

Hellenic Telecommunications and Post Commission (EETT)

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COMMENTS OF MOTOROLA SOLUTIONS INC.

Motorola Solutions Inc (MSI) is filing these comments for the EETT consultation on granting of spectrum usage rights in the 700MHz, 2GHz, 3.4-3.6GHz & 26GHz bands.

MSI is a global leader in mission-critical communications. We serve more than 100,000 customers in more than 100 countries, with 17,000 employees in 60 countries, and an install base of more than 13,000 systems around the world, based on industry-leading innovation. We believe our accumulated experience qualifies us well to comment on this discussion paper.

Please note that for questions not included in this paper, MSI has no comments to submit.

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Question 1. Do you consider additional measures are needed beyond those specified in Decision ECC / DEC / (15) 01 or elastic limits of coexistence between adjacent MFCNs, and between MFCNs in the 700 MHz band and systems in neighboring zones?

MSI observes that ECC Decision (15)01 should be adequate to ensure compatibility between MFCN blocks and the PPDR block.

The proposal to dedicate 2x3 MHz for PPDR is a positive step to enable basic broadband LTE for voice applications. For the remaining part that is proposed for the MoD, the proposal does not provide any technical details on current use by the MoD. It is assumed and recommended that such Defence systems in 736-758 MHz that is adjacent to the proposed 3+3 MHz PPDR block should be restricted to using narrowband mobile technologies, and that any guard band between the two users should be adopted from within the block dedicated to Defence systems. This will minimize any impact on the use of the PPDR uplink block at 733-736 MHz from continued or future use by the MoD.

In addition to the 3+3 MHz block, additional steps should be taken to enable more data intensive applications for the longer term. We recommend that, in addition to the proposed 3+3 MHz, an additional 5+5MHz in the MFCN frequency range should be reserved for Broadband PPDR applications in Greece. This approach reflects our experience with early adopters of LTE for Public Safety or Broadband PPDR. Most studies, including within CEPT (eg ECC REP 199), and ITU Report ITU-R M 2415 in preparation for WRC-15, concluded that an amount of spectrum in the range of 2x10 MHz is needed for future European broadband PPDR Wide Area Networks (WAN) to support day to day operations and small public protection events. Responding to wider-scale events or disaster relief may even require more spectrum or broader bandwidth.

Question 5. Do you agree with EETT's assessment of the requirement for a new restriction of rights in the 3400-3800 MHz band?

MSI agrees with the plan to move to TDD frequency arrangements based on 80 x 5MHz. We propose that 3700-3800 MHz should be reserved outside the auction rules, and used partly for rural broadband, and partly for private broadband, an approach under consideration or already taken by other European countries. (For example, see Germany's decision in our response to Q33 below). We propose that the upper 80 -100MHz be designated for a combination of rural and private LTE/5G for verticals and industrial /enterprise usages (60+20 MHz or 60+40 MHz), to be assigned on a local geographical area basis and through a separate administrative procedure. Localized/small area licensing rules with low spectrum fees on an administrative allocation basis is recommended for such uses.

Question 7. Do you agree with the proposals regarding the TDD network synchronization framework in the 3400-3800 MHz band?

MSI supports TDD frame synchronization for all TDD networks within the 3400-3800 MHz band. We also support ECC Report 281 applying a 47dBm/5MHz threshold.

Question 8. Do you agree with EETT's proposals on the technical requirements for base stations and terminals in the 3400-3800 MHz band?

MSI supports geographic separation as a method for reducing interference between systems operating in the band. We also support the use of E-field limits for cross border protection among CEPT member states.

Question 14. How important is the use of the 26GHz band for deployment 5G networks; Will some applications rely more on this zone? What uses are you planning?

MSI encourages the Commission to consider small area licensing even for commercial carriers (ECA) in this band, as some other EU member states have adopted. Nationwide licenses for millimeter wave (mmWave) are not an efficient way to manage spectrum resources, especially since most deployments are expected to be indoor for dense urban deployments or in a manner similar to fixed wireless access for non-dense urban deployments where actual frequency usage is limited to very small operational areas.

Question 22. Do you agree with the definition of maximum bandwidth per band, and with EETT's proposals? Please substantiate your views.

For 3.4-3.8 GHz, MSI believes that 100MHz TDD contiguous spectrum should be sufficient as the maximum bandwidth for 5G NR radio in this band is 100MHz as specified in 3GPP 38.104 (Table 5.3.5-1).

Question 26. For the 700 MHz band, do you consider a coverage requirement should be imposed? The municipalities in Annex III do not currently have broadband services with a transmission rate of 100+ Mbps to 95+% of the population. If the decision is to impose an obligation on all providers, assuming each provider incurs a share of the obligations, how would you divide the municipalities of Annex III into three groups?

MSI's understanding of this proposed plan is that PPDR systems in the 3+3 MHz block in the 700 MHz band are expected to be dedicated systems for public safety, and the concerned agencies will determine their own deployment and coverage requirements. Should PPDR services be procured from a commercial carrier operating in the adjacent 700MHz blocks, we expect that stringent geographical coverage requirements would be mandated on such a carrier, in addition to other operational and mission critical services requirements.

Question 31. Do you think there is interest in the Greek market from vertical markets for implementing their services through 5G networks?

Most vertical market users currently meet their secure mission critical communications requirements with narrow-band PMR systems. They also use dedicated RLANs that operate in shared spectrum bands for broadband applications. Requirements for private broadband will accelerate substantially once favorable rules are put in place and regulatory barriers to entry are reduced. In particular, it is expected that these requirements will increase exponentially as dedicated spectrum is set aside for these users.

It is also important to note that these requirements will be driven by the need for cybersecurity and the need to protect critical data that cannot be shared on a public electronic communications provider.

Question 32. If there is interest from vertical markets to implement their own 5G networks, which approach do you consider best: implementation of services through the IT networks, or through acquiring rights of use and exclusive use of the spectrum?

MSI believes there will be a mix of enterprise users, some requiring private networks where all traffic and network controllers are controlled by the private operator (e.g. utilities, industrial enterprises), while others will use service providers. The early adopters for private broadband include utilities, transportation (railway, seaports and airports) and logistics, private security, municipal, & manufacturing.

Question 33. Do you think solutions/applications for vertical markets will be dedicated solely to the use of 5G technology or they will combine other technologies?

Private Broadband using LTE or 5G NewRadio (NR) makes it possible to create an affordable, private data network at a lower cost and without the reliance/dependencies of a wireless carrier. In the future, Private

LTE/NR Broadband will unlock capabilities to drive automation, workforce productivity, efficiency and safety – all critical concerns for forward-looking organizations. MSI therefore supports arrangements whereby a smaller 'area license' could be issued to support a private LTE/NR network over geographic areas of limited size.

Unlicensed Wi-Fi/Mesh/SRD networks are alternatives where dedicated spectrum is not available, but do not provide the same level of control as PMR networks, nor the same protection against interference and quality of service as private LTE/NR networks do.

Greece's geography, with 6,000 islands as well as the mainland, would support smaller area licensing and access to spectrum for private use, such as industrial compounds, airports, and seaports. Our proposal is based on band segmentation of 3.4-3.8 GHz between spectrum for Electronic Communications Services, Private Broadband & Rural broadband. Geographic separation or means such as lower power and indoor deployment can be used if a block is to be shared between Rural and Private Broadband. For areas with no Rural broadband, the same spectrum is used for private broadband based on small area licensing.

Industrial facilities, Oil & Gas, transportation (seaports, airports), logistics hubs, utilities and smart cities can benefit from the use of converged standards in common sets of bands or ranges. As use cases for private networks continue to evolve, all these users can benefit from being able to deploy a secure and dedicated broadband ready infrastructure based on a common set of standards (e.g. LTE/5G NR).

In countries around the world, the rules governing spectrum acquisition and operation of networks are evolving to support new operational models. MSI encourages the Commission to offer parts of 3400-3800 MHz for localized broadband systems using highly innovative sharing techniques or localized licensing. We recognize that 3.7-3.8GHz includes an existing Rural Broadband FWA licensee (30+30MHz), and consider this a good opportunity to enable rural broadband and private broadband for verticals. We propose an approach that follows a band split between Mobile carriers and private broadband. For example, Greece should consider a model like Germany's (splitting mobile spectrum between carriers and private users: 300MHz to commercial carriers & 100 MHz for local and private licenses). Alternatively, Greece could consider allowing shared use (geographic, tiered, or dynamic). Sharing between rural and private broadband would benefit both categories of users.

Favourable spectrum pricing for private users is also important to reduce barriers on enterprises to invest in ICT infrastructure to meet their radio communication needs. Oil & Gas, transport authorities, utilities, and any community wishing to invest in a broadband network for a specific user group could be allowed to acquire spectrum at an affordable price and not compete with spectrum reserved to carriers that deploy 5G services to consumers at large who are awarded spectrum mostly through nationwide assignments.

Examples of local/private IMT-2020 spectrum licensing for your kind consideration:

Germany

- C-band rules include 300MHz auctioned to carriers and 100MHz 3.7-3.8 GHz for local licensing
- See [Spectrum pricing for Local LTE/5G](#)

UK

- rules to enable wireless innovation through local mobile broadband licensing across multiple bands
- Shared access license regulation & fees enable users to acquire 20MHz of spectrum for £160.
- See [Enabling wireless innovation through local licensing](#)
- See also [shared access licensing](#) for broadband

France

- See [rules on 2.6GHz\(2570-2620 MHz\) for Broadband PMR and the spectrum pricing decision](#)

USA

- See [FCC CBRS Rules for Priority & Shared spectrum in 3.55-3.7GHz](#)

We believe such approaches to spectrum licensing would greatly improve enterprise, industrial, and productivity levels, by allowing users to build and operate their own infrastructure, and support Greece's digital ICT agenda & the EU's 5G roadmap. The success of Wi-Fi shared bands and ecosystem worldwide shows the promise of shared bands and localized uses of spectrum. Similar success can be had through local licensing, and by securing access to parts of the MFCN bands or shared use of these bands, compared to nationwide licenses that are typically most suitable for commercial carriers.

Shared spectrum (geographic via local authorization regime, dynamic with geo- database/ SAAS, Shared via 2nd tier user, I/N basis), can offer localized broadband systems unique capabilities through highly customized levels of coverage, capacity and security that nationwide or public cellular systems cannot readily provide. By offering a portion of 3400-3800 MHz for industrial and enterprise use, nationwide spectrum utilization could be increased, while improving productivity and connectivity for thousands of entities and users as they embrace digital transformation.

A number of studies have assessed needs for broadband PMR or spectrum that can be acquired and deployed by private enterprises for business applications or service requirements. Examples include:

- Strict Consulting concluded there is a need for more spectrum for private broadband services, or for specialized companies offering business critical applications. Strict Consulting estimates something like 2x20 MHz or 2x40 MHz for FDD arrangements, and 1x40 or 1x80 MHz when using TDD.
- A study in 2018 by Dialogic and TU/e confirms that at least 40 MHz (1x40 or 2x20) of spectrum is required for these forms of service.
- A study by Harbor Research estimates that the total global Smart Systems revenue for the private LTE addressable market will grow from \$22.1 billion in 2017 to \$118.5 billion in 2023 at a 32.3% CAGR.
- According to a 2020 study by SNS, Private LTE and 5G networks are increasingly the preferred approach to deliver wireless connectivity for critical communications, industrial IoT, enterprise & campus environments, and public venues. The report further forecasts market growth at a CAGR of 19% between 2020 and 2023, eventually accounting for nearly \$8 Billion by the end of 2023.

Should spectrum for local & private licensing be made available, enterprises will be able to choose between deployment from a commercial carrier, a specialized provider or a company private network. What is important is that all users should be able to use frequencies in harmonized bands and standardized by industry, so that economies of scale and interoperability can be ensured.

Question 34. What do you think about implementing vertical market solutions/applications, and what are the requirements in terms of service quality (reliability, availability, latency, mobility etc) and in coverage (national/local)? How can they be guaranteed through the rights granted?

Telecommunications requirements vary across industries but they include service quality, control over end-to-end service delivery, security of users and data, privacy, enhanced quality of coverage, and manageable radio resources that could be deployed to meet varying business needs.

- A key characteristic of the Industry 4.0 environment is the possibility of very rapidly change and shift production lines for new products and product modifications.

- In a robotized environment, using AI, wireless connections must be able to supply control and sensor data with the absolute minimum latency and time jitter.
- In business critical applications, voice and real-time video are essential to assess the situational environment with real-time tracking and analysis of objects and people, and to transmit this data to people who could also be on the move or at a remote site.
- With growing awareness of the need to protect intellectual property, commercial WLAN products need to be replaced. With the implementation of robotized production, demanding M2M wireless communication, and professional voice services, 4G/5G (NR) technology is the logical answer for corporations, small and large.

Private broadband networks can provide better control and management of such types of services and requirements compared to an implementation using network slicing. Private broadband is expected to be required by many businesses and hence making spectrum regulations favorable to deploying private systems through local licensing of spectrum and reserving part of the 5G core MFCN bands is recommended.

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