



HAKOM

STRATEGIC PLAN FOR RADIOFREQUENCY SPECTRUM MANAGEMENT ACTIVITIES

SUMMARY

January 2026

This document sets out HAKOM's strategic measures and guidelines for radiofrequency spectrum management for the period 2026–2029. Its purpose is to enhance regulatory predictability through responsible, transparent, effective and efficient spectrum management, while ensuring equal access to spectrum for all market stakeholders in the Republic of Croatia.

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1. Introduction

The Croatian Regulatory Authority for Network Industries (HAKOM), pursuant to the Electronic Communications Act¹(Official Gazette Nos. 76/22 and 14/24; hereinafter: ECA),has statutory responsibility for regulatory activitiesin the field of electronic communications.

Within the scope of its regulatory activities, HAKOM particularly undertakes measures aimed at achieving the following objectives: promoting connectivity and access to very high-capacity networks, competition in the provision of electronic communications networks and services, contributing to the development of the internal market of the European Union (EU) through the removal of barriers to investment in electronic communications networks and services, and promoting citizens' interests by ensuring connectivity, availability, quality and affordability of services.

HAKOM achieves this through continuous strategic planning and foresight, timely anticipation of challenges, and a predictable regulatory approach guided by the principles of objectivity, transparency, competitiveness, proportionality and non-discrimination.

In implementing the above policies, RF spectrum, as a naturally limited resource, has an indispensable role. RF spectrum is a key resource of interest to the Republic of Croatia in the development of various wireless networks and the provision of services to individual and business end-users, thereby significantly affecting the functioning and development of public services, the economy, and the digital transformation of society as a whole. Rapid technological development provides numerous opportunities for the deployment of new services in the private, social and economic spheres of life.

This document contains a summary strategic plan of RF spectrum management activities that HAKOM intends to implement during the period 2026–2029. The activity plan is based on HAKOM's Proposal of Strategic Activities for Radiofrequency Spectrum Management and the comments received during the public consultation conducted from 30 October to 1 December 2025.

¹ <https://www.hakom.hr/hr/zakoni-2038/2038>

2. About the Strategic Plan of Radiofrequency Spectrum Management Activities

The Strategic Plan of Radiofrequency Spectrum Management Activities (Strategic Plan) represents HAKOM's key document with regard to the management of this limited and valuable resource. The main objectives of this Strategic Plan are based on the principle of efficient and effective use of RF spectrum with the aim of supporting economic development, technological advancement, social development, and the protection of the public interest in the Republic of Croatia.

The principal objective of this Strategic Plan is to ensure the availability of RF spectrum, its responsible, transparent, effective and efficient management, and regulatory predictability enabling equal access to spectrum for all stakeholders, as well as secure and advanced networks and services contributing to the development of society as a whole.

In accordance with the principal objective, the following specific objectives have been defined:

- Efficient and effective use of RF spectrum maximising its utilisation while ensuring economic sustainability through the application of appropriate assignment and usage models (e.g. dynamic allocation and spectrum sharing), which encourage investments in infrastructure, networks and services for end-users.
- Predictable and transparent RF spectrum management ensuring a clear regulatory decision-making process and predictability for spectrum users and investors.
- Support for the development and implementation of new technologies and services through timely regulatory decisions ensuring spectrum availability for innovation development and deployment (e.g. 6G, IoT, D2D/D2C satellite communications, 5G broadcasting, etc.).
- Compliance with the EU and international regulatory framework and standards through active participation in the work of EU, CEPT and ITU institutions in accordance with Croatian interests.
- Ensuring a fair and competitive market by encouraging competition and enabling access to spectrum for new users.
- Protection of existing communications networks at national and international level.
- Ensuring prerequisites for balanced development of all regions of the Republic of Croatia and society through the availability of services provided via RF spectrum across the entire territory of the Republic of Croatia.
- Protection of the public interest and critical systems by ensuring spectrum for emergency services, public services, cultural, scientific and educational needs.

3. Regulatory Framework

RF spectrum is a naturally limited public resource whose effective use is of national interest to the Republic of Croatia. Pursuant to the ECA, secondary legislation, and the Constitution, Convention and Radio Regulations of the ITU, HAKOM is competent for promoting efficient use and ensuring effective management of RF spectrum.

4. Digitalisation of RF Spectrum Management

HAKOM has gradually developed digital tools for RF spectrum management, while the digitalisation process accelerated significantly after 2020 due to the need for remote and uninterrupted provision of regulatory services during the COVID-19 pandemic. Today, digital systems enable a fully electronic workflow of licensing of RF spectrum usage through the e-Agency platform (e-Licence), including application submission, processing, licence issuance and fee collection. Management of radio station location data relies on a GIS system supporting planning, licensing and transparency through a publicly available GIS portal. Special electronic systems are used for notification of base stations and certain radio stations (e.g. RLAN), thereby improving spectrum monitoring and interference resolution. HAKOM continuously upgrades digital tools, increases the availability of open data and transparency of operations, and considers the application of artificial intelligence for further automation and more efficient RF spectrum management, particularly in spectrum-sharing scenarios.

Accordingly, regarding the digitalisation of RF spectrum management, HAKOM plans to:

1. Develop and publish new digital tools such as coverage maps of public mobile communication networks.
2. Define and publish datasets in accordance with the Open Data Directive and the Re-use of Public Sector Information Directive, as well as the Act on the Right of Access to Information.
3. Develop and improve existing tools related to RF spectrum management, licence issuance, and data accessibility for spectrum users and the public.
4. Monitor and assess the possibility of applying new tools in RF spectrum management and monitoring processes, including AI-based tools.

5. Radiofrequency Spectrum Management in Radiocommunication Services

A radiocommunication service is any service using radio waves for the transmission, emission or reception of information. This may include messages, voice, data or signals, with the purpose of connecting people, devices or systems remotely. Radiocommunication services are divided according to the type and purpose of communications (e.g. mobile service, satellite service, maritime service, aeronautical service, etc.).

5.1. Mobile Service

5.1.1. Public Mobile Networks

Public mobile networks depend on efficient RF spectrum management, and recent frequency bands assignments have enabled further development of 5G technology in Croatia. The deployment of 5G requires careful spectrum planning, higher infrastructure density and regulatory predictability, as well as consideration of new bands, spectrum sharing and dynamic assignment models.

5G Standalone (5G SA) networks represent a step towards full 5G functionality, including ultra-low latency, mMTC, high reliability and network slicing, which are crucial for digital transformation of the economy and the development of specialised verticals.

There are currently no commercial 5G SA networks in Croatia, although pilot projects exist and operators have started preparations. Flexible regulatory mechanisms, cooperation with industry and removal of barriers are important for accelerating implementation.

HAKOM monitors the state of spectrum utilisation and emphasises the importance of transparency and predictability of the regulatory framework for the further development of electronic communications.

Accordingly, regarding public mobile networks, HAKOM plans to:

1. Ensure sufficient amounts of spectrum for current and future needs (4G, 5G and future generations of mobile networks).
2. Harmonise the national regulatory framework with the European regulatory and technical framework (CEPT, ECC, EU regulation).
3. Monitor the development of 6G initiatives and adapt the regulatory framework to future market requirements.
4. Encourage implementation of 5G SA networks for vertical sectors and advanced digital services through the development of flexible regulatory mechanisms for spectrum assignment.

5. Internationally coordinate RF spectrum use with neighbouring countries for RF bands for which appropriate agreements for broadband technologies do not yet exist.

5.1.2. Private Mobile Networks

PMR networks enable reliable, secure and locally controlled communications in sectors requiring high availability and independence from public networks. Traditionally, narrowband systems below 1 GHz (e.g. TETRA, DMR) are used in public safety, utilities and industry.

HAKOM monitors PMR development in order to preserve existing systems and enable the introduction of broadband solutions for PPDR, including more efficient spectrum usage, migration to digital technologies and consolidation of network capacities.

Accordingly, regarding private mobile networks, HAKOM plans to:

1. Internationally coordinate the frequency bands 410–430 MHz and 440–470 MHz with neighbouring countries for the use of narrowband and broadband systems.
2. Open spectrum for new broadband private networks in accordance with EU and CEPT regulation, with focus on 3.8–4.2 GHz.
3. Develop a clear national legal framework regarding the provision of services in private networks.
4. Develop a national legal framework for conditions of access to and use of public mobile networks for the provision of critical communications services for PPDR users.

5.2. Fixed Service

The fixed service includes communication systems with fixed endpoints, primarily point-to-point microwave links and, to a lesser extent, point-to-multipoint systems. Although point-to-multipoint systems are currently not used in Croatia, HAKOM will consider their reintroduction should market interest arise. In general, the use of frequency bands for the fixed service is possible only after adoption of appropriate allocation plans, which HAKOM continuously adapts to market needs and technological development. Point-to-point microwave links are widely deployed and used in numerous bands above 1 GHz, with licences issued based on individual applications while encouraging the use of higher frequencies and spectral efficiency. HAKOM also applies a light licensing procedure, which is particularly suitable for high bands such as 70/80 GHz. Under the light licensing procedure, link planning is largely left to licensees. Some existing bands are gradually being repurposed or considered for alternative uses at EU level (primarily bands below 10 GHz), while at the same time the opening of new, very high bands for future microwave systems is being considered. Despite the growth of fibre-optic networks, microwave links remain a key

part of communications infrastructure, with continuous growth in the number of links and total transmission capacity.

Accordingly, regarding the fixed service, HAKOM plans to:

1. In communication with users, timely enable the use of new frequency bands for fixed-service applications (W-band, D-band and other bands). Adopt an allocation plan for the W and/or D band, including the possibility of licence assignment based on light licensing procedure, and conduct a public consultation thereon.
2. Simplify the microwave-link licence application process through the continuous improvement of electronic tools and, where possible, the streamlining of regulatory procedures (e.g. by introducing light licensing procedures).
3. Advocate within international bodies (CEPT, ITU-R, EU) for the protection of the fixed service.
4. In the event of foreseeable changes in the use of existing bands (e.g. upper 6 GHz), inform spectrum users in a timely manner about planned changes and their implementation timeline.
5. In coordination with other radio services and users, regularly ensure the required RF spectrum for purpose of electronic news gathering and outside broadcasting (ENG/OB).
6. In cooperation with the Ministry of the Sea, Transport and Infrastructure (MMPI), encourage efficient RF spectrum use also through reduction of spectrum usage fees.
7. Ensure the possibility of technical testing of new equipment in accordance with users' needs while safeguarding existing radio services from interference.

5.3. Broadcasting

Broadcasting refers to the transmission of analogue or digital radio and television signals via electromagnetic waves transmitted by terrestrial radio stations (transmitters).

In the Republic of Croatia, analogue radio (FM) and digital radio (DAB+) are used for sound broadcasting, while digital terrestrial television (DTT) is exclusively used for television broadcasting. All these forms of broadcasting are used to provide the wider public with access to various types of content, including news, entertainment, education and cultural programmes.

5.3.1. Analogue Radio (FM)

Analogue radio broadcasting via FM technology (FM - Frequency Modulation) uses the VHF II band (87.5–108 MHz). It remains widely used for broadcasting audio content such as news, music, entertainment and news programmes, including national, regional and local content, and often serves for distribution of emergency notifications in critical situations. In Croatia, the relevant

frequency band is now almost fully utilised and highly congested, making it extremely difficult in major cities and urban areas to assign new, free and internationally coordinated frequencies for launching new radio programmes and services. There are currently 155 analogue radio networks operating in Croatia: 11 public networks (HRT; 3 national and 8 regional) and 144 commercial networks (3 national, 3 regional, 18 county-level and the others at the city and local level). HAKOM directs its activities towards and actively promotes migration to the digital radio platform (DAB+), however, analogue radio will remain a widely used medium in the coming period due to its simplicity and availability, especially in areas with weaker digital signal coverage. It will also remain an extremely important medium for certain user segments, particularly the elderly population. For this reason, mandatory analogue radio switch-off and migration of existing content to the digital radio platform will not be considered in Croatia in the medium term.

Accordingly, regarding the future use of analogue radio (FM), HAKOM plans to:

1. Regularly analyse requests, determine possibilities and define technical parameters required for launching tenders for new radio concessions and for expansion or enhancement of coverage of existing concessions.
2. Conduct international coordination procedures for new FM frequencies or modified technical parameters of existing radio stations (FM transmitters) in order to ensure resources for improving coverage of existing concessions.
3. Regularly conduct measurement campaigns to identify interference affecting FM networks in Croatia and report identified interference to administrations of neighbouring countries and inform ITU bodies thereof.
4. Conduct all necessary activities related to resolving cross-border interference, particularly interference caused by non-coordinated radio stations from the Italian Republic. Within Croatia, cooperate with possible interdepartmental working groups and at multilateral and bilateral level, cooperate with the European Commission/RSPG, ITU and competent administrations of neighbouring countries.
5. Ensure conditions for preserving, maintaining and ensuring functionality of existing FM networks considering their importance for safety, emergency and local services, as well as for informing local communities and elderly populations.

5.3.2. Digital Radio (DAB+)

Digital radio is a platform for transmission of digital radio signals using DAB+ technology (DAB – Digital Audio Broadcasting), enabling interference-free radio reception, a wider selection of high-quality audio programmes, and additional text and graphical services accompanying audio content. Digital radio DAB+ uses the VHF III frequency band (174–230 MHz) and since November 2021 one commercial network (multiplex MUX 1) has been operational in the Republic of Croatia, providing coverage of more than 98% of the population for mobile reception (MO – Mobile Outdoor Reception). Given that there is no obligation to switch off analogue radio, the pace and success of digital radio implementation primarily depend on the availability and market penetration

of DAB+ receivers, user interest in new radio content and the interest of existing and future broadcasters in providing new content on the digital platform. The existing frequency plan and available RF spectrum in the Republic of Croatia provide 7 national and 3 regional/local multiplexes for digital radio, thereby enabling transmission of a large number of public, commercial and specialised radio programmes. At the international level, HAKOM regularly undertakes activities aimed at ensuring the technical prerequisites for continued implementation of the existing network and further development of the digital radio, together with more efficient allocation of available frequency resources and harmonisation of technical parameters, in order to ensure future interference-free operation of digital radio platform.

Accordingly, regarding the future use of DAB+ digital radio, HAKOM plans to:

1. Regularly participate in the work of multilateral working groups with administrations of neighbouring countries with the objective of replanning the VHF III frequency band and concluding bilateral and multilateral agreements in order to ensure efficient allocation of frequency resources.
2. Conduct international coordination procedures for new radio stations (DAB+ transmitters), primarily for local coverage areas, and respond to coordination requests from administrations of neighbouring countries.
3. Ensure compliance with EU guidelines (European Commission/RSPG), CEPT/ECC and ETSI recommendations, as well as international standards for digital radio broadcasting.
4. Ensure continuous improvement in DAB+ signal reception quality and enable coverage of rural and hard-to-reach areas through infrastructure expansion and optimisation of the use of the VHF III frequency band.
5. Enable and promote the introduction of additional functionalities on the DAB+ platform, such as a public warning and alert system for crisis situations (ASA – Automatic Safety Alert).
6. Should sufficient market interest arise, define the necessary technical parameters and initiate procedures for issuing licences for new national and/or regional multiplexes.
7. Promote the use of digital radio and raise public awareness of the advantages of DAB+ digital technology.
8. Within the framework of ensuring interoperability of consumer radio receivers, consider the possibility of introducing an obligation for certain categories of receivers to support reception and reproduction of DAB+ signals.

5.3.3. Digital Terrestrial Television (DTT)

Digital terrestrial television (DTT) is a technology for transmission of television content in digital format, and in the Republic of Croatia the latest DVB-T2 transmission system with H.265/HEVC encoding is currently in use. The transition to the DVB-T2 system ensured higher efficiency of the available RF spectrum, enabled higher transmission capacity and improved signal quality. Furthermore, through this transition, all digital terrestrial television broadcasting was fully migrated to the lower part of the UHF frequency band (470–694 MHz), while simultaneously releasing the 700 MHz band for broadband wireless communication networks, i.e. 5G technology. The existing frequency plan and available RF spectrum in the Republic of Croatia provide a total of 6 national and several regional and local multiplexes. Currently, 4 digital terrestrial television multiplexes with national coverage and 2 multiplexes with regional and local coverage are in operation. The existing licences for the use of RF spectrum for all multiplexes have been issued for the period until 31 December 2030. In accordance with the European Parliament and the Council Decision (EU) 2017/899 (the UHF Decision)² and the National Action Plan for the Use of the 470–790 MHz Frequency Band³, the 470–694 MHz frequency band in the Republic of Croatia will remain available for digital terrestrial television systems even after 2030. The share of households in the Republic of Croatia that use exclusively digital terrestrial television for reception of television content remains quite high and currently amounts to approximately 45%. Even considering the expected reduction in the amount of linear television content, digital terrestrial television is expected to remain the dominant platform for television content reception in the Republic of Croatia, primarily due to the achieved level of technological development, improved service quality, increased population coverage and relatively low costs for end-users, which is particularly important for certain audience segments such as elderly viewers and low-income households.

Accordingly, regarding the future use of digital terrestrial television, HAKOM plans to:

1. Continue harmonisation of RF spectrum use with international plans and multilateral and bilateral agreements.
2. Considering the public interest and market needs, ensure a stable regulatory framework essential for the continued operation and investment in existing digital terrestrial television networks and their further development.
3. Ensure continuous improvement in DVB-T2 signal reception quality and enable additional coverage of rural and hard-to-reach areas through infrastructure expansion and optimisation of the use of the UHF frequency band.
4. Enable the issuance of new RF spectrum usage licences for existing national and regional/local multiplexes even after 2030.
5. In case of market interest, initiate licence award procedures for new national or local multiplexes, subject to RF spectrum availability

² <https://eur-lex.europa.eu/legal-content/HR/TXT/PDF/?uri=CELEX:32017D0899>

³ https://mmpi.gov.hr/UserDocsImages/dokumenti/PROMET/Promet%205_20/MMPI%20Nacionalni%20plan%20djelovanja%202020VRH%206-5_20.pdf

5.4. PMSE

PMSE (Programme Making and Special Events) is a term used to describe wireless communication links enabling the creative industries to transmit recorded audio and video content from performers at a venue to audiences. PMSE is primarily divided into audio and video applications, each having unique characteristics that must be taken into account. PMSE applications typically share RF spectrum with other services through the application of one of the spectrum-sharing techniques, primarily defined in order to protect primary radiocommunication services from PMSE interference. Several frequency bands are currently used in the Republic of Croatia for PMSE: 470–694 MHz for professional and amateur users, 823–832 MHz within the duplex gap of public mobile communication networks, 1785–1805 MHz (issue: limited availability of equipment), 2400–2480 MHz (a band regulated under general authorisations and not protected from interference, thereby making it unsuitable for professional use). Of the above-mentioned frequency bands, the lower part of the UHF frequency band 470–694 MHz is most commonly used for PMSE audio services, and this is expected to remain the case in the forthcoming period. RF spectrum available for audio PMSE applications in the UHF frequency band has been significantly reduced since 2010 due to the transition from analogue to digital television and the release of the 800 MHz frequency band for public mobile communication networks. These challenges were recognised in the 2017 RSPG Opinion⁴ on a long-term strategy on future spectrum requirements and use of wireless audio and video PMSE applications, as well as in the 2023 RSPG Opinion⁵ on the strategy for the future use of the UHF frequency band 470–694 MHz. One of the recommendations states that Member States should ensure sufficient RF spectrum for PMSE applications. PMSE spectrum requirements are expected to continue growing, while the amount of usable spectrum will depend on further development of digital terrestrial television, as well as future allocation of the UHF frequency band for broadband wireless networks, i.e. 5G technology.

Accordingly, regarding the future use of PMSE, HAKOM plans to:

1. Harmonise future RF spectrum use in accordance with decisions of the European Commission and CEPT/ECC, applying relevant EU and CEPT recommendations and opinions, as well as ETSI standards.
2. Ensure sufficient RF spectrum for PMSE applications and its development within the UHF frequency band (470–694 MHz).
3. Investigate new frequency bands in which PMSE operation may be ensured in the future, such as: 174–235 MHz, 733–758 MHz, 1350–1400 MHz and 1518–1525 MHz.
4. Enable operation of new technologies for PMSE applications (e.g. DECT – Digital Enhanced Cordless Telecommunications, WMAS – Wireless Multi-Channel Audio Systems, C-PMSE – Cognitive Programme Making and Special Events, and 5G networks).

⁴https://circabc.europa.eu/d/a/workspace/SpacesStore/7c4e2799-e32e-42a1-98cb-3f8a1997ce50/RSPG17-037finalrev1_RSPG_opinion_PMSE.pdf

⁵https://radio-spectrum-policy-group.ec.europa.eu/document/download/6cb17632-9aba-4a15-ae99-28b9d272d9ed_en?filename=RSPG23-035final-RSPG_Opinion_on_UHF_beyond_2030.pdf

5.5. Satellite Service

Although the satellite sector is experiencing intensive global development, Croatia only recently initiated its own satellite projects through the launch of its first nanosatellite, CroCube, at the end of 2024, with full regulatory support from HAKOM.

HAKOM is the competent authority for the notification, coordination and protection of satellite and terrestrial systems. The vast majority of earth terminals used in the satellite service in Croatia operate under general authorisations issued ex officio by HAKOM, in accordance with European spectrum harmonisation. This simplifies their use and encourages the development of satellite services, while recognising that no guarantee of protection from interference is provided. For more complex or specific systems, HAKOM issues individual licences. HAKOM intends to actively support the implementation of large satellite networks for the benefit of end-users.

In the future, considering the development of satellite communications, HAKOM will assess the need and cost-effectiveness of introducing a monitoring system for RF spectrum use in the satellite service, either independently or through shared European measurement resources, in accordance with market needs and financial capabilities.

Accordingly, regarding the satellite service, HAKOM plans to:

1. Conduct regulatory procedures and international coordination for possible future satellite networks and provide all necessary support to such projects in order to ensure their implementation.
2. Encourage the deployment of gateway earth stations for large international satellite systems.
3. Monitor the development of European space-related regulation, as well as best practices in other countries, and implement them within the national legal framework.
4. Participate in the work of CEPT and ITU-R working bodies and issue new general authorisations in a timely manner or amend existing ones for the purposes of satellite communications.
5. Conduct an analysis of the need and cost-effectiveness of introducing satellite communications measurement capabilities within HAKOM or using measurement capabilities of external partners at EU level on the basis of relevant agreements.

5.6. Maritime Service

The Republic of Croatia, as a maritime country with a long coastline and significant economic, security and tourism-related activities at sea, has a strategic interest in efficient and secure use of

RF spectrum within the maritime sector. Maritime communications support safe maritime traffic, surveillance of the territorial sea, and search and rescue operations.

Accordingly, regarding the maritime service, HAKOM plans to:

1. Participate in the preparation of European Common Proposals for WRC-27.
2. Implement the results of WRC-27 into the Croatian legal framework.

5.7. Aeronautical Service

Aeronautical communications play a crucial role in ensuring air traffic safety, airspace management, communication between pilots and air traffic controllers, as well as navigation and surveillance functions. As these systems directly affect passenger safety and operational safety, RF spectrum use for this sector must be stable, protected and harmonised with international standards.

Accordingly, regarding the aeronautical service, HAKOM plans to:

1. Participate in the preparation of European Common Proposals for WRC-27.
2. Implement the results of WRC-27 into the Croatian legal framework.
3. Plan and assign spectrum for unmanned aircraft systems and their safe integration into air traffic.

5.8. Amateur Service and Amateur-Satellite Service

The amateur service is a radiocommunication service intended for training, intercommunication and technical investigations carried out by radio amateurs (authorised persons who have passed amateur radio examination and hold an amateur radio licence for RF spectrum use in the amateur service) who are interested in radio technology solely for personal purposes and without pecuniary interest. The amateur-satellite service is an amateur service using space stations on Earth satellites.

Accordingly, regarding the amateur service and amateur-satellite service, HAKOM plans to:

1. Monitor activities at ITU level in order to timely identify new frequency bands or update conditions for the use of existing bands.
2. Monitor activities at EU and CEPT level for the purpose of updating the national legal framework.

3. Enable continued testing within the 40.660–40.700 MHz frequency band for the purpose of potential identification of part of the spectrum for the amateur service within the lower VHF frequency band.

5.9. Short Range Devices (SRD)

Short Range Devices (SRD) use RF spectrum on a “non-interference and non-protection basis”, have secondary regulatory status and operate under general authorisations issued ex officio by HAKOM. Interference-free spectrum sharing with primary services is enabled through the application of interference mitigation techniques such as power and duty cycle limitations, LBT (Listen Before Talk), DFS (Dynamic Frequency Selection) and UWB (Ultra-Wideband) technologies. These techniques constitute a mandatory part of the regulatory conditions for RF spectrum use which are laid down in general authorisations.

Harmonisation of SRD use is carried out at European level through CEPT, with the key reference document being ERC/REC 70-03. In addition to this Recommendation, a key role is played by the European Commission’s permanent mandate to CEPT, resulting in implementing decisions obliging Member States, including Croatia, to monitor technological development of SRD devices. A particularly important category of SRD devices are WAS/RLAN systems for broadband internet access, which are widely used in households, public areas and private networks across several harmonised frequency bands. Due to the large number of such devices and the risk of interference, particularly towards meteorological radars, HAKOM introduced an obligation to notify outdoor WAS/RLAN stations.

General authorisations remain the fundamental and most appropriate regulatory framework for this commercially important category of devices.

Accordingly, regarding short range devices, HAKOM plans to:

1. Actively participate in the work of the SRD/MG project team and monitor amendments to Recommendation ERC/REC 70-03.
2. Regularly update general authorisations and issue new ones in accordance with EU decisions, amendments to Recommendation ERC/REC 70-03 and market needs.
3. Improve tools related to management of RF spectrum use for SRD devices (e.g. the tool for registration/notification of WAS/RLAN stations).
4. Ensure protection of primary services sharing spectrum with SRD devices.

6. Radiofrequency Spectrum Management in Areas of Special Interest

6.1. 6G

RF spectrum is a key element of Croatia's digital infrastructure, and by 2035 a transition towards 6G networks is expected, featuring significantly higher capacities, ultra-low latency and entirely new communication capabilities. Timely planning, international harmonisation and efficient spectrum assignment models are essential for successful 6G development.

6G is expected to utilise three spectrum ranges: sub-6 GHz bands for wide-area coverage, millimetre-wave bands for high-capacity communications in densely populated areas, and terahertz bands for advanced industrial and healthcare applications. Significant economic impacts are expected through investments, productivity growth and the development of new ecosystems.

The regulatory framework will need to support technological neutrality, research and development, cybersecurity, privacy protection and international coordination in order to avoid interference and ensure interoperability.

Accordingly, regarding 6G, HAKOM plans to:

1. Participate in activities at CEPT and EU level.
2. Harmonise RF spectrum in accordance with CEPT/EU decisions.
3. Ensure RF spectrum availability for research, development and testing purposes.

6.2. Spectrum Sharing

Due to growing demand, it is becoming increasingly difficult to reserve RF spectrum exclusively for individual technologies, which is why models of common and shared spectrum use are being encouraged. Spectrum sharing may be: single-layer (horizontal) sharing, where users have equal priority, or multi-layer (vertical) sharing with different priority levels among users. In practice, spectrum sharing is already applied in both licensed and "unlicensed" bands (bands that are used based on general licences), while new technologies such as cognitive radio enable dynamic rather than merely static spectrum sharing.

Transparent information regarding spectrum use is essential for more efficient sharing, market-based models and reduction of interference. Modern regulatory approaches may combine existing and new licensing models, including Licensed Shared Access (LSA), licensed local access, coordinated shared access and licence exemption, depending on the technical characteristics of the frequency band and user requirements.

Accordingly, regarding spectrum sharing, HAKOM plans to:

1. Promote the “use it or share it” principle in order to increase efficiency in RF spectrum use on the basis of voluntary agreements, incentives or imposed obligations.
2. For the purpose of facilitating and implementing various sharing scenarios, ensure availability of information on RF spectrum use (protection or exclusion zones, protection criteria, periods of use, etc.), applying appropriate anonymised formats when publishing such information, in accordance with national regulations (regarding cybersecurity, data confidentiality, business secrecy and other legal requirements).
3. Monitor activities within the European Commission and standardisation and regulatory organisations such as ETSI and CEPT concerning sharing scenarios, compatibility and technologies that could increase possibilities for spectrum sharing or coexistence solutions.
4. Examine spectrum-sharing scenarios in at least the following frequency bands:
 1. 2575–2615 MHz
 - Current allocation for local broadband networks for private-use purposes in accordance with the Allocation Plan for the 2500–2690 MHz frequency band.
 - Potential sharing scenario: Licensed Shared Access (LSA).
 2. 3400–3480 MHz
 - Current allocation for mobile and fixed communication networks at regional level in accordance with the Allocation Plan for the 3400–3800 MHz frequency band.
 - Potential sharing scenario: Licensed Shared Access (LSA) or licensed local access.
 3. 3800–4200 MHz
 - Current allocation for high-capacity microwave links in accordance with the Allocation Plan for frequency bands used for microwave links, although there are currently no active microwave links operating within the band.
 - Potential sharing scenario: a combination of Licensed Shared Access (LSA) and club use.
 4. 24.25–26.5 GHz
 - At the moment there are no allocation plans for this frequency band.
 - Potential sharing scenario: a combination of licence exemption and club use.

6.3. 6 GHz

The 6 GHz frequency band in Croatia and Europe is divided into a lower part (5945–6425 MHz) – L6, and an upper part (6425–7125 MHz) – 6U. Discussions on the future of the upper 6 GHz band began in the context of preparations for WRC-23, at which the upper 6 GHz band in ITU Region 1 was identified for IMT, while retaining the possibility of use for WAS/RLAN systems. This decision supports global spectrum harmonisation while taking into account regional and national needs as well as existing users. At the European level, following WRC-23, work continued with the aim of determining how this band should be used in the future in European countries.

The RSPG adopted on 12 November 2025 the opinion “Radio Spectrum Policy Group Opinion on Long-term vision for the upper 6 GHz band”, which essentially defines the further direction of decisions related to the upper 6 GHz frequency band at EU level. The opinion proposes that the 6585–7125 MHz band be prioritized for MFCN networks. Decisions on the 6425–6585 MHz sub-band would be taken after WRC-27, depending on the outcomes related to the identification of the 7125–7250 MHz band. If the 7125–7250 MHz band were to be identified for IMT, this would open the possibility of “combining” the 6585–7125 MHz and 7125–7250 MHz sub-bands into a single band to be used for MFCN (future 6G networks), while the 6425–6585 MHz sub-band would then primarily be used for WAS/RLAN systems. Otherwise, i.e. if WRC-27 does not identify the 7125–7250 MHz band for IMT, there is a significant rationale for also using the 6425–6585 MHz sub-band for MFCN networks.

In light of the above, regarding the upper 6 GHz frequency band, HAKOM plans to:

1. Advocate within CEPT and EU bodies for the protection of existing users of the band at least until 2030.
2. At the time of adoption of the EU-level harmonisation framework, timely inform existing and future users of this band about the further steps foreseen by that framework.
3. Given that WAS/RLAN equipment is already available on the market, if part of the frequency band is designated for this technology, ensure as soon as possible the possibility of indoor use of that portion of the band for WAS/RLAN systems, following the model of similar regulation already applied in the lower 6 GHz band.
4. Upon adoption of a harmonisation framework with clear timelines for spectrum availability for MFCN, plan the refarming of the frequency band and migration of existing users to alternative bands in accordance with the deadlines defined in the harmonisation framework, thereby enabling spectrum assignment for MFCN.
5. Collect new data on spectrum demand within this band and on market plans. In line with expressed interest, timely plan any potential decommissioning of microwave links, as well as migration of users after 2030 to alternative bands and refarming of the frequency band (or parts thereof). Also, guided by the dynamics of EU-level harmonisation and market interest, plan spectrum assignment for MFCN.
6. Timely inform existing spectrum users about potential changes in the usage of the 6G frequency band, and future MFCN users about spectrum availability timelines.

6.4. Future of the UHF frequency band (470–694 MHz)

The lower part of the UHF frequency band (the so-called sub-700 MHz band, 470–694 MHz) represents a portion of the radio frequency spectrum in the Republic of Croatia that is reserved and primarily used for digital terrestrial television (DTT) broadcasting and for PMSE (Programme Making and Special Events) applications. Due to historical legacy, the

share of households in the Republic of Croatia that use only digital terrestrial television for reception of television content remains very high, currently at approximately 45%. Despite the expected decline in the amount of linear television content, digital terrestrial television will continue to remain the dominant platform for television reception in the Republic of Croatia. It also plays an extremely important role in ensuring the availability of public media (PSM – Public Service Media), in particular public television content, whose role and importance are multiple and encompass various aspects of social, cultural, and political life.

In addition to digital terrestrial television networks, part of the spectrum in the UHF band (470–694 MHz) in the Republic of Croatia is currently also used for testing 5G broadcast technology (5G Broadcast), which enables efficient transmission of audiovisual content to a large number of devices with low latency and high throughput. Testing and pilot projects indicate that 5G broadcast may be a suitable alternative to digital terrestrial television networks.

At present, there is an intensive EU-level discussion on the future of the lower part of the UHF frequency band (470–694 MHz) after 2030. In this context, the RSPG has so far produced two documents: an Opinion⁶ and a Report⁷ (RSPG UHF Opinion and RSPG UHF Report), which are intended to assist the European Commission in defining a strategic decision on the use of the UHF frequency band (470–694 MHz) after 2030.

In parallel with these activities, the EU and CEPT are also preparing for the upcoming World Radiocommunication Conferences to be held in 2027 (WRC-27) and 2031 (WRC-31) and in that context it will also be necessary to develop a common position in light of the conclusions of the 2023 conference.

Accordingly, regarding the future use of digital terrestrial television, 5G broadcasting and PMSE in the UHF frequency band (470–694 MHz), HAKOM plans to:

1. Protect the interests of the Republic of Croatia within EU and CEPT bodies regarding the continued use of the UHF frequency band (470–694 MHz) for DTT, 5G broadcasting, and PMSE, and ensure their protection in this band beyond 2030.
2. Align future spectrum usage in accordance with decisions of the European Commission and CEPT/ECC, applying relevant EU and CEPT recommendations and opinions as well as ETSI standards.
3. Enable further testing of new coding techniques (e.g. UHD (4K)) and transmission technologies (e.g. 5G broadcast) as preparation for possible future commercial deployment.
4. Ensure continued broad availability of public and major commercial television content and critical information through the digital terrestrial television platform, including during the transition to other television reception platforms.

⁶[https://radio-spectrum-policy-group.ec.europa.eu/document/download/6cb17632-9aba-4a15-ae99-28b9d272d9ed_en?filename=RSPG23-035final-RSPG Opinion on UHF beyond 2030.pdf](https://radio-spectrum-policy-group.ec.europa.eu/document/download/6cb17632-9aba-4a15-ae99-28b9d272d9ed_en?filename=RSPG23-035final-RSPG%20Opinion%20on%20UHF%20beyond%202030.pdf)

⁷[https://radio-spectrum-policy-group.ec.europa.eu/document/download/1f058f8e-0228-455c-b04e-24519da81c67_en?filename=RSPG25-033final-RSPG Report on future use 470-694 MHz band.pdf](https://radio-spectrum-policy-group.ec.europa.eu/document/download/1f058f8e-0228-455c-b04e-24519da81c67_en?filename=RSPG25-033final-RSPG%20Report%20on%20future%20use%20470-694%20MHz%20band.pdf)

6.5. ENG/OB

Electronic News Gathering and Outside Broadcast (ENG/OB) comprises a set of radio links and equipment enabling television and multimedia coverage of events, most commonly sporting events, including live transmissions from fixed and mobile locations.

Modern production requires numerous communication channels for wireless cameras, unmanned aerial vehicles, multiple video feeds, and voice communication among teams, which significantly increases the demand for frequency resources. Voice communications are generally implemented in the PMR band 440–470 MHz and in bands used for radio microphones (PMSE), while video transmission requires higher frequency bands due to the need for wider channel bandwidths. The key standard band for ENG/OB video transmission is 2245–2400 MHz, alongside the use of a number of additional frequency bands that are assigned and coordinated on an ad hoc basis, often in cooperation with the military and other spectrum users, as well as through the use of bands regulated under general authorisations.

Although ENG/OB systems are used only occasionally, their requirements may involve very large bandwidths and they have high operational priority, which requires flexible RF spectrum management by HAKOM.

Accordingly, regarding ENG/OB, HAKOM plans to:

1. Actively adapt the Frequency Allocation Table and assignment plans in cooperation with ENG/OB spectrum users.
2. Work closely with the military and other ENG/OB spectrum users to enable the most efficient and straightforward use of frequency bands for ENG/OB transmissions.
3. Protect the use of the 2245–2400 MHz frequency band for ENG/OB transmissions.

6.6. Unmanned Aircraft Vehicles (UAV) and Counter-UAV Systems

6.6.1. Unmanned Aircraft Vehicles

Unmanned Aircraft Vehicles (UAVs) have broad and rapidly growing applications in military, civil, and commercial sectors due to their low cost, flexibility, and ability to collect data with high precision. Their use brings benefits in the economy, transport, agriculture, civil protection, and scientific research, but also raises new regulatory and technical challenges related to RF spectrum use.

For command, control, and communications, UAVs use ISM bands, mobile networks (LTE/5G), and GNSS systems, while the increasing number of drones is also driving the need for counter-drone (“anti-drone”) systems, which may likewise use RF spectrum for drone detection or jamming.

Accordingly, regarding unmanned aircraft, HAKOM plans to:

1. Harmonise RF spectrum use with EU and ECC decisions and recommendations concerning spectrum use for UAS systems.
2. Define clear technical requirements for interference mitigation, thereby contributing to the safety of air traffic.
3. Examine possibilities for the use of dedicated frequencies for professional and safety/security-related UAS missions (subject to CEPT and EU regulation), including:
 - Enabling operation in frequency bands designated for public mobile communications networks (subject to CEPT and EU regulation).
 - Enabling operation in the 1880–1920 MHz frequency band for all governmental users (subject to CEPT and EU regulation).
 - Identifying additional RF spectrum for the command and control of unmanned aircraft.
 - Developing a regulatory framework for additional equipment carried on unmanned aircraft vehicles, other than equipment used for command, control, and data transmission.

6.6.2. Counter-UAS Systems

Counter-UAS (anti-drone) systems are becoming increasingly important due to the growth in the use of unmanned aircraft and the potential threats they pose to security, privacy, and critical infrastructure. These systems use radars, cameras, and RF technologies for the detection, tracking, and neutralisation of drones, including interception of command-and-control signals and jamming of GNSS systems. Because of the strong RF signals that may affect other spectrum users, the use of counter-UAS systems is strictly regulated and permitted only to authorised authorities such as the Ministry of Defence and security agencies.

Accordingly, regarding counter-UAS systems, HAKOM plans to:

1. Define a regulatory framework for the use of counter-UAS systems involving RF spectrum use, including conditions for testing, licensing, and operational deployment, in cooperation with other institutions in the Republic of Croatia.
2. Cooperate with international bodies (EU, NATO, ITU) in order to harmonise approaches and exchange best practices.

6.7. Satellite Communications – Development and Availability of Space Technologies

The development of satellite communications had long been constrained by high costs and reliance on geostationary orbits, making space accessible primarily to the world's most technologically advanced countries. Technological progress and the reduction in launch costs, particularly driven by SpaceX, have enabled the large-scale use of Low Earth Orbit (LEO) systems and the development of satellite mega-constellations for global broadband connectivity.

At the same time, D2D and D2C concepts are being developed, enabling direct connectivity between satellites and existing terrestrial devices such as smartphones and IoT terminals, thereby blurring the boundary between terrestrial and satellite services. In Europe, the regulatory framework for such services is more complex than in the United States due to the fragmented assignment of IMT spectrum, and therefore D2C communications are currently considered more feasible in frequency bands allocated to the Mobile-Satellite Service (MSS).

Although countries such as the Republic of Croatia do not play an active role in the development of these systems, HAKOM recognises their potential as a complement to terrestrial networks and as an added value for end users, subject to an appropriate regulatory approach.

In response to global initiatives, the European Union is developing its own satellite system, IRIS², aimed at providing secure and resilient connectivity for the public sector, critical infrastructure, and commercial users. The IRIS² system, in which the Republic of Croatia also participates, is conceived as a complement to existing commercial constellations and as strategically important for European autonomy in the field of satellite communications.

Accordingly, regarding global satellite communications, HAKOM plans to:

1. Support the efforts of international satellite operators/companies should the need arise for the deployment of supplementary terrestrial infrastructure.
2. In cooperation with public mobile network operators, consider technical solutions aimed at enabling D2C services, in order to ensure the highest possible quality of broadband communications coverage throughout Croatia.
3. Actively participate in EU projects, such as IRIS²/USC, with the objective of developing European communications solutions implemented through LEO satellite networks.
4. Timely amend existing regulations or adopt new regulatory measures in order to enable end users to access such services in the simplest possible manner, while taking into account the protection of competition and the security of Croatian citizens.

6.8. Public Exposure to Electromagnetic Fields

The Ministry of Health is responsible for the protection of the population from electromagnetic fields (EMF) and prescribes exposure limits, design requirements, and EMF measurement procedures, while authorised companies carry out calculations and measurements. HAKOM monitors compliance of radio stations with these regulations, issues licences and certificates of compliance, and may also perform EMF measurements. Cooperation between HAKOM, the Ministry of Health, the Ministry of the Sea, Transport and Infrastructure (MMPI), and public health institutions also includes informing and educating the public in order to reduce concerns regarding EMF exposure and support the safe development of new technologies.

Accordingly, regarding EMF issues, HAKOM plans to:

1. Publish data on EMF calculations and measurements performed by authorised companies.
2. Participate in public education regarding the operation of new technologies and their impact on EMF levels in the environment.
3. Monitor activities within the European Commission related to updating recommendations on EMF exposure and the impact of such changes on the deployment of wireless technologies.
4. Analyse the possibility of introducing periodic reports on environmental EMF levels at national level.
5. Analyse and update the legislative framework and documentation relating to EMF assessment.

6.9. Use of Repeaters and Signal Boosters in Public Mobile Communications Networks

Reliable availability of public mobile communications networks is essential for everyday life; however, coverage in rural areas, indoor environments, and industrial facilities remains insufficient. Coverage improvement solutions may include Voice/SMS over Wi-Fi, distributed antennas, femtocells, repeaters, and signal boosters, which must be certified and installed by authorised mobile operators in order to avoid interference and service quality degradation.

Unauthorised use of repeaters and signal boosters has been identified and therefore, HAKOM is considering new regulatory frameworks, including the operation of such systems under a general authorisation, subject to operator consent, location notification requirements, or a combination of these approaches, together with strict technical requirements for equipment and interference protection within the relevant frequency bands.

Accordingly, regarding the use of repeaters and signal boosters in public mobile communications networks, HAKOM plans to:

1. Analyse the existing regulatory framework and propose possible improvements.
2. Monitor activities at the level of the European Commission.
3. Where necessary, amend the legislative framework for the purpose of implementing the final solution.

6.10. Radio Equipment

The development of the electronic communications market in Croatia depends on the availability and proper use of radio equipment using RF spectrum, particularly in the context of increasing digitalisation and the deployment of 5G and future 6G technologies. Short-Range Devices (SRDs), Wi-Fi, IoT devices, smart meters, and communication modules in vehicles require technical compliance and spectrum compatibility in order to avoid interference to primary spectrum users. The regulatory framework is based on EU Directives, in particular the Radio Equipment Directive (RED), and ECC recommendations, with the objective of ensuring the safe and interoperable use of radio equipment on both the national and European markets.

Accordingly, regarding radio equipment, HAKOM plans to:

1. Harmonise RF spectrum use with the EU framework (full alignment with the RED Directive and EU implementing acts).
2. Monitor the market and suppress the use of non-compliant equipment through market surveillance activities, in order to prevent the placing on the market and use of radio equipment that does not meet technical requirements and may cause interference or security risks.
3. Actively participate in the work of ECC and EU bodies responsible for radio equipment matters.