



CMe3100 Stream Plugin
User's Manual
English v1.3

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1 Document notes

All information in this manual, including product data, diagrams, charts, etc. represents information on products at the time of publication, and is subject to change without prior notice due to product improvements or other reasons. It is recommended that customers contact Elvaco AB for the latest product information before purchasing a CMe Series product.

The documentation and product are provided on an "as is" basis only and may contain deficiencies or inadequacies. Elvaco AB takes no responsibility for damages, liabilities, or other losses by using this product.

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2 Using this manual

2.1 Purpose and audience

This manual covers installation, configuration and usage of the CMe3100 Stream Plugin add-on.

2.2 Products

This manual applies to:

- **CMe3100 and CMeX50** Stream mode 434MHz
- **CMe3100 and CMeX50** Stream mode 868MHz

2.3 Online resources

To download the latest version of this user's manual, or to find information in other languages, please visit <http://www.elvaco.com>.

3 Introduction

This chapter provides a general description of CMe3100 Stream Plugin. In the next-coming sections you will learn more about possible applications and how CMe3100 Stream Plugin can be combined with other products.

3.1 Application description

Within metering, there are many applications for both Wired M-Bus and Wireless M-Bus. The Stream plugin is specifically designed to give an efficient solution for metering in large Wireless M-Bus systems where the receiving point is not concerned with the origin of the meter but to create an overall sufficient coverage of an area.

The Stream Plugin is one of the add-ons available for the CMe3100 and is pre-installed from the factory. The Stream Plugin extends the CMe3100 core services with support for Stream over TCP/IP, providing a powerful and versatile suite of tools for Head-end System (HES) integration as well as the possibility to read and monitor any WM-Bus meter.

3.2 Solution overview

In a metering system using Stream mode, multiple Stream mode products (receivers) are placed in suitable locations to create coverage for the designated geographical area. All receivers can be used to collect any meter within range. The key benefits with this approach are:

- Decreased effort for up-front project planning. No radio planning is needed with regards to which meters that should be collected by which receiver.
- Decreased maintenance effort. No reconfiguration of receiving devices is needed for additions, removal or replacement of meters.
- Increased robustness. A system can be designed with redundancy, so any meter is received by multiple receivers. This makes the system robust towards varying radio conditions over time, as for example new buildings or other changes in the area may affect radio performance for specific meters.

To limit up-stream data from received meters that is not of interested (e.g., not part of the system), the Stream plugin uses filter settings.

To be able to read the last sent telegram from a Wireless M-Bus meter the CMeX50 is forwarding the telegram to the CMe3100 via the USB-interface. The CMe3100 does all logic, filtering and pushing meter data to HES, in a time scheduled interval. After each push of meter data, memory is cleaned, so the CMe3100 will only send the latest values collected between each push report interval. If a meter is sending more frequently than scheduled push interval, the CMe3100 will only push the last received meter telegram.

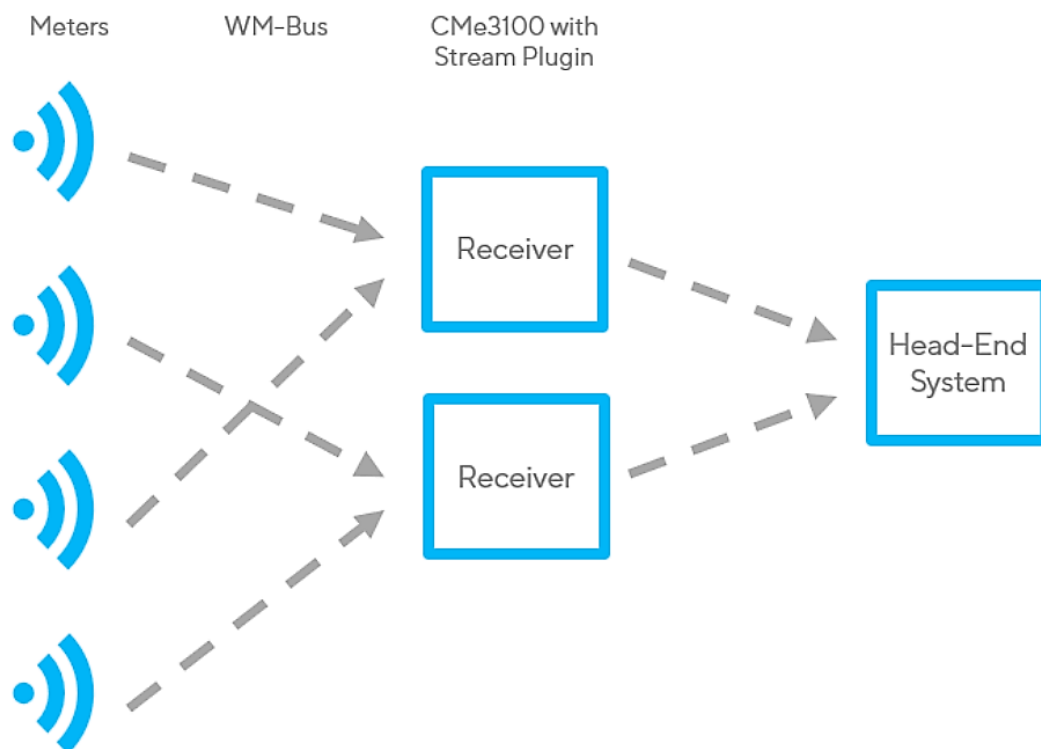


Figure 1 Stream Plugin - Solution Overview

3.3 Considerations for redundancy

When planning for coverage and redundancy it is highly advised to assure that every meter has a redundancy factor of at least 2. This means that every meter is within the effective range of at least two receivers. The effective range should be interpreted as meeting the requirements of $>X\%$ reception of meter values for the selected resolution. Designing the system this way makes it robust for changes in radio conditions and relaxes the requirement of reception for an individual meter.

3.4 Considerations for range and resolution

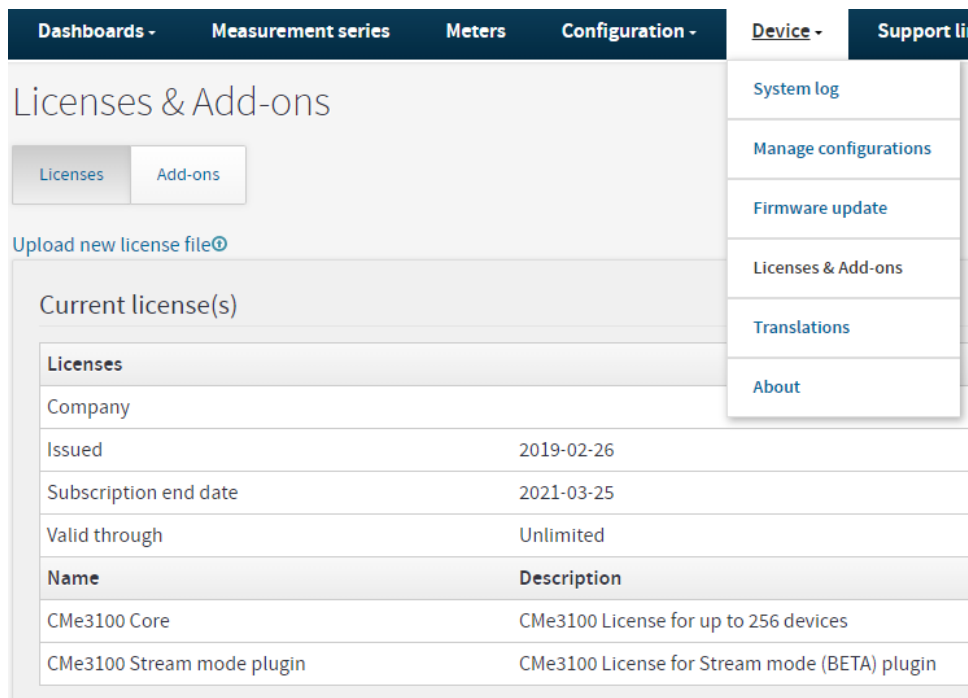
It is important to understand that the effective range of the reception area is also a function of resolution. In practise this means that, if it is required to have $>98\%$ reception of meter values every 15 minutes, the effective range will be less than if the requirement is $>98\%$ reception of meter values every 24 hours. This is not a property of the solution but inherent from how Wireless M-Bus radio works. I.e., the likelihood of properly receiving a distant meter is increasing over time and thus a lower required resolution increases the effective range.

4 Install the Plugin

This chapter covers the installation procedure of the Stream Plugin.

4.1 Validate license information

To be able to install the Plugin, the Product must have the license for *CMe3100 Stream mode Plugin License*. Validate the license information by navigating to *Device > Licenses & Add-ons*. See Figure 2 below.



The screenshot shows the 'Licenses & Add-ons' page. The navigation bar includes 'Dashboards -', 'Measurement series', 'Meters', 'Configuration -', 'Device -', and 'Support li'. The page title is 'Licenses & Add-ons'. There are two tabs: 'Licenses' (selected) and 'Add-ons'. Below the tabs, there is a link 'Upload new license file'. The main content area is titled 'Current license(s)'. It contains a table with the following data:

Licenses	
Company	
Issued	2019-02-26
Subscription end date	2021-03-25
Valid through	Unlimited
Name	Description
CMe3100 Core	CMe3100 License for up to 256 devices
CMe3100 Stream mode plugin	CMe3100 License for Stream mode (BETA) plugin

Figure 2 Licenses and Add-ons page

4.2 Install the plugin

Navigate to *Device > Licenses & Add-ons* and click the tab *Add-ons*. The list of available plugins and their status are shown according to Figure 3.

Click the *Install now* link to install and activate the Plugin.

Licenses & Add-ons

Licenses Add-ons

Install new add-on from file📎

Showing 1 to 5 of 5 entries First Prev

Name	Version	Date	Type	Installed	Started/Settings
Elvaco-Rest	1.7.1-SNAPSHOT	2019-04-24	WAR	No license Information	No
Elvaco-DLMS	1.7.1-SNAPSHOT	2019-04-24	SERVICE	No license Information	No
Elvaco-Stream	1.7.1-SNAPSHOT	2019-04-24	SERVICE	No Install now	No
Elvaco-Modbus	1.7.1-SNAPSHOT	2019-04-24	SERVICE	No license Information	No
Elvaco-JSON-RPC	1.7.1-SNAPSHOT	2019-04-24	WAR	No license Information	No

Figure 3 Licenses and Add-ons list

After installation of the Stream Plugin is completed, the installed status of the Plugin changes to “Yes”, see Figure 4.

Licenses & Add-ons

Licenses Add-ons

Install new add-on from file📎

Showing 1 to 5 of 5 entries First Prev

Name	Version	Date	Type	Installed	Started/Settings
Elvaco-Rest	1.7.1-SNAPSHOT	2019-05-16	WAR	No license Information	No
Elvaco-DLMS	1.7.1-SNAPSHOT	2019-05-16	SERVICE	No license Information	No
Elvaco-Stream	1.7.1-SNAPSHOT	2019-05-16	SERVICE	Yes Uninstall now	Yes Elvaco-Stream
Elvaco-Modbus	1.7.1-SNAPSHOT	2019-05-16	SERVICE	No license Information	No
Elvaco-JSON-RPC	1.7.1-SNAPSHOT	2019-05-16	WAR	No license Information	No

Figure 4 Stream Plugin installed

The Plugin is now installed and enabled with default configuration. Please note that the page might need to be reloaded manually to update the status.

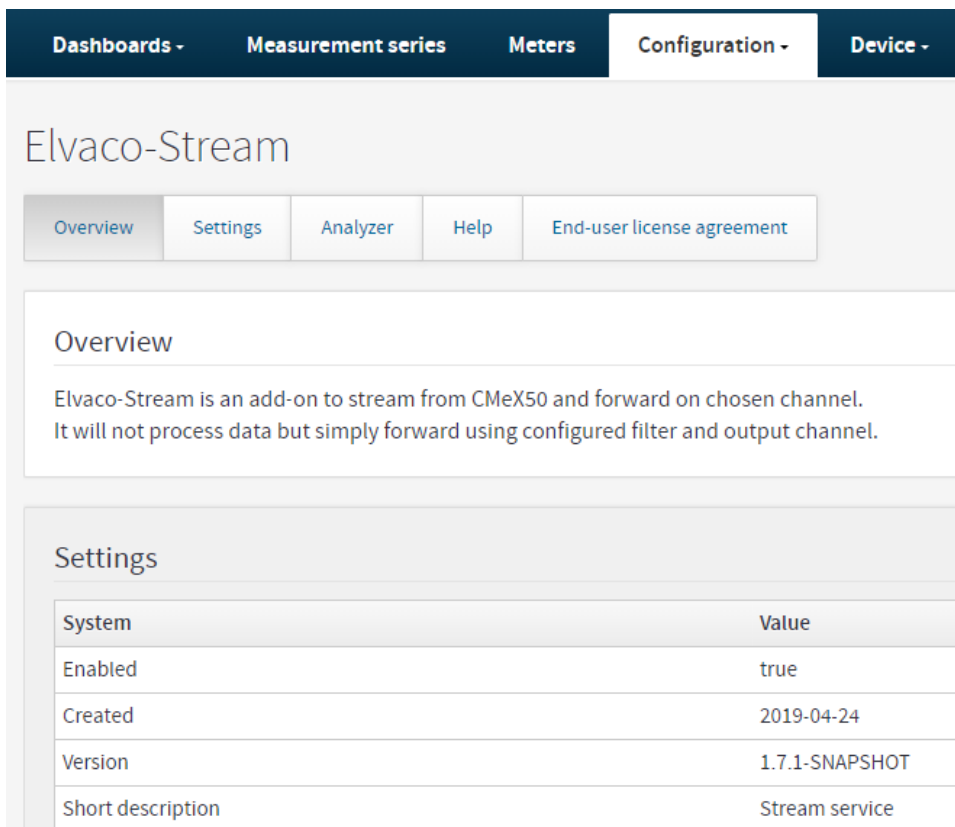
5 Plugin settings

This section covers the configuration possibilities available in the Stream Plugin.

- Navigate to Configuration > Services > Stream.

5.1 Overview

The default selected tab in the Stream Plugin settings is the Overview page. The Overview page shows general information about the Stream Plugin, see Figure 5.



Elvaco-Stream

Overview Settings Analyzer Help End-user license agreement

Overview

Elvaco-Stream is an add-on to stream from CMeX50 and forward on chosen channel. It will not process data but simply forward using configured filter and output channel.

Settings

System	Value
Enabled	true
Created	2019-04-24
Version	1.7.1-SNAPSHOT
Short description	Stream service

Figure 5. Stream Plugin overview

From the menu tab, you can access other available settings pages:

Settings

Page containing general Stream configuration for the Plugin.

Analyzer

Analysis of incoming data from CMeX50 with Stream Mode software.

Help

Help section describing the Stream Plugin, linking to this document.

End-user license agreement (EULA)

5.2 Stream Plugin settings

In the settings tab you can adjust settings for stream mode plugin listed below:

Receiving server address

Address of the server receiving push reports from Stream plug-in.

Push Schedule

Schedule for the push report to receiving server

Filter on manufacturer

Filter on manufacturer DLMS short name, e.g., ELV.

Filter on Device type

Filter on device type. This filter is using the M-Bus standard medium description (13757-3 2004), e.g., 07 is water.

Allow list

Filter on Device Identities, list the Device Identities that should be accepted, the Device Identities that aren't listed will not be accepted.

5.3 Analyzer

The analyzer tool shows which devices that has been received based on set filters, which can improve analysis of where to place receivers geographically depending on which device you want to receive data from. Meter ID, number of received telegrams, Signal Strength, Manufacturer and Meter type is shown.

There is an option to display only allow-listed devices in the analyzer tool. If this option is selected but no devices are whitelisted in settings tab, this filter will not be applied, and all received devices will be listed. There are also options for export the analyzer statistics into CSV format and reset the analyzer statistics.

The analyzer resets every 24 hours or if the user manually resets the function in the user interface.

Elvaco-Stream

Overview
Settings
Analyzer
Help
End-user license agreement

Analyzer

Show only whitelisted devices
Show only whitelisted devices or show all. When changed the statistics will be updated on next refresh.

Export as CSV

Reset

Export analyzer statistics in CSV format. Reset analyzer statistics.

Statistics

Analyzer time	18 hours 8 minutes 34 seconds				
Meters found	285				
Telegrams OK	148959				
Meter ID	Filter	Telegrams	Signal	Man.	Type
14000170	Accepted	7772	-93	HYD	bus/system component
64426688	Accepted	7002	-84	DME	heat
44488443	Accepted	6343	-88	HYD	heat
42082053	Accepted	5913	-90	DME	gas
44496705	Accepted	5056	-90	HYD	water
58175010	Accepted	4918	-89	DME	heat
01013910	Accepted	4044	-73	GWF	bus/system component

Figure 6 Stream Plugin Analyzer statistics

6 Parameters

6.1 Properties for Stream Mode

Parameter	Description	Example	
filter.device.type	Filter on device type (HEX) from M-Bus standard.	1B (room sensor)	
filter.manufacturer	Filter on manufacturer DLMS description (manufacturer registered acronym)	ELV (Elvaco)	
radio.mode	Filter on which radio modes meter is using.	T1_C1A_C1B	S1 T1 T1_C1A T1_C1B T1_C1A_C1B C1A C1B C1A_C1B C1A_WIDE C1B_WIDE C1A_C1B_WIDE
usb.baud.rate	Baud rate between wireless receiver and CMe3100 USB-interface	115200	3600 4800 7200 9600 14400 19200 28800 38400 57600 76800 115200
receiving.server.url	URI to push data to	http://evo.elvaco.se	
receiving.server.push.cron	Time interval between each push report	*/15 * * * * (push report for each 15min)	*/15 * * * *
service.enabled	Enable or disable plugin	true	true/false
sync.enabled	Enable auto configuration	true	true/false
show.only.filtered	Show only filtered meters in UI	true	true/false
configuration.server.cron	Time interval between each autoconfiguration attempt	30 0 * * * (sync each night 00:30)	
configuration.server.url	URI to fetch configuration from	http://middleware.elvaco.se	

6.2 Example file

Example.cad

```
Sync-Mode: server
Sync-Id: sm_elv
Sync-Config-0: receiving.server.url=http://evo.elvaco.se/sp/|/currentpluginconfig/stream.cfg
Sync-Config-1: receiving.server.push.cron=*/5 * * * *|/currentpluginconfig/stream.cfg
Sync-Config-2: configuration.server.cron=15 0 * * * *|/currentpluginconfig/stream.cfg
Sync-Config-3: filter.manufacturer=ELV,ABB|/currentpluginconfig/stream.cfg
Sync-Config-4: filter.device.type=1B,02|/currentpluginconfig/stream.cfg
```

7 Managing configurations

The product feature for managing configurations and backups also include settings for Stream Plugin (see “Manage configurations” section of the Product’s user interface).

7.1 Configuration

The configuration contains all properties that can be edited in the Product. These can be used to duplicate configuration to several devices since they do not contain any device specific settings.

To save a copy of the current configuration:

- Navigate to Configuration > Manage configurations.
- Select Configuration as File type.
- Click Execute.

When operation has finished the File repository section will contain the newly created configuration file. This can then be used to update a device and/or revert erroneous configurations.

To import a saved configuration:

- Navigate to Configuration > Manage configurations.
- Click Choose File and select the exported configuration file from the old device.
- Click upload.

To revert a configuration:

- Navigate to Configuration > Manage configurations.
- Click on the reload icon in the Action column of the configuration to revert to.

7.2 Backup

The backup contains Configuration as described in section 7.1 as well as a copy of the Products databases and operation system settings.

This backup contains device specific settings and is therefore not suitable for replicating configuration to another device, it should only be used to restore a device’s settings after a physical replacement.

To make a backup:

- Navigate to Configuration > Manage configurations.
- Select Backup as File type.
- Click Execute.

When operation has finished the File repository section will contain the newly created backup file.

8 Device replacement workflow

In case a device needs to be replaced the configuration should be backed up from the device being replaced and import to the replacement device. The steps for accomplishing this are described in section 7.

Please note that the system title of the replacement device will be new since it's derived from the devices serial number. The HES might need to be updated accordingly.

9 Integrator's guide

The following section present settings and options to guide an integrator for the CMe3100 Stream Plugin.

9.1 Setup a configuration server (http)

This section guides on how to connect to a product configuration server (http protocol). The synchronization starts with CMe product requesting a synchronization file. The synchronization file contains parameters to synchronize files and configuration keys to set in the product. When the synchronization of files and configuration are complete (or incomplete), the product will send a result to a specified result server. The result server can be specified in the cad file.

If using a web service that generates the cad file or if a result server is used, the server must respond with HTTP Response Code = 200 and "OK" in the http body (the body must not be empty).

Product identification in HTTP Post

To identify the product, the HTTP header User-Agent is filled with the following information:

User-Agent=TC65i/<imei> Profile/IMP-NG Configuration/CLDC-1.1 Model/<model> Hardware/<hw> Firmware/<fw> Application/<sw> Serial/<serial>

Parameter description
<imei>
15 digit product module IMEI number
<model>
Product model, i.e. CMe1000, CMe1100, CMe2000, CMe2100
<hw>
Product hardware version, i.e R4A
<fw>
Product module firmware version, i.e. 01.100
<sw>
Product software version, i.e. 1.1.0
<serial>
10 digit product serial number, i.e. 0006000000

Synchronization file (cad file)

The cad file contains the actual information to synchronize. See Table below for synchronization parameters. All cad files must have the extension .cad.

Parameter	Description
Sync-Mode	Synchronization mode, must be set to "server" Syntax: Sync-Mode: server
Sync-Notify-URL	Result server URL. Notifications will be sent to this server address. Can be left out. Syntax: Sync-Notify-URL: <notify url>
Sync-File-[0..n]-URL	Files to synchronize. The index must start at 0 and be continuous. Can be left out. Syntax: Sync-File-[0..n]-URL: <remoteurl>,<local file>
Sync-Config-[0..n]	Configuration keys and values to synchronize. The index must start at 0 and be continuous. Can be left out. Syntax: Sync-Config-[0..n]: <key>=<value>
Sync-Id	Identification which will be parsed into the result notification. Can be left out. Syntax: Sync-Id: <id>
Parameter descriptions for cad-files	
<notify url>	
URL where to post notifications	
<remote file>	
URL where to get remote file	
<local file>	
Local path and filename where to put downloaded file	
<key>	
Configuration key to set	
<value>	
Configuration key value	
<id>	
User specific identification for this synchronization	

Result notifications

If the parameter Sync-Notify-Url is set in the cad file, the product will post result information to given URL. The post is a standard HTTP post with a body containing the result information. Please see possible results in Table below.

Result	Description
900	Success Synchronization completed successfully.
920	Incompatible synchronizing mode The Sync-Mode was not set to "server".
921	Error synchronizing files. <error> Generic synchronization error.

9.2 Responsibilities for receiving head-end system (HES)

While Stream mode units provide an effective collection service, the receiving system needs to take care of the following:

- Handle redundancy**
 As multiple meters can be received by multiple receives, the HES needs to handle duplicates and the fact that meter values from the same meter can be received from multiple receivers.

- **Decoding, Key management and Decryption** (if encrypted meters are used)
The metering data from Stream mode is send as raw M-Bus. This means that if meters are transmitting encrypted data this needs to be decrypted with associated proper key management before the M-Bus meter data can be decoded.

9.3 Receiving Stream mode reports

HTTP (Hypertext Transfer Protocol) is widely used all over the world. This may be the choice when the integration platform has an external web server available. The product is using HTTP POST to send data to the server.

9.3.1 Requirements

The product follows the standard for an HTTP server. It is important to have matching authentication settings in the product and receiving server.

The product must be configured where to send the HTTP reports, which can be set using command `qset http`, see CMe Series User's Manual. Username, password, port and URL can also be set using the command `qset http`. HTTPS can be used for securing the connection, which is accomplished by entering `https` instead of `http` in the URL of the web server.

The reports sent from the product to the web server are created on the fly, thereby the content length of the post is unknown when the HTTP headers are sent. Thus, the receiving web server must handle chunked transfer encoding (this is normally not an issue when using Microsoft IIS or Apache web server, where chunked transfer encoding is handled automatically).

9.3.2 Stream Mode report format

The Stream mode report format is taken from the standard M-Bus EN13757. The following table is describing the report format properties:

Name	Description
Product serial-number	The product serial number which has read and stored the value of a meter.
Device identification	The M-Bus slave secondary identification which a value belongs to.
Date	The create date of a value.
Value data count	The M-Bus telegram in which a value was found.
Telegram	Meter values (M-Bus raw data)

Table 1. Properties of the stream mode report format

Below is an example for Stream mode report format:

(product serial number;device identification;date;value data count;telegram)
(00000161;05047157;YYYY-MM-DD hh:mm:ss;00; 080072640100619615011B000000000C787217006201FD711C0DFD3B616044961564010 061011B7A970400202F2F02653607426534078201652C072265320712653607626516075 265560702FB1A0E0242FB1A0E028201FB1A0E0222FB1A0E0212FB1A0E0262FB1A0902 52FB1A0F0202FD1B20C30DFD0F05322E302E310F

9.4 Wireless M-Bus to Wired M-Bus telegram

This section describes how data is mapped from the received wireless M-Bus telegram to the wired M-Bus telegram. The wired secondary address is taken from the M-Field and A-Field from the wireless M-Bus telegram. The wired A-Field is automatically assigned upon installation. The short header information received in the wireless M-Bus telegram is not used on the wired M-Bus interface.

9.4.1 Container

The DIF/VIF container description is identified by the following DIF/VIF data:

0x0D 0xFD 0x3B 0xnn	Where 0xnn is the length of the complete wireless M-Bus telegram (length of the container).
------------------------	---

9.4.2 Wireless M-Bus telegrams contained in Wired M-Bus container

The wireless M-Bus telegram should be placed in an M-Bus container if one or more of the following criteria are met:

C- and CI-Field are unknown to the product

Wireless M-Bus telegram

Wireless M-Bus Telegram Starting with L-Field, CRC-fields removed 0x2e44xx...

Wired Mbus telegram

C- Field 0x08	A- Field 0xnn	CI- Field 0x72	Long header Id, Man, Version, Device 0x00000000000000000000000000000000	DIF/VIF RSSI 0xFD7178NN	DIF/VIF Container 0x0DFD3BNN	Payload Wireless M-Bus Telegram
---------------------	---------------------	----------------------	---	-------------------------------	------------------------------------	--

Example:

```
080072640100619615011B000000000C787217006201FD711C0DFD3B6160449615640100610
11B7A970400202F2F02653607426534078201652C07226532071265360762651607526556070
2FB1A0E0242FB1A0E028201FB1A0E0222FB1A0E0212FB1A0E0262FB1A090252FB1A0F020
2FD1B20C30DFD0F05322E302E310F
```

Example in csv:

00000161;05047168;2009-12-17 00:00:00;00; 080072640100619615011B000000000C787217006201FD711C0DFD3B61604496156401006 1011B7A970400202F2F02653607426534078201652C072265320712653607626516075265 560702FB1A0E0242FB1A0E028201FB1A0E0222FB1A0E0212FB1A0E0262FB1A090252FB1A0 F0202FD1B20C30DFD0F05322E302E310F

10 Document history

10.1 Versions

Version	Date	Description	Author(s)
1.0	2020-03	First version	Tobias Svensson
1.1	2020-03	Re-structure content and update Integrator's guide	David Svensson
1.2	2021-10	Added Wireless M-Bus telegram description	Tobias Svensson & David Svensson
1.3	2021-11	Corrected Wireless M-Bus telegram instruction, RSSI DIF/VIF was missing	Tobias Svensson

10.2 Document software appliance

Type	Version	Date	Comments
Software	1.8.12		

11 References

- [1] EN13757-3:2013, Communication systems for and remote reading of meters – Part 3: Dedication application layer
- [2] CMe3100 Log Events

11.1 Terms and abbreviations

Abbreviation	Description
Plugin	CMe3100 Stream Mode Plugin
Product	CMe3100
GW	Gateway (CMe3100)
HES	Head End System

11.2 Number representation

- Decimal numbers are represented as normal number, i.e. 10 (ten).
- Hexadecimal numbers are represented with prefix 0x, i.e. 0x0A (ten)
- Binary numbers are represented with prefix 0b, i.e. 0b00001010 (ten)