5G/IMT-2020

ITU role in 5G and PPDR

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AGENDA

• ITU Role in 5G
  • What is ITU doing for 5G
  • ITU Vision for 5G/IMT-2020
  • ITU Time frame for selection of 5G technology
  • Spectrum for 5G
• PPDR and 5G
  • What is PPDR
  • How 5G will support PPDR
  • Spectrum for PPDR
• Summary and recommendations
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.

In 2015, ITU decided to name the next generation of mobile technology as IMT-2020

key elements of IMT-2020 are 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.
Enhanced Mobile Broadband

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

3D video, UHD screens

Work and play in the cloud

Augmented reality

Industry automation

Mission critical application, e.g. e-health

Self Driving Car

Gigabytes in a second

Smart Home/Building

Future IMT

Voice

Smart City

Future IMT
Enhancement of key capabilities from IMT-Advanced to IMT-2020

The importance of key capabilities in different usage scenarios

Recommendation ITU-R M.2083
ITU IMT-2020 Standardization Process

- Development Plan
- Market/Services View
- Technology/Research Kick Off
- Vision & Framework
- Name IMT-2020
- < 6 GHz Spectrum View
- > 6 GHz Technical View
- Process Optimization

2012-2015

- Spectrum/Band Arrangements (post WRC-15)
- Technical Performance Requirements
- Evaluation Criteria
- Invitation for Proposals
- Sharing Study Parameters (IMT-WRC-19)
- Sharing Studies (WRC-19)

2016-2017

- Proposals
- Evaluation
- Consensus Building
- CPM Report (IMT-WRC-19)
- Sharing Study Reports (WRC-19)

2018-2019

- Spectrum/Band Arrangements (WRC-19 related)
- Decision & Radio Framework
- Detailed IMT-2020 Radio Interface Specifications
- Future Enhancement/Update Plan & Process

2019-2020

Setting the stage for the future: vision, spectrum, and technology views

Defining the Technolog(y)(ies)
Detailed Timeline & Process For IMT-2020 in ITU-R

Note: While not expected to change, details may be adjusted if warranted.
## New spectrum: Bands under study for WRC-19

<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>
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<td>42.5 – 43.5 GHz</td>
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<tr>
<td>45.5 – 47 GHz</td>
<td>47 - 47.2 GHz</td>
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<tr>
<td>47.2 – 50.2 GHz</td>
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<td>50.4 – 52.6 GHz</td>
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<td>66 – 76 GHz</td>
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<tr>
<td>81 – 86 GHz</td>
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</table>
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“PPDR” IN ITU DEFINITION
INCLUDES BOTH “PP” & “DR” COMPONENTS

- **Public Protection**: Maintenance of law and order, protection of life and property and emergency situations. Same meaning as National Security and Public Safety.
- **Disaster Relief**: Serious disruption of the functioning of society, posing a significant widespread threat to human life, health, property or the environment.
MISSION CRITICAL PPDR COMMUNICATIONS

MISSION CRITICAL BROADBAND

DEDICATED LTE/5G NETWORK
- Mission Critical Geographic Coverage
- Dedicated N/W – Resilience
- Dedicated Spectrum - Determinism
- Mission Critical QoS Managed including Preemption

CARRIER LTE/5G NETWORK
- Commercially Driven Population Coverage
- Shared N/W – Commercial Engineering Grade
- Shared Spectrum
- Commercial QoS Policy

LMR 4G/5G NETWORK
- Mission Critical Geographic Coverage
- Dedicated N/W – Resilience
- Dedicated Spectrum (Determinism)
- Mission Critical QoS

ENTERPRISE SERVICES BROADBAND

MISSION CRITICAL VOICE/DATA

COVERAGE
PPDR IS BIG DATA
HOW TO CONVERT THAT BIG DATA INTO INTELLIGENCE

Intuitive, Context-Aware User Experience
Intelligent Recommendations, Analytics, Correlation
Mobilize Intelligence, Anywhere, Everywhere Availability

Collaboration | Situational Awareness | Inter-Agency Data Sharing | Geospatial Visualization

Descriptive Analytics | Digital Content Management | Predictive Patrol | Video Synopsis | Radio Integration | Radio Messaging Service
Social Media Monitoring | Natural Language Search | Mobile Video Streaming | Threat Detection & Alerting | Link Analysis | Facial/Pattern Recognition

Data Collection / Data Transformation

Internet of Things | Social Media | Private, Public Video | Government Records | Public Web | Court Records | Emerg Calls Incidents | Municipal Departments | Crime Records
CONNECTING THE PERSON

- 5G-LTE
- Context + Media
- 5G
- Context + Voice
- LMR
- HEADS UP DISPLAY
- IMAGING
- WEAPON
- LOCATION
- SENSOR DRONE
- BIO MONITOR
- HUMAN INTERACTION
- WIRELESS CHARGING
- REPOSITORY
Revised Resolution 646 adopted by ITU WRC-2015 recognized 694-894 MHz (700-800) as the globally harmonized frequency range for broadband PPDR.

**RESOLUTION 646 (Rev. WRC-15) GLOBAL PPDR SPECTRUM**

694-894 is the global harmonized frequency range for Public Safety Broadband. This includes:

- 700MHz LTE bands (APT Band 28, US Band 14 & R1 Band 68)
- 800 MHz LTE bands (EU Band 20 and AP Band 26)

- **Resolution 646 Revised by WRC-15**
- **ITU-R Technical Studies**
- **Report M.2368 (UPDATED FROM 2033)**
- **Rec. M.2015 Being UPDATED**
- **Rec. M.2009**
PPDR 4G/5G spectrum Bands

38+ countries, >2.6 Billion population: dedicated B_PPDR spectrum in 700/800MHz
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In Summary

• ITU is working on 5G standards and the final 5G technology will be selected by 2020
  – ITU vision for 5G is based on three pillars – massive broadband, IOT/MTC and low latency applications such as PPDR
  – 5G will use existing bands (700, 1.4, ...) and these will be supplemented by higher bands to be considered by WRC-19 (above 24 GHz)

• WRC-19 will decide in new spectrum for 5G/IMT-2020

• 5G / IMT-2020 will support PPDR
  – PPDR agencies around the world now see data just as critical as voice
  – Resilience – 5G networks will provide ultra reliable, low latency with high mobility designed to meet high demands of PPDR agencies

• 700 MHz or 800 MHz are already harmonized for 4G/5G PPDR by WRC-15.
Spectrum saves lives
Harmonisation saves Public money.

THANK YOU

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