Seminario AGCOM
“LTE per il mobile broadband: tecnologia, regolamentazione,, ecosistema e mercato”

Roma, 24 Febbraio 2012

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Agenda

Introduction to LTE “Executive Summary” (15 min)

Part I Regulation, Market and Ecosystem (1h)

- **LTE Regulation**
- **LTE Market**
- **LTE Ecosystem**

Part II LTE Technology (1h15min)

- **LTE basics**
- **LTE field performance**
- **Interference**
- **LTE –A evolution**

Q&A and Conclusion (10min)

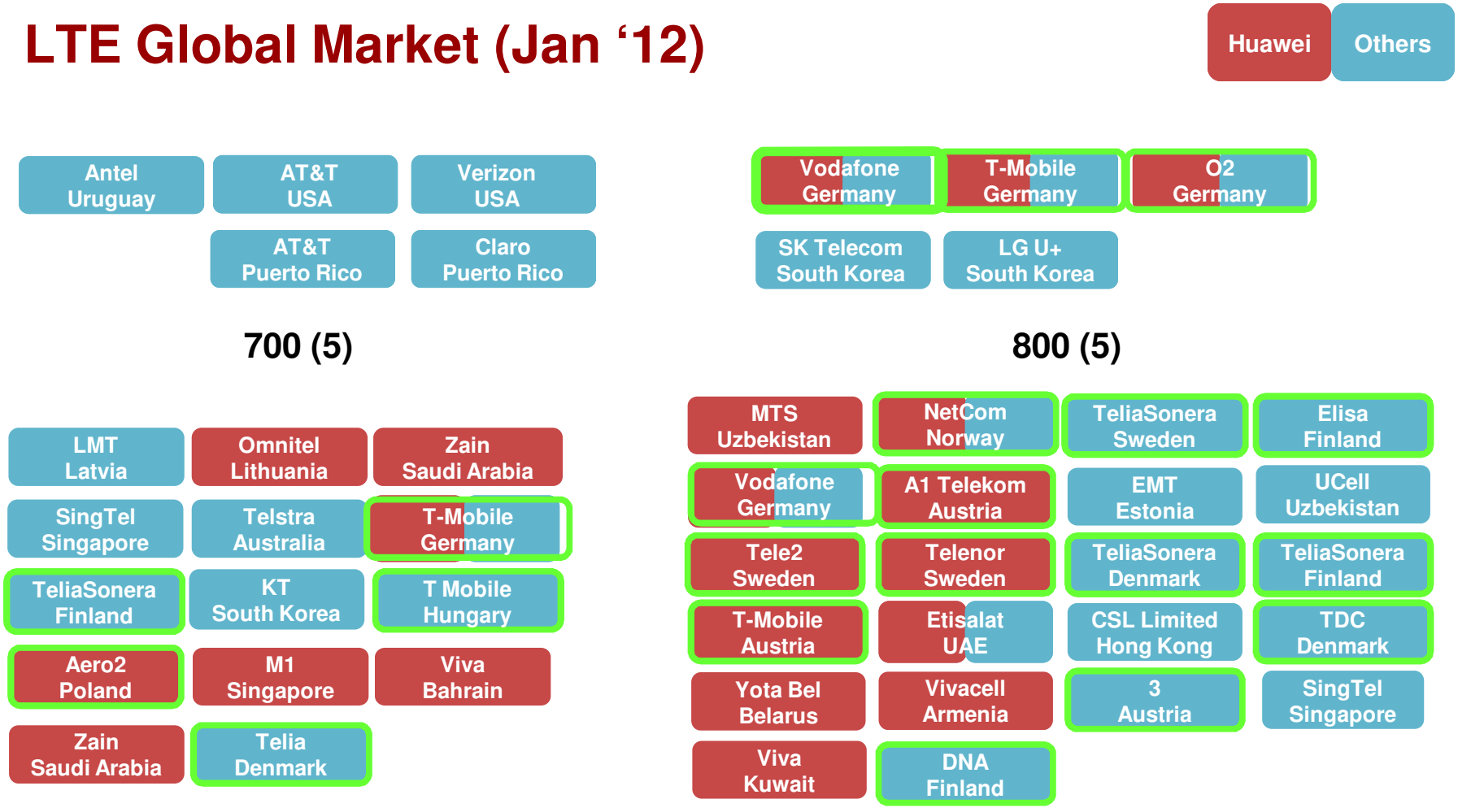
New MBB Spectrum for EU
Short / Medium and Long Term Targets

Approved RSPP targets availability of 1200MHz for MBB by 2015 → 575MHz to be added

(including 200MHz in the 3500MHz band which is not fully harmonized for MBB yet)

	Band Name	3GPP band #	UL (MHz)			DL (MHz)			Duplex mode	Av. BW (MHz)		Av. BW in EU (MHz)
FDD	IMT-2000 Core Band 2.1GHz	1	1920	–	1980	2110	–	2170	FDD	2x	60	120
FDD	GSM 1800 (DCS)	3	1710	–	1785	1805	–	1880	FDD	2x	75	150
FDD	2600 (IMT ext. band)	7	2500	–	2570	2620	–	2690	FDD	2x	70	140
FDD	GSM 900 (*)	8	880	–	915	925	–	960	FDD	2x	35	70
FDD	CEPT 800	20	832	–	862	791	–	821	FDD	2x	30	60
TDD	TDD 2000 lower	33	1900	–	1920	1900	–	1920	TDD	1x	20	20
TDD	TDD 2000 upper	34	2010	–	2025	2010	–	2025	TDD	1x	15	15
TDD	IMT Extension Gap	38	2570	–	2620	2570	–	2620	TDD	1x	50	50
Total	FDD											540
Total	TDD											85
Total	FDD & TDD											625
FDD	L-band (EU)	TBD	1452	-	1492	1452	-	1492	TBD	1x	40	40
FDD	2GHz MSS band (EU)	TBD	1980	-	2010	2170	-	2200	FDD	2x	30	60
TDD	2300	TBD	2300	-	2400	2300	-	2400	TDD	1x	100	100
TDD	"lower 3500 MHz band" TDD	42	3400	–	3600	3400	–	3600	TDD	1x	200	200
TOTAL MEDIUM TERM (2012 - 2015)	FDD											640
TOTAL MEDIUM TERM (2012 - 2015)	TDD											385
TOTAL MEDIUM TERM (2012 - 2015)	FDD & TDD											1025
FDD	"upper 3500 MHz band"	43	3600	-	3800	3600	-	3800	TBD	1x	200	200
FDD	DD2	TBD	698	-	733	753	-	788	FDD	2x	35	70
TOTAL LONG TERM (2016 - 2020)	FDD											910
TOTAL LONG TERM (2016 - 2020)	TDD											385
TOTAL LONG TERM (2016 - 2020)	FDD & TDD											1295

LTE Global Market (Jan '12)

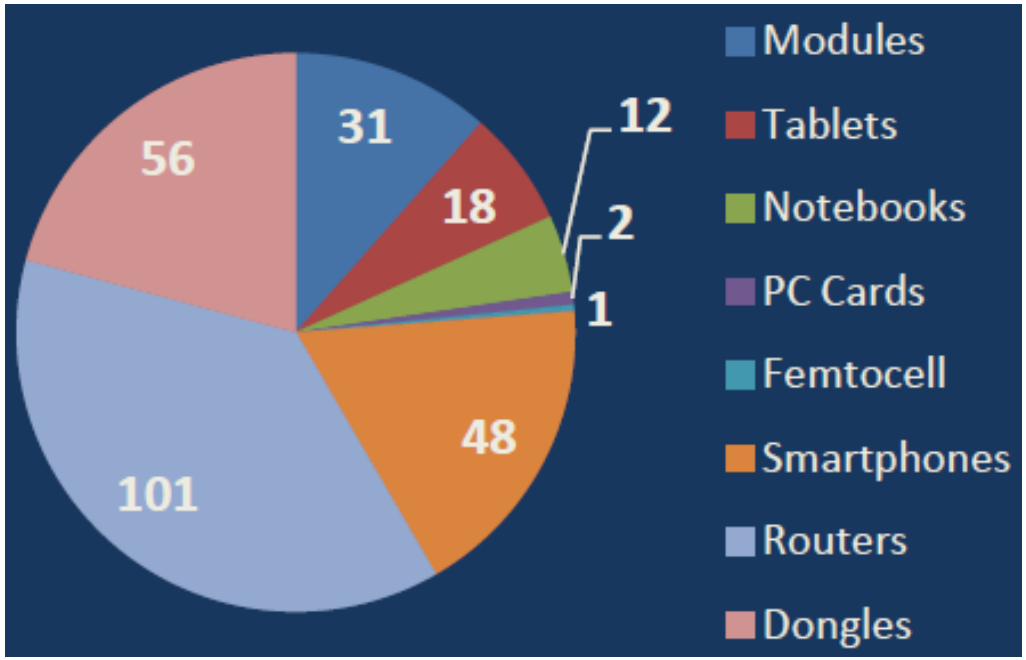


23 of 49 LTE commercial networks were deployed by Huawei as of Jan 5, 2012

Devices ecosystem status

- **269 LTE User Devices announced (57 manufacturers)**
  - +36% from October '11 GSA Report
  - 200+ new LTE user devices were launched in the past year
  - 44 LTE TDD devices are confirmed

- **GSA identified 48 LTE-enabled smartphones launched**
  - 159 LTE devices operate on either HSPA, HSPA+ or 42 Mbps DC-HSPA+ networks
  - 54 LTE devices support 42 Mbps DC-HSPA+
  - 87 LTE devices operate on EV-DO networks



Source: GSA: Jan 5, 2012

LTE ecosystem is establishing at unprecedented speed. (if compared to previous generations)

LTE targets

Higher throughput performance

- •100 Mbit/s peak downlink, 50 Mbit/s peak uplink
- • 1G for LTE Advanced
- • Higher cell edge performance
- • Reduced latency in setup time. Shorter transfer delay, shorter handover latency and interruption time for better user experience
- • Support of variable and scalable bandwidth (1.4, 3, 5, 10, 15 and 20 MHz)

Backwards compatible with Existing 3G technologies

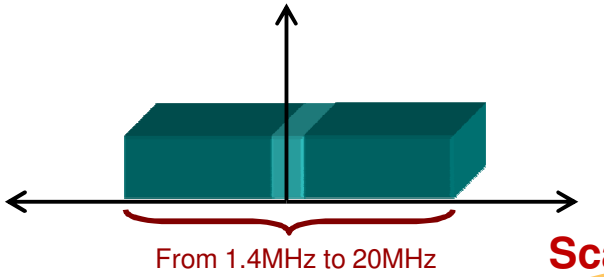
- •Works with GSM/EDGE/UMTS systems
- •Utilizes existing 2G and 3G spectrum and new spectrum
- •Supports hand-over and roaming to existing mobile networks

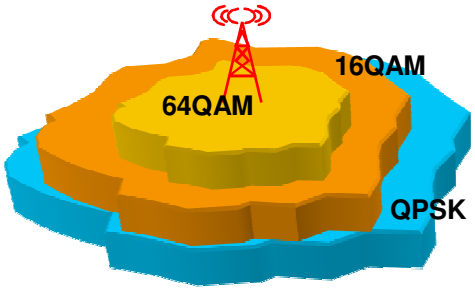
Quality of Service Support

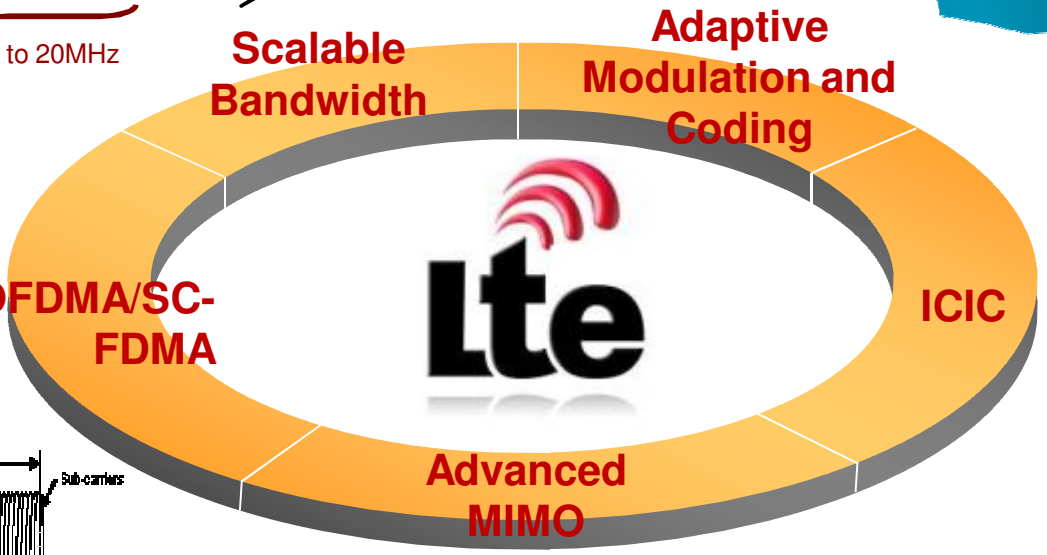
Wide application

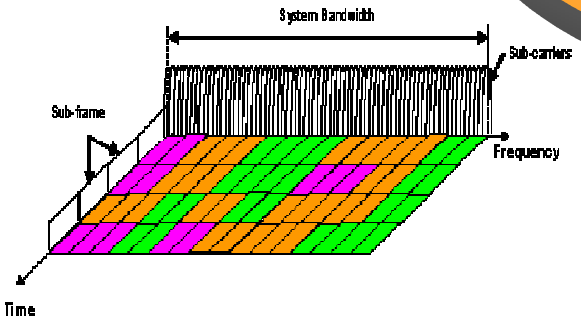
- •TDD (unpaired) and FDD (paired) spectrum modes
- •Mobility up to 450km/h
- •Large range of terminals (phones and PCs to cameras)

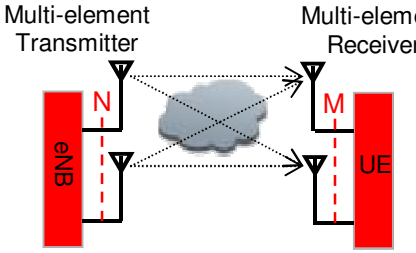
Key radio technologies of LTE

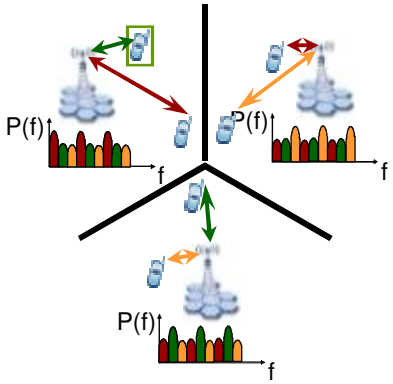




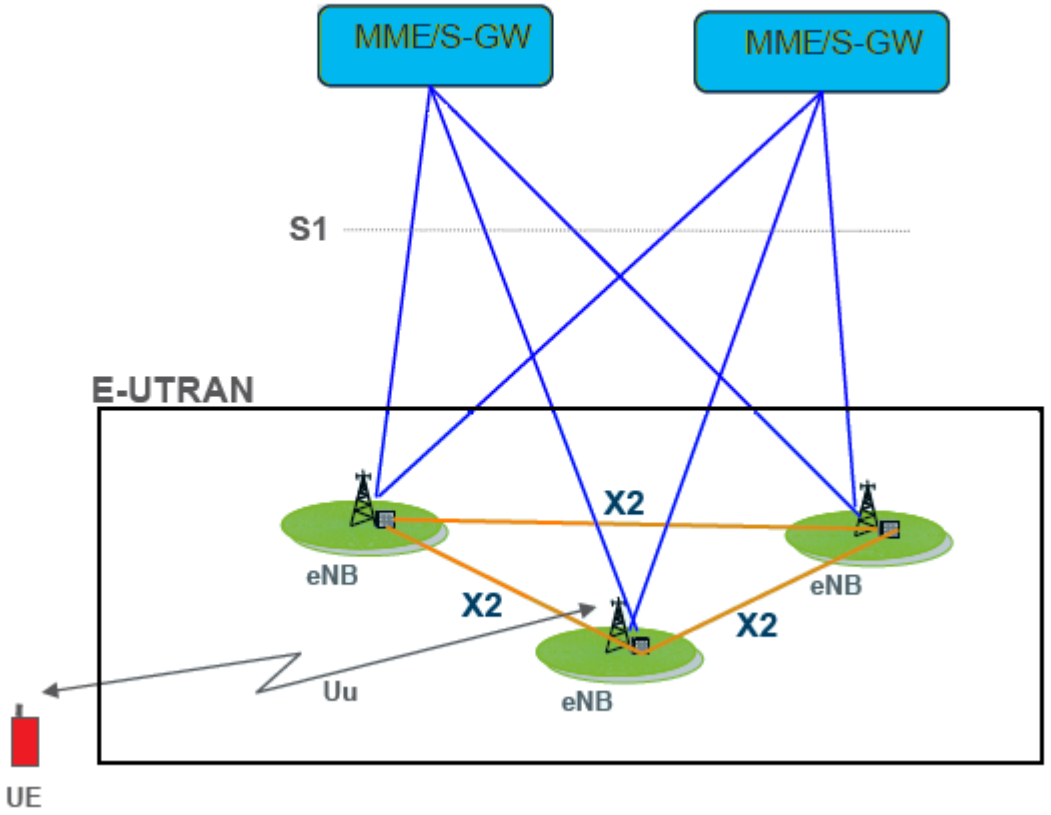




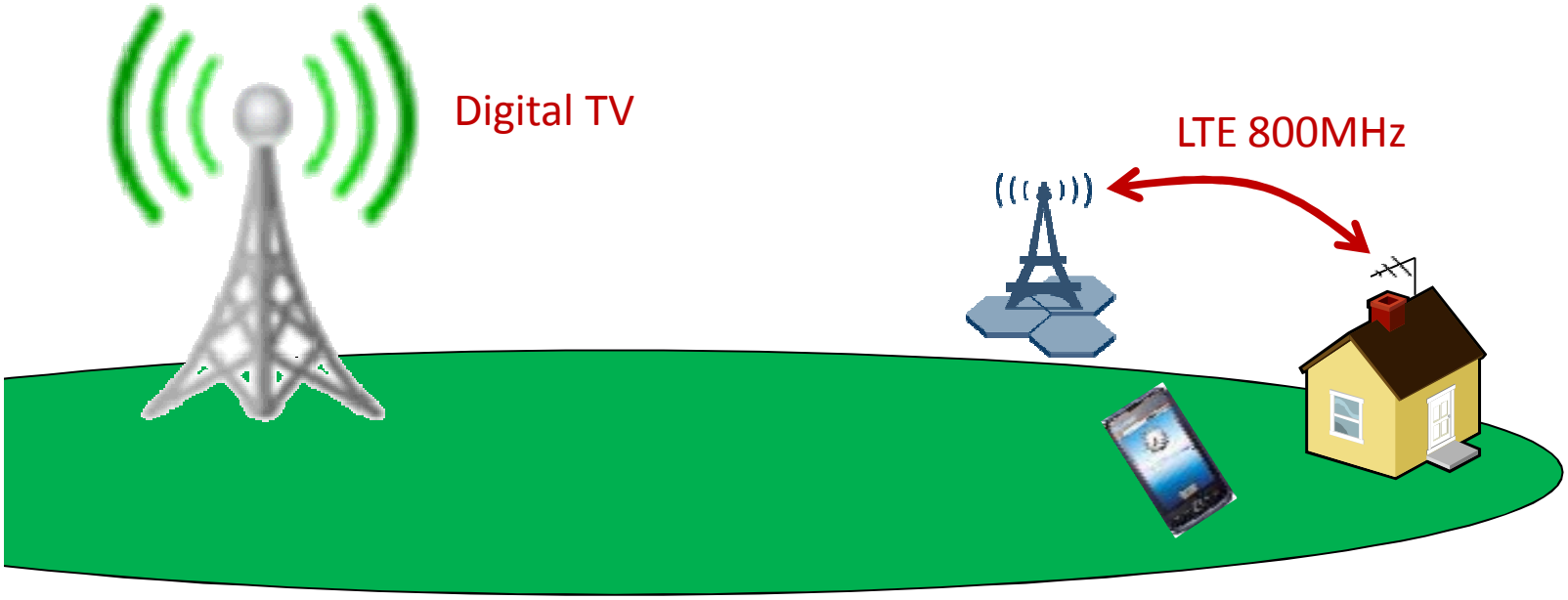




LTE Flat Architecture



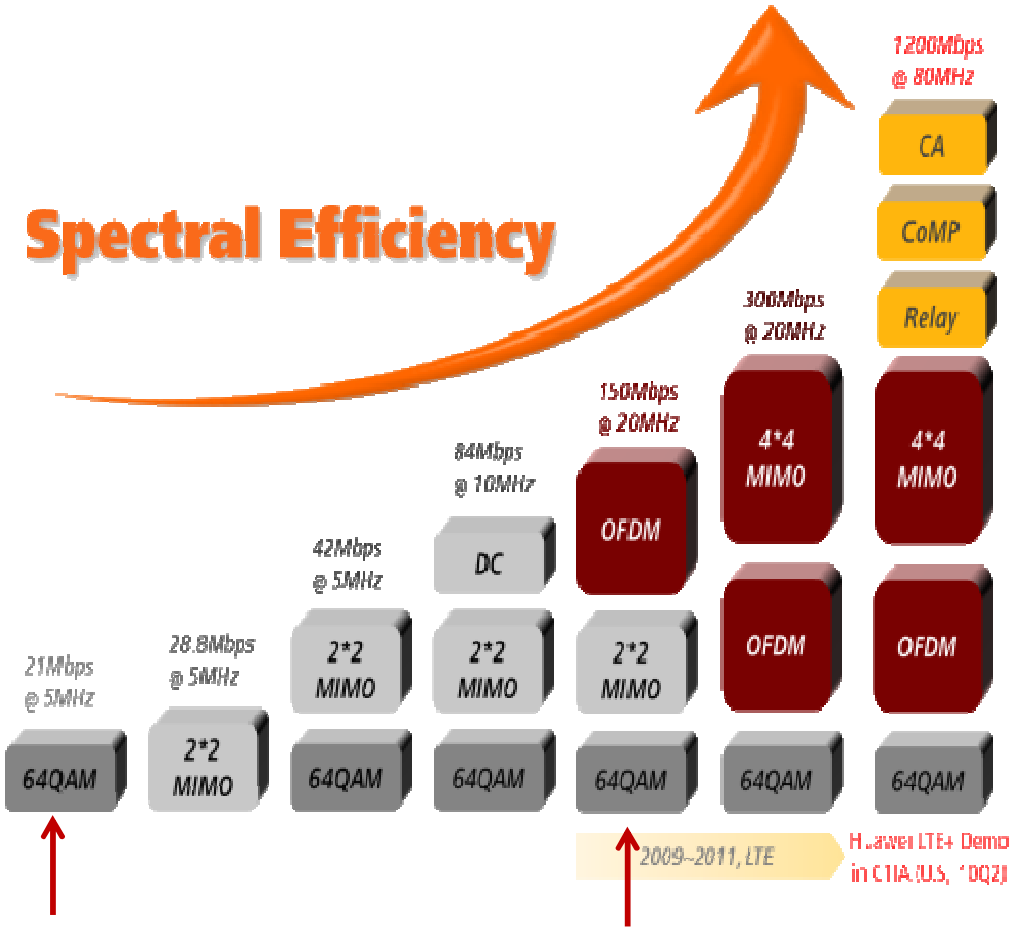
LTE – TV interference



Due to huge installed base of wide band TV receivers and limited guard band among systems, interference between LTE800 and DVB-T has to be considered.

The natural solution is to apply extra filters at LTE BTS and/or TV receivers.

Radio Interface evolution



HSPA ntws are here
(incl. DC-HSPA cases)

LTE ntws
are here

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PARTE I (Regulation, Market and Ecosystem)

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Contents

Part I

LTE Regulation

- LTE Market
- LTE Ecosystem

Part II

- LTE basics
- LTE field performance
- Interference
- LTE –A evolution

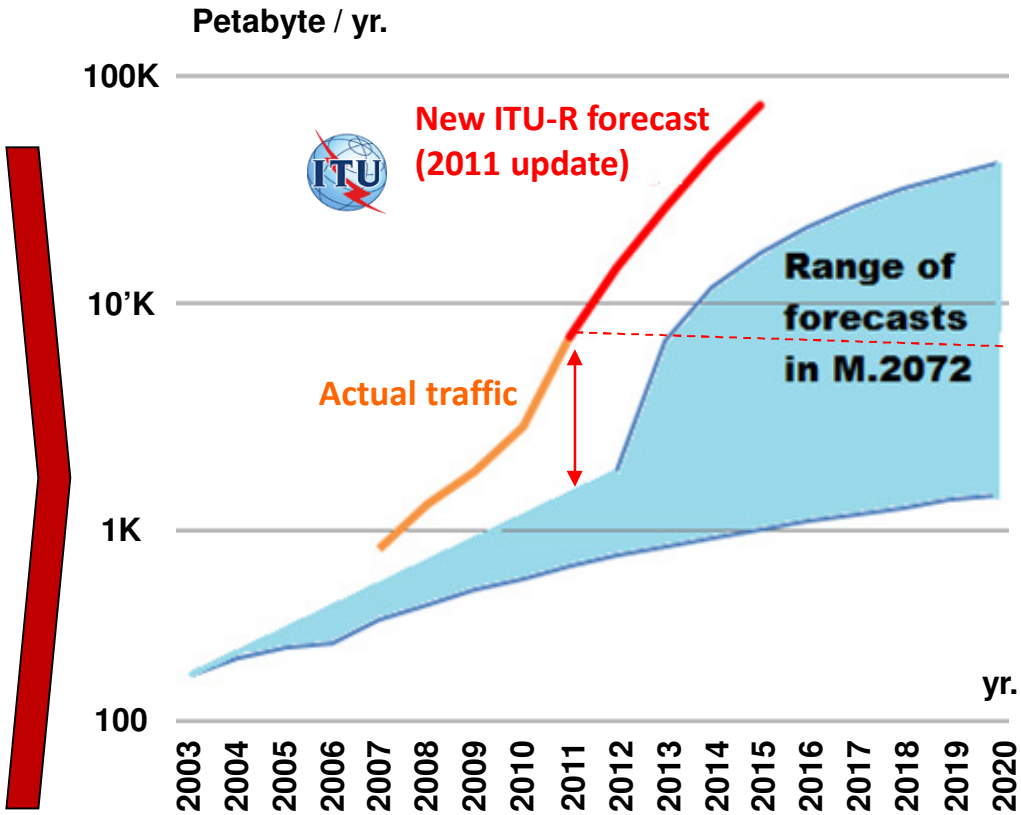
Requirements - Traffic Growth

2000
Feature phones
~1000 apps

2011
Smart devices
~ 350,000 apps

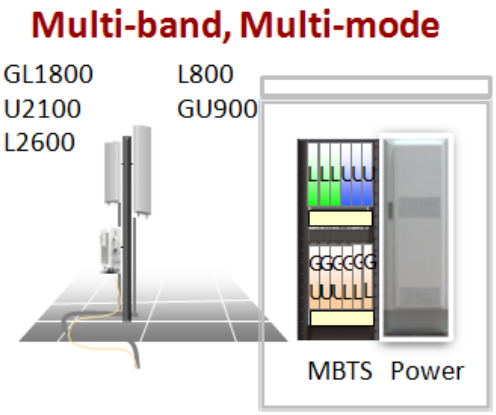
2014
Smart device account for 90% traffic. 0.5GB/mon / smartphone

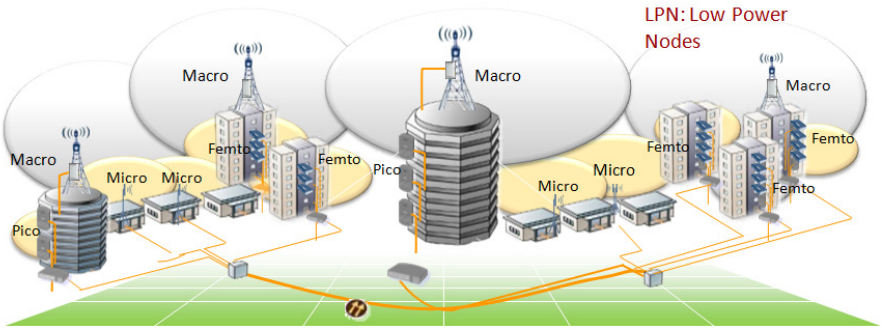
2020
devices > population
Apps > billions



- **User data & signaling**
- **Unevenly distributed**

Solutions - Huawei SingleRAN Beyond

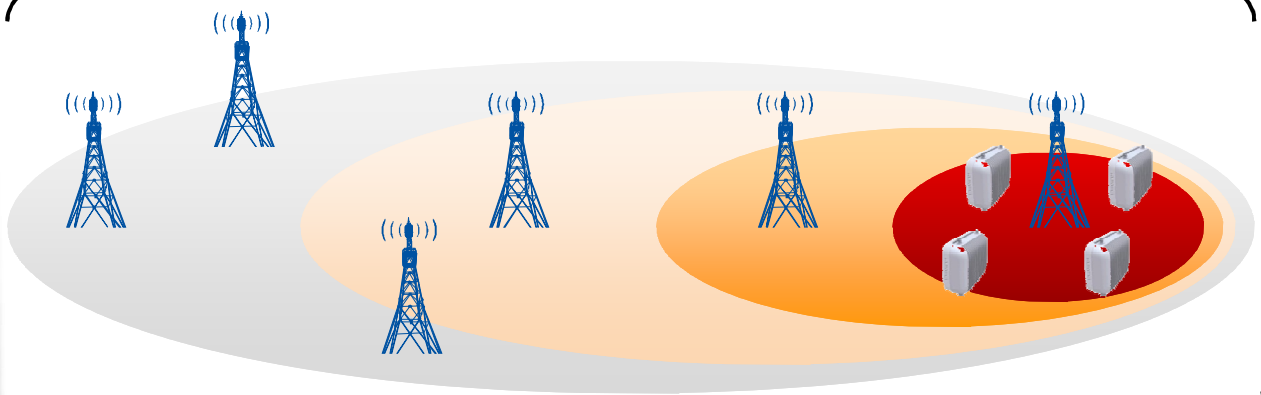




capacity

GigaSite
Maximize site value

SmallCell
Maximize capacity
@ hot zones



SingleSON
improve efficiency
& ensure reliability

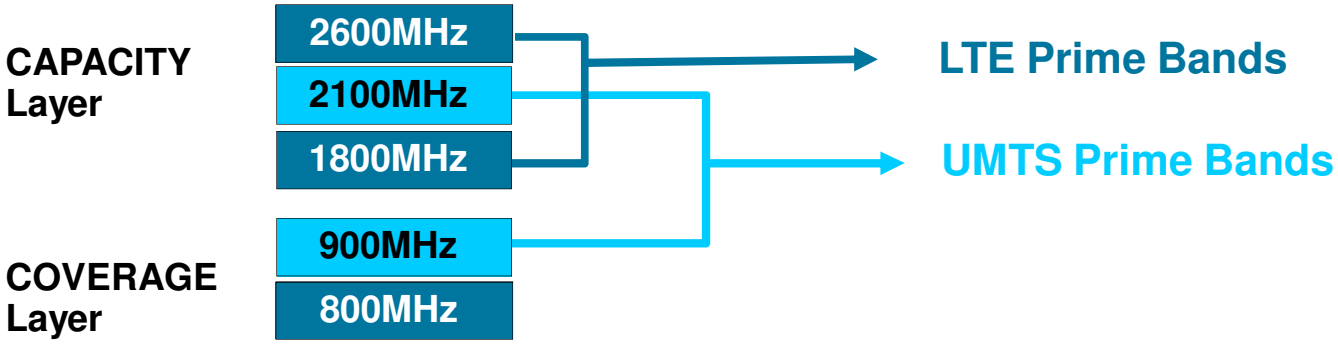
Self-Configuration
Inter-ANR: no manual neighbor cell configuration

Self-Optimization
Inter-RAT MLB: minimized traffic congestion

Self-Maintenance
Coordinated shutdown: up to 10% power saving

SingleRAN Beyond: GigaSite + SmallCell + SingleSON

Huawei Spectrum Strategy
Short Term



	GSM / EDGE	UMTS / HSPA+	LTE	WIMAX (TDD)	
3500 MHz			✓	★	180 MHz (TDD / FDD)
2600 MHz		✓	★	✓	2x70 MHz FDD + 50 MHz TDD
2100 MHz		★	✓		2x60 MHz FDD + 20-35 MHz TDD
1800 MHz	★	✓	★		2x75 MHz FDD
900 MHz	★	★	✓		2x35 MHz FDD
800 MHz (EU DD)		✓	★		2x30 MHz FDD

★ Prime Band (Huawei strategy) ✓ Supported Band (market driven)

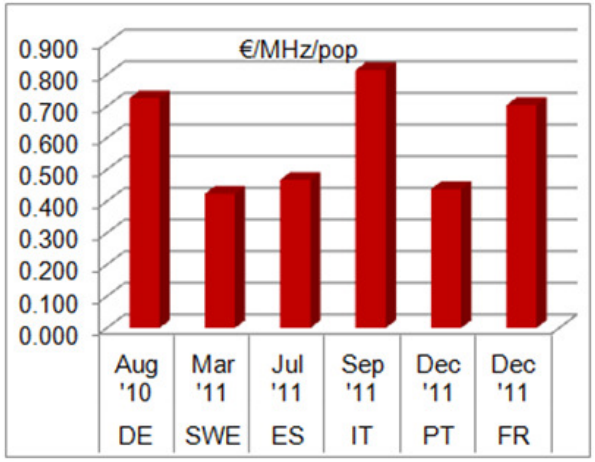
Drive Prime Bands

Support locally market driven Operators' spectrum strategies (be flexible)

Existing EU MBB Spectrum

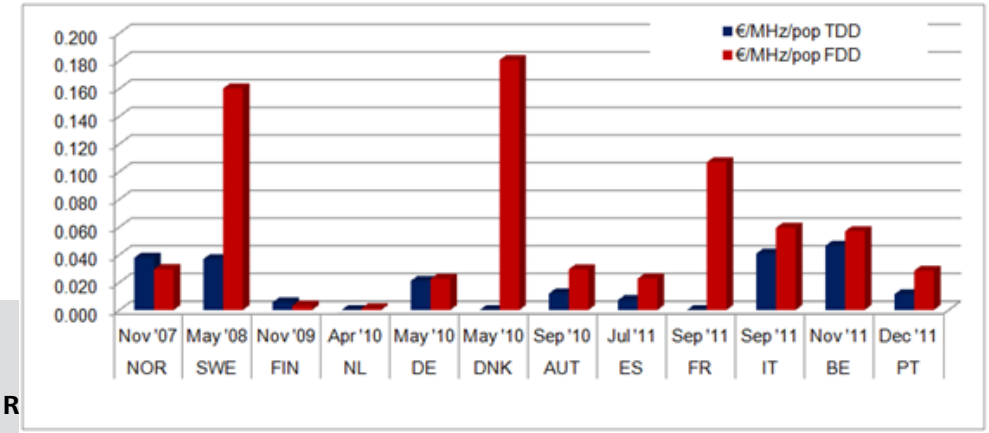
- **800MHz auctions ongoing**
  - Germany (BNA)
    - Auction closed in Aug ‘10, commercial in Dec ‘10
    - 5700 sites approved, 2332 commercial sites (Sep ‘11)
    - No interference cases
  - RSPP: Jan ’13 mandatory deadline (limited exceptions)

800MHz auctions (as of Feb ‘12)

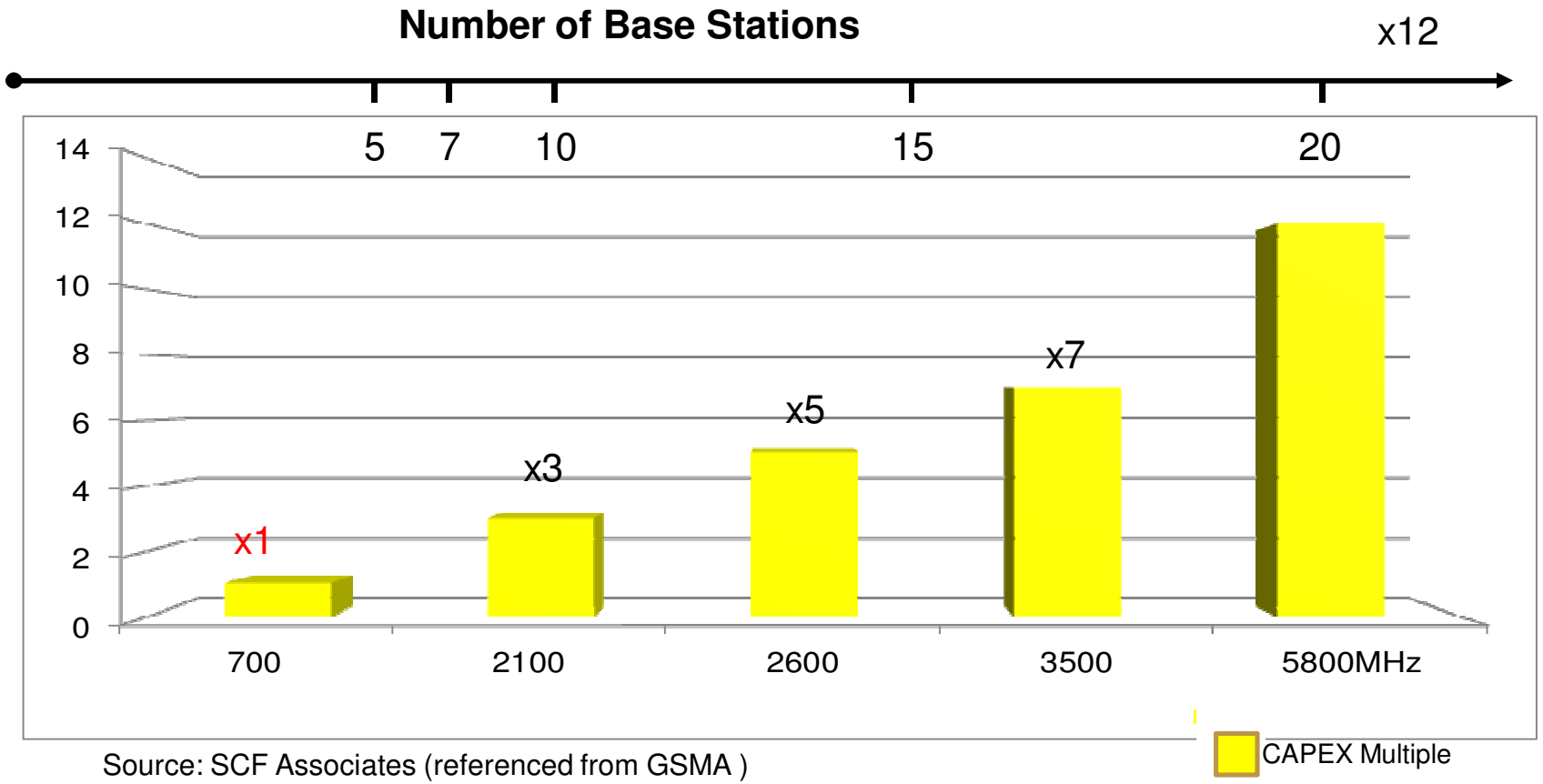


- **UMTS-900 & LTE-1800 MHz ongoing**
  - 14 LTE-1800 commercial networks globally. Trials in: BE, FR, ES, SWE, UK
  - 41 LTE-1800 devices (incl. multi-band & multi-mode)
  - Key countries to decide on L-1800 (e.g. UK, FR)
- **2100MHz consolidated (TDD under discussion)**
- **2600MHz auctions ongoing**
  - Commercial since Dec ‘09 (Norway)
  - 52 LTE-FDD-2600 devices, 17 LTE-TDD-2600

2600MHz auctions (as of Feb ‘12)



CAPEX Comparison of Frequency Band



Source: SCF Associates (referenced from GSMA)

DD CAPEX = 1/3 x CAPEX of 2.1GHz Band

New MBB Spectrum for EU
Short / Medium and Long Term Targets

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(including 200MHz in the 3500MHz band which is not fully harmonized for MBB yet)

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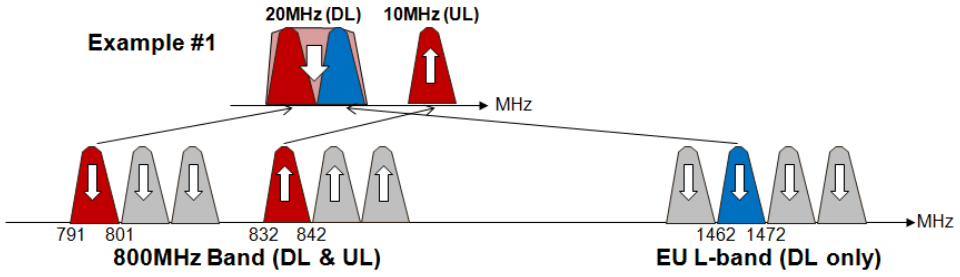
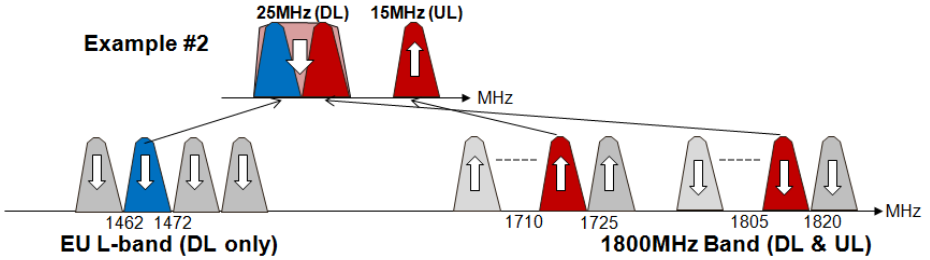
FDD	IMT-2000 Core Band 2.1GHz	1	1920 – 1980	2110 – 2170	FDD	2x 60	120
FDD	GSM 1800 (DCS)	3	1710 – 1785	1805 – 1880	FDD	2x 75	150
FDD	2600 (IMT ext. band)	7	2500 – 2570	2620 – 2690	FDD	2x 70	140
FDD	GSM 900 (*)	8	880 – 915	925 – 960	FDD	2x 35	70
FDD	CEPT 800	20	832 – 862	791 – 821	FDD	2x 30	60
TDD	TDD 2000 lower	33	1900 – 1920	1900 – 1920	TDD	1x 20	20
TDD	TDD 2000 upper	34	2010 – 2025	2010 – 2025	TDD	1x 15	15
TDD	IMT Extension Gap	38	2570 – 2620	2570 – 2620	TDD	1x 50	50
Total	FDD						540
Total	TDD						85
Total	FDD & TDD						625
FDD	L-band (EU)	TBD	1452 - 1492	1452 - 1492	TBD	1x 40	40
FDD	2GHz MSS band (EU)	TBD	1980 - 2010	2170 - 2200	FDD	2x 30	60
TDD	2300	TBD	2300 - 2400	2300 - 2400	TDD	1x 100	100
TDD	"lower 3500 MHz band" TDD	42	3400 – 3600	3400 – 3600	TDD	1x 200	200
TOTAL MEDIUM TERM (2012 - 2015)	FDD						640
TOTAL MEDIUM TERM (2012 - 2015)	TDD						385
TOTAL MEDIUM TERM (2012 - 2015)	FDD & TDD						1025
FDD	"upper 3500 MHz band"	43	3600 - 3800	3600 - 3800	TBD	1x 200	200
FDD	DD2	TBD	698 - 733	753 - 788	FDD	2x 35	70
TOTAL LONG TERM (2016 - 2020)	FDD						910
TOTAL LONG TERM (2016 - 2020)	TDD						385
TOTAL LONG TERM (2016 - 2020)	FDD & TDD						1295

L-Band (1452 – 1492 MHz)

Harmonization for Mobile Multimedia Supplemental Downlink use

- **Currently allocated for use by terrestrial and satellite DAB**
  - Terrestrial segment (1452-1479.5MHz) governed by Maastricht Special Arrangement 2002 as revised in Constanta in 2007
  - Satellite segment (1479.5–1492MHz) designated for use by Satellite DAB by ECC DEC(03)02 that is to be reviewed every 10 yrs.
  - Some Member States have issued licenses but the L band remains mostly unused in Europe
- **L – band harmonization for Mobile Multimedia Supplemental Downlink use**
  - Supporting internet traffic DL asymmetry (due to video)
  - Allowed by current ITU-R L-Band identification and by Maastricht agreement
  - Carrier Aggregation
    - Already defined for HSPA+ (3GPP Rel.9) and LTE (3GPP Rel. 10)
    - LTE SDL (716-728 MHz) CA 3GPP precedent
- **ECC FM 50 Project Team to identify the most appropriate future use of the L Band**
  - Decision by September 2012
  - Mobile Multimedia Supplemental Downlink likely to be the prime use selected

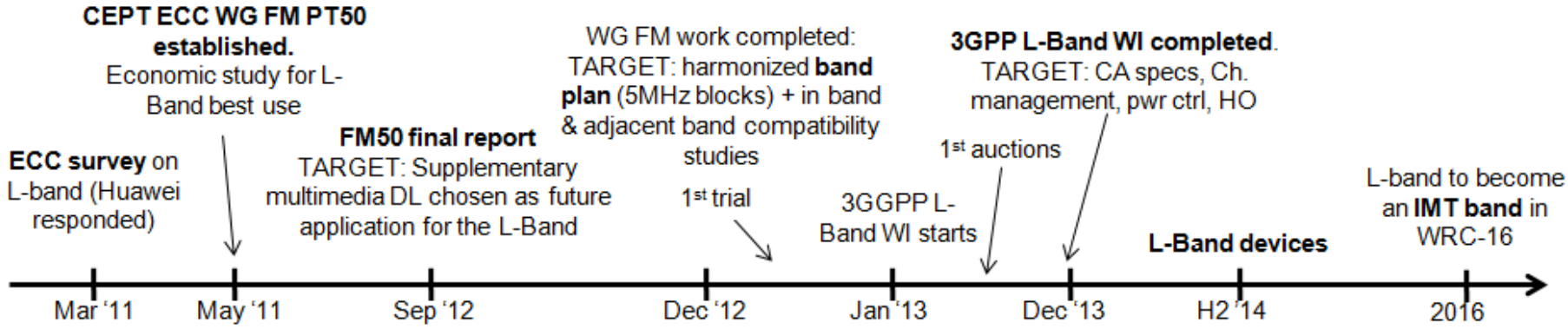




L-Band (1452 – 1492 MHz)

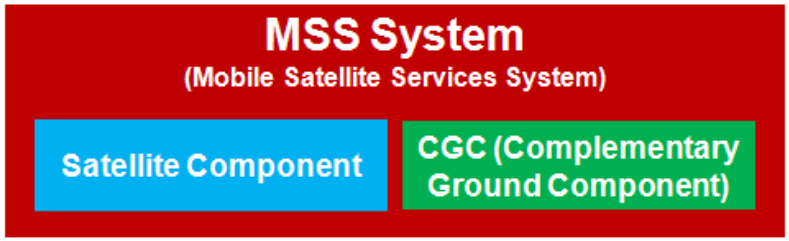
Harmonization for Mobile Multimedia Supplemental Downlink use

- **Denmark: ongoing consultation proposing to make the L-Band available by 2014 (additional adjacent spectrum , 61MHz in total in 2016 timeframe)**
- **Ireland: considering making the L-Band available in 2013**
- **Sweden: considering releasing the L-Band in 2013 (part of its plan to release 500+MHz in five yrs)**
- **UK: L-band (17 lots in 1452-1492 MHz) already awarded, also suitable for SDL**
- **Several other EU administrations are showing interest**
- **Harmonization and scale beyond Europe**

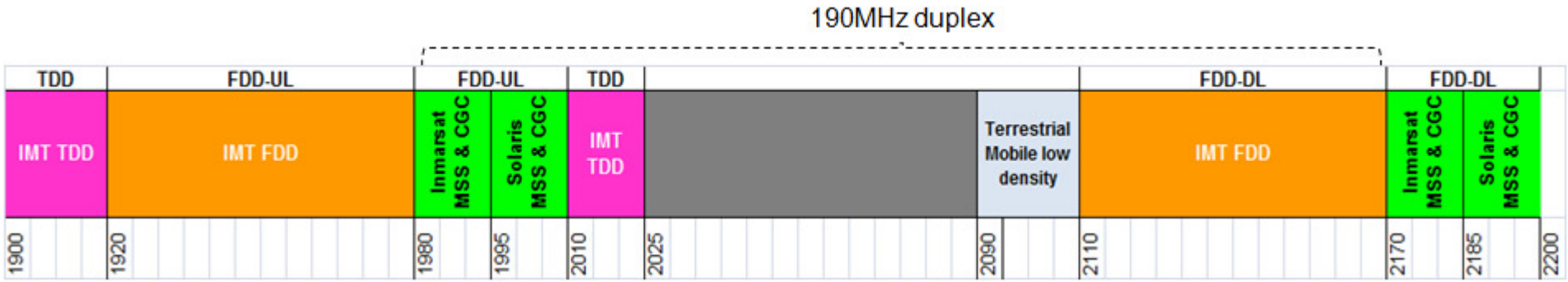


Mobile Multimedia Supplemental Downlink application.
Targeting 2014.

2GHz MSS Band



- **2006 ECC Decision designated to MSS systems which may incorporate a CGC**
  - CGC may not be operated as a stand-alone terrestrial-only network
- **2008 Council Decision "comparative selection procedure" at EU level**
- **Highly diversified national authorization approaches for the of both the satellite & CGC components -> 2011 EC Decision targets larger coordination among Member States**



2300MHz Band

- **WRC-07 Identified it for IMT applications on a global basis**
  - Alternative applications not precluded -> different outcomes in different areas

E-UTRA Operating Band	UL (MHz)	DL (MHz)	Duplex Mode
40	2300 – 2400	2300 – 2400	TDD

- **Not an MBB harmonized band in EU**
  - Incumbent applications: wireless cameras, PPDR, telemetry, fixed links
- **ECC addressing cross border coordination issues**
- **ECC draft Report is available and ready for approval**
- **ECC to issue a questionnaire to European administrations to better assess current national utilizations and future plans**
- **“Dynamic” spectrum management policies may address Incumbents’ discontinuous usage (geographic / time basis)**

2300MHz Band

- Considering 2300MHz availability by 2015 (targeting 600MHz for MBB)
- Considering 2300MHz availability in 2012-2013
- Considering 2300MHZ availability in 2012-2013 (targeting 500MHz for MBB)
- Considering 2300MHz a "prioritized band for release" (targeting 500MHz below 5GHz by 2020

- India assigned 2300MHz spectrum (20MHz + 20MHz) for 8bn USD in Jun '10 - plans for LTE-TDD services within 2012

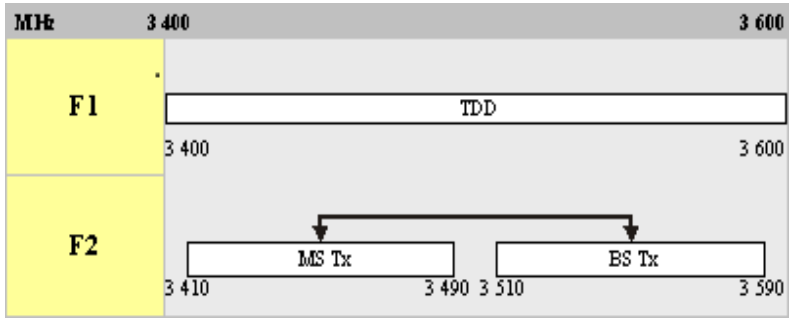
- 18 LTE-TDD-2300 devices commercially available in Oct '11
- Huawei LTE-2300-TDD contracts & trials; 12 WiMAX contracts, planning smooth migrations to LTE-TDD

First movers in EU will benefit from overseas economies of scale from 2012.

"Dynamic" spectrum management policies may address Incumbents' discontinuous usage (geographic / time basis.

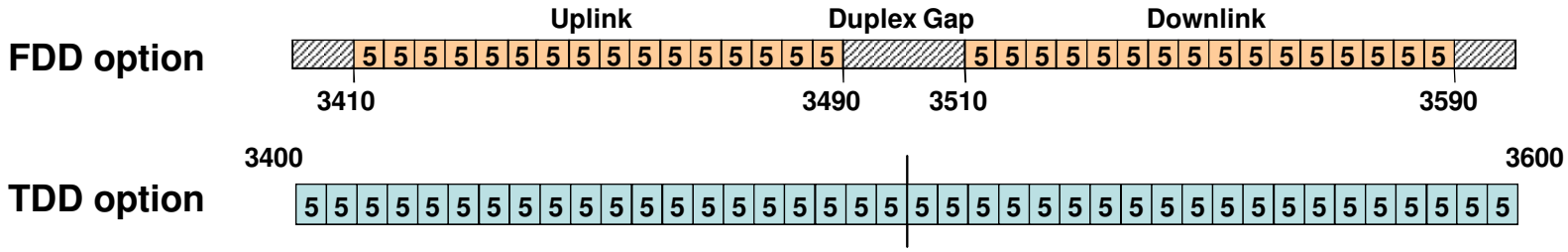
3400-3600 MHz Band

- 2005 ECC Rec. & 2007 ECC Dec.: BWA, fixed, nomadic, mobile; ECC opted for FDD & TDD options (to be re-discussed in 1yr from Dec '11 decision)
- ECC PT1 working on BEM updates for Mobile applications
- TDD is technically preferred (unbalanced traffic support & advanced antenna systems)



ITU-R Rec. M.1036-4

E-UTRA Band	UL (MHz)	DL (MHz)	Duplex Mode
22	3410 – 3490	3510 – 3590	FDD
42	3400 – 3600	3400 – 3600	TDD
43	3600 – 3800	3600 – 3800	TDD



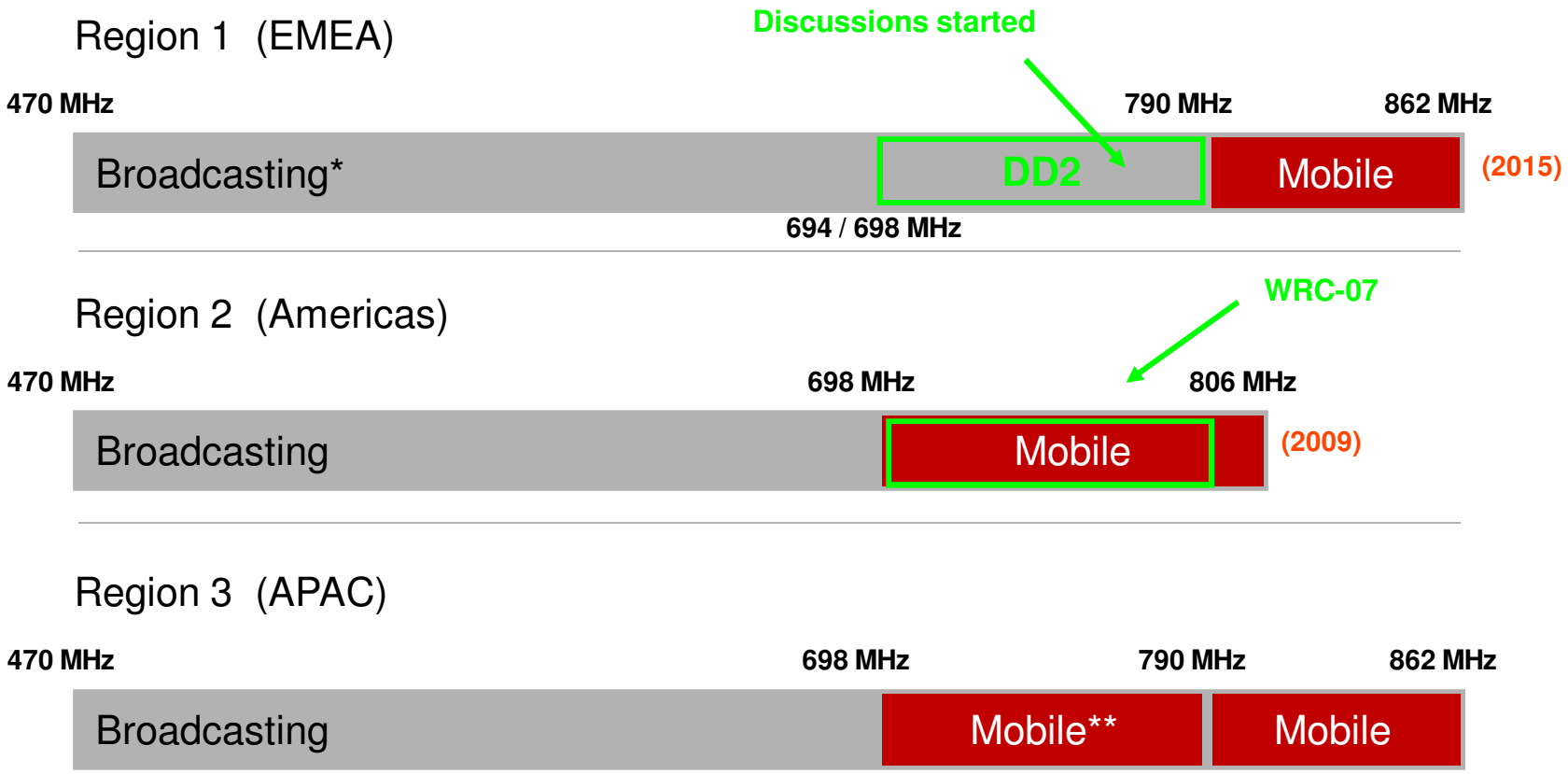
ONE harmonized band plan ASAP (economies of scale);
Main application: MBB Small cells;
Supporting migration from WiMAX to LTE-TDD across EU; Time to market: 2012.

WRC-12 Summary

- **WRC-12 AI 8.2: approval of WRC-15 AI 1.1 targeting additional spectrum allocation at WRC-15:**
  - WRC-15 AI 1.1: "To consider **additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT)** and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution COM6/8 (WRC-12);"

- **700 MHz band (694-790 MHz): approval of WRC-15 AI 1.2 targeting the 700MHz band in Europe (region 1)**
  - WRC-15 AI 1.2: "To examine the results of ITU-R studies, in accordance with the Resolution COM 5/10 (WRC-12), on the use of the frequency band **694-790 MHz by the mobile service except the aeronautical mobile service in Region 1** and take appropriate measures;"
  - Footnote text: "5.3XX In Region 1, the use of the band 694-790 MHz by the mobile, except aeronautical mobile, service is subject to the provisions of Resolution COM5/10 (WRC-12). See also Resolution 224 (Rev.WRC-12)."
  - Our expectation: 700 MHz co-allocation to the mobile service (IMT) in Region 1 will be effective at the end of WRC-15 (work on compatibility studies will be finalized before WRC-15)

DD2
Summary

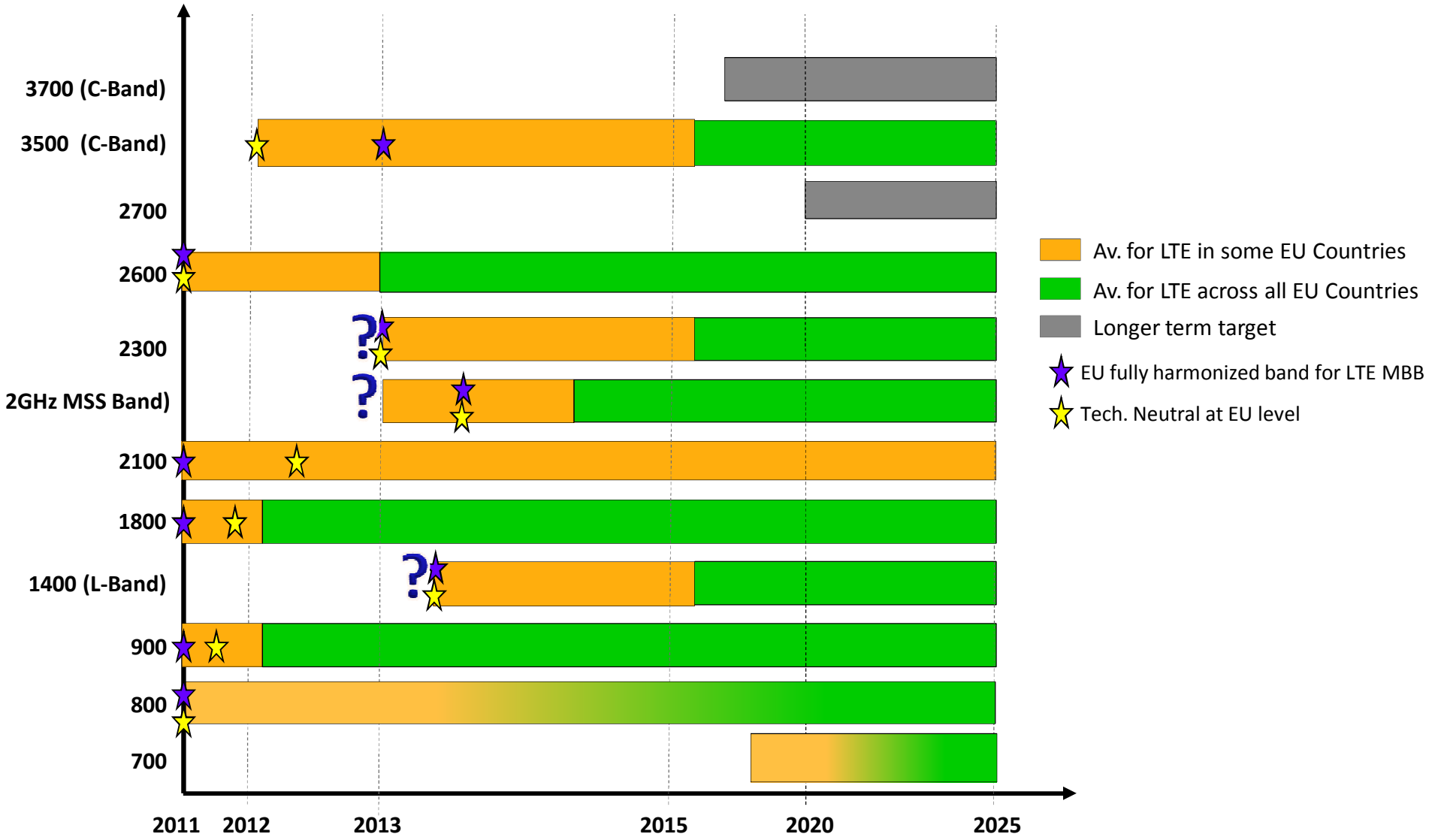


* 66 country declaration

** 9 countries, including China and India

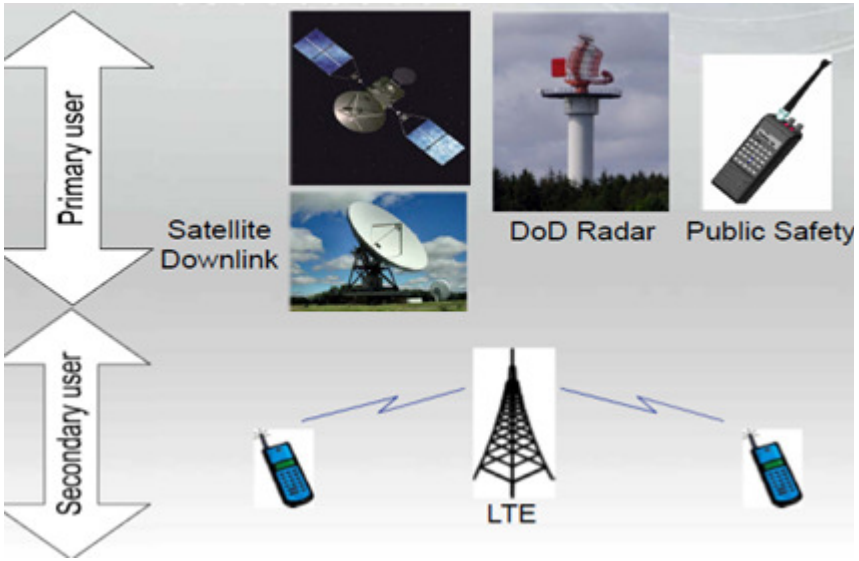
DD2 could become a globally harmonized band.

Spectrum Availability
Short, Medium and Long Term



Licensed Shared Access - Principles

- **LSA to unlock new MBB spectrum**
  - Regulatory tool independent from specific a band
  - Initially proposed for IMT bands, EC now considering to extend it to any other service
- **License-based but not exclusive:**
  - Primary user (e.g. Min. of Defense, broadcaster, public safety) shares its (underutilized) spectrum with a secondary user (e.g. MNO) that opportunistically gains access (according to a license agreement) on time / space / frequency domain basis
  - LSA authorizations to be managed by National regulators in accordance w. national regulation and EU Directives
- **Usage model**
  - QoS guaranteed (when LSA spectrum is available)
    - LSA users do not access the same spectrum at the same time and location as incumbents
    - No interference between LSA licensees -> ad hoc coexistence studies required
  - LSA spectrum not assumed available everywhere in a certain market -> fall back on other bands assumed
- **"Static" or dynamic (e.g. w. geo-location DB)**
- **LSA is assumed to be for LTE**
  - "out-of-the-box support from "Rel-8 LTE
  - Legacy UE not supporting CA can still access LSA spectrum
- **Work already ongoing at RSPG and CEPT**



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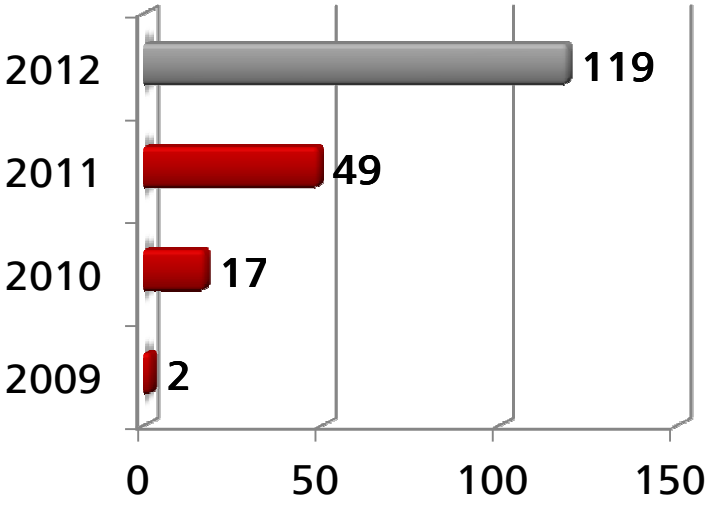
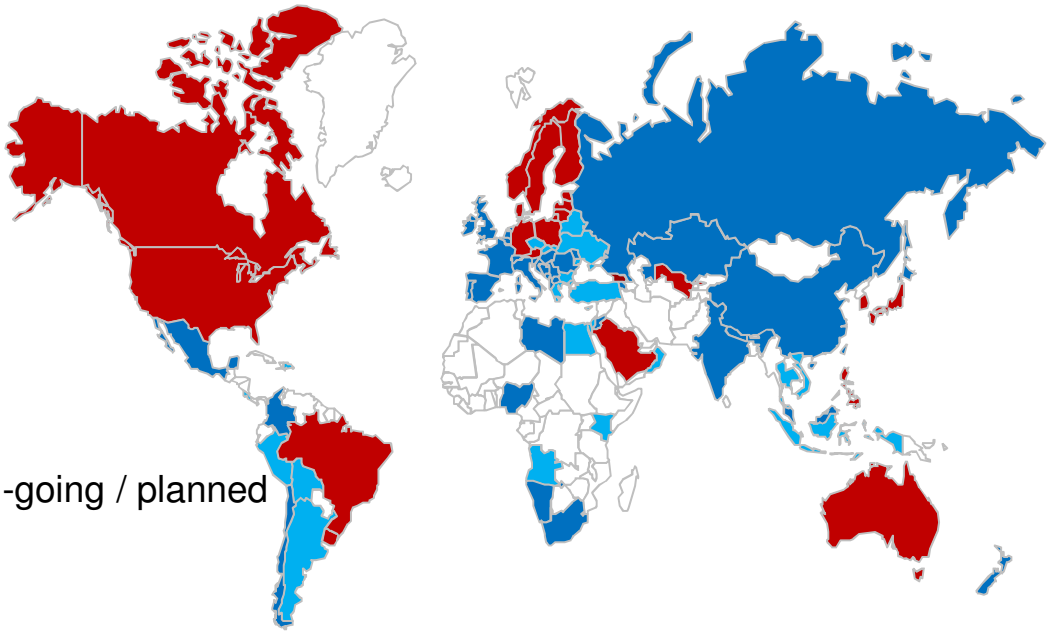
LTE Global Market (Jan '12)

GSA: Jan 5, 2012



- **285 operators investing in LTE in 93 countries**
- **Jan '12: 49 commercial LTE networks in 29 countries**
- **Dec '12: 119 commercial LTE networks in 53 countries**



Countries w. commercial LTE services
Countries w. LTE commercial network rollout on-going / planned
Countries w. LTE trials

LTE Global Market (Jan '12)

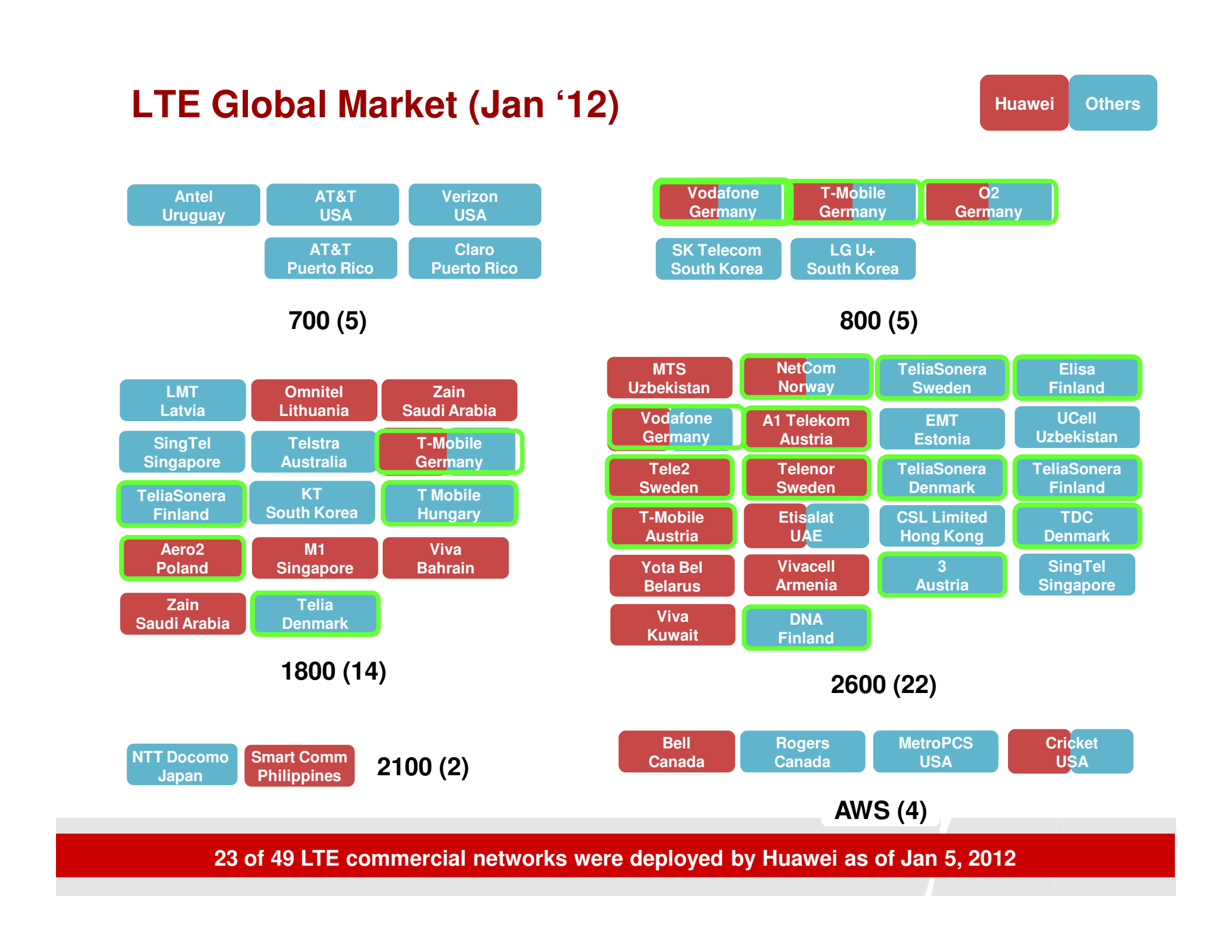
GSA: Jan 5, 2012

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

Country	Operator	Launch
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
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
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

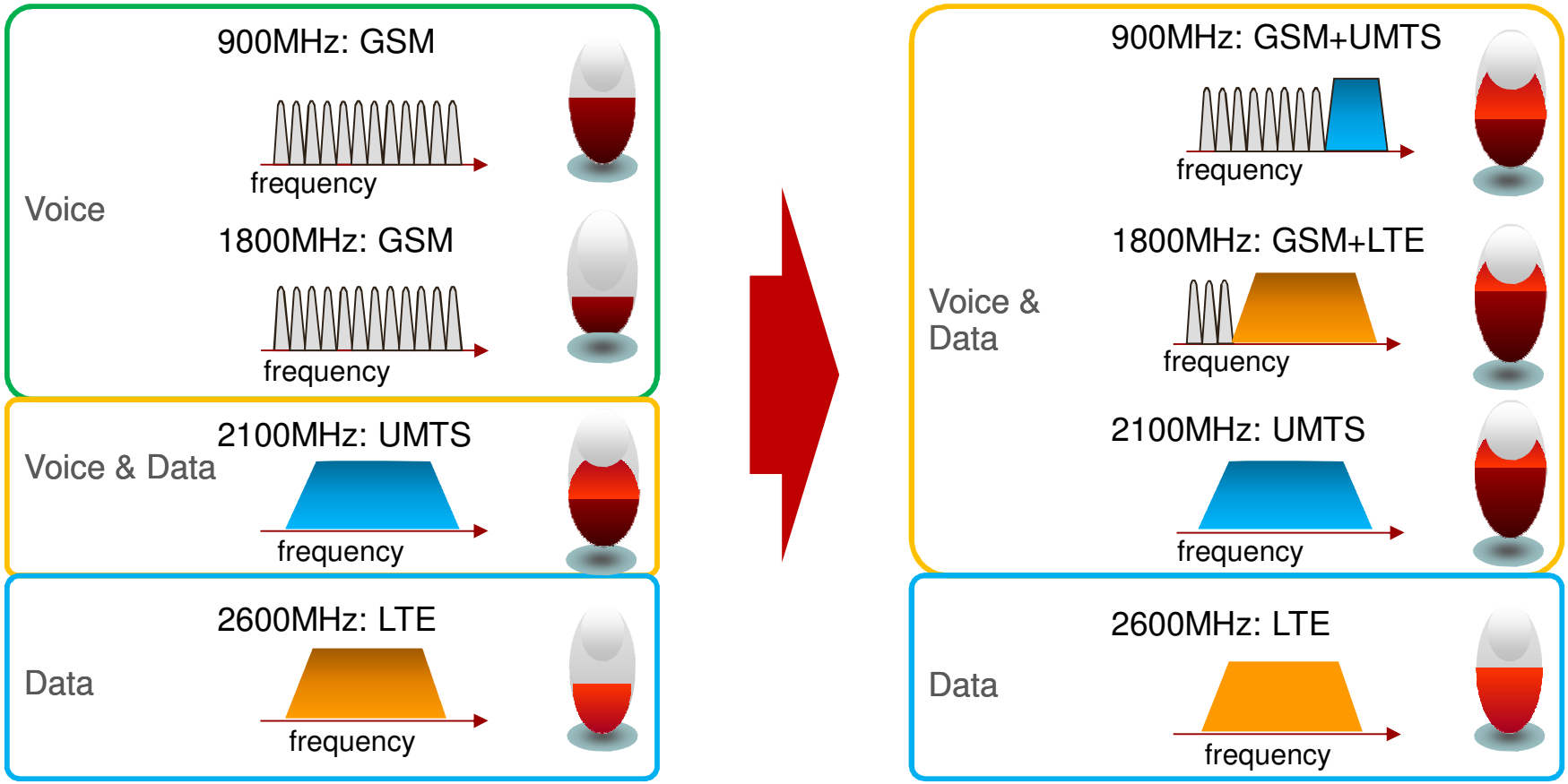
- **49 commercial LTE networks in 29 countries**
- **22 commercial LTE networks in West, North, East Europe**

LTE Global Market (Jan '12)

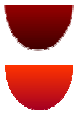


23 of 49 LTE commercial networks were deployed by Huawei as of Jan 5, 2012

Typical European Srategies



- **Migrate voice service to GSM900 for coverage and UMTS2100 for capacity**
- **Introduce LTE1800 to improve both capacity and coverage for data services**



Voice Load

Data Load

GL1800 Refarming is Main Stream

- **Total 75MHz in 1800M Band**
- **Most MNOs own 10~25MHz**
- **1800M spectrum underused**

- **GL1800 co-site, co-coverage**
- **Larger capacity than HSPA+**

- **Cost effective:**
  - **Frequency available**
  - **30%~50% TCO saving by SingleRAN**

- **50 L1800 devices announced**
- **Multi-mode, multi-band**

- **14** LTE1800 network **commercially launched**
- **14** LTE1800 in deployment, **20+** trials & plans
- 41 LTE-1800 devices (incl. multi-band & multi-mode)

aero2	Poland	Telstra	Australia
OMNITEL	Lithuania	telia	Denmark
m1	Singapore	elisa	Finland
T-Mobile	Germany	SL	Hongkong
LMT Latvijas Mobilais Telefons	Latvia	SingTel	Singapore
TeliaSonera	Finland	T-Mobile	Hungary
zain	Saudi Arabia	kt	South Korea

LTE TDD Commercialization Speeds Up

Country	Operator
Japan	Softbank
India	Augere
China	Sinosky
Saudi Arabia	STC
Saudi Arabia	Mobily
Poland	Aero2
UK	UKB
Denmark	Hi3G
Sweden	Hi3G
Russia	MGF
Brazil	SkyTV
Australia	NBN
South Africa	XXX
Nigeria	Vodafone
Zambia	Massnet
Cote d'ivoire	XXX

- **18 commercial networks across 6 Continents**
- **US, BRIC to start larger scale rollouts in 2012**
- "The new AXGP deployment by SoftBank provides a significant advantage over Japanese rivals" – IDC
- "More mobile operators are likely to add TDD to their strategy as a way to optimize network resources" - Infonetics

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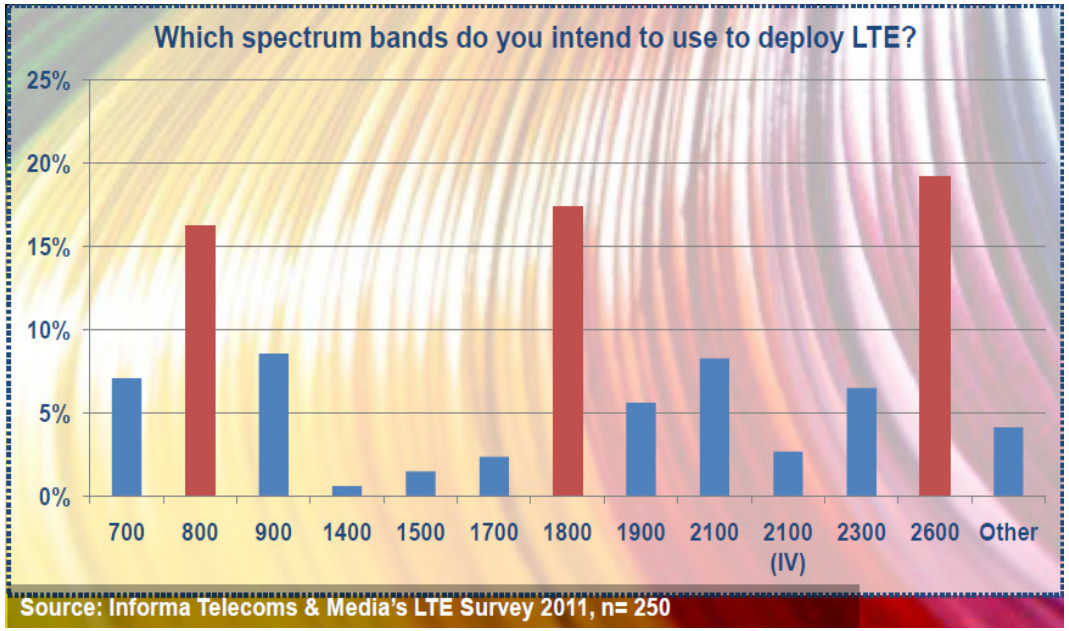
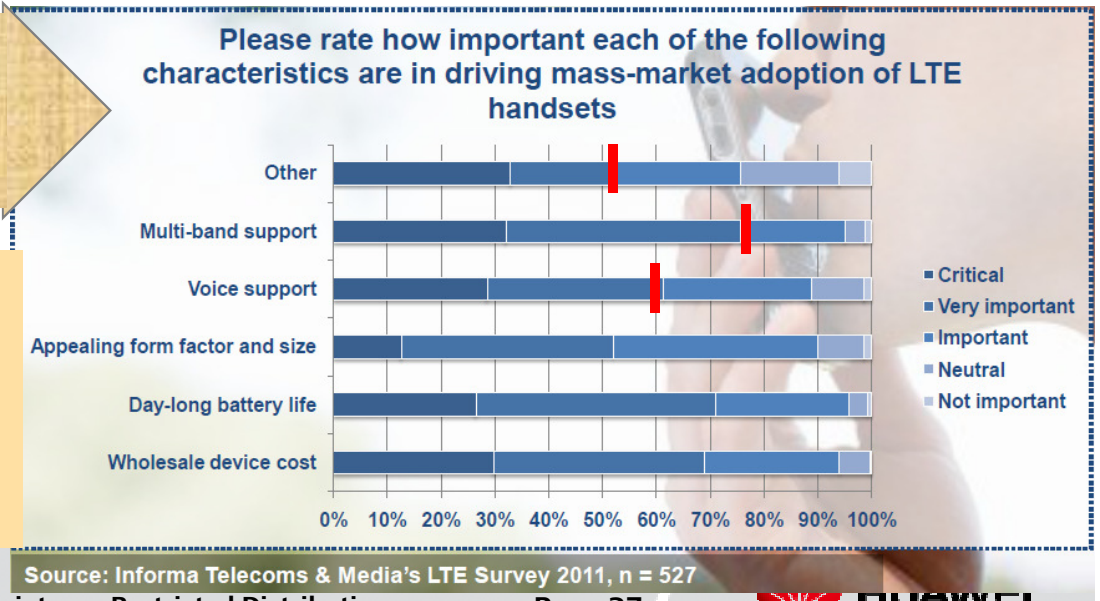
Operators requirements on LTE devices



Core bands are emerging, but spectrum fragmentation still prevalent may delay LTE mass deployment

Multi band support, battery and cost are critical/very important factors to device sales



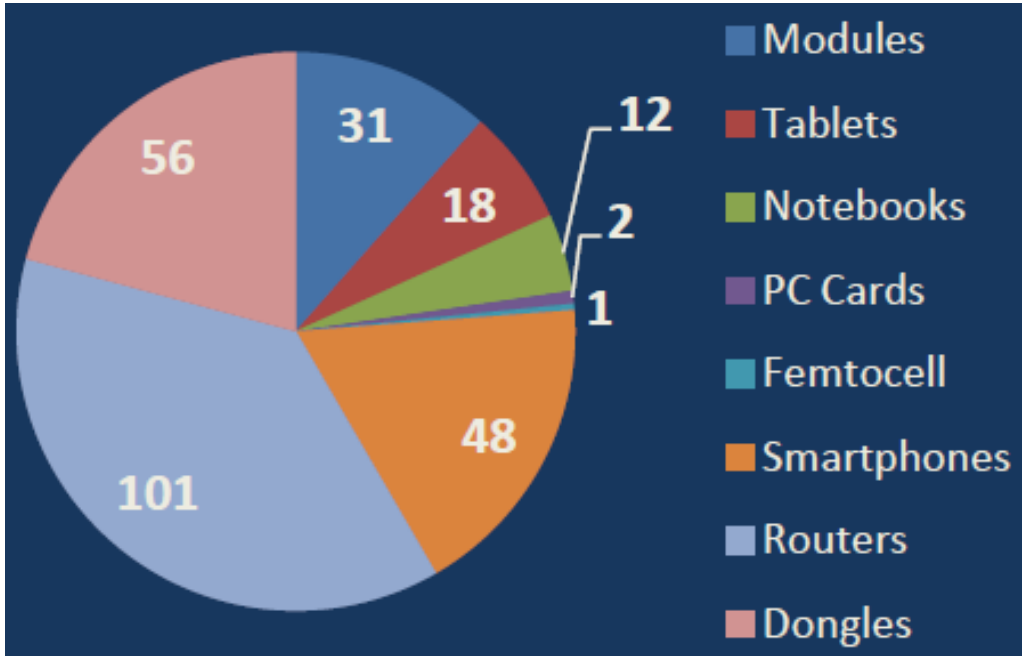
Other requirements

- Smart-phone is key to boost LTE adoption
- Early solutions for voice continuity, dual radio, dual stanby (NA, China), CSFB (Europe), later SRVCC
- PS HO

Devices ecosystem status (1/3)

- **269 LTE User Devices announced (57 manufacturers)**
  - **+36% from October '11** (GSA Report)
  - **200+ new LTE** user devices were launched in the past year
  - **44 LTE TDD** devices are confirmed

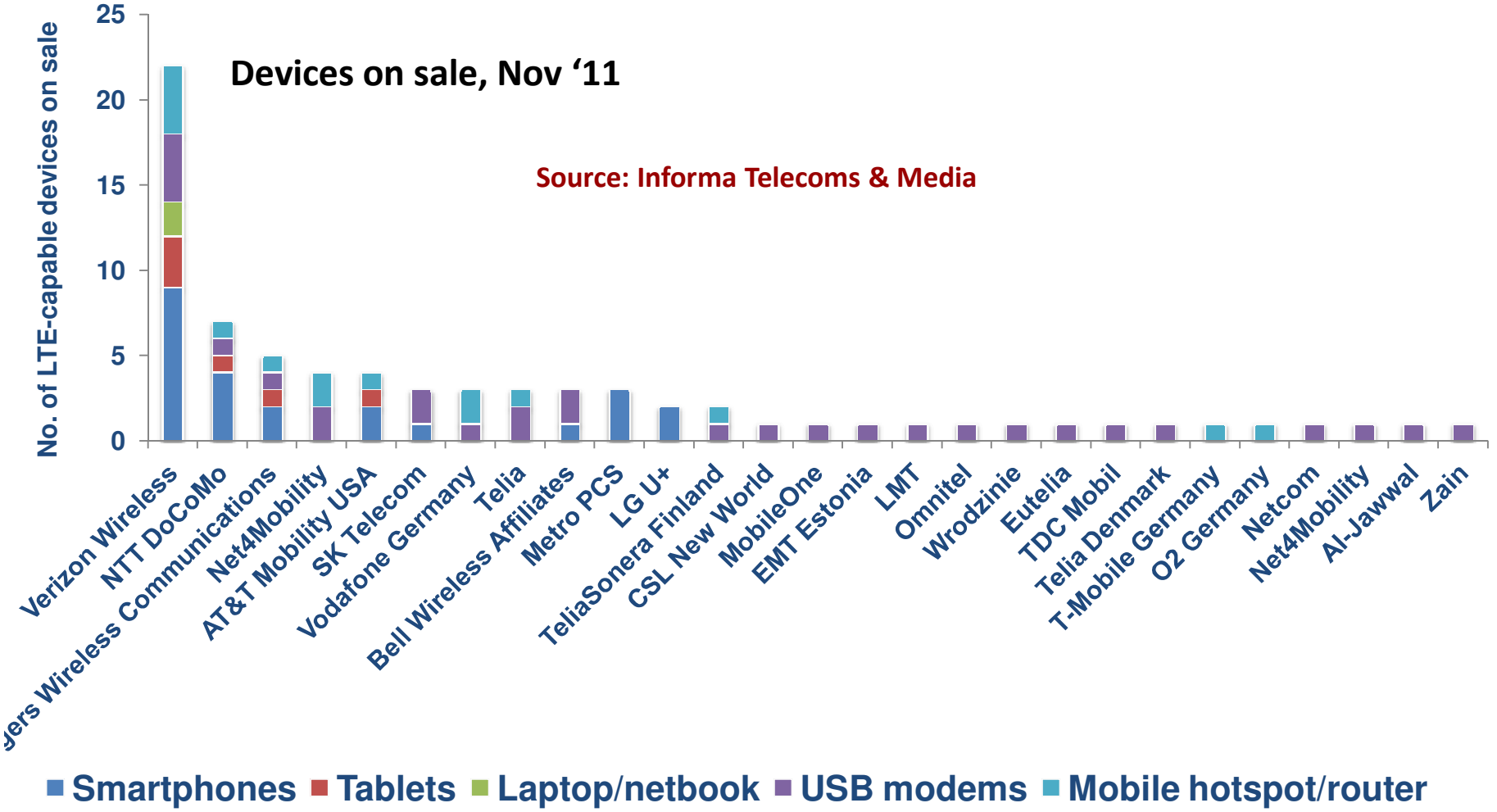
- **48 LTE-enabled smartphones are now launched**
  - **159 LTE** devices operate on either HSPA, HSPA+ or 42 Mbps DC-HSPA+ networks
  - **54 LTE** devices support 42 Mbps DC-HSPA+
  - **87 LTE** devices operate on EV-DO networks



Source: GSA: Jan 5, 2012

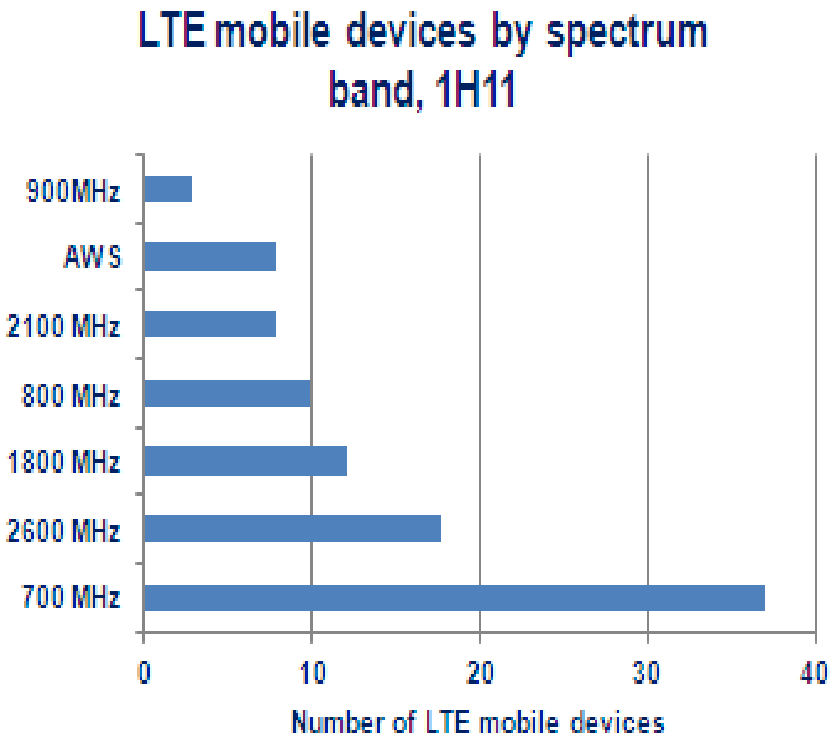
LTE ecosystem is establishing at unprecedented speed. (if compared to previous generations)

Devices ecosystem status (2/3)



>8 operators offering smartphones	Device portfolios are typically small	Modems & routers not driving growth	Compelling devices in market now

Devices ecosystem status (3/3)

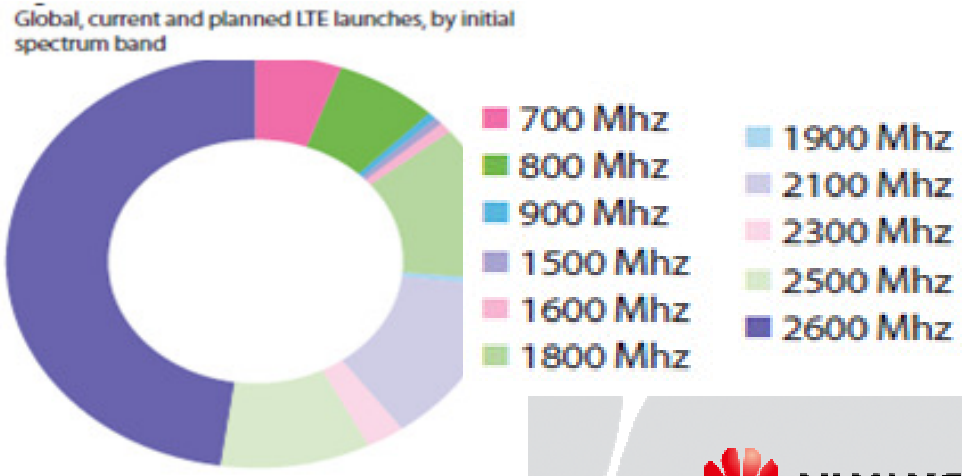


Source: Informa Telecoms & Media

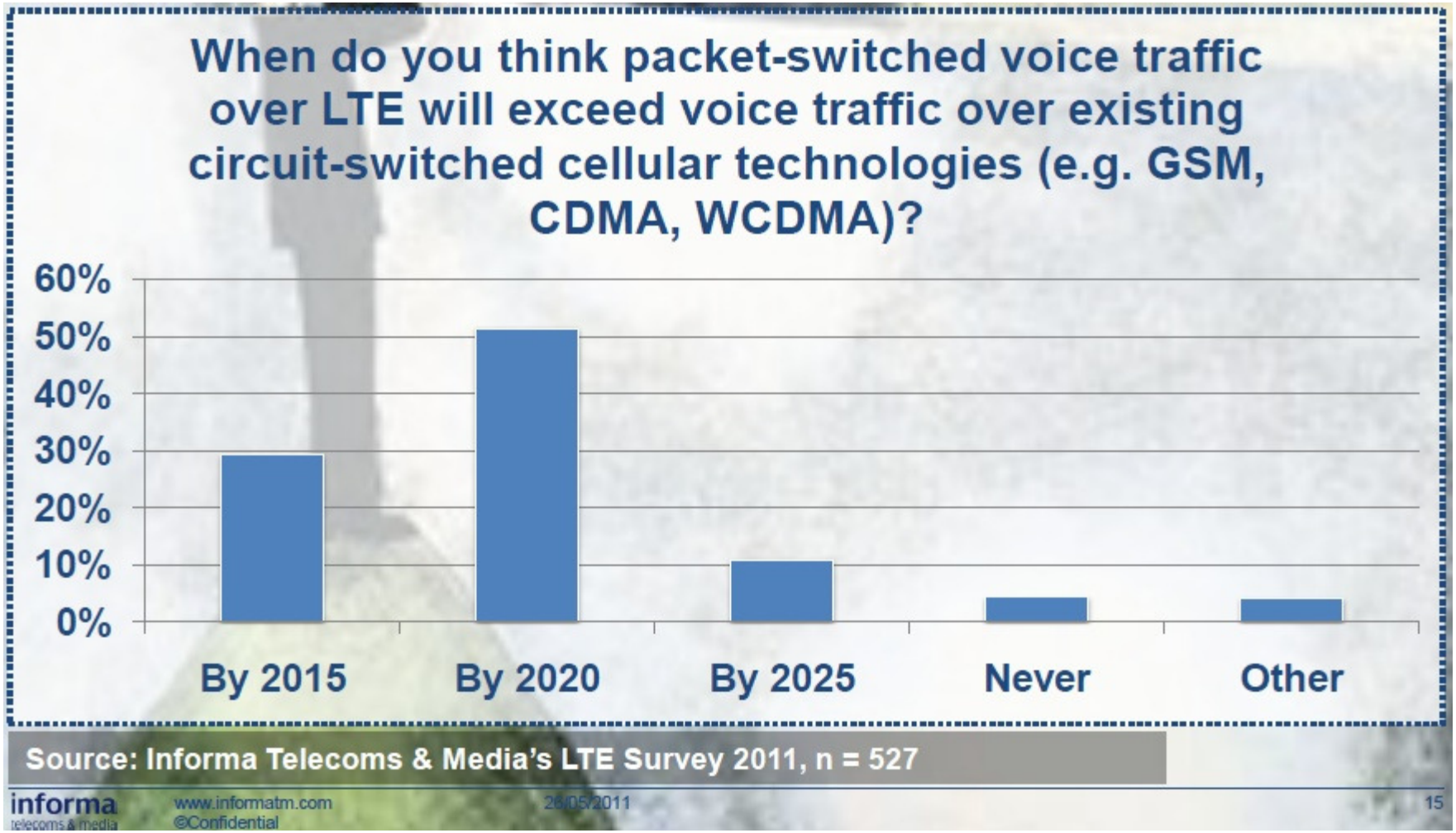
LTE FDD	
700 MHz	142 devices
800 MHz	52 devices
1800 MHz	50 devices
2600 MHz	65 devices
800/1800/2600 MHz	43 devices
AWS	51 devices

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

Source: GSA, Jan 2012

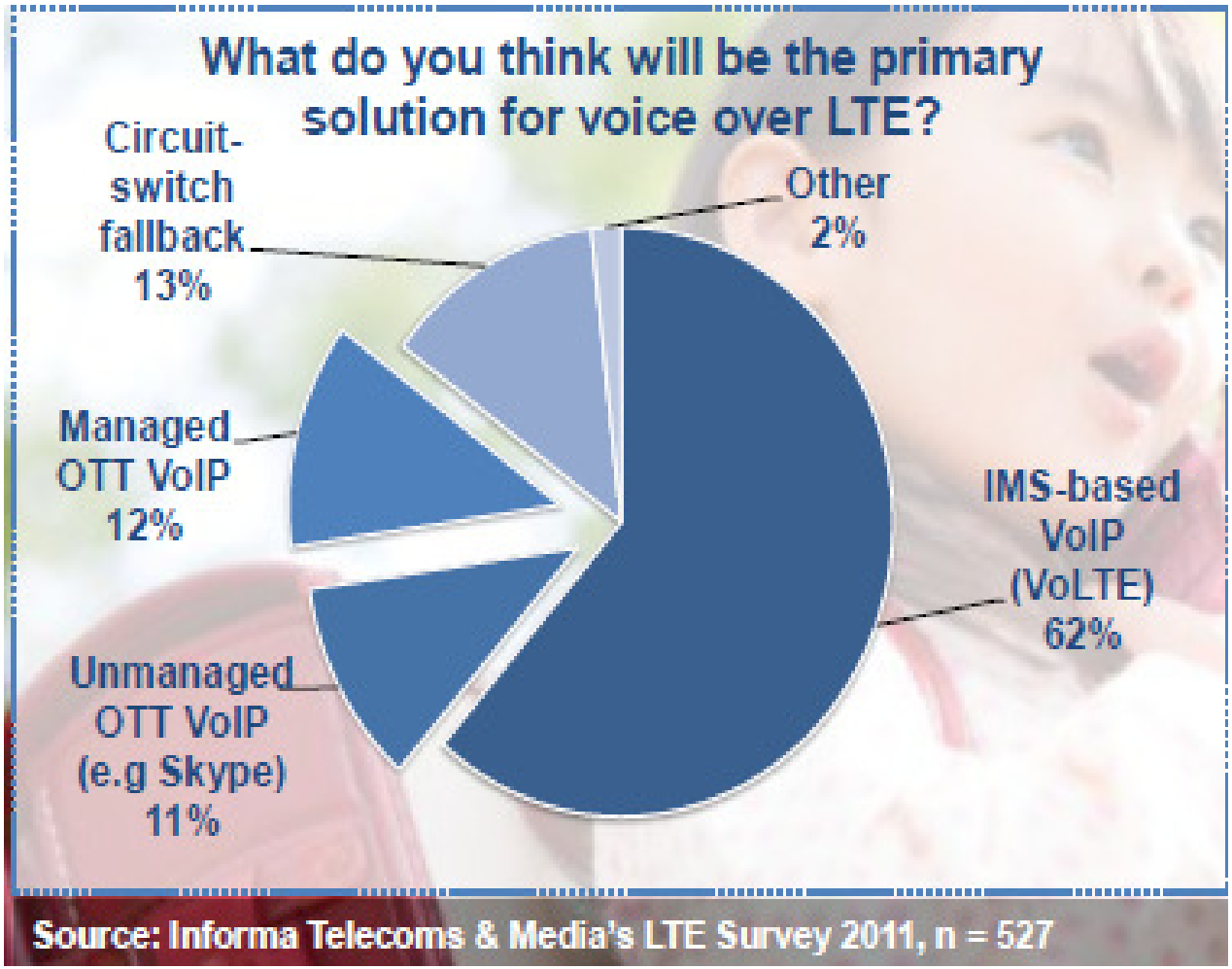


Packet-switched voice dominance will have a long and slow transition



GSM and WCDMA CS voice have still a long way, but majority of operators see the transition to PS voice dominance happening during this decade.

LTE terminals: voice capabilities

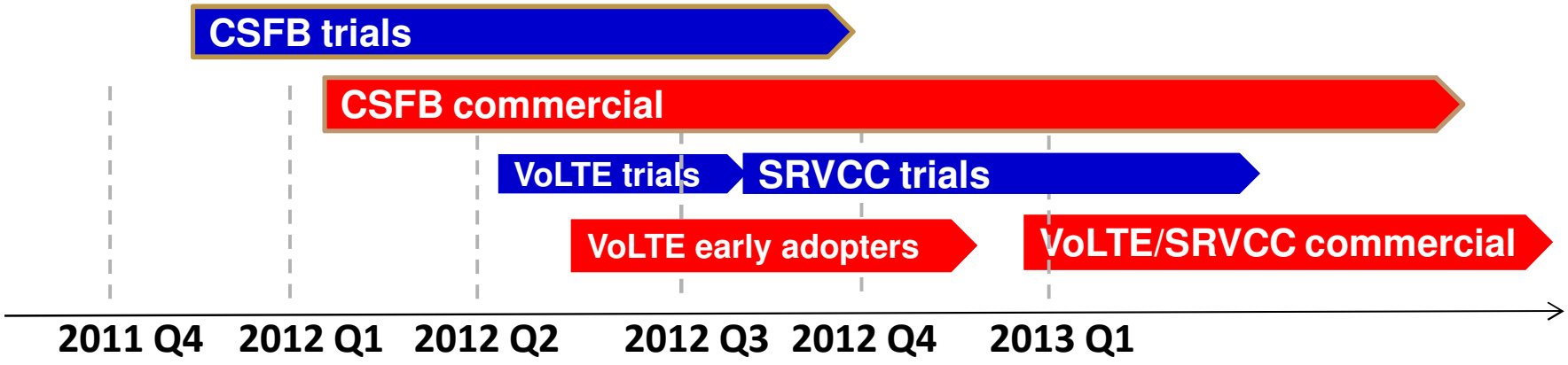


Note: This chart represents a mid to long term view about VoLTE market.

Source: 2011 LTE World Summit, Informa report (based on 527 interviews)

Voice evolution strategies

- **Data is now LTE driving force**
- Pressure on operators by **OTT services may partially accelerate** carrier class VoLTE
- **So far IMS investments are still limited: will VoLTE switch the change?**
- **Foreseen voice evolution steps:**
  - 2012: CSFB until LTE is spotty, to support voice continuity and inbound roamers
  - In one-two years (2013-14-….) upgrade to VoLTE, using SRVCC to manage the HO to the CS network,
  - All IP scenario, with fall back into HSPA, long term.



While CSFB will prevail initially, on the medium term we might see a battle between IMS-based VoIP and OTT approaches

10 YEARS OF CONNECTING EUROPE

Thank you

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