

1800 MHz HSPA/LTE Workshop
London – March 25, 2011

LTE Take Up
and interest in 1800 MHz (LTE1800) around the world

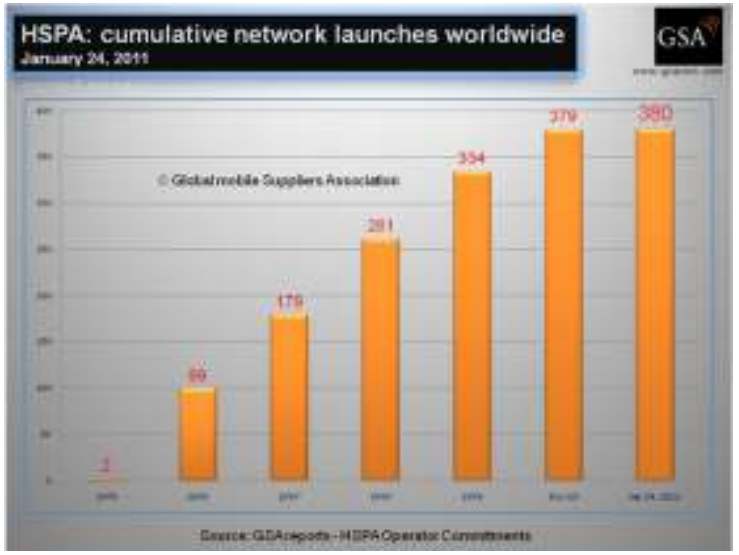
Alan Hadden, President
Global mobile Suppliers Association (GSA)
www.gsacom.com

HSPA laid the foundation of MBB success

- 383 commercial WCDMA operators in 156 countries
- Over 99% have deployed HSPA;
  - 380 commercial HSPA networks in 155 countries
- On the way to 1 billion mobile subscriptions by end 2011
- 2,922 HSPA user devices launched in market by 255 suppliers
- Most operators include mobile broadband in their product offerings
- Mobile broadband is driving traffic, revenue and profit growth in markets throughout the world

Band I	2100 MHz	2183 devices (c. 90%)
Band V	850 MHz	1125 devices (c. 46%)
Band I, II, V	850/1900/2100 MHz	817 devices (c. 33%)
Band I, V	850/2100 MHz	942 devices (c. 39%)
Band VIII	900 MHz	526 devices (c. 21%)
Band IV	AWS	107 devices (c. 4%)

Few HSPA devices operate in the 1800 MHz band today



Quick Facts

383 commercial WCDMA networks in 156 countries

Over 99% of WCDMA networks launched HSPA

25 commercial UMTS900 networks

526 UMTS900 user devices launched

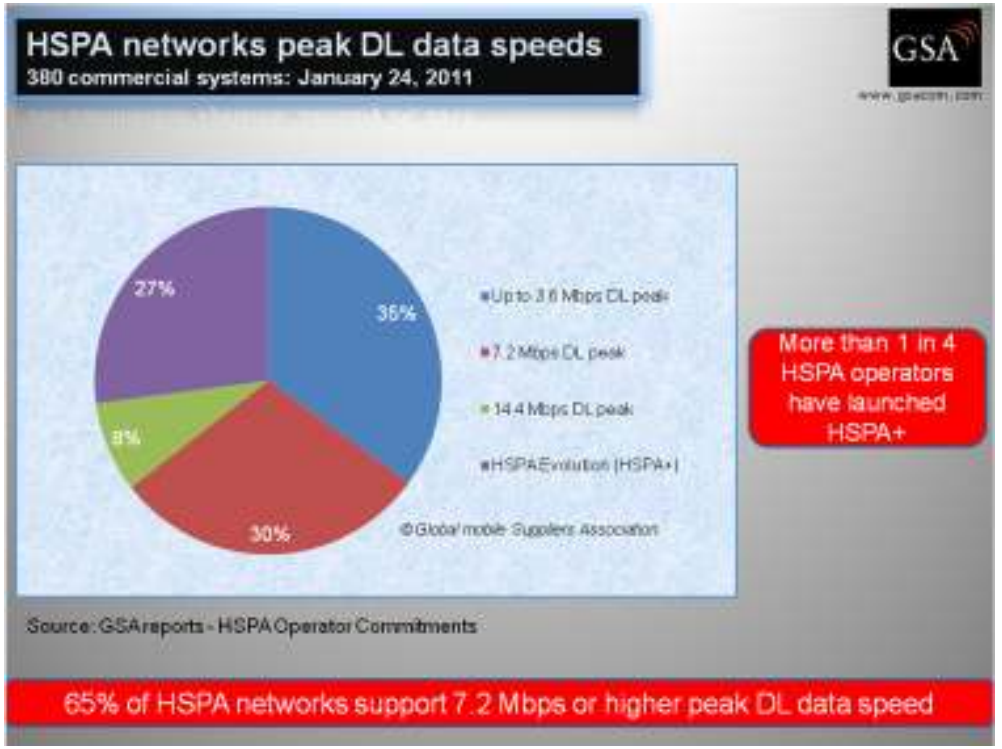
65% HSPA networks support 7.2 Mbps peak downlink or higher

Over 35% of HSPA operators launched HSUPA – now live in 68 countries

More than 1 in 4 HSPA operators launched HSPA+

HSPA+ is now a mainstream technology

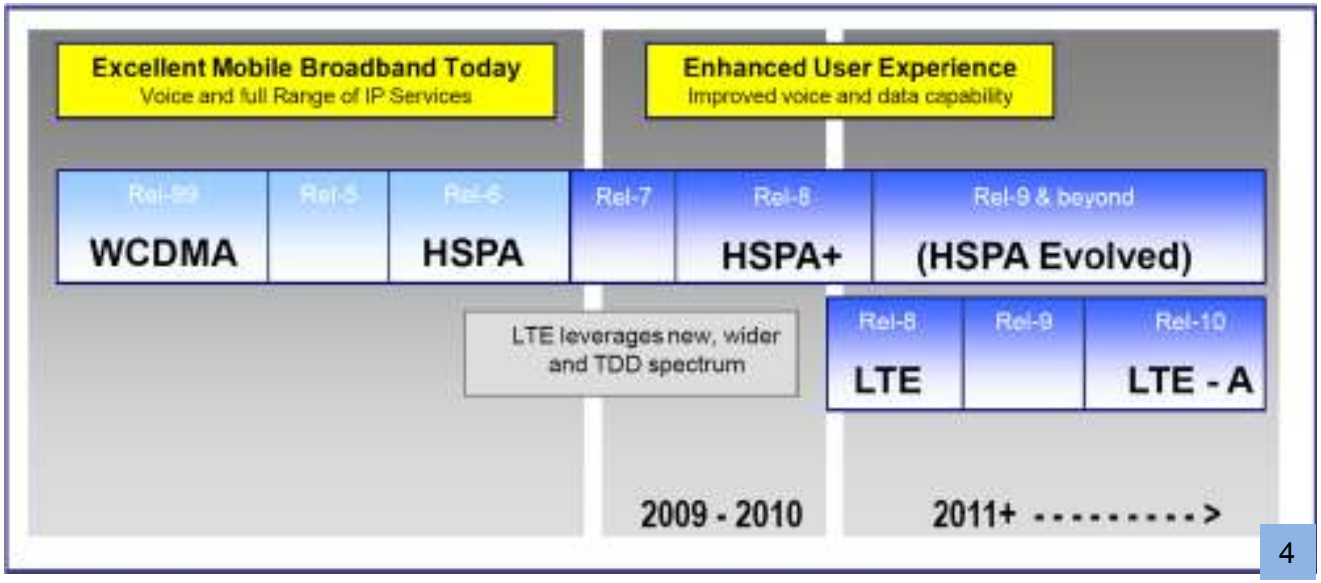
- HSPA peak speeds are increasing
  - DL: 65% support 7.2 Mbps or higher
  - UL: 35% have launched HSUPA
- HSPA Evolution (HSPA+)
  - the major trend in 2010
  - delivering higher capacity and performance and an improved user experience of mobile broadband
  - > 1 in 4 operators launched HSPA+
- 103 commercial HSPA+ systems
  - launched in 57 countries
  - + 45 commitments/deployments
  - 92 HSPA+ user devices launched
- 42 Mbps is market reality
  - 13 commercial DC-HSPA+ networks
  - at least 32 additional commitments



HSPA has a strong evolution path

- Some operators are already preparing to introduce the next evolutionary step of 84 Mbps

- The next step in the user experience
- Essential to address and deliver mobile broadband to the mass market
- Significant performance gains and efficiencies introduced - FDD and TDD modes
- Can be deployed in new spectrum and existing (re-farmed) spectrum
- Global support
- Evolution continues with LTE-Advanced

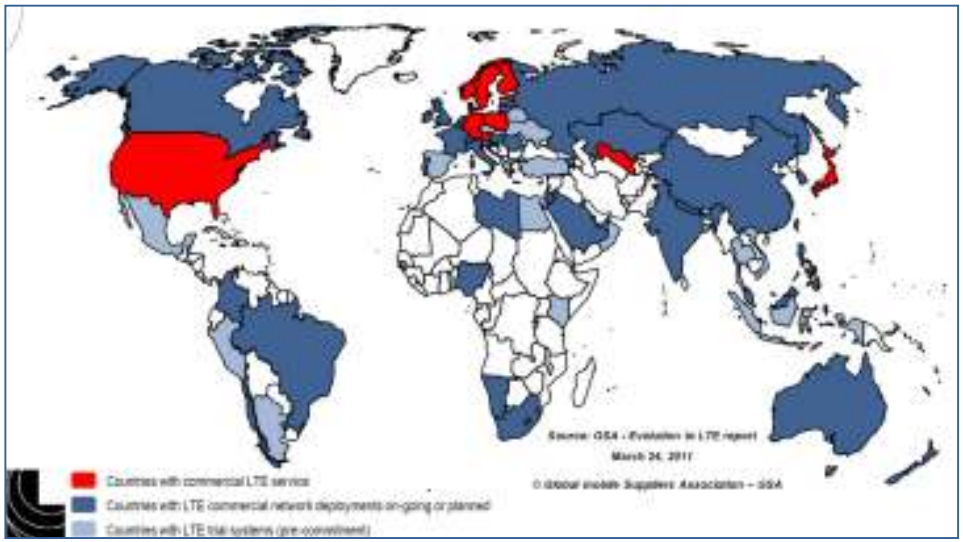


LTE commitments, deployments

196 operators in 75 countries investing in LTE

GSA, March 24, 2011

- 140 LTE network commitments in 56 countries
- 56 pre-commitment trials in 19 more countries
- 17 commercial LTE networks launched
- At least 73 LTE networks are anticipated to be in commercial service by end 2012



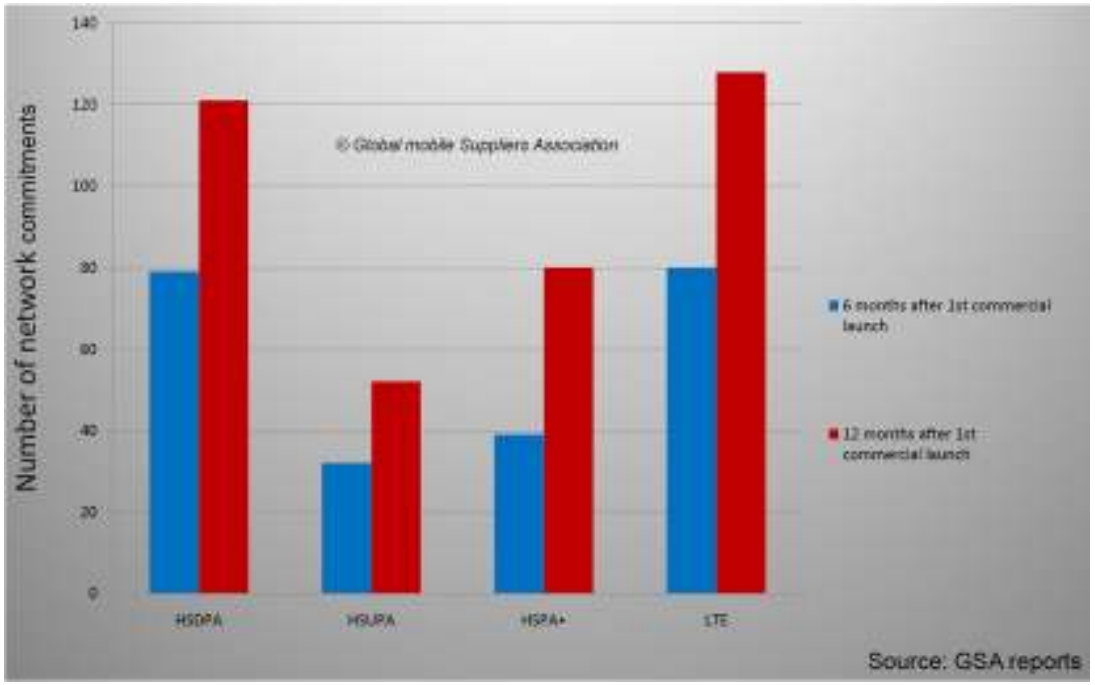
- Initial 17 launches have all been LTE-FDD mode
- Frequencies used are mainly 700, 2600 MHz
  - 1 commercial system launched in 1800 MHz
  - 1 DD/800 MHz system launched
- Commercial LTE TDD launches targeted from 2011
- *No. of operators committing to deploy commercial LTE systems increased by 118% in the past 12 months*
- *No. of countries increased 80% in same period*

17 commercial LTE networks launched

Country	Operator	Launched
Norway	TeliaSonera	15.12.09
Sweden	TeliaSonera	15.12.09
Uzbekistan	MTS	28.07.10
Uzbekistan	UCell	09.08.10
Poland	Mobyland & CenterNet	07.09.10
USA	MetroPCS	21.09.10
Austria	A1 Telekom Austria	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

It's official! LTE is the fastest developing mobile communications system technology ever !!

Until now HSPA had been the fastest developing mobile communications system. By comparing the number of operator commitments 6 months and 12 months after first commercial system launches for HSDPA, HSUPA, HSPA+ and LTE respectively, *LTE proves to be the fastest developing mobile communications system technology ever*



LTE1800 – promising option for many markets

+ Main motivation: coverage area about 2X larger than LTE2600.
+ Possibility to reuse antenna lines of UMTS2100 or GSM1800.
+ Possibility to deploy multi-RAN BTS with simultaneous LTE&GSM.
+ 1800 MHz (ITU band 3) widely available in Europe and APAC.
+ Not big regulatory issues: 1800 band often technology neutral.

+ Spectrum need for full LTE data speed 18.4 MHz when GSM and LTE base stations at same sites (coordinated case).
+ Often easier to refarm than 900 MHz.

Coordinated GSM-LTE case	Required spectrum
20 MHz LTE	18.4 MHz
15 MHz LTE	13.8 MHz
10 MHz LTE	9.4 MHz

- Terminal availability 6-12 months after LTE2600: not a real issue.
- LTE1800 can be estimated to be ready for mass market in 2012 with first network deployments and terminals in volume.

=> LTE1800: promising and available for mass market in time

18 18.5.2010 Dr. Eetu Prieur, Elisa LTE World Summit, Amsterdam

elisa

LTE1800 market status

World's first LTE1800 network commercially launched by Mobyland, Poland



CSL Ltd, Hong Kong has launched an LTE/DC-HSPA+ network
LTE initially uses 2.6 GHz spectrum; 1800 MHz LTE sites being introduced in the second phase



deploying LTE initially in 1800 MHz spectrum (launch end 2011)

deploying LTE in 800, 1800 MHz and 2.6 GHz spectrum (launch Summer 2011)

Additional LTE activities focused on 1800 MHz band

- **VHA** is trialling LTE in 1800 MHz spectrum
- **Optus** is expanding its LTE trials to include 1800 MHz
- In Finland LTE can be deployed in 2.6 GHz and 1800 MHz spectrum
  - **Elisa FI** launched LTE2600 and is trialling LTE1800
  - **TeliaSonera FI** launched LTE2600 and will launch in 1800 MHz when dual frequency modems become available - expected Spring 2011
- **Bouygues Telecom** is trialling LTE1800
- **Cosmote** has trialled LTE1800
- LTE1800 deployments are expected in **Singapore** following confirmation by the regulator that 1800 MHz can be used for LTE; **StarHub** plans to trial LTE1800
- **Smartone-Vodafone** (HK) is committed to LTE1800 network deployment
- **Deutsche Telekom** is interested to deploy LTE1800 in selected European markets (subject to re-farming approvals etc.)
- LTE1800 deployments may develop in **Estonia, Latvia, Namibia, Russia, UK**
- *several more trials/planning activities ahead of public commitments*

LTE1800 user devices

- At launch the IP Wireless dongle for Mobyland supported single-mode only LTE1800
- The ZTE dongle for CSL supports LTE2600/1800 plus 42 Mbps DC-HSPA+
- The triple-mode Huawei E398 dongle (GSM/HSPA/LTE) supports LTE2600/2100/1800/900

- LTE1800-capable devices shown at MWC '11, Barcelona (Feb 14-17) included:
  - Huawei E392 dongle
  - Huawei B593 router (multimode CPE)
  - Huawei E589 personal WiFi
  - Sierra Wireless AirCard 320U dongle



Sierra Wireless AirCard 320U dual-mode dongle for Telstra will support LTE1800, LTE2600 and 42 Mbps DC-HSPA+





IP Wireless LTE1800 dongle

Leading chipset manufacturers are confirming support for LTE1800 in their platforms



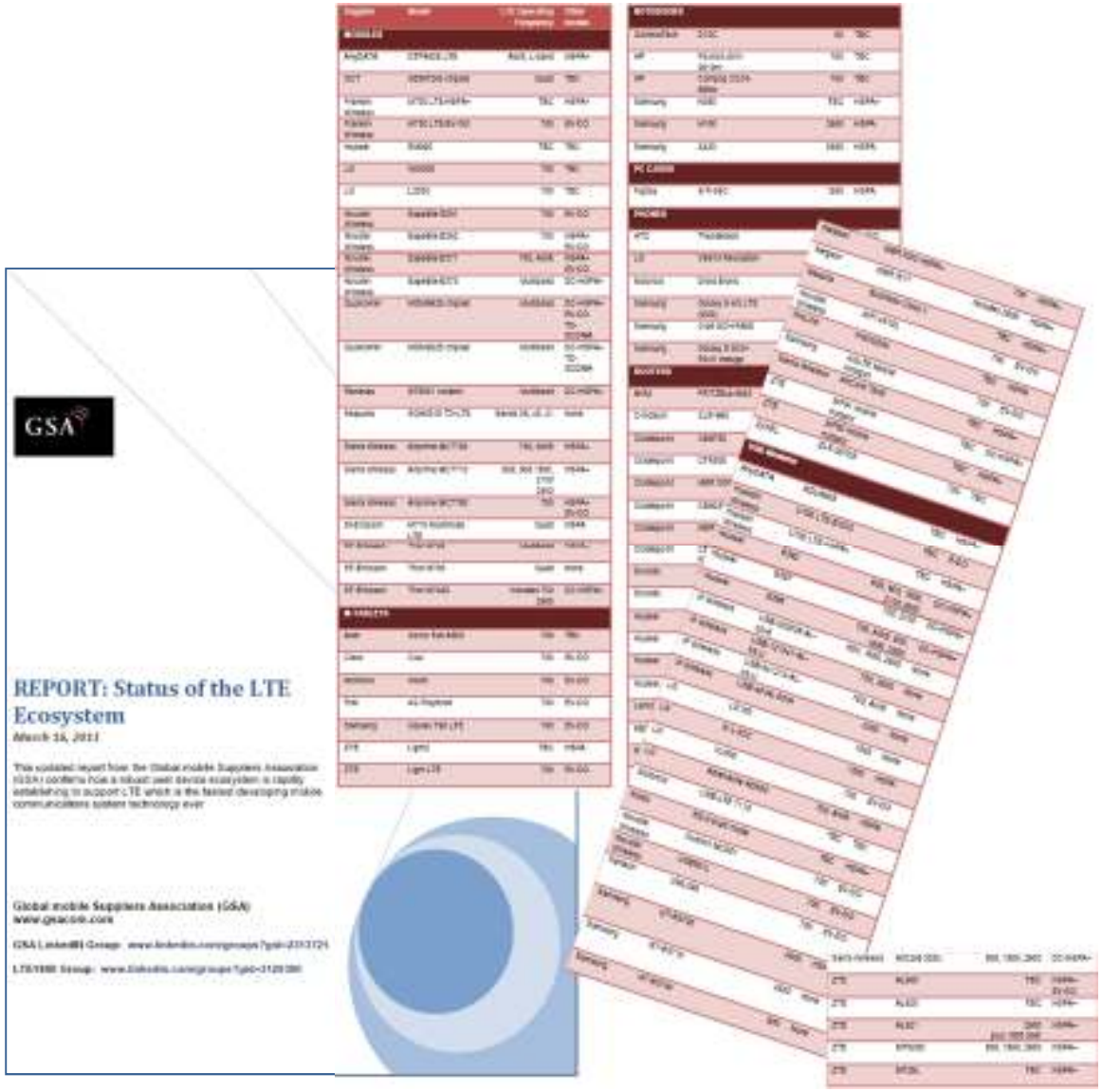


… therefore a selection of LTE1800 devices will be available this year

Status of the LTE Ecosystem

GSA report:
Status of the LTE Ecosystem
March 16, 2011

- 98 LTE User Devices launched
- Includes modules, routers, m-tablets, notebooks, PC cards, phones, USB modems
- Most are dual mode;
  - LTE and HSPA or HSPA+ or
  - LTE and EV-DO
- Support for 1800 MHz in 10% of LTE devices



LTE resources from GSA

1 "Evolution to LTE" Report
* Operator commitments, launches, trials
* Regulatory/market developments
* FDD and TDD

Free download: www.gsacom.com



2



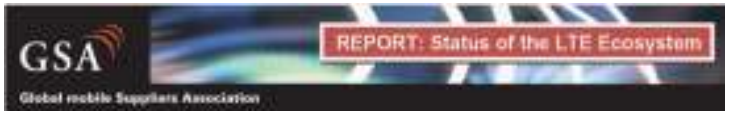


Select the LTE feature in GAMBoD
www.gsacom.com/gambod

Lists 2,922 HSPA devices (February 7, 2011) including devices supporting LTE

3 **LTE1800**
a subgroup of GSA (279 members)
www.linkedin.com/groups?=&gid=3129390

4



"Status of the LTE Ecosystem" report
Free download: www.gsacom.com