FISCAL DEVICE GATEWAY API SPECIFICATION

Doc. No. v7.2

Contents

1. DOCUMENT SUMMARY

1.1. Definitions

Term	Description
Device or Fiscal device	Hardware based or software-based solution which is accounting sales (issues fiscal invoices, debit or credit notes) and submits them to FDMS.
Device signature	Receipt signature signed by fiscal device before submission of a receipt to Fiscal Device Gateway API.
Fiscal Device Gateway API	FDMS system module responsible for fiscal invoices, debit, or credit notes acceptance from fiscal devices.
Fiscalisation Data Management System (FDMS)	Fiscalisation Data Management System means Fiscalisation Backend system used by the Commissioner or the Zimbabwe Revenue Authority to receive, control and monitor User business transactions recorded by Electronic Fiscal Devices interfaced to it and to generate various required reports for the purposes of tax revenue administration.
FDMS signature	Receipt signature signed by FDMS after submission of a fiscal invoices, debit, or credit notes to Fiscal Device Gateway API.
QR code	A machine-readable code consisting of an array of black and white squares storing fiscal invoices, debit, or credit notes identification information, required to validate a receipt.
QR code data	QR code data is one of few receipt identification fields stored in QR code, which represents fiscal invoices, debit, or credit notes device signature.
Receipt	Receipt encompasses fiscal invoice, debit, or credit note.
ZIMRA	Zimbabwe Revenue Authority.

2. FISCAL DEVICE GATEWAY USAGE SCENARIOS

2.1. Device registration

The process starts when a taxpayer initially registers or updates their information using the Zimra registration portal. After completing this process, the taxpayer is provided with device ID and Activation Key. Device registration must be done once before starting to use a new device. After device registration, it needs to get its configurations (config) from FDMS.

2.2. Fiscal device communication modes

Fiscal device communicates with Fiscal Device Gateway API in one of two possible communication modes:
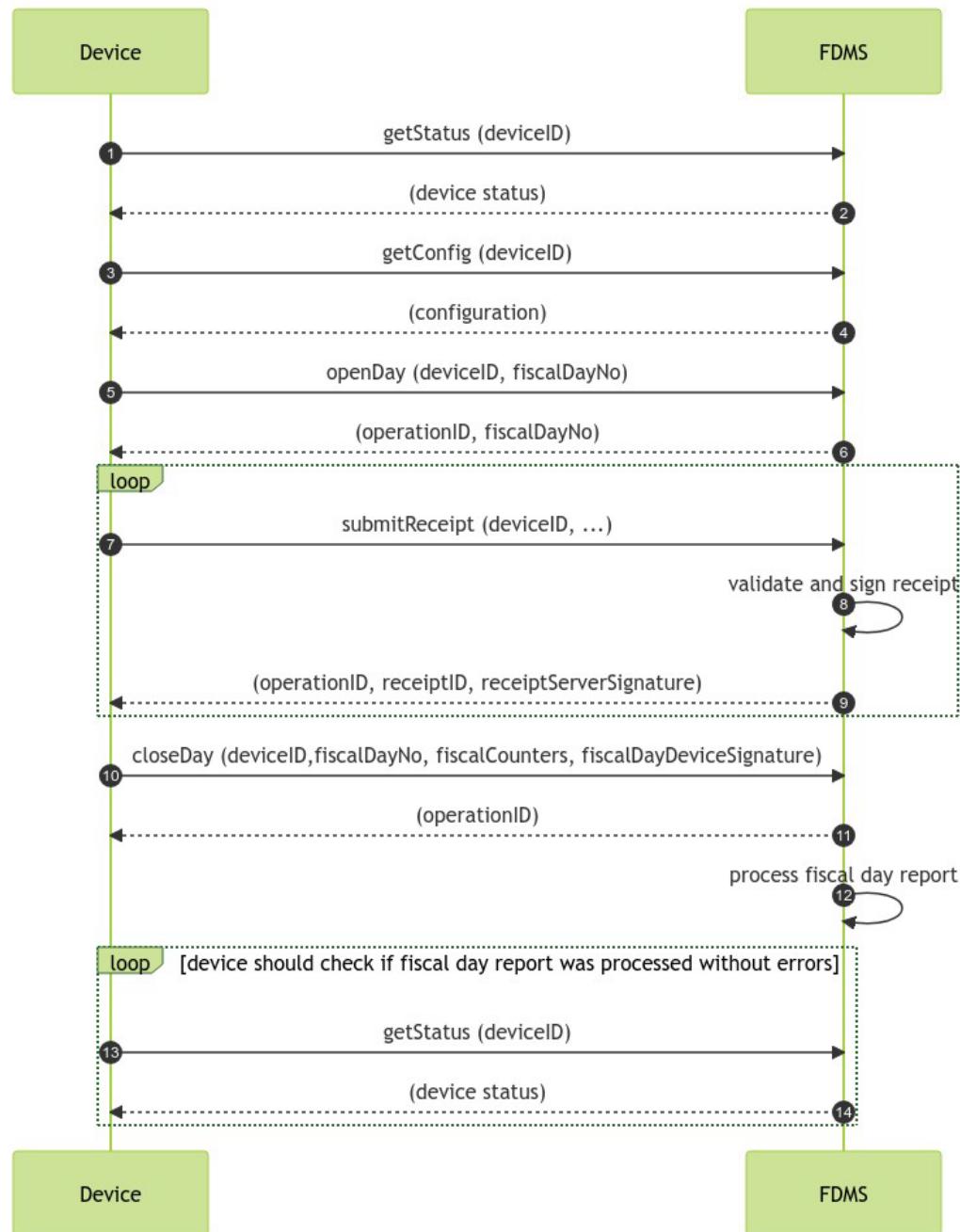
- Online
- Offline

Online communication mode represents fiscal device communication in a way when fiscal device must have online access to FDMS (must have internet connection available) when it wants to close fiscal day. Fiscal day opening and submission of a receipt to FDMS should be done immediately after opening a day or printing receipt or invoice for buyer respectively, however in case of missing internet connection, day opening message and submission of a receipt may be delayed but must be done before closing a fiscal day. In case fiscal day was opened and receipt was issued without internet connection, it is mandatory, that fiscal day opening message would be sent before sending receipts. Otherwise, receipts will not be accepted.

Offline communication mode represents fiscal device communication in a way, when fiscal device may not have internet, and its receipts and fiscal report data will be provided to FDMS by using files (by uploading file using Self-service, or by sending file to Fiscal Device Gateway API, whenever connection will be available).
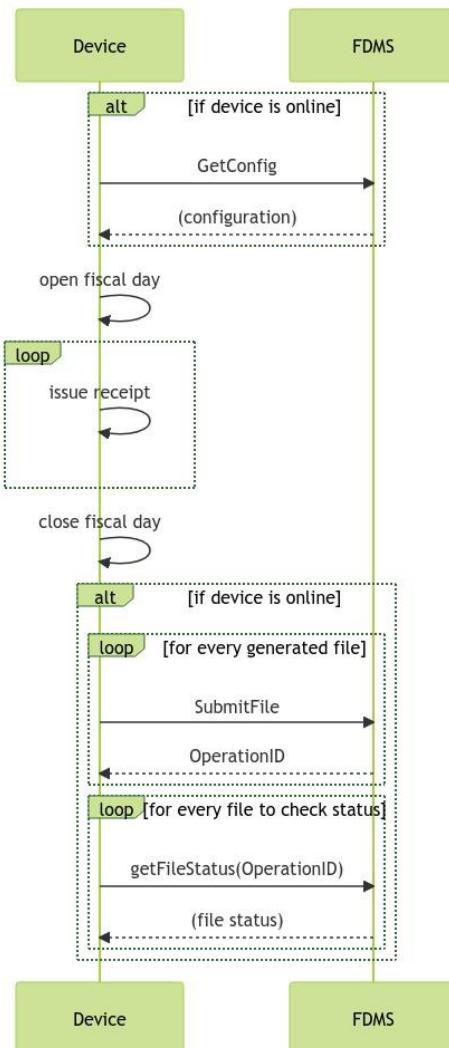
2.3. Fiscal day (in online mode)

After successful device registration, it can be used for submitting sales to FDMS. Sales submission is possible only when fiscal day is opened. When work is finished with device, it must close fiscal day.

In case of error in fiscal day report processing report must be corrected on device and resubmitted to FDMS. Report resubmission can be done unlimited number of times. In case it does not give successful result, and supplier cannot fix it to submit successful report, fiscal day may be closed manually by supplier in Public Portal, or by ZIMRA officer.

2.4. Fiscal day (in offline mode)

If device has internet connection, it should call getConfig method, to get device configuration information.

Device opens fiscal day, if device has internet connection it can send information using submitFile method (file with only header) about opened day.
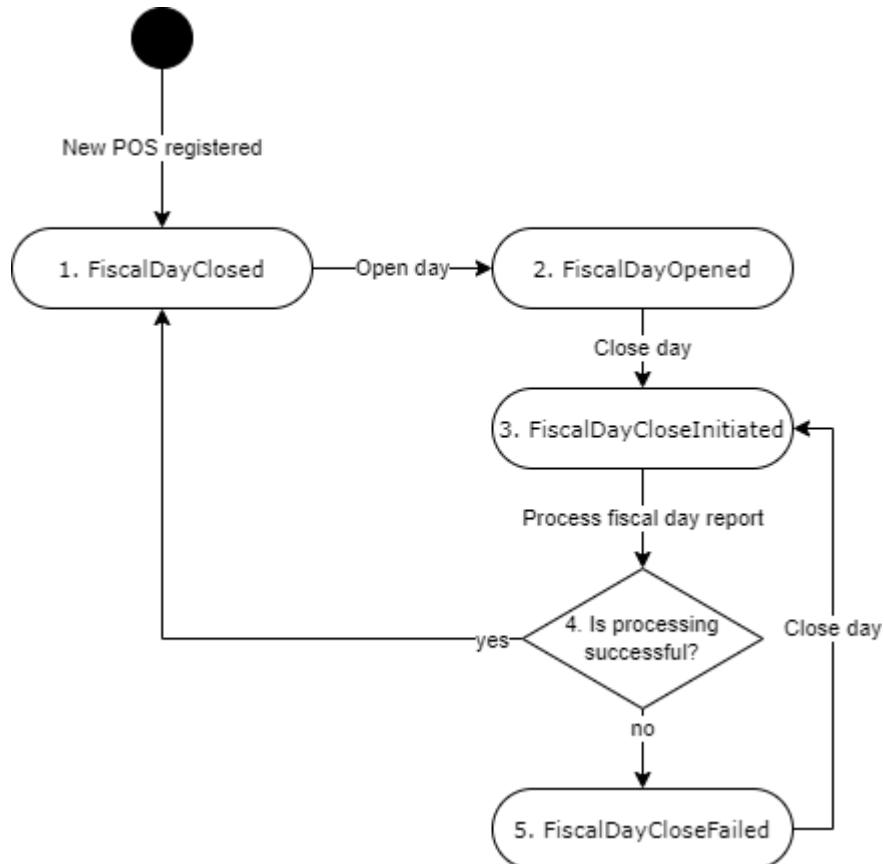
Invoices are issued which are saved in device if device has internet connection it can send information using submitFile method (file with header and content) about already issued invoices.

After fiscal day is closed information is saved in device, if device has internet connection it should send information using submitFile method (file with header and footer) about closed day. However, if there are still left unsent invoices it should send information using submitFile method (file with header, content and footer) about receipts and closed day.

After sending file device should call getFileStatus method to get sent file status.

3. OBJECT STATUSES

3.1. Fiscal day statuses

Status	Description
1. FiscalDayClosed	Status used when fiscal device has successfully closed fiscal day. New fiscal day opening is possible only from this status.
2. FiscalDayOpened	Fiscal day is opened. Invoices can be created only when fiscal day is in this status.
3. FiscalDayCloseInitiated	Closure of fiscal day is initiated, however FDMS not yet validated fiscal counters. While Fiscal day is in status "FiscalDayCloseInitiated", no new request to initiate fiscal day closure will be accepted from device or user. New invoices will not be accepted as well.
4. Is processing successful?	If processing of report is successful, fiscal day status is changed to FiscalDayClosed, if processing of report is not successful status is changed to FiscalDayCloseFailed.
5. FiscalDayCloseFailed	FDMS validated fiscal day report received from device, however there are validation errors. Device must correct issues and repeatedly submit fiscal day closure message.

4. FISCAL DEVICE GATEWAY API INTERFACES

Fiscal Device Gateway API exposes its methods using REST JSON interface. All methods except closeDay and submitFile are synchronous. closeDay and submitFile methods return response about accepted request synchronously, however processing of information is done asynchronously.

Each request must contain these HTTP headers:

Header name	Mandatory	Description
DeviceModelName	Yes	Device model name as registered in ZIMRA
DeviceModelVersionNo	Yes	Device model version number as registered in ZIMRA

During processing of request validations are performed and these errors may be returned:

- If device model is blacklisted error DEV04 is returned.
- If taxpayer is not active error DEV05 is returned.
- If device is not active error DEV01 is returned.

4.1. verifyTaxpayerInformation

verifyTaxpayerInformation endpoint is used to retrieve taxpayer information from FDMS before device registration (in order user could double check if device is going to be registered to correct taxpayer). Activation key is not yet used.

This API endpoint does not require certificate for authentication.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
activationKey	String (8)	Yes	Activation key.
deviceSerialNo	String (20)	Yes	Device serial number assigned by manufacturer.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
taxPayerName	String (250)	Yes	Taxpayer name
taxPayerTIN	String (10)	Yes	Taxpayer TIN code
vatNumber	String (9)	No	Taxpayer's VAT number. Field is not returned if taxpayer is not a VAT payer.
deviceBranchName	String (250)	Yes	Device branch name (or trade name) assigned by taxpayer.
deviceBranchAddress	Address	Yes	Device branch address.
deviceBranchContacts	Contacts	No	Device branch contacts information.

4.2. registerDevice

registerDevice endpoint is used to get device certificate and register device in FDMS (link device with FDMS).

This API endpoint does not require certificate for authentication.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID

activationKey	String (8)	Yes	Activation key. Case insensitive 8 symbols key.
certificateRequest	String	Yes	Certificate signing request (CSR) for which certificate will be generated (in PEM format). Assigned by ZIMRA device name (format: ZIMRA-<Fiscal_device_serial_no>-<zero_padded_10_digit_deviceId>) should be provided in CSR`s Subject Example of CN value, when fiscal device serial no is "SN: 001" and device id is "187": "ZIMRA-SN: 001-0000000187". Other CSR's Subject fields are optional, however if provided must match these values (otherwise device registration will be rejected): - C = ZW - O = Zimbabwe Revenue Authority - S = Zimbabwe Supported algorithms and key types (in order of suggested preference): 1) ECC ECDSA on SECG secp256r1 curve (also named as ANSI prime256v1, NIST P-256); Signature Algorithm: ecdsa-with-SHA256. 2) RSA 2048; Signature Algorithm - SHA256WithRSA. *Note:* RSA 2k and ECC 256 implement same security level, which is considered safe until 2030 year (considering trends due to upgrade in computer software and hardware combination). Most cryptographic tools and libraries support this format giving easy-to-use API and hiding all technical representation and encoding details. CSR is "CertificationRequest" structure, as defined by PKCS #10 (CSR syntax specified by RFC2986). Serialized in PEM format (i.e., base64 encoded with "------BEGIN CERTIFICATE REQUEST-----" header and "-----END CERTIFICATE REQUEST-----" footer). For more info, please refer to "12 Certificate signing request (CSR) and Certificate examples".

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
certificate	String	Yes	X.509 v3 type device certificate (in PEM format). It must be used by device in further communication with Fiscal Device Gateway API. Certificate is multi-purpose: - Client Certificate for SSL with Client Authentication. - For data signing when device signature is required. Certificate is "Certificate" structure specified by RFC5280. Serialized in PEM format (i.e. base64 encoded with "-----BEGIN CERTIFICATE-----" header and "-----END CERTIFICATE-----" footer). For more info, please refer to "12 Certificate signing request (CSR) and Certificate examples".

4.3. issueCertificate

issueCertificate endpoint is used to renew certificate before the expiration of the current certificate.

It is recommended to renew certificate a month before its expiration.

Certificate reissuance can be done at any time. It does not depend on fiscal day status, however it is recommended to be done before opening a new fiscal day.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID

Name	Type	Mandatory	Description
certificateRequest	String	Yes	Certificate signing request (CSR) for which certificate will be generated (in PEM format). certificateRequest requirements are specified in registerDevice endpoint description.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
certificate	String	Yes	X.509 v3 type device certificate (in PEM format). Certificate requirements are specified in registerDevice endpoint description.

4.4. getConfig

getConfig endpoint is used to retrieve taxpayers and device information and configuration.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
taxPayerName	String (250)	Yes	Taxpayer name
taxPayerTIN	String (10)	Yes	Taxpayer TIN code
vatNumber	String (9)	No	Taxpayer's VAT number. Field is not returned if taxpayer is not a VAT payer. If taxpayer which is not a VAT taxpayer, gets VAT number and its fiscal device has opened fiscal day, fiscal day must be closed and newly opened in order taxpayer could submit receipts with VAT.
deviceSerialNo	String (20)	Yes	Device serial number assigned by manufacturer.
deviceBranchName	String (250)	Yes	Device branch name (or trade name) assigned by taxpayer.
deviceBranchAddress	Address	Yes	Device branch address.
deviceBranchContacts	Contacts	No	Device branch contacts information.
deviceOperatingMode	DeviceOperatingMode	Yes	Specifies what are allowed receipt processing modes for this device. Possible values: - Online - Offline Device operational mode can be changed only by ZIMRA officer.
taxPayerDayMaxHrs	Int	Yes	Maximum fiscal day duration in hours.
taxpayerDayEndNotificationHrs	Int	Yes	How much time in hours before end of fiscal day device should show notification to salesperson.
applicableTaxes	Tax array	Yes	List of applicable tax rates which can be used by this taxpayer and are valid during getConfig request time or will be valid in the future.
certificateValidTill	Date	Yes	Date till when device certificate is valid. Device must reissue new certificate before this date. After this date device will not be able to submit any request to Fiscal Device Gateway.
qrUrl	String (50)	Yes	URL for QR preparation. This URL needs to be used by device when generating QR code printed on invoice.

Tax:

Name	Type	Mandatory	Description
taxID	Int	Yes	Tax ID uniquely identifying a tax. This tax ID must be used in submitting invoices.
taxPercent	Decimal (5,2)	No	Tax percent. In case of exempt, field will not be returned.
taxName	String (50)	Yes	Tax name.
taxValidFrom	Date	Yes	Date from which tax is valid.
taxValidTill	Date	No	Date till which tax is valid.

4.5. getStatus

getStatus endpoint is used to get fiscal day status.

Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
fiscalDayStatus	FiscalDayStatus	Yes	Device Fiscal day status.
fiscalDayReconciliationMode	FiscalDayReconciliationMode	No	In case fiscal day status is "FiscalDayClosed" defines how it was closed: automatically or manually.
fiscalDayServerSignature	SignatureDataEx	No	Fiscal day report signature prepared by FDMS. This field is returned only when fiscalDaySatus is "FiscalDayClosed". This signature is not used in further communication or any data preparation for FDMS. It is confirmation from FDMS that fiscal day is closed and should be stored on device. Signature verification rules are described in section 13.3.
fiscalDayClosed	DateTime	No	Date and time when fiscal day report was processed, and fiscal day status was changed to "FiscalDayClosed". Time is provided in local time without time zone information. This field is returned only when fiscalDaySatus is "FiscalDayClosed". If device has never started a new fiscal day, this field is not returned.
fiscalDayClosingErrorCode	FiscalDayProcessingError	No	Code of error which appears during fiscal day closure. Possible codes are defined in section 5.4.9 FiscalDayProcessingError. This field is returned only when fiscalDayStatus is "FiscalDayCloseFailed".
fiscalDayCounters	FiscalDayCounter array	No	List of fiscal day counters. This field is returned only when fiscalDayStatus is "FiscalDayClosed" and fiscalDayReconciliationMode is "Manual". List contains only non-zero value fiscal counters. FiscalDayCounter type description provided in *closeDay* endpoint.
fiscalDayDocumentQuantities	FiscalDayDocumentQuantity array	No	List of fiscal day document quantities. This field is returned only when fiscalDayStatus is "FiscalDayClosed" and fiscalDayReconciliationMode is "Manual". FiscalDayDocumentQuantity type description provided in FiscalDayDocumentQuantity table.

lastReceiptGlobalNo	Int	No	Last submitted receiptGlobalNo field value of fiscal invoice, credit note or debit note. In case no document is yet submitted from this fiscal device, this field is not returned.
lastFiscalDayNo	Int	No	In case fiscal day is opened, current fiscal day fiscalDayNo is returned. In case fiscal day is closed, last closed fiscal day fiscalDayNo is returned. In case fiscal device is new and not yet opened its first fiscal day, this field is not returned.

FiscalDayDocumentQuantity:

Name	Type	Mandatory	Description
receiptType	ReceiptType	Yes	Type of receipt.
receiptCurrency	String (3)	Yes	Receipt currency (ISO 4217 currency code).
receiptQuantity	Int	Yes	Total quantity of receipts of particular receipt type and currency for fiscal day.
receiptTotalAmount	Decimal (19,2)	Yes	Total receipt amount (including tax) of receipts of particular receipt type and currency for fiscal day.

4.6. openDay

openDay endpoint is used to open a new fiscal day. Opening of new fiscal day is possible only when previous fiscal day is successfully closed (fiscal day status is "FiscalDayClosed"). Opening of a new fiscal day in a fiscal device may be done without internet connection. It is important that such delayed request about day opening is sent before sending receipts.

Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
fiscalDayOpened	DateTime	Yes	Date and time when fiscal day was opened on a device. Time is provided in local time without time zone information.
fiscalDayNo	Int	No	Fiscal day number assigned by device. If this field is not sent, FDMS will generate fiscal day number and return it to device. **Validation rules:** - fiscalDayNo must be equal to 1 for the first fiscal day of fiscal device - fiscalDayNo must be greater by one from the last closed fiscal day fiscalDayNo.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
fiscalDayNo	Int	Yes	Fiscal day number of opened day. In case device has sent fiscalDayNo in request, it is returned in this field. In case device has not sent it, new fiscal day number will be generated by FDMS.

4.7. submitReceipt

submitReceipt endpoint is used to submit a receipt to FDMS in online mode and get a FDMS signature for it (signature is not a QR code, it is an acknowledgement of FDMS about received receipt). Receipt can be submitted only when fiscal day status is "FiscalDayOpened" or "FiscalDayCloseFailed".

Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

In case device tried to close a fiscal day and attempt was unsuccessful, device still have a possibility to submit a new receipt. In case it fails to submit, there should be retries of the unsent invoices to be sent.

In case the same receipt (with the same deviceID, receiptGlobalNo and receiptHash) is submitted more than once, Fiscal Device Gateway API will return successful result to fiscal device with the same original receipt receiptID, receiptServerSignature, however different operationID.

4.8. Each submitted receipt is validated. Receipt will not be accepted, error will be returned to fiscal device (as specified in 8.1 Http statuses

API can return such http statuses for errors:

Http status	Description
400	bad request – the message is malformed and could not be processed by Fiscal Backend Gateway
401	Authentication error (see Authentication and authorization)
404	Resource not found (call to not existing endpoint)
405	method not allowed – trying to access API using unsupported HTTP methos, e.g., POST to get config
422	Unprocessable Content – the instructions given by fiscal device to Fiscal Backend Gateway are incorrect, the response object ProblemDetails should contain ErrorCode to indicate the exact failing condition (e.g., DEV01 – device is blocked and therefore no instructions could be processed from such device)
500	Infrastructure error – the Fiscal Backend Gateway server is not available, or some infrastructure error occurred. The fiscal device should retry to send message later.
502	Bad gateway - the Fiscal Backend Gateway server could not be contacted. The fiscal device should retry to send message later.

Error codes), in these cases:

- fiscal device status is other than "*Active*";
- fiscal day status is other than "*FiscalDayOpened*" or "*FiscalDayCloseFailed*";
- receipt message structure is not valid.

In case the above-mentioned validations have passed, but receipt has other validation issues specified below (described in "Validation rules"), receipt will be accepted and signed, but will be marked as invalid with validation color code assigned (as specified in 8.2.1. Validation errors).

Each submitted receipt, must increase fiscal day counters as specified in *6. Fiscal counters*.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
receipt	Receipt	Yes	Receipt data

Receipt:

Name	Type	Mandatory	Description
receiptType	ReceiptType	Yes	Type of receipt.
receiptCurrency	String (3)	Yes	Receipt currency (ISO 4217 currency code). **Validation rules**

			RCPT010: currency code must be present in FDMS and must be valid at the time of receiptDate.
receiptCounter	Int	Yes	Daily ascending serial number of receipt assigned by taxpayer's device. **Validation rules:** RCPT011: receiptCounter must be equal to 1 for the first receipt in fiscal day and receiptCounter must be greater by one from the previous receipt's receiptCounter value for the second and other receipt in fiscal day.
receiptGlobalNo	Int	Yes	Cumulative ascending serial number of total receipts issued since device activation date. Taxpayer is allowed to reset this receiptGlobalNo counter to start from 1, however this is allowed to be done only for the first receipt in a fiscal day. **Validation rules:** RCPT012: receiptGlobalNo must be greater by one from the previous receipt's receiptGlobalNo or may be equal to 1 for the first receipt in fiscal day.
invoiceNo	String (50)	Yes	Invoice number generated by accounting system. **Validation rules:** RCPT013: invoiceNo must be unique in taxpayer context.
buyerData	Buyer	No	Buyer information.
receiptNotes	String	No*	Receipt notes. Usually used for CreditNote and DebitNote, mandatory for CreditNote and DebitNote. **Validation rules:** RCPT034: - receiptNotes is mandatory for receiptType CreditNote and DebitNote
receiptDate	DateTime	Yes	Date and time of device when receipt is printed for customer. Time is provided in local time without time zone information. **Validation rules:** RCPT014: - receiptDate must be greater than fiscal day opening date and time RCPT030: - receiptDate must be greater than previously submitted receiptDate RCPT031: - receiptDate must not be greater than current time (time difference set in AllowedTimeDifferenceForReceiptSubmission setting is allowed). RCPT041: - receiptDate must be less or equal than fiscal day opened + taxpayerDayMaxHrs.
creditDebitNote	CreditDebitNote	No*	Credited or debited receipt information. This field is mandatory in case receipt type is CreditNote or DebitNote. **Validation rules:** RCPT015: - creditDebitNote object is mandatory for receiptType CreditNote and DebitNote RCPT032: - credited or debited receipt must exist in FDMS, received also if credited or debited receipt does not belong to the same taxpayer of submitted credit or debit note RCPT033: - credited or debited receipt must be issued not earlier than 12 months before credit or debit note receiptDate RCPT035: - total credit note amount must not exceed original receipt amount with all previously submitted credit and debit notes amounts (where amount is calculated in this way original receipt amount – all submitted credit notes amounts + all submitted debit notes amounts. Result must be >= 0). RCPT036:

			- credit or debit note must have all or part of tax percentages plus tax ids used as in the original invoice. It cannot have new taxes, that are not in original invoice (example, if original invoice has exempt and 15% VAT tax lines, credit or debit note may have only exempt, 15% VAT or both tax lines, but cannot have 0% tax line). Non VAT taxpayer can still send VAT tax line if it was present on original invoice. RCPT029: - in case CreditDebitNote object is provided for FiscalInvoice document, received data will be saved with validation RCPT029 error. RCPT043: currency code must be same as in the original invoice. Credit/debit note cannot have different currency, than in original invoice.
receiptLinesTaxInclusive	Boolean	Yes	Specifies if receipt lines are tax inclusive or not. Possible values: - True, all receipt lines are tax inclusive - False, all receipt lines are tax exclusive
receiptLines	ReceiptLine array	Yes	Receipt lines. **Validation rules:** RCPT016: at least one line must be provided.
receiptTaxes	ReceiptTax array	Yes	Receipt taxes. **Validation rules:** RCPT017: at least one line must be provided.
receiptPayments	Payment array	Yes	Means of payments how receipt was paid. **Validation rules:** RCPT018: at least one line must be provided.
receiptTotal	Decimal (21,2)	Yes	Total receipt amount which is paid/received by buyer. **Validation rules:** RCPT019: - receiptTotal must be equal to sum of receiptLineTotal of all receiptLines in case receiptLinesTaxInclusive is true. RCPT037: - receiptTotal must be equal to sum of receiptLineTotal of all receiptLines plus sum of taxAmount of all receiptTaxes in case receiptLinesTaxInclusive is false. RCPT038: - receiptTotal must be equal to sum of salesAmountWithTax of all receiptTaxes. RCPT039: - receiptTotal must be equal to sum of paymentAmount of all receiptPayments. RCPT040: - receiptTotal must be greater than or equal to 0 for FiscalInvoice and DebitNote, receiptTotal must be less than or equal to 0 for CreditNote.
receiptPrintForm	ReceiptPrintForm	No	The format in which printed invoice was delivered to buyer (as a receipt, on A4 paper, etc.). Default value if field is not sent: Receipt48.
receiptDeviceSignature	SignatureData	Yes	SignatureData structure with SHA256 hash of receipt fields (hash used for signature) and receipt device signature prepared by using device private key as described in section 13.2. **Validation rules:** RCPT020: receiptDeviceSignature must be valid
username	String (100)	No	Username of user who created invoice.
userNameSurname	String (250)	No	Name and surname of user who created invoice.

Buyer:

Name	Type	Mandatory	Description
buyerRegisterName	String (250)	Yes	Buyer company name or physical person name and surname. **Validation rules:** RCPT043: buyerRegisterName and buyerTIN fields must be provided if buyer data is sent.

Name	Type	Mandatory	Description
buyerTradeName	String (250)	No	Buyer trade name (store name, or branch name).
buyerTIN	String (10)	Yes	Buyer TIN. **Validation rules:** RCPT043: buyerRegisterName and buyerTIN fields must be provided if buyer data is sent.
VATNumber	String (9)	No	Buyer VAT number.
buyerContacts	Contacts	No	Buyer contacts.
buyerAddress	Address	No	Buyer address.

CreditDebitNote:

Name	Type	Mandatory	Description
receiptID	Bigint	No	Receipt ID of credited or debited receipt which is credited or debited by current receipt. receiptID must be sent or deviceID with receiptGlobalNo and fiscalDayNo must be sent.
deviceID	Int	No	Device ID of credited or debited receipt which is updated by current receipt. In case receiptID is sent, this field is ignored.
receiptGlobalNo	Int	No	Receipt global No of credited or debited receipt which is updated by current receipt. In case receiptID is sent, this field is ignored.
fiscalDayNo	Int	No	fiscalDayNo of credited or debited receipt which is updated by current receipt.

ReceiptLine:

Name	Type	Mandatory	Description
receiptLineType	ReceiptLineType	Yes	Type of receipt line (for example sales or discount).
receiptLineNo	Int	Yes	Line sequence number in receipt.
receiptLineHSCode	String (8)	No*	Product or service code from National Harmonized System codes list, mandatory if taxpayer is a VAT payer. **Validation rules:** RCPT047 receiptLineHSCode must be sent if taxpayer is a VAT payer RCPT048 receiptLineHSCode length must be: - 4 or 8 digits if taxpayer is not VAT payer - 4 or 8 digits if taxpayer is VAT payer and line applied taxPercent is bigger than 0 - 8 digits if taxpayer is VAT payer and line applied taxPercent is equal to 0 or is empty
receiptLineName	String (200)	Yes	Product or service name
receiptLinePrice	Decimal (25,6)	No	Price of product or service in receipt currency (for single item). It may not be provided if the price for quantity of several prices is set (i.e., when selling 3 items for 1 USD). **Validation rules:** RCPT022: receiptLinePrice value must be: - greater than 0 for FiscalInvoice and DebitNote if ReceiptLineType is Sale; - less than 0 for FiscalInvoice if ReceiptLineType is Discount; - less than 0 for CreditNote if ReceiptLineType is Sale.
receiptLineQuantity	Decimal (25,6)	Yes	Product quantity **Validation rules:** RCPT023: value must be greater than 0
receiptLineTotal	Decimal (21,2)	Yes	Total price of receipt line (receiptLinePrice * receiptLineQuantity). **Validation rules:** RCPT024: in case receiptLinePrice is provided, receiptLineTotal must be equal to receiptLinePrice * receiptLineQuantity

taxCode	String (3)	No	Tax code representation in receipt. This field is not mandatory; however, it must be provided for all receipt lines or none of them. It is not allowed to provide taxCode for just a part of lines.
taxPercent	Decimal (5,2)	No	Applied tax percent. In case of no VAT sale, 0 value should be used, in case of exempt this field should not be provided. **Validation rules:** RCPT025: - Tax percent and tax ID combination must be the same as in FDMS.
taxID	Int	Yes	Applied tax ID uniquely identifying used tax. **Validation rules:** RCPT025: - VAT tax ID value must be one of the allowed tax ID values - receiptDate must be in a period of tax valid from and valid till period RCPT021: - VAT tax percent value determined by tax ID is greater than 0% and taxpayer is not VAT taxpayer.

ReceiptTax:

Name	Type	Mandatory	Description
taxCode	String (3)	No	Tax code representation in receipt.
taxPercent	Decimal (5,2)	No	Applied tax percent. In case of no VAT sale, 0 value should be used, in case of exempt this field should not be provided. **Validation rules:** RCPT025: -Tax percent and tax ID combination must be the same as in FDMS.
taxID	Int	Yes	Applied tax ID uniquely identifying used tax. **Validation rules:** RCPT025: - VAT tax ID value must be one of the allowed tax ID values - receiptDate must be in a period of tax valid from and valid till period RCPT021: - VAT tax percent value determined by tax ID is greater than 0% and taxpayer is not VAT taxpayer.
taxAmount	Decimal (21,2)	Yes	Total tax amount for this tax percent. taxAmount = SUM (receiptLineTotal of the same taxCode) * taxPercent/(1+taxPercent). In case of Non VAT and exempt, 0 should be sent in this field. **Validation rules:** RCPT026: - taxAmount must be equal to SUM (receiptLineTotal) * taxPercent/(1+taxPercent) of all receiptLines with the same taxPercent and taxCode values in case receiptLinesTaxInclusive is true - taxAmount must be equal to SUM (receiptLineTotal) * taxPercent of all receiptLines with the same taxPercent and taxCode values in case receiptLinesTaxInclusive is false
salesAmountWithTax	Decimal (21,2)	Yes	Total sales amount (including tax) for this tax percent. **Validation rules:** RCPT027: - salesAmountWithTax must be equal to sum of receiptLineTotal of all receiptLines with the same taxPercent and taxCode values in case receiptLinesTaxInclusive is true - salesAmountWithTax must be equal to SUM (receiptLineTotal)*(1+ taxPercent) of all receiptLines with the same taxPercent and taxCode values in case receiptLinesTaxInclusive is false

Payment:

Name	Type	Mandatory	Description
moneyTypeCode	MoneyType	Yes	Code of payment mean by which payment was done.
paymentAmount	Decimal (21,2)	Yes	Amount paid by this payment type in receipt currency. In case customer gave bigger amount (bill) in cash than total amount to be pay, it is needed to send amount without change to buyer. **Validation rules:**

| | | | RCPT028: paymentAmount value must be greater than or equal to 0 for FiscalInvoice and DebitNote, value be less than or equal to 0 for CreditNote. |

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
receiptID	Bigint	Yes	Receipt ID assigned by FDMS.
serverDate	DateTime	Yes	Date and time when FDMS signed a receipt.
receiptServerSignature	SignatureDataEx	Yes	Receipt FDMS signature generated by FDMS. This signature is not used in further communication or any data preparation for FDMS. It is confirmation from FDMS that receipt is accepted and should be stored on device. Signature verification rules are described in section 13.2.

4.9. submitFile

submitFile endpoint is used to submit a batch of invoices to FDMS in a single file. Request can be sent if DeviceOperatingMode is Offline.

File can have three parts: Header (fiscal day information), Content (invoices information) and Footer (Z report information). Header is always mandatory, Content and Footer are optional (Footer can be sent without Content, Content can be sent without Footer). File must have information only from a single fiscal day (single file cannot contain receipts from different fiscal days). Information must be sent only for closed fiscal day. Elements sequence in file must be assured to be: Header, Content, Footer, otherwise file format error will be returned. Footer must be sent only in last file for particular fiscal day.
File must be JSON format sent as base64 encoded string.
File will not be accepted, error will be returned to fiscal device (as specified in 8.1 Http statuses
API can return such http statuses for errors:

Http status	Description
400	bad request – the message is malformed and could not be processed by Fiscal Backend Gateway
401	Authentication error (see Authentication and authorization)
404	Resource not found (call to not existing endpoint)
405	method not allowed – trying to access API using unsupported HTTP methos, e.g., POST to get config
422	Unprocessable Content – the instructions given by fiscal device to Fiscal Backend Gateway are incorrect, the response object ProblemDetails should contain ErrorCode to indicate the exact failing condition (e.g., DEV01 – device is blocked and therefore no instructions could be processed from such device)
500	Infrastructure error – the Fiscal Backend Gateway server is not available, or some infrastructure error occurred. The fiscal device should retry to send message later.
502	Bad gateway - the Fiscal Backend Gateway server could not be contacted. The fiscal device should retry to send message later.

Error codes), in these cases:

- fiscal device operating mode is other than "Offline";
- file is bigger than 3 MB, file should be split to smaller than 3MB files by device;
- request structure is not valid;
- device id in input parameters and file header are different;
- file Header failed to be parsed;
- file is sent for already closed day.

In case the above-mentioned validations have passed, file is processed asynchronously. File status can be received by calling 4.10 getFileStatus API method.

If other validation issues during asynchronous processing will be detected error information may be retrieved in 4.10 getFileStatus response.

During asynchronous processing these steps will be executed:
- file structure will be validated;
- fiscal day status validated by information provided in header;

- invoices will be imported from file to FDMS (same validation rules will be applied as described in 4.6 openDay

openDay endpoint is used to open a new fiscal day. Opening of new fiscal day is possible only when previous fiscal day is successfully closed (fiscal day status is "FiscalDayClosed"). Opening of a new fiscal day in a fiscal device may be done without internet connection. It is important that such delayed request about day opening is sent before sending receipts.

Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
fiscalDayOpened	DateTime	Yes	Date and time when fiscal day was opened on a device. Time is provided in local time without time zone information.
fiscalDayNo	Int	No	Fiscal day number assigned by device. If this field is not sent, FDMS will generate fiscal day number and return it to device. **Validation rules:** - fiscalDayNo must be equal to 1 for the first fiscal day of fiscal device - fiscalDayNo must be greater by one from the last closed fiscal day fiscalDayNo.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
fiscalDayNo	Int	Yes	Fiscal day number of opened day. In case device has sent fiscalDayNo in request, it is returned in this field. In case device has not sent it, new fiscal day number will be generated by FDMS.

- submitReceipt);
  - Z report will be validated same validation rules will be applied as described in **Error! Reference source not found. Error! Reference source not found.**).
  Additional validation rules:
  - If Content and Footer are sent in a single file, they are processed as separate parts. It means that Content can be processed successfully, but Footer not successfully. In such case, invoices from Content part remains in FDMS. In case Content part fails to be processed, Footer part processing is skipped.

- Invoice is created in FDMS only if it does not yet exist (with the same deviceID, fiscalDayNo, receiptGlobalNo and receiptHash). It means if the same file with the same invoice is sent once again, or the same invoice is sent in another file invoice processing is skipped (because it is already saved in FDMS).
- If two files have same fiscal fiscalDayNo value but different fiscalDayOpened values. First received fiscalDayOpened value according to sequence field is saved, later received value is ignored.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
file	File in multipart/form-data	Yes	File containing invoices and other information related to fiscal day. Base64 encoded.

File:

Name	Type	Mandatory	Description
header	FileHeader	Yes	File header with fiscal day information.
content	FileContent	No*	File content information. Mandatory if invoices are sent.
footer	FileFooter	No*	File footer information. Mandatory if Z report is sent. Fiscal day closure procedure should be initiated.

FileHeader:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
fiscalDayNo	Int	Yes	Fiscal day number. Must be same as in FDMS if fiscal day is opened or greater by 1 if previous fiscal day is closed in case processImmediately is true. Otherwise, fiscal day number must be equal or greater than saved in FDMS.
fiscalDayOpened	DateTime	Yes	Date and time when fiscal day was opened on a device. Time is provided in local time without time zone information.
fileSequence	Int	Yes	Sequence number of file in fiscal day files sequence.

FileContent:

Name	Type	Mandatory	Description
receipts	Receipt array	Yes	List of receipts in file. Receipt type description is provided in 4.6 openDay
			openDay endpoint is used to open a new fiscal day. Opening of new fiscal day is possible only when previous fiscal day is successfully closed (fiscal day status is "FiscalDayClosed"). Opening of a new fiscal day in a fiscal device may be done without internet connection. It is important that such delayed request about day opening is sent before sending receipts.
			Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
fiscalDayOpened	DateTime	Yes	Date and time when fiscal day was opened on a device. Time is provided in local time without

					time zone information.
			fiscalDayNo	Int	No	Fiscal day number assigned by device.
						If this field is not sent, FDMS will generate fiscal day number and return it to device. **Validation rules:** - fiscalDayNo must be equal to 1 for the first fiscal day of fiscal device - fiscalDayNo must be greater by one from the last closed fiscal day fiscalDayNo.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
fiscalDayNo	Int	Yes	Fiscal day number of opened day. In case device has sent fiscalDayNo in request, it is returned in this field. In case device has not sent it, new fiscal day number will be generated by FDMS.

submitReceipt endpoint description.

FileFooter:

Name	Type	Mandatory	Description
fiscalCounters	FiscalDayCounter array	No	List of fiscal counters. Zero value counters must not be submitted to FDMS. FiscalDayCounter type description provided in **Error! Reference source not found.**_closeDay_ endpoint.
fiscalDayDeviceSignature	SignatureData	Yes	SignatureData structure with SHA256 hash of fiscal day report fields (hash used for signature) and fiscal day report device signature prepared by using device private key as described in section 13.3. **Validation rules:** - fiscalDayDeviceSignature must be valid
receiptCounter	Int	Yes	receiptCounter value of last receipt of current fiscal day.

Name	Type	Mandatory	Description
fiscalDayClosed	DateTime	Yes	Date and time when fiscal day was closed on a device. Time is provided in local time without time zone information.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.9.1. File example

```
{
        "header": {
                "deviceID": 1111,
                "fiscalDayNo": 5,
                "fiscalDayOpened": "2023-05-30T08:38:54",
                "fileSequence": 2
        },
        "content": {
                "receipts": [
                        {
                                "receiptType": "FiscalInvoice",
                                "receiptCurrency": "USD",
                                "receiptCounter": 5,
                                "receiptGlobalNo": 1112,
                                "invoiceNo": "IV-2023/1256",
                                "receiptDate": "2023-05-30T18:38:54",
                                "receiptLinesTaxInclusive": true,
                                "receiptLines": [
                                        {
                                                "receiptLineType": "Sale",
                                                "receiptLineNo": 1,
                                                "receiptLineHSCode": "85456852",
                                                "receiptLineName": "Man's shoes",
                                                "receiptLinePrice": 25,
                                                "receiptLineQuantity": 1,
                                                "receiptLineTotal": 25,
                                                "taxCode": "A",
                                                "taxPercent": 15,
                                                "taxID": 1
                                        }
                                ],
                                "receiptTaxes": [
                                        {
                                                "taxCode": "A",
                                                "taxPercent": 15,
                                                "taxID": 1,
                                                "taxAmount": 3.75,
                                                "salesAmountWithTax": 28.75
                                        }
                                ],
                                "receiptPayments": [
                                        {
                                                "moneyTypeCode": "Cash",
                                                "paymentAmount": 28.75
                                        }
                                ],
                                "receiptTotal": 28.75,
                                "receiptPrintForm": "Receipt48",
                                "receiptDeviceSignature": {
                                        "hash": "Yjkjy =",
                                        "signature": "Yy ="
                                }
                        },
                        {
                                //invoice No 2 data
                                "receiptType": "FiscalInvoice",
                                "receiptCurrency": "USD"
                        },
                        {
                                //invoice No 3 data
                                "receiptType": "FiscalInvoice",
                                "receiptCurrency": "USD"
```

```
                }
            ]
        },
        "footer": {
                "fiscalDayCounters": [
                        {
                                "fiscalCounterType": "SaleByTax",
                                "fiscalCounterCurrency": "USD",
                                "fiscalCounterTaxPercent": 15,
                                "fiscalCounterTaxID": 0,
                                "fiscalCounterMoneyType": "Cash",
                                "fiscalCounterValue": 28.75
                        }
                ],
                "fiscalDayDeviceSignature": {
                        "hash": "Yjkjy =",
                        "signature": "Yy ="
                },
                "receiptCounter": 1,
                "fiscalDayClosed": "2023-05-30T22:38:54"
        }
}
Valid sample:
{
    "header": {
        "deviceId": 1111,
        "fiscalDayNo": 6,
        "fiscalDayOpened": "2023-05-30T08:38:54",
        "fileSequence": 2
    },
    "content": {
        "receipts": [
            {
                "receiptType": "fiscalInvoice",
                "receiptCurrency": "USD",
                "receiptCounter": 5,
                "receiptGlobalNo": 1112,
                "invoiceNo": "IV-2023/1256",
                "receiptDate": "2023-05-30T18:38:54",
                "receiptLinesTaxInclusive": true,
                "receiptLines": [
                    {
                        "receiptLineType": "sale",
                        "receiptLineNo": 1,
                        "receiptLineHSCode": "85456852",
                        "receiptLineName": "Man's shoes",
                        "receiptLinePrice": 25,
                        "receiptLineQuantity": 1,
                        "receiptLineTotal": 25,
                        "taxCode": "A",
                        "taxPercent": 15,
                        "taxID": 1
                    }
                ],
                "receiptTaxes": [
                    {
                        "taxCode": "A",
                        "taxPercent": 15,
                        "taxID": 1,
                        "taxAmount": 3.75,
                        "salesAmountWithTax": 28.75
                    }
                ],
                "receiptPayments": [
                    {
                        "moneyTypeCode": "cash",
                        "paymentAmount": 28.75
                    }
                ],
                "receiptTotal": 28.75,
                "receiptPrintForm": "receipt48",
                "receiptDeviceSignature": {
                    "hash": "bGFiYXM=",
                    "signature": "bGFiYXM="
                },
                "receiptType": "fiscalInvoice",
                "receiptCurrency": "USD"
```

```
            }
        ]
    },
    "footer": {
        "fiscalDayCounters": [
            {
                "fiscalCounterType": "saleByTax",
                "fiscalCounterCurrency": "USD",
                "fiscalCounterTaxPercent": 15,
                "fiscalCounterTaxID": 0,
                "fiscalCounterMoneyType": "cash",
                "fiscalCounterValue": 28.75
            }
        ],
        "fiscalDayDeviceSignature": {
            "hash": "bGFiYXM=",
            "signature": "bGFiYXM="
        },
        "receiptCounter": 1,
        "fiscalDayClosed": "2023-05-30T22:38:54"
    }
}
```

4.10. getFileStatus

getFileStatus endpoint is used by device to get previously sent file processing status from FDMS.
Request can be sent if DeviceOperatingMode is Offline.

Request will not be accepted, error will be returned to fiscal device (as specified in 8.1 Http statuses
API can return such http statuses for errors:

Http status	Description
400	bad request – the message is malformed and could not be processed by Fiscal Backend Gateway
401	Authentication error (see Authentication and authorization)
404	Resource not found (call to not existing endpoint)
405	method not allowed – trying to access API using unsupported HTTP methos, e.g., POST to get config
422	Unprocessable Content – the instructions given by fiscal device to Fiscal Backend Gateway are incorrect, the response object ProblemDetails should contain ErrorCode to indicate the exact failing condition (e.g., DEV01 – device is blocked and therefore no instructions could be processed from such device)
500	Infrastructure error – the Fiscal Backend Gateway server is not available, or some infrastructure error occurred. The fiscal device should retry to send message later.
502	Bad gateway - the Fiscal Backend Gateway server could not be contacted. The fiscal device should retry to send message later.

Error codes), in these cases:

- fiscal device status is other than "*Active*";
- fiscal device operating mode is other than *"Offline"*;
- request structure is not valid.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
operationID	String (60)	No	Unique operation identifier received in 4.9 submitFile response. Mandatory if fiscalDayNo is not sent.
fileUploadedFrom	Date	Yes	Date from when uploaded files are needed. Interval between from and to can be no more than 100 days.

Name	Type	Mandatory	Description
fileUploadedTill	Date	Yes	Date till when uploaded files are needed. Interval between from and to can be no more than 100 days.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
fileStatus	FileStatus array	Yes	List of files statuses.

FileStatus:

Name	Type	Mandatory	Description
operationID	Int	Yes	Operation ID received in 4.9 submitFile request.
fileUploadDate	DateTime	Yes	File placement date and time. Time is provided in local time without time zone information.
deviceId	Int	Yes	Device id.
fileName	String (100)	Yes	File name
fileProcessingDate	DateTime	No	Date and time when file processing is finished. Returned if fileProcessingStatus is FileProcessingIsSuccessful or FileProcessingWithErrors. Time is provided in local time without time zone information.
fileProcessingStatus	FileProcessingStatus	Yes	File processing status. Possible statuses are defined in section 5.4.10 FileProcessingStatus.
fileProcessingErrorCode	FileProcessingError array	No	List of error codes which appear during submitted file processing, returned if FileProcessingStatus is FileProcessingWithErrors. Possible codes are defined in section 5.4.11 FileProcessingError.
fiscalDayNo	Int	Yes	Fiscal day number.
fiscalDayOpenedAt	DateTime	Yes	Date and time when fiscal day was opened on a device. Time is provided in local time without time zone information.
fileSequence	Int	Yes	Sequence number of file in fiscal day files sequence.
ipAddress	String (100)	Yes	Ip address from which file is uploaded.

4.11. closeDay

closeDay endpoint is used to initiate fiscal day closure procedure. This method is allowed when fiscal days status is "FiscalDayOpened" or "FiscalDayCloseFailed".

Request can't be sent if DeviceOperatingMode is Offline. If DeviceOperatingMode is Offline error DEV01 is received.

In case fiscal day contains at least one "Grey" or "Red" receipt (as specified in 8.2.1. Validation errors), FDMS will respond to *closeDay* request with error (fiscal day will remain opened). Otherwise, if fiscal day does not have "Grey" and "Red" receipts, validation of submitted *closeDay* request will be executed. In case of fiscal day validation fails (as specified below in "Validation rules"), fiscal day remains opened, and its status is changed to "FiscalDayCloseFailed".

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
fiscalDayNo	Int	Yes	Fiscal day number. **Validation rules:** - fiscalDayNo must be the same as provided/received fiscalDayNo value in openDay request.
fiscalDayCounters	FiscalDayCounters array	Yes	List of fiscal counters. Zero value counters must not be submitted to FDMS.

fiscalDayDeviceSignature	SignatureData	Yes	SignatureData structure with SHA256 hash of fiscal day report fields (hash used for signature) and fiscal day report device signature prepared by using device private key as described in section 13.3. **Validation rules:** - fiscalDayDeviceSignature must be valid
receiptCounter	Int	Yes	receiptCounter value of last receipt of current fiscal day.

FiscalDayCounter:

Name	Type	Mandatory	Description
fiscalCounterType	FiscalCounterType	Yes	Fiscal counter type.
fiscalCounterCurrency	String (3)	Yes	Fiscal counter currency (ISO 4217 currency code).
fiscalCounterTaxID	Int	No*	Tax ID of fiscal counter. Must be provided for all fiscal counter types "byTax".
fiscalCounterTaxPercent	Decimal (5,2)	No*	Tax percentage of fiscal counter. Must be provided for all fiscal counter types "byTax". In case of exempt, this field must not be provided.
fiscalCounterMoneyType	MoneyType	No*	Code of payment mean of fiscal counter. Must be provided for fiscal counter type "BalanceByMoneyType".
fiscalCounterValue	Decimal (19,2)	Yes	Fiscal counter value in counter currency.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.12. getServerCertificate

getServerCertificate endpoint is used to retrieve FDMS certificate for FDMS signature validation.

This API endpoint does not require certificate for authentication.

Input parameters:

Name	Type	Mandatory	Description
thumbprint	Binary (20)	No	Thumbprint of FDMS signing certificate which should be returned. If field is not provided, currently active FDMS signing certificate is returned. Together with the certificate, all certificate chain is returned.

Output parameters:

Name	Type	Mandatory	Description
certificate	String array	Yes	FDMS certificate chain (according to x.509 standard) to validate FDMS signatures.
certificateValidTill	Date	Yes	Date till when FDMS signing certificate is valid (despite that in the certificate parameter all the certificate chain is returned, this field shows validity time of the child certificate in the chain). Value is provided in UTC time.

4.13. ping

ping endpoint is used to report device is online to FDMS. When device is turned on, it must regularly report to FDMS that it is online. Reporting periodicity is specified in DeviceReportingFrequencyInMinutes parameter received in response from FDMS.

Input parameters:
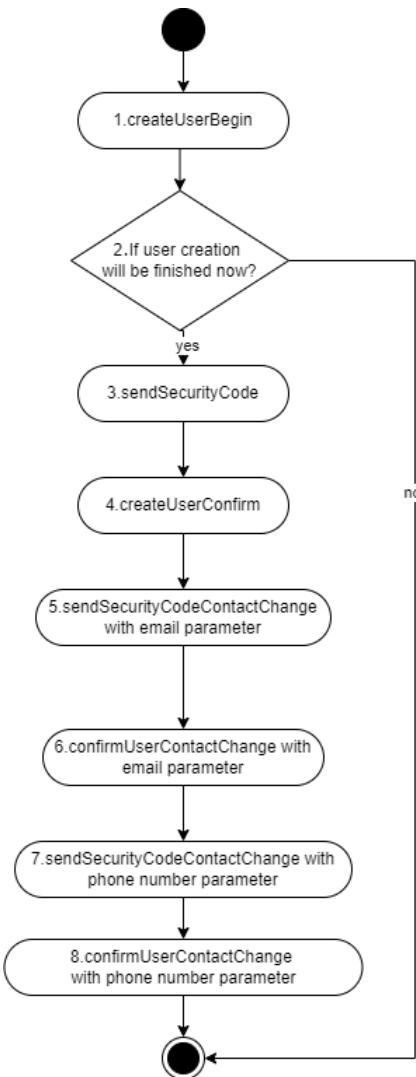
Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
reportingFrequency	int	Yes	Reporting frequency in minutes.
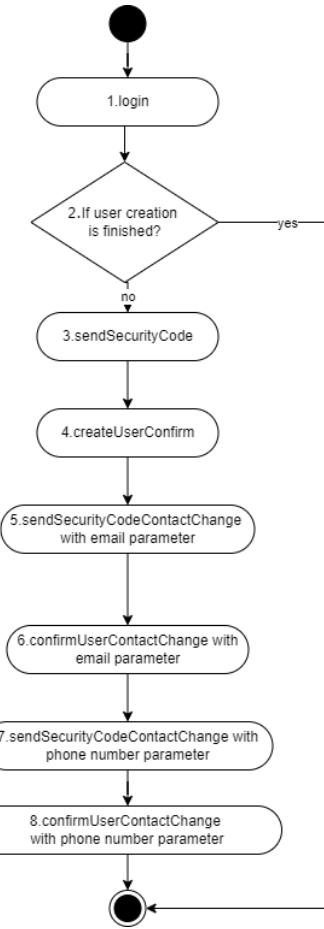
4.14. Users management

FDMS has complimentary taxpayer's user management functionality, which allows any taxpayer and any POS solution to utilize this functionality in their solutions. User management functionality is not mandatory to be used. This functionality is accessible only by Fiscal Device Gateway API using device with valid certificate.

4.14.1. User registration process if user registration is finished right away:

1.createUserBegin

2.If user creation
will be finished now?

yes

no

3.sendSecurityCode

4.createUserConfirm

5.sendSecurityCodeContactChange
with email parameter

6.confirmUserContactChange with
email parameter

7.sendSecurityCodeContactChange with
phone number parameter

8.confirmUserContactChange
with phone number parameter

4.14.2. User registration process if user registration is finished after user login:

4.14.3. getUsersList

getUsersList endpoint is used to get taxpayer users saved in FDMS list.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.

Output parameters:

Name	Type	Mandatory	Description
total	Int	Yes	Total rows returned in response.
operationID	String (60)	Yes	Operation ID assigned by FDMS.
rows	Users array	No	Taxpayer available users list.

Users:

Name	Type	Mandatory	Description
userName	String (100)	Yes	User username.
personName	String (100)	Yes	User name.
personSurname	String (100)	Yes	User surname.
userRole	String (100)	Yes	User role. POS can provide any textual value. It will be returned in users list.
email	String (100)	Yes	User e-mail address.

phoneNo	String (20)	Yes	User phone number.
userStatus	UserStatus	Yes	User status. Possible values: • Active • Blocked • NotConfirmed

4.14.4. login

login endpoint is used to check if sent username and password credentials are correct and user can login to POS. If username does not exist in a taxpayer context or is not active DEV08 is received. If username and password combination is incorrect error DEV11 is received.

If username and password combination is correct but user status is "NotConfirmed" value is false DEV13 is received .

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
userName	String (100)	Yes	User username.
password	String (100)	Yes	User password. For new user, which is not yet confirmed, it is same as username.

Output parameters:

Name	Type	Mandatory	Description
user	User	Yes	User data
token	String (1000)	Yes	Token assigned by FDMS.
operationID	String (60)	Yes	Operation ID assigned by FDMS.

User:

Name	Type	Mandatory	Description
userName	String (100)	Yes	User username.
personName	String (100)	Yes	User name.
personSurname	String (100)	Yes	User surname.
userRole	String (100)	Yes	User role.
email	String (100)	Yes	User e-mail address.
phoneNo	String (20)	Yes	User phone number.

4.14.5. createUserBegin

createUserBegin endpoint is the first step in user creation process. If username is not unique in a taxpayer context (which is already completed registration procedure) error DEV07 is received.

After execution of this method, new user is created, and status is set to "NotConfirmed".

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
userName	String (100)	Yes	User username.
personName	String (100)	Yes	User name.
personSurname	String (100)	Yes	User surname.
userRole	String (100)	Yes	User role.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.6. createUserConfirm

createUserConfirm endpoint is user creation confirmation by taxpayer (user email and phone needs to be confirmed after this step). If username does not exist in a taxpayer context or username is already confirmed error DEV08 is received. If the security code is not valid error DEV09 is received. If password does not meet complexity requirements error DEV10 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
userName	String (100)	Yes	User username.
securityCode	String (10)	Yesa	Security code received by email. Security code validity is limited in time. If DEV09 error is received, sendSecurityCode method should be called.
password	String (100)	Yes	User password.

Output parameters:

Name	Type	Mandatory	Description
user	User	Yes	User data
jwtToken	String (1000)	Yes	Token assigned by FDMS.
operationID	String (60)	Yes	Operation ID assigned by FDMS.

User:

Name	Type	Mandatory	Description
userName	String (100)	Yes	User username.
personName	String (100)	Yes	User name.
personSurname	String (100)	Yes	User surname.
userRole	String (100)	Yes	User role.
email	String (100)	Yes	User e-mail address.
phoneNo	String (20)	Yes	User phone number.

4.14.7. sendSecurityCode

sendSecurityCode endpoint is responsible for security code sending to taxpayer and branch where device registered emails. If username does not exist in a taxpayer context or username is already confirmed or blocked error DEV08 is received.

If this endpoint is called once again and user status is "NotConfirmed", security code is sent once again.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
userName	String (100)	Yes	User username.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.8. sendSecurityCodeContactChange

sendSecurityCodeContactChange endpoint is used to change user contacts. If username does not exist in a taxpayer context error DEV08 is received. If user creation is not yet confirmed error DEV08 is received. If token is not valid DEV12 is received. If email or phone number is not valid DEV14 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
phoneNo	String (20)	No*	User phone number.
userEmail	String (100)	No*	User email.
token	String (1000)	Yes	Token assigned by FDMS, received in login response.

* Only one of these two fields must be sent.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.9. confirmUserContactChange

confirmUserContactChange endpoint is used for user contact change confirmation. If username does not exist in a taxpayer context DEV08 is received. If the security code is not valid error DEV09 is received. If user creation is not yet confirmed error DEV08 is received. If token is not valid DEV12 is received. If this endpoint is called once again and contact already confirmed DEV15 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
channel	SendSecurityCodeTo	Yes	Channel where security code received. Possible values: • Email • Phone number
securityCode	String (10)	Yes	Security code received to email or phone number. Security code validity is limited in time.
token	String (1000)	Yes	Token assigned by FDMS, received in login response.

Output parameters:

Name	Type	Mandatory	Description
user	User	Yes	User data. User type description is provided in 4.14.6 createUserConfirm endpoint description.
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.10. updateUser

updateUser endpoint is used to change user details. If username does not exist in a taxpayer context error DEV08 is received. If token is not valid DEV12 is received.

Input parameters:

Name	Type	Mandatory	Description

deviceID	Int	Yes	Device ID
userName	String (100)	Yes	User username.
personName	String (100)	Yes	User name.
personSurname	String (100)	Yes	User surname.
userRole	String (100)	Yes	User role.
userStatus	UserStatus	Yes	User status. Possible values: • Active • Blocked
token	String (1000)	Yes	Token assigned by FDMS, received in login response.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.11. changeUserPassword

changeUserPassword endpoint is used to change user password. This method is used when user remembers his/her current password. In case user does not remember his/her current password, password reset procedure should be initiated. If username does not exist in a taxpayer context, is not active or user is not yet confirmed error DEV08 is received. If password does not meet complexity requirements, old password is not correct or new password is the same as the old password error DEV10 is received. If token is not valid DEV12 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
newPassword	String (100)	Yes	New user password. **Rules:** • Must be different than old password.
oldPassword	String (100)	Yes	Old user password. **Rules:** • Must be same as used before changing.
token	String (1000)	Yes	Token assigned by FDMS, received in login response.

Output parameters:

Name	Type	Mandatory	Description
user	User	Yes	User data. User type description is provided in 4.14.6 createUserConfirm endpoint description.
token	String (1000)	Yes	Token assigned by FDMS.
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.12. resetUserPasswordBegin

resetUserPasswordBegin endpoint is the first step in password reset process, used to initiate password reset. If username does not exist in a taxpayer context or is not active error DEV08 is received. If user creation is not yet confirmed error DEV08 is received. If email or phone number is not valid or doesn't exist DEV14 is received.

After calling this method security code is sent to user email or phone number and another email is sent to taxpayer email that user password reset is initiated.

Input parameters:

Name	Type	Mandatory	Description

deviceID	Int	Yes	Device ID.
userName	String (100)	Yes	User username.
channel	SendSecurit yCodeTo	Yes	Channel where security code should be sent. Possible values: • Email • Phone number

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.

4.14.13. resetUserPasswordConfirm

resetUserPasswordConfirm endpoint is used to finish password reset procedure. If username does not exist in a taxpayer context or if user is not active DEV08 is received. If security code is not valid error DEV09 is received. If password does not meet complexity requirements or is same as old password error DEV10 is received.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID.
userName	String (100)	Yes	User username.
newPassword	String (100)	Yes	New user password. **Rules:** • Must be different than old password
securityCode	String (10)	Yes	Security code assigned by FDMS. Security code validity is limited in time. If DEV09 error is received, resetUserPasswordBegin method should be called.

Output parameters:

Name	Type	Mandatory	Description
operationID	String (60)	Yes	Operation ID assigned by FDMS.
user	User	Yes	User data. User type description is provided in 4.14.6 createUserConfirm endpoint description.
token	String (1000)	Yes	Token assigned by FDMS.

4.15. getStockList

getStockList endpoint is used to get a list of goods in stock from FDMS. FDMS returns only these goods which have HS code and are assigned to store where device (by DeviceID) is located.

Input parameters:

Name	Type	Mandatory	Description
deviceID	Int	Yes	Device ID
hsCode	String (8)	No	Product or service code from National Harmonized System codes list. In FDMS searching exact match.
goodName	String (500)	No	Product or service name. In FDMS searching from beginning of each word.
sort	String (50)	No	Column according to which results should be sorted in response. Possible values:

				hsCode, goodName, branchName.
order	String (5)	No	Ordering in response, possible values: asc, desc.
offset	Integer	Yes	Record number from which results should be returned in response.
limit	Integer	Yes	Page size, number of records to be returned in response. Max allowed limit: 100.
operator	String (3)	No	Operator, possible values: and, or

Output parameters:

Name	Type	Mandatory	Description
total	Int	Yes	Total rows returned in response.
rows	Good array	Yes	List of goods.

Goods:

Name	Type	Mandatory	Description
hsCode	String (8)	Yes	Product or service code from National Harmonized System codes list.
goodName	String (200)	Yes	Product or service name.
quantity	Decimal (19,3)	Yes	Product quantity.
taxPayerId	Int	Yes	Taxpayer id.
taxPayerName	String (250)	Yes	Taxpayer name.
branchId	Int	No	Taxpayer branch id.
branchName	String (250)	No	Branch name.

5. DATA TYPES

5.1. Address

Address object is used to define address object for returning information from FDMS and for accepting buyers information.

Name	Type	Mandatory	Description
province	String (100)	Yes	Province name
city	String (100)	Yes	City, town, growth point, farming area, mining area
street	String (100)	Yes	Street, stand number, village
houseNo	String (100)	Yes	House number

5.2. Contacts

Contacts object is used to define Taxpayers and device contact information.

Name	Type	Mandatory	Description
phoneNo	String (20)	No*	Phone number
email	String (100)	No*	E-mail address

* at least one of field is mandatory.

5.3. SignatureData

SignatureData:

Name	Type	Mandatory	Description
hash	Binary (32)	Yes	SHA-256 hash.
signature	Binary (256)	Yes	Cryptographic signature, for which *hash* was used. More details see in "13 Signatures generation and verification rules". Field length is variable depends on cryptographic algorithm.

SignatureDataEx:

Name	Type	Mandatory	Description
SignatureData fields			
certificateThumbprint	Binary (20)	Yes	SHA-1 Thumbprint of Certificate used for *signature*.

5.4. Enums

Enum, short for "enumerated," is a data type that consists of predefined values. A variable defined as an enum can store one of the values listed in the enum declaration.

5.4.1. DeviceOperatingMode

Specifies what are allowed receipt processing modes for this taxpayer, possible values:

Enum value	Enum order
Online	0
Offline	1

5.4.2. FiscalDayStatus

Device Fiscal day status, possible values:

Enum value	Enum order

FiscalDayClosed	0
FiscalDayOpened	1
FiscalDayCloseInitiated	2
FiscalDayCloseFailed	3

5.4.3. FiscalDayReconciliationMode

Defines how fiscal day was closed, possible values:

Enum value	Enum order
Auto	0
Manual	1

5.4.4. FiscalCounterType

Fiscal counter type, possible values:

Enum value	Enum order
SaleByTax	0
SaleTaxByTax	1
CreditNoteByTax	2
CreditNoteTaxByTax	3
DebitNoteByTax	4
DebitNoteTaxByTax	5
BalanceByMoneyType	6

5.4.5. MoneyType

Code of payment mean of fiscal counter, possible values:

Enum value	Enum order
Cash	0
Card	1
MobileWallet	2
Coupon	3
Credit	4
BankTransfer	5
Other	6

5.4.6. ReceiptType

Type of receipt. Possible values:

Enum value	Enum order
FiscalInvoice	0
CreditNote	1
DebitNote	2

5.4.7. ReceiptLineType

Type of receipt line. Possible values:

Enum value	Enum order
Sale	0
, Discount	1

5.4.8. ReceiptPrintForm

Type of receipt or invoice visual representation template in which form it was printed and delivered to buyer. Possible values:

Enum value	Enum order	Description
Receipt48	0	Printed as receipt on receipt paper, 48 characters per line.
InvoiceA4	1	Printed on A4 paper as invoice.

5.4.9. FiscalDayProcessingError

Messages which are shown in case of error during fiscal day closure. Validations are performed in this sequence. Possible values:

Enum value	Enum order	Description
BadCertificateSignature	0	Close day is not allowed. Bad certificate signature is used.
MissingReceipts	1	Close day is not allowed. There are missing receipts in fiscal day ("Grey" validation error).
ReceiptsWithValidationErrors	2	Close day is not allowed. There are receipts with validation errors in fiscal day ("Red" validation error).
CountersMismatch	3	Close day is not allowed. There are mismatches between counters.

5.4.10. FileProcessingStatus

File processing status, possible values:

Enum value	Enum order
FileProcessingInProgress	0
FileProcessingIsSuccessful	1
FileProcessingWithErrors	2
WaitingForPreviousFile	3

5.4.11. FileProcessingError

Messages which are shown in case of error during submitted file processing. Possible values:

Enum value	Enum order	Description
IncorrectFileFormat	0	File structure is incorrect, elements sequence is incorrect.
FileSentForClosedDay	1	Fiscal day for which file is sent is closed.
BadCertificateSignature	2	Closing day is not allowed. Bad certificate signature is used.
MissingReceipts	3	Closing day is not allowed. There are missing receipts in fiscal day ("Grey" validation error).
ReceiptsWithValidationErrors	4	Closing day is not allowed. There are receipts with validation errors in fiscal day ("Red" validation error).
CountersMismatch	5	Closing day is not allowed. There are mismatches between counters.
FileExceededAllowedWaitingTime	6	Previous file in a sequence is missing, and maximum allowed waiting time for previous file to be received has exceeded.

5.4.12. UserStatus

User status, possible values:

Enum value	Enum order
Active	0
Blocked	1
NotConfirmed	2

5.4.13. SendSecurityCodeTo

Channels where security code can be sent, possible values:

Enum value	Enum order
Email	0
PhoneNumber	1

6. FISCAL COUNTERS

With each submitted receipt (FiscalInvoice, CreditNote and DebitNote), fiscal counters are updated.

After fiscal device finishes a fiscal day, it must close it by sending fiscal day report with fiscal counters provided in the table below to Fiscal Device Gateway API. Fiscal counter is optional to be sent in case it's value is zero.

Counters list and calculation rules for different types of receipt and different types of receipt lines are provided below. Please take a note to use correct sign when calculating a counter (add or subtract value from counter). In case negative receipt total amount is sent, fiscal counters become a negative sign too.

Fiscal day counters are reset after fiscal day close. Starting from a new fiscal day, counters start to be counted from zero.

Table below lists fiscal counters and specifies either they are calculated for different tax percents, currencies and/or payment methods:

Counter	By tax	By currency	By payment method	Description
SaleByTax	X	X		Total sales amount (after discount) by tax and by currency during fiscal day including tax. Does not include debit notes and credit notes.
SaleTaxByTax	X	X		Total tax amount by tax and by currency from sales (after discount) during fiscal day. Does not include debit notes and credit notes.
CreditNoteByTax	X	X		Total credit notes amount by tax and by currency during fiscal day including tax.
CreditNoteTaxByTax	X	X		Total tax amount by tax and by currency from credit notes during fiscal day.
DebitNoteByTax	X	X		Total debit notes amount by tax and by currency during fiscal day including tax.
DebitNoteTaxByTax	X	X		Total tax amount by tax and by currency from debit notes during fiscal day.
BalanceByMoneyType		X	X	Total collected or paid amount of money, by money type and by currency during fiscal day.

Table below shows, which counters each submitted receipt type is changing and which fields from submitted receipt are used:

Receipt type Counter	Fiscal invoice	Credit note	Debit note
SaleByTax	+salesAmountWithTax		
SaleTaxByTax	+taxAmount		
CreditNoteByTax		+salesAmountWithTax*	
CreditNoteTaxByTax		+taxAmount*	
DebitNoteByTax			+salesAmountWithTax
DebitNoteTaxByTax			+taxAmount
BalanceByMoneyType	+paymentAmount	+paymentAmount*	+paymentAmount

* - for credit note salesAmountWithTax, taxAmount, paymentAmount counters will be used with negative numbers so with each credit note counter value will decrease if there wasn't credit note(s) with receiptLineType Discount.

7. INTEGRATION SETUP REQUIREMENTS

7.1. Communication and security protocols

Fiscal Device Gateway API can be accessed using HTTPS protocol only. All Fiscal Device Gateway API methods except registerDevice and getServerCertificate use client authentication certificate which is issued by FDMS.

7.2. Environment addresses

Fiscal Device Gateway API is accessible in testing and production (real) environments. URL to access API:

Environment	URL
Testing environment	https://fdmsapitest.zimra.co.zw
	Testing environment's API can also be accessed using Swagger on https://fdmsapitest.zimra.co.zw/swagger/index.html
Production environment	https://fdmsapi.zimra.co.zw

7.3. Authentication and authorization

Fiscal Device Gateway uses mutual TLS authentication (https://en.wikipedia.org/wiki/Mutual_authentication) to authenticate fiscal device using fiscal device certificate. Fiscal device certificate is validated against issuing certificate to allow or deny access to API endpoints.

Note: endpoints 4.1 verifyTaxpayerInformation, 4.2 registerDevice, 4.12 getServerCertificate are public and do not require authentication. After authentication, provided fiscal device certificate is checked against issued certificate (see 4.2 registerDevice and 4.3 issueCertificate and methods for fiscal device certificate issuing) to check if the fiscal device certificate was issued to calling device (by method parameter deviceId) and the fiscal device certificate was not revoked.

The Fiscal Device Gateway will return HTTP 401 unauthorized code if:

- The provided fiscal device certificate was issued not by Fiscal Device Gateway.
- The provided fiscal device certificate was revoked.
- The provided fiscal device certificate expired.
- The provided fiscal device certificate was not issued to calling fiscal device.

7.4. Timeout Settings

Fiscal Device Gateway API response timeout for any synchronous operation – 30 seconds.

8. ERRORS

In case of API error, the system will return 4xx or 5xx http error code with response body containing a detailed problem details structure as described in https://www.rfc-editor.org/rfc/rfc7807 .

ProblemDetails:

Name	Type	Mandatory	Description
type	String	Yes	
title	String	Yes	human readable problem definition
status	Integer	Yes	Http status code
errorCode	String	No	specific error code, for exact meaning see below

8.1. Http statuses

API can return such http statuses for errors:

Http status	Description
400	bad request – the message is malformed and could not be processed by Fiscal Backend Gateway
401	Authentication error (see Authentication and authorization)
404	Resource not found (call to not existing endpoint)
405	method not allowed – trying to access API using unsupported HTTP methos, e.g., POST to get config
422	Unprocessable Content – the instructions given by fiscal device to Fiscal Backend Gateway are incorrect, the response object ProblemDetails should contain ErrorCode to indicate the exact failing condition (e.g., DEV01 – device is blocked and therefore no instructions could be processed from such device)
500	Infrastructure error – the Fiscal Backend Gateway server is not available, or some infrastructure error occurred. The fiscal device should retry to send message later.
502	Bad gateway - the Fiscal Backend Gateway server could not be contacted. The fiscal device should retry to send message later.

8.2. Error codes

Error Code	Description	API methods
DEV01	Device not found or not active	All
DEV02	Activation key is incorrect	registerDevice verifyTaxpayerInformation
DEV03	Certificate request is invalid	registerDevice issueCertificate
DEV04	Device model is blacklisted	All
DEV05	Taxpayer is not active	All
DEV06	Device model and version is not registered in FDMS	All
DEV07	Username is already used	createUserBegin
DEV08	Provided user information is not correct	Login sendSecurityCode createUserConfirm sendSecurityCodeContactChange

		confirmUserContactChange updateUser changeUserPassword resetUserPasswordBegin resetUserPasswordConfirm
DEV09	Security code is not valid	createUserConfirm resetUserPasswordConfirm confirmUserContactChange
DEV10	Password is not valid	changeUserPassword createUserConfirm resetUserPasswordConfirm
DEV11	User credentials are incorrect	login
DEV12	Token is not valid	confirmUserContactCreation sendSecurityCodeContactChange confirmUserContactChange updateUser changeUserPassword
DEV13	User is not confirmed	login
DEV14	Email or phone number is not valid or doesn't exist	sendSecurityCodeContactChange resetUserPasswordBegin
DEV15	Email or phone number already confirmed	confirmUserContactChange
RCPT01	Submitting receipt is not allowed. Fiscal day is closed or fiscal day close initiated	submitReceipt
RCPT02	Submit receipt failed. The receipt structure invalid or field requirements not satisfied (e.g., provided field value length is greater then allowed)	submitReceipt
FISC01	Open day is not allowed	openDay
FISC03	Closing day is not allowed. Close day is in progress	closeDay
FISC04	Closing day is not allowed. Fiscal day not opened	closeDay
FILE01	File is too big. Allowed file size: 3 MB	submitFile
FILE02	File structure invalid or field requirements not satisfied (e.g not sent mandatory fields)	submitFile getFileStatus
FILE03	Device operating mode is not Offline	submitFile getFileStatus
FILE04	File sent for already closed day or closing in progress	submitFile
FILE05	Device id in input parameters and file header are different	submitFile

8.2.1. Validation errors

When *sumbitReceipt* request is received by FDMS and it is not rejected, FDMS validates receipt data. In case previous receipt is missing, validation rules which require previous receipt to be present are temporarily marked as grey and are revalidated when previous receipt is received. After a validation, receipt is stored and signed by FDMS. Receipt validation status may be valid or invalid. In case of invalid receipt, validation errors are categorized by one of these colors:

Color	Description
Grey	This means that received receipt violates receipt chain and makes a gap in receipt chain (previous receipt is missing). Such receipt is marked in "Grey". With each of the next received receipt, such "Grey" receipt will be revalidated (in case newly received receipt is the previous for the "Grey" receipt). After repeated validation it will remain "Grey" (if newly received receipt is not the previous for it) or become valid.

		Fiscal day will not be allowed to be closed automatically if it has at least one "Grey" receipt.
Yellow		"Yellow" validation errors are minor ones. Fiscal day will be allowed to be closed automatically if it contains only "Yellow" validation errors.
Red		"Red" validation errors are major ones. Fiscal day fill is not allowed to be closed automatically if it has at least one "Red" receipt.

Possible validation errors and their color codes:

Validation error	Color	Do validation requires previous receipt to be present?	Validation error text
RCPT010	Red	No	Wrong currency code is used
RCPT011	Red	Yes	Receipt counter is not sequential.
RCPT012	Red	Yes	Receipt global number is not sequential.
RCPT013	Red	No	Invoice number is not unique
RCPT014	Yellow	No	Receipt date is earlier than fiscal day opening date
RCPT015	Red	No	Credited/debited invoice data is not provided
RCPT016	Red	No	No receipt lines provided
RCPT017	Red	No	Taxes information is not provided
RCPT018	Red	No	Payment information is not provided
RCPT019	Red	No	Invoice total amount is not equal to sum of all invoice lines
RCPT020	Red	No	Invoice signature is not valid
RCPT021	Red	No	VAT tax is used in invoice while taxpayer is not VAT taxpayer
RCPT022	Red	No	Invoice sales line price must be greater than 0 (less than 0 for Credit note), discount line price must be less than 0 for Invoice
RCPT023	Red	No	Invoice line quantity, must be positive
RCPT024	Red	No	Invoice line total is not equal to unit price * quantity
RCPT025	Red	No	Invalid tax is used
RCPT026	Red	No	Incorrectly calculated tax amount
RCPT027	Red	No	Incorrectly calculated total sales amount (including tax)
RCPT028	Red	No	Payment amount must be greater than or equal 0 (less than or equal to 0 for Credit note)
RCPT029	Red	No	Credited/debited invoice information provided for regular invoice
RCPT030	Red	Yes	Invoice date is earlier than previously submitted receipt date
RCPT031	Yellow	No	Invoice is submitted with the future date
RCPT032	Red	No	Credit / debit note refers to non-existing invoice
RCPT033	Red	No	Credited/debited invoice is issued more than 12 months ago
RCPT034	Red	No	Note for credit/debit note is not provided
RCPT035	Red	No	Total credit note amount exceeds original invoice amount
RCPT036	Red	No	Credit/debit note uses other taxes than are used in the original invoice
RCPT037	Red	No	Invoice total amount is not equal to sum of all invoice lines and taxes applied

RCPT038	Red	No	Invoice total amount is not equal to sum of sales amount including tax in tax table
RCPT039	Red	No	Invoice total amount is not equal to sum of all payment amounts
RCPT040	Red	No	Invoice total amount must be greater than or equal to 0 (less than or equal to 0 for Credit note)
RCPT041	Yellow	No	Invoice is issued after fiscal day end
RCPT042	Red	No	Credit/debit note uses other currency than is used in the original invoice
RCPT043	Red	No	Mandatory buyer data fields are not provided
RCPT047	Red	No	HS code must be sent if taxpayer is a VAT payer
RCPT048	Red	No	HS code length must be 4 or 8 digits if taxpayer is not VAT payer, 4 or 8 digits if taxpayer is VAT payer and applied tax percent is bigger than 0, 8 digits if taxpayer is VAT payer and applied tax percent is equal to 0 or is empty

9. REQUIREMENTS FOR FISCAL DEVICES

This chapter specifies requirements for fiscal devices to be met:

1. Fiscal device must open a new fiscal day before issuing receipts and invoices.
2. Fiscal device if internet connection is available must retrieve configuration from FDMS (*getConfig* endpoint) before opening a new fiscal day.
3. Fiscal device must save data from *getConfig* response about taxpayer and/or its branch (taxpayer name, address, contacts, etc.) and use it for receipt and invoice printing.
4. Fiscal device must track the time passed from opening a fiscal day, that it would not exceed maximum allowed fiscal day length (specified in parameter taxPayerDayMaxHrs) and forbid issuing new receipts and invoices after that.
5. Fiscal device must inform user about the approaching fiscal day end. Notification must be shown to the user a few hours before maximum fiscal day length is reached. The exact number of hours left to maximum fiscal day length is specified in parameter taxpayerDayEndNotificationHrs.
6. Fiscal device must assign receiptGlobalNo value to a receipt in a sequential order starting from 1 and continue numbering despite fiscal day close.
7. In case receiptGlobalNo value becomes very big and taxpayer would like to reset it, this can be done by submitting the first receipt in a new fiscal day.
8. Fiscal device must assign receiptCounter value to a receipt in a sequential order starting from 1 and continue numbering only in the same fiscal day. After fiscal day closure, receiptCounter must be reset to 0.
9. Fiscal device must not allow to add goods or services with VAT tax to receipt or invoice if taxpayer is not a VAT taxpayer (*VATNumber* value is received in *getConfig* response). In case taxpayer gets VAT number in the middle of fiscal day, fiscal device must not allow to issue new receipts or invoices and must require closing fiscal day first.
10. Fiscal day opening message must be sent immediately after opening a fiscal day, however if there is no connection, it can be delayed.
11. Receipt must be sent to Fiscal Device Gateway API only after successfully opening a fiscal day.
12. Fiscal device must send receipt to Fiscal Device Gateway API only after finishing it (when receipt is printed).
13. Fiscal device must send receipt to Fiscal Device Gateway API one by one in ascending receiptGlobalNo order, not skipping any of receipt. In case submission of receipt failed, issue must be fixed, and receipt submission must be repeated.

14. Fiscal device must send receipt to Fiscal Device Gateway API immediately after finishing it in case there is an internet connection and there are no waiting receipts to be sent, otherwise receipt must be put to the queue on device and send later when connection will be restored.
15. Fiscal device must update counters after issuing a receipt and reset counters after starting a new fiscal day as specified in 6. Fiscal counters.
16. Fiscal device must renew certificate which is near to expire before its expiration date.
17. Offline Fiscal device must send file content only for a single closed fiscal day. File cannot contain invoices from more than one fiscal day.
18. If file is bigger than 3 MB, content should be split into separate files, footer can't be split to two or more separate parts.
19. If fiscal day has a lot of receipts, it is recommended to split receipts and Z report to separate files.
20. If offline fiscal device prepared more than one file for a single fiscal day, these files must be sent to FDMS one by one in sequential order.
21. Offline fiscal devices must be able to export file with invoices if user requests it for manual upload to FDMS Self-service.
22. User must not uninstall application from device if there are unsent invoices.

10. STANDARD FISCAL RECEIPT, INVOICE AND REPORT VIEWS

10.1. Receipt48 view

Receipt48 view is used for tax inclusive invoice printed on receipt paper, which can print 48 characters of text per line.

Fiscal tax invoice template:

Receipt (template)	Receipt field name
	[1] Taxpayer logo
Company legal name	[2] Taxpayer company legal name
TIN: 123111000	[3] Taxpayer TIN
VAT No: 12341234	[4] VAT number
Downtown location	[5] Taxpayer's branch name
ZB Centre Cnr Nkwame Nkrumah Ave / First Street, Harare	[6] Taxpayer's branch address
zimra@email.com	[7] Taxpayer's branch e-mail
(0242) 758 891-5	[8] Taxpayer's branch phone
FISCAL TAX INVOICE	[9] Static text: Fiscal tax invoice or Fiscal invoice or Credit note or Debit note
Buyer	[10] Buyer's information
Company ABC, Ltd.	[11] Buyer's registered name
Food Market ABC	[12] Buyer's trade name
TIN: 1987012311	[13] Buyer's TIN
VAT: 198701211	
12 Southgate Hwange	[14] Buyer's address
john.smith@email.com	[15] Buyer's e-mail
(081) 20875	[16] Buyer's phone
Invoice No: 15/451 Fiscal day No: 45	[17], [18], [19] Invoice No (receiptCounter, receiptGlobalNo), Fiscal day number
Customer reference No: CISN-000040321	[20] Customer reference number
Device Serial No: 12345678901234567890	[21] Device serial number
Device ID: 6543210	[22] Fiscal device ID
Date: 03/07/23 18:48	[23] Receipt date and time
Description **Amount**	List of receipt items, if If line type is discount static text "Discount" is shown.
Item1 name 13200.00 VT	[30] , [33] , [34], Item name, total amount, tax code
Item2 with very long name which does not fit in a single line	
3 each @ 5000.00 15000.00 VT	[31], [32] item quantity, unit price
Item3 name	
0.555 @ 1081.08 600.00 NV	
Item4 name 2400.00 EX	
Discount:Item4 name -1200.00 EX	
Total ZWL **30000.00**	[35], [36] receipt currency, total amount to pay
ZWL Cash 5000.00	
ZWL Card 25000.00	[35], [37], [38] receipt currency, payment method, paid amount
Number of Items **5.555**	[39] number of items
Net Amount 1200.00	Tax table
VAT (Exempt) 0.00	
Gross Amount 1200.00	[40], [41], [42], [43], [44] tax code, tax percent, amount without tax, tax amount, total amount inclusive tax
Net Amount 600.00	
VAT (0%) 0.00	
Gross Amount 600.00	
Net Amount 24521.74	
VAT (15%) 3678.26	
Gross Amount 28200.00	
Invoice is issued after purchasing goods	[45] Credit/debit/invoice note
	[46] QR code
Verification code: 4C8B-E276-6333-0417	[47] Receipt verification code
You can verify this receipt manually at https://receipt.zimra.org/	[48] URL

Credit note template:

	Receipt field name
	[1] Taxpayer logo

Company legal name

TIN: 123111000
VAT No: 12341234

Downtown location
ZB Centre Cnr Nkwame Nkrumah Ave / First Street, Harare
zimra@email.com
(0242)758 891-5

- -

CREDIT NOTE

- -

Buyer
Company ABC, Ltd.
Food Market ABC
TIN: 19870123
VAT: 19870123
12 Southgate Hwange
john.smith@email.com
(081) 20875

- -
Invoice No: 15/451   Fiscal day No: 45
Customer reference No: CISN-000040321
Device Serial No: 12345678901234567890
Device ID: 6543210
Date: 03/07/23 18:48
- -

CREDITED INVOICE
Device Serial No: 98765432101234567890
Invoice No: 450   Date: 03/07/23 18:48
Customer reference No: CISN-000040320
- -

Description   **Amount**
- -
Item1 name   13200.00 VT
Item2 with very long name which does not fit in
a single line
    3 each @ 5000.00   15000.00 VT
Item3 name
    0.555 @ 1081.08   600.00 NV
Item4 name   2400.00 EX
Discount:Item4 name   -1200.00 EX
- -
Total ZWL   **30000.00**
    ZWL Cash   5000.00
    ZWL Card   25000.00

- -
Number of Items   **5.555**
- -

- -
Net Amount   1200.00
VAT (Exempt)   0.00
Gross Amount   1200.00

Net Amount   600.00
VAT (0%)   0.00
Gross Amount   600.00
- -
Net Amount   24521.74
VAT (15%)   3678.26
Gross Amount   28200.00
- -

Invoice is issued after purchasing goods

Verification code:
4C8B-E276-6333-0417

You can verify this receipt manually at
https://receipt.zimra.org/

Receipt field names (right column):

- [1] Taxpayer logo
- [2] Taxpayer company legal name
- [3] Taxpayer TIN
- [4] VAT number
- [5] Taxpayer's branch name
- [6] Taxpayer's branch address
- [7] Taxpayer's branch e-mail
- [8] Taxpayer's branch phone
- [9] Static text: Fiscal tax invoice or Fiscal invoice or Credit note or Debit note
- [10] Buyer's information
- [11] Buyer's registered name
- [12] Buyer's trade name
- [13] Buyer's TIN
- [51] Buyer's VAT
- [14] Buyer's address
- [15] Buyer's e-mail
- [16] Buyer's phone
- [17], [18], [19] Invoice No (receiptCounter, receiptGlobalNo), Fiscal day number
- [20] Customer reference no
- [21] Device serial number
- [22] Fiscal device ID
- [23] Receipt date and time
- Printed ony for Debit and Credit note
- [24] Static text "Credited invoice" or "Debited invoice"
- [25] Credited/debited invoice device serial No
- [26], [27] Credited/debited invoice No (receiptGlobalNo) and date
- [28] Credited/debited invoice customer reference No
- List of receipt items, if If line type is discount static text "Discount" is shown.
- [30], [33], [34], Item name, total amount, tax code
- [31], [32] item quantity, unit price
- [35], [36] receipt currency, total amount to pay
- [35], [37], [38] receipt currency, payment method, paid amount
- [39] number of items
- Tax table
- [40], [41], [42], [43], [44] tax code, tax percent, amount without tax, tax amount, total amount inclusive tax
- [45] Credit/debit/invoice note
- [46] QR code
- [47] Receipt verification code
- [48] URL

10.2. InvoiceA4 view

InvoiceA4 view is used for tax inclusive, or tax exclusive invoice printed on A4 paper.

Tax inclusive invoice template

Verification code
4C8B-E276-6333-0417 [46]
You can verify this receipt manually at
https://receipt.zimra.org/ [48]

[1] Taxpayer logo

[45] QR code

FICAL TAX INVOICE [9]

SELLER
Company legal name [2]
TIN: 1234567890 [3]
VAT No: 12345678 [4]
Downtown location [5]
ZB Centre Cnr Nkwame Nkrumah Ave/ First Street, Harare
zimra@email.com [7]
(0242)758 891-5 [8]

BUYER
Company ABC, Ltd. [11]
Food Market ABC [12]
TIN: 19870123 [13]
VAT: 1233455 [51]
12 Southgate Hwange [14]
john.smith@email.com [15]
(081) 20875 [16]

Invoice No: 15[17]/451[18]
Customer reference No: CISN-0000040012 [20]
Device Serial No: 12345678901234567890 [21]

Fiscal day No: 45 [19]
Date: 03/07/23 18:48 [23]
Fiscal device ID: 674473 [22]

Code [29]	Description [30]	Qty [31]	Price [32]	VAT [34.1]	Total amount (incl. tax) [33.1]
12345678	Item1 name	1	13200.00	1721.74	13200.00
11223344	Item2 name with very long name which does not fit in a single line	3	5000.00	1956.52	15000.00
12312312	Item3 name	1	600.00	0.00	600.00
12341234	Item4 name	1	2400.00	-	2400.00
12341234	Discount: Item4 name	1	-1200.00	-	-1200,00

Total15% [41] VAT	3678,26 [44]
Invoice total, ZWL [36]	**33120,00 [35]**

Invoice is issued after purchasing goods according to agreement No555 [49]

Tax inclusive credit note template

Verification code
4C8B-E276-6333-0417 [46]
You can verify this receipt manually at
https://receipt.zimra.org/ [48]

[1] Taxpayer logo

[45] QR code

CREDIT NOTE [9]

SELLER

Company legal name [2]
TIN: 1234567890 [3]
VAT No: 12345678 [4]
Downtown location [5]
ZB Centre Cnr Nkwame Nkrumah Ave/ First Street, Harare
zimra@email.com [7]
(0242)758 891-5 [8]

BUYER

Company ABC, Ltd. [11]
Food Market ABC [12]
TIN: 19870123 [13]
VAT: 1233455 [51]
12 Southgate Hwange [14]
john.smith@email.com [15]
(081) 20875 [16]

Invoice No: 15[17]/451[18]
Customer reference No: CISN-0000040012 [20]
Device Serial No: 12345678901234567890 [21]

Fiscal day No: 45 [19]
Date: 03/07/23 18:48 [23]
Fiscal device ID: 674473 [22]

CREDITED INVOICE [24]

Invoice No: 450 [26]
Customer reference No: CISN-0000040011 [28]
Device Serial No: 12345678901234567890 [25]

Date: 03/07/23 18:48 [27]

Code [29]	Description [30]	Qty [31]	Price [32]	VAT [34.1]	Total amount (incl. tax) [33.1]
12345678	Item1 name	1	13200.00	1721.74	13200.00
11223344	Item2 name with very long name which does not fit in a single line	3	5000.00	1956.52	15000.00
12312312	Item3 name	1	600.00	0.00	600.00
12341234	Item4 name	1	2400.00	-	2400.00
12341234	Discount: Item4 name	1	-1200.00	-	-1200,00

Total15% [41] VAT	3678,26 [44]
Invoice total, ZWL [36]	**33120.00 [35]**

Invoice is issued after purchasing goods according to agreement No555 [49]

Tax exclusive invoice template

[1] Taxpayer logo

Verification code
4C8B-E276-6333-0417 [46]
You can verify this receipt manually at
https://receipt.zimra.org/ [48]

[45] QR code

FICAL TAX INVOICE [9]

SELLER

Company legal name [2]

TIN: 1234567890 [3]

VAT No: 12345678 [4]

Downtown location [5]

ZB Centre Cnr Nkwame Nkrumah Ave/ First Street, Harare [6]

zimra@email.com [7]

(0242)758 891-5 [8]

BUYER

Company ABC, Ltd. [11]

Food Market ABC [12]

TIN: 19870123 [13]

VAT: 1233455 [51]

12 Southgate Hwange [14]

john.smith@email.com [15]

(081) 20875 [16]

Invoice No: 15[17]/451[18]

Customer reference No: CISN-0000040012 [20]

Device Serial No: 12345678901234567890 [21]

Fiscal day No: 45 [19]

Date: 03/07/23 18:48 [23]

Fiscal device ID: 674473 [22]

Code [29]	Description [30]	Qty [31]	Price [32]	Amount (excl. tax) [50]	VAT [34.2]	Total amount (incl. tax) [33.2]
12345678	Item1 name	1	13200.00	13200.00	1980.00	15180.00
11223344	Item2 name with very long name which does not fit in a single line	3	5000.00	15000.00	2250.00	17250.00
12312312	Item3 name	1	600.00	600.00	0.00	600.00
12341234	Item4 name	1	2400.00	2400.00	-	2400.00
12341234	Discount: Item4 name	1	-1200.00	-1200.00	-	-1200,00

Total (excl. tax) [47]	30000.00
Total15% [41] VAT	4320.00 [44]
Invoice total, ZWL [36]	**34320.00 [35]**

Invoice is issued after purchasing goods according to agreement No555 [49]

Tax exclusive credit note template

[1] Taxpayer logo

Verification code
4C8B-E276-6333-0417 [46]
You can verify this receipt manually at
https://receipt.zimra.org/ [48]

[45] QR code

CREDIT NOTE [9]

SELLER	BUYER
Company legal name [2]	Company ABC, Ltd. [11]
TIN: 1234567890 [3]	Food Market ABC [12]
VAT No: 12345678 [4]	TIN: 19870123 [13]
Downtown location [5]	VAT: 1233455 [51]
ZB Centre Cnr Nkwame Nkrumah Ave/ First Street, Harare [	12 Southgate Hwange [14]
zimra@email.com [7]	john.smith@email.com [15]
(0242)758 891-5 [8]	(081) 20875 [16]

Invoice No: 15[17]/451[18]	Fiscal day No: 45 [19]
Customer reference No: CISN-0000040012 [20]	Date: 03/07/23 18:48 [23]
Device Serial No: 12345678901234567890 [21]	Fiscal device ID: 674473 [22]

CREDITED INVOICE [24]

Invoice No: 450 [26]	Date: 03/07/23 18:48 [27]
Customer reference No: CISN-0000040011 [28]	
Device Serial No: 12345678901234567890 [25]	

Code [29]	Description [30]	Qty [31]	Price [32]	Amount (excl. tax) [50]	VAT [34.2]	Amount (incl. tax) [33.2]
12345678	Item1 name	1	13200.00	13200.00	1980.00	15180.00
11223344	Item2 name with very long name which does not fit in a single line	3	5000.00	15000.00	2250.00	17250.00
12312312	Item3 name	1	600.00	600.00	0.00	600.00
12341234	Item4 name	1	2400.00	2400.00	-	2400.00
12341234	Discount: Item4 name	1	-1200.00	-1200.00	-	-1200,00

Total (excl. tax) [47]	30000.00
Total15% [41] VAT	4320.00 [44]
Invoice total, ZWL [36]	**34320.00 [35]**

Invoice is issued after purchasing goods according to agreement No555 [49]

10.3. Receipt and invoice view fields descriptions

Fields in "Field name in which device sends data to FDMS" refers to Fiscal Device Gateway API endpoint *submitReceipt* fields. Fields in "Field name in which device receives data from FDMS" refers to Fiscal Device Gateway API endpoint *getConfig* fields.

Ob. No	Object name	Object description	Field name in which device sends data to FDMS	Field name in which device receives data from FDMS	Used in	Mandatory
	Taxpayer block					
[1]	Taxpayer's logo	Taxpayer's logo. If printer is not capable to print logo, field is not displayed.	-	-	Receipt48 InvoiceA4	N
[2]	Taxpayer's name	Taxpayer's company legal name.	-	taxpayerName	Receipt48 InvoiceA4	Y
[3]	Taxpayer's TIN	Taxpayer's identification number, displayed with label "TIN: ".	-	taxpayerTIN	Receipt48 InvoiceA4	Y
[4]	Taxpayer's VAT No	Taxpayer's VAT number. Must be displayed if taxpayer is VAT taxpayer	-	vatNumber	Receipt48 InvoiceA4	Y
	Taxpayer address and contacts block					
[5]	Taxpayer's branch name	Taxpayer's branch name (to which fiscal device is assigned) Field displayed only if it differs from Taxpayer's name.	-	deviceBranchName	Receipt48 InvoiceA4	Y*
[6]	Taxpayer's branch address	Taxpayer's branch address, where fiscal device is located. Displayed in this order: houseNumber, street, city, province	-	deviceBranchAddress	Receipt48 InvoiceA4	Y
[7]	Taxpayer's branch e-mail	E-mail address.	-	deviceBranchContacts. email	Receipt48 InvoiceA4	N
[8]	Taxpayer's branch phone number	Phone number.	-	deviceBranchContacts. phoneNo	Receipt48 InvoiceA4	N
	Fiscal tax invoice block					
[9]	Label	Static text "FISCAL TAX INVOICE" if document is fiscal invoice and taxpayer is VAT payer or "FISCAL INVOICE" if document is fiscal invoice and taxpayer is non VAT payer or "CREDIT NOTE" if document is credit note or "DEBIT NOTE" if document is debit note	-	-	Receipt48 InvoiceA4	Y
	Buyer block					
	Buyer block is displayed only if buyer information is provided.					
[10]	Block label	Static text "BUYER".	-	-	Receipt48 InvoiceA4	Y
[11]	Buyer's Name.	Buyer's register name (or individual person name, foreign company name or	buyerRegisterName	-	Receipt48 InvoiceA4	Y

		not registered trader name).				
[12]	Buyer's trade name	Buyer's trade name	buyerTradeName	-	Receipt48 InvoiceA4	N
[13]	Buyer TIN	Buyer's TIN.	buyerTIN	-	Receipt48 InvoiceA4	N
[51]	Buyer VAT	Buyer's VAT.	VATNumber	-	Receipt48 InvoiceA4	N-
[14]	Buyer's address	Buyer's address. Displayed in this order: houseNumber, street, city, province	buyerAddress	-	Receipt48 InvoiceA4	N
[15]	Buyer's e-mail	Buyer's e-mail address.	buyerContacts. email	-	Receipt48 InvoiceA4	N
[16]	Buyer's phone number	Purchaser's phone number. Field displayed if not empty.	buyerContacts. phoneNo	-	Receipt48 InvoiceA4	N
	Receipt information block					
[17]	Invoice No	Receipt number in fiscal day - current day receipt counter.	receiptCounter	-	Receipt48 InvoiceA4	Y
[18]	Invoice No	Receipt global No.	receiptGlobalNo	-	Receipt48 InvoiceA4	Y
[19]	Fiscal day No	Receipt Fiscal day number.	-	fiscalDayNo	Receipt48 InvoiceA4	Y
[20]	Customer reference No	Customer reference number must be unique at taxpayer level	invoiceNo		Receipt48 InvoiceA4	Y
[21]	Device Serial No	Fiscal device serial number.	-	deviceSerialNo	Receipt48 InvoiceA4	Y
[22]	Device ID	Fiscal device ID (assigned by FDMS during device registration).	deviceID	-	Receipt48 InvoiceA4	Y
[23]	Receipt date and time	Receipt date and time.	receiptDate	-	Receipt48 InvoiceA4	Y
	Credit note or Debit Note information block (displayed only in case of receipt type Credit Note or Debit Note)					
[24]	Label	Static text "Credited invoice" or "Debited invoice". Displayed only for Credit notes and Debit notes respectively.	-	-	Receipt48 InvoiceA4	Y
[25]	Device Serial No	Device Serial No of credited or debited receipt	creditNote.deviceID	-	Receipt48 InvoiceA4	Y
[26]	Invoice No	Invoice No (receiptGlobalNo) of credited or debited receipt.	creditNote. receiptGlobalNo	-	Receipt48 InvoiceA4	Y
[27]	Receipt date	Date of credited or debited receipt	receiptDate of credited or debited receipt	-	Receipt48 InvoiceA4	Y
[28]	Customer reference No	Customer reference No of credited or debited receipts, is unique at taxpayer level	invoiceNo of credited or debited receipt	-	Receipt48 InvoiceA4	Y

		Receipt lines block					
[29]	Item HS code	Receipt line item National Harmonized System code.	receiptLineHSCode		-	InvoiceA4	N
[30]	Item name	Item name. • If item name does not fit into 1 row it is split into more rows depending on item name length. • If ReceiptLineType is Discount static text "Discount:" is added as prefix.	receiptLineName		-	Receipt48 InvoiceA4	Y
[31]	Quantity	Receipt line item Quantity. May not be displayed in case quantity is 1 if it is Receipt48.	receiptLineQuantity,		-	Receipt48 InvoiceA4	N
[32]	Unit price	Receipt line item unit price. May not be displayed in case quantity is 1 if it is Receipt48. If Quantity is more than 1 word "each" is shown in Receipt48 view between quantity and price. In InvoiceA4 tax inclusive template – price is shown including tax. In InvoiceA4 tax exclusive template – price is shown excluding tax.	receiptLinePrice		-	Receipt48 InvoiceA4	N
[33]	Total amount	Receipt line total.	receiptLineTotal		-	Receipt48 InvoiceA4	Y
[33.1]	Total amount (incl. tax)	Receipt line total	receiptLineTotal		-	Receipt48 InvoiceA4	Y
[33.2]	Total amount (incl. tax)	Receipt line total inclusive tax Amount = receiptLineTotal * (1+taxPercent)	-		-	Receipt48 InvoiceA4	Y
[34]	Tax code	Tax code of receipt line.	taxCode		-	Receipt48 InvoiceA4	N
[34.1]	VAT	VAT amount of receipt line. VAT = receiptLineTotal * taxPercent/(1+taxPercent). If tax doesn't have percent, is null, shown minus sign.	-		-	Receipt48 InvoiceA4	Y
[34.2]	VAT	VAT amount of receipt line. VAT = receiptLineTotal * taxPercent. If tax doesn't have percent, is null, shown minus sign.	-		-	Receipt48 InvoiceA4	Y
[50]	Total amount (excl. tax)	Receipt line total amount excluding tax (receiptLineTotal value for tax exclusive invoice)	receiptLineTotal		-	InvoiceA4	Y
		Receipt settlement block					
[36]	Currency	Receipt currency code.	receiptCurrency		-	Receipt48 InvoiceA4	Y
[35]	Total receipt amount	Total receipt amount to be paid.	receiptTotal		-	Receipt48 InvoiceA4	Y
[37]	Payment method	Payment method.	moneyTypeCode		-	Receipt48	Y

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[38]	Total paid	Total paid by payment method.	paymentAmount	-	Receipt48 InvoiceA4	Y
	Number of Items block					
[39]	Number of Items	Number of items in receipt. SUM(Quantity) of all Sales lines. If item is weighed weight is added. For example: if one item is quantitative and quantity is 4, and another item is weighed, and weight is 0,555 kg, number of items should be 4+0,555=4,555. Always positive number (for credit note Number of Items also will be showed as positive number).	-	-	Receipt48	Y
	Taxes block					
	Receipt rows are grouped by tax percent and tax code. This block is not shown on receipt, if taxpayer is not VAT taxpayer.					
[40]	Tax code	Tax code	-	-	Receipt48	N
[41]	Vat %	Tax percentage. In case of exempt, no value is displayed, shown name.	-	-	Receipt48 InvoiceA4	Y
[42]	Net.Amt	Amount without tax, salesAmountWithTax - taxAmount	-	-	Receipt48 InvoiceA4	Y
[43]	VAT	Tax amount	taxAmount	-	Receipt48 InvoiceA4	Y
[44]	Amount	Sales amount with tax	salesAmountWithTax	-	Receipt48 InvoiceA4	Y
[47]	Total (excl. tax)	Used in InvoiceA4 when invoice is tax exclusive. It sums lines total amounts.	-	-	InvoiceA4	N
	Receipt verification block					
[45]	QR code	Generated QR code. More details in *Receipt QR code rules*. Optional if printer cannot print QR picture.	-	-	Receipt48 InvoiceA4	N*
[46]	Receipt verification code	QR code value (receiptQRData) of generate QR displayed in four characters groups separated by "- ". More details in *Receipt QR code rules*.	-	-	Receipt48 InvoiceA4	Y
[48]	URL	URL for QR validation.	-	qrUrl	Receipt48 InvoiceA4	Y
[49]	Note	Note for credit note/debit note/invoice.	receiptNotes	-	Receipt48 InvoiceA4	Y*

10.4. Z Report / X Report

Receipt field name

```
                Company legal name
                TIN: 123111000
                VAT No: 12341234

                Downtown location
ZB Centre Cnr Nkwame Nkrumah Ave / First Street,
                Harare
                zimra@email.com
                (0242)758 891-5
------------------------------------------------

                   Z REPORT
------------------------------------------------

Fiscal day No: 45
Fiscal day opened: 03/04/2023 18:01
Fiscal day closed: 04/04/2023 18:01
Device Serial No: 9876543210123456789
Device Id: 1450
------------------------------------------------
                 Daily totals
------------------------------------------------

Z W L
------------------------------------------------

Total net sales
Net,VAT 15%                           10,000.00
Net,VAT  9%                            5,000.00
Net,Non-VAT 0%                        15,000.00
Net,Exempt                            25,000.00
Total net amount                      55000.00
------------------------------------------------

Total taxes
Tax,VAT 15%                            1,500.00
Tax,VAT  9%                              450.00
Total tax amount                       1950.00
------------------------------------------------

Total gross sales
Total,VAT 15%                         11,500.00
Total,VAT  9%                          5,450.00
Total,Non-VAT 0%                      15,000.00
Total,Exempt                          25,000.00
Total gross amount                    56950.50
------------------------------------------------

Documents      Quantity      Total amount
Invoices            50            56,950.50
Credit notes         1              -500.00
Debit notes          1               500.00
Total documents     52            56950.50
================================================


------------------------------------------------

U S D
------------------------------------------------

Total net sales
Net,VAT 15%                            1,000.00
Net,VAT  9%                              100.00
Net,Non-VAT 0%                           500.00
Net,Exempt                             2,000.00
Total net amount                       3600.00
------------------------------------------------

Total taxes
Net,VAT 15%                              150.00
Net,VAT  9%                                9.00
Net,Non-VAT 0%                             0.00
Net,Exempt                                 0.00
Total tax amount                        159.00
------------------------------------------------

Total gross sales
Net,VAT 15%                            1,150.00
Net,VAT  9%                              109.00
Net,Non-VAT 0%                           500.00
Net,Exempt                             2,000.00
Total gross amount                     3759.00
------------------------------------------------

Documents      Quantity      Total amount
Invoices            10             3,759.00
Credit notes         2              -100.00
Debit notes          3               100.00
Total documents     15             3759.00
================================================
```

Receipt field names (right column):

[1] Taxpayer company legal name
[2] Taxpayer TIN
[3] VAT number

[4] Taxpayer's branch name
[5] Taxpayer's branch address
[6] Taxpayer's branch e-mail
[7] Taxpayer's branch phone

[8] Static text: Z REPORT or X REPORT

[9] Fiscal day number
[10] Fiscal day opening date
[11] Fiscal day closing date
[12] Device serial No
[13] Device Id

[14] Static text: Daily totals

List of counters in particular currency. Currency/counters information is shown only if there are sales with corresponding currency.
[15] Currency (currencies are in alphabetical order)

[16] Static text: Total net sales
[17], [18] Static text "Net", tax name, net amount (sales without tax) (ordered by tax percentage descending)

[19], [20] Static text: Total net amount, total amount

[21] Static text: Total taxes
[22] [23] Static text "Tax", tax name, tax amount (tax amount) (ordered by tax percentage descending)

[24], [25] Static text: Total tax amount, total amount

[26] Static text: Total gross sales
[27], [28] Static text "Total", tax name, total amount (sales with tax) (ordered by tax percentage descending)

[29], [30] Static text: Total gross amount, total amount

[31], [32], [33] Static texts: Documents, Quantity, Total amount
[34], [35], [36] Static text "Invoices", quantity of documents, total amount (sales with tax for invoices)
[37], [38], [39] Static text "Credit notes", quantity of documents, total amount (sales with tax for credit notes, value can be negative)
[40], [41], [42] Static text "Debit notes", quantity of documents, total amount (sales with tax for debit notes)
[43], [44], [45] Static text "Total documents", total quantity, total sum of amounts

10.5. Z report and X report fields description

Z report /X report are daily reports. Fields are described according getConfig, **Error! Reference source not found.**, getStatus APIs, Enums and Fiscal counters.

Ob. No	Object name	Object description	Field name
Taxpayer block			
[1]	Taxpayer name	Taxpayer's company legal name.	taxpayerName
[2]	Taxpayer TIN	Taxpayer's identification number, displayed with label "TIN: ".	taxpayerTIN
[3]	Taxpayer VAT No	Taxpayer's VAT number, displayed with label "VAT No:". Must be displayed if taxpayer is VAT taxpayer	vatNumber
Taxpayer address and contacts block			
[4]	Taxpayer's branch name	Taxpayer's branch name (to which fiscal device is assigned) Field displayed only if it differs from Taxpayer's name.	deviceBranchName
[5]	Taxpayer's branch address	Taxpayer's branch address, where fiscal device is located. Displayed in this order: houseNumber, street, city, province	deviceBranchAddress
[6]	Taxpayer's branch e-mail	E-mail address.	deviceBranchContacts. email
[7]	Taxpayer's branch phone number	Phone number.	deviceBranchContacts. phoneNo
Report block			
[8]	Label	Static text "Z REPORT" or "X REPORT". If FiscalDayStatus is FiscalDayClosed text "Z REPORT" is shown. If FiscalDayStatus is not FiscalDayClosed text "X REPORT" is shown.	-
[9]	Fiscal day No	Fiscal day number.	fiscalDayNo
[10]	Fiscal day opening date	Fiscal day opening date.	fiscalDayOpened
[11]	Fiscal day closing date	Fiscal day closing date. Is shown if FiscalDayStatus is FiscalDayClosed.	fiscalDayClosed
[12]	Device Serial No	Fiscal device serial number.	deviceSerialNo
[13]	Device ID	Fiscal device ID (assigned by FDMS during device registration).	deviceID
Daily totals block			
[14]	Label	Static text: Daily totals.	-
[15]	Currency	List of counters in particular currency. Block for particular currency is shown only if there are sales with corresponding currency. Blocks by currency is listed in alphabetical ascending order by currency code.	fiscalCounterCurrency
[16]	Total net sales text	Static text "Total net sales".	-
[17]	Net name	List of Net amounts for each tax. Static text "Net" + tax name. Taxes are ordered by tax percentage in descending order. If tax percent is equal to 0%, or exempt – line for that tax is not shown.	taxName
[18]	Net amount	Total net amount (sales without tax) by tax.	SaleByTax – SaleTaxByTax + CreditNoteByTax –

			NB. Credit note counter is added total because that it's value is negative.	CreditNoteTaxByTax + DebitNoteByTax – DebitNoteTaxByTax by particular tax.
[19]	Total net amount text	Static text "Total net amount"		-
[20]	Total net amount	Total net amount for all values, all taxes. NB. Credit note counter is added total because that it's value is negative.		Sum of (SaleByTax – SaleTaxByTax + CreditNoteByTax – CreditNoteTaxByTax + DebitNoteByTax - DebitNoteTaxByTax)
[21]	Total taxes text	Static text "Total taxes". This block is skipped if no taxes were collected (there were no sales with tax which percent is greater than 0%)		-
[22]	Tax name	List of Tax amounts for each tax. Static text "Tax" + tax name. Taxes are ordered by tax percentage in descending order. If tax percent is equal to 0%, or exempt – line for that tax is not shown.		taxName
[23]	Tax amount	Tax amount. NB. Credit note counter is added total because that it's value is negative.		SaleTaxByTax + CreditNoteTaxByTax + DebitNoteTaxByTax by particular tax.
[24]	Total tax amount text	Static text "Total tax amount"		-
[25]	Total tax amount	Total tax amount for all values, all taxes. NB. Credit note counter is added total because that it's value is negative.		Sum of (SaleTaxByTax + CreditNoteTaxByTax + DebitNoteTaxByTax)
[26]	Total gross sales text	Static text "Total gross sales".		-
[27]	Tax name	List of Total gross amounts for each tax. Static text "Total" + tax name. Taxes are ordered by tax percentage in descending order. If tax percent is equal to 0, or exempt – line for that tax is not shown.		taxName
[28]	Gross sales amount	Gross sales amount (sales with tax). NB. Credit note counter is added total because that it's value is negative.		SaleByTax + CreditNoteByTax + DebitNoteByTax by particular tax.
[29]	Total gross amount text	Static text "Total gross amount"		-
[30]	Total gross amount	Total gross amount for all values, all taxes. NB. Credit note counter is added total because that it's value is negative.		Sum of (SaleByTax + CreditNoteByTax + DebitNoteByTax)
[31]	Documents text	Static text "Documents".		-
[32]	Quantity text	Static text "Quantity".		-
[33]	Total amount text	Static text "Total amount".		-
[34]	Invoices text	Static text "Invoices".		-
[35]	Quantity of invoices	Quantity of invoices during fiscal day.		Number of issued documents where ReceiptType=FiscalInvoice
[36]	Total amount for invoices	Total amount (sales with tax for invoices).		Sum of SaleByTax
[37]	Credit notes text	Static text "Credit notes".		-
[38]	Quantity of credit notes	Quantity of credit notes during fiscal day.		Number of issued documents where ReceiptType=CreditNote

[39]	Total amount for credit notes	Total amount (sales with tax for credit notes). Is shown with minus sign.	Sum of CreditNoteByTax
[40]	Debit notes text	Static text "Debit notes".	-
[41]	Quantity of debit notes	Quantity of debit notes during fiscal day.	Number of issued documents where ReceiptType=DebitNote
[42]	Total amount for debit notes	Total amount (sales with tax for debit notes).	Sum of DebitNoteByTax
[43]	Total documents text	Static text "Total documents".	-
[44]	Total quantity	Quantity of documents during fiscal day. NB. Credit note counter is added total because that it's value is negative.	Number of issued documents
[45]	Total amount	Total amount for all documents, all taxes. NB. Credit note counter is added total because that it's value is negative.	Sum of SaleByTax + Sum of CreditNoteByTax + Sum of DebitNoteByTax

11. RECEIPT QR CODE RULES

Each issued receipt and invoice must contain QR code value printed as text and preferably also QR code picture (in case printer is capable to print it). QR code represents deep link URL with receipt identification information. QR code consists of this information:

Name	Length*	Description
qrUrl		URL for QR validation, received in **Error! Reference source not found.** (POS needs to add / at the end of URL before adding other fields to URL).
deviceID	10	Device ID represented in 10 digits number with leading zeros.
receiptDate	8	Invoice date (receiptDate field value) represented in 8 digits (format: ddMMyyyy).
receiptGlobalNo	10	Receipt global number (receiptGlobalNo field value) issued by device represented in 10 digits with leading zeros
receiptQrData	16	Receipt QR data field (first 16 characters of MD5 hash from ReceiptDeviceSignature hexadecimal format value).

* - length specifies a fixed length of value, which should be included in QR. In case value is shorter than indicated length, leading zeros must be added in front.

Example:

Name	Example No 1	Example No 2
qrUrl	https://invoice.zimra.co.zw	https://invoice.zimra.co.zw
deviceID	0000000321	0000000322
receiptDate	03042023	04042023
receiptGlobalNo	1112223331	0000001332
receiptQrData	4C8BE27663330417	C10B0476B3B14678
Result (receiptQrCode)	https://invoice.zimra.co.zw/00000003210304 202311122233314C8BE27663330417	https://invoice.zimra.co.zw/00000003220404 20230000001332C10B0476B3B14678
QR		

12. CERTIFICATE SIGNING REQUEST (CSR) AND CERTIFICATE EXAMPLES

12.1. Example keys used

12.1.1. ECC ECDSA on SECG secp256r1

ECC ECDSA on SECG secp256r1 (ANSI prime256v1, NIST P-256) private key used in examples:

```
-----BEGIN EC PRIVATE KEY-----
MHcCAQEEIBXgREh8BvsXj0FjjcZ29EQiVjWGJuqHQp55+LlZd6waoAoGCCqGSM49
AwEHoUQDQgAE+79w72O6UYOJc9mfO8EjMEl9uysJaWJ0kVellIj46atl7FAG4NpY
VDe6t5pTSWlM6qCj5qKealESKalMnV32qQ==
-----END EC PRIVATE KEY-----
```

This key in textual representation form:
```
Private-Key: (256 bit)
priv:
    15:e0:44:48:7c:06:fb:17:8f:41:63:8d:c6:76:f4:
    44:22:56:35:86:26:ea:87:42:9e:79:f8:b9:59:77:
    ac:1a
pub:
    04:fb:bf:70:ef:63:ba:51:83:89:73:d9:9f:3b:c1:
    23:30:49:7d:bb:2b:09:69:62:74:91:57:a5:94:88:
    f8:e9:ab:65:ec:50:06:e0:da:58:54:37:ba:b7:9a:
    53:49:69:4c:ea:a0:a3:e6:a2:9e:6a:51:12:29:a9:
    4c:9d:5d:f6:a9
ASN1 OID: prime256v1
NIST CURVE: P-256
```

12.1.2. RSA 2048

RSA 2048 private key used in examples:
```
-----BEGIN RSA PRIVATE KEY-----
MIIEpQIBAAKCAQEA52kCd2bXK+W72vC0+KlQ+tLUBNBsYNk9Gg+NPTxfD+92lFg9
sPW8B1MFxTO+Kpw5MRzArB6M3LZ3pj0O525vLcgT301bridwTgpSfzqtoHFhgTox
My94lMiYSK94w2RxslaMyDm4dCXGfU5AlAiuuegVFz056jV/Ik7jFjQLG5GQnRhW
tGkI2TKZLOlBsjhxUKLKPwUCPtkfZmDig/fXE1XigqSOGMoxQ9BTxJ/i8wWU3AR1
Tjou41EFisaOKpan4xqeRnvNrOs0eIccBFRXBCB78tLTZgE9yqgwoQ5oQpNm845O
kFXQ0F770cy0sx+CO2OnpdQisRK8WDx95kJkIQIDAQABAoIBAFar6/KQoBKe7ucn
tIBV2jC3ehV7grwbYVk7bej7jZdIVx9klWaMAyqzG7wqjxUiggE1BazxnEymQtYO
lGB16ko5X8gJD0eBGf0AvLlOXu1yydQ+2WKUaxM+tlqy7gYwvqzO4de0VrOZ2mfg
QSuwvNCAbjXQBrsD4mQVK9SLFYXzHuYPXDVgTnBktjVQpedV+gqdLVo8yMm1Fpv3
bB/tvotBmxHKsVR6AZmGME1ttO0HR4L6Ha4d1ao5FK4+LtvowFSpSssQ7wyczJmO
ualE4qt/S87Fvm1hYU7VLbm7pAcZMa15FhIVcWZar2RRwwhvm7XwZbnippNgETMC
9bDsogECgYEA87D38++I3eCVm+bJ8Qpsu8yKVS2Bqv+dAyFLG9wFmA6OJhNrpQ+f
JxSmv6sxiz492j4I+uHXuo9ylSg8NQmdtouNRD2Gb0Xb5K6W0zftnoj05P8zJkkR
Z9RyoSXppLblazzT6LqUSk1/PWsX3OXlliNEh4babqsU6fartlWrqtECgYEA8xk9
yz46DOKtu5GEl7i2pe2mMXNG3Ed/Bas1mwa1isnKPFjNNGLuMaITYvXDK+/O9hqO
ESWIRg/sjQ1NaHrbZ3izYgqBPyPVX8inA/w+4Yb6CVHY+9KJGVqzqrvlWwkMkd6K
IqL4SQAxWJQ1Ua1znbuB5TZ6tcZ4QcbVVcgB2FECgYEAwK+xn2RLqIUoRvmZu8ou
Z+A3kVpGKVusXwk4RnMWyUDZDSpV91H+2fvuTaejqSIx7hsXJqjk11MNmvsRgC52
UhzOOqMbZWirkoqqH6Eddjl8yoUvgJpN9Pd7HAjKUb98b+rM9DxzfL0CWyIO4E+3
1ZtVWIQ8uzzzcHvnEmlzL8ECgYEA5lPOFpl4yuijDwqLBG3AsGoAgu3j/6XGFgrn
mWC79SnH8XF5y97ILEKR97s/Fov6HXd/j4NuIGPKDsLByvJMmzbjT0sAtmAvNLea
```

```
    ds4yjeAjW10vJzmNKHalsGiioKRsQnEFlFewwwnptzGFa0PaPWKBajk5/qxzGG9Z
    hhMgnGECgYEAh3K9PsQSTT2tjxuOyyYjlDqDn7exl81i8XLeVKDOL7uQM6m3VICo
    F8KdKY2hrwe71pQMI6+P+GkDgx4J7qWO1EMZdMDcUDgzQemUQiUuFDFZ7FnUOkUS
    2RbcYyo9m5kGzHzfQPAAlk9J1tJ3/xm8Hi44b2ZpiCpHYNW+RtB2qjA=
    -----END RSA PRIVATE KEY-----
```

This key in textual representation form:

```
RSA Private-Key: (2048 bit, 2 primes)
modulus:
    00:e7:69:02:77:66:d7:2b:e5:bb:da:f0:b4:f8:a9:
    50:fa:d2:d4:04:d0:6c:60:d9:3d:1a:0f:8d:3d:3c:
    5f:0f:ef:76:94:58:3d:b0:f5:bc:07:53:05:c5:33:
    be:2a:9c:39:31:1c:c0:ac:1e:8c:dc:b6:77:a6:3d:
    0e:e7:6e:6f:2d:c8:13:df:4d:5b:ae:27:70:4e:0a:
    52:7f:3a:ad:a0:71:61:81:3a:31:33:2f:78:94:c8:
    98:48:af:78:c3:64:71:b2:56:8c:c8:39:b8:74:25:
    c6:7d:4e:40:94:08:ae:b9:e8:15:17:3d:39:ea:35:
    7f:22:4e:e3:16:34:0b:1b:91:90:9d:18:56:b4:69:
    08:d9:32:99:2c:e9:41:b2:38:71:50:a2:ca:3f:05:
    02:3e:d9:1f:66:60:e2:83:f7:d7:13:55:e2:82:a4:
    8e:18:ca:31:43:d0:53:c4:9f:e2:f3:05:94:dc:04:
    75:4e:3a:2e:e3:51:05:8a:c6:8e:2a:96:a7:e3:1a:
    9e:46:7b:cd:ac:eb:34:78:87:1c:04:54:57:04:20:
    7b:f2:d2:d3:66:01:3d:ca:a8:30:a1:0e:68:42:93:
    66:f3:8e:4e:90:55:d0:d0:5e:fb:d1:cc:b4:b3:1f:
    82:3b:63:a7:a5:d4:22:b1:12:bc:58:3c:7d:e6:42:
    64:21
publicExponent: 65537 (0x10001)
privateExponent:
    56:ab:eb:f2:90:a0:12:9e:ee:e7:27:b4:80:55:da:
    30:b7:7a:15:7b:82:bc:1b:61:59:3b:6d:e8:fb:8d:
    97:48:57:1f:64:95:66:8c:03:2a:b3:1b:bc:2a:8f:
    15:22:82:01:35:05:ac:f1:9c:4c:a6:42:d6:0e:94:
    60:75:ea:4a:39:5f:c8:09:0f:47:81:19:fd:00:bc:
    b9:4e:5e:ed:72:c9:d4:3e:d9:62:94:6b:13:3e:b6:
    5a:b2:ee:06:30:be:ac:ce:e1:d7:b4:56:b3:99:da:
    67:e0:41:2b:b0:bc:d0:80:6e:35:d0:06:bb:03:e2:
    64:15:2b:d4:8b:15:85:f3:1e:e6:0f:5c:35:60:4e:
    70:64:b6:35:50:a5:e7:55:fa:0a:9d:2d:5a:3c:c8:
    c9:b5:16:9b:f7:6c:1f:ed:be:8b:41:9b:11:ca:b1:
    54:7a:01:99:86:30:4d:6d:b4:ed:07:47:82:fa:1d:
    ae:1d:d5:aa:39:14:ae:3e:2e:db:e8:c0:54:a9:4a:
    cb:10:ef:0c:9c:cc:99:8e:b9:a9:44:e2:ab:7f:4b:
    ce:c5:be:6d:61:61:4e:d5:2d:b9:bb:a4:07:19:31:
    ad:79:16:12:15:71:66:5a:af:64:51:c3:08:6f:9b:
    b5:f0:65:b9:e2:a6:93:60:11:33:02:f5:b0:ec:a2:
    01
prime1:
    00:f3:b0:f7:f3:ef:88:dd:e0:95:9b:e6:c9:f1:0a:
    6c:bb:cc:8a:55:2d:81:aa:ff:9d:03:21:4b:1b:dc:
    05:98:0e:8e:26:13:6b:a5:0f:9f:27:14:a6:bf:ab:
    31:8b:3e:3d:da:3e:08:fa:e1:d7:ba:8f:72:95:28:
    3c:35:09:9d:b6:8b:8d:44:3d:86:6f:45:db:e4:ae:
    96:d3:37:ed:9e:88:f4:e4:ff:33:26:49:11:67:d4:
    72:a1:25:e9:a4:b6:e5:6b:3c:d3:e8:ba:94:4a:4d:
    7f:3d:6b:17:dc:e5:e5:96:23:44:87:86:da:6e:ab:
    14:e9:f6:ab:b6:55:ab:aa:d1
prime2:
    00:f3:19:3d:cb:3e:3a:0c:e2:ad:bb:91:84:97:b8:
    b6:a5:ed:a6:31:73:46:dc:47:7f:05:ab:35:9b:06:
    b5:8a:c9:ca:3c:58:cd:34:62:ee:31:a2:13:62:f5:
```

```
        c3:2b:ef:ce:f6:1a:8e:11:25:88:46:0f:ec:8d:0d:
        4d:68:7a:db:67:78:b3:62:0a:81:3f:23:d5:5f:c8:
        a7:03:fc:3e:e1:86:fa:09:51:d8:fb:d2:89:19:5a:
        b3:aa:bb:e5:5b:09:0c:91:de:8a:22:a2:f8:49:00:
        31:58:94:35:51:ad:73:9d:bb:81:e5:36:7a:b5:c6:
        78:41:c6:d5:55:c8:01:d8:51
    exponent1:
        00:c0:af:b1:9f:64:4b:a8:85:28:46:f9:99:bb:ca:
        2e:67:e0:37:91:5a:46:29:5b:ac:5f:09:38:46:73:
        16:c9:40:d9:0d:2a:55:f7:51:fe:d9:fb:ee:4d:a7:
        a3:a9:22:31:ee:1b:17:26:a8:e4:d7:53:0d:9a:fb:
        11:80:2e:76:52:1c:ce:3a:a3:1b:65:68:ab:92:8a:
        aa:1f:a1:1d:76:39:7c:ca:85:2f:80:9a:4d:f4:f7:
        7b:1c:08:ca:51:bf:7c:6f:ea:cc:f4:3c:73:7c:bd:
        02:5b:22:0e:e0:4f:b7:d5:9b:55:58:84:3c:bb:3c:
        f3:70:7b:e7:12:69:73:2f:c1
    exponent2:
        00:e6:53:ce:16:99:78:ca:e8:a3:0f:0a:8b:04:6d:
        c0:b0:6a:00:82:ed:e3:ff:a5:c6:16:0a:e7:99:60:
        bb:f5:29:c7:f1:71:79:cb:de:c8:2c:42:91:f7:bb:
        3f:16:8b:fa:1d:77:7f:8f:83:6e:20:63:ca:0e:c2:
        c1:ca:f2:4c:9b:36:e3:4f:4b:00:b6:60:2f:34:b7:
        9a:76:ce:32:8d:e0:23:5b:5d:2f:27:39:8d:28:76:
        a5:b0:68:a2:a0:a4:6c:42:71:05:94:57:b0:c3:09:
        e9:b7:31:85:6b:43:da:3d:62:81:6a:39:39:fe:ac:
        73:18:6f:59:86:13:20:9c:61
    coefficient:
        00:87:72:bd:3e:c4:12:4d:3d:ad:8f:1b:8e:cb:26:
        23:94:3a:83:9f:b7:b1:97:cd:62:f1:72:de:54:a0:
        ce:2f:bb:90:33:a9:b7:54:80:a8:17:c2:9d:29:8d:
        a1:af:07:bb:d6:94:0c:23:af:8f:f8:69:03:83:1e:
        09:ee:a5:8e:d4:43:19:74:c0:dc:50:38:33:41:e9:
        94:42:25:2e:14:31:59:ec:59:d4:3a:45:12:d9:16:
        dc:63:2a:3d:9b:99:06:cc:7c:df:40:f0:00:96:4f:
        49:d6:d2:77:ff:19:bc:1e:2e:38:6f:66:69:88:2a:
        47:60:d5:be:46:d0:76:aa:30
```

12.2. CSRs and Certificates

In examples we assume that device has:

- Keys described in "12.1 Example keys used".
- deviceId is 42.
- Assigned by ZIMRA device name for use in CSR Subject CN is "ZIMRA-SN0001-0000000042".

12.2.1. ECC ECDSA on SECG secp256r1

12.2.1.1. CSR

ECC ECDSA on SECG secp256r1 CSR:

```
-----BEGIN CERTIFICATE REQUEST-----
MIHYMIGAAgEAMB4xHDAaBgNVBAMME1pSQi1lVkZELTAwMDAwMDAwNDIwWTATBgcq
hkjOPQIBBggqhkjOPQMBBwNCAAT7v3DvY7pRg4lz2Z87wSMwSX27KwlpYnSRV6WU
iPjpq2XsUAbg2lhUN7q3mlNJaUzqoKPmop5qURIpqUydXfapoAAwCgYIKoZIzj0E
AwIDRwAwRAIgLMEJQDh18bUE9waT2UXzP0+8FcGukpcIegMxd1A4JaQCIAZkzmEH
e0aaZ2jIcZArZo+rWzI4IwnSXtJqXLrpGUML
-----END CERTIFICATE REQUEST-----
```

In textual representation form:

```
Certificate Request:
    Data:
        Version: 1 (0x0)
        Subject: CN = ZIMRA-SN0001-0000000042
        Subject Public Key Info:
            Public Key Algorithm: id-ecPublicKey
                Public-Key: (256 bit)
                pub:
                    04:fb:bf:70:ef:63:ba:51:83:89:73:d9:9f:3b:c1:
                    23:30:49:7d:bb:2b:09:69:62:74:91:57:a5:94:88:
                    f8:e9:ab:65:ec:50:06:e0:da:58:54:37:ba:b7:9a:
                    53:49:69:4c:ea:a0:a3:e6:a2:9e:6a:51:12:29:a9:
                    4c:9d:5d:f6:a9
                ASN1 OID: prime256v1
                NIST CURVE: P-256
        Attributes:
            a0:00
    Signature Algorithm: ecdsa-with-SHA256
         30:44:02:20:2c:c1:09:40:38:75:f1:b5:04:f7:06:93:d9:45:
         f3:3f:4f:bc:15:c1:ae:92:97:08:7a:03:31:77:50:38:25:a4:
         02:20:06:64:ce:61:07:7b:46:9a:67:68:c8:71:90:2b:66:8f:
         ab:5b:32:38:23:09:d2:5e:d2:6a:5c:ba:e9:19:43:0b
```

12.2.1.2. Certificate

ECC ECDSA on SECG secp256r1 Certificate:

```
-----BEGIN CERTIFICATE-----
MIIC6TCCAdGgAwIBAgIFAKsSzWowDQYJKoZIhvcNAQELBQAwZDELMAkGA1UEBhMC
TFQxETAPBgNVBAoMCEdvb2QgTHRkMScwJQYDVQQLDB5Hb29kIEx0ZCBDZXJ0aWZp
Y2F0ZSBBdXRob3JpdHkxGTAXBgNVBAMMEEdvb2QgTHRkIFJvb3QgQ0EwHhcNMTkx
MDAzMTU1NzA1WhcNMjAxMDEyMTU1NzA1WjBfMQswCQYDVQQGEwJUV8jERMA8GA1UE
CAwIWmFuemliYXIxHzAdBgNVBAoMFlphbnppYmFyIFJldmVudWUgQm9hcmQxHDAa
BgNVBAMME1pSQi1lVkZELTAwMDAwNDIwWTATBgcqhkjOPQIBBggqhkjOPQMB
BwNCAAT7v3DvY7pRg4lz2Z87wSMwSX27KwlpYnSRV6WUiPjpq2XsUAbg2lhUN7q3
mlNJaUzqoKPmop5qURIpqUydXfapo3IwcDAJBgNVHRMEAjAAMB8GA1UdIwQYMBaA
FK1RXHm1plvaintqlWaXDs1X3LX+MB0GA1UdDgQWBBRqr96XrCUbuwCQawxO0//n
TOCoNTAOBgNVHQ8BAf8EBAMCBeAwEwYDVR0lBAwwCgYIKwYBBQUHAwIwDQYJKoZI
hvcNAQELBQADggEBANr1Wk1cVZB96yobFgK3rQQv9oXW+Jle7Jh36J2o4wSSB+RH
lfMojDrqKVQCLrFDcF+8JIA3RTRKdduIXgBAr13xQ8JkHd1/o23yN6a2DaYgh0wr
DrndlR6y1yG0vQuurJ3IgXmC0ldM5+VhalgmoCKFV9JsUD+GhOyJ6NWlc0SqvJCs
3RZLYwZ4MNViPbRy0Kbp0ufY1zTbh02Gw9aVfFzUwL8GS00iMb4MnSav1xur7wQh
BoF3PpNvu003P7f1eVJ62qVD2LWWntfn0mL1aRmDe2wpMQKAKhxto+sDb2mfJ6G6
PFtwMHe7BUfiwTzGYqav21h1w/amPkxNVQ7Li4M=
-----END CERTIFICATE-----
```

In textual representation form:

```
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number:
            ab:12:cd:6a
        Signature Algorithm: sha256WithRSAEncryption
        Issuer: C = LT, O = Good Ltd, OU = Good Ltd Certificate Authority, CN
= Good Ltd Root CA
        Validity
            Not Before: Oct  3 15:57:05 2019 GMT
            Not After : Oct 12 15:57:05 2020 GMT
        Subject: C = ZW, O = Zimbabwe Revenue Authority, CN = ZIMRA-SN0001-
0000000042
        Subject Public Key Info:
```

```
                        Public Key Algorithm: id-ecPublicKey
                                Public-Key: (256 bit)
                                pub:
                                    04:fb:bf:70:ef:63:ba:51:83:89:73:d9:9f:3b:c1:
                                    23:30:49:7d:bb:2b:09:69:62:74:91:57:a5:94:88:
                                    f8:e9:ab:65:ec:50:06:e0:da:58:54:37:ba:b7:9a:
                                    53:49:69:4c:ea:a0:a3:e6:a2:9e:6a:51:12:29:a9:
                                    4c:9d:5d:f6:a9
                                ASN1 OID: prime256v1
                                NIST CURVE: P-256
                    X509v3 extensions:
                        X509v3 Basic Constraints:
                            CA:FALSE
                        X509v3 Authority Key Identifier:

keyid:AD:51:5C:79:B5:A6:5B:DA:8A:7B:6A:95:66:97:0E:CD:57:DC:B5:FE

                        X509v3 Subject Key Identifier:
                            6A:AF:DE:97:AC:25:1B:BB:00:90:6B:0C:4E:D3:FF:E7:4C:E0:A8:35
                        X509v3 Key Usage: critical
                            Digital Signature, Non Repudiation, Key Encipherment
                        X509v3 Extended Key Usage:
                            TLS Web Client Authentication
                Signature Algorithm: sha256WithRSAEncryption
                        da:f5:5a:4d:5c:55:90:7d:eb:2a:1b:16:02:b7:ad:04:2f:f6:
                        85:d6:f8:99:5e:ec:98:77:e8:9d:a8:e3:04:92:07:e4:47:95:
                        f3:28:8c:3a:ea:29:54:02:2e:b1:43:70:5f:bc:24:80:37:45:
                        34:4a:75:db:88:5e:00:40:af:5d:f1:43:c2:64:1d:dd:7f:a3:
                        6d:f2:37:a6:b6:0d:a6:20:87:4c:2b:0e:b9:dd:95:1e:b2:d7:
                        21:b4:bd:0b:ae:ac:9d:c8:81:79:82:d2:57:4c:e7:e5:61:6a:
                        58:26:a0:22:85:57:d2:6c:50:3f:86:84:ec:89:e8:d5:a5:73:
                        44:aa:bc:90:ac:dd:16:4b:63:06:78:30:d5:62:3d:b4:72:d0:
                        a6:e9:d2:e7:d8:d7:34:db:87:4d:86:c3:d6:95:7c:5c:d4:c0:
                        bf:06:4b:4d:22:31:be:0c:9d:26:af:d7:1b:ab:ef:04:21:06:
                        81:77:3e:93:6f:bb:4d:37:3f:b7:f5:79:52:7a:da:a5:43:d8:
                        b5:96:9e:d7:e7:d2:62:f5:69:19:83:7b:6c:29:31:02:80:2a:
                        1c:6d:a3:eb:03:6f:69:9f:27:a1:ba:3c:5b:70:30:77:bb:05:
                        47:e2:c1:3c:c6:62:a6:af:db:58:75:c3:f6:a6:3e:4c:4d:55:
                        0e:cb:8b:83
```

12.2.2. RSA 2048

12.2.2.1. CSR

RSA 2048 CSR:

```
-----BEGIN CERTIFICATE REQUEST-----
MIICYzCCAUsCAQAwHjEcMBoGA1UEAwwTWlJCLWVWRkQtMDAwMDAwMDA0MjCCASIw
DQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAOdpAndm1yvlu9rwtPipUPrS1ATQ
bGDZPRoPjT08Xw/vdpRYPbD1vAdTBcUzviqcOTEcwKwejNy2d6Y9Duduby3IE99N
W64ncE4KUn86raBxYYE6MTMveJTImEiveMNkcbJWjMg5uHQlxn1OQJQIrrnoFRc9
Oeo1fyJO4xY0CxuRkJ0YVrRpCNkymSzpQbI4cVCiyj8FAj7ZH2Zg4oP31xNV4oKk
jhjKMUPQU8Sf4vMFlNwEdU46LuNRBYrGjiqWp+MankZ7zazrNHiHHARUVwQge/LS
02YBPcqoMKEOaEKTZvOOTpBV0NBe+9HMtLMfgjtjp6XUIrESvFg8feZCZCECAwEA
AaAAMA0GCSqGSIb3DQEBCwUAA4IBAQBeU11K7MWhroA8Fz3O2KXI7fJqc7sj9Ip/
jhNlISfi8fJ3M3i58KqMSuXuBPF6Wv8NSncr3CmLa6noOZnfWTfrWG+4vLYi5MfA
//6orI54K8kOe1NFk4Hr+QdUtdFJ8/6AE9a5dwpo4IHSWR23kz7lAjgxrx29y2UF
9Ad4j8CM0NQifL5KHN5lEmhlDP/JCkmlMBkumSS8f1RfijWvnJ0mMc+Tbe+giMpp
qYE8b0Eqku+I3cKfVb4s7TJd6KNi6BEe2EYgczKUxdIsrZy8SgqKE7iRstPo/Xgq
o02dqr4n1W0pFUHntP9M1lhqeoXHZcrC5ShdDpSYO/1DP5Jh9Vg9
-----END CERTIFICATE REQUEST-----
```

In textual representation form:

```
Certificate Request:
    Data:
        Version: 1 (0x0)
        Subject: CN = ZIMRA-SN0001-0000000042
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
                RSA Public-Key: (2048 bit)
                Modulus:
                    00:e7:69:02:77:66:d7:2b:e5:bb:da:f0:b4:f8:a9:
                    50:fa:d2:d4:04:d0:6c:60:d9:3d:1a:0f:8d:3d:3c:
                    5f:0f:ef:76:94:58:3d:b0:f5:bc:07:53:05:c5:33:
                    be:2a:9c:39:31:1c:c0:ac:1e:8c:dc:b6:77:a6:3d:
                    0e:e7:6e:6f:2d:c8:13:df:4d:5b:ae:27:70:4e:0a:
                    52:7f:3a:ad:a0:71:61:81:3a:31:33:2f:78:94:c8:
                    98:48:af:78:c3:64:71:b2:56:8c:c8:39:b8:74:25:
                    c6:7d:4e:40:94:08:ae:b9:e8:15:17:3d:39:ea:35:
                    7f:22:4e:e3:16:34:0b:1b:91:90:9d:18:56:b4:69:
                    08:d9:32:99:2c:e9:41:b2:38:71:50:a2:ca:3f:05:
                    02:3e:d9:1f:66:60:e2:83:f7:d7:13:55:e2:82:a4:
                    8e:18:ca:31:43:d0:53:c4:9f:e2:f3:05:94:dc:04:
                    75:4e:3a:2e:e3:51:05:8a:c6:8e:2a:96:a7:e3:1a:
                    9e:46:7b:cd:ac:eb:34:78:87:1c:04:54:57:04:20:
                    7b:f2:d2:d3:66:01:3d:ca:a8:30:a1:0e:68:42:93:
                    66:f3:8e:4e:90:55:d0:d0:5e:fb:d1:cc:b4:b3:1f:
                    82:3b:63:a7:a5:d4:22:b1:12:bc:58:3c:7d:e6:42:
                    64:21
                Exponent: 65537 (0x10001)
        Attributes:
            a0:00
    Signature Algorithm: sha256WithRSAEncryption
         5e:53:5d:4a:ec:c5:a1:ae:80:3c:17:3d:ce:d8:a5:c8:ed:f2:
         6a:73:bb:23:f4:8a:7f:8e:13:65:21:27:e2:f1:f2:77:33:78:
         b9:f0:aa:8c:4a:e5:ee:04:f1:7a:5a:ff:0d:4a:77:2b:dc:29:
         8b:6b:a9:e8:39:99:df:59:37:eb:58:6f:b8:bc:b6:22:e4:c7:
         c0:ff:fe:a8:ac:8e:78:2b:c9:0e:7b:53:45:93:81:eb:f9:07:
         54:b5:d1:49:f3:fe:80:13:d6:b9:77:0a:68:e0:81:d2:59:1d:
         b7:93:3e:e5:02:38:31:af:1d:bd:cb:65:05:f4:07:78:8f:c0:
         8c:d0:d4:22:7c:be:4a:1c:de:65:12:68:65:0c:ff:c9:0a:49:
         a5:30:19:2e:99:24:bc:7f:54:5f:8a:35:af:9c:9d:26:31:cf:
         93:6d:ef:a0:88:ca:69:a9:81:3c:6f:41:2a:92:ef:88:dd:c2:
         9f:55:be:2c:ed:32:5d:e8:a3:62:e8:11:1e:d8:46:20:73:32:
         94:c5:d2:2c:ad:9c:bc:4a:0a:8a:13:b8:91:b2:d3:e8:fd:78:
         2a:a3:4d:9d:aa:be:27:d5:6d:29:15:41:e7:b4:ff:4c:d6:58:
         6a:7a:85:c7:65:ca:c2:e5:28:5d:0e:94:98:3b:fd:43:3f:92:
         61:f5:58:3d
```

12.2.2.2. Certificate

RSA 2048 Certificate:

```
-----BEGIN CERTIFICATE-----
MIIDtDCCApygAwIBAgIFAKsSzWswDQYJKoZIhvcNAQELBQAwZDELMAkGA1UEBhMC
TFQxETAPBgNVBAoMCEdvb2QgTHRkMScwJQYDVQQLDB5Hb29kIEx0ZCBDZXJ0aWZp
Y2F0ZSBBdXRob3JpdHkxGTAXBgNVBAMMEEdvb2QgTHRkIFJvb3QgQ0EwHhcNMTkx
MDAzMTU1NzE2WhcNMjAxMDEyMTU1NzE2WjBfMQswCQYDVQQGEwJUWjERMA8GA1UE
CAwIWmFuemliYXIxHzAdBgNVBAoMFlphbnppYmFyIFJldmVudWUgQm9hcmQxHDAa
BgNVBAMME1pSQi1lVkZELTAwMDAwMDAwNDIwggEiMA0GCSqGSIb3DQEBAQUAA4IB
DwAwggEKAoIBAQDnaQJ3Ztcr5bva8LT4qVD60tQE0Gxg2T0aD409PF8P73aUWD2w
9bwHUwXFM74qnDkxHMCsHozctnemPQ7nbm8tyBPfTVuuJ3BOClJ/Oq2gcWGBOjEz
L3iUyJhIr3jDZHGyVozIObh0JcZ9TkCUCK656BUXPTnqNX8iTuMWNAsbkZCdGFa0
aQjZMpks6UGyOHFQoso/BQI+2R9mYOKD99cTVeKCpI4YyjFD0FPEn+LzBZTcBHVO
```

```
        Oi7jUQWKxo4qlqfjGp5Ge82s6zR4hxwEVFcEIHvy0tNmAT3KqDChDmhCk2bzjk6Q
        VdDQXvvRzLSzH4I7Y6el1CKxErxYPH3mQmQhAgMBAAGjcjBwMAkGA1UdEwQCMAAw
        HwYDVR0jBBgwFoAUrVFcebWmW9qKe2qVZpcOzVfctf4wHQYDVR0OBBYEFDLA7tgo
        7/JLz5ayFa4HP3a7Kyf2MA4GA1UdDwEB/wQEAwIF4DATBgNVHSUEDDAKBggrBgEF
        BQcDAjANBgkqhkiG9w0BAQsFAAOCAQEAI7n2fUonnpbOJCUaX7/bDwDmdQ2SEJfH
        ro/rWfp/fhD8sBK0ZzZ0AzHH2OszBQOwBqX3+hyMMwAyBlsHdan97lvdNuSZtTnm
        HjtuOFYuF9o69BMCPMNHgj3XhikuNlh7NPzr1nU2ec6/tgx5guosoo0gZNsCpdbt
        ee4pJydnA4vmx4c6wbEWBJA1YhZLloGi9VR2NVI0OnxYuvlinqIHvNypJL+3aDT5
        yvjRY+suDkF+u3J8nRlrxc22b/YvPu3U4BhK6FJk/JSxy3qOMz1EUR4uPt9ci06E
        5OhpF9PSdcWt8NtC4f+i4EtwGcsj5XHplOWN+KoOksK9ZcwaJpQ7DQ==
        -----END CERTIFICATE-----
```

In textual representation form:

```
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number:
            ab:12:cd:6b
        Signature Algorithm: sha256WithRSAEncryption
        Issuer: C = LT, O = Good Ltd, OU = Good Ltd Certificate Authority, CN
= Good Ltd Root CA
        Validity
            Not Before: Oct  3 15:57:16 2019 GMT
            Not After : Oct 12 15:57:16 2020 GMT
        Subject: C = ZW, O = Zimbabwe Revenue Authority, CN = ZIMRA-SN0001-
0000000042
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
                RSA Public-Key: (2048 bit)
                Modulus:
                    00:e7:69:02:77:66:d7:2b:e5:bb:da:f0:b4:f8:a9:
                    50:fa:d2:d4:04:d0:6c:60:d9:3d:1a:0f:8d:3d:3c:
                    5f:0f:ef:76:94:58:3d:b0:f5:bc:07:53:05:c5:33:
                    be:2a:9c:39:31:1c:c0:ac:1e:8c:dc:b6:77:a6:3d:
                    0e:e7:6e:6f:2d:c8:13:df:4d:5b:ae:27:70:4e:0a:
                    52:7f:3a:ad:a0:71:61:81:3a:31:33:2f:78:94:c8:
                    98:48:af:78:c3:64:71:b2:56:8c:c8:39:b8:74:25:
                    c6:7d:4e:40:94:08:ae:b9:e8:15:17:3d:39:ea:35:
                    7f:22:4e:e3:16:34:0b:1b:91:90:9d:18:56:b4:69:
                    08:d9:32:99:2c:e9:41:b2:38:71:50:a2:ca:3f:05:
                    02:3e:d9:1f:66:60:e2:83:f7:d7:13:55:e2:82:a4:
                    8e:18:ca:31:43:d0:53:c4:9f:e2:f3:05:94:dc:04:
                    75:4e:3a:2e:e3:51:05:8a:c6:8e:2a:96:a7:e3:1a:
                    9e:46:7b:cd:ac:eb:34:78:87:1c:04:54:57:04:20:
                    7b:f2:d2:d3:66:01:3d:ca:a8:30:a1:0e:68:42:93:
                    66:f3:8e:4e:90:55:d0:d0:5e:fb:d1:cc:b4:b3:1f:
                    82:3b:63:a7:a5:d4:22:b1:12:bc:58:3c:7d:e6:42:
                    64:21
                Exponent: 65537 (0x10001)
        X509v3 extensions:
            X509v3 Basic Constraints:
                CA:FALSE
            X509v3 Authority Key Identifier:

keyid:AD:51:5C:79:B5:A6:5B:DA:8A:7B:6A:95:66:97:0E:CD:57:DC:B5:FE

            X509v3 Subject Key Identifier:
                32:C0:EE:D8:28:EF:F2:4B:CF:96:B2:15:AE:07:3F:76:BB:2B:27:F6
            X509v3 Key Usage: critical
                Digital Signature, Non Repudiation, Key Encipherment
            X509v3 Extended Key Usage:
```

```
                TLS Web Client Authentication
       Signature Algorithm: sha256WithRSAEncryption
          23:b9:f6:7d:4a:27:9e:96:ce:24:25:1a:5f:bf:db:0f:00:e6:
          75:0d:92:10:97:c7:ae:8f:eb:59:fa:7f:7e:10:fc:b0:12:b4:
          67:36:74:03:31:c7:d8:eb:33:05:03:b0:06:a5:f7:fa:1c:8c:
          33:00:32:06:5b:07:75:a9:fd:ee:5b:dd:36:e4:99:b5:39:e6:
          1e:3b:6e:38:56:2e:17:da:3a:f4:13:02:3c:c3:47:82:3d:d7:
          86:29:2e:36:58:7b:34:fc:eb:d6:75:36:79:ce:bf:b6:0c:79:
          82:ea:2c:a2:8d:20:64:db:02:a5:d6:ed:79:ee:29:27:27:67:
          03:8b:e6:c7:87:3a:c1:b1:16:04:90:35:62:16:4b:96:81:a2:
          f5:54:76:35:52:34:3a:7c:58:ba:f9:62:9e:a2:07:bc:dc:a9:
          24:bf:b7:68:34:f9:ca:f8:d1:63:eb:2e:0e:41:7e:bb:72:7c:
          9d:19:6b:c5:cd:b6:6f:f6:2f:3e:ed:d4:e0:18:4a:e8:52:64:
          fc:94:b1:cb:7a:8e:33:3d:44:51:1e:2e:3e:df:5c:8b:4e:84:
          e4:e8:69:17:d3:d2:75:c5:ad:f0:db:42:e1:ff:a2:e0:4b:70:
          19:cb:23:e5:71:e9:94:e5:8d:f8:aa:0e:92:c2:bd:65:cc:1a:
          26:94:3b:0d
```

13. SIGNATURES GENERATION AND VERIFICATION RULES

13.1. Signature an hash generation algorithm

Below algorithm is used to generate receipt and fiscal day hash and signature:

1) Receipt or fiscal day fields must be converted to string (by rules as described in table below) and concatenated (no concatenation character is used);
2) Concatenated line must be hashed using SHA256 to get the hash;
3) Concatenated line must be signed with private key to get the signature.

Formula to get a hash: Hash = SHA-256($x_1 || x_2 || ... || x_n$);
Formula to get a signature:
Signature = RSA($x_1 || x_2 || ... || x_n, d, n$) – in case RSA keys are used
or
Signature = ECC(Hash, CURVE, g, n) – in case ECC keys are used

Where
|| - means field concatenation;
$x_1, x_2, ..., x_n$ - receipt or fiscal day fields;
d – secret RSA exponent;
n - RSA modulus
CURVE – the elliptic curve field and equation used
G – elliptic curve base point, a point on the curve that generates a subgroup of large prime order n
n – integer order of G, means that n x G=O, where O is the identity element.

13.2. Receipt signature generation and verification

Receipt hash and signature are generated according to the rules provided in section 13.1.

13.2.1. Receipt device signature

Fields included in receipt hash which is used for device signature are (these fields must be included in hash in the same order as provided below):

Order	Field name	Description
1	deviceID	Device ID
2	receiptType	Receipt type value in upper case.
3	receiptCurrency	Currency code (ISO 4217 currency code). It must be in upper case.
4	receiptGlobalNo	Receipt global number.
5	receiptDate	Date in ISO 8601 format \<date>T\<time>, YYYY-MM-DDTHH:mm:ss (hours are represented in 24 hours format, local time). Example: 2019-09-23T14:43:23
6	receiptTotal	Receipt total is included in signature in cents. Examples: - If receiptTotal is 500 ZWL, value 50000 must be used in signature. - If receiptTotal is 12,34 USD, value 1234 must be used in signature. - If receiptTotal is 0,05 USD, value 5 must be used in signature.
7	receiptTaxes	Concatenated receiptTaxes, where each line is concatenated in this way: taxCode || taxPercent || taxAmount || salesAmountWithTax. In case of taxPercent is not sent, empty value should be used in signature. Amounts are represented in cents. In case taxPercent is not an integer there should be dot between the integer and fractional part. In case of exempt which does not send tax percent value, empty value should be used in signature.

		In case taxPercent is an integer there should be value of tax percent, dot and two zeros sent.
		Taxes are ordered by taxID in ascending order and taxCode in alphabetical order (if taxCode is empty it is ordered before A letter).
		Examples:
		- If taxPercent is 15, value 15.00 must be used in signature.
		- If taxPercent is 14.5 value 14.50 must be used in signature.
		- If taxPercent is 0 value 0.00 must be used in signature.
8	previousReceiptHash	Previous receipt hash is included into current receipt device signature. This will create a chain of receipts.
		This field is not used in signature when current receipt is first in fiscal day.

FiscalInvoice Examples:

Name	Example No 1
deviceID	321
receiptType	FISCALINVOICE
receiptCurrency	ZWL
receiptGlobalNo	432
receiptDate	2019-09-19T15:43:12
receiptTotal	9450,00
receiptTaxes	Tax lines:

Tax lines:

taxID	taxCode	taxPercent	taxAmount	salesAmountWithTax
1	A		0,00	2500,00
2	B	0	0,00	3500,00
3	C	15	150,00	1150,00
3	D	15	300,00	2300,00

Result:
A0250000B0.000350000C15.0015000115000D15.0030000230000

Name	Example No 1
previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	321FISCALINVOICEZWL4322019-09-19T15:43:12945000A0250000B0.000350000C15.0015000115000D15.0030000230000 hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Generated receipt hash in base64 representation	zDxEalWUpwX2BcsYxRUAEfY/13OaCrTwDt01So3a6uU=

Name	Example No 2
deviceID	322
receiptType	FISCALINVOICE
receiptCurrency	USD
receiptGlobalNo	85
receiptDate	2019-09-19T09:23:07
receiptTotal	40,35
receiptTaxes	Tax lines:

Tax lines:

taxID	taxPercent	taxAmount	salesAmountWithTax
1		0,00	7,00
2	0	0,00	10,00
3	14,5	0,05	0,35

Result:
07000.000100014.50535

Name	Example No 2
previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	07000.000100014.50535 hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Generated receipt hash in base64 representation	2zInR7ciOQ9PbtQlKaU5XoktQ/4/y1XShfzEEoSVO7s=

CreditNote Examples:

Name	Example No 1

deviceID	321
receiptType	CREDITNOTE
receiptCurrency	ZWL
receiptGlobalNo	432
receiptDate	2020-09-19T15:43:12
receiptTotal	-9450,00
receiptTaxes	Tax lines:

taxID	taxCode	taxPercent	taxAmount	salesAmountWithTax
1	A		0,00	-2500,00
2	B	0	0,00	-3500,00
3	C	15	-150,00	-1150,00
3	D	15	-300,00	-2300,00

Result:
A0-250000B0.000-350000C15.00-15000-115000D15.00-30000-230000

previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	321CREDITNOTEZWL4322020-09-19T15:43:12-945000 A0-250000B0.000-350000C15.00-15000-115000D15.00-30000-230000hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Generated receipt hash in base64 representation	Wu21g3N0fPIa67pnAp+FZkaEfBiv696B+4QoJCWRIcY=

Name	Example No 2
deviceID	322
receiptType	CREDITNOTE
receiptCurrency	USD
receiptGlobalNo	85
receiptDate	2020-09-19T09:23:07
receiptTotal	-40,35
receiptTaxes	Tax lines:

taxID	taxPercent	taxAmount	salesAmountWithTax
1		0,00	-7,00
2	0	0,00	-10,00
3	14,5	-3,00	-23,00

Result:
0-7000.000-100014.50-300-2300

previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	322CREDITNOTEUSD852020-09-19T09:23:07-40350-7000.000-100014.50-300-2300hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Generated receipt hash in base64 representation	F9/QB0vhxQlEF2nk+oebwP8V+qBcNlOFvoTeE/1QxPc=

DebitNote Examples:

Name	Example No 1
deviceID	321
receiptType	DEBITNOTE
receiptCurrency	ZWL
receiptGlobalNo	432
receiptDate	2020-09-19T15:43:12
receiptTotal	9450,00
receiptTaxes	Tax lines:

taxID	taxCode	taxPercent	taxAmount	salesAmountWithTax
1	A		0,00	2500,00
2	B	0	0,00	3500,00
3	C	15	150,00	1150,00
3	C	15	300,00	2300,00

Result:
A0250000B0.000350000C15.0015000115000D15.0030000230000

previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	321DEBITNOTEZWL4322020-09-19T15:43:12945000 A0250000B0.000350000C15.0015000115000D15.0030000230000hNVJXP/ACOiE8McD3pKsDlqBXpuaUq QOfPnMyfZWI9k=
Generated receipt hash in base64 representation	PHcormpq5Ppb/6Quh8iOY3bDq4B4cPW5hsENb65iK/I=

Name	Example No 2
deviceID	322
receiptType	DEBITNOTE
receiptCurrency	USD
receiptGlobalNo	85
receiptDate	2020-09-19T09:23:07
receiptTotal	40,35
receiptTaxes	Tax lines:<table><tr><td>taxID</td><td>taxPercent</td><td>taxAmount</td><td>salesAmountWithTax</td></tr><tr><td>1</td><td></td><td>0,00</td><td>7,00</td></tr><tr><td>2</td><td>0</td><td>0,00</td><td>10,00</td></tr><tr><td>3</td><td>14,5</td><td>3,00</td><td>23,00</td></tr></table>Result: 07000.000100014.503002300
previousReceiptHash	hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Result used for hash generation	322DEBITNOTEUSD852020-09-19T09:23: 07403507000.000100014.503002300hNVJXP/ACOiE8McD3pKsDlqBXpuaUqQOfPnMyfZWI9k=
Generated receipt hash in base64 representation	YOLYzYhCaaLN2yxrM574B83WUhxSkg52uc1hrM4g8Dw=

13.2.2. Receipt FDMS signature

Receipt FDMS signature may be verified by decrypting receiptServerSignature with FDMS public key and comparing if it matches with prepared receipt hash. receiptServerSignature is generated only for receipt submitted in "Online" receipt mode. Hash generation algorithm is provided in section 13.1.

Fields included in receipt hash which is used for FDMS signature are (these fields must be included in hash in the same order as provided below):

Order	Field name	Description
1	receiptDeviceSignature	Receipt signature generated by device.
2	receiptID	Receipt ID
3	serverDate	Date in ISO 8601 format <date>T<time>, YYYY-MM-DDThh:mm:ss (hours are represented in 24 hours format, local time). Example: 2019-09-23T14:43:23

Example

Name	Exmple
receiptDeviceSignature	YyXTSizBBrMjMk4VQL+sCNr+2AC6aQbDAn9JMV2rk3yJ6MDZwie0wqQW3oisNWrMkeZsuAyFSnFkU2A+pKm91sOHVdjeR BebjQgAQQIMTCVIcYrx+BizQ7Ib9iCdsVI+Jel2nThqQiQzfRef6EgtgsaIAN+PV55xSrHvPkIe+Bc=
receiptID	48377
serverDate	2019-09-19T15:43:12
Result used for hash generation	YyXTSizBBrMjMk4VQL+sCNr+2AC6aQbDAn9JMV2rk3yJ6MDZwie0wqQW3oisNWrMkeZsuAyFSnFkU2A+pKm91sOHVdjeR BebjQgAQQIMTCVIcYrx+BizQ7Ib9iCdsVI+Jel2nThqQiQzfRef6EgtgsaIAN+PV55xSrHvPkIe+Bc=483772019-09-19T15:43:12
Generated hash in base64 representation	JQoIo/AgOsvm+PUQpvlQ/U7YMei3m/jbygNrBVfz6Sg=

13.3. Fiscal day signature generation and verification

Fiscal day report hash and signature are generated according to the rules provided in section 13.1.

13.3.1. Fiscal day device signature

Fields included in fiscal day hash used for device signature are provided below (these fields must be included in hash in the same order as provided below):

Order	Field name	Description
1	deviceID	Device ID
2	fiscalDayNo	Fiscal day number
3	fiscalDayDate	Fiscal day date (date when fiscal day was opened). Date in ISO 8601 format YYYY-MM-DD. Example: 2019-09-23
4	fiscalDayCounters	Concatenated fiscal day counter lines, where each line is concatenated in this way: fiscalCounterType || fiscalCounterCurrency || fiscalCounterTaxPercent or fiscalCounterMoneyType || fiscalCounterValue. All text values are concatenated in upper case. Amounts are represented in cents. Only non-zero value fiscal counters are included in concatenation. Fiscal counters are concatenated in this order: • fiscalCounterType (in ascending order) • fiscalCounterCurrency (in alphabetical ascending order) • fiscalCounterTaxID (in ascending order) / fiscalCounterMoneyType (in ascending order) In case taxPercent is not an integer there should be dot between the integer and fractional part. In case of exempt which does not send tax percent value, empty value should be used in signature. In case taxPercent is an integer there should be value of tax percent, dot and two zeros sent. Examples: - If taxPercent is 15, value 15.00 must be used in signature. - If taxPercent is 14.5 value 14.50 must be used in signature. - If taxPercent is 0 value 0.00 must be used in signature.

Example:

Name	Exmple
deviceID	321
fiscalDayNo	84
fiscalDayDate	2019-09-23

fiscalDayCounters	fiscalCounterType	fiscalCounterCurrency	fiscalCounterTaxPercent / fiscalCounterMoneyType	fiscalCounterValue
	SaleByTax	ZWL		23000,00
	SaleByTax	ZWL	0	12000,00
	SaleByTax	USD	14,5	25,00
	SaleByTax	ZWL	15	12,00
	SaleTaxByTax	USD	15	2,50
	SaleTaxByTax	ZWL	15	2300,00
	BalanceByMoneyType	ZWL	CARD	15000,00
	BalanceByMoneyType	USD	CASH	37,00
	BalanceByMoneyType	ZWL	CASH	20000,00

Result:
SALEBYTAXZWL2300000SALEBYTAXZWL0.001200000SALEBYTAXUSD14.502500SALEBYTAXZWL15.001200SALETAXBYTAXUSD15.00250SALETAXBYTAXZWL15.00230000BALANCEBYMONEYTYPEUSDLCASH3700BALANCEBYMONEYTYPEZWLCASH2000000BALANCEBYMONEYTYPEZWLCARD1500000

Result used for hash generation	321842019-09-23SALEBYTAXZWL2300000SALEBYTAXZWL0.001200000SALEBYTAXUSD14.502500SALEBYTAXZWL15.001200SALETAXBYTAXUSD15.00250SALETAXBYTAXZWL15.00230000BALANCEBYMONEYTYPEUSDLCASH3700BALANCEBYMONEYTYPEZWLCASH2000000BALANCEBYMONEYTYPEZWLCARD1500000
Generated hash in base64 representation	OdT8lLI0JXhXl1XQgr64Zb1ltFDksFXThVxqM6O8xZE=

13.3.2. Fiscal day FDMS signature

Fiscal day FDMS signature may be verified by decrypting fiscalDayServerSignature with FDMS public key and comparing if it matches with prepared fiscal day hash.
Hash generation algorithm is provided in section 13.1.

Fields included in fiscal day hash used for FDMS signature are provided below (these fields must be included in hash in the same order as provided below):

Order	Field name	Description
1	deviceID	Device ID
2	fiscalDayNo	Fiscal day number
3	fiscalDayDate	Fiscal day date (date when fiscal day was opened). Date in ISO 8601 format YYYY-MM-DD. Example: 2019-09-23
4	fiscalDayUpdated	Date and time when fiscal day was closed. Date in ISO 8601 format <date>T<time>, YYYY-MM-DDThh:mm:ss (hours are represented in 24 hours format, local time). Example: 2019-09-23T14:43:23 fiscalDayClosed value from response to device.
5	reconciliationMode	Defines how fiscal day was close: automatically or manually. Possible values (in upper case): - AUTO - MANUAL
6	fiscalDayCounters	Concatenated fiscal day counter lines as described above in device signature generation.
7	fiscalDayDeviceSignature	Fiscal day signature generated by device. In case fiscal day is closed manually, this field is not included into hash for FDMS signature.

Example:

Name	Exmple			
deviceID	321			
fiscalDayNo	84			
fiscalDayDate	2019-09-23			
fiscalDayUpdated	2019-09-23T22:21:14			
reconciliationMode	AUTO			
fiscalDayCounters	fiscalCounterType	fiscalCounterCurrency	fiscalCounterTaxPercent/ fiscalCounterMoneyType	fiscalCounterValue
	SaleByTax	ZWL		23000,00
	SaleByTax	ZWL	0	12000,00
	SaleByTax	USD	15	25,00
	SaleByTax	ZWL	15	12,00
	SaleTaxByTax	USD	15	2,50
	SaleTaxByTax	ZWL	15	2300,00
	BalanceByMoneyType	ZWL	CARD	15000,00
	BalanceByMoneyType	USD	CASH	37,00
	BalanceByMoneyType	ZWL	CASH	20000,00
	Result: SALEBYTAXZWL2300000SALEBYTAXZWL0.001200000SALEBYTAXUSD15.002500SALEBYTAXZWL15.001200SALETAXBYTAXUSD15.00250SALETAXBYTAXZWL15.00230000BALANCEBYMONEYTYPEZWLCARD1500000BALANCEBYMONEYTYPEUSDLCASH3700BALANCEBYMONEYTYPEZWLCASH2000000			
fiscalDayDeviceSignature	YyXTSizBBrMjMk4VQL+sCNr+2AC6aQbDAn9JMV2rk3yJ6MDZwie0wqQW3oisNWrMkeZsuAyFSnFkU2A+pKm91sOHVdjeRBebjQgAQQIMTCVIcYrx+BizQ7Ib9iCdsVI+Jel2nThqQiQzfRef6EgtgsaIAN+PV55xSrHvPkIe+Bc=			
Result used for hash generation	321842019-09-232019-09-23T22:21:14AUTOSALEBYTAXZWL2300000SALEBYTAXZWL0.001200000SALEBYTAXUSD15.002500SALEBYTAXZWL15.001200SALETAXBYTAXUSD15.00250SALETAXBYTAXZWL15.00230000BALANCEBYMONEYTYPEZWLCARD1500000BALANCEBYMONEYTYPEUSDLCASH3700BALANCEBYMONEYTYPEZWLCASH2000000YyXTSizBBrMjMk4VQL+sCNr+2AC6aQbDAn9JMV2rk3yJ6MDZwie0wqQW3oisNWrMkeZsuAyFSnFkU2A+pKm91sOHVdjeRBebjQgAQQIMTCVIcYrx+BizQ7Ib9iCdsVI+Jel2nThqQiQzfRef6EgtgsaIAN+PV55xSrHvPkIe+Bc=			
Generated hash in base64 representation	nlqwrAoFAmXLfuMJlQTdS2m0B4d5X1sTJ2gPo5/Dq+s=			