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FIS for the RBC/RBC Handover involving a Baseline 2 RBC

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1. MODIFICATION HISTORY

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v.0.02 29-07-2014		Updates according to the agreed WP comments	Unisig WP RBC-RBC Handover
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3. INTRODUCTION

3.1 Scope and Purpose

3.1.1.1 This document specifies the functional interface for the RBC/RBC communication to perform an RBC/RBC handover between a Baseline 4 (B4) RBC and a Baseline 2 (B2) RBC according to the principles and procedures in the SRS [Subset-026].

3.1.1.2 The requirements contained in this document are specified for the B4 RBC, i.e. there are no requirements on a B2 RBC.

3.1.1.3 The B2 RBC operates with system version 1.0 and implements [Subset-039 v2.3.0].

3.1.1.4 To be compliant with this specification all the requirements of this specification shall be implemented in the B4 RBC.

3.1.1.5 The purpose of this specification is to enable a B4 RBC and a B2 RBC to be interconnected so that RBC/RBC handovers can be performed, independently of service performance and safety of the concerned RBCs, which are outside the scope of this specification.

3.1.1.6 Chapter 5 describes RBC/RBC handover issues for which this document does not provide harmonised solutions.

3.2 References

Reference	Title
Subset-023	Glossary of Terms and Abbreviations
Subset-026	System Requirements Specification
Subset-039	FIS for the RBC/RBC Handover
Subset-039 v2.3.0	FIS for the RBC/RBC Handover v2.3.0

4. REQUIREMENTS ON A B4 RBC INTERFACING WITH A B2 RBC

4.1 General Requirements

4.1.1.1 The [Subset-039] shall apply with the amendments specified in the following section 4.2.

4.1.1.1.1 Note: Any B4 RBC exchanging information with a B2 RBC has to comply with the requirements of [Subset-039] applicable to an interface according to system version 1.0 with the additional exceptions following in this specification in section 4.2.

4.1.1.2 Note: The statements in chapter 5 of the current document must be taken into account to avoid possible operational and/or safety problems caused by functional aspects which were not harmonised in the framework of the ETCS Baseline 2 specification.

4.2 Amendments to [Subset-039] when interfacing with a B2 RBC

4.2.1.1 [Subset-039] clause 4.5.1.6 shall not apply.

4.2.1.2 [Subset-039] clause 4.5.2.6 shall not apply.

4.2.1.3 In [Subset-039] clause 6.2.2.9 the incoming event “New train data received” specified in Table B2 of Annex B shall not apply.

4.2.1.4 In [Subset-039] clause 6.2.2.9 the outgoing event “New train data” specified in Table B3 of Annex B shall not apply.

4.2.1.5 In [Subset-039] clause 6.2.2.9 the event “New train data received” specified in Table B4 of Annex B shall not apply.

4.2.1.6 In [Subset-039] clause 6.2.2.10 the incoming event “New train data received” specified in Table B6 of Annex B shall not apply.

4.2.1.7 In [Subset-039] clause 6.2.2.10 the event “New train data received” specified in Table B8 of Annex B shall not apply.

4.2.1.8 In [Subset-039] Table 13 additional configuration item shall apply:

Configuration items	**Description**
RRI confirmation implemented in the neighbouring RBC	Yes/No

4.2.1.9 In [Subset-039] Table 13 additional configuration item shall apply:

Configuration items	Description
TSR revocation implemented in the neighbouring RBC	Yes/No

4.2.1.10 In [Subset-039] Table 14, message with identifier 207 shall not apply.

4.2.1.11 [Subset-039] clause 5.2.5 shall not apply.

4.2.1.12 In [Subset-039] clause 6.2.3.20 message identifier 207 shall not apply.

4.2.1.13 If the configuration item added in clause 4.2.1.9 has the value “No” then packet 66 shall be excluded from the list of optional packets specified in [Subset-039] clause 6.2.3.10.

4.2.1.14 If the configuration item added in clause 4.2.1.8 has the value “No” then [Subset-039] clause 5.3.3 shall not apply.

4.2.1.15 If the configuration item added in clause 4.2.1.9 has the value “No” then packet 66 shall be excluded from the list of track-to-train packets specified in [Subset-039] clause 6.2.3.16.

4.2.1.16 If the configuration item added in clause 4.2.1.8 has the value “No” then message identifier 224 shall be excluded from the list specified in [Subset-039] clause 6.2.3.20.

4.2.1.17 [Subset-039] clause 5.2.1.1 shall be replaced with: “Note: Pre-Announcement is only supported for modes FS, OS, SR, TR, PT or NL because in other modes either the Accepting RBC cannot forward any information to the on-board, the on-board cannot handle an RBC/RBC handover, or the mode is not supported by the B2 RBC.”

4.2.1.18 If the configuration item added in clause 4.2.1.9 of this document has the value “No” then [Subset-039] clause 6.2.3.2 shall be modified to read “Clause 5.1.1.7 shall be replaced with: “It shall be forbidden to send more instances of the same packet type in the same message, except for Packet 65 (TSR).”

4.2.1.19 In [Subset-039] clause 6.2.3.7 mode LS shall not apply.

4.2.1.20 In [Subset-039] clause 6.2.4.4.1 shall be replaced with: “In case an engine has to be pre-announced to an RBC X=1 then packet 11 shall be translated as follows:”. The tables and translations related to this clause remain unchanged.

4.2.1.21 In [Subset-039] clause 6.2.4.4.2 shall be replaced with: “Note In case an engine is pre-announced to an RBC X=1 the train running number cannot be sent in packet 5 but only as part of the train data in packet 11.”

4.2.1.22 In [Subset-039] clause 4.5.2.1 shall be replaced with: “If acknowledgement of pre-announcement is requested by the Handing Over RBC then the Accepting RBC is allowed to send route related information to the Handing Over RBC after the acknowledgement of the pre-announcement. If acknowledgement of pre-announcement

is not requested by the Handing Over RBC then the Accepting RBC is allowed to send route related information after reception of the pre-announcement from the Handing Over RBC."

4.2.1.23 In [Subset-039] clause 5.1.1.6.b) an additional rule shall apply: "Value 0 of variable M_ACK in a pre-announcement message shall be regarded as valid value.".

4.2.1.24 In [Subset-039] clause B.2.1.5 row 1 of table 8 shall be replaced by

Pre-Announcement received	If M_ACK=1: Send "Acknowledgement"→ ACC If M_ACK=0: → ACC	If M_ACK=1: Send "Acknowledgement"→ ACC If M_ACK=0: → ACC

5. ISSUES REQUIRING PROJECT SPECIFIC CONSIDERATION

5.1 Introduction

5.1.1.1 The points described in this chapter may lead to operation and/or safety issues unless they are addressed in the framework of a specific project.

5.1.1.2 The following sections identify each issue, but do not propose mitigations as these cannot be generic.

5.2 Pre-Announcement

5.2.1 Repetition of Pre-Announcement

5.2.1.1 The management of Pre-Announcement during an ongoing handover is not clearly defined in B2. No functional equivalent of [Subset-039] clauses 4.3.1.4, 4.3.1.5, 4.3.1.6 and 4.3.1.7 exists for B2 RBCs.

5.2.2 Acknowledgement of Pre-Announcement

5.2.2.1 In B2 the acknowledgement request (M_ACK = 1) for a Pre-Announcement message is not mandatory, and it is not mandatory for a B2 RBC to acknowledge the Pre-announcement before sending RRI. This raises the issue for a B4 Handing Over RBC that it could receive an RRI message before the acknowledgement of a Pre-Announcement.

5.2.3 Pre-Announcement of the train with OBU in LS mode

5.2.3.1 A train in LS mode cannot be pre-announced to a B2 RBC because the value for this mode is not allowed in the Pre-Announcement to a B2 RBC.

5.3 Receiving RRI before the first RRI Request

5.3.1.1 No functional equivalent of [Subset-039] clauses 4.3.1.8 exists for B2 RBCs.

5.4 Updating of Train Data

5.4.1.1 In B2 there is no harmonised means to update train data and train running number during an ongoing handover.

5.5 Definition of the variables Q_RRIMACHANGE and Q_TDCHANGE

5.5.1.1 The rules for the usage of variables Q_RRIMACHANGE and Q_TDCHANGE are different between the baselines.

5.6 Handling of life sign messages

5.6.1.1 Resolution and range of cycle times for transmission/reception of life sign messages are not defined in B2.

5.7 Overlapping handovers

5.7.1.1 No functional equivalents of [Subset-039] clauses 4.3.1.2.1 and 4.5.1.9 exist for B2 RBCs.

5.8 Handling of train category specific SSP elements

5.8.1.1 If a B4 RBC is operating with X=1, the provisions described in [Subset-039] for the handling of train category specific SSP elements are not sufficient to prevent hazards, see [Subset-113], ETCS-H0106. It might be necessary to apply mitigations in the role as HOV RBC as well as in the role as ACC RBC.

5.9 Timely termination of the session when the min safe rear end passes the border

5.9.1.1 In case of HOV with one mobile terminal the time it takes until a session can be established with the ACC RBC may be much longer than expected by the designers of the ACC RBC. The safety case of the B2 RBC might take into account the timely termination of the session when the min safe rear end (of the train being handed over) passes the border.

5.10 "Infinite" information in RRI

5.10.1.1 In case of a B2 HOV RBC this RBC might systematically discard Route Related Information from an ACC RBC, in case this latter sends a Mode Profile with L_MAMODE = special value “infinite”.