

**Submission to  
the Communications Authority (CA)  
and the Secretary for Commerce and  
Economic Development (SCED):**

**Comments on  
“Proposed Allocation of the 26 GHz and  
28 GHz Bands to Mobile Service and  
the Associated Arrangements for  
Spectrum Assignment and Spectrum  
Utilization Fee”**

AUGUST 17<sup>TH</sup>, 2018

**SAMSUNG**



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## 1. Executive Summary

Samsung Electronics Co., Ltd (hereinafter Samsung) is very pleased to take an opportunity to submit this document to the Communications Authority (hereinafter the CA) and the Secretary for Commerce and Economic Development (hereinafter the SCED) in response to the consultation on “Proposed Allocation of the 26 GHz and 28 GHz Bands to Mobile Service and the Associated Arrangements for Spectrum Assignment and Spectrum Utilization Fee<sup>1</sup>”, and are grateful for the opportunity to work with the CA and the SCED on 5G spectrum bands in 26 GHz and 28 GHz bands.

In section 2, Samsung provides views on each question listed in the consultation paper. As described in section 2, Samsung, as global leader of 26 GHz and 28 GHz bands for 5G, fully supports the CA and the SCED to adopt the bands for Hong Kong 5G. In order to drive an early 5G market using these bands with high prioritization by April 2019 in Hong Kong, Samsung would encourage the CA and the SCED to allocate these bands as early as possible, taking into account the readiness of the technology and global progress.

Finally Samsung thanks the CA and the SCED for the opportunity to comment on this consultation, and looks forward to working closely with the CA and the SCED continuously to enable 5G to be deployed in Hong Kong.

## 2. Comments

We believe that both 26 GHz and 28 GHz band should have high priority for early 5G implementation. Recently, 3GPP<sup>2</sup> has adopted these bands as 5G NR band.

- n257 (26.5 – 29.5 GHz, so called 28 GHz band and 5G Frontier band<sup>3</sup>)
- n258 (24.25 – 27.5 GHz, so called 26 GHz band and 5G Pioneer band)
- n261 (27.5 – 28.35 GHz)

In June 2018, 3GPP has finalized its work to develop technical specifications to support these frequency bands within the timeframe of Release 15. It is expected that commercial equipment supporting n257 and n261 based on 3GPP Rel-15 will be available within the year 2018.

Some European countries, e.g. the UK and Italy, conducted consultation process to make available upper portion of 26 GHz, i.e. 26.5 – 27.5 GHz, available before 2020. Significantly, in January 2018 Europe has committed to make at least 1 GHz of mmWave spectrum by 2020 and this is widely expected to be 26.5 – 27.5 GHz<sup>4</sup>. This band overlaps both the 26 GHz band and 28 GHz bands. Samsung would encourage the CA and the SCED to make 26.5 – 28.35 GHz (or up to 29.5 GHz) available first due to the early global availability of equipment to support this range. Once global

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<sup>1</sup> Available at [https://www.coms-auth.hk/filemanager/en/content\\_711/cp20180726\\_e.pdf](https://www.coms-auth.hk/filemanager/en/content_711/cp20180726_e.pdf)

<sup>2</sup> 3GPP: The 3rd Generation Partnership Project supporting 3G, 4G and 5G technical specifications ([www.3gpp.org](http://www.3gpp.org))

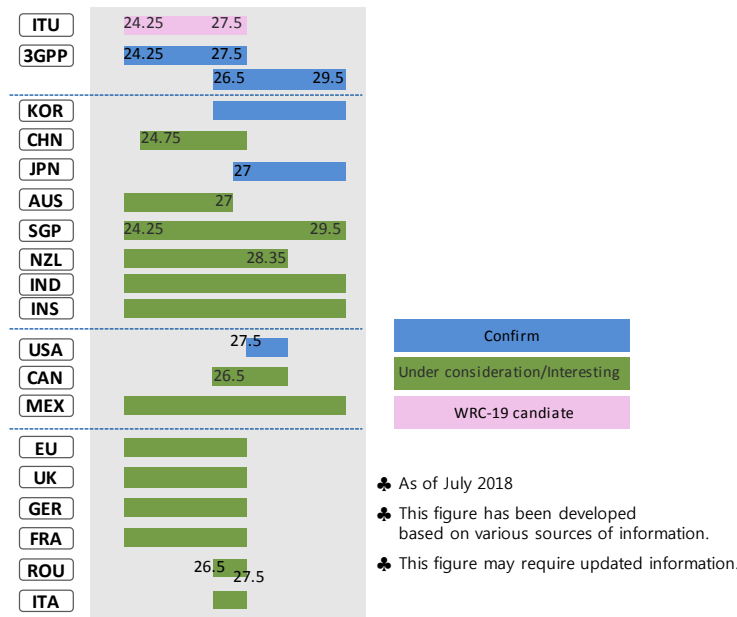
<sup>3</sup> Available at <https://gsacom.com/paper/initiative-develop-global-5g-market-28-ghz-spectrum-band/> and 28 GHz Frontier Workshop website at <http://5g-28frontier.org/>

<sup>4</sup> RSPG18-005 (January 20, 2018), Available at <http://rspg-spectrum.eu/2018/02/the-rspg-has-adopted-recommendations-to-policymakers-on-5g/>

movements and developments in the remainder of the 26 GHz band (24.25 – 26.5 GHz) are clearer, then the CA and the SCED could consider providing this remainder in a second phase once it's clear that global availability of equipment will materialize.

To date, it is expected that for 5G the USA would commercialize 28 GHz band (27.5 – 28.35 GHz) in 2018, Korea will commercialize 28 GHz (26.5 – 28.9 GHz) in March 2019<sup>5</sup> and Japan would commercialize 28 GHz (27.0 – 29.5 GHz) in 2020.

Figure 1. Global 5G Spectrum Outlook in 26-28 GHz frequency range



*Taking into account above and figure 1, therefore, Samsung recognizes that 5G using 26 GHz and 28 GHz bands as essential components will be necessary to support 5G services delivering eMBB and FWA services starting from April 2019. In particular, Samsung believes that the 28 GHz band from 26.5 GHz to 28.35 GHz (or 29.5 GHz) will be appropriate band taking into account several countries and readiness of early equipment eco-system development.*

In this section, Samsung provides views for some of questions asked.

**Q1. 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? What are your views on the protection of radio stations of co-primary users on a first-come-first-served basis?**

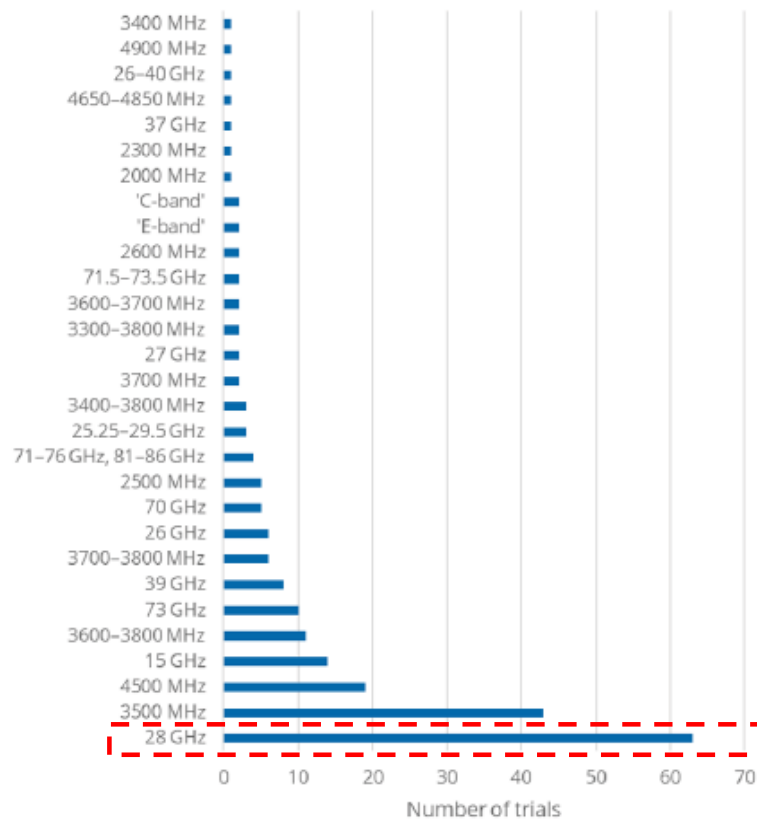
As emphasized at the beginning of this section, 26 GHz and 28 GHz bands are essential and key bands for 5G. Therefore, it is very reasonable to adopt frequency ranges from 24.25 GHz to 28.35 GHz for 5G in Hong Kong with priority. Moreover, we also encourage the CA and the SCED to give serious consideration to also making the 28 GHz band up to 29.5 GHz with same priority taking into account 3GPP standardization status, eco-system readiness and movements from other countries such as USA,

<sup>5</sup> Refer from <https://www.zdnet.com/article/south-koreas-5g-spectrum-auction-to-start-at-3-billion/> and <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=3047170&cloc=joongangdaily%7Cchome%7Cnewslst1>

Korea and Japan. And the 26 GHz band from 24.25 GHz to 27.5 GHz as one of the candidate bands for WRC-19 would also be important to make total 4.1 GHz spectrum bandwidth for Hong Kong 5G. Meanwhile, it should be noted that some issues are being studied in ITU-R Task Group 5/1 (TG 5/1) for sharing and compatibility issue between 23.6 GHz and 24 GHz to protect Earth-Exploration Satellite Service (EESS-passive). These study results might give some impacts to the 26 GHz band, such as more stringent unwanted emission levels, certain guard band, etc. Therefore, it would be necessary that impacts by these study results and WRC-19 decision should be considered, as appropriate.

Furthermore, it should be noted that GSA<sup>6</sup> as global suppliers association for mobile communications has published the report<sup>7</sup> in July 2018. From the report, most of 5G trials in the world are being focused on 28 GHz band as described in following figures.

Figure 2. Count of 5G demonstrations and trials according to spectrum bands used



<sup>6</sup> <https://gsacom.com/>

<sup>7</sup> Global progress to 5G-Trials, deployments and launches, July 2018, GSA. Available at <https://gsacom.com/paper/global-progress-to-5g-trials-deployments-and-launches/>

**Q2. Do you have any views on adopting an administrative assignment approach for the release of spectrum in the 26/28 GHz bands?**

In general, we support that approach. On the other hand, abundant supply of spectrum for 5G is very significant taking into account Recommendation ITU-R M.2083<sup>8</sup> defining 5G Vision and Resolution 238 (WRC-15)<sup>9</sup>. In addition, timing for timely 5G rollout in Hong Kong would also be important. In that regard, we are of the view that the suggested timing in the consultation paper to assign the bands by the end of 2018 and to provide 5G service starting from April 2019 would be the best, by making two bands available for mobile and fixed applications.

**Q3. Do you have any views on the proposed band plan with frequency slots of 100 MHz each?**

In June 2018, 3GPP has defined the detailed technical specifications for 5G NR. The following table summarizes what kinds of channel bandwidths are defined for 5G NR supporting bands 26 GHz and 28 GHz. In 3GPP, the transmission bandwidth configuration  $N_{RB}$  for each base station (BS) channel bandwidth and subcarrier spacing (SCS) is specified.

Table 1. Transmission bandwidth for FR2<sup>10</sup>

SCS [kHz]	50 MHz	100 MHz	200 MHz	400 MHz
	$N_{RB}$	$N_{RB}$	$N_{RB}$	$N_{RB}$
60	66	132	264	N.A
120	32	66	132	264

Therefore, we support that 100 MHz for each frequency slot/block-proposed by the CA and the SCED would be appropriate as band plan for 26 GHz and 28 GHz bands.

**Q4. Do you have any views on the proposal of assigning (a) 3300 MHz to 3700 MHz of spectrum in the 26/28 GHz bands for the provision of large scale public 5G services; and (b) the remaining 400 MHz to 800 MHz of spectrum in the two frequency bands to other entities for the provision of 5G services in specified locations on a shared basis?**

We support to assign wide bandwidth for 5G. When assuming assignment of 3.3 GHz to 3.7 GHz of spectrum bandwidth for the provision of large scale public 5G service in band around 25 GHz to 28.35 GHz or 26 GHz to 29.5 GHz, it would be a good assignment. And other remaining 400 MHz to 800

<sup>8</sup> Recommendation ITU-R M.2083, IMT-Vision – “Framework and overall objectives of the future development of IMT for 2020 band beyond”

<sup>9</sup> Resolution 238 (WRC-15): Studies on frequency-related matters for International Mobile Telecommunications identification including possible additional allocations to the mobile services on a primary basis in portion(s) of the frequency range between 24.25 and 86 GHz for the future development of International Mobile Telecommunications for 2020 and beyond

<sup>10</sup> FR2 (Frequency range 2) is covering frequency range from 24.25 GHz to 52.6 GHz.

MHz of spectrum could be considered for the provision of 5G services in specified locations on a shared basis as suggested in the consultation paper.

**Q5. Do you have any views on the proposed caps of (a) 800 MHz of spectrum in the 26/28 GHz bands for spectrum designated for the provision of large scale public 5G services; and (b) 400 MHz of the Shared Spectrum designated for the provision of specified location services?**

Taking into account 3GPP status and readiness of RF component technology, the proposed spectrum cap as 800 MHz of spectrum would be a reasonable for the provision of large scale public 5G services.

**Q6. What are your views on the proposed method of assigning spectrum in the 26/28 GHz band to qualified applications for the provision of large scale public 5G service?**

No specific answer.

**Q7. Do you have any preference on the assignment of spectrum in either the 26 GHz or 28 GHz band?**

No specific answer.

**Q8. What are your views in the proposed assignment method for the Shared Spectrum?**

No specific answer.

**Q9. 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?**

Taking into account radio propagation characteristics, the envisaged network planning and the geographic area of Hong Kong, the proposed network and service rollout obligations as a minimum of 5 000 radio base stations would be reasonable. But, in case of approach for the five stage, we hope that flexibility to install entire 5 000 radio stations even within 5 years on demand should be ensured.

**Q10. What are your views on the proposed performance bond for guaranteeing compliance with the proposed network and service rollout obligations for using spectrum assigned for the provision of large scale public 5G services?**

No specific answer.

**Q11. Do you have any views on the proposed for SUF as set out in paragraphs 45 to 50 above?**

No specific answer. But mmWave bands focusing on the 26/28 GHz bands are totally new spectrum bands for 5G. That is 5G is a totally new concept using mmWave bands unlike existing 3G and 4G only supporting bands below 6 GHz. Therefore, we look forward to relaxed constraints and flexible requirements to help spread and expansion of 5G using the bands.

### **3. Acronyms and Abbreviation**

3GPP	3 <sup>rd</sup> Generation Partnership Project
BS	Base Station
EESS	Earth-Exploration Satellite Service
eMBB	Enhanced Mobile Broadband
FR2	Frequency Range 2 (24.25 GHz to 52.6 GHz)
GSA	Global mobile Suppliers Association
ITU	International Telecommunications Union
ITU-R	ITU-Radiocommunication sector
NR	New Radio
$N_{RB}$	Transmission bandwidth configuration, expressed in units of resource blocks
Rel	Release
SCS	Subcarrier Spacing
TG	Task Group

### **4. Contacts**

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