



Open Metering System Conformance Test

Volume 1 General Part

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Release

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1 Scope

This document describes the general rules and frame conditions for the conformance test of the Open Metering System (OMS). The detailed test description is given in the higher volumes. The OMS-Conformance Test (OMS-CT) shows the following structure:

Volume	Description	Content
Vol.1	General Part (GEN)	This volume declares requirements and conditions for OMS-CT (e.g. Manufacturer declaration or Test report)
Vol.2	Technical Properties (PHY)	These volumes describes tests of physical and Medium Access layer (e.g. radio parameters and Timing)
Vol.3	Data Transmission (DLL)	This volume describes tests of the data link layer (e.g. the framing and timing)
Vol.4	Protocol (APL)	This volume describes in part 1 tests of the general application header (e.g. use of configuration word and encryption) and in part 2 the M-Bus Application layer (the M-Bus data point content)

Table 1: Open Metering Conformance Test Documents

This issue of OMS-Conformance Test is applicable only to unidirectional metering devices which claiming the conformity according to [OMSS-Vol2].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

[DSMR P2]	Dutch Smart Meter Requirements v3.0 final P2
[EN13757-1]	CEN EN 13757-1:2002 Communication system for meters and remote reading of meters -Part 1: Data Exchange
[EN13757-2]	CEN EN 13757-2:2004 Communication systems for meters and remote reading of meters Part 2: Physical and link layer
[EN13757-3]	CEN EN 13757-3:2004 Communication systems for meters and remote reading of meters Part 3: Dedicated application layer
[EN13757-4]	CEN EN 13757-4:2005 Communication systems for meters and remote reading of meters Part 4: Wireless meter readout (Radio meter reading for operation in the 868 MHz to 870 MHz SRD band)
[EN13757-6]	CEN EN 13757-6:2008 Communication systems for meters and remote reading of meters Part 6: Local Bus
[EN 300 220-1]	ETSI EN 300 220-1 V2.1.1 (2006-04) Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels up to 500 mW; Part 1: Technical characteristics and test methods.

75	[EN 301 489-1]	ETSI EN 301 489-1 V1.8.1 (2008-06) Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.
80	[EN 301 489-3]	ETSI EN 301 489-3 V1.4.1 (2002-08) Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
	[FLAG]	Flag Manufacture ID: File-Download by www.dlms.com/flag or WWW by http://www.dlms.com/organization/flagmanufacturesids/index.html
85	[IEC62056-53]	IEC 62056-53:2006 Electricity metering - Data exchange for meter reading, tariff and load control - Part 53: COSEM application layer
	[OMSS-Vol1]	OMS Open Metering System Specification, Volume 1, General Part, Issue 1.4.0 / 2011-01-31
	[OMSS-Vol2]	OMS Open Metering System Specification, Volume 2, Primary Communication, Issue 3.0.1 / 2011-01-31
90	[OMSCT-GEN]	OMS Open Metering System – Conformance Test Volume 1 – General Part; Issue 3.0.0 / 2015-09-01 (this document)
	[OMSCT-PHY]	OMS Open Metering System – Conformance Test Volume 2 - PHY/MAC; Issue 3.0.0 / 2015-09-01
95	[OMSCT-DLL]	OMS Open Metering System – Conformance Test Volume 3 - Data link layer, Issue 3.0.0 / 2015-09-01
	[OMSCT-APL]	OMS Open Metering System – Conformance Test Volume 4 - Application layer; Issue 3.0.0 / 2015-09-01
	[OMSCT-ManDec]	OMS Open Metering System – Conformance Test; Manufacturer Declaration; Issue 3.0.0 / 2015-09-01

100

3 Definitions, symbols and abbreviations

This chapter presents an overview of used term definitions, symbols and abbreviations.

3.1 Definitions

105 ***Device under Test (DUT)***

The device under test (DUT) is the device of which conformance with OMS specification is to be tested.

Fixed part of Application frame

110 The Application frame has to be separated into a fix and a variable part. The fix part consists of the Application header. The Application header is independent from the selected application protocol. The length of fix part depends on type of CI-Field and is listed in [OMSS-Vol2] Table 5.

115 ***Golden receiver unit***

A receiver device that has been proven against fundamental specifications, especially with respect to Manchester and 3-of-6 decoding, chip/bit/byte order, CRC decoding, and S2/T2 mode response transmission window. The response transmission window of the golden receiver shall be configurable for minimum and maximum values.

120

Golden transmitter unit

A transmitter device that has been proven against fundamental specifications, especially with respect to Manchester and 3-of-6 coding, chip/bit/byte order, and CRC coding.

125 ***M-Bus-String***

When M-Bus Application protocol is applied the collection of all bytes in the variable Part of the application frame are called M-Bus-String.

Marginal transmitter unit

130 A transmitter device that can be tuned to the extreme specifications with respect to transmitter frequency offset and chip rate offset.

Packet Generator

135 A packet generator is part of the conformance testing tool set. It is used to generate wireless M-Bus packets, especially requests and commands, in order to evaluate the reaction of the device under test.

Sniffer Tool

140 A sniffer tool is part of the conformance testing tool set. It is used to intercept all wireless M-Bus messages sent and received and to assess the conformance of the messages sent by

the device under test. For documentation purposes, all packets that are received by the sniffer tool are logged together with a timestamp.

Variable part of the Application frame

145 The Application frame has to be separated into a fix and a variable part. The variable part consists of Application protocol and starts at next byte behind the fix part to the end of telegram (without CRC, Check sum etc). Symbols

[T(vol)(part)-(test)(index)(revision*)]

150 Test index to reference to the criteria within the OMS-CT, with
 vol = number of volume within the OMS-CT
 part = number of part within the referenced volume
 test = characters to indicate the test item
 index = unique index of test point
 155 revision = single character ('a'-'z') to indicate revision index.

* The field "revision" is optionally and will be added only, if more than one version of the same test point exists.

3.2 Abbreviations

Abbreviation	Explanation
ABS	Absolute Value (without sign)
APL	Application layer of OSI-Communication model
BDM	Bidirectional Meter
CW0	Permanent transmission of frequency for symbol 0 (Continuous wave 0)
CW1	Permanent transmission of frequency for symbol 1 (Continuous wave 1)
DLL	Data link layer of OSI-Communication model
DIF	Data Information Field (refer to[EN13757-3])
DIFE	Data Information Field Extension (refer to[EN13757-3])
DSMR	Dutch Smart Metering Requirement
DUT	The device under test
VIF	Value Information Field (refer to [EN13757-3])
VIFE	Value Information Field Extension (refer to[EN13757-3])
Lo-Bus	Local Bus – A low voltage bus for short range, which may be used as physical layer instead of M-Bus. The Lo-Bus is standardized in [EN13757-6].
M-Bus	Meter Bus – A Bus with higher voltage for meter communication up to several kilometres. The M-Bus is standardized in [EN13757-2].
M-Bus Protocol	A Protocol specification for the transmission of meter data via the M-Bus, wM-Bus or other communication systems. The M-Bus-Protocol is standardised in [EN13757-3]
MSB	Most Significant Bit

MUC ¹	Multi utility communication controller
OMS	Open Metering System
OMS-CT	Open Metering System – Conformance Test
OMSS	Open Metering System Specification
PER	Packet error rate - number of lost packets referred to all transmitted packets
PHY	Physical layer of the OSI-Communication model
UDM	Unidirectional Meter
UDR	Unidirectional Repeater
wM-Bus	Wireless M-Bus – A specification for a wireless transmission of meter data for a short range. The wM-Bus is standardized in [EN13757-4]. A detailed specification is given in [OMSS-Vol1] and [OMSS-Vol2]

Table 2: List of used abbreviations

3.3 Number formats

Hexadecimal numbers are marked with a suffix "h". Binary coded numbers are marked with a suffix „b". Numbers without suffix are decimal numbers except another coding is explicitly declared.

¹ The Abbreviation „MUC“ is replaced by „Gateway“ in later specifications. To be align with [OMSS-Vol2] „MUC“ is still used

4 Test Preparation

4.1 Items for Test

To prepare the OMS- Conformance test, a vendor has to provide following items in advance:

1. Manufacturer declaration
2. At least two DUT (of normal production) for conformance test (If DUT are always running in test mode then two additional DUT with disabled test mode are also required)
3. Software and Interface (if necessary)
4. Test description explaining how to start special services on the DUT

The test description is not necessary if the manufacturer attends the tests. This shall be stated in the test documentation. The manufacturer declaration is always mandatory.

4.2 Manufacturer Declaration of DUT

Based on the manufacture declaration the applicable conformance tests will be selected by testing laboratory. The manufacturer shall declare following properties according to [OMSCT-ManDec].

4.2.1 Declaration of the OMS-Interface

Following table declares OMS-Interfaces for data exchange with MUC or another communication unit. (It does not declare the local service interface (e.g. optical interface)!)

Decla-ration	Type	Explanation
LB	Twisted Pair - Lo-Bus	Wired Lo-Bus interface (Local bus) conform to [EN13757-6]
MB	Twisted Pair - M-Bus	Wired M-Bus interface conform to [EN13757-2] and [OMSS-Vol2]
S1	Radio S1-mode (unidirectional)	Wireless radio interface conform to [EN13757-4] and [OMSS-Vol2]
S2	Radio S2-mode (bidirectional)	wireless radio interface conform to [EN13757-4] and [OMSS-Vol2]
T1	Radio T1-mode (unidirectional)	wireless radio interface conform to [EN13757-4] and [OMSS-Vol2]
T2	Radio T2-mode (bidirectional)	wireless radio interface conform to [EN13757-4] and [OMSS-Vol2]

Table 3: Declaration of standardised OMS-Interfaces

Note that one OMS-device might use more than one OMS-interface!

4.2.2 Declaration of Application protocol

For the transport of application data one of the following application protocols may be selected

Declaration	Explanation
M-BUS	M-Bus-Application layer conform to [EN13757-3] and [OMSS-Vol2]
DLMS/COSEM	DLMS-Application protocol transports COSEM-Object conform to [EN13757-1] and [IEC62056-53]
SML	SML-Application protocol conform to Smart Message Language specification. (refer to http://www.t-l-z.org/eng/sml-spezi_eng.html)

Table 4: Declaration of selected application protocol

4.2.3 Encryption mode and encryption key

If the DUT supports data encryption the manufacturer has to declare the Encryption mode and the Encryption key in [OMSC-T-ManDec]. The Encryption mode shall be one of the listed encryption modes in [OMSS-Vol2]. The format of encryption key shall be conforming to [OMSS-Vol2].

4.2.4 Declaration of transmission rate

The manufacturer shall declare the average transmission interval which is configured in the DUT. The average transmission interval declares the typical distance between the transmission of two data telegrams. A data telegram shall contain current consumption data! The transmission interval should be declared in seconds.

4.2.5 Declaration of installation telegrams

The manufacturer shall declare, if the DUT supports installation telegrams (manual triggered telegrams with C-Field 46h). If this feature is supported the way of starting the installation telegram shall be described in the Test documentation. If tools are necessary to start the installation telegrams they have to be provided by the manufacturer for the duration of the test.

4.2.6 Declaration of OMS conform data points

The manufacturer shall declare all data points which conform to [OMSS-Vol2] Annex A and be transmitted with either SND-NR (for wireless M-bus) or with REQ-UD2 (for wired M-Bus). The manufacturer may also declare additional data point which are not conforming to [OMSS-Vol2] Annex A or be provided in other telegrams. The declaration of this additional data points is optional.

4.2.7 Declaration of the test command

For several tests it is necessary to check if the meter or actuator is able to receive a message from the test master. A Test command is required to verify if the message was received and executed. The Test command should be defined by the manufacturer itself (e.g. shows Symbol on LCD e.g. "tEST" for 2 seconds or switches a valve). The complete test command (including authorisation sequence (if exist)) shall be described in test documentation.

4.2.8 Test mode

The DUT might use a special configuration (i.e. test mode) to run the OMS conformance test which is different to the normal operation configuration in the field. In this case, the manufacturer shall declare the differences between the special and the normal operation mode with reference to the OMS specification. The manufacturer shall describe how the special configuration is enabled / disabled. Alternatively, a subset of the DUT can use the special configuration permanently. In this case the manufacturer shall identify these devices in the test documentation using their identification numbers.

4.2.9 List of the test equipment

The manufacturer shall provide a complete list of the Test equipment (hardware, software and test documentation).

5 Test execution

5.1 Test of the technical properties (PHY)

5.1.1 wM-Bus Interface (S1, S2, T1 or T2)

235 The radio test for interfaces S1, S2, T1 or T2 shall be executed only by an accredited test laboratory for short range devices (Testing field A06 and A08). The test laboratory shall be accredited conform to ISO/IEC 17025. It shall prove its accreditation by listing its own accreditation number in the test report (e.g. the DAR- or DAkkS-Registration No.). All tests have to be executed according to [OMSCT-PHY]!

5.1.2 M-Bus Interface (MB, LB)

240 To be defined!

5.2 Test of the data transmission (DLL)

5.2.1 wM-Bus Interface

245 The radio test for the unique wireless data link layer of the OMS shall be tested by a test laboratory listed by the certification body.

All test has to be executed according to [OMSCT-DLL]!

5.2.2 M-Bus/Lo-Bus Interface

To be defined!

5.3 Test of Application layer (APL)

250 The test of the M-Bus Application protocol shall be executed by a test laboratory listed by the certification body.

5.3.1 Generic Application header

255 The test of the generic Application header shall be always executed independently from the selected type of application protocol. All tests have to be executed according to [OMSCT-APL]

5.3.2 M-Bus-Protocol

If the manufacturer declares the Application protocol "M-Bus" all tests have to be executed conform to [OMSCT-APL]!

6 Test results

For every volume of OMS-CT a separate Test report shall be generated to record the test results. The Test report shall conform to EN17025 and shall contain the following items:

1. Section "Details of the test laboratory"

- Name and address of test laboratory
- Registration number of accredited test laboratory
- Name and phone for contact purposes
- Name, Date and Sign of involved Testing personnel

2. Section "Declaration of the tested device"

- Name and address of Manufacturer of tested device
- Name and product identifier of the DUT (e.g. Gas meter BKG4)
- Software version of the DUT
- Tested OMS-Interfaces

3. Section "References of performed tests"

- Applied version of OMS-Specification
- Applied version of OMS-Conformance Test Specifications
- Additional references
- Deviations from the OMS-Conformance Test Specification

4. Section "Test Results"

- a. Summary of test results (Pass/Fail)
- b. Detailed description of every tests, with
 - Reference of performed test (Test name, Test-ID)
 - Applied limits for this test
 - Test result for every test (pass / fail / not applicable)

5. Section "Test Equipment"

- Complete list of the measurement equipment (e.g. type of spectrum analyser)
- Complete list of the test equipment (e.g. reference receiver) including Software version of test equipment

7 Certificate

290 The OMS-Certificate requires all test reports for the OMS-CT volumes 2, 3 and 4.

The OMS-Certificate certifies a passed Conformance test with references to

- Manufacturer
- Product name and product identifier
- Certified OMS-Interface e.g. T2
- 295 • Applied version of OMS-Specification and
- Applied version of OMS-Conformance Test
- Executing Test laboratory

The OMS-Certificate will issued by one of the following certification bodies:

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1. Certification body:

DVGW CERT GmbH
Josef-Wirmer-Str. 1
305 53123 Bonn