Check the 4G speed: Which network is the fastest?

This test is our most comprehensive view of the network performance of the four carriers currently offering 4G networks (Big Four).

TipsMake.com - **This test is our most comprehensive view of the network performance of 4 operators currently providing 4G network (Big Four).**

We are now seeing everywhere the company's commercial offers of **4G** broadband wireless devices mobile services. But with all the rhetoric and hype they bring, which company is reliable and can provide the next generation speed network?

We decided to find out by checking each of the four largest **4G** network operators in the United States: **AT&T** , **Sprint** , **T-Mobile** , and **Verizon** in 260 installation locations out of 13 cities of the country. America. We found some clear winners and some losers along with some good news about wireless service in the United States in general. Here is our conclusion.

Wireless data transfer speeds have increased sharply: Since this time last year, big wireless carriers, corporations have increased their average download speed for modems of laptops more than tripled. times, a clear result of their emergency transition from **3G** to **4G** network technology. (We took the best possible measurable results - **3G** or **4G** - at each test site) on a laptop modem, 'Quadruple' is currently providing average download speeds of about 3 , 5 Mbps in 13 cities we conducted tests, an increase of nearly 1 Mbps compared to early 2010, a significant improvement.

In our last year study of wireless network performance, we conducted a test on the "reliability" of data services, expressed in percentages of tests in which they were I can get a good connection. But the test results show that network services have improved to the point that we rarely find a signal that is unusable or has no signal at all. So during the year, we didn't use that reliability test anymore - a testament to the significant improvement of operators over the years.

Winners and Losers: Laptop Modem Tests

WIRELESS PROVIDER	Average download speed (mbps)[1]	Average upload speed (mbps)[1]	Latency (milliseconds)[2]
Verizon	6.44	5.00	128
T-Mobile	2.83	0.85	173
AT&T	2.48	1.05	169
Sprint	2.15	0.61	214

NOVARUM CHART NOTES: [1] Listed speeds, expressed in megabits per second (1 megabit=1000 kilobits), represent the average of test results from 260 locations in 13 cities. [2] Latency is the time needed for a single packet of data to travel through the network; latency times of less than 100 milliseconds are ideal, while delays of more than 200 milliseconds can limit throughput and impair real-time services such as VoIP and videoconferencing.

Verizon's 4G LTE is feasible: Verizon 's **4G LTE** service, currently available in 38 US markets, is widely available in 12 of the 13 cities that we test. (We haven't changed the list of test cities in the past three years when doing these tests.) The speed of our laptops on **Verizon** 's laptop is faster than all competitors. competing **4G** network in the same test (in fact, it is 2 times faster than the one behind it). **Verizon** 's **4G** network has an average download speed of about 6.5 Mb / s (Mbps) and an average upload speed of 5.0 Mbps.

One important thing to mention here is that there are only a relatively small number of **Verizon** customers currently using this new network service. During our testing period, **Verizon** provided only two models of laptop modems operating on **4G** networks, and no company's smartphone line could take advantage of **4G** networks. This high speed. The performance of **Verizon** 's network may be reduced when many users and devices connect to it.

And there's a downside to **Verizon 4G** success **.** While **Verizon** 's new **4G LTE networks** are lightning fast, our tests on smartphones use the **3G CDMA** network that most **Verizon** customers use today is actually quite slow. The connection speed we measured in **Verizon** 's **3G CDMA** smartphone tests (on Motorola Droid 2) in 10 cities we conducted tests at the same speed or decreased compared to the year. last. And at the moment, those CDMA phones are everywhere in the hands of **Verizon** Wireless **customers** .

T-Mobile's smartphone is the fastest: Verizon may have the fastest network for laptops, but in our test **T-Mobile** gave the fastest results on smartphones. The **T-Mobile HTC G2** we used to test the average test results in 13 cities with download speeds of 2.3 Mb / s, about 52% faster than the second network operator. **Sprint** HTC EVO **4G** with an average download speed of 1.5 mbps.

T-Mobile also impressed with our laptop modem tests. Although only half as fast as **Verizon** , **T-Mobile** has an average download speed of about 3 Mbps in our tests - more than three times the performance of this carrier at nearly 0.9 Mbps speed. Downloaded in our survey in January 2010. With positive results on both laptops and smartphones, **T-Mobile** is proving to be a worthy competitor to the network operators. much bigger than them.

Winners and Losers: Smartphone Tests

WIRELESS PROVIDER	Average download speed (mbps)[1]	Average upload speed (mbps)[1]
T-Mobile	2.28	0.95
Sprint	1.50	0.56
AT&T	1.45	0.97
Verizon	1.01	0.67

NOVARUM CHART NOTE: [1]Listed speeds, expressed in megabits per second (1 megabit=1000 kilobits), represent the average of test results from 260 locations in 13 cities.

AT & T continues to grow, but it may not be fast enough: **AT & T** - the big winner in our 2010 survey, continues to improve its speed, considering the results of the survey. this year. Its average download speed in manual PC modem tests at about 2.5Mbps increased by about 76% compared to last year. But each of its competitors has shown further leaps in download speeds over the past year, resulting in 3rd place for **AT&T** this year.

And the increase in AT & T's download speed is really not good in our smartphone-based tests with average download speeds measured on **Apple** 's **iPhone 4** (1.4 Mb / s) only increasing. 15% of the speed we measured on the same device in early 2010. However, **AT&T** plans to release its own **4G LTE** network later this year, a move that could help regain AT & T's position in today's competition among carriers.

Sprint needs a lot of 4G: In cities, where **Sprint** offers **4G** WiMax service, customers have seen major improvements over the past year. **Sprint** 's average download speed increased by 170 percent to 2.1 mbps in our tests this year, the results were even more impressive with WiMax service at many locations throughout our test. . But in cities like New Orleans, Phoenix, and San Diego, where **Sprint** still relies on its 3G CDMA network for data services, download speeds have dropped, at just 1 mbps.

Test results: Read rankings

In our study, we tested both with smartphones and laptops using a USB modem from the network. Tests on laptops, which use Ixia industry standard testing software, provide more accurate data than smartphones. Notebook results have yielded good results that can represent the maximum performance that can be achieved on networks and is a predictor of the speed required by carriers. granted for smartphones for one year or longer.

We use Ookla, an accredited FCC Web-based network speed meter to measure data download speeds on smartphones. The results are not entirely accurate for a number of reasons: we have to use different smartphones on different networks, and the measured results also reflect the limitations of the radio chipset, the processor. Smart phone, battery, and the test itself also has a bit of error.

The chart below includes a list of cities in the left column, moving to the right of the chart, you can see the average speed and network latency for each of the four wireless networks. Speed ??is expressed in megabits per second (Mbps). Delay (or the time it takes for a small packet to be transmitted to a home network and back) is measured in milliseconds. We recorded download speeds, uploads and delay times on the modem of the laptop and download and upload speeds in the tests on smartphones.

Network Performance by City (Laptop Modem Tests)

Here are the average download speeds, upload speeds, and network latency times of the service providers' fastest USB modems in each of our 13 testing cities, divided by region.

WIRELESS PROVIDER	AT&T			SPRINT			T-MOBILE			VERIZON		
	Download speed (mbps)	Upload speed (mbps)	Latency (millisec-onds)	Download speed (mbps)	Upload speed (mbps)	Latency (millisec-onds)	Download speed (mbps)	Upload speed (mbps)	Latency (millisec-onds)	Download speed (mbps)	Upload speed (mbps)	Latency (millisec-onds)
EAST												
Baltimore	1.97	1.39	156	2.90	0.82	206	3.07	0.99	94	6.86	4.69	117
Boston	2.78	0.92	141	2.87	0.70	205	2.45	1.26	126	6.72	4.96	95
New York	2.03	0.86	167	3.46	0.88	193	3.84	1.41	95	7.37	4.94	110
Orlando	2.06	1.02	165	2.47	0.72	259	3.77	1.03	165	4.0	3.28	140
CENTRAL												
Chicago	3.30	1.09	119	3.40	0.80	264	2.93	0.46	250	6.93	2.95	109
Denver	2.82	0.98	184	3.61	0.76	150	2.37	0.46	320	5.12	2.93	165
New Orleans	2.21	1.00	138	0.60	0.31	216	2.50	0.42	131	6.32	4.38	116
Phoenix	2.79	1.29	146	0.55	0.31	180	2.57	0.59	150	7.44	4.40	106
WEST												
Portland	1.98	0.97	202	1.15	0.48	314	3.31	0.47	160	0.55	0.56	290
San Diego	2.05	0.92	273	0.73	0.32	200	2.45	0.91	168	8.15	8.86	91
San Francisco	3.01	0.99	148	2.01	0.53	195	1.29	0.94	266	6.96	6.94	106
San Jose	2.56	1.02	226	1.34	0.48	227	2.45	0.84	203	9.55	8.96	111
Seattle	2.64	1.21	135	2.84	0.81	180	3.75	1.21	123	7.71	7.16	105

NOVARUM CHART NOTES: Listed speeds expressed in megabits per second (1 megabit=1000 kilobits). Latency is the time needed for a single packet of data to travel through the network; latency times of less than 100 milliseconds are ideal, while delays of more than 200 milliseconds can limit throughput and impair real-time services such as VoIP and videoconferencing.

Network Performance by City (Smartphone Tests)

Here are the average download speeds and upload speeds of the service providers' top smartphones in each of our 13 testing cities, divided by region.

WIRELESS PROVIDER	AT&T (IPHONE 4)		SPRINT (HTC EVO 4G)		T-MOBILE (HTC G2)		VERIZON (MOTOROLA DROID 2)	
	Download speed (mbps)	Upload speed (mbps)	Upload speed (mbps)	Download speed (mbps)	Download speed (mbps)	Upload speed (mbps)	Download speed (mbps)	Upload speed (mbps)
EAST								
Baltimore	1.41	1.20	1.31	0.65	2.18	1.11	0.88	0.75
Boston	1.76	0.89	1.93	0.59	1.56	1.12	n/a	n/a
New York	1.43	0.80	3.83	0.65	2.81	1.52	1.19	0.66
Orlando	1.36	0.96	1.32	0.58	2.49	1.31	1.14	0.58
CENTRAL								
Chicago	2.54	1.07	2.31	0.60	2.32	0.56	1.24	0.75
Denver	1.45	0.88	1.29	0.62	3.36	0.66	1.02	0.64
New Orleans	1.23	0.93	0.71	0.43	1.90	0.62	1.26	0.85
Phoenix	1.39	1.30	0.74	0.42	2.39	0.67	0.87	0.75
WEST								
Portland	1.17	1.01	0.92	0.54	2.74	0.57	0.68	0.61
San Diego	0.82	0.88	0.65	0.45	1.48	0.92	0.93	0.66
San Francisco	1.44	0.73	1.68	0.50	1.90	0.90	1.04	0.60
San Jose	1.47	0.92	1.60	0.68	1.45	0.96	1.04	0.60
Seattle	1.34	1.05	1.27	0.60	3.07	1.41	0.82	0.61

NOVARUM CHART NOTES: Listed speeds expressed in megabits per second (1 megabit=1000 kilobits). n/a= Not applicable. We were unable to measure data speeds on the Verizon smartphone in Boston due to equipment failure.

Nutshell speed test method

Our test method is designed to approximate what a modem user of a laptop or smartphone usually does on any day in the city where they live. PCWorld's test partner is Novarum, tested in each of our 13 cities during the first six weeks of 2011. At each of our 20 test locations in each city, We have a "snapshot" of the performance of each wireless service that checks download speed, upload and network latency.
We choose and record the fastest signals that the operator can reach, first search for **4G** services and then if not found, will continue to search the provider 's 3G service by default. In all, we run 177,000 times the performance of networks at 260 test sites in both urban and suburban areas.

Because we cannot test all cities in the country, we have selected 13 cities with large and medium wireless coverage in size and terrain: Baltimore, Boston, Chicago, Denver , New Orleans, New York, Orlando, Phoenix, Portland, San Diego, San Francisco, San Jose and Seattle. Because wireless signal quality depends on a lot of things such as network load level, distance from the nearest cell tower, weather and time of day, our results cannot be used to predict Exact performance in a specific area. Instead, they will represent the relative performance of wireless services in a city on a given day. Each result may have an error of plus or minus 5%.

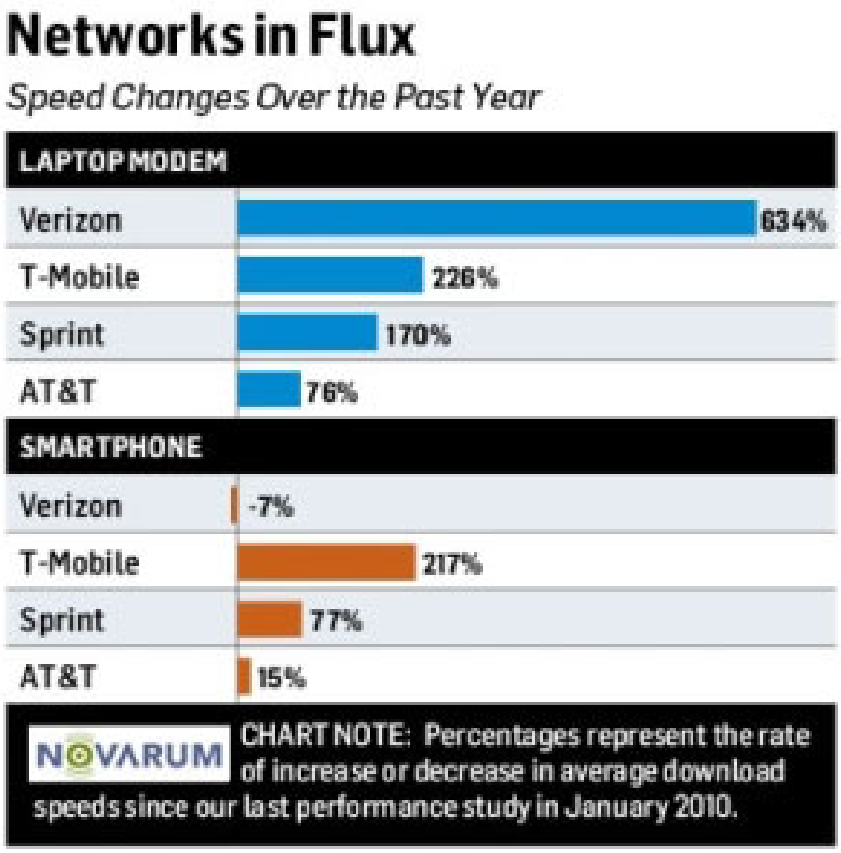
Verizon is optimized for LTE, CDMA 3G is the opposite

" ***Verizon*** *'s new* ***LTE*** *service is superior,* " said Ken Biba - CTO of Novarum, who helped us test the network. Tests showed that the **Verizon** network in 13 cities we tested had an average download speed for laptop modems of about 6.4 Mbps, more than twice the average download speed of people The second in our study is **T-Mobile** .

That average rate includes **Verizon** 's results in Portland, the only city in our study that does not yet have **LTE** service. Excluding Portland and only looking at the performance of the **LTE** network, **Verizon** 's average download speed jumps to nearly 7 mbps. Only in Orlando the average network speed is less than 5 Mbps, in about 4 mbps.

Overall, **Verizon** 's upload speed averaged about 5 Mbps in 13 cities was tested, in San Diego and San Jose the average upload speed also reached nearly 9 Mbps. **LTE networks are** different from older 3G networks in that they are symmetrically designed - that is, the signal flow from customer devices to the home network is equal to the signal flow from the host network down to the client's device. line. In many of our 260 test locations, the **Verizon** network provides upload speeds that are faster than its download speeds. For example, the average upload speed in San Diego is faster than its average download speed.

Such fast upload speeds can make two-way applications such as online conferencing, online gaming, and possibly Voice over IP (VoIP) mobile phones much more efficient, with photos and sounds will also be better. In these applications, the data you send from your device is just as important as the data you receive.



For example, in real-time VoIP calls, network delays are often the cause of "lag" and echo. In order to have a natural-sounding VoIP conversation, you need network latency of less than 150 milliseconds, and **LTE** is likely to ensure that it is better than other networks through our tests. In the 12 cities that we tested where **Verizon** 's **LTE** service was popular, the average delay was only 114 milliseconds, significantly shorter than the **HSPA** + network latency and WiMax tested networks. experience.

Verizon 's **LTE** network gives us an optimistic view of the future of wireless services, but currently only a handful of customers are using this network. **Verizon** currently sells only two models of USB modems that can exploit the network, and the company does not say how many it has sold. New **LTE** phones are not yet available until this summer.

" ***Verizon*** *'s new* ***4G*** *network is gimmicky, but that's partly because almost no one uses it,* " said Craig Moffett, a senior analyst at Sanford C. Bernstein & Co.

Verizon has ensured that with skeptics that their network will remain fast when connected to multiple devices. " *We are very pleased that the speed we have provided meets what our customers expect: an average of 2 to 5 Mbps for uploading and 5 to 10 Mbps for download,* " a spokesman for **Verizon** Wireless - Thomas Pica said. "" " *It is on a full network* ." "

Moffett also agrees with the statement: "Even if this network starts to get used to the first smartphones this summer, it will probably hold the crown and it will be the target for the However, at present, **Verizon** 's smartphone **subscribers are** still based on the company's **3G** CDMA network, and that is the network, as the results of our tests, is becoming slower than last year.

In our survey of **3G** services in January 2010, we measured the average download rate of about 1 Mbps in most cities we tested (average speed of 13 cities is 1,078 Mbps) on Motorola Droid smartphone. In the same cities this year, we saw similar results on our Droid 2 smartphone - again, the measured results were within 1 mbps, but the average download speed of 13 cities was 7% lower than last year, at 1,008 mbps.

We found even slower results on CDMA networks in laptops in laptops in Portland, where Verizon **LTE** services are not available. We measured the average download speed of 0.8 Mbps in Portland last year, and this year the average speed was only 0.55 Mbps. This, of course, is bad news for **Verizon** smartphone users, including those who recently bought a new Verizon iPhone.
Did **Verizon** build an impressive **LTE** network based on the intended cost of upgrading for its 3G CDMA network? Do most **Verizon** subscribers pay for **LTE** 's ultra-fast speeds just for a few users? **Verizon** has not commented on these questions.

T-Mobile is moving forward

T-Mobile began branding its **HSPA** + network and phone service as a **4G** network this year. It has had aggressive advertising campaigns that have attracted a lot of attention. But our test results show that this operator needs to spend more of his money than just advertising campaigns.

In short, **T-Mobile** 's network has grown much faster, farther and more reliable than it was a year ago - and the product it offers is worthy of competing with providers' **4G** services. other level. **T-Mobile** achieved the fastest speed in our tests of smartphone download speeds, and took second place admirable after **Verizon** Wireless in laptop modem tests.

T-Mobile has improved its speed by 3 times in our smartphone tests compared to last year. In our smartphone tests using the **T-Mobile HTC G2** , the average download speed we measured over 13 cities was 2.3 Mbps. This figure last year (tested on the HTC G1) was 0.72 Mbps. In Denver and Seattle, the average download speed on **T-Mobile** phones is over 3 Mbps. We measured the connection speed of more than 2 Mbps at 55% of the locations we conducted the survey.

Upload speeds also increased significantly from last year, from an average of 0.134 Mbps to nearly 1 Mbps this year. The average upload speed of **T-Mobile** reaches over 1 Mbps in 5 of the 13 cities that we tested: Baltimore, Boston, New York, Orlando and Seattle.
T-Mobile also performed well and improved significantly on the laptop's modem tests. The average download speed is nearly 3Mbps and in New York, Orlando, and Seattle cities, it reaches 4Mbps. Overall, **T-Mobile** 's download speed in 13 cities tested increased 226% compared to (very similar to 3G) last year's 0.87 Mbps average. The average delay is 173 milliseconds, not enough to provide services such as HD streaming video, but enough to ensure quality VoIP calls.

T-Mobile's competitors say that the **HSPA** + technology they are using is not really **4G** as **T-Mobile** claims. Technically, it may be true, but **T-Mobile** has proven that through system software enhancements it can provide competitive speed with other **4G** networks. With the short-term path upgrade of **HSPA** + technology, **T-Mobile** will still do many things worth waiting for.

AT & T grew slowly

Following the path of **T-Mobile** , **AT&T** has started building a brand of wireless broadband and " **4G** " phones this year. And like **T-Mobile** , **AT & T** 's **HSPA** + service certainly offers the same speed as **4G** . In tests on laptop modems, the service had an average download speed of 2.5 Mbps in 13 cities.

AT&T informs customers about the average download speed "up to about 6 mbps" in "key markets like Chicago, Houston, and Charlotte [North Carolina]." Although we didn't measure the 6mbps figure in laptop modem tests, this network also reached download speeds above 2Mbps most of the time (64 percent of the time, to be exact). In fact, **AT&T** showed an average speed of about 2 Mbps or higher in all 13 cities we tested. The fastest average download speed appears in Chicago (3.3 Mbps) and San Francisco (3.0 Mbps).

AT & T 's upload speed is also quite high - similar to **T-Mobile** . Upload speeds in modem tests of laptops are about 1MBps, even reaching nearly 1.4 mbps in Baltimore. This is a significant step over the average upload speed of these 13 cities last year of 0.77 Mbps.

AT & T's **HSPA** + technology creates a delay that is very similar to **T-Mobile** . We measured an average delay of 169 milliseconds across 13 cities (**T-Mobile** averaged 173 milliseconds), with the highest average delay being in San Diego (273 milliseconds) and San Jose (226 milliseconds).

However, the growth of **AT & T** 's data download speed has slowed. Last year we concluded that AT & T's data download rate increased 72 percent from the previous eight months. This time, **AT&T** continued to grow, but not so fast and certainly not as fast as its competitors.

So **AT & T** ranked third in both our laptop and smartphone modem tests. In the laptop's modem test results, **AT & T is** only slightly behind **T-Mobile** but less than half of **Verizon LTE** 's download speed.

AT & T 's slow growth is even more apparent in our smartphone test. In our study in early 2010, we measured average download speeds in 13 cities at 1.3 mbps most on **AT&T iPhone 4 phones,** up 54% from the previous year. In this year's test with on the same phone, this figure is 1.5 Mbps, only an increase of 15%.

Some cities have higher measurement results than other cities on **AT&T** smartphones: Chicago sees an average speed of 2.5 mbps, while San Diego averages just 0.8 mbps. However, the upload speed increased significantly, our test results on **AT&T** smartphones averaged 0.2 Mbps in 2010 and reached 1 Mbps this year.

AT&T believes that the new **4G** smartphone generation (not yet launched at the time we conducted this test) and other devices will make better use of this network's speed. " *A **T&T** introduced two **4G** phones, **Atrix Motorola** and **HTC Inspire** - and announced plans for about 20 other 4G devices this year*, " the company said in an e-mail. " " *Network speed, comprehensive level and extensive tests have brought to a conclusion that **AT&T** is currently the nation's fastest broadband mobile network provider* ."

AT & T's growth rate over the past two years can be explained by software upgrades and infrastructure improvements. The operator completed the upgrade of their broadband network with **HSPA** 7.2 technology at the end of 2009, then earlier this year they continued to announce that they had completed the upgrade to **HSPA** + to allow Download speeds are theoretically possible up to 14.4 Mbps. **AT&T** has also invested a large amount of capital for fiber optic lines that transmit mobile data to and from the center of its network.

AT&T also plans to launch its own **4G** LTE network, as well as some **4G LTE smartphones** to match by the end of the year.

Sprint shows weakness

The good news for **Sprint** is that the overall speed of its data services has actually increased significantly over the past year, about 170%. The bad news is that while **Sprint** provides its WiMax service in most cities we test, connecting to WiMax signals using our **Sprint 3G / 4G** modem is unstable. For example, in San Jose, California, we measured download speeds that were lower (sometimes even lower) of 0.5 Mbps on 8 of the 20 locations we conducted testing, a sign that In those places, WiMax service almost does not appear.

When **4G** services are not available, **Sprint** devices will automatically access the company's **3G** CDMA service and follow our tests on laptop modems to some extent. The network is slowing. Average download speeds slowed significantly in New Orleans (-24%), Phoenix (-3%), and San Diego (-24%) - three cities in our tests that did not have WiMax available.

Sprint said no such decline occurred. "The 3G speed test results you find are inconsistent with what we see, and unlike what an independent third party examines our network has reported," spokesperson for **Sprint** , Mr. Stephanie Vinge-Walsh said. "We have not seen any significant decline on the **3G** service we offer from last year to this year, our **3G** speeds are still in a high range and reliability."

The network test results of **Sprint** in 13 cities showed that the download speed averaged about 2.1 mbps but was a mixture of CDMA **3G** and WiMax **4G technology** . Overall, we recorded bandwidth speeds greater than 2 Mbps on half of our tests. In most cities we conduct tests that WiMax is available, we note the ability of 50-50 to connect to the service. There are exceptions such as in Baltimore, Boston, and Chicago, the laptop's modem test results show that 4G networks appear throughout the city, not as unstable as elsewhere.

With its **4G** WiMax service, **Sprint** says users can expect average download speeds of 3 Mbps to 6 Mbps, peaking at more than 10 mbps. Our test again shows skepticism about **Sprint** 's statement **.** Chúng tôi ch?a bao gi? ??t ???c t?c ?? cao h?n 7 Mbps và ??t t?c ?? c?a 6 Mbps tr? lên ch? t?i 5 trên t?ng s? 260 ??a ?i?m th? nghi? m. M?ng WiMax có th? ??t ???c t?c ?? t? 3 ??n 6mbps, nh?ng không ?n ??nh.

T?c ?? upload c?a **Sprint** cho chúng ta th?y m?t câu chuy?n v? m?c ?? ph? sóng c?a nhà cung c?p d?ch v? **4G** này. Trên nhi?u thành ph? mà chúng tôi ti?n hành th? nghi?m, xu?t hi?n 2 m?c ?? khác nhau c?a t?c ?? upload: m?t là ? m?c 1Mbps tr? lên, cho th?y r?ng chúng tôi ?ã tìm th?y d?ch v? WiMax, và m?t ? d??i m?c (?ôi khi còn d??i th?p h?n n?a) 0,4 Mbps, cho th?y chúng tôi ?ã k?t n?i v?i d?ch v? CDMA 3G. Nhìn chung, T?c ?? upload trung bình c?a **Sprint** ch? t??ng ???ng v?i 3G, ? m?c 0,6 mbps.

M?ng CDMA và WiMax c?a **Sprint** k?t h?p v?i nhau cho ra k?t qu? ?? tr? trung bình cao nh?t trong các th? nghi ?m c?a chúng tôi: 214 mili giây. V?i th?i gian tr? nh? v?y, **Sprint** có th? b?t ??u làm suy gi?m m?c ?? hi?u qu? c ?a các ?ng d?ng th?i gian th?c nh? chat video và g?i ?i?n tho?i VoIP.

S? chênh l?ch t??ng t? c?ng xu?t hi?n trên các m?ng **3G** và **4G** trong các bài ki?m tra trên ?i?n tho?i thông minh c?a chúng tôi. Trong ph?m vi ??a ?i?m mà WiMax ch?p ch?n ho?c không t?n t?i, t?c ?? download trung bình ? d ??i m?c 1mbps. T?i các thành ph?, n?i chúng tôi th??ng xuyên có th? k?t n?i v?i m?ng WiMax (Boston, Chicago và New York), chúng tôi ghi nh?n ???c t?c ?? download trung bình là 2 Mbps ho?c cao h?n.

M?c dù v? t?ng th? t?c ?? ?ã t?ng lên, d?ch v? c?a **Sprint** v?n x?p h?ng cu?i cùng trong c? hai m?c là t?c ?? download và t?c ?? upload trong n?m nay trên các bài ki?m tra v? modem máy tính xách tay. N?u nh? m?ng WiMax c?a **Sprint** ???c ph? bi?n r?ng rãi trong t?t c? các thành ph? chúng tôi ti?n hành ki?m tra có l? k?t qu? s? r?t khác. M?ng **4G** c?a h? không ph?i là ch?m, nó ch? không bao ph? ?? trên t?t c? các ??a ?i?m.

" *Vùng ph? sóng luôn luôn là gót chân Achilles c?a h? , gót chân trong* ***4G*** *, và các v?n ?? v? tài chính c?ng ?ã ng?n c?n h? trong vi?c m? r?ng m?ng* ***4G*** *c?a mình* ' ông Moffet cho bi?t. "M *?t n?m tr??c, h? ??ng ??u trên th ? tr??ng, bây gi? h? ?ang có nguy c? th?c s? r?i l?i phía sau.* "

Trong t??ng lai

Các b??c chuy?n ??i quan tr?ng t? **3G** lên **4G** v?n ?ang ???c ti?n hành và s? ti?p t?c t?o ti?n ?? cho s? phát tri?n c ?a b?ng thông di ??ng nhanh. N?u t?c ?? ti?p t?c t?ng ? m?c mà các nhà m?ng ?ã ?ã ??t ???c trong n?m qua, d?ch v? d? li?u **3G** (và c? t?c ??) s? s?m tr? thành ch? là m?t s? t?t h?u. Các th? nghi?m c?a chúng tôi cho th?y r?ng n? u các d?ch v? không dây **4G** các nhà m?ng cung c?p có s?n trong khu ph? c?a b?n thì nó ?ã nhanh h?n ?áng k? so v?i m?ng **3G** mà b?n ?ang s? h?u t?i nhà.

What does that mean? Các d?ch v? **4G** r?t có th? s? t?ng t?c ?? tiêu th? c?a b?n v? n?i dung Web, và thông su?t các ho?t ??ng c?a các d?ch v? nh? streaming video. Trong th?c t?, t?c ?? c?a **4G** có kh? n?ng cho phép b?n làm vi?c v?i thi?t b? di ??ng c?a b?n mà b?n không th? làm v?i m?t k?t n?i **3G** , các ?ng d?ng nh? video chat, ch?i game tr?c tuy?n, và g?i ?i?n tho?i VoIP. **4G** ch? là b??c ??u tiên c?a công ngh? b?ng thông r?ng không dây mà cu?i cùng có th? tách chúng ta ra kh?i máy tính ?? bàn, cho phép chúng ta ?? qu?n lý cu?c s?ng tr?c tuy?n c?a chúng ta b?t c? khi nào và b?t c? n?i nào chúng ta mu?n.

Chúng tôi ti?n hành th? nghi?m nh? th? nào?

Trong m?i thành ph?, chúng tôi ki?m tra 20 ??a ?i?m n?m trong n?m trong m?t m?ng l??i tính t? trung tâm c?a thành ph?. Nh?ng ??a ?i?m ?ó s? v??t ra kh?i trung tâm thành ph? kho?ng 2 d?m, cho phép chúng tôi ?o m?c ?? d?ch v? trong và gi?a các tháp di ??ng. T?i m?i ??a ?i?m th? nghi?m, chúng tôi ki?m tra các m?ng d?a trên tiêu chu?n công nghi?p s? d?ng máy tính xách tay, và ki?m tra các m?ng d?a trên tiêu chu?n Internet v?i ?i?n tho?i thông minh.

Các cu?c ki?m tra trên modem c?a máy tính xách tay c?a chúng tôi s? d?ng k?t n?i TCP tr?c ti?p vào m?ng ?? ki ?m tra n?ng l?c c?a m?ng ?ó bao g?m t?c ??, hi?u n?ng m?ng và kh? n?ng cung c?p cho các thuê bao. ?? k?t n?i các máy tính xách tay v?i các m?ng khác nhau, chúng tôi s? d?ng các modem USB nhanh nh?t có s?n trên th? tr ??ng, theo nh? chính nh?ng ?? xu?t c?a nhà m?ng. Chúng tôi s? d?ng modem USB VL600 LG **4G** ?? ki?m tra **Verizon** , modem USB ZTE WebConnect Rocket 2.0 ?? ki?m tra **T-Mobile** , AirCard Sierra Wireless 250U ?? ki?m tra **Sprint** , và Sierra Wireless USBConnect Shockwave ?? ki?m tra **AT & T** . S? d?ng công c? ki?m tra Ixia Chariot 4,2 trên máy tính xách tay c?a chúng tôi, chúng tôi ?ã th? nghi?m c? t?c ?? và ?? tr? c?a m?ng.

?? ?o t?c ?? download, Chariot yêu c?u m?t s? l??ng các t?p tin l?n và không th? nén ???c t? m?t máy ch? ? San Francisco Bay Area, sau ?ó t? m?t máy ch? khác ? mi?n B?c Virginia. ??i v?i m?i máy ch?, ph?n m?m s? ?o t?c ?? trong m?t kho?ng th?i gian 1 phút, và sau ?ó s? tính k?t qu? trung bình.

?? ?o t?c ?? upload, Chariot g?i m?t s? t?p tin t? các khách hàng Chariot v? máy tính xách tay ??n các máy ch? m ?ng n?i b? và t? xa, m?t l?n n?a th?i gian ?o m?i l?n chuy?n là 1 phút. Chúng tôi s? báo cáo k?t qu? truing bình c ?a m?i l?n chuy?n t? c? hai ??u t? máy ch? c?a ??a ph??ng và t? xa, l?y k?t qu? trung bình cho m?i v? trí ?ó.

Trong quá trình ki?m tra t?c ??, ph?n m?m ki?m tra Ixia c?ng ti?n hành ?o ?? tr?, ho?c th?i gian c?n ?? m?t gói tin di chuy?n t? máy tính xách tay khách hàng ??n các m?ng máy ch? và ng??c l?i. S? li?u này th? hi?n b?ng ??n v? mili giây, có th? cho bi?t ?? tr? ho?c t?c ngh?n trong dòng ch?y c?a d? li?u qua m?ng, và có th? tiên ?oán m?c ?? các ?ng d?ng th?i gian th?c nh? g?i ?i?n tho?i và video chat (các ?ng d?ng yêu c?u chuy?n gói tin g?n nh? t?c th?i ?? ??m b?o s? liên t?c) có ho?t ??ng ???c trên m?ng ?ang ki?m tra hay không.

Guide to Mobile Download Times

Here's how long it takes to download a Web page, an MP3 file, or a video using some common mobile connection speeds.

NOVARUM

DOWNLOAD SPEED	Download New York Times home page (1.4MB)	Download 3-minute MP3 file (4MB)	Download 3-minute Web video (10MB)
SLOW Average speed 800 kbps	14 seconds	40 seconds	1 minute, 40 seconds
MEDIUM Average speed 1.5 mbps	7 seconds	21 seconds	53 seconds
FAST Average speed 3.5 mbps	3.7 seconds	10.7 seconds	26.7 seconds

Các cu?c ki?m tra trên ?i?n tho?i thông minh v?i v? trí t??ng t? nh? các th? nghi?m trên modem c?a máy tính xách tay s? ?o các k?t n?i th?c t? gi?a ?i?n tho?i thông minh c? th? và các m?ng c? th?. ??i v?i các bài ki?m tra này, chúng tôi s? d?ng **iPhone 4** c?a m?ng AT&T, **HTC EVO 4G** c?a **Sprint** , **HTC G2** c?a **T-Mobile** , và **Motorola Droid 2** c?a **Verizon** .

Trên m?i ?i?n tho?i chúng tôi ch?y ph?n m?m th? nghi?m hi?u su?t b?ng thông r?ng di ??ng FCC c?a Ookla. Th? nghi?m này s? g?i m?t file l?n qua l?i gi?a các ?i?n tho?i thông minh và m?t m?ng ch?, và sau ?ó ?o t?c ?? mà t?i ?ó d? li?u ???c truy?n qua. Chúng tôi th?c hi?n ba cu?c th? nghi?m download và 3 cu?c th? nghi?m upload t?i m ?i ??a ?i?m th? nghi?m.

Chúng tôi ki?m tra t?t c? 13 thành ph? trong tháng 1 và tháng 2 n?m 2011, b?ng cách s? d?ng cùng m?t ??a ?i?m, ph??ng pháp, và nhân viên chúng tôi s? d?ng ?? th? nghi?m h?i tháng 1 n?m 2010. Duy trì m?t ph??ng pháp phù h?p cho phép chúng tôi so sánh hi?u su?t c?a các m?ng theo th?i gian và ?? tìm ki?m nh?ng thay ??i mang tính ??t phá.

Nghiên c?u c?a chúng tôi không ???c toàn di?n. Chúng tôi ?ã không kh?o sát trên t?t c? các thành ph?. Chúng tôi ?ã th? nghi?m t?i các ??a ?i?m t?nh, chúng tôi ?ã không th?c hi?n ki?m tra trong nhà, và chúng tôi ?ã không ?ánh giá d?ch v? gi?ng nói.