

Overview of LTE devices landscape

Building the mobile Broadband Ecosystem for 700 MHz band

MWC2013 – Barcelona, February 28, 2013

Alan Hadden, President, GSA

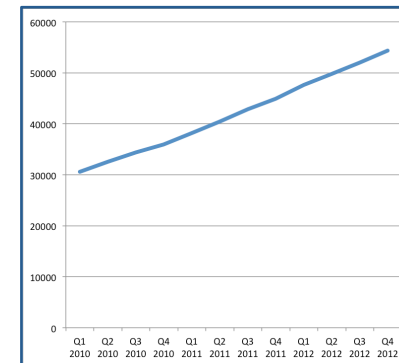
Global mobile Suppliers Association
www.gsacom.com

GSA's strategy is to inform, educate, and influence opinion about mobile communications using 3GPP technologies, including GSM/EDGE, WCDMA-HSPA/HSPA+, and LTE/LTE-A by reporting on the facts, statistics, developments and trends

GSA is a trusted brand used widely across the industry, and is established as the de-facto reference source for the worldwide status of mobile broadband commitments, network deployments and launches, and the supporting devices ecosystems

The GSA website is targeted to the industry

- ❑ Global reach, contacts growing by ~10,000 per year
- ❑ 46% Y-o-Y growth in downloads of reports, papers, etc.
- ❑ Significant presence across social network platforms



55,000+
registered site users

Some operator testimonials

"Collaboration with GSA in particular on the LTE1800 and LTE2600 MHz front has certainly contributed to the fast development of the eco-system into these two bands, as we can see from the high numbers of networks and devices now in these bands. This is helping the industry in deploying 4G LTE networks globally at the fastest speed ever seen for a wireless technology to offer an improved broadband experience to the more demanding customers"
– CSL Limited

"GSA is doing a wonderful job and its web site gsacom.com has become a one stop shop for any key information like operator roll-outs, device eco system, vendor information, etc. etc. for Mobile Broadband. If you want the latest information for any mobile broadband ecosystem just login to gsacom.com"
– Dialog Axiata

"Telstra has worked closely with the GSA for a number of years to obtain vital information on emerging technology trends and take up rates. We have also jointly worked to gain industry alignment for new opportunities such as the recent emergence of LTE1800. The information papers, LinkedIn site and GSA site allow operators from around the world to obtain timely information to assist in network and strategic planning decisions."

- ❑ GSA own-researched and produced reports and papers
 - ❑ *working directly with stakeholders, investors, developers, suppliers, etc.*
- ❑ Regulatory developments including spectrum and licensing
- ❑ Operator commitments, network deployments, commercial launches, market acceptance
- ❑ Development of the devices ecosystems, maturity, industry participants, encouragement
- ❑ Regular updates according to market developments
- ❑ Subscriptions growth and trends



LTE technology
is now
mainstream

104 new
network
commitments
confirmed

97 commercial
LTE networks
launched in
2012 alone

LTE service is
now available
in 37 more
countries than
a year ago

Almost 10x
subscriptions
growth in 12
months

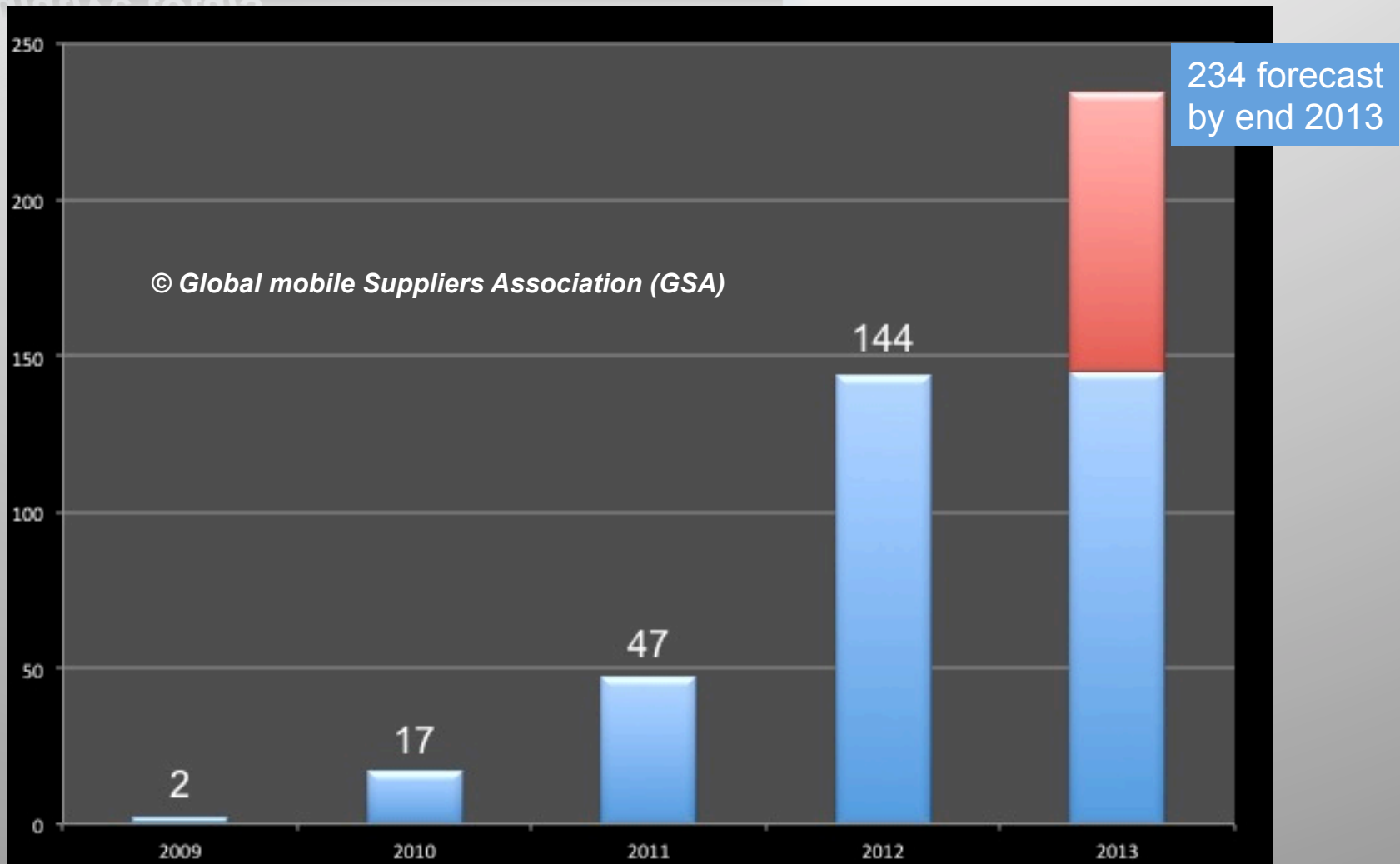
LTE is the fastest
developing mobile
system technology
ever
145 commercial
networks launched
by 1.1.13

Number of LTE user devices more than doubled
LTE is supported in the leading smartphone brands and models
- Wide choice of LTE-enabled tablets on the market

Voice (VoLTE) is market reality
First services commercially
launched

1800 MHz emerged as the dominant band for LTE network deployments (LTE1800)

Commercial LTE network launches - cumulative totals



Source of data: GSA Evolution to LTE report – January 8, 2013
www.gsacom.com



REPORT: Status of the LTE Ecosystem

January 31, 2013

This report by the GSA (Global mobile Suppliers Association) provides an analysis of 666 LTE user devices launched in the market by 87 suppliers, which we have identified from our latest research. The impressive scale of today's devices ecosystem is consistent with LTE as a mainstream technology with global acceptance and a huge industrial commitment. LTE is the fastest developing mobile communications system technology ever.

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

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Join the discussions in our LinkedIn groups

GSA: www.linkedin.com/groups?gid=2313721

LTE1800: www.linkedin.com/groups?gid=3129390

LTE TDD: www.linkedin.com/groups?gid=3978061

LTE User Devices: www.linkedin.com/groups?gid=4146472

Published January 31, 2013

Free download
www.gsacom.com

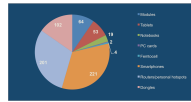
666 LTE User Devices

• announced by 87 manufacturers

GSA surveys worldwide mobile broadband market developments and publishes the facts, statistics and trends in its Evolution to LTE report, confirming operator commitments to LTE, network deployments, launches, trials, regulatory and market developments. The Evolution to LTE report of January 8, 2013 confirmed 381 operators are investing in LTE, comprising of 330 network build commitments plus 51 pre-commitment trials. 145 LTE systems were commercially launched by that date. GSA forecasts 234 LTE networks will be in commercial service by end 2013. Check our website www.gsacom.com regularly for updates. There were 43.7 million LTE subs at end September 2012.

In this report GSA confirms 666 LTE user device announcements have been made by 87 manufacturers, including frequency and carrier variants, to January 30, 2013. Almost 400 LTE devices were announced in the past year, and the number of manufacturers expanded by 52%.

LTE devices address all segments. Most operate in the FDD mode. A total of 124 devices can operate in the TDD mode – see next page for details.



666 LTE User Devices - by form factor

© GSA - Global mobile Suppliers Association

Download the above chart via link on www.gsacom.com

221 smartphones including operator and frequency variants are announced, which is 360% year-on-year growth. LTE is supported in the most popular smartphones from all leading brands.

Detailed analysis of each of the 666 LTE devices is available to authorized users of the *GAMBoD - LTE tool* - conditions apply (www.gsacom.com/gambod). *GAMBoD* is NOT a public resource.

Access is restricted to:
* registered users from "GSA member" companies
* registered users from network operators
* registered users from "Associate of GSA" enterprises

LTE Operating Frequencies

LTE networks are deployed globally in many bands. GSA's analysis of how the main LTE bands are supported by the devices ecosystem is as follows:

LTE FDD	
700 MHz	284 devices
800 MHz Band 20	137 devices
1800 MHz Band 3	153 devices
2600 MHz Band 7	180 devices
800/1800/2600 MHz	112 devices
2100 MHz Band 1	107 devices
AWS Band 4	
147 devices	
LTE TDD	
2300 MHz Band 40	82 devices
2600 MHz Band 39	88 devices
2600 MHz Band 41	18 devices

Note 1: Manufacturers have not declared operating frequencies or fallback modes for some products

Note 2: Several devices are multi-band

Note 3: 3GPP defines a number of bands in 700 MHz:

Band 12 (down C 700 MHz) 774 MHz-787 MHz 746 MHz-759 MHz

Band 13 (down C 700 MHz) 774 MHz-787 MHz 746 MHz-759 MHz

Band 14 (down C 700 MHz) 754 MHz-767 MHz 726 MHz-739 MHz

Band 17 (down B, C 700 MHz) 754 MHz-767 MHz 726 MHz-739 MHz

APRIL: Super Downlink (APRIL700) 800 MHz

An LTE device confirmed by GSA in the above table as operating in "700 MHz" may operate in only one of these bands, and in some cases may operate in more than one of these bands. Users with authorized access to GSA's *GAMBoD - LTE* may research products separately for bands 12, 13, 14, 17

Note 4: Certain products are carrier or country specific and are not available in all markets

GSA estimates that a user with a tri-band 800/1800/2600 MHz LTE FDD device could use it in 55 countries i.e. in more than 80% of countries where LTE service is commercially available today (subject to inter-carrier roaming agreements).

3G Interworking/fallback

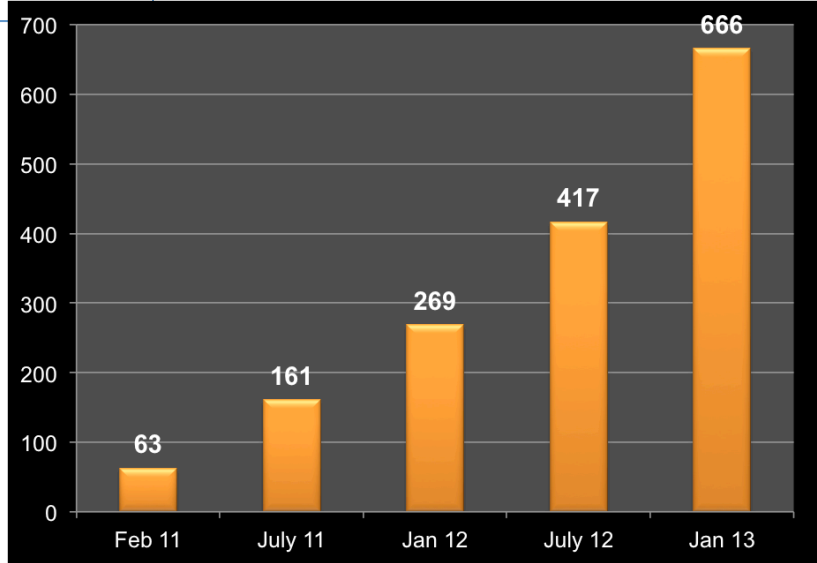
- 450 LTE devices also operate on either HSPA, HSPA+ or DC-HSPA networks
- 201 LTE devices support DC-HSPA+
- 150 LTE devices support EV-DO networks

1800 MHz: most popular LTE band

800 MHz is the most popular band for LTE deployments and is used in 40% of commercially launched networks worldwide. The LTE1800 devices ecosystem includes the leading brands and the most popular smartphones. 153 LTE1800 devices are announced, 100 more than a year ago.

For the current worldwide market situation of LTE network deployments in 1800 MHz spectrum see GSA's *Status of the Global LTE1800 Market* report – download via the link on www.gsacom.com

The report covers FDD and TDD devices



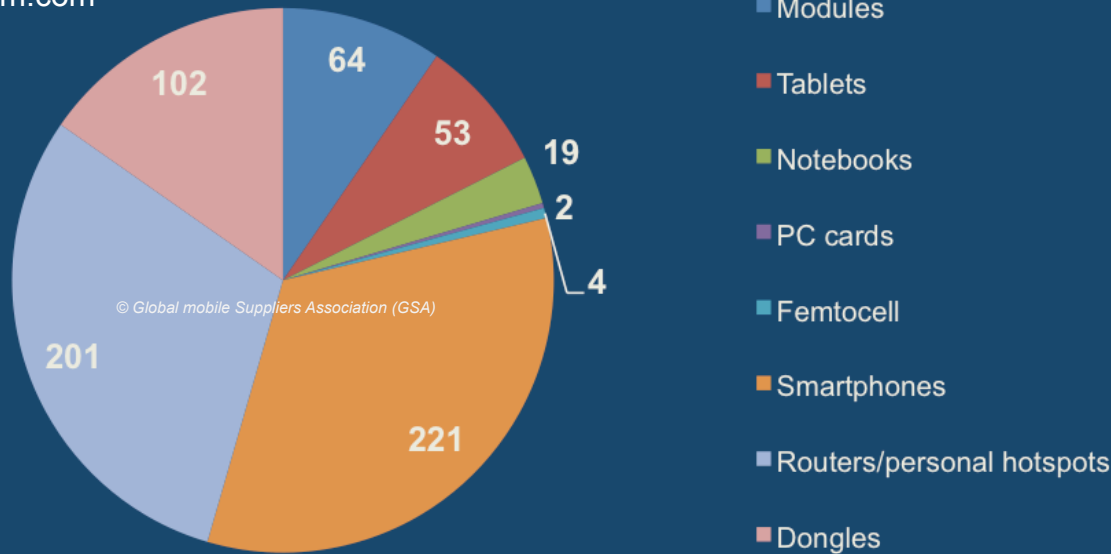
Growth in number of announced LTE user devices – GSA reports



LTE Ecosystem: 666 user devices announced

Includes FDD and TDD

666 LTE User Devices
www.gsacom.com



January 2013

87 manufacturers

LTE FDD	
700 MHz	284 devices
800 MHz Band 20	137 devices
1800 MHz Band 3	153 devices
2600 MHz Band 7	180 devices
800/1800/2600 MHz	112 devices
2100 MHz Band 1	107 devices
AWS Band 4	147 devices

LTE TDD	
2300 MHz Band 40	82 devices
2600 MHz Band 38	88 devices
2600 MHz Band 41	19 devices

Almost 400 LTE devices were announced in past year

Number of manufacturers expanded by 52% in same period

221 LTE smartphones including operator and frequency variants

LTE is supported in the leading smartphone brands and models

124 LTE TDD user devices

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

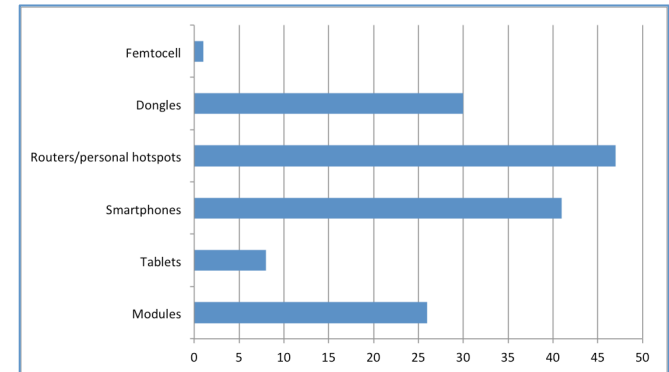
Analysis using GSA's GAMBoD-LTE tool

The industry, investors, and users all benefit from economies of scale

- ☐ Harmonization and firm investment commitments are crucial
- ☐ Technology needs to be standardized and available
- ☐ Operators need to confirm they are willing to invest, explaining scale and timelines
 - ☐ providing necessary leadership for the market
 - ☐ suppliers are then able to build confidence in the size of the market and the timetable
 - ☐ this will in turn support further spectrum allocations and more investments
- ☐ Favourable regulatory environment needed including allocations of harmonized spectrum in required contiguous blocks
- ☐ Messages and intentions clearly communicated, e.g.:
 - ☐ Press releases
 - ☐ By-lined articles
 - ☐ Roundtables, workshops
 - ☐ White papers
 - ☐ Joint report(s)
 - ☐ Requirements included in specifications to partners/suppliers

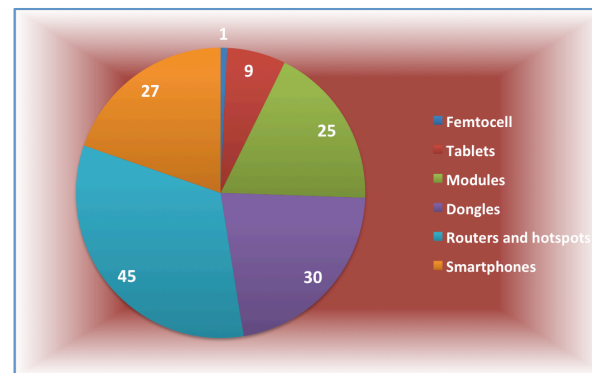
LTE1800 (band 3)

- ❑ Kick off GSMA-GSA seminar at MWC2011
- ❑ < 10 user devices supported LTE1800 at that time
- ❑ Current situation = 153 devices announced
- ❑ The number of LTE1800 products tripled in past year
- ❑ All form factors supported including the most popular smartphone brands and models
- ❑ 1800MHz is most widely used band for LTE deployments (used by 40% of LTE operators) - key enabler for roaming

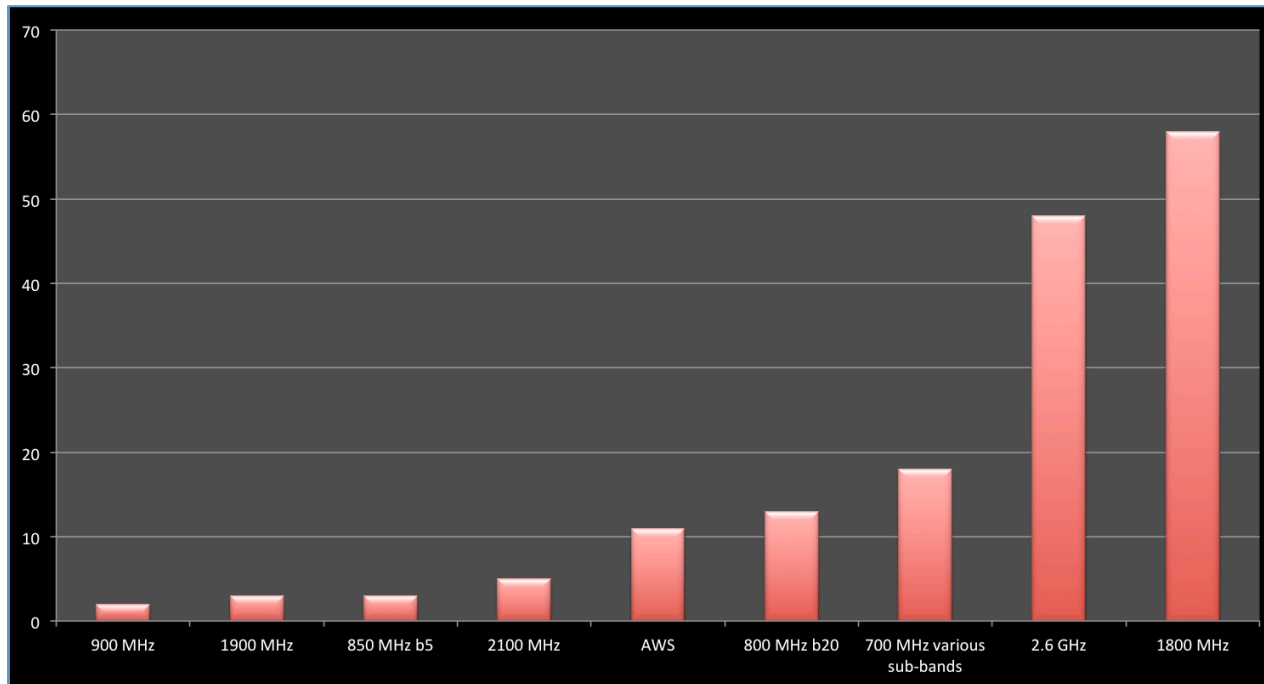


LTE800 (band 20 Digital Dividend)

- ❑ Sustained efforts by GSMA, GSA, industry
- ❑ Current situation = 137 devices announced
- ❑ 163% YoY growth in no. of LTE800 products
- ❑ All form factors supported



□ Bands used currently in 145 commercially launched LTE networks worldwide



A user with a triband 800/1800/2600 MHz LTE device could potentially use it in 55 countries, i.e. in 83% of countries where LTE is commercially available today

112 triband 800/1800/2600 MHz user devices have been introduced

- 1800 MHz is likely to remain the prime band for LTE and a key enabler for roaming in the foreseeable future
- 2nd most used band for LTE deployments is 2.6 GHz (band 7)
- 800 MHz is the next most popular contiguous band

The APT700 FDD band plan represents a major opportunity for global spectrum harmonization for LTE systems, paving the way for ensuring the greatest economies of scale for devices and capacity for mobile broadband, and for roaming

GSA is ready to assist progress towards this goal

www.gsacom.com



APT700 band: www.linkedin.com/groups?gid=4759091

LTE User Devices: www.linkedin.com/groups?gid=4146472