		ERTMS/ETCS
		FIS Juridical Recording
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# 1. MODIFICATION HISTORY

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0.1.0	All	Modifications after review	Sonia Valero
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3.2.1	CR 1249 reopening follo	owing RISC #75	Olivier Gemine
2016-04-28			
3.3.0	Baseline 3 2 <sup>nd</sup> release ve	ersion	Alain Hougardy
2016-05-13			

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# 3. INTRODUCTION

# 3.1 Scope

- 3.1.1.1 This document is a Function Interface Specification for juridical recording.
- 3.1.1.2 It describes the functional interface between the ERTMS/ETCS on-board function charged to provide juridical data and the on-board recording device.
- 3.1.1.3 It defines the format and content of the data messages sent by the ERTMS/ETCS onboard, as well as the list of on-board events that trigger the transmission of the related messages.
- 3.1.1.4 This document is inside the ERTMS/ETCS project scope. It is based on the documents [1], [2], [3], [4], [5], [6], and [7].

# 3.2 References

- [1] System Requirements Specification SUBSET-026,
- [2] FFFIS STM Application Layer SUBSET-058,
- [3] ETCS Driver Machine Interface ERA\_ERTMS\_015560,
- [4] Train Interface FIS SUBSET-034,
- [5] Glossary of Terms and Abbreviations SUBSET-023,
- [6] STM FFFIS Safe Time Layer SUBSET-056,
- [7] STM FFFIS Safe Link Layer SUBSET-057.

# 3.3 Abbreviations

3.3.1.1 For general terms, definitions and abbreviations refer to document [5].

# 4. FUNCTIONAL INTERFACE DEFINITION

# 4.1 Principles

- 4.1.1.1 The ERTMS/ETCS on-board equipment shall detect occurrence of specific events and provide the corresponding message to the on-board recording device (see section 4.3, table 2).
- 4.1.1.2 When such an event occurs, the ERTMS/ETCS on-board equipment shall register:
  - a) the date and time of the occurrence of the event using Universal Time Co-ordinated (UTC)
  - b) The train position and speed at the occurrence of the event
  - c) The operated system version, level and mode at the occurrence of the event
- 4.1.1.3 This date and time information shall be used to timestamp the corresponding message(s) to be sent over the interface according to the table 1.
- 4.1.1.4 The juridical data included in a message shall be forwarded over the interface less than 5 seconds after the occurrence of the event that triggered the message.
- 4.1.1.5 When sending one message or several messages together in relation with the same triggering event, the encapsulated data shall be consistent with each other regarding the time stamping.

# 4.2 Juridical Recording information (Messages / Variables)

## 4.2.1 Messages list

4.2.1.1 Each message has a variable in its header that contains a number to have a way to distinguish the messages. The list of all the messages, associated number and purpose is shown in Table 1:

NID_MESSAGE	MESSAGE	PAGE
1	GENERAL MESSAGE	19
2	TRAIN DATA	19
3	EMERGENCY BRAKE COMMAND STATE	26
4	SERVICE BRAKE COMMAND STATE	26
5	MESSAGE TO RADIO INFILL UNIT	27
6	TELEGRAM FROM BALISE	27
7	MESSAGE FROM EUROLOOP	27
8	MESSAGE FROM RADIO INFILL UNIT	28
9	MESSAGE FROM RBC	28
10	MESSAGE TO RBC	28
11	DRIVER'S ACTIONS	28
12	BALISE GROUP ERROR	30
13	RADIO ERROR	31
14	STM INFORMATION	31
15	INFORMATION FROM COLD MOVEMENT DETECTOR	34
16	START DISPLAYING FIXED TEXT MESSAGE	34
17	STOP DISPLAYING FIXED TEXT MESSAGE	34
18	START DISPLAYING PLAIN TEXT MESSAGE	35
19	STOP DISPLAYING PLAIN TEXT MESSAGE	35
20	SPEED AND DISTANCE MONITORING INFORMATION	35

21	DMI SYMBOL STATUS		
22	DMI SOUND STATUS		
23	DMI SYSTEM STATUS MESSAGE		
24	RBC CONTACT INFORMATION ENTERED BY THE DRIVER	Error! Bookm ark not defined.	
25	SR SPEED/DISTANCE ENTERED BY THE DRIVER	42	
26	NTC SELECTED	43	
27	SAFETY CRITICAL FAULT IN MODE SL, NL OR PS	44	
28	VIRTUAL BALISE COVER SET BY THE DRIVER	44	
29	VIRTUAL BALISE COVER REMOVED BY THE DRIVER	44	
30	SLEEPING INPUT	44	
31	PASSIVE SHUNTING INPUT		
32	NON LEADING INPUT		
33	REGENERATIVE BRAKE STATUS	45	
34	MAGNETIC SHOE BRAKE STATUS	46	
35	EDDY CURRENT BRAKE STATUS	46	
36	ELECTRO PNEUMATIC BRAKE STATUS	47	
37	ADDITIONAL BRAKE STATUS	47	
38	CAB STATUS	48	
39	DIRECTION CONTROLLER POSITION		
40	TRACTION STATUS		
41	TYPE OF TRAIN DATA		
42	NATIONAL SYSTEM ISOLATION		
43	TRACTION CUT OFF COMMAND STATE	51	
44	LOWEST SUPERVISED SPEED WITHIN THE MOVEMENT AUTHORITY	51	
45	TRACK CONDITIONS	52	

46	SET SPEED	54
47	BRAKE AND TRACTION INTERFACE CONFIGURATION	55
48	RADIO NETWORK ID ENTERED BY THE DRIVER	58
49	TRAIN RUNNING NUMBER ENTERED BY THE DRIVER	58
50-254	SPARE	
255	ETCS ON-BOARD PROPRIETARY JURIDICAL DATA	58

Table 1: Juridical Recording messages list

### 4.2.2 General structure of the messages

- 4.2.2.1 All the messages have the same structure with a common header and a set of variables depending on the message sent.
- 4.2.2.2 A message shall be composed of:
  - 1. A common header (fields 1 to 11). Therefore the variables 3 to 11 must be captured with each event of the table 2.
  - 2. Complementary variables as needed by application (fields 12-N) according to the messages list.

Field	FIELDS	Remarks

No

1	NID_MESSAGE	Message identification number
2	L_MESSAGE	Message length including fields 1 to N
3	DATE	Current date
4	TIME	Current time
5	TRAIN_POSITION	Current train position
6	V_TRAIN	Current train speed
7	DRIVER_ID	Driver identifier
8	NID_ENGINE	On-board ETCS identity
9	SYSTEM_VERSION	Currently operated system version
10	LEVEL	Current level

11	MODE	Current mode
12	Complementary variables	Data associated to the message. Its length depends on the message content, but it's always rounded up to a bytes unit.

Note: To be coherent the length of the variables defined in other documents is not included in the following description.

4.2.2.3 Signed values shall be encoded as 2's complement.

# 4.2.3 Common Fields Description

#### 4.2.3.1 NID\_MESSAGE

Description	This field contains the message identifier.		
Content	Variable	Length	Comment
	NID_MESSAGE	8	

### NID\_MESSAGE

Name	Message identifier		
Description	Identifier of the message		
Length of variable	Minimum Value Maximum Value Resolution/formula		
8 bits	0	255	Numbers
Special/Reserved Values			

#### 4.2.3.2 L\_MESSAGE

Description	This field contains the message length.			
Content	Variable Length Comment			
	L_MESSAGE	11		

#### L\_MESSAGE

Name	Message length				
Description	L_MESSAGE indicates the length of the message in bytes, including all variables defined in the message header (L_MESSAGE also).				
Length of variable	Minimum Value	Minimum Value Maximum Value Resolution/formula			
11 bits	0	) 2047 1 Byte			
Special/Reserved Values					

#### 4.2.3.3 DATE

Description	It contains the date.	It contains the date.		
Content	Variable	Length	Comment	
	YEAR	7		
	MONTH	4		
	DAY	5		

#### YEAR

Name	Official year		
Description	It's used to label data recorded. Only the last two figures of the year are recorded (unit and ten).		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
7 bits	00	99	1 year
Special/Reserved	110 0100	100	not used
Values			
	111 1110	126	not used
	111 1111	127	year unknown

### MONTH

Name	Official month		
Description	It's used to label data recorded.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
4 bits	01	12	1 month
Special/Reserved	0000	0	not used
Values	1101	13	not used
	1110	14	not used
	1111	15	month unknown

### DAY

Name	Official day		
Description	It's used to label data recorded.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
5 bits	01	31	1 day
Special/Reserved	0 0000	0	day unknown
Values			

#### 4.2.3.4 TIME

Description	It contains the time in Universal Time Co-ordinated (UTC).		
Content	Variable	Length	Comment
	HOUR	5	
	MINUTES	6	
	SECONDS	6	
	TTS	5	

HOUR	
------	--

Name	Official hour		
Description	It's used to label data recorded.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
5 bits	00	23	1 hour
Special/Reserved	1 1000	24	not used
Values			
	1 1110	30	not used
	1 1111	31	hour unknown

#### MINUTES

Name	Official minutes		
Description	It's used to label data recorded.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
6 bits	00	59	1 minute
Special/Reserved	11 1100	60	not used
Values	11 1101	61	not used
	11 1110	62	not used
	11 1111	63	minutes unknown

### SECONDS

Name	Official seconds			
Description	It's used to label data	It's used to label data recorded.		
Length of variable	Minimum Value Maximum Value Resolution/formula			
6 bits	00	59	1 second	
Special/Reserved	11 1100	60	not used	
Values	11 1101	61	not used	
	11 1110	62	not used	
	11 1111	63	seconds unknown	

Name	Official hundredth of second		
Description	It's used to label data recorded. Used only in conjunction with HOUR, MINUTES and SECONDS.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
5 bits	000 ms	950 ms	050 ms
Special/Reserved	10100 to 11110		
Values			
	11111		
			not used
			hundredth of second unknown

### TTS

### 4.2.3.5 TRAIN\_POSITION

Description	This field contains the position of the train. This position is calculated with the distance to the last LRBG.		
Content	Variable	Length	Comment
	Q_SCALE		Defined in Chapter 7 of [1]
	NID_LRBG		Defined in Chapter 7 of [1]
	D_LRBG		Defined in Chapter 7 of [1]
	Q_DIRLRBG		Defined in Chapter 7 of [1]
	Q_DLRBG		Defined in Chapter 7 of [1]
	L_DOUBTOVER		Defined in Chapter 7 of [1]
	L_DOUBTUNDER		Defined in Chapter 7 of [1]

# 4.2.3.6 V\_TRAIN

Description	This field contains the current speed of the train.		
Content	Variable Length Comment		
	V_TRAIN	10	

#### V\_TRAIN

Name	Current train speed		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0 km/h	600 km/h	1 km/h
Special/reserved value	601 – 1022	Spare	
	1023	Standstill	

#### 4.2.3.7 DRIVER\_ID

Description	This field contains the driver identifier number.		
Content	Variable Length Comment		
	DRIVER_ID	128 bits	

### DRIVER\_ID

Name	Driver identifier number		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
128 bits			16 alphanumeric characters (ISO 8859-1, also known as Latin Alphabet #1)
Special/reserved value	'?????????????????????????????????????	Unknown	

#### 4.2.3.8 NID\_ENGINE

Description	This field contains the onboard ETCS identity.		
Content	Variable Length Comment		
	NID_ENGINE		Defined in Chapter 7 of [1]

# 4.2.3.9 SYSTEM\_VERSION

Description	This field contains the currently operated system version.		
Content	Variable Length Comment		
	M_VERSION		Defined in Chapter 7 of [1]

#### 4.2.3.10 LEVEL

Description	This field contains the current level.		
Content	Variable Length Comment		
	M_LEVEL		Defined in Chapter 7 of [1]

#### 4.2.3.11 MODE

Description	This field contains the current mode.		
Content	Variable Length Comment		
	M_MODE		Defined in Chapter 7 of [1]

# 4.2.4 Message Description

### 4.2.4.1 GENERAL MESSAGE

Description	This message contains the common header only.		
Content	Complementary Variable Length Comment		
	Null		

### 4.2.4.2 TRAIN DATA

Description	This message contains the train data.		
Content	Complementary Variable	Length	Comment
	V_MAXTRAIN		Maximum train speed for the train. Defined in Chapter 7 of [1]
	NC_CDTRAIN		Cant deficiency train category. Defined in Chapter 7 of [1]
	NC_TRAIN		Other international train category. Defined in Chapter 7 of [1]
	L_TRAIN		Train length.
			Defined in Chapter 7 of [1]
	T_TRACTION_CUT_OFF	12	
	M_BRAKE_POSITION	2	
	M_NOM_ROT_MASS	5	
	Q_BRAKE_CAPT_TYPE	1	
	M_BRAKE_PERCENTAGE	8	Only if Q_BRAKE_CAPT_TYPE = 0
	N_BRAKE_CONF	4	Only if Q_BRAKE_CAPT_TYPE = 0
	M_BRAKE_LAMBDA_CONF(k)	3	Only if Q_BRAKE_CAPT_TYPE = 0: specific configuration of the special brakes for lambda train
	T_BRAKE_SERVICE(k)	12	Only if Q_BRAKE_CAPT_TYPE = 0: Service Brake delay time for target speed = 0
	T_BRAKE_SERVICE(k)	12	Only if Q_BRAKE_CAPT_TYPE = 0: Service Brake delay time for target speed > 0
	N_BRAKE_CONF	4	Only if Q_BRAKE_CAPT_TYPE = 1 (gamma type), N_BRAKE_CONF and the following variables follow until A_BRAKE_SERVICE_COMP inclusive

M_BRAKE_GAMMA_CONF(k)	4	Specific configuration of the special brakes for gamma trains
T_BRAKE_EMERGENCY(k)	12	Emergency Brake delay time
N_BRAKE_SECTIONS(k)	3	Number of sections in order to build the following brake model.
V_BRAKE_EMERGENCY_COM P(k, m)	10	Speed component of the emergency brake nominal deceleration.
A_BRAKE_EMERGENCY_COM P(k, m)	8	Acceleration component of the emergency brake nominal deceleration.
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 0)	5	Rolling stock correction factor on dry rail for a confidence level equal to 50 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 1)	5	Rolling stock correction factor on dry rail for a confidence level equal to 90 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 2)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 3)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,9 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 4)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,99 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 5)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,999 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 6)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,9999 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 7)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,99999 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 8)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,999999 %
M_KDRY_RST(A_BRAKE_EMERGENCY_ COMP(k, m), 9)	5	Rolling stock correction factor on dry rail for a confidence level equal to 99,9999999 %

M_KWET_RST(A_BRAKE_EMERGENCY _COMP(k, m))	5	Rolling stock correction factor on wet rail
T_BRAKE_SERVICE(k)	12	Service Brake delay time
N_BRAKE_SECTIONS(k)	3	Number of sections in order to build the following brake model.
V_BRAKE_SERVICE_COMP(k,	10	Speed component of the service brake nominal deceleration
A_BRAKE_SERVICE_COMP(k, m)	8	Acceleration component of the service brake nominal deceleration.
M_LOADINGGAUGE		Loading gauge. Defined in Chapter 7 of [1]
N_AXLE		Axle number of the engine. Defined in Chapter 7 of [1]
M_AXLELOADCAT		Axle load category. Defined in Chapter 7 of [1]
N_ITER		Number of iterations. Defined in Chapter 7 of [1]
M_VOLTAGE(k)		Traction system voltage. Defined in Chapter 7 of [1]
NID_CTRACTION(k)		Only if M_VOLTAGE(k) $\neq$ 0. Country identifier of the traction system. Defined in Chapter 7 of [1]
N_ITER		Number of iterations. Defined in Chapter 7 of [1]
NID_NTC(k)		National system identity. Defined in Chapter 7 of [1]
M_AIRTIGHT		Airtight system presence. Defined in Chapter 7 of [1]

# T\_TRACTION\_CUT\_OFF

Name	Time to cut-off traction	on		
Description	It is the time delay from the traction cut-off command by the on-board to the moment the acceleration due to traction is guaranteed to be zero.			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
12 bits	0 s	40.95 s	0.01 s	

### **M\_BRAKE\_POSITION**

Name	Brake position			
Description	The brake position defines the behaviour of the brake for specific train types.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
2 bits				
Special/reserved	0	Passenger train in P Freight train in P		
value	1			
	2	Freight train in G		
	3	Spare		

# M\_NOM\_ROT\_MASS

Name	Nominal rotating mass of the train			
Description	It defines the nominal rotating mass as a percentage of the total train weight.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
5 bits	0 %	15 %	1 %	
Special/reserved	16	Unknown		
value	17-31	Spare		

### **Q\_BRAKE\_CAPT\_TYPE**

Name	Qualifier for gamma/lambda discrimination			
Description	This variable discriminates the type of capture of the brake parameters.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/Reserved Values	0	Lambda type: the brake percentage is acquired as Train Data and the conversion model is applicable		
	1	Gamma type: all other captures		

M_BRAKE_PERCEN	TAGE
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Name	Brake percentage value			
Description	The brake percentage is used to derive the brake parameters in conjunction with the conversion model.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
8 bits	0 %	250 %	1 %	
Special/reserved value	251-255	Spare		

### N\_BRAKE\_CONF

Name	Special brakes configuration number			
Description	Number of iterations of special brake configuration(s) applicable to the selection of the appropriate brake parameter(s), following this variable in the message			
Length of variable	Minimum Value Maximum Value Resolution/formula			
4 bits	1	16		

# M\_BRAKE\_LAMBDA\_CONF

Name	Specific special brakes configuration for lambda trains			
Description	It describes a specific special brake configuration to which the related brake parameters are applicable.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
3 bits			Bit set	
Special/reserved value	000	No interface to special brakes exists or all status are inactive		
	xx1	Regenerative brake interface exists and status is active		
	x1x	Eddy current brake interface exists and status is active		
	1xx	Ep brake interface exists and status is active		

# T\_BRAKE\_SERVICE

Name	Service Brake delay time		
Description	This is the build up time for the service brake.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
12 bits	0 s	204.75 s	0.05 s

M_BRAKE_	GAMMA_C	ONF
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Name	Specific special brakes configuration for gamma trains			
Description	It describes a specific special brake configuration to which the related brake parameters are applicable.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
4 bits		Bit set		
Special/reserved value	0000	No interface to special brakes exists or all status are inactive		
	xxx1	Regenerative brake interface exists and status is active		
	xx1x	Eddy current brake interface exists and status is active		
	x1xx	Magnetic shoe brake interface exists and status is active		
	1xxx	Ep brake interface exists and status is active		

# T\_BRAKE\_EMERGENCY

Name	Emergency Brake delay time		
Description	This is the build up time for the emergency brake.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
12 bits	0 s	204.75 s	0.05 s

## **N\_BRAKE\_SECTIONS**

Name	Brake number of sections			
Description	Number of iterations of speed sections needed to build a brake model, following this variable in the message.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
3 bits	1	7		
Special/reserved value	0	Spare		

Name	Emergency brake speed component			
Description	It contains the lowest speed value of the speed section to which the related emergency brake deceleration component is applicable.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved value	601 – 1023	Spare		

# V\_BRAKE\_EMERGENCY\_COMP

### A\_BRAKE\_EMERGENCY\_COMP

Name	Emergency brake deceleration component		
Description	It contains the value of the emergency brake deceleration component which is applicable to the related speed section.		
Length of variable	Minimum Value         Maximum Value         Resolution/formula		
8 bits	0 m/s²	2.55 m/s <sup>2</sup>	0.01 m/s <sup>2</sup>

#### M\_KDRY\_RST

Name	Rolling stock correction factor on dry rails		
Description	This variable is a correction factor applicable to the emergency brake deceleration according to the variable M_NVEBCL defined in chapter 7 of [1].		
Length of variable	Minimum Value         Maximum Value         Resolution/formula		
5 bits	0	1.55	0.05

#### M\_KWET\_RST

Name	Rolling stock correction factor on wet rail		
Description	This variable is a correction factor applicable to the emergency brake deceleration according to the variable M_NVAVADH defined in chapter 7 of [1].		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
5 bits	0	1.55	0.05

	V_BRAKE	SERVICE	COMP
--	---------	---------	------

Name	Service brake speed component			
Description	It contains the lowest speed value of the speed section to which the related service brake deceleration component is applicable.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved value	601 – 1023	Spare		

### A\_BRAKE\_SERVICE\_COMP

Name	Service brake deceleration component		
Description	It contains the value of the service brake deceleration component which is applicable to the related speed section.		
Length of variable	Vinimum Value         Maximum Value         Resolution/formula		
8 bits	0 m/s²	2.55 m/s <sup>2</sup>	0.01 m/s <sup>2</sup>

### 4.2.4.3 EMERGENCY BRAKE COMMAND STATE

Description	This message records the emergency brake application command state (see [4] 2.3.3).			
Content	Complementary Variable	Length	Comment	
	M_BRAKE_COMMAND_STATE	1		

### M\_BRAKE\_COMMAND\_STATE

Name	Brake command state		
Description	It contains the command state of the brakes.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
1 bit			
Special/reserved	0	Not commanded	
value	1	Commanded	

#### 4.2.4.4 SERVICE BRAKE COMMAND STATE

Description	This message records the servic 2.3.3).	e brake a	pplication command state (see [4]
Content	Complementary Variable	Length	Comment

M_BRAKE_COMMAND_STATE	1	Defined in 4.2.4.3	
-----------------------	---	--------------------	--

### 4.2.4.5 MESSAGE TO RADIO INFILL UNIT

Description	This message shall be sent after sending a message to an RIU.					
Content	Complementary Variable	Length	Comment			
	NID_C		Defined in Chapter 7 of [1]			
	NID_RIU		Defined in Chapter 7 of [1]. ETCS identity (NID_C + NID_RIU) of the RIU to which the following message has been sent.			
	Message, as defined in Chapters 7 and 8 of [1], sent to the referenced RIU.					

#### 4.2.4.6 TELEGRAM FROM BALISE

Description	This message is sent after receiving a telegram from a balise.
Content	The content of this message is the telegram coming from a balise as defined in Chapters 7 and 8 of [1].

### 4.2.4.7 MESSAGE FROM EUROLOOP

Description	This message is sent after receiving a message from an Euroloop.
Content	The content of this message is any message coming from an Euroloop as defined in Chapters 7 and 8 of [1].

#### 4.2.4.8 MESSAGE FROM RADIO INFILL UNIT

Description	This message is sent after receiving a message from a radio infill unit.						
Content	Complementary Variable	Comment					
	NID_C		Defined in Chapter 7 of [1]				
	NID_RIU		Defined in Chapter 7 of [1]. ETCS identity (NID_C + NID_RIU) of the RIU from which the following message has been received.				
	Message, as defined in Chapters 7 and 8 of [1], coming from the reference RIU.						

#### 4.2.4.9 MESSAGE FROM RBC

Description	This message is sent after receiving a message from an RBC.					
Content	Complementary Variable	Length	Comment			
	NID_C		Defined in Chapter 7 of [1]			
	NID_RBC		Defined in Chapter 7 of [1]. ETCS identity (NID_C + NID_RBC) of the RBC from which the following message has been received.			
	Message, as defined in [1], coming from the referenced RBC.					

### 4.2.4.10 MESSAGE TO RBC

Description	This message is sent after sending a message to an RBC.					
Content	Complementary Variable	Length	Comment			
	NID_C		Defined in Chapter 7 of [1]			
	NID_RBC		Defined in Chapter 7 of [1]. ETCS identity (NID_C + NID_RBC) of the RBC to which the following message has been sent.			
	Message, as defined in [1], sent to the referenced RBC.					

#### 4.2.4.11 DRIVER'S ACTIONS

Description	This message is sent whenever the driver acts on the on board system via the ERTMS/ETCS DMI.						
Content	Complementary Variable Length Comment						
	M_DRIVERACTIONS	8					

# **M\_DRIVERACTIONS**

Name	Driver's actions.				
Description	This variable co	ontair	ns the driver's action	n.	
Length of variable	Minimum Value	Maximum Value		Resolution/formula	
8 bit					
Special/Reserved	0000 0000		Ack of On Sight n	node	
Values	0000 0001		Ack of Shunting n	node	
	0000 0010		Ack of Train Trip		
	0000 0011		Ack of Staff Resp	onsible mode	
	0000 0100		Ack of Unfitted me	ode	
	0000 0101		Ack of Reversing	mode	
	0000 0110		Ack level 0		
	0000 0111		Ack level 1		
	0000 1000		Ack level 2		
	0000 1001		Ack level 3		
	0000 1010		Ack level NTC		
	0000 1011		Shunting selected	1	
	0000 1100		Non Leading sele	cted	
	0000 1101		Ack of Limited Supervision mode		
	0000 1110		Override selected		
	0000 1111		"Continue Shunting on desk closure" selected		
	0001 0000		Brake release acknowledgement		
	0001 0001		Exit of Shunting selected		
	0001 0010		Isolation selected		
	0001 0011		Start selected		
	0001 0100		Train Data Entry I	requested	
	0001 0101		Validation of train	data	
	0001 0110		Confirmation of T	rack Ahead Free	
	0001 0111		Ack of Plain Text	information	
	0001 1000		Ack of Fixed Text	information	
	0001 1001		Request to hide s	upervision limits	
	0001 1010		Train integrity cor	ifirmation	
	0001 1011		Request to show	supervision limits	
	0001 1100		Ack of SN mode		
	0001 1101		Selection of Lang	uage	
	0001 1110		Request to show	geographical position	
	0001 1111		Request to hide g	eographical position	
	0010 0000		"Slippery rail" sele	ected	
	0010 0001		"Non slippery rail"	selected	
	0010 0010		Level U selected		
	0010 0011		Level 1 selected		

0010 0100	Level 2 selected
0010 0101	Level 3 selected
0010 0110	Level NTC selected
0010 0111	Request to show tunnel stopping area information
0010 1000	Request to hide tunnel stopping area information
0010 1001	Scroll up button activated
0010 1010	Scroll down button activated

### 4.2.4.12 BALISE GROUP ERROR

Description	This message contains a M_ERROR.	balise gro	oup related error as identified by
Content	Complementary Variable	Length	Comment
	NID_C		Defined in Chapter 7 of [1]
	NID_ERRORBG	14	
	M_ERROR		Defined in Chapter 7 of [1]

### NID\_ERRORBG

Name	Identity number of th	he balise group which trig	gered the error	
Description	It contains the identity number of the balise group to which the error is related.			
	NID_ERRORBG is in the NID_ERRORB "unknown" and cov identity is unknown	dentical to NID_BG (defir G Special Value "163 /ers the case that, due	ned in chapter 7 of [1]) except for 883" which has the meaning to the error, the balise group	
Length of variable	Minimum Value	Maximum Value	Resolution/formula	
14 bits	0	16382	Numbers	
Special/reserved value	16383	Unknown		

4.2.4.13	RADIO ERROR
----------	-------------

Description	This message contains an error related to communication with an RBC as identified by M_ERROR.		
Content	Complementary Variable	Length	Comment
	NID_C		Defined in Chapter 7 of [1]
	NID_RBC		Defined in Chapter 7 of [1]. ETCS identity (NID_C + NID_RBC) of the RBC to which the error is related
	M_ERROR		Defined in Chapter 7 of [1]

### 4.2.4.14 STM INFORMATION

Description	This message is sent to the on-board recording device on an STM event, i.e. when certain STM packets are exchanged, certain system status messages in relation to NTCs are displayed or a disconnection of the STM Control Function connection happens.			
Content	Complementary Variable	Length	Comment	
	NID_STMX	8	STM relevant for the event	
	NID_STMEVENT	2	STM Event type	
	M_DISCSENDER	1	If NID_STMEVENT = 0, sender of disconnect request	
	M_DISCTYPE	1	If NID_STMEVENT = 0, type of disconnection.	
	M_DISCREASON		If NID_STMEVENT = 0, disconnection reason as defined in [7], chapter 5.2.5.9 and [6] chapter 5.3.1.3	
	STM_SYSTEM_STATUS _MESSAGE	4	If NID_STMEVENT = 1	
	NID_STMPACKET	8	If NID_STMEVENT = 2	
	If NID_STMEVENT = 2, STM packet variables (without NID_I described in Chapters 7 & 8 of [2]			

#### NID\_STMX

Name	STM identification			
Description	STM relevant for the event			
	For STM-packets or disconnect requests sent from an STM or to a single STM, its value is given by the NID_STM as defined in [2].			
Length of variable	Minimum Value	Maximum Value	Resolution/formula	
8 bits	0	254		
Special/reserved	255	For STM-packets	or disconnect requests sent to all	
value		(connected) STMs		

## NID\_STMEVENT

Name	STM Event type		
Description			
Length of variable	Minimum Value	Maximum Value	Resolution/formula
2 bits			
Special/reserved	0	Disconnection	
value	1	Display of system status message	
	2	Reception/sending of STM packet	
	3	Spare	

## M\_DISCSENDER

Name	Sender of disconnect request		
Description	Sender of disconnect request (STM or STM Control Function).		
Length of variable	Minimum Value Maximum Value Resolution/formula		
1 bit			
Special/reserved	0	Disconnect request sent from STM	
value	1	Disconnect reques	t sent from STM Control Function

## M\_DISCTYPE

Name	Type of disconnection		
Description	Type of disconnection, see [7], section 5.2.5.9 (line "New setup desired")		
Length of variable	Minimum Value         Maximum Value         Resolution/formula		
1 bit			
Special/reserved	0	Final disconnection	
value	1	Non final disconned	stion

### STM\_SYSTEM\_STATUS\_MESSAGE

Name	STM SYSTEM STATUS MESSAGE		
Description	System status message displayed to the driver		
	A bit set to '1' means that the corresponding system status message is displayed		
Length of variable	Bit number Definition Resolution/formula		
4 bits		as in chapter 15	Bitset
		of [3]	The least significant bit of the
			variable corresponds to bit 01.
Special/Reserved	Bit 01	NTC brake demand	
Values	Bit 02	NTC needs data	
	Bit 03	NTC failed	
	Bit 04	NTC is not available	)

## NID\_STMPACKET

Name	STM packet identification			
Description	STM-packet numb	er, i.e. NID_PACKE	T as defined in Chapter 8 of [2].	
Length of variable	Minimum Value	Maximum Value	Resolution/formula	
8 bits				
Special/reserved	6	Override activation	n	
value	14	State order to ST	Μ	
	15	State report from STM           Transition variables STM max speed from STM		
	16			
	17	Transition variables STM system speed and distance from STM         National Trip Procedure         Antenna/BTM ID		
	18			
	20			
	21	Test Procedure P	Permission Request	
	22	Test Procedure P	Permission	
	23	End of Test Proce	edure	
	31	Active DMI chann	iel	
	32	Button Request		
	34	Button event repo	ort	
	35	Indicator request		
	38	Text message		
	39	Delete text messa	age	

40	Acknowledgement reply
43	Speed and distance supervision information
46	Sound command
47	ETCS BTM status message to STM
128	STM emergency and service brake command to brake interface
129	STM specific brake control command
130	STM commands to train interface
161	NTC juridical data from STM
Other values	Spare

#### 4.2.4.15 INFORMATION FROM COLD MOVEMENT DETECTOR

Description	This message gives the information from the cold movement detector at the power-up.		
Content	Complementary Variable	Length	Comment
	M_COLD_MVT	2	

# M\_COLD\_MVT

Name	Cold movement detector information			
Description	Indicates whether no cold movement has occurred or if a cold movement has been detected or if no cold movement information is available.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
2 bits				
Special/reserved	0	No cold movement occurred		
value	1	Cold movement detected		
	2	No cold movement information available		
	3	Spare		

### 4.2.4.16 START DISPLAYING FIXED TEXT MESSAGE

Description	This message contains a fix currently being shown to the d	ked text n river.	nessage from the	e trackside	that	is
Content	Complementary Variable	Length	h Comment			
	Q_TEXT		Defined in Chapte	er 7 of [1]		

### 4.2.4.17 STOP DISPLAYING FIXED TEXT MESSAGE

Description	This message contains a fixed text message from the trackside that is not shown to the driver any more.			
Content	Complementary Variable	Length Comment		
	Q_TEXT		Defined in Chapter 7 of [1]	

#### 4.2.4.18 START DISPLAYING PLAIN TEXT MESSAGE

Description	This message contains a plain text message from the trackside that is currently being shown to the driver.			
Content Complementary Variable Length			Comment	
	L_TEXT		Defined in Chapter 7 of [1]	
	X_TEXT(L_TEXT)		Defined in Chapter 7 of [1]	

### 4.2.4.19 STOP DISPLAYING PLAIN TEXT MESSAGE

Description	This message contains a plain text message from the trackside that is not shown to the driver any more.			
Content	Complementary Variable	Comment		
	L_TEXT		Defined in Chapter 7 of [1]	
	X_TEXT(L_TEXT)		Defined in Chapter 7 of [1]	

### 4.2.4.20 SPEED AND DISTANCE MONITORING INFORMATION

Description	This message contains Speed and Distance monitoring data, in relation to the information displayed to the driver			
Content	Complementary Variable	Length	Comment	
	M_SDMTYPE	2		
	M_SDMSUPSTAT	3		
	V_PERM	10		
	V_SBI	10		
	V_TARGET	10		
	D_TARGET	15		
	V_RELEASE	10		
	M_TTI	4		

# M\_SDMTYPE

Name	Speed and distance monitoring type			
Description	Type of the speed and distance monitoring			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
2 bits				
Special/reserved	0	Ceiling speed monitoring (CSM)		
value	1	Target speed monitoring (TSM)		
	2	Release speed monitoring (RSM)		
	3	Spare		

### M\_SDMSUPSTAT

Name	Speed and distance monitoring supervision status.			
Description	Supervision status of the speed and distance monitoring			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
3 bits				
Special/reserved	0	Normal Status		
value	1	Indication Status		
	2	Overspeed Status		
	3	Warning Status		
	4	Intervention Status		
	57	Spare		

# M\_TTI

Name	Time to Indication			
Description	Time to Indication displayed to the driver as per the size of the white square of the DMI object (see chapter 8.2.2 in document [3])			
Length of variable	Minimum Value	Maximum Value	Resolution/formula	
4 bits	5x5 cells	50x50 cells	5x5 cells	
Special/reserved	0	None		
value	11-15	Spare		

# V\_PERM

Name	Permitted speed.

Description	Permitted speed displayed to the driver			
Length of variable	Minimum Value	Maximum Value	Resolution/formula	
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved	601 – 1022	Spare		
value				
	1023	None		

# V\_SBI

Name	Service brake intervention speed.			
Description	SBI speed displayed to the driver			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved	601 – 1022	Spare		
value				
	1023	None		

## V\_TARGET

Name	Target speed.		
Description	Target speed displayed to the driver		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0 km/h	600 km/h	1 km/h
Special/reserved value	601 – 1022	Spare	
	1023	None	

## D\_TARGET

Name	Target distance.		
Description	Target distance displayed to the driver		
Length of variable	Minimum Value         Maximum Value         Resolution/formula		Resolution/formula
15 bits	0 m	32766 m	1 m
Special/reserved	32767	None	
value			

# V\_RELEASE

Name	Release speed.		
Description	Release speed displayed to the driver.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
10 bits	0 km/h	600 km/h	1 km/h
Special/reserved	601-1022	Spare	
value			
	1023	None	

### 4.2.4.21 DMI SYMBOL STATUS

Description	This message contains the status the DMI (except planning, naviga considered as relevant for juridical	of the se ation and recording	t of symbols that can be displayed on settings related symbols that are not ).
Content	Complementary Variable DMI_SYMB_STATUS	Length 87	Comment

# DMI\_SYMB\_STATUS

Name	DMI SYMBOL STATUS		
Description	Status of the symbo	ls displayed to the	driver
	A bit set to '1' mean	s that the correspo	nding symbol is displayed.
Length of variable	Bit number	Definition	Resolution/formula
87 bits		as in chapter 13	Bitset
	of [3]	of [3]	The bit 01 corresponds to the least significant bit of the variable
Special/Reserved	Bit 01	LE01	
Values	Bit 02	LE02	
	Bit 03	LE03	
	Bit 04	LE04	
	Bit 05	LE05	
	Bit 06	LE06	
	Bit 07	LE07	
	Bit 08	LE08	
	Bit 09	LE09	
	Bit 10	LE10	
	Bit 11	LE11	
	Bit 12	LE12	
	Bit 13	LE13	
	Bit 14	LE14	
	Bit 15	LE15	
	Bit 16	MO01	

Bit 17	MO02
Bit 18	MO03
Bit 19	MO04
Bit 20	MO05
Bit 21	MQ06
Bit 22	M007
Bit 22	MO08
Bit 24	MOOR
	MO10
Dit 20 Dit 26	MO10
	MOTT
	MO12
	MOTS
Bit 29	MO14
Bit 30	MO15
Bit 31	MO16
Bit 32	
Bit 33	MO18
Bit 34	MO19
Bit 35	MO20
Bit 36	MO21
Bit 37	MO22
Bit 38	ST01
Bit 39	ST02
Bit 40	ST03
Bit 41	ST04
Bit 42	ST05
Bit 43	ST06
Bit 44	TC01
Bit 45	TC02
Bit 46	TC03
Bit 47	TC04
Bit 48	TC05
Bit 49	TC06
Bit 50	TC07
Bit 51	TC08
Bit 52	TC09
Bit 53	TC10
Bit 54	TC11
Bit 55	TC12
Bit 56	TC13
Bit 57	TC14
Bit 58	TC15
Bit 59	TC16
Bit 60	TC17
Bit 61	TC18
Bit 62	TC19
Bit 63	TC20
Bit 64	TC21
	-

Bit 65	TC22
Bit 66	TC23
Bit 67	TC24
Bit 68	TC25
Bit 60	TC26
Dit 03	T020
Bit 70	
Bit 71	TC28
Bit 72	TC29
Bit 73	TC30
Bit 74	TC31
Bit 75	TC32
Bit 76	TC33
Bit 77	TC34
Bit 78	TC35
Bit 79	TC36
Bit 80	TC37
Bit 81	DR01
Bit 82	DR02
Bit 83	DR03
Bit 84	DR04
Bit 85	DR05
Bit 86	LX01
Bit 87	LS01

# 4.2.4.22 DMI SOUND STATUS

Description	This message contains the status of the sounds that are used to draw the driver's attention from the outside to the display.		
Content	Complementary Variable	Length	Comment
	DMI_SOUND_STATUS	3	

#### DMI\_SOUND\_STATUS

Name	DMI SOUND STATUS		
Description	Status of the audible information played to the driver A bit set to '1' means that the corresponding sound is generated		
Length of variable	Bit number Definition Resolution/formula		Resolution/formula
3 bits		as in chapter 14 of [3]	Bitset
			The bit 01 corresponds to the least significant bit of the variable
Special/Reserved	Bit 01	Sound Sinfo - Information on DMI	
Values	Bit 02	Sound S1 – Over-speed	
	Bit 03	Sound S2 – Warning	

### 4.2.4.23 DMI SYSTEM STATUS MESSAGE

Description	This message contains which system status messages are displayed to the driver		
Content	Complementary Variable	Length	Comment
	SYSTEM_STATUS_MESSAGE	23	

#### SYSTEM\_STATUS\_MESSAGE

Name	SYSTEM STATUS	MESSAGE	
Description	System status message displayed to the driver		ne driver
	A bitset to '1' mea	A bitset to '1' means that the corresponding system status message is	
	displayed		
Length of variable	Bit number	Definition	Resolution/formula
23 bits		as in chapter 15	Bitset
		of [3]	The least significant bit of the
			variable corresponds to bit 01.
Special/Reserved	Bit 01	Balise read error	
Values	Bit 02	Trackside malfunction Communication error	
	Bit 03		
	Bit 04	Entering FS	
	Bit 05	Entering OS	
	Bit 06	Runaway movemen	nt
	Bit 07	SH refused	
	Bit 08	SH request failed	
	Bit 09	Trackside not comp	patible
	Bit 10	Train data changed	
	Bit 11	Train is rejected	
	Bit 12	Unauthorized passir	ng of EOA / LOA
	Bit 13	No MA received at I	level transition

Bit 14	SR distance exceeded
Bit 15	SH stop order
Bit 16	SR stop order
Bit 17	Emergency stop
Bit 18	RV distance exceeded
Bit 19	No track description
Bit 20	Route unsuitable – axle load category
Bit 21	Route unsuitable – loading gauge
Bit 22	Route unsuitable – traction system
Bit 23	Radio network registration failed

## 4.2.4.24 RBC CONTACT INFORMATION ENTERED BY THE DRIVER

Description	This message contains the RB	This message contains the RBC contact information entered by the driver.			
Content	Complementary Variable	Length	Comment		
	Q_RBCENTRY	2			
	NID_C		Only if Q_RBCENTRY = 2		
			Identity of the country or region complementing the RBC identity number. Defined in chapter 7 of [1]		
	NID_RBC		Only if Q_RBCENTRY = 2 RBC ETCS identity number. Defined in Chapter 7 of [1]		
	NID_RADIO		Only if Q_RBCENTRY = 2 Radio subscriber number. Defined in Chapter 7 of [1]		

### **Q\_RBCENTRY**

Name	Qualifier for the RBC contact information			
Description	This variable indicates the type of driver's selection for the RBC data			
Length of variable	Minimum Value Maximum Value Resolution/formula			
2 bit				
Special/reserved	0	Contact last known RBC		
value   1   Use short number		Use short number		
	2 Enter RBC data			
	3	Spare		

### 4.2.4.25 SR SPEED/DISTANCE ENTERED BY THE DRIVER

Description	This message contains the change of the SR Speed or Distance entered by the driver.		
Content	Complementary Variable	Length	Comment
	D_SR	17	
	V_SR	10	

# D\_SR

Name	Staff Responsible distance.		
Description	Distance allowed running in Staff Responsible, modified by the driver through the DMI. The maximum value corresponds to the one that is considered appropriate from operational point of view.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
17 bits	0 m	100000 m	1 m
Special/reserved value	100001-131071	Spare	

# V\_SR

Name	Staff Responsible speed			
Description	Speed allowed running in Staff Responsible, modified by the driver through the DMI.			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved value	601-1023	Spare		

# 4.2.4.26 NTC SELECTED

Description	This message contains the i NTC.	dentity of	the NTC when the selected level is
Content	Complementary Variable	Length	Comment
	NID_NTC		Defined in Chapter 7 of [1].

#### 4.2.4.27 SAFETY CRITICAL FAULT IN MODE SL, NL OR PS

Description	This message records the occurrence of a safety critical fault in mode SL, NL or PS.			
Content	Complementary Variable Length Comment			
	Null	·		

#### 4.2.4.28 VIRTUAL BALISE COVER SET BY THE DRIVER

Description	This message reflects the code entered by the driver to set a VBC.			
Content	Complementary Variable	Length	Comment	
	NID_VBCMK		Defined in Chapter 7 of [1].	
	NID_C		Defined in Chapter 7 of [1].	
	T_VBC		Defined in Chapter 7 of [1].	

#### 4.2.4.29 VIRTUAL BALISE COVER REMOVED BY THE DRIVER

Description	This message reflects the code entered by the driver to remove a VBC.			
Content	Complementary Variable Length Comment			
	NID_C	Defined in Chapter 7 of [1].		
	NID_VBCMK Defined in Chapter 7 of [1			

### 4.2.4.30 SLEEPING INPUT

Description	This message allows to transmit the state of the sleeping input (see [4] 2.2.1).			
Content	Complementary Variable Length Comment			
	M_SLEEPING	1		

#### M\_SLEEPING

Name	Sleeping input state			
Description	This variable contains the state of the sleeping input.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
1 bit				
Special/reserved	0	Sleeping not requested		
value	1	Sleeping requested		

#### 4.2.4.31 PASSIVE SHUNTING INPUT

Description	This message allows to transmit the state of the passive shunting input (see [4] 2.2.2).			
Content	Complementary Variable Length Comment			
	M_PASSIVE_SHUNTING	1		

#### M\_PASSIVE\_SHUNTING

Name	Passive shunting input state			
Description	This variable contains the state of the passive shunting input.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	Passive shunting not permitted		
value	1	Passive shunting permitted		

### 4.2.4.32 NON LEADING INPUT

Description	This message allows to transmit the state of the non leading input (see [4] 2.2.3).		
Content	Complementary Variable	Comment	
	M_NON_LEADING	1	

#### M\_NON\_LEADING

Name	Non leading input state			
Description	This variable contains the state of the non leading input.			
Length of variable	Minimum Value	Num Value         Maximum Value         Resolution/formula		
1 bit				
Special/reserved	0	Non leading not permitted		
value	1	Non leading permitted		

### 4.2.4.33 REGENERATIVE BRAKE STATUS

Description	This message allows to transmit the regenerative brake status (see [4] 2.3.6).			
Content	Complementary Variable Length Comment			
	M_RB_STATUS	1		

#### M\_RB\_STATUS

Name	Status of the regenerative brake			
Description	This variable contains the status of the regenerative brake			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	Not active		
value	1	Active		

### 4.2.4.34 MAGNETIC SHOE BRAKE STATUS

Description	This message allows to trans 2.3.6).	smit the n	nagnetic shoe brake status (see	[4]
Content	Complementary Variable	Length	Comment	
	M_MSB_STATUS	1		

# M\_MSB\_STATUS

Name	Status of the magnetic shoe brake			
Description	This variable contains the status of the magnetic shoe brake			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
1 bit				
Special/reserved	0	Not active		
value	1	Active		

#### 4.2.4.35 EDDY CURRENT BRAKE STATUS

Description	This message allows to transmit the eddy current brake status (see [4] 2.3.6).			
Content	Complementary Variable Length Comment			
	M_ECB_STATUS	1		

#### M\_ECB\_STATUS

Name	Status of the eddy current brake			
Description	This variable contains the status of the eddy current brake			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	Not active		
value	1	Active		

### 4.2.4.36 ELECTRO PNEUMATIC BRAKE STATUS

Description	This message allows to transmit the electro pneumatic brake status (see [4] 2.3.6).		
Content	Complementary Variable	Length	Comment
	M_EP_STATUS	1	

#### M\_EP\_STATUS

Name	Status of the electro pneumatic brake			
Description	This variable contains the status of the electro pneumatic brake			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	Not active		
value	1	Active		

#### 4.2.4.37 ADDITIONAL BRAKE STATUS

Description	This message allows to transmit the additional brake status (see [4] 2.3.7).			
Content	Complementary Variable Length Comment			
	M_AB_STATUS	1		

#### M\_AB\_STATUS

Name	Status of the additional brakes				
Description	This variable contains the status of the additional brakes				
Length of variable	Minimum Value         Maximum Value         Resolution/formula				
1 bit					
Special/reserved	0	Not active			
value	1	Active			

#### 4.2.4.38 CAB STATUS

Description	This message allows to transmit the cab status that the ERTMS/ETCS onboard received from the train interface (see [4] 2.5.1).					
Content	Complementary Variable	Length	Comment			
	M_CAB_A_STATUS	1				
	Q_CAB_B	1				
	M_CAB_B_STATUS	1	Only if Q_CAB_B = 1			

### M\_CAB\_A\_STATUS

Name	Cab A status				
Description	This variable contains the cab A status. In case the ERTMS/ETCS onboard is connected to only one cab, this cab is considered as being the cab A.				
Length of variable	Minimum Value	Minimum Value Maximum Value Resolution/formula			
1 bit					
Special/reserved	0	Not active			
value	1	Active			

# Q\_CAB\_B

Name	Qualifier for cab B				
Description	Qualifier to indicate whether a second cab is connected to the ERTMS/ETCS onboard.				
Length of variable	Minimum Value Maximum Value Resolution/formula				
1 bit					
Special/reserved	0	No			
value	1	Yes			

#### M\_CAB\_B\_STATUS

Name	Cab B status				
Description	This variable contains the cab B status.				
Length of variable	Minimum Value         Maximum Value         Resolution/formula				
1 bit					
Special/reserved	0	Not active			
value	1	Active			

#### 4.2.4.39 DIRECTION CONTROLLER POSITION

Description	This message allows to tran 2.5.2).	smit the	direction	controller	position	(see	[4]
Content	Complementary Variable	Length		Comr	nent		
	M_DIRECTION_CONTROLL ER	2					

#### M\_DIRECTION\_CONTROLLER

Name	Direction controller state				
Description	This variable contains the direction controller input state.				
Length of variable	Minimum Value Maximum Value Resolution/formula				
2 bits					
Special/reserved	00	Neutral			
value	01	Backward			
	10	Forward			
	11	Spare			

#### 4.2.4.40 TRACTION STATUS

Description	This message allows to transmit the traction status (see [4] 2.5.4).				
Content	Complementary Variable	Length	Comment		
	M_TRACTION_STATUS 1				

#### M\_TRACTION\_STATUS

Name	Traction status				
Description	This variable contains the traction status				
Length of variable	Minimum Value Maximum Value Resolution/formula				
1 bit					
Special/reserved	0	Off			
value	1	On			

### 4.2.4.41 TYPE OF TRAIN DATA ENTRY

Description	This message allows to transmit the type of train data entry (see [4] 2.6.1).				
Content	Complementary Variable	Comment			
	M_TRAIN_DATA_ENTRY	2			

### M\_TRAIN\_DATA\_ENTRY

Name	Type of train data entry				
Description	This variable contains the type of train data entry				
Length of variable	Minimum Value Maximum Value Resolution/formula				
2 bit					
Special/reserved	0	Fixed			
value	1	Flexible			
	2	Switchable			
	3	Spare			

#### 4.2.4.42 NATIONAL SYSTEM ISOLATION

Description	This message allows to transmit the indication that a National System, which is interfaced to the on-board through an STM, is isolated or not (see [4] 2.7).				
Content	Complementary Variable	Length	Comment		
	NID_NTC		Defined in [1]		
	M_NATIONAL_SYSTEM_ISOLATION	1			

M_	NATIONAL	_SYSTEM_	ISOLATION
----	----------	----------	-----------

Name	Isolation of the National System			
Description	This variable contains the indication of isolation of the National System			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	NTC isolated		
value	1	NTC not isolated		

### 4.2.4.43 TRACTION CUT OFF COMMAND STATE

Description	This message allows to transmit the traction cut off command state (see [4] 2.4.9)			
Content	Complementary Variable	Length	Comment	
	M_TCO_COMMAND_STATE	1		

# M\_TCO\_COMMAND\_STATE

Name	Traction cut off command state			
Description	This variable contains the command state of the traction cut off.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
1 bit				
Special/reserved	0	Not commanded		
value	1	Commanded		

#### 4.2.4.44 LOWEST SUPERVISED SPEED WITHIN THE MOVEMENT AUTHORITY

Description	This message allows to transmit the LSSMA displayed to the driver		
Content	Complementary Variable	Length	Comment
	V_LSSMA	10	

V_LSSMA
---------

Name	Lowest Speed Supervised within the Movement Authority.		
Description	LSSMA displayed to the driver.		
Length of variable	Minimum Value Maximum Value Resolution/formula		
10 bits	0 km/h	600 km/h	1 km/h
Special/reserved	601-1022	Spare	
value	1023	None	

### 4.2.4.45 TRACK CONDITIONS

Description	This message allows to transmit the information related to track condition(s) (see [4] 2.3.4, 2.4.1, 2.4.2, 2.4.4, 2.4.6, 2.4.7 and 2.4.10).			
Content	Complementary Variable	Length	Comment	
	Q_SCALE		Defined in Chapter 7 of [1]	
	N_TRACKCOND_TI	5		
	M_TRACKCOND_TI(k)	4		
	D_MINSFE_TO_END(k)	16	Only if M_TRACKCOND_TI = 0, 1 or 9	
	D_MINSRE_TO_END(k)	15	Only if M_TRACKCOND_TI = 2, 3, 4, 5 or 6	
	M_VOLTAGE(k)		Only if M_TRACKCOND_TI = 7. Defined in Chapter 7 of [1]	
	NID_CTRACTION(k)		Only if M_VOLTAGE ≠ 0. Defined in Chapter 7 of [1]	
	M_CURRENT(k)		Only if M_TRACKCOND_TI = 8. Defined in Chapter 7 of [1]	
	M_PLATFORM(k)		Only if M_TRACKCOND_TI = 9. Defined in Chapter 7 of [1]	
	Q_PLATFORM(k)		Only if M_TRACKCOND_TI = 9. Defined in Chapter 7 of [1]	
	D_MAXSFE_TO_START(k)	16		

# N\_TRACKCOND\_TI

Name	Number of track conditions		
Description	Number of track conditions following this varia		able in the message.
Length of variable	Minimum Value Maximum Value Resolution/formula		
5 bits	1	27	
Special/reserved	0	Spare	
value	28-31	Spare	

# M\_TRACKCOND\_TI

Name	Type of track condition			
Description	Defines the type of	nes the type of track condition the information relates to		
Length of variable	Minimum Value	Maximum	Resolution/formula	
		Value		
4 bits				
Special/reserved	0	Powerless section	n with pantograph to be lowered	
value	1	Powerless section with main power switch to be switched off		
	2	Air tightness area		
	3	Inhibition of regenerative brake		
	4	Inhibition of magnetic shoe brake		
	5	Inhibition of eddy current brake for emergency brake		
	6	Inhibition of eddy	current brake for service brake	
	7	Change of traction system		
	8	Change of allowed current consumption		
	9	Station platform		
	10-15	Spare		

### D\_MAXSFE\_TO\_START

Name	Distance from train max safe front end to start location of a track condition.		
Description	Remaining distance from the train max safe front end to the start location of a track condition.		
Length of variable	Minimum Value	Maximum Value	Resolution/formula
16 bits	-327.670 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE.
Special/reserved value	-32768	Not relevant	

### D\_MINSFE\_TO\_END

Name	Distance from train min safe front end to end location of a track condition.			
Description	Remaining distance from the train min safe front end to the end location of a track condition.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
16 bits	-327.680 km	327.670 km	10 cm, 1m or 10 m depending on Q_SCALE	

# D\_MINSRE\_TO\_END

Name	Distance from train min safe rear end to end location of a track condition.			
Description	Remaining distance from the train min safe rear end to the end location of a track condition.			
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	

#### 4.2.4.46 SET SPEED

Description	This message allows to transmit the Set Speed displayed to the driver			
Content	Complementary Variable Length Comment			
	V_SETSPEED	10		

#### V\_SETSPEED

Name	Set Speed.			
Description	Set Speed displayed to the driver.			
Length of variable	Minimum Value Maximum Value Resolution/formula			
10 bits	0 km/h	600 km/h	1 km/h	
Special/reserved	601-1022	Spare		
value	1023	None		

#### 4.2.4.47 BRAKE AND TRACTION INTERFACE CONFIGURATION

Description	This message contains the configuration of the Train Interface with regards to the service brake command, the service brake feedback, the regenerative brake, the eddy current brake, the magnetic shoe brake, the electro pneumatic brake, the special/additional brake independent from wheel/rail adhesion and the traction cut-off command.					
Content	Complementary Variable	Length	Comment			
	Q_SERVICEBRAKEINTERFACE	1				
	Q_SERVICEBRAKEFEEDBACK	1				
	M_REGENERATIVEBRAKE2M_EDDYCURRENTBRAKE2					
	M_MAGNETICSHOEBRAKE 2					
	M_ELECTROPNEUMATICBRAKE 2					
	Q_SPECADDBRAKEINDADH 1					
	Q_TRACTIONCUTOFFINTERFA CE	1				

## **Q\_SERVICEBRAKEINTERFACE**

Name	Qualifier for service brake interface			
Description	Indicates whether the service brake command is implemented or no.			
Length of variable	Minimum Value         Maximum Value         Resolution/formula			
1 bit				
Special/Reserved	0	Not implemented		
Values	1	Implemented		

#### **Q\_SERVICEBRAKEFEEDBACK**

Name	Qualifier for service brake feedback interface			
Description	Indicates whether the service brake feedback is implemented or not.			
Length of variable	Minimum Value	inimum Value Maximum Value Resolution/formula		
1 bit				
Special/Reserved	0	Not implemented		
Values	1	Implemented		

#### M\_REGENERATIVEBRAKE

Name	Regenerative brake interface			
Description	It describes the interface with regenerative brake and whether it affects the braking curve calculation.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
2 bits				
Special/Reserved	00	No interface		
Values	01	Interface exists and affects only EB		
	10	Interface exists and affects only SB		
	11	Interface exists and affects	EB and SB	

### M\_EDDYCURRENTBRAKE

Name	Eddy current brake interface			
Description	Describes the interface with eddy current brake and whether it affects the braking curve calculation.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
2 bits				
Special/Reserved	00	No interface		
Values	01	Interface exists and affects only EB		
	10	Interface exists and affects only SB		
	11	Interface exists and affects	EB and SB	

#### M\_MAGNETICSHOEBRAKE

Name	Magnetic shoe brake interface			
Description	Describes the interface with magnetic shoe brake and whether it affects the braking curve calculation.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
2 bits				
Special/Reserved	00	No interface		
Values	01	Interface exists and affects only EB		
	10	Spare		
	11	Spare		

#### M\_ELECTROPNEUMATICBRAKE

Name	Electro pneumatic brake interface			
Description	Describes the interface with electro pneumatic brake and whether it affects the braking curve calculation.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
2 bits				
Special/Reserved	00	No interface		
Values	01	Interface exists and affects only SB		
	10	Interface exists and affects EB and SB		
	11	Spare		

#### Q\_SPECADDBRAKEINDADH

Name	Qualifier for special/additional brake interface			
Description	Indicates whether the interface with a special/additional brake independent from wheel/rail adhesion is implemented or not.			
Length of variable	Minimum Value	Maximum Value Resolution/formula		
1 bit				
Special/Reserved	0	Not implemented		
Values	1	Implemented		

### **Q\_TRACTIONCUTOFFINTERFACE**

Name	Qualifier for traction cut off interface			
Description	Indicates whether the traction cut off command is implemented or not.			
Length of variable	Minimum ValueMaximum ValueResolution/formula			
1 bit				
Special/Reserved	0	Not implemented		
Values	1	Implemented		

#### 4.2.4.48 RADIO NETWORK ID ENTERED BY THE DRIVER

Description	This message contains the Radio Network ID entered by the driver.		
Content	Complementary Variable	Length	Comment
	NID_MN		Identity of Radio Network. Defined in Chapter 7 of [1]

#### 4.2.4.49 TRAIN RUNNING NUMBER ENTERED BY THE DRIVER

Description	This message contains the Train Running Number entered by the driver.		
Content	Complementary Variable	Length	Comment
	NID_OPERATIONAL		Train Running Number. Defined in Chapter 7 of [1]

### 4.2.4.255 ETCS ON-BOARD PROPRIETARY JURIDICAL DATA

Description	This message allows to record information that is specific to an ETCS on- board equipment <sup>1</sup> .
Content	Proprietary data

<sup>&</sup>lt;sup>1</sup> If needed, the non harmonised information referred to in [4] can be included in this message.

# 4.3 Triggering events list

4.3.1.1 The following table gives the list of events that trigger the sending of a juridical data message by the ERTMS/ETCS on-board equipment.

TRIGGERING EVENT	NID_MESSAGE
Every 5 seconds	1
When the operated system version changes	1
When the level changes	1 (and 26 when level changes to NTC)
When the mode changes	1
When train data are validated at SoM	2
When train data are changed	2
When the state of the emergency brake command changes	3
When the state of the service brake command changes	4
When a telegram from an Eurobalise is received	6
When a message from an Euroloop is received	7
When a message from a RIU is received	8
When a message to a RIU is sent	5
When a message from a RBC is received	9
When a message to a RBC is sent	10
When a balise group error is detected	12
When a radio message error is detected	13
When a safety critical fault in mode SL, NL or PS occurs	27
At start up <sup>2</sup>	15, 47
When the driver acts on the on-board system through the DMI	11

 $<sup>^2</sup>$  i.e. once the ERTMS/ETCS on-board is powered up, when the connection with the On-board Recording Device is established.

When a fixed text message is shown to the driver	16
When a fixed text message is not shown any more to the driver	17
When a plain text message is shown to the driver	18
When a plain text message is not shown any more to the driver	19
When any of the speed and distance monitoring information changes	20
When the LSSMA appears, changes or disappears on the DMI	44
When the Set Speed appears, changes or disappears on the DMI	46
When any of the DMI symbols appears or disappears	21
When the playing of any audible information to the driver is started	22
When any of the system status messages appears or disappears on the DMI	23
When any of the STM related system status messages appears or disappears on the DMI	14
When the driver selects "Contact last known RBC", "Use short number" or when the driver has entered/re- entered/revalidated the RBC data	24
When the driver has entered a Radio Network	48
When the driver has entered/re-entered/revalidated the Train Running Number	49
When the driver changes the SR speed/distance	25
When the driver sets a Virtual Balise Cover	28
When the driver removes a Virtual Balise Cover	29
In any of the following events	30
• At start up <sup>2</sup>	
When the sleeping input state changes	
In any of the following events	31

At start up <sup>2</sup>	
When the passive shunting input state changes	
At start $up^2$ and when the non leading input state changes	32
Only if the ERTMS/ETCS enhand is interfaced with the	22
regenerative brake:	33
• At start up <sup>2</sup>	
When the status of the regenerative brake changes	
Only if the ERTMS/ETCS onboard is interfaced with the magnetic shoe brake in any of the following events:	34
• At start up <sup>2</sup>	
<ul> <li>When the status of the magnetic shoe brake changes</li> </ul>	
Only if the ERTMS/ETCS onboard is interfaced with the eddy current brake in any of the following events:	35
• At start up <sup>2</sup>	
When the status of the eddy current brake changes	
Only if the ERTMS/ETCS onboard is interfaced with the electro pneumatic brake in any of the following events:	36
• At start up <sup>2</sup>	
<ul> <li>When the status of the electro pneumatic brake changes</li> </ul>	
Only if the ERTMS/ETCS onboard is interfaced with the additional brakes in any of the following events	37
• At start up <sup>2</sup>	
When the status of the additional brake changes	
At start up <sup>2</sup> and when the cab status changes	38
In any of the following events:	39
• At start up <sup>2</sup> if a cab is already active	
When a cab becomes active	
When the direction controller input state changes	

In any of the following events:	40
• At start up <sup>2</sup>	
• When the status of the traction changes	
In any of the following events:	41
• At start up <sup>2</sup> if a cab is already active	
When a cab becomes active	
• When the type of the train data changes	
In any of the following events:	42
• At start up <sup>2</sup>	
<ul> <li>When the isolation status of any National System changes</li> </ul>	
When the traction cut off command state changes	43
When any of the following packets is sent to an STM:	14
STM-14 State order	
STM-20 Antenna/BTM ID	
STM-22 Test Procedure Permission	
STM-31 Active DMI channel	
STM-34 Button event report	
STM-40 Acknowledgement reply	
STM-47 ETCS BTM status message to STM	
When any of the following packets is received from an STM:	14
STM-6 Override activation	
STM-16 STM max speed	
STM-17 STM system speed and distance	
STM-18 National Trip Procedure	
STM-21 Test Procedure Permission Request	
STM-23 End of Test Procedure	

STM-32 Button Request	
STM-35 Indicator request	
STM-38 Text message	
STM-39 Delete text message	
STM-46 Sound command	
STM-128 Brake command	
STM-129 STM specific brake control command	
STM-130 STM commands to train interface	
STM-161 NTC juridical data	
When packet STM-15 State report from STM is received from an STM:	14
after a (re)connection	
<ul> <li>or with a different value of NID_STMSTATE with regards to previously-received packet STM-15</li> </ul>	
When packet STM-43 Speed and distance supervision information is received from an STM with a different value of any variable except D_TARGET with regards to previously-received packet STM-43	14
At any STM disconnect event	14
Each time information related to track condition(s) is provided to an ERTMS/ETCS external function	45

Table 2: List of triggering events and related messages

# 5. INTENTIONALLY DELETED

# 6. INTENTIONALLY DELETED