Please take the following as Nokia's final and consolidated responses to the Question 1 and 9.

Question 1: What are your views on the proposed allocation of the 26/28 GHz bands to mobile service and of the sub-band of 24.25 – 24.45 GHz to fixed service, both on a primary basis?

Nokia (HK) response:

The allocation of the 26/28GHz bands to mobile service is well aligned with global 5G spectrum adoption. In particular the 28Ghz band was already licensed and allocated in a few countries for 5G. There are clear centre of activities around the 28GHz which has driven the ecosystem maturity. Nokia anticipates the chipset/terminal supporting 28GHz band will be available in volume shipment in the first half of 2019. 26GHz band adoption is mainly in Europe followed by the approval of ECC decision to harmonize technical conditions for Mobile/Fixed Communication Networks in the band 24.25-27.5GHz. To our knowledge, 26GHz band ecosystem is roughly half to one year later than 28GHz. In view of the different pace of maturity in the ecosystem between 26GHz and 28GHz, the CA, when consider the spectrum allocation, should release 28GHz earlier and allow flexibility in rollout commitments in these bands.

Question 9: What are your views on the network and service rollout obligations proposed to be imposed on the use of spectrum assigned for the provision of large scale public 5G services?

Nokia (HK) response:

5G NR mmWave mobile deployments will require dense network topologies with very short inter-site distances (ISD). As a result, an additional potential deployment challenge with commercializing 5G NR mmWave is the perceived requirement for many additional cell sites, which could potentially delay the wide-scale commercial deployments and require large investments. As one area of focus for 5G NR mmWave mobile deployments will be high-traffic dense urban areas, the site acquisition issue will become even more challenging. In the context of deploying 5000 base stations or above as one of the obligations, Nokia has the following views:

a. The deployment scenario of mmWave technology as opposed to traditional macro site deployment in 3G and/or 4G in which base station is always referred to, the terminology like "base station" needs to be more well defined or shall be re-phrased. Terminologies such as Radio Access Points or Radio units to reference the rollout obligation which are deemed to be more appropriate in mmWave deployment of physical radio access network. In the recent 5G spectrum auction concluded in Korea, the rollout commitment of 28GHz band was specifically highlighted in terms of the number of Radio Units.
b. In terms of the scale of 26/28Ghz rollout obligation, Nokia has the view that these mmWave bands typically aim at network capacity boost rather than coverage enhancement because of the weak radio propagation characteristics compared to sub-6GHz bands. In other words, mmWave radio deployment is more confined to certain hot spot areas and/or locations where network capacity is heavily demanded in a bid to safeguard users' Quality of Service/Experience. This was one of

the factors the Regulator in Korea had taken into consideration in the recent spectrum auction that the rollout commitment of 28GHz band is less than 3.5GHz in terms of the radio units to be deployed. We hope this serves as a good reference to CA in defining the rollout obligations.

Best regards
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