



**Consultation Title** PTS Spectrum Strategy, Report No. PTS-ER-2014:16, Diary number 13-7510

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**Signatory** Inteno Group AB

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Dear Members of the Swedish National Post and Telecom Authority (“PTS”),

Inteno Group AB (Inteno) with subsidiaries Genexis Sweden AB and IOPSYS Software Solutions AB, respectfully acknowledge the principles presented in the Consultation for achieving the PTS’ vision for spectrum management. Where we like to address that wireless connectivity worldwide is increasingly dependent on Wi-Fi and therefore unlicensed spectrum. This Consultation represents an important step toward making much-needed spectrum available to address growing demand for Wi-Fi connectivity in Sweden. Inteno appreciates the opportunity to contribute to PTS’ efforts. The justification for this request is contained in the following sections.

### **Wi-Fi is integral to Swedish connectivity objectives**

Swedish citizens rely on Wi-Fi to connect millions of devices every day, and studies show this is increasing rapidly. In fact, Wi-Fi devices are now the primary means by which Swedes connect to the Internet. This central role will only increase because the future of wireless connectivity is more data traffic, more devices, more services and applications and much lower latency. These requirements cannot be fully addressed by wide area (e.g., 5G) networks. Instead, short range networks (e.g., Wi-Fi) in combination with broadband-to-home/building are integral to achieving Sweden’s connectivity objectives. With the goal of 100% fiber-to-home connectivity, Sweden is leading the way in broadband infrastructure; however, to achieve maximum benefits, the fiber deployments must be combined with Wi-Fi capabilities. Wi-Fi’s role is appropriately recognized in the European Commission’s 2030 Digital Compass: the European way for the Digital Decade, which underscores that gigabit connectivity in the European digital transition requires Wi-Fi functionality.

As Swedish based vendor in Optical Network Termination and in-home Gateway equipment, we are in the middle of the fiber networks expansion in Europe and a substantial equipment provider to the networks in Sweden, where Wi-Fi is likely to carry an even higher proportion of traffic on those fiber networks.

Inteno respectfully asks PTS to take in to account that even if the 2023 World Radiocommunication Conference were to identify the 6425-7125 MHz band for IMT in some countries, significant time (i.e., years) and investments (i.e., billions of euros) would be required to develop, implement, deploy and operate 5G (IMT) networks in the upper-6 GHz band. It is unlikely that such 5G (IMT) networks would be

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commercially viable, given their limited market scale and harmonization. Proposed “macro-base station” or other quasi-IMT implementations simply lack the economies of scope and scale necessary for a robust equipment ecosystem or commercial viability. In short, additional 6 GHz spectrum for 5G will not address the underlying problems of 5G network deployments in Europe. In fact, the IMT proponents’ assertions on the need for identification in yet another frequency band (i.e., 6425-7125 MHz) are simply irrational. This is clearly evidenced by recently published European Commission’s Digital Economy and Society Index 2022, which states that “spectrum assignment, an important precondition for the commercial launch of 5G, is still not complete: only 56% of the total 5G harmonized spectrum has been assigned, in the vast majority of Member States”. Moreover, the IMT proponents are also advocating for alternative mid-band spectrum in the 7-15 GHz range. Given that purported IMT spectrum needs can be accommodated in other frequency bands, Inteno respectfully asks PTS to consider that the 6425-7125 MHz frequency range is the only mid-band spectrum that has been identified for Wi-Fi expansion by policymakers and industry worldwide. There is no alternative spectrum to support growing demand for Wi-Fi connectivity in Europe. Access to less than the entire 5945-7125 MHz band (1180 MHz) for WAS/RLANs use would substantively reduce Wi-Fi performance in terms of QoS at higher data rates and lower latencies. Without access to the 6425-7125 MHz, Wi-Fi capabilities in Europe will be permanently impaired, undermining connectivity goals and objectives. Wi-Fi 6E, and the forthcoming Wi-Fi 7 standard, need access to the full 1200 MHz to utilise the full extent of their capabilities and support evolving and emerging innovative use cases, now and in the future. Opening only 480/500 MHz in the lower 6 GHz band would mean that Wi-Fi networks in dense deployments would have to continue employing small channel bandwidths, as only one 320 MHz channel or three 160 MHz channels would be available. With access to the full 1200 MHz, a larger number of these wide channels could be accommodated, significantly improving the performance available to each user. For more detail, see the Intel report *Spectrum needs of Wi-Fi 7*.<sup>1</sup>

## **Wi-Fi provides affordable connectivity to close the digital divide**

As noted in the European Commission’s *2030 Digital Compass: the European way for the Digital Decade*, a new digital divide has emerged between those who can fully benefit from an enriched, accessible and secure digital space with a full range of services, and those who cannot. The European vision for 2030 is a digital society where no one is left behind.

As users do not need to pay licence fees to use the spectrum, Wi-Fi is one of the most cost-effective ways to provide connectivity. Wi-Fi also enables multiple people to share a single broadband connection, reducing the cost of connectivity for each individual. As the Wi-Fi market grows, economies of scale are being realised, ensuring that the technology will be highly affordable, like its predecessors.

Reserving a portion of the 6 GHz band for a later decision on whether to allow IMT (or not) would forego the immediate economic gains that would have accrued from

<sup>1</sup> <https://www.intel.com/content/www/us/en/wireless-network/spectrum-needs-of-wi-fi-7.html>

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opening the full 6 GHz band to licence-exempt operations. In an August 2020 report<sup>2</sup>, Coleago Consulting estimated 5G will not be deployed in the 6 GHz band for at least a decade. During that time, the global economy would forego the vast economic value that would be generated by Wi-Fi 6E and Wi-Fi 7.

## Enabling Sweden to shift towards sustainability

Digital technologies, including Wi-Fi, will play a pivotal role in achieving the objectives of the European Green Deal. Connectivity can be used to curb greenhouse gas emissions, as well as human beings' broader impact on the environment.

At a more fundamental level, digital connectivity can also reduce the need to travel, enabling people to fulfil tasks and conduct meetings remotely, rather than having to drive or fly. As it can deliver high-speed and very responsive connectivity, Wi-Fi 6 and beyond is also well suited to delivering VR/AR services that can help people interact effectively without having to be physically present in the same location. VR/AR is increasingly used for training and education, as well as to help field engineers make repairs or install new equipment.

In cases where travel is necessary, Wi-Fi can help make public transport more appealing, thereby reducing congestion and emissions caused by private cars. By providing connectivity onboard trains, buses, trams, and at stations, Wi-Fi can make travel time more enjoyable and/or productive for passengers. Wi-Fi connectivity is now a standard feature on board trains in developed markets.

At the same time, Wi-Fi itself is becoming more efficient, thanks to new features, such as target wake time and the OFDMA radio interface, both of which reduce power consumption. Given that most Wi-Fi networks operate at much lower power levels than cellular systems, they could be the most energy-efficient connectivity option in many scenarios.

Indeed, a study by the French regulator ARCEP<sup>3</sup> found that the combination of fiber and Wi-Fi is the most efficient solution in terms of energy consumption, performance, and flexibility.

The ITU has forecast<sup>4</sup> that the energy used by mobile networks around the globe will emit 73.0 Mt CO<sub>2</sub> equivalent (CO<sub>2</sub>e) in 2025, compared with 35.2 Mt CO<sub>2</sub>e for fixed networks. Considering the share of mobile data and fixed broadband lines in Europe, around 4.8 Mt CO<sub>2</sub>e will be emitted from fixed networks and 10 Mt CO<sub>2</sub>e from mobile networks in the EU. That suggests fixed networks produce less than half the CO<sub>2</sub>e of mobile networks, even though they transport more than 10 times the amount of data.

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<sup>2</sup> See section 7.3 of the report: The 6 GHz Opportunity for IMT, which says "recognizing the 10+ year timeframe anticipated for 5G at 6 GHz".

<sup>3</sup> [https://en.arcep.fr/uploads/tx\\_gspublication/achieving-digital-sustainability-report-dec2020.pdf](https://en.arcep.fr/uploads/tx_gspublication/achieving-digital-sustainability-report-dec2020.pdf) (last visited 15 July 2022).

<sup>4</sup> Source: ITU, [Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement, 2020](#).

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Furthermore, Wi-Fi 6 introduces new features to support IoT deployments, such as support for large numbers of simultaneous connections and an extended duration of disabling the Wi-Fi radio between transmissions without a loss of connection. As a result, more IoT devices will be able to send more information and use less power.

Respectfully submitted

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A blue ink handwritten signature, appearing to read "Conny Franzen", written over the printed name.

Conny Franzen

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