

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 1/8
Intelligent Communication Infrastructures Laboratory		

1. PURPOSE.

The purpose of this document is to make the clients of the Intelligent Communication Infrastructures Laboratory to the R&D and Innovation Consortium familiar with:

- the product testing services it provides;
- the normative documents, standards and specifications applicable to these tests;
- the equipment for conducting the tests;
- the sequence of activities when performing test sessions;
- documents issued of product tests performed;
- the rights and obligations of the Client;
- the rights and obligations of the Intelligent Communication Infrastructures Laboratory;
- the sequence of actions to resolve complaints.

This document describes the general information and conditions for carrying out tests of a product - balise.

2. ABBREVIATIONS AND ACRONYMS

Following abbreviations are defined for the purposes of this document:

RDIC	R&D and Innovation Consortium
LICI	Laboratory Intelligent Communication Infrastructures
IM	ICIL Manager
MS	Quality management system
LP	Laboratory procedure
FP	Form for procedure
EBL/Product	Eurobalise/balise
EA BAS	Executive Agency Bulgarian Accreditation Service
Applicant	A person requesting a product testing service
Assignor/Client	A person with whom ICIL has concluded a contract for product testing
Manufacturer	A person that has manufactured the product to be tested

3. GENERAL INFORMATION

3.1. Presentation of RDIC and ICI Laboratory

RDIC is a scientific organization having the main objective to manage and develop the Laboratory Complex within the Science and Technology Park - Sofia. The Laboratory Complex consists of 11 high-tech laboratories, performing both independent and joint activities in the field of development, research and testing.

The Intelligent Communication Infrastructures Laboratory (LICI) specializes in R&D and testing in the field of railway traffic management and safety, 5G communications and the Internet of Things.

3.2. Grounds for balise testing.

The eurobalise/balise is a transponder (transmitting) device used in the railway sector that is installed between the rails of a railway line and serves to transmit information to the train/locomotive passing over it.

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 2/8
Intelligent Communication Infrastructures Laboratory		



Balises are classified as an interoperability constituent in accordance with item 3 of table 5.2a Basic interoperability constituents in the Control-Command and Signaling Trackside Subsystem of Commission Regulation (EU) 2016/919 on the technical specification for interoperability relating to the 'control-command and signaling' subsystems of the rail system in the European Union. Item 4.2.5.2 of the Regulation requires compliance of the balise communication interfaces with SUBSET-036 and SUBSET-085.

As such, balises that are installed in the railway infrastructure of the European Union must be certified for interoperability by a Notified Body (NoBo). For the purposes of product certification, the Manufacturer (or his authorized representative) must submit evidence to the Notified Body of successfully passed product tests conducted by an accredited laboratory.

4. BALISE PRODUCT TESTING SERVICES

4.1 Types of balise testing

- tests for the purpose of product certification as a constituent element of interoperability - the tests are performed by an accredited laboratory, according to the БДС ISO/IEC 17025:2018 standard.
- tests for the purpose of performance of intermediate checks during the product development stage to verify compliance of characteristic/s with the requirements of SUBSET-036 and SUBSET-085 – the tests are carried out by a laboratory, with the Applicant/Manufacturer choosing whether the tests to be carried out under accreditation or not.

4.2 Capacity of ICIL for testing balises

4.3 LICI has the capacity for testing following balise characteristics:

№	Characteristics	Method of testing	Tests
1	Up-link field conformity	UNISIG SUBSET-085 v3.0.0, p. 4.2.2	- Up-link field conformity in the main lobe zone - Up-link field conformity in the side lobe zone - Up-link field conformity in cross-talk protected zone.
2	Tele-powering field conformity	UNISIG SUBSET-085 v3.0.0, p. 4.2.3	- Tele-powering conformity in the main lobe zone - Tele-powering conformity in the side lobe zone
3	Input / output characteristics	UNISIG SUBSET-085 v3.0.0, p. 4.2.4	- Balise input / output characteristics
4	Cross-talk immunity	UNISIG SUBSET-085 v3.0.0, p. 4.2.5	- Cross-talk measurements; - LZB cable testing

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 3/8
Intelligent Communication Infrastructures Laboratory		

5	Balise impedance	UNISIG SUBSET-085 v3.0.0, p. 4.2.6	- Balise impedance
6	Up-link signal characteristics	UNISIG SUBSET-085 v3.0.0, p. 4.2.7	- Centre frequency and frequency deviation - Balise start-up after side lobe - Up-link mean data rate - Up-link maximum time interval error - Up-link amplitude jitter during start-up ramp - Up-link amplitude jitter during steady state flux - Up-link signal bandwidth - Delay time and interface 'C' parameter variation - Test of compatibility - Time for balise start with toggling AM and steep tele-powering slope
7	Balise controlling interface	UNISIG SUBSET-085 v3.0.0, p. 4.2.8	- Interface 'C' – electrical data versus signal level - Interface 'C' – electrical data versus mean data rate - Interface 'C' – electrical data versus jitter properties - Interface 'C' – balise testing under various return loss conditions - Interface 'C' – blocking of up-link telegram switching - Interface 'C' – default telegram switching
8	Balise damaging	UNISIG SUBSET-085 v3.0.0, p. 4.2.9	- Test for balise damaging

4.4 Capacity of LICI for testing balises while undergoing accreditation

The activities for testing of balises LICI are accredited, according to the standard БДС EN ISO/IEC 17025:2018. A Certificate for accreditation № 294 ЛИ, dated 05 July 2022 and valid till 05 July 2026 has been issued by Executive Agency "Bulgarian Accreditation Service".

The Certificate for accreditation is published in the web page of LICI.

5. NORMATIVE DOCUMENTS, STANDARDS AND SPECIFICATIONS

5.1 Normative documents

- Commission Regulation (EU) 2016/919 on the technical specification for interoperability relating to the 'control-command and signaling' subsystems of the rail system in the European Union.

5.2 Standards:

- БДС EN ISO/IEC 17025:2018 General requirements for testing and calibration laboratories

5.3 Specifications

- UNISIG SUBSET-085 – Test specification for Eurobalise FFFIS
- UNISIG SUBSET-036 – FFFIS for Eurobalise

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 4/8
Intelligent Communication Infrastructures Laboratory		

6. BALISE TESTING EQUIPMENT

LICI uses exclusively metrologically verified and secured technical measuring devices.

LICI has modern technical equipment for balise testing that corresponds to the requirements of the UNISIG SUBSET-085 specification. Additional equipment for conducting tests with pollutants, water and temperature influences is also provided.

7. SEQUENCE OF ACTIVITIES WHEN PERFORMING A TEST

The steps for conducting product testing activities consist of:

- application;
- negotiation;
- performance of a test campaign of the product;
- issuance and delivery of documents and records of the tests conducted.

7.1. Application

The application can be made by submitting:

- notification letter for inquiry - on paper or in electronic form (email);
- Test Request (LICI template).

When a notification letter is used - the letter should include sufficiently detailed information about the type of tests (according to item 4.1), the characteristics and specific tests, the type of balise - standard or reduced size, the kind of balise - permanent (fixed data) or steerable (switchable data), accredited or non-accredited tests, as well as additional information at the discretion of the Applicant.

When using a Test Request - the request form can be found on the LICI website. Download the file to your computer, fill in the form accurately and then send it to LICI mail (ici-lab@sofiatech.bg).

The information received is reviewed by the Head of the Laboratory (HL), and in the absence of sufficient information, he contacts the Applicant for clarification.

7.2. Negotiation

Based on the information received, HL prepares an offer.

The offer is sent by an official letter or e-mail.

If the offer is accepted by the Applicant, the testing activities are contracted through:

- A Contract for performance of laboratory tests service;
- An Engagement letter.

7.3. Performance of the tests

7.3.1. Acceptance of the product

LICI accepts the products on the territory of the laboratory, and the Applicant undertakes the commitments for packing, transport and delivery. LICI takes no responsibility for damages or irregularities caused to the product to be tested, during its transportation to and from the laboratory.

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 5/8
Intelligent Communication Infrastructures Laboratory		

Acceptance of the product in the laboratory is carried out by an authorized employee conducting incoming control of the product regarding:

- compliance with the requested type, kind and number of the product;
- presence of a plate or information containing at least the name of the manufacturer and the serial number of the product;
- external condition of the product;
- accompanying documents to the product, when specified in advance.

LICI bears responsibility for preserving the physical and functional characteristics of the product for the period from its acceptance in the laboratory to its handing over for shipment to the client. In any case of an incident with the product during its stay in the laboratory the client will be informed in a timely manner.

After the test session is completed, the client will be informed in order to arrange the shipment of the product to the client.

7.3.2. Performance of the tests of the product - balise

Balise testing is carried out according to the type of test defined in item 4.1 of this document Types of Balise Testing and according to the scope (number of characteristics) specified by the Applicant in the test request.

Regardless of the type of test, test methods defined in UNISIG SUBSET-085 – Test Specification for Eurobalise FFFIS shall be applied.

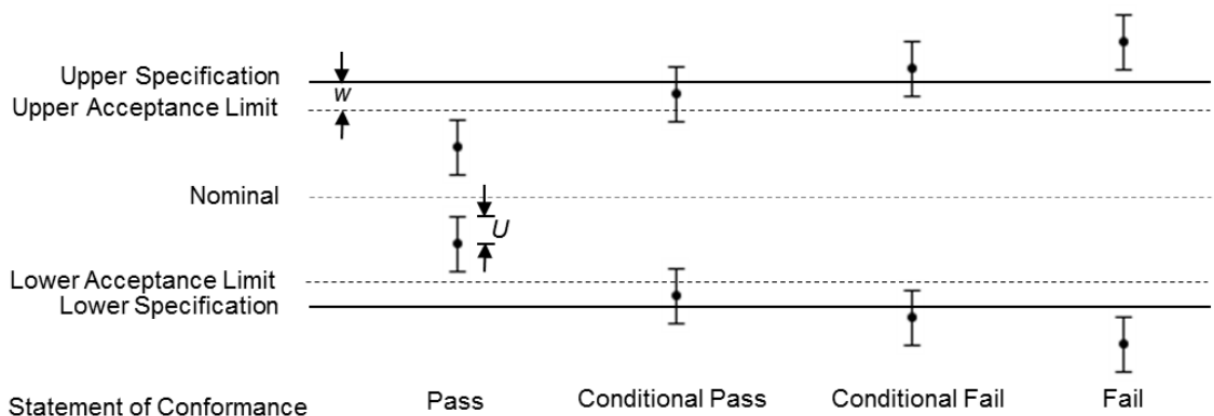
If negative results are found during the test, the LICI will notify the client in a timely manner.

LICI Laboratory has its own equipment for carrying out balise tests, corresponding to the requirements of UNISIG SUBSET-085 – Test Specification for Eurobalise FFFIS.

In the event that the use of a subcontractor would be needed to carry out product tests, this will be agreed upon in advance with the client.

7.3.3. Statement for conformance

LICI use the rule for decisions for conformance in order to ILAC-G8:09/2019, p. 4.2.3 “Non-binary Statement with Guard Band”. The visual presentation of the rule and the types of the decisions (pass, conditional pass, conditional fail, fail) are showed in the figure below.



, where $w = U$:

- U – Expanded Measurement Uncertainty;
- w – Guard band.

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 6/8
Intelligent Communication Infrastructures Laboratory		

7.4. Issuance of documents of the tests conducted

The results of the test conducted are documented in the "Balise Test Report". The client receives 1 (one) report in the original.

An additional original of the "Balise Test Report" could be issued upon a written request by the Client at no additional cost.

Amendments or additions to the Report may be made in the following situations:

- upheld and respected objections of the client;
- deficiencies, inaccuracies or errors found by the ICI laboratory when reflecting the results of the tests performed.

In cases that amendments to the report are necessary, the specifics will be discussed with the Client.

8. RIGHTS AND OBLIGATIONS OF THE CLIENT

The Client has the right to:

- withdraw his Application for testing the product in accordance with the terms of the contract signed;
- apply for additional services to the RDIC or the ICI laboratory;
- submit a complaint to the ICI laboratory or the RDIC regarding the balise testing services performed;
- use the documents from the conducted tests of the balise requested by him to certify its compliance with specific standards, specifications, regulatory documents or other criteria;
- be present through his representative during the test session of the product he has submitted an application for.

Obligations of the Client:

- to fill in and submit accurate and correct information about the tested product;
- to comply with the conditions and requirements of the Contract, as well as of the General Terms and Conditions to the Contract for Laboratory Tests;
- to ensure product's readiness and suitability for carrying out testing activities;
- to organize product's logistics to and from the ICI laboratory;
- to designate a person acting as a primary point of contact with the ICI laboratory;
- at the request of the ICI laboratory, to provide all the technical documentation for the product that is necessary for the correct planning and performance of the test;
- to inform RDIC in writing about any change in circumstances regarding the concluded contract or the product to be tested.

Additional rights and obligations are defined in the General Terms and Conditions to the Contract for Laboratory Tests and in the Contract.

9. RIGHTS AND OBLIGATIONS OF RDIC/ICI LABORATORY.

LICI has the right to:

- require (if necessary) from the client technical information/documentation for the product that is necessary for the product testing;

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 7/8
Intelligent Communication Infrastructures Laboratory		

- refuse to conduct a product test when an unfit product is presented by the client (acceptability criteria are specified in item 7.3.1 of this document);
- require the presence of a person representing the Client during product testing.

Obligations of LICI:

- to provide the Client with a detailed up-to-date description of the process of carrying out product testing activities;
- to provide the product testing service according to the agreed conditions;
- to maintain strict confidentiality at all its organizational levels with respect to information received or created during the performance of testing activities, as well as information regarding the Client received from appellant(s) or regulatory authorities other than the Client;
- to notify the Client in advance, in cases where by virtue of a law, he must disclose confidential information in connection with the testing activities, except for cases where other normative acts prohibit this;
- to carry out product testing activities in an impartial and objective manner;
- to provide, upon request, documents proving its legal status;
- to provide the Client with information in a timely manner in case that a deviation/non-compliance with the criteria has been found when testing the product.

10. RESOLUTION OF COMPLAINTS AND OBJECTIONS.

According to item 8 of this document, the Client has the right to file a complaint/s:

- complaint – expression of dissatisfaction other than appeal by a person or organization related to the ICI laboratory activities, where a response is expected (the definition is in accordance with the БДC EN ISO/IEC 17000 standard).

LICI has developed and implemented a complaint management procedure that can be made available to any interested party upon request.

In connection with the testing of products - balises, LICI accepts complaints in written form by an official letter. A documented complaint must include following attributes:

- outgoing number;
- date;
- content/description of the complaint;
- name and signature of the compiler;
- stamp.

Upon receipt, the complaint is reviewed for correctness, completeness and validity.

Within 5 working days, the client receives a written response on the merits of the complaint and its acceptance or rejection.

A complaint that refers to a reported conformity/nonconformity sent by the Client after 10 (ten) days as of the date of receipt of the "Balise Test Report" will be considered unfounded.

All complaints are considered within 30 working days. The person designated under the contract for contact and communication with the client notifies him in writing of the decision on the complaint.

Investigation and adjudication of complaints shall not result in any discriminatory actions.

RDIC	INFORMATION TO THE CLIENT Balise Testing	FP-7.1-07 Issue: 02 Date: 20.04.2023 Page: 8/8
Intelligent Communication Infrastructures Laboratory		

The person designated under the contract for contact and communication with the client maintains a feedback relationship with the complainant in order to provide information on the progress and results of the resolution of the complaint.

The decision communicated to the complainant shall be made or reviewed and approved by a person who was not involved in the product testing activities for which the complaint was filed.

The person designated under the contract for contact and communication with the client officially informs the sender of the complaint or appeal about the end of the process of consideration of the complaint

11. CONTACT

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Web: www.sofiatech.bg

Date: 20.04.2023

APPROVED BY: Signed
/ Prof. V. Poulkov/
Head of the Intelligent Communication
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