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**SPEECH BY MR DAMIAN CHAN, DIRECTOR OF ELECTRONICS,
SINGAPORE ECONOMIC DEVELOPMENT BOARD, AT THE LAUNCH
OF THE IC DESIGN CENTRE OF EXCELLENCE (VIRTUS), ON 15 DEC
2009 AT 9AM.**

Distinguished guests of ISIC,

Ladies and gentlemen,

1. Good morning. I am pleased to be here today for the launch of the Integrated Circuit Design Centre of Excellence of Singapore, also known as VIRTUS. Virtus in Latin means “Excellence”, and VIRTUS serves as an icon for IC design excellence in Singapore, developing talent, offering leading edge technologies and creating spin-offs to industry. VIRTUS aims to train at least 50 MEng and 50 PhD postgraduate students in analog/mixed signal and RF IC design over the next 5 years and develop key technologies in areas such as power management and energy harvesting which could potentially serve as key technology drivers for clean technology, medical technology, and consumer electronics.

Significance of the VIRTUS

2. Despite the trend towards digitization, analog ICs remain critical and increasingly so. As how we experience the world through sound and sight is analog in nature, analog ICs essentially serve as the windows or interface of digital electronics devices to the external world. Analog ICs are essential for power management

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and for conversion of physical signals such as pressure, sound and temperature to the 1s and 0s that power digital electronics.

VIRTUS is the first centre in Singapore to specialize in training and capability development for analog and mixed signal IC design. The establishment of this centre is significant for the electronics ecosystem in Singapore.

3. The electronics industry is a key pillar of Singapore's manufacturing sector. In 2008, the electronics manufacturing output totalled about S\$68 billion, accounting for 27% of total manufacturing output. Electronics also accounted for 73% of Singapore manufacturing sector R&D expenditure in 2007, based on the latest available data from A*STAR.
4. Today we have the full value chain of electronics R&D activities from process development to the design and development of electronics components and systems. Since 2008, despite the downturn, more than 700 new semiconductor R&D jobs have been created, including many IC design positions.

Today, we have about 40 IC design companies and play host to 9 of the world's top 10 fabless IC design companies with R&D activities in Singapore. Of the 1100 IC design engineers in Singapore, 44% specialise in analog, mixed signal and RF IC design. The Economic Development Board or EDB is committed to further training and build strong capabilities in this field. There is a global shortage of IC designers, especially analog IC designers, and this is validated by feedback EDB receives when we meet companies both from the developed and emerging economies. Analog design is challenging and complex, and demands a strong

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understanding of the physics underlying semiconductor devices. However, it is this challenging nature that enables analog IC designers to command a high salary and enjoy a rewarding and prestigious career.

VIRTUS's establishment aims to pre-position Singapore in advanced analog IC design capabilities. As part of our talent development efforts in the semiconductor industry, the EDB has also launched the S\$16 million IC Design Postgraduate Scholarship in June this year to train 150 Masters and PhDs IC designers over the next 5 years.

Electronics is critical for environmental sustainability efforts

5. Today, we frequently read about global trends such as rapid urbanization, climate change, energy conservation and ageing populations. These pose not only challenges, but also new opportunities for the electronics industry in Singapore. In line with this, EDB has identified four new growth areas, namely green electronics, bioelectronics, plastic electronics and security. By 2020, the contribution to electronics output from these new growth areas is expected to triple to 30% of the electronics output. The research areas of VIRTUS are aligned with these areas, especially green electronics and bioelectronics. Green electronics refer to energy efficient solutions for applications such as computing, automotive and lighting systems. Power management ICs are critical components to drive power optimization and energy efficiency in electronics devices and systems. Energy harvesting, on the other hand, captures and stores energy from external sources for future deployment. It drives applications where battery maintenance and replacement

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are difficult and encourages conversion of reusable energy. Analog IC design is the key enabling capability for power management and energy harvesting.

6. The next wave of growth is Bioelectronics which refers to the fusion of multidisciplinary fields including biology, electronics, physics and chemistry. VIRTUS's focus on low power chips will be important for driving innovative healthcare solutions to improve medical needs.

Public-private sector collaboration

7. This centre is an excellent example of public-private sector collaboration innovation. Industry participation will come from project contributions and co-funding of postgraduates with EDB. Besides having strong linkages to the industry, VIRTUS provides a good receptacle for companies to recruit experienced IC design engineers.
8. VIRTUS will be hosted by NTU within its campus in Boon Lay and it will open its doors to its first batch of postgraduate students in August 2010.
9. It is now my pleasure to launch the IC design centre of excellence of Singapore, VIRTUS and I look forward to your participation and contribution. Thank you.