

1. ONGOING WORK

1.1 Inputs

1.1.1 From trackside

Name	Type	Description	Related req
Dist_level_transition	D_LEVEL_TR	Information issue from packet 41	SRS-26 §5.10, 7.4.2.9, 7.4.2.11.2
Required_level_transition	M_LEVEL_TR	Information issue from packet 41 or 46	SRS-26 §5.10, 7.4.2.9, 7.4.2.11.2
Id_NTC_level_transition	NID_NTC	Information issue from packet 41 or 46	SRS-26 §5.10, 7.4.2.9, 7.4.2.11.2
Length_ack_level_transition	L_ACKLEVELTR	Information issue from packet 41	SRS-26 §5.10, 7.4.2.9, 7.4.2.11.2
Dist_ma_mode	D_MAMODE	Information issue from packet 80 “The max safe front end of the train is inside the {OS/LS/SH} area”	SRS-26 §4.6, 5.7, 5.9, 5.19, 7.4.2.26
Available_ma_mode	M_MAMODE	Information issue from packet 80 “A mode profile for {OS/LS/SH} area has been received and is used” or “A mode profile for {OS/LS/SH} area is on-board”	SRS-26 §4.6, 5.7, 5.9, 5.19, 7.4.2.26
Speed_ma_mode	V_MAMODE	Information issue from packet 80 SRS-26 §5.19.3.2 “The speed is lower than the Limited Supervision mode speed limit (national value, or value given in the mode profile).” + 5.7.3.2 + 5.9.3.2	SRS-26 §4.6, 5.7, 5.9, 5.19, 7.4.2.26
Length_ma_mode	L_MAMODE	Information issue from packet 80	SRS-26 §4.6, 5.7, 5.9, 5.19,

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		"The max safe front end of the train is inside the {OS/LS/SH} area"	7.4.2.26
Length_ack_ma_mode	L_ACKMAMODE	Information issue from packet 80 "An ackn. request for {OS/LS/SH} is displayed to the driver"	SRS-26 §4.6, 5.7, 5.9, 5.19, 7.4.2.26
Qualif_ma_mode	Q_MAMODE	Information issue from packet 80 <i>Todo : used for mode management ?</i>	SRS-26 §4.6, 5.7, 5.9, 5.19, 7.4.2.26
Dist_start_reversing_area	D_STARTREVERSE	Information issue from packet 138 SRS-26 §5.13.1.2 "The area where initiation of reversing will be possible is announced to the ERTMS/ETCS on-board equipment by trackside"	SRS-26 §4.6, 5.13, 7.4.2.34
Length_reverse_area	L_REVERSEAREA	Information issue from packet 138 SRS-26 §5.13.1.2 "The area where initiation of reversing will be possible is announced to the ERTMS/ETCS on-board equipment by trackside"	SRS-26 §4.6, 5.13, 7.4.2.34
	D_REVERSE	Information issue from packet 138 <i>Todo : used for mode management ?</i>	
	L_REVERSE	Information issue from packet 138 <i>Todo : used for mode management ?</i>	
Track_Req_stop_shunting	boolean	Packet 135 received	SRS-26 §4.6, 5.8, 7.4.2.31
Track_Req_stop_staff_resp	boolean	Packet 137 received	SRS-26 §4.6, 5.8, 7.4.2.31
	V_NVSHUNT	National value by default or from packet 3 To compare to Speed_ma_mode <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVSTFF	National value by default or from packet 3	SRS-26 §4.6, 7.4.2.1.1

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		<i>Todo : to clarify</i>	
	V_NVONSIGHT	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVLIMSUPERV	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVUNFIT	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVREL	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	D_NVROLL	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVALLOWOVERTRP	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	V_NVSUPOVTRP	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	D_NVOVTRP	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	T_NVOVTRP	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	D_NVPOTRP	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	D_NVSTFF	National value by default or from packet 3 <i>Todo : to clarify</i>	SRS-26 §4.6, 7.4.2.1.1
	T_NVCONTACT		SRS-26 §4.6, condition [41]

Todo : Discuss if management of supervision fo balise in SH or SR mode (packet 49 and 63) is on the scope of supervision function or mode management. Inlkd to condition [52], [54] of SRS-26 § 4.6

1.1.2 From driver

Name	Type	Description	Related req
Level_from_driver	T_LEVEL	ERTMS/ETCS level	SRS-26 §4.6, 4.7.2, 5.10
Driver_start	Boolean	Start	SRS-26 §4.6, 4.7.2, 5.4
Driver_req_override	Boolean	Override request	SRS-26 §4.6, 4.7.2, condition [37]
Driver_req_SH	Boolean	Shunting request	SRS-26 §4.6, 4.7.2, condition [5, 35]
Driver_req_continue_SH	Boolean	“Continue Shunting on desk closure” request	SRS-26 §4.6, 4.7.2, condition [26, 27]
Driver_req_exit_SH	Boolean	“Exit of Shunting” request	SRS-26 §4.6, 4.7.2, condition [19]
Driver_req_NL	Boolean	Non Leading request	SRS-26 §4.6, 4.7.2, condition [46, 47]
Driver_ack_Level_tr	Boolean	Ackn of level transition	SRS-26 §4.6, 4.7.2, 5.10.4
Driver_ack_LS	Boolean	Ackn of Limited Supervision mode	SRS-26 §4.6, 4.7.2, condition [70]
Driver_ack_OS	Boolean	Ackn of On Sight mode	SRS-26 §4.6, 4.7.2, condition [15]

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Driver_ack_SH	Boolean	Ackn of Shunting mode	SRS-26 §4.6, 4.7.2, condition [50]
Driver_ack_SR	Boolean	Ackn of Staff Resp. mode	SRS-26 §4.6, 4.7.2, condition [8]
Driver_ack_UN	Boolean	Ackn of Unfitted mode	SRS-26 §4.6, 4.7.2, condition [60]
Driver_ack_RV	Boolean	Ackn of Reversing mode	SRS-26 §4.6, 4.7.2, condition [59]
Driver_ack_SN	Boolean	Ackn of SN mode	SRS-26 §4.6, 4.7.2, condition [58]
Driver_ack_TR	Boolean	Ackn of Train Trip	SRS-26 §4.6, 4.7.2, condition [7, 62, 63, 68]
	Boolean	Ackn for Post Trip distance exceeded (<i>supervision ?</i>)	SRS-26 §4.6, 4.7.2, SRS-26 § 3.14.1.7.4
	Boolean	Ackn for reversing distance exceeded (<i>supervision ?</i>)	SRS-26 §4.6, 4.7.2, SRS-26 § 3.14.1.7.1
		SR mode speed limit and distance (<i>supervision ?</i>)	SRS-26 §4.6, 4.7.2, SRS-26 § 3.11.7.1.3
		Isolation <i>TODO :Clarify if the Driver isolate the on-board equipment by a switch (as describe in subset 034) or by a command on DMI</i>	SRS-26 §4.6, 4.7.2, condition [1]

1.1.3 Desk/Train (subset-034)

Name	Type	Description	Related req
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Train_req_SL	Boolean	Subset 034 :“The sleeping information is defined as a two state input with the following values: <ul style="list-style-type: none"> • Sleeping requested • Sleeping not requested.” 	Subset-034, SRS-26 §4.6, condition [3, 14]
Train_permitted PS	Boolean	Subset 034 :“The passive shunting information is defined as a two state input with the following values: <ul style="list-style-type: none"> • Passive shunting permitted • Passive shunting not permitted.” 	Subset-034, SRS-26 §4.6, condition [26, 30]
Train_permitted_N L	Boolean	Subset 034 :“The non-leading information is defined as a two state input with the following values: <ul style="list-style-type: none"> • Non-leading permitted • Non-leading not permitted.” 	Subset-034, SRS-26 §4.6, condition [46, 47]
ETCS_Isolated	Boolean	Subset 034 :“The isolation information is defined as a two state output with the following values: <ul style="list-style-type: none"> • ETCS isolated • ETCS not isolated.” 	Subset-034, SRS-26 §4.6, condition [1]
Desk_open	Boolean	Subset 034 :“The cab status information is defined as a two state input with the following values: <ul style="list-style-type: none"> • Cab active • Cab not active. 	Subset-034, SRS-26 §4.6, condition [2,...]

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		<p>Note 1: The cab status input is used by ERTMS/ETCS onboard for various purposes as defined in [1] or by an STM as defined in [3]. The expression "desk open" in [1] is equivalent to "Cab active" and "desk closed" in [1] is equivalent to "Cab not active".</p> <p><i>TODO: clarify for how many Cab/desk we need this information</i></p>	
Direction_Controller	{Forward, Neutral, Backward}	<p>"The direction controller information is defined as a three state input with the following values:</p> <ul style="list-style-type: none"> • Forward • Neutral • Backward. <p>The notion of forward direction shall correspond to the train orientation defined by the active (virtual) cab as defined in Erreur ! Source du renvoi introuvable., i.e. when the direction controller is in forward position, this means that the train movement will be in the direction of the active (virtual) cab.</p> <p>If no cab is active the direction controller information may have any value, but shall be ignored by ERTMS/ETCS onboard.</p> <p>Note: The direction controller input is used by ERTMS/ETCS onboard to prevent train movement which conflicts with the current position of the direction controller in the active cab and to detect the driver's intention to reverse, which is one of the conditions for entering Reversing mode. The direction controller input is also used by an STM as defined in [3]."</p>	Subset-034, SRS-26 §5.13.1.4

1.1.4 From other functions

Name	Type	Description	Related req
Train_position		<i>From calculate train position, structure ?</i>	
Train_speed		<i>From odometer ?</i>	
Fault_detected		<i>Fault detected by in-board, the system is going in system failure mode</i>	SRS-26 §4.6, condition [13]
EOA_overpassed		<i>From supervision , for trip mode</i>	SRS-26 §4.6, condition [12, 16]

1.1.5 Missing data for the mode transition conditions SRS-26 §4.6

Name	Type	Description	Related req
Train_standstill	Boolean	<i>Form the speed ?</i>	SRS-26 §4.6, condition [3,...]
On-boardPowered	Boolean		SRS-26 §4.6, condition [4,29]
		"The onboard reacts according to a linking reaction set to "trip", "the train/engine receives and uses a trip order given by balise", "unconditional emergency stop message is accepted"	SRS-26 §4.6, condition [17, 18, 20, 32]
		"a National Trip Procedure is active"	SRS-26 §4.6, condition [35, 38]
		"override" function is active" <i>TODO maybe internal data</i>	SRS-26 §4.6, condition [42, 46]
		"The system version number X of a received balise telegram is greater than the highest version number X supported by the on-board equipment"	SRS-26 §4.6, condition [65]
		"A balise group contained in the linking information is passed in the unexpected direction"	SRS-26 §4.6, condition [66]

1.2 Outputs

TODO

1.2.1 To trackside

Name	Type	Description	Related req

M_MODE (Packets 0, 1)

M_LEVEL (Packets 0, 1)

NID_NTC (Packets 0, 1)

1.2.2 To driver

Name	Type	Description	Related req

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- SRS-26 §4.7.2

ERTMS/ETCS Mode
Current ERTMS/ETCS level
Trip reason
Plain text information
Reversing allowed
Override status
Shunting refused by RBC
Shunting request not answered by RBC
Entry in FS/OS
Level transition announcement
SR mode proposed
OS/LS/SH mode proposed
SN mode proposed
UN mode proposed
RV mode proposed
Brake reason

1.2.3 Desk/Train (subset-034)

Name	Type	Description	Related req
EB_commanded	boolean	Subset 034 : “The emergency brake command (EBC) is defined as a two state output with the following values: <ul style="list-style-type: none"> Emergency brake commanded Emergency brake not commanded.” 	Subset-034, SRS-26 §4 some modes request EB command

1.2.4 To other function

Name	Type	Description	Related req
Status_of_mission	{Start, End, On-going}	Information necessary to manage exchange with driver and RBC + storage of information	SRS-26 §5.4.3, SRS-26 §5.5.3.1

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- Ask establishment of a communication session (see SRS-26 §3.4.2)
- Send position report at modes or levels change (SRS-26 §3.5.6.1.4)
- Selection of speed restriction depending on Modes (SRS-26 § 3.10.2.2)

1.3 Internal

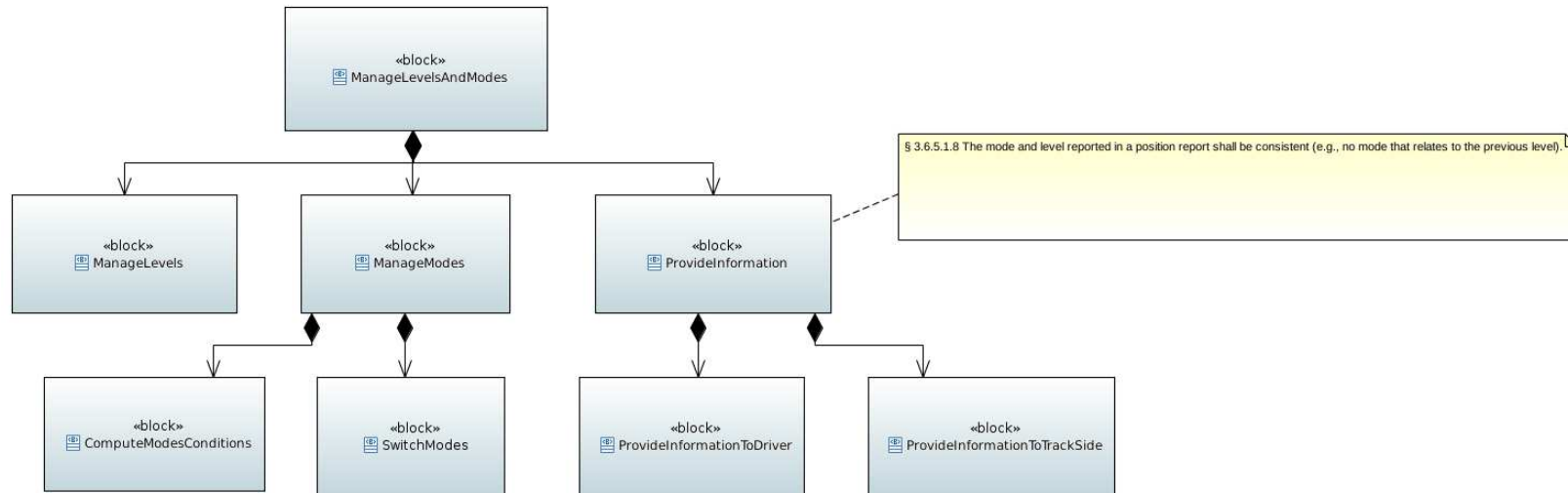
TODO

Name	Type	Description	Related req

- Current Level
- Current Mode
- Previous Level
- Previous Mode
- List of Required Level
- List of verified transition conditions

1.4 Architecture

1.4.1 High level



1.4.2 ProvideInformation

1.4.2.1.1 Description

TODO

- To provide level and mode to apply to other function
- To request EB ?
- To req message to send to driver

- To check that computed mode and Level are coherent (indeed, unfitted mode and Level 0) cf

3.6.5.1.8	<i>The mode and level reported in a position report shall be consistent (e.g., no mode that relates to the previous level).</i>
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Architecture of the function to clarify in function of the allocated tasks.

1.4.2.1.2 Inputs

1.4.2.1.3 Outputs

1.4.2.1.4 Requirements

SRS-26 § 3:

A set of requirements which needs mode or level information:.

3.5.2.4	<p>The on-board shall establish a communication session</p> <ul style="list-style-type: none"> a) At Start of Mission (only if level 2 or 3). b) If ordered from trackside. c) If a mode change, not considered as an End of Mission, has to be reported to the RBC (only if level 2 or 3) d) If the driver has manually changed the level to 2 or 3 e) When the train front reaches the end of an announced radio hole f) When the previous communication session is considered as terminated due to loss of safe radio connection (refer to 3.5.4.2.1) g) When a Start of Mission procedure, during which no communication session could be established, is completed in level 2 or 3
3.6.5.1.4	The on-board equipment shall send position reports as requested by the RBC in the position report parameters. In addition, it shall also send a position report if at least one

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	<p>of the events listed hereafter occurs:</p> <ul style="list-style-type: none"> a) The train reaches standstill, if applicable to the current mode. b) The mode changes. c) The driver confirms train integrity. d) A loss of train integrity is detected. e) The train passes a RBC/RBC border with its min safe rear end. f) The train passes a level transition border (from level 2/3 to level 0, NTC, 1) with its min safe rear end. g) The level changes. h) A communication session is successfully established. i) Intentionally moved. j) The train passes an LRBG compliant balise group (see 3.6.2.2.2), if no position report parameters are stored on-board. k) The train passes a RBC/RBC border with its max safe front end.
3.6.5.1.8	The mode and level reported in a position report shall be consistent (e.g., no mode that relates to the previous level).
3.7.1.1	<p>To control the train movement in an ERTMS/ETCS based system the ERTMS/ETCS on-board equipment shall be given information from the trackside system both concerning the route set for the train and the track description for that route. The following information shall be given from the trackside</p> <ul style="list-style-type: none"> a) Permission and distance to run, the Movement Authority (MA) (see

	<p>section Erreur ! Source du renvoi introuvable.)</p> <p>b) When needed, limitations related to the movement authority, i.e. Mode profile for On Sight, Limited Supervision or Shunting and signalling related speed restriction (see sections Erreur ! Source du renvoi introuvable. and Erreur ! Source du renvoi introuvable.). Mode profile and Signalling related Speed restriction shall always be sent together with the MA to which the information belongs</p> <p>c) Track description covering as a minimum the whole distance defined by the MA. Track description includes the following information</p> <ul style="list-style-type: none"> • The Static Speed Profile (SSP) (see section Erreur ! Source du renvoi introuvable.). • The gradient profile (see section Erreur ! Source du renvoi introuvable.). • Optionally Axle load Speed Profile (ASP) (see section Erreur ! Source du renvoi introuvable.). • Optionally Speed restriction to ensure a given permitted braking distance (see section 3.11.11) • Optionally track conditions (see section Erreur ! Source du renvoi introuvable.). • Optionally route suitability data (see section Erreur ! Source du renvoi introuvable.). • Optionally areas where reversing is permitted (see section Erreur ! Source du renvoi introuvable.). • Optionally changed adhesion factor (see section Erreur ! Source du renvoi introuvable.).
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	d) Linking information when available.
3.11.7.1	The value of the mode related speed restriction shall be determined by the corresponding national value or the corresponding default values if the national values are not applicable.
3.11.7.1.1	Exception 1: For the modes On Sight, Limited Supervision and Shunting the speed limit can also be given from the trackside. The speed limit given from the trackside shall prevail over the National value and the default value
3.11.7.1.2	Exception 2: For the mode Reversing there is no National/Default value. The speed limit is always given from trackside.
3.11.7.1.3	Exception 3: For the mode Staff Responsible the speed limit can also be entered by the driver. The speed limit given by the driver shall prevail over the National/Default value.
3.12.3.4.2	<p>The following events can be used to define the start condition:</p> <ul style="list-style-type: none"> • Location • Mode (start display as soon as in mode) • Level (start display as soon as in level)
3.12.3.4.3	<p>The following events can be used to define the end condition:</p> <ul style="list-style-type: none"> • Location • Time • Mode (stop display when leaving mode) • Level (stop display when leaving level)
3.14.1.3	If the emergency brake command was triggered due to a trip condition (see chapter 4)

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	the emergency brake command shall be released at standstill and after driver acknowledgement of the trip condition.
3.14.1.7.1	If the brake command was triggered due to an overpassed reversing distance related to a reversing area or due to any further movement in the direction opposite to the train orientation while the reversing distance is still overpassed, the brake command shall be released if the reversing distance becomes extended so that the reversing distance is no longer overpassed, or at standstill after driver acknowledgement.
3.14.1.7.3	If the brake command was triggered due to the detection of a train movement while modifying/revalidating train data or while entering SR speed/distance limits, the brake command shall be released at standstill and after driver acknowledgement..
3.14.1.7.4	If the brake command was triggered due to an overpassed distance allowed for moving backwards in Post Trip mode or due to any further movement in the direction opposite to the train orientation while the distance allowed for moving backwards in Post Trip mode is still overpassed, the brake command shall be released at standstill and after driver acknowledgement.
3.15.1.3.3	As soon as the on-board equipment has established the session with the Accepting RBC, it shall send its Train Data unless it is in sleeping or non leading mode.
3.15.3.1	ERTMS/ETCS shall allow Splitting and Joining using the normal supervision functions available (e.g. On-sight, Shunting).
3.15.8.1	After being switched off (i.e. once in No Power mode), the ERTMS/ETCS on-board equipment shall be capable, if fitted with, to detect and record whether the engine has been moved or not, during a period of at least 72 hours.
3.15.8.2	When powered on again, the ERTMS/ETCS on-board equipment shall use, if available, the memorised information about cold movement in order to update the status of

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	information stored by on-board equipment (see chapter 4 section 4.11 for details).
3.15.8.3	<p>Note: information memorised by Cold Movement Detection function is considered as not available if:</p> <p>a) no Cold Movement Detection function is implemented in the ERTMS/ETCS on-board equipment, OR</p> <p>the Cold Movement Detection function has encountered a condition, during the No Power period, which prevents the use of the Cold Movement information (e.g. the battery ensuring the Cold Movement Detection function has run down during the No Power period).</p>

1.5 ManageLevels

1.5.1 Description

TODO

1.5.2 Inputs- Outputs

Data	I/O	type	ok
announcement	I (BG/RBC)	transition information pos/level	x
announcement	O (DMI)	pos/level	
level trans	I (BG)	conditional / immediate transition	x
position	I data	estimated front	
train mode	I / data	current mode of train	
MA	I (BG/RBC)	new MA after transitions	x
priority table	I (BG/RBC)	list of levels with prio	x
level	I / data	current level	
mobile terminal	I / data	at least 1 terminal available	
NTC system	I / data	National System X is available	
selected It	O (DMI)	level transition info	
available level	O (DMI)	level information / selectable	
contact order	I (BG)	message order	x
first section desc	I	MA + track desc / LOA	x?

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train data	O (RBC)	?	x
level report	O (DMI?)	level + position report	x?
terminate order	I (BG/RBC)	order to terminate comm session	x
message "no enter"	O (RBC)	msg won't enter announced RBC area	
speed limit	I / data / ?	speed limit unequipped	
position	I / data	min safe rear end	
first section desc	I	MA (lvl 2/3) + track desc	x?
position report	O (RBC)	position report after transition	x
first section desc	I	MA (lvl 1) + track desc	x?
interface STM	I / data	bool	
conditional It	I		x?
level change manual	I (DMI)	level	
contact info	I / data	id + tel number	x?
level change report	O (RBC)	level selection	x?
position	I	max safe front	
ack position	I	position	
driver ack	I (DMI)	level change ack from driver	x
service brake	O	de/activate service brake	
train trip	O	train tripped	

1.5.3 Requirements

SRS-26 § 3:

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3.18.4.2.1	The driver shall have the possibility to enter the ERTMS/ETCS level during a start of a mission.
3.18.4.2.2	The ERTMS/ETCS level information is required for train operation except sleeping mode.
3.18.4.2.3	In normal operation after the start of mission the driver shall not have to select the ERTMS/ETCS level (all other level transitions are executed automatically).
3.18.4.2.4	For operational fallback situations: at standstill, the onboard equipment shall allow the driver to change the ERTMS/ETCS level..
3.18.4.2.5	If the table of supported levels given by trackside is available, the selection of level by the driver shall be limited to those contained in this table. If the table of trackside supported levels is not available, the driver can select any level within a default list configured on-board.
3.18.4.3.2	If the driver enters level 2/3, at start of mission, the ERTMS/ETCS on-board equipment shall offer the driver different means to select the RBC contact information (including RBC identity, RBC telephone number, and the identity of the radio network to be used), for details see chapter 5, Start of Mission procedure.
3.18.4.3.3	In normal operation after the start of mission, the driver shall have no further possibility to modify the RBC contact information (all further modifications of this data are executed automatically). Exception: after a manual level change to level 2/3 and if either no Mobile Terminal is registered to a Radio Network or no valid RBC-ID/phone number is available, the ERTMS/ETCS on-board equipment shall request the driver to select the RBC contact information by the same means as for Start of Mission.

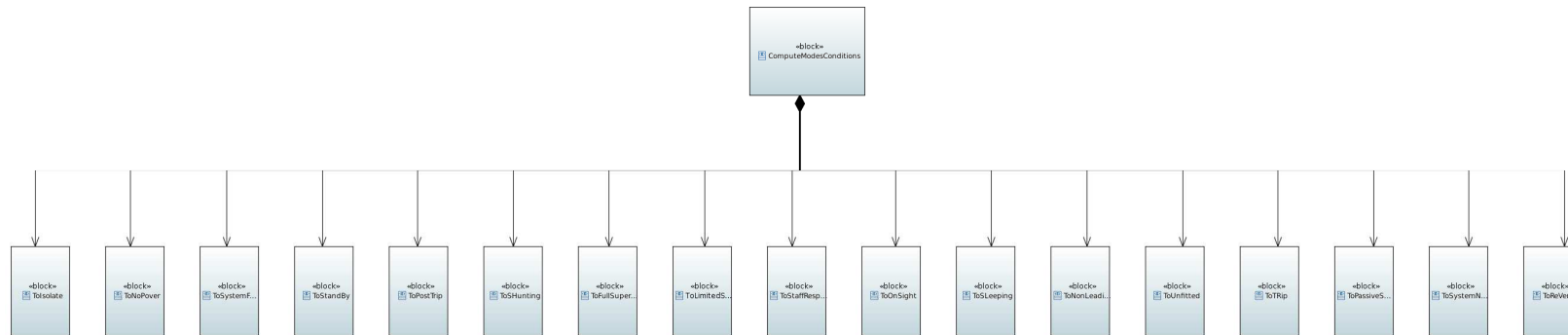
SRS-26 § 5.10:

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To analyse

1.6 ManageModes

1.6.1 Compute Modes Conditions



1.6.1.1 ToIsolate

1.6.1.1.1 Description

The Isolate Mode can be reached from any other mode with the highest priority.

To leave this mode a maintenance procedure is required.

1.6.1.1.2 Inputs

- ETCS_Isolated : Isolation request by the driver via Isolation Switch : interface with the train

1.6.1.1.3 Outputs

- Isolate_Req: priority 0 (not required) or 1 (required)

1.6.1.1.4 Requirements

SRS-26 § 4.4.3:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[1]	The driver isolates the ERTMS/ETCS on-board equipment.

1.6.1.2 ToNoPower

1.6.1.2.1 *Description*

The NoPower mode can be reached from all modes except Isolate

1.6.1.2.2 *Inputs*

- On-boardPowered : powered on of EVC

Commentaire [MD1]: Input to clarify, who provides it ?

1.6.1.2.3 *Outputs*

- NoPower_Req : priority 0 (not required) or 2 (required)

1.6.1.2.4 *Requirements*

SRS-26 § 4.4.4:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[29]	the ERTMS/ETCS on-board equipment is NOT powered

1.6.1.3 ToSystemFailure

1.6.1.3.1 *Description*

SystemFailure mode can be reached from all modes except Isolate and NoPower.

From SystemFailure mode, the system can only switch to NoPower or Isolate modes.

1.6.1.3.2 Inputs

How are detected and reported Safety system failures?

Commentaire [MD2]: This inoput shall be clarified.

1.6.1.3.3 Outputs

1.6.1.3.4 Requirements

SRS-26 § 4.4.5:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[13]	The ERTMS/ETCS on-board equipment detects a fault that affects safety

1.6.1.4 ToSleeping

1.6.1.4.1 Description

Sleeping mode can be reached from StandBy and PassiveShunting mode. It is related to the sleeping cab.

1.6.1.4.2 Inputs

- Desk_open: cabine is open or closed
- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ? how is store the information provided to DMI ?
- Train_req_SL: sleeping signal

1.6.1.4.3 Outputs

1.6.1.4.4 Requirements

SRS-26 § 4.4.6:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[14]	(The “sleeping” input signal is received) AND (train is at standstill) AND (all desks connected to the ERTMS/ETCS on-board equipment are closed)

SRS-26 § 5.5: procedure end of mission

To analyse

SRS-26 § 5.12: procedure change of train orientation

To analyse

1.6.1.5 ToStandBy

1.6.1.5.1 Description

StandBy mode is the default mode: it is selected at power-on and allow initialisation of train data.

It can be reached from all modes except Isolate, SystemFailure and Trip.

From standby mode the system can switch to all the modes except Passive shunting, PostTrip and reverse.

1.6.1.5.2 Inputs

- Desk_open: cabine is open or closed
- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ? how is store the information provided to DMI ?
- On-boardPowered : powered on of EVC
- Train_req_SL: sleeping signal
- Train_permitted PS : passive Shunting information (see subet 034)
- Train_permitted_NL: non leading information (see subset 034)

Commentaire [MD3]: What means “all desks open” ? for how many desk is stored the information ? all the desk of the train ?

Commentaire [MD4]: To check with the start of mission procedure.

Commentaire [MD5]: Input to clarify, who provides it ?

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- Driver_req_continue_SH: “Continue Shunting on desk closure” function is not active”
- Driver_req_exit_SH: “driver selects “exit Shunting””
- Track_Req_stop_shunting: “Stop Shunting on desk opening” information is stored onboard “Driver_req_exit_SH

1.6.1.5.3 Outputs

1.6.1.5.4 Requirements

SRS-26 § 4.4.7:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[2]	(a desk is open)
[3]	(no “go sleeping” input signal is received any more) AND (train is at standstill)
[4]	The ERTMS/ETCS on-board equipment is powered.
[19]	(driver selects “exit Shunting”) AND (train is at standstill).
[22]	(a desk is open) AND (“Stop Shunting on desk opening” information is stored onboard)
[27]	(desks are closed) AND (“Continue Shunting on desk closure” function is not active)
[28]	(desks are closed)
[30]	(desks are closed) AND (no “passive shunting” input signal is received)
[47]	(no “non leading” input signal is received any more) AND (train is at standstill)

SRS-26 § 5.5: procedure end of mission

To analyse

SRS-26 § 5.12: procedure change of train orientation

Commentaire [MD6]: Does it mean that if stop shunting information from trackside is stored, this function is no more active , without taking into account driver command ?
See also condition [26] for PS and previous condition [22]

To analyse

1.6.1.6 ToShunting

1.6.1.6.1 *Description*

To allow shunting movements, can be reached from SB, PS, FS, LS, SR, OS, UN, TR, PT, SN modes.

1.6.1.6.2 *Inputs*

- Desk_open: cabine is open or closed
- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
how is store the information provided to DMI ?
- Current Level
- Previous Level
- Driver_req_SH
- Driver_ack_SH
- Train_req_SL: sleeping signal
- Driver_req_continue_SH: "Continue Shunting on desk closure" function is not active"
- Driver_req_exit_SH: "driver selects "exit Shunting""
- Track_Req_stop_shunting: "Stop Shunting on desk opening" information is stored onboard "
- Available_ma_mode
- Dist_ma_mode
- Length_ma_mode
- Train_position
- "no valid Train Data is on-board "Driver_req_exit_SH"
- Driver_ack_TR

1.6.1.6.3 *Outputs*

Commentaire [MD7]: To clarify

1.6.1.6.4 Requirements

SRS-26 § 4.4.8:*To analyse***SRS-26 § 4.6:**

Condition Id	Content of the conditions
[5]	(train is at standstill) AND (ERTMS/ETCS level is 0 or NTC or 1) AND (driver selects Shunting mode)
[6]	(train is at standstill) AND (ERTMS/ETCS level is 2 or 3) AND (reception of the information "Shunting granted by RBC", due to a Shunting request from the driver)
[23]	(a desk is open) AND (no "Stop Shunting on desk opening" information is stored onboard)
[50]	(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges) see {5} here under
[51]	(A Mode Profile defining the entry of a Shunting area is used on-board) AND (The max safe front end of the train is inside the Shunting area)
[61]	(A Mode Profile defining a Shunting area is on-board) AND (The max safe front end of the train is inside the Shunting area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[68]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0 or NTC) AND (no valid Train Data is on-board)

Commentaire [MD8]: What is this information ?

Commentaire [MD9]: As for SB mode, this information merges information from driver and track ?

{5} The request to acknowledge Shunting is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Entry in Shunting" procedure and the "Start Of Mission" procedure of SRS-SRS-26 §5

SRS-26 § 5.4: procedure Start of mission*To analyse***SRS-26 § 5.5: procedure end of mission**

To analyse

SRS-26 § 5.6: procedure shunting initiated by driver

To analyse

SRS-26 § 5.7: procedure shunting with order from trackside

To analyse

SRS-26 § 5.11: procedure train trip

To analyse

SRS-26 § 5.12: procedure change of train orientation

To analyse

1.6.1.7 ToFullSupervision

1.6.1.7.1 *Description*

Iti is a nominal mode in which all functions of supervision are activated in level 1, 2 or 3.

FullSupervision mode can be reached from SB, LS, SR, OS, UN, PT, SN modes.

1.6.1.7.2 *Inputs*

- “valid Train Data is stored on board”
- “MA + SSP +gradient are on-board”
- Available_ma_mode
- Current Level
- Previous Level
- “no trip order is given by balise”

1.6.1.7.3 *Outputs*

1.6.1.7.4 *Requirements*

Commentaire [MD10]: To clarify what is store, only value or also availability ? are default values defined ?

Commentaire [MD11]: Via which packet is tranfered this information ?

SRS-26 § 4.4.9:*To analyse***SRS-26 § 4.6:**

Condition Id	Content of the conditions
[10]	(valid Train Data is stored on board) AND (MA + SSP +gradient are on-board) AND (no specific mode is required by a Mode Profile)
[25]	(ERTMS/ETCS level switches to 1,2 or 3) AND (MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile)
[31]	(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 2 or 3)
[32]	(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 1) AND (no trip order is given by balise)

SRS-26 § 5.4: procedure Start of mission*To analyse***SRS-26 § 5.11: procedure train trip***To analyse*

1.6.1.8 ToUnfitted

1.6.1.8.1 *Description*

Unfitted is the nominal mode associated to level 0. It can be reached from modes SB, FS, LS, SR, OS, Tr and SN.

1.6.1.8.2 *Inputs*

- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
How is store the information provided to DMI ?
- Current Level

- Driver_ack_TR
- “valid Train Data is stored on board”
- Driver_ack_UN

1.6.1.8.3 Outputs

1.6.1.8.4 Requirements

SRS-26 § 4.4.10:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[21]	(ERTMS/ETCS level switches to 0) see {2} here under
[60]	(an acknowledgement request for UN mode is displayed to the driver) AND (the driver acknowledges)
[62]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0) AND (valid Train Data is on-board)

{2} This transition to the Unfitted mode is also a transition of level.. For further information, See the “Level Transition” procedure” (SRS-SRS-26 §5) for transitions from FS/SR/OS/LS to UN and the “Start Of Mission” procedure” (SRS-SRS-26 §5) for transition from SB to UN.

SRS-26 § 5.4: procedure Start of mission

To analyse

SRS-26 § 5.11: procedure train trip

To analyse

1.6.1.9 ToStaffResponsible

1.6.1.9.1 Description

StaffResponsible mode can be reached from SB, FS, LS, OS, UN, PT and SN modes.

1.6.1.9.2 Inputs

- Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ? how is store the information provided to DMI ?
- Current Level
- Previous Level
- Driver_ack_SR
- Driver_req_override
- "the speed limit for triggering the "override" function"
- "Override function is active"
- "Unconditional emergency stop message has been received"

Commentaire [MD12]: To clarify

1.6.1.9.3 Outputs

1.6.1.9.4 Requirements

SRS-26 § 4.4.11:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[8]	(Staff Responsible mode is proposed to the driver) AND (driver acknowledges) {4}
[37]	(driver selects "override") AND (train speed is under or equal to the speed limit for triggering the "override" function) see {3} here under
[44]	("override" function is active) AND (ERTMS/ETCS level switches to 1) see {3} here under

[45]	("override" function is active) AND (no unconditional emergency stop message has been received) AND (ERTMS/ETCS level switches to 2 or 3) see {3} here under
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{3} See the "Override" procedure" of SRS-SRS-26 §5.

{4} The Staff Responsible mode is proposed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Start Of Mission" procedure and the "Train Trip" procedure of SRS-SRS-26 §5.

SRS-26 § 5.4: procedure Start of mission

To analyse

SRS-26 § 5.11: procedure train trip

To analyse

1.6.1.10 ToOnSight

1.6.1.10.1 Description

On Sight mode can be reached from SB, FS, LS, SR, UN, PT, SN modes.

1.6.1.10.2 Inputs

- Driver_ack_OS
- Available_ma_mode
- Dist_ma_mode
- Length_ma_mode
- Length_ack_ma_mode
- Current Level
- Previous Level
- Train_position

1.6.1.10.3 Outputs

1.6.1.10.4 Requirements

SRS-26 § 4.4.12:*To analyse***SRS-26 § 4.6:**

Condition Id	Content of the conditions
[15]	(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges) see {1} here under
[34]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[40]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area)
[73]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area) AND (The estimated front end of the train is not inside an LS acknowledgement area)

{1} The request to acknowledge On Sight is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "On Sight" procedure" of SRS-SRS-26 §5 (for transitions from FS/LS/UN to OS) and the "Start of mission" procedure (for transition from SB to OS).

SRS-26 § 5.4: procedure Start of mission*To analyse***SRS-26 § 5.9: procedure on sight***To analyse***SRS-26 § 5.11: procedure train trip***To analyse*

1.6.1.11 ToTrip

1.6.1.11.1 *Description***TODO**1.6.1.11.2 *Inputs***TODO**1.6.1.11.3 *Outputs*1.6.1.11.4 *Requirements***SRS-26 § 4.4.13:***To analyse***SRS-26 § 4.6:**

Condition Id	Content of the conditions
[12]	(The train/engine overpasses the EOA/LOA with its min safe antenna position) AND (ERTMS/ETCS level is 1).
[16]	(The train/engine overpasses the EOA/LOA with its min safe front end) AND (ERTMS/ETCS level is 2 or 3).
[17]	The onboard reacts according to a linking reaction set to "trip".
[18]	(the train/engine receives and uses a trip order given by balise) AND (override is not active).
[20]	(unconditional emergency stop message is accepted).
[35]	(driver selects Shunting mode) AND (The ERTMS/ETCS on-board equipment is interfaced to the National System through an STM) AND (a National Trip Procedure is active, see {8} here under)
[36]	(the identity of the over-passed balise group is not in the list of expected balises related to SR mode) AND (override is not active).

Commentaire [MD13]:
FS, LS, OS -> TR
I : EOA overpassed + level

Commentaire [MD14]:
FS, LS, OS -> TR
I: EOA overpassed + level

Commentaire [MD15]:
FS, LS, OS -> TR
I : Linking reaction set to trip

Commentaire [MD16]:
FS, LS, SR, OS -> TR
I : Trip order given by balise + override mode ?

Commentaire [MD17]:
SB, FS, LS, SR, OS, UN, SN -> TR
I unconditional emergency stop message ?

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[38]	(The ERTMS/ETCS on-board equipment is interfaced to the National System through an STM) AND (The ERTMS/ETCS level switches to 0,1,2 or 3) AND (a National Trip Procedure is active) see {8} here under
[39]	(The ERTMS/ETCS level switches to 1,2 or 3) AND (no MA has been accepted)
[41]	(T_NVCONTACT is passed) AND (associated reaction is "train trip")
[42]	(The train/engine overpasses the SR distance with its estimated front end) AND (override is not active)
[43]	(The train/engine overpasses the former EOA (when Override was activated) with the min safe antenna position) AND (override is not active), see {3} here under
[49]	(reception of information "stop if in shunting") AND (override is not active)
[52]	(the identity of the over-passed balise group is not in the list of expected balise groups related to SH mode) AND (override is not active).
[54]	(reception of information "stop if in Staff Responsible") AND (no list of expected balise groups related to SR mode has been received or the list of expected balise groups related to SR mode does not include the identity of the over-passed balise group) AND (override is not active)
[65]	(The system version number X of a received balise telegram is greater than the highest version number X supported by the on-board equipment) AND (ERTMS/ETCS level is 1, 2 or 3)
[66]	A balise group contained in the linking information is passed in the unexpected direction
[67]	(The ERTMS/ETCS level switches to level 1) AND (a trip order has been received) AND (override is not active)
[69]	Estimated train front end is in rear of the start location of either SSP or gradient profile stored on-board

{8} Refer to Subset-035 for details.

Commentaire [MD18]: Analyse of this mode in a future iteration.

SRS-26 § 5.11: procedure train trip*To analyse*

1.6.1.12 ToPostTrip

1.6.1.12.1 Description

This mode can be reached only from trip mode, it allows to position the train in safe condition.

1.6.1.12.2 Inputs

- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
How is store the information provided to DMI ?
- Current Level
- Driver_ack_TR

1.6.1.12.3 Outputs

1.6.1.12.4 Requirements

SRS-26 § 4.4.14:*To analyse***SRS-26 § 4.6:**

Condition Id	Content of the conditions
[7]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is different from 0, NTC)

SRS-26 § 5.11: procedure train trip*To analyse*

1.6.1.13 ToNonLeading

1.6.1.13.1 *Description*

1.6.1.13.2 *Inputs*

- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
how is store the information provided to DMI ?
- Train_permitted_NL: non leading information (see subset 034)
- Driver_req_NL

1.6.1.13.3 *Outputs*

1.6.1.13.4 *Requirements*

SRS-26 § 4.4.15:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[46]	(Driver selects NON LEADING) AND (train is at standstill) AND (The “non leading” input signal is received)

SRS-26 § 5.4: procedure Start of mission

To analyse

SRS-26 § 5.12: procedure change of train orientation

To analyse

1.6.1.14 ToSystemNational

1.6.1.14.1 *Description*

1.6.1.14.2 *Inputs*

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- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
How is store the information provided to DMI ?
- Current Level
- Previous Level
- Driver_ack_TR
- “valid Train Data is stored on board”
- Driver_ack_SN

1.6.1.14.3 Outputs

1.6.1.14.4 Requirements

SRS-26 § 4.4.17:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[56]	(the ERTMS/ETCS level switches to “NTC”)
[58]	(the ERTMS/ETCS level is “NTC”) AND (an acknowledgement request for SN mode is displayed to the driver) AND (the driver acknowledges)
[63]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is NTC) AND (valid Train Data is on-board)

SRS-26 § 5.4: procedure Start of mission

To analyse

SRS-26 § 5.11: procedure train trip

To analyse

1.6.1.15 ToReverse

1.6.1.15.1 Description

The Reverse mode can be reached in Level 1, 2 or 3 from FS, LS or OS modes.

1.6.1.15.2 Inputs

- Train_standstill or Train_speed: clarify if we have to check the speed (which one ?) or if the Odometry management function provide ?
How is store the information provided to DMI ?
- Driver_ack_RV

*1.6.1.15.3 Outputs**1.6.1.15.4 Requirements***SRS-26 § 4.4.18:**

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[59]	(train is at standstill) AND (driver has acknowledged the reversing) see {6} here under

{6} The request to acknowledge Reversing is displayed to the driver when certain conditions are fulfilled. These conditions are not specified here. See the “reversing” procedure of SRS-SRS-26 §5.

SRS-26 § 5.13: procedure train reversing

To analyse

*1.6.1.16 To LimitedSupervision**1.6.1.16.1 Description**1.6.1.16.2 Inputs*

- Driver_ack_LS

- Available_ma_mode
- Dist_ma_mode
- Length_ma_mode
- Length_ack_ma_mode
- Current Level
- Previous Level
- Train_position

1.6.1.16.3 Outputs

1.6.1.16.4 Requirements

SRS-26 § 4.4.19:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[70]	(An ackn. request for Limited Supervision is displayed to the driver) AND (the driver acknowledges) see {7} here under
[71]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[72]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area).
[74]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The estimated front end of the train is not inside an OS acknowledgement area)

{7} The request to acknowledge Limited Supervision is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Limited Supervision" procedure" of SRS-SRS-26 §5 (for transitions from FS/OS/UN to LS) and the "Start of mission" procedure (for transition from SB to LS).

SRS-26 § 5.4: procedure Start of mission

To analyse

SRS-26 § 5.11: procedure train trip

To analyse

SRS-26 § 5.19: procedure limited supervision

To analyse

1.6.1.17 To PassiveShunting

1.6.1.17.1 Description

1.6.1.17.2 Inputs

- Desk_open: cabine is open or closed
- Train_permitted PS : passive Shunting information (see subet 034)
- Driver_req_continue_SH: ""Continue Shunting on desk closure" function is not active"

1.6.1.17.3 Outputs

1.6.1.17.4 Requirements

SRS-26 § 4.4.20:

To analyse

SRS-26 § 4.6:

Condition Id	Content of the conditions
[26]	(desks are closed) AND ("Continue Shunting on desk closure" function is active)

Commentaire [MD19]: See cdtion [27] to SB

	AND (the “passive shunting” input signal is received)
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SRS-26 § 5.12: procedure change of train orientation

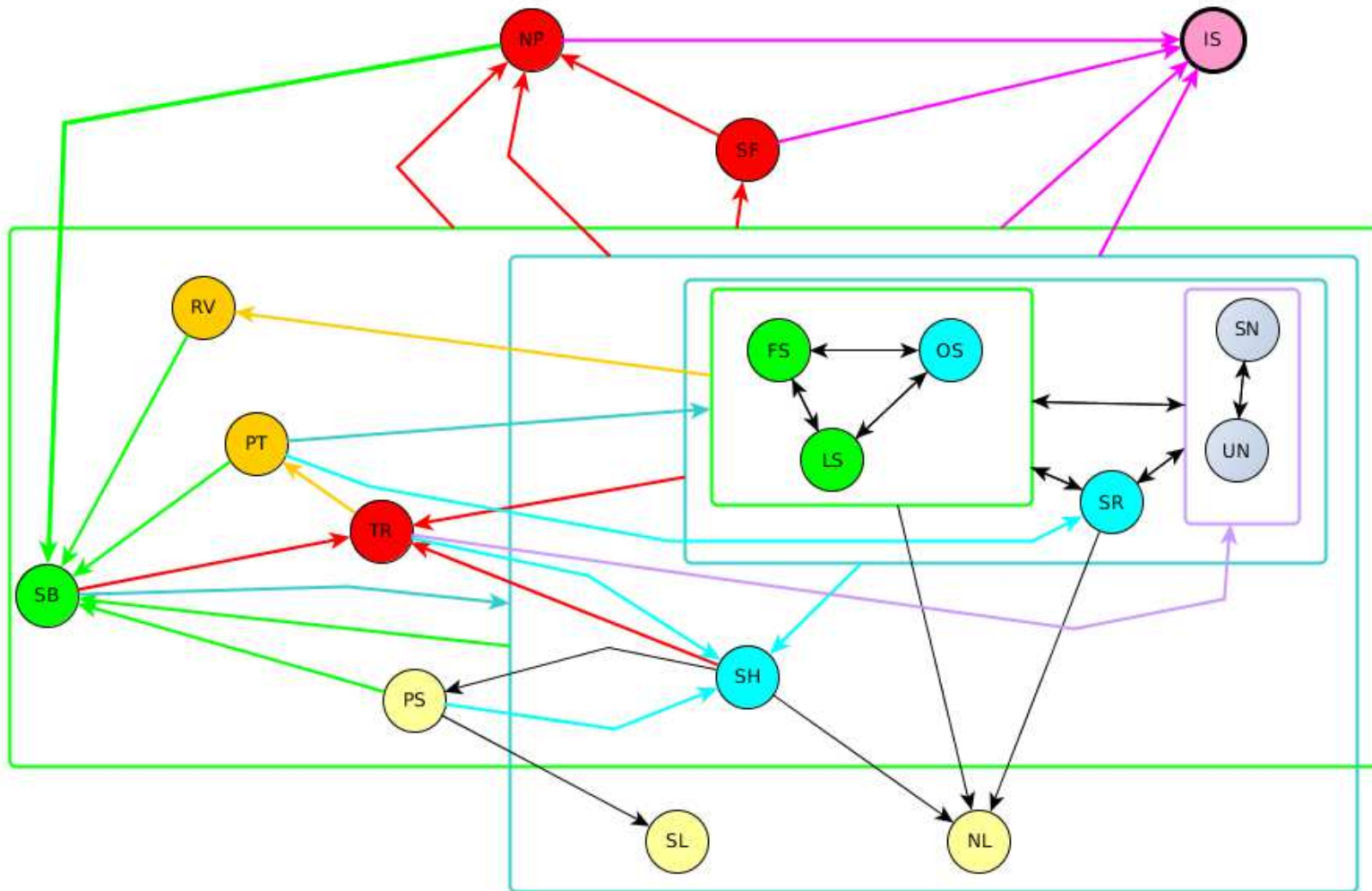
To analyse

1.6.2 SwitchMode

1.6.2.1.1 Description

This block is in charge to select the mode according conditions computed in “Compute Modes Conditions” block and priority defined in **SRS-26 § 4.6.1.**

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1.6.2.1.2 *Inputs*

The inputs are provided by “Compute Modes Conditions” block

1.6.2.1.3 *Outputs*

- Current Mode
- Previous Mode

1.6.2.1.4 *Requirements*

1.7 Requirements

SRS-26 § 3:

To analyse

3.4.4.2.3	<p><i>For each linked balise group, the trackside shall select one of the following reactions to be used in case of data inconsistencies:</i></p> <ul style="list-style-type: none"> a) Train trip (Trip mode, see Chapter 4) b) Command service brake c) No reaction <p>For further details see section Erreur ! Source du renvoi introuvable..</p>
3.5.2.4	<p>The on-board shall establish a communication session</p> <ul style="list-style-type: none"> h) At Start of Mission (only if level 2 or 3). i) If ordered from trackside. j) If a mode change, not considered as an End of Mission, has to be reported to the RBC (only if level 2 or 3) k) If the driver has manually changed the level to 2 or 3 l) When the train front reaches the end of an announced radio hole m) When the previous communication session is considered as terminated due to loss of safe radio connection (refer to 3.5.4.2.1) n) When a Start of Mission procedure, during which no communication session could be established, is completed in level 2 or 3
3.6.5.1.4	<p><i>The on-board equipment shall send position reports as requested by the RBC in the</i></p>

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	<p><i>position report parameters. In addition, it shall also send a position report if at least one of the events listed hereafter occurs:</i></p> <ul style="list-style-type: none"> l) The train reaches standstill, if applicable to the current mode. m) The mode changes. n) The driver confirms train integrity. o) A loss of train integrity is detected. p) The train passes a RBC/RBC border with its min safe rear end. q) The train passes a level transition border (from level 2/3 to level 0, NTC, 1) with its min safe rear end. r) The level changes. s) A communication session is successfully established. t) Intentionally moved. u) The train passes an LRBG compliant balise group (see 3.6.2.2.2), if no position report parameters are stored on-board. v) The train passes a RBC/RBC border with its max safe front end.
3.6.5.1.8	The mode and level reported in a position report shall be consistent (e.g., no mode that relates to the previous level).
3.7.1.1	<p>To control the train movement in an ERTMS/ETCS based system the ERTMS/ETCS on-board equipment shall be given information from the trackside system both concerning the route set for the train and the track description for that route. The following information shall be given from the trackside</p> <ul style="list-style-type: none"> e) Permission and distance to run, the Movement Authority (MA) (see

	<p>section Erreur ! Source du renvoi introuvable.)</p> <p>f) When needed, limitations related to the movement authority, i.e. Mode profile for On Sight, Limited Supervision or Shunting and signalling related speed restriction (see sections Erreur ! Source du renvoi introuvable. and Erreur ! Source du renvoi introuvable.). Mode profile and Signalling related Speed restriction shall always be sent together with the MA to which the information belongs</p> <p>g) Track description covering as a minimum the whole distance defined by the MA. Track description includes the following information</p> <ul style="list-style-type: none"> • The Static Speed Profile (SSP) (see section Erreur ! Source du renvoi introuvable.). • The gradient profile (see section Erreur ! Source du renvoi introuvable.). • Optionally Axle load Speed Profile (ASP) (see section Erreur ! Source du renvoi introuvable.). • Optionally Speed restriction to ensure a given permitted braking distance (see section 3.11.11) • Optionally track conditions (see section Erreur ! Source du renvoi introuvable.). • Optionally route suitability data (see section Erreur ! Source du renvoi introuvable.). • Optionally areas where reversing is permitted (see section Erreur ! Source du renvoi introuvable.). • Optionally changed adhesion factor (see section Erreur ! Source du renvoi introuvable.).
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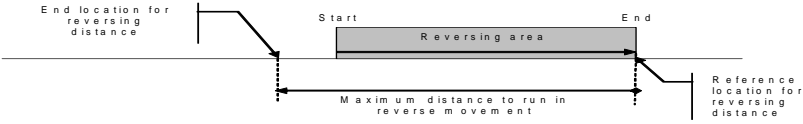
	h) Linking information when available.
3.11.6.4	In case of a signal at danger the signalling related speed restriction shall have value zero, which shall be evaluated by the ERTMS/ETCS on-board equipment not as a speed limit but as a train trip order.
3.11.7.1	The value of the mode related speed restriction shall be determined by the corresponding national value or the corresponding default values if the national values are not applicable.
3.11.7.1.1	<i>Exception 1: For the modes On Sight, Limited Supervision and Shunting the speed limit can also be given from the trackside. The speed limit given from the trackside shall prevail over the National value and the default value</i>
3.11.7.1.2	<i>Exception 2: For the mode Reversing there is no National/Default value. The speed limit is always given from trackside.</i>
3.11.7.1.3	<i>Exception 3: For the mode Staff Responsible the speed limit can also be entered by the driver. The speed limit given by the driver shall prevail over the National/Default value.</i>
3.12.3.4.2	<p><i>The following events can be used to define the start condition:</i></p> <ul style="list-style-type: none"> • Location • Mode (start display as soon as in mode) • Level (start display as soon as in level)
3.12.3.4.3	<p><i>The following events can be used to define the end condition:</i></p> <ul style="list-style-type: none"> • Location • Time

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	<ul style="list-style-type: none"> • Mode (stop display when leaving mode) • Level (stop display when leaving level)
3.12.4.1	The Mode Profile can request On Sight mode, Limited Supervision mode and Shunting mode.
3.12.4.2	For OS and LS mode the mode profile shall define the entry and the length of the On Sight/Limited Supervision area. For SH mode the mode profile only defines the entry location to SH mode, any length given shall be ignored by the on-board.
3.12.4.3	On reception of a new MA (with or without Mode Profile) the on-board equipment shall delete the currently supervised Mode Profile.
3.12.4.3.1	<i>Exception: When receiving a new MA by infill, any currently supervised Mode Profile shall be deleted only beyond the reference location of the infill information.</i>
3.12.4.4	In case the mode profile information for shunting is overwritten by a new shunting profile, before the on-board equipment switches to SH mode, a previous list of balise groups for SH area shall be deleted or replaced by a new list of balise groups for SH area.
3.12.4.5	The beginning of the Mode Profile relates to the max safe front end of the train.
3.12.4.6	<i>The end of the mode profile relates to the min safe front end of the train.</i>

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3.14.1.3	If the emergency brake command was triggered due to a trip condition (see chapter 4) the emergency brake command shall be released at standstill and after driver acknowledgement of the trip condition.
3.14.1.7.1	<i>If the brake command was triggered due to an overpassed reversing distance related to a reversing area or due to any further movement in the direction opposite to the train orientation while the reversing distance is still overpassed, the brake command shall be released if the reversing distance becomes extended so that the reversing distance is no longer overpassed, or at standstill after driver acknowledgement.</i>
3.14.1.7.3	<i>If the brake command was triggered due to the detection of a train movement while modifying/revalidating train data or while entering SR speed/distance limits, the brake command shall be released at standstill and after driver acknowledgement..</i>
3.14.1.7.4	<i>If the brake command was triggered due to an overpassed distance allowed for moving backwards in Post Trip mode or due to any further movement in the direction opposite to the train orientation while the distance allowed for moving backwards in Post Trip mode is still overpassed, the brake command shall be released at standstill and after driver acknowledgement.</i>
3.15.1.3.3	<i>As soon as the on-board equipment has established the session with the Accepting RBC, it shall send its Train Data unless it is in sleeping or non leading mode.</i>
3.15.3.1	<i>ERTMS/ETCS shall allow Splitting and Joining using the normal supervision functions available (e.g. On-sight, Shunting).</i>
3.15.4.1	It shall be possible to send in advance to an on-board equipment information about areas, where initiation of reversing of movement direction is possible, i.e. change the direction of train movement without changing the train orientation.
3.15.4.1.1	<i>A new reversing area given from the trackside shall replace the one already available</i>

	<i>on-board.</i>
3.15.4.2	<p>Together with start and end of reversing area, the following supervision information shall be sent:</p> <ul style="list-style-type: none"> a) Maximum distance to run in the direction opposite to the orientation of the reversing area, the fixed reference location being the end location of the area where reversing of movement is permitted at the time of reception of this reversing area information. b) Reversing mode speed limit allowed during reverse movement.  <p>Figure 1: Reversing area and maximum distance to run</p>
3.15.4.2.1	<p><i>Note: If a closer SvL is defined, see Appendix 3.4 for a complete list of situations, the reversing area is deleted beyond the new SvL. The reference location for the distance to run in the direction opposite to the reversing area remains fixed at its original position.</i></p>

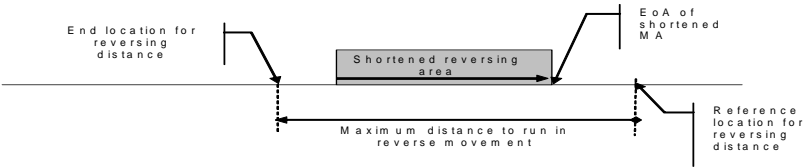
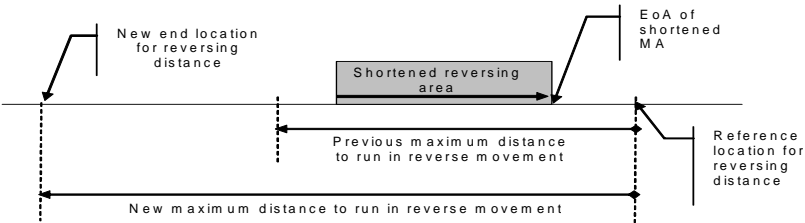


Figure 2: Influence of a shortened Movement Authority

3.15.4.3 New distance to run and Reversing mode speed limit given from the trackside shall replace the one already available on-board.

3.15.4.3.1 *In case of update of distance to run in reverse movement, the fixed reference location for reversing distance shall remain unchanged.*



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	Figure 3: New maximum distance to run
3.15.4.4	While at standstill with the front end of the train inside the indicated area, it shall be possible for the driver to reverse the direction of movement.
3.15.4.5	The on-board equipment shall allow movement in the direction opposite to the train orientation, supervising it according to distance and speed received.
3.15.4.6	Note: level transitions and RBC/RBC handovers are not handled by the ERTMS/ETCS on-board equipment when in Reversing mode.
3.15.4.7	When at standstill the on-board equipment shall inform the driver if the reversing of movement is permitted.
3.15.4.8	If the end location of the maximum distance to run in the opposite direction is passed by the train front end, the emergency brake command shall be triggered.
3.15.8.1	<i>After being switched off (i.e. once in No Power mode), the ERTMS/ETCS on-board equipment shall be capable, if fitted with, to detect and record whether the engine has been moved or not, during a period of at least 72 hours.</i>
3.15.8.2	<i>When powered on again, the ERTMS/ETCS on-board equipment shall use, if available, the memorised information about cold movement in order to update the status of information stored by on-board equipment (see chapter 4 section 4.11 for details).</i>
3.15.8.3	<p>Note: information memorised by Cold Movement Detection function is considered as not available if:</p> <p>b) no Cold Movement Detection function is implemented in the ERTMS/ETCS on-board equipment, OR</p> <p><i>the Cold Movement Detection function has encountered a condition, during the No</i></p>

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	<i>Power period, which prevents the use of the Cold Movement information (e.g. the battery ensuring the Cold Movement Detection function has run down during the No Power period).</i>
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4. CHAPTER 4 **MODES** AND TRANSITIONS

4.1 Modification History

4.2 Table of Contents

4.3 Introduction

4.3.1 Presentation of the document

- 4.3.1.1 This document defines the **modes** of the ERTMS/ETCS on-board equipment (see chapter 4.4 “Definition of the **modes**” and chapter 4.5 “**Modes** and on-board functions”).
- 4.3.1.2 This document gives all transitions between **modes** (see chapter 4.6 “Transitions between **modes**”).
- 4.3.1.3 This document describes the possible exchanged information between the driver and the ERTMS/ETCS on-board equipment, respect to the **mode** (see chapter 4.7 “DMI depending on **modes**”).
- 4.3.1.4 This document describes how the received information is filtered, respect to several criteria such as the **level**, the **mode**, etc.. (see chapter 4.8 “Acceptance of received information”).
- 4.3.1.5 This document describes how the stored information is handled, respect to several criteria such as the **level**, the **mode**, etc. (see chapter 4.9 “What happens to accepted and stored information when entering a given **level**”, and chapter 4.10 “What happens to accepted and stored information when entering a given **mode**”).
- 4.3.1.6 All the tables that are included in this document shall be considered as mandatory requirements.
- 4.3.1.7 Some notes appear in this document. These notes are here to help the reader to understand the specifications, or to explain the reason(s) of a requirement.

4.3.2 Identification of the possible **modes**

- 4.3.2.1 List of the **modes**:

Full Supervision (FS)

Limited Supervision (LS)

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On Sight	(OS)
Staff Responsible	(SR)
Shunting	(SH)
Unfitted	(UN)
Passive Shunting	(PS)
Sleeping	(SL)
Stand By	(SB)
Trip	(TR)
Post Trip	(PT)
System Failure	(SF)
Isolation	(IS)
No Power	(NP)
Non Leading	(NL)
National System	(SN)
Reversing	(RV)

4.4 Definition of the modes

4.4.1 Introduction

4.4.1.1 For each mode the following information is given:

- a) The context of utilisation of the mode and the functions that characterise the mode (chapter “Description”).
- b) The ERTMS/ETCS levels in which the mode can be used (chapter “Used in levels”).
- c) The related responsibility of the ERTMS/ETCS on-board equipment and of the driver, once the equipment is in this mode (chapter “Responsibilities”).

4.4.1.2 A complete list of transitions to and from each mode is given in the section 4.6.2 “Transitions Table”).

4.4.2 General Requirements

4.4.2.1 When the desk is open, a clear indication of the ERTMS/ETCS mode shall be shown to the driver.

4.4.2.2 Intentionally deleted.

4.4.3 ISOLATION

4.4.3.1 Description

- 4.4.3.1.1 In **Isolation mode**, the ERTMS/ETCS on-board equipment shall be physically isolated from the brakes and can be isolated from other on-board equipments/systems depending on the specific on-board implementation.
- 4.4.3.1.2 There shall be a clear indication to the driver that the ERTMS/ETCS on-board equipment is isolated.
- 4.4.3.1.3 To leave **Isolation mode**, a special operating procedure is needed (no transition from **Isolation** is specified). This procedure shall ensure that the on-board equipment is only put back into service when it has been proven that this is safe for operation.
- 4.4.3.1.4 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes** and on-board functions".

4.4.3.2 Used in **levels**

- 4.4.3.2.1 Used in all **levels**: **Level 0**, **level 1**, **level 2**, **level 3** and **level NTC**.

4.4.3.3 Responsibilities

- 4.4.3.3.1 **Isolation** of the ERTMS/ETCS on-board equipment is performed by the driver under his complete responsibility.
- 4.4.3.3.2 Once the ERTMS/ETCS on-board equipment is isolated, the ERTMS/ETCS on-board equipment has no more responsibility.

4.4.4 NO POWER

4.4.4.1 Description

4.4.4.1.1 When the ERTMS/ETCS on-board equipment is not powered, the equipment shall be in the No Power mode.

4.4.4.1.1.1 Note: in order to ensure cold movement detection function, some parts of the ERTMS/ETCS on-board equipment may be fed by an auxiliary power supply.

4.4.4.1.2 The ERTMS/ETCS on-board equipment shall permanently command the emergency brake.

4.4.4.1.3 Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".

4.4.4.2 Used in levels

4.4.4.2.1 Used in all levels: Level 0, level 1, level 2, level 3 and level NTC.

4.4.4.3 Responsibilities

4.4.4.3.1 The ERTMS/ETCS on-board equipment has no responsibility in this mode, except commanding the emergency brake and (optionally) monitoring cold movements.

4.4.4.3.2 The notion of responsibility of the driver is not relevant for the No Power mode.

4.4.4.3.3 If it is required to move a loco in NP mode as a wagon, ETCS brake command must be overridden by external means.

4.4.5 **SYSTEM FAILURE**

4.4.5.1 **Description**

4.4.5.1.1 *The ERTMS/ETCS on-board equipment shall switch to the **System Failure mode** in case of a fault, which affects safety.*

4.4.5.1.2 *The ERTMS/ETCS on-board equipment shall permanently command the Emergency Brakes.*

4.4.5.1.3 *Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes** and on-board functions".*

4.4.5.2 **Used in levels**

4.4.5.2.1 *Used in all **levels**: **Level 0**, **level 1**, **level 2**, **level 3** and **level NTC**.*

4.4.5.3 **Responsibilities**

4.4.5.3.1 *The ERTMS/ETCS on-board equipment is responsible for commanding the Emergency Brakes.*

4.4.5.3.2 *No responsibility of the driver.*

4.4.6 SLEEPING

4.4.6.1 Description

- 4.4.6.1.1 The **Sleeping mode** is defined to manage the ERTMS/ETCS on-board equipment of a slave engine that is remote controlled.
- 4.4.6.1.2 The desk(s) of a **sleeping** engine must be closed (since there is no driver, no information shall be shown).
- 4.4.6.1.3 As the engine is remote controlled by the leading engine, its ERTMS/ETCS on-board equipment shall not perform any train movement supervision.
- 4.4.6.1.4 The ERTMS/ETCS on-board equipment shall perform the Train Position function; in particular, the front/rear end of the engine (i.e., not the train) shall be used to refer to train front/rear end.
- 4.4.6.1.5 **Sleeping mode** shall be automatically detected on-board via the train interface.
- 4.4.6.1.6 If possible, the train must not be stopped due to a safety critical fault in a **sleeping** engine. The ERTMS/ETCS on-board equipment shall therefore try to memorise the occurrence of such fault(s), which shall be handled when the engine leaves the **Sleeping mode**. The ERTMS/ETCS on-board equipment shall also try to send an error information to the RBC.
- 4.4.6.1.7 If a desk of the **sleeping** engine is opened while the train is running (this is an abnormal operation), the ERTMS/ETCS on-board equipment shall switch to Stand-By **mode**.
- 4.4.6.1.8 If the "**sleeping** input signal" is **lost** (no more detection of the remote control), the switch to Stand-By **mode** shall be made only if the train is at standstill.
- 4.4.6.1.9 Intentionally deleted.
- 4.4.6.1.10 The ERTMS/ETCS on-board equipment shall open a communication session with the RBC when at least one of the following events occurs:
 - a) in all **levels**, on receipt of the order to contact the RBC.
 - b) In **level** 2/3, when entering or exiting **Sleeping mode** (to report the change of **mode** to the RBC).

c) In **level** 2/3, when a safety critical fault of the ERTMS/ETCS on-board equipment occurs (to report the fault to the RBC).

4.4.6.1.11 *Note: for the list of main functions related to this **mode**, refer to chapter 4.5 “Modes and on-board functions”.*

4.4.6.1.12 *In case of balise group message consistency error (refer to 3.16.2.4.4 and 3.16.2.5.1), the ERTMS/ETCS onboard equipment shall not command the service brake.*

4.4.6.1.13 *When in **levels** 2 or 3, if no compatible version has been established between the on-board equipment in **Sleeping mode** and the RBC, the ERTMS/ETCS onboard equipment shall react as specified in 3.5.3.8 b) but no driver's indication shall be given.*

4.4.6.2 Used in **levels**

4.4.6.2.1 *Used in all **levels**: **Level** 0, **level** 1, **level** 2, **level** 3 and **level** NTC.*

4.4.6.3 Responsibilities

4.4.6.3.1 *The ERTMS/ETCS on-board equipment of an engine in **Sleeping mode** has no responsibility for the train protection.*

4.4.6.3.2 *The notion of responsibility of the driver is not relevant for the **Sleeping mode**.*

4.4.6.3.2.1 *Note: The leading engine is responsible for the movement of the train. It is then the ERTMS/ETCS on-board equipment of the leading engine that is fully/partially/not responsible for the train protection, with respect to its **mode**.*

4.4.7 **STAND BY**

4.4.7.1 **Description**

- 4.4.7.1.1 *The Stand-By mode is a default mode and cannot be selected by the driver.*
- 4.4.7.1.2 *It is in the Stand-By mode that the ERTMS/ETCS on-board equipment awakes.*
- 4.4.7.1.3 *Data for mission shall be collected in Stand-By (see SRS-chapter 5: “Start of Mission” procedure).*
- 4.4.7.1.4 *In Stand-By mode, the desk of the engine can be open or closed. No interaction with the driver shall be possible as long as the desk is closed, except isolation of the ERTMS/ETCS on-board equipment.*
- 4.4.7.1.5 *The ERTMS/ETCS on-board equipment shall perform the Standstill Supervision.*
- 4.4.7.1.6 *Note: for the list of main functions related to this mode, refer to chapter 4.5 “Modes and on-board functions”.*

4.4.7.2 **Used in levels**

- 4.4.7.2.1 *Used in all levels: Level 0, level 1, level 2, level 3 and level NTC.*

4.4.7.3 **Responsibilities**

- 4.4.7.3.1 *The ERTMS/ETCS on-board equipment is responsible for maintaining the train at standstill.*
- 4.4.7.3.2 *The driver has no responsibility for train movements.*

4.4.8 SHUNTING

4.4.8.1 Description

4.4.8.1.1 The purpose of the Shunting mode is to enable shunting movements. In Shunting mode, The ERTMS/ETCS on-board equipment supervises the train movements against:

- a) a ceiling speed: the shunting mode speed limit
- b) a list of expected balise groups (if such list was sent by the trackside equipment). The train shall be tripped if a balise group, not contained in the list, is passed (When an empty list is sent, no balise group can be passed. When no list is sent, all balise groups can be passed)
- c) "stop if in shunting mode" information. The train is tripped if such information is received from balise groups
- d) Intentionally deleted

4.4.8.1.2 The Shunting mode shall not require Train Data.

4.4.8.1.3 The ERTMS/ETCS on-board equipment shall perform the Train Position function

4.4.8.1.4 Intentionally deleted.

4.4.8.1.5 When in Shunting mode, the ERTMS/ETCS on-board shall not manage level transitions. However, an immediate level transition order or a conditional level transition order shall be stored and evaluated only when another mode than Shunting or Passive Shunting has been entered (i.e. when the Shunting movement is terminated).

4.4.8.1.5.1 When receiving a communication session establishment order, the ERTMS/ETCS on-board in Shunting mode shall not establish the communication session, but shall store the RBC ID/phone number.

4.4.8.1.5.2 When in Shunting mode, the ERTMS/ETCS on-board shall not manage RBC-RBC hand-over, except for storing the RBC ID/phone number given at the RBC/RBC border.

4.4.8.1.6 Shunting mode can be selected by the driver, only accepted when the train is at standstill, or ordered by the trackside.

4.4.8.1.7 *In case of selection of **Shunting mode** by the driver:*

- in **level** 1 operations, the switch to **shunting** is always accepted by the on-board equipment
- in **level** 2 and 3 areas, the on-board shall ask the trackside for an authorisation. The switch to **shunting** is possible only after receiving such authorisation. The trackside can send a list of balises, that the train is allowed to pass while in **SH**, together with the authorisation

4.4.8.1.8 *In case of order to switch to **Shunting mode** from trackside, the order:*

- in **level** 1 is given by a balise group. A list of balises, that the train is allowed to pass after the entry in **Shunting**, can be sent together with the order
- in **level** 2 and 3 is sent via radio. A list of balises, that the train is allowed to pass after the entry in **Shunting**, can be sent together with the order

4.4.8.1.9 *When the switch to **shunting** is ordered by trackside, a driver acknowledgement is requested.*

4.4.8.1.9.1 *Note: in **Shunting mode** the train is only partially supervised, therefore it is necessary that the driver takes the responsibility.*

4.4.8.1.10 *The ERTMS/ETCS on-board equipment shall display the train speed and, only on driver request, the permitted speed. The display of the permitted speed shall also be stopped on driver request.*

4.4.8.1.11 *Intentionally deleted.*

4.4.8.1.12 *Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes** and on-board functions".*

4.4.8.2 Used in **levels**

4.4.8.2.1 *Used in **level** 0, NTC, 1, 2 and 3.*

4.4.8.3 Responsibilities

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4.4.8.3.1 *The ERTMS/ETCS on-board equipment is responsible for the supervision of the shunting mode speed limit, and that the engine with the active antenna is tripped when passing the defined border of the shunting area (only if there is a defined border: balise group not in the list given by trackside, or balise group giving the information “stop if in shunting”).*

4.4.8.3.2 *The driver is responsible for:*

- a) Remaining inside the shunting area defined by a procedure or an external system outside ERTMS/ETCS (also when the shunting area is protected by balises)
- b) Train/engine movements and shunting operations

4.4.9 FULL SUPERVISION

4.4.9.1 Description

- 4.4.9.1.1 The ERTMS/ETCS on-board equipment shall be in the Full Supervision mode when all train and track data, which is required for a complete supervision of the train, is available on board.
- 4.4.9.1.2 Full supervision cannot be selected by the driver, but shall be entered automatically when all necessary conditions are fulfilled.
- 4.4.9.1.3 To be in Full Supervision mode, SSP and gradient are not required for the whole length of the train, but shall be at least available from the FRONT END of the train.
- 4.4.9.1.4 Once in Full Supervision mode, if SSP and gradient are not known for the whole length of the train, an indication "ENTRY IN FULL SUPERVISION" shall be clearly displayed to the driver until SSP and gradient are known for the whole length of the train.
- 4.4.9.1.4.1 Note: this indication may also be displayed in case the train length has been increased, see 3.18.3.8.
- 4.4.9.1.5 The ERTMS/ETCS on-board equipment shall supervise train movements against a dynamic speed profile.
- 4.4.9.1.6 The ERTMS/ETCS on-board equipment shall display the train speed, the permitted speed, the target distance and the target speed to the driver (this list is not exhaustive – refer to chapter 4.7 "DMI depending on modes").
- 4.4.9.1.7 Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".

4.4.9.2 Used in levels

- 4.4.9.2.1 Used in level 1, 2 and 3.

4.4.9.3 Responsibilities

- 4.4.9.3.1 The ERTMS/ETCS on-board equipment is fully responsible for the train protection (except for the 2 situations described below).

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4.4.9.3.2 The driver is responsible for respecting the EOA when approaching an EOA with a release speed.

4.4.9.3.3 When “ENTRY IN FULL SUPERVISION” is displayed to the driver, the driver is responsible for respecting speed restrictions that apply for the part of the train that is not covered by SSP and gradient data.

4.4.10 UNFITTED

4.4.10.1 Description

4.4.10.1.1 The Unfitted mode is used to allow train movements in either:

- a) Areas that are equipped neither with ERTMS/ETCS track-side equipment nor with national train control system
- b) Intentionally deleted
- c) Areas that are equipped with ERTMS/ETCS trackside equipment and/or national train control system(s), but operation under their supervision is currently not possible

4.4.10.1.2 The ERTMS/ETCS on-board equipment shall supervise train movements against a ceiling speed: the lowest of the maximum train speed and the Unfitted mode speed limit for unfitted area (national value).

4.4.10.1.2.1 Intentionally deleted.

4.4.10.1.3 The ERTMS/ETCS on-board equipment shall also supervise temporary speed restrictions.

4.4.10.1.4 The ERTMS/ETCS on-board equipment shall display the train speed to the driver.

4.4.10.1.5 Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".

4.4.10.2 Used in levels

4.4.10.2.1 Used in level 0.

4.4.10.3 Responsibilities

4.4.10.3.1 The ERTMS/ETCS on-board equipment supervises a ceiling speed and (if available) temporary speed restrictions.

4.4.10.3.2 *The driver must respect the existing line-side signals and is fully responsible for train movements.*

4.4.11 STAFF RESPONSIBLE

4.4.11.1 Description

4.4.11.1.1 The **Staff Responsible mode** allows the driver to move the train under his own responsibility in an ERTMS/ETCS equipped area.

4.4.11.1.2 This **mode** is used when the system does not know the route. For example:

- a) After the ERTMS/ETCS on-board equipment starts-up (awakening of the train).
- b) To pass a signal at danger / override an EOA.
- c) After a trackside failure (for example: loss of radio contact).

4.4.11.1.3 The ERTMS/ETCS on-board equipment shall supervise train movements against:

- a) a ceiling speed: the **staff responsible mode** speed limit
- b) a given distance (regarding its origin location see 4.4.11.1.3.1). The ERTMS/ETCS on-board equipment shall supervise braking curves with a target speed of zero to the end of this distance. If the train overpasses this distance (see next note) the ERTMS/ETCS on-board equipment shall **trip** the train
- c) a list of expected balise groups, if this list has been sent by the RBC. The train shall be **tripped** if over-passing a balise group that is not in the list. (When an empty list is sent, no balise group can be passed. When no list is sent, all balise groups can be passed)
- d) balise groups giving the order 'stop if in **SR**'. This order shall immediately **trip** the train, unless the over-passed balise group is included in a list of expected balises as defined in item c)
- e) running in the direction opposite to the train orientation (reverse movement protection)

4.4.11.1.3.1 The ERTMS/ETCS on-board shall determine the start location of the **SR** distance as follows:

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- a) If the National/Default value determines the max permitted distance to run in **SR mode**, the starting point of this distance shall refer to the estimated position of the train front when **SR mode** was entered, or, already in **Staff Responsible mode**, when Override was activated.
- b) If the max permitted distance to run in **SR mode** is determined by the value transmitted by the RBC, or entered by the driver, the start location of the distance shall refer to the estimated position of the train front when the distance information is received or entered.
- c) If the max permitted distance to run in **SR mode** is determined by the value transmitted by EUROLOOP, the distance information transmitted by EUROLOOP shall be referred to one or more reference balise groups. On-board shall evaluate the distance to run in **SR mode** by matching the reference balise groups given with the LRBG.

In case the LRBG is, due to a change of orientation, in front of the train when the distance to run in **SR mode** is to be determined from the EUROLOOP information, the complete distance to run in **SR mode** shall be determined as the distance given by EUROLOOP plus the distance between the estimated train front end and the LRBG.

4.4.11.1.4 *Note: Since the gradient is unknown, the supervision of the braking curves in **Staff Responsible mode** does not ensure that the train will not pass the given distance.*

4.4.11.1.5 *The ERTMS/ETCS on-board equipment shall give the possibility to the driver to modify the value of the **SR mode** speed limit and of the given distance. This shall be possible only at standstill.*

4.4.11.1.5.1 *If a train movement is detected while the driver is entering the **SR** speed/distance limits, the ERTMS/ETCS on-board equipment shall trigger the brake command.*

4.4.11.1.6 *In **level** 2/3, the driver shall have the possibility to request a new distance to run in **Staff Responsible**, by selecting "Start". This triggers an MA request.*

4.4.11.1.6.1 *Note: Once the **SR** distance is covered, the driver may have to go further.*

4.4.11.1.6.2 *When entering **SR mode**, the value applicable for **SR mode** speed limit and the value applicable for **SR** distance shall be the corresponding National/Default values. Exception for **SR** distance: **SR mode** is authorised by RBC giving an **SR** distance.*

4.4.11.1.6.3 *While in **SR mode**, the value applicable for the **SR mode** speed limit shall be, if available, the last value entered by the driver.*

4.4.11.1.6.4 While in **SR mode**, the value applicable for the **SR** distance shall be, if available, the last value received by the ERTMS/ETCS on-board equipment amongst:

- a) the distance to run in **SR** entered by the driver;
- b) the distance to run in **SR** given by trackside.

4.4.11.1.6.5 When "Override" is selected, the **SR mode** speed limit value and the **SR** distance value previously entered by driver or given by trackside, if any, shall be deleted. The corresponding National/Default values shall enter in force.

4.4.11.1.6.6 If the train is in **SR** and receives a new distance to run in **SR mode** from the RBC, the stored list of expected balise groups, if any, shall be deleted or shall be replaced by the list of expected balise groups sent together with the distance to run in **SR**.

4.4.11.1.6.7 If an ERTMS/ETCS on-board equipment in **SR mode**, after having received from EUROLOOP max permitted distance to run in **SR mode** information, detects the main signal balise group being part of this information then it shall ignore any new max permitted distance to run in **SR mode** information from that loop.

4.4.11.1.7 The ERTMS/ETCS on-board equipment shall display the train speed and the (when active) override (permission to pass a signal at danger, **trip** inhibited). The permitted speed, target distance and the target speed shall be displayed only on driver request, until the driver requests to stop their display.

4.4.11.1.8 Intentionally deleted.

4.4.11.1.9 If receiving a "track ahead free" request from the RBC, the ERTMS/ETCS on-board equipment requests the driver to enter the "track ahead free" information.

4.4.11.1.10 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes** and on-board functions".

4.4.11.1.11 Intentionally deleted.

4.4.11.2 Used in **levels**

4.4.11.2.1 **Level** 1, 2 and 3.

4.4.11.3 Responsibilities

- 4.4.11.3.1 *The ERTMS/ETCS on-board equipment supervises a ceiling speed and a SR distance if finite (and if level 2/3, might also supervise a list of balises).*
- 4.4.11.3.2 *The driver must check if the track is free, if points are correctly positioned, and must respect the existing line-side information (signals, speed boards etc.).*
- 4.4.11.3.3 *When using the possibility to modify the value of the SR mode speed limit and of the given distance, the driver is responsible for entering reasonable values.*

4.4.12 ON SIGHT

4.4.12.1 Description

- 4.4.12.1.1 The **On Sight mode** enables the train to enter into a track section that could be already occupied by another train, or obstructed by any kind of obstacle.
- 4.4.12.1.2 **On Sight mode** cannot be selected by the driver, but shall be entered automatically when commanded by trackside and all necessary conditions are fulfilled.
- 4.4.12.1.3 The ERTMS/ETCS on-board equipment shall supervise train movements against a dynamic speed profile.
- 4.4.12.1.4 The ERTMS/ETCS on-board equipment shall display the train speed to the driver (this list is not exhaustive). The permitted speed, target distance, target speed and release speed (if any) shall be displayed only on driver request, until the driver requests to stop their display.
- 4.4.12.1.5 If receiving a "track ahead free" request from the RBC, the ERTMS/ETCS on-board equipment requests the driver to enter the "track ahead free" information.
- 4.4.12.1.6 To be in **On Sight mode**, SSP and gradient are not required for the whole length of the train, but shall be at least available from the FRONT END of the train.
- 4.4.12.1.7 Once in **On Sight mode**, if SSP and gradient are not known for the whole length of the train, an indication "ENTRY IN **ON SIGHT**" shall be clearly displayed to the driver until SSP and gradient are known for the whole length of the train.
- 4.4.12.1.7.1 Note: this indication may also be displayed in case the train length has been increased, see 3.18.3.8.
- 4.4.12.1.8 Deleted
- 4.4.12.1.9 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes and on-board functions**".

4.4.12.2 Used in levels

4.4.12.2.1 Used in level 1, 2 and 3.

4.4.12.3 Responsibilities

4.4.12.3.1 *The ERTMS/ETCS on-board equipment is responsible for the supervision of the train movements.*

4.4.12.3.2 *The driver is responsible for checking the track occupancy when moving the train, because the track may be occupied.*

4.4.13 TRIP

4.4.13.1 Description

4.4.13.1.1 Deleted

4.4.13.1.1.1 Note: Application of emergency brakes and train trip are two different things. For example, exceeding the permitted speed leads to application of the emergency brakes, but as long as the train does not pass the EOA, it is not a train trip.

4.4.13.1.2 The ERTMS/ETCS on-board equipment shall command the emergency brakes (no brake release is possible in Trip mode).

4.4.13.1.3 The ERTMS/ETCS on-board equipment shall indicate to the driver the reason of the train trip.

4.4.13.1.4 The ERTMS/ETCS on-board equipment shall request an acknowledgement from the driver once train is at standstill (to allow the driver to acknowledge the train trip).

4.4.13.1.4.1 Note: This acknowledgement is mandatory to exit from Trip mode.

4.4.13.1.5 Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".

4.4.13.1.6 Closing the desk while being in Trip mode will not cause a mode change but no interaction with the driver shall be possible as long as the desk is closed, except isolation of the ERTMS/ETCS on-board equipment

4.4.13.2 Used in levels

4.4.13.2.1 Used in level 0, NTC, 1, 2 and 3.

4.4.13.3 Responsibilities

4.4.13.3.1 The ERTMS/ETCS on-board equipment is responsible for stopping the train and for maintaining the train at standstill.

4.4.13.3.2 *The driver has no responsibility for train movements.*

4.4.14 POST TRIP

4.4.14.1 Description

4.4.14.1.1 The **Post Trip mode** shall be entered immediately after the driver acknowledges the **trip**.

4.4.14.1.2 Once in **post trip mode**, the onboard equipment shall release the Command of the emergency brake.

4.4.14.1.3 The train shall only be authorised to move backwards a given distance (national value). The ERTMS/ETCS on-board equipment shall supervise this national distance for reverse movements, and shall command the service brakes if the distance is over-passed. The driver shall be informed about the reason for the brake application.

4.4.14.1.3.1 Note: The ERTMS/ETCS onboard equipment performs the Reverse Movement Protection (as in **PT mode**, the "normally allowed movement" is backwards, then the Reverse Movement Protection avoids the train running in forward direction when in **PT mode**). This implies that the given distance to run backwards in **PT** is considered as a directional data, oriented backwards.

4.4.14.1.3.2 After the release of a brake command initiated due to an overpassed distance allowed for moving backwards in **Post Trip mode**, the ERTMS/ETCS on-board equipment shall command the service brake for any further movement in the direction opposite to the train orientation.

4.4.14.1.4 When moving backwards in **Post Trip mode**, the train **trip** shall be inhibited.

4.4.14.1.5 Intentionally deleted.

4.4.14.1.6 When ERTMS/ETCS **level** is 1, if the driver selects "Start" the onboard equipment proposes **Staff Responsible**. When ERTMS/ETCS **level** is 2 or 3, the selection of Start leads to an MA Request to the RBC. It is the RBC responsibility to give an **SR** authorisation, or a **Full Supervision** MA or an **On Sight/Shunting** MA to an ERTMS/ETCS equipment that is in **Post Trip mode**.

4.4.14.1.7 Intentionally deleted.

4.4.14.1.8 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "**Modes** and on-board functions".

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4.4.14.1.9 *In case of balise group message consistency error (refer to 3.16.2.4.4 and 3.16.2.5.1), the ERTMS/ETCS onboard equipment shall not command the service brake.*

4.4.14.2 Used in levels

4.4.14.2.1 *Used in level 1, 2 and 3.*

4.4.14.3 Responsibilities

4.4.14.3.1 *The ERTMS/ETCS on-board equipment is responsible for supervising that the train moves only backwards and that the backward movement does not exceed the maximum permitted distance (national value).*

4.4.14.3.2 *The driver is responsible if moving the train backwards.*

4.4.15 NON LEADING

4.4.15.1 Description

4.4.15.1.1 The Non-Leading **mode** is defined to manage the ERTMS/ETCS on-board equipment of a slave engine that is NOT electrically coupled to the leading engine (and so, not remote controlled) but has its own driver.

4.4.15.1.1.1 Note: This operating situation is called Tandem.

4.4.15.1.1.2 The ERTMS/ETCS on-board equipment shall use, as a necessary condition to enter in Non-Leading **mode**, a "non leading input signal" from the train interface.

4.4.15.1.1.3 If the "non leading input signal" is no longer present, the switch to Stand-By **mode** shall be made only if the train is at standstill.

4.4.15.1.2 The ERTMS/ETCS on-board equipment shall not perform any train movement supervision in Non-Leading **mode**.

4.4.15.1.3 The ERTMS/ETCS on-board equipment shall perform the Train Position function; in particular, the front/rear end of the engine (i.e., not the train) shall be used to refer to train front/rear end.

4.4.15.1.4 When **level** is 2 or 3, the ERTMS/ETCS on-board equipment shall report its position to the RBC, according to the previously received parameters.

4.4.15.1.5 If possible, the train must not be stopped due to a safety critical fault in a non-leading engine. The ERTMS/ETCS on-board equipment shall therefore try to memorise the occurrence of such fault(s), which shall be handled when the engine leaves **Non Leading mode**. The ERTMS/ETCS on-board equipment shall also try to send an error information to the RBC.

4.4.15.1.6 The ERTMS/ETCS on-board equipment shall display the train speed to the driver.

4.4.15.1.7 Intentionally deleted

4.4.15.1.8 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 "Modes and on-board functions".

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4.4.15.1.9 *The supervision of linking consistency shall not be performed in Non Leading mode.*

4.4.15.1.10 *In case of balise group message consistency error (refer to 3.16.2.4.4 and 3.16.2.5.1), the ERTMS/ETCS onboard equipment shall not command the service brake..*

4.4.15.2 Used in levels

4.4.15.2.1 *Used in all levels: Level 0, level 1, level 2, level 3 and level NTC.*

4.4.15.3 Responsibilities

4.4.15.3.1 *The ERTMS/ETCS on-board equipment shall perform NO protection functions, except forwarding track conditions associated orders through DMI or train interface.*

4.4.15.3.2 *The driver is responsible for obeying the orders associated to track conditions, when they are displayed by the DMI..*

4.4.16 **Intentionally deleted**

4.4.17 National System (SN) mode

4.4.17.1 Description

- 4.4.17.1.1 In SN mode, according to the specific on-board implementation, the National System may access the following resources via the ERTMS/ETCS on-board equipment: DMI, Juridical Recording interface, odometer, train interface and brakes. This can be achieved through the STM interface.
- 4.4.17.1.2 A limited set of data coming from balises shall be used by the ERTMS/ETCS on-board equipment, refer to SRS chapter 4.8 "Use of received information".
- 4.4.17.1.3 Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".

4.4.17.2 Used in levels

- 4.4.17.2.1 Level NTC.

4.4.17.3 Responsibilities of ERTMS/ETCS Onboard

- 4.4.17.3.1 No train supervision functionality is provided by the ERTMS/ETCS on-board equipment. In case the ERTMS/ETCS on-board equipment is interfaced to the National System through an STM, refer to the FFFIS STM (Subset 035) for the functionality provided by ERTMS/ETCS on-board.
- 4.4.17.3.2 Intentionally deleted.

4.4.17.4 Responsibilities of the National System

- 4.4.17.4.1 The National System is responsible for all train supervision and protection functions.
- 4.4.17.4.2 The National System is responsible for issuing and revoking brake command.

4.4.17.4.3 The **National System** is responsible for maintaining **national system** behaviour and interact with national trackside equipment.

4.4.17.4.4 The **National System** is responsible for interaction with the driver.

4.4.17.5 Responsibilities of the driver

4.4.17.5.1 The responsibility of the driver depends on the **National System** in use.

4.4.18 REVERSING

4.4.18.1 Description

4.4.18.1.1 The **Reversing mode** allows the driver to change the direction of movement of the train and drive from the same cab, i.e. the train orientation remains unchanged. This shall be possible only in areas so marked by trackside. **Reversing** areas shall be announced in advance by trackside.

4.4.18.1.2 Note: This **mode** is used to allow the train to escape from a dangerous situation and to reach as fast as possible a "safer" location.

4.4.18.1.3 The ERTMS/ETCS on-board equipment shall supervise train movements against:

- a) a ceiling speed: the **Reversing mode** speed limit given from trackside
- b) a distance to run in the direction opposite to the train orientation, given from trackside. The emergency brake shall be commanded if overpassing this distance

4.4.18.1.4 After the release of a brake command initiated due to an overpassed **reversing** distance, and while the **reversing** distance is still overpassed, the ERTMS/ETCS on-board equipment shall command the emergency brake for any further movement in the direction opposite to the train orientation.

4.4.18.1.5 The ERTMS/ETCS on-board equipment shall display the train speed, the permitted speed and the remaining distance to run.

4.4.18.1.6 In case the SBI supervision limit is exceeded (refer to chapter 3 table 5, triggering condition t4), the ERTMS/ETCS on-board equipment shall command the emergency brake instead of the service brake. For the revocation of the brake command, refer to 3.13.10.2.4.

4.4.18.1.7 The position reports sent when in **reversing mode** shall refer to the location of the driving cab (as before **reversing**).

4.4.18.1.8 Note: The ERTMS/ETCS onboard equipment performs the Reverse Movement Protection (as in **RV mode**, the "normally allowed movement" is backwards, then the Reverse Movement Protection avoids the train running in forward direction when in **RV mode**). This implies that the given distance to run in **reversing** is considered as a directional data, oriented backwards.

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4.4.18.1.9 *Note: for the list of main functions related to this mode, refer to chapter 4.5 "Modes and on-board functions".*

4.4.18.1.10 *In case of balise group message consistency error (refer to 3.16.2.4.4 and 3.16.2.5.1), the ERTMS/ETCS onboard equipment shall not command the service brake.*

4.4.18.1.11 *In case there is an alarm reporting a malfunction for the onboard balise transmission function, the ERTMS/ETCS onboard equipment shall ignore this alarm.*

4.4.18.1.12 *In case the ERTMS/ETCS system version number X transmitted by any balise is greater than the highest version X supported by the onboard equipment (refer to 3.17.3.5), the information from this balise shall be ignored, the train shall not be tripped and the driver shall not be informed.*

4.4.18.2 Used in levels

4.4.18.2.1 Level 1, 2, 3.

4.4.18.3 Responsibilities

4.4.18.3.1 *The ERTMS/ETCS on-board equipment supervises a ceiling speed and a distance to run in reverse direction.*

4.4.18.3.2 *The driver must keep the train movement inside the received distance to run.*

4.4.19 LIMITED SUPERVISION

4.4.19.1 Description

4.4.19.1.1 *The Limited Supervision mode enables the train to be operated in areas where trackside information can be supplied to realise background supervision of the train.*

4.4.19.1.2 *Limited supervision can not be selected by the driver, but shall be entered automatically when commanded by trackside and all necessary conditions are fulfilled.*

4.4.19.1.3 *The ERTMS/ETCS on-board equipment shall supervise train movements against a dynamic speed profile.*

4.4.19.1.4 *The ERTMS/ETCS on-board equipment shall display the train speed. If the permitted speed is lower than both the Limited Supervision mode speed limit and the maximum train speed, the permitted speed and the target speed shall be indicated (this list and the conditions are not exhaustive – refer to chapter 4.7 “DMI depending on modes”).*

4.4.19.1.5 *If receiving a "track ahead free" request from the RBC, the ERTMS/ETCS on-board equipment requests the driver to enter the "track ahead free" information.*

4.4.19.1.6 *To be in Limited Supervision mode, SSP and gradient are not required for the whole length of the train, but shall be at least available from the FRONT END of the train.*

4.4.19.1.7 *Note: for the list of main functions related to this mode, refer to 4.5 “Modes and on-board functions”.*

4.4.19.2 Used in levels

4.4.19.2.1 *Used in levels 1, 2 and 3.*

4.4.19.3 Responsibilities

4.4.19.3.1 *The ERTMS/ETCS on-board equipment is responsible for the background supervision of the train movement to the extent permitted by the information provided by trackside.*

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4.4.19.3.1.1 Note: The **Limited Supervision mode** enables the train to be operated in areas equipped with lineside signals where ETCS does not have information regarding the status of some signals, i.e. not all signals are fitted with LEUs or connected to an RBC

4.4.19.3.2 The driver must observe the existing line-side information (signals, speed boards etc.) and National operating rules.

4.4.20 PASSIVE SHUNTING

4.4.20.1 Description

- 4.4.20.1.1 The **Passive Shunting mode** is defined to manage the ERTMS/ETCS on-board equipment of a slave engine (NOT remote controlled, but mechanically coupled to the leading engine), being part of a **shunting** consist. This **mode** can also be used to carry on a **shunting** movement with a single engine fitted with one on-board equipment and two cabs, when the driver has to change the driving cab.
- 4.4.20.1.2 The desk of a **Passive Shunting** engine must be closed (since there is no driver, no information shall be shown).
- 4.4.20.1.3 As the engine is coupled to a leading engine, its ERTMS/ETCS on-board equipment shall not perform any train movement supervision.
- 4.4.20.1.4 The ERTMS/ETCS on-board equipment shall perform Train Position function; in particular, the front/rear end of the engine (i.e., not the train) shall be used to refer to train front/rear end.
- 4.4.20.1.5 It shall only be possible to enter in **Passive Shunting mode** from the **Shunting mode**; while in **Shunting mode**, the driver shall have the possibility to enable the function "Continue **Shunting** on desk closure".
- 4.4.20.1.6 When the active desk is closed, the ERTMS/ETCS on-board equipment shall switch to **Passive Shunting mode** if the function "Continue **Shunting** on desk closure" is active and the "**passive shunting** input signal" is received from the train interface. If the function "Continue **Shunting** on desk closure" is not active or the "**passive shunting** input signal" is not present, the ERTMS/ETCS on-board equipment shall switch to Stand-By **mode** instead.
- 4.4.20.1.7 The special function "Continue **Shunting** on desk closure" shall allow one and only one transition from **Shunting mode** to **Passive Shunting mode**. The special function shall be inactive once the **Shunting mode** is left.
- 4.4.20.1.8 If a desk of the **Passive Shunting** engine is opened and no "Stop **Shunting** on desk opening" information previously received from balise group is stored onboard, the ERTMS/ETCS on-board equipment shall switch to **Shunting mode**.

4.4.20.1.9 If a desk of the **Passive Shunting** engine is opened and “Stop **Shunting** on desk opening” information previously received from balise group is stored onboard, the ERTMS/ETCS on-board equipment shall switch to **Stand By mode**.

4.4.20.1.10 If possible, the train must not be stopped due to a safety critical fault in a **Passive Shunting** engine. The ERTMS/ETCS on-board equipment shall therefore try to memorise the occurrence of such fault(s), which shall be handled when the engine leaves the **Passive Shunting mode**.

4.4.20.1.11 When in **Passive Shunting mode**, the ERTMS/ETCS on-board shall not manage **level** transitions. However, an immediate **level** transition order or a conditional **level** transition order shall be stored and shall be evaluated only when another **mode** than **Shunting** or **Passive Shunting** has been entered (i.e. when the **Shunting** movement is terminated).

4.4.20.1.12 When receiving a communication session establishment order, the ERTMS/ETCS on-board in **Passive Shunting mode** shall not establish the communication session, but shall store the RBC ID/phone number information.

4.4.20.1.13 When in **Passive Shunting mode**, the ERTMS/ETCS on-board shall not manage RBC-RBC hand-over, except for storing the RBC ID/phone number information given at the RBC/RBC border.

4.4.20.1.14 Note: for the list of main functions related to this **mode**, refer to chapter 4.5 “**Modes** and on-board functions”.

4.4.20.1.15 In case of balise group message consistency error (refer to 3.16.2.4.4 and 3.16.2.5.1), the ERTMS/ETCS onboard equipment shall not command the service brake.

4.4.20.2 Used in **levels**

4.4.20.2.1 Used in all **levels**: **Level 0**, **level 1**, **level 2**, **level 3** and **level NTC**

4.4.20.3 Responsibilities

4.4.20.3.1 The ERTMS/ETCS on-board equipment of an engine in **Passive Shunting mode** has no responsibility for the train protection.

4.4.20.3.2 The notion of responsibility of the driver is not relevant for the **Passive Shunting mode**.

4.4.20.3.3 Note: The leading engine is responsible for the movement of the train. It is then the ERTMS/ETCS on-board equipment of the leading engine that is fully/partially/not responsible for the train protection, with respect to its **mode**.

4.5 Modes and on-board functions

4.5.1 Introduction

4.5.1.1 The following table specifies in which **modes** the on-board functions are active or not. The functions are described in the “Related SRS SRS-26 §” (second column of the table).

4.5.1.2 Note: **Modes** are not the only thing that can influence an onboard function. This is why this Table is not enough in itself to understand all the ERTMS/ETCS onboard behaviour. It must be understood as a complement to all other SRS chapters (especially SRS-26 §4.7, 4.8, 4.9 and 4.10).

4.5.1.3 Note: for DMI depending on **modes**, refer to SRS-26 §4.7.

4.5.2 Active Functions Table

4.5.2.1 X = functions shall be active
Empty case = function shall be inactive
O = Optional (function is not required for interoperability, but is not forbidden)

ONBOARD-FUNCTIONS	RELATED SRS SRS- 26 §	N P	S B	P S	S H	F S	L S	S R	O S	S L	N L	U N	T R	P T	S F	I S	S N	R V
Determine Mode and Level																		
Determine ERTMS/ETCS Mode	3.12.4, 4.6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Determine ERTMS/ETCS level	5.10		X	X	X	X	X	X	X	X	X	X	X			X	X	X

Figure 4: Active Functions table

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4.6 Transitions between modes

4.6.1 Symbols

- 4.6.1.1 The indication “4>” means: The condition n°4 must be fulfilled to trigger the transition
- 4.6.1.2 From the mode located in the column
- 4.6.1.3 To the mode that is indicated by the arrow “>”.
- 4.6.1.4 Each transition from a given mode receives a priority order (indicated by “-px-”, x is the priority order) to avoid a conflict between the different transitions when they occur at the same time (i.e. in the same clock cycle). P1 has a higher priority than P2.
- 4.6.1.5 Some transitions have received the same priority order. This has been decided when it is obvious that these transitions cannot occur at the same time, and so can never lead to a conflicting situation (for example, the RBC cannot give in the same time a MA for FS and a MA for OS to a given engine, this is why the transition “from SR to FS” and the transition “from SR to OS” have the same priority order).
- 4.6.1.6 "16, 17, 18" means "16 or 17 or 18".

4.6.2 Transitions Table

NF	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-	<29 -p2-		<29 -p2-	<29 -p2-
4> -p2-	SB	<22 -p4-	<19, 27, 30 -p5-	<28 -p5-	<28 -p5-	<28, -p5-	<28, -p5-	<2, 3 -p3-	<28, 47 -p3-	<28, -p6-		<28, -p4			<28 -p6-	<28 -p4-
		PS	<26 -p5-													
	5, 6, 50> -p7-	23> -p4	SH	<5,6, 50,51 -p6-	<5,6, 50,51 -p6-	<5,6, 51 -p6-	<5,6 50,51 -p6-			<5,61 -p7-	<68 -p4	<5,6, 50 -p5-			<5,61 -p7	
	10> -p7-			FS	<31,32 -p6-	<31,32 -p6-	<31,32 -p6-			<25 -p7-		<31 -p5-			<25 -p7-	
	70> -p7-			70,72> -p6-	LS	<72 -p6-	<70,74 -p6-			<71 -p7-		<70 -p5-			<71 -p7-	
	8,37> -p7-			37> -p6-	37> -p6-	SR	<37 -p6-			<44,45 -p4-		<8,37 -p5-			<44,45 -p4-	
	15> -p7-			15,40> -p6-	15,73> -p6-	40> -p6-	OS			<34 -p7-		<15 -p5-			<34 -p7-	
	14> -p5-	14> -p4						SL								
	46> -p6-		46> -p5-	46> -p6-	46> -p6-	46> -p6-	46> -p6-		NL							
	60> -p7-			21> -p6-	21> -p6-	21> -p6-	21> -p6-			UN	<62 -p4-				<21 -p7-	
	20> -p4-		49,52, 65>	12,16, 17,18,	12,16, 17,18,	18,20, 42, 43,	12,16, 17,18,			67,39, 20>	TR				<67, 39,38,	

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			-p4-	20,41, 65,66, 69> -p4-	20,41, 65,66, 69> -p4-	36, 54,65> -p4-	20,41, 65,66, 69> -p4-			-p5-					35,20 -p5-	
											7> -p4-	PT				
	13> -p3-	13> -p3-	13> -p3-	13> -p3-	13> -p3-	13> -p3-	13> -p3-			13> -p3-	13> -p3-	13> -p3-	SF		<13 -p3-	<13 -p3-
1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	1> -p1-	IS	<1 -p1-	<1 -p1-
	58> -p7-			56> -p6-	56> -p6-	56> -p6-	56> -p6-			56> -p7-	63> -p4-				SN	
				59> -p6-	59> -p6-		59> -p6-									RV

Figure 5: Transition table.

4.6.3 Transitions Conditions Table

Condition Id	Content of the conditions
[1]	The driver isolates the ERTMS/ETCS on-board equipment.
[2]	(a desk is open)
[3]	(no “go sleeping” input signal is received any more) AND (train is at standstill)
[4]	The ERTMS/ETCS on-board equipment is powered.
[5]	(train is at standstill) AND (ERTMS/ETCS level is 0 or NTC or 1) AND (driver selects Shunting mode)
[6]	(train is at standstill) AND (ERTMS/ETCS level is 2 or 3) AND (reception of the information “Shunting granted by RBC”, due to a Shunting request from the driver)
[7]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is different from 0, NTC)
[8]	(Staff Responsible mode is proposed to the driver) AND (driver acknowledges) {4}
[9]	Empty
[10]	(valid Train Data is stored on board) AND (MA + SSP +gradient are on-board) AND (no specific mode is required by a Mode Profile)
[11]	Empty
[12]	(The train/engine overpasses the EOA/LOA with its min safe antenna position) AND (ERTMS/ETCS level is 1)
[13]	The ERTMS/ETCS on-board equipment detects a fault that affects safety
[14]	(The “sleeping” input signal is received) AND (train is at standstill) AND (all desks connected to the ERTMS/ETCS on-board equipment are closed)

Commentaire [MD20]: From any mode to IS
I: isolation command

Commentaire [MD21]: SL -> SB
I: desk_open (or cab active)

Commentaire [MD22]: SL -> SB
I: sleeping command + standstill (speed =0)

Commentaire [MD23]: NP -> SB
I: EVC powered

Commentaire [MD24]: Procedure
Start of mission
SB, FS, LS, SR, OS, UN, PT, SN -> SH
I: standstill (speed =0) + level + SH from DMI

Commentaire [MD25]: Procedure
Start of Mission
SB, FS, LS, SR, OS, PT -> SH
I: standstill (speed =0) + level + SH from RBC

Commentaire [MD26]: TR -> PT
I: DMI Ack TR + standstill (speed =0) + level

Commentaire [MD27]: Procedure
Start of Mission and Train Trip
SB, PT -> SR
I: DMI ack to SR

Commentaire [MD28]: Procedure
Start of Mission
SB -> FS
I: valid train data stored + MA +SSP + no mode profile required

Commentaire [MD29]:
FS, LS, OS -> TR
I: EOA overpassed + level

Commentaire [MD30]:
SB, PS, SH, FS, LS, SR, OS, Un, TR, PT, SN, RV -> SF ... [1]

Commentaire [MD31]: Procedure
Start of Mission
SB, PS -> SL ... [2]

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[15]	(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges) see {1} here under
[16]	(The train/engine overpasses the EOA/LOA with its min safe front end) AND (ERTMS/ETCS level is 2 or 3).
[17]	The onboard reacts according to a linking reaction set to "trip".
[18]	(the train/engine receives and uses a trip order given by balise) AND (override is not active)
[19]	(driver selects "exit Shunting") AND (train is at standstill).
[20]	(unconditional emergency stop message is accepted)
[21]	(ERTMS/ETCS level switches to 0) see {2} here under
[22]	(a desk is open) AND ("Stop Shunting on desk opening" information is stored onboard)
[23]	(a desk is open) AND (no "Stop Shunting on desk opening" information is stored onboard)
[24]	Empty
[25]	(ERTMS/ETCS level switches to 1,2 or 3) AND (MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile)
[26]	(desks are closed) AND ("Continue Shunting on desk closure" function is active) AND (the "passive shunting" input signal is received)
[27]	(desks are closed) AND ("Continue Shunting on desk closure" function is not active)
[28]	(desks are closed)
[29]	the ERTMS/ETCS on-board equipment is NOT powered
[30]	(desks are closed) AND (no "passive shunting" input signal is received)
[31]	(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 2 or 3)

Commentaire [MD32]: Procedure Start of mission, and On-sight
SB, FS, LS, PT -> OS
I: driver ack OS

Commentaire [MD33]:
FS, LS, OS -> TR
I: EOA overpassed + level

Commentaire [MD34]:
FS, LS, OS -> TR
I : Linking reaction set to trip

Commentaire [MD35]:
FS, LS, SR, OS -> TR
I : Trip order given by balise + override mode ?

Commentaire [MD36]:
SH -> SB
I : driver select exit SH + standstill (speed = 0)

Commentaire [MD37]:
SB, FS, LS, SR, OS, UN, SN -> TR
I unconditional emergency stop message ?

Commentaire [MD38]:
FS, LS, SR, OS, SN -> UN
I : level

Commentaire [MD39]:
PS -> SB
I : desk open + Stop shunting information

Commentaire [MD40]:
PS -> SH
I : desk open + no Stop SH info

Commentaire [MD41]:
UN, SN -> FS
I level + MA +SSP + no mode profile

Commentaire [MD42]:
SH -> PS ... [3]

Commentaire [MD43]:
SH -> SB
I : desk closed + Continue sh not active

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[32]	(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 1) AND (no trip order is given by balise)
[33]	<i>Empty</i>
[34]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[35]	(driver selects Shunting mode) AND (The ERTMS/ETCS on-board equipment is interfaced to the National System through an STM) AND (a National Trip Procedure is active, see {8} here under)
[36]	(the identity of the over-passed balise group is not in the list of expected balises related to SR mode) AND (override is not active).
[37]	(driver selects “override”) AND (train speed is under or equal to the speed limit for triggering the “override” function) see {3} here under
[38]	(The ERTMS/ETCS on-board equipment is interfaced to the National System through an STM) AND (The ERTMS/ETCS level switches to 0,1,2 or 3) AND (a National Trip Procedure is active) see {8} here under
[39]	(The ERTMS/ETCS level switches to 1,2 or 3) AND (no MA has been accepted)
[40]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area)
[41]	(T_NVCONTACT is passed) AND (associated reaction is “train trip”)
[42]	(The train/engine overpasses the SR distance with its estimated front end) AND (override is not active)
[43]	(The train/engine overpasses the former EOA (when Override was activated) with the min safe antenna position) AND (override is not active), see {3} here under
[44]	(“override” function is active) AND (ERTMS/ETCS level switches to 1) see {3} here under

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[45]	("override" function is active) AND (no unconditional emergency stop message has been received) AND (ERTMS/ETCS level switches to 2 or 3) see {3} here under
[46]	(Driver selects NON LEADING) AND (train is at standstill) AND (The "non leading" input signal is received)
[47]	(no "non leading" input signal is received any more) AND (train is at standstill)
[48]	<i>Empty</i>
[49]	(reception of information "stop if in shunting") AND (override is not active)
[50]	(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges) see {5} here under
[51]	(A Mode Profile defining the entry of a Shunting area is used on-board) AND (The max safe front end of the train is inside the Shunting area)
[52]	(the identity of the over-passed balise group is not in the list of expected balise groups related to SH mode) AND (override is not active).
[53]	<i>Empty</i>
[54]	(reception of information "stop if in Staff Responsible") AND (no list of expected balise groups related to SR mode has been received or the list of expected balise groups related to SR mode does not include the identity of the over-passed balise group) AND (override is not active)
[56]	(the ERTMS/ETCS level switches to "NTC")
[58]	(the ERTMS/ETCS level is "NTC") AND (an acknowledgement request for SN mode is displayed to the driver) AND (the driver acknowledges)
[59]	(train is at standstill) AND (driver has acknowledged the reversing) see {6} here under
[60]	(an acknowledgement request for UN mode is displayed to the driver) AND (the driver acknowledges)

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[61]	(A Mode Profile defining a Shunting area is on-board) AND (The max safe front end of the train is inside the Shunting area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[62]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0) AND (valid Train Data is on-board)
[63]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is NTC) AND (valid Train Data is on-board)
[65]	(The system version number X of a received balise telegram is greater than the highest version number X supported by the on-board equipment) AND (ERTMS/ETCS level is 1, 2 or 3)
[66]	A balise group contained in the linking information is passed in the unexpected direction
[67]	(The ERTMS/ETCS level switches to level 1) AND (a trip order has been received) AND (override is not active)
[68]	(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0 or NTC) AND (no valid Train Data is on-board)
[69]	Estimated train front end is in rear of the start location of either SSP or gradient profile stored on-board
[70]	(An ackn. request for Limited Supervision is displayed to the driver) AND (the driver acknowledges) see {7} here under
[71]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The ERTMS/ETCS level switches to 1,2 or 3)
[72]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area).
[73]	(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end

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	of the train is inside the On Sight area) AND (The estimated front end of the train is not inside an LS acknowledgement area)
[74]	(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The estimated front end of the train is not inside an OS acknowledgement area)

{1} The request to acknowledge **On Sight** is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "**On Sight**" procedure" of SRS-SRS-26 §5 (for transitions from **FS/LS/UN** to **OS**) and the "Start of mission" procedure (for transition from **SB** to **OS**).

{2} This transition to the **Unfitted mode** is also a transition of **level**.. For further information, See the "**Level** Transition" procedure" (SRS-SRS-26 §5) for transitions from **FS/SR/OS/LS** to **UN** and the "Start Of Mission" procedure" (SRS-SRS-26 §5) for transition from **SB** to **UN**.

{3} See the "Override" procedure" of SRS-SRS-26 §5.

{4} The **Staff Responsible mode** is proposed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Start Of Mission" procedure and the "Train **Trip**" procedure of SRS-SRS-26 §5.

{5} The request to acknowledge **Shunting** is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Entry in **Shunting**" procedure and the "Start Of Mission" procedure of SRS-SRS-26 §5.

{6} The request to acknowledge **Reversing** is displayed to the driver when certain conditions are fulfilled. These conditions are not specified here. See the "**reversing**" procedure of SRS-SRS-26 §5.

{7} The request to acknowledge **Limited Supervision** is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "**Limited Supervision**" procedure" of SRS-SRS-26 §5 (for transitions from **FS/OS/UN** to **LS**) and the "Start of mission" procedure (for transition from **SB** to **LS**).

{8} Refer to Subset-035 for details.

4.7 DMI depending on modes

4.7.1 Introduction

- 4.7.1.1 The DMI is an interface that allows the direct exchange of information between the driver and the ERTMS/ETCS onboard equipment. The indirect exchange of information done via the train interface (e.g. a driver's action on the service brake used for the service brake feedback, opening/closing the desk) is not part of the DMI.
- 4.7.1.2 The device(s) used to select "ERTMS/ETCS onboard equipment powered/unpowered" is (are) not part of the DMI.
- 4.7.1.3 The device(s) used to select/indicate "ERTMS/ETCS onboard equipment isolated/not isolated" is (are) part of the DMI.
- 4.7.1.4 Intentionally deleted.
- 4.7.1.5 Information (input or output) only relevant for National System and not originated by the ERTMS/ETCS on-board is not included in the following section.

4.7.2 DMI versus Mode Table

- 4.7.2.1.1 *X = active: For a DMI output, this means that the output information shall be shown to the driver when the ERTMS/ETCS onboard equipment is in the mode indicated in the column. For a DMI input, this means that it shall be possible for the driver to enter this information when the ERTMS/ETCS onboard equipment is in the mode indicated in the column).*
- 4.7.2.1.2 *A = available: This means that the input/output shall become active ONLY if another condition(s) is (are) fulfilled. This condition(s) are not described here.*
- 4.7.2.1.3 *Grey cells: availability and meaning defined by national system.*
- 4.7.2.1.4 *NA = Not Applicable: This concerns the modes SF and IS in which the DMI inputs and outputs cannot be determined.*

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Input information	N P	S B	P S	S H	F S	L S	S R	O S	S L	N L	U N	T R	P T	S F	I S	S N	R V
ERTMS/ETCS level		A			A	A	A	A		A	A			NA	NA	A	
Start		A					A						A	NA	NA		
Override request		A		A	A	A	A	A			A		A	NA	NA	A	
Shunting request		A			A	A	A	A			A		A	NA	NA	A	
“Continue Shunting on desk closure” request				A										NA	NA		
“Exit of Shunting” request				X										NA	NA		
Non Leading request		A		A	A	A	A	A						NA	NA		
Ackn of fixed text information		A			A	A	A	A		A	A	A	A	NA	NA		A
Ackn of plain text information		A			A	A	A	A		A	A	A	A	NA	NA		A
Ackn of level transition		A			A	A	A	A			A	A		NA	NA	A	
Ackn of Limited Supervision mode		A			A	A		A					A	NA	NA		
Ackn of On Sight mode		A			A	A		A					A	NA	NA		
Ackn of Shunting mode		A		A	A	A		A					A	NA	NA		
Ackn of Staff Resp. mode		A											A	NA	NA		
Ackn of Unfitted mode		A												NA	NA		
Ackn of Reversing mode					A	A		A						NA	NA		
Ackn of SN mode		A												NA	NA		
Ackn of Train Trip												A		NA	NA		
Ackn for Roll Away Protection				A	A	A	A	A			A		A	NA	NA		A
Ackn for Reverse Movement Protection					A	A	A	A					A	NA	NA		A
Ackn for Standstill Supervision		A												NA	NA		

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Input information	N P	S B	P S	S H	F S	L S	S R	O S	S L	N L	U N	T R	P T	S F	I S	S N	R V
Ackn for Post Trip distance exceeded													A	NA	NA		
Ackn of Train Data change from source different from the driver					A	A	A	A			A	A		NA	NA	A	
Ackn for reversing distance exceeded														NA	NA		A
Track Ahead Free		A				A	A	A					A	NA	NA		
SR mode speed limit and distance							A							NA	NA		
Isolation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Output information	N P	S B	P S	S H	F S	L S	S R	O S	S L	N L	U N	T R	P T	S F	I S	S N	R V
ERTMS/ETCS Mode		A		X	X	X	X	X		X	X	A	X	A	X	X	X
Current ERTMS/ETCS level		A		X	X	X	X	X		X	X	A	X	NA	NA	X	X
Trip reason												A		NA	NA		
Plain text information		A			A	A	A	A		A	A	A	A	NA	NA		A
Reversing allowed					A	A		A						NA	NA		
Override status				A			A				A			NA	NA	A	
Shunting refused by RBC		A			A	A	A	A					A	NA	NA		
Shunting request not answered by RBC		A			A	A	A	A					A	NA	NA		
Entry in FS/OS					A			A						NA	NA		
Level transition announcement					A	A	A	A		A	A	A	A	NA	NA	A	

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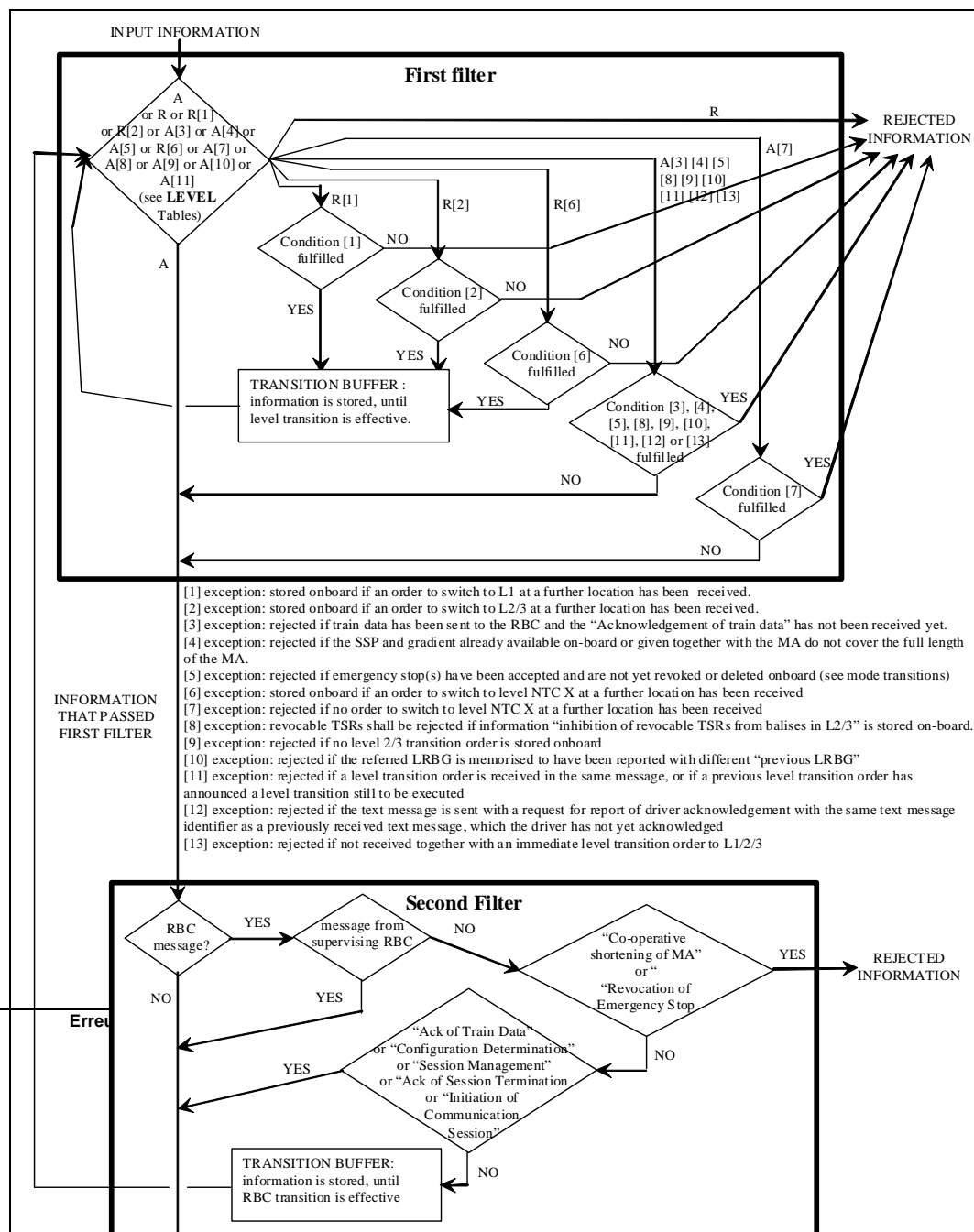
Output information	N P	S B	P S	S H	F S	L S	S R	O S	S L	N L	U N	T R	P T	S F	I S	S N	R V
SR mode proposed		A											A	NA	NA		
OS/LS/SH mode proposed		A											A	NA	NA		
SN mode proposed		A												NA	NA		
UN mode proposed		A												NA	NA		
RV mode proposed					A	A		A						NA	NA		
Brake reason		A		A	A	A	A	A			A		A	NA	NA	A	A

4.8 Acceptance of received information

4.8.1 Introduction

- 4.8.1.1 The aim of this chapter is to give an overview of which information is accepted or rejected depending on the state of the on-board (**level**, **mode**) and the nature of the received information (transmission medium, type of information: infill or non-infill).
- 4.8.1.2 The following sections have to be interpreted by applying the filters as shown in Figure 3. The first filter is detailed in section 4.8.3 “Accepted information depending on the **level** and transmission media”, the third filter in section 4.8.4 “Accepted information depending on the **modes**”.
- 4.8.1.3 If a message contains **level** transition information, any other information in that message shall be evaluated considering the **level** transition information.
- 4.8.1.3.1 *Information received in the same message as an immediate **level** transition order or a conditional **level** transition order that causes a **level** transition shall be evaluated first considering the on-board currently operated **level**, as if a **level** transition order for further location had been received (i.e. conditions [1], [2] or [6] of Figure 3, if applied, shall be automatically fulfilled). Then, if relevant, it shall be immediately extracted from the buffer and re-evaluated according to the new selected **level**.*
- 4.8.1.4 Note: As shown in Figure 3, information stored following an announcement of a change of **level**, is re-checked for acceptance when the **level** has changed. This implies that, when the **level** changes, the **mode** is - for a short moment – still unchanged, until the stored information has been processed. The consequence for the Third Filter is that information needs to be accepted for this short period also in **modes** in which this information is otherwise useless.
- 4.8.1.5 If a message contains infill information, this latter shall be evaluated considering all other non-infill information in that message.
- 4.8.1.6 When evaluating trackside information received by radio or when re-evaluating a set of information released from the transition buffer, linking information, if any, shall be evaluated prior to any other location related information.

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Figure 6: schematic representation of the filtering of received information:

4.8.2 Assumptions

4.8.2.1 The following tables shall be applied assuming that:

- a) the information complies with the data consistency checks.(see section 3.16)
- b) the direction for which the information is valid matches the current train orientation, or the balise group crossing direction (for **SL**, **PS** and **SH** engines).(see section 3.6.3)
- c) In **levels** 2/3, it is assumed that the “RBC” information which is marked “A” (Accepted) comes from the supervising RBC (see RBC/RBC handover). If this information is received from the “Accepting” RBC while the “Handing Over” RBC is still responsible, it is stored onboard until the RBC transition is performed
exception1: the information “Acknowledgement of Train Data”, “Trackside constituent system version”, “Initiation of Communication Session”, “Session Management” and “Acknowledgement of Session Termination” shall be immediately accepted.
exception2: the information “Co-operative shortening of MA” and “Revocation of Emergency Stop” shall be rejected.”
- d) to check exception [4] in 4.8.3, the track description is referred to the LRBG.

4.8.2.2 Regarding 4.8.2.1 a): In case a balise is missed or a balise telegram cannot be decoded, the information “Inhibition of balise group message consistency reaction” is only used by the on-board equipment to inhibit the service brake reaction, while the balise group message is rejected. If all the telegrams from a balise group are correctly read, the information “Inhibition of balise group message consistency reaction”, if received, shall be ignored by the on-board equipment. Therefore this information need not to be referred to in the following tables.

4.8.2.3 In case a balise telegram contains the information VBC marker and a country/region identity that both match a stored VBC, the whole balise telegram is ignored and any further check in relation to this balise telegram is irrelevant (refer to 3.15.9.3 b)). Otherwise the information VBC marker, if included in a consistent balise group message, shall always be ignored by the ERTMS/ETCS on-board equipment and need not to be referred to in the following tables.

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4.8.2.4 Note: with the exception of the data that is forwarded to a **National System** through the STM interface (see 3.15.6 and SUBSET-035), what will happen to the data to be used by applications outside ERTMS/ETCS (e.g. whether it is discarded, forwarded to an external application, processed by a national function...) is outside the scope of this specification and is assumed as not being part of the ERTMS/ETCS on-board functionality.

4.8.3 Accepted information depending on the **level** and transmission media

4.8.3.1 From RBC or not

4.8.3.1.1 Note: “No” in column “From RBC” has to be understood as any information (type: infill or non-infill) received from a balise group, loop or RIU; this does not include information received from the STM interface.

A = Accepted R = Rejected

Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
National Values	No	A	A	A	A	A
	Yes	R [2]	R [2]	R [2]	A	A
Linking	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Signalling Related Speed Restriction	No	R [1]	R [1]	A	R [1]	R [1]
	Yes					
Movement Authority + (optional) Mode Profile + (optional) List of Balises for SH area	No	R [1]	R [1]	A [4]	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3] [4] [5]	A [3] [4] [5]
Repositioning Information	No	R	R	A	R	R
	Yes					

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
Gradient Profile	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
International SSP	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Axle Load speed profile	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Level Transition Order	No	A	A	A	A	A
	Yes	A	A	A	A	A
Conditional Level Transition Order	No	A [11]	A [11]	A [11]	A [11]	A [11]
	Yes					
Session Management	No	A	A	A	A	A
	Yes	A	A	A	A	A
Radio Network registration	No	A	A	A	A	A
	Yes	A	A	A	A	A
MA Request Parameters	No					
	Yes	A	A	A	A	A
Position Report parameters	No					
	Yes	A	A	A	A	A
SR Authorisation + (optional) List of Balises in SR mode	No					
	Yes	R	R	R	A [3]	A [3]
Stop if in SR mode	No	R	R	A	A	A

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
	Yes					
SR distance information from loop	No	R	R	A	R	R
	Yes					
Temporary Speed Restriction	No	A	R [1] [2]	A	A [8]	A [8]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Temporary Speed Restriction Revocation	No	A	R [1] [2]	A	A	A
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Inhibition of revocable TSRs from balises in L2/3	No					
	Yes	R [2]	R [2]	R [2]	A	A
Default Gradient for TSR	No	A	R [1] [2]	A	A	A
	Yes					
Route Suitability Data	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Adhesion Factor	No	R[1]	R[1]	A	R	R
	Yes	R[2]	R[2]	R[2]	A	A
Plain Text Information	No	A	R [1] [2]	A	A	A
	Yes	R [2]	R [2]	R [2]	A [12]	A [12]
Fixed Text Information	No	A	R [1] [2]	A	A	A
	Yes	R [2]	R [2]	R [2]	A [12]	A [12]
Geographical Position	No	A	R [1] [2]	A	A	A
	Yes	R [2]	R [2]	R [2]	A	A

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
RBC Transition Order	No	R	R	R	A	A
	Yes	R	R	R	A [3]	A [3]
Danger for SH information	No	A [13]	A [13]	A	A	A
	Yes					
Stop Shunting on desk opening	No	A	A	A	A	A
	Yes					
Radio Infill Area information	No	R	R	A	R [1]	R [1]
	Yes					
Session Management with neighbouring RIU	No	R	R	A	R	R
	Yes					
EOLM information	No	A	A	A	A	A
	Yes					
Assignment of Co-ordinate system	No					
	Yes	A [10]	A [10]	A [10]	A [10]	A [10]
Infill Location Reference	No	R	R	A	R [1]	R [1]
	Yes					
Track Conditions excluding big metal masses	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Track condition big metal masses	No	A	A	A	A	A
	Yes					

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
Location Identity (NID_C + NID_BG transmitted in the balise telegram)	No	A	A	A	A	A
	Yes					
Recognition of exit from TRIP mode	No					
	Yes	R	R	R	A	A
Acknowledgement of Train Data	No					
	Yes	A	A	A	A	A
Co-operative shortening of MA + (optional) Mode Profile + (optional) List of Balises for SH area	No					
	Yes	R	R	R	A [3] [4] [5]	A [3] [4] [5]
Unconditional Emergency Stop	No					
	Yes	R [2]	R [2]	R [2]	A	A
Conditional Emergency Stop	No					
	Yes	R [2]	R [2]	R [2]	A	A
Revocation of Emergency Stop (Conditional or Unconditional)	No					
	Yes	R	R	R	A	A
SH refused	No					
	Yes	R	R	R	A [3]	A [3]
SH authorised + (optional) List of Balises for SH area	No					
	Yes	R	R	R	A [3]	A [3]
Trackside constituent System Version	No	A	A	A	A	A

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
	Yes	A	A	A	A	A
System Version order	No	A	A	A	A	A
	Yes					
Track Ahead Free Request	No					
	Yes	R	R	R	A [3]	A [3]
Train Running Number	No					
	Yes	R	R	R	A	A
Initiation of session	No					
	Yes	R	R	R	A	A
Acknowledgement of session termination	No	A	A	A	A	A
	Yes	A	A	A	A	A
Train Rejected	No					
	Yes	R	R	R	A	A
Train Accepted	No					
	Yes	R	R	R	A	A
SoM Position Report Confirmed by RBC	No					
	Yes	R	R	R	A	A
Reversing Area Information	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Reversing Supervision Information	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]

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Information	From RBC	Onboard operating level				
		0	NTC	1	2	3
Default Balise/Loop/RIU Information	No	A	A	A	A	A
	Yes					
Track Ahead Free up to level 2/3 transition location	No	A [9]	A [9]	A [9]	R	R
	Yes					
Permitted Braking Distance Information	No	R [1]	R [1]	A	R [1]	R [1]
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Level Crossing information	No	R [1] [2]	R [1] [2]	A	A	A
	Yes	R [2]	R [2]	R [2]	A [3]	A [3]
Virtual Balise Cover order	No	A	A	A	A	A
	Yes					
Data to be used by applications outside ERTMS/ETCS	No	A	A	A	A	A
	Yes	A	A	A	A	A

[1] exception: stored onboard if an order to switch to L1 at a further location has been received.

[2] exception: stored onboard if an order to switch to L2/3 at a further location has been received.

[3] exception: rejected if Train Data has been sent to the RBC and the “Acknowledgement of Train Data” has not been received yet.

[4] exception: rejected if the SSP and gradient already available on-board or given together with the MA do not cover the full length of the MA.

[5] exception: rejected if emergency stop(s) have been accepted and are not yet revoked or deleted onboard (see mode transitions).

[8] exception: revocable TSRs shall be rejected if information “inhibition of revocable TSRs from balises in L2/3” is stored on-board.

[9] exception: rejected if no level 2/3 transition order is stored onboard.

[10] exception: rejected if the referred LRBG is memorised to have been reported with different “previous LRBG”

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[11] exception: rejected if a **level** transition order is received in the same message, or if a previous **level** transition order has announced a **level** transition still to be executed

[12] exception: rejected if the text message is sent with a request for report of driver acknowledgement with the same text message identifier as a previously received text message, which the driver has not yet acknowledged

[13] exception: rejected if not received together with an immediate **level** transition order to L1/2/3

4.8.3.2 From **National System** X (through STM interface)

Information from National System X through STM interface	Onboard operating level					
	0	NTC X	NTC Y	1	2	3
STM max speed	A [7]	R	R [6]	A [7]	A [7]	A [7]
STM system speed/distance	A [7]	R	R	A [7]	A [7]	A [7]

[6] exception: stored by ETCS onboard if an order to switch to **level** NTC X at a further location has been received.

[7] exception: rejected by ETCS onboard if no order to switch to **level** NTC X at a further location has been received.

4.8.3.3 Intentionally deleted.

4.8.3.4 Intentionally deleted.

4.8.4 Accepted Information depending on the modes

4.8.4.1 Assumptions

4.8.4.1.1 For infill information, only the columns **FS** and **LS** apply. In all other **modes**, infill information is rejected.

4.8.4.1.2 Intentionally deleted.

4.8.4.2 Intentionally deleted.

NR = Not Relevant A = Accepted R = Rejected

Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
National Values	NR	A [2]	A	A	A	A	A	A	A	A	A	A	A [1]	NR	NR	A	A
Linking	NR	A[2][4]	R	R	A	A	A	A	R	A	A	R	A [1]	NR	NR	A	R
Signalling Related Speed Restriction	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Movement Authority + (optional) Mode Profile + (optional) List of Balises for SH area	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Repositioning Information	NR	R	R	R	A	A	R	A	R	R	R	R	R	NR	NR	R	R
Gradient Profile	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R

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Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
International SSP	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Axle load speed profile	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
STM max speed	NR	A [2]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	A	R
STM system speed/distance	NR	A [2]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	R	R
Level Transition Order and Conditional Level Transition Order	NR	A [2]	A [7]	A [7]	A	A	A	A	A	A	A	A	A [1] [5]	NR	NR	A	R
Session Management	NR	A	A [3]	A [3]	A	A	A	A	A	A	A	A	A [1]	NR	NR	A	A
Radio Network registration	NR	A [2]	A	A	A	A	A	A	A	A	A	A	A [1]	NR	NR	A	A
MA Request Parameters	NR	A [2]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Position Report parameters	NR	A [2]	R	R	A	A	A	A	R	A	A	R	A [1]	NR	NR	A	A
SR Authorisation+ (optional) List of Balises in SR mode	NR	A[2][4]	R	R	R	R	A	R	R	R	R	R	A [1]	NR	NR	R	R
Stop if in SR mode	NR	R	R	R	R	R	A	R	R	R	R	R	R	NR	NR	R	R
SR distance information from loop	NR	R	R	R	R	R	A [6]	R	R	R	R	R	R	NR	NR	R	R
Temporary Speed Restriction	NR	A [2][4]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	A	R

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Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
Temporary Speed Restriction Revocation	NR	A[2][4]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	A	R
Inhibition of revocable TSRs from balises in L2/3	NR	A [2]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	A	R
Default Gradient for TSR	NR	A[2][4]	R	R	A	A	A	A	R	R	A	A	A [1]	NR	NR	A	R
Route Suitability Data	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Adhesion Factor	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Plain Text Information	NR	A [2]	R	R	A	A	A	A	R	A	A	A	A [1]	NR	NR	A	A
Fixed Text Information	NR	A [2]	R	R	A	A	A	A	R	A	A	A	A [1]	NR	NR	A	A
Geographical Position	NR	A [2]	R	R	A	A	A	A	R	A	A	A	A [1]	NR	NR	A	R
RBC Transition Order	NR	A[2][4]	A [8]	A [8]	A	A	A	A	A	A	R	A	A [1]	NR	NR	R	R
Danger for SH information	NR	R	R	A	R	R	R	R	R	R	R	R	R	NR	NR	R	R
Stop Shunting on desk opening	NR	R	A	R	R	R	R	R	R	R	R	R	R	NR	NR	R	R
Radio Infill Area information	NR	R	R	R	A	A	A	A	R	R	R	R	R	NR	NR	R	R
Session Management with neighbouring RIU	NR	R	R	R	A	A	A	A	R	R	R	R	R	NR	NR	R	R
EOLM information	NR	R	R	A	A	A	A	A	A	A	A	A	R	NR	NR	A	A

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Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
Assignment of Co-ordinate system	NR	A [2]	R	R	R	R	A	R	R	A	A	R	A [1]	NR	NR	A	R
Infill Location Reference	NR	R	R	R	A	A	R	R	R	R	R	R	R	NR	NR	R	R
Track Conditions excluding sound horn, non stopping areas, tunnel stopping areas and big metal masses	NR	A[2][4]	R	R	A	A	A	A	R	A	A	A	A [1]	NR	NR	A	R
Track conditions sound horn, non stopping areas, tunnel stopping areas	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Track condition big metal masses	NR	A[2][4]	A	A	A	A	A	A	A	A	A	A	A [1]	NR	NR	A	R
Location Identity (NID_C + NID_BG)	NR	A [2]	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
Recognition of exit from TRIP mode	NR	R	R	R	R	R	R	R	R	R	R	R	A	NR	NR	R	R
Acknowledgement of Train Data	NR	A [2]	R	R	A	A	A	A	R	R	A	A	A	NR	NR	A	A
Co-operative shortening of MA + (optional) Mode Profile + (optional) List of Balises for SH area	NR	R	R	R	A	A	R	A	R	R	R	R	R	NR	NR	R	R
Unconditional Emergency Stop	NR	A [2]	R	R	A	A	A	A	R	R	A	R	R	NR	NR	A	R

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Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
Conditional Emergency Stop	NR	R	R	R	A	A	R	A	R	R	A	R	R	NR	NR	A	R
Revocation of Emergency Stop (Conditional or Unconditional)	NR	R	R	R	A	A	R	A	R	R	R	R	A [1]	NR	NR	R	R
SH refused	NR	A [2]	R	R	A	A	A	A	R	R	R	R	A [1]	NR	NR	R	R
SH authorised + (optional) List of Balises for SH area	NR	A [2]	R	R	A	A	A	A	R	R	R	R	A [1]	NR	NR	R	R
Trackside constituent System Version	NR	A	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
System Version order	NR	A	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
Track Ahead Free Request	NR	A [2]	R	R	R	A	A	A	R	R	R	R	A[1]	NR	NR	R	R
Train Running Number	NR	A [2]	R	R	A	A	A	A	R	A	R	A	A	NR	NR	R	A
Initiation of session	NR	A	R	R	A	A	A	A	A	A	R	A	A	NR	NR	R	A
Acknowledgement of session termination	NR	A	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
Train Rejected	NR	A [2]	R	R	R	R	R	R	R	R	R	R	R	NR	NR	R	R
Train Accepted	NR	A [2]	R	R	R	R	R	R	R	R	R	R	R	NR	NR	R	R
SoM Position Report Confirmed by RBC	NR	A [2]	R	R	R	R	R	R	R	R	R	R	R	NR	NR	R	R
Reversing Area Information	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	A

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Information	Modes																
	N P	SB	P S	S H	F S	LS	SR	OS	SL	N L	U N	TR	PT	SF	IS	SN	RV
Reversing Supervision Information	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	A
Default Balise/Loop/RIU Information	NR	A [2]	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
Track Ahead Free up to Level 2/3 transition location	NR	A [2]	R	R	A	A	A	A	R	R	A	A	A	NR	NR	A	R
Permitted Braking Distance Information	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Level Crossing information	NR	A[2][4]	R	R	A	A	A	A	R	R	A	R	A [1]	NR	NR	A	R
Virtual Balise Cover order	NR	A	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A
Data to be used by applications outside ERTMS/ETCS	NR	A	A	A	A	A	A	A	A	A	A	A	A	NR	NR	A	A

[1]: for level 2/3: only if following the reception of the information "Recognition of Exit from TR mode" with a more recent time stamp; for level 1: rejected

[2]: only if a cab is active

[3]: for order to establish a communication session: RBC ID/phone number is stored without establishing the communication session

[4]: only if valid Train Data are stored on-board

[5]: only level transition announcement (i.e., immediate level transition order and conditional level transition order shall be rejected)

[6]: rejected if override is active

[7]: only immediate level transition order and conditional level transition order shall be accepted (i.e., level transition announcement shall be rejected) and stored for later evaluation (see 4.4.8.1.5)

[8]: only RBC transition order with null distance to execution shall be accepted (i.e., RBC transition announcement shall be rejected) for storing the RBC ID/phone number (see 4.4.8.1.5.2)

4.8.5 Handling of transition buffer in case of level transition announcement or RBC/RBC handover

- 4.8.5.1 If an order to switch to level NTC, 1, 2 or 3 at a further location has been received, the ERTMS/ETCS onboard equipment shall be able to store in a transition buffer (see figure 3, first filter) three sets of information obtained from three filtered messages.
- 4.8.5.2 If a RBC transition order has been received and the Handing Over RBC is still the supervising one, the ERTMS/ETCS onboard equipment shall be able to store in a transition buffer (see figure 3, second filter) three sets of information obtained from three filtered messages from the Accepting RBC.
- 4.8.5.2.1 *Note: the term “set of information” refers to the part of a message being stored in the transition buffer (i.e. information which is neither accepted nor rejected immediately) according to the conditions stated in 4.8.3.1 [1] and [2] (for level transition) or according to 4.8.2.1c (for RBC/RBC handover).*
- 4.8.5.3 In case three sets of information are already stored in the transition buffer, any new set to be stored shall replace the oldest one currently stored.
- 4.8.5.4 The sets of information stored in the transition buffer shall be deleted:
- a) in case the level transition order is deleted or overwritten by another level transition order for a different level, OR
 - b) in case the RBC transition order is deleted or overwritten by an order to switch to another Accepting RBC, OR
 - c) in case the communication session with the RBC that provided the stored information is terminated
- 4.8.5.5 At the same time the level transition is performed or at the same time the Accepting RBC becomes the supervising one, the sets of information stored in the transition buffer shall be released and re-evaluated in the sequence they have been received.
- 4.8.5.6 This sequential re-evaluation of all the released information shall be a prerequisite to any use by the on-board equipment (e.g. it will lead neither to an intermediate change of mode nor to a change of information displayed to the driver) and shall obey the following principles:
- a) Starting from the information currently used by on-board at the moment the level/RBC transition is effective, the ERTMS/ETCS on-board equipment shall determine the new information for train supervision, by performing sequential updates from the information released from the transition buffer, if accepted.

- b) For each information update related to a re-evaluated set of information, the same rules shall apply as to information update related to new information accepted outside a **level**/RBC transition context.
- c) The information resulting from this sequential update shall then be used by the ERTMS/ETCS on-board equipment.

4.8.5.7 Accepting re-evaluated Conditional Emergency Stop information according to table 4.8.3 implies that the accepted Conditional Emergency Stop information may be accepted or rejected in a further step (see clause 3.10.2.2) depending on the given stop location. This decision, based on the comparison between the min safe front end position of the train at the time the message was received and the given stop location, shall be considered part of the evaluation process as it affects the further re-evaluation of information stored in the transition buffer (see clause 3.10.2.4).

4.8.5.7.1 *Note: For the case of the Unconditional Emergency Stop information accepting the information according to table 4.8.3 will always lead to the train being **tripped** (see clause 3.10.2.3) when re-evaluation of the transition buffer is completed. Information accepted during re-evaluation of information stored in the transition buffer can then be affected on transition to **TR mode** according to conditions in Table 4.10.*

4.8.5.8 Note: The requirement to acknowledge an Emergency Stop information according to clause 3.10.1.4, i.e., communicating to the RBC if the information has been accepted or ignored, applies to the time when the information is used, immediately after the sequential update has been completed.
Regards acknowledging the reception of an emergency stop message, as for any other information received from trackside, see clause 3.16.3.5.

4.9 What happens to accepted and stored information when entering a given level

4.9.1 Introduction

4.9.1.1 Every data that can be stored onboard after being accepted may be influenced by a level transition.

4.9.1.2 A level transition acts on the “status” of stored information.

4.9.1.3 In case of entering level 1, MA Request Parameters, Position Report Parameters and Track Ahead Free Request shall be deleted.

4.9.1.3.1 *In case of entering level 0, NTC or 1, the information “Inhibition of revocable TSRs from balises in L2/3” shall be deleted.*

4.9.1.4 For all other stored data, a level transition has no effect (void).

4.10 What happens to accepted and stored information when entering a given mode

4.10.1 Introduction

4.10.1.1 Every data that can be stored onboard after being accepted may be influenced by a mode transition.

4.10.1.2 A mode transition acts on the “status” of stored information.

4.10.1.3 Depending on which mode is entered, the action shall be one of the following:

- a) data is deleted,
- b) data is to be revalidated,
- c) data is reset (set to default values)
- d) data status is unchanged,
- e) not relevant (the action on the data cannot be determined. This concerns the entry in SF and IS modes)

D = Deleted TBR = To Be Revalidated U = Unchanged NR = Not relevant R = Reset

Data Stored on-board	Entered Mode																
	NP	SB	PS	SH	FS	LS	SR	OS	SL	NL	UN	TR	PT	SF	IS	SN	RV
National Values	U	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Not yet applicable National Values	D	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Linking	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D

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Data Stored on-board	Entered Mode																
	NP	SB	PS	SH	FS	LS	SR	OS	SL	NL	UN	TR	PT	SF	IS	SN	RV
Movement Authority	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
Gradient Profile	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
International SSP	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
Axle load speed profile	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
STM max speed	D	D	D	D	U	U	D	U	D	D	U	U	U	NR	NR	U	D
STM system speed/distance	D	D	D	D	U	U	D	U	D	D	U	U	U	NR	NR	U	D
Level Transition Order	D	D [1] [2]	U	D [2]	U	U	D	U	D [2]	D [1]	D	U	U	NR	NR	D	D
Stop Shunting on desk opening	D	D	U	U	U	U	U	U	D	U	U	U	U	NR	NR	U	U
List of balises for SH area	D	D	U	U	U	U	D	U	D	D	D	D	U	NR	NR	D	D
MA Request Parameters	D	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Position Report parameters	D	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
List of Balises in SR Authority + SR mode speed limit and distance	D	D	D	D	D	D	U	D	D	D	D	D	U	NR	NR	D	D
Temporary Speed Restriction	D	D	D	D	U	U	U	U	D	D	U	U	U	NR	NR	D	D
Inhibition of revocable TSRs from balises in L2/3	D	D	D	D	U	U	D	U	D	D	D	U	U	NR	NR	D	D
Default Gradient for TSR	D	D	D	D	U	U	U	U	D	D	U	U	U	NR	NR	D	D
Signalling related Speed Restriction	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
Route Suitability Data	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D

Mis en forme : Anglais (Royaume-Uni)

Mis en forme : Anglais (Royaume-Uni), Surlignage

Mis en forme : Anglais (Royaume-Uni)

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Data Stored on-board	Entered Mode																
	NP	SB	PS	SH	FS	LS	SR	OS	SL	NL	UN	TR	PT	SF	IS	SN	RV
Adhesion Factor (from trackside)	R	R	R	R	U	U	U	U	R	R	U	U	U	NR	NR	R	U
Adhesion Factor (from driver)	R	R	R	R	U	U	U	U	R	R	U	U	U	NR	NR	U	U
Plain Text Information	D	D	D	D	U	U	U	U	D	U	U	U	U	NR	NR	D	U
Fixed Text Information	D	D	D	D	U	U	U	U	D	U	U	U	U	NR	NR	D	U
Geographical Position	D	U	D	D	U	U	U	U	D	U	U	U	U	NR	NR	D	D
Mode Profile	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
RBC Transition Order	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
Radio Infill Area information	D	D	D	D	U	U	D	D	D	D	D	D	U	NR	NR	D	D
EOLM information	TBR	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Track Conditions excluding sound horn, non stopping areas, tunnel stopping areas and big metal masses	R	R	R	R	U	U	R	U	R	U	R	U	U	NR	NR	R	R
Track conditions sound horn, non stopping areas, tunnel stopping areas	R	R	R	R	U	U	R	U	R	R	R	R	R	NR	NR	R	R
Track condition big metal masses	R	R	R	R	U	U	R	U	R	U	U	U	U	NR	NR	U	R
Unconditional Emergency Stops	D	D	D	D	U	U	D	U	D	D	D	U	U	NR	NR	D	D
Conditional Emergency Stops	D	D	D	D	U	U	D	U	D	D	D	U	U	NR	NR	D	D
Train Position	TBR	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U

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Data Stored on-board	Entered Mode																
	NP	SB	PS	SH	FS	LS	SR	OS	SL	NL	UN	TR	PT	SF	IS	SN	RV
Train Data	D	TBR	U	TBR	U	U	U	U	U	U	U	U	U	NR	NR	U	U
ERTMS/ETCS level	TBR	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Table of priority of trackside supported levels	TBR	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Driver ID	D	TBR	U	U	U	U	U	U	D	U	U	U	U	NR	NR	U	U
Radio Network ID	U	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
RBC ID/Phone Number	TBR	U	U	U	U	U	U	U	U	U	D	U	U	NR	NR	D	U
Train Running Number	D	TBR	U	U	U	U	U	U	D	U	U	U	U	NR	NR	U	U
Reversing Area Information	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	U
Reversing Supervision Information	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	U
Track Ahead Free Request	D	D	D	D	D	D	U	U	D	D	D	D	U	NR	NR	D	D
Permitted Braking Distance Information	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
Level Crossing information	D	D	D	D	U	U	D	U	D	D	D	D	U	NR	NR	D	D
RBC/RIU System Version	D	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Operated System Version	U	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Virtual Balise Covers	U	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U
Language used to display information to the driver	U	U	U	U	U	U	U	U	U	U	U	U	U	NR	NR	U	U

[1]: exception: "U" when coming from SH

[2]: exception: "U" when coming from PS

4.10.1.4 NOTES:

4.10.1.4.1 Intentionally deleted.

4.10.1.4.2 The following information is not considered to be stored information:

- a) Repositioning information
- b) Session Management (exception: the RBC ID/phone number, which is given with an order to establish a communication session, is stored on-board)
- c) Danger for SH information
- d) Assignment of Co-ordinate system
- e) Infill Location Reference
- f) Location Identity (NID_C + NID_BG transmitted in the balise telegram)
- g) Recognition of exit from TRIP mode
- h) Acknowledgement of Train Data
- i) SH refused
- j) SH authorised
- k) Balise/loop System Version
- l) Track Condition Station Platforms
- m) Track Condition Change of Allowed Current Consumption
- n) Revocation of Emergency Stop (Conditional or Unconditional)
- o) Temporary Speed Restriction Revocation
- p) Initiation of communication session
- q) Acknowledgement of session termination

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- r) Default Balise Information
- s) Co-operative shortening of MA (if this message is used, it replaces the movement authority)
- t) Train Rejected
- u) Train Accepted
- v) SoM position report confirmed by RBC
- w) Track Ahead Free up to **level** 2/3 transition location
- x) Signalling related speed restriction value zero (i.e., train **trip** order)
- y) Stop if in **SR mode**
- z) Data to be forwarded to a **National System** through the STM interface

4.11 What happens to stored information when exiting NP mode

- 4.11.1.1 Status of stored information, which is set to "Invalid" when No Power mode is entered, shall be affected, when relevant, by information from the Cold Movement Detection function, according to the following table:

Transition conditions	Status of On-board stored information														
	EOLM information			Train Position			ERTMS/ETCS Level			Table of trackside supported levels			RBC ID/Phone Number		
	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid
No Cold movement occurred		● →			● →			● →			● →			● →	
Cold movement detected or Cold movement information not available	← ●									← ●					

- 4.11.1.2 Note: Status of stored information, which remains valid after NP mode has been entered, is not affected by information from the Cold Movement Detection function.
- 4.11.1.3 If a cold movement has been detected, or the Cold Movement Detection function is not able to confirm that no cold movement has taken place, no change of status of information to "valid" shall be made until it has been validated by a different means than cold movement detection.

5. CHAPTER 5 PROCEDURES

5.1 Modification History

5.2 Table of Contents

5.3 Introduction

5.3.1 Scope and Purpose

5.3.1.1 This document defines the procedures that are necessary for interoperability within the scope of ERTMS/ETCS.

5.3.1.2 Each procedure is defined by a set of mandatory requirements and, where convenient, is illustrated by a flowchart.

5.3.1.3 In case the condition(s) in chapter 4 triggering a **mode** transition is(are) fulfilled, this transition shall be executed even if not shown in the chapter 5 procedures.

5.3.1.3.1 *Note: Such a **mode** transition could lead to exiting a procedure immediately (e. g. cut off power of on-board equipment, **isolation** of on-board equipment).*

5.3.1.4 National operation rules (outside of ERTMS/ETCS) are also excluded, but may be applied by the railways in addition to the procedures as long as interoperability is retained.

5.3.2 Definitions

5.3.2.1 Procedures

A procedure defines the required reaction of the ERTMS/ETCS entities (subsystems and components) to either information exchanged between ERTMS/ETCS entities or events (triggered by external entities or internal events). The procedures focus on the required change in status and **mode** of the described ERTMS/ETCS entities.

5.3.2.2 Entities

The procedures define the required system behaviour on a context **level**, i. e. the entities that are used to define the procedures are for example: the on-board equipment, the trackside equipment (RBC/Balise), the driver.

5.3.2.3 States

States are situations of an ETCS subsystem with a specific set of available functions and a specific set of events that may start or terminate the state. A state remains active as long as the conditions to trigger the transition to a succeeding state are not completely satisfied.

Note 1: one **mode** of operation may include several states for the on-board equipment.

Note 2: A new state is only created, if the behaviour of the system differs from another one. Possession of information (e. g. location information) or not does not force branching in states.

5.3.2.4 Transitions

Transitions define the rules for passing from one state to another. A transition is triggered by a set of conditions which has to be fulfilled in a defined order or at the same time. When a transition refers to a driver's selection, it means that the conditions to enable the corresponding button on the DMI were fulfilled.

5.4 Procedure Start of mission

5.4.1 Introduction

5.4.1.1 The driver may have to start a mission:

- a) Once the train is awake, OR
- b) Once shunting movements are finished, OR
- c) Once a mission is ended, OR
- d) Once a slave engine becomes a leading engine.

5.4.1.2 The common point of all these situations is that the ERTMS/ETCS on-board is in Stand-By mode, but the Start of Mission will be different, since some data may be already stored on-board, depending on the previous situation.

5.4.1.3 Once the ERTMS/ETCS on-board equipment is in Stand-By mode, the start of mission is not the only possibility, the engine may become remote controlled (i.e. the on-board switches to Sleeping mode).

5.4.2 Status of data stored in the ERTMS/ETCS on-board equipment

5.4.2.1 At the beginning of the Start of Mission procedure, the data required may be in one of three states:

- a) "valid" (the stored value is known to be correct)
- b) "Invalid" (the stored value may be wrong)
- c) "Unknown" (no stored value available)

5.4.2.2 This refers to the following data: Driver ID, ERTMS/ETCS level, RBC ID/phone number, Train Data, Train Running Number, Train Position (see 3.6.1.3).

Commentaire [MD44]: Mode SB :
C5,6, 50 -> SH
C 10 -> FS
C 70 -> LS
C 8, 37 -> SR
C 15 -> OS
C 14 -> SL
C46 -> NL
C60 -> UN
C20 -> TR
C58 -> SN

Commentaire [MD45]: What means awake ? power-on or desk-open ?

Commentaire [MD46]: See next SRS-26 § what means, end of mission ? do we need a variable to store state of mission ?

Commentaire [MD47]: Train_req_SL

Commentaire [MD48]: Train_req_SL

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5.4.2.3 **Note 1:** The status of data in relation to the previous and the actual **mode** is described in chapter 4, section "What happens to stored information when entering a **mode**".

5.4.2.4 **Note 2:** The change of status of data in course of the procedure is shown in the table in section 5.4.3.3.

5.4.3 Table of requirements for “Start of Mission” procedure

5.4.3.1 The ID numbers in the table are used for the representation of the procedure in form of a flow chart in section 5.4.4.

5.4.3.2 Procedure

ID #	Requirements
S0	The Start of Mission procedure shall be engaged when the ERTMS/ETCS on-board equipment is in Stand-By mode with a desk open and no communication session is established or is being established.
S1	<p>Depending on the status of the Driver-ID, the ERTMS/ETCS on-board equipment shall request the driver to enter the Driver-ID (if the Driver-ID is unknown) or shall request the driver to revalidate or re-enter the Driver-ID (if the Driver-ID is invalid).</p> <p>The ERTMS/ETCS on-board equipment shall offer the driver the possibility to enter/re-validate (depending on the status) the Train running number.</p> <p>The ERTMS/ETCS on-board equipment shall also offer the driver the possibility to set/remove a Virtual Balise Cover.</p> <p>Once the Driver-ID is entered or revalidated (E1) (possibly further to the Train running number entry/revalidation and/or to Virtual Balise Cover setting/removal), the process shall go to D2</p>
D2	<p>If both the stored position and the stored level are valid, the process shall go to D3</p> <p>If the stored position or the stored level is "invalid" or "unknown", the process shall go to S2</p>
D3	<p>If the stored level is 2 or 3, the process shall go to D7</p> <p>If the stored level is 0,1 or NTC, the process shall go to S10</p>
D7	<p>If at least one Mobile Terminal is registered to a Radio Network, the process shall go to A31</p> <p>If no Mobile Terminal is registered to a Radio Network, the process shall go to A29</p>

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ID #	Requirements
S2	<p>If the status of the Level data is "unknown", the ERTMS/ETCS on-board equipment shall request the driver to enter it.</p> <p>If the status of the Level data is "invalid", the ERTMS/ETCS on-board equipment shall request the driver to re-validate or re-enter the ERTMS/ETCS level.</p> <p>If the entered / re-validated level is 2 or 3, the process shall go to S3</p> <p>If the entered / re-validated level is 0, 1 or one of proposed NTC level(s) (see 3.18.4.2 for the levels the driver is allowed to select), the process shall go to S10</p>

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ID #	Requirements
S3	<p>The ERTMS/ETCS on-board equipment shall offer the possibility to the driver to re-enter the Radio Network ID. If the driver elects to do so, the on-board equipment shall acquire an alphanumeric list of available and allowed networks, based on a request to the Mobile Terminal(s) and:</p> <ul style="list-style-type: none"> • If this list is empty (E3) the process shall go to A29 • If the driver selects a new Radio Network ID from the proposed list, the registration of the Mobile Terminal(s) to this new Radio Network shall be ordered and the status of the RBC-ID/phone number shall be immediately set to "unknown". <p>If at least one Mobile Terminal is registered to a Radio Network, the ERTMS/ETCS on-board equipment shall offer the following options to the driver for the RBC-ID/phone number:</p> <ul style="list-style-type: none"> • Only if the status of the RBC-ID/phone number is "invalid": order the ERTMS/ETCS on-board equipment to use the last stored RBC-ID/phone number • Order the ERTMS/ETCS on-board equipment to use the EIRENE short number (trackside call routing function) • Enter the RBC-ID/phone number (if its status is "unknown"), or revalidate/re-enter it (if its status is "invalid"). <p>Once the driver has selected the first or second option or once data is validated (E5), the process shall go to A31</p>
A29	<p>The ERTMS/ETCS on-board equipment shall inform the driver that the Radio Network registration has failed</p> <p>This condition leads to S10 (the driver has to unlock the situation to continue e.g. selection of new level)</p>

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ID #	Requirements
S10	<p>The ERTMS/ETCS on-board equipment shall offer the possibility to the driver to select SH, NL, or to select Train Data Entry.</p> <ul style="list-style-type: none"> • If the driver selects SH (E12), the process shall continue in the same way as the procedure “Shunting” initiated by the driver”. If, in level 2 or 3, the RBC rejects the request for Shunting (E13), the process shall go back to S10. • If the driver selects NL (E10) then the ERTMS/ETCS on-board equipment shall immediately switch to Non Leading mode (refer to SRS chapter 4, transition between modes: transition [46]). The mission starts in NL mode (if level is 2 or 3, the ERTMS/ETCS on-board equipment also reports the change of mode to the RBC). • If the driver selects Train Data Entry (E11), the process shall go to S12 • Following E10, E12, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: “unknown”)
S12	<p>The ERTMS/ETCS on-board equipment shall request the driver to enter/revalidate the Train Data that requires driver validation</p> <p>.</p> <p>Once Train Data is stored and validated (E16), the process shall go to D12</p>
D12	<p>If Train running number is valid, the process shall go to D10</p> <p>If Train running number is “unknown” or “invalid”, the process shall go to S13</p>

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ID #	Requirements
S13	<p>If the status of the Train running number is "unknown" or "invalid", the ERTMS/ETCS on-board equipment shall request the driver to enter/re-validate the Train running number now.</p> <p>Once Train running number is entered/re-validated (E18), the process shall go to D10.</p>
D10	<p>When the validated level is 2/3, the process shall go to D11</p> <p>When the validated level is 0,1 or NTC, the process shall go to S20</p>
D11	<p>When the session is open, the process shall go to S11, otherwise it shall go to S10</p>
S11	<p>The ERTMS/ETCS on-board equipment shall send Train Data to the RBC.</p> <p>When the RBC acknowledges Train Data (E14), then the ERTMS/ETCS onboard equipment shall go to the step S20.</p>
S20	<p>The ERTMS/ETCS on-board equipment shall offer the possibility to the driver to select "Start"</p> <ul style="list-style-type: none"> a) When the validated level is NTC and the driver selects "start" (E20), the process shall go to S22 b) When the validated level is 0 and the driver selects "start" (E21), the process shall go to S23 c) When the validated level is 1 and the driver selects "start" (E22), the process shall go to S24 d) When the validated level is 2 or 3 and the driver selects "start" (E24), the process shall go to S21

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ID #	Requirements
S21	<p>The ERTMS/ETCS on-board equipment shall send an MA request to the RBC and wait.</p> <p>If an SR authorisation is received from RBC (E26), the process shall go to S24</p> <p>If an MA allowing OS/LS/SH is received from RBC (E27), the process shall go to S25</p> <p>If an MA allowing FS is received from RBC (E29), the mission starts in Full Supervision mode (refer to SRS chapter 4, transitions between modes: transition from SB to FS)</p>
S22	<p>The ERTMS/ETCS on-board equipment shall request an acknowledgement from the driver for running under supervision of the selected National System. When the driver acknowledges (E30) , the mission starts in SN mode (refer to SRS chapter 4, transitions between modes).</p> <p>Following E30, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: "unknown")</p>
S23	<p>The ERTMS/ETCS on-board equipment shall require an acknowledgement from the driver for running in Unfitted mode. When the driver acknowledges (E31), the mission starts in Unfitted mode (refer to SRS chapter 4, transitions between modes: transition from SB to UN)</p> <p>Following E31, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: "unknown")</p>
S24	<p>The ERTMS/ETCS on-board equipment shall require an acknowledgement from the driver for running in Staff Responsible mode. When the driver acknowledges (E32), the mission starts in SR mode (refer to SRS chapter 4, transitions between modes: transition from SB to SR)</p> <p>Following E32, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: "unknown")</p>

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ID #	Requirements
S25	The ERTMS/ETCS on-board equipment shall require an acknowledgement from the driver for running in On Sight/Limited Supervision/Shunting mode. When the driver acknowledges (E33), the mission starts in On Sight/Limited Supervision/Shunting mode (refer to SRS chapter 4, transitions between modes: transition from SB to OS, LS or SH)
A31	The ERTMS/ETCS on-board equipment shall open the session with the RBC.
D31	If the opening of the session is successful, the process shall go to D32 If the opening of the session has failed, the process shall go to A32
A32	The driver shall be informed when the on-board equipment fails to open a radio session. Opening of a radio session has failed if <ul style="list-style-type: none"> No connection to the RBC can be established (see section 3.5.3.7) OR The ERTMS/ETCS on-board equipment, based on the system configuration reported by the RBC, decides that compatibility is not ensured and terminates the communication session This condition leads to S10 (The driver has to unlock the situation to continue e.g. selection of new level).
D32	If the stored position is valid, the process shall go to A33 If the stored position is invalid, the process shall go to A34
A33	If the train position data stored in the on-board equipment is of status "valid", the train position, marked as "valid" shall be transmitted to the RBC via the "SoM position report" message. This condition leads to S10 .

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ID #	Requirements
A34	<p>If the train position data stored in the on-board equipment is of status "invalid" or "unknown", the train position, marked as "invalid" or "unknown" shall be transmitted to the RBC via the "SoM position report" message.</p> <p>The process shall then go to D33</p>
D33	<p>When the position report marked as "invalid" is received by the RBC, this latter shall check whether it can validate this position report.</p> <p>If the position report can be validated by the RBC, the process shall go to A35</p> <p>Otherwise, if the position report was marked "unknown", or the "invalid" position report cannot be validated by the RBC, the process shall go to D22</p> <p>Note: How the RBC is able to validate the position report is a national issue, out of the scope for this specification</p>
A35	<p>The RBC shall inform the ERTMS/ETCS onboard equipment that the reported position is valid.</p> <p>When this message is received by the ERTMS/ETCS on-board equipment, the status of the position shall be set to "valid"</p> <p>The process shall go to S10.</p>
D22	<p>If the reported train position is "unknown", or the RBC is not able to confirm a reported "invalid" position, the RBC shall nevertheless decide whether it accepts the train or not.</p> <p>If yes, the process shall go to A23</p> <p>If no, the process shall go to A38</p> <p>Note: How the RBC assumes responsibility for the train is a national issue, out of the scope for this specification</p>

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ID #	Requirements
A23	The RBC shall inform the ERTMS/ETCS on-board equipment that it accepts the train although the on-board has no "valid" position information.
A24	When the ERTMS/ETCS on-board equipment is informed that the train is accepted without valid position data, it shall delete the train position data (new status: "unknown") This condition leads to S10 .
A38	The RBC shall inform the ERTMS/ETCS on-board equipment that it rejects the train
A39	When the ERTMS/ETCS on-board equipment is informed that the train is rejected, it shall delete the train position data (new status: "unknown") and shall terminate the session with the RBC. The process shall then go to A40
A40	The ERTMS/ETCS on-board equipment shall inform the driver that the train is rejected This condition leads to S10 (the driver has to unlock the situation to continue e.g. selection of new level).

5.4.3.2.1 The SoM procedure shall end as soon as at least one of the following conditions is fulfilled:

Transition to any mode other than SB

The desk is closed

5.4.3.3 Status of On-board Variables Affected by Start of Mission Procedure

Transition conditions	State of On-board Variables																	
	ERTMS/ETCS Level			RBC ID/Phone Number			Train position data			Driver ID			Train Data			Train Running Number		
	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid
Following S1 : Driver has entered driver ID										●	→							
Following S1 : Driver has re-validated/ re-entered driver ID										●	→							
Following S1 : Driver has entered Train running number																●	→	
Following S1: Driver has re-validated/ re-entered Train running number																●	→	
Following D2: stored position is "invalid" or "unknown"		←	●		←	●												
Following D2: stored level is "invalid" or "unknown"					←	●												
Following S2 : driver has entered level	●	→																
Following S2 : driver has re-validated/ re-entered level		●	→															
S3: driver has re-entered a Radio Network ID				←	●													
Following S3 : driver has entered RBC ID/Phone Number				●	→													

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Transition conditions	State of On-board Variables																	
	ERTMS/ETCS Level			RBC ID/Phone Number			Train position data			Driver ID			Train Data			Train Running Number		
	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid	Un- known	Invalid	Valid
Following S3: driver has re-validated/re-entered RBC ID/Phone Number					●	→												
Following D31: session has been successfully opened					●	→												
Following D31: session has been successfully opened				●	→													
A35 : RBC reports to On-board : position valid								●	→									
A24 : On-board deletes stored position data							←	●										
A39 : On-board terminates session, deletes stored position data							←	●										
Following E10, E12, E30, E31, E32, On-board deletes stored position data							←	●										
Following 5.4.5.3 a), f), g), On-board deletes stored position data							←	●										
Following S12: Train Data have been entered													●	→				
Following S12: Driver has (re-) validatedTrain Data														●	→			
Following S13: Driver has entered train running number																●	→	
Following S13: Driver has re-validated/re-entered train running number																	●	→

Transition conditions	State of On-board Variables																	
	ERTMS/ETCS Level			RBC ID/Phone Number			Train position data			Driver ID			Train Data			Train Running Number		
	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid	Un-known	Invalid	Valid
Following S10 or S20: Driver chooses to re-enter the level		←●			←●													

5.4.4 Flowchart

5.4.4.1 The ID numbers in the flowchart refer to the ID numbers of the table in section 5.4.3.

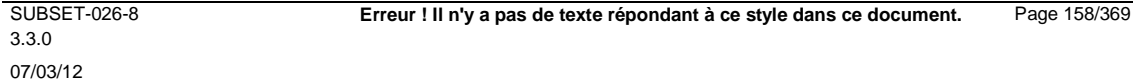


Figure 7: Flowchart for “Start of Mission”

5.4.5 Degraded Situations

- 5.4.5.1 Nominally, accidental loss of an already open session (that can occur at any step) has not been taken into account for the design of the SoM flowchart. However, should such a fault occur above D11 the nominal procedure applies (refer to D11 in flowchart). On the other hand, if it occurs in any step further than D11, the process shall go to S10.
- 5.4.5.2 The SoM flowchart described in section 5.4.3 only includes the main paths and does not exhaustively cover the various operational situations, which could occur while performing the SoM procedure (e.g. when revised instructions are given to the driver or when the driver needs to re-enter already captured data).
- 5.4.5.3 The ERTMS/ETCS on-board equipment shall also offer the driver the following possibilities, in addition to the ones that are described in section 5.4.3:
- a) only at S10 and S20 and if valid Train data is available, to select “Override”. If the driver chooses to do so, then the process shall go to the procedure “Override” and, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: “unknown”)
 - b) only at S10 and S20, to re-enter the Driver-ID
 - c) only at S10 and S20, to re-enter the “Train running number”
 - d) only at S20, to re-enter the Train data. If the driver chooses to do so, then the process shall go to S12.
 - e) only at S10 and S20, to re-enter the **Level**. If the driver chooses to do so, then the process shall go to S2
 - f) only at S20, to select “**Non Leading**”. If the driver chooses to do so, then the ERTMS/ETCS on-board equipment shall immediately switch to **Non Leading mode** and, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: “unknown”).
 - g) only at S20, to select “**Shunting**”. If the driver chooses to do so, then the process shall go to the procedure “**Shunting** initiated by driver” and, if the position is still invalid, the ERTMS/ETCS on-board shall delete the train position data (new status: “unknown”). If, in **level** 2 or 3, the RBC rejects the request for **Shunting**, the process shall go back to S20.

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h) only at S10, if valid Train Data is available, to select “Start”. If the driver chooses to do so:

if the level is 0, then the process shall go to S23.

if the level is NTC, then the process shall go to S22.

if the level is 1, then the process shall go to S24.

if the level is 2/3 and a session is open, then the process shall go to S21.

if the level is 2/3 and no session is open, then the process shall go to S24.

i) only at S10 and S20, to set/remove a Virtual Balise Cover.

5.4.6 Entry to Mode Considered as a Mission

5.4.6.1 A mission shall be considered as started as soon as the ERTMS/ETCS on-board equipment enters FS, LS, SR, OS, NL, UN, or SN mode.

5.4.6.2 Entry in all other modes, from SB mode, shall not be considered as a mission.

5.5 Procedure End of Mission

5.5.1 Introduction

5.5.1.1 End of mission refers to the situation where the trackside stops to authorise the movement of a unit. End of mission is initiated by the ERTMS/ETCS on-board equipment when entering specific **modes** (see below).

5.5.2 Entry to **Mode** Considered as an End of Mission:

5.5.2.1 Stand-By **mode**

5.5.2.1.1 From **FS**, **LS**, **OS**, **UN**, **NL**, **SR**, **PT**, **RV** or **SN** **mode**, the entry of the ERTMS/ETCS on-board equipment into the Stand-by **mode** is considered as an End of Mission

5.5.2.1.2 Note: While in **SN** **mode** (level NTC), some other conditions to end the mission may depend on the **National System**.

5.5.2.1.3 The entry of the ERTMS/ETCS on-board equipment into the Stand-by **mode**, from **PT** **mode**, is only considered as an End of Mission if there was an on-going mission.

5.5.2.2 **Sleeping** **mode**

5.5.2.2.1 The entry of the ERTMS/ETCS on-board equipment into the **Sleeping** **mode** is considered as an End of Mission.

5.5.2.2.1.1 Note: The transition to **Sleeping** **mode** is always made from the Stand-By **mode** (refer to chapter 4, transition between **modes**). If the end of mission has been already executed in Stand-by **mode** no further end of mission is required.

5.5.2.3 **Shunting** **mode**

5.5.2.3.1 The entry of the ERTMS/ETCS on-board equipment into the **Shunting** **mode**, from **FS**, **LS**, **OS**, **SR**, **SN** or **UN** **mode**, is considered as an End of Mission.

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5.5.2.3.2 The entry of the ERTMS/ETCS on-board equipment into the **Shunting mode**, from **PT mode**, is only considered as an End of Mission if there was an on-going mission.

5.5.2.3.3 Note: While in **SN mode** (level NTC), some other conditions to end the mission may depend on the **National System**.

5.5.3 End of Mission Procedure

5.5.3.1 The procedure comprises the following steps

5.5.3.1.1 Step 1 - MA, Track Description Data and Train Data may be deleted (**mode** dependent, see Chapter 4, section "What happens to accepted and stored information when Entering a **Mode**").

End of Procedure, if there is no existing communication session."

5.5.3.1.2 If a communication session with an RIU exists:

Step 2 - The ERTMS/ETCS on-board equipment shall terminate the communication session

End of procedure

5.5.3.1.3 If a communication session with an RBC exists:

Step 2 - The end of mission shall be reported to the RBC by means of the message "End of Mission".

Step 3 - The RBC shall request to terminate the communication session.

Step 4 - The ERTMS/ETCS on-board equipment shall terminate the communication session

End of procedure

5.5.3.1.3.1 Note: For the termination of the communication session refer to chapter 3, Management of Radio Communication.

5.5.3.1.3.2 Note: The "End of Mission" message contains a position report.

5.5.3.2 Intentionally deleted.

5.5.4 Degraded Situation

- 5.5.4.1.1 **Level 2,3** : *In case a communication session is established and no request to terminate the communication session is received from the RBC within a fixed waiting time (see appendix to chapter 3, List of Fixed Value Data) after sending the “End of Mission” message, the message shall be repeated with the fixed waiting time after each repetition.*
- 5.5.4.1.1.1 *After a defined number of repetitions (see appendix to chapter 3, List of Fixed Value Data), and if no reply is received within the fixed waiting time from the time of the last sending of “End of Mission”, the ERTMS/ETCS onboard equipment shall terminate the communication session.*
- 5.5.4.1.2 **Level 2,3** : *In case no communication session is open, no communication session shall be established to report the end of mission.*

5.6 **Shunting** Initiated by Driver

5.6.1 Introduction

5.6.1.1 The procedure describes the selection of **shunting** by the driver.

5.6.1.2 Intentionally deleted.

5.6.2 Table of requirements for “**Shunting** Initiated by Driver” procedure

5.6.2.1 The ID numbers in the table are used for the representation of the procedure in form of a flowchart in section 5.6.3.

5.6.2.2 Procedure

ID #	Requirements	
E015	The train is at standstill and the ERTMS/ETCS on-board equipment is in FS , LS , OS , SR , SN , UN or PT mode or is in SB mode with necessary preconditions fulfilled (Driver ID known, Level known, ... see procedure "Start of mission"). When the driver selects Shunting (E015) the process shall go to D020 .	
D020	If the current ETCS Level of operation is 0 or 1, the process shall go to A050 . If the current ETCS Level of operation is 2 or 3, the process shall go to A045 . If the current ETCS Level of operation is NTC, the process shall go to D030	
D030	If there is an on-going National Trip procedure reported by the STM, the process shall go to A030 Otherwise the process shall go to A050	

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ID #	Requirements	
A030	The process shall go to the "Train trip " procedure	
A045	The ERTMS/ETCS on-board equipment shall send the "Request for Shunting " message to the RBC together with a position report (with special value "position unknown" if the position is not known) The process shall go to S050 .	
S050	The ERTMS/ETCS on-board equipment awaits the reply to the SH request. If SH authorised is received from the RBC (optionally with a list of balise groups for SH area, which the train can pass when the ERTMS/ETCS onboard equipment is in shunting mode) (E090), the process shall go to A050 . If " SH refused" is received from the RBC (E215), the process shall go to A220 .	
A050	The mode shall change to SH . Any previous list of balise groups for SH area shall be deleted or replaced by a new list of balise groups for SH area. The process shall go to D040 .	
D040	If there is an on-going mission, the process shall go to A100 . If there is no on-going mission, the process shall go to D080 .	
A100	The process shall go to the "End of Mission" procedure	
D080	If the current ETCS Level of operation is 2 or 3, the process shall go to A095 . If the current ETCS Level of operation is 0, 1 or NTC the process shall END .	
A095	The mode change shall be reported to the RBC. The process shall go to S100 .	
S100	The ERTMS/ETCS on-board equipment awaits the RBC order to terminate the communication session. When an order to terminate the communication session is received from RBC the process shall go to A115 .	

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ID #	Requirements	
A115	The ERTMS/ETCS on-board equipment shall terminate the communication session. The process shall END .	
A220	An indication shall be given to the driver that SH was refused by the RBC. The process shall END .	

5.6.3 Flowchart

5.6.3.1 The ID numbers in the flowchart refer to the ID numbers of the table in section 5.6.2.

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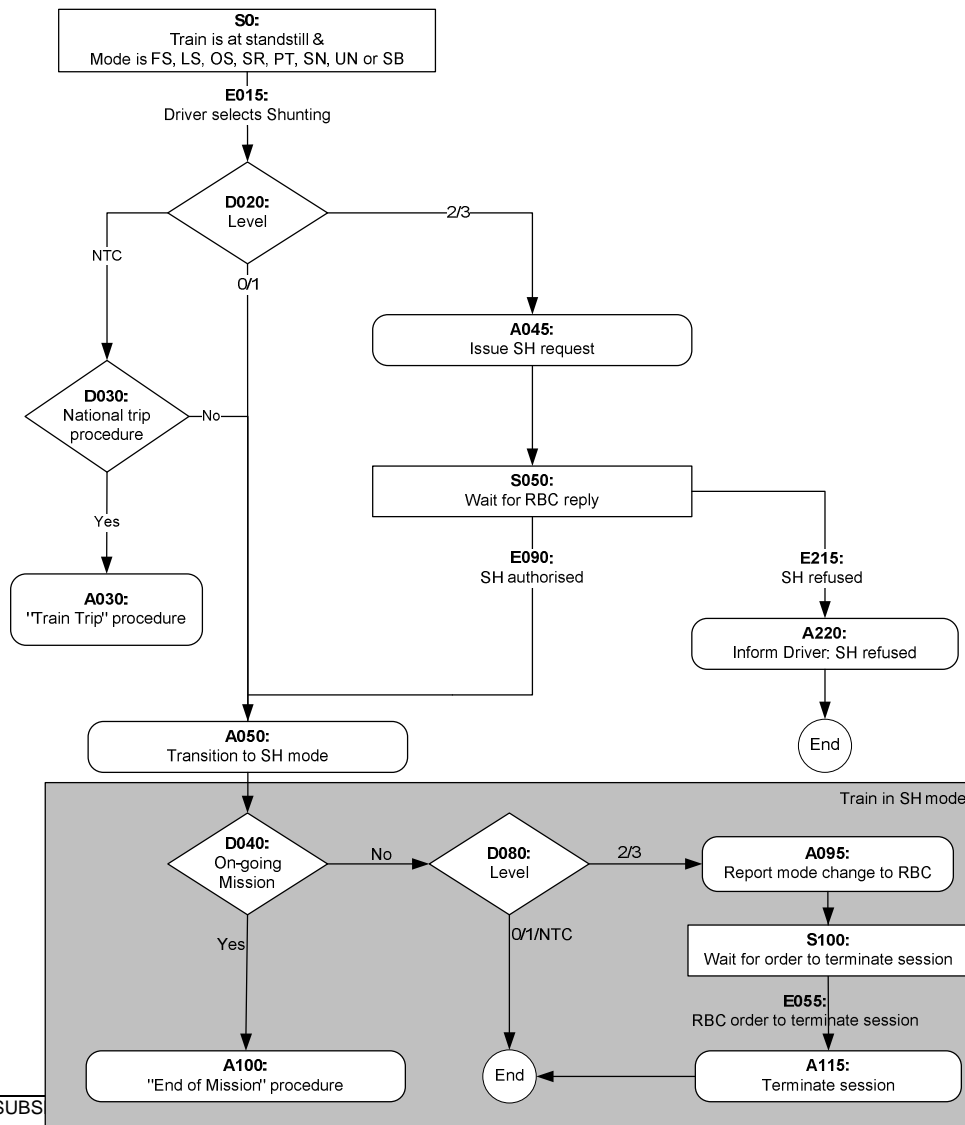


Figure 8: Flowchart for “Shunting Initiated by Driver”

5.6.4 Degraded Situation

5.6.4.1 ERTMS/ETCS level 2 or 3: no answer to Shunting request is received from the RBC

5.6.4.1.1 *In case a communication session is established and no reply is received from the RBC within a fixed waiting time (see appendix to chapter 3, List of Fixed Value Data) after sending the “Request for Shunting” message, the message shall be repeated with the fixed waiting time after each repetition.*

5.6.4.1.2 *After a defined number of repetitions (see appendix to chapter 3, List of Fixed Value Data), and if no reply is received within the fixed waiting time from the time of the last sending of “Request for Shunting”, the ERTMS/ETCS onboard equipment shall inform the driver and shall terminate the communication session.*

5.6.4.1.3 *If no authorisation for SH mode can be received from the RBC, refer to procedure “Override”.*

5.6.4.2 ERTMS/ETCS level 2 or 3: in case a communication session is established and no order to terminate the session is received from the RBC within a fixed waiting time (see appendix to chapter 3, List of Fixed Value Data) after reporting the mode change, the report shall be repeated with the fixed waiting time after each repetition

5.6.4.3 After a defined number of repetitions (see appendix to chapter 3, List of Fixed Value Data), and if no reply is received within the fixed waiting time from the last sending of the mode change report, the ERTMS/ETCS onboard equipment shall terminate the communication session.

5.7 Entry in **Shunting** with Order from Trackside

5.7.1 General Requirements

- 5.7.1.1 This procedure is used to allow the entry of a train into a **shunting** area.
- 5.7.1.2 Note: The **shunting** area, possibly including a “safety envelope”, can be already occupied by **shunting** units, not controlled by the trackside. It is therefore possible that the train shall enter into the **shunting** area in **OS mode**. The switch to **OS** is performed according to the relevant procedure.
- 5.7.1.3 The order to switch to **SH mode** shall be given by means of a **mode** profile, optionally with a list of balises groups, which the train can pass when the ERTMS/ETCS on-board equipment is in **shunting mode**.
- 5.7.1.4 The switch to **shunting**, if the transition to **shunting** was ordered by trackside, requires a driver acknowledgement, according to the specifications below.
- 5.7.1.5 When the ERTMS/ETCS on-board equipment has switched to **Shunting mode**, End of Mission, according to chapter 5.5.2.3, is performed.

5.7.2 **Shunting** is requested for the current location (from **modes** different from **Stand By** and **Post Trip**)

- 5.7.2.1 In a **level** 1 area, or at the border from a **level** 0 to a **level** 1 area, the beginning of the **shunting** area can be the location where a balise group is installed. In **level** 2/3 it is possible to send an ERTMS/ETCS on-board equipment the order to switch to **shunting** at the current location.
- 5.7.2.2 **Shunting** is requested for the current location means that, according to the **mode** profile received the max safe front end of the train is at or in advance of the location for which switching to **SH mode** is requested.
- 5.7.2.3 The ERTMS/ETCS on-board equipment shall switch immediately to **SH mode** and a request for acknowledgement shall be displayed to the driver (refer to SRS chapter 4, transitions between **modes**).

5.7.2.4 If the driver does not acknowledge within the driver acknowledgement time (refer to Appendix A3.1) after the change to **SH mode**, the service brake command shall be triggered. The command shall be released as soon as the driver acknowledges (unless the command was triggered also for other reasons).

5.7.3 **Shunting** is requested for a further location

5.7.3.1 An order to switch to **SH** at a further location can be sent

- a) in a **level** 1 area by a balise group,
- b) in a **level** 2 or 3 area by the RBC.

5.7.3.2 A request for acknowledgement shall be displayed to the driver, when the following two conditions are fulfilled:

- a) the distance between the estimated front end of the train and the beginning of **shunting** area is shorter than a value, contained in the **mode** profile
- b) the speed is lower than the **Shunting mode** speed limit (National Value, or value given in the **mode** profile)

5.7.3.3 Once the request for acknowledgement is displayed, it shall not be taken back, even if the above conditions are no more fulfilled (e.g., the train accelerates).

5.7.3.4 Until the ERTMS/ETCS on-board equipment has switched to **SH mode**, according to the **mode** profile, the beginning of the **shunting** area shall be considered either as the EOA (keeping the SvL given by the MA) or as both the EOA and SvL (instead of the EOA and SvL given by the MA), with no release speed.

5.7.3.5 When the driver acknowledges, the ERTMS/ETCS on-board equipment shall immediately switch to **SH mode** (refer to chapter 4, transitions between **modes**).

5.7.3.6 If the max safe front end of the train reaches the beginning of the **shunting** area according the **mode** profile and the driver has not yet acknowledged, the ERTMS/ETCS on-board equipment shall switch immediately to **SH mode** and a request for acknowledgement shall be displayed to the driver (refer to SRS chapter 4, transitions between **modes**).

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5.7.3.7 If, in this case, the driver does not acknowledge within the driver acknowledgement time (refer to Appendix A3.1) after the change to **SH mode**, the service brake command shall be triggered. The command shall be released as soon as the driver acknowledges (unless the command was triggered also for other reasons).

5.7.4 **Shunting** from **Stand By** or **Post Trip** **mode**

5.7.4.1 When performing a SoM or a Train **Trip** procedure and when the current **level** is 2 or 3, the ERTMS/ETCS on-board equipment can receive a **mode** profile giving an **Shunting** area which the train has already entered with its max safe front end. In this case, the ERTMS/ETCS on-board equipment shall first require an acknowledgement from the driver.

5.7.4.2 When the driver acknowledges, the ERTMS/ETCS on-board equipment shall perform transition to **Shunting mode**.

5.7.5 Flowchart

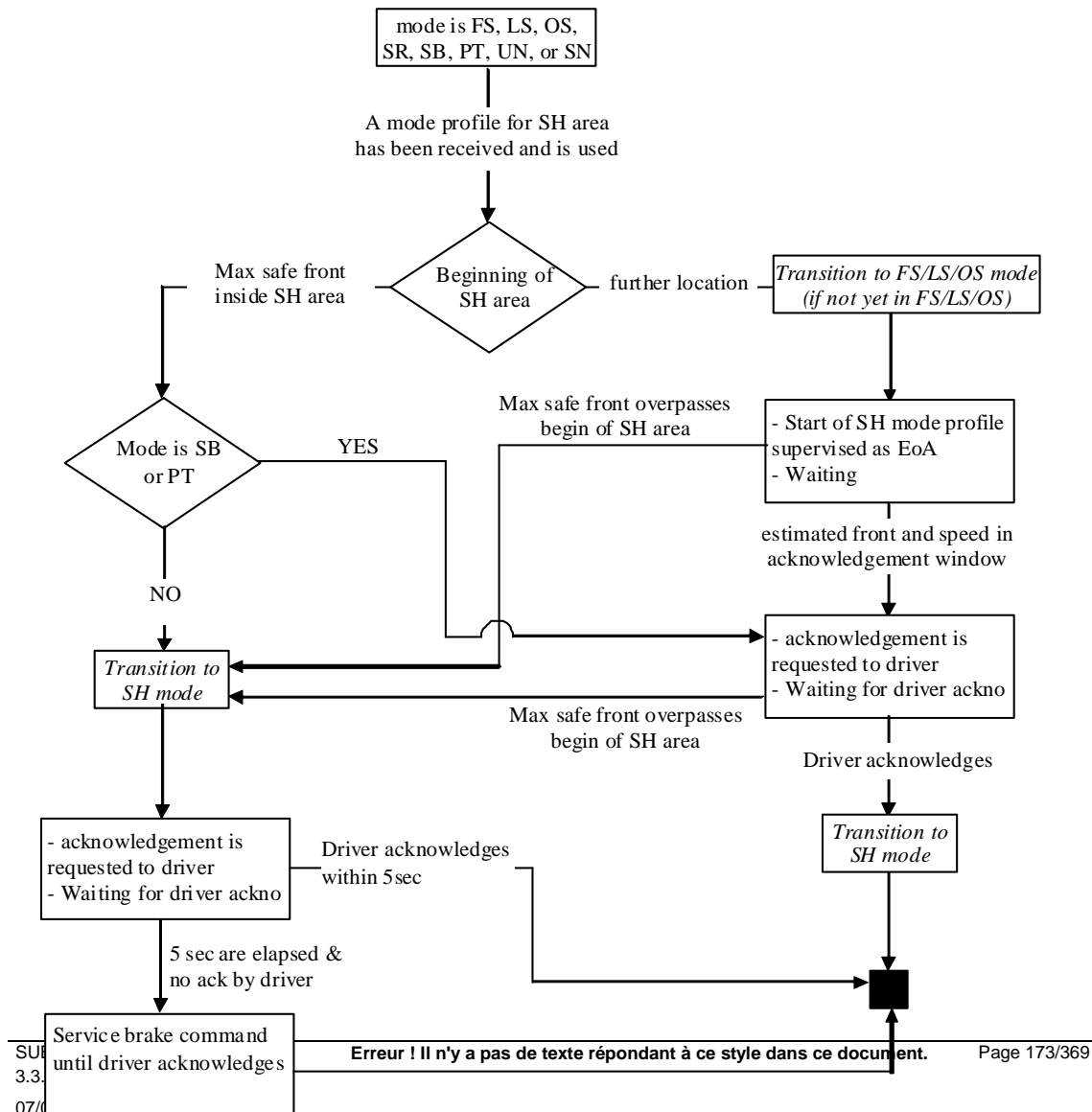


Figure 9: Flowchart for “Entry in **Shunting** with Order from Trackside”

5.8 Procedure Override

5.8.1 Introduction

- 5.8.1.1 In specific degraded situations (for example in the case of a failed signal, failed track circuit, failed point...), railways allow a train to pass its EOA.
- 5.8.1.2 For ERTMS/ETCS, passing an EOA can be required in degraded situations, e.g.
- In **level** 2/3, if a train is stopped without MA in a location where radio is unavailable (e.g. after having received an emergency message, or after a train **trip**).
 - In **level** 2/3, if a train is stopped at the border between two adjacent RBCs (e.g. the interface between RBCs is unavailable).
 - In **level** 2/3, if a train is stopped after having passed the border between two adjacent RBCs (e.g. the connection to the Accepting RBC cannot be established).
 - In **level** 2/3, if the RBC is unable to give a permission to run (e.g. lost connection with the interlocking)
 - In **level** 1, if a signal cannot show a proceed aspect (e.g., signal failure, route cannot be set)
 - In **level** 1, if a train is stopped without MA (e.g. after the MA has been shortened due to a time-out).
- 5.8.1.3 In **level** 0/NTC areas, passing a signal at danger is only a national procedure. The ERTMS/ETCS on-board equipment is not involved in this procedure, since it does not supervise the train movements.
- 5.8.1.4 In ERTMS equipped areas (**level** 1, 2 or 3), locations where the train shall stop are supervised by the ERTMS/ETCS on-board equipment. Receiving an order from the signalman to pass the EOA, the driver must then be able to inhibit this supervision.
- 5.8.1.4.1 **Note:** *The driver must not use the “Override” procedure unless authorised by trackside personnel. This authorisation is covered by operational procedures.*
- 5.8.1.5 If an EOA must be passed between announcement and execution of the **level** transition from an **unfitted** area (**level** 0) or from an area fitted with a **National System** (**level** NTC) to an ERTMS equipped area (**level** 1, 2, 3), the signalman gives the order to the driver to select “override”.

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5.8.1.6 **Note:** Passing the EOA by using this procedure the driver is fully responsible for the train driving. Therefore **Staff Responsible mode** is entered when the driver selects “override”.

5.8.1.7 In addition the procedure allows to avoid a train **trip** when passing a balise group:

- a) transmitting "stop in **SR mode**"
- b) not contained in the list of expected balises in **SR mode**
- c) transmitting "stop in **SH mode**"
- d) not contained in the list of expected balises in **SH mode**
- e) Intentionally deleted

5.8.1.8 Further, the Override procedure allows a train in **SR mode** reaching the end of the **SR** distance to proceed (see also 4.4.11.1.4)

5.8.2 Selection of “Override”

5.8.2.1 The ERTMS/ETCS on-board equipment shall allow the driver to select “Override” (i.e. the “Override” button becomes available) only when:

- a) The train speed is under or equal to the speed limit for triggering the “override” function (national value) AND
- b) The current **mode** is **Full Supervision**, **Limited Supervision**, **On Sight**, **Staff Responsible**, **Shunting**, **Unfitted**, **Post Trip**, **Stand By** (in **level** 2/3 only) or **SN (National System)** AND
- c) Validated Train Data is available (except when already in **Shunting mode**).

5.8.2.2 Intentionally deleted.

5.8.2.3 The “Override” procedure shall be triggered when selected by the driver.

5.8.3 Once the “Override” procedure has been triggered

5.8.3.1 The **mode** shall change as follows:

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- a) If the current mode is Full Supervision, Limited Supervision, On Sight, Stand-By or Post Trip, the mode shall immediately switch to the Staff Responsible (SR) mode (if the mode is already SR it remains unchanged)
- b) If the current mode is Shunting the mode shall remain unchanged
- c) If the current mode is Unfitted (level 0 area) or SN (level NTC area) the mode shall only change to Staff Responsible when the level changes to 1,2 or 3 (refer to SRS chapter 4, transitions between modes)

5.8.3.1.1 If the mode, when activating Override, is OS, LS or FS, the former EOA shall be retained. If the mode is SB or PT, the current position of the train front shall be considered as the former EOA.

5.8.3.1.2 Note: This former EOA will be used as a Trip condition if the Override function is no longer active. Any further activation of the Override in SR mode has no effect on the former EOA.

5.8.3.1.3 The former EOA shall be deleted if:

- a) the train reads the information "stop in SR mode" from a balise group OR
- b) SR mode is left.

5.8.3.2 **Note 1:** In level 2, 3, if radio communication is available, the RBC is only informed that the Override has been triggered by means of the reported mode change (if there is any)

5.8.3.3 **Note 2:** In level 2,3, if the ERTMS/ETCS- onboard equipment is able to report the mode change to the RBC, the RBC may transmit limits for the distance to run in SR mode (overriding the national value), a list of balises to be passed in SR mode (refer to chapter 4, Staff Responsible mode)

5.8.3.4 **Note 3:** In level 2,3, the transition to SR mode triggered by selecting Override revokes all emergency stop orders previously received.

5.8.3.5 In SR mode the driver may modify the value of the SR mode speed limit and of the distance to run in SR mode (refer to chapter 4, Staff Responsible mode)

5.8.3.6 The train trip shall be inhibited (suppression of the transition to the Trip mode), and only in level 0, 1, 2, 3, the MRSP shall include the Override function related Speed Restriction (see 3.11.10) as long as the Override function is active.

5.8.3.7 The status “override active” shall be indicated to the driver.

5.8.3.8 As long as the Override function is active, new **SR** distance information received from EUROLOOP shall be rejected.

5.8.3.9 When “Override” is selected and Override is already active, the supervision of the time and distance (see 5.8.4.1 a) and b)) for train **trip** suppression shall be re-started.

5.8.4 End of Override procedure

5.8.4.1 The Override procedure shall end when at least one of the following conditions is fulfilled:

- a) The "max. time for train **trip** suppression when Override function is triggered" (national value) elapses after Override has been selected, OR
- b) The train has run more than the "distance for train **trip** suppression when Override function is triggered" (national value) after Override has been selected, OR
- c) The former EOA has been passed with the min safe antenna position (calculated by subtracting distance between active EUROBALISE antenna and the front end of the train from the min safe front end position), OR
- d) The train passes a balise group giving “stop in **SR**” or “stop in **SH**” information, OR
- e) The train passes a balise group giving proceed information (i.e., MA with no signalling related speed restriction of value zero)
- f) In **level** 2,3, an MA is received from the RBC
- g) The train passes a balise group not in the list of expected balises in **SR mode** or the list of expected balises in **SH mode**
- h) The train overpasses the **SR** distance supervised before overriding with its estimated front end
- i) The ERTMS/ETCS on-board equipment switches to **TR**, **LS**, **OS** or **SH mode**.

5.8.4.1.1 *Note: For **modes UN** and **SN**, only end conditions a) and b) are supervised.*

5.8.4.2 Intentionally deleted.

5.8.4.3 Intentionally deleted.

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5.9 Procedure On-Sight

5.9.1 General Requirements

- 5.9.1.1 The ERTMS/ETCS on-board equipment shall be in **On Sight mode** before the train reaches the beginning of the **On Sight** area or, at the latest, when the train reaches the beginning of the **On Sight** area.
- 5.9.1.2 An acknowledgement for running in **On Sight mode** shall be requested from the driver. The conditions of the acknowledgement are specified below.

5.9.2 **On Sight** is requested for current location (from **modes** different from **Stand By** and **Post Trip**)

- 5.9.2.1 In a **level** 1 area, the beginning of the **On Sight** area can be the balise (group) that gives the **Mode** Profile. When the train passes the balise group and receives this information, the ERTMS/ETCS on-board equipment shall immediately switch to **On Sight mode**.
- 5.9.2.2 In a **level** 2 or 3 area, the ERTMS/ETCS on-board equipment can receive a **mode** profile giving an **On Sight** area which the train has already entered with its max safe front end. In this case, the ERTMS/ETCS on-board equipment shall immediately switch to **On Sight mode**.
- 5.9.2.3 The driver must acknowledge the **On Sight mode**. A request of acknowledgement shall be displayed to the driver.
- 5.9.2.4 If the driver has not acknowledged after the driver acknowledgement time (refer to Appendix A3.1), the service brake command shall be triggered. The brake command is released when the driver acknowledges, except if brakes are also applied for another reason(s).
- 5.9.2.5 **Note:** Once in **On Sight mode**, the speed supervision is such that the train speed cannot exceed the **OS mode** speed limit. If, when entering the **On Sight mode**, the train speed was higher than the **OS mode** speed limit (because a higher speed was allowed in **Full Supervision mode**, in **Limited Supervision mode** or in **Staff Responsible mode**) then a service/emergency brake command could be immediately triggered, independently of the acknowledgement of the driver, but because of the **On Sight** supervision (see Figure 10).

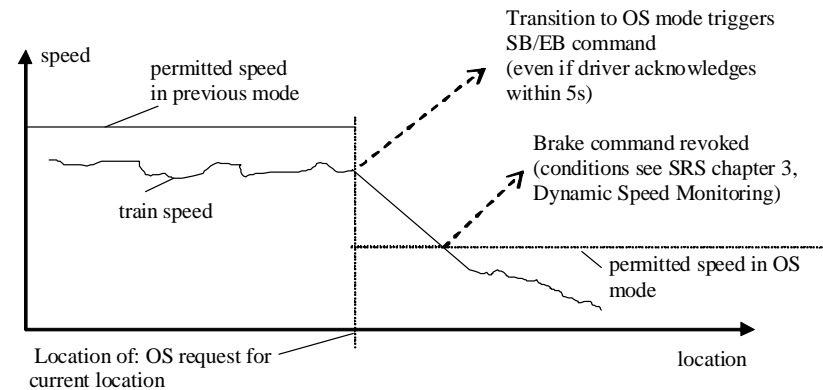


Figure 10: Train enters OS area with too high speed

- 5.9.2.6 **Note:** This sharp brake reaction can be avoided in **Full Supervision** or **Limited Supervision mode** by giving with the previous MA an EOA (or a LOA = **OS mode** speed limit) at the location of transition to **On Sight mode**. In **Staff Responsible mode**, lateral signals (if available) can also order the driver to decrease the train speed.
- 5.9.2.7 If the ERTMS/ETCS on-board equipment is already in **OS mode** when receiving the **OS mode** profile, no further acknowledgement shall be requested from the driver.
- 5.9.3 On Sight is requested for a further location**
- 5.9.3.1 The beginning of the **On Sight** area can be a location that the train has not reached yet. This occurs when:
- In a **level 1** area, a balise group gives a **Mode** Profile with an **On Sight** area that is located at a further location.
 - In a **level 2** or 3 area, the RBC gives a **Mode** Profile with an **On Sight** area that is located at a further location.
- 5.9.3.2 A request for acknowledgement shall be displayed to the driver when the following conditions are fulfilled:

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- a) The distance between the estimated front end of the train and the beginning of **On Sight** area is shorter than a value, contained in the **mode** profile.
- b) The speed is lower than the **On Sight mode** speed limit (national value, or value given in the **mode** profile).
- c) The current **mode** is not **On Sight**

5.9.3.3 **Note:** The first 2 conditions define the “rectangle of acknowledgement”.

5.9.3.4 Once the acknowledgement request is displayed, it is not taken back if the train leaves the “rectangle of acknowledgement” (for example: because the train accelerates).

5.9.3.5 Until the ERTMS/ETCS on-board equipment has switched to **OS mode**, according to the **mode** profile, the beginning of the **On Sight** area shall be temporarily considered either as the EOA (keeping the SvL given by the MA) or as both the EOA and SvL (instead of the EOA and SvL given by the MA), with no Release Speed.

5.9.3.6 When the driver acknowledges the **On Sight mode**, the ERTMS/ETCS on-board equipment shall immediately switch to the **On Sight mode**.

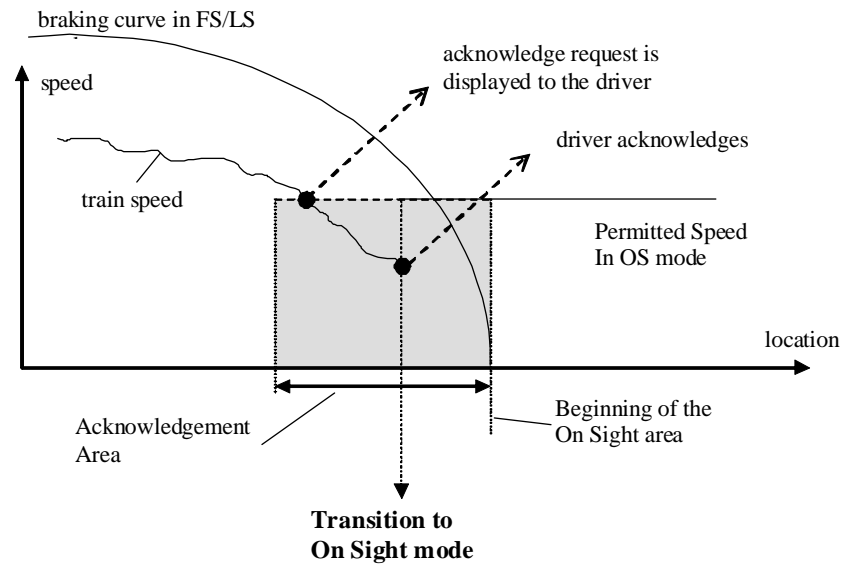


Figure 11: Transition from **FS/LS** to **OS mode** after driver acknowledgement

- 5.9.3.7 If the max safe front end of the train reaches the beginning of the **On Sight** area according to the **mode** profile and the driver has not yet acknowledged, the ERTMS/ETCS on-board equipment shall switch immediately to **OS mode** and a request for acknowledgement shall be displayed to the driver (refer to SRS chapter 4, transitions between **modes**).
- 5.9.3.8 If, in this case, the driver does not acknowledge within the driver acknowledgement time (refer to Appendix A3.1) after the change to **OS mode**, the service brake command shall be triggered. The command shall be released as soon as the driver acknowledges (unless the command was triggered also for other reasons).

5.9.4 On Sight from Unfitted or SN mode

5.9.4.1 The mode profile with regards to an OS area is only evaluated in levels 1,2,3, although the mode profile may have been received in level 0 (Unfitted mode) or NTC (SN mode). A transition to On Sight mode can therefore earliest occur at a transition of level: from level 0 or NTC to level 1 or 2 or 3.

5.9.4.2 Specifications of chapters 5.9.2 and 5.9.3 about the acknowledgement shall apply here.

5.9.5 On Sight from Stand By or Post Trip mode

5.9.5.1 When performing a SoM or a Train Trip procedure and when the current level is 2 or 3, the ERTMS/ETCS on-board equipment can receive a mode profile giving an On Sight area which the train has already entered with its max safe front end. In this case, the ERTMS/ETCS on-board equipment shall first require an acknowledgement from the driver.

5.9.5.2 When the driver acknowledges, the ERTMS/ETCS on-board equipment shall perform the transition to On Sight mode."

5.9.6 Exit of On Sight mode

5.9.6.1 General rule

5.9.6.1.1 The ERTMS/ETCS on-board equipment exits the On Sight mode when the min safe front end of the train passes the end of the On Sight area.

5.9.6.2 First case: The On Sight area ends at the EOA of the current MA

5.9.6.2.1 This occurs when the end of the On Sight area that is given by the Mode Profile has the same location as the EOA of the related MA.

5.9.6.2.2 In this case, the train must receive a new Movement Authority to be able to exit the On Sight area.

5.9.6.2.3 *Note: In an **On Sight** area there is no guarantee for the RBC that the track in front of the supervised train is free. Therefore, if the next block section is free, the RBC has nevertheless to ensure that there is no train/vehicle between the train and the end of the **On Sight** area. This information*

- can be given to the RBC by the signalman or any other trackside means (outside scope of ERTMS/ETCS), or
- can be inquired by the RBC by means of the following mechanism: the RBC sends a “track ahead free” request which the ERTMS/ ETCS on-board equipment displays to the driver. If the driver confirms that the track is free up to the end of the current section, the ERTMS/ ETCS on-board equipment will transmit this information to the RBC.

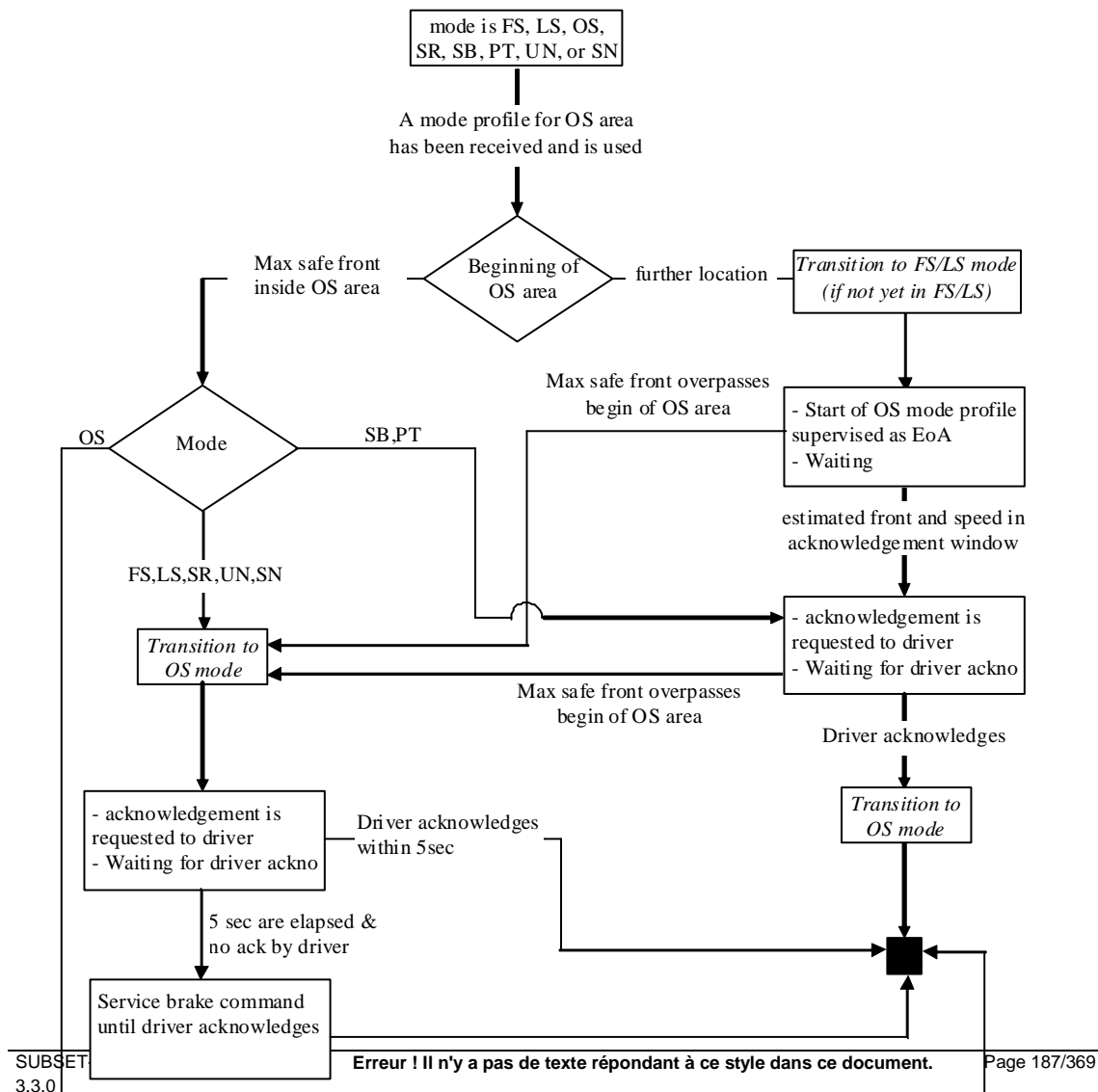
5.9.6.2.4 *Note: Receiving the “track ahead free” information, the RBC may be able to transmit an MA from the current position of the train, e.g., for **Full Supervision** (refer to SRS chapter 4, transitions between **modes**).*

5.9.6.3 Second case: The **On Sight area ends before the EOA of the current MA**

5.9.6.3.1 *In this case, the current Movement Authority already allows the train to exit the **On Sight** area.*

5.9.6.3.2 *When exiting the **On Sight** area, the ERTMS/ETCS on-board equipment switches either to **Full Supervision**, to **Limited Supervision** or to **Shunting mode** (refer to SRS chapter 4, transitions between **modes**).*

5.9.7 Flowchart



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Figure 12: Flowchart for “On-Sight”

5.10 Level Transitions

5.10.1 General requirements

- 5.10.1.1 Every **level** transition border to **levels** 2, 3, or NTC shall be announced to the ERTMS/ETCS on-board equipment via balise group or via the RBC.
- 5.10.1.2 A **level** transition announcement to the ERTMS/ETCS on-board equipment shall consist of an order to execute the **level** transition at a further location corresponding to the border.
- 5.10.1.3 When the ERTMS/ETCS on-board equipment receives a **level** transition announcement, and if this announcement will result in a change of the on-board **level**, it shall immediately inform the driver about the announced **level** transition.
- 5.10.1.3.1 *Note: In a mixed **level** area the actual **level** of the on-board equipment may remain unchanged even though a **level** transition boundary is passed.*
- 5.10.1.4 At the **level** transition border a balise group shall be placed with an immediate **level** transition order or a conditional **level** transition order.
- 5.10.1.4.1 **Note:** Balise groups are read in all **levels** and **level** transition orders and conditional **level** transition orders from balises are accepted independent of the **level** of operation. Also **sleeping** units read balise groups.

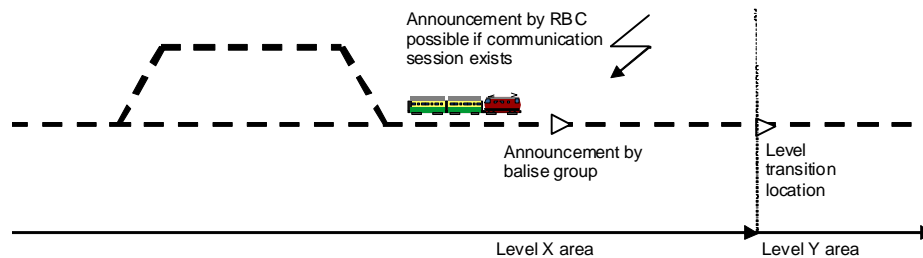


Figure 13: Transition from level X area to level Y area

- 5.10.1.5 If the message from the border balise group is not received, the level transition shall still be executed when the estimated front end passes the location given in the announcement.
- 5.10.1.6 The on-board equipment shall manage only one level transition order at a time. Therefore a new level transition order shall replace a previously received order, i.e. if a new order to switch to a different level or to the same level but at a different location is received, before the action from the first order has been performed, only the last order shall be executed.
 - 5.10.1.6.1 In **Shunting** and **Passive Shunting** modes only one set of Level Transition Information shall be stored at a time. Therefore a set of Level Transition Information received shall replace any Level Transition Information already stored on-board.
- 5.10.1.7 As soon as the announcement of the level transition has been received, some data (mainly movement authority and track description data) from the transmission media of the new level shall be accepted, but shall not be used until the level transition is effective.
 - 5.10.1.7.1 *Note: for the exhaustive list of accepted/rejected information, please refer to SRS chapter 4.8.*
 - 5.10.1.7.2 *Note: if only track description has been received from the new media without any movement authority, this track description still replaces the one previously received from the current media when the transition is performed.*
- 5.10.1.8 When the onboard has performed the level transition, further data (mainly movement authority and track description data) received from the transmission media of the level being left shall be rejected.
 - 5.10.1.8.1 *Note: for the exhaustive list of accepted/rejected information, please refer to SRS chapter 4.8.*
- 5.10.1.9 Intentionally deleted.

5.10.2 Table of priority of trackside supported levels

- 5.10.2.1 Any combination of ERTMS/ETCS levels 0, NTC, 1, 2, and 3 on a given area shall be possible.

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- 5.10.2.2 The **level** transition announcement and the immediate or conditional **level** transition order at the border shall contain all the supported ERTMS/ETCS **levels** with a table of priority. Even if only one **level** is permitted this is considered as a table of priority.
- 5.10.2.2.1 *Note: **Level** 0 is considered in the same way as the other **levels**. This means that, for example, when an area permits ERTMS/ETCS **level** 0, and is fitted with ERTMS/ETCS **level** 1 and 2, the track-side includes **levels** 0, 1 and 2 in a table of priority of supported **levels** in all **level** transition orders and conditional **level** transition orders applying to that area.*
- 5.10.2.3 The table of priority shall list all the supported **levels** from the highest priority **level** to the lowest one.
- 5.10.2.3.1 *Intentionally deleted.*
- 5.10.2.4 When receiving the information about all ERTMS/ETCS **levels** that are supported by trackside, the ERTMS/ETCS on-board equipment shall select from the table the **level** with the highest priority, which is available for use by the onboard equipment.
- 5.10.2.4.1 *The on-board equipment shall consider an ERTMS/ETCS **level** as “Available for use” as follows:*
- a) **Level** 2 or 3: the **level** is configured on-board and at least one Mobile Terminal is available on-board, i.e. the ETCS onboard has detected at least one Mobile Terminal in working condition, independently whether it is registered to a network or not.
 - b) **Level** NTC: the concerned **National System** is available on-board (if an STM is used, refer to SUBSET-035 for further details).
 - c) **Level** 0 or 1: always.
- 5.10.2.4.1.1 *Note regarding a) and b): how the ERTMS/ETCS on-board equipment checks the availability of the Mobile Terminals or of the **National System** (in case no STM is used) is an implementation issue.*
- 5.10.2.4.2 *Examples: The table of trackside supported **levels** gives 2, NTC X, 1, NTC Y. If **level** 1, 0 and NTC X are “Available for use”, the ERTMS/ETCS on-board will select NTC X **level**. If **level** 1, 0 and NTC Y are “Available for use”, it will select **level** 1. If **level** 2, 1 and 0 are “Available for use”, it will select **level** 2.*
- 5.10.2.5 When the onboard has selected the **level** it will switch to, it shall carry out the **level** transition as if it has received a **level** transition order to this **level** only i.e. it shall ignore the requirements related to transitions to the other **levels**.
- 5.10.2.6 The ERTMS/ETCS on-board equipment shall inform the driver about the selected **level** transition only.

5.10.2.7 If none of the ordered **level**(s) is available for use by the ERTMS/ETCS on-board equipment, it shall nevertheless make the transition, to the ordered **level** with the lowest priority.

5.10.2.7.1 **Justification:** *The On-board equipment will then indicate the trackside **level** to the driver to allow him to select the correct procedures for degraded situations.*

5.10.2.8 The ERTMS/ETCS on-board equipment shall store the table of priority of trackside supported ERTMS/ETCS **levels**.

5.10.2.9 Intentionally deleted.

5.10.2.10 Intentionally deleted.

5.10.2.10.1 Intentionally deleted.

5.10.3 Specific Additional Requirements

5.10.3.1 Transition from **Level 1** to **Level 2/3** area

5.10.3.1.1 *An order to connect to the RBC with a given id and telephone number shall be given via balise group in rear of the border location.*

5.10.3.1.2 *For the train to be able to enter the new area, the old area must possess information about at least the first section of the new area. The information may be transmitted to the train either:*

- a) as an MA and track description information into the new area, or
- b) as a target speed at the border location i.e. as an LOA.

5.10.3.1.3 *When the ERTMS/ETCS communication session is open, Train Data shall be sent to the RBC (which acknowledges the data) unless the onboard equipment is in **SL** or **NL mode**.*

5.10.3.1.4 *If no **Level 2/3** MA and track description has been received when entering the new area, the train shall still be supervised according to the **level 1** MA previously received.*

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5.10.3.1.5 When the ERTMS/ETCS on-board equipment has switched to the new **level**, it shall report the new on-board **level**, including a position report.

5.10.3.1.6 If an order to connect to an RBC has been received and the train will not enter the announced RBC area, an order to terminate the session shall be sent either from balises or from the RBC for any route not leading to the RBC area. This is the case both if the train turns back and if the train continues in the same direction, but on another route.

5.10.3.2 Transition from **Level 0 (Unfitted)** to **Level 2/3** area

5.10.3.2.1 An order to connect to the RBC with a given id and telephone number shall be given via balise group in rear of the border location.

5.10.3.2.2 When the ERTMS/ETCS communication session is open, Train Data shall be sent to the RBC (which acknowledges the data) unless the onboard equipment is in **SL** or **NL mode**.

5.10.3.2.3 A **level 2/3** MA and track description information shall be received from the RBC before the **level** transition border. If not, the train shall be **tripped** at passage of the border, i.e. after switching to **level 2 or 3**, movement is not allowed without a movement authority (refer to SRS chapter 4, transitions between **modes**).

5.10.3.2.4 The driver is responsible for entering the **level 2/3** area at a speed not exceeding the speed limits of the unequipped line.

5.10.3.2.5 When the ERTMS/ETCS on-board equipment has switched to the new **level**, it shall report the new on-board **level**, including a position report.

5.10.3.2.6 If an order to connect to an RBC has been received and the train will not enter the announced RBC area, an order to terminate the session shall be sent either from balises or from the RBC for any route not leading to the RBC area. This is the case both if the train turns back and if the train continues in the same direction, but on another route.

5.10.3.3 Transition from **Level 2/3** to **Level 1** area

5.10.3.3.1 For the train to be able to enter the new area, the old area must possess information about at least the first section of the new area. The information may be transmitted to the train either

a) as an MA and track description information into the new area, or

b) as a target speed at the border location i.e. as an LOA.

5.10.3.3.2 If no **Level 1** MA and track description has been received when entering the new area, the train shall still be supervised according to the **level 2/3** MA previously received from the RBC.

5.10.3.3.3 When the train has passed the **level** transition border with its min safe rear end, i.e. when the whole train has left the **level 2/3** area, the onboard equipment of the leading engine shall send a position report to the RBC.

5.10.3.3.4 After receiving this exit position report, the RBC can order the train to terminate the session (leading and non-leading engines).

5.10.3.4 Transition from **Level 0 (Unfitted)** to **Level 1** area

5.10.3.4.1 A **level 1** MA and track description information shall be received before or at the **level** transition border. If not, when the **level** transition is performed, the train shall be **tripped**, i.e. after switching to **level 1**, movement is not allowed without a movement authority (refer to SRS chapter 4, transitions between **modes**).

5.10.3.4.2 The driver is responsible for entering the **level 1** area at a speed not exceeding the speed limits of the unequipped line.

5.10.3.5 Transition from **Level 1** to **Level 0 (Unfitted)** area

5.10.3.5.1 For the train to be able to enter the new area, the old area must **possess** information about at least the first section of the new area. The information may be transmitted to the train either

a) as an MA and track description information into the new area, or

b) as a target speed at the border location i.e. as an LOA.

5.10.3.5.2 Note: When entering **UN mode**, all MA and track description data is deleted (refer to SRS Chapter 4, What happens to stored data when entering a **mode**)

5.10.3.6 Transition from **Level 2/3** to **Level 0 (Unfitted)** area

5.10.3.6.1 For the train to be able to enter the new area, the old area must possess information about at least the first section of the new area. The information may be transmitted to the train either

- a) as an MA and track description information into the new area, or
- b) as a target speed at the border location i.e. as an LOA.

5.10.3.6.2 When the train has passed the **level** transition border with its min safe rear end, i.e. when the whole train has left the **level** 2/3 area, the onboard equipment of the leading engine shall send a position report to the RBC.

5.10.3.6.3 After receiving this exit position report, the RBC can order the train to terminate the session (leading and non-leading engines).

5.10.3.6.4 Note: When entering **UN mode**, all MA and track description data is deleted (refer to SRS Chapter 4, What happens to stored data when entering a **mode**)

5.10.3.7 Transition from **Level** NTC to **Level** 2/3 area

5.10.3.7.1 An order to connect to the RBC with a given id and telephone number shall be given via balise group in rear of the border location.

5.10.3.7.2 When the ERTMS/ETCS communication session is open, Train Data shall be sent to the RBC (which acknowledges the data) unless the onboard equipment is in **SL** or **NL mode**.

5.10.3.7.3 A **level** 2/3 MA and track description information shall be received from the RBC before the **level** transition border. If not, the train shall be **tripped** at passage of the border, i.e. after switching to **level** 2 or 3, movement is not allowed without a movement authority (refer to SRS chapter 4, transitions between **modes**).

5.10.3.7.4 The driver is responsible for entering the **level** 2/3 area at a speed not exceeding the speed limits of the **level** NTC line.

5.10.3.7.5 When the **level** transition location is passed with the estimated front end a position report shall be sent to the RBC. In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition order.

5.10.3.7.6 If an order to connect to an RBC has been received and the train will not enter the announced RBC area, an order to disconnect shall be sent either from balises or from the RBC for any route not leading to the RBC area. This is the case both if the train turns back and if the train continues in the same direction, but on another route.

5.10.3.8 Transition from **Level** NTC to **Level** 1 area

5.10.3.8.1 A **level** 1 MA and track description information shall be received before or at the **level** transition border. If not, when the **level** transition is performed, the train shall be **tripped**, i.e. after switching to **level** 1, movement is not allowed without a movement authority (refer to SRS chapter 4, transitions between **modes**).

5.10.3.8.2 The driver is responsible for entering the **level** 1 area at a speed not exceeding the speed limits of the **Level** NTC line.

5.10.3.8.3 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border.

5.10.3.9 Transition from **Level 1 to **Level** NTC area**

5.10.3.9.1 For the train to be able to enter the new area, the old area must possess information about at least the first section of the new area. The information may be transmitted to the train either

- a) as an MA and track description information into the new area, or
- b) as a target speed at the border location i.e. as an LOA.

5.10.3.9.2 *Intentionally deleted.*

5.10.3.9.3 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border.

5.10.3.10 Transition from **Level 2/3 to **Level** NTC area**

5.10.3.10.1 For the train to be able to enter the new area, the old area must possess information about at least the first section of the new area. The information may be transmitted to the train either

- as an MA and track description information into the new area, or
- as a target speed at the border location i.e. as an LOA.

5.10.3.10.2 *Intentionally deleted.*

5.10.3.10.3 When the train has passed the **level** transition border with its min safe rear end, i.e. when the whole train has left the **level** 2/3 area, the onboard equipment of the leading engine shall send a position report to the RBC.

5.10.3.10.4 After receiving this exit position report, the RBC can order the train to terminate the session (leading and non-leading engines).

5.10.3.10.5 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border..

5.10.3.11 Transition from **Level NTC (**National System X**) to **Level** NTC (**National System Y**)**

5.10.3.11.1 Intentionally deleted.

5.10.3.11.2 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border.

5.10.3.11.3 Intentionally deleted.

5.10.3.12 Transition from **Level NTC to **Level** 0**

5.10.3.12.1 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border.

5.10.3.12.2 The driver is responsible for entering the **level** 0 area at a speed not exceeding the maximum speed of the **Level** NTC line.

5.10.3.12.3 Intentionally deleted.

5.10.3.13 Transition from **Level 0 to **Level** NTC**

5.10.3.13.1 Intentionally deleted.

5.10.3.13.2 In case the ERTMS/ETCS on-board equipment is interfaced to the **National System** through an STM, please refer to SUBSET-035 for the STM state transition orders in relation to the **level** transition announcement and border.

5.10.3.13.3 The driver is responsible for entering the **level** NTC area at a speed not exceeding the speed limits of the unequipped line.

5.10.3.14 Conditional level transition order

5.10.3.14.1 When the ERTMS/ETCS on-board equipment accepts a conditional level transition order the onboard shall check whether the current level is contained in the priority list of the conditional level transition order.

5.10.3.14.2 If the current level is contained in the priority list of the conditional level transition order, the onboard shall not change the level.

5.10.3.14.3 If the current level is not contained in the priority list of the conditional level transition order, the onboard shall evaluate the conditional level transition order in the same way as an immediate level transition order (see section 5.10.2).

5.10.3.14.4 In the same way as for a level transition order, the ERTMS/ETCS on-board equipment shall store the table of ERTMS/ETCS levels supported by trackside.

5.10.3.14.5 Note: The conditional level transition order allows to check, whether a train operates in a permitted level e.g. following a start of mission after a cold movement. The level of a train driving in a permitted level will not be changed, regardless of the priority of the current level operated by the train.

5.10.3.15 Transition initiated by driver

5.10.3.15.1 In addition to the level transitions ordered by trackside, it is also possible, at standstill, for the driver to change the ERTMS/ETCS level (refer to section 3.18.4.2).

5.10.3.15.2 If the driver changes the level to 2 or 3, the ERTMS/ETCS on-board equipment shall establish a communication session with the RBC:

- a) immediately if at least one Mobile Terminal is registered to a Radio Network and a valid RBC ID/ phone number is available, OR
- b) once the driver has selected the RBC contact information (by the same means as for Start of Mission), if either no Mobile Terminal is registered to a Radio Network or no valid RBC ID/phone number is available.

5.10.3.15.2.1 Note regarding b): If the level transition leads to TR mode, the request for RBC contact information is only displayed once the ERTMS/ETCS on-board equipment is in PT mode.

5.10.3.15.3 If the driver changes the **level** from 2 or 3 to any other, the ERTMS/ETCS on-board equipment shall report the new **level** to the RBC if a communication session is established. When receiving the **level** change report, the RBC shall order the communication session to be terminated.

5.10.4 Acknowledgement of the **level** transition

5.10.4.1 If defined so for the **level** transition (see table below), the driver shall be requested to acknowledge the transition

- a) when the max safe front end of the train has passed a trackside defined location in rear of the **level** transition border
- b) upon receipt of the order to switch to the new **level** immediately

5.10.4.1.1 *Exception: An ERTMS/ETCS on-board equipment in **NL mode** shall not require an acknowledgement from the driver.*

5.10.4.2 If the driver has not yet acknowledged within the driver acknowledgement time (refer to Appendix A3.1) after the **level** transition, a service brake command shall be initiated.

5.10.4.3 The driver shall then acknowledge the **level** transition in order to release the service brake command.

5.10.4.4 For the following transitions marked as “YES”, the **level** transition announcement shall define the location from where an acknowledgement is required:

		Acknowledgement when entering				
		L 0	L 1	L 2	L 3	L NTC
Coming from ...	L 0	-	No	No	No	Yes
	L 1	Yes	-	No	No	Yes
	L 2	Yes	No	-	No	Yes
	L 3	Yes	No	No	-	Yes
	L NTC	Yes	Yes	Yes	Yes	Yes

5.11 Procedure Train Trip

5.11.1 Introduction

A train can be tripped for various reasons: refer to SRS chapter 4, mode transition table.

5.11.2 Table of requirements for “Train Trip” procedure

5.11.2.1 The ID numbers in the table are used for the representation of the procedure in form of a flowchart in section 5.11.3.

5.11.2.2 Procedure

ID #	Requirements	Level
S010	The ERTMS/ETCS on-board equipment is in one of the following modes: FS, LS, OS, SR, SB, SH, SN or UN When an event occurs, which leads to train trip reaction (E015 – refer to chapter 4, transitions between modes), the process shall go to A025.	0,NTC, 1,2,3
A025	The mode shall change to TR. The process shall go to A030.	1,2,3
D020	If the level is 0/1/NTC, the process shall go to A035. If the level is 2/3, the process shall go to A030.	
A030	The ERTMS/ETCS on-board equipment shall report the mode change to the RBC The process shall go to A035.	2, 3

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ID #	Requirements	Level
A035	All current MA and track description data, except track conditions, shall be deleted and new ones shall not be accepted The process shall go to S050 .	1,2,3
S050	The ERTMS/ETCS on-board equipment awaits standstill. While braking a border to a level 0 or NTC area may be passed. When the train has come to standstill (E055), the process shall go to S060 .	0,1,2,3, NTC
S060	The ERTMS/ETCS on-board equipment shall display the "Request for driver acknowledgement to Train Trip " to the driver. When the driver acknowledges the Train Trip (E065), the process shall go to D080 .	0,1,2,3, NTC
D80	If the level is 1, 2 or 3 the process shall go to A105 . If the level is 0 or NTC, the process shall go to D085	0,1,2,3, NTC
A105	The mode shall change to PT and the ERTMS/ETCS on-board equipment revokes the emergency brake command. For the supervision provided by the PT mode refer to SRS chapter 4. The process shall go to D110 .	1,2,3
D085	If no valid Train Data is stored on-board, the process shall go to A140 If valid Train Data is stored on-board, the process shall go to D090	
A140	The mode shall change to SH and the process shall END .	
D090	If the level is 0, the process shall go to A145 . If the level is NTC, the process shall go to A150 .	
A145	The mode shall change to UN and the process shall END .	

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ID #	Requirements	Level
A150	The mode shall change to SN and the process shall END .	0,NTC
D110	If the level is 1, the process shall go to S140 . If the level is 2 or 3, the process shall go to A115 .	1,2,3
A115	The mode change to PT shall be reported to the RBC which shall acknowledge the mode report (Recognition of exit from TR). The process shall go to S120 .	2, 3
S120	The ERTMS/ETCS on-board equipment waits for the RBC to acknowledge the transition to PT . When the acknowledgement is received from the RBC (E125), the process shall go to D130 . Note: See 5.11.4 for degraded situation (no response received).	
D130	If there is at least one pending emergency stop, the process shall go to S130 . If there are no pending emergency stops the process shall go to S140 .	
S130	The ERTMS/ETCS on-board equipment waits for the RBC to revoke ALL pending emergency stops. When all emergency stops are revoked (E135) the process shall go to S140 .	2,3

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ID #	Requirements	Level
S140	<p>The ERTMS/ETCS on-board equipment shall offer the possibility to the driver to select "start" (only if train data has been previously entered), or to select SH</p> <ul style="list-style-type: none"> a) if the driver selects "start" and the level is 1 (E150), the process shall go to S160 b) and the driver selects "start" and the level is 2 or 3 (E155), the process shall go to S150 c) If the driver selects SH (E145), the process shall continue in the same ways as the procedure "Shunting initiated by the driver". If the SH request is refused by the RBC (E165) the process shall return to S140. 	1,2,3
S150	<p>The ERTMS/ETCS on-board equipment shall send an MA request to the RBC and wait.</p> <ul style="list-style-type: none"> a) If an SR authorisation is received from RBC (E26), the process shall go to S160 b) If an MA allowing OS/LS/SH is received from RBC (E175), the process shall go to S170 c) If an MA allowing FS is received from RBC (E170), the mode shall change to FS (refer to SRS chapter 4, transitions between modes: transition from PT to FS) and the process shall END. 	2,3

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ID #	Requirements	Level
S160	The ERTMS/ETCS on-board equipment shall request an acknowledgement from the driver for running in SR mode . When the driver acknowledges (E180), the mode shall change to SR (refer to SRS chapter 4, transitions between modes : transition from PT to SR) and the process shall END .	1,2,3
S170	The ERTMS/ETCS on-board equipment shall request an acknowledgement from the driver for running in OS/LS/SH mode . When the driver acknowledges (E185), the mode shall change to OS/LS/SH (refer to SRS chapter 4, transitions between modes : transition from PT to OS/LS/SH) and the process shall END .	2,3

5.11.3 Flowchart

5.11.3.1 The ID numbers in the flowchart refer to the ID numbers of the table in section 5.11.2.

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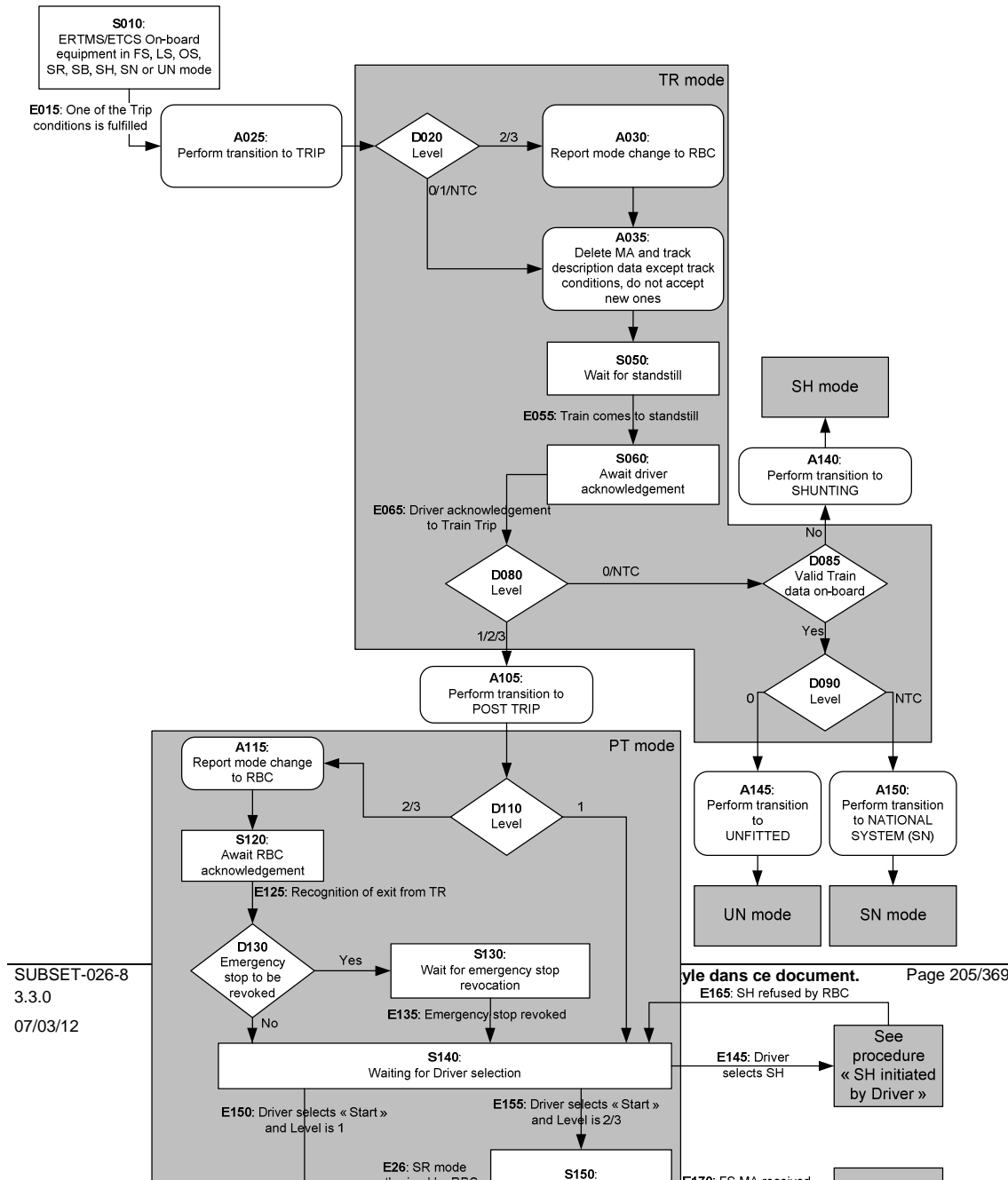


Figure 14: Flowchart for “Train Trip”

5.11.4 Degraded Situations

5.11.4.1 ERTMS/ETCS level 2 or 3: no acknowledge for PT mode is received from the RBC

5.11.4.1.1 *In case a communication session is established and no reply is received from the RBC within a fixed waiting time (see appendix to chapter 3, List of Fixed Value Data) after reporting the mode change, the report shall be repeated with the fixed waiting time after each repetition.*

5.11.4.1.2 *After a defined number of repetitions(see appendix to chapter 3, List of Fixed Value Data) and if no reply is received within the fixed waiting time from the last sending of the mode change report, the ERTMS/ETCS onboard equipment shall terminate the communication session.*

5.11.4.2 Nominally, accidental loss of an already open session (that can occur at any step) has not been taken into account for the design of the flowchart. However, should such a fault occur in any step while ERTMS/ETCS on-board equipment is in level 2/3 and in PT mode, the driver shall have the possibility to select "Override" and the process shall go to the procedure "Override "

5.12 Change of Train Orientation

5.12.1 Introduction

- 5.12.1.1 The scope of this procedure is the supervision of a train where the driver controls the train from the cab in the front of the train with the direction controller in FORWARD position.
- 5.12.1.2 This implies that when the driver has to change the orientation of the train, he has to change the driving cab.
- 5.12.1.3 The scope of this procedure is NOT shunting movements, during which the driver changes the running direction of the train without leaving the cab, by changing the position of the direction controller from FORWARD to REVERSE.
- 5.12.1.4 The scope of this procedure is NOT the backwards movement that is allowed in Post Trip or in Reversing mode.

5.12.2 The driver uses the same engine (a mission is on-going)

- 5.12.2.1 The situation is the following: The driver closes the desk A and leaves the cab A of the leading engine of the train, to go to cab B and open desk B of this same engine.
- 5.12.2.2 Desk A and desk B are connected to the same ERTMS/ETCS on-board equipment.
- 5.12.2.3 When the driver closes the desk A, the ERTMS/ETCS on-board equipment shall immediately go to Stand-By mode, which is considered as an end of mission (see “End of Mission” procedure)
- 5.12.2.4 When the driver opens the desk B, the “Start of Mission” procedure is triggered.
- 5.12.2.5 When the driver closes a desk and opens the other one of the same engine, the ERTMS/ETCS on-board equipment shall be able to calculate the new train position data (train front position, train orientation), by use of the previous data.

5.12.3 The driver leaves the engine to go to another one

5.12.3.1 The described situation is the following: The train has two engines (engine A and engine B). The engine A is the leading engine. The engine B is a slave engine. Each engine has its own ERTMS/ETCS on-board equipment.

- a) If engine B is remote controlled, its ETCS on-board equipment is in **Sleeping mode**.
Note: The **mode** is entered when on-board equipment detects the presence of the "remote control" signal.
- b) If the slave engine is not remote controlled (Tandem operation) by the leading engine but there is a driver who controls the engine, then the on-board equipment is in **Non leading mode**.
- c) If the engine B is not remote controlled (Tandem **Shunting** operation) by the leading engine and there is no driver who controls the engine, then the on-board equipment is in **Passive Shunting mode**.

5.12.3.2 Assumption: The train configuration does not change.

- a) When changing the train orientation, the leading engine A will become the slave engine, and the slave engine B will become the leading engine.
- b) If before the change of train orientation engine B was in **SL**, afterwards engine A will be in **SL mode**; If before the change of train orientation engine B was in **NL**, afterwards engine A will be in **NL mode**; If before the change of train orientation engine B was in **PS**, afterwards engine A will be in **PS mode**.

5.12.3.3 Case "Engine B was in **SL mode**"

5.12.3.3.1 *The driver of engine A closes the desk, then the ERTMS/ETCS on-board equipment of engine A switches to Stand-By **mode**. If the train has a mission, this is a end of mission (see "End of Mission" procedure)*

5.12.3.3.2 *As soon as the remote control signal disappears, the ERTMS/ETCS on-board equipment of engine B switches to Stand-By **mode**.*

5.12.3.3.3 **Level 2,3:** *The ERTMS/ETCS on-board equipment of engine B shall open a communication session (if possible) and report the **mode** change to the RBC.*

5.12.3.3.4 *When the driver opens a desk of engine B he triggers the "Start of Mission" procedure.*

5.12.3.4 Case "Engine B was in NL mode"

- 5.12.3.4.1 The driver of engine A selects "Non Leading". The ERTMS/ETCS equipment switches to Non Leading mode.
- 5.12.3.4.2 Once the non leading input signal is not received any more, the ERTMS/ETCS on-board equipment of engine B will switch to Stand-By mode (refer to SRS chapter 4, transitions between modes and chapter 5, "End of Mission" procedure).
- 5.12.3.4.3 Because the desk is open, when the ERTMS/ETCS on-board equipment enters Stand-By mode, the "Start of Mission" procedure is triggered.

5.12.3.5 Case "Engine B was in PS mode"

- 5.12.3.5.1 The driver of engine A selects "Continue Shunting on desk closure". The ERTMS/ETCS equipment switches to Passive Shunting mode once the driver closes the desk of engine A.
- 5.12.3.5.2 The driver opens a desk in engine B, and ERTMS/ETCS equipment switches to Shunting mode.

5.12.4 The driver uses the same engine (a Shunting movement is on-going)

- 5.12.4.1 The situation is the following: while the ERTMS/ETCS on-board equipment is in Shunting mode, the driver closes the desk A and leaves the cab A of the Shunting engine, to go to cab B and open desk B of this same engine.
- 5.12.4.2 Desk A and desk B are connected to the same ERTMS/ETCS on-board equipment.
 - 5.12.4.2.1 Before closing the desk A, the driver enables the function "Continue Shunting on desk closure". When the driver closes the desk A, the ERTMS/ETCS on-board equipment shall immediately go to Passive Shunting mode.
 - 5.12.4.2.2 When the driver opens the desk B, the ERTMS/ETCS on-board equipment shall immediately switch back to Shunting mode.
- 5.12.4.3 When the driver closes a desk and opens the other one of the same engine, the ERTMS/ETCS on-board equipment shall be able to calculate the new train position data (train front position, train orientation), by use of the previous data.

5.13 Train Reversing

- 5.13.1.1 This procedure is intended to allow the fast reversal of movement of a train, to run away from a danger up to a “safe” location.
- 5.13.1.2 The area where initiation of reversing will be possible is announced to the ERTMS/ETCS on-board equipment by trackside (refer to 3.15.4.2 for details).
- 5.13.1.3 While the train is at standstill inside the reversing permitted area, the driver shall be informed that reversing is possible
- 5.13.1.4 If the ERTMS/ETCS onboard detects the driver's intention to reverse (e.g. from a direction controller in reverse position), the ERTMS/ETCS on-board equipment shall ask the driver to acknowledge transition to RV mode.
- 5.13.1.5 If the driver acknowledges, the on-board equipment shall switch to RV mode
- 5.13.1.6 Once in RV mode, it shall be possible for the trackside to send a new permitted distance to run and a new maximum speed.
- 5.13.1.7 Once in RV mode, it shall also be possible for the trackside to send, together with the new permitted distance to run and the maximum speed, a new reference location for the new permitted distance to run.
- 5.13.1.8 Note: this new reference location is the end of a new reversing area given by trackside that the onboard will use only for the purpose of distance referencing.

5.14 Joining / Splitting

5.14.1 Definitions

- 5.14.1.1 Definition for splitting: The “train to be split” is the train at standstill, waiting for being split. The “front train after splitting” refers to the front part of the train before splitting, the “new train after splitting”, refers to the other part.
- 5.14.1.2 Definitions for joining: The “train to be joined” is the train at standstill, waiting for being joined. The “joining train” is the train performing the joining operation.

5.14.2 Procedure “Splitting”

- 5.14.2.1 Step 1 - The electrical and mechanical links between the two trains must be removed (this is a national operational procedure, out of the scope of the SRS).
- 5.14.2.1.1 *Note: If splitting requires moving the two train parts apart from each other for a small distance, this can be done even in SB mode*
- 5.14.2.2 Step 2a - If the ERTMS/ETCS onboard equipment which was supervising the train before splitting has not performed an end of mission for splitting, the driver must modify the Train Data such that it fits with the new train composition after splitting. For **level** 2 or 3, the new train data is sent to the RBC (see SRS chapter 3 – Data Entry / Modification Process)
- 5.14.2.3 Step 2b - If an ERTMS/ETCS on-board equipment of the "new train after splitting" was in **SL mode** before, it will switch to **SB mode** once the remote control signal is not received any more (refer to SRS chapter 4, transitions between **modes**). For **Level** 2 or 3: The ERTMS/ETCS on-board equipment shall open a communication session (if possible) and report the **mode** change to the RBC.
- 5.14.2.4 Step - 2c If an ERTMS/ETCS on-board equipment of the "new train after splitting" was in **NL mode** before, it will switch to **SB mode** once the **non leading** input signal is not received any more (refer to SRS chapter 4, transitions between **modes** and chapter 5, “end of mission” procedure).

- 5.14.2.5 The driver can then start a new mission with this “new train after splitting” (refer to the “Start of Mission” procedure). In all cases, to start a mission is not the only possibility. Shunting movements, or not moving the new train at all, are also possible.

5.14.3 Procedure “Joining”

- 5.14.3.1 Step 1 – The “joining train” must approach the “train to be joined”. This can be performed in SR, OS or SH mode (depending on the information available, and on the national procedure for joining).
- 5.14.3.2 Step 2 – The electrical and mechanical links between the two trains must be closed (vehicle dependent, outside the scope of the ETCS).
- 5.14.3.3 Step 3a – If a former leading ERTMS/ETCS on-board equipment remains leading and there was no end of mission, the driver must modify the Train Data such that it fits with the new train composition. For level 2 or 3, the new train data is sent to the RBC (see SRS chapter 3 – Data Entry / Modification Process)
- 5.14.3.4 Step 3b – If a former leading ERTMS/ETCS on-board equipment is to become slave equipment in SL mode, when closing the desk, the ERTMS/ETCS on-board equipment will switch to SB mode (see SRS chapter 4, transitions between modes) and the end of mission procedure is executed (see “End of Mission” procedure). Transition to SL mode is from SB mode.
- 5.14.3.5 Step 3c: If a former leading ERTMS/ETCS on-board equipment is to become slave equipment in NL mode, the driver selects NL mode (see SRS chapter 4, transitions between modes).
- 5.14.3.6 For further steps after joining refer to procedures “Start of Mission” and “Change of Train Orientation”.

5.15 RBC/RBC Handover

5.16 Procedure passing a non protected Level Crossing

5.17 Changing Train Data from sources different from the driver

5.17.1 Introduction

5.17.1.1 When valid Train Data is stored on-board, input information acquired from ERTMS/ETCS external sources different from the driver may affect some of the Train Data, depending on the type of train (e.g. tilting input information from tilting external device may affect the train category and the loading gauge).

5.17.1.2 The procedure here below describes the necessary steps performed by the ERTMS/ETCS on-board equipment from the detection of an input information change on an external interface, to the effective encountering of the Train Data change by the ERTMS/ETCS on-board equipment.

5.17.1.3 This procedure is not applicable for trains running in **RV mode**: on leaving **RV mode**, the Train Data will always be invalidated or deleted.

5.17.2 Table of requirements for “Changing Train Data from sources different from the driver” procedure

5.17.2.1 The ID numbers in the table are used for the representation of the procedure in form of a flow chart in section 5.17.3.

5.17.2.2 Procedure

ID #	Requirements
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ID #	Requirements
S0	<p>The ERTMS/ETCS on-board equipment is in one of the following modes: FS, LS, OS, SR, SB, SN, UN, TR, PT and valid Train Data is stored on-board.</p> <p>If a change of input information, which affects Train Data, is detected on an ERTMS/ETCS on-board external interface (E0), the process shall go to D0</p>
D0	<p>According to the specific train implementation, Train Data which is/are affected by the change of input information from the ERTMS/ETCS on-board equipment external interface may require validation:</p> <ul style="list-style-type: none"> • If the affected data requires driver validation, the process shall go to D2 • If the affected data does not require driver validation, the process shall go to D1
D1	<p>Depending on the type of Train Data which is/are affected by the change of input information from the ERTMS/ETCS on-board external interface, the following shall apply:</p> <ul style="list-style-type: none"> • If the impacted Train Data regards either train category, or axle load category, or traction system(s) accepted by the engine, or loading gauge, the process shall go to D3 • If the impacted Train Data regards any other type of Train Data, the process shall go to A1
D3	<p>Depending on the mode of the ERTMS/ETCS on-board equipment, the following shall apply:</p> <ul style="list-style-type: none"> • If mode is FS, LS, or OS, the process shall go to D7 • If mode is SB or PT, the process shall go to A1 • If mode is UN, SN, SR, or TR the process shall go to D5

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ID #	Requirements
D5	<p>The ERTMS/ETCS on-board equipment shall check whether MA and track description, received from RBC, are stored on-board, in case a level 2/3 transition or a RBC transition for a further location has been ordered:</p> <ul style="list-style-type: none"> • If MA and track description are stored, the process shall go to D7 • If MA and track description are not both stored, the process shall go to A1
D7	<p>The ERTMS/ETCS on-board equipment shall check whether the train is at standstill:</p> <ul style="list-style-type: none"> • If at standstill, the process shall go to A1 • If not at standstill, the process shall go to S2
A1	<p>The ERTMS/ETCS on-board equipment shall inform the driver that Train Data has been changed and the process shall go to A7</p>
S2	<p>The ERTMS/ETCS on-board equipment shall command the service brake, inform the driver about the reason of this brake command and waits for the train to be at standstill; when the ERTMS/ETCS on-board equipment detects that the train is at standstill (E2), the process shall go to S3</p>
S3	<p>The ERTMS/ETCS on-board equipment shall request the driver to acknowledge the brake command; when the driver acknowledges (E3), the process shall go to A5</p>
A5	<p>The ERTMS/ETCS on-board equipment shall release the brake command and the process shall go to A7</p>
D2	<p>Depending on the mode of the ERTMS/ETCS on-board equipment, the following shall apply:</p> <ul style="list-style-type: none"> • If mode is FS, LS, OS, SR, SB, SN or UN the process shall go to D9 • If mode is TR or PT, the process shall go to S1

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ID #	Requirements
S1	The ERTMS/ETCS on-board equipment shall wait for the end of the Train Trip procedure (see section 5.11). When the Train Trip procedure is exited (E1) (i.e. there is a mode transition to another mode than TR , PT), the process shall go to D4
D4	Depending on the mode of the ERTMS/ETCS on-board equipment, the following shall apply: <ul style="list-style-type: none"> If mode is FS, LS, OS, SR, SN or UN the process shall go to S6 If mode is SH, the Train Data are invalidated and the process shall END
D9	The ERTMS/ETCS on-board equipment shall check whether the train is at standstill: <ul style="list-style-type: none"> If at standstill, the process shall go to S6 If not at standstill, the process shall go to S4
S4	The ERTMS/ETCS on-board equipment shall command the service brake, inform the driver about the reason of this brake command and wait for the train to be at standstill; when the ERTMS/ETCS on-board equipment detects that the train is at standstill (E4), the process shall go to S5
S5	The ERTMS/ETCS on-board equipment shall request the driver to acknowledge the brake command; when the driver acknowledges (E5), the process shall go to A6
A6	The ERTMS/ETCS on-board equipment shall release the brake command and the process shall go to S6
S6	The ERTMS/ETCS on-board equipment shall request the driver to re-enter or re-validate the Train Data. Once Train Data is validated (E6), the process shall go to A7

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ID #	Requirements
A7	<p>The ERTMS/ETCS on-board equipment shall consider the Train Data as being changed and shall apply, when relevant, the requirements regarding change of Train Data (refer to clauses 3.18.3.4, 3.18.3.7 and 3.18.3.8).</p> <p>The process shall END.</p>

5.17.3 Flowchart

5.17.3.1 The ID numbers in the flowchart refer to the ID numbers of the table in section 5.17.2.

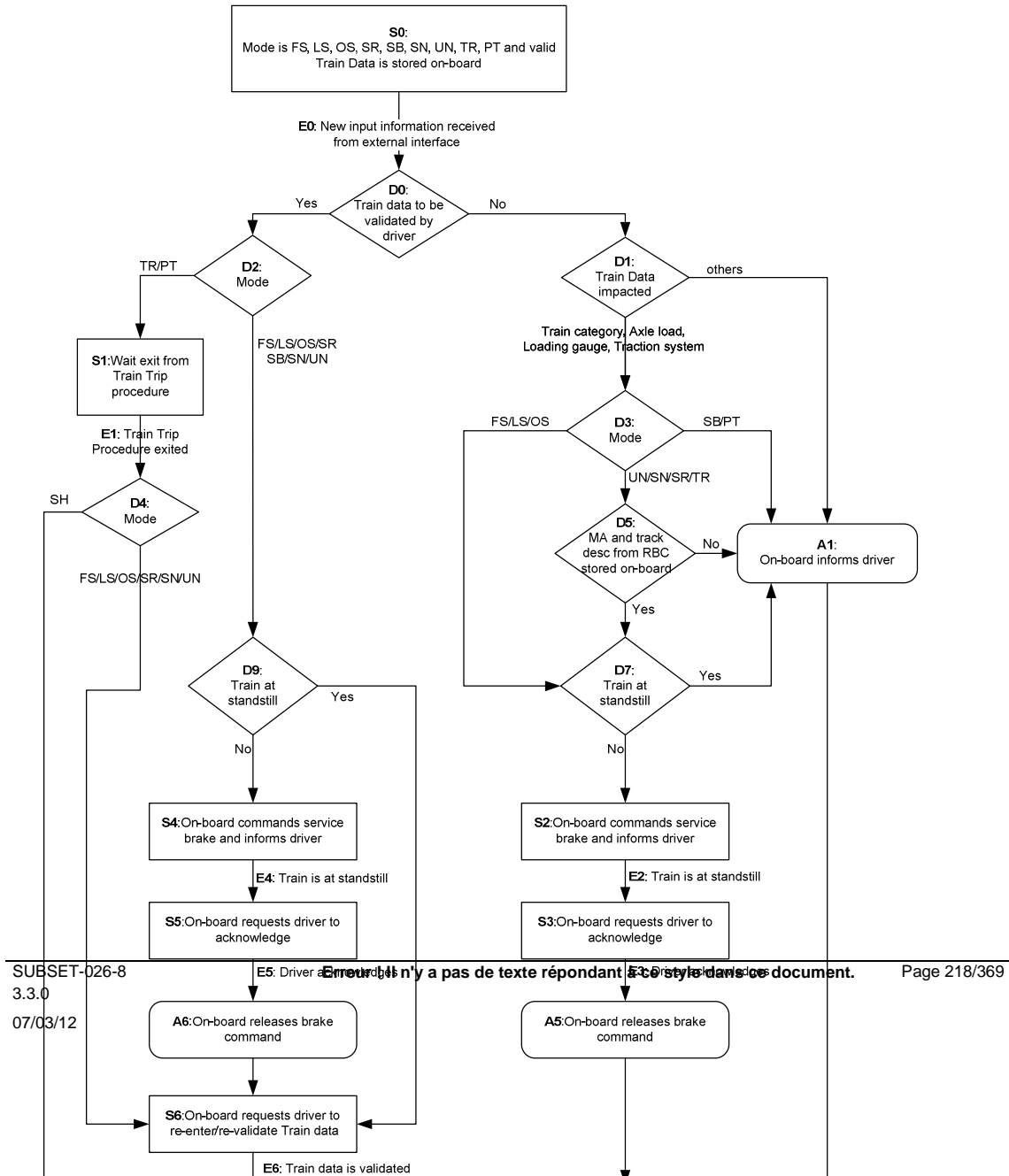


Figure 15: Flowchart for “Changing Train Data from sources different from the driver”

5.18 Indication of Track Conditions

5.19 Procedure Limited Supervision

5.19.1 General Requirements

- 5.19.1.1 The order to switch to Limited Supervision mode shall be given by means of a mode profile.
- 5.19.1.2 An acknowledgement for running in Limited Supervision mode shall be requested from the driver. The conditions of the acknowledgement are specified below.

5.19.2 Limited Supervision is requested for current location (from modes different from Stand By and Post Trip)

- 5.19.2.1 In a level 1 area, the beginning of the Limited Supervision area can be the balise (group) that gives the Mode Profile. When the train passes the balise group and receives this information, the ERTMS/ETCS on-board equipment shall immediately switch to Limited Supervision mode.
- 5.19.2.2 In a level 2 or 3 area, the ERTMS/ETCS on-board equipment can receive a mode profile giving a Limited Supervision area which the train has already entered with its max safe front end. In this case, the ERTMS/ETCS on-board equipment shall immediately switch to Limited Supervision mode.
- 5.19.2.3 The driver must acknowledge the Limited Supervision mode. A request of acknowledgement shall be displayed to the driver.
- 5.19.2.4 If the driver has not acknowledged after the driver acknowledgement time (refer to Appendix A3.1), the service brake command shall be triggered. The brake command is released when the driver acknowledges, except if brakes are also applied for another reason(s).
- 5.19.2.5 **Note:** Once in Limited Supervision mode, the speed supervision is such that the train speed cannot exceed the LS mode speed limit. If, when entering the Limited Supervision mode, the train speed was higher than the LS mode speed limit (because a higher speed was allowed in Full Supervision mode, On Sight mode or in Staff Responsible mode) then an emergency brake command could be immediately triggered, independently of the acknowledgement of the driver, but because of the LS supervision (see Figure 16).

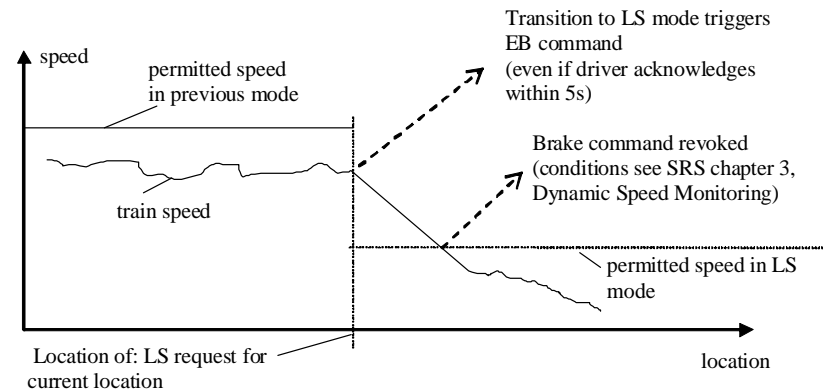


Figure 16: Train enters LS area with too high speed

5.19.2.6 **Note:** This sharp brake reaction can be avoided in **Full Supervision** or **On Sight mode** by giving with the previous MA an EOA (or a LOA = **LS mode** speed limit) at the location of transition to **Limited Supervision mode**.

5.19.2.7 If the ERTMS/ETCS on-board equipment is already in **LS mode** when receiving the **LS mode** profile, no further acknowledgement shall be requested from the driver.

5.19.3 **Limited Supervision** is requested for a further location

5.19.3.1 The beginning of the **Limited Supervision** area can be a location that the train has not reached yet. This occurs when:

- In a **level 1** area, a balise group gives a **Mode** Profile with an **Limited Supervision** area that is located at a further location.
- In a **level 2 or 3** area, the RBC gives a **Mode** Profile with an **Limited Supervision** area that is located at a further location.

5.19.3.2 A request for acknowledgement shall be displayed to the driver when the following conditions are fulfilled:

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- a) The distance between the estimated front end of the train and the beginning of **Limited Supervision** area is shorter than a value, contained in the **mode** profile.
- b) The speed is lower than the **Limited Supervision mode** speed limit (national value, or value given in the **mode** profile).
- c) The current **mode** is not **Limited Supervision**

5.19.3.3 **Note:** The first 2 conditions define the “rectangle of acknowledgement”.

5.19.3.4 Once the acknowledgement request is displayed, it is not taken back if the train leaves the “rectangle of acknowledgement” (for example: because the train accelerates).

5.19.3.5 Until the ERTMS/ETCS on-board equipment has switched to **LS mode**, according to the **mode** profile, the beginning of the **Limited Supervision** area shall be temporarily considered either as the EOA (keeping the SvL given by the MA) or as both the EOA and SvL (instead of the EOA and SvL given by the MA), with no Release Speed.

5.19.3.6 When the driver acknowledges the **Limited Supervision mode**, the ERTMS/ETCS on-board equipment shall immediately switch to the **Limited Supervision mode**.

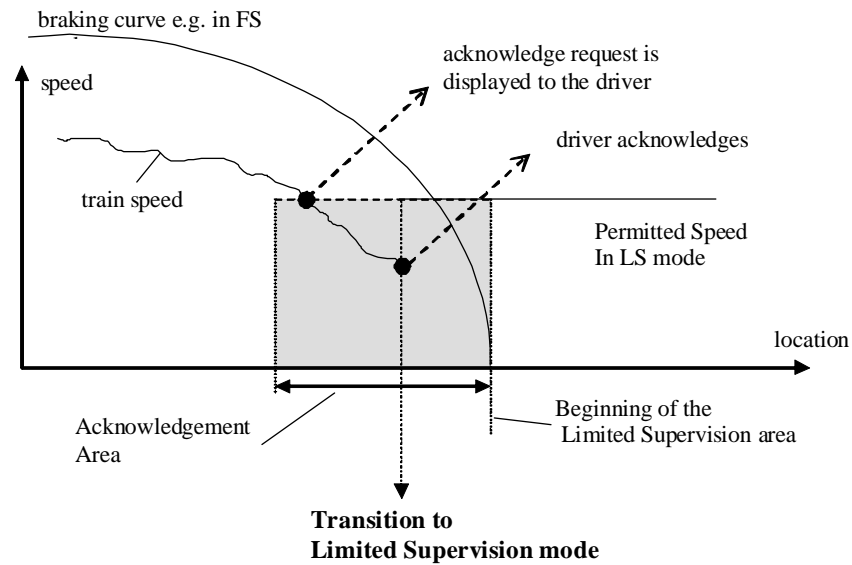


Figure 17: Transition to **LS mode after driver acknowledgement**

- 5.19.3.7 If the max safe front end of the train reaches the beginning of the **Limited Supervision** area according to the **mode** profile and the driver has not yet acknowledged, the ERTMS/ETCS on-board equipment shall switch immediately to **LS mode** and a request for acknowledgement shall be displayed to the driver (refer to SRS chapter 4, transitions between **mode**s).
- 5.19.3.8 If, in this case, the driver does not acknowledge within the driver acknowledgement time (refer to Appendix A3.1) after the change to **LS mode**, the service brake command shall be triggered. The command shall be released as soon as the driver acknowledges (unless the command was triggered also for other reasons).

5.19.4 Limited Supervision from Unfitted or SN mode

5.19.4.1 The mode profile with regards to an LS area is only evaluated in levels 1,2,3, although the mode profile may have been received in level 0 (Unfitted mode) or NTC (SN mode). A transition to Limited Supervision mode can therefore earliest occur at a transition of level: from level 0 or NTC to level 1 or 2 or 3.

5.19.4.2 Specifications of chapters 5.19.2 and 5.19.3 about the acknowledgement shall apply here.

5.19.5 Limited Supervision from Stand By or Post Trip mode

5.19.5.1 When performing a SoM or a Train Trip procedure and when the current level is 2 or 3, the ERTMS/ETCS on-board equipment can receive a mode profile giving an Limited Supervision area which the train has already entered with its max safe front end. In this case, the ERTMS/ETCS on-board equipment shall first require an acknowledgement from the driver.

5.19.5.2 When the driver acknowledges, the ERTMS/ETCS on-board equipment shall perform the transition to Limited Supervision mode.

5.19.6 Exit of Limited Supervision mode

5.19.6.1 General rule

5.19.6.1.1 The ERTMS/ETCS on-board equipment exits the Limited Supervision mode when the min safe front end of the train passes the end of the Limited supervision area.

5.19.6.2 First case: The Limited supervision area ends at the EOA of the current MA

5.19.6.2.1 This occurs when the end of the Limited Supervision area that is given by the Mode Profile has the same location as the EOA of the related MA.

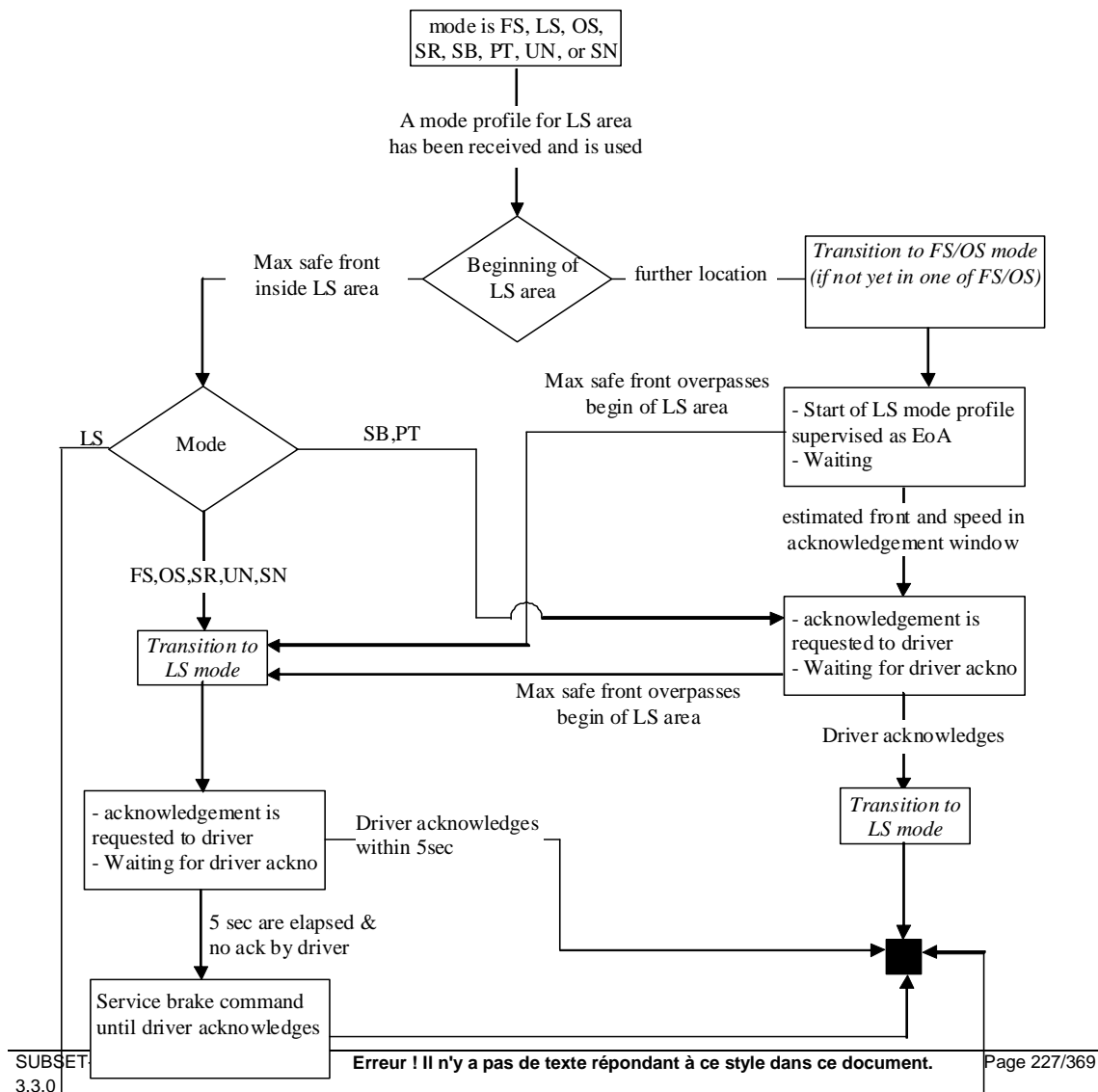
5.19.6.2.2 In this case, the train must receive a new Movement Authority to be able to exit the Limited Supervision area.

5.19.6.3 Second case: The Limited Supervision area ends before the EOA of the current MA

5.19.6.3.1 In this case, the current Movement Authority already allows the train to exit the Limited Supervision area.

5.19.6.3.2 When exiting the *Limited Supervision* area, the ERTMS/ETCS on-board equipment switches either to *Full Supervision*, *On Sight* or to *Shunting mode* (refer to SRS chapter 4, transitions between *modes*).

5.19.7 Flowchart



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Figure 18: Flowchart for “Limited Supervision”

7. CHAPTER 7 ERTMS/ETCS LANGUAGE

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7.4.1.3 Track to Train or Train to Track

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7.4.2 PACKETS: TRACK TO TRAIN

7.4.2.0 Packet Number 0: Virtual Balise Cover marker

7.4.2.1 Packet Number 2: System Version order

7.4.2.1.1 *Packet Number 3: National Values*

Description	Downloads a set of National Values to the train		
Transmitted by	Balise, RBC		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	D_VALIDNV	15	
	NID_C	10	Identification of national areas to which the set applies
	N_ITER	5	
	NID_C(k)	10	Identification of additional national area(s) to which the set applies
	V_NVSHUNT	7	
	V_NVSTFF	7	
	V_NVONSIGHT	7	
	V_NVLIMSUPERV	7	
	V_NVUNFIT	7	

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V_NVREL	7	
D_NVROLL	15	
Q_NVSBTSMPerm	1	
Q_NVEMRRLS	1	
Q_NVGUIPERM	1	
Q_NVSBFBPerm	1	
Q_NVINHSMICPerm	1	
V_NVALLOWOVTRP	7	
V_NVSUPOVTRP	7	
D_NVOVTRP	15	
T_NVOVTRP	8	
D_NVPOTRP	15	
M_NVCONTACT	2	
T_NVCONTACT	8	
M_NVDERUN	1	
D_NVSTFF	15	
Q_NVDRIVER_ADHES	1	
A_NVMAXREDADH1	Erreur ! Source du renvoi introuv able.	

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A_NVMAXREDADH2	Erreur ! Source du renvoi introuv able.	
A_NVMAXREDADH3	Erreur ! Source du renvoi introuv able.	
Q_NVLOCACC	6	
M_NVAVADH	5	
M_NVEBCL	4	
Q_NVKINT	1	
Q_NVKVINTSET	2	Only if Q_NVKINT = 1, Q_NVKVINTSET and the following variables follow
A_NVP12	Erreur ! Source du renvoi introuv able.	Only if Q_NVKVINTSET = 1

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A_NVP23	Erreur ! Source du renvoi introuvable.	Only if Q_NVKVINTSET = 1
V_NVKVINT	7	= 0 km/h
M_NVKVINT	7	Valid between V_NVKVINT and V_NVKVINT(1) If Q_NVKVINTSET = 1, gives the correction factor if maximum emergency brake deceleration is lower than A_NVP12
M_NVKVINT	7	Only if Q_NVKVINTSET = 1 Valid between V_NVKVINT and V_NVKVINT(1) Gives the correction factor if maximum emergency brake deceleration is higher than A_NVP23
N_ITER	5	
V_NVKVINT(n)	7	

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M_NVKVINT(n)	7	Valid between V_NVKVINT(n) and V_NVKVINT(n+1) If Q_NVKVINTSET = 1, gives the correction factor if maximum emergency brake deceleration is lower than A_NVP12
M_NVKVINT(n)	7	Only if Q_NVKVINTSET = 1 Valid between V_NVKVINT(n) and V_NVKVINT(n+1) Gives the correction factor if maximum emergency brake deceleration is higher than A_NVP23
N_ITER	5	
Q_NVKVINTSET(k)	2	
A_NVP12(k)	Erreur ! Source du renvoi introuv able.	Only if Q_NVKVINTSET(k) = 1

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A_NVP23(k)	Erreur ! Source du renvoi introuvable.	Only if Q_NVKVINTSET(k) = 1
V_NVKVINT(k)	7	= 0km/h
M_NVKVINT(k)	7	Valid between V_NVKVINT(k) and V_NVKVINT(k,1) If Q_NVKVINTSET(k) = 1, gives the correction factor if maximum emergency brake deceleration is lower than A_NVP12(k)
M_NVKVINT(k)	7	Only if Q_NVKVINTSET(k) = 1 Valid between V_NVKVINT(k) and V_NVKVINT(k,1) Gives the correction factor if maximum emergency brake deceleration is higher than A_NVP23(k)
N_ITER(k)	5	
V_NVKVINT(k,m)	7	

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M_NVKVINT(k,m)	7	Valid between V_NVKVINT(k,m) and V_NVKVINT(k,m+1) If Q_NVKVINTSET(k) = 1, gives the correction factor if maximum emergency brake deceleration is lower than A_NVP12(k)
M_NVKVINT(k,m)	7	Only if Q_NVKVINTSET(k) = 1 Valid between V_NVKVINT(k,m) and V_NVKVINT(k,m+1) Gives the correction factor if maximum emergency brake deceleration is higher than A_NVP23(k)
L_NVKRINT	5	= 0m
M_NVKRINT	5	Valid between L_NVKRINT and L_NVKRINT(1)
N_ITER	5	
L_NVKRINT(l)	5	
M_NVKRINT(l)	5	Valid between L_NVKRINT(l) and L_NVKRINT(l+1)
M_NVKTINT	5	

7.4.2.2 Packet Number 5: Linking

7.4.2.2.1 Packet Number 6: Virtual Balise Cover order

7.4.2.3 Packet Number 12: **Level** 1 Movement Authority

Description	Transmission of a movement authority for level 1.		
Transmitted by	Balise, loop, RIU		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	V_MAIN	7	
	V_LOA	7	
	T_LOA	10	Can be set to "no time-out"
	N_ITER	5	Set to zero if V_MAIN = 0 or if only one section in the MA
	L_SECTION(k)	15	
	Q_SECTIONTIMER(k)	1	
	T_SECTIONTIMER(k)	10	
	D_SECTIONTIMERSTOPLOC(k)	15	
	L_ENDSECTION	15	
	Q_SECTIONTIMER	1	
	T_SECTIONTIMER	10	

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D_SECTIONTIMERSTOPLOC	15	
Q_ENDTIMER	1	
T_ENDTIMER	10	
D_ENDTIMERSTARTLOC	15	
Q_DANGERPOINT	1	
D_DP	15	
V_RELEASEDP	7	
Q_OVERLAP	1	
D_STARTOL	15	
T_OL	10	
D_OL	15	
V_RELEASEOL	7	

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7.4.2.3.1 Packet Number 13: Staff Responsible distance Information from loop

Description	Information for trains in staff responsible mode		
Transmitted by	Loop		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	Q_NEWCOUNTRY	1	
	NID_C	10	If Q_NEWCOUNTRY = 1
	NID_BG	14	Main signal balise group
	Q_NEWCOUNTRY	1	
	NID_C	10	If Q_NEWCOUNTRY = 1
	NID_BG	14	Reference balise
	D_SR	15	
	N_ITER	5	
	Q_NEWCOUNTRY (k)	1	
	NID_C (k)	10	If Q_NEWCOUNTRY (k) = 1
	NID_BG (k)	14	Reference balise
	D_SR (k)	15	

7.4.2.4 Packet Number 15: Level 2/3 Movement Authority

Description	Transmission of a movement authority for levels 2/3.
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Transmitted by	RBC		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	V_LOA	7	
	T_LOA	10	Can be set to "no time-out"
	N_ITER	5	Set to zero if only one section in the MA
	L_SECTION(k)	15	
	Q_SECTIONTIMER(k)	1	
	T_SECTIONTIMER(k)	10	
	D_SECTIONTIMERSTOPLOC(k)	15	
	L_ENDSECTION	15	
	Q_SECTIONTIMER	1	
	T_SECTIONTIMER	10	
	D_SECTIONTIMERSTOPLOC	15	
	Q_ENDTIMER	1	
	T_ENDTIMER	10	
	D_ENDTIMERSTARTLOC	15	
	Q_DANGERPOINT	1	

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D_DP	15	
V_RELEASEDP	7	
Q_OVERLAP	1	
D_STARTOL	15	
T_OL	10	
D_OL	15	
V_RELEASEOL	7	

7.4.2.5 Packet Number 16: Repositioning Information

7.4.2.6 Packet Number 21: Gradient Profile

7.4.2.7 Packet Number 27: International Static Speed Profile

7.4.2.8 Packet Number 39: Track Condition Change of traction system

7.4.2.8.1 Packet Number 40: Track Condition Change of allowed current consumption

7.4.2.9 Packet Number 41: **Level** Transition Order

Description	Packet to identify where a level transition shall take place. In case of mixed levels , the successive M_ LEVEL TR's go from the highest priority level to the lowest one.		
Transmitted by	Any		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	

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D_LEVELTR	15	
M_LEVELTR	3	
NID_NTC	8	If M_LEVELTR = 1 (NTC)
L_ACKLEVELTR	15	
N_ITER	5	
M_LEVELTR(k)	3	
NID_NTC(k)	8	If M_LEVELTR(k) = 1 (NTC)
L_ACKLEVELTR(k)	15	

7.4.2.10 Packet Number 42: Session Management

7.4.2.11 Packet Number 44: Data used by applications outside the ERTMS/ETCS system.

7.4.2.11.1 Packet Number 45: Radio Network registration

7.4.2.11.2 Packet Number 46: Conditional Level Transition Order

Description	Packet for a conditional level transition. The successive M_LEVELTR's go from the highest priority level to the lowest one.		
Transmitted by	Balise		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	M_LEVELTR	3	
	NID_NTC	8	If M_LEVELTR = 1 (NTC)
	N_ITER	5	

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M_LEVEL	TR(k)	3	
NID_NTC(k)		8	If M_LEVEL TR(k) = 1 (NTC)

7.4.2.12 Packet Number 49: List of balises for SH Area

Description	Used to list balise group(s) which the train can pass over in SH mode		
Transmitted by	Any		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	N_ITER	5	
	Q_NEWCOUNTRY(k)	1	
	NID_C(k)	10	if Q_NEWCOUNTRY(k) = 1
	NID_BG(k)	14	

7.4.2.13 Packet Number 51: Axle Load Speed Profile

7.4.2.13.1 Packet Number 52: Permitted Braking Distance Information

7.4.2.14 Packet Number 57: Movement Authority Request Parameters

7.4.2.15 Packet Number 58: Position Report Parameters

7.4.2.16 Packet Number 63: List of Balises in SR Authority

Description	Used to list balise group(s) which the train can pass over in SR mode		
Transmitted by	RBC		
Content	Variable	Length	Comment

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NID_PACKET	8	
Q_DIR	2	
L_PACKET	13	
N_ITER	5	
Q_NEWCOUNTRY(k)	1	
NID_C(k)	10	if Q_NEWCOUNTRY(k) = 1
NID_BG(k)	14	

7.4.2.16.1 Packet Number 64: Inhibition of revocable **TSRs** from balises in L2/3

7.4.2.17 Packet Number 65: Temporary Speed Restriction

7.4.2.18 Packet Number 66: Temporary Speed Restriction Revocation

7.4.2.19 Packet Number 67: Track Condition Big Metal Masses

7.4.2.20 Packet Number 68: Track Condition

7.4.2.20.1 Packet Number 69: Track Condition Station Platforms

7.4.2.21 Packet Number 70: Route Suitability Data

7.4.2.22 Packet number 71: Adhesion factor

7.4.2.23 Packet Number 72: Packet for sending plain text messages

Description			
Transmitted by	Balise, RBC		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	

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L_PACKET	13	
Q_SCALE	2	
Q_TEXTCLASS	2	
Q_TEXTDISPLAY	1	Start/end events relation
D_TEXTDISPLAY	15	Start event
M_MODETEXTDISPLAY	4	Start event
M_LEVELTEXTDISPLAY	3	Start event
NID_NTC	8	If M_LEVELTEXTDISPLAY = 1 (NTC)
L_TEXTDISPLAY	15	End event
T_TEXTDISPLAY	10	End event
M_MODETEXTDISPLAY	4	End event
M_LEVELTEXTDISPLAY	3	End event
NID_NTC	8	If M_LEVELTEXTDISPLAY = 1 (NTC)
Q_TEXTCONFIRM	2	
Q_CONFTEXTDISPLAY	1	If Q_TEXTCONFIRM ≠ 0
Q_TEXTREPORT	1	If Q_TEXTCONFIRM ≠ 0
NID_TEXTMESSAGE	8	Only If Q_TEXTREPORT = 1
NID_C	10	Only If Q_TEXTREPORT = 1
NID_RBC	14	Only If Q_TEXTREPORT = 1
L_TEXT	8	
X_TEXT(L_TEXT)	8	

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7.4.2.24 Packet Number 76: Packet for sending fixed text messages

Description			
Transmitted by			
Balise, RBC			
Content			
Variable	Length	Comment	
NID_PACKET	8		
Q_DIR	2		
L_PACKET	13		
Q_SCALE	2		
Q_TEXTCLASS	2		
Q_TEXTDISPLAY	1	Start/end events relation	
D_TEXTDISPLAY	15	Start eventcondition	
M_MODETEXTDISPLAY	4	Start event	
M_LEVELTEXTDISPLAY	3	Start event	
NID_NTC	8	If M_LEVELTEXTDISPLAY = 1 (NTC)	
L_TEXTDISPLAY	15	End event	
T_TEXTDISPLAY	10	End event	
M_MODETEXTDISPLAY	4	End event	
M_LEVELTEXTDISPLAY	3	End event	
NID_NTC	8	If M_LEVELTEXTDISPLAY = 1 (NTC)	
Q_TEXTCONFIRM	2		
Q_CONFTEXTDISPLAY	1	If Q_TEXTCONFIRM ≠ 0	

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Q_TEXTREPORT	1	If Q_TEXTCONFIRM ≠ 0
NID_TEXTMESSAGE	8	Only If Q_TEXTREPORT = 1
NID_C	10	Only If Q_TEXTREPORT = 1
NID_RBC	14	Only If Q_TEXTREPORT = 1
Q_TEXT	8	

7.4.2.25 Packet Number 79: Geographical Position Information

7.4.2.26 Packet Number 80: Mode profile

Description	Mode profile associated to an MA		
Transmitted by	Any		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	D_MAMODE	15	
	M_MAMODE	2	OS, LS, SH
	V_MAMODE	7	
	L_MAMODE	15	
	L_ACKMAMODE	15	
	Q_MAMODE	1	
	N_ITER	5	
	D_MAMODE(k)	15	
	M_MAMODE(k)	2	OS, LS, SH

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V_MAMODE(k)	7	
L_MAMODE(k)	15	
L_ACKMAMODE(k)	15	
Q_MAMODE(k)	1	

7.4.2.26.1 Packet Number 88: Level Crossing information

7.4.2.26.2 Packet Number 90: Track Ahead Free up to level 2/3 transition location

Description	Notification to on-board that track ahead is free from the balise group transmitting this information up to the level 2/3 transition location		
Transmitted by	Balise		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_NEWCOUNTRY	1	
	NID_C	10	If Q_NEWCOUNTRY = 1
	NID_BG	14	Level 2/3 transition location balise group

7.4.2.27 Packet Number 131: RBC transition order

7.4.2.28 Packet Number 132: Danger for Shunting information

Description	Transmission of the aspect of a shunting signal		
Transmitted by	Balise		
Content	Variable	Length	Comment

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NID_PACKET	8	
Q_DIR	2	
L_PACKET	13	
Q_ASPECT	1	

7.4.2.29 Packet Number 133: Radio infill area information

7.4.2.30 Packet Number 134: EOLM Packet

7.4.2.31 Packet Number 135: Stop **Shunting** on desk opening

Description	Packet to stop Shunting on desk opening.		
Transmitted by	Balise		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	

7.4.2.32 Packet Number 136: Infill location reference

7.4.2.33 Packet Number 137: Stop if in **Staff Responsible**

Description	Information to stop a train in staff responsible .		
Transmitted by	Balise		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	

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L_PACKET	13	
Q_SRSTOP	1	

7.4.2.34 Packet Number 138: Reversing area information

Description	Used to send start and length of reversing area to the on-board		
Transmitted by	Any		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	D_STARTREVERSE	15	
	L_REVERSEAREA	15	

7.4.2.35 Packet Number 139: Reversing supervision information

Description	Used to send supervision parameters (distance to run, speed) of reversing area to the on-board		
Transmitted by	Any		
Content	Variable	Length	Comment
	NID_PACKET	8	
	Q_DIR	2	
	L_PACKET	13	
	Q_SCALE	2	
	D_REVERSE	15	

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	V_REVERSE	7	
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7.4.2.36 Packet Number 140: Train running number from RBC

7.4.2.37 Packet Number 141: Default Gradient for Temporary Speed Restriction

7.4.2.37.1 *Packet Number 143: Session Management with neighbouring Radio Infill Unit*

7.4.2.37.2 *Packet Number 145: Inhibition of balise group message consistency reaction*

7.4.2.38 Packet Number 254: Default balise, loop or RIU information

7.4.3 PACKETS: TRAIN TO TRACK

7.4.3.1 Packet Number 0: Position Report

Description	This packet is used to report the train position and speed as well as some additional information (e.g. mode, level, etc.)		
Transmitted to	RBC, RIU		
Content	Variable	Length	Comment
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	NID_LRBG	10 + 14	
	D_LRBG	15	
	Q_DIRLRBG	2	
	Q_DLRBG	2	
	L_DOUBTOVER	15	
	L_DOUBTUNDER	15	
	Q_LENGTH	2	
	L_TRAININT	15	If Q_LENGTH = "Train integrity confirmed by integrity monitoring device" or "Train integrity confirmed by driver"
	V_TRAIN	7	
	Q_DIRTRAIN	2	
	M_MODE	4	

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M_LEVEL	3	
NID_NTC	8	If M_LEVEL = NTC

7.4.3.2 Packet Number 1: Position Report based on two balise groups

Description	This packet is an extension of the “standard position report “ packet 0. It is used in case of single balise groups if the orientation of the LRBG is unknown but the on-board equipment is able to report a second balise group (the one detected before) to give a direction reference for the directional information in the position report.		
Transmitted to	RBC, RIU		
Content	Variable	Length	Comment
	NID_PACKET	8	
	L_PACKET	13	
	Q_SCALE	2	
	NID_LRBG	10 + 14	
	NID_PRVLRBG	10 + 14	Used as reference for all directional information in the packet: a move from PRVLRBG towards the LRBG defines the “nominal” direction
	D_LRBG	15	
	Q_DIRLRBG	2	Train orientation according to reference direction
	Q_DLRBG	2	Train front position according to reference direction
	L_DOUBTOVER	15	
	L_DOUBTUNDER	15	

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Q_LENGTH	2	
L_TRAININT	15	If Q_LENGTH = "Train integrity confirmed by integrity monitoring device" or "Train integrity confirmed by driver"
V_TRAIN	7	
Q_DIRTRAIN	2	Actual running direction according to reference direction
M_MODE	4	
M_LEVEL	3	
NID_NTC	8	If M_LEVEL = NTC

7.4.3.3 Packet Number 3: Onboard telephone numbers

7.4.3.4 Packet Number 4: Error reporting

7.4.3.4.1 Packet Number 5: Train running number

7.4.3.4.2 Packet Number 9: Level 2/3 transition information

Description	Identity of the level 2/3 transition balise group		
Transmitted to	RBC		
Content	Variable	Length	Comment
	NID_PACKET	8	
	L_PACKET	13	
	NID_LTRBG	10 + 14	

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7.4.3.5 Packet Number 11: Validated train data

7.4.3.6 Packet Number 44: Data used by applications outside the ERTMS/ETCS system.

7.4.4 PACKETS: TRACK TO TRAIN or TRAIN TO TRACK

7.4.4.1 Packet Number 255: End of Information

7.5 Definitions of Variables

7.5.0.1 A_NVMAXREDADH1

7.5.0.2 A_NVMAXREDADH2

7.5.0.3 A_NVMAXREDADH3

7.5.0.4 A_NVP12

7.5.0.5 A_NVP23

7.5.1.1 D_ADHESION

7.5.1.2 D_AXLELOAD

Name	Incremental distance to the start of the next Axle load speed profile		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.2.1 D_CURRENT

Name	Distance to change of allowed current consumption		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1 m or 10 m depending on Q_SCALE

7.5.1.3 D_CYCLOC

Name	Distance between two position reports from the train
Description	The train has to report its position every D_CYCLOC meters.

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	1111 ... 1111	The train has not to report cyclically its position.	

7.5.1.4 D_DP

Name	Distance from the End of Authority to danger point		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.5 D_EMERGENCYSTOP

Name	Distance to emergency stop location		
Description	Distance between the LRBG and the emergency stop location		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.6 D_ENDTIMERSTARTLOC

Name	Distance from End section timer start location to End of Authority		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.7 D_GRADIENT

Name	Incremental distance to next change of gradient.		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>

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15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.
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7.5.1.8 D_INFill

Name	Distance to location where to connect/disconnect to a radio infill unit		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.9 D_LEVELTR

Name	Distance to level transition		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE.
Special/Reserved Values	32767	Now (The level transition is performed upon receipt of the order)	

7.5.1.10 D_LINK

Name	Incremental linking distance to next linked balise group		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.11 D_LOC

Name	Incremental distance between locations where the train has to report its position.		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.12 D_LOOP

Name	Distance between EOLM and start of loop		
Description	The EOLM specifies the distance to the beginning of the loop transmission		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	1111 ... 1111	Distance not known	

7.5.1.13 D_LRBG

Name	Distance between the last relevant balise group and the estimated front end of the train (the side of the active cab).		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	Unknown	

7.5.1.13.1 D_LX

Name	Distance to LX start location		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.14 D_MAMODE

Name	Incremental distance to the start of the next Mode Profile		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE
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7.5.1.15 D_NVOVTRP

Name	Maximum distance for overriding the train trip		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.16 D_NVPOTRP

Name	Maximum distance for reversing in Post Trip mode		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.17 D_NVROLL

Name	Roll away distance limit		
Description	This variable is part of the National Values and is used for Roll Away Protection and Reverse Movement Protection. Within the (national/default) limits of D_NVROLL the train may be moved for uncoupling.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	∞	

7.5.1.18 D_NVSTFF

Name	Maximum distance for running in Staff Responsible mode		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE

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Special/Reserved Values	32767	∞
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7.5.1.19 D_OL

Name	The distance from the End of Authority to the end of overlap		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.19.1 D_PBD

Name	Permitted Braking Distance		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.19.2 D_PBD^{SR}

Name	Incremental distance to the start of the next speed restriction to ensure permitted braking distance		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.20 D_POSOFF

Name	Offset from the location reference of the geographical position reference balise group to the related track kilometre reference.		
Description	The geographical position reporting function uses this variables content as an offset from the location reference of the geographical position reference balise group to the related track kilometre reference.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.21 D_RBCTR

Name	Distance to RBC transition		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.22 D_REF

Name	Reference distance		
Description	Distance between the LRBG and the new shifted location reference. The positive values are in the nominal direction of the LRBG		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.
Special/Reserved Values	The negative value are coded in 2's complement		

7.5.1.23 D_REVERSE

Name	Maximum distance to run in RV mode		
Description	Distance from reference location to end location of the distance to run in RV mode		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	represents ∞	

7.5.1.24 D_SECTIONTIMERSTOPLOC

Name	Distance from beginning of section to the Section Time-out stop location		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.25 D_SR

Name	Distance in SR mode		
Description	Distance that can be run in SR mode		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
<i>Special/Reserved Values</i>	32767	Represents ∞	

7.5.1.26 D_STARTOL

Name	Distance from overlap timer start location to End of Authority		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.27 D_STARTREVERSE

Name	Distance to start of reversing permitted area		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.28 D_STATIC

Name	Incremental distance to next discontinuity in a international SSP profile		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.29 D_SUITABILITY

Name	Distance to change in route suitability		
Description	The incremental distance to where the route suitability data changes.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.30 D_TAFDISPLAY

Name	Distance from where on a track ahead free request shall be displayed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.31 D_TEXTDISPLAY

Name	Distance from where on a text shall be displayed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	1111 ... 1111	The display of the text shall not be distance limited.	

7.5.1.32 D_TRACKINIT

Name	Distance to start of empty profile		
Description	Distance to where initial states of the related track description in the packet shall be resumed		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.33 D_TRACKCOND

Name	Track condition distance		
Description	The incremental distance to where the track conditions change.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.34 D_TRACTION

Name	Distance to change of traction		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.35 D_TSR

Name	Distance to beginning of temporary speed restriction		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.36 D_VALIDNV

Name	Distance to start of validity of national values		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	Now (National Values are immediately applicable)	

7.5.1.37 G_A

Name	Safe gradient		
Description	This is the absolute value of the minimum gradient between two defined locations.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	254‰	1‰
Special/Reserved Values	255	Non numerical value telling that the current gradient description ends at D_GRADIENT(n)	

7.5.1.37.1 G_PBD^{SR}

Name	Default gradient for PBD Speed restriction		
Description	Defines a default gradient to be used for calculation of speed restriction to ensure permitted braking distance		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255‰	1‰

7.5.1.38 G_T^{SR}

Name	Default gradient for T ^{SR} supervision		
Description	defines a default gradient to be used for T ^{SR} supervision when no gradient profile (packet 21) is available.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255‰	1‰

7.5.1.39 L_ACK^{LEVEL}TR

Name	Length of the acknowledgement area in rear of the required ^{level}		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.40 L_ACKMA^{MODE}

Name	Length of the acknowledgement area in rear of the start of the required ^{mode}		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.41 L_ADHESION

Name	Length of reduced adhesion		
Description	Length for which the reduced adhesion factor apply.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1 m or 10 m depending on Q_SCALE

7.5.1.42 L_AXLELOAD

Name	Length of speed restriction due to Axle load		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.43 L_DOUBTOVER

Name	L_DOUBTOVER		
Description	L_DOUBTOVER is the over-reading amount plus the Q_LOCACC of the LRBG		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	Unknown	

7.5.1.44 L_DOUBTUNDER

Name	L_DOUBTUNDER		
Description	L_DOUBTUNDER is the under-reading amount plus the Q_LOCACC of the LRBG		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	Unknown	

7.5.1.45 L_ENDSECTION

Name	Length of the End section in the MA		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.46 L_LOOP

Name	Length of loop		
Description	L_LOOP specifies the length of the loop starting from the distance indicated by D_LOOP		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	1111 ... 1111	Length not known	

7.5.1.46.1 L_LX

Name	Length of the LX area		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.47 L_MA^{MODE}

Name	Length of the area of the required ^{mode}		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.660 km	10 cm, 1m or 10 m depending on Q_SCALE
Special/Reserved Values	1111...111	Infinite length	

7.5.1.48 L_MESSAGE

Name	Message length		
Description	L_MESSAGE indicates the length of the message in bytes, including all packets and all variables defined in the message header (NID_MESSAGE and L_MESSAGE also).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1023	1 Byte

7.5.1.48.1 L_NVKRINT

Name	Train length step used to define the integrated correction factor Kr		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
5 bits			
Special/Reserved Values	0	0m	
	1	25m	
	2	50m	
	3	75m	
	4	100m	
	5	150m	
	6	200m	

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	7	300m
 (steps of 100m)
	31	2700m

7.5.1.49 L_PACKET

Name	Packet length		
Description	L_PACKET indicates the length of the packet in bits, including all bits of the packet header		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
13 bits	0	8191	1 bit

7.5.1.49.1 L_PBD^{SR}

Name	Length of speed restriction to ensure permitted braking distance		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE.

7.5.1.50 L_REVERSEAREA

Name	Length of the reversing permitted area		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.51 L_SECTION

Name	Length of section in the MA		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.51.1 L_STOPLX

Name	Length of the stopping area in rear of the start location of the LX area		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.52 L_TAFDISPLAY

Name	Length on which a track ahead free request shall be displayed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.53 L_TEXT

Name	Length of text string		
Description	L_TEXT defines the length of a text string (L_TEXT * X_TEXT)		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	1 Text String Element

7.5.1.54 L_TEXTDISPLAY

Name	Length on which a text shall be displayed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.660 km	10 cm, 1m or 10 m depends on Q_SCALE
Special/Reserved Values	32767	The display of the text shall not be distance limited.	

7.5.1.55 L_TRACKCOND

Name	Length for which the defined track condition is valid		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE

7.5.1.56 L_TRAIN

Name	Train length		
Description	This is the absolute real length of the train.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
12 bits	0 m	4095 m	1 m

7.5.1.57 L_TRAININT

Name	Safe Train length		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 m	32767 m	1 m

7.5.1.58 L_TSR

Name	Length of the temporary speed restriction		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits	0 cm	327.670 km	10 cm, 1m or 10 m depends on Q_SCALE

7.5.1.59 M_ACK

Name	Qualifier for acknowledgement request
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Description	Indicates whether the telegram must be acknowledged or not		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No acknowledgement required	
	1	Acknowledgement required	

7.5.1.60 M_ADHESION

Name	Adhesion factor		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Slippery rail	
	1	Non slippery rail	

7.5.1.61 M_AIRTIGHT

Name	airtight system presence		
Description	indicates whether the train is fitted with an airtight system or not.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	Not fitted	
	01	Fitted	
	10	Spare	
	11	Spare	

7.5.1.62 M_AXLELOADCAT

Name	Axle load category
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Description	<p>The values allocated below correspond to a list of increasing axle load categories (i.e. B1 > HS17, B2 > B1, D2 > C4,etc) and it is used by the on-board equipment to compare its axle load category with the axle load category sent by trackside.</p> <p>For the underlying meaning of the axle load categories listed below (with the exception of HS17) refer to CR INF TSI.</p> <p>The category HS17 (axle load <= 17t) corresponds to a static load per axle only, as specified in HS RST TSI clause 4.2.3.2. The introduction of this artefact is necessary to ensure backward compatibility, without any negative performance impact, in case ASPs are used on lines operated with system version X = 1.</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits			
Special/Reserved Values	0	A	
	1	HS17	
	2	B1	
	3	B2	
	4	C2	
	5	C3	
	6	C4	
	7	D2	
	8	D3	
	9	D4	
	10	D4XL	
	11	E4	
	12	E5	
	13-127	Spare	

7.5.1.62.1 M_CURRENT

Name	Allowed current consumption		
Description	It defines the allowed current consumption to be used by the train		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0 A	10000 A	10 A
Special/Reserved Values	1001 - 1022	Spare	
	1023	No restriction for current consumption	

7.5.1.63 M_DUP

Name	Duplicate balise		
Description	Flags to tell whether the balise is a duplicate of one of the adjacent balises.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	No duplicates	
	01	This balise is a duplicate of the next balise (seen in the nominal direction of the balise group).	
	10	This balise is a duplicate of the previous balise (seen in the nominal direction of the balise group).	
	11	Spare	

7.5.1.64 M_ERROR

Name	Identifier of the type of error		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits			
Special/Reserved Values	0	Balise group: linking consistency error (ref. 3.16.2.3)	

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1	Linked balise group: message consistency error(ref. 3.16.2.4.1/4)
2	Unlinked balise group: message consistency error (ref. 3.16.2.5)
3	Radio: message consistency error (ref. 3.16.3.1.1a,c)
4	Radio: sequence error (ref. 3.16.3.1.1b)
5	Radio: safe radio connection error (ref. 3.16.3.4, to be sent when communication links re-established)
6	Safety critical failure (ref 4.4.6.1.6 , 4.4.15.1.5)
7	Double linking error (3.16.2.7.1)
8	Double repositioning error (3.16.2.7.2)
9-255	Spare

7.5.1.65 M_LEVEL

Name	Current Operating Level		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
3 bits			
Special/Reserved Values	0	Level 0	
	1	Level NTC specified by NID_NTC	
	2	Level 1	
	3	Level 2	
	4	Level 3	
	5-7	Spare	

7.5.1.66 M_LEVELTEXTDISPLAY

Name	Onboard operating level for text display
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Description	The text is displayed when entering / as long as in the defined level		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
3 bits			
Special/Reserved Values	0	Level 0	
	1	Level NTC specified by NID_NTC	
	2	Level 1	
	3	Level 2	
	4	Level 3	
	5	The display of the text shall not be limited by the level	
	6-7	Spare	

7.5.1.67 M_LEVELTR

Name	Required level		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
3 bits			Bitset
Special/Reserved Values	0	Level 0	
	1	Level NTC specified by NID_NTC	
	2	Level 1	
	3	Level 2	
	4	Level 3	
	5-7	Spare	

7.5.1.67.1 M_LINEGAUGE

Name	Line gauge
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Description	Defining which loading gauge(s) are permitted on a line (refer to TSI INF)		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits			Bitset
Special/Reserved Values	xxxx xxx1	G1	
	xxxx xx1x	GA	
	xxxx x1xx	GB	
	xxxx 1xxx	GC	
	00000000	Spare	
	xxx1 xxxx	Spare	
	xx1x xxxx	Spare	
	x1xx xxxx	Spare	
	1xxx xxxx	Spare	

7.5.1.68 M_LOADINGGAUGE

Name	Loading gauge		
Description	Defining the loading gauge profile of a train (refer to TSI RST)		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits			
Special/Reserved Values	0	The train does not fit to any of the interoperable loading gauge profiles	
	1	G1	
	2	GA	
	3	GB	
	4	GC	
	5-255	Spare	

7.5.1.69 M_LOC

Name	Special location/moment where the train has to report its position		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
3 bits			
Special/Reserved Values	000	Now (The position report is sent upon receipt of the order)	
	001	Every LRBG compliant balise group.	
	010	Do not send position report on passage of LRBG compliant balise group.	
	011 - 111	Spare	

7.5.1.70 M_MAMODE

Name	Required mode for a part of the MA		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	On Sight	
	01	Shunting	
	10	Limited Supervision	
	11	Spare	

7.5.1.71 M_MCOUNT

Name	Message counter		
Description	The purpose of this counter is to make it possible for the ERTMS/ETCS on-board to detect which balise group message the telegram belongs to.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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8 bits	0	253	Numbers
Special/Reserved Values	254	The telegram never fits any message of the group	
	255	The telegram fits with all telegrams of the same balise group	

7.5.1.72 M_ **MODE**

Name	Onboard operating mode		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits			
Special/Reserved Values	0	Full Supervision	
	1	On Sight	
	2	Staff Responsible	
	3	Shunting	
	4	Unfitted	
	5	Sleeping	
	6	Stand By	
	7	Trip	
	8	Post Trip	
	9	System Failure	
	10	Isolation	
	11	Non Leading	
	12	Limited Supervision	
	13	National System	
	14	Reversing	
	15	Passive Shunting	

7.5.1.73 M_MODETEXTDISPLAY

Name	Onboard operating mode for text display		
Description	The text is displayed when entering / as long as in the defined mode		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits			
Special/Reserved Values	0	Full Supervision	
	1	On Sight	
	2	Staff Responsible	
	3	Spare	
	4	Unfitted	
	5	Spare	
	6	Stand By	
	7	Trip	
	8	Post Trip	
	9	Spare	
	10	Spare	
	11	Non Leading	
	12	Limited Supervision	
	13	Spare	
	14	Reversing	
	15	The display of the text shall not be limited by the mode.	

7.5.1.73.1 M_NVAADH

Name	Weighting factor for available wheel/rail adhesion
Description	This variable is part of the National Values.

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
5 bits	0	1.00	0.05
Special/Reserved Values	1.05 – 1.55	Spare	

7.5.1.74 M_NVCONTACT

Name	T_NVCONTACT reaction		
Description	Indicates the reaction to be performed when T_NVCONTACT timer elapses This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
2 bits			
Special/Reserved Values	00	Train trip	
	01	Apply service brake	
	10	No Reaction	
	11	Spare	

7.5.1.75 M_NVDERUN

Name	Entry of Driver ID permitted while running		
Description	This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	No	
	1	Yes	

7.5.1.75.1 M_NVEBCL

Name	Confidence level for emergency brake safe deceleration on dry rails
Description	This variable is part of the National Values.

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	<p>Based on the required confidence level, the on-board equipment selects its corresponding rolling stock correction factor $K_{dry_rst}(V)$.</p> <p>The confidence level on emergency brake safe deceleration represents the probability of the following individual event: the rolling stock emergency brake subsystem of the train does ensure a deceleration at least equal to $A_{brake_emergency}(V) * K_{dry_rst}(V)$, when the emergency brake is commanded on dry rails.</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits			
Special/Reserved Values	0	Confidence level = 50 %	
	1	Confidence level = 90 %	
	2	Confidence level = 99 %	
	3	Confidence level = 99.9 %	
	4	Confidence level = 99.99%	
	5	Confidence level = 99.999 %	
	6	Confidence level = 99.9999 %	
	7	Confidence level = 99.99999 %	
	8	Confidence level = 99.999999 %	
	9	Confidence level = 99.9999999 %	
	10-15	Spare	

7.5.1.75.2 M_NVKRINT

Name	Integrated correction factor Kr
Description	<p>This is the train length dependent integrated correction factor.</p> <p>$M_NVKRINT(l)$ is valid for a train length between $L_NVKRINT(l)$ and $L_NVKRINT(l+1)$.</p> <p>$M_NVKRINT$ is valid between 0m and $L_NVKRINT(1)$</p> <p>This variable is part of the National Values</p>

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
5 bits	0	1.55	0.05

7.5.1.75.3 M_NVKTINT

<i>Name</i>	Integrated correction factor Kt		
<i>Description</i>	This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
5 bits	0	1.55	0.05

7.5.1.75.4 M_NVKVINT

<i>Name</i>	Integrated correction factor Kv		
<i>Description</i>	<p>This is the speed dependent integrated correction factor.</p> <p>M_NVKVINT(n) is valid for an estimated speed between V_NVKVINT(n) and V_NVKVINT(n+1).</p> <p>M_NVKVINT is valid between 0 km/h and V_NVKVINT(1)</p> <p>This variable is part of the National Values</p>		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
7 bits	0	2.54	0.02

7.5.1.75.5 M_PLATFORM

<i>Name</i>	Type of platform		
<i>Description</i>	Nominal height of platform above rail level (refer to TSI infrastructure)		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
4 bits			
<i>Special/Reserved Values</i>	0000	200 mm	
	0001	300-380 mm	
	0010	550 mm	

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0011	580 mm
0100	680 mm
0101	685 mm
0110	730 mm
0111	760 mm
1000	840 mm
1001	900 mm
1010	915 mm
1011	920 mm
1100	960 mm
1101	1100 mm
1110 – 1111	Spare

7.5.1.76 M_POSITION

Name	Track kilometre reference value		
Description	The geographical position reporting function uses this variables content as a reference value.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
24 bits	0 m	9'999'999 m	1 m
Special/Reserved Values	10'000'000-16'777'214	Spare	
	16'777'215	No more geographical position calculation after this reference location	

7.5.1.77 M_TRACKCOND

Name	Type of track condition		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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4 bits		
Special/Reserved Values	0000	Non stopping area. Initial state: stopping permitted
	0001	Tunnel stopping area. Initial state: no tunnel stopping area
	0010	Sound horn. Initial state: no request for sound horn
	0011	Powerless section – lower pantograph. Initial state: not powerless section
	0100	Radio hole (stop supervising T_NVCONTACT). Initial state: supervise T_NVCONTACT
	0101	Air tightness. Initial state: no request for air tightness
	0110	Switch off regenerative brake. Initial state: regenerative brake on
	0111	Switch off eddy current brake for service brake. Initial state: eddy current brake for service brake on
	1000	Switch off magnetic shoe brake. Initial state: magnetic shoe brake on
	1001	Powerless section – switch off the main power switch. Initial state: not powerless section
	1010	Switch off eddy current brake for emergency brake. Initial state: eddy current brake for emergency brake on
	1011 –1111	Spare

7.5.1.78 M_VOLTAGE

Name	Traction System voltage		
Description	<p>It indicates the voltage of the traction system installed on a specific line or respectively that can be used by an engine</p> <p>The identity of the traction system is given by M_VOLTAGE and, if M_VOLTAGE ≠ 0, by the country identifier of the traction system (NID_CTRACTION)</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits			
Special/Reserved Values	0	Line not fitted with any traction system	

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	1	AC 25 kV 50 Hz
	2	AC 15 kV 16.7 Hz
	3	DC 3 kV
	4	DC 1.5 kV
	5	DC 600/750 V
	6-15	Spare

7.5.1.79 M_VERSION

Name	Version of ETCS system		
Description	<p>This gives the version of the ETCS system</p> <p>Each part indicates the first and second number of the version respectively.</p> <ul style="list-style-type: none"> - The first number distinguishes not compatible versions. (The three MSB's) - The second number indicates compatibility within a version X. (The four LSB's) 		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits			
Special/Reserved Values	000 XXXX	Previous versions according to e.g. EEIG SRS, UIC A200 SRS	
	001 0000	Version 1.0, introduced in SRS 1.2.0 and re-used in SR Ss 2.0.0, 2.2.2, 2.3.0	
	001 0001	Version 1.1, introduced in SRS 3.3.0	
	001 0010	Not valid	
		
	001 1111	Not valid	
	010 0000	Version 2.0, introduced in SRS 3.3.0	
	010 0001	Reserved for future use (this is a valid value)	
	
	111 1111	Reserved for future use (this is a valid value)	

7.5.1.79.1 N_AXLE

Name	Axle number of the engine		
Description	This gives the number of axles of the single unit (fixed train set or locomotive) in which the onboard equipment is fitted		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1022	integers
Special/Reserved Values	1023	Unknown	

7.5.1.80 N_ITER

Name	Number of iterations of a data set following this variable in a packet		
Description	If N_ITER is 0 then no data set is following. Two nested levels of iterations can exist.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
5 bits	0	31	integers

7.5.1.81 N_PIG

Name	Position in Group		
Description	Defines the relative position in a balise group		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
3 bits			
Special/Reserved Values	0	I am the 1 st	
	
	7	I am the 8 th	

7.5.1.82 N_TOTAL

Name	Total number of balise(s) in the group
Description	

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
3 bits			
Special/Reserved Values	0	1 balise in the group	
	...		
	7	8 balises in the group	

7.5.1.82.1 NC_CDDIFF

Name	Cant Deficiency SSP category		
Description	<p>It is the "Cant Deficiency" SSP category for which a different value for the static line speed exists.</p> <p>Used together with V_DIFF to permit certain trains to go faster or lower than the "international basic static speed" given by V_STATIC.</p>		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
4 bits	0	15	
Special/Reserved Values	0	Specific SSP applicable to Cant Deficiency 80 mm	
	1	Specific SSP applicable to Cant Deficiency 100 mm	
	2	Specific SSP applicable to Cant Deficiency 130 mm	
	3	Specific SSP applicable to Cant Deficiency 150 mm	
	4	Specific SSP applicable to Cant Deficiency 165 mm	
	5	Specific SSP applicable to Cant Deficiency 180 mm	
	6	Specific SSP applicable to Cant Deficiency 210 mm	
	7	Specific SSP applicable to Cant Deficiency 225 mm	
	8	Specific SSP applicable to Cant Deficiency 245 mm	
	9	Specific SSP applicable to Cant Deficiency 275 mm	
	10	Specific SSP applicable to Cant Deficiency 300 mm	
	11 - 15	Spare	

7.5.1.82.2 NC_CDTRAIN

Name	Cant Deficiency Train Category		
Description	<p>Cant Deficiency Train category to which the train belongs.</p> <p>Thanks to NC_CDTRAIN, the train knows the "Cant Deficiency" SSP it must obey. By receiving a list of static speed profile, thanks to NC_CDDIFF, the train can select the "Cant Deficiency" SSP best suiting its NC_CDTRAIN.</p> <p>A train belongs to one and only one category of Cant Deficiency.</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits	0	15	
Special/Reserved Values	0	Cant Deficiency 80 mm	
	1	Cant Deficiency 100 mm	
	2	Cant Deficiency 130 mm	
	3	Cant Deficiency 150 mm	
	4	Cant Deficiency 165 mm	
	5	Cant Deficiency 180 mm	
	6	Cant Deficiency 210 mm	
	7	Cant Deficiency 225 mm	
	8	Cant Deficiency 245 mm	
	9	Cant Deficiency 275 mm	
	10	Cant Deficiency 300 mm	
	11 - 15	Spare	

7.5.1.83 NC_DIFF

Name	Other specific SSP category
Description	<p>It is the "other specific" SSP category for which a different value for the static line speed exists.</p> <p>Used together with V_DIFF to permit trains belonging to the corresponding "other international" train</p>

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	category to go faster or lower than the "international basic static speed" given by V_STATIC. Value 0 of NC_DIFF corresponds to the LSB of NC_TRAIN, value 14 of NC_DIFF to MSB (15-bit variable) of NC_TRAIN.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits	0	15	Numbers
Special/Reserved Values	0	Specific SSP applicable to Freight train braked in "P" position	
	1	Specific SSP applicable to Freight train braked in "G" position	
	2	Specific SSP applicable to Passenger train	
	3-15	Spare	

7.5.1.84 NC_TRAIN

Name	Other International Train Category.		
Description	<p>Other train category (different from Cant Deficiency) to which the train belongs.</p> <p>Thanks to NC_TRAIN, the train knows the "Other specific" SSP category it must consider.</p> <p>By receiving a list of static speed profile, thanks to NC_DIFF, the train can select the SSP it must obey.</p> <p>Each bit represents one category.</p> <p>A train can belong to various categories.</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
15 bits			Bitset
Special/Reserved Values	000 0000 0000 0000	Train does not belong to any of the "Other International" Train Category	
	Xxx xxxx xxxx xxx1	Freight train braked in "P" position	
	Xxx xxxx xxxx xx1x	Freight train braked in "G" position	
	Xxx xxxx xxxx x1xx	Passenger train	
	Xxx xxxx xxx 1xxx	Spare	
	Xxx xxxx xxx1 xxxx	Spare	
	Xxx xxxx xx1x xxxx	Spare	

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Xxx xxxx x1xx xxxx	Spare
Xxx xxxx 1xxx xxxx	Spare
Xxx xxx1 xxxx xxxx	Spare
Xxx xx1x xxxx xxxx	Spare
Xxx x1xx xxxx xxxx	Spare
Xxx 1xxx xxxx xxxx	Spare
Xx1 xxxx xxxx xxxx	Spare
X1x xxxx xxxx xxxx	Spare
1xx xxxx xxxx xxxx	Spare

7.5.1.85 NID_BG (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Identity number of the balise group		
Description	Identity number of a balise group or loop within the country or region defined by NID_C.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
14 bits	0	16382	Numbers
Special/Reserved Values	16383	Identity is unknown (only to be used for Linking information)	

7.5.1.86 NID_C (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Identity number of the country or region		
Description	Code used to identify the country or region in which the balise group, the RBC or the RIU is situated. These need not necessarily follow administrative or political boundaries.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1023	Numbers

7.5.1.86.1 NID_CTRACTION (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Country identifier of the traction system
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Description	It identifies the information, additional to M_VOLTAGE, required to fully define the traction system.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1023	Numbers

7.5.1.87 NID_EM

Name	Emergency message identity		
Description	Identifies the number of the emergency message		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits			

7.5.1.88 NID_ENGINE (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Onboard ETCS identity		
Description	The ETCS identity number is uniquely defined for ERTMS/ETCS purposes		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
24 bits			

7.5.1.89 NID_LOOP (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Identity number of the loop		
Description	Identity number of a loop within the country or region defined by NID_C given in the EOLM balise header.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
14 bits	0	16383	Numbers

7.5.1.90 NID_LRBG

Name	Identity of last relevant balise group		
Description	Country/region identity (NID_C) + balise identity number of last relevant balise group (NID_BG).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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10 + 14 bits			
Special/Reserved Values	16777215	Unknown	

7.5.1.90.1 NID_LTRBG

Name	Identity of the level 2/3 transition balise group		
Description	Identity of the balise group at the level 2/3 transition location towards which the train is running. Country/region identity (NID_C) + balise identity number of the level 2/3 transition location balise group (NID_BG).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 + 14 bits			

7.5.1.90.2 NID_LX

Name	Identity number of the Level Crossing.		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	Number
Special/Reserved Values	0-126	Reserved for non RBC transmission (balise, loop or radio infill)	
	127-255	Reserved for RBC transmission	

7.5.1.91 NID_MESSAGE

Name	Message identifier		
Description	Message identifier. Regards defined values of NID_MESSAGE, refer to chapters 8.5.2 and 8.5.3		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	Numbers

7.5.1.91.1 NID_MN (Values to be assigned according to *Erreur ! Source du renvoi introuvable.*)

Name	Identity of Radio Network		
Description	The NID_MN identifies the GSM-R network the calling mobile station has to register with. The NID_MN consists of up to 6 digits which are entered left adjusted into the data field, the leftmost digit is the digit to be dialled first. In case the NID_MN is shorter than 6 digits, the remaining space is to be filled with special character "F". For further information about NID_MN refer to Subset-54.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
24 bits	0	999999	Binary Coded Decimal
Special/Reserved Values	For each digit ;		
	Values A – E	Not Used	
	F	Use value F for digit to indicate no digit (if number shorter than 6 digits)	

7.5.1.92 NID_OPERATIONAL

Name	Train Running Number		
Description	This is the operational train running number. The NID_OPERATIONAL consists of up to 8 digits which are entered left adjusted into the data field, the leftmost digit is the digit to be entered first. In case the NID_OPERATIONAL is shorter than 8 digits, the remaining space is to be filled with special character "F".		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
32 bits	0	9999 9999	Binary Coded Decimal
Special/Reserved Values	For each digit ;		
	Values A – E	Spare	
	F	Use value F for digit to indicate no digit (if number shorter than 8 digits)	
	FFFF FFFF	Spare	

7.5.1.93 NID_PACKET

Name	Packet identifier
Description	This is used in the header for each packet, allowing the receiving equipment to identify the data which

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	follows. Regards defined values of NID_PACKET, refer to "packet numbers" in the tables in chapter 7.4.1.		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
8 bits	0	255	Numbers

7.5.1.94 NID_PRVLRBG

<i>Name</i>	Identity of previous LRBG		
<i>Description</i>	<p>Previous LRBG detected when running towards the balise group identified as LRBG with no change of direction in-between.</p> <p>Country/region identity (NID_C) + balise identity number of the previous LRBG (NID_BG).</p>		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
10 + 14 bits			
<i>Special/Reserved Values</i>	16777215	unknown	

7.5.1.95 NID_RADIO (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

<i>Name</i>	Radio subscriber number.		
<i>Description</i>	<p>Quoted as a 16 digit decimal number.</p> <p>The number is to be entered "left adjusted" starting with the first digit to be dialled. Padding by the special value F shall be added after the least significant digit of the number.</p> <p>For further information about NID_RADIO refer to SUBSET-054.</p>		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
64 bits	0	9999 9999 9999 9999	Binary Coded Decimal
<i>Special/Reserved Values</i>	For each digit ;		
	Values A – E	Not Used	
	F	Use value F for digit to indicate no digit (if number shorter than 16 digits)	
	FFFF FFFF FFFF FFFF	Use the short number stored onboard	

7.5.1.96 NID_RBC (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	RBC ETCS identity number		
Description	This variable provides the identity of the RBC belonging to NID_C. The RBC ETCS identity is given by NID_C + NID_RBC.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
14 bits	0	16 382	Number
Special/Reserved Values	16 383	Contact last known RBC	

7.5.1.97 NID_RIU (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Identity of radio infill unit		
Description	This variable provides the identity of the RIU belonging to NID_C. The RIU ETCS identity is given by NID_C + NID_RIU.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
14 bits	0	16 383	Number

7.5.1.98 NID_NTC (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	National System identity		
Description	Each value of this variable represents the identity of a National System.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	

7.5.1.98.1 NID_TEXTMESSAGE

Name	Text message identifier		
Description	Identity of a text message from trackside to be used in a report of driver acknowledgement to the RBC		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	Number

7.5.1.99 NID_TSR

Name	Identity number of Temporary Speed Restriction.		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255	Number
Special/Reserved Values	0-126	Reserved for non RBC transmission (balise, loop or radio infill)	
	127-254	Reserved for RBC transmission	
	255	Non-revocable speed restriction (applicable for all transmission media)	

7.5.1.99.1 NID_VBCMK

Name	Marker for Virtual Balise Cover		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
6 bits	0	63	Number

7.5.1.100 NID_XUSER (Values to be assigned according to **Erreur ! Source du renvoi introuvable.**)

Name	Identity of user system		
Description	Identity of user system for which remainder of packet is intended.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
9 bits	0	511	Numbers

7.5.1.101 Q_ASPECT

Name	Aspect of "danger for shunting" signal		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			

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Special/Reserved Values	0	Stop if in SH mode
	1	Go if in SH mode

7.5.1.101.1 Q_CONTEXTDISPLAY

Name	Qualifier for text confirmation versus end of text display		
Description	Gives the relationship between the event "driver acknowledgement" and the list of events "location", "time", "mode", "level" defining the end condition for text display		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Driver acknowledgement always ends the text display, regardless of the end condition	
	1	Driver acknowledgement is an additional condition to end the display	

7.5.1.102 Q_DANGERPOINT

Name	Qualifier for danger point description.		
Description	This variable is set to 1 if either a danger point exists or a release speed has to be specified		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No danger point information	
	1	Danger point information to follow	

7.5.1.102.1 Q_DIFF

Name	Qualifier for specific SSP categories.		
Description	Indicates the type of specific SSP category		
	In case of "other specific" SSP, it tells ERTMS/ETCS on-board equipment whether it replaces or not the Cant Deficiency SSP as selected by on-board (ref. 3.11.3.2.3), when the train belongs to an "other international" train category to which the "other specific" SSP applies		
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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2 bits			
Special/Reserved Values	0	Cant Deficiency specific category	
	1	Other specific category, replaces the Cant Deficiency SSP	
	2	Other specific category, does not replace the Cant Deficiency SSP	
	3	Spare	

7.5.1.103 Q_DIR

Name	Validity direction of transmitted data		
Description	Qualifier to indicate the relevant validity direction of transmitted data, with reference to directionality of the balise group sending the information or to directionality of the LRBG, in case of information sent via radio.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	Reverse	
	01	Nominal	
	10	Both directions	
	11	Spare	

7.5.1.104 Q_DIRLRBG

Name	Orientation of the train in relation to the direction of the LRBG		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	0	Reverse	
	1	Nominal	
	2	Unknown	

	3	Spare
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7.5.1.105 Q_DIRTRAIN

Name	Direction of train movement in relation to the LRBG orientation		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	0	Reverse	
	1	Nominal	
	2	Unknown	
	3	Spare	

7.5.1.106 Q_DLRBG

Name	Qualifier telling on which side of the LRBG the estimated front end is		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	0	Reverse	
	1	Nominal	
	2	Unknown	
	3	Spare	

7.5.1.107 Q_EMERGENCYSTOP

Name	Qualifier for emergency stop acknowledgement
Description	Qualifier to inform the RBC about the use of emergency stop by on-board equipment.

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
2 bit			
Special/Reserved Values	0	Conditional Emergency Stop accepted, with update of EOA	
	1	Conditional Emergency Stop accepted, with no update of EOA	
	2	Unconditional Emergency Stop accepted	
	3	Emergency stop (Conditional or Unconditional) rejected, whatever the reason	

7.5.1.108 Q_ENDTIMER

Name	Qualifier to indicate whether end section timer information exists for the End section in the MA		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	No End section timer information	
	1	End section timer information to follow	

7.5.1.109 Q_FRONT

Name	Qualifier for validity end point of profile element		
Description	Qualifier to indicate if a speed limit given for a profile element is to be applied until the front of the train (no train length delay) or the end of the train (train length delay) has left the element		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	Train length delay on validity end point of profile element.	
	1	No train length delay on validity end point of profile element	

7.5.1.110 Q_GDIR

Name	Qualifier for gradient slope.
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Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	downhill	
	1	uphill	

7.5.1.111 Q_INFILL

Name	Qualifier to indicate whether a train is entering or exiting the radio infill area.		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Enter	
	1	Exit	

7.5.1.112 Q_LENGTH

Name	Qualifier for train integrity status		
Description	Qualifier, identifying the train integrity information available. The related safe train length information is given by L_TRAININT		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	0	No train integrity information available	
	1	Train integrity confirmed by integrity monitoring device	
	2	Train integrity confirmed by driver	
	3	Train integrity lost	

7.5.1.113 Q_LGTLOC

Name	Qualifier for the specified report location		
Description	This qualifier tells whether the train has to report its position when the max safe front end or when the min safe rear end has over passed the location defined by D_LOC		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Min safe rear end	
	1	Max safe front end	

7.5.1.114 Q_LINK

Name	Link Qualifier		
Description	This qualifier is used to mark a balise group as linked or unlinked.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Unlinked	
	1	Linked	

7.5.1.115 Q_LOCACC

Name	Accuracy of the balise location		
Description	This Qualifier defines the absolute value of the accuracy of the Balise location (i.e., the value 63m identifies a location accuracy of +/- 63m)		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
6 bits	0 m	63 m	1 m

7.5.1.116 Q_LINKORIENTATION

Name	Qualifier for the direction of the linked balise group		
Description	Indicates whether the linked balise group will be overpassed by the train in nominal or reverse direction.		

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	The balise group is seen by the train in reverse direction	
	1	The balise group is seen by the train in nominal direction	

7.5.1.117 Q_LINKREACTION

Name	linking reaction		
Description	Qualifier for the reaction to be performed if a linking or a balise group message consistency problem occurs with the balise group linked to.		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
2 bits			
Special/Reserved Values	00	Train trip	
	01	Apply service brake	
	10	No Reaction	
	11	Spare	

7.5.1.118 Q_LOOPDIR

Name	Qualifier to indicate the direction of the loop		
Description	Indicates LOOP-reference direction in relation to EOLM direction		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	Opposite	
	1	Same	

7.5.1.118.1 Q_LXSTATUS

Name	LX Protection Status
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Description	Indicates whether the LX is protected or not		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	LX is protected	
	1	LX is not protected	

7.5.1.118.2 Q_MA **MODE**

Name	Qualifier to indicate the supervision of the beginning of the mode profile		
Description	This qualifier defines whether the beginning of the mode profile shall be considered either as the EOA (keeping the SvL given by the MA) or as both the EOA and SvL (instead of the EOA and SvL given by the MA).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	as the EOA (keeping the SvL given by the MA)	
	1	as both the EOA and SvL (instead of the EOA and SvL given by the MA)	

7.5.1.118.3 Q_MARQSTREASON

Name	Reason for MA request sending		
Description	Qualifier to indicate the reason why the MA request is sent to the RBC		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
5 bits			Bitset
Special/Reserved Values	xxxx1	Start selected by driver	
	xxx1x	Time before reaching pre-indication location for the EOA/LOA reached	
	xx1xx	Time before a section timer/LOA speed timer expires reached	
	x1xxx	Track description deleted	
	1xxxx	TAF up to level 2/3 transition location	

7.5.1.119 Q_MEDIA

Name	Qualifier to indicate the type of media		
Description	Indicates whether it is a balise telegram or a loop message		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Balise	
	1	Loop	

7.5.1.120 Q_MPOSITION

Name	Qualifier for track kilometre direction.		
Description	Qualifier to indicate the direction of counting of the geographical position track kilometre in relation to the geographical position reference balise group directionality.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit	0	1	
Special/Reserved Values	0	Opposite (counting downwards if passed in nominal direction or counting upwards if passed in reverse direction)	
	1	Same (counting upwards if passed in nominal direction or counting downwards if passed in reverse direction)	

7.5.1.121 Q_NEWCOUNTRY

Name	New Country Qualifier		
Description	<p>Qualifier to indicate whether the next balise group is in the same country / railway administration as the one before inside the packet or not.</p> <p>For the first balise group in the packet, if Q_NEWCOUNTRY = 0, it is the same country / railway administration as the one of the LRBG within the radio message, the one of balise group within the balise telegram giving the packet, or the one of the loop within the loop message giving the packet.</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			

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Special/Reserved Values	0	Same country / railway administration, no NID_C follows
	1	Not the same country / railway administration, NID_C follows

7.5.1.122 Q_NVDRIVER_ADHES

Name	Qualifier for the modification of trackside adhesion factor by driver		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Not allowed	
	1	Allowed	

7.5.1.123 Q_NVEMRRLS

Name	Qualifier Emergency Brake Release		
Description	Permission to revoke the emergency brake command when the Permitted Speed limit is no longer exceeded or at standstill (for ceiling speed and target speed monitoring). This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Revoke emergency brake command at standstill	
	1	Revoke emergency brake command when permitted speed supervision limit is no longer exceeded	

7.5.1.123.1 Q_NVGUIPERM

Name	Permission to use the guidance curve		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			

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Special/Reserved Values	0	No
	1	Yes

7.5.1.123.2 Q_NVINHSMICPERM

Name	Permission to inhibit the compensation of the speed measurement inaccuracy		
Description	<p>Qualifier to inhibit the compensation of the speed measurement inaccuracy for the calculation of the EBI related supervision limits.</p> <p>This variable is part of the National Values</p>		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No	
	1	Yes	

7.5.1.123.3 Q_NVKINT

Name	Qualifier for integrated correction factors		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No integrated correction factors follow	
	1		

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d Value s		
	1	Integrated correction factors follow

7.5.1.123.4Q_NVKVINTSET

Name	Type of Kv_int set		
Descr iption			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Speci al/Re serve d Value s	00	Freight trains	
	01	Conventional passenger trains	
	10-11	Spare	

7.5.1.123.5Q_NVLOCACC

Name	Default accuracy of the balise location (absolute value)		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
6 bits	0 m	63 m	1 m

7.5.1.123.6Q_NVSBFBPERM

Name	Permission to use the service brake feedback		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No	
	1	Yes	

7.5.1.124 Q_NVSBTSMPerm

Name	Permission to use service brake in target speed monitoring		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No	
	1	Yes	

7.5.1.125 Q_ORIENTATION

Name	Co-ordinate system assigned to a single balise group		
Description	The co-ordinate system is assigned by the RBC to a balise group reported by the on-board equipment as LRBG. The information reverse/nominal (i.e., the assigned co-ordinate system) is given in relation to the direction in which the balise has been passed when reading it.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	The balise group has been passed by the train in reverse direction	
	1	The balise group has been passed by the train in nominal direction	

7.5.1.126 Q_OVERLAP

Name	Qualifier to tell whether there is an overlap		
Description	This variable is set to 1 if either an overlap exists or a release speed has to be specified		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No overlap information	
	1	Overlap information to follow	

7.5.1.126.1 Q_PBD^{SR}

Name	Qualifier for Permitted Braking Distance		
Description	Qualifier defining whether the permitted braking distance is to be achieved with the Service Brake or Emergency Brake		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	EB intervention requested	
	1	^{SB} intervention requested	

7.5.1.126.2 Q_PLATFORM

Name	Platform position (relative to direction of authorised movement)		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	Platform on left side	
	01	Platform on right side	
	10	Platform on both sides	
	11	Spare	

7.5.1.127 Q_RBC

Name	Qualifier for communication session order		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Terminate communication session	
	1	Establish communication session	

7.5.1.128 Q_RIU

Name	Qualifier for communication session order		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Terminate communication session	
	1	Establish communication session	

7.5.1.129 Q_SCALE

Name	Qualifier for the distance scale.		
Description	Qualifier to indicate the same scale used for describing all distances inside the packet that contains Q_SCALE.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	0	10 cm scale	
	1	1 m scale	
	2	10 m scale	
	3	Spare	

7.5.1.130 Q_SECTIONTIMER

Name	Qualifier to indicate whether there is a Section Time-Out related to the section		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No Section Timer information	
	1	Section Timer information to follow	

7.5.1.131 Q_SLEEPSESSION

Name	Session management for sleeping equipment		
Description	Qualifier for a Sleeping onboard equipment to execute or not the "session establishment" order		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Ignore session establishment order	
	1	Execute session establishment order	

7.5.1.132 Q_SRSTOP

Name	"Stop if in Staff Responsible" information		
Description	Specifies whether an onboard equipment in staff responsible has to stop or not		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	Stop if in SR mode	
	1	Go if in SR mode	

7.5.1.133 Q_SSCODE

Name	Spread Spectrum Code for Euroloop
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Description	Specifies the code required to receive telegrams from a specific Euroloop installation.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
4 bits	0	14	
Special/Reserved Values	15	Code reserved for test purposes	

7.5.1.134 Q_STATUS

Name	status of SoM position report		
Description	It provides the status of the position report		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	Invalid	
	01	Valid	
	10	Unknown	
	11	spare	

7.5.1.134.1 Q_STOPLX

Name	Qualifier for stopping in rear of the LX		
Description	Indicates whether stopping the train in rear of a non protected LX is required		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No stop required	
	1	Stop required	

7.5.1.135 Q_SUITABILITY

Name	Type of route suitability data
Description	

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
2 bits			
Special/Reserved Values	00	Loading gauge	
	01	Max axle load	
	10	Traction system	
	11	Spare	

7.5.1.136 Q_TEXT

Name	Fixed message to be displayed.		
Description	Q_TEXT is a pointer to select a fixed text message from the defined table. The language selected by the driver for the DMI shall be used additionally as a qualifier to choose the appropriate language table.		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
8 bits	0	255	
Special/Reserved Values	0	"Level crossing not protected"	
	1	"Acknowledgement"	
	2-255	Spare	

7.5.1.137 Q_TEXTCLASS

Name	Class of message to be displayed.		
Description	Q_TEXTCLASS specifies the class of the text message included in the same packet (either plain or fixed message)		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
2 bits			
Special/Reserved Values	00	Auxiliary Information	
	01	Important Information	
	10	Spare	

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	11	Spare
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7.5.1.138 Q_TEXTCONFIRM

Name	Qualifier for text confirmation		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/Reserved Values	00	No confirmation required	
	01	Confirmation required	
	10	Confirmation required: command application of the service brake when display end condition is fulfilled, unless the text has already been acknowledged by the driver	
	11	Confirmation required: command application of the emergency brake when display end condition is fulfilled, unless the text has already been acknowledged by the driver	

7.5.1.139 Q_TEXTDISPLAY

Name	Qualifier for the combination of text message eventss		
Description	Q_TEXTDISPLAY defines whether the start/end events for text message are to be combined or not		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
1 bit			
Special/Reserved Values	0	No, display as soon as / until one of the events is fulfilled	
	1	Yes, display as soon as / until all events are fulfilled	

7.5.1.140 Q_TEXTREPORT

Name	Qualifier for reporting acknowledgement of text by driver
Description	

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	No driver acknowledgement report required	
	1	Driver acknowledgement report required	

7.5.1.141 Q_TRACKINIT

Name	Qualifier for resuming the initial states of the related track description of the packet.		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	No initial states to be resumed, profile to follow	
	1	Empty profile, initial states to be resumed	

7.5.1.142 Q_UPDOWN

Name	Balise telegram transmission direction		
Description	It defines the direction of the information in the balise telegram		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			
Special/Reserved Values	0	Down link telegram	
	1	Up link telegram	

7.5.1.142.1 Q_VBCO

Name	Qualifier for Virtual Balise Cover order		
Description	Qualifier to set or remove a VBC		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
1 bit			

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Special/Reserved Values	0	Remove the Virtual Balise Cover
	1	Set the Virtual Balise Cover

7.5.1.143 T_CYCLOC

Name	Time Interval between two position reports sent by the train		
Description	The train must send its position every T_CYCLOC		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0 seconds	254 s	1s
Special/Reserved Values	255	∞	

7.5.1.144 T_CYCRQST

Name	Time between two cyclic requests for a movement authority		
Description	When the train asks for a movement authority request, it will repeat its request every T_CYCRQST seconds until it receives a new MA		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0 seconds	254 s	1s
Special/Reserved Values	255	No repetition	

7.5.1.145 T_ENDTIMER

Name	Validity time for the End section in the MA		
Description	Time for which the End section is valid measured from the moment the train reaches the location defined by D_ENDTIMERSTARTLOC.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1022	1 s
Special/Reserved Values	1023	∞	

7.5.1.146 T_LOA

Name	Validity time for the target speed at the LOA		
Description	Time for which the target speed is valid measured from the moment information is received		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1022	1 s
Special/Reserved Values	1023	∞	

7.5.1.147 T_MAR

Name	Time before reaching pre-indication location for the EOA/LOA		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	254	1 s
Special/Reserved Values	255	No MA request triggering with regards to this function	

7.5.1.148 T_NVCONTACT

Name	Maximal time without new "safe" message.		
Description	If no "safe" message has been received from the track for more than T_NVCONTACT seconds, an appropriate action according to M_NVCONTACT must be triggered. This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0s	254s	1s
Special/Reserved Values	1111 1111	T_NVCONTACT = ∞ .	

7.5.1.149 T_NVOVTRP

Name	Maximum time for overriding the train trip
Description	This variable is part of the National Values

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
8 bits	0 s	255 s	1 s

7.5.1.150 T_OL

Name	Overlap validity time		
Description	The time span the train can expect the overlap to be available, measured from the moment the train reaches the location defined by D_STARTOL.		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
10 bits	0	1022 s	1 s
Special/Reserved Values	1023	∞	

7.5.1.151 T_SECTIONTIMER

Name	Validity time of a section in the MA		
Description	Time for which the section is valid.		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
10 bits	0	1022	1 s
Special/Reserved Values	1023	∞	

7.5.1.152 T_TEXTDISPLAY

Name	Duration for which a text shall be displayed		
Description			
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
10 bits	0	1022 s	1 s
Special/Reserved Values	1023	Display of text not limited by time.	

7.5.1.153 T_TIMEOUTRQST

Name	Time before any section timer expires or the LOA speed timer expires
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Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0	1022	1 s
Special/Reserved Values	1023	No MA request triggering with regards to this function	

7.5.1.154 T_TRAIN

Name	Trainborne clock		
Description	Time, according to trainborne clock, at which message is sent		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
32 bits	0	42949672.94 s	10 ms
Special/Reserved Values	4294967295	Unknown	

7.5.1.154.1 T_VBC

Name	VBC validity period		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
8 bits	0	255 days	1 day

7.5.1.155 V_AXLELOAD

Name	Speed restriction related to axleload		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121 –127	Spare	

7.5.1.156 V_DIFF

Name	Absolute Positive Speed associated to a train category.
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Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.157 V_LOA

Name	Permitted speed at the limit of authority		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.157.1 V_LX

Name	Permitted speed for the LX speed restriction		
Description	Speed at which the LX can be passed when it is not protected		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.158 V_MAIN

Name	Signalling related speed restriction		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	
	V_MAIN = 0 means "trip order"		

7.5.1.159 V_MAXMODE

Name	Required mode related speed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0	600 km/h	5 km/h
Special/Reserved Values	121 – 126	Spare	
	127	Use the national speed value of the required mode	

7.5.1.160 V_MAXTRAIN

Name	Maximum train speed.		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0	600 km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.161 V_NVALLOWOVTRP

Name	Speed limit allowing the driver to select the “override” function		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.161.1 V_NVKVINT

Name	Speed step used to define the integrated correction factor Kv		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula

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7 bits	0 km/h	600km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.161.2 V_NVLIMSUPERV

Name	Limited Supervision mode speed limit		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.162 V_NVONSIGHT

Name	On Sight mode speed limit		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.163 V_NVSUPOVTRP

Name	Override speed limit to be supervised when the “override” function is active		
Description	This variable is part of the National Values		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.164 V_NVREL

Name	Release Speed		
Description	This variable is part of the National Values		

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.165 V_NVSHUNT

Name	Shunting mode speed limit		
Description	This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.166 V_NVSTFF

Name	Staff Responsible mode speed limit		
Description	This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.167 V_NVUNFIT

Name	Unfitted mode speed limit		
Description	This variable is part of the National Values		
<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.168 V_RELEASEDP

Name	Release speed associated with the danger point		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-125	Spare	
	126	Use onboard calculated release speed	
	127	Use national value	

7.5.1.169 V_RELEASEOL

Name	Release speed associated with the overlap		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-125	Spare	
	126	Use onboard calculated release speed	
	127	Use national value	

7.5.1.170 V_REVERSE

Name	Reversing mode speed limit		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.171 V_STATIC

Name	Basic static speed profile		
Description	Basic static speed profile speed after discontinuity (k).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0	600 km/h	5 km/h
Special/Reserved Values	121-126	Spare	
	127	Non numerical value telling that the static speed profile description ends at D_STATIC(n)	

7.5.1.172 V_TRAIN

Name	Train speed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0	600 km/h	5 km/h
Special/Reserved Values	121-127	Spare	

7.5.1.173 V_TSR

Name	Permitted speed for the temporary speed restriction		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	0 km/h	600 km/h	5 km/h
Special/Reserved Values	121 – 127	Spare	

7.5.1.174 X_TEXT

Name	Text String Element
Description	Text strings are used to transmit plain text messages. Each element of a text string contains a single character encoded as ISO 8859-1, also known as Latin Alphabet #1.

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<i>Length of variable</i>	<i>Minimum Value</i>	<i>Maximum Value</i>	<i>Resolution/formula</i>
8 bits			

8. CHAPTER 8 MESSAGES

8.1 Modification History

8.2 Table of Contents

8.3 Introduction

8.4 Rules

8.4.1 Common Rules

8.4.2 Rules for Eurobalise telegrams

8.4.2.1 The format of the telegram to be transmitted by each balise is as follows:

General Format of Balise Telegram			
Field No.	VARIABLE	Length (bits)	Remarks
1	Q_UPDOWN	1	Defines the direction of the information: Down-link telegram (train to track) (0) Up-link telegram (track to train) (1)
2	M_VERSION	7	Version of the ERTMS/ETCS system.
3	Q_MEDIA	1	Defines the type of media: Balise (0)
4	N_PIG	3	Position in the group. Defines the position of the balise in the balise group.
5	N_TOTAL	3	Total number of balises in the balise group
6	M_DUP	2	Used to indicate whether the information of the balise is a duplicate of the balise before or after this one.
7	M_MCOUNT	8	Message counter (M_MCOUNT) - 8 bits. To enable detection of a change of balise group message during passage of the balise group.
8	NID_C	10	Country or region.
9	NID_BG	14	Identity of the balise group.
10	Q_LINK	1	Marks the balise group as linked (Q_LINK = 1) or unlinked (Q_LINK = 0)
	Packet 0 (optional)	14	Virtual Balise Cover marker
	Information	Variable	This information is composed according to the rules applicable for packets.
	Packet 255	8	Finishing flag of the telegram

Number of bits in balise header: 50

8.4.2.2 The user information transmitted by a balise shall contain complete packets, i.e. splitting a packet between two balises is forbidden.

8.4.2.3 When used, the packet 0 shall be transmitted as the first packet of the telegram (i.e. it is appended to the header).

8.4.3 Rules for Euroloop messages

8.4.4 Rules for Euroradio messages

8.4.4.1 The message identifier is unique (variable NID_MESSAGE).

8.4.4.1.1 *All currently not defined message identifiers are reserved for future use and shall be considered as invalid values (i.e. like spare values). Exception: reception of information only differing by Y with regards to the highest system version number X supported by on-board (refer to section 3.17.3.11 b)).*

8.4.4.2 Each message shall indicate its own length through the use of the variable L_MESSAGE.

8.4.4.2.1 *If the computed length of the message is not equal to the length given by L_MESSAGE, the entire message shall be rejected.*

8.4.4.3 The messages shall be composed of predefined variables and packets.

8.4.4.4 For some messages, it shall be possible to add optional packets at the end of the message.

8.4.4.4.1 *The track to train messages possibly including optional packets are listed hereafter:*

Track to Train message	Mess. ID	Optional packets
SR Authorisation	2	63
Movement Authority	3	21, 27, 49, 80, plus common optional packets
Request To Shorten MA	9	49, 80
General Message	24	From RBC: 21, 27, plus common optional packets From RIU: 45, 143, 254
SH authorised	28	3, 44, 49
MA with Shifted Location Reference	33	21, 27, 49, 80, plus common optional packets

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Infill MA	37	5, 21, 27, 39, 40, 41, 44, 49, 51, 65, 66, 68, 69, 70, 71, 80, 88, 138, 139
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8.4.4.4.1.1 *The common optional packets are the following ones:*

Common optional packets
3, 5, 39, 40, 51, 41, 42, 44, 45, 52, 57, 58, 64, 65, 66, 68, 69, 70, 71, 72, 76, 79, 88, 131, 138, 139, 140

8.4.4.4.2 *The train to track message 136 (Train Position Report) and 157 (SoM Position Report) may optionally include the following packets:*

- a) *Packet 4 (Error Reporting),*
- b) *Packet 5 (Train running number),*
- c) *Packet 44 (Data used by applications outside the ERTMS/ETCS system).*

8.4.4.4.3 *The train to track message 159 (Session Established) may optionally include the following packets:*

- a) *Packet 3 (Onboard Telephone Numbers)*

8.4.4.4.4 *The train to track message 132 (MA request) may optionally include the following packet:*

- a) *Packet 9 (Level 2/3 transition information)*

8.4.4.5 *If needed to obtain an integer number of bytes, padding shall be added at the end of the message.*

8.4.4.6 Standard format of a radio message from track to train :

8.4.4.6.1 *Format:*

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Message Identification Number
2	L_MESSAGE	Message length including everything (from field 1 to padding inclusive).
3	T_TRAIN	Time Stamp from RBC (see sections 3.16.3.2 & 3.16.3.3).
4	M_ACK	Indicates whether the message must be acknowledged (or not) by the on-board equipment (message n° 146).
5	NID_LRBG	Identification Number of LRBG.
...	variables as required by NID_MESSAGE	If needed for this message. Used when sending variables which are not included in a packet.
...	packets as required by NID_MESSAGE	If needed for this message.
	Optional packets	Refer to section 8.4.4.4 of this document.
	Padding	If required.

8.4.4.6.2 *Note: In section 8.7 giving the contents of the messages, the padding information is intentionally omitted.*

8.4.4.6.3 *The track to train message 39 (Acknowledgement of termination of a communication session) shall include the variable M_ACK set to 0. Justification: see 3.5.5.3.*

8.4.4.7 Standard format of a radio message from train to track:

8.4.4.7.1 *Format:*

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Message Identification Number
2	L_MESSAGE	Message length including everything (from field 1 to padding inclusive).
3	T_TRAIN	Time Stamp from Train (see chapter 3 – Data Consistency).
4	NID_ENGINE	Identity of the train.
5	variables as required by NID_MESSAGE	If needed for this message. Used when sending variables which are not included in a packet.
6	Packet 0 or 1	Train-to-track packet type 0 – Position report, or packet type 1 - Position report based on two balise groups. Not included in messages 146, 154, 155, 156 and 159.
7	Other Packets as required by NID_MESSAGE	(only for message 129)
8	Optional packets	
	Padding	If required.

8.4.4.7.2 *Exception: The position report (packet 0 or packet 1) shall not be included in the following messages:*

- a) *Message 146 (Acknowledgement),*
- b) *Message 154 (No compatible version supported),*
- c) *Message 155 (Initiation of a communication session),*
- d) *Message 156 (Termination of a communication session),*

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e) *Intentionally deleted*

f) *Message 159 (Session Established).*

8.4.4.7.3 *Note: In section 8.6 giving the contents of the messages, the padding information is intentionally omitted.*

8.5 List of radio Messages

8.5.1 Introduction

- 8.5.1.1 This section identifies the radio messages with corresponding Message Identifier ("Mes. Id.") and Message Name. It also gives a list of the version-invariant messages.
- 8.5.1.2 "Type" defines whether a message is to be sent as normal priority (N) or as high priority data (E), as defined in Euroradio specifications.

8.5.2 Train to Track radio messages

Mes. Id.	Message Name	Type	Invariant	Transmitted to
129	Validated Train Data	N	No	RBC
130	Request for Shunting	N	No	RBC
132	MA Request	N	No	RBC
136	Train Position Report	N	No	RBC, RIU
137	Request to shorten MA is granted	N	No	RBC
138	Request to shorten MA is rejected	N	No	RBC
146	Acknowledgement	N	No	RBC, RIU
147	Acknowledgement of Emergency Stop	N	No	RBC
149	Track Ahead Free Granted	N	No	RBC
150	End of Mission	N	No	RBC
153	Radio infill request	N	No	RIU

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Mes. Id.	Message Name	Type	Invariant	Transmitted to
154	No compatible version supported	N	Yes	RBC, RIU
155	Initiation of a communication session	N	Yes	RBC, RIU
156	Termination of a communication session	N	Yes	RBC, RIU
157	SoM Position Report	N	No	RBC
158	Text message acknowledged by driver	N	No	RBC
159	Session Established	N	No	RBC, RIU

8.5.3 Track to Train radio messages

Mes. Id.	Message Name	Type	Invariant	Transmitted by
2	SR Authorisation	N	No	RBC
3	Movement Authority	N	No	RBC
6	Recognition of exit from TRIP mode	N	No	RBC
8	Acknowledgement of Train Data	N	No	RBC
9	Request to Shorten MA	N	No	RBC
15	Conditional Emergency Stop	E or N	No	RBC
16	Unconditional Emergency Stop	E or N	No	RBC
18	Revocation of Emergency Stop	N	No	RBC
24	General message	N	No	RBC, RIU
27	SH Refused	N	No	RBC
28	SH Authorised	N	No	RBC
33	MA with Shifted Location Reference	N	No	RBC
34	Track Ahead Free Request	N	No	RBC
37	Infill MA	N	No	RIU
40	Train Rejected	N	No	RBC
32	RBC/RIU System Version	N	Yes	RBC, RIU
38	Initiation of a communication session	N	Yes	RBC
39	Acknowledgement of termination of a	N	Yes	RBC, RIU

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Mes. Id.	Message Name	Type	Invariant	Transmitted by
	communication session			
41	Train Accepted	N	No	RBC
43	SoM position report confirmed by RBC	N	No	RBC
45	Assignment of coordinate system	N	No	RBC

8.6 Definition of Radio Messages from Train to Track

8.6.1 Message 129: Validated Train Data

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	Train - track packet type 11.
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Packet 0 or 1	
6	Train data	

8.6.2 Message 130: Request for Shunting

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Packet 0 or 1	

8.6.3 Message 132: MA Request

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Q_MARQSTREAS ON	
6	Packet 0 or 1	
7	Optional packets	

8.6.4 Message 136: Train Position Report

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Packet 0 or 1	
6	Optional packets	

8.6.5 Message 137: Request to Shorten MA is granted

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	Time stamp contained in the request.
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	T_TRAIN	
6	Packet 0 or 1	

8.6.6 Message 138: Request to Shorten MA is rejected

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	Time stamp contained in the request.
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	T_TRAIN	
6	Packet 0 or 1	

8.6.7 Message 146: Acknowledgement

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Time stamp contained in the message that is acknowledged.
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	T_TRAIN	

8.6.8 Message 147: Acknowledgement of Emergency Stop

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Identification Number of the acknowledged Emergency Message.
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	NID_EM	
6	Q_EMERGENCY STOP	
7	Packet 0 or 1	

8.6.9 Message 149: Track Ahead Free Granted

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Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Packet 0 or 1	

8.6.10 Message 150: End of Mission

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Packet 0 or 1	

8.6.11 Message 153: Radio infill request

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	NID_C	identity of the country of the "target" main balise group
6	NID_BG	identity of the "target" main balise group
7	Q_INFILL	start; end of infill
8	Packet 0 or 1	

8.6.12 Message 154: No compatible version supported**8.6.13 Message 155: Initiation of a communication session****8.6.14 Message 156: Termination of a communication session****8.6.15 Message 157: SoM Position Report**

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	NID_ENGINE	
5	Q_STATUS	
6	Packet 0 or 1	
7	Optional packets	

8.6.16 Message 158: Text Message Acknowledged by Driver

Field No.	VARIABLE/ PACKET	Remarks
1	NID_MESSAGE	

2	L_MESSAGE	Identity of the text message that the driver has acknowledged.
3	T_TRAIN	
4	NID_ENGINE	
5	NID_TEXTMESSAGE	
6	Packet 0 or 1	

8.6.17 Message 159: Session established

8.7 Definition of Radio Messages from Track to Train

8.7.1 Message 2: SR Authorisation

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	Q_SCALE	
7	D_SR	
8	Optional packets	

8.7.2 Message 3: Movement Authority

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	

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5	NID_LRBG	Packet 15
6	Level 2/3 Movement Authority	
7	Optional packets	

8.7.3 Message 6: Recognition of exit from TRIP mode

Field No.	VARIABLE	Remarks
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1	NID_MESSAGE
2	L_MESSAGE
3	T_TRAIN
4	M_ACK
5	NID_LRBG

8.7.4 Message 8: Acknowledgement of Train Data

Field No.	VARIABLE	Remarks
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1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	T_TRAIN	Reference to received train data message

8.7.5 Message 9: Request to Shorten MA

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Packet 15
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	Level 2/3 Movement Authority	
7	Optional packet	

Packet 80

8.7.6 Message 15: Conditional Emergency Stop

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Identification Number of the Emergency Stop Message.
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	NID_EM	
7	Q_SCALE	

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8	D_REF	
9	Q_DIR	
10	D_EMERGENCYSTOP	Distance between LRBG and the position reference to the emergency stop.

8.7.7 Message 16: Unconditional Emergency Stop

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Identification Number of the Emergency Stop Message.
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	NID_EM	

8.7.8 Message 18: Revocation of Emergency Stop

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Identification Number of the Emergency Stop Message.
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	NID_EM	

8.7.9 Message 24: General message

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	Optional packets	

8.7.10 Message 27: SH Refused

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Time stamp of the shunting request.
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	T_TRAIN	

8.7.11 Message 28: SH Authorised

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	Time stamp of the shunting request.
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	T_TRAIN	
7	Optional packets	

8.7.12 Message 32: RBC/RIU System Version

8.7.13 Message 33: MA with Shifted Location Reference

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	Q_SCALE	
7	D_REF	Reference Distance
8	Level 2/3 Movement Authority	Packet 15
9	Optional packets	

8.7.14 Message 34: Track Ahead Free Request

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	
6	Q_SCALE	
7	D_REF	
8	Q_DIR	
9	D_TAFDISPLAY	
10	L_TAFDISPLAY	

8.7.15 Message 37: Infill MA

Field No.	VARIABLE	Remarks
1	NID_MESSAGE	
2	L_MESSAGE	
3	T_TRAIN	
4	M_ACK	
5	NID_LRBG	

6	Infill Location Reference	Packet 136
7	Level 1 Movement Authority	Packet 12
8	Optional packets	

8.7.16 Message 38: Initiation of a communication session

8.7.17 Message 39: Acknowledgement of termination of a communication session

8.7.18 Message 40: Train Rejected

8.7.19 Message 41: Train Accepted

8.7.20 Intentionally deleted

8.7.21 Message 43: SoM position report confirmed by RBC

8.7.22 Message 45: Assignment of coordinate system

SB, PS, SH, FS, LS, SR, OS, Un, TR, PT, SN, RV -> SF

I: safety fault detected

Procedure Start of Mission

SB, PS -> SL

I : Sleeping command + standstill (speed =0) + all desk closed ?

SH -> PS

I: desk closed + n Continue SH info + PS signal