

# Samsung V-NAND SSD

## 970 EVO Plus

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2019 Data Sheet

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Revision 2.0



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**SAMSUNG**

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## Revision History

Revision Number	Description	Revision Date
1.0	Initial Release	Jan., 2019
2.0	Added 2TB Specification	Mar., 2019

## Samsung SSD 970 EVO Plus

The Samsung SSD 970 EVO Plus is a client PC NVMe SSD with Samsung's latest 3-bit MLC V-NAND. The 970 EVO Plus is specially designed for tech enthusiasts, hardcore gamers, and professionals who need unrivaled performance, superior reliability, and it boasts the best-in-class capacity for intensive workloads on PCs and workstations.

### Unrivaled Performance

In combination with the latest Samsung V-NAND technology and firmware optimization, the 970 EVO Plus achieves random write speeds up to 57% faster than the 970 EVO. Also, it offers industry-leading sequential performance among NVMe SSDs with read/write speeds of up to 3,500/3,300 MB/s, respectively. The 970 EVO Plus performance will be the industry-leading and maximum within the current PCIe Gen3 interface.

### Superior Reliability

The 970 EVO Plus boasts exceptional endurance with up to 1,200 terabytes<sup>1)</sup> written. Advanced thermal control solutions enhance performance with reduced heat risk. Dynamic Thermal Guard (DTG) technology proactively prevents overheating, and a heat spreader with an integrated thin copper film dissipates heat more efficiently. A nickel coating on the Phoenix controller also helps to dissipate heat faster during heavy workload use in order to ensure the high levels of quality and reliability for which Samsung is known. The 970 EVO Plus comes with an industry-leading 5-year warranty.

1) All documented endurance test results are in compliance with JESD218 standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information.

### System Design Flexibility

The 970 EVO Plus enables convenient storage expansion across many different devices. The 970 EVO Plus comes in a broad range of capacity options, made possible through Samsung's latest V-NAND technology. In addition, the 970 EVO Plus offers high power efficiency as well as exceptional speeds, making it the ideal solution to use with application ranging from ultra-thin computing to high-performance computing systems.

### Advanced Data Encryption

The 970 EVO Plus provides multiple advanced data encryption features like Self-Encrypting Drive (SED) security technology that will help keep data safe at all times. The 970 EVO Plus includes an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. The 970 EVO Plus is compliant with various advanced security management solutions (such as, TCG Opal and Encrypted Drive-IEEE1667).

### Samsung Data Migration and Magician Software

Samsung Magician and Data Migration software supports the 970 EVO Plus. These powerful software programs offer consumers an easy way to manage their Samsung SSDs. With Magician, users can instantly gain an overview of critical drive information and compatibility issues. Users will find and implement the process of keeping their firmware, drivers and other settings up to date easier than ever.

The Samsung Data Migration software is simple to use – yet provides a very powerful “Custom Cloning” feature that enables migration work even when source data is greater than the SSD's capacity.

## TECHNICAL SPECIFICATIONS

## Samsung SSD 970 EVO Plus

Usage Application	Client PCs					
Interface	PCIe Gen 3.0 x4, NVMe 1.3					
Hardware Information	Capacity <sup>1)</sup>	250GB	500GB	1TB	2TB	
	Controller	Samsung Phoenix Controller				
	NAND Flash Memory	Samsung V-NAND 3bit MLC				
	DRAM Cache Memory	512MB LPDDR4	1GB LPDDR4	2GB LPDDR4		
	Dimension	Max 80.15 x Max 22.15 x Max 2.38 (mm)				
	Form Factor	M.2 (2280) <sup>2)</sup>				
Performance (Up to.) <sup>3)4)</sup>	Sequential Read	3500 MB/s				
	Sequential Write	2300 MB/s	3200 MB/s	3300 MB/s		
	QD 1 Thread 1	Ran. Read	17K IOPS	19K IOPS		
		Ran. Write	60K IOPS			62K IOPS
	QD 32 Thread 4	Ran. Read	250K IOPS	480K IOPS	600K IOPS	620K IOPS
Ran. Write		550K IOPS			560K IOPS	
Power Consumption <sup>5)</sup>	Idle (ASPT on)		30mW			
	Active (Avg.)	Read	5 W	5.5 W		
		Write	4.2 W	5.8 W	6 W	
	L1.2 mode		5 mW			
Reliability	Temp.	Operating	0°C to 70°C (Measured by S.M.A.R.T. Temperature Proper airflow recommended)			
		Non-Operating	-45°C to 85°C			
	Humidity		5% to 95% non-condensing			
	Shock	Non-Operating	1,500G(Gravity), duration: 0.5ms, 3 axis			
	Vibration	Non-Operating	20~2,000Hz, 20G			
	MTBF		1.5 million hours			
Warranty <sup>9)</sup>	TBW <sup>6)7)</sup>	150TB	300TB	600TB	1,200TB	
	Period	5 years limited <sup>8)</sup>				
Supporting Features	TRIM (Required OS support), Garbage Collection, S.M.A.R.T					
Data Security	AES 256-bit Full Disk Encryption, TCG/Opal V2.0, Encrypted Drive (IEEE1667)					

1) 1GB = 1,000,000,000 bytes by IDEMA. A certain portion of capacity may be used for system file and maintenance uses, thus the actual available capacity may differ from the labeled capacity.

2) M.2 is the specification of a form factor for ultra-thin PCs. The M.2 standard allows widths of 12, 16, 22 and 30mm and lengths of 16, 26, 30, 38, 42, 69, 80 and 110mm. Commercially popular M.2 are those with a width of 22mm and lengths of 30, 42, 60, 80 and 110mm. Samsung provides the most popular form factor, which is 22mm x 80mm (i.e., 2280), for the convenience of customers.

3) Sequential and random performance measurements are based on IOMeter1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test system configuration: Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 32GB, OS-Windows 10 Build 10240, Chipset-ASUS PRIME Z270-A.

4) Sequential and random write performance was measured with Intelligent TurboWrite technology being activated. The sequential write performances for the portion of data exceeding over Intelligent TurboWrite buffer size are: 400 MB/s for 250GB, 900 MB/s for 500GB, 1700 MB/s for 1TB and 1750 MB/s for 2TB. The random write performances for the portion of data exceeding over Intelligent TurboWrite buffer size (tested with QD 32 Thread 4) are: 100,000 IOPS for 250GB, 200,000 IOPS for 500GB, 400,000 IOPS for 1TB and 420,000 IOPS for 2TB. Performance may vary depending on SSD's firmware, system hardware & configuration and other factors.

5) Power consumption is measured with IOMeter1.1.0 version with Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 16GB, Gigabyte GA-Z270X, OS – Windows 10 PRO K x64.

6) All documented endurance test results are in compliance with JESD218 Standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on JESD218 Standards

7) TBW means Terabytes Written.

8) Please refer to the detailed warranty statement here at <http://www.samsung.com/samsungssd>

9) Warranty provides coverage for the stated time period or the TBW, whichever comes first.

## PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
250GB*	MZ-V7S250	Samsung SSD 970 EVO Plus 250GB Warranty Statement	MZ-V7S250BW MZ-V7S250B/AM
500GB*	MZ-V7S500	Samsung SSD 970 EVO Plus 500GB Warranty Statement	MZ-V7S500BW MZ-V7S500B/AM
1TB (1,000GB*)	MZ-V7S1T0	Samsung SSD 970 EVO Plus 1TB Warranty Statement	MZ-V7S1T0BW MZ-V7S1T0B/AM
2TB (2,000GB*)	MZ-V7S2T0	Samsung SSD 970 EVO Plus 2TB Warranty Statement	MZ-V7S2T0BW MZ-V7S2T0B/AM

\* GB: 1GB = 1,000,000,000 bytes. The actual usable capacity may be less than the labeled capacity.

For more information, including but not limited to the warranty provided for this product, and to download the latest software & manuals, please visit [www.samsung.com/ssd](http://www.samsung.com/ssd) and [www.samsungssd.com](http://www.samsungssd.com).

## Testing Configuration and notes

Below you will find a list of system configurations Samsung used to obtain the results reported in this Data Sheet.

	Read/Write Performance	Power Consumption
NVMe Interface	PCIe Gen 3.0 x4	PCIe Gen 3.0 x4
OS	Windows 10 Build 10240	Windows 10 PRO K x64
CPU	Intel Core i7™ -7700K @ 4.2GHz	Intel Core i7™ -7700K @ 4.2GHz
Memory	Samsung DDR4 2,400MHz 32GB (16GB x 2ea)	Samsung DDR4 2,133MHz 16GB (8GB x 2ea)
Chipset	ASUS PRIME Z270-A	Gigabyte GA-Z270X
Test Program	IOmeter 1.1.0	IOmeter 1.1.0