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Conformance Test

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1 Scope

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

This issue is applicable only together with [OMS-CT1.GP].

- 5 This document specifies the tests to show conformance for the Use Cases which are defined in OMS Specification Volume 2, Primary Communication [OMS-S2], Annex M, Release A.

The parameters to be tested, and the test limits are based on OMS Specification Volume 2, Primary Communication [OMS-S2] including Annex M, Release A and the referenced Wireless M-Bus specification [EN 13757-4].

- 10 **NOTE:** This version of test specification does not cover all items of the current OMS Specification.

It is not in the scope of this document to show conformance to the essential requirements of any relevant EU directive, e. g. the Radio Equipment Directive 2014/53/EU (RED), or other national or international standards.

2 References

The references used are listed in [OMS-CT1.GP].

3 Definitions, Symbols and Abbreviations

The term definitions, symbols and abbreviations used are defined in [OMS-CT1.GP] (OMS Open Metering System – Conformance Test Volume 1 – General Part).

4 Test Cases

4.1 Introduction

This chapter described the test procedures for the OMS-UseCases as defined in [OMS-S2] Annex M, Release A.

- 5 If the Manufacturer declares the implementation of an OMS-UseCase in the [MANDEC] the described Test cases have to be passed successful for achievement of OMS Conformity.

4.2 Test Cases for UseCase 00 (UC-00)

4.2.1 [OMS-CT3.DLL] Addition

4.2.1.1 Test of Response Time

- 10 The timing limits are depending on the radio mode T2, S2 and C2.
The implemented radio mode is declared in the [MANDEC].

4.2.1.1.1 [T31-RT01] Slow Response Time

This test is mandatory for radio modes S2, T2, C2.

The following timing shall be tested:

- 15 Mode S2: 3,1 ms, 14.9 ms
Mode T2: 2,1 ms, 2,9 ms
Mode C2_slow: 999,6 ms, 1000,4 ms

- 20 The test is **passed** if the DUT has processed the commands in the given timing window in 2 out of 2 communications, otherwise it is **failed**. This test case shall be integrated in the test case [T43-UC00-1].

4.2.1.1.2 [T31-RT02] Fast Response Time

This test is mandatory for radio mode C2.

For radio modes S2, T2 this test is not applicable.

The following timing shall be tested:

- 25 Mode C2_fast: 99,6 ms, 100,4 ms

The test is **passed** if the DUT has processed the commands in the given timing window in 2 out of 2 communications, otherwise it is **failed**. This test case shall be integrated in the test case [T43-UC00-1].

4.2.1.1.3 [T31-RSP03] Response Time Switch

- 30 The OMS-CT shall test the switching capability of response timing slow -> fast -> slow.

This test can be executed with a test case of the [OMS-UC00] described later.

The test is **passed** if the DUT has processed the commands in the given timing window in 2 out of 2 communications, otherwise it is **failed**. This test case shall be integrated in the test case [T43-UC00-1].

4.2.1.1.4 Response Time for Test Cycles

35 All test sequences shall use the fast response timing for mode C2 and slow response timing for modes S2 and T2.

The OMS-CT shall transmit the messages to the DUT in the middle of the timing window.

NOTE: This not a test point. It is a precondition for the following tests.

4.2.1.2 Frequent Access Cycle

- 40 If the Manufacturer declares the implementation of an OMS-UseCase in the [MANDEC] the described Test cases have to be passed successful for achievement of OMS Conformity.

The principle is shown in Figure 1.

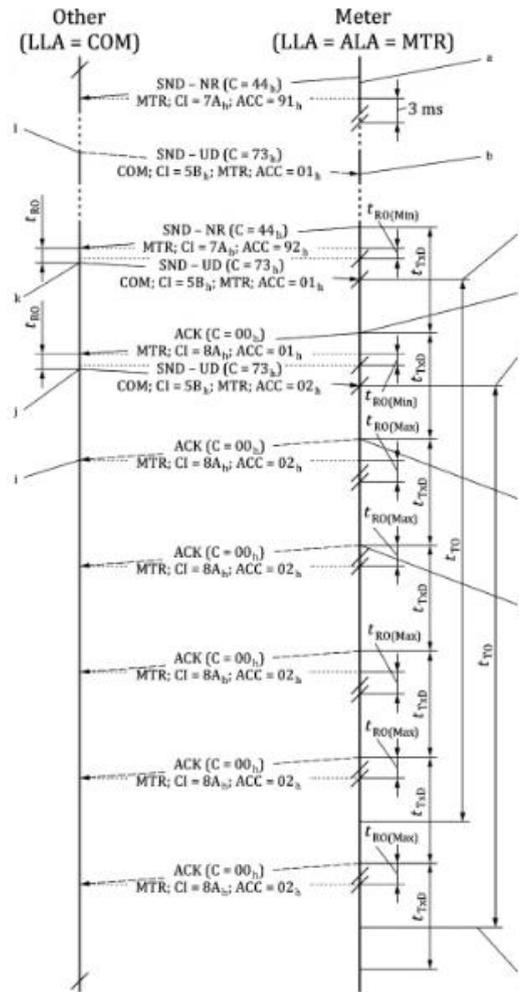


Figure 1 – Frequent Access Cycle for mode T

4.2.1.2.1 [T31-FAC1] Frequent Access Cycle Timing

Table 1 – [T31-FAC1] Frequent Access Cycle Timing

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall stimulate the DUT to enter FAC by sending 1 SND-UD with application reset 00h	
2	The OMS CT Tool shall receive all ACKs from the DUT and timestamp it	
3	The OMS CT Tool shall receive the ACKs from the DUT for min 25 s (t_TO)	
4	The OMS CT Tool shall not receive any ACK after 30 s. t_TO	
5	The OMS CT Tool shall evaluate that timing interval and deviation of the ACK messages.	
Test result		
1	The Test [T31-FAC1] is passed if <ul style="list-style-type: none"> The interval of ACK messages (all measured t_TxD) is constant / within a deviation of ± 500 ms. The measured time interval of ACK messages (t_TxD) is either 2, 3 or 5 s otherwise the test [T31-FAC1] is failed. 	

4.2.1.2.2 [T31-FAC2] Frequent Access Cycle Timing Extension

Table 2 – [T31-FAC2] Frequent Access Cycle Timing Extension

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall stimulate the DUT to enter FAC by sending 1 SND-UD with application reset 00h.	
2	The OMS CT Tool shall receive all ACKs from the DUT and timestamp it	
	The OMS CT Tool shall send 1 SND-UD with application reset 00h to the DUT	
	The OMS CT Tool shall receive all ACKs from the DUT and timestamp it	
	The OMS CT Tool shall send 1 SND-UD with application reset 00h to the DUT	
	The OMS CT Tool shall receive all ACKs from the DUT and timestamp it.	
3	The OMS CT Tool shall receive the ACK from the DUT for min 25 s (t_{TO}) after the last send message.	
4	The OMS CT Tool shall not receive and ACK after 30 s. t_{TO} after the last send message.	
5	The OMS CT Tool shall evaluate the timing interval and deviation of the ACK messages.	
Test result		
1	The Test [T31-FAC2] is passed if all conditions are positive <ul style="list-style-type: none"> The interval of ACK messages (all t_{TxD}) is constant / within a deviation of ± 500 ms. The interval of ACK messages (t_{TxD}) is either 2, 3 or 5 s. otherwise the test is failed	

4.2.1.3 Communication sequences

The [OMS-S2] describes the communication sequences

- Seq_SND-UD (mandatory)
- Seq_SND-UD2 (optional)
- REQ-UD1 (mandatory)

This chapter describes the test procedures for this communication sequences. All applicable tests have to be passed.

4.2.1.3.1 [T31-CS1] Communication sequence Seq_SND-UD

This test is mandatory.

Table 3 – [T31-CS1] Communication sequence Seq_SND-UD

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	Required credits for this test: min. xxx; typ. yyy
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	OMS CT Tool is receiving a telegram with bidi access enable	
2	OMS CT Tool send correct SND-UD with application reset 00h to the DUT	
3	OMS CT Tool is receiving the answer from the DUT Answer = ACK -> continue Answer = any other Frame -> Error No answer in 2x 5 sec -> Timeout -> Error	
4	OMS CT Tool is sending REQ-UD2 to the DUT	Only in case of no error
5	OMS CT Tool is receiving answer Answer = RSP-UD -> OK, Success of Test Answer = any other frame: Error No Answer in 2x5 sec -> Timeout -> Error	Only in case of no error
6	Send SND-NKE to the DUT and wait for SND-NR from the DUT	
7	In case of Error the test sequences (step 1..6) shall be repeated once	
Test result		
1	If at least one test sequence passed OK the test is passed; otherwise failed.	

4.2.1.3.2 [T31-CS2] Communication sequence Seq_SND-UD2

The communication sequence Seq_SND-UD2 is optional.

If the manufacturer declares implementation of Seq_SND-UD2 in the [MANDEC] this test shall be passed.

5

Table 4 – [T31-CS2] Communication sequence Seq_SND-UD2

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	OMS CT Tool is receiving a telegram with bidi access enable	
2	OMS CT Tool send correct SND-UD2 with application reset 00h to the DUT	
3	OMS CT Tool is receiving the answer from the DUT Answer = RSP-UD -> success, OK! Answer = any other Frame -> Error No answer in 2x 5 sec -> Timeout -> Error	
4	Send SND-NKE to the DUT and wait for SND-NR from the DUT	
5	In case of Error the test sequences (step 1..4) shall be repeated	
Test result		
1	If at least one test sequence passed OK the test is passed; otherwise failed.	

4.2.1.3.3 [T31-CS3] Communication sequence REQ-UD1

This test is mandatory.

Table 5 – [T31-CS3] Communication sequence Seq_REQ-UD1

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	Required credits for this test: min. xxx; typ. yyy
Test sequence		
1	OMS CT Tool is receiving a telegram with bidi access enable	
2	OMS CT Tool send correct REQ-UD1 to the DUT	
3	OMS CT Tool is receiving the answer from the DUT	
Test result		
1	(Answer = ACK) or (Answer = AlarmProtocol) -> passed Otherwise failed	

4.2.1.3.4 Communication sequence for test procedure

5 **For Information only:**

If the [MANDEC] declares that the DUT implements SND-UD2 then all remaining tests are conducted with SND-UD2, otherwise all remaining tests are conducted with SND-UD.

If the [MANDEC] declares the implementation of SND-UD2 and [T31-CS2] has failed all bidirectional tests are regarded as failed and no additional tests are executed.

10

4.2.1.4 Application Security

The [OMS-S2], 9.4 defines Application security with different profiles. The applicable Application secure profile (ASP) per UseCase is defined in [OMS-S2], Annex M.

Table 6 – Application security

ASP	OMS-UC-00	OMS-UC-01	OMS-UC-02	OMS-UC-03	OMS-UC-04	OMS-UC-05	OMS-UC-06	OMS-UC-07	OMS-UC-08	OMS-UC-09
ASP01	- ¹	-	-	-	-	-	-	-	M	-
ASP02	-	-	-	-	-	-	-	-	-	-
ASP03	-	-	-	-	-	M	-	-	-	-
ASP04 to ASP09	Reserved									
ASP10	O	-	-	M	- ² / M ³	M/O ⁴	M	-	-	-
ASP11 to ASP19	Reserved									
ASP20	-	-	-	-	-	-	-	-	-	-
-	not applicable									
M	mandatory									
D	derivate from UC-01 to UC-09									
O	optional (depending on UC-05 details)									
¹	Availability based on implemented OMS-UC-01 ... OMS-UC-09									
²	Only for OMS-UC-04a									
³	Only for OMS-UC-04b & OMS-UC-04c									
⁴	Depending on the messages									

5 If the manufacturer declares in the [MANDEC] the implementation of 1 or more UseCases that mandatory require the usage of an ASP or declared the optional usage of an ASP the related ASP shall be tested. This test is passed if all applicable tests are passed. Otherwise this test is failed.

4.2.1.4.1 [T43-ASP01] Test of Application security profile 01

10 This ASP is specific for UC08 and therefore tested in the according UseCase.

4.2.1.4.2 [T43-ASP03] Test of Application security profile 03

This ASP is specific for UC05 and therefore tested in the according UseCase.

4.2.1.4.3 [T43-ASP02] Test of Application Security Profile 10

4.2.1.4.3.1 [T43-ASP02-01] Test of Application Security Profile 10 – Acceptance

Table 7 – [T43-ASP02-01] Test of Application security profile 10 – acceptance

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS-CT shall prepare a command using the applicable Security Profile [MANDEC]	
2	The OMS-CT shall apply ASP10 to the command using KeyID = 1Fh [MANDEC]	
3	The OMS CT shall execute the [T43-UC00-1] successfully	
Test result		
1	If [T43-UC00-1] is passed successfully this test is passed Otherwise it is failed	

4.2.1.4.3.2 [T43-ASP02-02] Test of Application Security Profile 10 - Key Error

Table 8 – [T43-ASP02-02] Test of Application security profile 10 - key error

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS-CT shall prepare the test command “Empty or standard response” [OMS-S2] Annex M, table M.4 using the applicable Security Profile [MANDEC]	
2	The OMS-CT shall apply ASP10 to the command using a key different to KeyID = 1Fh [MANDEC]	
3	The OMS CT shall send the test command to the DUT	
4	The OMS CT shall receive the replay from the DUT	
Test result		
1	If the replay of the DUT = ApplicationError with ErrorCode = 20h this test is passed Otherwise it is failed	

4.2.1.4.3.3 [T43-ASP02-03] Test of Application Security Profile 10 – Frame Manipulation

Table 9 – [T43-ASP02-03] Test of Application security profile 10 – frame manipulation

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS-CT shall prepare the test command “Empty or standard response” [OMS-S2] Annex M, table M.4 using the applicable Security Profile [MANDEC]	
2	The OMS-CT shall apply ASP10 to the command using <i>KeyID = 1Fh</i> [MANDEC]	
3	The generated payload shall be manipulated: Generate a test payload e.g. 5A MAC shall be calculated on original payload Manipulate payload by XOR0000100000....b (single bit error)	
4	The OMS CT shall send the test command to the DUT	
5	The OMS CT shall receive the replay from the DUT	
Test result		
1	If the replay of the DUT = ApplicationError with ErrorCode = 20h this test is passed Otherwise it is failed	

4.2.1.4.3.4 [T43-ASP03] Test of Application Security Profile 20

5 Not required for this release.

4.2.2 [OMS-CT4.APL] Addition

4.2.2.1 Check OMS UseCase 00

The Implementation of OMS UseCase 00 according [OMS-S2] Annex M is mandatory if at least one of the other bidirectional OMS UseCases are declared in the [MANDEC].

5 For successful conformity test all test criteria's of this chapter have to be passed.

Special Information on DUT required for UC00 [MANDEC]:

- Applied security profile according [OMS-S2] Annex M, Table M.5
- Applied Encryption and Authentication [OMS-S2] Annex M, Table M.5
- Applied Application security (optional)
 - 10 ○ If Application security is applied: KeyID 1Fh

The following tests shall be executed to test the specific or unspecific response of DUT triggered by commands.

The timing of response is included in the error response test cases (see 4.2.1.1) and not explicit included here.

4.2.2.2 Test for Command Response

4.2.2.2.1 [T43-UC00-1] Test for Command with no Specific Response

This test is mandatory.

Table 10 – [T43-UC00-1] Test for command with no specific response

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	Required credits for this test: min. xxx; typ. yyy
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Empty or standard response” [OMS-S2] Annex M, table M.4 using <ul style="list-style-type: none"> • defined security profile as declared in [MANDEC] • defined application security if implemented, using KeyID 1Fh as declared in [MANDEC] 	
2	The OMS CT Tool shall send the command “ Empty or standard response ” [OMS-S2] Annex M, table M.4 to the DUT	Seq_SND-UDx (see OMS-S2 Annex M) is used.
3	The OMS CT Tool shall receive the answer from the DUT	
4	The test sequence is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> • telegram type is RSP-UD • telegram content is successfully checked for <ul style="list-style-type: none"> ○ standard response with mandatory data points according [OMS-CT Vol4], Annex M., M1.5 or ○ empty response according to [OMS-S2], Annex M., M1.5 	
5	Test sequences 2...4 shall be repeated once	
Test result		
1	The Test is passed if 2 of 2 test sequences have been successful. otherwise the test is failed	

4.2.2.2.2 [T43-UC00-2] Test for Command with Short Response

This test is mandatory.

Table 11 – [T43-UC00-2] Test for command with short response

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Test response short” [OMS-S2] Annex M, table M.4 using <ul style="list-style-type: none"> defined security profile as declared in [MANDEC] defined application security if implemented, using KeyID 1Fh as declared in [MANDEC] 	
2	The OMS CT Tool shall send the command “Test response short” [OMS-S2] Annex M, tables M.4 and M.6 to the DUT	Seq_SND-UDx (see OMS-S2 Annex M) is used.
3	The OMS CT Tool shall receive the answer from the DUT	
4	The test sequence is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> telegram type is RSP-UD The received data is ‘42h 42h’ ([OMS-S2] Annex M, Table M.4 	
5	Test sequences 2...4 shall be repeated once without interruption	
Test result		
1	The Test is passed if 2 of 2 test sequences have been successful. otherwise the test is failed	

4.2.2.2.3 [T43-UC00-3] Test for Command with Long Response

This test is mandatory.

Table 12 – [T43-UC00-3] Test for command with long response

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
3	The [MANDEC] declares the maximum datagram-length to be transmitted by the DUT.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Test response long” [OMS-S2] Annex M, tables M.4 and M.6 using defined security profile as declared in [MANDEC] defined application security if implemented, using KeyID 1Fh as declared in [MANDEC]	
2	The OMS CT Tool shall send the command “Test response long” [OMS-S2] Annex M, tables M.4 and M.6 to the DUT	Seq_SND-UDx (see OMS-S2 Annex M) is used.
3	The OMS CT Tool shall receive the answer from the DUT	
4	The test sequence is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> telegram type is RSP-UD The received data is N times ‘43h’ ([OMS-S2] Annex M, Tables M.4 and M.6) where N corresponds to the maximum datagram length according to [MANDEC] 	N depends on the applied security profile and application security. The datagram-length will be less or equal to the length declared in [MANDEC].
5	Test sequences 2...4 shall be repeated once without interruption	
Test result		
1	The Test is passed if 2 of 2 test sequences have been successful. otherwise the test is failed	

4.2.2.2.4 [T43-UC00-4] Test for Test Command Long

This test is mandatory.

Table 13 – [T43-UC00-4] Test for test command long

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
3	The [MANDEC] declares the maximum datagram-length according to [OMS-S2], 5.2.2	
Test sequence		
1	The OMS CT Tool shall prepare the command “Test command long” [OMS-S2] Annex M, table M.4 using defined security profile as declared in [MANDEC] defined application security if implemented, using KeyID 1Fh as declared in [MANDEC] with the maximum datagram-length as declared in [MANDEC]	The actual length may be less due to applied security profile and application profile.
2	The OMS CT Tool shall send the command “Test command long” [OMS-S2] Annex M, table M.4 to the DUT	Seq_SND-UDx (see OMS-S2 Annex M) is used.
3	The OMS CT Tool shall receive the answer from the DUT	
4	The test sequence is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> telegram type is RSP-UD The received data is the last 4 bytes of the test pattern sequence ([OMS-S2] Annex M, Table M.4) 	
5	Test sequences 2...4 shall be repeated once without interruption	
Test result		
1	The Test is passed if 2 of 2 test sequences have been successful. otherwise the test is failed	

4.2.2.3 Error Response

4.2.2.3.1 [T43-UC00-5] Test for Error Response

This test is mandatory.

Target is to test the application error response to a command and the timeout of a specific response.

5

Table 14 – [T43-UC00-5] Test for Error Response

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	All communication sequences are finalized, DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Application error” [OMS-S2] Annex M, table M.4 using <ul style="list-style-type: none"> defined security profile defined Encryption and Authentication defined application security if implemented, using KeyID 1Fh 	
2	The OMS CT Tool shall sent the command “Application error” [OMS-S2] Annex M, table M.4 to the DUT	
3	The OMS CT Tool shall receive the answer1 from the DUT	
4	Waiting Time for 10...15 sec	
5	The OMS CT Tool shall send a REQ-UD2 to the DUT	
6	The OMS CT Tool shall receive the answer2 from the DUT	
7	Waiting Time for >= 250 sec	
8	The OMS CT Tool shall send a REQ-UD2 to the DUT as answer to SND-NR with BiDi Access	
9	The OMS CT Tool shall receive the answer3 from the DUT	
Test result		
1	The test [T43-UC00-5] is successfully passed if the received answer1 is evaluated by <ul style="list-style-type: none"> telegram type the telegram shall be an Application Error answer1 = answer2 answer3 != answer1 	Evaluation of answer3 missing

4.3 Test Case for UseCase 01 (UC-01) - [OMS-CT4.APL] Addition

4.3.1 Introduction

The implementation of OMS UseCase 01 according [OMS-S2] Annex M is declared in the [MANDEC].

For successful conformity test all test criterias of this chapter must be passed.

Special Information on DUT required for UC01 [MANDEC]:

- Instructions how installation procedure is started
- Interval of SND-IR telegrams
- Applied Encryption and Authentication [OMS-S2] Annex M, Table M.7

4.3.2 [T44-UC01-1] Test Meter Registration

The Meter Registration is optional.

For the current release of [OMS-S2], Annex M this test is identical to [T31-TIM2a].

If the manufacturer declares implementation of UC01 in the [MANDEC] this test shall be passed.

Table 15 – [T44-UC01-1] Test Meter Registration

Index	Description	Remark
Precondition		
1	DUT is not in FAC.	
Test sequence		
1	Trigger the DUT manually to start the Meter Registration.	
2	The OMS CT Tool shall receive the SND-IR of the device	
3	The first SND-IR is sent within 60 seconds	
4	The SND-IR is repeated at least 5 times (6 transmissions) The SND-IR interval shall be within 30 and 60 seconds	
5	The transmission of installation messages shall stop no later than 60 minutes after the manual start event	
Test result		
1	The test [T44-UC01-1] is passed if the test execution was once in 2 runs successful. Otherwise, the test [T44-UC01-1] is failed .	

4.4 Test Cases for UseCase 03 (UC-03) - [OMS-CT4.APL] Addition

4.4.1 Introduction

5 For a successful conformity test all test criteria's of this chapter have to be passed, if UseCase 03 is supported by the DUT.

The Implementation of OMS UseCase 03 according to [OMS-S2] Annex M is optional and will be tested if UseCase 03 is declared in the [MANDEC].

If not described in another way, all communication shall use the ASP10 according to [OMS-S2], Table 41 with the specified settings:

- 10
- BCF = 20h / A0h
 - PID = 01h
 - KeyID = 20h
 - TargetTime = 3000000000h

4.4.2 [T60-UC03-0] Test for Radio Content

15 This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 16 – [T60-UC03-0] Test for radio content

Index	Description	Remark
Precondition		
1	DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall check every datagram which is not marked as static for MB-Data-Tags <ul style="list-style-type: none"> • DC1! • DC2! 	
Test result		
1	The test is successfully passed if every received datagram, which is a SND-NR datagram and is not marked as static, contains the MB-Data-Tags: <ul style="list-style-type: none"> • DC1! • DC2! Otherwise the test is failed .	

4.4.3 Basic Communication Tests

4.4.3.1 [T60-UC03-10] Test for Basic Communication Precondition

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 17 – [T60-UC03-10] Test for basic communication precondition

Index	Description	Remark
Precondition		
1	DUT is not in FAC..	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> • the command "XDC1!" • with value 00h (close/disconnect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.3.2 [T60-UC03-11] Test for Basic Usage of Subunit

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 18 – [T60-UC03-11] Test for basic usage of subunit

Index	Description	Remark
Precondition		
1	Continuously check for subunit during the complete test procedure.	
Test sequence		
1	<p>The OMS CT Tool shall check every datagram which is not marked as static for MB-Data-Tags.</p> <p>The subunit in each data information block in the whole communication shall be checked for the following MB-Data-Tags:</p> <ul style="list-style-type: none"> • DC1! • DC2! 	
Test result		
1	<p>The test is successfully passed if the subunit of all data information blocks of named MB-Data-Tags are:</p> <p>If device type of DUT is 20h or 21h:</p> <ul style="list-style-type: none"> • Subunit = 0 <p>If device type of DUT is 02h, 03h, 04h, 06h, 07h, 08h, 0Ah, 0Bh, 0Ch, 0Dh, 15h, or 16h:</p> <ul style="list-style-type: none"> • Subunit = 1 <p>Otherwise the test is failed.</p>	<p>For communication the OMS-CTT need to set the subunit within XDC1! to 1 in required cases otherwise to 0</p>

4.4.3.3 [T60-UC03-12] Test for wrong usage of Subunit

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 19 – [T60-UC03-12] Test for wrong usage of Subunit

Index	Description	Remark
Precondition		
1	If device type of DUT is 20h or 21h: <ul style="list-style-type: none"> Run test case [T60-UC03-10] with subunit 1 If device type of DUT is 02h, 03h, 04h, 06h, 07h, 08h, 0Ah, 0Bh, 0Ch, 0Dh, 15h, or 16h: <ul style="list-style-type: none"> Run test case [T60-UC03-10] with subunit 0 	
Test sequence		
1	The OMS CT Tool shall check the response datagram from the DUT.	
Test result		
1	The test is successfully passed if the device does not responds with DC1! or DC2! on the command XDC1! Otherwise the test is failed .	

4.4.4 Tests for Type “Direct switch-on”

4.4.4.1 [T60-UC03-20] Test for Open/Connect for Type “Direct switch-on”

This test is mandatory for disconnector type “Direct switch-on”.

Table 20 – [T60-UC03-20] Test for open/connect for type “Direct switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-10] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 01h (open/connect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 01h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.4.2 [T60-UC03-21] Test for Open/Connected Loop for Type “Direct switch-on”

This test is mandatory for disconnector type “Direct switch-on”.

Table 21 – [T60-UC03-21] Test for open/connected loop for type “Direct switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-20] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> the command “XDC1!” with value 01h (open/connect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> no application error no application busy MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> value is = 01h MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> value is = 00h or 01h Otherwise the test is failed .	

4.4.4.3 [T60-UC03-22] Test for Close/Disconnect for Type “Direct switch-on”

This test is mandatory for disconnector type “Direct switch-on”.

Table 22 – [T60-UC03-22] Test for close/disconnect for type “Direct switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-21] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 00h (close/disconnect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.4.4 [T60-UC03-23] Test for Close/Disconnect Loop for Type “Direct switch-on”

This test is mandatory for disconnecter type “Direct switch-on”.

Table 23 – [T60-UC03-23] Test for close/disconnect loop for type “Direct switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-22] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 00h (close/disconnect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5 Tests for Type “Manual switch-on”

4.4.5.1 [T60-UC03-30] Test for Open/Connect for Type “Manual switch-on”

This test is mandatory for disconnector type “Manual switch-on”.

Table 24 – [T60-UC03-30] Test for open/connect for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-10] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 01h (open/connect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 02h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.2 [T60-UC03-31] Test for Release for Type “Manual switch-on”

This test is mandatory for disconnecter type “Manual switch-on”.

Table 25 – [T60-UC03-31] Test for release for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-10] was passed	
Test sequence		
1	Execute [T60-UC03-10] again	It is necessary for put DUT in closed/disconnected state
2	The OMS CT Tool shall send Seq_SND-UDx - the command “XDC1!” - with value 02h (release)	See OMS-S2, Annex M, Release A, Table M.8
3	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 02h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.3 [T60-UC03-32] Test for Manual Action for Type “Manual switch-on”

This test is mandatory for disconnecter type “Manual switch-on”.

Table 26 – [T60-UC03-32] Test for manual action for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-31] was passed	
3	Wait for status “closed/disconnect” (by SND-NR or RSP-UD) <ul style="list-style-type: none"> • MB-Data -Tag “DC2!” <ul style="list-style-type: none"> ○ value is = 00h 	
Test sequence		
1	Perform manufacturer declared action for manual switch-on actions	
2	The OMS CT Tool shall receive the standard-response from the DUT (RSP-UD) after REQ-UD2 and Appl.Reset	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 01h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.4 [T60-UC03-33] Test for Open/Connected Loop for Type “Manual switch-on”

This test is mandatory for disconnector type “Manual switch-on”.

Table 27 – [T60-UC03-33] Test for open/connected loop for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-32] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 01h (open/connect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 01h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.5 [T60-UC03-34] Test for Released Loop for Type “Manual switch-on”

This test is mandatory for disconnector type “Manual switch-on”.

Table 28 – [T60-UC03-34] Test for released loop for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-33] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 02h (release) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 01h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.6 [T60-UC03-35] Test for Close/Disconnect for Type “Manual switch-on”

This test is mandatory for disconnecter type “Manual switch-on”.

Table 29 – [T60-UC03-35] Test for close/disconnect for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-34] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 00h (close/disconnect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.5.7 [T60-UC03-36] Test for Close/Disconnect Loop for Type “Manual switch-on”

This test is mandatory for disconnecter type “Manual switch-on”.

Table 30 – [T60-UC03-35] Test for close/disconnect loop for type “Manual switch-on”

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-35] was passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx <ul style="list-style-type: none"> • the command “XDC1!” • with value 00h (close/disconnect) 	See OMS-S2, Annex M, Release A, Table M.8
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • no application error • no application busy • MB-Data-Tag “DC1!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag “DC2!” is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.6 Tests for ASP10

4.4.6.1 [T60-UC03-40] Test for Unsecure Communication (without ASP10)

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 31 – [T60-UC03-40] Test for unsecure communication (without ASP10)

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-36] or [T60-UC03-23] is passed	Depending on the disconnecter type (Direct switch-on or Manual switch-on).
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> • the command "XDC1!" • with value 01h (open/connect) • without "ASP10", no application security 	
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • application error • MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed	

4.4.6.2 [T60-UC03-41] Test for other Application Security Communication (e.g. with ASP1)

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 32 – [T60-UC03-41] Test for other application security communication (e.g. with ASP1)

5

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-36] or [T60-UC03-23] is passed	Depending on the disconnecter type (Direct switch-on or Manual switch-on).
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> • the command "XDC1!" • with value 01h (open/connect) • with "ASP1", wrong application security 	
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • application error • MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.6.3 [T60-UC03-42] Test for wrong Settings of Security Communication (e.g. with ASP1)

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on).

Table 33 – [T60-UC03-42] Test for wrong settings of security communication (e.g. with ASP1)

5

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	[T60-UC03-36] or [T60-UC03-23] is passed	Depending on the disconnecter type (Direct switch-on or Manual switch-on).
3	[T60-UC03-40] and [T60-UC03-41] are passed	
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> • the command "XDC1!" • with value 01h (open/connect) • with "ASP10" and KeyID=21h 	KeyID wrong
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> • application error • MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h • MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> ○ value is = 00h or 01h Otherwise the test is failed .	

4.4.6.4 [T60-UC03-43] Test for Target Time in ASP10

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on), in case the manufacturer has declared support of the target time feature within [MANDEC].

Table 34 – [T60-UC03-43] Test for target time in ASP10

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	UseCase4 shall be supported	
3	Current time of device within RSP-UD (standard response) has been received.	
4	[T60-UC03-36] or [T60-UC03-23] is passed	Depending on the disconnecter type (Direct switch-on or Manual switch-on).
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> the command "XDC1!" with value 01h (open/connect) TargetTime in ASP10 set to readout time (precondition 3) + 60 seconds 	
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
3	Wait 20 seconds	
4	Seq_SND-UDx [App-Reset, REQ-UD2 / SND-UD2]	
5	Wait 60 seconds	
6	Seq_SND-UDx [App-Reset, REQ-UD2 / SND-UD2]	
Test result		
1	<p>The test is successfully passed if the received immediate response and the response after 20 seconds: (after step 2 and 4)</p> <ul style="list-style-type: none"> no application error no application busy MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> value is = 00h MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> value is = 00h or 01h <p>the response after 80 seconds (after step 6):</p> <ul style="list-style-type: none"> no application error no application busy MB-Data-Tag "DC1!" is within RSP-UD <ul style="list-style-type: none"> value is = 01h or 02h MB-Data -Tag "DC2!" is within RSP-UD <ul style="list-style-type: none"> value is = 00h or 01h <p>Otherwise the test is failed.</p>	

4.4.6.5 [T60-UC03-44] Test for Unsupported Target Time in ASP10

This test is mandatory for both types of disconnecter (Direct switch-on, Manual switch-on), in case the manufacturer has **not** declared support of the target time feature within [MANDEC].

Table 35 – [T60-UC03-44] Test for unsupported target time in ASP10

Index	Description	Remark
Precondition		
1	DUT is in FAC.	
2	Current time of device within RSP-UD (standard response) has been received.	
3	[T60-UC03-36] or [T60-UC03-23] is passed	Depending on the disconnecter type (Direct switch-on or Manual switch-on).
Test sequence		
1	The OMS CT Tool shall send Seq_SND-UDx [App-Reset, MBusData] <ul style="list-style-type: none"> the command "XDC1!" with value 01h (open/connect) TargetTime in ASP10 set to readout time (precondition 3) + 60 seconds 	
2	The OMS CT Tool shall receive the response from the DUT (RSP-UD) after REQ-UD2 / SND-UD2	
Test result		
1	The test is successfully passed if the received response is evaluated by <ul style="list-style-type: none"> replied with a SITP status response using value 23h Otherwise the test is failed .	

4.5 Test Cases for UseCase 04 (UC-04) - [OMS-CT4.APL] Addition

4.5.1 [T43-UC04-1] OMS-UC-04 a/b/c: Read Time

5 According to the OMS-UC-04 the DUT shall respond with the MB-Data-Tag DT1! in the standard response and in SND-NR messages (except static messages).

Table 36 – [T60-UC04-1] OMS-UC-04 a/b/c: Read Time

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The manufacturer confirms in the [ManDec] that OMS-UC-04 is being supported	
3	All communication sequences are finalized, DUT is not in FAC	
Test sequence		
1	OMS CT Tool receives a telegram with bidi access enabled	
2	OMS CT Tool sends a SND-UDx with [App-Reset] to the DUT	
3	OMS CT Tool receives a RSP-UD from the DUT	
4	In case of Error the test sequences (step 1..3) shall be repeated	
Test result		
1	The Test [...] is passed if <ul style="list-style-type: none"> • SND-NR contains the MB-Data-Tag DT1! and • RSP-UD contains the MB-Data-Tag DT1! Otherwise the test [...] is failed .	

4.5.2 [T43-UC04-2] OMS-UC-04 a/b: Adjust and Correct Clock Time by Gateway

According to the OMS-UC-04 the DUT shall support the Clock Synchronization Protocol according to [OMS-S2] 8.7, with both functions:

- 5 • "Time adjustment" (TC-field 01h or 02h and time format type J)
- "Time correction" (TC-field 03h and time format type J)

Table 37 – [T60-UC04-2] OMS-UC-04 a/b: Adjust and Correct Clock Time by Gateway

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The manufacturer confirms in the [ManDec] that OMS-UC-04 a or b is being supported and informs about supported TC-field values	
3	All communication sequences are finalized, DUT is not in FAC	
Test sequence		
1.1	Read time of DUT (according test case "Read Time")	
2.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and "Time adjustment" TC-field 01 to the DUT, time shall differ more than 60 seconds	check that invalid deviations are not accepted
2.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing "any application error".	
2.3	OMS CT Tool shall send a REQ-UD2 to acquire application error from the DUT via RSP-UD	Application error 15h expected
2.4	In case of an communication Error the test sequences (step 2.1..2.3) shall be repeated	
3.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and "Time adjustment" TC-field 01 or 02 (depending on what is supported by the DUT) to the DUT, time to be adjusted shall differ less than 60 seconds	adjust time use time format type J
3.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing "no error".	Correct command execution can only be verified after 12 hours
3.3	In case of a communication Error the test sequences (step 3.1..3.2) shall be repeated	
4.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and "Time adjustment" TC-field 01 or 02 (depending on what is supported by the DUT) to the DUT	check that no further adjustment/correction will be accepted

Index	Description	Remark
4.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing “any application error”.	
4.3	OMS CT Tool shall send a REQ-UD2 to acquire application error from the DUT via RSP-UD	Application error 10h expected
4.4	In case of a communication Error the test sequences (step 4.1..4.3) shall be repeated	
5	Wait 12 hours	if no communication error
6.1	OMS CT Tool receives a telegram with bidi access enabled	
6.2	OMS CT Tool sends a SND-UDx with [App-Reset] to the DUT	
6.3	OMS CT Tool receives a RSP-UD from the DUT	containing DT1! Time adjustment expected to have been effectuated
6.4	In case of an communication Error the test sequences (step 6.1..6.3) shall be repeated	
7	Repeat test with (steps 1.1..6.4) <ul style="list-style-type: none"> • “Time correction” TC-field 03 	
Test result		
1	The Test [...] is passed if <ul style="list-style-type: none"> • sequence 3 was successful for <ul style="list-style-type: none"> ○ either “Time adjustment” with TC-field 01 or with TC-field 02, ○ and “Time correction” with TC-field 03 • and sequence 2 failed (Application error 15h) • and sequence 4 failed (Application error 10h) • and time read in sequence 6 is according to the time read in step 1.1 taking the time adjustment/correction correctly into account Otherwise the test [...] is failed .	

NOTE 1: A clock correction or adjustment can be confirmed not earlier than 12 hours after the correction or adjustment. Use “Read Time” for confirmation.

NOTE 2: A once initiated clock adjustment/setting will prevent adjustment/setting as long as the adjustment /setting is ongoing.

4.5.3 [T43-UC04-3] OMS-UC-04b/c: Adjust Clock Time by Head-End

According to the OMS-UC-04 the DUT shall support the Clock Synchronization Protocol according to [OMS-S2], 8.7, with both functions:

- “Time adjustment” (TC-field 01h or 02h and time format type J)
- “Time correction” (TC-field 03h and time format type J)

Table 38 – [T60-UC04-3] OMS-UC-04b/c: Adjust Clock Time by Head-End

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The manufacturer confirms in the [ManDec] that OMS-UC-04 b or c is supported and informs about supported TC-field values	
3	All communication sequences are finalized, DUT is not in FAC	
4	[ManDec] provides key for ASP10.	
Test sequence		
1	Read time of DUT (according test case “Read Time”)	
2.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and “Time adjustment” TC-field 01 or 02 (depending on what is supported by the DUT) to the DUT, time to be adjusted shall differ more than 60 seconds	check that invalid deviations are not accepted
2.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing “any application error”.	
2.3	OMS CT Tool shall send a REQ-UD2 to acquire the application answer via RSP-UD. This SITP answer contains an application error showing the value 15 _h “parameter is missing or wrong”	Application error 15 _h is expected SITP-PID is 02 _h indicating application error protocol
2.4	In case of a communication Error the test sequences (step 2.1..2.3) shall be repeated	
3.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and “Time adjustment” TC-field 01 or 02 (depending on what is supported by the DUT) to the DUT, time to be adjusted shall differ less than 60 seconds	adjust time use time format type J
3.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing “no error”.	

Index	Description	Remark
3.3	OMS CT Tool shall send a REQ-UD2 to acquire the application answer via RSP-UD that contains a SITP status response (DSI 22) with a value 00 _h "successful SITP command"	Correct command execution can only be verified after 12 hours
3.4	In case of a communication Error the test sequences (step 3.1..3.3) shall be repeated	
4.1	OMS CT Tool sends a SND-UD with [Clock-Sync] and "Time adjustment" TC-field 01 or 02 (depending on what is supported by the DUT) to the DUT	check that no further adjustment/correction will be accepted
4.2	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing "any application error".	
4.3	OMS CT Tool shall send a REQ-UD2 to acquire the application answer via RSP-UD. This SITP answer contains an application error showing the value 15 _h "parameter is missing or wrong"	Application error 10 _h expected SITP-PID is 02 _h indicating application error protocol
4.4	In case of a communication Error the test sequences (step 4.1..4.3) shall be repeated	
5	Wait 12 hours	if no communication error
6.1	OMS CT Tool receives a telegram with bidi access enabled	
6.2	OMS CT Tool sends a SND-UDx with [App-Reset] to the DUT	
6.3	OMS CT Tool receives a RSP-UD from the DUT	containing DT1! Time adjustment expected to have been effectuated
6.4	In case of an communication Error the test sequences (step 6.1..6.3) shall be repeated	
7	Repeat test with (steps 1.1..6.4) <ul style="list-style-type: none"> • "Time correction" TC-field 03 	
8	OMS CT Tool shall test [OMS-UC-04a]	

Index	Description	Remark
Test result		
1	The Test [...] is passed if <ul style="list-style-type: none"> • sequence 3 was successful for <ul style="list-style-type: none"> ○ either “Time adjustment” with TC-field 01 or with TC-field 02, ○ and “Time correction” with TC-field 03 • and sequence 2 failed (Application error 15h) • and sequence 4 failed (Application error 10h) • and time read in sequence 6 is according to the time read in step 1.1 taking the time adjustment/correction correctly into account • and [OMS-UC-04a] failed Otherwise the test [...] is failed .	

NOTE 1: A clock correction or adjustment can be confirmed not earlier than 12 hours after the correction or adjustment. Use “Read Time” for confirmation.

NOTE 2: A once initiated clock adjustment/setting will prevent adjustment/setting as long as the adjustment /setting is ongoing.

4.5.4 [T43-UC04-4] OMS-UC-04b/c: Set Date and Time by Head-End

According to the OMS-UC-04 the DUT shall only support function “Time setting” with TC-field 00h and time format type I shall be supported.

Table 39 – [T60-UC04-4] OMS-UC-04b/c: Set Date and Time by Head-End

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The manufacturer confirms in the [ManDec] OMS-UC-04 b or c is being supported	
3	All communication sequences are finalized, DUT is not in FAC	
4	[ManDec] provides key for ASP10.	
Test sequence		
1.1	OMS CT Tool receives a telegram with bidi access enabled	
1.2	OMS CT Tool sends a SND-UD with [Clock-Sync] and “Time setting” with TC-field 00h to the DUT	use time format type I remember time difference to world-time
1.3	OMS CT Tool receives an ACK from the DUT with a TPL Status Byte showing “no error”.	
1.4	OMS CT Tool shall send a REQ-UD2 to acquire the application answer via RSP-UD that contains a SITP status response (DSI 22) with a value 00 _h “successful SITP command”	
1.5	In case of an communication Error the test sequences (step 1.1.. 1.4) shall be repeated	
2	Read time of DUT (according test case “Read Time”)	
3	OMS CT Tool shall perform the test case “Adjust Clock Time by Gateway”	To check if this test case intentionally fails.
Test result		
1	The Test [...] is passed if <ul style="list-style-type: none"> • “Time setting” with TC-field 00h was successful, • and time read in step 2 is according to the dates and time set in step 1.2 • and step 3 “Adjust Clock Time by Gateway” failed Otherwise the test [...] is failed .	

5 **NOTE:** With “Set Time” the time is set immediately.

4.6 Test Cases for UseCase 05 (UC-05)

Reserved for future revisions of this document.

4.7 Test Cases for UseCase 06 (UC-06) - [OMS-CT4.APL] Addition

4.7.1 Introduction

5 The Implementation of OMS UseCase 06 according [OMS-S2] Annex M is declared in the [MANDEC].

The usage of the datapoints MM2! or MM3! and optional MM8! are declared in the [MANDEC].

For successful conformity test all test criteria's of this chapter have to be passed.

Special Information on DUT required for UC06 [MANDEC]:

- 10
- Applied security profile according [OMS-S2] Annex M, Table M.23
 - Applied Encryption and Authentication [OMS-S2] Annex M, Table M.23

4.7.2 Standard Response

4.7.2.1 Introduction

The DUT shall reply with a standard response to a request after an ApplicationReset.

4.7.2.2 [T43-UC06-1] Test for Get Status Information

This test is mandatory.

Table 40 – [T43-UC06-1] Test for get status information

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered (enough credits shall be available)	
2	DUT is not in FAC.	
Test sequence		
1	The OMS CT Tool shall send the sequence “Seq_SND-UDx” [OMS-S2] Annex M, table M.23 to the DUT using <ul style="list-style-type: none"> defined security profile as declared in [MANDEC] defined encryption and authentication as declared in [MANDEC] 	
2	The OMS CT Tool shall receive the answer from the DUT	
3	The test [T43-UC06-1] is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> telegram type is RSP-UD (standard response) [OMS-S2], table 33 The received data contain error flag MM2! or MM3! as declared in the [MANDEC] The received data contain battery life time MM8! (optional) 	
4	The test sequence shall be executed 2 times without interruption	
Test result		
1	The Test [T43-UC06-1] is passed if 2 of 2 test sequences have been successful. Otherwise the test [T43-UC06-1] is failed .	

4.7.2.3 [T43-UC06-2] Test for Clear Status Information Bitwise

This test is mandatory.

Table 41 – [T43-UC06-2] Test for clear status information bitwise

Index	Description	Remark
Precondition		
1	Credit Handling shall be not considered (min. XXX credits shall be available)	
2	DUT is not in FAC.	
3	A KeyCounter value 1000 is assumed as valid.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Clear status information bitwise” [OMS-S2] Annex M, table M.24 using <ul style="list-style-type: none"> defined security profile as declared in [MANDEC] defined encryption and authentication as declared in [MANDEC] defined application security parameters 	
2	The OMS CT Tool shall send the sequence “Seq_SND-UDx” [OMS-S2] Annex M, table M.24 to the DUT using <ul style="list-style-type: none"> MB-Command: XMM2! or XMM3! 	
3	The OMS CT Tool shall receive the answer from the DUT.	
4	The test [T43-UC06-2] is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> telegram type is RSP-UD (standard response) [OMS-S2], table 33 or SND-NR Dynamic Data [OMS-S2], table 29 The received data contain error flag MM2! or MM3!. 	
5	The test sequence shall be executed 2 times without interruption.	
Test result		
1	The Test [T43-UC06-2] is passed if 2 of 2 test sequences have been successful. Otherwise the test [T43-UC06-2] is failed .	

4.7.2.4 [T43-UC06-3] Test for Clear Status Information all

This test is mandatory.

Table 42 – [T43-UC06-3] Test for clear status information all

Index	Description	Remark
Precondition		
1	Credit Handling shall be not considered (min. XXX credits shall be available)	
2	DUT is not in FAC.	
3	A KeyCounter value 1010 is assumed as valid.	
Test sequence		
1	The OMS CT Tool shall prepare the command “Clear status information all” [OMS-S2] Annex M, table M.24 using <ul style="list-style-type: none"> • defined security profile as declared in [MANDEC] • defined encryption and authentication as declared in [MANDEC] • defined application security parameters 	
2	The OMS CT Tool shall send the sequence “Seq_SND-UDx” [OMS-S2] Annex M, table M.24 to the DUT using <ul style="list-style-type: none"> • MB-Command: XMM4! 	
3	The OMS CT Tool shall receive the answer from the DUT.	
4	The test [T43-UC06-3] is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> • telegram type is RSP-UD (standard response) [OMS-S2], table 33 • The received data contain error flag MM2! or MM3!. 	
5	The test sequence shall be executed 2 times without interruption.	
Test result		
1	The Test [T43-UC06-3] is passed if 2 of 2 test sequences have been successful. Otherwise the test [T43-UC06-3] is failed .	

4.8 Test Cases for UseCase 08 (UC-08) - [OMS-CT4.APL] Addition

4.8.1 Introduction

For successful conformity test all test criteria's of this chapter have to be passed.

5 Special Information on DUT required for UC08 [MANDEC]:

- Key ID 00h version 0
- Wrapper Key ID 12h
- If ASP10 supported (optional)
 - Key ID 1Fh
 - Wrapper Key ID 14h

10

4.8.2 Get List of Active Keys

The DUT shall replay a SITP response with a list of active key information.

4.8.2.1 [T43-UC08-1] Test for Active Key Information

This test is mandatory.

5

Table 43 – [T43-UC08-1] Test for active key information

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command " Get list of active key information " [OMS-S2] Annex M, table M.27 using <ul style="list-style-type: none"> • BCF=08h, DSI=00h 	
2	The OMS CT Tool shall send the prepared command to the DUT	
3	The OMS CT Tool shall receive the answer from the DUT	
Test result		
1	<p>The Test is passed if the received answer contains:</p> <ul style="list-style-type: none"> • BCF=88h, DSI=21h • The list shall contain at least: <ul style="list-style-type: none"> ○ Master Key ID (00h) and version which must be in accordance with the precondition 2. ○ Communication wrapper key ID (12h) and version. • If ASP10 is supported as declared in [MANDEC], the list shall also contain: <ul style="list-style-type: none"> ○ OMS compliance test key ID (1Fh) and version, ○ Application wrapper key ID (14h) and version. <p>Otherwise, the test is failed</p>	

4.8.2.2 [T43-UC08-2] Test for Active Keys and Key Counter Information

This test is mandatory.

Table 44 – [T43-UC08-2] Test for active keys and key counter information

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active master key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command "Get list of active keys and key counter information" [OMS-S2] Annex M, table M.27 using <ul style="list-style-type: none"> • BCF=09h, DSI=00h 	
2	The OMS CT Tool shall send the prepared command to the DUT	
3	The OMS CT Tool shall receive the answer from the DUT	
Test result		
1	<p>The Test is passed if the received answer contains:</p> <ul style="list-style-type: none"> • BCF=89h, DSI=23h • The list shall contain at least: <ul style="list-style-type: none"> ○ Master Key ID (00h), version which must be in accordance with the precondition 2, and key counter. ○ Communication wrapper key ID (12h), version and key counter. • If ASP10 is supported as declared in [MANDEC], the list shall also contain: <ul style="list-style-type: none"> ○ OMS compliance test key ID (1Fh), version and key counter. ○ Application wrapper key ID (14h), version and key counter. <p>Otherwise, the test is failed</p>	

4.8.3 Transfer of Key Material

4.8.3.1 [T43-UC08-3] Test for Transfer of Key Material (Master Key)

This test is mandatory.

Table 45 – [T43-UC08-3] Test for transfer of key material (Master key)

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active master key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
3	The communication security wrapper key (Key-ID = 12h) and its related version shall be provided in the [MANDEC] according to ASP01 [OMS-S2]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command “ Transfer security information ” [OMS-S2] Annex M, table M.28 using <ul style="list-style-type: none"> • BCF=00h, DSI=01h • DSH1= 12h, Communication security wrapper key Id, • DSH2= Communication security wrapper key version, • Key ID= 00h (MK) • If current active version is Vn: <ul style="list-style-type: none"> ○ Key version= Vn+1, ○ Key= value from the CT Tool 	The key value provided by the CT Tool shall be different from the previous used key.
2	The OMS CT Tool shall send the prepared command to the DUT	
3	The OMS CT Tool shall receive the answer from the DUT	
Test result		
1	The Test is passed if the received answer contains: <ul style="list-style-type: none"> • BCF=80h, DSI=22h • Status response = 00h (Success) Otherwise, the test is failed	

4.8.3.2 [T43-UC08-4] Test for Transfer of Key Material (Application Security Key)

This test is optional.

Table 46 – [T43-UC08-4] Test for transfer of key material (Application security key)

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active master key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
3	The application security wrapper key (Key-ID = 14h) and its related version shall be provided in the [MANDEC] according to ASP01 [OMS-S2]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command " Transfert security information " [OMS-S2] Annex M, table M.28 using <ul style="list-style-type: none"> • BCF=00h, DSI=01h • DSH1= 14h, Application security wrapper key Id, • DSH2= Application security wrapper key version, • Key ID= 1Fh, Application security key, • If current active version is Vn: <ul style="list-style-type: none"> ○ Key version= Vn+1, ○ Key= value from the CT Tool 	Current active key has been retrieved during the test of active key information [Txx-UC8-1] The key value provided by the CT Tool shall be different from the previous used key.
2	The OMS CT Tool shall send the prepared command to the DUT	
3	The OMS CT Tool shall receive the answer from the DUT	
Test result		
1	The Test is passed if the received answer contains: <ul style="list-style-type: none"> • BCF=80h, DSI=22h • Status response = 00h (Success) Otherwise, the test is failed	

4.8.4 Activation/Deactivation of Key Material

4.8.4.1 [T43-UC08-5] Test for Activation/Deactivation of Key Material (Master Key)

This test is mandatory.

5 **Table 47 – [T43-UC08-5] Test for activation/deactivation of key material (Master key)**

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active master key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
3	The communication security wrapper key (Key-ID = 12h) and its related version shall be provided in the [MANDEC] according to ASP01 [OMS-S2]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command " Combined activation/deactivation of security information " [OMS-S2] Annex M, table M.29 using <ul style="list-style-type: none"> • BCF=04h, DSI=03h • DSH1= 12h, Communication security wrapper key Id, • DSH2= Communication security wrapper key version, • Activated Key ID= 00h (MK) • Deactivated Key ID= 00h (MK) • If current active version is Vn: <ul style="list-style-type: none"> ○ Activated Key version= Vn+1, ○ Deactivated Key version = Vn • Option = 1 to perform the message counter reset 	
2	The OMS CT Tool shall send the prepared command to the DUT with SND-UD	
3	OMS CT Tool shall load the new key after the ACK was received	
4	The OMS CT Tool shall send a REQ-UD2	
5	The OMS CT Tool shall receive the answer from the DUT	

Index	Description	Remark
Test result		
1	The Test is passed if the received answer is encrypted with the newly activated version and contains: <ul style="list-style-type: none"> • Successful decryption • BCF=84h, DSI=22h • Status response = 00h (Success) • Message counter has to be reset to 1 Otherwise, the test is failed	

4.8.4.2 [T43-UC08-6] Test for Activation/Deactivation of Key Material (Application Security Key)

This test is optional.

Table 48 – [T43-UC08-6] Test for activation/deactivation of key material (Application security key)

5

Index	Description	Remark
Precondition		
1	Credit Handling shall not be considered therefore sufficient Credits shall be available	
2	The index of the current active master key has been determined from the last SND-NR sent by the DUT (either the initial master key V0 or Vn from the CT Tool) in accordance with the defined security profile as declared in [MANDEC]	
3	The application security wrapper key (Key-ID = 14h) and its related version shall be provided in the [MANDEC] according to ASP01 [OMS-S2]	
Test sequence		
1	The OMS CT Tool shall prepare the SITP command " Combined activation/deactivation of security information " [OMS-S2] Annex M, table M.29 using <ul style="list-style-type: none"> • BCF=04h, DSI=03h • DSH1= 14h, Application security wrapper key Id, • DSH2= Application security wrapper key version, • Activated Key ID= 1Fh (Application security key) • Deactivated Key ID= 1Fh (Application security key) • If current active version is Vn: <ul style="list-style-type: none"> ○ Activated Key version= Vn+1, ○ Deactivated Key version = Vn 	
2	The OMS CT Tool shall send the prepared command to the DUT with SND-UD	
3	OMS CT Tool shall load the new key after the ACK was received	
4	The OMS CT Tool shall send a REQ-UD2	

Index	Description	Remark
5	The OMS CT Tool shall receive the answer from the DUT	
6	If the received answer contains: <ul style="list-style-type: none"> • Successful decryption • BCF=84h, DSI=22h • Status response = 00h (Success) • Otherwise, the test is failed	
7	The OMS-CT shall prepare “test response short command” [32h].	
8	The OMS-CT shall apply ASP10 to the command using KeyID = 1Fh [MANDEC]	
9	The OMS CT shall execute the [T43-UC00-1] successful.	
Test result		
1	The test sequence is successfully passed if the received answer is evaluated by <ul style="list-style-type: none"> • telegram type is RSP-UD The received data is ‘42h 42h’ ([OMS-S2] Annex M, Table M.4	