

# Radio Spectrum and Technical Standards Advisory Committee

## SSAC Paper No. 2/2021

### Type Acceptance Criteria for 5G Radio Equipment Certification



Office of the Communications Authority  
4 May 2021

# Legal Basis on Equipment Certification

- Telecommunications Ordinance (Cap. 106) (“**TO**”) **Section 32D** empowers the Communications Authority (“**CA**”) to –
  - prescribe telecommunications standards
- **Section 32E of the TO** empowers the CA to –
  - 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

- Hong Kong Telecommunications equipment Evaluation and Certification (“**HKTEC**”) Scheme
  - provides for the evaluation and certification of telecommunications and ISM equipment against technical standards prescribed by the CA
- Technical standards are prescribed in the form of **HKCA specifications** or **Type Acceptance Criteria**
  - mainly set for, among others, the purposes of –
    - ▶ Prevention of interference
    - ▶ Efficient use of radio spectrum
    - ▶ Compliance with international or recognised industrial standards



# Type-approval vs Type-acceptance

## ■ Type-approval

- HKCA specifications adopt widely recognised applicable standards for regulatory control, such as
  - ▶ the harmonised European standards (“EN standards”) published by the European Telecommunications Standards Institute
  - ▶ rules of the Federal Communications Commission of the United States
- Radio equipment evaluated by the accredited certification bodies as meeting the relevant **HKCA specifications** will be granted type-approval

## ■ Type-acceptance

- If no applicable standard for regulatory control is available and hence no relevant HKCA specification is in place
  - ▶ radio equipment can be type-accepted if they meet the relevant **Type Acceptance Criteria**

# Certification Requirements

## ■ Compulsory Certification

- Equipment must be certified to comply with the relevant HKCA specifications or Type Acceptance Criteria before it can be used under a licence
- Applicable to **base station** (“**BS**”) equipment for public mobile services, microwave link equipment, private land mobile radio, etc.

## ■ Voluntary Certification

- Manufacturers, suppliers and dealers should ensure that their equipment comply with the relevant HKCA specifications or Type-Acceptance Criteria even if they choose not to apply for certification
- Applicable to **user equipment** (“**UE**”) accessing public mobile services (e.g. mobile phones, tablets), Wi-Fi access points, low power short range devices, etc. as covered under the Exemption Order, among others

# Type Acceptance Criteria for 5G New Radio (“NR”) Equipment

- Applicable EN standards have been adopted in relevant HKCA specifications for legacy generations (i.e. 2G, 3G and 4G) of mobile technologies
- Plan to adopt relevant **EN standards for 5G NR equipment to be issued by Q2 2022** in **HKCA specifications**
- In order to facilitate 5G development in Hong Kong, during the interim period
  - OFCA has started releasing **Type Acceptance Criteria for 5G NR equipment since April 2019** based on technical specifications published by the Third Generation Partnership Project (“**3GPP**”)[<sup>1</sup>](Release-15 or later)

# Type Acceptance Criteria for 5G NR Equipment (cont.)

- Seven Type Acceptance Criteria<sup>[2]</sup> have been released for 5G NR

	Issue	Date	Title
TAC 005	1	04/2019	Type Acceptance Criteria for 5G New Radio Base Station Equipment Operating in the 24.25-28.35 GHz Band
TAC 006	1	04/2019	Type Acceptance Criteria for 5G New Radio User Equipment Operating in the 24.25-28.35 GHz Band
TAC 007	2	12/2020	Type Acceptance Criteria for 5G New Radio Base Station Equipment Operating Below 6 GHz Band
TAC 008	2	12/2020	Type Acceptance Criteria for 5G New Radio User Equipment Operating Below 6 GHz Band
TAC 009	2	12/2020	Type Acceptance Criteria for 5G New Radio User Equipment for Interworking Operation with Other Radios
TAC 010	1	09/2020	Type Acceptance Criteria for 5G NR, E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station Equipment Operating Below 6 GHz
TAC 011	1	03/2021	Type Acceptance Criteria for Active Antenna System (AAS) Base Station Equipment Operating Below 6 GHz

[2] Type Acceptance Criteria are available at

[https://www.ofca.gov.hk/en/industry\\_focus/standards/tel\\_standards/information/type\\_acceptance\\_criteria/index.html](https://www.ofca.gov.hk/en/industry_focus/standards/tel_standards/information/type_acceptance_criteria/index.html)



# Type Acceptance Criteria for 5G NR Single Radio Access Technology (“RAT”) BS Equipment

## TAC 005

### “Type Acceptance Criteria for 5G New Radio Base Station Equipment Operating in the 24.25 – 28.35 GHz Band”

Equipment	5G NR Single RAT BS
Operating Frequencies	unpaired band <b>24.25 – 28.35 GHz</b>
Technical Requirements	3GPP TS 38.141-2 (NR Base Station (BS) conformance testing, Part 2: Radiated conformance testing)
Evaluation Method	3GPP TS 38.141-2
Issue Number	Issue 1
Release Date	April 2019



# Type Acceptance Criteria for 5G NR Single RAT BS Equipment (cont.)

## TAC 007

### “Type Acceptance Criteria for 5G New Radio Base Station Equipment Operating Below 6 GHz Band”

Equipment	5G NR Single RAT BS
Operating Frequencies	All bands in use for public mobile services <b>below 6 GHz</b>
Technical Requirements	3GPP TS 38.141-1 (NR Base Station (BS) conformance testing, Part 1: Conducted conformance testing)
Evaluation Method	3GPP TS 38.141-1
Issue Number	Issue 2
Release Date	December 2020

# 3GPP Specifications vs EN Standards for 5G NR Single RAT BS Equipment

## ETSI EN 301 908-24

Harmonised Standard for access to radio spectrum;  
Part 24: New Radio (NR) Base Stations (BS)

## 5G NR Single RAT BS

Frequency Range 1 (“FR1”): 410 – 7125 MHz  
Frequency Range 2 (“FR2”): 24.25 – 52.6 GHz

Forecasted Publication Date: **18 July 2022**  
will consider for adoption in **future HKCA Specifications**

## 3GPP TS 38.141-2

**5G NR single RAT BS**  
24.25 – 28.35 GHz

Adopted in **TAC 005**

## 3GPP TS 38.141-1

**5G NR single RAT BS**  
Below 6 GHz

Adopted in **TAC 007**

# Type Acceptance Criteria for 5G NR UE

## TAC 006

### “Type Acceptance Criteria for 5G New Radio User Equipment Operating in the 24.25 – 28.35 GHz Band”

Equipment	5G NR Standalone (“SA”) mode UE
Operating Frequencies	unpaired band <b>24.25 – 28.35 GHz</b>
Technical Requirements	3GPP TS 38.521-2 (NR User Equipment (UE) conformance specification, radio transmission and reception; Part 2: Range 2 Standalone)
Evaluation Method	3GPP TS 38.521-2
Issue Number	Issue 1
Release Date	April 2019

# Type Acceptance Criteria for 5G NR UE (cont.)

## TAC 008

### “Type Acceptance Criteria for 5G New Radio User Equipment Operating Below 6 GHz Band”

Equipment	5G NR <b>SA</b> mode UE
Operating Frequencies	All bands in use for public mobile services <b>below 6 GHz</b>
Technical Requirements	3GPP TS 38.521-1 (NR User Equipment (UE) conformance specification; radio transmission and reception; Part 1: Range 1 Standalone)
Evaluation Method	3GPP TS 38.521-1
Issue Number	Issue 2
Release Date	December 2020

# Type Acceptance Criteria for 5G NR UE (cont.)

## TAC 009

### “Type Acceptance Criteria for 5G New Radio User Equipment for Interworking Operation with Other Radios”

Equipment	5G NR Non-standalone (“ <b>NSA</b> ”) mode UE
Operating Frequencies	All bands in use for public mobile services <b>below 6 GHz</b> and the unpaired band of <b>24.25 – 28.35 GHz</b>
Technical Requirements	3GPP TS 38.521-3 (NR User Equipment (UE) conformance specification; radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios)
Evaluation Method	3GPP TS 38.521-3
Issue Number	Issue 2
Release Date	December 2020

# 3GPP Specifications vs EN Standards for 5G NR UE

## ETSI EN 301 908-25

Harmonised Standard for access to radio spectrum;  
Part 25: New Radio (NR) User Equipment (UE)

### 5G NR UE (SA and/or NSA mode)

FR1: 410 – 7125 MHz

FR2: 24.25 – 52.6 GHz

Forecasted Publication Date: **4 September 2022**  
will consider for adoption in **future HKCA Specifications**

### 3GPP TS 38.521-2

#### 5G NR SA mode UE

24.25 – 28.35 GHz

Adopted in **TAC 006**

### 3GPP TS 38.521-1

#### 5G NR SA mode UE

Below 6 GHz

Adopted in **TAC 008**

### 3GPP TS 38.521-3

#### 5G NR NSA mode UE

Below 6 GHz and  
24.25 – 28.35 GHz

Adopted in **TAC 009**

# Type Acceptance Criteria for 5G NR Multi-Standard Radio (“MSR”) BS Equipment

## TAC 010

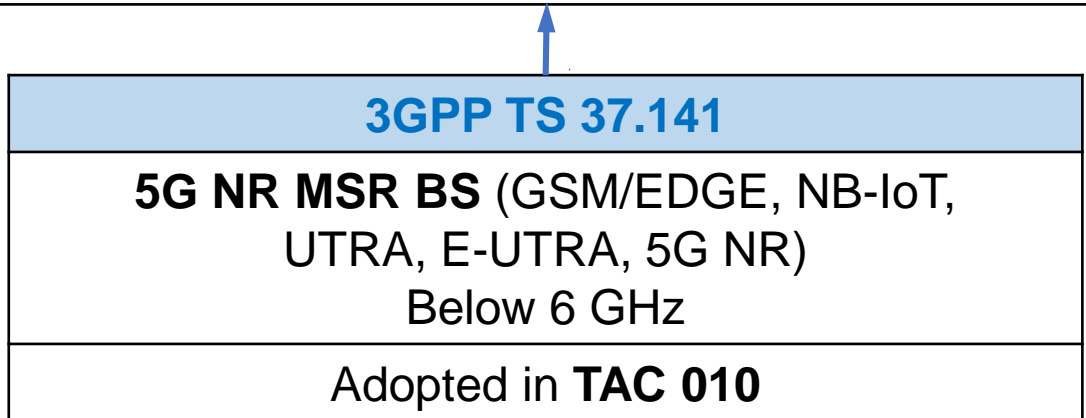
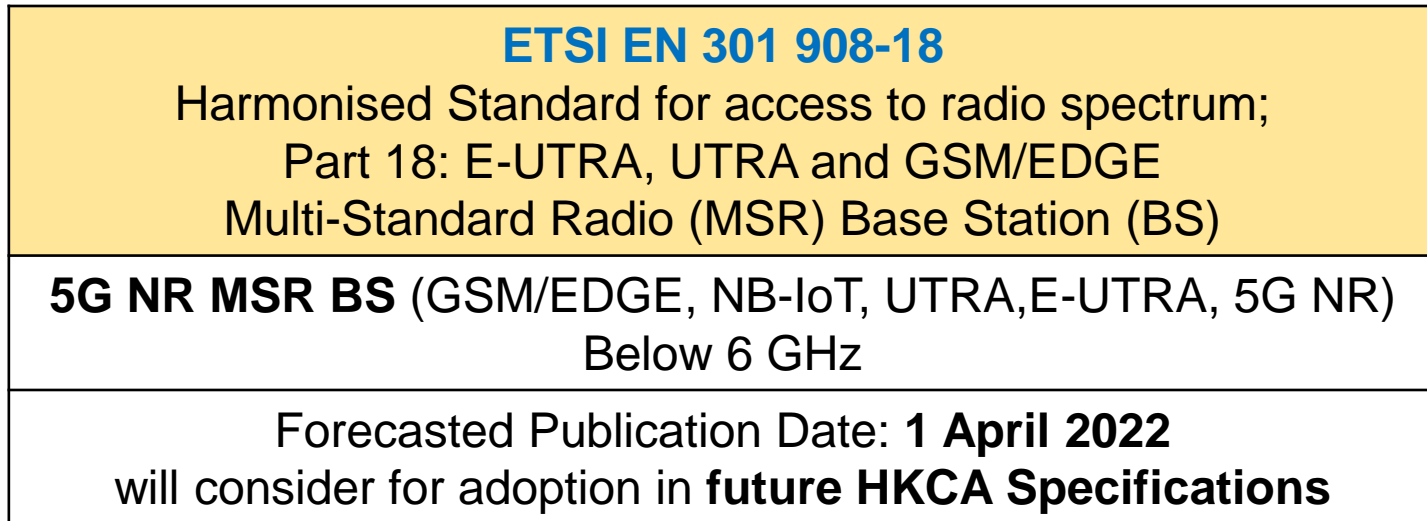
### “Type Acceptance Criteria for 5G NR, E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station Equipment Operating Below 6 GHz”

Equipment	5G NR <b>MSR</b> BS (GSM/EDGE, NB-IoT, UTRA, E-UTRA, 5G NR)
Operating Frequencies	All bands in use for public mobile services <b>below 6 GHz</b> <sup>[3]</sup>
Technical Requirements	3GPP TS 37.141 (NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing)
Evaluation Method	3GPP TS 37.141
Issue Number	Issue 1
Release Date	September 2020

[3] The unpaired band 4840 – 4920 MHz is not covered in TAC 010 since it is not covered by 3GPP TS 37.141 specification



# 3GPP Specifications vs EN Standards for 5G NR MSR BS Equipment



# Type Acceptance Criteria for Active Antenna System (“AAS”) BS Equipment

## TAC 011

### “Type Acceptance Criteria for Active Antenna System (AAS) Base Station Equipment Operating Below 6 GHz”

Equipment	<b>AAS</b> BS (single RAT UTRA, single RAT E-UTRA, and MSR (UTRA, E-UTRA, 5G NR))
Operating Frequencies	All bands in use for public mobile services <b>below 6 GHz</b> <sup>[4]</sup>
Technical Requirements	3GPP TS 37.145-1 (Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: Conducted conformance testing)
Evaluation Method	3GPP TS 37.145-1
Issue Number	Issue 1
Release Date	March 2021

[4] The unpaired band 4840 – 4920 MHz is not covered in TAC 010 since it is not covered by 3GPP TS 37.145 specifications

# 3GPP Specifications vs EN Standards for AAS BS Equipment

## ETSI EN 301 908-23

Harmonised Standard for access to radio spectrum;  
Part 23: Active Antenna System (AAS) Base Station (BS)

**AAS BS** (single RAT UTRA, single RAT E-UTRA, and  
MSR (UTRA, E-UTRA, 5G NR))  
Below 6 GHz

Forecasted Publication Date: **10 July 2022**  
will consider for adoption in **future HKCA Specifications**

## 3GPP TS 37.145-1

**AAS BS** (single RAT UTRA, single RAT E-UTRA,  
and MSR (UTRA, E-UTRA, 5G NR))  
Below 6 GHz

Adopted in **TAC 011**

# Frequency Bands Covered by the Type Acceptance Criteria

	Frequency Bands									
	850 MHz	900 MHz	1.8 GHz	1.9/2.1 GHz	2.5/2.6 GHz	2.3 GHz	3.3 GHz	3.5 GHz	4.9 GHz	26/28 GHz
TAC 005										✓
TAC 006										✓
TAC 007	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TAC 008	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TAC 009	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TAC 010	✓	✓	✓	✓	✓	✓	✓	✓		
TAC 011	✓	✓	✓	✓	✓	✓	✓	✓		

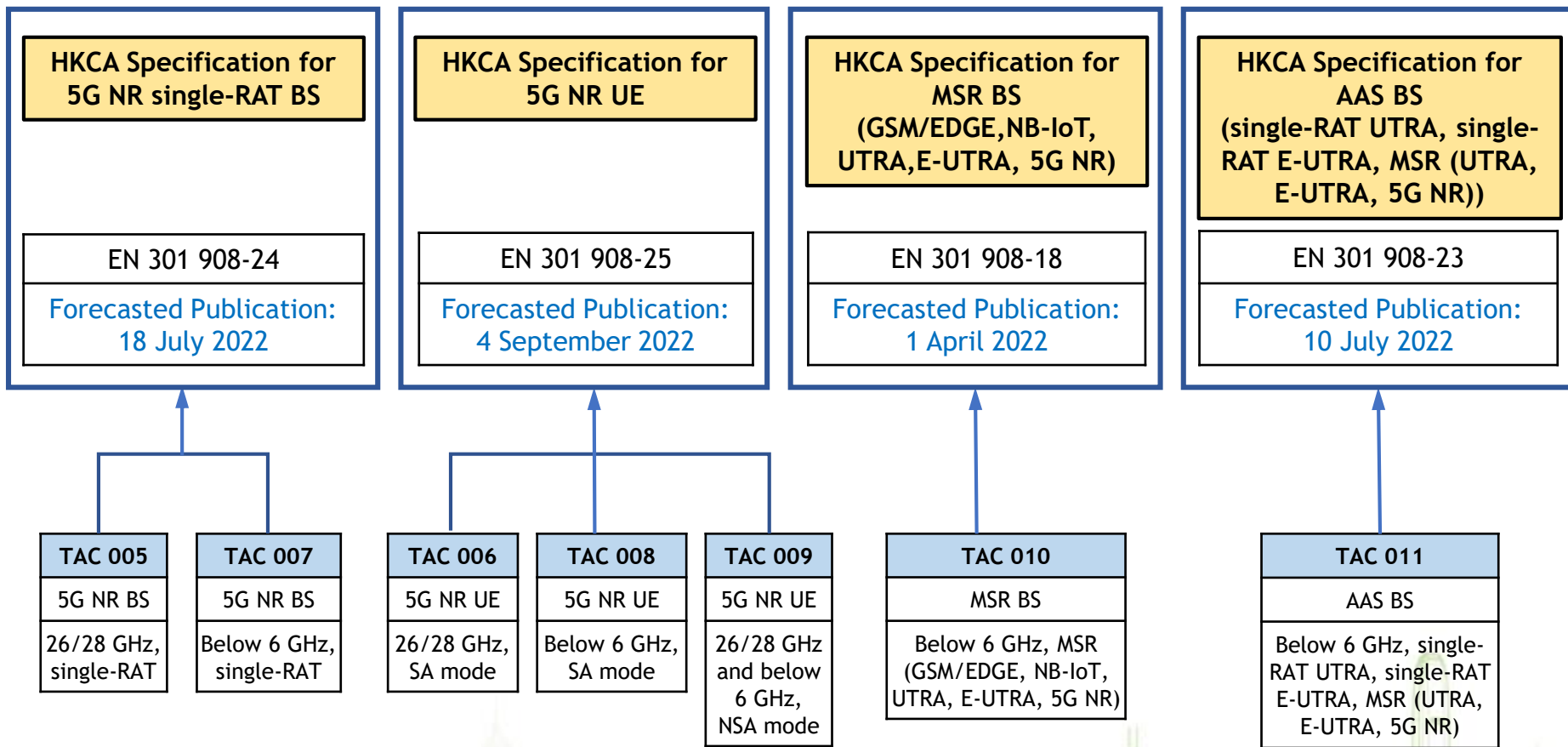
## Paired Bands

850 MHz: 832.5 - 837.5 MHz / 877.5 - 882.5 MHz  
 900 MHz: 880 - 915 MHz / 925 - 960 MHz  
 1.8 GHz: 1710 - 1785 MHz / 1805 - 1880 MHz  
 1.9/2.1 GHz: 1920 - 1980 MHz / 2110 - 2170 MHz  
 2.5/2.6 GHz: 2500 - 2570 MHz / 2620 - 2690 MHz

## Unpaired bands

2.3 GHz: 2300 - 2390 MHz  
 3.3 GHz: 3300 - 3400 MHz  
 3.5 GHz: 3400 - 3600 MHz  
 4.9 GHz: 4840 - 4920 MHz  
 26/28 GHz: 24.25 - 28.35 GHz

# Summary of Future HKCA Specifications vs Existing Type Acceptance Criteria



# Way Forward

- OFCA will keep monitoring the development of
  - the aforementioned EN standards, and
  - other widely recognised standardsfor regulatory control
- As and when these applicable standards become available, the HKCA specifications concerned will be updated or new HKCA specifications will be developed to replace the relevant Type Acceptance Criteria

# Acronym List

EDGE	Enhanced Data rates for GSM Evolution
E-UTRA	Evolved UTRA
GSM	Global System for Mobile communications
ISM	Industrial, Scientific and Medical
LTE	Long-Term Evolution
NB-IoT	Narrowband Internet of Things
UTRA	Universal Terrestrial Radio Access



# Thank You

