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[Continued on next page]

(54) Title: ADVERTISING THROUGH CELL BROADCAST

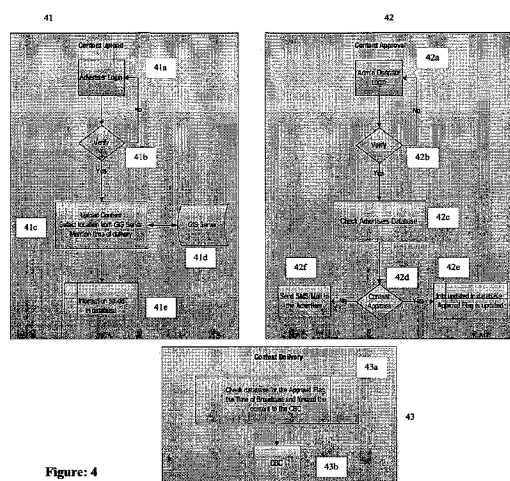


Figure: 4

(57) Abstract: The present invention relates to an advertising method and apparatus provides advertising services via broadcast messages to mobile stations and other devices. The broadcasted messages are stored and authenticated prior to being communicated to devices within a geographic area. The apparatus has different interfaces for individual advertisers. Each advertiser stores messages to be broadcasted in the allocated spaces within the advertising apparatus and method. All messages prior to being broadcasted are authenticated by the operator. Messages broadcasted are on separate broadcast channels. The advertising method and apparatus includes a Geographic Information System (GIS), the advertising entity with an http interface that receives messages from the advertisers and a cell broadcast center that communicates the cell broadcast messages to the mobile station and other devices. The advertising method and apparatus may push information to devices based on activation. The advertisers and the operator use the advertising entity through the http interface.

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ADVERTISING THROUGH CELL BROADCAST

BACKGROUND

5 FIELD OF THE INVENTION

The present invention is directed to wireless services. In particular, the present invention is directed to providing the advertising method and apparatus for the broadcasting messages to mobile station

DISCUSSION OF PRIOR ART

- 10 The Global System for Mobile (GSM) telecommunications is used in cellular telephone networks in many countries around the world. Existing GSM networks are based on time-division multiple access (TDMA) digital communications technology. GSM offers a useful range of network services and standards.

- One of these GSM network services is a short message service-cell broadcast (SMSCB),
15 for distributing short messages from a Cell Broadcast Center (CBC) via Base Station Subsystems (BSSs) in the network to subscriber units, or Mobile Stations (MSs). SMSCB messages may come from various sources, such as traffic and weather reports. These messages are broadcast to MSs in defined geographical areas, known as cell broadcast areas, over a dedicated Cell Broadcast Channel (CBCH) without requiring
20 acknowledgment from the MS.

- The messages are received by the MS only in idle mode (i. e., when a telephone call is not in progress). SMSCB and related interfaces, protocol stacks and message formats are described, inter alia, in GSM standards 02.03, 03.41, 03.49 and 04.12, which are incorporated herein by reference. It is noted, however, that there is no mandatory protocol
25 defined by GSM standards between the CBC and the BSSs. Rather, the interface protocol is left to be determined by operators of the network and cell broadcast services, based on primitives defined by the 03.41 standard.

The messages are distributed from a Cell Broadcast Center. Cell Broadcast Center allows the operator to specify the locations and the time frame for the messages to be broadcasted. The advertising method and apparatus communicating with the CBC allows the operator and advertisers to distribute messages based on location. The advertising
5 method and apparatus provides the operator to make interfaces available to the various advertisers, so that they can upload, store, and broadcast messages. It makes the CBC available to the advertisers. The geographic locations are selected graphically as well as mentioned numerically.

All messages through the advertising method and apparatus are authenticated and the
10 message content is checked prior to being forwarded to the CBC.

CA 2381197A1 discloses *Cell broadcast in a hybrid DSM/CDMA network* wherein a system and method to broadcast messages over the CDMA air-interface is proposed such that the message is conveyed to a base station substantially in accordance with GSM standards followed by relaying the message to the mobile station over the CDMA air-
15 interface. This patent does not discuss advertisements and is different from the present invention. KR 20040001060 discloses a *Method for transmitting commercial message in mobile communication terminal* wherein a method is provided to transmit a commercial CB (Cell Broadcast) message while a user is on the line in case of using a DTX (Discontinuous Transmission) mode of a GSM (Global System for Mobile
20 communication) to transmit the message irrespective of the state of the mobile communication terminal. US2004076126A1 discloses a *GSM Cell Broadcast SMS Message transmission in CDMA systems* wherein techniques to send GSM CBS message over the CDMA air interface are proposed. They do not relate specifically to advertisement content however. US2005215259A1 proposes *A Method for receiving free*
25 *wireless public broadcast services with a mobile station* wherein an RF scan is performed on all frequencies to determine a broadcast channel and measuring RSSI values to make a decision. This has no advertisement implications and is distinct from the present invention.

SUMMARY OF THE INVENTION

An advertising method and apparatus provides advertising services via broadcast messages to mobile stations and other devices. The broadcasted messages are stored and authenticated prior to being communicated to devices within a geographic area. The advertising apparatus has different interfaces for individual advertisers. Each advertiser stores messages to be broadcasted in the allocated spaces within the advertising apparatus and method. All messages prior to being broadcasted are authenticated by the operator. Messages broadcasted are on separate broadcast channels.

The advertising method and apparatus includes a Geographic Information System (GIS), the advertising entity with an http interface that receives messages from the advertisers and a cell broadcast center that communicates the cell broadcast messages to the mobile station and other devices. The advertising method and apparatus may push information to devices based on activation. The advertisers and the operator use the advertising entity through the http interface.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 shows the overall block diagram of the invention.

Fig. 2 shows the interaction between the various entities.

Fig. 3 shows the block diagram of the advertising entity.

Fig. 4 shows the content upload, approval and delivery sub-systems.

Fig. 5 shows how the system diagram by means of a network stack.

Fig. 6 shows the protocol messages exchanged in the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 shows the overall block diagram of the invention. As seen in this figure, a mobile terminal 2 communicates with a base station 4, which further communicates with a BSC 6 and a CBC 8. The advertising entity 10 interfaces via HTTP 18 and TCP/IP to either of advertisers 16 or operators 5 or a GIS application 12.

Fig. 1 shows the overall block diagram of the invention. As seen in this figure, a mobile terminal 2 is a physical equipment or Mobile Equipment (ME), such as a mobile phone or a laptop computer that is used by mobile subscribers, with a Subscriber identity Module (SIM). The SIM includes an International Mobile Subscriber Identity (IMSI), which is a unique identifier of the subscriber. A BTS 4 is physical equipment, such as a radio tower, that enables a radio interface to communicate with the mobile equipment 2. Each BTS may serve more than one ME. A BSC 6 manages radio resources, including the BTS 4. The BSC may be connected to several BTSs. A CBC 8 communicates cell broadcast messages with the BSC 6 that are typically delivered to multiple mobile terminals in a specified area. Cell broadcast is one-to-many geographically focused service. It enables messages to be communicated to multiple mobile phone customers who are located within a given part of its network coverage area at the time the message is broadcast. The Advertising Entity 10 receives stores and forwards messages to the CBC to be broadcasted. The advertising entity 10 interfaces via HTTP 18 and TCP/IP to either of advertisers 16 or operators 5 or a GIS application 12. Individual advertisers log onto the advertising entity via HTTP to upload contents. The advertisers select the location for the content to be broadcasted from the GIS application 12. The GIS application consists of predefined BTS, BSC location details provided by the operator. The BTS, BSC location details are mapped in the GIS application which is accessed through the advertising entity 10. The Operator 14 is an administrator login to the advertising entity which is accessed by the operator of the network. The operator checks the content to be broadcasted for any false data.

Fig. 2 shows the interaction between the various entities. At first, the advertisers login 20, followed by the server providing a geographic location of the BSC and BTS 21 following which the advertisers select the locations for the content to be broadcast. The advertisers are further able to upload content to be broadcasted 22. Following this, the advertiser selects 23 the time and specifies the number of messages to be sent to the mobile user 24. Location, time, content and the number of occurrences of the message of the advertiser is further stored for later broadcasts 25. The operator is a separate actor 27 who is also an administrator. The content for each advertiser is checked by the operator 26 prior to

broadcast and if the content passes the pre-determined tests, the message is broadcast at various locations **28**.

Fig. 3 shows the block diagram of the advertising entity. There are several functional blocks within the advertising entity including a content delivery system **33**, a content approval system **32**, a content upload system **31** and a GIS server **34** for location information. The advertising entity further communicates with the CBX **35** which communicates with the BSC/MSB **36** prior to transmitting the content to the BTS **37**.

Fig. 4 shows the content upload, approval and delivery sub-systems. The content upload sub-system **41** has the advertisers login **41a**, and their authenticity verified **41b**. If the user is authentic, the content is uploaded from selected locations **41c** obtained from the GIS server **41d**. All relevant information is further saved in a database **41e** for later retrieval. The content approval sub-system **42** has the operator (who is also the administrator) login **42a**, followed by verifying authenticity **42b**. If the user is authentic, the advertiser's database is checked **42c** followed by performing the action of approving the content **42d**. If the content is approved, the information is uploaded to a database **42e** and an approval flag is updated. In case the content is disapproved, the advertiser is alerted with an SMS or an e-mail **42f**. The content delivery sub-system **43** checks the database for the approval flag and the time of broadcast and forwards this content to the CBC **43a**. This is followed by the CBC **43b** performing the requisite actions. The CBC **43b** delivery module works in both synchronous and asynchronous mode. In synchronous mode the CBC regularly keeps checking the uploaded database **42e** for an approval flag and then processes the database records and converts it into a signaling message that's understood by BSC. In asynchronous mode the content delivery sub-system **43** triggers an event to the CBC, which then converts the database records into a signaling message. The CBC **43b** converts the database records to application data units as defined in GSM 03.41

Fig. 5 shows how the system diagram by means of a network stack comprised of an application layer **50**, convergence functions that map application entity protocol (CBSE)

directly to the network layer in unused layers 51, 52, a network layer 53, the link layer 54 and a physical layer 55. Our application talks directly to the layer 3 of the SS7 network bypassing other layers of the network. This makes the message transport much more reliable and faster.

5

Fig. 6 shows the protocol messages exchanged in the present invention. The CBSMSE-BIND message 60 is transmitted by CBC followed by an N-CONNECT message 61. An N-CONNECT response message is received 62 followed by sending an N-DATA message 63. This causes the CBSMSE-BIND message 64 to be transmitted by the CBC
10 to the BSC. The BSC replies the CBSMSE-BIND-CONFIRM message 65, the convergence function sends an N-DATA request 66, which is followed by sending a CBSMSE-BIND-CONFIRM message 67. A CBCSMSE-UNBIND message 68 is sent and an N-DATA message 69 follows. Following this an N-DISCONNECT message 70 is sent which causes a CBSMSE-UNBIND message 71 to be transmitted. The entities are
15 CBC, convergence function and BSC. The Convergence Function is an application logic which carries CBSMSE-BIND parameters, CBSMSE-BIND-CONFIRM and CBSMSE-UNBIND parameters as NS-user-data (Network Service user data), which is necessary when the CBC application bypassing layers 4,5,6 of the network layer and communicates directly with Layer 3 of the Network layer. The complexity of dealing with the many
20 different network layer protocols is avoided by mapping the application protocols to the Network Layer Service defined by X.213. A convergence function (see Draft CCITT Recommendation Q.941 Report R 22 May 1990) which maps an application entity protocol directly to the Network Layer service defined by X.213

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CLAIMS:

1. A system that provides authenticated, reliable and efficient advertising services via broadcast messages to mobile stations and other devices by direct
5 communication with the network enabled by mapping the application entity protocol (CBSE) directly to the network layer in unused layers of the network stack comprising:
 - a. A mobile terminal, also referred to as Mobile Equipment (ME);
 - b. A BTS serving one or more MEs;
 - 10 c. One or more base stations;
 - d. One or more BSCs;
 - e. One or more CBCs;
 - f. One or more advertising entities that can interface by means of HTTP and TCP/IP with a set of operators and advertisers;
 - 15 g. A GIS module to provide location information; and
 - h. One or more operators that administer the system.
2. A system of claim 1 wherein the mobile terminal could be any physical or mobile
20 equipment such as a mobile phone or a laptop computer that is associated with a subscriber identity module (SIM), which includes an international mobile subscriber identity (IMSI) that uniquely identifies the subscriber.
3. A system of claim 1 wherein the BTS could be a radio tower enabling a radio
25 interfaces to communicate with the mobile equipment wherein a BTS may serve more than one ME.
4. A system of claim 1 wherein the BSC manages radio resources including the BTS wherein a BSC may be connected to one or more BTS-es.

5. A system of claim 1 wherein the CBC communicates cell broadcast messages, which are one-to-many broadcasts, with the BSC such that the messages are delivered to multiple mobile terminals in a specified area.

5 6. A system of claim 1 wherein the advertising entity receives, stores and forwards messages to the CBC to be broadcast further comprising:

a. Means to interface via HTTP and TCP/IP to either of advertisers, operators or GIS applications;

10 b. Means to allow advertisers log onto the advertising entity via HTTP to manipulate content;

c. Means to allow advertisers select the location for the content to be broadcast from the GIS module;

d. One or more content delivery systems;

e. One or more content approval systems;

15 f. One or more content upload systems;

g. A GIS module further comprising:

i. Pre-defined BTS, BSC location details provided by the operator; and

20 ii. Means to map BTS, BSC location details to be accessed through the advertising entity; and

h. Means to communicate with the CBX, which communicates with the BSC/MSR prior to transmitting the content to the BTS.

25 7. A system of claim 1 wherein one or more operators administer the system through authenticated access including functions such as:

a. Avoiding malicious data being broadcasted; and

b. Checking the credentials of the advertisers.

8. A system of claim 6 wherein the content upload system further comprises:

30 a. Means to allow advertisers to login and authenticate themselves;

- b. Means to allow authenticated advertisers upload content in select locations obtained from the GIS module; and
- c. Means to save relevant information in a data-store for further retrieval.

5 9. A system of claim 6 wherein the content approval system further comprises:

- a. Means to allow the operators to login and authenticate themselves;
- b. Means to allow authenticated operators check the advertiser's data-store and approve the content provided by the advertiser;
- c. Means to *permanently* store approved content in the data-store and update
- 10 an approval flag associated with the content; and
- d. Means to alert advertisers in case the content is not approved by utilizing various communication methods.

10. A system of claim 9 wherein advertisers could be alerted by means of:

- 15 a. Short Messages (SMS); and
- b. Electronic Mail.

11. A system of claim 6 wherein the content delivery system checks the database for the approval flag and the time of broadcast and forwards this content to the CBC.

20

12. A system of claim 1 wherein the CBC is such that its delivery mechanisms work in both synchronous and asynchronous mode and converts the database records to application data units as defined in industrial broadcasting standard specification wherein:

- 25 a. In synchronous mode the CBC regularly keeps checking the uploaded data-store for an approval flag and then processes the database records and converts it into a signaling message that's understood by BSC;
- b. In asynchronous mode the content delivery sub-system triggers an event to the CBC, which then converts the database records into a signaling
- 30 message; and
- c. A system of claim 12 wherein the broadcasting standard is GSM 03.4.

13. A system of claim 1 wherein the network stack comprised of an application layer, convergence functions that map application entity protocol (CBSE) directly to the network layer in unused layers a network layer, the link layer and a physical layer.

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14. A system of claim 13 wherein the application talks directly to the layer 3 of the SS7 network bypassing other layers of the network, enabling reliable and efficient communication.

10

15. A method that provides authenticated, reliable and efficient advertising services via broadcast messages to mobile stations and other devices by direct communication with the network enabled by mapping the application entity protocol (CBSE) directly to the network layer in unused layers of the network stack executed amongst various participating entities including:

15

(a) One or more mobile terminals, also referred to as Mobile Equipment (ME);

(b) A BTS serving one or more MEs;

(c) One or more base stations;

(d) One or more BSCs;

(e) One or more CBCs;

20

(f) One or more advertising entities that can interface by means of HTTP and TCP/IP with a set of operators and advertisers; and

(g) One or more operators that administer the system comprising the steps of:

a. the advertisers logging into the *application* to authenticate themselves;

b. the GIS module providing a geographic location of the BSC and BTS;

25

c. the advertisers selecting the locations for the content to be broadcast;

d. the advertisers uploading content to be broadcasted;

e. the advertiser selecting parameters such as the time and the number of messages to be broadcast;

30

f. the application storing such parameters as location, time, content and the number of occurrences of the message of the advertiser is further stored for later broadcasts;

g. checking the content for each advertiser performed by the operator prior to broadcast;

i. If the content passes the pre-determined tests, the message is broadcast at various locations; and

ii. If the content fails the pre-determined tests, notifying the advertisers of the failure.

16. A method of claim 15 wherein the protocol messages exchanged between the CBC, convergence function and BS in the present invention include:

a. The CBSMSE-BIND message is transmitted by CBC;

b. Followed by an N-CONNECT message;

c. An N-CONNECT response message is received;

d. Followed by sending an N-DATA message;

e. This causes the CBSMSE-BIND message to be transmitted by the CBC to the BSC;

f. The BSC replies the CBSMSE-BIND-CONFIRM message;

g. The convergence function sends an N-DATA request ;

h. Which is followed by sending a CBSMSE-BIND-CONFIRM message;

i. A CBSMSE-UNBIND message is sent;

j. An N-DATA message follows;

k. Following this an N-DISCONNECT message is sent; and

l. Which causes a CBSMSE-UNBIND message to be transmitted.

17. A method of claim 15 wherein the Convergence Function is an application logic which carries CBSMSE-BIND parameters, CBSMSE-BIND-CONFIRM and CBSMSE-UNBIND parameters as NS-user-data (Network Service user data), which is necessary when the CBC application bypassing layers 4,5 and 6 of the network layer and communicates directly with Layer 3 of the Network layer such that the complexity of dealing with the many different network layer protocols is avoided by mapping the application protocols to the Network Layer Service.

18. A method of claim 17 wherein the convergence function is written according to specifications defined by X.213.

5 19. A computer program product that provides authenticated, reliable and efficient advertising services via broadcast messages to mobile stations and other devices by direct communication with the network enabled by mapping the application entity protocol (CBSE) directly to the network layer in unused layers of the network stack executed amongst various participating entities including:

(a) One or more mobile terminals, also referred to as Mobile Equipment (ME);

10 (b) A BTS serving one or more MEs;

(c) One or more base stations

(d) One or more BSCs;

(e) One or more CBCs;

15 (f) One or more advertising entities that can interface by means of HTTP and TCP/IP with a set of operators and advertisers; and

(g) One or more operators that administer the system comprising:

a. A Convergence Function is an application logic which carries CBSMSE-BIND parameters, CBSMSE-BIND-CONFIRM and CBSMSE-UNBIND parameters as NS-user-data (Network Service user data), which is
20 necessary when the CBC application bypassing layers 4, 5 and 6 of the network layer and communicates directly with Layer 3 of the Network layer such that the complexity of dealing with the many different network layer protocols is avoided by mapping the application protocols to the Network Layer Service.

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20. A computer program product of claim 19 wherein the convergence function is written according to specifications defined by X.213.

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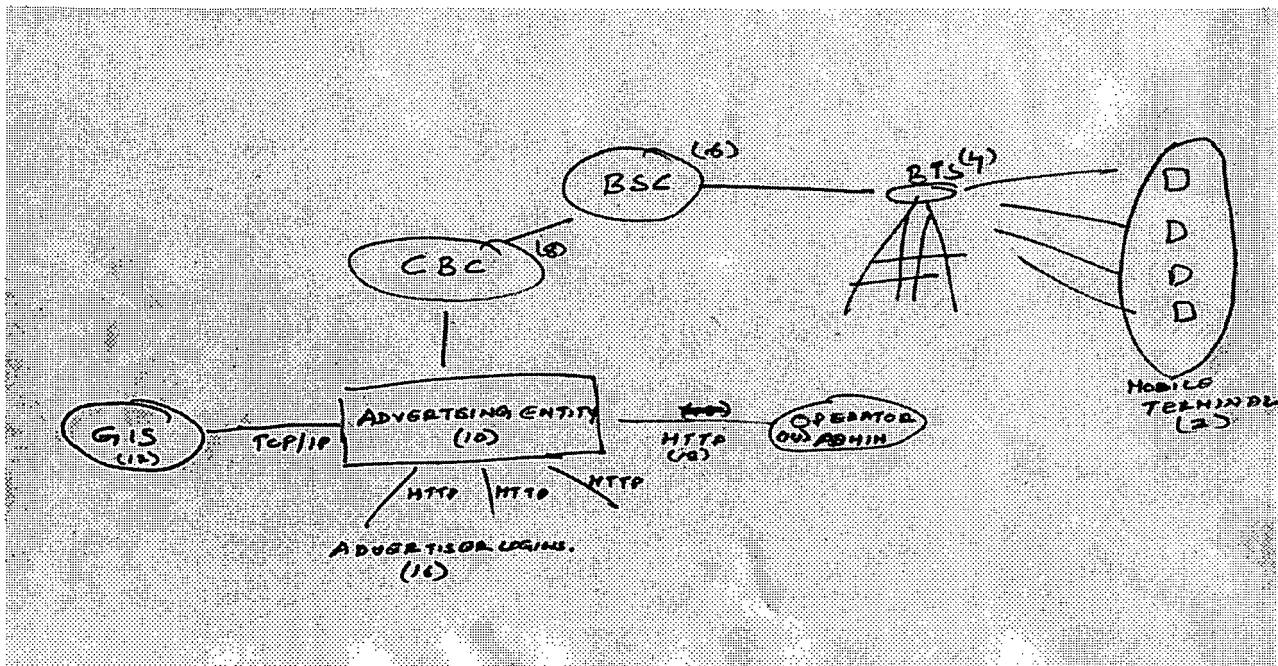


Figure 1

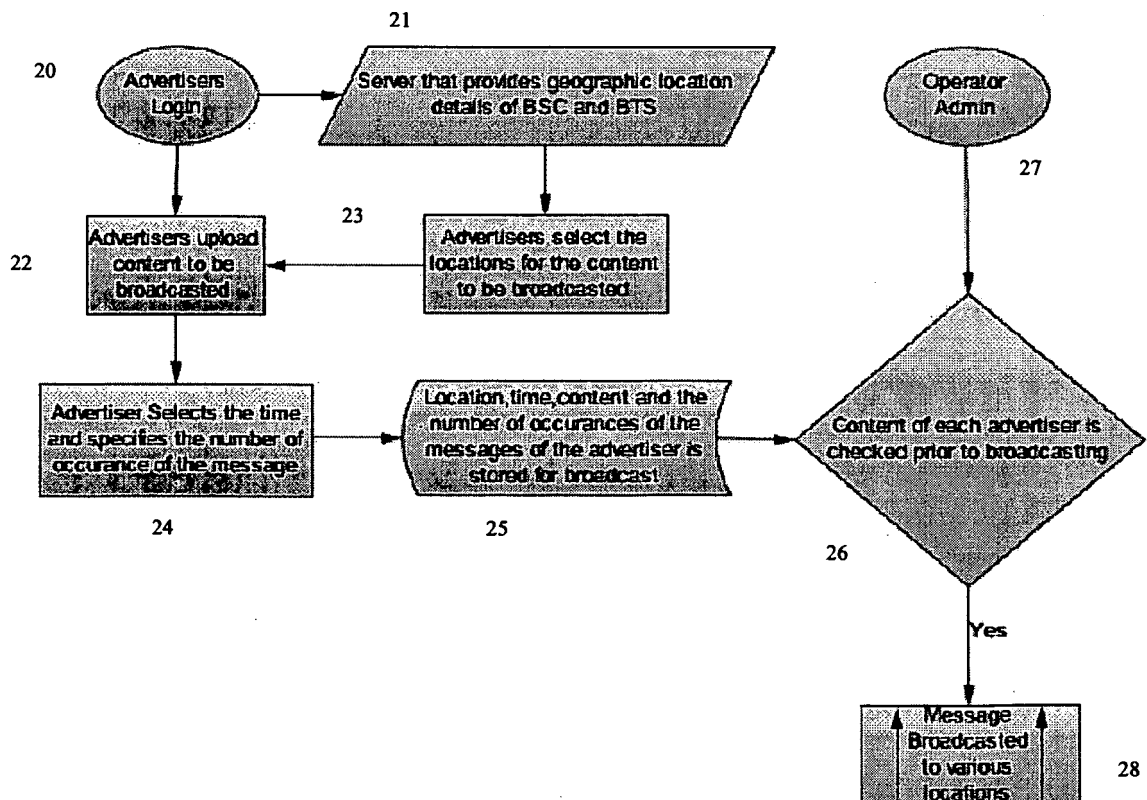
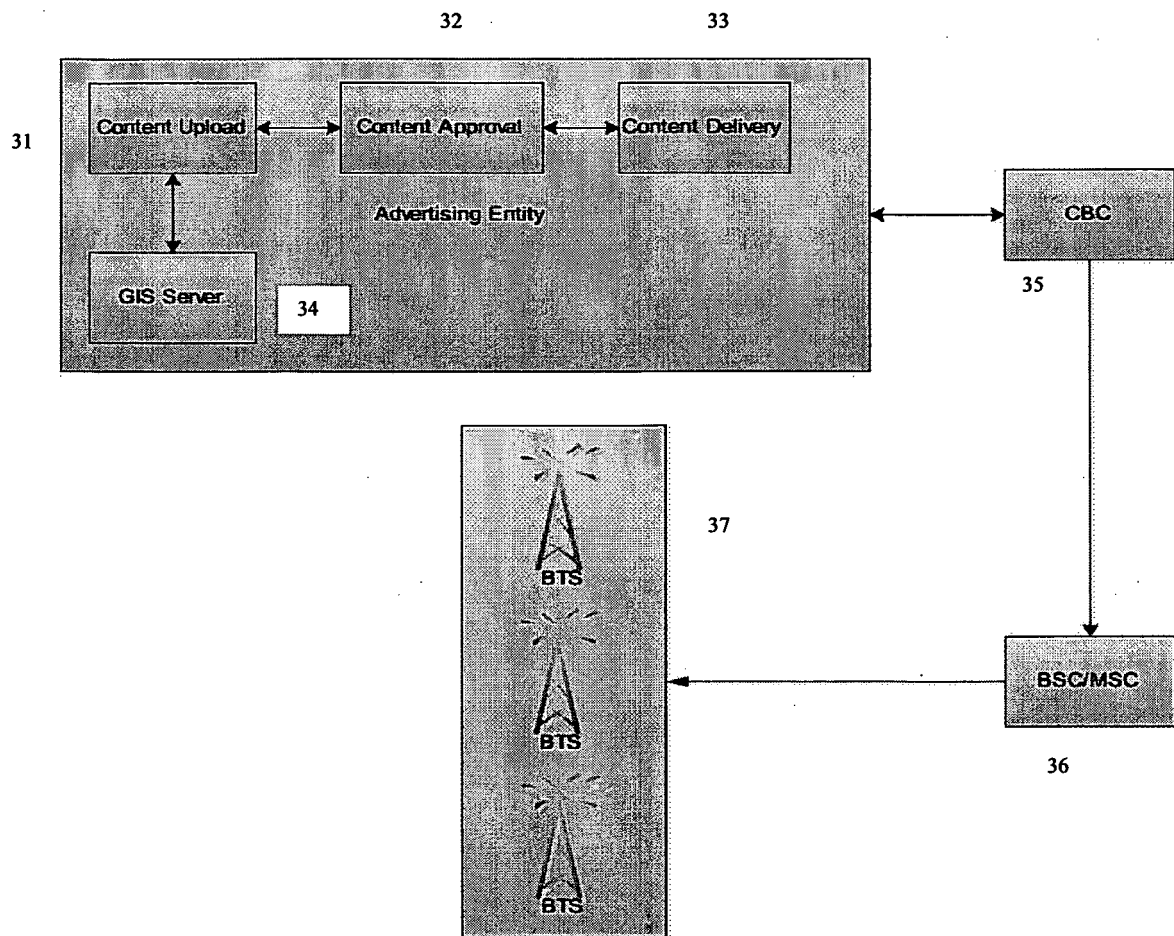


Figure: 2

**Figure: 3**

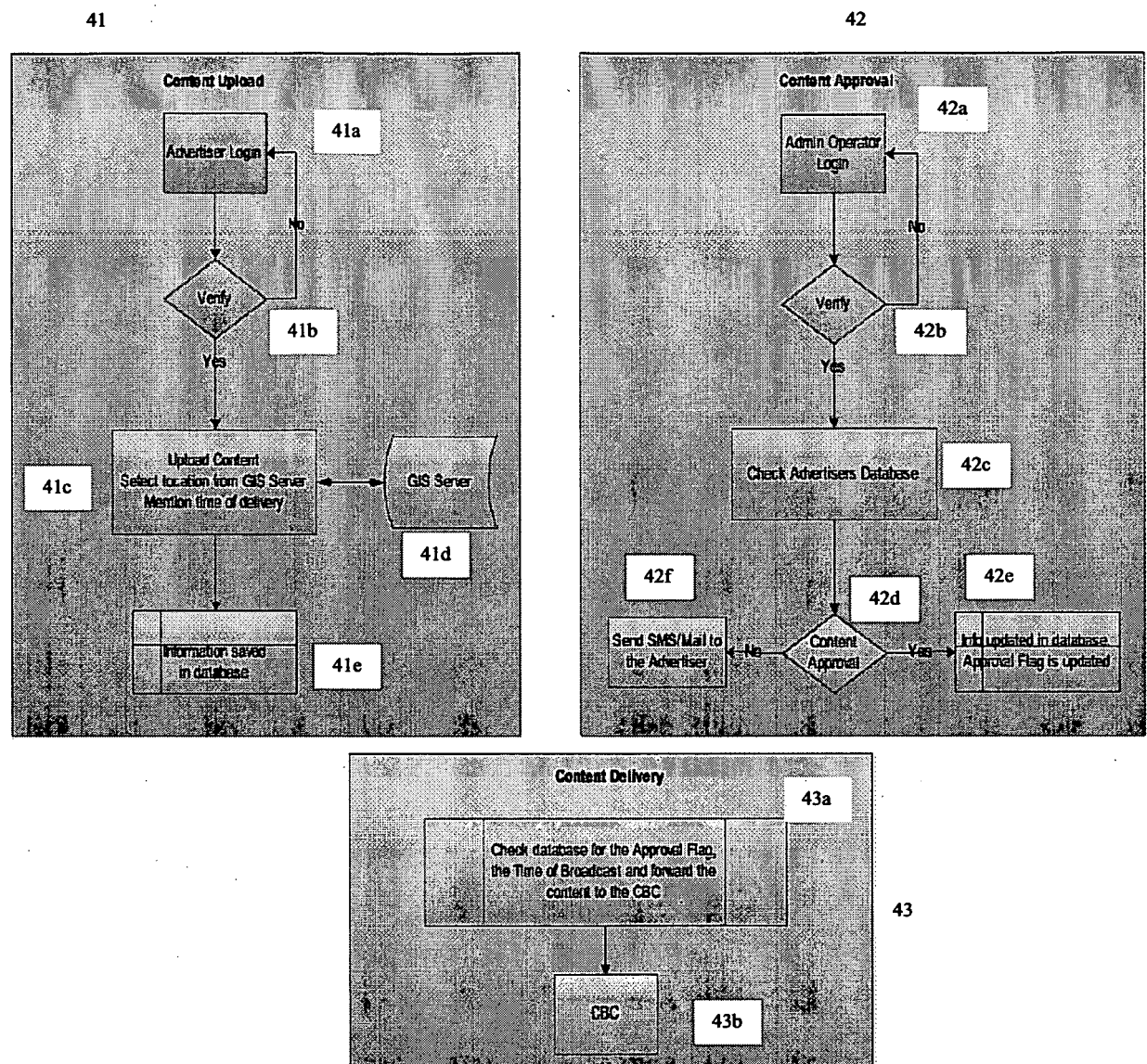


Figure: 4

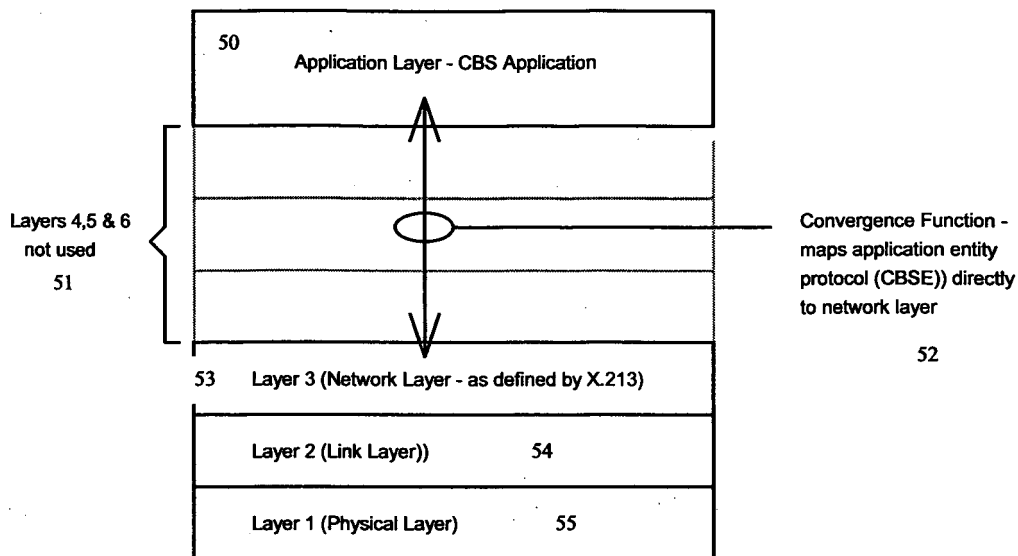
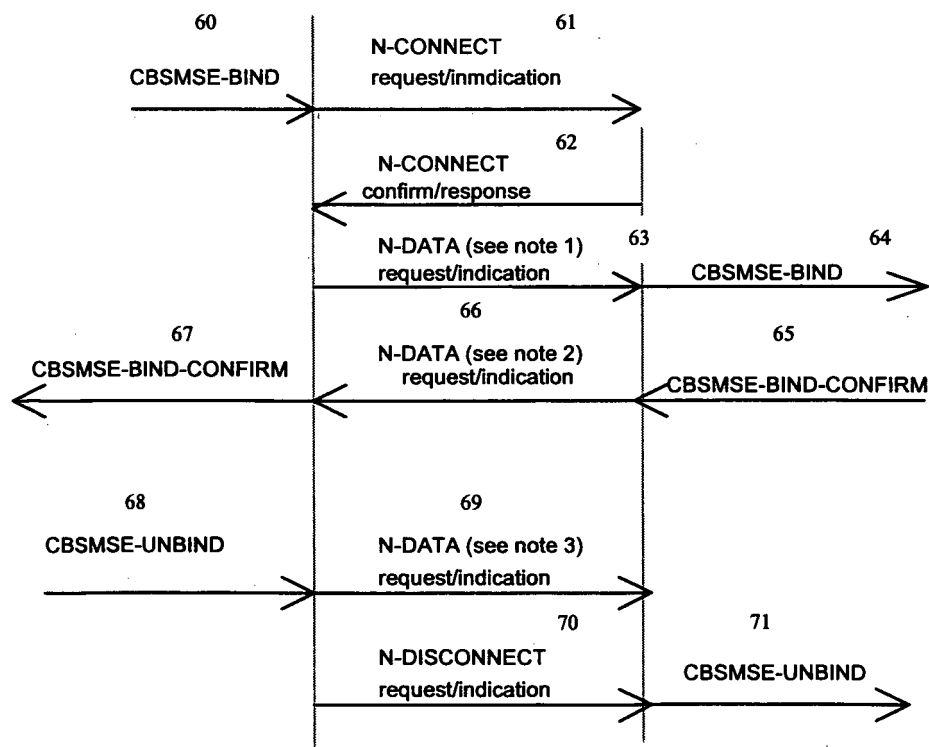


Figure: 5



NOTE 1: CBSMSE-BIND parameters are carried as NS-user-data

NOTE 2: CBSMSE-BIND-CONFIRM is carried as NS-user-data

NOTE 3: CCBSMSE-UNBIND parameters are carried as NS-user-data

Figure: 6