

# **Macao Funding Scheme for Key R&D Projects 2024**

## **Application Guideline for Projects of Integrated Circuit (Chip Design)**

### **I. Background**

The chip industry is a comprehensive manifestation of a country's high-end manufacturing capabilities and is the strategic commanding elevation for competitions on global high-tech national strength. China attaches great importance to the chip manufacturing industry. The “*14<sup>th</sup> Five-Year Plan*” for the Development of Digital Economy proposes to “enhance the competitiveness of core industries. Further, the supply of basic software and hardware, core electronic components, key basic materials, and production equipment shall be increased to ensure that adequate key products can be produced domestically”. The “*14<sup>th</sup> Five-Year Plan*” for National Informatization states that “innovations in computing chips and memory chips shall be promoted” and the “research on the basic theoretical framework of chips shall be strengthened, and the cloud-side, edge-side, and end-side chip product iterations for scenarios such as supercomputing, cloud computing, Internet of Things, and intelligent robots shall be accelerated.”

The Macao SAR Government has been actively fostering the development of high-tech. In the *Second Five-Year Plan for Economic and Social Development of the Macao Special Administrative Region (2021-2025)*”, it proposes to “accelerate the construction of a microelectronics industry chain for the

design, testing, and inspection of characteristic chips”. In 2010, the Ministry of Science and Technology of the People’s Republic of China approved the establishment of the State Key Laboratory of Analog and Mixed-Signal VLSI in Macao. With the continuous support of the country and the SAR Government, the design level of analog chips in Macao has been significantly improved.

In order to further develop high-tech industries and improve R&D capabilities and industrialization level, the Science and Technology Development Fund (FDCT) has proposed this Scheme for Key R&D Projects after taking into opinions and suggestions from Macao’s researchers in relevant fields and seeking expertise from mainland experts. This Scheme is conducive to fueling the development of Macao’s chip design industry, in support of Macao’s appropriate economic diversification and the development of the international innovation and technology hub in the Guangdong-Hong Kong-Macao Greater Bay Area, thereby further integrating into the overall national development.

## II. Overall Objectives

It aims to leverage Macao’s R&D advantages in the field of analog and mixed-signal chip design, considering the work priorities in the construction of the international innovation and technology hub in the Greater Bay Area as well as regional cooperation and development. Besides, according to the characteristics of the chip design industry and the application needs of the automobile industry, the R&D of automotive-grade dedicated chips for new energy vehicles will be carried out to realize application verification, thus promoting the development

of the chip industry.

### III. Research Field

**Research field:** Key technology research and chip development for high-speed signal transmission of automotive SerDes.

The research should focus on the R&D and breakthrough technologies such as low-jitter clock generation and spread spectrum, data recovery, adaptive equalization, 50Ω/100Ω load impedance compatibility, reliability in complex environments, etc. to develop high-speed signal transmission chips that obey the vehicle regulations.

#### **Performance indicators:**

- (1) Transmission rate  $\geq 6.5\text{Gbps}$ .
- (2) Support cable length  $\geq 15\text{m}$  coaxial/10m twisted pair.
- (3) Bit error rate  $\leq 10^{-12}$ .
- (4) The research results comply with ISO 26262 and AEC-Q100 Grade 2.
- (5) The vehicle-mounted application verification is completed.
- (6) The Technology Readiness Level (TRL) shall achieve TRL 7.

### IV. Application Requirements

- (1) The lead applicant shall be a Macao entity, and the project shall be led or participated by enterprises, which shall provide supporting funds of no less than 50% of the FDCT fund. If an enterprise participates in the project, it shall be a Macao or Hengqin enterprise.

- (2) A formal cooperation agreement shall be provided if the project is collaborative.
- (3) The project duration is 3 years. The maximum application amount for each project is MOP 15 million.

#### V. Experts Involved in the Formulation of the Guideline

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