

ISO 17987-6:2025-05 (E)

Road vehicles - Local Interconnect Network (LIN) - Part 6: Protocol conformance test specification

Contents		Page
Foreword		vii
Introduction		viii
1	Scope	1
2	Normative references	1
3	Terms, definitions, symbols and abbreviated terms	1
3.1	Terms and definitions	1
3.2	Symbols	2
3.3	Abbreviated terms	3
4	Conventions	4
5	General test specification considerations	5
5.1	General	5
5.2	Test conditions	5
5.3	Mandatory requirements for IUT as commander	5
5.4	Mandatory requirements for IUT as responder	5
5.5	Test case architecture	5
5.6	Classification	6
5.7	Test system requirements	6
5.7.1	Generation of LIN frames	6
5.7.2	Common requirements for the test cases	6
5.7.3	Common requirements for bit timing testing	6
5.7.4	Test system for IUT as responder node	7
5.7.5	Sleep state verification for IUT as responder node	7
5.8	Test system definition	8
5.9	Global predefinitions for the test setup	8
5.9.1	Configuration of IUT and test system	8
5.9.2	Default delays for frame headers	9
5.9.3	Default bit rate	9
5.9.4	Time measurement	9
5.9.5	Default spaces between the different frame parts of a LIN message	10
6	Essential test cases before test start	10
6.1	General	10
6.2	[PT-CT 1] Diagnostic frame "commander request", IUT as responder	10
6.3	[PT-CT 2] Diagnostic frame "responder response", IUT as responder	10
6.4	[PT-CT 3] Error in received frame, IUT as responder	11
7	Timing parameters	11
7.1	General	11
7.2	[PT-CT 4] Length of break field low phase, IUT as commander	11
7.3	[PT-CT 5] Variation of length of break field low phase, IUT as responder	12
7.4	[PT-CT 6] Length of break delimiter, IUT as commander	12
7.5	[PT-CT 7] Variation of length of break delimiter, IUT as responder	13
7.6	[PT-CT 8] Inconsistent break field error, IUT as responder	14
7.7	[PT-CT 9] Inconsistent sync byte field error, IUT as responder	14
7.8	[PT-CT 10] Bit rate detection, IUT as responder with making use of detection	14

7.9	[PT-CT 10] Verification of the sync byte field, IUT as commander	16
7.10	[PT-CT 11] Incomplete frame reception, IUT as responder	16
7.11	[PT-CT 12] Unknown frame reception, IUT as responder	17
7.12	[PT-CT 13] Length of header, IUT as commander	17
7.13	[PT-CT 14] Variation of length of header, IUT as responder	18
7.14	[PT-CT 15] Bit rate tolerance, IUT as commander	18
7.15	[PT-CT 16] Bit rate tolerance, IUT as responder without making use of synchronization ...	19
7.16	[PT-CT 17] Bit rate tolerance, IUT as responder with making use of synchronization	19
7.17	Length of response	20
7.17.1	[PT-CT 18] Length of response, IUT as responder	20
7.17.2	[PT-CT 19] Length of response, IUT as commander	21
7.17.3	[PT-CT 20] Acceptance of response field, IUT as responder	21
7.18	Verification of schedule table timing	22
7.18.1	[PT-CT 21] Verification of jitter, IUT as commander	22
7.18.2	[PT-CT 22] Schedule table management, IUT as commander	23
7.19	[PT-CT 23] Sample point test, IUT as responder	24
7.20	[PT-CT 24] Initialization time, IUT as responder	25
8	Communication without failure	26
8.1	Variation of LIN identifier	26
8.1.1	[PT-CT 25] Variation of LIN PID, IUT as commander	26
8.1.2	[PT-CT 26] Variation of LIN PIDs of subscribed frames, IUT as responder	26
8.1.3	[PT-CT 27] Variation of LIN identifier of published frames, IUT as responder	27
8.2	Transmission of the checksum byte	27
8.2.1	[PT-CT 28] Transmission of the checksum byte "classic checksum", IUT as responder ...	27
8.2.2	[PT-CT 29] Transmission of the checksum byte "enhanced checksum", IUT as responder	28
8.2.3	[PT-CT 30] Transmission of the checksum byte "classic checksum", IUT as commander .	28
8.2.4	[PT-CT 31] Transmission of the checksum byte of unconditional frames, IUT as commander	28
8.3	Unused bits	29
8.3.1	[PT-CT 32] Unused bits, IUT as commander	29
8.3.2	[PT-CT 33] Unused bits, IUT as responder	29
8.4	Reserved frame	30
8.4.1	[PT-CT 34] Reserved frame, IUT as responder	30
8.5	[PT-CT 35] Diagnostic frame commander request, IUT as commander	30
8.6	Supported frames according to the IUT specification	31
8.6.1	[PT-CT 36] Supported Tx frames according to the IUT specification, IUT as responder	31
8.6.2	[PT-CT 37] Supported Rx frames according to the IUT specification, IUT as responder	31
9	Communication with failure	32
9.1	General	32
9.2	[PT-CT 38] Bit error, IUT as responder	32
9.3	[PT-CT 39] Framing error in header of published frame, IUT as responder	33
9.4	[PT-CT 40] Framing error in response field of subscribed frame, IUT as responder	34
9.5	[PT-CT 41] Checksum error by inversion, IUT as responder	34
9.6	[PT-CT 42] Checksum error by carry, IUT as responder	35
9.7	[PT-CT 43] Communication robustness, IUT as responder	35
10	Event triggered frames	35
10.1	General	35
10.2	[PT-CT 44] Event triggered frame, IUT as responder	36
10.3	Event triggered frame with collision	36
10.3.1	[PT-CT 45] Event triggered frame with collision resolving, IUT as responder	36
10.3.2	[PT-CT 46] Event triggered frame with errors in collision resolving, IUT as responder	37
10.3.3	[PT-CT 47] Event triggered frame with collision resolving, IUT as commander	37
10.3.4	[PT-CT 48] Error in transmitted frame with collision, IUT as responder	38
11	Status management	38
11.1	[PT-CT 49] Error in received frame, IUT as responder	38
11.2	[PT-CT 50] Error in transmitted frame, IUT as responder	38

11.3	[PT-CT 51] response_error signal handling, IUT as responder	39
12	Sleep/wake-up/power mode tests	39
12.1	[PT-CT 52] Send "go-to-sleep command", IUT as commander	39
12.2	[PT-CT 53] Receive "go-to-sleep command", IUT as responder	40
12.3	[PT-CT 54] Receive a wake-up signal, IUT as commander	41
12.4	[PT-CT 55] Receive a wake-up signal, IUT as responder	41
12.5	Send a wake-up signal	42
12.5.1	[PT-CT 56] Send a wake-up signal, IUT as commander and IUT as responder	42
12.5.2	[PT-CT 57] Send a block of wake-up signals, IUT as responder	42
12.5.3	[PT-CT 58] Wait after one block of wake-up signals, IUT as responder	43
12.5.4	[PT-CT 59] Trigger wake-up signal followed by a frame header from commander, IUT as responder	43
12.6	[PT-CT 60] ECU power loss, IUT as commander	44
12.7	[PT-CT 61] Powered up with LIN shorted, IUT as commander	44
12.8	[PT-CT 62] LIN shorted before scheduling, IUT as commander	45
12.9	[PT-CT 63] LIN shorted after start of scheduling, IUT as commander	45
13	Sleepstateafterbusidle	46
13.1	[PT-CT 64] Sleep state after event and bus idle, IUT as responder	46
13.2	[PT-CT 65] Sleep state after bus idle with power up and wake-up signal, IUT as responder	47
13.3	[PT-CT 66] Timeout after bus idle, IUT as responder	48
14	Frame ID range assignment	48
14.1	[PT-CT 67] Frame ID range assignment with indirect response, IUT as responder	48
14.2	[PT-CT 68] Frame ID range unassignment with indirect response, IUT as responder	49
15	Wildcards	50
15.1	[PT-CT 69] Request with direct response, IUT as responder	50
16	ReadByIdentifiercommand	50
16.1	LIN product identification	50
16.1.1	[PT-CT 70] LIN product identification request with direct response, IUT as responder	50
16.1.2	[PT-CT 71] LIN product identification -- With interleaved unconditional frame, IUT as responder	51
16.2	[PT-CT 72] ReadByIdentifier command with correct NAD, IUT as responder	51
16.3	[PT-CT 73] ReadByIdentifier command with incorrect addressing, IUT as responder	52
17	NAD assignment	53
17.1	General	53
17.2	[PT-CT 74] NAD assignment -- Followed by ReadByIdentifier service, IUT as responder	53
17.3	[PT-CT 75] NAD assignment -- With positive response, IUT as responder	53
17.4	[PT-CT 76] NAD assignment -- Initial NAD, IUT as responder	53
18	SaveConfiguration	54
18.1	General	54
18.2	[PT-CT 77] Save configuration -- With positive response, IUT as responder	54
18.3	[PT-CT 78] Save configuration -- Save a new NAD, IUT as responder	54
18.4	[PT-CT 79] Save configuration -- Save new frame identifiers, IUT as responder	55
19	Transport protocol	56
19.1	[PT-CT 80] Transport layer functional request, IUT as responder	56
19.2	[PT-CT 81] Abort diagnostic communication with new diagnostic request, IUT as responder	56
19.3	[PT-CT 82] IUT receives a segmented request as specified, IUT as responder	56
19.4	[PT-CT 83] IUT receives a segmented request interleaved with unconditional frame, IUT as responder	57
19.5	[PT-CT 84] IUT receives a segmented request with interleaved functional request, IUT as responder	58
19.6	IUT shall ignore request after timeout	59

19.6.1	[PT-CT 85] IUT shall ignore segmented requests on N_Crmax timeout, IUT as responder	59
19.6.2	[PT-CT 86] IUT shall observe transport layer N_Asmx timeout, IUT as responder	60
19.7	[PT-CT 87] IUT shall ignore segmented requests with wrong sequence numbering, IUT as responder	61
19.8	[PT-CT 88] IUT shall respond with correct segmented response, IUT as responder	62
19.9	IUT sends a segmented response with interleaved unconditional frames	63
19.9.1	[PT-CT 89] IUT sends a segmented response with interleaved unconditional frame, IUT as responder	63
19.9.2	[PT-CT 90] IUT sends a segmented response with interleaved functional request, IUT as responder	64
19.10	[PT-CT 91] IUT shall not respond to responder response header if there is no request before, IUT as responder	65
19.11	[PT-CT 92] IUT shall not respond to responder response header if the response is already sent, IUT as responder	65
19.12	[PT-CT 93] IUT shall abort segmented response on N_Csmx timeout, IUT as responder	66
Annex A (normative) LIN AA procedure C protocol conformance test plan		68
Annex B (normative) LIN AA procedure D protocol conformance test plan		75
Annex C (normative) LIN AA procedure E protocol conformance test plan		81
Bibliography		104