



Huawei comments on NMHH Public Hearing on plans regarding the frequency bands available for the provision of wireless broadband services and the future use of the VHF III band

26th, November, 2017



II Overview of frequency bands

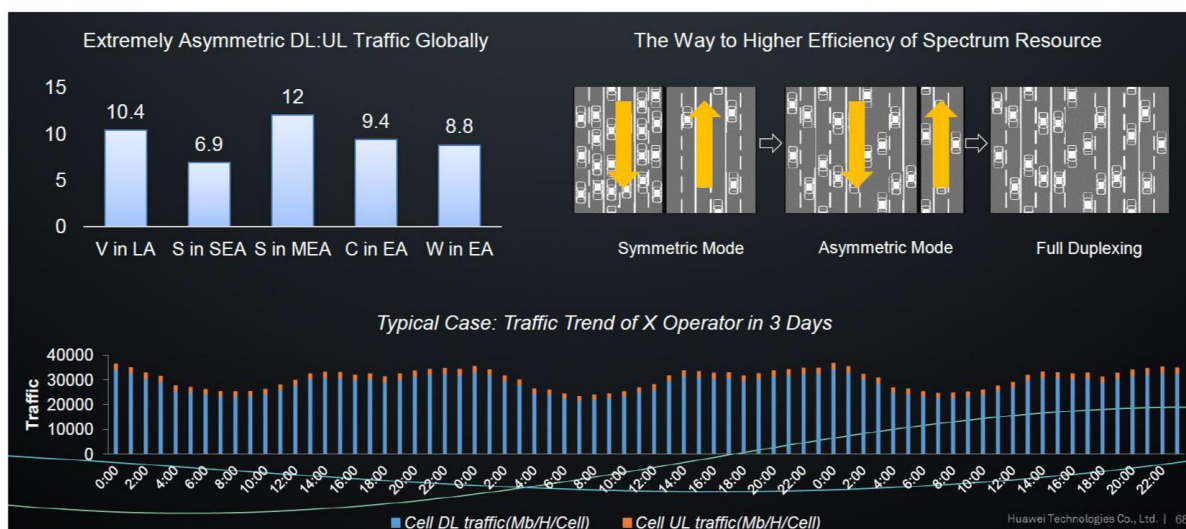
A. 5G pioneer bands

1. 700 MHz frequency band

- a) Planned distribution of the spectrum is in line with the RSPG recommendation and supports an ongoing band harmonization framework across Europe. Huawei supports planned mode of distribution of the 700MHz blocks as one of the critical 5G enablers for wide service coverage.
- b) No comment
- c) No comments for the license duration. Taking into account 5G standard, product, ecosystem readiness and traffic volume projections, suggested 15 years span to guarantee sufficiently investment security and return.
- d) Huawei supports NMHH opinion in this regard
- e) No comment

2. 3400-3800MHz Frequency band

f) B42 and B43 are primarily seen as pioneer bands for 5G cellular networks. In line with the release plans from many countries, the 3300-3800 MHz band will be the primary 5G band with the greatest potential for global harmonisation over time. Hence, expected nature of the 5G traffic together with the telecommunication equipment roadmaps should be taken into account in defining paired or unpaired spectrum division. Technically, both access modes: TDD and FDD can be handled by 5G NR (New Radio). However, services for 5G are having clear asymmetrical nature (Ref: see chart below that shows DL/UL traffic asymmetry). Hence unpaired TDD spectrum allows operator for more effective utilization enabling more extensive user benefits. For instance, the 3GPP 5G NR specification will support 3300-3800 MHz from the start, using a TDD access scheme. Good majority of our technical solutions including RAN network infrastructure and terminals designed for operations bandwidth within 3.4-3.8G (B42/B43) are capable to work in TDD mode only across these bands. Hence, taking into account both – the standardization and RAN (Radio Access Network) product solutions roadmaps, allocation of spectrum in TDD configuration will clearly accelerate 5G deployment.



g) Nationwide, exclusive licensing is the preferred model for 5G. New spectrum assignments should be technology and service neutral.

Unpaired spectrum allocation requires to either (i) define a fixed subframe ratio (DL:UL) for all TDD licenses granted across the country or (ii) operators to introduce a guard band to prevent adjacent channel interference. Namely, for the option (ii), operators deviating from the default TDD subframe ratio configuration are responsible to introduce guard band on their behalf to avoid interference with operators using adjacent TDD spectrum using different subframe ratio.

In addition to the strong preference for TDD access mode, facilitating 5G NR services using 3.3~4.2GHz band Huawei recommends to use a bandwidth of 100MHz or as closed as possible to 100MHz. This should allow operators to take the full advantage of 5G NR in terms of capacity. Therefore we recommend regulators to allocate blocks of 100MHz (or as closed as possible to 100MHz) per operator in the 3.3~4.2GHz band. For example it is expected that Ofcom UK will allocate 2 blocks of 70MHz and 80MHz bandwidths by end of 2017 or early 2018 within 3.4~3.6GHz or recently in Czech Rep. B42/B43, operators were allocated with 40 MHz blocks (Nordic Telecom 5G got 80 MHz block).

Standardization organization (3GPP) has suggested in workgroup meeting in Qingdao in June, 2017, the following channel bandwidths for 5G NR: (please see below)



NR Band	Data SCS = 15kHz					Data SCS = 30kHz								Data SCS = 60kHz								
	10MHz	15MHz	20MHz	[40MHz]	50MHz	10MHz	15MHz	20MHz	[40MHz]	50MHz	[60MHz]	80MHz	100MHz	10MHz (NOTE)	15MHz	20MHz	[40MHz]	50MHz	[60MHz]	80MHz	100MHz	
3.3-4.2 GHz	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

SCS: Sub-Carrier Spacing (note that in LTE the SCS is fixed to 15kHz)

Source: 3GPP TSG-RAN WG4-NR Meeting #2, Qingdao, China, 27th – 29th June, 2017

Table #1: 3GPP R15 Bandwidth for 3.3~4.2GHz

h) No comments for the license duration. Taking into account 5G standard, product, ecosystem readiness and traffic volume projections, suggested 15 years span guarantees sufficiently investment security and return.

3. 26GHz Frequency band

i) CEPT ECC PT1 is developing regulatory technical conditions for the “26G band” (24.25-27.5 GHz) for mobile use in Europe. The 26G band is the most promising frequency spectrum for the early deployment of 5G millimeter wave systems, and several leading markets are preparing ecosystem for development accordingly.

26G band is a pioneer band seen as enabler of innovative ultra-wideband 5G services. Hence, in order to support 5G ecosystem and business development, Huawei suggests earlier distribution of selected blocks of test frequency in 26G bands. This would support European 5G-oriented drive towards 5G calling for pilots and trials already starting from the next year 2018. Such approach has been taken into action by many regulator authorities across Europe including e.g. UK, Germany and Sweden. Huawei suggests that potential allocation of testing blocks should be provided in minimum width of 400MHz in line with current 5G NR standards and understanding. In general, Huawei encourages regulators to address these issues to allow the ecosystem over high frequency bands to be ready from 2020, hence supports communicated NMHH roadmap plan.

j) No comment

k) Huawei supports NMHH opinion in this regard

**B. Not-yet-sold bands affected by the harmonization****4. Utilization of the 1500 MHz frequency band**

l) The L-band (1427-1518 MHz) is another 5G candidate band that has the potential to be allocated to mobile in most countries in the world. As indicated, CEPT and CITEEL regions have adopted the SDL (Supplemental Down Link) scheme for this band. The requirement for standalone operation in the band (both UL and DL transmissions) has emerged in some other regions. In the case of standalone 5G systems, a TDD access scheme is a potentially appropriate option, which can accommodate traffic asymmetry in the UL/DL directions with good potential for economies of scale. The same 5G NR equipment can serve both the TDD and SDL markets.

5. 2300-2400 MHz frequency band

m) 2.3-2.4G offers a good compromise between capacity and coverage, hence usage of such 'alternative' band is generally recommended for PMSE usage. In particular usage of present and future –radio technologies improve spectral efficiency hence supporting PMSE service evolution. Huawei recommends that the band will be served both MFCN and PMSE. Huawei supports NMHH initiative and roadmap.

n) No comment

o) No comment

6. 2100 MHz frequency band

p) Huawei supports that the spectrum should be utilized. Following observations from other markets, incentive sales principle supports spectrum utilization and network development.

7. 2600 MHz frequency band

q) 2600M unpaired spectrum supports evolution to 5G, hence Huawei fully supports early release this spectrum. Current readiness of RAN products allow to obtain fantastic LTE spectrum efficiency on 2600 TDD. Huawei suggests that target spectrum allocation should be 20 MHz per



operator of this band.

III MFCN-related general regulatory solutions affecting multiple bands

A. Regulation of spectrum maximum

r) The limitation of amount of spectrum should be carefully evaluated

s) No comment

B. LSA concept

t) No comment

u) No comment

IV Issues concerning the future use of the VHF III band

v) No comment