

GSM/3G Network Update

April 2007

Over 100 3G/HSDPA Networks Delivering Mobile Broadband Services Globally

GSM/3G FAST FACTS

GSM includes EDGE, WCDMA-HSPA

Almost 700 commercial GSM networks in 213 countries/territories

GSM accounts for 83.9% of the world mobile market (up from 80.3% - December 2005)

2.255 billion GSM subscriptions globally (31.12.06)

GSM added more than half a billion subscriptions in 2006, and 81 million more than the total of all other cellular technologies combined i.e. TDMA, PDC, iDEN, all analogue systems, cdmaOne, CDMA2000 1X, CDMA2000, 1xEV-DO

155 3G/WCDMA networks are commercially launched in 68 countries

104 HSDPA networks launched in 54 countries

The majority of WCDMA-HSDPA networks combine with GSM/EDGE for service continuity and the best user experience

100 million WCDMA subscriptions (31.12.06); over 4 million average monthly growth in 2006

Over 650 WCDMA devices launched in the market

HSDPA devices enter the mainstream with over 250 products launched

263 GSM/EDGE deployments in 136 countries, including 198 commercial GSM/EDGE networks in 105 countries

Over 500 GSM/EDGE devices launched

As CDMA market share falls, 30 CDMA operators are deploying or using GSM for mobile services

GSM, WCDMA subscriptions data is provided by Informa Telecoms & Media – World Cellular Information Service (www.wcisdata.com)

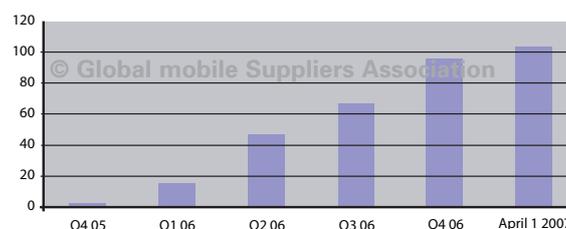
Mobile broadband services enabled by 3G/HSPA is reality today around the world and is the de-facto industry baseline. The milestone of 100 commercial HSDPA networks was passed in March 2007. HSDPA devices enter the mainstream with over 250 products launched.

The number of network deployments supporting mobile broadband has risen sharply. WCDMA, which is the natural evolution for GSM operators for 3G, leads the market with 72% share of the number of commercially launched 3G networks. GSA regular surveys on the evolution of 3G show rapid progress, confirming WCDMA as the mainstream 3G technology, with 155 networks commercially launched in 68 countries. The majority of WCDMA operators are deploying High Speed Downlink Packet Access (HSDPA), which is the first evolution of WCDMA, delivering typical user data speeds of 0.8 to 3.6 Mbps. Some networks are now able to support 7.2 Mbps peak downlink speeds, with services scheduled to start in May 2007. One HSDPA operator has announced its network is "14.4 Mbps ready", with several more operators planning to support 14.4 Mbps by end 2007.

HSDPA commercial network launches - global

104 commercial HSDPA networks

HSDPA commercial network launches (cumulative)



Source: GSA HSDPA Operator Commitments Survey

Figure 1: HSDPA commercial networks growth
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According to GSA research published on April 2, 2007, 156 operators in 72 countries have committed to HSDPA, with 104 networks commercially launched in 54 countries. In Europe, HSDPA is commercially available in 25 of the 27 countries that today make up the European Union.

Most services benefit from HSDPA, which delivers high data throughput capabilities and shorter response times as a result of lower latency (round trip time). HSDPA is a great support to enterprise mobility and productivity. Other services are more feasible or enabled by HSDPA, such as Voice over IP, "Push to X" services and mobile gaming. HSDPA delivers fast data access for music and video downloads, file sharing, large email attachments, web surfing, streaming services, more efficient mobile working and more. It means a similar customer experience to fixed broadband, with the added value of mobility. For operators, HSDPA drives cost and spectrum efficiencies, introduction of advanced services at lower costs with increased revenues and profitability, and maintains and improves

Australia	3	Launched
Australia	Telstra	Launched; "14.4 ready"
Australia	Vodafone	Launched
Australia	Optus	In deployment
Austria	Mobilkom	Launched; supports 7.2
Austria	T-Mobile	Launched
Austria	ONE	Launched; some 7.2 areas
Belgium	Proximus	Launched
Brazil	Telemig Celular	In deployment
Bulgaria	Mobitel (M-TEL)	Launched; deploying 14.4
Chile	Entel PCS	Launched
Croatia	VIPNet	Launched; deploying 14.4
Denmark	3 Denmark	Launched
Denmark	Sonofon	Launched
Finland	Elisa	Launched
France	SFR	Launched
Germany	T-Mobile	Launched; deploying 7.2
Germany	Vodafone	Launched; deploying 7.2
Hong Kong SAR	Smartone-Vodafone	Launched
Hong Kong SAR	3	Launched
Hungary	T-Mobile	Launched; deploying 7.2
Indonesia	INDOSAT	Launched
Ireland	O2	In deployment
Ireland	3	Launched
Isle of Man	Manx Telecom	Trialling
Italy	TIM	Launched
Japan	NTT DoCoMo	Launched
Japan	eMobile	Launched
Latvia	Bite	Launched
Latvia	LMT	Launched
Liechtenstein	FL1 (Mobilkom)	Deploying 14.4 Mbps
Lithuania	Bite	Launched
New Zealand	Vodafone	Launched in 3 major cities
Portugal	Optimus	Launched
Singapore	M1	Launched
Singapore	SingTel Mobile	Commercial trial from 30 Nov 06
Singapore	StarHub	Deploying 14.4 Mbps
Slovenia	Mobitel	Launched
South Korea	KTF	Launched
Sweden	3	Launched
Taiwan	Vibo Telecom	In deployment
Taiwan	Chunghwa Telecom	In deployment
Taiwan	FarEasTone	Launched
UK	T-Mobile	Launched
USA	AT&T Wireless	In deployment

Figure 2: HSDPA networks supporting 3.6 Mbps (peak) or above
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competitiveness. The radio access upgrade path to HSDPA is easy; WCDMA base stations require only a software upgrade. HSDPA offers the highest performance at the lowest cost, enabling true mass-market mobile IP multimedia.

Increasing network data speed

Most HSDPA networks today support 1.8 Mbps data speeds (peak) which means a typical user experience of 0.8 – 1.5 Mbps according to individual network and user device capabilities. However, at least 45 operators have commercially launched or are deploying 3.6 Mbps peak data capability in their networks, as the first phase of a planned evolution which will progress for many operators by end 2007 to 14.4 Mbps peak.

HSUPA

For the uplink, High Speed Uplink Packet Access (HSUPA) is standardized by 3GPP. HSUPA alleviates uplink capacity bottlenecks, increases data throughput to 0.72 Mbps and 1.45 Mbps (peak) initially (evolving later to 5.8 Mbps peak), reduces latency, improves services e.g. wireless gaming and VoIP, and enables new services to deliver increased user satisfaction. The first HSUPA systems are now launched. According to GSA research, at least 14 networks have launched, or are testing or deploying HSUPA, and this figure will increase substantially throughout 2007. Together with HSDPA, HSUPA means a huge stride in network performance.

WCDMA/HSDPA and GSM/EDGE combination

Operators understand the need to ensure the best user experience for their customers. The current trend towards EDGE-capable GSM networks and devices is continuing. Many HSDPA network operators rely on GSM/EDGE for service continuity in areas where HSDPA coverage is not available. 51 out of 104, i.e. approaching half of commercially launched HSDPA networks have also launched EDGE, which delivers typical user data speeds up to 200 kbps, according to individual network capabilities. This strategy ensures that users will receive a good experience of most 3G services.

Globally, there are 263 GSM/EDGE operator commitments in 136 countries, of which 198 networks have launched commercial services in 105 countries.

Evolved GERAN (EDGE Evolution)

WCDMA evolution to HSDPA and HSUPA is the key driver for improving GSM/EDGE to minimize the performance gap. "Evolved GERAN" (GSM/EDGE Radio Access Network) aims to achieve several benefits with low impact on the GSM/EDGE network:

- 2–3 times increase in EDGE bit rates (up to 1 Mbps peak)
- 2–3 times spectral efficiency gain (for voice & data capacity)
- Halve latency (roundtrip time)

A Feasibility Study by 3GPP for Evolved GERAN has confirmed the work items for standardization by 3GPP as part of Release 7, which include:

- Dual carrier in the Downlink
- MS receive diversity
- Latency Reductions
- Higher Uplink Performance for GERAN Evolution

This improved data performance in GSM will be an important complement to high-speed WCDMA-HSPA networks, to satisfy the growing demand for data bandwidth and mobility. “Evolved GERAN” commercial solutions are expected in 2009. For the network infrastructure this will typically be achieved through a software upgrade of existing equipment.

GSM/3G Devices

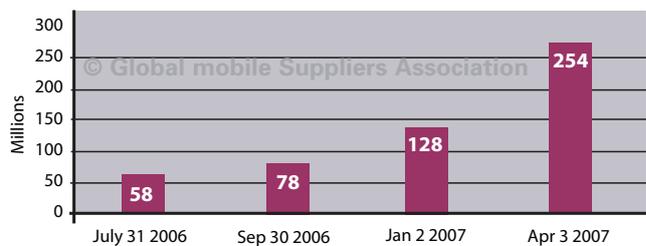
GSA regularly surveys 3G devices availability for GSM/EDGE and 3G/WCDMA-HSDPA voice and data services and applications. Industry commitment to the GSM/3G system is global and extremely positive.

According to GSA research, over 60 suppliers have launched in the region of 650 3G/WCDMA devices. WCDMA devices are competitive with traditional GSM products with regards to size, weight, battery life and cost. Over 200 WCDMA devices also incorporate EDGE in support of the growing trend for mobile network operators to deliver 3G voice and data services on combined GSM/EDGE-WCDMA infrastructures. GSM/EDGE has firmly entered the mainstream with more than 500 user devices launched.

According to a survey by GSA published on April 3, 2007 there are 254 HSDPA devices which have been launched by 62 suppliers. The HSDPA devices in this survey confirm how all market segments are addressed:

- 104 phones
- 54 PC datacards (PCMCIA cards and embedded modules)
- 43 notebooks
- 29 wireless routers
- 20 USB modems
- 3 Personal Media Players
- 1 camera with HSDPA-connectivity

HSDPA Device Launches
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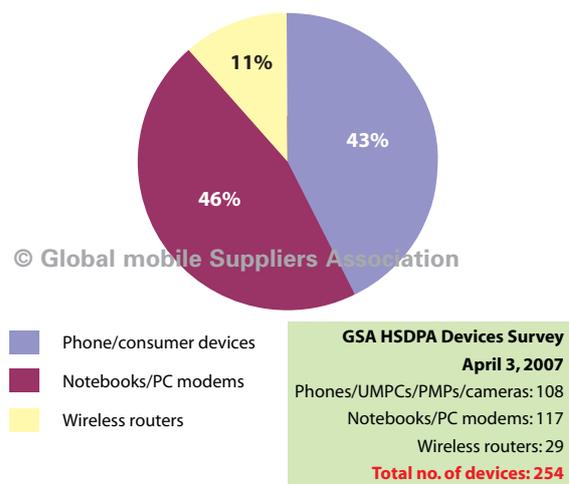
Source: GSA's HSDPA Devices surveys

Figure 3: HSDPA Device Launches
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The survey also confirms that 40 devices support, or can be upgraded for, a high-speed downlink capability of 7.2 Mbps peak according to network capabilities. At least 20 devices support, or can be upgraded for, HSUPA (High Speed Uplink Packet Access) delivering a data rate of 2.1 Mbps peak in the uplink direction.

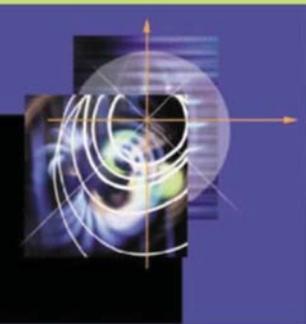
The figures confirm also how HSDPA is supporting the enterprise user. From the survey we can see that 117 devices have been brought onto the market enabling high speed broadband connectivity and full wide-area mobility for computer users. Fixed users e.g. notebook and

HSPA Device Segmentation
GSA survey - April 3, 2007



GSA HSDPA Devices survey
www.gsacom.com/gsm_3g/wcdma_databank.php4#HSDPA_Devices

Figure 4: HSDPA Devices segmentation
© Global mobile Suppliers Association



desktop PC users in offices and homes are also HSDPA-enabled. And there is a wide choice of wireless routers on the market supporting HSDPA as well as WCDMA, EDGE and GSM/GPRS.

3G Spectrum

The majority of GSM/3G systems (WCDMA, HSPA) operate in internationally designated IMT-2000 core band spectrum of 1920 – 1980 MHz paired with 2110 – 2170 MHz. This co-ordination facilitates maximum engineering and production efficiencies, and interoperability for roaming services.

Three operators – AT&T (formerly Cingular Wireless), USA, Rogers Wireless, Canada, and Telstra, Australia – have launched WCDMA-HSDPA networks and services in the 850 MHz band. According to the GSA HSDPA Devices survey, at least 72 WCDMA-HSDPA devices operate at 850 MHz. Increasingly many WCDMA-HSDPA devices are designed for tri-band operation, i.e. 850/1900/2100 MHz. Thus 3G deployment in the 850 MHz band using WCDMA-HSDPA is an attractive choice for other operators in Latin America, Asia Pacific and elsewhere who are planning to introduce 3G services in their respective markets.

3G/WCDMA-HSPA Market Acceptance

Operators globally are reporting strong market take-up and acceptance of 3G mobile broadband enabled by WCDMA-HSPA. Some examples are given:

Success story: Australia

When Telstra launched its nationwide mobile broadband WCDMA-HSPA network in October 2006, it brought broadband services to many remote communities for the very first time. Telstra built a 3.6 Mbps nationwide network reaching 98% of the country's population, and making it the world's largest HSPA network covering 1.9 million square kilometres. Take-up of HSPA datacards and HSPA mobile phones has been very encouraging, with HSPA revolutionizing the competitive landscape in Australia.

Success story: Austria

Mobilkom Austria launched HSDPA on its WCDMA network in January 2006, and attracted 140,000 new subscriptions within one year. HSDPA makes it possible to share pictures and videos in seconds, and real-time mobile video streaming.

Success story: Finland

According to a recent survey for Elisa, investigating 3G user experiences among Finns, 40% use 3G services and 25% are considering using them. In December 2005, only 1% of users had a 3G phone. The most wanted 3G services are email (60%), map and route services (49%)

and Internet (40%). Currently, there are more than 700,000 3G phones in use in Finland, compared with 50,000 a year ago. The amount of mobile data has increased more than five-fold, and usage of mobile Internet has more than tripled in the last year.

Success story: Hong Kong

SmarTone recently reported that first-half profit rose 17 percent on increased sales of the company's 3G (WCDMA-HSPA) services.

Success story: Hungary

On the 3G/HSDPA network of T-Mobile Hungary data traffic generated by customers increased almost 15 times within one year, compared with January 2006. Today 40% of total data traffic is transmitted through the broadband (3G/HSDPA) network. This rapid increase in traffic shows that mobile data transmission represents significant value both in business and for private lifestyles, and the experience justifies the decision to rapidly introduce HSDPA.

Success story: Japan

NTT DoCoMo reported a total subscriber base of 52.3 million at end February 2007, with 34 million (65%) subscribing to 3G/WCDMA services. This underlines the rapid expansion of 3G from less than 50% one year earlier. The number of 3G subscribers passed the number of 2G subscribers on June 18, 2006. 3G handsets and PC cards launched in August 2006 are HSDPA-capable, supporting 3.6 Mbps peak data in the downlink direction.

Success story: South Africa

MTN launched a 3G/WCDMA mobile broadband service in 2005 and added HSDPA capabilities to high usage sites, which launched in March 2006. HSDPA is positioned as a mobile broadband service, competing with fixed-line and other technologies. WCDMA-HSDPA has the advantage of being faster, cheaper and easier to deploy, proving that mobile broadband can be the main Internet connection for business and consumer users, in commercial centres, homes and rural and poor communities.

Success story: South Korea

SK Telecom has around 190,000 HSDPA users while KTF has around 87,000. KTF announced that less than one month after launching its nationwide handset HSDPA service SHOW, it attracted 40,916 subscribers.

Success story: United Arab Emirates

Etisalat reports having over 850,000 3G/WCDMA customers, with HSDPA covering over 90% of the populated areas of the UAE.

Success story: USA

During 2006 AT&T's HSDPA service rolled out to most of the largest 100 cities. Launching compelling services such as video clips and broadband Internet access proved the reality of mobile broadband, delivering rapid growth in data revenues and increased customer loyalty. Data ARPU increased 53% in Q4 06. Churn fell to 1.8% in Q4 06 from 2.4% in Q4 04.

GSM Gains Market Share in 2006

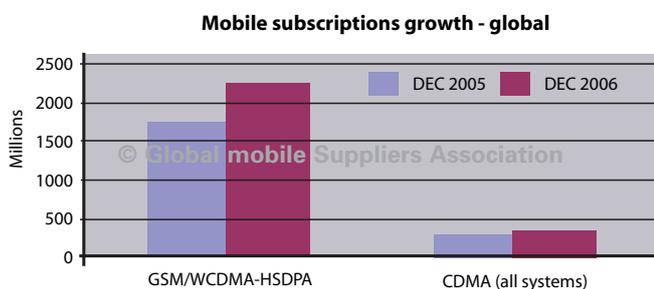
The global number of GSM subscriptions (including WCDMA-HSDPA) reached 2.255 billion at the end of 2006. It meant that the GSM family increased market share from 80.3% to 83.9% during 2006.

GSM added 511 million subscriptions in 2006. This was 81 million more than the total of all other cellular technologies combined i.e. TDMA, PDC, iDEN, all the analogue systems, cdmaOne, CDMA2000 1X, CDMA2000, and 1xEV-DO.

The new growth markets of Africa, Latin America, Asia, India and Russia drive subscriptions. Increasingly in these markets GSM provides the communications infrastructure, including Internet activity. According to the World Bank, the capital cost of providing mobile coverage to an individual is typically one-tenth of the cost of installing a new fixed-line connection, and GSM is the technology of choice having regard to performance, future proofing and total cost of ownership.

Mobile subscriptions growth - global

GSM added more than half a billion subscriptions in 2006



GSM/WCDMA-HSDPA added 511 million new subscriptions in 2006
Over 29% growth in 2006, total GSM/WCDMA up to 2,255 million
CDMA added 50.5 million in 2006; under 18% growth

Source: informa telecoms & media

Figure 5: Mobile subscriptions growth
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GSM performance by region

Africa

Having passed 100 million GSM mobile subscribers in June 2005, the market has powered on to pass 193 million by end January 2007. Growth exceeded 40% in the previous 12 months. There are over one million 3G/WCDMA subscriptions, with HSDPA commercially available in Namibia, South Africa and Tanzania.

Americas

GSM is the engine of growth in Latin America and the Caribbean, adding 82 million subscriptions in 2006 and climbing to a year end total for the region of over 211 million, with 63% growth in the year.

In under a year, three leading CDMA operators in the region, Vivo (Brazil), Movistar (Venezuela) and Movilnet (Venezuela), all announced plans to deploy GSM. Vivo and Movistar have now launched GSM services. GSA research confirms that 30 CDMA operators worldwide are choosing GSM either for an overlay to a CDMA network, or as its replacement.

In North America, the number of GSM users passed the 100 million milestone in January 2007.

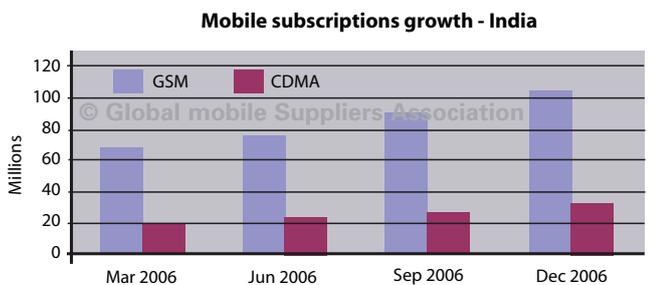
HSDPA is today commercially available in the Americas in Canada, Chile, Puerto Rico and USA. The first WCDMA-HSDPA system in Brazil is now being deployed.

Asia Pacific

The number of mobile users (all technologies) passed 1 billion in the region towards the end of 2006, and reached an estimated 1.052 billion by January 31, 2007. GSM stood at 875 million by that date (including 48 million 3G/WCDMA subscribers) to achieve over 83% market share. The world's largest mobile market, China, climbed to 451 million subscriptions, comprising 413 million GSM (for market share of 91.6 %) and 38 million CDMA subscribers.

In India, GSM passed 100 million subscribers during November 2006 and (according to COAI) reached 115.3 million by end February 2007. India is the world's fastest growing mobile market, with recent monthly growth between 4 and 5 million, similar to China. GSM is the prime contributor to the 200 million milestone reached by the telecom sector as a whole in February 2007.

Mobile subscriptions growth - India



Almost 47 million GSM subscriptions added in 2006 = 80% growth
 GSM gained over 75% share of the market in 2006
 4.5 million average GSM monthly growth in 2H 2006
 CDMA added 15 million in 2006

Source: informa telecoms & media

Figure 6: Mobile subscriptions growth in India
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HSDPA is commercially available in Australia, Cambodia, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, The Philippines, Singapore, South Korea, Sri Lanka and Taiwan

Europe

In Eastern Europe, the number of GSM subscribers had climbed to 347 million by the end of January 2007, including almost 10 million contributed by Russia in the previous 5 months. The number of WCDMA subscribers has tripled since April 2006, to reach 1 million 3G/WCDMA subscribers in January 2007.

In Western Europe, the number of GSM subscriptions reached an estimated 484 million by the end of January 2007, including over 50 million WCDMA subscriptions.

Growth is driven by the take-up of 3G. Since September 2006 two-thirds of new GSM subscriptions were for 3G/WCDMA.

HSDPA mobile broadband is commercially available in Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, the Isle of Man, Italy, Latvia, Lithuania, Madeira, Malta, Netherlands, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and the UK.

Middle East

The number of GSM subscribers is estimated at around 73 million for end January 2007, including 1.2 million WCDMA subscriptions. The number of WCDMA customers has tripled in 6 months.

HSDPA commercial services are launched in Bahrain, Israel, Kuwait, Saudi Arabia and UAE.

GSM/3G Market Intelligence

Keep up to date with regular visits to the GSA website as the one-stop place for the mobile industry for the latest information, charts and statistics covering GSM/EDGE and WCDMA-HSPA market developments, technology deployments, devices availability, subscription growth and much more.

Use the RSS feed to keep informed of latest news and announcements:
<http://www.gsacom.com/rss/gsanews.php4>



Or use GSA's new MOBI site from your mobile phone for news, facts, statistics and updates wherever you are:
<http://gsacom.mobi>



Upcoming industry events supported by GSA include:

Event	Date	Venue	Organizer
3GPP Workshop, PCG, OP	April 17-19	New Delhi	3GPP
Deploying HSPA	May 8-11	Munich	IIR
Mobile Vietnam	May 9-10	Hanoi	Informa
China Mobility	July 11-12	Beijing	Beacon Events
India Telecommunications	October 3-5	New Delhi	Beacon Events
GSA Mobile Broadband Forum	December 3	Hong Kong	GSA
Mobility World Congress	December 4-6	Hong Kong	Beacon Events

Full listing and more information at www.gsacom.com/events/index.php4

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