هيئة تنظيم الاتصالات والحكومة الرقمية
TELECOMMUNICATIONS AND DIGITAL GOVERNMENT REGULATORY AUTHORITY

United Arab Emirates

UAE Spectrum Outlook (2026-2031)

Version 2.0

Document Date: 01 November 2025

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Table of Contents

1. Introduction and objectives

Radio spectrum is the cornerstone of wireless connectivity, but is a scarce resource that all wireless systems depend on for their operation. The way spectrum is managed and the way its concurrent and different users access it will enable industries to digitalise and thrive or may alternatively impede the development of entire parts of the economy. This is therefore a prime area for the Telecommunications and Digital Government Regulatory Authority (TDRA) to focus on given its increasing economic and social value.

Connectivity, supported by information and communications technologies more broadly, is the fundamental prerequisite for all the platforms that form part of the developing 'digital lifestyle', powered by smart devices, smart systems and smart services. Wireless connectivity in all sectors will become a basic human need, as wireless connectivity will bring flexibility and ubiquity to the digital lifestyle.

The rapid evolution of wireless technologies, including the deployment of IMT 2020 (5G) and upcoming IMT2030 (6G) networks, evolution of local area networks (RLANs) and wireless access systems (WAS) (including Wi-Fi), ultra-wide band (UWB), Urban Air Mobility (UAM),NTN and other technologies requires a forward-looking approach to spectrum management that ensures efficient and flexible use of spectrum resources. The growing adoption of emerging technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), and blockchain will drive new spectrum demands across various sectors, from autonomous vehicles to smart cities, remote healthcare, and industrial automation.

The coming years are also expected to see significant developments in space services and satellite technologies, reshaping global and national connectivity. The increasing deployment of non-geostationary satellite orbit (NGSO) constellations, the rise of direct-to-device (D2D) satellite communication, and the expansion of Earth observation capabilities will create new spectrum demands and coordination challenges. These developments will support critical applications across sectors such as environmental monitoring, emergency response, agriculture, and maritime and aviation safety. A proactive and adaptive spectrum management approach will be essential to enable seamless integration of space-based services into the national digital ecosystem, while ensuring efficient use of spectrum and safeguarding coexistence with terrestrial systems.

The "UAE Strategy for the Future" encourages all government entities to focus on future topics that include amongst others:

- The future of technology and smart systems
- The future of the infrastructure and transportation
- The future of economy and economic and commercial security
- The future of the government and governmental services
- The future of positive and happy life environment.

Aligned with these goals, the "We the UAE 2031" vision sets a strategic direction for the next decade, emphasizing digital transformation, sustainability, and global competitiveness. For instance, the deployment of emerging technologies including AI will enable smart cities, bolster

industrial automation, and transform sectors such as healthcare and transportation and sets a strategic direction for the next decade, emphasizing digital transformation, sustainability, and global competitiveness. The UAE ranks at the top in global ICT Indices and ranked as the fastest mobile broadband. The mobile broadband is dependent on adequate spectrum supply in the appropriate frequency bands with a clear strategy on future spectrum re-allocations. In response to this vision, the UAE Spectrum Outlook for the period 2026–2031 will address key spectrum management objectives, including supporting innovative technologies, promoting efficient spectrum use, and enabling the UAE's leadership in the global digital economy. The vision also advocates for a seamless, agile government framework grounded in zero bureaucracy, ensuring faster decision-making and citizen-centric services.

In its endeavour to contribute towards the "We the UAE 2031" vision", the TDRA has revised its Spectrum Outlook to cover the period 2026–2031 based on meeting future wireless connectivity needs, while taking into account the evolution of wireless technologies, market demands, changing lifestyles, smart and connected living. The "UAE Spectrum Outlook" is the output of a comprehensive future-looking exercise and thorough analysis aimed at highlighting the goals for the UAE's ecosystem industries and to reflect the aspirations for the UAE's ICT sector over the coming years. This includes proposed changes to the way that spectrum is used to address the major wireless sectors and their growing demands for wireless connectivity.

As part of the development exercise to prepare the UAE Spectrum Outlook, the TDRA has taken account of a broad range of considerations:

- International agreements ratified by the UAE
- abiding to the key principles governing all the TDRA's activities, as listed in the Radiocommunication Policy
- achieving the TDRA's objectives for frequency spectrum management as presented in the Radiocommunications Policy
- assessing local and global, demand and technology trends as well as understanding the main future challenges which could affect spectrum management in the UAE
- studying the international experience in preparing future-looking spectrum strategies, and in particular other spectrum outlook documents developed in leading countries.
- collaborating with the industry and incorporating feedback from industry stakeholders, with a public consultation held in February/March 2025, aligned with the UAE future shaping.

Additionally, the TDRA will engage in continuous collaboration with global and regional regulatory bodies, ensuring the UAE's spectrum management is harmonized with international best practices and aligned with global developments, particularly in anticipation of WRC-27 and the growing significance of Non-Terrestrial Networks (NTNs) and Low Earth Orbit (LEO) satellite constellations.

The paramount objective of developing the "UAE Spectrum Outlook" is to give the industry the confidence that frequencies will be available to meet future demand, and also to give existing spectrum users confidence that spectrum will continue to be available to meet their needs.

This will allow spectrum users to make informed long-term decisions and allow technological advancements to develop and mature in the UAE market.

The TDRA has set a six-year horizon for the “UAE Spectrum Outlook”, because the TDRA believes that this period is sufficient to give a reasonable level of predictability to the industry, while considering the rapid pace of change in wireless technology and shifting demands of various spectrum users. Furthermore, this period is in line with international practice and the industry has expressed its satisfaction at this time horizon. Notwithstanding the above, the TDRA may revisit from time to time some aspects of the plan within the 2026-2031 period.

- The TDRA has investigated various aspects that impact spectrum needs and usage in the UAE and developed the UAE Spectrum Outlook (2026-2031) in the following manner in order to highlight the primary issues that should be covered in the document:
- In Section 2, considers the challenges of spectrum management and the alternative spectrum management approaches that are emerging internationally in terms of assignment, change of use and sharing. The TDRA will have to consider whether changes are needed to the UAE spectrum management framework.
- In Section 3, the outlook then reviews key wireless developments such as the demand for services and technology trends affecting the main categories of radio system and service, which are subject to the TDRA national regulation. Based on this review, the TDRA highlighted a number of issues in relation to the potential changes in needs and demand for spectrum in the next six years.
- Section 4 of the UAE Spectrum Outlook (2026-2031) outlines the primary initiatives for the TDRA over the next six years. It primarily draws from the analysis presented in Sections 4 and 5, but it also considers global developments, such as relevant ITU-R recommendations, as well as other bilateral and regional international agreements including decisions made at the most recent World Radiocommunication Conference in Dubai (WRC-23). Additionally, it considers upcoming research aligned with the agenda for the next World Radiocommunication Conference (WRC-27) and the provisional agenda for World Radiocommunication Conference (WRC-31). as well as upcoming research that will be carried out in accordance with the 2027 agenda for the next World Radiocommunication Conference and the provisional agenda for WRC-31. In light of these developments, the TDRA should consider improving the way spectrum is used, developing frameworks for sharing, and making new allocations and assignments. After that, the TDRA will carry out technical and sharing studies, re-plan the spectrum, prepare UAE positions for regional and international study groups on radio and spectrum matters, monitor global developments, and update the country's frequency plan and spectrum regulations in accordance with them.
- Section 5 finally provides a high-level assessment of the impact of the UAE Spectrum Outlook, highlighting the expected benefits for the UAE from the outlook. Furthermore, the TDRA will closely monitor and adapt to the rapid advancements in 5G Advanced and 6G technologies, ensuring the UAE remains at the forefront of mobile network innovation.

2. Innovative approaches to spectrum planning

Regulators worldwide are exploring new spectrum planning approaches to maximise spectrum efficiency, enable new uses and, where relevant, allow for more dynamic and adaptive spectrum assignment and use, including shared use of spectrum enabled through databases or spectrum access systems (SAS). Dynamic spectrum access techniques have been reviewed internationally in ITU-R Report SM.2405, "Spectrum management principles, challenges and issues related to dynamic access to frequency bands by means of radio systems employing cognitive capabilities"[1]. The ITU-R report notes the need for regulators to weigh up a range of considerations – including cross-border frequency co-ordination with neighbouring countries, efficient use of spectrum and complexity of implementation (e.g. of SAS databases) – before taking a decision on implementing an innovative future spectrum management approach.

As per current regulations, the TDRA aims to ensure spectrum is allocated, assigned and used efficiently in the UAE. The TDRA recognised that the rapid development of new technologies requires an increasingly dynamic and flexible approach to spectrum planning, while taking into account the needs of the UAE market.

With the growing deployment of various wireless technologies and preparation for 6G, as well as the expansion of Internet of Things (IoT) devices, Artificial Intelligence (AI), Device-to-Device (D2D), Machine Learning (ML), and other emerging technologies, spectrum management must evolve to support not only increased connectivity but also innovative applications like extended Reality (XR), Mixed Reality (MR), Digital Twin (DT) and the Metaverse, bridging the physical and digital worlds, autonomous systems, smart cities, and beyond.

The TDRA has noted from responses to the public consultation on the draft Spectrum Outlook published in February 2025, that a number of stakeholders are interested in seeing greater use of spectrum-sharing approaches in some spectrum bands in the UAE.

In addition, international trends, such as the introduction of flexible licensing frameworks and the adoption of AI-based dynamic spectrum management tools, underscore the need for the UAE to adopt more adaptive and innovative spectrum management approaches.

Within the next six years, the TDRA will study the feasibility of applying approaches identified as relevant in the UAE. In light of these studies and within the UAE's legal, technical and regulatory framework, the TDRA will consider whether changes are needed to UAE spectrum planning to allow for greater flexibility, use of novel spectrum sharing approaches and/or other emerging spectrum planning approaches.

This will include evaluating new techniques such as Cognitive Radio Networks (CRNs), Artificial Intelligence-driven spectrum management, and assessment and the introduction of spectrum sharing frameworks that enable co-existence between multiple users where feasible and appropriate.

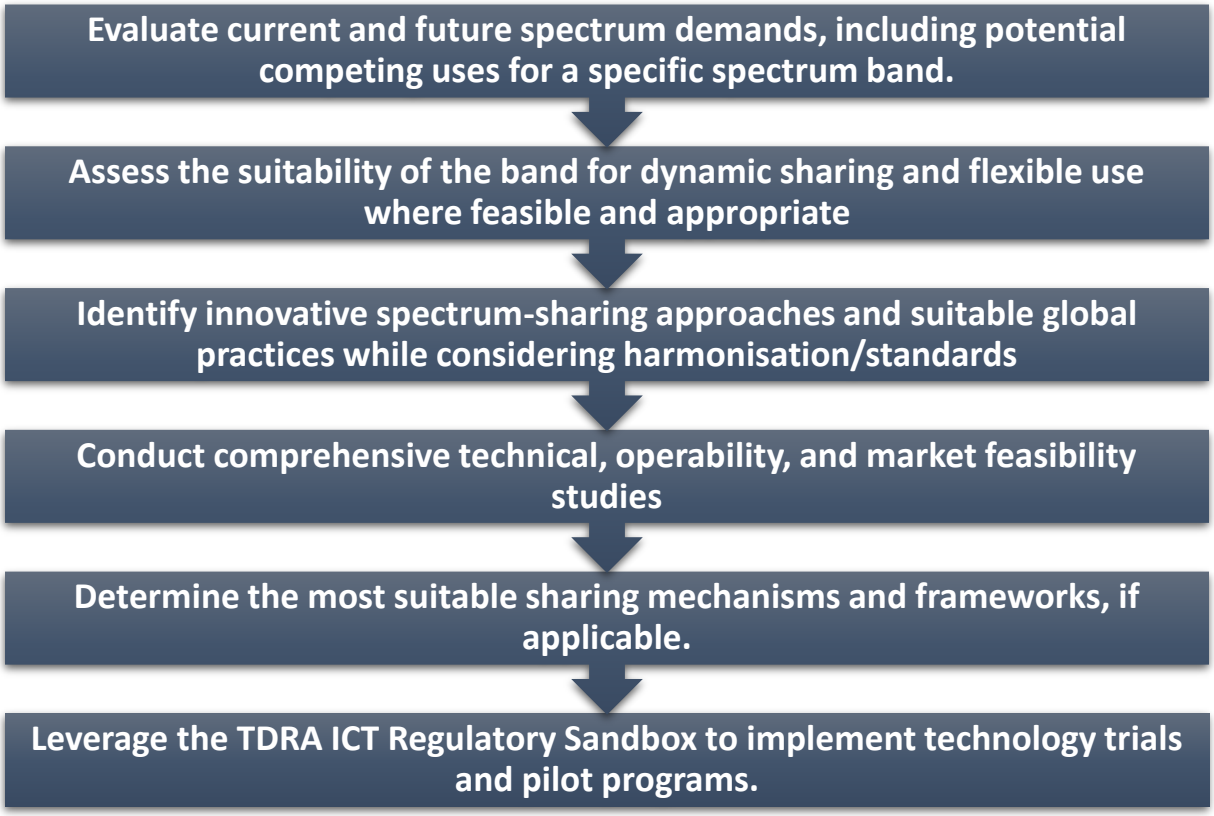
[1] https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-SM.2405-2017-PDF-E.pdf

In the event that the TDRA identifies that future spectrum planning approaches require changes to the UAE's legal and regulatory framework for use of spectrum, the TDRA will identify the revisions needed, to enable the identified actions.

Whilst the TDRA can learn from developments in other countries, further work is needed in the UAE market to identify relevant new planning approaches, and where pertinent, suitable bands for shared use.

The TDRA is also considering the use of advanced technologies such as blockchain for spectrum transactions, which could facilitate secure and transparent spectrum trading, and sharing, enabling a more dynamic and responsive spectrum management environment.

The diagram below shows a high-level illustration of the process the TDRA will undertake to understand whether sharing mechanisms are relevant bands in the UAE.

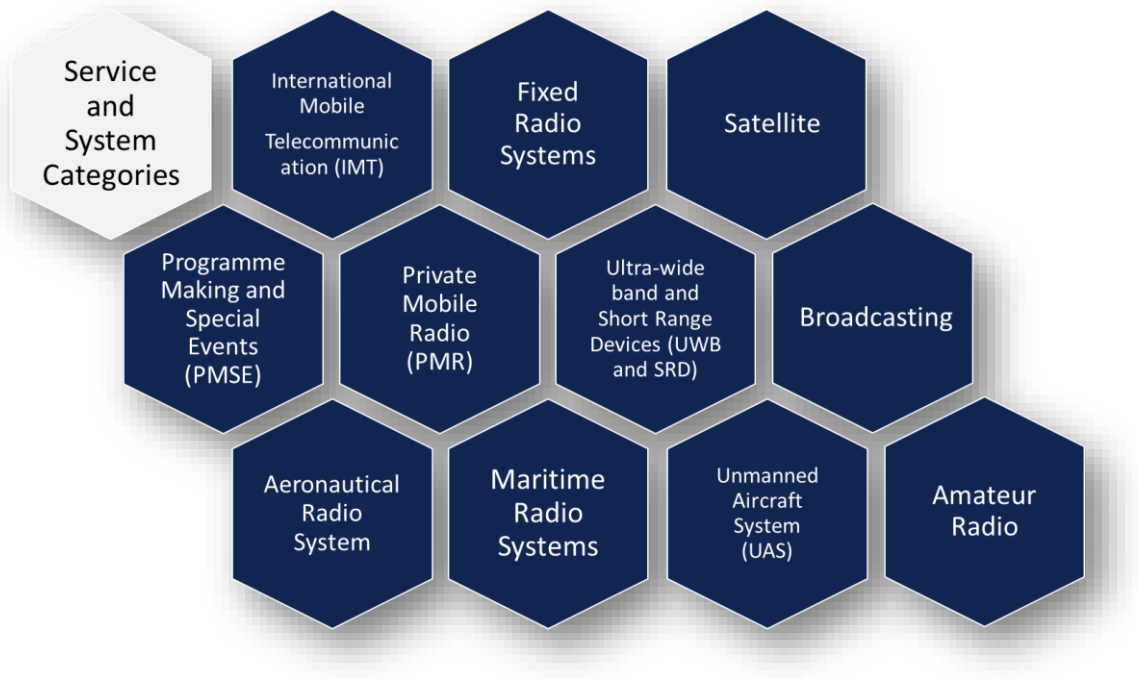


3. Review of Radio Services Developments

The TDRA has analyzed radio service developments, demand trends, and emerging technologies to identify key challenges impacting future spectrum needs. Informed by this assessment, the UAE Spectrum Outlook will propose targeted actions to enable sustainable sector growth.

With the rollout of 5G, early 6G planning, increasing deployment of non-geostationary satellite orbit (NGSO) constellations, the rise of direct-to-device (D2D) satellite communication and the integration of IoT and AI-based networks, a forward-looking spectrum strategy is essential. Increasing demand from autonomous vehicles, smart cities, digital industry, and remote healthcare further underscores this need.

Below is a classification of regulated radio services under TDRA, followed by an overview of related technological and demand trends. The following is a classification of some radio services and systems that are subject to national regulations under the TDRA, followed by an examination of technological trends and demand:



The TDRA, under the National Frequency Plan 4.0, is monitoring emerging technologies to meet growing spectrum needs. Demand is rising for IMT (5G/6G) and expanding satellite services such as Direct-to-Device (D2D), requiring more capacity and coordination. Emerging technologies are significantly reshaping spectrum demand, introducing new performance requirements and challenging existing allocation models. Key drivers include:

- Direct-to-Device (D2D) Connectivity: Enabling seamless global coverage and integrated location-based services via satellite and non-terrestrial networks.

- Short-Range Devices (SRD): Supporting dense and massive machine-type communications (mMTC), low-power wide-area networks, and ubiquitous sensor deployments critical for smart environments.
- Air-to-Ground (A2G) Communications: Facilitating high-speed inflight broadband and secure command-and-control links for unmanned aerial vehicles (UAVs).
- Local Broadband Networks: Powering high-performance wireless connectivity across campuses, industrial facilities, smart ports, and logistics hubs, often through private 5G or Wi-Fi 6/7 deployments.
- Urban Air Mobility (UAM): Requiring dedicated spectrum for electric vertical take-off and landing (eVTOL) aircraft, covering telemetry, communications, navigation, and air traffic integration.
- Emerging technologies are significantly reshaping spectrum demand, introducing new performance requirements and challenging existing allocation models. Key drivers include:
- Massive Internet of Things (IoT): Driving the need for scalable, low-latency, and energy-efficient spectrum solutions to support billions of interconnected devices.
- Vehicle-to-Everything (V2X): Enabling connected and autonomous vehicle ecosystems through real-time communication with infrastructure, other vehicles, and cloud services.
- Industrial Automation: Demanding ultra-reliable, low-latency communications (URLLC) for advanced manufacturing, robotics, and mission-critical operations.
- AI-Native Networks: Integrating artificial intelligence into network management and orchestration, requiring flexible and dynamically allocated spectrum resources.
- Immersive Technologies: Augmented reality (AR), virtual reality (VR), and the metaverse are pushing the boundaries of high-throughput, low-latency wireless connectivity to enable lifelike digital experiences.

Collectively, these technologies are driving the transition toward more dynamic, application-aware spectrum management frameworks to ensure the UAE's readiness for future innovation. These developments must be balanced with support for legacy and essential services such as aeronautical, maritime, broadcast, and amateur radio. Efficient coexistence, sharing, and dynamic access strategies are vital to managing this complex and multidimensional spectrum landscape. These technologies are accelerating the shift to dynamic, application-aware spectrum management. This must be balanced with continued support for legacy services like aeronautical, maritime, broadcast, and amateur radio through efficient sharing and coexistence strategies.

The following subsections provide an overview of these developments:

3.1 International Mobile Telecommunications (IMT)

3.1.1 **Present status:** Mobile Network Operators (MNOs) in the UAE are licensed to provide a full range of telecommunications services, including International Mobile Telecommunications (IMT), commonly known as public cellular mobile services. Operating under a technology-neutral regulatory framework, they have deployed networks supporting GSM (2G), UMTS (3G), LTE (4G), and New Radio (5G), utilizing

a wide range of frequency bands. The selection of air interface and network management remains at the operators' discretion.

Both licensed operators continue to expand their 5G network coverage in line with global standards. IMT (5G) services are commercially available across many urban areas in the UAE, supporting enhanced mobile broadband (eMBB), fixed wireless access (FWA), and scalable solutions for industrial and IoT applications, including massive machine-type communications.

To complement the public rollout and support industrial digitalization, the TDRA conducted a feasibility study on introducing private 5G networks. The study assessed technical, regulatory, and market aspects and identified the 3800–4200 MHz and 24.25–25.5 GHz bands as suitable for private network use, based on propagation characteristics, ecosystem readiness, and support for localized licensing models. These bands are well suited for verticals such as manufacturing, logistics, and critical infrastructure.

As confirmed in the WRC-23 Final Acts, no changes to the Radio Regulations were needed to allow the use of IMT technologies under the fixed service category. Securing additional IMT spectrum remains a strategic priority, with Region 1 allocations such as 3600–3800 MHz and 6425–7125 MHz expected to support the ongoing evolution of 4G, 5G, and future 6G networks

3.1.2 **Spectrum outlook for IMT**: IMT-2030 introduces a new era of mobile communications, targeting peak data rates exceeding 100 Gbps, end-to-end latency below 0.1 milliseconds, connection densities over 10 million devices/km², and energy efficiency gains of 100× compared to previous generations. These capabilities will power the UAE's future digital infrastructure—enabling AI-native networks, real-time XR applications, smart mobility, autonomous systems, and critical IoT across industries.

TDRA fully supports the transition to IMT-2030 and is committed to enabling its implementation through a forward-looking and comprehensive spectrum strategy. This includes aligning national policies with ITU-R Recommendations and regional frameworks established by the GCC and ASMG. The UAE is actively incorporating the outcomes of WRC-23 into its regulatory framework and will continue to play a leading role in global and regional preparations for WRC-27 and WRC-31. This strategic engagement ensures the UAE remains at the forefront of spectrum innovation and digital transformation.

To support these developments, TDRA is re-planning existing IMT spectrum to create wider contiguous blocks (e.g., 100 MHz in mid-bands, 800 MHz+ in mmWave), while ensuring coexistence with satellite and fixed services. Candidate bands under study include:

- 4.4–4.8 GHz (mid-band expansion),

- 7.125–8.4 GHz (high-capacity uplink/downlink options),
- 14.8–15.35 GHz (for future ultra-high throughput IMT).

These actions are guided by Resolution 256 (WRC-23) to evaluate sharing and compatibility with incumbent primary services. By proactively managing spectrum and embracing cutting-edge standards, TDRA is positioning the UAE to be a regional leader in IMT-2030—supporting national economic growth, digital innovation, and sustainability targets for the coming decade.

3.2 Fixed Radio Systems

3.2.1 **Present status:** In the UAE, MNOs are the primary users of fixed services for mobile backhaul and point-to-point links. Other sectors, including oil, utilities, finance, and government entities for public protection and disaster relief (PPDR), also heavily rely on fixed radio systems. Oil and utility companies use point-to-multipoint applications extensively to improve communication, coordination, safety, and response times. Government entities use these systems for emergency response and public safety, ensuring reliable communication during crises. The TDRA Regulations for Fixed Radio Systems cover frequencies from approximately 230 MHz to 95 GHz, providing various industries with the necessary bandwidth for their specific needs, from high-capacity backhaul to localized point-to-multipoint connections. The TDRA revised the "fixed radio systems" regulations in 2022.

3.2.2 **Spectrum outlook for fixed radio systems:** The future of fixed radio systems in the UAE will be shaped by growing demand for high-capacity, low-latency connectivity to support 5G, IMT-2030, and beyond. While fiber networks continue to expand and integrate with mobile architectures, high-frequency fixed links—particularly in E-Band (71–86 GHz)—will remain essential for mobile backhaul in areas with limited fiber access.

Emerging technologies are enabling wider bandwidth, full duplex, and portable microwave links, improving deployment flexibility for temporary, emergency, or hard-to-reach locations. The role of fixed links will further expand with the adoption of D-Band (130–174.8 GHz) and W-Band (92–114.5 GHz), with future extensions potentially reaching 275–325 GHz, subject to ITU-R studies under Resolution 721 (WRC-23) and future outcomes of WRC-31.

Despite reduced reliance on traditional Point-to-Point microwave links in urban areas, Point-to-Multipoint (PMP) systems continue to play a vital role in delivering enterprise and last-mile broadband, especially in fiber-scarce regions. Additionally, HF and VHF bands remain critical for maritime, aeronautical, and public safety communications.

The TDRA is committed to addressing capacity demands and the digital divide by promoting use of higher frequency bands for fixed services, in line with global and regional trends such as ECC recommendations. The UAE National Frequency Plan, currently covering up to 94 GHz, will evolve to accommodate these advancements and

ensure spectrum availability supports fixed-mobile convergence—a key consideration as networks increasingly blur the lines between fixed and mobile infrastructure.

3.3 Satellite

3.3.1 **Present status:** The UAE has a thriving satellite industry with both fixed and mobile satellite services. These operators provide fixed satellite service (FSS), broadcasting satellite service (BSS), mobile satellite service (MSS), Earth exploration satellite service (EESS), and Space Research Service (SRS). Technological advancements in the satellite sector are making connectivity more affordable, faster to deploy, and more attractive due to its ubiquity, broad coverage, and improved latency. Current developments include new non-geostationary-satellite orbit (NGSO) systems, advancements in geostationary-satellite orbit (GSO) networks, increased use of Earth stations in motion (ESIM) terminals, hybrid satellite-terrestrial IMT systems, and integration of IoT/M2M technology via satellite. Future innovations may include massive machine-type communications (mMTC), high-density fixed satellite systems (HDFSS), low-power data collection via NGSO, unmanned aircraft systems control and non-payload communications (UAS and CNPC), enhanced synthetic-aperture radar (SAR) capabilities, and improved meteorological satellite spectrum.

3.3.2 **Spectrum outlook for satellite:** The satellite sector is undergoing rapid transformation, driven by the emerging of direct-to-device (D2D) satellite communication, non-geostationary orbit (NGSO) constellations, their integration with 5G networks, advancements in internet of things (IoT) and high-throughput satellite (HTS) technologies. Enhanced earth observation capabilities, artificial intelligence (AI), machine learning, expanding applications in unmanned aerial systems (UAS), secure communications, and meteorology are further shaping the future of space services. These innovations are significantly improving service performance, enabling global connectivity, and supporting emerging government, commercial, and scientific applications.

In line with these trends, the TDRA continues to enhance its regulatory frameworks to support evolving satellite technologies and ensure efficient spectrum utilization. UAE's focus remains on fostering innovation while ensuring interference-free operation of satellite and terrestrial services.

At the international level, WRC-27 will address several strategic topics for the satellite sector, including studies on direct-to-device (D2D) connectivity to enable satellite communication with mobile devices, the development of regulatory frameworks for NGSO systems including coexistence conditions, and space science-related matters such as the protection of passive services and assessment of future spectrum requirements. The conference will also examine the use and sharing conditions for satellite gateways and user terminals, space-to-space communication links to support NGSO relay and deep-space missions, and measures to prevent unauthorized operation of Earth stations.

Following WRC-23, the TDRA is implementing updated regulatory provisions that support the expansion of NGSO satellite services, improve global broadband coverage, and enable low-latency applications. The conference also introduced new

frequency allocations and protections for Earth exploration satellite services (EESS), contributing to enhance climate monitoring, disaster management, and weather prediction.

By aligning national policies with international regulatory developments, the UAE aims to optimize spectrum use, promote innovation, and ensure satellite services continue to serve strategic, scientific, and societal needs across all sectors.

3.4 Terrestrial Broadcasting Services

3.4.1 **Present status:** Sound broadcasting continues to be a vital and resilient media platform within the UAE, operating across both analogue and digital formats. Analogue AM/FM radio (operating within the 148.5-283.5 KHz, 526.5-1606.5 KHz and 87.5-108 MHz frequency band) remains widely utilized, especially within automotive environments, despite increasing saturation of the FM spectrum. The transition towards terrestrial digital audio broadcasting (T-DAB) has been gradual, with uptake progressing slowly.

Although multiple successful T-DAB trials have been conducted by various operators nationwide, there are currently no commercial terrestrial DAB networks actively broadcasting. To facilitate the eventual migration to digital audio broadcasting, the TDRA, in collaboration with the Ministry of Industry and Advanced Technology (MoiAT), has established comprehensive technical standards. These include the "UAE Terrestrial Radio Receiver Specifications for AM/FM/T-DAB+" and the "Receiver Specification Requirements for Digital Terrestrial TV Broadcasting in UAE," both of which are accessible to the public via the MoiAT website.

In the realm of digital television, broadcasters recognize Digital Terrestrial Television (DTT) as a strategically important platform, particularly for emergency and crisis communications. However, the majority of digital TV consumers in the UAE currently prefer cable, fibre-optic, and satellite services due to their broader channel selections and superior viewing quality. Concurrently, internet streaming platforms are gaining traction, offering flexible on-demand and live content through broadband networks.

While some broadcasters have yet to launch their DTT networks, this has contributed to the partial clearance of the UHF spectrum (470-694 MHz). This situation has prompted ongoing discussions regarding the optimal utilization of this valuable frequency band, especially in light of growing demand for advanced digital services.

At the international level, the outcomes of the WRC-23 have significant implications for the region. The Arab states secured both primary and secondary allocations in the 614-694 MHz band, establishing a framework to harmonize the competing requirements of mobile communication services and broadcasting within the UHF spectrum.

3.4.2 **Spectrum outlook for terrestrial broadcasting services:** The broadcasting landscape in the UAE is undergoing a significant transformation, driven by the rise of Terrestrial Digital Audio Broadcasting (T-DAB), internet radio, and online audio streaming platforms. In response to growing congestion in the analogue FM band, the TDRA is actively supporting the rollout of T-DAB networks. This shift not only enhances

audio quality but also expands content variety and interactivity, offering features such as program guides, multimedia services, and real-time data.

In television broadcasting, the increasing popularity of internet-based platforms is gradually reducing reliance on traditional spectrum, particularly Digital Terrestrial Television (DTT). While DTT remains critical for public service broadcasting and emergency communications, its limited uptake in the UAE has prompted TDRA to re-evaluate the optimal use of the UHF frequency band (470–694 MHz).

Looking ahead, global and national focus is turning toward the convergence of broadcasting and International Mobile Telecommunications (IMT) services, as emphasized at the World Radiocommunication Conference 2023 (WRC-23). In alignment with WRC-23 outcomes, TDRA will adopt the relevant resolutions to ensure a balanced, future-ready approach to UHF spectrum allocation that supports both broadcasting and mobile broadband services.

To advance this vision, TDRA is launching pilot projects and 5G broadcast trials in collaboration with industry stakeholders. These initiatives will explore innovative use cases and business models for next-generation broadcasting, particularly over 5G networks. By fostering such innovation and efficiency, TDRA aims to deliver resilient, high-quality broadcasting services while accommodating the UAE's increasing demand for mobile connectivity and spectrum optimization.

3.5 Programme Making and Special Events (PMSE)

3.5.1 **Present status:** Audio and video Programme Making and Special Events (PMSE) applications play a critical role in the successful delivery of events across the UAE. These technologies are especially vital during high-profile international gatherings, such as the Abu Dhabi Formula One Grand Prix, where spectrum demand significantly increases.

To ensure seamless operation and uninterrupted service quality, the TDRA carefully manages this demand through optimized spectrum allocation and robust regulatory frameworks.

Audio PMSE systems - such as wireless microphones, in-ear monitors, and intercoms - operate across a broad frequency range, from 138 MHz to 1900 MHz, with primary reliance on the UHF band (470-694 MHz). This spectrum segment is preferred due to its favorable propagation characteristics and equipment compatibility.

Video PMSE devices - including wireless cameras and video transmission links - typically operate within higher frequency bands, ranging from 1.98 GHz to 9.1 GHz. A key concentration of activity is found in the 2.2-2.4 GHz range, which supports high-quality, real-time video transmission essential for live coverage and production.

The TDRA has implemented advanced regulatory measures to ensure the efficient and interference-free use of spectrum resources for PMSE. These measures support not only growing demand and evolving technologies but also reinforce the UAE’s capacity to host world-class events with reliability and excellence in media production and broadcasting infrastructure.

3.5.2 **Spectrum outlook for PMSE:** The future of Programme Making and Special Events (PMSE) technologies in the UAE appears highly promising, driven by the increasing demand for advanced audio-visual solutions across major international events spanning sports, culture, and business. To support this growth, the TDRA is committed to refining spectrum management strategies and aligning with international best practices to ensure excellent service delivery.

The TDRA will continue to engage with key stakeholders—including broadcasters, event organizers, and equipment manufacturers—to identify and allocate suitable frequency bands that meet the evolving operational and technical needs of PMSE users. This collaborative, forward-looking approach aims to ensure efficient spectrum usage, reduce interference, and support the seamless execution of complex, high-profile events.

On the technology front, rapid advancements are expected to introduce more sophisticated, flexible, and high-performance PMSE equipment with improved spectral efficiency. Innovations such as Wireless Audio Management Systems (WAMS) are set to transform real-time frequency coordination, enabling dynamic spectrum allocation and better interference mitigation. Furthermore, the integration of PMSE systems with cutting-edge technologies like 5G, Artificial Intelligence (AI), and the Internet of Things (IoT) will significantly enhance the quality, reliability, and responsiveness of event production, even in dense and demanding environments.

Overall, the UAE's PMSE landscape is poised for sustained innovation and operational excellence, underpinned by progressive regulatory support and a commitment to delivering superior media experiences at excellent events.

3.6 Private Mobile Radio (PMR)

3.6.1 **Present status:** The UAE's private mobile radio (PMR) sector remains active, delivering customized land mobile services with enhanced control, security, and reliability. PMR is widely used across critical sectors, including public protection and disaster relief (PPDR), non-civil (military and governmental) applications, and industries requiring robust, mission-critical communications. It also supports the growing demand for machine-to-machine (M2M) and industrial IoT applications.

PMR services in the UAE primarily operate in the 137–174 MHz, 350–380 MHz, and 401–470 MHz bands. The TDRA enables a variety of PMR technologies—including DMR, dPMR, TETRA, PMR446, LPD433, and Push-to-Talk over Cellular (PoC)—with certain services authorized under Class Authorization to improve access for low-power users.

The TDRA continues to align national PMR policies with ITU-R Recommendations (e.g., M.2474, M.2014, M.2009), ensuring spectrum use meets evolving global standards and operational needs.

The TDRA supports a diverse range of PMR technologies, including DMR, dPMR, TETRA, PMR446, LPD433, and Push-to-Talk over Cellular (PoC). PMR services such

as PMR446 and LPD433 are authorized under Class Authorization, improving accessibility for low-power users.

3.6.2 **Spectrum outlook for PMR:** The TDRA is guiding the evolution of PMR in the UAE toward fully digital, broadband-enabled systems to meet the growing need for secure, real-time, and data-driven communications across critical sectors. Legacy analogue PMR systems will be gradually phased out in favor of digital technologies such as DMR**,** dPMR**,** and TETRA**,** which offer greater efficiency, security, and functionality. Integration with IoT**,** AI, and cloud platforms will enhance capabilities like smart dispatching, automated alerts, and predictive analytics. To expand coverage, especially in remote areas, satellite-based solutions including LEO constellations will complement terrestrial PMR networks.

The TDRA will continue to promote spectrum efficiency, regulatory clarity, and interoperability to ensure PMR remains a resilient and future-ready tool for public safety, transportation, utilities, and industrial applications.

3.7 Ultra-Wide Band (UWB) and Short-Range Devices (SRD)

3.7.1 **Present status:** Low-power wireless technologies operating under Class Authorization are increasingly adopted across diverse sectors in the UAE, in line with the TDRA regulations and aligned with ECC Recommendation 70-03. These include short-range devices (SRDs), ultra-wideband (UWB) systems, and wireless power transmission (WPT), all designed to operate on a license-exempt basis under defined technical conditions to ensure coexistence with other spectrum users.

SRDs are widely used in applications such as smart agriculture, environmental monitoring, logistics, healthcare, and industrial automation. In agriculture, for example, smart sensors monitor soil and climate conditions to optimize irrigation, while in environmental management, real-time sensing systems track air and water quality. In urban and industrial settings, SRDs support asset tracking, home and building automation, and smart city infrastructure—enhancing operational efficiency and improving quality of life.

UWB devices are authorized for specific uses such as location tracking, gesture recognition, and automotive radar, with operational constraints defined by the UAE National Frequency Plan and in accordance with ECC Rec. 70-03. These devices typically operate in designated frequency bands with strict power limits and duty cycle requirements to ensure non-interference with other services.

Wireless power transmission technologies, including WPT for electric vehicles (WPT-EV), are also advancing in the UAE. These systems offer safe and efficient cable-free charging solutions, especially in controlled environments such as parking facilities or depots, and represent a key enabler for the broader electrification of transport.

At the international level, WRC-23 recognized increasing interest in expanding mobile applications in the 6 GHz band—particularly for radio local area networks (RLANs) and wireless access systems (WAS). The conference upheld flexibility for administrations to decide whether to allocate this band for RLANs or for IMT use at the national or regional level. The TDRA continues to monitor these developments closely to ensure national regulations support both innovation and spectrum efficiency in the evolving landscape of low-power wireless communication.

3.7.2 **Spectrum outlook for UWB and SRD:** UWB and SRD will play a key role in enabling smart agriculture, environmental sensing, industrial automation, healthcare monitoring, and smart city infrastructure. Globally, new SRD use cases include UWB-based indoor positioning, 60 GHz high-speed wireless links, sub-GHz IoT networks, body-coupled communications, and radar-based gesture recognition.

Wireless Power Transmission (WPT), especially for electric vehicle charging, is also advancing rapidly, supporting cleaner and more efficient energy systems. To support these developments, the TDRA updated its UWB and SRD regulations in 2023, in line with ECC Rec. 70-03. The regulatory framework enables innovation through license-exempt access while ensuring coexistence with primary services and continued spectrum availability.

3.8 Intelligent Transport Systems (ITS)

3.8.1 **Present status:** The UAE is advancing its transportation systems with a strong focus on wireless technologies to enhance sustainability, safety, and innovation. Autonomous vehicles currently account for a portion of national transport, with a target of reaching 25% autonomy by 2030**.** This shift relies on robust vehicle-to-everything (V2X) connectivity to enable real-time communication, improving road safety and operational efficiency.

Wireless technologies are also integral to rail and metro systems, supporting real-time monitoring, automation, and integration with ITS. Broader applications include smart traffic management, connected logistics, and infrastructure for electric and hydrogen-powered vehicles, all benefiting from low-latency, high-reliability wireless networks.

The UAE is actively deploying and exploring unmanned vehicles (UVs) across air, ground, and marine domains. These systems are being integrated into national ITS frameworks to support connected, efficient, and sustainable mobility across the country.

3.8.2 **Spectrum outlook for ITS:** Intelligent Transportation Systems (ITS) are transforming global mobility across road, rail, marine, and air transport, powered by advanced wireless technologies that enable real-time communication, automation, and safety.

Key trends include the rise of electric and hydrogen vehicles, urban air mobility (UAM) such as air taxis and drones, clean marine transport, and autonomous systems. These

rely on robust V2X connectivity, including C-V2X, as well as technologies like LIDAR, UWB, and low-power wireless for enhanced performance.

In rail, global momentum is building around FRMCS, with bands such as 1900–1910 MHz (TDD) and 874.4–880 / 919.4–925 MHz (FDD) identified for next-generation train communications. The UAE is expected to align with these developments.

The TDRA's UWB and SRD Regulations (Version 5.0) already support ITS and transport-related applications. To further support this evolution, the TDRA will develop a dedicated ITS spectrum regulation covering emerging technologies across land, air, and sea. This framework will ensure reliable, low-latency communication and align with national goals for smart, sustainable transport.

3.9 Aeronautical Radio Systems

3.9.1 **Present status:** The UAE's aeronautical radio services, regulated by the TDRA, cover essential communication, navigation, and surveillance systems in line with ITU and ICAO frameworks. Frequency assignments are coordinated regionally through the GCC Telecommunications Bureau and globally via ICAO procedures. The TDRA ensures spectrum availability and interference protection for systems such as VHF/UHF voice, ILS, VOR, Mode S, ADS-B, and supports the integration of advanced avionics like WAIC, SBAS, and on-board broadband. With the rise of drones and unmanned aircraft systems (UAS), the TDRA is also developing frameworks for secure command, control, and payload links, ensuring safe coexistence with conventional aviation.

3.9.2 **Spectum outlook for aeronautical radio systems:** The aeronautical sector is rapidly evolving with the introduction of autonomous systems, smart airport infrastructure, and advanced air traffic management, enhancing safety, efficiency, and flexibility. New services such as high-throughput satellite links, air-to-ground (A2G) connectivity, and onboard broadband are improving inflight communication and passenger experience.

The integration of urban air mobility (UAM), drone operations, and the potential use of IMT networks highlight the sector's growing reliance on reliable, high-capacity wireless systems. These advancements underscore the vital role of spectrum in enabling innovation, automation, and global interoperability.

The TDRA will continue to align national aeronautical spectrum regulations with ICAO and ITU guidance, WRC-23 outcomes, and in coordination with the GCAA, ensuring access to internationally harmonized frequency bands. Updated regulations will support both traditional and emerging aeronautical services, including WAIC, UAS, ADS-B, SBAS, and A2G systems, maintaining the UAE's leadership in connected aviation

3.10 Maritime Radio Systems

3.10.1 **Present status:** Maritime communication is essential for navigational safety, operational efficiency, and data exchange across sea, air, space, and terrestrial domains. It encompasses a range of technologies—from short-range systems like Wi-

Fi and Bluetooth to global solutions such as SATCOM and VSAT for broadband connectivity. Narrowband technologies support low-power, long-distance links, while cellular and satellite networks enable high-speed data for maritime IoT, navigation, and multimedia applications.

Despite advancements, Maritime Communication Networks (MCNs) still fall short of 5G-level performance, and integrating UAV-based maritime networks remains complex due to mobility and environmental constraints.

In the UAE, the TDRA manages call signs and Maritime Mobile Service Identities (MMSIs) as national numbering resources and ensures proper registration of vessels and coastal stations in the ITU's Maritime Access and Retrieval System (MARS) database. This ensures global recognition, compliance with ITU regulations, and safe, coordinated maritime operations.

3.10.2 **Spectrum outlook for maritime radio systems:** The future of maritime communication will be shaped by emerging technologies such as Unmanned Aerial Vehicles (UAVs) and Unmanned Surface Vehicles (USVs), offering cost-effective, flexible coverage without relying solely on satellite systems. UAVs can serve as mobile aerial base stations, while USVs support autonomous data collection and wireless connectivity for remote maritime operations.

The integration of IoT, including the Industrial Internet of Things (IIoT) and the Internet of Underwater Things (IoUT), will enable real-time data exchange for smart containers, autonomous underwater vehicles (AUVs), and systems supporting fleet management, environmental monitoring, and disaster prevention.

To address future spectrum demands, ITU-R Report S.2460 explores the use of the 47.2–50.2 GHz and 50.4–51.4 GHz (Earth-to-space) bands for aeronautical and maritime Earth stations in motion (ESIMs), communicating with both GSO and NGSO satellites. These developments reflect growing needs for high-capacity satellite links in dynamic environments.

In response, the TDRA will update its regulations for maritime radio systems to align with WRC-23 outcomes, support new use cases, and ensure regulatory clarity. The TDRA will continue participating in WRC-27 and WRC-31 studies related to maritime services and will consult with industry stakeholders throughout the UAE Spectrum Outlook implementation to support innovation, safety, and global interoperability in maritime communications.

3.11 Unmanned Aircraft Systems (UAS)

3.11.1 **Present status:** The TDRA regulations define the frequency ranges, usage, and conditions for Unmanned Aerial Systems (UAS), reflecting past WRC decisions on the use of satellite networks for UAS connectivity. The 5030–5091 MHz band is designated

for command-and-control (C2) and telemetry services, ensuring safe and reliable UAS operations.

The integration of UAS into IMT (4G/5G) networks is set to transform civil applications, ranging from scientific research to delivery services. UAS technologies are already revolutionizing industries such as oil and gas by enabling efficient infrastructure inspections and advanced data collection. At the same time, major companies like Amazon are trialing drone-based direct-to-customer deliveries, aiming to enhance last-mile logistics and reduce delivery times..

3.11.2 **Spectrum outlook for UAS:** The future of Unmanned Aerial Systems (UAS) is poised for remarkable transformation, with significant advancements in autonomous capabilities enabling them to execute complex missions with minimal human intervention. Breakthroughs in sensor technologies will facilitate more accurate data collection, advanced analytics, and high-precision mapping—enhancing applications in environmental monitoring, disaster management, and infrastructure inspection.

Integration with 5G and beyond (6G) will deliver ultra-reliable, low-latency connectivity, enabling real-time communication, extended operational range, and seamless integration into intelligent transport and logistics networks. Meanwhile, innovations in propulsion systems and lightweight composite materials will increase endurance, payload capacity, and energy efficiency, broadening UAS applications across environmental research, critical infrastructure surveillance, and emergency response.

In parallel, Electric Vertical Take-Off and Landing (eVTOL) aircraft are emerging as a cornerstone of Urban Air Mobility (UAM) ecosystems. These platforms will enable efficient, low-emission passenger and cargo transport within and between cities, reducing congestion and offering rapid point-to-point connectivity. Their success will rely on harmonized regulatory frameworks, safe integration into controlled and uncontrolled airspace, and robust communication systems that leverage both terrestrial and satellite-based networks.

The TDRA will continue to monitor global industry advancements and assess future spectrum requirements for aviation, UAS, and UAM operations. This includes ensuring adequate allocations to support airborne IMT equipment, satellite-based command-and-control links, and emerging aeronautical broadband applications. Of particular relevance, a provisional WRC-27 agenda item is considering the review of mobile allocations between 694–960 MHz to potentially remove the “except aeronautical” restriction—unlocking the ability for UAS and eVTOL systems to maintain reliable air-to-ground and air-to-air connectivity over IMT networks.These developments will play a critical role in enabling safe, efficient, and scalable aerial mobility—transforming the way goods and people move in the decades to come.

3.12 Amateur radio

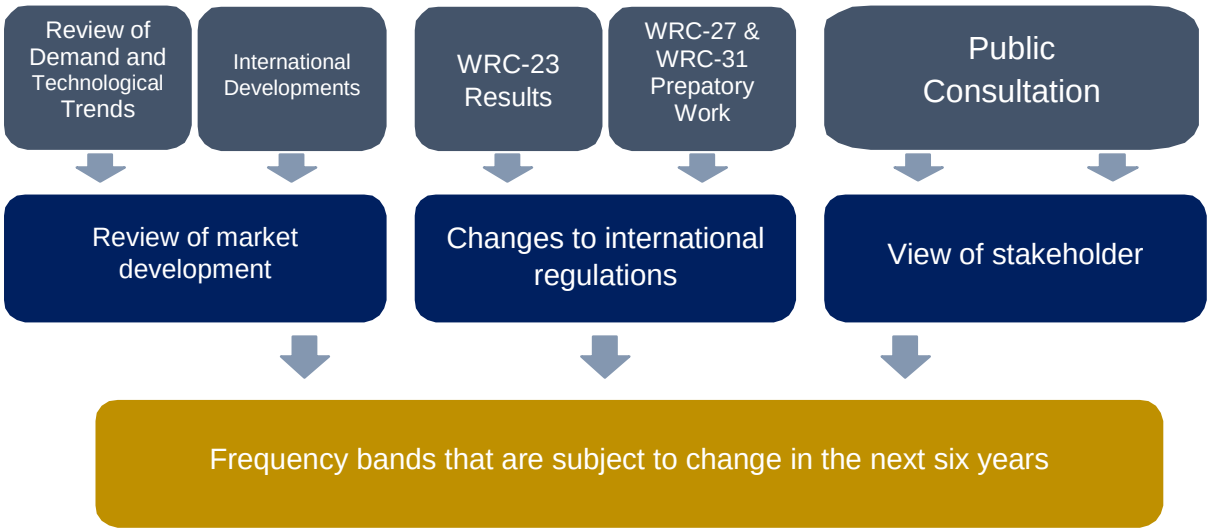
3.12.1 **Present status:** Amateur radio spectrum in the UAE is recreationally by radio enthusiasts. It is also used by universities for training, instruction, and research projects, including lab tests involving amateur satellite spectrum.

3.12.2 **Spectrum outlook for amateur radio:** No significant changes are expected in the amateur sector in the near future. WRC-31 will consider new allocations for amateur and amateur satellite use. The TDRA has updated its Regulations for Amateur Radio Systems 3.0 in 2020, In order to align with WRC-31 decisions; the TDRA will update its regulations for amateur radio systems, seek feedback from the amateur community, and monitor global developments as needed.

4. Indicative spectrum re-planning roadmap

The roadmap for future spectrum use and associated re-planning activities takes account of future trends, international developments and anticipated future demand for spectrum. The roadmap also takes account of comments received in response to the TDRA's public consultation on the draft UAE Spectrum Outlook issued in February 2025.

To identify frequency bands that may be subject to change in use over the next six years, the TDRA has thus taken account of several inputs, as summarised below:



To implement changes, the TDRA will take different actions depending on the nature of the band in question and the nature of the changes being proposed. Actions that the TDRA will need to take are summarised as follows:

Change of Use

- Bands which are currently used by an existing service in the UAE, which are to be studied for a change of use taking account of UAE market demand, and which might include studies on existing usage, sharing, re-planning and changes to existing UAE spectrum national regulations, etc.

Spectrum Release

- Bands which are currently unused, where parts of the band are available for new use, which can be immediately planned for spectrum release (i.e. without a need to re-plan existing use)

Further Study

- Bands that might be subject to a future change of use in the UAE, but subject to decisions of a future WRC- which might be the subject of further studies that the TDRA should carry out

Follow International Developments

- Bands that are subject of international developments, which the TDRA should follow in order to identify their relevance to the UAE

It is important to note, however, that this roadmap is indicative and will have to remain flexible and dynamic to align with developments in:

- equipment availability
- market demand
- changes in industry standards.

The tables below summarise the actions identified for the TDRA over the period 2026- 2031 of this spectrum outlook.

IMT

The following table identifies bands subject to potential changes relevant to public mobile and IMT, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2025-2026	*614-694 MHz*	Change the current use from Broadcasting applications (i.e. PMSE) to IMT use
2025–2026	*2300–2400 MHz*	Implement usage of the band and plan for deployment of PPDR 5G networks.
2025-2026	*3800-4200 MHz*	Evaluate the feasibility of releasing this band for IMT (5G) use, taking into account international interest and potential harmonization strategies to meet growing mobile broadband requirements.
2028–2030	*37–40.5GHz*	Initiate studies and collaborate with operators to share parts of this band between fixed and mobile or change the use from fixed to mobile, for use by IMT (5G) systems. When authorising for IMT, ensure protection of EESS (passive) in the 36–37GHz band, according to WRC-19.
2029–2031	*40.5–43.5GHz*	Conduct industry consultation to consider making available parts of this band for IMT (5G) systems, based on standards development and equipment availability.
2028–2031	*66–71GHz*	Initiate studies to bring into use the band for IMT, taking account of the decision at WRC-19.

Spectrum release		
2025-2026	614-694 MHz	Ommence detailed planning to enable the effective use of this band, already allocated to both mobile operators, to enhance coverage and support advanced 5G applications, leveraging existing ecosystem readiness
2025-2026	6.425–7.125 GHz	Allocate this band for IMT use, with the ecosystem currently in the development stage and expected to reach a certain level of maturity by Q1 2026 to support advanced 5G applications and future 6G evolution. Coordinate with both licensees to enable deployment and utilization, building on the successful trials conducted in 2023.
2025–2026	*1427–1518MHz*	Resume coordination with MNOs and vendors following confirmation from chipset manufacturers of their readiness, to proceed with the allocation of this band for IMT use to mobile operators
2026–2031	*Release of any other bands confirmed by change of use studies, as above and as per the results of the IMT bands re-planning conducted in 2024 with agreed plan mutually agreed by the TDRA and licensees*	
Further study		
2026-2028	*4 400-4 800 MHz*	Participate in studies under WRC-27 Agenda Item 1.7 to evaluate potential identification of this band for IMT use, considering its strategic importance for expanding mobile broadband coverage in both urban and rural settings.
2026-2028	*7 125-8 400 MHz*	Engage in studies under WRC-27 Agenda Item 1.7 to explore the possible identification of parts of this band for IMT use in. This includes evaluating sharing and compatibility with existing services and possible use for IMT applications.
2026-2028	*14.8-15.35 GHz*	Conduct studies under WRC-27 Agenda Item 1.7 to consider identifying this band for terrestrial IMT use. Focus on the technical, operational, and regulatory aspects, including protection of existing services and services in adjacent bands.
Follow international development		
2026–2030	*Monitor and align with global standards and technology developments related to IMT, such as 5G-Advanced and early-stage 6G, including new bands and*	

	use cases.

Fixed radio systems

The following table identifies bands subject to potential changes relevant to fixed radio systems, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2029	*275–296GHz*	Explore allocation of these bands for land mobile and fixed services, focusing on technological developments and equipment availability, while maintaining protection of Earth Exploration Satellite Service (EESS) and considering GCC collaboration.
	306–313GHz	
	318–333GHz	
	356–450GHz	
Spectrum release		
2026 and beyond	*Above 95GHz* *275–296GHz*	Consider implementing necessary changes in UAE regulations for fixed radio systems to make these bands available for point-to-point and point-to-multipoint use, subject to market demand, and taking account of the studies above, along with equipment availability.
	306–313GHz	
	318–333GHz	
	356–450GHz	
Further study		
2025 and beyond	*71–76GHz*	Participate in WRC-27 studies to review the technical conditions associated with these bands, including sharing possibilities between fixed radio systems and NGSO satellite services, with a focus on GCC region harmonization.
	81–86GHz	
Follow international development		
2025 and beyond	*Above 95GHz*	Monitor international developments and GCC regional initiatives concerning equipment availability and use of

		bands above 95 GHz for fixed radio systems including D-Band (130-174.8 GHz) and W-Band (92-114.5GHz). Align with the emerging standards and potential applications as identified by WRC-27 studies

Satellite

The following table identifies bands subject to potential changes relevant to satellite services, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2029	*137–138MHz*	Consider regulatory actions to facilitate the use of this band for space operation services associated with short-duration mission satellite systems, in line with WRC-19 and WRC-23 decisions. Ensure coordination with regional needs and developments.
	148–149.9MHz	
2026–2029	*401–403MHz*	Adjust national regulations regarding in-band power limits for Earth Exploration Satellite Service (EESS) and Meteorological Satellite (MetSat) systems, following WRC-19 and WRC-23 decisions. Consider regional requirements for harmonized use.
2026–2028	*17.7–19.7GHz*	Implement regulatory changes to allow Earth Stations in Motion (ESIM) to communicate with GSO Fixed Satellite Services (FSS) satellites, considering emission limits established by WRC-19 and aligning with new WRC-23 outcomes.
	27.5–29.5GHz	
Spectrum release		
Update and revise Earth station regulations for any bands confirmed by change-of-use studies for satellite use, incorporating results from WRC-23 and WRC-27 outcomes and considering regional harmonization.		
Further study		
2025 - 2027	*47.2 - 50.2 GHz*	Follow up WRC-27 studies on technical and operational conditions to facilitate the use of aeronautical and maritime earth stations in motion communicating with geostationary space stations and non-geostationary space stations in the fixed-satellite service.
	50.4 - 51.4 GHz	
2025 - 2027	*13.75 - 14 GHz*	Follow up WRC-27 studies on possible revisions of sharing conditions to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes.

2025 - 2027	*51.4 - 52.4 GHz*	Follow up WRC-27 studies on enabling use by gateway earth stations transmitting to non-geostationary-satellite orbit systems in the fixed-satellite service.
2025 - 2027	*1518 - 1544MHz*	Follow up WRC-27 studies on considering technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites operating in the mobile-satellite service.
	1545 - 1559MHz	
	1610 - 1645.5MHz	
	1646.5 - 1660MHz	
	1670 - 1675MHz	
	2483.5 - 2500MHz	
2025 - 2027	*1427 - 1432 MHz*	Follow up WRC-27 studies on possible allocations to the mobile-satellite service and possible regulatory actions required for the future development of low-data-rate non-geostationary mobile-satellite systems.
	1645.5 - 1646.5 MHz	
	1880 - 1920 MHz	
	2010 - 2025 MHz	
2025 - 2027	*2010 - 2025 MHz*	Follow up WRC-27 studies to consider possible additional allocations to the mobile-satellite service.
	2120 - 2160 MHz	
	2160 - 2170 MHz	
2025 - 2027	*694/698 MHz & 2.27 GHz*	Follow up WRC-27 studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage.
2025 - 2027	*Various frequency ranges as specified in Res. 680 (WRC-23)*	Follow up WRC-27 studies on possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface.
2025 - 2027	*27.5 - 28 MHz*	Follow up WRC-27 studies on regulatory provisions and potential primary allocations to the meteorological aids service (space weather) to accommodate receive-only
	29.7 - 30.2 MHz	
	32.2 - 32.6 MHz	

	37.5 - 38.325 MHz	space weather sensor applications in the Radio Regulations.
	73.0 - 74.6 MHz	
	608 - 614 MHz	
2025 - 2027	*Various frequency bands above 76 GHz as specified in Res. 712 (WRC-23)*	Follow up WRC-27 studies on compatibility between the Earth exploration-satellite service (passive), the radio astronomy service in certain bands above 76 GHz, and active services in adjacent and nearby frequency bands.
2025 - 2027	*4 200 - 4 400 MHz*	Follow up WRC-27 studies on possible allocations to the Earth exploration-satellite service (passive).
	8 400-8 500 MHz	
Follow international development		
2025-2031	*Monitor international developments and regional strategies regarding satellite services. Assess relevance and applicability to UAE's national spectrum plan and regulatory frameworks.*	

Broadcasting

The following table identifies bands subject to potential changes relevant to broadcasting, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2028	*174-230 MHz*	Collaborate with stakeholders in the broadcasting sector and UAE government to encourage the continued preparation and deployment of Digital Audio Broadcasting (DAB) networks to facilitate the introduction of new digital radio services, in line with international trends and GCC strategies.
Spectrum release		
2026–2031	*Release of any bands confirmed by change of use studies, as above.*	
Further study		
2026–2027	*470-614 MHz*	Continue discussions and studies at the Gulf regional level (Gulf Cooperation Council, GCC, and Arab Spectrum Management Group, or ASMG) to evaluate the present use of spectrum in this band, and potential future use by IMT in the band or part of it. Study the alternative requirements for broadcasting channels and coordination between neighbouring countries to protect their services.
Follow international development		
2025–2031	*470-694 MHz*	Follow international developments in IMT and broadcast technologies within this frequency range and consider future strategy for distribution of digital terrestrial television in the UAE and future use of the 470–694MHz spectrum, taking account of the studies identified above in relation to regional and international developments in future use of the 470–649MHz band.

PMSE

The following table identifies bands subject to potential changes relevant to PMSE, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2025-2026	*614-694 MHz*	Change the current use from PMSE Audio applications to IMT use
2025–2026	*2300-2400 MHz*	Change the current use of the band from PMSE video applications to support the implementation and planned deployment of PPDR 5G networks.
2025-2026	*3800-4200 MHz*	Change the current use of the band from PMSE video applications to evaluate the feasibility of releasing this band for IMT (5G) use, taking into account international interest and potential harmonization strategies to meet growing mobile broadband requirements.
2026–2027	*Conduct studies to assess the impact of potential changes in spectrum use, especially for bands currently used by PMSE. Evaluate the implications of reallocations for IMT or other services, considering findings from WRC-27 and coordinating with GCC and ASMG stakeholders.*	
Spectrum release		
2026-2028	*4400-4800 MHz*	Participate in studies under WRC-27 Agenda Item 1.7 to evaluate potential identification of this band for IMT use, considering its strategic importance for expanding mobile broadband coverage in both urban and rural settings.
2026–2030	*Update and revise PMSE regulations for any bands confirmed by change-of-use studies, ensuring alignment with international developments and regional strategies, particularly with GCC and ASMG member states.*	
Further study		
2025–2027	*470-694 MHz*	Conduct studies to assess the impact of allocation changes in the 470–694 MHz band on spectrum availability for PMSE. Evaluate potential interference

		scenarios, sharing opportunities, and spectrum requirements for PMSE equipment. Assess the potential for dynamic spectrum sharing and flexible use in light of technological advancements.
Follow international development		
2025 and beyond	*Various*	The TDRA will endeavour to take a proactive approach in following equipment and market developments for PMSE.
2025 and beyond	*The TDRA will collaborate with PMSE stakeholders and monitor international developments in PMSE equipment and market trends, aligning UAE regulations with global best practices and emerging technologies.*	

PMR

No significant changes in the PMR sector are expected within the next six years. The TDRA will continue to monitor international developments relevant to PMR, including the evolution towards PAMR systems currently serving PPDR users, and may consider their applicability for other user groups in the future.

UWB and SRD

The following table identifies bands subject to potential changes relevant to UWB and SRD, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2027	*5150–5250MHz*	Update SRD regulations in line with WRC-27 agenda items to allow flexible indoor and outdoor usage, including vehicles and transport systems, at power levels up to 200mW e.i.r.p, with potential options for higher power use cases following studies on coexistence.
2026–2027	*5650–5850MHz*	Review and update regulations for the 5650-5850 MHz band to enhance its use for mobile (Wi-Fi and RLANs), considering both indoor and outdoor applications, while ensuring coexistence with other services.
2028–2030	*60 GHz (57–71 GHz)*	Evaluate the use of 60 GHz band for outdoor SRD applications following international trends, particularly

		focusing on Class Authorization frameworks to promote broadband access.
Spectrum release		
2026–2031	*Update and revise UWB and SRD regulations for any bands confirmed by change of use studies, as above.*	
Further study		
2026–2028	*Above 100 GHz*	Monitor developments and participate in studies concerning new allocations for UWB and SRD technologies in frequencies above 100 GHz, with focus on innovation and emerging market demands.

Follow international development		
2026–2029	*Below 45MHz*	Follow market and technology developments in SRD applications and ensure that new applications are able to develop in the UAE.
2025 and beyond	*6.425–7.125GHz*	Follow market and technology developments in SRD applications and ensure that new applications are able to develop in the UAE.
2027 and beyond	*231.5–275 GHz*	Explore the potential for new applications in radiolocation services and other innovative technologies that could leverage these frequencies, following outcomes from WRC-27.

ITS

The following table identifies bands subject to potential changes relevant to ITS, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2031	*Study the change of use of bands identified as relevant in further studies.*	
Spectrum release		
2026–2031	*Incorporate results of studies above in proposed new spectrum regulations for ITS.*	
Further study		
2026–2029	*5850–5925MHz*	Continue national studies and consult with industry concerning implementation of DSRC and/or C-V2X ('PC5') systems in this band in the UAE, for ITS.
2026–2028	Participate in studies, which look to facilitate global or regional harmonised frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations.	
2026–2028	*470–960MHz* *1900-1910 MHz*	Participate in studies related to evaluating the need of making additional spectrum available for FRMCS 4G/5G-based railway systems in the UAE, such as FDD 874.4–880 MHz and 919.4–925 MHz bands and TDD 1900-1910MHz.
2026-2028	*76–81GHz*	Take account of the use of automotive radars operating in the band 76–81GHz when participating in studies on future use of 71–76GHz and 81–86GHz in preparation for WRC-27.
Follow international development		
2026 and beyond	Launch a public consultation to develop specific spectrum regulations for ITS, focusing on emerging technologies and new spectrum needs, as guided by international related standards and frameworks.	

Aeronautical radio systems

The following table identifies bands subject to potential changes relevant to aeronautical radio systems, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026–2028	*Study the change of use of bands identified as relevant in further studies.*	
Spectrum release		
2026–2031	*Update and revise aeronautical radio systems regulations for any bands confirmed by change of use studies, as above.*	
Further study		
2026–2031	*47.2–50.2 GHz*	Consider the technical and operational conditions for the use of these bands (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary and non-geostationary space stations in the fixed-satellite service, in accordance with Resolution 176 (Rev.WRC-23). Develop regulatory measures to facilitate the use of these bands following WRC-27 outcomes.
2026–2031	*50.4–51.4 GHz*	Examine potential allocations and usage conditions for these frequencies for aeronautical applications, ensuring protection of existing services and alignment with WRC-27 decisions, particularly for Earth-to-space communications with space stations in the fixed-satellite service.
2026-2028	Participate in the WRC-27 studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile applications.	
Follow international development		
2025 and beyond	*Monitor and align with international developments related to aeronautical radio systems, including updates from WRC-27, to maintain compatibility with global aviation standard*	

Maritime radio systems

The following table identifies bands subject to potential changes relevant to maritime radio systems, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026-2031	Study the change of use of bands identified as relevant in further studies.	
Spectrum release		
2026–2031	*Update and revise maritime radio systems regulations for any bands confirmed by change of use studies, as above.*	

Amateur radio

The following table identifies bands subject to potential changes relevant to amateur services, with the proposed period indicative and subject to change based on the above.

Proposed period	Frequency band	Comment
Change of use		
2026-2031	Study the change of use of bands identified as relevant in further studies.	
Spectrum release		
2026–2031	*Update and revise amateur radio systems regulations for any bands confirmed by change of use studies, as above.*	
Further study		
2026-2028	*1 610–1 645.5 MHz*	Participate in WRC-27 studies to consider the technical and regulatory conditions for space-to-space links between non-geostationary and geostationary satellites in the mobile-satellite service that may affect the amateur services, in accordance with Resolution 249 (Rev.WRC-23).
Follow international development		
2026–2031	*Follow international developments relevant to amateur systems and consider their relevance in the UAE.*	

5. Impact of the UAE Spectrum Outlook

The UAE Spectrum Outlook 2026-2031 has been the result of a comprehensive review of the main spectrum uses, the evolving demand and technological trends that are affecting spectrum needs. This review process was undertaken in close collaboration with the industry to understand stakeholders' concerns and needs in relation to spectrum.

The resulting indicative roadmap summarises the main actions, which the TDRA may undertake to anticipate technological developments over the next six years.

The upcoming six-year period promises transformative growth and innovation. Many governments and private-sector organisations worldwide are realising the importance of ICT and are undergoing digital transformation to reap the benefits of ICT. This is also the case of the UAE, where strategies and initiatives have been put forward to stimulate and co-ordinate efforts towards the objective of a diversified and flexible knowledge-based economy. The UAE's objective of establishing a global leadership position of UAE in the ICT sector perfectly fits with these efforts. With a growing number of wireless devices of all forms, and technologies and applications supported across all economic sectors, and with the continuous investment into wireless infrastructure, the challenge now is that spectrum will need to become available to foster innovation and enable investment – while safeguarding existing investments in wireless infrastructure.

The TDRA's transparent approach, driven by the principles that guides its actions, particularly in spectrum management, brings alignment and predictability to the wireless industry including spectrum users, service providers, and technology partners. The TDRA believes this approach will in turn allow the wireless industry in the UAE to unlock the immense potential of spectrum as an enabler and an innovation catalyst for industries that rely on wireless technologies for economic activities, as well as for the safety, security and well-being of citizens and residents of the UAE.

Annex A List of acronyms and abbreviations

The table below lists the acronyms and abbreviations used in this report.

Acronym	Meaning
5G	5th generation mobile communication network
3GPP	3rd Generation Partnership Project
4D	Four dimensions
4G	4th generation mobile communication network
5G	5th generation mobile communication network
AM	Amplitude modulation
AM(R)S	Aeronautical mobile (R) service
ARNS	Aeronautical radio-navigation service
ASMG	Arab Spectrum Management Group
A-SMGCS	Advanced surface movement guidance and control systems
AWAIC	Wireless avionics intra-communications
BVLOS	Beyond visual line of sight
CBRS	Citizens Broadband Radio Services
CEPT	European Conference of Postal and Telecommunications Administrations
C-V2X	Communication - Vehicle to X
DAB	Digital audio broadcast
DSRC	Digital short-range communications
DTT	Digital terrestrial TV
EESS	Earth exploration satellite services
eMBB	Enhanced mobile broadband
E-S	Earth to space
ESIM	Earth stations in motion
FM	Frequency modulation
FRMCS	Future Railway Mobile Communication System

Acronym	Meaning
FSS	Fixed satellite service
FWA	Fixed wireless access
GCAA	General Civil Aviation Authority
GCC	Gulf Cooperation Council
GHz	Gigahertz
GMDSS	Global maritime distress and safety system
GSM-R	Global system for mobile communications – railway
GSO	Geostationary-satellite orbit
HDFSS	High-density fixed satellite systems
HF	High frequency
ICAO	International Civil Aviation Organisation
ICT	Information communication technology
IMT	International mobile telecommunications
IMT(5G)	Fifth generation of international mobile telecommunications
IoT	Internet of Things
ITS	Intelligent transport systems
ITU	International Telecommunication Union
ITU-R	ITU radiocommunication sector
kHz	kilohertz
LEO	Low Earth orbit
LF	Low frequency
LTE	Long-term evolution
M2M	Machine to machine
MetSat	Meteorological satellite
MF	Medium frequency
MHz	Megahertz
mMTC	Massive machine-type communications

Acronym	Meaning
mmWave	Millimetre wave
MNO	Mobile Network Operator
MSS	Mobile satellite service
NB-IOT	Narrowband Internet of Things
NGSO	Non-geostationary satellite orbit
PMR	Private mobile radio
PMSE	Programme making and special events
RLAN	Radio local area network
RSTT	Railway radio systems between train and trackside
SAR	Synthetic-aperture radar
SAS	Spectrum access system
s-E	Space to Earth
TCO	Total cost of ownership
TETRA	Terrestrial trunked radio
TDRA	Telecommunication and Digital Government Regulatory Authority
TV	Television
UAE	United Arab Emirates
UAM	Urban air mobility
UAS	Unmanned aircraft systems
UAS CNPC	Unmanned aircraft systems control and non-payload communications links
UAV	Unmanned Aerial Vehicles
UHF	Ultra-high frequency
UK	United Kingdom
USA	United States of America
USV	Unmanned Surface Vehicles
UWB and SRD	Ultra-wide band and short-range devices

Acronym	Meaning
VHF	Very high frequency
VLF	Very low frequency
Wi-Fi	Wireless fidelity
WP5A	Working party 5A (ITU-R)
WPT	Wireless power transmission
WPT-EV	Wireless power transmission for electric vehicle
WRC-19	World Radiocommunication Conference 2019
WRC-23	World Radiocommunication Conference 2023
WRC-27	World Radiocommunication Conference 2027
WRC-31	World Radiocommunication Conference 2031