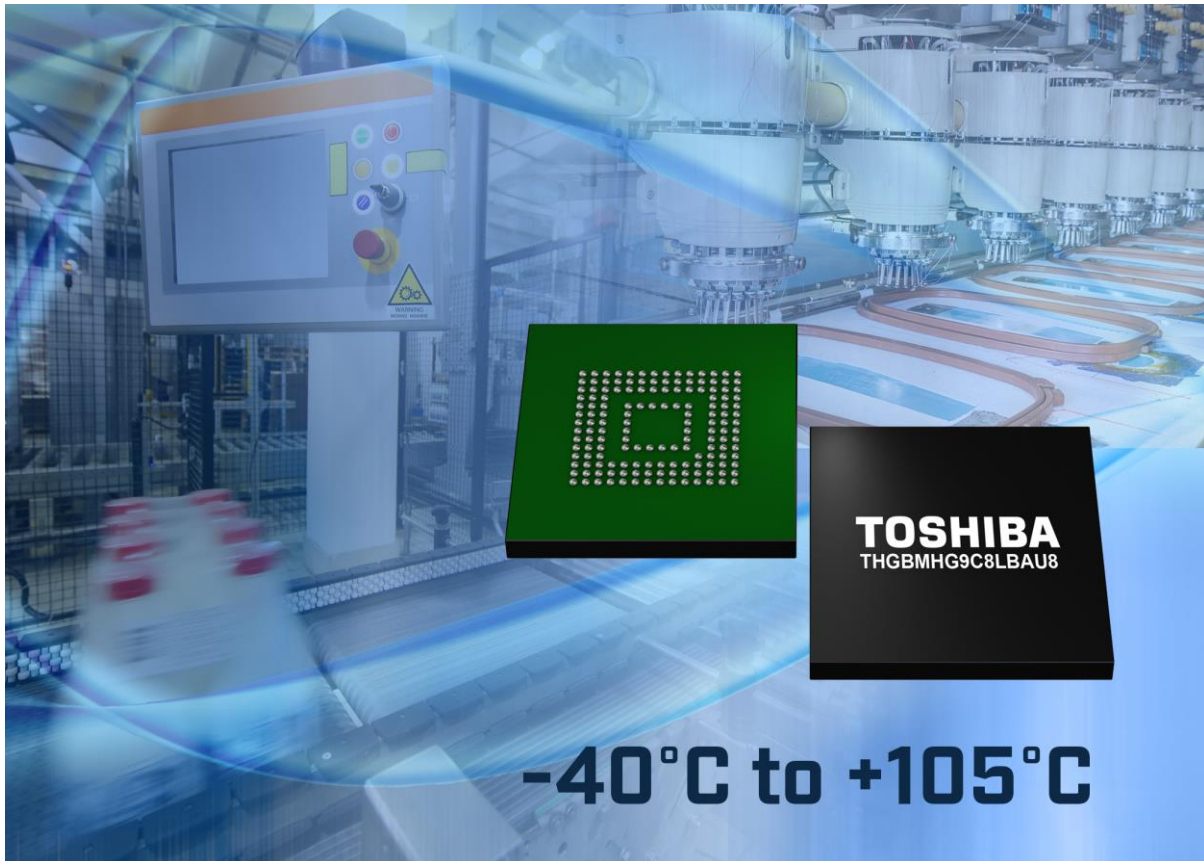## Toshiba Expands Line-up of Industrial-Grade *e•*MMC™ Ver.5.1 Compliant Embedded NAND Flash Memory Products

Operating temperature range enhanced to +105°C

TOKYO, 10th January, 2017 — Toshiba Corporation's Storage & Electronic Devices Solutions Company today announced the launch of JEDEC *e·*MMC™ Version 5.1[1] compliant embedded NAND flash memory products with an enhanced operational temperature range of -40°C to +105°C . The new products integrate NAND chips fabricated with 15nm process technology and are designed for industrial applications, including PLC[2], CoMs[3] and factory automation equipment, and can also be used in a wide range of consumer applications. The line-up offers densities of 8GB, 16GB, 32GB and 64GB. Sample shipments start from today, with mass production scheduled for March 2017.

The new products integrate NAND chips with a controller to manage basic control functions for NAND applications in a single package. As a complement to Toshiba's current industrial product group of *e·*MMC, which have an operating temperature range of -40 to +85°C, the new *e·*MMC product family support applications that require *e·*MMC storage solutions to operate at higher temperatures up to +105°C. This enhanced range offers users more freedom of choice in developing memory solutions for industrial applications in high temperature environments.

In the consumer and industrial market demand for *e*·MMC with high temperature support continues to grow for applications requiring higher performance and higher power consumption. Toshiba is meeting this demand by reinforcing its line-up of high performance and high density memory products and will continue to take leadership in the market.

Key Features
1. The JEDEC *e*·MMC Version 5.1 compliant interface handles essential functions, including writing block management, error correction and driver software. It simplifies system development, allowing manufacturers to minimize development costs and speed up time to market for new and upgraded products. Additionally, new features[4] standardized in JEDEC *e*·MMC Version 5.1, such as BKOPS control, Cache Barrier, Cache Flushing Report, Large RPMB Write and Command Queuing, are applied to the new products to enhance usability.
2. Supports operating temperature range of -40°C to +105°C.

Notes
[1] *e*•MMC™ is a product category for a class of embedded memory products built to the JEDEC *e*•MMC Standard specification and is a trademark of the JEDEC Solid State Technology Association.
[2] Programmable Logic Controller.
[3] Computer on Modules.
[4] ¨BKOPS control" is a function where the host allows the device to perform background operation when the device is idle. "Cache Barrier" is a function that controls when cache data is written to the memory chip. "Cache Flushing Report" is a function that informs the host if the device's flushing policy is FIFO (First In First Out) or not. "Large RPMB write" is a function that increases the data size that can be written to the RPMB area to 8KB. The "Command Queuing" feature allows users to process multiple tasks generated by the user's issue of multiple commands, in the order of the user's preference, by initially storing the tasks in a waiting queue. It improves random read performance speed by approximately 30% at maximum according to Toshiba survey.

*The products are labelled based on their memory chip(s), not the amount of memory capacity available for data storage by the end user. Part of the capacity is reserved for device management. Please refer to the data sheet or your local Toshiba sales representative. (For purposes of measuring memory capacity in this context, 1GB = 1,073,741,824 bytes.)

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About Toshiba Electronics Europe

Toshiba Electronics Europe (TEE) is the European electronic components business of Toshiba Corporation, which is ranked among the world's largest semiconductor vendors. TEE offers one of the industry's broadest IC and discrete product lines including high-end memory, microcontrollers, ASICs and ASSPs for automotive, multimedia, industrial, telecoms and networking applications. The company also has a wide range of power semiconductor solutions as well as storage products including HDDs, SSDs, SD Cards and USB sticks.

TEE was formed in 1973 in Neuss, Germany, providing design, manufacturing, marketing and sales and now has headquarters in Düsseldorf, Germany, with branch offices in France, Italy, Spain, Sweden and the United Kingdom. TEE employs approximately 300 people in Europe. Company president is Mr Akira Morinaga.

For more company information visit TEE's web site at www.toshiba.semicon-storage.com.

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