

# Mobile Broadband Update

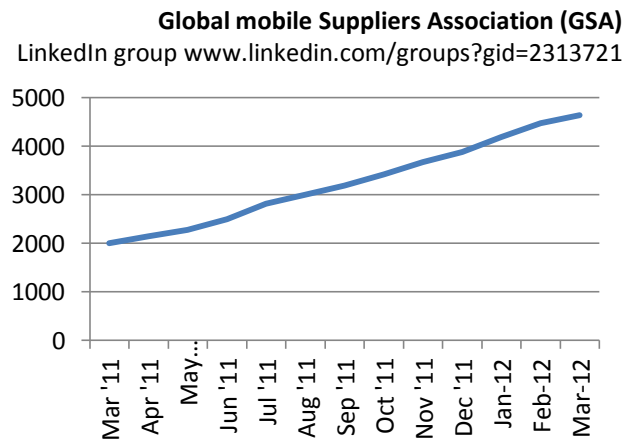
## HSPA, HSPA+ and LTE Developments Worldwide

*March 20, 2012*

GSA Secretariat  
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- ❑ A non-profit trade association representing suppliers - established October 2, 1998
  - ❑ Promote technologies: 3GPP family - GSM/EDGE, WCDMA-HSPA/HSPA+, LTE/LTE-A
- ❑ Trusted, authoritative source of facts, statistics and objective analysis for the industry globally
  - ❑ Produce regular reports on status of mobile broadband network deployments and development of the devices ecosystems
- ❑ Show thought-leadership, educate and influence using information papers and white papers
- ❑ Assist operators e.g. seminars, showcase success stories and viewpoints, case studies, joint papers, campaigns included HSPA/HSPA+, UMTS900, HD Voice (W-AMR), LTE, LTE1800.....
- ❑ GSA website [www.gsacom.com](http://www.gsacom.com) has true global reach
  - ❑ 47,300+ registered site users; growing by ~ 1,000 every 35 days
  - ❑ Social Networks: LinkedIn, Twitter, Facebook



# HSPA laid the foundation for Mobile Broadband success

- ❑ Mobile broadband began with WCDMA and its first evolution - HSPA
- ❑ 100% of WCDMA operators have deployed HSPA
  - ❑ 451 commercial HSPA networks in 174 countries\*
  - ❑ achieved in just over 6 years
- ❑ 891 million WCDMA mobile broadband subs (including 695 million HSPA) – *December 31, 2011*
- ❑ At least 3,362 HSPA user devices launched by 271 suppliers\*\*
  - ❑ 440 devices added to GSA's database in the past year
- ❑ Mobile broadband is driving traffic, revenue and profit growth in all markets
  - ❑ Most operators include mobile broadband in their service portfolio



\* GSA: HSPA Operator Commitments report, January 29, 2012  
 \*\* GSA: HSPA Devices Survey, January 24, 2012

WCDMA subscriptions data: Informa Telecoms and Media

# Evolution to HSPA+ is the main trend globally



HSPA+ delivers higher capacity and performance and an improved user experience of mobile broadband

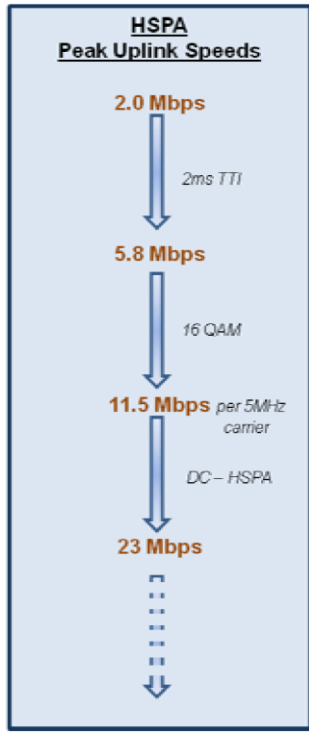
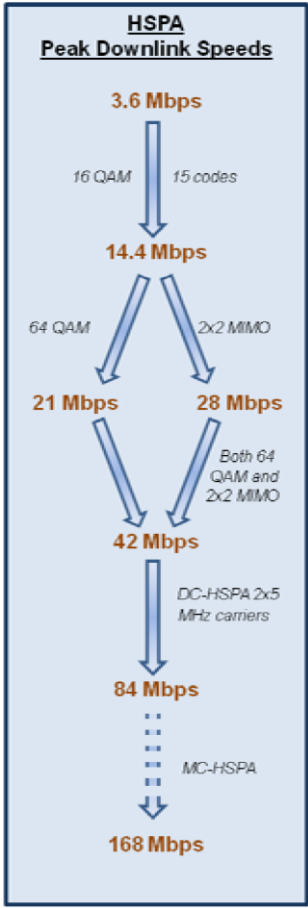
**> 41% of HSPA operators have launched HSPA+**

241 operators in 106 countries committed to HSPA+ deployments

187 HSPA+ systems commercially launched in 96 countries

62 operators have commercially launched 42 Mbps DC-HSPA+

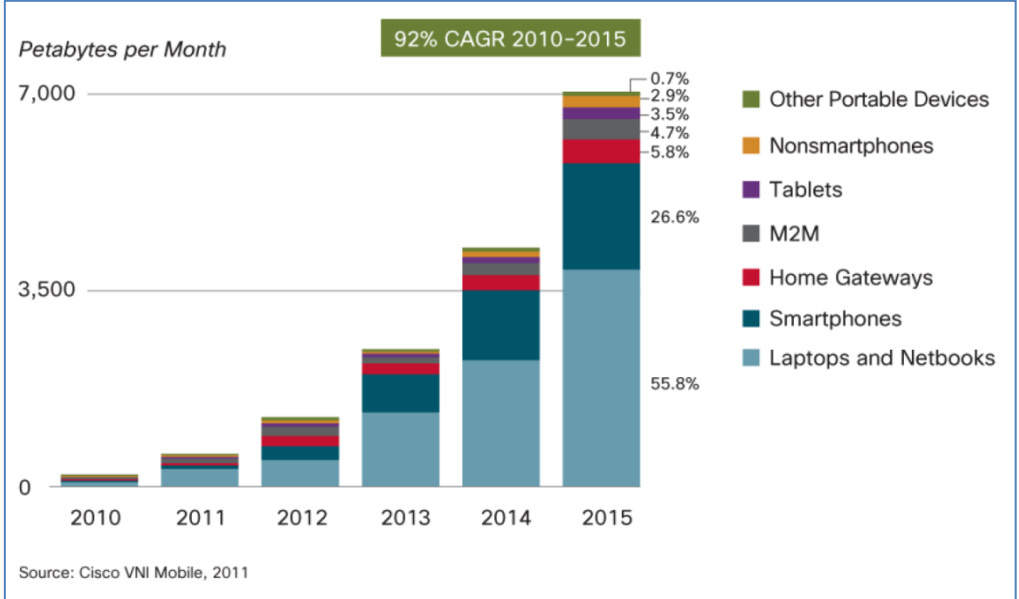
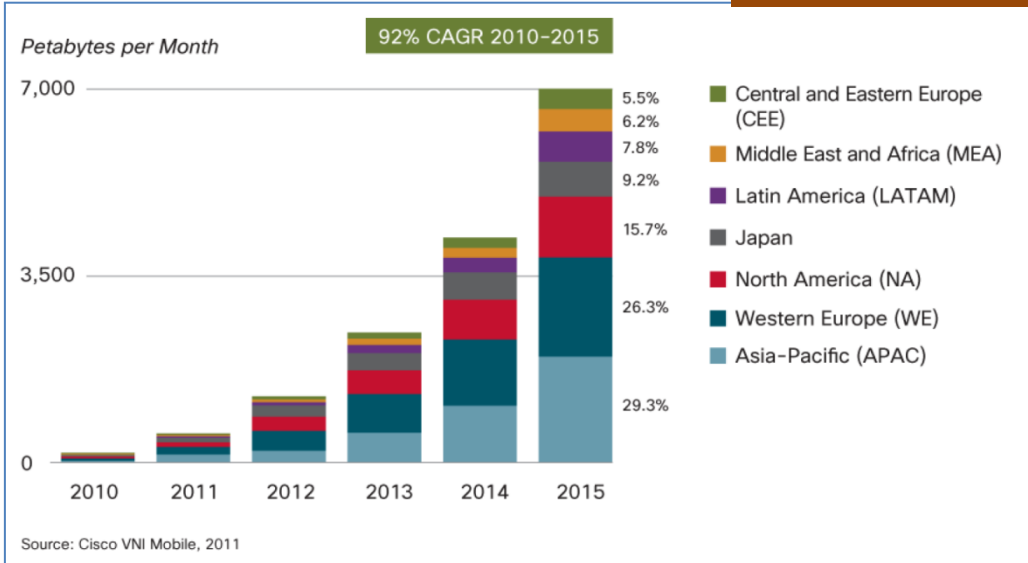
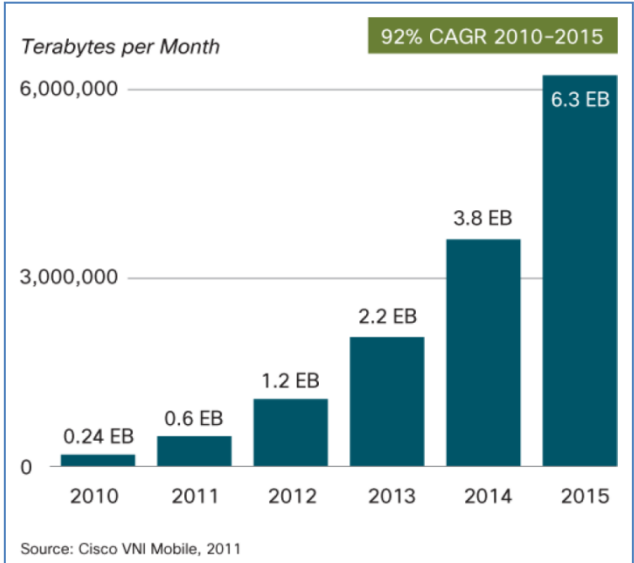
- ❑ 245 HSPA+ devices announced (compared to 92 a year ago)
  - ❑ 137 devices support 21 Mbps peak downlink speed
  - ❑ 14 devices support 28.8 Mbps
  - ❑ 93 devices support 42 Mbps DC-HSPA+ (22 a year ago)
  - ❑ 1 device supports 84 Mbps
  
- ❑ 27 HSPA+ smartphones (including carrier and frequency variants) are confirmed



**HSPA+ is mainstream**



Global mobile data traffic



- In 2011 global mobile data traffic grew 133%. Cisco says mobile data will grow another 110% in 2012
- Global mobile data traffic to grow 18 x 2011 - 2016
- By 2016 video is expected to make up 71% percent of all mobile data traffic (2011 = 52%)
- By 2016 there will be more than 10 billion mobile Internet connections

**Laptops and smartphones lead traffic growth**  
 Cisco said in 2011 average traffic per smartphone = 150 Mbytes/ month (55 Mbytes/month in 2010)  
 Smartphones represent 12% of total global handsets in use today, but are responsible for > 82% of total global handset traffic

- The primary drive towards LTE comes from the need for network capacity, performance management and efficiency
- Opportunities for new products/services
- Opportunities for revenue growth
  - LTE could be a tool to charge more for mobile data
  - much faster uplink
  - lower latency
  - some new video-based services might only be possible using LTE



## The Video tsunami



- 86,000 hours of footage uploaded every day
- An hour's footage is uploaded to the site every second
- More than 4 billion video views per day

*Mobile taking a growing share of access .....*

**301 operators are investing in LTE in 95 countries**

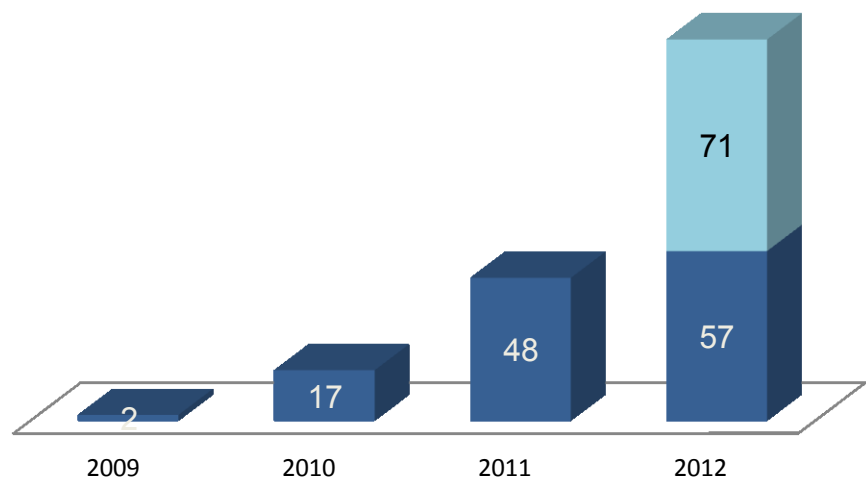
242 operator commitments in 81 countries  
59 pre-commitment trials in 14 more countries

**57 commercial networks in 32 countries**

GSA forecasts 128 commercial LTE networks in 56 countries by end 2012

*GSA – Evolution to LTE report  
March 13, 2012*

LTE commercial networks - cumulative



57 commercial LTE networks at March 13, 2012



**301 operators in 95 countries investing in LTE**

- 242 commercial LTE network commitments in 81 countries
- 59 pre-commitment trials in additional 14 countries
- 57 commercial LTE networks launched in 32 countries

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■ Countries with commercial LTE service  
■ Countries with LTE commercial network deployments on-going or planned  
■ Countries with LTE trial systems (pre-commitment)

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301 operators are investing in LTE in 95 countries

242 firm operator commitments to deploy LTE in 81 countries

59 pre-commitment trials in another 14 countries

57 commercial networks in 32 countries

Country	Operator	Launch
Norway	TeliaSonera	14.12.09
Sweden	TeliaSonera	14.12.09
Uzbekistan	MTS	28.07.10
Uzbekistan	UCell	09.08.10
Poland	Aero2/Mobyland/CenterNet (LTE TDD from 10.05.11)	07.09.10
USA	MetroPCS	21.09.10
Austria	A1 Telekom	05.11.10
Sweden	TeleNor Sweden	15.11.10
Sweden	Tele2 Sweden	15.11.10
Hong Kong	CSL Limited	25.11.10
Finland	TeliaSonera	30.11.10
Germany	Vodafone	01.12.10
USA	Verizon Wireless	05.12.10
Finland	Elisa	08.12.10
Denmark	TeliaSonera	09.12.10
Estonia	EMT	17.12.10
Japan	NTT DoCoMo	24.12.10
Germany	Deutsche Telekom	05.04.11
Philippines	Smart Communications	16.04.11
Lithuania	Omnitel	28.04.11
Latvia	LMT	31.05.11
Singapore	M1	21.06.11
South Korea	SK Telecom	01.07.11
South Korea	LG U+	01.07.11
Germany	O2	01.07.11
Canada	Rogers Wireless	07.07.11
Austria	T-Mobile	28.07.11
USA	Mosaic Telecom	July 2011

Canada	Bell Mobility	14.09.11
Saudi Arabia	Mobily (LTE TDD)	14.09.11
Saudi Arabia	STC (LTE TDD)	14.09.11
Saudi Arabia	Zain	14.09.11
USA	AT&T Mobility	18.09.11
UAE	Etisalat	25.09.11
Australia	Telstra	27.09.11
Denmark	TDC	10.10.11
Austria	3	18.11.11
Puerto Rico	AT&T Mobility	20.11.11
Puerto Rico	Claro	24.11.11
Belarus	Yota Bel	01.12.11
Kyrgyzstan	Saima Telecom	09.12.11
Brazil	Sky Brazil (LTE TDD)	13.12.11
Finland	DNA	13.12.11
Uruguay	Antel	13.12.11
USA	Cricket	21.12.11
Singapore	SingTel	22.12.11
Kuwait	Viva	27.12.11
Armenia	Vivacell-MTS	28.12.11
Bahrain	Viva Bahrain	01.01.12
Hungary	T Mobile	01.01.12
South Korea	KT	03.01.12
Russia	Yota	15.01.12
Canada	TELUS	10.02.12
USA	Peoples Telephone Co-op	14.02.12
Japan	Softbank (LTE TDD)	24.02.12
Portugal	TMN (Portugal Telecom)	12.03.12
Portugal	Vodafone Portugal	12.03.12



Evolution to LTE report  
March 13, 2012



# 301 operators investing in LTE



## 242 LTE commitments in 81 countries

Country	Operator	Expected launch
Norway	TeliaSonera	Launched 14.12.09
Sweden	TeliaSonera	Launched 14.12.09
Uzbekistan	MTS	Launched 28.07.10
Uzbekistan	Ucell	Launched 09.08.10
Poland	Mobyland and CenterNet	Launched 07.09.10
USA	MetroPCS	Launched 21.09.10
Austria	A1 Telekom	Launched 05.11.10
Sweden	TeliaNor Sweden	Launched 15.11.10
Sweden	Tele2 Sweden	Launched 15.11.10
Hong Kong	CSL Limited	Launched 25.11.10
Finland	TeliaSonera	Launched 30.11.10
Germany	Vodafone	Launched 01.12.10
USA	Verizon Wireless	Launched 05.12.10
Finland	Elisa	Launched 08.12.10
Denmark	TeliaSonera	Launched 09.12.10
Estonia	EMT	Launched 17.12.10
Japan	NTT DoCoMo	Launched 24.12.10
Germany	Deutsche Telekom	Launched 05.04.11
Philippines	Smart Communications	Launched 16.04.11
Lithuania	Oriontel	Launched 28.04.11
Singapore	M1	Launched 21.06.11
Latvia	LMT	Launched 31.05.11
South Korea	SK Telecom	Launched 01.07.11
South Korea	LG U+	Launched 01.07.11
Canada	O2 (Telefonica)	Launched 07.07.11
Canada	Rogers Wireless	Launched 07.07.11
Austria	T Mobile	Launched 28.07.11
USA	Mosaic Telecom	Launched July 2011
Canada	Bell Mobility	Launched 14.09.11
Saudi Arabia	Mobily (LTE TDD)	Launched 14.09.11
Saudi Arabia	SATC (LTE TDD)	Launched 14.09.11
Saudi Arabia	Zain	Launched 14.09.11
USA	AT&T Mobility	Launched 18.09.11
UAE	Etisalat	Launched 25.09.11
Australia	Telstra	Launched 27.09.11
Denmark	TDC	Launched 10.10.11
Austria	3	Launched 18.11.11
Puerto Rico	AT&T Mobility	Launched 20.11.11
Puerto Rico	Claro	Launched 24.11.11
Belarus	Uya Bel	Launched 01.12.11
Kyrgyzstan	Saima Telecom	Launched 09.12.11
USA	Sky Brazil (LTE TDD)	Launched 13.12.11
Finland	DNA	Launched 13.12.11
Uruguay	Antel	Launched 13.12.11
USA	Leap Wireless/Cricket	Launched 21.12.11
Singapore	SingTel	Launched 22.12.11
Kuwait	Viva	Launched 27.12.11
Armenia	Vivacell-MTS	Launched 28.12.11
Bahrain	Viva	Launched 01.01.12
Hungary	T Mobile	Launched 01.01.12
South Korea	KT	Launched 03.01.12
Russia	Yota	Launched 15.01.12
Canada	Telus	Launched 10.02.12
USA	Peoples Telephone Co-op	Launched 14.02.12
Japan	Softbank Mobile (LTE TDD)	Launched 24.02.12
Portugal	TMN (Portugal Telecom)	Launched 12.03.12
Portugal	Vodafone Portugal	Launched 12.03.12
Andorra	Andorra Telecom	2012
Angola	Movicel	2012
Australia	NBN Co (LTE TDD)	2012
Australia	Optus	2012
Australia	Vivid Wireless (LTE TDD)	2012
Azerbaijan	Azericell	2012
Bahamas	BTCom	2012
Belgium	Belgacom (Proximus)	2012
Belgium	Mobistar	2012
Canada	MTS Allstream	2012
Canada	Sasktel	2012
China	China Mobile (LTE TDD)	2013
China	China Telecom	2012
Colombia	Une-EPM	2012
Costa Rica	Claro	2012
Costa Rica	ICE	2012
Croatia	VIPNet	2012
Croatia	T-Hrvatski Telekom	2012

Denmark	3 Denmark	2012
Denmark	TeleNor	2012
Ghana	Glo Mobile	2012
India	Augere (LTE TDD)	2012
India	Reliance (LTE TDD)	2012
India	Bharti Airtel (LTE TDD)	2012
India	Qualcomm India LTE Venture	2012
Italy	3 Italia	2012
Japan	eMobile	2012
Japan	KDDI	2012
Jordan	Zain	2012
Lithuania	Tele2	2012
Malaysia	P1 Networks (LTE TDD)	2012
Malaysia	Asiaspace (LTE TDD)	2012
Mexico	Telcel	2012
Moldova	Moldcell	2012
Montenegro	Telenor	2012
Nepal	Ncell	2012
Norway	TeleNor	2012
Paraguay	Vox	2012
Philippines	Globe	2012
Portugal	Sonasecom/Optimus	2012
Puerto Rico	Open Mobile	2012
Russia	Antares Group	2012
Russia	Rostelecom (LTE TDD)	2012
South Africa	Vodacom	2012
Switzerland	Swisscom	2012
Russia	MTS (LTE TDD)	2013
Russia	Vimpelcom	2012
Russia	Tele2	2012
Russia	Megafon	2012
Singapore	StarHub	2012
Slovenia	Mobitel	2012
South Africa	WBS	2012
Spain	Orange	2012
Sweden	H3G	2012
Switzerland	Orange	2012
UAE	Du	2012
UK	Everything Everywhere	2012
UK	UK Broadband (3.5 GHz band)	2012
USA	Aircell	2012
USA	BayRiCS	2012
USA	Bluegrass Cellular	2012
USA	C Spire Wireless	2012
USA	Cellcom	2012
USA	CenturyLink	2012
USA	Cross Telephone	2012
USA	Lightsquared	2012
USA	NorthwestCell	2012
USA	Pioneer Cellular	2012
USA	Sprint	2012
USA	US Cellular	2012
Uzbekistan	Beeline	2012-13
France	Orange	2012-13
Ireland	Hutchison 3	2012-13
Switzerland	Sunrise	2012-13
Italy	Vodafone	2013
Italy	Wind	2013
Malaysia	DiGi	2013
Malaysia	Maxis	2013
Mexico	Telefonica	2013
Monaco	Monaco Telecom	2013
Nepal	Nepal Telecom (LTE TDD)	2013
UK	O2	2013
UK	Virgin	2013
USA	T-Mobile USA	2013
Bulgaria	M-Tel	2013-14
Armenia	Armentel	To be confirmed
Armenia	Orange Armenia	To be confirmed
Australia	EnergyAustralia Ausgrid	To be confirmed
Australia	VIA	To be confirmed
Austria	VIA	To be confirmed
Austria	Orange	To be confirmed
Azerbaijan	Azerfon	To be confirmed
Azerbaijan	Bakcell	To be confirmed
Bahrain	Zain	To be confirmed
Belarus	BeST (Life)	To be confirmed
Belgium	KPN Base	To be confirmed
Brazil	Vivo (Telefonica)	To be confirmed
Canada	Videotron	To be confirmed
Chile	Entel PCS	To be confirmed

Chile	Movistar	To be confirmed
Chile	Claro	To be confirmed
China	Veiatel-Aerostrong (LTE TDD)	To be confirmed
Colombia	Tigo	To be confirmed
Estonia	Elisa	To be confirmed
Estonia	Tele2	To be confirmed
France	Bouygues Telecom	To be confirmed
France	SFR	To be confirmed
Germany	E Plus	To be confirmed
Greece	Cosmote	To be confirmed
Hong Kong	SmarTone-Vodafone	To be confirmed
Hong Kong	Hutchison 3 (FDD and TDD)	To be confirmed
Hong Kong	PCCW	To be confirmed
Hong Kong	China Mobile (FDD and TDD)	To be confirmed
Hong Kong	21 Vianet Group (LTE TDD)	To be confirmed
Hungary	Telenor Magyarorszag	To be confirmed
India	Tikona Digital (LTE TDD)	To be confirmed
Indonesia	Indosat	To be confirmed
Indonesia	Telkomsel	To be confirmed
Indonesia	XL Axiata	To be confirmed
Israel	Cellcom	To be confirmed
Israel	Telecom Italia	To be confirmed
Jamaica	Claro	To be confirmed
Jersey	Clear Mobitel	To be confirmed
Kazakhstan	Kcell	To be confirmed
Kuwait	Zain	To be confirmed
Latvia	Bite	To be confirmed
Latvia	Tele2	To be confirmed
Lebanon	MTC Touch	To be confirmed
Libya	Al Madar	To be confirmed
Luxembourg	Orange	To be confirmed
Malaysia	U Mobile	To be confirmed
Moldova	Orange	To be confirmed
Namibia	Leo (Cell One)	To be confirmed
Namibia	MTC	To be confirmed
Netherlands	KPN	To be confirmed
Netherlands	Vodafone	To be confirmed
Netherlands	T Mobile	To be confirmed
Netherlands	Ziggo 4	To be confirmed
Netherlands	Tele2	To be confirmed
New Zealand	Telecom NZ	To be confirmed
New Zealand	Vodafone NZ	To be confirmed
Nigeria	Globacom	To be confirmed
Nigeria	Zoda Fones (LTE TDD)	To be confirmed
Oman	Orantel	To be confirmed
Philippines	Pitit	To be confirmed
Philippines	Bayan Telecommunications	To be confirmed
Poland	ERA/T-Mobile	To be confirmed
Qatar	Qtel	To be confirmed
Romania	Orange	To be confirmed
Romania	Vodafone	To be confirmed
Russia	Base Telecom (LTE TDD)	To be confirmed
South Africa	Cell C	To be confirmed
South Africa	MTN	To be confirmed
South Africa	8ta	To be confirmed
Spain	Telefonica	To be confirmed
Spain	Vodafone	To be confirmed
Spain	Yoigo	To be confirmed
Sri Lanka	Dialog Axiata	To be confirmed
Sri Lanka	Mobitel	To be confirmed
Taiwan	Global Mobile (LTE TDD)	To be confirmed
Taiwan	Chunghua Telecom	To be confirmed
Tunisia	Tunisiana	To be confirmed
UK	Vodafone	To be confirmed
Uruguay	Dedicado (LTE TDD)	To be confirmed
USA	Agri-Valley Broadband	To be confirmed
USA	Appalachian Wireless	To be confirmed
USA	Alaska Communications	To be confirmed
USA	Carolina West Wireless	To be confirmed
USA	Charlton Valley Comms	To be confirmed
USA	Custer Telephone	To be confirmed
USA	Etex Telephone Co-op	To be confirmed
USA	Comnet Wireless	To be confirmed
USA	Convergence Technologies	To be confirmed
USA	O2 Secure Wireless	To be confirmed
USA	Panhandle Telephone Co-op	To be confirmed
USA	Peoples Telephone Co-op	To be confirmed
USA	S and R Communications	To be confirmed
USA	S&T Telephone Cooperative	To be confirmed

USA	SpeedConnect	To be confirmed
USA	Strata Networks	To be confirmed
USA	Texas Energy Network	To be confirmed
USA	Thumb Cellular	To be confirmed
USA	United Wireless	To be confirmed
USA	Public Service Wireless	To be confirmed
USA	City of Charlotte Council	To be confirmed
Vietnam	RusViet Telecom	To be confirmed

## 59 pre-commitment LTE network trials

Country	Operator
Abkhaz	Aquafon
Angola	Unitel
Argentina	Telefonica
Argentina	Personal
Bahrain	Batelco
Belarus	MTS
Belgium	Telenet
Bolivia	Entel Movil
Brazil	Algar Telecom (CTBC)
Brazil	Claro
Brazil	Oi
Brazil	Sao Paulo Military Police
Brazil	Army – trials planned, pending approval
Bulgaria	Vivacom
Canada	Wind Mobile
Canada	Xplornet (LTE TDD)
Czech Republic	O2 (Telefonica)
Dominican Republic	Orange Dominicana
Egypt	Vodafone
Egypt	Mobilni
Egypt	Etisalat Misr
Georgia	Magicom
India	BSNL – study phase LTE TDD
India	MTNL – study phase LTE TDD
Indonesia	Bakrie Telecom
Indonesia	Mank Telecom
Latvia	Triatel
Latvia	Lattelecom
Lithuania	Bite
Kazakhstan	Beeline
Kazakhstan	Tele2
Kenya	Safaricom
Malaysia	Cellcom
New Zealand	Kordia – study phase
New Zealand	Woosh – study phase
Nigeria	Starcomms – study phase
Oman	Nawras
Peru	Telefonica
Qatar	Vodafone Qatar
Russia	OAO VoenTelecom
Slovak Republic	O2 (Telefonica)
Slovak Republic	Orange
Slovak Republic	T-Mobile Slovensko
Slovenia	Si.mobil
South Africa	Neotel
Taiwan	Fitel (LTE TDD)
Thailand	DPC/AIS
Thailand	AIS – TOT
Thailand	True Move
Turkey	Avea
Turkey	Turkcell
UK	3 UK
UK	Clear Mobitel
UK	Arqiva
Ukraine	MTS-Ukraine
USA	Dish Network seeking FCC approval

**GSA** Evolution to LTE report  
March 13, 2012



# LTE prime spectrum bands

- ❑ In Europe, APAC etc. 2.6 GHz is new spectrum and the main LTE capacity band
- ❑ 2.6 GHz auctions are completed in many markets incl. Austria, Belgium, Denmark, Estonia, Finland, France, Germany, HK, Italy, Netherlands, Norway, Portugal, Singapore, Spain, Sweden
- ❑ Digital Dividend is new spectrum for coverage
- ❑ Initial network launches are mainly LTE-FDD. The most common frequencies used for LTE are:

700 MHz: band 13, band 17  
 800 MHz: band 20  
 1800 MHz: band 3  
 2600 MHz: band 7

*Deployments made in other bands include 2.1 GHz (band 1), AWS (band 4), 900 MHz (band 8), 850 MHz (Japan - various), 1700 MHz (band 9), etc.....*

- ❑ 5 commercial LTE TDD networks launched

E-UTRA Operating Band	Band name	Uplink (UL) operating band BS receive UE transmit		Downlink (DL) operating band BS transmit UE receive		Duplex Mode
		F <sub>UL_low</sub>	F <sub>UL_high</sub>	F <sub>DL_low</sub>	F <sub>DL_high</sub>	
1	2.1 GHz	1920 MHz	1980 MHz	2110 MHz	2170 MHz	FDD
2	PCS 1900	1850 MHz	1910 MHz	1930 MHz	1990 MHz	FDD
3	1800 MHz	1710 MHz	1785 MHz	1805 MHz	1880 MHz	FDD
4	AWS	1710 MHz	1755 MHz	2110 MHz	2155 MHz	FDD
5	850 MHz	824 MHz	849 MHz	869 MHz	894 MHz	FDD
6 <sup>1</sup>	850 MHz (Japan #1)	830 MHz	840 MHz	875 MHz	885 MHz	FDD
7	2.6 GHz (IMT Ext)	2500 MHz	2570 MHz	2620 MHz	2690 MHz	FDD
8	900 MHz	880 MHz	915 MHz	925 MHz	960 MHz	FDD
9	1700 MHz (Japan #2)	1749.9 MHz	1784.9 MHz	1844.9 MHz	1879.9 MHz	FDD
10	Ext 1.7/2.1 GHz	1710 MHz	1770 MHz	2110 MHz	2170 MHz	FDD
11	1500 MHz lower (Japan #3)	1427.9 MHz	1447.9 MHz	1475.9 MHz	1495.9 MHz	FDD
12	Lower 700 MHz	699 MHz	716 MHz	729 MHz	746 MHz	FDD
13	Upper C 700 MHz	777 MHz	787 MHz	746 MHz	756 MHz	FDD
14	Upper D 700 MHz public safety/private	788 MHz	798 MHz	758 MHz	768 MHz	FDD
15	Reserved			Reserved		FDD
16	Reserved			Reserved		FDD
17	Lower B, C 700 MHz AT&T blocks	704 MHz	716 MHz	734 MHz	746 MHz	FDD
18	850 MHz (Japan #4)	815 MHz	830 MHz	860 MHz	875 MHz	FDD
19	850 MHz (Japan #5)	830 MHz	845 MHz	875 MHz	890 MHz	FDD
20	CEPT800	832 MHz	862 MHz	791 MHz	821 MHz	FDD
21	1500 MHz (Japan #6)	1447.9 MHz	1462.9 MHz	1495.9 MHz	1510.9 MHz	FDD
24	US L-Band	1626.5 MHz	1660.5 MHz	1525 MHz	1559 MHz	FDD
...						
33	TDD 2000 Lower	1900 MHz	1920 MHz	1900 MHz	1920 MHz	TDD
34	TDD 2000 Upper	2010 MHz	2025 MHz	2010 MHz	2025 MHz	TDD
35	TDD 1900 Lower	1850 MHz	1910 MHz	1850 MHz	1910 MHz	TDD
36	TDD 1900 Upper	1930 MHz	1990 MHz	1930 MHz	1990 MHz	TDD
37	PCS Center Gap	1910 MHz	1930 MHz	1910 MHz	1930 MHz	TDD
38	IMT Extension Gap	2570 MHz	2620 MHz	2570 MHz	2620 MHz	TDD
39	China TDD	1880 MHz	1920 MHz	1880 MHz	1920 MHz	TDD
40	2300 MHz	2300 MHz	2400 MHz	2300 MHz	2400 MHz	TDD
41	US 2600	2496 MHz	2690 MHz	2496 MHz	2690 MHz	TDD
42	3500 MHz	3400 MHz	3600 MHz	3400 MHz	3600 MHz	TDD
43	3700 MHz	3600 MHz	3800 MHz	3600 MHz	3800 MHz	TDD

Note 1: Band 6 is not applicable  
 Source: 3GPP TS 36.104 V10.2.0 (2011-04)

**LTE TDD: summary of network plans, commitments, trials, deployments**

JOIN GSA's LTE TDD LINKEDIN GROUP  
[www.linkedin.com/groups?gid=3978061](http://www.linkedin.com/groups?gid=3978061)

**Global TD-LTE Initiative**  
*The Global TD-LTE Initiative (GTI) aims to bring together leading industry partners to steer the TD-LTE ecosystem as a major standard in mobile broadband technology & drive the development of next generation mobile broadband networks. Website: [www.lte-tdd.org](http://www.lte-tdd.org)*

Australia	WiMAX™ operator Vivid Wireless trialed LTE TDD in Sydney for 2 months from December 2010 in high demand, high density, inner city conditions. Commercial launch is expected by 2012. NBN Co is deploying a 2.3 GHz fixed-wireless LTE TDD network to serve rural areas
Brazil	<b>Sky Brazil launched a commercial LTE TDD network in December 2011</b>
Canada	WiMAX™ operator Xplornet has successfully trialed LTE TDD in 2.5 GHz and 3.5 GHz spectrum over existing WiMax infrastructure.
China	China Mobile has launched large-scale LTE TDD trials which will be extended in 2012 to 20,000 base sites. Commercial services are expected to begin in 2013
Denmark	3 acquired 2.6 GHz TDD spectrum and is deploying a combined LTE FDD/TDD network
France	Orange has deployed a trial LTE network in Paris supporting FDD and TDD modes. FDD-TDD co-existence tests are on-going
Germany	E-Plus, a member of the Global TD-LTE Initiative, is trialling LTE TDD in 2.6 GHz
Hong Kong	LTE TDD spectrum obtained by China Mobile, 21 Vianet Group, and Hutchison 3 HK
India	<ul style="list-style-type: none"> <li>RIL has committed to deploy LTE TDD</li> <li>Bharti Airtel, a member of the Global TD-LTE Initiative, is deploying LTE TDD</li> <li>Qualcomm India LTE Venture is committed to LTE TDD deployment.</li> <li>Tikona Digital will deploy LTE TDD</li> <li>Augere is deploying LTE TDD</li> <li>BSNL may introduce LTE TDD</li> <li>MTNL may introduce LTE TDD</li> </ul>
Ireland	LTE TDD testing was completed June 2010
Japan	<b>Softbank Mobile launched a commercial LTE TDD network in February 2012</b>

Malaysia	<ul style="list-style-type: none"> <li>WiMAX™ operator Packet Networks (P1) is planning to deploy LTE TDD on existing sites as an overlay network.</li> <li>WiMAX™ operator Asiaspace is planning to deploy 2.3 GHz LTE TDD</li> </ul>
Nepal	Nepal Telecom is deploying 2.3 GHz LTE TDD
Nigeria	Zoda Fones is deploying LTE TDD in 3.5 GHz
Oman	Omantel has showcased LTE TDD and plans deployment, also became the first Arab network to join the Global TD-LTE Initiative
Poland	<b>Aero2 launched LTE TDD in Band 38 (2.6 GHz), part of Aero2's dual LTE network (LTE TDD and LTE1800 FDD). Aero2 is a member of the Global TD-LTE Initiative</b>
Russia	<ul style="list-style-type: none"> <li>Rostelecom is reported to have approval to deploy LTE TDD network in 2.3 GHz spectrum</li> <li>Voentelecom is trialling LTE TDD</li> </ul>
Saudi Arabia	<ul style="list-style-type: none"> <li><b>Etisalat launched a commercial LTE TDD network in September 2011</b></li> <li><b>STC launched a commercial LTE TDD network in September 2011</b></li> </ul>
Sweden	3 acquired 2.6 GHz TDD spectrum and is deploying a combined LTE FDD/TDD network
Taiwan	<ul style="list-style-type: none"> <li>CHT has completed LTE tests on the high-speed rail system using TDD and FDD modes in 2.6GHz spectrum</li> <li>FarEasTone and China Mobile are co-operating on an LTE TDD trial in Taipei</li> <li>The National Chiao Tung University conducted a trial of LTE TDD in 2010</li> <li>WiMAX operator Global Mobile Corp will seek approval to allow a switch to LTE TDD once WiMAX coverage hits 70% of the population</li> <li>Fitel (PHS, WiMAX operator) trialling LTE TDD</li> </ul>
Thailand	AIS – TOT joint trial in 2.3 GHz band
Uruguay	Dedicado planning deployment in 3.5 GHz
USA	<p>Clearwire requested 3GPP to standardize LTE TDD for operation in the band 2496 – 2690 MHz and in August 2011 announced plans to deploy LTE TDD in this band as an overlay to its existing network.</p> <p>Clearwire is a member of the Global TD-LTE Initiative</p>
Various	US-based VelaTel Global Communications has joined the Global TD-LTE Initiative, and has BWA projects in various markets including in China e.g via its JV with Aerostrong

**LTE TDD commercial network launches**

Aero2, Poland

Etisalat, Saudi Arabia

STC, Saudi Arabia

Sky Brazil

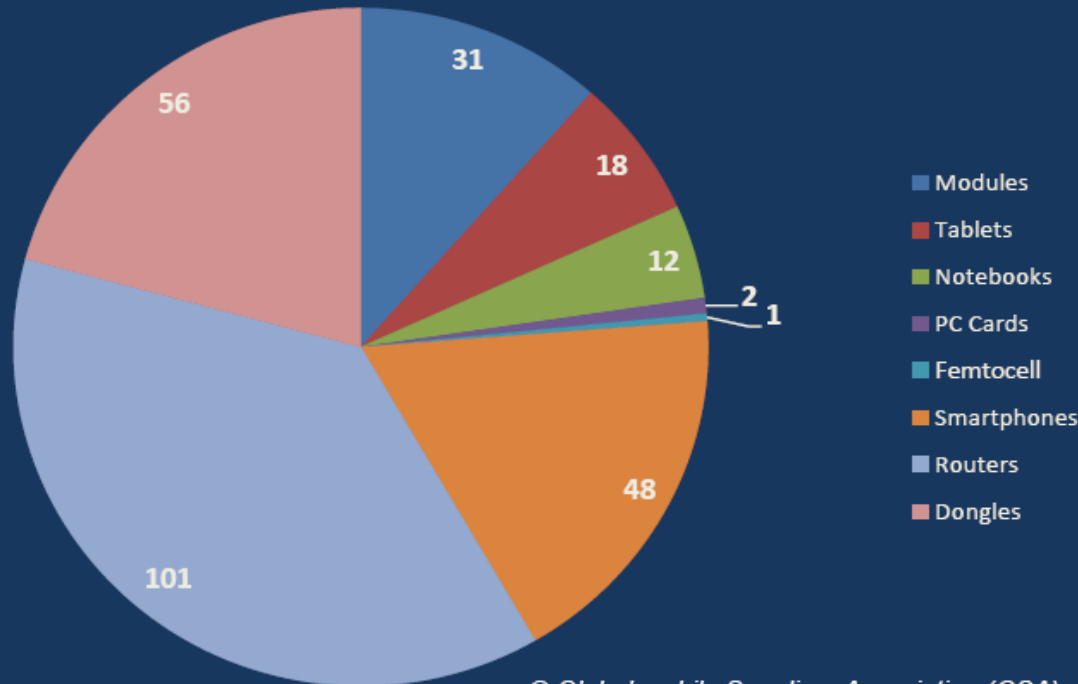
Softbank, Japan

# LTE Devices: 269 products launched



www.gsacom.com

57 manufacturers



© Global mobile Suppliers Association (GSA)

36% increase in LTE devices announced in 3 months

Over 200 LTE user devices launched in past year

LTE smartphone devices increased 6-fold in 6 months

LTE-enabled tablets more than doubled in 6 months

LTE FDD	
700 MHz	142 devices
800 MHz	52 devices
1800 MHz	50 devices
2600 MHz	65 devices
800/1800/2600 MHz	43 devices
AWS	51 devices

LTE TDD	
2300 MHz Band 40	36 devices
2600 MHz Band 38	36 devices
2600 MHz Band 41	5 devices

Source of data: Status of the LTE Ecosystem report – GSA  
January 20, 2012



GAMBoD, the **GSA** Analyzer for **M**obile **B**roadband **D**evices, is a unique search and analysis tool developed by GSA allowing searches of our mobile broadband devices databases by supplier, form factor, features, peak downlink and uplink speeds, and operating frequency. Results are presented as a list, or as a spreadsheet, or in charts. Users may subscribe to an RSS feed to receive alerts as new devices are added to the databases. Charts may be inserted into documents or presentations, subject to accreditation of GSA as the source.

There are two GAMBoD tools:

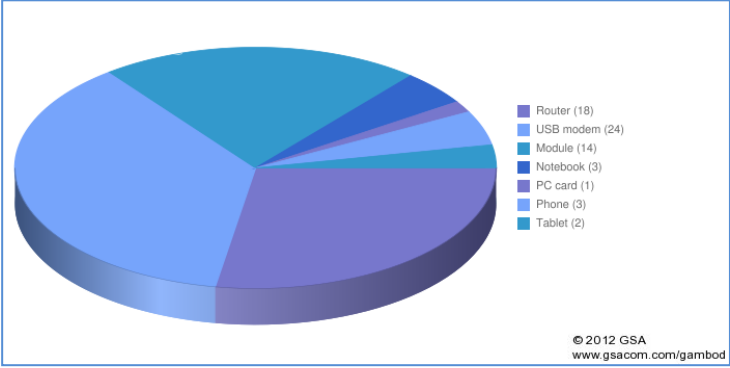
**GAMBoD – HSPA** (for HSPA, HSPA+ and DC-HSPA+ user devices)  
**GAMBoD – LTE** (for LTE user devices)

© GSA – Global mobile Suppliers Association

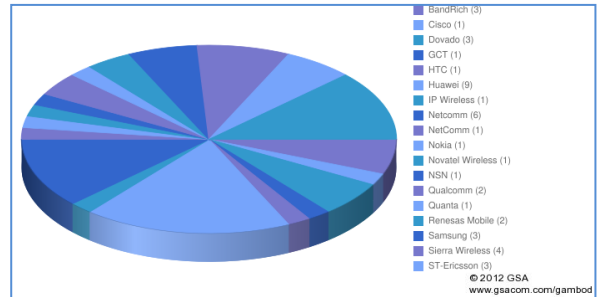


[www.gsacom.com/gambod](http://www.gsacom.com/gambod)

*GAMBoD is available only to individual qualified site users, whom GSA defines as representatives of GSA Member companies who have registered using their corporate email address, or representatives of network operators who have registered using their corporate email address*



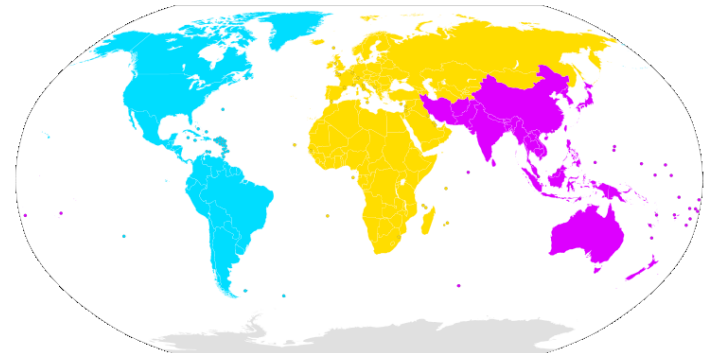
Example chart produced by GAMBoD  
65 LTE2600 user devices by form factor



Example chart produced by GAMBoD  
50 LTE1800 user devices by manufacturer

- ❑ USA leads the way – widespread LTE deployments in 700 MHz\* spectrum arising from early switchover from analog to digital TV. Examples - Verizon Wireless, AT&T Mobility, others.....
- ❑ In APAC the favoured digital dividend band (APAC700) is 698 – 806 MHz
  - ❑ several allocations made in this band
- ❑ In Europe digital switchover (analog to digital TV) will be completed by 2012 in most countries
  - ❑ Digital dividend band is 790-862 MHz (800 MHz)
  - ❑ DD spectrum has been auctioned in several countries, more auctions are scheduled
  - ❑ 800 MHz is often packaged with 2.6 GHz (prime LTE band for capacity / urban coverage)
  - ❑ LTE800 networks are commercially launched, initially targeting rural areas
  - ❑ LTE800 is a prime band for LTE and is supported by many chipset and device vendors
- ❑ WRC-12 agreed to allocate more UHF spectrum for mobile services in Region 1 (Europe, Russia, Africa, parts of Middle East). This allocation, 694–790 MHz, to come into force in 2015, is next to the existing digital dividend band (790-862 MHz). It will enable countries in Africa and the Middle East to award digital dividend spectrum in the 700 MHz band where parts of the 800 MHz band are used for other systems and services. It also provides additional bandwidth e.g. for mobile broadband in Europe, and raises the prospect of harmonization with other ITU Regions

\* The term 700 MHz embraces some or all of the following:  
 Band 12: (Lower 700 MHz) 699 MHz - 716 MHz / 729 MHz - 746 MHz  
 Band 13: (Upper C 700 MHz) 777 MHz - 787 MHz / 746 MHz - 756 MHz  
 Band 14: (Upper D 700 MHz) 788 MHz - 798 MHz / 758 MHz - 768 MHz  
 Band 17: (Lower B, C 700 MHz) 704 MHz - 716 MHz / 734 MHz - 746 MHz  
 APAC Digital Dividend (APAC700): 698 - 806 MHz



- ❑ More than 350 operators are estimated to have been allocated 1800 MHz spectrum
- ❑ Today 1800 MHz is mainly used for voice (GSM) service
- ❑ GSM traffic is peaking/reducing; momentum has swung to mobile broadband access
- ❑ Data traffic is growing significantly (for some, exponentially); operators need more capacity and to be able to deliver a better user experience of mobile broadband
- ❑ In many markets 1800 MHz represents the largest spectrum allocation
  - ❑ *60% of 1800 MHz spectrum in the top 7\* EU markets is available in 10 MHz or wider assignments*
- ❑ 1800 MHz band is harmonized, non-fragmented, and often only partially-utilized
- ❑ Potential to deploy HSPA or LTE in 1800 MHz
  - ❑ *FT/Orange confirmed throughput advantage of HSPA at 1800 MHz over 2.1GHz*
  - ❑ *Several LTE operators confirmed 2 x coverage advantage compared to 2.6 GHz*
- ❑ 1800 MHz RF components now available in volume production from multiple vendors
- ❑ 14 commercial LTE1800 networks launched

\* France, Germany, Italy, Norway, Spain, Sweden, UK (source: Qualcomm)

Band 3	
Total spectrum:	2 x 75 MHz
Uplink:	1710-1785 MHz
Downlink:	1805-1880 MHz

## 14 commercial LTE1800 systems

### LTE1800 Global Status

Poland	Mobyland/CenterNet	Commercially launched
Lithuania	Omnitel	Commercially launched
Singapore	M1	LTE1800/2600 commercial service launched
Germany	DT	Commercially launched
Latvia	LMT	Commercially launched
Finland	TeliaSonera	Commercially launched
Saudi Arabia	Zain	Commercially launched
Australia	Telstra	Commercially launched
Denmark	Telia	Commercially launched
Finland	Elisa	LTE2600/LTE1800 – DC-HSPA+ commercial service launched for consumers on November 17, 2011
Hong Kong	CSL Limited	Combined LTE2600/1800 and DC-HSPA+ network. LTE1800 commercially launched November 2011
Singapore	SingTel	LTE1800/2600 commercial service launched
Hungary	T Mobile	Commercially launched
Sth Korea	KT	Commercially launched

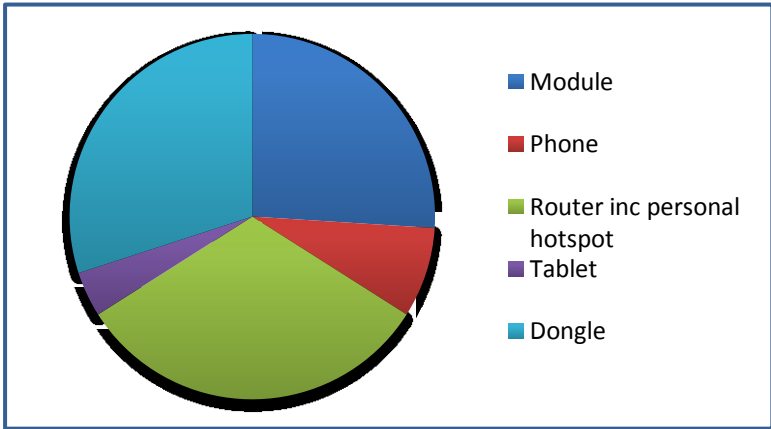
### LTE1800 trials and deployments across the world

Angola	Movicell	LTE1800 in deployment
Australia	Optus	LTE1800 in deployment for April 2012 service launch
Australia	VHA	LTE1800 in deployment
Belgium	Mobistar	LTE1800 in deployment
Belgium	Proximus	LTE1800 in deployment
Bulgaria	M-TEL	Trials
Brazil	Oi	Trials
Croatia	VIPnet	800/1800MHz consumer trial launched September 2011
Estonia	Elisa	Interested
Estonia	EMT	In deployment
France	Bouygues	Trials
France	Orange	Trials
Georgia	Magticom	1800 MHz is an option
Germany	E Plus	Trials
Greece	Cosmote	Trialled. All incumbents acquired more 1800 MHz
Hong Kong	Smartone-Vodafone	LTE1800 in deployment
Indonesia	Indosat	LTE1800 trial ended October 2011. Plans commercial LTE1800 in deployment
Italy	Three	LTE1800 in deployment for use alongside LTE2600
Malaysia	Celcom	Trials – 1800 and 2600 MHz
Namibia		Under discussion
Philippines	Bayan Tel	Plans to deploy LTE1800
Russia	Tele2	Asked permission to deploy
Singapore	StarHub	Targeting Q4 2012 launch
Slovenia	Mobitel	LTE to be deployed in 800, 1800, 2600 MHz. LTE1800 launch target of 2012
Sth Africa	MTN	LTE1800 in deployment
Sth Korea	SK Telecom	LTE1800 in deployment
Spain	Yoigo	LTE1800 in deployment
Sri Lanka	Dialog Axiata	Seeking additional 1800MHz spectrum for commercial LTE1800 deployment
Sweden	Tele2	LTE1800 in deployment via Net4Mobility joint venture
Sweden	TeleNor	LTE1800 in deployment via Net4Mobility joint venture
Sweden	TeliaSonera	LTE1800 in deployment
Thailand	AIS/DPC-CAT	Trials
Thailand	True Move	Planning trials
Turkey	Avea	Trials
UAE	Du	LTE1800 in deployment, launch anticipated in 2012
UK	Everything Everywhere (Orange, T-Mobile)	Trialling LTE1800 in 2012. Provisional approval given to deploy commercial network

Excellent choice of LTE1800 devices

50 LTE1800 devices are announced

The number of LTE1800 devices has tripled over the past 6 months



50 LTE1800 devices



## Embracing the 1800MHz opportunity: Driving mobile forward with LTE in the 1800MHz band



[www.gsacom.com](http://www.gsacom.com)

Prepared for the GSA by:



Free download for registered site users  
[www.gsacom.com](http://www.gsacom.com)

ENGLISH and RUSSIAN language versions

GSA website user registration page:  
[www.gsacom.com/php/register\\_form.php4](http://www.gsacom.com/php/register_form.php4)

## GSA LTE1800 report

Embracing the 1800 MHz opportunity: driving mobile forward with LTE in the 1800 MHz band

Published November 16, 2011

Co-sponsored by CSL Limited, DT, Elisa, Qualcomm, StarHub, and Telstra

Additional insights: Ericsson, NSN, and TeliaSonera

The report makes a strong case for the re-use of frequencies in the 1800 MHz band to enable improved provision of LTE services, and enable delivery of LTE services even earlier

### LTE1800 zone

*LTE in 1800 MHz spectrum*

White Papers, seminar presentations,  
plus links to other key resources

LTE1800 resources: white papers, info papers, presentations, etc on LTE1800  
[www.gsacom.com](http://www.gsacom.com)

- ❑ Providing initial widespread coverage with LTE in the 1800 MHz band can be as much as 60% cheaper than covering the same area with LTE using higher frequency bands
- ❑ Operators will typically deploy LTE across a range of spectrum bands in order to maximise coverage and capacity, and to optimise their cost structures
- ❑ Deployment of LTE 1800 MHz can mean a faster time to market
- ❑ Where LTE has been deployed in another band, deploying additionally in 1800 MHz spectrum can mean improved geographic or indoor coverage at lower cost
- ❑ 1800 MHz is a prime band for LTE deployment in virtually all regions of the world, and is likely to be an important enabler for international roaming
- ❑ Vendors need to develop multi-mode, multi-band handsets, with capability to operate in 1800 MHz as well as other LTE bands and on other networks; specific requirements are likely to vary by region
- ❑ In order to realise the benefits of LTE 1800MHz, regulators need to accelerate efforts to enable refarming of spectrum in the 1800 MHz band. This is underway, but regulators should redouble their efforts to remove barriers as swiftly as possible

- ❑ Prime bands for LTE FDD deployments are emerging, currently:
  - ❑ 700 MHz\*
  - ❑ 800 MHz: Europe (digital dividend band)
  - ❑ 2.6 GHz: Europe, APAC, MEA and some Latin American markets committed
  - ❑ 1800 MHz for mobile broadband services – typically re-farmed, some new allocations (e.g. South Korea)

**In European markets, LTE FDD user devices need to support as a minimum:**

**LTE 800/1800/2600 plus (for US roaming) 700 MHz\***

**+**

**3G/WCDMA-HSPA+ in 850/900/1900/2100 MHz**

**+**

**GSM/EDGE/GPRS in 850/900/1800/1900 MHz**

***More LTE (and HSPA) bands will be added in the future !***

\* The term 700 MHz embraces some or all of the following:

Band 12: (Lower 700 MHz) 699 MHz - 716 MHz / 729 MHz - 746 MHz

Band 13: (Upper C 700 MHz) 777 MHz - 787 MHz / 746 MHz - 756 MHz

Band 14: (Upper D 700 MHz) 788 MHz - 798 MHz / 758 MHz - 768 MHz

Band 17: (Lower B, C 700 MHz) 704 MHz - 716 MHz / 734 MHz - 746 MHz

APAC Digital Dividend (APAC700): 698 - 806 MHz

LTE-A is the next major step in the evolution of LTE. Standardized by 3GPP and approved by ITU as meeting the requirements of an IMT-Advanced system

Key LTE-A features include:

Optimizing small cell performance using features such as range expansion

Inter-band carrier aggregation

❑ combining more carriers mean higher peak speed, higher capacity, lower latency, enhanced user experience, bandwidths above 20 MHz

Introduces higher order MIMO e.g. 4 x 4

LTE Advanced expected to offer download peak rate of 1 Gbps in a low mobility scenario and 100 Mbps in a high mobility environment

LTE-Advanced is backwards and forwards-compatible with existing LTE systems

Some LTE-Advanced features are expected to be commercialized in 2012



## Etisalat Misr

Announcing Success of a Breakthrough 84 Mbps HSPA+ Trial  
Presentation by Hussein Keshk, 3G Broadband Senior Team Leader

NEW

## Telstra

Spectrum: Using What We've Got  
Presentation by Mike Wright, Executive Director Networks and Access Technologies

NEW

## Aero2

Nationwide Broadband Radio Network Based on Dual LTE Technologies  
Presentation by Dr. Adam Kurianski, CEO of Aero2, Mobyland, and CenterNet

See  
[www.gsacom.com](http://www.gsacom.com)  
for links to these  
network operator  
presentations

## Du

Driving Broadband Innovation in UAE; Du LTE Evolution  
Presentation by Dr. Ayman Elnashar, Sr. Director - Wireless Broadband & Site Sharing

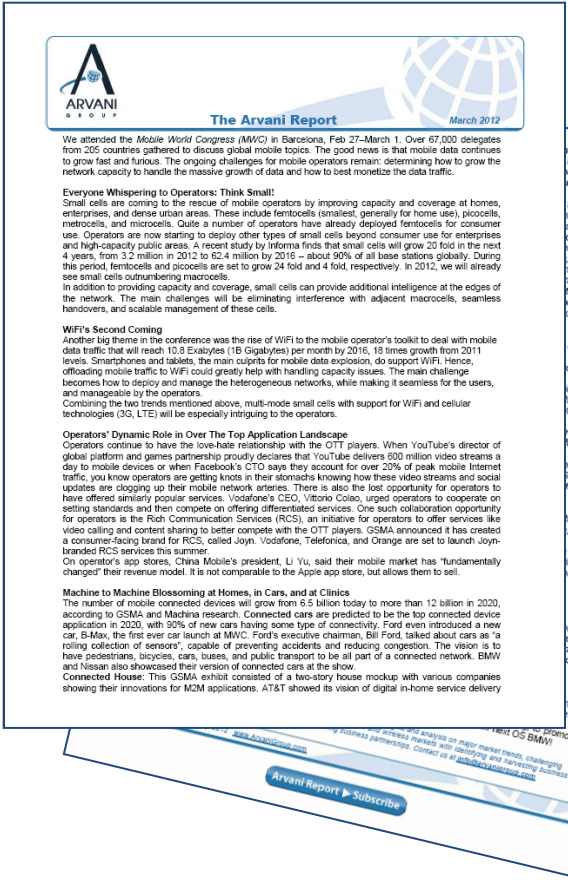
## Dialog Axiata

Developing the LTE Deployment Strategy  
Presentation by Pradeep De Almeida, Group Chief Technology Officer

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# MWC 2012 Report (Arvani Group) Small Cells, LTE, WiFi, OTT, M2M, M-Health, Devices, Imaging, NFC



...whole are connected to a 'digital life lightbulb, power outlets, door locks, and our favorite the fireplace, where to control air conditioning, tracking application, and most rural income can be realized in...  
...agriculture travel services, in...  
...of its Mobile Baby's...  
...care to pregnant women in...  
...2010), conducted through...  
...of tech companies, doctor's...  
...March 2013, and commercial...  
...health services come from a...  
...py innovations.

...arena. High end devices...  
...The quad-core phones...  
...for power hungry these...  
...ons reaching extreme...  
...to 'take over'...  
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...but the...  
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...ring

...Promote...  
...MWC

...Arvani Report - Subscribe

## GSA Member Introduction – Renesas Mobile Multi-band multi-mode devices

Multi-Band Multi-Mode Devices  
from Chipset vendor perspective

An Introduction to  
the Panel Discussion

Jaakko Hulkko, Renesas Mobile Corporation  
LTE Forum 2011  
Warsaw, Poland

November 24, 2011

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Log in to [www.gsacom.com](http://www.gsacom.com) and follow the links to download



## Evolution to LTE Report

Global mobile Suppliers Association  
 March 13, 2012  
**GSM/3G MARKET/TECHNOLOGY UPDATE**

The LTE system is standardized by 3GPP and delivers capacity and data throughput enhancements and low latency, to support new services and features requiring higher levels of capacity and performance. The standards cover FDD and TDD modes. LTE is market reality and the next step in the user experience, enhancing more demanding applications such as interactive TV, mobile video blogging, advanced gaming, and professional services. Data rates are significantly higher. LTE supports a full IP-based network and harmonization with other radio access technologies.

LTE is the natural evolution choice for GSM/HSPA, CDMA or Wimax™ network operators. Pressure on spectrum resources will continue, therefore operators should deploy the most efficient technologies available to them. All 3G technologies can harmonize to LTE as a single unifying global standard, for even higher scale economies and simplifying roaming.

The uptake of LTE is a global phenomenon. The primary drive towards LTE from operators comes from the need for more network capacity, performance management and improved efficiencies to drive down the unit cost of delivering traffic.

**GSA has confirmed LTE as the fastest developing mobile system technology ever.**

**301 operators are investing in LTE in 95 countries**

242 operator commitments in 81 countries  
 59 pre-commitment trials in 14 more countries

**57 commercial networks in 56 countries**

GSA forecasts 128 commercial networks in 56 countries by end of 2012

Country	Operator
Norway	TeliaSonera
Sweden	TeliaSonera
Uzbekistan	MTS
Uzbekistan	Ucell
Poland	Aero2/Mobilyland/CenterNet (LTE TDD from 10.05.11)
USA	MetroPCS

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 Phone +44 1279 438 067 • e-mail: info@gsacom.com

Austria	A1 Telekom	05.11.10
Sweden	Telia/Telia Sweden	15.11.10
Sweden	Telia2 Sweden	15.11.10
Hong Kong	CSL Limited	25.11.10
Finland	TeliaSonera	30.11.10
Germany	Vodafone	01.12.10
USA	Verizon Wireless	06.12.10
Finland	Eisa	06.12.10
Denmark	TeliaSonera	09.12.10
Estonia	EMT	17.12.10
Japan	NTT DoCoMo	24.12.10
Germany	Deutsche Telekom	05.04.11
Philippines	Smart Communications	19.04.11
Lithuania	Omnitel	28.04.11
Latvia	LMT	31.05.11
Singapore	M1	31.05.11
South Korea	SK Telecom	01.07.11
South Korea	LG U+	01.07.11
Germany	O2	01.07.11
Canada	Rogers Wireless	07.07.11
Austria	T-Mobile	28.07.11
USA	Mosaic Telecom	July 2011
Canada	Bell Mobility	14.09.11
Saudi Arabia	Mobily (LTE TDD)	14.09.11
Saudi Arabia	STC (LTE TDD)	14.09.11
Saudi Arabia	Zain	14.09.11
USA	AT&T Mobility	18.09.11
UAE	Etisalat	25.09.11
Australia	Telstra	27.09.11
Denmark	TDC	10.10.11
Austria	3	18.11.11
Puerto Rico	AT&T Mobility	20.11.11
Puerto Rico	Claro	24.11.11
Belarus	Yota Bel	01.12.11
Kyrgyzstan	Saima Telecom	06.12.11
Brazil	Sky Brazil (LTE TDD)	13.12.11
Finland	DNA	15.12.11
Uruguay	Arce1	13.12.11
USA	Cricket	21.12.11



## REPORT: Status of the LTE Ecosystem

January 20, 2012

This updated report, which was researched and published by GSA (Global mobile Suppliers Association), lists 269 LTE devices launched in the market by 57 suppliers, and confirms how a robust user device ecosystem has been established in support of LTE as the fastest developing mobile communications system technology ever.

GSA (Global mobile Suppliers Association)  
 www.gsacom.com

Join the discussions in our LinkedIn groups  
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 LTE1800: www.linkedin.com/groups?gid=3129390  
 LTE TDD: www.linkedin.com/groups?gid=3978061  
 LTE User Devices: www.linkedin.com/groups?gid=4146472

## GAMBoD

**GSA Analyzer for Mobile Broadband Devices**

Analyze the GSA's unique database of thousands of mobile broadband devices HSPA, HSPA+ and LTE

For use by GSA member organizations and network operators

**LOG IN FIRST**

**GAMBoD-HSPA and GAMBoD-LTE**

[www.gsacom.com/gambod](http://www.gsacom.com/gambod)

Access is restricted to GSA member companies and network operators. Conditions apply

## LTE1800 zone

LTE in 1800 MHz spectrum

White Papers, seminar presentations, plus links to other key resources

[www.gsacom.com/lte1800](http://www.gsacom.com/lte1800)



Global mobile Suppliers Association (GSA)  
[www.linkedin.com/groups?gid=2313721](http://www.linkedin.com/groups?gid=2313721)

**LTE1800**  
[www.linkedin.com/groups?=&gid=3129390](http://www.linkedin.com/groups?=&gid=3129390)

**LTE TDD**  
[www.linkedin.com/groups?gid=3978061](http://www.linkedin.com/groups?gid=3978061)

**LTE User Devices**  
[www.linkedin.com/groups?gid=4146472](http://www.linkedin.com/groups?gid=4146472)

## 483 HSPA Operator Commitments in 181 countries/territories

Global mobile Suppliers Association  
 HSPA Operator Commitments - January 26, 2012  
**GSM/3G MARKET/TECHNOLOGY UPDATE**

The path to mobile broadband began with WCDMA, a 3GPP global standard. Its first evolution - High Speed Packet Access (HSPA), reduces latency, boosts capacity and user data speeds. HSPA is the leading mobile broadband technology globally with 451 commercial networks commercially launched. All WCDMA operators have launched HSPA.

339 HSPA networks support a peak download data speed of 7.2 Mbps or more. User download data speeds typically approach or may exceed 5.0 Mbps, subject to network and user device capabilities, and in some cases user data speeds are much higher. Capacity and performance improve with HSPA Evolution (HSPA+). 241 countries have committed to HSPA+ deployments in 108 countries, including 187 HSPA+ networks in commercial service in 96 countries. Over 41% of HSPA operators have launched HSPA+. Many operators successfully position HSPA+ or HSPA+ as an alternative to fixed broadband, with the added value of mobility, reporting strong traffic and revenue growth for mobile broadband services. 190 operators (over 43%) have launched HSPA+ in 93 countries, including 129 networks (65%) supporting 5.0 Mbps peak uplink data speed, of which 12 networks extend to 11.5 Mbps peak.

117 HSPA+ commercial networks use 64QAM for delivering 21 Mbps peak on the downlink, 8 networks support 28 Mbps (16 QAM with MIMO) and 62 networks support 42 Mbps (64QAM and 2 x 5 MHz carriers). This capability was enabled in 3GPP Release 8, which also allows 42 Mbps to be achieved by combining 2 x 2.2 MHz MIMO and 64QAM in a single 5 MHz carrier. Using 16QAM instead of QPSK on the uplink doubles the peak rate to 11.5 Mbps.

HSPA+ has a strong evolution path. Release 9 combines multicarrier and MIMO technologies in 10 MHz bandwidth to reach 84 Mbps peak downlink. Using multicarrier on the uplink doubles the peak rate to 23 Mbps. Standardization beyond Release 9 leads to the realization of download data speeds exceeding well over 100 Mbps.

Related resources for GSA registered site users to download from [www.gsacom.com](http://www.gsacom.com) include:

- For the global market status of HSPA+ see report "Global HSPA- Network Commitments and Deployments"
- For UMTS300 (HSPA) network deployments, launches, developments - see "UMTS300 Global Status"
- GSA's own-researched database of 3,362 launched HSPA devices includes 245 HSPA+ products (compared to 92 a year ago) - 93 devices support 5.0 Mbps DC-HSPA+, and 102 HSPA+ products support LTE. See "HSPA Device Survey - Key Findings"

**483 HSPA network commitments in 181 countries/territories**

Americas: 115 networks | APAC: 92 networks | Europe: 178 networks | Middle East/Africa: 98 networks

**451 commercial HSPA operators in 174 countries/territories**

**Americas:** Argentina, Arabia Baharia, Barbados, Bolivia, Botswana, Brazil, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Curaçao, Dominican Republic, Ecuador, El Salvador, FI, Guinea, Guatemala, Guatemala, Guyana, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Qatar, St. Kitts, St. Lucia, St. Vincent and the Grenadines, Suriname, USA, Venezuela, Virgin Islands  
**APAC:** Australia, Bahrain, Brunei, Cambodia, China, East Timor, FI, French Polynesia, Guam, Hong Kong SAR, India, Indonesia, Japan, Laos, Macao SAR, Malaysia, Maldives, Mongolia, Nepal, New Zealand, N. Korea, Philippines, Singapore, Solomon Islands, S. Korea, Sri Lanka, Taiwan, Thailand, Vanuatu, Vietnam  
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Global mobile Suppliers Association  
 January 29, 2012  
**GSM/3G MARKET/TECHNOLOGY UPDATE**

GSA confirms 241 operators in 106 countries have committed to HSPA+ network deployments

17 commercial networks support 5.0 Mbps peak uplink data speed including 12 networks supporting 11.5 Mbps peak

8 commercial networks support 28 Mbps peak downlink data speed

62 commercial networks support 42 Mbps DC-HSPA+ plus another 28 fm operator commitments to deploy

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## 187 HSPA+ systems are commercially launched

Over 41% of HSPA operators have commercially launched HSPA+  
 62 operators have commercially launched 42 Mbps DC-HSPA+

Wireless market assistance of strong, HSPA-enabled networks and notebook, and the rapidly developing smartphone segment have pushed data rates to new levels. The first evolution beyond Release 8 is HSPA+ (HSPA Evolution) (HSPA+) systems to meet the demand. GSA confirms that 187 HSPA+ systems are now commercially launched in 96 countries. A further 54 HSPA+ networks are in deployment or planned. This report lists all known HSPA+ network deployments and launches, and provides an overview of HSPA+ research to date.

HSPA+ is a multiband technology, supported by a rapidly evolving device ecosystem. HSPA+ has a strong evolution path (see chart left). Many operators have updated their plans for evolution. 3G operators have commercially launched 42 Mbps DC-HSPA+ technology on their networks, with a further 28 commitments to deploy 42 Mbps or currently selected 42 Mbps DC-HSPA+ with two carriers (2 x 5 MHz + 10 MHz - this is known as DC-HSPA+). This capability was introduced in 3GPP Release 8, which also standardized 42 Mbps capacity by combining 2 x 2.2 MHz MIMO and 64QAM in a single 5 MHz carrier.

For the uplink, using 16 QAM instead of QPSK modulation makes it possible to double the peak rate to 11.5 Mbps. Dual carrier extends the uplink performance up to 23 Mbps peak. 3GPP Release 9 combines multicarrier and MIMO technologies in 10 MHz bandwidth to reach 84 Mbps peak downlink. Using multicarrier on the uplink doubles the peak data rate to 23 Mbps. Standardization beyond Release 9 extends multicarrier and combinations of multicarrier and MIMO enable download data speeds exceeding 100 Mbps to be reached. 3GPP has ongoing work on Long Term HSPA Evolution, which will significantly boost capabilities further by using 8 carrier multicarrier aggregation, combination of multiple antennas, and higher modulation.

The world's first HSPA+ system was launched by Telstra in Australia on February 23rd, 2009. Using 64 QAM modulation, the first HSPA+ mobile broadband system supports a peak download data rate of 7.2 Mbps and a peak uplink data rate of 5.0 Mbps. Telstra subsequently launched an upgrade to 42 Mbps DC-HSPA+ peak uplink data speed in 2010. At the end of 2011, 187 HSPA+ systems are commercially launched in 96 countries. A further 54 HSPA+ networks are in deployment or planned. This report lists all known HSPA+ network deployments and launches, and provides an overview of HSPA+ research to date.

Over 41% of HSPA operators have launched HSPA+ (high speed uplink) including 129 networks supporting 5.0 Mbps peak uplink data speed including 12 networks supporting 11.5 Mbps peak.

Over 41% of HSPA operators have commercially launched HSPA+  
 62 operators have commercially launched 42 Mbps DC-HSPA+

17 commercial networks support 5.0 Mbps peak uplink data speed including 12 networks supporting 11.5 Mbps peak

8 commercial networks support 28 Mbps peak downlink data speed

62 commercial networks support 42 Mbps DC-HSPA+ plus another 28 fm operator commitments to deploy

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