Requirements, Evaluation Criteria and Submission Templates

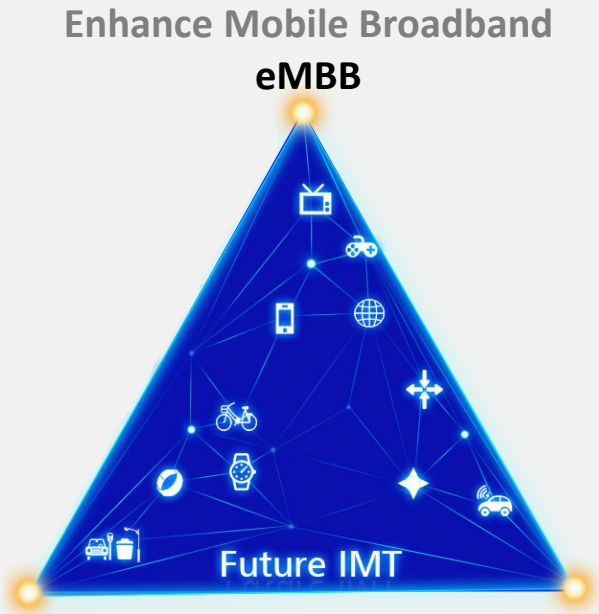
for the development of IMT-2020

"Report ITU-R M.[IMT-2020.SUBMISSION]"

Workshop on IMT-2020 terrestrial radio interfaces (October 4, 2017)

WU Yong

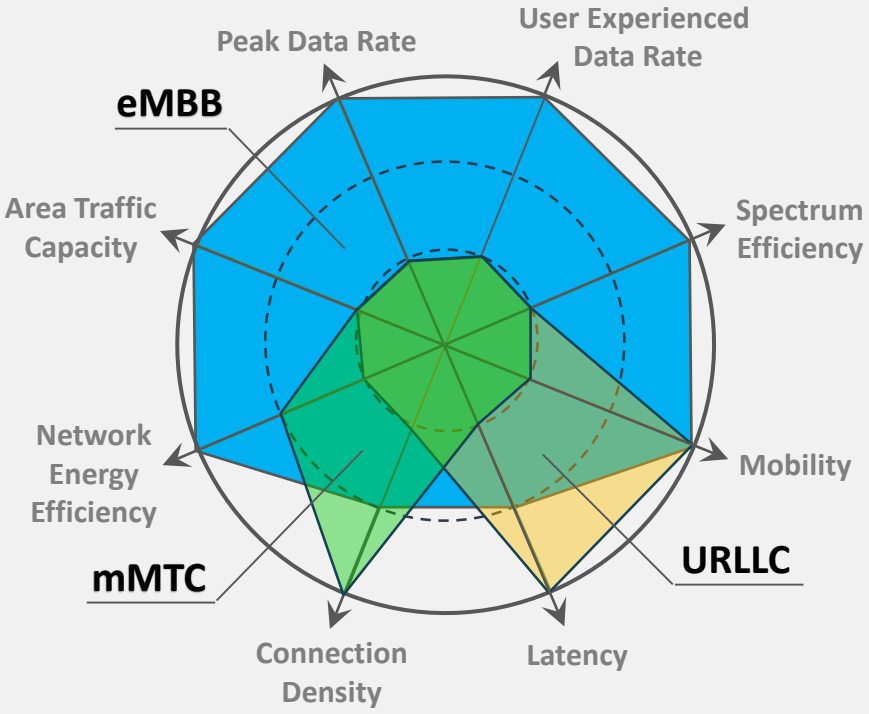
Background



IMT-2020 usage scenario

Diverse services

IMT-2020 Vision
Rec. ITU-R M.2083

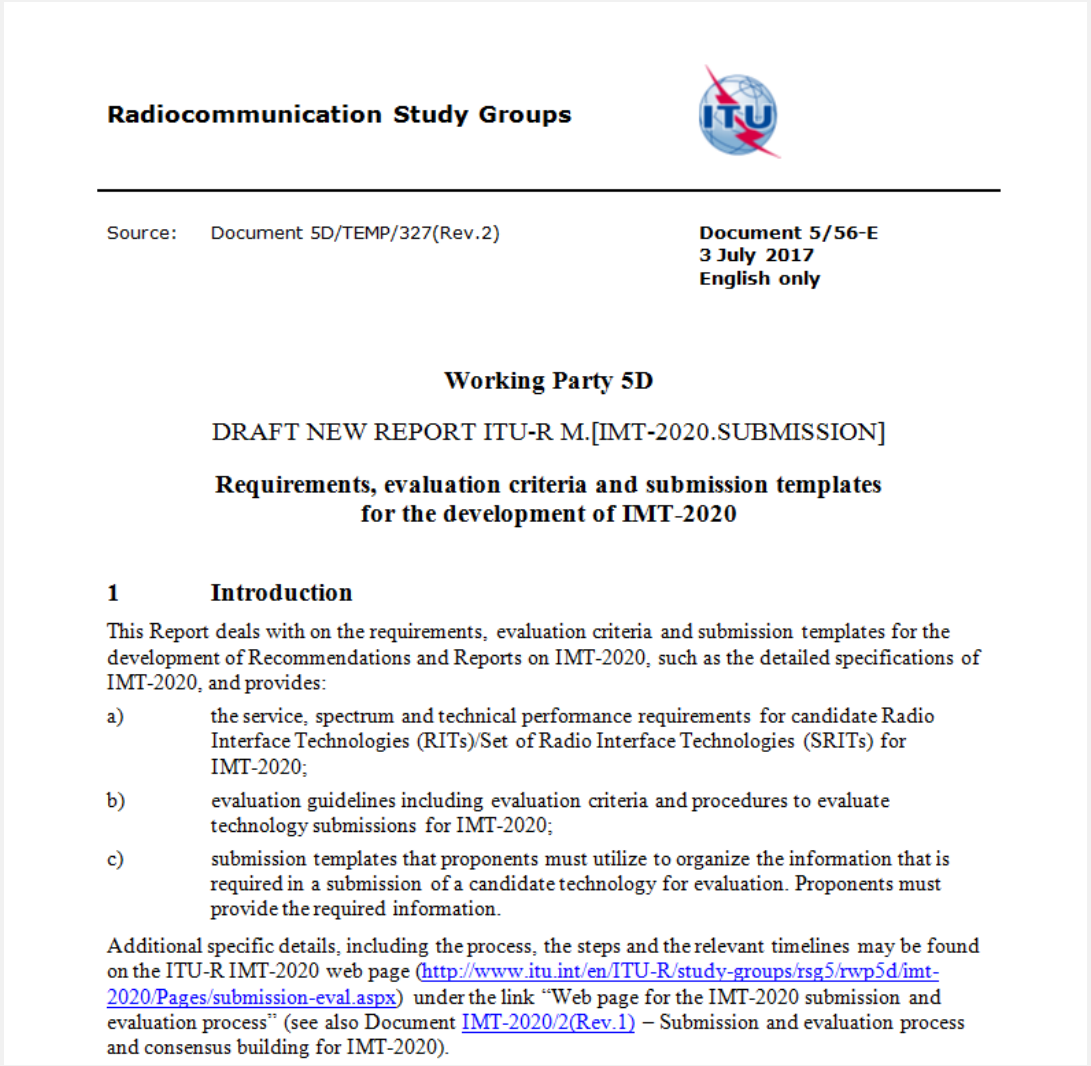


IMT-2020 Key capabilities

Diverse requirements

Transforming IMT-2020 Vision to Requirements, Evaluation criteria, and submission templates

Introduction



Radiocommunication Study Groups

Source: Document 5D/TEMP/327(Rev.2)

Document 5/56-E
3 July 2017
English only

Working Party 5D

DRAFT NEW REPORT ITU-R M.[IMT-2020.SUBMISSION]

Requirements, evaluation criteria and submission templates for the development of IMT-2020

1 Introduction

This Report deals with on the requirements, evaluation criteria and submission templates for the development of Recommendations and Reports on IMT-2020, such as the detailed specifications of IMT-2020, and provides:

a) the service, spectrum and technical performance requirements for candidate Radio Interface Technologies (RITs)/Set of Radio Interface Technologies (SRITs) for IMT-2020;

b) evaluation guidelines including evaluation criteria and procedures to evaluate technology submissions for IMT-2020;

c) submission templates that proponents must utilize to organize the information that is required in a submission of a candidate technology for evaluation. Proponents must provide the required information.

Additional specific details, including the process, the steps and the relevant timelines may be found on the ITU-R IMT-2020 web page (http://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/submission-eval.aspx) under the link "Web page for the IMT-2020 submission and evaluation process" (see also Document IMT-2020/2(Rev.1) – Submission and evaluation process and consensus building for IMT-2020).

Draft New Report M. [IMT-2020.SUBMISSION] –

Requirements, Evaluation criteria, and submission templates for the development of IMT-2020

This Report provides

- **IMT-2020 minimum requirements** (Section 3 of this Report)
  - Service, Spectrum, Technical performance
  - The compliance of the candidate RIT[1] or SRIT[2] will be assessed with the above minimum requirements.
- **Evaluation criteria and guidelines** (Section 4 of this Report)
  - Applicable to all IMT-2020 minimum requirements
  - Candidate RIT/SRIT will be evaluated using the criteria to assess the compliance with the minimum requirements.
- **IMT-2020 submission guideline and templates** (Section 5 of this Report)
  - Completeness of submission
  - Submission template: Required information in a organized format

1 Radio Interface Technology; 2 Set of RIT

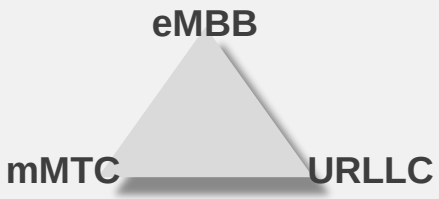
IMT-2020 Minimum Requirements

IMT-2020 Minimum Requirements

The IMT-2020 minimum requirements relate to three aspects

Services
(Section 3.1 of this Report)

- Diverse services for eMBB, mMTC and URLLC are envisaged.
- A wide range of services across usage scenarios shall be supported
- The requirements are indicated in the compliance templates
  - Relevant information are encouraged to be provided

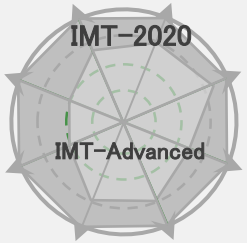


Spectrum
(Section 3.2 of this Report)

- A list of frequency bands (ranging from 450MHz to 4990MHz) have been identified for IMT.
- Also a need of higher frequency bands to address radio traffic growth.
- The requirements related to spectrum are in the compliance templates.

Technical performance
(Section 3.3 of this Report)

- Technical performance requirements are defined to assess the technical capabilities of IMT-2020.
- The necessary background information about the individual requirements, the justification for the items and the values chosen are provided in ***Report ITU-R M.[IMT-2020. TECH PERF REQ].***

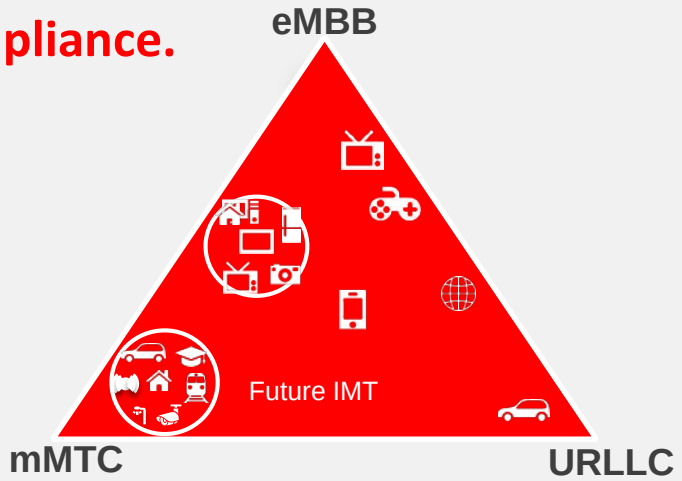


Compliance of Candidate IMT-2020 RIT/SRIT will be assessed from the three aspects

IMT-2020 Minimum Requirements
Related to Service

Candidate IMT-2020 RIT/SRIT will be assessed against the following compliance.

	Service capability requirements
5.2.4.1.1	**Support for wide range of services** Is the proposal able to support a range of services across different usage scenarios (eMBB, URLLC, and mMTC)?: ☒YES / ☐NO Specify which usage scenarios (eMBB, URLLC, and mMTC) the candidate RIT or candidate SRIT can support. (1)
	(1) Refer to the process requirements in IMT-2020/2.



The usage scenarios that shall be supported by candidate RIT/SRIT are according to the condition defined in Step 2, 6, 7 in Doc. IMT-2020/02


Smart Access


Smart Drive


AR/VR

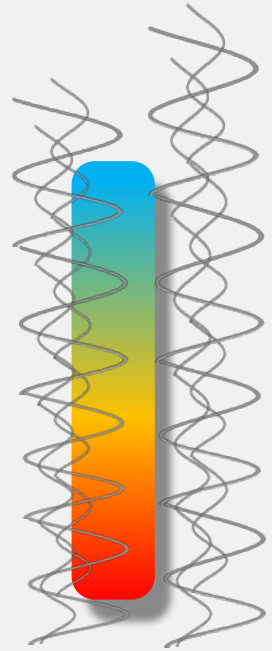
In addition, the following information is encouraged to be provided

5.2.3.2.23	**Support for wide range of services**
5.2.3.2.23.1	Describe *what kind of services/applications* can be supported in each usage scenarios in Recommendation ITU-R M.2083 (eMBB, URLLC, and mMTC).
5.2.3.2.23.2	Describe *any capabilities/features to flexibly deploy* a range of services across different usage scenarios (eMBB, URLLC, and mMTC) in an efficient manner, (e.g., a proposed RIT/SRIT is designed to use a single continuous or multiple block(s) of spectrum).

IMT-2020 Minimum Requirements
Related to Spectrum

Candidate IMT-2020 RIT/SRIT will be assessed against the following compliance

	Spectrum capability requirements
5.2.4.2.1	**Frequency bands identified for IMT** Is the proposal able to utilize at least one frequency band identified for IMT in the ITU Radio Regulations?: ☐YES / ☐NO Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.
5.2.4.2.2	**Higher Frequency range/band(s)** Is the proposal able to utilize the higher frequency range/band(s) above 24.25 GHz?: ☐YES / ☐NO Specify in which band(s) the candidate RIT or candidate SRIT can be deployed. NOTE 1: In the case of the candidate SRIT, at least one of the component RITs need to fulfil this requirement.



Candidate SRIT 1	Component RIT1	Component RIT2	Remarks
IMT bands	Y	Y	Both shall support IMT bands
Higher bands	Y	N	At least one of them shall support higher bands

Compliant

Candidate SRIT 2	Component RIT1	Component RIT2
IMT bands	**N**	Y
Higher bands	Y	N

Not compliant

Candidate RIT	RIT
IMT bands	Y
Higher bands	**N**

Not compliant

IMT-2020 Minimum Requirements
Related to Technical Performance

Candidate IMT-2020 RIT/SRIT will be assessed against compliance of the required number of test environments by related technical performance. The required number of test environments as defined in *Doc. IMT-2020/02*.

Usage scenario	Sub-items	Evaluation method	Test environment				
			eMBB			mMTC	URLLC
			Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate	Analysis	■	■	■		
	Peak spectral efficiency	Analysis	■	■	■		
	User experienced data rate	Analysis, or ***SLS*** (for multi-layer)		■			
	5th percentile user spectral efficiency	***SLS***	■	■	■		
	Average spectral efficiency	***SLS***	■	■	■		
	Area traffic capacity	Analysis	■				
	Energy efficiency	Inspection	■	■	■		
	Mobility	***SLS + LLS***	■	■	■		
eMBB, URLLC	User plane latency	Analysis	■	■	■		■
	Control plane latency	Analysis	■	■	■		■
	Mobility interruption time	Analysis	■	■	■		■
URLLC	***Reliability***	***SLS + LLS***					■
mMTC	***Connection density***	***SLS + LLS, or Full SLS***				■	
General	Bandwidth and Scalability	Inspection	■	■	■	■	■

Gray grids show the related Tech Perf Req (TPR) of a test environment.

All TPRs related to a specific test environment will be evaluated to test the candidate's compliance with that test environment.

If the candidate failed to meet one TPR, then it is not compliant with this test environment.

IMT-2020 Minimum Requirements
Related to Technical Performance

Some examples:

Usage scenario	Sub-items	Test environment				
		eMBB			mMTC	URLLC
		Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate	Yes				
	Peak spectral efficiency					
	User experienced data rate					
	5th percentile user spectral efficiency		No			
	Average spectral efficiency					
	Area traffic capacity					
	Energy efficiency					
	Mobility					
eMBB, URLLC	User plane latency					
	Control plane latency					
	Mobility interruption time					
URLLC	***Reliability***					
mMTC	***Connection density***					
General	Bandwidth and Scalability					

- **This example candidate RIT/SRIT fulfills minimum requirement of:**
  - ✓ Two eMBB test environments (Indoor + Rural) *and*
  - ✓ One mMTC test environment.

The required number of test environments of the candidate RIT/SRIT is defined in Step 2, 6, and 7 in *Doc. IMT-2020/02*.

IMT-2020 Minimum Requirements
Related to Technical Performance

Some examples:

Usage scenario	Sub-items	Test environment				
		eMBB			mMTC	URLLC
		Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate	Yes				
	Peak spectral efficiency					
	User experienced data rate					
	5th percentile user spectral efficiency					
	Average spectral efficiency					
	Area traffic capacity					
	Energy efficiency					
	Mobility					
eMBB, URLLC	User plane latency					
	Control plane latency					
	Mobility interruption time	No				
URLLC	***Reliability***					
mMTC	***Connection density***					
General	Bandwidth and Scalability					

- **This example candidate RIT/SRIT fulfills minimum requirement of:**
  - ✓ One mMTC test environment.

The required number of test environments of the candidate RIT/SRIT is defined in Step 2, 6, and 7 in *Doc. IMT-2020/02*.

IMT-2020 Evaluation

IMT-2020 evaluation

Candidate RITs or SRITs will be evaluated according to the guidelines defined in *Report ITU-R M.[IMT-2020.EVAL]*.

The candidate RIT/SRIT passes one TPR under a specific test environment, if it achieves the TPR for one of the evaluation configurations under that specific test environment.

Usage scenarios	**eMBB**									**mMTC**		**URLLC**	
Test environments	Indoor Hotspot – eMBB			Dense Urban – eMBB			Rural – eMBB			Urban Macro – mMTC		Urban Macro – URLLC	
Eval. Config.	**A:** 4GHz	**B:** 30GHz	**C:** 70GHz	**A:** 4GHz/ Macro layer	**B:** 30GHz/ Macro layer	**C:** Multi-layer	**A:** 700MHz/ 1732m	**B:** 4GHz/ 1732m	**C:** 700MHz/ 6000m (LMLC)	**A:** 500m/ 700MHz	**B:** 1732m/ 700MHz	**A:** 4GHz	**B:** 700MHz
Average spectral efficiency													
5th percentile user spectral efficiency													
User experienced data rate				Analysis	Analysis								
Mobility													
Connection density													
Reliability													
(other TPRs with analysis or inspection)													

Gray grids need simulation.

For these TPRs, the evaluation configurations in red box can be selected for a specific test environment.

IMT-2020 Submission Templates

IMT-2020 submission templates

The proponent should prepare submission templates according to the format given in this Report.

Completed templates

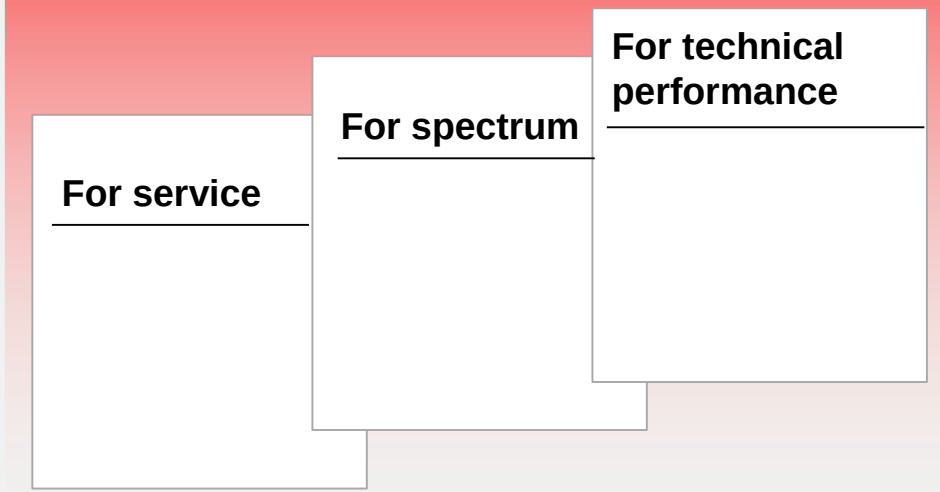
Description templates

- **To facilitate a sufficient understanding of the proposal**

Characteristics template	Link budget template
• A list of items (questions) for the description of the characteristics of the proposal • It is NOT a part of minimum requirement	• A calculation table to provide link budget of the proposal in each of test environment • It is NOT a part of minimum requirement

Compliance templates

- **To assess the compliance of the proposal with the minimum requirements**



- **For a candidate SRIT, the template should be provided for each component RIT within the composite SRIT and/or for the composite SRIT**

IMT-2020 Submission Templates
Description templates - Characteristics

Item	Item to be described
5.2.3.2.1	**Test environment(s)**
5.2.3.2.1.1	What test environments (described in Report ITU-R M.[IMT-2020.EVAL]) does this technology description template address?
5.2.3.2.2	**Radio interface functional aspects**
5.2.3.2.2.1	*Multiple access schemes* Which access scheme(s) does the proposal use? Describe in detail the multiple access schemes employed with their main parameters.
5.2.3.2.2.2	*Modulation scheme*
5.2.3.2.2.2.1	What is the baseband modulation scheme? If both data modulation and spreading modulation are required, describe in detail. Describe the modulation scheme employed for data and control information. What is the symbol rate after modulation?
5.2.3.2.2.2.2	*PAPR* What is the RF peak to average power ratio after baseband filtering (dB)? Describe the PAPR (peak-to-average power ratio) reduction algorithms if they are used in the proposed RIT/SRIT.
5.2.3.2.2.3	*Error control coding scheme and interleaving*
5.2.3.2.2.3.1	Provide details of error control coding scheme for both downlink and uplink. For example, – FEC or other schemes? The proponents can provide additional information on the decoding schemes.
5.2.3.2.2.3.2	Describe the bit interleaving scheme for both uplink and downlink.
5.2.3.2.3	**Describe channel tracking capabilities (e.g. channel tracking algorithm, pilot symbol configuration, etc.) to accommodate rapidly changing delay spread profile.**
5.2.3.2.4	**Physical channel structure and multiplexing**
5.2.3.2.4.1	What is the physical channel bit rate (M or Gbit/s) for supported bandwidths? i.e., the product of the modulation symbol rate (in symbols per second), bits per modulation symbol, and the number of streams supported by the antenna system.
5.2.3.2.4.2	*Layer 1 and Layer 2 overhead estimation.* Describe how the RIT/SRIT accounts for all layer 1 (PHY) and layer 2 (MAC) overhead and provide an accurate estimate that includes static and dynamic overheads.
5.2.3.2.4.3	*Variable bit rate capabilities:* Describe how the proposal supports different applications and services with various bit rate requirements.

- **Characteristics template provides a list of items (questions) for the description of the characteristics of the proposal**
  - ✓ Providing sufficient information relevant to the assessment will assist in the evaluation of the proposal by independent evaluation groups
  - ✓ If an item is not relevant to or for a proposal, it should be answered N/A (Not Applicable); optionally with an explanation of why the item is not applicable
  - ✓ Proponents are encouraged to extend beyond the template if additional information would assist in the assessment

IMT-2020 Submission Templates

Description templates - Characteristics

Item	Item to be described
5.2.3.2.1	**Test environment(s)**
5.2.3.2.1.1	What test environments (described in Report ITU-R M.[IMT-2020.EVAL]) does this technology description template address?
5.2.3.2.2	**Radio interface functional aspects**
5.2.3.2.2.1	*Multiple access schemes* Which access scheme(s) does the proposal use? Describe in detail the multiple access schemes employed with their main parameters.
5.2.3.2.2.2	*Modulation scheme*
5.2.3.2.2.2.1	What is the baseband modulation scheme? If both data modulation and spreading modulation are required, describe in detail. Describe the modulation scheme employed for data and control information. What is the symbol rate after modulation?
5.2.3.2.2.2.2	*PAPR* What is the RF peak to average power ratio after baseband filtering (dB)? Describe the PAPR (peak-to-average power ratio) reduction algorithms if they are used in the proposed RIT/SRIT.
5.2.3.2.2.3	*Error control coding scheme and interleaving*
5.2.3.2.2.3.1	Provide details of error control coding scheme for both downlink and uplink. For example, – FEC or other schemes? The proponents can provide additional information on the decoding schemes.
5.2.3.2.2.3.2	Describe the bit interleaving scheme for both uplink and downlink.
5.2.3.2.3	**Describe channel tracking capabilities (e.g. channel tracking algorithm, pilot symbol configuration, etc.) to accommodate rapidly changing delay spread profile.**
5.2.3.2.4	**Physical channel structure and multiplexing**
5.2.3.2.4.1	What is the physical channel bit rate (M or Gbit/s) for supported bandwidths? i.e., the product of the modulation symbol rate (in symbols per second), bits per modulation symbol, and the number of streams supported by the antenna system.
5.2.3.2.4.2	*Layer 1 and Layer 2 overhead estimation.* Describe how the RIT/SRIT accounts for all layer 1 (PHY) and layer 2 (MAC) overhead and provide an accurate estimate that includes static and dynamic overheads.
5.2.3.2.4.3	*Variable bit rate capabilities:* Describe how the proposal supports different applications and services with various bit rate requirements.

- Test environment(s)
- Radio interface functional aspects (multiple access, modulation, PAPR, coding scheme)
- Channel tracking capabilities (e.g., pilot symbol configuration)
- Physical channel structure and multiplexing
- Mobility management (Handover)
- Radio resource management
- Frame structure
- Spectrum capabilities and duplex technologies
- Support of Advanced antenna capabilities
- Link adaptation and power control
- Power classes
- Scheduler, QoS support and management, data services
- Radio interface architecture and protocol stack
- Cell selection
- Location determination mechanisms
- Priority access mechanisms
- Unicast, multicast and broadcast
- Privacy, authorization, encryption, authentication and legal intercept schemes
- Frequency planning
- Interference mitigation within radio interface
- Synchronization requirements
- Support for wide range of services
- Global circulation of terminals
- Energy efficiency
- Other items

IMT-2020 Submission Templates
Description templates – Link Budget

TABLE 4

Link budget template for Urban Macro - mMTC

Item	Downlink	Uplink
System configuration		
Carrier frequency (GHz)	0.7	0.7
BS antenna heights (m)	25	25
UE antenna heights (m)	1.5	1.5
Cell area reliability[1] (%) (Please specify how it is calculated.)		
Transmission bit rate for control channel (bit/s)		
Transmission bit rate for data channel (bit/s)		
Target packet error ratio for the required SNR in item (19a) for control channel		
Target packet error ratio for the required SNR in item (19b) for data channel		
Spectral efficiency[2] (bit/s/Hz)		
Pathloss model[3] (Select from LOS, NLOS or O-to-I)		
UE speed (km/h)		
Feeder loss (dB)		
Transmitter		
(1) Number of transmit antennas (The number shall be within the indicated range in § 8.4 of Report ITU-R M.[IMT-2020.EVAL])		
(2) Maximal transmit power per antenna (dBm)		
(3) Total transmit power = function of (1) and (2) (dBm) (The value shall not exceed the indicated value in § 8.4 of Report ITU-R M.[IMT-2020.EVAL])		
(4) Transmitter antenna gain (dBi)		

- **Link budget template provides a calculation table to demonstrate link budget information**
  - ✓ Proponents should provide link budget information according to this template for each test environment in the target set of test environments
  - ✓ The parameter values should follow the values or constraints given in the templates and in § 8 of Report ITU-R M.[IMT-2020.EVAL].
  - ✓ Proponent should use the same configuration and parameters of each test environment as ones in its self-evaluation.

IMT-2020 Submission Templates
Compliance templates for Service

This compliance template will be used to assess the compliance of the proposal with service requirements.

	Service capability requirements	Evaluator's comments
5.2.4.1.1	**Support for wide range of services** Is the proposal able to support a range of services across different usage scenarios (eMBB, URLLC, and mMTC)?: ☐YES / ☐NO Specify which usage scenarios (eMBB, URLLC, and mMTC) the candidate RIT or candidate SRIT can support. (1)	
(1) Refer to the process requirements in IMT-2020/2.		

The usage scenarios that shall be supported by candidate RIT/SRIT are according to the condition defined in Step 2, 6, 7 in Doc. IMT-2020/02

- ***Evaluation method***: **Inspection as specified in Report M.[IMT-2020.EVAL]**

IMT-2020 Submission Templates

Compliance templates for Spectrum

This compliance template will be used to assess the compliance of the proposal with spectrum requirements.

	Spectrum capability requirements
5.2.4.2.1	**Frequency bands identified for IMT** Is the proposal able to utilize at least one frequency band identified for IMT in the ITU Radio Regulations?: ☐YES / ☐NO Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.
5.2.4.2.2	**Higher Frequency range/band(s)** Is the proposal able to utilize the higher frequency range/band(s) above 24.25 GHz?: ☐YES / ☐NO Specify in which band(s) the candidate RIT or candidate SRIT can be deployed. NOTE 1: In the case of the candidate SRIT, at least one of the component RITs need to fulfil this requirement.

- ***Evaluation method*: Inspection as specified in Report M.[IMT-2020.EVAL]**

IMT-2020 Submission Templates

Compliance templates for Tech. Perf.

This compliance template will be used to assess the compliance of the proposal with technical performance requirements under specific test environments.

Minimum technical performance requirements item (5.2.4.3.x), units, and Report ITU-R M.[IMT-2020.TECH PERF REQ] section reference[1]	Category			Required value	Value[2]	Requirement met?	Comments[3]
	Usage scenario	Test environment	Downlink or uplink				
5.2.4.3.4 5th percentile user spectral efficiency (bit/s/Hz) *(4.4)*	eMBB	Indoor Hotspot – eMBB	Downlink	0.3		☐Yes ☐No	
			Uplink	0.21		☐Yes ☐No	
	eMBB	Dense Urban – eMBB	Downlink	0.225		☐Yes ☐No	
			Uplink	0.15		☐Yes ☐No	
	eMBB	Rural – eMBB	Downlink	0.12			
			Uplink	0.045			

Proponent to provide:
- Evaluation results

Proponent to report:
- Evaluation configuration employed,
- Channel model variant used,
- Evaluation method.

Downlink and Uplink should use the same evaluation configuration

IMT-2020 Submission Templates

Compliance templates for Tech. Perf.

This compliance template will be used to assess the compliance of the proposal with technical performance requirements under specific test environments.

Minimum technical performance requirements item (5.2.4.3.x), units, and Report ITU-R M.[IMT-2020.TECH PERF REQ] section reference[1]	Category			Required value	Value[2]	Requirement met?	Comments[3]
	Usage scenario	Test environment	Downlink or uplink				
5.2.4.3.2 Peak spectral efficiency (bit/s/Hz) *(4.2)*	eMBB	Not applicable	Down			Yes No	
			Uplink				
5.2.4.3.14 Mobility interruption time (ms) *(4.12)*	eMBB and URLLC	Not applicable	Not applicable	0		No	
5.2.4.3.15 Bandwidth and Scalability *(4.13)*	Not applicable	Not applicable	Not applicable	At least 100 MHz		Yes No	
				…		…	

This TPR is related to **all eMBB** test environments

This TPR is related to **all eMBB *and* URLLC** test environments

This TPR is related to **all** test environments

IMT-2020 Submission Templates
Compliance templates for Tech. Perf.

Some example compliance template fulfillment

Minimum technical performance requirements item (5.2.4.3.x), units, and Report ITU-R M.[IMT-2020.TECH PERF REQ] section reference(1)	Category			Required value	Value(2)	Requirement met?	Comments(3)
	Usage scenario	Test environment	Downlink or uplink				
5.2.4.3.4 5th percentile user spectral efficiency (bit/s/Hz) *(4.4)*	eMBB	Indoor Hotspot – eMBB	Downlink	0.3	X1	☐Yes ☐No	Configuration A, Channel model A
			Uplink	0.21	Y1	☐Yes ☐No	
			Downlink	0.3	X2	☐Yes ☐No	Configuration B, Channel model A
			Uplink	0.21	Y2	☐Yes ☐No	

IMT-2020 Submission Templates

Compliance templates for Tech. Perf.

Assess the number of test environment TPR fulfillment by this compliance template

Usage scenario	Sub-items	Test environment				
		eMBB			mMTC	URLLC
		Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate	Yes				
	Peak spectral efficiency					
	User experienced data rate					
	5th percentile user spectral efficiency					
	Average spectral efficiency					
	Area traffic capacity					
	Energy efficiency					
	Mobility					
eMBB, URLLC	User plane latency					
	Control plane latency					
	Mobility interruption time					
URLLC	***Reliability***					
mMTC	***Connection density***					
General	Bandwidth and Scalability					

Completeness of Submission

A complete submission must provide three major components as below.
Proponents must provide all required information within each of the major components

Completed templates

Description templates

(Characteristics + Link budget)

Compliance templates

(Service + Spectrum + Technical performance)

Self evaluation

- **Self evaluation is provided by proponent and based on compliance templates.**
- **It is performed using the IMT-2020 evaluation guidelines and criteria.**
- **Proponent can also endorse an initial evaluation submitted by another entity.**

Compliance with IPR policy

- **Proponents and IPR holders should indicate their compliance with the ITU policy on intellectual property rights[1]**
- **It is specified in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC available at http://www.itu.int/ITU-T/dbase/patent/patent-policy.html.**

1 See NOTE 2 in section A2.6 of Resolution ITU-R 1-7

Completeness of IMT-2020 submission

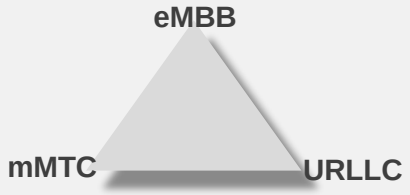
Summary

Summary

Requirements, Evaluation criteria, and submission templates for the development of IMT-2020

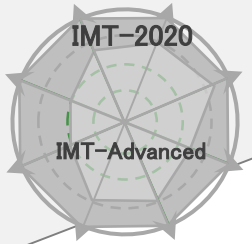
Minimum requirements

Service



Spectrum

Technical Performance



Evaluation

Inspection

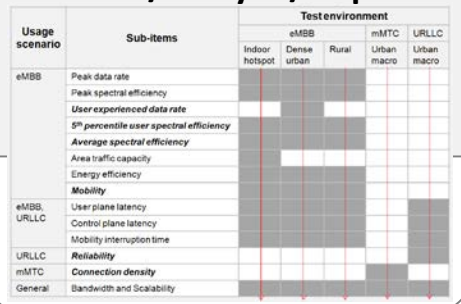
Support for wide range of services

Inspection

Frequency bands identified for IMT;

Higher Frequency range/band(s)

Simulation/Analysis/Inspection



Usage scenario	Sub-items	Test environment				
		eMBB			mMTC	URLLC
		Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate					
	Peak spectral efficiency					
	User experienced data rate					
	5th percentile user spectral efficiency					
	Average spectral efficiency					
	Area traffic capacity					
	Energy efficiency					
	Mobility					
eMBB, URLLC	User plane latency					
	Control plane latency					
	Mobility interruption time					
URLLC	*Reliability*					
mMTC	*Connection density*					
General	Bandwidth and Scalability					

Submission templates

Description templates

(Characteristics + Link budget)

Compliance templates

(Service + Spectrum + Technical performance)

Completeness of submission

Self evaluation

And

Compliance with ITU IPR policy

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THANK YOU

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