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| **Radiocommunication Study Groups** |  |
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| Source: Document 5D/TEMP/205 | **Document IMT-2020/97-E** |
| **18 February 2025** |
| **English only** |
| Working Party 5D |
| THE OUTCOME FOR THE “NUFRONT PROPONENT” FOR THE EVALUATION, CONSENSUS BUILDING, AND COMPLIANCE WITH MINIMUM REQUIREMENTS FOR RIT QUALIFICATION IN THE IMT-2020 PROCESS (STEPS 4 TO 7) FOR THE REVISION 3 OF RECOMMENDATION ITU-R M.2150 |
|   |

# 1 Introduction

In the process for the Revision 3 of ITU-R Recommendation M.2150, when a new RIT or SRIT is proposed by an ***RIT/SRIT Proponent***, the proposal will follow the process for IMT-2020 as defined in Document [IMT-2020/57](https://www.itu.int/md/R15-IMT.2020-C-0057/en) specifically:

 The process will begin at Step 3 (“Submission/reception of the RIT and SRIT proposals and acknowledgement of receipt”). Documents [IMT-2020/2(Rev.2)](https://www.itu.int/md/R15-IMT.2020-C-0002/en), and Reports ITU-R [M.2410-0](https://www.itu.int/pub/R-REP-M.2410) (2017), ITU-R [M.2411-0](https://www.itu.int/pub/R-REP-M.2411) (2017), ITU-R [M.2412-0](https://www.itu.int/pub/R-REP-M.2412) (2017), will apply. For timing purposes**[[1]](#footnote-1)**, the meeting at which the new proposal is submitted will be considered “Critical Milestone (1)”, the proposal deadline meeting, as defined in the Schedule of Document [IMT-2020/2(Rev.2)](https://www.itu.int/md/R15-IMT.2020-C-0002) in Figure 1. Within the process as outlined in Figure 1, the specific dates of the schedule will be appropriately decided respecting the steps of the process (approximately four meetings from “Critical Milestone (1)” to the finalization of Step 7 of the process in Document [IMT‑2020/2(Rev.2)](https://www.itu.int/md/R15-IMT.2020-C-0002).

 In Step 8, Document [IMT-2020/20](https://www.itu.int/md/R15-IMT.2020-C-0020/en) (“Process and the use of Global Core Specification (GCS), references and related certifications in conjunction with Recommendation ITU‑R M.2150”) will apply. The completion of Step 8 will be synchronized with the recurring update of Recommendation ITU-R M.2150. *Consequently, only after successful completion of Step 7, the new technology can enter the revision cycle for Recommendation ITU-R M.2150 at Z+2A or as late as Z+2B as outlined in Table 1 or 2 for inclusion in the current planned Revision.*

Addendum 1 to the Circular Letter 5/LCCE/109 was developed to announce the reception by ITU-R of a submission of a new proposal for candidate radio interface technology (RIT) ([IMT-2020/76](https://www.itu.int/md/R15-IMT.2020-C-076/en)).

An ITU-R WP 5D webpage [*“IMT-2020 submission and evaluation process for M.2150 “Revision after Year 2021” planned to complete in 2023”*](https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/submission-eval-after2021.aspx) was established.

Independent Evaluation Groups (IEGs) participating in the IMT-2020 process were invited to engage in the evaluation Step 4 work for the candidate technology submission, while the schedule and actions of the proponent and WP 5D were also provided in Document IMT-2020/57 & IMT‑2020/87 rev.2. There were three IEGs that had registered for evaluation for the candidate technology submission from Nufront.

The work undertaken adhered to the relevant IMT-2020 process guidance documents found in:

– Resolution [ITU-R 65](https://www.itu.int/pub/R-RES-R.65) – *Principles for the process of future development of IMT for 2020 and beyond*,

– Document [IMT-2020/2(Rev.2](https://www.itu.int/md/R15-IMT.2020-C-0002/en)) – *Submission, evaluation process and consensus building* for IMT-2020,

– Report ITU-R [M.2410](https://www.itu.int/pub/R-REP-M.2410) – *Minimum requirements related to technical performance for IMT-2020 radio interface(s)*,

– Report ITU-R [M.2411](https://www.itu.int/pub/R-REP-M.2411) – *Requirements, evaluation criteria and submission templates for the development of IMT-2020*, and particularly

– Report ITU-R [M.2412](https://www.itu.int/pub/R-REP-M.2412) – *Guidelines for evaluation of radio interface technologies for IMT-2020.*

# 2 Scope

The Report is the record of the work performed after receipt of complete proposal for IMT-2020 candidate RIT (IMT-2020/89). These steps correspond to:

– Step 4: Evaluation of candidate RITs or SRITs by Independent Evaluation Groups.

– Step 5: Review and coordination of outside evaluation activities.

– Step 6: Review to assess compliance with minimum requirements.

– Step 7: Consideration of evaluation results, consensus building and decision.

The details of these steps are provided in Document IMT-2020/2(Rev.2).

# 3 Related text references

– Recommendation ITU-R M.2150 Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020)

– Report ITU-R M.2411 Requirements, evaluation criteria and submission templates for the development of IMT-2020

– Report ITU-R M.2410 Requirements related to technical performance for IMT-2020 radio interface(s)

– Report ITU-R M.2412 Guidelines for evaluation of radio interface technologies for IMT-2020

– Report ITU-R M.2483-0 [The outcome of the evaluation, consensus building and decision of the IMT-2020 process (Steps 4 to 7), including characteristics of IMT-2020 radio interfaces](https://www.itu.int/net4/ITU-T/search/api/redirection?dest=http%3A%2F%2Fhandle.itu.int%2F11.1002%2Fpub%2F8164d123-en%3Flocatt%3Did%3A0&position=10&page=1)

– Document IMT-2020/2(Rev.2) Submission and evaluation process and consensus building for IMT-2020

– Document IMT-2020/57 Procedure for the development of draft revisions
of Recommendation ITU-R M.2150-0

– Document IMT-2020/87(Rev.2) Schedule for Revision 3 of
Recommendation ITU-R M.2150

– Resolution ITU-R 65 Principles for the process of development of IMT for 2020 and beyond

## 3.1 List of acronyms and abbreviations

IMT International Mobile Telecommunications

RIT Radio interface technology

SRIT Set of radio interface technologies

# 4 Summary of submission

Following the guidelines of the IMT-2020 process, the candidate technology submission accepted by ITU-R under Step 3[[2]](#footnote-2) was reviewed and the following was acknowledged as “complete” **[[3]](#footnote-3)** candidate technology submission as per § 5 of Report ITU-R M.2411:

– IMT-2020/89– ACKNOWLEDGEMENT OF CANDIDATE RIT SUBMISSION FROM NUFRONT UNDER STEP 3 OF THE IMT-2020 PROCESS

For convenience, this submission is attached to Annex 1 of this Report.

# 5 Conclusion for Steps 4 to 7

## 5.1 Results of Steps 4, “Evaluation of candidate RITs or SRITs by Evaluation Groups” and Step 5, “Review and coordination of outside evaluation activities”

Under Step 4 of IMT-2020 process, candidate technology submission from “Nufront Proponent” was evaluated by Independent Evaluation Groups (IEG) that registered with the ITU-R in conformance with the process. In this step, the candidate technology submission was evaluated based on Reports ITU-R [M.2411](https://www.itu.int/pub/R-REP-M.2411) and ITU‑R [M.2412](https://www.itu.int/pub/R-REP-M.2412).

An [Evaluation Group discussion area for 3rd revision of M.2150](https://extranet.itu.int/itu-r/imt2020-rev-3-M2150-evalgroup/SitePages/Home.aspx) was opened during Step 4 between January 2024 and February 2025 to facilitate activities among IEGs and the proponents, and among IEGs.

Three IEGs engaged in evaluation of the candidate technology submission. The list of those IEGs is as following:

* ARIB IMT-2020 Evaluation Group (ARIB IEG)
* 5G India Forum (5GIF)
* Wireless World Research Forum (WWRF)

The evaluation reports received from three of these registered IEGs were considered by ITU-R under Steps 4 and 5, as appropriate. These evaluation reports are included in Annex 2 of this Report.

The list of the final evaluation reports of the IEGs and a summary of the mapping of the candidate technology submission is shown in Table 1.

Table 1

Index of documents related to IEG Final Evaluation Reports for the Candidate Technology Submission
of IMT‑2020/89 Under Step 4

|  |  |
| --- | --- |
| **IMT-2020/xx** | **Summary of Step 4 of the IMT-2020 Process for Evaluation of IMT-2020 Candidate Technology Submission** [**IMT-2020/89**](https://www.itu.int/dms_pub/itu-r/md/15/imt.2020/c/R15-IMT.2020-C-0089%21%21MSW-E.docx) |
|  |
| **RegisteredIndependent Evaluation Group/summary** | **Summary of IEG Evaluation Results** | **Based on or References IEG Contributions Docs. 5D/** | **Evaluation Reports History Documents** |
| ARIB IMT-2020 Evaluation Group (ARIB IEG) | IMT-2020/93 | [5D/457](https://www.itu.int/md/R23-WP5D-C-0457/en) | IMT-2020/90 Rev1 |
| 5G India Forum (5GIF) | IMT-2020/94 | [5D/554](https://www.itu.int/md/R23-WP5D-C-0554/en) | IMT-2020/91 Rev1 |
| Wireless World Research Forum (WWRF) | IMT-2020/95 | [5D/491](https://www.itu.int/md/R23-WP5D-C-0491/en) | IMT-2020/92 |

The IEGs utilized the defined ITU-R evaluation methodology and criteria established in the relevant ITU-R Reports covering IMT-2020. ITU-R concluded that the IEGs had fulfilled their role in the process and that the inclusion of views from organizations external to the ITU‑R had been useful to the work on IMT-2020 and had contributed to the IMT-2020 process.

Considering the requirements, evaluation criteria and submission templates for the development of IMT-2020 included in [Report ITU-R M.2411](https://www.itu.int/pub/R-REP-M.2411), the minimum requirements related to technical performance for IMT‑2020 radio interface(s) included in Report ITU-R [M.2410](https://www.itu.int/pub/R-REP-M.2410), and the guidelines for evaluation of radio interface technologies for IMT‑2020 included in [Report ITU‑R [M.2412](https://www.itu.int/pub/R-REP-M.2412)](https://www.itu.int/pub/R-REP-M.2412), the following conclusions have been reached.

### 5.1.1 Summary of the evaluations received for the candidate RIT submission (Document IMT-2020/89) from Nufront

There were three relevant final evaluation reports received for Nufront in IMT-2020/89, in which the received evaluation reports indicated that,

* + The final evaluation report from ARIB IEG was of the opinion that the candidate technology does not meet the minimum requirements for Indoor Hotspot-eMBB, Dense Urban - eMBB, UrbanMacro - mMTC and Urban Macro - URLLC.
	+ The final evaluation report from 5GIF was of the opinion that the candidate technology does not meet the minimum requirements for Indoor Hotspot-eMBB, Dense Urban – eMBB, Rural-eMBB, UrbanMacro - mMTC and Urban Macro - URLLC.
	+ The final evaluation report from WWRF was of the opinion that the candidate technology does not meet the minimum requirements for Indoor Hotspot-eMBB, Dense Urban – eMBB and UrbanMacro – mMTC.

TABLE 2

Summary of the evaluations received for the candidate RIT submission (Document IMT-2020/89) from Nufront

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test environment | **Does the evaluation report indicate that the minimum technical performance requirements are met in the test environment?****Yes: all technical performance requirements are met.****No: at least one technical performance requirement is not met.** | ARIB IEG | 5GIF | WWRF |
| Indoor Hotspot – eMBB | No | No | No |
| Dense Urban – eMBB | No | No | No |
| Rural – eMBB |  | No |  |
| Urban Macro – mMTC | No | No | No |
| Urban Macro – URLLC | No | No |  |

#### 5.1.1.1 References to evaluation reports for the candidate RIT submission (Document IMT-2020/89) from Nufront

The ITU-R views of the relevant evaluation reports from the IEGs and the individual IEG analyses for the Nufront technology, are included in Annex 2 of this Report, are as follows:

**–** [**IMT-2020/93**](https://www.itu.int/md/R15-IMT.2020-C-0093/en) **-** Evaluation by ARIB IMT-2020 Evaluation Group of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

**–** [**IMT-2020/94**](https://www.itu.int/md/R15-IMT.2020-C-0094/en) -Evaluation by 5G India Forum (5GIF) of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

**–** [**IMT-2020/95**](https://www.itu.int/md/R15-IMT.2020-C-0095/en) **-** Evaluation by Wireless World Research Forum (WWRF) of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

Also, the document IMT-2020/96 provides composite summary tables of the detailed information based on the above final evaluation reports.

**–** [**IMT-2020/96**](https://www.itu.int/md/R15-IMT.2020-C-0096/en) - Summary of Step 4 of the IMT-2020 Process for Evaluation of IMT-2020 Candidate Technology Submission IMT-2020/89

### 5.1.2 Summary of Step 5 (Review and coordination of outside evaluation activities) for the candidate RIT submission (Document IMT-2020/89) from Nufront

In step 5 of the IMT-2020 process, WP 5D acts as the focal point for coordination between the various independent evaluation groups and monitors the progress of the evaluation activities, and provides appropriate responses to problems or requests for guidance to facilitate consensus building. In this step, coordination activities included that:

**5D/77** **Chapter 5 (January-February 2024)**

• A new technology proposal for IMT-2020 was submitted to this meeting by Nufront (Doc. 5D/51). After review, the meeting concluded that Step 3 for this candidate technology proposal was finalised, and the proposal was provided to SWG Evaluation for consideration under Step 4 of the process of submission, evaluation and consensus building for IMT-2020.

• The proponent Nufront introduced its technology proposal with supplementary information on the key changes of their proposal comparing to their prior candidate technology proposal submitted to ITU-R in 2022.

**5D/77 Chapter 5 Annex 5.2 (January-February 2024)**

• With conclusion on step 3 from SWG IMT-Specification for IMT-2020, Step 4 started. Besides the new submission on IMT-2020 candidate technology, Proponent Nufront also provided further ‘supplementary information’ indicating the key changes (i.e., ‘change record’) on the detailed technical specifications aligned with the current submission from the prior detailed technical specifications. The related slides in share point were introduced during the meeting by the proponent, which were agreed to be attached in IMT-2020/88 (submission history).

• The meeting agreed the registration deadline for Potential Independent Evaluation Groups (IEGs) is 13th June 2024 based on the proposals of input contribution and the meeting discussions, to better enable dialog between the IEGs and Proponent in order to meet the planned deadlines. An Evaluation Group discussion area for “Revision 3” of Recommendation ITU-R M.2150 was decided to be set up. The meeting expects to receive the final evaluation reports from the IEGs on this IMT-2020 candidate technology RIT by its 48th meeting (February 2025), and that the IEGs are encouraged to provide interim evaluation reports for the 47th meeting (October 2024).

• It was discussed how to reduce duplicated work during the meeting. The evaluation from IEGs can consider focussing on a set of technical performance requirements which were not fulfilled by the proponent’s prior specification, according to some of the IEGs. This does not imply that an IEG is restricted to evaluate this technology for other technical performance requirements nor provide a complete evaluation though.

**5D/242 Chapter 5 (June-July 2024)**

• Three Independent Evaluation Groups (IEGs) have registered to participate the evaluation of the “Nufront” proposal. One IEG submitted a list of questions on the technology proposal. The proponent Nufront agreed to provide their responses to the questions using the Evaluation Group discussion area which was set up by the BR to facilitate discussions among IEGs and the proponent.

• A liaison statement to IEGs and the proponent is developed to provide information update including the important dates of the major milestones of the evaluation activity (Chapter 7 to Doc. 5D/242).

**5D/413 Chapter 5 (October 2024)**

• Two interim evaluation reports were received and reviewed at this meeting. The proponent Nufront provided responses at this meeting to questions raised by the Independent Evaluation Groups (IEGs) at this and the previous meeting.

• A liaison statement to relevant External Organizations involved in the process of revision of the Recommendations ITU-R M.2012 and ITU-R M.2150, and the evaluation process of the “Nufront” proposal, is developed to inform the new planned dates of WP 5D meetings in 2025.

## 5.2 Results of Step 6, “Review to assess compliance with minimum requirements”

Under Step 6 of the IMT-2020 process and guidelines, an assessment of each proposal was made as to whether it met a version of the minimum technical requirements and evaluation criteria of the IMT‑2020 process in force as described in Report ITU-R [M.2411](https://www.itu.int/pub/R-REP-M.2411). The evaluation methodology is described in Report ITU-R [M.2412](https://www.itu.int/pub/R-REP-M.2412). The version of the minimum technical requirements used is described in Report ITU-R [M.2410](https://www.itu.int/pub/R-REP-M.2410).

In this step, the evaluated proposal for a RIT/SRIT is assessed as a qualifying RIT/SRIT, if a RIT/SRIT fulfils the minimum requirements for the five test environments comprising the three usage scenarios.

Such a qualified RIT/SRIT will go forward for further consideration in Step 7.

Based on a review of the evaluations carried out by the IEGs as well as the self-evaluations from the proponents, the conclusions of the ITU-R for Step 6 are presented in the following sub-sections. Thus, the summary view of the evaluations indicated in § 5.1 are directly relevant to this assessment.

### 5.2.1 Results of assessment in Step 6 for the candidate RIT submission (Document IMT‑2020/89) from Nufront Proponent

1 The evaluations results from IEGs are represented as below

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test environment** | **Does the evaluation report indicate that the minimum technical performance requirements are met in the test environment?**Yes: all technical performance requirements are met.No: at least one technical performance requirement is not met. | **ARIB IEG** | **5GIF** | **WWRF** |
| Indoor Hotspot – eMBB | No | No | No |
| Dense Urban – eMBB | No | No | No |
| Rural – eMBB |  | No |  |
| Urban Macro – mMTC | No | No | No |
| Urban Macro – URLLC | No | No |  |

2 These evaluation results when taken together, demonstrates the candidate technology from IMT-2020/89 does not meet the minimum requirements for all the five test environments comprising the three usage scenarios.

3 This candidate technology from IMT-2020/89 cannot be declared as a qualified RIT.

4 Consequently, the candidate technology from IMT-2020/89 cannot go forward for further consideration in Step 7 of the IMT-2020 process.

## 5.3 Result of Step 7, “Consideration of evaluation results, consensus building and decision”

### 5.3.1 Consideration of evaluation results

“NOT APPLICABLE” - Candidate technology does not move forward to this Step

### 5.3.2 Consensus building and decision

“NOT APPLICABLE” - Candidate technology does not move forward to this Step

# 6 Characteristics of the technologies and basis of the specifications for Step 8

In Step 8, a (set of) IMT-2020 terrestrial component radio interface Recommendation(s) is (are) developed within the ITU-R based on the results of Step 7, sufficiently detailed to enable worldwide compatibility of operation and equipment, including roaming.

## 6.1 Detailed specifications for the radio interface technologies for IMT‑2020 in Step 8

“NOT APPLICABLE” - Candidate technology does not move forward to this Step

### 6.1.1 Characteristics of radio interface technologies for IMT-2020 in Step 8 for the candidate RIT submission (Document IMT‑2020/89) from Nufront

“NOT APPLICABLE” - Candidate technology does not move forward to this Step

Annex 1

Index of IMT-2020 documents for the RIT submission

|  |  |  |
| --- | --- | --- |
| **RIT/SRIT Proponent** | **Acknowledgement of submission(IMT-2020/YYY)** | **Submission history** |
| **Nufront** | Document [IMT‑2020/89](file:///E%3A%5C1.%20ITU%5C2025.02%20ITU%2348%5C6.%20SWG%20Eval%20Preparation%5CPreparations%20for%20IMT-2020%5CPrepared%20documents%5C2%5Citu.int%5Cmd%5CR15-IMT.2020-C-0089%5Cen) | ACKNOWLEDGEMENT OF CANDIDATE RIT SUBMISSION FROM NUFRONT UNDER STEP 3 OF THE IMT-2020 PROCESS (FOR REVISION 3 OF RECOMMENDATION ITU-R M.2150) | Document[IMT‑2020/88](file:///E%3A%5C1.%20ITU%5C2025.02%20ITU%2348%5C6.%20SWG%20Eval%20Preparation%5CPreparations%20for%20IMT-2020%5CPrepared%20documents%5C2%5Citu.int%5Cmd%5CR15-IMT.2020-C-0088%5Cen) | SUBMISSION RECEIVED FOR PROPOSALS OF CANDIDATE RADIO INTERFACE TECHNOLOGIES FROM PROPONENT ‘NUFRONT’ UNDER STEP 3 OF THE IMT-2020 PROCESS (FOR REVISION 3 OF RECOMMENDATION ITU-R M.2150) |

Annex 2

Summary and details of Evaluation Reports from
Independent Evaluation Groups

**IMT-2020/93**

Evaluation by [ARIB IMT-2020 Evaluation Group](https://www.itu.int/oth/R0A060000B3/en) of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

**IMT-2020/94**

Evaluation by 5G India Forum (5GIF) of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

**IMT-2020/95**

Evaluation by [Wireless World Research Forum (WWRF)](https://www.itu.int/oth/R0A060000B1/en) of IMT-2020 candidate technology submission in Document(s) IMT-2020/89

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1. The dates established for this revision of Rec. ITU-R M.2150 shall be applied to the process/procedures referenced in Document IMT-2020/57 and shall also be applied for Document IMT-2020/2 (Rev 2), in lieu of specific dates previously indicated in the text of the document, as those dates were only applicable to the first release of IMT-2020. [↑](#footnote-ref-1)
2. As announced in Circular Letter [5/LCCE/109](https://www.itu.int/dms_pub/itu-r/md/00/sg05/cir/R00-SG05-CIR-0109%21A1%21MSW-E.docx) Addendum 1. [↑](#footnote-ref-2)
3. In the IMT-2020 process, an acknowledgement of a “complete” submission under Step 3 does not imply any conclusions on the results of the formal evaluation under Step 4 to 7. A submission is acknowledged as “complete” if it fulfilled, for that candidate technology submission, supplying all requested information in the format specified following the guidance of Report ITU-R M.2411 – Requirements, evaluation criteria and submission templates for the development of IMT-2020. [↑](#footnote-ref-3)