Functional Tests

1 Firmware Upgrade

PMD-1000 - Firmware Upgrade - Definition

Scope=F

The upgrade file shall contain all information necessary in order to verify the image integrity and perform the upgrade.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1001 - Firmware Upgrade - Store

Scope=F

The upgrade file shall be protected against IP theft through encryption. The image file is transferred through available communication interface and is stored locally until the actual upgrade is triggered

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1002 - Firmware Upgrade - Enable and disable

Scope=F

It shall be possible to enable and disable upgrade functionality through, and only through, HMI. (UPDATE: The enabling process will done through Modbus command. BACnet meter will have an enable button in the HMI.).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1003 - Firmware Upgrade - Protocol

Scope=D

If the configured communication protocol does not support firmware upgrade it shall be possible to temporarily switch protocol to one that support firmware upgrade. It shall only be possible to set upgrade mode through the HMI. (UPDATE: BACnet meter will have an enable button in the HMI in order to enable FW upgrade through Modbus TCP).

Action	Expected Behaviour
Check that the device is configured as BACnet device	Ok
Enable FW upgrade through HMI	Ok
Perform FW upgrade with the procedure for a Modbus TCP device	Ok
Confirm succesfull FW upgrade (i.e. new FW version)	Ok
Verify that the device restores BACnet communication	Ok

[In Work]

PMD-1004 - Firmware Upgrade - Transfer

Scope=D

It shall be possible to transfer the upgrade file, through communication, to the device. The actual upgrade is performed by the second stage bootloader.

Action	Expected Behaviour
Perform a firmware upgrade	Ok
Verify that the second Bootloader detects the FW upgrade activation and updates the internal Flash	Ok
Check on the device information screen that the	Ok

FW version is the latest one	
Verify the Audit Log created a new entry with a new FW version	Ok

[In Work]

PMD-1005 - Firmware Upgrade - Integrity verification

Scope=D

It shall only be possible to trigger the upgrade if the image integrity has been successfully verified.

Action	Expected Behaviour
Transfer the new FW_BAD file to the device storage	Ok
Verify that no FW upgrade is triggered	Ok
Verify the rejection code	Ok
Verify that the FW version is not changed	Ok
Verify that no Audit Log has been created	Ok

[In Work]

PMD-1006 - Firmware Upgrade - Update enable

Scope=D

It shall be possible to trigger the upgrade through communication.

Action	Expected Behaviour
Enable firmware upgrade through communication	Ok
Verify correct execution of the enable procedure	Ok

[Obsolete]

PMD-1007 - Firmware Upgrade - Log

Scope=D

All upgrade attempts shall be logged in the audit log (see Table 1)

Action	Expected Behaviour
Verify that all successful FW upgrade attempts result in Audit Log entries creation	Ok

[In Work]

PMD-1008 - Firmware Upgrade - Log limit

Scope=F

It shall be possible to log up to 40 upgrade (only successful upgrades are logged).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1009 - Firmware Upgrade - Log full

Scope=D

It shall not be possible to perform upgrades if it is not possible to create the audit log entry.

Action	Expected Behaviour
In order to perform this test: create fake entries in order to fill the Audit Log or change the maximum number of entries.	Ok
Try to trigger a FW upgrade and verify no upgrade takes place when the Audit log is full	FW upgrade not possible
Try to change the CT ratio and verify that is not possible	Change not possible

[In Work]

PMD-1010 - Firmware Upgrade - Log info

Scope=D

Each audit log entry shall contain the information seen in Table 1.

Action	Expected Behaviour
Reading through MODBUS verify that Audit Log entries contain all data listed in Table 1	Ok

[In Work]

PMD-1011 - Firmware Upgrade - Log cannot be deleted

Scope=D

It shall not be possible to erase an Audit Log entry.

Action	Expected Behaviour
Try to erase the Adit Log via HMI or cummincation (e.g. reset) and confirm that is not possible	O k

[In Work]

PMD-4557 - Firmware Upgrade - General and robustness check

With the latest bootloader developed for MID meters, the FW image can be built in MID and non-MID mode.

A MID meter can only be updated with a MID FW image.

Action	Expected Behaviour
Perform at least 3 upgrades with Bootloader B1.0.0.0 (Firmware to be upgraded from a version P1.3.x) with M4M 20 or 30 non-MID. Use a non-MID FW image.	Upgrade ok, just one reset and HMI with just energy LED on during the process.
Perform at least 3 upgrades with Bootloader B1.0.0.0 (Firmware to be upgraded from a version P1.3.x) with M4M 20 or 30 non-MID. Use a MID FW image.	Upgrade ok, just one reset and HMI with just energy LED on during the process.
Load an invalid file with Bootloader B1.0.0.0 (Firmware to be upgraded from a version P1.3.x) with M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.
Interrupt the connection during FW update with Bootloader B1.0.0.0 (Firmware to be upgraded from a version P1.3.x) with M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.

Perform at least 3 upgrades with Bootloader B2.1.0.0 (First firmware loaded version P2.4.0.0) with M4M 20 or 30 non-MID. Use a non-MID FW image.	Upgrade ok, just one reset and HMI with texts showing the status of the process.
Perform at least 3 upgrades with Bootloader B2.1.0.0 (First firmware loaded version P2.4.0.0) with M4M 20 or 30 non-MID. Use a MID FW image.	Upgrade ok, just one reset and HMI with texts showing the status of the process.
Load an invalid file with Bootloader B2.1.0.0 (First firmware loaded version P2.4.0.0) with M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.
Interrupt the connection during FW update Bootloader B2.1.0.0 (First firmware loaded version P2.4.0.0) with M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.
Perform at least 3 upgrades with Bootloader B2.1.0.0 (First firmware loaded after version P2.4.0.0) with M4M 2X. Use a non-MID FW image.	Upgrade ok, just one reset and HMI with just power LED on.
Perform at least 3 upgrades with Bootloader B2.1.0.0 (First firmware loaded after version P2.4.0.0) with M4M 2X. Use a MID FW image.	Upgrade ok, just one reset and HMI with just power LED on.
Interrupt the connection during FW update Bootloader B2.1.0.0 (First firmware loaded after version P2.4.0.0) with M4M 2X.	Upgrade failed, the device reboots with the latest loaded FW.
Interrupt the connection during FW update BBootloader B2.1.0.0 (First firmware loaded after version P2.4.0.0) with M4M 2X.	Upgrade failed, the device reboots with the latest loaded FW.
Perform at least 3 upgrades with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 2X or M4M 20 or 30 non-MID. Use a non-MID FW image.	Upgrade ok, just one reset and HMI with texts showing the status of the process, or just power LED on for 2X
Perform at least 3 upgrades with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 2X or M4M 20 or 30 non-MID. Use a MID FW image.	Upgrade ok, just one reset and HMI with texts showing the status of the process, or just power LED on for 2X
Load an invalid file with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 2X or M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.
Interrupt the connection during FW update Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 2X or M4M 20 or 30 non-MID.	Upgrade failed, the device reboots with the latest loaded FW.
Perform at least 3 upgrades with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 20 or 30 MID. Use a non-MID FW image.	Upgrade not possible with a non-MID FW image.
Perform at least 3 upgrades with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 20 or 30 MID. Use a MID FW image.	Upgrade ok, just one reset and HMI with texts showing the status of the process.
Load an invalid file with Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 20 or 30 MID.	Upgrade failed, the device reboots with the latest loaded FW.
Interrupt the connection during FW update Bootloader B2.2.0.0 (First firmware loaded after version P2.6.0.0) with M4M 20 or 30 MID.	Upgrade failed, the device reboots with the latest loaded FW.

[In Work]

2 Second Stage Bootloader

PMD-1013 - Second Stage Bootloader - FW start if no upgrade is detected

Scope=D

If the second stage bootloader does not detect activation of an upgrade, from the firmware, it shall start the firmware.

Action	Expected Behaviour
Verify that in case a new FW upgrade procedure is not initialize, the second Bootloader starts the resident FW (i.e. at the power on the current FW is loaded)	Ok

[In Work]

PMD-1014 - Second Stage Bootloader - Integrity verification

Scope=F

If activation of an upgrade is detected it shall verify the image integrity of the locally stored image file.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1015 - Second Stage Bootloader - Store

Scope=F

The second stage bootloader shall only store the image if its integrity was successfully verified.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level (FW upgrade test case covered by another test case)	Ok

[In Work]

PMD-1016 - Second Stage Bootloader - Decript to correct location

Scope=F

The decrypted image shall be written to its proper location.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1017 - Second Stage Bootloader - Upgrade result

Scope=D

The result of the upgrade shall be communicated to the firmware; this result shall include successfully upgraded, verification failed and other error

Action	Expected Behaviour

Perform a FW upgrade with a proper file	Ok
Ask the upgrade status via communication	Ok
Check that the response in SUCCESS (0x01)	Ok
Perform a FW upgrade with an invalid file	Ok
Ask the upgrade status via communication	Ok
Check that the response in INVALID FW (0x02)	Ok
Perform a FW upgrade and abort the procedure (e.g. abort the file transfer)	Ok
Ask the upgrade status via communication	Ok
Check that the response in ERROR (0x03)	Ok

[In Work]

PMD-1852 - Production firmware upload

During the first FW upload both the second stage bootloader and the application are loaded. This differs from the firmware upgrade procedure.

Action	Expected Behaviour
Load a new production firmware on an erased mainboard	Ok
Perform the initial configuration through the wizard	Ok
Check on the device information screen that the FW version is the latest one	Ok

[In Work]

3 Persistent storage

PMD-1019 - Persistent storage - Definition

Scope=F

The device must be able to retain all persistent data for at least 10 years.

Action	Expected Behaviour
Check the Internal and External FLASH datasheet for Data Retention Specification	Ok

[In Work]

PMD-1020 - Persistent storage - Redundancy

Scope=D

The device must minimize risk of loss of critical data (measurement, configuration etc.) e.g. through redundancy

Action	Expected Behaviour
In debug mode force the data of a sensible register to a wrong value (e.g. during flash reading change the CRC or the data content)	Ok
Verify that the redundant data is loaded correctly	Ok

Verify that the wrong data is replaced with correct data	Ok

[In Work]

4 System Clock

PMD-1022 - System Clock - Definition

Scope=L

The system shall provide time information in a timestamp format that contains the number of seconds that has passed since start of epoch in UTC.

Action	Expected Behaviour
Set the date and time in the RTC via HMI	Ok
Read date and time via HMI and verify that is compliant to the set value	Ok
Read the UTC value in the related register via communication and verify that is compliant to the set value	Ok
Set the date and time in the RTC via communication	Ok
Read date and time via HMI and verify that is compliant to the set value	Ok
Read the UTC value in the related register via communication and verify that is compliant to the set value	Ok
Verify that is not possible to set an invalid date and time via HMI	Ok
Verify that is not possible to set an invalid date and time via communication	Ok

[In Work]

PMD-1023 - System Clock - Daylight saving time

Scope=L

The system shall provide time information in a date time format that that is adjusted according to any daylight savings settings. The date portion shall contain year, month and date while the time portion shall contain hours, minutes and seconds.

Action	Expected Behaviour
Set the date and time such as the DTS is not effective (e.g. 01/01/2020 08:00)	Ok
Enable the Daylight Saving Time option	Ok
Read date and time and verify that is compliant to the set value (e.g. 01/01/2020 08:00)	Ok
Disable the Daylight Saving Time option	Ok
Read date and time and verify that is compliant to the set value (e.g. 01/01/2020 08:00)	Ok
Set the date and time such as the DTS is effective (e.g. 01/07/2020 08:00)	Ok
Enable the Daylight Saving Time option	Ok
Read date and time and verify that is compliant to the set	Ok

value (e.g. 01/01/2020 09:00)	
Disable the Daylight Saving Time option	Ok
Read date and timeand verify that is compliant to the set value (e.g. 01/01/2020 08:00)	Ok
Perform the previous steps both though HMI and Communication	Ok

[In Work **]**

PMD-1024 - System Clock - Subscription to events triggered every whole second

Scope=F

The system shall be able to subscribe to an event that is triggered every whole second.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1025 - System Clock - Status information

Scope=L

The system clock shall provide status information; including whether the date has been set or not, whether the time has been set or not and RTC circuit error.

Action	Expected Behaviour
Verify that the system clock's status information are present both in HMI and via communication (flag if the date has been set or not, flag if the time has been set or not and RTC circuit error)	Ok

[In Work **]**

5 Counter Up/Down

PMD-1027 - Counter Up/Down - Definition

Scope=L

There shall be two counters, one that counts up each minute and one that counts down each minute.

Action	Expected Behaviour
Read the value of the counters via HMI and communication	Ok
Wait 10 minutes	Ok
Read the value of the counters via HMI and communication and confirm the correct value	Ok

[In Work **]**

PMD-1028 - Counter Up/Down - Down-counter start value set

Scope=L

It shall be possible to set the start value of the counter that counts down. The default value shall be one year (i.e. 365*24*60 minutes).

Action	Expected Behaviour
Check / set the default countdown timer value to 1 year (365*24*60 = 525600) via HMI or Modbus (0x8CFB)	Ok
Reset the timer via HMI (Configuration -> Unit -> Reset -> Timer reset) or Modbus (write 1 to register 0x8F59)	Ok
Check that the default value of the down counter is 1 year (365*24*60 = 525600) via HMI (Data reading -> Timers).	Ok
Check that the default value of the down counter is 1 year (365*24*60 = 525600) via Modbus (0x8CF9).	Ok

[In Work **]**

PMD-1029 - Counter Up/Down - Reset

Scope=L

It shall be possible to reset both counters; the counter that counts up is reset to zero and the counter that counts down shall reset to the last set start value.

Action	Expected Behaviour
Read the value of both the counters via HMI and communication	Report the value in the result filed
Wait 2 minutes	Ok
Read the value of both the counters via HMI and communication	Values increased/decreased by 2 minutes
Set the start value of the down counter to a new value via HMI	Ok
Reset both Counters	Ok
Read the UP CNT value = 0 (via HMI and communication)	Zero
Read the DOWN CNT value = last set start value (via HMI and communication)	Last set start value
Set the start value of the down counter to a new value via Modbus (or HMI if no Modbus is present)	Ok

[In Work **]**

PMD-1030 - Counter Up/Down - Down-counter maximum

Scope=F

The maximum value for the counter that counts down shall be three years.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1031 - Counter Up/Down - Up-counter maximum

Scope=F

The maximum value for the counter that counts up shall be set so that it is extremely unlikely that it will be reached (e.g. 100 years).

Action	Expected Behaviour

Confirm the requirement fulfillment at FW level	Ok

[In Work]

6 Logs

6.1 Error, Warning and Alarm Log

PMD-1034 - Error, Warning and Alarm Log - Warp-around

Scope=D

Each log shall be stored in a circular way, where the oldest entry is overwritten once the log is full.

Action	Expected Behaviour
By means of specific tricks (special FW or test equipment) emulate the fill up of the buffer and verify a correct wrap up without loss/corruption of data for the Error Log	Ok
By means of specific tricks (special FW or test equipment) emulate the fill up of the buffer and verify a correct wrap up without loss/corruption of data for the Warning Log	Ok
By means of specific tricks (special FW or test equipment) emulate the fill up of the buffer and verify a correct wrap up without loss/corruption of data for the Alarm Log	Ok

[In Work]

PMD-1035 - Error, Warning and Alarm Log - Maximum number of entries

Scope=F

Each log shall be able to store up to 200 events.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1036 - Error, Warning and Alarm Log - Basic info

Scope=L

Each entry shall contain the date and time, a unique event code and duration of the event.

Action	Expected Behaviour
Read Error Log through HMI and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok
Read Warning Log through HMI and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok
Read Alarm Log through HMI and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok
Read Error Log through Communication and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok

Read Warning Log through Communication and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok
Read Alarm Log through Communication and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION	Ok

[In Work **]**

PMD-1037 - Error, Warning and Alarm Log - Events to be logged in the Error log

Scope=D

The events listed in Table 3 shall be logged in the error log.

Action	Expected Behaviour
Try to trigger an "Audit Log Error" and verify that the proper entry is present in the Error Log	Ok
Try to trigger an "Firmware CRC Error" and verify that the proper entry is present in the Error Log	Ok
Try to trigger an "Persistent Storage Error" and verify that the proper entry is present in the Error Log	Ok
Try to trigger an "AC Reference Error" and verify that the proper entry is present in the Error Log	Ok
Try to trigger an "Temperature Sensor Error" and verify that the proper entry is present in the Error Log	Ok
Try to trigger an "RTC Circuit Error" and verify that the proper entry is present in the Error Log	Ok

[In Work **]**

PMD-1038 - Error, Warning and Alarm Log - Events to be logged in the Warning log

Scope=D

The events listed in Table 4 shall be logged in the warning log.

Action	Expected Behaviour
Try to trigger an Warning Log entry for each of the events in Table 4 according to the device model being tested	Ok

[In Work **]**

PMD-1039 - Error, Warning and Alarm Log - Events to be logged in the Alarm log

Scope=D

All alarm, which are configured to be logged, shall be logged in the alarm log.

Action	Expected Behaviour
Trigger one of the configured alarm and verify that the proper entry is present in the Information Log	Ok

[In Work **]**

PMD-1040 - Error, Warning and Alarm Log - Read

Scope=L

It shall be possible to read the log through the HMI and communication.

Action	Expected Behaviour
Read one or more Error/Warning Log entries through HMI and compare the contents with the same entries read through MODBUS, confirm the match	Ok

[In Work]

PMD-1041 - Error, Warning and Alarm Log - Erase logs

Scope=L

It shall be possible to erase the log through communication and HMI

Action	Expected Behaviour
Erase the Error log through HMI and verify the erase success reading both through HMI and Communication	Ok
Erase the Warning log through HMI and verify the erase success reading both through HMI and Communication	Ok
Erase the Alarm log through HMI and verify the erase success reading both through HMI and Communication	Ok
Erase the Error log through Communication and verify the erase success reading both through HMI and Communication	Ok
Erase the Warning log through Communication and verify the erase success reading both through HMI and Communication	Ok
Erase the Alarm log through Communication and verify the erase success reading both through HMI and Communication	Ok

[In Work]

PMD-1803 - Warning logs - Read and reset

Action	Expected Behaviour
Power on the device without any voltage/current applied	After few seconds the device displays a warning notification
Read the warning list though HMI and Modbus	The same information are present in HMI and Modbus
Exit the notification menu in HMI	The warning notification symbol disappears
Erase all notifications through HMI (Configuration > Unit > Reset > Notification reset)	Ok
Read the warning list though HMI and Modbus	No entries are present

[In Work]

6.2 Event Log

PMD-1043 - Event Log - Warp-around

Scope=D

The event log shall be stored in a circular way, where the oldest entry is overwritten once the log is full.

Action	Expected Behaviour
By means of specific tricks (special FW or test equipment) emulate the fill up of the buffer and verify a correct wrap up without loss/corruption of data for the Event Log	Ok

[✖ Obsolete **]**

PMD-1044 - Event Log - Maximum number of entries

Scope=F

The event log shall be able to store up to 10 events simultaneously.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✖ Obsolete **]**

PMD-1045 - Event Log - Basic info

Scope=L

Each entry shall contain the date and time, a unique event code, duration of the event and a recording of the associated signals (see Table 5).

Action	Expected Behaviour
Read Event Log through HMI and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION, SIGNAL DATA RECORDS (40+40)	Ok
Read Event Log through Communication and verify that every entry includes: DATE & TIME, UNIQUE EVENT CODE, DURATION, SIGNAL DATA RECORDS (40+40)	Ok

[✖ Obsolete **]**

PMD-1046 - Event Log - Signal recording resolution

Scope=F

The signal recording shall have the resolution of one RMS value per line cycle. (frequency is not RMS measurements)

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✖ Obsolete **]**

PMD-1047 - Event Log - Number of stored entries for each event

Scope=L

A total of 40 line cycles before the event occurred and a 40 line cycles after the event occurred (consecutive) shall be recorded.

Action	Expected Behaviour

Reading through Communication verify that each triggered Event Log entry include 40+40 records	Ok
Reading through HMI verify that each triggered Event Log entry include 40+40 records	Ok

[✖ Obsolete]

PMD-1048 - Event Log - Events to be logged in the Event log

Scope=D

The events listed in Table 5 shall be logged in the event log.

Action	Expected Behaviour
Try to trigger an Event Log entry for each of the events in Table 5 according to the device model being tested	Ok

[✖ Obsolete]

PMD-1049 - Event Log - Threshold

Scope=L

It shall be possible to configure the threshold for each event listed in Table 5. (Note they shall be connencted to the “rated” value settings in the HMI).

Action	Expected Behaviour
Configure an Over Voltage threshold such that given the real Line Voltage of the Test environment set up an Event Log is triggered : set the threshold lower than the real Line Voltage	Ok
Configure an Under Voltage threshold such that given the real Line Voltage of the Test environment set up an Event Log is triggered : set the threshold higher than the real Line Voltage	Ok
Configure an Over Current threshold such that given the real Line Current of the Test environment set up an Event Log is triggered : set the threshold lower than the real Line Current	Ok
Configure an Over Frequency threshold such that given the real Line Frequency of the Test environment set up an Event Log is triggered : set the threshold lower than the real Line Frequency	Ok
Configure an Under Frequency threshold such that given the real Line Frequency of the Test environment set up an Event Log is triggered : set the threshold higher than the real Line Frequency	Ok

[✖ Obsolete]

PMD-1050 - Event Log - Read

Scope=L

It shall be possible to read the log through the HMI and communication.

Action	Expected Behaviour
Read one or more Event Log entries through HMI and compare the contents with the same entries read through	Ok

Communication, confirm the match	
Read one or more Event Log entries through MODBUS and compare the contents with the same entries read through HMI, confirm the match	Ok

[✖ Obsolete]

PMD-1051 - Event Log - Erase logs

Scope=L

It shall be possible to erase the log through communication and HMI

Action	Expected Behaviour
Try to erase the Event Log through HMI and verify reading the log through HMI and Communication	Ok
Try to erase the Event Log through Communication and verify reading the log through HMI and Communication	Ok

[✖ Obsolete]

6.3 Audit Log

PMD-1053 - Audit Log - Creation

Scope=L

An Audit log entry shall be created each time the transformer ratio, the number of elements is reconfigured or reset.

Action	Expected Behaviour
Chenge the CT-ratio through HMI and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Chenge the CT-ratio through Communication and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Chenge the VT-ratio through HMI and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Chenge the VT-ratio through Communication and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Chenge the Number of Elements through HMI and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Chenge the Number of Elements through Communication and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Reset the CT-ration through HMI and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Reset the VT-ration through HMI and verify a new Setting(Audit) Log entry has been created (read through HMI and Communication the current value of CT)	Ok
Reset the Settings though Factry Reset via HMI and verify	Ok

a new Setting(Audit) Log entry has been created	

[In Work]

PMD-1054 - Audit Log - Log full

Scope=D

The Audit Log has limited memory of 843 entries for installation changes and energy reset and 80 successfully FW upgrades.

Action	Expected Behaviour
Fill the Audit Log and verify that no more entries are stored. CT ration, VT ratio, wires and energy reset are allowed	Ok
Perform 80 successfully FW upgrade and verify that it is not possible to update the meter any more	Ok

[In Work]

PMD-1055 - Audit Log - Erase or modification not allowed

Scope=D

It shall not be possible to erase or modify a settings log entry.

Action	Expected Behaviour
Try to erase the Adit Log via HMI or cummincation (e.g. reset) and confirm that is not possible	Ok

[In Work]

PMD-1056 - Audit Log - Info to be stored in the Settings log

Scope=L

Each setting log entry shall contain the information listed in Table 6.

Action	Expected Behaviour
Read the Settings(Audit) Log through HMI and verify each entry contains all information (Home > Configuration > Unit > Audit Log > Last)	System Info: Entry num Timestamp Upgrade counter FW Version Configuration: TRAFO_V_Prim TRAFO_V_Sec TRAFO_I_Prim TRAFO_I_Sec TRAFO_IN_Prim (for IH and similar) TRAFO__IN_Sec (for IH and similar) Energy: ACTIVE_ENERGY_IMPORT_TOTAL ACTIVE_ENERGY_IMPORT_L1 ACTIVE_ENERGY_IMPORT_L2 ACTIVE_ENERGY_IMPORT_L3 ACTIVE_ENERGY_IMPORT_TAR1 ACTIVE_ENERGY_IMPORT_TAR2 ACTIVE_ENERGY_IMPORT_TAR3 ACTIVE_ENERGY_IMPORT_TAR4 ACTIVE_ENERGY_IMPORT_TAR6

	ACTIVE_ENERGY_IMPORT_TAR6 ACTIVE_ENERGY_EXPORT_TOTAL
Read the Settings(Audit) Log through Communication and verify each entry contains all information (header registers starting from 0x6660, data registers starting from 0x6670)	System Info: Entry num Timestamp Upgrade counter FW Version Configuration: TRAFO_V_Prim TRAFO_V_Sec TRAFO_I_Prim TRAFO_I_Sec TRAFO_IN_Prim (for IH and similar) TRAFO__IN_Sec (for IH and similar) Energy: ACTIVE_ENERGY_IMPORT_TOTAL ACTIVE_ENERGY_IMPORT_L1 ACTIVE_ENERGY_IMPORT_L2 ACTIVE_ENERGY_IMPORT_L3 ACTIVE_ENERGY_IMPORT_TAR1 ACTIVE_ENERGY_IMPORT_TAR2 ACTIVE_ENERGY_IMPORT_TAR3 ACTIVE_ENERGY_IMPORT_TAR4 ACTIVE_ENERGY_IMPORT_TAR6 ACTIVE_ENERGY_IMPORT_TAR6 ACTIVE_ENERGY_EXPORT_TOTAL

[In Work]

PMD-1057 - Audit Log - Maximum number of entries

Scope=F

It shall be possible to store up to n different setting log entries (up to the end of the Audit Log area).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

6.4 Power outage log

PMD-3650 - Power Outage Log entry

At each power fail condition, it shall be triggered and stored in the persistent storage a Power Outage Log entry.

Action	Expected Behaviour
Check date and time are properly set.	Ok
Perform a power cycle of the device.	The device reboots nominally.
Check for a new power outage log in the HMI (lighting icon).	Power outage log present with correct information.
Check for power outage log via Modbus (register from 0x67C0)	Power outage log present with correct information.

[In Work]

7 Historical Functions

7.1 Load Profile

PMD-1059 - Load Profile - Definition

Scope=L

It shall be possible to configure a Load Profile channel for the quantities listed in Table 7. The quantity shall only be selectable if it is available in the product.

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though HMI that it shall be possible to configure a Load Profile channel for the quantities listed in Table 7. If the device under test is a M4M20xxx (BH): verify though HMI that the Load Profile functionality is not present.	Ok

[✏ In Work **]**

PMD-1060 - Load Profile - Time interval definition

Scope=L

It shall be possible to configure the time interval, between two snapshots, to one of the options available in Table 8.

Action	Expected Behaviour
Verify though HMI that it shall be possible to configure the Load Profile Time Interval to one of the following: 1, 2, 5, 10, 15, 30, 60 minutes	1, 2, 5, 10, 15, 30, 60 minutes

[✏ In Work **]**

PMD-1061 - Load Profile - The time interval is common for all channels

Scope=F

The time interval may be common for all Load Profile channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✏ In Work **]**

PMD-1062 - Load Profile - Maximum number of channels

Scope=F

It shall be possible to configure up to 25 different channels, which are the same which will be used for the demand functionality.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✏ In Work **]**

PMD-1063 - Load Profile - Warp-around

Scope=D

The Load Profile channels shall be stored in a circular buffer (i.e. the oldest snapshots are overwritten with new snapshots once the buffer is full).

Action	Expected Behaviour
By means of specific tricks shorten the time required to fill up the buffer (e.g. set the time interval to 1 minute in debug mode) and verify a correct wrap up without loss/corruption of data	Ok

[In Work]

PMD-1064 - Load Profile - Buffer size

Scope=F

It shall be possible to store all snapshots for a time period of one year when all channels are used and the time interval is set to 15 minutes (i.e. 25*4*365=876000 snapshots). Reviewed to 30 minutes for a year with all channels 25*2*365 = 18250.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level (Buffer size definition)	Ok

[In Work]

PMD-1065 - Load Profile - Configuration through HMI

Scope=L

It shall be possible to configure each load profile channel and the time interval through the HMI.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 minute trough HMI (Configuration > Historicals > ...)	Ok
Configure channels 1 to 25 trough HMI (Configuration > Historicals > Load Profile > ...)	Ok
Wait 5 minutes and verify that the correct number of snapshots have been stored (Historicals > Load Profile)	Ok
Change the time interval to 5 minutes from the viewing menu (Historicals > Load Profile)	Ok
Change the channel quantity from the viewing menu (Historicals > Load Profile)	Ok
Wait 20 minutes and verify that the correct number of snapshots have been stored (Historicals > Load Profile)	Ok

[In Work]

PMD-1066 - Load Profile - Configuration through communication

Scope=D

It shall be possible to configure each load profile channel and the time interval through communication.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 minute trough MODBUS	Ok

Configure channels 1 to 25 trough MODBUS	Ok
Wait 5 minutes and verify that the correct number of snapshots have been stored (MODBUS)	Ok
Change the time interval to 5 minutes through MODBUS	Ok
Change the channel quantity through MODBUS	Ok
Wait 20 minutes and verify that the correct number of snapshots have been stored (MODBUS)	Ok

[In Work **]**

PMD-1067 - Load Profile - Power fail

Scope=L

If a power failure occurs that lasts over the end of an interval, the value will be stored when the meter powers up again only if time/date are still correct.

Action	Expected Behaviour
Configure the Load Profile in order to store a snapshot every hour	Ok
Check that after the first hour a snapshot has been stored	Ok
Power down the device for at least an hour	Ok
Power up the device and verify that a second snapshot is stored at power on	Ok

[In Work **]**

PMD-4405 - Load Profile - M4M 2X management

Load Profile functionality is available only for M4M 2X with PQ1 or PQ2 pakages

Action	Expected Behaviour
Load Profile functionality is available on Modbus (reading)	Available only for M4M 2X with PQ1 or PQ2 pakages
Load Profile functionality is available on Modbus (writing)	Available only for M4M 2X with PQ1 or PQ2 pakages
Only half of the total memory is available for PQ1	Ok

[In Work **]**

7.2 Max/Min Demand

PMD-1069 - Max/Min Demand - Definition

Scope=L

It shall be possible to configure each Demand channel for the quantities listed in Table 10. The quantity shall only be selectable if available in the product.

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though HMI that it shall be possible to configure a Demand channel for the quantities listed in Table 7 (Configuration > Historicals > Max/Min Demand > Channels > …). If the device under test is a M4M20xxx (BH): verify though HMI that the Demand functionality is not present.	Ok

[In Work]

PMD-1070 - Max/Min Demand - Configure channel to be max or min

Scope=L

It shall be possible to configure each channel to be either maximum or minimum demand.

Action	Expected Behaviour
Verify though HMI (Config menu) that it shall be possible to configure a channel to store maximum, minumum or both (Configuration > Historicals > Max/Min Demand > Channels > …)	Max, Min, Max and Min
Verify though HMI (View menu) that it shall be possible to configure a channel to store maximum, minumum or both (Historicals > ... > Param. > …)	Max, Min, Max and Min

[In Work]

PMD-1071 - Max/Min Demand - Configure channel for one of three levels

Scope=L

It shall be possible to configure a Demand channel for one of three levels of values for the selected quantity; highest, second highest and third highest for maximum demand and smallest, second smallest and third smallest for minimum demand.

Action	Expected Behaviour
Verify though HMI (Config menu) that it shall be possible to configure a channel to store 1, 2 or 3 max/min values (Configuration > Historicals > Max/Min Demand > Channels > …)	1, 2, 3
Verify though HMI (View menu) that it shall be possible to configure a channel to store1, 2 or 3 max/min values (Historicals > ... > Param. > …)	1, 2, 3

[In Work]

PMD-1072 - Max/Min Demand - Sliding or not sliding configuration

Scope=F

It shall be possible to configure each channel to be sliding or not sliding demand (same configuration apply to all channels).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1073 - Max/Min Demand - Configure time interval

Scope=L

It shall be possible to configure the time interval to one of the options available in Table 9.

Action	Expected Behaviour
Verify though HMI (Config Menu) that it shall be possible to configure the Demand Time Interval to one of the following: 1, 2, 5, 10, 15, 30, 60 minutes (Configuration > Historicals > …)	1, 2, 5, 10, 15, 30, 60 minutes
Verify though HMI (View menu) that it shall be possible to	1, 2, 5, 10, 15, 30, 60 minutes

configure the Demand Time Interval to one of the following: 1, 2, 5, 10, 15, 30, 60 minutes (Historicals > ... > (Time on bottom right) > …)	

[In Work]

PMD-1074 - Max/Min Demand - Configure sub-time interval

Scope=L

It shall be possible to configure the sub time interval to one of the options available in Table 9. The Sub-Interval must be smaller than the time interval the time interval must be evenly divisible with the sub-interval.

Action	Expected Behaviour
Verify though HMI (Config Menu) that it shall be possible to configure the Demand Sub-Time Interval to one of the following: 1, 2, 5, 10, 15, 30 minutes or No Sliding (Configuration > Historicals > …)	No Sliding, 1, 2, 5, 10, 15, 30 minutes
Verify though HMI (View menu) that it shall be possible to configure the Demand Sub-Time Interval to one of the following: 1, 2, 5, 10, 15, 30 minutes or No Sliding (Historicals > ... > (Time on bottom right) > …)	No Sliding, 1, 2, 5, 10, 15, 30 minutes
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 1 minute(s).	Configuration NOT possible
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 2 minute(s).	Configuration NOT possible
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 5 minute(s).	Configuration NOT possible
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 10 minute(s).	Configuration NOT possible
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 15 minute(s).	Configuration NOT possible
Configure the Time Interval to 1 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 2 minute(s).	Configuration NOT possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 5 minute(s).	Configuration NOT possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 10 minute(s).	Configuration NOT possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 15 minute(s).	Configuration NOT possible
Configure the Time Interval to 2 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 5 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 5 minute(s) and the Sub-Interval to 2 minute(s).	Configuration NOT possible
Configure the Time Interval to 5 minute(s) and the Sub-Interval to 5 minute(s).	Configuration NOT possible

Configure the Time Interval to 5 minute(s) and the Sub-Interval to 10 minute(s).	Configuration NOT possible
Configure the Time Interval to 5 minute(s) and the Sub-Interval to 15 minute(s).	Configuration NOT possible
Configure the Time Interval to 5 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 2 minute(s).	Configuration possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 5 minute(s).	Configuration possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 10 minute(s).	Configuration NOT possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 15 minute(s).	Configuration NOT possible
Configure the Time Interval to 10 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 2 minute(s).	Configuration NOT possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 5 minute(s).	Configuration possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 10 minute(s).	Configuration NOT possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 15 minute(s).	Configuration NOT possible
Configure the Time Interval to 15 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 2 minute(s).	Configuration possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 5 minute(s).	Configuration possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 10 minute(s).	Configuration possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 15 minute(s).	Configuration possible
Configure the Time Interval to 30 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Configure the Time Interval to 60 minute(s) and the Sub-Interval to 1 minute(s).	Configuration possible
Configure the Time Interval to 60 minute(s) and the Sub-Interval to 2 minute(s).	Configuration possible
Configure the Time Interval to 60 minute(s) and the Sub-	Configuration possible

Interval to 5 minute(s).	
Configure the Time Interval to 60 minute(s) and the Sub-Interval to 10 minute(s).	Configuration possible
Configure the Time Interval to 60 minute(s) and the Sub-Interval to 15 minute(s).	Configuration possible
Configure the Time Interval to 60 minute(s) and the Sub-Interval to 30 minute(s).	Configuration possible

[In Work]

PMD-1075 - Max/Min Demand - Common time interval for all channels

Scope=F

The time interval shall be common for all demand channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1076 - Max/Min Demand - Common sub-time interval for all channels

Scope=F

The sub time interval shall be common for all Demand channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1077 - Max/Min Demand - Maximum number of channels

Scope=F

It shall be possible to configure up to 150 different channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1078 - Max/Min Demand - Configure demand period

Scope=L

It shall be possible to configure the Demand period to be either a day, a week or a month.

Action	Expected Behaviour
Verify though HMI that it shall be possible to configure the Demand Time Interval to one of the following: day, a week or a month.	Day, week or month.

[In Work]

PMD-1079 - Max/Min Demand - Configure demand period start/end time

Scope=F

It shall be possible to configure the Demand period start/end to be any arbitrary whole minute within the period.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1080 - Max/Min Demand - Common period for all channels

Scope=F

The Demand period shall be common for all channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1081 - Max/Min Demand - Warp-around

Scope=D

The Demand periods shall be stored in a circular buffer (i.e. the oldest period is overwritten with a new period once the buffer is full) that shall be able to store up to 365 historic periods in addition to the current period.

Action	Expected Behaviour
By means of specific tricks shorten the time required to fill up the buffer (e.g. set the time interval to 1 second and the period to 1 minute in debug mode) and verify a correct wrap up without loss/corruption of data	Ok

[In Work]

PMD-1082 - Max/Min Demand - Last average

Scope=F

The last average demand, for the last completed interval, shall be determined for each configured quantity.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1083 - Max/Min Demand - Predicted demand

Scope=F

The indicated (predicted) demand shall be determined for each configured quantity.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1084 - Max/Min Demand - Configuration through HMI

Scope=L

It shall be possible to configure each Demand channel, interval, sub-interval and period through the HMI.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in	Ok

order to emulate a well defined power profile	
Configure the time interval to 60 minutes, no sliding, 1 day period trough HMI (Configuration > Historicals > ...)	Ok
Configure channels 1 to 25 trough HMI (Configuration > Historicals > Min/Max Demand > ...)	Ok
Wait 2 days with the device powered on	Ok
Verify that the correct number and values of min/max demand have been stored (Historicals > Min/Max Demand)	Ok
Verify that the current ongoing period measurements are available (Historicals > Min/Max Demand > Current Period)	Ok

[In Work **]**

PMD-1085 - Max/Min Demand - Configuration through communication

Scope=L

It shall be possible to configure each Demand channel, interval, sub-interval and period through communication.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 60 minutes, no sliding, 1 day period trough Modbus	Ok
Configure channels 1 to 25 trough Modbus	Ok
Wait 2 days with the device powered on	Ok
Verify through Modbus that the correct number and values of min/max demand have been stored	Ok
Verify that the current ongoing period measurements are available	Ok

[In Work **]**

PMD-1086 - Max/Min Demand - Power fail

Scope=D

If a power fail occurs that lasts over the end of an ongoing period, the period will be stored when the meter powers up again and a new period will start.

Action	Expected Behaviour
By means of specific tricks shorten the time interval and the time period (e.g. set the time interval to 1 minute and the period to 10 minute in debug mode)	Ok
Check that after 20 minutes 2 periods have been stored	Ok
Power down the device for at least 10 minutes	Ok
Power up the device and verify that a third period is stored at power on	Ok

[In Work **]**

PMD-1853 - Max/Min Demand - No regression test

It shall be possible to configure and read each Demand channel, interval, sub-interval and period through HMI and communication.

Action	Expected Behaviour
Verify though HMI (Config Menu) that it shall be possible to configure the Demand interval and sub-interval (Configuration > Historicals > …): Configure the Time Interval to 1 minute(s) and the Sub-Interval to 5 minute(s).	Configuration NOT possible
Verify though HMI (Config Menu) that it shall be possible to configure the Demand interval and sub-interval (Configuration > Historicals > …): Configure the Time Interval to 5 minute(s) and the Sub-Interval to 2 minute(s).	Configuration NOT possible
Verify though HMI (Config Menu) that it shall be possible to configure the Demand interval and sub-interval (Configuration > Historicals > …): Configure the Time Interval to 10 minute(s) and the Sub-Interval to 30 minute(s).	Configuration NOT possible
Verify though HMI (Config Menu) that it shall be possible to configure the Demand interval and sub-interval (Configuration > Historicals > …): Configure the Time Interval to 10 minute(s) and the Sub-Interval to 5 minute(s).	Ok
Verify though HMI (Config Menu) that it shall be possible to configure the Demand interval and sub-interval (Configuration > Historicals > …): Configure the Time Interval to 1 minute(s) and the Sub-Interval to No-Sliding.	Ok
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 minutes, no sliding, 1 day period trough HMI (Configuration > Historicals > ...)	Ok
Configure channels 1 to 25 trough HMI (Configuration > Historicals > Min/Max Demand > ...)	Ok
Reset the Historicals data though HMI	Ok
Wait 3 minutes with the device powered on	Ok
Verify that the correct number and values of min/max demand have been stored (Historicals > Min/Max Demand)	Ok
Configure the time interval to 10 minutes, 5 minute sliding, 1 day period trough Modbus	Ok
Configure channels 1 to 25 trough Communication	Ok
Reset the Historicals data though Communication	Ok
Wait 15 minutes with the device powered on	Ok
Verify that the correct number and values of min/max demand have been stored though Communication	Ok
If possible, wait 2 days with the device powered on, otherwhise change the time to 23:45, wait 15 minutes, change again to 23:45 and wait 15 minutes	Ok
Verify through Modbus and HMI that the correct number and values of min/max demand have been stored	Ok
Verify that the current ongoing period measurements are available	Ok

[In Work]

PMD-4378 - Demand - M4M 2X management

Demand functionality is available only for M4M 2X with PQ1 or PQ2 pakages

Action	Expected Behaviour
Check that Demand funcionality is available on Modbus (reading)	Available only for meters with PQ1 or PQ2 pakages
Check that Demand funcionality is available on Modbus (writing)	Available only for meters with PQ1 or PQ2 pakages
Only half of the total memory is available for PQ1	OK

[In Work]

7.3 Cumulative Energy Consumption

PMD-1088 - Cumulative Energy Consumption - Definition

Scope=L

It shall be possible to configure each Energy Consumption Cumulative channel for the quantities listed in Table 11. The quantity shall only be selectable if it is available in the product.

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though HMI that it shall be possible to configure a Energy Consumption Cumulative (Energy Snapshot) channel for the quantities listed in Table 7. If the device under test is a M4M20xxx (BH): verify though HMI that the Energy Snapshot functionality is not present.	Ok

[In Work]

PMD-1089 - Cumulative Energy Consumption - Time interval definition

Scope=L

It shall be possible to configure the time interval to be either a day, a week or a month.

Action	Expected Behaviour
Verify though HMI that it shall be possible to configure the Energy Consumption Cumulative (Energy Snapshot) Time Interval to one of the following: 1h, 6h, 12h, day, week or month	1h, 6h, 12h, day, week or month

[In Work]

PMD-1090 - Cumulative Energy Consumption - Configure start/end time of time interval

Scope=F

It shall be possible to configure the time interval to start/end any whole minute within the period.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1091 - Cumulative Energy Consumption - Common time interval for all channels

Scope=F

The Energy Consumption Cumulative time interval shall be common for all channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1092 - Cumulative Energy Consumption - Warp-around

Scope=D

The Energy Consumption Cumulative snapshots shall be stored in a circular buffer (i.e. the oldest period is overwritten with a new period once the buffer is full) that shall be able to store up to 365 historic snapshots for all channels.

Action	Expected Behaviour
By means of specific tricks shorten the time required to fill up the buffer (e.g. set the time interval to 1 second in debug mode) and verify a correct wrap up without loss/corruption of data	Ok

[In Work]

PMD-1093 - Cumulative Energy Consumption - Configuration through HMI

Scope=L

It shall be possible to configure each Energy Consumption Cumulative channel and time interval through the HMI.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 hour trough HMI (Configuration > Historicals > ...)	Ok
Configure channels 1 to 20 trough HMI (Configuration > Historicals > Energy Historicals > ...)	Ok
Wait 3 hours and verify that the correct number of snapshots have been stored (Historicals > Energy Snapshots)	Ok

[In Work]

PMD-1094 - Cumulative Energy Consumption - Configuration through communication

Scope=D

It shall be possible to configure each Energy Consumption Cumulative channel and time interval through communication.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 hour trough Modbus	Ok
Configure channels 1 to 20 trough Modbus	Ok
Wait 3 hours and verify that the correct number of snapshots have been stored (Modbus)	Ok

[In Work]

PMD-1095 - Cumulative Energy Consumption - Power fail

Scope=D

If a power fail occurs that lasts over the end of an ongoing period, the period will be stored when the meter powers up again and a new period will start.

Action	Expected Behaviour
By means of specific tricks shorten the time interval and the time period (e.g. set the time interval to 1 minute in debug mode)	Ok
Check that after 20 minutes 2 periods have been stored	Ok
Power down the device for at least 10 minutes	Ok
Power up the device and verify that a third period is stored at power on	Ok

[In Work]

PMD-4391 - Cumulative Energy Consumption - M4M 2X management

Cumulative Energy Consumption functionality is available only for M4M 2X with PQ1 or PQ2 pakages

Action	Expected Behaviour
Check that Cumulative Energy Consumption funcionality is available on Modbus (reading)	Available only for M4M 2X with PQ1 or PQ2 pakages
Check that Cumulative Energy Consumption funcionality is available on Modbus (writing)	Available only for M4M 2X with PQ1 or PQ2 pakages
Only half of the total memory is available for PQ1	Ok

[In Work]

7.4 Energy Consumption Trend

PMD-1097 - Energy Consumption Trend - Definition

Scope=L

It shall be possible to configure a Energy Consumption Trend channel for the quantities listed in Table 7. The quantity shall only be selectable if it is available in the product.

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though HMI that it shall be possible to configure a Energy Consumption Trend (Energy Trend) channel for the quantities listed in Table 7. If the device under test is a M4M20xxx (BH): verify though HMI that the Energy Trend functionality is not present.	Ok

[In Work]

PMD-1098 - Energy Consumption Trend - Time interval definition

Scope=L

It shall be possible to configure the time interval, between two snapshots, to one of the options available in Table 8.

Action	Expected Behaviour

Verify though HMI that it shall be possible to configure the Energy Consumption Cumulative (Energy Snapshot) Time Interval to one of the following: 1h, 6h, 12h, day, week or month	1h, 6h, 12h, day, week or month

[In Work **]**

PMD-1099 - Energy Consumption Trend - Configure start/end time of time interval

Scope=F

It shall be possible to configure the time interval to be any whole minute within the period.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1100 - Energy Consumption Trend - Common time interval for all channels

Scope=F

The time interval may be common for all Energy Consumption Trend channels.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1101 - Energy Consumption Trend - Maximum number of channels

Scope=F

It shall be possible to configure up to 20 different channels (The configured in the Energy Consumption Cumulative functionality).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1102 - Energy Consumption Trend - Warp-around

Scope=D

The Energy Consumption Trend channels shall be stored in a circular buffer (i.e. the oldest snapshots are overwritten with new snapshots once the buffer is full).

Action	Expected Behaviour
By means of specific tricks shorten the time required to fill up the buffer (e.g. set the time interval to 1 second in debug mode) and verify a correct wrap up without loss/corruption of data	Ok

[In Work **]**

PMD-1103 - Energy Consumption Trend - Maximum number of snapshots

Scope=F

It shall be possible to store all snapshots for a time period of one year when all channels are used and the time interval is set to 1 hour (i.e. 20*24*365=175200 snapshots).

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1104 - Energy Consumption Trend - Configuration through HMI

Scope=L

It shall be possible to configure each Energy Consumption Trend channel and the time interval through the HMI.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 hour trough HMI (Configuration > Historicals > ...)	Ok
Configure channels 1 to 20 trough HMI (Configuration > Historicals > Energy Trend > ...)	Ok
Wait 3 hours and verify that the correct number of snapshots have been stored (Historicals > Energy Trend	Ok

[In Work]

PMD-1105 - Energy Consumption Trend - Configuration through communication

Scope=D

It shall be possible to configure each Energy Consumption Trend channel and the time interval through communication.

Action	Expected Behaviour
Set up the Test Environment (i.e. ZERA or OMICRON) in order to emulate a well defined power profile	Ok
Configure the time interval to 1 hour trough Modbus	Ok
Configure channels 1 to 20 trough Modbus	Ok
Wait 3 hours and verify that the correct number of snapshots have been stored (Modbus)	Ok

[In Work]

PMD-1106 - Cumulative Energy Trend - Power fail

Scope=D

If a power fail occurs that lasts over the end of an ongoing period, the period will be stored when the meter powers up again and a new period will start.

Action	Expected Behaviour
By means of specific tricks shorten the time interval and the time period (e.g. set the time interval to 1 minute in debug mode)	Ok
Check that after 20 minutes 2 periods have been stored	Ok
Power down the device for at least 10 minutes	Ok
Power up the device and verify that a third period is stored at power on	Ok

[In Work]

PMD-4404 - Cumulative Energy Trend - M4M 2X management

Cumulative Energy Trend functionality is available only for M4M 2X with PQ1 or PQ2 pakages

Action	Expected Behaviour
Check that Cumulative Energy Trend funcionality is available on Modbus (reading)	Available only for M4M 2X with PQ1 or PQ2 pakages
Check that Cumulative Energy Trend funcionality is available on Modbus (writing)	Available only for M4M 2X with PQ1 or PQ2 pakages
Only half of the total memory is available for PQ1	Ok

[In Work]

8 Tariff

PMD-1108 - Tariff - Number of tarifs

Scope=F

It shall be possible to use up to six tariffs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1109 - Tariff - Registers

Scope=F

Each tariff shall have an active energy import, active energy export, reactive energy import and reactive energy export tariff register.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1110 - Tariff - Possible activation sources

Scope=F

The tariffs shall be activated based on one of three possible sources; inputs, communication or clock.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1111 - Tariff - Configuration through HMI

Scope=L

It shall be possible to configure the tariff source through HMI.

Action	Expected Behaviour
Verify though HMI that it shall be possible to configure the tariff source (Configuration > Tariffs) to one of the	Clock, Input, Communication

following: Clock, Input, Communication	

[In Work]

PMD-1112 - Tariff - Configuration through communication

Scope=L

It shall be possible to configure the tariff source through communication.

Action	Expected Behaviour
Change the Tariff source to Clock though Modbus	Ok
Verify though HMI that the tariff source is Clock	Clock
Change the Tariff source to Input though Modbus	Ok
Verify though HMI that the tariff source is Input	Input
Change the Tariff source to Communication though Modbus	Ok
Verify though HMI that the tariff source is Communication	Communication

[In Work]

PMD-1113 - Tariff - Read HMI

Scope=L

It shall be possible to view the tariff registers through HMI.

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though HMI that it shall be possible to read all the Tariffs enery registers. If the device under test is a M4M20xxx (BH): verify though HMI that is not possible to read the Tariffs enery registers.	Ok

[In Work]

PMD-1114 - Tariff - Read communication

Scope=D

It shall be possible to read the tariff registers through communication

Action	Expected Behaviour
If the device under test is a M4M30xxx (IH): verify though Modbus that it shall be possible to read all the Tariffs enery registers. If the device under test is a M4M20xxx (BH): verify though Modbus that is not possible to read the Tariffs enery registers.	Ok

[In Work]

PMD-4365 - Tariff - M4M 2X management

The Tariff funcion is available only on M4M 2X with RTS packet

Action	Expected Behaviour
Check that the tariff funcion is available only for M4M 2X meters with RTS package	Available only for M4M 2X with RTS packet

Check HMI	Available only for M4M 2X with RTS packet
Read tariff energy registers via modbus	Available only for M4M 2X with RTS packet
Check tariff source	Available only for M4M 2X with RTS packet
Check current tariff register	Available only for M4M 2X with RTS packet
Check IO settings (tariff input)	Available only for M4M 2X with RTS packet

[In Work]

8.1 Communication control

PMD-1116 - Communication control - Activate tariff through communication

Scope=L

It shall be possible to activate a tariff through communication

Action	Expected Behaviour
Repeat the below steps for every available Tariff MODBUS activation command (T2 ,T3,T4,T5,T6)	Ok
Enable and configure COMMUNICATION as Tariff source through HMI (Configuration > Tariffs)	Ok
Activate the first applicable Tariff (T1) by running the activation command through MODBUS	Ok
Set up the Test environment (Power Network variables) in order to emulate a well defined Import/Export Active/Reactive Energy	Ok
Allow accumulation of the Energy Tariff registers for a defined period of time	Ok
Verify that only the Energy Tariff registers associated to the active Tariff have been incremented accordingly (reading through HMI)	Ok
Verify that only the Energy Tariff registers associated to the active Tariff have been incremented accordingly (reading through Communication)	Ok
Confirm that all the six tariffs have been tested	Ok

[In Work]

8.2 Input control

PMD-1118 - Input control - Activate tarif through inputs

Scope=F

It shall be possible to use up to three inputs to control the tariffs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1119 - Input control - Configure inputs combinations

Scope=F

It shall be possible to configure which tariff is activated, given a certain combination of the inputs, for all possible combinations.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1120 - Input control - Configura inputs through HMI

Scope=L

It shall be possible to configure the input control through the HMI.

Input 1	Input 2	Input 3	Tariff
OFF	OFF	OFF	= T1
ON	OFF	OFF	= T2
OFF	ON	OFF	= T3
ON	ON	OFF	= T4
OFF	OFF	ON	= T5
ON	OFF	ON	= T6

Action	Expected Behaviour
Repeat the below steps for every available Tariff input combinations (T2 ,T3,T4,T5,T6)	Ok
Enable and configure the INPUT as Tariff source through HMI (Configuration > Tariffs)	Ok
Activate the first applicable Tariff (T1) by applying the first combination of stimuli to the inputs	Ok
Set up the Test environment (Power Network variables) in order to emulate a well defined Import/Export Active/Reactive Energy	Ok
Allow accumulation of the Energy Tariff registers for a defined period of time	Ok
Verify that only the Energy Tariff registers associated to the active Tariff have been incremented accordingly	Ok
Confirm that all the six tariffs have been tested	Ok

[In Work]

PMD-1121 - Input control - Configure inputs through communication

Scope=L

It shall be possible to configure the input control through communication

Action	Expected Behaviour
Enable and configure the INPUT as Tariff source through MODBUS	Ok
Activate the first applicable Tariff (T1) by applying the first combination of stimuli to the inputs	Ok
Set up the Test environment (Power Network variables) in order to emulate a well defined Import/Export	Ok

Active/Reactive Energy	
Allow accumulation of the Energy Tariff registers for a defined period of time	Ok
Verify that only the Energy Tariff registers associated to the active Tariff have been incremented accordingly	Ok
Repeat the above steps for every available Tariff input combinations (T2 ,T3,T4,T5,T6)	Ok

[In Work **]**

PMD-4540 - Input control - Configure inputs for MID meters

For the MID meters the IO Slot 1 is fixed as pulse out. The tariff inputs are connected to slots 2,3,4.

Tariff	Input 2	Input 3	Input 4
1	off	off	off
2	on	off	off
3	off	on	off
4	on	on	off
5	off	off	on
6	on	off	on

Action	Expected Behaviour
Enable and configure the INPUT as Tariff source	Ok
Set up the Test environment (Power Network variables) in order to emulate a well defined Import/Export Active/Reactive Energy	Ok
Activate the first applicable Tariff (T1) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T1
Activate the first applicable Tariff (T2) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T2
Activate the first applicable Tariff (T3) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T3
Activate the first applicable Tariff (T4) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T4
Activate the first applicable Tariff (T5) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T5
Activate the first applicable Tariff (T6) by applying the first combination of stimuli to the inputs	The energy accumulates in tariff T6

[In Work **]**

8.3 Clock control

PMD-1854 - Clock control

TBW

Action	Expected Behaviour

[In Work]

9 Reset Functionality

9.1 Factory Reset

PMD-1123 - Factory Reset - Definition

Scope=F

The factory reset shall reset the device back to the state it was in when produced in factory except for the audit and settings logs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1124 - Factory Reset - Perform factory reset though HMI

Scope=D

It shall be possible to perform the factory reset through the HMI.

Action	Expected Behaviour
Perform a Factory Reset through HMI (Configuration > Unit > Reset > Factory Reset)	Ok
Read CT and VT ratio via Communication	5A/5A for CT and 400V/400V for VT
Read the energy registers via Communication	The energy registers are NOT cleared
Verify that the initial configuration wizard is restored	Ok
Verify from the HMI that the following items are not configured/configured according to default values: • DEMAND (if applicable) • LOAD_PROFILE (if applicable) • PREVIOUS_VALUES (if applicable) • COMPLEX_ALARM (if applicable) • IP_SETUP (if applicable) • ALARM • MODBUS_RTU (if applicable) • PROFIBUS (if applicable) • ANALOG_OUTPUT (if applicable) • GPIO • BACNET (if applicable) • MINMAXAVG	Ok

[In Work]

PMD-3560 - Factory Reset - Perform factory reset though Modbus

Scope=D

It shall be possible to perform the factory reset through Modbus.

Action	Expected Behaviour
Perform a Factory Reset through Modbus (Write "1" to register 0x8F5B - 36699)	Ok
Read CT and VT ratio via HMI	5A/5A for CT and 400V/400V for VT
Read the energy registers via HMI	The energy registers are NOT cleared
Verify that the initial configuration wizard is restored	Ok
Verify from the HMI that the following items are not configured/configured according to default values: • DEMAND (if applicable) • LOAD_PROFILE (if applicable) • PREVIOUS_VALUES (if applicable) • COMPLEX_ALARM (if applicable) • IP_SETUP (if applicable) • ALARM • MODBUS_RTU (if applicable) • PROFIBUS (if applicable) • ANALOG_OUTPUT (if applicable) • GPIO • BACNET (if applicable) • MINMAXAVG	Ok

[In Work **]**

PMD-3646 - Factory reset for DIN version

Factory reset shall not reset Bluetooth enable state for DIN rail power meters, but it shall return the pairing key to the default value.

Action	Expected Behaviour
Perform a Factory Reset	Ok
Check that the bluetooth is ON by default	Device visible in EPiC app
Check that the pairing code has been reset (new connection to EPiC app)	The pairing is equal to "00"+<last 4 digit of the serial number>
Verify from that the following items are not configured/configured according to default values: • DEMAND (if applicable) • LOAD_PROFILE (if applicable) • PREVIOUS_VALUES (if applicable) • COMPLEX_ALARM (if applicable) • IP_SETUP (if applicable) • ALARM • MODBUS_RTU (if applicable) • PROFIBUS (if applicable) • ANALOG_OUTPUT (if applicable) • GPIO • BACNET (if applicable) • MINMAXAVG	Ok

[In Work **]**

PMD-3647 - Factory reset for MID verision

Factory reset for MID meters shall not rest Trafo ratios (voltage and current) or Wires.

Action	Expected Behaviour
Perform a Factory Reset	Ok
Verify that the VT, CT and installation type are not reset	Keep the previous value
Verify from that the following items are not configured/configured according to default values: • DEMAND (if applicable) • LOAD_PROFILE (if applicable) • PREVIOUS_VALUES (if applicable) • COMPLEX_ALARM (if applicable) • IP_SETUP (if applicable) • ALARM • MODBUS_RTU (if applicable) • PROFIBUS (if applicable) • ANALOG_OUTPUT (if applicable) • GPIO • BACNET (if applicable) • MINMAXAVG	

[In Work **]**

9.2 Global Reset

PMD-1126 - Global Reset - Definition

Scope=F

The global reset performs a complete reset of the device except for the settings and the audit and settings logs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1127 - Global Reset - Perform global reset though HMI

Scope=D

It shall be possible to perform global reset through the HMI.

Action	Expected Behaviour
Perform a Global Reset through HMI	Ok
Read all the Logs and Device registers through MODBUS and verify all are cleared while Setting(Audit) Logs are not	Ok

[In Work **]**

9.3 HMI Password Reset

PMD-1129 - HMI Password Reset - Definition

Scope=F

The HMI password shall reset the HMI password and allow the user to enter a new password.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✏ In Work]

PMD-1130 - HMI Password Reset - Log

Scope=D

Reset of the HMI password shall be logged in the settings log.

Action	Expected Behaviour
Perform a HMI Pwd Reset	Ok
Read the Settings (Audit) Log through MODBUS and confirm that the password reset has been logged	Ok
Read the Settings (Audit) Log through HMI and confirm that the password reset has been logged	Ok

[✏ In Work]

PMD-1131 - HMI Password Reset - Perform password reset though HMI

Scope=L

It shall be possible to reset the HMI password through the HMI

Action	Expected Behaviour
Change the password to a value different from the default	Ok
Perform password reset according to current device (IH: Long click of hamburger button > Short click of left-most (empty) button in hamburger menu > Long click of empty button > Short click of hamburger button; BH: Long click of hamburger button > Long click of up-arrow button > Long click of down-arrow button > Short click of hamburger button)	Ok
After correct sequence of buttons password is being reset and information popup appears on the screen	Ok
Check that the password has been reset to default value	Ok

[✏ In Work]

9.4 Log Reset

PMD-1133 - Log Reset - Definition

Scope=F

The log reset shall clear the error, warning, alarm and event logs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1134 - Log Reset - Perform logs reset though HMI or comminucation

Scope=D

It shall be possible to reset the logs through either the HMI or communication

Action	Expected Behaviour
Read the Error Log , Warning Log, Alarm Log and Event Log to verify presence of entries	Ok
Select a Log Reset through HMI	Ok
Read the Error Log , Warning Log, Alarm Log and Event Log through MODBUS and verify entries are cleared	Ok
Create conditions to generate new entries in the Logs	Ok
Run the Log Reset through MODBUS (Write "1" to register 0x8F57 - 36695)	Ok
Read the Logs with new entries through HMI and verify entries are cleared	Ok

[In Work]

PMD-3648 - Log Reset - MID

Log reset shall not reset the Power Outage logs for MID meters.

Action	Expected Behaviour
Read the Power Outage log to verify presence of entries (if there are no entries, power cycle the device)	Ok
Read the Error Log , Warning Log, Alarm Log and Event Log to verify presence of entries	Ok
Select a Log Reset through HMI	Ok
Read the Error Log , Warning Log, Alarm Log and Event Log through MODBUS and verify entries are cleared	Ok
Read the Power Outage logs and confirm that no entries have been deleted	Ok
Run the Log Reset through MODBUS (Write "1" to register 0x8F57 - 36695)	Ok
Read the Power Outage logs and confirm that no entries have been deleted	Ok

[In Work]

9.5 Historic Functionality Reset

PMD-1136 - Historic Functionality Reset - Definition

Scope=F

The historic functionality reset shall clear the load profile, demand, energy cumulative and energy trend data.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[✏ In Work]

PMD-1137 - Historic Functionality Reset - Perform historical data reset though HMI or comminucation

Scope=D

It shall be possible to reset the historic functionality data through either the HMI or communication

Action	Expected Behaviour
Select a Historical Funcionality Reset through HMI	Ok
Read Load Profile Log through MODBUS and confirm the clear of the entries	Ok
Read Demand Log through MODBUS and confirm the clear of the entries	Ok
Read Energy Cum and Energy Trend Logs through MODBUS and confirm the clear of the entries	Ok
Allow some new Historical data to be accumulated and verify some new Log entries have been created	Ok
Run the Historical Funcionality Reset through MODBUS (Write "1" to register 0x8F58 - 36696)	Ok
Read Load Profile Log through HMI and confirm the clear of the entries	Ok
Read Demand Log through HMI and confirm the clear of the entries	Ok

[✏ In Work]

9.6 Timer Reset

PMD-3563 - Timer Reset - Perform timers reset though HMI or comminucation

Scope=D

It shall be possible to reset the timers through either the HMI or communication

Action	Expected Behaviour
Read the counters and note down the current values	Ok
Select a Timer Reset through HMI	Ok
Read the timers through MODBUS and verify entries are reset	Ok
Wait few minutes to accumulate time	Ok
Run the Timer Reset through MODBUS (Write "1" to register 0x8F59 - 36697)	Ok

Read the timers through HMI and verify entries are reset	Ok

[In Work]

9.7 Energy Reset

PMD-1140 - Energy Reset - Definition

Scope=F

The energy reset shall reset all energy registers.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1141 - Energy Reset - Perform energy reset though HMI

Scope=D

It shall be possible to reset the energy through the HMI.

Action	Expected Behaviour
Perform energy reset though HMI (take note of the current value of the registers)	Ok
Verify that all the energy register have been reset to 0 (reading through HMI)	Ok
Verify that all the energy register have been reset to 0 (reading through Comminication)	Ok
Verify new audit log creation with previous value of energy registers	Ok

[In Work]

PMD-3564 - Energy Reset - Perform energy reset though Modbus

Scope=D

It shall be possible to reset the energy through the Modbus.

Action	Expected Behaviour
Perform energy reset though Modbus (take note of the current value of the registers) (Write "1" to register 0x8F5A - 36698)	Ok
Verify that all the energy register have been reset to 0 (reading through HMI)	Ok
Verify that all the energy register have been reset to 0 (reading through Comminication)	Ok
Verify new audit log creation with previous value of energy registers	Ok

[In Work]

PMD-3565 - Energy Reset - MID - The energy reset is not possible

Scope=D

It shall NOT be possible to reset the energy registers through HMI or Modbus for MID meters.

Action	Expected Behaviour
Verify that is not possible to perform the energy reset on th HMI (no entry)	No entry on HMI
Try to perform an energy reset via Modbus (Write "1" to register 0x8F5A - 36698)	Not possible

[In Work]

10 Alarms and Complex alarms

PMD-4454 - Alarm and complex alarm for the M4M 2X

Simple alarms are available for all the M4M 2X. Complex alarms are available onnly for M4M 2X with RTS package

Action	Expected Behaviour
Check that the Simple alarms funcionality is available via Modbus	Available for all the M4M 2X
Check that the Complex alarms funcionality is available via Modbus	Available only for the M4M 2X with RTS package

[In Work]

11 I/O

PMD-4481 - I/O management for M4M 2X

Nominally the M4M 2X have only two digital output (as like the BH). Only if configured with RTS package all four programmable I7O are available.

Action	Expected Behaviour
Check that all the IO slots can be configured according to the M4M 2X package	Only two digital out (pulse output, alarm output, communication output, ON, OFF) for all devices, except for the RTS package. For RTS package: all four I/O (pulse input, tariff input, pulse output, alarm output, communication output, ON, OFF)

[In Work]

11.1 Pulse Input

PMD-1142 - Pulse Input - Definition

Scope=F

It shall be possible to count the number of pulses on an input and store it in a register.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1878 - Pulse Input - IO test

It is possible to count the number of pulses on an input and store it in a register.

Action	Expected Behaviour
For IH Devices: Configure slot 1 as Pulse Input with ratio = 1 and unit = none	Ok
For IH Devices: Configure slot 2 as Pulse Input with ratio = 5 and unit = Wh	Ok
For IH Devices: Configure slot 3 as Pulse Input with ratio = 10 and unit = kvarh	Ok
For IH Devices: Configure slot 4 as Pulse Input with ratio = 7 and unit = gal	Ok
For IMA Devices: Configure slot 5 as Pulse Input with ratio = 1 and unit = MCF	Ok
For IMA Devices: Configure slot 6 as Pulse Input with ratio = 5 and unit = Therm	Ok
Apply more than 20 pulses to each IO	Ok
Verify for each IO that the reading though HMI is compliant (Data reading > I/O)	Ok
Verify for each IO that the reading though Modbus is compliant	Ok

[In Work]

PMD-2015 - Pulse Input - max frequency

Action	Expected Behaviour
Configure an I/O as Pulse Input counter with ratio = 1	Ok
Apply a defined number of pulses and check that the counter increases for the correct amount of pulses	Ok
Decrease the pulse length until reaching the limit of the input capability and write the value in the result	Write the min pulse length for correct input reading
Increase the frequency of the pulses until reaching the limit of the input capability and write the value in the result	Write the max frequency for correct input reading

[In Work]

11.2 Analogue Outputs

PMD-1143 - Analogue Outputs - Definition

Scope=F

The device shall have two analogue current outputs.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1144 - Analogue Outputs - Configuration of range

Scope=D

The range of the current outputs shall be configurable to either 0-20 mA or 4-20 mA.

Action	Expected Behaviour
From the HMI confirm that it is possible to select 0-20 mA or 4-20 mA as range for the analogue outputs (Configuration > I/O > Slot 7/8 > ….)	Ok

[In Work **]**

PMD-1145 - Analogue Outputs - Conversion

Scope=D

The conversion from the quantity value to the analogue current output shall be so that the range of values for the quantity (as indicated in Table 16) uniformly converted to the range of current on the current output.

Action	Expected Behaviour
From the HMI configure the first analogue out slot to 0-20mA range, Voltage L1, min = 0, Max = 300 (Configuration > I/O > Slot 7 > ….)	Ok
From the HMI configure the second analogue out slot to 4-20mA range, CurrentL1, min = 0, Max = 5 (Configuration > I/O > Slot 8 > ….)	Ok
Configure the power source in order to have voltage L1 = 0; current L1 = 0	0V; 0A
Read the current from the first analogue output (slot 7)	0mA
Read the current from the second analogue output (slot 8)	4mA
Configure the power source in order to have voltage L1 = 150V; 3A	150V; 3A
Read the current from the first analogue output (slot 7)	10mA
Read the current from the second analogue output (slot 8)	13.6mA
Configure the power source in order to have voltage L1 = 300V; 5A	300V
Read the current from the first analogue output (slot 7)	20mA
Read the current from the second analogue output (slot 8)	20mA

[In Work **]**

11.3 Fixed output

PMD-1157 - I/O - Set output through HMI

Scope=L

It shall be possible to configure an output to be always on or always off through the HMI.

Test setup:

- Connect the COM pin to GND
- Connect each I/O to a 1k Ohm resistor
- Connect the resistor to > 24V
- The voltage shall be measured between the I/O pin and GND

Action	Expected Behaviour
Select an I/O	Ok
Configure the output manually (HMI) to be always OFF	Ok
Check that the voltage level on the selected physical output stays HIGH	Ok
Configure the output manually (HMI) to be always ON	Ok
Check that the voltage level on the selected physical output stays LOW	Ok
Repeat the previous steps for all the I/O available on the device	Ok

[In Work]

PMD-1158 - I/O - Set output through communication

Scope=D

It shall be possible to configure an output to be controlled via communication through the HMI

Action	Expected Behaviour
Select one of the I/O	Ok
Configure the output through communication to be always OFF	Ok
Check that the voltage level on the selected physical output stays HIGH	Ok
Configure the output through communication to be always ON	Ok
Check that the voltage level on the selected physical output stays LOW	Ok
Repeat the previous steps for all the I/O available on the device	Ok

[In Work]

11.4 Pulse output

PMD-1883 - Pulse output

It shall be possible to send pulses on an output based on energy consumption (a specified pulse frequency with unit impulses per energy unit)

Action	Expected Behaviour
Set up the Test Environment (Power Network variables) in order to emulate a well defined Total Active, Total Reactive and Apparent Energy consumption	Ok
Configure output_1 to be associated to the Total Active Energy import through HMI	Ok
Monitor the output_1 with an oscilloscope to verify the generated pulse train is consistent with the setting	Ok
Configure output_2 to be associated to the Total Rective Energy export through MODBUS	Ok
Monitor the output_2 with an oscilloscope to verify the generated pulse train is consistent with the setting	Ok
For IH devices: Configure output_3 to be associated to the Total Apparent Energy import through HMI	Ok
For IH devices: Monitor the output_3 with an oscilloscope to verify the generated pulse train is consistent with the setting	Ok
For IH devices: Configure output_4 to be associated to the Total Active Energy export through MODBUS	Ok
For IH devices: Monitor the output_4 with an oscilloscope to verify the generated pulse train is consistent with the setting	Ok
For IMA devices: Configure output_5 to be associated to the Total Apparent Energy export through HMI (for BH devices this is Slot 3 in HMI and Slot 5 via communication)	Ok
For IMA devices: Monitor the output_5 with an oscilloscope to verify the generated pulse train is consistent with the setting (for BH devices this is Slot 3 in HMI and Slot 5 via communication)	Ok
For IMA devices: Configure output_6 to be associated to the Total Reactive Energy import through MODBUS (for BH devices this is Slot 4 in HMI and Slot 6 via communication)	Ok
For IMA devices: Monitor the output_6 with an oscilloscope to verify the generated pulse train is consistent with the setting (for BH devices this is Slot 4 in HMI and Slot 6 via communication)	Ok

[In Work **]**

PMD-2014 - Pulse output with different settings

This test aims to verify different settings of pulse outputs at the same time and one I/O configured for a different function

Action	Expected Behaviour

Set up the Test Environment (e.g. OMICRON) in order to have 230V / 5A	Ok
Configure output_1 to be associated to the Total Active Energy Import Total with 5000 pulses/kWh and 100ms of Pulse length and check that is working as expected	Ok
Configure output_2 to be associated to the Total Active Energy Import Total with 50 pulses/Wh and 10ms of Pulse length	Ok
For IH or BH IMA devices: configure output_3 to be associated to the Total Active Energy Import Total with 10 pulses/Wh and 10ms of Pulse length	Ok or NA
For IH or BH IMA devices: configure output_4 to be associated to the Total Active Energy Import Total with 10 pulses/Wh and 100ms of Pulse length	Ok or NA
For IH IMA devices: configure output_5 to be associated to the Total Active Energy Import Total with 5000 pulses/kWh and 100ms of Pulse length	Ok or NA
For IH IMA devices: configure output_6 to be associated to the Total Active Energy Import Total with 5000 pulses/kWh and 100ms of Pulse length	Ok or NA
Check that all previous configured Pulse outputs are working as expected	Ok
Check that the communication is working as expected	Ok
Check that the measurements values are correct	Ok
Check that the led pulses are correct	Ok
For IH devices: configure output_1 as Pulse Input and check that is working as expected (for BH IMA devices perform this step for output_3)	Ok or NA
For IH devices: configure output_1 as Tariff Input and check that is working as expected	Ok or NA
Configure a simple alarm	Ok
Configure output_1 as Alarm Output and check that is working as expected	Ok
For IH devices: configure a complex alarm	Ok
For IH devices: configure output_1 as Alarm Output and check that is working as expected	Ok
Configure output_1 as Communication Output and check that is working as expected	Ok
Configure output_1 as always On and check that is working as expected	Ok

Configure output_1 as always Off and check that is working as expected	Ok
Configure output_1 as Pulse Output, associated to the Total Active Energy Import Total with 50 pulses/Wh and 100ms of Pulse length	Ok
Check that output_1 is always LOW (limit threshold reached) and check that the communication, the measurements and the other I/O are working as expected.	Ok

[In Work]

PMD-2504 - Pulse output plus installation setting

This test checks the update of the installation setting while a pulse output is enabled. This test covers the verification of the a bug.

Action	Expected Behaviour
Set up the Test Environment (e.g. OMICRON)	Ok
Configure one or more IO as pulse output	Pulse out is working as expected
Change CT ratio	Device is working fine. CT ratio is updated and also pulse out changes according.
Change VT ratio	Device is working fine. VT ratio is updated and also pulse out changes according.
Change wires setting	Device is working fine. Installation setting is updated and also pulse out changes according.

[In Work]

PMD-4562 - Pulse Output - MID

The user shall not have access via HMI or communication to configure the pulse output 1 for active energy. The defined output and settings shall be factory defined and the algorithm shall adjust the pulse frequency according to the voltage and current primaries.
The pulse is fixed in 30 ms for the MID pulse output.
For the MID pulse output the frequency is not configurable. It is automatically by the firmware according the following rule:
CT*VT >= 1 000 000 -> 1 impulse/MWh
100 000 <= CT*VT < 1 000 000 -> 10 impulses/MWh
10 000 <= CT*VT < 100 000 -> 100 impulses/MWh
1000 <= CT*VT < 10 000 -> 1 impulses/MWh
100 <= CT*VT < 1000 -> 10 impulses/kWh
10 <= CT*VT < 100 -> 100 impulses/kWh
1 < CT*VT < 10 -> 1000 impulses/kWh
CT*VT = 1 -> 10 000 impulses/kWh

Action	Expected Behaviour
Try to change slot 1 configuration via HMI	Not permitted
Try to change slot 1 configuration via Modbus (0x8C0C)	Not permitted
Try to change pulse output parameters for slot 1 via Modbus (from 0x8C12)	Not permitted
Check that the pulse length is fixed to 30 ms via Modbus (0x8C1B)	30ms

Check that the pulse frequency is configured as the above table (0x8C17)	See above table
Try to change slot 2 configuration via HMI	Permitted
Try to change slot 2 configuration via Modbus (0x8C0D)	Permitted
For IH: Try to change slot 3 configuration via HMI	Permitted / NA
For IH: Try to change slot 3 configuration via Modbus (0x8C0E)	Permitted / NA
For IH: Try to change slot 4 configuration via HMI	Permitted / NA
For IH: Try to change slot 4 configuration via Modbus (0x8C0F)	Permitted / NA
Apply a defined energy profile (e.g. with the Omicron) and check that the Pulse out on slot 1 is correct (frequency and lenght)	30ms pulse lenght, frequency according to above table

[In Work **]**

11.5 Alarm output

PMD-4443 - Alarm output configuration via HMI

Action	Expected Behaviour
Configure a simple alarm	OK
Configure an IO as Alarm output, related to the previously configured alarm	OK
Trigger the alarm (e.g. voltage crossdown)	OK
Verofy that the IO slot change state according to the Alarm status	OK
Repeat the above steps for more that one alarm and for ALL the IO slot available for the device	Ok
For IH devices: configure a complex alarm	Ok or NA (i.e. pass for BH devices)
For IH devices: configure an IO as Alarm output, related to the previously configured complex alarm	Ok or NA (i.e. pass for BH devices)
For IH devices:trigger the complex alarm	Ok or NA (i.e. pass for BH devices)
For IH devices: repeat the above steps for more that one complex alarm and for ALL the IO slot available for the device	Ok or NA (i.e. pass for BH devices)

[In Work **]**

PMD-4444 - Alarm output configuration via Modbus

Action	Expected Behaviour
Configure a simple alarm via Modbus	Ok
Configure an IO as Alarm output via Modbus, related to the previously configured alarm	Ok
Trigger the alarm (e.g. voltage crossdown)	Ok
Verofy that the IO slot change state according to the Alarm status	Ok

Verify via Modbus also the IO output status registers	Ok
Repeat the above steps for more that one alarm and for ALL the IO slot available for the device	Ok
For IH devices: configure a complex alarm via Modbus	Ok or NA (i.e. pass for BH devices)
For IH devices: configure an IO as Alarm output via Modbus, related to the previously configured complex alarm	Ok or NA (i.e. pass for BH devices)
For IH devices:trigger the complex alarm	Ok or NA (i.e. pass for BH devices)
For IH devices: verify via Modbus also the IO output status registers	Ok or NA (i.e. pass for BH devices)
For IH devices: repeat the above steps for more that one complex alarm and for ALL the IO slot available for the device	Ok or NA (i.e. pass for BH devices)

[In Work **]**

11.6 Tariff Input

8.2-3 - Input control - Configura inputs through HMI

12 Instrumentation

PMD-1159 - Instrumentation - Definition

Scope=F

It shall be possible measure the instrumentation quantities listed in Table 17. Note that note all quantities might not be used in all products.

Action	Expected Behaviour
Verify which Instrumentation quantities are used for the model being tested	Ok

[In Work **]**

PMD-1160 - Instrumentation - Read

Scope=C

It shall be possible to read all instrumentation values through HMI and communication.

Action	Expected Behaviour
Set up the Test Environment (Power Network variables) in order to emulate a well defined set of measurable quantities (the quantities available in the model being tested)	Ok
Read all the Instrumentation quantities through HMI	Ok
Read all the Instrumentation quantities through MODBUS	Ok
Verify consistency between the two readouts	Ok

[In Work **]**

PMD-1161 - Instrumentation - Measurement time

Scope=C

The measurement time shall be configurable in production to a certain number of line cycles in the range 1 – 255.

Action	Expected Behaviour
Requirement related to calibration tasks. Confirm that proper validation has been completed succesfully.	Ok

[In Work]

PMD-1162 - Instrumentation - Standards

Scope=C

Instrumentation quantities covered in IEC 61557-12 shall meet the standard requirements for the accuracy class specified.

Action	Expected Behaviour
Requirement related to calibration tasks. Confirm that proper validation has been completed succesfully.	Ok

[In Work]

PMD-4468 - Neutral current measurement for M4M 2X

The reading of the neutral current from the related CT is available only for M4M 2X with PQ2 package.

Action	Expected Behaviour
Verify the CT ration configuration is available only for PQ2 package (registers 35848 and 35850)	Available only for M4M 2X with PQ2 package.
Verify that the installation "4CT" is available only for PQ2 package (register 36069 can be set to 0)	Value equal 0 (3Ph/4W/4CT) is available only for M4M 2X with PQ2 package. Default for the other meter type is 1 (3Ph/4W/3CT).
Verify that the neutral current measurement (register 23318) is calculated for the meter without PQ2 package and it's measured for a meter with PQ2 package (e.g. use different setup for the neutral current and check that the configuration with 3CT and the 4CT are different)	Neutral current measured with the CT only for M4M 2X with PQ2 package.

[In Work]

PMD-4561 - LED source for MID meters

LED pulse for MID meters shall have factory fixed configuration only, always referring to Total Active Import Energy.

Action	Expected Behaviour
Check that the LED is associated with the active energy	Ok
Change the LED source via Modbus (register 0x8CE4) to 1 (reactive energy)	Operation not admitted. The value is kept to 0
Check that the LED is associated with the active energy	Ok

[In Work]

PMD-4569 - Floating voltage detection algorithm

When the device is connected with long cables and there is no voltage reference, the high impedance of the voltage inputs implies a fake voltage reading. The FW relies on an algorithm to check if the input voltage is "real".

Action	Expected Behaviour

Verify nominal reading with 3 phase system (e.g. Omicron with 230V - 1A)	Correct reading according to source parameters
Verify voltage threshold (40V)	Zero voltage reading below the threshold
Verify nominal reading with 3 phase system with 120 phase angles and currents below the threshold (1mA)	Voltage readings nominal, currents and powers are 0. No energy increments.
Verify nominal reading with 3 phase system with 110 phase angles and currents below the threshold (1mA secondary)	Voltages, currents and powers reading are 0. No energy increments.
Verify nominal reading with 3 phase system with 130+ phase angles and currents below the threshold (1mA secondary)	Voltages, currents and powers reading are 0. No energy increments.
Verify nominal reading with 3 phase system with 110- phase angles and currents above the threshold (51mA secondary)	Correct reading according to source parameters
Verify nominal reading with 3 phase system with 130+ phase angles and currents above the threshold (1mA secondary)	Correct reading according to source parameters
Verify nominal reading with 2 phase system (e.g. Omicron with 230V - 1A)	Correct reading according to source parameters
Verify nominal reading with 1 phase system (e.g. Omicron with 230V - 1A)	Correct reading according to source parameters
Without any voltage applied, connect long cables to V1, V2 and V3 to the meter. No cable on Vn. No connection on the other end of the cable (leave them floating)	Voltages, currents and powers reading are 0. No energy increments.
Without any voltage applied, connect long cable to Vn to the meter. No cable on V1, V2, and V3. No connection on the other end of the cable (leave them floating)	Voltages, currents and powers reading are 0. No energy increments.

[In Work **]**

13 Active Energy

PMD-1164 - Active Energy - Definition

Scope=F

It shall be possible to use the active energy registers listed in Table 18, although some devices might use a subset.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1165 - Active Energy - Read

Scope=L

It shall be possible to read all active energy registers through HMI and communication.

Action	Expected Behaviour
Set up the Test environment for a well defined Active Power consumption	Ok
Read all the ACTIVE ENERGY registers through HMI and check consistency with the Test environment set up	Ok

Read all the ACTIVE ENERGY registers through MODBUS and check consistency with the Test environment set up	Ok
Verify consistency between the two readouts	Ok

[In Work]

PMD-1166 - Active Energy - Standards

Scope=C

Active energies covered in IEC 62052-11, IEC 62053-22, IEC 61557-12 and MID shall meet the standard requirements for the accuracy/performance class 0.5 %.

Action	Expected Behaviour
Requirement related to calibration tasks. Confirm that proper validation has been completed succesfully.	Ok

[In Work]

14 Reactive Energy

PMD-1168 - Reactive Energy - Definition

Scope=F

It shall be possible to use the reactive energy registers listed in Table 19, although some devices might use a subset.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1169 - Reactive Energy - Read

Scope=L

It shall be possible to read all reactive energy registers through HMI and communication.

Action	Expected Behaviour
Set up the Test environment for a well defined Reactive Power consumption	Ok
Read all the REACTIVE ENERGY registers through HMI and check consistency with the Test environment set up	Ok
Read all the REACTIVE ENERGY registers through MODBUS and check consistency with the Test environment set up	Ok
Verify consistency between the two readouts	Ok

[In Work]

PMD-1170 - Reactive Energy - Standards

Scope=C

Reactive energies covered in IEC 62052-11, IEC 62053-24, IEC 61557-12 shall meet the standard requirements for the accuracy/performance class 1 %.

Action	Expected Behaviour
Requirement related to calibration tasks. Confirm that proper validation has been completed succesfully.	Ok

[In Work]

15 Apparent Energy

PMD-1172 - Apparent Energy - Definition

Scope=F

It shall be possible to use the apparent energy registers listed in Table 20, although some devices might use a subset.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1173 - Apparent Energy - Read

Scope=L

It shall be possible to read all apparent energy registers through HMI and communication.

Action	Expected Behaviour
Set up the Test environment for a well defined Apparent Power consumption	Ok
Read all the APPARENT ENERGY registers through HMI and check consistency with the Test environment set up	Ok
Read all the APPARENT ENERGY registers through MODBUS and check consistency with the Test environment set up	Ok
Verify consistency between the two readouts	Ok

[In Work]

PMD-1174 - Apparent Energy - Standards

Scope=C

Apparent energies covered in IEC 61557-12 shall meet the standard requirements for the performance class 0.5 %.

Action	Expected Behaviour
Requirement related to calibration tasks. Confirm that proper validation has been completed succesfully.	Ok

[In Work]

16 Conversion Registers

PMD-1456 - Conversion Registers - CU

It shall be possible to configure a conversion factor between Active Energy Import Total and currency register.

It shall be possible to configure the conversion factors through the HMI.

It shall be possible to configure the conversion factors through communication.

Action	Expected Behaviour
Configure the conversion factor between AEIT and Currency register through HMI	OK
Verify that the proper conversion took place reading the equivalent Currency through HMI	OK
Verify that the proper conversion took place reading the equivalent Currency through Communication	OK
Configure the conversion factor between AEIT and Currency register through Communication	OK
Verify that the proper conversion took place reading the equivalent Currency through HMI	OK
Verify that the proper conversion took place reading the equivalent Currency through Communication	OK

[In Work **]**

PMD-1455 - Conversion Registers - CO2

It shall be possible to configure a conversion factor between Active Energy Import Total and CO2 register.

It shall be possible to configure the conversion factors through the HMI.

It shall be possible to configure the conversion factors through communication.

Action	Expected Behaviour
Configure the conversion factor between AEIT and CO2 register through HMI	OK
Verify that the proper conversion took place reading the equivalent CO2through HMI	OK
Verify that the proper conversion took place reading the equivalent CO2 through Communication	OK
Configure the conversion factor between AEIT and CO2 register through Communication	OK
Verify that the proper conversion took place reading the equivalent CO2 through HMI	OK
Verify that the proper conversion took place reading the equivalent CO2 through Communication	OK

[In Work **]**

17 Harmonics

PMD-1175 - Harmonics - Maximum number of individual harmonics

Scope=F

The maximum number of individual harmonics shall be 41.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1176 - Harmonics - Visualize through HMI

Scope=L

It shall be possible to view a visualization of the harmonics through the HMI.

Action	Expected Behaviour
Set up the Test environment for a well defined harmonic distortion	Ok
Check on the HMI that all the quantities related to harmonics are correctly computer (Data Reading > Power Quality > …)	Ok
If the device is a M4M 30 (IH) check also that the individual harminics graph is correct (Graphs > Harminics > …)	Ok

[In Work]

PMD-1177 - Harmonics - Read through communication

Scope=D

It shall be possible to read the total harmonic distortion and individual harmonics through communication.

Action	Expected Behaviour
Set up the Test environment for a well defined harmonic distortion	Ok
Read the THD and all the IHD data through a set of MODBUS read commands, compare to those read through HMI and check matching	OK

[In Work]

PMD-4430 - Harmonics - M4M 2X management

Harmonics are available only for PQ1 packet (up to 25th) and for PQ2 packet (up to 40th)

Action	Expected Behaviour
Verify that single harmoonic values are available, based on the meter type, via Modbus	Harminics available only up to 25th on PQ1 and up to 40th on PQ2

[In Work]

18 Waveforms

PMD-1451 - Waveforms

Scope=L

Waveform capture consists of a number of channels where each channel store signal samples over two line cycles. This is done for the quantities:

- Voltage Phase 1 to Neutral
- Voltage Phase 2 to Neutral
- Voltage Phase 3 to Neutral
- Voltage Phase 1 to Phase 2
- Voltage Phase 3 to Phase 2
- Voltage Phase 1 to Phase 3
- Current Phase 1
- Current Phase 2
- Current Phase 3
- Current Neutral

Action	Expected Behaviour
Set up the Test environment for a well-defined profile (ZERA/Omicron)	OK
Check in the menu Graphs > Waveforms the correctness of all the waveforms	OK
Change the environment simulator (e.g. adding harmonics) and check that the corresponding waveform change accordingly	OK

[In Work **]**

19 Unbalance

PMD-1178 - Unbalance - Read through HMI

Scope=L

It shall be possible to read unbalanced values through the HMI.

Action	Expected Behaviour
Set up the Test environment for a well defined unbalance profile	Ok
Confirm that the values read through HMI are correct (Data Reading > Power Quality > Unbalances)	Available for IH devices. Not available for BH devices.

[In Work **]**

PMD-1179 - Unbalance - Read through communication

Scope=D

It shall be possible to read unbalanced values through communication.

Action	Expected Behaviour

Set up the Test environment for a well defined unbalance profile	Ok
Read all the available unbalanced value through MODBUS (registers from 25088) and compare theam with test enviroment	Available for IH devices. Not available for BH devices.

[In Work]

PMD-4455 - Unbalance - M4M 2X management

Unbalances are available only for M4M devices with PQ1 or PQ2 packages.

Action	Expected Behaviour
Set up the Test environment for a well defined unbalance profile	Ok
Read all the available unbalanced value through MODBUS (registers from 25088) and compare theam with test enviroment	Available only for M4M devices with PQ1 or PQ2 packages.

[In Work]

20 Transformer Ratios

PMD-4710 - Measurements reading are related to CT and VT ratio

Action	Expected Behaviour
Change the VT ratio to 4000/400 via Modbus (reg 8C04)	Value accepted
Change CT ratio to 20/5 (reg 8C00)	Value accepted
For IH devices and proper 2X devices: change the CN ratio for neutral to 10/5 (reg 8C08)	Value accepted
Set installation type to 1 - 3Ph/4W/3CT (reg 8CE5)	Value accepted
Set up the Test environment: Voltages = 230V on all phases Current L1 = 1A Current L2 = 1.5A Current L3 = 2.5A	Ok
Read instruments data from Modbus and HMI	Voltages = 2300V Current L1 = 4A Current L2 = 6A Current L3 = 10A Neutral current (calculated) = 5.292A Total Active Power = 46kW
Set installation type to 7 - 1Ph/2W/1CT (reg 8CE5)	Value accepted
Read instruments data from Modbus and HMI	Voltage = 2300V Current L1 = 4A Total Active Power = 9.2kW
For IH devices and proper 2X devices: Set installation type to 0 - 3Ph/4W/4CT (reg 8CE5)	Value accepted
For IH devices and proper 2X devices: read instruments data from Modbus and HMI	Voltages = 2300V Current L1 = 4A Current L2 = 6A

	Current L3 = 10A Neutral current (real, according to CT) = 2.646A Total Active Power = 46kW
Reset VT and CT ratio to te default value	Ok

[In Work]

20.1 Voltage transformer ratio

PMD-1182 - Voltage transformer ratio - Configuration through HMI

Scope=L

It shall be possible to configure the VT ratio through HMI.

Action	Expected Behaviour
Configure the Primary VT through HMI to 1	Value accepted
Configure the Secondary VT through HMI to 1	Value accepted
Read VT through HMI	Primary=1; Secondary=1
Read VT through Communication	Primary=1; Secondary=1
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary VT through HMI to 500000	Value accepted
Configure the Secondary VT through HMI to 999	Value accepted
Read Primary VT through HMI	Primary=500000; Secondary=999
Read Primary VT through Communication	Primary=500000; Secondary=999
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary VT through HMI to 1000000	Value not accepted
Configure the Secondary VT through HMI to 1000	Value not accepted
Read Primary VT through HMI	Primary=500000; Secondary=999
Read Primary VT through Communication	Primary=500000; Secondary=999
Read the Settings(Audit) Log through HMI to confirm that no changes have been logged	Pass
Read the Settings(Audit) Log through Communication to confirm that no changes have been logged	Pass

[In Work]

PMD-1183 - Voltage transformer ratio - Configuration through Communication

Scope=D

It shall be possible to configure the VT ratio through Communication.

Action	Expected Behaviour
Configure the Secondary VT through Communication to 1	Value accepted
Configure the Primary VT through Communication to 1	Value accepted
Read VT through HMI	Primary=1; Secondary=1
Read VT through Communication	Primary=1; Secondary=1
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary VT through Communication to 500000	Value accepted
Configure the Secondary VT through Communication to 999	Value accepted
Read Primary VT through HMI	Primary=500000; Secondary=999
Read Primary VT through Communication	Primary=500000; Secondary=999
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary VT through Communication to 1000000	Value not accepted
Configure the Secondary VT through Communication to 1000	Value not accepted
Read Primary VT through HMI	Primary=999999; Secondary=999
Read Primary VT through Communication	Primary=999999; Secondary=999
Read the Settings(Audit) Log through HMI to confirm that no changes have been logged	Pass

[In Work **]**

20.2 Current transformer ratio

PMD-1185 - Current transformer ratio - Configuration through HMI

Scope=L

It shall be possible to configure the CT ratio through HMI.

Action	Expected Behaviour
Configure the Primary CT (L1, L2, L3 and Neutral) through HMI to 1	Value accepted
Configure the Secondary CT (L1, L2, L3 and Neutral)	Value accepted

through HMI to 1	
Read CT (L1, L2, L3 and Neutral) through HMI	Primary=1; Secondary=1
Read CT (L1, L2, L3 and Neutral) through Communication	Primary=1; Secondary=1
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary CT (L1, L2, L3 and Neutral) through HMI to 500000	Value accepted
Configure the Secondary CT (L1, L2, L3 and Neutral) through HMI to 5	Value accepted
Read Primary CT (L1, L2, L3 and Neutral) through HMI	Primary=500000; Secondary=5
Read Primary CT (L1, L2, L3 and Neutral) through Communication	Primary=500000; Secondary=5
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary CT (L1, L2, L3 and Neutral) through HMI to 1000000	Value not accepted
Configure the Secondary CT (L1, L2, L3 and Neutral) through HMI to 6	Value not accepted
Read Primary CT (L1, L2, L3 and Neutral) through HMI	Primary=500000; Secondary=5
Read Primary CT (L1, L2, L3 and Neutral) through Communication	Primary=500000; Secondary=5
Read the Settings(Audit) Log through HMI to confirm that no changes have been logged	Pass
Read the Settings(Audit) Log through Communication to confirm that no changes have been logged	Pass

[In Work **]**

PMD-1186 - Current transformer ratio - Configuration through Communication

Scope=D

It shall be possible to configure the CT ratio through Communication.

Action	Expected Behaviour
Configure the Secondary CT (L1, L2, L3 and Neutral) through Communication to 1	Value accepted
Configure the Primary CT (L1, L2, L3 and Neutral) through Communication to 1	Value accepted
Read CT (L1, L2, L3 and Neutral) through HMI	Primary=1; Secondary=1
Read CT (L1, L2, L3 and Neutral) through Communication	Primary=1; Secondary=1

Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary CT (L1, L2, L3 and Neutral) through Communication to 500000	Value accepted
Configure the Secondary CT (L1, L2, L3 and Neutral) through Communication to 5	Value accepted
Read Primary CT (L1, L2, L3 and Neutral) through HMI	Primary=500000; Secondary=5
Read Primary CT (L1, L2, L3 and Neutral) through Communication	Primary=500000; Secondary=5
Read the Settings(Audit) Log through HMI to confirm changes have been properly logged	Pass
Read the Settings(Audit) Log through Communication to confirm changes have been properly logged	Pass
Verify the configuration is possible through a valid HMI Pwd	Pass
Configure the Primary CT (L1, L2, L3 and Neutral) through Communication to 1000000	Value not accepted
Configure the Secondary CT (L1, L2, L3 and Neutral) through Communication to 1000	Value not accepted
Read Primary CT (L1, L2, L3 and Neutral) through HMI	Primary=500000; Secondary=5
Read Primary CT (L1, L2, L3 and Neutral) through Communication	Primary=500000; Secondary=5
Read the Settings(Audit) Log through HMI to confirm that no changes have been logged	Pass
Read the Settings(Audit) Log through Communication to confirm that no changes have been logged	Pass

[In Work **]**

21 Local HMI Password

PMD-1188 - Local HMI Password - Definition

Scope=L

The HMI shall protect the functionality listed in Table 25 through requiring the user to enter a password (pin code).

Action	Expected Behaviour
In HMI try to change the CT ratio parameter and verify is possible only through a valid active password	Ok
In HMI try to change the VT ratio parameter and verify is possible only through a valid active password	Ok
In HMI try to change the Wiring settings and verify is possible only through a valid active password	Ok
In HMI try to change the Tariff config and verify is possible	Ok

only through a valid active password	
In HMI trya Reset functionality and verify is possible only through a valid active password	Ok

[In Work]

PMD-1189 - Local HMI Password - Change password

Scope=L

It shall be possible to change password.

Action	Expected Behaviour
In HMI try to change the Password and verify is possible only through a valid active password	Ok

[In Work]

PMD-4563 - HMI - Password PIN - MID Meters

It shall be possible tp chage HMI PIN, but not to disable it for MID meters.

Action	Expected Behaviour
In the first commissioning wizard try to enter 00000 as password	Value not allowed
Insert a valid password (e.g. 99999) and continue with the wizard, including locking the device	Ok
After the device is locked, try to change the password to 00000	Value not allowed

[In Work]

22 HMI

PMD-4565 - HMI - MID Lock

MID meter shall have a lock menu in the HMI which can only be set once, i.e. the user cannot reset the lock state.

Action	Expected Behaviour
Perform the initial configuration wizard and lock the device	Ok
Try change configuration parameter (VT, CT, wires)	Not allowed

[In Work]

PMD-4566 - HMI - Power Outage Notification Icon - MID meters

For MID meters the user can only disable Power Outage Notification Icon (until next power outage) via the following key combination:

M4M 30:

- Go to Power Outage menu
- Short click of hamburger button
- Long click of left-most (empty) button in hamburger menu
- Long click of hamburger button

M4M 20:

- Go to Power Outage menu
- Short click of hamburger button
- Long click of up arrow
- Long click of hamburger button

Action	Expected Behaviour
Perform a power cycle of the device and verify that a new Power Outage is created and the lighting icon is on the screen	Ok
Disable the power outage log with the above combination	Success, icon removed
Perform a power cycle of the device and verify that a new Power Outage is created and the lighting icon is again on the screen	Ok

[In Work **]**

23 Communication

23.1 Switch Configuration

PMD-1191 - Switch Configuration - Daisy chain active on startup

Scope=D

The Ethernet switch shall be configured at startup so that it operates as expected for a daisy chaining application

Action	Expected Behaviour
Chain at least 3 devices though Ethermet daisy chain (e.g. two Modbus TCP with daisy chain and one Bacnet)	Ok
Configure the devices to use the DHCP	Ok
Verify that the communication works as expected	Ok
Configure the devices with static settings	Ok
Verify that the communication works as expected	Ok

[In Work **]**

23.2 TCP/IP

PMD-1193 - TCP/IP - Standards TCP/IP

Scope=F

The TCP/IP protocol standard shall be followed.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work **]**

PMD-1194 - TCP/IP - Standards DHCP

Scope=D

DHCP shall be supported.

Action	Expected Behaviour
Configure the Modbus/Bacnet device to use the DHCP	Ok
Verify that the communication works as expected	Ok

[In Work]

PMD-1195 - TCP/IP - Configuration

Scope=D

It shall be possible to configure the parameters listed in Table 27 through HMI and communication.

Action	Expected Behaviour
Try to set up TCP/IP parameters (IP address, DNS address, Subnet mask, DHCP and Gateway IP) through HMI	Ok
Verify successful Ethernet connection and data transfer	Ok
Try to set up TCP/IP parameters (IP address, DNS address, Subnet mask, DHCP and Gateway IP) through Communication	Ok
Verify successful Ethernet connection and data transfer	Ok

[In Work]

23.3 Modbus

PMD-1196 - Modbus - Standards

Scope=F

The implementation shall fulfil the protocol standard.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1197 - Modbus - Supported function codes

Scope=F

Function code 3 (read holding registers), 6 (write single register) and 16 (write multiple registers) shall be supported.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1198 - Modbus - Register mapping

Scope=F

The power meter Modbus addressing map, datatypes and scaling should be similar to M2M/DMTME addressing map when applicable.

Action	Expected Behaviour

Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1199 - Modbus - Addresses

Scope=F

Modbus addresses not covered by M2M/DMTME should use addresses used in the EQ meters.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

23.3.1 Modbus RTU

PMD-1200 - Modbus RTU - Baud rates supported

Scope=F

Baudrates 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 shall be supported.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1201 - Modbus RTU - Parity supported

Scope=F

Parity even, odd and none shall be supported.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1202 - Modbus RTU - Configuration

Scope=D

It shall be possible to configure the baudrate, parity and address through HMI and communication.

Action	Expected Behaviour
Configure Modbus RTU boudrate through HMI to a defined value (different from the default)	Ok
Configure Modbus RTU parity through HMI to a defined value (different from the default)	Ok
Configure Modbus RTU address through HMI to a defined value (different from the default)	Ok
Verify that the Modbus communication works with the new settings as expected	Ok
Configure Modbus RTU boudrate through Communication to a defined value (different from the default)	Ok
Configure Modbus RTU parity through Communication to a defined value (different from the default)	Ok

Configure Modbus RTU address through Communication to a defined value (different from the default)	Ok
Verify that the Modbus communication works with the new settings as expected	Ok

[In Work]

23.3.2 Modbus TCP

PMD-1203 - Modbus TCP - Connection

Scope=F

Modbus shall accept incoming connections on port 502.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

PMD-1204 - Modbus TCP - Port configuration

Scope=D

It shall be possible to configure the port through HMI and communication.

Action	Expected Behaviour
Configure Modbus TCP port through HMI to a defined value (different from the default)	Ok
Configure Modbus IP through HMI to a defined value (different from the default)	Ok
Configure Modbus Subnet mask through HMI to a defined value (different from the default)	Ok
Verify that the Modbus communication works with the new settings as expected	Ok
Configure the Modbus to use the DHCP	Ok
Verify that the Modbus communication works with the new settings as expected	Ok

[In Work]

23.3.3 Profibus

PMD-1788 - Profibus checks for BH device

Action	Expected Behaviour
Establish the connection to a Profibus M4M BH device	Ok
Set up the Test environment for a well-defined consumption	Ok
Check the data on page 0	Data according to Profibus mapping/manual
Check the data on page 1	Data according to Profibus mapping/manual
Check the data on page 2	Data according to Profibus mapping/manual
Check the data on page 3	Data according to Profibus mapping/manual
Check the data on page 4	Data according to Profibus mapping/manual

Check the data on page 5	Data according to Profibus mapping/manual
Check the data on page 6	Data according to Profibus mapping/manual
Check the data on page 7	Data according to Profibus mapping/manual

[In Work]

PMD-1789 - Profibus checks for IH device

Action	Expected Behaviour
Establish the connection to a Profibus M4M IH device	Ok
Set up the Test environment for a well-defined consumption	Ok
Check the data on page 0	Data according to Profibus mapping/manual
Check the data on page 1	Data according to Profibus mapping/manual
Check the data on page 2	Data according to Profibus mapping/manual
Check the data on page 3	Data according to Profibus mapping/manual
Check the data on page 4	Data according to Profibus mapping/manual
Check the data on page 5	Data according to Profibus mapping/manual
Check the data on page 6	Data according to Profibus mapping/manual
Check the data on page 7	Data according to Profibus mapping/manual
Check the data on page 8	Data according to Profibus mapping/manual
Check the data on page 9	Data according to Profibus mapping/manual
Check the data on page 10	Data according to Profibus mapping/manual
Check the data on page 11	Data according to Profibus mapping/manual
Check the data on page 12	Data according to Profibus mapping/manual
Check the data on page 13	Data according to Profibus mapping/manual
Check the data on page 14	Data according to Profibus mapping/manual
Check the data on page 15	Data according to Profibus mapping/manual
Check the data on page 16	Data according to Profibus mapping/manual
Check the data on page 17	Data according to Profibus mapping/manual

[In Work]

PMD-2503 - BACnet - Communication checks

This test aims to check the BACnet communication.

Action	Expected Behaviour
Connect the BACnet device to the network and run BACeye SW	Ok
Set up the Test environment for a well-defined consumption	Ok
Verify that the device is discoverable and all the readable objects are correct	Ok
Verify that all the writable objects work as expected (CT,	Ok

VT, wires)	

[In Work]

24 Default Configuration

PMD-1205 - Default Configuration

Scope=F

All configurable parameters shall have a default value.

Action	Expected Behaviour
Confirm the requirement fulfillment at FW level	Ok

[In Work]

25 Power fail

PMD-1885 - Power Fail - Modbus RTU Communication

Scope=D

It shall be possible recover communication after a power fail.

Action	Expected Behaviour
Configure Modbus Baud rate to the high speed allowed - 115200	Ok
Configure Modbus parity - even/odd/none	Ok
Starts communication, reading the maximum number of modbus register allowed	Ok
During reading, cut off the power supply	Ok
Plug in power supply cable	Ok
Verify that the Modbus communication works after a power cycle	Ok

[In Work]

PMD-1886 - Power Fail - Modbus TCP Communication

Scope=D

It shall be possible recover communication after a power fail.

Action	Expected Behaviour
Configure Modbus TCP port and IP through HMI to a defined value (different from the default)	Ok
Configure Modbus Subnet mask through HMI to a defined value (different from the default)	Ok
Starts communication, reading the maximum number of modbus register allowed	Ok
During reading, cut off the power supply	Ok

Plug in power supply cable	Ok
Verify that the Modbus communication works after a power cycle	Ok

[In Work]

PMD-1887 - Power Fail - Profibus Communication

Scope=D

It shall be possible recover communication after a power fail.

Action	Expected Behaviour
Configure Profibus address through HMI to a defined value (different from the default)	Ok
Check via profitrace device is 'Live on the network	Ok
Starts communication - put the device in data exchange with master (read pages different from page 0)	Ok
During reading cut off the power supply	Ok
During reading, cut off the power supply	Ok
Verify that the Profibus communication works after a power cycle (data available on the network are the one present in the page zero)	Ok

[In Work]

PMD-1888 - Power Fail - BACnet Communication

Scope=D

It shall be possible recover communication after a power fail.

Action	Expected Behaviour
Configure BACnet TCP port and IP through HMI to a defined value (different from the default)	Ok
Configure BACnet Subnet mask through HMI to a defined value (different from the default)	Ok
Starts communication, reading the maximum amount of available data	Ok
During reading, cut off the power supply	Ok
Plug in power supply cable	Ok
Verify that the BACnet communication works after a power cycle	Ok

[In Work]

PMD-1889 - Power Fail - HMI Time dependent functionality

Scope=D

It shall be possible recover data after a power fail during reading external flash memory.

Action	Expected Behaviour
Configure all TDFs to store data with minimum time interval	Ok

Wait until a lot of data are stored into the external flash	Ok
Open the menu Historical -> Load Profile	Ok
Cut off the power supply	Ok
Plug in power supply cable	Ok
Verify Load Profile show the right data on all channels	Ok
Open the menu Historical -> Demand	Ok
Cut off the power supply	Ok
Plug in power supply cable	Ok
Verify Demand show the right data on all channels	Ok
Open the menu Historical -> Energy Cumulative	Ok
Cut off the power supply	Ok
Plug in power supply cable	Ok
Verify Energy Cumulative show the right data on all channels	Ok
Open the menu Historical -> Energy Trend	Ok
Cut off the power supply	Ok
Plug in power supply cable	Ok
Verify Energy Trend show the right data on all channels	Ok

[In Work **]**

PMD-1890 - Power Fail - First Commissioning

Scope=D

It shall be possible recover first commissioning after a power fail.

Action	Expected Behaviour
Device Power On	Ok
Execute first commissiong until password setting and set a new password	Ok
Cut off the power supply	Ok
Plug in power supply cable	Ok
Check the first commissioning re-start from the beginning	Ok

[In Work **]**

PMD-2502 - Power Fail - Energy registers

During a power fail the energy register must be saved.

Action	Expected Behaviour
Set up the Test Environment (Zera/Omicron) in order to emulate a well defined power consumption scenario with	Ok

both active and reactive energy (IMPORT)	
Let the energy registers accumulate some measurements. Stop the Zera/Omicron, save the measurements and power down the device (read from HMI or communication).	Ok
Power up again the device and check that the energy quantities are correct.	Ok
Set up the Test Environment (Zera/Omicron) in order to emulate a well defined power consumption scenario with both active and reactive energy (EXPORT)	Ok
Let the energy registers accumulate some measurements. Stop the Zera/Omicron, save the measurements and power down the device (read from HMI or communication).	Ok
Power up again the device and check that the energy quantities are correct.	Ok

[In Work]

26 Bluetooth

PMD-1892 - Bluetooth

The device has a bluetooth module in order to communicate with the ABB APiC app (for Android and IOS)

Action	Expected Behaviour
Enable the Bluetooth (Settings > Communication > Bluetooth > Enable) For 2X devices the Bluetooth is enable by default	Ok
Start EPiC app from the smartphone	Ok
Connect the device via bluetooth (Settings > Communication > Bluetooth >Pairing for the pairing procedure) For 2X devices the pairing code is 00 + "last 4 digits of the serial number"	Ok
Check that the connection is successful and the data are correct (i.e. FW version)	Ok
Check that the tag name is correct (e.g. equal to the device serial number)	Ok

[In Work]

PMD-4526 - Bluetooth stability

The Bluetooth connection shall be stable in case of more connection and disconnection

Action	Expected Behaviour
Enable the Bluetooth (Settings > Communication > Bluetooth > Enable) For 2X devices the Bluetooth is enable by default	Ok
Start EPiC app from the smartphone and connect the device	Ok
Perform at least 10 disconnections and reconnections	Ok
Check that the connection is stable	Ok

Check that the Slave ID is correct	Ok
Connect to the device with ekip connect and perform the same above steps	Both bluetooth and ekip connects are stable

[In Work]

PMD-4527 - Bluetooth enabling via Modbus

The bluetooth can be activated and deactivated via modbus

Action	Expected Behaviour
Activate the Bluetooth via Modbus	Check Bluetooth in enable
Deactivate the Bluetooth via Modbus	Check Bluetooth in disable
Activate the Bluetooth via Modbus	Check Bluetooth in enable

[In Work]

27 Ekip connect

PMD-2501 - Ekip connect

This test ensure the compatibility with Ekip Connect for Modbus devices (RTU or TCP)

Action	Expected Behaviour
Connect the device to the network (Modbus or TCP) and run Ekip Connect SW	Ok
Set up the Test environment for a well-defined profile (ZERA/Omicron)	Ok
Read all the available items on Ekip Connect	Values are correct, according to the device
Change the installation parameters (CT, VT, wires) via Ekip Connect	Changes are applied to the meter
Change other configuration such as connection settings	Changes are applied to the meter

[In Work]

28 System tests

28.1 Modbus TCP/IP

PMD-4494 - Modbus TCP - System test with one client

Test the Modbus TCP connection with one client and maximum stress condition.

Action	Expected Behaviour
Test the Modbus TCP connection with a PC client (e.g. at least ModbusPoll with R&D minimum set system test workspace)	Connection with no errors
Test the Modbus TCP connection with an automated device (e.g. ate least with PLC R&D setup) for at least one day.	Connection with no errors

[In Work]

PMD-4495 - Modbus TCP - System test with two clients

Test the Modbus TCP connection with two clients

Action	Expected Behaviour
Setup two connections to the same device (e.g. modbus poll and e-hub or Insite Pro M, ekip connect or at least two instances of the R&D specification PMD-4494). Polling time of 100ms for at least three days.	Connections with no errors

[In Work]

PMD-4496 - Modbus TCP - System test with three clients

Test the Modbus TCP connection with three clients

Action	Expected Behaviour
Setup three connections to the same device (e.g. modbus poll and e-hub and ekip connect), with at least one embedded device (e-hub, plc or Insite). Polling time of 100 ms for at least three days testing.	Connections with no errors

[In Work]

PMD-4498 - Modbus TCP - Long term system test

Test the Modbus TCP connection for a long period of time (i.e. keep devices under test and continue monitoring)

Action	Expected Behaviour
Test the Modbus TCP connection with an automated device (e.g. PLC, e-hub, Insite) with set of registers, polling time, number of clients and duration defined by R&D.	Connection stable with no errors for a long period of time

[In Work]

PMD-4499 - Modbus TCP - System test with Ekip Connect and one more client

Test the Modbus TCP connection with Ekip connect and one more client

Action	Expected Behaviour
Setup two connections to the same device: Ekip connect and another client (e.g. modbus poll, e-hub)	Connections with no errors
On ekip connect navigate all the pages, including the time dependant functionalitites for IH meters	Connections with no errors
From ekip connect perform a FW upgrade	Connections with no errors and FW upgrade successful
Perform all available configurations of the product.	Connections with no errors

[In Work]

PMD-4541 - Modbus TCP - System test with Ekip Connect and two mode clients

Test the Modbus TCP connection with Ekip connect and two more clients

Action	Expected Behaviour
Setup two connections to the same device: Ekip connect and another two clients (e.g. modbus poll, e-hub)	Connections with no errors

On ekip connect navigate all the pages, including the time dependant functionalitites for IH meters	Connections with no errors
Perform all available configurations of the product.	Connections with no errors

[In Work]

PMD-4542 - Modbus TCP - System test with Bluetooth

Test a M4M Modbus TCP connected to a Ekip connect and Epic via Bluetooth

Action	Expected Behaviour
Setup the device and connect to Ekip Desktop and the Epic mobile.	Connections with no errors
On ekip connect navigate all the pages, including the time dependant functionalitites for IH meters	Connections with no errors
Connect and disconnect the Bluetooth for at least 10 times.	Connections with no errors

[In Work]

PMD-4545 - Modbus TCP - System test with E-Hub

Test a M4M Modbus TCP with E-Hub.

Action	Expected Behaviour
Setup at least two devices (M4M 20 and M4M 30) in the network and connect to E-Hub with set of registers and polling time defined by R&D.	Connections with no errors
Monitors the behavior for at least three days.	Connections with no errors

[In Work]

28.2 Modbus RTU

PMD-4553 - Modbus RTU- System test with Ekip Connect

Test the Modbus RTU connection with Ekip.

Action	Expected Behaviour
Setup the connection with Ekip Connect.	Connections with no errors
On ekip connect navigate all the pages, including the time dependant functionalitites for IH meters	Connections with no errors
From ekip connect perform a FW upgrade	Connections with no errors and FW upgrade successful
Perform all available configurations of the product.	Connections with no errors

[In Work]

PMD-4552 - Modbus RTU - System test with Bluetooth

Test a M4M with Modbus RTU connected to a Ekip connect and Epic via Bluetooth

Action	Expected Behaviour
Setup the device and connect to Ekip Desktop and the Epic mobile.	Connections with no errors

On ekip connect navigate all the pages, including the time dependant functionalitites for IH meters	Connections with no errors
Connect and disconnect the Bluetooth for at least 10 times.	Connections with no errors

[In Work]

PMD-4549 - Modbus RTU- Long term system test

Test the Modbus RTU communication for a long period of time

Action	Expected Behaviour
Setup the Modbus RTU PLC with at least two M4M (one 20 and one 30) slave devices and monitors for the period defined by R&D.	Connection stable with no errors for a long period of time

[In Work]

PMD-4546 - Modbus RTU - System with M4M and Insite Pro M

Test a M4M in a Insite Pro M RTU bus.

Action	Expected Behaviour
Create a bus with at least two M4Ms, one with baudrate 19200 bps and another with 115 200 bps and integrate setup Insite to query the devices.	Connections with no errors
Monitors the behavior for at least three days.	Connections with no errors

[In Work]

28.3 Profibus

PMD-4547 - Profibus- Long term system test

Test the Profibus communication for a long period of time

Action	Expected Behaviour
Setup the Profibus PLC with at least one slave device and monitors for the period defined by R&D.	Connection stable with no errors for a long period of time

[In Work]

PMD-4544 - Profibus- System Test with Bluetooth

Test a M4M with Profibus connected to a PLC and Epic via Bluetooth

Action	Expected Behaviour
Setup the device and connect to the Profibus PLC and the Epic mobile.	Connections with no errors
Check the available pages in the PLC and Epic responses.	Connections with no errors
Connect and disconnect the Bluetooth for at least 10 times.	Connections with no errors

[In Work]

28.4 BACnet

PMD-4550 - BACnet - System test with one client

Test the BACnet connection with one client.

Action	Expected Behaviour
Test the BACnetconnection with a PC client (e.g. BACeye or PLC).	Connection with no errors

[In Work]

PMD-4548 - BACnet- Long term system test

Test the BACnet communication for a long period of time

Action	Expected Behaviour
Setup the BACnet PLC with at least one device and monitors for the period defined by R&D.	Connection stable with no errors for a long period of time

[In Work]

PMD-4543 - BACnet- System Test with Bluetooth

Test a M4M with BACnet connected to a BACeye and Epic via Bluetooth

Action	Expected Behaviour
Setup the device and connect to BACeye and the Epic mobile.	Connections with no errors
On BACeye navigate in all avaliable objects.	Connections with no errors
Connect and disconnect the Bluetooth for at least 10 times.	Connections with no errors

[In Work]

29 Firmware testing for MID (IMQ certification)

PMD-4576 - MID - Verify firmware version and CRC from HMI

Action	Expected Behaviour
Check the FW version and the CRC in the HMI (configuration > unit > device info)	Report the value in the result and compare with firmware crc file.

[In Work]

PMD-4577 - MID - CRC verification during boot and normal operation (firmware in debug mode)

Action	Expected Behaviour
Verify that the CRC is checked ad the boot of the device	Compare with firmware crc file.

Verify that the CRC is checked regularly (at each 2 hours) during nominal operation	Compare with firmware crc file.

[In Work]

PMD-4572 - MID parameters check during boot and normal operation (firmware in debug mode)

Action	Expected Behaviour
Verify that the MID parameters have a CRC verification at boot.	OK
Verify that the MID parameters have a CRC verification at each 2 hours.	Compare with initial in the boot.
Verify that the MID parameters have a CRC updated when changed.	OK

[In Work]

PMD-4574 - MID backup data (firmware in debug mode)

Action	Expected Behaviour
Generate an error in the regular data area and check if the redundant is used.	OK
Generate an error in the redundant data area and check if this area is recovered.	OK

[In Work]

PMD-4580 - MID - Watchdog (firmware in debug mode)

Action	Expected Behaviour
Write to an invalid register area forcing an exception in the firmware	Watcchdog shall be triggered in 10s.

[In Work]

PMD-4581 - MID - Power outage

Action	Expected Behaviour
Generate a power cycle in the device	A power outage log shall be visible in the HMI.

[In Work]

PMD-4579 - MID - Test communication with valid and invalid commands

Action	Expected Behaviour
Test MID device with Ekip or Modbus poll the mapping table.	Only non MID parameters shall be changeble if the meter is locked.
With Modbus Poll generate random Modbus requests with non valid registers	Product shall keep normal behavior.

[In Work]

PMD-4578 - MID - Reboot with blocking error condition(firmware in debug mode)

Action	Expected Behaviour
In debug generate a CRC error.	The meter shall not measure energy.
Reset the device keeping the CRC error.	The meter shall not measure energy.

[In Work]

PMD-4573 - MID - Firmware upgrade

Action	Expected Behaviour
Verify max number of FW upgrade	FW upgrade not possible after max number
Upgrade with wrong CRC	FW not updated, error message
Communication interruption during update	FW not updated, error message

[In Work]

PMD-4575 - MID - Verify MID logs (firmware in debug mode)

Action	Expected Behaviour
Generate a fw CRC error	Check if the fw CRC log is generated
Generate a MID parameters CRC error	Check if the RAM CRC log is generated
Load an invalid image during the firmware upgrade	Check if the invalid fw image log is generated
During the firmware upgrade block the communication process before finishing.	Check if the invalid fw upgrade error log is generated
Load 40 invalid images during the firmware upgrade	Check if the max invalid fw upgrade error log is generated and firmware upgrade is blocked forever.
Load 80 valid images during the firmware upgrade	Check if the max fw upgrade error log is generated and firmware upgrade is blocked forever.

[In Work]