



**Blogger Workshop  
Benchmark Summary:  
MDP Tablet Featuring  
APQ8064 Quad-Core**



# Executive Overview

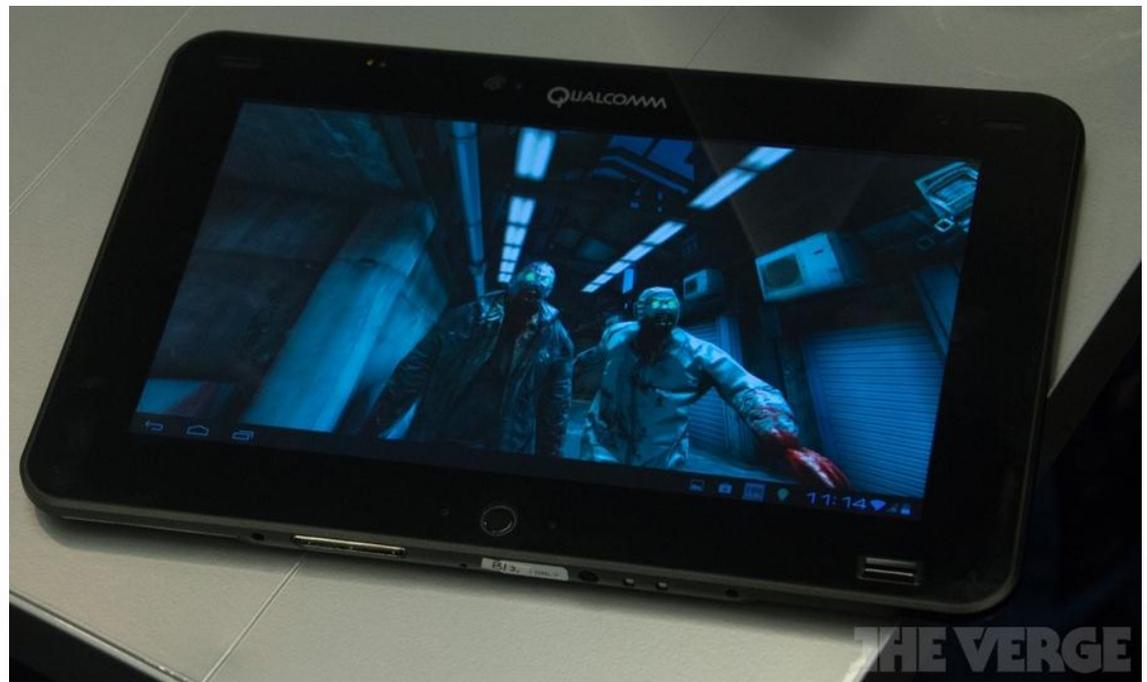
- On July 24th, 2012, 30 bloggers (15 International, 15 U.S) descended into San Francisco, CA to take part in a blogger's workshop where they spent unsupervised time benchmarking and testing our latest tablet MDP equipped with the APQ8064, otherwise known as the Snapdragon S4 Pro.
- The tone of coverage overall was extremely positive. Bloggers who attended the workshop raved about the performance of the quad-core devices and the potential benefits for developers. The graphics garnered particular acclaim, especially in comparison to competitor's quad-core devices. The articles from the workshop attendees spurred a second wave of global coverage, especially in China, that took note of their reviews as well as the availability of the MDP.
- Below is a compilation of benchmark data pulled from various third party sources, including Anandtech, TheVerge, SlashGear, and Android Community. This benchmark data reflects performance across multiple vectors in the Snapdragon S4 Pro, including CPU, GPU and browsing.
- In the same deck, commercial devices featuring our dual core Snapdragon S4 processor has been updated to reflect data from the Samsung Galaxy S3 (MSM8960).

## Snapdragon S4 Pro APQ8064 MDP

**HEADLINE: “Qualcomm Snapdragon S4 Pro quad-core developer tablet shows off stunning benchmark performance”**

“It's fast, handily eclipsing the Samsung Galaxy SIII's Exynos 4 Quad, the HTC One X's Tegra 3, and Qualcomm's own Snapdragon S4 on a spate of synthetic benchmarks.” –

*Nate Ralph, TheVerge*



	QUADRANT	VELLAMO	GLB 2.1 EGYPT (720P)	ANTUTU
<b>Snapdragon S4 Pro APQ8064</b>	7,635	2,527	131fps	13,998
<b>Acer Iconia Tab A700 (Tegra 3)</b>	3,574	1,210	60fps	10,480
<b>Asus Transformer Pad (Tegra 3)</b>	3,623	1,358	63fps	9,614
<b>Galaxy S III (Exynos 4 Quad)</b>	5,283	2,008	101fps	10,568
<b>HTC One X (Tegra 3)</b>	4,430	1,614	65fps	11,322
<b>HTC One S (Snapdragon S4)</b>	5,141	2,420	57fps	7,107

**THE VERGE**

Source: TheVerge by Nate Ralph 7/24/2012

<http://www.theverge.com/2012/7/24/3185016/qualcomm-snapdragon-s4-pro-APQ8064>

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# Snapdragon S4 Pro APQ8064 MDP

## Comprehensive System Performance Leadership

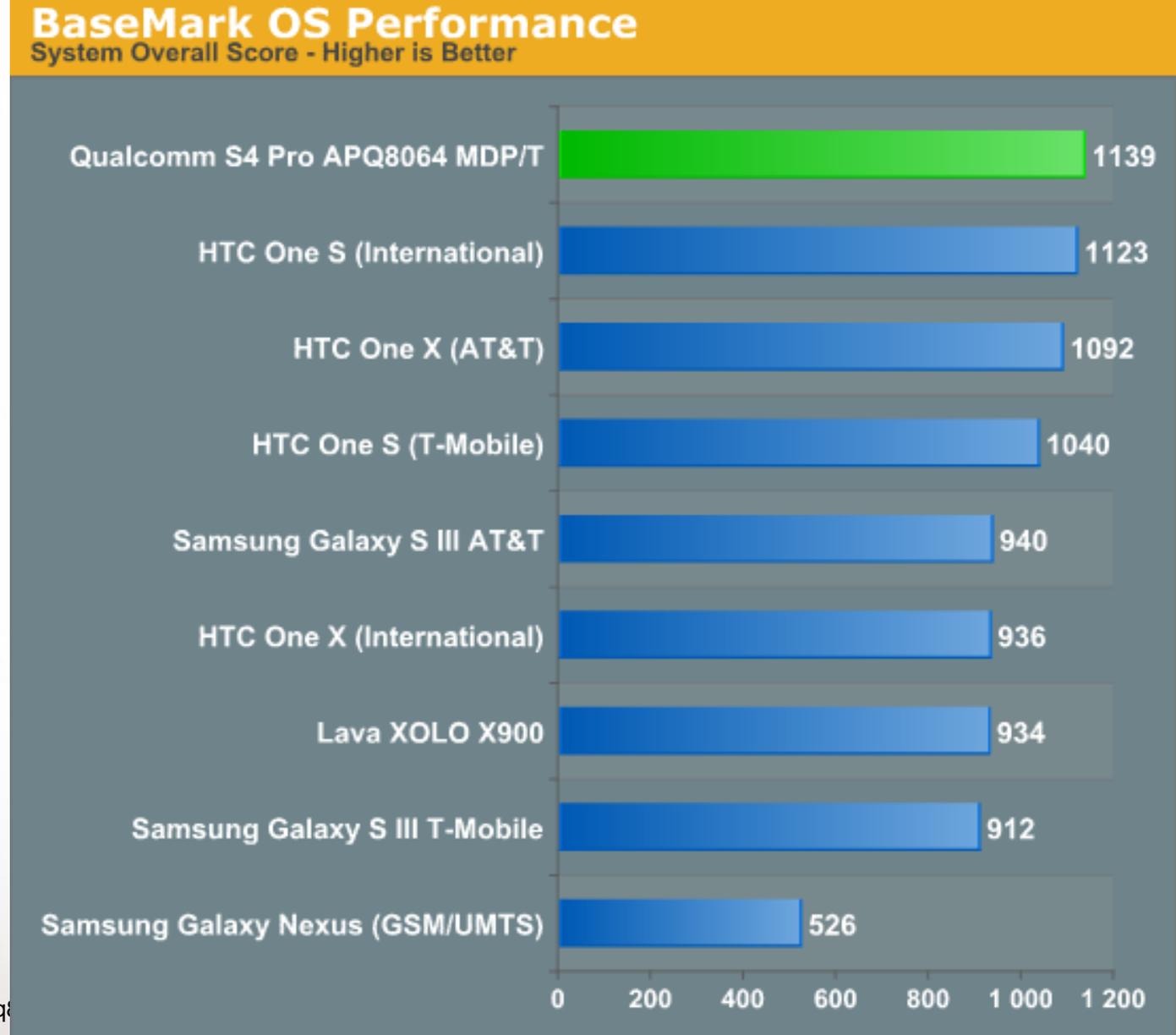
“Overall the quad-core S4 Pro should deliver everything we love about the dual-core S4's performance, just with more cores.”

-- Brian Klug, Anandtech



Source: Anandtech by Brian Klug 7/24/2012  
<http://www.anandtech.com/show/6112/qualcomms-quadcore-snapdragon-s4-apq8064>

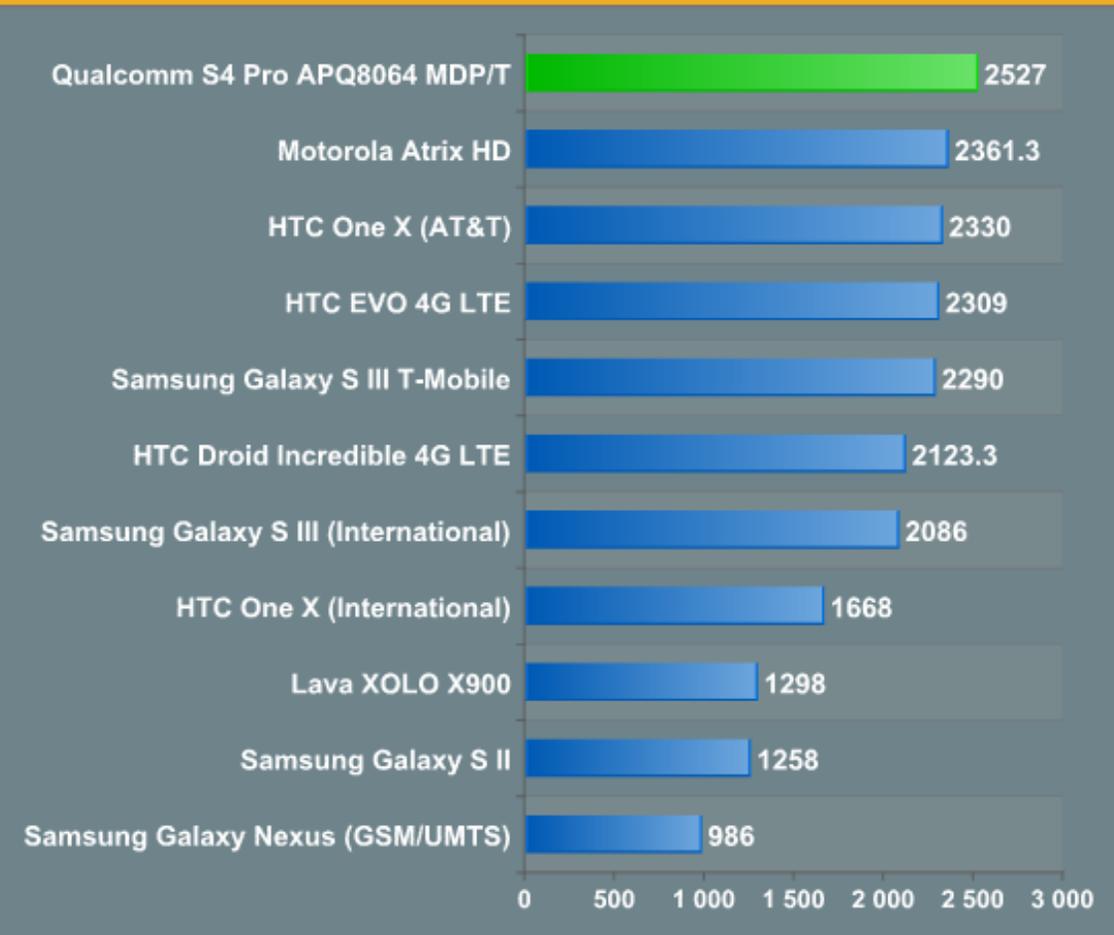
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# Snapdragon S4 Pro APQ8064 MDP

## Vellamo Overall Score

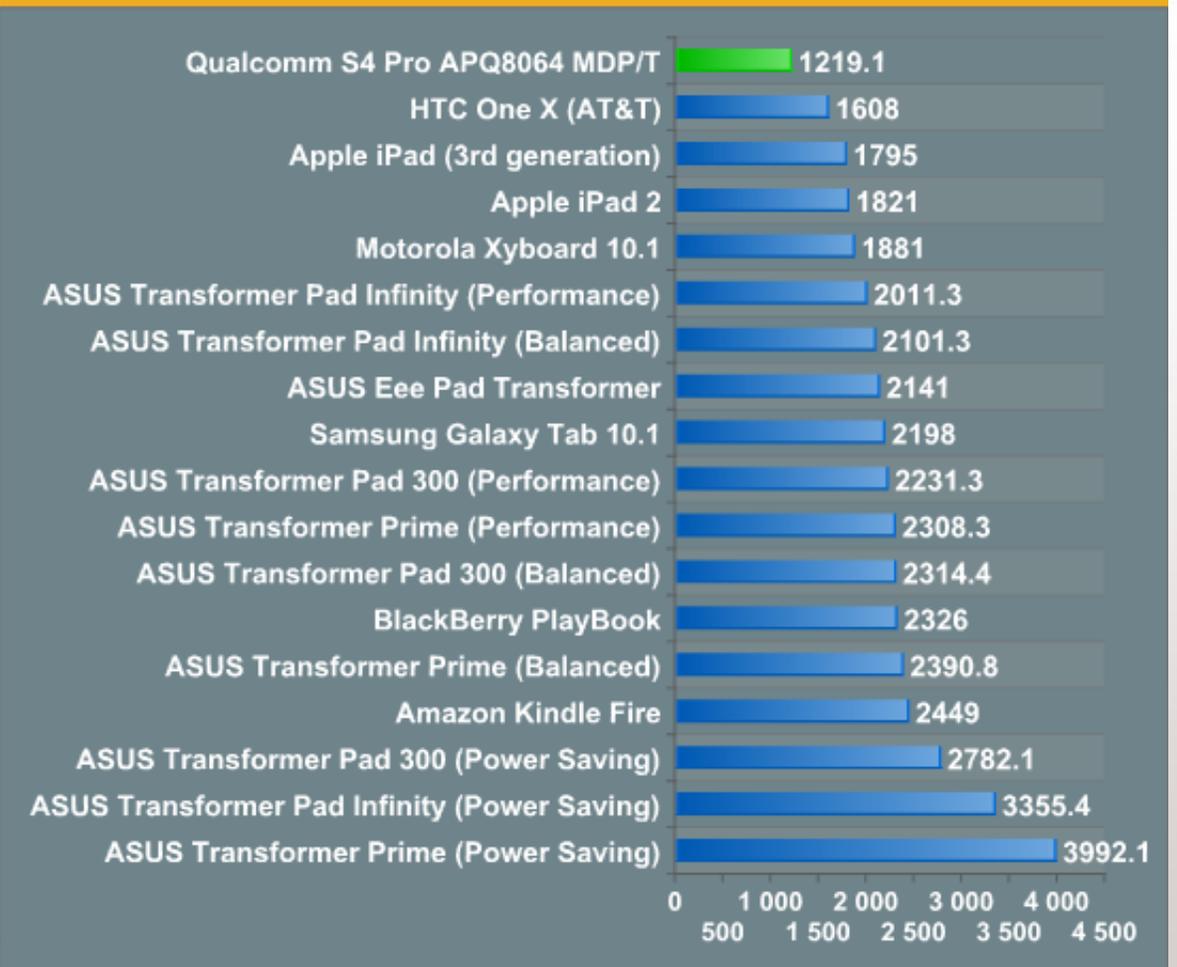
Higher is Better



## Browser Performance Leadership

## SunSpider JavaScript Benchmark 0.9.1

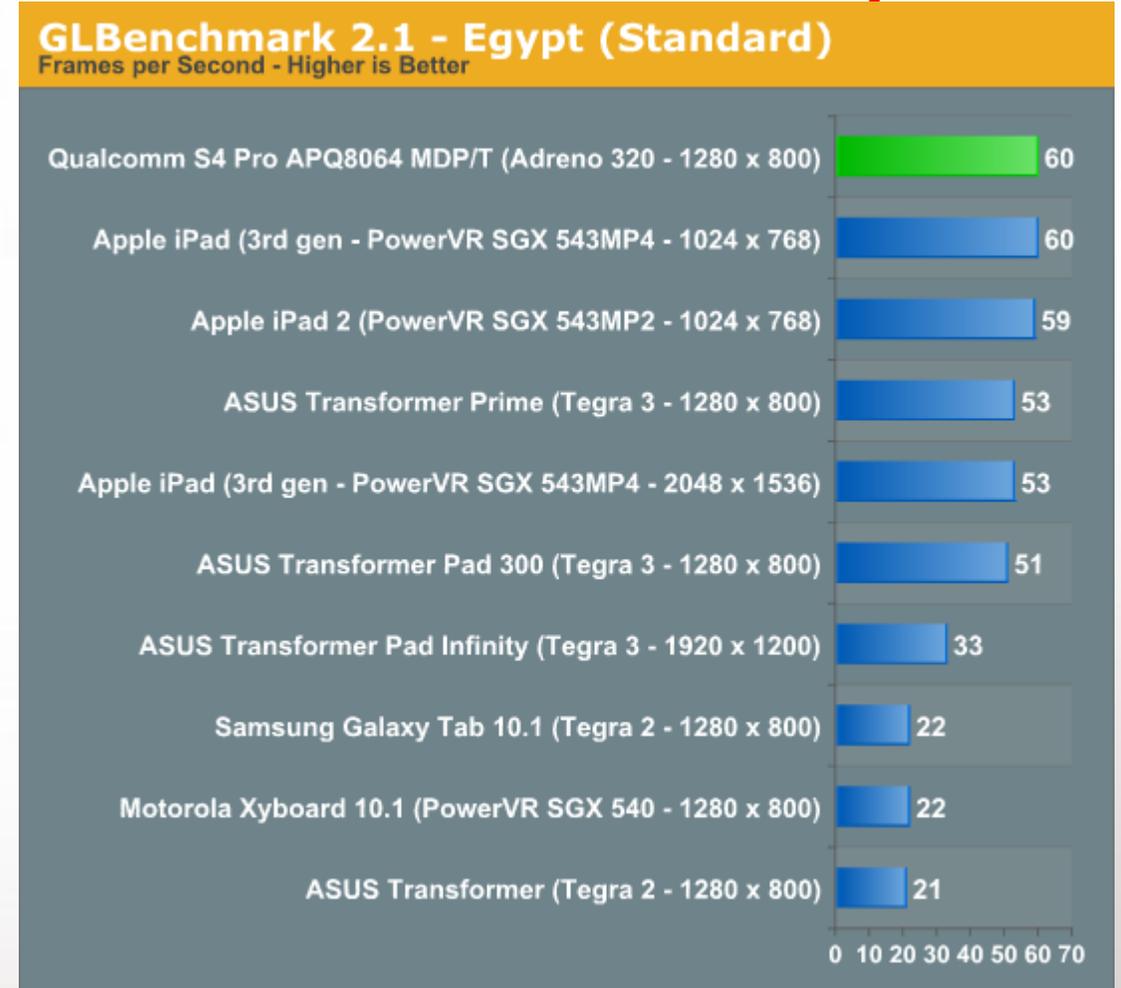
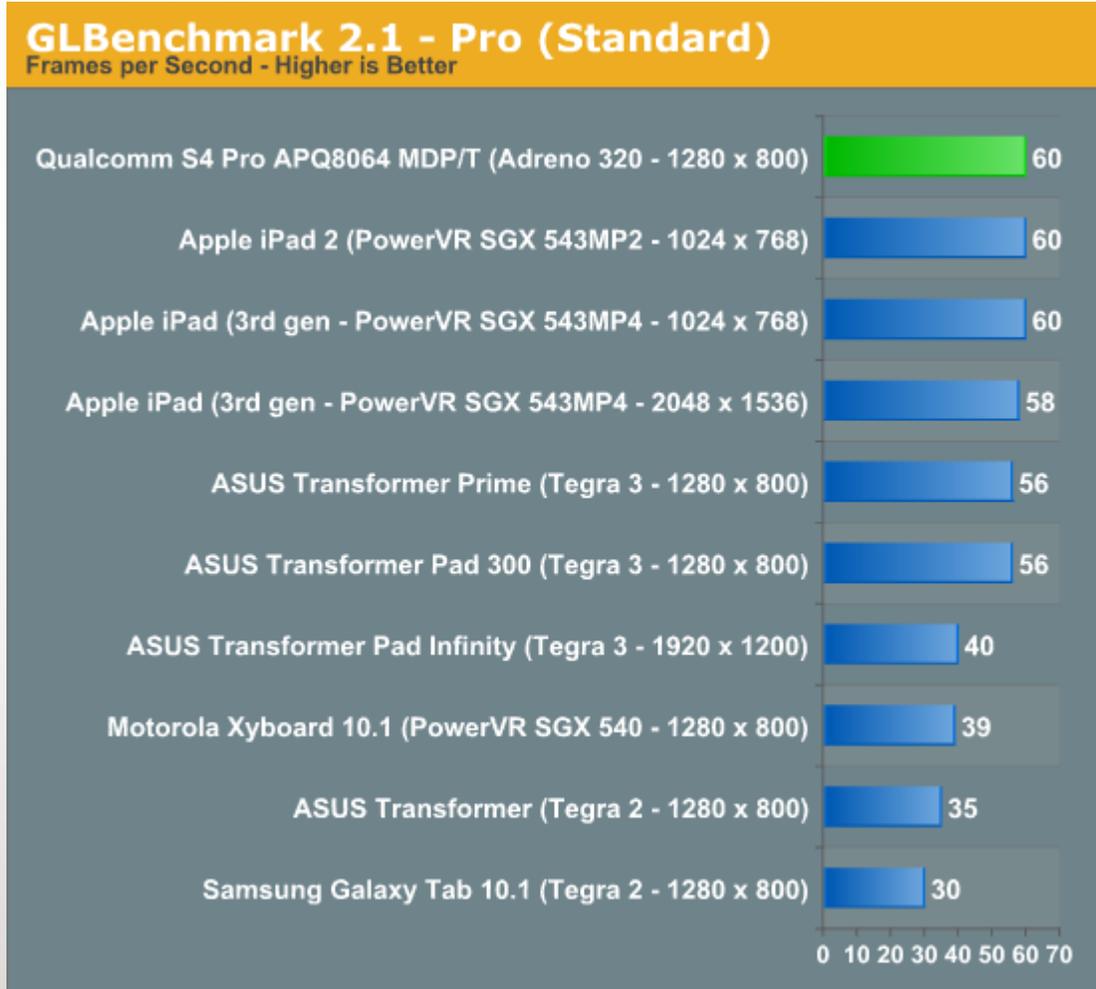
Overall Performance in ms (Lower is Better)



Source: Anandtech by Brian Klug 7/24/2012  
<http://www.anandtech.com/show/6112/qualcomms-quadcore-snapdragon-s4-apq8064adreno-320-performance>

# Snapdragon S4 Pro APQ8064 MDP

## Gaming and GPU Performance Leadership



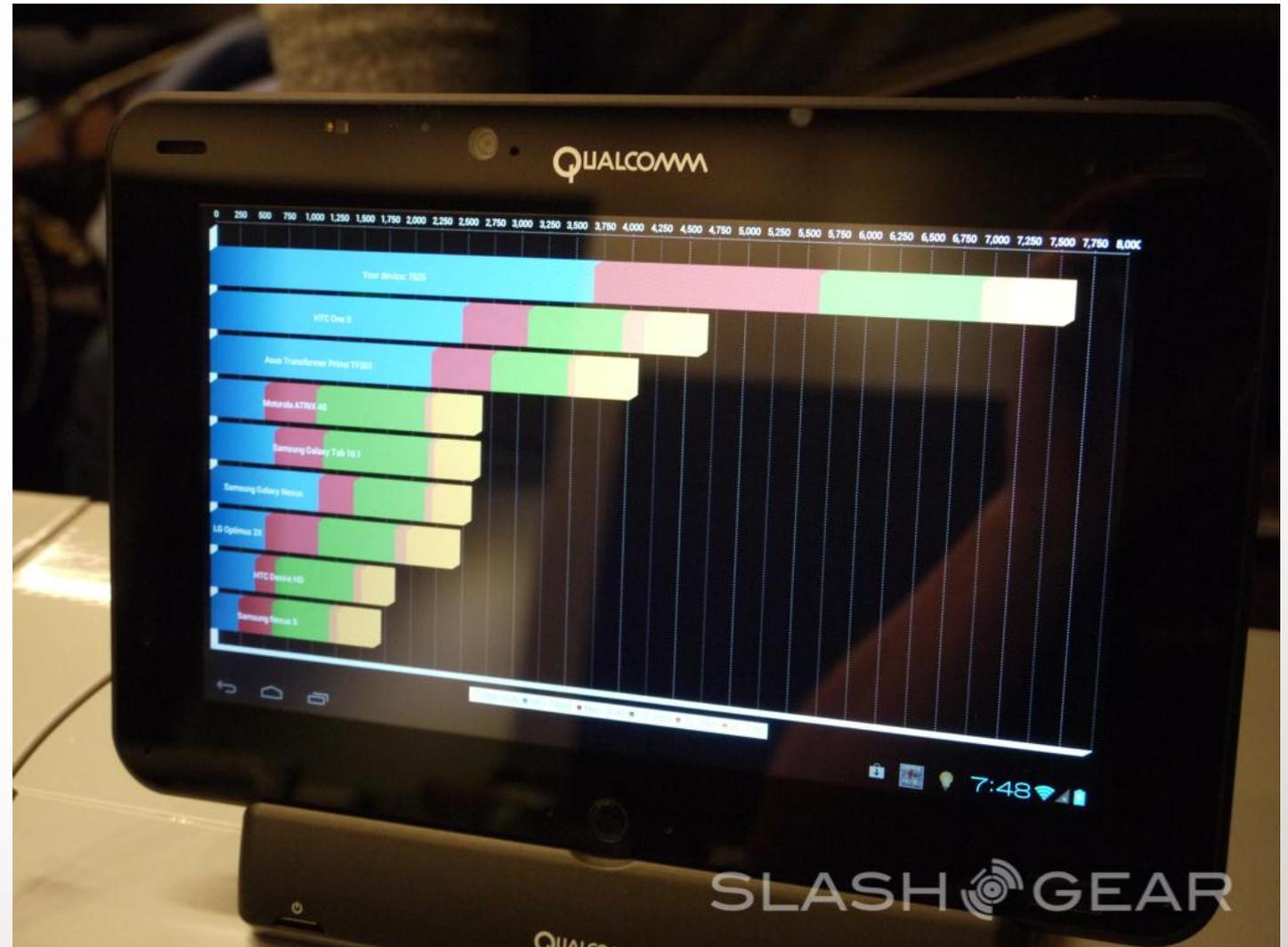
Source: Anandtech by Brian Klug 7/24/2012  
<http://www.anandtech.com/show/6112/qualcomms-quadcore-snapdragon-s4-apq8064adreno-320-performance-preview>

## Snapdragon S4 Pro APQ8064 MDP

“Quadrant blew through the roof posting numbers nearing 8000, and AnTuTu clearly was ahead of the other quad-core options available today.”

-- Cory Gunther, *SlashGear*

SLASH GEAR



Source: SlashGear by Cory Gunther 7/24/2012

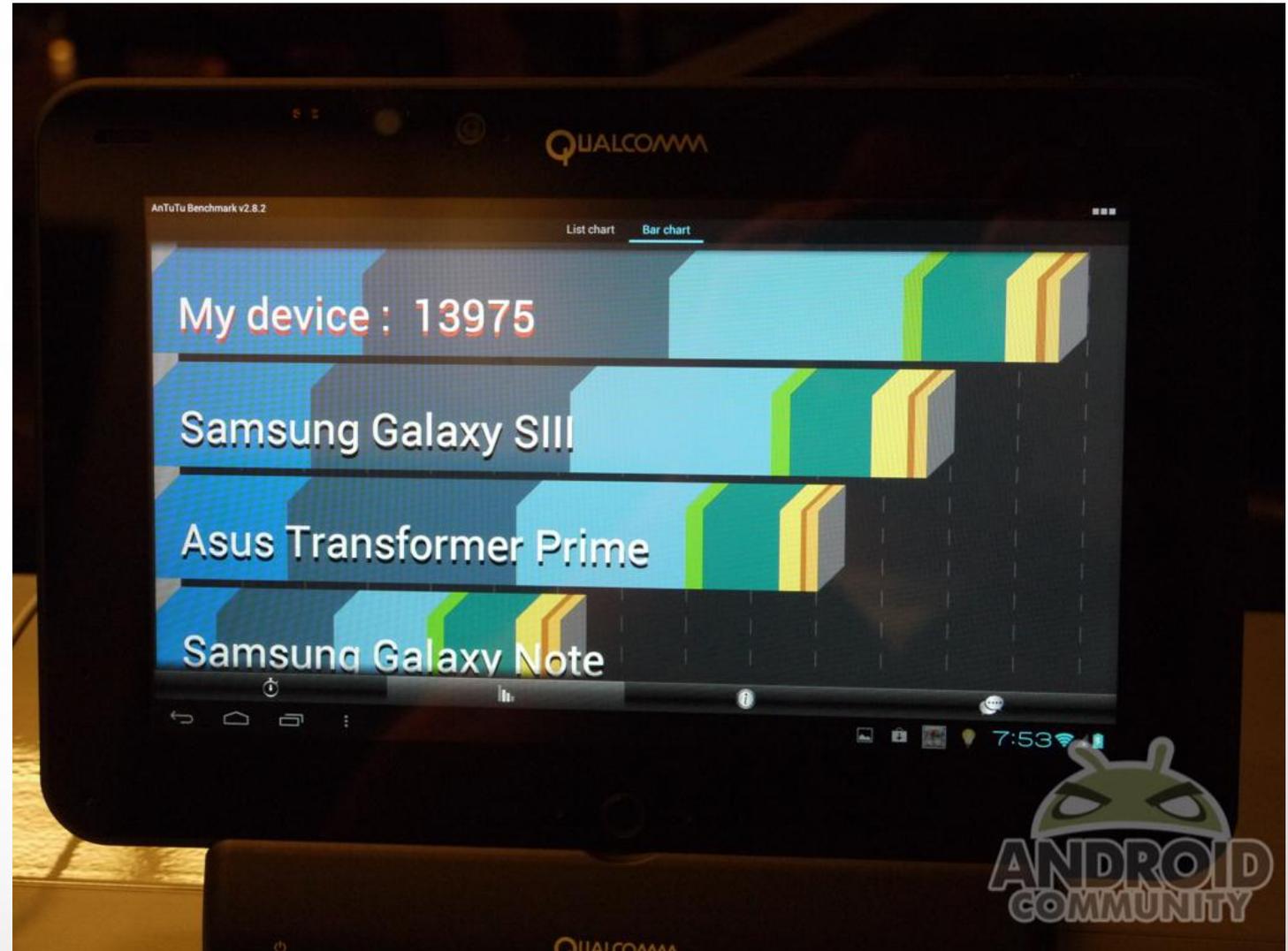
<http://www.slashgear.com/qualcomm-snapdragon-s4-pro-quad-core-tops-the-benchmark-charts-hands-on-24240021/>

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## Snapdragon S4 Pro APQ8064 MDP

“The Samsung Galaxy S III is widely considered to be one of the most powerful Android devices around, so the fact that the S4 Pro came out ahead of it in the AnTuTu test speaks volumes about what’s going on under the hood.”

-- *Eric Abent, Android Community*



Source: Android Community by Eric Abent 7/24/2012

<http://androidcommunity.com/qualcomm-s4-pro-quad-core-developer-tablet-benchmarks-and-hands-on-20120724/>

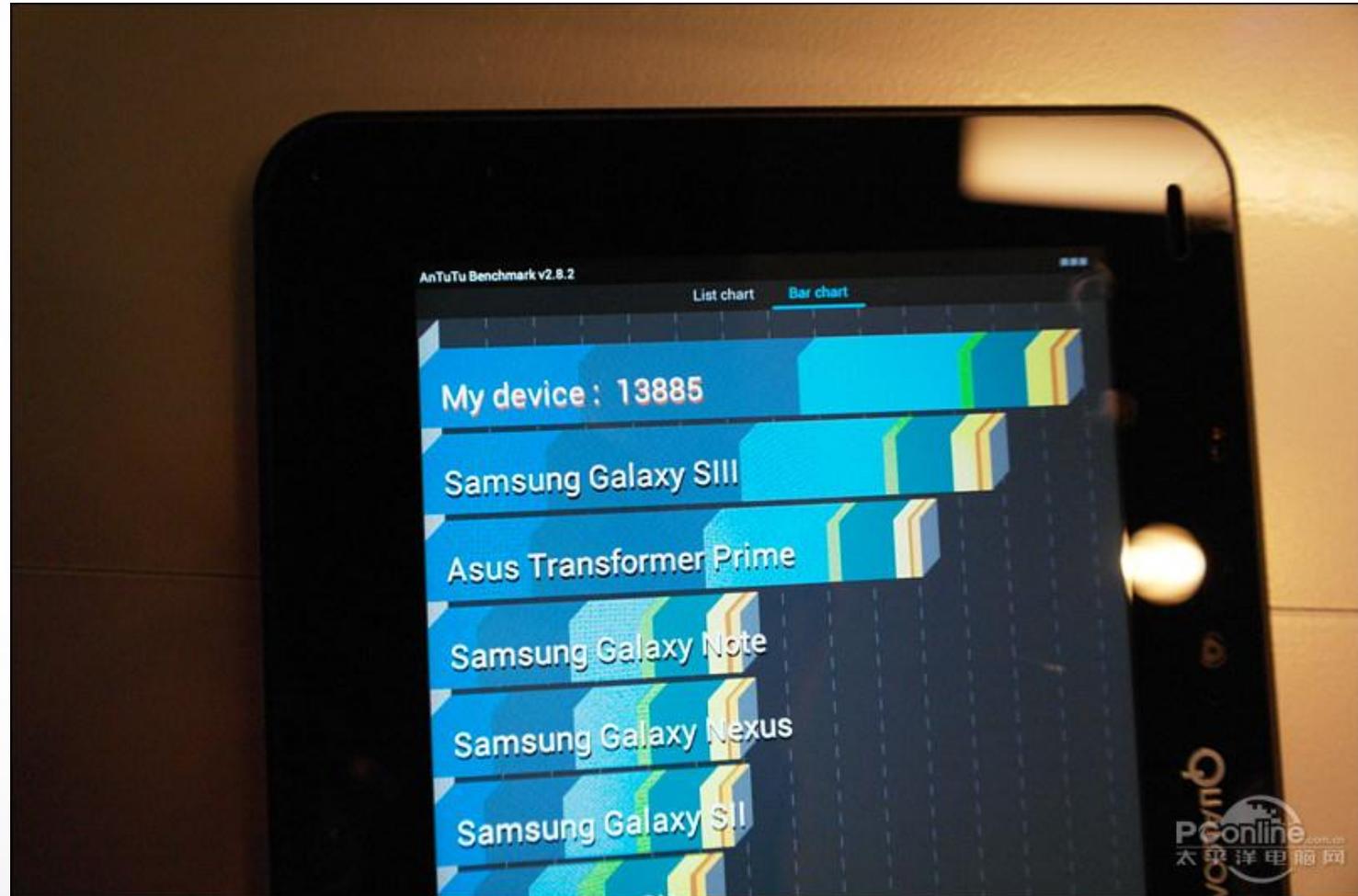
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## Snapdragon S4 Pro APQ8064 MDP

### 强大的跑分表现

通过对大家熟悉的安兔兔进行跑分，获得了约14000分的表现，实力十分强劲，领先于目前的Nvidia和Exynos四核CPU。

-- Tang Qunxing, *Pconline (China)*



## Snapdragon S4 Pro APQ8064 MDP

“Here is a quick test on Quadrant benchmark and it managed to score an awesome score of 7641 points, the best we have seen for device till now.”

-- Varun Krish, *fonearena (India)*



Source: fonearena by Varun Krish 7/27/2012

<http://www.fonearena.com/blog/52689/qualcomm-snapdragon-s4-pro-preview.html>

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# Links to Coverage

- Anandtech: Qualcomm's Quad-Core Snapdragon S4 (APQ8064/Adreno 320) Performance Preview  
<http://www.anandtech.com/show/6112/qualcomms-quadcore-snapdragon-s4-apq8064adreno-320-performance-preview>
- SlashGear: Qualcomm Snapdragon S4 Pro quad-core tops the benchmark charts [Hands-on]  
<http://www.slashgear.com/qualcomm-snapdragon-s4-pro-quad-core-tops-the-benchmark-charts-hands-on-24240021/>
- Engadget: Qualcomm Snapdragon S4 Pro (APQ8064) MDP benchmarks blow away the competition  
<http://www.engadget.com/2012/07/24/qualcomm-snapdragon-s4-pro-apq8064-benchmark/>
- Android Community: Qualcomm S4 Pro quad-core developer tablet benchmarks and hands-on  
<http://androidcommunity.com/qualcomm-s4-pro-quad-core-developer-tablet-benchmarks-and-hands-on-20120724/>
- IntoMobile: Qualcomm's Snapdragon S4 Pro is Fast  
<http://www.intomobile.com/2012/07/24/qualcomms-snapdragon-s4-pro-fast-mdp-available-1299/>
- PCMag.com: Qualcomm's Quad-Core Screamer: Hands On, Benchmarked  
<http://www.pcmag.com/article2/0,2817,2407597,00.asp>
- Know Your Mobile: Qualcomm S4 Snapdragon Pro destroys everything  
[http://www.knowyourmobile.com/blog/1502458/qualcomm\\_s4\\_snapdragon\\_pro\\_destroys\\_everything.html](http://www.knowyourmobile.com/blog/1502458/qualcomm_s4_snapdragon_pro_destroys_everything.html)
- Gadgetsteria: [Qualcomm's Quad-Core S4 Pro Developer Tablet Posts Class Leading Benchmarks](http://gadgetsteria.com/2012/07/24/qualcomms-quad-core-s4-pro-developer-tablet-posts-class-leading-benchmarks-conquers-all/)  
<http://gadgetsteria.com/2012/07/24/qualcomms-quad-core-s4-pro-developer-tablet-posts-class-leading-benchmarks-conquers-all/>
- Hot Hardware: [Qualcomm's 10.1" Quad-Core Development Tablet Hits For \\$1299](http://hothardware.com/News/Qualcomms-101-QuadCore-Development-Tablet-Hits-For-1299/)  
<http://hothardware.com/News/Qualcomms-101-QuadCore-Development-Tablet-Hits-For-1299/>
- PCWorld (blog): Qualcomm's Quad Snapdragon S4 Pro Tablet Now Available to Developers  
[http://www.pcworld.com/article/259792/qualcomms\\_quad\\_snapdragon\\_s4\\_pro\\_tablet\\_now\\_available\\_to\\_developers.html](http://www.pcworld.com/article/259792/qualcomms_quad_snapdragon_s4_pro_tablet_now_available_to_developers.html)
- Exremetech: Qualcomm's quad-core Snapdragon S4 eats Tegra and Exynos for breakfast  
<http://www.extremetech.com/computing/133460-qualcomms-quad-core-snapdragon-s4-eats-tegra-and-exynos-for-breakfast?print>



**Benchmarks:  
Commercial Devices  
Featuring  
Snapdragon™ S4  
Processors.**



HTC One S (MSM8260A)  
Reviewed by Engadget

*“According to these benchmarks, the dual-core One S manages to trump its quad-core contemporary.... and the phone smoked its dual-core competition” -- Mat Smith, Engadget*



Performance and battery life

	HTC One S	HTC One X	Galaxy Note
Quadrant	5,053	4,906	3,998
Linpack (single-thread)	103.88	48.54	64.3
Linpack (multi-thread)	222.22	150.54	95.66
NenaMark2 (fps)	61.0	47.6	32.8
NenaMark1 (fps)	60.8	59.5	56.6
Vellamo	2,452	1,617	901
SunSpider 9.1 (ms, lower numbers are better)	1,742.5	1,772.5	2,902

Source: Engadget by Mat Smith 4/2/2012

<http://www.engadget.com/2012/04/02/htc-one-s-review>

<sup>1</sup>Single and multithreaded tests were performed using Linpack



# CPU Performance Advantage

HTC One S smartphone performance reviews by Engadget and TheVerge

Dual Krait  
CPUs vs  
Other Dual  
& Quad  
CPUs<sup>1</sup>

**1.6x-2.1x**

Linpack Single-Threaded

**1.4x-2.3x**

Linpack Multi-Threaded

**1.5x-2.7x**

Web Browsing

<sup>1</sup>Source: Engadget and TheVerge review of the HTC One S featuring Snapdragon S4 MSM8260A with dual Krait CPUs @ 1.5GHz  
<http://www.engadget.com/2012/04/02/htc-one-s-review/>  
<http://www.theverge.com/2012/4/2/2916098/htc-one-s-review>

# GPU Performance Advantage: Adreno 225

HTC One S smartphone performance review by Engadget and TheVerge



Up to  
1.86x

Nenamark 2

Up to 2x

GL Benchmark  
Egypt 2.1 (1080p)

Source: Engadget and TheVerge review of the HTC One S featuring Snapdragon S4 MSM8260A with Adreno 225 Graphics  
<http://www.engadget.com/2012/04/02/htc-one-s-review/>  
<http://www.theverge.com/2012/4/2/2916098/htc-one-s-review>

# Superior System Performance

HTC One S smartphone performance reviews by Engadget and TheVerge



Dual Krait CPUs  
versus other Dual  
& Quad CPUs<sup>1</sup>

Up to 1.2x

Quadrant

*“Perhaps -- dare we say -- it's not all about the cores and display size.”*

*“According to these benchmarks, the dual-core One S manages to trump its quad-core contemporary.”*

HTC One S Review by Matt Smith  
Engadget, April 2, 2012

<http://www.engadget.com/2012/04/02/htc-one-s-review/>

Source: Engadget and TheVerge review of the HTC One S featuring Snapdragon S4 MSM8260A with Adreno 225 Graphics  
<http://www.engadget.com/2012/04/02/htc-one-s-review/>  
<http://www.theverge.com/2012/4/2/2916098/htc-one-s-review>

HTC One X  
AT&T(MSM8960) Reviewed  
by Engadget

*“In our benchmarks it beat the Tegra 3 variant in almost every test, with scores matching the Snapdragon S4-equipped One S in each category. All told, it's quite possibly the speediest handset we've ever played with.” – Myriam Joire, Engadget*

*“Even with LTE enabled, battery life is noticeably better on AT&T's One X than on the foreign version.....We recorded eight hours and 55 minutes in our video loop rundown test with the screen set to 50 percent brightness -- most folks will have little trouble getting a full day's use from the 1,800mAh cell.” – Myriam Joire*



	HTC One X (AT&T)	HTC One X (global)	HTC One S (global)	Samsung Galaxy Note (global)
Quadrant (v2)	<b>5183</b>	4,906	5,053	3,854
Linpack single-thread (MFLOPS)	<b>103.77</b>	48.54	103.88	64.3
Linpack multi-thread (MFLOPS)	<b>214.53</b>	150.54	222.22	95.66
NenaMark2 (fps)	<b>58.7</b>	47.6	61.0	32.8
NenaMark1 (fps)	<b>58.6</b>	59.5	60.8	56.6
Vellamo	<b>2350</b>	1,617	2,452	901
SunSpider 9.1 (ms, lower numbers are better)	<b>1709</b>	1,772.5	1,742.5	2,902

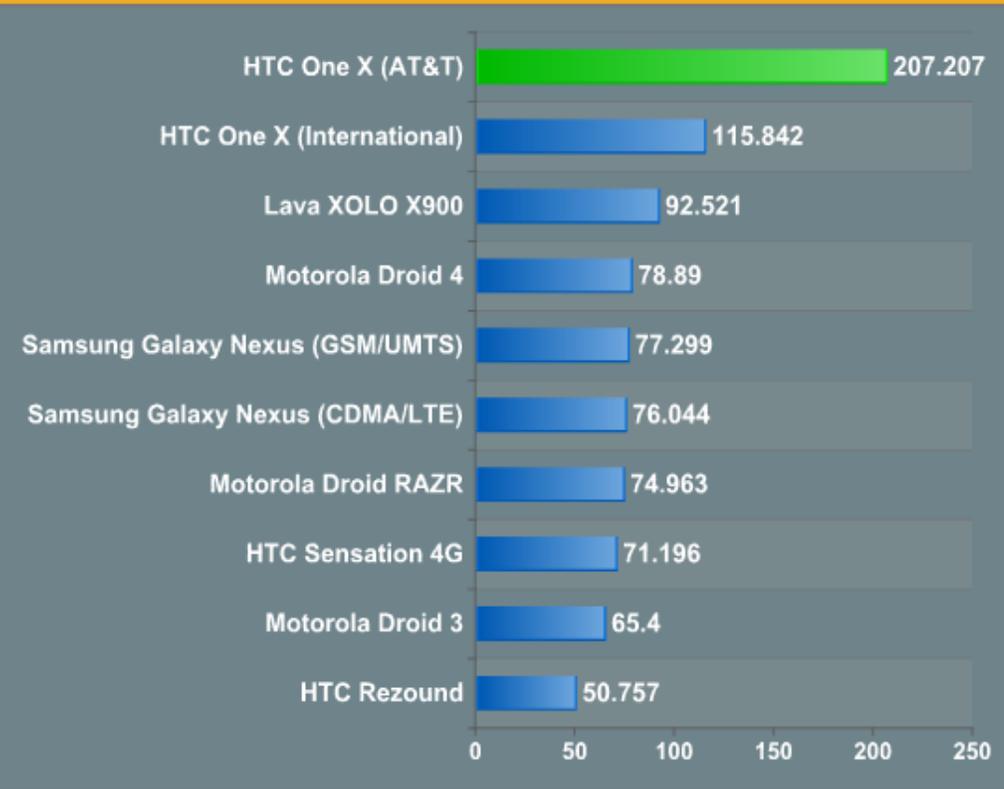
Source: Engadget by Mayriam Joire 5/1/2012

<http://www.engadget.com/2012/05/01/htc-one-x-for-att-review/>

# HTC One X (AT&T) Featuring Snapdragon S4 MSM8960

## Linpack - Multi-threaded

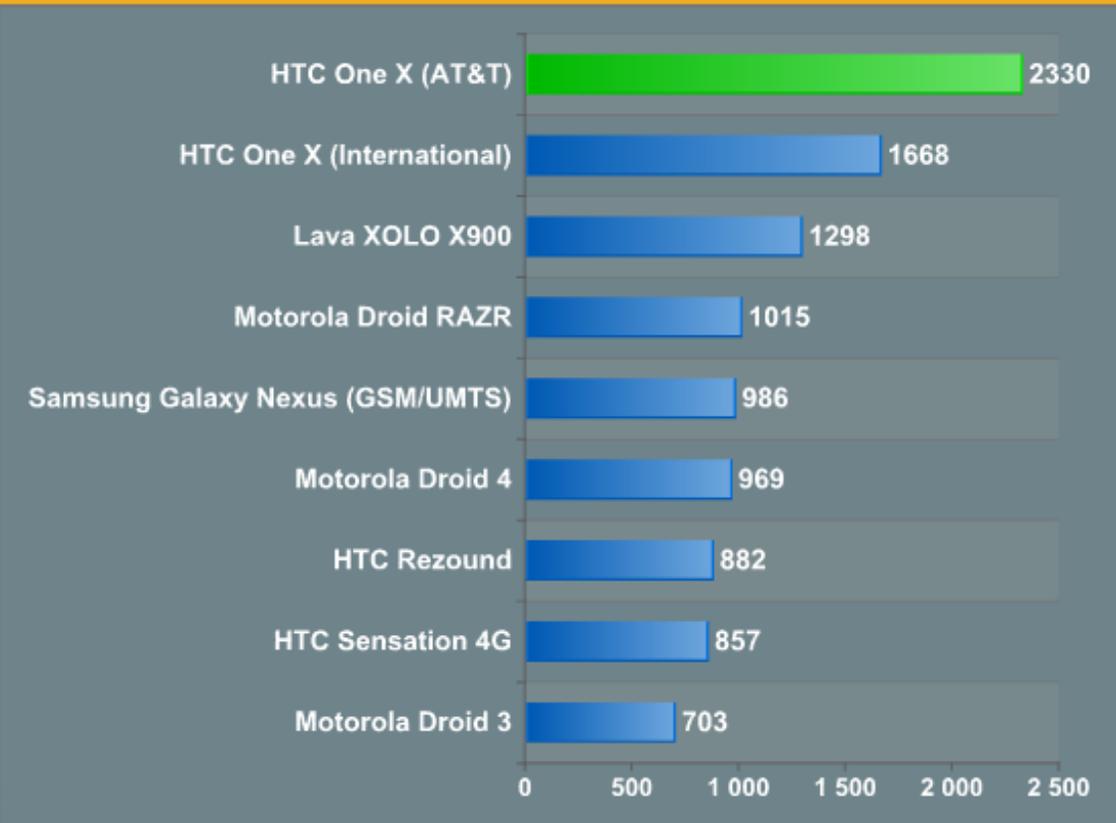
MFLOPS - Higher is Better



## CPU and Browser Performance Leadership

## Vellamo Overall Score

Higher is Better



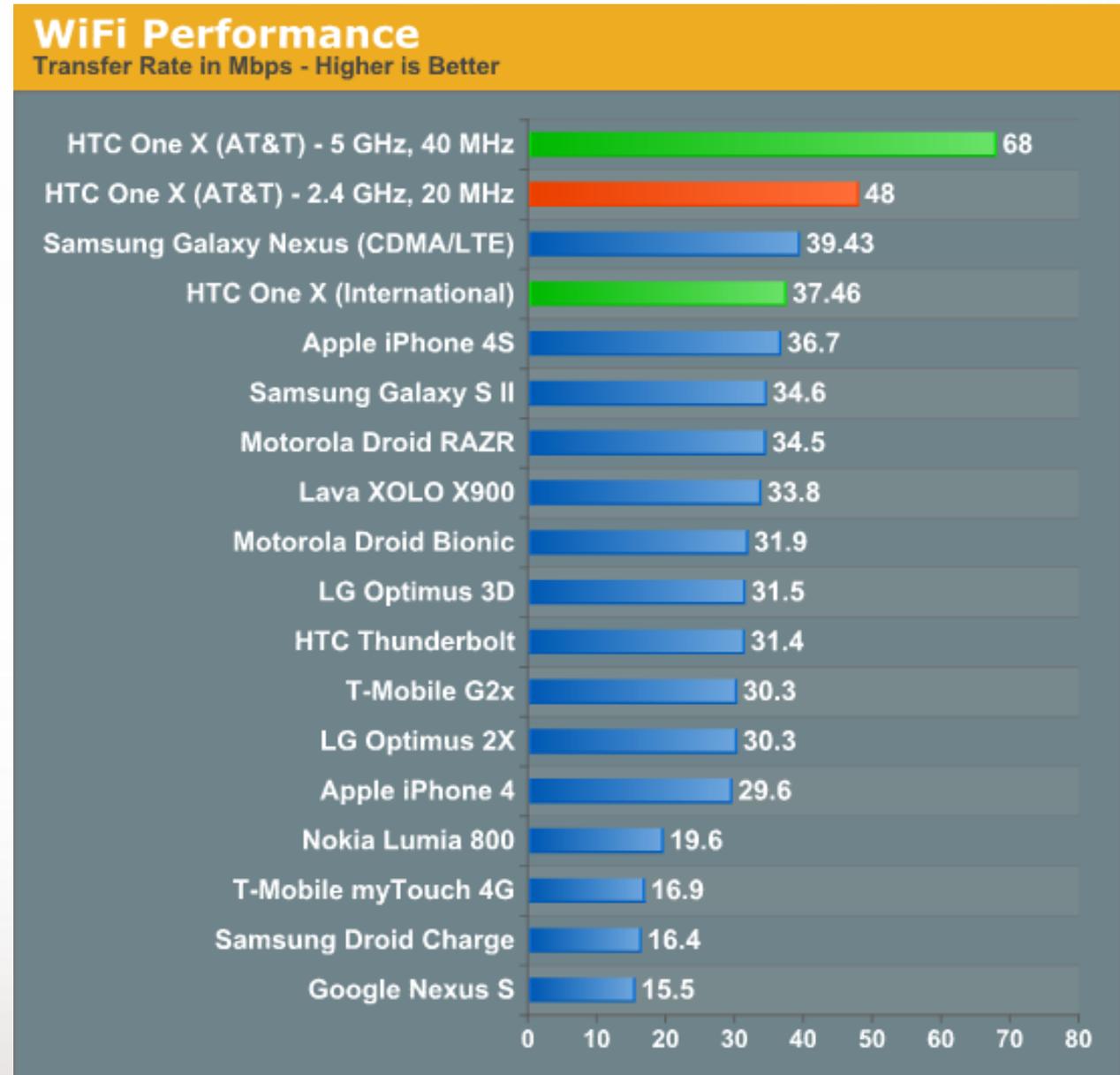
Source: Anandtech by Brian Klug 5/1/2012  
<http://www.anandtech.com/show/5779/htc-one-x-for-att-review/4>

# HTC One X (AT&T) Featuring Snapdragon S4 MSM8960

## WiFi Performance Leadership



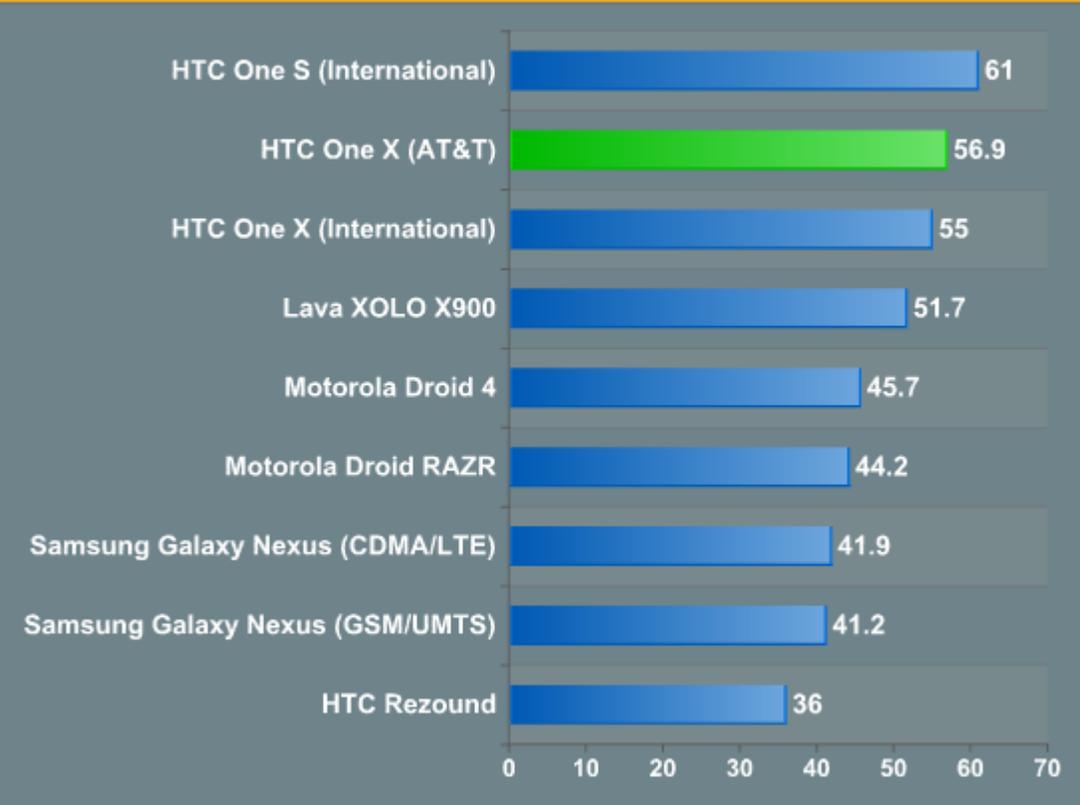
Source: Anandtech by Brian Klug 5/1/2012  
<http://www.anandtech.com/show/5779/htc-one-x-for-att-review/4>



# HTC One X (AT&T) Featuring Snapdragon S4 MSM8960

## GLBenchmark 2.1 - Pro

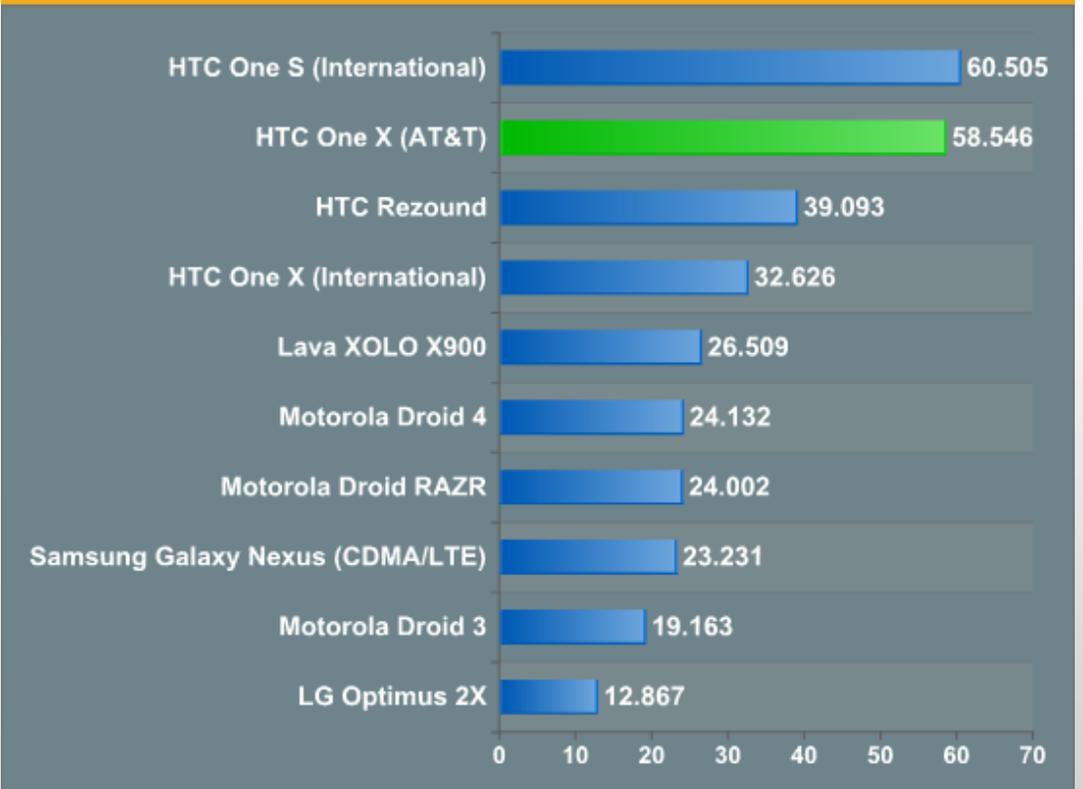
Frames per Second - Higher is Better



## GPU Performance Leadership

## RightWare Basemark ES 2.0 V1 - Hoverjet

WVGA, AA Off - Frames per Second - Higher is Better

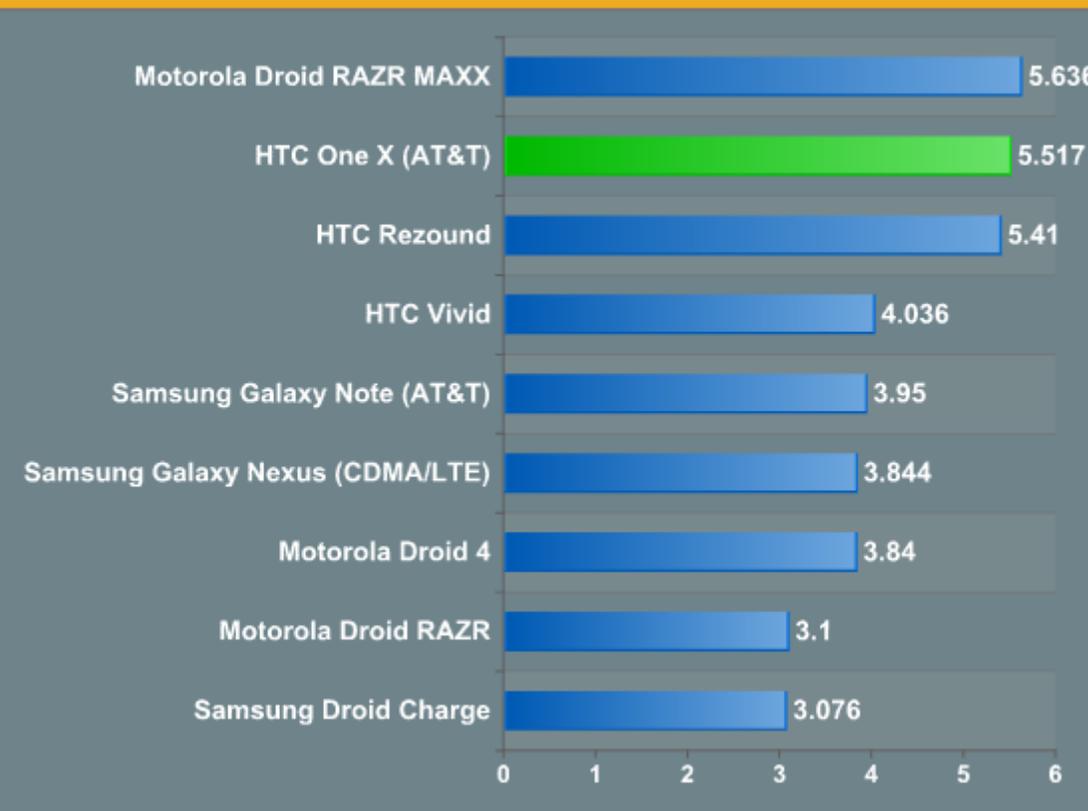


Source: Anandtech by Brian Klug 5/1/2012  
<http://www.anandtech.com/show/5779/htc-one-x-for-att-review/4>

# HTC One X (AT&T) Featuring Snapdragon S4 MSM8960

## Web Browsing (Cellular 4G WiMAX or LTE)

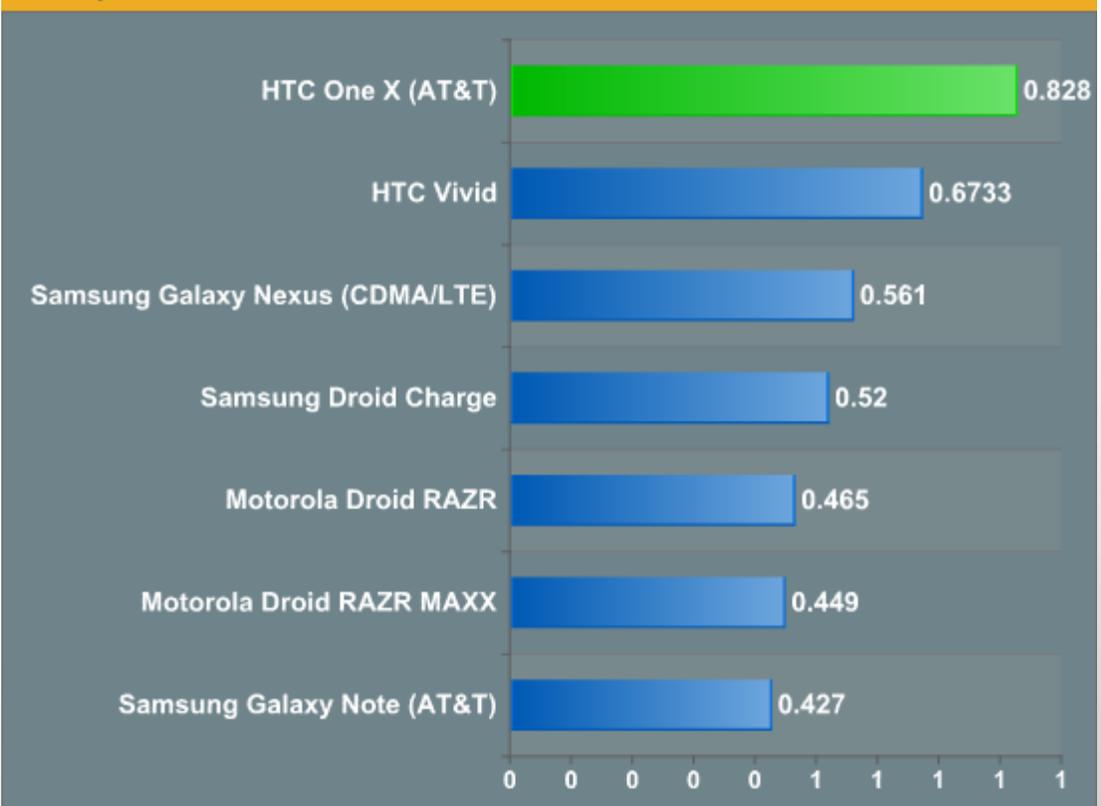
Time in Hours - Higher is Better



*“The big question is how well does the AT&T One X do when we’re using the MSM8960’s LTE baseband? Pretty darn well, when you consider that it’s bested only by the RAZR MAXX with its gargantuan battery.”* -- Brian Klug, Anandtech

## Normalized Battery Life - Web Browsing (Cellular 4G)

Hours per Watt-Hour



## Battery Life and Power Efficiency



Source: Anandtech by Brian Klug 5/1/2012  
<http://www.anandtech.com/show/5779/htc-one-x-for-att-review/4>

# HTC Evo 4G LTE

w/MSM8960 Benchmarked

Cameras / software	QUADRANT	VELLAMO	GLB 2.1 EGYPT (720P)	GLB 2.1 EGYPT (1080P)	ANTUTU
Performance					
Wrap-up					
Comments					
× CLOSE					
HTC Evo 4G LTE	5,070	2,335	56fps	29fps	6,612
HTC One X (LTE)	4,925	2,346	57fps	29fps	6,681
HTC One S	5,141	2,420	57fps	29fps	7,107
Galaxy Nexus	2,002	1,065	28fps	14fps	6,079

“The 1.5GHz Snapdragon processor inside the Evo absolutely screams. Whether I was playing games like *Temple Run* (best game ever, by the way), switching between two dozen apps, or just pinching and zooming in Chrome, the Evo handled everything I threw at it with aplomb.”

--David Pierce, *The Verge*

# Samsung Galaxy S3 (AT&T)

w/MSM8960 Benchmarked

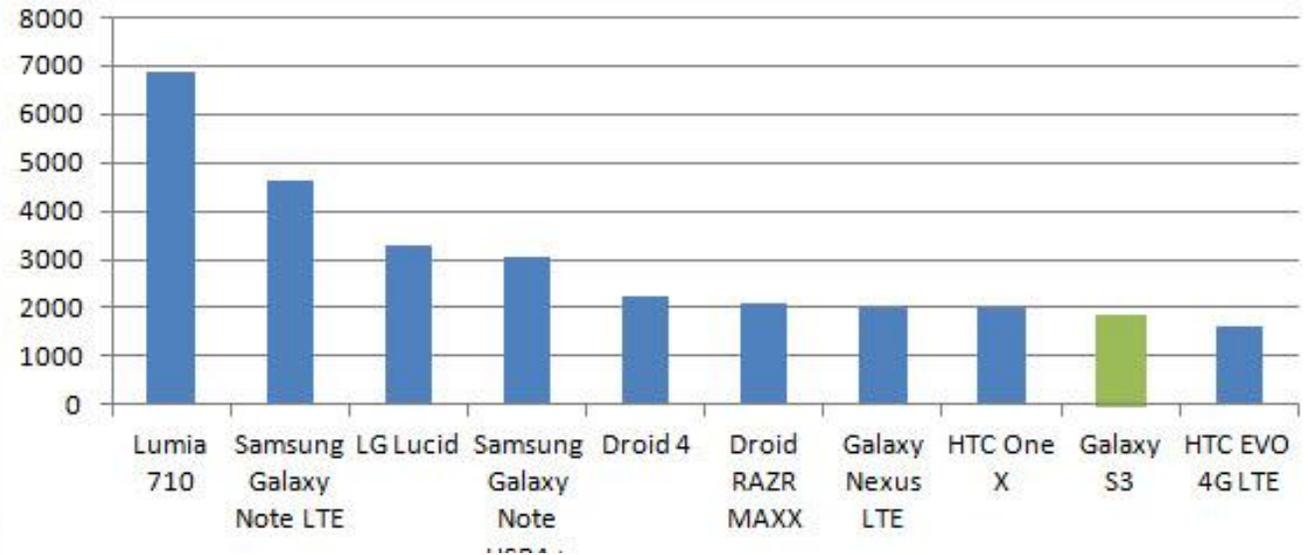
“Samsung has opted for the Qualcomm Snapdragon S4 dual-core SoC with a Adreno 225 graphics processor, which is the preferred chip of many handset makers when it comes to a 4G LTE solution.”

“...the Galaxy S3 can run games at a surprising speed. For example, we could run the Riptide GP game at a solid 60FPS in the first level. It’s actually hard to find games or benchmarks that will challenge this hardware for now.”

--Hubert Nguyen and Elaine Fiolet, UberGizmo

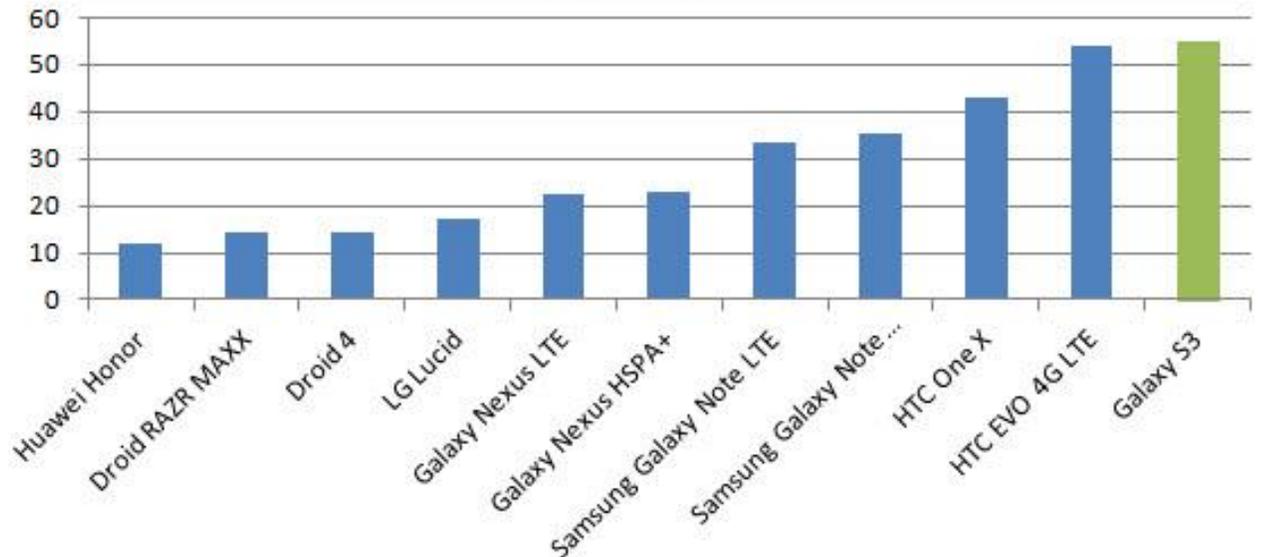
## Sunspider 0.9.1 (in ms)

lower is better



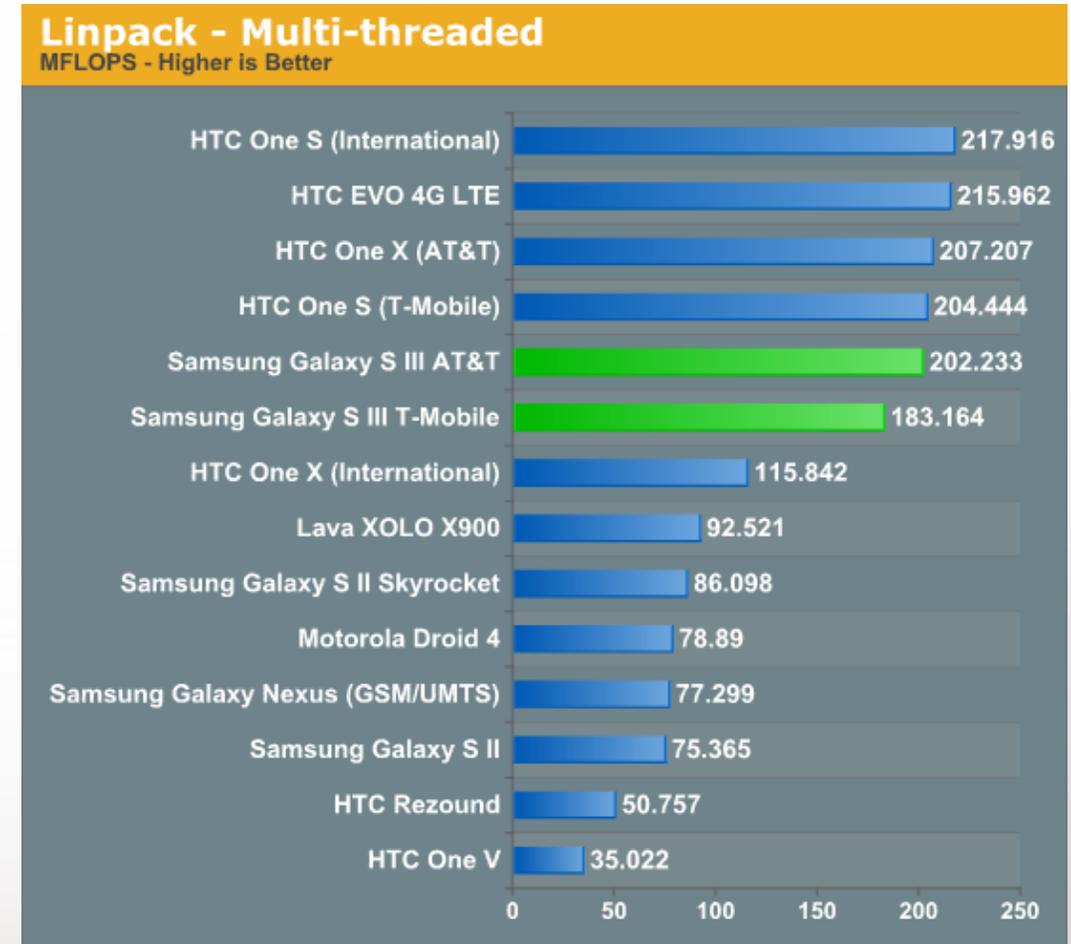
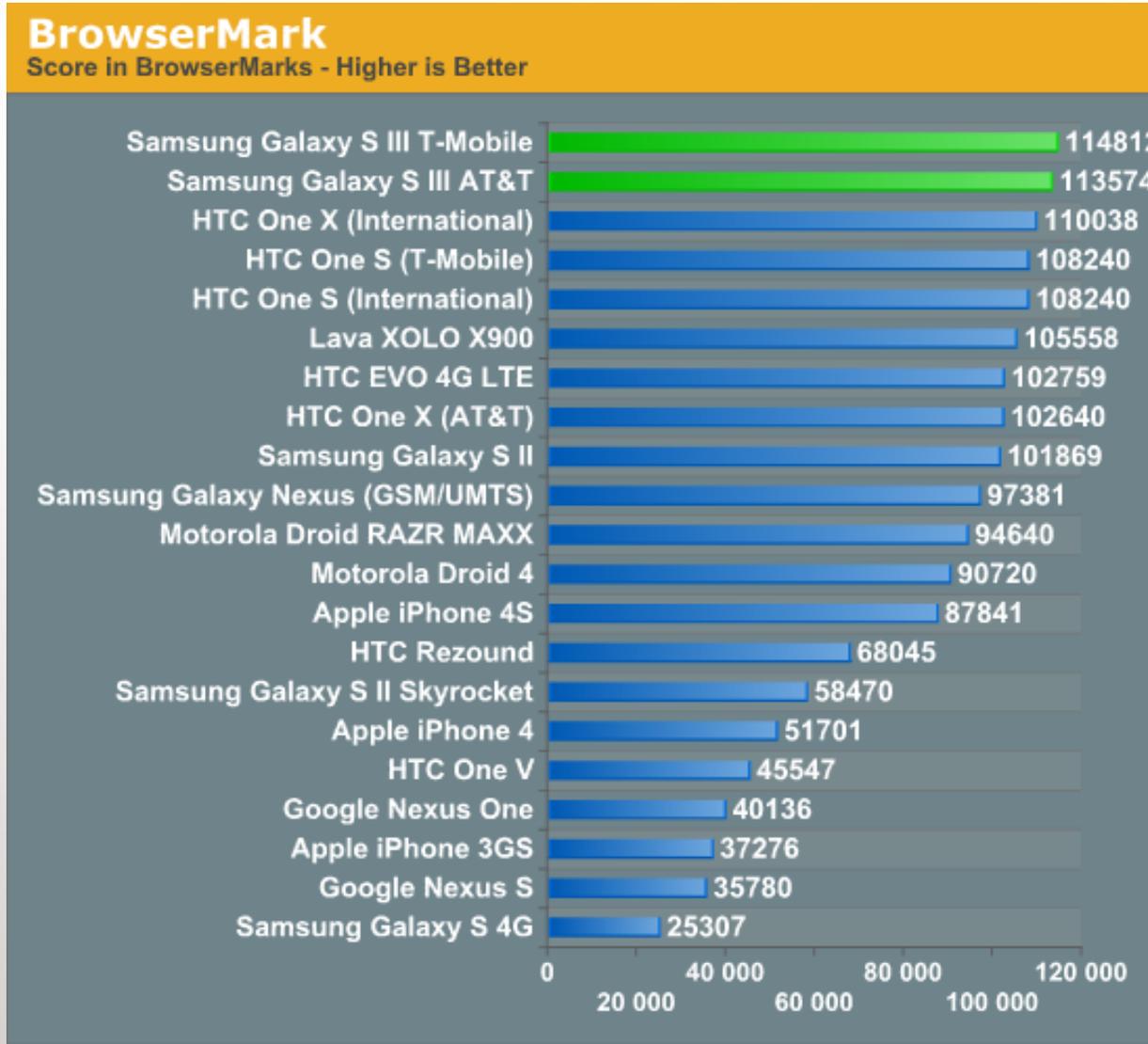
## Nenamark 2 Megapixel/s

higher is better



# Samsung Galaxy S3 (AT&T) Featuring Snapdragon S4 MSM8960

## CPU and Browser Performance Leadership



Source: Anandtech by Brian Klug 6/20/2012

<http://www.anandtech.com/show/6022/samsung-galaxy-s-iii-review-att-and-tmobile-usa-variants/4>

Lenovo K800 w/Medfield Z2460  
Benchmarked

“.... the general score performance came close to that of the Galaxy Note (powered by a 1.4GHz dual-core Exynos chipset)”  
– Richard Lai, Engadget



	K800	HTC One S	HTC One X	Galaxy Note (int'l)
Quadrant (v2)	3,850	5,053	4,906	3,854
Linpack single-thread (MFLOPS)	89.47	103.88	48.54	64.3
Linpack multi-thread (MFLOPS)	90.57	222.22	150.54	95.66
NenaMark2 (fps)	27.6	61.0	47.6	32.8
NenaMark1 (fps)	38	60.8	59.5	56.6
Vellamo	1,162	2,452	1,617	901
SunSpider 9.1 (ms, lower numbers are better)	1,270.2	1,742.5	1,772.5	2,902

# Thank You

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