:57
-	261	power near2 amplifier same pulse same bias\$3	USPAT	2001/07/25 06:33
-	139	width and (power near2 amplifier same pulse same bias\$3)	USPAT	2001/07/25 06:33
-	81	width same bias\$ and (width and (power near2 amplifier same pulse same bias\$3))	USPAT	2001/07/25 06:45
-	32	loop\$3 and (width same bias\$ and (width and (power near2 amplifier same pulse same bias\$3)))	USPAT	2001/07/25 06:46
-	8	455/\$.ccls. and (width same bias\$ and (width and (power near2 amplifier same pulse same bias\$3)))	USPAT	2001/07/25 06:52
-	11	455/\$.ccls. and (width and (power near2 amplifier same pulse same bias\$3))	USPAT	2001/07/25 08:00
-	16	455/\$.ccls. and (power near2 amplifier same pulse same bias\$3)	USPAT	2001/07/25 07:18
-	122096	pulse near4 generat\$	USPAT	2001/07/25 07:19
-	2888	(power near2 amplifier same pulse) and (pulse near4 generat\$)	USPAT	2001/07/25 07:19
-	151	((power near2 amplifier same pulse) and (pulse near4 generat\$)) and (power near2 amplifier same pulse same bias\$3)	USPAT	2001/07/25 07:20
-	105	455/\$.ccls. and ((power near2 amplifier same pulse) and (pulse near4 generat\$))	USPAT	2001/07/25 07:25
-	42	bias\$3 and (455/\$.ccls. and ((power near2 amplifier same pulse) and (pulse near4 generat\$)))	USPAT	2001/07/25 07:25
-	0	power near2 amplifier same pulse near4 generat\$3	USPAT	2001/07/25 07:58
-	1491	power near2 amplifier same pulse near4 generat\$3	USPAT	2001/07/25 07:59
-	463	bias\$ and (power near2 amplifier same pulse near4 generat\$3)	USPAT	2001/07/25 07:59
-	19	455/\$.ccls. and (bias\$ and (power near2 amplifier same pulse near4 generat\$3))	USPAT	2001/07/25 08:00
-	5249	power near2 amplifier same detect\$3	USPAT	2001/07/27 09:48
-	151	455/127.ccls. and (power near2 amplifier same detect\$3)	USPAT	2001/07/27 09:48
-	35	power adj1 detector and (455/127.ccls. and (power near2 amplifier same detect\$3))	USPAT	2001/07/27 10:00
-	7	((maximum or highest) near4 power same detect\$3 and ((maximum or highest) near4 power and (power adj1 detector and (455/127.ccls. and (power near2 amplifier same detect\$3))))	USPAT	2001/07/27 10:01
-	12	((maximum or highest) near4 power and (power adj1 detector and (455/127.ccls. and (power near2 amplifier same detect\$3))))	USPAT	2001/07/27 10:21
-	4	memory and variable near2 amplifier and ((maximum or highest) near4 power and (power adj1 detector and (455/127.ccls. and (power near2 amplifier same detect\$3))))	USPAT	2001/07/27 10:30
-	8	memory and variable near2 amplifier and (power adj1 detector and (455/127.ccls. and (power near2 amplifier same detect\$3)))	USPAT	2001/07/27 10:30



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/142,051	05/10/2002	Makoto Katagishi		3869

24956 7590 08/10/2004

MATTINGLY, STANGER & MALUR, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

EXAMINER

FERGUSON, KEITH

ART UNIT

PAPER NUMBER

2683

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/142,051	Applicant(s) KATAGISHI ET AL.	
	Examiner Keith T. Ferguson	Art Unit 2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

1. Claims 8-10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-7 of U.S. Patent No. 6,408,193. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 4-5 of the patent talks about a smoothing circuit which would "increase gradually" which means that the only difference is the use of the ratio.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith T. Ferguson whose telephone number is (703) 305-4888. The examiner can normally be reached on 6:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on (703) 308-5318. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Application/Control Number: 10/142,051
Art Unit: 2683

Page 3

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Keith Ferguson
Art Unit 2683
August 6, 2004



FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. H-852-02		SERIAL NO. 10/142,051		
LIST OF DOCUMENTS CITED BY APPLICANT <i>(Use several sheets if necessary)</i>				APPLICANT M. KATAGISHI et al		GROUP 2683		
				FILING DATE May 10, 2002				
U.S. PATENT DOCUMENTS								
* EXAMINER INITIAL	DOCUMENT	DATE	NAME	CLASS	SUBCLASS	FILING DATE <i>(If Appropriate)</i>		
KE	AA	5,056,109	10/08/91	Gilhousen et al	—	—		
	AB							
	AC							
	AD							
	AE							
	AF							
	AG							
	AH							
	AI							
	AJ							
	AK							
FOREIGN PATENT DOCUMENTS								
	DOCUMENT	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO		
KE	AL	9-46152	02/14/97	Japan	—	—	<input type="checkbox"/>	<input type="checkbox"/>
	AM	4-277909	10/02/92	Japan	—	—	<input type="checkbox"/>	<input type="checkbox"/>
	AN	6-252797	09/09/94	Japan	—	—	<input type="checkbox"/>	<input type="checkbox"/>
	AO					<input type="checkbox"/>	<input type="checkbox"/>	
	AP					<input type="checkbox"/>	<input type="checkbox"/>	
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, etc.)</i>								
	AR							
	AS							
	AT							
EXAMINER Keith Ferguson				DATE CONSIDERED 8/5/04				
<small>* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>								



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OCT 25 2004

Technology Center 2600

H-852-02

41

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

M. Katagishi et al

Serial No. 10/142,051

Group Art Unit: 2683

Filed: May 10, 2002

Examiner: K. Ferguson

For: CELLULAR TELEPHONE

INFORMATION DISCLOSURE STATEMENT (IDS)
UNDER § 1.97 AND § 1.98

Commissioner for Patents
Mail Stop DD
P.O. Box 1450
Alexandria, VA 22313-1450

October 21, 2004

Sir:

1. This IDS should be considered:

(a) when filed within three months of the filing date of the present application, or within three months of the filing date of the National Stage as set forth in § 1.491 in an international application, or before the mailing date of a first Office Action on the merits, whichever occurs last;

(b) when filed before the mailing date of either a Final Rejection under § 1.113 or a Notice of Allowance under § 1.311, whichever occurs first and when 1(a) does not apply. For this purpose, there is included herein either a certification in section 4 below (included when indicated by a marked box), or a fee of \$180.00 (a Credit Card Payment Form in the amount of \$180.00 is enclosed, or if not see section 5 below);

(c) when filed prior to the payment of the Issue Fee, when 1(a)-(b) do not apply, and when a certification is included in section 4 below (included when indicated by a marked box); then the Applicant(s) hereby petition(s) and request(s) consideration of this IDS, and provided herewith is

a fee of \$180.00 (a Credit Card Payment Form in the amount of \$180.00 to cover the petition fee, or if not see section 5 below).

2. When 1(a)-(c) do not apply, then it is requested that this IDS be placed in the file.

3. Listing of the information submitted is on the attached Form PTO-1449, which forms a part of this IDS. A copy of each listed document is enclosed when needed (needed for U.S. and foreign patents, publication or portion thereof listed; no copy of a U.S. patent application is needed; a copy of a document is not needed when previously submitted or previously cited by the PTO in a parent application of the present application as set forth under 35 U.S.C. § 120).

4. The undersigned hereby states:

☐ (a) that each item of information contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application, as indicated on the copy of the communication submitted herewith, which communication was dated not more than three months prior to the filing of this IDS; or

☒ (b) that no item of information contained in this IDS was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned after making reasonable inquiry, was known to any individual designated in § 1.56(c) more than three months prior to the filing of this IDS.

5. If a fee or additional fee is required, the Commissioner is hereby authorized to charge any fee or additional fee that may be required and credit any excess to Deposit Account No. 50-1417.

6. No explanation of relevancy is being provided for the following document(s) because each is either in the English language, discussed in the present Specification, or its relevance is as stated in a communication from a foreign patent office in a counterpart foreign application.

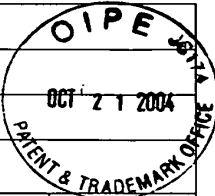
7. If the PTO determines that part(s) of the required content is inadvertently omitted, then it is requested that the Applicant(s) be given additional time and specific identification of such omission(s) to enable full compliance.

Respectfully submitted,



Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
(703) 684-1120
Date: October 21, 2004

FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. H-852-02	SERIAL NO. 10/142,051		
LIST OF DOCUMENTS CITED BY APPLICANT <i>(Use several sheets if necessary)</i>				APPLICANT M. KATAGISHI et al			
				FILING DATE May 10, 2002			
				GROUP 2683			
U.S. PATENT DOCUMENTS							
* EXAMINER INITIAL	DOCUMENT	DATE	NAME	CLASS	SUBCLASS	FILING DATE (If Appropriate)	
	AA 5,452,473	9/19/95	WEILAND et al				
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
FOREIGN PATENT DOCUMENTS							
	DOCUMENT	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
	AL					<input type="checkbox"/>	<input type="checkbox"/>
	AM					<input type="checkbox"/>	<input type="checkbox"/>
	AN					<input type="checkbox"/>	<input type="checkbox"/>
	AO					<input type="checkbox"/>	<input type="checkbox"/>
	AP					<input type="checkbox"/>	<input type="checkbox"/>
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, etc.)</i>							
	AR						
	AS						
	AT						
EXAMINER				DATE CONSIDERED			
<small>* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>							

MATTINGLY, STANGER & MALUR, P.C.

ATTORNEYS AT LAW

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COLIN D. BARNITZ
GENE W. STOCKMAN
OF COUNSELJEFFREY M. KETCHUM
Registered Patent Agent

* Bar Membership Other Than Virginia

(703) 684-1120

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AND COPYRIGHT LAW

FACSIMILE: (703) 684-1157

Date: December 10, 2004

FACSIMILE COVER LETTER

Facsimile Number: (703) 872-9306

To: Examiner K. Ferguson
Group Art Unit 2683, USPTO

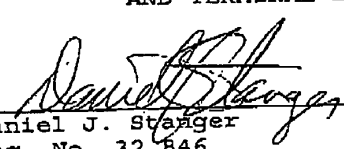
From: Mr. Daniel J. Stanger
MATTINGLY, STANGER & MALUR, P.C.

Re: USSN 10/142,051
Attorney Docket No.: H-852-02

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that the following listed documents are being facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below:

PTO-1083 TRANSMITTAL;
REPLY;
PETITION FOR ONE-MONTH EXTENSION OF TIME;
TERMINAL DISCLAIMER; AND
CREDIT CARD FORM INCLUDING \$250.00 IN PAYMENT
OF PETITION FOR ONE-MONTH EXTENSION OF TIME
AND TERMINAL DISCLAIMER FEE.


Daniel J. Stanger
Reg. No. 32,846

December 10, 2004

Date

Total Number of Pages (including cover sheet): **13**

If the facsimile you receive is incomplete or illegible,
please CALL (703) 684-1120. Thank you.

BEST AVAILABLE COPY

FORM PTO-1083

PATENT

Case Docket No. H-852-02

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DEC 10 2004

In RE application of M. KATAGISHI et al

Serial No.: 10/142,051

Group Art Unit: 2683

Filed: May 10, 2002

Examiner: K. FERGUSON

For: CELLULAR TELEPHONE

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith is an Amendment in the above-identified application.

- ☐ Small entity status of this application under 37 CFR 1.9 and 1.27 has been established by a verified statement previously submitted.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27 is enclosed.
- ☐ No additional fee is required.

The fee has been calculated as shown below:

(COL. 1)		(COL. 2)		(COL. 3)
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra
Total	10	Minus	20	0
Indep.	3	Minus	3	0

☐ First Presentation of Multiple Dependent Claims

SMALL ENTITY	
Rate	Additional Fee
x 9	\$
x 42	\$
+ 140	\$
Total	\$

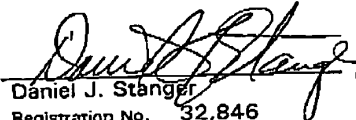
OTHER THAN A SMALL ENTITY	
Rate	Additional Fee
x 18	\$ 0
x 84	\$ 0
+ 280	\$ 0
Total	\$ 0

- * If the entry in Col. 1 is less than the entry in Col. 2, write '0' in Col. 3.
- ** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 20, write '20' in this space.
- *** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 3, write '3' in this space.
- ... The 'Highest Number Previously Paid For' (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior Amendment or the number of claims originally filed.

- ☐ Please charge my Deposit Account No. 50-1417 in the amount of \$ _____.
- ☒ A check in the amount of \$ 250.00 is attached in payment of:
CREDIT CARD FORM INCL 1M EOT & TERM DISCL FEE.
- ☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-1417.
- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.
- ☒ Any patent application processing fees under 37 CFR 1.17.
- ☒ Any Extension of Time fees that are necessary, which are hereby requested if necessary.

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
(703) 684-1120

By:


 Daniel J. Stanger
 Registration No. 32,846
 Attorney for Applicant(s)
Date: December 10, 2004

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DEC 10 2004

H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

M. KATAGISHI et al.

Serial No. 10/142,051

Group Art Unit: 2683

Filed: May 10, 2002

Examiner: K. Ferguson

For: CELLULAR TELEPHONE

REPLY

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

December 10, 2004

Sir:

In response to the Office Action dated August 10, 2004,
the Applicants request reconsideration as set forth below. A
Petition for a One-Month Extension of Time accompanies this
Reply.

12/13/2004 EKOLI1 00000005 10142051

02 FC:1251

120.00 OP

U.S. Serial No. 10/142,051

H-852-02

IN THE CLAIMS

Please amend Claims 8-10, and add new claims 11-17 as set forth below.

1-7 (Canceled).

8. (Currently amended) A cellular telephone used in a CDMA system comprising:

an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station and transmitting a second communication signal to the cell-site station,

a duplexer connected to said antenna,

a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a power control signal ~~deriving~~ derived from said transmitting power control signal sent from said cell-site station,

an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into an audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into an input voice code signal,

U.S. Serial No. 10/142,051

H-852-02

a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said input voice code signal into said second communication signal, and

a controller connected to said receiver and said transmitter for ~~controlling~~ amplitude control of said transmitter,

wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector for controlling an output power of said power amplifier, said controller includes a central processing unit and a memory, said controller controls 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 the transmitted power to converge into a range required by said cell-site station, and said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between the bias data and the gain data stored in said memory, in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and that said bias condition increases gradually

U.S. Serial No. 10/142,051

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to the maximum value when output intensity increases to the value taken when said cellular telephone is very far from the cell-site station.

9. (Previously presented) A cellular telephone according to claim 8, wherein said bias condition is nearly 60 percent of the maximum value when said output intensity is nearly up to -50 dB.

10. (Previously presented) A cellular telephone according to claim 8, wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.

11. (New) A method of controlling a transmission power of a cellular telephone adapted to be used in a CDMA system, said method comprising the steps of:

receiving a first communication signal and a transmitting power control signal from a cell-site station by a receiver of the cellular telephone;

outputting a power control signal derived from the transmitting power control signal sent from the cell-site station;

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inputting a data signal;

converting the input data signal into a second communication signal;

controlling a transmitter of the cellular telephone so that an open-loop power control is performed at first and then a closed-loop power control is performed according to the power control signal so as to control a transmission power to converge into a range required by said cell-site station, and

transmitting the second communication signal to the cell-site station by the transmitter;

wherein the transmitter includes a variable amplitude amplifier and a power amplifier, and a gain of the variable amplifier and a bias condition of the power amplifier are controlled so as to control the transmission power to change gradually based on a function defining a relation between bias data and gain data stored in a memory of the cellular phone.

12. (New) A method according to Claim 11,

wherein said bias condition is nearly 60 percent of a bias condition maximum value when output intensity of said second communication signal is nearly up to -50 dB.

13. (New) A method according to Claim 11,

U.S. Serial No. 10/142,051

H-852-02

wherein said bias condition increases gradually to a bias condition maximum value when output intensity of said second communication signal increases within the range of -50 dB to 0 dB.

14. (New) A method according to Claim 11, further comprising the steps of:

supplying a pulse-width-controlled pulse so as to control said bias condition; and
smoothing said pulse.

15. (New) 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:

receiving a first communication signal and a transmitting power control signal from a cell-site station,

generating a power control signal derived from said transmitting power control signal received from said cell-site station,

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

U.S. Serial No. 10/142,051

H-852-02

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

converting an audio input signal from said acoustic
transducer into an input voice code signal,

converting said input voice code signal into a second
communication signal,

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

controlling a gain of said variable amplitude amplifier
and a bias condition of said power amplifier using a function
defining a relation between the bias data and the gain data
stored in said memory, in such a manner that said function
uses bias conditions defined in a ratio to the maximum bias
voltage value and 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.

U.S. Serial No. 10/142,051

H-852-02

16. (New) A method according to claim 15,
wherein said bias condition is nearly 60 percent of
the maximum value when said output intensity is nearly up to
-50 dB.

17. (New) A method according to claim 15,
wherein said bias condition increases gradually to the
maximum value when said output intensity increases within the
range of -50 dB to 0 dB.

U.S. Serial No. 10/142,051

H-852-02

REMARKS

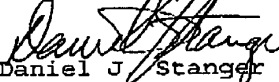
The Applicants request reconsideration of the rejection.
Claims 8-17 are now pending.

Claims 8-10 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-7 of parent patent no. 6,408,193. Without admitting to the propriety of the rejection, the Applicants submit herewith a Terminal Disclaimer to avoid the rejection.

New Claims 11-17 also patentably define over the prior art, and have been submitted to provide additional scope of patent protection.

In view of the foregoing amendments, remarks, new claims, and Terminal Disclaimer the Applicants request reconsideration of the rejection and allowance of the claims.

Respectfully submitted,



Daniel J. Stanger

Registration No. 32,846

Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
Date: December 10, 2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of
Serial No. 10/142,051
Filed: May 10, 2002
For: CELLULAR TELEPHONE

M. KATAGISHI et al.
Group Art Unit: 2683
Examiner: K. Ferguson

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DEC 10 2004

**TERMINAL DISCLAIMER TO OBIVATE A DOUBLE PATENTING
REJECTION (37 CFR 1.321(b)) (ref OG 7-28-92)**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 10, 2004

Sir:

The evidentiary documents accompanying or referred to in the Terminal Disclaimer have been reviewed by the undersigned and it is certified that, to the best of the assignees' knowledge and belief, title is in the assignees seeking to take action.

The Assignment was recorded on February 19, 2002, at Reel 012592, Frame 0250. Assignee/Assignees: Hitachi, Ltd.

We the Petitioners, as indicated herein, are the owners of 100 percent interest in the instant application. Petitioners hereby disclaim, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of U.S. Patent No. 6,408,193. Petitioners hereby agree that any patent so granted on the application shall be enforceable only for and during such period that it and the above-listed patent are commonly owned. This agreement runs with any patent granted on the application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, Petitioners do not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 to 156 and 173, as presently shortened by any terminal disclaimer, of the above-listed patent in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is otherwise terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

The undersigned is an attorney of record who may sign this Disclaimer in accordance with 37 CFR § 1.321(b)(1)(iv).

We hereby declare that all statements made herein of my/our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Attorney of Record:

Daniel J. Stanger
(Printed Name)

Attorney of Record
(Printed Title)

December 10, 2004
(Date)


(Signature)

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.
☒ The Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.
☒ PTO suggested wording for terminal disclaimer was
☒ unchanged, ☐ changed (if changed, an explanation should be supplied).

12/13/2004 EKOL11 00000005 10142051

01 FC:1814

130.00 OP

BEST AVAILABLE COPY

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

10142051

CLAIMS AS FILED - PART I

(Column 1)

(Column 2)

TOTAL CLAIMS	3	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	3 - minus 20 =	*
INDEPENDENT CLAIMS	1 - minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY
TYPE ☐

OR

OTHER THAN
SMALL ENTITY

RATE	FEE
BASIC FEE	370.00
X\$ 9=	
X42=	
+140=	
TOTAL	

RATE	FEE
BASIC FEE	740.00
X\$18=	
X84=	
+280=	
TOTAL	740

CLAIMS AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	* 10	Minus	** 20 = -
	Independent	* 3	Minus	*** 3 = -
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

RATE	ADDI- TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDI- TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	** =
	Independent	*	Minus	*** =
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

RATE	ADDI- TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDI- TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	** =
	Independent	*	Minus	*** =
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

RATE	ADDI- TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDI- TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

EAST Search Notes

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	371	open adj loop same close adj loop	US-PGPUB; USPAT	OR	ON	2005/03/16 16:49
L2	17800	gain same bias	US-PGPUB; USPAT	OR	ON	2005/03/16 16:48
L3	35	l1 and l2	US-PGPUB; USPAT	OR	ON	2005/03/16 16:48
L4	1294	gain same bias same (stor\$ or memory or database)	US-PGPUB; USPAT	OR	ON	2005/03/16 17:00
L5	1	l3 and l4	US-PGPUB; USPAT	OR	ON	2005/03/16 16:49
L6	1	l1 and l4	US-PGPUB; USPAT	OR	ON	2005/03/16 16:49
L7	10185	open\$2 adj loop same close\$2 adj loop	US-PGPUB; USPAT	OR	ON	2005/03/16 17:00
L8	40	l4 and l7	US-PGPUB; USPAT	OR	ON	2005/03/16 16:50
L9	2204	open\$2 adj loop same close\$2 adj loop	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:01
L10	2692	gain same bias same (stor\$5 or memory or database)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:02
L11	32	l9 and l10	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:01
L12	1340	open\$2 adj loop same close\$2 adj loop	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:02
L13	168	gain same bias same (stor\$5 or memory or database)	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:02
L14	1	l12 and l13	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/03/16 17:02

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	702	(open\$3 adj loop\$3 or close\$3 adj loop\$3) and 455/522,68,69.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/21 07:40
L2	261	(open\$3 adj loop\$3 same close\$3 adj loop\$3) and 455/522,68,69.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/21 07:40
L3	217	cdma and l2	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L4	66	power near amplifier and l3	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L5	1422	gain same bias same (stor\$ or memory or database or register\$3)	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L6	37	cdma and l5	US-PGPUB; USPAT	OR	ON	2005/03/21 08:36
L7	24	power near amplifier and l6	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L8	1	"6434130".pn.	US-PGPUB; USPAT	OR	ON	2005/03/21 08:36
L9	5629	varia\$ near1 amplifier	US-PGPUB; USPAT	OR	ON	2005/03/21 08:37
L10	0	l8 and l9	US-PGPUB; USPAT	OR	ON	2005/03/21 08:37
L11	1	amplifier and l8	US-PGPUB; USPAT	OR	ON	2005/03/21 09:08
L12	360	bias same smooth\$3 same pulse	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L13	1	l4 and l12	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L14	21698	pulse same bias	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L15	15780	smooth\$3 same pulse	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L16	1312	l14 and l15	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L17	101	power near amplifier and l16	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L18	27	power near amplifier same bias and l17	US-PGPUB; USPAT	OR	ON	2005/03/21 09:16
L19	3338	bias same (db or decibel)	US-PGPUB; USPAT	OR	ON	2005/03/21 09:19
L20	5	bias same (db or decibel) and l4	US-PGPUB; USPAT	OR	ON	2005/03/21 09:19
L21	6	bias same (db or decibel) and l2	US-PGPUB; USPAT	OR	ON	2005/03/21 09:45
L22	1	"4335468".pn. and power	US-PGPUB; USPAT	OR	ON	2005/03/21 09:45

Search History 3/21/05 10:26:06 AM Page 1
C:\APPS\EAST\Workspaces\ao142051.wsp

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	702	(open\$3 adj loop\$3 or close\$3 adj loop\$3) and 455/522;68,69.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/21 07:40
L2	261	(open\$3 adj loop\$3 same close\$3 adj loop\$3) and 455/522;68,69.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/21 07:40
L3	217	cdma and l2	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L4	66	power near amplifier and l3	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L5	1422	gain same bias same (stor\$ or memory or database or register\$3)	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
L6	37	cdma and l5	US-PGPUB; USPAT	OR	ON	2005/03/21 08:36
L7	24	power near amplifier and l6	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L8	1	"6434130".pn.	US-PGPUB; USPAT	OR	ON	2005/03/21 08:36
L9	5629	varia\$ near1 amplifier	US-PGPUB; USPAT	OR	ON	2005/03/21 08:37
L10	0	l8 and l9	US-PGPUB; USPAT	OR	ON	2005/03/21 08:37
L11	1	amplifier and l8	US-PGPUB; USPAT	OR	ON	2005/03/21 09:08
L12	360	bias same smooth\$3 same pulse	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L13	1	l4 and l12	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L14	21698	pulse same bias	US-PGPUB; USPAT	OR	ON	2005/03/21 09:10
L15	15780	smooth\$3 same pulse	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L16	1312	l14 and l15	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L17	101	power near amplifier and l16	US-PGPUB; USPAT	OR	ON	2005/03/21 09:11
L18	27	power near amplifier same bias and l17	US-PGPUB; USPAT	OR	ON	2005/03/21 09:16
L19	3338	bias same (db or decibel)	US-PGPUB; USPAT	OR	ON	2005/03/21 09:19
L20	5	bias same (db or decibel) and l4	US-PGPUB; USPAT	OR	ON	2005/03/21 09:19
L21	6	bias same (db or decibel) and l2	US-PGPUB; USPAT	OR	ON	2005/03/21 09:45
L22	1	"4335468".pn. and power	US-PGPUB; USPAT	OR	ON	2005/03/21 09:45

S1	1294	gain same bias same (stor\$ or memory or database)	US-PGPUB; USPAT	OR	ON	2005/03/21 08:05
S2	10298	(open\$3 adj loop\$3 same close\$3 adj loop\$3)	US-PGPUB; USPAT	OR	ON	2005/03/17 08:34
S3	41	S1 and S2	US-PGPUB; USPAT	OR	ON	2005/03/17 08:28
S4	91231	(open\$3 adj loop\$3 or close\$3 adj loop\$3)	US-PGPUB; USPAT	OR	ON	2005/03/21 07:39
S5	249	S1 and S4	US-PGPUB; USPAT	OR	ON	2005/03/17 08:34
S6	204	power and S5	US-PGPUB; USPAT	OR	ON	2005/03/17 08:35
S7	15001	(open\$3 adj loop\$3 and close\$3 adj loop\$3)	US-PGPUB; USPAT	OR	ON	2005/03/17 09:12
S8	111	S1 and S7	US-PGPUB; USPAT	OR	ON	2005/03/17 08:35
S9	97	power and S8	US-PGPUB; USPAT	OR	ON	2005/03/17 08:35
S10	10	("5287555" "5432473" "5493707" "5640691" "5926749").PN. OR ("6178313").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/03/17 08:38
S11	828	(open\$3 adj loop\$3 and close\$3 adj loop\$3) and "455"/\$.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/17 09:12
S12	651	(open\$3 adj loop\$3 same close\$3 adj loop\$3) and "455"/\$.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/17 09:12
S13	613	power and S12	US-PGPUB; USPAT	OR	ON	2005/03/17 09:13
S14	3591	455/91,116-128.ccls.	US-PGPUB; USPAT	OR	ON	2005/03/17 09:15
S15	86	S13 and S14	US-PGPUB; USPAT	OR	ON	2005/03/17 09:15
S16	13	("5126688" "5128629" "5182527" "5193223" "5293407" "5303268" "5334979" "5337006" "5530920" "5603106" "6256502" "6570929").PN. OR ("6701135").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/03/17 09:20
S17	10	("20020132595" "3680004" "5054116" "5438683" "5483681" "5559468" "5945876" "6353359" "6384677").PN. OR ("6606483").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2005/03/17 09:24



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/142,051	05/10/2002	Makoto Katagishi		3869
24956	7590	03/25/2005		
MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C. 1800 DIAGONAL ROAD SUITE 370 ALEXANDRIA, VA 22314				
			EXAMINER FERGUSON, KEITH	
			ART UNIT 2683	PAPER NUMBER

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/142,051	KATAGISHI ET AL.	
	Examiner	Art Unit	
	Keith T. Ferguson	2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
5) ☒ Claim(s) 8-10 and 15-17 is/are allowed.
6) ☒ Claim(s) 11-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/17/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

3. Claims 8-17 are objected to because of the following informalities: Claim 8 recites the limitation "the bias data" in line 38. It should recited "a bias data". Appropriate correction is required. Claim 8 recites the limitation "the gain data" in line 38. It should recite "a gain data". Appropriate

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correction is required. Claim 11 recites the limitation "the bias data" in line 25. It should recited "a bias data".

Appropriate correction is required. Claim 11 recites the limitation "the gain data" in line 26. It should recite "a gain data". Appropriate correction is required. Claim 15 recites the limitation "the bias data" in line 26. It should recited "a bias data". Appropriate correction is required. Claim 15 recites the limitation "the gain data" in line 27. It should recite "a gain data". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soininen et al. in view of Ichihara.

Regarding claim 1, Soininen et al. discloses a method (col.

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2 line 59 through col. 3 line 36 and col. 13 line 10 through col. 14 line 65) of controlling a transmission power of a cellular telephone adapted to be used in a CDMA system (col.

2 line 59 through col. 3 line 36 and col. 13 line 10 through col. 14 line 65), said method comprising the steps of: receiving a first communication signal and a transmitting power control signal from a cell-site station by a receiver of the cellular telephone (col. 6 lines 23-50); outputting a power control signal derived from the transmitting power control signal sent from the cell-site station (col. 6 lines 23-50); inputting a data signal; converting the input data signal into a second communication signal (col. 6 lines 23-50); controlling a transmitter of the cellular telephone so that an open-loop power control is performed at first and then a closed-loop power control is performed according to the power control signal so as to control a transmission power to converge into a range required by said cell-site station (col. 6 lines 23-50 and col. 9 lines 20-43), and transmitting the second communication signal to the cell-site station by the transmitter (col. 6 lines 23-50 and col. 9 lines 20-43), wherein the transmitter includes a power amplifier (fig. 2 number 28). Soininen et al. differs from claim 11 of the present invention in that it does not disclose the transmitter includes a variable amplitude amplifier and a gain of the variable amplifier and a bias condition of the power amplifier are controlled so as to control the transmission power to change gradually based on a function defining a relation between bias data and gain data stored in a memory of the cellular phone. Ichihara teaches a transmission power control device (fig. 2) in a CDMA system (col. 1 lines 36-42) wherein a transmitter includes a variable amplitude amplifier (fig. 2 number 11) and a gain of the variable amplifier and a bias condition of the power amplifier are controlled so as to control the transmission power to change gradually based on a function defining a relation between bias data and gain data stored in a memory (converting circuit) (fig. 2 number 18) of the cellular phone (fig. 2 and col. 2 line 63 through col. 3 line 49 and col. 5 line 57 through col. 6 line 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Soininen et al. with the transmitter includes a variable amplitude amplifier and a gain of the variable amplifier and a bias condition of the power amplifier are controlled so as to control the transmission power

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to change gradually based on a function defining a relation between bias data and gain data stored in a memory of the cellular phone in order to provide the cellular telephone a power control setting to overcome near or far problems caused by a distance between the cellular telephone and base station thereby reducing interference from other cellular telephones when making a call, as taught by Ichihara.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soininen et al. in view of Ichihara as applied to claim 11 above, and in further view of Kim et al..

Regarding claims 12 and 13, the combination of Soininen et al. and Ichihara differs from claims 12 and 13 of the present invention in that they do not disclose the bias condition is nearly (increases gradually) 60 percent of the bias condition maximum value when output intensity increases of said second communication signal is nearly up to -5Q dB to 0db. Kim et al. teaches a portable power control device wherein the bias condition is adjusted to a percent of the bias condition maximum value when output intensity increases of said second communication signal is 30 db. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Soininen et al. and Ichihara with the bias condition is nearly (increases gradually) 60 percent of the bias condition maximum value when output intensity increases of said second communication signal is nearly up to -5Q dB to 0db in order to improve the received power control signal between the cellular telephone and base station for reliable communication and less interference, as taught by Kim et al..

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soininen et al. in view of Ichihara as applied to claim 11 above, and in further view of Foster et al..

Regarding claim 14, the combination of Soininen et al. and Ichihara differs from claim 14 of the present invention in that they do not disclose supplying a pulse-width-controlled

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pulse so as to control said bias condition; and smoothing said pulse. Foster et al. teaches a power control device (abstract and col. 3 lines 41-64) wherein supplying a pulse-width-controlled pulse so as to control said bias condition (col. 3 lines 41-64); and smoothing said pulse (col. 3 lines 41-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Soinen et al. and Ichihara with supplying a pulse-width-controlled pulse so as to control said bias condition; and smoothing said pulse in order to suppress interference that would be generated when supplying a power control signal from the cellular telephone to the base station, as taught by Foster et al..

Allowable Subject Matter

8. Claims 8-10 and 15-17 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 8, the prior art of record fails to teach or suggest, alone or in combination a cellular telephone used in a CDMA system comprising: an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station and transmitting a second communication signal to the cell-site station, a duplexer connected to said antenna, a receiver connected to said antenna through a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code and for outputting a power control signal derived from said transmitting power control signal sent from said cell-site station, **an encoder/decoder apparatus connected**

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to said receiver and an acoustic transducer for converting said voice signal code into an audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into an input voice code signal, a transmitter connected to said encoder/decoder apparatus said duplexer for converting said and to said antenna through input voice code signal into said second communication signal, a controller connected to said receiver and said transmitter for amplitude control of said transmitter, wherein said transmitter includes a variable amplitude amplifier and a power amplifier, said power amplifier includes a maximum power detector for controlling an output power of said power amplifier, said controller includes a central processing unit and a memory, said controller controls said transmitter in such a manner that an open-loop power control performed at first and then a closed-loop power control is performed according to said power control signal so as to control the transmitted power to converge into a range required by said cell-site station, and said controller controls a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between the bias data and the gain data stored in said memory, in such a manner that said function uses bias conditions defined in a ratio to the maximum bias

Art Unit: 2683

voltage value and that said bias condition increases gradually.

Regarding claim 15, the prior art of record fails to teach or suggest, alone or in combination 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: receiving a first communication signal power control signal from a cell-site station, generating a power control signal derived from said transmitting power control signal received from said cell-site station, **converting said first communication signal received from a cell-site station into a voice signal code, and a transmitting converting said voice signal code into an audio signal of said cellular telephone, for driving an acoustic transducer converting an audio input signal from said acoustic transducer into an input voice code signal, converting said input voice code signal into a second communication signal, 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 controlling a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function**

Art Unit: 2683

defining a relation between the bias data and the gain data stored in said memory, in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and 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.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2683

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith T. Ferguson whose telephone number is (703) 305-4888. The examiner can normally be reached on 6:30am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on (703) 308-5318. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Keith Ferguson *Keith 2*
Art Unit 2683

Application/Control Number: 10/142,051

Page 11

Art Unit: 2683

March 21, 2005

Notice of References Cited	Application/Control No. 10/142,051	Applicant(s)/Patent Under Reexamination KATAGISHI ET AL.	
	Examiner Keith T. Ferguson	Art Unit 2683	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-4,335,468	06-1982	Foster et al.	455/501
	B	US-6,434,130	08-2002	Soininen et al.	370/331
	C	US-5,710,981	01-1998	Kim et al.	455/69
	D	US-6,434,373	08-2002	Ichihara, Masaki	455/127.5
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

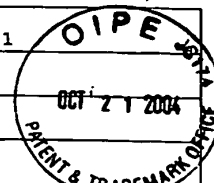
NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	


*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. H-852-02	SERIAL NO. 10/142,051		
LIST OF DOCUMENTS CITED BY APPLICANT (Use several sheets if necessary)				APPLICANT M. KATAGISHI et al			
				FILING DATE May 10, 2002			
				GROUP 2683			
U.S. PATENT DOCUMENTS							
* EXAMINER INITIAL	DOCUMENT	DATE	NAME	CLASS	SUBCLASS	FILING DATE (If Appropriate)	
KF	AA	5,452,473	9/19/95	WEILAND et al			
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
FOREIGN PATENT DOCUMENTS							
	DOCUMENT	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
	AL					<input type="checkbox"/>	<input type="checkbox"/>
	AM					<input type="checkbox"/>	<input type="checkbox"/>
	AN					<input type="checkbox"/>	<input type="checkbox"/>
	AO					<input type="checkbox"/>	<input type="checkbox"/>
	AP					<input type="checkbox"/>	<input type="checkbox"/>
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)							
	AR						
	AS						
	AT						
EXAMINER Keith Ferguson			DATE CONSIDERED 3/15/05				

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



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Search Notes 	Application No.	Applicant(s)	
	10/142,051	KATAGISHI ET AL.	
	Examiner	Art Unit	
	Keith T. Ferguson	2683	

SEARCHED			
Class	Subclass	Date	Examiner
455	500 517 69	3/15	KF
	522	3/15	KF

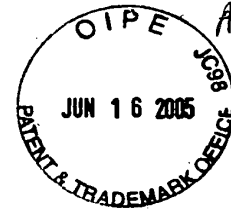
INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
East Search Included	3/15/05	KF
Consulted with Rexford Barrie	3/17	KF

FORM PTO-1083

PATENT

Case Docket No. H-852-02



In RE application of M. KATAGISHI et al

Serial No.: 10/142,051

Group Art Unit: 2683

Filed: May 10, 2002

Examiner: K. FERGUSON

For: CELLULAR TELEPHONE

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith is an Amendment in the above-identified application.

- ☐ Small entity status of this application under 37 CFR 1.9 and 1.27 has been established by a verified statement previously submitted.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27 is enclosed.
- ☒ No additional fee is required.

The fee has been calculated as shown below:

	(COL. 1)		(COL. 2)		(COL. 3)
	Claims Remaining After Amendment		Highest No. Previously Paid For		Present Extra
Total	* 6	Minus	** 20	=	0
Indep.	* 2	Minus	*** 3	=	0

☐ First Presentation of Multiple Dependent Claims

SMALL ENTITY	
Rate	Additional Fee
x 9	\$
x 42	\$
+ 140	\$
Total	\$

OTHER THAN A SMALL ENTITY	
Rate	Additional Fee
x 18	\$ 0
x 84	\$ 0
+ 280	\$ 0
Total	\$ 0

- * If the entry in Col. 1 is less than the entry in Col. 2, write '0' in Col. 3.
- ** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 20, write '20' in this space.
- *** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 3, write '3' in this space.
- The 'Highest Number Previously Paid For' (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior Amendment or the number of claims originally filed.

- ☐ Please charge my Deposit Account No. 50-1417 in the amount of \$ _____.
- ☐ A check in the amount of \$ _____ is attached in payment of: _____.
- ☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-1417.
- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.
- ☒ Any patent application processing fees under 37 CFR 1.17.
- ☒ Any Extension of Time fees that are necessary, which are hereby requested if necessary.

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
(703) 684-1120

Date: June 16, 2005

By: 
Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)



H-852-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

M. KATAGISHI et al.

Serial No. 10/142,051

Group Art Unit: 2683

Filed: May 10, 2002

Examiner: K. Ferguson

For: CELLULAR TELEPHONE

REPLY

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

June 16, 2005

Sir:

In response to the final rejection dated March 25, 2005,
the Applicants request reconsideration as set forth below.

IN THE ABSTRACT

Please replace the Abstract as originally filed with the amended Abstract as set forth below:

ABSTRACT OF THE DISCLOSURE

A cellular telephone includes a receiver connected to an antenna through a duplexer. The receiver converts a first communication signal into a voice signal code, and outputs a signal indicating an intensity of the first communication signal. The cellular telephone also includes a transmitter connected to an encoder/decoder apparatus and to the antenna through the duplexer. The receiver converts the input voice code signal from the encoder/decoder apparatus into a second communication signal. A controller controls the amplitude of the transmitter corresponding to the intensity of the first communication signal. The transmitter includes a variable amplitude amplifier and a power amplifier, and the controller includes a central processing unit and a memory. The controller controls a gain of the variable amplitude amplifier and a bias condition of the power amplifier according to a function stored in the memory.

IN THE CLAIMS

1-7. (Canceled).

8. (Currently amended) A cellular telephone used in a CDMA system comprising:

an antenna for receiving a first communication signal and a transmitting power control signal from a cell-site station and transmitting a second communication signal to the cell-site station,

a duplexer connected to said antenna,

a receiver connected to said antenna through said duplexer for converting said first communication signal into a voice signal code, and for outputting a power control signal derived from said transmitting power control signal sent from said cell-site station,

an encoder/decoder apparatus connected to said receiver and an acoustic transducer for converting said voice signal code into an audio signal for driving said acoustic transducer and converting an audio input signal from said acoustic transducer into an input voice code signal,

a transmitter connected to said encoder/decoder apparatus and to said antenna through said duplexer for converting said

input voice code signal into said second communication signal,
and

a controller connected to said receiver and said
transmitter for amplitude control of said transmitter,

wherein said transmitter includes a variable amplitude
amplifier and a power amplifier, said power amplifier includes
a maximum power detector for controlling an output power of
said power amplifier, said controller includes a central
processing unit and a memory, said controller controls 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 the transmitted power to converge into a range
required by said cell-site station, and said controller
controls a gain of said variable amplitude amplifier and a
bias condition of said power amplifier using a function
defining a relation between [the] bias data and [the] gain
data stored in said memory, in such a manner that said
function uses bias conditions defined in a ratio to the
maximum bias voltage value and 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.

9. (Previously amended) A cellular telephone according to claim 8, wherein said bias condition is nearly 60 percent of the maximum value when said output intensity is nearly up to -50 dB.

10. (Previously presented) A cellular telephone according to claim 8, wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.

11-14. (Canceled).

15. (Currently amended) 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:

receiving a first communication signal and a transmitting power control signal from a cell-site station,

generating a power control signal derived from said transmitting power control signal received from said cell-site station,

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

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

converting an audio input signal from said acoustic transducer into an input voice code signal,

converting said input voice code signal into a second communication signal,

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

controlling a gain of said variable amplitude amplifier and a bias condition of said power amplifier using a function defining a relation between [the] bias data and [the] gain data stored in said memory, in such a manner that said function uses bias conditions defined in a ratio to the maximum bias voltage value and 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.

16. (Previously presented) A method according to claim 15,

wherein said bias condition is nearly 60 percent of the maximum value when said output intensity is nearly up to -50 dB.

17. (Previously presented) A method according to claim 15,

wherein said bias condition increases gradually to the maximum value when said output intensity increases within the range of -50 dB to 0 dB.

REMARKS

The Applicants request reconsideration of the rejection.

A replacement Abstract has been submitted to overcome the Examiner's objection to the length of the Abstract as originally filed.

Claims 8-17 are objected to because of minor grammatical informalities, and the claims have been amended to address the Examiner's objections, without narrowing the scope of the claims.


Claims 8-10 and 15-17 are allowed.

Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Soininen, et al., U.S. 6,434,130 (Soininen) in view of Ichihara, U.S. 6,434,373 (Ichihara). Claims 12 and 13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Soininen et al. in view of Ichihara as applied to Claim 11, and in further view of Kim, et al., U.S. 5,710,981 (Kim). Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Soininen et al, in view of Ichihara as applied to Claim 11 above, and in further view of Foster et al., U.S. 4,335,468 (Foster).

Without admitting to the propriety of these art rejections, the Applicants simply note that Claims 11-14 have been canceled to expedite the allowance of Claims 8-10 and 15-17.

In view of the foregoing amendments, remarks, new claims, and Terminal Disclaimer the Applicants request reconsideration of the rejection and allowance of the claims.

Respectfully submitted,


Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)

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1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
Date: June 16, 2005

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

10142051

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	3	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	3 - minus 20 =	-
INDEPENDENT CLAIMS	1 - minus 3 =	-
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	10	20	-
Independent	3	3	-
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

6/16/05

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	6	20	-
Independent	2	3	-
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total			
Independent			
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

- * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
- ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
- *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐ OR OTHER THAN SMALL ENTITY

RATE	FEE	RATE	FEE
BASIC FEE	370.00	BASIC FEE	740.00
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL		TOTAL	740

SMALL ENTITY OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

10142051

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	3	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	3 - minus 20 =	-
INDEPENDENT CLAIMS	1 - minus 3 =	-
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	10	20	-
Independent	3	3	-
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

6/16/05

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	6	20	-
Independent	2	3	-
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total			
Independent			
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

- * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
- ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
- *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐ OR OTHER THAN SMALL ENTITY

RATE	FEE	RATE	FEE
BASIC FEE	370.00	BASIC FEE	740.00
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL		TOTAL	740

SMALL ENTITY OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
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ADDIT. FEE		ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
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RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL		TOTAL	
ADDIT. FEE		ADDIT. FEE	

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NOTICE OF ALLOWANCE AND FEE(S) DUE

24956 7590 07/13/2005

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

EXAMINER

FERGUSON, KEITH

ART UNIT

PAPER NUMBER

2683

DATE MAILED: 07/13/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/142,051	05/10/2002	Makoto Katagishi		3869

TITLE OF INVENTION: CELLULAR TELEPHONE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	10/13/2005

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24956 7590 07/13/2005

**MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/142,051	05/10/2002	Makoto Katagishi		3869

TITLE OF INVENTION: CELLULAR TELEPHONE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$1700	10/13/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
FERGUSON, KEITH	2683	455-571000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number** is required.

2. For printing on the patent front page, list
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/142,051	05/10/2002	Makoto Katagishi		3869

24956 7590 07/13/2005

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

EXAMINER

FERGUSON, KEITH

ART UNIT

PAPER NUMBER

2683

DATE MAILED: 07/13/2005

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 367 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 367 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability	Application No.		Applicant(s)		
	10/142,051		KATAGISHI ET AL.		
	Examiner		Art Unit		
Keith T. Ferguson		2683			

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6/16/05.
2. ☒ The allowed claim(s) is/are 8-10 and 15-17.
3. ☒ The drawings filed on 10 May 2002 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.


5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

<ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material 	<ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____ 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____
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Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/142,051	KATAGISHI ET AL.	
	Examiner	Art Unit	
	Keith T. Ferguson	2683	

ISSUE CLASSIFICATION									
ORIGINAL		CLASS	CROSS REFERENCE(S)						
CLASS	SUBCLASS		SUBCLASS (ONE SUBCLASS PER BLOCK)						
455	571	455	522	69	550.1	126	127.1	115	
INTERNATIONAL CLASSIFICATION		370	311						
404 Q	7120	375	345						
404 Q	7132								
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	/								
	/								
_____ (Assistant Examiner) (Date)		_____ (Primary Examiner) (Date)			Total Claims Allowed: 6				
_____ (Legal Instruments Examiner) (Date)		_____ (Primary Examiner) (Date)			O.G. Print Claim(s) 8		O.G. Print Fig. 1		

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant										<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61		91		121		151		181		
	2		32		62		92		122		152		182		
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	4		34		64		94		124		154		184		
	5		35		65		95		125		155		185		
	6		36		66		96		126		156		186		
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	29		59		89		119		149		179		209		
	30		60		90		120		150		180		210		

Index of Claims



Application/Control No.

10/142,051

Examiner

Keith T. Ferguson

Applicant(s)/Patent under Reexamination

KATAGISHI ET AL.

Art Unit

2683

✓	Rejected
=	Allowed

—	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date			
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

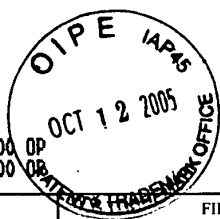
24956 7590 07/13/2005

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
 1800 DIAGONAL ROAD
 SUITE 370
 ALEXANDRIA, VA 22314

10/14/2005 MBEYENE2 00000046 10142051

01 FC:1501
 02 FC:1504

1400.00 OP
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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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TITLE OF INVENTION: CELLULAR TELEPHONE

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nonprovisional	NO	\$1400	\$300	\$1700	10/13/2005

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FERGUSON, KEITH	2683	455-571000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

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2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

MATTINGLY, STANGER,
 1 MALUR & BRUNDIDGE PC
 2
 3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

HITACHI, LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

TOKYO, JAPAN

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☒ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-1417 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature

Daniel J. Stanger
 DANIEL J. STANGER

Date OCTOBER 12, 2005

Typed or printed name

Registration No. 32,846

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
filed in the U.S. District Court Central District of California on the following
☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:17-cv-7528	DATE FILED 10/13/2017	U.S. DISTRICT COURT Central District of California
PLAINTIFF Maxell, Ltd.		DEFENDANT ASUSTeK Computer, Inc. and ASUS Computer International, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 See Attachment A-e		
2 6430498		
3 9451229		
4 6973334		
5 7551209		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6243340		
2 7403226		
3 9544517		
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5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court _____ for the District of Delaware _____ on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED 10/13/2017	U.S. DISTRICT COURT for the District of Delaware
PLAINTIFF Maxell, Ltd.		DEFENDANT BlackBerry Corporation and BlackBerry Ltd.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 See Attachment A		
2 6580999		
3 8170394		
4 6973334		
5 7199821		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6765616		
2 7995897		
3 9100604		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas, Texarkana Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 5:18-CV-33	DATE FILED 3/2/2018	U.S. DISTRICT COURT for the Eastern District of Texas, Texarkana Division
PLAINTIFF MAXELL, LTD.		DEFENDANT HUAWEI DEVICE USA, INC., and HUAWEI DEVICE CO., LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 7,324,487	1/29/2008	Maxell, Ltd.
2 7,068,503	6/27/2006	Maxell, Ltd.
3 8,982,086	3/17/2015	Maxell, Ltd.
4 6,928,306	8/9/2005	Maxell, Ltd.
5 6,983,140	1/3/2006	Maxell, Ltd.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY		
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1			
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.)

DOCKET NO. 5:18-CV-33	DATE FILED 3/2/2018	U.S. DISTRICT COURT for the Eastern District of Texas, Texarkana Division
PLAINTIFF MAXELL, LTD.		DEFENDANT HUAWEI DEVICE USA, INC., and HUAWEI DEVICE CO., LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6 7,995,897	8/9/2011	Maxell, Ltd.
7 6,347,068	2/12/2002	Maxell, Ltd.
8 6,973,334	12/6/2005	Maxell, Ltd.
9 9,544,517	1/10/2017	Maxell, Ltd.
10 7,515,810	4/7/2009	Maxell, Ltd.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy