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| **Radiocommunication Study Groups** |  |
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| **2 July 2019** |
| **English only**  **TECHNOLOGY ASPECTS** |
| Director, Radiocommunication Bureau[[1]](#footnote-1) | |
| evaluation activities from CHINESE evaluation group | |
|  | |

# Introduction

According to the ITU-R Working Party (WP) 5D’s work plan, the IMT-2020 candidate RIT/SRIT will be received from different countries or SDO, before the deadline in July 2019. The independence evaluation reports for these received candidates RIT/SRIT will be submitted by the deadline in February 2020. In Report ITU-R M.2412, three types of evaluation methods are specified for different perspectives of evaluation for IMT-2020 RIT or SRIT which will be accepted and processed for further considering for ITU-R IMT-2020 standards.

To facilitate the discussion on Evaluation Group discussion area, the system level simulation calibration is considered by Chinese Evaluation Group (ChEG).

ChEG also looks forward to further collaboration with other IEGs and proponents on IMT-2020 submission and evaluation process.

# Proposal

Calibration results, an interim evaluation report skeleton and some reviewed parts of 3GPP technologies from submission of corresponding proponents were prepared by ChEG and can be found in the attachment.

**Attachment**: 1

Attachment

Initial evaluation report on 3GPP technologies[[2]](#footnote-2)

Part I

Administrative aspects of the Independent Evaluation Group

# I.1 Introduction

As part of the ongoing process for IMT-2020, the period from October 2018 (the 31st meeting of Working Party 5D) to February 2020 (the 34th meeting of WP 5D) has been designated for evaluation of the IMT-2020 candidate technology submissions by Independent Evaluation Groups. After the ITU-R WP 5D #31 meeting hold in Fukuoka, ChEG received the liaison from ITU‑R WP 5D to independent evaluation groups for informing the submitted IMT-2020 candidate RIT/SRITs and encouraging submission of interim/preliminary evaluation reports on WP 5D #34 meeting.

In the previous ITU-R WP 5D meeting, ChEG shared workplan information as informative materials and received useful feedbacks. Updated calibration information has been attached to annex part of ChEG evaluation report. Following IMT-2020 development process and in response to WP 5D’s liaison statement, ChEG provides this skeleton of preliminary evaluation report on 3GPP technology and some reviewed parts of 3GPP technologies from submission of corresponding proponents.

# I.2 Administrative aspects

## I.2.1 Name of the independent evaluation group

Chinese Evaluation Group (ChEG).

## I.2.2 Background of the ChEG

The Chinese Evaluation Group (ChEG) is built under the structure of IMT-2020 (5G) Promotion Group. The Promotion Group is established as a non-profit association, founded under Chinese law, with its seat in Beijing, China. The Promotion Group works on 5G research & development, pre‑standardization activities, spectrum issues, technical scheme evaluation, and technical trials.

The major task of ChEG includes registration and participation in ITU independent evaluation activity for formal results submission.

The members who participate in the evaluation activities are as follows:

– China Academy of Information and Communications Technology

– China Mobile Communications Corporation

– China Telecommunications Corporation

– China Unicom

– Beijing University of Posts and Telecommunications,

– Huawei Technologies Co., Ltd.

– China Information Communication Technologies Group Corporation (CATT)

– ZTE Corporation

– OPPO

– VIVO.

ChEG participated in developing IMT related systems since 20 years ago, e.g. IMT-2000 evaluation in 1998, OFDMA TDD WMAN evaluation in 2007 and IMT-Advanced evaluation in 2010. In 2017, ChEG revived as an independent evaluation group for evaluation of IMT-2020 candidate submission.

ChEG follows the guidelines of ITU IMT-2020 process. Currently ChEG is working on evaluation of submissions in Documents [IMT‑2020/3](https://www.itu.int/md/R15-IMT.2020-C-0003/en) and [IMT‑2020/5](https://www.itu.int/md/R15-IMT.2020-C-0005/en), (i.e. “3GPP technology”).

## I.2.3 Method of Work

From the year 2017, ChEG organized face to face meetings and e-mail discussions. Through these meetings, members of ChEG have opportunities to discuss and reach consensus on parameter assumption, calibration, evaluation methodologies and other issues which are related to evaluation tasks. More importantly, ChEG participated in several workshops organized by ITU-R and 3GPP, meeting with proponents and IEGs, clarifying technical details and exchanging knowledge of evaluation.

The assessments reported are performed with three evaluation methodologies, which are inspection, analysis and simulation suggested in Report ITU-R M.2412.

## I.2.4 Administrative contact details

Name: Mr. WAN Yi, from China Academy of Information and Communication Technology (CAICT), of MIIT

Email: [wanyi@caict.ac.cn](mailto:wanyi@caict.ac.cn); [wanyi@ritt.cn](mailto:wanyi@ritt.cn)

TEL： 86-10-62300182

FAX： 86-10-62300178

## I.2.5 Technical contact details

Name: Mr. WAN Yi

Email: [wanyi@caict.ac.cn](mailto:wanyi@caict.ac.cn)

Name: Ms. XU Xiaoyan

Email: [xuxiaoyan@caict.ac.cn](mailto:xuxiaoyan@caict.ac.cn)

Part II

Technical aspects of the work of the Independent Evaluation Group

# II.1 Evaluated candidate IMT-2020 RIT/SRIT

This contribution is an initial evaluation report on the submissions in Docs. IMT-2020/3 and IMT‑2020/5, (i.e. “3GPP technology”), including 3GPP NR RIT and SRIT.

# II.2 Utilization of ITU-R documents

ChEG confirms that the evaluation reported in this contribution is performed in accord with in Report ITU‑R M.2412. The evaluation methodologies and configurations used for each minimum requirement are chosen according to Table 8-2 in Report ITU-R M.2412.

Other details used in this contribution are in accord with Documents [IMT‑2020/3](https://www.itu.int/md/R15-IMT.2020-C-0003/en) and [IMT‑2020/5](https://www.itu.int/md/R15-IMT.2020-C-0005/en), which are submissions from the proponents.

# II.3 Quality check per Report ITU-R M.2411 of the templates and the self‑evaluation

ChEG identifies that the technology submissions in Documents [IMT‑2020/3](https://www.itu.int/md/R15-IMT.2020-C-0003/en) and [IMT‑2020/5](https://www.itu.int/md/R15-IMT.2020-C-0005/en), (i.e. “3GPP technology”) include complete compliance templates for service, spectrum and technical performance as specified in Chapter 4.2.4 of Report ITU-R M.2411. In additional, ChEG identifies that the technology submissions also include material for independent evaluation.

# II.4 Quantitative assessment per Reports ITU-R M.2410, ITU-R M.2411 and ITU-R M.2412

In this section, assessment and evaluation on both NR RIT and SRIT from 3GPP technologies are included. Evaluations are performed according to compliance templates.

## II.4.1 Initial assessment and evaluation results on NR RIT of 5G

#### 4.2.4.1 Compliance template for services

[*Editor Note: Evaluation is in process*]

#### 4.2.4.2 Compliance template for spectrum

|  |  |  |
| --- | --- | --- |
|  | Spectrum capability requirements | ChEG’s comments |
| **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?:  Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.  🗹YES / NO | The supported frequency bands identified for IMT are provided in item 5.2.3.2.8.3 in characteristics template for NR RIT. See the table for frequency range 1 (FR1). |
| **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?:  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.  🗹YES / NO | The supported frequency bands above 24.25 GHz are provided in item 5.2.3.2.8.3 in characteristics template for NR RIT. See the table for frequency range 2 (FR2). |

#### 4.2.4.3 Compliance template for technical performance

[*Editor Note: Evaluation is in process*]

## II.4.2 Initial assessment and evaluation results on SRIT of 5G

#### 4.2.4.1 Compliance template for services

[*Editor Note: Evaluation is in process*]

#### 4.2.4.2 Compliance template for spectrum

|  |  |  |
| --- | --- | --- |
|  | Spectrum capability requirements | ChEG’s comments |
| **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?:  Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.  🗹YES / NO | The supported frequency bands identified for IMT by NR and LTE component RIT are provided in item 5.2.3.2.8.3 in characteristics template for SRIT. See the table for frequency range 1 (FR1) for NR component RIT, and the table for LTE component RIT. |
| **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?:  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.  🗹YES / NO | The supported frequency bands above 24.25 GHz by NR component RIT are provided in item 5.2.3.2.8.3 in characteristics template for SRIT. See the table for frequency range 2 (FR2) for NR component RIT. |

#### 4.2.4.3 Compliance template for technical performance

[*Editor Note: Evaluation is in process*]

## II-5 Questions and Feedback to WP 5D and/or the proponents or other Independent Evaluation Groups

## II-6 Proposed next steps in Independent Evaluation Group from August 2019 to February 2020 towards the final Independent Evaluation Group report to be sent to WP 5D for the June 2010 meeting

ChEG will provide an interim IEG reports with further evaluation results to the WP 5D#33 meeting, then finalised IEG reports for WP 5D#34 meeting. And ChEG will exchange evaluation related information with proponents and other IEGs during this period.

PartIII

Conclusion

# Annex 1: Evaluation report from ChEG

[*Editor Note: Evaluation is in process*]

# Annex 2: Updated calibration information

These calibration results can be found in the attachment “ChEG Calibration results.zip”. It is notable that evaluation configurations of each test environment refer to Report ITU-R M.2412 and received liaison statement from 3GPP.The comparison between ChEG and 3GPP’s calibration can be found in Table A1, in which it is observed that the calibration results from all members are well aligned. The difference of fifth percentage point of CDF in DL geometry (wideband SINR) results between ChEG and 3GPP are typically within 0.01~0.29 dB; while the difference of Coupling Loss is less 0.53 dB.



Table A1

Conclusion on ChEG calibration results

| Test Environment | Evaluation Configuration | Channel model | | Number of samples | 50% CDF on Difference between 3GPP and ChEG | |
| --- | --- | --- | --- | --- | --- | --- |
| Coupling Loss | DL geometry |
| Indoor Hotspot‑eMBB | Config A (4GHz) | Channel model A | 12 TRxP | 6 | <0.09 dB | <0.04 dB |
| 36 TRxP | 6 | <0 dB | <0.06 dB |
| Channel model B | 12 TRxP | 6 | <0.15 dB | <0.21 dB |
| 36 TRxP | 7 | <0.09 dB | <0.02 dB |
| Config B  (30GHz) | Channel model A/B | 12 TRxP | 6 | <0.04 dB | <0.11 dB |
| 36 TRxP | 6 | <0.05 dB | <0.26 dB |
| Config C  (70GHz) | Channel model A/B | 12 TRxP | 6 | <0.17 dB | <0.19 dB |
| 36 TRxP | 5 | <0.13 dB | <0.02 dB |
| Dense Urban‑eMBB | Config  A (4GHz) | Channel model A | | 7 | <0.53 dB | <0.01 dB |
| Channel model B | | 7 | <0.19 dB | <0.15 dB |
| Config B  (30GHz) | Channel model A/B | | 7 | <0.17 dB | <0.57 dB |
| Rural-eMBB | Config A  (1732m, 700MHz) | Channel model A | | 7 | <0.2 dB | <0.13 dB |
| Channel model B | | 7 | <0.28 dB | <0.04 dB |
| Config B  (1732m, 4GHz) | Channel model A | | 7 | <0.45 dB | <0.26 dB |
| Channel model B | | 7 | <0.37 dB | <0.11 dB |
| Config C  (LMLC, 6km, 700MHz) | Channel model A | | 6 | <0.16 dB | <0.13 dB |
| Channel model B | | 6 | <0.04 dB | <0.22 dB |
| Urban Macro‑mMTC | Config A  (500m, 700MHz) | Channel model A | | 6 | <0.35 dB | <0.22 dB |
| Channel model B | | 6 | <0.37 dB | <0.06 dB |
| Config B (1732m, 700MHz) | Channel model A | | 6 | <0.39 dB | <0.29 dB |
| Channel model B | | 6 | <0.11 dB | <0.11 dB |
| Urban Macro‑URLLC | Config A (4GHz) | Channel model A | | 6 | <0.12 dB | <0.18 dB |
| Channel model B | | 6 | <0.22 dB | <0.14 dB |
| Config B (700MHz) | Channel model A | | 6 | <0.45 dB | <0.16 dB |
| Channel model B | | 6 | <0.1 dB | 0.2 dB |

# References

[1] Report [ITU-R M.2410](https://www.itu.int/en/publications/ITU-R/pages/publications.aspx?parent=R-REP-M.2410), “Minimum requirements related to technical performance for IMT-2020 radio interface(s)”, 2017.

[2] Report [ITU-R M.2411](https://www.itu.int/en/publications/ITU-R/pages/publications.aspx?parent=R-REP-M.2411), “Requirements, evaluation criteria and submission template for the development of IMT-2020”, 2017.

[3] Report [ITU-R M.2412](https://www.itu.int/en/publications/ITU-R/pages/publications.aspx?parent=R-REP-M.2412), “Guidelines for evaluation of radio interface technologies for IMT-2020”, 2017.

[4] Document [5D/556](https://www.itu.int/md/R15-WP5D-C-0556/en), “Liaison statement on 3GPP IMT-2020 Self-evaluation activities”, Cancun, July, 2018.

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1. Submitted on behalf of Chinese Evaluation Group (ChEG). [↑](#footnote-ref-1)
2. Including Documents [IMT‑2020/3](https://www.itu.int/md/R15-IMT.2020-C-0003/en) and [IMT‑2020/5](https://www.itu.int/md/R15-IMT.2020-C-0005/en). [↑](#footnote-ref-2)