Overview of 3GPP Submission *and* Compliance to IMT-2020 Requirements

Workshop on 3GPP submission towards IMT-2020
(October 24-25, 2018)

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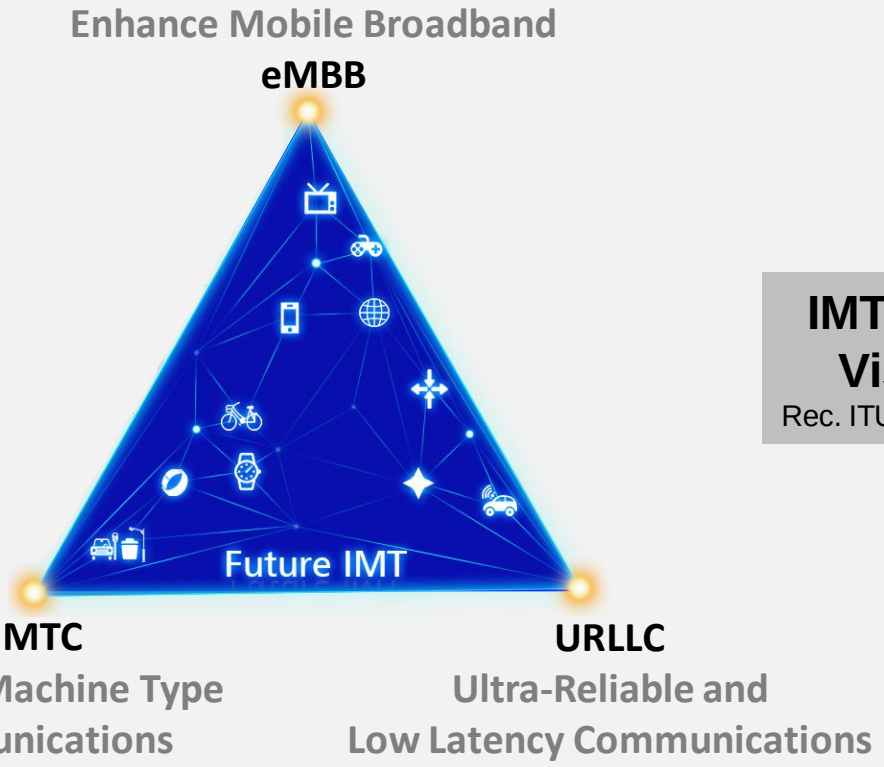
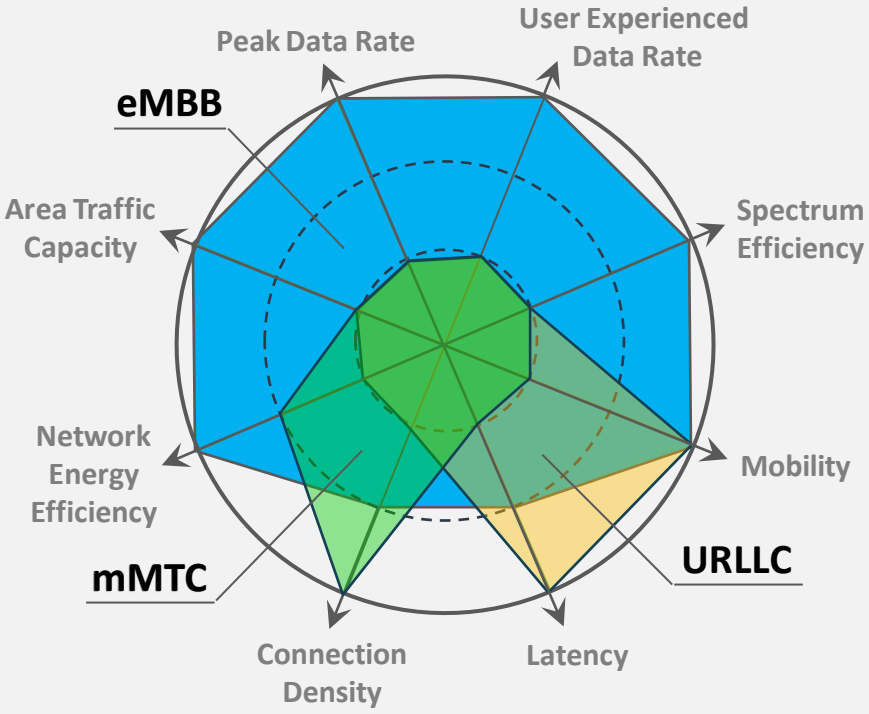
3GPP 5G meets IMT-2020 vision



IMT-2020 usage scenario

Diverse services

IMT-2020 Vision
Rec. ITU-R M.2083



IMT-2020 Key capabilities

Diverse requirements

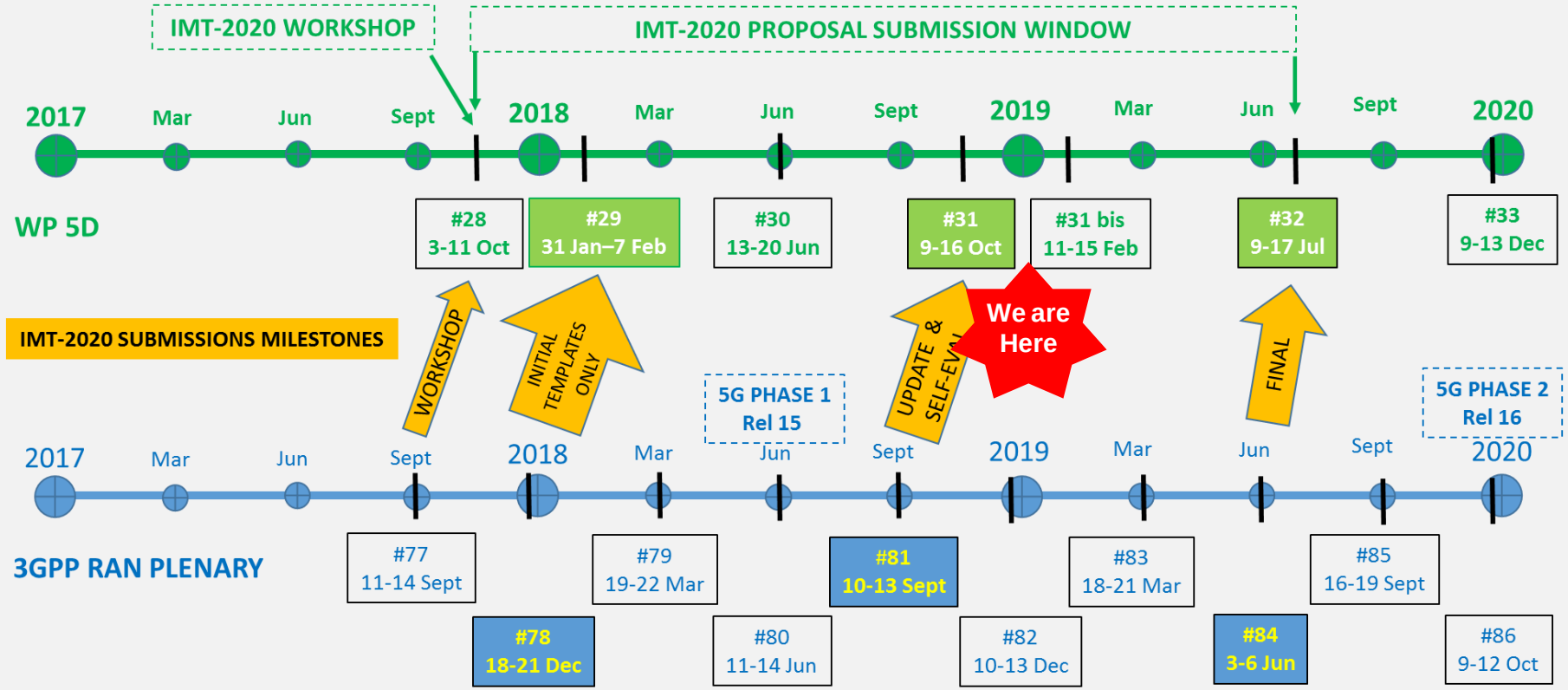
3GPP "5G" aims to meet IMT-2020 vision capabilities

Overview of 3GPP submission

Name : 5G

Footnote: Developed by 3GPP as 5G, Release 15 and beyond

- *Submission 1:* **SRIT**
  - Component RIT: **NR**
  - Component RIT: **EUTRA / LTE**
  - Include LTE-NR Dual connectivity (DC)
- *Submission 2:* **NR RIT**



3GPP provided updated submission with preliminary self evaluation to WP 5D in LAST WEEK

3GPP submission templates

According to Report ITU-R M.2411 "*Requirements, Evaluation criteria, and submission templates for the development of IMT-2020***".**

3GPP provided the following submission templates and preliminary self evaluation

Description templates

Characteristics templates (RP-182052)

- For SRIT (NR+LTE)
- For NR RIT

Link budget template (RP-182110)

- NR in 4 test environments,
- LTE in 2 test environments

Compliance templates

Compliance templates (RP-182053)

- For SRIT (NR+LTE)
- For NR RIT

On

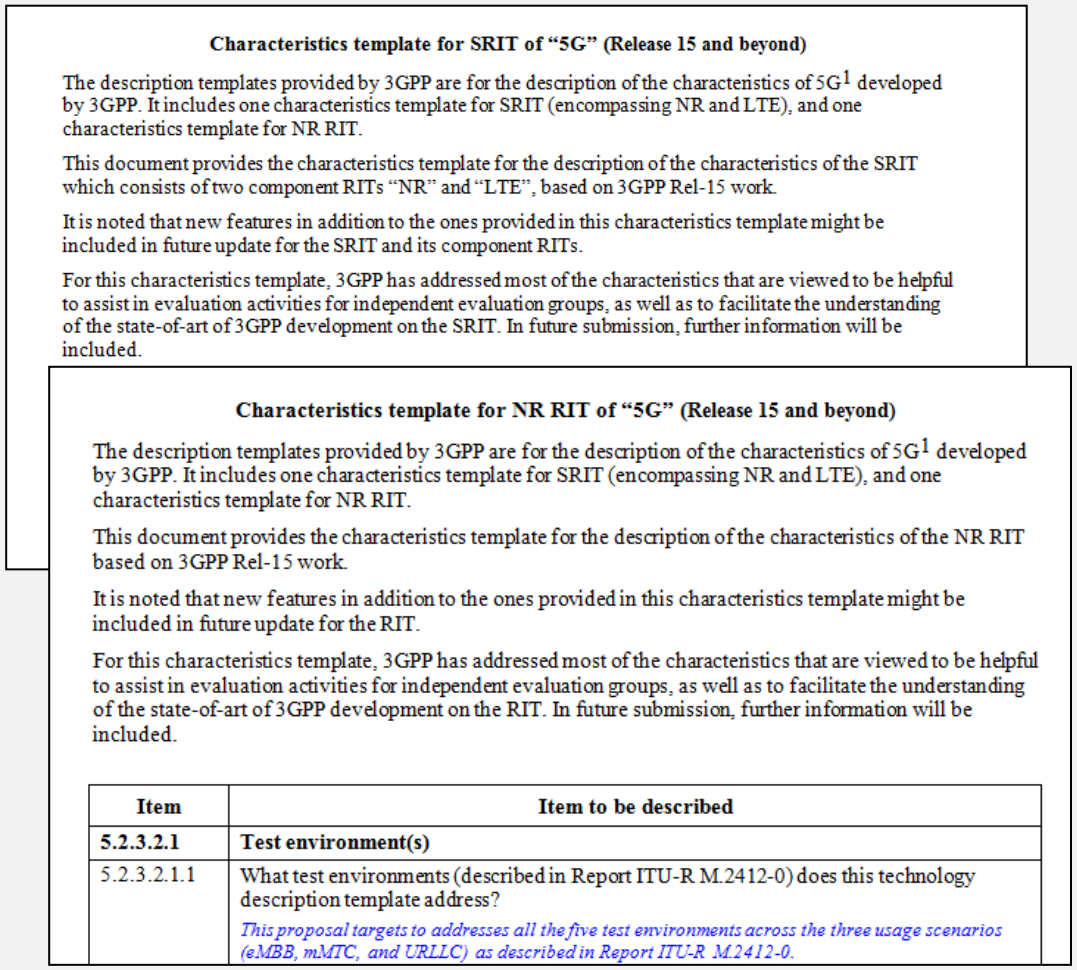
✓ Service, Spectrum and Technical performance requirement

Self evaluation report TR37.910v1.0.0

- Based on evaluation guidelines defined in Report ITU-R M.2412.
- **Preliminary results for Rel-15**
  - ✓ ***NR RIT***: 5 test environments for eMBB, URLLC and mMTC
  - ✓ ***LTE RIT***: Rural – eMBB and Urban Macro – mMTC
  - ✓ May be further updated before final submission

IMT-2020 submission

3GPP Submission Templates
Description templates - Characteristics



Characteristics template for SRIT of "5G" (Release 15 and beyond)

The description templates provided by 3GPP are for the description of the characteristics of 5G[1] developed by 3GPP. It includes one characteristics template for SRIT (encompassing NR and LTE), and one characteristics template for NR RIT.

This document provides the characteristics template for the description of the characteristics of the SRIT which consists of two component RITs "NR" and "LTE", based on 3GPP Rel-15 work.

It is noted that new features in addition to the ones provided in this characteristics template might be included in future update for the SRIT and its component RITs.

For this characteristics template, 3GPP has addressed most of the characteristics that are viewed to be helpful to assist in evaluation activities for independent evaluation groups, as well as to facilitate the understanding of the state-of-art of 3GPP development on the SRIT. In future submission, further information will be included.

Characteristics template for NR RIT of "5G" (Release 15 and beyond)

The description templates provided by 3GPP are for the description of the characteristics of 5G[1] developed by 3GPP. It includes one characteristics template for SRIT (encompassing NR and LTE), and one characteristics template for NR RIT.

This document provides the characteristics template for the description of the characteristics of the NR RIT based on 3GPP Rel-15 work.

It is noted that new features in addition to the ones provided in this characteristics template might be included in future update for the RIT.

For this characteristics template, 3GPP has addressed most of the characteristics that are viewed to be helpful to assist in evaluation activities for independent evaluation groups, as well as to facilitate the understanding of the state-of-art of 3GPP development on the RIT. In future submission, further information will be included.

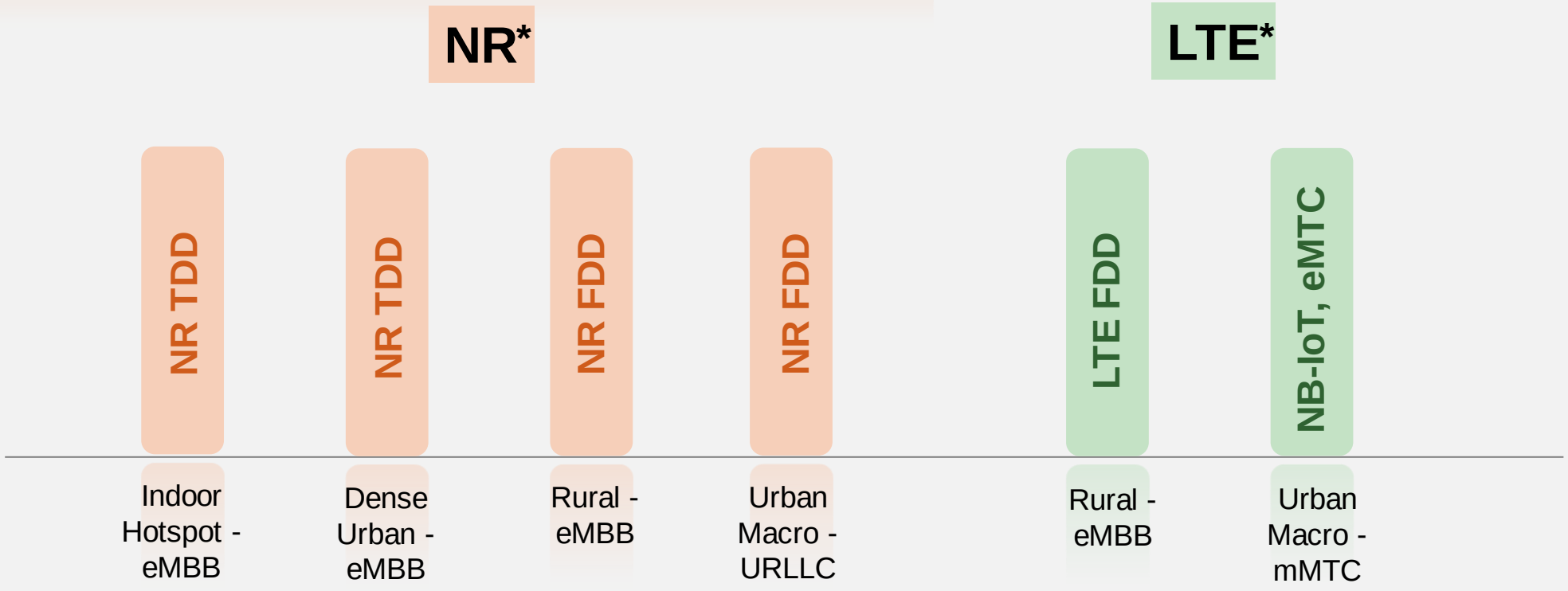
Item	Item to be described
5.2.3.2.1	**Test environment(s)**
5.2.3.2.1.1	What test environments (described in Report ITU-R M.2412-0) does this technology description template address? *This proposal targets to addresses all the five test environments across the three usage scenarios (eMBB, mMTC, and URLLC) as described in Report ITU-R M.2412-0.*

- 3GPP provided characteristics description for SRIT (NR+LTE) and NR RIT for most items.
- The description on new and key functionalities are the basis for ITU evaluation.

- Test environment(s)
- Radio interface functional aspects (multiple access, modulation, PAPR, coding scheme)
- Channel tracking capabilities (e.g., pilot symbol configuration)
- Physical channel structure and multiplexing
- Mobility management (Handover)
- Radio resource management
- Frame structure
- Spectrum capabilities and duplex technologies
- Support of Advanced antenna capabilities
- Link adaptation and power control
- Power classes
- Scheduler, QoS support and management, data services
- Radio interface architecture and protocol stack
- Cell selection
- Location determination mechanisms
- Priority access mechanisms
- Unicast, multicast and broadcast
- Privacy, authorization, encryption, authentication and legal intercept schemes
- Frequency planning
- Interference mitigation within radio interface
- Synchronization requirements
- Support for wide range of services
- Global circulation of terminals
- Energy efficiency
- Other items

Description templates – Link budget

- 3GPP provided initial link budget for NR and LTE, respectively.
- The coverage capability of 3GPP 5G is verified.

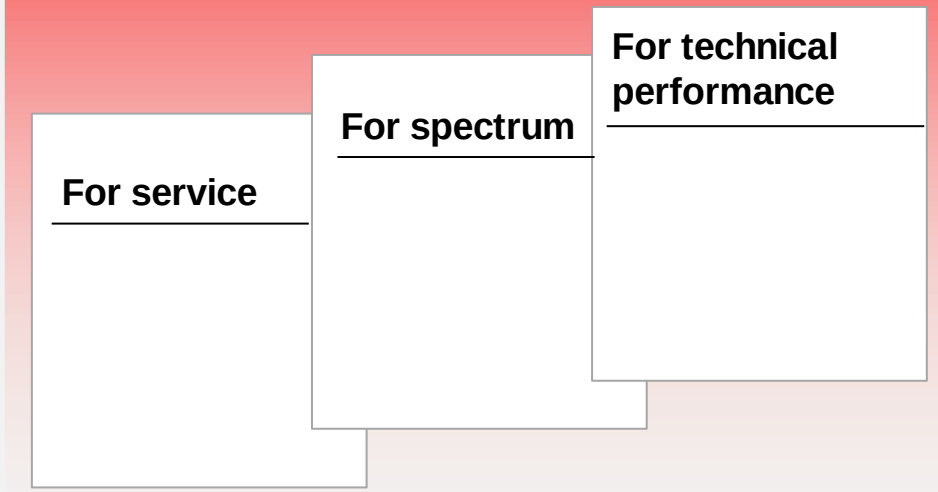


*** For both channel model A and B**

3GPP Submission Templates
Compliance templates

Compliance templates

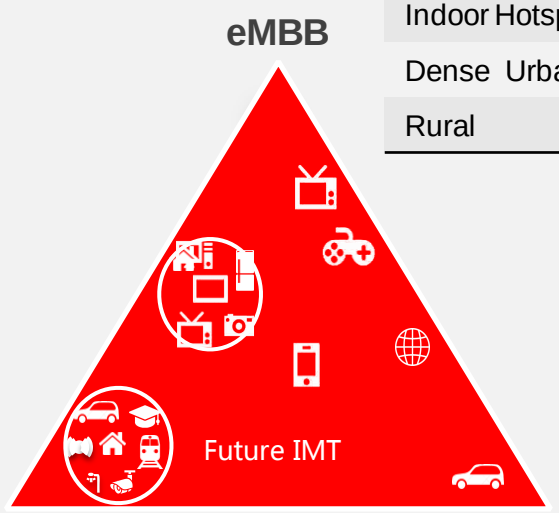
- **To assess the compliance of the proposal with the minimum requirements**



- 3GPP provided initial compliance template for
  - **SRIT** (NR+LTE)
  - **NR RIT**
  - Based on the preliminary self evaluation results.
- The compliance assessment is applied to IMT-2020 requirements as defined in Report ITU-R M.2411, including
  - Service requirement
  - Spectrum requirement
  - Technical performance requirements.
- It is shown that both SRIT and NR RIT are fully compliant with IMT-2020 requirements.

Self evaluation report TR 37.910

- TR 37.910 v1.0.0 provides the preliminary assessment of 3GPP 5G towards IMT-2020 requirements



	NR	LTE
Indoor Hotspot	✓	TBD
Dense Urban	✓	TBD
Rural	✓	✓

mMTC

	NR	LTE
Urban Macro	✓	✓

URLLC

	NR	LTE
Urban Macro	✓	TBD

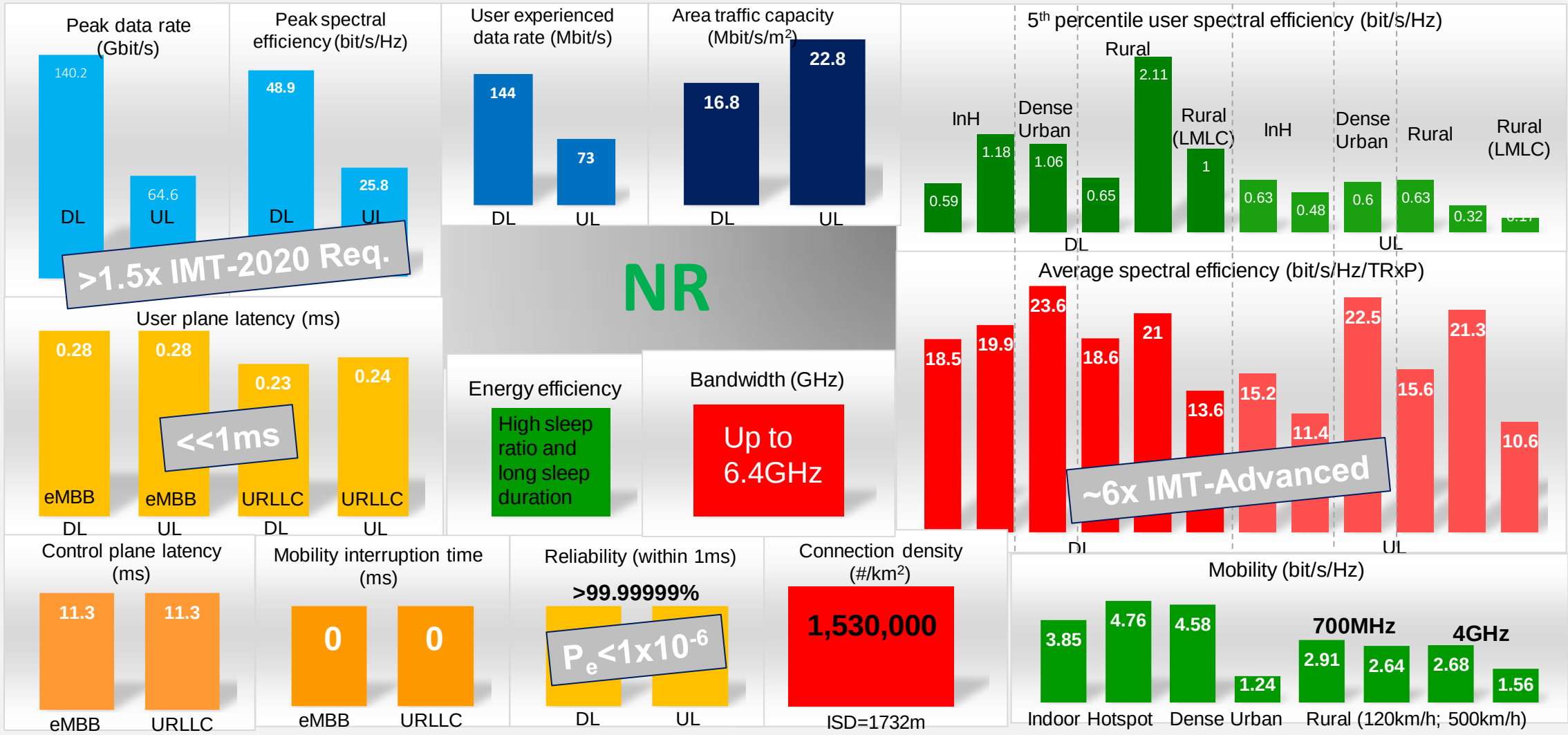
3GPP Compliance to Service and Spectrum Requirement

	Service capability requirements	SRIT (NR+LTE)	NR RIT
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/NO Specify which usage scenarios (eMBB, URLLC, and mMTC) the candidate RIT or candidate SRIT can support.	*YES* *The SRIT can support eMBB, URLLC and mMTC usage scenarios.*	*YES* *The NR RIT can support eMBB, URLLC and mMTC usage scenarios.*
	Spectrum capability requirements	**SRIT (NR+LTE)**	**NR RIT**
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 /NO Specify in which band(s) the candidate RIT or candidate SRIT can be deployed.	*YES* *LTE RIT supports the IMT band from 450 MHz to 5925 MHz.* *NR RIT supports the IMT band from 663 MHz to 5000 MHz.* *See Section 5.2.3.2.8.3 in characteristics template for details.*	*YES* *NR RIT supports the IMT band from 663 MHz to 5000 MHz, including 3.3-3.8; 3.3-4.2 GHz. See Section 5.2.3.2.8.3 in characteristics template for NR RIT for details.*
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)	*YES* *NR RIT supports 24.25-27.5; 27.5-28.35; 26.5-29.5; 37-40 GHz.*	*YES* *NR RIT supports 24.25-27.5; 27.5-28.35; 26.5-29.5; 37-40 GHz.*

NOTE 1 – In the case of the candidate SRIT, at least one of the component RITs need to fulfil this requirement.

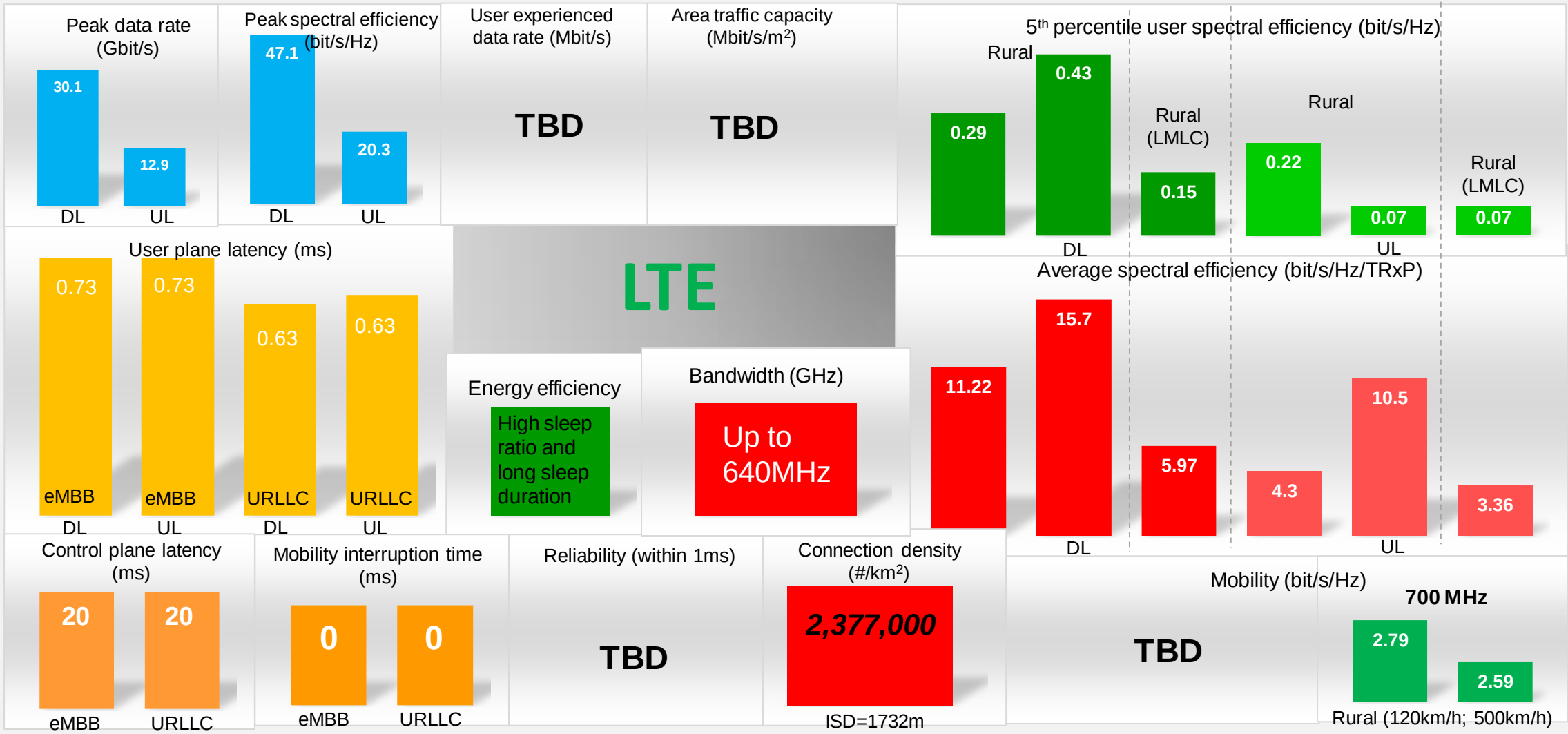
3GPP Compliance to Technical Performance Requirement

- **For NR RIT, Rel-15 is evaluated; further update might be made before final submission**



3GPP Compliance to Technical Performance Requirement

- **For LTE RIT, Rel-15 is evaluated; further update might be made before final submission**



3GPP Compliance to Technical Performance Requirement

Usage scenario	Sub-items	Evaluation method	Test environment				
			eMBB			mMTC	URLLC
			Indoor hotspot	Dense urban	Rural	Urban macro	Urban macro
eMBB	Peak data rate	Analysis	■	■	■		
	Peak spectral efficiency	Analysis	■	■	■		
	User experienced data rate	Analysis, or SLS (for multi-layer)		■			
	5th percentile user spectral efficiency	SLS	■	■	■		
	Average spectral efficiency	SLS	■	■	■		
	Area traffic capacity	Analysis	■				
	Energy efficiency	Inspection	■	■	■		
	Mobility	SLS + LLS	■	■	■		
eMBB, URLLC	User plane latency	Analysis	■	■	■		■
	Control plane latency	Analysis	■	■	■		■
	Mobility interruption time	Analysis	■	■	■		■
URLLC	Reliability	SLS + LLS					■
mMTC	Connection density	SLS + LLS, or Full SLS				■	
General	Bandwidth and Scalability	Inspection	■	■	■	■	■

***Both* 5G SRIT and NR RIT are compliant with all technical performance requirements**

Summary

- 3GPP provided all necessary templates and preliminary self evaluation results towards IMT-2020 submission based on Rel-15 work.
- Preliminary evaluation shows that 3GPP 5G meets all IMT-2020 requirements.
- Independent evaluation groups are welcome to refer to these materials to prepare the evaluation activity.

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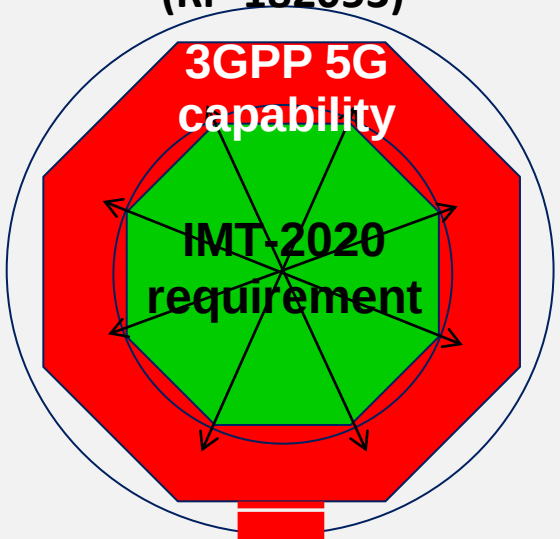

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IMT-2020 submission

Thanks to all contributors!

THANK YOU

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