



VIETTEL JOURNEY TO THE ULTIMATE BROADBAND

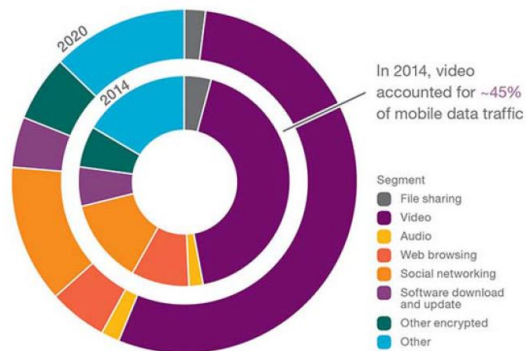
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3G Issues

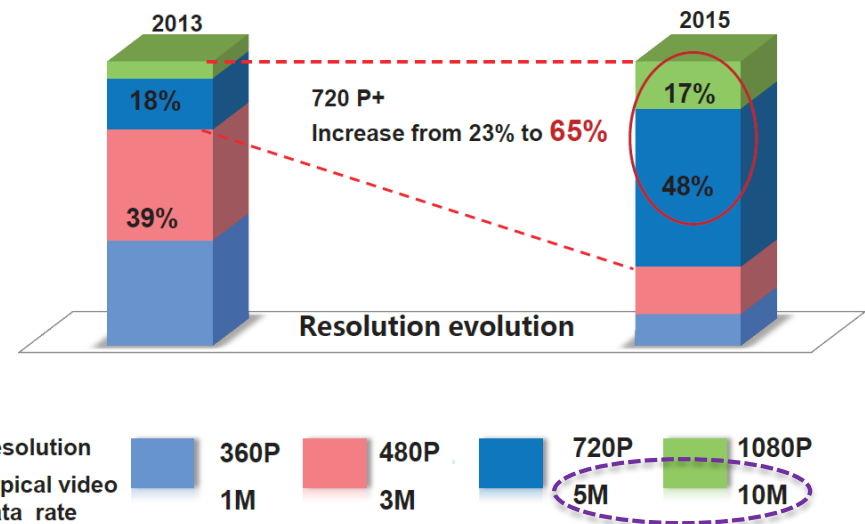
- Video traffic is increasing and contributes more than 50% of total mobile traffic in 2020

Mobile Data Traffic Distribution 2014 & 2020



Source: Ericsson prediction on data traffic 2015

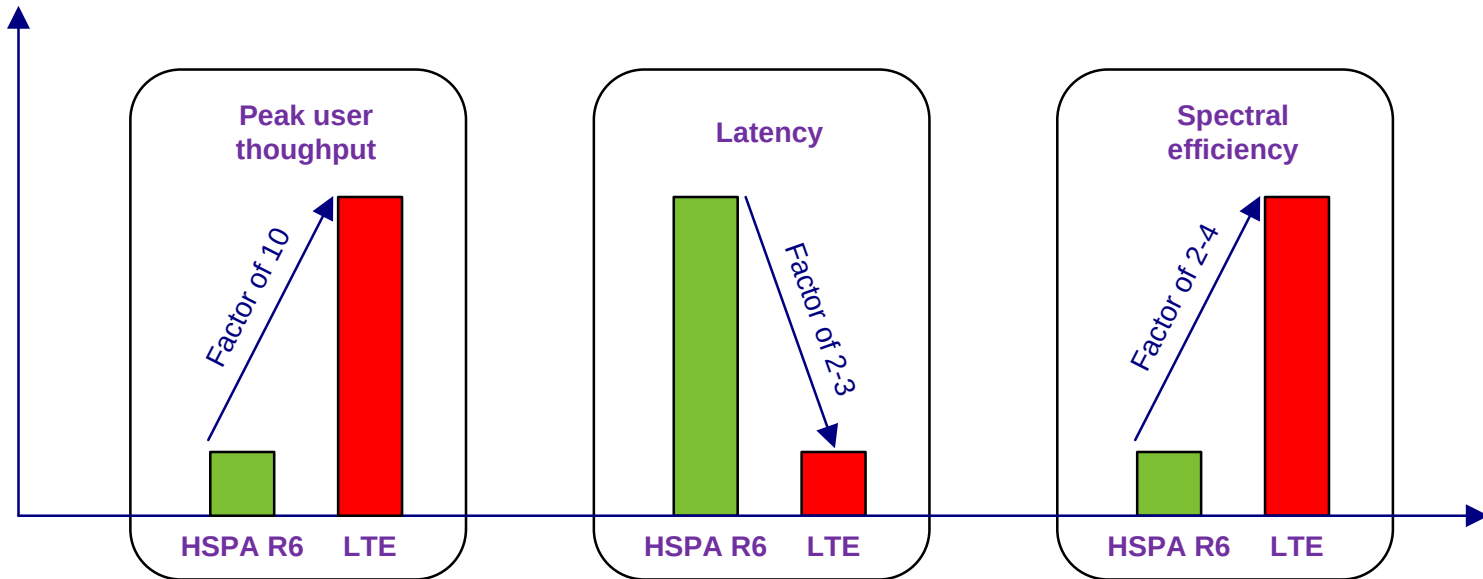
- 65% Video traffic with HD quality



Source: Huawei prediction on video traffic 2015

- 3G does not satisfy data rate requirements of HD Video services, that traffic increasing quickly
- Also 3G lacks of deep indoor coverage: 1Mbit/s area coverage is less than 70% total urban area

4G can fix that



- Spectral efficiency 2 – 4 times more than with HSPA Release 6
- Peak rates exceed 100Mbps in the down link and 50Mbps in the uplink
- Enables a round trip time of <10ms
- Packet switched optimized
- High level of mobility and security
- Optimized terminal power efficiency
- Frequency flexibility with allocations from below 1.5MHz up to 20MHz



We are ready

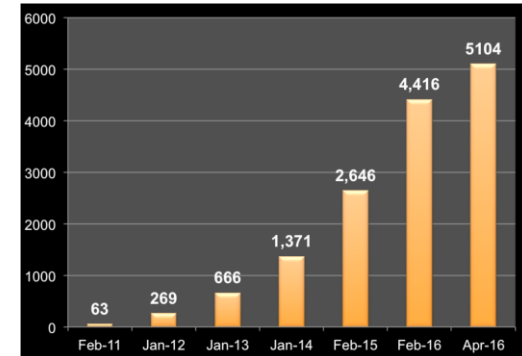
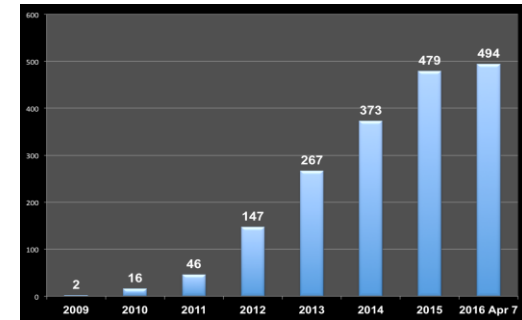
- ✓ Network Operators successfully deployed 4G LTE trial projects; Viettel deployed in Vung Tau from 12/12/2015 until now
 - Peak throughput **285Mbps** with 40MHz Bandwidth and MIMO 2x2 (~ theoretical maximum throughput 300Mbps)
 - Minimum Cell Edge throughput reaches **5Mbps**, more than enough for watching HD Video
 - Maintain 2G KPIs as well as before refarming
- ✓ 4G Handsets are popular
 - Millions of existing smartphone active in Viettel Network support 4G LTE
 - **80%** 4G Handsets support 1800 MHz Band
- ✓ Network Infrastructure is ready for 4G LTE deployment with 1Gbps Backhaul
- ✓ Thousands of engineer are developing new cutting edge solutions and services include: high quality multimedia streaming, smart city, online gaming, E-Government services, E-Commerce services, E-Learning,...



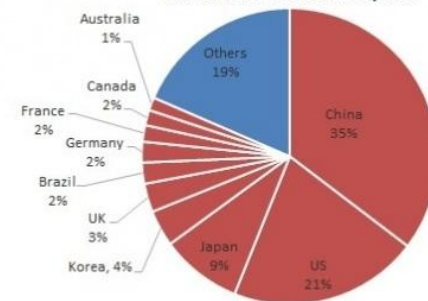
4G is becoming dominant

- ✓ 494 commercially launched LTE networks in 162 countries
- ✓ 226 LTE1800 networks commercially launched in 104 countries (45%)
- ✓ +5100 LTE devices announced by 417 suppliers
- ✓ Growth of 4G is two times faster than 3G: Reaching 1 billion subscriptions milestone, LTE has taken less than 6 years (2010 – Q4 2015) compared with more than 10 years required for 3G

Source:GSA's Evolution to LTE report



2015: 1.05 billion LTE Subscriptions



Source:Ovum report

5G is coming

Tier 1 Operators 5G plans

- ✓ TeliaSonera and Ericsson announced to offer 5G services in Stockholm and Estonia as early as 2018
- ✓ Korean KT has plans to launch a live 5G service for the 2018 Winter Olympic Games in Pyeongchang
- ✓ Japan's NTT DoCoMo is gearing up to showcase 5G at the 2020 Tokyo Olympics



Mark Zuckerberg made an appearance at the Samsung Galaxy S7 launch to talk about VR

The demand for new services could accelerate 5G deployment faster than we thought



We are late

and the consequences are:

✓ **Customers:**

- Not fully enjoy video and broadband data services with 3G while 4G could provide those services with an outstanding level of customer experience

✓ **Operators:**

- Continue much costly investment on the old 3G technology

✓ **The Country:**

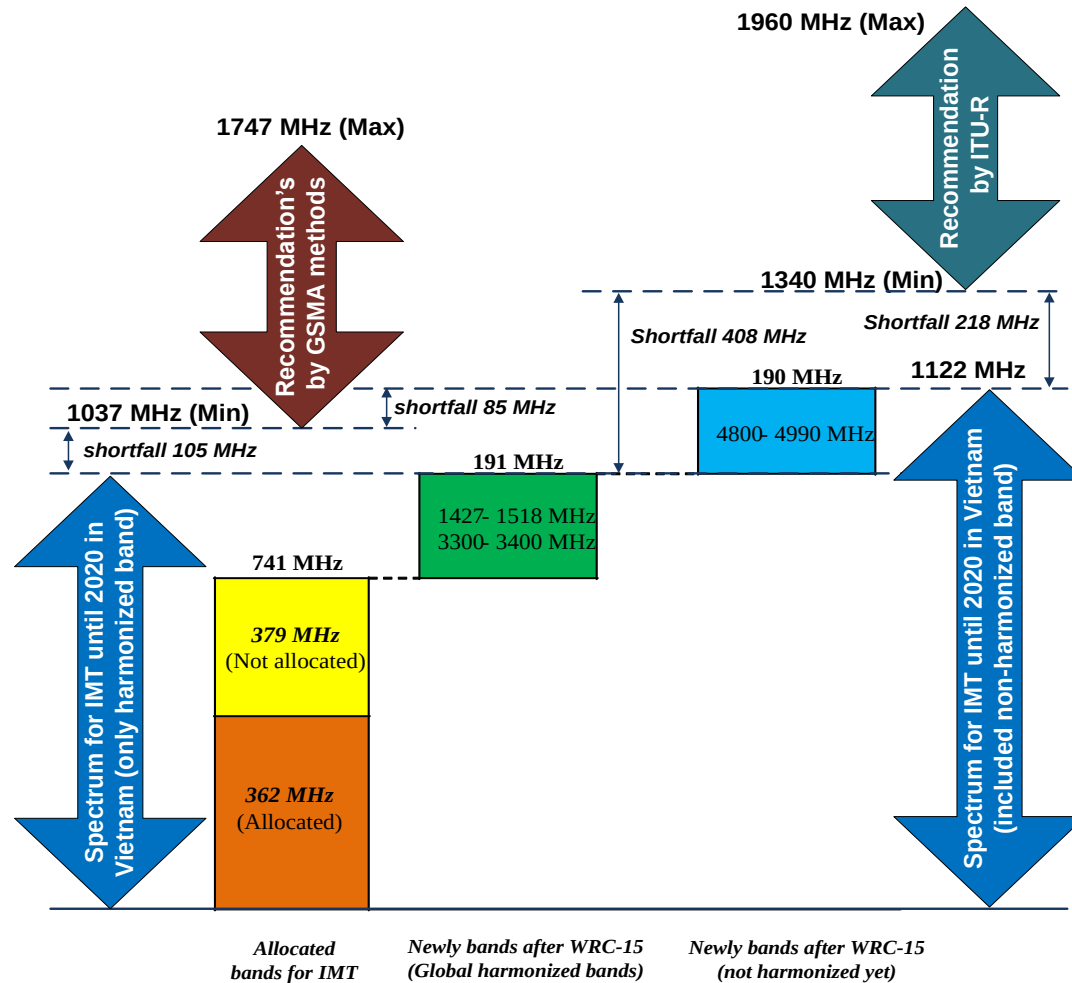
- Left behind in ICT development and evolution among the Asia Pacific countries (*Viet Nam decreasingly ranked 102/167 in the World and 17/32 in Asia Pacific on ICT Development (ITU)*)



An urgent call for Regulator

Approve mobile operators to deploy 4G LTE on their own 1800MHz frequency band as soon as possible!

And one more thing



Continue release 2600MHz frequency band for capacity and 700MHz band for coverage within the next 3 years



Viettel journey to the Ultimate Broadband

