CELLULAR SYSTEM, APPARATUS AND METHOD FOR ENABLING SIMULTANEOUS ACCESS TO MULTIPLE SERVICE PROVIDERS

Field of the Invention

[0001] The present invention relates to a cellular telecommunication system capable of allowing individual users simultaneous access to a plurality of service providers; and in particular, each user or his mobile station may easily select the most suitable service providers for a particular service component, with reference to user preference and / or a set of service related parameters.

Background of the Invention

[0002] Cellular telecommunication services are typically provided by cellular service providers who may be the network operators or mobile virtual network operators (MVNOs) offering network services over spectrums leased from other network operators. The promotion of service competition in many countries has driven down service tariffs and raised service quality. The number of licensed cellular network operators and MVNOs is on the rise. However, users always find it difficult to benefit from this trend. The reason is that the conventional model of a mobile station user served by a single cellular service provider severely restricts the user in his choice of cellular and value-added services. In particular, each GSM-compliant and third-generation mobile station comes with a subscriber identity module (SIM) which ties the user to the SIM issuing network or service operator. Very often, users unwillingly accept the service components offered or bundled by a service operator even though they may not entirely suit the users' needs and expectations.

[0003] WO01033880 and WO99062282 teach methods of employing a plurality of SIM cards in a mobile station, whose user may, at any specific time, activate a particular SIM and hence all service components corresponding to the SIM. The disclosed methods allow users to switch SIM and hence service provider. However, all the service components corresponding to the deactivated SIM are disabled. This is undesirable to the users as they cannot have, at any one time, access to all their preferred service components,

which may partly be offered by one service provider and partly by other service providers. Disabling a subscriber identity module may lead to missed calls, undeliverable messages and mails, which in turn may cause inconvenience or even financial loss.

[0004] Accordingly, there is an imperative need for an innovative cellular communication system for allowing a mobile station user simultaneous access to the service components offered by more than one cellular service operator. Means of assisting the user in his choice of the most suitable service providers for specific service components is highly desirable. The cellular communication system of the present invention satisfies the need. Other advantages of this invention are apparent with reference to the detailed description provided herewith.

Summary of the Invention

[0005] In accordance with one aspect of the present invention, a cellular telecommunication system comprising a plurality of cellular service providers, mobile virtual network operators and value-added service providers is capable of simultaneously delivering said offered service components to a plurality of mobile stations which allow the users simultaneous access to the service components provided by a plurality of said service providers and network operators. Said mobile stations further enable users to easily select the providers of their choice for each said service component, or said mobile stations may determine or automatically select the most suitable providers as per sets of provider assignment criteria and service related parameters, which may be defined by the users, generated by their mobile stations and / or downloaded from the service providers.

[0006] In accordance with another aspect of the present invention, each of the mobile stations comprises a plurality of mobile equipment modules, subscriber identity modules and other subsystems all controlled by a processing unit, which also runs a provider assignment process for determining the most suitable providers for a particular service component. The architecture of the present system makes it possible to support new functionalities and applications that may not be possible with conventional and prior-art systems.

[0007] In accordance with yet another aspect of the present invention, a method of operating a cellular telecommunication system comprising the steps associated with allowing a plurality of service providers to deliver service components to individual users

having mobile stations capable of simultaneous access to said service components and carrying out a provider assignment process is disclosed.

Brief Description of the Drawings

[0008] Preferred embodiments according to the present invention will now be described with reference to the following figures, in which like reference numerals denote like elements.

[0009] **FIG. 1** illustrates the cellular telecommunication system of the present invention.

[0010] **FIG. 2** shows steps and components in the provider assignment process.

[0011] **FIG. 3** shows the architecture of the mobile stations used in the present system.

[0012] **FIG. 4** depicts the typical system architecture of the mobile equipment modules used in the mobile stations.

Detailed Description of the Invention

[0013] The present invention may be understood more readily by reference to the following detailed description of certain embodiments of the invention.

[0014] **FIG. 1** depicts the cellular telecommunication system **100** of the present invention which comprises a plurality of major building blocks **110 – 180**. The inter-connection paths illustrate the communications among the functional blocks in the system hierarchy and they may vary in accordance with the deployment requirements. The present system **100** comprises a plurality of cellular telecommunication networks **120** denoted by CN_1, CN_2, ..., CN_L where L is equal to or greater than one ($L \geq 1$), wherein each of said cellular networks **120** is typically made up of base station subsystems, network and switching subsystems, location registers, authentication subsystems, network interface to public switched telephone network(s) and, very often, Internet Protocol network(s). Said cellular telecommunication system **100** further comprises a plurality of cellular service providers **130** denoted by CSP_1, CSP_2, ..., CSP_M, where M is typically greater than one ($M > 1$). Cellular service providers **130** are often referred to as mobile virtual network operators **131** (MVNOs) if they do not operate any cellular networks. Instead, MVNOs **131**

provide their cellular services over spectrums leased from third-party cellular network operators. Such MVNOs may deploy their cellular services on more than one cellular network. If M > L, a portion of the cellular service providers are MVNOs. Typical cellular services include voice and messaging services. In the present system, a plurality of value-added service providers **140** ($VASP_1$, $VASP_2$, ..., $VASP_N$) offer their value-added services through the cellular service providers **130** and the MVNO **131**. Value-added service providers **140** provide applications and services delivered to the end users' mobile stations **110** over the air interface **180**. Said applications include push mails, voice over data networks, location-based services and contents for download. Cellular services and value-added applications are referred hereinafter as "**service components**". Said mobile stations **110** receive cellular services offered by CSPs **130** and MVNOs **131** as well as value-added services offered by VASPs **140** (through CSPs **130**). Said mobile stations **110** are used by cellular service customers or subscribers for accessing, downloading and managing said cellular and value-added services.

[0015] Unlike conventional systems and prior-art designs, the present system **100** allows each user to use a single mobile station **110** for simultaneous access to services offered by a plurality of cellular service providers **130**, and more particularly, said mobile stations **110** allow users to assign the most preferred cellular service providers for each service component. This "**provider assignment**" process is particularly useful for service components, such as voice calls or short messaging services, which are offered by more than one service provider **130, 131**. Said provider assignment can be achieved as per user preference through manual selection, or in accordance with a plurality of predetermined service related parameters **115** (SRPs) such as tariff rates as functions of other parameters, time and date, signal strength and location information.

[0016] In the provider assignment process shown in **FIG.** 2, A set of provider assignment criteria **222** is first established in accordance with user preference and service related parameters such as signal strength and tariff rates as functions of other parameters.. The service related parameters are captured in step **210** through manual user selection indicating user preference in step **214**, or generated by the processing unit of the mobile station in step **216**, or downloaded in step **212** from the network or service providers or value-added service providers, or determined through combinations of said methods on a continuous basis or at predetermined intervals. If SRP is not available or supported, the

provider assignment process terminates with step **242** in which mobile station **110** prompts the user for manual provider selection. If the corresponding SRPs are found, then mobile station **110** is now ready to compute in step **220** the most suitable service providers for the corresponding service components. This is accomplished by comparing the SRPs captured in step **210** against the values of said established provider assignment criteria **222**. Next, mobile station **110** further checks in step **240** the associated option pre-selected by the user for automatic provider selection. Said mobile station **110** proceeds to select the most suitable providers **244** if the result of step **240** is positive. Otherwise, mobile station **110** notifies the user in step **246** of the most suitable providers that it has derived. If more than one service provider has been derived in step **220** and the result of step **240** is positive, mobile station **110** may prompt the user for manual selection, or it may select one of the derived service providers in a random manner or in accordance with some pre-determined user preference.

[0017] Service related parameters **115** provided by the cellular or value-added service providers **130, 131 & 140** are presented in predetermined formats typically comprising data fields of network ID, service provider identifier, service component identifier and parameter values, and they may further comprise preambles, error detection codes and any other fields deemed necessary for clear and non-ambiguous presentation of the SRP of interest. In addition, said service related parameters **115** are transmitted to the corresponding mobile stations in step **212** over appropriate cellular network paging, signaling or data channels.

[0018] Service related parameters **115** used in the present system are generally used to manage the potentially vast number of service components concurrently provided by the plurality of service providers **130, 131 & 140** in the system of the present invention. Said parameters **115** are particularly useful to the end users when similar or identical cellular or value-added services are provided by more than one provider. As an exemplary application, a first service provider offers lower voice call charges during off-peak hours whereas a second service provider offers lower voice call charges at three locations pre-selected by a user. While the user's mobile station **110** in the present system allows concurrent access to both service providers, the user may manually choose one of said providers depending upon when and where he or she initiates voice calls. Alternatively, the user may update the respective tariff schedules as functions of time and location in his

mobile station **110**, either through manual data entry or by downloading said tariff schedules from the providers. Said tariff schedules are one type of SRP **115**. Subsequently, the mobile station **110** monitors the corresponding time and location SRPs and prompts the user which provider offers the lowest rate at any one time (**246**). Alternatively, the mobile station may be instructed to automatically select (**244**) the cheaper service component whenever the user initiates a voice call. Time stamps can be obtained from the internal timing function of the mobile station (**216**) or they can be requested from the providers (**212**). Similarly, location information may be derived from the mobile station (**216**), provided that it has an integrated global positioning module, or said information can be obtained from the providers (**212**). Pricing may not be the only factor in the choice of service providers. Indeed, said user may further refine his provider selection criteria by making use of parameters governing service quality. Service related parameters **115** such as signal strength can directly be measured and updated by the mobile station **110**.

[0019] Conventional cellular telecommunication systems bind each mobile station to a single service provider. Prior art systems allow each mobile station to change from one service provider and connect to another service provider. In contrast, the present system allows each mobile station **110** simultaneous access to more than one cellular service provider **130, 131**. Each of the mobile stations **110** used in the present system comprises a plurality of mobile equipment modules **310**, as shown in **FIG. 3**, and corresponding SIM cards **340**, antenna **350**, processing unit **320**, at least one display device **330**, a keypad **332** and / or touch screen as inputting means. It may further comprise detachable memory device **334**, a power supply module **336** and other subsystems which may include audio transducers **338**, short-ranged wireless communication devices **340** and input-output data ports and interfaces **342**. Said processing unit **320** comprises volatile and non-volatile memory devices **322, 324**, controller unit **326** for operating the plurality of mobile equipment modules **310**, said detachable memory device **334**, inputting means **332**, SIM cards **340** and any audio and data interface drivers **338, 342**. Said processing unit **320** is capable of executing all associated low-level and application-level instructions in all associated software necessary to control and manage all the functionalities of all the systems, subsystems, modules, drivers and devices of said mobile station **110**. Said software codes are stored in the non-volatile memory devices **324** & **334**.

[0020] The suite of software **328** used for accomplishing provider assignment may include the following applications: a first application executable by said processing unit **320** is tasked to create, store and manage said provider assignment criteria **222**; a second application for acquiring, monitoring and requesting said service related parameters **115**; a third application executable by said processing unit **320** is designed to alert the user when at least one of said provider assignment criteria **222** is met; and a fourth application executable by said process unit **320** is used for selecting service providers which best meet said provider assignment criteria. At least one of the above-named applications is preferably available for execution by the processing unit **320**. However, the user is free to over-ride the selection process undertaken by said processing unit **320**, and the user is able to manually select the desired service provider if none of said applications is available nor supported for execution.

[0021] Said mobile equipment modules **310** are cellular radio transceivers which identify themselves to the corresponding networks through SIMs **340**. As shown in **FIG. 4**, each of the mobile equipment modules **310** typically comprises front-end radio frequency stage **410**, power amplifiers **415**, analogue-to-digital and digital-to-analogue converters **420**, modulator and demodulator **430**, coders and decoders **440**, speech codec **450** and any other subsystems required for normal cellular voice and data operations. Each of said mobile station modules **310** may have a standalone antenna **350** (**FIG. 3**) or a plurality of said mobile equipment modules **310** may share an antenna **350** with the required resonant frequencies, bandwidth and selectivity for normal cellular telephony operations. A single SIM **340** is assigned to each of said mobile equipment modules. SIMs **340** are used to store information and execute operations necessary for identification, authentication, cryptographic operations, storage of contacts, messages and any other applications and usages required for normal access to all the subscribed and free services provided by a single service provider as well as all the application providers **140** partnering with said service provider **130**, **131**.

[0022] The mobile stations **110** in the present system perform additional functionality not available to conventional mobile telephones. Said processing unit **320** enables applications requiring collaboration and sharing of data among the mobile equipment modules **310** and SIMs **340**. For instance, data stored on each SIM comprising contact details and short messages can be shared with another SIM. Forwarding of

messages, emails or voice calls among mobile equipment modules can easily be achieved. As a second example, the mobile station **110** of the present system may be used to conduct multi-party conference calls with each conference attending party connected through each of the mobile equipment modules **310** and corresponding SIMs **340**.

[0023] The following exemplary scenarios demonstrate the benefits of the cellular telecommunication systems **100** of the present invention over conventional systems and prior art designs:

[0024] **Voice call service with location-dependent tariff plan**: A first cellular service provider charges their customers for using their voice service according to the time of the day. More particularly, voice calls made during off-peak hours, such as the time interval between 10 p.m. and 7 a.m. for weekdays and whole days for weekends, are charged at a discounted rate. Most of their customers choose to use the conventional wired telephony service when they are at home, especially during peak hours. Moreover, said first cellular service provider is part of an incumbent telecommunication operator who owns and runs most of the conventional wired telephony services. In order to attract the same group of users to use their cellular voice call service, a second cellular service provider allows the users to select a plurality of locations where cellular voice calls can be initiated at the same or even lower tariff rates than those for the wired telephony service offered by said first service operator. Prior-art designs of manually activating any one SIM card corresponding to the lower tariff rate do not achieve the additional benefits of the present system, since firstly, the mobile stations **110** of the present system are capable of alerting users **246** when the provider assignment criteria **222** resulting in lower charges are met, the mobile stations may also be instructed to engage the cheaper service components automatically **244**, and secondly all incoming voice calls, irrespective of their carriers or service providers, are able to reach the users.

[0025] **Discounted or free services with advertisements:** Free voice or data services are used as rewards for users who purchase goods or services from retailers, airline companies or for users who charge their bills to their credit card accounts. The bonus systems are suitable for individual stores, retail chain stores or networks of stores or companies. The reward program is highly flexible with the objective of giving away free cellular voice or data services after the users have purchased a predetermined amount of goods or services. This could be achieved through the use of service related parameters

115, more particularly setting the tariff rate to zero to indicate free services. Alternatively, free SIM cards **340** may be given away to users who have met the predetermined reward criteria. The free SIM cards are typically in the form of pre-paid SIM which may be used to display merchant logos or related brand names on said mobile station **110**. Said pre-paid SIM can further be used to receive further promotional short messages. The provider assignment criteria **222** may be updated to indicate preference of outgoing calls to be made on the network associated with said pre-paid SIM. The mobile station **110** of the present system is important in this application to keep the users' own cellular phone or SMS numbers in use while enjoying free voice calls offered by the merchants running the promotional campaign. It should be evident that said free services may not be tied to a promotional campaign, and they may be offered on a long-tem or even permanent basis. For instance, free-of-charge information such as public announcement, news, financial information, mobile games and magazine-styled content may be made available to users who are willing to accept advertisements or their links pushed to the users' mobile stations.

[0026] **Mobile payment application**: Mobile payment services initiate by banks or merchants typically experience resistance from cellular service providers **130** unless said service providers can benefit significantly. The present cellular system **100** is ideal for supporting mobile payment applications operated by parties independent of said cellular service providers. Said mobile payment operators may issue SIM cards **340** with built-in secure payment applications. It is apparent that merchants or banks do not typically have access to the SIM issued by the cellular service providers **130**. In this particular case, said merchants or banks act as value-added mobile payment service provider **140**, and at the same time, they may operate as MVNO **131** who operate their cellular services on leased spectrum. In addition, said mobile payment enabled SIM cards need to support key management and cryptographic operations, and they are typically more advanced than those issued by cellular service providers for voice centric services. The mobile stations **110** of the present system is ideal for this application, as it accommodates basic voice service offered by traditional service providers and supported through low-cost SIM cards, and at the same time, it supports advanced applications operated by independent parties such as said merchants and banks.

[0027] **Combined signal coverage to enhance signal quality and network resilience**: In parts of a city or suburbs where cellular signal coverage provided by any individual cellular service provider **130** is moderate or even poor, using the mobile stations of the present system **100** may significantly enhance the effective or overall signal coverage. In this application, each mobile equipment module **310** connects to a single but different cellular service provider **130**. The processing unit **320** monitors all received signal strengths which are used as the service related parameters **115** for comparison. Thus, said processing unit **320** is able to determine which service component or provider the mobile station shall use at any one time. The same application can also be applied to achieve better network resilience through the use of signal strengths or quality as the SRP for determining which service component or provider should preferably be in operation. Unexpected events such as accidents may seriously affect the cellular service of one network. The mobile stations **110** of the present system are capable of detecting the weakened signal strength and either to alert **246** the users or automatically **244** switch to the one that possesses the strongest signal at the time of the unexpected events.

[0028] It is evident to those skilled in the art that the mobile stations **110** in the present system **100** are capable of simultaneously connecting to services and applications provided by a plurality of cellular service providers (CSPs) **130** which are the SIM issuing parties. Without loss of generality, the mobile stations **110** can also be used to access services and applications provided by a CSP who have issued more than one SIMs **340** to a single user who requires two separate cellular phone numbers, or for any other reasons and usages. The benefits of the present system, however, remain fully applicable provided that the nature, tariff plans or other features and characteristics of the services and applications provided through the different SIMs **340** are not identical.

[0029] While the present invention has been described with reference to particular embodiments, it will be understood that the embodiments are illustrative and that the invention scope is not so limited. Alternative embodiments of the present invention will become apparent to those having ordinary skill in the art to which the present invention pertains. Such alternate embodiments are considered to be encompassed within the spirit and scope of the present invention. Accordingly, the scope of the present invention is described by the appended claims and is supported by the foregoing description.

CLAIMS

What is claimed is:

1. A cellular telecommunication system comprising:

a plurality of cellular service providers providing their respective service components to a plurality of users through wireless communication between the cellular networks engaged or operated by said cellular service providers and the mobile stations of said users;

wherein

said mobile stations being capable of simultaneous access to the service components provided by more than one of said service providers, and said mobile stations being capable of executing a provider assignment process for selecting the most suitable cellular service provider for a particular service component.

2. The cellular telecommunication system of claim 1 wherein said provider assignment process comprising the establishment of a set of provider assignment criteria, followed by capturing the values of a set of service related parameters for comparison against said provider assignment criteria; and identifying the most suitable service providers who meet the most number of said provider assignment criteria.

3. The cellular telecommunication system of claim 2 wherein said provider assignment criteria being established in accordance with user preference and / or at least one of said service related parameters.

4. The cellular telecommunication system of claim 2 wherein said process of capturing the values of service related parameters being accomplished through manual user selection indicating user preference, or generated by the processing units of said mobile stations, or downloaded from the networks or service providers, or determined through combinations of said methods.

5. The cellular telecommunication system of claims 3 and 4 wherein said service related parameters associated with said provider assignment criteria and provider assignment process including but not being limited to tariff rates, time and date, signal strength and location information .

6. The cellular telecommunication system of claim 2 wherein said provider assignment process being terminated by prompting said users for manual provider selection when none of said service related parameters being available or supported.

7. The cellular telecommunication system of claim 2 wherein said provider assignment process having derived the most suitable service providers and further advancing to either notify said users of the most suitable service providers or automatically select said most suitable service providers for said users.

8. The cellular telecommunication system of claim 2 wherein said service related parameters having predetermined formats known to both said mobile stations and service providers.

9. The cellular telecommunication system of claim 8 wherein said formats typically comprising data fields of network identifier, service provider identifier, service component identifier and parameter value, and said formats may further comprising preambles, error detection codes and any other fields deemed necessary for clear and non-ambiguous presentation of the service related parameters of interest.

10. The cellular telecommunication system of claim 1 wherein a proportion of said cellular service providers being mobile virtual network operators who engage third-party cellular networks or cellular service providers as the carriers of their service components.

11. The cellular telecommunication system of claims 1 and 10 wherein a plurality of value-added service providers offering their value-added services and applications through said cellular service providers and said mobile virtual network operators.

12. The cellular telecommunication system of claims 1 and 10 wherein said cellular service providers and said mobile virtual network operators issuing subscriber identity modules (SIM) to said users.

13. The cellular telecommunication system of claims 12 wherein said subscriber identity modules being used mainly for user identification and authentication with the corresponding SIM issuing providers who possess records in their subscriber and service database in regards with each said user's rights and entitlement to said service components including free services, cellular and value-added service components.

14. The cellular telecommunication system of claims 12 wherein said subscriber identity modules being used for storing and executing information, data and applications generated, supplied or downloaded by said users and any of said service providers.

15. The cellular telecommunication system of claims 12 wherein said subscriber identity modules being chip cards or smart cards having on-chip memory, processor and any other subsystems and devices necessary for said storage and execution of information, data and applications.

16. The cellular telecommunication system of claims 1 and 12 wherein each of said mobile stations comprising more than one mobile equipment module and more than one subscriber identity module, with said mobile equipment modules and subscriber identity modules being controlled by a processing unit.

17. The cellular telecommunication system of claim 16 wherein a single subscriber identity module being assigned to or associated with each of said mobile equipment modules for user identification and authentication, and storing and executing information, data and applications generated, supplied or downloaded by said users and any of said service providers.

18. The cellular telecommunication system of claim 16 wherein said mobile equipment modules being cellular radio transceivers comprising front-end radio frequency stage,

power amplifiers, analogue-to-digital and digital-to-analogue converters, modulator and demodulator, coders and decoders, speech codec and any other subsystems required for normal cellular voice and data operations.

19. The cellular telecommunication system of claim 16 wherein either each of said mobile station modules having a standalone antenna or a plurality of said mobile equipment modules sharing an antenna with the required resonant frequencies, bandwidth and selectivity for normal cellular telephony operations.

20. The cellular telecommunication system of claim 16 wherein said processing unit being used to run applications requiring sharing of information and collaboration among said mobile equipment modules and said subscriber identity modules.

21. The cellular telecommunication system of claim 21 wherein said sharing of information and collaboration including but not being limited to sharing of contact details, messages and data, forwarding of messages, emails or voice calls among mobile equipment modules, and collaboration among a plurality of mobile equipment modules for multi-party conference calls.

22. The cellular telecommunication system of claims 1 wherein each of said mobile stations further comprising at least one display device, a keypad and / or touch screen as inputting means, detachable memory device, power supply module and other subsystems necessary for the normal operation of said mobile station.

23. The cellular telecommunication system of claim 22 wherein said subsystems comprising audio transducers, short-ranged wireless communication devices and input-output data ports and interfaces.

24. The cellular telecommunication system of claim 16 wherein said processing unit being capable of executing all associated low-level and application-level instructions in all associated software necessary to control and manage all the functionalities of all the systems, subsystems, modules, drivers and devices of said mobile stations.

25. The cellular telecommunication system of claim 24 wherein said processing unit further comprising both non-volatile and volatile memory devices for storing parameters, data and software applications codes necessary for said code execution, system control and data management.

26. The cellular telecommunication system of claim 25 wherein said software applications comprising all the operations associated with said provider assignment criteria and provider assignment process.

27. The cellular telecommunication system of claims 1 and 12 wherein one of said service providers offering discounted services during pre-determined time bands and days of the week, whereas the other service provider offering discounted services at a plurality of locations pre-selected by said users; and said users or mobile stations selecting the service provider based on lower tariff rates with reference to the time and / or the location where said services are requested or initiated.

28. The cellular telecommunication system of claims 1 and 12 wherein one of said subscriber identity modules being given away in promotions or reward programs for allowing a particular user to enjoy free cellular services up to a predetermined quantity. Said give-away subscriber identity module may allow promotional information being displayed on the user's mobile station or promotional short messages being sent to the user's mobile station. Said user or mobile station may use said give-away subscriber identity module for making outgoing calls free of charge while keeping his own cellular phone numbers in use. Said free cellular services may be offered on a long-term or permanent basis provided that the user is willing to accept advertisements sent or pushed to his or her mobile station.

29. The cellular telecommunication system of claims 1 and 12 wherein each of said mobile stations comprising subscriber identity modules for normal voice and data services while having one of said subscriber identity modules issued by a mobile payment operator

for storing and executing secure payment applications including strong authentication, cryptographic operations, key management and account management.

30. The cellular telecommunication system of claims 1 and 12 wherein said mobile stations having simultaneous access to service components offered by two independent cellular service providers; and said users or mobile stations selecting the service provider in accordance with signal strength, thus resulting in enhanced combined signal coverage, signal quality and network resilience.

31. A method of operating a cellular telecommunication system comprising the steps of having a plurality of cellular service providers to provide their respective service components to a plurality of users through wireless communication between the cellular networks engaged or operated by said cellular service providers and the mobile stations of said users;

using mobile stations that are capable of simultaneous access to the service components provided by more than one of said service providers, and

using mobile stations that are capable of executing a provider assignment process for selecting the most suitable cellular service provider for a particular service component.

32. The method of claim 31 wherein said provider assignment process comprising the establishment of a set of provider assignment criteria, followed by capturing the values of a set of service related parameters for comparison against said provider assignment criteria; and identifying the most suitable service providers who meet the most number of said provider assignment criteria.

33. The method of claim 32 wherein said provider assignment criteria being established in accordance with user preference and / or at least one of said service related parameters.

34. The method of claim 32 wherein said process of capturing the values of service related parameters being accomplished through manual user selection indicating user preference, or generated by the processing units of said mobile stations, or downloaded

from the networks or service providers, or determined through combinations of said methods

35. The method of claims 33 and 34 wherein said service related parameters associated with said provider assignment criteria and provider assignment process including but not being limited to tariff rates, time and date, signal strength and location information .

36. The method of claim 32 wherein said provider assignment process being terminated by prompting said users for manual provider selection if none of said service related parameters being available or supported.

37. The method of claim 32 wherein said provider assignment process having derived the most suitable service providers and further advancing to either notify said users of said most suitable service providers or automatically select said most suitable service providers for said users.

38. The method of claim 32 wherein said service related parameters having predetermined formats known to both said mobile stations and service providers.

39. The method of claim 38 wherein said formats typically comprising data fields of network identifier, service provider identifier, service component identifier and parameter value, and said formats may further comprising preambles, error detection codes and any other fields deemed necessary for clear and non-ambiguous presentation of the service related parameters of interest.

40. The method of claim 31 wherein a proportion of said cellular service providers being mobile virtual network operators who engage third-party cellular networks or cellular service providers as the carriers of their service components.

41. The method of claims 31 and 40 wherein a plurality of value-added service providers offering their value-added services and applications through said cellular service providers and said mobile virtual network operators.

42. The method of claims 31 and 40 wherein said cellular service providers and said mobile virtual network operators issuing subscriber identity modules (SIM) to said users.

43. The method of claims 42 wherein said subscriber identity modules being used mainly for user identification and authentication with the corresponding SIM issuing providers who possess records in their subscriber and service database in regards with each said user's rights and entitlement to said service components including free services, cellular and value-added service components.

44. The method of claims 42 wherein said subscriber identity modules being used for storing and executing information, data and applications generated, supplied or downloaded by said users and any of said service providers.

45. The method of claims 42 wherein said subscriber identity modules being chip cards or smart cards having on-chip memory, processor and any other subsystems and devices necessary for said storage and execution of information, data and applications.

46. The method of claims 31 and 42 wherein each of said mobile stations comprising more than one mobile equipment module and more than one subscriber identity module, with said mobile equipment modules and subscriber identity modules being controlled by a processing unit.

47. The method of claim 46 wherein a single subscriber identity module being assigned to or associated with each of said mobile equipment modules for user identification and authentication, and storing and executing information, data and applications generated, supplied or downloaded by said users and any of said service providers.

48. The method of claim 46 wherein said mobile equipment modules are cellular radio transceivers comprising front-end radio frequency stage, power amplifiers, analogue-to-digital and digital-to-analogue converters, modulator and demodulator, coders and

decoders, speech codec and any other subsystems required for normal cellular voice and data operations.

49. The method of claim 46 wherein either each of said mobile station modules having a standalone antenna or a plurality of said mobile equipment modules sharing an antenna with the required resonant frequencies, bandwidth and selectivity for normal cellular telephony operations.

50. The method of claim 46 wherein said processing unit being used to run applications requiring sharing of information and collaboration among said mobile equipment modules and said subscriber identity modules.

51. The method of claim 51 wherein said sharing of information and collaboration including but not being limited to sharing of contact details, messages and data, forwarding of messages, emails or voice calls among mobile equipment modules, and collaboration among a plurality of mobile equipment modules for multi-party conference calls.

52. The method of claims 31 wherein each of said mobile stations further comprising at least one display device, a keypad and / or touch screen as inputting means, detachable memory device, power supply module and other subsystems necessary for the normal operation of said mobile station.

53. The method of claim 52 wherein said subsystems comprising audio transducers, short-ranged wireless communication devices and input-output data ports and interfaces.

54. The method of claim 46 wherein said processing unit being capable of executing all associated low-level and application-level instructions in all associated software necessary to control and manage all the functionalities of all the systems, subsystems, modules, drivers and devices of said mobile stations.

55. The method of claim 54 wherein said processing unit further comprising both non-volatile and volatile memory devices for storing parameters, data and software applications codes necessary for said code execution, system control and data management.

56. The method of claim 55 wherein said software applications comprising all the operations associated with said provider assignment criteria and provider assignment process.