



## **Horizon 2020 5G PPP**

# **5G Communication Infrastructure, Beyond 2020 Timeline**

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# Content

- Samsung's 5G vision & global activities
- 5G PPP in a nutshell
- 5G PPP KPIs, program and timelines
- 5G PPP major milestones, and next steps



# Samsung 5G vision (1/2)\*

A diagram illustrating four key aspects of Samsung's 5G vision: 'Everything on Cloud', 'Immersive Experience', 'Ubiquitous Connectivity', and 'Intuitive Remote Access'. Each aspect is shown in a rounded rectangular box with a title, a descriptive sentence, and representative icons. The background is dark blue with a grid pattern.

- Everything on Cloud**  
Desktop-like experience on the go  
Icons: A cloud connected to a laptop, a tablet, and a smartphone.
- Immersive Experience**  
Lifelike media everywhere  
Icons: A VR headset, a curved display, a TV, and AR glasses.
- Ubiquitous Connectivity**  
An intelligent web of connected things  
Icons: A smartwatch, a smart speaker, a smart refrigerator, a smart car, a smart washing machine, and a smart door lock.
- Intuitive Remote Access**  
Real-time remote control of machines  
Icons: A drone, a forklift, and a robotic arm.

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\*See Tuesday plenary by SVP Cheun, Samsung

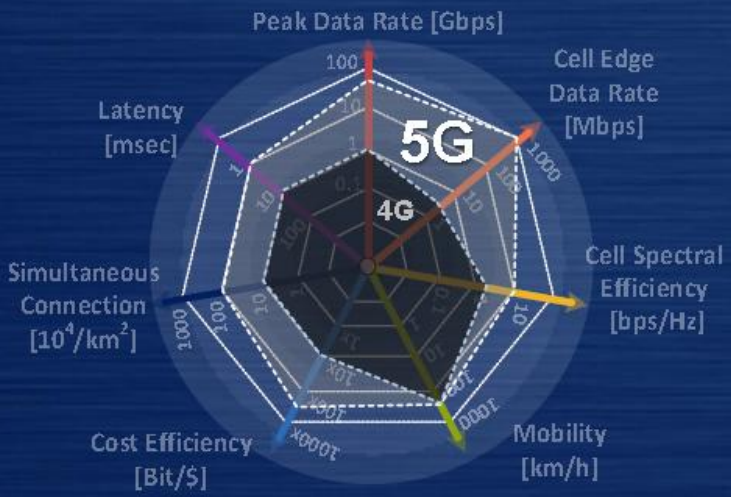


# Samsung 5G vision (2/2)



## 5G for 2020 and Beyond

### 5G Rainbow of Requirements



### Key Technologies

- Tech. for Above 6 GHz
- Adv. Coding & Modulation
- Adv. MIMO & BF
- Enhanced D2D
- Adv. Small Cell
- Interf. Management
- Flat Network
- Multi-RAT Interworking
- Mobile SDN



# 5G Global R&D Activities

Current Global 5G Research Initiatives and Samsung's Active Engagements





# 5G PPP in a nutshell



- 5G PPP (Public Private Partnership) is a new instrument in EU Horizon 2020
- Takes orientation from industry-led 5G PPP proposal (response to call from EU Commissioner Neelie Kroes, MWC 2013)
- Focus on 5G communication infrastructure R&D, with a beyond 2020 timeline
- Also support for 5G development activities (e.g. standardization, spectrum planning, international consensus)
- Contractual Arrangement on 5G PPP signed between EU Commission and private side, represented by 5G Infrastructure Association  
<http://5g-ppp.eu>
- 700 million € EU funding [2014-2020].  
matched by about 700 million € from private side





# 5G Infrastructure Association

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## Industry

- ADVA Optical Networking SE
- Alcatel-Lucent
- Astrium Satellites
- Atos
- Deutsche Telekom
- DOCOMO Communications Laboratories Europe
- Ericsson
- Huawei Technologies Düsseldorf GmbH
- IBM Research
- Intel Mobile Communications
- NEC Europe Ltd., NEC Laboratories Europe
- Nokia
- Orange Labs
- Portugal Telecom
- Samsung Electronics
- SES
- Telecom Italia
- Telefónica I+D
- Telenor ASA
- Telespazio
- Thales Alenia Space
- Turk Telekomünikasyon A.Ş.

## Research

- CEA-LETI
- Centre Tecnologic de Telecomunicacions de Catalunya (CTTC)
- Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)
- Fundacion IMDEA Networks
- Instituto de Telecomunicacoes
- IST – University of Lisbon
- TNO
- University of Bologna – DEI

## SMEs

- Integrasys SA
- INTERINNOV
- M.B.I. S.R.L.
- Nextworks s.r.l.
- Quobis
- Sequans Communications



# 5G PPP KPI

- **Business-related KPIs:**

- Leverage effect of EU research and innovation funding in terms of private investment in R&D for 5G systems in the order of 5 to 10 times;
- Target SME participation under this initiative commensurate with an allocation of 20% of the total public funding;
- Reach a global market share for 5G equipment & services delivered by European headquartered ICT companies at, or above, the reported 2011 level of 43 % global market share in communication infrastructure.

- **Performance KPIs:**

- Providing 1000 times higher wireless area capacity and more varied service capabilities compared to 2010;
- Reducing the average service creation time cycle from 90 hours to 90 minutes (as compared to the equivalent time cycle in 2010);
- Very dense deployments to connect over 7 trillion wireless devices serving over 7 billion people;
- Secure, reliable and dependable Internet with a “zero perceived” downtime for services provision.

- **Societal KPIs:**

- Enabling advanced User controlled privacy;
- Reduction of energy consumption per service up to 90 % (as compared to 2010);
- European availability of a competitive industrial offer for 5G systems and technologies;
- New economically-viable services of high societal value like U-HDTV and M2M applications;
- Establishment and availability of 5G skills development curricula in partnership with the EIT.





# Major 5G PPP Milestones

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- First Call for Proposals published on December 11, 2013
- Contractual Arrangement on 5G PPP signed between EU Commission and private side on December 17, 2013
- Budget for 2014 – 2020 time frame
  - 700 million € public funding
  - Matched by about 700 million € from private side
  - Including leveraging factor 5 of additional private investment value about 3.5 billion €
- 5G PPP industry launch at Mobile World Congress on February 24, 2014
- Submission deadline of proposals on November 25, 2014
- 1<sup>st</sup> batch of projects expected to start first half of 2015





# H2020 5G PPP Call 1 strands



## **Radio network architecture and technologies**

Support anticipated 1000 fold mobile traffic increase and very different classes of traffic/services, from UHD TV to IoT

## **Convergence beyond last mile**

Support integration of a ubiquitous access continuum composed of cooperative, cognitive fixed and heterogeneous wireless resources, with fixed optical access reaching at least the 10 Gb/s range

## **Network management**

Challenge to radically decrease network management Opex through automation whilst increasing user perceived quality of service, of experience and security

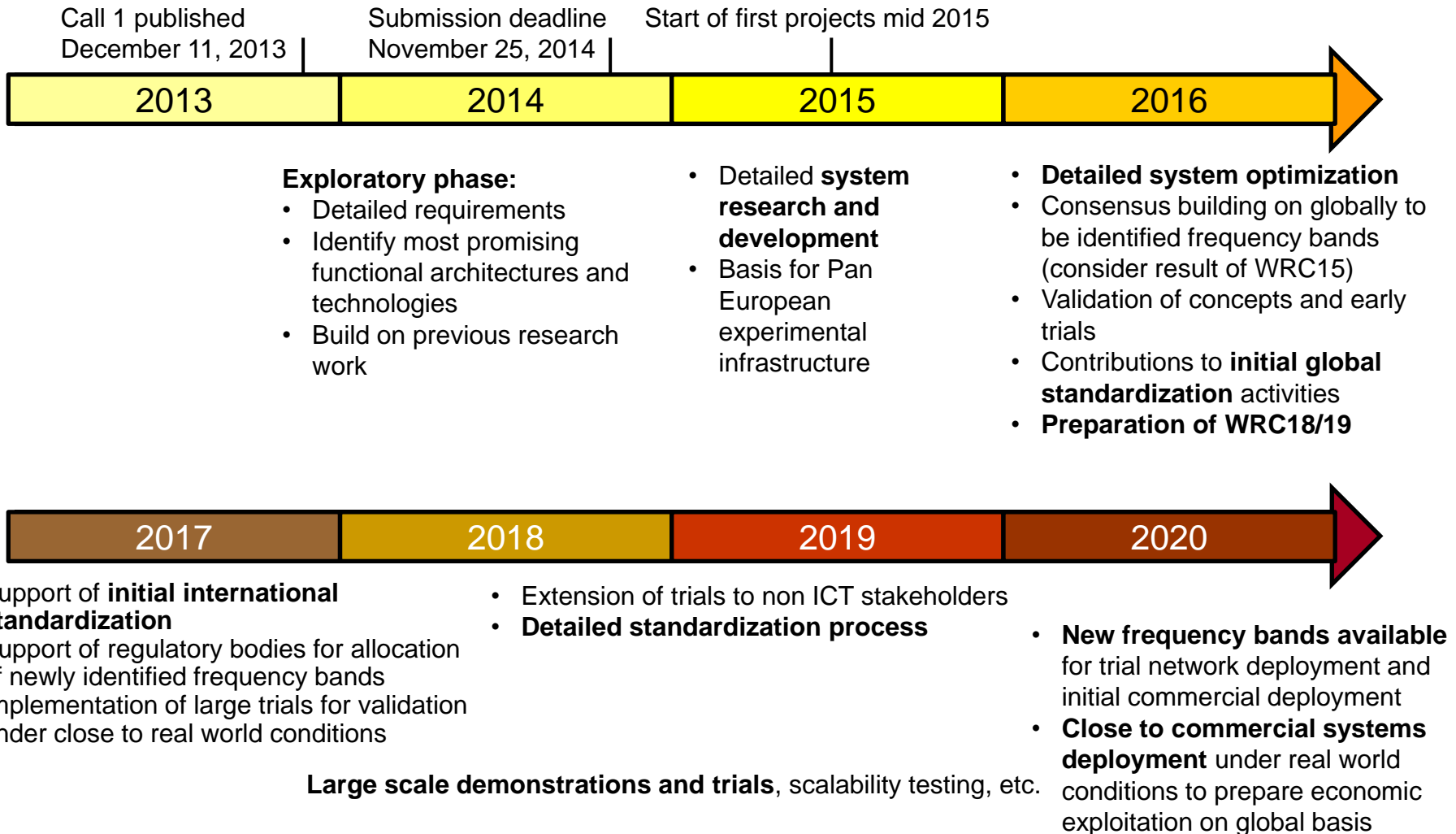
## **Network virtualization and Software Networks**

Highly flexible, manufacturer-independent model of controlling reconfigurable resources supporting changing/emerging application requirements

125 million € funding across 4 strands



# Indicative timeline





**Thank you for listening!**

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**Dr Wonil Roh, VP Samsung Electronics**