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Wireless Industry Collaboration Co., Ltd., Hong Kong, China

(subsidiary of Wi-Fi Alliance)

**WI-FI INDUSTRY VIEWS ON WRC-19**

**AGENDA ITEM 1.13**

**AGENDA ITEM 1.16**

**AGENDA ITEM 9.1 ISSUE 9.1.5**

For consideration in APG Working Party 2

**Introduction**

RLANs using Wi-Fi standards have become increasingly important in connecting people and devices. Hundreds of millions of people across the APAC region rely on Wi-Fi to connect their billions of devices every day. Studies show that Wi-Fi is the primary means by which APAC region connects to the internet. For example, in 2017, Wi-Fi delivered more than half (51.2%) of all the internet traffic and 70%-80% of the mobile traffic via offload.[[1]](#footnote-1)/

Today Wi-Fi supports high-resolution video streaming, Wi-Fi calling, smart home monitoring, hotspot access, automation of city-wide services, residential, AR/VR applications, and seamless roaming. This central infrastructure role will only increase in the future, since Wi-Fi technology will be core component in support of Fifth Generation wireless (“5G”) networks, with ultra-dense, high-speed connections to wireless and wired networks, making end-to-end communications seamless and ubiquitous.[[2]](#footnote-2)/ Wi-Fi will continue to deliver mission critical connectivity and will carry a bulk of the world’s data traffic as 5G networks are deployed. [Wi-Fi 6](https://www.wi-fi.org/discover-wi-fi/wi-fi-6), based on the IEEE 802.11ax standard, will bring increased access and capabilities, while [WiGig](https://www.wi-fi.org/discover-wi-fi/wi-fi-certified-wigig) enhancements, based on the IEEE 802.11ad/ay standards at the 60 GHz band, will deliver faster speeds and longer ranges providing connectivity for many advanced use cases in connected homes, connected enterprises, IoT, smart cities, carrier services, and public venues.

All of this traffic over Wi-Fi-enabled and other RLAN devicesrequiresspectrum capacity. Despite ever increasing demand, however, the spectrum available for RLANs has not changed since WRC-03. Wi-Fi industry is concerned that without improved spectrum access, RLAN users will begin to experience degradation in performance. This problem will be particularly acute in high-density RLAN (Wi-Fi) deployments which are prevalent in many APAC region’s metropolitan areas. With that in mind, Wi-Fi industry seeks APT support on the following WRC-19 issues.

**Agenda Item 1.13 (Item J: 66-71 GHz)**

The frequency band 66-76 GHz is included under Resolution **238 (WRC-15)** for sharing and compatibility studies. During the TG 5/1 effort, some administrations expressed support for IMT identification in the 66-71 GHz portion of this band. Wi-Fi industry considers this approach as highly problematic.

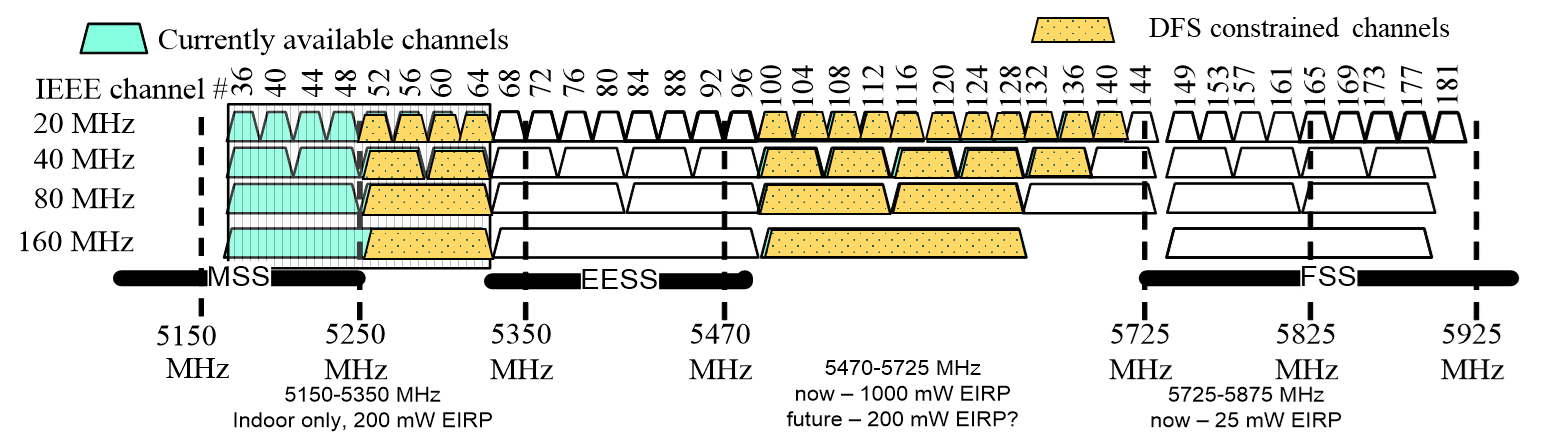
As noted in the draft CPM-19 report, very few sharing and compatibility studies have been carried out on the 66-71 GHz band.[[3]](#footnote-3) This can be explained by the fact that many countries have identified this and adjacent bands for implementation of license-exempt technologies (e.g. IEEE 802.11ad/ay (WiGig)). In the United States, for example, the FCC decided to maintain the unlicensed use of the 64-71 GHz band and even to expand these operations on to aircraft in flight.[[4]](#footnote-4) Similarly, the European Union’s Radio Spectrum Policy Group of the (RSPG), expressed that “a general authorization” (i.e., license-exempt) regime in the 66-71 GHz band would be important for 5G implementation.[[5]](#footnote-5) Similarly, ITU-R confirmed plans for implementation of the Multiple Gigabit Wireless Systems (MGWS) in this frequency band.[[6]](#footnote-6) In light of that, it is particularly troubling that no sharing or compatibility studies between MGWS and IMT have been performed.

The MGWS such as WiGig offer low-latency connectivity that expands the Wi-Fi experience for virtual reality, multimedia streaming, gaming, wireless docking, and enterprise applications requiring high speed, data-intensive connections. These systems need access to the uncongested 60 GHz frequency band with wide channels to transmit data efficiently at multi-gigabit per second speeds. Users benefit from expanded capacity and focused transmission between devices to reduce interference, even in crowded environments. Given nascent state of the 5G ecosystem in the 60-70 GHz frequency range, it is difficult to predict, prior to WRC-19, how technologies, spectrum needs, market demands and other factors will evolve. A recent study projects that by the year 2022, annual chipset shipments based on IEEE 802.11ad/ay protocols would exceed 1.5 billion. It is clear, however, that an IMT identification in the 66-71 GHz band will be highly disruptive to the ongoing MGWS development and deployments. Such identification would create regulatory and market uncertainty, and, thereby, impede development of license-exempt (e.g., non-IMT) systems.

Wi-Fi industry urges the APT administrations to take a technology neutral approach – ***support NOC for the band 66-71 GHz Draft CPM-19 Report Method J1 (Section 2/1.13/4.10.1)***.

**Agenda Item 1.16 (5 150-5 250 MHz)**

Radio Local Area Networks (RLANs) have proven to be a tremendous success in providing affordable and ubiquitous broadband connectivity in the APAC region. Introduced by some administrations in limited spectrum in the 2.4 GHz band and subsequently expanded into the 5 GHz band, today, RLANs are integral component of telecommunications infrastructure. The WRC-03, recognizing significant demand for RLANs worldwide, designated a limited amount of spectrum for RLANs in 5 GHz.



**Figure 1: RLAN spectrum in 5 GHz band with IEEE 802.11 channelization**

As shown on Figure 1, except for the band 5 150-5 250 MHz, other RLAN spectrum in the 5 GHz range is subject to the dynamic frequency selection (DFS) constraint. The DFS constraint, albeit necessary, reduces spectrum access and raises equipment cost and complexity for RLAN implementation. The current Radio Regulations provisions, adopted at WRC-03, restrict the band 5150-5250 MHz to indoor use only. Over the last 15 years (since WRC-03), however, the requirements for RLAN outdoor deployments have evolved, for example:

* Smart cities and communities;[[7]](#footnote-7)
* Mobile Data – volume of mobile data traffic offloaded to Wi-Fi significantly exceeds traffic carried (remaining) on cellular networks;[[8]](#footnote-8)
* Locations which are increasingly expected to offer ubiquitous Wi-Fi access including outdoor areas such as sports arenas, municipal/private networks, parks, and other high traffic areas as well as indoor areas such as shopping malls, airports, hotels, restaurants office buildings and schools;
* Sensors and connectivity for public transport, automotive, utilities, etc. rely on Wi-Fi connectivity;
* Internet of Things (IoT) technologies entail both indoor and outdoor deployments;
* Connected wearables and other consumer applications rely on Wi-Fi to support various use cases.

The lack of adequate spectrum particularly for RLAN outdoor deployments threatens to degrade performace and limit conectivity for billions of consumers in the APAC region. In light of this fact, administartions in the APAC region are modifying their national regulations to allow RLAN outdoor deploymnts in the band 5 150-5 250 MHz, countries including India, Indonesia, Japan and Republic of Korea.

Wi-Fi industry urges the APT administrations to support revisions to Resolution **229 (Rev.WRC-12)** are proposed in order to enable outdoor RLAN operations including possible associated conditions for new e.i.r.p. limits while addressing the protection of incumbent services – ***support Draft CPM-19 Report Method A2* (Section 2/1.16/4.1.2)**.

**Agenda Item 9.1 Issue 9.1.5**

WRC-03 designated 5 250-5 350 MHz and 5 470-5 725 MHz frequency bands for use by RLANs. In doing so, WRC-03 adopted RR Nos. 5.447F and 5.450A provision specifying that RLANs must protect radiolocation service described in Recommendations ITU-R M.1638-0 and ITU-R M.1849-0. The actual coexistence requirement between RLAN and the radiolocation service is regulated by No. **5.446A** and associated Resolution **229** (Rev. WRC 12) and is premised on application of the Dynamic Frequency Selection (DFS) technique. The listen-before-talk approach of the DFS is the only practical method for RLANs to avoid operations on frequencies in use by radars.

Since WRC-03, along with growing demand for RLAN connectivity, there has been evolution in radar technology, with new fast-frequency-hopping and bi-static radars introduced in to the 5 GHz bands. Significant amount of work has been carried out to study coexistence between RLANs and newly introduced radar systems which operate in the 5250-5850 MHz range.  In general, the studies conclude that DFS isthe only realistic mitigation technique identified to protect radars from RLAN interference is the DFS, but that it cannot protect the fast frequency hopping and bi-static radars. In other words, the listen-before-talk, DFS technique cannot protect radars that are specifically designed so as not to be heard.

Nonetheless, some radar proponents insist that existing international regulation must be modified at WRC-19 to require RLANs to protect *all* radar systems in the band, including those that use bi-static and advanced fast frequency hopping techniques. Under the radar proponents’ logic, RLANs must protect the radars that they cannot sense. I mposing such contradictory regulatory requirement would effectively preclude RLAN operations in the 5250-5350 MHz and 5470-5725 MHz bands. With 95% of Wi-Fi devices shipped in 2021 expected to support 5 GHz, this is unacceptable.

Wi-Fi industry urges the APT administrations to support approaches that maintain RLAN access to much needed spectrum in the 5 GHz band – **support Draft CPM-19 Report, Approach B (Section 2/9.1.5/3.1.2 or Approach C (Section 2/9.1.5/3.1.3).**

**Summary**

The success of Wi-Fi is improving lives all over the globe and delivers significant economic value (see [www.ValueofWiFi.com](http://www.ValueofWiFi.com)). As Wi-Fi popularity grows, it is important to ensure reasonable availability of spectrum. Recent studies project a significant shortfall in spectrum based on projected Wi-Fi growth and needs (see [Spectrum Needs Study](http://www.wi-fi.org/news-events/newsroom/additional-unlicensed-spectrum-needed-to-deliver-future-wi-fi-connectivity)). APT administrations are urged to consider these factors in their preparatory effort for WRC-19 and in the future national spectrum regulatory decisions.

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1. / CISCO, *VNI Complete Forecast Highlights Tool*, Asia Pacific, Wired Wi-Fi and Mobile Growth (2017), https://www.cisco.com/c/m/en\_us/solutions/service-provider/vni-forecast-highlights.html# (select “Asia Pacific” drop-down menu and expand “Fixed/Wi-Fi.” (“CISCO VNI”). [↑](#footnote-ref-1)
2. / *See, e.g.*, Wi-Fi Alliance, [*Next Generation Wi-Fi: The future of connectivity*](https://www.wi-fi.org/file/next-generation-wi-fi-the-future-of-connectivity), or Wireless Broadband Alliance, [*The Role of Wi-Fi and Unlicensed Technologies in 5G*](https://www.wballiance.com/the-role-of-wi-fi-unlicensed-technologies-in-5g/) [↑](#footnote-ref-2)
3. *See* Draft CPM 19-2 Report at Paragraph 2/1.13/3.2.9 [↑](#footnote-ref-3)
4. [Use of Spectrum Bands Above 24 GHz for Mobile Radio Services Second Report and Order](https://docs.fcc.gov/public/attachments/DOC-347449A1.pdf), Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177 [↑](#footnote-ref-4)
5. *See* [RSPG Second Opinion on 5G Networks](https://circabc.europa.eu/sd/a/fe1a3338-b751-43e3-9ed8-a5632f051d1f/RSPG18-005final-2nd_opinion_on_5G.pdf) [↑](#footnote-ref-5)
6. *See* ITU-R Doc. 5-1/32, Recommendation ITU-R [M.2003](http://www.itu.int/rec/R-REC-M.2003/en)-2 and Report ITU‑R [M.2227](http://www.itu.int/pub/R-REP-M.2227) [↑](#footnote-ref-6)
7. <https://www.itu.int/en/ITU-T/ssc/Pages/default.aspx> [↑](#footnote-ref-7)
8. <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html> [↑](#footnote-ref-8)