

MOST

Media Oriented Systems Transport

Multimedia and Control
Networking Technology

**MOST Extended Core Compliance Test Specification:
Electrical Control Line**

Rev 1.1

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Document References

Number	Document	Revision
[1]	MOST Core Compliance Test Specification	3.0
[2]	MOST Electrical Control Line Specification	1.1 1.1.1
[3]	ETSI ES 201 873-3 (Methods for Testing and Specification; Part 3: TTCN-3 Graphical presentation Format GFT)	3.2.1

Document History

Changes MOST Extended Core Compliance Test Specification: Electrical Control Line Rev 1.0 to MOST Extended Core Compliance Test Specification: Electrical Control Line Rev. 1.1

Change Ref.	Section	Changes
1V1_001	General Notes	<p>(1) Cross-reference Table: Revised first sentence</p> <p>(2) Devices With Several ECL Interfaces: Limitation of this test specification: Every physical MOST Interface is linked to exactly one physical ECL interface. This is necessary to address the correct FB ET for triggering. → Limitation of this test specification: Each ECL interface is linked to exactly one physical MOST Interface. This is necessary to address the correct FB ET for triggering.</p> <p>(3) Timing Definitions: Definition of tTimeoutForSleep removed Remove tTestRestart_Min as already covered by ECL Spec Rev. 1.1 Add note: If not other stated, timing values in GFTs are specified in seconds.</p> <p>(4) Test Procedure: Update of wording</p>
1V1_002	Para 2.1.1	<p>(1) RPU calculation considers optional RPU</p> <p>(2) Exemplary values of RPU now based on ECL Spec Rev 1.1</p> <p>(3) Description of suffix “_participant” and “_initiator” added</p>
1V1_003	Para 2.2	Update of GFT messages and functions
1V1_004	Para 2.3 Macros	Update of Macro f_wait_for_tTestRestart_Min; t_DeadLockMid replaced by 5 * t_restart_min
1V1_004	Para 2.4 Altsteps	Introduction of altsteps for FB ET function calls
1V1_005	Para 2.5	New para: Test procedure
1V1_006	Manufacturer Information	<p>(1) Minor updates</p> <p>(2) Harmonize naming of IECL: I_{ECLQuiescentCurrent} I_{ECLActiveState} I_{ECLShortCircuit}</p> <p>(3) New manufacturer information: Initiator equipped with RPU</p>
1V1_007	All test cases	<p>(1) Update of GFTs</p> <p>(2) Applicability: No longer distinguishes “single node devices” and multi node devices. Now covers “Device Type” and “Multi Node Device”</p> <p>(3) Experimental set-up: master → timing master slave → timing slave</p>

Change Ref.	Section	Changes
1V1_008	5.1.1.1	<p>(1) Replace Table with En/On combination by a diagram.</p> <p>(2) Delete test result DUT ok(2): The DUT does not support P1-P5 pattern for this test.</p>
1V1_009	5.1.2-1	<p>(1) Update value of interest: tTestResult added.</p> <p>(2) Remove if statement (p_ShortCircuit) and t_DeadLockMid at end of test</p>
1V1_010	5.3.1-3	<p>Update test focus: Determination of the signal timings produced by DUT (during test sequence for system test) → Determination of the signal timings produced by DUT (during Start Sequence and Parameter Sequence of system test)</p>
1V1_011	5.3.1-4	Test case deleted; already covered by test case 5.1.2.1
1V1_012	5.3.1-5	<p>(1) Update of diagram of result sequence</p> <p>(2) Test has to cover all supported node classes of DUT</p> <p>(3) Remove if statements in test; use new parameters instead</p>
1V1_013	5.3.1-6	Update of visualization of test cases
1V1_014	5.3.3-2	Test case deleted; now covered by new test case 5.3.3-5
1V1_015	5.3.3-3	Test case deleted; now covered by new test case 5.3.3-5
1V1_016	5.3.3-5	New test case that covers 5.3.3-2 and 5.3.3-3.
1V1_017	Appendix 3	Add new Appendix 3 with overview and description of GFT symbols

Abbreviations

DUT	Device Under Test
ECL	Electrical Control Line
GFT	TTCN-3 Graphical Presentation Format
S/C	Short Circuit
TSI	System Test Start Impulse

Overview Of ECL Tests (Sorted By Test Number)

Test name	Test number	Page
System Test (Initiator)	5.1.1-1	30
System Test (Participant)	5.1.2-1	33
Wake-up Test (Participant); No MOST Signal At Input	5.2.2-1	35
Wake-up Test (Participant); MOST Signal At Input	5.2.2-2	37
Sender Signal Tolerance Test (Initiator)	5.3.1-3	39
Receiver Signal Tolerance Test (Initiator)	5.3.1-5	41
Receiver Signal Tolerance Test (Participant)	5.3.1-6	44
TSI Pulse Width Test	5.3.2-2	48
ECL Current In Active State Test	5.3.3-1	50
ECL Current When Node Not Connected To Power Supply Test	5.3.3-4	52
ECL Current In Short Circuit Test	5.3.3-5	54

1 Introduction

This test specification is valid for Electrical Control Line (ECL) 1.1 and 1.1.1. It is intended to define test cases for ECL which shall be used during Core Compliance Tests of ECUs.

2 General Notes

This release of ECL test specification covers „straight forward test cases” only. Stress tests, robustness tests and tests of special failure conditions (e.g. no stable lock, ring break) are not focus of first release of this test specification.

Cross-reference Table

In case notation differs between Electrical Control Line (ECL) 1.1 and 1.1.1, the notation of ECL 1.1.1 will be used in this test specification.

The following cross reference table lists all notations of ECL 1.1.1 used in this test specification that are different in ECL 1.1.

Notation of ECL 1.1.1	Notation of ECL 1.1	Note
System test “MOST signal result, coding error result”	System test “MOST signal result, threshold”	
EWU	Electrical wake-up	refer to para 3.2 of ECL Specification 1V1 / 1V1.1
EWU repetitions	Electrical wake-up retries	refer to para 3.2 of ECL Specification 1V1 / 1V1.1
Wake-up with multiple EWUs	Wake-up with retries	refer to para 4.3.1 of ECL Specification 1V1 / 1V1.1
Wake-up with single EWU	Wake-up without retries	refer to para 4.3.1 of ECL Specification 1V1 / 1V1.1

Devices With Several ECL Interfaces

In case the DUT contains more than one physical ECL interface, each ECL interface has to be tested separately.

Limitation of this test specification: Each ECL interface is linked to exactly one physical MOST Interface. This is necessary to address the correct FB ET for triggering.

Timing Definitions

Names of timer, used by this test specification are based on the Electrical Control Line Specification. The Electrical Control Line Specification does not distinguish timer between sender and receiver by name but minimum and maximum values are different between sender and receiver. In this Test Specification, timer values for sender are marked with suffix “_S” and timer values for receiver are marked with suffix “_R”. The suffix is placed behind the “_min” resp. “_max” suffix. So, if timer ends with “_S”, the values of corresponding timer table of sending devices have to be used.

Example:

Timing definition for sending device (based on ECL test specification)

Name	Min Value	Typ Value	Max Value	Description
t_{TSI}	$t_{TSI_min_S}$ = 195 ms	t_{TSI} = 200 ms	$t_{TSI_max_S}$ = 205 ms	System test start impulse

Timing definition for receiving device (based on ECL test specification)

Name	Min Value	Typ Value	Max Value	Description
t_{TSI}	$t_{TSI_min_R}$ = 170 ms	t_{TSI} = 200ms	$t_{TSI_max_R}$ = 230 ms	Impulse for a system test

Note:

No suffix (neither “_S” nor “_R”) added in case timer values are identical for sender and receiver (e.g. typical values).

In addition to the ECL Specification, one new timer has been introduced by this Test Specification. The value depends on manufacturer information:

$t_{EWURepeatPause}$: Pause between repetitive EWU pulses in case the DUT supports wake-up mechanism “wake-up with multiple EWUs”.

States Of DUT

Each test case specifies a start condition that contains the state of DUT. This state has to be triggered as follows:

State	Procedure to trigger state
DUT: <i>NetInterface NormalOperation</i>	Use procedure for “DUT: NormalOperation” as specified in MOST Core Compliance Test Specification [1].
DUT: <i>DevicePowerOff</i>	Use the following procedure to effectuate state of DUT “DevicePowerOff”: <ol style="list-style-type: none"> 1. Disconnect DUT from Power 2. wait 1 min 3. connect DUT to power 4. wait until DUT switch off MOST signal 5. wait $t_{PwrSwitchOffDelay_max}$ 6. DevicePowerOff assumed

2.1 Test Setup

The DUT is connected at least via MOST (ring closed) and via ECL with the tester.

The test setup must fulfill the following basic principles:

- Power supply must be adjustable (V_{BAT_ECU}).
- Measurement of power consumption of DUT must be possible.
- Measurement of V_{ECL} must be possible.
- Measurement of I_{ECL} must be possible.
- Measurement of I_{BAT_ECU} must be possible.
- R_{PU} of tester must be adjustable in range R_{PU_min} to R_{PU_max} (refer to para 2.1.1; in case the tester has to simulate a fully equipped system (DUT + 19 additional nodes), the value of R_{PU} has to be adjustable in a larger range than specified by ECL Specification.).
- C must be adjustable; normally set to " $C_{ECL_max} - tolerance_setup_C_ECL$ " for complete setup (with tester and DUT connected to ECL).

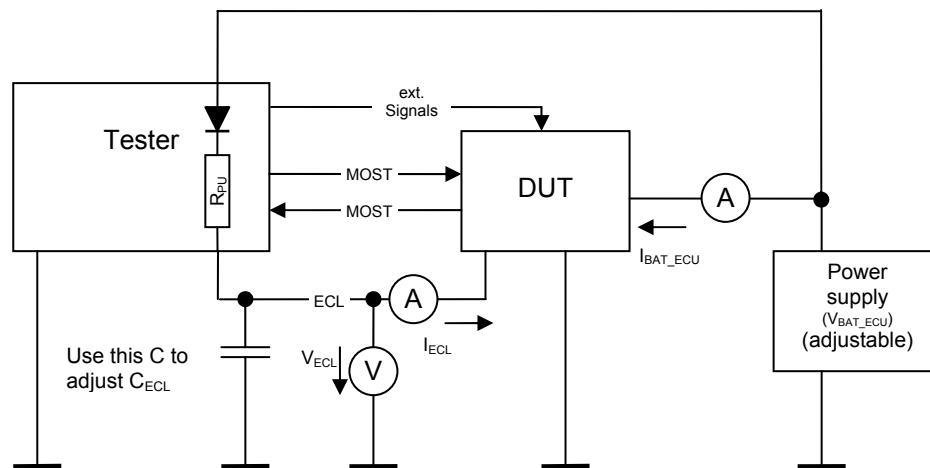


Figure 2-1 Test setup

Note: In the test setup that is shown above, the MOST interface, the ECL interface and the interface to apply external signals (e.g. to apply additional wake-up pre-conditions) to the DUT are located within one tester. It is also allowed to locate the MOST-specific part and the ECL-specific part in separate tester devices.

2.1.1 Calculation Of Values Of R_{PU} For Test Setup

ECL Specification does not distinguish R_{PU} between sender and receiver by name but values are different between initiator and participant. In this Test Specification, R_{PU} of participant is marked with suffix “_participant” and R_{PU} of initiator is marked with suffix “_initiator”.

ECL Specification only specifies R_{PU} of system test initiator and participant. The ECL Test Specification applies specified values of R_{PU} to EWU initiator and participant devices (in case a device does not support system test but EWU).

The applied value of R_{PU} of tester depends on DUT:

Minimum Value:

The minimum value is applicable if the tester simulates remaining nodes of a fully equipped system, consisting of one system test initiator and 19 system test participants.

If DUT is System Test Initiator, the tester has to simulate 19 system test participants.

→ The minimum value of R_{PU} of tester:

$$R_{PU_min_participant} / 19 + tolerance_tester_R_{PU}$$

If DUT is System Test Participant, the tester has to simulate 18 system test participants + 1 system test initiator.

--> The minimum value of R_{PU} of tester:

$$R_{PU_min_participant} * R_{PU_min_initiator} / (18 * R_{PU_min_initiator} + R_{PU_min_participant}) + tolerance_tester_R_{PU}$$

Maximum Value:

The maximum value is applicable if the tester simulates all remaining nodes of a minimum equipped system, consisting of one system test initiator and one system test participant.

If DUT is System Test Initiator, the tester has to simulate one system test participant.

--> The maximum value of R_{PU} of tester:

$$R_{PU_max_participa-t} - tolerance_tester_R_{PU}$$

If DUT is System Test Participant, the tester has to simulate one system test initiator.

--> The maximum value of R_{PU} of tester:

$$R_{PU_max_initiat-r} - tolerance_tester_R_{PU}$$

Summary:

	Minimum value of R_{PU} of tester	Maximum value of R_{PU} of tester
DUT is System Test Initiator	$R_{PU_min_participant} / 19 + tolerance_tester_R_{PU}$ Exemplary values ¹ : ECL 1V1: $1.05\text{ k}\Omega + tolerance_tester_R_{PU}$ ECL 1V1.1 (with optional R_{PU}) $1.05\text{ k}\Omega + tolerance_tester_R_{PU}$ ECL 1V1.1 (without optional R_{PU}) $1.1\text{ k}\Omega + tolerance_tester_R_{PU}$	$R_{PU_max_participant} - tolerance_tester_R_{PU}$ Exemplary values ¹ : ECL 1V1: $60 - \Omega - tolerance_tester_R_{PU}$ ECL 1V1.1 (with optional R_{PU}) $60 - \Omega - tolerance_tester_R_{PU}$ ECL 1V1.1 (without optional R_{PU}) $60 - \Omega - tolerance_tester_R_{PU}$

1) Note: Exemplary values based on ECL Specification Rev. 1.1 / Rev. 1.1.1

($R_{PU_min_participant} = 20\text{ k}\Omega$; $R_{PU_max_participant} = 60\text{ k}\Omega$; $R_{PU_min_initiator} = \text{k}\Omega$; $R_{PU_max_initiator} = \text{k}\Omega$)

2.2 GFT

TTCN-3 Graphical presentation Format (GFT) is used to support specification of test cases for ECL.

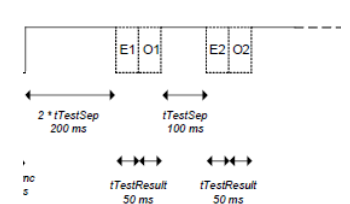
Messages

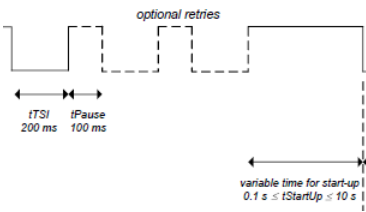
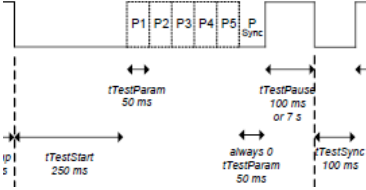
Within the GFTs, two kinds of messages are utilized, MOST messages and ECL messages. MOST messages are connected to port instance "pET" or "pNetBlock" and have to be transmitted via MOST interface. For better readability, MOST messages from or to FB ET have prefix "EnhancedTestability." (e.g. EnhancedTestability.ECLTrigger_StartResult). MOST messages from or to NetBlock have prefix "NetBlock." (e.g. NetBlock.FBlockIDs_Status). ECL messages are connected to port instance "pECL". Their names always begin with "ECL_" and define a single pulse or a sequence of pulses at ECL, (e.g. ECL_StartSequence). Transmission is performed via ECL.

The port instance "self" covers all messages, MOST messages and ECL messages sent by the tester and received from the tester.

All port instances are implemented in the tester.

The following table contains an overview of all ECL messages, utilized in the GFTs.

Message	Description of Message	Description of Parameter
ECL_Pulse(State, Length)	Single pulse, considering measurement uncertainty (Appendix 1)	State: Logical state of ECL pulse Length: Duration of pulse in s
ECL_PulseList({{State, Length}},{{State, Length}},...)	Generates a sequence of pulses at ECL according to parameter list.	State: Logical state of ECL pulse Length: Duration of pulse in s
ECL_ResultSequence(p_resultSequenceParams)	<p>System Test Result Sequence, based on ECL specification for all supported Node Classes defined in mi_supportedNodeClassList.</p> <p>Measurement uncertainty (Appendix 1) to be considered.</p> <p>The sequence, generated by Participant is defined as follows:</p> <ol style="list-style-type: none"> 1. Pause ($2 * t_{TestSep}$) 2. E1 according to p_resultSequenceParams ($t_{TestResult}$) 3. O1 according to p_resultSequenceParams ($t_{TestResult}$) 4. Pause ($t_{TestSep}$) 5. Continue with E2... 	p_resultSequenceParams: Includes the whole signal sequence to generate the result sequence.

Message	Description of Message	Description of Parameter
ECL_StartSequence(mi_startSequenceRetries, mi_tStartUp)	<p>System Test Start Sequence, based on ECL specification and considering measurement uncertainty (Appendix 1)</p> <p>The sequence, generated by Initiator is defined as follows:</p> <ol style="list-style-type: none"> 1. Pulse (tTSI) 2. Pause (tPause) 3. Retries of Pulse (tTSI) and Pause (tPause) according to parameter mi_startSequenceRetries 4. Pause (tStartUp) 	<p>mi_startSequenceRetries: Number of retries</p> <p>mi_tStartUp: Duration of tStartUp in s</p>
ECL_ParameterSequence(mi_ECLsystemTestKind)	<p>System Test Parameter Sequence based on ECL specification and considering measurement uncertainty (Appendix 1)</p> <p>The generated sequence consists of the following pulses:</p> <ol style="list-style-type: none"> 1. Pulse (tTestStart) 2. Pulse P1 according to parameter mi_ECLsystemTestKind (tTestParam) 3. Pulse P2 according to parameter mi_ECLsystemTestKind (tTestParam) 4. Pulse P3 according to parameter mi_ECLsystemTestKind (tTestParam) 5. Pulse P4 according to parameter mi_ECLsystemTestKind (tTestParam) 6. Pulse P5 according to parameter mi_ECLsystemTestKind (tTestParam) 7. Pulse P Sync (tTestParam) 8. Pause (tTestPause) 9. Pulse (tTestSync) 	<p>mi_ECLsystemTestKind: System test that have to be triggered via P1...P5: e_RBD (00000) e_alive (10000) e_codingerror (01000) e_SSO_CU (11000)</p>
ECL_EWU()	<p>Generates EWU signal according to ECL specification including all retries defined in mi_EWUretries with pause defined in mi_tEWURepeatPause.</p> <p>Measurement uncertainty (Appendix 1) to be considered.</p>	

Timer Names

Due to limitations of GFT layout, timer names used in the GFTs are not subscript (e.g. t_{TestParam} of ECL Specification is identical to tTestParam in GFT).

Timing Values

If not other stated, timing values in GFTs are specified in seconds.

Parameter

All parameters containing manufacturer information always start with "mi_". The manufacturer information list contains a reference to relevant GFT parameter, if applicable.
Parameter values of functions (test cases) always start with "p_".

References In GFTs

The following table contains an overview of all functions, utilized in the GFTs.

Function	Description of Function	Description of Parameter
f_tester_prepares_active_ECL_current_measurement()	The function is used to initialize measurement equipment (start measurement). Necessary for function f_tester_analyzes_ECL_current_measurement()	
f_start_ECL_current_measurement(ECL_State)	The function is used to initialize measurement equipment (start measurement). The measurement starts with calling the function. Duration of measurement: $2 * t_{\text{TestRestart_Min}}$ Measurement is done every 10ms. Necessary for function f_tester_analyzes_ECL_current_measurement.	ECL_State: State of ECL: e_ActiveState p_ShortCircuitDependingOnTestCase e_NotConnected
f_stop_ECL_current_measurement(ECL_State)	This function is used to stop a measurement, started with function f_start_ECL_current_measurement(). The measurement will be stopped even if the default duration of measurement ($2 * t_{\text{TestRestart_Min}}$) is not finished. Before usage, the function f_start_ECL_current_measurement have to be called. Necessary for function f_tester_analyzes_ECL_current_measurement.	ECL_State: State of ECL: e_ActiveState p_ShortCircuitDependingOnTestCase e_NotConnected
f_tester_analyzes_ECL_current_measurement(ECL_State, mi_ECLrole)	This function returns maximum value of current while measurement period (I_{ECL} in mA). Before usage, the functions f_start_ECL_current_measurement and f_stop_ECL_current_measurement have to be called to perform measurement of current.	ECL_State: State of ECL: e_ActiveState p_ShortCircuitDependingOnTestCase e_NotConnected mi_ECLrole: e_SystemTestInitiator e_SystemTestParticipant
f_tester_switches_MOST_signal(state)	This function is used to control MOST interface.	State = on: Switch MOST signal on State = off: Switch MOST signal off
f_tester_measures_current_consumption(current)	This function returns current consumption of DUT. Measurement is done every 500ms.	Current: $I_{\text{BAT_ECU}}$ in mA
f_set_ECLData_ECLsystemTestKind(mi_ECLsystemTestKind)	The function selects the ECLTestParameters according to mi_ECLsystemTestKind. The ECLTestParameters are stored into ECLData_ECLsystemTestKind. ECLData_ECLsystemTestKind is used for FBlock ET.ECLTrigger call.	mi_ECLsystemTestKind : The system test: e_RBD (MOST signal result, RBD result) e_codingerror (MOST signal result, coding error result) e_alive (Alive result) e_SSO_CU (MOST signal result, SSO/CU result)
f_DUT_DevicePowerOff()	This functions waits for DUT entering DevicePowerOff.	

Function	Description of Function	Description of Parameter
f_init_StartSequence (mi_startSequenceRetries, tTSI_Min .. tTSI_Max, tPause_Min .. tPause_Max, tStartup_Min .. tStartup_Max)	This function initializes the parameter list of start sequence. The parameter list can be used by message ECL_PulseList.	mi_startSequenceRetries: Number of retries tTSI_Min: Duration of t _{TSI_min} in s tTSI_Max: Duration of t _{TSI_max} in s tPause_Min: Duration of t _{Pause_min} in s tPause_Max: Duration of t _{Pause_max} in s tStartup_Min: Duration of t _{Startup_min} in s tStartup_Max: Duration of t _{Startup_max} in s
f_init_ParameterSequence (mi_ECLsystemTestKind, tTestStart_Min .. tTestStart_Max, tTestParam_Min .. tTestParam_Max, tTestPause_Min .. tTestPause_Max, tTestSync_Min .. tTestSync_Max)	This function initializes the parameter list of parameter sequence. The parameter list can be used by message ECL_PulseList.	mi_ECLsystemTestKind : The system test: e_RBD (MOST signal result, RBD result) e_codingerror (MOST signal result, coding error result) e_alive (Alive result) e_SSO_CU (MOST signal result, SSO/CU result) tTestStart_Min: Duration of t _{TestStart_min} in s tTestStart_Max: Duration of t _{TestStart_max} in s tTestParam_Min: Duration of t _{TestParam_min} in s tTestParam_Max: Duration of t _{TestParam_max} in s tTestPause_Min: Duration of t _{TestPause_min} in s tTestPause_Max: Duration of t _{TestPause_max} in s tTestSync_Min: Duration of t _{TestSync_min} in s tTestSync_Max: Duration of t _{TestSync_max} in s
f_init_ParameterSequence_Modified (mi_ECLsystemTestKind, p_tTestStartModified, p_tTestParamModified)	This function initializes the parameter list of parameter sequence with modification of timings for different test patterns. The parameter list can be used by message ECL_PulseList.	mi_ECLsystemTestKind : The system test: e_RBD (MOST signal result, RBD result) e_codingerror (MOST signal result, coding error result) e_alive (Alive result) e_SSO_CU (MOST signal result, SSO/CU result) p_tTestStartModified: Duration of t _{TestStart} in s p_tTestParamModified: Duration of t _{TestParam} in s

Function	Description of Function	Description of Parameter
f_wait_for_tTestRestart_Min()	This function waits for $t_{\text{TestRestart_Min}}$ to ensure DUT is ready to perform system test. See para "2.3.1 Wait_For_tTestRestart_Min" for detailed specification of the function.	

2.3 Macros

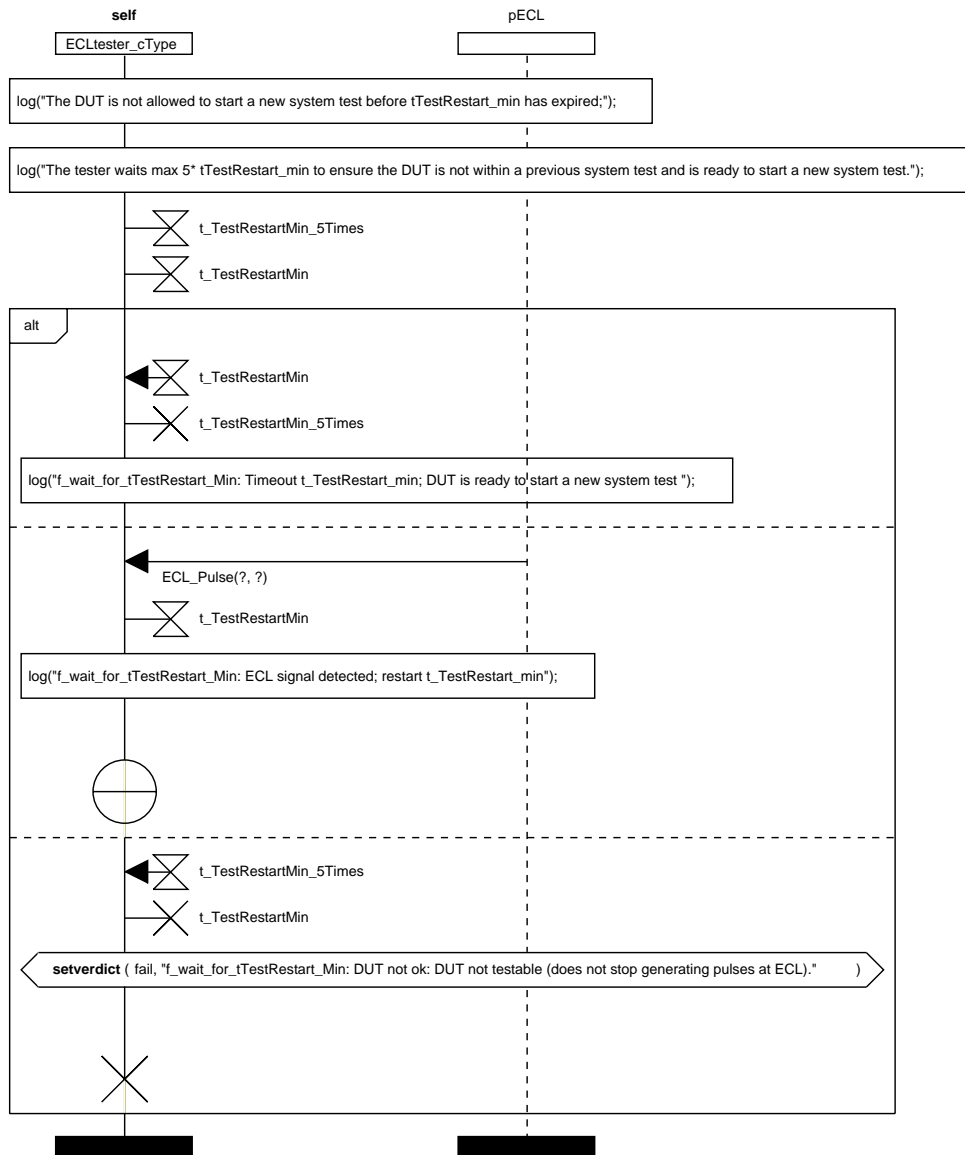
Macros are called by several test cases.

2.3.1 Wait_For_tTestRestart_Min

Name of macro	f_wait_for_tTestRestart_Min
Reference to GFT	f_wait_for_tTestRestart_Min()
Description	This macro waits for $t_{\text{TestRestart_Min}}$ to ensure DUT is ready to perform system test. In case DUT generates any signal at ECL line before $t_{\text{TestRestart_Min}}$ expires, restart $t_{\text{TestRestart_Min}}$. Timeout in case of cyclic restart of $t_{\text{TestRestart_Min}}$: $5 * t_{\text{TestRestart_Min}}$
Notes	
Results	DUT not ok: DUT not testable (does not stop generating pulses at ECL).

function f_wait_for_tTestRestart_Min ()

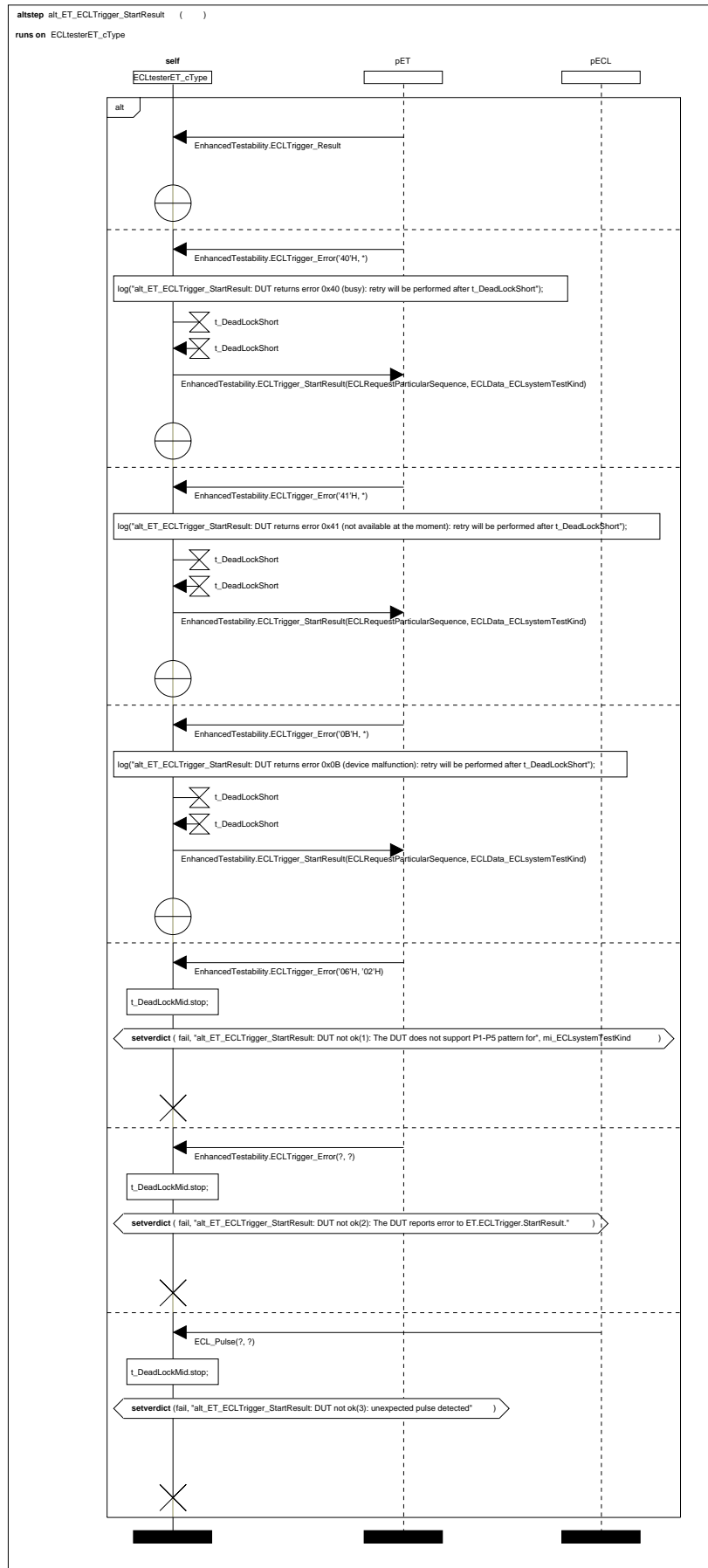
runs on ECLtester_cType



2.4 Altsteps

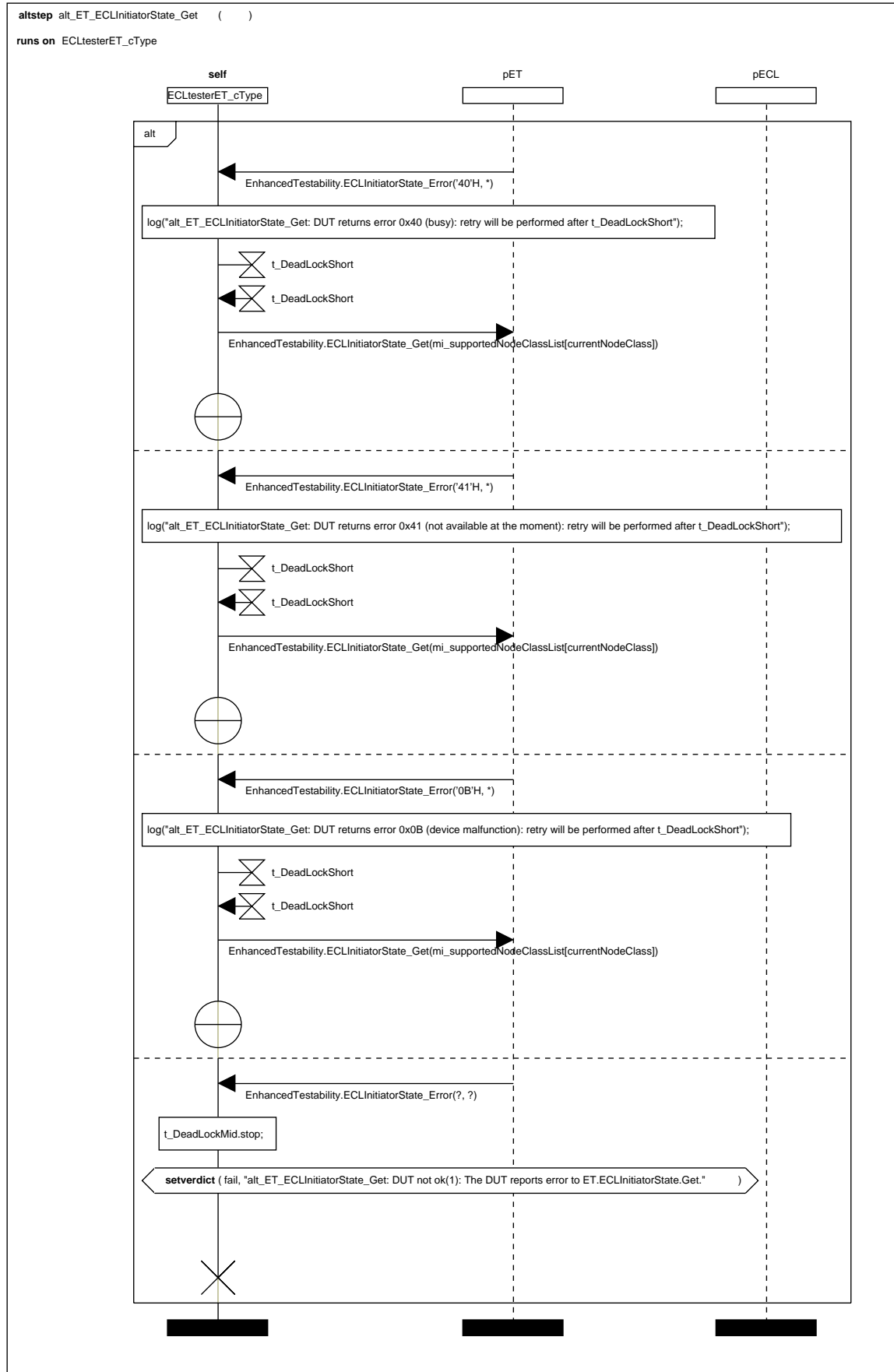
2.4.1 Alt_ET_ECLTrigger_StartResult

Name of macro	Alt_ET_ECLTrigger_StartResult
Reference to GFT	alt_ET_ECLTrigger_StartResult ()
Description	This altstep has to be executed any time function ET.ECLTrigger is called. It handles potential error results of DUT.
Notes	Timeout t _{WaitforProperty} is not test focus and not tested.
Results	DUT not ok(1): The DUT does not support P1-P5 pattern. DUT not ok(2): The DUT reports error to ET.ECLTrigger.StartResult. DUT not ok(3): Unexpected pulse detected.



2.4.2 Alt_ET_ECLInitiatorState_Get

Name of macro	Alt_ET_ECLInitiatorState_Get
Reference to GFT	alt_ET_ECLInitiatorState_Get()
Description	This altstep has to be executed any time function ET.ECLInitiatorstate is called. It handles potential error results of DUT.
Notes	Timeout $t_{\text{WaitforProperty}}$ is not test focus and not tested.
Results	DUT not ok(1): The DUT reports error to ET.ECLInitiatorState.Get.



2.5 Test Procedure

- GFTs may be reused in the specification of another test case. In this case the descriptive part, e.g.: start condition and experimental setup, of the test case where the GFT is defined is overwritten by the new test case.
- If it is proven that the DUT after applying all wake-up preconditions is not able to reach start condition (such as "DUT: NetInterface NormalOperation"), the test case will be marked as "DUT not ok".
- Because of reproducibility reasons after each test case the DUT has to be disconnected from power until buffer capacitors are empty. The DUT shall be shutdown regularly before disconnecting from power.
- If a test case is run with several parameters, DUT has to be disconnected from power until buffer capacitors are empty before every run. The DUT shall be shutdown regularly before disconnecting from power.

2.6 DUT Manufacturer Information List

This list contains information that have to be provided by the device manufacturer for ECL compliance testing. It also includes remarks and references to corresponding test cases. In case a DUT has more than one ECL interface, the information from the DUT Manufacturer Information List has to be given from the manufacturer for each interface.

General properties that are not ECL specific but potentially relevant for testing (e.g. DUT is TimingMaster) have to be derived from DUT manufacturer information list of Core Compliance Test Specification. The DUT manufacturer information list of Core Compliance Test Specification has to be provided by the DUT manufacturer.

Item / Property	Note / Remark	Reference to ECL Compliance Test Case
Node Properties (General)		
MultiNodeDevice (MOST nodes)	In case DUT is MultiNodeDevice, information necessary whether the device contains <ul style="list-style-type: none"> • system test initiator • wake-up initiator In case of system test Initiator / wake-up initiator: Which node implements ECL functionality? (to trigger ECL via FB ET)	all test cases
Supported ECL Specification	The lower limit of tStartUp of ECL Rev. 1.1 is different from value of ECL Rev. 1.1.1 In case DUT supports ECL 1.1: Lower limit of tStartUp = 4s In case DUT supports ECL 1.1.1: Lower limit of tStartUp = 0.1s	all test cases
System Test Parameter		
DUT supports system test as <ul style="list-style-type: none"> • initiator • participant • none 	Reference in GFTs: mi_ECLrole	5.1.1-1 System Test (Initiator) 5.1.2-1 System Test (Participant) 5.3.1-3 Sender Signal Tolerance Test (Initiator) 5.3.1-5 Receiver Signal Tolerance Test (Initiator) 5.3.1-6 Receiver Signal Tolerance Test (Participant) 5.3.2-2 TSI Pulse Width Test 5.3.3-1 ECL Current In Active State Test 5.3.3-5 ECL Current In Short Circuit Test
Supported system tests: <ul style="list-style-type: none"> • MOST signal result, RBD result • MOST signal result, coding error result • Alive result • MOST signal result, SSO/CU result 	Reference in GFTs: mi_ECLsystemTestKind In case DUT supports ECL Rev 1.1.1, the "alive result" test is mandatory. Device manufacturer is not able to set it to "not supported".	5.1.1-1 System Test (Initiator) 5.1.2-1 System Test (Participant) 5.3.1-3 Sender Signal Tolerance Test (Initiator) 5.3.1-5 Receiver Signal Tolerance Test (Initiator) 5.3.1-6 Receiver Signal Tolerance Test (Participant) 5.3.2-2 TSI Pulse Width Test 5.3.3-1 ECL Current In Active State Test 5.3.3-5 ECL Current In Short Circuit Test

Item / Property	Note / Remark	Reference to ECL Compliance Test Case
System Test Initiator: List of Node Classes expected / supported by initiator	Reference in GFTs mi_supportedNodeClassList	5.1.1-1 System Test (Initiator) 5.3.1-5 Receiver Signal Tolerance Test (Initiator)
System Test Initiator / Participant: Number of retries of "system test start impulse"	Reference in GFTs: mi_startSequenceRetries	5.1.1-1 System Test (Initiator) 5.1.2-1 System Test (Participant) 5.3.1-5 Receiver Signal Tolerance Test (Initiator) 5.3.1-6 Receiver Signal Tolerance Test (Participant)
System Test Participant: Node Class, the participant is associated with	Every device is associated with exactly one node class. Reference in GFTs: mi_nodeClass	5.1.2-1 System Test (Participant) 5.3.1-5 Receiver Signal Tolerance Test (Initiator) 5.3.1-6 Receiver Signal Tolerance Test (Participant)
System Test Initiator: Maximum number of node classes in system (m_c)	m_c is used to simulate all required participants by tester. Reference in GFTs: mi_mc	5.1.1-1 System Test (Initiator) 5.3.1-3 Sender Signal Tolerance Test (Initiator)
EWU Parameter		
DUT supports EWU as <ul style="list-style-type: none"> • initiator • participant • both • none 		5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input 5.2.2-2 Wake-up Test (Participant); MOST Signal At Input
ECL 1V1 Number of retries of "electrical wake-up" <ol style="list-style-type: none"> of a single wake-up attempt (= multiple EWUs) retries in case of failed wake-up attempt (no lock) 	ECL 1V1 The ECL specifies two different kinds of retries in conjunction with wake-up: <ol style="list-style-type: none"> The procedure of a single wake-up attempt can be performed in different ways: "wake-up with retries" and "wake-up" without retries. In case of "wake-up with retries", every wake-up attempt consists of a <i>defined number of repetitive wake-up pulses</i>. The reaction (<i>retry</i>) of a device in case the first wake-up attempt fails (no lock) Reference in GFTs: mi_EWUretries; used within function ECL_EWU()	5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input 5.2.2-2 Wake-up Test (Participant); MOST Signal At Input
ECL 1V1.1 Number of EWU repetitions	ECL 1V1.1 Number of EWU repetitions (multiple EWUs), specified by system integrator.	
Pause between repetitive wake-up pulses of one wake-up attempt (multiple EWUs). ($t_{EWURepeatPause}$)	Only relevant in case DUT performs wake-up mechanism "wake-up with retries". Reference in GFTs: mi_tEWRRepeatPause; used within function ECL_EWU()	5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input 5.2.2-2 Wake-up Test (Participant); MOST Signal At Input
Number of wake-up initiators in system	Maximum value of t_{EWU} depends on this information	5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input 5.2.2-2 Wake-up Test (Participant); MOST Signal At Input
Timing Parameter		

Item / Property	Note / Remark	Reference to ECL Compliance Test Case
t_{Startup}	Only applicable in case DUT supports System Test Reference in GFTs: mi_t_{Startup}	5.1.1-1 System Test (Initiator) 5.1.2-1 System Test (Participant) 5.3.2-2 TSI Pulse Width Test
$t_{\text{PwrSwitchOffDelay_max}}$	Time between switching off the Tx output and changing to state DevicePowerOff. (refer to MOST Specification Rev 3.0E2, para 3.2.9 Timing Definitions)	States of DUT: DevicePowerOff
Physical Parameter		
Nominal supply voltage " $V_{\text{BAT_ECU}}$ "	Voltage level, the DUT requires during ECL compliance testing	all test cases
Max. allowed supply voltage " $V_{\text{BAT_ECU_MAX}}$ "		5.3.3-5 ECL Current In Short Circuit Test
$I_{\text{ECLActiveState}}$ (if specified by system integrator)	If a system integrator requires a lower limit of I_{ECL} (ECL Current limitation for driver active state) than $I_{\text{ECL_max}}$ specified by ECL Specification, the device manufacturer has to provide this value.(refer to para 4.1 ECL Circuit of ECL Specification [2]) Reference in GFTs: $mi_I_{\text{ECLActiveState}}$	5.3.3-1 ECL Current In Active State Test
$I_{\text{ECLShortCircuit}}$ (if specified by system integrator)	If a system integrator requires a lower limit of I_{ECL} (ECL Current limitation in case of short circuit) than $I_{\text{ECL_max}}$ specified by ECL Specification, the device manufacturer has to provide this value.(refer to para 4.1 ECL Circuit of ECL Specification [2]) Reference in GFTs: $mi_I_{\text{ECLShortCircuit}}$	5.3.3-5 ECL Current In Short Circuit Test
$I_{\text{ECLQuiescentCurrent}}$	Maximum quiescent current, drawn by DUT via ECL when disconnected from $V_{\text{BAT_ECU}}$ Reference in GFTs: $mi_I_{\text{ECLQuiescentCurrent}}$	5.3.3-4 ECL Current When Node Not Connected To Power Supply Test
Power consumption in SleepMode: $I_{\text{SleepModeThreshold}}$	Maximum power consumption of DUT in SleepMode. To detect whether DUT has entered SleepMode (refer to MOST Core Compliance Test Specification Rev. 3.0E2). Reference in GFTs: $mi_sleepmodeThreshold$	5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input
Power consumption out of SleepMode: $I_{\text{OutOfSleepMode_min}}$	Minimum power consumption of DUT out of SleepMode. To detect whether DUT has left SleepMode. Reference in GFTs: $mi_outOfSleepmodeThreshold$	5.2.2-1 Wake-up Test (Participant); No MOST Signal At Input
Initiator equipped with R_{PU}	In ECL Rev. 1.1.1, R_{PU} of initiator is optional	Test Setup

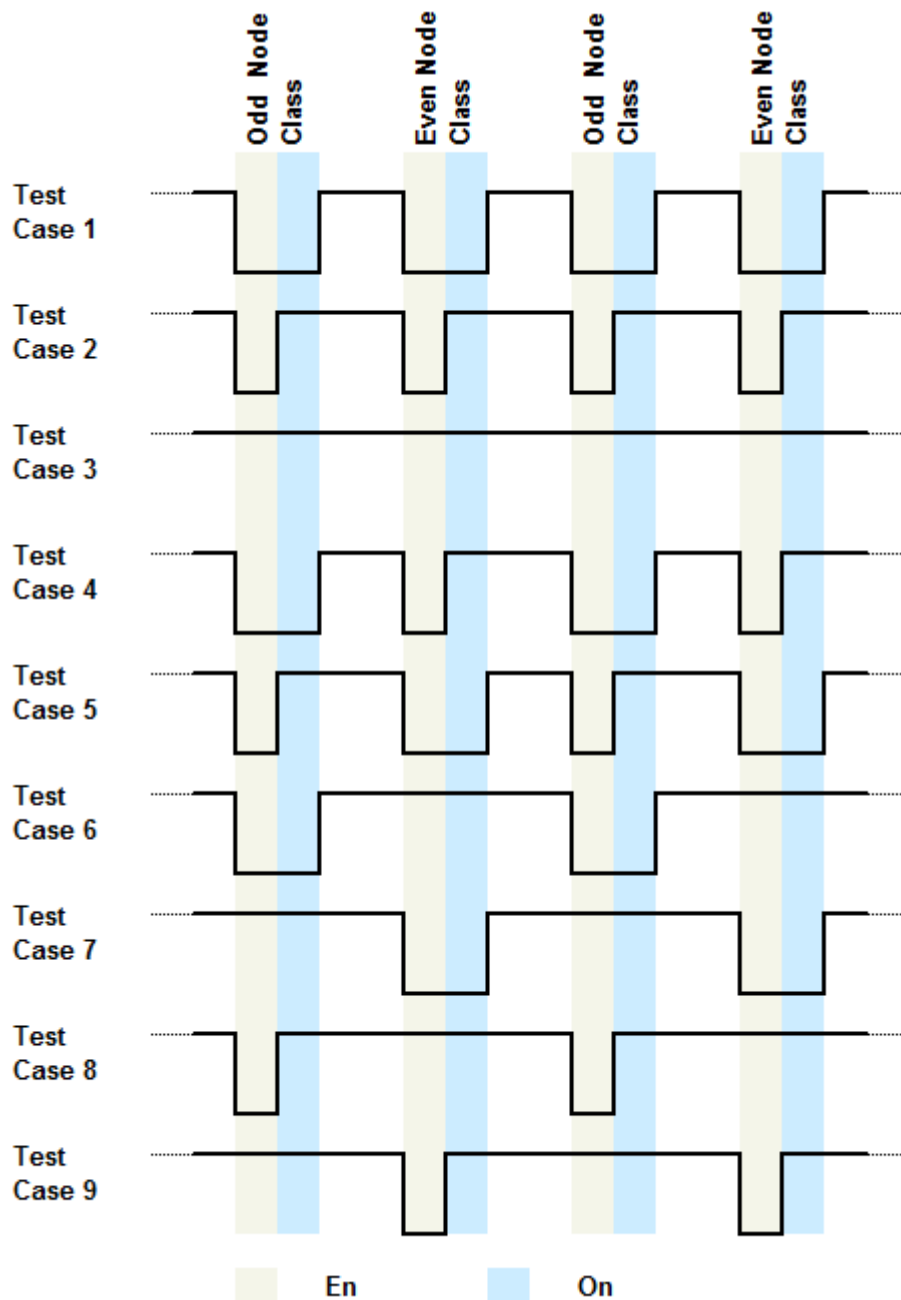
3 Nominal function tests

3.1 System Test

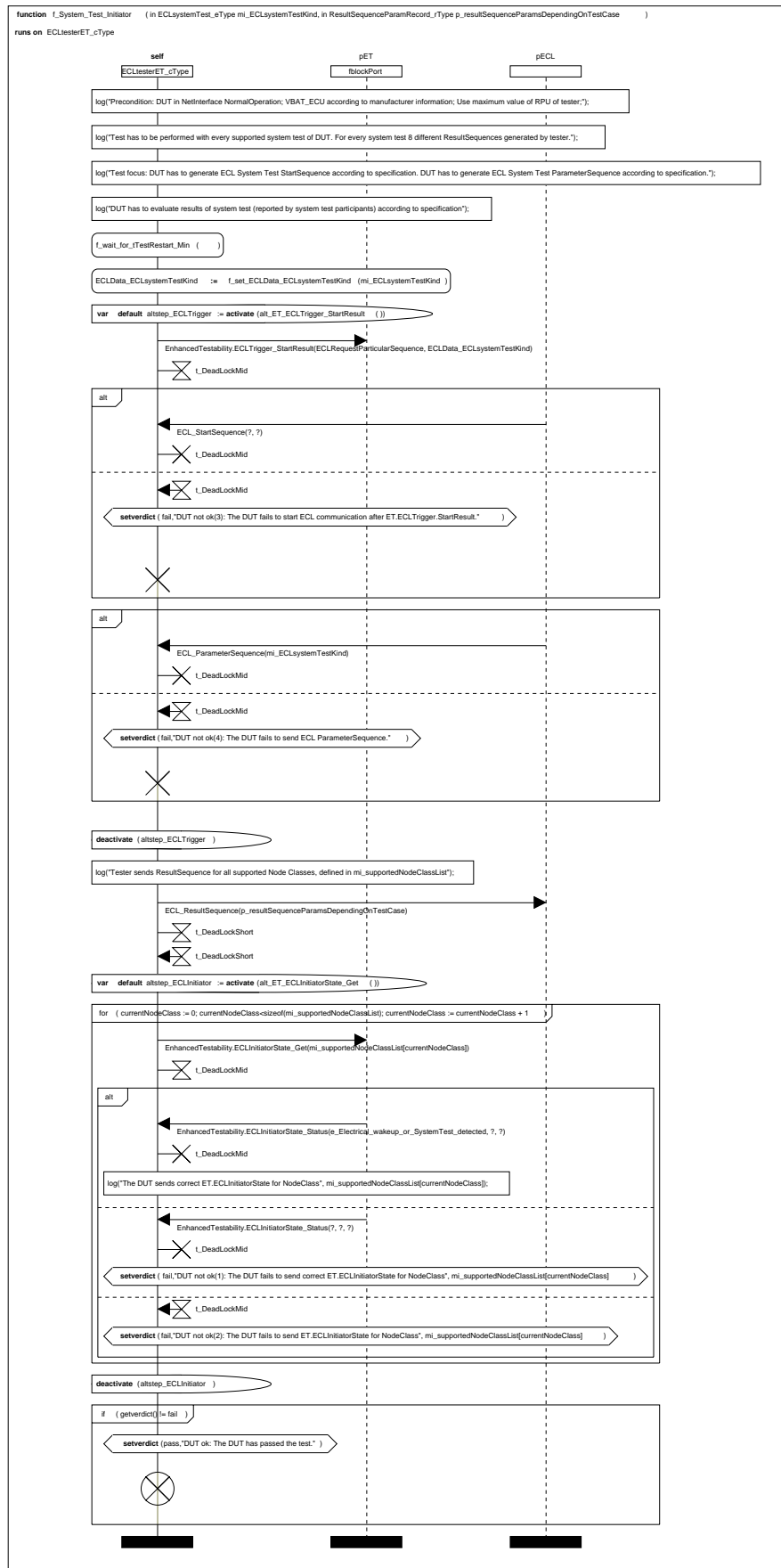
3.1.1 System Test (Initiator)

3.1.1.1 System Test (Initiator)

Name of test	System Test (Initiator) 5.1.1-1										
Reference to GFT	f_System_Test_Initiator (in ECLsystemTest_eType mi_ECLsystemTestKind, in ResultSequenceParamRecord_rType p_resultSequenceParamsDependingOnTestCase)										
Reference to Electrical Control Line Specification	3.1 System Test 4.4 Triggers										
Value of Interest	Start Sequence Parameter Sequence Evaluation of Result Sequence										
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information										
Test focus	DUT has to generate a valid ECL System Test "Start Sequence". DUT has to generate a valid ECL System Test "Parameter Sequence". DUT has to evaluate the result sequences.										
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.										
Applicability	Any device with "ECL System Test Initiator" functionality.										
Notes	<p>$t_{TestPause}$ depends on mi_ECLsystemTestKind. Use corresponding maximum value according to table 4-5 of ECL Specification:</p> <table border="1"> <thead> <tr> <th>mi_ECLsystemTestKind</th><th>$t_{TestPause}$</th></tr> </thead> <tbody> <tr> <td>"e_RBD"</td><td>alternative while testing</td></tr> <tr> <td>"e_codingerror"</td><td>alternative while testing</td></tr> <tr> <td>"e_alive"</td><td>waiting while testing</td></tr> <tr> <td>"e_SSO/CU"</td><td>waiting while testing</td></tr> </tbody> </table> <p>Test has to be performed with every supported system test of DUT. For every system test 9 different result sequences generated by tester. For details of result sequences refer to figure below that specifies test case 1 to test case 9.</p> <p>In case DUT switches off MOST signal or enters DevicePowerOff during / after performing a system test, the result of this test loop is assumed as "DUT ok"</p>	mi_ECLsystemTestKind	$t_{TestPause}$	"e_RBD"	alternative while testing	"e_codingerror"	alternative while testing	"e_alive"	waiting while testing	"e_SSO/CU"	waiting while testing
mi_ECLsystemTestKind	$t_{TestPause}$										
"e_RBD"	alternative while testing										
"e_codingerror"	alternative while testing										
"e_alive"	waiting while testing										
"e_SSO/CU"	waiting while testing										
Results	<p>DUT ok(1): The DUT has passed the test.</p> <p>DUT not ok(1): The DUT fails to send correct ET.ECLInitiatorState.</p> <p>DUT not ok(2): The DUT fails to send ET.ECLInitiatorState.</p> <p>DUT not ok(3): The DUT fails to start ECL communication after ET.ECLTrigger.StartResult.</p> <p>DUT not ok(4): The DUT fails to send ECL ParameterSequence.</p>										



GFT of "System Test (Initiator)"

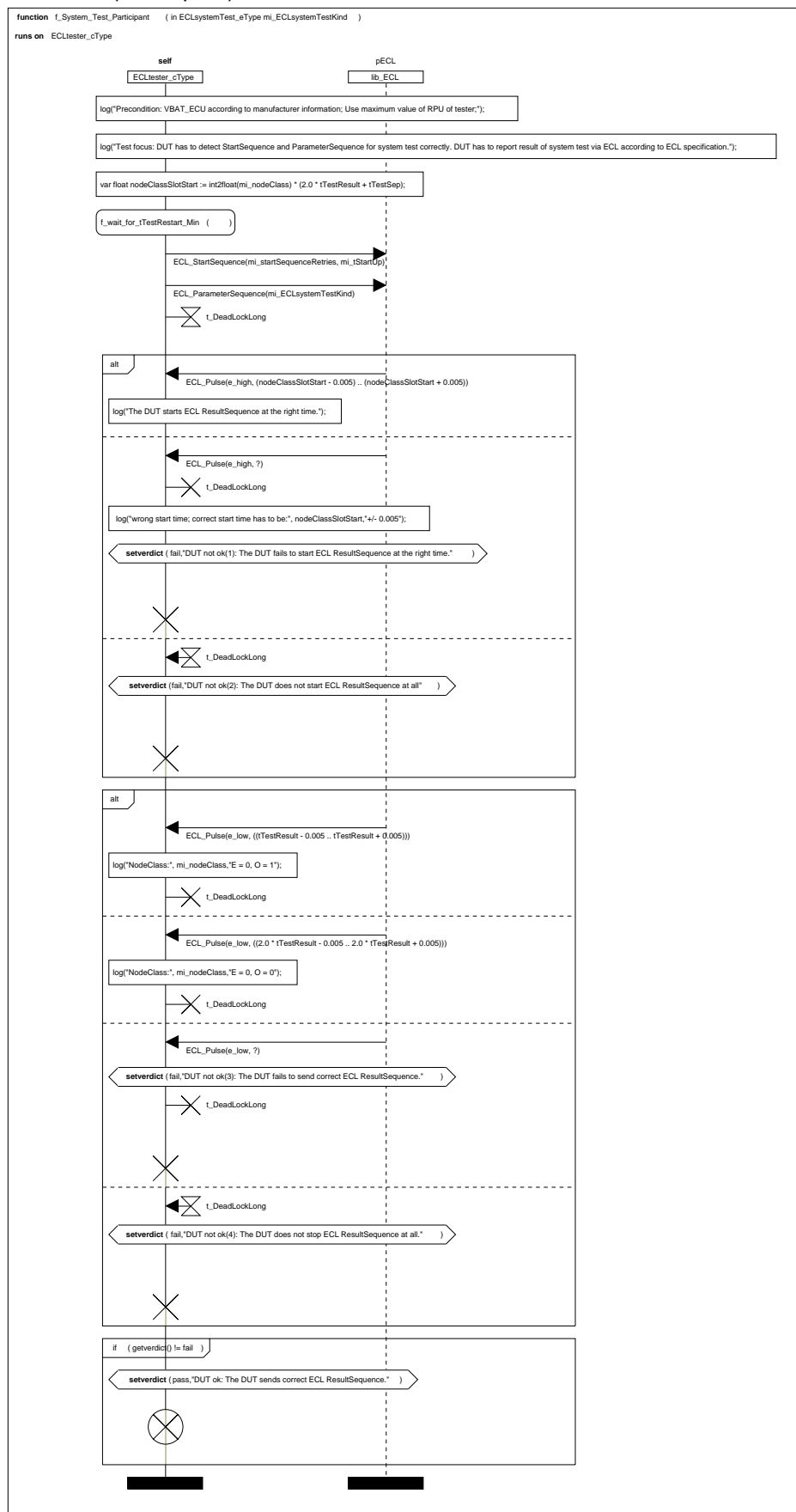


3.1.2 System Test (Participant)

3.1.2.1 System Test (Participant)

Name of test	System Test (Participant) 5.1.2-1
Reference to GFT	f_System_Test_Participant(in ECLsystemTest_eType mi_ECLsystemTestKind)
Reference to Electrical Control Line Specification	3.1 System Test 4.4 Triggers
Value of Interest	Result Sequence $t_{\text{TestResult}}$
Start Conditions	Test case 1: DUT: NetInterface NormalOperation Test case 2: DUT: DevicePowerOff; ring interrupted in front of DUT $V_{\text{BAT_ECU}}$ according to manufacturer information
Test focus	DUT has to detect "start sequence" and "parameter sequence" for system test correct. DUT has to report result of system test via ECL according to ECL specification.
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.
Applicability	Any device with "ECL System Test Participant" functionality.
Notes	Two test cases to be performed: Test case 1: DUT in NormalOperation Test case 2: DUT in DevicePowerOff Each test case has to be performed with all supported system tests.
Results	DUT ok: The DUT sends correct ECL ResultSequence. DUT not ok(1): The DUT fails to start ECL ResultSequence at the right time. DUT not ok(2): The DUT does not start ECL ResultSequence at all. DUT not ok(3): The DUT fails to send correct ECL ResultSequence. DUT not ok(4): The DUT does not stop ECL ResultSequence at all.

GFT of "System Test (Participant)"



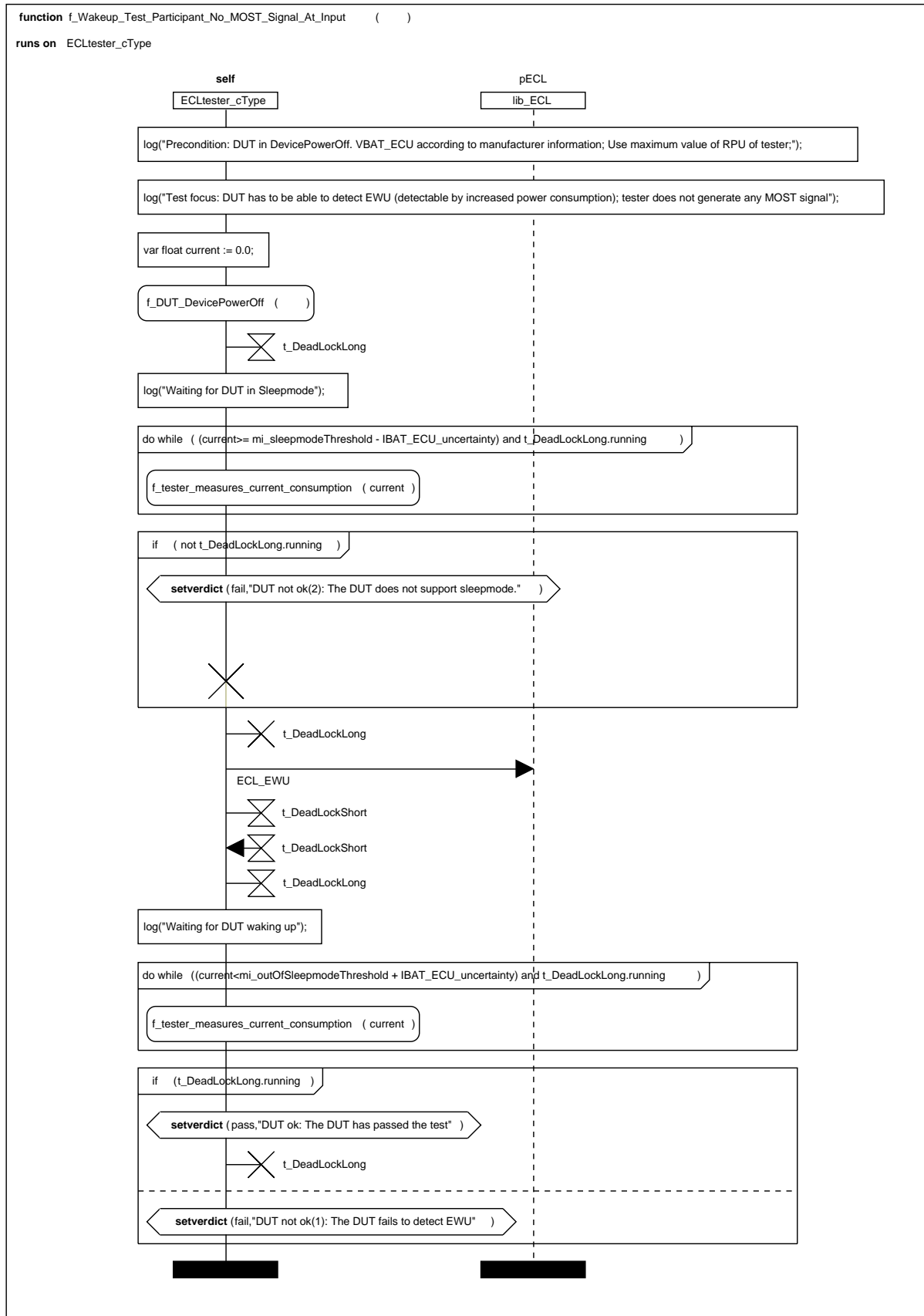
3.2 Wake-up

3.2.1 Wake-up (Participant)

3.2.1.1 Wake-up (Participant); No MOST Signal At Input

Name of test	Wake-up Test (Participant); No MOST Signal At Input 5.2.2-1
Reference to GFT	f_Wakeup_Test_Participant_No_MOST_Signal_At_Input()
Reference to Electrical Control Line Specification	3.2 Electrical Wake-up 4.3 Impulses
Value of Interest	Power consumption of DUT
Start Conditions	DUT: DevicePowerOff V_{BAT_ECU} according to manufacturer information
Test focus	DUT (in DevicePowerOff) has to be able to detect EWU (detectable by increased power consumption); tester does not generate any MOST signal
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT); no MOST signal at output of tester. Use maximum value of R_{PU} of tester.
Applicability	Any device with "EWU participant" functionality.
Notes	
Results	DUT ok: The DUT has passed the test. DUT not ok(1): The DUT fails to detect EWU. DUT not ok(2): The DUT does not support sleepmode.

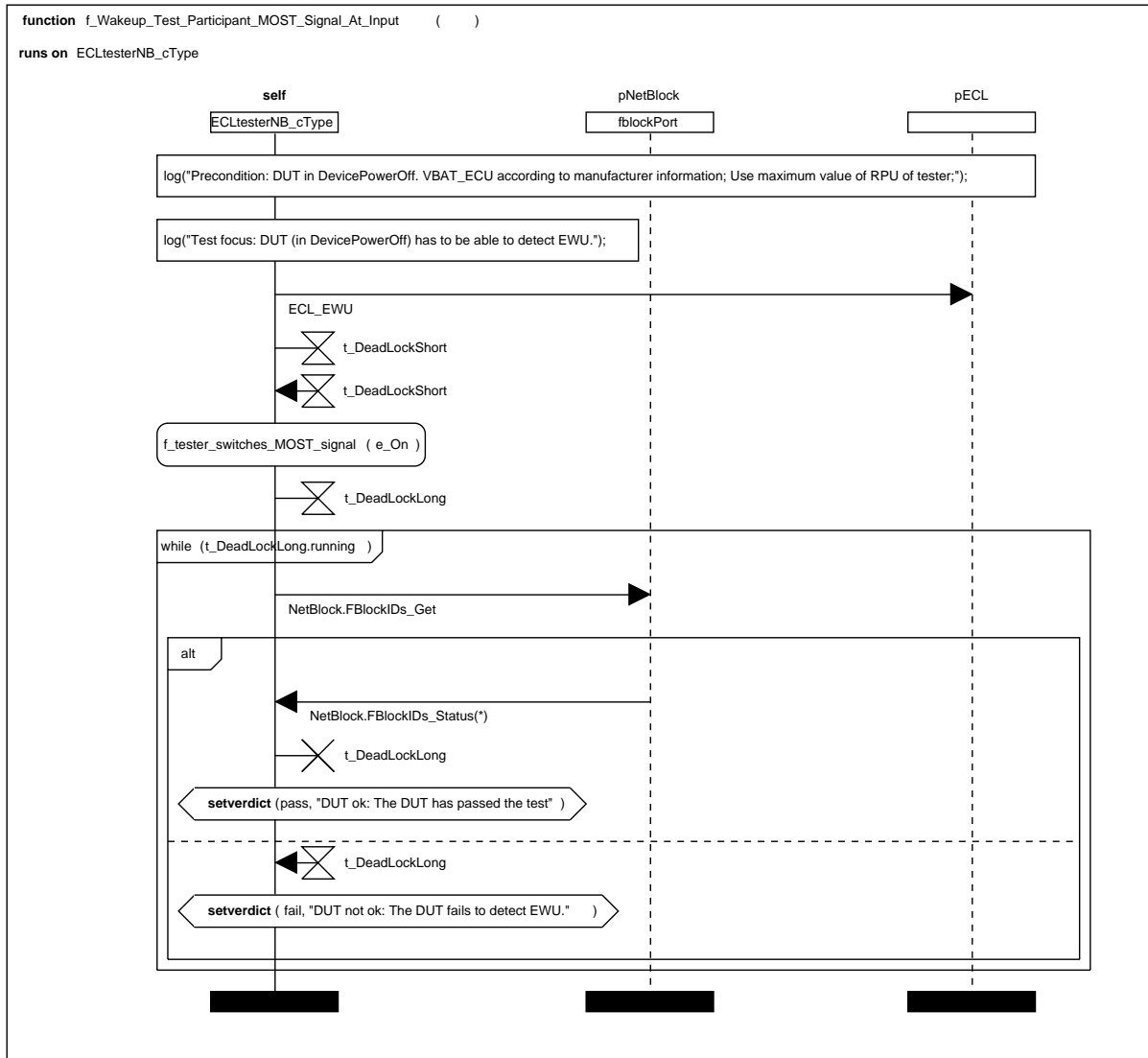
GFT of "Wake-up Test (Participant); No MOST Signal At Input"



3.2.1.2 Wake-up (Participant); MOST Signal At Input

Name of test	Wake-up Test (Participant); MOST Signal At Input 5.2.2-2
Reference to GFT	f_Wakeup_Test_Participant_MOST_Signal_At_input()
Reference to Electrical Control Line Specification	3.2 Electrical Wake-up
Value of Interest	FBlockIDs.Status
Start Conditions	DUT: DevicePowerOff V _{BAT_ECU} according to manufacturer information
Test focus	DUT (in DevicePowerOff) has to be able to detect EWU.
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT); no MOST signal at output. Use maximum value of R _{PU} of tester.
Applicability	Any device with "electrical wake-up participant" functionality.
Notes	
Results	DUT ok: The DUT has passed the test. DUT not ok: The DUT fails to detect EWU.

GFT of "Wake-up Test (Participant); MOST Signal At Input"



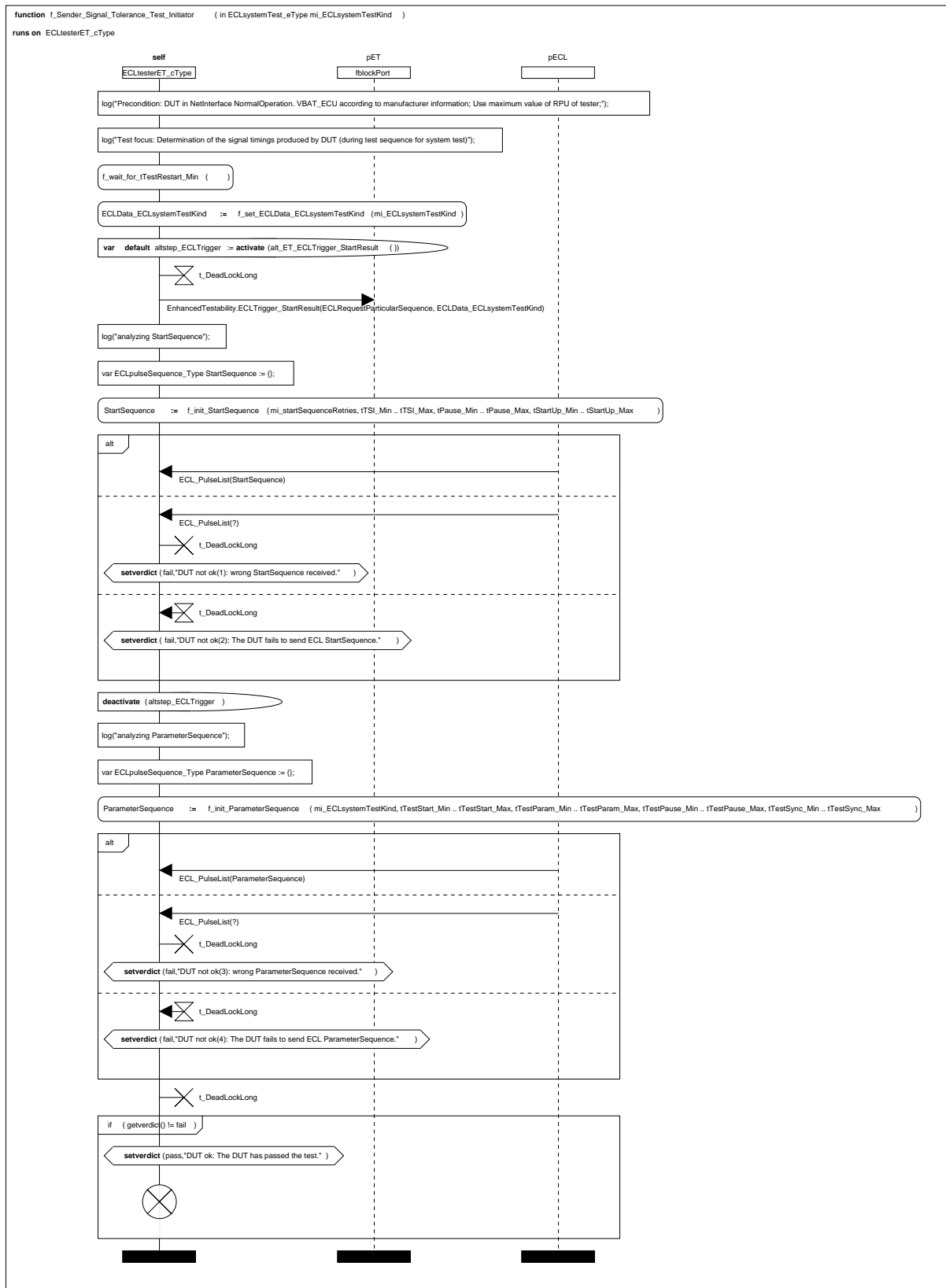
3.3 Signal Tests

3.3.1 Impulses

3.3.1.1 Sender Signal Tolerance Test (Initiator)

Name of test	Sender Signal Tolerance Test (Initiator) 5.3.1-3
Reference to GFT	f_Sender_Signal_Tolerance_Test_Initiator(in ECLsystemTest_eType mi_ECLsystemTestKind)
Reference to Electrical Control Line Specification	4.3 Impulses; table 4-5
Value of Interest	t_{TSI} t_{Pause} $t_{TestPause}$
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information
Test focus	Determination of the signal timings produced by DUT (during Start Sequence and Parameter Sequence of system test)
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.
Applicability	Any device with "ECL System Test Initiator" functionality.
Notes	Test has to be performed 5 times with every supported system test. Each test has to be passed.
Results	DUT ok: The DUT has passed the test. DUT not ok(1): Wrong StartSequence received. DUT not ok(2): The DUT fails to send ECL StartSequence. DUT not ok(3): Wrong ParameterSequence received DUT not ok(4): The DUT fails to send ECL ParameterSequence.

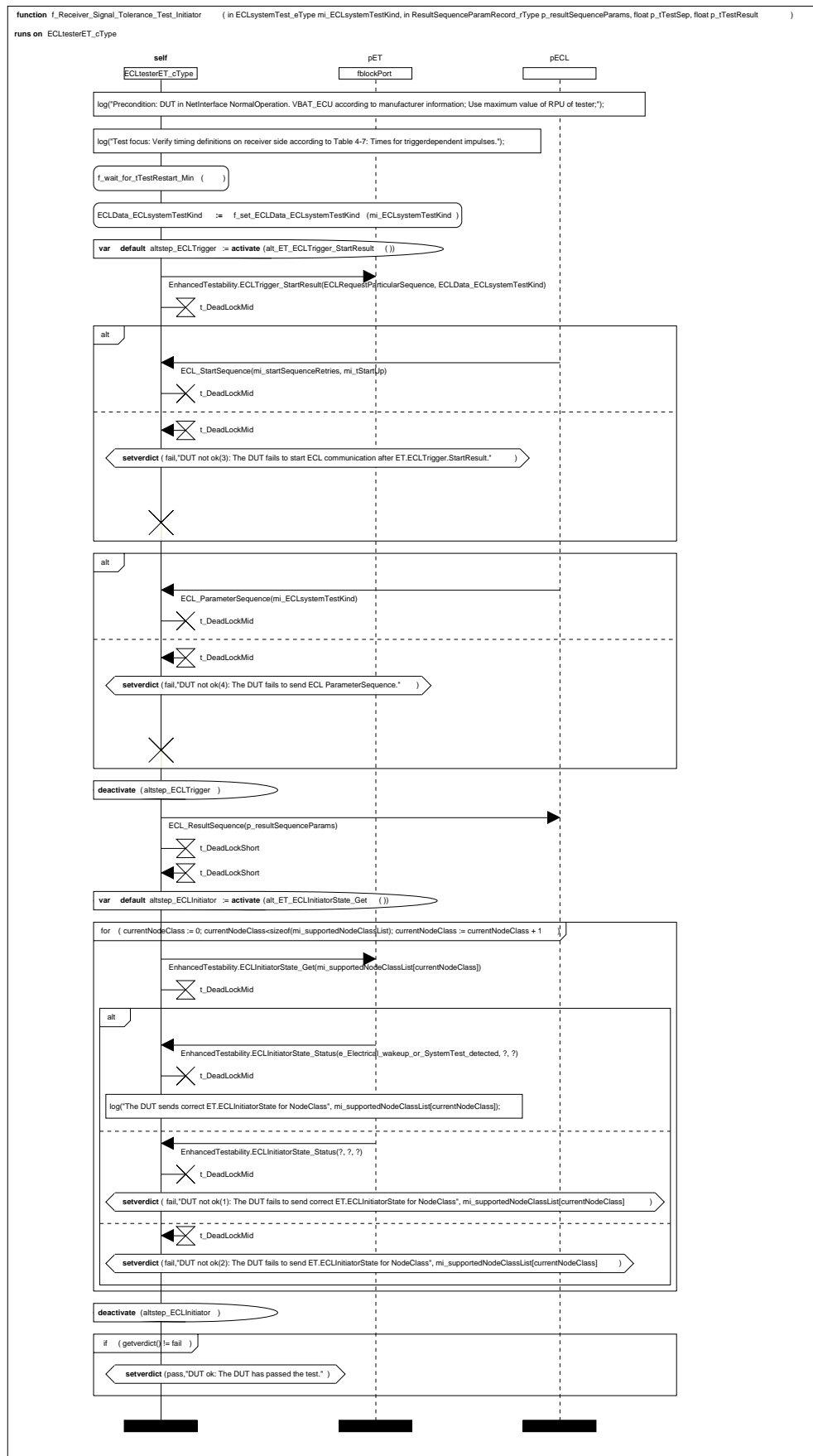
GFT of "Sender Signal Tolerance Test (Initiator)"

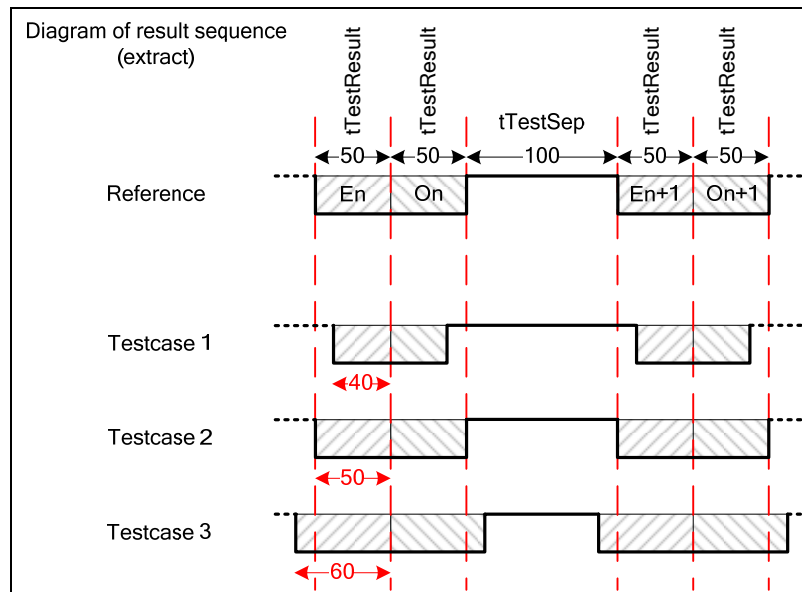


3.3.1.2 Receiver Signal Tolerance Test (Initiator)

Name of test	Receiver Signal Tolerance Test (Initiator) 5.3.1-5
Reference to GFT	f_Receiver_Signal_Tolerance_Test_Initiator(in ECLsystemTest_eType mi_ECLsystemTestKind, in ResultSequenceParamRecord_rType p_resultSequenceParams, float p_tTestSep, float p_tTestResult)
Reference to Electrical Control Line Specification	4.4 Triggers; table 4-8
Value of Interest	Signal tolerance while receiving
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information
Test focus	Verify timing definitions on receiver side according to “Table 4-7: Times for trigger-dependent impulses” of [2].
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.
Applicability	Any device with “ECL System Test Initiator” functionality.
Notes	Test has to be performed with different values of parameter p_tTestResult: Testcase 1: p_tTestResult = 40ms Testcase 2: p_tTestResult = 50ms Testcase 3: p_tTestResult = 60ms See diagram at end of GFT for details of testcases. En/On of each supported node class of DUT has to be generated. Each testcase has to be performed 5 times with every supported system test. Each test has to be passed.
Results	DUT ok: The DUT has passed the test. DUT not ok(1): The DUT fails to send correct ET.ECLInitiatorState. DUT not ok(2): The DUT fails to send ET.ECLInitiatorState. DUT not ok(3): The DUT fails to start ECL communication after ET.ECLTrigger.StartResult. DUT not ok(4): The DUT fails to send ECL ParameterSequence.

GFT of "Receiver Signal Tolerance Test (Initiator)"

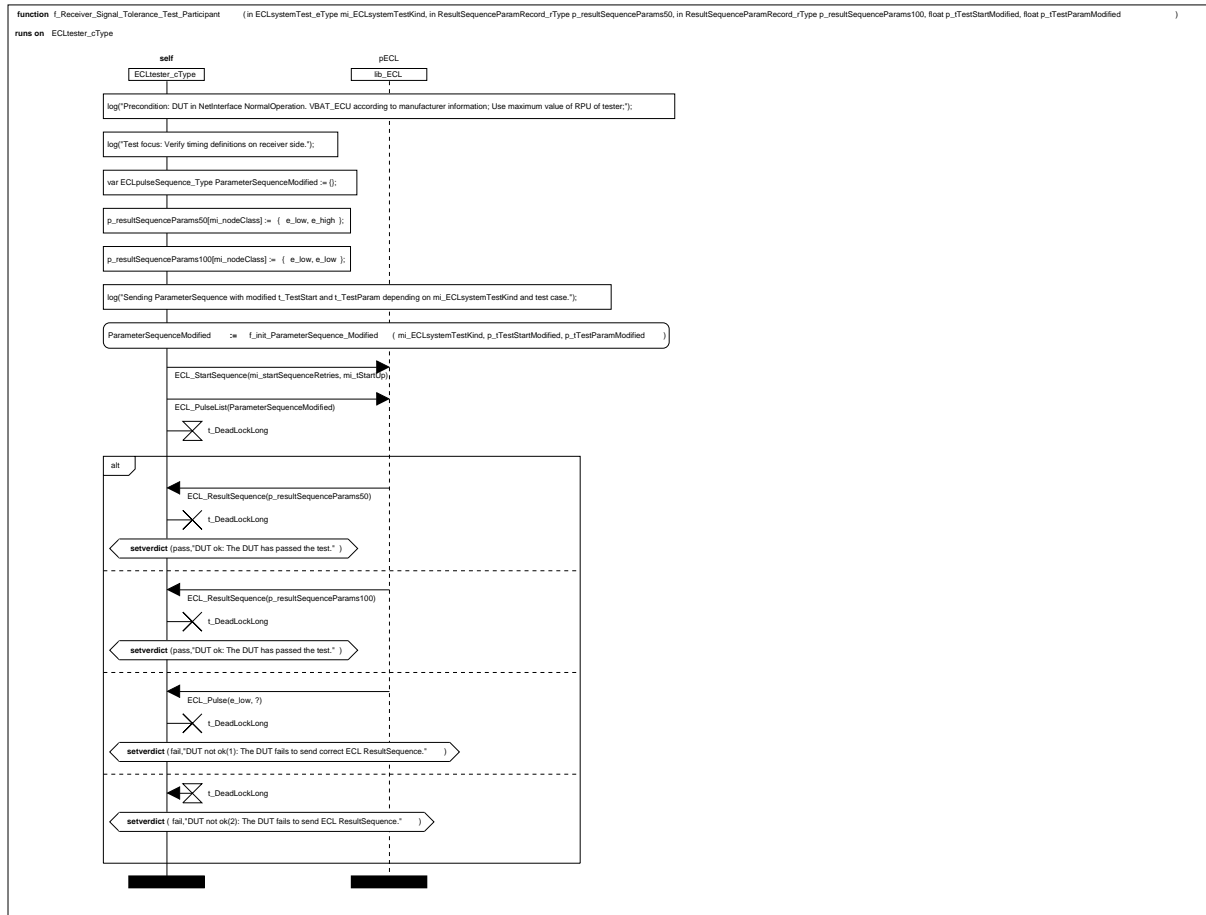




3.3.1.3 Receiver Signal Tolerance Test (Participant)

Name of test	Receiver Signal Tolerance Test (Participant) 5.3.1-6
Reference to GFT	f_Receiver_Signal_Tolerance_Test_Participant(in ECLsystemTest_eType mi_ECLsystemTestKind, in ResultSequenceParamRecord_rType p_resultSequenceParams50, in ResultSequenceParamRecord_rType p_resultSequenceParams100, float p_tTestStartModified, float p_tTestParamModified)
Reference to Electrical Control Line Specification	4.4 Triggers; table 4-8
Value of Interest	Signal tolerance while receiving
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information
Test focus	Verify timing definitions on receiver side according to "Table 4-7: Times for trigger-dependent impulses" of [2].
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.
Applicability	Any device with "ECL System Test Participant" functionality.
Notes	The test has to be performed 5 times with every supported system test. Each test has to be passed. Negative tolerance not tested; ECL specification allows smaller values for $t_{TestParam_min}$.
Results	DUT ok: The DUT has passed the test. DUT not ok(1): The DUT fails to send correct ECL ResultSequence. DUT not ok(2): The DUT fails to send ECL ResultSequence.

GFT of "Receiver Signal Tolerance Test (Participant)"

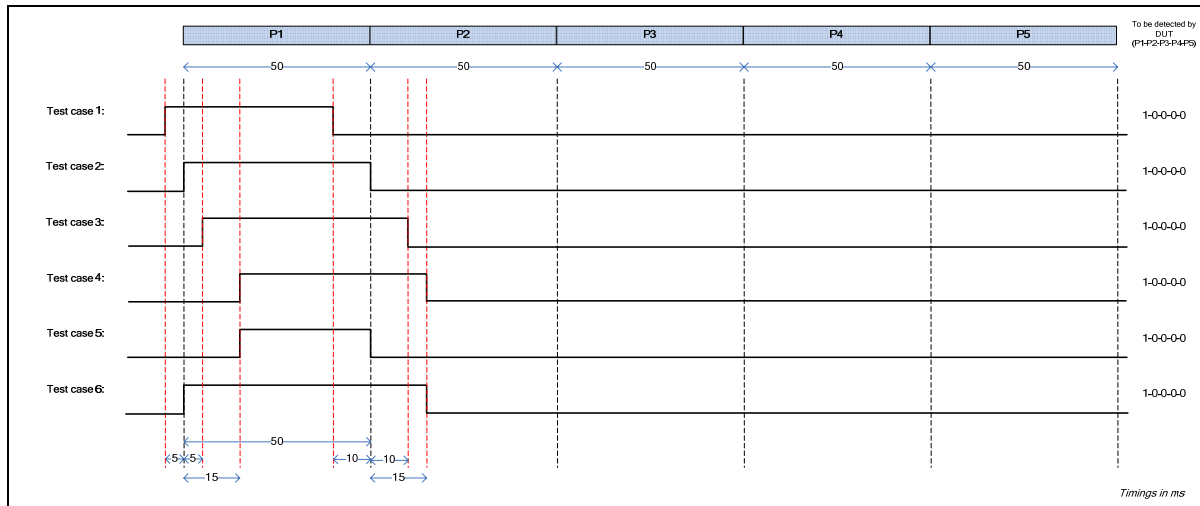


Visualization of the defined test cases:

Note: Due to clearness reasons, the graphs do not contain tolerance of tester

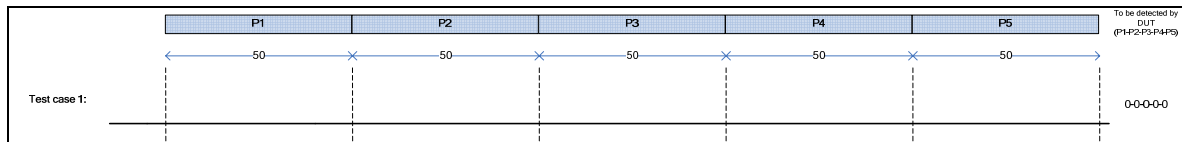
Applicable test pattern according to parameter mi_ECLsystemTestKind:

mi_ECLsystemTestKind = "e_alive":



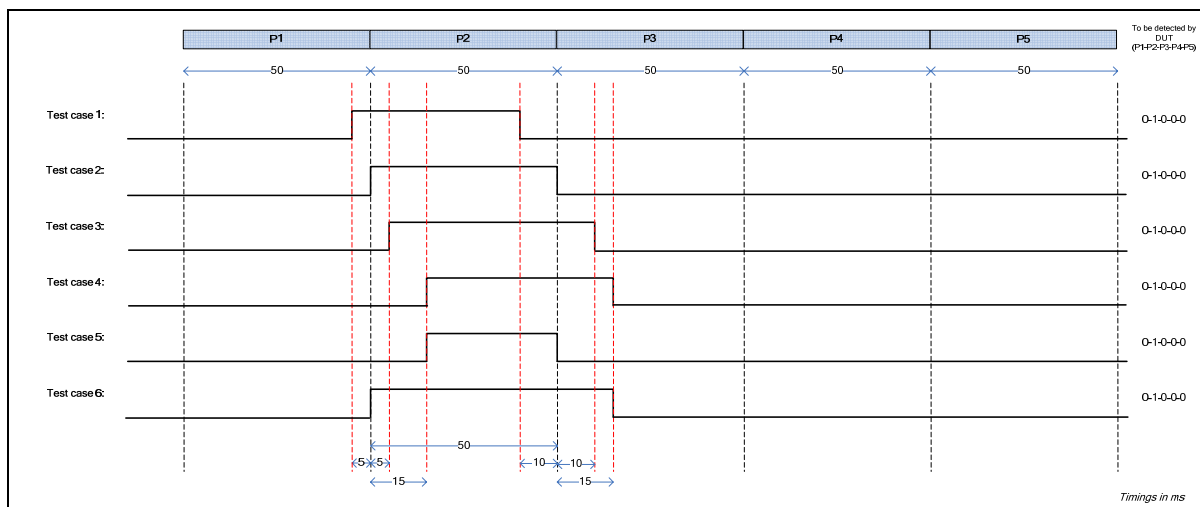
mi_ECLsystemTestKind = "e_RBD":

Only one test case (low at all t_TestParam)



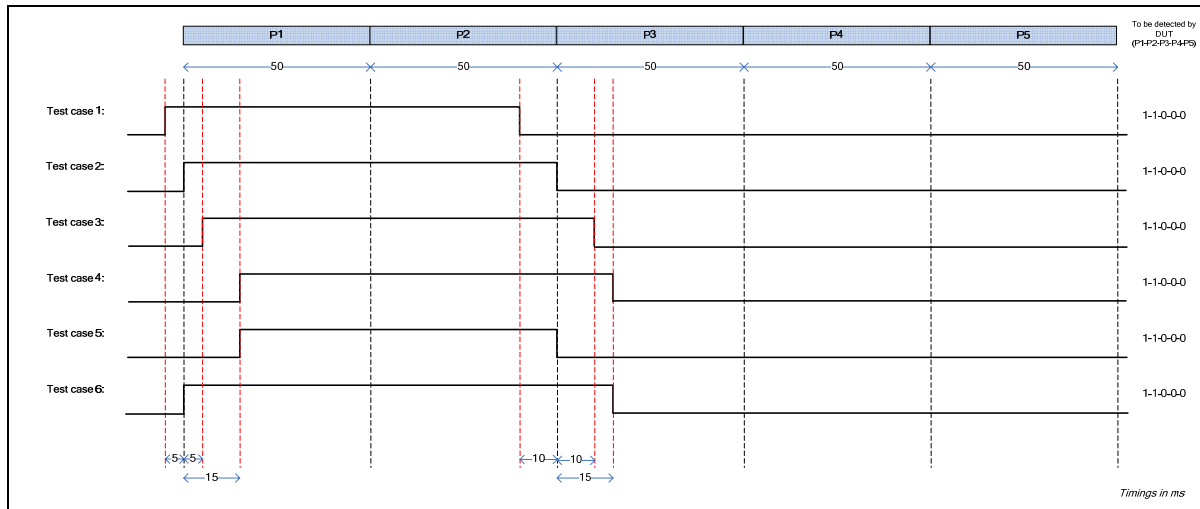
mi_ECLsystemTestKind = "e_codingerror":

Use same test pattern as "alive test" but all high-pulses shifted by 50ms (P2 instead of P1)



mi_ECLsystemTestKind = "e_SSO_CU"

Use same test pattern as "alive test" but increase length of all high pulses by 50ms (P1 and P2 instead of P1 only).

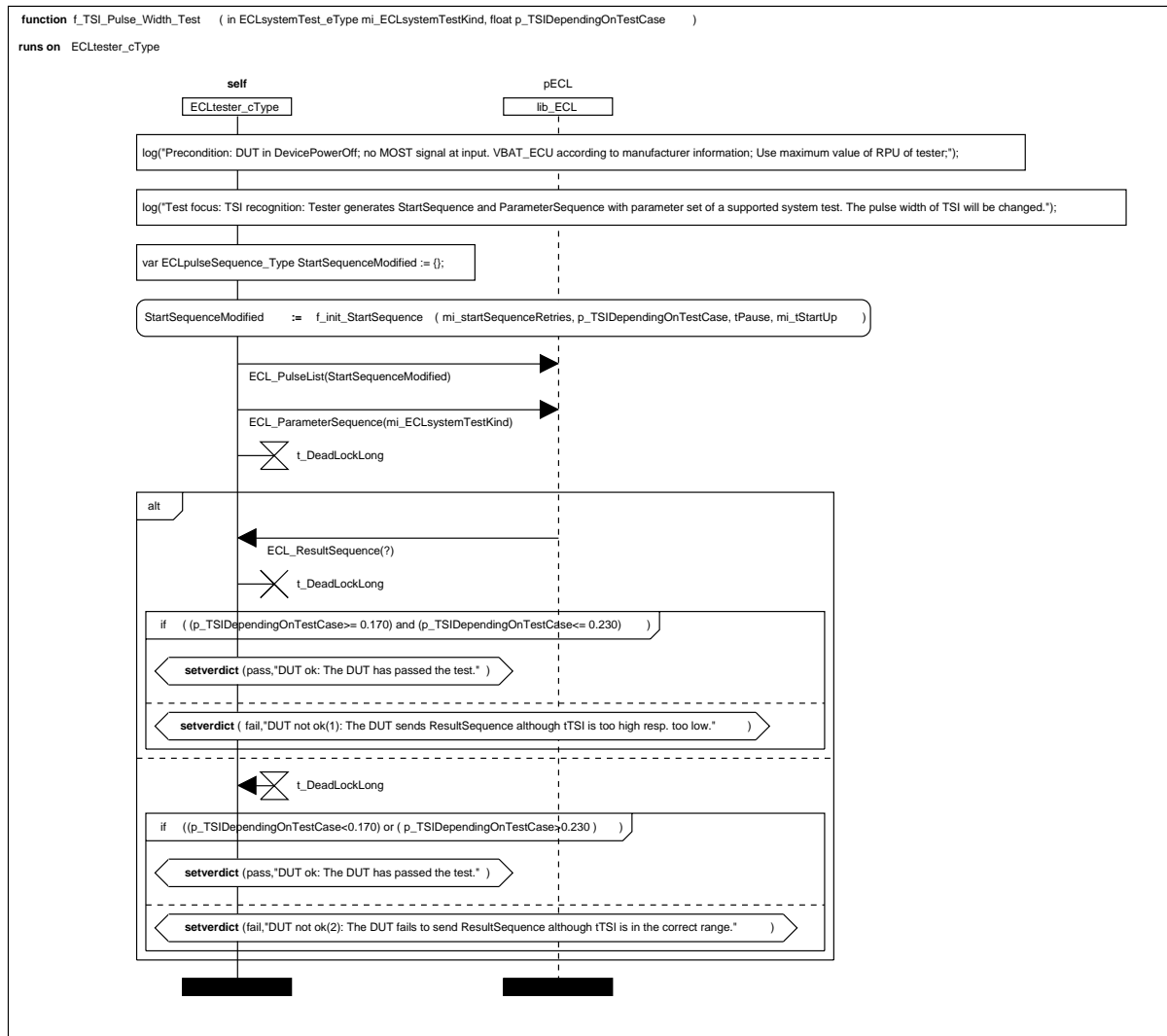


3.3.2 Triggers

3.3.2.1 TSI Pulse Width Test

Name of test	TSI Pulse Width Test 5.3.2-2
Reference to GFT	f_TSI_Pulse_Width_Test(in ECLsystemTest_eType mi_ECLsystemTestKind, float p_TSIDependingOnTestCase)
Reference to Electrical Control Line Specification	4.3 Impulses; table 4-6
Value of Interest	Signal tolerance of TSI detection
Start Conditions	DUT: DevicePowerOff; no MOST signal at input V _{BAT_ECU} according to manufacturer information
Test focus	TSI recognition
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R _{PU} of tester.
Applicability	Any device with "System Test Participant" functionality.
Notes	Tester generates "start sequence" and "parameter sequence" with parameter set of a supported system test. The pulse width of TSI will be changed as specified in GFT. Test has to be performed 4 times with different values of parameter p_TSIPulse: Testcase 1: p_TSIPulse = 165 ms Testcase 2: p_TSIPulse = 175 ms Testcase 3: p_TSIPulse = 225 ms Testcase 4: p_TSIPulse = 235 ms
Results	DUT ok: The DUT has passed the test. DUT not ok(1): The DUT sends ResultSequence although t _{TSI} is too high resp. too low. DUT not ok(2): The DUT fails to send ResultSequence although t _{TSI} is in the correct range.

GFT of "TSI Pulse Width Test"

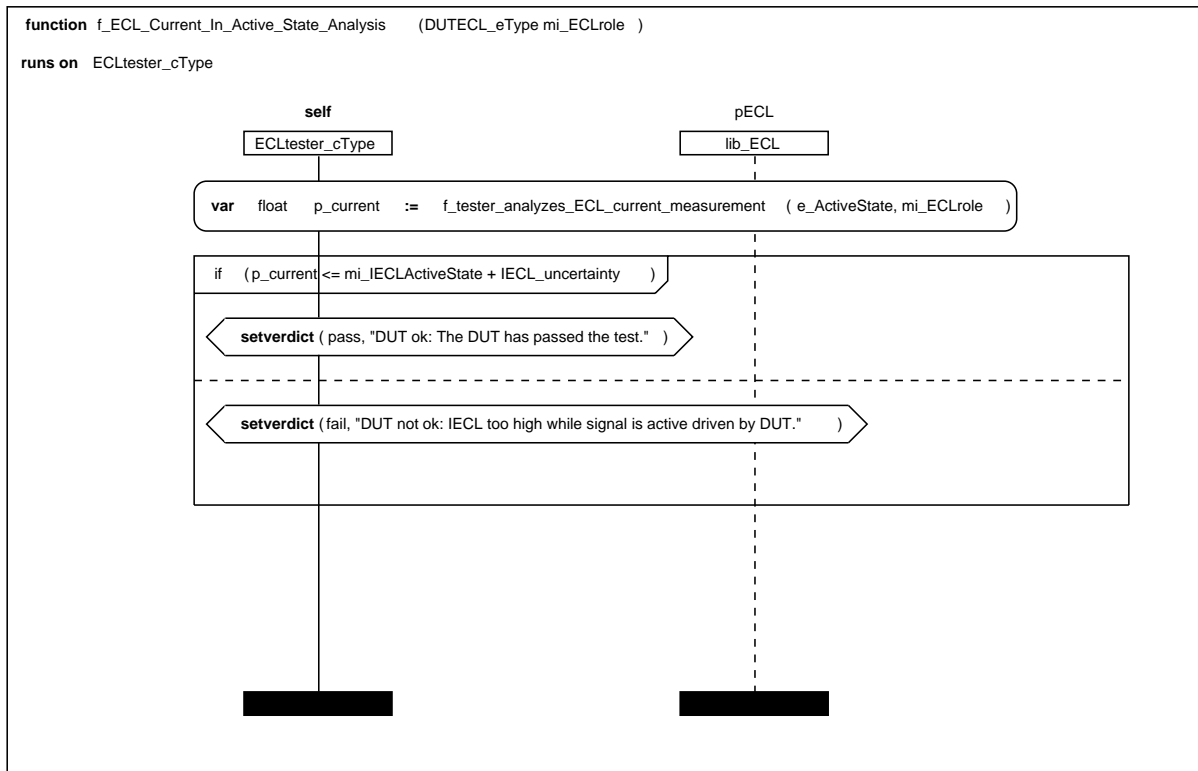
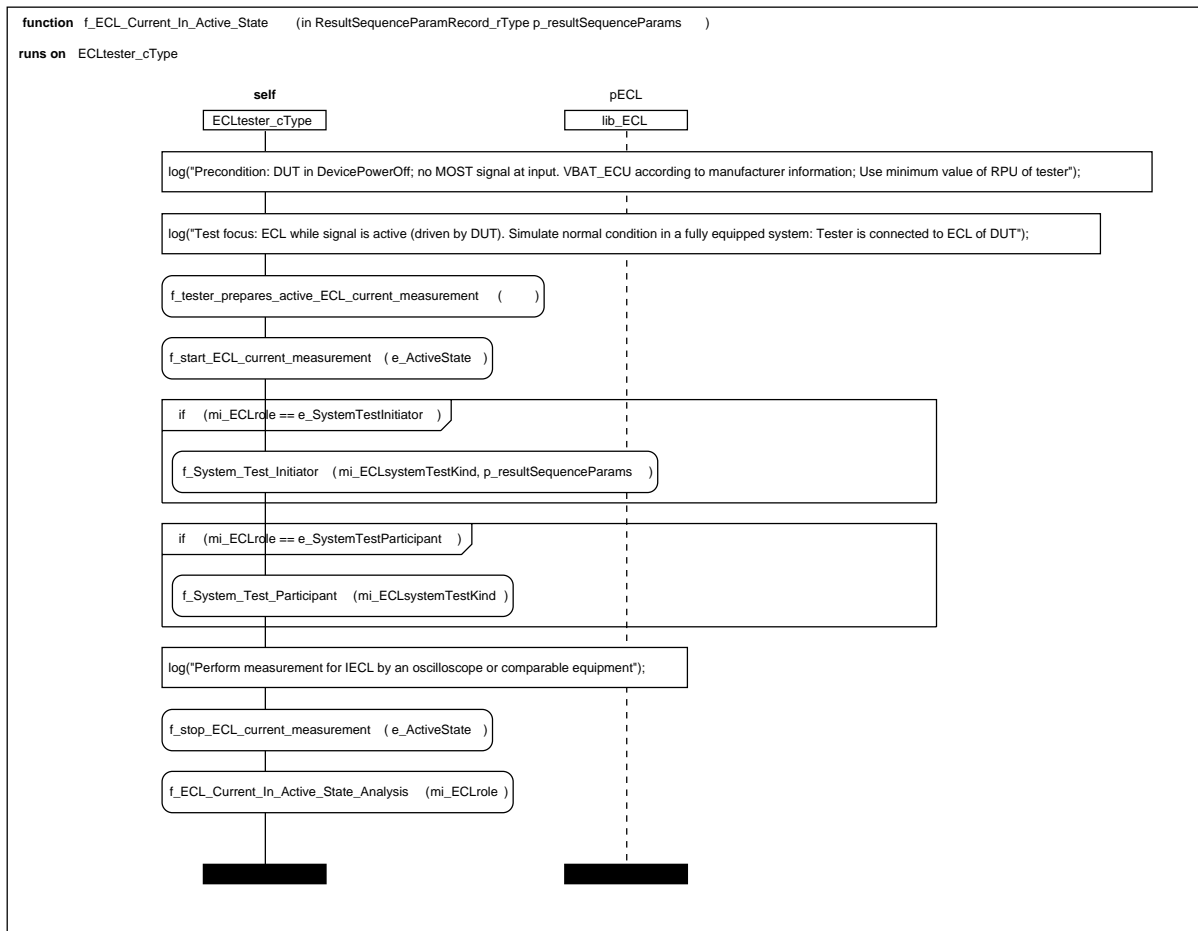


3.3.3 ECL Circuit

3.3.3.1 ECL Current In Active State

Name of test	ECL Current In Active State Test 5.3.3-1
Reference to GFT	f_ECL_Current_In_Active_State(in ResultSequenceParamRecord_rType p_resultSequenceParams)
Reference to Electrical Control Line Specification	4.1 ECL Circuit; table 4-1
Value of Interest	I_{ECL}
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information
Test focus	I_{ECL} while signal is active (driven by DUT)
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use minimum value of R_{PU} of tester.
Applicability	Any device with either "System Test Initiator" or "System Test Participant" functionality.
Notes	Simulate normal condition in a fully equipped system: Tester is connected to ECL of DUT; use minimum value of R_{PU} of tester to simulate a fully equipped system.
Results	DUT ok: The DUT has passed the test. DUT not ok: I_{ECL} too high while signal is active driven by DUT

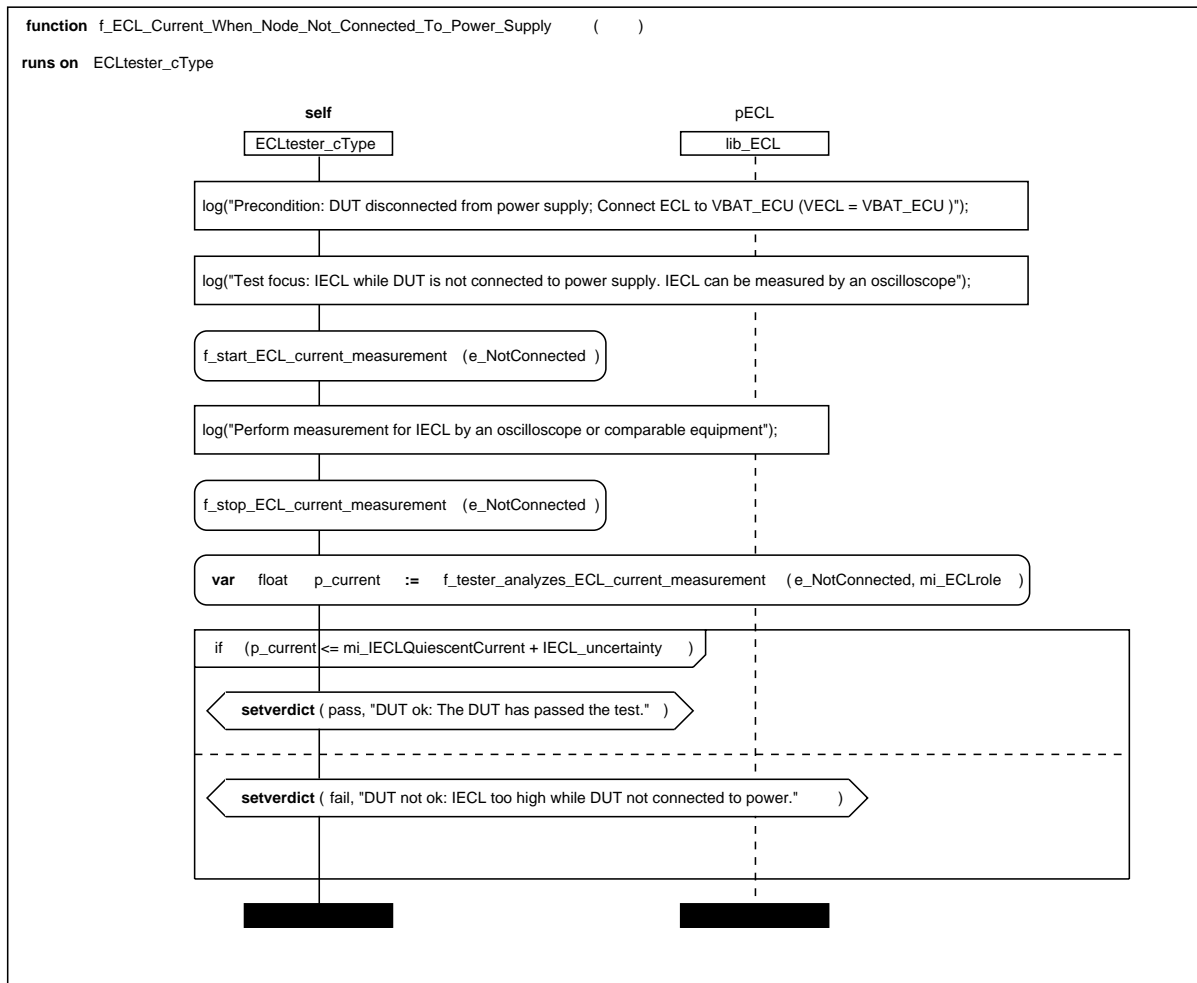
GFT of "ECL Current In Active State Test"



3.3.3.2 ECL Current When Node Not Connected To Power Supply

Name of test	ECL Current When Node Not Connected To Power Supply Test 5.3.3-4
Reference to GFT	f_ECL_Current_When_Node_Not_Connected_To_Power_Supply()
Reference to Electrical Control Line Specification	4.1 ECL Circuit
Value of Interest	I_{ECL}
Start Conditions	DUT disconnected from power supply. Connect ECL to V_{BAT_ECU} ($V_{ECL} = V_{BAT_ECU}$)
Test focus	I_{ECL} while DUT is not connected to power supply
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use minimum value of R_{PU} of tester.
Applicability	Any device with ECL interface.
Notes	
Results	DUT ok: The DUT has passed the test. DUT not ok: I_{ECL} too high while DUT not connected to power

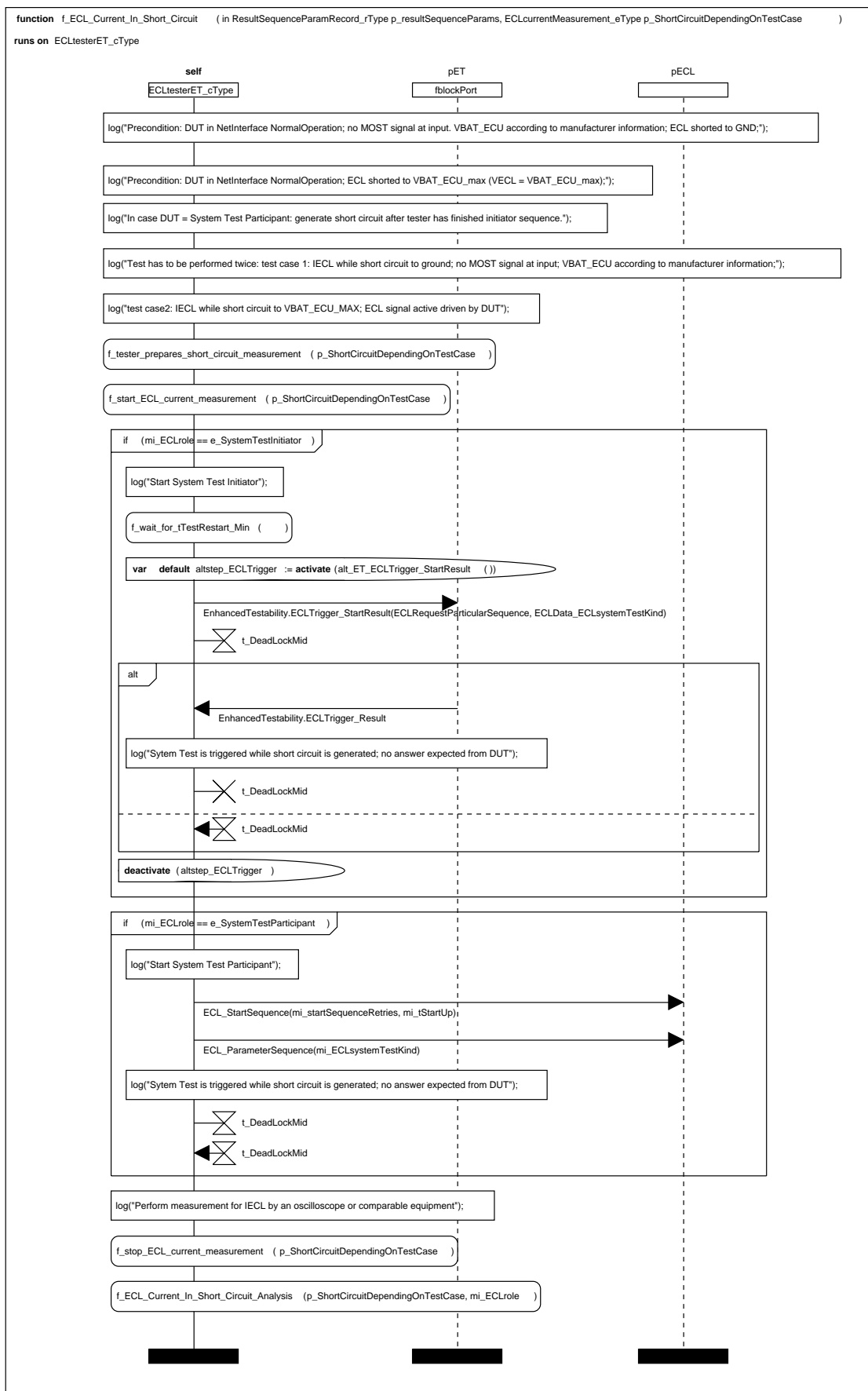
GFT of "ECL Current When Node Not Connected To Power Supply Test"

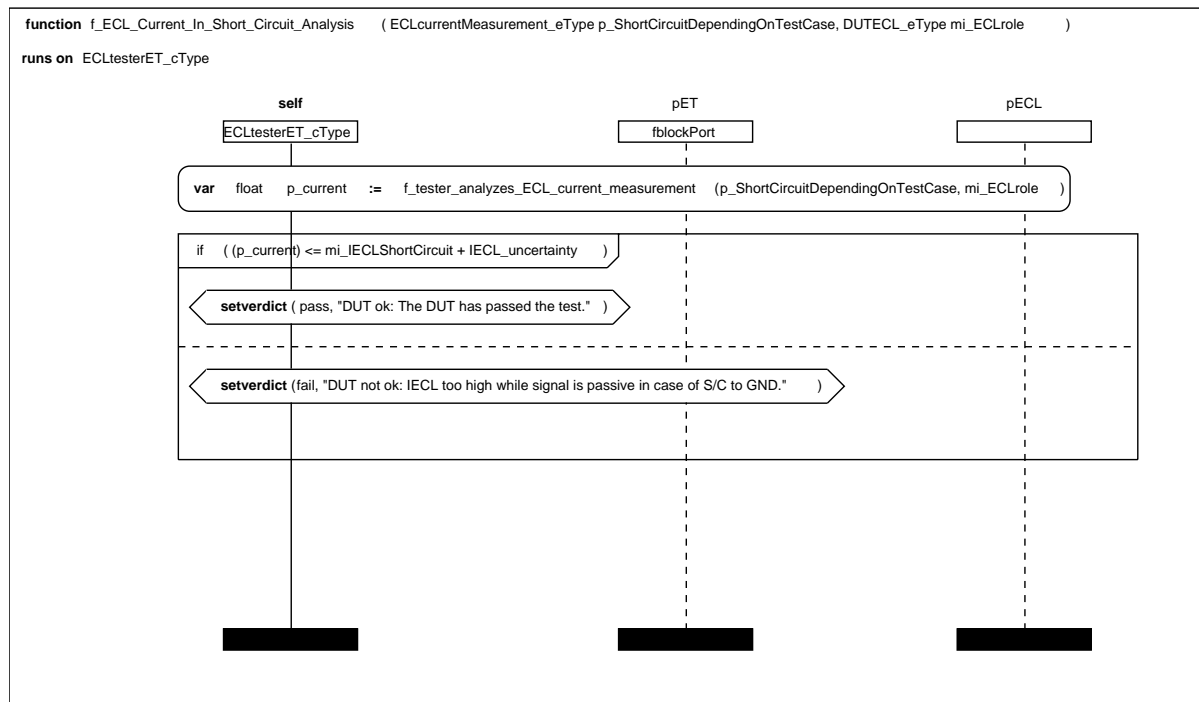


3.3.3.3 ECL Current In Short Circuit

Name of test	ECL Current In Short Circuit Test 5.3.3-5
Reference to GFT	f_ECL_Current_In_Short_Circuit(in ResultSequenceParamRecord_rType p_resultSequenceParams, ECLcurrentMeasurement_eType p_ShortCircuitDependingOnTestCase)
Reference to Electrical Control Line Specification	4.1 ECL Circuit; table 4-1
Value of Interest	I_{ECL}
Start Conditions	DUT: NetInterface NormalOperation V_{BAT_ECU} according to manufacturer information ECL shorted to GND or $V_{BAT_ECU_max}$ ($V_{ECL} = V_{BAT_ECU_max}$); in case DUT = "System Test Participant": generate short circuit after tester has finished initiator sequence.
Test focus	I_{ECL} while short circuit to ground or to $V_{BAT_ECU_MAX}$
Experimental set-up	Tester in timing master mode or timing slave mode (depends on DUT). Use maximum value of R_{PU} of tester.
Applicability	Any device with either "System Test Initiator" or "System Test Participant" functionality.
Notes	Test has to be performed twice: 1. ECL shorted to GND 2. ECL shorted to $V_{BAT_ECU_MAX}$
Results	DUT ok: The DUT has passed the test. DUT not ok: I_{ECL} too high while signal is passive in case of S/C

GFT of "ECL Current In Short Circuit Test"





Appendix 1 - Measurement Uncertainty And Tolerances

Measurement Uncertainty

Test number	Test Case Name	Measured value	Measurement uncertainty
5.1.1-1	System Test (Initiator)	t_{TSI} t_{Pause} $t_{StartUp}$ $t_{TestStart}$ $t_{TestParam}$ $t_{TestPause}$ $t_{TestSync}$	$\pm 2ms$ $\pm 2ms$ $\pm 2ms$ $\pm 2ms$ $\pm 2ms$ $\pm 2ms$ $\pm 2ms$
5.1.2-1	System Test (Participant)	$"mi_nodeClass * 200ms - 5ms"$ $\dots "mi_nodeClass * 200ms + 5ms"$ $"mi_nodeClass * 200ms + 50ms - 5ms" \dots "mi_nodeClass * 200ms + 100ms + 5ms"$ $t_{TestResult}$	$\pm 2ms$ $\pm 2ms$ $\pm 2ms$
5.2.2-1	Wake-up Test (Participant); No MOST Signal At Input	I_{BAT_ECU}	$\pm 4mA$ (= $I_{BAT_ECU_uncertainty}$)
5.2.2-2	Wake-up Test (Participant); MOST Signal At Input	-	-
5.3.1-3	Sender Signal Tolerance Test (Initiator)	t_{TSI} t_{Pause} $t_{TestPause}$	$\pm 2ms$ $\pm 2ms$ $\pm 2ms$
5.3.1-5	Receiver Signal Tolerance Test (Initiator)	Note: Tester generates relevant signals	-
5.3.1-6	Receiver Signal Tolerance Test (Participant)	Note: Tester generates relevant signals	-
5.3.2-2	TSI Pulse Width Test	Note: Tester generates relevant signals	-
5.3.3-1	ECL Current In Active State Test	I_{ECL}	$\pm 4mA$ (= $I_{ECL_uncertainty}$)
5.3.3-4	ECL Current When Node Not Connected To Power Supply Test	I_{ECL}	$\pm 4mA$ (= $I_{ECL_uncertainty}$)
5.3.3-5	ECL Current In Short Circuit Test	I_{ECL}	$\pm 4mA$ (= $I_{ECL_uncertainty}$)

Tolerances

The tester has to comply with all tolerances that are specified by ECL Specification. In addition, the following table lists tolerances that are not covered by ECL Specification but relevant for testing.

Test number	Test Case Name	Value	Tolerance
-	General	Tolerance_tester_R _{PU} Tolerance_setup_C_ECL V _{BAT_ECU} Tolerance_tester_timing	± 10% ± 10% ± 1% ± 1ms

Appendix 2 - FBlock ET Reference To ECL Test Cases (Informative)

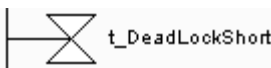
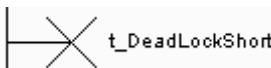
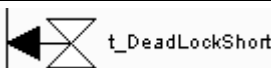
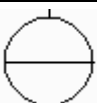


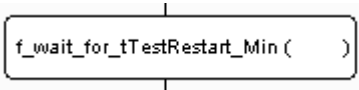

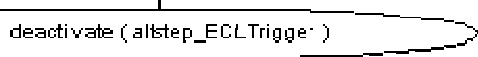
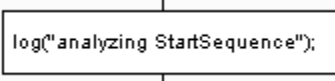
Note:

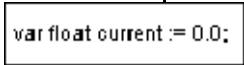
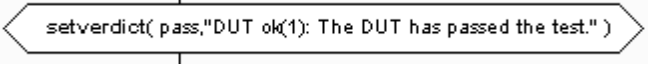
This table only contains FktIDs that will be used by at least one test case of this test specification.

FktID	Name	Test Case	Page
0x220	ECLTrigger	5.1.1-1 System Test (Initiator)	30
		5.3.1-3 Sender Signal Tolerance Test (Initiator)	39
		5.3.1-5 Receiver Signal Tolerance Test (Initiator)	41
0x221	ECLInitiatorState	5.1.1-1 System Test (Initiator)	30
		5.3.1-5 Receiver Signal Tolerance Test (Initiator)	41

Appendix 3 – GFT Symbols (Informative)

Overview of GFT symbols, based on ETSI ES 201 873-3

Symbol	Description
	Start Timer
	Stop Timer
	Timeout Timer
	Repeat A repeat statement is used in alt statements to wait for a new event in same alt statement.
	Stop A stop statement is used to stop the current function and all associated functions within a test case. This stops the whole test case.
	Return A return statement is used to leave the current function. It may be optionally associated with a return value.
	Reference A reference symbol is used to call a macro or a function.
	Default A default symbol is used to activate an altstep. An altstep adds additional alternatives to the subsequent alternative statements, until it is deactivated by means of deactivate symbol.
	Deactivate Deactivates an altstep.
	Logging Writes some output into a log file.

Symbol	Description
	Variable declaration. Optionally, declaration is done together with initialization, which is shown here in the symbol
	Condition The test result is set by means of “setverdict()”. It can be “pass” or “fail”, followed by a description. It is possible to call setverdict() several times within a test case. Once it is set to “fail”, it cannot be reset to “pass” by a subsequent setverdict() until test case is finished.

For further symbols and details, see ETSI ES 201 873-3 [3]

Notes: