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Head, Spectrum Planning Division
Malaysian Communications and Multimedia Commission (MCMC)
MCMC HQ Tower 1
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Cyber 6
630000 Cyberjaya
Selangor Darul Ehsan
Malaysia

Dear Sir,

RE: WIRELESS LOCAL AREA NETWORK (WLAN) IN THE 6 GHZ FREQUENCY BAND

Inmarsat welcomes the opportunity to provide comments to the Malaysian Communications and Multimedia Commission (**MCMC**) in response to its public consultation paper "Wireless Local Area Network (**WLAN**) in the 6 GHz frequency band" (the "**Consultation Paper**"), published on 12th August 2021.

Please find enclosed Inmarsat's response to the Consultation Paper, for your consideration.

If you have any clarifications with respect to this submission, please contact the undersigned.

We look forward engaging with MCMC.

Yours sincerely,

Mary Lim
Regulatory and Market Access
Inmarsat Global Limited

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Inmarsat's Response

1 Inmarsat response to specific MCMC's questions

Inmarsat responses to the questions specified in the Consultation Paper as follows.

Question	Response
Question 1 MCMC seeks your views and comments on the demand for spectrum for Wi-Fi in the 6 GHz frequency band.	No comment
Question 2 MCMC seeks your views and comments on the emerging technologies utilising the 6 GHz frequency band.	The band 5925 – 7075 MHz is allocated to the Fixed Satellite Service (**FSS**) and is heavily used for FSS uplinks. Inmarsat uses the 6425 – 6575 MHz frequency band to provide feeder uplinks. These feeder uplinks support the L-band Mobiles Satellite Service (**MSS**) which are used for safety and critical communications on land, on ships and on aircraft. Excessive interference to those uplinks would harm those L-band services and hence it is very important that robust regulations are in place to prevent any risk of interference. Satellite operators are continuing to develop new satellite systems using these frequencies and any plans for any new terrestrial services will need to be cognisant of compatibility issues with respect to FSS operations. Under WRC-23 agenda item 1.2, the upper 6 GHz band is being examined for possible identification for International Mobile Telecommunications (**IMT**) in International Telecommunication Union (**ITU**) Region 1. Inmarsat does not believe that IMT or 5G systems will be able to coexist with FSS usage in Region 1 or elsewhere. Inmarsat also considers that the 6 GHz band is not necessary for IMT/5G, given the availability of other frequency bands already identified for IMT by WRC-19 and previous WRCs.
Question 3 MCMC seeks your views and comments on the frequency range within the 6 GHz frequency band that could be considered for Wi-Fi under the Class Assignment in Malaysia. Should MCMC consider allowing Wi-Fi to operate in the entire 1200 MHz (5925 MHz to 7125 MHz frequency band) or only in the 500	Inmarsat considers that use of the 6 GHz band (5925 MHz – 7125 MHz) for Wi-Fi could be a useful and effective additional use of the 6 GHz band, provided that it is subject to conditions that ensure compatibility with FSS operations. Inmarsat suggests that MCMC limits the WLAN operations to low power indoor operations and very low power outdoor operations, following the European Conference of Postal and Telecommunications (**CEPT**) power limits. While the CEPT power limits were developed for the lower 6 GHz band (5925 – 6425 MHz) they could be adopted for both the upper and lower 6 GHz bands.

Question	Response
MHz (5925 MHz to 6425 MHz frequency band)?	This will result in low risk of aggregate interference into the FSS uplinks in the 5925 – 7075 MHz frequency band. This will also have a benefit to any Malaysian developers of WLAN devices in the band, as they will more readily meet the European standards, should they intend to export their devices, and similarly importers could rely heavily on Malaysia standards being compatible with those in other parts of the world, especially those of the European Union. Use of the 6 GHz band for Wi-Fi should also be subject to not claiming protection from interference from FSS earth stations. The risk of interference from earth stations to Wi-Fi devices is probably low, given that earth stations use highly directional antennas, pointing above the horizon. However there would need to be regulatory conditions to ensure that existing earth stations in Malaysia are not constrained by Wi-Fi devices and to ensure that new earth stations are able to be deployed.
Question 4 MCMC seeks your views and comments on: i. the coexistence between Wi-Fi and incumbent services (i.e. fixed service and fixed-satellite service); and ii. the potential interference mitigation between these services.	The main interference issue with respect to FSS operations in the 6 GHz is from the aggregate from WLAN devices to the satellite receiver. According to the European Communications Committee (**ECC**) compatibility study between WLAN and FSS in the 5925 – 6425 MHz frequency band, the study results highlighted the risk of potential interference into the FSS uplinks from outdoor WLAN deployment. The ECC therefore limits the WLAN operations to a low power indoor only and very low power outdoor. For "low power indoor" use, the ECC determined limits of 23 dBm (maximum mean EIRP) and 10 dBm/MHz (maximum mean EIRP density). For "very low power outdoor" devices, ECC limits of 14 dBm (maximum mean EIRP) and 1 dBm/MHz (maximum mean EIRP density). Inmarsat suggests MCMC to adopt the same limits as those adopted in Europe. As noted above, Inmarsat suggests that the same limits could be adopted also for the upper 6 GHz band (6425 – 7125 MHz). The use of Wi-Fi devices should in any case be subject to the condition of not claiming protection from FSS earth stations.
Question 5 MCMC seeks your views and comments on the potential technical and operational conditions to be imposed if the 6 GHz frequency band is introduced for Wi-Fi under the Class	Inmarsat proposes the technical and operational conditions to impose the "low power indoor/very low power outdoor usage" in the 6 GHz frequency band, following the limits adopted by CEPT. Those limits were subject to extensive sharing studies, including assessment of interference to satellite uplinks and are expected to provide acceptable compatibility with FSS.

Question	Response
Assignment. Should part of the frequency band be limited to indoor operation? Should standard power devices operating under the Automatic Frequency Coordination (AFC) system be adopted in Malaysia?	Inmarsat opposes the use of standard power devices operating under the AFC. In the 6 GHz band, satellite antenna beams typically cover a very wide area, covering several countries and typically covering the whole of the visible earth surface through use of a global beam. It would be necessary for any AFC system to have knowledge of WLAN devices deployed within the whole satellite beam. An AFC based system to protect satellite operations is therefore not practically implementable. AFC has been suggested as a system to minimise interference to other terrestrial systems such as fixed services, but does not assist in compatibility with the FSS and hence does not allow for any relaxation of the power limits.
Question 6 What other key issues need to be considered in introducing Wi-Fi in the 6 GHz frequency range?	No comment

2 Conclusions and recommendations

The 6 GHz band is widely used in Malaysia and in the Asia Pacific Region for FSS systems and any new use of the 6 GHz band will need to be compatible with that FSS use. Inmarsat considers that there is scope to permit the operation of Wi-Fi devices in Malaysia in the 6 GHz band (5925 – 7125 MHz) in a manner compatible with existing and future FSS operations in the same band. Such use would improve the overall efficiency of the use of this band and would align Malaysia with many other countries which have already decided to make the 6 GHz band available for Wi-Fi.