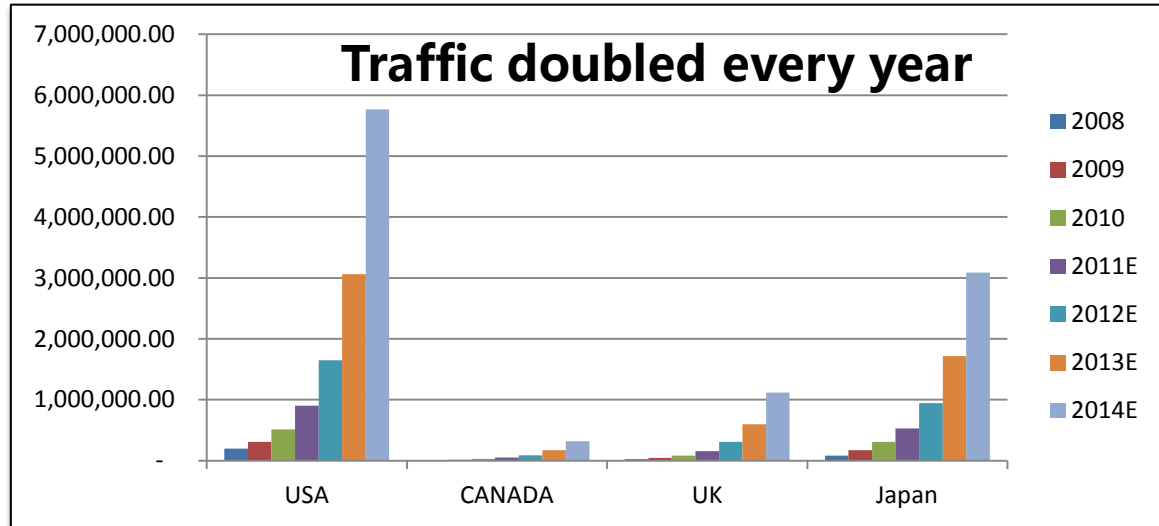


Motivation of the New SI Proposal: Study on Licensed-Assisted Access using LTE

Huawei, CMCC, Ericsson, Qualcomm, Verizon

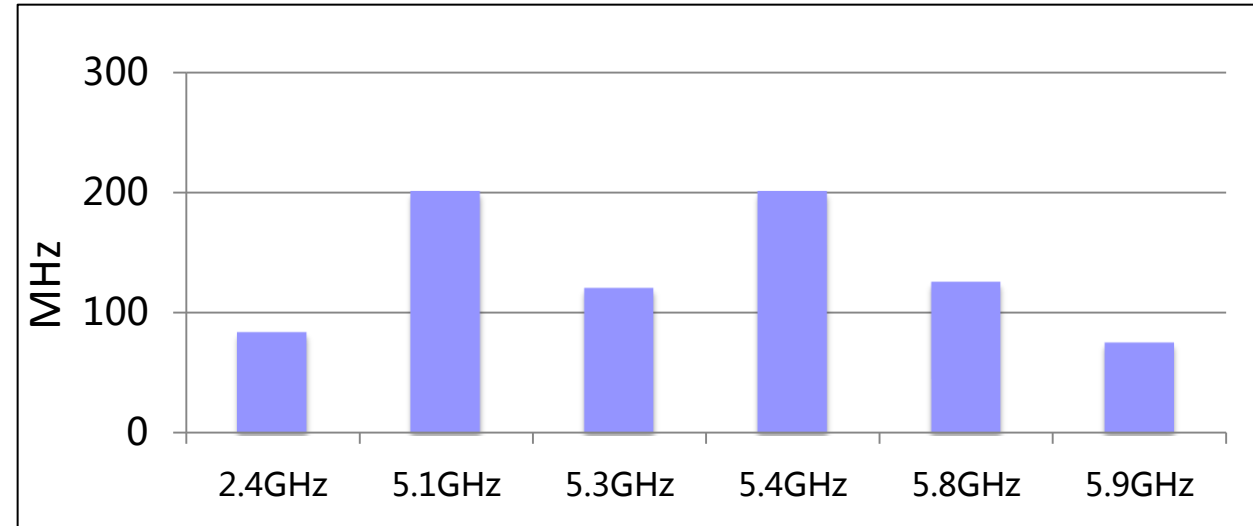
Motivation (1/2)

MBB Traffic Increase, e.g. X 1000@2020



Source: Huawei Wireless 2011 Q1 (Based on Informa 2010Q3)

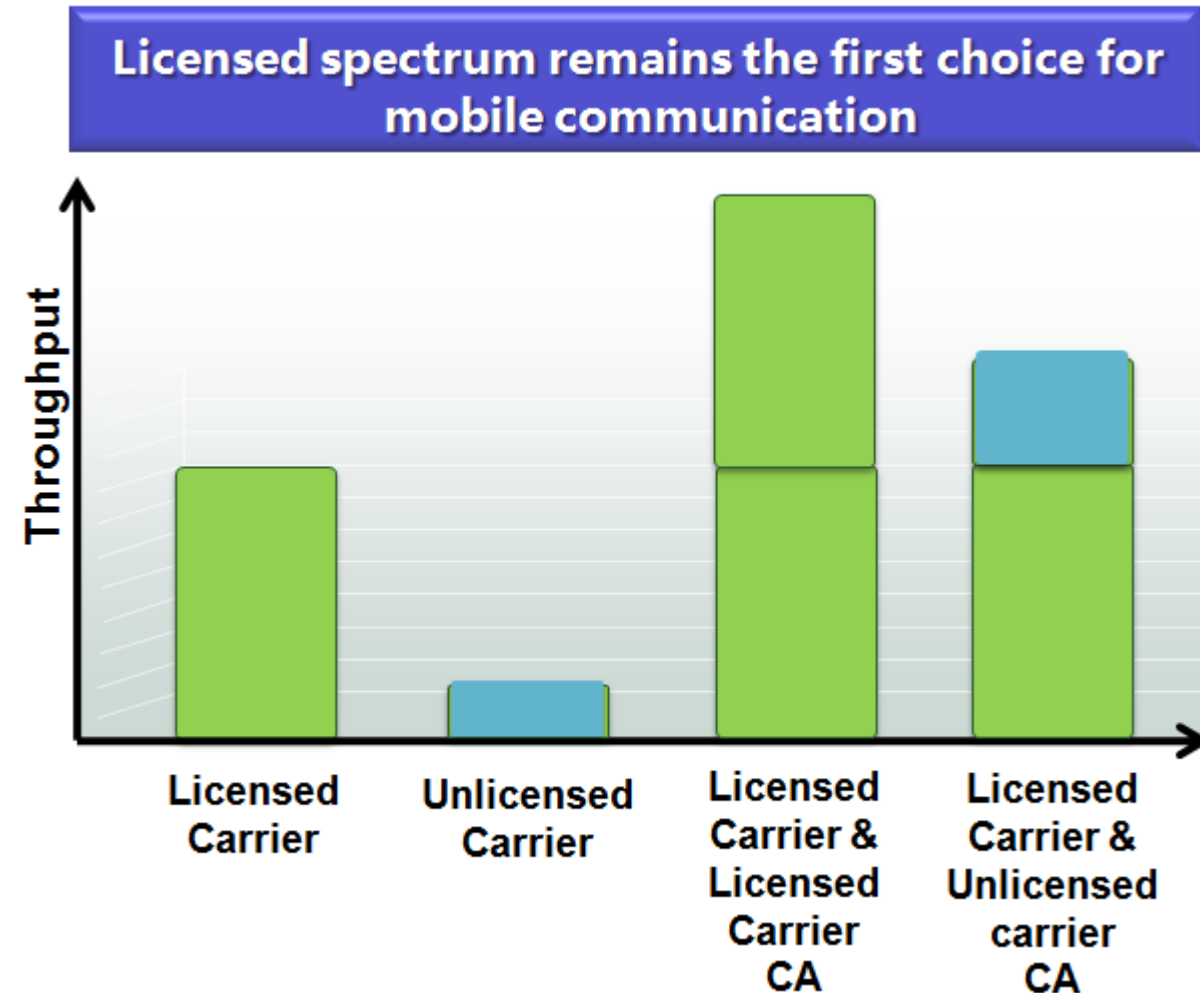
Unlicensed Spectrum available for any interested party



Striving to meet the market demands, there have been increasing interests from operators in deploying some complementary accesses utilizing unlicensed spectrum to meet the expected traffic growth, with maintaining the carrier user experience on quality, security, mobility, etc.

Motivation (2/2)

- **Licensed spectrum with exclusive usage is superior for telecommunication services**
 - Guaranteed security, coverage, mobility, QoS, ...
 - Spectrum resource might be limited in some area to meet MBB traffic requirement during busy hours
- **Using LTE for a Licensed-Assisted Access to unlicensed spectrum can only be a complement**
 - Some operators use WiFi offloading for capacity boosting
 - LTE-based access can provide benefits, with licensed-assisted access



Scenarios & Deployments

Scenarios – Operator-Controlled



Residence
Personal deployment



Public
Operator deployment
Indoor/Outdoor



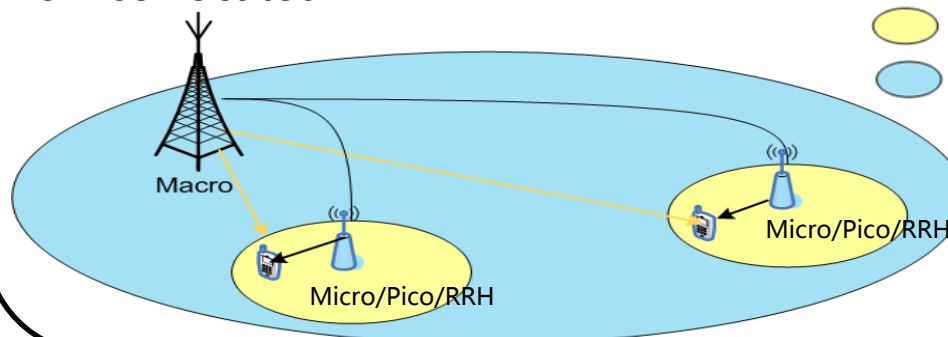
Deployments – Non-standalone

Co-located



Unlicensed carriers
Licensed carriers

Non-co-located



Unlicensed carriers
Licensed carriers

Unlicensed carriers are integrated into operator networks
with Licensed-Assisted LTE Access

Requirements

- **Efficient Hotspot Traffic Offloading:**

- Efficient Air-Interface: reuse LTE physical-layer design and numerology as much as possible
- Integration of unlicensed carriers into LTE licensed system

- **Unified Operation and Management:**

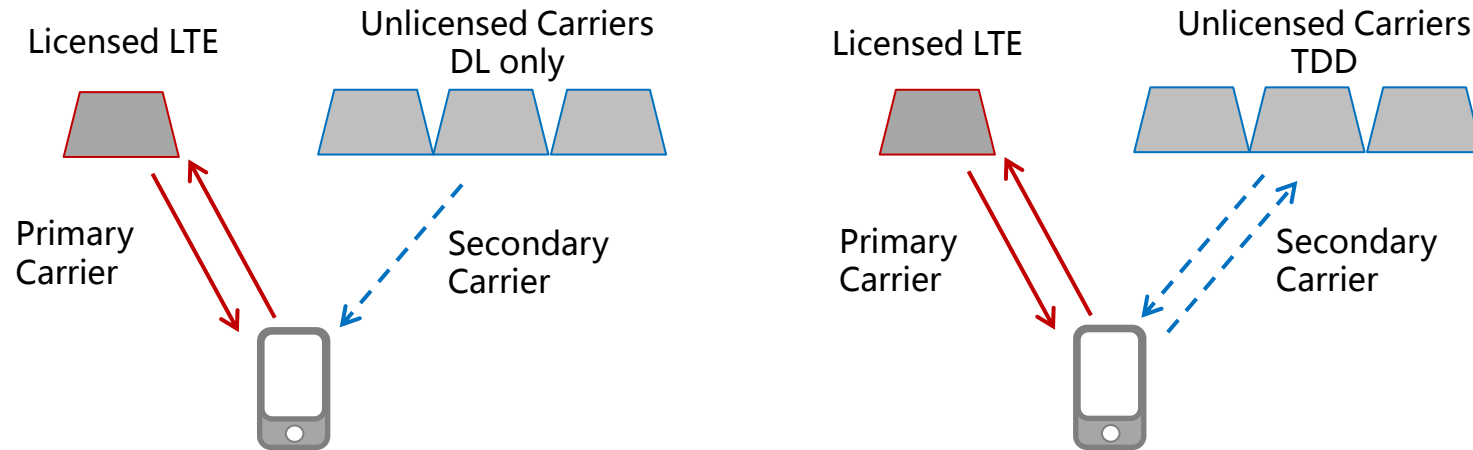
- Guaranteed User Experience with uniform telecom-level QoS
- Common authority and security with transparent switch of unlicensed/licensed carrier
- Joint operation, load balancing and interference management

- **Co-existence: common solution to address global situation**

- Coexistence of the licensed-assisted LTE accesses among different operators that are sharing the same unlicensed band
- Coexistence with other technologies in the same band, i.e. WiFi

Licensed-Assisted Access of LTE in Unlicensed Spectrum

Non-Standalone: Candidate solutions



Licensed-assisted access in unlicensed carriers

Coverage
& Capacity
Guarantee

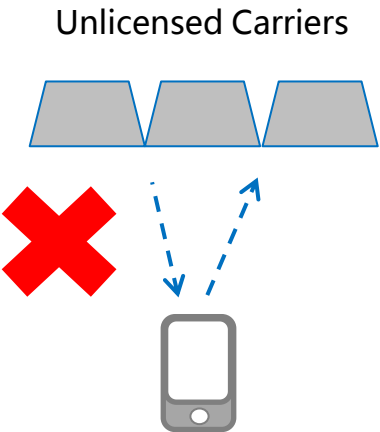
Mobility
and service
continuity

QoS
Guarantee

Unified
OAM, RRM,
etc.

Controlled by Operator Network

Standalone



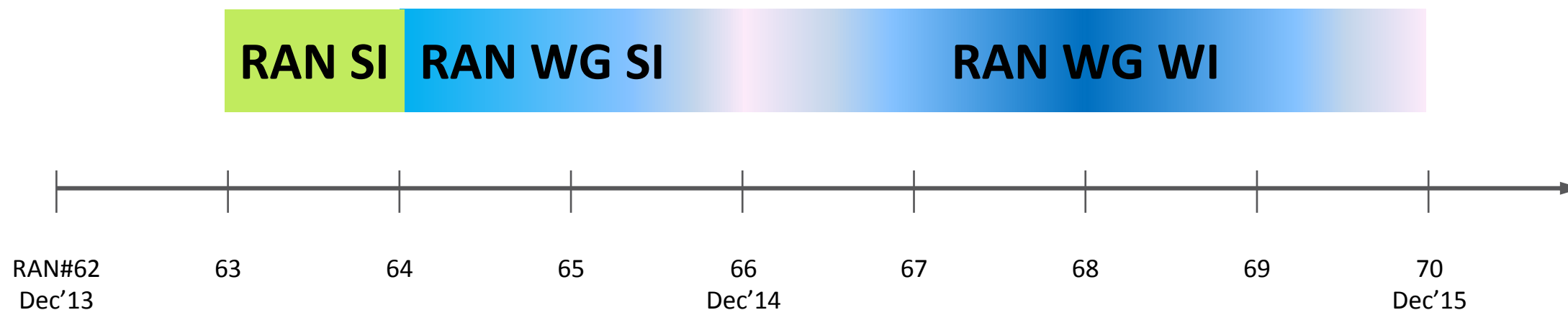
Without Licensed LTE,
unlicensed access will
lose these advantages

Selection of Unlicensed Spectrum for Licensed-Assisted Access of LTE

- **Diverse unlicensed spectrum**
 - 2.4GHz is widely used by residential WLAN, with high interference
 - 5GHz: regulation restriction differs for different bands and in different regions
 - 60GHz: too high propagation loss to fit to operator scenario
 - Other unlicensed spectrum: regional and narrow bandwidth
 - A summary of regulation restriction of unlicensed spectrum will be a good starting point to move forward
- **Potential principle of selecting proper unlicensed spectrum for integration to IMT systems**
 - Propagation loss: preferred $< 6\text{GHz}$
 - Available bandwidth
 - Global common spectrum assignment
 - Existing interference level due to existing deployment of other systems
 - Regulation restriction, e.g. transmit power
 - Inter-modulation interference with existing IMT bands

Tentative Standards Plan

- **Tentative standard schedule:**
 - Start RAN Plenary SI at RAN#63
 - Complete solution addressing global situation in Rel-13
- **RAN SI scope:**
 - Identify the most important deployment scenarios and requirements
 - Summarize regional regulatory status and restrictions, and recommend high priority unlicensed bands and band combinations
 - Define the scope of needed coexistence studies for integrating unlicensed spectrum operation to LTE



Thank you !

