



IEEE 802 EC 5G/IMT-2020 SC draft report

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5G SC report


Philosophy

- **Include and describe all options**
 - That are derivatives of the four requested cases
- **Expand cost/benefit for each**
 - In a prioritized manner
- **SC conclusion recommended**
 - Consensus preferred on preference
 - not required
 - Worst case straw poll preference
 - Recommend way forward for preference (s)

What are “costs and benefits”?

- **This is a cost-benefit analysis**
 - But without monetary cost, only relative costs
 - A quantitative pros vs cons
 - Strengths, Weaknesses, Opportunities and Threats
- **Brainstorm all costs and benefits**
 - E.g., resource cost, standards development cost, installation cost, operational cost, energy cost, etc.
 - Are there unexpected costs?
 - Are there unanticipated benefits?
- **Estimate value relative to a baseline**

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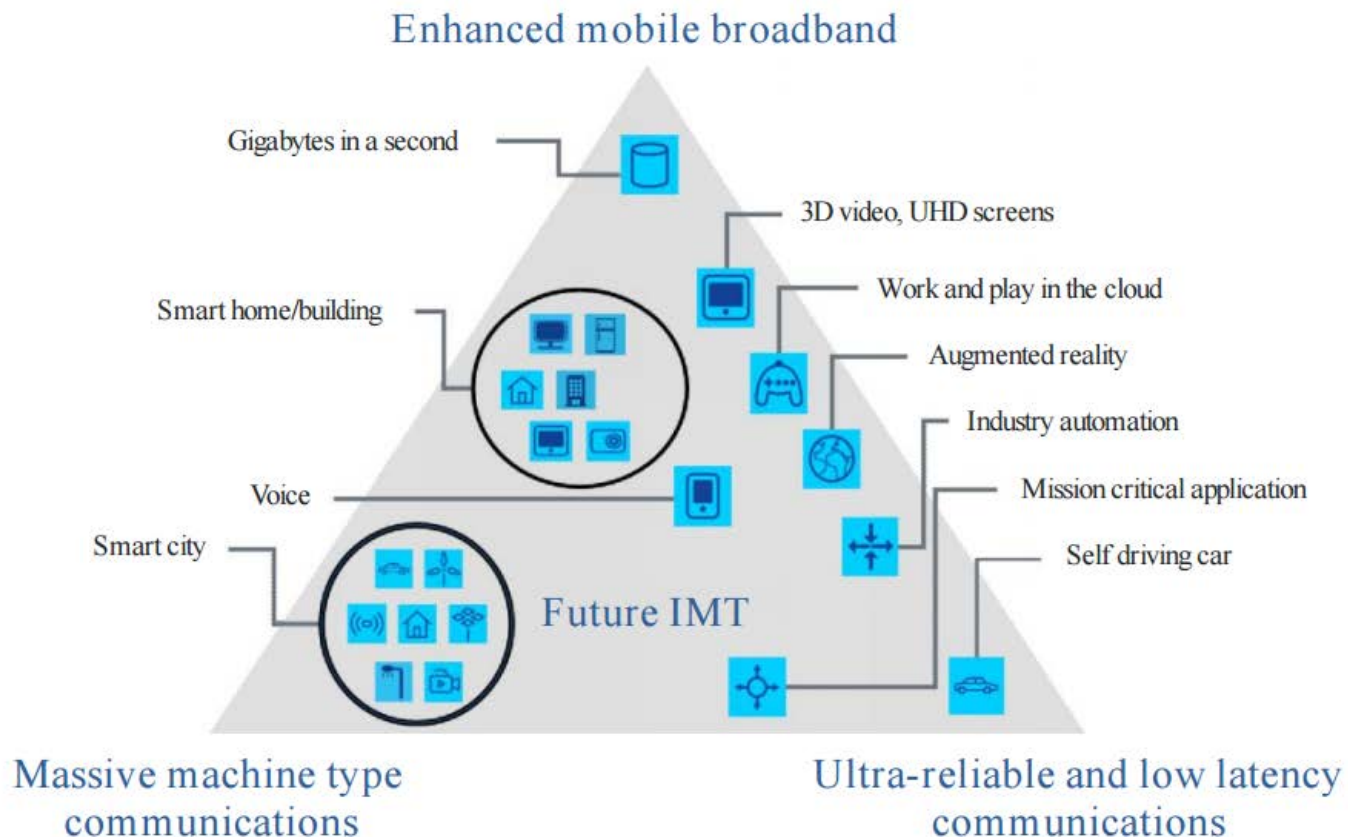
- **Introduction**
 - IEEE 802 5G related projects
 - **Options Considered**
 1. **IEEE 5G**
 - Description
 - Benefits
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 2. **IMT-2020 – single technology**
 - Description
 - Benefits
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 4. **IMT-2020 – external proposal**
 - Description
 - Benefits
 - Costs
 - **Conclusion**
- 
- **802.1**
 - P802.1CF – OmniRAN architecture
 - P802.1CM – TSN for Fronthaul
 - **802.3**
 - **802.11**
 - P802.11ax – high aggregate throughput. High density of users.
 - IEEE Std 802.11ad – high individual throughput, short range.
 - P802.11ay – next generation of 802.11ad.
 - P802.11ah - <1 GHz for IoT requirements
 - **802.15**
 - P802.15.3d
 - 100Gb/s THz project
 - P802.15.7 REVa, Optical Wireless Communications,
 - P802.15.4 family.
 - **802.16**
 - 802.16.1
 - **802.21**
 - P802.21.1

What is 5G?

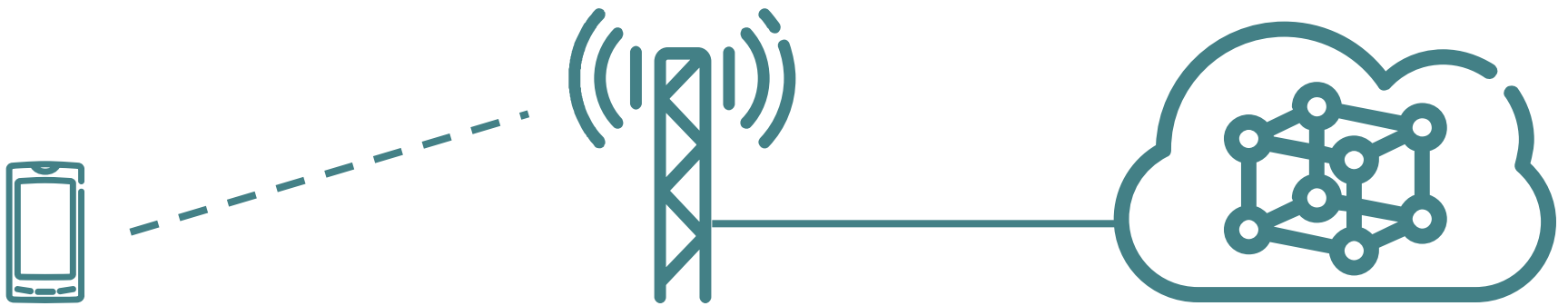
There are two contexts for 5G

- **IEEE 5G**
 - Some sort of description will be required
 - This may include use cases and requirements
- **IMT-2020**
 - **Usage scenarios (as defined by ITU-R M.2083)**
 - Enhanced Mobile Broadband (eMBB)
 - Ultra-reliable and low latency communications (UrLLC)
 - Massive machine type communications (mMTC)
 - **Capabilities (as defined by ITU-R M.2083)**
 - Peak Data rate, User experienced data rate, Latency, Mobility, Connection density, Energy efficiency, Spectrum efficiency, Area traffic capacity

IMT-2020 (per ITU-R M.2083 - Figure 2)



IEEE 5G architecture



... simplified

What are all the derivatives
of options?

1. IEEE 5G

- **Description**
 - Cost/benefit analysis does not include submission to IMT-2020
 - At least simplified architecture , but likely more
 - A combination of multiple IEEE standard technologies, profiled in a single standard
- a) **IEEE 802 wireless 5G**
 - i. **802.11 only**
 - a. P802.11ax – high aggregate throughput. High density of users.
 - b. P802.11ay , IEEE Std 802.11ad – high individual throughput, short range.
 - c. P802.11ah - <1 GHz for IoT requirements
 - d. 802.11p - wireless access in vehicular environments
 - ii. **802.15 only**
 - a. P802.15.3d
 - b. 100Gb/s THz project
 - c. P802.15.7 REVa, Optical Wireless Communications,
 - d. P802.15.4 family.
- b) **“All IEEE 802” 5G**
- c) **IEEE 802 5G plus others**
 - i. **3GPP 5G**
 - ii. **IETF**
- d) **“All IEEE” 5G**
 - i. **IEEE 802 and ComSoc projects**
- e) **IEEE 5G plus others**

2. IMT-2020 - single technology

- **Description**
 - Just radio interface of simplified architecture . Single or multiple singles...
 - IMT-2020 proposal by IEEE
- a) **eMBB(<6GHz)**
 - i. IEEE 802.11ax
 - ii. IEEE 802.11ac
 - iii. IEEE 802.11n
- b) **eMBB (>6GHz)**
 - i. IEEE 802.11ay
 - ii. IEEE 802.11aj
 - iii. IEEE 802.11ad
- c) **UrLLC– IEEE 802.11p**
- d) **mMTC – IEEE 802.11ah**
- e) **eMBB**
 - a) P802.15.3d
 - b) 100Gb/s THz project
 - c) P802.15.7 REVa, Optical Wireless Communications,
- f) **mMTC - P802.15.4 family.**

3. IMT-2020 – set of technologies

- **Description**
 - At least radio interface of simplified architecture , but likely more
 - A combination of multiple IEEE 802 standard technologies, profiled in a single standard
 - IMT-2020 proposal by IEEE
- a) **IEEE 802.11**
 - i. eMBB (<6GHz) – IEEE 802.11 ax,ac,n
 - ii. eMBB (>6GHz) – IEEE 802.11 ay,aj,ad
 - iii. UrLLC– IEEE 802.11p
 - iv. mMTC – IEEE 802.11ah
- b) **IEEE 802.11 with 802.1/3**
- c) **IEEE 802.15**
 - a) eMBB
 - a) P802.15.3d
 - b) 100Gb/s THz project
 - c) P802.15.7 REVa, Optical Wireless Communications,
 - b) mMTC - P802.15.4 family.
- d) **IEEE 802.11 with 3GPP 5G**
 - i. LWA
 - ii. LWIP
 - iii. eLWA
 - iv. New?

4. IMT-2020 - external proposal

- **Description**
 - Part of a complete architecture
 - A combination of IEEE 802 standard technologies with other technologies (e.g., 3GPP)
 - IMT-2020 proposal by external party (e.g., 3GPP)
- a) **IEEE 802.11 with 3GPP 5G**
 - i. LWA
 - ii. LWIP
 - iii. eLWA (Release 14)
 - iv. Release 16?

Next Steps

Contributions requested

- **IEEE 5G**
 - Use cases and Requirements
 - Endorse others, subset others, develop new
 - Describe architecture and/or technology

- **Derivative options**
 - Expand list
 - Prioritize list

- **Report content**
 - Indicate which option
 - Expand costs and benefits