Radiocommunication Study Groups

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TECHNOLOGY ASPECTS

IAFI[1] , WWRF[2]

Proposal for the IMT-2030 Characteristics Template and Evaluation Template

Introduction

ITU-R Working Party (WP) 5D is progressing work on developing the framework for IMT-2030 technology development. From an IEG perspective, the documents of interest include the Characteristic Template, which defines prominent technical features of the RIT/SRIT, and the Evaluation Template, which outlines how these features need to be evaluated. In this paper we present our thoughts on a few of the capabilities identified for IMT-2030 and make proposals to these documents.

This contribution is a revision of Document 5D/510 that was submitted to meeting 5D#48.

The IMT-2030 framework

The IMT-2030 framework in Recommendation ITU-R M.2160 outlines a comprehensive approach to the design, development and evolution of the next-generation IMT systems. It emphasizes the key usages evolved from those of IMT-2020; from enhanced mobile broadband, ultra-reliable and low-latency communications, and massive machine-type communications into immersive communications, hyper-reliable & low-latency communications and massive communications respectively. In addition to these evolved usage scenarios, there are new usage scenarios identified including ubiquitous connectivity, integrated sensing and communications and AI and communication. These elements introduce new dimensions to the evaluation process, necessitating more sophisticated methodologies, tools and resources.

In a previous document [Doc. 5D/319], we pointed to challenges in the evaluation of candidate IMT-2030 RIT/SRIT proposals, and then provided informative proposals on how the evaluation needs to be performed. Amongst others, we recommended for the evaluation to focus solely on the mandate of ITU-R when evaluating the radio aspects of IMT-2030 technologies. Building on top of that, we propose in this document some details of the Characteristic Template and TPR for a few of these capabilities including Security, Resilience, AI and Interworking.

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[1] ITU-APT Foundation of India is a sector member of ITU-R, ITU-T and ITU-D.

[2] The Wireless World Research Forum (WWRF) is a Sector Member of ITU-R, ITU-T and ITU-D.

Proposals

1 Security

In [Doc. 5D/319], we proposed that ITU-R WP 5D should expect the proponents to report such details of these capabilities as are supported by the radio access network to higher-layer functions in their submission templates as informative material.

In support of the same, we offer examples of elements that need to become part of the Characteristic Templates as described below on security:

Sl. No.	Capability	Characteristic Template
1	Security	a. Provide a description of the techniques and technologies employed in L1 and L2 that define the security strength of the RIT/SRIT b. Provide details of whether the RIT/SRIT is designed to be quantum safe and quantum ready c. Is the proposed RIT/SRIT backward compatible with previous IMT technologies? If yes, provide details of the security framework employed d. Is the proposed RIT/SRIT designed to interwork with non-IMT technologies? If yes, provide details of the security framework employed e. …

2 Resilience

In [Doc. 5D/319], we proposed that ITU-R WP 5D should expect the proponents to report such details of these capabilities as are supported by the radio access network to higher-layer functions in their submission templates as informative material.

In support of the same, we offer examples of elements that need to become part of the Characteristic Templates as described below on resilience:

Sl. No.	Capability	Characteristic Template
2	Resilience	a. Is the proposed RIT/SRIT designed to be resilient? If yes provide details of the features employed that define the resilient behaviour of the proposed RIT/SRIT b. Is the RIT/SRIT designed with interfaces to resilient networks (e.g., PPDR)? If yes, provide details of the related functionalities in the RIT/SRIT c. What is the anticipated downtime in milliseconds?

3 Artificial intelligence

In [Doc. 5D/319], we proposed that ITU-R WP 5D should expect the proponents to report any relevant technical studies done that demonstrate possible gains by exposure of metrics and interfaces from the radio functionalities which assist in developing AI inferencing.

In support of the same, we offer examples of elements that need to become part of the characteristic templates as described below:

Sl. No.	Capability	Characteristic Template
3	AI related capabilities	a. Is the RIT/SRIT designed to natively support AI models? If yes, provide such details b. Does the RIT/SRIT define specifications to be accessed by AI models/implementations? If yes, provide such details c. Describe if the RIT/SRIT can natively support AI enabled functioning/decision making.

4 NTN Interworking

In [Doc. 5D/319], we proposed that ITU-R WP 5D should strictly evaluate candidate RIT/SRIT proposals based on the scope of WP 5D, which is terrestrial IMT. However, there is wide recognition now that the overarching objective of ubiquity can only be achieved if it interworks with non-terrestrial networks.

In support of the same, we offer examples of elements that need to become part of the characteristic templates as described below:

Sl. No.	Capability	Characteristic Template
4	NTN Interworking	a. Is the RIT/SRIT flexibly designed to natively support interworking with NTN? If yes, provide such details b. If the RIT/SRIT does not natively support interworking with NTN, is it designed with interfaces to interwork with NTN? If yes, provide such details c. Provide details on anticipated downtime in connectivity to move from TN to NTN, and vice versa d. Provide details on the authentication mechanisms available in the RIT/SRIT available for the operator of a service

We further propose that WP 5D discuss and include these questions related to the new capabilities in the characteristics template and compliance template into the working document of the draft new Report ITU-R M.[IMT-2030.SUBMISSION]. The changes proposed are highlighted in yellow and track change mode.

Attachment: 1

ATTACHMENT

REPORT ITU-R M.[IMT-2030.SUBMISSION]

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

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5.2.3.2 Description template – characteristics template

Item	Item to be described
5.2.3.2.1	**Test environment(s)**
…	…
5.2.3.2.9	**Support of Advanced antenna capabilities**
5.2.3.2.9.1	Fully describe the multi-antenna systems (e.g. massive MIMO) supported in the UE, base station, or both that can be used and/or must be used; characterize their impacts on systems performance; e.g. does the RIT have the capability for the use of: – spatial multiplexing techniques, – spatial transmit diversity techniques, – beam-forming techniques (e.g. analogue, digital, hybrid).
…	
…	
…	
5.2.3.2.18	**Privacy, authorization, encryption, authentication and legal intercept schemes**
5.2.3.2.18.1	Any privacy, authorization, encryption, authentication and legal intercept schemes that are enabled in the radio interface technology should be described. Describe whether any synchronisation is needed for privacy and encryptions mechanisms used in the RIT/SRIT. Describe how the RIT/SRIT addresses the radio access security, with a particular focus on the following security items: – system signalling integrity and confidentiality, – user equipment identity authentication and confidentiality, – subscriber identity authentication and confidentiality, – user data integrity and confidentiality Describe how the RIT/SRIT may be protected against attacks, for example: – passive, – man in the middle, – replay, – denial of service.

…	...
…	…
5.2.3.2.26.1	*Coverage extension schemes* Describe the capability to support/ coverage extension schemes, such as relays or repeaters.
5.2.3.2.26	**Other items**
5.2.3.2.26.1	*Coverage extension schemes* Describe the capability to support/ coverage extension schemes, such as relays or repeaters.
5.2.3.2.26.2	...
…	...

….

5.2.4 RIT/SRIT compliance templates

This section provides templates for the responses that are needed to assess the compliance of a candidate RIT or SRIT with the minimum requirements of IMT-2020.

The compliance templates are:

– Compliance template for services

– Compliance template for spectrum, and

– Compliance template for technical performance.

5.2.4.1 Compliance template for services

If a proponent determines that a specific question does not apply, the proponent should indicate that this is the case and provide a rationale for why it does not apply.

	Service capability requirements	Evaluator's comments
5.2.4.1.1	**Support for wide range of services expanded on those of IMT-2020** Is the proposal able to support a range of services across different usage scenarios (eMBBIC, URLLCHRLLC, and mMTCMC)?: 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.