

IMT-2020 Work in ITU-R Working Party 5D (An Update on 2015 & 2016 Activities)

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5G Related Aspects in ITU-R Working Party 5D

(Responsible group for terrestrial IMT in ITU-R)


- **WP 5D initiated detailed work in 2012 towards the next generation IMT for the year 2020 and beyond (i.e., “5G”). Significant milestone deliverables in 2015**
 - Agreement on a workplan through year 2020 to address constituent parts of “5G” as parts of “IMT for 2020”
 - Foundation work now such as technology perspectives and future vision and the more detailed defining information in near future
 - Supported the need for additional spectrum for the future success of IMT
 - The remaining documents in the foundation set of deliverables will complete in 2015
 - *Released a detailed time line and action plan for IMT for 2020 to energize and focus the industry “5G” activities through year 2020*
- **The work on the next phases will ramp up in 2016 and early aspects have been initiated towards the radio interface technology or sets of radio interface technologies**
 - The Report on the Technical Performance Requirements expected of a technology to satisfy “IMT-2020”
 - The Report on Evaluation Criteria and Evaluation Methods for “IMT-2020” technologies
 - The Report on Specific Requirements of the candidate technology related to submissions, the evaluation criteria and submission templates
 - For efficiency, the process and deliverable formats effectively utilized for IMT-Advanced will be leveraged
- **WP 5D also addressed for WRC-15 the future spectrum needs (per the terms of reference of WRC-15 for AI 1.1 & 1.2)**
 - Development of Reports on future market for mobile broadband
 - Development of anticipated spectrum requirements
 - Suggested potential frequency ranges for future use
 - Perspectives on future technology trends aimed at 2020 and beyond to assist national and regional preparation:

"IMT-2020" Standardization Process



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- ❖ Development Plan
 - ❖ Market/Services View
 - ❖ Technology/ Research Kick Off
 - ❖ Vision - IMT for 2020
 - ❖ Name
 - ❖ < 6 GHz Spectrum View
 - ❖ Process Optimization

2012-2015

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- ❖ 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
- ❖ Decision & Radio Framework
- ❖ Detailed IMT-2020 Radio Specifications
- ❖ Future Enhancement/ Update Plan & Process

2019-2020

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

Defining the
technology

2015 SNAPSHOT

WP 5D

2012-2015 ITU-R STUDY PERIOD

- This Study Period concluded in 2015 with two major activities:
 - Radiocommunications Assembly 2015 (26-30 October)
 - World Radio Conference 2015 (2-27 November)
- As part of this Study Period, Working Party completed in 2015 all the planned 2015 underpinning deliverables for IMT-2020
- These were successfully approved by the ITU-R Member States either
 - at the Study Group 5 Meeting in July 2015,
 - at the Radiocommunications Assembly 2015,
 - or by Correspondence
- These deliverable as well as those completed earlier in the Study Period form the foundation for the initiation of terrestrial IMT-2020

2015 ITU-R IMT-2020 Related Deliverables



- **Revision of Resolution ITU R 56-1** - *Naming for International Mobile Telecommunications (added the new name of IMT-2020)*
- **New Resolution ITU-R 65** - *Principles for the process of future development of IMT for 2020 and beyond*
- **New Resolution ITU-R 66** - *Studies related to wireless systems and applications for the development of the Internet of Things*
- **Revision of Resolution ITU-R 50-2** - *Role of the Radiocommunication Sector in the ongoing development of IMT*
- **Recommendation ITU-R M.2083** - *Framework and overall objectives of the future development of IMT for 2020 and beyond (i.e., the Vision Document)*
- **Report ITU-R M.2370** - *IMT Traffic estimates beyond year 2020*
- **Report ITU-R M.2373** - *Interactive unicast and multicast audio-visual capabilities and applications provided over terrestrial IMT systems*
- **Report ITU-R M.2376** - *The technical feasibility of IMT in the bands above 6 GHz*
- **Report ITU-R M.2375** - *Architecture and topology of IMT networks*

Bands below 6 GHz identified by WRC-15



- **UHF band: 470 – 694/698 MHz**
 - All or part of this band is identified for IMT in USA, Canada, Mexico, Bangladesh, New Zealand and nine other countries
 - Any decision for EMEA (ITU Region 1) has been postponed to 2023
- **L-Band: 1427 – 1518 MHz**
 - 80MHz of spectrum for supplementary downlink
 - EU has already harmonised 1452-1492MHz band
- **3300 – 3400 MHz: Identified for IMT**
 - In many African countries, 6 countries in the Americas, India, Pakistan and 3 others in AP
 - An ecosystem for product is likely to develop for this band, because of China
- **3400 – 3600 MHz –lower C-Band**
 - Full regional allocation and Identification for EMEA and the Americas (ITU Regions 1 and 2)
 - National allocation and Identification in Asia Pacific, including India, Australia and New Zealand
- **3600 – 3800 MHz –upper C-Band**
 - Only bottom half (3600-3700MHz), and only in USA, Canada, Columbia and Costa Rica
- **4800 – 4990 MHz**

Bands Above 6 GHz Towards WRC-19

Agenda Item 1.13



- The studies and decisions by WRC-19 are limited to the following bands, **all above 24GHz**:
- Already allocated to the Mobile Service in the Table of Allocations: 24.25-27.5 GHz, 37-40.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz
- Would require a new allocation to the Mobile Service in the Table of Allocations: 24.25-27.5 GHz, 31.8-33.4 GHz, 40.5-42.5 GHz and 47-47.2 GHz
- Not all of these bands and/or not complete bands will be identified for IMT by WRC-19
- A new ITU group TG5/1 has been established to study coexistence of 5G with existing uses of these bands
- *These availability of bands above 6GHz offering wide channel sizes are critically important to IMT-2020*
- Note: Even though not part of Agenda Item 1.13, some countries and regions are proceeding with consideration of other bands such as the 28 GHz band

2016 SNAPSHOT

**The Technology Focus for IMT-2020 is provided here.
Work is also proceeding many other areas including spectrum and
studies for a number of WRC-19 Agenda Items
where WP 5D has a leading role.**

WP 5D

2016-2019 ITU-R STUDY PERIOD



- ❖ **Working Party 5D continues in this new Study Period with its on-going internal structure of three major Working Groups:**
 - General Aspects
 - Spectrum Aspects
 - Technology Aspects
- ❖ **Working Party 5D held three meetings in 2016, following our usual practice:**
 - The 23rd meeting was held from 23 February – 2 March 2016 in Beijing.
 - The Report of this meeting is contained in [Document 5D/82](#).
 - The 24th meeting was held from 14-16 June 2016 in Geneva.
 - The Report of this meeting is contained in [Document 5D/234](#)
 - The 25th meeting was held from 5-13 October 2016 in Geneva.
 - The Report of this meeting is contained in [Document 5D/374](#)

2016 ITU-R IMT-2020

Completed Technology Related Deliverables



- **New Recommendation ITU-R M.[IMT.MODEL]** - *Modelling and simulation of IMT networks for use in sharing and compatibility studies*
- **Revision of Report ITU-R M.2291-0** - *The use of International Mobile Telecommunications (IMT) for broadband Public Protection and Disaster relief (PPDR) applications*
- **Release of Circular Letter 5/LCCE/59** - *The announcement of the formal process and the invitation for submission of proposals for candidate radio interface technologies for the terrestrial components of IMT-2020.*
- **Document IMT-2020/1 (IMT-2020 BACKGROUND)** – *Provides a general overview and background on IMT-2020 drawing upon information in many of the IMT-2020 detailed deliverables*
- **Document IMT-2020/2 (Submission, Evaluation Process And Consensus Building For IMT-2020)** – *Provided the framework for the IMT-2020 process in ITU-R*

IMT-2020 Technology Related Deliverables Initiated in 2016

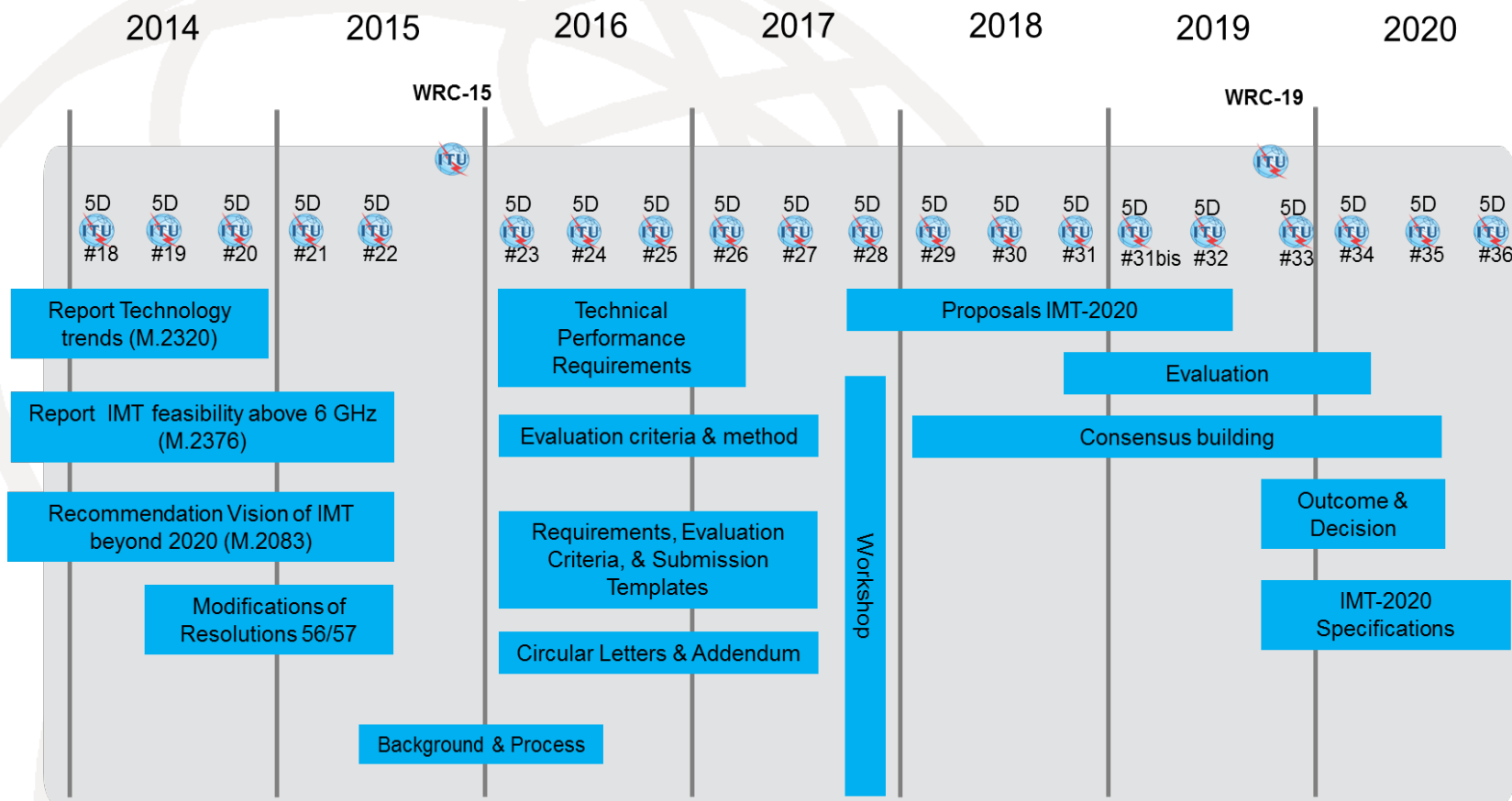


- **Draft new Report ITU-R M.[IMT-2020. TECH PERF REQ]** - *General Technical Performance Requirements expected of a technology to satisfy IMT-2020*
- **Draft new Report ITU-R M.[IMT-2020. EVAL]** - *Evaluation Criteria and Evaluation Methods for IMT-2020 technologies*
- **Draft new Report ITU-R M.[IMT-2020. SUBMISSION]** - *Specific Requirements of the candidate technology related to submissions, the evaluation criteria and submission templates.*

THE ON-GOING PROGRAM FOR IMT-2020 TECHNOLOGY

WP 5D Timeline for “IMT-2020” related to the Terrestrial Radio Interface Technology and Systems

Source Document 5/31 Attachment 1



Note: While not expected to change, details may be adjusted if warranted.

Note: Meeting #31bis – if needed focus meeting towards WRC-19 (non-Technology), Meeting #33 – focus meeting on Evaluation (Technology)

WP 5D deliverables initiated in 2016 to complete in 2017



Item	Proposed “IMT-2020” Related Deliverable	Aspect to be Addressed in Proposed Deliverable	Potential Work Start Timing	Potential Document Completion in WP 5D	IMT-Advanced Model Document
3	Draft new Report ITU-R M.[IMT-2020. TECH PERF REQ]	General Technical Performance Requirements expected of a technology to satisfy IMT-2020	Meeting #23 (February 2016)	Meeting #26 (February 2017)	Report ITU-R M.2134 “Requirements related to technical performance for IMT-Advanced radio interface(s)”
4	Draft new Report ITU-R M.[IMT-2020. EVAL]	Evaluation Criteria and Evaluation Methods for IMT-2020 technologies	Meeting #23 (February 2016)	Meeting #27 (June 2017)	Report ITU-R M.2135 “Guidelines for evaluation of radio interface technologies for IMT-Advanced”
5	Draft new Report ITU-R M.[IMT-2020. SUBMISSION]	Specific Requirements of the candidate technology related to submissions, the evaluation criteria and submission templates	Meeting #23 (February 2016)	Meeting #27 (June 2017)	Report ITU-R M.2133 “Requirements, evaluation criteria and submission templates for the development of IMT-Advanced”
6	Circular Letter IMT-2020 (on-going Addenda & updates as IMT-2020 progresses)	The official ITU-R announcement of the IMT-2020 process and the invitation for candidate technology submissions	Meeting #23 (February 2016)	Meeting #27 (June 2017)	Circular Letter 5/LCCE/2 and Addenda “Invitation for submission of proposals for candidate radio interface technologies for the terrestrial components of the radio interface(s) for IMT-Advanced and invitation to participate in their subsequent evaluation”

WP 5D deliverables initiated in 2017 to complete in 2019



Item	Proposed “IMT-2020” Related Deliverable	Aspect to be Addressed in Proposed Deliverable	Potential Work Start Timing	Potential Document Completion in WP 5D	IMT-Advanced Model Document
7	Doc. IMT-2020/YYY Input Submissions Summary	Capturing in ITU-R documentation the inputs documents and the initial view of suitability as a valid submission	Meeting #28 (October 2017)	Meeting #32 (June 2019)	For example, Documents IMT-ADV/4 thru IMT-ADV/9 <i>“Acknowledgement of candidate submission fromunder step 3 of the IMT-Advanced process (..... technology)”</i>

WP 5D deliverables initiated in 2018 to complete in 2020



Item	Proposed “IMT-2020” Related Deliverable	Aspect to be Addressed in Proposed Deliverable	Potential Work Start Timing	Potential Document Completion in WP 5D	IMT-Advanced Model Document
8	Doc. IMT-2020/ZZZ Evaluation Reports Summary	As the evaluation of each candidate technology proceeds the results of each evaluation of each technology by the different evaluation groups must be documented and analyzed by WP 5D towards the final evaluation assessment	Meeting #31 (October 2018)	Meeting #34 (February 2020)	For example, Documents IMT-ADV/10 thru IMT-ADV/23 <i>“Evaluation IMT-Advanced candidate technology submissions in documents IMT-ADV/xyz by XYZ Evaluation Group”</i>

WP 5D deliverables initiated in 2019 to complete in 2020



Item	Proposed “IMT-2020” Related Deliverable	Aspect to be Addressed in Proposed Deliverable	Potential Work Start Timing	Potential Document Completion in WP 5D	IMT-Advanced Model Document
9	Draft new Report ITU-R M.[IMT-2020. OUTCOME]	The outcome of the evaluation and assessment and the statement on those candidate technologies suitable to move to the specification phase in ITU-R	Meeting #33 (October 2019)	Meeting #35 (June 2020)	Report ITU-R M.2198 <i>“The outcome of the evaluation, consensus building and decision of the IMT-Advanced process (Steps 4 to 7), including characteristics of IMT-Advanced radio interface”</i>
10	Draft new Recommendation ITU-R M.[IMT-2020.SPECS]	The detailed specification of each of IMT-2020 technology	Meeting #33 (October 2019)	Meeting #36 (October 2020)	Recommendation ITU-R M.2012 <i>“Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)”</i>

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Thank You

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ADDITIONAL MATERIAL FOR INFORMATION

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WP 5D Home Page

<http://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/Pages/default.aspx>