Open Metering System
Compliance Test

Volume 2
PHY (Radio Parameters)

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Release

Document History

Version	Date	Comment	Editor
1.0.0	2011-10-11	Final version	J. Feuchtmeier
1.9.0	2013-08-09	Adaptions to OMS-S V3 To be released as OMS-CT V2.0	J. Feuchtmeier
2.0.0	2013-10-16	Adaption according Enquiry results document status changed to “Release”	J. Feuchtmeier
3.0.0	2014-10-06	Adopting version number of the OMS-CT to be in line with the corresponding OMS-S version	J. Feuchtmeier
4.0.0.0	2015-03-04	Start Version for OMS-CT V4 Using Gateway instead of MUC	J. Feuchtmeier
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4.0.1	2017-10-07	Adaption to OMS-S Vol2, V4.1.2	J. Feuchtmeier
4.0.2	2018-01-18	Frequency deviation based on OMS WG3 decission#54-2 Release Version	J. Feuchtmeier
4.0.3	2019-08-12	Support of PHY_B (433 MHz)	J. Feuchtmeier
4.0.4	2019-09-17	Editorial changes Change of all numbers to decimal comma format	AG3 A. Reissinger
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Contents

Tables

1 Scope

The present document is part of the Compliance Test Specification used for certification of equipment according to the Open Metering System (OMS) specification.

This issue is applicable only together with [OMSCT-GEN].

This document specifies the tests to show compliance for the Physical Layer (PHY) and the Medium Access Layer (MAC) covering radio parameters and basic timing.

The parameters to be tested, and the test limits are based on OMS Specification Volume 2, Primary Communication [OMSS-Vol2], chapter 4, *Physical Layer*, and the referenced Wireless M-Bus specification [EN 13757-4].

Note:

This version of test specification does not cover all items of the current OMS Specification.

It is not the scope of this document to show compliance to the essential requirements of the R&TTE directive (1999/5/EC), Radio Equipment Directive 2014/53/EU (RED), or other national or international standards.

2 References

The used references are listed in [OMSCT-GEN].

3 Definitions, symbols and abbreviations

The used term definitions, symbols and abbreviations are defined in [OMSCT-GEN] (OMS Open Metering System – Conformance Test Volume 1 – General Part).

Part 1:

Wireless M-Bus (wMBus)

4 General requirements

If the DUT has already been subject to other compliance tests (i.e. for R&TTE essential requirements) using [EN 300 220-1], test results from such a test report can be used, and it is not required to repeat those tests where they are overlapping.

4.1 [T21-GR1] Operating mode

The manufacturer shall state the operating mode; S1, S2, T1, T2, C1 and/or C2.

The manufacturer shall state the selected radio band: PHY_A (868 MHz) or PHY_B (433 MHz)

4.2 [T21-GR2] Receiver category

The manufacturer shall state the receiver performance class, LR, MR or HR as defined in [EN 13757-4].

4.3 [T21-GR3] Transmitter category

The manufacturer shall state the transmitter performance class, LT, MT or HT as defined in [EN 13757-4].

4.4 [T21-GR4] Temperature range

The manufacturer shall state the operating temperature range.

4.5 [T21-GR5] Power supply

The manufacturer shall state the power source.

In case of external power supply the manufacturer shall state nominal, minimum and maximum voltage and maximal current.

4.6 [T21-GR6] Antenna

The manufacturer shall state if the antenna is detachable or not, and if an antenna connector is available.

5 Test conditions, power sources and ambient temperatures

Testing shall be performed under normal test conditions, and also, where stated, under extreme test conditions.

Extreme test conditions are as specified in [OMSCT-PHY] subclause 4.4 and 4.5.

Test conditions and procedures shall be as specified in [EN 300 220-1] subclauses 5.2 to 5.4.

6 Transmitter parameters

6.1 [T21-TX1] Nominal frequency

	PHY_A 868 MHz	PHY_B 433 MHz
S-mode meter nominal frequency	868,300 MHz	433,500 MHz
S-mode other nominal frequency		
T-mode meter nominal frequency	868,950 MHz	434,475 MHz
T-mode other nominal frequency	868,300 MHz	433,500 MHz
C-mode meter nominal frequency	868,950 MHz	434,475 MHz
C-mode other nominal frequency	869,525 MHz	433,500 MHz

Nominal frequency shall be calculated by (CW0 + CW1)/2,

CW0 and CW1 shall be committed in the radio test report or approved with a measurement according to [EN 300 220-1].

Note:

There are no relevant pass / fail criteria listed here. The test conditions are covered by [T21-TX3].

6.2 [T21-TX2] Frequency deviation

The frequency deviation, as defined in [EN 13757-4], shall comply with the following limits:

	PHY_A 868 MHz		PHY_B 433 MHz	
	Minimum	Maximum	Minimum	Maximum
S-mode	±40 kHz	±80 kHz	±40 kHz	±60 kHz
T-mode	±40 kHz	±80 kHz	±40 kHz	±60 kHz
C-mode	±33,75 kHz	±56,25 kHz	±33,75 kHz	±56,25 kHz

The frequency deviation shall be measured and the results shall be documented.

The method how to measure is up to the manufacturer.

The measurement can be done by the manufacturer or a certified laboratory.

The measurement procedure has to be documented and provided to the OMS certification body.

6.3 [T21-TX3] Frequency error or drift

The frequency error or frequency drift, as defined in [EN 13757-4], shall comply with the following limits:

	PHY_A 868 MHz			PHY_B 433 MHz		
	+/- ppm	Minimum	Maximum	+/- ppm	Minimum	Maximum
S1 mode meter	60	868,250 MHz	868,350 MHz	60	433,474 MHz	433,526 MHz
S2 mode meter or other	25	868,278 MHz	868,322 MHz	25	433,489 MHz	433,511 MHz
T1/T2 mode meter	60	868,900 MHz	869,000 MHz	60	434,449 MHz	434,501 MHz
T2 mode other	25	868,278 MHz	868,322 MHz	25	433,489 MHz	433,511 MHz
C1/C2 mode meter	25	868,928 MHz	868,972MHz	25	434,449 MHz	434,501 MHz
C2 mode other	25	869,503MHz	869,547MHz	25	433,489 MHz	433,511 MHz

The frequency error or frequency drift of Battery operated equipment, as defined in [EN 300 220-1] sub clause 7.9.1, shall not exceed the limits given above.

The test shall be performed at normal and extreme test conditions.

The drift of the nominal frequency shall be calculated using measured results of CW0 and CW1 under extreme test conditions.

Nominal frequency (Cond1)= (CW0(Cond1) + CW1(Cond1)) / 2

Nominal frequency (Cond2)= (CW0(Cond2) + CW1(Cond2)) / 2

Frequency Drift = ABS (Nominal Frequency (Cond1) – Nominal Frequency (Cond2))

6.4 Transmission power

Depending on the declaration of [OMSCT-PHY] subclause 4.6 (Antenna) transmission power has measured conducted or radiated

6.4.1 [T21-TX4] Average power (conducted)

The average power (conducted), as defined in [EN 300 220-1] subclause 7.2.1, shall comply with the following limits after the antenna gain is taken into consideration:

Transmitter class LT: Minimum -5 dBm ERP

Transmitter class MT: Minimum 0 dBm ERP

Transmitter class HT, meter: Minimum +5 dBm ERP

Transmitter class HT, other: Minimum +8 dBm ERP

The test shall be performed at normal conditions.

The nominal value from test report according to [EN 300 220-1] shall exceed the minimum value of the declared transmitter class.

.[T21-TX5] Effective radiated power (ERP)

The effective radiated power, as defined in [EN 300 220-1] sub clause 7.3.1, shall comply with the following limits:

Transmitter class LT: Minimum -5 dBm ERP

Transmitter class MT: Minimum 0 dBm ERP

Transmitter class HT, meter: Minimum +5 dBm ERP

Transmitter class HT, other: Minimum +8 dBm ERP

The nominal value from test report according to [EN 300 220-1] shall exceed the minimum value of the declared transmitter class

6.5 [T21-TX6] Chip rate, Chip rate tolerance, Chip rate variation within the header, Bit jitter and Data rate

The manufacturer shall state compliance to [EN 13757-4] within [OMSCT-ManDec].

6.6 [T21-TX7a] Preamble length and Postamble length

The manufacturer shall state compliance to [EN 13757-4] within [OMSCT-ManDec].

The manufacturer shall additionally state compliance with the limits of [OMSS-Vol2] subclause 4.2.3.2 within [OMSCT-ManDec].

Otherwise → ERROR

Appendix A: Applicable Test cases of OMS-CT (Normative)

1. Test cases of Wireless M-Bus devices

Test case	Description	UDM[1)]	BDM[2)]	UDR[3)]	GW[4)]
[T21-GR1]	Operating mode	X	X	X	X
[T21-GR2]	Receiver category		X	X	X
[T21-GR3]	Transmitter category	X	X	X	X
[T21-GR4]	Temperature range	X	X	X	X
[T21-GR5]	Power supply	X	X	X	X
[T21-GR6]	Antenna	X	X	X	X
[T21-TX1]	Nominal frequency	X	X	X	X
[T21-TX2]	Frequency deviation	X	X	X	X
[T21-TX3]	Frequency error or drift	X	X	X	X
[T21-TX4]	Carrier power (conducted)	A1	A1	A1	A1
[T21-TX5]	Effective radiated power (ERP)	A1	A1	A1	A1
[T21-TX6]	Chip rate, Chip rate tolerance	X	X	X	X
[T21-TX7a]	Preamble length and Postamble length	X	X	X	X

Note:

X This Test case is mandatory

Ax One of the Test cases marked with same number “x” shall be applied

1) UDM = Unidirectional Meter

2) BDM = Bidirectional Meter

3) UDR = Unidirectional Repeater

4) GW = Gateway

Table 1**: Test Cases related to DUT type**