## Compliance template for candidate ‘NR+NB-IoT’ RIT

The compliance templates provided by China are for the assessment of the compliance of candidate IMT-2020 radio interface technology. It includes one compliance template for candidate RIT which is composed of NR and NB-IoT.

This document provides the compliance template for ‘NR+NB-IoT’ RIT based on 3GPP Rel-15 work.

It is noted that the relevant technology is still under development in 3GPP. The assessment of compliance might be further updated based on the progress of 3GPP’s study on self-evaluation towards IMT-2020.

#### 5.2.4.1 Compliance template **for** services[[1]](#footnote-1)

|  |  |  |
| --- | --- | --- |
|  | 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.* |
| (1) Refer to the process requirements in IMT-2020/2. | | |

#### 5.2.4.2 Compliance **template** for spectrum3

|  |  |
| --- | --- |
|  | 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).* |
| **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.  *The supported frequency bands above 24.25 GHz are provided in item 5.2.3.2.8.3 in characteristics template. See the table for frequency range 2 (FR2).* |

#### 5.2.4.3 Compliance template for **technical** performance3

*See self evaluation report for detailed analysis, results and specific assumptions (e.g. duplexing schemes, antenna configurations, etc.).*

| 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 |
| **5.2.4.3.1** Peak data rate (Gbit/s) *(4.1)* | eMBB | Not applicable | Downlink | 20 | *21.1~78.2* | *Yes* | *The values are achieved by using 16 carrier aggregation.* |
| Uplink | 10 | *17.0~38.2* | *Yes* |
| **5.2.4.3.2** Peak spectral efficiency (bit/s/Hz) *(4.2)* | eMBB | Not applicable | Downlink | 30 | *30.4~48.9* | *Yes* |  |
| Uplink | 15 | *18.2~25.8* | *Yes* |
| **5.2.4.3.3** User experienced data rate (Mbit/s) *(4.3)* | eMBB | Dense Urban – eMBB | Downlink | 100 | *101.6~144.34* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B.* |
| Uplink | 50 | *50.1~73.15* | *Yes* |
| **5.2.4.3.4** 5th percentile user spectral efficiency (bit/s/Hz) *(4.4)* | eMBB | Indoor Hotspot – eMBB | Downlink | 0.3 | *0.31~0.59* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B, with 12 TRxP.* |
| Uplink | 0.21 | *0.39~0.63* | *Yes* |
| eMBB | Dense Urban – eMBB | Downlink | 0.225 | *0.23~0.96* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B.* |
| Uplink | 0.15 | *0.17~0.6* | *Yes* |
| eMBB | Rural – eMBB | Downlink | 0.12 | *0.15~0.3* | *Yes* | *For evaluation configuration A (700 MHz), Channel model A/B.* |
| Uplink | 0.045 | *0.09~0.2* | *Yes* |
| Downlink | 0.12 | *0.29~0.72* | *Yes* | *For evaluation configuration B (4 GHz), Channel model A/B.* |
| Uplink | 0.045 | *0.09~0.32* | *Yes* |
| Downlink | 0.12 | *0.19~0.41* | *Yes* | *For evaluation configuration C (LMLC), Channel model A/B.* |
| Uplink | 0.045 | *0.05~0.1* | *Yes* |
| **5.2.4.3.5** Average spectral efficiency (bit/s/Hz/ TRxP) *(4.5)* | eMBB | Indoor Hotspot – eMBB | Downlink | 9 | *9.92~18.5* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B, with 12 TRxP and 36 TRxP.* |
| Uplink | 6.75 | *6.95~9.57* | *Yes* |
| eMBB | Dense Urban – eMBB | Downlink | 7.8 | *12.51~23.55* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B.* |
| Uplink | 5.4 | *5.69~8.82* | *Yes* |
| eMBB | Rural – eMBB | Downlink | 3.3 | *6.22~11.96* | *Yes* | *For evaluation configuration A (700 MHz), Channel model A/B.* |
| Uplink | 1.6 | *4.22~6.02* | *Yes* |
| Downlink | 3.3 | *12.01~21.1* | *Yes* | *For evaluation configuration B (4 GHz), Channel model A/B.* |
| Uplink | 1.6 | *3.12~7.83* | *Yes* |
| Downlink | 3.3 | *7.7~11.02* | *Yes* | *For evaluation configuration C (LMLC), Channel model A/B.* |
| Uplink | 1.6 | *3.17~4.81* | *Yes* |
| **5.2.4.3.6** Area traffic capacity (Mbit/s/m2) *(4.6)* | eMBB | Indoor-Hotspot – eMBB | Downlink | 10 | *10.06~16.81* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B, with 12 TRxP and 36 TRxP.* |
| **5.2.4.3.7** User plane latency (ms) *(4.7.1)* | eMBB | Not applicable | Downlink | 4 | *0.31~3.19* | *Yes* |  |
| Uplink | 4 | *0.28~3.84* | *Yes* |
| URLLC | Not applicable | Downlink | 1 | *0.23~0.99* | *Yes* |
| Uplink | 1 | *0.24~0.98* | *Yes* |
| **5.2.4.3.8** Control plane latency (ms) *(4.7.2)* | eMBB | Not applicable | Not applicable | 20 | *11.3~18.8* | *Yes* |  |
| URLLC | Not applicable | Not applicable | 20 | *11.3~18.8* | *Yes* |
| **5.2.4.3.9** Connection density (devices/km2) *(4.8)* | mMTC | Urban Macro – mMTC | Uplink | 1 000 000 | *41,325,000/ 180 kHz~ 41,981,000 / 180 kHz* | *Yes* | *For evaluation configuration A (ISD=500m) with full buffer system level simulation followed by link level simulation; Channel model A/B.* |
| Uplink | 1 000 000 | *2,384,315/180kHz~*  *2,650,000/180kHz* | *Yes* | *For evaluation configuration B (ISD=1732m) with full buffer system level simulation followed by link level simulation; Channel model A/B.* |
| Uplink | 1 000 000 | *8,047,087/180kHz* | *Yes* | *For evaluation configuration A (ISD=500m) with Non-full buffer system level simulation; Channel model A.* |
| Uplink | 1 000 000 | *1,198,000/180kHz~*  *1,203,880/180kHz* | *Yes* | *For evaluation configuration B (ISD=1732m) with Non-full buffer system level simulation; Channel model A/B.* |
| **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* |
| **5.2.4.3.11** Reliability *(4.10)* | URLLC | Urban Macro –URLLC | Downlink | 1-10−5 success probability of transmitting a layer 2 PDU (protocol data unit) of size 32 bytes within 1 ms in channel quality of coverage edge | *99.99969%~ 99.99995%* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B.* |
| Downlink | *99.9994%~ 99.99999%* | *Yes* | *For evaluation configuration B (700 MHz), Channel model A/B.* |
| Uplink | *99.9992%~ 99.9999999992%* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B.* |
| Uplink | *99.9992%~ 99.99999999%* | *Yes* | *For evaluation configuration B (700 MHz), Channel model A/B.* |
| **5.2.4.3.12** Mobility classes *(4.11)* | eMBB | Indoor Hotspot – eMBB | Uplink | Stationary, Pedestrian | *Stationary, Pedestrian* | *Yes* | *For all evaluation configurations in Indoor Hotspot – eMBB.* |
| eMBB | Dense Urban – eMBB | Uplink | Stationary, Pedestrian,  Vehicular (up to 30 km/h) | *Stationary, Pedestrian,*  *Vehicular (up to 30 km/h)* | *Yes* | *For all evaluation configurations in Dense Urban – eMBB* |
| eMBB | Rural – eMBB | Uplink | Pedestrian, Vehicular, High speed vehicular | *Pedestrian, Vehicular, High speed vehicular* | *Yes* | *For all evaluation configurations in Rural - eMBB* |
| **5.2.4.3.13**  Mobility Traffic channel link data rates (bit/s/Hz) *(4.11)* | eMBB | Indoor Hotspot – eMBB | Uplink | 1.5 (10 km/h) | *1.59~3.85* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B, LOS and NLOS.* |
| eMBB | Dense Urban – eMBB | Uplink | 1.12 (30 km/h) | *1.79~4.58* | *Yes* | *For evaluation configuration A (4 GHz), Channel model A/B, LOS and NLOS.* |
| eMBB | Rural – eMBB | Uplink | 0.8 (120 km/h) | *1.54~2.91* | *Yes* | *For evaluation configuration A (700 MHz), Channel model A/B, LOS and NLOS.* |
| 0.45 (500 km/h) | *1.28~2.43* | *Yes* |
| 0.8 (120 km/h) | *1.16~2.68* | *Yes* | *For evaluation configuration B (4 GHz), Channel model A/B, LOS and NLOS.*  *.* |
| 0.45 (500 km/h) | *0.83~1.56* | *Yes* |
| **5.2.4.3.14** Mobility interruption time (ms)  *(4.12)* | eMBB and URLLC | Not applicable | Not applicable | 0 | *0* | *Yes* |  |
| **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* |  |
| 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.  (4) Refer to § 7.3.1 of Report ITU-R M.2412-0. | | | | | | | |

1. 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. [↑](#footnote-ref-1)