ERTMS/ETCS – Class 1

Trackside-Trainborne FIS for RADIO IN-FILL

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3. GENERAL ASPECTS

3.1 Scope

3.1.1.1 This FIS is applicable to radio communication systems providing communication services for safety-related application processes using open networks. It specifies the ERTMS Level 1 message exchange between on-board equipment and Radio In-fill unit.

3.1.1.2 Radio In-fill shall use services and protocols as specified by UNISIG EURORADIO FIS and UNISIG Key Management System.

3.1.1.3 This FIS is strictly dependent on the UNISIG EURORADIO FIS for class 1 [5], specifying the Radio System Interoperability for message exchange between on-board and trackside equipment in respect to safety-related application processes, like Automatic Train Control of ETCS level 2/3.

3.1.1.4 For this reason this document has the same structure of [5]. Each chapter of this FIS contains only the reference to EURORADIO FIS and the possible specific characteristics (differences) for in-fill application.

3.1.1.5 Some features shall be optional for Radio In-fill application.

3.1.1.6 This FIS does not define:

a) the radio in-fill application functionality and application information flow.

b) the open networks used.

c) the physical architecture of the radio communication subsystem.

3.1.1.7 Within the scope of this document the terms “Radio Communication System (RCS)” and EURORADIO system are used synonymously.

3.2 Acronyms and abbreviations

3.2.1.1 See [5].

3.3 Definitions

3.3.1.1 See [5].

3.4 References

3.4.1 Main References

[1] ERTMS/ETCS Class 1 “SRS Chapter 2 Basic System Description” – issue 2.0.0 – 22.12.99

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[2] ERTMS/ETCS Class 1 “SRS Chapter 3 Principles” – issue 2.0.0 – 22.12.99

[3] ERTMS/ETCS Class 1 “SRS Chapter 7 ERTMS/ETCS language” – issue 2.0.0 – 22.12.99

[4] ERTMS/ETCS Class 1 “SRS Chapter 8 Messages” – issue 2.0.0 – 22.12.99

[5] ERTMS/ETCS Class 1 “EURORADIO FIS” – issue 2.0.0 – 30.03.00

[6] ERTMS/ETCS Class 1 “Key Management FIS” – issue 2.0.0 – 30.03.00

[7] ERTMS/ETCS Class 1 “Radio In-fill FFFS” – issue 2.0.0 – 30.03.00

[8] ERTMS/ETCS Class 1 “ Trainborne FFFIS for Radio In-fill” – issue 2.0.0 – 30.03.00

3.4.2 Normative References

See [5].

3.4.3 Informative References

See [5].

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4. REFERENCE ARCHITECTURE

4.1.1.1 See [5].

4.1.1.2 The following features and options shall not be required for ETCS level 1 radio in-fill:

a) exchange of non-safety related information with remote application processes in the safety related equipment.

b) the optional service interface 2 between non-safe applications or support applications and the Communication Functional Module (CFM).

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5. INTERFACE TO SAFE SERVICES

5.1.1.1 See [5].

5.2 Service primitives for safe connection set-up

5.2.1.1 See [5].

5.3 Service primitives for safe data transfer

5.3.1.1 See [5].

5.4 Service primitives for connection release

5.4.1.1 See [5].

5.5 Service primitives for error reporting

5.5.1.1 See [5].

5.6 Service primitives for high priority data

5.6.1.1 This service shall not be required for ETCS level 1 radio in-fill.

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6. INTERFACE TO THE MOBILE NETWORK

6.1.1.1 See [5].

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7. SAFETY FUNCTIONAL MODULE

7.1.1.1 See [5].

7.2 Service definition

7.2.1.1 See [5].

7.2.2 Model of the safe services

7.2.2.1 See [5].

7.2.2.2 The HP service shall not be required for ETCS level 1 radio in-fill.

7.2.3 Safe connection set-up

7.2.3.1 See [5].

7.2.4 Safe data transfer

7.2.4.1 See [5].

7.2.5 Release of safe connection

7.2.5.1 See [5].

7.2.6 Error reporting

7.2.6.1 See [5].

7.2.7 Service for high priority data

7.2.7.1 This service shall not be required for ETCS level 1 radio in-fill.

7.3 Safety protocol

7.3.1.1 See [5].

7.3.2 Introduction

7.3.2.1 See [5].

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7.3.3 Functions of the safety layer

7.3.3.1 See [5].

7.3.3.2 The service of High priority information shall not be required for ETCS level 1 radio in-fill.

7.3.4 Time sequences

7.3.4.1 See [5].

7.3.5 Structure and encoding of safety PDUs

7.3.5.1 See [5].

7.3.5.2 Handling of HP SaPDU shall not be required for ETCS level 1 radio in-fill

7.3.5.3 Support of HP SaPDU, Sa-HP-Data.req, Sa-HP-Data.ind shall not be required for ETCS level 1 radio in-fill.

7.4 Safety Protocol Management

7.4.1.1 See [5].

7.4.2 Functions of the Safety Protocol Management

7.4.2.1 See [5].

7.4.3 Configuration Management

7.4.3.1 See [5].

7.4.4 Supervision and Diagnostics

7.4.4.1 See [5].

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8. COMMUNICATION FUNCTIONAL MODULE

8.1.1.1 See [5].

8.2 Service definition

8.2.1.1 See [5].

8.2.2 Model of communication services

8.2.2.1 See [5].

8.2.2.2 The following option shall not be required for ETCS level 1 radio in-fill:

a) Optionally, more than one transport connection per physical channel can be supported by a CFM.

8.2.2.3 The HP service shall not be required for ETCS level 1 radio in-fill

8.2.3 Connection establishment

8.2.3.1 See [5].

8.2.3.2 Optionally, the track-side CFM can establish transport connections. This option shall not be required for ETCS level 1 radio in-fill unit.

8.2.4 Data transfer

8.2.4.1 See [5].

8.2.5 Connection release

8.2.5.1 See [5].

8.2.6 High priority data

8.2.6.1 The HP service shall not be required for ETCS level 1 radio in-fill

8.3 Communication protocols

8.3.1.1 See [5].

8.3.2 Introduction

8.3.2.1 See [5].

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8.3.3 Data Link Layer

8.3.3.1 See [5].

8.3.4 Network Layer

8.3.4.1 See [5].

8.3.5 Transport Layer

8.3.5.1 See [5].

8.3.5.2 Multiplexing of two or more transport connections onto a single network connection can be provided as an option. This option shall not be required for ETCS level 1 radio in-fill.

8.3.6 Application conditions of X.224

8.3.6.1 See [5].

8.3.7 Time sequences

8.3.7.1 See [5].

8.4 Management of Communication Functional Module

8.4.1.1 See [5].

8.4.2 Call and ID-Management

8.4.2.1 See [5].

8.4.2.2 The EURORADIO System communication functional module offers optionally several logical connections between the trackside and the onboard equipment via the same physical channel. This option shall not be required for ETCS level 1 radio in-fill unit.

8.4.3 Configuration management

8.4.3.1 See [5].

8.4.4 Supervision / Diagnostics

8.4.4.1 See [5].

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9. KEY MANAGEMENT

9.1.1.1 According to [6].

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