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**An Electronic Voucher Distribution System  
Functional Overview**

Version 2

## Cell Power v2 EVD Functional Overview

Document Revision: 201309



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## Abbreviations

The following are a list of abbreviations used throughout the document:

<b>AES</b>	Advanced Encryption Standard
<b>CPU</b>	Central Processing Unit
<b>CSV</b>	Comma Separated Value
<b>EVD</b>	Electronic Voucher Distribution
<b>GPRS</b>	General Packet Radio Service
<b>GSM</b>	Global System for Mobile Communications
<b>ISO</b>	International Organization for Standardization
<b>PC</b>	Personal Computer
<b>PIN</b>	Personal Identification Number
<b>POS</b>	Point of Sales
<b>SMS</b>	Short Message Service
<b>SSL</b>	Secure Sockets Layer
<b>STS</b>	Security Token Service
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>USSD</b>	Unstructured Supplementary Services Data
<b>WAP</b>	Wireless Application Protocol

# 1 Introduction

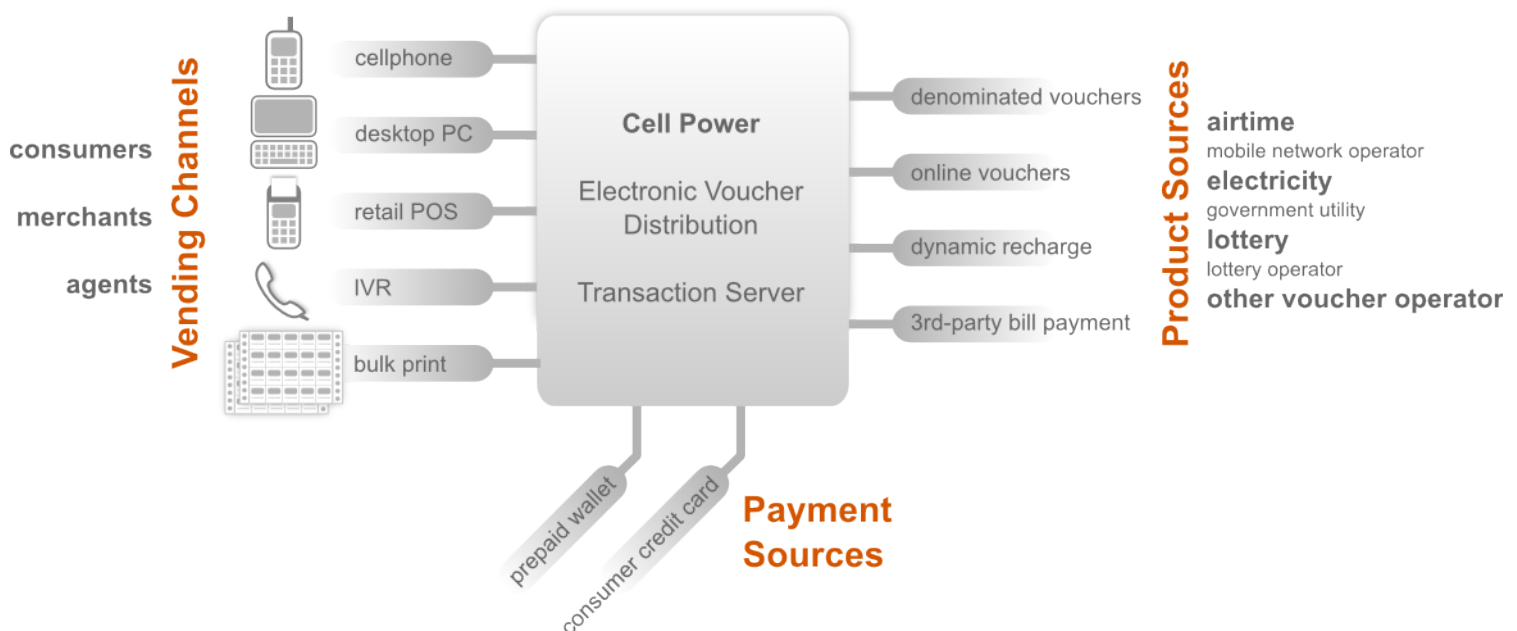
Cell Power is an Electronic Voucher Distribution (EVD) system that can be used to vend products and services that can be delivered as an alpha-numeric number. Cell Power can also be configured to process 3rd-party bill payments. Prepaid airtime and electricity vouchers are examples of products that can be vended through Cell Power.

Dedicated retail POS (Point-of-Sale) terminals, standard GSM cellphones and desktop computers can be used as POS terminals by merchants to vend electronic vouchers to consumers. Merchants must have a prepaid sales account registered on the Cell Power system for each type of product they want to sell (airtime, electricity, etc.); a single sales account can also be associated with multiple products. Merchants must credit their prepaid sales accounts upfront, and can sell products up to the value of the available credit in their sales account. Merchant commissions are automatically paid back into the merchant's sales account with each sales transaction.

Consumers can also purchase electronic vouchers directly from Cell Power by using their own cellphones or desktop computers. Consumers can either purchase products from their prepaid sales account, or use their credit cards if Cell Power is integrated with a third-party payment switch, in which case consumers do not need to be registered on the Cell Power system in order to purchase vouchers.

Registered account holders can perform account transfers to other account holders from their prepaid sales account. The prepaid sales account is also referred to as a wallet.

The Cell Power solution implements a framework that can be used to sell a variety of products through a variety of delivery channels.



## 2 Merchants and Consumers

The distinction between merchants and consumers is superficial. Consumers, like merchants, can register on the Cell Power system. Merchants buying prepaid vouchers for themselves are, in fact, consumers. Similarly, consumers buying prepaid vouchers for family or friends are acting as merchants. The terms for merchants, agents and consumers may be used interchangeably within the context of an account holder or reseller.

## 3 Product Features

### 3.1 Multiple distribution channels

Cell Power is able to make use of multiple channel technologies as sales distribution channels for electronic vouchers. This means that a variety of devices can be used as Point-of-Sale (POS) devices, a feature that facilitates the roll-out of a large and cost-effective vending footprint, appropriate to available technologies and budget.

The following devices can be used as POS terminals with Cell Power:

<b>GSM Cellphones</b>	Standard GSM cellphones, without the installation of special software, using SMS, USSD and Packet-switched Data Services (WML/HTML over GPRS/3G).
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<b>Desktop Computers</b>	A desktop computer with a standard Web browser, such as Internet Explorer, Firefox or Google Chrome
<b>Dedicated POS Terminal</b>	A dedicated retail POS terminal, using GPRS, Ethernet or WiFi. A Cell Power application is currently available for the CREON range of POS terminals from Spectra Technologies
<b>Interactive Voice Response (IVR)</b>	An IVR interface allows merchants to interact with Cell Power by placing a standard voice call from a telephony device.
<b>Bulk Print</b>	Vouchers can be download and printed in bulk to a dot-matrix printer for physical distribution.

## 3.2 Multiple product types

Cell Power supports multiple types of prepaid electronic vouchers and voucher technologies in a single platform.

<b>Denominated Vouchers</b>	Denominated vouchers are of fixed value, and are loaded into a secure voucher store in Cell Power for offline storage, and retrieved from the store at the time of the sale. Examples of denominated vouchers are prepaid airtime vouchers, lottery vouchers, denominated discount vouchers - any voucher that can be stored offline, electronically as a number and sold at a later date.
<b>Online Dynamic Vouchers</b>	Online dynamic vouchers are generated dynamically at the time of the sale, and are not loaded and stored in the voucher vault prior to the sale. The value of the voucher is discretionary, and is specified by the consumer at the time of the sale. Examples of online vouchers are STS electricity vouchers (or tokens) that are retrieved online (at the time of the sale) via the XMLvend protocol from the electricity utility's prepaid management system.
<b>Dynamic Recharge</b>	Dynamic recharge refers to the mechanism of dispensing value electronically without vending a denominated electronic voucher to the customer. An example is PINless recharge for prepaid airtime, where a customer's prepaid cellphone account can be recharged by any amount specified by the customer without dispensing a voucher. Cell Power has been integrated with a number prepaid billing platforms for various mobile telephone operators.
<b>3rd-Party Bill Payments</b>	Cell Power can be integrated with 3rd-party platforms to provide bill or account payments for 3rd-party services and products.

## 3.3 Flexible commission structures

The operator has complete control over the configuration of merchant and agent sales commissions in order to reflect the desired business model. Merchants receive discounts on their own sales, paid as a commission, whilst agents receive indirect commission (passive income) on sales made by consumers, merchants or other agents assigned to them. Cell Power supports a sales commission hierarchy of up to five levels, where indirect commissions can be paid to each agent in the hierarchy above which the sale is made. All commissions are calculated and disbursed online, i.e. in real-time when the sales transaction takes place.

## 3.4 Prepaid wallets

All sales accounts are implemented as prepaid accounts, called wallets. Wallets are the accounts against which all sales accounting is performed. Merchants must credit their wallets, by making a deposit, in order to purchase or resell stock. All commissions are paid back into the wallet in real-time at the time of the sales transaction.

## 3.5 Inter-account transfers

Funds can be transferred between Cell Power accounts. This enables merchants to transfer money to other merchant accounts, agents to transfer money to merchants assigned to them and consumers to transfer funds to other consumers.

## 3.6 Online transaction processing

Cell Power is an online transaction processing (OTP) system. All billing events are recorded in real-time, and sales data are processed for near real-time, online analysis. No offline processing is required to settle or reconcile sales accounts and commissions.

## 3.7 Automated deposit processing

Cell Power can be configured to receive and process SMS and/or email messages sent by the operator's financial institution for each deposit made into the operator's bank account. This is subject to the availability of a deposit notification service provided by the operator's financial institution. This provides a high level of business automation with a rapid turn-around time to process merchant deposits.

### **3.8 Online and offline transactions for dedicated POS terminals**

Transactions from dedicated retail POS terminals can either be online (voucher is requested from the Cell Power server for every transaction), or offline (terminal requests a batch of vouchers according to business rules configured for each terminal, and which are then stored on the terminal for offline sales). Stock levels for offline sales are replenished automatically.

### **3.9 Standing instructions for future-dated transactions**

Merchants, agents or administrators can schedule future-dated sales transactions by start- and end-date, number of occurrences, day-of-week, day-of-month and week-of-month.

### **3.10 Bulk sales and printing of denominated vouchers**

Merchants can purchase denominated vouchers in bulk by completing an on-line order form and downloading a single text-delimited file containing the ordered vouchers. The file can also be encrypted using PGP, or printed directly to a dot-matrix printer that supports Epson control codes.

### **3.11 Web-based user interfaces**

A standard Web browser is used as the administration interface for the Cell Power application. This eliminates the roll out of administration clients on administration computers.

### **3.12 Administrator hierarchy**

User roles are used to configure administrator privileges, and can be added, deleted or modified. The system is configured with a number of default user roles, including: superuser, support, supervisor, cashier, management, merchant and agent.

### **3.13 Merchant administration**

Merchant accounts can be added/edited/deleted. Sales accounts can be managed for each product type (e.g. airtime, electricity, etc) per merchant; overdraft limits can be set for each sales account. Detailed and summary statements and sales reports can be drawn for each sales account for each merchant.

Sales margins for each voucher type can be set per merchant. Merchants can be assigned to a group; merchant groups can be added/edited/deleted; sales margins can be configured for each merchant group.

Vending times can be set for each merchant account and/or specific terminals on a time-of-day and day-of-week basis.

All merchant details are stored on Cell Power, including name, ID or company registration number and contact and address information. Custom data fields can also be created to store additional merchant data specific to the Cell Power operator's requirements.

### **3.14 Merchant deposit processing**

Merchant deposits into the operator's bank account can be processed in Cell Power by importing bank statements, or by receiving and processing deposit notification email and/or SMS messages received from the operator's financial institution, or manually by an administrator.

Merchants receive SMS and/or email notifications when their sales accounts are debited or credited.

Bank charges can be configured to be automatically charged to the merchant's account for each deposit type.

### **3.15 Agents**

Merchants can be assigned to a sales agent. Agents receive indirect commission on sales made by other merchants, agents and/or consumers beneath them. Agents can view statements and sales reports for the merchants assigned to them. Agents can be organized in a hierarchy up to five levels deep; commissions from merchants' sales can be disbursed along the agent chain.

### **3.16 Terminal administration**

Terminals can be added/edited/deleted. Separate login PINs can be configured per terminal used for cellphone and Internet vending. Other terminal administration functions include terminal activation and deactivation, and force upload of offline stock stored on dedicated POS terminals. Business rules defining the total value and distribution of offline stock, up to a maximum value can be configured for dedicated POS terminals.



### 3.17 Configurable authentication methods for POS interfaces

Authentication methods can be configured per merchant account and/or per terminal, per vending channel. Authentication methods include PIN Only, PIN and OTP or OTP only. OTPs (One-time Passwords) can be sent to a designated email address or cellphone number via SMS.

### 3.18 Over-the-air POS terminal software management

Dedicated POS terminals can be configured to automatically retrieve software updates from the Cell Power server. This allows terminal software to be maintained in the field.

### 3.19 SMS and email messaging

Send SMS and/or email messages to merchants, groups of merchants, terminals and ad hoc numbers and email addresses; view SMS and email messages in the message queue; delete and/or purge SMS and email messages from the message queue.

### 3.20 Administration logs

All administration events are logged for auditing purposes. The administration logs may be queried based on a combination of administrator type, action and administered entity type.

### 3.21 Trace logs

All transactions are logged in detailed trace logs. The trace logs may be queried against a number of transaction types, events and parameters. Detailed trace views are available for each transaction for accurate debugging and analysis.

### 3.22 Denominated voucher store

Electronic vouchers stored in the database are encrypted using the AES encryption algorithm. An extensive search engine is available to query the voucher store based on voucher status and other trace history events and parameters. Vouchers are defined per voucher operator, e.g. mobile network operator. Import rules are defined per supplier to import character-separated, PGP-encrypted stock files into the voucher store; cost prices are configurable per supplier to set the cost price per voucher when imported. Expired vouchers are automatically quarantined; vouchers are sold on a first-in-first-out basis. Vouchers can be quarantined, refunded and released.

Alarms can be configured for DOH (Days-on-Hand) and SOH (Stock-on-Hand) thresholds. Historical rate-of-sale statistics are used to suggest stock order replenishment volumes.

### 3.23 Reporting and management interface for merchants

Merchants, agents and consumers are provided with a login to draw various sales statements, invoices and reports, and manage their own terminals. Agents can view statements and reports for merchants that are assigned to them.

### 3.24 Reports

Various sales reports provide views on sales by stock type, voucher type, merchants and terminals. Reports can also be downloaded to PDF and CSV format; CVS files can then be imported into third-party software programs. Extensive sales statistics are also displayed in the sales reports, such as maximum, minimum and average sales and commissions, average hourly sales for each day in the report period, and refunded transactions.

A comprehensive dashboard provides access to all headline reporting elements, with tabular and graphic mini-reports. Reports can also be scheduled to run on specific days of the week, month or year, and delivered to specified email addresses. See section 7 for further details.

### 3.25 System monitor

Administrators may monitor the system vital signs, such as memory and disk utilization, CPU load, uptime and core server application processes.

### 3.26 Alarms

Alarms may be triggered by various critical events. Administrators are notified via email and/or SMS (if GSM connectivity is available). Alarms can also be triggered on low balance thresholds for merchant accounts and sales activity, e.g. potentially fraudulent sales patterns that exceed configurable thresholds.

### 3.27 Log rotation

All text logs files are rotated, ensuring that log files do not exhaust system resources. Database logs are also rotated and optimized from time-to-time for database efficiency.

### 3.28 Process watchdogs

All core processes are monitored via watchdog processes, and are immediately restarted if they terminate.

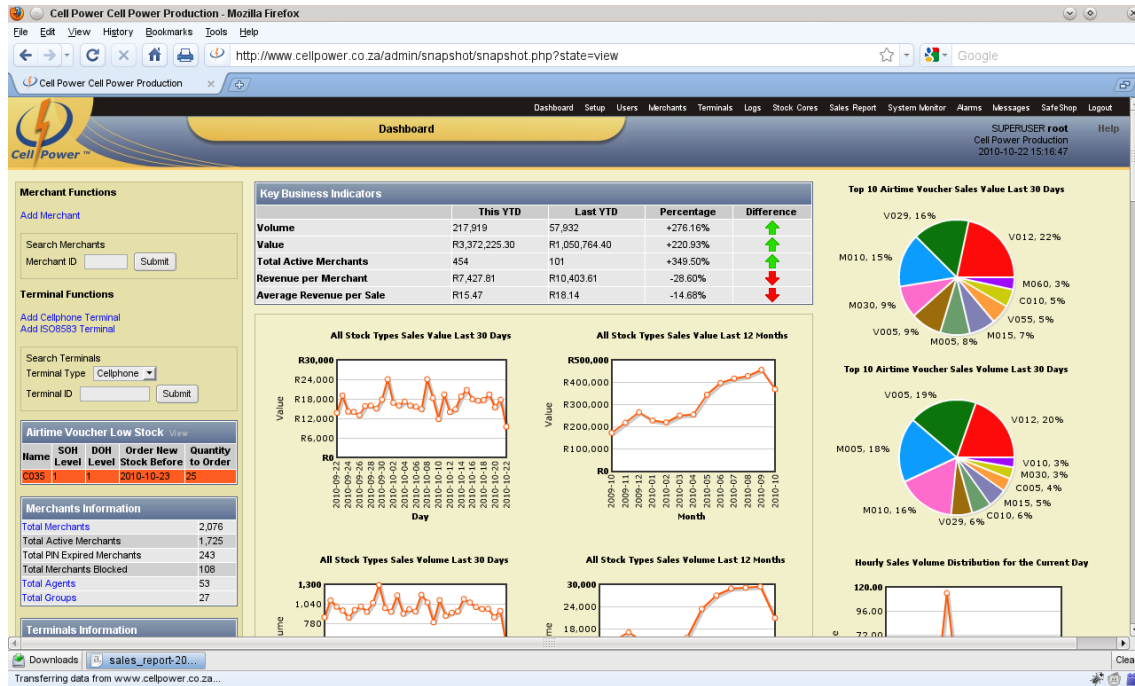


Figure 1: Sales Dashboard Example

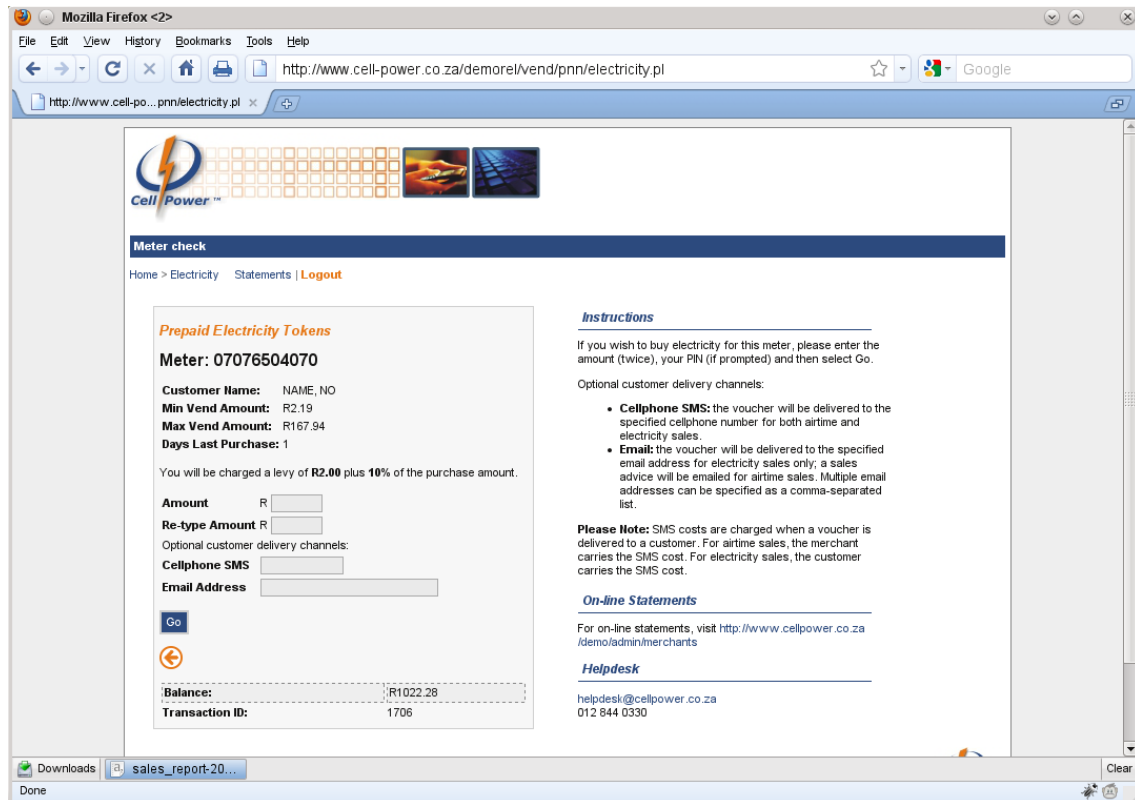


Figure 2: Vending/Purchasing Electricity Token Example

## 4 Product Types

Cell Power supports multiple types of prepaid electronic vouchers technologies and other e-commerce products and services in a single platform. These can be classified as follows:

### 4.1 Electronic Vouchers

#### 4.1.1 Denominated Vouchers

Denominated vouchers are electronic vouchers of fixed value that are generated offline and stored in a database, and retrieved at some future date when sold. Examples of denominated vouchers are prepaid airtime vouchers, lottery vouchers, discount coupons - any voucher that can be stored offline, electronically as a number and sold at a later date.

Cell Power provides a facility to import prepaid denominated vouchers in bulk electronic format and save the vouchers in a secure Voucher Store on the Cell Power server. Vouchers are stored in an encrypted format (AES cipher), and only decrypted when retrieved at the time sale. Cell Power may be configured to accept voucher import files in various CSV formats. The voucher import file may also be decrypted on the fly during the import process. Various encryption ciphers are supported, including PGP.

All vouchers are allocated a unique tracking number, and a full history of all actions performed on the vouchers is logged for auditing purposes. Denominated vouchers can be quarantined, released, refunded and deleted.

Typically, the Cell Power operator will receive vouchers in a PGP-encrypted file via email from the supplier.

#### 4.1.2 Online Dynamic Vouchers

Online dynamic vouchers are generated dynamically at the time of the sale, and are not uploaded and stored in the voucher store prior to the sale. These vouchers are also not denominated (fixed value) – the value of the voucher is discretionary, and is determined by the consumer at the time of the sale.

Examples of online vouchers are STS electricity vouchers (or tokens) that are retrieved online (at the time of the sale) from the electricity utility's prepaid management system (for example, via the XMLvend protocol).

Prepaid STS electricity vouchers differ from prepaid airtime vouchers in that the voucher is generated and encrypted for a specific electricity meter for a consumer. Prepaid electricity vouchers cannot be generated in bulk, but must be generated at the time of sale. During a vending transaction, the consumer supplies the serial number of the electricity meter in the home, as well as the amount for which he wants to buy. This information is communicated to the STS Token Management Server of the electricity utility, and a voucher that is encrypted for the specific electricity meter is returned and delivered to the consumer.

Cell Power currently interfaces with a number of STS Token Management Servers using the XMLVend protocol and various proprietary derivatives.

#### 4.1.3 Dynamic Recharge

Dynamic recharge refers to the mechanism of dispensing value electronically without vending a denominated electronic voucher to the customer. An example is PINless recharge for prepaid airtime, where a customer's prepaid cellphone account can be recharged by any amount specified by the customer without dispensing a voucher.

Cell Power has been integrated with a number prepaid billing platforms for various mobile telephone operators.

### 4.2 3rd-Party Bill Payments

Cell Power can be integrated with 3rd-party platforms to provide bill or account payments for 3rd-party services and products. For example, payments of utility accounts, telecommunications accounts, insurance premium, etc.

Integration with 3rd-party system for bill payments is usually performed as customized software development, as there are no universal standards for this functionality.

### 4.3 Inter-account Funds Transfers

Credit funds can be transferred between Cell Power accounts. Commissions and transaction fees can be configured for inter-account transfers.

The various use cases for funds transfers are discussed below.

#### 4.3.1 Agent to Merchant

Agents act as a local collector/bank for the merchants assigned to them. Merchants can pay the amount they would like credited to their account by the agent. The agent then transfers money from his Cell Power account to the Cell Power account of the merchant. This allows merchants to sell prepaid vouchers despite not having easy access to a bank.

### 4.3.2 Merchant to Merchant

A merchant can top up another merchant's account when they run out of credit by transferring money from their own Cell Power account to the other merchant's account. The other merchant would then pay them in cash.

### 4.3.3 Consumer to Consumer

If a consumer would like to pay another consumer for example, for services rendered, the consumer could transfer funds from their Cell Power account to the other consumer's Cell Power account.

### 4.3.4 Money Transfer

A consumer can pay money into his Cell Power account, and thereafter transfer the funds to another consumer's account. If the recipient consumer would like to receive the money in cash, he/she can contact a merchant in their local area, transfer the funds to the merchant's account and then receive the money in cash from the merchant.

## 5 POS Terminals

Cell Power supports various types of POS terminals:

### 5.1 Desktop Computer

A desktop computer with a standard Web browser and Internet connection can be used as a POS terminal. No special hardware or software is required by the merchant, and the merchant can make use of existing, standard equipment (PC and printer). All transactions are online, and security is provided by a merchant PIN (and optional One-Time Password) over an SSL-encrypted link via the Internet.

The merchant can either print the transaction response (e.g. voucher), or instruct Cell Power to deliver the transaction response to the customer via SMS (billed to the merchant).

### 5.2 GSM Cellphones

A GSM cellphone can be used to vend vouchers from the Cell Power system. This provides a very affordable way in which to expand the vending footprint. Independent merchants can be signed up to run their own voucher-selling business, using their own equipment to do so. This reduces the barrier to entry for the small and informal business sector. The merchant density in a given area, the total geographical coverage and the business hours can be increased through this sales channel.

When selling vouchers, the merchant compiles a text-based vending request on the cellphone, transmits this to the Cell Power server which replies by sending a text message containing a voucher (or transaction response) back to the merchant. Depending on the quality of service of the GSM service provider, this transaction can take less than 10 seconds to complete. The merchant can also instruct Cell Power to deliver the transaction response to the customer via SMS (billed to the merchant).

All transactions using cellphones take place online, with all information is logged and recorded on the Cell Power server. All transactions are implemented as atomic actions that are guaranteed to either commit in full, or be rolled back completely in case of a communication error.

The following GSM delivery channels are supported:

- SMS
- USSD
- Packet-switched data (Internet over GPRS/3G)

#### 5.2.1 Special requirements for SMS and USSD vending

SMS vending requires the installation of one or more GSM modems attached to the Cell Power transaction server. Cell Power also provides an SMPP interface for direct integration with an SMSC.

USSD vending requires integration with the USSD gateway of local mobile network operators (MNO) or wireless application service providers in the territory where Cell Power is used. The operator will have to request a USSD service code from the MNO.

### 5.3 Dedicated Retail POS Terminals

Cell Power can vend vouchers to dedicated retail POS terminals. Currently supported terminals are the CREON range of terminals manufactured by Spectra Technologies. These terminals use the ISO8583 protocol at the application layer and offer various communication methods, such as GPRS, Wi-Fi and Ethernet.

Two modes of operation are available:

### 5.3.1 Online Transactions

In the online mode, the terminal connects to the Cell Power server at the time of sale and requests one or more vouchers which are directly printed out to be handed to the consumer.

### 5.3.2 Offline Transactions

In the offline mode, prepaid vouchers are stored directly on the POS terminal, ready to be sold at a later stage. Vouchers stored on the terminal can be sold without making a connection to the Cell Power server. The POS terminals are configured to make a daily scheduled call to the Cell Power server, during which the terminal is automatically replenished with stock according to the business rules configured for that terminal, i.e. minimum stock levels per voucher type, total maximum value of downloaded stock, and percentage mix of vouchers.

The offline mode can be used to create a completely transparent vending environment for the merchant. The merchant simply sells vouchers while Cell Power ensures that there is always enough stock on the POS terminal for offline sales, and that all sales reports are automatically reconciled on the server.

Stock can also be uploaded back to the Cell Power server from the terminals by marking the terminal as stolen, or setting the terminal to the stock upload state.

The POS terminals support multiple operator logins defined on the terminal. The terminals can be configured to sell with or without shift control.

## 6 Sales Accounting

Each merchant, agent or consumer is allocated one or more prepaid sales accounts. A sales account can be allocated to one or more product types. The sales accounts are also referred to as wallets. These wallets are the accounts against which all sales accounting is performed. Merchants must credit their wallets, by making a deposit, in order to purchase or resell stock. An overdraft can also be set per sales account to provide the merchant with a credit facility. The overdraft can be configured to be reset to a specified value after a specified number of hours.

Cell Power is an online transaction processing (OTP) system. All sales commissions are paid back into the wallet in real-time at the time of the sales transaction (and not at the time of the merchant's deposit). Flexible commission structures can be configured, expressed as a combination of a percentage and/or a fixed amount per product and voucher, and can be configured for ranges of transaction value steps.

When a merchant initiates a transaction, Cell Power first checks if there are enough funds available in his sales account before allowing the transaction.

All transactions on sales accounts are done according to double-entry accounting principles, resulting in a system that can be audited by an external auditor. All critical transactions are implemented as atomic instructions, with the result that even in the face of potential communication errors and hardware failures, transactions are either committed in full, or rolled back completely. All transactions are logged to form a complete audit trail.

Merchant accounts are updated in real time and merchant statements and statistics can be used to either manage the sales targets for employed merchants or provide an independent merchant with a summary of his vending business accounts.

## 7 Reporting

The Cell Power system provides a number of reports to administrative users and merchants.

The following administrative reports are available (some of these reports can be made available to merchant and agent user roles if applicable):

<b>Merchant Group Sales Report</b>	Detailed report listing sales per merchant ordered by merchant group
<b>Merchant Invoice Statement</b>	Detailed report listing deposits, sales, refunds, transactions and banking costs per merchant per stock type.
<b>Merchant Database Report</b>	Detailed report listing all configured data fields per merchant, including sales activity status by sales value thresholds per period (day/week/month/year).
<b>Merchant Account Report</b>	Detailed report listing all merchant sales account balances up to the date specified.
<b>Inactive Merchant Sales Report</b>	List all merchants who have not transacted within the specified period.
<b>Merchant Sales Summary Report</b>	Report showing tabular and graphical data including top/bottom-N merchants by sales value, total sales per merchant group, and number of transactionally active merchants for each period data point.
<b>Merchant Sales Statement</b>	Detailed report listing sales value, volume, cost price and discount per merchant per voucher for the selected period.

<b>Merchant Registration Report</b>	List all merchants who have been registered on the system during the selected period.
<b>Merchant Out-if-Credit Report</b>	List the number of merchants out of credit, and number of merchants with credit during the selected period, and for each period data point within the selected period.
<b>Agent Sales Summary Report</b>	List sales and sales commissions per agent for sales by merchants assigned to each agent.
<b>Agent Detailed Sales Report</b>	List sales and sales commissions per agent for sales by merchants assigned to each agent, showing a detailed breakdown of each merchant's sales by product and voucher type.
<b>Sub-Agent Sales Summary Report</b>	List sales and sales commissions per agent for sales by sub-agents' merchants assigned to each agent.
<b>Agent Transfer Report</b>	Detailed report listing all inter-account funds transfers between agents and merchants.
<b>Sales Summary Report</b>	System sales report listing summary sales value, volume, operator profit and cost of sales for the selected period. The report also includes all other transaction costs levied by the system, and other sales data such as min., max. and avg. sales transactions, and average per-hour and per-period data point sales value and volume.
<b>Sales Transactions Report</b>	Detailed report showing each sales transaction during the selected period, including merchant ID, terminal ID and all billing data per transaction.
<b>Balance Report</b>	Summary report listing all system account balances and inventories at the end of the selected period, useful for end-of-period reconciliations.
<b>Voucher Import Report</b>	Summary report listing all denominated voucher import events, including date, administrative user, quantities and value of imported vouchers.
<b>Merchant Deposit Report</b>	Detailed reporting listing deposits processed per administrative user, with the option to drill down to per-transaction level.
<b>Transaction Report</b>	Reporting listing all non-sales transactions for the selected period and transaction types.

The following reports can be drawn for each merchant account, and are accessible by both administrative users and merchants:

<b>Summary Sales Report</b>	Total income and expenditure statement; sales value, sales volume, cost price and profit margin per voucher type. Report also includes time series charts of sales value and volume per voucher type.
<b>Detailed Sales Report</b>	Total income and expenditure statement; detailed listing of each sales transaction including date, transaction ID, sales value, cost price and profit margin.
<b>Detailed Terminal Sales Report</b>	List sales broken down by POS terminal assigned to merchant, including sales statistics per hour and day of the selected period, and detailed sales transaction listing for each terminal.
<b>Sales Invoice</b>	Total income and expenditure statement rendered as an invoice.
<b>Deposit Report</b>	Report listing all deposits (including bank charges) during the selected period.
<b>Detailed Statement</b>	Detailed report listing all credit and debit billing events accounts the selected account during the selected period.

## 8 Security Features

Cell Power provides a secure environment for performing virtual electronic transactions.

- All communication interfaces are encrypted using the HTTPS protocol.
- Client-side SSL certificates can be issued to restrict access to the administrative interface.
- Merchants can request client-side certificates which are associated with their terminal ID.
- Merchant accounts can be configured to use a One-time Password (OTP), delivered by email or SMS, to access the vending interface.
- A Vending Calendar can be configured for both merchants and terminals, and limits the time-of-day and day-of-week when vending is permitted.
- Denominated vouchers are stored in encrypted format.

## 9 Software Components

The Cell Power software includes the following modules installed on the Cell Power servers:



- Transaction server software
- Administration Internet interface software
- Point-of-Sale server software for Internet vending from personal computers and cellphones
- Point-of-Sale server software for SMS vending from cellphones
- Point-of-Sale server software for USSD vending from cellphones
- Registration server software for merchant and/or consumer registrations via the Internet from personal computers and cellphones
- Registration server software for merchant and/or consumer registrations via USSD from cellphones
- Reporting and management Internet interface software for merchants and/or consumers

Cell Power uses the MySQL relational database and Linux operating system.

## 10 Basic Operation

### 10.1 Administration

Administration tasks are performed via a graphical user interface that uses a standard web browser on a desktop computer. Security is provided through an encrypted (SSL) link between the desktop computer and the Cell Power Server. The main Administration tasks include:

- **Managing Administrators**
  - Add/delete/edit administrators
  - Add/delete/edit user roles to determine administrator access levels
- **Managing Merchants**
  - Add/delete/edit merchants
  - Activate/block merchants
  - Credit/debit merchant accounts
  - Set merchant account credit limits
  - Set merchant sales account low balance alarm thresholds
  - Set merchant and agent sales commissions
  - Configure merchant vending calendar
  - Display merchant account statements and reports
  - Add/edit future-dated sales transactions
- **Managing Terminals**
  - Add/delete/edit terminals
  - Assign a terminal to a merchant.
  - Activate/block a terminal
  - Schedule dial-up times for dedicated POS terminals
  - Set stock levels for dedicated POS terminals
  - Upload offline vouchers from dedicated POS terminal
  - Manage terminal vending calendar
  - Edit terminal maintenance journal and parts list
- **Administration Logs**
  - Query logs of tasks performed by administrative users.
- **Trace Logs**
  - Query detailed transaction logs of transactions between POS terminals and Cell Power.
- **Managing Denominated Voucher Store**
  - Define new voucher types and set inventory alarm levels

- Import vouchers
- Display voucher stock
- Display inventory
- Display inventory levels and predicted stock orders
- **Dynamic/Online Voucher Stock Cores**
  - Query voucher request logs of requests between Cell Power and dynamic/online voucher supplier systems.

## 10.2 Selling Vouchers

Airtime vouchers can be purchased in bulk electronic format from the telecommunication service providers. Cell Power provides a mechanism through which these vouchers can be imported and stored securely in a Voucher Store on the Cell Power server.

Electricity vouchers are obtained online directly from the Electricity Token Generation Server at the time of a transaction

### 10.2.1 Selling Vouchers Using a Cellphone or Desktop Computer

After a merchant has been added to the Cell Power database and credit has been added to his sales account, he is ready to sell vouchers. This includes the following steps (a similar process is applicable to selling via a desktop computer):

- The merchant compiles a voucher-request message on his mobile phone using either the SMS, USSD or packet-switched data service (Internet). For security, every request includes a secret merchant PIN.
- This message is sent via the GSM network to the Cell Power server.
- The Cell Power server verifies sufficient funds in the merchant's sales account, and then requests the voucher from one of the internal stock cores and credits the merchant's sales account with the commission amount (if this was configured).
- A message containing the voucher is sent back to the merchant's cellphone (and optionally to the consumer's cellphone as well).
- Optionally, the merchant writes the PIN on a personal business card and hands this to the consumer.
- For bookkeeping purposes, the return message also informs the merchant of the current balance on his sales account.
- An SMS message may also be sent to the customer's cell phone if this was specified during the original transaction request.

### 10.2.2 Selling Vouchers Using a Dedicated POS

When a dedicated POS terminal is added to the Cell Power database, it is also associated with a specific merchant. Selling vouchers from a POS terminal includes the following steps:

- The terminal is configured to dial up to the Cell Power server once a day to upload information on all sales during the previous day, and to download more airtime voucher stock to the terminal. The available funds in the merchant's sales account and the business rules that are defined in the Cell Power server dictates what the stock levels and mix would be. This happens automatically without any intervention from the merchant.
- When a merchant wants to sell an airtime voucher to a consumer, the terminal first checks its local stock for vouchers. If no vouchers are available, the terminal automatically dials up and requests more vouchers from the Cell Power server. After checking and updating the merchant's sales account, vouchers are downloaded to the POS terminal. A voucher is printed out, and the slip is handed to the consumer.
- When a merchant wants to sell an electricity voucher, he enters the consumer's electricity meter serial number with the amount for which the consumer wants to buy electricity. This information is communicated to the Cell Power server which checks the merchant's sales account for enough funds before an electricity voucher is requested from the Electricity Token Generation Server, downloaded to the terminal and printed on a paper slip.

## 10.3 Transferring Funds

Agents, merchants and consumers can transfer funds between their Cell Power accounts (in the following steps, merchant can also refer to an agent or consumer):

- Similar to the voucher-request message, the merchant compiles a transfer-request message on his mobile phone. Every request includes a secret merchant PIN for security.
- The message contains the merchant ID of the agent, merchant or consumer that the funds will be transferred to.



- The message is sent via the GSM network to the Cell Power server.
- The Cell Power server checks that the merchant has enough funds for the transfer, before the merchant's sales account is debited with the transfer amount and the receiving account is credited with the transfer amount. Commissions and transaction fees are billed to the relevant sales accounts if configured.
- The return message also informs the merchant of the current balance on his account. This is for bookkeeping purposes.

## 11 More Information

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