Standards development for broadband wireless access

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Committed to connecting the world

**ITU Overview**

193 Member States
673 Sector Members
168 Associates
108 Academia

**ITU-T**
Telecommunication standardization - network and service aspects

**ITU-R**
Global radio spectrum management and radiocommunication standardization

**ITU-D**
Promote and assist the extension of ICTs to all the world’s inhabitants - narrowing the digital divide
All of today’s 3G and 4G mobile broadband systems are based on the ITU’s IMT standards.

ITU established the detailed specifications for IMT-2000 and the first “3G” deployments commenced around the year 2000.

In January 2012, ITU defined the next big leap forward in wireless cellular technology – IMT-Advanced – and this is now being progressively deployed worldwide.

The detailed investigation of the key elements of IMT-2020 is already well underway, once again using the highly successful partnership ITU-R has with the mobile broadband industry and the wide range of stakeholders in the 5G community.
Organizations involved in the development of IMT in ITU-R WP 5D

- 3GPP,
- 3GPP2,
- 4G Americas,
- 5G Infrastructure Public Private Partnership,
- 5G Innovation Centre,
- APT Wireless Group,
- Fifth Generation Mobile Communications Promotion Forum,
- ARIB,
- ATIS,
- CCSA,
- CDG,
- ETSI,
- EU METIS Project,
- GSMA,
- IEEE,
- IMT-2020 Promotion Group,
- ITRI,
- NGMN,
- NYU Wireless,
- TSDSI,
- TIA,
- TTA,
- TTC,
- UMTS Forum,
- WiMax Forum
- Wireless World Research Forum
- We welcome any other interested partners
ITU-R WP 5D is working together with these partners in the same open process to establish the criteria for IMT-2020.

Recommendation ITU-R M.2083-0, approved in September 2015, defines the framework and overall objectives of the future development of IMT for 2020 and beyond.

The ITU Radiocommunication Assembly held in Geneva, 26-30 October 2015, approved Resolutions ITU-R 65 and 56-2 that establish the roadmap for the development of 5G mobile and the term that will apply to it: “IMT-2020”.

IMT-2020 studies
Work on the next phases of IMT-2020 will ramp up in 2016, with the expected adoption in 2016/17 of the following deliverables:

- The Report on the Technical Performance Requirements that a technology would need to meet to satisfy “IMT-2020”
- The Report on Specific Submission Requirements of the candidate technology under assessment related to submissions, the evaluation criteria and submission templates
- Communication via Circular Letters and Liaisons will be a key element of the work.
Development of the requirements

• 5G requirements will be different because of the wide range of use cases creating distinctly different “wants” and potentially separate sets of requirement values
  • IoT, “Typical” Wireless Broadband, Video and other higher bandwidth applications (e.g., above 6 GHz)

• The ITU Circular Letter 5/LCCE/59 was issued on 22 March 2016:
  • invitation for submission of proposals for candidate radio interface technologies for the terrestrial components of the radio interface(s) for IMT-2020
  • invitation to participate in their subsequent evaluation

• Liaisons from WP 5D to External Organizations will solicit information seeking:
  • Understanding of the key characteristics to define the overall detailed requirement universe and subsequently the detailed information necessary to establish the actual parameter values
Proposal Submission and Evaluation

• It is anticipated that the timeframe for proposals will be focused on 2018 (window spans late 2017 to mid-2019).

• The evaluation by independent external evaluation groups and definition of the new radio interfaces to be included in “IMT-2020” will take place from 2018-2020.

• Coordination with entities external to ITU-R will continue to be a cornerstone in the work.
• It is expected that **the final specifications** for the “global core specification (GCS)” from the external organizations (the technology proponents) towards the work on Draft new Recommendation ITU-R M.[IMT-2020.SPECS] “Detailed specifications of the terrestrial radio interfaces of IMT-2020” would be received into WP 5D Meeting #34 (February 2020) at the latest.

• **Transposed specifications** (from the individual regional or national transposing organizations) would be received by June 2020 at the latest.

• The new Recommendation ITU-R M.[IMT-2020.SPECS] for the initial release of “IMT-2020” is expected to be approved by October 2020.
Detailed Timeline & Process For IMT-2020 in ITU-R


- **Background & Process**

- **Report Technology trends (M.2320)**

- **Report IMT feasibility above 6 GHz (M.2376)**

- **Recommendation Vision of IMT beyond 2020 (M.2083)**

- **Modifications of Resolutions 56/57**

- **Technical Performance Requirements**

- **Evaluation criteria & method**

- **Requirements, Evaluation Criteria, & Submission Templates**

- **Circular Letters & Addendum**

- **Proposals IMT-2020**

- **Evaluation**

- **Consensus building**

- **Outcome & Decision**

- **IMT-2020 Specifications**

**Note:** While not expected to change, details may be adjusted if warranted.
Enhanced Mobile Broadband

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

Smart City

Voice

Mission critical application, e.g. e-health

Industry automation

Smart Home/Building

Work and play in the cloud

Augmented reality

3D video, UHD screens

Gigabytes in a second
5G Capability Perspectives from the ITU-R IMT-2020 Vision Recommendation

Fig 3. Enhancement of key capabilities from IMT-Advanced to IMT-2020

Fig 4. The importance of key capabilities in different usage scenarios

The values in the Figure 3 above are targets for research and investigation for IMT-2020 and may be further developed in other ITU-R Recommendations, and may be revised in the light of future studies. Additional descriptions and further details for both Figures are in the IMT-2020 Vision Recommendation - Recommendation ITU-R M.2083
<table>
<thead>
<tr>
<th>Existing mobile allocation</th>
<th>No global mobile allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.25 GHz – 27.5 GHz</td>
<td>31.8 – 33.4 GHz</td>
</tr>
<tr>
<td>37 – 40.5 GHz</td>
<td>40.5 – 42.5 GHz</td>
</tr>
<tr>
<td>42.5 – 43.5 GHz</td>
<td></td>
</tr>
<tr>
<td>45.5 – 47 GHz</td>
<td>47 - 47.2 GHz</td>
</tr>
<tr>
<td>47.2 – 50.2 GHz</td>
<td></td>
</tr>
<tr>
<td>50.4 – 52.6 GHz</td>
<td></td>
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<tr>
<td>66 – 76 GHz</td>
<td></td>
</tr>
<tr>
<td>81 – 86 GHz</td>
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</table>
Related ITU-R studies

ITU-R – radio standards and spectrum
- **SG1** - spectrum management, licensing, short range devices, cognitive radio
- **SG3** – propagation studies – incl. studies > 6 GHz
- **SG4** – satellite systems
- **SG5** – machine-type comms, intelligent transport systems, sensor networks, **IMT**

ITU-T – fixed network aspects
- **SG13** - Future networks (& cloud)
- **SG20** - IoT and applications, smart cities
- Focus Group on IMT-2020 (FG IMT-2020)
Thank you!