ITUEvents

ITU Regional Seminar 5G Implementation in Europe and CIS

Strategies and Policies Enabling New Growth Opportunities

3-5 July 2018
Budapest, Hungary

5G

HOSTED BY

NMHH
National Media and Infocommunications
Authority · Hungary

NATIONAL STRATEGIES FOR
5G DEPLOYMENT

ENABLING
ENVIRONMENT

5G PILOT
IMPLEMENTATION

NEW BUSINESS
MODELS

DIGITAL
DIVIDEND

SPECTRUM
MANAGEMENT

ITU

IMT-2000, IMT-Advanced & IMT-2020

- All of today's 3G and 4G mobile broadband systems are based on the ITU's IMT standards.

- IMT provides the global platform on which to build the next generations of mobile broadband connectivity.

- 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 with 4G 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.

Evolution of mobile networks

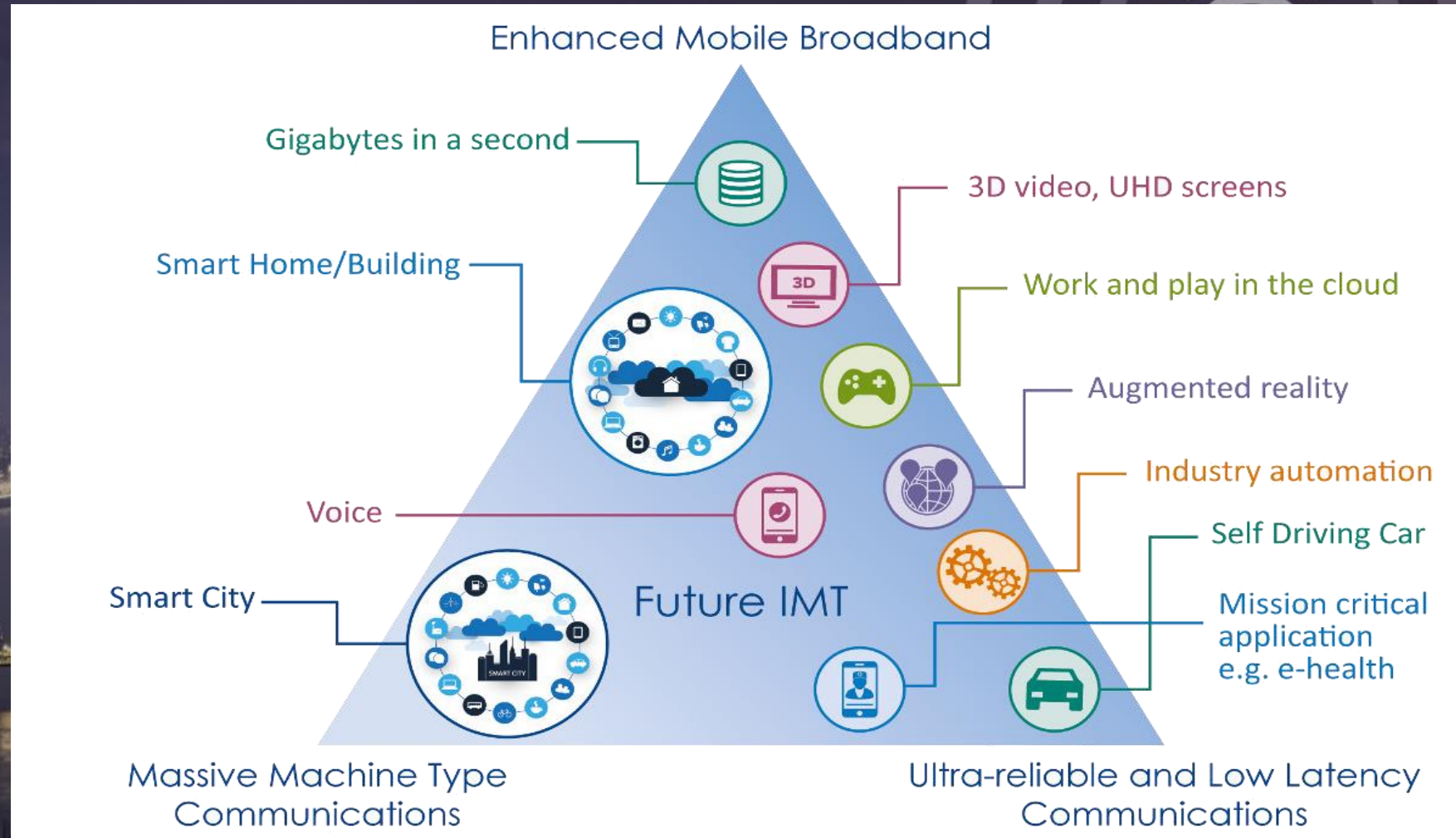|	1G	2G	3G	4G	5G
Approximate deployment date	1980s	1990s	2000s	2010s	2020s
Theoretical download speed	2kbit/s	384kbit/s	56Mbit/s	1Gbit/s	10Gbit/s
Latency	N/A	629 ms	212 ms	60-98 ms	< 1 ms

Source: GSMA, OpenSignal, operator press releases, ITU

Role of IMT 2020 (5G) and beyond

- ITU-R Recommendation M.2083-0: IMT should contribute to
  - ✓ Wireless infrastructure to connect the world: Broadband connectivity will acquire the same level of importance as access to electricity. IMT will continue to play an important role in this context as it will act as one of the key pillars to enable mobile service delivery and information exchanges. In the future, private and professional users will be provided with a wide variety of applications and services, ranging from infotainment services to new industrial and professional applications.
  - ✓ New ICT market: The development of future IMT systems is expected to promote the emergence of an integrated ICT industry which will constitute a driver for economies around the globe. Some possible areas include: the accumulation, aggregation and analysis of big data; delivering customized networking services for enterprise and social network groups on wireless networks.
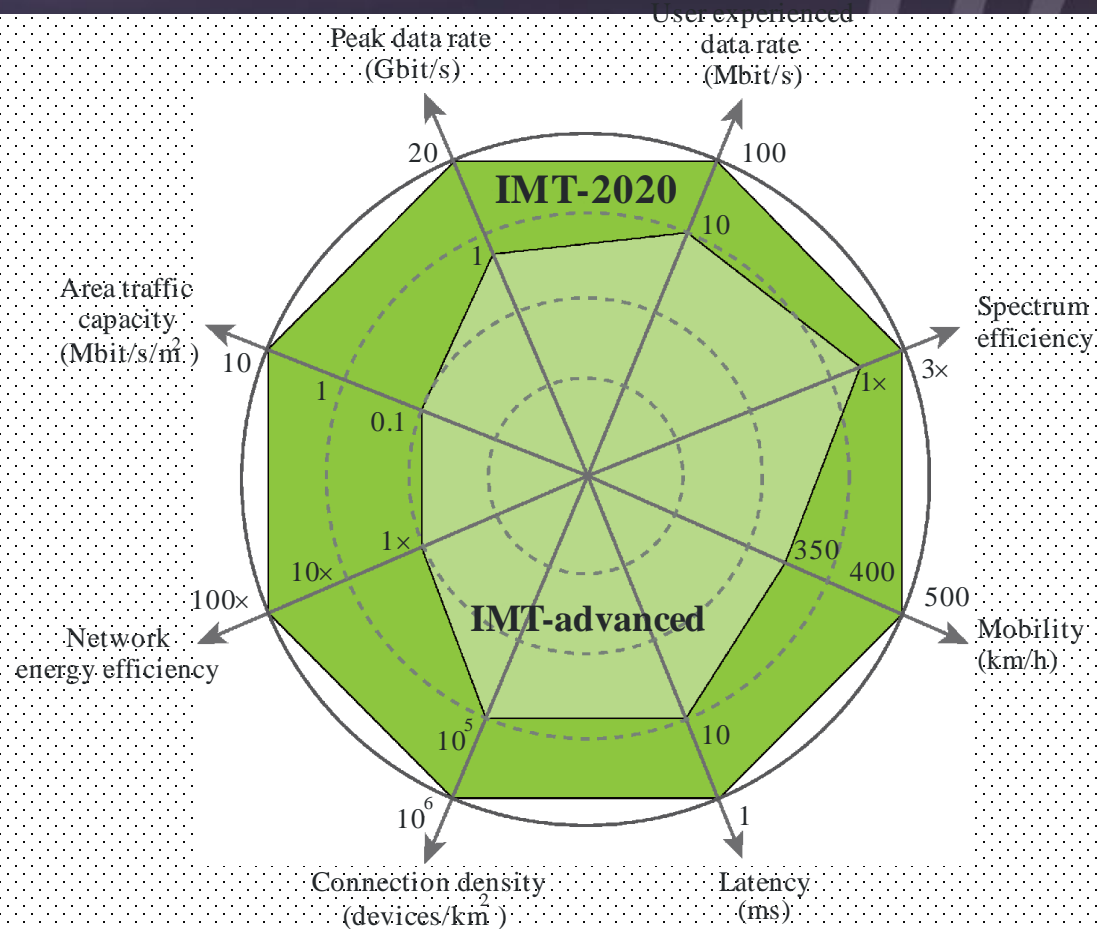
Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Smart Home/Building

Work and play in the cloud

Augmented reality

Voice

Industry automation

Smart City

Self Driving Car

Future IMT

Mission critical application e.g. e-health

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

IMT Vision for 2020 and beyond from Recommendation ITU-R M.2083, 2015

Detailed timeline and process for ITU-R IMT-2020
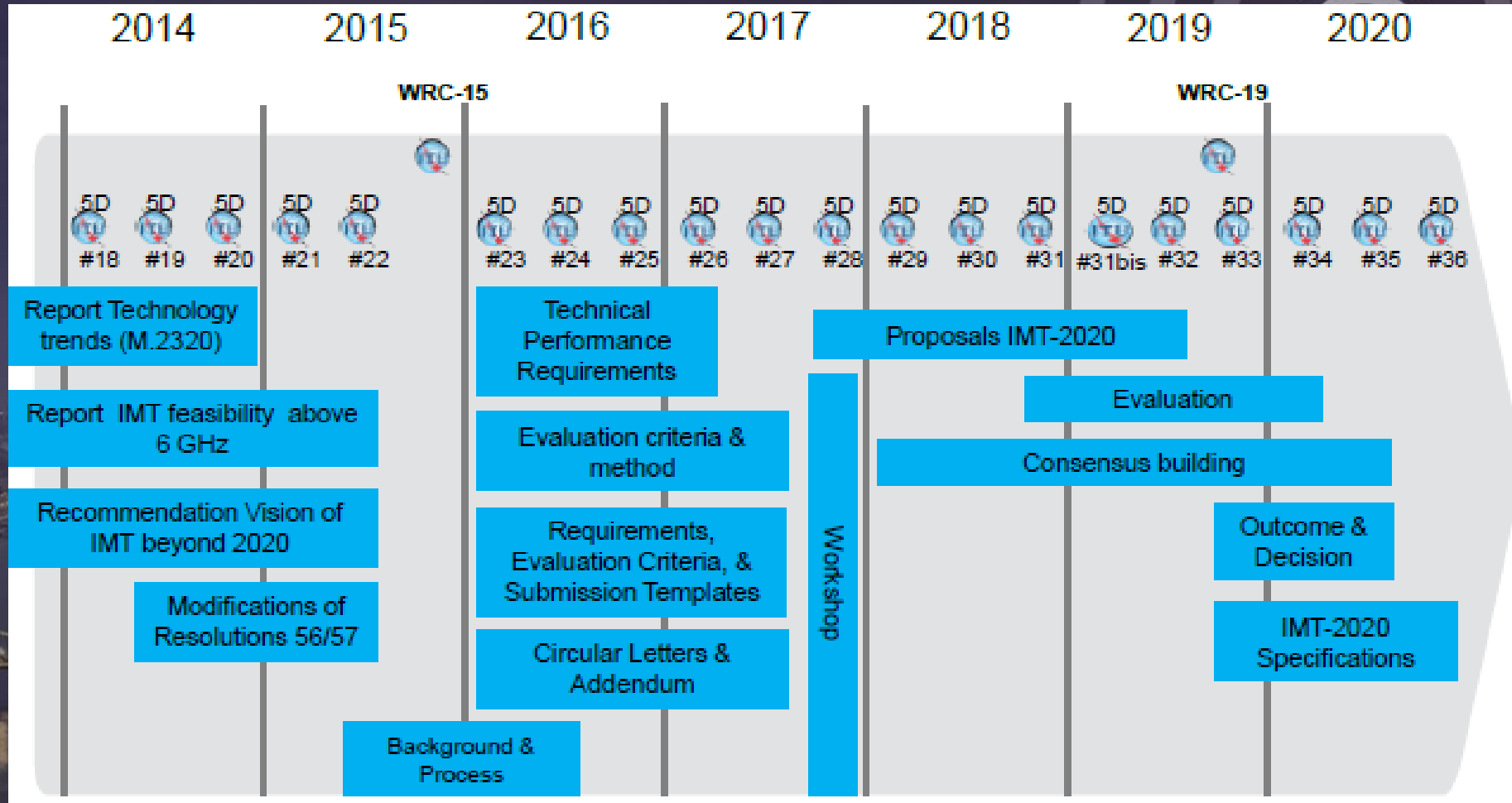
IMT-2020 Standardization Process

❖ Development Plan
❖ Market/Services View
❖ Technology/
   Research Kick Off
❖ Vision & Framework
❖ Name IMT-2020
❖ < 6 GHz Spectrum
   View
❖ > 6 GHz Technical
   View
❖ Process Optimization
	❖ Spectrum/Band
	   Arrangements
	   (post WRC-15)
	❖ Technical
	   Performance
	   Requirements
	❖ Evaluation Criteria
	❖ Invitation for Proposals
	❖ Sharing Study
	   Parameters (IMT-
	   WRC-19)
	❖ Sharing Studies
	   (WRC-19)
		❖ Proposals
		❖ Evaluation
		❖ Consensus
		   Building
		❖ CPM Report (IMT-
		   WRC-19)
		❖ Sharing Study Reports
		   (WRC-19)
			❖ Spectrum/Band
			   Arrangements (WRC-
			   19 related)
			❖ Decision & Radio
			   Framework
			❖ Detailed IMT-2020
			   Radio Interface
			   Specifications
			❖ Future Enhancement/
			   Update Plan &
			   Process

2012-2015	**2016-2017**	**2018-2019**	**2019-2020**

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

Defining the
technologies

Some challenges in rolling out 5G

➢ Small cell deployment
  ➢ Local permitting and planning process
  ➢ Lengthy engagement and procurement exercises
  ➢ High fees and charges to access street furniture (and the access itself)
  ➢ EMF
➢ Fiber backhaul
➢ Spectrum

After WRC-15 spectrum for IMT

Band (MHz)	Footnotes identifying the band for IMT			Bandwidth
	Region 1 or parts thereof	Region 2 or parts thereof	Region 3 or parts thereof	
450-470		5.286AA		20
470-698	-	5.295, 5.308A	5.296A	228
694/698-960	5.317A	5.317A	5.313A, 5.317A	262
1 427-1 518	5.341A, 5.346	5.341B	5.341C, 5.346A	91
1 710-2 025		5.384A, 5.388		315
2 110-2 200		5.388		90
2 300-2 400		5.384A		100
2 500-2 690		5.384A		190
3 300-3 400	5.429B	5.429D	5.429F	100
3 400-3 600	5.430A	5.431B	5.432A, 5.432B, 5.433A	200
3 600-3 700	-	5.434	-	100
4 800-4 990	-	5.441A	5.441B	190
Total Bandwidth	1,886 (Regional allocations vary and totals can be different for a specific region)			

New spectrum bands under study for WRC-19

Existing mobile allocation	No global mobile allocation
24.25 – 27.5 GHz	31.8 – 33.4 GHz
37 – 40.5 GHz	40.5 – 42.5 GHz
42.5 – 43.5 GHz	
45.5 – 47 GHz	47 – 47.2 GHz
47.2 – 50.2 GHz	
50.4 GHz – 52.6 GHz	
66 – 76 GHz	
81 – 86 GHz	

5G Market Readiness

- China, Japan, South Korea and the US are commonly regarded as the leading countries in 5G development and implementation.

- The economic power, size of the market, and investment in mobile technologies over the years have enabled these countries to stay ahead of others in the 5G race.

- policy makers may consider undertaking their own economic assessment of the commercial viability and economic impact of 5G networks.

- Nordics aim to break away (slightly) to do their own 5G thing. The Prime Ministers of Sweden, Norway, Denmark, Iceland and Finland have agreed a 'Letter of Intent' for 5G leadership to pursue a world-leading 5G program to develop and digitalize all sectors of society and to create "a common Nordic 5G space". https://www.ericsson.com/en/news/2018/5/nordic-prime-ministers-prioritize-5g

Socio economic implications of 5G

- Despite the potential economic benefits that can be realised from 5G, the industry is sceptical about the commercial case for investment in 5G.

- Given the significant amount of investment that will be required to be made by operators in deploying 5G networks there is scepticism among some European operators over the hype that 5G has caused and over how they are supposed to make money from it.

- These concerns have been supported by the 5G Infrastructure Association (5GIA), a European Union (EU)-backed body, and by senior telecoms executives which have cautioned the market against premature 5G launch announcements*.

*https://www.techradar.com/news/eu-backed-groups-warns-about-5g-claims

What can 5G do for developing countries

- Directly increasing GDP

- Greater economic growth or % gain in GDP

- Reducing transaction costs

- Better, faster, more informed decision-making

- Boosting labour productivity

- Resulting in a net gain in jobs

5G in the developing world

- It will undoubtedly happen, and quite rapidly once it starts.

- 5G issue part is of a much bigger issue – connecting the unconnected, and bridging the digital divide.

- Coverage versus speed trade-off reflects a larger debate about social objectives versus 'cherry-picking' profitable areas.

- Need a credible, viable commercial business case going forward for 5G deployments to happen in most optimal way.

Summary

- The scope of IMT-2020 is much broader than previous generations of mobile broadband communication systems.

- Use cases foreseen include enhancement of the traditional mobile broadband scenarios as well as ultra-reliable and low latency communications and massive machine-type communications.

- The ITU's work in developing the specifications for IMT-2020, in close collaboration with the whole gamut of 5G stakeholders, is now well underway, along with the associated spectrum management and spectrum identification aspects.

- IMT-2020 will be a cornerstone for all of the activities related to attaining the goals in the 2030 Agenda for Sustainable Development.

ITU-D SG related Experts' Knowledge Exchange

- **Green Sessions**: Explore new ways of building synergies between the work that is taking place in the regions and the activities on the same topics that are under way in the ITU Telecommunication Development Sector's two study groups.

- Looking a specific emerging topics and themes that are of interest to the members, which include Administrations, regulators, private sector members, research institutes and universities.

- Regional seminars: great benefit, and would provide insights to the global community that convene around the ITU-D study groups; useful lessons learned

- A new concept and approach here in Budapest this week where we together will try to bring your rich case studies, insights, guidelines, and findings to the work of the ITU-D study groups

- Two of the ITU-D Study Group 1 Vice-Chairmen present here this week, Mr Krisztián Stefanics, National Media and Infocommunications Authority (Hungary) and Mr Vadym Kaptur, ONAT (Ukraine); also ITU Focal Point on some Questions, István Bozsóki

- At the end of each day, we will reflect on the presentations and discussions that took place in the light of two specific study Questions. Around 20 minutes to do this to then try to agree on some main points and takeaways. At the end of the workshop a bit more time to discuss and develop these suggestions further and include them in the report of the meeting. Asking our host of this event, Hungary, to consider submitting a contribution with this report to the next ITU-D SG1 and SG2 meetings (17 September to 12 October 2018).

THANK YOU

Istvan Bozsoki

**Head of Spectrum Management
and Broadcasting Division
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