

RADIO SYSTEM COMPATIBILITY

ADIF & ADIF-AV

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CHANGE CONTROL

DATE	VERSION	CHANGES
16/01/2020	V1	First version
20/02/2020	V2	Elimination of RSC type 3 as not applicable to any line in service Redefinition of RSC types in order to provide only one type per line in RINF
20/07/2020	V3	Update of existing HW&SW configurations: all lines with HW&SW configurations 1 and 2 have been migrated to configuration 3. So, every line with RSC type identifiers "RSC-ES-01" and "RSC-ES-02" are updated to "RSC-ES-03". Configuration ids 1 and 2 and RSC types "RSC-ES-01" and "RSC-ES-02" are maintained unused and Configuration ids 3 and 4 and RSC type identifiers "RSC-ES-03" and "RSC-ES-04" are not renamed to keep coherence with previous versions of this document
06/04/2021	V4	<ol style="list-style-type: none"> 1. New radio configuration, and new RSC type id. 2. Elimination of reference to line HSL Figueras-Perpignan as it is a line which is not managed neither by ADIF nor ADIF-AV, although GSM-R core network services are provided by ADIF-AV to this line 3. Lines updated: 4. Added reference to new BSS SW version: Kontron V18 pc6, although it doesn't generate a new RSC type as it doesn't include any change on air interface (stated by supplier) 5. Update of contact details to request execution of tests



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1. INTRODUCTION

In the Commission Implementing Regulation (EU) 2019/776 of 16 May 2019 amending Commission 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 Commission 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 premises 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:

- High Speed Lines (ADIF-Alta Velocidad): follow instructions indicated in ADIF-Alta Velocidad web page (www.adifaltavelocidad.es -> Companies and services -> Solicitud de pruebas en instalaciones)
- Conventional Lines (ADIF: follow instructions indicated in ADIF web page (www.adif.es -> Companies and services -> Request for testing in the facilities)

The set of tests to be performed 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)
3	NOKIA	BS40, BS240, BS240-II, BS240-II B & Flexi EDGE BTS	Flexi BSC	RGR40 MP9
4	KONTRON	BTS8000 & BTS900	BSC3000	v.18P&C5 or V.18P&C6
5	NOKIA	MultiRadio	Flexi BSC	RGR50

Note: Configuration ids 1 and 2 defined in the previous versions of this document are not in service in the network at the moment, but configuration ids 3 and 4 are not redefined as 1 and 2 in order to keep coherence with previous versions of this document.

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 were a double layer configuration and each layer had a different network configuration, two configuration ids would be indicated (this is not the normal case, but it can happen when a network upgrade is ongoing and both layers are not updated simultaneously). 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, the following RSC Type Identifiers are defined:

LINE	CONFIGURATION/S ID/S	RSC TYPE IDENTIFIER
HSL Albacete-Alicante	3	RSC-ES-03
HSL Antequera-Granada	3	RSC-ES-03
HSL Atocha-Chamartín	3	RSC-ES-03
HSL Barcelona-Figueras-Frontera	3	RSC-ES-03
HSL Córdoba-Málaga	3	RSC-ES-03
HSL La Encina-Xàtiva-Valencia	4	RSC-ES-04
HSL La Sagra-Toledo	3	RSC-ES-03
HSL León-La Robla-Pola de Lena	5	RSC-ES-05
HSL Monforte del Cid-Murcia	3	RSC-ES-03
HSL Madrid-Barcelona	3	RSC-ES-03
HSL Madrid-Segovia-Valladolid	3	RSC-ES-03
HSL Madrid-Sevilla	3	RSC-ES-03
HSL Monforte-Beniel-Murcia	3	RSC-ES-03
HSL Motilla del Palancar-Valencia-Albacete	3	RSC-ES-03
HSL Olmedo-Zamora-Pedralba	3	RSC-ES-03
HSL Orense-Santiago	4	RSC-ES-04
HSL Pedralba-Taboadela-Orense	5	RSC-ES-05
HSL Plasencia-Cáceres-Badajoz-Frontera	3	RSC-ES-03
HSL Torrejón de Velasco-Motilla del Palancar	3	RSC-ES-03
HSL Valladolid-León-Burgos	3	RSC-ES-03
HSL Vilaseca-Tarragona	3	RSC-ES-03
HSL Zaragoza-Huesca	3	RSC-ES-03
CL Aranjuez-Villalba	4	RSC-ES-04
CL Buñol-Utiel	5	RSC-ES-05
CL Bobadilla-Ronda	4	RSC-ES-04
CL Cercanías Bilbao	4	RSC-ES-04
CL Cercanías Barcelona	3	RSC-ES-03
CL Humanes-Monfragüe	4	RSC-ES-04
CL Plasencia-Casar	5	RSC-ES-05

Note 1: HSL – High Speed Line; CL – Conventional Line

Note 2: Configuration ids 1 and 2 are not in use in the network at the moment due to network updates since the previous version of this document, so RSC type identifiers previously assigned to them: “RSC-ES-01” for lines with configurations 1&3 and “RSC-ES-02” for lines with configurations 2&3, are not used anymore. They will be maintained unused for coherence with previous versions of this document. It is not necessary to retest equipment previously tested for these configurations as they were already tested with the existing HW&SW configurations.

3. TEST LIST

3.1. CAB-RADIO

It is considered that the following test cases stated in document “O-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. Adaptations of these tests to the ADIF & ADIF-AV’s GSM-R network will be done when necessary:

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 “O-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)