



ERTMS/ETCS

FFFIS STM Test cases of Functional identity 008

BTM

Total: 3 Test cases

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Company	Technical Approval	Management approval
ALSTOM		
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THALES		

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Modification History

Issue Number Date	Section Number	Modification / Description	Author
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2.9.1 08.05.2013	8b.1	Modification according to Thales Review	SIEMENS F. Simon
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2.9.2 30.08.2013	All	Updated according to comments from 2nd internal review and from ERA traceability review	SIEMENS F. Simon
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Supplier-specific delays

#	Supplier of	Start time	End time
Ts1	ETCS	Reference Time when STM Control function is established (Packet 1 is sent to the STM)	Reference Time of “Antenna/BTM ID” Packet sent to STM
Ts2	ETCS	Reference Time of change of active Antenna	Reference Time of BTM Antenna Status and ID send to STM
Ts3	ETCS	Reference Time when STM Control function is established (Packet 1 is sent to the STM)	Reference Time of “BTM Alarm Status” sent to STM

Diagram A

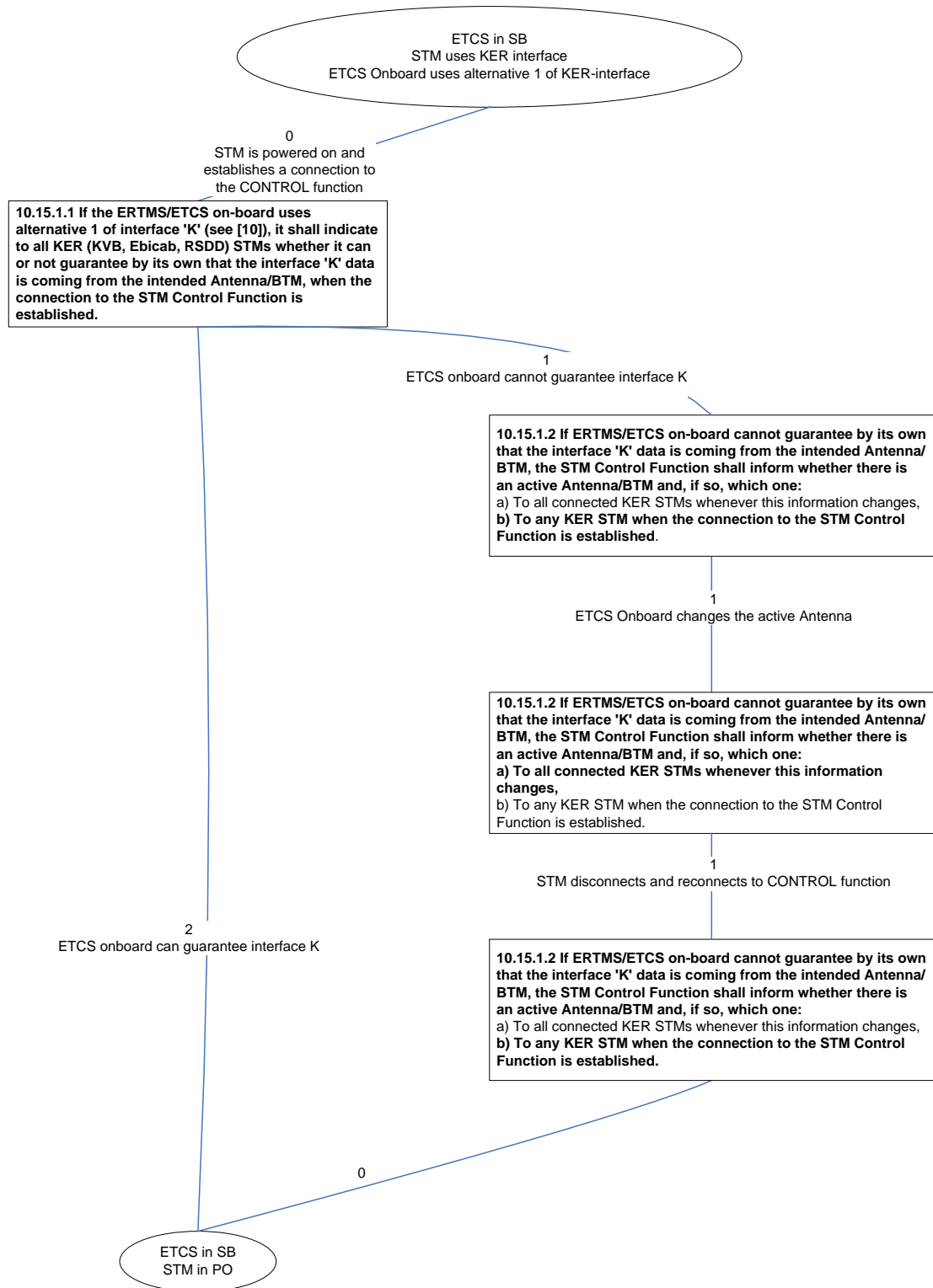
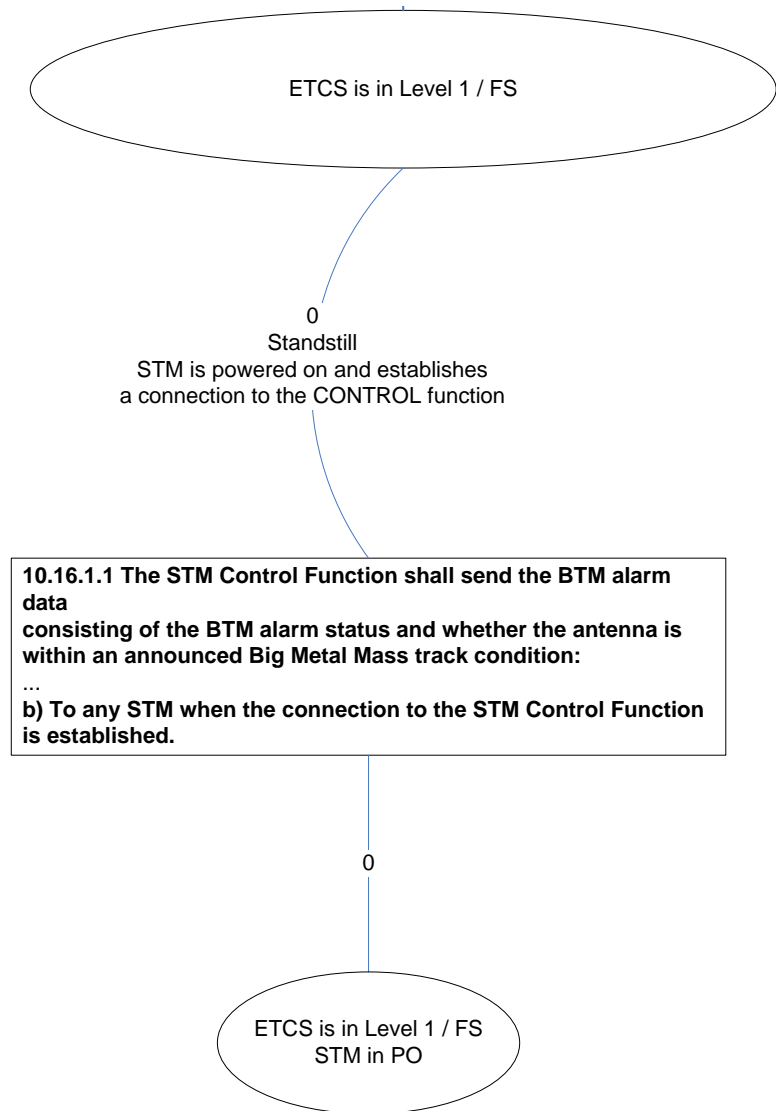


Diagram B





Test case 8a.1

TEST CASE HEADER

Test Case identification	BTM
	8a.0.2
	Check the behaviour of ERTMS/ETCS Onboard regarding the Antenna/BTM ID information if it uses alternative 1 and connects to KER STM. ETCS can guarantee by it's own, that the data is coming from the intended antenna
ERTMS/ETCS on-board requirements tested	SUBSET 035: 10.15.1.1
STM Requirements Tested	
Packets Transmitted via FFFIS STM	Packet STM-20
ETCS Configuration	
Comments and constraints	Only relevant, if the ERTMS/ETCS Onboard uses alternative 1 of KER-interface. STM uses KER Interface (KVB, EBICAB or RSDD)

Starting Conditions	Value	Comments
STM State	NP	STM not powered
ETCS Mode	SB	
ETCS Level	1	

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Starting Conditions	Value	Comments
Train State	standstill	
ETCS Train Data	invalid	
Active DMI channel connection	not relevant	
Other DMI channel 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 (Desk Status)	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC Isolation Status	Not isolated	



ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input Time	Input Action	Output I/F	Output Time Interval	Output action
1	STM is powered on and establishes a connection to STM Control function	PROF	T0	Message SC1 from STM	PROF	5 s	Message EC1 to STM Time T1
2	ETCS Onboard sends BTM/Antenna ID info to STM	-	T1	-	PROF	Ts1	STM Control function Message EC2 (Antenna/BTM ID) to STM

STM Test Case

Not applicable

Message-EC1 (Version Info to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
Padding bits	COMPUTED	NOT RELEVANT	



Message-SC1 (Version Info to ETCS): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
NID_PACKET	8	15	State Report from STM
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	1	State PO
Padding bits	COMPUTED	NOT RELEVANT	

Message-EC2 (Antenna/BTM ID to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	KVB, RSDD or EBICAB
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	20	Antenna/BTM ID
L_PACKET	13	COMPUTED	packet length
Q_CHECKNEEDED	1	0	no check needed
Padding bits	COMPUTED	NOT RELEVANT	



End Conditions	Value	Comments
STM State	PO	
ETCS Mode	SB	
ETCS Level	1	
Train State	unchanged	
ETCS Train Data	unchanged	
Active DMI channel connection	Not relevant	
Other DMI channel 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 (Desk Status)	Not relevant	
BIU Emergency Brake Command	Not relevant	
BIU Service Brake Command	Not relevant	
BIU Emergency Brake Status	Not relevant	
BIU Service Brake Status	Not relevant	
NTC Isolation Status	Not isolated	



Test case 8a.2

TEST CASE HEADER

Test Case identification	BTM
	8a.0.1.1.1.0
	Check the behaviour of ERTMS/ETCS Onboard regarding the BTM Status information if uses alternative 1 and connected to KER STM. ETCS cannot guarantee by it's own, that the data is coming from the intended antenna
ERTMS/ETCS on-board requirements tested	SUBSET 035: 10.15.1.1, 10.15.1.2 a) and b)
STM Requirements Tested	-
Packets Transmitted via FFFIS STM	Packet STM-20
ETCS Configuration	
Comments and constraints	Only relevant, if the ERTMS/ETCS Onboard uses alternative 1 of KER-interface. STM uses KER Interface (KVB, EBICAB or RSDD)

Starting Conditions	Value	Comments
STM State	NP	STM not powered
ETCS Mode	SB	
ETCS Level	1	
Train State	standstill	

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Starting Conditions	Value	Comments
ETCS Train Data	invalid	
Active DMI channel connection	not relevant	
Other DMI channel 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 (Desk Status)	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC Isolation Status	Not isolated	



ERTMS/ETCS on-board Test Case

Step	Description/Comments	Input I/F	Input Time	Input Action	Output I/F	Output Time Interval	Output action
1	STM is powered on and establishes a connection to STM Control function	PROF	T0	Message SC1 from STM to STM control function	PROF	5s	STM Control function Message EC1 (Version Info) to STM Time T1
2	ETCS Onboard sends BTM Antenna ID info to STM	-	-T1	-	PROF	Ts1	STM Control function Message EC2 (Antenna/BTM ID) to STM
3	ETCS Onboard changes the active Antenna	-	T0 + 30	BTM Antenna change	PROF	Ts2	STM Control function Message EC3 (Antenna/BTM ID) to STM
4	STM Control function disconnects (non-final) and re-establishes connection.	PROF	T0 + 60	Message SC1 from STM to STM control function	PROF	5s	STM Control function Message EC1 (Version Info) to STM TimeT2
5	ETCS Onboard sends BTM Antenna ID info to STM	-	T2	-	PROF	Ts1	STM Control function Message EC3 (Antenna/BTM ID) to STM

STM Test Case

Not applicable



Message-EC1 (Version Info to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
Padding bits	COMPUTED	NOT RELEVANT	

Message-SC1 (Version Info to ETCS): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
NID_PACKET	8	15	State Report from STM
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	1	State PO
Padding bits	COMPUTED	NOT RELEVANT	



Message-EC2 (Antenna/BTM ID to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	KVB, RSDD or EBICAB
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	20	Antenna/BTM ID
L_PACKET	13	COMPUTED	packet length
Q_CHECKNEEDED	1	1	check needed
Q_ANTN_BTМ_ACTIVE	1	0	For this test, first NO antenna shall be active
NID_ANTENNA_BTМ	2	FINITE VALUE	Depends on ETCS Onboard, shall be the correct NID
Padding bits	COMPUTED	NOT RELEVANT	

Message-EC3 (Antenna/BTM ID to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	KVB, RSDD or EBICAB
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	20	BTM Status to STM
L_PACKET	13	COMPUTED	packet length
Q_CHECKNEEDED	1	1	check needed
Q_ANTN_BTМ_ACTIVE	1	1	
NID_ANTENNA_BTМ	2	FINITE VALUE	Depends on ETCS Onboard, shall be the correct NID

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Message-EC3 (Antenna/BTM ID to STM): ETCS STM Control Function → STM

VARIABLE	Length	VALUE	COMMENTS
Padding bits	COMPUTED	NOT RELEVANT	

End Conditions	Value	Comments
STM State	PO	
ETCS Mode	SB	
ETCS Level	1	
Train State	unchanged	
ETCS Train Data	unchanged	
Active DMI channel connection	not relevant	
Other DMI channel 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 (Desk Status)	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	

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BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC Isolation Status	not isolated	



Test case 8b.1

TEST CASE HEADER	
Test Case identification	BTM
	8b.0.0
	Check the behaviour of ERTMS/ETCS Onboard regarding the BTM Alarm Status information on Start-Up
ERTMS/ETCS on-board requirements tested	SUBSET 035: 10.16.1.1 b)
STM requirements tested	-
Packets transmitted via FFFIS STM	Packet STM-47
ERTMS/ETCS on-board configuration	- STM X installed STM is a KER-Interface STM.
Comments and constraints	STM is powered and establishes a connection to the STM Control function. The current BTM alarm status shall be send to STM

Starting Conditions	Value	Comments
STM State	NP	STM not powered
ETCS Mode	FS	
ETCS Level	1	
Train State	standstill	
ETCS Train Data	valid	

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Starting Conditions	Value	Comments
Active DMI channel connection	not relevant	
Other DMI channel 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 (Desk Status)	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC Isolation Status	Not isolated	



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 is powered on and establishes a connection to the STM Control function	PROF	T0	Message SC1 from STM to STM control function	PROF	5s	STM Control function Message EC1 (Version Info) to STM Time T1
2	Current BTM Alarm status is sent to STM Control function	-	T1	-	PROF	Ts3	STM Control function: Message EC2 (BTM Alarm Status to STM) to STM

STM Test Case

Not applicable

Message-EC1 (Version Info to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
Padding bits	COMPUTED	NOT RELEVANT	



Message-SC1 (Version Info to ETCS): STM → ETCS STM Control Function			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	Valid value for NID_STM X
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	1	Version Info to STM
L_PACKET	13	COMPUTED	packet length
N_VERMAJOR	8	4	Baseline 3
N_VERMINOR	8	0	Baseline 3
NID_PACKET	8	15	State Report from STM
L_PACKET	13	COMPUTED	packet length
NID_STMSTATE	4	1	State PO
Padding bits	COMPUTED	NOT RELEVANT	

Message-EC2 (BTM Alarm Status to STM): ETCS STM Control Function → STM			
VARIABLE	Length	VALUE	COMMENTS
NID_STM	8	FINITE VALUE	any STM
L_MESSAGE	8	COMPUTED	message length
NID_PACKET	8	47	BTM Alarm Status to STM
L_PACKET	13	COMPUTED	packet length
Q_BT_M_ALARM	1	0	BTM Alarm not active
Padding bits	COMPUTED	NOT RELEVANT	



End Conditions	Value	Comments
STM State	PO	
ETCS Mode	FS	
ETCS Level	1	
Train State	unchanged	
ETCS Train Data	unchanged	
Active DMI channel connection	not relevant	
Other DMI channel 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 (Desk Status)	not relevant	
BIU Emergency Brake Command	not relevant	
BIU Service Brake Command	not relevant	
BIU Emergency Brake Status	not relevant	
BIU Service Brake Status	not relevant	
NTC Isolation Status	not isolated	