METHOD AND APPLICATION FOR LOCATION-BASED SERVICES

BACKGROUND

[0001] The present invention relates to providing location based services. The services can include a tax refund service for purchase transactions by a user who may be eligible to use the service and that may be validated for the service.

[0002] Tax refund systems are offered in many countries for travellers. Providing tax free shopping can be attractive to visitors to a country and can help to promote tourism. However, traditionally, the administration for tax free shopping schemes has been paper-based with merchants issuing vouchers or cheques at a point of sale, and then customs verifying the export of the goods at a border. Although regulations vary from country to country, the traditional format for providing tax free shopping is for a merchant in a country to identify and verify that a customer is a visiting traveller entitled to a tax refund, and then to issue the voucher that includes details of the traveller and the purchased item and then for custom to verify at the point of exit from the country that an item being exported and the traveller correspond to the item and traveller identified on the voucher. The refund can then be made. Tax refund operators act with merchants and customs to facilitate the operation of this process and to manage the paperwork associated therewith.

[0003] However, such a process can be very labour and cost intensive. There are significant technical difficulties in ensuring that a tax refund system can operate efficiently, while at the same time being secure.

[0004] The present invention seeks to provide a technological solution to such problems.

SUMMARY

[0005] Aspects of the invention are defined in the claims.

[0006] An aspect of the invention provides a location-based service using a mobile communications device registered for the service. The method includes: receiving at a location, by at least one application on the mobile communications device, information for connecting the mobile communications device to a wireless network via a base station at the location; connecting the mobile communications device to the wireless network at the location; connecting the application via the wireless network

and the base station to a system providing the service for which the mobile communications device is registered.

[0007] An aspect of the invention provides an application including program code for providing the service.

[0008] A computer readable medium can carry the application.

[0009] An aspect of the invention provides a mobile communication device comprising the application.

[0010] Although various aspects of the invention are set out in the accompanying claims, other aspects of the invention include any combination of features from the described embodiments and/or the accompanying dependent claims with the features of the independent claims, and not solely the combinations explicitly set out in the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Embodiments are described, by way of example only, with reference to the accompany drawings.

[0012] Figure 1 is a schematic diagram of an example embodiment of a refund system according to an embodiment of the invention;

[0013] Figure 2 is a schematic system overview;

[0014] Figure 3 is a schematic block diagram representing functional elements of a mobile communications device;

[0015] Figures 4-7 are flow diagrams of example methods of operation.

DETAILED DESCRIPTION

[0016] An example embodiment of the invention seeks to provide simplicity of operation while providing flexibility of use. In example embodiments one or more devices, apparatus and systems coordinate processing of purchases and refunds using a mobile communications device that uniquely identifies a user, for example a traveller and enables communication with the user. The one or more devices apparatus and systems can be operated by merchants and/or Tax Refund Operators (TROs) and/or customs authorities. An example embodiment enables information relating to a user and to purchases made by the user to be held centrally and securely and to be accessed using the mobile communications device and one or more other devices.

[0017] As well as providing administration of refund operations, a TRO can provide education for a user and merchants throughout the process. Through the use of information technology systems, the TRO can ensure the integrity of the system.

[0018] Figure 1 illustrates an example method, apparatus and system for managing a refund process. In the example process shopping and receiving of a receipt (issuing 30) is separated from further processing (acquiring 32, authorisation 34 and payment 36).

[0019] As with credit and debit cards, there can be multiple providers of issuing services, and multiple acquirers of transactions and processing. For example there can be multiple TROs. A wide range of point of sale (POS) devices and in-store support for user shopping can be provided.

[0020] In an example embodiment, a merchant system can provide the issuing 30 of transactions using TRO provided POS devices and/or software. A TRO operated host system can carry out acquiring 32 of tax refund transactions. A validation system (for example a customs approval system) can carry out tax refund authorisation 34. The host system can carry out refund payment operations 36. An automated kiosk (otherwise termed a validation station or validation terminal) can be provided at a point of exit from a territory and can be used for various operations, including the automatic recognition of a mobile communications device. Refund payment can be handled by a refund desk (run by the TRO) or by the kiosks for immediate refunds in cash, or refunds can be provided using automated payments to bank and/or credit card accounts and/or using back-office processes by the TRO.

[0021] The determination of eligibility of a user can be made in store at a time of a purchase transaction as will be described later. However, subject to legal requirements in a given territory, the determination of eligibility and identity can be moved away from a point of sale to the point of exit from the territory.

[0022] An example embodiment can provide simplicity and flexibility of use as perceived by the users of the system, while also providing security and integrity of operation.

[0023] An example embodiment of the invention can employ one or more technologies to provide communication between a mobile communications device and other systems to support transactions.

[0024] One such technology is so-called Near Field Communications (NFC) technology. NFC technology is a short-range wireless communication technology that can enable the exchange of data between devices over about a short distance, for

example over a distance of about 0.1 metre. NFC technology is an extension of the proximity-card standard (contactless card, RFID) that can combine the interface of a smartcard and a reader into a single device. It is compatible with existing contactless infrastructure already in use for public transportation and payment. NFC is primarily aimed at usage in mobile telephones. Examples of mobile phones are already on the market that use NFC technology. NFC reading/writing devices that incorporate NFC interfaces are also available from various manufacturers. Other short range wireless technologies based on Radio Frequency IDs (RFIDs) can also be used in various embodiments, as can technologies such as Bluetooth.

[0025] In one example, when making a purchase transaction, a mobile communications device application (an MCD application) installed on a mobile communications device (e.g., a mobile telephone) of a user can interact with a merchant's point of sale (POS) terminal and/or with a merchant web site. Digital tax free shopping (TFS) transaction information can be transmitted to a Tax Refund Operator (TRO) and user information can be associated with the transmitted information. The user can optionally also pay for the goods using or via the mobile communications device. The user can then make further purchases using the MCD application, with further digital TFS transaction information being transmitted in the same manner. Validation and refund phases can be unified by recognising the user using the mobile communication device. For example, the validation and refund can take place automatically on the user mobile communication device approaching a customs kiosk that is NFC enabled, or when in the vicinity of a point of exit from a territory.

[0026] The MCD application can be installed before or during the first purchase, for example by being downloaded as part of a registration process. This MCD application can support the user during the whole tax refund process as well as provide other TRO services. Examples of such services can include issuing, validation, refund and tracking operations, and merchant and other tourist info maps, promotions, online proactive instructions, marketplace, direct currency conversion support, online services, loyalty programs, etc.

[0027] A wireless communication base station (for example a WiFi base station) can be used to interface with a mobile communications device of a user. For example, base stations can be installed at locations at which a user can be expected to use the service, and the application installed on the mobile communications device of a user can interact with the base station. The base stations can be provided by a TRO, or a

by a merchant or third party and can be connected, for example, via the Internet to a TRO host system. In one example, one or more standard Service Set Identifiers (SSIDs) could be provided for all base stations provided by or for a TRO service, whereby a mobile communications device can configured, for example using the aforementioned application, automatically to recognise such a base station as being provided for the service on detecting the SSID and automatically to connect to the base station when in range of the base station, for example using a predetermined password. In one example, the mobile communications device may not be arranged automatically to connect to a base station, even if the base station and password are known to the mobile communications device or an MCD application on the mobile communications device. For example, the application may require the user to input the SSID and the password, advantageously by entering the SSID and password using location specific information, for example proximity data captured by the mobile communications device using NFC technology or derived from an image of a one or two dimensional bar code (or QR code) captured by a camera of the mobile communications device.

[0028] For example, a base station can be provided at the premises of a merchant, and, in response to connection of a user's mobile communication device to the base station, a TRO system at the merchant or an application on the mobile communications device can be operable to transmit a message the TRO host system to retrieve information for use in connection with the provision of the service. Such information can include, for example, information about the user to be provided to a merchant system. Alternatively or in addition, messages can be sent to the user's mobile communication device for output to the user. The messages could be provided, for example, by a message exchange between the TRO host system and/or the merchant system and an application on the mobile communications device, or by means of SMS, MMS, or email messages or the like sent to the mobile communications device from the TRO host system and/or the merchant system. The messages sent to the user could include information about the services that can be provided, for example steps that need to be taken to take advantage of the service, special offers or the like, or direct support for taking advantage of the service (for example for a tax refund service, the generation of refund cheques or the like). The messages could used to alert the user to the possibility of using other services such as a dynamic currency conversion service.

[0029] Example embodiments of the invention use a mobile communications device. The mobile communications device can be, for example, a mobile phone, personal data assistant (PDA), portable media player, tablet computer, web-book, notebook or other portable computing device. In an example embodiment, the mobile communications device is used as an intelligent token for identifying the user at various stages during the tax refund process. The mobile communications device can be configured, for example using wireless technology and an MCD application, for communicating with other devices and apparatus such as a merchant POS terminal, a validation kiosk and/or a customs kiosk and TRO and/or customs systems and/or web-based systems. In such an example, by presenting the mobile communications device when making a purchase, a mobile communications device identifier can be provided to a merchant's system, for example a merchant's POS terminal or merchant's website using wireless technology and/or information relating to the transaction can be communicated to the mobile communications device using wireless technology. Respective applications, for example provided by the TRO, operating, respectively, on the mobile communication device and the merchant's systems can control the exchange of information between the mobile communication device and the merchant's systems, for example the merchant's POS terminal or website.

[0030] The determination of eligibility of a user to receive a service, for example a tax refund service, can be determined by an operator, e.g. a merchant, at the point of sale. This can be done, for example, by using the communication device identifier to determine whether the user has already been registered to use the service and/or by providing information to the merchant to enable the merchant to identify the user.

[0031] For example the POS terminal can be operable, via intermediate systems, to interrogate the TRO host system to determine whether the mobile communication device identifier has been associated with user identification information.

[0032] If the mobile communication device identifier has been associated with user identification, the TRO host system can be operable to either return information identifying the user (e.g., by transmitting passport information, photographic or other biometric information, or the like) for the operator to verify the identity of the user.

[0033] If the mobile communication device identifier has not been associated with user identification, the TRO host system can be operable to return an appropriate indication to this effect and the merchant system can be operable to prompt the operator to enter predetermined information identifying the user. The predetermined

information can, for example, be a passport number for the user's passport and an issuing country of the passport, an identity card number for the user's identity card and an issuing country of the identity card, a driver's licence number for the user's driver's licence and an issuing country of the driver's licence, by way of example. Information entered at the POS terminal can then be transmitted to the TRO host system for association with the mobile communication device identifier so that this can then be used as a means of identifying the user. A user record can be held by the TRO host system that includes the mobile communications identifier along with other information (for example one or more other tokens) that can be used to identify the user.

[0034] Alternatively, information may be provided from the mobile communications device in a secure and/or encrypted manner from the mobile communications device to identify the user. For example, applications on the mobile communications device and the merchant's terminal could be used to exchange verifiable information, for example using an encryption algorithm to verify that biometric information displayable on the mobile communications device (e.g., a photograph of the user displayable on the mobile communications device) is genuine and authenticated.

[0035] The merchant system, either directly, or via the user's mobile communication device, can then be operable to communicate purchase information associated with the mobile communications device identifier and/or another token related to the user for the creation of a computer record of the transactions. Such a transaction record can include an association between the mobile communications device identifier and/or the other token and a transaction identifier for a purchase transaction for one or more purchases. The mobile communications device identifier can then be used subsequently to access, either directly or via the user record, the record of the transaction(s) on exit from the territory to validate the refund on later purchases, for example for one or more subsequent trips.

[0036] A system and method of an example embodiment of a tax refund system for a territory will now be described with reference to Figures 1 and 2 in which one or more TROs affiliate merchants, and then provide tax refunds to users. Figure 1 is a schematic diagram illustrating the operation of an example system, and Figure 2 is a schematic block diagram of an example system configuration, where various functions elements are interconnected via a network 15 (e.g., the Internet).

[0037] The mobile communications device 40 can be set as a token to identify the user at stage 102. This can be done before or at a point of entry to the territory or at a

point of sale. It should be noted that one or more other tokens could be defined for a user. For example the user can choose a token to be used. For example the user could specify, for example via a website, or at a point of sale or other terminal, or in response to being asked by a merchant, a mobile communications device and one or more other tokens to be used. For example, a user can register his/her details and associate the mobile communications device identifier and one or more additional tokens by registering on a web site provided by a TRO. The mobile communications device identifier can be formed from one or more of a mobile telephone number for the mobile communications device 40, a SIM number for the mobile communications device 40, a NFC identifier for the mobile communications device, a unique identifier associated with the MCD application on the mobile communications device, etc.

[0038] As part of the registration process the user can also be asked to provide personal details such as name, contact information (e.g., address), nationality, passport number, gender, date of birth, home telephone numbers, bank account and/or credit card details, etc. The user can also be asked to specify a preferred currency to be used when overseas.

[0039] If the user has not already done so, on completion of the registration the user can then download the mobile communications device application mentioned earlier, with traveller's identification and preferences embedded in the application. Alternatively, if the application has already been downloaded, the traveller's identification and the user preferences can be updated in the application.

[0040] Such a downloaded application can provide a wide range of functions including, for example, functions that enable the location of WiFi zones at which information can be downloaded without roaming charges and information and processes to enable automatic connection to the network provided by the WiFi zones, location information of stores at which tax refundable purchases can be made, location information of validation stations at which tax refund cheques can be validated, a currency conversion calculator that can provide currency conversion from a local currency to a currency selected by the user at stored or downloadable currency conversion rates, a tax refund calculator that can calculate a tax refund available is a user makes a tax refund purchase, and so on.

[0041] The TRO can then provide information to the user about refund opportunities and processes. In addition, the user could be issued with a specific token (for example a visitor or TRO-issued card).

[0042] The registration process can be conducted, for example, prior to arrival in a territory, at a point of entry to the territory or after entry to the territory, for example at a point of sale. A suitable input station can include, for example, a computer processor and memory, one or more input/output interfaces in the form of one or more of a keypad, a keyboard, a touch sensitive screen, a card reader, a machine readable identifier reader, a document scanner, a voice-activated input, a display, a printer, a card writer, a speaker, and an NFC interface. The input station could also be provided with a finger print reading and/or camera technology for verifying biometric information held on a machine readable user identifier (e.g., an ID document such as a passport). In an example embodiment, the mobile communications device itself can be used as the input terminal on connection via a browser or other application, for example the MCD application downloaded to the mobile communications device.

[0043] The mobile communications device identifier can be held (stored) in memory (MEM) by a TRO acquiring host server system (host system) 20 with the user details. The host system 20 can be operated by a TRO and can comprise one or more server computers, each comprising one or more processors (CPU) and memory (MEM), located in a single place or in a distributed system. The efficiency of the system is enhanced where the mobile communications device identifier and the details of the user are forwarded to the host system 20 and are recorded in real time.

[0044] In one example, the user 12 can make purchases at 104, for example at a merchant, where the mobile communications device is used as a token.

[0045] When presented with the normal shop receipt, the user 12 can be asked if a tax refund is required (or the user can ask for a tax refund). If a refund is desired, a second, simple transaction can be created by entering a receipt identifier (e.g. a receipt number), the value of the goods purchased, and the mobile communications device identifier. In this example, information including two or three items (receipt identifier, value of purchase, and mobile communications device identifier) can then be electronically transmitted by a merchant system 14 to the host system 20. The merchant system 14 can comprise one or more computers, each comprising one or more processors (CPU) and memory (MEM), located in a single place or in a distributed system. The functionality can be integrated into a point of sale (POS) terminal where purchase details are directly retrieved from an electronic cash register (ECR) 44 and therefore there is no need to enter this information again. Alternatively, the information could be entered in a stand alone terminal such as a web based issuing application, a card payment terminal not linked to an ECR, other applications

or software not linked to an ECR. These alternatives could require re-entry of the relevant purchase details to allow an approval system of a customs officer to verify the purchases made. One or more point of sale devices 44, that can include one or more input/output interfaces in the form, for example, of one or more of a keypad, a keyboard, a touch sensitive screen, a card reader, a scanner, a voice-activated input, a display, a printer, a card writer, a speaker, and an NFC or other RFID interface 42.

[0046] A WiFi base station 54 can be provided at the premises of a merchant and, as shown in Figure 2, can be connected, for example, to the Internet for onward connection, for example to TRO host system 20. Alternatively, or in addition, the base station 54 could be connected directly or indirectly (e.g., via the Internet) to a merchant system 14. The base station can be allocated a predetermined SSID for the TRO, and an application on the mobile communications device 40 can be programmed automatically to recognise and connect to the base station when in range of the base station. However, different WiFi base stations for different merchants may be detected by a mobile communications device in a given location (for example respective base stations for respective shops in a shopping mall). Accordingly, in various example embodiments, the connection to a particular base station and/or merchant can be achieved under the control of a MCD application that detects a particular location using proximity information that can more accurately locate the position of the mobile communication device and enables automatic connection to an appropriate base station.

[0047] In one example, the entrance to a merchant premises could include a RFID detector zone (for example an RFID loop) that can be detected by the mobile communication device as the user enters the premises and can cause activation of a MCD application on the mobile communications device. The MCD application can be operable to read an SSID, password and merchant identifier from the RFID loop for connection of the mobile communications device to a wireless network formed by one or more base stations. The MCD application could be configured automatically to connect to the wireless network using the SSID and the password and/or to connect to the merchant systems using the merchant identifier. Alternatively, or for example on a first occasion of use, the MCD application could optionally be configured to provide a visual and/or audible prompt to the user before connection is effected to invite the user to confirm approval for the connection by, for example, touching a displayed or hardware button on the mobile communications device.

[0048] In one example, the user could be prompted, for example by a sign with an integrated NFC interface that stores the SSID and the password, to place the mobile communications device on the NFC interface, whereby a MCD application on the mobile communications device can be operable to read the SSID and password and the merchant identifier and to use these to connect to a wireless network formed by the one or more base stations and/or to the merchant system. As for the example described above, the MCD application could be configured automatically to connect to the wireless network or to prompt the user to confirm approval for the connection.

[0049] In an example suitable for a mobile communication device not provided with NFC or RFID technology, the user could be prompted, for example by a sign with readable one or two dimensional bar code, for example a so-called quickly readable (QR) code that encode the SSID and password and the merchant identifier to capture an image of the bar code or QR code using a camera of the mobile communications device and for the MCD application to decode the bar code or QR code and to use the SSID and password to connect to a wireless network formed by the one or more base stations and/or to connect to the merchant system. As for the examples described above, the MCD application could be configured automatically to connect to the wireless network or to prompt the user to confirm approval for the connection.

[0050] Various combinations of the examples described above can be provided, whereby the mobile communications device can be used to capture information locally to a merchant premises to enable a secure connection to a wireless communications network in the merchant premises. Using one of the mechanisms above to retrieve, for example, an SSID and/or password and/or merchant identifier and/or other information can also be used automatically to activate the MCD application on the mobile communications device to take the information to connect to the wireless network and/or to connect to the merchant system. After connection to the wireless network, the MCD application could be operable to download updates free of roaming charges via the wireless connection, for example to update current exchange rates from the currency local to the merchant to the preferred currency of the user provided at registration. The traveller could tweet or "facebook" his/her where-about right away too!

[0051] While shopping, the traveller could use his/her mobile phone to read RFID tags on goods to check on the price and, using the preferred currency and the current currency conversion rate downloaded to the MCD application, convert it into amount in preferred currency using the TRO's reference rate. The MCD application could

also calculate an applicable refund amount if the user wishes to make a tax refund request.

[0052] The mobile communications device, for example under the control of the MCD application on the mobile communications device, or a system, for example the merchant system 14 connected to the base station 54, can be operable, in response to connection of the mobile communications device to the base station, to send a message to the TRO host system 20 to retrieve information for use in connection with the provision of the service. Such information can include, for example, information about the user to be provided to a merchant system. Alternatively or in addition, messages can be sent to the user's mobile communication device for output to the user. The messages could be provided, for example, by a message exchange between the TRO host system and the MCD application on the mobile communications device, or by means of SMS, MMS, or email messages, or by a web-based exchange via a website provided by the TRO and/or the merchant. The messages sent to the user could include information about the services that can be provided, for example steps that need to be taken to take advantage of the service, special offers or the like, or direct support for taking advantage of the service (for example for a tax refund service, the generation of refund cheques or the like).

[0053] There may be only one TRO in a market. However, where there are multiple TROs in a market, there can be multiple acquiring system hosts 20. The relationship between a merchant and a TRO is that of merchant and acquirer (to use the credit/debit card example). Each TRO affiliates its own merchants and is responsible for the point of sale (POS) devices and integrated software that creates a tax refund transaction.

[0054] A transaction message can, for example, be transmitted 105 to the TRO host system 20 where further processing can be performed. The transaction message format between the POS and the host system 20 can take any appropriate form as this can be proprietary. In one example the transaction message transmitted between the merchant system 14 and the host system 20 contains the mobile communications device identifier, a receipt identifier (e.g. a receipt number), references to the goods purchased, a merchant identifier, a TRO identifier, a time and date stamp, and a security hash (which is used to prevent tampering). It may in addition contain information about a tour guide, promotional codes, or any other data that the TRO wishes to collect.

[0055] A separate host system 20 can be provided for each TRO, so that commercially sensitive information can be kept separate in that each TRO is only able to see transactions generated by its affiliated merchants. All tax refund transactions generated by affiliated merchants can be stored in the database of the host system 20. A transaction record as stored in memory of the host system 20 can include, for example, a unique transaction identifier for the transaction, a token identifier (e.g., mobile communications device identifier or a token identifier derived therefrom), a receipt identifier (e.g. a receipt number), references to the goods purchased, a merchant identifier and a time and date stamp. The host system 20 can allocate the unique transaction identifier (e.g., a unique transaction number) to the transaction in order that a unique number is available within the system to track that transaction during processing. The transaction identifier can be returned to the merchant system and can be printed on a purchase receipt given to a user, using clear text and/or a visible encoding such as a bar code or the like.

[0056] A message interface, or switch, 24, for example a web-service based interface using an industry standard (e.g. SOAP, WCF, XML over IP), can provide an interface for messages to be formatted and/or routed. For example transaction messages can include one or more of the transaction identifier (e.g. a transaction number), the token identifier (e.g., mobile communications device identifier or a token identifier derived therefrom), the receipt identifier (e.g. a receipt number), references to the goods purchased, the merchant identifier, the TRO identifier, the time and date stamp, and the security hash (which is used to prevent tampering). The message interface 24 may be a separate system, or combined with a validation system (for example a custom approval system) 26 according to a particular implementation.

[0057] In one example embodiment the message interface 24 could be implemented as a server system that comprises processing and storage capacity and is operable to act as a central repository for data to be accessed by the host system(s) 20 and the validation system (e.g., a customs approval system) 26 as well as providing for message formatting and forwarding. However, in another embodiment the data can be held in the TROs host systems and can be accessed via the message interface by the validation system 26.

[0058] The validation system 26 provides an authorisation system for authorising refunds, and can be run by a customs authority, or on its behalf by a third party. The validation system 26 is capable of approving or rejecting tax refund transactions automatically based on rules set in the system by customs. The validation system 26

can also be accessed manually by a customs officer from a customs service station 28.

[0059] It has been proposed to provide self-service validation stations (otherwise known as validation terminals or kiosks) 22 at exit points from a territory (for example airside at an airport) that are connected to the host system(s) 20, for example via a standardised web service or through the message interface 24. Such a validation station 22 can be configured to invite a user to present a personal identifier (e.g., an identity document such as a passport) to be read. Such a validation station 22 can be provided with one or more input interfaces in the form, for example, of one or more of a keypad, a keyboard, a touch sensitive screen, a card reader, a scanner, a voice-activated input and one or more output interfaces in the form, for example, of one or more of a display, a printer, a card writer, a speaker. An NFC interface 42 can be provided. The validation station 22 could also be provided with a finger print reading and/or camera technology for verifying biometric information held on a machine readable user identifier (e.g., an ID document such as a passport).

[0060] However, in order to be able to use such a validations kiosk as previously proposed, the user has to locate and use the kiosk.

[0061] Where a mobile communications device is registered with a host server for a tax refund service, automatic detection of the proximity of the mobile communication device to a point of exit from a territory can be used to cause an invitation to use the tax refund service can be presented to the user using the mobile communications device. In different examples, this can be achieved in different ways.

[0062] In one example, a MCD application on the mobile communications device 40 can be responsive to detecting that the mobile communication device is connected to a mobile network cell (represented by mobile communications aerial 52) that is located at or proximate to the exit point. The MCD application may be running as a foreground task on the mobile communications device, or may be configured to run as a background task. In such an example, the application can contain a file or other record of mobile network cells that correspond to exit points from a territory and can be responsive to recognising that the mobile network cell to which the mobile communications device is currently connected is a cell in the file to cause the display of a prompt to the user to make use of the tax refund service. This can involve, for example, displaying instructions as to the location of validation kiosks, or can involve the mobile communications device acting as the kiosk and communicating with the

validation system directly using, for example, SMS messaging, email or a web-based service.

[0063] In another example, the MCD application in the mobile communications device 40 can be responsive to recognising that the mobile network cell 52 to which the mobile communications device is currently connected is a cell in the file and can cause the sending of a message to the validation service 26 to cause the validation service 26 to return messages to be presented to the user regarding use of the validation service.

[0064] In another example, a mobile communications network 50 can be operable to recognise that a mobile communications device 40 currently connected to a mobile network cell 52 that is located at or proximate to the exit point is a mobile communications device registered for a tax refund service and can be configured to inform the host system 20 or the validation service 26 and to cause the host system 20 or the validations service to transmit a message to the mobile communication device for the presentation to the user of an invitation to use the tax refund service.

[0065] As an alternative to using the mobile network cell 52, or as an additional measure, the mobile communications device can respond to satellite-derived positioning information (e.g. GPS information) detected by a satellite location detector (e.g., a GPS unit) of the mobile communications device 40 as indicative that the mobile communications device 40 is proximate to the validation location.

[0066] As an alternative to using the mobile network cell and/or to satellite-derived positioning information, the mobile communications device can be responsive to location based wireless connection services (for example using WiFi, Bluetooth or alternative technologies) detected by the mobile communications device 40 as indicative that the mobile communications device is proximate to the validation point. For example, the mobile communications device 40 can be responsive to detecting a WiFi base station 54 having a particular network name and/or signature as being proximate to a point of exit. In one particular example, a WiFi hotspot operated by a TRO or customs service can be used. For example in Figure 2, a WiFi base station 54 is associated with a TRO refund system 56 at a TRO service desk. In such a case, the validation process can then be conducted using a WiFi connection to the mobile communications device.

[0067] As described above with respect to the base station 54 at a merchant's premises, the base station 54 associated with the TRO service desk or otherwise proximate to the point of exit, can be connected, for example, to the Internet for

onward connection, for example to the TRO host system 20. This base station 54 can also be allocated a predetermined SSID and password for the TRO, whereby an application on the mobile communications device 40 can readily be programmed automatically to recognise and connect to the base station when in range of the base station and to connect to the TRO host via the wireless connection.

[0068] Indeed, in a similar manner to that described above with respect to the use of the mobile communication device in association with a merchant's premises, various areas in an airport can be provided with WiFi network base stations in different locations, so that the connection of the mobile communications device to a particular base station can be indicative of the user being in a particular part of an airport, whereby this can be used to verify that the user is, for example, land side or airside of customs and immigration/emigration at the airport. As described in association with merchant premises, in various example embodiments, the connection to a particular base station can be achieved under the control of a MCD application that detects a particular location using proximity information that can locate the position of the mobile communication device and can enable automatic connection to an appropriate base station.

[0069] In one example, moving from landside to airside in an airport could include a RFID detector zone (for example an RFID loop) that can be detected by the mobile communication device as the user passes airside and can cause activation of a MCD application on the mobile communications device. The MCD application can be operable to read an SSID and password from the RFID loop for connection of the mobile communications device to a wireless network airside formed by one or more base stations. The MCD application could be configured automatically to connect to the wireless network. Alternatively, or for example on a first occasion of use, the MCD application could optionally be configured to provide a visual and/or audible prompt to the user before connection is effected to invite the user to confirm approval for the connection by, for example, touching a displayed or hardware button on the mobile communications device.

[0070] In one example, the user could be prompted, for example by a sign with an integrated NFC interface that stores the SSID and the password, to place the mobile communications device on the NFC interface, whereby a MCD application on the mobile communications device can be operable to read the SSID and the password and to use these to connect to a wireless network formed by the one or more base stations. As for the example described above, the MCD application could be

configured automatically to connect to the wireless network or to prompt the user to confirm approval for the connection.

[0071] In an example suitable for a mobile communication device not provided with NFC or RFID technology, the user could be prompted, for example by a sign with visual code such as readable bar code or a so-called QR code that encode the SSID and password to capture an image of the bar code or QR code using a camera of the mobile communications device and for the MCD application to decode the bar code or QR code and to use the SSID and password to connect to a wireless network formed by the one or more base stations. As for the examples described above, the MCD application could be configured automatically to connect to the wireless network or to prompt the user to confirm approval for the connection.

[0072] Various combinations of the examples described above can be provided, whereby the mobile communications device can be used to capture information locally to a wireless network to enable a secure connection to a wireless communications network in in an airport using information that is only available at or proximate to an appropriate validation point to confirm that the user is at or proximate to the validation point. The MCD application can be programmed with geotagging information to automatically recognise the connection of the mobile communications device to a given base station in a given location as confirmation that the location of the mobile communications device is at or proximate to an approved validation location. Alternatively, or in addition, in the various examples given above, the MCD could be operable to read identification information that the location of the mobile communications device is at or proximate to an approved validation location.

[0073] The MCD application on the mobile communications device 40 can be responsive to the determination that it is proximate to the validation point, and/or to receipt of a message in response to such a determination to connect to a validation service for validation of transactions for tax refunds. The MCD application can be configured to effect the connection automatically, or an invitation to the user to use the service and/or to confirm acceptance of the service can be provided. The presentation can, for example, be by means of a visual and/or audible message.

[0074] The invitation could be a simple invitation to use a validation station 22 as mentioned earlier, and may not need an active response from the user.

[0075] In one example, the mobile communications device 40 can be used to replace at least part of the functionality of a validation station 22.

[0076] For example, the MCD application on the mobile communications device can be operable interact with a validation service 26 to present one or more transactions for selection by the user to be processed by the service, and can be responsive to user input to send a message to the validation service 26 and/or the host system 20 that identifies any transaction selected by the user to be processed by the service.

[0077] According to local requirements, the user may be required to provide further identification. This could be done using biometric sensors of the mobile communications device 40, if present, such as a fingerprint read by a fingerprint reader, an image taken using a camera of the mobile communications device, and then processed by the mobile communications device and/or transmitted to the validation service for comparison to stored records.

[0078] Where the mobile communications device is not provided with such biometric sensors, or where a local regulation requires separate processes, in one example a validation station 22 can be configured to determine the eligibility of a user for a tax refund by machine reading a personal identifier (e. g, passport, identity card, driver's licence, etc.) of the user. The validation station 22 can be operable to read the information from the personal identifier and to determine eligibility by checking the information against an internal or external database that contains information about domestic/non-eligible users. In this case, the user can be deemed eligible if his/her nationality or status is not on the list (negative approval). Alternatively, or in addition, the validation station 22 can be operable to determine eligibility by checking the information against an internal or external database that contains information about non-domestic/eligible users. In this case, the user can be deemed eligible if his/her nationality or status is on the list (positive approval).

[0079] As mentioned above, the validation station 22 could also be provided with a fingerprint scanner and/or a camera and can be used to verify the identity of a user using biometric information held on the machine readable identifier (e.g., an identity document such as a passport). A discussion about such biometric information is to be found, for example, at the following Internet link:
http://www.highprogrammer.com/alan/numbers/mrp.html.

[0080] Where eligibility of a user is determined, the mobile communications device 40 and/or a validation station can be operable to send one or more validation request messages to the validation system 26, for example via the message interface 24. In response to receipt of the token, the validation system 26 will return all transactions that are suitable for export validation.

[0081] In one example, the mobile communications device 40 can be configured to prompt a user to initiate validation and then to pass a validation request message to the validation system 26 (e.g., a custom approval system), for example via the message interface 24, to request approval based on both the eligibility of the user for which the mobile communications identifier is registered and transactions recorded in association with the user and/or mobile communications identifier.

[0082] The validation approval system 26 can be operable to respond to a validation request message to retrieve all the transactions for the user (for example all transactions already associated with the token) from its own database and/or from the host system 20 via the message interface 24, and can apply rules set to determine approval or rejection as will be described later.

[0083] In one example, the validation system 26 could be set to either automatically approve one or more of the transactions based on rules that have been set, ("green channel") or automatically to reject a transaction ("red channel"), again based on rules set within the validation system 26.

[0084] When the validation system 26 makes a decision about a transaction (approve/reject), an authorisation message (validation request response message) is automatically routed through the message interface 24 back to the appropriate host system 20. Such a response could be in the form of a web service response and can hold the electronically approved transactions (including an electronic customs stamp). The host system 20 updates an existing tax refund transaction record for the transaction with the authorisation message (approve, reject, change).

[0085] In an example embodiment the validation system 26 does not act as the payment authorisation host, but rather the host system 20 is the system of record.

[0086] Each host system 20 formats and transmits a refund message to the requestor (e.g., validation station 22 or a mobile communications device 40) indicating which transactions have been approved for "green channel" automatic payment. A TRO that issued a token can be given first position on the validation station, and that TROs transactions are displayed.

[0087] If one or more of the retrieved transactions have approved codes, the user could be given "green channel" service for the approved transactions and could be asked how a refund is to be paid. By "green channel" service is meant that the refund is approved without further action being needed. If any of the transactions are not approved, the user is given "red channel" service for at least those transactions (possible for all transactions) and is asked to present himself to a customs officer for

further processing. By "red channel" service is meant that for at least those transactions (possible for all transactions) the user has to present himself to a customs officer for further processing to obtain approval.

[0088] If the choice of refund is to a payment card (e.g., a credit card), the refund can be made automatically to a registered payment card. If no payment card is registered, the validation station 22 or mobile communications device can be configured to specify to where the refund should be made.

[0089] If the user requests a cash equivalent refund and the user has used a mobile communications device 40 or other form of token that can store a cash amount, then the refund amount can be credited to the token.

[0090] In the event that red channel processing is indicated, then the validation station 22 or the mobile communications device 40 is operable to prompt the user to proceed to a customs officer, who can then use the mobile communications device identifier to begin processing. A customs official can be provided with an approval station 28 that is linked to or forms part of the validation system 26. However, in other examples, the approval stations can be separate from and/or remote from the validation system 26 and can communicate therewith, for example via the message interface 24.

[0091] In response to user selection of one or more transactions for validation processing, the mobile communications device can be operable to transmit the validation request message to the validation system 26, which can then receive in response a message identifying approved and rejected transactions.

[0092] The customs officer can then approve or reject each transaction, or change (reduce) the value amount. The customs officer can enter the result of his/her decisions using input device(s) of the approval station 28. The result of his/her decisions is communicated by the validation system 26 through the message interface 24 to the appropriate host system 20. The host system 20 now contains tax refund transactions with approval codes (approved, rejected, changed value).

[0093] The validation system 26 can be configured to operate in one or both of two modes of operation. In one mode of operation, information for transactions is stored on the respective host systems 20. In the first mode of operation, the validation system 26 is operable to retrieve transaction information from the respective host system 20 for validating refunds. The result of the authorisations is communicated back through the message interface 24 to the appropriate host system 20. The host system 20 now contains tax refund transactions with approval codes (approved,

rejected, changed value). In the second mode of operation, the validation system 26 retains a copy of each transaction within its own database, associated not only with the relevant token (mobile communications device) identifier, but also with a host system identifier. In this case the validation system 26 also passes the transaction and approval code back to the host system 20 concerned. The difference between the two modes is that in the second mode, the customs approval system retains a copy of all data from all host systems 20.

[0094] The mobile communications device 40 can be operable to employ messaging using any appropriate technology, such as SMS messaging, email or a web-based service. Appropriate security protocols can be used for communicating information using existing software, equipment, and processes for handling secure financial transactions as known for electronic payments. A standards-based message format can thus be used for transmitting refund transactions. The use of standard message format can allow for multiple TRO providers, while ensuring that customs and tax authorities only have to deal with a single system for approvals.

[0095] By recording transactions on the host system 20 and/or on a validation system 26 using at least a transaction identifier and a value of purchase, and then associating user detail records linked to a mobile communications device identifier in the host system 20, a validation system 26 can be operable to retrieve refund transactions from the host system 20 of a TRO based on the mobile communications device identifier, to indicate a "yes/no" response to a request for permission to refund, and to transmit that result to the host system 20.

[0096] In the illustrated example communication between the host system(s) 20 and the validation system 26 can be effected via a message interface 24. The message interface 24 can provide a dedicated network between the validation system 26 and the host systems 20 for one or more TROs. The message interface can be implemented using web services or other online or offline connection arrangements.

[0097] In an example embodiment, automated validation stations 22 can be provided that allow automatic pre-screening of refund transactions to generate a "red channel/green channel" response without human intervention. The automatic pre-screening process could be effected using, for example a validation station 22 at an exit point from the territory.

[0098] The validation station 22, or an approval system (e.g. the validation system 26) in communication with the validation station 22, could be provided with rules defining a "red channel" requirement, for example for high-value purchases and/or for

purchases of a particular type. The "red channel" behaviour could be to require a user to present a token, shopping receipt, passport, and the goods purchased to a Customs Officer at a customs station 16 for approval.

[0099] The validation station 22, or the approval system 26 in communication with the validation station, could be provided with rules defining a "green channel" situation providing automatic approval according to certain criteria such as: country of origin of the traveller, item value, transaction value, value of all transactions, quantity of goods, merchant, etc., and logical combination of such criteria. Also white and black lists for countries or origin, retailers, travellers and so on can be used.

[00100] In an example embodiment, the MCD application on the mobile communications device is operable to provide functions of the validation stations (kiosks) 22 by providing an interface for the user to obtain automatic pre-screening of refund transactions to generate a "red channel/green channel" response without human intervention. The automatic pre-screening process could be effective when it is determined that the mobile communications device is in the proximity of the exit point from the territory.

[00101] The mobile communications device application, or a validation system (e.g. a customs approval system) 26 in communication with the mobile communications device 40, could be provided with rules defining a "red channel" requirement, for example for high-value purchases and/or for purchases of a particular type. The "red channel" behaviour could be to require a user to present a token, shopping receipt, passport, and the goods purchased to a customs officer at a customs station 16 for approval.

[00102] The mobile communications device application, or a validation system (e.g. a customs approval system) 26 in communication with the mobile communications device, could be provided with rules defining a "green channel" situation providing automatic approval according to certain criteria such as: country of origin of the traveller, item value, transaction value, value of all transactions, quantity of goods, merchant, etc., and logical combination of such criteria. Also white and black lists for countries or origin, retailers, travellers and so on can be used.

[00103] Figure 2 also illustrates a reservation system 58 and an immigration system 60. The reservation system 58 can be a travel reservation system, for example an airline booking system. Such airline booking systems typically comprise large networked computer systems including multiple processors (CPU) and memories/storage systems (MEM). A travel reservation system 58 is able to monitor

the status of the journey of a traveller, and to update the status of the traveller at various stages during the journey. For example, in a first stage, the reservation system will recognise that the user has made a reservation for a journey and it will include information identifying the user. Thus, within the reservation system there will be a travel record that identifies particular journeys (e.g., flights) to be taken by the user, and information identifying the user. The information identifying the user can either be held directly in the travel record, or it can involve a link to a user record. In an example system, the reservation system 58 is configured to also store the status of the user with regard to the use of a service, for example a tax refund service. Information about the registration of the tax refund service can be included, for example, in a field of the actual travel reservation record, or could be held in a field of separate user records linked to the travel reservation record. For example, the registration for a tax refund service could be held as part of a loyalty program record for the airline. It is also envisaged that the traveller records within the host system 20 can include a link to a travel reservation within the travel reservation system 58.

[00104] By interlinking the travel reservation system 58 and the host system 20 records (i.e., by including appropriate links in fields in respective records in the travel reservation system 58 and the host system 20), the user travel status can be used automatically to cause the generation of messages to be send to the user and/or to automatically determine when a user has actually departed to provide final authorisation for a tax refund to be made.

[00105] The same functionality can be provided, for example, using an immigration system 60 that comprises one or more processors and appropriate memory, and includes records relating to individual travellers that enter and leave a country. This immigration system 60 could be integrated with the travel reservation system 58 and/or the tax refund host system 20 to enable the automatic generation of messages to be sent to a user and/or the automatic authorisation of a tax refund when the user departs from the territory in question.

[00106] In the above description of Figure 2, the reservation system 58 is linked to the host system 20 via the network 15. However, it is to be noted that the reservation system 58 can also be functionally linked to the validation system 26 in the same manner as described above. In this regard, it will be noted that dotted line links are shown between the reservation system 58 and the message interface 24 in Figure 2.

[00107] Figure 3 is a schematic block diagram illustrating functional components of a mobile communications device, for example a mobile telephone such as a smart phone.

[00108] As illustrated in Figure 3, the mobile communications device 40 includes one or more processors 70 and memory 72 for the storage of programs and data. Various inputs and outputs are provided including audio inputs and outputs 76 (for example, a speaker and microphone), an imaging device (e.g. a camera) 77, a vibration mechanism 78 for providing vibratory alerts, a touch sensor mechanism 80 for user input, the touch sensor being arranged to overlie the display 74, and one or more keys 82. Various communication interfaces can be provided including a radio module 84 for radio communication with a cellular network, a NFC module 86 for interacting with near field communications technology, a WiFi module 88 for communication with WiFi base stations, a Bluetooth module 90 for communication using Bluetooth technology and a GPS module 92 for position location of the mobile communications device. It will be appreciated that the interaction of the various functional components shown in Figure 3 is merely illustrated in a schematic manner, and that any appropriate conventional configuration of individual components is possible within the mobile communications device. In example embodiments the memory 72 can hold a downloadable MCD application 75 that is operable to control the operation of processes for carrying out operations as described herein.

[00109] Figures 4-7 provide a flow diagram giving an overview of example operations of a system as illustrated in Figures 1-3.

[00110] It is assumed in the flow diagrams that the user has already registered for the service as discussed earlier, has recorded the mobile communications device identifier as a token and has downloaded the MCD application to the mobile communications device.

[00111] Figure 4 illustrates example of processes that can be performed at a point of sale where a user makes a purchase. A merchant operator may use as a merchant terminal, a POS terminal that interfaces with a merchant website, or a mobile communications device such as a smart phone or a tablet computer, or the like, for conducting transactions with a user. In this example the user can using his or her mobile communications device to interface with the merchant systems including the website to conduct the purpose transaction, and, where appropriate, to additionally cause the issue of a tax free cheque, either by the merchant system or the user's mobile communication device.

[00112] As described with reference to Figure 2, a wireless network can be provided at a merchant's premises, for example via one or more WiFi base stations 54 (Figure 2) and, as shown in Figure 2, can be connected, for example, to the Internet for onward connection, for example to TRO host system 20 and/or directly or indirectly (e.g., via the Internet) to a merchant system 14.

[00113] At step 412, a MCD application on the mobile communications device can be operable to establish a link with the wireless network at a merchant's premises, for example through one of the WiFi base stations. A secure connection can be established , for example, using one of the techniques described with reference to Figure 2. In one example the entrance to a merchant premises could include a RFID detector zone (for example an RFID loop) that can be detected by the mobile communication device as the user enters the premises and can cause activation of a MCD application on the mobile communications device. The MCD application can be operable to read an SSID and password from the RFID loop for connection of the mobile communications device to a wireless network formed by one or more base stations. In another example the user could be prompted, for example by a sign with an integrated NFC interface that stores the SSID and the password, to place the mobile communications device on the NFC interface, whereby a MCD application on the mobile communications device can be operable to read the SSID and the password and to use these to connect to a wireless network formed by the one or more base stations. In a further example suitable for a mobile communication device not provided with NFC or RFID technology, the user could be prompted, for example by a sign with readable bar code or a so-called QR code that encode the SSID and password to capture an image of the bar code or QR code using a camera of the mobile communications device and for the MCD application to decode the bar code or QR code and to use the SSID and password to connect to a wireless network formed by the one or more base stations. The MCD application could be configured automatically to connect to the wireless network or alternatively to prompt the user to confirm approval for the connection. Combinations of the examples described above can be provided, whereby the mobile communications device can be used to capture information locally to a merchant premises to enable a secure connection to a wireless communications network in the merchant premises.

[00114] At 414, the MCD application, which can be supplied by the TRO can be operable to establish a secure connection to a merchant application on the merchant systems, for example on a merchant terminal via the wireless network. The merchant

application can be supplied by the TRO, or can include a software interface for connection to a TRO host. The MCD application can also be operable to connect to the TRO host.

[00115] At 416, while shopping, the traveller can use his/her mobile phone to support user selection of goods, for example by reading RFID tags on goods to check on the price and, using the preferred currency and the current currency conversion rate downloaded to the MCD application, converting it into amount in preferred currency using the TRO's reference rate. The MCD application could also calculate an applicable refund amount if the user wishes to make a tax refund request.

[00116] At 418, the merchant can use the merchant terminal to conduct a purchase transaction for the user. The details of the purchase can be captured by the merchant system using any conventional technique, for example by the merchant scanning a bar code and the merchant system retrieving details of the purchase from storage in the merchant system associated with the bar code, or by entry of the goods using, for example a web-based product selection page. Indeed, in an example implementation, the selection of the product details could be effected using a website. The merchant can use the merchant terminal for initiating or confirming payment for the goods. If payment is effected by cash or cheque, the merchant can record this on the payment terminal. Payment by credit card can be made using a conventional payment terminal associated with the merchant terminal. Alternatively, the merchant application on the merchant terminal can be operable to interface with the MCD application on the mobile communication device to pass details of the payment to be effected. In one example the MCD application can then be operable to prompt the user to effect the payment, for example as a web-based payment transaction via the merchant website using the mobile communication device. The user could, for example, use stored credit card information to perform payment with a preferred currency recoded during the registration process or at some subsequent time. The payment terminal will retrieve latest exchange rate and converted amount in preferred currency for payment authorization. The merchant application on the merchant terminal can be operable to monitor the merchant website for successful completion of the payment transaction to record completion of the payment transaction. During the payment transaction, the MCD application and the merchant application can communicate via the wireless connection (e.g., the WiFi connection).

[00117] At 420, the merchant terminal application or the MCD application can prompt the user to indicate whether a tax refund transaction is also required.

[00118] If the user selects a tax refund transaction using the mobile communications device, then at 422, the MCD application can operable to provide information to the merchant for establishing eligibility of the user to receive a tax refund service. The MCD application can contain the information identifying the user and can include a user identifier that is recorded on TRO host. The MCD application can, for example include securely stored information for identifying the user that can include, for example a passport number and/or biometric information (for example) a photograph, for identifying the user. In one example this information could be displayed on the mobile communications device and/or on the merchant terminal along with verification information, for example a security code that is processed by the merchant application as well as the MCD application to confirm authenticity. On a first occasion of use, the merchant could be requested to additionally verify that the passport number and photograph correspond to a passport number and photograph on a passport or identity document. After verification on this first occasion, the passport number and photograph on the mobile communications device could be identified as verified, whereby on future occasions of use this information could be used instead of a passport to confirm the identity of the carrier of the mobile communications device.

[00119] Instead of having the information for identifying the user stored on the mobile communications device, this can be held solely in user records in the TRO host system 20 and can be supplied to the merchant terminal from the host system 20. If, the user is eligible to receive the service, then the merchant application on the merchant terminal and/or the MCD application on the mobile communications device can be operable to transmit a transaction message to the host system 20. The transaction message can include a receipt identifier (e.g. a receipt number), the value of the goods purchased, and the mobile communications device identifier. Further information can also be included in the message, for example details of the goods purchased.

[00120] The host system 20 can be operable to allocate a transaction identifier (e.g. a transaction number or string) the transaction and creates a transaction record including the transaction identifier, the receipt identifier, the value of purchase, and the mobile communications device identifier). Further information can also be included in the transaction record, for example details of the goods purchased.

[00121] In other words, an example transaction record entry held at the host system can include the following fields, some or all of which may be populated in response to the above described steps:

Transaction identifier;
Receipt identifier;
Value of purchase;
Token identifier;
Registered flag;
Details of Goods;
Details of traveller;
A payment target.

[00122] At 426 the host system 20 can further be configured to return a transaction response message that includes the transaction identifier that can be printed on the purchase receipt printed by the merchant system 14 or provided in electronic form to the mobile communications device via the wireless connection. The process then ends at 428.

[00123] Figure 5 is a flow diagram illustrating an example of operation of the system described with reference to Figures 1-3 when a user approaches an exit point from a territory.

[00124] In an example embodiment, the system is automatically operable to determine 512 that the mobile communications device is in the vicinity of a border crossing or a customs validation point. This automatic determination of the location of the mobile communications device can be achieved in various ways as described earlier.

[00125] In one example, the interaction of the mobile communications device 40 and the cellular telephone network to which the mobile communications device is connected can be used to determine the location of the mobile communications device 40. Thus, for example, either the mobile network 50 or the mobile communications device 40 can be operable to determine that the mobile communications device 40 is in a mobile communication cell that is associated with the border crossing or customs validation point. This is represented in Figure 2 by the mobile network antenna 52. This determination can be made by the mobile network comparing the identity of the mobile communications device to a record, held in memory (MEM) in the mobile communications network system 50, that indicates that the mobile communications device 40 is registered with the tax refund service. The mobile communications network system 50 could then be operable to send a message to the validation system 26 (or the host system 20), and the recipient can then be configured to send 514 an invitation message to the mobile communications device 40 inviting the user to take advantage of the tax refund service. As an

alternative to the mobile network system 50 recognising the presence of the mobile communications device and then communicating with the validation system 26 or the host system 20, the MCD application on the mobile communications device 40 can itself recognise the identity of the mobile communications network cell as being a cell in the vicinity of a border crossing or customs validation point (for example, by comparison of the cell identity with a list of cell identities held as data for an application on the mobile communications device 40) as being associated with a border crossing or customs validation point. The mobile communications device 40 can then be operable, either to communicate with the validation system 26 or the host system 20, or merely directly to provide a message to the user inviting the user to take advantage of the tax refund service.

[00126] The invitation can take the form of merely a query inviting the user to respond, or the invitation can take the form of more detailed instructions as to the steps to be taken in order to obtain a tax refund. This can include, for example, information regarding the location of a validation station within the border crossing or customs validation point, the location of a tax refund operator service desk, the location of a customs desk, etc.

[00127] The invitation message may not necessarily require a response from the user, particularly if the message provides instructions of the type just described. However, in the event that the invitation message does require a response, and a response is received at 516 by the originator (i.e. the validation system 26 or host system 20), then if, at 518 the response is that the user declines a service, then the process stops at 520.

[00128] Alternatively, if 518 the user requests to continue with the tax refund service, then at step 522, the validation process can proceed as described with reference to Figure 6.

[00129] Figure 6 illustrates an example of operation to provide validation of purchases where the mobile communications device connects via a wireless communications network to a validation service.

[00130] In step 612, the mobile communications device can be operable to connect to a wireless communications network via, for example, a WiFi base station. As described earlier, the connection of a mobile communications device to a WiFi network base station in a particular part of an airport can provide one manner for verifying that the user is at a validation location. In an example embodiment the connection to a particular base station can be achieved under the control of the MCD

application by detecting a particular location using proximity information that can locate the position of the mobile communication device and can enable automatic connection to the base station. As described earlier, this can be achieved by the mobile communications device detecting an RFID detector zone that causes activation of a MCD application on the mobile communications device. The MCD application can be operable to read an SSID and password from the RFID loop for connection of the mobile communications device to a wireless network airside formed by one or more base stations. The user could be prompted, for example by a sign with an integrated NFC interface that stores the SSID and the password, to place the mobile communications device on the NFC interface, whereby a MCD application on the mobile communications device can be operable to read the SSID and the password and to use these to connect to a wireless network formed by a base station. The user could be prompted, for example by a sign with readable bar code or a so-called QR code that encode the SSID and password to capture an image of the bar code or QR code using a camera of the mobile communications device and for the MCD application to decode the bar code or QR code and to use the SSID and password to connect to a wireless network formed by the one or more base stations. The MCD application could be configured automatically to connect to the wireless network or to prompt the user to confirm approval for the connection. Various combinations of these examples can be provided, whereby the mobile communications device can be used to capture information locally to a wireless network to enable a secure connection to a wireless communications network in in an airport using information that is only available at or proximate to an appropriate validation point to confirm that the user is at or proximate to the validation point. The connection of the mobile communications device to a given base station in a given location can, in itself confirm the location of the mobile communications device as being at or proximate to an approved validation location.

[00131] At 614 the MCD application can then be operable to connect to a validation service using information held in the MCD application and/or read along with the SSID and password for the base station.

[00132] At 616 the validation system 26 can be operable to retrieve purchase transactions using the mobile communications device identifier from the place at which the transaction records are stored (for example, in the host system 20 or the message interface 24) and can apply rules set to determine approval or rejection as described earlier. In other words, the validation system 26 can be set to either

automatically approve one or more of the transactions based on rules that have been set, ("green channel") or automatically to reject a transaction ("red channel"), again based on rules set within the validation system 26 as described earlier. In the example shown in Figure 6, the retrieved purchase information is sent to the mobile communications device and can be displayed to the user with refund status.

[00133] At 618, the user can optionally select the purchases for validation using the application on the mobile communications device 40 and the selections can be sent from the mobile communications device 40 to the validation system 26.

[00134] At 620 the validation system 26 can be set to either automatically approve one or more of the transactions based on rules that have been set, ("green channel") or automatically to reject a transaction ("red channel"), again based on rules set within the validation system 26 as described earlier.

[00135] At 622, the status of the purchases can be returned to mobile communications device for display to the user with the refund status.

[00136] The steps 618-622 can be repeated as required by the user until confirms at 624 that the user wishes to proceed to process the refunds.

[00137] If, at 624, the user confirms that the user wishes to proceed to process the refunds, if all of the purchases are green channel status, then the refund can be processed at 626 without further actions from the user. Alternatively, if at least some of the purchases have a red channel status, then the user can be provided on the MCD with a message to indicate the steps to be taken.

[00138] Figure 7 illustrates operations that can be formed on a mobile communications device as part of the process described with reference to Figure 6.

[00139] For example, at 712, the mobile communications device would receive the invitation message referred to earlier. In the present example shown in Figure 7, it is assumed that the invitation message invites the user to respond to indicate whether the user wishes to use the tax refund system or not. At 714, the mobile communications device is responsive to user input at the mobile communications device. If, at 716, the user declines to use the tax refund service, then at 718 the process stops.

[00140] Alternatively, if it is assumed that the user response at 714 is to confirm 716 use of the tax refund service, then at 720 the mobile communications device will receive the status message referred to earlier with regard to Figure 6. At 722, the user can be invited to enter a selection of one or more of the purchases to be processed for tax refund. In other words, rather than provide tax refund processing

for all purchases, the user may select one or more of the purchases. In this regard, the mobile communications device can be operable in response to the status message to indicate all of the purchase transactions which were centrally recorded and retrieved from the central storage to the user, to enable the user to make a selection of one or more of those transactions. At 724, the response from the mobile communications device is sent to the validation system 26.

[00141] The conditions that can lead to automatic approval being or not being given can depend on predefined rules that can vary according to various legal and regulatory requirements.

[00142] For example, a typical requirement is that the purchaser of the goods is an eligible person who also exports the goods. Accordingly, in the situation that eligibility is not verified a the time of purchase, for example as a result of the user not having registered at that time, an embodiment of the invention enables this to be identified from the transaction record held in the system. In such a case, the system can be operable to indicate red channel processing (i.e. non-automatic processing for the user). In the present example the verification of eligibility and/or registration at the time of a transaction can be identified from the status of the "Registered" flag in a transaction record. As also explained above, optionally according to local requirements, the "Registered" flag for a transaction can be reset if, for example, it is determined subsequently to the time of purchase that registration is incomplete.

[00143] Although in the present example a "Registered" flag is used as a means of tracking verification of eligibility, it will be appreciated that in other examples the tracking of eligibility can be achieved by date stamping records and comparing timings of the recording of eligibility verses the time of purchase transactions.

[00144] Other factors can affect the availability of automatic approval such as the value of goods purchased, the types of transactions, a pattern of transactions, the nationality of a user, etc. Also, non-automatic processing can be required on a statistical basis as a part of a sampling process.

[00145] Accordingly non-automatic processing (red channel processing) can be determined at when locally determined requirements for automatic processing are determined not to have been met and/or a statistical sample processing is required. Accordingly, an example system provides for increased flexibility of operation while still providing secure and verifiable operation.

[00146] As mentioned above, rules can be provided for determining approval or rejection (green or red channel status). Such rules can be implemented, for example,

by providing scoring for different parameters, whereby the validation system 26 or the mobile communications device 40 can use the scoring to determine whether a resultant score fits within a range for a green channel response or a red channel response. For example, different scores could be allocated to travellers based on their home country and different scores could be allocated to different classes of goods and/or different amounts for purchases. Such scores could be stored in the validation system 26 and/or in storage for an application running on the mobile communications device 40. The scores could be stored, for example, in one or more look-up tables, or in any other appropriate manner, the look up tables being accessed by codes associated with the various parameters. The look up tables could include a plurality of entries, one for each parameter, with a first field identifying the parameter (for example a code or string representative of the parameter, and a second field containing a score associated therewith.

[00147] Program code operating on one or more processors of the validation system 26 or the mobile communications device 40, respectively, can be operable to access the appropriate look-up table(s) to retrieve the scores associated with respective parameters. The program code can be operable to determine one or more resulting scores by mathematically combining the individual scores retrieved for the relevant parameters for a refund request. For example, a total resulting score could be derived from a score based on nationality, plus, for each item for which a refund is requested, a score based on the type of item and a score for the amount of the item). Although in this simple example the scores for the relevant parameters are added to each other to form a resulting score, other mathematical operators (for example multipliers) can be used to determine one or more resulting scores. A total resulting score and/or one or more resulting scores for each item, or a group of items, can be compared to stored ranges of values representative of green channel and red channel responses to determine whether the resulting score(s) fall within the respective ranges. As a result, a determination of a green or red channel response can be made in respect of all items, individual items or groups of items, as required.

[00148] In the example system described above, the transaction records are held in the host system(s) 20 and these are accessed by the validation system 26 and/or the transaction station(s) 22 or the customs station(s) 28. However, in another example the transaction records could be held alternatively or additionally in the message interface, where this is configured as a central server system.

[00149] Also, although in the described example an automated validation station 22 is shown in addition to a customs station 16, the customs station 16 could be provided with the functionality of the validation station 22 and/or could replace the separate validation station 22. In the cases that the a customs station 16 forms an example of the validation station 22 , the entry of the user information can be performed by the user or by a customs official as appropriate.

[00150] An embodiment may be embodied in a mobile communications device application in the form of a computer program product for operating one or more processors. The computer program product may be in the form of a computer program on a carrier medium. The carrier medium could be a storage medium such as a solid state, magnetic, optical, magneto-optical or other storage medium. The carrier medium could be a transmission medium such as broadcast, telephonic, computer network, wired, wireless, electrical, electromagnetic optical or any other transmission medium.

[00151] There has been described a system and method of providing a service, for example a tax refund service, including an apparatus being responsive to a mobile communications device identifier for a mobile communications device of a user to verify whether the mobile communications device identifier is associated with a registration for the service, and, in the event that the mobile communications device identifier is registered with the service, determining predetermined user information associated with the mobile communications device identifier for providing the service.

[00152] The apparatus can be operatively connected to a remote server comprising storage providing association between information derived from mobile communications device identifiers and predetermined user information. The apparatus can be configured to query the remote server using information derived from the mobile communications device identifier of the mobile communications device. The apparatus can be configured to receive information from the remote server derived from the predetermined user information associated with information derived from the mobile communications device identifier read from the mobile communications device. In the event that the mobile communications device identifier is not registered with the service, the apparatus can be configured to enable operator entry of predetermined user information for the user and to cause association of information derived from the entered user information with information derived from the mobile communications device identifier prior to providing the service.

[00153] The apparatus can be configured to transmit information derived from the entered user information and the mobile communications device identifier of the mobile communications device to the remote server for storage. The apparatus can include a mobile communication device reader operable to read the mobile communications device identifier from the mobile communications device. The mobile communication device reader can include an NFC interface. The mobile communications device can be a mobile telephone. The user information can include information identifying a nationality of a user, for example, a country and number of a passport or other identity carrier. The apparatus, or a separate device, for example the mobile communications device, can be operable to transmit details of a transaction associated with the mobile communications identifier to a remote system, for example a host system or a validation system. The details of a transaction can, for example, be transmitted via a mobile telephony system. The mobile communication device can be operable to receive an invitation message inviting the user to respond to the invitation message using the mobile communication device in order to receive the service. In the event that the user responds to such an invitation message using the mobile communication device, the mobile communication device can be operable to receive a status message confirming to the user whether the service is automatically approved or whether further steps are required for approval.

[00154] The system can be operable to determine the proximity of the mobile communications device to a border crossing or customs validation point, for example using one or more of determining GPS coordinate information captured by the mobile communications device, determining a cell to which the mobile communications device is connected, determining that information at the border crossing or customs validation point is entered by the user to the mobile communication device. The mobile communication device can, for example, receive the invitation message and/or the status message in response to determination of the proximity of the mobile communications device to a border crossing or customs validation point. The mobile communication device can be operable to present a plurality of transactions for selection by the user for processing by the service. Messaging can, for example, be provided using SMS and/or email. Part of providing the service can include issuing a tax refund cheque, for example using the mobile communication device.

[00155] There has also been described a computer-implemented system and method of providing a service, including, in response to a determination being made that a mobile communications device, registered with a host server for the service, is

proximate to a validation location for the service, automatically initiating at least one service action for the service.

[00156] The determination that the mobile communications device is proximate to a validation location can include a determination that a cell to which the mobile communications device is connected is a cell proximate to the validation location. For example, the mobile communications device can determine that the cell to which the mobile communications device is connected is a cell proximate to the validation location. Alternatively, this can be performed by a mobile communication network system, the mobile communications network system being configured to recognise the mobile communications device as being registered for the service. The determination that the mobile communications device is proximate to a validation location can use satellite-derived positioning information detected by the mobile communications device as indicative that the mobile communications device is proximate to the validation location. The determination that the mobile communications device is proximate to a validation location can include using location based wireless connection services (e.g., provided by a WiFi base station) detected by the mobile communications device as indicative that the mobile communications device is proximate to the validation location. The determination that the mobile communications device is proximate to a validation location can include confirmation by at least one of the mobile communications device or the host server that information input by the user to the mobile communication device corresponds to information presented to the user of the mobile communications device at the validation location.

[00157] A service action can include one or more of the mobile communications device being responsive to a received message automatically to present an invitation to the user to use the service, the mobile communications device automatically providing information the user how to use the service, providing automatic validation of transactions for the service, presenting the validation status of one or more transactions to the user. Prior to the determination being made that the mobile communications device is proximate to a validation location for the service, the mobile communication device can be operable to present an invitation to the user to use the service and be responsive to user input to the mobile communication device accepting the service to send a confirmation message to a host server for confirming acceptance of the service. Prior to the determination being made that the mobile communications device is proximate to a validation location for the service, the mobile

communications device can be operable to present one or more transactions for selection by the user to be processed by the service, the mobile communication device responding to user input to the mobile communication device to send a message that identifies any transaction selected by the user to be processed by the service. A service action can include one or more of presenting an invitation to the user to confirm acceptance of the service, the mobile communication device responding to user input to the mobile communication device accepting the service to send a confirmation message to a host server for confirming acceptance of the service, the mobile communications device presenting one or more transactions for selection by the user to be processed by the service, the mobile communication device responding to user input to the mobile communication device to send a message that identifies any transaction selected by the user to be processed by the service. The messages can be effected using SMS or email. The mobile communications device can be a mobile telephone. The service can be a tax refund service.

[00158] One or more records corresponding to purchase transactions can be used to present one or more transactions to the user. The one or more records can be held on the mobile communications device. The one or more records can be held on a server and be provided to the mobile communication device in a message from the server in response to the determination that the mobile communications device is proximate to a validation location. The mobile communication device can be operable to receive a status message confirming to the user whether any transactions selected by the user to be processed by the tax refund service is automatically approved or whether further steps are required for approval. The validation point can be a border crossing or customs validation point. The system can be operable automatically to validate whether transactions registered with the tax refund service are eligible for refund, and to transmit a message to the mobile communications device to cause the mobile communications device to indicate to the user whether a tax refund service is automatically approved for one or more of the transactions and/or whether additional steps are needed to obtain approval for one or more of the transactions. Records corresponding to purchase transactions registered with the tax refund service can be used to determine automatic eligibility for refund.

[00159] There has also been described a mobile communications device comprising means for outputting information to a user, means for receiving user input, wireless communication means for communication with a communications network system,

storage means and processing means, the mobile communication device being configured for communication with a remote server with which the mobile communications device is registered for the provision of a service, the mobile communications device being configured automatically to present an invitation to a user to use the service in response to a determination that the mobile communications device is proximate to a validation location for the service. A computer system providing automated validation of requests for a tax refund in respect of one or more services, can be operable automatically to validate whether transactions registered with a tax refund service are automatically eligible for refund, and to transmit a validation status message to such a mobile communications device registered with a host server for a tax refund service to cause the mobile communications device to indicate to the user whether a tax refund service is automatically approved for one or more of the transactions and/or whether additional steps are needed to obtain approval for one or more of the transactions.

[00160] There has further been described a system and method for automated processing of tax refunds, the system comprising: a first database in which traveller records of travellers registered for a tax refund service are stored, a second database in which travel status for travellers are stored; a computer server operable to initiate a service action in respect of the tax refund service for a traveller registered for the tax refund service in response to detection of a travel status of the traveller indicative that the traveller is preparing to leave the territory.

[00161] The second database can be a travel reservation database of travel reservation system, the travel status for the traveller being held in a travel reservation record in the travel reservation database, the travel reservation record being linked to a traveller record in the first database. The second database can be an immigration database of an immigration system, the travel status for the traveller being held in a travel status record in the immigration database, the travel status record being linked to a traveller record in the first database. Initiating the service action can include the automatic sending of an alert message to a mobile communication device of the traveller, the mobile communication device being identified by a traveller record for the traveller. The alert message can be send automatically to the mobile communication device of the traveller in response to a change in traveller status held on the second database indicative that the user is preparing to leave the territory. The alert message can, for example, provide information regarding steps to be taken by the user to effect validation of purchase transactions for the tax refund service.

[00162] A record in the second database can include a reference to a record in the first database. A record in the first database can include a reference to a record in the second database. An automatic response can be provided to receipt of a request for validation for a tax refund in respect of one or more purchase transactions by the traveller by determining a travel status of the traveller from the second database and a service action can be initiated in respect of the tax refund service in response to the determined travel status of the traveller. A travel status of the traveller indicative that the traveller is preparing to leave the territory can be one or more of, for example: checked in; checked in at station, port or airport; checked in luggage; boarded; departed.

[00163] A tax refund system (e.g., a host system or a validation system) can be operable to query the travel system to determine the status of the traveller. A tax refund system (e.g., a host system or a validation system) can be operable to receive automated updates from the travel system in response to changes in travel status of the traveller. A tax refund system (e.g., a host system or a validation system) can be operable to check that the identity of the registered traveller corresponds to the identity of the traveller for the travel reservation. At least one transaction record can identify one or more purchases registered for tax free refund for the traveller. A service action can include automatic initiation of a validation process for one or more purchases of the traveller. A service action can include automatically indicating to a traveller whether one or more purchases of the traveller are eligible for automatic refund on departure, or whether further steps are required to obtain refund. Further steps for refund can include presentation of purchases for export to a customs desk. A service action can include causing a refund to be made to a traveller in respect of purchases validated for refund in response a predefined change in travel reservation status of the traveller. A predefined change in travel reservation status can include a change in travel reservation status to one or more of: checked in; checked in at station, port or airport; checked in luggage; boarded; departed.

[00164] In the description above, reference is made to an application provided on the mobile communications device. Such an application can be configured to run as a foreground task and/or as a background task on the mobile communications device or as a background task, subject to the capabilities of the mobile communication device. Such an application can be configured to take on varying degrees of the processes described above. In one example, the mobile communications device application can be operable to provide the location processes described above and to provide

information to the user, with the tax refund service itself being provided by the infrastructure described with reference to Figures 1 and 2, for example with all user records and transaction records, stored electronic tax refund cheques, etc., being held in storage as part of that infrastructure, for example in the TRO host system 20 and/or the message interface 24, and the validation process conducted by the validation system 26 via a validation station 22. In another example, the mobile communications device can be used to support much more of the tax refund service, with the tax refund service itself being provided by the infrastructure described with reference to Figures 1 and 2, for example with transaction records and/or electronic tax refund cheques, etc., being held in storage on the mobile communications device and managed by the application on the mobile communications device, and the validation process being conducted by the validation system 26 in communication with the mobile communications device 40 application. An application on the mobile communications device can be used to determine the location of the mobile communications device using one or more or a combination of GPS, mobile network cell location and wireless base station location information. In these examples and also in other examples with a different distribution of task as part of the refund process, user records, transaction records and stored electronic tax refund cheques can be linked using a mobile communications device identifier or another identifier associated therewith, whereby the various stages of the refund process can be tracked by the system as a whole.

[00165] Although the embodiments described above have been described in detail, numerous variations and modifications will become apparent to those skilled in the art once the above disclosure is fully appreciated. It is intended that the following claims be interpreted to include all such variations and modifications and their equivalents.

CLAIMS

1. A method of providing location-based service using a mobile communications device registered for the service, wherein the service is a tax refund service, the method including:

receiving at a location, by at least one application on the mobile communications device, information for connecting the mobile communications device to a wireless network via a base station at the location;

connecting the mobile communications device to the wireless network at the location;

connecting the application via the wireless network and the base station to a host system with which the mobile communications device is registered for providing the service for which the mobile communications device is registered.

2. The method of claim 1, wherein receiving information at a location includes detecting, from an RFID device using an RFID reader of the mobile communication device, an SSID and password for connecting the mobile communications device to a wireless network via a base station at the location.

3. The method of claim 2, wherein the RFID device is an NFC device and the RFID reader includes an NFC reader.

4. The method of claim 1, wherein receiving information at a location includes detecting, from a visual code using an imaging device of the mobile communication device, an SSID and password for connecting the mobile communications device to a wireless network via a base station at the location.

5. The method of any one of the preceding claims, comprising providing information to the host system for recording refund transactions associated with the mobile communication device.

6. The method of any one of the preceding claims, comprising detecting purchase items using the application an identifying at least one of a price in a first currency, a price in a preselected second currency, and a tax refund value to a user.

7. The method of any one of the preceding claims, further comprising detecting an identifier indicative that base station of the wireless network is at a validation location for validating transactions for a tax refund.

8. The method of any one of the preceding claims, further comprising initiating, using the application, a validation process for the refund of tax using a validation service in response to identification that the mobile communication device is connected to a wireless network at a validation location.

9. The method of any one of claims 1 to 6, further comprising detecting an identifier for connecting the application to a system providing the service for which the mobile communications device is registered.

10. The method of claim 9, wherein the identifier is merchant identifier and the system is a merchant system of a merchant providing at least part of the service.

11. The method of claim 10, comprising conducting a purchase transaction using the application in response to information received from the merchant system.

12. An application for a mobile communication device registered for a location-based service using the mobile communications device, the application comprising program code operable to perform the steps of any one of claims 1 to 11.

13. A computer readable medium carrying the application of claim 12.

14. A mobile communication device comprising memory in which the application of claim 12 is stored.

15. The mobile communications device of claim 14 comprising at least one of an RFID interface or an NFC interface.

16. The mobile communications device of claim 14 or claim 15, wherein the mobile communications device is a mobile telephone.