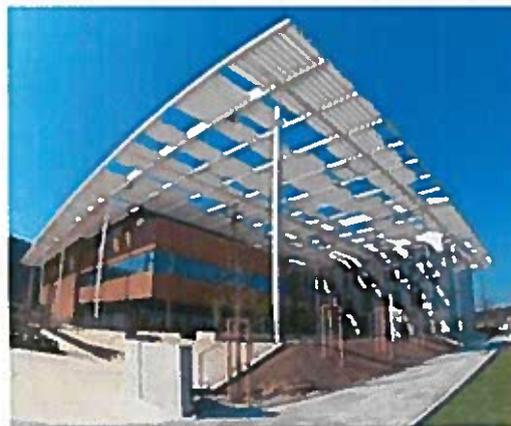


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[RSD Product Category A]

Processing electronics for LUIS BPM system
(Electron beam diagnostics)
TP20_008



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1. Introduction

1.1. Purpose

This Requirements Specification Document (RSD) lists the technical requirements and constraints on product applying in RA2 program of ELI project. This can lead to the identification of product interfaces with the ELI science-based technology and ELI building facility. This RSD also acts as the parent document for the technical requirements that need to be addressed in lower-level design description documents.

1.2. Scope

This RSD contains all of the technical requirements: functional, performance, operational and design, delivery, safety and quality requirements for the following product (*tender N^o TP20_008*): **BPM processing electronics** (further "**BPM units**"). The BPM units are registered in the PBS database under the following PBS code: E.E5.LUX.ELE.7 (*LUX, Electron beam diagnostics*).

These BPM units are products Category A according to the ELI Beamlines RSD categories. The category A is an Off-the-shelf Product without the necessity of modifications and necessity to be subjected to a verification programme (review of design, inspection and testing) for ELI applications by the actual project specifications. All verification activities performed by a supplier shall be executed in accordance with the supplier's plan of outgoing inspection and tests. The verification of all specified parameters listed in this RSD shall be undertaken by the supplier before delivery to the ELI Beamlines facility. Furthermore, the BPM units may be subject to testing and verification upon delivery to the ELI Beamlines facility by qualified personnel. All non-conformances (if any) must be addressed by the supplier in a timely manner.

1.3. Terms, Definitions and Abbreviations

For the purpose of this document, the following abbreviations apply:

Abbreviation	Meaning
ADC	Analogue to Digital Converters
BPM	Beam Position Monitor
CA	Contracting Authority (Institute of Physics AV CR, v. v. i.)
ELI	Extreme Light Infrastructure
FPGA	Field Programmable Gate Arrays
LVTTL	Low-Voltage Transistor–Transistor Logic
NDA	Non-Disclosure Agreement
OS	Operating System
Pcs	pieces
RF	Radio Frequency
RSD	Requirements Specification Document
SD	Secure Digital

For the purpose of this document, the following definitions are applied:

- A **Rack Unit** (abbreviated **U** or **RU**) is a unit of measure defined as 44.45 mm of vertical space that equipment occupies in the rack according to EIA-310.

1.4. References to Standards

If this document includes references to standards or standardized/ standardizing technical documents the CA allows/permits also another equal solution to be offered. If a supplier offers another equal solution the CA shall not reject its bid, once the supplier by appropriate means in the bid proves that the offered supplies, services or works meet in an equivalent manner the requirements including references to standards or technical documents.

2. Functional, Performance and Design requirements

2.1. General requirements

REQ-028236/A

The Supplier shall deliver **5 pcs of the cavity BPM processing units** with the following specifications:

- Commercial Cavity BPM readout system on a 19", 1U rack-mountable chassis, passive cooled;
- 3 RF inputs able to acquire three signals (X,Y,I) at 6.47 GHz and 1 Reference input at 100 MHz;
- 1 LEMO LVTTTL trigger input for data acquisition - supporting up to 100 Hz trigger frequency;
- Gigabit Ethernet interface and booting from SD card;
- 500 MSPS - 14 bit ADCs, Xilinx ZYNQ FPGA;
- Linux-based OS;
- ADC raw data available on buffer;
- Position information delivered on a separate data stream, pulse by pulse;
- Software and FPGA code available for developing;
- Tango DS delivered with the instrument for Control System integration.

NOTE: The CA promises to the Supplier that the software and FPGA code shall:

- *not use the source code for the commercial purposes (i.e. for the profit);*
- *not hand over the source code to the third parties;*
- *maintain the confidentiality with respect to know-how gained from the source code.*

3. Delivery requirements

3.1. General requirements

REQ-028237/A

The transportation to the final destination shall be conducted by the Supplier.

NOTE: The bid price will be considered by the CA as the final price, including transportation cost.

REQ-028238/A

The **BPM units** and its components shall be delivered in a protective package preventing damage and contamination. The **BPM units** shall be cleaned and packaged in compliance with the cleanliness of class 7 according to ČSN EN ISO 14644 (equivalent to EN ISO 14644).

NOTE: If the Supplier cannot fulfil class 7 cleanliness requirements, the Supplier and the CA shall agree on the cleaning methods to be used to achieve the corresponding level of cleanliness (see REQ-028240/A).

4. Safety requirements

REQ-028239/A

The Supplier shall supply a Declaration of Conformity or any other equivalent document legally recognized and accepted in the Czech Republic for each product type if the appropriate legislation determines the Supplier's obligation to have a Declaration of Conformity (or the equivalent document) for the purposes of a Device sale in the Czech Republic to fulfil the requirements of 2001/95/EC directive or applicable Czech law.

5. Quality requirements

5.1. General Quality requirements

REQ-028240/A

The Supplier shall provide Instructions for use (Product User Manual) as part of the delivered product. Completeness of the Manual shall be approved by the CA. The Manual shall include the instructions and descriptions regarding the following procedures:

- transport, handling and storage;
- installation and cleaning (see REQ-028238/A);
- safe operation and maintenance procedures.

REQ-028241/A

The Supplier shall provide information on the execution of the outgoing check of the BPM units and ensure their completeness. At least this information shall comprise a declaration about the execution of outgoing check and declaration of conformity with technical requirements defined by the product RSD.

REQ-028411/A

The Supplier shall provide measurement protocols outlining the results of tests executed for each individual unit to confirm specification conformity (see REQ-028241/A).

REQ-028242/A

The Supplier shall establish and maintain a nonconformity control system compatible with ČSN EN ISO 9001 (equivalent to EN ISO 9001).

