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For (title): **Method, Apparatus and Computer Program For User Equipment Access Channel Procedures**

Enclosed are the following:

- ☐ Application Cover Page
- ☒ **25** pages of Specification that consists of, **19** pages of Description, **5** pages of Claims and **1** page of Abstract;
- ☒ **7** sheet of drawings;
- ☒ Inventor(s) Declaration; x2
- ☐ Preliminary Amendment;
- ☐ Priority is hereby claimed from:
 - Patent Application Number filed on ;
 - Patent Application Number filed on ;
 - Patent Application Number filed on ;
- ☐ Certified Copy of priority document(s);
- ☐ English language translation of priority document;
- ☐ Application Data Sheet;
- ☒ Information Disclosure Statement and/or Form PTO 1449 and cited non-U.S. art (if applicable);
- ☒ Assignment and Recordation Form Cover Sheet; x3
- ☒ Return Receipt Postcard;

☐ Other:
Assignment Data

- ☒ An assignment of the invention to Nokia Corporation
☒ is attached.
☐ will follow.
☐ has been previously filed.

Small Entity Status

- ☐ Applicant claims small entity status.

Fees

- ☒ Utility ☐ Reissue
☐ Design

Basic Filing Fee **\$330.00**

Excess Claim Fee

	Number Filed		Number Extra	Rate	
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Independent Claims	3 - 3 =	0	x	\$ 220.00	\$0

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- ☐ A check in the amount of **\$0** in payment of the filing fee is enclosed.
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METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES

TECHNICAL FIELD:

[0001] The exemplary and non-limiting embodiments of this invention relate generally to wireless communication systems, methods, devices and computer programs and, more specifically, relate to access procedures by which a user equipment accesses a wireless network.

BACKGROUND:

[0002] Various abbreviations that appear in the specification and/or in the drawing figures are defined as follows:

3GPP	third generation partnership project
AI/AICH	acquisition indicator/acquisition indicator channel
CAZAC	constant amplitude zero autocorrelation (e.g., Zadoff-Chu sequence)
DL	downlink
EUTRAN	evolved UTRAN (also referred to as LTE or 3.9G)
GSM	global system for mobile telecommunications
LTE	long term evolution
MME	mobility management entity
Node B	base station
PC	power control
PRACH	physical random access channel
RACH	random access channel
UE	user equipment
UL	uplink
UTRAN	universal terrestrial radio access network
WCDMA	wideband code division multiple access

[0003] The following 3GPP specifications are relevant to these teachings:

- TS 25.211, v8.4.0 (2009-03) Physical channels and mapping of transport channels onto physical channels (RACH at section 4.1.2.4; PRACH at section 5.2.2.1; and AICH at section 5.3.3.7);
- TS 25.214, v8.5.0 (2009-03) Physical layer procedures (PRACH at section 5.1.1; and physical random access procedures at section 6.1);
- TS 25.331, V8.2.0 (2008-03) Radio Resource Control (PRACH selection at section 8.5.17).

Similar teachings for E-UTRA are in technical specifications (TS) bearing a leading 36 series number.

[0004] As an overview and example of network access procedures for the WCDMA system, reference is made to Figures 1A and 1B, of which Figure 1B is reproduced from Figure 4 of 3GPP TS 25.211 (v 8.0.0) at section 5.2.2.1.1. Briefly, the UE seeking access to the system transmits on a RACH a first preamble to an access node (base station) and listens on an acquisition indicator channel AICH for a corresponding acquisition indicator AI. If that AI is not received, the UE tries again by transmitting a second preamble and again listens for a corresponding AI. In the example, this continues a third time, at which Figure 1A shows that an AI corresponding to the third preamble is received by the UE. Only after receiving that AI does the UE then transmit what is termed the message part of its access message. The preambles and message parts are shown also at Figure 1B. Generally, each of those three preambles uses a signature sequence that the UE randomly generates for each of the different preambles. This avoids different UEs attempting access over the same RACH from reading the AI from the other UE, since the AI is mapped to the signature sequence used in the preamble to which the AI corresponds. While the example shows three preambles, this is not to be seen limiting, and there can be one up to a network-configured maximum number of preambles, depending on channel conditions.

[0005] In general, the transmit power that the UE uses on the PRACH for the first preamble is set by higher layers. As currently set forth in 3GPP TS 25.214 at section 6.1, the UE randomly selects a signature set (e.g., a CAZAC sequence for LTE-specific implementations) and sets the transmit power for its initial access attempt on the PRACH to a commanded preamble power set by higher layers (shown as P_{init} at Figure 2). If the UE finds no positive or negative acquisition indicator on the AICH that corresponds to the slot at which the UE sent its first preamble on the PRACH at power P_{init} , the UE then randomly selects another signature sequence and as shown at Figure 2 re-attempts access using an increased power, where the increase is given as a power ramp step P_0 . The UE continues these transmissions, repeatedly using a different sequence and increasing transmit power by the ramp step until either it finds the acquisition indicator at the corresponding slot of the AICH or its counter hits a maximum, which may or may not be three as in this example. Once the UE receives its acquisition indicator on the AICH, then as can be seen at Figure 2 the UE can send the message part of the PRACH.

[0006] There are several problems seen with the above approach. As seen at Figure 2, when the first preamble does not result in the acquisition indicator being received at the

UE, the UE must repeat the process with new signature sequence and increased power $P_{init} + P_0$. If there is a reception problem at the BS, or if there is interference in the first-sent preamble, then the second-sent preamble represents needless power consumption at the UE, which is a consideration with portable electronic devices. Also with the second-sent preamble there is an added computational complexity for the UE which needs to map the randomly generated sequence used in each preamble to the corresponding slot in the AICH at which the UE looks for its acquisition indicator. These teachings are directed toward addressing at least some of the above concerns.

SUMMARY:

[0007] In accordance with one example embodiment of the invention is a method that includes attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences; and responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0008] In accordance with another example embodiment of the invention is an apparatus that includes a processor and a transmitter. The transmitter is configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences. The processor is configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to that determining, the processor is configured to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0009] In accordance with yet another example embodiment of the invention is a computer readable memory storing a program of instructions that when executed by a processor result in actions that comprise: attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences; and

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0010] In accordance with still another example embodiment of the invention is an apparatus that includes processing means and a sending means. The sending means is for attempting access to a wireless network by transmitting, on a random access channel at a first transmit power, a first preamble comprising a signature sequence, which the processing means randomly selects from a set of signature sequences. The processing means is also for determining that the access attempt from the first preamble was unsuccessful, and responsive to that determining is for causing the sending means to re-attempt access to the wireless network by causing it to transmit on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. In a specific exemplary embodiment, the processing means comprises at least one processor, the sending means comprises a transmitter, and the apparatus comprises a portable handheld user equipment.

[0011] These and other aspects are detailed below with more particularity.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0012] The foregoing and other aspects of the exemplary embodiments of this invention are made more evident in the following Detailed Description, when read in conjunction with the attached Drawing Figures.

[0013] Figure 1A is a signalling diagram representing initial network access by a UE in a WCDMA system showing three preamble transmissions before the user equipment receives an acquisition indicator.

[0014] Figure 1B reproduces Figure 4 from section 5.2.2.1.1 of 3GPP TS 25.211 (ver 8.0.0), Overall structure of random-access transmission.

[0015] Figure 2 is a schematic diagram of a prior art PRACH/AICH exchange when first and second access attempts fail and an acquisition indicator is received only after a third access attempt by the UE.

[0016] Figure 3 is a table of sequence selection and power control for PRACH preamble transmissions according to four exemplary and non-limiting embodiments of the invention.

[0017] Figure 4 is a schematic diagram similar in form to Figure 2 but showing transmit power for the PRACH preambles according to the second and fourth embodiments of Figure 4.

[0018] Figure 5 is a logical flow diagram that illustrates the operation of a method, and the result of execution of computer program instructions by the data processor shown in Figures 6A-B according to exemplary embodiments of the invention.

[0019] Figure 6A shows a simplified block diagram of various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention.

[0020] Figure 6B is a more particularized block diagram of a user equipment such as that shown at Figure 6A.

DETAILED DESCRIPTION:

[0021] In the specific examples given below are several approaches to resolving the problem of no access from an initial transmission by the UE of its preamble transmission on the PRACH. They may be used singly or in various combinations, and are summarized as follows:

- The initial access attempt on PRACH is at a transmit power increased over the initial power indicated by higher layers (e.g., at $P_{init}+P_0$ instead of at P_{init}).
- The signature sequence(s) used for subsequent access attempts after the first access attempt are statically assigned rather than randomly selected by the UE.

[0022] Relevant to the first point above, the inventors have determined that too often the UE's first access attempt is unsuccessful, so increasing the power at which that initial PRACH access attempt over the power indicated by higher layers P_{init} should improve the success rate. It is still possible that in some instances that initial access attempt may be unsuccessful. In that case, any second attempt by the UE at network access that may be necessary is, according to certain exemplary embodiments of the invention, at a transmit power that is no greater than the initial access attempt. Specifically in the second and fourth embodiments detailed below, the UE's transmit power for the second preamble is

less than the UE's transmit power for the first preamble.

[0023] Relevant to the second point above, in certain exemplary embodiments the UE randomly generates a signature sequence as normal for the first preamble transmission, and in the event the UE needs to send another preamble transmission because it did not see an acquisition indicator at the mapped portion of the AICH, the UE then re-uses the signature sequence it previously generated which was already used in the first preamble transmission.

[0024] Various combinations of those two points above lead to four different embodiments for the first two PRACH attempts. These are exemplary and non-limiting; other variations will be readily apparent within these teachings. In a first exemplary embodiment, the signature sequences for each of the first and second access attempt is random and the power for the first and second access attempt is the same at P_{init} . In a second exemplary embodiment, the signature sequences for each of the first and second access attempt is random and the power for the first access attempt is higher than the initial power indicated by higher layers (e.g., $P_{init} + P_0$) while the power for the second access attempt is lower, say for example at the initial power indicated by higher layers P_{init} . In a third exemplary embodiment, the signature sequences for the first access attempt is random and signature sequence for the second access attempt repeats that of the first access attempt, while the power for both the first and second access attempts is the same, say for example at the initial power indicated by higher layers P_{init} . In a exemplary fourth embodiment, the signature sequences for the first access attempt is random and signature sequence for the second access attempt repeats that of the first access attempt, while the power for the first access attempt is higher than the initial power indicated by higher layers (e.g., $P_{init} + P_0$) and the power for the second access attempt is lower (e.g., P_{init}).

[0025] These four can be generalized as follows: the UE attempts access to a wireless network by sending, on the random access channel at a first transmit power, a first preamble that comprises a signature sequence that is randomly generated (e.g., randomly selected from a pre-determined set of signature sequences). Responsive to the UE determining that the access attempt from sending the first preamble was unsuccessful (where the determining is for example the UE failing to find an AI in a slot of the AICH that is mapped by the sent first preamble), the UE re-attempts access to the wireless network by sending, again on the random access channel but this time at a second transmit

power, a second preamble that comprises a signature sequence. But in this case the second transmit power is no greater than the first transmit power. For the first and second embodiments above, the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly generated. For the third and fourth embodiments above, the signature sequence for the first preamble is randomly generated and the signature sequence for the second preamble is the same as the signature sequence for the first preamble, re-used in the second preamble.

[0026] As compared to the prior art, each of those four embodiments decrease interference caused by the second preamble. Additionally, the second embodiment also increases the likelihood that the Node B will correctly receive the first PRACH access attempt. Further, the third and fourth embodiments also reduce computation complexity by the UE since it does not need to randomly generate another signature sequence for the second PRACH attempt. Like the second embodiment, the fourth embodiment also increases the likelihood that the Node B will correctly receive the first PRACH access attempt. For this reason the fourth embodiment is considered at this time to be the best mode.

[0027] These four exemplary and non-limiting embodiments are set forth in tabular form at Figure 3. With respect to Figure 3, assume that UE has a counter that limits the number of preambles sent in each RACH access attempt to three, and these are termed the initial preamble (corresponding to the leftmost preamble of Figure 2 which as indicated there is sent with power P_{init}), the second preamble (corresponding to the centremost preamble of Figure 2) and the third preamble (corresponding to the rightmost preamble of Figure 2). Of course the UE's counter may go to any integer maximum greater than zero, but we use three as the limit for this example. Each preamble that the UE sends on the PRACH increments the counter by one. Each time the counter reaches its maximum is one RACH attempt. At the end of each RACH attempt, or when an AI is received on time, the UE re-sets its counter to zero. If the UE has not yet received the AI and therefore has not acquired access to the network once the counter hits its maximum, the UE can then re-attempt access in a second RACH attempt, incrementing the counter again for each preamble it sends in the second RACH attempt. Figure 3 illustrates by way of example two distinct RACH access attempts, where the UE begins the second RACH access attempt after failing to obtain the acquisition indicator following any of the three preamble transmissions of the first RACH access attempt, re-sets its counter, and begins the RACH process anew.

[0028] Excluding column titles, the first two rows of Figure 3 illustrate the signature sequence which the UE puts in the various preambles according to the four exemplary embodiments noted above, and the last two rows illustrate the power at which the UE transmits those preambles according to those same four exemplary embodiments.

[0029] At the first row of Figure 3 and for the first RACH access attempt, according to the first and second embodiments the UE randomly selects a signature sequence and transmits a first preamble that has the randomly generated/selected signature sequence on the RACH. If in response the UE fails to obtain the acquisition indicator (e.g., it does not correctly receive an AI on the slot of the AICH which is mapped by the first preamble), then the UE randomly generates/selects another signature sequence for the second preamble that it transmits on the RACH. If again the UE fails to receive in response the acquisition indicator it expects on the AICH, then the UE randomly generates/selects still another signature sequence for the third preamble that it transmits on the RACH. At this point the UE's RACH counter is at its upper limit of three. Should the UE choose to re-attempt RACH access further, then the second RACH access attempt repeats just as the first RACH access attempt, by which the UE randomly selects a signature sequence for each preamble transmission of the second RACH attempt.

[0030] At the second row of Figure 3, and for the first RACH access attempt, according to the third and fourth embodiments the UE randomly selects a signature sequence and transmits a first preamble that has the randomly generated/selected signature sequence on the RACH. This is the same as the first and second embodiments. But in the third and fourth embodiments, the UE re-uses the same sequence from the first preamble of the RACH access attempt. Note at Figure 3 for the third and fourth embodiments that for the first preamble in the second RACH access attempt, the UE generates anew another signature sequence different from that used in the first RACH access attempt. Re-use of the same signature sequence for subsequent preambles within the same RACH access attempt avoids the need for the UE to expend processing power on dynamically re-generating signature sequences for the second and third preambles.

[0031] According to these third and fourth embodiments, the UE maps the first randomly generated signature sequence of the first preamble to a particular slot on the AICH. The UE stores this mapping in its local memory. If the UE does not find an AI for it at the mapped slot, then by re-using the same signature sequence in the second (and third) RACH preambles it need only read its previously stored mapping to find the correct AICH

slot in which to look, and need not independently map each preamble's signature sequence independently to the AICH.

[0032] Note that in both mapping and re-using the same signature sequence, the sequences for all three preambles of a RACH access attempt are known at the start of the RACH access attempt (defined by the UE's counter). In this manner the signature sequences for all but the first preamble of any RACH access attempt are statically determined, as compared to the prior art in which they are randomly generated as they are needed for the upcoming preamble transmission.

[0033] The two lowermost rows of the table at Figure 3 tabulate the power control aspects of the above exemplary embodiments of the invention. As noted above these may be combined with the signature sequence aspects of the invention or employed separately therefrom. As a review of the prior art shown at Figure 2 and as detailed in the background section above, for the initial preamble transmission during the first RACH access attempt, the UE sets its transmit power for the first preamble according to P_{init} which is an initial power level for random access to the network and which is obtained from higher layers. Further as noted for Figure 2, for each subsequent preamble transmission while the UE's counter is not yet expired the UE increases its preamble transmit power one ramp step (P_0 in Figure 2 which is also broadcast in system information) as compared to the last preamble transmission. If that prior art UE chooses to re-attempt another RACH access attempt after its counter tops out, it re-sets the counter and begins again as with the first RACH access attempt where the first preamble of the second RACH attempt is again transmitted at the commanded power P_{init} .

[0034] The initial power level is obtained from higher layers, in one particular embodiment, by exchanging the parameters between the radio resource control RRC logical layer of the eNB and the RRC layer of the UE. Bits signalled between the network and the UE are on the physical layer. Consider those bits the power value which the UE receives by example in system information from the network. The RRC layer of the eNB uses P_{init} to find that power value which it sends on the physical layer, and the RRC layer of the UE finds P_{init} for its own use using the power value which it receives on the physical layer. Thus P_{init} is obtained from the RRC layers of the eNB and the UE. In an embodiment it is this computed power P_{init} , which the UE gets from its RRC layer, that is the transmit power for the second preamble for all embodiments at Figure 3 and that is the transmit power for the first preamble of the 1st and 3rd embodiments at Figure 3. Note

also that the same higher layer can compute the transmit power $P_{init}+P_0$ for the first preamble for the 2nd and 4th embodiments of Figure 3. As a specific example, consider that the value signaled by the network in its system information and received at the UE's receiver is Primary CPICH TX power. The network may also signal other relevant parameters, such as uplink UL interference and some constant value, for example. The UE receives those three signaled values, it may further measure the channel to arrive at its own measured parameter, and computes P_{init} from those signaled and measured parameters. Specifically, the formula used at the UE's RRC layer may be, for example: $P_{init}=(\text{Primary CPICH power})-(\text{CPICH_RSCP})+(\text{UL interference})+(\text{Constant Value})$; where CPICH_RSCP represents the UE's own measurement.

[0035] One non-limiting embodiment of this aspect of the invention shown by way of example at the last row of Figure 3 takes a different approach so as to better avoid the case where the preamble transmitted with the initial power P_{init} yields no resulting acquisition indicator on the AICH. Specifically, according to the second and fourth exemplary embodiments of the invention, for the first preamble the UE sets its transmit power at $P_{init}+P_0$; one power step P_0 above the initial preamble power P_{init} indicated by higher layers. Recall that the PRACH message part (right side of Figures 1B and 2) is transmitted at a power that is increased over the power used on the most recent preamble transmission (which resulted in the acquisition indicator on the AICH) by the power offset P_m set by higher layers. In a variation of the second and fourth embodiments particularly shown at Figure 3, the second preamble is sent with a transmit power that is lower than that of the first preamble for the same RACH access attempt (e.g., transmit power for the second preamble is reduced by a power step size P_0 as compared to the transmit power for the first preamble). Also as shown at Figure 3, the transmit power for the third preamble is greater than both the first preamble and the second preamble, and in an exemplary embodiment the increase is in increments of the commanded step size (e.g., $P_{init}+P_0+x= P_{init}+2P_0$). In other variations of the second and fourth embodiments not shown at Figure 3, the second and third preamble transmissions are at the same power as would be generated by the prior art; namely, $P_{init}+P_0$, and $P_{init}+P_0+P_0$. Note that the result is that the first and second preamble transmissions of each RACH access are then at the same power: $P_{init}+P_0$.

[0036] For the case where the UE is unsuccessful in obtaining an acquisition indicator on the AICH during the first RACH access attempt, Figure 3 also shows that the power control aspects of the second and fourth embodiments continue in the second RACH

access attempt as the first; the UE re-sets its counter and sends the first (and the second if needed) preamble transmission at one power step above the initial power. If the third preamble is necessary after the second preamble is transmitted, the UE increases the power used on the final (third) preamble of a RACH access attempt by more than one additional power step over that used in the second-last (second) preamble, so that transmit power on the final preamble exceeds transmit power on every other preamble of that same RACH access attempt. This makes it more likely the BS will receive the UE's third preamble and send an AI in response, thereby helping prevent the UE having to begin a whole new RACH access attempt.

[0037] There is a slight increased risk such as when path loss is very low (e.g., UE very near the base station) that this initial preamble transmission will render other RACH preamble transmissions from other UEs unreadable by the base station, but this is seen to be quite slight in view of other separation factors already established in the RACH slot and sequence selection for contention based access. Further, to the extent it does happen, the UE power savings to any random UE is seen to be a net positive over time, since it is anticipated that there will be more instances of this technique eliminating the need for the UE to send a second RACH preamble than there will be that the UE would have to send a second RACH preamble due to its first RACH preamble being overpowered by another UE using the same procedure.

[0038] Also at Figure 3 at the second to last row is the power control profile for the preambles according to the first and third embodiments. Like the prior art, the first preamble is sent at the power commanded by the network, P_{init} . However in these exemplary embodiments the power at which the UE sends its second preamble (within a same RACH access attempt) is the same as that used to send the first preamble, P_{init} . In these exemplary embodiments, all preambles of a RACH access attempt are sent at a same power, except for the last preamble (e.g., tracked by the UE's counter) which is sent at a higher transmit power. In the specific example at Figure 3, the last preamble is sent at a power increased one network-directed step size over the network-commanded initial power.

[0039] Figure 4 illustrates schematically, similar in form to Figure 2, the power profile according to the second and fourth embodiments of the invention, shown at the last row of Figure 3. The upper diagram illustrates the AICH 401 which is downlink and received at the UE, and the lower diagram illustrates the PRACH 402 which is uplink and transmitted by the UE. Time progresses left to right, and so at Figure 4 a UE sends in a first access

slot 410 of a PRACH 402 a first preamble 412 at a first transmit power 411. The first preamble has a signature sequence. The UE maps the first preamble to a first access slot 414 of the AICH 401 and tunes its receiver according to the mapping. At 416 the UE determines that the access attempt from sending the first preamble has failed because the UE has not correctly received an AI at the mapped access slot 414. Responsive to this determining, the UE re-attempts access to the wireless network by sending on the RACH 402 at a second transmit power 421 a second preamble 420 comprising a signature sequence, in which the second transmit power 421 is no greater than the first transmit power 411. The specific embodiment of Figure 4 shows the second transmit power 421 the second transmit power is an initial power P_{init} indicated by the higher layers for random access and the first transmit power 411 is greater than the second transmit power 421 by one network-indicated step size P_0 .

[0040] Further at Figure 4, the UE maps the second preamble 420 to a second access slot 424 of the AICH 401 and tunes its receiver according to the mapping. For the case of the third and fourth embodiments in which the signature sequence is re-used in each preamble of the same RACH access attempt, the mapping is simply retrieved from the memory after being stored there from the first preamble process. At 426 the UE determines that the access re-attempt from sending the second preamble 420 has failed because the UE has not correctly received an AI at the mapped access slot 424. Responsive to this determining, the UE again re-attempts access to the wireless network by sending on the random access channel 402 at a third transmit power 431 a third preamble 430 comprising a signature sequence, in which the third transmit power 431 is greater than the first transmit power 411 and greater than the second transmit power 421.

[0041] The UE maps the third preamble 430 to a third access slot 434 of the AICH 401 and tunes its receiver according to the mapping (as above, the mapping may be retrieved from a local UE memory according to certain embodiments). At 436 the UE correctly receives on the AICH 401 an AI at the mapped access slot 434, and in response sends a PRACH message part 440 at a transmit power increased by P_m over the transmit power used for the most recently transmitted preamble, which in this example is the third preamble 430. The value of P_m is also given by the network in broadcast system information.

[0042] Figure 5 is a logical flow diagram that illustrates the operation of a method, and the result of execution of computer program instructions by the data processor shown in Figures 6A-B below according to various exemplary embodiments of the invention. Figure

5 is not comprehensive of all the options detailed above but summarizes some major aspects of those embodiments for the reader's convenience. At block 502 the UE attempts access to a wireless network by sending on the random access channel at a first transmit power a first preamble comprising a signature sequence. This signature sequence is randomly selected from a set of signature sequences. Responsive to determining that the access attempt from sending the first preamble was unsuccessful, which at block 504 of Figure 5 is by the UE failing to properly receive an AI at the AICH slot which maps from the sent first preamble, the UE at block 506 re-attempts access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0043] The dotted lines indicate various options for the different exemplary embodiments noted above. At block 508 the signature sequence of the first and second preambles are randomly generated, which extends to the signature sequences of all preambles of the RACH access attempt. At block 510, different from block 508, the signature sequence for the first preamble is re-used in all other preambles of the same RACH access attempt, and mapping of the signature sequence to the AICH slot is done once and stored in the UE's local memory. At block 512 the first and second transmit powers are equal, and set to the initial RACH power indicated by higher layers. Different from block 512, at block 514 the first transmit power is greater than the second transmit power, and it is the second transmit power that is set to the initial RACH power indicated by higher layers. Note that these dotted line blocks may be used in various combinations, block 508 can be combined with either block s 512 or 514, and block 510 can be also combined with either block s 512 or 514.

[0044] Assuming the UE determines that the access re-attempt from sending the second preamble was unsuccessful, which Figure 5 shows at block 516 as the UE failing to receive an AI at the AICH slot which maps from the second preamble, then responsive to that determining the UE at block 518 again re-attempts access to the wireless network by sending on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power. The signature sequences of the third preamble may be randomly generated as at block 508, or re-used from the first preamble as at block 510.

[0045] At block 510 there is a decision based on whether the UE finds an AI on the AICH

slot that maps from the third preamble. If there is an AI there, the UE gets access to the network and sends at block 522 the PRACH message part at a transmit power that is increased by P_m over the transmit power for the most recently transmitted preamble (third preamble in this example). If there is no AI there, the UE re-sets its RACH counter at block 524 and begins again at block 502 for its second RACH access attempt. It is understood from Figure 5 that the RACH counter has a maximum of three for this example, and that each time the UE sends a new preamble within a RACH access attempt it increments its RACH counter by one.

[0046] Reference is now made to Figure 6A for illustrating a simplified block diagram of various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention. In Figure 6A a wireless network 1 is adapted for communication with an apparatus, such as a mobile communication device which may be referred to as a UE 10, via a network access node, such as a Node B (base station). The network 1 may include a network control element (NCE) 14 that may be embodied as a MME/S-GW (serving gateway) or a radio network controller RNC or other higher network element, and which provides connectivity with a broader network 16, such as a telephone network and/or a data communications network (e.g., the internet). The UE 10 includes a data processor (DP) 10A, a memory (MEM) 10B that stores a program (PROG) 10C, and a suitable radio frequency (RF) transceiver 10D for bidirectional wireless communications over links 11 with the access node 12, which also includes a DP 12A, a MEM 12B that stores a PROG 12C, and a suitable RF transceiver 12D. The access node 12 is coupled via a data path 13 to the NCE 14. Another data interface 15 may be present for coupling to another access node (not shown) of the same type network 1. At least the PROG 10C and/or 12C may be assumed to include program instructions that, when executed by the associated DP 10A and 12A, enable the electronic device to operate in accordance with the exemplary embodiments of this invention, as detailed above and in the process diagram of Figure 5.

[0047] The exemplary embodiments of this invention may be implemented at least in part by computer software executable by the DP 10A of the UE 10, or by hardware, or by a combination of software and hardware (and firmware).

[0048] For the purposes of describing the exemplary embodiments of this invention the UE 10 may be assumed to also include a power control PC functional unit 10E, and the network access node 12 of the first network 1 also includes a PC functional unit 12E. The

PC functional units 10E, 12E, which may be embodied as software stored in the MEM 10B, 12B, or as circuitry or some combination of computer software and hardware (and firmware), are assumed to be constructed and operated in accordance with the exemplary embodiments of this invention. These PC units 10E, 12E determine the transmit power for the various preambles according to the power-control aspects of the invention. These PC units 10E, 12E may also control how the signature sequences are constructed for the various preambles according to the signature sequence aspects of the invention.

[0049] In general, the various embodiments of the UE 10 can include, but are not limited to, cellular telephones, personal digital assistants (PDAs) having wireless communication capabilities, portable computers having wireless communication capabilities, image capture devices such as digital cameras having wireless communication capabilities, gaming devices having wireless communication capabilities, music storage and playback appliances having wireless communication capabilities, Internet appliances permitting wireless Internet access and browsing, as well as portable units or terminals that incorporate combinations of such functions.

[0050] The MEMs 10B and 12B may be of any type suitable to the local technical environment and may be implemented using any suitable data storage technology, such as semiconductor based memory devices, flash memory, magnetic memory devices and systems, optical memory devices and systems, fixed memory and removable memory. The DPs 10A and 12A may be of any type suitable to the local technical environment, and may include one or more of general purpose computers, special purpose computers, microprocessors, digital signal processors (DSPs) and processors based on a multicore processor architecture, as non-limiting examples.

[0051] Typically there will be a plurality of UEs 10 serviced by the network access node 12. The UEs 10 may or may not be identically constructed, but in general are all assumed to be electrically and logically compatible with the relevant network protocols and standards needed for operation in the wireless network 1.

[0052] Figure 6B illustrates further detail of an exemplary UE in both plan view (left) and sectional view (right), and the invention may be embodied in one or some combination of those more function-specific components. At Figure 6B the UE 10 has a graphical display interface 20 and a user interface 22 illustrated as a keypad but understood as also encompassing touch-screen technology at the graphical display interface 20 and voice-recognition technology received at the microphone 24. A power actuator 26 controls the

device being turned on and off by the user. The exemplary UE 10 may have a camera 28 which is shown as being forward facing (e.g., for video calls) but may alternatively or additionally be rearward facing (e.g., for capturing images and video for local storage). The camera 28 is controlled by a shutter actuator 30 and optionally by a zoom actuator 32 which may alternatively function as a volume adjustment for the speaker(s) 34 when the camera 28 is not in an active mode.

[0053] Within the sectional view of Figure 6B are seen multiple transmit/receive antennas 36 that are typically used for cellular communication. The antennas 36 may be multi-band for use with other radios in the UE. The operable ground plane for the antennas 36 is shown by shading as spanning the entire space enclosed by the UE housing though in some embodiments the ground plane may be limited to a smaller area, such as disposed on a printed wiring board on which the power chip 38 is formed. The power chip 38 controls power amplification on the channels being transmitted and/or across the antennas that transmit simultaneously where spatial diversity is used, and amplifies the received signals. The power chip 38 outputs the amplified received signal to the radio-frequency (RF) chip 40 which demodulates and downconverts the signal for baseband processing. The baseband (BB) chip 42 detects the signal which is then converted to a bit-stream and finally decoded. Similar processing occurs in reverse for signals generated in the apparatus 10 and transmitted from it.

[0054] Signals to and from the camera 28 pass through an image/video processor 44 which encodes and decodes the various image frames. A separate audio processor 46 may also be present controlling signals to and from the speakers 34 and the microphone 24. The graphical display interface 20 is refreshed from a frame memory 48 as controlled by a user interface chip 50 which may process signals to and from the display interface 20 and/or additionally process user inputs from the keypad 22 and elsewhere.

[0055] Certain embodiments of the UE 10 may also include one or more secondary radios such as a wireless local area network radio WLAN 37 and a Bluetooth® radio 39, which may incorporate an antenna on-chip or be coupled to an off-chip antenna. Throughout the apparatus are various memories such as random access memory RAM 43, read only memory ROM 45, and in some embodiments removable memory such as the illustrated memory card 47 on which the various programs 10C are stored. All of these components within the UE 10 are normally powered by a portable power supply such as a battery 49.

[0056] The aforesaid processors 38, 40, 42, 44, 46, 50, if embodied as separate entities in a UE 10 or eNB 12, may operate in a slave relationship to the main processor 10A, 12A, which may then be in a master relationship to them. Embodiments of this invention are most relevant to the baseband chip 42, though it is noted that other embodiments need not be disposed there but may be disposed across various chips and memories as shown or disposed within another processor that combines some of the functions described above for Figure 6B. Any or all of these various processors of Figure 6B access one or more of the various memories, which may be on-chip with the processor or separate therefrom. Similar function-specific components that are directed toward communications over a network broader than a piconet (e.g., components 36, 38, 40, 42-45 and 47) may also be disposed in exemplary embodiments of the access node 12, which may have an array of tower-mounted antennas rather than the two shown at Fig. 2B.

[0057] Note that the various chips (e.g., 38, 40, 42, etc.) that were described above may be combined into a fewer number than described and, in a most compact case, may all be embodied physically within a single chip.

[0058] Note that the various blocks shown in Figure 5 are directed toward the UE 10, and may be viewed as method steps, and/or as operations that result from operation of computer program code, and/or as a plurality of coupled logic circuit elements constructed to carry out the associated function(s). Consistent with these teachings, similar functionality resides in the network access node to receive the UE-sent messages and to send those messages that Figure 5 shows as the UE receiving, as well as the power values indicated by higher layers such as P_{init} , P_0 , and P_m .

[0059] In general, the various exemplary embodiments may be implemented in hardware or special purpose circuits, software, logic or any combination thereof. For example, some aspects may be implemented in hardware, while other aspects may be implemented in firmware or software which may be executed by a controller, microprocessor or other computing device, although the invention is not limited thereto. While various aspects of the exemplary embodiments of this invention may be illustrated and described as block diagrams, flow charts, or using some other pictorial representation, it is well understood that these blocks, apparatus, systems, techniques or methods described herein may be implemented in, as non-limiting examples, hardware, software, firmware, special purpose circuits or logic, general purpose hardware or controller or other computing devices, or

some combination thereof.

[0060] As such, it should be appreciated that at least some aspects of the exemplary embodiments of the inventions may be practiced in various components such as integrated circuit chips and modules. The design of integrated circuits is by and large a highly automated process. Complex and powerful software tools are available for converting a logic level design into a semiconductor circuit design ready to be fabricated on a semiconductor substrate. Such software tools can automatically route conductors and locate components on a semiconductor substrate using well established rules of design, as well as libraries of pre-stored design modules. Once the design for a semiconductor circuit has been completed, the resultant design, in a standardized electronic format (e.g., Opus, GDSII, or the like) may be transmitted to a semiconductor fabrication facility for fabrication as one or more integrated circuit devices.

[0061] Various modifications and adaptations may become apparent to those skilled in the relevant arts in view of the foregoing description, when read in conjunction with the accompanying drawings and the appended claims. For example, certain steps shown in Figure 3 may be executed in other than the order shown, and certain of the computations described may be performed in other ways. However, all such and similar modifications of the teachings of this invention will still fall within the scope of this invention.

[0062] Further, while the exemplary embodiments have been described above in the context of the WCDMA system, it should be appreciated that the exemplary embodiments of this invention are not limited for use with only this one particular type of wireless communication system, and that they may be used to advantage in other types of wireless communication systems such as for example the LTE (E-UTRAN) system, which uses protocol similar to WCDMA for random access procedures. Other exemplary but non-limiting wireless systems include GSM. Relevant specifications for the LTE system begins with series 36, but otherwise mirror the series 25 technical specifications for WCDMA noted above. Further, the various names used for the channels and described parameters (e.g. AICH, PRACH, signature sequence, CAZAC, etc.) are not intended to be limiting in any respect, as these channels and parameters may be identified by any suitable names in different wireless protocols and standards.

[0063] It should be noted that the terms "connected," "coupled," or any variant thereof, mean any connection or coupling, either direct or indirect, between two or more elements,

and may encompass the presence of one or more intermediate elements between two elements that are "connected" or "coupled" together. The coupling or connection between the elements can be physical, logical, or a combination thereof. As employed herein two elements may be considered to be "connected" or "coupled" together by the use of one or more wires, cables and/or printed electrical connections, as well as by the use of electromagnetic energy, such as electromagnetic energy having wavelengths in the radio frequency region, the microwave region and the optical (both visible and invisible) region, as several non-limiting and non-exhaustive examples.

[0064] Furthermore, some of the features of the examples of this invention may be used to advantage without the corresponding use of other features. For example, the power control features detailed above may be used in some embodiments of the invention without the signature sequence aspects of the invention, and vice versa. As such, the foregoing description should be considered as merely illustrative of the principles, teachings, examples and exemplary embodiments of this invention, and not in limitation thereof.

Claims:

We claim:

1. A method comprising:
attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;
responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.
2. The method of claim 1, wherein:
the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately;
and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.
3. The method according to claim 2, further comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.
4. The method according to claim 2, wherein the second transmit power is an initial transmit power determined from an indication obtained from higher layers and the first transmit power is greater than the second transmit power.
5. The method according to claim 2, further comprising:
responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in

which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately.

6. The method of claim 1, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble;

and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

7. The method according to claim 6, further comprising determining an initial transmit power from an indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

8. The method according to claim 6, wherein the second transmit power is the determined initial power and the first transmit power is greater than the second transmit power.

9. The method according to claim 6, further comprising:

responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble.

10. An apparatus comprising:

a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the

random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

11. The apparatus according to claim 10, wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble;
and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

12. The apparatus according to claim 11:
wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and
the apparatus further comprises a memory storing the received parameters;
and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the determined initial power.

13. The apparatus according to claim 11:
wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and
the apparatus further comprises a memory storing the parameters;
and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

14. The apparatus according to claim 11:
wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first

transmit power and greater than the second transmit power;

and wherein the processor is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles.

15. The apparatus according to claim 10, further comprising a memory,

wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory;

and wherein the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

16. The apparatus according to claim 15:

wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the initial power.

17. The apparatus according to claim 15:

wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

18. The apparatus according to claim 15:

wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the

transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory.

19. A computer readable memory storing a program of instructions that when executed by a processor result in actions comprising:

attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

20. A computer readable memory of claim 19, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory.

ABSTRACT:

Access to a wireless network is attempted by sending on a random access channel RACH at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences. After the access attempt from sending the first preamble is determined unsuccessful, access to the wireless network is re-attempted by sending on the RACH at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. Embodiments variously combine different options: the signature sequences of the first and second preambles are each randomly selected separately, or the signature sequence of the first preamble is re-used in the second preamble; the first and second transmit powers are each equal to an initial transmit power, or the second transmit power is the initial power and less than the first transmit power.

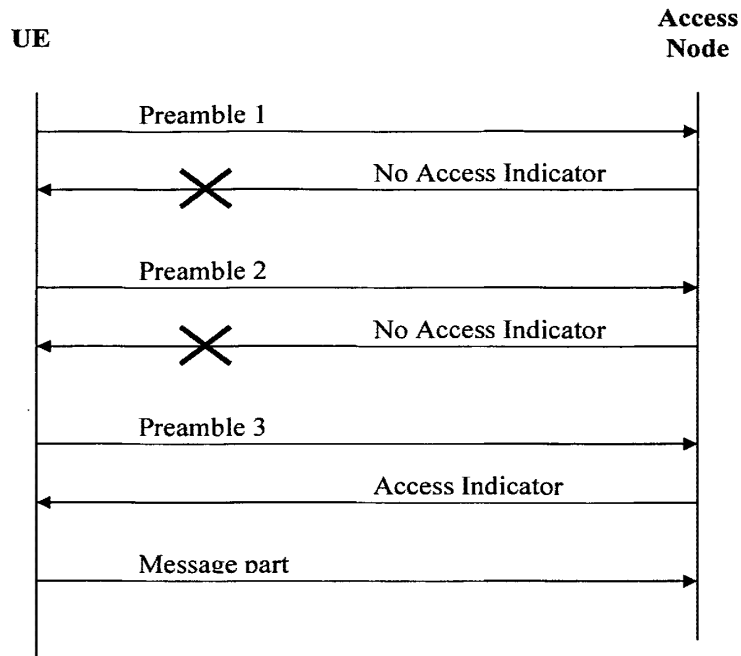


Figure 1A: Prior Art

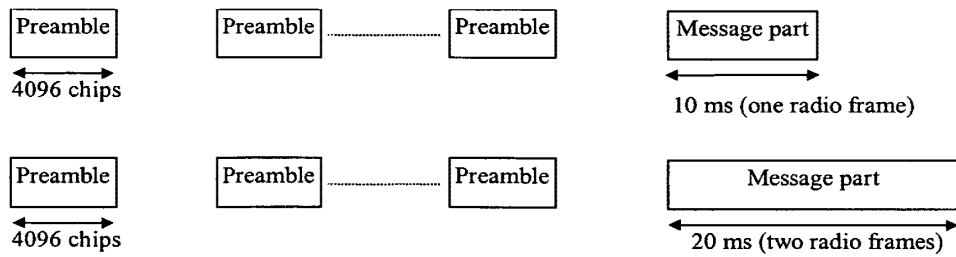


Figure 1B: Prior Art

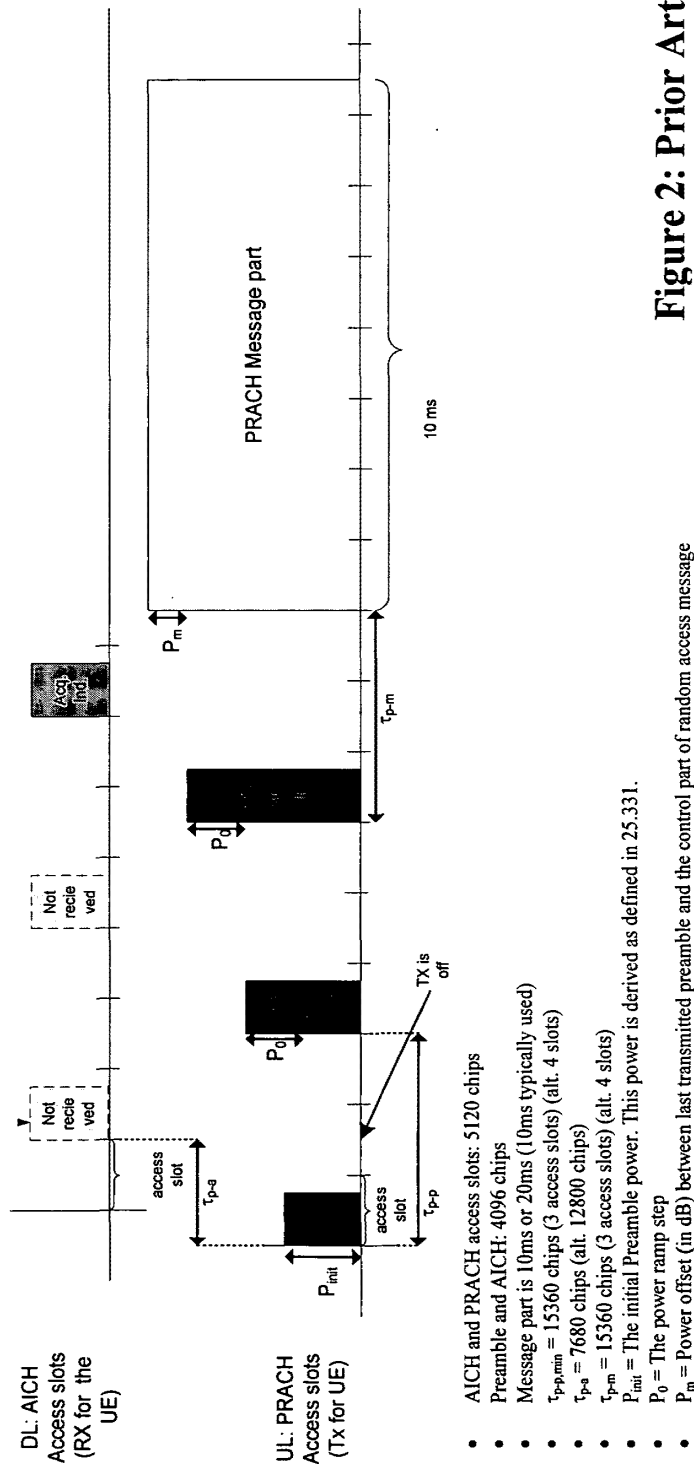


Figure 2: Prior Art

	1 st RACH access attempt			2 nd RACH access attempt		
	1 st preamble	2 nd preamble	3 rd preamble	1 st preamble	2 nd preamble	3 rd preamble
1 st & 2 nd embodiments	Randomly select sequence	Randomly select sequence	Randomly select sequence	Randomly select sequence	Randomly select sequence	Randomly select sequence
3 rd & 4 th embodiments	Randomly select sequence	Re-use same sequence from 1 st preamble of 1 st RACH access attempt	Re-use same sequence from 1 st preamble of 1 st RACH access attempt	Randomly select sequence	Re-use same sequence from 1 st preamble of 2 nd RACH access attempt	Re-use same sequence from 1 st preamble of 2 nd RACH access attempt
1 st & 3 rd embodiments	Initial Power (P_{init})	Initial Power (P_{init})	Initial Power + 1 step increase ($P_{init} + P_0$)	Initial Power (P_{init})	Initial Power (P_{init})	Initial Power + 1 step increase ($P_{init} + P_0$)
2 nd & 4 th embodiments	Initial Power + 1 step increase ($P_{init} + P_0$)	Initial Power (P_{init})	Initial Power + greater than 1 step increase ($P_{init} + P_0 + x$)	Initial Power + 1 step increase ($P_{init} + P_0$)	Initial Power (P_{init})	Initial Power + greater than 1 step increase ($P_{init} + P_0 + x$)

Figure 3

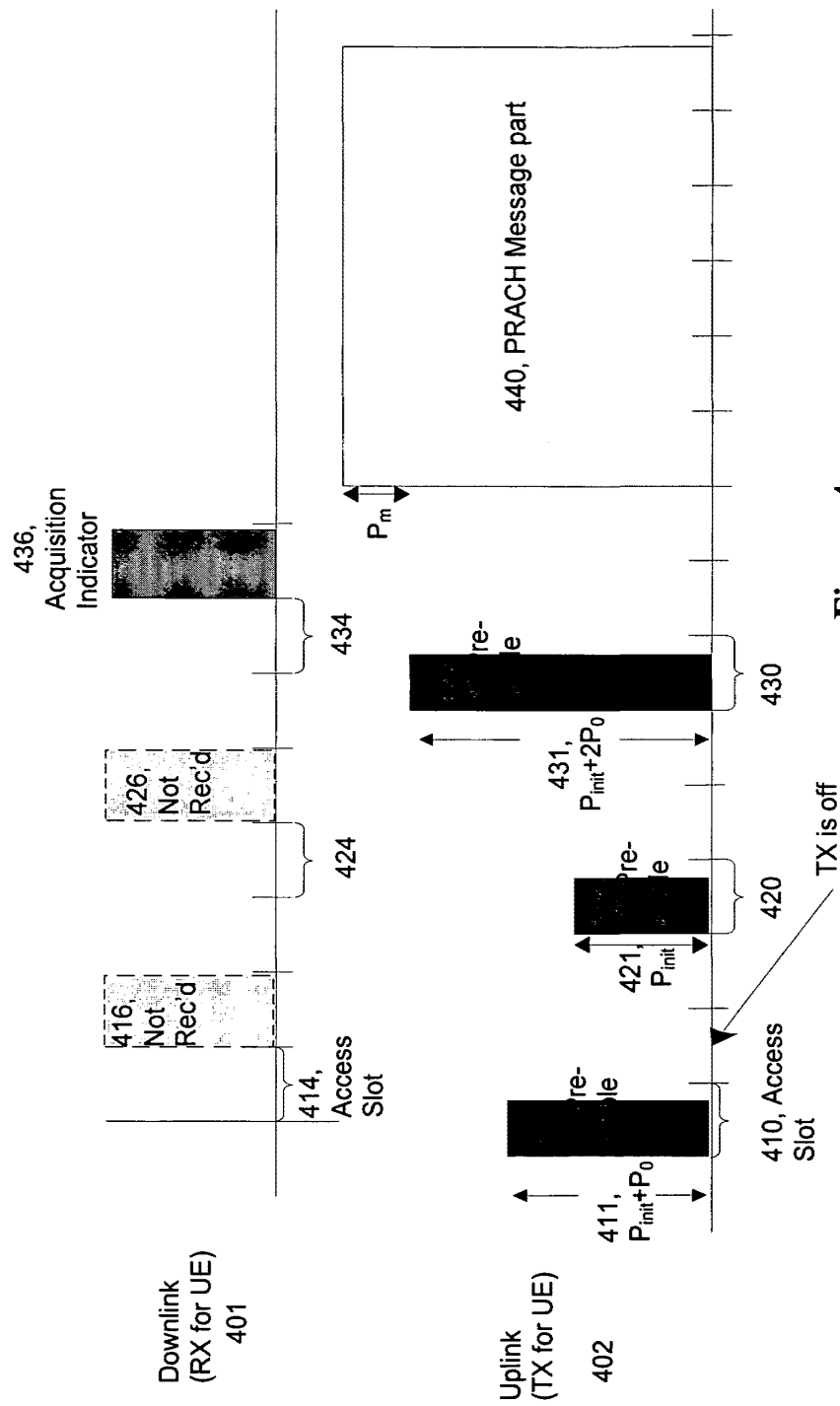


Figure 4

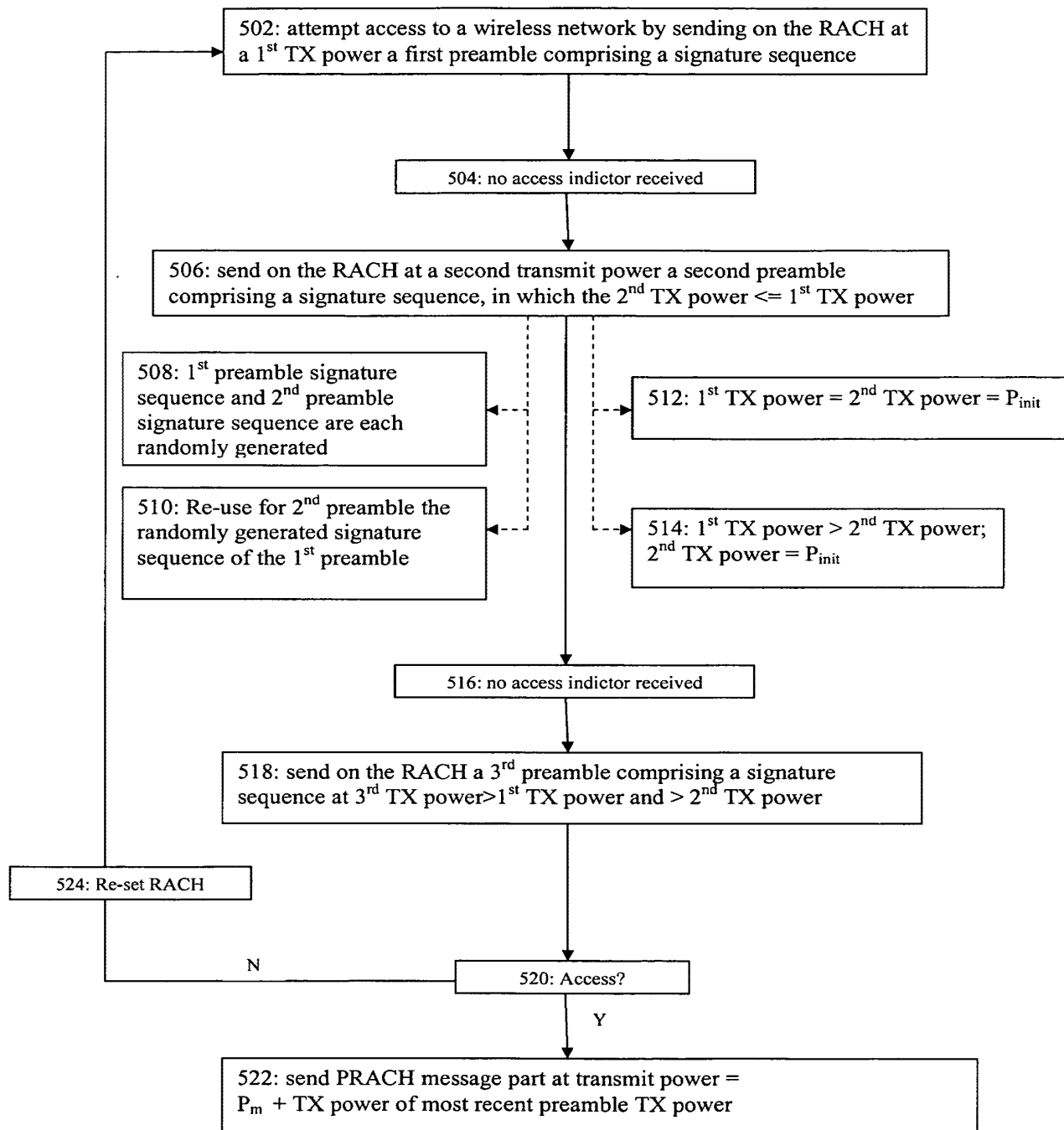


Figure 5

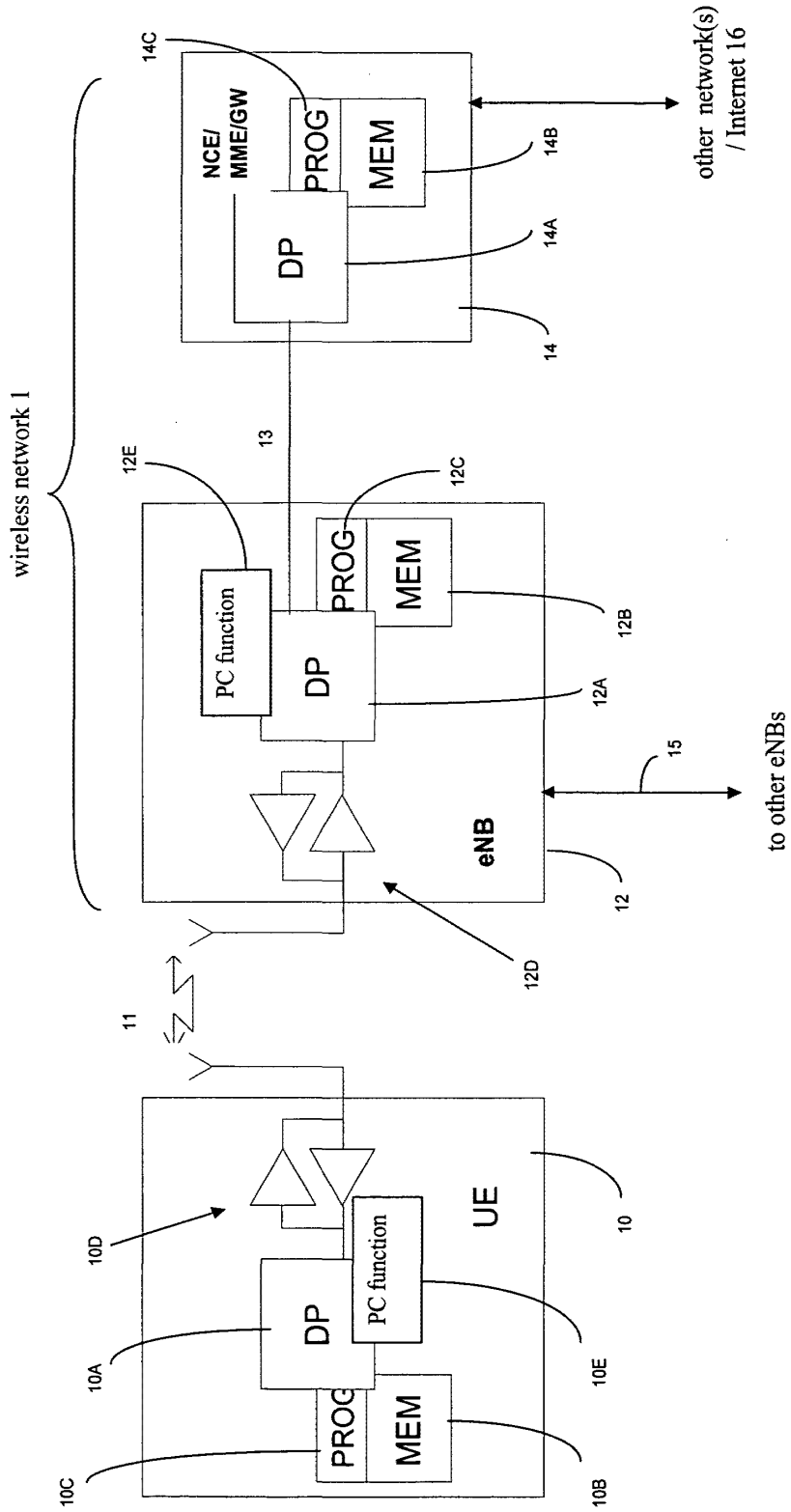


Figure 6A

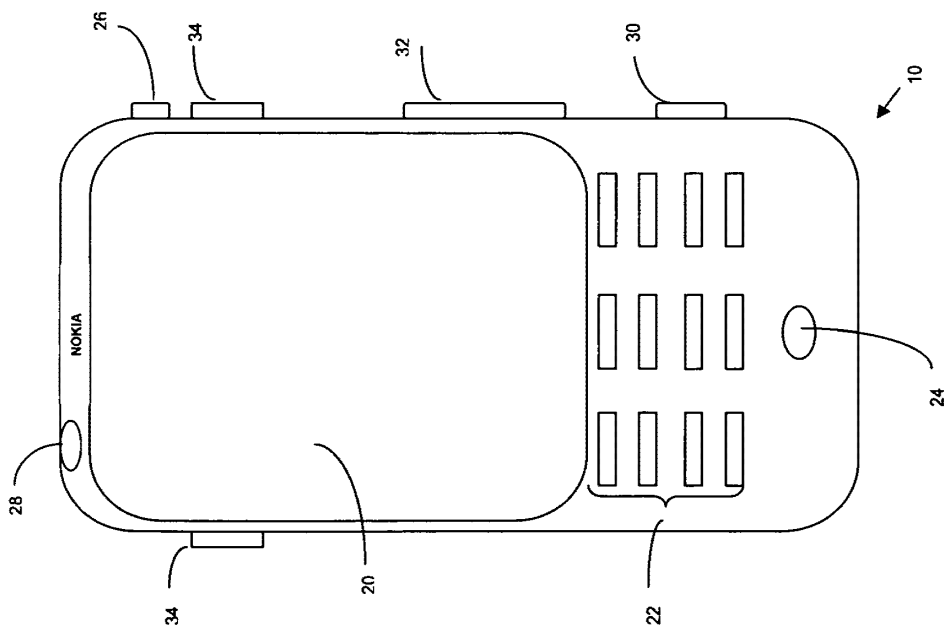
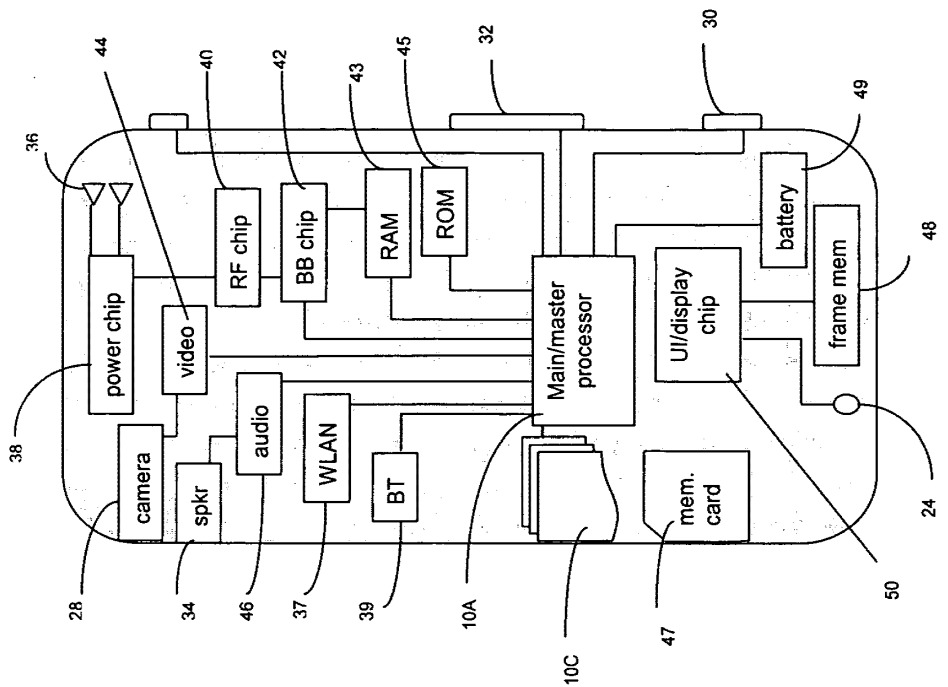


Figure 6B



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Nokia Corporation Docket No. NC64058US
Harrington & Smith, PC Docket No.: 854.0090.U1(US)
As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below 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 which is claimed and for which a patent is sought on the invention entitled:

**METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS
CHANNEL PROCEDURES**

the specification of which

(check one) ☒ is attached hereto.

_____ was filed on _____ as Application Serial No.

_____ and/or that was amended on _____.

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 to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

(Number) (Country) (Day/Mon/Year Filed) Yes No

I hereby claim the benefit under Title 35, United States Code, §119(e) of the United States provisional patent application(s) listed below:

(Application Serial No.)

(Filing Date)

I hereby claim benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred 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)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorneys and/or agents listed below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby 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 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.

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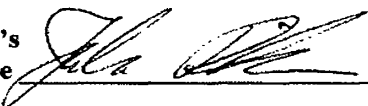
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POST OFFICE ADDRESS: **Vattulantie 17, Kammenniemi, Finland**

Inventor's
Signature  Date MAY 12th 2009

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **TARKIAINEN** **Markku** **Juhani**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Oulu, Finland**

POST OFFICE ADDRESS: **Jokipellontie 4, Oulu, Finland**

Inventor's
Signature _____ Date _____

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Nokia Corporation Docket No. NC64058US
 Harrington & Smith, PC Docket No.: 854.0090.U1(US)
 As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below 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 which is claimed and for which a patent is sought on the invention entitled:

**METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS
 CHANNEL PROCEDURES**

the specification of which

(check one) ☒ is attached hereto.

_____ was filed on _____ as Application Serial No.

_____ and/or that was amended on _____.

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 to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

 (Number) (Country) (Day/Mon/Year Filed) Yes No

I hereby claim the benefit under Title 35, United States Code, §119(e) of the United States provisional patent application(s) listed below:

(Application Serial No.)

(Filing Date)

I hereby claim benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred 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)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorneys and/or agents listed below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

NAMES**REGISTRATION NUMBERS**

Gary H. Savitt	44,351
Wayne DeMello	48,601
Arjun Krishnan	55,347
Fang Geng	57,719

and all Attorneys and/or Agents listed under **Customer Number: 29683** including:

Mark Harrington	31,686
Harry Smith	32,493
Christine W. Beninati	37,967
Jerry Stanton	46,008

SEND CORRESPONDENCE TO:

Customer Number: **29683**.

DIRECT TELEPHONE CALLS TO:

Harrington & Smith, PC
Telephone:(203)925-9400
Facsimile:(203)944-0245

I hereby 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 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.

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **STEUDLE** **Ville** **O.**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Turku, Finland** **Finland**

POST OFFICE ADDRESS: **Kokkokatu 42 B, Turku, Finland**

Inventor's
Signature *Ville Steudle* Date *11.05.2009*

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **PIRSKANEN** **Juho** **Mikko Oskari**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Tampere, Finland** **Finland**

POST OFFICE ADDRESS: **Ahkionkatu 16 A2, Tampere, Finland**

Inventor's
Signature _____ Date _____

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **KUSNYER** **Ladislav**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Salo, Finland** **Czech Republic**

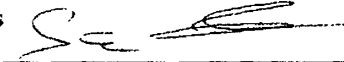
POST OFFICE ADDRESS: **Ketomäenkatu 3 A7, Salo, Finland**

Inventor's
Signature *Ladislav Kusnyer* Date *11.05.2009*

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **HAKALA** **Sami** **P.**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Oulu, Finland** **Finland**

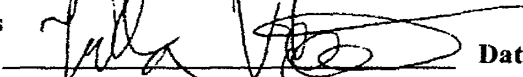
POST OFFICE ADDRESS: **Haapakuja 9 B 10, Oulu, Finland**

Inventor's 
Signature Date 08-May-2009

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **VIKSTEDT** **Jukka** **T.**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Oulu, Finland** **Finland**

POST OFFICE ADDRESS: **Kerolankuja 1 A, Oulu, Finland**

Inventor's 
Signature Date 08-May-2009

FULL NAME LAST NAME FIRST NAME MIDDLE NAME
OF INVENTOR : **VALIO** **Harri** **Matti Johannes**

RESIDENCE & CITY & STATE OR COUNTRY CITIZENSHIP
CITIZENSHIP: **Kammenniemi, Finland** **Finland**

POST OFFICE ADDRESS: **Vattulantie 17, Kammenniemi, Finland**

Inventor's
Signature _____ Date _____

FULL NAME OF INVENTOR :	LAST NAME TARKIAINEN	FIRST NAME Markku	MIDDLE NAME Juhani
RESIDENCE & CITIZENSHIP:	CITY & STATE OR COUNTRY Oulu, Finland	CITIZENSHIP Finland	

POST OFFICE ADDRESS: **Jokipellontie 4, Oulu, Finland**

Inventor's
Signature



Date

12.5.2009

U.S. PTO
12/454053
05/12/2009

Attorney Docket No.: 854.0090.U1(US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Express Mail Certificate

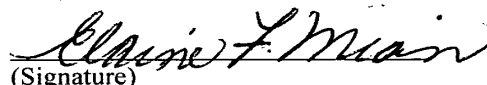
Express Mail mailing label number: **EM 026 578 913 US**

Date of Deposit: **May 12, 2009**

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and addressed to the Commissioner For Patents, P.O. Box 1450, Alexandria, VA 223131450.

Elaine Mian

(Name of person mailing paper)


(Signature)

Commissioner For Patents
Mail Stop: NEW PATENT APPLICATION
P.O. Box 1450
Alexandria, VA 22313-1450

NEW APPLICATION TRANSMITTAL FORM

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): **Ville O. Steudle, Juho Pirskanen, Ladislav Kusnyer, Sami P. Hakala, Jukka T. Vikstedt, Harri Matti Johannes Valio and Markku Juhani Tarkiainen**

For (title): **Method, Apparatus and Computer Program For User Equipment Access Channel Procedures**

Enclosed are the following:

- ☐ Application Cover Page
- ☒ 25 pages of Specification that consists of, 19 pages of Description, 5 pages of Claims and 1 page of Abstract;
- ☒ 7 sheet of drawings;
- ☒ Inventor(s) Declaration; x2
- ☐ Preliminary Amendment;
- ☐ Priority is hereby claimed from:
 - Patent Application Number filed on ;
 - Patent Application Number filed on ;
 - Patent Application Number filed on ;
- ☐ Certified Copy of priority document(s);
- ☐ English language translation of priority document;
- ☐ Application Data Sheet;
- ☒ Information Disclosure Statement and/or Form PTO 1449 and cited non-U.S. art (if applicable);
- ☒ Assignment and Recordation Form Cover Sheet; x3
- ☒ Return Receipt Postcard;

☐ Other:

Assignment Data

- ☒ An assignment of the invention to Nokia Corporation
☒ is attached.
☐ will follow.
☐ has been previously filed.

Small Entity Status

☐ Applicant claims small entity status.

Fees

- ☒ Utility ☐ Reissue
☐ Design

Basic Filing Fee **\$330.00**

Excess Claim Fee

	Number Filed		Number Extra	Rate	
Total Claims	20-20 =	0	x	\$ 52.00	\$0
Independent Claims	3 - 3 =	0	x	\$ 220.00	\$0

☐ Multiple Dependent Claim Fee (\$390.00) \$

Examination Fee **\$220.00**

Patent Search Fee **\$540.00**

Exceeding of 100 sheets of paper fee (\$270.00 per each 50 sheets) \$

Assignment Recordal **3 x \$ 40.00 \$120.00**

TOTAL FEES **\$ 1,210.00**

- ☐ A check in the amount of **\$0** in payment of the filing fee is enclosed.
- ☒ Charge **\$1,210.00** to Deposit Account No. 50-1924
- ☒ The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 1.16 and 1.17 which may be required for this communication or during the entire pendency of this patent application, or credit any overpayment, to Deposit Account No. 50-1924.

Correspondence

Address all future communications to: **Customer No.: 29,683**
Direct telephone calls to Jerry Stanton at (203) 925-9400
Direct facsimiles to (203) 944-0245

May 12, 2009

Date



Jerry Stanton (Reg. No.: 48,006)

Customer No.: 29,683

Harrington & Smith, PC
4 Research Drive
Shelton, CT 06484-6212
(203) 925-9400

Serial No.: to be assigned

Filing Date: Herewith

Group:

[illegible][illegible]

	3GPP TS 25.331 V8.2.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol Specification (Release 8), pages 1-31, page 285-286, page 717-720
	3GPP TS 25.211 V8.0.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Channels and Mapping of Transport Channels onto Physical Channels (FDD) (Release 8), pages 1-54
	3GPP TS 25.214 V8.1.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Layer Procedures (FDD) (Release 8), pages 1-87

Date Considered:

Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.
Include a copy of this citation form with your next correspondence to the Applicant(s).

SCORE Placeholder Sheet for IFW Content

Application Number: **12454053**

Document Date: **05/12/2009**

The presence of this form in the IFW record indicates that the following document type was received in paper and is scanned and stored in the SCORE database.

- Drawings

Images of the original documents are scanned in gray scale or color and stored in SCORE. Bi-tonal images are also stored in IFW. Defects visible in both IFW and SCORE are indicative of defects in the original paper documents.

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- Examiners may access SCORE content via the eDAN interface.
- Other USPTO employees can bookmark the current SCORE URL (<http://es/ScoreAccessWeb/>).
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Form Revision Date: December 8, 2006

PATENT APPLICATION SERIAL NO. _____

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

05/13/2009 CCHAUI 00000016 501924 12454053

01 FC:1011	330.00 DA
02 FC:1111	540.00 DA
03 FC:1311	220.00 DA

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002- 489-267/69033

Filing Date: 05/13/09

Approved for use through 7/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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.

PATENT APPLICATION FEE DETERMINATION RECORD					12/454,053	
Substitute for Form PTO-875						
APPLICATION AS FILED – PART I						
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	
BASIC FEE (37 CFR 1.16(a), (b), or (c))						
SEARCH FEE (37 CFR 1.16(k), (j), or (m))						330
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))						540
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 =				220
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =				
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))						
				N/A		
				TOTAL		1090
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDI- TIONAL FEE (\$)
	Total (37 CFR 1.16(i))	Minus	**	=	X	=
	Independent (37 CFR 1.16(h))	Minus	***	=	X	=
	Application Size Fee (37 CFR 1.16(s))				N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL ADD'T FEE	
(Column 1)		(Column 2)		(Column 3)		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDI- TIONAL FEE (\$)
	Total (37 CFR 1.16(i))	Minus	**	=	X	=
	Independent (37 CFR 1.16(h))	Minus	***	=	X	=
	Application Size Fee (37 CFR 1.16(s))				N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL ADD'T 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.						

This collection of information is required by 37 CFR 1.16. 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, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)

CONFIRMATION NO. 1254

29683
HARRINGTON & SMITH, PC
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

FORMALITIES LETTER



Date Mailed: 05/26/2009

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - The application papers (including any electronically submitted papers) are not in compliance with 37 CFR 1.52 because pages 3, 5-6, 9-10, 12, 14, 17 contain text that is written in unacceptable font or font size. The text must be written in nonscript type font (e.g., Arial, Times Roman, Courier, preferably a font size of 12) lettering style having capital letters that should be at least 0.3175 cm. (0.125 inch) high. A font with capital letters smaller than 0.3175 cm. (0.125 inch) high is only acceptable if the writing is clear and legible.
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 6B.
 - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 2-5.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.

<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/fly/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/454,053	05/12/2009	2617	1090	854.0090.U1(US)	20	3

CONFIRMATION NO. 1254

29683
HARRINGTON & SMITH, PC
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

FILING RECEIPT



OC000000036137739

Date Mailed: 05/26/2009

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Ville O. Steudle, Turku, FINLAND;
Juho Mikko Oskari Pirskanen, Tampere, FINLAND;
Ladislav Kusnyer, Salo, FINLAND;
Sami P. Hakala, Oulu, FINLAND;
Jukka T. Vikstedt, Oulu, FINLAND;
Harri Matti Johannes Valio, Kammenniemi, FINLAND;
Markku Juhani Tarkiainen, Oulu, FINLAND;

Assignment For Published Patent Application

Nokia Corporation

Power of Attorney: The patent practitioners associated with Customer Number 29683

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 05/22/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/454,053**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

page 1 of 3

Title

Method, apparatus and computer program for user equipment access channel procedures

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

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page 2 of 3

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

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UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)

29683
HARRINGTON & SMITH, PC
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

US ACTION
DUE DATE 7/26/09
PAPER DATED 5/26/09
OA FINAL 11/26/09
MSG PT DWG
APPEAL ISSUE FEE
OTHER Spec

CONFIRMATION NO. 1254

FORMALITIES LETTER



Date Mailed: 05/26/2009

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
 - The application papers (including any electronically submitted papers) are not in compliance with 37 CFR 1.52 because pages 3, 5-6, 9-10, 12, 14, 17 contain text that is written in unacceptable font or font size. The text must be written in nonscript type font (e.g., Arial, Times Roman, Courier, preferably a font size of 12) lettering style having capital letters that should be at least 0.3175 cm. (0.125 inch) high. A font with capital letters smaller than 0.3175 cm. (0.125 inch) high is only acceptable if the writing is clear and legible.
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 6B.
 - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 2-5.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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IN THE U.S. PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of:

APPLICANT(S): V. Steudle et al.

SERIAL NO.: 12/454,053

EXAMINER: Not Yet Assigned

FILING DATE: May 12, 2009

ART UNIT: 2617

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TITLE: Method, Apparatus and Computer Program For User Equipment Access
Channel Procedures

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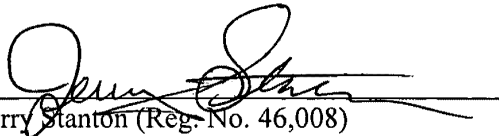
Response to Notice to File Corrected Application Papers

Sir:

As requested in the Notice to File Corrected Application Papers dated May 26, 2009, enclosed please find a Substitute Specification, Claims and Abstract. The attached substitute specification, claims and abstract is not being accompanied by a marked-up version, as the whole document has been corrected to a Times Roman type font with a font size of 12, as indicated in the Notice. Please replace the originally filed specification, claims and abstract with the attached revised specification, claims and abstract. The attached specification does not contain any new matter.

Also enclosed are seven (7) sheets of formal drawings indicated as Replacement Sheets, regarding the above-referenced application. We believe these drawings are acceptable, and submit them for your consideration.

Respectfully submitted,


Jerry Stanton (Reg. No. 46,008)

July 8, 2009
Date

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**METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER
EQUIPMENT ACCESS CHANNEL PROCEDURES**

TECHNICAL FIELD:

[0001] The exemplary and non-limiting embodiments of this invention relate generally to wireless communication systems, methods, devices and computer programs and, more specifically, relate to access procedures by which a user equipment accesses a wireless network.

BACKGROUND:

[0002] Various abbreviations that appear in the specification and/or in the drawing figures are defined as follows:

3GPP	third generation partnership project
AI/AICH	acquisition indicator/acquisition indicator channel
CAZAC	constant amplitude zero autocorrelation (e.g., Zadoff-Chu sequence)
DL	downlink
EUTRAN	evolved UTRAN (also referred to as LTE or 3.9G)
GSM	global system for mobile telecommunications
LTE	long term evolution
MME	mobility management entity
Node B	base station
PC	power control
PRACH	physical random access channel
RACH	random access channel
UE	user equipment
UL	uplink
UTRAN	universal terrestrial radio access network
WCDMA	wideband code division multiple access

[0003] The following 3GPP specifications are relevant to these teachings:

- TS 25.211, v8.4.0 (2009-03) Physical channels and mapping of transport channels onto physical channels (RACH at section 4.1.2.4; PRACH at section 5.2.2.1; and AICH at section 5.3.3.7);
- TS 25.214, v8.5.0 (2009-03) Physical layer procedures (PRACH at section 5.1.1; and physical random access procedures at section 6.1);

- TS 25.331, V8.2.0 (2008-03) Radio Resource Control (PRACH selection at section 8.5.17).

Similar teachings for E-UTRA are in technical specifications (TS) bearing a leading 36 series number.

[0004] As an overview and example of network access procedures for the WCDMA system, reference is made to Figures 1A and 1B, of which Figure 1B is reproduced from Figure 4 of 3GPP TS 25.211 (v 8.0.0) at section 5.2.2.1.1. Briefly, the UE seeking access to the system transmits on a RACH a first preamble to an access node (base station) and listens on an acquisition indicator channel AICH for a corresponding acquisition indicator AI. If that AI is not received, the UE tries again by transmitting a second preamble and again listens for a corresponding AI. In the example, this continues a third time, at which Figure 1A shows that an AI corresponding to the third preamble is received by the UE. Only after receiving that AI does the UE then transmit what is termed the message part of its access message. The preambles and message parts are shown also at Figure 1B. Generally, each of those three preambles uses a signature sequence that the UE randomly generates for each of the different preambles. This avoids different UEs attempting access over the same RACH from reading the AI from the other UE, since the AI is mapped to the signature sequence used in the preamble to which the AI corresponds. While the example shows three preambles, this is not to be seen limiting, and there can be one up to a network-configured maximum number of preambles, depending on channel conditions.

[0005] In general, the transmit power that the UE uses on the PRACH for the first preamble is set by higher layers. As currently set forth in 3GPP TS 25.214 at section 6.1, the UE randomly selects a signature set (e.g., a CAZAC sequence for LTE-specific implementations) and sets the transmit power for its initial access attempt on the PRACH to a commanded preamble power set by higher layers (shown as P_{init} at Figure 2). If the UE finds no positive or negative acquisition indicator on the AICH that corresponds to the slot at which the UE sent its first preamble on the PRACH at power P_{init} , the UE then randomly selects another signature sequence and as shown at Figure 2 re-attempts access using an increased power, where the increase is given as a power ramp step P_0 . The UE continues these transmissions, repeatedly using a different sequence and increasing

transmit power by the ramp step until either it finds the acquisition indicator at the corresponding slot of the AICH or its counter hits a maximum, which may or may not be three as in this example. Once the UE receives its acquisition indicator on the AICH, then as can be seen at Figure 2 the UE can send the message part of the PRACH.

[0006] There are several problems seen with the above approach. As seen at Figure 2, when the first preamble does not result in the acquisition indicator being received at the UE, the UE must repeat the process with new signature sequence and increased power $P_{init} + P_0$. If there is a reception problem at the BS, or if there is interference in the first-sent preamble, then the second-sent preamble represents needless power consumption at the UE, which is a consideration with portable electronic devices. Also with the second-sent preamble there is an added computational complexity for the UE which needs to map the randomly generated sequence used in each preamble to the corresponding slot in the AICH at which the UE looks for its acquisition indicator. These teachings are directed toward addressing at least some of the above concerns.

SUMMARY:

[0007] In accordance with one example embodiment of the invention is a method that includes attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences; and responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0008] In accordance with another example embodiment of the invention is an apparatus that includes a processor and a transmitter. The transmitter is configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences. The processor is configured to determine that the access attempt

from the first preamble was unsuccessful, and responsive to that determining, the processor is configured to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0009] In accordance with yet another example embodiment of the invention is a computer readable memory storing a program of instructions that when executed by a processor result in actions that comprise: attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences; and responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0010] In accordance with still another example embodiment of the invention is an apparatus that includes processing means and a sending means. The sending means is for attempting access to a wireless network by transmitting, on a random access channel at a first transmit power, a first preamble comprising a signature sequence, which the processing means randomly selects from a set of signature sequences. The processing means is also for determining that the access attempt from the first preamble was unsuccessful, and responsive to that determining is for causing the sending means to re-attempt access to the wireless network by causing it to transmit on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. In a specific exemplary embodiment, the processing means comprises at least one processor, the sending means comprises a transmitter, and the apparatus comprises a portable handheld user equipment.

[0011] These and other aspects are detailed below with more particularity.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0012] The foregoing and other aspects of the exemplary embodiments of this invention are made more evident in the following Detailed Description, when read in conjunction with the attached Drawing Figures.

[0013] Figure 1A is a signalling diagram representing initial network access by a UE in a WCDMA system showing three preamble transmissions before the user equipment receives an acquisition indicator.

[0014] Figure 1B reproduces Figure 4 from section 5.2.2.1.1 of 3GPP TS 25.211 (ver 8.0.0), Overall structure of random-access transmission.

[0015] Figure 2 is a schematic diagram of a prior art PRACH/AICH exchange when first and second access attempts fail and an acquisition indicator is received only after a third access attempt by the UE.

[0016] Figure 3 is a table of sequence selection and power control for PRACH preamble transmissions according to four exemplary and non-limiting embodiments of the invention.

[0017] Figure 4 is a schematic diagram similar in form to Figure 2 but showing transmit power for the PRACH preambles according to the second and fourth embodiments of Figure 4.

[0018] Figure 5 is a logical flow diagram that illustrates the operation of a method, and the result of execution of computer program instructions by the data processor shown in Figures 6A-B according to exemplary embodiments of the invention.

[0019] Figure 6A shows a simplified block diagram of various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention.

[0020] Figure 6B is a more particularized block diagram of a user equipment such as that

shown at Figure 6A.

DETAILED DESCRIPTION:

[0021] In the specific examples given below are several approaches to resolving the problem of no access from an initial transmission by the UE of its preamble transmission on the PRACH. They may be used singly or in various combinations, and are summarized as follows:

- The initial access attempt on PRACH is at a transmit power increased over the initial power indicated by higher layers (e.g., at $P_{init}+P_0$ instead of at P_{init}).
- The signature sequence(s) used for subsequent access attempts after the first access attempt are statically assigned rather than randomly selected by the UE.

[0022] Relevant to the first point above, the inventors have determined that too often the UE's first access attempt is unsuccessful, so increasing the power at which that initial PRACH access attempt over the power indicated by higher layers P_{init} should improve the success rate. It is still possible that in some instances that initial access attempt may be unsuccessful. In that case, any second attempt by the UE at network access that may be necessary is, according to certain exemplary embodiments of the invention, at a transmit power that is no greater than the initial access attempt. Specifically in the second and fourth embodiments detailed below, the UE's transmit power for the second preamble is less than the UE's transmit power for the first preamble.

[0023] Relevant to the second point above, in certain exemplary embodiments the UE randomly generates a signature sequence as normal for the first preamble transmission, and in the event the UE needs to send another preamble transmission because it did not see an acquisition indicator at the mapped portion of the AICH, the UE then re-uses the signature sequence it previously generated which was already used in the first preamble transmission.

[0024] Various combinations of those two points above lead to four different embodiments for the first two PRACH attempts. These are exemplary and non-limiting;

other variations will be readily apparent within these teachings. In a first exemplary embodiment, the signature sequences for each of the first and second access attempt is random and the power for the first and second access attempt is the same at P_{init} . In a second exemplary embodiment, the signature sequences for each of the first and second access attempt is random and the power for the first access attempt is higher than the initial power indicated by higher layers (e.g., $P_{init} + P_0$) while the power for the second access attempt is lower, say for example at the initial power indicated by higher layers P_{init} . In a third exemplary embodiment, the signature sequences for the first access attempt is random and signature sequence for the second access attempt repeats that of the first access attempt, while the power for both the first and second access attempts is the same, say for example at the initial power indicated by higher layers P_{init} . In a exemplary fourth embodiment, the signature sequences for the first access attempt is random and signature sequence for the second access attempt repeats that of the first access attempt, while the power for the first access attempt is higher than the initial power indicated by higher layers (e.g., $P_{init} + P_0$) and the power for the second access attempt is lower (e.g., P_{init}).

[0025] These four can be generalized as follows: the UE attempts access to a wireless network by sending, on the random access channel at a first transmit power, a first preamble that comprises a signature sequence that is randomly generated (e.g., randomly selected from a pre-determined set of signature sequences). Responsive to the UE determining that the access attempt from sending the first preamble was unsuccessful (where the determining is for example the UE failing to find an AI in a slot of the AICH that is mapped by the sent first preamble), the UE re-attempts access to the wireless network by sending, again on the random access channel but this time at a second transmit power, a second preamble that comprises a signature sequence. But in this case the second transmit power is no greater than the first transmit power. For the first and second embodiments above, the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly generated. For the third and fourth embodiments above, the signature sequence for the first preamble is randomly generated and the signature sequence for the second preamble is the same as the signature sequence for the first preamble, re-used in the second preamble.

[0026] As compared to the prior art, each of those four embodiments decrease interference caused by the second preamble. Additionally, the second embodiment also increases the likelihood that the Node B will correctly receive the first PRACH access attempt. Further, the third and fourth embodiments also reduce computation complexity by the UE since it does not need to randomly generate another signature sequence for the second PRACH attempt. Like the second embodiment, the fourth embodiment also increases the likelihood that the Node B will correctly receive the first PRACH access attempt. For this reason the fourth embodiment is considered at this time to be the best mode.

[0027] These four exemplary and non-limiting embodiments are set forth in tabular form at Figure 3. With respect to Figure 3, assume that UE has a counter that limits the number of preambles sent in each RACH access attempt to three, and these are termed the initial preamble (corresponding to the leftmost preamble of Figure 2 which as indicated there is sent with power P_{init}), the second preamble (corresponding to the centremost preamble of Figure 2) and the third preamble (corresponding to the rightmost preamble of Figure 2). Of course the UE's counter may go to any integer maximum greater than zero, but we use three as the limit for this example. Each preamble that the UE sends on the PRACH increments the counter by one. Each time the counter reaches its maximum is one RACH attempt. At the end of each RACH attempt, or when an AI is received on time, the UE re-sets its counter to zero. If the UE has not yet received the AI and therefore has not acquired access to the network once the counter hits its maximum, the UE can then re-attempt access in a second RACH attempt, incrementing the counter again for each preamble it sends in the second RACH attempt. Figure 3 illustrates by way of example two distinct RACH access attempts, where the UE begins the second RACH access attempt after failing to obtain the acquisition indicator following any of the three preamble transmissions of the first RACH access attempt, re-sets its counter, and begins the RACH process anew.

[0028] Excluding column titles, the first two rows of Figure 3 illustrate the signature sequence which the UE puts in the various preambles according to the four exemplary embodiments noted above, and the last two rows illustrate the power at which the UE transmits those preambles according to those same four exemplary embodiments.

[0029] At the first row of Figure 3 and for the first RACH access attempt, according to the first and second embodiments the UE randomly selects a signature sequence and transmits a first preamble that has the randomly generated/selected signature sequence on the RACH. If in response the UE fails to obtain the acquisition indicator (e.g., it does not correctly receive an AI on the slot of the AICH which is mapped by the first preamble), then the UE randomly generates/selects another signature sequence for the second preamble that it transmits on the RACH. If again the UE fails to receive in response the acquisition indicator it expects on the AICH, then the UE randomly generates/selects still another signature sequence for the third preamble that it transmits on the RACH. At this point the UE's RACH counter is at its upper limit of three. Should the UE choose to re-attempt RACH access further, then the second RACH access attempt repeats just as the first RACH access attempt, by which the UE randomly selects a signature sequence for each preamble transmission of the second RACH attempt.

[0030] At the second row of Figure 3, and for the first RACH access attempt, according to the third and fourth embodiments the UE randomly selects a signature sequence and transmits a first preamble that has the randomly generated/selected signature sequence on the RACH. This is the same as the first and second embodiments. But in the third and fourth embodiments, the UE re-uses the same sequence from the first preamble of the RACH access attempt. Note at Figure 3 for the third and fourth embodiments that for the first preamble in the second RACH access attempt, the UE generates anew another signature sequence different from that used in the first RACH access attempt. Re-use of the same signature sequence for subsequent preambles within the same RACH access attempt avoids the need for the UE to expend processing power on dynamically re-generating signature sequences for the second and third preambles.

[0031] According to these third and fourth embodiments, the UE maps the first randomly generated signature sequence of the first preamble to a particular slot on the AICH. The UE stores this mapping in its local memory. If the UE does not find an AI for it at the mapped slot, then by re-using the same signature sequence in the second (and third) RACH preambles it need only read its previously stored mapping to find the correct AICH

slot in which to look, and need not independently map each preamble's signature sequence independently to the AICH.

[0032] Note that in both mapping and re-using the same signature sequence, the sequences for all three preambles of a RACH access attempt are known at the start of the RACH access attempt (defined by the UE's counter). In this manner the signature sequences for all but the first preamble of any RACH access attempt are statically determined, as compared to the prior art in which they are randomly generated as they are needed for the upcoming preamble transmission.

[0033] The two lowermost rows of the table at Figure 3 tabulate the power control aspects of the above exemplary embodiments of the invention. As noted above these may be combined with the signature sequence aspects of the invention or employed separately therefrom. As a review of the prior art shown at Figure 2 and as detailed in the background section above, for the initial preamble transmission during the first RACH access attempt, the UE sets its transmit power for the first preamble according to P_{init} which is an initial power level for random access to the network and which is obtained from higher layers. Further as noted for Figure 2, for each subsequent preamble transmission while the UE's counter is not yet expired the UE increases its preamble transmit power one ramp step (P_0 in Figure 2 which is also broadcast in system information) as compared to the last preamble transmission. If that prior art UE chooses to re-attempt another RACH access attempt after its counter tops out, it re-sets the counter and begins again as with the first RACH access attempt where the first preamble of the second RACH attempt is again transmitted at the commanded power P_{init} .

[0034] The initial power level is obtained from higher layers, in one particular embodiment, by exchanging the parameters between the radio resource control RRC logical layer of the eNB and the RRC layer of the UE. Bits signalled between the network and the UE are on the physical layer. Consider those bits the power value which the UE receives by example in system information from the network. The RRC layer of the eNB uses P_{init} to find that power value which it sends on the physical layer, and the RRC layer of the UE finds P_{init} for its own use using the power value which it receives on the physical

layer. Thus P_{init} is obtained from the RRC layers of the eNB and the UE. In an embodiment it is this computed power P_{init} , which the UE gets from its RRC layer, that is the transmit power for the second preamble for all embodiments at Figure 3 and that is the transmit power for the first preamble of the 1st and 3rd embodiments at Figure 3. Note also that the same higher layer can compute the transmit power $P_{init}+P_0$ for the first preamble for the 2nd and 4th embodiments of Figure 3. As a specific example, consider that the value signaled by the network in its system information and received at the UE's receiver is Primary CPICH TX power. The network may also signal other relevant parameters, such as uplink UL interference and some constant value, for example. The UE receives those three signaled values, it may further measure the channel to arrive at its own measured parameter, and computes P_{init} from those signaled and measured parameters. Specifically, the formula used at the UE's RRC layer may be, for example: $P_{init}=(\text{Primary CPICH power})-(\text{CPICH_RSCP})+(\text{UL interference})+(\text{Constant Value})$; where CPICH_RSCP represents the UE's own measurement.

[0035] One non-limiting embodiment of this aspect of the invention shown by way of example at the last row of Figure 3 takes a different approach so as to better avoid the case where the preamble transmitted with the initial power P_{init} yields no resulting acquisition indicator on the AICH. Specifically, according to the second and fourth exemplary embodiments of the invention, for the first preamble the UE sets its transmit power at $P_{init}+P_0$; one power step P_0 above the initial preamble power P_{init} indicated by higher layers. Recall that the PRACH message part (right side of Figures 1B and 2) is transmitted at a power that is increased over the power used on the most recent preamble transmission (which resulted in the acquisition indicator on the AICH) by the power offset P_m set by higher layers. In a variation of the second and fourth embodiments particularly shown at Figure 3, the second preamble is sent with a transmit power that is lower than that of the first preamble for the same RACH access attempt (e.g., transmit power for the second preamble is reduced by a power step size P_0 as compared to the transmit power for the first preamble). Also as shown at Figure 3, the transmit power for the third preamble is greater than both the first preamble and the second preamble, and in an exemplary embodiment the increase is in increments of the commanded step size (e.g., $P_{init}+P_0+x = P_{init}+2P_0$). In other variations of the second and fourth embodiments not shown at Figure 3, the second

and third preamble transmissions are at the same power as would be generated by the prior art; namely, $P_{init}+P_0$, and $P_{init}+P_0+P_0$. Note that the result is that the first and second preamble transmissions of each RACH access are then at the same power: $P_{init}+P_0$.

[0036] For the case where the UE is unsuccessful in obtaining an acquisition indicator on the AICH during the first RACH access attempt, Figure 3 also shows that the power control aspects of the second and fourth embodiments continue in the second RACH access attempt as the first; the UE re-sets its counter and sends the first (and the second if needed) preamble transmission at one power step above the initial power. If the third preamble is necessary after the second preamble is transmitted, the UE increases the power used on the final (third) preamble of a RACH access attempt by more than one additional power step over that used in the second-last (second) preamble, so that transmit power on the final preamble exceeds transmit power on every other preamble of that same RACH access attempt. This makes it more likely the BS will receive the UE's third preamble and send an AI in response, thereby helping prevent the UE having to begin a whole new RACH access attempt.

[0037] There is a slight increased risk such as when path loss is very low (e.g., UE very near the base station) that this initial preamble transmission will render other RACH preamble transmissions from other UEs unreadable by the base station, but this is seen to be quite slight in view of other separation factors already established in the RACH slot and sequence selection for contention based access. Further, to the extent it does happen, the UE power savings to any random UE is seen to be a net positive over time, since it is anticipated that there will be more instances of this technique eliminating the need for the UE to send a second RACH preamble than there will be that the UE would have to send a second RACH preamble due to its first RACH preamble being overpowered by another UE using the same procedure.

[0038] Also at Figure 3 at the second to last row is the power control profile for the preambles according to the first and third embodiments. Like the prior art, the first preamble is sent at the power commanded by the network, P_{init} . However in these exemplary embodiments the power at which the UE sends its second preamble (within a

same RACH access attempt) is the same as that used to send the first preamble, P_{init} . In these exemplary embodiments, all preambles of a RACH access attempt are sent at a same power, except for the last preamble (e.g., tracked by the UE's counter) which is sent at a higher transmit power. In the specific example at Figure 3, the last preamble is sent at a power increased one network-directed step size over the network-commanded initial power.

[0039] Figure 4 illustrates schematically, similar in form to Figure 2, the power profile according to the second and fourth embodiments of the invention, shown at the last row of Figure 3. The upper diagram illustrates the AICH 401 which is downlink and received at the UE, and the lower diagram illustrates the PRACH 402 which is uplink and transmitted by the UE. Time progresses left to right, and so at Figure 4 a UE sends in a first access slot 410 of a PRACH 402 a first preamble 412 at a first transmit power 411. The first preamble has a signature sequence. The UE maps the first preamble to a first access slot 414 of the AICH 401 and tunes its receiver according to the mapping. At 416 the UE determines that the access attempt from sending the first preamble has failed because the UE has not correctly received an AI at the mapped access slot 414. Responsive to this determining, the UE re-attempts access to the wireless network by sending on the RACH 402 at a second transmit power 421 a second preamble 420 comprising a signature sequence, in which the second transmit power 421 is no greater than the first transmit power 411. The specific embodiment of Figure 4 shows the second transmit power 421 the second transmit power is an initial power P_{init} indicated by the higher layers for random access and the first transmit power 411 is greater than the second transmit power 421 by one network-indicated step size P_0 .

[0040] Further at Figure 4, the UE maps the second preamble 420 to a second access slot 424 of the AICH 401 and tunes its receiver according to the mapping. For the case of the third and fourth embodiments in which the signature sequence is re-used in each preamble of the same RACH access attempt, the mapping is simply retrieved from the memory after being stored there from the first preamble process. At 426 the UE determines that the access re-attempt from sending the second preamble 420 has failed because the UE has not correctly received an AI at the mapped access slot 424. Responsive to this determining,

the UE again re-attempts access to the wireless network by sending on the random access channel 402 at a third transmit power 431 a third preamble 430 comprising a signature sequence, in which the third transmit power 431 is greater than the first transmit power 411 and greater than the second transmit power 421.

[0041] The UE maps the third preamble 430 to a third access slot 434 of the AICH 401 and tunes its receiver according to the mapping (as above, the mapping may be retrieved from a local UE memory according to certain embodiments). At 436 the UE correctly receives on the AICH 401 an AI at the mapped access slot 434, and in response sends a PRACH message part 440 at a transmit power increased by P_m over the transmit power used for the most recently transmitted preamble, which in this example is the third preamble 430. The value of P_m is also given by the network in broadcast system information.

[0042] Figure 5 is a logical flow diagram that illustrates the operation of a method, and the result of execution of computer program instructions by the data processor shown in Figures 6A-B below according to various exemplary embodiments of the invention. Figure 5 is not comprehensive of all the options detailed above but summarizes some major aspects of those embodiments for the reader's convenience. At block 502 the UE attempts access to a wireless network by sending on the random access channel at a first transmit power a first preamble comprising a signature sequence. This signature sequence is randomly selected from a set of signature sequences. Responsive to determining that the access attempt from sending the first preamble was unsuccessful, which at block 504 of Figure 5 is by the UE failing to properly receive an AI at the AICH slot which maps from the sent first preamble, the UE at block 506 re-attempts access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

[0043] The dotted lines indicate various options for the different exemplary embodiments noted above. At block 508 the signature sequence of the first and second preambles are randomly generated, which extends to the signature sequences of all preambles of the RACH access attempt. At block 510, different from block 508, the signature sequence for

the first preamble is re-used in all other preambles of the same RACH access attempt, and mapping of the signature sequence to the AICH slot is done once and stored in the UE's local memory. At block 512 the first and second transmit powers are equal, and set to the initial RACH power indicated by higher layers. Different from block 512, at block 514 the first transmit power is greater than the second transmit power, and it is the second transmit power that is set to the initial RACH power indicated by higher layers. Note that these dotted line blocks may be used in various combinations, block 508 can be combined with either block s 512 or 514, and block 510 can be also combined with either block s 512 or 514.

[0044] Assuming the UE determines that the access re-attempt from sending the second preamble was unsuccessful, which Figure 5 shows at block 516 as the UE failing to receive an AI at the AICH slot which maps from the second preamble, then responsive to that determining the UE at block 518 again re-attempts access to the wireless network by sending on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power. The signature sequences of the third preamble may be randomly generated as at block 508, or re-used from the first preamble as at block 510.

[0045] At block 510 there is a decision based on whether the UE finds an AI on the AICH slot that maps from the third preamble. If there is an AI there, the UE gets access to the network and sends at block 522 the PRACH message part at a transmit power that is increased by P_m over the transmit power for the most recently transmitted preamble (third preamble in this example). If there is no AI there, the UE re-sets its RACH counter at block 524 and begins again at block 502 for its second RACH access attempt. It is understood from Figure 5 that the RACH counter has a maximum of three for this example, and that each time the UE sends a new preamble within a RACH access attempt it increments its RACH counter by one.

[0046] Reference is now made to Figure 6A for illustrating a simplified block diagram of various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention. In Figure 6A a wireless network 1 is adapted for

communication with an apparatus, such as a mobile communication device which may be referred to as a UE 10, via a network access node, such as a Node B (base station). The network 1 may include a network control element (NCE) 14 that may be embodied as a MME/S-GW (serving gateway) or a radio network controller RNC or other higher network element, and which provides connectivity with a broader network 16, such as a telephone network and/or a data communications network (e.g., the internet). The UE 10 includes a data processor (DP) 10A, a memory (MEM) 10B that stores a program (PROG) 10C, and a suitable radio frequency (RF) transceiver 10D for bidirectional wireless communications over links 11 with the access node 12, which also includes a DP 12A, a MEM 12B that stores a PROG 12C, and a suitable RF transceiver 12D. The access node 12 is coupled via a data path 13 to the NCE 14. Another data interface 15 may be present for coupling to another access node (not shown) of the same type network 1. At least the PROG 10C and/or 12C may be assumed to include program instructions that, when executed by the associated DP 10A and 12A, enable the electronic device to operate in accordance with the exemplary embodiments of this invention, as detailed above and in the process diagram of Figure 5.

[0047] The exemplary embodiments of this invention may be implemented at least in part by computer software executable by the DP 10A of the UE 10, or by hardware, or by a combination of software and hardware (and firmware).

[0048] For the purposes of describing the exemplary embodiments of this invention the UE 10 may be assumed to also include a power control PC functional unit 10E, and the network access node 12 of the first network 1 also includes a PC functional unit 12E. The PC functional units 10E, 12E, which may be embodied as software stored in the MEM 10B, 12B, or as circuitry or some combination of computer software and hardware (and firmware), are assumed to be constructed and operated in accordance with the exemplary embodiments of this invention. These PC units 10E, 12E determine the transmit power for the various preambles according to the power-control aspects of the invention. These PC units 10E, 12E may also control how the signature sequences are constructed for the various preambles according to the signature sequence aspects of the invention.

[0049] In general, the various embodiments of the UE 10 can include, but are not limited to, cellular telephones, personal digital assistants (PDAs) having wireless communication capabilities, portable computers having wireless communication capabilities, image capture devices such as digital cameras having wireless communication capabilities, gaming devices having wireless communication capabilities, music storage and playback appliances having wireless communication capabilities, Internet appliances permitting wireless Internet access and browsing, as well as portable units or terminals that incorporate combinations of such functions.

[0050] The MEMs 10B and 12B may be of any type suitable to the local technical environment and may be implemented using any suitable data storage technology, such as semiconductor based memory devices, flash memory, magnetic memory devices and systems, optical memory devices and systems, fixed memory and removable memory. The DPs 10A and 12A may be of any type suitable to the local technical environment, and may include one or more of general purpose computers, special purpose computers, microprocessors, digital signal processors (DSPs) and processors based on a multicore processor architecture, as non-limiting examples.

[0051] Typically there will be a plurality of UEs 10 serviced by the network access node 12. The UEs 10 may or may not be identically constructed, but in general are all assumed to be electrically and logically compatible with the relevant network protocols and standards needed for operation in the wireless network 1.

[0052] Figure 6B illustrates further detail of an exemplary UE in both plan view (left) and sectional view (right), and the invention may be embodied in one or some combination of those more function-specific components. At Figure 6B the UE 10 has a graphical display interface 20 and a user interface 22 illustrated as a keypad but understood as also encompassing touch-screen technology at the graphical display interface 20 and voice-recognition technology received at the microphone 24. A power actuator 26 controls the device being turned on and off by the user. The exemplary UE 10 may have a camera 28 which is shown as being forward facing (e.g., for video calls) but may alternatively or additionally be rearward facing (e.g., for capturing images and video for local storage).

The camera 28 is controlled by a shutter actuator 30 and optionally by a zoom actuator 32 which may alternatively function as a volume adjustment for the speaker(s) 34 when the camera 28 is not in an active mode.

[0053] Within the sectional view of Figure 6B are seen multiple transmit/receive antennas 36 that are typically used for cellular communication. The antennas 36 may be multi-band for use with other radios in the UE. The operable ground plane for the antennas 36 is shown by shading as spanning the entire space enclosed by the UE housing though in some embodiments the ground plane may be limited to a smaller area, such as disposed on a printed wiring board on which the power chip 38 is formed. The power chip 38 controls power amplification on the channels being transmitted and/or across the antennas that transmit simultaneously where spatial diversity is used, and amplifies the received signals. The power chip 38 outputs the amplified received signal to the radio-frequency (RF) chip 40 which demodulates and downconverts the signal for baseband processing. The baseband (BB) chip 42 detects the signal which is then converted to a bit-stream and finally decoded. Similar processing occurs in reverse for signals generated in the apparatus 10 and transmitted from it.

[0054] Signals to and from the camera 28 pass through an image/video processor 44 which encodes and decodes the various image frames. A separate audio processor 46 may also be present controlling signals to and from the speakers 34 and the microphone 24. The graphical display interface 20 is refreshed from a frame memory 48 as controlled by a user interface chip 50 which may process signals to and from the display interface 20 and/or additionally process user inputs from the keypad 22 and elsewhere.

[0055] Certain embodiments of the UE 10 may also include one or more secondary radios such as a wireless local area network radio WLAN 37 and a Bluetooth® radio 39, which may incorporate an antenna on-chip or be coupled to an off-chip antenna. Throughout the apparatus are various memories such as random access memory RAM 43, read only memory ROM 45, and in some embodiments removable memory such as the illustrated memory card 47 on which the various programs 10C are stored. All of these components within the UE 10 are normally powered by a portable power supply such as a battery 49.

[0056] The aforesaid processors 38, 40, 42, 44, 46, 50, if embodied as separate entities in a UE 10 or eNB 12, may operate in a slave relationship to the main processor 10A, 12A, which may then be in a master relationship to them. Embodiments of this invention are most relevant to the baseband chip 42, though it is noted that other embodiments need not be disposed there but may be disposed across various chips and memories as shown or disposed within another processor that combines some of the functions described above for Figure 6B. Any or all of these various processors of Figure 6B access one or more of the various memories, which may be on-chip with the processor or separate therefrom. Similar function-specific components that are directed toward communications over a network broader than a piconet (e.g., components 36, 38, 40, 42-45 and 47) may also be disposed in exemplary embodiments of the access node 12, which may have an array of tower-mounted antennas rather than the two shown at Fig. 2B.

[0057] Note that the various chips (e.g., 38, 40, 42, etc.) that were described above may be combined into a fewer number than described and, in a most compact case, may all be embodied physically within a single chip.

[0058] Note that the various blocks shown in Figure 5 are directed toward the UE 10, and may be viewed as method steps, and/or as operations that result from operation of computer program code, and/or as a plurality of coupled logic circuit elements constructed to carry out the associated function(s). Consistent with these teachings, similar functionality resides in the network access node to receive the UE-sent messages and to send those messages that Figure 5 shows as the UE receiving, as well as the power values indicated by higher layers such as P_{init} , P_0 , and P_m .

[0059] In general, the various exemplary embodiments may be implemented in hardware or special purpose circuits, software, logic or any combination thereof. For example, some aspects may be implemented in hardware, while other aspects may be implemented in firmware or software which may be executed by a controller, microprocessor or other computing device, although the invention is not limited thereto. While various aspects of the exemplary embodiments of this invention may be illustrated and described as block

diagrams, flow charts, or using some other pictorial representation, it is well understood that these blocks, apparatus, systems, techniques or methods described herein may be implemented in, as non-limiting examples, hardware, software, firmware, special purpose circuits or logic, general purpose hardware or controller or other computing devices, or some combination thereof.

[0060] As such, it should be appreciated that at least some aspects of the exemplary embodiments of the inventions may be practiced in various components such as integrated circuit chips and modules. The design of integrated circuits is by and large a highly automated process. Complex and powerful software tools are available for converting a logic level design into a semiconductor circuit design ready to be fabricated on a semiconductor substrate. Such software tools can automatically route conductors and locate components on a semiconductor substrate using well established rules of design, as well as libraries of pre-stored design modules. Once the design for a semiconductor circuit has been completed, the resultant design, in a standardized electronic format (e.g., Opus, GDSII, or the like) may be transmitted to a semiconductor fabrication facility for fabrication as one or more integrated circuit devices.

[0061] Various modifications and adaptations may become apparent to those skilled in the relevant arts in view of the foregoing description, when read in conjunction with the accompanying drawings and the appended claims. For example, certain steps shown in Figure 3 may be executed in other than the order shown, and certain of the computations described may be performed in other ways. However, all such and similar modifications of the teachings of this invention will still fall within the scope of this invention.

[0062] Further, while the exemplary embodiments have been described above in the context of the WCDMA system, it should be appreciated that the exemplary embodiments of this invention are not limited for use with only this one particular type of wireless communication system, and that they may be used to advantage in other types of wireless communication systems such as for example the LTE (E-UTRAN) system, which uses protocol similar to WCDMA for random access procedures. Other exemplary but non-limiting wireless systems include GSM. Relevant specifications for the LTE system begins

with series 36, but otherwise mirror the series 25 technical specifications for WCDMA noted above. Further, the various names used for the channels and described parameters (e.g. AICH, PRACH, signature sequence, CAZAC, etc.) are not intended to be limiting in any respect, as these channels and parameters may be identified by any suitable names in different wireless protocols and standards.

[0063] It should be noted that the terms "connected," "coupled," or any variant thereof, mean any connection or coupling, either direct or indirect, between two or more elements, and may encompass the presence of one or more intermediate elements between two elements that are "connected" or "coupled" together. The coupling or connection between the elements can be physical, logical, or a combination thereof. As employed herein two elements may be considered to be "connected" or "coupled" together by the use of one or more wires, cables and/or printed electrical connections, as well as by the use of electromagnetic energy, such as electromagnetic energy having wavelengths in the radio frequency region, the microwave region and the optical (both visible and invisible) region, as several non-limiting and non-exhaustive examples.

[0064] Furthermore, some of the features of the examples of this invention may be used to advantage without the corresponding use of other features. For example, the power control features detailed above may be used in some embodiments of the invention without the signature sequence aspects of the invention, and vice versa. As such, the foregoing description should be considered as merely illustrative of the principles, teachings, examples and exemplary embodiments of this invention, and not in limitation thereof.

Claims:

We claim:

1. A method comprising:
attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;
responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.
2. The method of claim 1, wherein:
the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately;
and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.
3. The method according to claim 2, further comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.
4. The method according to claim 2, wherein the second transmit power is an initial transmit power determined from an indication obtained from higher layers and the first transmit power is greater than the second transmit power.
5. The method according to claim 2, further comprising:

responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately.

6. The method of claim 1, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble;

and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

7. The method according to claim 6, further comprising determining an initial transmit power from an indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

8. The method according to claim 6, wherein the second transmit power is the determined initial power and the first transmit power is greater than the second transmit power.

9. The method according to claim 6, further comprising:

responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the

signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble.

10. An apparatus comprising:

a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

11. The apparatus according to claim 10, wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

12. The apparatus according to claim 11:

wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the received parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the determined initial power.

13. The apparatus according to claim 11:

wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;
and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

14. The apparatus according to claim 11:

wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the processor is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles.

15. The apparatus according to claim 10, further comprising a memory,

wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory;

and wherein the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

16. The apparatus according to claim 15:

wherein the receiver is configured to receive from the higher layers parameters for

an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the initial power.

17. The apparatus according to claim 15:

wherein the receiver is configured to receive from the higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

18. The apparatus according to claim 15:

wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory.

19. A computer readable memory storing a program of instructions that when executed by a processor result in actions comprising:

attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature

sequence, in which the second transmit power is no greater than the first transmit power.

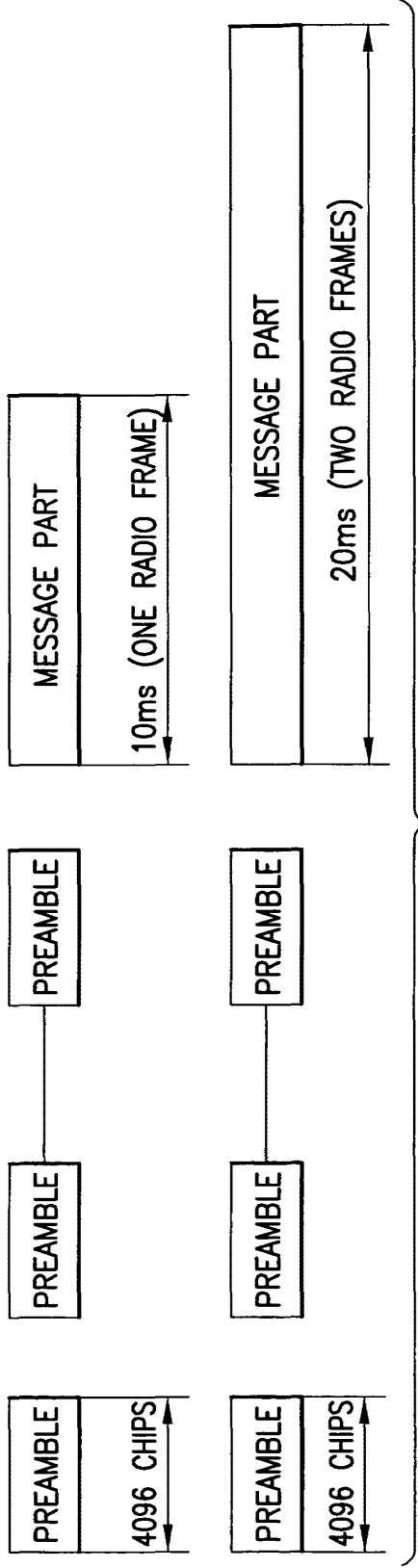
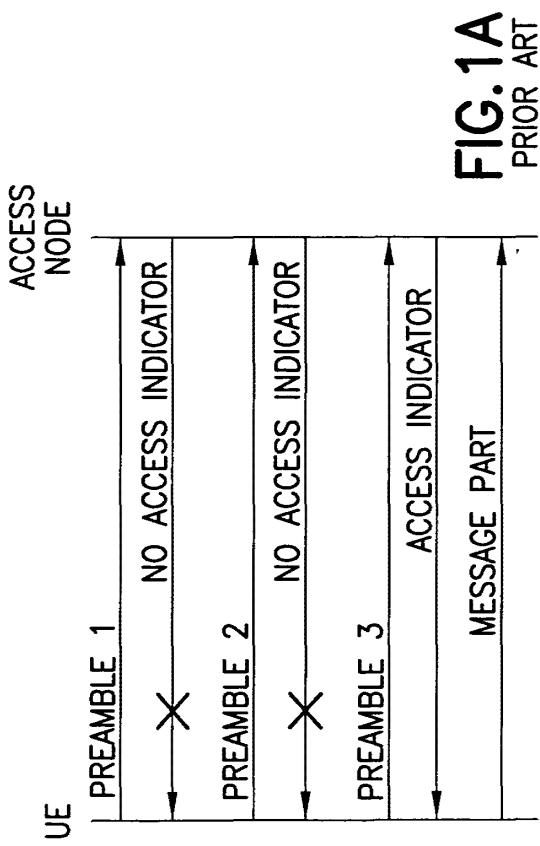
20. A computer readable memory of claim 19, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory.

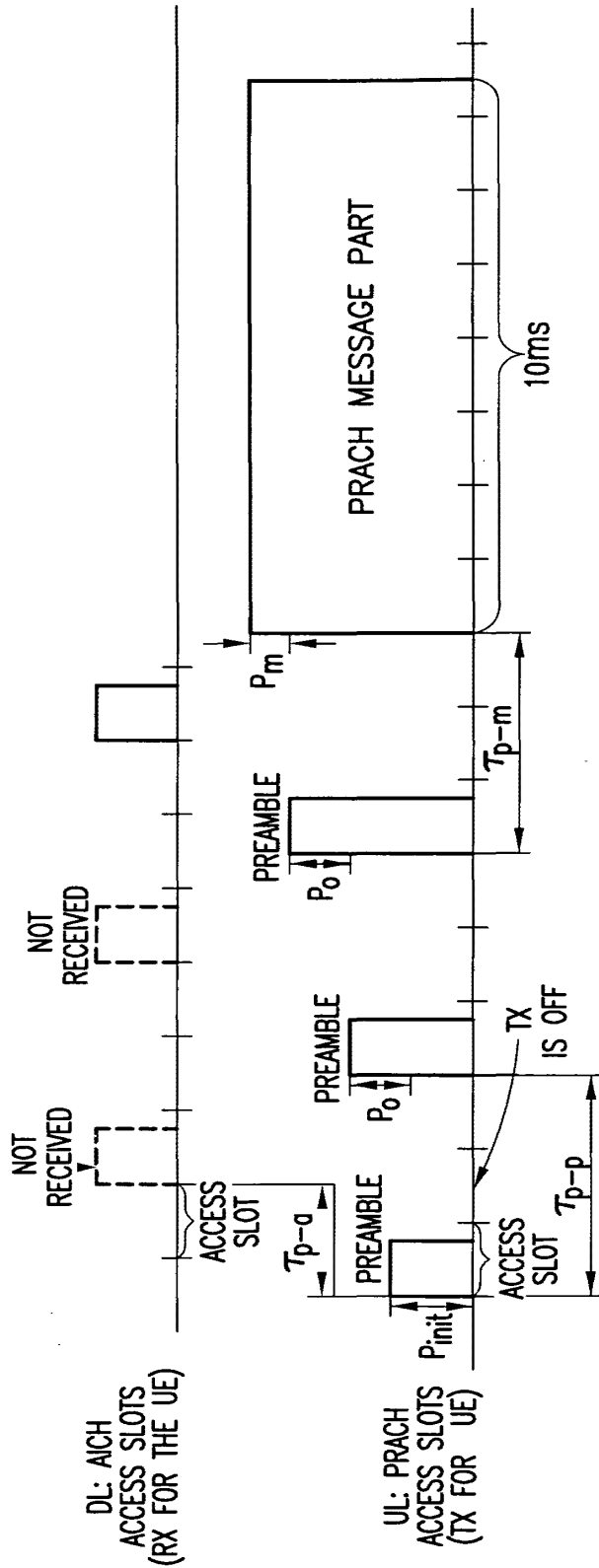
ABSTRACT:

Access to a wireless network is attempted by sending on a random access channel RACH at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences. After the access attempt from sending the first preamble is determined unsuccessful, access to the wireless network is re-attempted by sending on the RACH at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power. Embodiments variously combine different options: the signature sequences of the first and second preambles are each randomly selected separately, or the signature sequence of the first preamble is re-used in the second preamble; the first and second transmit powers are each equal to an initial transmit power, or the second transmit power is the initial power and less than the first transmit power.

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- AICH AND PRACH ACCESS SLOTS: 5120 CHIPS
- PREAMBLE AND AICH: 4096 CHIPS
- MESSAGE PART IS 10ms OR 20ms (10ms TYPICALLY USED)
- $\tau_{p-p,min} = 15360$ CHIPS (3 ACCESS SLOTS) (ALT. 4 SLOTS)
- $\tau_{p-a} = 7680$ CHIPS (ALT. 12800 CHIPS)
- $\tau_{p-a} = 15360$ CHIPS (3 ACCESS SLOTS) (ALT. 4 SLOTS)
- P_{init} = THE INITIAL PREAMBLE POWER. THIS POWER IS DERIVED AS DEFINED IN 25.331.
- P_o = THE POWER RAMP STEP
- P_m = POWER OFFSET (IN dB) BETWEEN LAST TRANSMITTED PREAMBLE AND THE CONTROL PART OF RANDOM ACCESS MESSAGE

FIG.2
PRIOR ART

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	1 st RACH ACCESS ATTEMPT			2 nd RACH ACCESS ATTEMPT		
	1 st PREAMBLE	2 nd PREAMBLE	3 rd PREAMBLE	1 st PREAMBLE	2 nd PREAMBLE	3 rd PREAMBLE
1 st & 2 nd EMBODIMENTS	RANDOMLY SELECT SEQUENCE	RANDOMLY SELECT SEQUENCE	RANDOMLY SELECT SEQUENCE	RANDOMLY SELECT SEQUENCE	RANDOMLY SELECT SEQUENCE	RANDOMLY SELECT SEQUENCE
3 rd & 4 th EMBODIMENTS	RANDOMLY SELECT SEQUENCE	RE-USE SAME SEQUENCE FROM 1 st PREAMBLE OF 1 st RACH ACCESS ATTEMPT	RE-USE SAME SEQUENCE FROM 1 st PREAMBLE OF 1 st RACH ACCESS ATTEMPT	RANDOMLY SELECT SEQUENCE	RE-USE SAME SEQUENCE FROM 1 st PREAMBLE OF 2 nd RACH ACCESS ATTEMPT	RE-USE SAME SEQUENCE FROM 1 st PREAMBLE OF 2 nd RACH ACCESS ATTEMPT
1 st & 3 rd EMBODIMENTS	INITIAL POWER (P _{init})	INITIAL POWER (P _{init})	INITIAL POWER+1 STEP INCREASE (P _{init} +P ₀)	INITIAL POWER (P _{init})	INITIAL POWER (P _{init})	INITIAL POWER+1 STEP INCREASE (P _{init} +P ₀)
2 nd & 4 th EMBODIMENTS	INITIAL POWER+1 STEP INCREASE (P _{init} +P ₀)	INITIAL POWER (P _{init})	INITIAL POWER+ GREATER THAN 1 STEP INCREASE (P _{init} +P ₀ +x)	INITIAL POWER+1 STEP INCREASE (P _{init} +P ₀)	INITIAL POWER (P _{init})	INITIAL POWER+ GREATER THAN 1 STEP INCREASE (P _{init} +P ₀ +x)

FIG.3

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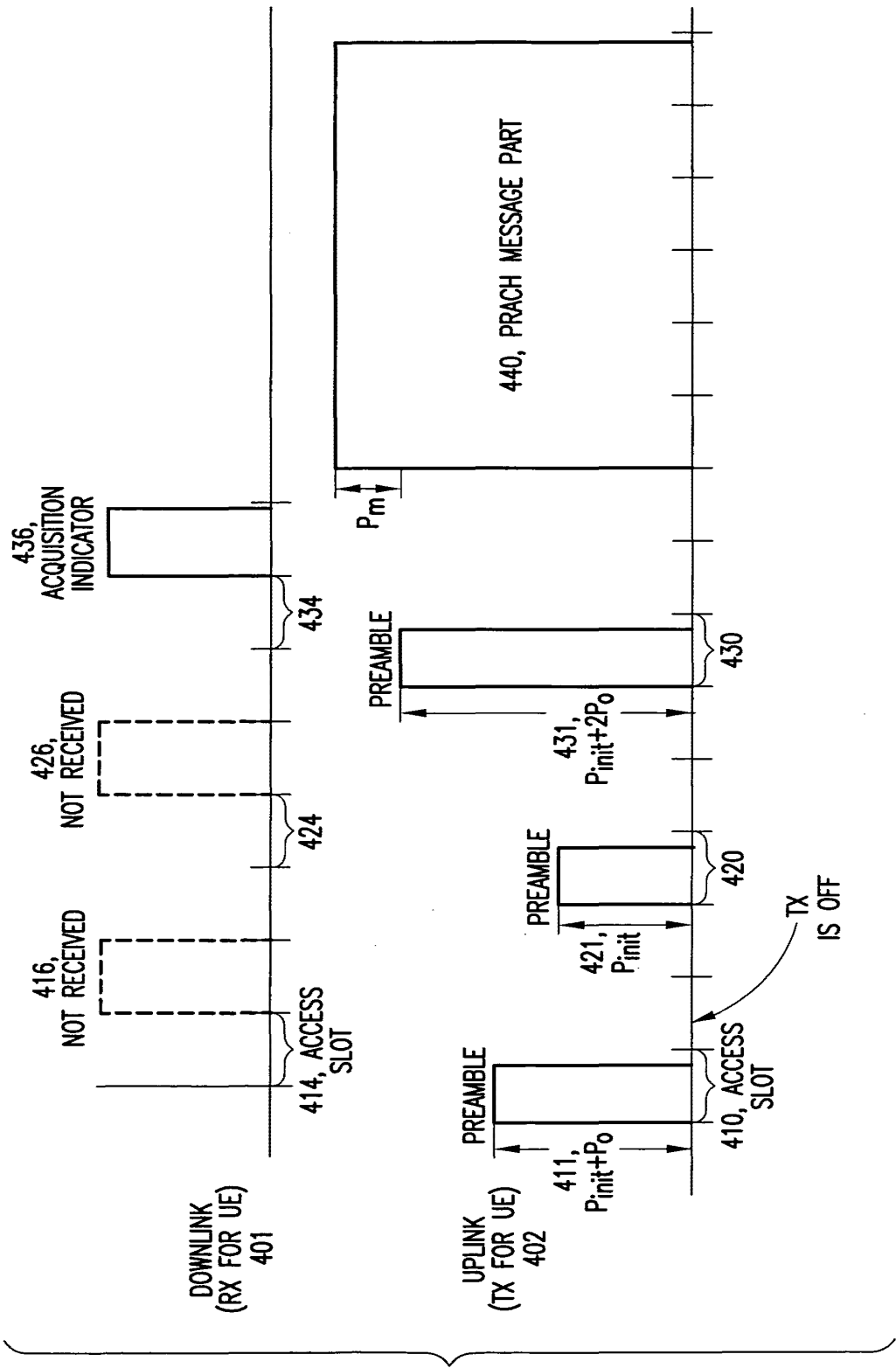


FIG.4

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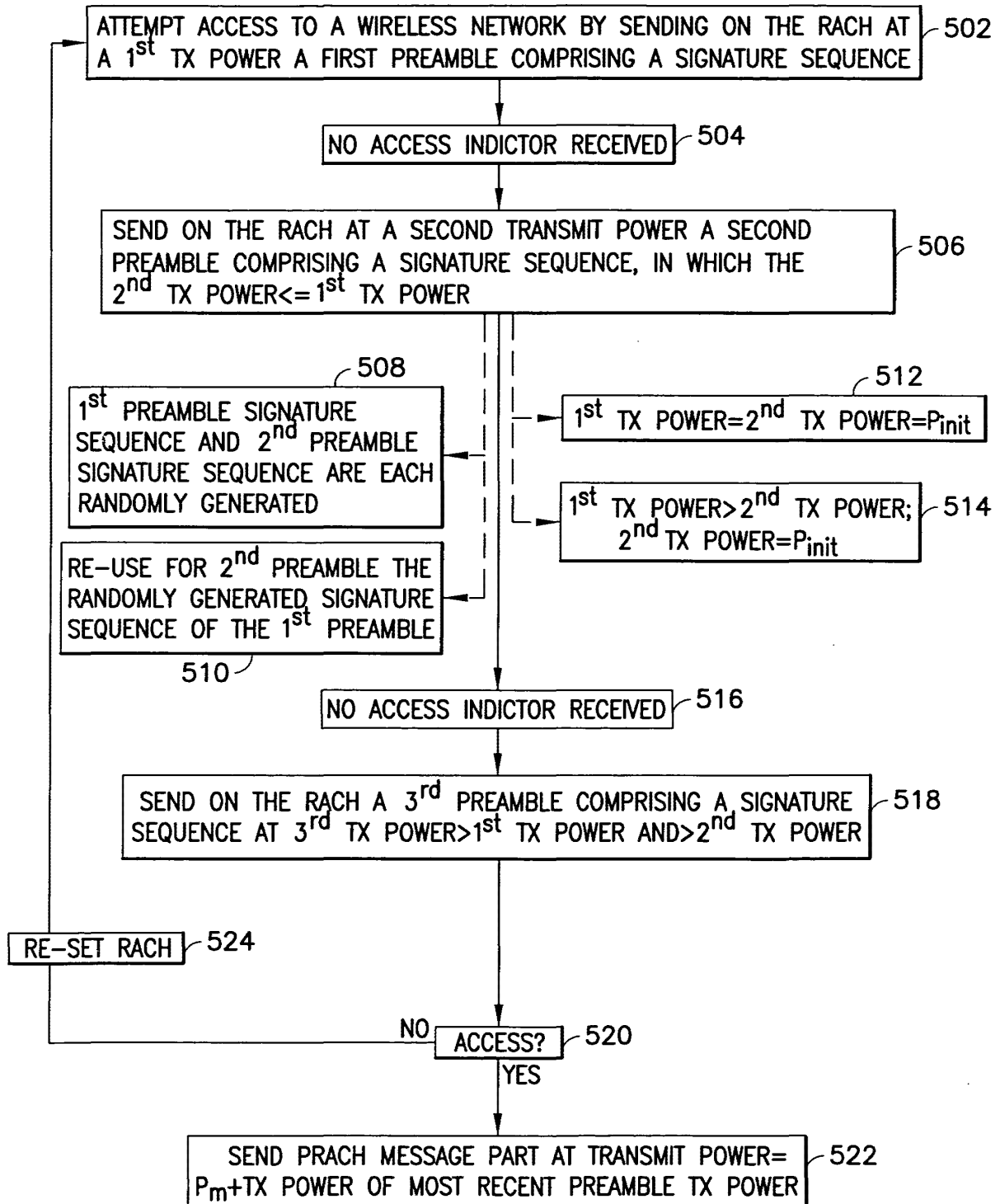


FIG.5

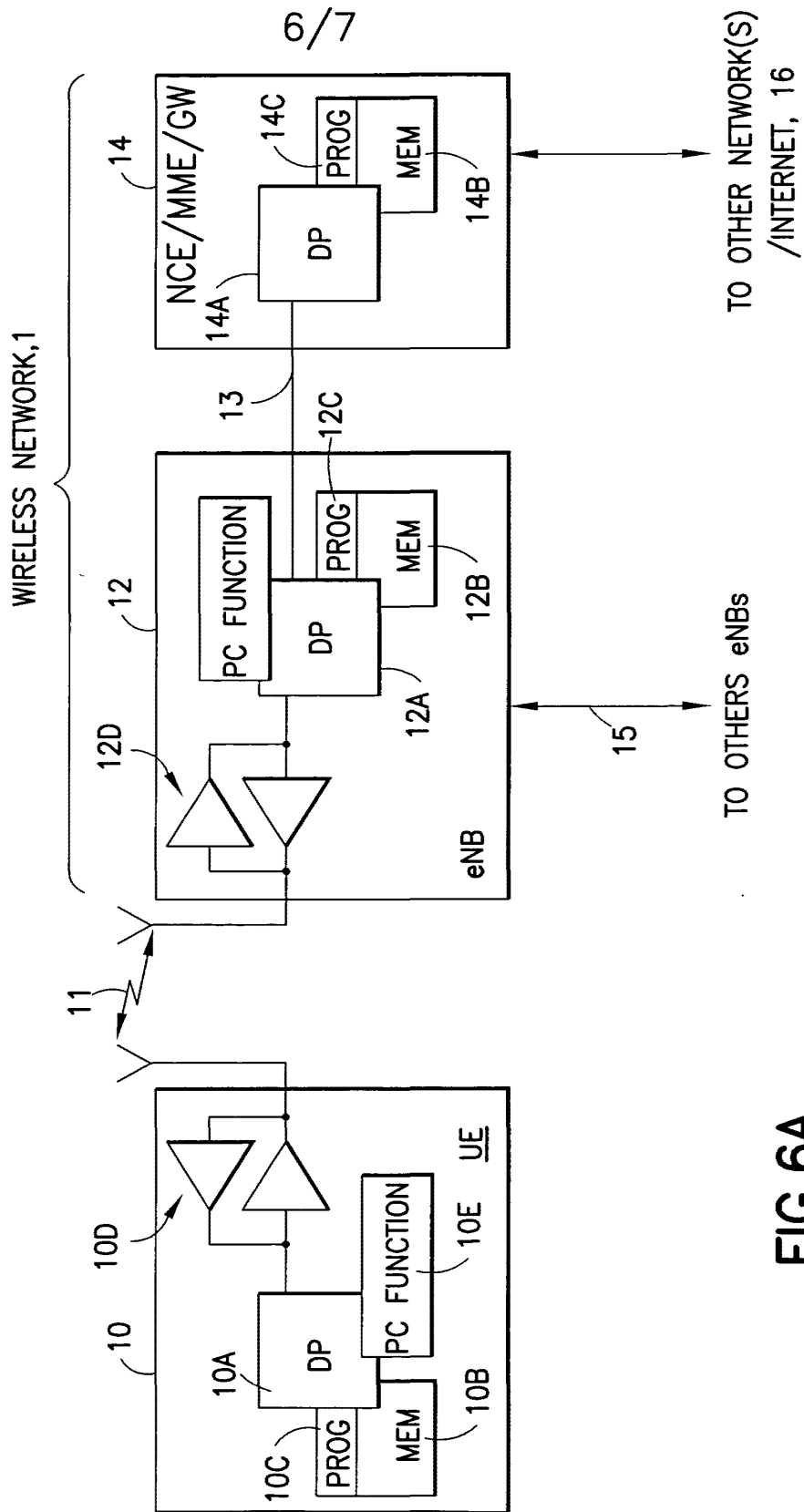


FIG.6A





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Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

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Assignment For Published Patent Application

Nokia Corporation

Power of Attorney: The patent practitioners associated with Customer Number 29683

Domestic Priority data as claimed by applicant

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Non-Publication Request: No

Early Publication Request: No

Title

Method, apparatus and computer program for user equipment access channel procedures

Preliminary Class

370

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

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LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

page 2 of 3

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)

CONFIRMATION NO. 1254

10948

Harrington & SMith , Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484

PUBLICATION NOTICE



OC000000044556088

Title:Method, apparatus and computer program for user equipment access channel procedures

Publication No.US-2010-0290408-A1

Publication Date:11/18/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)	1254
10948	7590	11/30/2010	EXAMINER	
Harrington & SMith, Attorneys At Law, LLC 4 Research Drive, Suite 202 Shelton, CT 06484			YAO, KWANG BIN	
			ART UNIT	PAPER NUMBER
			2473	
			MAIL DATE	DELIVERY MODE
			11/30/2010	PAPER

Notice of Erroneous Early Release of Patent Application Information on November 11, 2010

On November 11, 2010, the United States Patent and Trademark Office (USPTO), unintentionally and as a result of a processing error, made available to subscribers of patent application data the patent application publications that were not scheduled to publish under 35 U.S.C. 122(b) until November 18, 2010. The USPTO's subscription service allows a member of the public to obtain copies of all patents or application publications from the USPTO on the date of grant or publication for a fee. One subscriber who had access to the early-published data made these premature patent application publications available on its free Web service, known as Free Patents Online, on November 11, 2010 - one week prior to the scheduled publication date. At the USPTO's request, the subscriber removed access to the patent application publications dated November 18, 2010 on November 15, 2010 until November 18, 2010. While the premature release of application information on November 11, 2010, is not considered a publication of such applications under 35 U.S.C. 122(b), the USPTO acknowledges that there are potential international ramifications in certain very limited circumstances such as where an applicant whose application information was released early did not file a foreign application within the Paris Convention priority period but did file in a foreign country between November 11, 2010 and November 18, 2010.

The USPTO did not post the publications on its Web site until November 18, 2010, and it did not provide access to the public Patent Application Information Retrieval (PAIR) System based on the early release of the publication data. Moreover, the USPTO did not record in its records that a publication occurred until November 18, 2010. Copies of, and access to, any of the affected applications described in this document were not provided by the USPTO under 37 CFR 1.14 based on the error described in this document. The USPTO regrets this error and is instituting controls to prevent similar processing errors in the future.

Inquiries regarding this matter may be directed to Mark Polutta, Senior Legal Advisor, Office of Patent Legal Administration at (571) 272-7709 or via email addressed to mark.polutta@uspto.gov.



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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/454,053		2473	



000000048359111

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 10948 on 11/15/2010

- Correspondence Address
- Power of Attorney Address

The address of record for Customer Number 10948 is:

10948

Harrington & SMith , Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484



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NOTICE OF ALLOWANCE AND FEE(S) DUE

10948 7590 12/06/2011
Harrington & Smith, Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484

EXAMINER

QURESHI, AFSAR M

ART UNIT

PAPER NUMBER

2472

DATE MAILED: 12/06/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)	1254

TITLE OF INVENTION: METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	03/06/2012

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 DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). 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. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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
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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)

10948 7590 12/06/2011
Harrington & Smith, Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484

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.
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12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)	1254
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TITLE OF INVENTION: METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	03/06/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
QURESHI, AFSAR M	2472	370-329000

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 3.111. 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 submitted:

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

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, 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).

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)	1254
10948	7590	12/06/2011	EXAMINER	
Harrington & Smith, Attorneys At Law, LLC			QURESHI, AFSAR M	
4 Research Drive, Suite 202			ART UNIT	PAPER NUMBER
Shelton, CT 06484			2472	

DATE MAILED: 12/06/2011

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 512 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 512 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 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	12/454,053	STEUDLE ET AL.	
	Examiner	Art Unit	
	AFSAR M. QURESHI	2472	

-- 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 Application received on 05/12/2009 and an Interview dtd. 12/1/2011.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-20.

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)

1. ☒ Notice of References Cited (PTO-892)	5. ☐ Notice of Informal Patent Application
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	6. ☒ Interview Summary (PTO-413), Paper No./Mail Date <u>12/1/2011</u> .
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____	7. ☒ Examiner's Amendment/Comment
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	8. ☒ Examiner's Statement of Reasons for Allowance
	9. ☐ Other ____.

/AFSAR M QURESHI/ Primary Examiner, Art Unit 2472	12/1/2011
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EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jerry Stanton on 12/1/2011.

2. The application has been amended as follows:

IN THE CLAIMS:

Claims 19 and 20.

Line 1, "A computer readable memory storing a program" has been replaced by

-- A **non-transitory** computer readable memory storing program --

(see Interview Summary for details).

3. Claims 1-20 are allowed over prior art of record.

The following is an examiner's statement of reasons for allowance:

The closest prior art of record, Ozluturk et al. (US 7,190,966), Willenegger et al. (US 2004/0233870) and Ostman et al. (US 7,586,865), are in the same field of

endeavor, generally disclosing allocating power when a UE requesting, on RACH, an access to a wireless network at a preamble comprising a signature sequence and if the access attempt is unsuccessful on a first transmit power, adjusting the transmit power by *ramping up* and re-attempting access to the wireless network at a higher transmit power until it succeeds. However, the prior art, disclosed above, fails to disclose the inventive features wherein, the step of re-attempting access to the wireless network "at a second transmit power and a second preamble comprising signature sequence, in which the second transmit power is no greater than the first transmit power", as claimed herein.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pankaj et al. (US 7,126,930), Damjanovic et al. (US 2010/0309877),
RAO (US 2010/0260132).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AFSAR M. QURESHI whose telephone number is

(571)272-3178. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 27223088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AFSAR M QURESHI/
Primary Examiner, Art Unit 2472

12/1/2011

Notice of References Cited	Application/Control No. 12/454,053	Applicant(s)/Patent Under Reexamination STEUDLE ET AL.	
	Examiner AFSAR M. QURESHI	Art Unit 2472	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0233870	11-2004	Willenegger et al.	370/329
*	B	US-7,586,865	09-2009	Ostman et al.	370/318
*	C	US-2010/0260132	10-2010	Rao, Anil M.	370/329
*	D	US-7,126,930	10-2006	Pankaj et al.	370/335
*	E	US-2010/0309877	12-2010	Damnjanovic et al.	370/331
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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	N					
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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.

INFORMATION DISCLOSURE CITATION FORM FOR PATENT APPLICATION (FORM PTO-1449) (Substitute)		Docket No.: 854.0090.U1(US) Serial No.: to be assigned Applicant(s): Ville O. Steudle et al Filing Date: Herewith 05/12/2009 Group:			
U.S. PATENT DOCUMENTS					
Examiner Initials	Document Number (Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name of Patentee or Applicant	Class	Sub-class
/A.Q./ /A.Q./ /A.Q./ US- US- US- US- US- US- US- US- US- US-	US-7,190,966 B2	03/13/2007	Ozluturk et al	455	522
	US-7,117,004 B2	10/03/2006	Ozluturk et al	455	522
	US-7,286,847 B2	10/23/2007	Ozluturk et al	455	522
FOREIGN PATENT DOCUMENTS					
Examiner Initials	Document Number (Country Code-Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name Of Patentee of Applicant	Translation? Yes/No/n/a	
	- -				
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	- -				
	- -				
OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)					
/A.Q./	3GPP TS 25.331 V8.2.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol Specification (Release 8), pages 1-31, page 285-286, page 717-720				
/A.Q./	3GPP TS 25.211 V8.0.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Channels and Mapping of Transport Channels onto Physical Channels (FDD) (Release 8), pages 1-54				
/A.Q./	3GPP TS 25.214 V8.1.0 (2008-03), 3 rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical Layer Procedures (FDD) (Release 8), pages 1-87				
Examiner's Signature: /Afsar Qureshi/			Date Considered: 11/24/2011		
Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered. Include a copy of this citation form with your next correspondence to the Applicant(s).					



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BIB DATA SHEET

CONFIRMATION NO. 1254

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/454,053	05/12/2009	370	2472	854.0090.U1(US)		
APPLICANTS Ville O. Steudle, Turku, FINLAND; Juho Mikko Oskari Pirskanen, Tampere, FINLAND; Ladislav Kusnyer, Salo, FINLAND; Sami P. Hakala, Oulu, FINLAND; Jukka T. Vikstedt, Oulu, FINLAND; Harri Matti Johannes Valio, Kammenniemi, FINLAND; Markku Juhani Tarkiainen, Oulu, FINLAND;						
** CONTINUING DATA *****						
** FOREIGN APPLICATIONS *****						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 05/22/2009						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /AFSAR M QURESHI/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY FINLAND	SHEETS DRAWINGS 7	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 3
ADDRESS Harrington & Smith, Attorneys At Law, LLC 4 Research Drive, Suite 202 Shelton, CT 06484 UNITED STATES						
TITLE Method, apparatus and computer program for user equipment access channel procedures						
FILING FEE RECEIVED 1090	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	12/454,053	STEUDLE ET AL.	
	Examiner	Art Unit	
	AFSAR M. QURESHI	2472	

ISSUE CLASSIFICATION									
ORIGINAL				CROSS REFERENCE(S)					
CLASS		SUBCLASS		CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
370		329		370	335	342			
INTERNATIONAL CLASSIFICATION				375	145				
H	0	4	W	4/00	455	522			
H	0	4	B	7/216					
H	0	4	B	7/00					
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(Assistant Examiner) (Date)				/Afsar M. Qureshi/, AU 2472 12/1/2011				Total Claims Allowed: 20	
(Legal Instruments Examiner) (Date)								O.G. Print Claim(s)	O.G. Print Fig.
				(Primary Examiner) (Date)				1	4

☒ Claims renumbered in the same order as presented by applicant												☐ CPA		☐ T.D.		☐ R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original		
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	2		32		62		92		122		152		182				
	3		33		63		93		123		153		183				
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	30		60		90		120		150		180		210				

<i>Index of Claims</i> 	Application/Control No.		Applicant(s)/Patent under Reexamination	
	12/454,053		STEUDLE ET AL.	
	Examiner		Art Unit	
	AFSAR M. QURESHI		2472	

✓	Rejected	—	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date					
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EAST Search History**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	1	"7126930".pn.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:54
L3	15961	(reduc\$3 same (transmit \$4 adj power))	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:54
L4	427	3 and (RACH or "random access channel")	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:55
L5	204	4 and "370"/\$.ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:55
L6	12	4 and (signature adj sequence).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:56
L7	1	6 and (first adj (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:57
L8	0	6 and (another adj (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:57
L9	0	6 and (re-transmit adj (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:58
L10	5	6 and 370/329,335,342.ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:58
L11	5	10 and ((equal or similar) and (transmit adj power))	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 11:59

L12	1	10 and ((equal or similar) and (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:10
L13	1	6 and ((transmit adj power)same (higher or "ramp up")).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:11
L14	5	6 and 5 and "455"/\$.ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:12
L15	0	14 and 455/522.127.5.ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:12
L16	68	4 and "375"/\$.ccls.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:13
L17	1	16 and (initial same (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:13
L18	7	16 and ((equal or similar) and (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:14
L19	0	18 and (re-transmit adj (transmit adj power)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/12/01 12:14

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EAST Search History**EAST Search History (Prior Art)**

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S1	2	"7190966".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:10
S2	3	"7117004".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:11
S3	2	"7286847".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:11
S4	1	S1 and (transmit adj5 power)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:12
S5	0	S4 and preamble	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:13
S6	1	S4 and sequence\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:13
S8	0	S4 and (signature same sequence\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:17

S9	0	S4 and (specific same sequence\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:18
S10	1	S4 and (unique same sequence\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 15:18
S11	0	S10 and retransmit	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 16:11
S12	0	S10 and re-transmit\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 16:11
S13	1	S10 and transmit\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/29 16:12
S14	1	"20050265430".PN.	US-PGPUB	OR	ON	2011/11/30 12:10
S15	1	"20050265430".PN.	US-PGPUB	OR	ON	2011/11/30 12:10
S16	1	"20050265430".PN.	US-PGPUB	OR	ON	2011/11/30 12:11
S17	1	"20050254478".PN.	US-PGPUB	OR	ON	2011/11/30 12:14
S18	1	"20020036998".PN.	US-PGPUB	OR	ON	2011/11/30 12:15
S19	1	"7126930".PN.	USPAT; USOCR	OR	ON	2011/11/30 12:28
S20	1	"20020036998".PN.	US-PGPUB	OR	ON	2011/11/30 16:57

S21	0	((Trandmit adj power) same RACH)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 16:59
S22	233	((Transmit adj power) same RACH)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:00
S23	40	S22 and ((signature adj sequence\$1) or (code adj word\$1))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:00
S24	5	S23 and ((transmit adj power) same (first and second))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:01
S25	14	S23 and 370/329,335,342.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:06
S26	10	S23 and 455/69,517,522.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:07
S27	0	S23 and 375/145.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:07
S28	0	S23 and 375/145,146, E1.008.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:07

S29	0	S23 and 375/145,146. ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:07
S30	3	S23 and "375"/\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:07
S31	14	S25 and preamble	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:09
S32	6	S31 and (re-transmit or retransmit or re-attempt)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/30 17:10

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Search Notes 	Application/Control No. 12/454,053		Applicant(s)/Patent under Reexamination STEUDLE ET AL.	
	Examiner AFSAR M. QURESHI		Art Unit 2472	

SEARCHED			
Class	Subclass	Date	Examiner
370	230-278 320-342 491	12/1/2011	AQ
375	145,146	12/1/2011	AQ
375	E1.008	12/1/2011	AQ
713	320	12/1/2011	AQ
455	13.4	12/1/2011	AQ
455	69	12/1/2011	AQ
455	127.5	12/1/2011	AQ
455	517,522	12/1/2011	AQ

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
370	329,335	12/1/2011	AQ
370	342	12/1/2011	AQ
455	522	12/1/2011	AQ
375/145		12/1/2011	AQ

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST, WEST, IEEE, EPO, JPO, USPAT, USOCR, INSPEC, DERWENT, PgPubs.	12/1/2011	AQ
IDS/NPL/GOOGLE	12/1/2011	AQ
Checked for ODP	12/1/2011	AQ
Consulted on 101 (Non-statutory status)	12/1/2011	AQ
Interference search (included)	12/1/2011	AQ

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appl. No. : 12/454,053
Applicant : Ville O. STEUDLE, et al.
Filed : May 12, 2009

TC/AU : 2472 (confirmation no. 1254)
Examiner : Afsar M. QURESHI

Docket No. : 854.0090.U1(US)
Customer No. : 10,948

Title : METHOD, APPARATUS, METHOD AND COMPUTER
PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL
PROCEDURES

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

AMENDMENT UNDER 37 CFR 1.312

Sir:

Further to the PTOL-85 Notice of Allowance and Fee(s) Due dated December 6, 2011, the Applicant hereby requests the above-referenced application be amended as follows:

Amendments to the Specification: None.

Amendments to the Drawings: None.

Amendments to the Claims: begins at page 2 of this paper.

Remarks/Arguments: begins at page 7 of this paper.

Appendix: None.

This Amendment is filed following the Notice of Allowance but prior to paying the issue fee. Should any fee be due, please consider this as a petition for an extension of time necessary to effect his Amendment and/or charge Deposit Account No. 50-1924 for any required fee deficiency.

The issue fee will be paid under separate cover.

AMENDMENTS TO THE CLAIMS:

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

1.(Original) A method comprising:

attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

2.(Original) The method of claim 1, wherein:

the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately; and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

3.(Original) The method according to claim 2, further comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

4.(Original) The method according to claim 2, wherein the second transmit power is an initial transmit power determined from an indication obtained from higher layers and the first transmit power is greater than the second transmit power.

5.(Original) The method according to claim 2, further comprising:

responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble

comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately.

6.(Original) The method of claim 1, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble;

and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

7.(Original) The method according to claim 6, further comprising determining an initial transmit power from an indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

8.(Original) The method according to claim 6, wherein the second transmit power is the determined initial power and the first transmit power is greater than the second transmit power.

9.(Original) The method according to claim 6, further comprising:

responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble.

10.(Original) An apparatus comprising:

a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature

sequence that is randomly selected from a set of signature sequences;

a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

11.(Original) The apparatus according to claim 10, wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

12.(Currently Amended) The apparatus according to claim 11:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the received parameters;
and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the determined initial power.

13.(Currently Amended) The apparatus according to claim 11:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;
and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

14.(Original) The apparatus according to claim 11:

wherein the processor is configured to determine that the access re-attempt from the

second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the processor is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles.

15.(Original) The apparatus according to claim 10, further comprising a memory,

wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory;

and wherein the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

16.(Currently Amended) The apparatus according to claim 15:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the initial power.

17.(Currently Amended) The apparatus according to claim 15:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

18.(Original) The apparatus according to claim 15:

wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory.

19.(Previously Presented) A non-transitory computer readable memory storing a program of instructions that when executed by a processor result in actions comprising:

attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

20.(Previously Presented) A non-transitory computer readable memory of claim 19, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory.

REMARKS:

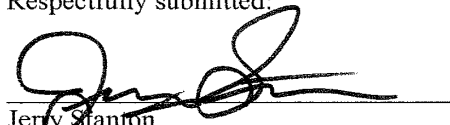
The PTOL-85 Notice of Allowance and Fee(s) Due dated December 6, 2011 allowed each of claims 1-20. The Applicant hereby submits this Amendment under Rule 312 [37 CFR 1.312 and MPEP 714.16] to cure a minor antecedent basis issue at claims 12-13 and 16-17.

Claims 19-20 as presented herein reflect the Examiner's Amendment cited in the above referenced Allowance, and are therefore annotated as "Previously Presented".

In an email exchange spanning January 12-14, 2012, the undersigned presented a proposed amendment under Rule 312 for which the Examiner indicated certain changes were not appropriate for a Rule 312 Amendment. Changes made herein are limited to those which the Examiner deemed during that exchange as changes which would be entered.

Entry of this Amendment will require no additional search or examination, and MPEP 714.16(d) Part II grants the Examiner authority to enter this amendment at the Examiner's own discretion even without submission to a supervisory patent examiner. The undersigned representative welcomes the opportunity to resolve any matters that may remain via teleconference at the Examiner's discretion.

Respectfully submitted:


Jerry Stanton
Reg. No.: 46,008

Feb 1, 2012
Date

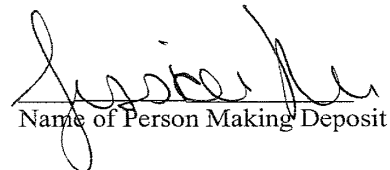
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Date


Name of Person Making Deposit

Electronic Acknowledgement Receipt	
EFS ID:	11971513
Application Number:	12454053
International Application Number:	
Confirmation Number:	1254
Title of Invention:	METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES
First Named Inventor/Applicant Name:	Ville O. Steudle
Customer Number:	10948
Filer:	Mark F. Harrington/Jessica Pace
Filer Authorized By:	Mark F. Harrington
Attorney Docket Number:	854.0090.U1(US)
Receipt Date:	01-FEB-2012
Filing Date:	12-MAY-2009
Time Stamp:	11:05:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment after Notice of Allowance (Rule 312)	Amendment.pdf	334858 4dd676a15dbefd4e74912f9999888a6b8395c671	no	7

Warnings:

Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Please Enter

Examiner: Afsar Qureshi

IN THE U.S. PATENT AND TRADEMARK OFFICE

/AQ/

2/9/2012 Appl. No. : 12/454,053
Applicant : Ville O. STEUDLE, et al.
Filed : May 12, 2009

TC/AU : 2472 (confirmation no. 1254)
Examiner : Afsar M. QURESHI

Docket No. : 854.0090.U1(US)
Customer No. : 10,948

Title : METHOD, APPARATUS, METHOD AND COMPUTER
PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL
PROCEDURES

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

AMENDMENT UNDER 37 CFR 1.312

Sir:

Further to the PTOL-85 Notice of Allowance and Fee(s) Due dated December 6, 2011, the Applicant hereby requests the above-referenced application be amended as follows:

Amendments to the Specification: None.

Amendments to the Drawings: None.

Amendments to the Claims: begins at page 2 of this paper.

Remarks/Arguments: begins at page 7 of this paper.

Appendix: None.

This Amendment is filed following the Notice of Allowance but prior to paying the issue fee. Should any fee be due, please consider this as a petition for an extension of time necessary to effect his Amendment and/or charge Deposit Account No. 50-1924 for any required fee deficiency.

The issue fee will be paid under separate cover.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)	1254
10948 7590 02/13/2012 Harrington & Smith, Attorneys At Law, LLC 4 Research Drive, Suite 202 Shelton, CT 06484			EXAMINER QURESHI, AFSAR M	
			ART UNIT 2472	PAPER NUMBER
			MAIL DATE 02/13/2012	DELIVERY MODE PAPER

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

The time period for reply, if any, is set in the attached communication.

Response to Rule 312 Communication	Application No. 12/454,053	Applicant(s) STEUDLE ET AL.
	Examiner AFSAR M. QURESHI	Art Unit 2472
-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -- 1. ☒ The amendment filed on <u>01 February 2012</u> under 37 CFR 1.312 has been considered, and has been: a) ☒ entered. b) ☐ entered as directed to matters of form not affecting the scope of the invention. c) ☐ disapproved because the amendment was filed after the payment of the issue fee. Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue. d) ☐ disapproved. See explanation below. e) ☐ entered in part. See explanation below. Minor corrections to claims 12, 13, 16 and 17 are entered as requested. The status of claims 19 and 20 (previously amended via Examiner's Amendment) is noted.		
2/9/2012	/AFSAR M QURESHI/ Primary Examiner, Art Unit 2472	

Plse. Enter

/AQ/

S.N. 12/454,053

2/9/2012

Art Unit 472; confirmation no 1254

AMENDMENTS TO THE CLAIMS:

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

1.(Original) A method comprising:

attempting access to a wireless network by sending from a transmitter on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending from the transmitter on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

2.(Original) The method of claim 1, wherein:

the signature sequence of the first preamble and the signature sequence of the second preamble are each randomly selected from the set of signature sequences separately; and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

3.(Original) The method according to claim 2, further comprising determining an initial transmit power from an indication obtained from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

4.(Original) The method according to claim 2, wherein the second transmit power is an initial transmit power determined from an indication obtained from higher layers and the first transmit power is greater than the second transmit power.

5.(Original) The method according to claim 2, further comprising:

responsive to determining that the access re-attempt from sending the second preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble

comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequences for the first, second and third preambles are each randomly selected from the set of signature sequences separately.

6.(Original) The method of claim 1, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble;

and wherein determining that the access attempt from sending the first preamble was unsuccessful comprises monitoring an acquisition channel of the wireless network and failing to find an acquisition indicator on the acquisition channel that corresponds to the sent first preamble.

7.(Original) The method according to claim 6, further comprising determining an initial transmit power from an indication received from higher layers, and wherein the first transmit power is equal to the second transmit power which is the determined initial power.

8.(Original) The method according to claim 6, wherein the second transmit power is the determined initial power and the first transmit power is greater than the second transmit power.

9.(Original) The method according to claim 6, further comprising:

responsive to determining that the access re-attempt from sending the second transmit preamble was unsuccessful, again re-attempting access to the wireless network by sending from the transmitter on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power, and in which the signature sequence of the third preamble is the same as the signature sequence of the first preamble and of the second preamble.

10.(Original) An apparatus comprising:

a transmitter configured to attempt access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature

sequence that is randomly selected from a set of signature sequences;

a processor configured to determine that the access attempt from the first preamble was unsuccessful, and responsive to such determining to cause the transmitter to re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

11.(Original) The apparatus according to claim 10, wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and separately to randomly select from the set of signature sequences the signature sequence of the second preamble;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

12.(Currently Amended) The apparatus according to claim 11:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the received parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the determined initial power.

13.(Currently Amended) The apparatus according to claim 11:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

14.(Original) The apparatus according to claim 11:

wherein the processor is configured to determine that the access re-attempt from the

second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the processor is configured to randomly select from the set of signature sequences, separately, the signature sequence of the first, second and third preambles.

15.(Original) The apparatus according to claim 10, further comprising a memory,

wherein the processor is configured to randomly select from the set of signature sequences the signature sequence of the first preamble and to store the selected signature sequence in the memory;

and wherein the signature sequence of the second preamble is the selected signature sequence of the first preamble retrieved from the memory;

and wherein the processor is configured to determine that the access attempt from the first preamble was unsuccessful by tuning a receiver of the apparatus to monitor an acquisition channel of the wireless network and determining that no acquisition indicator that corresponds to the sent first preamble was received at the receiver on the acquisition channel.

16.(Currently Amended) The apparatus according to claim 15:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the first transmit power is equal to the second transmit power which is equal to the initial power.

17.(Currently Amended) The apparatus according to claim 15:

wherein the receiver is configured to receive ~~from the higher~~ from higher layers parameters for an initial power for random access; and

the apparatus further comprises a memory storing the parameters;

and wherein the processor is further configured to determine from the parameters the initial power for random access, and wherein the second transmit power is the initial power and the first transmit power is greater than the second transmit power.

18.(Original) The apparatus according to claim 15:

wherein the processor is configured to determine that the access re-attempt from the second preamble was unsuccessful, and responsive to such determining to cause the transmitter to again re-attempt access to the wireless network by causing the transmitter to send on the random access channel at a third transmit power a third preamble comprising a signature sequence, in which the third transmit power is greater than the first transmit power and greater than the second transmit power;

and wherein the signature sequence of the third preamble is the selected signature sequence of the first preamble retrieved from the memory.

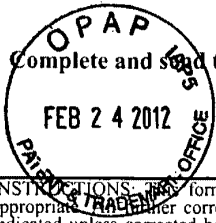
19.(Previously Presented) A non-transitory computer readable memory storing a program of instructions that when executed by a processor result in actions comprising:

attempting access to a wireless network by sending on a random access channel at a first transmit power a first preamble comprising a signature sequence that is randomly selected from a set of signature sequences;

responsive to determining that the access attempt from sending the first preamble was unsuccessful, re-attempting access to the wireless network by sending on the random access channel at a second transmit power a second preamble comprising a signature sequence, in which the second transmit power is no greater than the first transmit power.

20.(Previously Presented) A non-transitory computer readable memory of claim 19, wherein:

the signature sequence of the first preamble is randomly selected from the set of signature sequences and the signature sequence of the second preamble is the same as the signature sequence of the first preamble, retrieved from a memory.



PART B - FEE(S) TRANSMITTAL

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

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(571)-273-2885

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10948 7590 12/06/2011
Harrington & Smith, Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484

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Blair K. Ribeiro (Depositor's name)
Blair K. Ribeiro (Signature)
February 21, 2012 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/454,053 05/12/2009 Ville O. Steudle 854.0090.U1(US) 1254

TITLE OF INVENTION: METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional NO \$1740 \$300 \$0 \$2040 03/06/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
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QURESHI, AFSAR M 2472 370-329000

02/27/2012 MBLANC01 00000009 501924 12454053
01 FC:1501 1740.00 DA
02 FC:1504 300.00 DA

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,
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1. Harrington & Smith
2.
3.

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

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(A) NAME OF ASSIGNEE

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

NOKIA CORPORATION

ESPOO, FINLAND

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

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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).

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Authorized Signature

Date

Feb 21, 2012

Typed or printed name Jerry Stanton

Registration No. 46,008

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/454,053	04/03/2012	8149776	854.0090.U1(US)	1254

10948 7590 03/14/2012
Harrington & Smith, Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 499 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Ville O. Steudle, Turku, FINLAND;
Juho Mikko Oskari Pirskanen, Tampere, FINLAND;
Ladislav Kusnyer, Salo, FINLAND;
Sami P. Hakala, Oulu, FINLAND;
Jukka T. Vikstedt, Oulu, FINLAND;
Harri Matti Johannes Valio, Kammenniemi, FINLAND;
Markku Juhani Tarkiainen, Oulu, FINLAND;

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I hereby appoint:

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Name	Registration Number

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☐ The address associated with Customer Number:

OR

☒	Firm or individual name Etheridge Law Group		
	Address 2600 East Southlake Blvd., Suite 120-324		
	City Southlake	State TX	Zip 76092
	Country US		
	Telephone (817) 470-7249		Email jim@etheridgelaw.com

Assignee name and address: WSOU Investments, LLC
11150 Santa Monica Boulevard, Suite 1400
Los Angeles, CA 90025

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature <i>Stuart Shanus</i>	Date August 23, 2021
Name Stuart Shanus	Telephone 310-633-2327
Title President of WSOU Investments, LLC	

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 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, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	44884830
Application Number:	12454053
International Application Number:	
Confirmation Number:	1254
Title of Invention:	METHOD, APPARATUS AND COMPUTER PROGRAM FOR USER EQUIPMENT ACCESS CHANNEL PROCEDURES
First Named Inventor/Applicant Name:	Ville O. Steudle
Customer Number:	10948
Filer:	Sean Dylan Burdick/Mita Encarnacion
Filer Authorized By:	Sean Dylan Burdick
Attorney Docket Number:	854.0090.U1(US)
Receipt Date:	01-FEB-2022
Filing Date:	12-MAY-2009
Time Stamp:	00:12:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	64058-US-NP_aia0096.pdf	134862	no	3
			b803bf28508e7cb9b8f0f378bcf6b8854e9f6f0f		

Warnings:

Information:					
2	Power of Attorney	WSOU_Executed_POA_Etheridge_Correspondence.pdf	568072	no	2
			a740c804b91684000432730d03925b2a06b4ffcbe		
Warnings:					
Information:					
Total Files Size (in bytes):			702934		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Markku Tarkiainen et al.

Application No./Patent No.: 8,149,776 Filed/Issue Date: April 3, 2012

Titled: Method, Apparatus and Computer Program for User Equipment Access Channel Procedures

WSOU INVESTMENTS LLC, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Inventors To: Nokia Corporation

The document was recorded in the United States Patent and Trademark Office at
Reel 022896, Frame 0748, or for which a copy thereof is attached.

2. From: Inventors To: Nokia Corporation

The document was recorded in the United States Patent and Trademark Office at
Reel 022896, Frame 0411, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 1.11 and 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, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: Inventors To: Nokia Corporation

The document was recorded in the United States Patent and Trademark Office at
Reel 022717, Frame 0475, or for which a copy thereof is attached.

4. From: Nokia Corporation To: Nokia Technologies OY

The document was recorded in the United States Patent and Trademark Office at
Reel 035496, Frame 0653, or for which a copy thereof is attached.

5. From: Nokia Technologies OY To: WSOU Investments, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 045084, Frame 0282, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Sean D. Burdick/

January 31, 2022

Signature _____

Date _____

Sean D. Burdick

51513

Printed or Typed Name _____

Title or Registration Number _____

Privacy Act Statement

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/454,053	05/12/2009	Ville O. Steudle	

151091
WSOU Investments, LLC
11150 Santa Monica Blvd., Suite 1400
Los Angeles, CA 90025

CONFIRMATION NO. 1254
POA ACCEPTANCE LETTER



Date Mailed: 02/02/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/01/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/nrhayden/



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/454,053	05/12/2009	Ville O. Steudle	854.0090.U1(US)

CONFIRMATION NO. 1254

POWER OF ATTORNEY NOTICE

10948
Harrington & Smith, Attorneys At Law, LLC
4 Research Drive, Suite 202
Shelton, CT 06484



Date Mailed: 02/02/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/01/2022.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/nrhayden/

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 Western District of Texas _____ on the following

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

DOCKET NO. 6:22-cv-00137	DATE FILED 2/8/2022	U.S. DISTRICT COURT for the Western District of Texas
PLAINTIFF WSOU Investments, LLC d/b/a Brazos Licensing and Development		DEFENDANT ZTE Corporation
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,149,776	4/3/2012	WSOU Investments, LLC d/b/a Brazos Licensing and Development
2		
3		
4		
5		

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
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