Irish Railway Standard IRS-304-A

Requirements for Class A ETCS CCO Systems and for RU and IM Operating Rules in the Republic of Ireland

Issue	Published by	Issue Date
A	CRR on behalf of the Irish Railway industry stakeholders	24/08/2022

Table of contents

LIST OF FIGURES

LIST OF TABLES

1 Foreword

1.1 This Irish Railway Standard:

i. cannot replace any Technical Standard for Interoperability (TSI) or other legal requirements which may be applicable to a given project;
ii. is recommended to be chosen in accordance with RFU-STR-088 as an Alternative Solution in conjunction with a TSI Parameter to demonstrate conformity with the Essential Requirements;
iii. may be called up as a code of practice in conjunction with 402/2013;
iv. may be called up as good industry practice in conjunction with the Railway Safety Act 2005;
v. may be called up as a code of practice in conjunction with the safe integration of projects within the Railway System in the Republic of Ireland as defined under 2016/797 (EU) Art 18;
vi. may in parts or in full be called up as a National Rule (NR) for the Republic of Ireland in conjunction with 2016/797 (EU).

1.2 Where this document is called up as a National Rule, the reason for its application shall be identified in line with EU 2016/797 Art 13(2):

i. where the TSIs do not cover, or do not fully cover, certain aspects corresponding to the Essential Requirements, including open points as referred to in 2016/797 Article 4(6);
ii. where non-application of one or more TSIs or parts of them has been notified under 2016/797 Article 7 or 2008/57/EC Art9 or Art20;
iii. where a specific case requires the application of technical rules not included in the relevant TSI;
iv. National Rules used to specify existing systems, limited to the aim of assessing technical compatibility of the vehicle with the network;
v. networks and vehicles not covered by TSIs;
vi. as an urgent temporary preventive measure, in particular following an accident.

2 Scope and Application

2.1 Scope

2.1.1 General scope

This document is complementary to the European Union Agency for Railways (ERA) specifications for ETCS Baseline 3 Release 2, which are set out in the Control, Command and Signalling Technical Specification for Interoperability (CCS TSI).
One focus of this IRS is the standardisation of the requirements for principal functional performance and principal interfaces of the ETCS systems to be implemented in Ireland. This includes primarily the required CCO configuration choices and customisations, including the interface to the driver.
A second focus is the identification of topics for which standardised Operating Rules shall be established by IMs and RUs.
Note: This shall ensure that predictable system behaviour and performance, as well as standardised interfaces, support the safe and standard operation of any Class A system application.

2.1.2 Scope of this version

This Release A forms the basis for the first application of ETCS Level 1 in the Republic of Ireland. The requirements are also expected to evolve as a result of the application of the CRR Guideline [CRR-031] .

2.2 Editing rules

- The document is divided into sections and sub-sections in which requirements are defined.
- Each requirement is identified with a unique identification number, and with an attribute, that makes the requirement Mandatory or Optional in order to specify the configuration for application of the requirements of [TSI-CCS], where these requirements contain options or contain a range of configuration parameters to select from.
    - Mandatory Requirements shall be implemented in all CCO installations.
    - Optional Requirements may be implemented or not.
- The unique identifiers are intended to support the development, verification & validation activities for the Class A equipment. The requirement identifiers are not intended to change in the next version of this document. For new requirements new identifiers would be generated in sequence and introduced between the existing ones.
- Each requirement is labelled with an 'Onboard' or 'Application Condition' "Allocation".
- Each requirement is labelled with an "Owner" . The "Owner" label is an informative element which is intended to support the allocation of requirements between the industry stakeholders;
    - IM: the requirement is allocated to the IM which operates, or intends to operate, the network on which the CCT is installed
    - RU: the requirement is allocated to the RU which operates, or intends to operate in Ireland, a Unit on which the CCO is installed. This is expected to be implemented through a mandatory IM requirement (e.g. network access requirement).
    - ETCS CCO Supplier: the requirement is allocated to the RU which operates, or intends to operate in Ireland, the Unit on which the CCO is installed. Its implementation may typically be carried out by a supplier which has been contracted by the RU to supply an element of the CCO. Such requirements can originate from a mandatory IM requirement to the RU (e.g. through network access requirement).

  The above allocation is independent of which entity is defined as the "Applicant" according to 2016/797 (EU).

- Notes, Justifications and Examples are only informative and shall be regarded as supporting information for the understanding of the requirements. They are shown in blue italics as follows: *Notes in the text*.
- The use of terms her, his, signalman, driver, etc. in this standard is not intended to be gender specific.

2.3 General compliance date

This Irish Railway Standard comes into force on the date of its publication.

2.4 NR Provisions

- Table 1 identifies all sections of this IRS which are proposed as Irish NRs. The rationale is identified in line with section 1.2.
- In each case where DeBo assessment is required for conformity assessment of a NR it shall be performed by an IRL recognised DeBo employing the Modules stated. The assessment Modules are defined in 2010/713/EC (In this regard, the term NoBo (as used in 2010/713/EC) shall be understood to mean DeBo and references to TSIs shall be understood to mean references to Irish NRs). Note, all NRs to be employed as part of an authorisation require DeBo assessment. As exceptions NRs originating from the TSI OPS do not require DeBo assessment.
- Compliance with NRs to TSI OPS is demonstrated during SMS assessment and afterwards monitored by supervision.

Table 1 NR Provisions

Section	Rationale (as defined in section 1.2)		Module
None proposed	Absence of TSI requirements	i	Not applicable
None proposed	Non-application of TSIs	ii	Not applicable
None proposed	Technical Compatibility between on-board and trackside equipment	iv	
	Networks/ vehicles not covered by TSIs	v	

Note: It is expected that Infrastructure Managers – in order to ensure a common, standardised and interoperable network access – require compliance to this IRS by all Railway Undertakings operating or intending to operate on their networks. Based on current European and National legislation it is expected that this is enforced through the IMs Network Statements.

2.5 Conformity Assessment

Any RU, through application of their Safety Management System and of the requirements of [IOD] in combination with applicable TSIs and applicable NRs, shall ensure compliance with the requirements of this IRS allocated to them.

Any IM, through application of their Safety Management System and of the requirements of [IOD] in combination with applicable TSIs and applicable NRs, shall ensure compliance with the requirements of this IRS allocated to them.

When a requirement of this IRS refers to the [IRS-EMC], the conformity assessment of this requirement shall be made in accordance with the assessment requirements specified in that [IRS-EMC] document.

The assessment against the Application Conditions (SRACs) of this document shall be performed by the IM and/or RU responsible for their implementation (self-assessment), under the control of an Assessment Body (AsBo).

3 Normative references

In the development, verification & validation, operation and management of the CCO and CCT systems the application of the following standards and legislations shall be required in conjunction with this IRS. Subsequent revisions may be used instead of the quoted revisions where these are compatible with the revision quoted. In the case of legal documents, the use of subsequent revisions is often mandatory.

[IRS-CCT] Requirements for Class A CCT Systems in the Republic of Ireland, IRS-305-A

[IRS-EMC] IRS 203 Irish Railway Standard EMC–coordination, version as valid on the date of application

[IRS-403] IRS 403 - Requirements for Vehicle Network Interfaces for Vehicles

[50126] EN50126-1/2:2017 Railway applications - The specification and demonstration of reliability, availability, maintainability and safety (RAMS) Part 1 and Part 2

[50128] EN50128:2020 Railway applications - Communication, signalling and processing systems - Software for railway control and protection systems

[50129] EN50129:2018 Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling

[50159] EN50159:2010 Railway applications - Communication, signalling and processing systems - Safety-related communication in transmission systems

[UIC 453-2001] Procedures for air brake tests effected with a powered Unit - Provisions concerning international trains – 01/07/2001

[UIC 544-1] Brakes - Braking Performance – 10/2014

[50155] EN 50155:2017 Railway applications - Electronic equipment used on Rolling Stock

[61375] IEC 61375-1:2012 Electronic railway equipment –Train communication network (TCN) –Part 1: General architecture
and
IEC 61375-2-12012 Electronic railway equipment – Train communication network (TCN) – Part 2-1: Wire Train Bus (WTB)

[CSM402] CSM-RA 402/2009 Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment.

[ECM] COMMISSION REGULATION (EU) No 445/2011 of 10 May 2011 on a system of certification of entities in charge of maintenance for freight wagons,
or
COMMISSION IMPLEMENTING REGULATION (EU) 2019/779 of 16 May 2019 laying down detailed provisions on a system of certification of entities in charge of maintenance of vehicles.

[SUB-026] UNISIG ERTMS/ETCS SUBSET-026: System Requirements Specification, Issue 3.6.0

[SUB-027] UNISIG ERTMS/ETCS SUBSET-027: FIS Juridical Recording, Issue 3.3.0

[SUB-034] UNISIG ERTMS/ETCS SUBSET-034: FIS Train Interface, Issue 3.2.0

[SUB-035] UNISIG ERTMS/ETCS SUBSET-035: Specific Transmission Module FFFIS, issue 3.2.0

[SUB-036] UNISIG ERTMS/ETCS SUBSET-036: FFFIS for Eurobalise, Issue 3.1.0

[SUB-040] UNISIG ERTMS/ETCS SUBSET-040: Dimensioning and Engineering rules, Issue 3.4.0

[SUB-041] UNISIG ERTMS/ETCS SUBSET-041: Performance Requirements for Interoperability, Issue 3.2.0

[SUB-DMI] ERA ERTMS/ETCS, ETCS Driver Machine Interface, 3.6.0

[02S126] ERTMS/ETCS RAMS Requirements Specification - Chapter 2 – RAM, issue 6

[TSI-CCS] Technical Specification for Interoperability relating to the 'control-command and signalling' subsystems of the rail system in the European Union COMMISSION REGULATION (EU) 2016/919 including any related amendments.

[TSI-L&P] Technical Specification for Interoperability relating to the 'Rolling Stock — locomotives and passenger Rolling Stock' subsystem of the rail system in the European Union – 1302/2014, including any related amendments.

[TSI-WAG] Technical Specification for interoperability relating to the subsystem 'Rolling Stock — Freight Wagons' of the rail system in the European Union - 321/2013, including any related amendments.

[TSI-OPE] Up to 16.05.2021: Technical Specification for Interoperability relating to the operation and traffic management subsystem of the rail system in the European Union - 2012/757/EU including any related amendments (e.g. (EU) 2015/995).
From 16.05.2021: Commission Implementing Regulation (EU) 2019/773 on the Technical Specification for Interoperability relating to the operation and traffic management subsystem of the rail system within the European Union including any related amendments.

[IOD] Interoperability Directive, (EU) 2016/797 (as transposed in IRL)

[CRR-031] Guidance for the Drafting, Reviewing, Publishing and Updating of Irish Railway Standards, CRR-G-031

4 Terms and Definitions

Where a Term contained in this section is used in this IRS, it shall have the associated Definition contained in this section.

Note: Standard terms from [TSI-CCS] are not recalled in this section

Actual Train Consist	The current train composition including all its physical properties (e.g. length, load, brake performance). These properties shall reflect the true current values including any set up of equipment or presence of failed equipment or degraded performance of equipment.
Operating Rule	Any Operating Rule required by this standard shall be established in accordance with [TSI OPE]. *Note: Operating Rules which become required through the application of this IRS will constitute e.g. SMS operational procedures or IM/RU Company rules relating to the operation of a class A CCT or CCO system according to [TSI OPE].* In accordance with [TSI-OPE] and the IM's SMS established under the requirements of the Railway Safety Directive the Operating Rules shall be contained in the Route Book elements provided from an IM to the RUs for integration into their Rule Books for drivers. In accordance with [TSI-OPE] and the RU's SMS established under the requirements of the Railway Safety Directive the Operating Rules shall be contained in the driver's Rule Book provided from the RUs to the drivers. In accordance with [TSI-OPE] and the IM's SMS established under the requirements of the Railway Safety Directive the Operating Rules for IM shall be contained in the Documentation for Infrastructure Managers' staff.
Predefined Train Consist	A train formation of several Units coupled together, which was already pre-defined at design stage and which can be re-configured during operation without the need to use specific workshop equipment. Example: It has been pre-defined, at design stage, that a fixed formation of an (IE-Class8100 EMU plus IE-Class8300 EMU) Unit may operate with up to three other fixed formations of the same Unit type in a train. *Note: in some fixed formations, two vehicles may share a joint element of running gear.*
Train	An operational formation consisting of one or more Units. Operational means, in this context, that the Train is equipped with a traction system, with at least one cab from which the Train can be operated, and with all other equipment as required for its operation on the rail network.
Unit	The smallest operational vehicle element which may be integrated in a Train or taken out of a Train by operating staff without the need to use specific workshop equipment. A Unit may be composed of one or multiple individual vehicles. Examples:

	• An IE-Class201 locomotive, as an individual vehicle, is a Unit • A fixed formation of one IE-Class8100 EMU motorised vehicle with one IE-Class8300 EMU trailer vehicle is a Unit *Note: In some fixed formations, two vehicles may share a joint element of running gear.*
Vehicle	Composed of Rolling Stock and CCO (definition by EU legislation and guidance)

5 Symbols and Abbreviated Terms

ATP	Automatic Train Protection (Class B train protection system)
AWS	Automatic Warning System (Class B train protection system)
CAWS	Continuous Automatic Warning System (Class B train protection system)
CCO	Command Control & signalling On-board sub-system
CCT	Command Control & signalling Trackside sub-system
DMI	Driver Machine Interface
DMU	Diesel Multiple Unit
EB	Emergency Brake
ECM	Entity in Charge of Maintenance
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMU	Electric Multiple Unit
EP	Electro Pneumatic
ETCS	European Train Control System
EVC	European Vital Computer
IM	Infrastructure Manager
IRL	Republic of Ireland
JRU	Juridical Recording Unit (Event Recorder)
MVB	Multifunction Vehicle Bus
NR	National Rule
NTC	National Train control
RBC	Radio Block Center
RU	Railway Undertaking
SB	Service Brake
SIL	Safety Integrity Level
SRAC	Safety Related Application Condition(s)
TPWS	Train Protection and Warning System (Class B train protection system)
TSI	Technical Specification for Interoperability

Where a Term contained in this section is used in this IRS, it shall have the associated Definition contained in this section.

6 Architecture Overview

The figures below provide a description of the overall CCT and CCO architecture, reflecting a single cab and dual cab configurations.

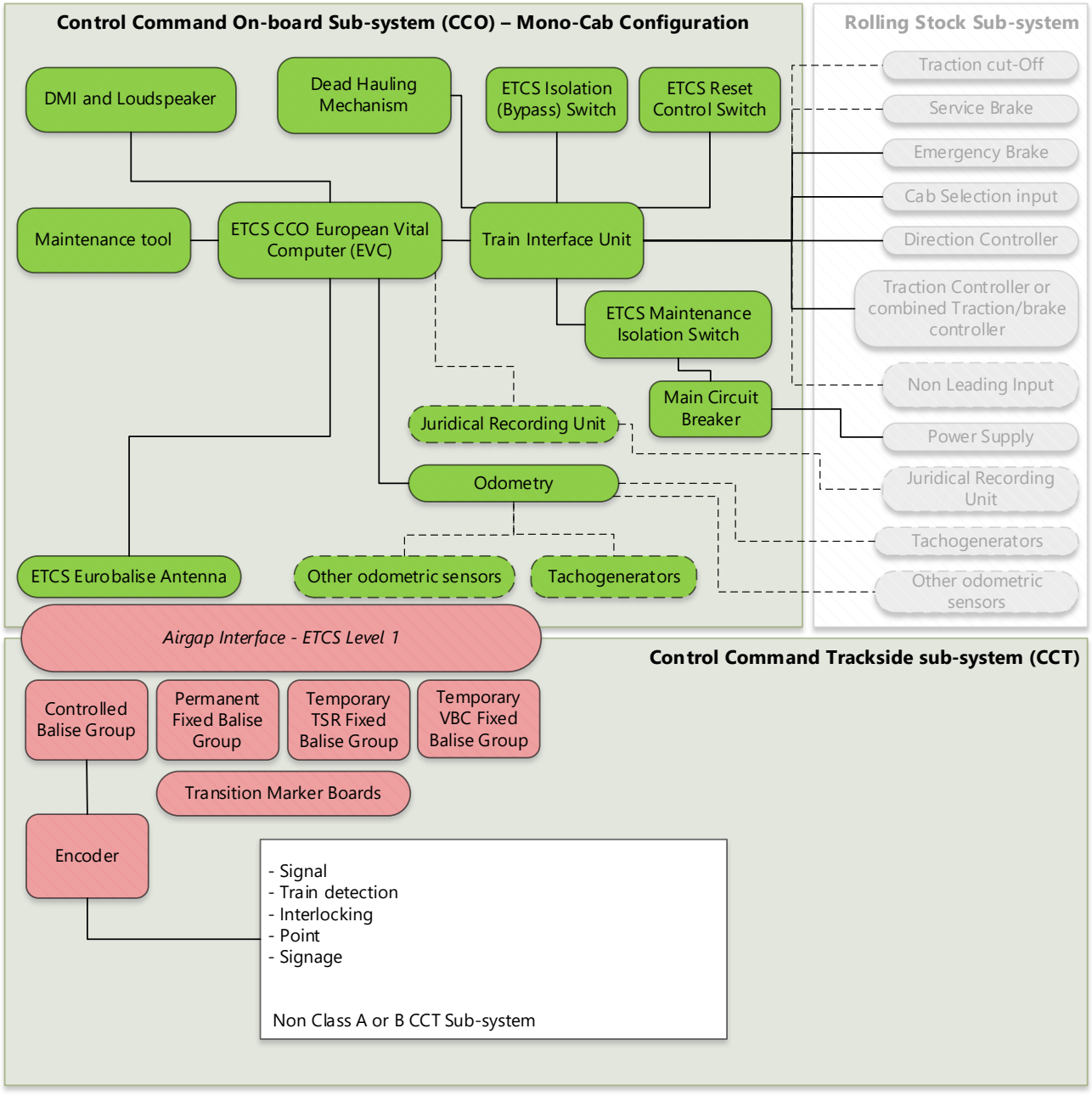

Figure 1: CCT and CCO architecture block diagram – Single Cab Configuration

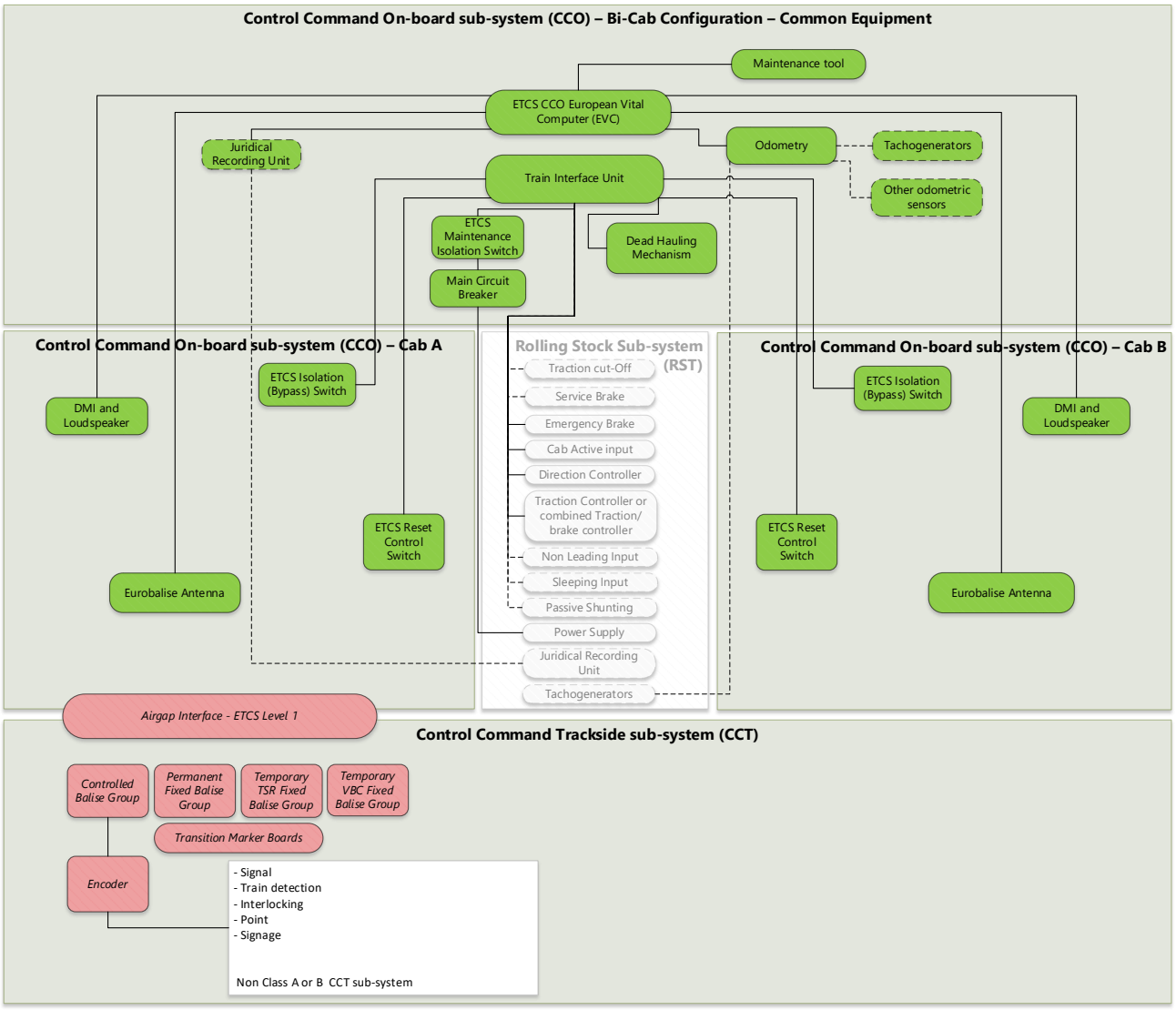

Figure 2: CCT and CCO architecture block diagram - Dual Cab Configuration

Note: Dotted lines refer to optional or alternative configurations:

- *The CCO EVC may be connected to the Rolling Stock Juridical Recording Unit (if it satisfies the requirement of this IRS) or a dedicated CCO Juridical Recording Unit.*
- *The odometry system may be connected to the Rolling Stock tachogenerators (if they satisfy the requirement of this IRS) or dedicated CCO tachogenerators. Other odometry sensors shall be added where required to achieve the required Safety Integrity Level.*
- *The Service brake connections may be configured or not.*
- *The Non-Leading input shall be implemented in accordance with [SUB-034] if required for operational reasons*
- *A mechanism may be implemented to enable moving a fitted vehicle without power, 'as a wagon' (Dead Hauling Mechanism).*
- *An ETCS Maintenance Isolation Switch may be implemented to enable maintenance (e.g. underframe maintenance)..*

7 Control Command and signalling On-board (CCO) Requirements (including Requirements for RU and IM Operating Rules)

7.1 General Requirements for CCO

[REQ:IRS_CLASSA_CCO_00001];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Unless otherwise stated, CCO shall be read in this document as meaning Class A ETCS CCO. On some occasions, where Class B equipment is intended to be referenced, the term Class B CCO is specifically employed.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00002];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The Class A CCO shall not interfere adversely with any other CCT or CCO systems which are installed in IRL at the time of placing on market/in service. This shall be assessed based on following topics:

- Installation conditions at application level,
- Applicable and related requirements of [TSI CCS], [IRS-EMC].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00003];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU and IM]

SRAC: Every SRAC indicated in this document requiring the establishment of an Operating Rule or the information or the training of staff shall, in accordance with [CSM402], be transferred to the relevant actor, through suitable means.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00110];[Allocation:Application Condition];[Type:Mandatory];[Owner: RU and IM]

SRAC: Operating Rules shall be established by IM and RU, in accordance with [TSI-OPE] to ensure that the drivers correctly interact with the CCO during all operational scenarios, e.g.:

- Selecting the appropriate ETCS Mode
- Entering and updating Train Data
- Performing Level Transitions
- Overriding End of Authority
- Activating Non-leading, Isolation (Bypass) and ETCS Maintenance Isolation switches or Dead Hauling Mechanism.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00099];[Allocation:Application Condition];[Type:Mandatory];[Owner: RU and IM]

SRAC: Operating Rules shall be established by IM and RU to determine the conditions under which the driver is permitted to increase the Staff Responsible mode related speed restriction (e.g. to 80 km/h in case of single line working). Such rule may include obtaining authorisation from the signaller. The definition of the authorised speed in such circumstances shall be made in accordance with the requirements of [CSM402], [50126], [50128], and [50129].

[END_REQ]

Note: this speed increase from the 30km/h (National Value for the Staff Responsible speed) to 80km/h may be required for degraded operation in accordance with the previously existing operating rules (e.g. 50 mph applicable in single line working).

[REQ:IRS_CLASSA_CCO_00020];[Allocation: Application Condition];[Type:Mandatory];[Owner: RU and IM]

SRAC: Operating Rules shall be established by IM and RU to determine the conditions under which the driver is permitted to modify the distance to run in Staff Responsible mode. The definition of the authorised speed in such circumstances shall be made in accordance with the requirements of [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00004];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO requirements indicated in this section 7 shall be read in conjunction with the CCT Requirements indicated in [IRS-CCT].

[END_REQ]

7.2 Class A ETCS CCO and Class B CCO

[REQ:IRS_CLASSA_CCO_00005];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Class A ETCS CCO and Class B CAWS CCO may operate simultaneously on the same Unit.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00006];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Class A ETCS CCO and Class B ATP CCO shall not operate simultaneously on the same Unit.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00096];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Class A CCO and Class B TPWS/AWS CCO may operate simultaneously on the same Unit.

[END_REQ]

7.3 ETCS configuration

[REQ:IRS_CLASSA_CCO_00007];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Unless specified otherwise in this IRS, the ETCS CCO shall fully conform to:

- The mandatory set of specifications for ETCS Baseline 3 Release 2, listed in (EU) 2016/919 CCS TSI Annex Table A 2.3 (including any related amendments), and
- The related opinion from 'Opinion for the European Union Agency for Railways for The European Commission Regarding Error Correction to the CCS TSI', dated 05/05/2020, and referenced ERA-OPI-2020-2.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00008];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The Unit fitted with CCO shall be operational in ETCS Level 0 and ETCS Level 1.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00009];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO Euroloop infill and Radio Infill equipment may be installed.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00010];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO architecture shall be upgradable to ETCS Level 2 through the installation and connection of additional hardware only required for ETCS Level 2 (Data Radio Module and associated antennas). The ETCS Level 1 components shall not require hardware replacement or modification (e.g. EVC, odometry, antenna, DMI).

[END_REQ]

[REQ:IRS_CLASSA_CCO_00097];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO architecture shall be upgradable to ETCS Level 2 without the need for development of new software compared to the CCO ETCS Level 1 architecture. It is required that only activation of already existing software elements will be necessary to enable full ETCS Level 2 functionality.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00011];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The unit fitted with CCO is not required to be operational in Level NTC.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00012];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO may be capable of providing the Cold Movement Detection function.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00013];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO may be capable of recovering train data from an auxiliary train management system to minimise train driver workload during the DMI data entry process. If implemented, this functionality shall be demonstrated to be SIL4, or equivalent, in conjunction with any associated operating procedures. The demonstration shall be based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00014];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO shall be configured so that it calculates ETCS braking curves according to the gamma train principles.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00015];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO may provide interfaces for any of the following:

- Controls of the pantograph
- Controls of the main power switch associated with external electric traction power supply
- Inhibition of special brakes: magnetic shoe brakes, regenerative brakes
- Station platform information

[END_REQ]

Note: The [IRS-403] prohibits the use of some types of special brakes, e.g. eddy current brakes are not allowed in Ireland.

[REQ:IRS_CLASSA_CCO_00016];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO may provide the following interfaces optionally:

- Service brake command
- Service brake feedback
- EP brake feedback
- Traction cut-off

[END_REQ]

[REQ:IRS_CLASSA_CCO_00098];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

If EP brake feedback is implemented, the configuration of the CCO according to Table 3 of [SUB-026] shall be made in accordance with

- the Safety Integrity Level of the EP brake feedback function throughout the actual train consist and
- the requirements of [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00106];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: If EP brake feedback is used by CCO for the emergency brake model, the status of this input as provided by the Unit to which the CCO is fitted shall reflect the status of all EP brakes of all vehicles in the actual train consist.

[END_REQ]

Note: this means that this function cannot be implemented for emergency brake model unless all vehicles in the actual train consist are fitted with EP brake and are capable of delivering the related feedback to the Unit to which the CCO is fitted.

7.4 EVC Configurations

Note: This section intends to provide clarifications to the TSI which do not impact the interoperability of the CCO.

[REQ:IRS_CLASSA_CCO_00017];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO shall display a "Balise Group Error" message to the driver if a Balise Group associated with a linking reaction set to 'No Reaction' presents a Linking Consistency or Balise Group Message Consistency error.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00018]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00019]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00021];[Allocation:Application Condition];[Type:Mandatory];[Owner IM]

SRAC: The IM shall regulate the Network Access for actual train consists and shall ensure that the Cant Deficiency parametrization (NC_CDTRAIN) of the trains using the network corresponds to the Cant Deficiency based differential speed profile (NC_CDDIFF) of the network which is transmitted by the ETCS CCT.

[END_REQ]

Note: The table below associates the NC_CDDIFF, the cant deficiency and the train category label according to [SUB-026] and [SUB-DMI]. This table also indicates the expected configuration for the typical train consists used in Ireland.

NC_CDDIFF	*Cant deficiency*	*Train category label*	*Typical train consists used in Ireland*
0	*80 mm*	*PASS1, FP1, FG1*	*PASS1: Loco-hauled passenger (Mk3)* *FG1: Freight vacuum/air, OTM* *FP1: Freight air, OTM*
1	*100 mm*	*FP2, FG2*	*FP2: Future freight air*
2	*130 mm*	*PASS2, FP3, FG3*	*PASS2: Loco-hauled passenger (Enterprise, MkIV)* *FP3: Future freight air*

NC_CDDIFF	*Cant deficiency*	*Train category label*	*Typical train consists used in Ireland*
3	*150 mm*	*PASS3, FP4, FG4*	*PASS3: DMU/EMU/Future BEMU, Future loco-hauled* *FP4: Future freight air*
4	*165 mm*	*TILT1*	*Future tilting trains*
5	*180 mm*	*TILT2*	
6	*210 mm*	*TILT3*	
7	*225 mm*	*TILT4*	
8	*245 mm*	*TILT5*	
9	*275 mm*	*TILT6*	
10	*300 mm*	*TILT7*	

7.5 DMI Configuration

[REQ:IRS_CLASSA_CCO_00022]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00023];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO DMI shall be configurable so that it can show the speed in mph in addition to the standard km/h display. The configurable option shall be as follows;

- Display the speed dial in both km/h and mph as indicated as an example in Figure 3
- Display the speed dial in km/h only

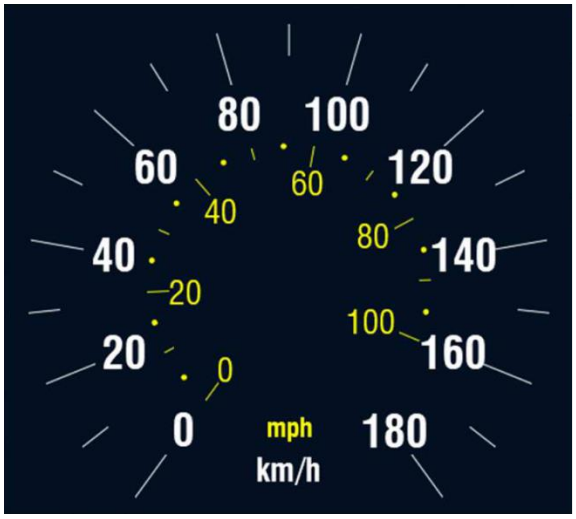

Figure 3: Example of km/h and mph DMI Speed Display

[END_REQ]

Note: this does not impact the digital speed presented in the centre of the speed pointer which shall always be displayed in km/h.

[REQ:IRS_CLASSA_CCO_00024];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO DMI may be configurable so that it can display the speed dial in both km/h and mph only while the CCO operates in ETCS Level 0.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00025];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO DMI may not display to the driver those elements which are strictly related to unavailable

or irrelevant functions, if this can be demonstrated to be acceptably safe based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402]. This may include:

- To not display on the DMI of diesel trains the track condition icons related to electric units (pantograph, change traction, etc.);
- To not display the elements related to the following information:
    - Driver ID
    - Train Running Number
    - Radio Data
    - Staff Responsible distance
    - RBC Data
    - Radio Network ID
    - Any Level 2 or 3 information not supported/enabled by the architecture
    - Train integrity
    - Language (if only one language is configured)
    - Non Leading mode activation if the Non Leading input is not configured
- Preventing drivers from accessing the technical menus that are not intended for their use.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00107];[Allocation: On-board];[Type:Optional];[Owner: ETCS Supplier]

Optional: For CCO operated on a CCT area fitted with ETCS Level 1 and not fitted with ETCS Level 2, the CCO may not request the driver to enter Driver ID and Train Running Number during the start of mission. These variables may instead be pre-parametrised in the ETCS CCO.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00108];[Allocation: On-board];[Type:Mandatory];[Owner: ETCS Supplier]

If CCO is required to be operated on a CCT area fitted with ETCS Level 2, the CCO shall either

- be capable of managing the Train Running Number in alphanumeric format or
- obtain the train running number in numeric format from the GSM-R radio.

[END_REQ]

Note: When alphanumeric Train Running Numbers are no longer in use in Ireland, a future version of this standard may be updated to remove this requirement.

[REQ:IRS_CLASSA_CCO_00026];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The messages and labels displayed to the driver on the CCO DMI shall be configurable. The content of the messages shall be defined in consultation with drivers and Human Factors experts.

[END_REQ]

Note: A future version of the standard intends to identify the content of each message and label in the English (Ireland) language to ensure standardisation across the entire fleet operating on the Irish Railway network.

[REQ:IRS_CLASSA_CCO_00027];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO DMI data entry process for predefined train consists shall use the Fixed Data Entry concept. The fixed configuration shall reflect any foreseeable combination of:

- The formation of the actual train consist, and
- The brake isolation status of the actual train consist.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00028];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO DMI data entry process for non-predefined train consists shall use the Flexible Data Entry concept and require the driver to enter:

- Train Category
- Train Length (m)
- Emergency Brake Deceleration Rate (Gamma concept)
- Emergency Brake Delay Time (Gamma concept)
- Maximum Speed (km/h)

[END_REQ]

[REQ:IRS_CLASSA_CCO_00111];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: An Operating Rule shall be established to ensure that:

- the drivers only
    - enter and confirm a set of train data or
    - confirm a set of preconfigured train data,

  which they know reflects the properties and performance of the Actual Train Consist, at the start of a mission, and
- the drivers stop operation and update train data in the event of a change in the properties or performance of the actual train consist, and
- the drivers correctly communicate the current train data, and properties and performance of the Actual Train Consist to the next driver during driver changes.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00029]

Intentionally blank

[END_REQ]

[REQ:IRS_CLASSA_CCO_00030];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

In accordance with LOC & PAS TSI clause 4.2.9.3.4 (5) the volume of CCO DMI alarms shall be at least 6 dB(A) above the noise level in the cab.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00031];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Manual ETCS DMI loudspeaker volume adjustment shall be possible and be simple to achieve by the driver whilst the train is being driven.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00032];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The ETCS DMI shall be configured so that the train driver cannot reduce the ETCS DMI loudspeaker volume to the point where the audible information does not comply with IRS_CLASSA_CCO_00030.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00033];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: Audible CCO alarms may automatically adjust their volume in response to the real time background noise level in the cab.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00034];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: The CCO DMI luminance may adjust automatically in response to changing cab lighting levels.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00035];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Manual CCO DMI luminance adjustment by the driver shall be possible and simple to achieve whilst the train is being driven.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00036];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO DMI shall be configured so that the train driver cannot reduce the DMI display luminance to the point where the visual information being presented cannot be reliably read.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00037];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO DMI shall respond to any manual input within 100 ms.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00038];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Graphical objects on the CCO DMI shall be fully rendered and displayed within 20 ms of the DMI display being commanded to present them

[END_REQ]

7.6 CCO Performances

[REQ:IRS_CLASSA_CCO_00039];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO shall not require tests, which necessitate the transition of the CCO to No Power mode, to be performed more frequently than once every 24h.

[END_REQ]

Note: Based on discussions with the representatives of Irish Railway Undertakings, 24 hours is considered an acceptable value.

[REQ:IRS_CLASSA_CCO_00040];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

An audible alert and a message shall be given to the driver when the time remaining before the next test, which necessitates the transition of the CCO to No Power mode, reaches a predefined value.

This value shall be capable of being set between 1 and 5 hours through the maintenance configuration menu, with steps of 1h.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00041];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: Upon request from the driver, the CCO shall display a message on the DMI which includes the time remaining in [hh:mm] format before the next test, which necessitates the transition of the CCO to No Power mode, needs to be performed.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00109];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

If the remaining time before a test, which necessitates the transition of a CCO to No Power mode, has elapsed and that CCO is not connected to an active cab, this event shall not initiate a brake demand.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00042];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO initialization sequence, including the hardware, software and interface tests, shall be completed within a maximum of 60 seconds after power has been applied to the CCO.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00043];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The maximum time for entering into Standby mode from any other mode once the cab is disabled and all other required mode transition conditions are fulfilled shall not be greater than 1 second.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00044]

Intentionally blank.

[END_REQ]

7.7 Rolling stock integration requirements

7.7.1 CCO switches requirements

[REQ:IRS_CLASSA_CCO_00047];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

A CCO Isolation (Bypass) switch shall be provided to permit operation in Isolation Mode. The design and location of this switch shall be based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402]. The hazard identification shall at least consider:

- hazards related to the possibility of driving the train while the switch is activated
- hazards related to the switch being activated during train operation
- hazards related to inadvertent operation of the switch
- hazards related to the deactivation of the switch
- threats to persons working close to an energised Antenna and

[END_REQ]

[REQ:IRS_CLASSA_CCO_00045];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO Isolation (Bypass) switch shall have two distinct positions which shall be clearly labelled “ETCS Active” and “ETCS Isolated”. The position of the switch shall be clearly and directly identifiable by eye.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00046];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Isolation mode shall be entered when the driver operates the CCO Isolation (Bypass) switch to the “ETCS Isolated” position.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00048]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00049];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO Isolation (Bypass) Switch shall be located such that is not at driver's reach when in the normal driving position.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00050];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

It shall be permitted, that the driver is required to stop the Train and leave the driving position to inspect the status of the CCO Isolation (Bypass) switch. It shall not be required for the driver to step off the vehicle or enter the passenger compartment or the engine compartment for this purpose.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00051]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00102];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: When the CCO is in Isolation mode, a speed limiter may be interfaced to the train control systems to contain the train speed within an acceptable low range.

The detailed requirements for this function shall be based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00103];[Allocation:Application Condition];[Type:Mandatory];[Owner: RU and IM]

SRAC: Operating Rules shall be established by the IM and the RU to regulate the use of the Isolation (Bypass) Switch and the degraded operation in Isolation mode.

These must reflect the absence of the speed indication on the CCO DMI and the necessity for a second competent person to observe the lineside signals and the driver reactions to them. In case of the driver not showing the required reactions, the competent person shall instruct the driver to comply and shall stop the Train by activation of an Emergency Brake where the driver still fails to perform the required reactions.

[END_REQ]

Note: A future version of this standard may include a more comprehensive set of requirements for operation in Isolation mode.

[REQ:IRS_CLASSA_CCO_00052]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00053];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: To support the operating rules defined in section 7.7.4, requirement *[REQ:IRS_CLASSA_CCO_00094]*, an ETCS Maintenance Isolation Switch may be provided to facilitate underframe works. The design and functionality of this switch shall be based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402]. The hazard identification shall at least consider:

- threats to persons working close to an energised Antenna and (e.g. padlocked switch)
- hazards related to the switch being activated during train operation

- hazards related to the possibility of driving the train while the switch is activated

[END_REQ]

[REQ:IRS_CLASSA_CCO_00054];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO shall include a CCO Reset Control Switch in each driving cab that allows the train driver to remove and reinstate power to the CCO in order to force the system to transition to No Power and then Standby mode.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00055];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The CCO Reset Control Switch shall be protected with a cover to prevent its unintended operation. Special tools or equipment shall not be necessary to activate the CCO Reset switch.

[END_REQ]

Note: the switch should be of a spring-return type, to avoid being unintentionally left in the "Off" (No Power) position.

[REQ:IRS_CLASSA_CCO_00104];[Allocation: On-board];[Type:Mandatory];[Owner: ETCS Supplier]

The CCO Reset Control Switch shall be located such that is not at driver's reach when in the normal driving position. It shall not be required for the driver to step off the vehicle or enter the passenger compartment or the engine compartment in order to operate the CCO Reset Control Switch.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00056];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

In dual cab configuration, the activation of the CCO Reset Control Switch in a non-active cab shall have no effect on the power supply to the CCO.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00057];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Operation of the CCO Reset Control Switch shall be recorded in the Juridical Recorder.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00058]

Intentionally blank.

[END_REQ]

7.7.2 EMC and electrical safety requirements

[REQ:IRS_CLASSA_CCO_00059];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Earthing and bonding must adequately protect against EMC/EMI threats, in accordance with [IRS-EMC].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00060];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Insulation coordination, circuit protection, earthing and bonding must adequately protect against electric shocks, based on a risk assessment compliant with the requirements of [50126], [50128], [50129] and [CSM_402].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00061];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The electromagnetic characteristics for the CCO (EMC and EMI requirements) shall be according to [IRS-EMC].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00062];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: The electromagnetic characteristics (EMC and EMI requirements) of the Unit in which the CCO is fitted shall be demonstrated to be compliant with [IRS-EMC].

[END_REQ]

Note: The above requirement concentrates on topics specific to Ireland, which are additional to the generic requirements of the European EMC Directive and to the requirements of the relevant TSIs.

7.7.3 Interfaces to fitted Unit, to Actual Train Consist, and to Environment

[REQ:IRS_CLASSA_CCO_00100];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The interface implemented between CCO and the Unit in which it is fitted shall be compliant with [SUB-034] and [SUB-027].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00063]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00064];[Allocation:Application Condition];[Type:Mandatory];[Owner:IM and RU]

SRAC: Operating Rule shall be established by the IM and the RU to ensure that only the front cab of a train is used for driving in Full Supervision or On-Sight modes. Operation in other modes shall be regulated by rules established by the IM and the RU.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00065];[Allocation:Application Condition];[Type:Mandatory];[Owner: RU]

SRAC: The Rolling Stock design shall be suitable to support the permanent trainwide availability and execution of the data values obtained via CCO Pre-Parametrisation and Data Entry function for

- Train Emergency Brake Build-up Time and
- Train Emergency Brake Deceleration.

The Rolling Stock design shall ensure that the permanent trainwide availability and execution of these values, for each CCO application, achieves either SIL4 or a comparable level of safety integrity, in accordance with [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00066]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00067]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00068];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: An Operating Rule shall be established to require that the formation of any Actual Train Consist shall ensure a trainwide execution of the CCO emergency brake demand at a performance equal or better than the values entered via CCO Pre-Parametrisation and the Data Entry function for

- Train Emergency Brake Build-up Time and
- Train Emergency Brake Deceleration;

at either SIL4 or a comparable level of safety integrity, in accordance with [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00112];[Allocation:Application Condition];[Type:Mandatory];[Owner: IM and RU]

SRAC: Operating Rules shall be established by the IM and the RU to require drivers, when operating under degraded braking circumstances (e.g. low wheel rail adhesion conditions), to use their professional driving skills and not rely solely on the speed limits indicated on the DMI.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00069];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: The design of the Rolling Stock into which CCO is integrated must ensure that CCO emergency brake demands automatically result in a trainwide Traction Cut Off within the Train Emergency Brake Build-up Time which has been established for CCO operation via the Data Entry function. This shall be achieved at either SIL4 or a comparable level of safety integrity, established in accordance with [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00070];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: If the Service Brake is interfaced to the CCO, the Rolling Stock design shall be suitable to support the permanent trainwide availability and execution of the values set for

- Train Service Brake Build-up Time and
- Train Service Brake Deceleration.

The Rolling Stock design shall ensure that the availability of these values, for each CCO application, shall achieve either SIL0 (also called 'Basic Integrity') or a comparable level of safety integrity, in accordance with [CSM402], [50126], [50128], and [50129].

[END_REQ]

[REQ:IRS_CLASSA_CCO_00071];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: If the Traction Cut Off is interfaced to the CCO, the design of the Rolling Stock into which CCO is integrated shall ensure that the Traction Cut-Off demands from CCO are executed trainwide, within the Traction Cut Off Response Time which has been configured for CCO operation.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00072];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: If Service Brake is configured and the CCO demands the application of both Service Brake and Emergency Brake simultaneously, then the Rolling Stock design shall ensure that:

- at least the Emergency Brake is executed trainwide, and
- unacceptable compounding of the Service Brake and Emergency Brake is prevented trainwide.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00073];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: The design of the Rolling Stock into which CCO is integrated shall ensure that CCO emergency brake

demands from any CCO in the Train are executed trainwide via all emergency brake systems present in the Train.

[END_REQ]

Note: This could include, as applicable, any parallel pneumatic, electric, electro-pneumatic, electronic brake systems, etc.

[REQ:IRS_CLASSA_CCO_00074]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00075]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00076]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00077]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00078]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00079]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00080]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00081];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

In order to ensure the reliability/availability of service, the CCO shall be powered from the battery of the Unit to which it is fitted, via a separate CCO Circuit Breaker, which only feeds this CCO equipment. This circuit breaker shall be accessible and operable by the driver without the need for using tools.

[END_REQ]

Note: this is to support availability of the network as a loss of CCO power supply would result in Emergency Brake application and subsequent operational disruption.

[REQ:IRS_CLASSA_CCO_00082]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00083];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

In order to ensure the reliability/availability of service, it is not permitted to use the Rolling Stock body as

negative return path from the CCO to the battery.

[END_REQ]

Note: this is to support availability of the network, as a loss of CCO power supply could result in Emergency Brake application and subsequent operational disruption.

[REQ:IRS_CLASSA_CCO_00084];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: In order to ensure the reliability/availability of service, an Operating Rule shall be established by the RU for determining a priority for retention of CCO functionality when load shedding is performed by the Unit to which CCO is fitted, to retain essential functions when the on-board electric power supply is operated at reduced capacity.

[END_REQ]

Note: this is to support availability of the network as a loss of CCO power supply would result in Emergency Brake application and subsequent operational disruption.

[REQ:IRS_CLASSA_CCO_00085];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

Where Fixed Data Entry is used, the actual length of each Train Consist, including buffers and couplings, must be equal to or smaller than the value used for pre-configuring 'Nominal Length' of the predefined Train Consist.

This pre-configured 'Nominal Length' value shall consider all vehicle types/variants/versions/etc. that can be part of an individual predefined Train Consist.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00086]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00087]

Intentionally blank.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00088];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

All CCO equipment shall be compliant with the requirements of [TSI-L&P]/[TSI-WAG], as appropriate, for fire safety.

The CCO equipment shall meet the same Fire Category as the Unit to which it is fitted.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00089];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

All CCO equipment shall be compliant with the requirements of [TSI-L&P]/[TSI-WAG], as appropriate, associated with electrical hazards.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00090];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

All CCO equipment shall be compliant with the requirements of [TSI-L&P]/[TSI-WAG], as appropriate, for intended environmental conditions.

The CCO equipment shall meet the same Categories for environmental conditions as the Unit to which it is fitted.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00091];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

All modifications to the Unit to which CCO is fitted as well as their impact on non-modified elements of the Unit shall be compliant with the requirements of [TSI-L&P]/[TSI-WAG] as appropriate.

Note: This includes e.g. effects on vehicle mass and balance, effects on the bogie structure, the structural safety of CCO mounting equipment, the effects of the DMI introduction to the interior layout of the cab and driver visibility, etc.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00101];[Allocation:On-board];[Type:Optional];[Owner:ETCS Supplier]

Optional: A mechanism may be implemented to enable the dead hauling movement of unpowered trains. The design and implementation of such mechanism shall be made in accordance with the requirements of [501265], [EN50128], [50129] and [CSM_402]

[END_REQ]

[REQ:IRS_CLASSA_CCO_00105];[Allocation:Application Condition];[Type:Mandatory];[Owner:IM and RU]

SRAC: Operating Rules shall be established by the RU and IM to regulate the use of Dead Hauling Mechanism, if implemented.

[END_REQ]

7.7.4 Maintenance Interface

[REQ:IRS_CLASSA_CCO_00092];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

The Maintenance Staff shall be able to interact with the CCO by means of dedicated tools. These tools shall:

- Be protected for use by authorised staff only.
- Allow maintenance staff to upload updated configuration data.
- Allow the download of CCO-detected errors.
- Allow the performance of failure diagnostics to identify the root cause of the errors.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00093];[Allocation:Application Condition];[Type:Mandatory];[Owner:RU]

SRAC: An Operating Rule shall be established to ensure that the Wheel Diameter parametrised in the CCO is equal to or greater than the diameter of the actual wheels on the axles to which the CCO tachogenerators are fitted. This Operating Rule shall include the update of the CCO parameters after wheels are turned or changed by maintenance staff.

[END_REQ]

[REQ:IRS_CLASSA_CCO_00094];[Allocation:Application Condition];[Type:Mandatory];[Owner:IM and RU]

SRAC: Operating Rules shall be established by the IM and the RU to ensure that safety measures are in place prior to undertaking any work or inspection near the Balise Antenna.

[END_REQ]

Note: The Balise Antenna is an active antenna which should be considered to emit electromagnetic energy at any time while CCO is connected to its power supply.
For reasons of health and safety, the RUs, ECMs, and IMs that control staff working / persons being present in the vicinity of the Balise Antenna for maintenance or emergency assistance, are required to perform an associated risk assessment in accordance with the relevant health and safety legislation and standards.

[REQ:IRS_CLASSA_CCO_00095];[Allocation:On-board];[Type:Mandatory];[Owner:ETCS Supplier]

In order to ensure the safety and reliability/availability of service, maintenance requirements, tasks and intervals shall be defined based on a risk assessment compliant with the requirements of [ECM],[50126], [50128], [50129] and [CSM_402].

[END_REQ]

Note: CCO is legally defined as being a part of a 'vehicle' and is as such subject to the relevant requirements of the Railway Safety Directive. This includes the requirement for maintenance to be managed by an ECM.

Note: [ECM] sets mandatory minimum requirements for maintenance files and maintenance management systems. This includes CCO equipment.

8 Further Clarification

Further clarification on these guidelines can be sought from the CRR by phone at +353 1 206 8110 or by email info@crr.ie.

9 List of Participants

The participants for each revision of this IRS are shown below in Table 2.

Table 2 List of Participants by Revision

Participant Name and Organisation		**Involved in IRS-304-A**	
Maik Wuttke	CRR	✓	
Paraic O'Lochlainn	IÉ-IM	✓	
Istvan Darazsi	IÉ-IM	✓	
Francois Pignard	IÉ-IM	✓	