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| **Radiocommunication Study Groups** |  |
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| Received: 3 December 2019 | **Document 5D/33-E** |
| **4 December 2019** |
| **English only**  **TECHNOLOGY ASPECTS** |
| Director, Radiocommunication Bureau[[1]](#footnote-1) | |
| INITIAL EVALUATION REPORT FROM AEG FOR CHINA  PROPONENT SUBMISSIONS OF SRIT & RIT | |
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# 1 Introduction

In accordance to the ITU-R Submission, Evaluation Process and Consensus Building for IMT-2020 (Doc. [IMT-2020/2](https://www.itu.int/md/R15-IMT.2020-C-0002/en)), the Africa Evaluation Group (AEG) has been established as an independent evaluation group open to all African administrations, industry and academia. This initial/interim report focuses of the “inspection approach” of the China proponent submission of the SRIT and RIT. The inspection was conducted by reviewing the functionality and parameter provided by China. The following were inspected; (1) *energy efficiency*, (2) *bandwidth,* (3) *support of wide range of services* and (4) *supported spectrum band(s)/range(s).*

This preliminary submission covers only items labelled “Inspection” in Table 1 *“Summary of evaluation methodologies*” of Report ITU-R M.2412-0. The assessment criteria from Reports ITU‑R M.2410-0 (11/2017), ITU-R M.2411-0 (11/2017) and ITU-R M.2412-0 (10/2017) have been followed.

Work is in progress to expand the evaluation for further submission in time for the 34th Working Party 5D meeting to include items labelled “Analytical” in Table 1 of Report ITU-R M.2412-0.

# 2 Evaluation of Technical Performance Requirements (TPR)

This section evaluates TPR and Other Requirements via “inspection” of the China submission for IMT-2020.

## 2.1 Energy Efficiency

From the characteristics template, 5.2.3.2.25.

For NR:

*Network efficicency: The fundamental always-on transmission that must take place is the periodic SS/PBCH block. The SS/PBCK block is used for the UE to detect the cell, obtain basic information of it on PBCH, and maintain synchronization to it.*

*Device efficicency: Multiple features facilitating device energy efficiency have been specified for NR Rel-15.*

For NB-IoT:

*Device efficiency: Multiple features facilitating device energy efficiency have been specified for NR Rel-15.*

## 2.2 Bandwidth

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| Minimum technical performance requirements item (5.2.4.3.x), units, and Report ITU-R M.2410-0 section reference(1) | Category | | | Required value | Value (2) | Requirement met? | Comments(3) |
| Usage scenario | Test environment | Downlink or uplink |
| **5.2.4.3.10** Energy efficiency *(4.9)* | eMBB | Not applicable | Not applicable | Capability to support a high sleep ratio and long sleep duration | *Sleep ratio: 80%~99.87%*  *Sleep duration:*  *Up to 159ms* | *Yes* | *Network side* |
| *Sleep ratio: 84.2%~99.5%*  *Sleep duration:*  *2.56s~10.24s* | *Yes* | *Device side* |

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| Minimum technical performance requirements item (5.2.4.3.x), units, and Report ITU‑R M.2410-0 section reference(1) | Category | | | **Required value** | Value (2) | Requirement met? | Comments(3) |
| Usage scenario | Test environment | Downlink or uplink |
| **5.2.4.3.15** Bandwidth and Scalability *(4.13)* | Not applicable | Not applicable | Not applicable | At least 100 MHz | *800 MHz ~ 6.4 GHz* | *Yes* |  |
| Up to 1 GHz | *Yes* |  |
| Support of multiple different bandwidth values(4) | *3~13 different component carrier bandwidth values* | *Yes* |  |

From the characteristics template, 5.2.3.2.8.2.

*One component carrier supports a scalable bandwidth, 5, 10, 15, 20, 25, 40, 50, 60, 80, 100 MHz for frequency range 450 MHz to 6 000 MHz (see [38.101] for the actual support of bandwidth for each band), with guard band ratio from 20% to 2%; and a scalable bandwidth, 50, 100, 200, 400 MHz for frequency range 24 250-52 600 MHz (see [38.101] for the actual support of bandwidth for each band), with guard band ratio from 8% to 5%. By aggregating multiple component carriers, transmission bandwidths up to 6.4 GHz are supported to provide high data rates. Component carriers can be either contiguous or non-contiguous in the frequency domain. The number of component carriers transmitted and/or received by a mobile terminal can vary over time depending on the instantaneous data rate.*

*For NB-IoT, the channel bandwidth is not scalable. There is not aggregation of multiple NB-IoT carriers – see item 5.2.3.2.8.1 for more details.*

## 2.3 Range of Services supported

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|  | 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***  Specify which usage scenarios (eMBB, URLLC, and mMTC) the candidate RIT or candidate SRIT can support.(1)  *The candidate RIT composed of NR and NB-IoT can support eMBB, URLLC and mMTC usage scenarios.* | *The assessment of service requirement follows the evaluation method as defined in Section 7.3.3 in Report ITU-R M.2412.* |

## 2.4 Supported Bands/Ranges

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|  | 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***  Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.  *The supported frequency bands identified for IMT are provided in item 5.2.3.2.8.3 in characteristics template. See the table for frequency range 1 (FR1).*  What are the frequency bands supported by the RIT/SRIT? Please list.  *The following frequency bands will be supported, in accordance with spectrum requirements defined by Report ITU-R M.2411-0. Introduction of other ITU-R IMT identified bands are not precluded in the future. 3GPP technologies are also defined as appropriate to operate in other frequency arrangements and bands.*  *450-6000 MHz:*   |  |  |  |  | | --- | --- | --- | --- | | NR *operating band* | Uplink (UL) *operating band* BS receive / UE transmit  FUL\_low – FUL\_high | Downlink (DL) *operating band* BS transmit / UE receive  FDL\_low – FDL\_high | Duplex Mode | | n1 | 1920 MHz – 1980 MHz | 2110 MHz – 2170 MHz | FDD | | n2 | 1850 MHz – 1910 MHz | 1930 MHz – 1990 MHz | FDD | | n3 | 1710 MHz – 1785 MHz | 1805 MHz – 1880 MHz | FDD | | n5 | 824 MHz – 849 MHz | 869 MHz – 894 MHz | FDD | | n7 | 2500 MHz – 2570 MHz | 2620 MHz – 2690 MHz | FDD | | n8 | 880 MHz – 915 MHz | 925 MHz – 960 MHz | FDD | | n12 | 699 MHz – 716 MHz | 729 MHz – 746 MHz | FDD | | n20 | 832 MHz – 862 MHz | 791 MHz – 821 MHz | FDD | | n25 | 1850 MHz – 1915 MHz | 1930 MHz – 1995 MHz | FDD | | n28 | 703 MHz – 748 MHz | 758 MHz – 803 MHz | FDD | | n34 | 2010 MHz – 2025 MHz | 2010 MHz – 2025 MHz | TDD | | n38 | 2570 MHz – 2620 MHz | 2570 MHz – 2620 MHz | TDD | | n39 | 1880 MHz – 1920 MHz | 1880 MHz – 1920 MHz | TDD | | n40 | 2300 MHz – 2400 MHz | 2300 MHz – 2400 MHz | TDD | | n41 | 2496 MHz – 2690 MHz | 2496 MHz – 2690 MHz | TDD | | n50 | 1432 MHz – 1517 MHz | 1432 MHz – 1517 MHz | TDD | | n51 | 1427 MHz – 1432 MHz | 1427 MHz – 1432 MHz | TDD | | n66 | 1710 MHz – 1780 MHz | 2110 MHz – 2200 MHz | FDD | | n70 | 1695 MHz – 1710 MHz | 1995 MHz – 2020 MHz | FDD | | n71 | 663 MHz – 698 MHz | 617 MHz – 652 MHz | FDD | | n74 | 1427 MHz – 1470 MHz | 1475 MHz – 1518 MHz | FDD | | n75 | N/A | 1432 MHz – 1517 MHz | SDL | | n76 | N/A | 1427 MHz – 1432 MHz | SDL | | n77 | 3300 MHz – 4200 MHz | 3300 MHz – 4200 MHz | TDD | | n78 | 3300 MHz – 3800 MHz | 3300 MHz – 3800 MHz | TDD | | n79 | 4400 MHz – 5000 MHz | 4400 MHz – 5000 MHz | TDD | | n80 | 1710 MHz – 1785 MHz | N/A | SUL | | n81 | 880 MHz – 915 MHz | N/A | SUL | | n82 | 832 MHz – 862 MHz | N/A | SUL | | n83 | 703 MHz – 748 MHz | N/A | SUL | | n84 | 1920 MHz – 1980 MHz | N/A | SUL | | n86 | 1710 MHz – 1780 MHz | N/A | SUL | |
| **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***  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.  *24250-52600 MHz:*   |  |  |  | | --- | --- | --- | | NR *operating band* | Uplink (UL) and Downlink (DL) *operating band* BS transmit/receive UE transmit/receive  FUL\_low – FUL\_high  FDL\_low – FDL\_high | Duplex Mode | | n257 | 26500 MHz – 29500 MHz | TDD | | n258 | 24250 MHz – 27500 MHz | TDD | | n260 | 37000 MHz – 40000 MHz | TDD | | n261 | 27500 MHz – 28350 MHz | TDD |   *Additional frequency bands can be introduced in the future in release independent manner. Support for frequency bands above 52 600 MHz is under study, and the support for frequency bands within 6 000 MHz to 24 250 MHz is planned to be studied.*  *For NB-IoT, Category NB1 and NB2 are designed to operate in band 1, 2, 3, 4, 5, 8, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 28, 31, 41, 66, 70, 71, 72 and 74 in the above table. See more details in [36.101] sub-clause 5.5F.* |

(1) As defined in Report ITU-R M.2410-0.

(2) According to the evaluation methodology specified in Report ITU-R M.2412-0.

(3) Proponents should report their selected evaluation methodology of the Connection density, the channel model variant used, and evaluation configuration(s) with their exact values (e.g. antenna element number, bandwidth, etc.) per test environment, and could provide other relevant information as well. For details, refer to Report ITU-R M.2412-0, in particular, § 7.1.3 for the evaluation methodologies, § 8.4 for the evaluation configurations per each test environment, and Annex 1 on the channel model variants.

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1. Submitted on behalf of [Africa Evaluation Group](https://www.itu.int/oth/R0A06000085/en) (AEG). [↑](#footnote-ref-1)