

**New Zealand Radio Spectrum Management  
Ministry of Business, Innovation and Employment**

**Draft Long Term Spectrum Outlook 2022-2026 Consultation**

**Comments of Cisco Systems, Inc.**

Cisco Systems, Inc. (Cisco) congratulates the Ministry of Business, Innovation and Employment (MBIE) and its Radio Spectrum Management (RSM) team for evaluating New Zealand's spectrum requirements over the next five-year period. Spectrum has become a critical ingredient for broadband connectivity and business enablement, while wireless technologies can deliver Gross Domestic Product (GDP)-enhancing results to the nation's economy. For companies like Cisco, where we are today literally developing technology that will be introduced to the market in the future, the opportunity to share with RSM in response to RSM's draft Five Year Spectrum Outlook 2022-2026 (the draft) on how we think spectrum utilization will evolve over the next five years is invaluable.

Cisco is a global provider of networking solutions and products that support the needs of enterprise and service provider customers, including in New Zealand. A significant part of our business is supplying wireless connectivity to enterprise and government customers, many of whom rely on wireless technology to meet their operational needs. As we work with businesses in New Zealand and across the Asia Pacific region, we are witnessing a desire to utilize wireless capabilities more deeply than ever before, and to utilize different technologies that address different use cases. For example, public and Private 5G, Wi-Fi 6 and its evolution to Wi-Fi 7, and other technologies such as LoRA, are seen as key enablers of digitalization imperatives for our customers. That is the reason Cisco has been so active in spectrum policy discussions on the need for license-exempt technologies to occupy the full 5945-7125 MHz range, as well as more spectrum for 5G networks. This requires us to pay close attention to spectrum allocation decisions globally, as well as to the technologies that will operate in those allocations.

Our comments to this consultation supplement the comments you are receiving from organizations where we are members, including those filed by the Dynamic Spectrum Alliance

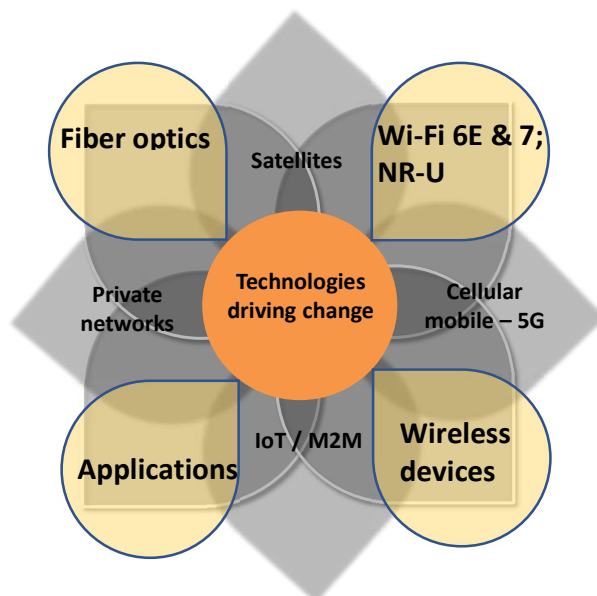
(DSA) and the Wi-Fi Alliance (WFA). We endorse the views filed by those groups, and in this comment, will amplify a few concerns:

- First, Cisco urges the RSM to more thoroughly consider the full range of technologies that are driving change in spectrum utilization. The draft identifies four, but we suggest that there really are eight (further elaborated below).
- Second, Cisco endorses the draft’s attention to 5G spectrum and in particular the important role of 3 GHz spectrum. We do ask the RSM to consider on a priority basis the importance of opening the full 6 GHz band to license-exempt use.
- Third, we endorse the draft’s attention to Private 5G networks, and offer our reasons why this is an important topic.
- Finally, we highlight what we consider as the important role of automated spectrum sharing techniques, and why RSM should place New Zealand at the forefront of this development.

### Technologies driving change

The draft report is missing some petals on the flower that are also technologies that are driving spectrum utilization in profound ways. We suggest the following amendments to the chart:

Figure 2 – Technologies driving change



The reason the “technologies driving change” diagram needs to be augmented is that it does not capture fully technological changes that are driving how spectrum is utilized and consumed:

- **Wi-Fi 6E and 7**, designed for the full 6 GHz band, are critical to the success of wireless connectivity as these technologies will: (1) continue to support mobile device offloading of up to 70% of data traffic onto Wi-Fi networks; (2) operate at the edge of fixed broadband networks, including fixed wireless 5G and satellite broadband, to provide edge connectivity to devices at home or at work; (3) enable enterprises to move beyond yesterday’s channelization plans to take advantage of wider channels; and (4) **New Radio-Unlicensed (NR-U)**, a 3GPP standardized contention-based technology, also requires 6 GHz to perform to its design objectives.
- **Wireless devices** continue to proliferate in number and diversity (well beyond the categories of IoT or M2M), but have a common element in that virtually all of them support Wi-Fi connectivity; as generational changes in devices are made, devices’ data consumption increases significantly, and therefore require next generation Wi-Fi networks to support faster speeds and more diverse transmission characteristics.
- **Applications** that will run on this larger and more diverse set of devices are also diversifying well beyond applications in widespread use today, and some of these (such as virtual or augmented reality) will place enormous new data consumption demands on networking capacity across the range of broadband networks.
- **Fiber optic** speeds continue to increase at a geometric rate. When Wi-Fi technologies operate at the edge of fixed fiber networks, Wi-Fi can quickly become a choke point unless there is an opportunity to deploy Wi-Fi 6E and future Wi-Fi 7 to its full potential. The importance of policies that advance both fixed broadband technologies in conjunction with wireless broadband technologies cannot be overstated.

### **Spectrum band priorities**

Cisco agrees with the draft that for advanced IMT technologies, RSM has correctly proposed the priority bands: 600 MHz, 3.3- 3.4 MHz, 3.4-3.8 MHz, 3.8-4.2 MHz, and 24-30 GHz. In fact, the

3 GHz band is the most utilized 5G band in the world, supporting global economies of scale. For mid-band spectrum for 5G, there is simply no substitute for 3 GHz spectrum.

Cisco further agrees that RSM should consider spectrum requirements for IoT / M2M devices both in the context of license-exempt spectrum and, for licensed spectrum, to utilize flexible spectrum licensing to enable service provider licensees to offer IoT and M2M services on their 5G networks. The demand for IoT / M2M networks will continue to grow for the foreseeable future, and there will not be a “one size fits all” approach for users of these networks.

For 6 GHz, RSM should consider the opportunity costs of inaction with respect to enabling license-exempt technologies and should move to allocate the band under its General User Radio License (GURL) approach. For our enterprise customers, opening the 6 GHz band to license-exempt ensures that in their use of Wi-Fi, they can finally move beyond the 40 MHz wide channels used in enterprise networks since the mid-2000s, and toward 80 MHz or 160 MHz wide channels that they will need to power their networks in the future. For our service provider customers, the 6 GHz band as license-exempt allows for more mobile offload to Wi-Fi in congested areas and deep indoors, and supports enhanced in-home applications together with fibre broadband expansion. Service providers can also consider use of 5G NR-U to supplement macro 5G for specific locations. For consumers, RSM needs to evaluate the steps already taken by the global consumer electronics industry to enable their equipment for the full 6 GHz band, with a range of more than 200 devices already in the market from smartphones to smart TVs to laptops and more. Those devices will simply not be accessible to New Zealand users in the absence of a change to the 6 GHz rules. The 6 GHz band has been the topic of a separate consultation. It deserves to be progressed, and we urge RSM to do so.

## **Private 5G**

Private 5G networks or “locally licensed” networks are being embraced by most nations that have a leadership position in manufacturing or industry, and we encourage RSM to prioritize this topic. In Cisco’s view, enterprise customers globally (including government customers) are already digitizing operational processes to an extent never seen before, and in the process, not

just improving efficiency, but also discovering new sources of data within their organizations that enable them to provide better products and services to customers. That is happening as a function of wireless networking, although to date largely from the capabilities of license-exempt technology. It will profoundly impact national economic performance and competitiveness.

For the future, regulators who wish to address these private networking needs should think in terms of two very large technology ecosystems – IEEE 802.11 or “Wi-Fi” and 3GPP 5G/6G – and some important but smaller ecosystems that serve critical needs, such as low power wide area technologies for wide area IoT solutions. Even when 5G services are available, tailored to specific verticals, not all enterprise customers will wish to convert their network operations from today’s “owned and operated” model to a “services model.” Instead, we project enterprise customers are more likely to utilize a heterogenous approach to technologies and business models. These vertical markets are global and will require wireless solutions that range from advanced Wi-Fi, to 5G services to Private 5G “controlled by the enterprise.”

RSM should look to other Asia Pacific countries that have enabled Private 5G and/or to European nations that have permitted licensing at the enterprise premises level, and that have created the technical rules to enable it as well as to manage interference. Based on choices made by other regulators, it is becoming clear that the 3 GHz band plays an important role in Private 5G, as equipment is readily available, although we caution that a majority of 3 GHz spectrum should be made available for service provider spectrum. RSM may also wish to consider the 4.5 GHz (n79) band to support Private 5G as used in Japan, South Korea and Taiwan. Millimeter wave bands can also be considered, but as of today, these represent a future opportunity in that equipment is not yet widely available at scale economies.

### **Spectrum management techniques**

Cisco agrees with much of the draft plan’s assessment of spectrum management and spectrum sharing technologies. Clearing and re-farming, when available, remain the best choice for licensed technologies such as 5G. However, spectrum sharing technologies are rapidly evolving – the Wi-Fi global community is embracing its first use of database-enabled sharing for higher power devices in the 6 GHz band and 3GPP technologies sharing spectrum in the 3.5 GHz band with the United States utilizing such a database approach. Countries that can squeeze more

utilization from bands by having unlike radio systems operating in them using automated spectrum sharing technology will have a long-term competitive advantage. The 6 GHz band for standard power license-exempt radios would be a logical place to begin.

## **Conclusion**

Thank you for the opportunity to provide these comments to the RSM's long term spectrum management plan. Cisco looks forward to working with you as you expand the opportunity for spectrum technologies throughout New Zealand.

Respectfully submitted,

CISCO SYSTEMS, INC.

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