RADIO SYSTEM COMPATIBILITY

ADIF & ADIF-AV

Version: V2

Date: 20/02/2020

CHANGE CONTROL

DATE	VERSION	CHANGES
16/01/2020	V1	First version
20/02/2020	V2	Elimination of RSC type 3 as not applicable no any in service line Redefinition of RSC types in order to provide only one type per line in RINF

1. INTRODUCTION

In the Commision Implementing Regulation (EU) 2019/776 of 16 May 2019 amending Commision Regulations (EU) No 321/2013, (EU) No 1299/2014, (EU) No 1301/2014, (EU) No 1302/2014, (EU) No 1303/2014 and (EU) 2016/919 and Commision Implementing Decision 2011/665/EU as regards the alignment with Directive (EU) 2016/797 of the European Parliament and of the Council and the implementation of specific objectives set out in Commission Delegated Decision (EU) 2017/1474, the following is stated:

6.1.2.5. Requirements for Radio System Compatibility. The Agency shall set up and manage in a technical document the set of checks to demonstrate the technical compatibility of an on-board subsystem with the trackside subsystem. Infrastructure Managers, with the support of the GSM-R suppliers for their network, shall submit to the Agency the definition of the necessary checks (as defined in 4.2.17) on their network by 16 January 2020 at the latest. Infrastructure Managers shall classify their lines according to RSC types for voice and, if applicable, ETCS data in RINF. Infrastructure Managers shall submit to the Agency any changes on the referred checks for their network.

In order to fulfill with the request '*Infrastructure Managers, with the support of the GSM-R suppliers for their network, shall submit to the Agency the definition of the necessary checks (as defined in 4.2.17) on their network by 16 January 2020 at the latest.'*, ADIF & ADIF-AV have prepared this document, accordingly with the draft version of the CCS TSI Application Guide received for comments.

2. Radio System Compatibility (RSC) in ADIF & ADIF-AV

Based on experience, ADIF & ADIF-AV consider that the RSC in its GSM-R network must be based on the execution of the same set of tests for each existing network configuration (hardware(HW) and software(SW)) and radio equipment, ensuring the technical compatibility between the different HW and SW versions of the on-board and on-track subsystems (cab-radio/EDOR and GSM-R network, respectively). It is considered that the GSM-R network includes the dispatching system. So, as there is only one CORE network (NSS) for the whole GSM-R network, RSC types are defined for each BSS configuration, and the tests should be performed with each dispatching system in each BSS configuration, for those tests that involve a dispatcher as originator or receiver of calls.

As it is a matter of testing the compatibility between elements based on HW and SW versions, independently on the characteristics of the railway track, speed or any other operating condition, the tests could be performed in a laboratory provided by ADIF & ADIF-AV, where the different network configurations would be available, enabling the execution of the tests for all the necessary conditions. Whenever a certain configuration is not available in laboratory or a railway operator is not able to take a cab-radio/EDOR to this laboratory for testing, ADIF & ADIF-AV will collaborate to perform these tests in the railway lines where the different HW/SW versions to test are available, in the time slots when the tests can be performed without any impact on the railway operations. For railway operators, in order to request for testing, these are the contact details: Mariano García Ruiz - marianogarcia@adif.es .

The set of tests to be perfomed in every case are stated in the chapter TEST LIST of this document, where the definition and criteria to pass each test are provided. Basically, the target is to test the basic functionalities provided by the GSM-R network to users in order to fulfill the required operations: attachment to the network, registration/deregistration to functional numbers, and making and receiving point-to-point calls, group calls and railway emergency calls. The success of the establishment and reception of calls must be tested against every dispatching system. It is considered that documentary evidences are not sufficient to perform the check, so the specific tests are strictly needed for it.

All tests can be performed at cab-radio/EDOR (IC) level, taking into account its HW and SW versions. So, the tests should be performed for each cab-radio/EDOR manufacturer, HW version and SW version, unless the manufacturer certifies that different versions do not imply any change for the implementation of the functionalities to test (for example, there is no need to test a new SW version if it only has changes in the DMI representation, with no change at functional and communications levels), under the responsibility of the railway operator.

The results for a cab-radio/EDOR supplier/HW/SW versions will be considered applicable to every train equipped with those devices, not requiring the testing for each train or type of train.

The tests are necessary for every cab-radio/EDOR, and not just for devices with a certain set of specifications.

The number of scenarios on which each one of these tests have to be performed, is based on the different BSS network configurations which are available nowadays in ADIF & ADIF-AV's GSM-R network, depending on network elements suppliers (NOKIA and KONTRON, up today) and HW/SW versions:

CONFIGURATION ID	SUPPLIER	HW BSS (BTS)	HW BSS (BSC/TRAU)	SW BSS (System Release)
1	NOKIA	BS40, BS240 & BS240-II B	'Siemens' BSC	BR10
2	NOKIA	BS40, BS240 & BS240-II B	'Siemens' eBSC	BR10
3	NOKIA	BS40, BS240, BS240-II, BS240-II B & Flexi EDGE BTS	Flexi BSC	RGR40 MP9
4	KONTRON	BTS8000 & BTS900	BSC3000	v.18P&C5

So, a train must demonstrate that its cab-radio/EDOR is compatible with each RSC type of the GSM-R infrastructure of the lines it is going to run. In the following table, the lines where GSM-R is available in ADIF & ADIF-AV's network are assigned the configuration id from the previous table according to the BSS configurations available. In the case in a line there is a double layer configuration and each layer has a different network configuration, two configuration ids are indicated (this is not the normal case, but nowadays there is an BSS upgrade ongoing, and in the end both layers will have the same network configuration). Also, in the case of double layer configuration, tests must be performed on each layer, even if both of them have the same configuration id. Based on this, 4 different RSC Type Identifiers are defined for the existing network:

LINE	CONFIGURATION/S ID/S	RSC TYPE IDENTIFIER
HSL Albacete- Alicante	2 & 3	RSC-ES-02
HSL Antequera- Granada	3	RSC-ES-03
HSL Barcelona- Figueras	3	RSC-ES-03
HSL Córdoba -Málaga	1 & 3	RSC-ES-01
HSL La Sagra- Toledo	1 & 3	RSC-ES-01
HSL Monforte- Murcia	3	RSC-ES-03
HSL Madrid- Barcelona	1 & 3	RSC-ES-01
HSL Madrid- Segovia-Valladolid	1 & 3	RSC-ES-01
HSL Madrid- Sevilla	1 & 3	RSC-ES-01
HSL Motilla del Palancar- Valencia-Albacete	2 & 3	RSC-ES-02
HSL Olmedo - Zamora -Pedralba	3	RSC-ES-03
HSL Torrejón- Motilla del Palancar	2 & 3	RSC-ES-02
HSL Valladolid- León – Burgos	3	RSC-ES-03
HSL Vilaseca- Tarragona	3	RSC-ES-03
HSL Zamora- Pedralba	3	RSC-ES-03
HSL Zaragoza- Huesca	3	RSC-ES-03
HSL Orense-Santiago	4	RSC-ES-04
HSL Figueras-Perpignan	4	RSC-ES-04
CL Cercanías Bilbao	4	RSC-ES-04

Note: HSL – High Speed Line; CL – Conventional Line

3. TEST LIST

3.1. CAB-RADIO

It is considered that the following test cases stated in document "0-3001-1 Test specifications for GSM-R MI related requirements-Part 1: Cab Radio" must be performed in each network layer and for each of the configurations included in the RSC Type, accordingly with the definitions and expected results indicated in that document:

Cab-radio start-up and turn-off:

4.1. System boot with error free device

Registration/deregistration:

6.1.1. Registration of train number to cab-radio

6.1.1. Registration of train number to cab-radio (TO FUNCTIONAL NUMBER IN USE)

6.3.1. Deregistration of train number

6.2.2. Forced de-registration

Point to Point Calls:

7.2.8. Initiate call dialling MSISDN or number of fixed network user

7.1.1. Incoming ptp call to driver with priority 4 / 7.1.2. Incoming call to driver with priority higher than 4 (automatic answering)

7.2.1. Call to Controller (Primary, Secondary, Power Supply) (TO 1200)

7.2.1. Call to Controller (Primary, Secondary, Power Supply) (TO 1300)

Voice Group Calls (VGCS):

8.1.1. Incoming group call "All drivers in same area"

8.1.2. Incoming other group call (PRIORITY 0)

Voice Broadcast Calls (VBS):

9.1.1. Incoming broadcast call "All drivers in area"

Railway Emergency Calls (REC):

10.2.1. Outgoing Train emergency call in idle mode

10.1.1. Incoming railway emergency call in idle mode

Short Messages (SMS):

12.2. Sending a text message

12.1.1 Receive and read a text message using SMS teleservice

3.2. EDOR

It is considered that the following test case stated in document "0-3001-2 Test specifications for GSM-R MI related requirements-Part 2: EDOR" must be performed in each network layer and for each of the configurations included in the RSC Type, accordingly with the definitions and expected results indicated in that document:

6.2.8. Data call – transparent 4800 bps (V.110)