Public consultation

National Framework for Private Mobile Networks (IMT) in the UAE

UAE Private IMT Networks Enablement Framework

PRIMTE-UAE

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Private IMT Networks Enablement Framework

Telecommunications and Digital Government Regulatory Authority (TDRA)
United Arab Emirates

1. Introduction

The Telecommunications and Digital Government Regulatory Authority (TDRA) hereby establishes the PRIMTE-UAE — Private IMT Networks Enablement Framework (hereinafter referred to as "the Framework") to provide a comprehensive regulatory basis for the enablement, deployment, and operation of Private IMT Networks within the UAE. This Framework sets out the governing principles, regulatory conditions, and procedural requirements necessary to facilitate the orderly development of such networks, while ensuring the efficient use of national spectrum resources, safeguarding fair competition, and maintaining the integrity and sustainability of the telecommunications ecosystem.

The accelerating advancement of digital technologies — including automation, artificial intelligence, industrial Internet of Things (IIoT), robotics, and mission-critical communication systems — is driving a structural transformation across industries and public services. These developments generate increased demand for advanced connectivity solutions capable of delivering enhanced performance, ultra-reliable communications, low latency, high security, and greater operational control.

In this context, Private IMT Networks are recognized as a key enabler of next-generation industrial and enterprise applications, supporting a wide range of use cases across sectors such as energy, manufacturing, logistics, transport, mining, ports, and smart infrastructure.

The enablement of such networks is aligned with the UAE's national strategic priorities, including digital transformation, economic diversification, and the advancement of Industry 4.0. By supporting the adoption of advanced connectivity solutions, these networks facilitate the integration of emerging technologies, enhance operational efficiency, and enable productivity gains across critical sectors of the economy.

Furthermore, the deployment of Private IMT Networks is expected to support the development of resilient, secure, and future-ready infrastructure, capable of meeting the evolving demands of both industrial and societal applications. In addition to their economic impact, such networks contribute to improving service delivery, enhancing infrastructure reliability, and supporting the overall quality of life within the UAE.

Accordingly, this Framework establishes a clear, forward-looking, and flexible regulatory approach that:

- Enables both operator-led and enterprise (including government)-led deployment models
- Ensures efficient and sustainable use of spectrum resources
- Promotes innovation while safeguarding fair competition
- Maintains alignment with international standards and best practices

Through this Framework, the TDRA reaffirms its commitment to enabling advanced connectivity solutions and supporting the UAE's position as a global leader in digital economy development and emerging technologies.

> **Q1. Do you agree with the overall objectives of enabling Private IMT Networks in the UAE?**
>
> **Q2. Do you foresee strong demand for private IMT networks across your sector, and are there any additional national priorities or use cases that should be explicitly addressed?**

2. Definition and Purpose

The purpose of this Framework is to establish a clear, comprehensive, and consistent regulatory approach for the enablement, deployment, and operation of Private IMT Networks within the UAE. This Framework defines the applicable regulatory principles, conditions, and procedures required to support the orderly development and deployment of such networks in the UAE, while ensuring the efficient and effective use of radio frequency spectrum, safeguarding fair and sustainable competition, and preserving the integrity of existing telecommunications services.

The Framework further aims to provide regulatory clarity and certainty to stakeholders facilitate the adoption of advanced connectivity solutions across key sectors, and support innovation in alignment with national priorities related to digital transformation and economic diversification.

2.1 Definition of Private IMT Networks

For the purpose of this Framework, Private IMT Networks shall mean:

> *Radio communication networks based on International Mobile Telecommunications (IMT) technologies, deployed — either by MNO or enterprises (including government entities) — for the dedicated or restricted use of a specific entity or defined group of users, providing customized connectivity within a defined geographic scope, and designed to meet specific performance, security, and operational requirements.*

Such networks shall:

- Be used solely to support the internal or operational needs of the specific entity or defined group of users
- Serve exclusively the internal operational needs of such entity or group
- Access is strictly limited to:
    - Employees of the entity or group; and

- Authorized personnel /devices directly engaged in its operations

- Not be used to provide public telecommunications services, nor to offer, resell, or extend connectivity to unaffiliated third parties
- Not interconnect[1] with:
  - Any Public Telecommunications Network;
  - Any international telecommunications carrier;
  - Any other Private Telecommunications Network; or
  - Any other networks as directed by the TDRA.
- Operate exclusively within the radio frequency spectrum bands and numbering resources assigned or authorized by the TDRA, and in accordance with all applicable regulatory conditions
- Be restricted to a defined geographic scope

> **Q3. Do you agree with the proposed definition of Private IMT Networks, including the limitation to internal operational use and restricted access to authorized users?**
>
> **Q4. Should the Framework allow limited access to enterprises (including government entities) and third parties (e.g., contractors or partners)?**

2.2 Deployment Architectures

Private IMT Networks may be deployed under one of the following architectures, subject to TDRA authorization:

- Standalone (fully isolated) networks — the network is deployed independently of public mobile networks, utilizing dedicated core network, radio access infrastructure, and control functions, thereby ensuring full isolation, enhanced security, and complete operational control by the entity.
- Integrated networks — the network may utilize elements of public mobile network infrastructure (including, but not limited to, radio access, core network, or transport components), subject to prior approval by the TDRA and compliance with applicable regulatory requirements, including those related to security, interoperability, numbering, and spectrum usage.

In all cases, the selected deployment model shall be clearly specified in the relevant authorization and shall remain subject to the technical, operational, and regulatory conditions prescribed by the TDRA.

[1]The following configurations are expressly prohibited: SIP trunking or PSTN gateways enabling voice breakout; internet gateways providing public internet access; roaming arrangements with public mobile networks; tunnels or routing arrangements that enable indirect public connectivity; and cross-border backhaul that enables access to the global public telecommunications domain.

> **Q5. Do you agree with the classification of deployment architectures into Standalone (fully isolated) networks and Integrated networks?**
>
> **Q6. What additional safeguards should apply to integrated architectures?**

2.3 Distinction from Public Mobile Networks

Private IMT Networks differ from public mobile networks in that they:

- Shall not be intended or permitted to provide telecommunications services to the general public or to unaffiliated third parties
- Shall be deployed strictly within defined geographic boundaries, as specified in the relevant TDRA authorizations, and shall not extend beyond the authorized coverage area
- Shall operate within the technical, operational, regulatory, and capacity limits defined in the applicable authorizations, including — but not limited to — power levels, coverage parameters, and network configurations
- Shall utilize only the radio frequency spectrum bands and numbering resources assigned or authorized by the TDRA, and shall not access or use any resources beyond those explicitly approved
- Shall provide enhanced control over network performance, security, and data management, with such control remaining under the responsibility of the authorized entity and subject to applicable regulatory obligations

> **Q7. Are the distinctions between private and public networks sufficiently clear?**

3. Scope

This Framework applies to the enablement, deployment, and operation of Private IMT Networks within the United Arab Emirates, and sets out the applicable requirements governing all related activities.

In particular, this Framework shall apply to:

- All entities seeking authorization to establish, deploy, operate, or manage Private IMT Networks, including MNO and enterprises (including government entities).
- All aspects of spectrum access and usage, including the assignment, authorization, management, and reuse of radio frequency spectrum, in accordance with TDRA policies and subject to defined technical conditions.

- All applicable spectrum fees and charges, including application fees, spectrum usage fees, and any other charges as determined by the TDRA.
- All associated numbering and identification resources, where applicable, including their allocation, assignment, and use.
- The technical, operational, and deployment conditions governing such networks, including geographic scope, coverage limitations, power levels, interference management requirements, and network configurations
- Compliance, monitoring, and enforcement requirements applicable to authorized entities

This Framework shall be read in conjunction with, and shall complement, applicable telecommunications law, regulations, and spectrum management policies issued by the TDRA. In the event of any inconsistency, the provisions of the Telecommunications Law and its regulatory instruments issued by the TDRA shall prevail.

> **Q8. Does the scope of the Framework adequately cover all relevant stakeholders and activities?**

4. Deployment Models

The following deployment models shall be permitted under this Framework, subject to TDRA authorization and applicable regulatory conditions:

4.1 MNO-Led Model

Under the MNO-Led Model, licensed mobile network operators (MNOs) may deploy, operate, and manage Private IMT Networks on behalf of enterprises (including government entities) using spectrum resources assigned to such operators.

In this model, the MNO shall retain responsibility for:

- Network deployment, operation, and maintenance
- Compliance with all applicable regulatory obligations, including spectrum, numbering utilization, and usage conditions
- Ensuring service quality, security, and lawful operation

The enterprise may utilize the network based on agreed commercial and operational arrangements with the operator. The network may be implemented using:

- Dedicated network infrastructure; or
- Shared infrastructure components with the public mobile network, where technically feasible and approved

⚠ Interconnection Restriction

Interconnection with public mobile networks shall not be permitted under this Framework. Private IMT Networks shall operate independently of public telecommunications networks.

This model enables enterprises (including government entities) to leverage existing operator capabilities and infrastructure, while ensuring regulatory compliance is maintained under the licensed operator[2].

> **Q9. Do you agree with the MNO-Led deployment model?**

4.2 Enterprise (Including Government)-Led Model

Under the Enterprise (Including Government)-Led Model, enterprises (including government entities) may be authorized by the TDRA to deploy, operate, and manage Private IMT Networks for their own use, subject to obtaining the necessary authorizations.

In this model, the enterprise shall be directly responsible for:

- Network deployment, operation, and management
- Compliance with all applicable regulatory, technical, and security requirements
- Ensuring that network usage remains within the authorized scope and purpose
- Spectrum shall be assigned or authorized directly to the enterprise for use within a defined geographic area and under specified technical conditions

The enterprise may engage third parties, vendors and/or service providers for network deployment and operation, provided that:

- The enterprise retains full regulatory responsibility; and
- All involved parties comply with TDRA requirements

⚠ Interconnection Restriction

Interconnection or integration with public mobile networks shall not be permitted. Private IMT Networks shall operate independently and shall not interface with public telecommunications networks under any circumstances.

[2]Under the MNO-Led Model, the provision, deployment, operation, and management of Private Telecommunications Networks by a UAE Licensee constitutes a Regulated Activity as defined in the Telecommunications Law, as such Private Networks are being provided to any customer requesting them on commercial terms and conditions. The provision of Private Networks by a UAE Licensee falls within the scope of the Licensee's grant to provide Telecommunications Services under the licence issued by the TDRA.

This model provides enterprises (including government entities) *with enhanced control over network performance, security, and operational parameters, and is particularly suited to mission-critical and specialized use cases.*

> **Q10. Do you agree with allowing enterprises (including government) to directly deploy and operate private networks?**
>
> **Q11. Are enterprises (including government) capable of meeting regulatory and technical obligations?**

5. Spectrum Framework

5.1 General Principles

The assignment, authorization, and use of radio frequency spectrum for Private IMT Networks shall be governed by the following principles:

- Spectrum shall be assigned and authorized strictly in accordance with the national frequency plan and the applicable regulatory instruments issued by the TDRA, ensuring alignment with national priorities and international obligations
- Spectrum use shall remain IMT technology-neutral, unless otherwise specified by the TDRA, provided that such use complies with applicable technical conditions, international standards, and does not result in harmful interference
- Efficient and effective utilization of spectrum shall be ensured; authorized entities shall deploy and operate networks in a manner that maximizes spectrum efficiency and avoids underutilization
- Spectrum shall be used only for the purposes and within the scope defined in the relevant authorization, including geographic, technical, and operational limits
- Authorized use of spectrum shall not cause harmful interference to existing or authorized services; licensees shall comply with all applicable interference management requirements
- The TDRA reserves the right to impose additional technical, operational, or administrative conditions to ensure optimal spectrum use, protect incumbent services, and maintain overall spectrum integrity. The TDRA may further require the modification, suspension, or cessation of operations, and may suspend or revoke the relevant authorization, in the event of non-compliance or where necessary to prevent harmful interference

> **Q12. Do you agree with the proposed principles for spectrum assignment and use?**

5.2 Spectrum Bands

Spectrum for Private IMT Networks shall be assigned and authorized primarily within designated IMT bands, including:

5.2.1 Mid-Band Spectrum (3.8–4.2 GHz)

The 3.8–4.2 GHz band (within IMT terrestrial Band n77) is designated as the primary band for the deployment of Private IMT Networks. The 400 MHz of available spectrum within this band shall be organized into a structured three-tier allocation, designed to accommodate operator-led deployments, enterprise (including government)-led deployments, and a strategic reserve maintained under TDRA control.

Band Structure

The 400 MHz band shall be divided into three contiguous sub-ranges as follows:

Sub-range	Frequency	Bandwidth	Purpose
Operator Tier	3800–4000 MHz	200 MHz	Operator-led (MNO-led) deployments
Enterprise Tier	4000–4100 MHz	100 MHz	Enterprise (including government)-led deployments
Reserved Tier	4100–4200 MHz	100 MHz	TDRA strategic reserve

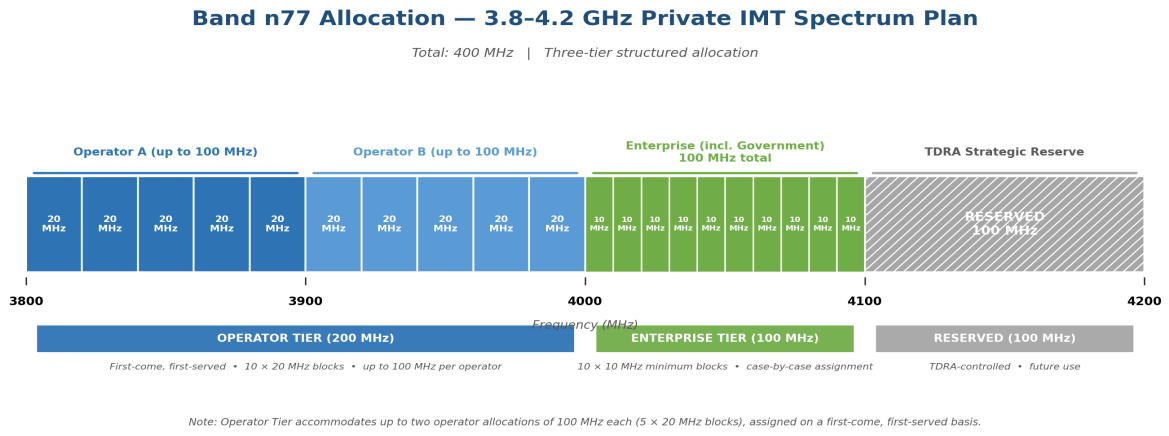


Figure 1 — Band n77 (3.8–4.2 GHz) three-tier allocation plan

Operator Tier (3800–4000 MHz)

The 200 MHz Operator Tier shall be made available to licensed Mobile Network Operators (MNOs) for the deployment of Private IMT Networks on behalf of enterprise customers, subject to the following conditions:

- The tier shall be organized into **ten (10) blocks of 20 MHz**, representing the minimum assignable unit
- Spectrum shall be assigned in allocations of **up to 100 MHz per licensed operator** (equivalent to five contiguous 20 MHz blocks), accommodating up to two operator allocations within the 200 MHz tier
- Allocations shall be granted on a **first-come, first-served basis**, subject to spectrum availability, demonstrated demand, and compliance with TDRA technical and regulatory requirements
- The TDRA shall allocate contiguous 20 MHz blocks within each operator allocation, in accordance with the band plan and coexistence considerations
- Assignments shall be granted for a defined duration and subject to renewal, review, and ongoing compliance with utilization requirements

Enterprise Tier (4000–4100 MHz)

The 100 MHz Enterprise Tier shall be dedicated to enterprises including government entities, seeking direct authorization to deploy and operate Private IMT Networks for their own use. This tier shall be organized into ten (10) blocks of 10 MHz, representing the minimum assignable unit for enterprise (including government)-led deployments. Block size, quantity, and geographic deployment conditions for individual assignments shall be determined by the TDRA on a case-by-case basis, in accordance with the technical parameters set out in Section 6.

Reserved Tier (4100–4200 MHz)

The 100 MHz Reserved Tier shall be retained under TDRA control to:

- Support future deployment requirements and emerging use cases
- Enable flexibility in spectrum planning and reallocation
- Address potential spectrum congestion and increased demand
- Ensure continued efficient spectrum management and long-term availability

The TDRA reserves the right to modify, reconfigure, reassign, or release the Reserved Tier as necessary to respond to evolving regulatory, technical, and market conditions.

General Conditions

Private IMT Networks shall only be deployed within the above-designated band and tiers, unless otherwise expressly authorized by the TDRA under exceptional circumstances and subject to specific technical and regulatory conditions.

> **Q13. Do you agree with the proposed three-tier allocation within Band n77 (200 MHz Operator / 100 MHz Enterprise / 100 MHz Reserved)?**

> **Q14. Do you agree with structuring the Operator Tier to accommodate up to two operator allocations of 100 MHz each (5 × 20 MHz blocks), assigned on a first-come, first-served basis?**
>
> **Q15. Do you agree that 20 MHz blocks for operators and 10 MHz blocks for enterprises (including government entities) represent appropriate minimum assignable units?**
>
> **Q16. Is the 100 MHz strategic reserve appropriately sized to support future use cases, or should the size of the reserve be reconsidered?**

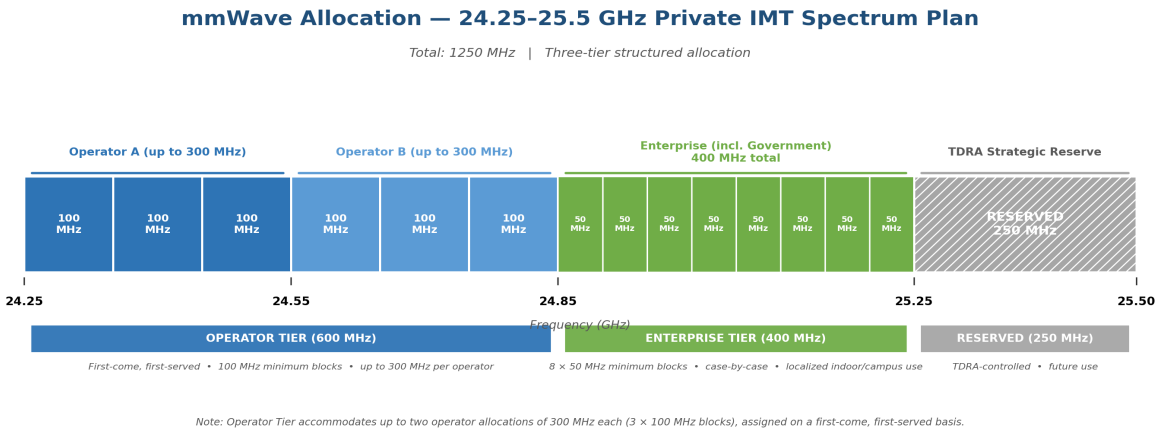
5.2.2 High-Band Spectrum (24.25–25.5 GHz — Millimeter Wave)

The millimeter wave band (24.25–25.5 GHz, within IMT terrestrial Band n258) is designated as the primary high-band for Private IMT Networks, supporting high-capacity, ultra-low-latency, and highly localized deployments. The 1250 MHz of available spectrum within this band shall be organized into a structured three-tier allocation, mirroring the approach adopted in the mid-band, and designed to accommodate operator-led deployments, enterprise (including government)-led deployments, and a strategic reserve maintained under TDRA control.

Band Structure

The 1250 MHz band shall be divided into three contiguous sub-ranges as follows:

Sub-range	Frequency	Bandwidth	Purpose
Operator Tier	24.25–24.85 GHz	600 MHz	Operator-led (MNO-led) deployments
Enterprise Tier	24.85–25.25 GHz	400 MHz	Enterprise (including government)-led deployments
Reserved Tier	25.25–25.50 GHz	250 MHz	TDRA strategic reserve



Note: Operator Tier accommodates up to two operator allocations of 300 MHz each (3 × 100 MHz blocks), assigned on a first-come, first-served basis.

Figure 2 — mmWave Band (24.25–25.5 GHz) three-tier allocation plan

Operator Tier (24.25–24.85 GHz)

The 600 MHz Operator Tier shall be made available to licensed Mobile Network Operators (MNOs) for the deployment of high-capacity Private IMT Networks on behalf of enterprise customers, particularly for wide-area, large-scale, and high-throughput use cases. The following conditions shall apply:

- The tier shall be organized into **six (6) blocks of 100 MHz**, representing the minimum assignable unit
- Spectrum shall be assigned in allocations of **up to 300 MHz per licensed operator** (equivalent to three contiguous 100 MHz blocks), accommodating up to two operator allocations within the 600 MHz tier
- Allocations shall be granted on a **first-come, first-served basis**, subject to spectrum availability, demonstrated demand, and compliance with TDRA technical and regulatory requirements
- The TDRA shall allocate contiguous 100 MHz blocks within each operator allocation, supporting 3GPP NR FR2 channel bandwidths (typically 100 MHz, 200 MHz, or 400 MHz carriers) and efficient use of beamforming and carrier aggregation
- Assignments shall be granted for a defined duration and subject to renewal, review, and ongoing compliance with utilization requirements

Enterprise Tier (24.85–25.25 GHz)

The 400 MHz Enterprise Tier shall be dedicated to enterprises including government entities, seeking direct authorization to deploy and operate high-capacity Private IMT Networks for their own operational needs. The following conditions shall apply:

- The tier shall be organized into **eight (8) blocks of 50 MHz**, representing the minimum assignable unit for enterprise (including government)-led deployments
- Assignments may be issued in single 50 MHz blocks or in contiguous combinations (e.g., 100 MHz, 200 MHz, or 400 MHz), subject to demonstrated need and the technical parameters set out in Section 6
- Larger contiguous assignments (typically 200–400 MHz) may be authorized on an exclusive basis to support high-throughput enterprise use cases
- Use of this tier shall support a wide range of enterprise operational scenarios, including industrial facilities, campuses, ports, airfields, and other defined geographic areas

Reserved Tier (25.25–25.50 GHz)

The 250 MHz Reserved Tier shall be retained under TDRA control to:

- Support future high-throughput use cases, including advanced 5G-Advanced and 6G applications
- Enable flexibility in spectrum planning and reallocation in response to evolving demand
- Address potential congestion in the Operator and Enterprise Tiers
- Provide protection contours where required to safeguard adjacent satellite and fixed services

The TDRA reserves the right to modify, reconfigure, reassign, or release the Reserved Tier as necessary to respond to evolving regulatory, technical, and market conditions.

General Conditions

Use of the mmWave band shall support high-capacity, low-latency enterprise applications — including industrial automation, fixed wireless access, advanced manufacturing, port and airfield operations, mining, and other high-throughput use cases — across defined geographic deployment areas.

Private IMT Networks shall only be deployed within the above-designated band and tiers, unless otherwise expressly authorized by the TDRA under exceptional circumstances and subject to specific technical and regulatory conditions.

> **Q17. Do you agree with the proposed three-tier allocation of the 24.25–25.5 GHz mmWave band (600 MHz Operator / 400 MHz Enterprise / 250 MHz Reserved)?**
>
> **Q18. Do you agree with structuring the Operator Tier to accommodate up to two operator allocations of 300 MHz each (3 × 100 MHz blocks), assigned on a first-come, first-served basis?**
>
> **Q19. Do you agree that 100 MHz blocks for operators and 50 MHz blocks for enterprises represent appropriate minimum assignable units for mmWave deployments?**
>
> **Q20. Is the 250 MHz strategic reserve appropriately sized to support future use cases (e.g., 5G-Advanced, 6G), or should the size of the reserve be reconsidered?**
>
> **Q21. What are your expected use cases for mmWave private networks, and which tier (operator-led or enterprise-led) best suits your operational requirements?**

6. Spectrum Assignment Model

Key Principle

The assignment and authorization of spectrum for Private IMT Networks shall be based on defined technical parameters per band, designed to maximize spectrum efficiency while ensuring protection of incumbent services and prevention of harmful interference.

6.1 Technical Parameters — Mid-Band (3.8–4.2 GHz)

Private IMT Network deployments within the 3.8–4.2 GHz band (3GPP Band n77) shall comply with the following technical parameters, calibrated to the available 5G NR equipment ecosystem (small cells, FWA radios, and macro gNBs):

Parameter	Value
Frequency band	3.8–4.2 GHz (Band n77)
Channel bandwidths	10, 20, 30, 40, 50, 80, 100 MHz
Maximum EIRP	42 dBm per 20 MHz carrier
Power tolerance	+2 dB
Duplexing mode	TDD
Out-of-band emissions	Per ITU-R / 3GPP TS 38.104 specifications
Equipment compliance	3GPP NR Band n77 conformant

The 42 dBm EIRP limit per 20 MHz carrier aligns with standard 5G NR Band n77 ecosystem capabilities and enables flexible deployment scenarios across a wide range of operational environments and site geometries.

> **Q22. Do you agree with the proposed technical parameters for the 3.8–4.2 GHz mid-band, including the maximum EIRP limit and supported channel bandwidths?**
>
> **Q23. Do you agree that the proposed parameters are consistent with available 5G NR Band n77 equipment, or should additional parameters be considered?**

6.2 Technical Parameters — mmWave (24.25–25.5 GHz)

Private IMT Network deployments within the 24.25–25.5 GHz band (3GPP Band n258) shall comply with the following technical parameters, calibrated to the available 5G NR FR2 equipment ecosystem (small cells, integrated access and backhaul nodes, and fixed wireless access radios):

Parameter	Value
Frequency band	24.25–25.5 GHz (Band n258)
Channel bandwidths	50, 100, 200, 400 MHz

Parameter	Value
Maximum EIRP	40 dBm per 200 MHz carrier
Power tolerance	+2 dB
Duplexing mode	TDD
Beam characteristics	Highly directional / beamformed
Out-of-band emissions	Per ECC/DEC(18)06 and 3GPP TS 38.104 specifications
EESS protection (23.6–24.0 GHz)	Maximum −33 dBW/200 MHz TRP
Equipment compliance	3GPP NR Band n258 conformant

The 40 dBm EIRP limit per 200 MHz carrier aligns with available 5G NR Band n258 ecosystem equipment, supporting high-capacity and low-latency deployments across a wide range of use cases including industrial automation, fixed wireless access, port and airfield operations, and high-throughput enterprise applications.

Out-of-band emission limits and protection of the adjacent Earth Exploration Satellite Service (EESS) band (23.6–24.0 GHz) shall be maintained in accordance with international harmonized conditions (ECC/DEC(18)06).

> **Q24. Do you agree with the proposed technical parameters for the 24.25–25.5 GHz mmWave band, including the maximum EIRP limit and supported channel bandwidths?**
>
> **Q25. Do you agree with the proposed approach to protecting adjacent EESS earth stations through out-of-band emission limits, or should additional protection measures be defined?**

6.3 TDD Frame Structure

Both the 3.8–4.2 GHz mid-band and the 24.25–25.5 GHz mmWave band operate in Time Division Duplex (TDD) mode. In TDD systems, all transmitters within a defined geographic area must use a common, synchronized frame structure to prevent harmful base-station-to-base-station and user-equipment-to-user-equipment cross-link interference. The choice of frame structure determines the downlink-to-uplink ratio, latency profile, and — critically — coexistence with adjacent-band public mobile services.

Public Mobile Network Operators in the UAE are currently mandated to use the DDDDDDDSUU frame structure (commonly referred to as the 8:2 pattern) in the 3.4–3.8 GHz band, providing a downlink-heavy

allocation suitable for consumer mobile broadband and ensuring synchronized coexistence between operators.

For Private IMT Networks, the requirements differ. Many enterprise use cases — industrial automation, machine vision, mission-critical control, augmented reality, and uplink-intensive sensor networks — demand a more balanced or uplink-favored frame structure. However, any frame structure adopted must coexist with adjacent-band public mobile operations, particularly in the 3.4–3.8 GHz band immediately below the mid-band private allocation.

6.3.1 Coexistence Considerations

The 3.8–4.2 GHz Private IMT band is directly adjacent to the 3.4–3.8 GHz public mobile band. Two coexistence scenarios apply:

- Synchronized operation — Private and public networks operate with aligned frame structures, eliminating cross-link interference at the band edge and removing the need for guard bands
- Unsynchronized operation — Private and public networks operate with different frame structures, requiring either a frequency guard band, geographic separation, or additional filtering to prevent harmful interference

The mmWave band (24.25–25.5 GHz) presents a different coexistence profile. Adjacent services include the Earth Exploration Satellite Service (EESS) in the 23.6–24.0 GHz band and licensed public mmWave operations in the 25.1–27.5 GHz range. mmWave's short propagation range and high directionality substantially reduce the inter-network coexistence challenge, though out-of-band emission limits and EESS protection remain critical.

6.3.2 Proposed Frame Structure for Private IMT — Mid-Band (3.8–4.2 GHz)

Three frame structure options are evaluated for the 3.8–4.2 GHz Private IMT band:

Frame Structure	DL:UL Ratio	Compatibility with Public Mobile	Suitability for Enterprise
DDDDDDDSUU (8:2)	8:2	Fully compatible — identical to public mobile pattern	Limited — downlink-heavy, low uplink capacity
DDDSU (3:1)	3:1	Compatible — same DL-end alignment, no cross-link interference at band edge	Limited — downlink-favored; constrains uplink-intensive industrial traffic

Frame Structure	DL:UL Ratio	Compatibility with Public Mobile	Suitability for Enterprise
DSUUU (1:3)	1:3	Requires a guard band, additional filtering or geographic separation (unsynchronized with adjacent public mobile)	Excellent — uplink-favored; matches uplink-dominant industrial traffic (recommended default)

Recommended Frame Structure — Mid-Band

Private IMT deployments in the 3.8–4.2 GHz band shall use the **DSUUU (uplink-favored, ~1:3)** frame structure with 30 kHz subcarrier spacing as the default. Private IMT traffic is predominantly uplink-driven — machine-vision feeds, video surveillance, sensor telemetry and remote operation — so an uplink-favored ratio matches real enterprise demand far better than the downlink-heavy public mobile pattern. As this structure is not aligned with the adjacent 3.4–3.8 GHz public mobile downlink, deployments shall apply appropriate band-edge coexistence measures — a frequency guard band, additional filtering or geographic separation — or, where feasible, a synchronization agreement with the adjacent operator.

6.3.3 Proposed Frame Structure for Private IMT — mmWave (24.25–25.5 GHz)

In the 24.25–25.5 GHz band, the dominant coexistence consideration is alignment with public mobile mmWave deployments in the adjacent 25.1–27.5 GHz range. UAE public mobile operators in the 26 GHz range use the DDDSU pattern with 120 kHz subcarrier spacing, consistent with 3GPP NR FR2 best practice.

Recommended Frame Structure — mmWave

Private IMT deployments in the 24.25–25.5 GHz mmWave band shall use the **DSUUU (uplink-favored, ~1:3)** frame structure with 120 kHz subcarrier spacing, consistent with the mid-band approach and with the uplink-dominant nature of high-capacity industrial applications (machine vision, video and sensor aggregation). The short propagation range and high directionality of mmWave substantially reduce inter-network coexistence sensitivity; where deployments are adjacent to public mmWave operations, out-of-band emission limits and, where necessary, beam-pointing or geographic separation shall be applied. The structure remains compatible with the available 3GPP NR FR2 ecosystem (small cells, IAB nodes, and FWA radios).

Operators with genuinely downlink-dominant requirements — for example, fixed wireless access or broadcast-style distribution — may request an alternative downlink-favored structure, subject to a coexistence study and demonstrated operational need.

6.3.4 Synchronization Source

To maintain network synchronization, all Private IMT base stations shall be locked to a common timing reference. Acceptable timing sources include:

- Global Navigation Satellite System (GNSS) — GPS, Galileo, or BeiDou — with a minimum holdover capability of 24 hours in the event of signal loss
- Precision Time Protocol (PTP, IEEE 1588) over the operator's transport network, with appropriate primary reference time clock (PRTC) sources
- Synchronous Ethernet (SyncE) for frequency synchronization, complemented by PTP for phase synchronization

Licensees shall demonstrate compliance with the timing accuracy requirements specified in 3GPP TS 38.133 (±1.5 µs maximum cell phase difference for wide-area scenarios, ±3 µs for local-area scenarios) as part of the authorization process.

> **Q26. Do you agree with adopting an uplink-favored frame structure (DSUUU, approximately 1:3 DL:UL) as the default for Private IMT deployments in both the 3.8–4.2 GHz and 24.25–25.5 GHz bands, reflecting the uplink-dominant nature of private-network traffic?**
>
> **Q27. Do you agree that downlink-favored or other alternative frame structures should be permitted only subject to a coexistence study and demonstrated operational need? Which uplink-intensive use cases in your sector should the default support, and what DL:UL ratio would best serve them?**
>
> **Q28. Do you agree with the proposed approach to timing synchronization (GNSS, PTP, or SyncE) and the application of 3GPP TS 38.133 accuracy requirements?**

6.4 Regulatory Control and Authorization

All spectrum assignments under this Framework shall:

- Be subject to TDRA authorization
- Be limited to the approved geographic scope, technical parameters, and assigned frequency blocks
- Comply with all applicable interference management and coexistence requirements
- Be recorded in the centralized TDRA spectrum database for transparency and traceability

The TDRA reserves the right to:

- Modify technical conditions to reflect evolving spectrum management priorities
- Impose additional operational requirements where necessary to protect existing services
- Restrict or revoke spectrum usage where necessary to ensure efficient spectrum utilization and protect existing services

> **Q29. Do you consider the proposed TDRA regulatory control mechanisms sufficient to ensure efficient spectrum management and protection of incumbent services?**

7. Spectrum Assignment Conditions

The TDRA shall impose specific conditions on spectrum assignments to ensure efficient utilization, effective regulatory oversight, and alignment with national spectrum management objectives.

Geographic Limitation

Assignments shall be geographically limited to clearly defined areas corresponding to the approved deployment, such as specific sites, campuses, or designated zones. Use of the assigned spectrum outside the authorized geographic boundaries shall require prior approval from the TDRA.

Time-Limited Authorization

Assignments shall be granted on a time-limited basis, for a defined duration specified in the authorization. Any renewal or extension shall be subject to review, taking into account compliance with applicable conditions, continued operational need, and overall spectrum availability.

Technical and Operational Compliance

Authorized users shall comply with all applicable technical and operational conditions, including power limits, emission requirements, and interference management measures as determined by the TDRA. Non-compliance shall result in regulatory enforcement actions.

Spectrum Utilization

Spectrum that is not utilized within a reasonable timeframe, or that remains unused or inefficiently used, may be withdrawn, reassigned, or re-farmed by the TDRA to ensure optimal use of spectrum resources.

Ongoing Monitoring

The TDRA reserves the right to monitor compliance on an ongoing basis and to take appropriate action to enforce these conditions.

7.1 Spectrum Allocation Limits

The TDRA may define indicative spectrum allocation ranges to support private networks. Such ranges are for guidance only and do not constitute fixed rights. Any spectrum limits remain non-binding and may be revised, suspended, or withdrawn in line with market developments, national priorities, and coexistence requirements. The TDRA may also make additional spectrum bands available in the future, where necessary, to support private network demand. **Assignments shall be considered on a case-by-case basis, and the TDRA retains full discretion to adjust spectrum access conditions to ensure efficient use and alignment with national objectives.**

> **Q30. Do you agree with the use of non-binding spectrum allocation ranges, or should minimum and/or maximum spectrum caps be defined?**

8. Application Process

Applications shall be submitted through the TDRA online portal, in accordance with the prescribed procedures and documentation requirements.

All applications shall be subject to administrative and technical review, including verification of completeness and assessment of technical feasibility. Where applicable, applicants shall provide detailed interference analysis and any supporting studies required to demonstrate compatibility with existing and planned spectrum use.

Authorizations shall be granted following successful completion of the technical evaluation and confirmation of compliance with all regulatory requirements, including the settlement of applicable fees.

Applications will normally be processed on a first-come, first-served basis, without prejudice to spectrum availability or other regulatory considerations.

9. Fees and Charges

(Refer to Spectrum Fees Regulations.)

Fees shall be based on a **cost-recovery principle**, including:

- Application fees
- Annual spectrum usage fees

Annual fees may consider the following factors:

- Spectrum bandwidth
- Geographic area of deployment

Q31. Do you agree with a cost-recovery pricing approach, and which pricing model do you prefer (flat fee or formula-based)? Additionally, which factors should determine pricing (e.g., bandwidth, area, use case, frequency band)?

Q32. Should incentives or reduced fees be offered for private IMT networks?

10. Monitoring and Enforcement

The TDRA shall:

- Monitor compliance and spectrum usage
- Conduct audits and inspections
- Enforce penalties in case of violations

Q33. Do you consider the proposed monitoring and compliance mechanisms sufficient, or should real-time/automated monitoring be introduced, and what enforcement measures should apply in cases of non-compliance?

11. Numbering and Identification

The TDRA shall establish a flexible and controlled approach for the assignment and management of numbering resources associated with private networks, ensuring alignment with the National Numbering Plan and avoiding unnecessary resource allocation.

As a general principle, private networks shall not be assigned public numbering resources unless explicitly required by the nature of the service. The following framework shall apply:

11.1 MNO-Led Private Networks

For private networks deployed through licensed public operators, normally a single PLMN ID shall be assigned to each licensed Mobile Network Operator (MNO) for the provision of private network services.

Such PLMN ID shall be used to support multiple private network deployments under the operator's authorization, including across different enterprise customers, sites, or use cases.

The MNO shall be responsible for managing and segmenting these deployments within its network, ensuring appropriate separation, security, and quality of service in accordance with applicable regulatory and technical requirements. The use of a shared PLMN ID is intended to promote efficient utilization of numbering resources, avoid unnecessary proliferation of identifiers, and maintain consistency with national and international practices.

11.2 Directly Authorized Private Networks

For directly authorized private networks, the TDRA may allocate dedicated PLMN identifiers where justified. This may include the assignment of Mobile Network Codes (MNCs) under the national Mobile Country Code (MCC) 424. The use of 3-digit MNCs may be introduced, subject to regulatory approval, to support scalability and future demand.

Alternative approaches, including the use of non-geographic identifiers (e.g., MCC 999 with structured MNC allocation), may also be considered, subject to further regulatory determination. The TDRA shall maintain a centralized database of all assigned identifiers to prevent conflicts and ensure coordination.

11.3 Public Numbering Resources

In principle, private networks are not expected to require traditional public numbering resources. However, where specific use cases necessitate numbering (e.g., M2M or IoT applications), such requests shall be assessed on a case-by-case basis. Any allocation shall be subject to existing numbering policies, system availability, and potential revisions to block size structures where justified.

Interconnection with public networks and the use of voice or other public numbering resources shall not be permitted by default. The TDRA reserves the right to define applicable fees, including application and renewal charges, and to revise such fees in line with the broader authorization framework.

This framework shall remain adaptive and subject to future review, particularly in light of evolving private network use cases, numbering demand, and international best practices.

> **Q34. Do you agree with the proposed identification approach for private networks (e.g., single PLMN ID per MNO, enterprise use of PLMN/MNC), and are there any limitations?**
>
> **Q35. Do you agree with restricting the use of public numbering resources, and in which use cases would numbering be required?**

12. General Questions

The TDRA welcomes additional views and recommendations from stakeholders on the following matters:

> **Q36. What regulatory changes would accelerate adoption?**
>
> **Q37. What spectrum bands should be considered in the future?**
>
> **Q38. What security or compliance obligations should be imposed?**
>
> **Q39. Any additional comments or recommendations?**

— End of Framework Document —

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