CREDIT PROVISION SYSTEM AND METHOD

FIELD OF THE INVENTION

The present invention relates to systems and methods for providing credit facilities within a communications network. In particular although not exclusively the present invention relates to the provision of airtime recharge services within mobile communication networks.

DISCUSSION OF THE BACKGROUND ART

Most mobile communications systems at present employ two charging paradigms, post-paid and pre-paid. Most post-paid mobile phone services are provided via a contract between the user and a service provider. Under the post-paid paradigm the user is billed at the end of each billing cycle based on their level of usage.

Under the pre-paid paradigms, the user typically purchases the handset along with a set amount of network credit. The user is then free to access the network until they run out of credit. A user may add more credit to the pre-paid account at any time. This is known as "topping up" the account. This top up can be affected by a credit/debit card transaction with the provider or by purchasing a "top-up card" at a retail outlet. The top-up card is stamped with a unique code (often under a scratch-off panel) which can be redeemed on the phone for credit. Credit for a pre-paid mobile phone may have a time limit, for example 90 days from the date the last credit was added. In these cases, customers who do not add more credit before expiration will lose their remaining balance, and the service (and its associated phone number) may be discontinued.

One problem with the use of pre-paid mobiles is the difficulty in recharging credit when the user is outside their service provider's network (e.g. user is roaming internationally). In such instances users are unable to purchase recharges cards from their particular service provider. However, as mentioned above, the user has

the option to recharge credit by utilising credit or debit cards. Typically, this recharge facility is provided in the form of a web portal, dial in service via a preprogrammed service number or SMS service. The dial in and SMS recharge can be particularly problematic if the user has insufficient credit to initiate the call or send the SMS. Likewise the web portal requires the user to be able to access the Internet, consequently there may be significant delays between being notified of lack of credit and recharge during which the user is unable to access the network and in some instances unable to receive calls. The delays can be further exacerbated as the user's home network takes some time to register the update in credit values, further delays can occur as the change in credit values is propagated through to the host network.

Accordingly there is a need for a system and method that would allow for the recharge of mobile credit for a mobile subscriber across multiple mobile service provider platforms that is relatively simple to use and seamless. It would also be advantageous to provide a system and method that not only allows recharging of mobile airtime but also enables the recharge credit to be utilised to purchase additional services or goods.

SUMMARY OF THE INVENTION

In one aspect of the present invention, there is provided a mobile communication system for providing credit to a subscriber roaming in a foreign network, said system including:

a plurality of networks, each of said networks supporting a plurality of subscribers;

a central settlement facility coupled to each network within the plurality of networks, said central settlement facility maintaining a plurality of subscriber accounts and wherein the central settlement facility is adapted, on receipt of request for credit from a subscriber, to:

convert the request for credit to an intermediate value of a virtual currency of the central settlement facility based on a conversion arrangement specific to the central management facility;

obtain value credit from a credit provider of the foreign network with said intermediate value;

credit an account held by the roaming subscriber on the settlement facility with an amount equivalent to the request for credit; and advise the roaming subscriber of the approval of the request for credit;

The central settlement facility may include at least one server, said server being adapted to maintain the plurality of subscriber accounts and negotiate the provision of credit from a plurality of credit providers to one or more subscribers.

The central settlement facility may be coupled to a foreign exchange trading service to allow conversion of the credit request to the intermediate value. Preferably the requested amount of credit is transmitted to the central settlement facility in the local currency of the network from which the subscriber makes the request. Suitably the intermediate value is the US dollar equivalent of the requested amount of credit. It will be appreciated by those skilled in the art that the central settlement facility may be provided with access to foreign exchange systems (forex) and as such would be capable of selecting multiple currencies for use as the intermediate value. The requested credit amount may be transmitted to the settlement facility by the subscriber via a web portal, SMS, MMS, WAP, On Device Portal (ODP), ATM, POS, Kiosk or USSD command. Where the credit request is transmitted via a mobile handset, the handset may be adapted to provide a set of functional menus to allow the user to input the relevant details of the request. Preferably, the central settlement facility may further contain a central clearing house.

The advice regarding approval of the request for credit may be sent to the subscriber in the form of an email, SMS, MMS, WAP, On Device Portal (ODP), flash message via USSD or STK or the like. Suitably the approval notice includes the amount credited to the subscriber's account and the amount charged to the subscriber for obtaining the requested amount of credit. Preferably the subscriber is charged for the provision of credit by direct debit to the subscriber's or the credit provider's financial institution.

The request for credit may include providing a cash payment for predetermined credit value to a third party, in such instances the system may be configured to transfer credit between the subscriber's account and the third party's subscriber account e.g. third party acts as credit provider. Alternatively the system may be configured to allow the third party to broker the request for credit with the credit

provider to obtain the best rate for the subscriber. The system may be configured to credit the third party with a predetermined commission for brokering the provision of credit for the subscriber.

Preferably the credit obtained by the subscriber can be exchanged through the central settlement facility for a number of goods and services offered by one or more third parties registered with the credit facility.

In addition, the central settlement facility may be adapted to obtain information on the location of the subscriber making the request for credit. The settlement facility may also be configured to calculate the appropriate local and international taxes due of the transaction and adjust the sales price, remittance to a seller (i.e. commission), etc.

In a further aspect of the present invention there is provided a mobile communication system for providing airtime to a subscriber of a communications service, said system including:

a plurality of networks each of said networks supporting a plurality of subscribers;

a central settlement facility coupled to each network within the plurality of networks, said settlement facility maintaining a plurality of subscriber accounts and wherein the settlement facility is adapted, on receiving a request for airtime from a subscriber on a first network, to:

convert the request for airtime to an intermediate value of a virtual currency of the central settlement facility based on a conversion arrangement specific to the central management facility;

obtain airtime from a second network with said intermediate value;

credit the subscriber with the requested amount of airtime; and

advise the subscriber of the approval of the airtime request.

Preferably each of the networks is a mobile communications network, wherein each mobile network may be owned by different mobile service provider. In such instances the subscribers may include mobile subscribers, mobile dealers and retailers of mobile services.

Suitably the first network is the network currently hosting the subscriber and the second network is the subscriber's home network. Alternatively the first and second network may be the same network (i.e. domestic airtime transfer).

The central settlement facility may be coupled to a foreign exchange trading service to allow for the conversion of the airtime request to the intermediate value. Preferably the airtime request is transmitted to the central settlement facility in the local currency of the first network. Suitably the intermediate value is the cost in US dollars of the requested amount of airtime. The central settlement facility, however, would be capable of using multiple currencies or a different currency as the intermediate value. The airtime request may be transmitted to the central settlement facility by the subscriber via a web portal, ATM, POS, Kiosk or via a mobile handset in the form of an SMS, MMS, WAP, ODP or USSD command. Where the airtime request is transmitted via a mobile handset, the handset may be adapted to provide a set of functional menus to allow the user to input the relevant details of the request including but not limited to account id, amount of airtime requested and other relevant information.

The subscriber may be a post-paid customer of the second network. Suitably the system is configured to debit the subscriber's post-paid account on the second network in the local currency of the second network for the cost of the requested amount of airtime. The advice regarding approval of the request for airtime is sent to the subscriber in the form of an email, SMS, MMS flash message on phone via USSD or STK or the like. Suitably the notification includes advice on the amount billed to the subscriber's post-paid account for the provision of the requested airtime.

The subscriber may be a pre-paid customer of the second network. In such an instance, the request for airtime includes debiting the third party subscriber's account with the amount corresponding to the requested airtime, and crediting the subscriber's account with the amount corresponding to said requested airtime in the local currency of the network on which the pre-paid account is maintained. This transaction may involve payment of cash to the third party subscriber, in the

currency as may be agreed between the parties, which may be the local currency of the third party subscriber or any acceptable currency, in such amount as may correspond to the requested airtime, and which could be subject to a further markup. The advice regarding approval of the request for airtime is sent to the subscriber in the form of an email, SMS, MMS, flash message via USSD or STK or the like. Suitably the notification includes advice on the amount in the local currency of the subscriber's home network the amount of airtime credited to the subscriber's account.

The system may also be adapted to allow the transfer of airtime between subscribers. The transfer of airtime between subscribers may be initiated by sending a keyword or flash message via USSD command to the central settlement facility. The party initiating the transfer may then be required to enter the recipient's mobile number and the amount of airtime the initiating party wishes to transfer to the intended recipient. The system may be further configured to debit the initiating party's home network billing system and to credit the airtime to the recipient's home billing system.

The system may be adapted to provide a predetermined commission to the mobile service provider based on the sale made by mobile dealers and mobile retailers. The system may also provide a predetermined commission to mobile dealers for each sale made to a mobile retailer. Suitably the predetermined commission on each transaction is negotiated by each of the mobile service providers registered with the credit facility.

The system may be adapted to obtain information on the location of the subscriber making the request for additional airtime or transfer of airtime.

In a further aspect of the present invention there is provided a method of facilitating the provision of credit to a selected subscriber via a central settlement facility coupled to a plurality of networks, wherein each of said networks supports a plurality of subscribers, said method including the steps of:

receiving at the central settlement facility a request for credit from at least one subscriber roaming in a foreign network;

determining if the roaming subscriber has an account with the central settlement facility;

on determining that the subscriber maintains an account with the central settlement facility, converting the request for credit to an intermediate value of a virtual currency of the central settlement facility based on a conversion arrangement specific to the central management facility;

obtaining credit from a credit provider of the foreign network based on the intermediate value;

crediting the roaming subscriber's account with the central settlement facility the amount of requested credit; and

advising the roaming subscriber of the approval of the request for credit.

Suitably the step of receiving includes receiving a request for credit in the form of a keyword or keywords by way of a web portal, a wireless terminal, an ATM, a POS, or a kiosk. In case of a wireless terminal such as a mobile phone, the request is made via SMS, MMS, WAP, ODP or USSD command in advance of receiving the request for credit.

The step of converting to an intermediate value may include converting the request for credit to an equivalent US dollar amount. Suitably the conversion is performed on the basis of the prevailing forex rates which are not necessarily real-time rates and which can be stored within the system.

Preferably the step of obtaining credit (for post-paid subscribers) includes debiting the credit provider's account on the central settlement facility the amount of the request for credit and billing the subscriber's home network service account. Suitably the step of billing the subscriber's home network service account includes converting the intermediate value to the local currency of the subscriber's home network. Alternatively, for pre-paid subscribers, the credit provider can be paid either directly in cash, or by way of cash or credit card, mobile banking, check, or such other equivalent forms of cash.

The method may further include the step of exchanging the credit contained in a subscriber's account for goods and service provided by third parties registered with the credit facility.

Suitably the step of advising includes sending an electronic notification to the subscriber. The electronic notification may be an SMS, email, MMS, flash message via USSD or STK, or the like. The notification may include information on the amount of credit obtained and the amount billed to the subscriber's home service account for provision of the requested amount of credit.

In another aspect of the present invention, there is provided a method of providing airtime to a subscriber of a mobile communications network via a central settlement facility coupled to a plurality of mobile communications networks supports a plurality of subscribers, said method including the steps of:

receiving at the central settlement facility, from at least one subscriber on a first network, a request for airtime from a second network within the plurality of mobile communications networks coupled to the settlement facility;

determining if the subscriber has an account with the central settlement facility;

on determining that the roaming subscriber maintains an account with the central settlement facility, converting the request for airtime to an intermediate value of a virtual currency of the central settlement facility based on a conversion arrangement specific to the central management facility;

obtaining airtime from the second network based on the intermediate value;

crediting the subscriber's account with the central settlement facility the amount of requested airtime; and

advising the subscriber of the approval of the request for airtime.

Suitably the step of receiving includes receiving a request via SMS, MMS, ATM, POS, kiosk, ODP or USSD command in advance of receiving the request for airtime.

Preferably the first network is the network currently hosting the subscriber and the second network is the subscriber's home network. The first and second network may be the subscriber's home network.

The request for airtime may be in local currency of the first network, and the step of converting to an intermediate value may include converting the request for airtime from the first network currency to an equivalent US dollar amount or to any equivalent amount in the currency or currencies set or chosen.

The subscriber may be a post-paid customer of the second network, accordingly the method may include the step of debiting the subscriber's post-paid account on the second network in the local currency of the second network the amount of request for airtime.

The subscriber may be a pre-paid customer of the second network. In such an instance the method may include the steps of providing a cash payment to a third party within the first network in a first currency, debiting the third party's subscriber account in the amount of the cash payment, and crediting the subscribers pre-paid account in the amount of the cash payment in the local currency of the subscriber's home network on which the pre-paid account is maintained.

Suitably the step of advising includes sending an electronic notification to the subscriber. The electronic notification may be an SMS, email, MMS, flash message via USSD or STK, or the like. The notification may include information on the amount of credit obtained and the amount billed to the subscriber's home service account for provision of the requested amount of airtime.

There is also disclosed herein, a system for facilitating transactions between subscribers, said system including:

a plurality of networks, each of said networks supporting a plurality of subscribers;

a central settlement facility coupled to each network within the plurality of networks, said settlement facility maintaining a plurality of subscriber accounts and wherein the settlement facility is adapted, on receipt of a request for subscriber, to:

bind one or more credit and/or debit accounts of a subscriber to the account maintained by subscriber on the central settlement facility, wherein binding includes

creating a virtual account having a unique set of credentials, said virtual account being utilised by the subscriber to conduct transactions with a plurality of third parties registered with the central settlement facility; and

wherein the central settlement facility is further adapted to negotiate approval of said transactions with the appropriate credit and/or debit accounts of the subscriber bound to the virtual account.

Preferably the creation of the virtual account requires the subscriber to designate a default account from the one or more credit and/or debit accounts via which negotiating approval of all transactions is primarily performed. Suitably, the transactions between the subscriber and third parties may be conducted via a web portal, ATM, POS, kiosk, SMS, MMS, WAP, On Device Portal (ODP) or USSD command.

Preferably the virtual account is link to a physical medium to facilitate transaction with third parties registered with the central settlement facility. The physical medium may be a magnetic stripe card, smart card, contactless card or RFID tag. Alternatively, the physical medium is the subscriber's mobile telephone.

Preferably, the central settlement facility is adapted to create a set of subsidiary accounts from the virtual account, each subsidiary account including a subsidiary settlement account. Each subsidiary accounts may be configured to be associated with a third party selected from the plurality of third parties registered with the central settlement facility. Each subsidiary accounts from the virtual account may also be configured such that the subscriber is required to designate a default account from the one or more credit and/or debit accounts via which negotiating approval of all transactions conducted through the subsidiary settlement accounts is primarily performed. Each subsidiary account may be further configured to be linked to a physical medium to facilitate transaction with the third party associated with the subsidiary account. Preferably, the physical medium is a magnetic stripe card, smart card, contactless card or RFID tag. Alternatively, the physical medium may be the subscriber's mobile telephone. Suitably, the transactions between the

subscriber and third parties are conducted via a web portal, ATM, POS, kiosk, SMS, MMS, WAP, On Device Portal (ODP) or USSD command.

There is also disclosed herein a method of facilitating transactions between a subscriber and third parties via a central settlement facility coupled to a plurality of networks, wherein each of said networks supports a plurality of subscribers, said method including the steps of:

creating at the central settlement facility a virtual account for the subscriber;

binding one or more credit and/or debit accounts of a subscriber to the virtual account;

conducting via the virtual account transactions with a plurality of third parties registered with the central settlement facility; and

negotiate approval of said transactions with the appropriate credit and/or debit accounts of the subscriber bound to the virtual account.

BRIEF DETAILS OF THE DRAWINGS

In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings, which illustrate preferred embodiments of the invention, and wherein:

FIG. 1 is a schematic diagram illustrating the transfer of credit between users of two networks according to one embodiment of the present invention

FIG. 2 is a schematic diagram illustrating one possible configuration of a credit provision facility according to one embodiment of the present invention

FIG. 3 is a schematic diagram illustrating one possible configuration of airtime provision to a mobile subscriber according to one embodiment of the present invention

FIG. 4 depicts one possible structure for a rate card according to one embodiment of the present invention

FIG. 5 is a schematic diagram illustrating the process steps associated with providing a mobile subscriber with additional credit

FIG. 6 is a schematic diagram illustrating the relationship between network providers, dealers and retailers according to one embodiment of the present invention

FIG. 7 is a schematic diagram illustrating the process steps associated with enrolling a network provider on the credit provision system according to one embodiment of the present invention

FIG. 8 is a schematic diagram illustrating the process steps associated with providing a dealer with credit according to one embodiment of the present invention;

FIG. 9 is a schematic diagram illustrating the process steps associated with providing a retailer with credit according to one embodiment of the present invention

FIG. 10A and 10B are flow charts illustrating the login and change password processes according to one embodiment of the present invention.

FIG. 11 is a schematic diagram illustrating the transfer of airtime between two mobile subscribers according to one embodiment of the present invention

FIG. 12 is an example of a series of user screens for initiating transfer of airtime from one mobile subscriber to another according to one embodiment of the present invention

FIG. 13 is a schematic diagram illustrating the process steps associated with the transfer of airtime between mobile subscribers

FIG. 14 is a schematic diagram representing another possible application environment for the credit provision system according to one embodiment of the present invention

FIG. 15 is a schematic diagram illustrating one possible configuration of a credit provision system for the purchasing of goods and services according to one embodiment of the present invention.

FIG. 16 is a schematic diagram illustrating one possible configuration of a credit provision system for facilitating transactions between subscribers and third parties according to one embodiment of the present invention.

FIG. 17 is a schematic diagram illustrating one possible configuration of a credit provision system for facilitating transactions between subscribers and third parties according to one embodiment of the present invention.

FIG. 18 is a schematic diagram illustrating one possible configuration of a credit provision system for facilitating transactions between subscribers and third parties according to one embodiment of the present invention, and

FIG. 19 is a schematic diagram depicted how commissions for various transactions may be distributed to all relevant parties according to one embodiment of the invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

With reference to Fig 1 there is illustrated an overview of system functionality for the provision of credit to subscribers of the participating communications networks according to one embodiment of the present invention. As shown two networks, network A **101** and network B **102** allow subscribers of network A **103** to roam (roaming subscriber **105**) within network B and vice versa (i.e. roaming subscriber **106** in network A).

As is the case with most current pre-paid credit paradigms, subscribers **103**, **104** are free to purchase additional airtime from their local retailers **107**, **108**. Unlike standard pre-paid arrangements, however, the exemplified system in this instance allows for roaming subscribers **105**, **106** to purchase additional credit from retailers in the current host network **101**, **102**. The purchasing of credit outside a subscriber's local network **101**, **102** is discussed in greater detail below.

In addition to allowing a subscriber to purchase additional credit outside their local network, the system also allows for the transfer of credit between various subscribers. For example if a subscriber purchases a pre-paid service on network A and the subscriber maintains a post-paid service on network B, any leftover airtime on the pre-paid service could be credited back to the subscribers post-paid service via a suitable transfer process **112** e.g. peer to peer .

To permit subscribers to purchase airtime from their local network via the current host network the system utilises a central credit facility. An example of one possible arrangement of a centralised settlement facility **200** is illustrated in Fig 2.

As shown networks A **101**, and B **102** are coupled to the settlement facility **200** to permit the transfer of funds associated with a credit request to the Transfer Server (TS) **201** of the settlement facility **200**.

The (TS) **201** in this instance is an application running on at least one server **202** disposed within the settlement facility **200**. The TS **201** is responsible for co-ordinating the purchasing of airtime by various subscribers, retailers and dealers across both networks. As shown the TS **201** maintains an account for each of the registered users $\mathbf{203_1}$, $\mathbf{203_2}$,..., **203n**. Each account contains a settling account **204** information, configuration data **205** and transaction logs **206**.
The settling accounts **204** may include information relating to the amount of available credit for a given user. Indeed for most individual users the settling account simply contains the amount of available credit. However in the case of dealers and retailers the settling account **204** can contain additional information such as commissions and sales and others as may be deemed pertinent (discussed in greater detail below).

The configuration data **205** for each user can include information relating to the network configuration for the particular user, rate card and commissioning scheme etc. The transaction log **206** maintains a log of all transactions for reporting and settlement (system should be able to determine the breakdown or allocation of the transaction amount into sales and commissions)

As illustrated various users (subscribers **103,105**(as seen in Fig. 2) dealers **601a**, **601b** (not shown) and retailers **107,108**) can access the settlement facility **200** in a variety of manners. For instance a user could access the settlement facility via web portal an ATM, a POS or a kiosk **207**. Alternatively the user could access the settlement facility **200** via phone **208** keyword, menu, SMS or USSD command. The settlement facility **200** may be coupled to the backend billing systems **209**, **210** of network A and network B respectively. On receiving a request for additional credit the settlement facility **200** passes the request to the TS **201** which then processes the request. The appropriate credit value in the user's settling account is

adjusted accordingly and the user is billed via his/her home network billing system **209, 210.**

As shown in Fig 2 the settlement facility has access to foreign currency facilities **211.** This enables the system to convert the requested amount of credit to a common base rate before forwarding the requested credit value to TS **201** for processing. The manner in which the credit request is processed is discussed in greater detail below.

Fig 3 depicts one example of how the settlement facility **200** can be utilised to effect airtime recharge for a roaming subscribers **105,106** in a host network. As shown the roaming subscriber **105** purchases additional airtime from a retailer **108** with host network **102.** The retailer **108** then forwards the purchase request to the settlement facility **200.**

In this particular example, the roaming subscriber **105** requests $HK40 in additional credit. This value is then forwarded to the settlement facility **200.** The settlement facility then converts the cash value to an e-value via an Electronic Value Transaction (EVT). In the present example, the EVT involves the conversion of the $HK40 to an equivalent US dollar amount. The US dollar amount can then be equated to an equivalent load denomination offered on the subscriber's home network by the TS **201.** The load denominations offered are determined by the relevant networks party to the partnering agreement. These values are stored in a standard rate card. An example of the rate card is shown in Fig 4. As shown, the rate card lists the minimum load denominations in USD and the applicable currencies of the member networks. The minimum denominations are set in accordance with the Standard Retail Price (SRP) for airtime (in local currency) of each of the participating networks. The SRP is comprised of the Rate Card Cost (Electronic Value equivalent of the airtime being sold, which is inclusive of any applicable tax such as VAT) and the Mark-up (which serves as the Retailer's earnings).

Once the TS **201** has determined the load denomination, it proceeds to debit the retailer's settling account **301** in the amount of credit purchased by the subscriber **105** and credits the user's home network settling account **302** the amount of credit purchased in the home networks local currency based on the values contained in the rate card. The home network **101** then updates the roaming subscriber's airtime credit **303** based on the received funds and sends back an SMS acknowledgement to the retailer and subscriber **304** of the successful completion of the transaction. This acknowledgement could also be in another form or media, such as an email.

A more detailed view of the process of the inter-network purchasing of additional credit is shown in Fig 5. Here the subscriber buys airtime from a host network retailer **108**; the retailer **108** then sends a load airtime transaction request (step **501**) to the TS **201**. On receipt of the request the TS **201** performs a validation **502** to determine if the retailer **108** is a validly registered user. At this stage the TS **201** also determines whether the transfer is a domestic or international transfer and whether the retailer is transacting within the host network's country. Once the validation step is complete, the TS **201** then proceeds to retrieve the available denominations and their Standard Retail Price (step **503**). The retrieved denomination is calculated by the TS **201** converting the requested denomination for load into the conversion rate based on the rate card table (see Fig 4) plus any local taxes applicable. The TS **201** then advises the retailer **108** of the available denominations (step **504**). The retailer then selects the appropriate denomination and sends a confirmation (step **505**) to the TS **201**.

On receipt of the confirmation, the TS **201** then validates the request (step **506**). If the request is valid, the system then computes the converted cost (step **507**) (converted cost = denomination cost x conversion rate). The TS **201** then reviews the retailer's settling account to ensure they have sufficient credit to enable the transaction (step **508**). If there is sufficient credit to enable the transaction, the TS **201** proceeds to debit the retailer's settling account (step **509**). The TS **201** then sends the reload request (step **510**) to the subscriber's home network billing system **210**. The billing system **210** then credits the subscriber's airtime allocation with the

received load denomination (step **511**) and sends a response back to the TS **201** signalling the successful update (step **512**). A notification is then sent to the subscriber (step **513**) and the retailer (step **514**) advising them of successful completion of the reload operation.

If there is no sufficient credit to enable the transaction, the TS **201** will then check if there is a credit provider with whom the retailer has an existing credit agreement. If there is a credit provider with whom the retailer has an existing credit agreement, then the system checks for the amount of credit available for the retailer. If the amount of credit available for the retailer from the credit provider is sufficient to cover the requested transaction, then the system debits this amount from the settlement account of the credit provider and credits the same to the settlement account of the retailer.

If there is no credit provider with whom the retailer has an existing credit agreement, the retailer can then obtain the credit necessary to enable the transaction from a dealer. The settlement account of the dealer is checked if it would be sufficient to provide the credits requested by the retailer. If the settlement account of the dealer is sufficient to provide the credits requested by the retailer, the amount corresponding to the airtime required by the subscriber is debited from the settlement account of the dealer and credited to the settlement account of the retailer.

The TS **201** then proceeds to debit the retailer's settlement account (step **509**). The TS **201** sends the reload request (step **510**) to the subscriber's home network billing system **210**. The billing system **210** then credits the subscriber's airtime with the received load denomination (step **511**) and sends a response back to the TS **201** signalling the successful update (step **512**). A notification is then sent to the subscriber (step **513**), the retailer (step **514**), and the credit provider or the dealer, as the case may be, advising them of successful completion of the reload operation.

If the settlement account of the dealer is not sufficient to provide the credits requested by the retailer, the system then checks if there is a credit provider with whom the dealer has an existing credit agreement. If there is a credit provider with whom the dealer has an existing credit agreement, then the system checks for the amount of credit available for the dealer. If the amount of credit available for the dealer from the credit provider is sufficient to cover the requested transaction, then the system debits this amount from the settlement account of the credit provider and credits the same to the settlement account of the dealer. The same amount is then debited from the settlement account of the dealer, and in turn credited to the settlement account of the retailer.

The TS **201** then proceeds to debit the retailer's settlement account (step **509**). The TS **201** sends the reload request (step **510**) to the subscriber's home network billing system **210**. The billing system **210** then credits the subscriber's airtime with the received load denomination (step **511**) and sends a response back to the TS **201** signalling the successful update (step **512**). A notification is then sent to the subscriber (step **513**), the retailer, the credit provider and/or the dealer (step **514**), as the case may be, advising them of successful completion of the reload operation.

If the available credit in the settlement account of the retailer and/or the dealer is not sufficient to enable the transaction and there is no credit provider as provided for in the foregoing, the TS **201** then declines the transaction and notifies the retailer of such fact and the reason for the denial.

Once the reload is effected, the TS **201** then proceeds to compute the commissions for the dealer through which the retailer purchases credit and the commission for the host network (step **515**). The dealer commission is calculated on the basis of the converted cost multiplied by the agreed commission rate and dealer's share. Likewise the host network commission is calculated on the basis of the converted cost multiplied by the agreed commission rate and host network's share. Once the commissions are calculated the TS **201** proceeds to credit the dealer's and host network's settling accounts (step **516**) with the appropriate amounts. Once this is

complete, the TS **201** then proceeds to calculate the sales amount for the subscriber's home network (step **517**) (home network sales = denomination cost x conversion rate – agent network and dealer commissions). The sales value is then credited to the home networks settling account (step **518**).

As can be seen from the above discussion, in order to effect settling of the requested credit value, the participating dealers, retailers of the host networks are required to have a level of available credit within their settling accounts to permit sale and transfer of airtime to subscribers. The system, however, also provides for making credit available through credit providers having existing credit arrangements with the dealers and/or the retailers.

Typically the dealers purchase credit from their local network provider which inturn is provided with an amount of credit as part of their airtime sales commitment upon entry into the partnering agreement. Fig 6 shows this hierarchy of network providers, dealers and retailers. Under the present system, the network providers **101,102** have the ability to enrol dealers **601a, 601b** onto the system, modify the dealer profile and remove dealer from the system. Dealers **601a, 601b** are able to enrol a number of retailers **107,108** onto the system. Dealers **601a, 601b** sell credit to the retailers as part of the enrolment process.

Retailers **107, 108** earn money based on the percentage mark up applied to the sale of credit to subscribers. For each sale, the retailer makes the enrolling dealer **601a, 601b** earns a percentage commission. Network providers **101, 102** then earn a percentage commission on all sales made by dealers to retailers and retailers to subscribers.

Commissions may then be en-cashed by the dealers **601a, 601b** and network providers **101, 102.** There are a number of commission payment models that may be utilised. For example, commissions may paid back on a just in time basis. The commission scheme utilised to effect transfer is determined by the network providers on entry into the partnering agreement.

Fig 7 illustrates the process of crediting a network provider's electronic settling account. Here the provider gives an airtime sales commitment as agreed to in the partnering agreement between the participating networks. The actual value transmitted by the network provider **101,102** is the agreed sales commitment plus the service fee for utilising the settlement facility (preferably in US Dollars). For example if the network provider agrees to a $100, 000 sales commitments and the settlement facility has a 2% commission, the transfer request would in fact be for $102, 000. The settlement facility then converts the received transfer request to a US dollar amount and deducts the required service fee before forwarding the transfer request (step **702**) to the TS **201**. The TS **201** then converts the received value back to the local currency of the enrolling network provider based on the exchange rate at the date of the original transfer request (step **703**). The TS **201** then credits the network provider's settling account with a load denomination equivalent to the received value (step **704**) and then sends a notification back to the network provider (step **705**) of the deposit of the load credit.

Fig 8 depicts the transfer of credit between the network provider and an authorised dealer **601a, 601b** for the network. Here the dealer **601a, 601b** purchases a set amount of credit (step **801**) from the network provider for later resale to the dealer's retail network. The network provider then sends a transfer request (step **802**) to the TS **201**. The TS **201** then performs a validation on the sending and receiving parties (i.e. network provider and dealer making purchase)- step **803**. If both parties are validly registered the with the system then the TS **201** proceeds to check if the network provider's settling account has sufficient balance to deliver the requested credit to the dealer (step **804**). If the balance of the network provider's account has sufficient credit then the TS **201** debits the network provider's account (step **805**) and credits the dealers account with the requested amount of credit (step **806**). The TS **201** then sends an SMS, MMS or flash notification message via USSD or STK to both **601a, 601b** of the successful completion of the transfer request (steps **807a, 807b** respectively). Such message may also be an email or any notification in another form or medium. Similarly, Fig. 8 can also depict the transfer of credit between the network provider and a credit provider, where the credit provider is treated as an authorised dealer

Moreover, Fig. 8 may likewise depict the transfer of credit between the credit provider and a dealer **601a, 601b**. This contemplates an instance when the dealer does not have sufficient settlement credits required to consummate a credit load request from its retailers. Here, the dealer **601a, 601b** obtains a certain amount of credit (step **801**) from the credit provider for subsequent resale to the dealer's retail network. The credit provider then sends a transfer request (step **802**) to the TS **201**. The TS **201** performs validation on the sending and receiving parties (step **803**). If both parties are validly registered with the system, then the TS **201** proceed to check if the credit provider's settlement account has sufficient balance to deliver the requested credit to the dealer (step **804**). If the balance of the credit provider's account has sufficient credit then the TS **201** debits the credit provider's account (step **805**) and credits the dealer's account with the requested amount of credit (step **806**). Otherwise, the transaction is declined. Due notification is then sent to the parties.

A similar process is employed for the transfer of credit between the dealer **601a, 601b** and retailer **107, 108**, as shown in Fig 9. The retailer **107, 108** purchases credit from their specified dealer **601a, 601b**. The dealer **601a, 601b** initiates a transfer request (step **901**) to the TS **201**. The TS **201** then proceeds to validate the request (step **902**). During the validation the TS **201** firstly checks if the target account and transfer amount is valid. The TS **201** then proceeds to check if the target (retailer) account is enrolled to the source (dealer) account and if the source account has enough credit. Once it is established that the proposed transaction is valid, the TS **201** proceeds to debit the dealer's settling account (step **903**) and credit the retailers settling account (step **904**). Once the transaction is complete, the TS **201** sends a notification to the retailer **107, 108** (step **905**) and to the dealers **601a, 601b** (step **906**). Another way to look at Fig. 9 is that in the case of transfer of credit between a credit provider **601a, 601b** and retailer **107, 108**. Instead of outright purchase of credit, however, payment from retailer **107, 108** to the credit provider **601a, 601b** may be deferred in such terms as may have been previously agreed upon by both parties.

It should be noted that the transactions between the network provider, dealer, retailer and/or credit provider are performed directly with the TS **201** and do not require the settlement facility to perform a conversion to US dollars. As it will no doubt be appreciated by those skilled in that art as the TS **201** stores the credit values in the home currency of the network then there is no need to perform a currency conversion as all parties in the transactions illustrated in Figs 7 to 9 utilise the same currency.

As briefly mentioned above, the TS **201** also maintains a commission and sales accounts as part of the general settling account, which store the commissions conferred and revenues generated by sales to the network service providers, dealers and retailers.

The commissions account is generally only applicable to network providers and dealers as retailers earn revenue through the mark-up they place over the counter sale of the load credit. The values stored in the commissioning accounts for various dealers can be en-cashed at a later date. For example, the network provider may be provided with the ability to deplete the dealer's electronic settlings account for commissions in exchange for cash or load credit.

In such instances the dealer goes to an encashment centre designated by the network provider and requests for redemption of commissions earned. The dealer is presented with the option of taking the commissions in the form of cash or additional load credit. Once the dealer selects the desired form of redemption the network provider initiates the transfer by submitting the dealer's request to the TS **201**, which then checks the dealer's commission account and collates the total commissions payable. The TS **201** then proceeds to check if the network provider has sufficient credit in their settling account to cover the commission payable and if so debits the networks provider's account and transfers the appropriate monetary value to an account of the dealer's choice. The TS **201** then proceeds to clear the commissions account of the dealer.

If dealer opts to redeem the commissions in the form of credit, the TS **201** checks the network provider's account to determine whether there is enough credit to complete the transaction. The TS **201** then proceeds to debit the dealer's commissions account and the network service provider's settling account of the corresponding value of load credit, before finally crediting the dealer's settling account with the credit value corresponding to the commission earned by the dealer. The TS **201** then notifies both parties of the successful completion of the transaction.

The en-cashing of commissions at the network service provider level differs slightly to that of the en-cashing scheme between dealer and network service provider. In the case of the network service provider, the settlement facility performs a sweep of all electronic settling accounts for commissions owed to a particular network service provider. The settlement facility then collates these commissions and deposits them into the relevant network provider's bank account. A similar en-cashing process to that discussed in relation to the redemption of commissions owed to a particular network is used to redeem the sales made by a particular network. In this case the settlement facility sweeps the sales account of the relevant network and deposits the appropriate amount into the relevant network provider's bank account. In addition to the above, the system also provides a number of auxiliary functions to the network providers, dealers and retailers are summarised in table 1 below:

Auxiliary Transactions	
Network Provider	
Inquire Balance: Load Credit	This transaction allows the Agent Network to view the current balance of its Electronic Settling Account for Credit Load. *Transaction Flow* • Agent Network initiates (via mobile or web) Balance Inquiry transaction for Credit Load and submits transaction. • UTS processes request. • Agent Network receives notification containing balance information.
Inquire Balance: Commissions	This transaction allows the Agent Network to view the current balance of its Electronic Settling Account for Commissions. *Transaction Flow* • Agent Network initiates (via mobile or web) Balance Inquiry transaction for Commissions and submits transaction. • UTS processes request. • Agent Network receives notification containing balance information.
Inquire Balance:	This transaction allows the Home Network to view the current balance

Sales	of its Electronic Settling Account for Sales. *Transaction Flow* • Home Network initiates (via mobile or web) Balance Inquiry transaction for Sales and submits transaction. • UTS processes request. • Home Network receives notification containing balance information.
Dealer	
Inquire Balance: Credit	This transaction allows the Dealer to view the current balance of its Electronic Settling Account for Credit Load. • Follows the same flow as inquire balance for network provider set out above.
Inquire Balance: Commissions	This transaction allows the Dealer to view the current balance of its Electronic Settling Account for Commissions. • Follows the same flow as inquire balance for network provider set out above.
Acct. Management: Set PIN	This transaction allows the Dealer to define a PIN that can be used to protect or 'Lock' the Credit Load Menu. This does not apply to web-based or USSD-based transactions. *Transaction Flow* • Dealer selects Set PIN transaction on the Credit Load Menu. • Inputs desired PIN, confirms PIN and submits. • UTS processes request. • Dealer receives a notification for the successful transaction.
Acct. Management: Change PIN	This transaction allows the Dealer to change the current PIN. *Transaction Flow* • Dealer selects Change PIN transaction on the Credit Load Menu. • Inputs current PIN, new PIN, confirms new PIN and submits. • UTS processes request. • Dealer receives a notification for the successful transaction.
Acct. Management: Lock/Unlock	This transaction allows the Dealer to Lock or Unlock the Credit Load Menu. Functionalities ▪ Lock hides all options of the Credit Load Menu (e.g. Transfer, Inquire Balance), except Unlock, Change PIN and Call Hotline ▪ Unlock exposes all options of the Credit Load Menu (when previously Locked). PIN entry will be required for this transaction (prerequisite: Dealer has performed Set PIN).
Acct. Management: Call Hotline	This transaction allows the Dealer to initiate a voice call to the assigned after sales group upon selecting the Call Hotline option in the Credit Load Menu.
Retailer	
Inquire Balance: Credit	This transaction allows the Retailer to view the current balance of its Electronic Settling Account for Credit Load. • Follows the same flow and logic as inquire balance for network provider set out above.
Acct. Management: Set PIN	This transaction allows the Retailer to define a PIN that can be used to protect or 'Lock' the Credit Load Menu. This does not apply to web-based or USSD-based transactions. • Follows the same flow and logic as per dealer acct management set pin set out above.
Acct. Management: Change PIN	This transaction allows the Retailer to change the current PIN. • Follows the same flow and logic as set out in dealer change pin set out above.
Acct. Management: Lock/Unlock	This transaction allows the Retailer to Lock or Unlock the Credit Load Menu. Has the same functionalities as described in dealer lock/unlock set out above.

Acct. Management: Call Hotline	This transaction allows the Retailer to initiate a voice call to the assigned after sales group upon selecting the Call Hotline option in the Credit Load Menu.

Table 1: Summary Auxiliary Functions for Account Management on TS

Fig 10 A depicts one possible configuration of a user login process according to one embodiment of the present invention. To initiate login the user enters their assigned user ID and password (step **1001**). The system then determines if the user name and password are valid (step **1002**). If so the system then proceeds to check if this is the user first login (step **1003**). If it is the users first login, the system then initiates a change password process which is described in greater detail below (see Fig 10B).

If the user name and password are valid and have been utilised for a previous login, the system proceeds to verify the status of the user's account (step **1005**). If the user's account has been blocked, the system advises the user that the account is not valid and returns to the initial login screen (step **1006**). If the user's account status is valid, the system then proceeds to verify the users access level (step **1007**) and then open the appropriate home screen with the relevant user options (as set out in table 1 above).

Fig 10B depicts one possible implementation of the change password function. The process is initiated (step **1009**) by the user selecting the change password word button. The system then requests the user to verify his/her current password, or in the case where it is initial login discussed above the system verifies whether the assigned password is valid (step **1010**). If the password is invalid, the system notifies the user and returns to the main user screen (step **1011**).

In the event that the password is valid the system then requests that the user enter the new password (step **1012**). The system then requests the user to re-enter the new password for verification (step **1013**). Once verified the system updates the password (step **1014**), before returning the user to the main user screen (step **1015**).

It will be appreciated by those skilled in the art that while the above system has been described in relation to the transfer of credit between networks that the system is equally applicable to the provision of credit within a single network (i.e. wherein the host and home network are the same).

The system also provides subscribers with the ability to transfer airtime charged to a subscriber's post-paid account to a pre-paid account of their choosing or vice versa, via the use of a peer to peer operation **112**. Such a transfer scheme is also applicable for the transfer of airtime from one pre-paid subscriber to another pre-paid subscriber. An example of the peer to peer transfer **112** of airtime between subscribers is shown in Fig 11.

In this example, a subscriber of network B wishes to transfer airtime to a subscriber in network A. The load airtime transaction is initiated through SMS, MMS, WAP, or by sending a keyword or USSD command. Once the request is initiated, the sending party **1101** inputs the desired recipient's **1104** mobile number and airtime denomination. The request is then sent to the TS **201** for processing. The TS **201** then validates the initiating party's and recipient's mobile numbers to determine if they are registered users of the system. If so, the TS **201** debits the initiating party's home network billing system and then credits the airtime to the recipient's home billing system. Both the initiating party and the recipient are then notified of the successful transfer of airtime between the subscribers.

Fig 12 depicts one example of a series of user screens that may be initiated on a subscriber's handset to effect transfer of airtime. As shown, the user accesses the transfer procedure by selecting it from the user option menu (step **1201**). The user is then required to enter the mobile number they wish to transfer airtime to (step **1202**). Once the recipient's mobile number has been entered the initiating party is then required to enter the desired transfer amount in the recipient's local currency (step **1203**). To confirm the transfer of the requested amount the initiating party is then required to enter a pre-assigned personal identification number (PIN) (step **1204**). Once the transfer is effected, the initiating subscriber is then advised of the transfer and the amount billed to their home account (step **1205**).

A more detailed view of the transfer process is depicted in Fig 13 as above, where the initiating party **1101** sends a transfer request **1301** to the TS **201**, which then proceeds to validate the request (step **1302**). During the validation the TS determines the type of transfer requested e.g. post-paid to prepaid etc. Once the TS **201** has validated the request it proceeds to retrieve the available denominations (step **1303**) and convert the retrieved denominations to the host network's currency (step **1304**). The TS **201** then sends a reply (step **1305**) to the initiating party **1101** advising of the available denominations and the prices associated with each. The initiating party **1101** then selects the desired denomination and confirms the transfer (step **1306**).

On receipt of the confirmation the TS **201** then proceeds to calculate a converted value (step **1307** selected denomination x conversion rate). A request is then sent (step **1308** which includes the initiating party's mobile number and the converted value) to the host network billing system **209** which then processes the request (step **1309**) and sends a response (step **1310**) to the TS **201**. The TS **201** then sends a request (step **1311** which includes the recipient's mobile number and the desired denomination) to the recipient's home network billing system **210**, which processes the request (step **1312**) and sends a response to the TS **201** (step **1313**). The TS **201** then sends notifications to the initiating party (step **1314**) and the recipient (step **1315**) advising of the successful completion of the transaction.

Once the TS **201** has notified the initiating and receiving parties, it then computes the converted cost associated with the transaction (step **1316**) (denomination cost x conversion rate). The TS **201** then proceeds to determine if the host network has sufficient credit (step **1317**) and if so the TS **201** proceeds to deduct the converted cost from the host networks settling account (step **1318**). The system then proceeds to calculate the commissions due to the host network (step **1319**) (denomination cost x conversion cost x commission rate). The calculated commission is then credited to the host networks settling account (step **1320**). Finally the TS **201** calculates the value of sales due to the home network **210** (step

1321) (denomination cost x conversion rate – commissions) and credits these to the home networks settling account (step **1322**).

Fig 14 illustrates a further possible application of the credit provisioning system according to one embodiment of the present invention. Here the system is utilised to purchase various third party goods and services. As shown, a consumer **1403** (e.g. a mobile subscriber, small retail store etc) can access a number of products and services offered by a number of manufacturers **1401** and third party retailers (lead stores) **1402**. In this particular example, the credit is exchanged for goods and services as opposed to airtime per the above examples. Consequently the TS **201** not only maintains settling accounts for each user but it is also configured to maintain an inventory of items for sale in the case of manufacturers **1401**, the lead stores **1402** and goods purchased in the case of customers **1403**. Accordingly the TS **201** manages the purchasing and settlement. In addition to this the TS **201** is also tied to one or more logistic providers **1405**. This enables the system to provide inventory tracking and distribution services between the manufacturers **1401**, lead stores **1402** and consumers **1403**.

Fig 15 depicts one example of how a purchase may be affected via the TS **201**. As shown a consumer **1403** is free to view the various goods and service on offer from manufacturers **1401** and retailers **1402** via an access point **1503**, which in this instance is either a web portal **1501** or mobile network **1502**. When the consumer **1403** identifies the item he/she wishes to purchase, he/she initiates a purchasing request to the TS **201**. The purchasing request contains the store identification, the item code and the quantity. The system then checks the stores inventory list **1405** contained in their member account to ensure that the item is in stock and if so the system places a purchase order which is saved to the transaction logs of the store and consumer **1403** making the purchase. The store is then notified regarding the pending transaction (email, SMS, MMS etc).

The store then issues a purchase invoice for the transaction. This is then stored in the transaction logs **206** of both the consumer and the issuing store. When the consumer wishes to complete the transaction, the system retrieves the purchase invoice and displays it to the consumer for review. If the consumer is satisfied that

the details of the purchase are correct, they then issue a payment request. On receipt of the payment request the system proceeds to check the consumer's settling account to ensure they have sufficient credit to complete the transaction. If the consumer has sufficient credit, the system proceeds to debit the consumer's settling account in the required amount and credit the store's settling account.

The system then notifies the store of the transfer of credit, the store then issues a purchase receipt. The purchase receipt is then sent back to the consumer to verify the successful completion of the transaction. A copy of the purchase receipt is stored in transaction logs **206** of the store and consumer. By maintaining a copy of the receipt within both parties member accounts the system can readily resolve any disputes that may arise over the order etc.

As with the airtime loading system above, the trading system allows distributors to sell goods to dealers who in turn are able to sell to the retailers. Indeed the purchasing process that occurs at the service provider end is similar to the purchasing process occurring between the consumer and retailer. For instance a dealer can review the inventory of a various distributors and select the items he wish to purchase from the distributor.

The supply of the goods from the distributor to the dealer can be administered under two possible usage scenarios. Under the first possible supply model, the dealer may take the goods on credit. In this instance the dealer is free to select the goods they wish to purchase from the distributor. Once the dealer has made their desired selections, he issues a purchase request including the distributor ID, the items for purchase and the quantities of each item required. On receipt of the purchase request the system proceeds to check the dealer's inventory account to ensure that the dealer has sufficient stock to fulfil the request. If there is sufficient stock to fulfil the request, the distributor is then notified of the pending transaction (via email, SMS etc). The distributor issues a purchase invoice for the requested goods, the invoice is then saved to the transaction log of the distributor and dealer. The stock items are then debited from the distributor's inventory list and credited to the dealer's inventory list.

The dealer is then free to sell the stock items to retailers, the stock items are on sale at suitable mark up. On sale of the goods to the retailers, the dealer's settling account is credited in the sales amount. To effect settlement with the distributor, the dealer sends a request to the system to retrieve the relevant purchase invoice utilising an access code or keyword associated with the purchase invoice number. The system then checks if the invoice number is valid and then verifies if there is sufficient credit in the dealer's settling account to complete the transaction. If so the system debits the dealer's settling account and credits the distributor's settling account. Both the dealer and distributor receive notifications from the system on successful completion of the transaction.

The alternate usage model is that of a commission model. Here the dealer purchases an agreed volume of inventory from the distributor. In this instance, the dealer sends a purchase order including the distributor ID and agreed purchase amount to the system, the system then checks the dealer's account to ensure that there is sufficient credit to proceed with the transaction. If so the system proceeds to debit the dealer's settling account and credits the distributor's settling account. The distributor then advises the system of the stock items to transfer from its inventory listing to the dealer's inventory listing. On transfer of the stock items, the system provides the dealer with a listing of the incoming stock. The dealer is then free to sell the stock at the recommend price for each sale. The dealer's settling account is credited by the amount of the recommended sale price set by the distributor. A corresponding entry is also made in the dealer's commissions account in accordance with the agreed commissioning scheme in place between the dealer and the distributor.

The commissions may be redeemed on a periodic basis or at the initiation of the dealer. In the case of a periodic redemption process, the system performs a sweep of the dealer's account for any unpaid commissions (i.e. values stored in dealers commissions account). The settlement facility then collates these commissions and arranges for transfers of the appropriate funds to be transferred from the relevant

distributor's settling account into the dealer's selected bank account. The system then notifies the dealer and the distributor of the transfer.

In the case of a dealer initiated transfer, the dealer sends a transfer request to the system which then verifies whether the dealer and the distributor are validly registered members of the system. If so the system then proceeds to check if the distributor's settling account has sufficient funds to affect the transfer of the required funds to the dealer. In the event that the distributor's account contains sufficient credit, the system arranges transfer of the appropriate funds to the dealer's bank account. The system then notifies the distributor and dealer of the transfer.

As shown, the system may also be linked to various financial institutions **1404**. This enables the system to en-cash the credit accumulated by retailers, dealers and distributors directly into the account of their choosing. In addition, linking into various financial institutions **1404** provides the consumer with the option to purchase credit directly from the credit facility. For example, a consumer can logon to their account with the settlement facility and request additional credit, the system then debits the selected bank account of the consumer in the amount of the credit request and then updates the amount of available credit in the consumers settling account.

Fig 16 depicts an example of how the member's account on the TS **201** may be linked to various accounts owned by an individual to effect transactions with various parties. As shown, bank accounts **1604**, credit or debit cards **1605**, and virtual cash accounts **1606** are all linked or bound to a member's account which acts as a virtual account **1601**. The binding of the accounts in this manner effectively blurs the difference between the virtual account **1601** and the accounts to which it is linked, because the virtual account serves as proxy to the bound accounts. Thus the virtual account merely serves as a repository of credentials for the bound accounts. Any transactions via the virtual account causes the translation or look-up of the account credentials mapped or bound to virtual account to permit the system to negotiate approval of the transaction as if directly transacting using the bound account. A settlement account is provided at the merchant **1607** backend, so that the system

can calculate and credit commissions and whatever fees that are due to each party involved in the transaction. In any transaction between the member and the merchant **1607**, the bank accounts **1604**, credit or debit cards **1605**, or virtual cash accounts **1606** are transparent to the merchant **1607** as these are encapsulated in virtual account **1601**.

Fig 17 depicts one example of how transactions can be made using the virtual account **1601**. In this particular case, the virtual account is a physical device that is associated with the virtual account **1601**. As shown the physical device may include, but is not limited to, a magnetic stripe card **1709** which needs to be swiped at a magnetic card reader at the merchant **1607** side, an RFID key chain **1710** for contactless transaction, a contactless or proximity card, smart card or the like.

The system may be further adapted to allow over-the-air transactions, for example via a mobile phone **1711**. In such cases, the virtual account **1601** is associated with the mobile phone **1711**, sharing identifiers such as but not limited to SIM (Subscriber Identity Module), account, and IMEI (International Mobile Equipment Identity) numbers and similar information.

In the above scenarios, the merchant **1607** is actually transacting with the virtual account **1601** through a physical device. However the use of such a physical device is not always necessary. As shown the virtual account **1601** has two associated properties, the identifier **1703** and the body **1702**. Utilizing the identifier **1703** it is possible to conduct a transaction without an associate physical device. In such instances the indentifer **1703** is inputted directly into the merchant's payment gateway **1708** which could form part of a storefront or website.

Fig 18 depicts yet a further example of how the virtual account **1601** may be utilized to conduct transactions with various merchants **1607**. In this particular example several subsidiary accounts $\mathbf{1801_1}$, $\mathbf{1801_2}$, $\mathbf{1801_3}$ are created from a virtual account. Each subsidiary account $\mathbf{1801_1}$, $\mathbf{1801_2}$, $\mathbf{1801_3}$ is coupled to a subsidiary settlement account $\mathbf{1802_1}$, $\mathbf{1802_2}$, $\mathbf{1802_3}$. An account holder may transfer funds in any amount from his nominated account through the virtual account **1601** to the subsidiary

settlement account **1802_1**, **1802_2**, **1802_3** within the subsidiary account **1801_1**, **1801_2**, **1801_3**. Transaction limits, may be imposed on any subsidiary settlement account **1802_1**, **1802_2**, **1802_3** just as a credit card account could have a credit limit, but which may also include other parameters of limitation such as frequency or time of use. Funds available through the virtual account **1601** may be converted to an intermediate value, which could be any common or agreed currency base in the foreign exchange or a non-currency-based numeric representation based on an arranged conversion factor, and transferred directly from the fund source to the specific subsidiary accounts in such amount or quantity as may correspond to the transferred fund in the intermediate value.

When transacting with a merchant **1607** via the subsidiary account **1801_1**, **1801_2**, **1801_3**, the subsidiary settlement account **1802_1**, **1802_2**, **1802_3** is debited with the transaction value, which is in turn credited to the merchant settlement account **1812**. Such transaction contemplates only instances where the merchant requires a specific or dedicated settlement account; otherwise, the transaction should draw funds directly from the nominated fund source through the virtual account **1601** and not from the subsidiary settlement account **1802_1**, **1802_2**, **1802_3**.

One advantage to the use of such subsidiary account **1801_1**, **1801_2**, **1801_3** may be created for a specific purpose. For instance, a transportation system **1807** (i.e. specific class of merchant **1607**) may require a micropayment system with a co-branded access card. A subsidiary account **1801_1** may be created with a subsidiary settlement account **1802_1** which is mapped to the settlement account of the transport system **1812**. A metro card co-branded with the transportation system may then be issued, the metro card being linked to the subsidiary account **1801_1**. This metro card is then used for entry and exit to the facilities of the transportation system **1807**, and every time it is used, the subsidiary settlement account **1802_1** is debited with the value corresponding to the fare for travel, which in turn is credited to the settlement account **1812** of the transportation system **1807**. When the value contained in the subsidiary settlement account **1802_1** is insufficient for a particular transaction, it may be replenished or topped up with credit from the nominated fund

source through the virtual account **1601**, provided that such is within the parameters of limitations imposed on the subsidiary account **1801_1**.

In the event that the metro card is used, for instance, in a transaction such as purchase of goods where there is no specific subsidiary settlement account **1802_1** from which the value of the transaction may be debited the system firstly determines the point of use from which the source of funds or credits is based and then draws funds to cover the transaction directly from the nominated fund source through the virtual account **1601**.

With reference to Fig 19, there is illustrated an example of how the automatic payment of commissions to the appropriate party is done through the settlement accounts. As shown is an individual A transferring the amount of $100 from his bank account **1904** through the virtual account **1601**, to his settlement account **1914**. Assuming one-to-one equivalency between the currency in use and the credit units, the value 100 will be debited from the bank account **1904** and credited to the settlement account **1914**.

If individual A transacts with merchant B for example in the amount of 50 credits, the amount will be debited from his settlement account **1914**. The transaction between may then trigger automatic payment of commissions, assuming that for such transaction, commissions are due to logistics provider (Account C) and supplier (Account D). As shown, 40 credits are credited to the settlement account of merchant B **1912** less the commissions for the parties to whom commission is due. In this example, the settlement account of logistics provider C **1916** is credited with 8 credits, while the settlement account of supplier D **1917** is credited with 2 credits, their respective commissions. Assuming further that merchant B decides to cash-in on his settlement credits, the amount of 40 credits which is the current value of his settlement account, shall be debited from said account **1912**, and credited in the amount of its monetary equivalent 40 dollars to his bank account **1918**. For purposes of accounting, it has been shown in Fig 19 that transactions in both the settlement and banking systems balance out.

It is to be understood that the above embodiments have been provided only by way of exemplification of this invention, and that further modifications and improvements thereto, as would be apparent to persons skilled in the relevant art, are deemed to fall within the broad scope and ambit of the present invention described herein.

CLAIMS

1. A mobile communication system for providing credit to a subscriber, said system including:

a host network operable to host a mobile handset of the subscriber, wherein the subscriber is a pre-paid subscriber of a home network, the mobile handset is internationally roaming in the host network outside the home network;

the mobile handset operable to pay a first value in local currency of the host network to a retailer's accounts; wherein the retailer is in the host network;

a retailer handset of the retailer operable to send a request for credit corresponding to the first value in order to recharge credit for the mobile handset from the home network;

a server, connected with the host network and the home network, operable to:

receive the request for credit corresponding to the first value from the retailer handset;

convert the first value to a second value in local currency of the home network wherein the conversion is performed on a basis of foreign exchange rate and standard retail price, the standard retail price includes the retailer's commission;

review credit in the retailer's account;

determine whether to use a credit provider contracted with the retailer based on the credit in the retailer's account;

wherein if the server determined not to use the credit provider, the server proceeds to debit the retailer's account with the first value, and if the server determined to use the credit provider, the system debits from the credit provider's account with amount of credit available for the retailer and credits to the retailer's account with the amount of credit available for the retailer, and the server proceeds to debit the retailer's account with the first value; and

credit to the subscriber's pre-paid account with the second value after debiting the first value; and

the home network operable to recharge the credit for the mobile handset based on the second value, and advise the mobile handset of approval of the request for credit.

2. The system of claim 1 wherein the server is included in a central settlement facility, the server being adapted to maintain a plurality of subscriber accounts and negotiate a provision of credit from the credit provider.

3. The system of claim 2 wherein the request for credit is sent to the central settlement facility in the local currency of the host network from which the subscriber makes the request.

4. The system of claim 2 or claim 3 wherein the central settlement facility is coupled to a foreign exchange trading service.

5. The system of any one of claims 2 to 4 wherein the request for credit is sent to the central settlement facility via at least one of the following: a web portal; ATM; POS; kiosk; SMS; MMS; WAP; On Device Portal (ODP); USSD command.

6. The system of any one of claims 2 to 5 wherein the central settlement facility contains a central clearing house.

7. The system of claim 2 wherein the request for credit includes providing a cash payment for the first value to a third party broker having an account with the central settlement facility.

8. The system of claim 7 wherein the system is configured to transfer credit from the credit provider's account to the subscriber's account.

9. The system of claim 7 wherein the system is configured to allow the third party broker to negotiate the request for credit with the credit provider to obtain a rate for the subscriber.

10. The system of claim 9 wherein the system is configured to credit the third party broker with a predetermined commission for brokering the provision of credit for the subscriber.

11. The system of claim 7 wherein the system is configured to credit the credit provider with a predetermined commission for a sale of credit to the subscriber.

12. The system of any one of claims 1 to 11 wherein the advice regarding approval of the request for credit is sent in takes at least one of the following forms: an email; SMS; MMS; IP and flash message via USSD; STK.

13. The system of claim 12 wherein the advice includes information related to an amount of credit obtained by the subscriber.

14. The system of any one of claims 2 to 13 wherein a portion of credit contained in the subscriber's account is exchanged for at least one of goods and services by at least one third party registered with the central settlement facility.

15. A method of providing a credit to a subscriber in a system, said method including the step of:

hosting a mobile handset of the subscriber in a host network, wherein the subscriber is a pre-paid subscriber of a home network, the mobile handset is internationally roaming in the host network outside the home network;

paying, by the mobile handset, a first value in local currency of the host network to a retailer's account, wherein the retailer is in the host network;

sending, by a retailer handset of the retailer, a request for credit corresponding to the first value in order to recharge credit for the mobile handset for the home network;

receiving, by a server, the request for credit corresponding to the first value from the retailer handset, wherein the server is connected with the host network and the home network;

converting, by the server, the first value to a second value in local currency of the home network wherein the conversion is performed on a basis of foreign

exchange rate and standard retail price, the standard retail price includes the retailer's commission;

reviewing, by the server, credit in the retailer's account;

determining by the server, whether to use a credit provider contracted with the retailer based on the credit in the retailer's account;

wherein if the server determines not to use the credit provider, the server proceeds to debit the retailer's account with the first value, and if the server determines to use the credit provider the system debits from the credit provider's account with amount of credit available for the retailer and credits to the retailer's account with the amount of credit available for the retailer, and the server proceeds to debit the retailer's account with the first value;

crediting, by the server, to the subscriber's pre-paid account with the second value after debiting with the first value;

recharging, by the home network, the credit for the mobile handset based on the second value; and

advising, by the home network, the mobile handset of approval of the request for credit.

16. The method of claim 15 wherein the server is included in a central settlement facility, the server being adapted to maintain a plurality of subscriber accounts and negotiate a provision of credit from the credit provider.

17. The method of claim 16 wherein the request for credit sent to the central settlement facility takes the form of at least one of the following: a request submitted by way of a web portal; ATM; POS; kiosk; SMS; MMS; WAP; On Device Portal (ODP); USSD command.

18. The method of claim 16 wherein the request for credit is sent to the central settlement facility in the local currency of the host network from which the subscriber makes the request.

19. The method of claim 16 wherein the request for credit includes providing a cash payment for the first value to a third party broker having an account with the central settlement facility.

20. The method of claim 19 further including transferring credit from the credit provider's account to the subscriber's account.

21. The method of any one of claims 16 to 20 further including a step of exchanging a portion of credit contained in the subscriber's account for at least one of goods and services provided by at least one third party registered with the central settlement facility.

22. The method of any one of claims 16 to 21 wherein the step of advising includes sending an electronic notification to the mobile handset.