

ERTMS/ETCS – Class 1

FFFIS STM test cases of Functional Identity 003

Level Transition ETCS -> STM

Total: 45 Test cases

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Company	Technical Approval	Management approval
ALCATEL		
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Modification History

Issue Number Date	Section Number	Modification / Description	Author
0.0.1 2004-07-01	All	Document created, including Test case 3b.1.2.3.2.3.1, Test case 3b.3.1, Test case 3b.2.0.	P. Lührs (Siemens AG)
0.0.2 2004-07-02	several "Test Cases"	Test case 3a.0.0.1.1.1.0.0.0 and Test case 3a.0.0.2.2.0.0.0 added. Test case 3b.1.2.3.2.3.1 updated: DUT and Output I/F, numbers of test steps. Test case 3b.2.0 updated: List of "Packets Transmitted via FFFIS STM".	P. Lührs (Siemens AG)
0.0.3 2004-07-23	"Test Case Diagram" several "Test Cases"	Updated Test Case Diagrams included. Test case 3a.0.0.1.1.1.0.0.0 updated: new requirement (10.5.2.8). Change in Methodology of Testing: padding bits included, opening of connections. All currently included Test Cases updated according to review comments. Test case 3a.0.0.1.1.3.1.0, Test case 3a.0.0.1.2.1.0.1.0.0.0, Test case 3a.0.0.1.2.2.0.1.0.0.0, Test case 3a.0.0.3.2.1.2.0.0.0, Test case 3a.0.0.2.3.2 and Test case 3c.1.0.3.1.1 added.	P. Lührs (Siemens AG)
0.0.4 2004-08-31	Footer "Test Case Diagram" several "Test Cases"	Footer corrected. Overview diagram for Test Case Diagrams included and diagram Transition ETCS -> STM: Level Transition border updated. All currently included Test Cases updated according to review comments. Test case 3c.1.0.1.0.1.3.0.0, Test case 3c.1.0.2.1.3.0.0, Test case 3c.1.0.2.2.1, Test case 3c.1.0.2.2.0, Test case 3c.1.0.3.1.2.0 and Test case 3c.1.0.4.1.3.0.0 added.	P. Lührs (Siemens AG)
0.0.5 2004-10-19	"Test Case Diagram" several "Test Cases"	SUBSET-035 requirement 7.4.1.2.2 included in the Test Case Diagrams. All currently included Test Cases updated according to review comments (Starting condition „Train State" and "DMI connection", Test Step numbering, Indication of request for Train Trip Acknowledgement, Safe Action, No MA in Balise Group at Level Transition border to STM, The STM may send information based on the national system behaviour to the ETCS On-board after activation, Check of "STM Max Speed" in the supervision gap updated (Test case 3c.1.0.1.0.1.3.0.0)).	P. Lührs (Siemens AG)
0.0.6 2004-11-04	"Test Case Diagram"	Test Case Diagram updated due to VISIO/WORD-Problems (connections). SUBSET-035 requirement 5.2.10.1 ("DMI preliminary requests", "FS"/"SR"/"OS"/"NL"/"UN"/"TR") included in the Test Case Diagrams. Test Case Diagram "Transition ETCS->STM: Level Transition border" corrected.	P. Lührs (Siemens AG)

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Issue Number Date	Section Number	Modification / Description	Author
	several "Test Cases"	All currently included Test Cases updated according to review comments (Starting condition „TIU Sleeping Status“). SUBSET-035 requirement 7.4.1.2.2 included in the Test Case Headers. Connection information for all transmitted PROFIBUS messages added in the Test Cases. The STM shall report the state to all connected ETCS Functions (Requirement 7.3.4.4). Test case 3b.4.1, Test case 3b.5.1, Test case 3b.6.1, Test case 3b.7.1, Test case 3b.8.2.0 added to test the requirement 5.2.10.1 ("DMI preliminary requests", "SR"/"OS"/"NL"/"UN"/"TR"). Test case 3b.3.1 is valid only for "FS". Missing test cases (Test case 3b.1.1, Test case 3b.1.2.1, Test case 3b.1.2.2.1, Test case 3b.1.2.3.1, Test case 3b.1.2.3.2.1, Test case 3b.1.2.3.2.3.4.0, Test case 3b.1.2.3.2.3.5.1, Test case 3b.1.2.3.2.4.0, Test case 3b.1.2.3.2.5.1, Test case 3b.1.2.3.3.1, Test case 3b.1.2.3.4.0, Test case 3b.1.2.3.5.1, Test case 3b.1.2.4.0, Test case 3b.1.2.5.1, Test case 3b.1.3.1, Test case 3b.1.4.0, Test case 3b.1.5.1, Test case 3c.1.0.5.1.0.1.0, Test case 3c.1.0.5.2.0.2, Test case 3c.1.0.5.3.2.0, Test case 3c.1.0.4.2.0.1.0, Test case 3c.1.0.4.3.2.0, and Test case 3c.2.0.2.1.3.0.0) added).	P. Lührs (Siemens AG)
0.0.7 2004-11-18	"Test Case Diagram" several "Test Cases"	SUBSET-035 requirement 5.10.1.2 (DMI preliminary requests) for the ETCS mode "PT" included in the Test Case Diagrams. All currently included Test Cases updated according to review comments (selected language "English", no DMI messages in Test case 3c.1.0.5.2.0.2, ETCS mode does not change in Test case 3c.1.0.5.2.0.2, driver acknowledgement for transition added to all Test case 3c except for starting condition SL, justification for specification of Test case 3c.1.0.1.0.1.3.0.0 added, ...). All Test case 3b updated due to the inclusion of SUBSET-035 requirement 5.10.1.2 (DMI preliminary requests) for the ETCS mode "PT". Starting / end conditions corrected.	P. Lührs (Siemens AG)
0.0.8 2004-11-30	all "Test Cases"	"Reference Clock Connection" included in the end condition. "Not transmitted" parts of telegrams deleted.	P. Lührs (Siemens AG)
0.0.9 2004-12-07	Several	Minor mistakes corrected (requirements lists in the test cases, ...).	P. Lührs (Siemens AG)
0.1.0 2004-12-15		Editorial changes for preliminary delivery.	P. Lührs (Siemens AG)
0.1.1 2005-01-24	Several Test Cases	Test case 3a.0.0.1.1.1.0.0.0, Test case 3a.0.0.1.2.1.0.1.0.0.0, Test case 3a.0.0.2.2.0.0.0, Test case 3c.1.0.4.2.0.1.0, Test case 3c.1.0.5.1.0.1.0, and Test case 3c.1.0.5.2.0.2 updated based on new review comments (new feature of the test equipment: parallel time lines, minor mistakes corrected).	P. Lührs (Siemens AG)

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Issue Number Date	Section Number	Modification / Description	Author
0.1.2 2005-01-26	Several Test Cases	„The STM takes the train supervision according to the national system behaviour.“ (BIU connection) added and minor mistakes corrected.	P. Lührs (Siemens AG)
0.1.3 2005-01-26	Several Test Cases	Title updated and mistakes corrected.	P. Lührs (Siemens AG)
0.2.0 2005-01-27		Editorial changes for delivery.	P. Lührs (Siemens AG)
1.0.0 13.10.2005		Editorial changes for delivery	Invensys Rail

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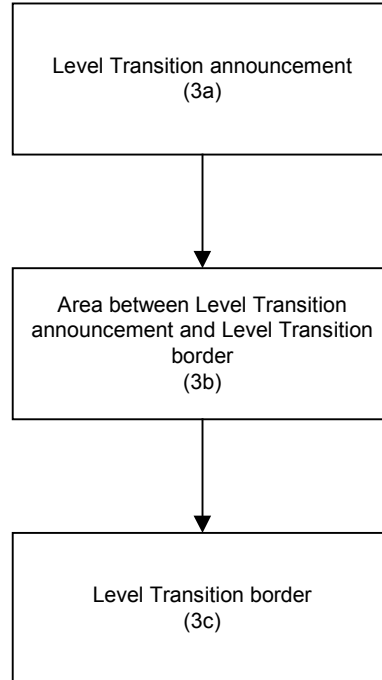
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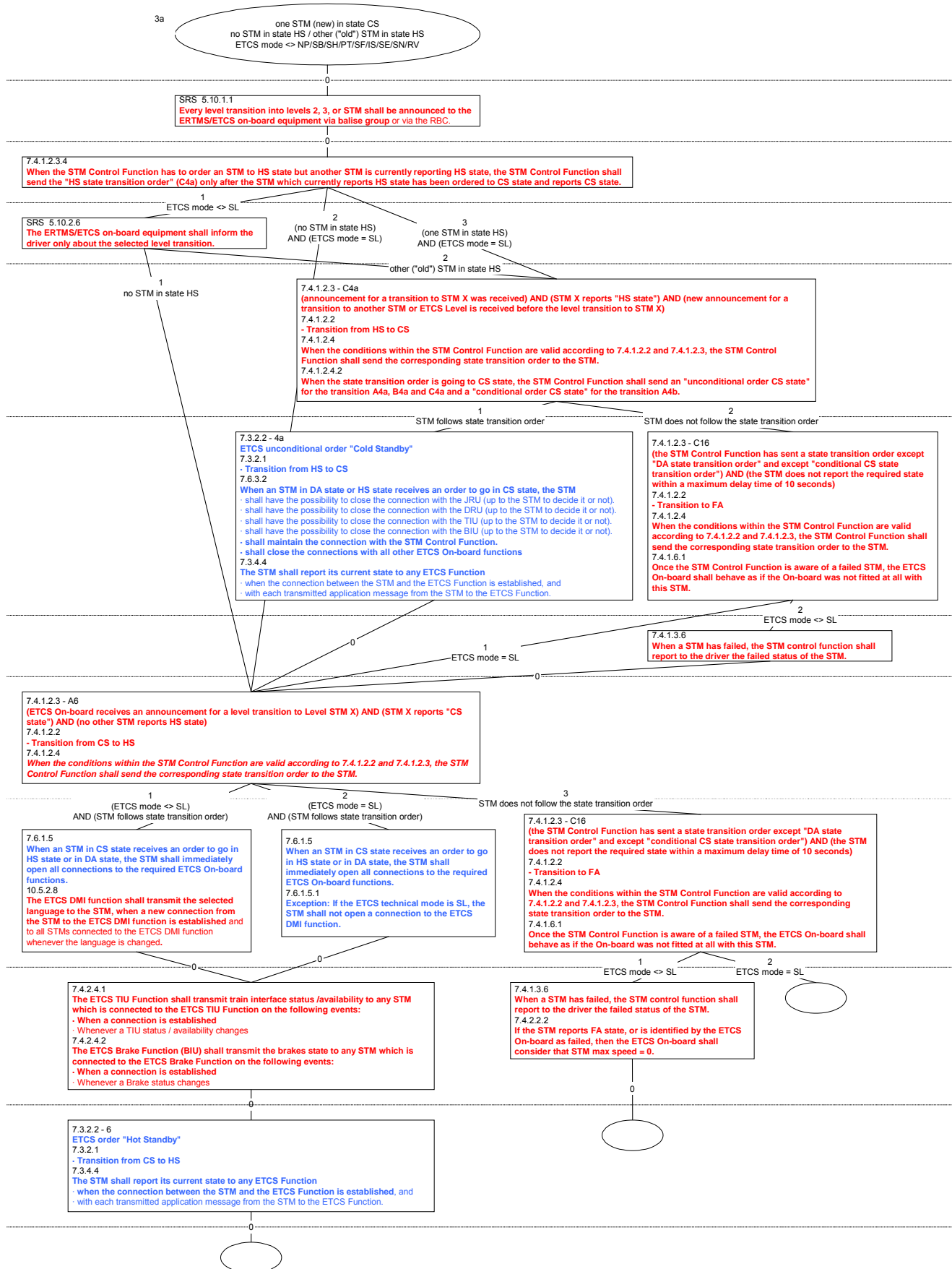
TEST CASE DIAGRAMS

Overview

The Test Case Diagram for the Functional Identity “Level Transition ETCS -> STM” is divided into three parts:



Transition ETCS -> STM: Level Transition announcement



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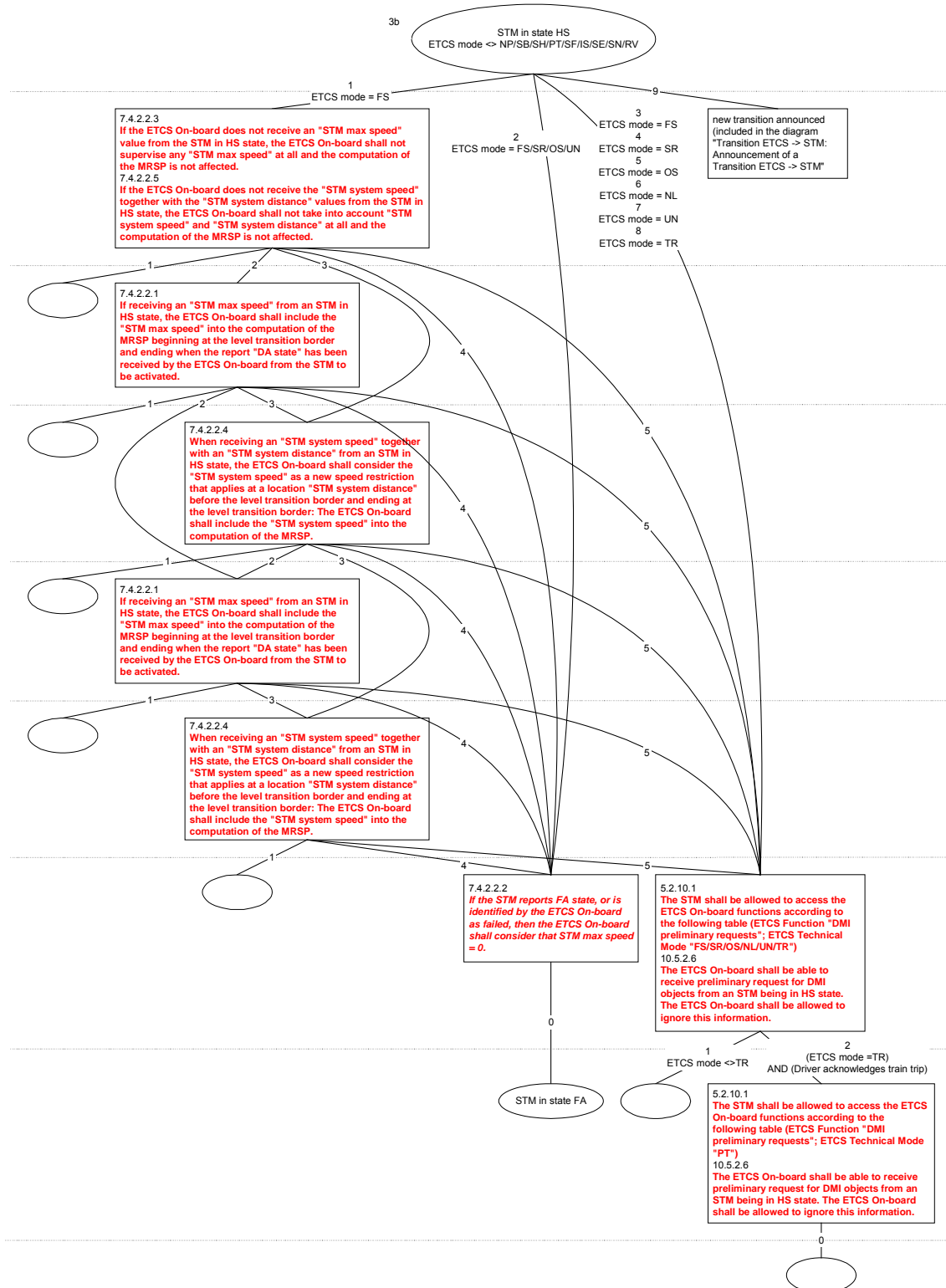
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Level Transition ETCS -> STM

Transition ETCS -> STM: Area between announcement and border



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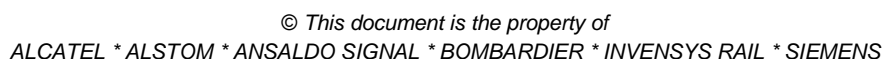
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FFFIS STM test cases of Functional Identity 003

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Level Transition ETCS -> STM



TEST CASES

Test case 3a.0.0.1.1.1.0.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board (not in the ETCS technical mode SL) and the STM at a level transition announcement (announced by balise group), when no other STM is currently in the state HS and the STM follows the state transition order to state HS in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (CS to HS), 7.4.1.2.3.4, 7.4.1.2.3 (A6), 7.4.1.2.4, 7.4.2.4.1, 7.4.2.4.2, 10.5.2.8
	SUBSET-026 5.10.1.1, 5.10.2.6
STM Requirements Tested	SUBSET-035 7.3.2.2.1 (6), 7.3.2.1 (CS to HS), 7.3.4.4, 7.6.1.5
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14, STM-15, STM-30, STM-136, STM-139
Comments and constraints	<p>The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state HS when a level transition announcement to this STM is received and that the ETCS On-board BTM Function and TIU Functions send the current status / availability information to the STM when the connection to these functions is opened by the STM.</p> <p>The objective of this test is also to check that the STM follows a state transition order to the state HS.</p> <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	

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Starting Conditions	Value	Comments
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	not established	
Odometry Data	transmitted	
Reference Time Data	transmitted	
TIU Connection	not established	
BIU Connection	not established	
JRU Connection	not relevant	
Other connections	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Command	not relevant	
TIU Eddy Current Brake Command	not relevant	
TIU Inhibit Passenger Emergency Brake Command	not relevant	
TIU Pantograph Command	not relevant	
TIU Air Tightness Command	not relevant	
TIU Main Switch / Circuit Breaker Command	not relevant	
TIU Traction Cut Off Command	not cut	
TIU Sleeping Status	not Sleeping	
TIU Traction Cut Off Status	inactive	
TIU Direction Controller Position Status	forward	
TIU Cab Status (Desk Status)	desk A opened	
BIU Status	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	release	
BIU Service Brake Status	release	

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Starting Conditions		Value	Comments
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order announced STM to HS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the selected level transition
2	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	Prof	establish BIU Connection	-	-	-
	The current state (CS) is reported to the BIU Function	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of BIU signals	-	-	ETCS	Prof	BIU Connection: Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
3	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	Prof	establish TIU Connection	-	-	-
	The current state (CS) is reported to the TIU Function	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of TIU signals	-	-	ETCS	Prof	TIU Connection: Message-ET1 (STM-139 - train interface inputs status / availability to STM)
4	Connection to the ETCS On-board DMI Function (cab A) is established by the STM (SLL/STL/Application Layer)	Prof	establish DMI Connection (cab A)	-	-	-
	The current state (CS) is reported to the DMI Function	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current select language	-	-	ETCS	Prof	DMI Connection: Message-ED1 (STM-30 - driver language transmission)
5	Time: T0 + 8 seconds STM reports state HS in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state HS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2a1	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish BIU Connection - optional -
2a2	The current state (CS) is reported to the BIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	BIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
	Transmission of the status / availability information to the STM	Prof	BIU Connection – if opened -: - Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)	-	-	-
		-	-	STM	Prof	BIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2b1	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish TIU Connection - optional -
2b2	The current state (CS) is reported to the TIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	TIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		Prof	TIU Connection – if opened -: - Message-ET1 (STM-139 - train interface inputs status / availability to STM)	-	-	-
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2c1	Connection to the ETCS On-board JRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish JRU Connection - optional -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2c2	The current state (CS) is reported to the JRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	JRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		-	-	STM	Prof	JRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2d1	Connection to the ETCS On-board DRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DRU Connection - optional -
2d2	The current state (CS) is reported to the DRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		-	-	STM	Prof	DRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2e1	Connection to the ETCS On-board DMI Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DMI (cab A) Connection - optional -
2e2	The current state (CS) is reported to the DMI Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DMI Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		Prof	DMI Connection – if opened -: - Message-ED1 (STM-30 - driver language transmission)	-	-	-
		-	-	STM	Prof	DMI Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2f1	STM reports state HS to the ETCS STM Control Function	-	-	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile. Level Transition Order)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile, Level Transition Order)			
VARIABLE	Length	VALUE	COMMENTS
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	136	Brake Interface emergency and service brake status / availability to STM (STM-136)
L_PACKET	13	COMPUTED	packet length
M_BIEB_STATUS	2	2	emergency brake released
M_BISB_STATUS	2	2	service brake released
Padding bits	COMPUTED	COMPUTED	

Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	139	Train Interface inputs status / availability to STM (STM-139)
L_PACKET	13	COMPUTED	packet length
M_TITR_C_STATUS	2	2	no traction cut off
M_TIDIR_STATUS	2	1	forward
M_TICAB_STATUS	2	1	cab A opened
Padding bits	COMPUTED	COMPUTED	

Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length

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Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	30	Driver language transmission (STM-30)
L_PACKET	13	COMPUTED	packet length
NID_DRV_LANG	2	en	English
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	HS	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	

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DMI Connection	established	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	established	
BIU Connection	established	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3a.0.0.1.1.3.1.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board (not in the ETCS technical mode SL) and the STM at a level transition announcement (announced by balise group), when no other STM is currently in the state HS and the announced STM does not follow the state transition order to state HS in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (CS to HS, to FA), 7.4.1.2.3.4, 7.4.1.2.3 (A6, C16), 7.4.1.2.4, 7.4.1.6.1, 7.4.1.3.6, 7.4.2.2.2
	SUBSET-026 5.10.1.1, 5.10.2.6
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state FA in case the STM does not report the state HS in due time after the ETCS On-board has sent the order to state HS.

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	not established	
Odometry Data	transmitted	
Reference Time Data	transmitted	

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Starting Conditions		Value	Comments
TIU Connection		not established	
BIU Connection		not established	
JRU Connection		not established	
Other connections		not established	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

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ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order announced STM to HS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the selected level transition
	Time: T0 + 10 seconds STM has not reported HS state in due time: order announced STM to FA state	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the failed STM
	"STM Max Speed" is set to "0" as the announced STM is regarded as to be in the state FA	-	-	ETCS	DMI	the indication of the target speed (at the transition border) is set to "0 km/h"
		-	-	ETCS	Prof	close STM Control Connection

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

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Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	not established	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	

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TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3a.0.0.1.2.1.0.1.0.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board and the STMs at a level transition announcement (announced by balise group), when another STM is in the state HS and the STMs follow the state transition orders in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to CS, CS to HS), 7.4.1.2.3.4, 7.4.1.2.3 (C4a, A6), 7.4.1.2.4, 7.4.1.2.4.2, 7.4.2.4.1, 7.4.2.4.2, 10.5.2.8
	SUBSET-026 5.10.1.1, 5.10.2.6
STM Requirements Tested	SUBSET-035 7.3.2.2.1 (4a), 7.3.2.1 (HS to CS), 7.6.3.2
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14, STM-15, STM-30
Comments and constraints	<p>The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state HS when a level transition announcement to this STM is received after any other STM in state HS was ordered to the state CS and that the ETCS On-board BTM Function and TIU Functions send the current status / availability information to the STM when the connection to these functions is opened by the STM which was ordered to the state HS.</p> <p>The objective of this test is also to check that the STM follows a state transition order to the state HS.</p> <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	another STM shall be in state HS, no other STM in state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	

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Starting Conditions		Value	Comments
National Values		valid	
STM Control Function Connection		Established	
DMI Connection		not established	the STM in state HS shall have an established connection to the DMI function
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order STM in HS state to CS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
		-	-	ETCS	DMI	Indication to the driver about the selected level transition
2	Time: T0 + 3 seconds The STM closes the connection to the ETCS DMI function (cab A)	Prof	close DMI Connection (cab A)	-	-	-
	STM reports CS state in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	The STM has reported CS state: order STM the announced STM to HS state	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
3	Connection to the ETCS On-board DMI Function (cab A) is established by the STM (SLL/STL/Application Layer)	Prof	establish DMI Connection (cab A)	-	-	-
	The current state (CS) is reported to the DMI Function	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
	Transmit current select language	-	-	ETCS	Prof	DMI Connection: Message-ED1 (STM-30 - driver language transmission)
5	Time: T0 + 6 seconds STM reports state HS in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S3 (STM-15 - state report from STM)	-	-	-

STM Test Case (STM in state HS, see 'starting conditions')

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state CS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)	-	-	-
	The STM closes the connection to the ETCS DMI function (cab A)	-	-	STM	Prof	close DMI Connection (cab A)
	The STM reports CS state in due time to all connected ETCS Functions	-	-	STM	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)
		-	-	STM	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
		-	-	STM	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -

Note: It is not necessary to perform the activation of an STM (order to HS state), as this is already included e. g. in the test case Test case 3a.0.0.1.1.0.0.0.

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group

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Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	30	Driver language transmission (STM-30)
L_PACKET	13	COMPUTED	packet length
NID_DRV_LANG	2	en	English
Padding bits	COMPUTED	COMPUTED	

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Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-S3 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	HS	another STM in state CS, no other STM in state DA
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	

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Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	established	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3a.0.0.1.2.2.2.0.1.0.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board and the STM at a level transition announcement (announced by balise group), when another STM is in the state HS that does not follow the state transition order to the state CS in due time. The announced STM follows the state transition orders in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to CS, CS to HS, to FA), 7.4.1.2.3.4, 7.4.1.2.3 (C4a, C16, A6), 7.4.1.2.4, 7.4.1.2.4.2, 7.4.1.6.1, 7.4.2.4.1, 7.4.2.4.2, 7.4.1.3.6, 10.5.2.8
	SUBSET-026 5.10.1.1, 5.10.2.6
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14, STM-15, STM-30
Comments and constraints	<p>The objective of this test is to check that the ETCS On-board (STM Control Function) orders an STM, which is in the state HS at a level transition announcement to another STM, to the state FA in case this STM does not follow the state transition order to the state CS and that the announced STM is ordered to the state HS after the STM, which was previously in the state HS, is regarded as to be in the state FA.</p> <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	another STM shall be in state HS, no other STM in state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	

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Starting Conditions		Value	Comments
National Values		valid	
STM Control Function Connection		Established	
DMI Connection		not established	the STM in state HS shall have an established connection to the DMI function
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order STM in HS state to CS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the selected level transition
2	Time: T0 + 10 seconds The STM does not report CS state in due time: order STM in HS state to FA state	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the failed STM
	Order the announced STM to HS state	-	-	ETCS	Prof	STM Control Connection: Message-EC3 (STM-14 - state order to STM)
3	Connection to the ETCS On-board DMI Function (cab A) is established by the STM (SLL/STL/Application Layer)	Prof	establish DMI Connection (cab A)	-	-	-
	The current state (CS) is reported to the DMI Function	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
	Transmit current select language	-	-	ETCS	Prof	DMI Connection: Message-ED1 (STM-30 - driver language transmission)
5	Time: T0 + 13 seconds STM reports state HS in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S3 (STM-15 - state report from STM)	-	-	-

STM Test Case

Note: There are no requirements on the STM for the STM in HS state at the beginning of the test case and therefore there is not test case necessary for this part of the test case. In addition, it is not necessary to perform the activation of an STM (order to HS state), as this is already included e. g. in the test case Test case 3a.0.0.1.1.1.0.0.0.

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)

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Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

Message-EC3 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	30	Driver language transmission (STM-30)
L_PACKET	13	COMPUTED	packet length
NID_DRV_LANG	2	en	English
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

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Message-S3 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	HS	another STM in state FA, no other STM in state DA
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	established	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	

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TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3a.0.0.2.2.0.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board and the STM at a level transition announcement (announced by balise group), when the ETCS technical mode is SL (Sleeping) and no STM is currently in the state HS and the STM follows the state transition order to state HS in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (CS to HS), 7.4.1.2.3.4, 7.4.1.2.3 (A6), 7.4.1.2.4, 7.4.2.4.1, 7.4.2.4.2
	SUBSET-026 5.10.1.1
STM Requirements Tested	SUBSET-035 7.3.2.2.1 (6), 7.3.2.1 (CS to HS), 7.3.4.4, 7.6.1.5, 7.6.1.5.1
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14, STM-15, STM-136, STM-139
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state HS when a level transition announcement to this STM is received and that the ETCS On-board BTM Function and TIU Functions send the current status / availability information to the STM when the connection to these functions is opened by the STM.
	The objective of this test is also to check that the STM follows a state transition order to the state HS.

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	Valid	

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Starting Conditions		Value	Comments
STM Control Function Connection		established	
DMI Connection		not established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not established	
BIU Connection		not established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		neutral	
TIU Cab Status (Desk Status)		desk A&B closed	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order announced STM to HS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
2	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL)	Prof	establish BIU Connection	-	-	-
	The current state (CS) is reported to the BIU Function	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of BIU signals	-	-	ETCS	Prof	BIU Connection: Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)
3	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	Prof	establish TIU Connection	-	-	-
	The current state (CS) is reported to the TIU Function	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
	Transmit current status / availability of TIU signals	-	-	ETCS	Prof	TIU Connection: Message-ET1 (STM-139 - train interface inputs status / availability to STM)
4	Time: T0 + 8 seconds STM reports state HS in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state HS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)	-	-	-
2a1	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish BIU Connection - optional -
2a2	The current state (CS) is reported to the BIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	BIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
	Transmission of the BIU status / availability information to the STM	Prof	BIU Connection – if opened -: - Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)	-	-	-
		-	-	STM	Prof	BIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2b1	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish TIU Connection - optional -
2b2	The current state (CS) is reported to the TIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	TIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
	Transmission of the TIU status / availability information to the STM	Prof	TIU Connection – if opened -: - Message-ET1 (STM-139 - train interface inputs status / availability to STM)	-	-	-
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2c1	Connection to the ETCS On-board JRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish JRU Connection - optional -
2c2	The current state (CS) is reported to the JRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	JRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
		-	-	STM	Prof	JRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2d1	Connection to the ETCS On-board DRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DRU Connection - optional -
2d2	The current state (CS) is reported to the DRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
		-	-	STM	Prof	DRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2e1	STM reports state HS to the ETCS STM Control Function	-	-	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates

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Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	136	Brake Interface emergency and service brake status / availability to STM (STM-136)
L_PACKET	13	COMPUTED	packet length
M_BIEB_STATUS	2	2	emergency brake released
M_BISB_STATUS	2	2	service brake released
Padding bits	COMPUTED	COMPUTED	

Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	139	Train Interface inputs status / availability to STM (STM-139)
L_PACKET	13	COMPUTED	packet length
M_TITR_C_STATUS	2	2	no traction cut off

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Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
M_TIDIR_STATUS	2	2	neutral
M_TICAB_STATUS	2	2	cab A&B closed
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	HS	
ETCS Mode	Unchanged	
ETCS Level	Unchanged	
Train State	Unchanged	
Train Data	Unchanged	
Additional Data	Unchanged	
National Values	Unchanged	
STM Control Function Connection	Unchanged	
DMI Connection	Unchanged	

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Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	Unchanged	

Test case 3a.0.0.2.3.2

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board and the STM at a level transition announcement (announced by balise group), when the ETCS technical mode is SL (Sleeping) and no STM is currently in the state HS and the STM does not follow the state transition order to state HS in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (CS to HS, to FA), 7.4.1.2.3.4, 7.4.1.2.3 (A6, C16), 7.4.1.2.4, 7.4.1.6.1
	SUBSET-026 5.10.1.1
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) in the ETCS technical mode SL orders the STM to the state FA in case the STM does not report the state HS in due time after the ETCS On-board has sent the order to state HS.

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	not established	
Odometry Data	transmitted	

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Starting Conditions		Value	Comments
Reference Time Data		transmitted	
TIU Connection		not established	
BIU Connection		not established	
JRU Connection		not established	
Other connections		not established	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		Sleeping	
TIU Traction Cut Off Status		inactive	
TIU Direction Controller Position Status		neutral	
TIU Cab Status (Desk Status)		desk A&B closed	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions	Value	Comments
Track Adhesion	not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order announced STM to HS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
	Time: T0 + 10 seconds STM has not reported HS state in due time: order announced STM to FA state	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	Prof	close STM Control Connection

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)

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Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	not established	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	

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TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3a.0.0.3.2.1.2.0.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Announcement)
	Check the behaviour of the ETCS On-board and the STM at a level transition announcement (announced by balise group), when the ETCS technical mode is SL (Sleeping) and an STM, which is not announced by the balise group) is in the state HS and does not follow the state transition order to the state CS in due time. The announced STM follows the state transition orders in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to CS, to FA, CS to HS), 7.4.1.2.3.4, 7.4.1.2.3 (C4a, C16, A6), 7.4.1.2.4, 7.4.1.2.4.2, 7.4.1.6.1, 7.4.2.4.1, 7.4.2.4.2
	SUBSET-026 5.10.1.1
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-14, STM-15
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) in the ETCS technical mode SL orders an STM, which is in the state HS at a level transition announcement to another STM, to the state FA in case this STM does not follow the state transition order to the state CS and that the announced STM is ordered to the state HS after the STM, which was previously in the state HS, is regarded as to be in the state FA.

Starting Conditions	Value	Comments
STM State	CS	another STM shall be in state HS, no other STM in state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	

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Starting Conditions		Value	Comments
National Values		valid	
STM Control Function Connection		established	
DMI Connection		not established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		Sleeping	
TIU Traction Cut Off Status		inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition announcement for an ETCS -> STM transition: order STM in HS state to CS state Time: T0	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile, 41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM)
2	Time: T0 + 10 seconds The STM does not report CS state in due time: order STM in HS state to FA state	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
	Order the announced STM to HS state	-	-	ETCS	Prof	STM Control Connection: Message-EC3 (STM-14 - state order to STM)
5	Time: T0 + 13 seconds STM reports state HS in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S3 (STM-15 - state report from STM)	-	-	-

STM Test Case

Note: There are no requirements on the STM for the STM in HS state at the beginning of the test case and therefore there is not test case necessary for this part of the test case. In addition, it is not necessary to perform the activation of an STM (order to HS state), as this is already included e. g. in the test case Test case 3a.0.0.1.1.1.0.0.0.

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	2000	2000 m
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates

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Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: STM in HS at the beginning of the test case)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

Message-EC3 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

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Message-S3 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM (HERE: announced STM)
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	HS	another STM in state FA, no other STM in state DA
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	established	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	

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TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.1.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.2.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.2.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.2.3.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of handling of the STM max Speed and STM system Speed / Distance within the ETCS On-board (STM Control Function) during a level transition ETCS to STM.
ETCS Requirements Tested	SUBSET-035 7.4.2.2.3, 7.4.2.2.5, 7.4.2.2.1, 7.4.2.2.4
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-16, STM-17
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) is able to receive and process STM max Speed as well as STM system Speed / Distance from an STM in state HS during a level transition ETCS to STM.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	no STM max Speed and STM system Speed / Distance messages (Packet STM-16, STM-17) were transmitted by the STM after the current state change to state HS.
DMI Connection	established	

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Starting Conditions		Value	Comments
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	New MA and Static Speed Profile (constant is transmitted	BTM	Telegram-B1 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile) Telegram-B2	ETCS	DMI	The indication of the permitted speed and the target speed is "200 km/h"
2	No STM max Speed and STM system Speed / Distance is taken into account while calculating the MRSP	-	-	ETCS	DMI	The indication of the permitted speed, the target speed and the target distance in unchanged
3	"STM Max Speed" is received and processed (supervised) by the ETCS On-board	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM, STM-16 - transition variables STM max speed from STM)	ETCS	DMI	The indication of the target speed is set to "180 km/h" and the indication of the target distance is to the level transition border and the new profile is shown at the planning area
4	"STM System Speed / Distance" is received and processed (supervised) by the ETCS On-board Time: T0	Prof	STM Control Connection: Message-S3 (STM-15 - state report from STM, STM-17 - transition variables STM system speed and distance from STM)	ETCS	DMI	The indication of the target speed is set to "170 km/h" and the indication of the target distance is "100 m" before the level transition border and the new profile is shown at the planning area

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
5	Time: T0 + 10 seconds An update of "STM Max Speed" is received and processed by the ETCS On-board	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM, STM-16 - transition variables STM max speed from STM)	ETCS	DMI	The indication of the target speed is set to "60 km/h" and the indication of the target distance is to the level transition border and the updated profile is shown at the planning area
6	An update of "STM System Speed / Distance" is received and processed (supervised) by the ETCS On-board	Prof	STM Control Connection: Message-S4 (STM-15 - state report from STM, STM-17 - transition variables STM system speed and distance from STM)	ETCS	DMI	The indication of the target speed is set to "50 km/h" and the indication of the target distance is "100 m" before the level transition border and the updated profile is shown at the planning area

Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out

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Telegram-B1: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
N_ITER	5	0	only one section
L_ENDSECTION	15	32767	327.670 km
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates

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Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-S1: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	16	Transition variables STM max speed from STM (STM-16)
L_PACKET	13	COMPUTED	packet length
V_STMMAX	7	36	180 km/h
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	16	Transition variables STM max speed from STM (STM-16)
L_PACKET	13	COMPUTED	packet length
V_STMMAX	7	12	60 km/h
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM

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Message-S3: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	17	Transition variables STM system speed and distance from STM (STM-17)
L_PACKET	13	COMPUTED	packet length
V_STMSYS	7	34	170 km/h
D_STMSYS	15	10	100 m
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	17	Transition variables STM system speed and distance from STM (STM-17)
L_PACKET	13	COMPUTED	packet length
V_STMSYS	7	10	50 km/h
D_STMSYS	15	10	100 m
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	Unchanged	
ETCS Mode	Unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	

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DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.1.2.3.2.3.4.0

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.2.0. Therefore no test case is included here.

Test case 3b.1.2.3.2.3.5.1

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.2.4.0

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.2.0. Therefore no test case is included here.

Test case 3b.1.2.3.2.5.1

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.3.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.2.3.4.0

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.2.0. Therefore no test case is included here.

Test case 3b.1.2.3.5.1

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.3.1. Therefore no test case is included here.

Test case 3b.1.2.4.0

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.2.0. Therefore no test case is included here.

Test case 3b.1.2.5.1

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.3.1. Therefore no test case is included here.

Test case 3b.1.3.1

Note: This test case is included in Test case 3b.1.2.3.2.3.1. Therefore no test case is included here.

Test case 3b.1.4.0

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.2.0. Therefore no test case is included here.

Test case 3b.1.5.1

Note: This test case shall be performed by performing Test case 3b.1.2.3.2.3.1 before Test case 3b.3.1. Therefore no test case is included here.

Test case 3b.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Area between announcement and transition)
	Check of the handling of an STM that fails after the STM reported state HS.
ETCS Requirements Tested	SUBSET-035 7.4.2.2.2
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15
Comments and constraints	The objective of this test is to check that the ETCS STM Control Function considers the STM Max Speed to be "0" when an STM that has reported state HS sends a state report with a new state FA.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	FS	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	
Odometry Data	transmitted	
Reference Time Data	transmitted	
TIU Connection	not relevant	
BIU Connection	not relevant	

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Starting Conditions		Value	Comments
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

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ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	"STM Max Speed" is set to "0" when a state report with a new state FA is received from an STM which was previously in state HS	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	ETCS	DMI	The indication of the target speed (at the transition border) is set to "0 km/h"
		Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

Message-S1: STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	

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BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

Test case 3b.3.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is FS.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", FS), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	FS	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	

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Starting Conditions		Value	Comments
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	

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TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.4.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is SR.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", SR), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	SR	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	

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TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.5.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is OS.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", OS), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	OS	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	

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TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.6.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is NL.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", NL), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	NL	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	

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TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.7.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is UN.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", UN), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	UN	
ETCS Level	0	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	

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TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3b.8.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (area between announcement and transition)
	Check of the ability of the ETCS DMI function to receive preliminary DMI requests during a level transition ETCS to STM while the ETCS Technical Mode is TR or PT.
ETCS Requirements Tested	SUBSET-035 5.2.10.1 ("DMI preliminary requests", TR/PT), 10.5.2.6
	SUBSET-026 none
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-15, STM-32, STM-35, STM-38, STM-39, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS DMI function is able to receive preliminary DMI requests from an STM in state HS to be prepared for the level transition. The ETCS DMI function may use this information or not, but it has to be able to receive this information.
	Note: The STM shall send all information to the ETCS DMI function, when changing to state DA. This is not checked in this test case.

Starting Conditions	Value	Comments
STM State	HS	
ETCS Mode	TR	
ETCS Level	1	
Train State	not relevant	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not relevant	
BIU Connection		not relevant	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		not relevant	
TIU Direction Controller Position Status		not relevant	
TIU Cab Status (Desk Status)		not relevant	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		not relevant	
BIU Service Brake Status		not relevant	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
2	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
3	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-
4	Driver acknowledges Train Trip at standstill	ODO	Standstill	ETCS	DMI	the driver is requested to acknowledge the train trip situation
		DMI	Driver acknowledges Train Trip	ETCS	Prof	STM Control Connection: Message-EC1 (STM-5 - ETCS status data)
		-	-	ETCS	DMI	requested to acknowledge the train trip situation is removed
5	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (button and indicator request)	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
6	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (text message with / without acknowledgement)	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message)	ETCS	-	-
7	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	-	-

Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	

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Message-S1: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	33	
X_TEXT(1)	8	'B'	
X_TEXT(2)	8	'A'	
X_TEXT(3)	8	'L'	
X_TEXT(4)	8	'I'	
X_TEXT(5)	8	'S'	
X_TEXT(6)	8	'E'	
X_TEXT(7)	8	'S'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'A'	
X_TEXT(10)	8	'R'	
X_TEXT(11)	8	'E'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'I'	
X_TEXT(14)	8	'N'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(15)	8	'N'	
X_TEXT(16)	8	'O'	
X_TEXT(17)	8	'C'	
X_TEXT(18)	8	'E'	
X_TEXT(19)	8	'N'	
X_TEXT(20)	8	'T'	
X_TEXT(21)	8	' '	
X_TEXT(22)	8	'Y'	
X_TEXT(23)	8	'E'	
X_TEXT(24)	8	'L'	
X_TEXT(25)	8	'L'	
X_TEXT(26)	8	'O'	
X_TEXT(27)	8	'W'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'B'	
X_TEXT(30)	8	'O'	
X_TEXT(31)	8	'X'	
X_TEXT(32)	8	'E'	
X_TEXT(33)	8	'S'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	39	Delete Text Message (STM-39)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	2	
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	2	Level 1
M_MODE	4	8	PT (Post Trip)
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	PT	
ETCS Level	unchanged	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	

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TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

Test case 3c.1.0.1.0.1.3.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is not in the ETCS technical mode NL (Non-Leading) or SL (Sleeping): ETCS On-board orders the STM to state DA and supervises the “STM Max Speed”. The STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA), 7.4.1.1.12, 7.4.1.2.3 (A9), 7.4.1.2.4, 7.4.2.3.1, 7.4.2.3.2, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (HS to DA), 7.3.2.2.1 (9), 7.3.4.4
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	<p>The objective of this test is to check</p> <ul style="list-style-type: none"> that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed and switches to the ETCS level STM, and the supervision of “STM Max Speed” after the transition border until the state DA is reported by the STM, and that the STM follows a state transition order to the state DA. <p>Note: With a test equipment that simulates the behaviour of a real train or locomotive (“Reference On Board Equipment Test Architecture”, see SUBSET-094-0, ERTMS / ETCS - Class 1 UNISIG Functional Requirements for an on board Reference Test Facility), it is not possible to test the supervision of the STM max speed in the supervision gap (from the deactivation of ETCS supervision until the STM reports the state DA) by passing the level transition border at a speed which does not lead to an emergency brake application, because it is not possible to accelerate the train from a speed that does not lead to an emergency brake to a speed which leads to the emergency brake application within 5 seconds when the traction cut-off and service brake application is respected by the test</p>

	equipment.
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Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	train speed shall be 100 km/h
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	may be not established for STM Test Case (STM implementation)
Odometry Data	transmitted	
Reference Time Data	transmitted	
TIU Connection	established	may be not established for STM Test Case (STM implementation)
BIU Connection	established	may be not established for STM Test Case (STM implementation)
JRU Connection	not relevant	
Other connections	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Command	not relevant	
TIU Eddy Current Brake Command	not relevant	
TIU Inhibit Passenger Emergency Brake Command	not relevant	
TIU Pantograph Command	not relevant	
TIU Air Tightness Command	not relevant	
TIU Main Switch / Circuit Breaker Command	not relevant	
TIU Traction Cut Off Command	not relevant	
TIU Sleeping Status	not Sleeping	
TIU Traction Cut Off Status	Inactive	
TIU Direction Controller Position Status	forward	
TIU Cab Status (Desk Status)	desk A opened	
BIU Status	not relevant	

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Starting Conditions		Value	Comments
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
-	Initial Condition: It shall be possible to release an emergency brake application while the train is moving (national value Q_NVEMRRLS)	BTM	Telegram-B1 (3 – National Values) Telegram-B2	-	-	-
-	Initial Condition: The ETCS On-board shall have an MA which leads to a supervision of 200 km/h	BTM	Telegram-B3 (12 - Level 1 Movement Authority, 21 - Gradient Profile, 27 - International Static Speed Profile) Telegram-B2	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
-	Initial Condition: "STM Max Speed" (60 km/h) is transmitted to the ETCS On-board Note: This message shall be sent directly before the level transition border (see Step 1).	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM, STM-16 - transition variables STM max speed from STM)	-	-	-
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B4 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
	An emergency brake has to be applied due to the "STM Max Speed" of 60 km/h and the actual speed of 100 km/h	-	-	ETCS	BIU	emergency brake applied
		-	-	ETCS	DMI	indication of an emergency brake application
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed-
3	Time: T0 + 3 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	ETCS	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
	The emergency brake has to be released as the STM has reported DA state			ETCS	BIU	no emergency brake applied
		-	-	ETCS	DMI	no indication of an emergency brake application

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
4	Time: T0 + 4 seconds STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S5 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA and follows state transition order in due time	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)
		-	-	STM	Prof	BIU Connection: Message-S2 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: Message-S2 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	JRU Connection: Message-S2 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	DRU Connection: Message-S2 (STM-15 - state report from STM) - if opened -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
		-	-	STM	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM) - if opened -
	The STM takes the train supervision according to the national system behaviour	-	-	STM	Prof	BIU Connection: The STM may send a message with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM) - if opened -
		-	-	STM	Prof	DMI Connection: The STM may send a message or messages with packet STM-32 - button request, STM-35 - indicator request, STM-38 – text message, STM-43 - national ETCS DMI, STM-46 – sound command (including packet STM-15 – state report from STM) - if opened -

Telegram-B1: Balise-Information (National Values)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group

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Telegram-B1: Balise-Information (National Values)

VARIABLE	Length	VALUE	COMMENTS
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	3	Packet 3 – National Values
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_VALIDNV	15	0	the national values shall be valid direct after reception
N_ITER	5	0	no national area(s)
V_NVSHUNT	7	6	30 km/h (default value)
V_NVSTFF	7	8	40 km/h (default value)
V_NVONSIGHT	7	6	30 km/h (default value)
V_NVUNFIT	7	20	100 km/h (default value)
V_NVREL	7	8	40 km/h (default value)
D_NVROLL	15	2	2 m (default value)
Q_NVSRBKTRG	1	1	yes (default value)
Q_NVEMRRLS	1	1	immediate release possible
V_NVALLOWOVTRP	7	0	0 km/h (default value)
V_NVSUPOVTRP	7	6	30 km/h (default value)
D_NVOVTRP	15	200	200 m (default value)
T_NVOVTRP	8	60	60 s (default value)
D_NVPOTRP	15	200	200 m (default value)
M_NVCONTACT	2	10B	no reaction (default value)
T_NVCONTACT	8	255	∞ (default value)
M_NVDERUN	1	1	yes (default value)
D_NVSTFF	15	32767	∞ (default value)
Q_NVDRIVER_ADHES	1	0	not allowed (default value)
NID_PACKET	8	11111111	Packet 255 – End of information

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Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B3: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	12	Packet 12 - Level 1 Movement Authority
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
V_MAIN	7	40	200 km/h
V_LOA	7	40	200 km/h
T_LOA	10	1023	no time out
N_ITER	5	0	only one section
L_ENDSECTION	15	1000	10 km

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Telegram-B3: Balise-Information (L1 MA, Gradient Profile, International Speed Profile)			
VARIABLE	Length	VALUE	COMMENTS
Q_SECTIONTIMER	1	0	
Q_ENDTIMER	1	0	
Q_DANGERPOINT	1	0	
Q_OVERLAP	1	0	
NID_PACKET	8	21	Packet 21 – Gradient Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_GRADIENT	15	0	0 m
Q_GDIR	1	0	downhill
G_A	8	0	0‰
N_ITER	5	0	only one gradient
NID_PACKET	8	27	Packet 27 – International Static Speed Profile
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	2	10 m
D_STATIC	15	0	0 m
V_STATIC	7	40	200 km/h
Q_FRONT	1	1	no train length delay
N_ITER	5	0	
N_ITER	5	0	
NID_PACKET	8	11111111	Packet 255 – End of information

Message-S1: STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	16	Transition variables STM max speed from STM (STM-16)
L_PACKET	13	COMPUTED	packet length
V_STMMAX	7	12	60 km/h

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Message-S1: STM → ETCS STM Control Function

VARIABLE	Length	VALUE	COMMENTS
Padding bits	COMPUTED	COMPUTED	

Telegram-B4: Balise-Information (Level Transition Order)

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	changed	Q_NVEMRRLS is set to “immediate release possible”
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	

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TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

Test case 3c.1.0.2.1.3.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is not in the ETCS technical mode NL (Non-Leading) or SL (Sleeping) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA), 7.4.1.1.12, 7.4.1.2.3 (A9), 7.4.1.2.4, 7.4.2.3.1, 7.4.2.3.2, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	<p>The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed and switches to the ETCS level STM.</p> <p>The objective of this test is also to check that the STM follows a state transition order to the state DA.</p>

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	
Odometry Data	transmitted	

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Starting Conditions		Value	Comments
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions	Value	Comments
Track Adhesion	not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed-
3	Time: T0 + 2 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
4	Time: T0 + 4 seconds STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S3 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Note: The STM test case for this test case is the same as included in Test case 3c.1.0.1.0.1.3.0.0. Therefore no test case is included here.

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	39	
X_TEXT(1)	8	'P'	
X_TEXT(2)	8	'a'	
X_TEXT(3)	8	'c'	
X_TEXT(4)	8	'k'	
X_TEXT(5)	8	' '	
X_TEXT(6)	8	'm'	
X_TEXT(7)	8	'y'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'b'	
X_TEXT(10)	8	'o'	
X_TEXT(11)	8	'x'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'w'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(14)	8	'i'	
X_TEXT(15)	8	't'	
X_TEXT(16)	8	'h'	
X_TEXT(17)	8	' '	
X_TEXT(18)	8	'f'	
X_TEXT(19)	8	'i'	
X_TEXT(20)	8	'v'	
X_TEXT(21)	8	'e'	
X_TEXT(22)	8	' '	
X_TEXT(23)	8	'd'	
X_TEXT(24)	8	'o'	
X_TEXT(25)	8	'z'	
X_TEXT(26)	8	'e'	
X_TEXT(27)	8	'n'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'l'	
X_TEXT(30)	8	'i'	
X_TEXT(31)	8	'q'	
X_TEXT(32)	8	'u'	
X_TEXT(33)	8	'o'	
X_TEXT(34)	8	'r'	
X_TEXT(35)	8	' '	
X_TEXT(36)	8	'j'	
X_TEXT(37)	8	'u'	
X_TEXT(38)	8	'g'	
X_TEXT(39)	8	's'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	Unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	

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TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.2.2.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is in the ETCS technical mode SL (Sleeping) and the STM does not follow the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA, to FA), 7.4.1.1.12, 7.4.1.2.3 (A9, D16), 7.4.1.2.4, 7.4.1.6.1
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed while the ETCS technical mode is SL and switches to the ETCS level STM even in case the STM does not follow the state transition order in due time.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	not established	
Odometry Data	transmitted	

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Starting Conditions		Value	Comments
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions	Value	Comments
Track Adhesion	not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
2	Time: T0 + 5 seconds STM does not report state DA in due time	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	5	SL (Sleeping)
Padding bits	COMPUTED	COMPUTED	

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Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	Message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	SL	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	

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TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.2.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is not in the ETCS technical mode NL (Non-Leading) or SL (Sleeping) and the STM does not follow the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA, to FA), 7.4.1.1.12, 7.4.1.2.3 (A9, D16), 7.4.1.2.4, 7.4.1.3.6, 7.4.1.4, 7.4.1.6.1
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed and switches to the ETCS level STM even in case the STM does not follow the state transition order in due time. In this case the ETCS will also apply the safe action because the active STM does not report DA state.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	

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Starting Conditions		Value	Comments
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed
3	Time: T0 + 5 seconds STM does not report state DA in due time	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the failed STM
		-	-	ETCS	BIU / DMI	ETCS takes the safe action, i. e. command brake application.

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	Message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	

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TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

Test case 3c.1.0.3.1.1

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is in the ETCS technical mode SL (Sleeping) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA), 7.4.1.1.12, 7.4.1.2.3 (A9), 7.4.1.2.4
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (HS to DA), 7.3.2.2.1 (9), 7.3.4.4
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed while the ETCS technical mode is SL and switches to the ETCS level STM.
	The objective of this test is also to check that the STM follows a state transition order to the state DA.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		not established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	may be not established for STM Test Case (STM implementation)
BIU Connection		established	may be not established for STM Test Case (STM implementation)
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
2	Time: T0 + 1 second STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
	STM reports state DA to all connected ETCS Functions	-	-	STM	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)
		-	-	STM	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	JRU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	DRU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
	The STM takes the train supervision according to the national system behaviour.	-	-	STM	Prof	BIU Connection: The STM may send a message or messages with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM) - if opened -

Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	5	SL (Sleeping)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	unchanged	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	

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Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.3.1.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is in the ETCS technical mode NL (Non-Leading) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.2.2 (HS to DA), 7.4.1.1.12, 7.4.1.2.3 (A9), 7.4.1.2.4, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (HS to DA), 7.3.2.2.1 (9), 7.3.4.4
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed while the ETCS technical mode is NL and switches to the ETCS level STM.
	The objective of this test is also to check that the STM follows a state transition order to the state DA.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	NL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	may be not established for STM Test Case (STM implementation)
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	may be not established for STM Test Case (STM implementation)
BIU Connection		established	may be not established for STM Test Case (STM implementation)
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed-
3	Time: T0 + 2 second STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
4	Time: T0 + 1 second STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S3 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	-	-	-
	STM reports state DA to all connected ETCS Functions	-	-	STM	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)
		-	-	STM	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	JRU Connection: Message-S1 (STM-15 - state report from STM) - if opened -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
		-	-	STM	Prof	DRU Connection: Message-S1 (STM-15 - state report from STM) - if opened -
		-	-	STM	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM) - if opened -
	The STM takes the train supervision according to the national system behaviour.	-	-	STM	Prof	BIU Connection: The STM may send a message or messages with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM) - if opened -
		-	-	STM	Prof	TIU Connection: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM) - if opened -
		-	-	STM	Prof	DMI Connection: The STM may send a message or messages with packet STM-32 - button request, STM-35 - indicator request, STM-38 – text message, STM-43 - national ETCS DMI, STM-46 – sound command (including packet STM-15 – state report from STM)

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	11	NL (Non-Leading)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	39	
X_TEXT(1)	8	'P'	
X_TEXT(2)	8	'a'	
X_TEXT(3)	8	'c'	
X_TEXT(4)	8	'k'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(5)	8	' '	
X_TEXT(6)	8	'm'	
X_TEXT(7)	8	'y'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'b'	
X_TEXT(10)	8	'o'	
X_TEXT(11)	8	'x'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'w'	
X_TEXT(14)	8	'i'	
X_TEXT(15)	8	't'	
X_TEXT(16)	8	'h'	
X_TEXT(17)	8	' '	
X_TEXT(18)	8	'f'	
X_TEXT(19)	8	'i'	
X_TEXT(20)	8	'v'	
X_TEXT(21)	8	'e'	
X_TEXT(22)	8	' '	
X_TEXT(23)	8	'd'	
X_TEXT(24)	8	'o'	
X_TEXT(25)	8	'z'	
X_TEXT(26)	8	'e'	
X_TEXT(27)	8	'n'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'l'	
X_TEXT(30)	8	'i'	
X_TEXT(31)	8	'q'	
X_TEXT(32)	8	'u'	
X_TEXT(33)	8	'o'	
X_TEXT(34)	8	'r'	
X_TEXT(35)	8	' '	
X_TEXT(36)	8	'j'	
X_TEXT(37)	8	'u'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(38)	8	'g'	
X_TEXT(39)	8	's'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	unchanged	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	

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TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.4.1.3.0.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group), when the ETCS On-board is in the ETCS technical mode TR (Trip) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (HS to DA), 7.4.1.2.3 (B9), 7.4.1.2.4, 7.4.2.3.1, 7.4.2.3.2, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed while the ETCS technical mode is TR and switches to the ETCS level STM.
	The objective of this test is also to check that the STM follows a state transition order to the state DA.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	TR	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		established	
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	-	-	-
2	Driver acknowledges Train Trip at standstill	ODO	Standstill	ETCS	DMI	the driver is requested to acknowledge the train trip situation
	Time: T0	DMI	Driver acknowledges Train Trip	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	requested to acknowledge the train trip situation is removed
		-	-	ETCS	DMI	transition acknowledgement request is displayed
3	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed
4	Time: T0 + 2 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
5	Time: T0 + 2 seconds STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S2 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S3 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Note: The STM test case for this test case is the same as included in Test case 3c.1.0.1.0.1.3.0.0. Therefore no test case is included here.

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	

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Message-S2: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	39	
X_TEXT(1)	8	'P'	
X_TEXT(2)	8	'a'	
X_TEXT(3)	8	'c'	
X_TEXT(4)	8	'k'	
X_TEXT(5)	8	' '	
X_TEXT(6)	8	'm'	
X_TEXT(7)	8	'y'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'b'	
X_TEXT(10)	8	'o'	
X_TEXT(11)	8	'x'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'w'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(14)	8	'i'	
X_TEXT(15)	8	't'	
X_TEXT(16)	8	'h'	
X_TEXT(17)	8	' '	
X_TEXT(18)	8	'f'	
X_TEXT(19)	8	'i'	
X_TEXT(20)	8	'v'	
X_TEXT(21)	8	'e'	
X_TEXT(22)	8	' '	
X_TEXT(23)	8	'd'	
X_TEXT(24)	8	'o'	
X_TEXT(25)	8	'z'	
X_TEXT(26)	8	'e'	
X_TEXT(27)	8	'n'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'l'	
X_TEXT(30)	8	'i'	
X_TEXT(31)	8	'q'	
X_TEXT(32)	8	'u'	
X_TEXT(33)	8	'o'	
X_TEXT(34)	8	'r'	
X_TEXT(35)	8	' '	
X_TEXT(36)	8	'j'	
X_TEXT(37)	8	'u'	
X_TEXT(38)	8	'g'	
X_TEXT(39)	8	's'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	'T'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	6	state HS
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	

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TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.4.2.0.1.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (transmitted by balise group) with no announcement of the transition, when the ETCS On-board is in the ETCS technical mode TR (Trip) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (CS to DA), 7.4.1.2.3 (B9), 7.4.1.2.4, 10.5.2.8, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (CS to DA), 7.3.2.2.1 (9), 7.3.4.4, 7.6.1.5
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	<p>The objective of this test is to check</p> <ul style="list-style-type: none"> that the ETCS On-board (STM Control Function) orders the STM to the state DA when, without receiving an announcement, a level transition border to this STM is passed while the ETCS technical mode is TR and switches to the ETCS level STM, and that the STM follows a state transition order to the state DA. <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	TR	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	

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Starting Conditions		Value	Comments
National Values		valid	
STM Control Function Connection		established	
DMI Connection		not established	may be established for STM Test Case (STM implementation)
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not established	may be established for STM Test Case (STM implementation)
BIU Connection		not established	may be established for STM Test Case (STM implementation)
JRU Connection		not established	may be established for STM Test Case (STM implementation)
Other connections		not established	may be established for STM Test Case (STM implementation)
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not cut	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	-	-	-
2	Driver acknowledges Train Trip at standstill	ODO	Standstill	ETCS	DMI	the driver is requested to acknowledge the train trip situation
	ETCS orders the announced STM to DA state Time: T0	DMI	Driver acknowledges Train Trip	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	requested to acknowledge the train trip situation is removed
		-	-	ETCS	DMI	transition acknowledgement request displayed
3	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed
4	Time: T0 + 2 seconds Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	Prof	establish BIU Connection	-	-	-
	The current state (CS) is reported to the BIU Function	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
	Transmit current status / availability of BIU signals	-	-	ETCS	Prof	BIU Connection: Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)
	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	Prof	establish TIU Connection	-	-	-
	The current state (CS) is reported to the TIU Function	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of TIU signals	-	-	ETCS	Prof	TIU Connection: Message-ET1 (STM-139 - train interface inputs status / availability to STM)
	Connection to the ETCS On-board DMI Function (cab A) is established by the STM (SLL/STL/Application Layer)	Prof	establish DMI Connection (cab A)	-	-	-
	The current state (CS) is reported to the DMI Function	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current select language	-	-	ETCS	Prof	DMI Connection: Message-ED1 (STM-30 - driver language transmission)
5	Time: T0 + 3 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
6	Time: T0 + 4 seconds STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S5 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	-	-	-
2a1	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish BIU Connection - optional -
2a2	The current state (CS) is reported to the BIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	BIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if “2f1” is not yet performed -
	Transmission of the BIU status / availability information to the STM	Prof	BIU Connection – if opened -: - Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
		-	-	STM	Prof	BIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2a3	The STM takes the train supervision according to the national system behaviour.	-	-	STM	Prof	BIU Connection - if opened -: The STM may send a message or messages with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM)
2b1	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish TIU Connection - optional -
2b2	The current state (CS) is reported to the TIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	TIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if “2f1” is not yet performed -
	Transmission of the TIU status / availability information to the STM	Prof	TIU Connection – if opened -: - Message-ET1 (STM-139 - train interface inputs status / availability to STM)	-	-	-
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2b3	The STM takes the train supervision according to the national system behaviour	-	-	STM	Prof	TIU Connection - if opened -: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2c1	Connection to the ETCS On-board JRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish JRU Connection - optional -
2c2	The current state (CS) is reported to the JRU Function(only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	JRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2d1	Connection to the ETCS On-board DRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DRU Connection - optional -
2d2	The current state (CS) is reported to the DRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		-	-	STM	Prof	DRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2e1	Connection to the ETCS On-board DMI Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DMI (cab A) Connection - optional -
2e2	The current state (CS) is reported to the DMI Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DMI Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		Prof	DMI Connection – if opened -: - Message-ED1 (STM-30 - driver language transmission)	-	-	-
		-	-	STM	Prof	DMI Connection - if opened -: Message-S2 (STM-15 - state report from STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2e3	The STM takes the train supervision according to the national system behaviour	-	-	STM	Prof	DMI Connection - if opened -: The STM may send a message or messages with packet STM-32 - button request, STM-35 - indicator request, STM-38 – text message, STM-43 - national ETCS DMI, STM-46 – sound command (including packet STM-15 – state report from STM)
2f1	STM reports state DA to the ETCS STM Control Function	-	-	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	136	Brake Interface emergency and service brake status / availability to STM (STM-136)
L_PACKET	13	COMPUTED	packet length
M_BIEB_STATUS	2	2	emergency brake released
M_BISB_STATUS	2	2	service brake released
Padding bits	COMPUTED	COMPUTED	

Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	139	Train Interface inputs status / availability to STM (STM-139)
L_PACKET	13	COMPUTED	packet length
M_TITR_C_STATUS	2	2	no traction cut off
M_TIDIR_STATUS	2	1	forward
M_TICAB_STATUS	2	1	cab A opened
Padding bits	COMPUTED	COMPUTED	

Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length

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Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	30	Driver language transmission (STM-30)
L_PACKET	13	COMPUTED	packet length
NID_DRV_LANG	2	en	English
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	39	
X_TEXT(1)	8	'P'	
X_TEXT(2)	8	'a'	
X_TEXT(3)	8	'c'	
X_TEXT(4)	8	'k'	
X_TEXT(5)	8	' '	
X_TEXT(6)	8	'm'	
X_TEXT(7)	8	'y'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'b'	
X_TEXT(10)	8	'o'	
X_TEXT(11)	8	'x'	

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'w'	
X_TEXT(14)	8	'i'	
X_TEXT(15)	8	't'	
X_TEXT(16)	8	'h'	
X_TEXT(17)	8	' '	
X_TEXT(18)	8	'f'	
X_TEXT(19)	8	'i'	
X_TEXT(20)	8	'v'	
X_TEXT(21)	8	'e'	
X_TEXT(22)	8	' '	
X_TEXT(23)	8	'd'	
X_TEXT(24)	8	'o'	
X_TEXT(25)	8	'z'	
X_TEXT(26)	8	'e'	
X_TEXT(27)	8	'n'	
X_TEXT(28)	8	' '	
X_TEXT(29)	8	'l'	
X_TEXT(30)	8	'i'	
X_TEXT(31)	8	'q'	
X_TEXT(32)	8	'u'	
X_TEXT(33)	8	'o'	
X_TEXT(34)	8	'r'	
X_TEXT(35)	8	' '	
X_TEXT(36)	8	'j'	
X_TEXT(37)	8	'u'	
X_TEXT(38)	8	'g'	
X_TEXT(39)	8	's'	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_TEXT	8	5	
X_TEXT(1)	8	'T'	
X_TEXT(2)	8	'R'	
X_TEXT(3)	8	'U'	
X_TEXT(4)	8	'E'	
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-S5: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
NID_PACKET	8	43	National ETCS DMI (STM-43)
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	

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Message-S5: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	Unchanged	
Train Data	Unchanged	
Additional Data	Unchanged	
National Values	Unchanged	
STM Control Function Connection	Unchanged	
DMI Connection	Established	may be not established for STM Test Case (STM implementation)
Odometry Data	Unchanged	
Reference Time Data	unchanged	
TIU Connection	established	may be not established for STM Test Case (STM implementation)
BIU Connection	established	may be not established for STM Test Case (STM implementation)
JRU Connection	unchanged	may be changed for STM Test Case (STM implementation)
Other connections	unchanged	may be changed for STM Test Case (STM implementation)
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	

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TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.4.3.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (transmitted by balise group), when the ETCS On-board is in the ETCS technical mode TR (Trip) and the STM does not follow the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (HS to DA, to FA), 7.4.1.2.3 (B9, D16), 7.4.1.2.4, 7.4.1.3.6, 7.4.1.4, 7.4.1.6.1
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM to the state DA when a level transition border to this STM is passed and switches to the ETCS level STM even in case the STM does not follow the state transition order in due time. In this case the ETCS will also apply the safe action because the active STM does not report DA state.

Starting Conditions	Value	Comments
STM State	HS	no other STM in state HS or state DA
ETCS Mode	TR	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	

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Starting Conditions		Value	Comments
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	-	-	-
2	Driver acknowledges Train Trip at standstill	ODO	Standstill	ETCS	DMI	the driver is requested to acknowledge the train trip situation
	Time: T0	DMI	Driver acknowledges Train Trip	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	requested to acknowledge the train trip situation is removed
		-	-	ETCS	DMI	transition acknowledgement request displayed
3	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed
4	Time: T0 + 5 seconds STM does not report state DA in due time	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the failed STM
		-	-	ETCS	BIU / DMI	ETCS takes the safe action, i. e. command brake application.

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	Linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in CS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked

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Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in CS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	Message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	

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National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.5.1.0.1.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (transmitted by balise group) with no announcement of the transition, and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (CS to DA), 7.4.1.2.3 (F9), 7.4.1.2.4, 10.5.2.8, 10.5.3.5
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (CS to DA), 7.3.2.2.1 (9), 7.3.4.4, 7.6.1.5
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15, STM-32, STM-35, STM-38, STM-43, STM-46
Comments and constraints	<p>The objective of this test is to check</p> <ul style="list-style-type: none"> that the ETCS On-board (STM Control Function) orders the STM to the state DA when, without receiving an announcement, a level transition border to this STM is passed, and switches to the ETCS level STM, and that the STM follows a state transition order to the state DA. <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	

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Starting Conditions		Value	Comments
DMI Connection		not established	may be established for STM Test Case (STM implementation)
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not established	may be established for STM Test Case (STM implementation)
BIU Connection		not established	may be established for STM Test Case (STM implementation)
JRU Connection		not established	may be established for STM Test Case (STM implementation)
Other connections		not established	may be established for STM Test Case (STM implementation)
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not cut	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order the announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed
3	Time: T0 + 2 seconds Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	Prof	Establish BIU Connection	-	-	-
	The current state (CS) is reported to the BIU Function	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of BIU signals	-	-	ETCS	Prof	BIU Connection: Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)
	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	Prof	Establish TIU Connection	-	-	-
	The current state (CS) is reported to the TIU Function	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
	Transmit current status / availability of TIU signals	-	-	ETCS	Prof	TIU Connection: Message-ET1 (STM-139 - train interface inputs status / availability to STM)
	Connection to the ETCS On-board DMI Function (cab A) is established by the STM (SLL/STL/Application Layer)	Prof	Establish DMI Connection (cab A)	-	-	-
	The current state (CS) is reported to the DMI Function	Prof	DMI Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current select language	-	-	ETCS	Prof	DMI Connection: Message-ED1 (STM-30 - driver language transmission)
4	Time: T0 + 3 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	DMI Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
5	Time: T0 + 4 seconds STM sends the information to be displayed at the DMI	Prof	DMI Connection: Message-S3 (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request) DMI Connection: Message-S4 (STM-15 - state report from STM, STM-38 – text message, STM-38 – text message) DMI Connection: Message-S5 (STM-15 - state report from STM, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS	DMI	transmitted information is displayed at the DMI

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	-	-	-
2a1	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish BIU Connection - optional -
2a2	The current state (CS) is reported to the BIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	BIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
	Transmission of the BIU status / availability information to the STM	Prof	BIU Connection – if opened -: - Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)	-	-	-
		-	-	STM	Prof	BIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2a3	The STM takes the train supervision according to the national system behaviour.	-	-	STM	Prof	BIU Connection - if opened -: The STM may send a message or messages with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM)
2b1	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish TIU Connection - optional -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2b2	The current state (CS) is reported to the TIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	TIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
	Transmission of the TIU status / availability information to the STM	Prof	TIU Connection – if opened -: - Message-ET1 (STM-139 - train interface inputs status / availability to STM)	-	-	-
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2b3	The STM takes the train supervision according to the national system behaviour	-	-	STM	Prof	TIU Connection - if opened -: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM) - optional -
2c1	Connection to the ETCS On-board JRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish JRU Connection - optional -
2c2	The current state (CS) is reported to the JRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	JRU Connection: Message-S1 (STM-15 - state report from STM) - if opened - - only if "2f1" is not yet performed -
		-	-	STM	Prof	JRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2d1	Connection to the ETCS On-board DRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DRU Connection - optional -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2d2	The current state (CS) is reported to the DRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		-	-	STM	Prof	DRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2e1	Connection to the ETCS On-board DMI Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DMI (cab A) Connection - optional -
2e2	The current state (CS) is reported to the DMI Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DMI Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2f1" is not yet performed -
		Prof	DMI Connection – if opened -: - Message-ED1 (STM-30 - driver language transmission)	-	-	-
		-	-	STM	Prof	DMI Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2e3		-	-	STM	Prof	DMI Connection - if opened -: The STM may send a message or messages with packet STM-32 - button request, STM-35 - indicator request, STM-38 – text message, STM-43 - national ETCS DMI, STM-46 – sound command (including packet STM-15 – state report from STM)
2f1	STM reports state DA to the ETCS STM Control Function	-	-	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked

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Telegram-B2: Balise-Information			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	136	Brake Interface emergency and service brake status / availability to STM (STM-136)
L_PACKET	13	COMPUTED	packet length
M_BIEB_STATUS	2	2	emergency brake released

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Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
M_BISB_STATUS	2	2	service brake released
Padding bits	COMPUTED	COMPUTED	

Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	139	Train Interface inputs status / availability to STM (STM-139)
L_PACKET	13	COMPUTED	packet length
M_TITR_C_STATUS	2	2	no traction cut off
M_TIDIR_STATUS	2	1	forward
M_TICAB_STATUS	2	1	cab A opened
Padding bits	COMPUTED	COMPUTED	

Message-ED1 (driver language transmission): ETCS DMI Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	30	Driver language transmission (STM-30)
L_PACKET	13	COMPUTED	packet length
NID_DRV_LANG	2	en	English
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
NID_PACKET	8	32	Button Request (STM-32)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	2	request for 2 buttons
NID_STM(1)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	4	1	
NID_ICON(1)	8	1	
M_BUT_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	9	
X_CAPTION(1,1)	8	'A'	
X_CAPTION(1,2)	8	'T'	
X_CAPTION(1,3)	8	'T'	
X_CAPTION(1,4)	8	'E'	
X_CAPTION(1,5)	8	'N'	
X_CAPTION(1,6)	8	'T'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	
X_CAPTION(1,9)	8	'N'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_BUTTON(2)	8	2	
NID_BUTPOS(2)	4	3	
NID_ICON(2)	8	1	
M_BUT_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	4	
X_CAPTION(2,1)	8	'H'	
X_CAPTION(2,2)	8	'E'	
X_CAPTION(2,3)	8	'L'	
X_CAPTION(2,4)	8	'P'	

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Message-S3: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	35	Indicator Request (STM-35)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	3	request for 3 indicators
NID_STM(1)	8	COMPUTED	any valid value for NID_STM
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	4	1	
NID_ICON(1)	8	3	
M_IND_ATTRIB(1)	10	1000000001B	white text on black background, not flashing
L_CAPTION(1)	5	1	
X_CAPTION(1,1)	8	'A'	
NID_STM(2)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(2)	8	2	
NID_INDPOS(2)	4	2	
NID_ICON(2)	8	3	
M_IND_ATTRIB(2)	10	1000000001B	white text on black background, not flashing
L_CAPTION(2)	5	1	
X_CAPTION(2,1)	8	'B'	
NID_STM(3)	8	FINITE VALUE	any valid value for NID_STM
NID_INDICATOR(3)	8	3	
NID_INDPOS(3)	4	3	
NID_ICON(3)	8	1	
M_IND_ATTRIB(3)	10	1000000001B	white text on black background, not flashing
L_CAPTION(3)	5	1	
X_CAPTION(3,1)	8	'C'	
Padding bits	COMPUTED	COMPUTED	

Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	COMPUTED	packet length
NID_XMESSAGE	8	1	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	0	no acknowledgement required
L_TEXT	8	39	
X_TEXT(1)	8	'P'	
X_TEXT(2)	8	'a'	
X_TEXT(3)	8	'c'	
X_TEXT(4)	8	'k'	
X_TEXT(5)	8	' '	
X_TEXT(6)	8	'm'	
X_TEXT(7)	8	'y'	
X_TEXT(8)	8	' '	
X_TEXT(9)	8	'b'	
X_TEXT(10)	8	'o'	
X_TEXT(11)	8	'x'	
X_TEXT(12)	8	' '	
X_TEXT(13)	8	'w'	
X_TEXT(14)	8	'i'	
X_TEXT(15)	8	't'	
X_TEXT(16)	8	'h'	
X_TEXT(17)	8	' '	
X_TEXT(18)	8	'f'	
X_TEXT(19)	8	'i'	
X_TEXT(20)	8	'v'	
X_TEXT(21)	8	'e'	
X_TEXT(22)	8	' '	
X_TEXT(23)	8	'd'	
X_TEXT(24)	8	'o'	
X_TEXT(25)	8	'z'	
X_TEXT(26)	8	'e'	
X_TEXT(27)	8	'n'	

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Message-S4: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(28)	8	‘ ‘	
X_TEXT(29)	8	‘l’	
X_TEXT(30)	8	‘i’	
X_TEXT(31)	8	‘q’	
X_TEXT(32)	8	‘u’	
X_TEXT(33)	8	‘o’	
X_TEXT(34)	8	‘r’	
X_TEXT(35)	8	‘ ’	
X_TEXT(36)	8	‘j’	
X_TEXT(37)	8	‘u’	
X_TEXT(38)	8	‘g’	
X_TEXT(39)	8	‘s’	
NID_PACKET	8	38	Text Message (STM-38)
L_PACKET	13	RESERVED	packet length
NID_XMESSAGE	8	2	
M_XATTRIBUTE	10	1000000001B	white text on black background, not flashing
Q_ACK	1	1	acknowledgement required
L_TEXT	8	5	
X_TEXT(1)	8	‘T’	
X_TEXT(2)	8	‘R’	
X_TEXT(3)	8	‘U’	
X_TEXT(4)	8	‘E’	
X_TEXT(5)	8	‘?’	
Padding bits	COMPUTED	COMPUTED	

Message-S5: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
NID_PACKET	8	43	National ETCS DMI (STM-43)

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Message-S5: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
L_PACKET	13	COMPUTED	packet length
Q_SCALE	2	1	
Q_INDICATE	12	000000000000 B	no inhibition
Q_WARNINGLIMIT	1	0	
Q_INDICATIONLIMIT	1	0	
V_PERMIT	10	100	
V_TARGET	7	0	
V_RELEASE	7	40	
V_INTERV	7	110	
D_TARGET	15	100	
N_ITER	5	0	no customized supervision information
NID_PACKET	8	46	Sound Command (STM-46)
L_PACKET	13	COMPUTED	packet length
N_ITER	5	1	request for 1 sound
NID_STM	8	FINITE VALUE	any valid value for NID_STM
NID_SOUND	8	1	
Q_SOUND	2	1	
N_ITER	5	1	one frequency
M_FREQ	8	4000	
T_SOUND	8	1	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	

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DMI Connection	established	may be not established for STM Test Case (STM implementation)
Odometry Data	unchanged	
Reference Time Data	unchanged	
TIU Connection	established	may be not established for STM Test Case (STM implementation)
BIU Connection	established	may be not established for STM Test Case (STM implementation)
JRU Connection	unchanged	may be changed for STM Test Case (STM implementation)
Other connections	unchanged	may be changed for STM Test Case (STM implementation)
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.5.2.0.2

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (transmitted by balise group) with no announcement of the transition, while the ETCS technical mode is SL (Sleeping) and the STM follows the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (CS to DA), 7.4.1.2.3 (F9), 7.4.1.2.4
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 7.3.2.1 (CS to DA), 7.3.2.2.1 (9), 7.3.4.4, 7.6.1.5, 7.6.1.5.1
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14, STM-15
Comments and constraints	<p>The objective of this test is to check</p> <ul style="list-style-type: none"> that the ETCS On-board (STM Control Function) orders the STM to the state DA when, without receiving an announcement, a level transition border to this STM is passed while the ETCS technical mode is SL, and switches to the ETCS level STM, and that the STM follows a state transition order to the state DA. <p>The selected language shall be "English".</p>

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	SL	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	

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Starting Conditions		Value	Comments
National Values		valid	
STM Control Function Connection		established	
DMI Connection		not established	may be established for STM Test Case (STM implementation)
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		not established	may be established for STM Test Case (STM implementation)
BIU Connection		not established	may be established for STM Test Case (STM implementation)
JRU Connection		not established	may be established for STM Test Case (STM implementation)
Other connections		not established	may be established for STM Test Case (STM implementation)
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not cut	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		Inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order the announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
2	Time: T0 + 2 seconds Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	Prof	Establish BIU Connection	-	-	-
	The current state (CS) is reported to the BIU Function	Prof	BIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of BIU signals	-	-	ETCS	Prof	BIU Connection: Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)
	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	Prof	Establish TIU Connection	-	-	-
	The current state (CS) is reported to the TIU Function	Prof	TIU Connection: Message-S1 (STM-15 - state report from STM)	-	-	-
	Transmit current status / availability of TIU signals	-	-	ETCS	Prof	TIU Connection: Message-ET1 (STM-139 - train interface inputs status / availability to STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
3	Time: T0 + 4 seconds STM reports state DA in due time to all connected ETCS Functions	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	BIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-
		Prof	TIU Connection: Message-S2 (STM-15 - state report from STM)	-	-	-

STM Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM is ordered to state DA	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)	-	-	-
2a1	Connection to the ETCS On-board BIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish BIU Connection - optional -
2a2	The current state (CS) is reported to the BIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	BIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
	Transmission of the BIU status / availability information to the STM	Prof	BIU Connection – if opened -: - Message-EB1 (STM-136 - brake interface emergency and service brake status / availability to STM)	-	-	-
		-	-	STM	Prof	BIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2a3	The STM takes the train supervision according to the national system behaviour.	-	-	STM	Prof	BIU Connection - if opened -: The STM may send a message or messages with packet STM-128 – STM emergency and service brake command to brake interface (including packet STM-15 – state report from STM)
2b1	Connection to the ETCS On-board TIU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish TIU Connection - optional -
2b2	The current state (CS) is reported to the TIU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	TIU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if “2e1” is not yet performed -
	Transmission of the TIU status / availability information to the STM	Prof	TIU Connection – if opened -: - Message-ET1 (STM-139 - train interface inputs status / availability to STM)	-	-	-
		-	-	STM	Prof	TIU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2b3	The STM takes the train supervision according to the national system behaviour	-	-	STM	Prof	TIU Connection - if opened -: The STM may send a message or messages with packet STM-129 – STM specific brake control command, STM-130 – STM commands to train interface (including packet STM-15 – state report from STM) - optional -
2c1	Connection to the ETCS On-board JRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish JRU Connection - optional -

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Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
2c2	The current state (CS) is reported to the JRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	JRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
		-	-	STM	Prof	JRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2d1	Connection to the ETCS On-board DRU Function is established by the STM (SLL/STL/Application Layer)	-	-	STM	Prof	establish DRU Connection - optional -
2d2	The current state (CS) is reported to the DRU Function (only if the state is not yet HS when the connection is opened)	-	-	STM	Prof	DRU Connection - if opened -: Message-S1 (STM-15 - state report from STM) - only if "2e1" is not yet performed -
		-	-	STM	Prof	DRU Connection - if opened -: Message-S2 (STM-15 - state report from STM)
2e1	STM reports state DA to the ETCS STM Control Function	-	-	STM	Prof	STM Control Connection: Message-S2 (STM-15 - state report from STM)

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
Q_LINK	1	1	linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in HS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-S1 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	4	state CS
Padding bits	COMPUTED	COMPUTED	

Message-EB1 (brake interface emergency and service brake status / availability to STM): ETCS BIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	136	Brake Interface emergency and service brake status / availability to STM (STM-136)
L_PACKET	13	COMPUTED	packet length
M_BIEB_STATUS	2	2	emergency brake released
M_BISB_STATUS	2	2	service brake released
Padding bits	COMPUTED	COMPUTED	

Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	139	Train Interface inputs status / availability to STM (STM-139)
L_PACKET	13	COMPUTED	packet length

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Message-ET1 (train interface inputs status / availability to STM): ETCS TIU Function → STM			
VARIABLE	Length	VALUE	COMMENTS
M_TITR_C_STATUS	2	2	no traction cut off
M_TIDIR_STATUS	2	1	forward
M_TICAB_STATUS	2	1	cab A opened
Padding bits	COMPUTED	COMPUTED	

Message-S2 (state report from STM): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	7	state DA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	DA	
ETCS Mode	unchanged	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	Unchanged	
Odometry Data	Unchanged	
Reference Time Data	unchanged	
TIU Connection	Established	may be not established for STM Test Case (STM implementation)
BIU Connection	Established	may be not established for STM Test Case (STM implementation)
JRU Connection	Unchanged	may be changed for STM Test Case (STM implementation)
Other connections	Unchanged	may be changed for STM Test Case (STM implementation)
TIU Regenerative Brake Command	Unchanged	
TIU Magnetic Shoes Command	Unchanged	
TIU Eddy Current Brake Command	Unchanged	

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TIU Inhibit Passenger Emergency Brake Command	Unchanged	
TIU Pantograph Command	Unchanged	
TIU Air Tightness Command	Unchanged	
TIU Main Switch / Circuit Breaker Command	Unchanged	
TIU Traction Cut Off Command	Unchanged	
TIU Sleeping Status	Unchanged	
TIU Traction Cut Off Status	Unchanged	
TIU Direction Controller Position Status	Unchanged	
TIU Cab Status (Desk Status)	Unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

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Test case 3c.1.0.5.3.2.0

TEST CASE HEADER	
Test case Identification	Level Transition ETCS -> STM (Level Transition Border)
	Check the behaviour of the ETCS On-board and the STM at a level transition border (announced by balise group) with no announcement of the transition, when the ETCS On-board is not in the ETCS technical mode NL (Non-Leading) or SL (Sleeping) and the STM does not follow the state transition order to state DA in due time.
ETCS Requirements Tested	SUBSET-035 7.4.1.1.12, 7.4.1.2.2 (CS to DA, to FA), 7.4.1.2.3 (F9, D16), 7.4.1.2.4, 7.4.1.3.6, 7.4.1.4, 7.4.1.6.1
	SUBSET-026 5.10.1.4
STM Requirements Tested	SUBSET-035 none
	SUBSET-026 none
Packets Transmitted via FFFIS STM	Packet STM-5, STM-14
Comments and constraints	The objective of this test is to check that the ETCS On-board (STM Control Function) orders the STM (from CS state) to the state DA when a level transition border to this STM is passed and switches to the ETCS level STM even in case the STM does not follow the state transition order in due time. In this case the ETCS will also apply the safe action because the active STM does not report DA state.

Starting Conditions	Value	Comments
STM State	CS	no STM in state HS or state DA
ETCS Mode	FS	
ETCS Level	1	
Train State	moving	
Train Data	valid	
Additional Data	valid	
National Values	valid	
STM Control Function Connection	established	
DMI Connection	established	

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Starting Conditions		Value	Comments
Odometry Data		transmitted	
Reference Time Data		transmitted	
TIU Connection		established	
BIU Connection		established	
JRU Connection		not relevant	
Other connections		not relevant	
TIU Regenerative Brake Command		not relevant	
TIU Magnetic Shoes Command		not relevant	
TIU Eddy Current Brake Command		not relevant	
TIU Inhibit Passenger Emergency Brake Command		not relevant	
TIU Pantograph Command		not relevant	
TIU Air Tightness Command		not relevant	
TIU Main Switch / Circuit Breaker Command		not relevant	
TIU Traction Cut Off Command		not relevant	
TIU Sleeping Status		not Sleeping	
TIU Traction Cut Off Status		inactive	
TIU Direction Controller Position Status		forward	
TIU Cab Status (Desk Status)		desk A opened	
BIU Status		not relevant	
BIU Emergency Brake Command		not relevant	
BIU Service Brake Command		not relevant	
BIU Emergency Brake Status		release	
BIU Service Brake Status		release	
STM Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	

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Starting Conditions		Value	Comments
ETCS Version Number	Subset-026	1.0	
	Subset-035	3.0.z	
	Subset-058	3.0.z	
	Subset-056	3.0.z	
	Subset-057	3.0.z	
Track Adhesion		not relevant	

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	Level Transition border for an ETCS -> STM transition: order announced STM to DA state Time: T0	BTM	Telegram-B1 (41 - Level Transition Order) Telegram-B2	ETCS	Prof	STM Control Connection: Message-EC1 (STM-14 - state order to STM, STM-5 - ETCS status data)
		-	-	ETCS	DMI	transition acknowledgement request displayed
2	Time: T0 + 1 second Driver acknowledges the transition	DMI	Driver acknowledges Transition	ETCS	DMI	transition acknowledgement request removed-
3	Time: T0 + 5 seconds STM does not report state DA in due time	-	-	ETCS	Prof	STM Control Connection: Message-EC2 (STM-14 - state order to STM)
		-	-	ETCS	DMI	indication to the driver about the failed STM
		-	-	ETCS	BIU / DMI	ETCS takes the safe action, i. e. command brake application.

Telegram-B1: Balise-Information (Level Transition Border)			
VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	Uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	0	1 st Balise
N_TOTAL	3	1	2 Balise in group

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Telegram-B1: Balise-Information (Level Transition Border)

VARIABLE	Length	VALUE	COMMENTS
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	Linked
NID_PACKET	8	41	Packet 41 – Level Transition Order
Q_DIR	2	1	nominal direction
L_PACKET	13	COMPUTED	
Q_SCALE	2	1	1 m
D_LEVELTR	15	32767	now (the level transition is performed upon receipt of the order)
M_LEVELTR	3	1	Level STM, specified by NID_STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in CS state)
L_ACKLEVELTR	15	0	acknowledgement area starts at the level transition border
N_ITER	5	0	no mixed level area
NID_PACKET	8	11111111	Packet 255 – End of information

Telegram-B2: Balise-Information

VARIABLE	Length	VALUE	COMMENTS
Q_UPDOWN	1	1	uplink
M_VERSION	7	FINITE VALUE	SRS version
Q_MEDIA	1	0	Balise
N_PIG	3	1	2 nd Balise
N_TOTAL	3	1	2 Balise in group
M_DUP	2	0	no duplicates
M_MCOUNT	8	255	identical Value for all balises of the group
NID_C	10	FINITE VALUE	ID of country / region
NID_BG	14	FINITE VALUE	ID of Balise Group
Q_LINK	1	1	linked
NID_PACKET	8	11111111	Packet 255 – End of information

Message-EC1 (state order to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM

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Message-EC1 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	7	state DA
NID_PACKET	8	5	ETCS status data (STM-5)
L_PACKET	13	COMPUTED	packet length
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	any valid value for NID_STM (here: NID_STM of the STM in CS state)
M_MODE	4	13	SN (STM National)
Padding bits	COMPUTED	COMPUTED	

Message-EC2 (state order to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any valid value for NID_STM
L_MESSAGE	8	COMPUTED	Message length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	COMPUTED	packet length
NID_STMSTATEORDER	4	8	state FA
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM State	FA	
ETCS Mode	SN	
ETCS Level	STM	
Train State	unchanged	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Data	unchanged	
Reference Time Data	unchanged	

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TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	
TIU Inhibit Passenger Emergency Brake Command	unchanged	
TIU Pantograph Command	unchanged	
TIU Air Tightness Command	unchanged	
TIU Main Switch / Circuit Breaker Command	unchanged	
TIU Traction Cut Off Command	unchanged	
TIU Sleeping Status	unchanged	
TIU Traction Cut Off Status	unchanged	
TIU Direction Controller Position Status	unchanged	
TIU Cab Status (Desk Status)	unchanged	
BIU Status	unchanged	
BIU Emergency Brake Command	unchanged	
BIU Service Brake Command	unchanged	
BIU Emergency Brake Status	unchanged	
BIU Service Brake Status	unchanged	
STM Version Number	unchanged	
ETCS Version Number	unchanged	
Track Adhesion	unchanged	

Test case 3c.2.0.2.1.3.0.0

Note: This test case is the same as Test case 3c.1.0.2.1.3.0.0 except for the requirement to perform the transition. As the requirement to perform the transition is an SRS requirement which is not tested here, no test case is included here.