

VERIFICATION REPORT

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Release: 01

UP BOARD WITH GOODRAM SSD

mini mSATA 120GB BICS 3D NAND FLASH mSATA 128GB MLC NAND FLASH mSATA 256GB MLC NAND FLASH

Revision	Description	Date
01	First release	07/09/2017

	Position	Name	Date	Signature
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1. Test purpose

Target of the test is to verify compatibility of AAEON UP board with GOODRAM:

- mini mSATA 120GB BICS 3D NAND FLASH (to compare with previous report)
- mSATA 128GB MLC NAND FLASH



• mSATA 256GB MLC NAND FLASH





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2. Test means

UP board with BIOS UP-APL01 R1.8 (UPA1AM18), Intel Pentium CPU N4200 @ 1.10GHz 8GB LPDDR4 RAM, 32GB eMMC:



Power supply 5V, 400mA:





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3. Test description

GOODRAM receive customer device with pre-installed ubilinux[™] system. SSD detection and basic read/write functionality was verified. Due to account privileges limitations we were not able to install third party benchmark software.

On customer device operating system Ubuntu 16.04 64bit was installed. SSD detection and basic read/write functionality was verified. With use of system pre-installed benchmark software read/write transfer speed was verified.

After that, installation of Windows 10 operating system was performed. SSD detection and basic read/write functionality was verified. With use of benchmark softwares read/write transfer speed was verified.

SSD was installed directly to customer board without any converter board.



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4. Test results

4.1. mini mSATA 120GB BICS 3D NAND FLASH



SSD was detected correctly by operating system ubilinux[™] and works without problem.

SSD was detected correctly by operating system Ubuntu 16.04 64bit and works without problem:





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Maximum data transfer was verified with use of system benchmark software.



Average Read Rate: 562 MB/s Average Write Rate: 540 MB/s

Sample Size: 10MB (100 samples)



Average Read Rate: 547 MB/s Average Write Rate: 522 MB/s

GOOD [®] RAM		RP-01/07/09/2017
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SSD was detected correctly by operating system Windows 10 and works without problem. Maximum data transfer was verified with use of benchmark softwares:

AS SSD Benchmark v1.9.5986.35387:

🚔 AS SSD Benchmark 1.9.5986.35387 💼 🔳 🖾			
File Edit View Tools	Language Help		
D: GOODRAM	✓ 1 GB ✓ 120GB mSATA mini		
GOODRAM SBFM61.1 storahci - OK 1024 K - OK 111.79 GB	Read:	Write:	
⊠ Seq	498,67 MB/s	396,97 MB/s	
⊠ 4K	13,52 MB/s	35,92 MB/s	
☑ 4K-64Thrd	463,75 MB/s	248,21 MB/s	
☑ Acc.time	0,088 ms	0,471 ms	
Score:	527	324	
	11	16	
Start Abort			

ATTO: Disk Benchmark v3.05:





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Crystal Disk Mark 5.2.2 x64:



<u>Note:</u> mini mSATA 120GB TLC 3D SSD was tested with previous customer application (test report RP_0103082017_verification_report). Now test purpose was to check compatibility with new customer application.



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4.2. mSATA 128GB MLC NAND FLASH



SSD was detected correctly by operating system ubilinux[™] and works without problem.

SSD was detected correctly by operating system Ubuntu 16.04 64bit and works without problem:





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Maximum data transfer was verified with use of system benchmark software.



Average Read Rate: 565 MB/s Average Write Rate: 544 MB/s

Sample Size: 10MB (100 samples)

DODRAM	Model GOODRAM (SBFM21.1)
D Card 🙆 Benchmark	
4,2 MB 570 MB/s	105
4,2 MB 513 MB/5	0,9 ms
4,2 MB 456 MB/5	0,8 ms
'dev/mm 399 M8/5	0,7 ms
342 MB/s	0,6 ms
285 MB/s	0,5 ms
228 MB/s	0,4 ms
171 MB/s	0,3 ms
114 MB/s	0.2 ms
37 Maja	0,05
off 10% Disk or Devic Last Benchmarke Sample Si Average Read Rai Average Write Rai Average Access Tim	20% 30% 40% 50% 60% 70% 80% 90% 100% = 128 CB lsk—CODAM (SBFM21.1) (Jdev/sda) d czw, 7 wrz 2017, 15:49:01 (Less than a minute ago) = 564, 1M B/s (2 samples) = 543,8 MB/s (2 samples) = 0,11 msec (2 samples)
Start Benchmark	Close

Average Read Rate: 544 MB/s Average Write Rate: 514 MB/s

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SSD was detected correctly by operating system Windows 10 and works without problem. Maximum data transfer was verified with use of benchmark software's:

AS SSD Benchmark v1.9.5986.35387:

🚔 AS SSD Benchmark 1.9.5986.35387 💼 🗉 😰			
File Edit View Tools	Language Help		
D: GOODRAM	✓ 1 GB ✓ 128GB mSATA		
GOODRAM SBFM21.1 storahci - OK 132096 K - OK 119,24 GB	Read:	Write:	
⊠ Seq	494,20 MB/s	419,04 MB/s	
⊠ 4K	8,63 MB/s	39,90 MB/s	
☑ 4K-64Thrd	534,18 MB/s	237,05 MB/s	
☑ Acc.time	0,105 ms	0,654 ms	
Score:	592	319	
	12	08	
-			
Star	t	Abort	

ATTO: Disk Benchmark v3.05:





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Crystal Disk Mark 5.2.2 x64:





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4.3. mSATA 256GB MLC NAND FLASH



SSD was detected correctly by operating system ubilinuxTM and works without problem .

SSD was detected correctly by operating system Ubuntu 16.04 64bit and works without problem:





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Maximum data transfer was verified with use of system benchmark software.



Average Read Rate: 5654MB/s Average Write Rate: 543 MB/s

RAM	Mod	el GOODRAM	(SBFM21.1)		
😽 🥯 Benchmark					
B 560 MB/s	mona a			man and	5ms
B 504 MB/5	min		min	in	↔ 4,5 ms
B 448 MB/S					4#5
392 MB/s					3,5 ms
336 MB/S					3 ms
280 MB/s					2,5 ms
224 MB/5					Zms
168 MB/s					1,5 ms
112 M8/s					1ms
56 MB/5					0,5 ms
0 MB/s 0% 10	J% 207% 30%	40% 50%	60% 70%	80% 90%	0 ms
Disk or E	vevice 256 GB Disk -	GOODRAM [SI	BFM21.1] (/dev	/sda)	
Last Benchm	arked czw, 7 wrz 201	7, 15:58:49 (Les	s than a minut	e ago)	
Sampl	e Size 10,0 MiB (1048	15760 bytes)			
Average Read	Rate 547,1 MB/s (10	0 samples)			
Average Write	e Rate 522,8 MB/s (10	0 samples)			
Average Access	Time 0,04 msec (1000) samples)			100

Sample Size: 10MB (100 samples)

Average Read Rate: 547 MB/s Average Write Rate: 523 MB/s

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SSD was detected correctly by operating system Windows 10 and works without problem. Maximum data transfer was verified with use of benchmark software's:

AS SSD Benchmark v1.9.5986.35387:

🚔 AS SSD Benchmark 1.9.5986.35387 💼 🗉 😰			
File Edit View Tools	Language Help		
D: GOODRAM	✓ 1 GB ✓ 256GB mSATA		
GOODRAM SBFM21.1 storahci - OK 132096 K - OK 238,47 GB	Read:	Write:	
⊠ Seq	486,38 MB/s	413,12 MB/s	
⊠ 4K	9,45 MB/s	41,83 MB/s	
☑ 4K-64Thrd	268,55 MB/s	254,50 MB/s	
☑ Acc.time	0,104 ms	0,512 ms	
Score:	327	338	
	82	29	
-		()	
Star	t	Abort	

ATTO: Disk Benchmark v3.05:





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Crystal Disk Mark 5.2.2 x64:

