



ERTMS/ETCS

FFFIS STM Test cases of Functional identity 007

DMI FUNCTION: MOVED ETCS AREAS

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2.7 Moved ETCS areas

2.7.1 Test Case 7g.1

TEST CASE HEADER	
Test case identification	DMI Function
	7g2.1.5.6.8.9.7.1
	Test for moved ETCS buttons F1-F5 for selecting sub level windows main, override, data view, special and settings for soft key technology.:
	The STM buttons configured in the moved area are requested, their mode is changed to flashing, the buttons are pressed and released. Then the moved ETCS buttons are used to select each sub level window. Eventually the STM buttons configured in the moved area are removed by the STM
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	



Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	

NTC isolation status	Not isolated for active STM. Not relevant for other STMs	
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ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests buttons 2, 3, 1, 4, 5 at positions 2, 3, 1, 4, 5 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Buttons 2, 3, 1, 4, 5 are displayed without flashing at ETCS areas F1-F5. Buttons for sub level selection are displayed at ETCS areas F6-F10.
2	STM requests flashing mode for buttons 2, 3, 1, 4, 5	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS areas F1-F5. Buttons for sub level selection are displayed at ETCS areas F6-F10.
3	Button 2 clicked	DMI	T0+10s	Driver presses button 2 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 2 with 'button pressed' and 'button released' events in sequence.
4	Button 3 clicked	DMI	T0+15s	Driver presses button 3 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E2. ETCS sends button events for button 3 with 'button pressed' and 'button released' events in sequence.
5	Button 1 clicked	DMI	T0+20s	Driver presses button 1 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E3. ETCS sends button events for button 1 with 'button pressed' and



							'button released' events in sequence.
6	Button 4 clicked	DMI	T0+25s	Driver presses button 4 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E4. ETCS sends button events for button 4 with 'button pressed' and 'button released' events in sequence.
7	Button 5 clicked	DMI	T0+30s	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E5. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
8	Driver changes to Main window	DMI	T0+35s	Driver presses button for selection of Main window	DMI		Main window is displayed.
9	Driver changes back to default window	DMI	T0+40s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS areas F1-F5.
10	Driver changes to Override window	DMI	T0+45s	Driver presses button for selection of Override window	DMI		Override window is displayed.
11	Driver changes back to default window	DMI	T0+50s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS areas F1-F5.
12	Driver changes to Data view window	DMI	T0+55s	Driver presses button for selection of Data view window	DMI		Data view window is displayed.
13	Driver changes back to default window	DMI	T0+60s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS



							areas F1-F5.
14	Driver changes to Special window	DMI	T0+65s	Driver presses button for selection of Special window	DMI		Special window is displayed.
15	Driver changes back to default window	DMI	T0+70s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS areas F1-F5.
16	Driver changes to Settings window	DMI	T0+75s	Driver presses button for selection of Settings window	DMI		Settings window is displayed.
17	Driver changes back to default window	DMI	T0+80s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 2, 3, 1, 4, 5 are displayed with flashing at ETCS areas F1-F5.
18	STM removes buttons 2, 3, 1, 4, 5	PROF	T0+85s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas F1-F5. Buttons for sub level selection are displayed at ETCS areas F6-F10.

Message-S1: STM requests buttons 2, 3, 1, 4, 5 at positions 2, 3, 1, 4, 5 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	42	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	291	Packet Length
N_ITER	5	5	Request for 5 buttons



NID_BUTTON(1)	8	2	
NID_BUTPOS(1)	5	2	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	2	Caption="B2"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"2"	
NID_BUTTON(2)	8	3	
NID_BUTPOS(2)	5	3	
NID_ICON(2)	8	0	
M_BUT_ATTRIB(2)	10	1000010000b	black on red, no flashing
L_CAPTION(2)	6	2	Caption="B3"
X_CAPTION(2,1)	8	"B"	
X_CAPTION(2,2)	8	"3"	
NID_BUTTON(3)	8	1	
NID_BUTPOS(3)	5	1	
NID_ICON(3)	8	0	
M_BUT_ATTRIB(3)	10	1000010000b	black on red, no flashing
L_CAPTION(3)	6	2	Caption="B1"
X_CAPTION(3,1)	8	"B"	
X_CAPTION(3,2)	8	"1"	
NID_BUTTON(4)	8	4	
NID_BUTPOS(4)	5	4	



NID_ICON(4)	8	0	
M_BUT_ATTRIB(4)	10	1000010000b	black on red, no flashing
L_CAPTION(4)	6	2	Caption="B4"
X_CAPTION(4,1)	8	"B"	
X_CAPTION(4,2)	8	"4"	
NID_BUTTON(5)	8	5	
NID_BUTPOS(5)	5	5	
NID_ICON(5)	8	0	
M_BUT_ATTRIB(5)	10	1000010000b	black on red, no flashing
L_CAPTION(5)	6	2	Caption="B5"
X_CAPTION(5,1)	8	"B"	
X_CAPTION(5,2)	8	"5"	
Padding bits	4	0000b	

Message-S2: STM requests flashing mode for buttons 2, 3, 1, 4, 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	42	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=291, N=5, ID=2, P=2, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=2, T="B2"			
(2): ID=3, P=3, IC=0, MI=1001010000b, L=2, T="B3"		(3): ID=1, P=1, IC=0, MI=1001010000b, L=2, T="B1"	
(4): ID=4, P=4, IC=0, MI=1001010000b, L=2, T="B4"		(5): ID=5, P=5, IC=0, MI=1001010000b, L=2, T="B5"	



Message-E1: ETCS reports button events for button 2 with 'button pressed' and 'button released' in sequence
(events may be send in one message or two separate messages).

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	2	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	2	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-E2: ETCS reports button events for button 3 with 'button pressed' and 'button released' in sequence
(events may be send in one message or two separate messages).

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length



N_ITER	5	2	2 button events
NID_BUTTON(1)	8	3	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	3	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-E3: ETCS reports button events for button 1 with 'button pressed' and 'button released' in sequence
(events may be send in one message or two separate messages).

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	1	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	1	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event



Padding bits	4	NOT RELEVANT	
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Message-E4: ETCS reports button events for button 4 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	4	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	4	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-E5: ETCS reports button events for button 5 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)

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L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	5	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	5	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes buttons 2, 3, 1, 4, 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	32	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=211, N=5, ID=2, P=2, IC=0, MI=0000000000b (No display), L=0			
(2): ID=3, P=3, IC=0, MI=0000000000b, L=0		(3): ID=1, P=1, IC=0, MI=0000000000b, L=0	(4): ID=4, P=4, IC=0, MI=0000000000b, L=0
(5): ID=5, P=5, IC=0, MI=0000000000b, L=0			

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	



Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	

NTC isolation status	unchanged	
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2.7.2 Test Case 7g.2

TEST CASE HEADER	
Test case identification	DMI Function
	7g2.2.2.3.4.5.6.8.9.7.1
	Test for moved ETCS buttons F1-F5 for selecting sub level windows main, override, data view, special and settings for touchscreen technology.: The STM indicator configured in the moved area is requested, its mode is changed to flashing and the indicator is removed. The STM buttons configured in the moved area are requested, their mode is changed to flashing, the buttons are pressed and released. Then the moved ETCS buttons are used to select each sub level window. Eventually the STM buttons configured in the moved area are removed by the STM
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.1

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 12 at position 12 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 12 is displayed without flashing at ETCS area F3. Buttons



							for sub level selection are displayed at ETCS areas F5-F9.
2	STM requests flashing mode for indicator 12	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 12 is displayed with flashing at ETCS area F3. Buttons for sub level selection are displayed at ETCS areas F5-F9.
3	STM removes indicator 12	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas F1-F4. Buttons for sub level selection are displayed at ETCS areas F5-F9.
4	STM requests buttons 8, 1, 2, 7 at positions 8, 1, 2, 7 without flashing	PROF	T0+15s	connection of active DMI channel: Message-S4	DMI		Buttons 8, 1, 2, 7 are displayed without flashing at ETCS areas F1-F4. Buttons for sub level selection are displayed at ETCS areas F5-F9.
5	STM requests flashing mode for buttons 8, 1, 2, 7	PROF	T0+20s	connection of active DMI channel: Message-S5	DMI		Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4. Buttons for sub level selection are displayed at ETCS areas F5-F9.
6	Button 8 clicked	DMI	T0+25s	Driver presses button 8 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 8 with 'button pressed' and 'button released' events in sequence.
7	Button 1 clicked	DMI	T0+30s	Driver presses button 1 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E2. ETCS sends button events for button 1 with 'button pressed' and 'button released' events in sequence.
8	Button 2 clicked	DMI	T0+35s	Driver presses button 2 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E3.



							ETCS sends button events for button 2 with 'button pressed' and 'button released' events in sequence.
9	Button 7 clicked	DMI	T0+40s	Driver presses button 7 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E4. ETCS sends button events for button 7 with 'button pressed' and 'button released' events in sequence.
10	Driver changes to Main window	DMI	T0+45s	Driver presses button for selection of Main window	DMI		Main window is displayed.
11	Driver changes back to default window	DMI	T0+50s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4.
12	Driver changes to Override window	DMI	T0+55s	Driver presses button for selection of Override window	DMI		Override window is displayed.
13	Driver changes back to default window	DMI	T0+60s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4.
14	Driver changes to Data view window	DMI	T0+65s	Driver presses button for selection of Data view window	DMI		Data view window is displayed.
15	Driver changes back to default window	DMI	T0+70s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4.
16	Driver changes to Special window	DMI	T0+75s	Driver presses button for selection of Special window	DMI		Special window is displayed.
17	Driver changes back to default	DMI	T0+80s	Driver presses close button	DMI		Default window is displayed in STM



	window						mode. Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4.
18	Driver changes to Settings window	DMI	T0+85s	Driver presses button for selection of Settings window	DMI		Settings window is displayed.
19	Driver changes back to default window	DMI	T0+90s	Driver presses close button	DMI		Default window is displayed in STM mode. Buttons 8, 1, 2, 7 are displayed with flashing at ETCS areas F1-F4.
20	STM removes buttons 8, 1, 2, 7	PROF	T0+95s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas F1-F4. Buttons for sub level selection are displayed at ETCS areas F5-F9.

Message-S1: STM requests indicator 12 at position 12 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	87	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	12	
NID_INDPOS(1)	5	12	
NID_ICON(1)	8	0	



M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	3	Caption="I12"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"1"	
X_CAPTION(1,3)	8	"2"	

Message-S2: STM requests flashing mode for indicator 12			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=87, N=1, ID=12, P=12, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=3, T="I12"			

Message-S3: STM removes indicator 12			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=12, P=12, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests buttons 8, 1, 2, 7 at positions 8, 1, 2, 7 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	35	Message Length



NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	238	Packet Length
N_ITER	5	4	Request for 4 buttons
NID_BUTTON(1)	8	8	
NID_BUTPOS(1)	5	8	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	2	Caption="B8"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"8"	
NID_BUTTON(2)	8	1	
NID_BUTPOS(2)	5	1	
NID_ICON(2)	8	0	
M_BUT_ATTRIB(2)	10	1000010000b	black on red, no flashing
L_CAPTION(2)	6	2	Caption="B1"
X_CAPTION(2,1)	8	"B"	
X_CAPTION(2,2)	8	"1"	
NID_BUTTON(3)	8	2	
NID_BUTPOS(3)	5	2	
NID_ICON(3)	8	0	



M_BUT_ATTRIB(3)	10	1000010000b	black on red, no flashing
L_CAPTION(3)	6	2	Caption="B2"
X_CAPTION(3,1)	8	"B"	
X_CAPTION(3,2)	8	"2"	
NID_BUTTON(4)	8	7	
NID_BUTPOS(4)	5	7	
NID_ICON(4)	8	0	
M_BUT_ATTRIB(4)	10	1000010000b	black on red, no flashing
L_CAPTION(4)	6	2	Caption="B7"
X_CAPTION(4,1)	8	"B"	
X_CAPTION(4,2)	8	"7"	
Padding bits	1	0b	

Message-S5: STM requests flashing mode for buttons 8, 1, 2, 7			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	35	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=238, N=4, ID=8, P=8, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=2, T="B8"			
(2): ID=1, P=1, IC=0, MI=1001010000b, L=2, T="B1"		(3): ID=2, P=2, IC=0, MI=1001010000b, L=2, T="B2"	
(4): ID=7, P=7, IC=0, MI=1001010000b, L=2, T="B7"			

Message-E1: ETCS reports button events for button 8 with 'button pressed' and 'button released' in sequence



(events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	8	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	8	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-E2: ETCS reports button events for button 1 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events



NID_BUTTON(1)	8	1	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	1	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-E3: ETCS reports button events for button 2 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	2	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	2	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	



Message-E4: ETCS reports button events for button 7 with 'button pressed' and 'button released' in sequence
(events may be send in one message or two separate messages).

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	7	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	7	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S6: STM removes buttons 8, 1, 2, 7

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	27	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=174, N=4, ID=8, P=8, IC=0, MI=0000000000b (No display), L=0			
(2): ID=1, P=1, IC=0, MI=0000000000b, L=0		(3): ID=2, P=2, IC=0, MI=0000000000b, L=0	(4): ID=7, P=7, IC=0, MI=0000000000b, L=0



2.7.3 Test Case 7g.3

TEST CASE HEADER	
Test case identification	DMI Function
	7g3.0.2.3.4.9.2.3.4.1
	<p>Test for moved ETCS area A4 for display of slippery rail indicator for soft key technology.:</p> <p>The test starts with adhesion set to non slippery rail. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the driver changes the adhesion to slippery rail and the test steps are repeated with adhesion set to slippery rail.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-177, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	For the test the driver must be allowed to change the adhesion and the adhesion shall be non slippery rail at start of the test

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	
Train State	not relevant	
ETCS Train Data	not relevant	

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Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	Not isolated for active STM. Not relevant for other STMs	



ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 15 at position 15 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 15 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
2	STM requests flashing mode for indicator 15	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 15 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
3	STM removes indicator 15	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
4	Driver changes adhesion to slippery rail	DMI	T0+15s	Driver selects Special window and then Adhesion window. He changes adhesion to slippery rail and returns to default window.	DMI		Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
					PROF		STM Control Connection Message E1: ETCS reports changed adhesion to STM
5	STM requests indicator 15 at position 15 without flashing	PROF	T0+25s	connection of active DMI channel: Message-S1	DMI		Indicator 15 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
6	STM requests flashing mode for indicator 15	PROF	T0+30s	connection of active DMI channel: Message-S2	DMI		Indicator 15 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.



7	STM removes indicator 15	PROF	T0+35s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
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Message-S1: STM requests indicator 15 at position 15 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	15	
NID_INDPOS(1)	5	15	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind15"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	



X_CAPTION(1,5)	8	"5"	
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Message-S2: STM requests flashing mode for indicator 15			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=15, P=15, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind15"			

Message-S3: STM removes indicator 15			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=15, P=15, IC=0, MI=0000000000b (No display), L=0			

Message-E1: ETCS reports changed adhesion to STM			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	177	Additional Data Values and date/time to STM(STM-177)
L_PACKET	13	116	Packet Length
NID_ENGINE	24	FINITE_VALUE	According to tested ETCS onboard
M_ADHESION	1	1	Slippery rail



YEAR	7	FINITE_VALUE	Actual date and time
MONTH	4	FINITE_VALUE	
DAY	5	FINITE_VALUE	
HOURL	5	FINITE_VALUE	
MINUTES	6	FINITE_VALUE	
SECONDS	6	FINITE_VALUE	
TTS	5	FINITE_VALUE	
NID_OPERATIONAL_STM	32	FINITE_VALUE	Train running number
Padding bits	4	NOT RELEVANT	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	



TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	

2.7.4 Test Case 7g.4

TEST CASE HEADER	
Test case identification	DMI Function
	7g3.0.5.6.8.7.2.3.4.9.5.6.8.7.2.3.4.1
	<p>Test for moved ETCS area A4 for display of slippery rail indicator for touchscreen technology.:</p> <p>The test starts with adhesion set to non slippery rail. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p>



	The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the driver changes the adhesion to slippery rail and the test steps are repeated with adhesion set to slippery rail.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-177, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.3.
	For the test the driver must be allowed to change the adhesion and the adhesion shall be non slippery rail at start of the test

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 4 at position 4 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Button 4 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
2	STM requests flashing mode for button 4	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 4 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
3	Button 4 clicked	DMI	T0+10s	Driver presses button 4 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 4 with 'button pressed' and 'button released' events in sequence.



4	STM removes button 4	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
5	STM requests indicator 15 at position 15 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 15 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
6	STM requests flashing mode for indicator 15	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 15 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
7	STM removes indicator 15	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows no symbol.
8	Driver changes adhesion to slippery rail	DMI	T0+35s	Driver selects Special window and then Adhesion window. He changes adhesion to slippery rail and returns to default window.	DMI		Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
					PROF		STM Control Connection Message E2: ETCS reports changed adhesion to STM
9	STM requests button 4 at position 4 without flashing	PROF	T0+45s	connection of active DMI channel: Message-S1	DMI		Button 4 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
10	STM requests flashing mode for button 4	PROF	T0+50s	connection of active DMI channel: Message-S2	DMI		Button 4 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.



11	Button 4 clicked	DMI	T0+55s	Driver presses button 4 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 4 with 'button pressed' and 'button released' events in sequence.
12	STM removes button 4	PROF	T0+60s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
13	STM requests indicator 15 at position 15 without flashing	PROF	T0+65s	connection of active DMI channel: Message-S4	DMI		Indicator 15 is displayed without flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
14	STM requests flashing mode for indicator 15	PROF	T0+70s	connection of active DMI channel: Message-S5	DMI		Indicator 15 is displayed with flashing at ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.
15	STM removes indicator 15	PROF	T0+75s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved indicator for adhesion in G1 shows symbol ST02 for slippery rail.

Message-S1: STM requests button 4 at position 4 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length



NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	4	
NID_BUTPOS(1)	5	4	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But4"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"4"	

Message-S2: STM requests flashing mode for button 4			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=95, N=1, ID=4, P=4, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But4"			

Message-E1: ETCS reports button events for button 4 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	4	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	4	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 4			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=4, P=4, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 15 at position 15 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length

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NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	15	
NID_INDPOS(1)	5	15	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind15"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"5"	

Message-S5: STM requests flashing mode for indicator 15			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=15, P=15, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind15"			



Message-S6: STM removes indicator 15			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=15, P=15, IC=0, MI=0000000000b (No display), L=0			

Message-E2: ETCS reports changed adhesion to STM			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	177	Additional Data Values and date/time to STM(STM-177)
L_PACKET	13	116	Packet Length
NID_ENGINE	24	FINITE_VALUE	According to tested ETCS onboard
M_ADHESION	1	1	Slippery rail
YEAR	7	FINITE_VALUE	Actual date and time
MONTH	4	FINITE_VALUE	
DAY	5	FINITE_VALUE	
HOUR	5	FINITE_VALUE	
MINUTES	6	FINITE_VALUE	
SECONDS	6	FINITE_VALUE	
TTS	5	FINITE_VALUE	
NID_OPERATIONAL_STM	32	FINITE_VALUE	Train running number



Padding bits	4	NOT RELEVANT	
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2.7.5 Test Case 7g.5

TEST CASE HEADER	
Test case identification	DMI Function
	7g4.0.1.2.3.4.1
	Test for moved ETCS area B7 for display of ERTMS/ETCS mode for soft key technology.: The STM indicator configured in the moved area B7 is requested and its mode is changed to flashing. Then the indicator is removed.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.8
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN/NL	Both modes shall be tested
ETCS Level	NTC	



Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	

NTC isolation status	Not isolated for active STM. Not relevant for other STMs	
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ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 2 at position 20 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 2 is displayed without flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
2	STM requests flashing mode for indicator 2	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 2 is displayed with flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
3	STM removes indicator 2	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D

Message-S1: STM requests indicator 2 at position 20 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length



NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	2	
NID_INDPOS(1)	5	20	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind2"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	

Message-S2: STM requests flashing mode for indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=2, P=20, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind2"			

Message-S3: STM removes indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM

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L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=2, P=20, IC=0, MI=0000000000b (No display), L=0			

End Conditions	Value	Comments	
STM State	unchanged		
ETCS Mode	unchanged		
ETCS Level	unchanged		
Train State	not relevant		
ETCS Train Data	not relevant		
Active DMI channel Connection	unchanged		
Other DMI channels Connections	not relevant		
TIU Connection	not relevant		
BIU Connection	not relevant		
JD Connection	not relevant		
TIU Regenerative Brake Command	not relevant		
TIU Magnetic Shoes Brake Command	not relevant		
TIU Eddy Current Brake Command for Emergency Brake	not relevant		
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	

2.7.6 Test Case 7g.6

TEST CASE HEADER	
Test case identification	DMI Function
	7g4.0.1.5.6.8.7.2.3.4.1
	Test for moved ETCS area B7 for display of ERTMS/ETCS mode for touchscreen technology.: The STM button configured in the moved area B7 is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed. The STM indicator configured in the moved area B7 is requested and its mode is changed to flashing. Then the indicator is removed.
ERTMS/ETCS on-board requirements tested	



	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.8
Comments and constraints	Starting and end conditions as for test case 7g.5.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 2 at position 18 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Button 2 is displayed without flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
2	STM requests flashing mode for button 2	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 2 is displayed with flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
3	Button 2 clicked	DMI	T0+10s	Driver presses button 2 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 2 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 2	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area B7.



							Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
5	STM requests indicator 2 at position 20 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 2 is displayed without flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
6	STM requests flashing mode for indicator 2	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 2 is displayed with flashing at ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D
7	STM removes indicator 2	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area B7. Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area D

Message-S1: STM requests button 2 at position 18 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length

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N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	2	
NID_BUTPOS(1)	5	18	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But2"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"2"	

Message-S2: STM requests flashing mode for button 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=95, N=1, ID=2, P=18, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But2"			

Message-E1: ETCS reports button events for button 2 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)



L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	2	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	2	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=2, P=18, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 2 at position 20 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA



NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	2	
NID_INDPOS(1)	5	20	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind2"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	

Message-S5: STM requests flashing mode for indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=2, P=20, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind2"			

Message-S6: STM removes indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length

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STM-15: PL=25, ST=7, (State DA)

STM-35: PL=63, N=1, ID=2, P=20, IC=0, MI=0000000000b (No display), L=0

2.7.7 Test Case 7g.7

TEST CASE HEADER	
Test case identification	DMI Function
	7g4.0.2.3.4.1.2.3.4.1
	<p>Test for moved ETCS areas C8 and B7 for display of ERTMS/ETCS mode and level for soft key technology.:</p> <p>The STM indicator configured in the moved area C8 is requested and its mode is changed to flashing. Then the indicator is removed.</p> <p>The STM indicator configured in the moved area B7 is requested and its mode is changed to flashing. Then the indicator is removed.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.5.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
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1	STM requests indicator 1 at position 15 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 1 is displayed without flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
2	STM requests flashing mode for indicator 1	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 1 is displayed with flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
3	STM removes indicator 1	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
4	STM requests indicator 2 at position 19 without flashing	PROF	T0+15s	connection of active DMI channel: Message-S4	DMI		Indicator 2 is displayed without flashing at ETCS area B7. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
5	STM requests flashing mode for indicator 2	PROF	T0+20s	connection of active DMI channel: Message-S5	DMI		Indicator 2 is displayed with flashing at ETCS area B7.



							<p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>
6	STM removes indicator 2	PROF	T0+25s	connection of active DMI channel: Message-S6	DMI		<p>No indicators or buttons are displayed in ETCS area B7.</p> <p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>

Message-S1: STM requests indicator 1 at position 15 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	1	
NID_INDPOS(1)	5	15	
NID_ICON(1)	8	0	



M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind1"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	

Message-S2: STM requests flashing mode for indicator 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=1, P=15, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind1"			

Message-S3: STM removes indicator 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=1, P=15, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 2 at position 19 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	2	
NID_INDPOS(1)	5	19	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind2"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	

Message-S5: STM requests flashing mode for indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=2, P=19, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind2"			



Message-S6: STM removes indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=2, P=19, IC=0, MI=0000000000b (No display), L=0			

2.7.8 Test Case 7g.8

TEST CASE HEADER	
Test case identification	DMI Function
	7g4.0.5.6.8.7.2.3.4.1.5.6.8.7.2.3.4.1
	<p>Test for moved ETCS areas C8 and B7 for display of ERTMS/ETCS mode and level for touchscreen technology.:</p> <p>The STM button configured in the moved area C8 is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed. The STM indicator configured in the moved area C8 is requested and its mode is changed to flashing. Then the indicator is removed.</p> <p>The STM button configured in the moved area B7 is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed. The STM indicator configured in the moved area B7 is requested and its mode is changed to flashing. Then the indicator is removed.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35



ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.5.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 1 at position 4 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Button 1 is displayed without flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
2	STM requests flashing mode for button 1	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 1 is displayed with flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
3	Button 1 clicked	DMI	T0+10s	Driver presses button 1 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 1 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 1	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved level indicator shows symbol



							for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
5	STM requests indicator 1 at position 15 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 1 is displayed without flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
6	STM requests flashing mode for indicator 1	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 1 is displayed with flashing at ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
7	STM removes indicator 1	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas A4+C8. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
8	STM requests button 2 at position 12 without flashing	PROF	T0+35s	connection of active DMI channel: Message-S7	DMI		Button 2 is displayed without flashing at ETCS area B7. Moved level indicator shows symbol for active STM in area G1 Moved mode indicator shows

							symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5
9	STM requests flashing mode for button 2	PROF	T0+40s	connection of active DMI channel: Message-S8	DMI		<p>Button 2 is displayed with flashing at ETCS area B7.</p> <p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>
10	Button 2 clicked	DMI	T0+45s	Driver presses button 2 and releases it within 500ms.	PROF		<p>Connection of active DMI channel: Message-E2.</p> <p>ETCS sends button events for button 2 with 'button pressed' and 'button released' events in sequence.</p>
11	STM removes button 2	PROF	T0+50s	connection of active DMI channel: Message-S9	DMI		<p>No indicators or buttons are displayed in ETCS area B7.</p> <p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>
12	STM requests indicator 2 at position 19 without flashing	PROF	T0+55s	connection of active DMI channel: Message-S10	DMI		<p>Indicator 2 is displayed without flashing at ETCS area B7.</p> <p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>
13	STM requests flashing mode for indicator 2	PROF	T0+60s	connection of active DMI channel: Message-S11	DMI		Indicator 2 is displayed with flashing at ETCS area B7.



							<p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>
14	STM removes indicator 2	PROF	T0+65s	connection of active DMI channel: Message-S12	DMI		<p>No indicators or buttons are displayed in ETCS area B7.</p> <p>Moved level indicator shows symbol for active STM in area G1</p> <p>Moved mode indicator shows symbol MO19 (for mode SN) or MO12 (for mode NL) in area G5</p>

Message-S1: STM requests button 1 at position 4 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	1	
NID_BUTPOS(1)	5	4	
NID_ICON(1)	8	0	



M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But1"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"1"	

Message-S2: STM requests flashing mode for button 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=95, N=1, ID=1, P=4, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But1"			

Message-E1: ETCS reports button events for button 1 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	1	
Q_BUTTON(1)	1	0	Button pressed



T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	1	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=1, P=4, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 1 at position 15 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	1	



NID_INDPOS(1)	5	15	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind1"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	

Message-S5: STM requests flashing mode for indicator 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=1, P=15, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind1"			

Message-S6: STM removes indicator 1			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=1, P=15, IC=0, MI=0000000000b (No display), L=0			

Message-S7: STM requests button 2 at position 12 without flashing			
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VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	2	
NID_BUTPOS(1)	5	12	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But2"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"2"	

Message-S8: STM requests flashing mode for button 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length



STM-15: PL=25, ST=7, (State DA)

STM-32: PL=95, N=1, ID=2, P=12, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But2"

Message-E2: ETCS reports button events for button 2 with 'button pressed' and 'button released' in sequence
(events may be send in one message or two separate messages).

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	2	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	2	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S9: STM removes button 2

VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length

STM-15: PL=25, ST=7, (State DA)



STM-32: PL=63, N=1, ID=2, P=12, IC=0, MI=0000000000b (No display), L=0

Message-S10: STM requests indicator 2 at position 19 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	2	
NID_INDPOS(1)	5	19	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="Ind2"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	

Message-S11: STM requests flashing mode for indicator 2			
VARIABLE	Length	VALUE	COMMENT

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NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=95, N=1, ID=2, P=19, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="Ind2"			

Message-S12: STM removes indicator 2			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=2, P=19, IC=0, MI=0000000000b (No display), L=0			

2.7.9 Test Case 7g.9

TEST CASE HEADER	
Test case identification	DMI Function
	7g5.0.2.3.4.1.2.0
	Test for moved ETCS area C1 for level announcement and mode acknowledgement for soft key technology.: The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then a level announcement is received and the location to acknowledge the announcement passed. Then the driver acknowledges the level transition.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	



Packets transmitted via FFFIS STM	STM-15, STM-14, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	
Train State	moving	speed constant 100km/h
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	Not isolated for active STM. Not relevant for other STMs	

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 17 at position 17 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 17 is displayed without flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
2	STM requests flashing mode for indicator 17	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 17 is displayed with flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
3	STM removes indicator 17	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C1. Moved indicator for level announcement



							and mode acknowledgement in G3+G4 shows no symbol.
4	Another level is announced	BTM	T0+15s	Message-B1: balise group received with level transition announcement to another Level NTC.	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE08.
5	Location for acknowledgement of level announcement is passed	ODO	T0+20s	More than 100m passed since level transition announcement	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE09.
6	Driver acknowledges level announcement	DMI	T0+30s	Driver presses the acknowledge button	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE08.
7	Location of border is passed	ODO	T0+37s	More than 600m passed since level transition announcement	DMI		Display of actual level is changed to new NTC level. DMI display is adapted to configuration of new STM, except hiding of CSG.
8			T0+37s		PROF	5	STM Control Connection: Message-E1. ETCS conditionally orders STM to CS.
9	STM reports CS in time		T0+40s	STM Control Connection Message-S5	PROF		
10	Driver acknowledgment timeout		T0+37s	More than 5 seconds passed since border passed.	TIU	5-10	No service brake applied because of missing driver acknowledgement.

Message-S1: STM requests indicator 17 at position 17 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	17	
NID_INDPOS(1)	5	17	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind17"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"7"	

Message-S2: STM requests flashing mode for indicator 17			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			



STM-35: PL=103, N=1, ID=17, P=17, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind17"

Message-S3: STM removes indicator 17			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=17, P=17, IC=0, MI=0000000000b (No display), L=0			

Message-E1: ETCS orders STM conditionally to CS			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	6	Message Length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	25	Packet Length
NID_STMSTATEORDER	4	5	Conditional state order to CS
Padding bits	7	NOT RELEVANT	

Message-S4: STM reports state CS			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the previously active STM
L_MESSAGE	8	6	Message Length
STM-15: PL=25, ST=4, (State CS)			



Message-B1 balise 1 of 2 : Level transition announcement to another Level NTC.			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order
Q_DIR	2	01b	Nominal
L_PACKET	13	71	
Q_SCALE	2	01b	1m scale
D_LEVELTR	15	600	600m
M_LEVELTR	3	1	Level NTC specified by NID_NTC
NID_NTC	8	FINITE_VALUE	Another NTC than the currently active one
L_ACKLEVELTR	15	500	500m
N_ITER	5	0	no mixed level area
NID_PACKET	8	255	Finishing flag of the telegram



Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	unchanged	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	



BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	

2.7.10 Test Case 7g.10

TEST CASE HEADER	
Test case identification	DMI Function

	7g5.0.5.6.8.7.2.3.4.1.1.1.2.0
	<p>Test for moved ETCS area C1 for level announcement and mode acknowledgement for touchscreen technology.:</p> <p>The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p> <p>The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then a level announcement is received and the location to acknowledge the announcement passed. The STM button configured in the moved area is requested and the button is pressed and released.</p> <p>Then the driver acknowledges the level transition.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-14, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 3 at position 3 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Button 3 is displayed without flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
2	STM requests flashing mode for button 3	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 3 is displayed with flashing at ETCS area C1. Moved indicator for level announcement and mode



							acknowledgement in G3+G4 shows no symbol.
3	Button 3 clicked	DMI	T0+10s	Driver presses button 3 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 3 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 3	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
5	STM requests indicator 17 at position 17 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 17 is displayed without flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
6	STM requests flashing mode for indicator 17	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 17 is displayed with flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
7	STM removes indicator 17	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows no symbol.
8	Another level is announced	BTM	T0+35s	Message-B1: balise group received with level transition announcement to Level 1.	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE10.



9	Location for acknowledgement of level announcement is passed	ODO	T0+40s	More than 100m passed since level transition announcement	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE11.
10	STM requests button 3 at position 3 without flashing	PROF	T0+40s	connection of active DMI channel: Message-S1	DMI		Button 3 is displayed without flashing at ETCS area C1. Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE11.
11	Button 3 clicked	DMI	T0+45s	Driver presses button 3 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 3 with 'button pressed' and 'button released' events in sequence.
12	Driver acknowledges level announcement	DMI	T0+50s	Driver presses the level announcement symbol in G3+G4	DMI		Moved indicator for level announcement and mode acknowledgement in G3+G4 shows symbol LE10.
13	Location of border is passed	ODO	T0+57s	More than 600m passed since level transition announcement	DMI		Display of actual level is changed to level 1. DMI elements are displayed as specified for ETCS, all DMI elements of the STM removed and ETCS areas moved for the STM are moved back.
14			T0+57s		PROF	5	STM Control Connection: Message-E2. ETCS unconditionally orders STM to CS.
15	STM reports CS in time		T0+60s	STM Control Connection Message-S8	PROF		



16	Driver acknowledgment timeout		T0+57s	More than 5 seconds passed since border passed.	TIU	5-10	No service brake applied because of missing driver acknowledgement.
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Message-S1: STM requests button 3 at position 3 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	3	
NID_BUTPOS(1)	5	3	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But3"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"U"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"3"	

Message-S2: STM requests flashing mode for button 3



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=95, N=1, ID=3, P=3, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But3"			

Message-E1: ETCS reports button events for button 3 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	3	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	3	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 3			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=3, P=3, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 17 at position 17 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	17	
NID_INDPOS(1)	5	17	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind17"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	



X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"7"	

Message-S5: STM requests flashing mode for indicator 17			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=17, P=17, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind17"			

Message-S6: STM removes indicator 17			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=17, P=17, IC=0, MI=0000000000b (No display), L=0			

Message-E2: ETCS orders STM unconditionally to CS			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	6	Message Length
NID_PACKET	8	14	State order to STM (STM-14)
L_PACKET	13	25	Packet Length
NID_STMSTATEORDER	4	4	Unconditional state order to CS



Padding bits	7	NOT RELEVANT	
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Message-S7: STM reports state CS			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the previously active STM
L_MESSAGE	8	6	Message Length
STM-15: PL=25, ST=4, (State CS)			

Message-B1 balise 1 of 2 : Level transition announcement to Level 1.			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order
Q_DIR	2	01b	Nominal
L_PACKET	13	63	
Q_SCALE	2	01b	1m scale

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D_LEVELTR	15	600	600m
M_LEVELTR	3	2	Level 1
L_ACKLEVELTR	15	0	0m
N_ITER	5	0	no mixed level area
NID_PACKET	8	255	Finishing flag of the telegram

Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

2.7.11 Test Case 7g.11

TEST CASE HEADER	
Test case identification	DMI Function



	7g6.0.2.3.4.9.2.3.4.10.1
	<p>Test for moved ETCS area C7 for display of override for Customisable DMI service with configuration 7a.8 for soft key technology.:</p> <p>The test starts with no override active. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM reports the activation of its override procedure to the ETCS and the test steps are repeated with override activated. Eventually the override status is terminated by ETCS.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-6, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.8
Comments and constraints	For the test the national values for the maximum distance (D_NVOVTRP) and time (T_NVOVTRP) in override shall be 200m and 60 seconds respectively.

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	
Train State	moving	speed constant 10km/h
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	



JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	Not isolated for active STM. Not relevant for other STMs	

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 21 at position 21 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 21 is displayed without flashing at ETCS area C7. Moved



							override indicator in area D shows no symbol
2	STM requests flashing mode for indicator 21	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 21 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows no symbol
3	STM removes indicator 21	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows no symbol
4	STM reports activation of its override procedure	PROF	T0+15s	STM Control connection: Message-S4	DMI		Moved override indicator in area D shows symbol MO03
5	STM requests indicator 21 at position 21 without flashing	PROF	T0+40s	connection of active DMI channel: Message-S1	DMI		Indicator 21 is displayed without flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
6	STM requests flashing mode for indicator 21	PROF	T0+45s	connection of active DMI channel: Message-S2	DMI		Indicator 21 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
7	STM removes indicator 21	PROF	T0+50s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows symbol MO03
8	ETCS terminates override after maximum time		T0+15s	60 s passed since override activated	DMI	60-65	Moved override indicator in area D shows no symbol

Message-S1: STM requests indicator 21 at position 21 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	21	
NID_INDPOS(1)	5	21	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind21"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	
X_CAPTION(1,5)	8	"1"	

Message-S2: STM requests flashing mode for indicator 21			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			



STM-35: PL=103, N=1, ID=21, P=21, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind21"

Message-S3: STM removes indicator 21			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=21, P=21, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM reports activation of its override procedure			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	8	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	6	Override activation from STM(STM-6)
L_PACKET	13	21	Packet Length
Padding bits	2	00b	

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	



Train State	unchanged	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	

NTC isolation status	unchanged	
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2.7.12 Test Case 7g.12

TEST CASE HEADER	
Test case identification	DMI Function
	7g6.0.5.6.8.7.2.3.4.9.5.6.8.7.2.3.4.10.1
	Test for moved ETCS area C7 for display of override for Customisable DMI service with configuration 7a.8 for touchscreen technology.:
	<p>The test starts with no override active. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p> <p>The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM reports the activation of its override procedure to the ETCS and the test steps are repeated with override activated. Eventually the override status is terminated by ETCS.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-6, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.8
Comments and constraints	<p>Starting and end conditions as for test case 7g.11.</p> <p>For the test the national values for the maximum distance (D_NVOVTRP) and time (T_NVOVTRP) in override shall be 200m and 60 seconds respectively.</p>

ERTMS/ETCS on-board Test Case



Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 19 at position 19 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Button 19 is displayed without flashing at ETCS area C7. Moved override indicator in area D shows no symbol
2	STM requests flashing mode for button 19	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 19 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows no symbol
3	Button 19 clicked	DMI	T0+10s	Driver presses button 19 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 19 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 19	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows no symbol
5	STM requests indicator 21 at position 21 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 21 is displayed without flashing at ETCS area C7. Moved override indicator in area D shows no symbol
6	STM requests flashing mode for indicator 21	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 21 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows no symbol
7	STM removes indicator 21	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows no symbol



8	STM reports activation of its override procedure	PROF	T0+35s	STM Control connection: Message-S7	DMI		Moved override indicator in area D shows symbol MO03
9	STM requests button 19 at position 19 without flashing	PROF	T0+40s	connection of active DMI channel: Message-S1	DMI		Button 19 is displayed without flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
10	STM requests flashing mode for button 19	PROF	T0+45s	connection of active DMI channel: Message-S2	DMI		Button 19 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
11	Button 19 clicked	DMI	T0+50s	Driver presses button 19 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 19 with 'button pressed' and 'button released' events in sequence.
12	STM removes button 19	PROF	T0+55s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows symbol MO03
13	STM requests indicator 21 at position 21 without flashing	PROF	T0+60s	connection of active DMI channel: Message-S4	DMI		Indicator 21 is displayed without flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
14	STM requests flashing mode for indicator 21	PROF	T0+65s	connection of active DMI channel: Message-S5	DMI		Indicator 21 is displayed with flashing at ETCS area C7. Moved override indicator in area D shows symbol MO03
15	STM removes indicator 21	PROF	T0+70s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area D shows symbol MO03



16	ETCS terminates override after maximum time		T0+35s	60 s passed since override activated	DMI	60-65	Moved override indicator in area D shows no symbol
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Message-S1: STM requests button 19 at position 19 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	19	
NID_BUTPOS(1)	5	19	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="But19"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"U"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"9"	



Message-S2: STM requests flashing mode for button 19			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=103, N=1, ID=19, P=19, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="But19"			

Message-E1: ETCS reports button events for button 19 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	19	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	19	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 19



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=19, P=19, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 21 at position 21 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	21	
NID_INDPOS(1)	5	21	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind21"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	



X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"2"	
X_CAPTION(1,5)	8	"1"	

Message-S5: STM requests flashing mode for indicator 21			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=21, P=21, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind21"			

Message-S6: STM removes indicator 21			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=21, P=21, IC=0, MI=0000000000b (No display), L=0			

Message-S7: STM reports activation of its override procedure			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	8	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length



NID_STMSTATE	4	7	State DA
NID_PACKET	8	6	Override activation from STM(STM-6)
L_PACKET	13	21	Packet Length
Padding bits	2	00b	

2.7.13 Test Case 7g.13

TEST CASE HEADER	
Test case identification	DMI Function
	7g6.0.2.3.4.9.2.3.4.10.1
	Test for moved ETCS area C7 for display of override for Customisable DMI service with configuration 7a.9 for soft key technology.: The test starts with no override active. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM reports the activation of its override procedure to the ETCS and the test steps are repeated with override activated. Eventually the override status is terminated by ETCS.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-6, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.11.
	For the test the national values for the maximum distance (D_NVOVTRP) and time (T_NVOVTRP) in override shall be 200m and 60 seconds respectively.

ERTMS/ETCS on-board Test Case



Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 18 at position 18 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 18 is displayed without flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
2	STM requests flashing mode for indicator 18	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 18 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
3	STM removes indicator 18	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows no symbol
4	STM reports activation of its override procedure	PROF	T0+15s	STM Control connection: Message-S4	DMI		Moved override indicator in area G4 shows symbol MO03
5	STM requests indicator 18 at position 18 without flashing	PROF	T0+40s	connection of active DMI channel: Message-S1	DMI		Indicator 18 is displayed without flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
6	STM requests flashing mode for indicator 18	PROF	T0+45s	connection of active DMI channel: Message-S2	DMI		Indicator 18 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
7	STM removes indicator 18	PROF	T0+50s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows symbol MO03
8	ETCS terminates override after maximum time		T0+15s	60 s passed since override activated	DMI	60-65	Moved override indicator in area G4 shows no symbol



Message-S1: STM requests indicator 18 at position 18 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	18	
NID_INDPOS(1)	5	18	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind18"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"8"	

Message-S2: STM requests flashing mode for indicator 18			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=18, P=18, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind18"			

Message-S3: STM removes indicator 18			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=18, P=18, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM reports activation of its override procedure			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	8	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	6	Override activation from STM(STM-6)
L_PACKET	13	21	Packet Length
Padding bits	2	00b	



2.7.14 Test Case 7g.14

TEST CASE HEADER	
Test case identification	DMI Function
	7g6.0.2.3.4.9.2.3.4.10.1
	Test for moved ETCS area C7 for display of override for Customisable DMI service with configuration 7a.9 for touchscreen technology.:
	<p>The test starts with no override active. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p> <p>The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM reports the activation of its override procedure to the ETCS and the test steps are repeated with override activated. Eventually the override status is terminated by ETCS.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-6, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.11.
	For the test the national values for the maximum distance (D_NVOVTRP) and time (T_NVOVTRP) in override shall be 200m and 60 seconds respectively.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 6 at position 6	PROF	T0	connection of active DMI channel:	DMI		Button 6 is displayed without



	without flashing			Message-S1			flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
2	STM requests flashing mode for button 6	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 6 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
3	Button 6 clicked	DMI	T0+10s	Driver presses button 6 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 6 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 6	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows no symbol
5	STM requests indicator 18 at position 18 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 18 is displayed without flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
6	STM requests flashing mode for indicator 18	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 18 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows no symbol
7	STM removes indicator 18	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows no symbol
8	STM reports activation of its override procedure	PROF	T0+35s	STM Control connection: Message-S7	DMI		Moved override indicator in area G4 shows symbol MO03
9	STM requests button 6 at position 6	PROF	T0+40s	connection of active DMI channel:	DMI		Button 6 is displayed without



	without flashing			Message-S1			flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
10	STM requests flashing mode for button 6	PROF	T0+45s	connection of active DMI channel: Message-S2	DMI		Button 6 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
11	Button 6 clicked	DMI	T0+50s	Driver presses button 6 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 6 with 'button pressed' and 'button released' events in sequence.
12	STM removes button 6	PROF	T0+55s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows symbol MO03
13	STM requests indicator 18 at position 18 without flashing	PROF	T0+60s	connection of active DMI channel: Message-S4	DMI		Indicator 18 is displayed without flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
14	STM requests flashing mode for indicator 18	PROF	T0+65s	connection of active DMI channel: Message-S5	DMI		Indicator 18 is displayed with flashing at ETCS area C7. Moved override indicator in area G4 shows symbol MO03
15	STM removes indicator 18	PROF	T0+70s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS area C7. Moved override indicator in area G4 shows symbol MO03
16	ETCS terminates override after maximum time		T0+35s	60 s passed since override activated	DMI	60-65	Moved override indicator in area G4 shows no symbol



Message-S1: STM requests button 6 at position 6 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	6	
NID_BUTPOS(1)	5	6	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But6"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"6"	

Message-S2: STM requests flashing mode for button 6			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=95, N=1, ID=6, P=6, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But6"			

Message-E1: ETCS reports button events for button 6 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	6	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	6	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 6			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length



STM-15: PL=25, ST=7, (State DA)

STM-32: PL=63, N=1, ID=6, P=6, IC=0, MI=0000000000b (No display), L=0

Message-S4: STM requests indicator 18 at position 18 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	18	
NID_INDPOS(1)	5	18	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind18"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"8"	



Message-S5: STM requests flashing mode for indicator 18			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=18, P=18, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind18"			

Message-S6: STM removes indicator 18			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=18, P=18, IC=0, MI=0000000000b (No display), L=0			

Message-S7: STM reports activation of its override procedure			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	8	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	6	Override activation from STM(STM-6)
L_PACKET	13	21	Packet Length
Padding bits	2	00b	



2.7.15 Test Case 7g.15

TEST CASE HEADER	
Test case identification	DMI Function
	7g7.0.2.3.4.9.2.3.4.9.2.3.4.10.1
	Test for moved ETCS area C9 for display of emergency/service brake intervention for soft key technology.: The test starts without brake intervention. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM requests service brake intervention and the test steps are repeated. Then the STM requests additionally emergency brake intervention and the test steps are repeated. Eventually the STM releases the brakes.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-128, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	

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Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	Established	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	Release	
BIU Service Brake Command	Release	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	



NTC isolation status	Not isolated for active STM. Not relevant for other STMs	
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ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 16 at position 16 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
2	STM requests flashing mode for indicator 16	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
3	STM removes indicator 16	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
4	STM requests the service brake	PROF	T0+15s	BIU connection: Message-S4	DMI		Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
5	STM requests indicator 16 at position 16 without flashing	PROF	T0+25s	connection of active DMI channel: Message-S1	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
6	STM requests flashing mode for	PROF	T0+30s	connection of active DMI channel:	DMI		Indicator 16 is displayed with

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	indicator 16			Message-S2			flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
7	STM removes indicator 16	PROF	T0+35s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
8	STM additionally requests the emergency brake	PROF	T0+40s	BIU connection: Message-S5	DMI		Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
9	STM requests indicator 16 at position 16 without flashing	PROF	T0+50s	connection of active DMI channel: Message-S1	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
10	STM requests flashing mode for indicator 16	PROF	T0+55s	connection of active DMI channel: Message-S2	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
11	STM removes indicator 16	PROF	T0+60s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
12	STM releases the brake	PROF	T0+65s	BIU connection: Message-S6	DMI		Moved indicator for



						emergency/service brake intervention in G2 shows no symbol.
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Message-S1: STM requests indicator 16 at position 16 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	



Message-S2: STM requests flashing mode for indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"			

Message-S3: STM removes indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests the service brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	128	Transmission of the STM EB and SB command to the brake interface (STM-128)
L_PACKET	13	25	Packet Length
M_BIEB_CMD	2	11b	Emergency brake command: keep the current status



M_BISB_CMD	2	01b	Service brake command: apply the brake
Padding bits	6	000000b	

Message-S5: STM additionally requests the emergency brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-128: PL=25, EBC=01b (apply the brake), SBC=11b (keep the current status)			

Message-S6: STM releases the brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-128: PL=25, EBC=10b (release the brake), SBC=10b (release the brake)			

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	



Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	Established	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	Release	
BIU Service Brake Command	Release	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	



2.7.16 Test Case 7g.16

TEST CASE HEADER	
Test case identification	DMI Function
	7g7.0.5.6.8.7.2.3.4.9.5.6.8.7.2.3.4.9.5.6.8.7.2.3.4.10.1
	Test for moved ETCS area C9 for display of emergency/service brake intervention for touchscreen technology.: The test starts without brake intervention. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed. Then the STM requests service brake intervention and the test steps are repeated. Then the STM requests additionally emergency brake intervention and the test steps are repeated. Eventually the STM releases the brakes.
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
ERTMS/ETCS on-board requirements tested	
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-128, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.15.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 5 at position 5	PROF	T0	connection of active DMI channel:	DMI		Button 5 is displayed without

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	without flashing			Message-S1			flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
2	STM requests flashing mode for button 5	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
3	Button 5 clicked	DMI	T0+10s	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 5	PROF	T0+15s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
5	STM requests indicator 16 at position 16 without flashing	PROF	T0+20s	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
6	STM requests flashing mode for indicator 16	PROF	T0+25s	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows no symbol.
7	STM removes indicator 16	PROF	T0+30s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for



							emergency/service brake intervention in G2 shows no symbol.
8	STM requests the service brake	PROF	T0+35s	BIU connection: Message-S7	DMI		Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
9	STM requests button 5 at position 5 without flashing	PROF	T0+45s	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
10	STM requests flashing mode for button 5	PROF	T0+50s	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
11	Button 5 clicked	DMI	T0+55s	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
12	STM removes button 5	PROF	T0+60s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
13	STM requests indicator 16 at position 16 without flashing	PROF	T0+65s	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake



							intervention in G2 shows symbol ST01 without flashing frame.
14	STM requests flashing mode for indicator 16	PROF	T0+70s	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
15	STM removes indicator 16	PROF	T0+75s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
16	STM additionally requests the emergency brake	PROF	T0+80s	BIU connection: Message-S8	DMI		Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
17	STM requests button 5 at position 5 without flashing	PROF	T0+90s	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
18	STM requests flashing mode for button 5	PROF	T0+95s	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
19	Button 5 clicked	DMI	T0+100s	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and



							'button released' events in sequence.
20	STM removes button 5	PROF	T0+105s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
21	STM requests indicator 16 at position 16 without flashing	PROF	T0+110s	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
22	STM requests flashing mode for indicator 16	PROF	T0+115s	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
23	STM removes indicator 16	PROF	T0+120s	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for emergency/service brake intervention in G2 shows symbol ST01 without flashing frame.
24	STM releases the brake	PROF	T0+125s	BIU connection: Message-S9	DMI		Moved indicator for emergency/service brake intervention in G2 shows no symbol.

Message-S1: STM requests button 5 at position 5 without flashing			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	5	
NID_BUTPOS(1)	5	5	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But5"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"5"	

Message-S2: STM requests flashing mode for button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			

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	STM-32: PL=95, N=1, ID=5, P=5, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But5"		
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Message-E1: ETCS reports button events for button 5 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	5	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	5	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			



STM-32: PL=63, N=1, ID=5, P=5, IC=0, MI=0000000000b (No display), L=0

Message-S4: STM requests indicator 16 at position 16 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	

Message-S5: STM requests flashing mode for indicator 16



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"			

Message-S6: STM removes indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-S7: STM requests the service brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	128	Transmission of the STM EB and SB command to the brake interface (STM-128)
L_PACKET	13	25	Packet Length
M_BIEB_CMD	2	11b	Emergency brake command: keep the current status
M_BISB_CMD	2	01b	Service brake command: apply the brake



Padding bits	6	000000b	
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Message-S8: STM additionally requests the emergency brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-128: PL=25, EBC=01b (apply the brake), SBC=11b (keep the current status)			

Message-S9: STM releases the brake			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	9	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-128: PL=25, EBC=10b (release the brake), SBC=10b (release the brake)			

2.7.17 Test Case 7g.17

TEST CASE HEADER	
Test case identification	DMI Function
	7g8.0.2.3.4.1.1.2.3.4.1
	<p>Test for moved ETCS area E1 for display of safe radio connection for soft key technology with successful setup of safe radio connection.:</p> <p>The test starts with no safe radio connection established. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.</p>



	Then a balise group with an announcement for a transition to level 2 and a request to establish the communication session with the RBC is passed and the ETCS successfully sets up the connection. Then the test steps are repeated with indication of the safe radio connection state.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	
Train State	moving	speed <= 100km/h
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	



TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	Not isolated for active STM. Not relevant for other STMs	

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 16 at position 16 without flashing	PROF	T0+0	connection of active DMI channel: Message-S1	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
2	STM requests flashing mode for	PROF	T0+5	connection of active DMI channel:	DMI		Indicator 16 is displayed with

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	indicator 16			Message-S2			flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
3	STM removes indicator 16	PROF	T0+10	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
4	Level announcement and request to establish communication session	BTM	T0+15	Air gap: Message-B1	RTM		ETCS tries to set up communication session
					DMI		Moved indicator for the safe radio connection in G2 shows no symbol.
5	Safe radio connection successfully established	RTM	T1	Radio connection: safe radio connection established.	DMI		Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
6	STM requests indicator 16 at position 16 without flashing	PROF	T1+25	connection of active DMI channel: Message-S1	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
7	STM requests flashing mode for indicator 16	PROF	T1+30	connection of active DMI channel: Message-S2	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
8	STM removes indicator 16	PROF	T1+35	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
	Level border not yet reached						

Message-S1: STM requests indicator 16 at position 16 without flashing



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	

Message-S2: STM requests flashing mode for indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"			

Message-S3: STM removes indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-B1 balise 1 of 2 : Level transition announcement to level 2 including request to establish communication session			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order



Q_DIR	2	01b	Nominal
L_PACKET	13	63	
Q_SCALE	2	01b	1m scale
D_LEVELTR	15	2000	2000m
M_LEVELTR	3	3	Level 2
L_ACKLEVELTR	15	0	0m
N_ITER	5	0	no mixed level area
NID_PACKET	8	42	Session Management
Q_DIR	2	01b	Nominal
L_PACKET	13	113	
Q_RBC	1	1	Establish communication session
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_RBC	14	FINITE_VALUE	RBC ETCS identity number or special value 'Contact last known RBC'
NID_RADIO	64	FINITE_VALUE	Radio subscriber number.
Q_SLEEPSESSION	1	0	Ignore session establishment if sleeping
NID_PACKET	8	255	Finishing flag of the telegram

Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group



N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	moving	unchanged
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	not relevant	

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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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	

2.7.18 Test Case 7g.18

TEST CASE HEADER	
Test case identification	DMI Function
	7g8.0.5.6.8.7.2.3.4.1.1.5.6.8.7.2.3.4.1
	Test for moved ETCS area E1 for display of safe radio connection for touchscreen technology with successful setup of safe radio connection.:
	<p>The test starts with no safe radio connection established. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p> <p>The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.</p> <p>Then a balise group with an announcement for a transition to level 2 and a request to establish the communication session with the RBC is passed and the ETCS successfully sets up the connection.</p>



	Then the test steps are repeated with indication of the safe radio connection state.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.17.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 5 at position 5 without flashing	PROF	T0+0	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
2	STM requests flashing mode for button 5	PROF	T0+5	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
3	Button 5 clicked	DMI	T0+10	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.



4	STM removes button 5	PROF	T0+15	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
5	STM requests indicator 16 at position 16 without flashing	PROF	T0+20	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
6	STM requests flashing mode for indicator 16	PROF	T0+25	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
7	STM removes indicator 16	PROF	T0+30	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
8	Level announcement and request to establish communication session	BTM	T0+35	Air gap: Message-B1	RTM		ETCS tries to set up communication session
					DMI		Moved indicator for the safe radio connection in G2 shows no symbol.
9	Safe radio connection successfully established	RTM	T1	Radio connection: safe radio connection established.	DMI		Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
10	STM requests button 5 at position 5 without flashing	PROF	T1+45	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
11	STM requests flashing mode for button 5	PROF	T1+50	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol



							ST03 without flashing frame.
12	Button 5 clicked	DMI	T1+55	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
13	STM removes button 5	PROF	T1+60	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
14	STM requests indicator 16 at position 16 without flashing	PROF	T1+65	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
15	STM requests flashing mode for indicator 16	PROF	T1+70	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
16	STM removes indicator 16	PROF	T1+75	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST03 without flashing frame.
	Level border not yet reached						

Message-S1: STM requests button 5 at position 5 without flashing			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	5	
NID_BUTPOS(1)	5	5	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But5"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"5"	

Message-S2: STM requests flashing mode for button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			

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	STM-32: PL=95, N=1, ID=5, P=5, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But5"		
--	--	--	--

Message-E1: ETCS reports button events for button 5 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	5	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	5	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			



STM-32: PL=63, N=1, ID=5, P=5, IC=0, MI=0000000000b (No display), L=0

Message-S4: STM requests indicator 16 at position 16 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	

Message-S5: STM requests flashing mode for indicator 16



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"			

Message-S6: STM removes indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-B1 balise 1 of 2 : Level transition announcement to level 2 including request to establish communication session			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group



Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order
Q_DIR	2	01b	Nominal
L_PACKET	13	63	
Q_SCALE	2	01b	1m scale
D_LEVELTR	15	2000	2000m
M_LEVELTR	3	3	Level 2
L_ACKLEVELTR	15	0	0m
N_ITER	5	0	no mixed level area
NID_PACKET	8	42	Session Management
Q_DIR	2	01b	Nominal
L_PACKET	13	113	
Q_RBC	1	1	Establish communication session
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_RBC	14	FINITE_VALUE	RBC ETCS identity number or special value 'Contact last known RBC'
NID_RADIO	64	FINITE_VALUE	Radio subscriber number.
Q_SLEEPSESSION	1	0	Ignore session establishment if sleeping
NID_PACKET	8	255	Finishing flag of the telegram

Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system



Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

2.7.19 Test Case 7g.19

TEST CASE HEADER	
Test case identification	DMI Function
	7g8.0.2.3.4.2.1.2.3.4.1
	Test for moved ETCS area E1 for display of safe radio connection for soft key technology with failing setup of safe radio connection.:
	<p>The test starts with no safe radio connection established. The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.</p> <p>Then a balise group with an announcement for a transition to level 2 and a request to establish the communication session with the RBC is passed and the ETCS fails to set up the connection.</p> <p>Then the test steps are repeated with indication of the safe radio connection state.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1



STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.17.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 5 at position 5 without flashing	PROF	T0+0	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
2	STM requests flashing mode for button 5	PROF	T0+5	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
3	Button 5 clicked	DMI	T0+10	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 5	PROF	T0+15	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
5	STM requests indicator 16 at	PROF	T0+20	connection of active DMI channel:	DMI		Indicator 16 is displayed without



	position 16 without flashing			Message-S4			flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
6	STM requests flashing mode for indicator 16	PROF	T0+25	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
7	STM removes indicator 16	PROF	T0+30	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
8	Level announcement and request to establish communication session	BTM	T0+35	Air gap: Message-B1	RTM		ETCS tries to set up communication session
					DMI		Moved indicator for the safe radio connection in G2 shows no symbol.
9	Set up of safe radio connection failed	RTM	T1	Radio connection: safe radio connection setup failed.	DMI		Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
10	STM requests button 5 at position 5 without flashing	PROF	T1+45	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
11	STM requests flashing mode for button 5	PROF	T1+50	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
12	Button 5 clicked	DMI	T1+55	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and



							'button released' events in sequence.
13	STM removes button 5	PROF	T1+60	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
14	STM requests indicator 16 at position 16 without flashing	PROF	T1+65	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
15	STM requests flashing mode for indicator 16	PROF	T1+70	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
16	STM removes indicator 16	PROF	T1+75	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
	Level border not yet reached						

Message-S1: STM requests button 5 at position 5 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length



NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length
N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	5	
NID_BUTPOS(1)	5	5	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But5"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"5"	

Message-S2: STM requests flashing mode for button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
	STM-32: PL=95, N=1, ID=5, P=5, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But5"		

Message-E1: ETCS reports button events for button 5 with 'button pressed' and 'button released' in sequence



(events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	5	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	5	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=5, P=5, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 16 at position 16 without flashing			
VARIABLE	Length	VALUE	COMMENT



NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	

Message-S5: STM requests flashing mode for indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length



STM-15: PL=25, ST=7, (State DA)
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"

Message-S6: STM removes indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-B1 balise 1 of 2 : Level transition announcement to level 2 including request to establish communication session			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order
Q_DIR	2	01b	Nominal



L_PACKET	13	63	
Q_SCALE	2	01b	1m scale
D_LEVELTR	15	2000	2000m
M_LEVELTR	3	3	Level 2
L_ACKLEVELTR	15	0	0m
N_ITER	5	0	no mixed level area
NID_PACKET	8	42	Session Management
Q_DIR	2	01b	Nominal
L_PACKET	13	113	
Q_RBC	1	1	Establish communication session
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_RBC	14	FINITE_VALUE	RBC ETCS identity number or special value 'Contact last known RBC'
NID_RADIO	64	FINITE_VALUE	Radio subscriber number.
Q_SLEEPSESSION	1	0	Ignore session establishment if sleeping
NID_PACKET	8	255	Finishing flag of the telegram

Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group
N_TOTAL	3	1	2 balises in group



M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

2.7.20 Test Case 7g.20

TEST CASE HEADER	
Test case identification	DMI Function
	7g8.0.5.6.8.7.2.3.4.2.1.5.6.8.7.2.3.4.1
	Test for moved ETCS area E1 for display of safe radio connection for touchscreen technology with failing setup of safe radio connection.:
	<p>The test starts with no safe radio connection established. The STM button configured in the moved area is requested, its mode is changed to flashing, the button is pressed and released. Then the button is removed.</p> <p>The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.</p> <p>Then a balise group with an announcement for a transition to level 2 and a request to establish the communication session with the RBC is passed and the ETCS fails to set up the connection.</p> <p>Then the test steps are repeated with indication of the safe radio connection state.</p>
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-32, STM-34, STM-35



ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	Starting and end conditions as for test case 7g.17.

ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests button 5 at position 5 without flashing	PROF	T0+0	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
2	STM requests flashing mode for button 5	PROF	T0+5	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
3	Button 5 clicked	DMI	T0+10	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
4	STM removes button 5	PROF	T0+15	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
5	STM requests indicator 16 at position 16 without flashing	PROF	T0+20	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
6	STM requests flashing mode for	PROF	T0+25	connection of active DMI channel:	DMI		Indicator 16 is displayed with

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	indicator 16			Message-S5			flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
7	STM removes indicator 16	PROF	T0+30	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows no symbol.
8	Level announcement and request to establish communication session	BTM	T0+35	Air gap: Message-B1	RTM		ETCS tries to set up communication session
					DMI		Moved indicator for the safe radio connection in G2 shows no symbol.
9	Set up of safe radio connection failed	RTM	T1	Radio connection: safe radio connection setup failed.	DMI		Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
10	STM requests button 5 at position 5 without flashing	PROF	T1+45	connection of active DMI channel: Message-S1	DMI		Button 5 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
11	STM requests flashing mode for button 5	PROF	T1+50	connection of active DMI channel: Message-S2	DMI		Button 5 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
12	Button 5 clicked	DMI	T1+55	Driver presses button 5 and releases it within 500ms.	PROF		Connection of active DMI channel: Message-E1. ETCS sends button events for button 5 with 'button pressed' and 'button released' events in sequence.
13	STM removes button 5	PROF	T1+60	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS areas C9+E1.



							Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
14	STM requests indicator 16 at position 16 without flashing	PROF	T1+65	connection of active DMI channel: Message-S4	DMI		Indicator 16 is displayed without flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
15	STM requests flashing mode for indicator 16	PROF	T1+70	connection of active DMI channel: Message-S5	DMI		Indicator 16 is displayed with flashing at ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
16	STM removes indicator 16	PROF	T1+75	connection of active DMI channel: Message-S6	DMI		No indicators or buttons are displayed in ETCS areas C9+E1. Moved indicator for the safe radio connection in G2 shows symbol ST04 without flashing frame.
	Level border not yet reached						

Message-S1: STM requests button 5 at position 5 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	32	Button request from STM (STM-32)
L_PACKET	13	95	Packet Length



N_ITER	5	1	Request for 1 button
NID_BUTTON(1)	8	5	
NID_BUTPOS(1)	5	5	
NID_ICON(1)	8	0	
M_BUT_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	4	Caption="But5"
X_CAPTION(1,1)	8	"B"	
X_CAPTION(1,2)	8	"u"	
X_CAPTION(1,3)	8	"t"	
X_CAPTION(1,4)	8	"5"	

Message-S2: STM requests flashing mode for button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	17	Message Length
STM-15: PL=25, ST=7, (State DA)			
	STM-32: PL=95, N=1, ID=5, P=5, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=4, T="But5"		

Message-E1: ETCS reports button events for button 5 with 'button pressed' and 'button released' in sequence (events may be send in one message or two separate messages).			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM



L_MESSAGE	8	16	Message Length
NID_PACKET	8	34	Button event report to STM (STM-34)
L_PACKET	13	108	Packet Length
N_ITER	5	2	2 button events
NID_BUTTON(1)	8	5	
Q_BUTTON(1)	1	0	Button pressed
T_BUTTONEVENT(1)	32	FINITE_VALUE	Timestamp of button pressed event
NID_BUTTON(2)	8	5	
Q_BUTTON(2)	1	1	Button released
T_BUTTONEVENT(2)	32	FINITE_VALUE	Timestamp of button released event
Padding bits	4	NOT RELEVANT	

Message-S3: STM removes button 5			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-32: PL=63, N=1, ID=5, P=5, IC=0, MI=0000000000b (No display), L=0			

Message-S4: STM requests indicator 16 at position 16 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)



L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA
NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	16	
NID_INDPOS(1)	5	16	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind16"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"6"	

Message-S5: STM requests flashing mode for indicator 16			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=16, P=16, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind16"			

Message-S6: STM removes indicator 16



VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=16, P=16, IC=0, MI=0000000000b (No display), L=0			

Message-B1 balise 1 of 2 : Level transition announcement to level 2 including request to establish communication session			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	0	Balise 1 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	41	Level Transition Order
Q_DIR	2	01b	Nominal
L_PACKET	13	63	
Q_SCALE	2	01b	1m scale
D_LEVELTR	15	2000	2000m



M_LEVELTR	3	3	Level 2
L_ACKLEVELTR	15	0	0m
N_ITER	5	0	no mixed level area
NID_PACKET	8	42	Session Management
Q_DIR	2	01b	Nominal
L_PACKET	13	113	
Q_RBC	1	1	Establish communication session
NID_C	10	FINITE_VALUE	Identifier of country or region
NID_RBC	14	FINITE_VALUE	RBC ETCS identity number or special value 'Contact last known RBC'
NID_RADIO	64	FINITE_VALUE	Radio subscriber number.
Q_SLEEPSESSION	1	0	Ignore session establishment if sleeping
NID_PACKET	8	255	Finishing flag of the telegram

Message-B1 balise 2 of 2 : End of group			
VARIABLE	Length	VALUE	COMMENT
Q_UPDOWN	1	1	Up-link telegram
M_VERSION	7	FINITE_VALUE	Version of the ERTMS/ETCS system
Q_MEDIA	1	0	Balise
N_PIG	3	1	Balise 2 of group
N_TOTAL	3	1	2 balises in group
M_DUP	2	00b	No duplicates
M_MCOUNT	8	255	The telegram fits with all telegrams of the same balise group
NID_C	10	FINITE_VALUE	Identifier of country or region



NID_BG	14	FINITE_VALUE	Identifier of balise group
Q_LINK	1	0	Unlinked
NID_PACKET	8	255	Finishing flag of the telegram

2.7.21 Test Case 7g.21

TEST CASE HEADER	
Test case identification	DMI Function
	7g9.0.2.9.3.9.4.9.1
	Test for moved ETCS area G13 for display of local time for soft key technology.:
	The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9
Comments and constraints	

Starting Conditions	Value	Comments
STM State	DA	
ETCS Mode	SN	
ETCS Level	NTC	



Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	Established	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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 Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	Cab A or B active	For the test it is not relevant, what cab is active
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	



NTC isolation status	Not isolated for active STM. Not relevant for other STMs	
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ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 11 at position 11 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 11 is displayed without flashing at ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.
2	STM requests flashing mode for indicator 11	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 11 is displayed with flashing at ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.
3	STM removes indicator 11	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.

Message-S1: STM requests indicator 11 at position 11 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA



NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	11	
NID_INDPOS(1)	5	11	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind11"
X_CAPTION(1,1)	8	"I"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"1"	

Message-S2: STM requests flashing mode for indicator 11			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=11, P=11, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind11"			

Message-S3: STM removes indicator 11			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM

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L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=11, P=11, IC=0, MI=0000000000b (No display), L=0			

End Conditions	Value	Comments
STM State	unchanged	
ETCS Mode	unchanged	
ETCS Level	unchanged	
Train State	not relevant	
ETCS Train Data	not relevant	
Active DMI channel Connection	unchanged	
Other DMI channels Connections	not relevant	
TIU Connection	not relevant	
BIU Connection	not relevant	
JD Connection	not relevant	
TIU Regenerative Brake Command	not relevant	
TIU Magnetic Shoes Brake Command	not relevant	
TIU Eddy Current Brake Command for Emergency Brake	not relevant	
TIU Eddy Current Brake Command for Service Brake	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	

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TIU Traction Status	not relevant	
TIU Direction Controller Position Status	not relevant	
TIU Cab Status	unchanged	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC isolation status	unchanged	

2.7.22 Test Case 7g.22

TEST CASE HEADER	
Test case identification	DMI Function
	7g9.0.2.9.3.9.4.9.1
	Test for moved ETCS area G13 for display of local time for touchscreen technology.: STM removes indicator 11The STM indicator configured in the moved area is requested and its mode is changed to flashing. Then the indicator is removed.
ERTMS/ETCS on-board requirements tested	
	ERA ERTMS 015560 (DMI Spec) 9.2.1.1
STM requirements tested	
Packets transmitted via FFFIS STM	STM-15, STM-35
ERTMS/ETCS on-board configuration	Customisable DMI service with configuration 7a.9



Comments and constraints	Starting and end conditions as for test case 7g.21.
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ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input time	Input Action	Output I/F	Output time limit	Output action
1	STM requests indicator 11 at position 11 without flashing	PROF	T0	connection of active DMI channel: Message-S1	DMI		Indicator 11 is displayed without flashing at ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.
2	STM requests flashing mode for indicator 11	PROF	T0+5s	connection of active DMI channel: Message-S2	DMI		Indicator 11 is displayed with flashing at ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.
3	STM removes indicator 11	PROF	T0+10s	connection of active DMI channel: Message-S3	DMI		No indicators or buttons are displayed in ETCS area G13. Moved indicator for local time in A1 shows the local time and is updated regularly.

Message-S1: STM requests indicator 11 at position 11 without flashing			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
NID_PACKET	8	15	State report from STM (STM-15)
L_PACKET	13	25	Packet Length
NID_STMSTATE	4	7	State DA



NID_PACKET	8	35	Indicator request from STM (STM-35)
L_PACKET	13	103	Packet Length
N_ITER	5	1	Request for 1 indicator
NID_INDICATOR(1)	8	11	
NID_INDPOS(1)	5	11	
NID_ICON(1)	8	0	
M_IND_ATTRIB(1)	10	1000010000b	black on red, no flashing
L_CAPTION(1)	6	5	Caption="Ind11"
X_CAPTION(1,1)	8	"l"	
X_CAPTION(1,2)	8	"n"	
X_CAPTION(1,3)	8	"d"	
X_CAPTION(1,4)	8	"1"	
X_CAPTION(1,5)	8	"1"	

Message-S2: STM requests flashing mode for indicator 11			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM
L_MESSAGE	8	18	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=103, N=1, ID=11, P=11, IC=0, MI=1001010000b (black on red, slow flashing, normal phase), L=5, T="Ind11"			

Message-S3: STM removes indicator 11			
VARIABLE	Length	VALUE	COMMENT
NID_STM	8	FINITE_VALUE	NID_STM of the active STM

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L_MESSAGE	8	13	Message Length
STM-15: PL=25, ST=7, (State DA)			
STM-35: PL=63, N=1, ID=11, P=11, IC=0, MI=0000000000b (No display), L=0			