

ERTMS/ETCS – Class 1
FFFIS STM test cases of Functional identity 001 START OF MISSION Total: 9 Test cases
REF : SUBSET-074-2-1 ISSUE : 1.0.0 DATE : 13.10.05

Company	Technical Approval	Management approval
ALCATEL		
ALSTOM		
ANSALDO SIGNAL		
BOMBARDIER		
INVENSYS RAIL		
SIEMENS		

Modification History

Issue Number Date	Section Number	Modification / Description	Author
Version 0.0.1 14/06/2004	All	First version/review	Invensys Rail
Version 0.0.2 30.06.2004		Updated according to the new template New test cases for this functional identity	Invensys Rail
Version 0.0.3 14.07.2004		Updated according to the comments and conclusions of the Berlin meeting on the 7th and 8th of July	Invensys Rail
Version 0.0.4 04.10.2004		Updated according to the comments received	Invensys Rail
Version 0.0.5 22.11.04		Updated according to the comments received in Stuttgart meeting on 08.11.04	Invensys Rail
Version 0.0.6 03.12.04		Updated according to the comments received in Brussels on 29.11.04	Invensys Rail
Version 0.0.7 22.12.04		Updated according to the comments received in Madrid on 09.12.04	Invensys Rail
Version 0.0.8 24.01.05		Updated according to the comments received	Invensys Rail
Version 0.0.9 26.01.05		Updated within the Paris meeting on the 26.01.2005	Invensys Rail
Version 0.1.0 27.01.05		Editorial changes for delivery	Invensys Rail
Version 1.0.0 13.10.05		Editorial changes for delivery	Invensys Rail

Table of Contents

Test Case Diagrams.....	4
Test Cases	11
Test case 1.1.0.0.1.0.1.1.0.1.0.....	11
Test case 1.2.0.1.1.0.1.0	25
Test case 1.1.0.0.2.0.1.0.1.1.0.0.0.1.0.....	33

© This document is the property of

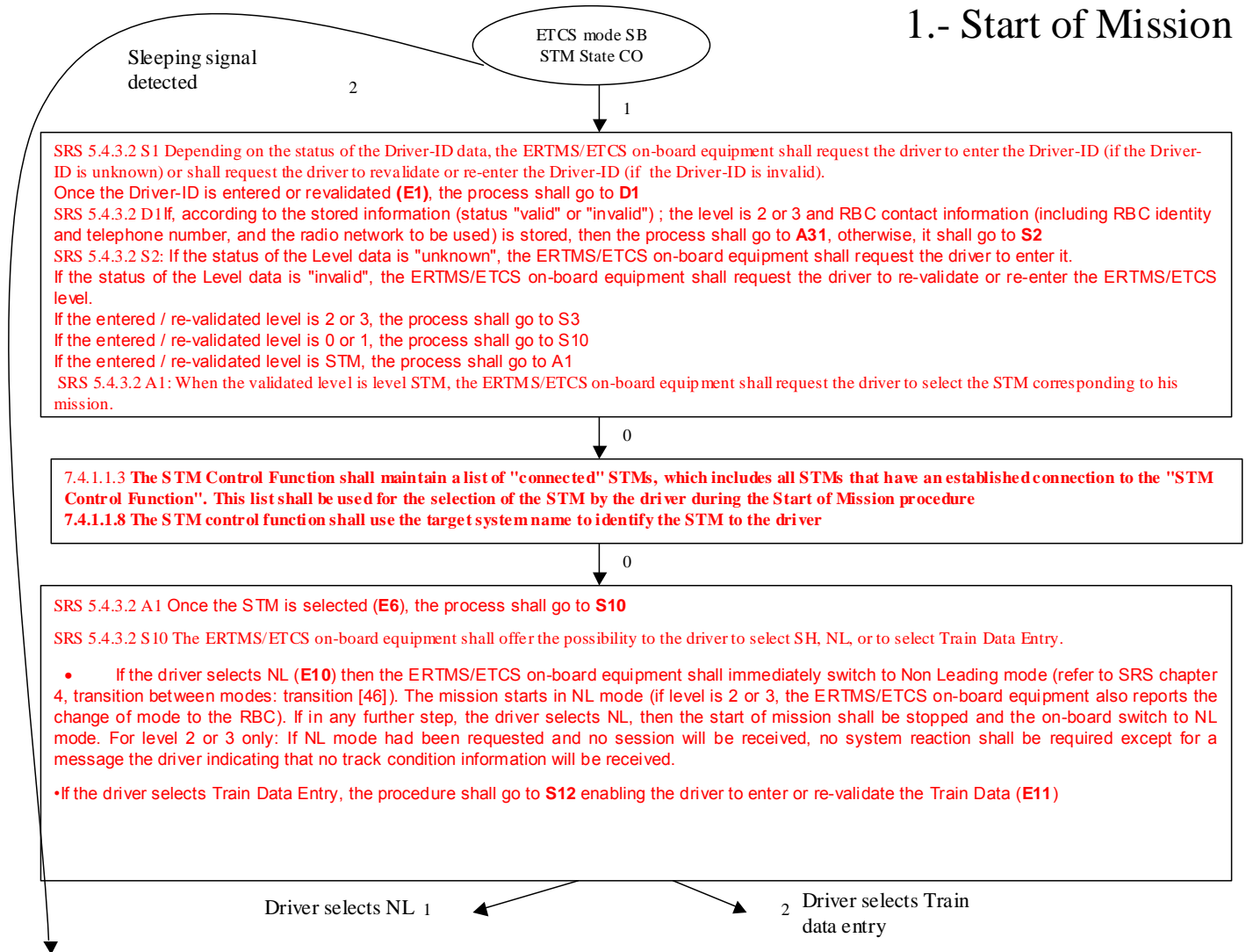
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

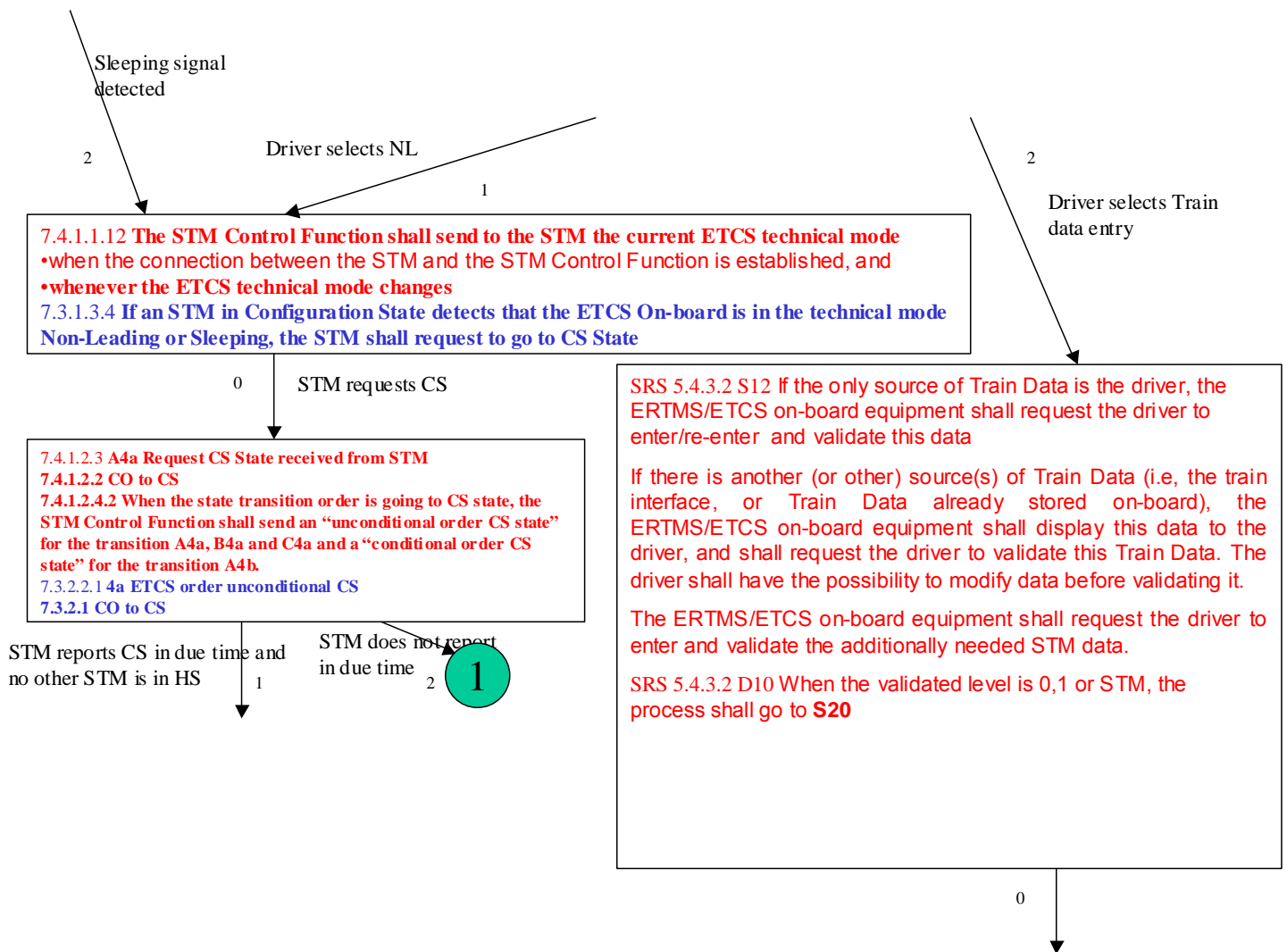
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

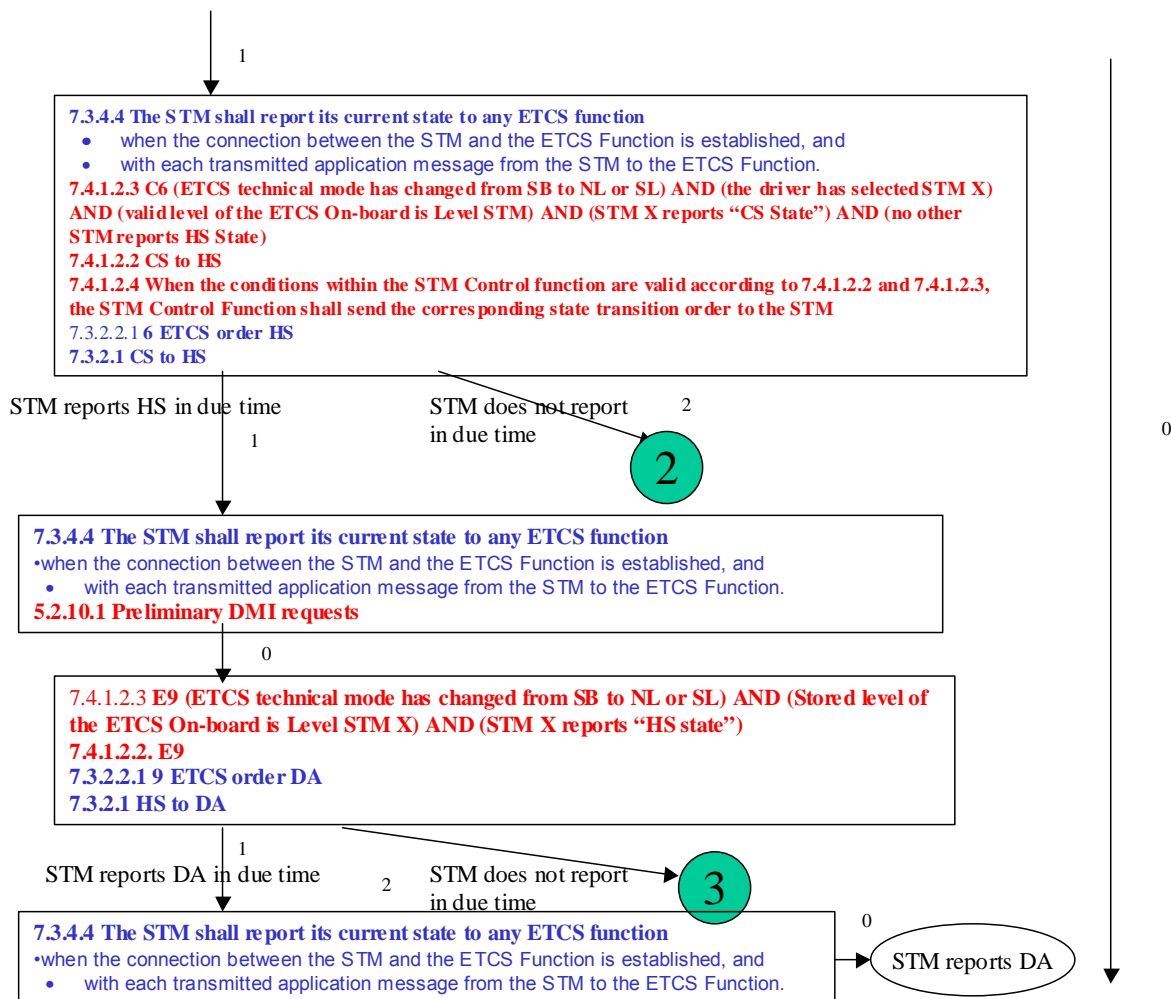
Test case 1.1.0.0.2.0.2.0.1.1.0.0.0.1.0	46
Test case 1.1.0.0.1.0.2.0	47
Test case 1.1.0.0.1.0.1.2.0	53
Test case 1.1.0.0.1.0.1.1.0.2.0.....	60
Test case 1.1.0.0.2.0.1.0.2.0.....	68
Test case 1.1.0.0.2.0.1.0.1.2.0.....	78
Test case 1.1.0.0.2.0.1.0.1.1.0.0.0.2.0.....	89

TEST CASE DIAGRAMS

1.- Start of Mission







↓ 0

- 5.2.11.2 The ERTMS/ETCS onboard shall transmit a subset of the ETCS train data to all STMs as described below:
- a) Train Category
 - b) Train length
 - c) Deceleration data
 - d) Maximum permitted speed for the train, taking into account the maximum speed of every vehicle contained in the train.
 - e) Loading gauge
 - f) Axle Load
 - g) Power supply accepted by the train
 - h) Train fitted with airtight system
 - i) Train running number
- 5.2.11.3 The ERTMS/ETCS Onboard shall transmit a subset of the ETCS additional data and date/time to all STMs as described below:
- a) Driver id
 - b) ERTMS/ETCS Level
 - c) ETCS on-board identity
 - d) Adhesion factor
 - e) Data and Time (UTC Time)
- 5.2.11.4 The ERTMS/ETCS onboard shall transmit a subset of the National default values to all STMs as described below:
- a) Modification of adhesion factor by driver
 - b) Shunting mode (permitted) speed limit.
 - c) Staff Responsible mode (permitted) speed limit.
 - d) On sight mode (permitted) speed limit
 - e) Unfitted mode (permitted) speed limit
 - f) Release speed value
 - g) Distance to be used in Roll Away protection, Reverse Movement protection and Standstill Supervision
 - h) Max. Speed limit for triggering the override end of Authority function is triggered
 - i) Permitted speed limit to be supervised when the “override EOA” function is active.
 - j) Distance for train tripsuppression when override end of Authority function is triggered
 - k) Max. Time for train tripsuppression when override end of authority function is triggered.
 - l) Distance to be allowed for reversing in Post Trip mode.
 - m) Max. Permitted distance to run in Staff Responsible mode

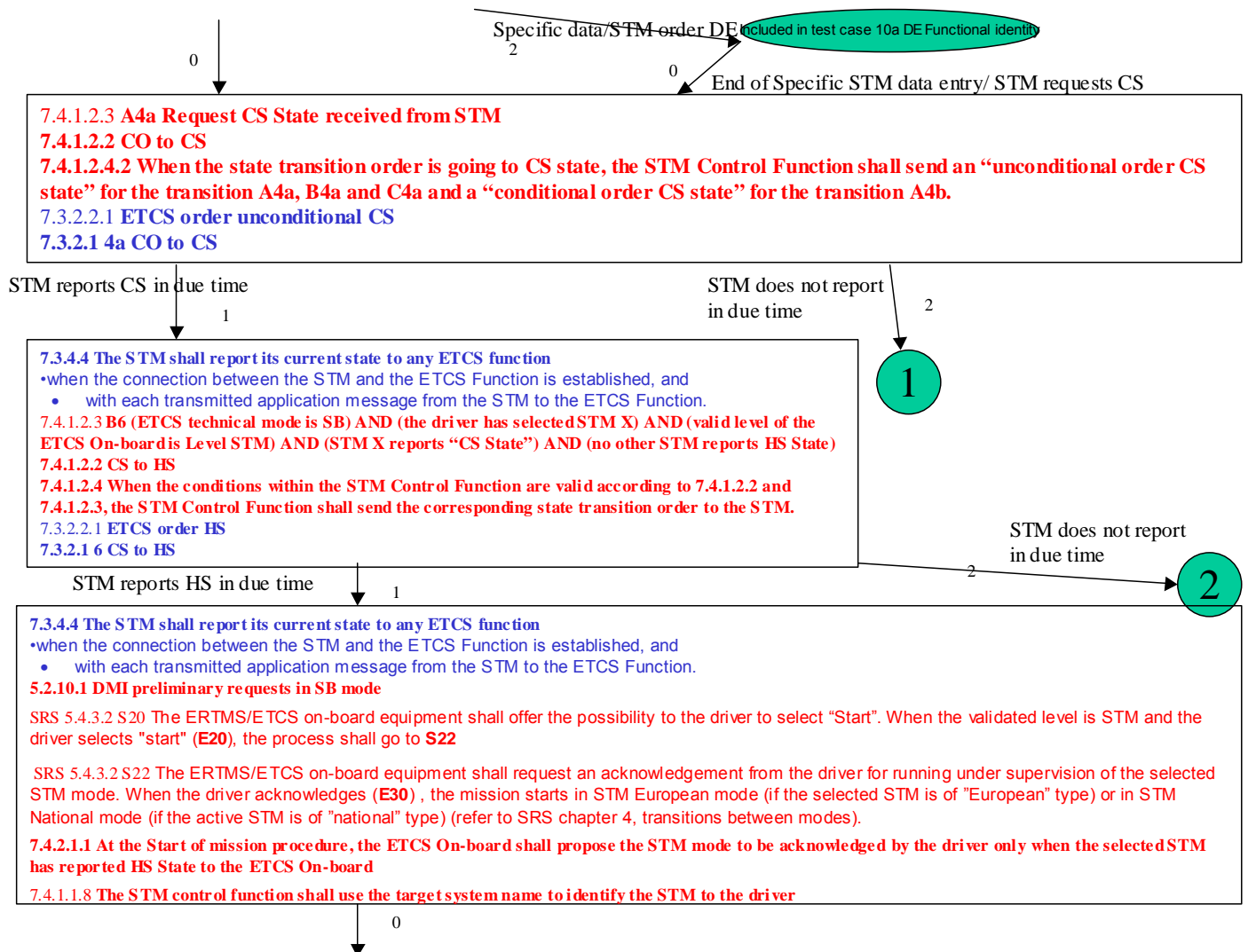
End of Specific STM data entry/STM requests CS 1

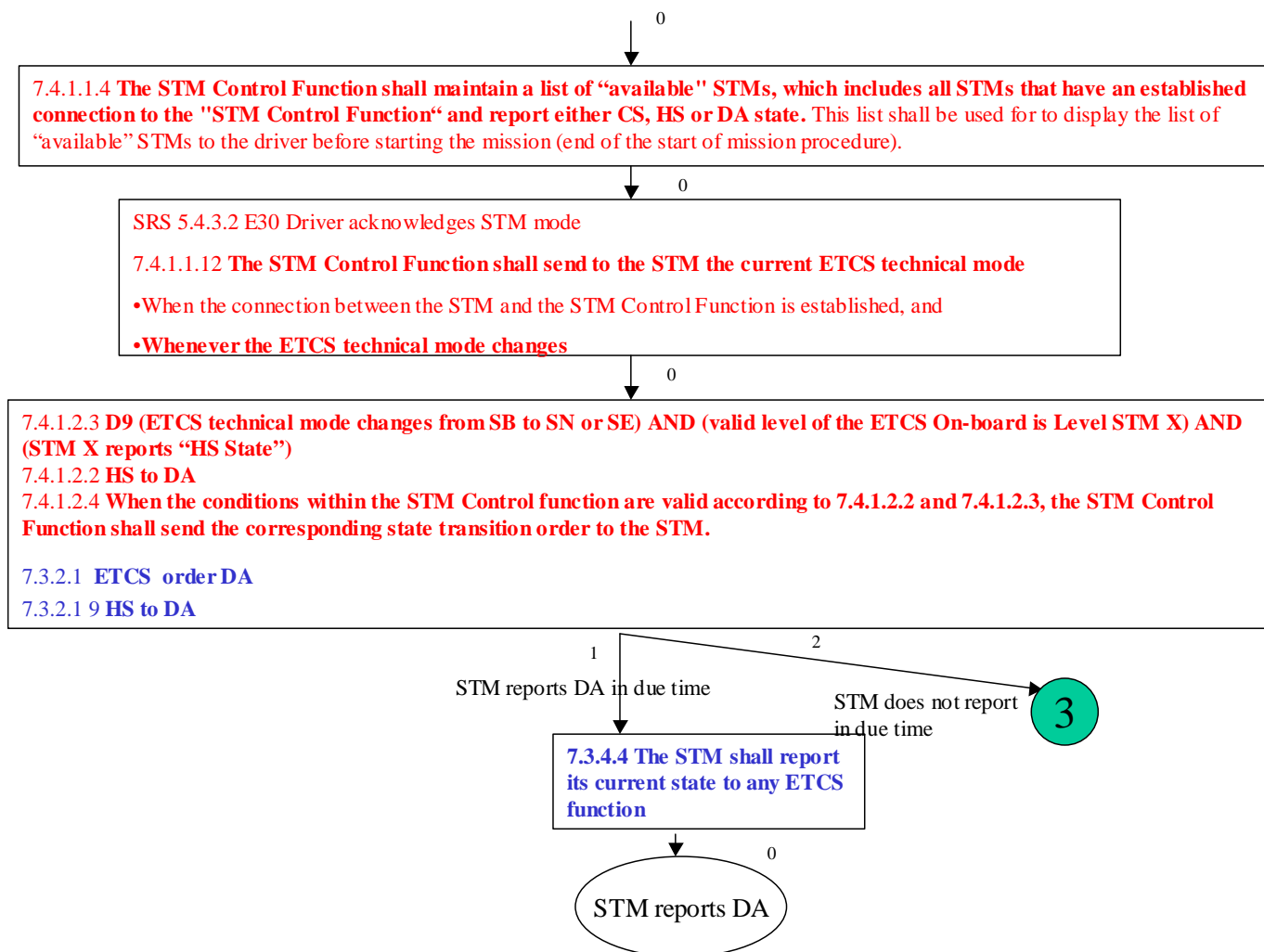
SRS 5.4.3.2 S12 Once Train Data and (if required) additional STM data is stored and validated (E16), the process shall go to D10

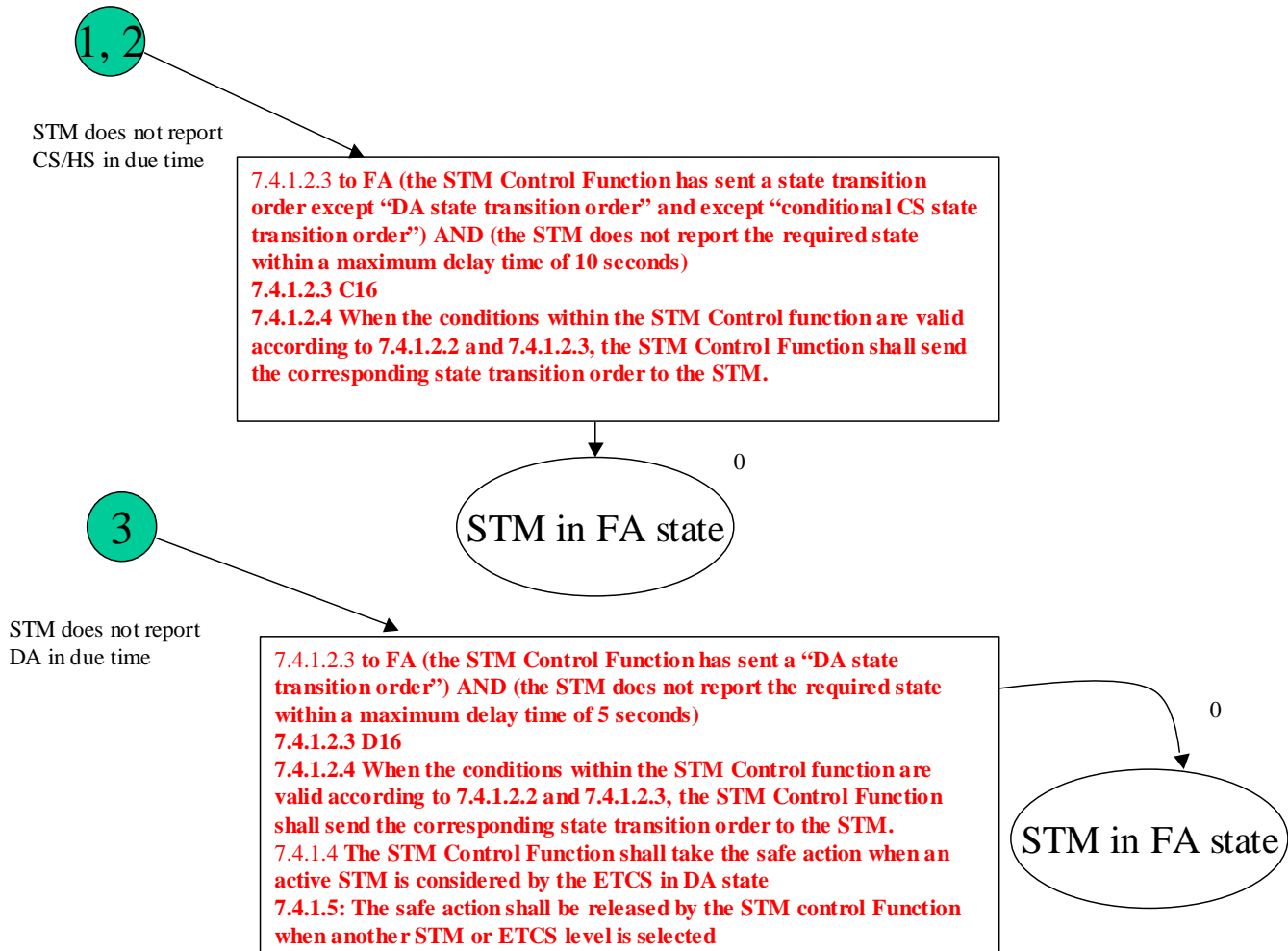
7.3.1.3.3 Once the exchange of configuration data is finished, and if the STM has received enough configuration information thanks to this process, then the STM shall request CS state to the STM control function

↓ 0

2







TEST CASES

Test case 1.1.0.0.1.0.1.1.0.1.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS mode is SB and the driver selects NL in mode SB, the STM requests immediately to go to CS State, the ETCS sends the STM to CS state, the ETCS sends the order to HS State and when the STM confirms it, the ETCS sends the order to DA State
ETCS Requirements Tested	Subset-026 none
	subset-035 5.2.10.1; 7.4.1.1.3; 7.4.1.1.8; 7.4.1.1.12; 7.4.1.2.3 A4a; C6; E9; 7.4.1.2.2 CO to CS; CS to HS; HS to DA; 7.4.1.2.4.2; 7.4.1.2.4
STM Requirements Tested	Subset-026 none
	subset-035; 7.3.1.3.4; 7.3.2.1 CO to CS; CS to HS; HS to DA; 7.3.2.2.14a; 6; 9; 7.3.4.4;
Packets Transmitted via FFFIS STM	Packet STM-13; STM-15; STM-5; STM-14; STM-32; STM-35; STM-38; STM-39; STM-43; STM-46
Comments and constraints	In this test case it is foreseen that there is no STM reporting HS when the selected STM reports CS, so the ETCS sends directly the order to switch to HS. All status changes for the STM are in due time. The final STM status is DA The driver has already entered the driver id and the level selection is displayed to the driver.

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
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	Established	
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

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver selects STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3	ETCS sends its current technical mode to the STM	DMI	Driver selects NL	ETCS	Prof	STM Control Connection: Message - 5 Sent packet STM-5 ETCS status data
4	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 received packet STM-13 STM State request	ETCS	Prof	STM Control Connection: Message – 6 Sent packet STM - 14 State order to STM
5	ETCS sends the order to HS	Prof	STM Control Connection STM reports CS State Message 2 received packet STM-15 State report from STM	ETCS	Prof	STM Control Connection Message – 7 Sent packet STM - 14 State order to STM
6	ETCS sends the order to DA	Prof	STM Control Connection STM reports HS State Message 3 received packet STM-15 State report from STM	ETCS	Prof	STM Control Connection Message – 8 Sent packet STM - 14 State order to STM
7	STM opens the communication	Prof	STM opens the connection with the DMI function	ETCS	-	-
8	STM sends preliminary DMI requests	Prof	DMI Connection: Message 9 received. (STM-15 - state report from STM, STM-32 - button request, STM-35 - indicator request)	ETCS	-	-
9	STM sends preliminary DMI requests	Prof	DMI Connection: Message 10 received. (STM-15 - state	ETCS		

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

			report from STM, STM-38 – text message, STM-38 – text message)			
10	Check of the ability of the ETCS DMI function to receive preliminary DMI requests (delete text message, supervision data, sound)	Prof	DMI Connection: Message-11 (STM-15 - state report from STM, STM-39 – delete text message, STM-43 - national ETCS DMI, STM-46 – sound command)	ETCS		
11			STM Control Connection STM reports DA in due time Message 4 received packet STM-15 STM State report	ETCS		Nothing to do

STM Test case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM request CS State when NL mode is reported by the ETCS	Prof	STM Control Connection ETCS mode report (NL mode) Message 5 received. Packet STM-5 ETCS Status data	STM	Prof	STM Control Connection Message - 1 Sent packet STM-13 State request from STM
2	STM switches to CS State based on State transition order and reports its new state	Prof	STM Control Connection ETCS orders CS Message 6 received packet STM-14 State Order to STM	STM	Prof	STM Control Connection Message - 2 Sent packet STM 15 State report from STM
3	STM Switches to HS State based on state transition order and reports its new state	Prof	STM Control Connection ETCS orders HS Message 7 received packet STM-14 State order to STM	STM	Prof	STM Control Connection Message - 3 Sent packet STM - 15 State report from STM
4	STM switches to DA based on state transition order and reports its new state	Prof	STM Control Connection ETCS orders DA Message 8 received packet STM-14 State order to STM	STM	Prof	STM Control Connection Message - 4 Sent packet STM - 15

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 1: STM → ETCS (Packet STM-13)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: STM → ETCS (Packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

Message 3: STM → ETCS (Packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM which the EVC is connected to

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	6	Hot StandBy
Padding bits	COMPUTED	COMPUTED	

Message 4: STM → ETCS (Packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	7	Data Available
Padding bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM(Packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID STM	8	FINITE VALUE	The NID_STM selected by the driver

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

M_MODE	4	11	Non-Leading
Padding Bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM(Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 7: ETCS → STM(Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	6	Order HS State
Padding bits	COMPUTED	COMPUTED	

Message 8: ETCS → STM(Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	7	Order DA State
Padding bits	COMPUTED	COOMPUTED	

Message-9: 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'	
X_CAPTION(1,7)	8	'I'	
X_CAPTION(1,8)	8	'O'	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message-9: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message-9: 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-10: 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	' '	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message-10: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
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	
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'	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message-10: STM → ETCS DMI Function			
VARIABLE	Length	VALUE	COMMENTS
X_TEXT(5)	8	'?'	
Padding bits	COMPUTED	COMPUTED	

Message-11: 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	

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message-11: 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	NL	
ETCS Level	unchanged	
Train State	Standstill	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	established	
Odometry Connection	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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.2.0.1.1.0.1.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the sleeping signal is detected while the mode is SB, the STM requests immediately to go to CS State, the ETCS sends the STM to CS state, the ETCS sends the order to HS State and when the STM confirms it, the ETCS sends the order to DA State
ETCS Requirements Tested	Subset-026 none
	subset-035 7.4.1.1.12; 7.4.1.2.3 A4a; C6; E9; 7.4.1.2.2 CO to CS; CS to HS; HS to DA; 7.4.1.2.4; 7.4.1.2.4.2;
STM Requirements Tested	Subset-026 none
	subset-0357.3.1.3.4; 7.3.2.1CO to CS; CS to HS; HS to DA; 7.3.2.2.14a; 6; 9; 7.3.4.4;
Packets Transmitted via FFFIS STM	Packet STM-13; STM-15; STM-5; STM-14;
Comments and constraints	In this test case it is foreseen that there is no STM reporting HS when the selected STM reports CS, so the ETCS sends directly the order to switch to HS. All status changes for the STM are in due time. The final STM status is DA The stored ETCS level is STM

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

DMI Connection		Established	
Odometry Data		Transmitted	
Reference Time Data		Transmitted	
TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Track Adhesion	Not Relevant	
----------------	--------------	--

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	ETCS sends its current technical mode to the STM when the mode changes to SL	TIU	Sleeping signal is detected	ETCS	Prof	STM Control Connection: Message - 5 Sent packet STM-5 ETCS status data
2	STM closes the DMI connection	Prof	STM closes the connection to the DMI	ETCS	-	-
3	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 received packet STM – 13 STM State request	ETCS	Prof	STM Control Connection: Message – 6 Sent packet STM - 14 State order to STM
4	ETCS sends the order to HS	Prof	STM Control Connection: STM reports CS State and no other STM reports HS Message 2 received. Packet STM-15 STM State report	ETCS	Prof	STM Control Connection: Message – 7 Sent packet STM - 14 State order to STM
5	ETCS sends the order to DA	Prof	STM Control Connection: STM reports HS State Message 3 received packet STM-15 STM State report	ETCS	Prof	STM Control Connection: Message – 8 Sent packet STM - 14 State order to STM
6			STM Control Connection: STM reports DA in due time. Message 4 received packet STM-15 STM State report	ETCS		Nothing to do

STM Test case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM request CS State when SL mode is reported by the ETCS	Prof	STM Control Connection: ETCS mode report (SL mode) Message 5 received packet STM-5 ETCS status data	STM	Prof	STM Control Connection: Message - 1 Sent packet STM-13 State request from STM
				STM	Prof	DMI Connection: Connection is closed
2	STM switches to CS State and	Prof	STM Control Connection:	STM	Prof	STM Control Connection: Message - 2

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

	reports its new state		ETCS orders CS Message 6 received packet STM-14 State order to STM			Sent packet STM 15 State report from STM
3	STM Switches to HS State and reports its new state	Prof	STM Control Connection: ETCS orders HS Message 7 received packet STM-14 State order to STM	STM	Prof	STM Control Connection: Message - 3 Sent packet STM - 15 State report from STM
4	STM switches to DA and reports its new state	Prof	STM Control Connection: ETCS orders DA Message 8 received packet STM-14 State order to STM	STM	Prof	STM Control Connection: Message - 4 Sent packet STM - 15

Message 1: STM → ETCS (packet STM-13)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: STM → ETCS(packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding Bits	COMPUTED	COMPUTED	

Message 3: STM → ETCS(packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	6	Hot StandBy
Padding bits	COMPUTED	COMPUTED	

Message 4: STM → ETCS (packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	7	Data Available
Padding bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM (packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID_STM stored
M_MODE	4	5	Sleeping
Padding bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM(packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 7: ETCS → STM(packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	6	Order HS State
Padding bits	COMPUTED	COMPUTED	

Message 8: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM stored
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	7	Order DA State
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	DA	
ETCS Mode	SL	
ETCS Level	unchanged	
Train State	Standstill	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	Not Established	
Odometry Connection	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Sleeping	
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	Subset-026	unchanged
	Subset-035	unchanged
	Subset-058	unchanged
	Subset-056	unchanged
	Subset-057	unchanged
ETCS Version Number	Subset-026	unchanged
	Subset-035	unchanged
	Subset-058	unchanged
	Subset-056	unchanged
	Subset-057	unchanged
Track Adhesion	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.2.0.1.0.1.1.0.0.1.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects data entry (no specific data is needed). The driver enters data and data is transmitted to the STM. When the STM has all the necessary information it requests the CS state, the ETCS sends the order to CS state, the STM switches to CS state, the ETCS sends the order to HS state, the STM switches to HS state and then the ETCS sends the order to DA state which is confirmed by the STM
ETCS Requirements Tested	Subset-026 none
	subset-035 5.2.11.2; 5.2.11.3; 5.2.11.4; 5.2.10.1; 7.4.1.1.3; 7.4.1.1.8; 7.4.1.1.12; 7.4.1.2.3A4a; B6; D9; 7.4.2.1.1; 7.4.1.2.2 CO to CS; CS to HS;HS to DA; 7.4.1.2.4; 7.4.1.2.4.2; 7.4.1.1.4
STM Requirements Tested	Subset-026 none
	subset-035 7.3.1.3.3; 7.3.2.1 CO to CS; CS to HS;HS to DA ;7.3.2.2.1 4a; 6, 9; 7.3.4.4;
Packets Transmitted via FFFIS STM	STM-13; STM-15; STM-175; STM-176; STM-177; STM-178; STM-14; STM-5; STM-179
Comments and constraints	<p>In this test case it is foreseen that there is no STM reporting HS when the selected STM reports CS, so the ETCS sends directly the order to switch to HS(Due to no specific STM data requested the STM will immediately request CS</p> <p>It shall be checked that the data entered by the driver is the data transmitted by the ETCS. Normally the Train data used by the ETCS test specification may be used.</p> <p>The driver has already entered the driver id and the level selection is displayed to the driver</p>

Starting Conditions	Value	Comments
STM STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	
DMI Connection	Established	
Odometry Data	Transmitted	
Reference Time Data	Transmitted	
TIU Connection	Established	
BIU Connection	Established	
JRU Connection	Established	
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	Subset-026	1.0

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Number	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	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver selects the STM	DMI	Driver selects the STM	ETCS	DMI	List of connected STMs is removed
3		DMI	Drivers enters and/or validates train data and additional data	ETCS		
	ETCS sends ETCS train data			ETCS	Prof	STM Control Connection: Message - 5 Sent packet STM-175 Train data and 176 Train data additional "braking characteristic" to STM
	ETCS sends ETCS additional data and data/time			ETCS	Prof	STM Control Connection: Message - 6 Sent packet 177 Additional Data Values and date/time to STM
	ETCS sends the National Values to the STM			ETCS	Prof	STM Control Connection: Message - 7 Sent packet 178 National values to STM
4		Prof	STM Control Connection: STM sends End Specific data entry message12 packet STM-179 Specific STM Data Entry Request			
5	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 received packet STM-13 STM State request	ETCS	Prof	STM Control Connection: Message – 8 Sent packet STM - 14 State order to STM
6	ETCS sends the order to HS	Prof	STM Control Connection: STM reports CS State Message 2 received packet STM 15 STM	ETCS	Prof	STM Control Connection: Message – 9 Sent packet STM - 14 State order to STM

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

			State report			
7		DMI	Driver selects Start	-	-	-
8	ETCS on- board propose the STM mode to the driver	Prof	STM Control Connection: STM reports HS State Message 3 received packet STM-15 STM State report	ETCS	DMI	Ack STM mode displayed on the DMI
9		DMI	Driver acknowledges the STM mode	ETCS	DMI	Ack STM mode is removed
	ETCS sends the order to DA	-	-	ETCS	Prof	STM Control Connection: Message – 10 Sent packet STM - 14 State order to STM
	ETCS reports its new status (mode SN)	-	-	ETCS	Prof	STM Control Connection: Message- 11 Sent packet STM - 5 ETCS Status data
10			STM Control Connection: STM reports DA in due time message 4 packet STM-15 STM State report	ETCS		Nothing to do

STM Test case (only applicable for STM that do not request STM Specific data)

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	STM request CS State	Prof	STM Control Connection: STM has received all the configuration data Messages 5, 6 and 7 are received	STM	Prof	STM Control Connection: Message - 1 Sent packet STM-13 State request from STM
				STM	Prof	STM Control Connection: STM sends message 12 end of specific data entry packet STM-179 Specific STM data entry
2	STM switches to CS State and reports its new state	Prof	STM Control Connection: ETCS orders CS Message 8 received packet STM-14 State order to STM	STM	Prof	STM Control Connection: Message - 2 Sent packet STM 15 State report from STM
3	STM Switches to HS State and reports its new state	Prof	STM Control Connection: ETCS orders HS Message 9 received packet STM-14 State	STM	Prof	STM Control Connection: Message - 3 Sent packet STM - 15 State report from STM

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

4	STM switches to DA and reports its new state	Prof	order to STM STM Control Connection: ETCS orders DA Message 10 received packet STM-14 State order to STM	STM	Prof	STM Control Connection: Message - 4 Sent packet STM - 15
-	-	Prof	STM Control Connection: ETCS Status is received. Message 11 packet STM-5 ETCS status data	STM	-	-

Message 1: STM → ETCS (packet STM-13)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: STM → ETCS(packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

Message 3: STM → ETCS (packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	6	Hot StandBy
Padding bits	COMPUTED	COMPUTED	

Message 4: STM → ETCS (packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	7	Data Available
Padding bits	COMPUTED	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 5: ETCS → STM (packet STM-175 and STM-176)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	175	Train Data
L_PACKET	13	COMPUTED	
NID_OPERATIONAL	32	FINITE VALUE	Train running number entered by the driver
NC_TRAIN	15	FINITE VALUE	Train category entered by the driver
L_TRAIN	12	FINITE VALUE	Train length (example taken from the subset-076) entered by the driver
V_MAXTRAIN	7	FINITE VALUE	Maximum permitted train speed (example taken from the subset-076) entered by the driver
M_LOADINGGAUGE	8	FINITE VALUE	Load Profile entered by the driver
M_AXLELOAD	7	FINITE VALUE	Axle Load entered by the driver
M_AIRTIGHT	2	FINITE VALUE	Airtight system presence entered by the driver
N_ITER	5	1	1 Iteration
M_TRACTION (1)	8	FINITE VALUE	Traction System type entered by the driver
NID_PACKET	8	176	Train data additional "braking characteristic" to STM
L_PACKET	13	COMPUTED	
T_BEGIN_SB_EF	16	FINITE VALUE	Brake delay time for starting service brake effort (To be defined)
T_FULL_SB:EF	16	FINITE VALUE	Brake delay time for full service brake effort (To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_SB_CHAR (1)	10	0	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (1)	8	92	Deceleration characteristic for Service brake: Deceleration value

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

V_SB_CHAR (2)	10	160	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (2)	8	69	Deceleration characteristic for Service brake: Deceleration value
T_BEGIN_EB_EF	16	FINITE VALUE	Brake delay time for starting emergency brake effort(To be defined)
T_FULL_EB_EF	16	FINITE VALUE	Brake delay time for full emergency brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_EB_CHAR (1)	10	0	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	107	Deceleration characteristic for Emergency brake: Deceleration value
V_EB_CHAR (2)	10	160	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	80	Deceleration characteristic for Emergency brake: Deceleration value
T_TRACTION_CUT_OFF	16	FINITE VALUE	Traction cut off time(To be defined)
A_MAX	8	FINITE VALUE	Maximum Train acceleration(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM (packet STM-177)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	177	Additional Data Values and date/time to STM
L_PACKET	13	COMPUTED	
NID_DRIVER	32	FINITE VALUE	Driver identity
NID_ENGINE	24	FINITE VALUE	On-board ETCS identity(To be defined)
M_ADHESION	1	FINITE VALUE	Adhesion factor(To be defined)
T_YEAR	7	FINITE VALUE	Official year UTC(To be defined)
T_MONTH	4	FINITE VALUE	Official month UTC(To be defined)

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

T_DAY	5	FINITE VALUE	Official day UTC(To be defined)
T_HOUR	5	FINITE VALUE	Official hour UTC(To be defined)
T_MINUTES	6	FINITE VALUE	Official minutes UTC(To be defined)
T_SECONDS	6	FINITE VALUE	Official seconds UTC(To be defined)
T_TTS	5	FINITE VALUE	Official hundred of second UTC(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 7: ETCS → STM(packet STM-178)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	178	National Values to STM
L_PACKET	13	COMPUTED	
Q_SCALE	2	FINITE VALUE	Distance scale(To be defined)
V_NVSHUNT	7	FINITE VALUE	Shunting mode speed limit(To be defined)
V_NVSTFF	7	FINITE VALUE	Staff Responsible mode speed limit(To be defined)
V_NVONSIGHT	7	FINITE VALUE	On Sight mode speed limit(To be defined)
V_NVUNFIT	7	FINITE VALUE	Unfitted mode speed limit(To be defined)
V_NVREL	7	FINITE VALUE	Release Speed speed limit(To be defined)
D_NVROLL	15	FINITE VALUE	Roll away distance limit(To be defined)
V_NVALLOWOVTRP	7	FINITE VALUE	Maximum speed limit allowing the driver to select the “override EOA” function(To be defined)
V_NVSUPOVTRP	7	FINITE VALUE	Permitted speed limit to be supervised when the “override EOA” function is

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

			active(To be defined)
D_NVOVTRP	15	FINITE VALUE	Maximum distance for overriding the train trip(To be defined)
T_NVOVTRP	8	FINITE VALUE	Maximum time for overriding the train trip(To be defined)
D_NVPOTRP	15	FINITE VALUE	Maximum distance for reversing in Post Trip mode(To be defined)
D_NVSTFF	15	FINITE VALUE	Maximum distance for running in Staff Responsible mode(To be defined)
Q_NVDRIVER_ADHES	1	FINITE VALUE	Qualifier for the modification of trackside adhesion factor by driver(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 8: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 9: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STMSTATEORDER	4	6	Order HS State
Padding bits	COMPUTED	COMPUTED	

Message 10: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	7	Order DA State
Padding bits	COMPUTED	COMPUTED	

Message 11: ETCS → STM (packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
M_MODE	4	13	STM National
Padding bits	COMPUTED	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 12: STM → ETCS (packet STM-179)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	179	Specific STM Data Entry Request
L_PACKET	13	COMPUTED	
Q_DRIVERINT	1	0	
Q_FOLLOWING	1	0	
N_ITER	5	0	
Padding bits	COMPUTED	COMPUTED	

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

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.2.0.2.0.1.1.0.0.0.1.0

All the requirements of this test case are included in the functional identity 10a and in the test case 1.1.0.0.2.0.1.0.1.1.0.0.0.1.0

Test case 1.1.0.0.1.0.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects NL. The STM requests immediately the CS state. The ETCS sends the order to switch to CS but the STM does not follow the CS State order
ETCS Requirements Tested	Subset-026 none
	subset-035 7.4.1.1.3; 7.4.1.1.8; 7.4.1.1.12; 7.4.1.2.3A4a; C16; 7.4.1.2.2 CO to CS; CO to FA; 7.4.1.2.4.2;
STM Requirements Tested	Subset-026 none
	Subset-035 None
Packets Transmitted via FFFIS STM	Packet STM-13; STM-15; STM-5; STM-14;
Comments and constraints	This is a ETCS test case for applying the safe action in the case an STM does not follow an state transition order The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	
DMI Connection	Established	
Odometry Data	Transmitted	
Reference Time Data	Transmitted	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

ETCS Test Case

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver select STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3	ETCS sends its current technical mode to the STM	DMI	Driver selects NL	ETCS	Prof	STM Control Connection: Message - 2 Sent packet STM-5 ETCS status data
4	ETCS sends the order to CS Time = T0	Prof	STM Control Connection: STM request CS State Message 1 received packet STM13, packet STM-15	ETCS	Prof	STM Control Connection: Message – 3 Sent packet STM - 14 State order to STM
5	Time = T0 + 10s ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message – 4 Sent packet STM - 14 State order to STM
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU
	DMI Connections are closed			ETCS	Prof	DMI Connection: Connection is closed
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection is closed

Message 1: STM → ETCS (packet STM-13 and STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: ETCS → STM (packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
M_MODE	4	11	Non-Leading
Padding bits	COMPUTED	COMPUTED	

Message 3: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 4: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	8	Order FA State
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	NL	The driver selected NL
ETCS Level	STM	
Train State	Standstill	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	unchanged	
DMI Connection	unchanged	
Odometry Connection	unchanged	
Reference Time Data	unchanged	
TIU Connection	unchanged	
BIU Connection	unchanged	
JRU Connection	unchanged	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.1.0.1.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects NL and the STM requests the CS state. The STM switches to the CS state when receiving the order from the ETCS. The ETCS sends the order to HS state when receiving the confirmation of CS State from the STM but the STM does not follow the HS State order
ETCS Requirements Tested	Subset-026 none
	subset-035 7.4.1.1.3; 7.4.1.1.8; 7.4.1.1.12; 7.4.1.2.3A4a; C6; C16; 7.4.1.2.2CO to CS; CS to HS; CS to FA; 7.4.1.2.4; 7.4.1.2.4.2;
STM Requirements Tested	Subset-026 None
	Subset-035 None
Packets Transmitted via FFFIS STM	Packet STM-13; STM-15; STM-5; STM-14;
Comments and constraints	This is a ETCS test case for applying the safe action in the case an STM does not follow an state transition order to HS The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

DMI Connection		Not Established	
Odometry Data		Transmitted	
Reference Time Data		Transmitted	
TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Track Adhesion	Not Relevant	
----------------	--------------	--

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver select STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3	ETCS sends its current technical mode to the STM	DMI	Driver selects NL	ETCS	Prof	STM Control Connection: Message - 2 Sent packet STM-5 ETCS status data
4	ETCS sends the order to CS (no other STM in HS)	Prof	STM Control Connection: STM request CS State Message 1 Packet STM 13 , 15 received	ETCS	Prof	STM Control Connection: Message – 3 Sent packet STM - 14 State order to STM
5	ETCS sends the order to HS Time = T0	Prof	STM Control Connection: STM reports CS State Message 6 packet STM-15 STM State report	ETCS	Prof	STM Control Connection: Message - 4 Sent packet STM-14 State order to STM
6	Time = T0 + 10s ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message – 5 Sent packet STM - 14 State order to STM
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection is closed

Message 1: STM → ETCS (Packet STM-13, STM-15)

VARIABLE	Length	VALUE	COMMENTS
----------	--------	-------	----------

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: ETCS → STM (Packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID STM selected by the driver
M_MODE	4	11	Non-Leading
Padding bits	COMPUTED	COMPUTED	

Message 3: ETCS → STM(Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 4: ETCS → STM (Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	6	Order Unconditional HS State
Padding Bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM (Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	8	Order FA State

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Padding bits	COMPUTED	COMPUTED	
Message 6: STM → ETCS (Packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report to STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	5	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	NL	
ETCS Level	STM	
Train State	Standstill	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	Not Established	
DMI Connection	unchanged	
Odometry Connection	unchanged	
Reference Time Data	unchanged	
TIU Connection	Not Established	
BIU Connection	Not Established	
JRU Connection	Not Established	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.1.0.1.1.0.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects NL. The STM requests the CS state and the ETCS sends the order to CS state. The STM switches to the CS state when receiving the order from the ETCS. The ETCS sends the order to HS and the STM switches to HS state. The ETCS sends the order to DA state but the STM does not follow the DA State order
ETCS Requirements Tested	Subset-026 none
	subset-035 7.4.1.1.3; 7.4.1.1.8; 7.4.1.1.12; 7.4.1.2.3A4a; C6; E9; C16; 7.4.1.2.2 CO to CS; CS to HS; HS to DA; HS to FA; 7.4.1.2.4; 7.4.1.2.4.2; 7.4.1.4; 7.4.1.5; ;
STM Requirements Tested	Subset-026 None
	Subset-035 None
Packets Transmitted via FFFIS STM	Packet STM-13; STM-15; STM-5; STM-14;
Comments and constraints	This is a ETCS test case for applying the safe action in the case an STM does not follow an state transition order The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

STM Control Function Connection		Established	
DMI Connection		Not Established	
Odometry Data		Transmitted	
Reference Time Data		Transmitted	
TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

	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	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver select STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3	ETCS sends its current technical mode to the STM	DMI	Driver selects NL	ETCS	Prof	STM Control Connection: Message - 2 Sent packet STM-5 ETCS status data
4	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 packet STM 13 , 15 received	ETCS	Prof	STM Control Connection: Message – 3 Sent packet STM - 14 State order to STM
5	ETCS sends the order to HS	Prof	STM Control Connection: STM reports CS State Message 7 Packet STM-15 STM State report	ETCS	Prof	STM Control Connection: Message - 4 Sent packet STM-14 State order to STM
6	ETCS sends the order to DA Time = T0	Prof	STM Control Connection: STM reports HS state Message 8 Packet STM – 15 STM State report	ETCS	Prof	STM Control Connection: Message - 5 Sent packet STM-14 State order to STM
7	Time = T0 + 5s ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message – 6 Sent packet STM - 14 State order to STM
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

						is closed
--	--	--	--	--	--	-----------

Message 1: STM → ETCS (Packet STM- 13, STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: ETCS → STM (packet STM-5)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
M_MODE	4	11	Non-Leading

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Padding Bits	COMPUTED	COMPUTED	
--------------	----------	----------	--

Message 3: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding Bits	COMPUTED	COMPUTED	

Message 4: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	6	Order Unconditional HS State
Padding bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	7	Order DA State
Padding Bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	8	Order FA State
Padding Bits	COMPUTED	COMPUTED	

Message 7: STM → ETCS (Packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

Message 8: STM → ETCS (Packet STM-15)			
---------------------------------------	--	--	--

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	6	Hot StandBy
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	NL	
ETCS Level	STM	
Train State	Standstill	
Train Data	unchanged	
Additional Data	unchanged	
National Values	unchanged	
STM Control Function Connection	Not Established	
DMI Connection	unchanged	
Odometry Connection	unchanged	
Reference Time Data	unchanged	
TIU Connection	Not Established	
BIU Connection	Not Established	
JRU Connection	Not Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.2.0.1.0.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects data entry (no specific data is needed). When the driver enters the data, the data is sent to the STM. When the STM has all the information needed for operation, requests the CS state. The ETCS sends the order to CS State but the STM does not follow the CS State order
ETCS Requirements Tested	Subset-026 none
	subset-035 5.2.11.2; 5.2.11.3; 5.2.11.4; 7.4.1.1.3; 7.4.1.1.8; 7.4.1.2.3 A4a; C16; 7.4.1.2.2 CO to CS; CO to FA; 7.4.1.2.4.2;
STM Requirements Tested	Subset-026 none
	Subset-035 None
Packets Transmitted via FFFIS STM	STM-13; STM-15; STM-175; STM-176; STM-177; STM-178; STM-14; STM-179
Comments and constraints	This test case is just for checking the behaviour of the ETCS when an STM does not follow the state transition order The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

DMI Connection	Established	
Odometry Data	Transmitted	
Reference Time Data	Transmitted	
TIU Connection	Established	
BIU Connection	Established	
JRU Connection	Established	
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

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Track Adhesion	Not Relevant	
----------------	--------------	--

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver select STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3		DMI	Drivers enters and/or validates train data and additional data	ETCS		
	ETCS sends ETCS train data			ETCS	Prof	STM Control Connection: Message - 2 Sent packet STM-175 Train data and 176 Train data additional "braking characteristic" to STM
	ETCS sends ETCS additional data and data/time			ETCS	Prof	STM Control Connection: Message - 3 Sent packet 177 Additional Data Values and date/time to STM
	ETCS sends the National Values to the STM			ETCS	Prof	STM Control Connection: Message - 4 Sent packet 178 National values to STM
4	-	Prof	STM Control Connection: STM sends End Specific data entry message 7 packet STM-179 Specific STM Data Entry Request			
5	ETCS sends the order to CS Time = T0	Prof	STM Control Connection: STM request CS State Message 1 packets STM-13 and STM-15 received	ETCS	Prof	STM Control Connection: Message – 5 Sent packet STM - 14 State order to STM
6	Time = T0 + 10s ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message - 6 Sent packet STM - 14 State order to STM
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

	DMI Connections are closed			ETCS	Prof	DMI Connection: Connection is closed
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection is closed

Message 1: STM → ETCS (Packets STM-13 and STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: ETCS → STM (Packet STM-175 and STM176)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	175	Train Data
L_PACKET	13	COMPUTED	

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_OPERATIONAL	32	FINITE VALUE	Train running number
NC_TRAIN	15	FINITE VALUE	Train category
L_TRAIN	12	FINITE VALUE	Train length (example taken from the subset-076)
V_MAXTRAIN	7	FINITE VALUE	Maximum permitted train speed (example taken from the subset-076)
M_LOADINGGAUGE	8	FINITE VALUE	Load Profile
M_AXLELOAD	7	FINITE VALUE	Axle Load
M_AIRTIGHT	2	FINITE VALUE	Airtight system presence
N_ITER	5	1	1 Iteration
M_TRACTION (1)	8	FINITE VALUE	Traction System type
NID_PACKET	8	176	Train data additional "braking characteristic" to STM
L_PACKET	13	COMPUTED	
T_BEGIN_SB_EF	16	FINITE VALUE	Brake delay time for starting service brake effort (To be defined)
T_FULL_SB:EF	16	FINITE VALUE	Brake delay time for full service brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_SB_CHAR (1)	10	0	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (1)	8	92	Deceleration characteristic for Service brake: Deceleration value
V_SB_CHAR (2)	10	160	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (2)	8	69	Deceleration characteristic for Service brake: Deceleration value
T_BEGIN_EB_EF	16	FINITE VALUE	Brake delay time for starting emergency brake effort(To be defined)
T_FULL_EB_EF	16	FINITE VALUE	Brake delay time for full emergency brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_EB_CHAR (1)	10	0	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	107	Deceleration characteristic for Emergency brake: Deceleration value

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

V_EB_CHAR (2)	10	160	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	80	Deceleration characteristic for Emergency brake: Deceleration value
T_TRACTION_CUT_OFF	16	FINITE VALUE	Traction cut off time(To be defined)
A_MAX	8	FINITE VALUE	Maximum Train acceleration(To be defined)

Message 3: ETCS → STM (Packet STM-177)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	177	Additional Data Values and date/time to STM
L_PACKET	13	COMPUTED	
NID_DRIVER	32	FINITE VALUE	Driver identity
NID_ENGINE	24	FINITE VALUE	On-board ETCS identity(To be defined)
M_ADHESION	1	FINITE VALUE	Adhesion factor(To be defined)
T_YEAR	7	FINITE VALUE	Official year UTC(To be defined)
T_MONTH	4	FINITE VALUE	Official month UTC(To be defined)
T_DAY	5	FINITE VALUE	Official day UTC(To be defined)
T_HOUR	5	FINITE VALUE	Official hour UTC(To be defined)
T_MINUTES	6	FINITE VALUE	Official minutes UTC(To be defined)
T_SECONDS	6	FINITE VALUE	Official seconds UTC(To be defined)
T_TTS	5	FINITE VALUE	Official hundred of second UTC(To be defined)
Padding bits	COMPUTED	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 4: ETCS → STM (Packet STM-178)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	178	National Values to STM
L_PACKET	13	COMPUTED	
Q_SCALE	2	FINITE VALUE	Distance scale(To be defined)
V_NVSHUNT	7	FINITE VALUE	Shunting mode speed limit(To be defined)
V_NVSTFF	7	FINITE VALUE	Staff Responsible mode speed limit(To be defined)
V_NVONSIGHT	7	FINITE VALUE	On Sight mode speed limit(To be defined)
V_NVUNFIT	7	FINITE VALUE	Unfitted mode speed limit(To be defined)
V_NVREL	7	FINITE VALUE	Release Speed speed limit(To be defined)
D_NVROLL	15	FINITE VALUE	Roll away distance limit(To be defined)
V_NVALLOWOVTRP	7	FINITE VALUE	Maximum speed limit allowing the driver to select the “override EOA” function(To be defined)
V_NVSUPOVTRP	7	FINITE VALUE	Permitted speed limit to be supervised when the “override EOA” function is active(To be defined)
D_NVOVTRP	15	FINITE VALUE	Maximum distance for overriding the train trip(To be defined)
T_NVOVTRP	8	FINITE VALUE	Maximum time for overriding the train trip(To be defined)
D_NVPOTRP	15	FINITE VALUE	Maximum distance for reversing in Post Trip mode(To be defined)
D_NVSTFF	15	FINITE VALUE	Maximum distance for running in Staff Responsible mode(To be defined)
Q_NVDRIVER_ADHES	1	FINITE VALUE	Qualifier for the modification of trackside adhesion factor by driver(To be defined)
Padding bits	COMPUTED	COMPUTED	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 5: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding Bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM (Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	8	Order FA State
Padding Bits	COMPUTED	COMPUTED	

Message 7: STM → ETCS (packet STM-179)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_PACKET	8	179	STM Specific data request
L_PACKET	13	COMPUTED	
Q_DRIVERINT	1	0	
Q_FOLLOWING	1	0	
N_ITER	5	0	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Valid	
Additional Data	Valid	
National Values	unchanged	
STM Control Function Connection	Not Established	
DMI Connection	Not Established	
Odometry Connection	unchanged	
Reference Time Data	Unchanged	
TIU Connection	Not Established	
BIU Connection	Not Established	
JRU Connection	Not Established	
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	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Command			
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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.2.0.1.0.1.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects data entry (no specific data is needed). When the driver enters the data, the data is sent to the STM. When the STM has all information for operation, it requests to go the CS state, and the ETCS orders the CS state. Once the STM confirms the CS state, the ETCS sends the order HS state to the STM but the STM does not follow the HS State order
ETCS Requirements Tested	Subset-026 None
	subset-035 5.2.11.2; 5.2.11.3; 5.2.11.4; 7.4.1.1.3; 7.4.1.1.8; 7.4.1.2.3 A4a; B6; 7.4.1.2.2 CO to CS; CS to HS; 7.4.1.2.4.2
STM Requirements Tested	Subset-026 None
	Subset-035 None
Packets Transmitted via FFFIS STM	STM-13; STM-15; STM-175; STM-176; STM-177; STM-178; STM-14; STM-179
Comments and constraints	This test case is just for checking the behaviour of the ETCS when an STM does not follow the state transition order The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	
STM Control Function Connection	Established	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

DMI Connection		Not Established	
Odometry Data		Transmitted	
Reference Time Data		Transmitted	
TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Track Adhesion	Not Relevant	
----------------	--------------	--

ETCS Test Case

Step	Description/Comments	Input I/F	Input Action	DUT	Output I/F	Output action
1	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver select STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3		DMI	Drivers enters and/or validates train data and additional data	ETCS		
	ETCS sends ETCS train data			ETCS	Prof	STM Control Connection: Message - 3 Sent packet STM-175 Train data and 176 Train data additional "braking characteristic" to STM
	ETCS sends ETCS additional data and data/time			ETCS	Prof	STM Control Connection: Message - 4 Sent packet 177 Additional Data Values and date/time to STM
	ETCS sends the National Values to the STM			ETCS	Prof	STM Control Connection: Message - 5 Sent packet 178 National values to STM
4		Prof	STM Control Connection: STM sends End Specific data entry message 9 packet STM-179 Specific STM Data Entry Request			
5	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 packets STM-13 and STM-15 received	ETCS	Prof	STM Control Connection: Message – 6 Sent packet STM - 14 State order to STM
6	ETCS sends the order to HS Time = T0	Prof	STM Control Connection: STM reports CS state and no other STM is in the HS State Message 2 packet STM-15received	ETCS	Prof	STM Control Connection: Message - 7 Sent packet STM- 14 State order to STM
7	Time = T0 + 10sec ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message - 8 Sent packet STM - 14 State order to

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

						STM
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection is closed

Message 1: STM → ETCS (packets STM-13 and STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: STM → ETCS (packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

Message 3: ETCS → STM (packets STM-175 and STM176)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	175	Train Data
L_PACKET	13	COMPUTED	
NID_OPERATIONAL	32	FINITE VALUE	Train running number entered by the driver
NC_TRAIN	15	FINITE VALUE	Train category entered by the driver
L_TRAIN	12	FINITE VALUE	Train length (example taken from the subset-076) entered by the driver
V_MAXTRAIN	7	FINITE VALUE	Maximum permitted train speed (example taken from the subset-076) entered by the driver
M_LOADINGGAUGE	8	FINITE VALUE	Load Profile entered by the driver
M_AXLELOAD	7	FINITE VALUE	Axle Load entered by the driver
M_AIRTIGHT	2	FINITE VALUE	Airtight system presence entered by the driver
N_ITER	5	1	1 Iteration
M_TRACTION (1)	8	FINITE VALUE	Traction System type
NID_PACKET	8	176	Train data additional "braking characteristic" to STM
L_PACKET	13	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

T_BEGIN_SB_EF	16	FINITE VALUE	Brake delay time for starting service brake effort (To be defined)
T_FULL_SB:EF	16	FINITE VALUE	Brake delay time for full service brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_SB_CHAR (1)	10	0	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (1)	8	92	Deceleration characteristic for Service brake: Deceleration value
V_SB_CHAR (2)	10	160	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (2)	8	69	Deceleration characteristic for Service brake: Deceleration value
T_BEGIN_EB_EF	16	FINITE VALUE	Brake delay time for starting emergency brake effort(To be defined)
T_FULL_EB_EF	16	FINITE VALUE	Brake delay time for full emergency brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_EB_CHAR (1)	10	0	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	107	Deceleration characteristic for Emergency brake: Deceleration value
V_EB_CHAR (2)	10	160	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	80	Deceleration characteristic for Emergency brake: Deceleration value
T_TRACTION_CUT_OFF	16	FINITE VALUE	Traction cut off time(To be defined)
A_MAX	8	FINITE VALUE	Maximum Train acceleration(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 4: ETCS → STM (packet STM-177)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	177	Additional Data Values and date/time to STM
L_PACKET	13	COMPUTED	

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_DRIVER	32	FINITE VALUE	Driver identity
NID_ENGINE	24	FINITE VALUE	On-board ETCS identity(To be defined)
M_ADHESION	1	FINITE VALUE	Adhesion factor(To be defined)
T_YEAR	7	FINITE VALUE	Official year UTC(To be defined)
T_MONTH	4	FINITE VALUE	Official month UTC(To be defined)
T_DAY	5	FINITE VALUE	Official day UTC(To be defined)
T_HOUR	5	FINITE VALUE	Official hour UTC(To be defined)
T_MINUTES	6	FINITE VALUE	Official minutes UTC(To be defined)
T_SECONDS	6	FINITE VALUE	Official seconds UTC(To be defined)
T_TTS	5	FINITE VALUE	Official hundred of second UTC(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM (Packet STM-178)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	178	National Values to STM
L_PACKET	13	COMPUTED	
Q_SCALE	2	FINITE VALUE	Distance scale(To be defined)
V_NVSHUNT	7	FINITE VALUE	Shunting mode speed limit(To be defined)
V_NVSTFF	7	FINITE VALUE	Staff Responsible mode speed limit(To be defined)
V_NVONSIGHT	7	FINITE VALUE	On Sight mode speed limit(To be defined)
V_NVUNFIT	7	FINITE VALUE	Unfitted mode speed limit(To be defined)

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

V_NVREL	7	FINITE VALUE	Release Speed speed limit(To be defined)
D_NVROLL	15	FINITE VALUE	Roll away distance limit(To be defined)
V_NVALLOWOVTRP	7	FINITE VALUE	Maximum speed limit allowing the driver to select the “override EOA” function(To be defined)
V_NVSUPOVTRP	7	FINITE VALUE	Permitted speed limit to be supervised when the “override EOA” function is active(To be defined)
D_NVOVTRP	15	FINITE VALUE	Maximum distance for overriding the train trip(To be defined)
T_NVOVTRP	8	FINITE VALUE	Maximum time for overriding the train trip(To be defined)
D_NVPOTRP	15	FINITE VALUE	Maximum distance for reversing in Post Trip mode(To be defined)
D_NVSTFF	15	FINITE VALUE	Maximum distance for running in Staff Responsible mode(To be defined)
Q_NVDRIVER_ADHES	1	FINITE VALUE	Qualifier for the modification of trackside adhesion factor by driver(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 7: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS

© This document is the property of
ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	6	Order HS State
Padding bits	COMPUTED	COMPUTED	

Message 8: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	8	Order FA State
Padding bits	COMPUTED	COMPUTED	

Message 9: STM → ETCS (packet STM-179)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	179	STM Specific data request
L_PACKET	13	COMPUTED	
Q_DRIVERINT	1	0	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Q_FOLLOWING	1	0	
N_ITER	5	0	
Padding bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Valid	
Additional Data	Valid	
National Values	unchanged	
STM Control Function Connection	Not Established	
DMI Connection	Unchanged	
Odometry Connection	Unchanged	
Reference Time Data	Unchanged	
TIU Connection	Not Established	
BIU Connection	Not Established	
JRU Connection	Not Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Test case 1.1.0.0.2.0.1.0.1.1.0.0.2.0

TEST CASE HEADER	
Test case Identification	Start of mission
	The ETCS Level is STM, the ETCS technical mode is SB and the driver selects data entry (no specific data is needed). When the driver enters the data, the data is sent to the STM. When the STM has all information for operation, it requests to go the CS state, and the ETCS orders the CS state. Once the STM confirms the CS state, the ETCS sends the order HS state to the STM. When the STM switches to HS state the ETCS sends the order to DA but the STM does not follow the DA State order
ETCS Requirements Tested	Subset-026 none
	subset-035 5.2.11.2; 5.2.11.3; 5.2.11.4; 7.4.1.1.3; 7.4.1.1.8; ; 7.4.1.2.3 A4a; B6; D9; D16; 7.4.1.2.2 CO to CS; CS to HS; HS to DA; HS to FA; 7.4.1.2.4.2; 7.4.1.2.4; 7.4.2.1.1; 5.2.10.1;7.4.1.1.4; 7.4.1.1.12;; 7.4.1.4; 7.4.1.5
STM Requirements Tested	Subset-026 none
	Subset-035 None
Packets Transmitted via FFFIS STM	STM-13; STM-15; STM-175; STM-176; STM-177; STM-178; STM-14; STM-179
Comments and constraints	This test case is just for checking the behaviour of the ETCS when an STM does not follow the state transition order The driver has already entered the driver id and the level selection is displayed to the driver

Starting Conditions	Value	Comments
STM_STATE	CO	
ETCS Mode	SB	
ETCS Level	STM	
Train State	Standstill	
Train Data	Invalid	
Additional Data	Invalid	
National Values	Valid	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

STM Control Function Connection		Established	
DMI Connection		Not Established	
Odometry Data		Transmitted	
Reference Time Data		Transmitted	
TIU Connection		Established	
BIU Connection		Established	
JRU Connection		Established	
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	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

	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	ETCS displays a list of the connected STMs to the driver for selecting the correspondent STM	DMI	Driver selects Level STM	ETCS	DMI	List of connected STMs is displayed to the driver for selecting the relevant one
2	Driver selects STM	DMI	Driver selects STM	ETCS	DMI	List of connected STMs is removed
3		DMI	Drivers enters and/or validates train data and additional data	ETCS		
	ETCS sends ETCS train data			ETCS	Prof	STM Control Connection: Message - 4 Sent packet STM-175 Train data and 176 Train data additional "braking characteristic" to STM
	ETCS sends ETCS additional data and data/time			ETCS	Prof	STM Control Connection: Message - 5 Sent packet 177 Additional Data Values and date/time to STM
	ETCS sends the National Values to the STM			ETCS	Prof	STM Control Connection: Message - 6 Sent packet 178 National values to STM
4		Prof	STM Control Connection: STM sends End Specific data entry message 10 packet STM-179 Specific STM Data Entry Request			
5	ETCS sends the order to CS	Prof	STM Control Connection: STM request CS State Message 1 packets STM-13 and STM-15received	ETCS	Prof	STM Control Connection: Message – 7 Sent packet STM - 14 State order to STM
6	ETCS sends the order to HS (no other STM in HS)	Prof	STM Control Connection: STM reports CS state Message 2 packet STM-15 received	ETCS	Prof	STM Control Connection: Message - 8 Sent packet STM- 14 State order to STM
7		DMI	Driver selects Start			
8	ETCS on- board propose the STM mode to the driver	Prof	STM Control Connection: STM reports HS Message 3 packet	ETCS	DMI	Ack STM mode displayed on the DMI

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

			STM-15 received			
9		DMI	Driver acknowledges the STM mode	ETCS	DMI	Ack STM mode is removed
10	ETCS sends the order to DA Time = T0			ETCS	Prof	STM Control Connection: Message 9 Sent packet STM-14 State order to STM
				ETCS	Prof	STM Control Connection: ETCS Status data is sent message 11 packet STM 5
11	Time = T0 + 5s ETCS sends the order to FA	-	-	ETCS	Prof	STM Control Connection: Message - 10 Sent packet STM - 14 State order to STM
-	ETCS takes the safe action	-	-	ETCS	BIU/DMI	Safe action applied
				ETCS	DMI	Information about the failed STM is displayed on the DMI
				ETCS	JRU	Information about the failed STM is recorded in the JRU
	TIU Connection is closed			ETCS	Prof	TIU Connection: Connection is closed
	BIU Connection is closed			ETCS	Prof	BIU Connection: Connection is closed
	JRU Connection is closed			ETCS	Prof	JRU Connection: Connection is closed
	STM Control Connection is closed			ETCS	Prof	STM Control Connection: Connection is closed
12	ETCS releases the safe action when the level is changed	DMI	The driver changes the level to level 1	ETCS	BIU/DMI	Safe action is released

Message 1: STM → ETCS (packets STM-13 and STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	13	STM State request
L_PACKET	13	COMPUTED	Packet length
NID_STMSTATEREQUEST	4	4	Request CS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	2	Configuration
Padding bits	COMPUTED	COMPUTED	

Message 2: STM → ETCS (packet STM-15)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	4	Cold StandBy
Padding bits	COMPUTED	COMPUTED	

Message 3: STM → ETCS			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	15	State report from the STM
L_PACKET	13	COMPUTED	
NID_STMSTATE	4	6	Hot StandBy
Padding bits	COMPUTED	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

Message 4: ETCS → STM (packets STM-175 and STM-176)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	175	Train Data
L_PACKET	13	COMPUTED	
NID_OPERATIONAL	32	FINITE VALUE	Train running number entered by the driver
NC_TRAIN	15	FINITE VALUE	Train category entered by the driver
L_TRAIN	12	FINITE VALUE	Train length (example taken from the subset-076) entered by the driver
V_MAXTRAIN	7	FINITE VALUE	Maximum permitted train speed (example taken from the subset-076) entered by the driver
M_LOADINGGAUGE	8	FINITE VALUE	Load Profile entered by the driver
M_AXLELOAD	7	FINITE VALUE	Axle Load entered by the driver
M_AIRTIGHT	2	FINITE VALUE	Airtight system presence entered by the driver
N_ITER	5	1	1 Iteration
M_TRACTION (1)	8	FINITE VALUE	Traction System type entered by the driver
NID_PACKET	8	176	Train data additional "braking characteristic" to STM
L_PACKET	13	COMPUTED	
T_BEGIN_SB_EF	16	FINITE VALUE	Brake delay time for starting service brake effort (To be defined)
T_FULL_SB:EF	16	FINITE VALUE	Brake delay time for full service brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_SB_CHAR (1)	10	0	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (1)	8	92	Deceleration characteristic for Service brake: Deceleration value

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

V_SB_CHAR (2)	10	160	Deceleration characteristic for Service brake: Speed value
A_SB_CHAR (2)	8	69	Deceleration characteristic for Service brake: Deceleration value
T_BEGIN_EB_EF	16	FINITE VALUE	Brake delay time for starting emergency brake effort(To be defined)
T_FULL_EB_EF	16	FINITE VALUE	Brake delay time for full emergency brake effort(To be defined)
N_ITER	5	2	Number of iterations (this is the example used in the subset-076)
V_EB_CHAR (1)	10	0	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	107	Deceleration characteristic for Emergency brake: Deceleration value
V_EB_CHAR (2)	10	160	Deceleration characteristic for Emergency brake: Speed value
A_EB_CHAR (1)	8	80	Deceleration characteristic for Emergency brake: Deceleration value
T_TRACTION_CUT_OFF	16	FINITE VALUE	Traction cut off time(To be defined)
A_MAX	8	FINITE VALUE	Maximum Train acceleration(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 5: ETCS → STM (packet STM-177)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	177	Additional Data Values and date/time to STM
L_PACKET	13	COMPUTED	
NID_DRIVER	32	FINITE VALUE	Driver identity
NID_ENGINE	24	FINITE VALUE	On-board ETCS identity(To be defined)
M_ADHESION	1	FINITE VALUE	Adhesion factor(To be defined)
T_YEAR	7	FINITE VALUE	Official year UTC(To be defined)
T_MONTH	4	FINITE VALUE	Official month UTC(To be defined)

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

T_DAY	5	FINITE VALUE	Official day UTC(To be defined)
T_HOUR	5	FINITE VALUE	Official hour UTC(To be defined)
T_MINUTES	6	FINITE VALUE	Official minutes UTC(To be defined)
T_SECONDS	6	FINITE VALUE	Official seconds UTC(To be defined)
T_TTS	5	FINITE VALUE	Official hundred of second UTC(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 6: ETCS → STM (packet STM-178)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	178	National Values to STM
L_PACKET	13	COMPUTED	
Q_SCALE	2	FINITE VALUE	Distance scale(To be defined)
V_NVSHUNT	7	FINITE VALUE	Shunting mode speed limit(To be defined)
V_NVSTFF	7	FINITE VALUE	Staff Responsible mode speed limit(To be defined)
V_NVONSIGHT	7	FINITE VALUE	On Sight mode speed limit(To be defined)
V_NVUNFIT	7	FINITE VALUE	Unfitted mode speed limit(To be defined)
V_NVREL	7	FINITE VALUE	Release Speed speed limit(To be defined)
D_NVROLL	15	FINITE VALUE	Roll away distance limit(To be defined)
V_NVALLOWOVTRP	7	FINITE VALUE	Maximum speed limit allowing the driver to select the “override EOA” function(To be defined)
V_NVSUPOVTRP	7	FINITE VALUE	Permitted speed limit to be supervised when the “override EOA” function is

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

			active(To be defined)
D_NVOVTRP	15	FINITE VALUE	Maximum distance for overriding the train trip(To be defined)
T_NVOVTRP	8	FINITE VALUE	Maximum time for overriding the train trip(To be defined)
D_NVPOTRP	15	FINITE VALUE	Maximum distance for reversing in Post Trip mode(To be defined)
D_NVSTFF	15	FINITE VALUE	Maximum distance for running in Staff Responsible mode(To be defined)
Q_NVDRIVER_ADHES	1	FINITE VALUE	Qualifier for the modification of trackside adhesion factor by driver(To be defined)
Padding bits	COMPUTED	COMPUTED	

Message 7: ETCS → STM (packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	4	Order Unconditional CS State
Padding bits	COMPUTED	COMPUTED	

Message 8: ETCS → STM (Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

NID_STMSTATEORDER	4	5	Order HS State
Padding bits	COMPUTED	COMPUTED	

Message 9: ETCS → STM (Packet STM-14)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	14	State order to STM
L_PACKET	13	COMPUTED	
NID_STMSTATEORDER	4	7	Order DA State
Padding bits	COMPUTED	COMPUTED	

Message 10: STM → ETCS (packet STM-179)			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	179	STM Specific Data request
L_PACKET	13	COMPUTED	
Q_DRIVERINT	1	0	
Q_FOLLOWING	1	0	
N_ITER	5	0	
Padding bits	COMPUTED	COMPUTED	

Message 11: ETCS → STM (packet STM-5)			
---------------------------------------	--	--	--

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
L_MESSAGE	8	COMPUTED	
NID_PACKET	8	5	ETCS Status data
L_PACKET	13	COMPUTED	
M_LEVEL	3	1	Level STM
NID_STM	8	FINITE VALUE	The NID_STM selected by the driver
M_MODE	4	13	SN
Padding Bits	COMPUTED	COMPUTED	

End Conditions	Value	Comments
STM_STATE	FA	
ETCS Mode	SB	
ETCS Level	1	
Train State	Standstill	
Train Data	Valid	
Additional Data	Valid	
National Values	unchanged	
STM Control Function Connection	Not Established	
DMI Connection	Unchanged	
Odometry Connection	unchanged	
Reference Time Data	unchanged	
TIU Connection	Not Established	
BIU Connection	Not Established	
JRU Connection	Not Established	
Other connections	unchanged	
TIU Regenerative Brake Command	unchanged	
TIU Magnetic Shoes Command	unchanged	
TIU Eddy Current Brake Command	unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS

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	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
ETCS Version Number	Subset-026	unchanged	
	Subset-035	unchanged	
	Subset-058	unchanged	
	Subset-056	unchanged	
	Subset-057	unchanged	
Track Adhesion		unchanged	

© This document is the property of

ALCATEL * ALSTOM * ANSALDO SIGNAL * BOMBARDIER * INVENSYS RAIL * SIEMENS