

October 11, 2021

Suruhanjaya Komunikasi dan Multimedia Malaysia
(The Malaysian Communications and Multimedia Commission)
MCMC HQ Tower 1
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
Malaysia

**re: MCMC Public Consultation on WIRELESS LOCAL AREA NETWORK (WLAN)
IN THE 6 GHz FREQUENCY BAND**

Dear MCMC,

Hewlett Packard Enterprise (“HPE”) submits these comments in response to the consultation from the Malaysian Communications and Multimedia Commission (“MCMC”) on its investigation of potential use of the 6 GHz band in Malaysia for Wi-Fi devices under a Class Assignment. HPE strongly supports the MCMC moving to open this critical band to the rapidly expanding ecosystem of 6 GHz-capable devices now coming to market. Making the 6 GHz band available on a Class Assignment basis is an important opportunity for Malaysia to support broadband connectivity in both 5G and next generation networks and will open the door to a host of new and innovative use cases. However, to realize the full impact of the 6 GHz band, it is of the greatest importance that the MCMC make the full 1,200 MHz (5925 MHz to 7125 MHz) available for WLAN use.

HPE is one of the world’s largest providers of managed wireless local area network (“WLAN” or “RLAN”) infrastructure and is a global leader in the Wi-Fi equipment marketplace. HPE’s Aruba business unit ships millions of indoor and outdoor Wi-Fi access points (“APs”) every year, representing approximately 15% of the global market for such devices. Aruba is the leading provider of Wi-Fi equipment to Malaysian enterprises and service providers, with approximately 38-39% market share according to the latest Enterprise WLAN market report from IDC (2021 Q2). Aruba supplies Wi-Fi solutions in Malaysia for deployment by entities including; leading mobile and fixed broadband providers, universities, K-12 schools, hoteliers, government ministries/agencies, and retailers.

We are particularly encouraged by the MCMC’s question regarding Standard Power WLAN operations, noting the importance of outdoor Wi-Fi use cases and that ~2/3 of the 280 MHz of spectrum in the 5 GHz band that is available for outdoor operations in Malaysia is subject to Dynamic Frequency Selection (“DFS”) and Transmit Power Control (“TPC”) requirements. HPE is the second largest provider of outdoor RLAN equipment in the world (by revenue) and as such we look forward to delivering Standard Power capable products to the Malaysian market – for both outdoor and higher-power indoor operations. HPE provides mission-critical outdoor Wi-Fi equipment to a broad set of industries, including hospitals, K-12 schools, universities, resorts, logistics centers, sporting facilities, and government ministries/agencies across Malaysia.

In this matter, HPE has partnered with a broad group of equipment manufacturers, software makers, and internet service companies that are working together to make the 6 GHz band available for WLAN use (“the RLAN Group”) around the world. HPE supports the comprehensive comments filed by this group (the “Joint Filers”). In addition, HPE fully supports comments of the Wi-Fi Alliance (“WFA”), the American Malaysian Chamber of Commerce (“AMCHAM”), and the Dynamic Spectrum Alliance (“DSA”)



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filed in response to this 6GHz WLAN consultation. We submit these individual comments to highlight issues where HPE has specialized insight and equities.

Please find on the following pages HPE's responses to the specific questions that MCMC posed in the consultation. If you have any questions, please contact either of the HPE signatories below.

Sincerely,

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Question	Response
<p>Question 1 MCMC seeks your views and comments on the demand for spectrum for Wi-Fi in the 6 GHz frequency band.</p>	<p>HPE agrees with MCMC’s observation in Part 1.2 that advancements in wireless technologies, applications, and services are driving increasing demands on the spectrum available for Wi-Fi and other license exempt (i.e. unlicensed) technologies.</p> <p>In response to MCMC Part 2.13 HPE would also note that increasing Wi-Fi capacity requirements in Enterprise and Large Public Venue (e.g. stadiums, airports, shopping malls, etc...) deployments have resulted in in signification densification of these deployments. In general terms, the coverage area for an enterprise indoor AP has decreased from ~500-1000 meters² in 2003, to ~250 meters² by 2010, to as little as ~150 meters² today. We are now at a point where further densification is not feasible due to the impacts from co-channel and adjacent channel interference if access points (“APs”) are placed even closer to one another. The only way to add capacity in these situations is to use wider channel bandwidths, but this is not possible given the limited number of wide bandwidth channels available in the 5 GHz band. The 6 GHz band is the key to unlocking true “gigabit wireless” services by allowing for Wi-Fi channel bandwidths of 80 MHz or 160 MHz, as opposed to the 20 MHz or 40 MHz bandwidths that are most common for Enterprise deployments today. In a recent customer study, HPE found that 91% of the surveyed customers were utilizing narrower channels (20 MHz or 40 MHz), almost certainly due to the insufficient number of 80 MHz channels currently available in 5 GHz. A typical 2-stream Wi-Fi 6 client can only achieve a maximum throughput of 574 Mbps when utilizing a 40 MHz channel. This same 2-stream Wi-Fi 6 client can transmit/receive at up to 1.2 Gbps or 2.4 Gbps when operating on an 80 MHz or 160 MHz channel, respectively – highlighting the device types and capabilities MCMC refers to in Part 2.14. These are the gigabit capacities that will be required for Wi-Fi to meet the wireless application and service demands of the next decade including the AR, VR, and UHD video examples that MCMC mentions in Part 2.12. It is critical that the 6 GHz band be opened to Wi-Fi in order to meet these needs.</p>
<p>Question 2 MCMC seeks your views and comments on the emerging technologies utilising the 6 GHz frequency band.</p>	<p>HPE commends MCMC for highlighting in Part 3 the importance of one or more robust and vibrant equipment ecosystems in order to make efficient use of a spectrum band.</p> <p>The Wi-Fi industry has been diligently working to develop the necessary IEEE standards, Wi-Fi Alliance certifications, and actual product solutions to enable a strong Wi-Fi ecosystem for 6 GHz products (aka “Wi-Fi 6E”) since 2017. The result is a range of Wi-Fi 6E solutions that are available in the market today, covering the consumer, residential, enterprise, carrier, education, industrial, and IoT segments.¹</p> <p>In May, HPE announced the world’s first enterprise-class Wi-Fi solution for the 6 GHz band, the Aruba 630 Series of access points.² The Aruba 630 Series joined a long and growing list of Wi-Fi 6E capable devices, including consumer-grade access points, client devices, modules, and chipsets. The rapid formation of the Wi-Fi 6E ecosystem clearly illustrates industry’s eagerness to take advantage of the first major allocation of license exempt midband spectrum in 20 years and the wider channel bandwidths that 6 GHz enables. HPE looks forward to bringing the 630 Series of</p>

¹ <https://www.wi-fi.org/beacon/the-beacon/quarterly-update-wi-fi-6e-devices-driving-technology-innovation>

² <https://www.businesswire.com/news/home/20210525005243/en/Aruba-Introduces-Industry%E2%80%99s-First-Enterprise-Grade-Wi-Fi-6E-Solution>



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access points, along with other forthcoming 6 GHz Wi-Fi solutions, to Malaysian businesses and citizens soon after MCMC would make an enabling decision.

HPE agrees with MCMC’s observations in **Part 3.17** on the significant work done within 3GPP on 5G New Radio-License exempt (“5G NR-U”), specifically in 3GPP Releases 17 and 18. While the 6 GHz NR-U ecosystem is not currently as developed as the Wi-Fi 6E ecosystem, HPE agrees that a viable 6 GHz NR-U ecosystem will emerge over the next several years. With both carrier-aggregation / supplemental downlink modes (similar to LTE-LAA) and fully self-contained modes (similar to 5 GHz ‘MultiFire’), HPE believe that 3GPP 5G NR-U provides an excellent opportunity for both mobile network capacity augmentation and private (aka non-Public Networks or NPN) deployments.

MCMC noted in **Part 3.18** the WRC-23 study items for possible IMT operations in 6425-7025 in ITU Region 1 (Europe, Middle East, Africa, and the CIS) and in 7025-7125 MHz globally. While this is certainly a factual observation, HPE would point out that the Region 1 study on 6425-7025 MHz has no direct bearing on Malaysia, and that both studies are exploratory in nature – examining the ability of IMT services to coexist with incumbent services such as fixed service and fixed satellite service operations. On this point, a leading Region 1 regulator recently noted, *“IMT identification is being considered for region 1 at WRC-23. But coexistence between existing users and high power outdoor mobile is not possible – would require clearing incumbents”*³, so there are still many questions about IMT’s feasibility in 6 GHz. Other Region 1 countries such as Saudi Arabia have already acted to open the full 5925-7125 MHz band for license exempt operations, along with the many countries in Regions 2 and 3 who have done so.

HPE reiterates that the Wi-Fi needs in the 6 GHz band are clear and pressing *today*, sharply in contrast with speculation about possible *future* IMT uses. Additionally, policymakers and regulators around the world have gone to great lengths in recent years to make substantial midband assignments for IMT services in the general 3.3-4.2 GHz frequency range (3GPP Band n77), and the mobile industry’s focus should be on putting that 3 GHz spectrum to use rather than abruptly shifting their focus to the 6 GHz band. MCMC should respond to this known, current license exempt need and look skeptically at claims that 6 GHz is suddenly needed for licensed 5G services (or ‘5.5G’ as some have recently recast it) after nearly a decade of advocacy by those same proponents for 80 to 100 MHz per mobile operator in the 3 GHz band, which has largely been made available.

HPE again strongly agrees with MCMC’s emphasis in **Part 3** on the ecosystem that is needed in order to make efficient use of a spectrum band. HPE has found that the strength and vitality of a wireless ecosystem is directly proportional to the harmonization of spectrum assignments (and resulting uses) around the world. With countries representing nearly 42% of global Gross Domestic Product (“GDP”) opening or considering opening the full 5925-7125 MHz band for license exempt use (while there have been no decisions for licensing 6 GHz), it is clear that the formation of a strong IMT ecosystem in any portion of this range is highly doubtful, while a strong and growing ecosystem of license exempt equipment, particularly Wi-Fi equipment, already exists.

Further evidence of this is the longstanding, strong activity to bring license exempt 6 GHz solutions to market contrasted with the absence of activity in the IMT community (which has quite

³ <http://dynamicspectrumalliance.org/wp-content/uploads/2021/06/Session-3-Keynote-Philip-Marnick.pdf> (slide 6)



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reasonably been focused on forming and developing an ecosystem in the 3 GHz band). The relative 6 GHz activity of the license exempt (i.e. unlicensed) and licensed industries is summarized in the following table:

	6 GHz Unlicensed (Wi-Fi 6E & 5G NR-U)	6 GHz Licensed (5G NR)
Standards	IEEE 802.11ax-2021 (<i>approved Feb 2021</i>) 3GPP 5G NR-U (<i>5 GHz in Rel 16, 6 GHz well underway - expected NLT Rel 18</i>)	3GPP 5G NR (<i>feasibility WIDs recently approved</i>)
Equipment Regulatory Authorization	US FCC KDB987594 (<i>published Feb 2021</i>) ECC/DEC/(20)01 (<i>published Dec 2020</i>) First 6E Solution approved for market in EU/UK (<i>approved July 2021</i>)	<i>None</i>
Industry Certification	Wi-Fi Alliance: Wi-Fi 6E (<i>announced Jan 2020, launched Jan 2021</i>) 3GPP RAN4: 5G NR-U in 5 GHz (<i>Rel 16</i>), 5G NR-U in 6 GHz (<i>expected NLT Rel 18</i>)	<i>None</i>
Equipment Forecasts (Global)	2021: <i>338 Million Wi-Fi 6E Devices</i> 2022: <i>700 Million Wi-Fi 6E Devices</i>	2021: <i>None</i> 2022: <i>None</i>

Wi-Fi 6E device forecasts from IDC, as reported by the Wi-Fi Alliance.⁴

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

HPE strongly urges MCMC to open the full 1200 MHz (from 5925-7125 MHz) for Wi-Fi and other license exempt technologies under a Class Assignment, putting Malaysia in alignment with the United States (**Part 4.19.i**), Republic of Korea (**Part 4.19.iii**), Brazil, Canada, Saudi Arabia, and other countries around the world who have already taken this action. HPE would again note that countries representing nearly 42% of global GDP have opened or are considering opening the full 5925-7125 MHz band for license exempt services. The European Union has only acted on the 5925-6425 MHz range to this point as MCMC noted in **Part 4.19.ii**, but HPE would point out that a number of EU member states are now supporting a study of the upper 6425-7125 MHz range for license exempt operations.

HPE participated in the creation of a recent study analyzing the needs for the full 1200 MHz for Wi-Fi and license exempt technologies, along with the reasons that such an allocation is fully justified. The study is posted to the DSA website, and HPE highly commends it to MCMC for consideration⁵. At a high level, some of the points made in the study include:

- The full 1200 MHz is needed to supply new technologies with the spectrum necessary to deliver on current and emerging innovative use cases, now and in the future.
- Addressing the digital divide, improving rural connectivity, accelerating economic innovation, advancing energy efficiency through smart buildings and improving quality of service are just a few benefits.

⁴ <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-wi-fi-6e-certification-program>

⁵ <http://dynamicspectrumalliance.org/wp-content/uploads/2021/08/6GHz-License-Exempt-Band-Why-1200-MHz-and-Why-Now.pdf>



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in the 500 MHz (5925 MHz to 6425 MHz frequency band)?

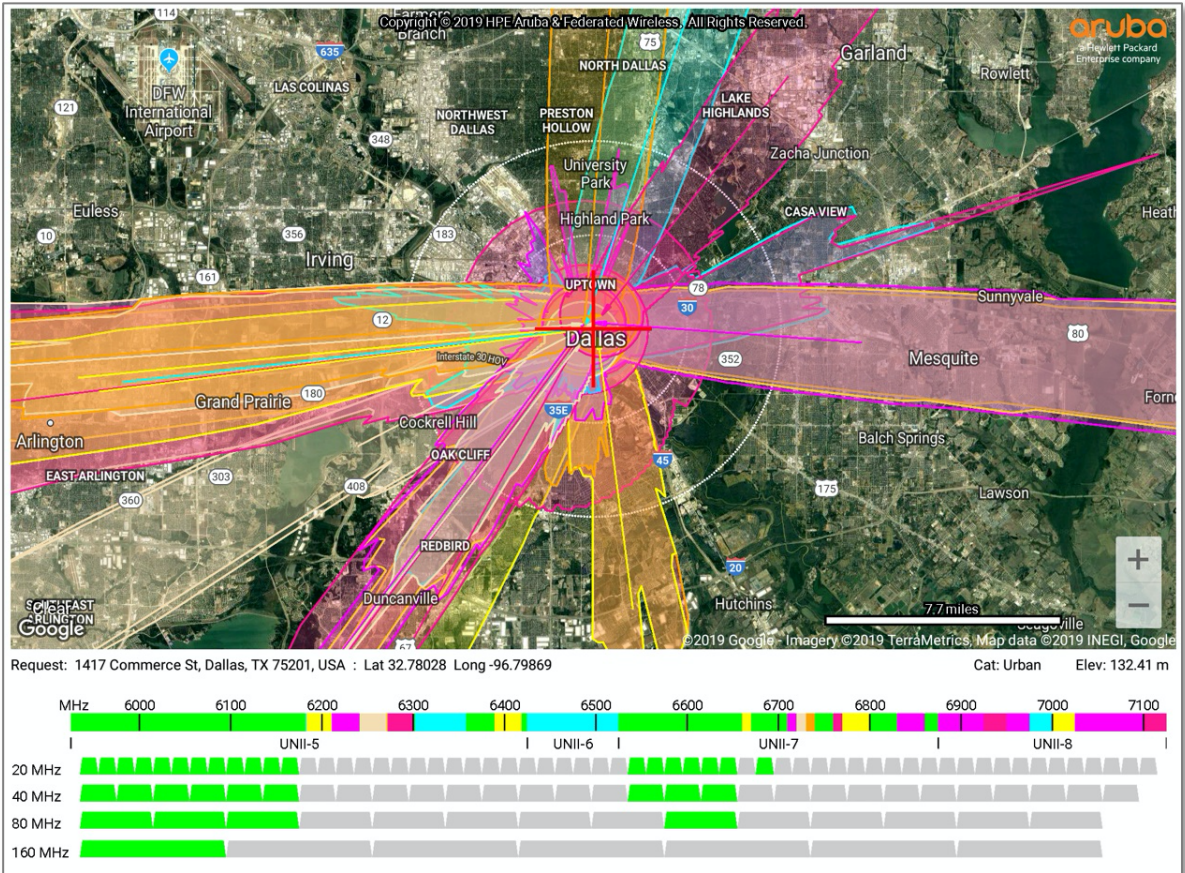
- 6 GHz Wi-Fi technology and products are ready to access the entire 5925-7125 MHz band now.
- Any benefit of reserving a portion of the spectrum for a later decision on whether to allow IMT is entirely speculative and essentially nonexistent. No IMT specifications are in place nor is there any commercially available IMT equipment for this band.
- Wi-Fi and license exempt technologies in the full 6 GHz band, operating under appropriate regulatory conditions, enable incumbents to continue – and to grow – their operations in the band.
- The best way to support 5G deployment in the 6 GHz band is to authorize Wi-Fi and license exempt technologies use throughout the entire 1200 MHz of the band, which supports mobile offload, 5G backhaul, and 5G NR-U operation.

Another reason that HPE strongly encourages MCMC to open the 5925-7125 MHz for Wi-Fi use under a Class Assignment is that the full 1200 MHz of spectrum availability is necessary to enable Standard Power operation in the band. As HPE has noted in our previous responses, Standard Power is critical for a number of outdoor and higher power uses cases which are not achievable with the LPI and VLP access modes. Standard Power access points typically operate in conjunction with an Automated Frequency Coordination (AFC) capability, which is a relatively simple geo-location database with awareness of incumbent operations and their characteristics. The Standard Power access point reports its characteristics and location to the AFC, and the AFC returns a list of available channels/frequencies and permissible operating powers to the access point, ensuring that the access point’s emissions do not exceed the protection thresholds established for the incumbent services in the vicinity.

Because the AFC must protect the incumbent services in proximity to the Standard Power access point, the available channels at a given location will be a subset of the overall “pool” of spectrum that the AFC can evaluate. The image on the following page shows a map with the calculated protection contours for a good number of fixed wireless incumbent links operating near the downtown area of Dallas, TX in the United States. Below the map is a diagram showing the available channels (denoted in green) to a Standard Power access point operating at the pink “+” location in the center of the map.



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It is clear that while the US has made the full 5925-7125 MHz range available for unlicensed (i.e. license exempt) use, at this location only 4 out of 14 and 1 out of 7 channels (80 MHz and 160 MHz channels respectively) in the overall 6 GHz band are available for Standard Power operation. In other words, while 1200 MHz may seem like a large swath of spectrum, for Standard Power the actual spectrum availability will often be much less - only totally an aggregate of 320 MHz (with 80 MHz channelization) or 160 MHz (with 160 MHz channelization) in this example.

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

HPE’s advocacy to open 6 GHz for Wi-Fi and other license exempt technologies is based on the principle that important incumbent users (such as the fixed service and fixed-satellite service that MCMC notes in **Part 5.21**) are not required to be relocated, and in fact, can grow their network operations over time. Currently 6GHz license exempt decisions have been made covering nearly 50 countries around the world. Coexistence with incumbent FS and FSS operations has been the subject of extensive studies and engineering analysis. Policymakers in all of these countries have concluded that the adopted mitigations, such as lower power levels, indoor-only requirements, automated frequency coordination, and very low power levels for portable devices will ensure that licensed incumbent operations are appropriately protected. This view was summarized nicely by ISED Canada in its May 2021 decision opening the full 6 GHz band for license exempt:

“ISED has performed detailed technical analysis on the coexistence of RLANs with existing users. Furthermore, ISED has reviewed and analyzed various technical studies submitted in other jurisdictions with similar incumbent users. ISED is of the view that, under the proposed licence-exempt approach, existing licensed users such as public safety agencies, major



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<p>ii. the potential interference mitigation between these services.</p>	<p><i>telecom operators for backhaul connectivity, satellite service providers and broadcasters will be able to continue to operate and grow in this band.”⁶</i></p> <p>To underscore the ability of license exempt services to coexist with the existing incumbents, HPE would note that in their response to RSM New Zealand’s recent consultation on license exempt operations in 6 GHz, GVF and ESOA stated, <i>“The Commenters do not oppose potential future use of 6425-7125 MHz for WLANs, provided that primary services in the band such as the FSS are protected and can be deployed in the future.”⁷</i></p> <p>However, in that same response to the RSM consultation, GVF and ESOA rejected the idea of FSS coexistence with IMT services in the 6 GHz band, noting <i>“The Commenters oppose any consideration of the use of the 6 GHz band for IMT, as it implies exclusive, primary use of the band for mobile services. Compatibility between high-powered outdoor IMT deployments and both FSS uplinks and downlinks in the same band will be difficult to achieve and impractical - refer to ITU-R Report S.2367 and ITU-R Report S.2368.”⁸</i></p>
<p>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 Assignment. Should part of the frequency</p>	<p>HPE agrees that MCMC could authorize Wi-Fi and other license exempt technologies to operate in the 6 GHz band in Malaysia under a Class Assignment for short-range radiocommunications devices (“SRDs”) in accordance with the Communications and Multimedia Act of 1998 (Part 6.23-24).</p> <p>In order to make the most intensive and efficient use of the 6 GHz band for Wi-Fi and other license exempt technologies, HPE recommends that MCMC authorize the following classes of access point devices:</p> <ul style="list-style-type: none"> Low Power Indoor (LPI) Access Point <ul style="list-style-type: none"> Location: Indoor Only Maximum mean e.i.r.p.: 30 dBm (1000 mW) Standard Power (SP) Access Point <ul style="list-style-type: none"> Location: Indoor and Outdoor Maximum mean e.i.r.p.: 36 dBm (4000 mW) Subject to authorization by an approved AFC System Very Low Power (VLP) Access Point <ul style="list-style-type: none"> Location: Indoor and Outdoor Maximum mean e.i.r.p.: 17 dBm (50 mW) <p>As we have noted in our previous responses, HPE encourages MCMC to authorize Standard Power Wi-Fi and other license exempt technology devices to operate in the band in order to enable</p>

⁶ ISED 6GHz Decision at page 13, para 39. See also FCC 6 GHz Report & Order at page 9 and para. 19 (“The rules we adopt today are designed to optimize unlicensed access to the 6 GHz band while also protecting incumbent services so that they continue to thrive in the band. In our analysis below, we account for the concerns raised by parties representing the various incumbent services that operate in the 6 GHz band, weigh the various technical studies presented by proponents of unlicensed operations as well as representatives of incumbent services, and address how the rules we are adopting will enable unlicensed operations to operate in the 6 GHz band and protect the various incumbent services that operate in the band.”)

⁷ GVF and ESOA Response to RSM New Zealand “WLAN use in the 6 GHz band, Discussion document, June 2021” at pg 2

⁸ Ibid



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<p>band be limited to indoor operation? Should standard power devices operating under the Automatic Frequency Coordination (AFC) system be adopted in Malaysia?</p>	<p>important outdoor and higher power use cases. These Standard Power operations should be subject to authorization to operate at a particular geolocation, in one or more frequency ranges at specified power levels (up to the statutory limit, which we recommend be established at 36 dBm), and for a specific duration. These authorizations can be made by an Automated Frequency Coordination (AFC) system which is a geolocation-aware database able to calculate permissible Standard Power operational parameters and communicate those to the SP device.</p> <p>HPE would note that significant progress has been made in the areas of AFC standardization and development for the US market. In fact, the US FCC has recently adopted a Public Notice detailing the process it will use to authorize AFC systems⁹. Also of importance are the enabling AFC working programs and resulting deliverables of the Wi-Fi Alliance¹⁰ and the Wireless Innovation Forum (“WinnForum”)¹¹.</p> <p>The Wi-Fi Alliance:</p> <ul style="list-style-type: none"> • has defined the message types that will be used between the AFC and the Standard Power access point, • has defined an authorization test framework whereby the AFC and Standard Power access point may be independently tested for proper function as a System Under Test (“SUT”) and Device Under Test (“DUT”) respectively via standardized test harnesses, and, • is defining the test cases that could be utilized to certify both AFC and Standard Power access points utilizing the testing framework mentioned above. <p>The WinnForum 6 GHz committee has the following activities in progress:</p> <ul style="list-style-type: none"> • enumerating and defining AFC system requirements, • general description of the AFC incumbent protection contour calculation, • evaluation of static parameters/inputs to the protection contour calculation, and, • procedures for identifying and correcting erroneous incumbent information in the US FCC’s Universal Licensing System (“ULS”) database. <p>While this last WinnForum activity is specific to 6 GHz in the US, the vast majority of these industry efforts and work products are easily transferable to an AFC implementation for Malaysia and could be leveraged to quickly enable Standard Power operation. An HPE technologist is a Vice-Chair of the Wi-Fi Alliance AFC Task Group and HPE is also a member of the WinnForum 6 GHz Steering Group. We stand ready and eager to assist MCMC in further defining the rules and developing an authorization program for AFC operations for Malaysia.</p>
<p>Question 6 What other key issues need to be considered in introducing Wi-Fi in the 6 GHz frequency range?</p>	<p>The only other point that HPE would like to make is that by opening the full 6 GHz band for Wi-Fi 6E solutions, MCMC will also held ease congestion in the 2.4 GHz and 5 GHz bands. As Wi-Fi 6E access points and clients are deployed and begin utilizing the 6 GHz band, this will positively impact previous generations of Wi-Fi equipment and services operating in 2.4 GHz and 5 GHz. In this way, introducing Wi-Fi in the 6 GHz band will have an indirect benefit to older devices that don’t even support 6 GHz.</p>

⁹ <https://docs.fcc.gov/public/attachments/DOC-375609A1.pdf>

¹⁰ [https://www.wi-fi.org/who-we-are/current-work-areas#Automatic%20Frequency%20Coordination%20\(AFC\)](https://www.wi-fi.org/who-we-are/current-work-areas#Automatic%20Frequency%20Coordination%20(AFC))

¹¹ <https://6ghz.wirelessinnovation.org/>