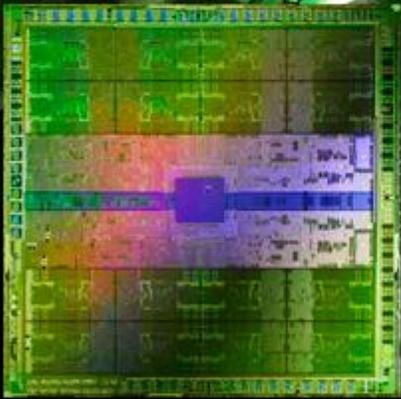




NVIDIA



Reviewer's Guide
GEFORCE GTX 480M

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GeForce GTX 480M

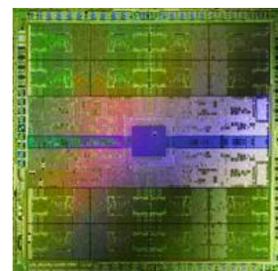
World's Fastest Notebook GPU

NVIDIA® GeForce® GTX 480M notebook GPUs give your games an adrenaline shot with the fastest performance and visually-stunning graphics. Bringing notebook gaming closer to cinema quality effects, GeForce GTX 480M with its multiple distributed tessellation engines and 352 CUDA cores deliver up to 5x more performance than any other notebook GPU. Kick your game up a notch and connect your notebook to a NVIDIA 3D Vision™-ready display for an immersive 3D gaming experience.

Whether the game is DX11, DX10, or DX9 GeForce GTX 480M delivers high frame rates and exceptional visual quality. With the GeForce GTX 480M, you can raise resolution, in-game settings, Full-Scene Anti-Aliasing and Anisotropic Filtering levels, and more.

Specifications

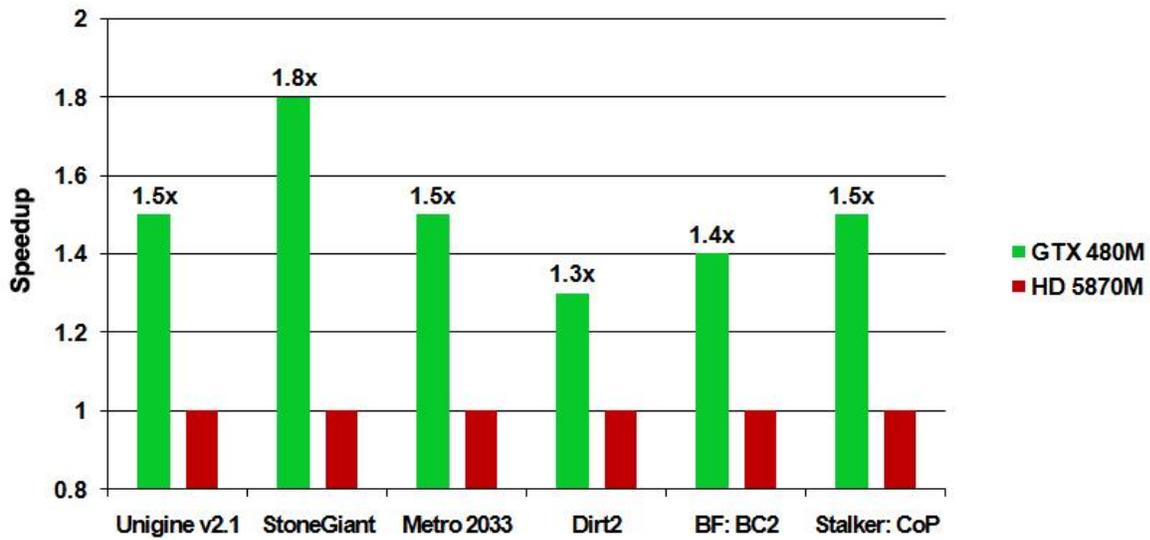
GEFORCE GTX 480M	
CUDA Cores	352
Graphics Clock (MHz)	425
Processor Clock (MHz)	850
Memory Clock (MHz)	600
Memory Data Rate (MHz)	2400
Memory Bandwidth (GB/sec)	76.8
Texture Fill Rate (billions/sec)	18.7
Standard Memory Configuration	GDDR5
Memory Interface Width	256 bit
DirectX 11 support	Yes
PhysX support	Yes
3D Vision support	Yes
NVIDIA Verde driver support	Yes



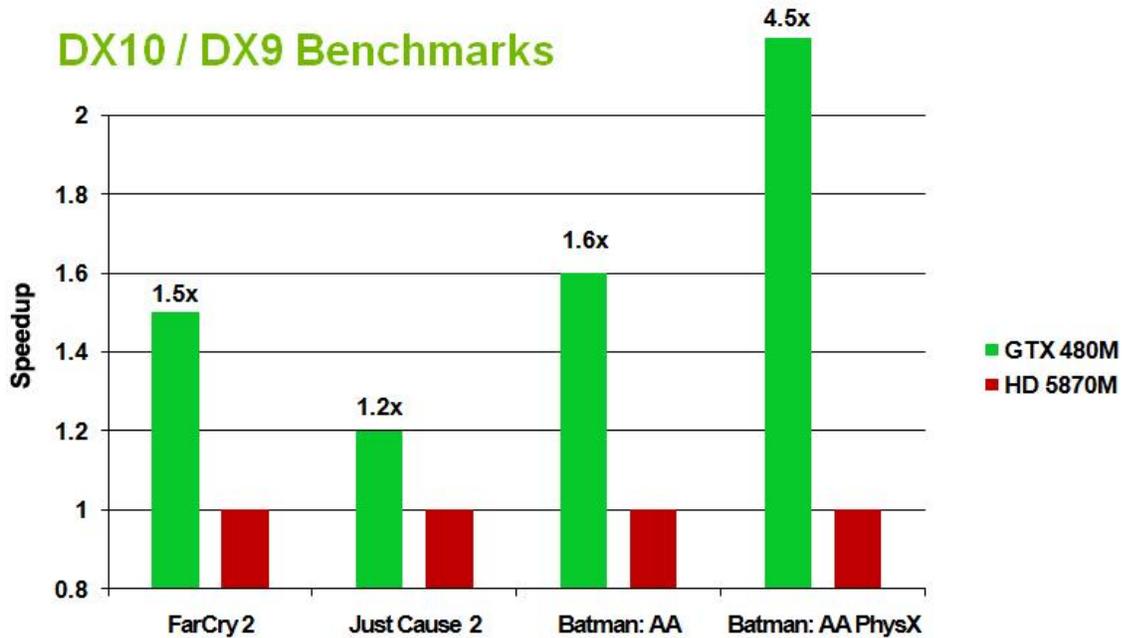
Performance Benchmarks

Sample Result Overview

DX11 Benchmarks



DX10 / DX9 Benchmarks



Unigine Heaven v2.1

DirectX¹¹

Summary

Based upon the new Unigine engine, the new Heaven v2.1 application is an extremely intensive benchmark which previews how GPUs will handle the DX11 titles on the horizon. In this benchmark, the GeForce GTX 480M is up to **52% faster** than the Mobility Radeon 5870.

Note: Unigine Heaven v2.1 adds support for OpenGL 4.0. GeForce GTX 480M supports this feature today. However, Radeon Mobility 5870 showcases major stability and image corruption issues with the latest Catalyst 10.4 public drivers.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the application's built-in benchmark utility.

Benchmark Controls

- F2:** toggle wireframe
- F3:** toggle tessellation
- F4:** Change camera mode
- F9:** Run benchmark
- F12:** Take screenshot
- Enter:** Next camera path
- Escape:** Show/hide menu

Tessellation Settings

The Unigine v2.1 engine allows you to choose between three options for tessellation. As illustrated in Figure 1 below, there is a dramatic difference in complexity (and resulting quality) between the options. For the most realistic image quality, we recommend selecting the “Extreme” setting for testing. Given the fact that the GeForce GTX 480M was designed with multiple dedicated geometry engines called [PolyMorph Engines](#), this flagship notebook GPU handles the increased tessellation workload much better than the competition.

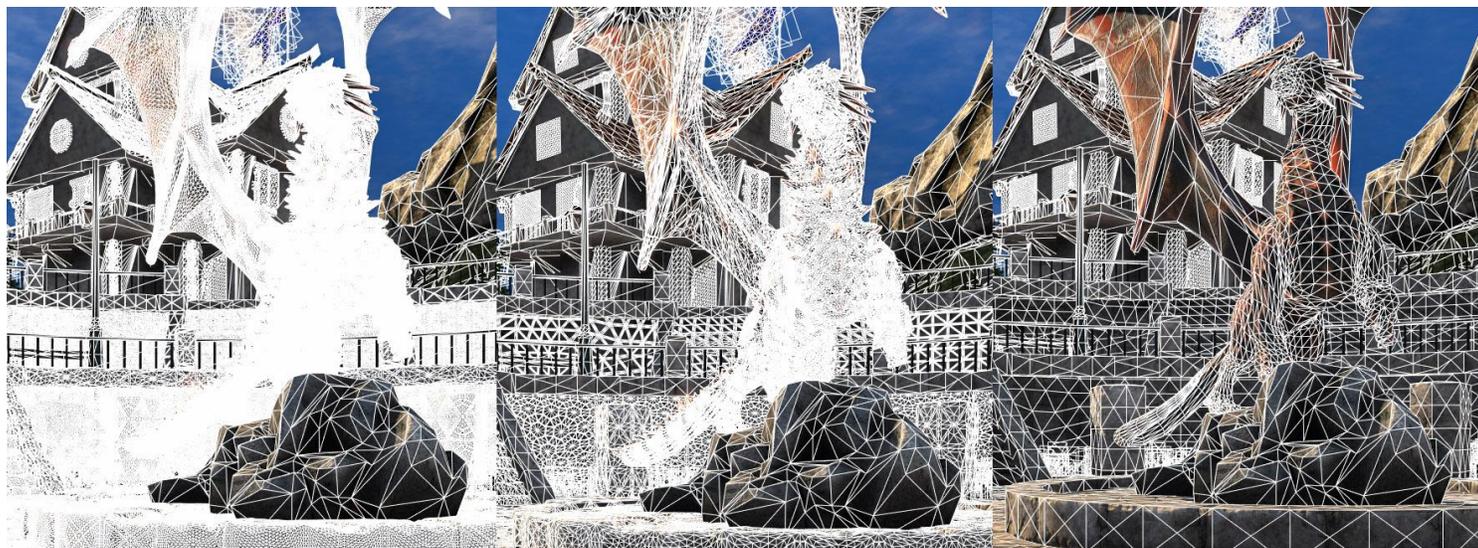


Figure 1: Tessellation Levels (Extreme, Normal, Off)

Sample Results

	Shaders	Tessellation	FSAA	AF	GTX 480M	HD 5870M	
1920x1080	High	Normal	1x	1x	23.1	17.3	34%
DX11	High	Normal	1x	4x	21.8	16.7	31%
	High	Normal	4x	4x	17.0	13.1	30%
	High	Normal	8x	4x	14.9	11.4	31%
	High	Normal	8x	16x	14.5	11.0	32%
	High	Extreme	1x	1x	17.3	11.4	52%
	High	Extreme	1x	4x	16.8	11.2	50%
	High	Extreme	4x	4x	13.2	9.1	45%
	High	Extreme	8x	4x	11.6	8.1	43%
	High	Extreme	8x	16x	11.4	7.9	44%

Stone Giant

DirectX¹¹

Summary

Bitsquid's new Stone Giant benchmark takes advantage of some extreme tessellation features to illustrate how the games of tomorrow will look in terms of image quality and realism. In this intensive test, the GeForce GTX 480M is up to **83% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the application's built-in benchmark utility. Once the benchmark is completed, the average framerate will be displayed in the upper-right corner of the screen.

Benchmark Controls

- Enter:** Start/stop cinematic sequence
- 1-5:** Toggle preset close-up shots
- F1:** Toggle wireframe
- F2:** Toggle tessellation settings
- F3:** Toggle depth of field effect
- F4:** Enable performance statistics and framerate counter
- W,A,S,D:** Move camera
- Mouse:** Rotate Camera

Tessellation Settings

Stone Giant allows you to choose between three options for tessellation. As shown in Figure 2 below, the level of realism increases substantially when “High” tessellation is used. For this reason, we strongly suggest you use this setting for your benchmarking purposes. Given the fact that the GeForce GTX 480M was designed with dedicated geometry engines called [PolyMorph Engines](#), this flagship notebook GPU handles the increased tessellation workload of the Stone Giant benchmark much better than the competition.

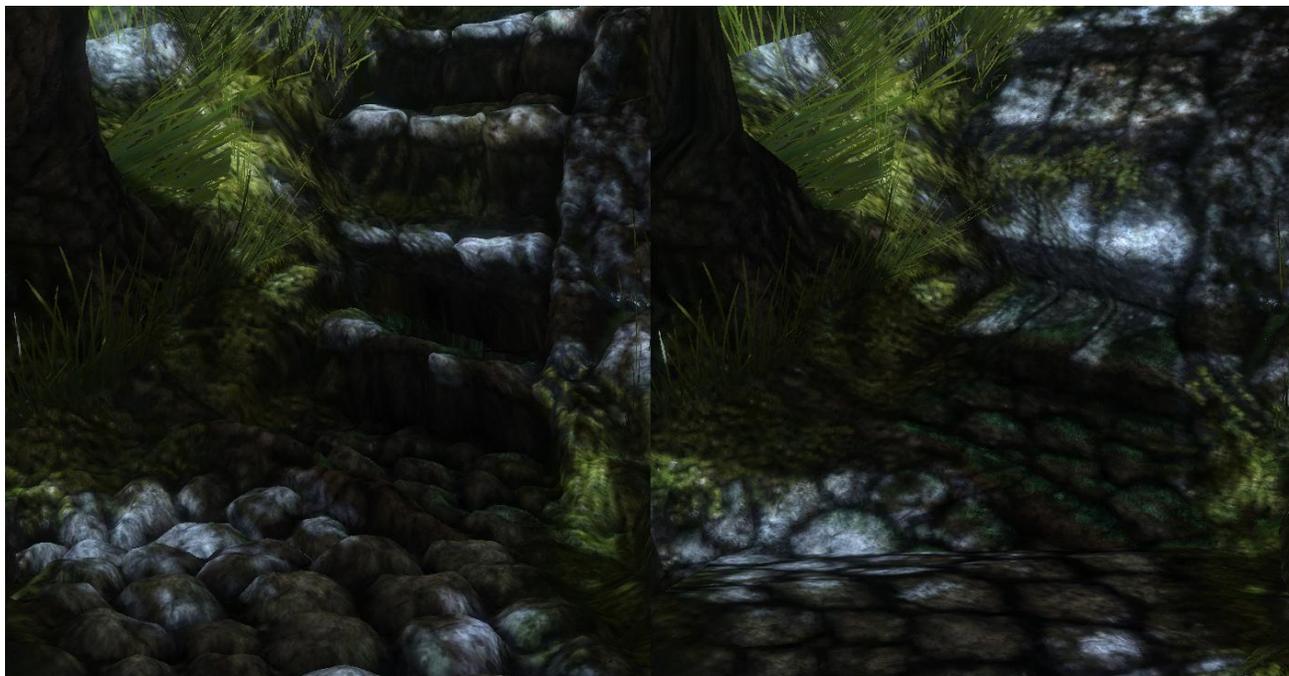


Figure 2: Tessellation Levels (High, Off)

Sample Results

			GTX 480M	HD 5870M	
	Depth of Field				
		Tessellation			
1920x1080	Off	High	33.0	18.0	83%
DX11	On	High	18.0	12.0	50%

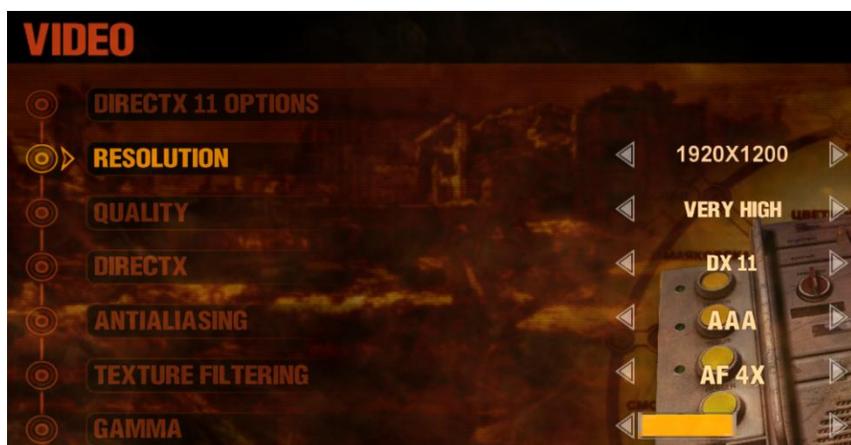
Metro 2033

DirectX¹¹

Summary

Metro 2033 utilizes DX11 and advanced PhysX effects to create a whole new level of immersion for gaming. In this title, the GeForce GTX 480M is up to **51% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

When testing Metro 2033 for performance with different GPU solutions, we suggest the following procedures for accurate readings:

Chapter One, level "Chase" is a pre scripted tunnel traveling scene where you are riding a hand cart with a couple of other tunnel dwellers. For the first half of the scene, you have visual movement control, but you cannot shoot or move the character. This provides a consistent environment for testing. Halfway through the level, you are forced to defend the hand cart and your disabled comrades from enemy mutants, and deliver some gunfire and movement.

When testing GPU performance with Advanced PhysX enabled, we suggest you check out the PhysX grenade explosions that produce a turbulent smoke clouds all being calculated real time. Use the level Chapter 4 "Frontline" to test this feature. The beginning of the level provides a consistent scenario for testing in the absence of a built-in benchmark. You start the level about 40 feet down a tunnel from a Nazi camp where each of the enemies is carrying a grenade. The saved game we have provided starts you at the beginning of this level with five grenades for maximum explosions. To test, simply start throwing grenades at the truck full of Nazi soldiers and watch the explosions ensue. With a few tries you will get the hang of it and produce a very consistent benchmarking environment for comparing a PhysX workload on the GPU versus the CPU.

We have posted a save game file to the Press FTP. It is enclosed in a folder named "4A Games". To allow the saved game to be accessed, you need to place the "4A Games" folder into your documents folder (overwrite existing folder).

"User"/Documents/4A Games

Sample Results

					GTX 480M	HD 5870M	
1920x1080	Quality	FSAA	AF	PhysX			
	High	AAA	4x	Off	15.7	13.7	15%
DX11	High	4xMSAA	4x	Off	12.9	9.1	42%
	High	AAA	16x	Off	15.5	13.2	17%
	High	4xMSAA	16x	Off	11.9	8.5	40%
	Very High	AAA	4x	Off	12.6	10.3	22%
	Very High	4xMSAA	4x	Off	9.7	6.7	45%
	Very High	AAA	16x	Off	12.5	10.2	23%
	Very High	4xMSAA	16x	Off	9.7	6.5	49%
	High	AAA	4x	ON	15.8	13.7	15%
	High	4xMSAA	4x	ON	12.1	8.8	38%
	High	AAA	16x	ON	15.4	13.3	16%
	High	4xMSAA	16x	ON	11.8	8.5	39%
	Very High	AAA	4x	ON	12.6	10.3	22%
	Very High	4xMSAA	4x	ON	10.3	6.8	51%
	Very High	AAA	16x	ON	12.3	10.1	22%
	Very High	4xMSAA	16x	ON	9.7	6.5	49%

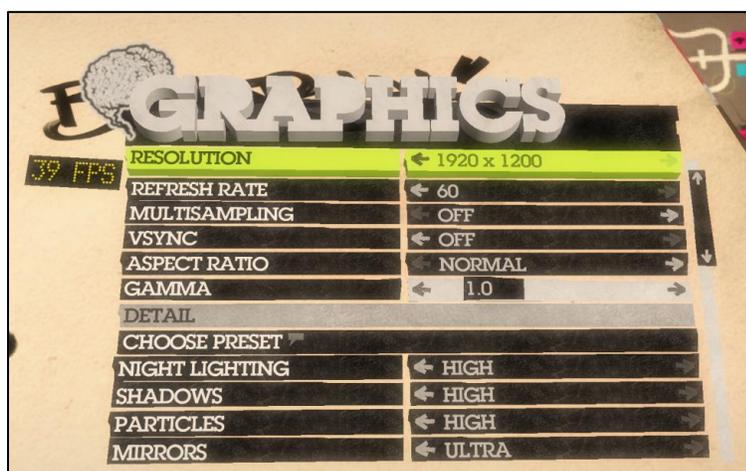
DIRT 2

DirectX¹¹

Summary

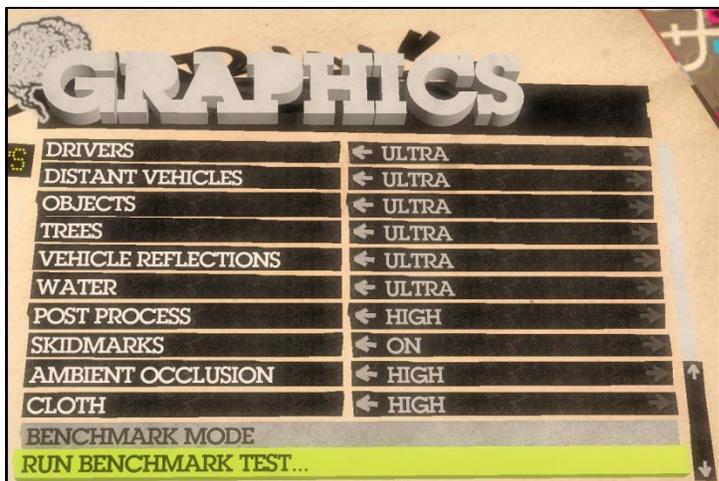
When running in DX11 mode, DIRT2 provides exceptional detail and realism. When using the highest settings, the GeForce GTX 480M is up to **35% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the game's built-in benchmark utility. Once you have viewed the initial cinematic clips and reached the first level of gameplay, the main menu will show "benchmark" in the listing directly under "options". After you have configured the game to the settings you'd like to test (using the settings menu shown above), simply click "Benchmark" to launch the game's benchmark utility. Once the benchmark is finished, you'll be presented with minimum, maximum, and average framerate information.



Sample Performance

			GTX 480M	HD 5870M	
1920x1080	Preset	FSAA			
DX11	Ultra	1x	40.6	30.1	35%
	Ultra	2x	36.5	27.7	32%
	Ultra	4x	35.4	27.4	29%
	Ultra	8x	31.4	26.3	19%

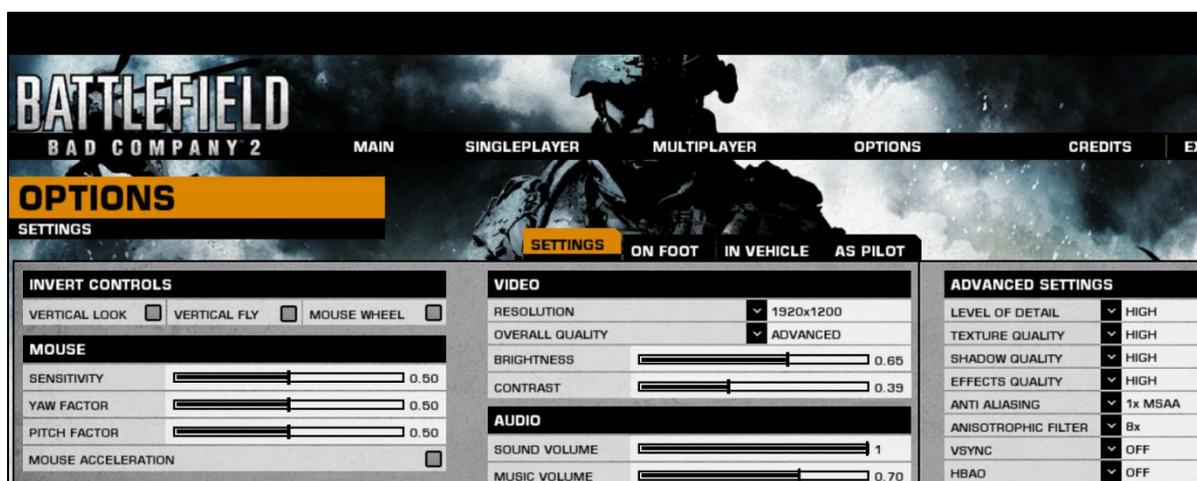
BF: Bad Company 2

DirectX¹¹

Summary

Battlefield: Bad Company 2 is based upon the Frostbite engine and takes advantage of the new DX11 API. When using the highest settings, the GeForce GTX 480M is up to **38% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using FRAPS (www.fraps.com) to measure framerate during gameplay. For each run, you will need to follow the same path and perform the same actions in order for the results to be accurate.

Using FRAPS



1. Double-click the FRAPS icon to start the utility
2. Launch the game to be benchmarked
3. Start the game or load a save game
4. Start measuring the frame rate by pressing F11
5. Play the game for at least 60 seconds
6. Stop measuring the frame rate by pressing F11 again

Performance data (average frame rate) is located within the FRAPS.LOG file located in the utility's installed directory. (typically C:\Fraps)

Sample Results

	Detail	HBAO	FSAA	AF	GTX 480M	HD 5870M	
1920x1080	High	Off	1x	1x	49.3	42.4	16%
DX11	High	Off	8x	8x	38.5	27.8	38%
	High	On	1x	1x	34.2	32.5	5%
	High	On	8x	8x	28.8	23.1	25%

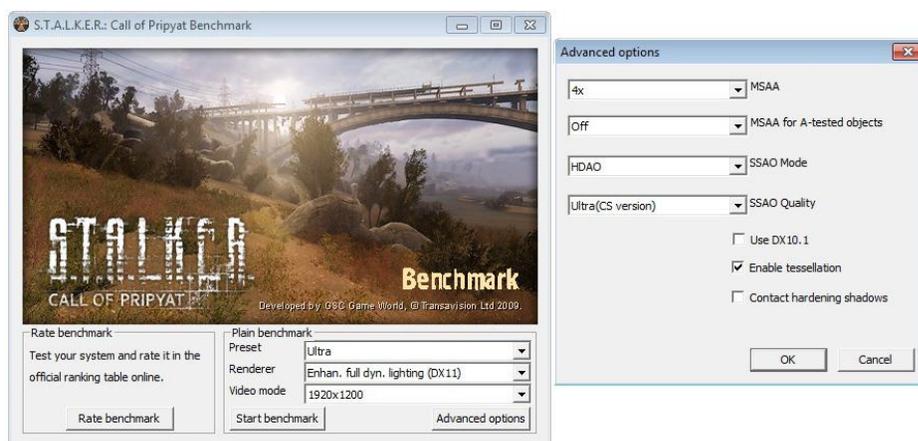
Stalker: Call of Pripyat

DirectX¹¹

Summary

Stalker: Call of Pripyat has a wealth of enhanced image quality settings and includes support for DX11 features and functionality. Using the game's native benchmark tool, the GeForce GTX 480M is up to **48% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the game's built-in benchmark utility. After you have configured the game to the settings you'd like to test (using the "Advanced Options" section shown above), simply click "Start Benchmark" to launch the game's benchmark utility. Once the benchmark is finished, you'll be presented with minimum, maximum, and average framerate information.

Sample Results

	Preset	MSAA	SSAO Mode	SSAO Quality	GTX 480M	HD 5870M	
1920x1080	Ultra	0x	Off	Low	26.9	20.5	31%
DX11	Ultra	0x	HDAO	Ultra	23.7	18.1	31%
SunShaft	Ultra	2x	Off	Low	23.8	17.0	40%
	Ultra	2x	HDAO	Ultra	19.6	14.7	33%
	Ultra	4x	Off	Low	21.2	14.3	48%
	Ultra	4x	HDAO	Ultra	18.4	12.6	46%

Just Cause 2

DirectX¹⁰

Summary

Just Cause 2's developer Avalanche coordinated efforts with NVIDIA to make the title one of the most advanced PC games ever created. Enhanced image quality features like a Bokeh Filter and unique GPU Water Simulation effects offer a new dimension of realism and are only available on NVIDIA GeForce GPUs. Using the game's native benchmark tool, the GeForce GTX 480M is up to **17% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the game's built-in benchmark utility. After you have configured the game to the settings you'd like to test (using the settings menu shown above), simply click "Benchmark" to launch the game's benchmark utility. You'll have three maps to choose from which represent different levels within the game. Once the benchmark is finished, you'll be presented with minimum, maximum, and average framerate information.



Sample Results

						GTX 480M	HD 5870M	
	Details	FSAA	AF	Bokeh Filter*	GPU Water*			
1920x1080	Very High	1x	2x	Off	Off	25.2	23.5	7%
DX10	Very High	2x	8x	Off	Off	23.0	20.7	11%
	Very High	4x	8x	Off	Off	22.2	19.0	17%
	Very High	1x	2x	On	On	15.9	N/A*	

*These high quality features are exclusive to GeForce GPUs

Batman: Arkham Asylum

DirectX¹⁰

Summary

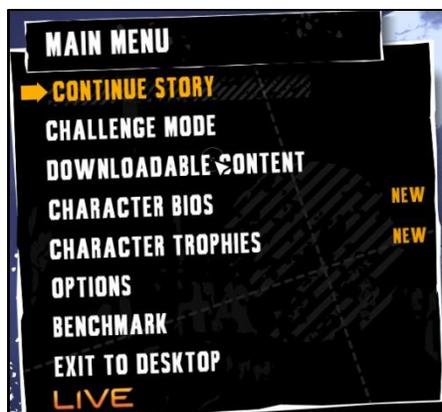
Batman: Arkham Asylum is the 2009 Game of the Year and uses advanced PhysX effects to create a lifelike gaming environment. Using the game's native benchmark tool, the GeForce GTX 480M is up to **60% faster** than the Mobility Radeon 5870 with standard settings and up to **345% faster** using GPU-based PhysX (versus CPU-based PhysX on the competitive solution)!

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the game's built-in benchmark utility. Once you have viewed the initial cinematic clips and reached the first level of gameplay, the main menu will show "benchmark" in the listing directly under "options". After you have configured the game to the settings you'd like to test (using the settings menu shown above), simply click "Benchmark" to launch the game's benchmark utility. Once the benchmark is finished, you'll be presented with minimum, maximum, and average framerate information.



Note: If you are playing through any of the boss levels of Batman Arkham Asylum with PhysX enabled, a DLL update is required. Copy the "RRB.dll" file from the press FTP to your Batman executable directory. This ensures the correct rendering of rigid bodies in the game. This update is not necessary for other levels, such as the built-in benchmark.

Sample Results

					GTX 480M	HD 5870M	
	Detail	Ambient Occlusion	PhysX	FSAA			
1920x1080	Very High	Yes	Off	1x	88	78	13%
DX10	Very High	No	Off	1x	103	100	3%
	Very High	Yes	Off	2x	77	48	60%
	Very High	No	Off	2x	91	61	49%
	Very High	Yes	Off	4x	68	47	45%
	Very High	No	Off	4x	81	59	37%
	Very High	Yes	Normal	1x	44	11	300%
	Very High	No	Normal	1x	49	11	345%
	Very High	Yes	Normal	2x	41	N/A*	
	Very High	No	Normal	2x	45	N/A*	
	Very High	Yes	Normal	4x	39	N/A*	
	Very High	No	Normal	4x	42	N/A*	

* FSAA broken in Catalyst 10.4 with this title

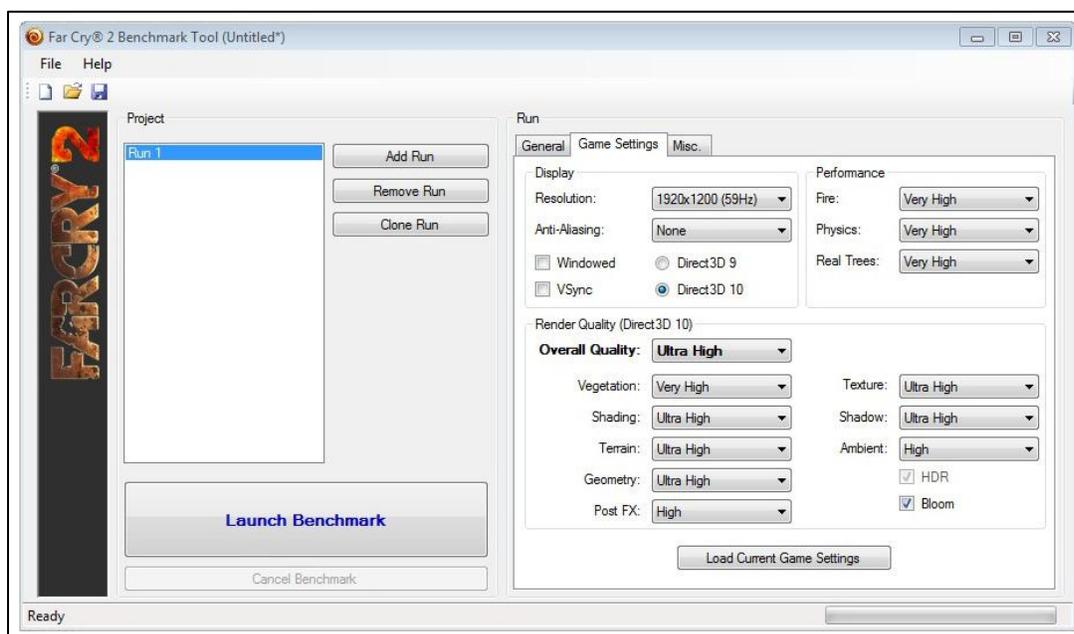
Far Cry 2

DirectX[®]10

Summary

FarCry2 is one of the most widely used benchmarks due to the exceptional range of settings and intensity. Using the game's built-in benchmark tool and raising settings as high as possible, the GeForce GTX 480M is up to **51% faster** than the Mobility Radeon 5870.

Settings



Recommended Procedure

In order to obtain the most realistic performance benchmarks, we recommend using the game's built-in benchmark utility. Browse the "Far Cry 2" installed directory and open the "bin" folder. Right-click on "FC2BenchmarkTool.exe" and select "Send to desktop" to create a shortcut to this utility on the desktop. When ready to benchmark, launch this application and you'll be presented with the screen shown above. After you have configured the game to the settings you'd like to test, simply click "Launch Benchmark" to launch the game's benchmark utility. Once the benchmark is finished, you'll be presented with minimum, maximum, and average framerate information.

Sample Results

			GTX 480M	HD 5870M	
1920x1080	Preset	FSAA			
			Ultra High	1x	61.1
DX10	Ultra High	2x	54.2	41.8	30%
	Ultra High	4x	48.9	36.1	35%
	Ultra High	8x	41.2	27.3	51%

3D Vision

The Ultimate Immersion



For the most immersive gaming experience possible, you can connect the Dual-Link DVI port on your GeForce GTX 480M based notebook to a 120Hz 3D display. With NVIDIA's 3D Vision technology, you'll be able to game using the industry's only full 1080p HD 3D solution. Currently, you can play over 425 PC games in immersive 3D.

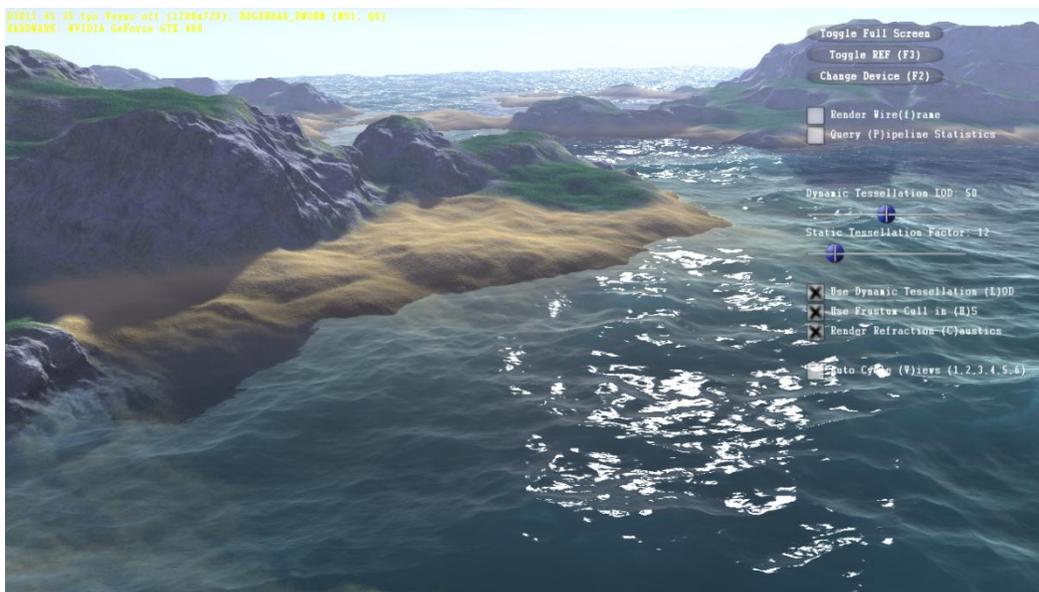
- Supports many of today's most popular games, including World of Warcraft, Need for Speed Shift, James Cameron's Avatar the Game, and Battlefield Bad Company 2
- Works with standard PC games available at retail stores and online via Steam
- Game in 1080p with HD panels available now from Alienware, Acer, ASUS, and LG

Demos

NVIDIA Island Demo

The NVIDIA island demo uses tessellation and displacement mapping to create a highly realistic ocean environment. The demo showcases dynamic ocean currents, caustic reflections, translucent wave fronts, high dynamic range reflections.

The Island Demo can be downloaded from the NVIDIA Press FTP.



Test Procedure:

1. Launch application
2. Note the two sliders: Dynamic Tessellation and Static Tessellation. The former will only be enabled when "Use Dynamic Tessellation LOD" box is checked. If it is not checked, the static tessellation factor will be used.
3. Set the desired tessellation level.
4. Click on "Auto Cycle Views"
5. Repeat the above procedure using different tessellation factors as desired.

NVIDIA Supersonic Sled Demo

Taking advantage of PhysX, CUDA, and DirectX 11, Supersonic Sled straps you on a high powered test rocket and hurtles you down a six mile long track in the Nevada desert at speeds in excess of 800 miles an hour. You'll have to avoid falling rocks, destroy buildings and bridges, and avoid flying off the side of a massive cliff.

The Supersonic Sled Demo can be downloaded from NVIDIA.com.



Test Procedure:

1. Launch application
2. Select your preferred camera view
3. Start the sled by pressing the up arrow
4. Ignite one of four boosters by pressing 1-4
5. Brake by pressing down arrow (pressing 5 will ignite a reverse booster to decelerate aggressively)
6. Avoid overloading the sled by keeping boost from staying in the "Critical" range for too long.
7. Get the sled to the finish line as quickly as possible without going over the edge of the cliff.
8. Post your results and compare to other Top Scores on the result database.
<http://www.nvidiademo.com/sss/>

NVIDIA Raging Rapids Demo

The Raging Rapids demo was developed by the PhysX team at NVIDIA to showcase next-generation water simulations in a dynamic and natural environment. Far from the “water in a tank” style tech simulations, this demo shows a racing boat going down a river with realistic swirls, waterfalls, sprays, and rigid-body interactions.



Test Procedure

1. Launch application
2. Change camera modes by pressing F1, F2, or F3 (auto camera change is F4)
3. Speed boat up/down by pressing up/down arrows
4. Turn boat left/right by pressing left/right arrows
5. Zoom in/out with right mouse button
6. Rotate camera using left mouse button

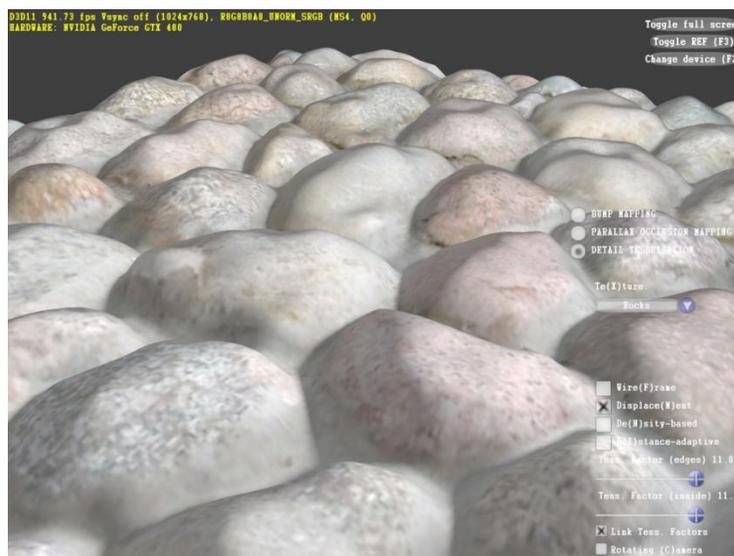
Microsoft DirectX 11 SDK

The Microsoft DirectX 11 SDK contains a number of sample applications that make use of various tessellation schemes including PN Triangle (used in *S.T.A.L.K.E.R. Call of Pripyat*) and Catmull-Clark subdivision (expected to be used in upcoming id and Valve titles).

The latest SDK is on the NVIDIA press FTP and can also be downloaded from here:

<http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=2c7da5fb-ffbb-4af6-8c66-651cbd28ca15>

Test 1: Detail Tessellation

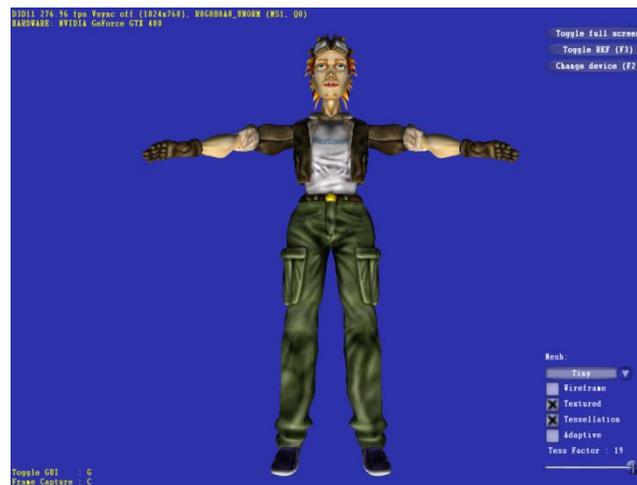


The Detail Tessellation sample shows how tessellation with displacement mapping can improve the visual fidelity of various materials such as rocks, bricks, and wood carvings.

Test Procedure

1. Start FRAPs. Set FRAPs to stop benchmarking after 20 seconds.
2. Go to Start → Programs → Microsoft DirectX SDK → DirectX Sample Browser
3. Scroll down until you reach the “DetailTessellation11” demo. Launch either the 32-bit or 64-bit executable.
4. Select rotating camera and start FRAPs.
5. After 20 seconds, record the FPS.
6. Repeat the above procedure with the tessellation factor set to maximum.

Test 2: PN Triangles



Test Procedure

1. Start FRAPS. Set FRAPS to stop benchmarking after 20 seconds.
2. Go to Start → Programs → Microsoft DirectX SDK → DirectX Sample Browser
3. Scroll down until you reach the "PNTriangles11" demo. Launch either the 32-bit or 64-bit executable.
4. Check the "Tessellation" box.
5. Record the FPS.
6. Set tessellation factor set to maximum.
7. Record the new FPS.

Test 3: Catmull-Clark Subdivision



Test Procedure

1. Start FRAPs. Set FRAPs to stop benchmarking after 20 seconds.
2. Go to Start → Programs → Microsoft DirectX SDK → DirectX Sample Browser
3. Scroll down until you reach the “SubD11” demo. Launch either the 32-bit or 64-bit executable.
4. Disable Wireframe.
5. Wait for the character to clench his fist, and then start FRAPs.
6. After 20 seconds, record the FPS.
7. Repeat the above procedure with the patch division set to maximum.

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