ERTMS/ETCS

FIS Juridical Recording

REF : SUBSET-027
ISSUE : 3.3.0
DATE : 2016-05-13

1. MODIFICATION HISTORY

Issue Number Date	Section Number	Modification / Description	Author
0.0.1 1999-07-27	All	Creation	Sonia Valero avier Congosto
0.1.0 1999-09-30	All	Modifications after review comments	Sonia Valero avier Congosto
1.0.0 1999-10-07	All	Final version	Sonia Valero avier Congosto
1.1.0 2000-02-18	All	Updating to SRS 2.0.0	Sonia Valero
1.2.0 2000-02-24		4.1.2.4.5, Final for distribution	U. Dräger (ed)
1.2.1 2000-03-28	All	Modifications after review with ECSAG (2000-03-22)	Sonia Valero
2.0.0 2000-03-30		Final issue to ECSAG	U.D. (ed)
2.0.1 2001-10-31		Update with Proposal 0.0.4 to SUBSET-027 v2.0.1	Sonia Valero
2.2.2 10-02-03		Raised in issue for release to the Users Group. No technical changes	WLH
2.2.3 2003-07-07		Eliminate all reference to M_VOLTAGE as requested by the Users Group.	Sonia Valero
2.2.4 2005-01-03	All	Including all CLRs included in the UNISIG data base related to the FFFIS JRU-Downloading tool v. 2.2.3 up to 03/01/2005 and the problems detected during the CEDEX interoperability tests. It also contains changes included in SRS v 2.2.2 affecting the juridical recorder functionality.	Sonia Valero
2.2.5 2005-04-21	All	Updating to SRS 2.2.6. The chapter about the physical interface has been not	Sonia Valero

		updated.	
2.2.6 2005-09-05	3.2.1.12 4.1.2.5.2 4.1.2.5.11 4.1.2.5.25 4.1.2.5.26 4.1.2.6.5.1 4.1.3.1.1.1 5.1.2.1 6.1.2.1	Update to include proposals from CEDEX and comments to version 2.2.5.	Sonia Valero
2.2.7 2005-10-13		Update to include comments from SuperGroup	Sonia Valero
2.2.8 2005-10-17		Update after revision	Sonia Valero
2.2.9 2005-10-17		Update of referenced documents	Sonia Valero/HK
2.2.12 2009-02-25		Update in the frame of 2.3.0d: update according to CRs 240, 262, 394, 643, 703 and 775.	Philippe Prieels
2.3.0 2009-04-22		Update in the frame of 2.3.0d regarding CR240 modifications	Jörg Liesche
2.3.1 2011-09-06		Upgrade of the whole document to baseline 3	Eric Lepailleur
2.3.2 2012-02-01			Eric Lepailleur
2.3.3 2012-02-27		Update to include editorial comments from UNISIG and to incorporate STM related juridical data	Eric Lepailleur Alain Hougardy
2.3.4 2012-03-01		Minor editorial comments	Alain Hougardy
3.0.0 2012-03-02		Baseline 3 release version	Alain Hougardy
3.0.1 2014-04-04		CR’s 1124, 1173, 1231	Olivier Gemine

3.0.2 2014-04-23		Baseline 3 1st maintenance pre-release version	Olivier Gemine
3.0.3 2014-05-06		CR 1223 Baseline 3 1st maintenance 2nd pre-release version	Olivier Gemine
3.1.0 2014-05-12		Baseline 3 1st maintenance release version	Olivier Gemine
3.1.1 2015-06-23		CR's 1163, 1167, 1169, 1260	Olivier Gemine
3.1.2 2015-11-17		CR's 539, 1087, 1249, 1265	Olivier Gemine
3.1.3 2015-12-16		Update due to overall CR consolation phase	Olivier Gemine
3.1.3 2015-12-16		Update due to overall CR consolation phase	Olivier Gemine
3.2.0 2015-12-18	Baseline 3 2nd release version as recommended to EC (see ERA-REC-123-2015/REC)		Olivier Gemine
3.2.1 2016-04-28	CR 1249 reopening following RISC #75		Olivier Gemine
3.3.0 2016-05-13	Baseline 3 2nd release version		Alain Hougardy

2. TABLE OF CONTENTS

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 on-board, 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

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 No	FIELDS	Remarks
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**	**Maximum Value**	**Resolution/formula**
11 bits	0	2047	1 Byte
Special/Reserved Values			

4.2.3.3 DATE

Description	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 Values	110 0100 … 111 1110 111 1111	100 … 126 127	not used … not used 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 Values	0000 1101 1110 1111	0 13 14 15	not used not used not used 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 Values	0 0000	0	day unknown

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 Values	1 1000	24	not used
	…	…	…
	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 Values	11 1100	60	not used
	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 recorded.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
6 bits	00	59	1 second
Special/Reserved Values	11 1100	60	not used
	11 1101	61	not used
	11 1110	62	not used
	11 1111	63	seconds unknown

TTS

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 Values	10100 to 11110 11111		 not used hundredth of second unknown

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_COMP(k, m)	10	Speed component of the emergency brake nominal deceleration.
A_BRAKE_EMERGENCY_COMP(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, m)	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) ≠ 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		
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 value	0	Passenger train in P	
	1	Freight train in P	
	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 value	16	Unknown	
	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_PERCENTAGE

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_CONF

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	

V_BRAKE_EMERGENCY_COMP

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	

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/s^2	2.55 m/s^2	0.01 m/s^2

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	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bits	0 m/s²	2.55 m/s²	0.01 m/s²

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 value	0 1	Not commanded Commanded	

4.2.4.4 SERVICE BRAKE COMMAND STATE

Description	This message records the service brake application command state (see [4] 2.3.3).		
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**	**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 from which the following message has been received.
	Message, as defined in Chapters 7 and 8 of [1], coming from the referenced 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 contains the driver's action.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
8 bit			

Special/Reserved Values	
0000 0000	Ack of On Sight mode
0000 0001	Ack of Shunting mode
0000 0010	Ack of Train Trip
0000 0011	Ack of Staff Responsible mode
0000 0100	Ack of Unfitted mode
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
0000 1100	Non Leading selected
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 requested
0001 0101	Validation of train data
0001 0110	Confirmation of Track Ahead Free
0001 0111	Ack of Plain Text information
0001 1000	Ack of Fixed Text information
0001 1001	Request to hide supervision limits
0001 1010	Train integrity confirmation
0001 1011	Request to show supervision limits
0001 1100	Ack of SN mode
0001 1101	Selection of Language
0001 1110	Request to show geographical position
0001 1111	Request to hide geographical position
0010 0000	"Slippery rail" selected
0010 0001	"Non slippery rail" selected
0010 0010	Level 0 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 balise group related error as identified by M_ERROR.		
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 the balise group which triggered the error		
Description	It contains the identity number of the balise group to which the error is related. NID_ERRORBG is identical to NID_BG (defined in chapter 7 of [1]) except for the NID_ERRORBG Special Value "16383" which has the meaning "unknown" and covers the case that, due to the error, the balise group identity is unknown		
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_PACKET) as 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 value	255	For STM-packets or disconnect requests sent to all (connected) STMs	

NID_STMEVENT

Name	STM Event type		
Description			
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
2 bits			
Special/reserved value	0	Disconnection	
	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 value	0	Disconnect request sent from STM	
	1	Disconnect request 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 value	0	Final disconnection	
	1	Non final disconnection	

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 of [3]	Bitset The least significant bit of the variable corresponds to bit 01.
Special/Reserved Values	Bit 01 Bit 02 Bit 03 Bit 04	NTC brake demand NTC needs data NTC failed NTC is not available	

NID_STMPACKET

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

	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 value	0	No cold movement occurred	
	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 fixed text message from the trackside that is currently being shown to the driver.		
Content	**Complementary Variable**	**Length**	**Comment**
	Q_TEXT		Defined in Chapter 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**	**Length**	**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 value	0	Ceiling speed monitoring (CSM)	
	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 value	0	Normal Status	
	1	Indication Status	
	2	Overspeed Status	
	3	Warning Status	
	4	Intervention Status	
	5...7	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 value	0	None	
	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 value	601 – 1022	Spare	
	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 value	601 – 1022	Spare	
	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**
15 bits	0 m	32766 m	1 m
Special/reserved value	32767	None	

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 value	601-1022	Spare	
	1023	None	

4.2.4.21 DMI SYMBOL STATUS

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

DMI_SYMB_STATUS

Name	DMI SYMBOL STATUS		
Description	Status of the symbols displayed to the driver A bit set to '1' means that the corresponding symbol is displayed.		
Length of variable	**Bit number**	**Definition**	**Resolution/formula**
87 bits		as in chapter 13 of [3]	Bitset The bit 01 corresponds to the least significant bit of the variable
Special/Reserved Values	Bit 01	LE01	
	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	MO06
	Bit 22	MO07
	Bit 23	MO08
	Bit 24	MO09
	Bit 25	MO10
	Bit 26	MO11
	Bit 27	MO12
	Bit 28	MO13
	Bit 29	MO14
	Bit 30	MO15
	Bit 31	MO16
	Bit 32	MO17
	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 69	TC26
	Bit 70	TC27
	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**
3 bits		as in chapter 14 of [3]	Bitset The bit 01 corresponds to the least significant bit of the variable
Special/Reserved Values	Bit 01 Bit 02 Bit 03	Sound Sinfo - Information on DMI Sound S1 – Over-speed 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 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 of [3]	Bitset The least significant bit of the variable corresponds to bit 01.
Special/Reserved Values	Bit 01 Bit 02 Bit 03 Bit 04 Bit 05 Bit 06 Bit 07 Bit 08 Bit 09 Bit 10 Bit 11 Bit 12 Bit 13	Balise read error Trackside malfunction Communication error Entering FS Entering OS Runaway movement SH refused SH request failed Trackside not compatible Train data changed Train is rejected Unauthorized passing of EOA / LOA No MA received at 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 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 value	0	Contact last known RBC	
	1	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 identity of the NTC when the selected level is NTC.		
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 value	0	Sleeping not requested	
	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 value	0	Passive shunting not permitted	
	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**	**Length**	**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**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/reserved value	0	Non leading not permitted	
	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 value	0 1	Not active Active	

4.2.4.34 MAGNETIC SHOE BRAKE STATUS

Description	This message allows to transmit the magnetic shoe brake status (see [4] 2.3.6).		
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 value	0 1	Not active 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 value	0 1	Not active 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 value	0 1	Not active 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 value	0 1	Not active 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**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/reserved value	0 1	Not active 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 value	0 1	No 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 value	0 1	Not active Active	

4.2.4.39 DIRECTION CONTROLLER POSITION

Description	This message allows to transmit the direction controller position (see [4] 2.5.2).		
Content	**Complementary Variable**	**Length**	**Comment**
	M_DIRECTION_CONTROLLER	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 value	00 01 10 11	Neutral Backward Forward 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 value	0 1	Off 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**	**Length**	**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 value	0 1 2 3	Fixed Flexible Switchable 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 value	0 1	NTC isolated 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 value	0 1	Not commanded 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 value	601-1022 1023	Spare 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 variable in the message.		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
5 bits	1	27	
Special/reserved value	0 28-31	Spare Spare	

M_TRACKCOND_TI

Name	Type of track condition		
Description	Defines the type of track condition the information relates to		
Length of variable	**Minimum Value**	**Maximum Value**	**Resolution/formula**
4 bits			
Special/reserved value	0	Powerless section with pantograph to be lowered	
	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 value	601-1022 1023	Spare 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_REGENERATIVEBRAKE	2	
	M_EDDYCURRENTBRAKE	2	
	M_MAGNETICSHOEBRAKE	2	
	M_ELECTROPNEUMATICBRAKE	2	
	Q_SPECADDBRAKEINDADH	1	
	Q_TRACTIONCUTOFFINTERFACE	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 Values	0	Not implemented	
	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**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0	Not implemented	
	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 Values	00	No interface	
	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 Values	00	No interface	
	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 Values	00	No interface	
	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 Values	00	No interface	
	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 Values	0	Not implemented	
	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 Value**	**Maximum Value**	**Resolution/formula**
1 bit			
Special/Reserved Values	0	Not implemented	
	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[1].
Content	Proprietary data

[1] 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[2]	15, 47
When the driver acts on the on-board system through the DMI	11

[2] 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 • At start up[2] • When the sleeping input state changes	30
In any of the following events	31

• At start up[2] • 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 onboard is interfaced with the regenerative brake: • At start up[2] • When the status of the regenerative brake changes	33
Only if the ERTMS/ETCS onboard is interfaced with the magnetic shoe brake in any of the following events: • At start up[2] • When the status of the magnetic shoe brake changes	34
Only if the ERTMS/ETCS onboard is interfaced with the eddy current brake in any of the following events: • At start up[2] • When the status of the eddy current brake changes	35
Only if the ERTMS/ETCS onboard is interfaced with the electro pneumatic brake in any of the following events: • At start up[2] • When the status of the electro pneumatic brake changes	36
Only if the ERTMS/ETCS onboard is interfaced with the additional brakes in any of the following events • At start up[2] • When the status of the additional brake changes	37
At start up[2] and when the cab status changes	38
In any of the following events: • At start up[2] if a cab is already active • When a cab becomes active • When the direction controller input state changes	39

In any of the following events: • At start up[2] • When the status of the traction changes	40
In any of the following events: • At start up[2] if a cab is already active • When a cab becomes active • When the type of the train data changes	41
In any of the following events: • At start up[2] • When the isolation status of any National System changes	42
When the traction cut off command state changes	43
When any of the following packets is sent to an STM: • 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	14
When any of the following packets is received from an STM: • 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	14

• 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: • after a (re)connection • or with a different value of NID_STMSTATE with regards to previously-received packet STM-15	14
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