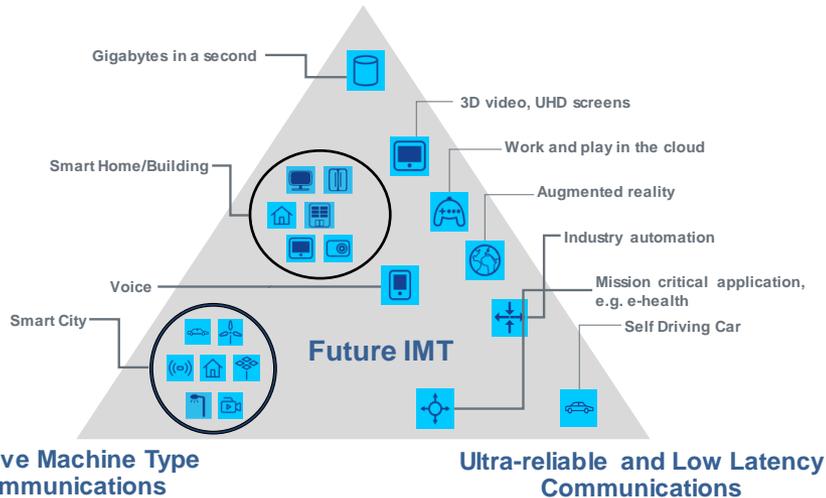


Industry Vision and Schedule for the New Radio Part of the Next Generation Radio Technology

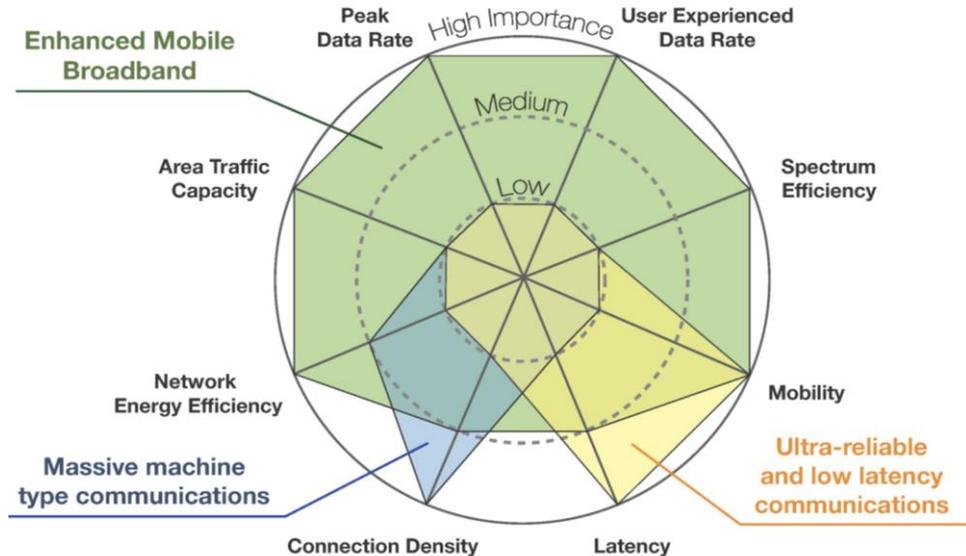
**Nokia Networks, Ericsson, Qualcomm, NTT DOCOMO,
Samsung, SK-Telecom, Sony, Intel, KT, Panasonic, Verizon,
Softbank, Kyocera, Mitsubishi, Sumitomo Electric, Hitachi,
NEC, Fujitsu, Sharp, ETRI, Straight Path Communications,
KDDI, InterDigital**

ITU-R vision for IMT-2020 and beyond

Enhanced Mobile Broadband



Three use case categories



Eight Key Capabilities

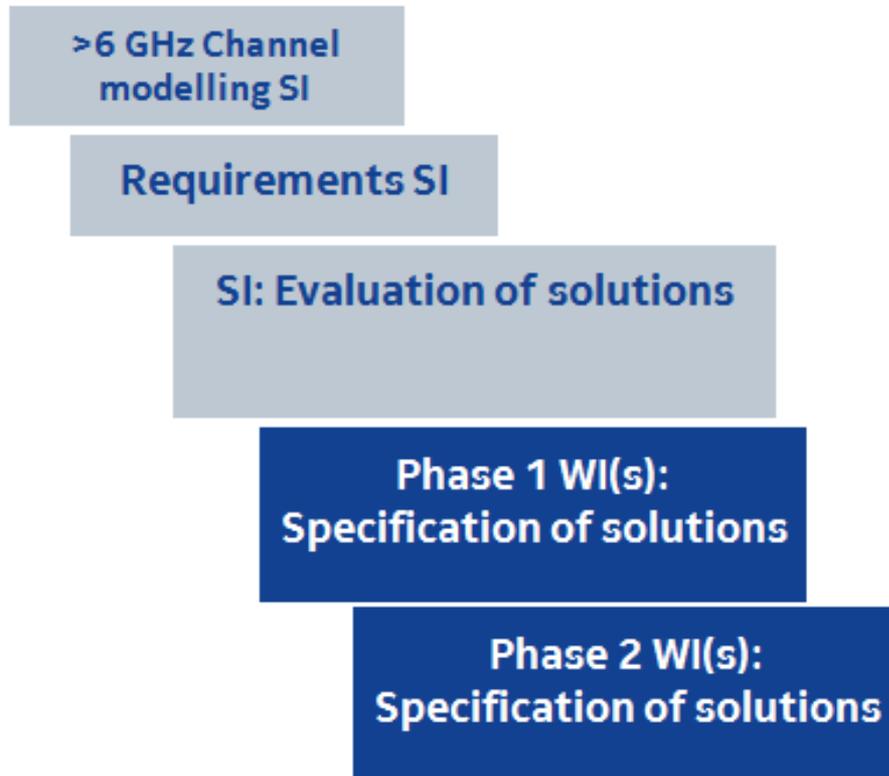
“Framework and overall objectives of the future development of IMT for 2020 and beyond”

Source: ITU-R M.[IMT.VISION]

5G overall picture

5G system to be designed to meet the needs of 2020 and beyond
2020 deployment needs are a subset of the full IMT-2020 capabilities

'5G' to be standardized in phases



5G study phase

5G Technical Studies shall start from March 2016, including support for eMBB, uMTC, mMTC and other uses cases

Frequency range

Supported up to 100 GHz

Deployment models

All

Interworking with LTE

Including dual-connectivity

Study to prioritize work according to phasing

eMBB – Enhanced Mobile Broadband
uMTC – Ultra-reliable and Low-latency Communications
mMTC – Massive Machine Type Communications

'5G' standards – Phase I of the New RAT

Phase I introduces the New RAT (not backwards compatible to LTE)

Phase I optimized for eMBB use case, but can be used for other uses cases as well
Tight LTE integration

Frequency & Bandwidth

L1 support for a wide spectrum range, up to at least 30...40 GHz
TDD, FDD and unlicensed
Optimize L1 for 100 MHz or higher carrier bandwidth

Energy efficiency

Minimized overhead channels

Deployments

Urban Macro
Urban Micro
Indoor Hotspot

Waveform

Flexible numerology
OFDM-based, potentially with non-orthogonal waveform and multiple access

20 Gbps peak rate

1 ms latency

Scalable (Variable) TTI
Minimum TTI of 100 μ s order

Phase I of the New RAT must be forward compatible with Phase II and beyond, and is not backwards compatible to LTE

Phase I is a stepping-stone on the path to the IMT-2020 system of Phase II

'5G' standards – Phase II of the New RAT

Phase II optimized for all '5G' use cases

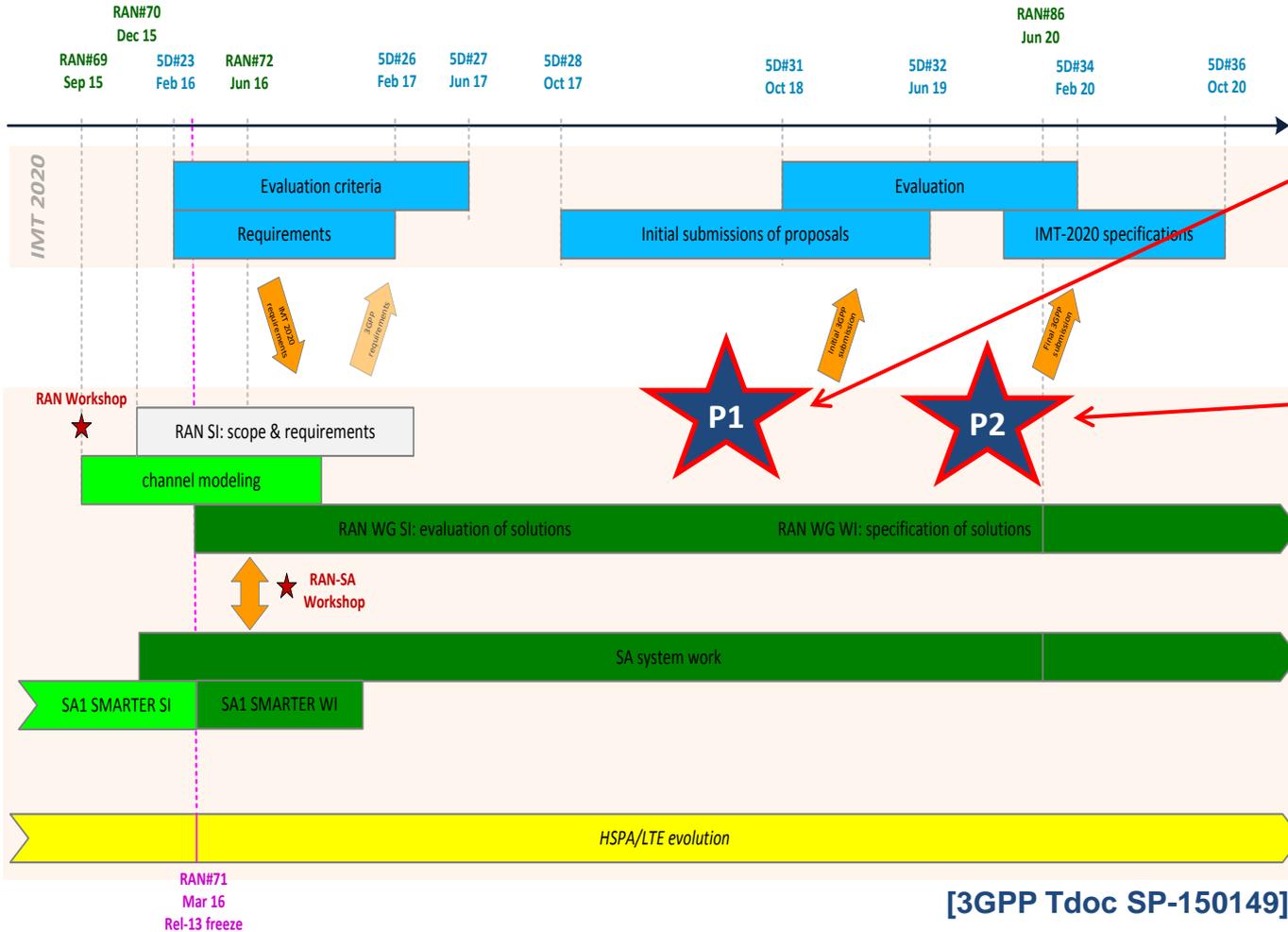
The 3GPP candidate SRIT for ITU-R (potentially together with LTE evolution)

Frequency bands	Deployments	Capabilities
~0.3...~100 GHz TDD, FDD (flexible duplex)	All	Meets all ITU-R requirements and additional ones identified in 3GPP

Future proof design essential for further evolution of '5G' beyond Phase II
Flexible design to allow new service introduction using the same network and same carrier frequency

SRIT – Set of Radio Interface Technologies

3GPP timeline and phasing of '5G'



Phase I specifications should be completed in Sept 2018

Phase II specifications should be completed in Dec 2019

Phase I for early commercial deployment of 'initial new RAT'
Phase II for 'Full 5G' and final ITU-R submission

Summary

- 📶 3GPP needs to define the next generation mobile communication system meeting the needs of the next decade – and beyond
- 📶 The more imminent deployment needs are a subset of the overall next generation system capabilities
- 📶 3GPP should phase its work and thus ensure both the short term and long term needs can be met efficiently
- 📶 The time allocated to LTE work in RAN WGs should be sufficiently kept, parallel sessions for dealing with the new studies needed.