EXPRESS MAIL NO.: EM 274 088 328 US
IN THE U.S. PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of:

APPLICANTS:	Lindholm et al.
SERIAL NO.:	
FILING DATE:	Herewith
EXAMINER:	
ART UNIT:	
DOCKET NO.:	863.0099.U1(US)
TITLE:	Method, Apparatus And Computer Program For Power Control Related To Random Access Procedures

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PRELIMINARY AMENDMENT

Sir:

This Preliminary Amendment is herewith filed in conjunction with the filing of a new U.S. Patent Application. Any fee required as a result of this Preliminary Amendment should be charged to Deposit Account No. 50-1924.

Please amend the application as shown below.

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listings, of the claims in this application.

1. (Original) A method comprising:

using a processor to initialize for *i*=0 a first power control adjustment state g(i) for an uplink control channel and a second power control adjustment state f(*i*) for an uplink shared channel to each reflect an open loop power control error;

using the processor to compute an initial transmit power for the uplink shared channel using full pathloss compensation, wherein the initial transmit power depends on a preamble power of a first message sent on an access channel , and is initialized with the second power control adjustment state f(0); and

sending from a transmitter a third message on the uplink shared channel at the initial transmit power.

2. (Original) The method according to claim 1, wherein the first message comprises a random access request message, the method further comprising:

computing the preamble power using full pathloss compensation,

sending from the transmitter on the access channel the first message and in response receiving at a receiver a second message that comprises an allocation of resources on which the third message is sent;

and after sending the third message, the method further comprises using the processor to compute an updated transmit power for the uplink shared channel using fractional power control and sending from the transmitter a subsequent message on the uplink shared channel using the updated transmit power.

3. (Original) The method according to claim 1, wherein the second power control adjustment state f(*i*) for *i*=0 is initialized as:

$$P_{0\_UE\_PUSCH} + f(0) = \Delta P_{PC} + \Delta P_{rampup};$$

wherein: $P_{0\_UE\_PUSCH}$ is a power control constant for the uplink shared channel that is specific for a user equipment executing the method;

ΔP_{rampup} is a ramp-up power for preamble transmissions; and

ΔP_{PC} is a power control command indicated in a second message that is received in response to sending the first message.

4. (Currently Amended) The method according to claim 1~~any one of claims 1 through 3~~, wherein the first power control adjustment state g(*i*) for *i*=0 is initialized as:

$$P_{0\_UE\_PUCCH} + g(0) = \Delta P_{PC} + \Delta P_{rampup};$$

wherein: $P_{O\_UE\_PUCCH}$ is a power control constant for the uplink control channel power that is specific for a user equipment executing the method.

5. (Original) The method according to claim 4, wherein $P_{0\_UE\_PUSCH} = P_{O\_UE\_PUCCH} = 0$ when computing initial values at *i*=0 of power control states for the respective shared and control channels.

6. (Currently Amended) The method according to claim 1~~any one of claims 1 through 3~~,

wherein the initial transmit power P_{Msg3} of the third message for *i*=0 is equal to:

$$P_{Msg3} = \min\{P_{\max}, P_{preamble} + \Delta_{0,preamble\_Msg3} + \Delta_{PC\_Msg3} + 10\log_{10}(M_{\text{PUSCH}}(i)) + \Delta_{\text{TF}}(TF(i))\};$$

in which: P_{MAX} is a maximum allowed transmission power;

$P_{preamble}$ is the preamble power of the first message;

$M_{\text{PUSCH}}(i)$ is determined from an uplink resource allocation of a second message received in response to sending the first message;

$\Delta_{\text{TF}}(TF(i))$ is calculated from received signaling;

Δ_{PC_Msg3} is indicated by a power control command received at the receiver; and

$\Delta_{0,preamble\_Msg3}$ is an offset from the preamble power.

7. (Original) A method according to claim 6, further comprising, after sending the third message, using the processor to compute an updated transmit power for the shared uplink channel using fractional power control and sending from the transmitter a subsequent message on the uplink shared channel using the updated transmit power, wherein the updated transmit power $P_{\text{PUSCH}}(i)$ is equal to:

$$P_{\text{PUSCH}}(i) = \min\{P_{\text{MAX}}, 10\log_{10}(M_{\text{PUSCH}}(i)) + P_{\text{O\_PUSCH}}(j) + \alpha \cdot PL + \Delta_{\text{TF}}(TF(i)) + f(i)\};$$

wherein: $P_{\text{O\_PUSCH}}(j)$ is calculated from received signaling,

α or an indication of α is received in signaling, and

PL is path loss that is estimated from received signaling.

8. (Original) The method according to claim 7, wherein α=1 for the third message and for all retransmissions of the third message indicating full pathloss compensation, and α<1 for messages after the third message and all retransmissions of the third message indicating fractional pathloss compensation.

9. (Original) The method according to claim 8, executed by a user equipment; and wherein the third message comprises an indication of a power difference between the initial transmit power which is computed using full pathloss compensation and a fractional pathloss computation of the initial transmit power.

10. (Original) A computer readable memory storing a computer program that when executed by a processor results in actions comprising:

initializing for *i*=0 a first power control adjustment state g(i) for an uplink control channel and a second accumulation power control adjustment state f(*i*) for an uplink shared channel to each reflect an open loop power control error;

computing an initial transmit power for the uplink shared channel using full pathloss compensation, wherein the initial transmit power depends on a preamble power of a first message sent on an access channel, and is initialized with the second power control adjustment state f(0); and

outputting the initial transmit power for transmission of a third message on the uplink shared channel.

11. (Original) The computer readable memory according to claim 10,

wherein the second accumulation power control adjustment state f(*i*) for *i*=0 is initialized as:

$$P_{0\_UE\_PUSCH} + f(0) = \Delta P_{PC} + \Delta P_{rampup};$$

wherein: $P_{0\_UE\_PUSCH}$ is a power control constant for the uplink shared channel that is specific for a user equipment which sends the first and third messages;

ΔP_{rampup} is a ramp-up power for preamble transmissions; and

ΔP_{PC} is a power control command indicated in a second message that is received in response to the first message.

12. (Original) An apparatus comprising:

a processor configured to initialize for *i*=0 a first power control adjustment state g(i) for an uplink control channel and a second accumulation power control adjustment state f(*i*) for an uplink shared channel to each reflect an open loop power control error, and configured to compute an initial transmit power for the uplink shared channel using full pathloss compensation, wherein the initial transmit power depends on a preamble power of a first message sent on an access channel, and is initialized with the second power control adjustment state f(0); and

a transmitter configured to send a third message on the uplink shared channel at the initial transmit power.

13. (Original) The apparatus according to claim 12, wherein the first message comprises a random access request message, and:

the processor is configured to compute the preamble power using full pathloss compensation,

the transmitter is configured to send on the access channel the first message;

the apparatus comprises a receiver configured to receive, in response to the transmitter sending the first message, a second message that comprises an allocation of resources on which the third message is sent;

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