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Second edition
2018-07

Road vehicles — Controller area network (CAN) conformance test plan —

Part 2: High-speed medium access unit — Conformance test plan

Véhicules routiers — Gestionnaire de réseau de communication (CAN) plan d'essai de conformité —

Partie 2: Unité d'accès au medium haute vitesse — Plan d'essai de conformit

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This second edition cancels and replaces the first edition (ISO 16845-2:2014), which has been technically revised and includes the following changes:

— several clauses, subclauses, tables and figures have been technically revised. In particular, the test cases and test requirements to verify if the CAN transceiver with implemented selective wake-up functions conform to the specified functionalities within ISO 11898-6:2013 were extended. This was done to provide a conformance test plan for the whole CAN medium access unit implementations compliant with ISO 11898-2:2016 (which is the result of the merge of ISO 11898-2:2003, ISO 1898-5:2007 and ISO 11898-6:2013).

A list of all the parts in the ISO 16845 series can be found on the ISO website.

Introduction

ISO 16845 was first published in 2004 to provide a test plan for conformance testing of the CAN data link layer and physical signalling as standardized in ISO 11898-1. With ISO 11898-6:2013, CAN high-speed medium access units were standardized, which partly implements a CAN data link layer, in order to provide selective wake-up functionality. This standard was merged together with ISO 11898-5:2007 and ISO 11898-2:2003 to produce ISO 11898-2:2016. In order to provide a conformance test plan for CAN medium access unit implementations compliant with ISO 11898-2:2016, this document has been developed. It comprises static tests and dynamic tests.

Road vehicles — Controller area network (CAN) conformance test plan —

Part 2:
High-speed medium access unit — Conformance test plan

1 Scope

This document specifies the conformance test plan for the CAN physical layer as standardized in ISO 11898-2:2016. It specifies static and dynamic tests. The dynamic tests includes the test cases for the partly implemented Classical CAN protocol and CAN FD protocol as standardized in ISO 11898-1:2015. The static tests describe the data to be given in datasheets.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11898-1:2015, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling*

ISO 11898-2:2016, *Road vehicles — Controller area network (CAN) — Part 2: High-speed medium access unit*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11898-2:2016 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
implementation under test
IUT
HS-PMA which will be conformance tested according to this document

EXAMPLE Standalone transceiver or SBC.

3.2
lower tester
LT
part of the test system, which emulates the interfaces of the underlying OSI layer from sight of the IUT

3.3
normal mode
mode, in which biasing as well as RX and TX are enabled and low-power mode is disabled

3.4
system under test
SUT
system, which embeds the IUT as a part or contains the IUT, because it cannot operate as a stand-alone component

3.5
test system
TS
system, which fulfils in this case all requirements to perform the tests defined in this specification

3.6
upper tester
UT
part of the test system, which emulates the interfaces of the overlying OSI layer from sight of the IUT

3.7
valid frame
syntactically correct CAN frame

3.8
invalid frame
syntactically incorrect CAN frame with CAN conform error treatment

3.9
sync frame
syntactically correct CAN frame which is present on the bus while the IUT is in low power mode.

Note 1 to entry: It could be a WUF or non WUF.

3.10
sync sequence
group of sync frames which the IUT may use to calibrate or fine tune internal parameter to be prepared to detect a WUF

4 Symbols and abbreviated terms

The following symbols and abbreviated terms are used in this document:

ACK acknowledge

ASP abstract service primitives

CAN controller area network

CBFF classical base frame format

CEFF classical extended frame format

CRC cyclic redundancy check

DLC data length code

EOF end of frame

FBFF FD base frame format

FEC frame error counter

FEFF FD extended frame format

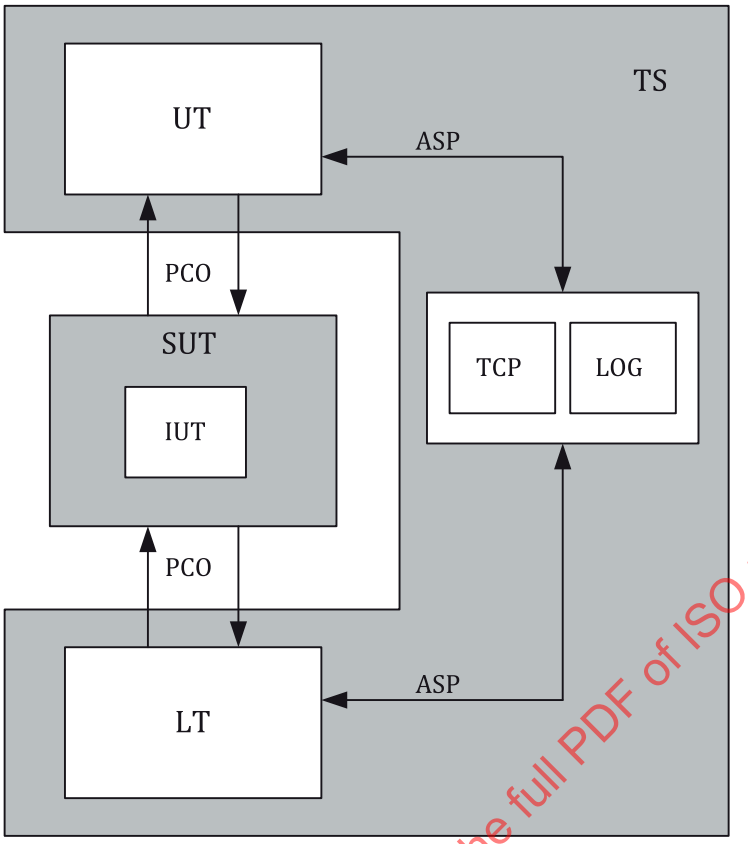
ID	identifier
IMF	intermission field
MAC	medium access control
OSI	open system interconnection
PCO	point of control and observation
PHS	physical signalling
PL	physical layer
PMA	physical medium attachment
SBC	system base chip
SOF	start of frame
WUF	wake-up frame
WUP	wake-up pattern

5 Global overview

5.1 OSI conformance test method

OSI conformance testing was mainly introduced by the ISO 9646, ISO 9646-1 and ISO 9646-2, for the purpose of regulating and harmonizing impartial tests. In general information about the internal structure of the implementation as well as source code is not available to the party performing the tests. This explains why the preferred OSI conformance testing methodology is black box testing and consequently does not take into account any implementation details.

Figure 1 — The OSI coordinated test method depicts the OSI coordinated test method.



Key

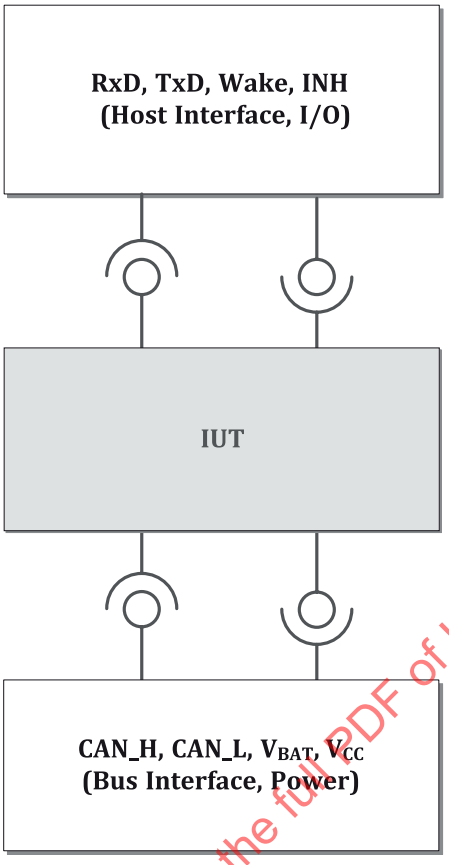
ASP	abstract service primitives
IUT	implementation under test
LOG	logger
LT	lower tester
PCO	point of control and observation
SUT	system under test
TCP	test coordination procedure
TS	test system
UT	upper tester

Figure 1 — The OSI coordinated test method

OSI conformance testing proposes many test methods suitable for different sorts of IUT, providing different points of control and observation.

A coordinated test method which provides a simple interface to the IUT is the most suitable for HS-PMA, i.e. the CAN network itself, and a flexible test coordination protocol using CAN messages between the LT as part of the TS and the UT in the SUT. The LT controls and observes the IUT lower service boundary indirectly via the underlying service provider, using the ASPs of the CAN protocol. The UT controls and observes the IUT upper service boundary. The TCPs ensure the cooperation between the LT and the UT.

In case of IUTs with partial networking functionalities, influencing variables from the UT side are the digital CAN signals (RXD and TXD), host interface signals and I/O signals like INH or wake. The LT influencing variables are the analogue bus interface with the signals CAN_H and CAN_L and the supply power. Figure 2 depicts the influencing variables on the IUT.



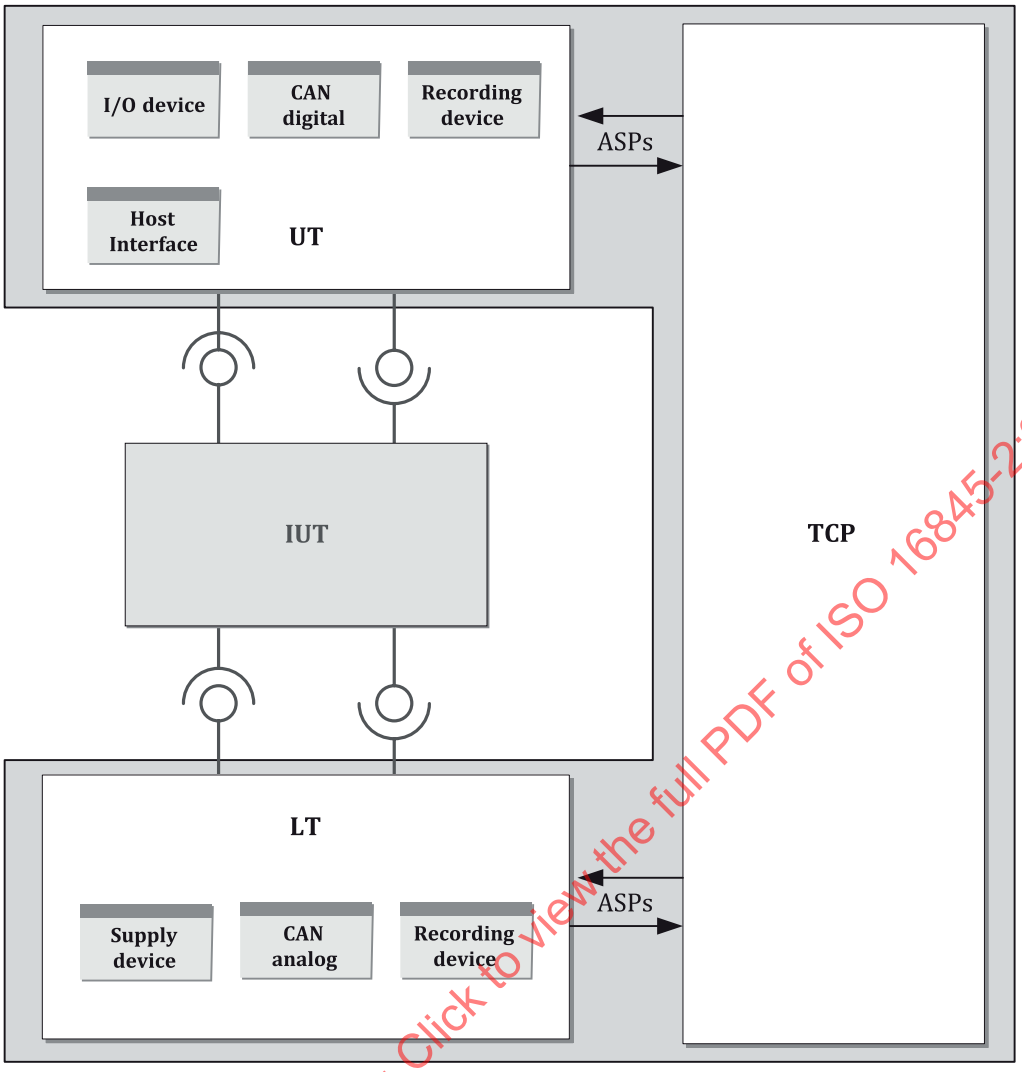
Key

CAN_H	CAN high signal
CAN_L	CAN low signal
INH	inhibit output
IUT	implementation under test
I/O	input/output
RXD	receive data output
TXD	transmit data input
V_{BAT}	battery supply input
V_{CC}	supply input
Wake	mode signalling output

Figure 2 — Influencing variables on IUT

To realise all services stimulating the IUT and recording the responses of the IUT regarding all influencing variables, abstract logical devices are defined as followed.

Figure 3 — Abstract logical devices of UT and LT depicts abstract logical devices of UT and LT.



Key

IUT implementation under test
LT lower tester
TCP test coordination procedure
UT upper tester

Figure 3 — Abstract logical devices of UT and LT

The OSI model divides a communication interface in seven logical layers which contain defined interfaces from / to the upper or lower layer (as introduced by the ISO 7498-1). Following the OSI coordinated test method the TS realises the upper layer with help of the UT and the lower layer with help of the LT. For IUTs without partial networking capability, the IUT is implemented inside the logical layer 1 – the physical layer with the lower interface as the CAN network and the upper interface to the layer 2, known as the data link- or protocol layer, with logical signals TXD and RXD. In case of an IUT supporting partial networking the IUT itself contains functionalities appropriate to the data link layer (partial networking functionalities) and physical layer (typical transceiver functionalities). To follow the OSI coordinated test method this test specification is split in a physical layer part, verifying the transceiver characteristics appropriated to the OSI physical layer and a data link layer part, verifying the protocol implementation necessary for partial networking functionalities.

5.2 General organization

The abstract test suites of the TS are independent to one another. Each abstract test suite checks the behaviour of the IUT for a particular parameter of the CAN protocol as defined in ISO 11898-1:2015. Each test case may be executed one after another in any order or alone.

Test cases requiring variations of individual parameters shall be repeated for each value of the parameter. Each repetition is named elementary test. A test case including different elementary tests is valid only if all tests pass.

The result of executing a test case on an IUT should be the same whenever it is performed. To realize such reproducibility of test results, this document is designed in the way to minimize the possibility that a test case produces different test outcomes on different occasions. Therefore, test requirements, which shall be met, and how the verdicts are to be assigned are defined in an unambiguous way.

All parameters in a test case are given for the electrical interface pins of IUT. The stimulus generator should correctly signal delays and voltage drops of test setup.

If not explicitly different described in test case, all applied stimuli for CAN data and remote frames are built according to the CAN protocol behaviour as expected on a real CAN network.

5.3 Test case organization

5.3.1 Overview

All defined test cases should be executed in accordance with the supported IUT-specific bit rates defined in the IUT's datasheet.

In case the IUT supports other bit rates, the following scenarios are possible.

— if the IUT supports only one bit rate, then all test cases should be executed using this specific bit rate;

— if the IUT supports two bit rates, then all test cases should be executed with both bit rate; and

— if the IUT supports more than two bit rates or a range of bit rates, then all test cases should be executed considering the highest and the lowest bit rate, as well as a bit rate in-between.

5.3.2 Setup state

5.3.2.1 General

The setup state is a defined and explicitly entered and verified state in which the IUT shall be before entering the test state. A test starts with unpowered IUT. The first step is to set IUT power supply on. The IUT, unless otherwise specified, is configured with data as found in 5.3.4.2.

Each elementary test is made of three states:

— setup state;

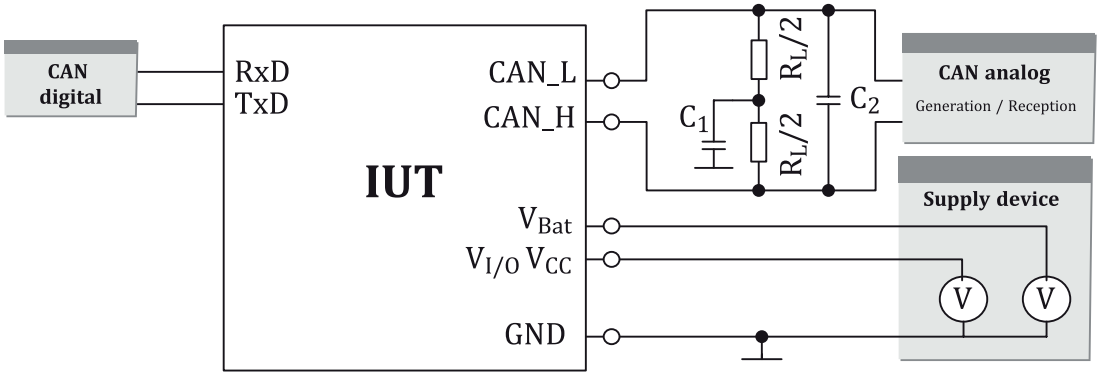
— test state; and

— verification state.

Before the first elementary test is started, the IUT shall be initialised into the default state.

5.3.2.2 Default setup

Figure 4 describes the default setup for the test, which shall be applied unless otherwise specified in setup of the test case description. Furthermore, the setup information of the related IUT documentation shall be followed.



Key

CAN_H	CAN high signal
CAN_L	CAN low signal
GND	ground
IUT	implementation under test
I/O	input/output
RXD	receive data output
TXD	transmit data input
V_{BAT}	battery supply input
V_{CC}	supply input
$V_{I/O}$	logic supply input
R_L	test load resistance of 60 Ω ± 0,6 Ω
C_1	test load capacitance of 4,7 nF ± 0,235 nF (absent unless otherwise specified)
C_2	differential test load capacitance if 100 pF ± 1 pF

Figure 4 — Default setup for test

5.3.2.3 Default state

The default state is characterised by the following default value:

— IUT power supply on;

— IUT configured to the bit rate(s) for the particular test; and

— IUT set to Normal mode.

After the end of each elementary test, the default state should be re-applied.

5.3.3 Test state

The time between two frames on the bus shall be zero bits of idle after IMF, unless otherwise specified. The idle phase shall not be longer than $t_{SILENCE(min)}$.

5.3.4 Test frame definition for protocol related test cases

5.3.4.1 Elements of CAN test frames

In the CAN protocol related test cases; the focus is on correct frame handling. Therefore, the test frames or test patterns sent to the IUT are conforming to CAN protocol. In case of valid, syntactically correct frames and also for invalid, syntactically incorrect frames, the treatment around the bus failure shall

be compliant to the CAN Protocol. The test frames and error treatments are structured as depicted in ISO 11898-1:2015.

5.3.4.2 IUT configuration and default parameters

Unless otherwise specified in the corresponding test case definition, the used test frame shall be as defined in Table 1.

Table 1 — Definition of the default test frames

Frame format	CAN ID field	DLC	Data field	ACK bit
CBFF	000_h	1	01_h	0_b
CEFF	00000000_h	1	01_h	0_b

Further default parameters which shall be used unless otherwise specified in the corresponding test case definition:

— Used frame type: CBFF;

— ID configuration: corresponding to the used test frame (wake-up condition fulfilled);

— Data field configuration: corresponding to the used test frame (wake-up condition fulfilled);

— ID mask: set all bits to "care";

— Data mask bit: if implemented, it shall be set to enable; and

— t_{WAIT}: eight recessive bits after intermission field.

5.3.4.3 Sync frame sequence

The sync frame sequence as it is used in several test cases shall be as defined in Table 2.

Table 2 — Definition of the sync frame sequence

Frame	ID	DLC	Data
1	078_h	1	FF_h
2 to 5[a]	555_h	1	FF_h
[a] 2 to 9 in case of data rate > 500 kbit/s			

The frame generator sends each sync frame without a dominant ACK bit followed by an active error frame with intermission field. The first frame will be followed by additional idle time of 250 µs for bias reaction time.

5.3.5 Hierarchical structure of tests

5.3.5.1 Overview

All the tests defined in the test plan are grouped into categories in order to aid planning, development, understanding or execution of each test case. There are two levels of categories:

— the test groups; and

— the test cases.

5.3.5.2 Test group structure

The test cases are grouped by different functional blocks of the IUT which will be verified separately. Each test group consists of one or several test cases.

5.3.5.3 Test case structure

Each test case of a test group focuses one particular requirement which will be verified.

Each test case is defined by a specific number and a particular name in order to differentiate the test cases and to easily summarise the goal of the test case.

Table 3 depicts the structure of the defined test cases.

Table 3 — Structure of the defined test cases

Item title	Test case item title and remarks of the test case
Purpose	Short description of the purpose of the test case
CAN version	Classical CAN and / or CAN FD tolerant
HS-PMA	Mode of HS-PMA wakeup capabilities
Test variables	The parameter definition of the test case [optional: test frame sequence definition]
Elementary test cases	Describes the number of tests / measurements
Setup	Setup of the test case
Execution	Test steps dealing with the setup being applied and what is observed and measured
Response	Description about what is expected as the result
Reference	Link to the requirement specification

5.3.6 Elementary tests

Some test cases may be subdivided into elementary tests which are repetitions of the test case for several values of the focussed parameter to test. Each elementary test has its own parameter definition which is defined in the test variables of the test case definition.

5.3.7 Applicable test cases for IUTs with enhanced voltage biasing

It should be distinguished between implementations which support the complete requirements or only the enhanced biasing functionalities defined in ISO 11898-2:2016. The following test cases are applicable for IUTs which support only the enhanced voltage biasing compliant to ISO 11898-2:2016.

— Static test cases: Clause 6

— Dynamic test cases: Clause 7 to Clause 10

6 Test type 1, static test cases

The motivation of static test cases is to check the availability and the boundaries in the data sheet of the IUT. For all integrated circuits every related parameter in Table 4 shall be part of the data sheet and fulfil the specified boundaries in terms of physical worst-case condition. Data sheet parameter names may deviate from the names in Table 4, but in this case, a cross-reference list (data sheet versus Table 4), shall be provided for this test. Parameter conditions may deviate from the conditions in Table 4 , if the data sheet conditions are according to the physical worst-case context in Table 4.

Table 4 — Static test case summary

No.	Parameter		Limits			Conditions[d]	Conformance test is passed if value		Test case valid for HS-PMA type:[a]			
			Min	Max	Unit		≤	≥	a	b	c	d
1	General maximum rating V_{CAN_H} and V_{CAN_L}	Table 15	−27,0	+40,0	V	−/−	min	max	y	y	y	y
2	Extended maximum rating V_{CAN_H} and V_{CAN_L} (if supported)	Table 15	−58,0	+58,0	V	−/−	min	max	y	y	y	y
3	Maximum rating V_{Diff}	Table 15	−5,0	+10,0	V	The maximum rating for VDiff excludes that all combinations of VCAN_H and VCAN_L are compliant to this standard. $V_{Diff} = V_{CAN\_H} - V_{CAN\_L}$. This is required regardless whether general or extended maximum rating for V_{CAN_H} and V_{CAN_L} is fulfilled	min	max	y	y	y	y
4	Single ended recessive output voltage on CAN_H (V_{CAN_H}), bus biasing active	Table 5	+2,0	+3,0	V	All requirements in Table 5 apply concurrently. Therefore, not all combinations of V_{CAN_H} and V_{CAN_L} are compliant with the defined differential output voltage. See also ISO 11898-2:2016, Table 5.	max	min	y	y	y	y
5	Single ended recessive output voltage on CAN_L (V_{CAN_L}), bus biasing active	Table 5	+2,0	+3,0	V	All requirements in Table 5 apply concurrently. Therefore, not all combinations of V_{CAN_H} and V_{CAN_L} are compliant with the defined differential output voltage. See also ISO 11898-2:2016, Table 5.	max	min	y	y	y	y
6	Differential recessive output voltage (V_{Diff}), bus biasing active	Table 5	−0,5	+0,05	V	All requirements in Table 5 apply concurrently. Therefore, not all combinations of V_{CAN_H} and V_{CAN_L} are compliant with the defined differential output voltage. See also ISO 11898-2:2016, Table 5.	max	min	y	y	y	y

[a] HS-PMA types: a - without low-power mode and partial network, b - with low-power mode, normal biasing and without partial network, c - with low-power mode, automatic biasing and without partial network, d - with low-power mode, automatic biasing and partial network; labelling: y – applicable, n – not applicable.

[b] The minimum value of 0,3 ms is accepted for legacy implementations.

[c] For legacy implementations a minimum value of 350 µs is acceptable.

[d] Parameters within the conditions are aligned with Figure 4 p for test.

Table 4 *(continued)*

No.	Parameter		Limits			Conditions[d]	Conformance test is passed if value		Test case valid for HS-PMA type:[a]			
			Min	Max	Unit		≤	≥	a	b	c	d
7	Single ended recessive output voltage on CAN_H (V_{CAN_H}), bus biasing inactive	Table 6	−0,1	+0,1	V	See ISO 11898-2:2016, 5.10 to determine when bias shall be inactive. See also ISO 11898-2:2016, Table 6.	max	min	n	y	y	y
8	Single ended recessive output voltage on CAN_L (V_{CAN_L}), bus biasing inactive	Table 6	−0,1	+0,1	V	See ISO 11898-2:2016, 5.10 and Table 6.	max	min	n	y	y	y
9	Differential recessive output voltage (V_{Diff}), bus biasing inactive	Table 6	−0,2	+0,2	V	See ISO 11898-2:2016, 5.10 and Table 6.	max	min	n	y	y	y
10	Single ended voltage on CAN_H, dominant output (V_{CAN_H})	Table 2	+2,75	+4,50	V	R_L = 50 Ω … 65 Ω	max	min	y	y	y	y
11	Single ended voltage on CAN_L, dominant output (V_{CAN_L})	Table 2	+0,5	+2,25	V	R_L = 50 Ω … 65 Ω	max	min	y	y	y	y
12	Differential voltage on normal bus load, dominant output (V_{Dfiff})	Table 2	+1,5	+3,0	V	R_L = 50 Ω … 65 Ω	max	min	y	y	y	y
13	Differential voltage on effective resistance during arbitration, dominant output (V_{Diff})	Table 2	+1,5	+5,0	V	R_L = 2 240 Ω	max	min	y	y	y	y
14	Differential voltage on extended bus load, dominant output (V_{Diff}) (if supported)	Table 2	+1,4	+3,3	V	R_L = 45 Ω … 70 Ω	max	min	y	y	y	y

[a] HS-PMA types: a - without low-power mode and partial network, b - with low-power mode, normal biasing and without partial network, c - with low-power mode, automatic biasing and without partial network, d - with low-power mode, automatic biasing and partial network; labelling: y – applicable, n – not applicable.

[b] The minimum value of 0,3 ms is accepted for legacy implementations.

[c] For legacy implementations a minimum value of 350 µs is acceptable.

[d] Parameters within the conditions are aligned with Figure 4 p for test.

Table 4 *(continued)*

No.	Parameter		Limits			Conditions[d]	Conformance test is passed if value		Test case valid for HS-PMA type:[a]			
			Min	Max	Unit		≤	≥	a	b	c	d
15	Driver symmetry (V_{SYM}), with a frequency that corresponds to the highest bit rate for which the HS-PMA implementation is intended, however, at most 1 MHz (2 MBit/s)	Table 3	+0,9	+1,1	–/–	R_L = 60 Ω; C_1 = 4,7 nF	max	min	y	y	y	y
16	Absolute current on CAN_H (I_{CAN_H}), Maximum driver output current	Table 4	–/–	115	mA	–3,0 V ≤ V_{CAN_H} ≤ +18,0 V See also ISO 11898-2:2016, Table 4.	max	–/–	y	y	y	y
17	Absolute current on CAN_L (I_{CAN_L}), Maximum driver output current	Table 4	–/–	115	mA	–3,0 V ≤ V_{CAN_L} ≤ +18,0 V See also ISO 11898-2:2016, Table 4.	max	–/–	y	y	y	y
18	Transmit dominant time out (t_{dom}), (if supported)	Table 7	+0,8[b]	+10,0	ms	–/–	max	min	y	y	y	y
19	Receiver recessive state differential input voltage range, bus biasing active (V_{Diff})	Table 8	–3,0	+0,5	V	–12,0 V ≤ V_{CAN_L} ≤ +12,0 V –12,0 V ≤ V_{CAN_H} ≤ +12,0 V	min	max	y	y	y	y
20	Receiver dominant state differential input voltage range, bus biasing active (V_{Diff})	Table 8	+0,9	+8,0	V	–12,0 V ≤ V_{CAN_L} ≤ +12,0 V –12,0 V ≤ V_{CAN_H} ≤ +12,0 V	min	max	y	y	y	y
21	Receiver recessive state differential input voltage range, bus biasing inactive (V_{Diff}), (if supported)	Table 9	–3,0	+0,4	V	–12,0 V ≤ V_{CAN_L} ≤ +12,0 V –12,0 V ≤ V_{CAN_H} ≤ +12,0 V	min	max	n	y	y	y
22	Receiver dominant state differential input voltage range, bus biasing inactive (V_{Diff}), (if supported)	Table 9	+1,15	+8,0	V	–12,0 V ≤ V_{CAN_L} ≤ +12,0 V –12,0 V ≤ V_{CAN_H} ≤ +12,0 V	min	max	n	y	y	y

[a] HS-PMA types: a - without low-power mode and partial network, b - with low-power mode, normal biasing and without partial network, c - with low-power mode, automatic biasing and without partial network, d - with low-power mode, automatic biasing and partial network; labelling: y – applicable, n – not applicable.

[b] The minimum value of 0,3 ms is accepted for legacy implementations.

[c] For legacy implementations a minimum value of 350 µs is acceptable.

[d] Parameters within the conditions are aligned with Figure 4 p for test.

Table 4 *(continued)*

No.	Parameter		Limits			Conditions[d]	Conformance test is passed if value		Test case valid for HS-PMA type:[a]			
			Min	Max	Unit		≤	≥	a	b	c	d
23	Differential internal resistance, receiver input resistance (R_{Diff})	Table 10	12	100	kΩ	$-2{,}0\ V \le V_{CAN\_H} \le +7{,}0\ V$ $-2{,}0\ V \le V_{CAN\_L} \le +7{,}0\ V$	max	min	y	y	y	y
24	Single ended internal resistance, receiver input resistance (R_{CAN_H}, R_{CAN_L})	Table 10	6	50	kΩ	$-2{,}0\ V \le V_{CAN\_H} \le +7{,}0\ V$ $-2{,}0\ V \le V_{CAN\_L} \le +7{,}0\ V$	max	min	y	y	y	y
25	Matching of receiver internal resistance (m_R)	Table 11	−0,03	+0,03	−/−	$V_{CAN\_H} = +5{,}0\ V$ $V_{CAN\_L} = +5{,}0\ V$"	max	min	y	y	y	y
26	Loop delay (t_{Loop})	Table 12	−/−	255	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	−/−	y	y	y	y
27	Transmitted recessive bit width @ 2 Mbit/s ($t_{Bit(Bus)}$), (if supported)	Table 13	435	530	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y
28	Received recessive bit width @ 2 Mbit/s ($t_{Bit(RXD)}$), (if supported)	Table 13	400	550	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y
29	Receiver timing symmetry @ 2 Mbit/s (Δt_{Rec}), (if supported)	Table 13	−65	+40	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y
30	Transmitted recessive bit width @ 5 Mbit/s ($t_{Bit(Bus)}$), (if supported)	Table 14	155	210	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y
31	Received recessive bit width @ 5 Mbit/s ($t_{Bit(RXD)}$), (if supported)	Table 14	120	220	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y
32	Receiver timing symmetry @ 5 Mbit/s (Δt_{Rec}), (if supported)	Table 14	−45	+15	ns	$R_L = 60\ \Omega$, $C_2 = 100$ pF, $C_{RXD} = 15$ pF	max	min	y	y	y	y

[a] HS-PMA types: a - without low-power mode and partial network, b - with low-power mode, normal biasing and without partial network, c - with low-power mode, automatic biasing and without partial network, d - with low-power mode, automatic biasing and partial network; labelling: y – applicable, n – not applicable.

[b] The minimum value of 0,3 ms is accepted for legacy implementations.

[c] For legacy implementations a minimum value of 350 µs is acceptable.

[d] Parameters within the conditions are aligned with Figure 4 p for test.

Table 4 *(continued)*

No.	Parameter		Limits			Conditions[d]	Conformance test is passed if value		Test case valid for HS-PMA type:[a]			
			Min	Max	Unit		≤	≥	a	b	c	d
33	Leakage current on CAN_H, CAN_L (I_{CAN_H}, I_{CAN_L}), maximum leakage currents, unpowered	Table 16	−10	+10	µA	V_{CAN_H} = 5 V, V_{CAN_L} = 5 V, All supply inputs connected to GND.	max	min	y	y	y	y
34	CAN activity filter time, long (t_{Filter}), (if supported)	Table 20	0,5	5,0	µs	−/−	max	min	n	y	y	y
35	CAN activity filter time, short (t_{Filter}), (if supported)	Table 20	0,15	1,8	µs	−/−	max	min	n	y	y	y
36	Wake-up timeout (t_{Wake}), (if supported)	Table 20	800,0[c]	10 000,0	µs	−/−	max	min	n	y	y	y
37	Timeout for bus inactivity ($t_{Silence}$)	Table 20	0,6*10[6]	1,2*10[6]	µs	−/−	max	min	n	n	y	y
38	Bus Bias reaction time (t_{Bias})	Table 20	−/−	250,0	µs	−/−	max	−/−	n	n	y	y
39	Number of recessive bits before a new SOF shall be accepted (n_{Bits_idle}) (if supported)	Table 18	6	10	−/−	−/−	max	min	n	n	n	y
40	CAN FD data phase glitch filter (slow) ($pGlitch_{Slow}$) (if supported)	Table 19	5,00	17,5	% of arbitration bit time	−/−	min	max	n	n	n	y
41	CAN FD data phase glitch filter (fast) ($pGlitch_{Fast}$) (if supported)	Table 19	2,50	8,75	% of arbitration bit time	−/−	min	max	n	n	n	y

[a] HS-PMA types: a - without low-power mode and partial network, b - with low-power mode, normal biasing and without partial network, c - with low-power mode, automatic biasing and without partial network, d - with low-power mode, automatic biasing and partial network; labelling: y – applicable, n – not applicable.

[b] The minimum value of 0,3 ms is accepted for legacy implementations.

[c] For legacy implementations a minimum value of 350 µs is acceptable.

[d] Parameters within the conditions are aligned with Figure 4 p for test.

7 Test type 2, normal CAN communication acceptance

7.1 Test class 1, valid frame format

7.1.1 ID test in CBFF messages

Table 5 specifies the test of different IDs in CBFF messages.

Table 5 — ID test in CBFF messages

Item	Description
Purpose	This test verifies the behaviour of the IUT when presence of correct CBFF messages with different IDs.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: Refer to test execution — DLC: 0
Elementary test cases	The CAN-ID shall be element of: $\in [000_h, 7FF_h]$ Different CAN-ID's are used for test. **Test** **Configured wake-up ID** #1 000_h #2 555_h #3 $2AA_h$ #4 $7FF_h$ #5 randomly generated ID
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS generates first ID with a value of 000_h. 3) If the ID is not equal to the configured wake-up ID, the TS sends test frame with the generated ID; otherwise go to test step 4. 4) If the ID is smaller than $7FF_h$, the TS increments the ID by one and goes back to test step 3, otherwise go to test step 5. 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the test frame with configured wake-up ID.
Response	The last test frame shall cause a wake-up. All previously sent test frames shall not cause a wake-up.
Reference	ISO 11898-1:2015

7.1.2 ID test in CEFF messages

Table 6 specifies the test of different IDs in CEFF messages.

Table 6 — ID test in CEFF messages

Item	Description
Purpose	This test verifies the behaviour of the IUT when presence of a correct data frame with different IDs in CEFF messages.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 6 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration** — Configured ID: Refer to elementary test definition **Test frame:** — ID: Refer to test execution
Elementary test cases	The CAN ID shall be element of: ∈ [00000000_h, $1FFFFFFF_h$] Different CAN ID's are used for test. **Test** **Configured wake-up ID** #1 00000000_h #2 15540000_h #3 $0AA80000_h$ #4 $1FFC0000_h$ #5 randomly generated ID
Setup	— The IUT is configured corresponding Test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS generates first ID with a value of 00000000_h. 3) If the ID is not equal to the configured wake-up ID, the TS sends test frame with the generated ID; otherwise go to test step 4. 4) If the ID is smaller than $1FFC0000_h$, the TS increment the ID by 00040000_h and goes back to test step 3, otherwise go to test step 5. 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the test frame with configured wake-up ID.
Response	The last test frame shall cause a wake-up. All previously sent test frames shall not cause a wake-up.
Reference	ISO 11898-1:2015

7.1.3 WUP element of WUF

Table 7 — WUP element of WUF specifies the test of a WUP as element of a WUF.

Table 7 — WUP element of WUF

Item	Description
Purpose	This test verifies the behaviour of the IUT detecting a WUP which is element of a WUF.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — DLC: 0 — ID: 078_h containing a bit-sequence of five dominant, five recessive and five dominant bits)
Elementary test cases	There is one elementary test case.

Table 7 *(continued)*

Item	Description
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS waits for at least 1,1 * $t_{SILENCE(max)}$. 2) The TS sends test frame six times each separated by two times the maximum bias reaction time (t_{bias}).
Response	— The WUP inside the first test frame shall be detected; i.e. the biasing is switched on after first test frame (because of presence of a valid WUP). — The IUT shall wake-up latest after the presence of the sixth test frame.
Reference	ISO 11898-1:2015

7.1.4 WUF element of another valid frame — CBFF message

Table 8 specifies the test of a WUF as element of a valid frame.

Table 8 — WUF element of another valid frame — CBFF message

Item	Description
Purpose	This test verifies the behaviour of the IUT detecting a WUF which is element of a valid frame.
CAN Version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 012_h — DLC: 0
Elementary test cases	Test frames as defined in table below: **Frame** — **Frame definition** #1 — ID = 012_h, DLC = 5, Data = 01_h, 20_h, $0F_h$, 76_h, $7F_h$ #2 — ID = $0960F012_h$, DLC = 0 #3 — ID = $0F4FD012_h$, DLC = 0 #4 — ID = 011_h, DLC = 8, Data = $9A_h$, $4F_h$, 01_h, 20_h, $0F_h$, 76_h, $7F_h$, FF_h #5 — ID = $0960F011_h$, DLC = 8, Data = $9A_h$, $4F_h$, 01_h, 20_h, $0F_h$, 76_h, $7F_h$, FF_h #6 — ID = $0F4FD011_h$, DLC = 8, Data = $9A_h$, $4F_h$, 01_h, 20_h, $0F_h$, 76_h, $7F_h$, FF_h #7 — ID = 012_h, DLC = 0
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frames 1 to 7 as defined in test variables, each separated by two times the maximum bias reaction time (t_{bias}).
Response	The IUT shall detect the wake-up condition on presence of test frame 7.
Reference	ISO 11898-1:2015

7.1.5 WUF element of another valid frame — CEFF message

Table 9 specifies the test of a WUP as element of a WUF.

Table 9 — WUF element of another valid frame — CEFF message

Item	Description
Purpose	This test verifies the behaviour of the IUT detecting a WUP which is element of a WUF.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $4C7_h$ — DLC: 3 — Data field: FF_h (all bytes)
Elementary test cases	Test frames as defined in table below: **Frame** **Frame definition** #1 ID = $0960F4C7_h$, DLC = 3, Data = $C7_h$, $8E_h$, 68_h #2 ID = $0F4FD4C7_h$, DLC = 3, Data = $C7_h$, $8E_h$, 68_h #3 ID = $18B084C7_h$, DLC = 3, Data = $C7_h$, $8E_h$, 68_h #4 ID = $1E9FA4C7_h$, DLC = 3, Data = $C7_h$, $8E_h$, 68_h #5 ID = $4C7_h$, DLC = 3, Data = $C7_h$, $8E_h$, 68_h
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frames 1 to 5 as defined in Test variables, each separated by two times the maximum bias reaction time (t_{bias}).
Response	The IUT shall detect the wake-up condition on presence of test frame 5.
Reference	ISO 11898-1:2015

7.1.6 Acceptance of no nominal "SRR" in CEFF message

Table 10 specifies the test of the acceptance of no nominal SRR bit.

Table 10 — Acceptance of no nominal "SRR" CEFF message

Item	Description
Purpose	The purpose of this test is to verify that the IUT accepts the no nominal value of "SRR" bit in CEFF message.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — SRR: 0
Elementary test cases	There is one elementary test case.

Table 10 *(continued)*

Item	Description
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables.
Response	The test frame shall cause a wake-up.
Reference	ISO 11898-1:2015

7.1.7 Absent bus idle after data frame

Table 11 specifies the test of two consecutive presence of frames without a bus idle state.

Table 11 — Absent bus idle after data frame

Item	Description
Purpose	This test verifies the behaviour of the IUT when presence of two consecutive frames not separated by a bus idle state.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame_1:** — ID: 10_h; DLC: 0; Length of IMF [bit]: Refer to elementary test definition **Test frame_2:** — All values are set to default parameters as defined in 5.3.4.2
Elementary test cases	Elementary tests are defined as follows: **Test** **Length of IMF [bit] of test frame in IFS** #1 2 #2 3
Setup	— The IUT is configured corresponding test variables, test frame 2 for wake-up. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame #1 with shortened IFS as depicted in test variables. 3) The TS sends test frame #2.
Response	The test frame #2 shall cause a wake-up.
Reference	ISO 11898-1:2015

7.1.8 Stuff acceptance test 1

Table 12 — Stuff acceptance test 1 specifies the test of stuff acceptance (CBFF message).

Table 12 — Stuff acceptance test 1

Item	Description
Purpose	This test verifies the behaviour of the IUT when presence of a CBFF message with particular data containing worst-case stuffing bit profiles in the different fields of the frame.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — Data: Refer to elementary test definition
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **DLC** **Data** #1 078_h 8 01_h, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$ #2 $41F_h$ 0 — #3 $47F_h$ 1 $1F_h$ #4 758_h 0 — #5 777_h 1 $1F_h$
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frame as depicted in test variables.
Response	The test frame shall cause a wake-up.
Reference	ISO 11898-1:2015

7.1.9 Stuff acceptance test 2

Table 13 specifies the test of stuff acceptance (CEFF message).

Table 13 — Stuff acceptance test 2

Item	Description
Purpose	This test verifies the behaviour of the IUT when presence of a CBFF message with particular data containing worst-case stuffing bit profiles in the different fields of the frame.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — Data: Refer to elementary test definition

Table 13 *(continued)*

Item	Description
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **DLC** **Data** #1 $07C30F0F_h$ 8 $3C_h$ (all bytes) #2 $07C0F0F0_h$ 1 41_h #3 $00BC0000_h$ 1 $A0_h$
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as depicted in test variables.
Response	The test frame shall cause a wake-up.
Reference	ISO 11898-1:2015

7.1.10 Acceptance of Sync Sequence

Table 14 specifies the test of sync sequence acceptance.

Table 14 — Acceptance of Sync Sequence

Item	Description
Purpose	This test verifies if the IUT is able to receive correct sync sequences.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — WUP: dominant – recessive – dominant pulses each with the length t_{Pulse} — t_{Pulse}: ≥ $t_{Filter(max)}$ like specified in the datasheet of the IUT, e.g. 5,5 µs — t_{WAIT}: Refer to elementary test definition **Sync frame:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — Data: Refer to elementary test definition **Wake-up frame:** — ID: $07830F0F_h$ — DLC: 7 — Data: 87_h (all bytes)
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **RTR** **DLC** **Data** **t_{WAIT}** #1 000_h 0 0 — $0,9 \times t_{SILENCE(min)}$ #2 000_h 0 0 — 1 bit time #3 555_h 0 8 AA_h (all bytes) 1 bit time #4 555_h 0 8 AA_h (all bytes) $0,9 \times t_{SILENCE(min)}$ #5 $4C7_h$ 0 3 C7h, $8E_h$, 68_h 1 bit time #6 $07830F0F_h$ 0 6 87_h (all bytes) 1 bit time #7 $0E0_h$ 1 1 — 1 bit time

Table 14 *(continued)*

Item	Description
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS waits for at least 1,1 × $t_{SILENCE(max)}$. 2) The TS sends WUP as defined in test variables. 3) The TS waits two times the maximum bias reaction time. 4) The TS sends sync frame as defined in test variables. 5) The TS waits for t_{WAIT}. 6) The TS repeats test steps 4 and 5 for three times (or seven times in case of data rate > 500 kbit/s). 7) The TS waits two times the maximum bias reaction time. 8) The TS sends wake-up frame.
Response	The wake-up frame at step 8 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4

7.1.11 Idle detection after CAN FD frame (FD tolerant implementation only)

Table 15 specifies the test of the correct frame detection after CAN FD frame.

Table 15 — Idle detection after CAN FD frame

Item	Description
Purpose	The purpose of this test is to verify that the IUT will detect the following frame correct after a CAN FD frame.
CAN version	— CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame 1:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — FDF: 1 **Test frame 2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
NOTE This test is not applicable for CAN FD implementation.	

Table 15 *(continued)*

Item	Description					
Elementary test cases	Elementary tests are defined as follows:					
	Test	**ID**	**DLC**	**Data**	**bit rate ratio**	**Condition before next frame**
	#1	$2AA_h$	0	—	1:2	Valid frame with dominant ACK + EOF + IFS = 2
	#2	707_h	8	—	1:2	Valid frame, active error frame at DLC
	#3	360_h	15	all $0F_h$	1:2	Valid frame with recessive ACK + passive error frame after ACK
	#4	$2AA_h$	0	—	1:4	Valid frame with dominant ACK + EOF + IFS = 2
	#5	707_h	0	—	1:4	Invalid frame, active error frame after stuff error in DLC
	#6	360_h	15	all $0F_h$	1:4	Valid frame with recessive ACK + passive error frame after ACK
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.					
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame 2. 3) The TS sends the test frame 1. 4) The TS sends default WUF to wake the IUT.					
Response	— The IUT shall wake-up after step 4.					
Reference	ISO 11898-2:2016, 5.9.4					
NOTE This test is not applicable for CAN FD implementation.						

7.2 Test class 2, error detection

7.2.1 Stuff error test 1

Table 16 specifies the test of stuff error detection in CBFF messages.

Table 16 — Stuff error test 1

Item	Description
Purpose	This test verifies that the IUT detects a stuff error whenever it receives six consecutive bit of the same value until the position of the CRC delimiter in CBFF messages.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — Data: Refer to elementary test definition

Table 16 *(continued)*

Item	Description
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **DLC** **Data** #1to #18 078_h 8 01_h, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$, $E1_h$ #19 to #22 $41F_h$ 1 80_h #23 to #25 $47F_h$ 1 $1F_h$ #26 to #27 777_h 1 $1F_h$ Each stuff bit derives one elementary test. Therefore, 27 elementary tests exist.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as depicted in test variables containing a stuff error in one position. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame as depicted in test variables not containing any stuff error.
Response	— The IUT shall not accept the test frame containing the stuff error as a WUF. — The IUT shall accept the second test frame without a stuff error and shall wake-up.
Reference	ISO 11898-1:2015

7.2.2 Stuff error test 2

Table 17 specifies the test of stuff error detection (CBFF messages).

Table 17 — Stuff error test 2

Item	Description
Purpose	This test verifies that the IUT detects a stuff error whenever it receives six consecutive bit of the same value until the position of the CRC delimiter in CBFF messages.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — Data: Refer to elementary test definition
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **DLC** **Data** #1 to #23 $07C30F0F_h$ 8 $3C_h$ (all bytes) #24 to #29 $1FB80000_h$ 1 $A0_h$ Each stuff bit derives one elementary test. Therefore, 29 elementary tests exist.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.

Table 17 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as depicted in test variables containing a stuff error in one position. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame as depicted in test variables not containing any stuff error.
Response	— The IUT shall not accept the test frame containing the stuff error as a WUF. — The IUT shall accept the second test frame without a stuff error and shall wake-up.
Reference	ISO 11898-1:2015

7.2.3 CRC error test

Table 18 specifies the test of CRC mechanism and error detection.

Table 18 — CRC error test

Item	Description
Purpose	The purpose of this test is to verify: — that the IUT uses the specific CRC mechanism as defined in ISO 11898-1:2015. — that the IUT detects a CRC error.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2.
Elementary test cases	There are two elementary tests to perform: **Test** #1 A dominant bit in the CRC field is changed to a recessive one. #2 A recessive bit in the CRC field is changed to a dominant one.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame containing a CRC error as depicted in test variables. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame not containing any CRC error.
Response	— The IUT shall not accept the test frame containing the CRC error as a WUF. — The IUT shall accept the second test frame without a CRC error and shall wake-up.
Reference	ISO 11898-1:2015

7.2.4 Form error in data frame

Table 19 specifies the test of form error detection in data frames.

Table 19 — Form error in data frame

Item	Description
Purpose	This test verifies that the IUT detects a form error when the recessive bit of CRC delimiter is forced to dominant state by the LT.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2.
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame containing a dominant CRC delimiter. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame with correct CRC delimiter.
Response	— The IUT shall not accept the test frame containing the form error as a WUF. — The IUT shall accept the second test frame without any form error and shall wake-up.
Reference	ISO 11898-1:2015

7.3 Test class 3, error frame management

7.3.1 Absent bus idle after error scenario

Table 20 specifies the test of an absent bus idle after an error scenario.

Table 20 — Absent bus idle after error scenario

Item	Description
Purpose	The purpose of this test is to verify that the IUT accepts a frame starting after the second bit of the IMF following an error frame.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2. — Shortened IMF size for Test: 2 bit
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends four sync frames as depicted in test variables (or eight in case of data rate > 500 kbit/s). 2) The TS sends one sync frame (including the active error frame) containing a shortened IMF as defined in the test variables followed by a test frame without any delay in between.
Response	The IUT shall get the test frame and detect the wake-up condition.
Reference	ISO 11898-1:2015

7.3.2 Active error condition during ignored frames after switching on the bias

Table 21 specifies the test of the active error condition after switching on the bias.

Table 21 — Active error condition during ignored frames after switching on the bias

Item	Description
Purpose	This test verifies that the IUT handles the error scenario with no acknowledged frames.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Frame sequence:** — WUP: dominant – recessive – dominant pulses each with the length t_{Pulse} — t_{Pulse}: ≥ $t_{Filter(max)}$ like in the datasheet of the IUT specified e.g. 5,5 µs **Test frame:** — DLC: 0 — ID: 078_h — Ack_Slot: recessive (followed by an active error frame and nominal inter frame space)
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS waits for at least 1,1 × $t_{SILENCE(max)}$. 2) The IUT sends WUP as depicted in test variables. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame and active error frame as depicted in test variables. 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS repeats test steps 4 and 5 for four times (or eight times in case of data rate > 500 kbit/s).
Response	The IUT shall get at least the fifth (or ninth in case of data rate > 500 kbit/s) test frame, which will cause a wake-up.
Reference	ISO 11898-2:2016

7.3.3 Passive error condition during ignored frames after switching on the bias

Table 22 specifies the test of the passive error condition after switching on the bias.

Table 22 — Passive error condition during ignored frames after switching on the bias

Item	Description
Purpose	This test verifies that the IUT handles the error scenario with no acknowledged frames.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 22 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Frame sequence:** — WUP: dominant – recessive – dominant pulses each with the length t_{Pulse} — t_{Pulse}: ≥ $t_{Filter(max)}$ like in the datasheet of the IUT specified e.g. 5,5 µs **Test frame:** — ID: 078_h — DLC: 0 — ACK_Slot: recessive (followed by a passive error frame and nominal inter frame space)
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS waits for at least 1,1 × $t_{SILENCE(max)}$. 2) The IUT sends WUP as depicted in test variables. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame, passive error frame as depicted in test variables. 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS repeats test step 4 and 5 for four times (or eight times in case of data rate > 500 kbit/s).
Response	The IUT shall wake-up latest after the presence of the fifth (or ninth in case of data rate > 500 kbit/s) test frame.
Reference	ISO 11898-1:2015

7.4 Test class 4, CAN bit decoding

7.4.1 Correct sampling of the 10th bit after the last dominant edge causing resync

Table 23 specifies the test of the correct sampling of the 10th and 11th bit after resynchronization.

Table 23 — Correct sampling of the 10th bit after the last dominant edge causing resync

Item	Description
Purpose	This test verifies if the IUT is able to sample the 10th and 11th bit correctly under the consideration of the minimum amount of edges.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — DLC: 7 — ID: Refer to elementary test definition — Data field bytes: 087_h (all bytes)

Table 23 *(continued)*

Item	Description
Elementary test cases	Elementary tests are defined as follows: **Test ID** #1 078_h #2 $07C30F0F_h$
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.2 Correct sampling of the 10th bit after the last dominant edge after hard sync

Table 24 specifies the test of the correct sampling of the 10th and 11th bit after hard synchronization.

Table 24 — Correct sampling of the 10th bit after the last dominant edge after hard sync

Item	Description
Purpose	This test verifies if the IUT is able to sample the 10th and 11th bit correctly under the consideration of the minimum amount of edges and a hard synchronization on frame start.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — IMF: 1 bit × (2 + e) — e: Refer to elementary test definition **Test frame:** — DLC: 7 — ID: 078_h — Data field bytes: 87_h (all bytes) **Sync frame:** — DLC: 1 — ID: 555_h — Data field byte: FF_h
Elementary test cases	Elementary tests are defined as follows: **Test e** #1 0,95 #2 0,90 #3 0,85 ... ... #19 0,05
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.

Table 24 *(continued)*

Item	Description
Execution	1) The TS sends four sync frames as depicted in test variables (or eight in case of data rate > 500 kbit/s). 2) The TS sends a sync frame (including the active error frame) containing a shortened IMF as defined in the test variables followed by a test frame without any delay in between.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.3 IUT robustness against dominant bit extensions

Table 25 specifies the test of the correct sampling of all bits with extensions of dominant bit phases.

Table 25 — IUT robustness against dominant bit extensions

Item	Description
Purpose	This test verifies if the IUT is able to sample all bits correctly even if there are extensions of dominant bit phases.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — DLC: 7 — ID: Refer to elementary test definition — Data field bytes: Refer to elementary test definition
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **Data** #1 078_h 87_h (all bytes) #2 $07830F0F_h$ 87_h (all bytes) #3 555_h AA_h (all bytes)
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables where each dominant bit, which is followed by a recessive bit, is prolonged by 55 % of the bit time and the recessive bit, which follows is shortened by 55 % of the bit time.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.4 IUT robustness against dominant bit shortening

Table 26 specifies the test of the correct sampling of all bits with shortenings of dominant bit phases.

Table 26 — IUT robustness against dominant bit shortening

Item	Description
Purpose	This test verifies if the IUT is able to sample all bits correctly even if there are shortenings of dominant bit phases.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — DLC: 7 — ID: Refer to elementary test definition — Data: Refer to elementary test definition
Elementary test cases	Elementary tests are defined as follows: **Test** **ID** **Data** #1 078_h 87_h (all bytes) #2 $07830F0F_h$ 87_h(all bytes) #3 555_h AA_h (all bytes)
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables where each dominant bit, which is following a recessive bit, is shortened by 5 % of the bit time and the recessive bit which follows it is lengthened by 5 % of the bit time.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.5 Correct sampling after bit deformation and hard sync

Table 27 specifies the test of the correct sampling of all bits after a hard synchronization with shortenings and extensions of dominant bit phases.

Table 27 — Correct sampling after bit deformation and hard sync

Item	Description
Purpose	This test verifies if the IUT is able to sample all bits correctly after a hard synchronization even if there are shortenings and extensions of dominant bit phases.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — IMF: 1 bit × (2 + e) — e: Refer to elementary test definition **Test frame:** — DLC: 7 — ID: Refer to elementary test definition — Data: Refer to elementary test definition

Table 27 *(continued)*

Item	Description							
Elementary test cases	Elementary tests are defined as follows:							
	Test	**ID**	**Data** (all bytes)	**e**	**Test**	**ID**	**Data** (all bytes)	**e**
	#1	078_h	87_h	0,95	#20	555_h	AA_h	0,95
	#2	078_h	87_h	0,90	#21	555_h	AA_h	0,90
	#3	078_h	87_h	0,85	#22	555_h	AA_h	0,85
	...	...	...	...	...	...	...	...
	#19	078_h	87_h	0,05	#38	555_h	AA_h	0,05
	All elementary test cases should be executed applying the following two bit deformations. Each dominant bit, which is following a recessive bit, is shortened by 5 % of the bit time and the recessive bit which follows it is lengthened by 5 % of the bit time, and Each dominant bit, which is followed by a recessive bit, is prolonged by 55 % of the bit time and the recessive bit which follows it is shortened by 55 % of the bit time.							
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.							
Execution	1) The TS sends four sync frames as depicted in test variables (or eight in case of data rate > 500 kbit/s). 2) The TS sends a sync frame (including the active error frame) containing a shortened IMF as defined in the test variables followed by a test frame without any delay in between.							
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.							
Reference	ISO 11898-2:2016, 5.9.4.3							

7.4.6 No frame constant bit deformation due to loss of arbitration or ringing effects

Table 28 specifies the test of the correct sampling of all bits after loss of arbitration or ringing effects.

Table 28 — No frame constant bit deformation due to loss of arbitration or ringing effects

Item	Description
Purpose	This test verifies if the IUT is able to sample all bits correctly after loss of arbitration or ringing effects (no constant dominant bit shortening) even if there are shortenings and extensions of dominant bit phases.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — ID: $07830F0F_h$ — DLC: 7 — Data: 87_h (all bytes)

Table 28 *(continued)*

Item	Description
Elementary test cases	Elementary tests are defined as follows: Prolongation of each dominant bit which is followed by a recessive bit and shortening the following recessive bit **Test** / **From SOF until IDE** / **After IDE until EOF** #1 / 0 % of the bit time / 55 % of the bit time #2 / 55 % of the bit time / 0 % of the bit time #3 / −5 % of the bit time / 0 % of the bit time #4 / 0 % of the bit time / −5 % of the bit time #5 / −5 % of the bit time / 55 % of the bit time #6 / 55 % of the bit time / −5 % of the bit time
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.7 Glitch filtering test in idle state

Table 29 specifies the test of the glitch filtering in idle state.

Table 29 — Glitch filtering test in idle state

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not interpret a dominant phase as a SOF when the dominant level is shorter than 55 % of the bit time.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — Glitch length = 54 % of the bit time
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS waits an additional time in idle state of ≥ 10 bit times. 3) The TS sends a dominant glitch with glitch length as depicted in test variables. 4) The TS waits for two bit times before sending the test frame.
Response	The IUT shall get this frame correctly and detect the wake-up condition.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.8 Glitch filtering test after FD format frame after IFS and EOF (FD tolerant implementation only)

Table 30 specifies the test of the glitch filtering in IFS and EOF.

Table 30 — Glitch filtering test after FD format frame in IFS and EOF

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not interpret a dominant phase as a SOF when the dominant level is shorter than 55 % of the bit time.
CAN version	— CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except FDF = 1 and BRS = 0 — Glitch length = 54 % of the arbitration bit time — Wait time after CAN FD frame ACK delimiter: 10 bit times (IFS bit 3)
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends one CAN FD format frame with dominant ACK. 3) The TS sends a dominant glitch at position after ACK delimiter and with glitch length as depicted in test variables. 4) The TS waits for four bit times before sending the test frame (WUF).
Response	The IUT shall get the frame (4) correctly and detect the wake-up condition.
Reference	ISO 11898-2:2016, 5.9.4.3
NOTE This test is not applicable for CAN FD implementation.	

7.4.9 Glitch filtering test in CAN FD data phase (FD tolerant implementation only)

Table 31 specifies the test of the glitch filtering in CAN FD data phase.

Table 31 — Glitch filtering test in CAN FD data phase

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not detect dominant pulses for reset of recessive bit counter in CAN FD Data phase.
CAN version	— CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — Glitch length according supported bit rates: ≤ 2,5 % and/or ≤ 5 % nominal bit time — Wait time after CAN FD frame ACK delimiter: four bit times (EOF bit 5) CAN FD data phase bit time / bit rate ratio according IUT datasheet.
Elementary test cases	There is one elementary test case for each discrete supported bit rate. Free programmable IUT will be tested at MAX and MIN bit rate corner points.
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends a FD format frame with a dominant glitch at a position defined in test variables and with glitch length as depicted in test variables. 3) The TS waits for five bit times before sending the test frame (WUF).
Response	The IUT shall get the frame (test step 3) correctly and detect the wake-up condition.
Reference	ISO 11898-2:2016, 5.9.4.6

7.4.10 Bit (glitch) detection test in CAN FD data phase (FD tolerant implementation only)

Table 32 specifies the test of the detection of long dominant glitches.

Table 32 — Bit (glitch) detection test in CAN FD data phase

Item	Description
Purpose	The purpose of this test is to verify that the IUT will detect dominant pulses for reset of recessive bit counter in CAN FD data phase.
CAN version	— CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — Glitch length according supported bit rates: ≥ 8,5 % and/or ≥ 17,5 % nominal bit time and ≤ 10 % and / or ≤ 20 % as upper limit. The TS send a CAN FD frame with BRS = logical "0"; ESI = logical "1"; DLC = 15. The dominant stuff bit expected after the DLC field will be reduced to glitch length and followed by a passive error frame. The TS applies a glitch before error delimiter and at 6th bit of error delimiter. The glitch is send instead of the depicted Bit. CAN FD data phase bit time / bit rate ratio according IUT datasheet.
Elementary test cases	There is one elementary test case for each discrete supported bitrate. Free programmable IUT will be tested at MAX and MIN bit rate corner points.
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends a FD format frame with two dominant glitches with glitch length as depicted in test variables. 3) The TS sends default WUF which should NOT wake the IUT. 4) The TS sends default WUF to wake-up the IUT.
Response	The IUT shall get the second frame (4) correctly and detect the wake-up condition.
Reference	ISO 11898-2:2016, 5.9.4.6

7.4.11 Clock tolerance test

Table 33 specifies the test of the oscillator tolerance after a WUF.

Table 33 — Clock tolerance test

Item	Description
Purpose	Purpose of test is to check the oscillator tolerance behaviour to be in sync (±0,5 %) after a WUF.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 33 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **No wake-up frame 1:** — ID: 15555555_h — DLC: 10 — Data: AA_h (all bytes) **No wake-up frame 2:** — ID: $0E0_h$ — RTR: 1 **Wake-up frame:** — ID: $07830F0F_h$ — DLC: 7 — Data: 87_h (all bytes)
Elementary test cases	**Elementary tests are derived as follows:** One test for each combination of tolerance's corner points (bus traffic at opposite tolerance as WUFs). **Test** / **No Wake-up frame** / **Clock tolerance** #1 / Frame 1 / No WUFs and sync frames with bit rate on 99,5 % bit rate, WUFs with bit rate on 100,5 % bit rate #2 / Frame 1 / No WUFs and sync frames with bit rate on 100,5 % bit rate, WUFs with bit rate on 99,5 % bit rate #3 / Frame 2 / No WUFs and sync frames with bit rate on 99,5 % bit rate, WUFs with bit rate on 100,5 % bit rate #4 / Frame 2 / No WUFs and sync frames with bit rate on 100,5 % bit rate, WUFs with bit rate on 99,5 % bit rate
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends 10 no wake-up frames as "bus traffic". 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends one wake-up frame.
Response	The last test frame shall cause a wake-up. All previously sent test frames shall not cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.3

7.4.12 Not constant network timing due to loss of arbitration

Table 34 specifies the test of the correct sampling of all bits after a far node wins the arbitration.

Table 34 — Not constant network timing due to loss of arbitration

Item	Description
Purpose	This test verifies if the IUT is able to sample all bits correctly in case a far node wins the arbitration against a near node.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	**Test frame:** — ID: $07830F0F_h$ — DLC: 7 — Data field bytes: 87_h (all bytes) — Timing deviation: 55 % of the bit time Prolong the last dominant bit, which is followed by a recessive bit in the arbitration field by the timing deviation. All following bits are delayed by this timing deviation as a consequence.
Elementary test cases	There is one elementary test case.
Setup	The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame as defined in test variables.
Response	The IUT shall sample all bits correctly. The test frame shall cause a wake-up due to the correct bit sampling.
Reference	ISO 11898-2:2016, 5.9.4.3 (case B2 - combine case A with a phase jump)

8 Test type 3, WUF evaluation

8.1 Test class 1, CAN message ID filter test

8.1.1 Message filter / CBFF – test 1

Table 35 specifies the test of the matching of the frames to the mask criteria (CBFF massages).

Table 35 — Message filter / CBFF – test 1

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 35 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $2AA_h$ — ID mask: Refer to elementary test definition — DLC: 0 **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 0
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **test** **ID Mask** #1 CCC CCCC CCCC #7 CCC CCDC CCCC #2 CCC CCCC CCCD #8 CCC CDCC CCCC #3 CCC CCCC CCDC #9 CCC DCCC CCCC #4 CCC CCCC CDCC #10 CCD CCCC CCCC #5 CCC CCCC DCCC #11 CDC CCCC CCCC #6 CCC CCCD CCCC #12 DCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.2 Message filter / CBFF – test 2

Table 36 specifies the test of the matching of the frames to the mask criteria (CBFF massages).

Table 36 — Message filter / CBFF – test 2

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accepts received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 36 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 555_h — ID mask: Refer to elementary test definition — DLC: 0 **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 0
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **test** **ID Mask** #1 CCC CCCC CCCC #7 CCC CCDC CCCC #2 CCC CCCC CCCD #8 CCC CDCC CCCC #3 CCC CCCC CCDC #9 CCC DCCC CCCC #4 CCC CCCC CDCC #10 CCD CCCC CCCC #5 CCC CCCC DCCC #11 CDC CCCC CCCC #6 CCC CCCD CCCC #12 DCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.3 Message filter / CBFF – test 3

Table 37 specifies the test of the matching of the frames to the mask criteria (CBFF massages).

Table 37 — Message filter / CBFF – test 3

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 37 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 000_h — ID mask: Refer to elementary test definition — DLC: 0 **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config Msg. ID in D fields — DLC: 0
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **test** **ID Mask** #1 DDD DDDD DDDC #7 DDD DCDD DDDD #2 DDD DDDD DDCD #8 DDD CDDD DDDD #3 DDD DDDD DCDD #9 DDC DDDD DDDD #4 DDD DDDD CDDD #10 DCD DDDD DDDD #5 DDD DDDC DDDD #11 CDD DDDD DDDD #6 DDD DDCD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.4 Message filter / CBFF – test 4

Table 38 specifies the test of the matching of the frames to the mask criteria (CBFF massages).

Table 38 — Message filter / CBFF – test 4

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 38 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $7FF_h$ — ID mask: Refer to elementary test definition — DLC: 0 **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 0
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **Test** **ID Mask** #1 DDD DDDD DDDC #7 DDD DCDD DDDD #2 DDD DDDD DDCD #8 DDD CDDD DDDD #3 DDD DDDD DCDD #9 DDC DDDD DDDD #4 DDD DDDD CDDD #10 DCD DDDD DDDD #5 DDD DDDC DDDD #11 CDD DDDD DDDD #6 DDD DDCD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.5 Message filter / CEFF – test 1

Table 39 specifies the test of the matching of the frames to the mask criteria (CEFF massages).

Table 39 — Message filter / CEFF – test 1

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 39 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $1AAAAAAA_h$ — ID mask: Refer to elementary test definition **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 C CCCC CCCC CCCC CCCC CCCC CCCC CCCC #2 C CCCC CCCC CCCC CCCC CCCC CCCC CCCD #3 C CCCC CCCC CCCC CCCC CCCC CCCC CCDC ... #29 C DCCC CCCC CCCC CCCC CCCC CCCC CCCC #30 D CCCC CCCC CCCC CCCC CCCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.6 Message filter / CEFF – test 2

Table 40 specifies the test of the matching of the frames to the mask criteria (CEFF massages).

Table 40 — Message filter / CEFF – test 2

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 40 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 05555555_h — ID mask: Refer to elementary test definition **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 C CCCC CCCC CCCC CCCC CCCC CCCC CCCC #2 C CCCC CCCC CCCC CCCC CCCC CCCC CCCD #3 C CCCC CCCC CCCC CCCC CCCC CCCC CCDC ... #29 C DCCC CCCC CCCC CCCC CCCC CCCC CCCC #30 D CCCC CCCC CCCC CCCC CCCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (tbias). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.7 Message filter / CEFF – test 3

Table 41 specifies the test of the matching of the frames to the mask criteria (CEFF massages).

Table 41 — Message filter / CEFF – test 3

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 41 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 00000000_h — ID mask: Refer to elementary test definition **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 D DDDD DDDD DDDD DDDD DDDD DDDD DDDC #2 D DDDD DDDD DDDD DDDD DDDD DDDD DDCD ... #28 D CDDD DDDD DDDD DDDD DDDD DDDD DDDD #29 C DDDD DDDD DDDD DDDD DDDD DDDD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.1.8 Message filter / CEFF – test 4

Table 42 specifies the test of the matching of the frames to the mask criteria (CEFF massages).

Table 42 — Message filter / CEFF – test 4

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 42 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $1FFFFFFF_h$ — ID mask: Refer to elementary test definition **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 D DDDD DDDD DDDD DDDD DDDD DDDD DDDC #2 D DDDD DDDD DDDD DDDD DDDD DDDD DDCD ... #28 D CDDD DDDD DDDD DDDD DDDD DDDD DDDD #29 C DDDD DDDD DDDD DDDD DDDD DDDD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.2 Test class 2, CAN message data filter test

8.2.1 Message data filter – matching data field

Table 43 specifies the test of the acceptance of received frames matching the data field evaluation.

Table 43 — Message data filter – matching data field

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the data field evaluation.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 43 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — DLC: X, X: ∈ {1, 2, …, 15} **Test frame:** — Data byte number Y of test frame: Refer to elementary test definition: Y: X-1 for X ≤ 8, otherwise X-9
Elementary test cases	Elementary tests are defined as follows:

Test no.	Data byte Y of test frame	Other data byte of test frame	Comment
#1 to #15	$0000\ 0001_b$	00_h	DLC = {1, 2, …, 15}
#16 to #30	$0000\ 0010_b$	00_h	DLC = {1, 2, …, 15}
#31 to #45	$0000\ 0100_b$	00_h	DLC = {1, 2, …, 15}
#46 to #60	$0000\ 1000_b$	00_h	DLC = {1, 2, …, 15}
#61 to #75	$0001\ 0000_b$	00_h	DLC = {1, 2, …, 15}
#76 to #90	$0010\ 0000_b$	00_h	DLC = {1, 2, …, 15}
#91 to #105	$0100\ 0000_b$	00_h	DLC = {1, 2, …, 15}
#106 to #120	$1000\ 0000_b$	00_h	DLC = {1, 2, …, 15}

	All eight elementary tests shall be executed for all DLC settings separately.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends “sync frame sequence” as described in 5.3.4.3. 2) The TS sends test frame but with data bytes being the bitwise inverted value of the configured bytes. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame.
Response	The presence of test frame in test step 4 shall cause a wake-up due to one matching logical “1” bit in the data field.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.9

8.3 Test class 3, CAN message DLC filter tests

8.3.1 Message DLC filter test

Table 44 specifies the test of the acceptance of received frames matching the DLC evaluation.

Table 44 — Message DLC filter test

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the DLC evaluation.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 44 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — DLC: Refer to elementary test definition — Data field: 01_h (all bytes) (for 0 < DLC ≤ 15) **Test frame:** — DLC: Refer to execution — Data: 01_h (all bytes) (for 0 < DLC ≤ 15)
Elementary test cases	Elementary tests are defined as follows: **Test DLC** #1 0 #2 1 #3 2 … #15 14 #16 15
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS generates first DLC with a value of 0. 3) If the DLC is not equal to the configured DLC, the TS sends test frame with actual DLC. 4) If the DLC is smaller than 15, the TS increment the DLC by 1 and go back to test step 3, otherwise go to test step 5. 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the test frame with configured DLC.
Response	Only the last sent test frame shall cause a wake-up due to matching DLC evaluation.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.8

8.4 Test class 4, optional data mask bit tests

8.4.1 Message filter / CBFF – test 1 while DLC matching condition disabled

Table 45 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 45 — Message filter / CBFF – test 1 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 45 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $2AA_h$ — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **Test** **ID Mask** #1 CCC CCCC CCCC #7 CCC CCDC CCCC #2 CCC CCCC CCCD #8 CCC CDCC CCCC #3 CCC CCCC CCDC #9 CCC DCCC CCCC #4 CCC CCCC CDCC #10 CCD CCCC CCCC #5 CCC CCCC DCCC #11 CDC CCCC CCCC #6 CCC CCCD CCCC #12 DCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3 but in extended format with ID: 15555555_h. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4, 5.9.4.7

8.4.2 Message filter / CBFF – test 2 while DLC matching condition disabled

Table 46 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 46 — Message filter / CBFF – test 2 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 46 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 555_h — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **Test** **ID Mask** #1 CCC CCCC CCCC #7 CCC CCDC CCCC #2 CCC CCCC CCCD #8 CCC CDCC CCCC #3 CCC CCCC CCDC #9 CCC DCCC CCCC #4 CCC CCCC CDCC #10 CCD CCCC CCCC #5 CCC CCCC DCCC #11 CDC CCCC CCCC #6 CCC CCCD CCCC #12 DCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3 but in extended format with ID: 15555555_h. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.3 Message filter / CBFF – test 3 while DLC matching condition disabled

Table 47 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 47 — Message filter / CBFF – test 3 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 47 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 000_h — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config Msg. ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **Test** **ID Mask** #1 DDD DDDD DDDC #7 DDD DCDD DDDD #2 DDD DDDD DDCD #8 DDD CDDD DDDD #3 DDD DDDD DCDD #9 DDC DDDD DDDD #4 DDD DDDD CDDD #10 DCD DDDD DDDD #5 DDD DDDC DDDD #11 CDD DDDD DDDD #6 DDD DDCD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3 but in extended format with ID: 15555555_h. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.4 Message filter / CBFF – test 4 while DLC matching condition disabled

Table 48 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CBFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 48 — Message filter / CBFF – test 4 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 48 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $7FF_h$ — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** **Test** **ID Mask** #1 DDD DDDD DDDC #7 DDD DCDD DDDD #2 DDD DDDD DDCD #8 DDD CDDD DDDD #3 DDD DDDD DCDD #9 DDC DDDD DDDD #4 DDD DDDD CDDD #10 DCD DDDD DDDD #5 DDD DDDC DDDD #11 CDD DDDD DDDD #6 DDD DDCD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3 but in extended format with ID: 15555555_h. 2) The TS sends test frame #1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame #2.
Response	— The presence of test frame #1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.5 Message filter / CEFF – test 1 while DLC matching condition disabled

Table 49 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 49 — Message filter / CEFF – test 1 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 49 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $0AAAAAAA_h$ — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 C CCCC CCCC CCCC CCCC CCCC CCCC CCCC #2 C CCCC CCCC CCCC CCCC CCCC CCCC CCCD #3 C CCCC CCCC CCCC CCCC CCCC CCCC CCDC ... #29 C DCCC CCCC CCCC CCCC CCCC CCCC CCCC #30 D CCCC CCCC CCCC CCCC CCCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame #1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame #2.
Response	— The presence of test frame #1 shall not cause a wake-up. — The presence of test frame #2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.6 Message filter / CEFF – test 2 while DLC matching condition disabled

Table 50 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 50 — Message filter / CEFF – test 2 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 50 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 15555555_h — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 C CCCC CCCC CCCC CCCC CCCC CCCC CCCC #2 C CCCC CCCC CCCC CCCC CCCC CCCC CCCD #3 C CCCC CCCC CCCC CCCC CCCC CCCC CCDC ... #29 C DCCC CCCC CCCC CCCC CCCC CCCC CCCC #30 D CCCC CCCC CCCC CCCC CCCC CCCC CCCC
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame #1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame #2.
Response	— The presence of test frame #1 shall not cause a wake-up. — The presence of test frame #2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.7 Message filter / CEFF – test 3 while DLC matching condition disabled

Table 51 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 51 — Message filter / CEFF – test 3 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accept received frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 51 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: 00000000_h — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 D DDDD DDDD DDDD DDDD DDDD DDDD DDDC #2 D DDDD DDDD DDDD DDDD DDDD DDDD DDCD ... #28 D CDDD DDDD DDDD DDDD DDDD DDDD DDDD #29 C DDDD DDDD DDDD DDDD DDDD DDDD DDDD
Setup	The IUT is configured corresponding test variables. The IUT is set to low-power mode with configured selective wake-up.
Execution	The TS sends "sync frame sequence" as described in 5.3.4.3. The TS sends test frame #1. The TS waits two times the maximum bias reaction time (t_{bias}). The TS sends test frame #2.
Response	The presence of test frame #1 shall not cause a wake-up. The presence of test frame #2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.8 Message filter / CEFF – test 4 while DLC matching condition disabled

Table 52 specifies the test of the acceptance of received frames matching the mask criteria, while data mask bit is set to 0 (CEFF massages).

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 52 — Message filter / CEFF – test 4 while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify that the IUT only accepts frames matching the mask criteria.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 52 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — ID: $1FFFFFFF_h$ — ID mask: Refer to elementary test definition — DLC matching condition disabled **Test frame:** — ID of test frame_1: unequal to config ID in C fields, equal to config ID in D fields — ID of test frame_2: equal to config ID in C fields, unequal to config ID in D fields — DLC: 4 — Data: AA_h (all bytes)
Elementary test cases	Elementary tests are defined as follows (with C = care and D = don't care): **Test** **ID Mask** #1 D DDDD DDDD DDDD DDDD DDDD DDDD DDDC #2 D DDDD DDDD DDDD DDDD DDDD DDDD DDCD ... #28 D CDDD DDDD DDDD DDDD DDDD DDDD DDDD #29 C DDDD DDDD DDDD DDDD DDDD DDDD DDDD
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame_1. 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame_2.
Response	— The presence of test frame_1 shall not cause a wake-up. — The presence of test frame_2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4 and 5.9.4.7

8.4.9 Acceptance of frames independent of the DLC while DLC matching condition disabled

Table 53 specifies the test of the detection of a frame as a valid WUF.

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 53 — Acceptance of frames independent of the DLC while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify if the IUT is able to detect a frame as a valid WUF (independent of the DLC) as long as the configured ID matches the IUT configuration.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 53 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — DLC: 8 — Data field: FF_h (all bytes) — DLC matching condition disabled **Test frame:** — DLC: see execution — Data field: 00_h (all bytes)
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS set the test frame DLC to 0. 3) The TS sends the test frame with configured wake-up ID. 4) The TS waits the maximum bias reaction time (t_{bias}). 5) The TS set the IUT to low-power mode with configured selective wake-up. 6) The TS increments the test frame DLC by 1. 7) If DLC < 16, go to step 3, otherwise end test execution.
Response	Each test frame shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4

8.4.10 Acceptance of remote frames independent of the DLC while DLC matching condition disabled

Table 54 specifies the test of the detection of a remote frame as a valid WUF.

NOTE This test case is applicable if the optional data mask bit is implemented.

Table 54 — Acceptance of remote frames independent of the DLC while DLC matching condition disabled

Item	Description
Purpose	The purpose of this test is to verify if the IUT is able to detect a remote frame as a valid WUF (independent of the DLC) as long as the configured ID matches the IUT configuration.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)

Table 54 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **IUT configuration:** — DLC: 8 — Data field: FF_h (all bytes) — DLC matching condition disabled **Test frame:** — RTR: 1 — DLC: see execution
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS set the test frame DLC to 0. 3) The TS sends the test frame with configured wake-up ID. 4) The TS waits two times the maximum bias reaction time (t_{bias}). 5) The IUT is set to low-power mode with configured selective wake-up. 6) The TS increments the test frame DLC by 1. 7) If DLC < 16, go to step 3, otherwise end test execution.
Response	Each test frame shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4

8.5 Test class 5, non-acceptance of remote frames

8.5.1 Non-acceptance of remote frames

Table 55 specifies the test of the detection of a remote frame as a valid WUF.

Table 55 — Non-acceptance of remote frames

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not detect a remote frame as a valid WUF.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame:** — DLC: see elementary test cases — RTR: Refer to Execution
Elementary test cases	There are two elementary test cases. **Test** **DLC** **Data field** #1 DLC = 0 — #2 DLC = 1 FF_h

Table 55 *(continued)*

Item	Description
Setup	— The IUT is configured corresponding test variables. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends test frame with RTR bit set to 1 (recessive). 3) The TS waits two times the maximum bias reaction time (t_{bias}). 4) The TS sends test frame with RTR bit is set to 0 (dominant).
Response	— The test frame #1 shall not cause a wake-up. — The test frame #2 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.4

9 Test type 4, FEC management

9.1 General

This test group considers the correct implementation of the counter for erroneous frames as it is defined in ISO 11898-2. In the following subclause, this counter is referenced as FEC. If the overflow threshold value is implemented, the IUT should be configured to wake-up on counter overflow with the 32nd increment immediately or upon the next received WUP.

9.2 Test class 1, valid frame format

9.2.1 FEC decrement on valid frame presence

Table 56 specifies the test of the FEC behaviour after presence of a valid frame.

Table 56 — FEC decrement on valid frame presence

Item	Description
Purpose	The purpose of this test is to verify that the IUT decrements it's FEC, after presence of a valid frame.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: $2AA_h$ — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	There is one elementary test case.
Setup	— The IUT is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.

Table 56 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame #1. 3) The TS sends two times test frame #1 containing a corrupted CRC field. The FEC should be increased by one after each erroneous frame. 4) Then, the TS sends two times test frame #1. The FEC shall be decreased by one after each valid frame until zero. 5) Then, the TS sends test frame #1 containing a CRC error in data field 32 times. The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 6) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame).
Response	The IUT shall increment its FEC by one for each erroneous frame sent by the TS in step 3. After occurrence of all erroneous frames, the IUT shall wake-up (immediately or upon the next WUP which is element of a valid frame) due to a FEC overflow.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.2 FEC no increment on form error in error delimiter

Table 57 specifies the test of the FEC behaviour when detecting a form error in error delimiter.

Table 57 — FEC no increment on form error in error delimiter

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not increase its FEC, when detecting a form error on a bit of an error delimiter.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame 1:** — ID: $2AA_h$ — DLC: 0 **Test frame 2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	Elementary tests are defined as follows: **Test** **Bit position for error in error delimiter** #1 second bit #2 fifth bit
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.

Table 57 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame 1. 3) The TS sends 30 times test frame 1 containing a stuff error bit in DLC field (the FEC shall have a value of 30). The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS waits two times the maximum bias reaction time (t_{bias}). 5) The TS sends test frame 1 containing a stuff error in DLC field followed by an active error frame with manipulated error delimiter as depicted in test variables (the FEC shall have a value of 31). 6) The TS wait additional 10 bit times before it sends test frame 2 as depicted in test variables (a WUP which is element of a valid frame). The FEC shall have a value of 30. 7) The TS waits two times the maximum bias reaction time (t_{bias}). 8) The TS sends two times test frame 1 containing a stuff error in DLC field (The FEC shall be incremented by 2). The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 9) The TS sends test frame 2 as depicted in test variables (a WUP which is element of a valid frame).
Response	— After occurrence of all erroneous frames (sent by TS in test steps 3 and to 5), the IUT shall not wake-up (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after presence of the test frame #2 sent by TS in test step 8 immediately, or in test step 9 upon the next WUP, which is element of a valid frame due to a FEC overflow.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.3 FEC no increment on sixth bit of error delimiter

Table 58 specifies the test of the FEC behaviour when detecting a dominant bit on sixth bit of error delimiter.

Table 58 — FEC no increment on sixth bit of error delimiter

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not increase its FEC, when detecting a dominant bit on the sixth bit of error delimiter.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: $2AA_h$ — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	There is one elementary test case.

Table 58 *(continued)*

Item	Description
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame #1. 3) The TS sends 30 times test frame #1 containing a stuff error in DLC field (the FEC shall have a value of 30). The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS waits two times the maximum bias reaction time (t_{bias}). 5) The TS generates an active error frame where the sixth bit of error delimiter is forced dominant by LT (the FEC shall have a value of 31). 6) The TS wait additional 10 bit times before it sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). The FEC shall have a value of 30. 7) The TS waits two times the maximum bias reaction time (t_{bias}). 8) The TS sends two times test frame #1 containing a stuff error in DLC field (The FEC shall be incremented by 2). The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 9) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame).
Response	— After occurrence of all erroneous frames sent by TS in test steps 3 to 5, the IUT shall not wake-up (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after presence of the test frame #2 sent by TS in test step 8 immediately, or in test step 9 upon the next WUP, which is element of a valid frame due to a FEC overflow.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.4 FEC no increment on ACK error

Table 59 specifies the test of the FEC behaviour when detecting an ACK error.

Table 59 — FEC no increment on ACK error

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not increase its FEC, when detecting an ACK error.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: $2AA_h$ — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	There is one elementary test case.

Table 59 *(continued)*

Item	Description
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five (or nine in case of data rate > 500 kbit/s) times test frame 1. 3) The TS repeats sending the test frame with a recessive ACK slot and without any active error flag for 32 times. The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the default wake-up frame, which shall cause a wake-up.
Response	— The IUT shall not increment its FEC by one for each erroneous frame. After occurrence of all erroneous frames, the IUT shall not wake-up (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after presence of the frame sent by TS in test step 6.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.5 FEC no increment on form error in ACK delimiter

Table 60 specifies the test of the FEC behaviour when detecting a form error on the ACK delimiter.

Table 60 — FEC no increment on form error in ACK delimiter

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not increase its FEC, when detecting a form error on the ACK delimiter.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: $2AA_h$ — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	There is one elementary test case.
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.

Table 60 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame #1. 3) The TS repeats sending the test frame with a dominant ACK delimiter for 32 times. The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the default wake-up frame, which shall cause a wake-up.
Response	— The IUT shall not increment its FEC by one for each erroneous frame. After occurrence of all erroneous frames, the IUT shall not wake-up (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after presence of the frame sent by TS in test step 6.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.6 FEC no increment on form error in EOF field

Table 61 specifies the test of the FEC behaviour when detecting a form error on the EOF field.

Table 61 — FEC no increment on form error in EOF field

Item	Description
Purpose	The purpose of this test is to verify that the IUT does not increase its FEC, when detecting a form error on the EOF field.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: $2AA_h$ — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	Elementary tests are defined as follows: **Test** **Bit position for error in EOF** #1 first bit #2 second bit #3 third bit #4 fourth bit
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.

Table 61 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame #1 without a corrupted EOF field. 3) The TS repeats sending the test frame but with a corrupted EOF field as depicted in test variables for 32 times. The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends the default wake-up frame which shall cause a wake-up.
Response	— The IUT shall not increment its FEC by one for each erroneous frame. After occurrence of all erroneous frames, the IUT shall not wake-up (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after presence of the frame sent by TS in test step 6.
Reference	ISO 11898-2:2016, 5.9.4.5

9.2.7 FEC no increment on glitches

Table 62 specifies the test of the FEC behaviour on dominant glitches.

Table 62 — FEC no increment on glitches

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not interpret a dominant phase as a SOF when the dominant level is shorter than 55 % of the bit time and will not be logged as an error.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: — Glitch length = 54 % of the bit time **Test frame #1:** — ID: 001_h — DLC: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	There is one elementary test case.
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.

Table 62 *(continued)*

Item	Description
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five (or nine in case of data rate > 500 kbit/s) times test frame #1. 3) The TS sends test frame #1 containing a stuff error 31 times (The FEC shall have a value of 31). The TS waits two times the maximum bias reaction time (t_{bias}) between repetitions. 4) The TS waits two times the maximum bias reaction time (t_{bias}) followed by a dominant glitch with glitch length as depicted in test variables. 5) The TS repeats 30 times steps 4. 6) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). 7) The TS waits two times the maximum bias reaction time (t_{bias}). 8) The TS sends the default wake-up frame.
Response	— After the occurrence of all erroneous frames sent by TS in test step 3, the IUT shall increment its FEC to 31. The IUT shall not wake-up due to a FEC overflow. — The glitches sent in step 5 shall not be detected by the IUT; i.e. the FEC shall not be incremented and therefore, the IUT shall not wake-up (neither immediately nor upon the next WUP which is element of a valid frame). — The last test frame sent in step 8 shall cause a wake-up.
Reference	ISO 11898-2:2016, 5.9.4.3

9.2.8 FEC no increment on classical CAN frames with not nominal "FDF, r0"

Table 63 specifies the test of the FEC behaviour after not nominal reserved bits.

Table 63 — FEC no increment on classical CAN frames with not nominal "FDF, r0"

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not interpret a not nominal "FDF, r0" as an error.
CAN version	— Classical CAN — CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — FDF, r0: Refer to elementary test definition — SRR, RTR: Refer to elementary test definition **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
NOTE This test is designed for Classical CAN and for CAN FD tolerant implementation. It is not applicable for CAN FD enabled implementation. In this test FDF = 1 reflects a non-nominal bit value in a Classical CAN frame.	

Table 63 *(continued)*

Item	Description					
Elementary test cases	Elementary tests are defined as follows: (CBFF and CEFF frames are applied)					
	Test	**ID**	**RTR**	**FDF**	**DLC**	**Data**
	#1	$2AA_h$	1	1	0	—
	#2	$2AA_h$	0	1	0	—
	#3	707_h	0	1	15	$0F_h$ (all bytes)
	#4	360_h	0	1	0	—
	#5	730_h	0	1	0	—
	Test	**ID**	**SRR**	**FDF**	**r0**	**DLC**	**Data**
	#6	$01E31717_h$	0	0	1	15	$0F_h$ (all bytes)
	#7	$01E00FF0_h$	0	1	1	12	$1F_h$, $0F_h$, $E0_h$, $F0_h$, $7F_h$, $E0_h$, FF_h, 20_h
	#8	00000000_h	1	1	0	0	—
	#9	00000000_h	0	1	0	0	—
	#10	$07C0F0F0_h$	0	1	0	1	$A0_h$
	#11	$07C0F0F0_h$	1	0	1	0	—
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.					
Execution	1) The TS sends "sync frame sequence" as described in 5.3.4.3. 2) The TS sends five times (or nine times in case of data rate > 500 kbit/s) test frame #2. 3) The TS sends 32 times the test frame #1. The TS waits two times the maximum bias reaction time (tbias) between repetitions. 4) The TS sends test frame #2 as depicted in test variables (a WUP which is element of a valid frame). 5) The TS waits two times the maximum bias reaction time (t_{bias}). 6) The TS sends default WUF to wake the IUT.					
Response	— The IUT shall not increment its FEC by any transmission of test frame #1. — The IUT shall not wake-up after presence of the last test frame sent by TS in test step 3 (neither immediately nor upon the next WUP) due to a FEC overflow. — The IUT shall wake-up after step 6.					
Reference	ISO 11898-2:2016, 5.9.4.5					
NOTE This test is designed for Classical CAN and for CAN FD tolerant implementation. It is not applicable for CAN FD enabled implementation. In this test FDF = 1 reflects a non-nominal bit value in a Classical CAN frame.						

9.2.9 FEC no increment on CAN FD frames (FD tolerant implementation only)

Table 64 specifies the test of the FEC behaviour after CAN FD frames.

Table 64 — FEC no increment on CAN FD frames

Item	Description
Purpose	The purpose of this test is to verify that the IUT will not interpret a set FD bit as an error nor any errors until idle detected.
CAN version	— CAN FD tolerant
HS-PMA	— Low-power mode with selective wake-up capability (WUF)
NOTE This test is not applicable for CAN FD enabled implementation.	

Table 64 *(continued)*

Item	Description
Test variables	All parameters are set to the default parameters as defined in 5.3.4.2 except: **Test frame #1:** — ID: Refer to elementary test definition — DLC: Refer to elementary test definition — RRS: Refer to elementary test definition — FDF: 1 — res: 0 **Test frame #2:** — ID: 078_h (containing a bit-sequence of five dominant, five recessive, and five dominant bits) — DLC: 0
Elementary test cases	Elementary tests are defined as follows: **Test** / **ID** / **RRS** / **DLC** / **Data** / **Bit rate ratio** / **Special condition** #1 / $2AA_h$ / 1 / 0 / — / 1:2 / IFS reduced to two bit times #2 / $2AA_h$ / 1 / 0 / — / 1:2 / Active error frame started at DLC #3 / $2AA_h$ / 1 / 0 / — / 1:2 / Recessive ACK and active error frame started after ACK delimiter #4 / 707_h / 0 / 8 / all 55_h / 1:2 #5 / 360_h / 0 / 15 / all FF_h / 1:4 #6 / 555_h / 0 / 0 / — / 1:1 / If applicable IUT configured with data mask bit set #7 / 555_h / 1 / 0 / — / 1:1 / If applicable IUT configured with data mask bit set #8 / $01E31717_h$ / 0 / 8 / all 55_h / 1:2 #9 / $01E31717_h$ / 1 / 15 / all FF_h / 1:4 In case the IUT is FD tolerance is defined for a dedicated bit rate configuration, only this configuration will be used for test.
Setup	— The IUT selective wake-up is configured with default parameters as defined in 5.3.4.2. — The IUT is set to low-power mode with configured selective wake-up.
NOTE This test is not applicable for CAN FD enabled implementation.	