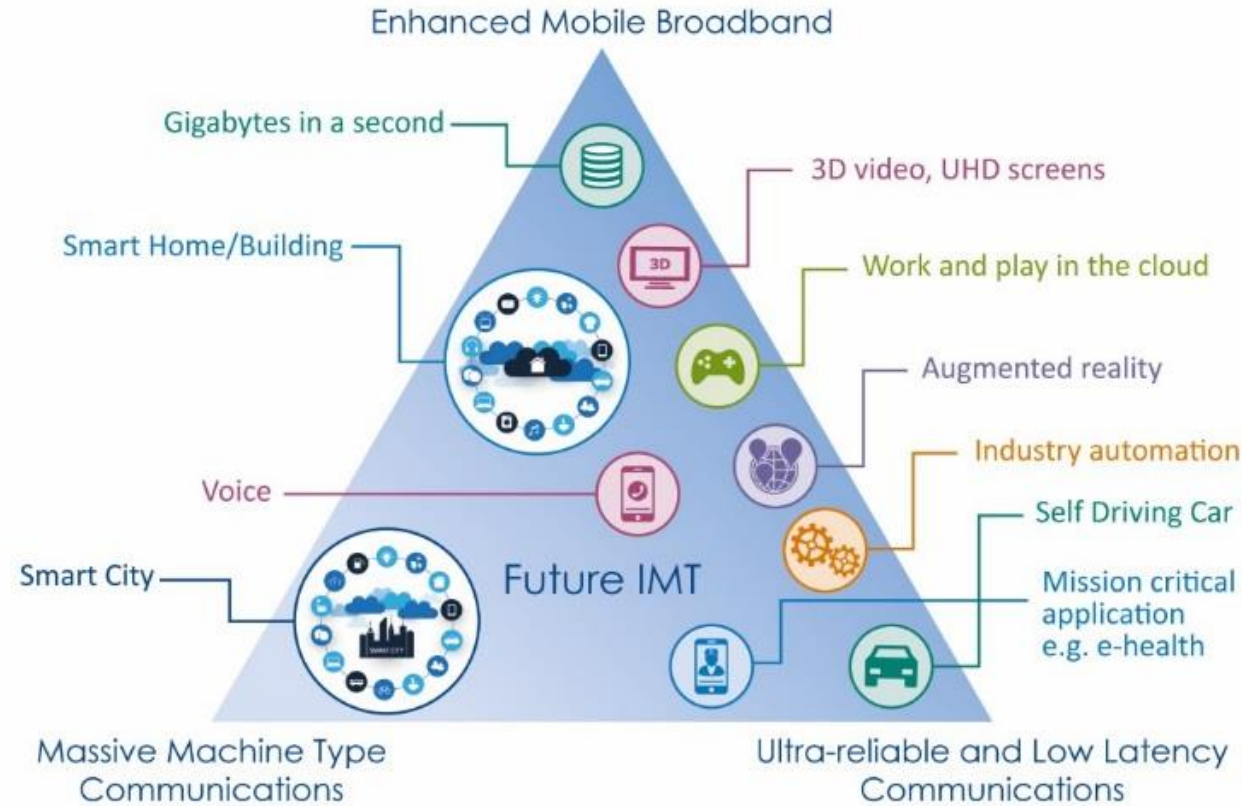


# 3GPP delivering the 5G promise

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Director – Standardization & Public Policy

# What did partners set out to achieve ?



# Which is more important?



## ❑ Evolved Mobile Broadband is important

- The main priority for some early operators
- Business models and revenue streams are well understood
- 5G Phase1 addresses very well this use case family



## ❑ ...but so are Ultra-Reliable Low-Latency Communications and Massive Machine Type Communications

- URLLC features are contained in 5G Phase 1
- URLLC and mMTC to be fully covered in 5G Phase 2



# Is 5G just higher data rates ?

IMT2020 detailed performance targets are being set by ITU-R as follows:

- Peak data rate [Downlink: 20Gbit/s, Uplink: 10Gbit/s]
- **Peak spectral efficiency** [Downlink: 30bit/s/Hz, Uplink: 15bit/s/Hz]
- User experienced data rate [Dense Urban Downlink: 100Mbit/s, Uplink: 50Gbit/s]
- 5<sup>th</sup> percentile user spectral efficiency [Indoor Hotspot, eMBB scenario: Downlink: 0,3bit/s/Hz]
- Average spectral efficiency [Indoor Hotspot, eMBB scenario: Downlink: 9bit/s/Hz/TRxP]
- Area traffic capacity [Downlink indoor hotspot (eMBB scenario): 10Mbit/s/m<sup>2</sup>]
- **User plane latency** [4ms for eMBB, 1 ms for URLLC]
- **Control plane latency** [Minimum 20ms, ideally 10ms]
- **Connection density** [eMTC scenario, 1 000 000 devices per km<sup>2</sup>]
- Energy efficiency [no values at this stage]
- **Reliability** [URLLC scenario: 1-10<sup>-5</sup>]
- **Mobility** [Up to 500 Km/h (Rural eMBB)]
- Mobility interruption time [eMBB and URLLC scenarios: 0ms]
- Bandwidth [Minimum 100MHz, Maximum 1GHz]

# Where did 5G work begin?

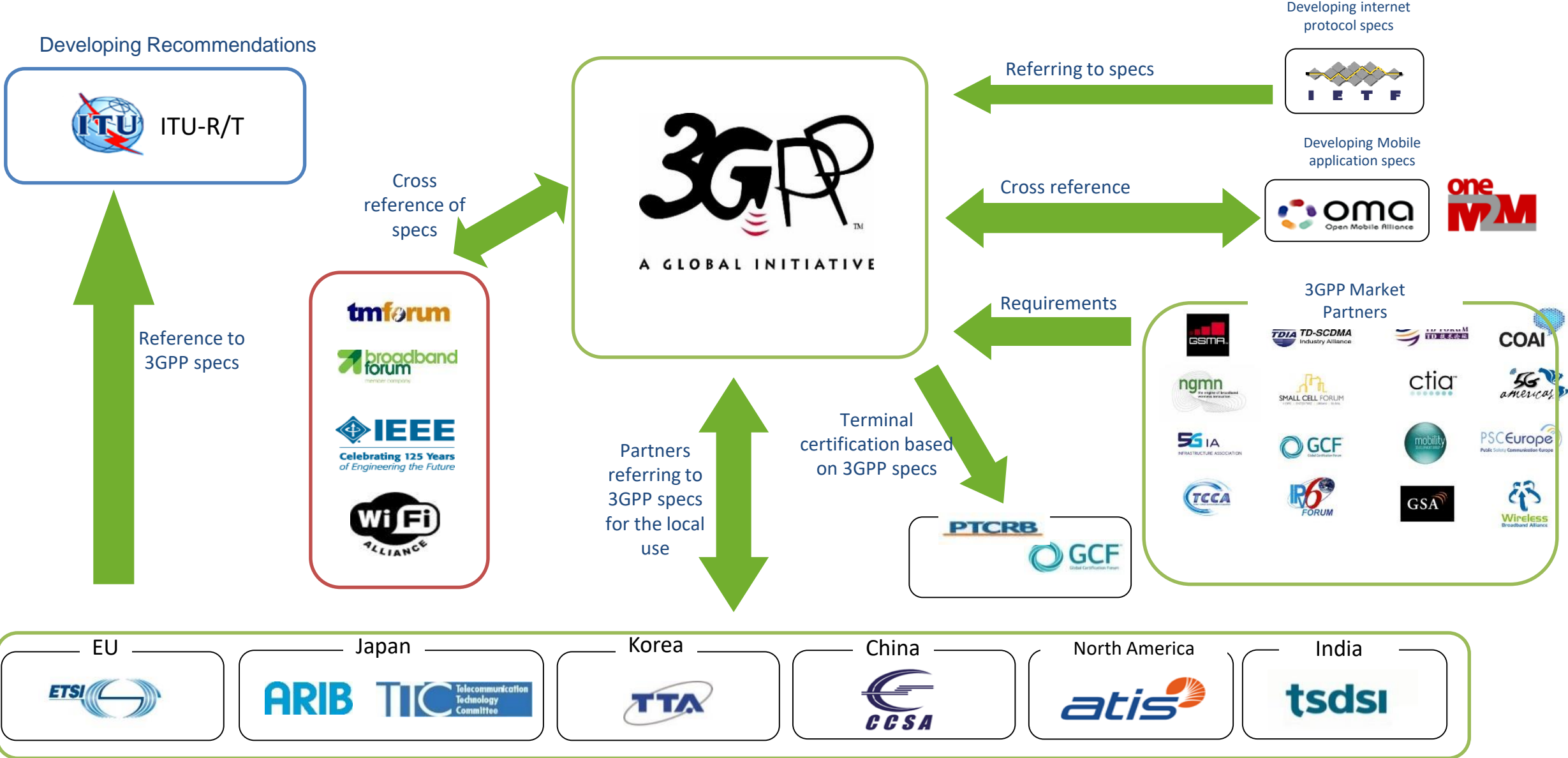
## □ 3GPP consultative workshop: Phoenix, September 2015

- 550 experts from industry, government, regulators, research and academia
- Agreed to split 5G Standardization into two phases:
  - **Phase 1** (new radio and core network) to be delivered by **mid 2018** (to address a more urgent sub-set of commercial needs)
  - **Phase 2** to be delivered by **end 2019** (to address all identified use cases and requirements)
- Agreed that 5G standards must address 3 major use case families: **eMBB, mMTC, URLLC**
- Intention was to enable new industry sectors to benefit from 5G (e.g., **Automotive, Health, Energy, Manufacturing ...**)

## □ ...but 5G building blocks were already being defined in ETSI, e.g.:

- ETSI ISG Network Functions Virtualization (NFV): started work in 2013
- ETSI ISG Multi-Access Edge Computing (MEC): started work in 2014

# 3GPP specifying a complete 5G system



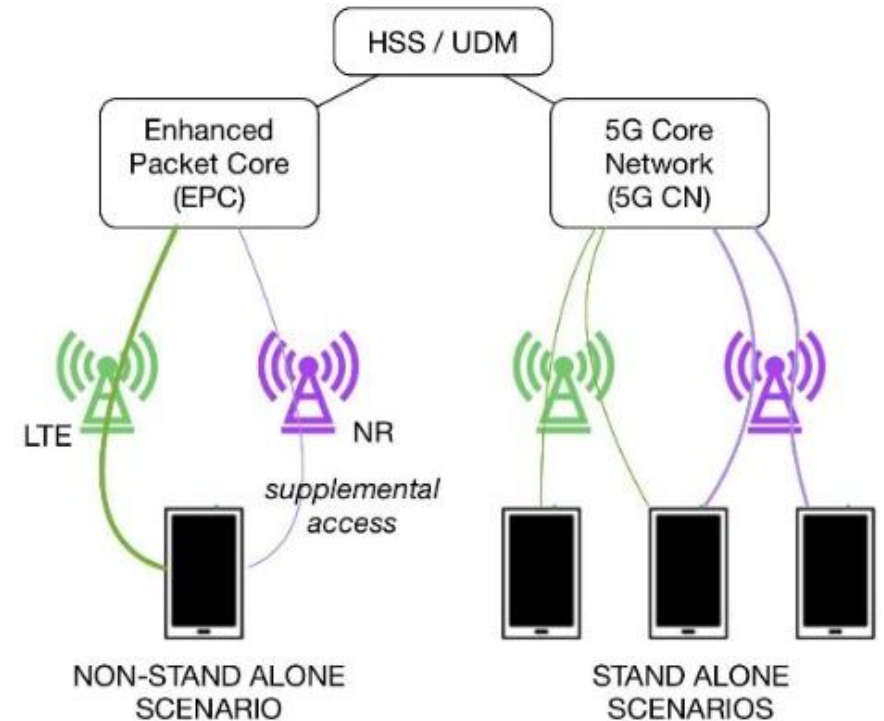
# Where it stands now?

## 5G NR (new radio) completed ahead of schedule

- The specification of 5G NR completed in December 2017, **6 months ahead of schedule**, at the request of those players that wished to deploy 5G early (in non-standalone mode)
- The remainder of 5G Phase 1 (including Next Generation Core Network) on schedule to be completed by June 2018 (enabling deployment in standalone mode)

## ...but how was that possible?

- 3GPP Working Groups saw a large increase in experts participation (more than 600 experts present in some working group meetings)
- During 2017, 3GPP processed 100 000 input contributions during 75 000 delegate/days of meetings
- This represents an **unprecedented** effort from the whole industry....



# Is it just the same old faces?

## □ 3GPP Members now include, for example:

- **Agricultural** machinery manufacturers (e.g., John Deere, Husqvana, etc)
- **Automotive** manufactures (e.g, Volkswagen, Volvo, Toyota)
- **Rail** (e.g., Internationale Union of Railways)
- **Factory Automation** companies (e.g., Siemens)
- **Energy Sector** (e.g., Legrand)
- **Environment** (e.g., Veolia)
- **Broadcasting Community** (e.g., EBU, BBC, TDF)
- **Satellite Community** (e.g., ESO, Inmarsat)
- **Aerospace** (e.g., Lockheed Martin, BAE)
- **Retail Sector** (e.g., Alibaba)
- **Social Media** (e.g., Facebook)
- **Advertising** (e.g., Google)

Full listing available here:

<http://www.3gpp.org/about-3gpp/membership>



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# So what next?



- ❑ While 5G Phase 1 (Rel15) completed, agree contents of 5G Phase 2 Rel16)
  - Studies already underway
  - Definitive plans and priorities to be set
- ❑ Continue to work with different industry sectors and encourage their active participation in standards setting
- ❑ Release 16 will be the beginning of 5G, not the end!



# For more Information:



info@3gpp.org



www.3gpp.org

Search for WIDs at <http://www.3gpp.org/specifications/work-plan> and [http://www.3gpp.org/ftp/Information/WORK\\_PLAN/](http://www.3gpp.org/ftp/Information/WORK_PLAN/) (See excel sheet)



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