Annex No. 1 – **Technical specifications**

**Technical specifications**

**ECU development platform**

The subject of the public contract is the supply of ECU development platform, consisting of the delivery of an automotive ECU development platforms for educational usage, the platform will consist of 8 standard sets for 8 student stations and 1 extension set compatible with standard set.

**1) The standard set consists of:**

* 1. Programmable control unit for applications of automotive electronic systems (supported AUTOSAR) – suplied with a connector set (total for supply 8 pieces);
  2. HW set in the form of communication interfaces for connection between PC and ECU, respectively to automotive communication buses (may be realised as a set of more devices) (total for supply 8 pieces);
  3. SW set in the form of AUTOSAR basic SW modules designed to the offered ECU in point 1a) (total for supply 8 pieces);
  4. SW set in the form of design and configuration tools for offered ECU in point 1a) and SW modules in point 1c) (total for supply 8 pieces);
  5. AUTOSAR training course (total for supply 2 pieces);
  6. AUTOSAR SW example for offered HW elements (total for supply 2 pieces).

**2) The extension set consists of:**

* 1. HW element in the form of V2X bus interface compatible with HW and SW elements in standard sets (total for supply 2 pieces);
  2. SW configuration tools for items in point 2a) (total for supply 2 pieces);
  3. SW universal calibration tool compatible with XCP protokol and HW equipment in point 1a) (total for supply 8 pieces).

The subject of performance also includes transport to the place of performance.

**Manufacturer of the device:** *to be completed by the participant*

**Exact type designation of the device:** *to be completed by the participant*

**ECU development platform (HW + SW) must meet following criterias:**

|  |  |  |
| --- | --- | --- |
| **Basic technical parameters** | **Minimal required values – obligatory condition!** | **Value of the offered device** |
| **1a) 8 pcs – Programmable control units (Supported AUTOSAR)** | | |
| CPU | min 1 x Dual core | *the participiant indicates YES/NO and indicates specific value* |
| Communication interfaces | min. 6 x CAN 2.0  1x LIN  1 x Ethernet  1 x FlexRay | *the participiant indicates YES/NO and indicates specific value* |
| Digital Inputs | min. 20 | *the participiant indicates YES/NO and indicates specific value* |
| Analog Inputs | min. 14 x 0 .. 5 V  8 x 0 .. Vbatt | *the participiant indicates YES/NO and indicates specific value* |
| Digital Outputs | min. 30 | *the participiant indicates YES/NO and indicates specific value* |
| Sensor supply | min. 2 x 5 V | *the participiant indicates YES/NO and indicates specific value* |
| Operating voltage range | 8 .. 16 VDC | *the participiant indicates YES/NO and indicates specific value* |
| Compatibility with LV124 | Yes | *the participiant indicates YES/NO* |
| Compatibility with ISO 26262 | Yes | *the participiant indicates YES/NO* |
| Connectors set included | Yes | *the participiant indicates YES/NO* |
| **1b) 8 pcs – Set of communication interfaces for automotive buses** | | |
| USB <-> CAN interface | Yes | *the participiant indicates YES/NO* |
| USB <-> LIN interface | Yes | *the participiant indicates YES/NO* |
| USB <-> Ethernet interface | Yes | *the participiant indicates YES/NO* |
| USB <-> FlexRay interface | Yes | *the participiant indicates YES/NO* |
| Number of CAN channels | min. 2 channels | *the participiant indicates YES/NO and indicates specific value* |
| Number of LIN channels | min. 1 channel | *the participiant indicates YES/NO and indicates specific value* |
| Number of Ethernet channels | min. 2 channels | *the participiant indicates YES/NO and indicates specific value* |
| Number of FlexRay channels | min. 1 channel | *the participiant indicates YES/NO and indicates specific value* |
| CAN(FD) compatibility | Yes | *the participiant indicates YES/NO* |
| Ethernet 100BASE-T1(BroadR-Reach) | Yes | *the participiant indicates YES/NO* |
| USB type | min. 2.0 | *the participiant indicates YES/NO and indicates specific value* |
| **1c) 8 pcs – Set of AUTOSAR basic SW modules** | | |
| Modules below based on AUTOSAR 4.x standard | Yes | *the participiant indicates YES/NO* |
| Modul for Real-time operating system | Yes | *the participiant indicates YES/NO* |
| Run-time enviroment for software components | Yes | *the participiant indicates YES/NO* |
| Diagnostics modules | Yes | *the participiant indicates YES/NO and indicates specific value* |
| Modules for managing nonvolatile memory | Yes | *the participiant indicates YES/NO* |
| Modules for CAN communication | Yes | *the participiant indicates YES/NO* |
| Modules for LIN communication | Yes | *the participiant indicates YES/NO* |
| Modules for FleyRay communication | Yes | *the participiant indicates YES/NO* |
| Modules for Ethernet communication | Yes | *the participiant indicates YES/NO* |
| Modules for Audio/Video via Ethernet | Yes | *the participiant indicates YES/NO* |
| Modules for monitoring and debugging | Yes | *the participiant indicates YES/NO* |
| CRC library | Yes | *the participiant indicates YES/NO* |
| Modules for driving microcontroller periphery | Yes | *the participiant indicates YES/NO* |
| **1d) 8 pcs – Set of design and configuration SW tools** | | |
| Configuration tool for interfaces in point 1b) | Yes | *the participiant indicates YES/NO* |
| Tool for simulation of automotive buses | Yes | *the participiant indicates YES/NO* |
| Tool for designing the architecture of software components for ECU in point 1a) | Yes | *the participiant indicates YES/NO* |
| Configuration tool for configuring of the basic software modules | Yes | *the participiant indicates YES/NO* |
| Tool for diagnostics of ECU in point 1a) | Yes | *the participiant indicates YES/NO* |
| **1e) 2 pcs - AUTOSAR training course** | | |
| Number of person | min. 1 | *the participiant indicates YES/NO and indicates specific value* |
| Number of training days | min. 2 | *the participiant indicates YES/NO and indicates specific value* |
| Online/attendance training | Yes | *the participiant indicates YES/NO* |
| Language of the course | English or Czech | *the participiant indicates YES/NO and indicates specific value* |
| **1f) 2 pcs – AUTOSAR SW example** | | |
| Number of examples | min. 1 | *the participiant indicates YES/NO and indicates specific value* |
| Automotive focused | Yes | *the participiant indicates YES/NO* |
| Intended for ECU in point 1a) | Yes | *the participiant indicates YES/NO* |
| **2a) 2 pcs – V2X bus interface** | | |
| V2X specification: 802.11p | Yes | *the participiant indicates YES/NO* |
| Number of V2X channels | min. 2 |  |
| Global Navigation Satellite System | Yes | *the participiant indicates YES/NO* |
| GNSS with GPS, GLONASS, Galileo | Yes | *the participiant indicates YES/NO* |
| Number of CAN-bus channels | min. 2 x CAN (CAN(FD)) | *the participiant indicates YES/NO and indicates specific value* |
| Analog inputs | min. 1 | *the participiant indicates YES/NO and indicates specific value* |
| Digital inputs | min. 2 | *the participiant indicates YES/NO and indicates specific value* |
| Operating voltage range | 8 .. 16 VDC | *the participiant indicates YES/NO and indicates specific value* |
| **2b) 2 pcs – SW configuration tool for V2X** | | |
| Configuration tool for interfaces in point 2a) | Yes | *the participiant indicates YES/NO* |
| Compatible with SW tools in point 1d) | Yes | *the participiant indicates YES/NO* |
| Tool for simulation of automotive communication buses | Yes | *the participiant indicates YES/NO* |
| Specific options for V2X and C2C communication | Yes | *the participiant indicates YES/NO* |
| Support for physical layer of 802.11p | Yes | *the participiant indicates YES/NO* |
| **2c) 8 pcs - Universal calibration tool compatible with XCP protocol** | | |
| Calibration tool compatible with ECU in point 1a) | Yes | *the participiant indicates YES/NO* |
| Measurement data acquisition from ECU | Yes | *the participiant indicates YES/NO* |
| ECU parameter calibration | Yes | *the participiant indicates YES/NO* |
| ECU flash programming | Yes | *the participiant indicates YES/NO* |
| Calibration protocol: CCP, XCP | Yes | *the participiant indicates YES/NO* |
| MATLAB/Simulink extension | Yes | *the participiant indicates YES/NO* |

*The participiant should enter the data in compliance with the technical specification of the offered devices.*