

Radio Spectrum and Technical Standards Advisory Committee

SSAC Paper 7/2019 for Information:

Brief on Local Standards
for 5G Radio Equipment Certification

Office of the Communications Authority
30 September 2019

Legal Basis of Equipment Certification

Telecommunications Ordinance (Cap. 106) empowers the Communications Authority (CA) to -

- **prescribe telecommunications standards**
- **require testing and certification of telecommunications equipment against prescribed standards**
- **accredit organisations for the purposes of testing and/or certification of telecommunications equipment**



HKTEC Scheme

- Certification of radio equipment for use in Hong Kong is governed by the Hong Kong Telecommunications equipment Evaluation and Certification (**HKTEC**) Scheme
- CA prescribes technical standards in terms of **HKCA Specifications** for radio equipment and fixed network equipment –
 - based on widely recognized international standards
 - to prevent interference and ensure network compatibility, among others



Type-approval vs Type-acceptance

Type-approval

- Radio equipment which has been evaluated against and meets the relevant **HKCA specifications** may be granted a type-approval

Type-acceptance

- For radio equipment without relevant HKCA specifications for type-approval evaluation (for instance, no available international standard)
- Equipment certification can be applied against the relevant **Type Acceptance Criteria** prescribed by the CA

Certification Requirements

Radio Base Station Equipment (RBS)

- **Compulsory Certification**

- Equipment must be certified against the relevant HKCA specifications or Type Acceptance Criteria before it can be used under licence

User Equipment (UE), such as mobile phones

- **Voluntary Certification**

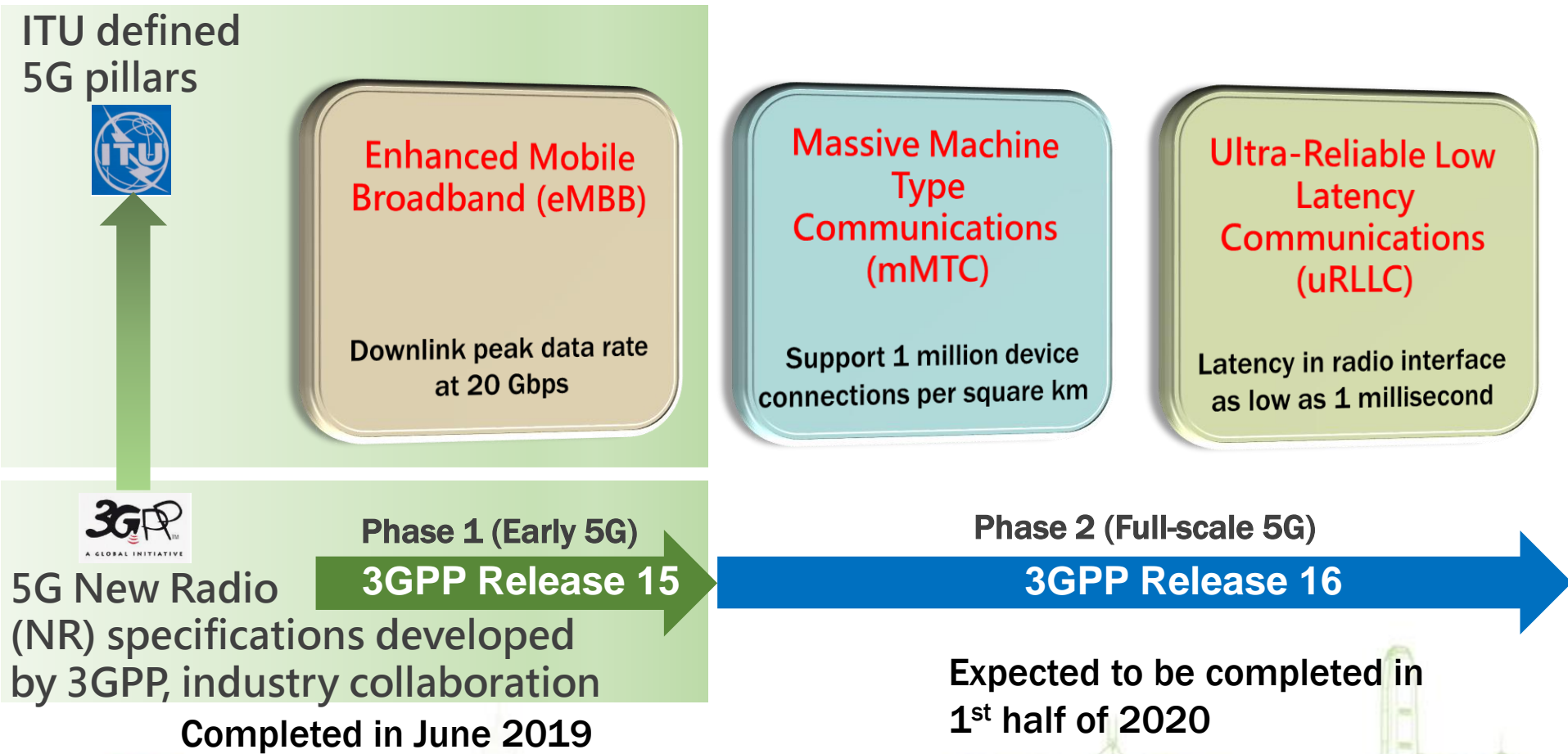
- Manufacturers, suppliers and dealers must ensure that their equipment comply with the relevant HKCA specifications or Type Acceptance Criteria even if they do not apply for certification



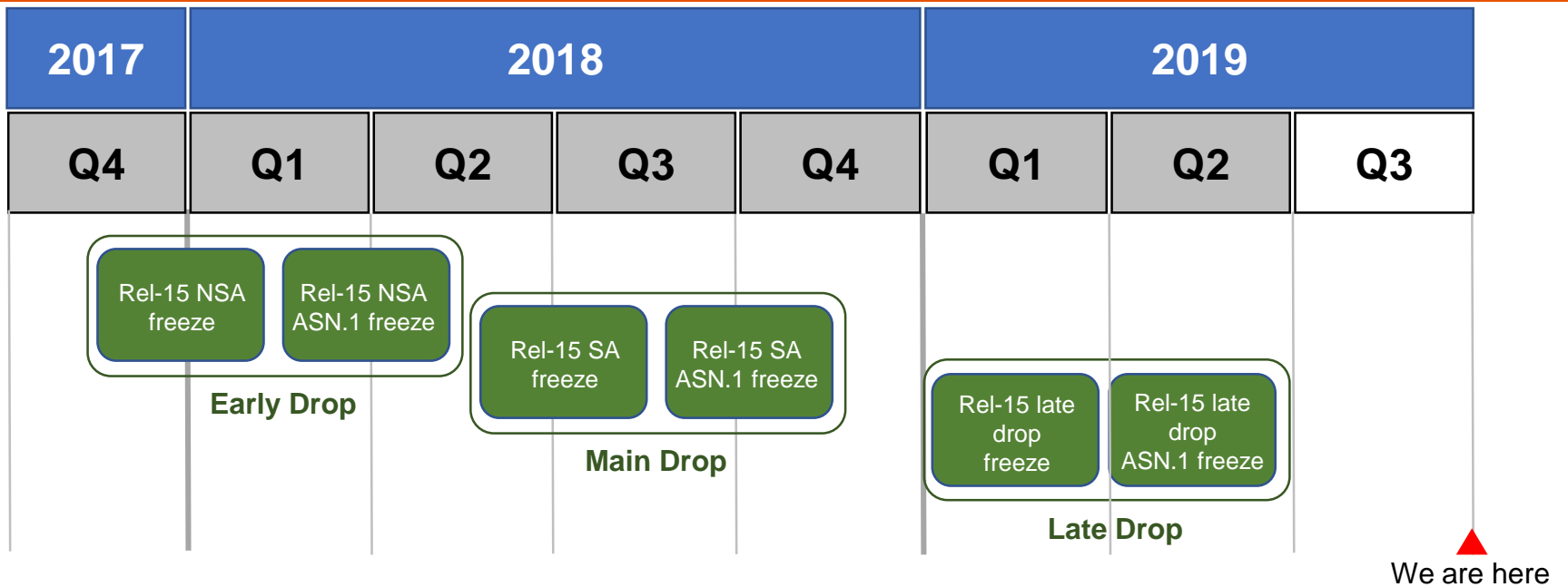
Certification Procedure

- **Local Certification Bodies (LCBs)** are accredited to provide services for type-approval or type-acceptance of radio equipment
- Manufacturers, suppliers or dealers may submit full sets of test reports of their equipment to a LCB for certificate application
- More information are available from OFCA's website –
 - guidelines on “*How To Apply for Type-approval or Type-acceptance of Radio Equipment*”
<https://www.ofca.gov.hk/filemanager/ofca/common/Industry/telecom/standard/i401e.pdf>
 - a list of LCBs with their contact information and scope of service
https://www.ofca.gov.hk/en/industry_focus/telecommunications/standards/telecom/list_of_certification_bodies/index.html

Fifth Generation (5G) Mobile Service

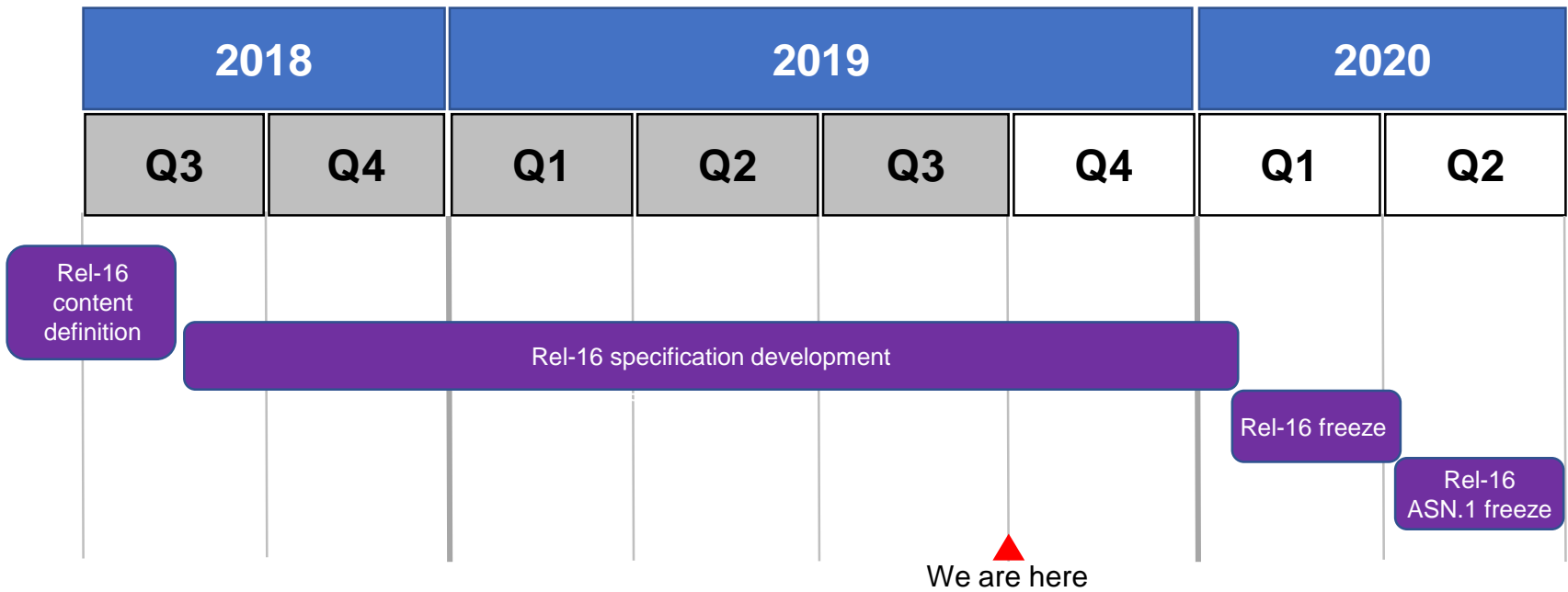


5G NR Phase 1



- **3GPP Release 15** targets at **eMBB** for “5G NR Phase 1” -
 - **1st step: Non-standalone (NSA):** leverage on existing LTE deployments (i.e. LTE core, LTE-anchor, LTE-NR Dual Connectivity)
 - **2nd step: Standalone (SA):** full user and control capabilities for 5G NR and 5G core
- NSA and SA share **common 5G NR physical layer specifications** for **air interface**

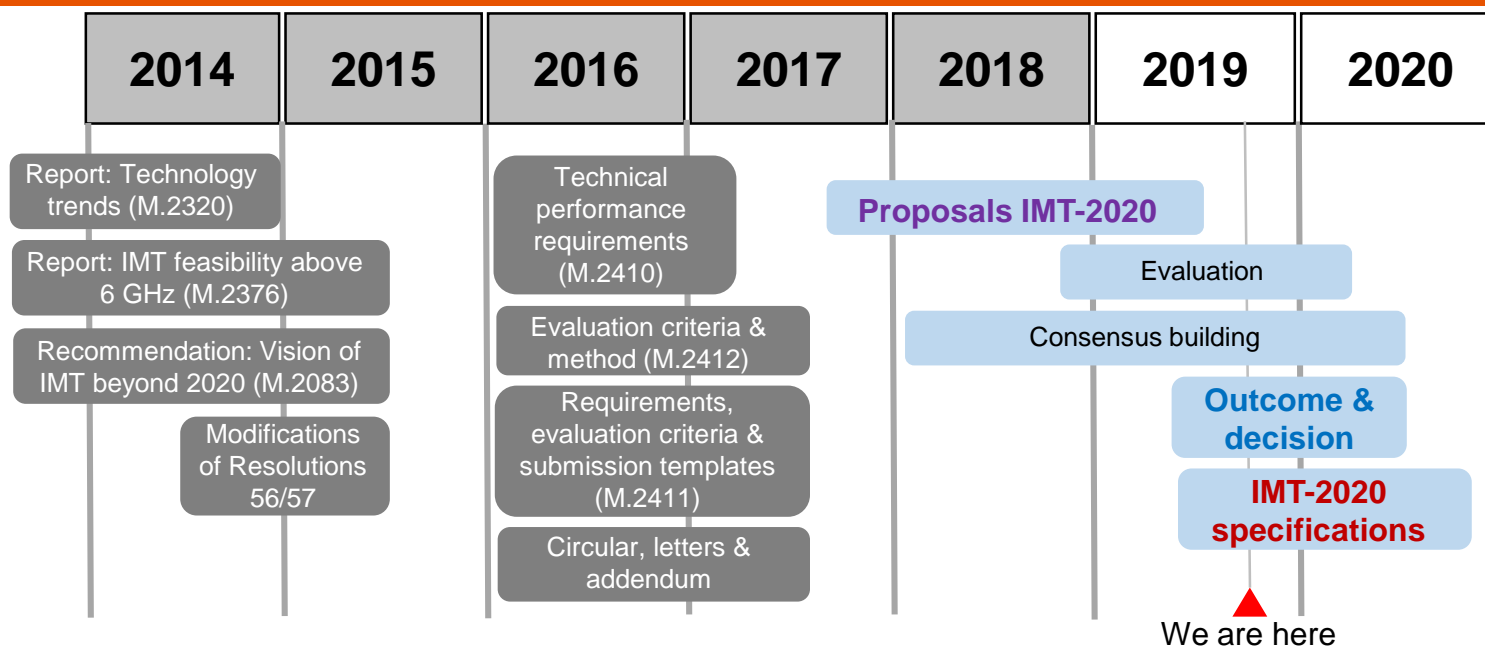
5G NR Phase 2



- **3GPP Release 16 for "5G NR Phase 2" -**

- expected to be completed in **June 2020** focusing on vertical deployments
 - ▶ including Vehicle-to-Everything, Industrial IoT and uRLLC enhancements and 5G NR Operation in unlicensed bands and overall system improvements

5G Standardization by ITU-R



- 3GPP, Korea and China made respective submissions to ITU Working Party 5D (WP5D) in **July 2019**
- ITU-R will decide on the selected candidate technologies in **June 2020**. WP5D will draft new ITU-R recommendation for the relevant specifications anticipated to be completed by **November 2020**

Allocation of Spectrum for 5G Services in Hong Kong

The CA has decided to release the following bands for public mobile (including 5G) services in Hong Kong -

Sub-6 GHz Bands

- 3.3 GHz band (3.3 – 3.4 GHz)
- 3.5 GHz band (3.4 – 3.6 GHz)
- 4.9 GHz band (4.84 – 4.92 GHz)

Millimeter Wave Bands

- 26 GHz band (24.25 – 27.5 GHz)
- 28 GHz band (27.5 – 28.35 GHz)
- Collectively referred to as the 26/28 GHz Bands

Type Acceptance Criteria for 5G NR Equipment

- Pending for the issue of international standards, **Type Acceptance Criteria** will be prescribed to cover 5G NR equipment
- Adopt minimum performance requirements in relevant **3GPP specifications (Rel-15)** for conformity assessment of Base Station (**BS**) and User Equipment (**UE**) –
 - **Sub-6 GHz Bands**
 - ▶ TS 38.141-1 for 5G NR BS
 - ▶ TS 38.521-1 for 5G NR UE
 - **26/28 GHz Bands**
 - ▶ TS 38.141-2 for 5G NR BS
 - ▶ TS 38.521-2 for 5G NR UE

Four Sets of Type Acceptance Criteria for 5G NR Equipment

Stage 1 – 26/28 GHz Bands (already issued in April 2019)

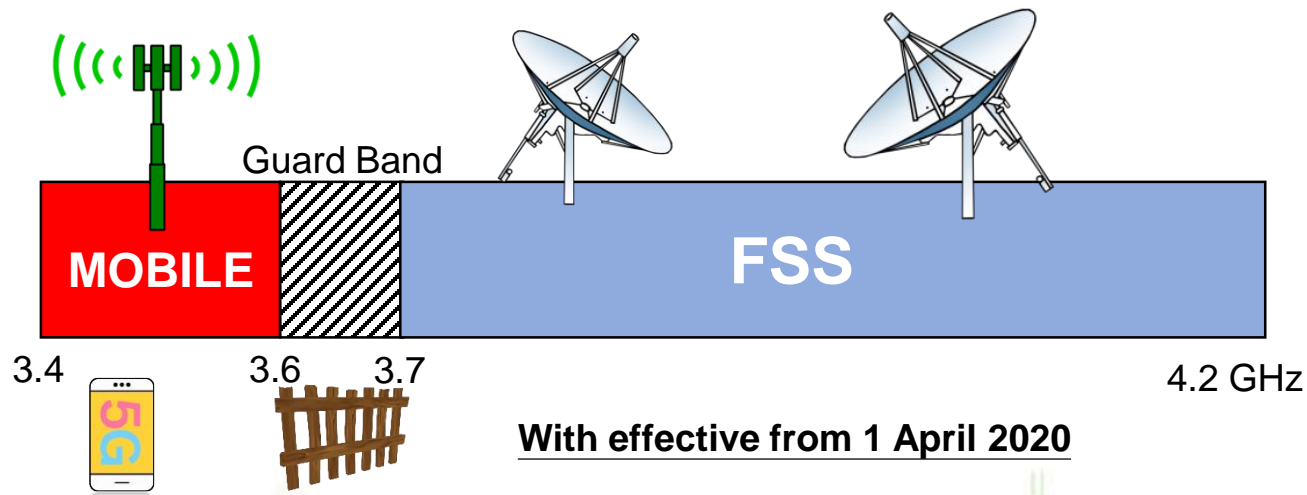
1. Type Acceptance Criteria for 5G NR BS Operating in the 26/28 GHz Bands
2. Type Acceptance Criteria for 5G NR UE Operating in the 26/28 GHz Bands

Stage 2 - Sub-6 GHz Bands (to be issued in December 2019)

3. Type Acceptance Criteria for 5G NR BS Operating below 6 GHz Band
4. Type Acceptance Criteria for 5G NR UE Operating below 6 GHz Band

Special Requirements on Sub-6 GHz Bands in Hong Kong

Frequency Band	Special Requirements
3.3 – 3.4 GHz	Limited to indoor use only
3.4 – 3.6 GHz 4.84 – 4.92 GHz	<u>Additional Requirement *</u> Spurious emissions of 5G base station falling on the adjacent 3.7 – 4.2 GHz band shall not exceed - 52 dBm/MHz in order to protect Satellite Master Antenna Television Systems which are popular in Hong Kong



With effective from 1 April 2020

* Per clause 6.6.5.2.3 of 3GPP TS 38.104 “NR Base Station Transmission and Reception”, additional spurious emission requirements may be set by local or regional regulation.

Radiation Protection Requirements for 5G NR UE : Sub-6 GHz Bands

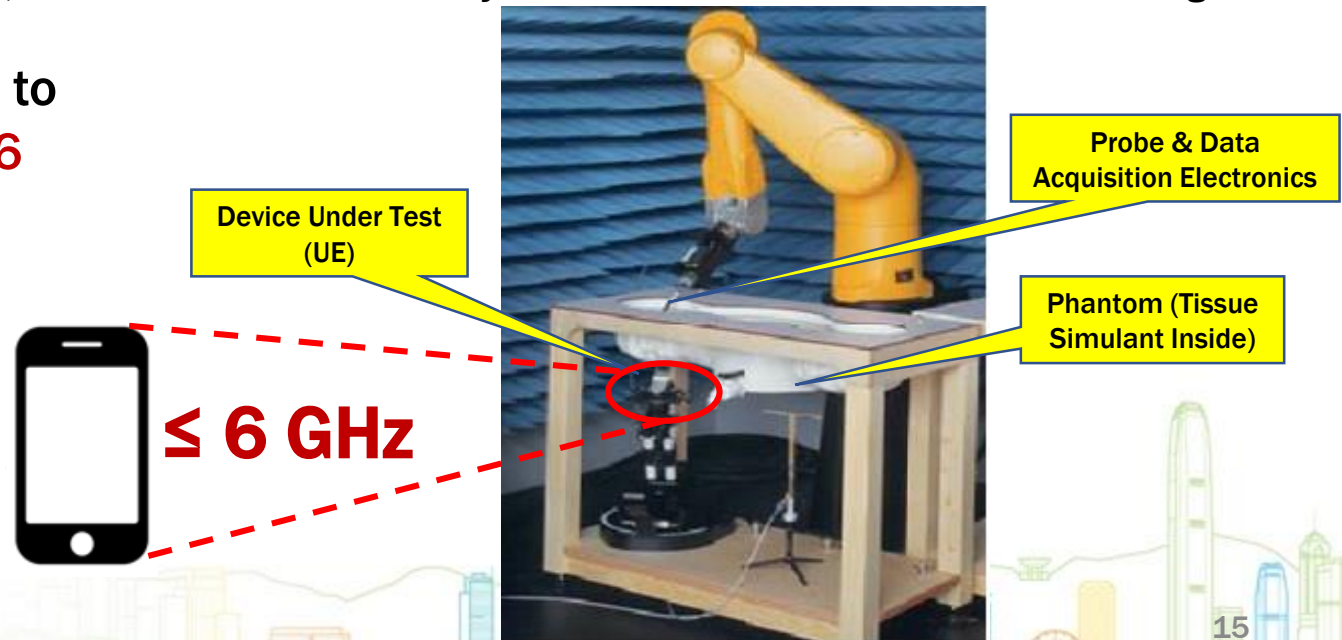
- UE operating **below 6 GHz** shall comply with the Specific Absorption Rate (**SAR**) limit for general public exposure specified in -

“Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300GHz)” issued by International Commission on Non-Ionizing Radiation Protection (ICNIRP)

or

IEEE Std C95.1 “IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz” issued by Institute of Electrical and Electronics Engineers

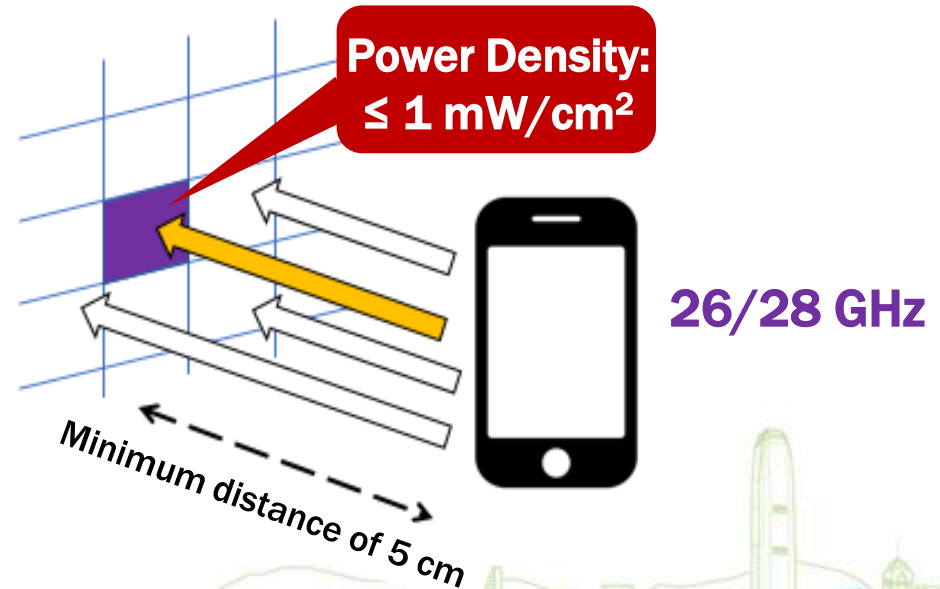
SAR limit applicable to
UE operating **below 6**
GHz is **2 W/kg**



Radiation Protection Requirements for 5G NR UE : Millimeter Wave Bands

- UE operating in the 26/28 GHz Bands will be evaluated using the Maximum Permissible Exposure (MPE) limits in accordance with FCC's 47 CFR Section 30.207

Frequency Range (MHz)	General Public / Uncontrolled Exposure	
	Power density (mW/cm ²)	Average time (minutes)
1 500 - 100 000	1.0	30



END

