BCA Report Art 10

*GSM-R CRs*

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# Introduction

## Background

### The Commission Regulation (EU) 2016/919 enforcing the GSM-R Baseline 1 (GSM-R B1) of the ERTMS/GSM-R specifications and amended by Commission Regulation (EU) 2019/776 states in its article 10 that: “If errors that do not allow the system to provide a normal service are detected, the Agency shall of its own motion or at the request of the Commission identify as soon as possible solutions to correct them and an evaluation of their impact on the compatibility and stability of the existing ERTMS deployment. In such cases, the Agency shall send to the Commission an opinion on such solutions and the evaluation. The Commission shall analyse the Agency's opinion, assisted by the committee referred to in Article 51(1) of Directive (EU) 2016/797, and may recommend that the solutions specified in the Agency's opinion apply until the next revision of the TSI.“

### This report is therefore to be incorporated in any Technical Opinion submitted to the Commission pursuant to the above mentioned article 10.

## Scope and Purpose

### 1.2.1 The scope of this document is to report on the analysis of the compatibility between trackside and on-board within the existing baseline (i.e. GSM-R B1), in the light of the problem description of all the error CRs that were logged in the ERA database at the date of 26 January 2020, that were neither packaged in the existing baseline nor in the state “rejected” or “superseded”. For the error CRs whose consequences of the described problem do not allow the system to provide a normal service, trackside mitigation measures are defined for the existing baseline.

### 1.2.2 Since the article 10 of the Commission Regulation (EU) 2016/919 requests that solutions are sought for these errors preventing the normal service, this compatibility analysis also checks the compatibility, on the one hand, between a “GSM-R B1 + Art10SP” trackside and an on-board compliant with the existing baseline (GSM-R B1) and, on the other hand, between a “GSM-R B1 + Art10SP” on-board and a trackside compliant with the existing baseline (GSM-R B1). When relevant, specific trackside mitigation measures are also defined for these on-board/trackside combinations.

### Note: The term “GSM-R B1 + Art10SP (Article 10 Service Pack)” subsystem (on-board or trackside) must be understood as a GSM-R B1 subsystem that has implemented the solution of an error CR whose consequences of the described problem do not allow the system to provide a normal service.

### It must be noted that for the errors identified in this report as potentially preventing the normal service within the GSM-R B1 baseline, the solutions of the related CRs have been derived against this baseline only, no matter when and how they will be incorporated later in the TSI CCS annex A.

### As long as on-board and trackside subsystems will be designed against the existing baseline GSM-R B1, the purpose of this document is therefore to identify/describe the potential safety hazards and/or the operational shortcomings that would prevent the normal service and to recommend trackside mitigation measures to cope with them.

### Note: The compatibility analysis will be referred with the term “BCA”, which had been created in the past to refer to a similar analysis in the ETCS domain and that is still used by the parties working on this topic.

# Compatibility Assessment

## Methodology

#### 2.1.1 The methodology used is based on the one put in place to perform the assessment of the ETCS CRs for the Technical Opinion technical opinion (ERA/OPI/2017-2). This BCA is carried out with individual CR assessments, each of them consisting in answering questions based on the provisions laid down in the ETCS SUBSET-104 and in the section 2.4 of the ERA CCM procedure (PRO\_CCM\_002).

### To perform the CR individual assessments, a strict focus on the content of the specifications has been observed. Project or product specific considerations, quantified or not, were on purpose not considered.

### Compatibility is considered to be achieved for a particular combination of on-board and trackside when the on-board is able to run a normal service on that trackside. The expression “train is running a normal service” shall be understood as “a train not penalised because of a reduction of performance or safety” (see ETCS SUBSET-104 clause 5.1.1.5).

### The BCA is made of the following steps:

* + - * Check whether each error CR identifies potential compatibility issue(s) inherent to the GSM-R B1 existing baseline (see questions Q4 in the annex A.1)
			* In case the assessment of an individual error CR identifies a potential compatibility issue within an existing baseline, define the mitigation measure to be applied by the trackside (see mitigations for questions Q4 in the annex A.1)
			* In case the assessment of an individual error CR identifies a potential compatibility issue within the GSM-R B1, check whether the CR solution, when applied to only one of two GSM-R B1 subsystems, does not create any further potential compatibility issue with the other subsystem compliant with the existing baseline (see questions Q1 and Q2 in the annex A.1). If necessary, the corresponding mitigation measures are defined too (see mitigations for questions Q1 and Q2 in the annex A.1).

### For the formulation of the questions allowing to perform the BCA, see sheet “Explanation” in the Excel file embedded in the annex A.1.

## Results

### Out of the 15 Change Requests categorised as Error in the database, 7 have not been analysed for this opinion. For 1 out of the 8 analysed Change Requests, the analysis demonstrated that the concerned issue does not prevent the system from providing a normal service in any of the existing baselines, i.e. they do not need any mitigation measure.

### For the other 7 CRs (i.e. those which have identified issues potentially preventing the normal service by applying the clause 2.1.1.2), mitigation measures are defined for most of them.

### However, the issues identified for the following 4 CRs could not be fully mitigated:

* + - * CR 5038 (FN Numbers registration/deregistration): no mitigation on the trackside: those tracks that are not able to perform the bulk registration/deregistration of up to 10 FN in 30 seconds cannot be configured in a different way.
			* CR 5039 (Call arbitration table for cab radios): no technical mitigation on the trackside, the call arbitration table only applies to on-boards. In case there is an operational rule where a specific scenario of call arbitration in the cab radio is implied, the operation rule should consider the real behaviour on-board.
			* CR 5040 (MI/M misalignments in the specifications – item 2: entering/leaving SH): no technical mitigation possible on the trackside. The situation could be avoided only by instructing the driver not to change mode in the GSM-R cab radio (from Train to Shunting mode or vice versa) if there is an ongoing call, establishing an operational rule on this respect.
			* CR 5050 (Errors & inconsistencies found in FFFIS for SIM card): no technical mitigation available on the trackside. For the “Last Number Dialled”, the driver could be instructed to compose the number dialled again. For the problems to initiate the GPRS service at the EDOR side, the train will only be able to run in ETCS Level 2 in Circuit Switched mode.

### The detailed analysis is given in the annex A.1. Note: there are no safety related issues referred to in this report.

### The mitigation measures recommended in the embedded file ensure that the negative consequences resulting from the issues spotted by the CRs will not occur. However, it will be the responsibility of each individual trackside implementation of ERTMS/GSM-R to check whether or not a particular mitigation is applicable, suitable, or necessary, depending on its implemented GSM-R functions, engineering/operational rules, safety analysis, etc.

### The Agency has not launched any survey to the UNITEL on-board suppliers or to the Infrastructure Managers members of CER and EIM for the CRs whose problem is potentially preventing the normal service, as a difference with the methodology applied for the ETCS CRs. After assessment within the members of the working group, it is considered that the number of potential issues that could be encountered is much higher than the issues encountered in reality, taking into account the current status of the GSM-R on-board and trackside implementations, and the study can be made by each stakeholder. The GSM-R system is based on 3GPP/ETSI standards for GSM plus an additional set of specifications conforming the GSM-R B1; there are cases where there are errors in GSM-R B1 specifications, but the solutions implemented have followed 3GPP/ETSI, which ensures their correct behaviour and their backwards and forwards compatibility.

# ANNEXES

## A.1. Compatibility Analysis

