TECHNICAL SPECIFICATION OF CERTIFIED INVOICING SYSTEM (CIS) FOR A VIRTUAL SALES DATA CONTROLLER (VSDC)

Introduction

Rwanda Revenue Authority is currently using an Integrated Software that collects and manages domestic tax revenues. The said tax system handles the internal taxpayer registry and other tax processes but doesn't manage taxpayers' business transactions as they occur in real time. However, to have a true picture of taxpayer's business transactions and be able to expand our tax base and finance our national needs, RRA introduced Electronic Billing Machines used by taxpayers at their business premises. In 2017, RRA has upgraded the EBM backend in order to enable the supply chain management capability and integrate EBM with other RRA data sets (i.e. Importation).

Area of application

Rwanda Revenue Authority has released requirements for Electronic Billing Machines (EBM) in 2013. The stipulations on the requirements imposed on EBM state that a Certified Invoicing System (Cash Register/POS device or any other business machine used to issue invoices) must be connected to a Sales Data Controller. As of 2018, RRA seeks to introduce the usage of Virtual Sales Data Controllers (VSDC) capable of handling a richer dataset than the traditional SDC required. **This guideline includes specific requirements concerning the Certified Invoicing System to be used together with a Virtual Sales Data Controller**.

Definitions

- "Authority" means Rwanda Revenue Authority
- "User" means a taxpayer, user of CIS
- "TIN" –Tax Identification Number
- "Commissioner General" means the Commissioner General of Rwanda Revenue Authority;
- "Electronic Billing Machines" means a system comprising of Certified Invoicing System and Virtual Sales Data Controller connected together;
- "Certified Invoicing System (CIS)" means a system designated for use in business for efficiency management controls in areas of sales analysis and stock control which conforms to the requirements specified by the Authority;
- "Machine Registration Code (MRC)" means CIS's unique serial number;
- "Receipt" means a certified retail receipt or a wholesale receipt (where required) or a receipt for the provision of services provided to the customer (private individual or businessman, as applicable);
- "Signature" means receipt data used for integrity verification by Authority;
- "Virtual Sales Data Controller (VSDC)" is a software module communicating with both the CIS and the Authority for processing receipts;
- "Receipt data" means every receipt data provided by CIS which needs to be processed by VSDC;
- "Response data" means every information sent from VSDC to CIS;
- "Internal data" means encrypted information related to the current receipt and saved to internal storage of VSDC;
- "VSDC serial number" - Virtual Sales Data Controller's unique serial number with designation of its certificate;
- "Remote audit" - function of VSDC to establish two way communication with remote server designated by the Authority in order to transfer required audit information;
- "Local audit" - function of VSDC to provide information from its internal memory to a removable storage media;
- "POS" - Point Of Sale.

CIS specification for Virtual SDC

1. A Certified Invoicing System (CIS) can be any electronic cash register, any terminal with cash register software, any computer using invoicing software, or any other similar system used for registration of outbound transactions.

2. A CIS shall not be able to receive importation and purchase data or produce invoices unless connected to a functional Virtual Sales Data Controller unit assigned for the same TIN. This VSDC preserves in an irrevocable and secure manner all relevant data of the outbound transactions, uses this data to calculate an encrypted value that must be printed on the final receipt, in accordance with this guideline.

3. A Cash Register/POS and similar business machine shall:
   3.1. Contain software (PC software or firmware) that controls the functions indicated in this guideline
   3.2. be provided with a model name and a manufacturing number through a Machine Registration Code (MRC) described below:
     3.2.1. Each CIS shall be provided with MRC (a model designation and serial number). MRC has a unique number by which both the certified invoicing system and the manufacturer are clearly identified. The MRC will be built as follows:
       i. Cash registers: AAABBNNNNNN, where:
          1. AAA = manufacturer id. (given by the Authority);
          2. BB = manufacturer certificate number (given by the Authority);
          3. NNNNNN = serial number (in ascending order, given by the manufacturer)
       ii. POS systems: BBBCCNNNNNN, where:
          1. BBB = software developer id. (given by the Authority);
          2. CC = software developer certificate number (given by the Authority);
          3. NNNNNN = serial number (in ascending order, given by the software developer)

4. A Certified Invoicing System shall generate receipts, which must show, among others, the data enumerated in Items a to n of this Article as minimum required information:
   a. Taxpayer's name;
   b. Tax Identification Number;
   c. the address at which the sale takes place;
   d. tax Identification number of the client;
   e. phone number of the client;
   f. receipt type and transaction type;
   g. serial number of the receipt from an uninterrupted ascending number series per receipt type;
   h. registered items and/or services with description, quantity, price, with any other action that may be done such as cancellations, corrections;
   h. total sales amount;
   i. tax rates applied;
   j. the value added tax added to the sale amount;
   k. means of payment;
   l. VSDC information:
      i. Date and time stamped by VSDC;
      ii. Sequential receipt type number;
      iii. Receipt signatures;
      iv. VSDC identification number;
   m. Date and time stamped by CIS;
   n. Machine Registration Code (MRC).

5. Each receipt issued by Certified Invoicing System is formed from a combination of receipt type and transaction type.

   5.1. Receipt types are:

   5.1.1. NORMAL

   5.1.2. COPY

   5.1.3. TRAINING

   5.1.4. PROFORMA

   5.2. Each receipt type is attributed with one of the following transaction types:

   5.2.1. SALE;

   5.2.2. REFUND.

   5.3. Certified Invoicing System shall assign a unique receipt label to each combination of receipt type and transaction, so that the Virtual Sales Data Controller can interpret them unambiguously. The table below gives the combinations of receipt labels:

RECEIPT TYPE	TRANSACTION TYPE	RECEIPT LABEL
NORMAL	SALES	**NS**
NORMAL	REFUND	**NR**
COPY	SALES	**CS**
COPY	REFUND	**CR**
TRAINING	SALES	**TS**
TRAINING	REFUND	**TR**
PROFORMA	SALES	**PS**

6. For the purpose of signing an invoice, the data flow between the Certified Invoicing System and the Virtual Sales Data Controller will be as follows for each receipt type:

   6.1. the CIS sends the following receipt data to the VSDC at the time when the receipt is being produced:

   6.1.1. date and time;

   6.1.2. Tax Identification Number;

   6.1.3. client's TIN ;

   6.1.4. client phone number;

   6.1.5. machine registration code (MRC);

   6.1.6. receipt number;

   6.1.7. receipt type and transaction type;

   6.1.8. TAX rates;

   6.1.9. total amounts with TAX;

   6.1.10. TAX amounts.

   6.2. the VSDC receives receipt data from CIS

   6.3. the VSDC generates the following response data and sends it back to the CIS:

   6.3.1. VSDC ID;

   6.3.2. date and time;

   6.3.3. receipt label;

   6.3.4. receipt counter per receipt type;

   6.3.5. receipt counter of all receipts;

   6.3.6. digital signatures (except for the receipt types TRAINING and PRO FORMA);

   6.4. the CIS finalizes receipt by printing VSDC information on designated place within the receipt.

   6.5. the CIS sends complete journal data of NS and NR receipt labels in text form to VSDC.

7. CIS shall:

   7.1. contain software (PC software or firmware) that controls the functions indicated in these regulations;

   7.2. have reprogrammable TIN under its service mode, for the purpose of ownership transfer, only if the change of TIN is conditioned by the reset which deletes all information saved for previously programmed TIN;

7.3. carry consecutive numbers in order to guarantee the completeness and the inalterability of the journal records. This means that the journal records in the electronic journal or the journal file (which includes all receipts of the various types, among other things) shall have maximum one ascending numbering per receipt type. In case of a total reset of the Certified Invoicing System, the aforementioned numbering shall recommence from 1 (one);

7.4. be provided with a model name and a manufacturing number through a Machine Registration Code (MRC);

7.5. have display screen showing the inputs and outputs of the sale with 2 decimal places;

7.6. be able to produce Z daily report and X daily report. Z daily report refers to the summary of sales of a full day (from 00:00:00 to 23:59:59) of operations. X daily report refers to the summary of sales operations from the last Z report to the present;

7.7. be issued with a version number which is a unique identifier of the software version and should be adapted for every change made to the software. CIS software version must be enabled for verification by Authority personnel;

7.8. be able to issue receipts only if connected to VSDC unit which is functioning under normal circumstances;

7.9. be able to independently detect whether the VSDC is operational or not, and inform user of its status in case of error;

7.10. not have any other functions than those stipulated in its documentation. The documentation shall be written in English and accompany the CIS on delivery;

7.11. have an inventory control, where the user is able to input and/or remove goods from stock and produce independent reports showing inventory status;

7.12. be able to register cash deposits and withdrawals;

7.13. be able to register a payment with different means of payment;

7.14. be equipped with paper journal or electronic journal or the log file which contains all the sales that immediately upon the creation of any printed material are recorded and shall not operate without it;

7.15. not to be constructed in such a way that it is possible to register a sales amount without simultaneously printing a receipt;

7.16. not be able to register the amount of a transaction without identifying the good and /or service;

7.17. not be able to correct a transaction without prior cancelation of the original transaction. Each cancelation must refer to the original erroneous SDC Receipt number. Moreover, an original transaction is allowed to be cancel only once;

7.18. print only one original receipt. Reprint shall have a watermark with mention Copy.

7.19. send receipt data to VSDC in prescribed format defined in this guideline;

7.20. receive response data from VSDC and add this information to final receipt structure;

7.21. allow, as programming/servicing function, input of:
   7.21.1. TIN,
   7.21.2. MRC,
   7.21.3. Registered company name and address,
   7.21.4. Date and time,
   7.21.5. TAX rates, labeled as: "A", B, "C" and "D" corresponding to indexes 1-4.

7.22. print each tax rate programmed with value > 0. The tax label and value must be appearing on every receipt even though the sale was not including that particular tax rate;

7.23. print the tax label and value for tax rate equal to zero, only when an item with this particular tax rate is used;

7.24. enable to print in a uniform layout response data received from VSDC structured with following content:
   7.24.1. The designation "SDC Information"
   7.24.2. Time and date of VSDC (Date: dd/mm/yyyy Time: hh:mm:ss)
   7.24.3. VSDC identification "SDC ID: SDCXXXXXXXXX"
   7.24.4. Receipt counter "A/B RT"
   7.24.5. Internal data separate by dash after every 4th character

7.24.6. Receipt signature separate by dash after every 4th character

7.24.7. QR Code: made by *invoice_date(ddmmyyyy)#time(hhmmss)#sdc number#sdc_receipt_number#internal_data#receipt_signature*

7.25. print receipt type counter and total counter presented in the following manner A/B RT where:

7.25.1. A = Counter per receipt type;

7.25.2. B = Total counter;

7.25.3. RT = receipt type label.

7.26. provide to competent auditors an interface for audit purposes, including an overview of software settings and database;

7.27. have an item counter which presents the number of items shown on the receipt (excluding voids);

7.28. continue or re-print last line in the case of power failure or after missing paper recovery

7.29. print official RRA logo on each receipt regardless the type.

7.30. not issue a receipt of goods when the corresponding stock is less than the requested quantity. However, CIS can issue a receipt for service item regardless the stock.

7.31. be able to provide a closing stock of a given date by user.

8. Host Devices Compliance- Shall be approved by Rwanda Utilities Regulatory Authority (RURA)/ or compliant with the international safety standards for electronic equipment

9. The Certified Invoicing System functionalities shall not be affected or interrupted by any other accessory or electronic equipment connected to the same host device.

Receipt specification

10. Certified Invoicing System shall not be able to print receipt of any type before the aforementioned data flow has been finalized. This means that it shall be impossible to issue receipt if the CIS did not receive any response from the VSDC.

11. When the CIS provides a function for printing copies of the receipt, training or proforma tickets, it must be clearly distinguishable from the NORMAL receipt type. The designation COPY, TRAINING, PROFORMA has to be placed on the invoice below receipt header and above item description section and as a watermark. Moreover, in such cases the following text should appear below the amount totals of the ticket: "THIS IS NOT AN OFFICIAL RECEIPT". These identifying texts shall be at least twice bigger than the text that indicates the amount.

12. All corrections on the receipt should be performed before approving it.

13. *Normal Sale*, defined by receipt label NS, refers to a receipt that shall be produced and offered to the client. It is understood to be any receipt produced while the Electronic Billing Machine is in its normal registration mode, used to register sales of goods and/or services, including corrections and discounts.

13.1. Following is an example of receipt type NORMAL and transaction type SALE (NS):

Trade Name			TAXPAYER'S NAME
Address, City			Shop address
TIN: 000000000			Taxpayer Identification number

```
                    Trade Name                         TAXPAYER'S NAME
                   Address, City                       Shop address
                   TIN: 000000000                      Taxpayer Identification number
        -------------------------------------------
                Welcome to our shop                    Commercial message
                Client ID: 000000000                  CLIENT'S Identification (optional)
        -------------------------------------------
        Plain Bread
        1000.00x          1.00      1000.00A-EX        Item description, unit price, quantity,
        Gouda cheese                                   total price and tax designation
        33600.00x         0.200      6720.00B
        discount -25%                5040.00           Discount percentage, total price
        Wriggly gum                                    with discount
        60.00x            5.00        300.00B
        -------------------------------------------
           TOTAL                      6340.00          Total price to be paid
           TOTAL A-EX                 1000.00          Total TAX exempted amount
           TOTAL B-18.00%             5340.00          Total amount with TAX per tax rate
           TOTAL TAX B                 814.58          Total amount of TAX per tax rate
           TOTAL TAX                   814.58          Total amount of TAX
        -------------------------------------------
        CASH                          6340.00          Payment method
        ITEMS NUMBER                        3          Number of items sold
        -------------------------------------------
                 SDC INFORMATION
        Date: 25/5/2012        Time: 11:07:35          Date and time originated from VSDC
        SDC ID:            SDC001000001                VSDC Serial number
        RECEIPT NUMBER:         168/258  NS            Receipt number originated from VSDC
                 Internal Data:                        Internal data (separate by dash)
        TE68-SLA2-34J5-EAV3-N569-88LJ-Q7
                Receipt Signature:                     Receipt signature (separate by dash)
                V249-J39C-FJ48-HE2W

                  [QR CODE]                            QR Code

        -------------------------------------------
        RECEIPT NUMBER:                   152          Receipt number originated from CIS
        DATE: 25/5/2012        TIME: 11:09:32          Date and time originated from CIS
        MRC:               AAACC123456                 Machine Registration Code
        -------------------------------------------
                   THANK YOU
                COME BACK AGAIN                        Commercial message
             YOUR BEST STORE IN TOWN
```

14. *Normal Refund*, defined by receipt label NR, refers to a receipt that shall be produced, while Electronic Billing Machine is in refund mode, for a client upon request with information indicating that a previously printed Normal Sale receipt contains incorrect information or information on a refund for returned or discounted goods or services. Such refund receipt contains only negative, refunded amounts. Each receipt of this type requires a statement by user inputted to a special refund log book containing receipt details and justification with description and the name of the refund recipient.

14.1. Following is an example of receipt type NORMAL and transaction type REFUND (NR)

Receipt	Description
Trade Name	TAXPAYER'S NAME
Address, City	Shop address
TIN: 000000000	Taxpayer Identification number

REFUND	TITLE for REFUND
REF. NORMAL RECEIPT#: NNNN	Receipt number based on which refund is issued (SDC receipt number)

REFUND IS APPROVED ONLY FOR ORIGINAL SALES RECEIPT	
Client ID: 000000000	CLIENT'S Identification

Gravel /t	Item description, unit price, quantity, total price
9000.00x 5.354 -48186.00B	in NEGATIVE amount and tax designation
-25% -36139.50	Reduction of price in percentage and total amount
---	
TOTAL **-36139.50**	Total amount to be refunded (negative amount)
TOTAL B-18.00% -36139.50	Total amount with TAX (negative amount)
TOTAL TAX B -5512.81	Total amount of TAX per tax rate (negative)
TOTAL TAX -5512.81	Total amount of TAX (negative)

CASH -36139.50	Payment method (negative amount)
ITEMS NUMBER 1	Number of items

SDC INFORMATION	
Date: 25/5/2012 Time: 11:48:27	Date and time originated from VSDC
SDC ID: SDC001000001	VSDC Serial number
RECEIPT NUMBER: 12/259 NR	Receipt number originated from VSDC
Internal Data:	
IR84-99TN-FCYY-CE22-4HWE-V5TA-EE	Internal data (separate by dash)
Receipt Signature:	
669X-TBMM-GPE4-445D	Receipt signature (separate by dash)
[QR code]	
--	
RECEIPT NUMBER: 153	Receipt number from CIS
DATE: 25/5/2012 TIME: 11:50:24	Date and time from CIS
MRC: AAACC123456	Machine Registration Code
---	Commercial message
THANK YOU	

15. **Copy**, defined by receipt label CS or CR, refers to a copy or re-print of a generated receipt of any NORMAL receipt type

   15.1. Following is example of receipt type COPY and transaction type REFUND (CR):

Trade Name Address, City TIN: 000000000 **COPY** --- **REFUND** REF. NORMAL RECEIPT#: .... NNNN --- REFUND IS APPROVED ONLY FOR ORIGINAL SALES RECEIPT Client ID: 000000000 --- Gravel /t 9000.00x 5.354 -48186.00B -25% -36139.50	
	TITLE for COPY
--- **THIS IS NOT AN OFFICIAL RECEIPT -** **--**	Warning message
TOTAL **-36139.50** TOTAL B-18.00% -36139.50 TOTAL TAX B -5512.81 TOTAL TAX -5512.81 --- CASH -36139.50 ITEMS NUMBER 1 --- **COPY**	
	TITLE for COPY
--- SDC INFORMATION Date: 25/5/2012 Time: 11:49:47 SDC ID: SDC001000001 RECEIPT NUMBER: 24/260 CR Internal Data: IR84-99TN-FCYY-CE22-4HWE-V5TA-EE Receipt Signature: REE4-EGMK-DSA2-PKMM --- RECEIPT NUMBER: 154 DATE: 25/5/2012 TIME: 11:51:44 MRC: AAACC123456 --- THANK YOU WE APPRECIATE YOUR BUSINESS	

16. Training, defined by receipt label "TS" or "TR", refers to a printout purely for practice purposes on Electronic Billing Machine and shall be produced only when it is in training mode. The printed information looks similar to the NORMAL receipt information excluding digital signatures and follow instructions of this guideline.

    16.1. Following is example of receipt type TRAINING and transaction type SALE (TS):

```
              Trade Name
              Address, City
             TIN: 000000000
             TRAINING MODE                    TITLE for TRAINING
  ---------------------------------------------
            Welcome to our shop
            Client ID: 000000000
  ---------------------------------------------
  Plain Bread
  1000.00x            1.00     1000.00A-EX
  Wriggly gum
  60.00x              5.00       300.00B
  ---------------------------------------------
    THIS IS NOT AN OFFICIAL RECEIPT            Warning message
    -------------------------------------
    TOTAL                       1300.00
    TOTAL A-EX                  1000.00
    TOTAL B-18.00%               300.00
    TOTAL TAX B                   45.76
    TOTAL TAX                     45.76
  ---------------------------------------------
  CASH                          6340.00
  ITEMS NUMBER                        2
  ---------------------------------------------
            TRAINING MODE                      TITLE for TRAINING
  ---------------------------------------------
            SDC INFORMATION
  Date: 25/5/2012          Time: 11:55:12
  SDC ID:                  SDC001000001
  RECEIPT NUMBER:             33/261 TS
  ---------------------------------------------
  RECEIPT NUMBER:                   155
  DATE: 25/5/2012          TIME: 11:57:08
  MRC:                     AAACC123456
  ---------------------------------------------
              THANK YOU
            COME BACK AGAIN
         YOUR BEST STORE IN TOWN
```

17. *Proforma* or an *advance receipt*, defined by receipt label "PS". It refers to a printout from an Electronic Billing Machine while in proforma mode. The printed information looks similar to the NORMAL receipt information excluding digital signatures and follow instructions of this guideline.

   17.1. Following is example of receipt type PROFORMA and transaction type SALE (PS):

```
                Trade Name
               Address, City
             TIN: 000000000
               PROFORMA                    TITLE for PROFORMA
   ---------------------------------------------
            Welcome to our shop
            Client ID: 000000000
   ---------------------------------------------
   Cement 42.5/50kg
   11000.00x         65.00        715000.00B
   Clay local made brick
   30.00x           5500.00        16500.00B
   ---------------------------------------------
   THIS IS NOT AN OFFICIAL RECEIPT            Warning message
   ---------------------------------------------
      TOTAL                   880000.00
      TOTAL B-18.00%          880000.00
      TOTAL TAX B             134237.29
      TOTAL TAX               134237.29
   ---------------------------------------------
              PROFORMA                    TITLE for PROFORMA
   ---------------------------------------------
            SDC INFORMATION
   Date: 25/5/2012         Time: 12:17:41
   SDC ID:              SDC001000001
   RECEIPT NUMBER:           25/262  PS
   ------------------------------------------
   RECEIPT NUMBER:                  156
   DATE: 25/5/2012        TIME: 12:19:38
   MRC:                 AAACC123456
   ------------------------------------------
              THANK YOU
      WE LOOK FORWARD TO EARNING
             YOUR BUSINESS
```

18. Certified Invoicing System shall have facility to generate detailed X daily report of the day's sale during which financial transactions were conducted since the previous Z daily report was generated.

    18.1. Daily X report is produced by CIS and represents a summary of all sales records since the end of the previous Z daily report and it shall at least contain information on:

        18.1.1. trade name and tax identification number;

        18.1.2. date and time;

        18.1.3. information showing this is an X daily report;

        18.1.4. CIS designation and MRC;

        18.1.5. total sales amount for all sales receipts labeled as NS, including tax;

        18.1.6. total sales amount for all sales receipts labeled as NS, including tax, for the different main groups if main groups are used;

        18.1.7. number of sales receipts labeled as NS;

        18.1.8. total refund amount for all refund receipts labeled as NR, including tax;

        18.1.9. number of refund receipts labeled as NR;

        18.1.10. taxable amounts per applicable tax rates divided between sales (NS) and refunds (NR);

        18.1.11. tax amounts per applicable tax rates divided between sales (NS) and refunds (NR);

        18.1.12. opening deposit;

        18.1.13. number of items sold;

        18.1.14. number of receipt copies labeled as CS or CR and amount with tax included;

        18.1.15. number of receipts in training mode labeled as TS or TR and amount with tax included;

        18.1.16. number of advance receipts in proforma mode labeled as PS and amount with tax included;

        18.1.17. sales total divided according to means of payment for sales (NS) and refund (NR) receipts;

        18.1.18. all discounts;

        18.1.19. other registrations that have reduced the day's sales and their amount;

        18.1.20. number of incomplete sales.

19. Certified Invoicing System shall have facility to generate detailed Z daily report at the end of each day during which financial transactions were conducted and certified receipts generated. This report will be regarded as a business and accounting record.

    19.1. Daily Z report produced by CIS represents a summary of all registrations suitable for account of a day's sale and shall at least contain information on:

        19.1.1. trade name and tax identification number;

        19.1.2. date and time;

        19.1.3. information showing this is an Z daily report;

        19.1.4. CIS designation and MRC;

        19.1.5. total sales amount for all sales receipts labeled as NS, including tax;

        19.1.6. total sales amount for all sales receipts labeled as NS, including tax, for the different main groups if main groups are used;

        19.1.7. number of sales receipts labeled as NS;

        19.1.8. total refund amount for all refund receipts labeled as NR, including tax;

        19.1.9. number of refund receipts labeled as NR;

        19.1.10. taxable amounts per applicable tax rates divided between sales (NS) and refunds (NR);

        19.1.11. tax amounts per applicable tax rates divided between sales (NS) and refunds (NR);

        19.1.12. opening deposit;

        19.1.13. number of items sold;

        19.1.14. number of receipt copies labeled as CS or CR and amount with tax included;

        19.1.15. number of receipts in training mode labeled as TS or TR and amount with tax included;

        19.1.16. number of advance receipts in proforma mode labeled as PS and amount with tax included;

19.1.17. sales total divided according to means of payment for sales (NS) and refund (NR) receipts;

19.1.18. all discounts;

19.1.19. other registrations that have reduced the day's sales and their amount;

19.1.20. number of incomplete sales.

20. When no report or only one of the above mentioned reports has been generated, the next report shall contain all the data for the entire period (from the time of the previous Z daily report to the time of the new report).

21. PLU report contains full details of each item, the quantities sold and the amounts collected for each item and category according to the user chosen interval of date.

    21.1. PLU report shall at least contain information on:

        21.1.1. company name and tax identification number;

        21.1.2. interval date and time;

        21.1.3. information showing this is an PLU report;

        21.1.4. CIS designation;

        21.1.5. item code, item name, unit price, tax rate, quantity on sold;

        21.1.6. Remain quantity in stock.

Communication Protocol between CIS and VSDC

22. Certified Invoicing System (CIS) shall connect to the Virtual Sales Data Controller (VSDC) via a web service API (SOAP or REST) or any other application service communication protocol available to the CIS and supported by the VSDC;

Communication Flow between CIS and VSDC

23. CIS sends a message containing a command for the VSDC.

24. VSDC executes the command and sends a response message to the CIS within a set time-out period. CIS must wait for a reply before sending another message to VSDC.

    24.1. Message sequence

        24.1.1. During communication, the VSDC will always act as a service application responding to CIS requests.
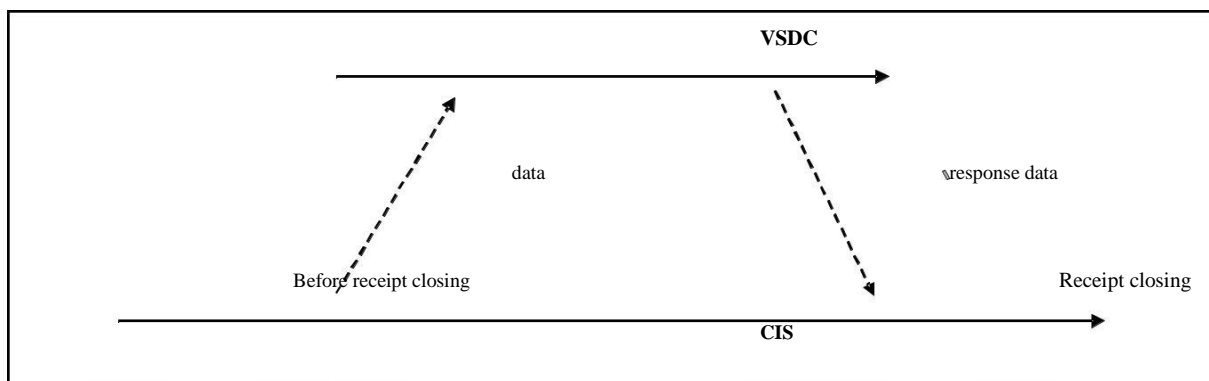
24.2. Message Time-out

24.2.1. The CIS must ensure a 1000 ms time-out for receiving a reply. If no reply is received after the time-out, the CIS must resend the message. After a set number of failures, the CIS must display a warning for disconnecting.

24.2.2. CIS messages shall be sent in xml format.

24.3. Errors while processing the request

24.3.1. In the case of an error, VSDC has to reply with an error code message.

24.4. Data Format

24.4.1. Decimal numbers are presented with two decimal places. Decimal separator is dot ('.'). For example: '18.00'. Zero value is always presented as '0.00'.

24.4.2. Date format is 'DD/MM/YYYY'. For example: '20/06/2012' for 20 June 2012.

24.5. Message formatting between CIS and VSDC

Messages from the CIS to the VSDC	

`<TIN>182345362</TIN>`
`<CMD></CMD>`
`<DATA></DATA>`	

`<CMD>`	**Command code**
`<DATA>`	**Data field**

Messages from the VSDC to the CIS	

`<TIN>182345362</TIN>`
`<CMD></CMD>`
`<DATA></DATA>`
`<STATUS>P</STATUS>`	

`<CMD>`	**Command code**
`<DATA>`	**Data field**
`<STATUS>`	**Status of the VSDC**

24.6. VSDC status code <STATUS>

24.6.1. The VSDC current state is coded and sent in each reply message:

General usage
'P' – if command is successfully 'E' – if there is an error with the command

24.6.2. Error codes are listed by their priority. Whatever error is first detected, it is the one that should be shown as the error code.

24.6.3. VSDC Error codes:

    i.   00 – no error;

    ii.   11 – internal memory full;

    iii.   12 – internal data corrupted;

    iv.   13 – internal memory error;

    v.   20 – Real Time Clock error;

    vi.   30 – wrong command code;

    vii.   31 – wrong data format in the CIS request data;

viii.	32 – wrong TIN in the CIS request data;
ix.	33 – wrong tax rate in the CIS request data;
x.	34 – invalid receipt number in the CIS request data;
xi.	40 – VSDC not activated;
xii.	41 – VSDC already activated;
xiii.	42 – VSDC Authentication error
xiv.	90 – Internet error;
xv.	91 – Backup error;
xvi.	99 – Hardware intervention is necessary.

24.6.4. Warning codes:
- i. 0 – no warning;
- ii. 1 – VSDC internal memory is near to full (it is at more than 90% of capacity);
- iii. 2 – VSDC internal memory is near to full (it is at more than 95% of capacity).

24.7. Detailed command description

24.7.1. This command is used to send CIS receipt data to VSDC:

CMD: SEND_RECEIPT	
Data field:	*<Rtype><TType><MRC>,<TIN>,<Date><Space><Time>,<RNum>,< TaxRate1>,< TaxRate2>,<TaxRate3>,<TaxRate4>,<Amount1>,<Amount2>,<Am ount3>,<Amount4>,<Tax1>,<Tax2>,<Tax3>,<Tax4>[,<ClientsTin>, <Clientphone>]*
Response:	**<Code><ErrorCode>**
Comment:	
RType	Receipt type: N - normal; C - copy; T - training; P - proforma
TType	Transaction type: S – sale; R – refund
MRC	CIS machine registration code - up to 12 characters
TIN	Tax registration number of the taxpayer
Date	Date of issuing the receipt: DD/MM/YYYY
Time	Time of issuing the receipt: HH:MM:SS
RNum	Receipt number
TaxRate1,…,TaxRate4	Percentage Tax rates
<Amount1>,…,<Amount4 >	Receipt amounts corresponding to each Tax (taxable amouts)
<Tax1>,…,<Tax4>	Calculated taxes corresponding to each Tax (tax amounts)
ClientsTin	Tax registration number of the client.
Clientphone	Phone number of the client
Code	**'P'** – the command is executed **'E'** – error
ErrorCode	Warning number when *Code* is P. Error number when *Code* is E

24.7.2. This command is used to get VSDC information for the last receipt processed by VSDC:

CMD: RECV_RECEIPT	
Data field:	*<RNumber>*
Response:	*<Snumber>,<TNumber>,<GNumber>,<RLabel>,<Date><Space><Time>,<Receipt Signature>,<Internal Data>*
Comment:	
Rnumber	Receipt number
SNumber	VSDC serial number as a string
TNumber	Receipt number per receipt type
GNumber	Total receipt number
RLabel	Receipt label, based on receipt type (N, C, P, T) and transaction type (S, R): <receipt type><transaction type>, for example: NS
Date	Date of accepting the receipt by the VSDC: DD/MM/YYYY
Time	Time of accepting the receipt by the VSDC: HH:MM:SS
Receipt Signature	Receipt Signature, sent as a string
Internal Data	Internal Data, sent as a string
Exemplary responses:	SDC999123456,300234,234556,NS,19/01/201212:39:05,JVPGPLYGDJRSMXF2,2ASVSDCZBZ5AH3TZVVIKEXRW6IQ

24.7.3. This command can be used to read the signatures for the last receipt processed by VSDC:

CMD: SIGNATURE_REQUEST	
Data field:	*<Type><RNumber>*
Response:	*<Signature>*
Comment:	
Type	R – Receipt Signature I – Internal Data
Rnumber	Receipt number
Signature	VSDC signature, sent as a string
Exemplary responses:	For the Receipt Signature: JVPGPLYGDJRSMXF2 For the Internal Data: 2ASVSDCZBZ5AH3TZVVIKEXRW6IQ

24.7.4. This command can be used to read the counters for the last receipt processed by VSDC:

CMD: COUNTERS_REQUEST	
Data field:	*<RNumber>*
Response:	*<TNumber>,<GNumber>,<Date><Space><Time>*
Comment:	
RNumber	Receipt number, sent by the CIS
TNumber	Receipt number per receipt type
GNumber	Total receipt number
Rlabel	Receipt label, based on receipt type (N, C, P, T) and transaction type (S, R): <receipt type><transaction type>, for example: NS
Date	Date of accepting the receipt by the VSDC: DD/MM/YYYY
Time	Time of accepting the receipt by the VSDC: HH:MM:SS
Ex. response:	300234,234556,NS,19/01/2012 12:39:05

24.7.5. This command is used to read the date and time of VSDC:

CMD: DATE_TIME_REQUEST	
Data field:	*No data*
Response:	*<Date><Space><Time>*
Comment:	
Date	*Current date of VSDC: DD/MM/YYYY*
Time	*Current time of VSDC: HH:MM:SS*

24.7.6. This command is used to read the serial number of VSDC:

CMD: ID_REQUEST	
Data field:	*No data*
Response:	*<SNumber>*
Comment:	
SNumber	VSDC serial number as a string

24.7.7. EJ Data:

CMD: EJ_DATA	
Data field:	*<String>*
Response:	*<Flg>*
Comment:	
String	String that represent invoice print out. Each string of line must be ended by "\n"
Flg	'P' - operation succeed 'E' - operation failure

24.7.8. VSDC Status:

CMD: STATUS	
Data field:	*No data*
Response:	*<Snumber>,<FWver>,<HWrev>,<CurrentZ>,<LastRemoteDate>,<Last LocalDate>*
Comment:	
Snumber	VSDC serial number
FWver	Firmware version
HWrev	Hardware revision
CurrentZ	The number of current VSDC daily report
LastRemoteDate	Last remote audit date and time
LastLocalDate	Last local audit date and time

24.7.9. A Certified Invoicing System must stop operating, whenever a communication error appears, due to the disconnection from the VSDC or due to power failure interruption. After the error has been cleared, the continuation of the printing process must be enabled

24.8. These commands are used to define the type of data to be shared between VSDC and CIS. They are sent in XML format. The data flow transmission should be schedule to a maximum of 15 min.

Tag	Description
<CMD>	1. SEND_RECEIPT: Used when VSDC sends to Authority Server one or many *Receipt* records. 2. SEND_RECEIPTITEM: Used when VSDC sends to Authority Server one or many *Receipt Item* records. 3. SEND_PURCHASE: Used when VSDC sends to Authority Server one or many *Purchase* records. 4. RECV_PURCHASEITEM: Used when VSDC receives one or many *PurchaseItem* records from the Authority Server. 5. SEND_PURCHASEITEM: Used when VSDC sends to Authority Server one or many *Purchase Item* records. 6. SEND_INVENTORY: Used when VSDC sends to Authority Server one or many *Current Stock* records. 7. SEND_ITEM: Used when VSDC sends to Authority Server one or many *Item description* records. 8. RECV_ITEM: Used when VSDC receives one or many *Item description* records from the Authority Server. 9. RECV_IMPORT_ITEM: Used when VSDC receives one or many *Importation* records from the Authority Server. 10. SEND_IMPORT_ITEM: Used when VSDC sends one or many *Importation* record confirmations to the Authority Server. 11. RECV_SYSCODECLS: Used when VSDC receives one or many *System Code Classification* records from the Authority Server. 12. RECV_SYSCODE: Used when VSDC receives one or many *System Code* records from the Authority Server. 13. RECV_TAXPAYER: Used when VSDC receives one or many *Taxpayer* records from the Authority Server.
<tin>	Taxpayer Identification Number owning the VSDC

Each <DATA> tag contains different types of tags depending on the value in <CMD> as described below:

24.8.1. For <CMD>value = SEND_RECEIPT

	Tag name	Description	Sample data
	invId	Invoice ID	290
	bhfId	Branch ID	00
	sdcId	Sales Data Controller Id	SDCXXXXXXXXX
	mrcNo	Machine Registration Code	MRCXXXXXXXX
	bcncId	Customer TIN	100111222
	bcncNm	Customer Name	TAXPAYERXX
	refId	Reference invoice number	
	transTyCd	Transaction Type code	N
	rcptTyCd	Receipt Type Code	S
	ValidDt	Receipt date	2017-06-21 13:15:28
	totNumItem	Total number item	1
	taxRateA	Tax rate A	0
	taxRateB	Tax rate B	18
	taxRateC	Tax rate C	0

Tag name	Description	Sample data
taxRateD	Tax rate D	0
totTaxablAmtA	Total taxable amount A	0
TotTaxablAmtB	Total taxable amount B	295000
TotTaxablAmtC	Total taxable amount C	0
totTaxablAmtD	Total taxable amount D	0
totTaxA	Total tax amount A	0
totTaxB	Total tax amount B	45000
totTaxC	Total tax amount C	0
totTaxD	Total tax amount D	0
totTax	Total Tax amount	45000
totAmt	Total amount	295000
rcptDt	Receipt date	21062017131534 (DDMMYYYYHHMMSS)
sdcRcptNo	SDC receipt number	285
totSdcRcptNo	SDC receipt number	285
internalData	Receipt Internal data	G7ZTMX4DSSAPNR5C6UTSJYKRNA
signature	Receipt signature	OHYYSNKC2XQ2N3AM
journal	Electronic journal	[RECEIPT TEXT]
regusrId	Register User id	2
regusrNm	Register user name	Test
rptNo	Report number	2
regDt	Send date	2017-06-21 13:15:35

24.8.2. For <CMD>value = SEND_RECEIPTITEM

Tag name	Description	Sample data
invId	Invoice ID	12
bhfId	Branch ID	00
itemSeq	Item sequence	1
itemClsCd	Item Classification Code	3026530000
itemCd	Item Code	RW2BEXUXXX0000001
itemNm	Item Name	Bar 12mm
bcncId	Customer TIN number	100111222
pkgUnitCd	Packaging unit code	BE (Sys Code:17)
pkgQty	Packaging quantity	0
qtyUnitCd	Quantity unit code	U(Sys Code:10)
qty	Quantity	50
untpc	Unit price	5900
splpc	Supplier price	295000
dcRate	Discount rate	0
dcAmt	Discount amount	0
taxablAmt	Taxable amount	295000
taxTyCd	Tax type code	B(Sys Code:4)
tax	Tax amount	45000
totAmt	Total amount	295000

24.8.3. For <CMD>value = RECV_PURCHASE

The request for the <CMD> RECV_PURCHASE doesn't require the data. However its response can contain zero or many rows.

	Tag name	Description	Sample data
	InvId	Invoice ID	251
	bhfId	Branch ID	00
	bcncId	Customer TIN	101558700
	bcncSdcId	Supplier SDC Id	SDC007000001
	bcnMrcNo	Supplier Mrc No	MRC00100001
	regTyCd	Registration Type code -M: Manual - A: Automatic	M
	refId	Reference Id (Supplier invoice number)	2
	payTyCd	Paymeny Type Code	01
	invStatusCd	Invoice status code	02
	ocde	Transaction Date	20161219
	validDt	Valid Date	2016-12-19 09:05:12
	CancelReqDt	Cancel Request Date	2016-12-19 09:05:12
	canceledDt	CanceId Date	2016-12-19 09:05:12
	cancelTyCd	Cancel Type Code	
	refundDt	Refund Date	2016-12-19 09:05:12
	totNumItem	Total number item	1
	totTaxablAmtA	Total taxable amount A	0
	totTaxablAmtB	Total taxable amount B	630000
	totTaxablAmtC	Total taxable amount C	0
	totTaxablAmtD	Total taxable amount D	0
	totTaxA	Total tax A	0
	totTaxB	Total tax B	96101.70
	totTaxC	Total tax C	0
	totTaxD	Total tax D	0
	totSplpc	Total Supplier Amount	630000
	totTax	Total Vat amount	96101.70
	totAmt	Total Amount	630000
	remark	Remark	[FREE TEXT]
	regusrId	Register user ID	Teller
	regDt	Register Date	20161219171600

24.8.4. For <CMD>value = SEND_PURCHASE

Tags in <DATA> with a corresponding sample value

	Tag name	Description	Sample data
Row (1..n)	table	Target table	TRNPURCHASE
	actionCd	Target data processing	ACT – INSERT
	InvId	Purchase ID	251
	bhfId	Branch ID	00
	bcncId	Supplier TIN	101558700
	bcncNm	Supplier Name	TAXPAYER X
	bcncSdcId	Supplier SDC Id	SDCXXXXXXXXX
	bcncMrcNo	Supplier MRC No	MRCXXXXXXXX
	regTyCd	Registration Type Code	M
	refId	Reference Id	1
	payTyCd	Payment type code	02

Tag name	Description	Sample data
invStatusCd	Invoice Status Code	02
ocde	Transaction date	20161219
validDt	Valid Date	2016-12-19 09:05:12
cancelReqDt	Cancel Request Date	2016-12-19 09:05:12
CancelDt	Cancel Date	2016-12-19 09:05:12
refundDt	Refund Date	2016-12-19 09:05:12
cancelTyCd	Cancel Type Date	
totNumItem	Total number item	1
totTaxablAmtA	Total taxable amount A	0
totTaxablAmtB	Total taxable amount B	630000
totTaxablAmtC	Total taxable amount C	0
totTaxablAmtD	Total taxable amount D	0
totTaxA	Total tax A	0
totTaxB	Total tax B	96101.70
totTaxC	Total tax C	0
totTaxD	Total tax D	0
totSplpc	Total Supplier Amount	630000
totTax	Total Vat amount	96101.70
totAmt	Total Amount	630000
remark	Remark	[FREE TEXT]
regusrId	Register ID	Teller
regDt	Register date	20161219171600

24.8.5. For <CMD>value = RECV_PURCHASEITEM

The request for the <CMD> RECV_PURCHASEITEM doesn't require the data. However its response can contain zero or many rows.

21.12.4.1 Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_PURCHASEITEM

Tag name	Tag description	Sample data
invId	Invoice ID	251
bhfId	Branch ID	00
itemSeq	Item sequence	1
itemClsCd	Item Classification Code	3026530000
itemCd	Item Code	RW2BEXUXXX0000002
itemNm	Item Name	Bar 10 mm
bcncItemClsCd	Supplier item class code	3026530000
bcncItemCd	Supplier item code	17350053850030
bcncItemNm	Supplier item name	10 mm Bar
pkgUnitCd	Packaging unit code	BE(Sys Code:17)
pkgQty	Packaging quantity	10
qtyUnitCd	Quantity unit code	U(Sys code:10)
qty	Quantity	150
expirDt	Expiry date	20200801
untpc	Unit price	4200
splpc	Supplier price	630000
dcRate	Discount rate	0
dcAmt	Discount amount	0
taxablAmt	Taxable amount	630000
taxTyCd	Tax type code	B(Sys Code:4)
tax	Tax amount	96101.70
totAmt	Total amount	630000
regTyCd	Registration type code	M

24.8.6. For <CMD>value = SEND_PURCHASEITEM

Tags in <DATA> with a corresponding sample value

Tag name	Tag Description	Sample data
invId	Invoice ID	251
bhfId	Branch ID	00
refId	Reference ID	1
itemSeq	Item sequence	1
itemClsCd	Item Classification Code	3026530000
itemCd	Item Code	RW2BEXUXXX0000002
itemNm	Item Name	Bar 10 mm
bcncItemClsCd	Supplier item class code	3026530000
bcncItemCd	Supplier item code	17350053850030
bcncItemNm	Supplier item name	10 mm Bar
pkgUnitCd	Packaging unit code	BE(Sys Code:17)
pkgQty	Packaging quantity	10
qtyUnitCd	Quantity unit code	U(Sys code:10)
qty	Quantity	150
expirDt	Expiry date	20200801
untpc	Unit price	4200
splpc	Supplier price	630000
dcRate	Discount rate	0
dcAmt	Discount amount	0
taxablAmt	Taxable amount	630000
taxTyCd	Tax type code	B(Sys Code:4)
tax	Tax amount	96101.70
totAmt	Total amount	630000
regTyCd	Registration type code	M

24.8.7. For <CMD>value = SEND_INVENTORY

24.8.7.1.   Tags in <DATA> with a corresponding sample value

Tag name	Description	Sample data
Tin	Taxpayer Identification Number	001201612190001
bhfId	Branch ID	00
itemClsCd	Item Classification Code	3026530000
itemCd	Item Code	RW2BEXUXXX0000001
qty	Quantity	120
updDt	Update date	2018-02-05 13:02:52

24.8.8. For <CMD>value = SEND_ITEM

24.8.8.1.   Tags in <DATA> with a corresponding sample value

Tag name	Description	Sample data
itemCd	Item Code	RW2BEXUXXX0000028
itemClsCd	Item classification code	5612180500
itemNm	Item name	Bar 15mm
itemTyCd	Item type code	2
itemStd		
OrgplceCd	Origin country	RW
PkgUnitCd	Packaging unit code	JY
QtyUnitCd	Quantity unit code	KG
AdiInfo	Addition information	0001
InitlWhUntpc	Initial unit price	2000
InitlQty	Beginning stock	10

Tag name	Description	Sample data
AvgWhUntpc	Average unit price	2000
dfltDlUntpc	Sale price	2000
taxTyCd	Tax type code	B
rm	Remark	[FREE TEXT]
useYn	Item usage on market	Y
regusrId	Register username	User1
regDt	Register date	20180301144328 (YYYYMMDDHHmmSS)
updusrId	Update username	User1
updDt	Update date	20180301144328 (YYYYMMDDHHmmSS)
safetyQty	Security stock quantity	0
useBarcode	Use of barcode	N
changeYn	Change yes/no	N
useAdiYn		Y

24.8.9. For <CMD>value = RECV_ITEM

The request for the <CMD> RECV_ITEM doesn't require any row. However its response can contain zero or many rows.

24.8.9.1. Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_ITEM

	Tag name	Tag Description	Sample data
Row (1..n)	Table	Target table	ITMITEM
	actionCd	Target data processing	ACT – INSERT
	itemCd	Item Code	RW2JYXLTR0000016
	itemClsCd	Item classification code	5015151300
	itemNm	Item name	zahabu 3 litres
	itemTyCd	Item type code	2
	itemStd		
	OrgplceCd	Origin country	RW
	PkgUnitCd	Packaging unit code	JY
	QtyUnitCd	Quantity unit code	LTR
	taxTyCd	Tax type code	B
	useYn	Item usage on market	Y
	regusrId	Register username	User1
	regDt	Register date	2017-04-24 16:18:00 (YYYY-MM-DD HH:mm:SS)
	useBarcode	Use of barcode	N
	changeYn	Change yes/no	N
	useAdiYn		Y

24.8.10. For <CMD>value = RECV_IMPORT_ITEM

The request for the <CMD> RECV_IMPORT_ITEM doesn't require any row. However its response can contain zero or many rows.

24.8.10.1. Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_IMPORT_ITEM

	Tag name	Description	Sample data
	operationCd	Operation code	1141093
	dclrtDate	Declaration date	20160826
	itemSeq	Item Sequence	1
	hsCd	HS Code	84715000000
	itemNm	Item name	EBM INCOTEX 133 (2 IN 1)
	orgplceCd	Origin Code	BG
	expNatCd	Export Country Code	BG

pkgQty	Packaging quantity	30
qty	Quantity	298
qtyUnitcd	Quantity unit code	NMB
grossWt	Gross Weight	434
netWt	Net weight	434
supplierNm	Supplier name	AL-AZHAR AUTO SPARE PARTS P.O BOX 81694 DEIRA DUBAI-UNITED ARAB EMIRATES
agentNm	Agent name	UMOJA CLEARING AGENCY LTD
invAmtFcx	Invoice Amount in foreign currency	34800
invCurCd	Invoice currency	USD
invCurRate	Exchange rate	804

24.8.11. For <CMD>value = SEND_IMPORT_ITEM

24.8.11.1. Tags in <DATA> with a corresponding sample value

	Tag name	Description	Sample data
	operationCd	Operation code	1141093
	dclrtDate	Declaration date	20160826
	itemSeq	Item sequence	1
	approvalStatusCd	Approval status code	3
	itemClsCd	Item classification code	
	itemCd	Item code	
	commF	Communication status	Y
	remark	remark	(FREE TEXT)

24.8.12. For <CMD>value = RECV_SYSCODECLS

The request for the <CMD> RECV_SYSCODECLS doesn't require any row. However its response can contain zero or many rows.

24.8.12.1. Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_SYSCODECLS

	Tag name	Tag description	Sample data
	table	Target table	SYSCODECLS
	actionCd	Target data processing	ACT – INSERT
Row (1..n)	codeCls	Code classification	39
	codeClsNm	Classification name	Warning Type
	codeClsDc	Classification description	Different warning message
	useYn	In use Yes/No	Y

24.8.13. For <CMD>value = RECV_SYSCODE

The request for the <CMD> RECV_SYSCODE doesn't require any row. However its response can contain zero or many rows.

24.8.13.1. Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_SYSCODE

	Tag name	Tag description	Sample data
	codeCls	Code classification	38
	code	Classification name	R
	codeNm	Classification description	Refund
	codeDc	Code description	Invoice refund
	useYn	In use Yes/No	

24.8.14. For <CMD>value = RECV_TAXPAYER

The request for the <CMD> RECV_TAXPAYER doesn't require any row. However its response can contain zero or many rows.

24.8.14.1. Tags in <DATA> with a corresponding sample value of response for <CMD>=RECV_TAXPAYER

Tag name	Tag description	Sample data
tin	Taxpayer Identification Number	123456789
bizCnd	Business activity	Wholesaler of different products
province	province	KIGALI CITY
district	district	KICUKIRO
sector	sector	KIGARAMA
locDc	Location description	KK 250 ST