



# LTE Market Reality

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# Global mobile Suppliers Association

- ❑ Representing leading GSM/EDGE, WCDMA-HSPA, LTE suppliers globally
- ❑ Promoting GSM/EDGE/WCDMA and evolved systems for successful delivery of mobile broadband, enhanced multimedia, voice services
- ❑ 3GPP Market Representation Partner



**Facts-based research by GSA**  
**Leveraging strong links in the industry**  
**Objective analysis**  
**GSA surveys, reports, regular updates**

**LTE Operator Commitments**

**HSPA network deployments/launches**

**WCDMA Network Launches**

**HSPA Devices availability**

**Services and Applications**

**Environment and sustainability**

**EDGE Operators Worldwide**

**Mobile Broadband Growth reports**

**UMTS 900 Global Status**

**HD voice**

**Evolution of Network Speeds**

**Mobile Broadband Spectrum**

**EDGE Evolution**

**HSPA Evolution (HSPA+)**

**Spectrum – including Digital Dividend**

**60+ charts, maps**

**FAST FACTS (regularly updated)**  
[www.gsacom.com/news/gsa\\_fastfacts.php4](http://www.gsacom.com/news/gsa_fastfacts.php4)

# 2010: A Good Year for LTE



38 THE LTE / LTE-ADVANCED GUIDE - NOVEMBER 2010

## 2010: A Good Year for LTE

By Alan Hadden, President  
Global Mobile Suppliers Association

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LTE made excellent progress in 2010. A total of 156 operators were announced, including 113 commercial launches, 17 pre-commercial trials, and 26 operators who are planning to launch in 2011. In the same timeframe, 113 operators have committed to LTE, including 43 pre-commercial trials, 17 commercial launches, and 53 operators who are planning to launch in 2011.

**LTE operator commitments are developing faster than for HSPA+**

Source: GSA reports - 113 LTE Network Commitments and 113 Commercial LTE Network Launches and Trials

### 156 operators in 64 countries investing in LTE

113 commercial LTE network commitments in 46 countries  
17 pre-commercial LTE network commitments in 12 countries

**CHART 2: LTE NETWORK DEPLOYMENT COMMITMENTS, LAUNCHES AND TRIALS**

BACK TO TABLE OF CONTENTS

THE LTE / LTE-ADVANCED GUIDE - NOVEMBER 2010

This article charts recent progress made by LTE, drivers for LTE deployments worldwide for both FDD and TDD system modes, spectrum requirements, the developing eco-system, and the planned evolution of LTE as an IMT-Advanced system

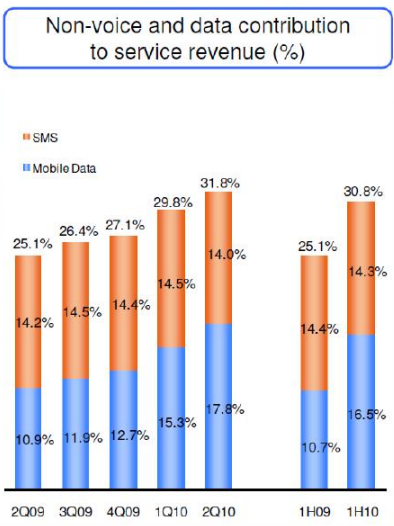
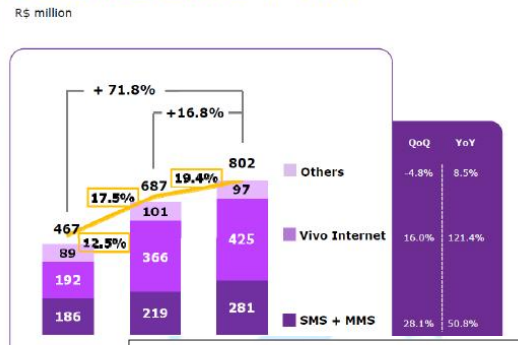
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# Mobile broadband success stories globally



Traffic, revenue, profit growth across the world

## Data Revenue + VAS



AT&T: 2Q 2010  
Mobile data revenue YoY up \$900m

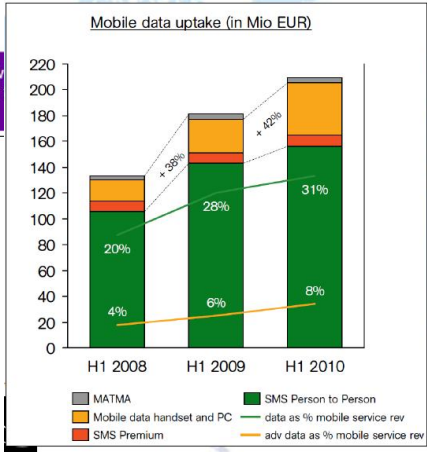
SmarTone-Vodafone : 2Q 2010  
Mobile data revenue YoY up 38%

PCCW: 2Q 2010  
Mobile data revenue YoY up 31%

Vodacom South Africa : FY 2010  
Data traffic up 58%

MOBISTAR: 1H 2010  
Mobile data revenue = 31%

Turkcell: 2Q 2010  
Mobile data revenue YoY up 79%



There are dozens more examples

The trend is consistent and global

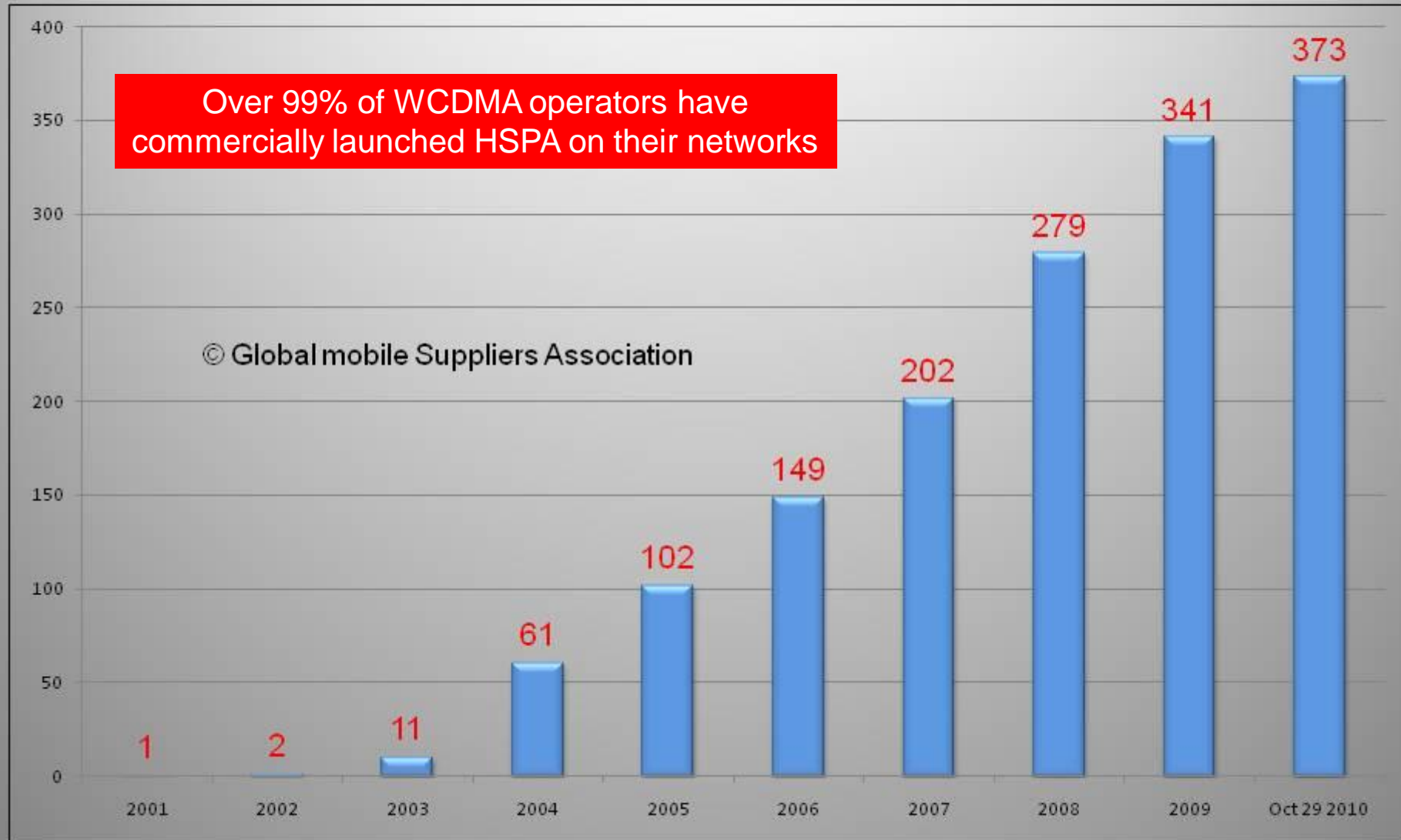
# WCDMA: cumulative network launches worldwide

October 29, 2010



www.gsacom.com

OCTOBER 29, 2010



Source: GSA survey: 3G/WCDMA-HSPA Launches Worldwide

# HSPA mobile broadband

Commercial systems worldwide: November 9, 2010



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

HSPA commercial networks

370

7.2 Mbps peak DL or higher

61%

HSUPA commercial launches

127

HSPA user devices launched

2,776

HSPA+ commercial networks

81

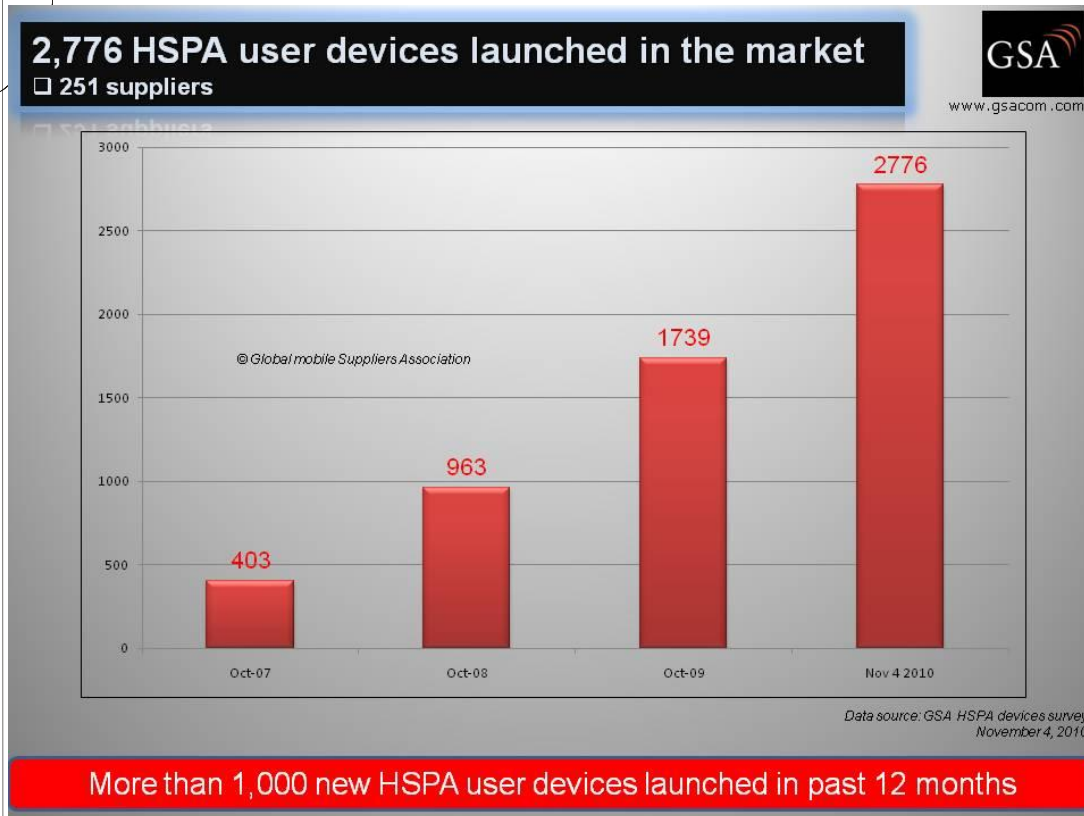
UMTS900 commercial networks

25

99% of WCDMA operators have launched HSPA

# HSPA mobile broadband eco-system - mainstream

- 2,776 HSPA devices launched by 251 suppliers
- 1000+ HSPA devices launched in past year; 60% annual growth



57% of devices support peak DL data speed of at least 7.2 Mps

825 HSUPA devices  
 -and the majority support 5.8 Mbps

68 HSPA+ devices

Smartphones (i.e. HSPA with WiFi) is the main growth device segment

480 UMTS900 (HSPA) devices  
 Excluding notebooks and e-book readers, 21% of HSPA devices operate in the 900 MHz band

HSPA, HSPA+ and LTE devices analysis tool  
 (for GSA members and network operators)

GSA HSPA Devices Survey Key Findings – November 4, 2010  
 www.gsacom.com

# HSPA+ is the main trend in 2010

- ❑ 136 operators in 63 countries have committed to HSPA+ network deployment
- ❑ More than 1 in 5 HSPA operators have commercially launched HSPA+
- ❑ HSPA+ has a strong evolution path



**136 HSPA+ network operator commitments in 63 countries**

**81 commercial HSPA+ systems launched in 48 countries**

**Operator name in RED = commercially launched**

<p>Orange, Austria Viva, Kuwait Viva, Bahrain Velcom, Belarus Vodafone, Ireland DT, Germany O2, Germany 3, Denmark TDC, Denmark 3, Sweden Aero2, Poland Avea, Turkey Vodafone, Turkey Turkcell, Turkey Etisalat Misr, Egypt Vodafone, Netherlands M Tel, Bulgaria DNA, Finland Elisa, Finland Bite, Lithuania Bite, Latvia</p>	<p>Telstra, Australia Du, UAE Mobitel, Slovenia Vodafone, Romania Orange, Moldova TMN, Portugal Cosmote, Greece Vodafone, Greece Vodafone, Portugal Vodafone, Spain Batelco, Bahrain Cosmote, Romania Zain, Kuwait Cell C, South Africa MTN, South Africa Vodacom, South Africa Elisa, Estonia EMT, Estonia Megafon, Russia Pelephone, Israel</p>	<p>Skytel, Mongolia CSL Limited, Hong Kong eMobile, Japan Telkomsel, Indonesia PT Indosat, Indonesia M1, Singapore PCCW, Hong Kong Smartone-Vodafone, HK Hutchison 3, HK U Mobile, Malaysia Smartone, Macau Telecom New Zealand StarHub, Singapore SingTel, Singapore SK Telecom, S. Korea Viettel, Vietnam</p>
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Source: GSA HSPA+ Network Commitments report (October 29, 2010) [www.gsacom.com](http://www.gsacom.com)

81 commercial HSPA+ networks launched in 48 countries

- 63 networks support 21 Mbps peak
- 9 networks support 28 Mbps
- 9 networks support 42 Mbps

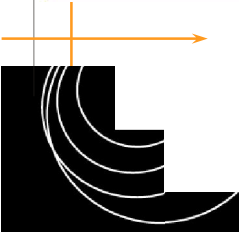
68 HSPA+ devices / 13 suppliers

By end 2010 GSA anticipates 100 HSPA+ networks will be in commercial service

A further 55 HSPA+ networks are being deployed

Over thirty 42 Mbps DC-HSPA+ networks are planned or being deployed  
Five operators have committed to 84 Mbps

Updates on network commitments, launches, ecosystem  
**Global HSPA+ Network Commitments and Deployments report**  
[www.gsacom.com](http://www.gsacom.com)





# EDGE contributes to mobile broadband success

□ Most HSPA networks combine with EDGE



543 EDGE network operator commitments in 198 countries

531 EDGE networks launched in 196 countries



www.gsacom.com



Countries where GSM/EDGE is commercially launched

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Source: EDGE Fact Sheet - August 19, 2010

543 GSM/EDGE commitments  
in 198 countries

531 commercial GSM/EDGE  
networks in 196 countries

295 HSPA network operator  
commitments (72.3%) also  
committed to EDGE

1,924 HSPA user devices (84%)  
also support GSM/EDGE  
(excluding notebooks and e-  
book readers)

Evolved EDGE in deployment

Source: GSA EDGE Fact Sheet - August 19, 2010

[www.gsacom.com/gsm\\_3g/edge\\_databank.php4#EDGE\\_Fact\\_Sheet](http://www.gsacom.com/gsm_3g/edge_databank.php4#EDGE_Fact_Sheet)



# The industry direction is to LTE

- LTE is needed to accommodate huge traffic growth

Mobile broadband is gaining momentum from widespread 3.5G deployments, flat rate data tariffs, and availability of internet friendly mobiles

Traffic rising/revenue falling

40x – 100x traffic increase  
May need to be supported across several frequency bands

**LTE is essential to take mobile broadband to the mass market**

## Year 2010: LTE performance

Peak downlink: > 150 Mbps  
Typical user speed: 10-30 Mbps  
Typical user UL rate: 5-50 Mbps

## Spectrum flexibility

Can use new or re-farmed spectrum, FDD and TDD  
Variable channel bandwidth

## Improved performance

Higher capacity, peak and user data rates  
Higher bandwidth  
Much lower latency  
“always on”; enhanced user experience

## Lower cost

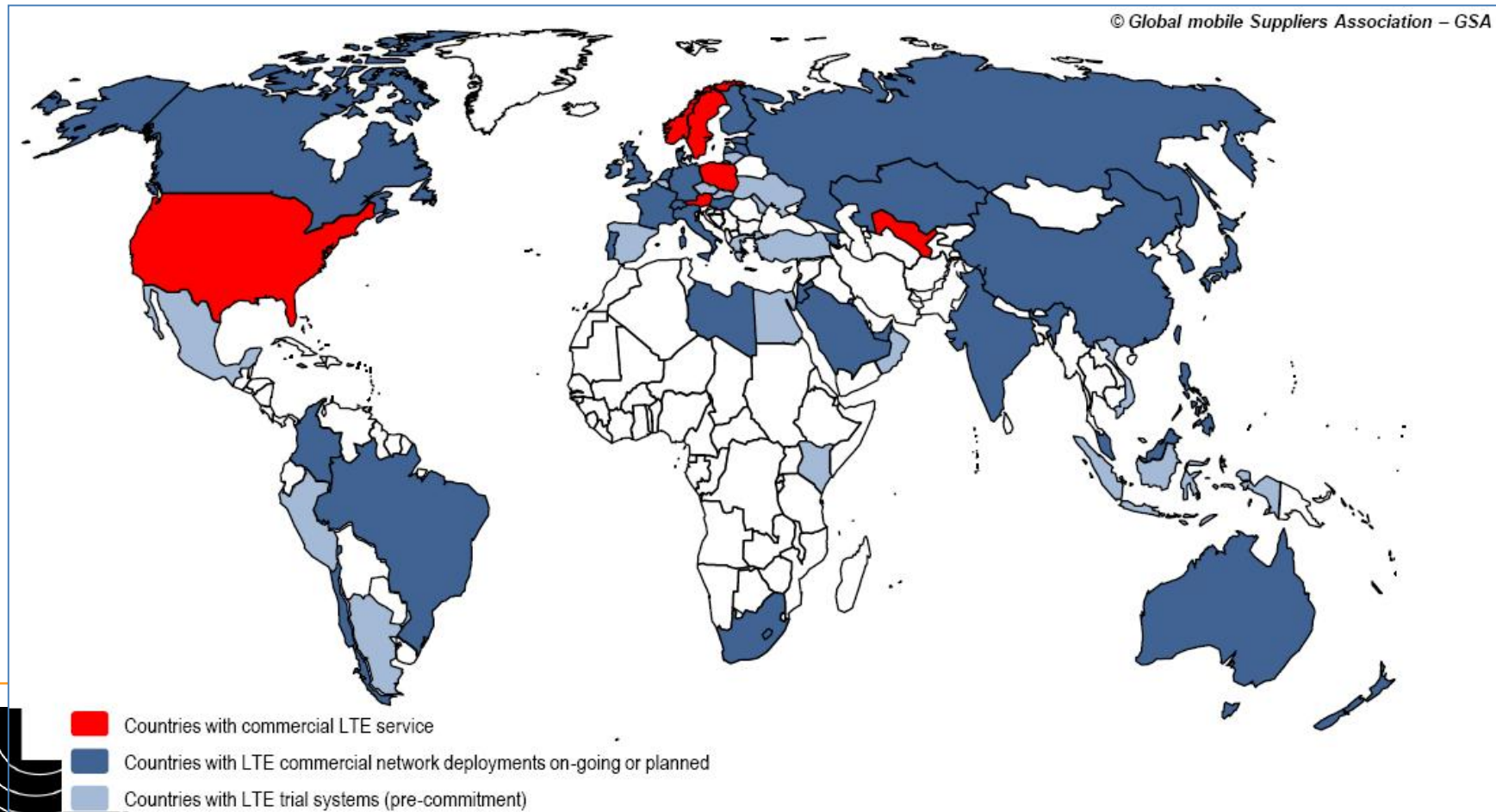
IP-based flat network architecture; Low OPEX  
High degree of self configuration/optimization  
High re-use of assets including sites

## Complements 3G/HSPA

Addresses high capacity requirements  
Seamless service continuity/multimode devices  
Next generation solution for 3GPP and 3GPP2

# 156 operators in 64 countries investing in LTE

- ❑ 113 commercial LTE network commitments in 46 countries
  - ❑ 10 LTE networks commercially launched
- ❑ 43 additional pre-commitment trials



Country	Operator	Expected launch
Norway	TeliaSonera	Launched 15.12.09
Sweden	TeliaSonera	Launched 15.12.09
Uzbekistan	MTS	Launched 28.07.10
Uzbekistan	UCeIl	Launched August 2010
Poland	Mobyland and CenterNet	Launched 07.09.10
USA	MetroPCS	Launched 21.09.10
Austria	Mobilkom Austria	Launched 19.10.10
Armenia	Vivacell-MTS	2010
Canada	Telus	2010
Canada	Bell Canada	2010
Finland	TeliaSonera	2010
Germany	Deutsche Telekom	2010
Japan	NTT DoCoMo	2010
Japan	Emobile	2010
Russia	Yota	2011
Sweden	TeleNor Sweden	2010
Sweden	Tele2 Sweden	2010
USA	CenturyTel	2010
USA	Verizon Wireless	2010
UAE	Etisalat	2010
Canada	Rogers Wireless	2010-11
China	China Mobile	2010-11
Germany	Vodafone	2010-11
Hong Kong	PCCW	2010-11
Hong Kong	CSL Limited	2010-11
USA	Cox Comms	2010-11
South Africa	Vodacom	2011
Canada	Shaw Communications	2011
Colombia	UME EPM	2011
Denmark	3 Denmark	2011
Denmark	TDC	2011
Denmark	TeleNor	2011
Denmark	Telia Danmark	2011
Germany	O2 (Telefonica)	2011
India	Qualcomm India LTE Venture	2011
Ireland	Hutchison 3	2011
Japan	Softbank Mobile	2011
Jordan	Zain	2011
Portugal	TMN	2011
Portugal	Vodafone Portugal	2011
Russia	Rostelecom	2011
South Korea	LG Telecom	2011
South Korea	KT	2011
South Korea	SK Telecom	2011
Switzerland	Orange	2011
Switzerland	Swisscom	2011
USA	AT&T Mobility	2011
USA	Aircell	2011
USA	BayRICS	2011
Austria	T-Mobile	2011-12
Austria	Hutchison 3	2011-12
Austria	Orange	2011-12
France	Orange	2012
Japan	KDDI	2012
Taiwan	Chunghwa Telecom	2012
Malaysia	DiGi	2013
Australia	Optus	To be confirmed
Australia	Telstra	To be confirmed
Australia	VHA	To be confirmed
Bahrain	Zain	To be confirmed
Brazil	Vivo	To be confirmed
Canada	MTS Allstream	To be confirmed
Canada	SaskTel	To be confirmed
Chile	Entel PCS	To be confirmed
Chile	Movistar	To be confirmed

UPDATE: 3 recent LTE launches:  
 CSL Limited (Hong Kong) and Tele2 (Sweden)  
 Verizon Wireless (USA)

## 113 LTE network commitments, 46 countries

China	China Telecom	To be confirmed
Estonia	EMT	To be confirmed
Estonia	Tele2	To be confirmed
Finland	DNA	To be confirmed
Finland	Elisa	To be confirmed
Finland	SFR	To be confirmed
Germany	E Plus	To be confirmed
Hong Kong	SmarTone-Vodafone	To be confirmed
Hong Kong	Hutchison 3	To be confirmed
Hong Kong	China Mobile	To be confirmed
Hungary	Telenor Magyarorszag	To be confirmed
Italy	Telecom Italia	To be confirmed
Italy	Wind	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
Latvia	LMT	To be confirmed
Libya	Al Madar	To be confirmed
Malaysia	Asiaspace	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
Norway	TeleNor	To be confirmed
Philippines	Pite!	To be confirmed
Russia	Svyazinvest	To be confirmed
Saudi Arabia	Zain	To be confirmed
Saudi Arabia	STC	To be confirmed
Saudi Arabia	Etisalat (Mobily)	To be confirmed
Singapore	M1	To be confirmed
Singapore	SingTel	To be confirmed
Singapore	StarHub	To be confirmed
South Africa	Cell C	To be confirmed
UK	Vodafone	To be confirmed
USA	Cellcom	To be confirmed
USA	Cellular South	To be confirmed
USA	Lightsquared	To be confirmed
USA	T-Mobile USA	To be confirmed
USA	Commnet Wireless	To be confirmed
USA	Leap Wireless	To be confirmed
USA	Texas Energy Network	To be confirmed
USA	Public Service Wireless	To be confirmed

Source: GSA Evolution to LTE report  
 October 26, 2010  
[www.gsacom.com](http://www.gsacom.com)



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

## 43 pre-commitment trials

Country	Operator
Argentina	Telefonica
Argentina	Personal
Belgium	Mobistar
Belgium	Telenet
Brazil	Telefonica
Czech Republic	O2 (Telefonica)
France	Bouygues Telecom
Egypt	Vodafone
Greece	Cosmote
Hungary	Magyar Telekom (T-Mobile)
Indonesia	Telkomsel
Indonesia	XL Axiata
Indonesia	Indosat
Latvia	Bite
Latvia	Triatel
Lithuania	Bite
Lithuania	Omnitel
Kazakhstan	Vimpelcom
Kenya	Safaricom
Malaysia	Maxis
Malaysia	Celcom
Mexico	Telcel
Mexico	Telefonica
Moldova	Orange Moldova
Oman	Omantel
Peru	Telefonica
Philippines	Globe Telecom
Philippines	Smart
Puerto Rico	Claro
Russia	MTS
Russia	Vimpelcom
Russia	Tele2 Russia
Russia	Megafon
Slovak Republic	O2 (Telefonica)
South Africa	MTN
Spain	Telefonica
Turkey	Turkcell
UK	O2 (Telefonica)
UK	Clear Mobitel
Ukraine	MTS-Ukraine
USA	Clearwire
Vietnam	FPT Telecom
Vietnam	VDC

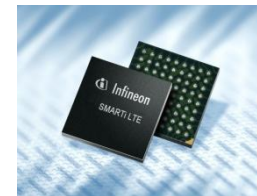
# LTE eco-system is building



Mobile phones, computer and consumer electronic devices including notebooks, netbooks, ultra-mobile PC's, gaming devices, cameras, and PMPs will incorporate embedded LTE connectivity.

Supplier	Model name	Form factor
4M Wireless	PS100 UE protocol stack	Software
Altair Semi	FourGee™ 3100/6200	Chipset
Altair Semi	FourGee™ 6150 for TDD	Chipset
Beceem	BCS500 LTE FDD/TDD and WiMAX™	Chipset
Continuous Computing, picoChip, Cavium Networks	LTE femtocell reference design	Chipset reference design
Huawei	E398 LTE/GSM/HSPA 2.6 GHz, 900 MHz	USB modem
Icera	Dual mode HSPA modem	Chipset
Innofidei	SMART™ LU LTE / 3G / 2G multimode RF Transceiver	Chipset, USB modem

Infineon	SMART™ LU LTE / 3G / 2G multimode RF Transceiver	Chipset, USB modem
LG	M13 test device CDMA EV-DO/LTE dual mode band 13	Chipset
LG	LTE handset modem chip	Chipset
MediaTek	LTE mobile terminal platform licensing arrangement with NTT DoCoMo	Chipset
MimoOn	mMobilePHY™ 3GPP Release 8 software stack supporting FDD and TDD FDD LTE USB-LTE 7110	Chipset
Motorola	RD-3 multi mode	Chipset
Nokia	MDM9200 (WCDMA HSPA+ and LTE)	Chipset
Qualcomm	MDM9600 (WCDMA EV-DO Rev. B, WCDMA HSPA+ and LTE)	Chipset
Qualcomm	MSM8960 (CDMA2X EV-DO Rev. B, WCDMA HSPA, HSPA+ and LTE)	Chipset
Runcom		Chipset
Samsung	GT-B3710 (2.6 GHz)	Chipset
Samsung	GT-B3730 (LTE/2G/3G)	Chipset
Samsung	N150 10 inch with Kalmia LTE chipset	Chipset
Sequans	SCH-1900 multi-mode CDMA-LTE handset prepared for sampling	Chipset
Sierra Wireless	AirPrime MC7750 LTE, EV-DO, HSPA+ LTE, HSPA+	Chipset
Sierra Wireless	AirPrime MC7700 LTE, HSPA+	Chipset
Sierra Wireless	AirPrime MC7710 LTE, HSPA+	Chipset
ST-Ericsson	M700 LTE quad band	Module
Synopsys	M710 multi mode LTE band	Module
Tata Elsi	LTE TDD Model Library	Chipset
Toshiba	LTE Femto/Pico eNodeB solution compliant to 3GPP Rel 8 & Femto Forum specs	Chipset
Wavesat	T130 T3 3 inch: choice of 4 Intel LTE U/LY processors	Chipset
ZTE	Odyssey 9000 family	Software Chipset reference design
ZTE	AL620 LTE/UMTS/EV-DO	Chipset
ZTE	ZLR-2070S	Chipset
		USB modem
		USB modem
		Router



Source of data: GSA Information Paper "Evolution to LTE" – October 26, 2010

# Spectrum for LTE deployments



- An operator may introduce **LTE in 'new' bands** where it is easier to deploy 10 MHz or 20 MHz carriers for maximum benefits of using LTE
  - **2.6 GHz band** (IMT Extension band)
  - **Digital Dividend spectrum 700, 800 MHz**
  - or in **re-farmed** existing mobile bands e.g. 850, 900, 1700, 1800, 1900, 2100 MHz
- Eventually **LTE may be deployed in all of these bands – and others later**
- **2.6 GHz** (for capacity) and **DD 700/800 MHz** (wider coverage, improved in-building) **is a good combination**
- LTE offers a **choice of carrier bandwidths**: 1.4 MHz to 20 MHz; the widest bandwidth will be needed for the highest speeds

Europe today	GSM	GSM	UMTS	LTE	
Frequency band	800 MHz	900 MHz	1.8 GHz	2.1 GHz	2.6 GHz
Future	LTE	GSM UMTS LTE(?)	GSM LTE	UMTS	LTE

Germany is first European country to allocate DD/800 MHz spectrum  
 - Vodafone Germany LTE network soft launch in September 2010

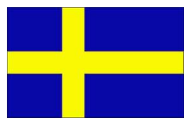
## 2.6 GHz: key LTE band for APAC, Europe, MEA, LatAm



- Telenor and Netcom acquired 2.6 GHz spectrum and are building LTE networks in Norway
- TeliaSonera launched LTE commercial service in Oslo launched on December 15, 2009



- Teliasonera, Elisa and DNA have been granted licences and 2.6 GHz spectrum and are deploying LTE networks in Finland



- TeliaSonera Sweden launched LTE beginning in Stockholm in December 2009; now continuing deployment in more cities using nationwide 2 x 20 MHz 2.6 GHz spectrum
- Tele2 Sweden with TeleNor Sweden launched an LTE network (via their JV - Net4Mobility) on November 15, 2010 which includes spectrum sharing in 900 MHz and 2.6 GHz



- In Hong Kong, 2x15 MHz blocks of 2.6 GHz FDD spectrum have been won via auction by China Mobile, Genius Brand and CSL. CSL launched LTE for corporate users on 25.11.10

Europe: 2.6 GHz spectrum has also been awarded in Austria, Denmark, Germany and The Netherlands  
More auctions of 2.6 GHz spectrum are planned in the coming months

Asia: 2.6 GHz spectrum consultations, trials are on-going in many markets including Australia, Indonesia, Malaysia, Singapore, Taiwan, The Philippines

MEA: Deployments, trials underway e.g Saudi Arabia, Jordan, South Africa, UAE

Latin America: Brazil, Chile and Mexico plan auctions of 2.6 GHz. In Colombia one operator has been allocated 2.6 GHz and will deploy LTE in this band

# LTE1800: a promising option

- + 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.
- 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.

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

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

18 18.5.2010 Dr. Eric Bideur, Elisa LTE World Summit, Amsterdam  
Used with permission from Elisa

elisa



LTE1800 operator trials and deployment activities e.g.:

- Elisa (FI)
- Bouygues Telecom (FR)
- Orange (FR)
- Cosmote (GR)
- Telstra (AUS)
- VHA (AUS)
- CSL Ltd (HK)
- SmarTone-Vodafone (HK)
- T-Mobile (some markets)

**First commercial LTE1800 system launched (in 20 MHz bandwidth) Mobyland & CenterNet Poland**



# LTE1800: World's first commercial launch



**Mobyland and CenterNet, Poland**

**World's first commercial LTE network launch**

**September 7, 2010**

**First LTE user device (USB modem / dongle)**



# The LTE market includes TDD as well as FDD



**LTE TDD is positioned as the next evolution of the TD-SCDMA family and a natural progression**

- ❑ From 3GPP standards perspective: commonality with FDD
- ❑ From vendor perspective: increasing use of software defined radio techniques
- ❑ From operator perspective: spectrum availability, flexible base stations

Large-scale LTE TDD trial during the World Expo 2010, Shanghai



Clearwire (USA) has requested 3GPP to standardize LTE TDD for operation in 2496 – 2690 MHz and on August 4, 2010 announced plans for technology trials to test both LTE TDD and LTE FDD

Softbank Mobile (Japan) is reported to be considering LTE TDD in 2.5 GHz spectrum it owns

WiMAX™ operator Asiaspace (Malaysia) is exploring deployment in near future of LTE TDD in 2.3 GHz band

Mobyland and CenterNet are testing LTE TDD in Poland in 2.5 GHz band

# LTE TDD is maturing towards commercialization



LTE TDD showcase at the World Expo 2010, Shanghai - key milestones achieved in the trial included:

- Demonstration of LTE TDD HD video telephone in single 20 MHz spectrum with peak DL speeds of up to 80 Mbps
- Demonstration of VOD, video communication, and other high-speed mobile broadband apps
- Demonstration of 24-channel video streaming
- Mobile HD video conferencing between the trial network and another location
- Inter-Operability Test of multiple LTE TDD USB dongles in a single mobile network cell

❑ China Mobile is deploying further trial LTE TDD networks in 3 major cities (Qingdao, Xiamen and Zhuhai).

Deployment in each city will be 100+ base stations. Smaller trial networks will also be deployed in Beijing and Shanghai

❑ China Mobile is also partnering with foreign operators to trial LTE TDD networks overseas, e.g. Taiwan

❑ Orange France is trialling LTE in both FDD and TDD modes

❑ Omantel showcased LTE TDD to visitors to the Salalah Tourism Festival in July 2010

❑ Russia: LTE TDD commercial network deployment (Yota) and trial (Rostelecom)

❑ India is a key market for LTE TDD following the BWA spectrum auction. Qualcomm through its JV with local partners is committed to LTE TDD and anticipates commercial service from 2011. Some other BWA spectrum winners are finalizing their technology choice, so more may also choose LTE TDD

# LTE-Advanced

Officially recognized as an IMT-Advanced (4G) system



3GPP made a formal submission to the ITU in October 2009, proposing that LTE Release 10 & beyond (LTE-Advanced) be evaluated as a candidate for IMT-Advanced. The submission was made jointly in the name of the 3GPP Organizational Partners: ARIB, ATIS, CCSA, ETSI, TTA and TTC. GSA supported this as a Market Representation Partner of 3GPP.

The ITU has now formally recognized LTE and LTE-Advanced as a future-proofed roadmap for mobile operators who are deploying more and more advanced mobile broadband services.

In October 2010 the ITU announced it had accepted and officially designated LTE-Advanced as an IMT-Advanced (4G) technology. IMT-Advanced provides a global platform on which to build the next-generations of interactive mobile services that will provide faster data access, enhanced roaming capabilities, unified messaging and broadband multimedia

3GPP plans to complete its work on LTE-Advanced specifications by 2010/2011



**Smooth transition from 3G to 4G**

**LTE-Advanced will be the main feature of 3GPP Release 10**

**LTE-Advanced formally submitted on Oct 7, 2009 to the ITU for evaluation as a candidate for IMT-Advanced**

- Improved spectrum efficiency**
- Support for wider bandwidth: Up to 100 MHz**
- Downlink transmission scheme**
  - Improvements to LTE by using 8x8 MIMO
  - Data rates 100 Mbps high mobility, 1 Gbps low mobility
- Uplink transmission scheme**
  - Improvements to LTE; data rates up to 500 Mbps
- Reduced latency**
- Relay functionality**
  - Improving cell edge coverage
  - More efficient coverage in rural areas
- Backward compatibility and interworking with LTE and other 3GPP legacy systems**

ITU website: Overview - Development of IMT-Advanced  
[www.itu.int/itu-news/manager/display.asp?lang=en&year=2008&issue=10&ipage=39&ext=html](http://www.itu.int/itu-news/manager/display.asp?lang=en&year=2008&issue=10&ipage=39&ext=html)

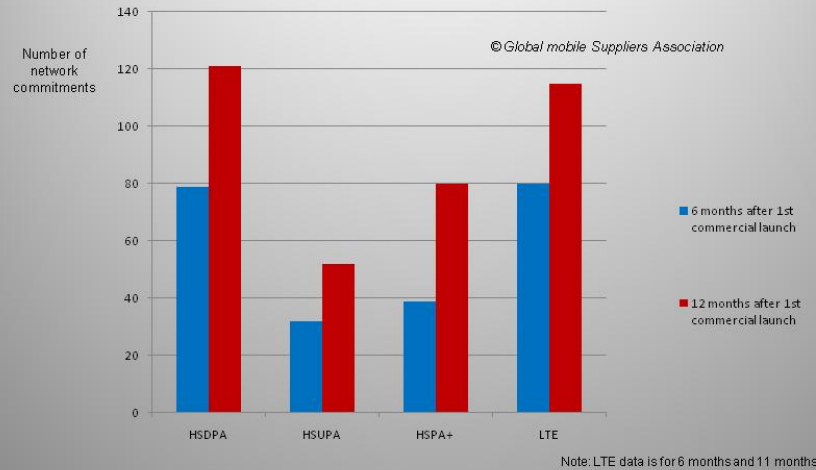
# LTE: the single global standard



## LTE operator commitments are growing fast



www.gsacom.com



**LTE is on track**, attracting global industry support

- ❑ Operator commitments are similar/higher than HSPA

LTE is the natural migration choice for GSM/HSPA operators. LTE is also the next generation mobile broadband system of choice of leading CDMA operators, who will be in the forefront of service introduction

Leading WiMAX operators are also shifting to LTE

LTE TDD mode is a real complement to LTE FDD and a future-proof evolution path for TD-SCDMA

- ❑ With LTE we have **one single global standard**, securing and driving even higher economies of scale and simplifying roaming

Reports, information papers, facts, charts on the website  
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Subgroups established: UMTS900  
LTE1800  
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