

HUAWEI's RESPONSES TO IMDA CONSULTATION PAPER

ON

**PROPOSED POLICY FRAMEWORKS FOR THE ALLOCATION OF
800 MHZ, TDD 1900 MHZ AND FDD 2100 MHZ SPECTRUM BANDS**

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For the attention of:

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About Huawei

Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. With integrated solutions across four key domains – telecom networks, IT, smart devices, and cloud services – we are committed to bringing digital to every person, home and organization for a fully connected, intelligent world.

Huawei's end-to-end portfolio of products, solutions and services are both competitive and secure. Through open collaboration with ecosystem partners, we create lasting value for our customers, working to empower people, enrich home life, and inspire innovation in organizations of all shapes and sizes.

At Huawei, innovation focuses on customer needs. We invest heavily in basic research, concentrating on technological breakthroughs that drive the world forward. We have more than 180,000 employees, and we operate in more than 170 countries and regions. Founded in 1987, Huawei is a private company fully owned by its employees.

About Huawei 5G

Since its 5G research started in 2009, Huawei has submitted 18000 proposals to 3GPP. Huawei has claimed 2570 5G patents in the essential category, making up the highest proportion of above 20% among all vendors. With the largest investment in standards, the broadest domains of research, and the greatest number of patents, Huawei took the least time to convert standards to products.

From 2009 when its 5G research was started to 2019, Huawei has accumulatively invested more than USD 4 billion on 5G R&D. More than 10000 persons have been poured into 5G network research (not including terminals).

Till August 2019, Huawei has gained over 50 5G commercial contracts and shipped over 200,000 5G base stations.

For more information, please visit Huawei online at <https://www.huawei.com/en/about-huawei>

HUAWEI RESPONSE TO IMDA PROPOSED POLICY FRAMEWORKS FOR THE ALLOCATION OF 800 MHZ, TDD 1900 MHZ AND FDD 2100 MHZ SPECTRUM BANDS

Question 1: IMDA seeks views on the proposed allocation approach for the 800 MHz spectrum band, in particular:

- (a) Whether the proposed lot sizes allow for meaningful use of the spectrum or if there are other alternative combinations of spectrum lot sizes that should be considered for efficiency reasons;
- (b) Whether the proposed spectrum right duration is adequate from a business viability and investment perspective; and
- (c) The reasons for your views on the above.

Huawei's Response:

Based on ITU-R M.2015-2 report, 800MHz B26 is recommended as the harmonized band for public protection and disaster relief (PPDR) use in the Asia Pacific region. While the remaining B26 spectrum (after considering 2x10MHz reservation for PPDR use in Singapore) can be used for mobile service, the lack of global LTE B26 device ecosystem could be a challenge to support the efficient use of 800MHz spectrum band. Most of device are customized for PPDR applications such as push to talk and push to data transmission which compatible to the Asia Pacific region frequency bands.

Huawei welcomes IMDA's decision to use LTE based technology for 800MHz spectrum as it is mature and spectral efficient wireless technology to enable broadband based data services.

- a) Huawei believes the proposed IMDA's 800MHz spectrum assignment and lot sizes would facilitate efficient use of the spectrum.
 - i. It maximizes the spectrum assignment for B26 which has a much more mature ecosystem for PPDR and enterprise use as compared to B27. Based on latest GSA's GAMBoD LTE device database, globally there are only a total of 38 LTE B27 devices compared to 707 LTE B26 devices.
 - ii. Industry has mature enterprise wireless solution based on band26 available now, solution for Band27 may need to be customized according to market requirement. 3MHz lot sizes will involve more cost for network and UE customization compare to standard 5M or 10M bandwidth per lot size.
- b) Huawei agrees with IMDA's proposed spectrum right duration as 7- to 10-year term is reasonable for business viability, as well as to cater for future technology development and evaluation.
- c) No further comment.

Question 2: IMDA seeks views on the proposed allocation approach for the TDD1900 MHz spectrum band, in particular:

- (a) Whether there is a need for additional filters if the guard band between FDD and TDD systems is 5 MHz, and the specifications of the required band-pass filter;
- (b) Whether there are known technical frameworks for the co-existence of LTE-based networks operating in 3GPP band 1 and band 33/39;
- (c) Whether the proposed lot sizes allow for meaningful use of the spectrum;
- (d) Whether the proposed spectrum right duration is adequate from a business viability and investment perspective; and
- (e) The reasons for your views on the above.

Huawei's Response:

- a) Based on results of prior studies of other markets similar to the proposed Singapore's TDD1900MHz spectrum deployment scenario, Huawei thinks that 5MHz may not be sufficient to mitigate interference from the band 33/39 transmitters to the existing band 1 mobile networks. Customized filter could need to be installed in both the band 33/39 transmitter and band 1 receiver. This could incur significant cost and effort for the existing band 1 mobile network operators as well as potential service impacts to existing mobile users.

Huawei suggests IMDA to conduct detailed interference study and field testing on the co-existence of band33/39 with 3GPP band 1 mobile network.

- b) Based on Huawei's understanding, while some countries have allocated the band 33/39 spectrum, this spectrum remains mostly unused due to poor economics of deployment. Huawei is not aware of any large scale commercial band 33/39 TDD networks in co-existence with 3GPP band 1 mobile networks other than the China market. However, China has deployed customized filter solution for 3GPP band 1 2100MHz and band 33/39 TDD since day 1 deployment of both the 3G 2100MHz and TDS-CDMA 1900MHz networks. In Singapore scenario, to allow for band 33/39 deployment, it could incur significant cost to install additional customized filter on existing Band1 2100MHz networks.
- c) Please refer to comment (b)
- d) Huawei does not have any comment on the proposed spectrum right duration.

Question 3: IMDA seeks views on the proposed allocation approach for the FDD2100 MHz spectrum band, in particular:

- (a) Whether the proposed FROR allocation allows existing 3G mobile network operators to serve the needs of their customers or if there are other alternative combinations of FROR allocations that should be considered; and
- (b) Whether the proposed spectrum right duration is adequate from a business viability and investment perspective; and
- (c) The reasons for your views on the above.

Huawei's Response:

- a) Huawei does not have any comment on the proposed FDD2100MHz spectrum allocation scheme.
- b) Huawei thinks that the proposed 15-year spectrum right duration is reasonable and recommends IMDA to assign the FDD2100MHz spectrum on a fully technology neutral basis, i.e. for the provisioning of 3G or 4G services as well as evolution to support future 5G and multi radio access technology services.
- c) No further comment.

Question 4: IMDA welcomes views and comments on the proposed allocation of the spectrum bands in the next allocation exercise, including on the proposed uses and spectrum right durations of the spectrum bands, the proposed "Clock Plus" auction format, the proposed reserve prices as well as the proposed spectrum caps and regulatory obligations to ensure the optimal use of spectrum.

Huawei's Response:

Huawei does not have any comment on the proposed spectrum allocation framework and format.