



**Information & Communication Technologies Authority**

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**RESPONSE TO CONSULTATION PAPER ON MAKING AVAILABLE ADDITIONAL  
SPECTRUM FOR IMT**

**07 NOVEMBER 2024**

## **BACKGROUND**

The ICT Authority (ICTA) released, on 23 August 2024, a consultation paper on **“Making available additional spectrum for IMT”**. The consultation paper was released on 23 August 2024 and stakeholders were invited to submit their responses. The ICTA received comments, by 19 September 2024, from five respondents, namely:

- (a) Emtel Ltd.
- (b) Huawei Technologies (Mauritius) Co. Ltd.
- (c) QUALCOMM International, Inc.
- (d) Mahanagar Telephone (Mauritius) Ltd.
- (e) Cellplus (Mobile) Communications Ltd.

The present paper provides the complete responses or a summary of the responses received to the different questions raised in the consultation paper, including general comments from respondents. The views of the ICT Authority with respect to the responses are also provided at the end of each series of questions.

## **OBJECTIVES OF CONSULTATION PAPER**

The ICTA, through its consultation paper, aimed to engage mobile network operators in shaping a robust Network Spectrum Roadmap for Mauritius. Through this consultation, and by collaborating with industry stakeholders, the ICTA aims to create a regulatory framework that supports sustainable growth in Mauritius’ mobile telecommunications sector. Our goal is to align spectrum resources with national development objectives and international best practices.

The ICTA shall follow up on the priorities established from the responses received and carry out further discussions with stakeholders to implement the outcomes of this consultation.

The following section summarises the responses received to the questions raised in the consultation paper.

## FREQUENCY BANDS CURRENTLY USED FOR TERRESTRIAL MOBILE SERVICE IN MAURITIUS

### A. 900 MHz and 1800 MHz bands

The ICTA issued a Decision on 23 June 2017 where it was decided that the 900 MHz band will be fully IMT upon GSM switch-off.

(note: DECT phones being used in 1880-1900 MHz)

Q1 Do you foresee a phase-out of GSM operations in the 900 MHz and 1800 MHz band? If so, what is the anticipated timeline and factors that will influence such decision? Operators are requested to provide us with an indication of the number of active GSM-only clients on your network.

Stakeholder	Remarks
Emtel	<p>Emtel notes that though the trend of active GSM-only clients on its network has been on a steady decline, there remains a non-negligible segment of its customer base using GSM-only devices. The reluctance of GSM-only users to upgrade their devices, often due to lack of awareness or affordability, is a significant barrier to the planned GSM shutdown.</p> <p>The phase-out of GSM services in the 900 MHz and 1800 MHz bands could significantly impact the operation of devices such as Point-of-Sale (POS) machines, monitoring systems, ATMs and CEB smart meters, particularly in areas where alternative technologies are not yet fully deployed. Emtel highlights that transition to 4G-capable POS machines and other similar devices has been relatively slow.</p> <p>Emtel suggests that the timeline for phase-out should align with market readiness and the transition to more modern technologies for commercial and consumer devices to ensure minimal disruption. A phased approach involving the phase-out of GSM operations in the 1800 MHz band followed by the 900 MHz band is advocated to allow sufficient time for stakeholders to adapt, minimize service interruptions, and facilitate a smoother transition.</p> <p>No of active devices: Estimate has been provided.</p>
MTML	<p>MTML anticipates GSM and UMTS phase-out in the 900MHz band in the next 3-4 years.</p> <p>There are currently approximately 7000+ users still on GSM network.</p> <p>The final timeline for GSM/UMTS shutdown will be influenced by the rate of VoLTE adoption, resolution of handset compatibility issues and migration of M2M equipment/applications to LTE/5G.</p>

Cellplus	<p>Cellplus Ltd anticipates a gradual phase-out of GSM operations in both the 900 MHz and 1800 MHz bands by the end of 2026. Currently, Cellplus Ltd serves 113,842 2G customers inclusive of M2M devices, which accounts for approximately 12% of its total user base.</p> <p>Several factors will influence this decision:</p> <ol style="list-style-type: none"> <li><b>1. Customer Migration:</b> A significant portion of customers still rely on GSM-only devices. Its approach will focus on facilitating the migration of these customers to LTE and 5G-compatible devices. Cellplus anticipates that with continued customer education and the availability of affordable devices, the majority of GSM users will transition within the next 2 years.</li> <li><b>2. Device Ecosystem:</b> The availability and affordability of LTE/5G devices are critical. As the cost of these devices decreases, Cellplus expects an acceleration in customer migration away from GSM.</li> <li><b>3. Regulatory Guidelines:</b> Cellplus believes that the process of phase-out of GSM should be driven by the ICTA, to ensure alignment across all operators. An ICTA led initiative will maintain a level playing field amongst all operators.</li> <li><b>4. Operational Costs:</b> The costs associated with maintaining legacy GSM networks will continue to rise as the user base diminishes. This will be a key driver in moving towards the shutdown of GSM services.</li> </ol> <p>Cellplus Ltd is targeting a complete GSM phase-out by 2026, aligning with the anticipated technological advancements and market readiness for LTE and 5G networks.</p>
Qualcomm	<p>The re-use of modern technologies, such as 4G at 850 MHz, 900 MHz, and 1800 MHz is now possible and broad support exists for 4G devices to operate in these frequency bands worldwide. Planning and announcing the 2G shutdown will not only drive 4G/5G migration but will encourage the largest M2M users who still use 2G modules to work on this migration.</p>

Q2 Provide an indication of any new technology to be used in these band? If yes, what is the estimated timeframe and constraints, if any, for deployment?

Stakeholder	Remarks
Emtel	Emtel foresees the 900 MHz and 1800 MHz bands to be used for LTE/5G to improve the network coverage and capacity.
MTML	Presently 1800MHz band is already in use for LTE services, and will continue for further period. Refarming of 900MHz bands can be considered for LTE services for improved capacity and coverage.

Cellplus	<p>Cellplus Ltd plans to repurpose the 900 MHz and 1800 MHz bands for LTE and 5G technologies following the phase-out of GSM operations.</p> <p><i>Estimated Timeframe:</i></p> <ul style="list-style-type: none"> <li>• <b>LTE Expansion:</b> As GSM services are gradually phased out, it will increase the bandwidth of LTE, particularly in the 1800 MHz band, aiming for full deployment by the end of 2026.</li> <li>• <b>5G Deployment:</b> The 900 MHz band will be partially allocated to 5G services to enhance coverage, especially in areas where higher frequency bands may be less effective for indoor coverage and the additional bandwidth will be used to enhance 5G capacity. It anticipates utilisation by the end of 2027.</li> </ul> <p><i>Constraints:</i></p> <ul style="list-style-type: none"> <li>• <b>Customer Migration:</b> The primary constraint is the migration of existing 2G customers to newer technologies.</li> <li>• <b>Regulatory Approval:</b> Any changes in spectrum usage will require approval from ICTA. This includes ensuring alignment with other operators to avoid any interference or competitive imbalances.</li> </ul>
Qualcomm	<p>All low band frequencies will, over the next decade or so, be re-farmed for use by 5G. Approximate timelines for deployment will depend largely on the existing infrastructure and spectrum allocation plans for different countries.</p> <p>Challenges or constraints related to deploying newer technologies may arise if regulators do not sufficiently prepare for the transition.</p>

Q3 Do you think that the 900 MHz band should be combined with higher band spectrum?

Stakeholder	Remarks
Emtel	Emtel recommends that decisions regarding the implementation of any spectrum combinations be left to individual operators in line with the technical feasibility, device compatibility, and overall impact on network performance based on their specific operational needs and user base.
MTML	MTML is presently using 800MHz & 1800MHz for LTE carrier aggregation. Similarly, 900 MHz band can also be considered for carrier aggregation for providing LTE/5G services in future.
Cellplus	Integrating the 900 MHz band into the 5G spectrum portfolio will be essential in achieving a balanced, high-performance network that meets the growing needs of all its customers. This strategic use of the 900 MHz band will ensure that Cellplus Ltd can deliver on the promise of 5G, providing both broad coverage and the advanced capabilities required for next-generation services.
Qualcomm	It is vital to ensure that MNOs have access to a broad portfolio of spectrum in the low-, mid-, and high-bands. A mix of low-, mid-, and high-band spectrum is crucial to meet 5G capacity and coverage requirements and to accelerate the adoption of more innovative and efficient technologies in Mauritius.

Additional questions to Mobile Network Operators

Q4 What are your plans regarding UMTS and/or LTE operations in the 900 MHz and 1800 MHz band?

Stakeholder	Remarks
Emtel	LTE is currently deployed on the 900 and 1800 MHz bands. While there are no immediate plans to change the current configuration, the 900 MHz band could be fully utilized for LTE following the GSM shutdown. Emtel also recognizes the potential of these bands for future 5G deployment and may consider reallocating them to 5G depending on business requirements and the evolving needs of its customers.
MTML	UMTS operation in 900 MHz Band will continue for at least 3-4 Years. LTE operations in 1800 MHz band will continue and no closure timeline can be given as of now.
Cellplus	<p>Cellplus Ltd will continue to operate UMTS in the 900 MHz band, especially following the removal of UMTS from the 2100 MHz band in 2025. However, as customer demand for high-speed data services continues to grow, Cellplus plans to gradually phase out UMTS operations in this band by the end of 2026. The spectrum currently used for UMTS will then be repurposed for 5G services to meet the increasing demand for advanced mobile broadband.</p> <p>LTE is extensively deployed in the 1800 MHz band, and this will remain a crucial band for LTE services. Following the cessation of GSM operations after 2026, Cellplus will further optimize the use of this spectrum for LTE.</p> <p>These plans align with its broader strategy to optimize spectrum utilization, enhance network performance, and deliver high-quality mobile broadband services to its customers.</p>

**ICTA views with respect to questions Q1 to Q4**

*It is observed that while the 3 operators expect to shut down their GSM operations, they have different timelines for the completion of GSM phase-out. More information regarding 2G-only and 3G-only devices currently in operation on respective networks would be required from Mobile Network Operators (MNOs).*

*The Authority, after consulting with mobile operators and other stakeholders, will determine the most practical date for the sunset of GSM services. Once this date is established, the Authority will proactively issue directives and notify all stakeholders in a timely manner. This will ensure that the importation of GSM-only equipment will cease prior to the phase-out date. Necessary changes will also be made to the Clearance regulations.*

*MNOs will be required to provide a detailed timeline for their planned GSM switch-off. The said timeline shall comprise of information including:*

- a) changes to network*
- b) equipment acquisition*
- c) communication campaign*

d) customer support

The ICTA notes that the 900 MHz and 1800 MHz will continue to be used for provision of existing GSM and UMTS services until their switch-off. The said services will gradually be replaced by LTE and 5G. MNOs will recall that the ICTA already laid the basis for technology neutrality in its ICTA Decision of 23 June 2017, where it was decided that the 900 MHz band will be fully IMT upon GSM switch-off.

The ICTA is of the view that the operators are in the best position to make optimal use of frequencies assigned to them for deployment of their networks and provision of services. While the MNOs are in favour of LTE and eventually 5G replacing legacy technologies, the proposed timeframe for sunseting is yet to be established for all. The constraints identified are:

- a) availability of VoLTE devices
- b) migration of customers from legacy technologies to new ones at an affordable price
- c) network readiness to support VoLTE and to absorb the subscribers' change in technology

An MNO would need a clear communication campaign to inform its customers of technology shutdown and alternative solutions available.

## B. 2100 MHz band

Q5 Do you foresee continued operations of UMTS in the 2100 MHz band? If yes, for how long?

Stakeholder	Remarks
Emtel	Emtel anticipates that UMTS operations in the 2100 MHz band will continue at least until 2027. This extension will support existing 3G customer base while Emtel transitions to widespread VoLTE adoption, which will eventually support traditional voice service.
MTML	MTML is considering UMTS Shutdown in 2100 MHz band in next 2 years. The Traffic to be gradually migrated to UMTS in 900 MHz or to VoLTE.
Cellplus	<p>Cellplus Ltd anticipates continuing UMTS operations in the 2100 MHz band till end of 2025. However, it recognizes that the demand for higher data speeds and more advanced services is steadily increasing, leading to a gradual decline in the need for UMTS and more customers are using LTE and 5G-compatible devices.</p> <p><i>Planned Timeline:</i></p> <ul style="list-style-type: none"><li>• <b>Short to Medium Term (2024-2025):</b> Cellplus Ltd plans to maintain UMTS services in the 2100 MHz band until 2025, ensuring a reliable 3G network for customers who have not yet transitioned to LTE or 5G. By mid of 2025, it anticipates a phased reduction in UMTS operations within this band, with complete decommissioning by the end of 2025.</li></ul>

Cellplus	<ul style="list-style-type: none"> <li>• <b>Long Term (Post-2025):</b> Beyond 2025, Cellplus Ltd will cease UMTS operations in the 2100 MHz band. The spectrum will be repurposed for LTE services to better meet the growing demand for high-speed data and enhanced mobile broadband. For 2026, UMTS operations will be limited to the 900 MHz band, providing additional time for customers to upgrade their devices and transition to more advanced technologies.</li> </ul> <p>This strategy ensures a smooth transition for customers while allowing Cellplus Ltd to optimize the 2100 MHz band for more advanced network services, in line with evolving technology trends and user needs.</p>
Qualcomm	UMTS operations will most likely give way to newer, more efficient technologies including 5G. This will allow MNOs to deliver more data at higher speeds in the same allotment of spectrum. Existing mid-bands including the 1800 MHz, 2100 MHz and 2600 MHz bands will eventually be re-farmed for use by 5G.

**Q6** Do you eventually foresee a phase out of UMTS operations in the 2100 MHz band?  
If so, what is the anticipated timeline and factors that will influence such decision?

Stakeholder	Remarks
Emtel	Emtel foresees a phase out of UMTS in the 2100 MHz band in the next 3 years, driven by the declining use of 3G services and to accommodate growing data demands. The exact timeline for the phase-out of UMTS will be influenced by industry developments and the transition to LTE/5G devices and widespread adoption of VoLTE services. Emtel recommends that the regulatory authority should consider measures to support the phase out of 3G-only devices, including stopping the issue of type approvals to dealers for the import of GSM/GPRS/3G only phones.
MTML	MTML is considering UMTS Shutdown in 2100 MHz band in next 2 years.
Cellplus	<p>Yes, Cellplus Ltd foresees a complete phase-out of UMTS operations in the 2100 MHz band by the end of 2025. This decision is driven by several key factors:</p> <p><b>Anticipated Timeline:</b></p> <ul style="list-style-type: none"> <li>• <b>2024-2025:</b> During this period, Cellplus Ltd will gradually reduce UMTS operations in the 2100 MHz band, with the goal of fully decommissioning the service by December 2025.</li> </ul> <p><b>Factors Influencing the Decision:</b></p> <ol style="list-style-type: none"> <li>1. <i>Increasing Demand for High-Speed Data:</i> As more customers adopt LTE and 5G technologies, the demand for UMTS services is declining. The shift towards faster, more efficient networks is a natural progression, making UMTS less relevant in the current market.</li> <li>2. <i>Spectrum Optimization:</i> The 2100 MHz band is a valuable resource that can be better utilized for LTE or future 5G services, which offer superior performance and capacity. Repurposing this spectrum aligns with the strategy of Cellplus to optimize network efficiency and meet the growing demand for high-speed mobile broadband.</li> </ol>



	<p>3. <i>Device Evolution</i>: The widespread adoption of LTE and 5G-compatible devices is reducing the need for UMTS support. As customers continue to upgrade their devices, the necessity for maintaining a 3G network diminishes.</p> <p>4. <i>Regulatory Alignment</i>: Cellplus recommends that the phase-out to be led by the ICTA thus ensuring a smooth transition.</p>
Qualcomm	See answer in Q5.

Q7 Do you foresee any new technology to be used in this band? If yes, what is the estimated timeframe and constraints, if any, for deployment?

Stakeholder	Remarks
Emtel	Emtel foresees a full refarming of the 2100 MHz band to LTE and 5G NR in future. The exact timeline will be influenced by industry developments and regulatory decisions (such as opening of the 2100 MHz band for 5G), which will provide further clarity as the transition progresses.
MTML	Refarming of 2100MHz bands can be considered for LTE services for improved capacity.
Cellplus	<p>Cellplus Ltd plans to deploy LTE and potentially 5G technology in the 2100 MHz band after the phase-out of UMTS operations by the end of 2025.</p> <p><b>Estimated Timeframe:</b>  <i>2026 Onwards</i>: Following the complete phase-out of UMTS by the end of 2025, Cellplus Ltd intends to repurpose the 2100 MHz band for LTE services. The deployment of 5G in this band will be considered as part of Cellplus's broader 5G expansion strategy, depending on market demand and technological advancements beyond 2030.</p> <p><b>Constraints:</b></p> <p>1. <i>Device Compatibility</i>: One of the key constraints is ensuring that customer devices are compatible with LTE or 5G in the 2100 MHz band. Some customers will need to upgrade their devices, which requires adequate time and support.</p> <p>2. <i>Customer Transition</i>: Ensuring a smooth transition for customers currently using UMTS services is a priority. This will involve targeted communication and assistance programs to encourage customers to upgrade to LTE/5G-compatible devices.</p>
Qualcomm	See answer in Q2.

**ICTA views with respect to questions Q5 to Q7**

The ICTA in its Decision of 21 August 2018 opened the 2100 MHz band for operation of IMT, including IMT-Advanced, thereby setting the basis for technological neutrality in the said frequency band.

From the mixed responses received, it appears likely that UMTS will remain into operation for the next coming years. All stakeholders foresee a shutdown of UMTS before GSM, possibly by 2027.

The constraints identified are:

- availability of compatible devices
- migration of customers from legacy technologies to new ones at an affordable price
- network readiness to support and absorb the subscribers' change in technology.

Given that there is no common sunseting date, the ICTA plans to follow a similar process as for GSM shutdown. An MNO would need a clear communication campaign to inform its customers of technology shutdown and alternative solutions available.

**C. 800 MHz, 2600 MHz and 3500 MHz bands**

Q8 Do you foresee any new technology to be used in any of these bands? If yes, what is the estimated timeframe and constraints, if any, for deployment?

Stakeholder	Remarks
Emtel	Emtel anticipates a progressive refarming of the 2600 MHz band to prioritize NR, depending on regulatory decisions regarding the full allocation of this band for 5G deployment. Emtel's timeline for this refarming will align with updates from regulatory authorities and market demands. Emtel wishes to raise concerns about potential interference with existing satellite communications in the 3.5 GHz band. It recommends that the Authority facilitates coordination between operators to mitigate interference with C-Band satellite services.
MTML	800 MHz already used for LTE and 2600 MHz and 3500 MHz band is allocated for 5G services in Mauritius. These bands will continue to be important for 5G and further next generation mobile technologies.
Cellplus	Existing service are to be maintained in 800 MHz and 3.5 GHz bands. The 2600 MHz band will not be considered for new technology deployment at this time.  <i>800 MHz constraint:</i> Requests to reconsider constraint on limit for site height to be above 15m. <i>3.5 GHz constraint:</i> Cellplus Ltd currently has access to 100 MHz of spectrum in this band (3500 to 3600 MHz). The remaining 100 MHz (3400–3500 MHz) is not in use currently. Cellplus Ltd had successfully tested carrier aggregation with these two contiguous carriers and suggest that the ICTA consider reallocating this portion to Cellplus Ltd and allocate the new bands (3.3GHz or 3.6GHz) to the other operator. This would allow Cellplus Ltd to meet the future surge in data demand and fully leverage 5G's potential.

Qualcomm	See answer in Q2.
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**ICTA views with respect to question Q8**

*MNOs have been assigned frequencies in the 800 MHz, 2600 MHz and 3.5 MHz bands. The views and concerns of MNOs are well noted and may be taken up during further consultative meetings.*

*As per Amended Decision of 15 April 2021, any further assignment in the 2.6 GHz band is subject to Emtel switching off of its LTE / LTE-Advanced network and surrendering the 40 MHz of spectrum currently being used.*

*The purpose of this consultation exercise is to make available additional spectrum to MNOs for IMT on a technology neutral and equitable basis. To note that 100 MHz in the 3.4-3.5 GHz band is currently assigned to MTML.*

**FREQUENCY BANDS CONSIDERED FOR ALLOCATIONS IN THE NEAR FUTURE**

Table 1

Range	IMT bands	Remarks
Below 1 GHz	700 MHz (UL: 698-718 MHz; DL: 753-773 MHz)	As per consultation in 2018, 20 MHz duplex in FDD mode available. Possibility to allocate further 20 MHz.
Mid-band	2.3 GHz (2.3-2.4 GHz)	100 MHz TDD
	3.3 GHz (3.3-3.4 GHz)	100 MHz TDD
	3.6 GHz (3.6-3.8 GHz)	200 MHz TDD to be assigned in blocks of 100 MHz

The ICTA has earmarked the above-listed frequency bands for the next spectrum assignment exercise.

**Q9** Please provide indications of industry interest in the allocation of long-term rights in the above bands, as well as planned services, and target market segments for the use of each of these bands.

Stakeholder	Remarks
Emtel	Based on Emtel’s evaluation and potential use cases, there is strong interest in the future allocation of these bands. <b>2300 MHz</b> a. <i>Interest Level:</i> High b. <i>Planned services:</i> This band is considered for providing additional capacity for LTE and 5G services, subject to the full 100 MHz allocation. It offers a balance

	<p>between coverage and capacity thus making it useful for expanding its current 5G coverage and improving service quality. It can also be used to support emerging applications.</p> <p>c. <i>Target Market Segments:</i> 5G MBB and FWA services</p> <p><b>700 MHz</b></p> <p>a. Interest Level: High</p> <p>b. <i>Planned Services:</i> This band could potentially be used for low frequency LTE/5G coverage to extend the coverage and improve the indoor penetration. However, the viability and effectiveness of the 700 MHz will largely depend on the bandwidth that is allocated to Emtel in order to meet its service goals.</p> <p>c. <i>Target Market Segments:</i> MBB users in rural and poorly covered regions, IoT services.</p> <p><b>3.3 GHz (3.3-3.4 GHz)</b></p> <p>a. <i>Interest Level:</i> Moderate</p> <p>b. <i>Planned Services:</i> This band may serve as a complementary band to Emtel’s 5G 2600 MHz band for additional capacity and to provide 5G services in hotspot areas with high user density or signification data demand such as city centers, malls and metro stations. However, due to concerns regarding interference with existing satellite communications, it will require careful management to mitigate interference.</p> <p>c. <i>Target Market Segments:</i> 5G MBB and FWA users, urban hotspot areas.</p> <p><b>3.6 GHz (3.6-3.8 GHz)</b></p> <p>a. <i>Interest Level:</i> Moderate</p> <p>b. <i>Planned Services:</i> This band can potentially be used for 5G services, however, this frequency range is close to the C-band used by satellite services, particularly for satellite communications in the 3.7 to 4.2 GHz band. There is a risk of interference between 5G operations and satellite communications, which could affect satellite TV, broadband, and other critical satellite services.</p> <p>c. <i>Target Market Segments:</i> 5G MBB and FWA users, urban hotspot areas.</p>
MTML	<p>Operators and regulators worldwide are increasingly recognizing the importance of these band for 5G, and we can expect to see growing deployment in the coming years. However, successful utilization will require support from the device ecosystem.</p> <p>Further MTML foresees 700MHz band utilization for 5G deployment, particularly for achieving wide-area coverage and improving indoor penetration. While it may not offer the high capacities, it plays a crucial role in creating a balanced and comprehensive 5G network architecture.</p>
Cellplus	<p><b>700 MHz Band:</b></p> <p>1. <i>Planned Services:</i> This band can be utilized for 5G services to provide extensive coverage, especially in rural and underserved areas where lower frequency bands offer better propagation characteristics.</p> <p>2. <i>Target Market Segments:</i> Rural, as well as urban users requiring robust indoor coverage.</p>

	<p><b>2.3 GHz Band:</b></p> <p>1. <i>Planned Services:</i> Cellplus Ltd considers the 2.3 GHz band as a potential future asset. Cellplus will assess the possibility of utilizing this band as traffic trends evolve and the demand for higher throughput and new applications arises. The band could be earmarked for expanding future 5G services, focusing on areas requiring increased capacity and better data throughput.</p> <p>2. <i>Target Market Segments:</i> High-density urban areas, commercial zones, and industrial parks where demand for high-speed data and reliable connectivity is highest. This band can support enterprise solutions and enhanced mobile broadband for both consumer and business markets.</p> <p><b>3.3 GHz &amp; 3.6 GHz Bands:</b></p> <p><i>Planned Services:</i> Cellplus Ltd is currently operating 5G services in the 3.5 GHz band. The 3.4 GHz band is of higher interest to MT to achieve 5G advance.</p> <p><i>Long-Term Vision:</i></p> <p>Cellplus Ltd views the long-term allocation of the 3.5 GHz band as more convenient compared to the above-mentioned bands as essential for sustaining its growth and meeting the increasing demand for mobile data services. The strategy of Cellplus involves leveraging this frequency band to create a seamless, high-capacity network that can support the future of emerging technologies and services that will drive the digital economy in Mauritius.</p>
Huawei	<p>Frequency bands below 1 GHz offers both coverage and capacity to help bridge the "digital gap" between sparsely-populated and densely-populated areas and to increase universal service and access. Low-band spectrum offers blanket coverage because it enables MNOs to provide comprehensive coverage and serve many customers with just a few towers. Low-band spectrum also allows the mobile signal to penetrate windows and walls. Therefore, bands below 1 GHz are of primary interest for mobile services.</p> <p>Mid band spectrum offers a middle ground between performance and coverage – higher speeds than the Low-Band and better coverage than the High-Band. Mid-bands are ideal for metropolitan areas. They are well suited to provide 5G FWA in population clusters such as towns and smaller urban areas, especially where other options are expensive or unavailable. Mid-bands complement lower bands (e.g. sub-1 GHz), which are useful for rural and remote areas where populations are more spread out, and mmWave bands, which can provide access in more densely populated areas with the very fastest 5G speeds.</p> <p>Huawei has also provided statistics from Global mobile Suppliers Association (GSA) to indicate that, as at January 2024, there were a number of devices supporting LTE and 5G NR on the low frequency bands as well as in the mid frequency bands up to 3.7 GHz</p>
Qualcomm	<p>The 700 MHz band can be leveraged for both LTE and 5G deployments, depending on an operator’s business model.</p> <p>Qualcomm also strongly supports the use of the C band (3.3-3.8 GHz) and its extension (3.8-4.2 GHz) for mobile services. Considering the existing support from manufacturers and mobile operators, as well as international trends and existing</p>

	<p>harmonization, the full C band, including 3.8 GHz to 4.2 GHz, should be prioritized for release in Mauritius.</p> <p>There have been extensive studies of IMT deployment in the C band and the potential for coexistence with other services, including the FSS. ITU studies of compatibility between IMT and FSS can be found in Report ITU-R S.2368.</p> <p>As per the GSA, as at July 2024, the largest ecosystems of announced 5G devices are in the 3GPP bands n78 (3.3-3.8 GHz), n41 (2.496-2.690 GHz), n1(2.1 GHz) and n77(3.3-4.2 GHz) respectively.</p>
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Q10 Are there any co-existence issues with other services or bands that need to be addressed?

Stakeholder	Remarks
Emtel	<p>The presence of adjacent broadcasting band (470-694 MHz) would be a concern for co-existence with IMT technologies in the 700 MHz band. Emtel suggests that the Authority define a testing methodology and conduct testing in coordination with stakeholders as outlined in the response to the consultation paper on the opening of 700 MHz and 800 MHz bands for IMT Advanced (Ref: ICTA/01/19/RES) to ensure that the 700 MHz band is free from interference with the DVB-T service. Ideally, the 700 MHz band has to be cleared of DVB-T, considering the cost element of providing filters that will have to be borne by operators.</p> <p>In the consultation paper (Ref: ICTA/01/18,) the Authority also highlighted that it has started to issue licenses to operate PMSE devices in the 470 – 862 MHz band. The Authority maintained a proposal to give prior notice to PMSE users to retune their devices in view of the opening of the 700 MHz band for mobile services is maintained. Emtel recommends the Authority enforces this in order to avoid any potential interference.</p>
MTML	<p>3.6MHz to 3.8MHz band if used for IMT services will impact satellite operation in C-band. MTML is using satellite services from Intelsat in C-Band, which is operating in this proposed band. This will cause interference and impact MTML’s existing satellite service operations.</p>
Cellplus	<p><b>700 MHz:</b> As per Cellplus, the Broadcasting services need to be migrated first. There is the need to take appropriate measures to mitigate potential interference issues.</p> <p><b>2.3 GHz:</b> They may be possible issues for co-existence with services in adjacent bands. Same may be resolved by spectrum reallocation for existing services and via the use of appropriate guard bands and filters.</p> <p><b>3.3 GHz &amp; 3.6 GHz:</b> Potential interference from adjacent band services may be resolved via use of appropriate guard bands and filters.</p>

Huawei	<p>Huawei recommends to allocate the 700 MHz band with the lower duplexer, as used in Europe and other African countries. This is a 2x30 MHz FDD band-plan which would avoid the overlap with the 800 MHz band.</p> <p>In Mauritius, the frequency band 3 300-3 400 MHz is identified for the implementation of IMT subject to RR FN No 5.429B. Huawei understands that this band is currently unused in Mauritius hence there should not be any co-existence issues.</p> <p>In Mauritius, the frequency band 3 600-3 800 MHz is identified for IMT subject to RR No. 5.434B. This band is traditionally used for the Fixed Satellite Service downlink. Co-existence of IMT with FSS earth stations requires exclusion zones. The size of the zones needs to be determined on a case by case basis. However, calculation of the zones requires knowledge of the locations and characteristics of the earth stations. This may not be available in the case of VSAT stations. Alternatively, ICTA could require satellite users to migrate to the upper part of the satellite band (3800-4200 MHz).</p>
Qualcomm	<p>For the IMT bands mentioned in this section (700 MHz, 2.3 GHz, 3.3 GHz, and 3.6 GHz), it is unlikely that there would be any co-existence issues with other services or bands.</p> <p>Qualcomm has observed that the C band is less utilized by satellite services than previously, at least in the mass market. For example, broadband internet applications, including non-stationary earth stations (ESIMs and ESOMPs) have migrated to bands such as Ku and Ka. For the protection of the remaining uses of the C band by the fixed-satellite service, some administrations have implemented coordination mechanisms that include the installation of filters, the coordination of the distance of stations, and the establishment of a guard band between high-density public IMT networks and fixed-satellite service deployments.</p>

Q11 Should the 700 MHz band be allocated as a standalone, or coupled with higher band spectrum? Please provide the reasons in support of your answer.

Stakeholder	Remarks
Emtel	<p>Emtel is of the opinion that it is not necessary that the allocation of the 700 MHz band to be coupled with higher spectrum bands. Emtel recommends that the decision on spectrum combination should be left to the discretion of the operators. Each operator should have the flexibility to define the most suitable combination of bands to deploy with the 700 MHz band, if any, from their existing spectrum portfolio. This approach allows operators to optimize their network strategies based on their specific needs, customer demands, and technical capabilities, ensuring efficient and effective use of the 700 MHz band.</p>

MTML	Standalone. Presently the bandwidth costs in the higher bands are quite high, compared with the local business condition.
Cellplus	<p>Cellplus recommends that the 700 MHz band be coupled with Higher Band Spectrum for 5G</p> <p><i>Enhanced Coverage and Capacity:</i> Standalone 700 MHz Band: While the 700 MHz band is ideal for broad-area coverage and strong signal propagation, its bandwidth limitations may constrain data speeds and overall network capacity.</p> <p><i>Coupled with Higher Band Spectrum and 5G:</i> Integrating the 700 MHz band with higher frequency bands (e.g. 3.5 GHz) and leveraging 5G technology maximizes network performance. The 700 MHz band provides extensive coverage, while higher bands 5G deliver increased capacity, faster data speeds, and advanced network features. This combination ensures comprehensive service delivery across various regions. Cellplus Ltd can deploy technologies such as carrier aggregation and dynamic spectrum sharing.</p>
Huawei	<p>Linking 700 MHz band with higher band frequencies ensures that coverage and capacity is achieved in terms of Universal Access to Mobile Broadband. The higher band spectrum can be used to provide more capacity where it is required. If an operator only has its assignment in the 700 MHz band, it may find that if the band becomes congested, network capacity cannot be increased in the urban areas which the operator would normally rely on to make a profit to offset investments.</p> <p>Huawei does not advise that licences in 700 MHz are assigned in a bundle with licences in other bands.</p>
Qualcomm	See answer in Q3.

### Additional questions to Mobile Network Operators

Q12 What would be your interest in obtaining additional spectrum, for IMT downlink only, in the 738-758 MHz frequency band?

Stakeholder	Remarks
Emtel	Emtel would be interested to deploy LTE/5G technology in the 700 MHz band with a minimum allocation of 15 MHz in the frequency range 758 to 773 MHz. However, Emtel would like to emphasize the importance of ensuring that all potential interference issues are fully addressed to ensure a smooth deployment of LTE/5G technologies.
MTML	Yes.
Cellplus	<p>Cellplus Ltd is interested in obtaining additional spectrum in the 700 MHz frequency band for both downlink and uplink purposes.</p> <p><b>Uplink Requirements:</b></p> <ul style="list-style-type: none"> <li>• <i>Balancing Network Traffic:</i> Although traditionally downlink demand is higher, having additional spectrum for uplink in the 700 MHz band will help balance</li> </ul>



	<p>network traffic and improve overall network performance. This is especially important as the number of devices and applications requiring uplink capacity, such as IoT devices and real-time data services, continues to increase.</p> <ul style="list-style-type: none"> <li>• <i>Supporting Emerging Applications:</i> As new applications and services with substantial uplink requirements emerge, having access to additional uplink spectrum will be vital for maintaining service quality and accommodating future growth. This includes critical services that depend on low-latency and high-reliability uplink communications.</li> </ul> <p>Cellplus Ltd believes it is essential to obtain spectrum in the 700 MHz band for both downlink and uplink purposes. This approach will support real-time services and IoT devices by providing the necessary uplink capabilities while also leveraging the band's benefits for enhanced downlink coverage and performance.</p>
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Q13 Describe how the use of each of the above bands, as applicable, fits into your overall spectrum strategy and long-term vision?

Stakeholder	Remarks
Emtel	<p>The use of the above bands fits Emtel's overall strategy and long-term vision as follows:</p> <p><b>700 MHz Band:</b> This is in line with its strategy to ensure ubiquitous LTE/5G services across all regions, to address coverage gaps, and ensure reliable connectivity. The 700 MHz band will be fundamental for enhancing coverage, particularly in rural and suburban areas, and for improving indoor penetration.</p> <p><b>2.3 GHz Band:</b> The mid-band spectrum, including the 2.3 GHz band, is key to balancing coverage and capacity. This band will complement its existing 2600 MHz 5G spectrum holdings, enabling Emtel to enhance its network capacity and improve the user experience, particularly in high-density areas.</p> <p><b>3.3 and 3.6 GHz Bands:</b> These bands are of significant interest for future 5G deployments due to their capability to deliver ultra-fast data speeds, low latency, and high capacity in densely populated urban areas. These bands could be integral to Emtel's long-term vision of supporting advanced applications such as IoT, smart cities, and industrial use cases, and ensuring that its network is ready to meet future demands.</p> <p>However, Emtel's ability to fully leverage these bands will depend on effectively mitigating potential interference with existing satellite services and the allocated bandwidth.</p>
MTML	Please refer to response for Q8 & Q9
Cellplus	<p>Cellplus Ltd's spectrum strategy is designed to support its long-term vision of delivering high-quality, reliable, and innovative services that meet its customers' growing demands while driving Mauritius's digital transformation. The use of the below bands plays a crucial role in this strategy, as outlined below:</p> <p><b>700 MHz Band:</b></p>

	<p><i>Role in Strategy:</i> The 700 MHz band is integral to Cellplus’s plan for widespread 5G deployment, particularly in providing extensive coverage in rural and underserved areas.</p> <p><i>Long-Term Vision:</i> By leveraging the 700 MHz band, Cellplus Ltd aims to bridge the digital divide, regardless of location, and have access to high-speed mobile broadband.</p> <p><b>2.3 GHz Band:</b></p> <p><i>Role in Strategy:</i> This band can be utilized as traffic trends evolve and the demand for higher throughput and new applications arises potentially for future 5G deployments, particularly in high-density urban areas where additional capacity is needed.</p> <p><b>3.3 GHz to 3.6 GHz Bands:</b></p> <p><i>Role in Strategy:</i> These bands are critical for 5G operations. The 3.5 GHz band is already in use for 5G, and Cellplus Ltd is interested in additional spectrum in the 3.4 GHz to 3.5 GHz range to enhance 5G services.</p> <p><i>Long-Term Vision:</i> The goal of Cellplus is to position the 3.4 GHz band at the core of its 5G network, enabling us to deliver ultra-fast speeds, low latency, and high capacity by providing 5G advance. This will support a wide range of applications, from enhanced mobile broadband to industrial automation and smart infrastructure, driving Mauritius toward becoming a leader in the digital economy.</p>
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Q14 What technology would you be interested to deploy and how much bandwidth would you require for such deployment?

Stakeholder	Remarks																		
Emtel	<p>Emtel has provided its intention to deploy the specified technologies across the various IMT bands, along with the corresponding bandwidth requirements as follows:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Range</th> <th>IMT bands</th> <th>Technology</th> <th>Bandwidth</th> </tr> </thead> <tbody> <tr> <td>Below 1 GHz</td> <td>700 MHz (UL: 698-718 MHz; DL: 753-773 MHz)</td> <td>LTE/5G</td> <td>20 MHz</td> </tr> <tr> <td rowspan="3">Mid-band</td> <td>2.3 GHz (2.3-2.4 GHz)</td> <td>LTE/5G</td> <td>100 MHz*</td> </tr> <tr> <td>3.3 GHz (3.3-3.4 GHz)</td> <td>5G</td> <td>100 MHz*</td> </tr> <tr> <td>3.6 GHz (3.6-3.8 GHz)</td> <td>5G</td> <td>100 MHz*</td> </tr> </tbody> </table> <p>*Emtel is interested in acquiring 100 MHz band in either the 2.3 GHz, 3.3 GHz or 3.6 GHz band.</p>	Range	IMT bands	Technology	Bandwidth	Below 1 GHz	700 MHz (UL: 698-718 MHz; DL: 753-773 MHz)	LTE/5G	20 MHz	Mid-band	2.3 GHz (2.3-2.4 GHz)	LTE/5G	100 MHz*	3.3 GHz (3.3-3.4 GHz)	5G	100 MHz*	3.6 GHz (3.6-3.8 GHz)	5G	100 MHz*
Range	IMT bands	Technology	Bandwidth																
Below 1 GHz	700 MHz (UL: 698-718 MHz; DL: 753-773 MHz)	LTE/5G	20 MHz																
Mid-band	2.3 GHz (2.3-2.4 GHz)	LTE/5G	100 MHz*																
	3.3 GHz (3.3-3.4 GHz)	5G	100 MHz*																
	3.6 GHz (3.6-3.8 GHz)	5G	100 MHz*																
MTML	MTML would be interested in 700MHz and 2.3GHz band. The preference would be for 700MHz, for maximum bandwidth allocation.																		

Cellplus	<p>The specific technologies and bandwidth requirements are as follows:</p> <p><b>5G Technology:</b>  <i>Interest:</i> Cellplus Ltd is focused on expanding and enhancing its 5G network across Mauritius. 5G is crucial for enabling ultra-fast data speeds, low latency, and high capacity, which are essential for supporting advanced applications such as smart cities, IoT, augmented reality (AR), virtual reality (VR), and industrial automation.  <i>Bandwidth Requirement:</i> For optimal 5G deployment, Cellplus Ltd requires a minimum of an additional 100 MHz in the mid-band spectrum (3.4 GHz to 3.5 GHz range). Additionally, access to lower bands such as 700 MHz is essential for providing wide-area.</p> <p><b>4G Technology:</b>  <i>Interest:</i> While 5G is the future, LTE remains a vital technology for providing reliable mobile broadband services. Cellplus Ltd is committed to maintaining and optimizing its LTE network, particularly in the 800 MHz, 1800 and 2100 MHz bands, to ensure consistent coverage and high-quality service.</p>
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Q15 What would be the timeframe for deployment and start of service in each of the above bands?

Stakeholder	Remarks
Emtel	Emtel plans to deploy LTE/5G services in the 700 MHz band within the next 2-3 years. The commencement of service is expected to follow shortly after the allocation of spectrum and the necessary infrastructure upgrades. The deployment in the 2.3 GHz, 3.3 GHz, or 3.6 GHz mid-bands, with minimum 100 MHz of bandwidth for 5G, is planned within the next 3 years, contingent on network testing and device readiness.
MTML	The preference would be for 700MHz, which MTML can consider in next 2-3 years.
Cellplus	<p>Proposed timeframe for deployment and start of services in each band:</p> <p><b>700 MHz Band:</b>  <i>Timeframe for Deployment:</i> Deployment of services in the 700 MHz band is planned to commence after 2029, with island-wide coverage expected to be achieved within two years.  <i>Start of Service:</i> Commercial services are anticipated to be operational shortly after 2029, providing extensive coverage.</p> <p><b>2.3 GHz Band:</b>  <i>Timeframe for Deployment:</i> Cellplus Ltd will consider the 2.3 GHz band depending on the traffic growth and demand for additional throughput and may be anticipated for deployment post-2030, depending on market demand and regulatory developments.</p> <p><b>3.3 GHz and 3.6 GHz Bands:</b>  <i>Timeframe for Deployment:</i> The 3.5 GHz band is actively used for 5G services, with ongoing expansion and optimization. The 3.3 GHz and 3.6 GHz bands are not the</p>

	<p>primary focus for future 5G advancements, as the 3.4 GHz band is preferred for achieving 5G advanced capabilities.</p> <p><i>Start of Service:</i> 5G services in the 3.5 GHz band are already operational, with full nationwide deployment targeted for completion by the end of 2025. If the 3.4 GHz band is allocated, service activation could begin as early as mid-2025.</p>
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**Q16** What potential challenges do you anticipate in deploying and utilising each of the above frequency band, as may be relevant?

Stakeholder	Remarks
Emtel	<p>Emtel anticipates the following potential challenges in deploying and utilizing each of the above frequency bands:</p> <p><b>700 MHz Band:</b> The primary challenge in deploying the 700 MHz band involves clearing existing users, particularly the DVB-T service, to avoid any interference. This process will demand extensive coordination and considerable time and resources for testing prior to deployment. Additionally, there will be a need for substantial investment in new antennas, expanded board capacity, and possibly filters. It is also crucial that spectrum pricing is set at a level that does not become prohibitive, as excessive costs could hinder deployment and limit the benefits of utilizing this band.</p> <p><b>2.3 GHz Band:</b> Key challenges include device readiness and compatibility to be able to fully leverage its capabilities and maximize the benefits of this band. Additionally, there will be significant investment in new infrastructure, such as antennas and expanded board capacity.</p> <p><b>3.3 GHz and 3.6 GHz Bands:</b> Deploying 5G in these bands will require significant investment in network equipment upgrade. Another challenge is managing potential interference with existing services, such as satellite communications and aviation operations.</p>
MTML	<p>Please refer to response for Q10.</p> <p>MTML also wishes to highlight that a notable disparity exists between the bandwidth costs in higher frequency bands and the prevailing local business conditions. The expenses associated with acquiring and utilizing spectrum in these higher bands have reached levels that appear disproportionate when considered against the economic realities of the local market. This misalignment poses significant challenges for operators striving to deploy advanced services while maintaining financial viability. To address this issue and foster a more conducive environment for technological progress, it is imperative that the spectrum fees for these higher bands undergo a comprehensive review.</p>
Cellplus	<p><b>700 MHz Band:</b></p> <ul style="list-style-type: none"> <li>Ensuring minimal interference with existing services and adjacent bands may require careful planning and mitigation strategies.</li> <li>Upgrading existing RAN infrastructure to support 700 MHz operations.</li> </ul>

	<p><b>2.3 GHz Band:</b> The 2.3 GHz band has a relatively limited ecosystem, which may result in fewer device options.</p> <p><b>3.3 GHz and 3.6 GHz Bands:</b> Managing coexistence with existing services, particularly in adjacent bands, could lead to challenges in maintaining service quality and avoiding interference.</p>
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**Q17** How will such deployment impact your existing services and spectrum usage in other bands?

Stakeholder	Remarks
Emtel	Emtel expects the deployment of services in the 700 MHz band to complement its existing service services in other bands, especially to enhance the indoor coverage of its LTE/5G network.
MTML	700MHz and 2.3GHz band presents a valuable opportunity for 5G deployment, particularly or achieving wide-area coverage and improving indoor penetration.
Cellplus	<p><b>700 MHz Band:</b> Deployment in the 700 MHz band will complement existing LTE and 5G services, potentially reducing the load on higher frequency bands by offloading traffic and enabling more efficient DSS to balance the needs of both LTE and 5G.</p> <p><b>2.3 GHz Band:</b> While not a priority, if deployed, the 2.3 GHz band could serve as an additional capacity layer in highdensity urban areas, enhancing future 5G services.</p> <p><b>3.3 GHz and 3.6 GHz Bands:</b> Expanding into the 3.3 GHz and 3.6 GHz bands would improve the overall performance and capacity of 5G networks. It may also lead to a reallocation or reduction in reliance on lower bands (e.g., 1800 MHz) for LTE, as 5G becomes more dominant.</p>

**ICTA views with respect to questions Q9 to Q17**

All MNOs are in favour of opening of the frequency bands earmarked. MNOs have indicated their preferred frequency bands of operation and their priorities. Huawei and Qualcomm have stated that user and network devices are already available on the market in these bands.

The ICTA notes the interest expressed by MNOs and other stakeholders in the opening of the bands 700 MHz, 2.3 GHz, 3.3-3.4 GHz and 3.6-3.8 GHz in the near future. The ICTA is of the view that spectrum must be made available on an equitable basis.

The ICTA believes that MNOs are in the best position to make optimal use of frequencies assigned to them for deployment of their networks and provision of services. The information provided by MNOs helps to ensure that their needs are adequately met.

*The constraints identified will help to establish technical parameters for co-existence of IMT with existing services in same and adjacent frequency bands. Taking all of the above into consideration and after further consultation with MNOs, the ICTA will use this information to prioritise the frequency bands which are to be opened/ refarmed.*

*As such, the opening of the 700 MHz band will be subject to:*

- i. Migration of broadcasting services from the 700 MHz band;*
- ii. Relevant communication to PMSE users;*
- iii. technical parameters provided in the consultation document Ref: ICTA/01/18 and tests being performed.*

*With regard to the constraints identified in higher bands (2.3GHz, 3.3-3.4GHz and 3.6-3.8 GHz), the ICTA will, after further consultation with all stakeholders, consider all possible options and establish technical parameters for co-existence of IMT with existing services operating in same and adjacent frequency bands.*

*The ICTA will use the information to see whether efficient use is being made of spectrum available and whether additional spectrum needs to be released. The ICTA will subsequently issue relevant Decision(s) for operation of IMT in the identified bands, taking into consideration co-existence with services in same and adjacent bands. The said bands will thereafter be made available for assignment upon invitation.*

## **OTHER FREQUENCY BANDS UNDER CONSIDERATION**

*Table 2*

<b>Range</b>	<b>IMT bands</b>	<b>Remarks</b>
Below 1 GHz	400 MHz (450-470 MHz)	This band is currently used for Fixed links (PTP), Private Mobile Radio (PMR) and Public Protection and Disaster Relief (PPDR) in the Republic of Mauritius.
Mid-band	1 427-1452 MHz, 1492-1 518 MHz	Allocated to fixed and mobile (except aeronautical mobile) services.
	1880-1920 MHz, 1980-2010 MHz, 2010-2025 MHz, 2170-2200 MHz	115 MHz of currently unallocated frequency in the 1800 MHz and 2100 MHz bands.
	6425-7125 MHz	Currently being used for Fixed-satellite uplinks and fixed links (PTP).
High-band	24.25-27.5 GHz	Frequency bands identified for IMT in WRC-23
	37-43.5 GHz	
	45.5-47 GHz	
	47.2-48.2 GHz	
	66-71 GHz	

Q18 Please provide indications of industry interest in the allocation of long-term rights in the above bands, as well as planned services, and target market segments for the use of each of these bands.

Stakeholder	Remarks
Emtel	<p>Emtel is interested in the allocation of high-band spectrum, particularly the 24.25-27.5 GHz band, as part of its long-term strategy for deploying mmWave 5G. This spectrum will be vital for delivering ultra-high-speed services in localized urban hotspots and to support advanced use cases, including industrial automation and IoT applications. However, Emtel wishes to emphasize that the high-band spectrum also comes with its own set of challenges, including its highly limited coverage range, device compatibility, and high deployment costs. Emtel is of the opinion that a balanced and supportive pricing structure is essential to make 5G mmWave deployment cost-effective and beneficial. This could involve bundling the high-band spectrum with existing 5G spectrum or other spectrum offerings, or offering it at significantly reduced costs since the current pricing is prohibitive.</p> <p>The 400 MHz band and mid-band frequencies proposed by the Authority are not of particular interest to Emtel at this time due to their lack of harmonization for IMT deployment worldwide, which presents challenges in terms of equipment ecosystem and device support.</p> <p>The very high bands (above 37 GHz) are more future-oriented and not immediately relevant to Emtel. However, these bands could be explored for future cutting-edge 5G trials or even 6G applications in the longer term.</p>
MTML	<p>The industry will show significant interest in long-term rights for all these bands, each serving different purposes in the evolving telecommunications landscape. The 400MHz band is crucial for IoT and critical communications, 1800MHz remains a versatile band for widespread mobile services, and high bands are essential for cutting-edge 5G applications.</p>
Cellplus	<p><b>400 MHz (450-470 MHz) Band:</b>  <i>Industry Interest:</i> While the band is not traditionally used for IMT services, there is potential for its use in critical communications, particularly for public safety and industrial IoT applications if the need arises.  <i>Planned Services:</i> If repurposed, the band could be utilized for mission-critical communications and potentially for narrowband IoT (NB-IoT) services that require robust and reliable connectivity.  <i>Target Market Segments:</i> Key target segments include public safety organizations, emergency services, and industrial sectors that require secure and resilient communication systems.</p> <p><b>1 427-1 452 MHz and 1 492-1 518 MHz:</b>  <i>Industry Interest:</i> There is growing interest in these mid-bands, particularly due to their potential for enhancing mobile broadband services.  <i>Planned Services:</i> These bands could be leveraged for supplementary downlink (SDL) services, improving the capacity and coverage of existing mobile networks, especially in urban areas in case additional downlink capacity is required for 5G.</p>

	<p><i>Target Market Segments:</i> Urban and suburban areas with high mobile data usage, including consumers and businesses needing enhanced mobile broadband.</p> <p><b>1 880-1 920 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, and 2 170-2 200 MHz Bands:</b>  <i>Industry Interest:</i> These bands can be considered for expanding existing LTE and future 5G networks.  <i>Planned Services:</i> Providing additional capacity for LTE and 5G depending of the traffic growth.  <i>Target Market Segments:</i> Densely populated urban areas, commercial hubs, and areas with high mobile traffic demand.</p> <p><b>6 425-7 125 MHz Band:</b>  <i>Industry Interest:</i> The industry recognizes the potential of this band for future IMT services.  <i>Planned Services:</i> If repurposed, this band could support high-capacity mobile backhaul, depending on the 5G usage in the future.  <i>Target Market Segments:</i> Urban centers, where there is a need for high-capacity mobile backhaul to support growing data traffic.</p> <p><b>24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, and 66-71 GHz Bands:</b>  <i>Industry Interest:</i> There is significant interest in these high-frequency bands, particularly for 5G and beyond-5G services. These bands are critical for providing ultra-high-speed connectivity and supporting the deployment of advanced technologies such as mmWave 5G.  <i>Planned Services:</i> These bands will be used for ultra-fast mobile broadband, fixed wireless access, and advanced applications like augmented reality (AR), virtual reality (VR), and massive IoT.  <i>Target Market Segments:</i> Urban areas, industrial zones, and commercial districts where high-capacity, low-latency connectivity is essential. These bands will also cater to emerging applications requiring ultra-reliable and high-speed data transfer.</p>
Huawei	<p>450-470 MHz: Consumer equipment in the band is limited, and would limit service offerings of public operators.</p> <p>1.5 GHz (extended L-Band): Supplementary downlink is the most popular bandplan as a whole. Suggests that ICTA watch developments in ATU and elsewhere before making a decision on a bandplan and on assignment.</p> <p>1880-1920,1980-2010,2010-2025,2170-2200 MHz Bands not used for IMT in Region 1. Terminal and network support is low. Not to be considered further.</p> <p>6.425-7.125 GHz: Potential band for 5.5G deployment &amp; 6G later. ICTA should target introduction of IMT in this band in the 2027-2030 timeframe and prepare for co-existence and/or migration of FSS from the band.</p> <p>mmWave bands (24/44/66 GHz) Global take up is very limited. Suggests to wait until ecosystem is ready and there is interest.</p>
Qualcomm	<p>In the context of Africa, the African Telecommunications Union (ATU) has focused on utilizing the lower 6 GHz band (5925-6425 MHz) for Wi-Fi and wireless access systems/radio local area networks (WAS)/(RLANs) on a licence-exempt basis, while</p>



	<p>no regional consideration has been made for using the upper 6 GHz band for Wi-Fi. However, it remains important to evaluate the potential benefits that the upper 6 GHz band could bring to the region in the long term, especially as demand for wireless services continues to grow.</p> <p>It is important to note that the WRC-23 decisions were designed to provide flexibility for different administrations to adopt the most suitable approach to using the upper 6 GHz band, ensuring that both Wi-Fi and IMT technologies can evolve and benefit from economies of scale. Given the ongoing global technical and policy debates regarding the optimal use of this spectrum—along with ongoing spectrum-sharing studies between RLANs and WA WBB in the European Union and other regions—it may be prudent for the ICTA to closely monitor these international developments.</p> <p>Qualcomm also believes that bands above 24 GHz, particularly the 26 GHz (24.25-27.5 GHz) band, offer a tremendous opportunity for the deployment of 5G services as it will enable 5G connectivity with multi-gigabit data rates, dense spatial re-use, and flexible configuration of spectrum, which enables both access and backhaul services to be provided. As stated in previous sections, Qualcomm believes that the availability of new spectrum in the low (700 MHz), mid (3.5 GHz), and high (26 GHz) bands is key to unlocking the full potential associated with 5G. Thus, Qualcomm encourages the ICTA to release the 26 GHz band for use by MNOs as soon as possible.</p>
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Q19 Are there any co-existence issues with other services or bands that need to be addressed?

Stakeholder	Remarks
Emtel	Emtel recognizes that the deployment of 5G millimeter-wave services in the 24.25-27.5 GHz band may raise potential co-existence issues with other existing services, particularly those operating in adjacent frequency bands, such as fixed satellite services (FSS) and fixed links. However, Emtel believes this should not be a major concern owing to the limited coverage of mmWave and primarily indoor coverage use case.
MTML	In the mid band, MTML is currently operating both UMTS and LTE. MTML needs to carefully consider while allocating these band for other services.
Cellplus	<p><b>400 MHz (450-470 MHz) Band:</b> This band is currently utilized for Fixed links (PTP), Private Mobile Radio (PMR), and Public Protection and Disaster Relief (PPDR) in Mauritius. Introducing IMT services could potentially interfere with these critical services, particularly those used for disaster relief and public safety.</p> <p><b>1 427-1 452 MHz, 1 492-1 518 MHz Bands:</b> These mid-band frequencies are allocated to fixed and mobile services, but potential conflicts could arise with aeronautical mobile services, even though the band is excluded from this usage.</p> <p><b>1 880-1 920 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, 2 170-2 200 MHz Bands:</b> With 115 MHz of unallocated frequency within the 1800 MHz and 2100 MHz bands,</p>

	<p>care must be taken to ensure that new allocations for IMT do not interfere with existing mobile services operating in adjacent bands.</p> <p><b>6 425-7 125 MHz Band:</b> Currently used for Fixed-satellite uplinks and fixed links (PTP), introducing IMT services in this band could lead to interference, particularly with satellite operations that require uninterrupted communication links.</p> <p><b>High-band Frequencies (24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, 66-71 GHz):</b> Potential co-existence issues could arise with existing high-frequency services, such as satellite communications and fixed wireless links.</p>
Huawei	<p>Implementation of IMT in the 6425-7125 MHz in Mauritius will not adversely affect the operation of FSS earth stations and their future development. Protection of non-GSO earth station in the frequency band 6 700-7 075 MHz from an IMT base station would require an exclusion area.</p> <p>Similarly, protection of stations in the radio astronomy service (RAS) from harmful interference in the frequency band 6 650-6 675.2 MHz would also require a protection area. There is also a need for coordination of SRS (deep space) stations operating in the band 7 145-7 190 MHz with IMT stations operating in the frequency band 6 425-7 125 MHz.</p> <p>Co-existence with stations in the FS is the most critical issue. Studies in ITU before the WRC-23 show that IMT and FS cannot coexist in the same geographical area unless measures are adopted. Huawei suggests ICTA to start preparations for introduction of IMT in the band in the 2027-2030 time frame. The period until introduction of IMT can be used to address the coexistence with FS. Huawei proposes that ICTA:</p> <ol style="list-style-type: none"> <li>1) Stop issuing new authorisations for FS in the band</li> <li>2) Consider and consult with mobile operators on possible scenarios for shared use of the band by IMT and FS</li> <li>3) Agree with users on a timeline for migration of FS, considering the number of FS stations impacted and alternative modes of transmission</li> <li>4) Examine mitigation and co-existence measures that could be put in place if FS is preserved, notably in protection areas.</li> </ol>
Qualcomm	<p>For higher bands, there may be co-existence issues particularly with fixed satellite services (FSS). The ICTA should give special consideration to whether operation in any of the bands above 24 GHz would interfere with existing satellite services.</p>

Additional questions to Mobile Network Operators

Q20 Describe how the use of each of the above bands, as applicable, fits into your overall spectrum strategy and long-term vision?

Stakeholder	Remarks
Emtel	Please refer to response to Q18
MTML	Please refer to response for Q18
Cellplus	<p><b>400 MHz (450-470 MHz) Band:</b>  <i>Strategic Fit:</i> This band offers significant potential for IoT and machine-to-machine (M2M) communications, particularly in industries that demand reliable, robust communication in remote or challenging environments.  <i>Long-Term Vision:</i> Cellplus Ltd envisions a gradual exploration of the 400 MHz band as the demand for additional bandwidth for IoT applications arises.</p> <p><b>1 427-1 452 MHz, 1 492-1 518 MHz Bands:</b>  <i>Strategic Fit:</i> These mid-band frequencies are well-suited for expanding 5G downlink services, providing a balance between coverage and capacity.  <i>Long-Term Vision:</i> These bands may be considered by Cellplus Ltd in the future in the need for additional 5G capacity is required.</p> <p><b>1 880-1 920 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, 2 170-2 200 MHz Bands</b>  <i>Strategic Fit:</i> These bands are ideal for both LTE and 5G services, offering the spectrum resources needed to support the growing demand for high-speed data services.  <i>Long-Term Vision:</i> Cellplus Ltd may leverage these bands to further densify its network.</p> <p><b>6 425-7 125 MHz Band:</b>  <i>Strategic Fit:</i> While currently used for Fixed-satellite uplinks and fixed links (PTP), this band holds promise for future backhaul solutions, which are critical for managing the increased data traffic associated with 5G networks.  <i>Long-Term Vision:</i> Cellplus Ltd may explore this band to enhance network backhaul capabilities.</p> <p><b>High-Band Frequencies (24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, 66-71 GHz):</b>  <i>Strategic Fit:</i> These high-band frequencies are crucial for supporting the ultra-high-speed and low-latency needs of advanced 5G applications, including industrial automation, smart cities, and immersive media experiences.  <i>Long-Term Vision:</i> Cellplus Ltd is committed to integrating these highband frequencies into its 5G strategy.</p>

Q21 What technology would you be interested to deploy and how much bandwidth would you require for such deployment?

Stakeholder	Remarks
Emtel	Please find below the outline for the technologies Emtel intends to deploy across the various IMT bands, along with the corresponding bandwidth requirements.

	Range	IMT bands	Technology	Bandwidth
	Below 1 GHz	400 MHz (450-470 MHz)	N/A	N/A
	Mid-band	1 427-1452 MHz, 1492-1 518 MHz	N/A	N/A
		1880-1920 MHz, 1980-2010 MHz, 2010-2025 MHz, 2170-2200 MHz	N/A	N/A
		6425-7125 MHz	5G	TBD
	High-band	24.25-27.5 GHz	mmWave 5G	800 MHz
		37-43.5 GHz		N/A
		45.5-47 GHz		N/A
		47.2-48.2 GHz		N/A
		66-71 GHz		N/A
MTML	<p>The mid band can be planned for the following services:</p> <ol style="list-style-type: none"> <li>4G LTE (current primary use)</li> <li>5G NR (future refarming)</li> <li>Mobile broadband</li> <li>Voice over LTE (VoLTE)</li> <li>Fixed Wireless Access (FWA)</li> </ol> <p>The high band can be planned for the following services:</p> <ol style="list-style-type: none"> <li>Private 5G networks</li> <li>Augmented/Virtual reality</li> <li>Enhance Mobile broadband</li> <li>Ultra Hi-speed 5G and next generation mobile networks</li> </ol>			
Cellplus	<p>Technology Deployment and Bandwidth Requirements:</p> <p>700 MHz Band:</p> <ul style="list-style-type: none"> <li>Technology: 5G NR (New Radio)</li> <li>Bandwidth Required: 10-20 MHz</li> </ul> <p>1 427-1 452 MHz and 1 492-1 518 MHz Bands:</p> <ul style="list-style-type: none"> <li>Technology: 5G NR</li> <li>Bandwidth Required: 40-60 MHz</li> </ul> <p>1 880-1 920 MHz, 1 980-2 010 MHz, 2 010-2 025 MHz, 2 170-2 200 MHz Bands:</p> <ul style="list-style-type: none"> <li>Technology: LTE and 5G NR</li> <li>Bandwidth Required: 60-100 MHz</li> </ul> <p>3 300-3 600 MHz Bands:</p> <ul style="list-style-type: none"> <li>Technology: 5G NR</li> <li>Bandwidth Required: Blocks of 100 MHz</li> </ul> <p>High-Band Frequencies (24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-</p>			

	<p>48.2 GHz, 66-71 GHz):</p> <ul style="list-style-type: none"> <li>• Technology: 5G NR (mmWave)</li> <li>• Bandwidth Required: 400 MHz or more</li> </ul>
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Q22 What would be the timeframe for deployment and start of service in each of the above bands?

Stakeholder	Remarks
Emtel	<p><b>Below 1 GHz:</b> Emtel currently has no plans for deployment in these bands.</p> <p><b>Mid-band:</b> Emtel has no immediate plans for deployment in these bands. However, recognizing the growing global interest in the 6 GHz band for 5G, Emtel expect the ecosystem to evolve significantly in the coming years. Emtel intends to closely monitor these developments and will make informed decisions based on market trends, technological advancements, and the maturation of the device ecosystem.</p> <p><b>High-band (24.25-27.5 GHz):</b> Emtel anticipates deploying services in this band within the next 3-5 years (with trials starting earlier), focusing initially on urban hotspots and industrial zones where there is demand for ultra-high-speed connectivity.</p>
MTML	May be considered after 3 years.
Cellplus	<p>1. High-Band Frequencies: The start of service for the high-band frequencies is projected to be beyond 2029.</p> <p>2. Other Bands: The utilization of the remaining bands will be driven by the growing demand for services such as IoT, PPDR (Public Protection and Disaster Relief), and additional LTE and 5G capacity, with deployment anticipated beyond 2030. In the interim, the existing 2G and 3G bands will be refarmed to meet the increasing need for LTE and 5G services.</p>

Q23 What potential challenges do you anticipate in deploying and utilising each of the above frequency band, as may be relevant?

Stakeholder	Remarks
Emtel	<p>Emtel anticipates the following potential challenges in deploying and utilizing the above frequency bands:</p> <p><b>Below 1 GHz:</b> Although Emtel does not currently plan to deploy services in these bands, general challenges include the potential need for clearing existing users and ensuring device compatibility, which may require substantial coordination and investment. Additionally, the propagation characteristics of these bands could introduce interference challenges that would need careful management.</p>

	<p><b>Mid-band:</b> While Emtel has no immediate plans for deployment in these bands, general challenges will typically involve maturity of the device ecosystem and the need for significant infrastructure investment, including new antennas and base station equipment, to support the higher capacity and faster speeds associated with mid-band frequencies. Interference management with existing services and the potential need for network optimization are also concerns.</p> <p><b>High-band (24.25-27.5 GHz):</b> The limited coverage range of mmWave frequencies will necessitate a higher density of sites with an impact on network deployment costs and complexity. Additionally, device compatibility with these frequencies may be limited initially, requiring coordination with manufacturers and significant investment in new infrastructure. Ensuring non-interference with existing services, such as satellite communications in adjacent bands, is another key challenge. Lastly, the high deployment and operational costs associated with this band necessitate a supportive pricing structure to make the rollout economically viable.</p>
MTML	<ul style="list-style-type: none"> <li>• <i>Device compatibility:</i> Development of device ecosystem for providing economical priced devices in each of these bands.</li> <li>• <i>Infrastructure development:</i> In Higher band the cell radius is smaller requirement more cell sites which poses challenge for network operator for having cost effective deployment.</li> <li>• Adoption of killer applications like augmented reality, virtual reality, IOT application and industrial automation.</li> <li>• Security and privacy issues.</li> <li>• <i>Regulatory hurdle:</i> Higher band spectrum fees is higher. The expenses associated with acquiring and utilizing spectrum in these higher bands have reached levels that appear disproportionate when considered against the economic realities of the local market.</li> </ul>
Cellplus	<p><b>Interference with Adjacent Services:</b> Ensuring minimal interference between different services in these bands might require advanced filtering techniques or strict adherence to guard bands.</p> <p><b>Equipment Availability:</b> The deployment of IMT services in these bands may be limited by the availability of compatible equipment.</p> <p><b>Increased Operational Costs:</b> Managing a more complex spectrum portfolio, especially during the deployment phase, could increase operational costs. This includes the need for additional maintenance, monitoring, and optimization of the expanded spectrum resources. Potential costs for interference mitigation measures can increase the overall deployment budget.</p> <p><b>Capital Investment:</b> The deployment of new bands will require significant capital investment in infrastructure, including new base stations, antennas, and backhaul solutions.</p>

Q24 How will such deployment impact your existing services and spectrum usage in other bands?

Stakeholder	Remarks
Emtel	Emtel does not anticipate the new deployment in the high band spectrum to impact its existing operations in other bands. The deployment of new services in the high-band (24.25-27.5 GHz) spectrum will be carefully planned to complement and enhance Emtel's existing services and spectrum in other bands, as well as to augment its existing network capacity by offloading traffic from LTE/low band 5G in high-demand urban hotspots and industrial areas. This will improve overall network efficiency and enhance user experiences, particularly in areas where high data throughput is required.
MTML	It will have several significant impacts on existing services and spectrum usage. These effects can be both positive and challenging, requiring careful planning and management.
Cellplus	<p><b>Reallocation Needs:</b> Deploying new frequency bands may necessitate the reallocation of spectrum currently used for existing services. This could involve refarming spectrum from older technologies like GSM to newer technologies such as LTE or 5G. The transition period could temporarily affect the quality and availability of services in the reallocated bands.</p> <p><b>Interference with Adjacent Bands:</b> The introduction of new frequency bands could lead to interference with services operating in adjacent bands. For instance, deploying high-band spectrum for 5G might interfere with existing microwave links or satellite services, necessitating advanced filtering techniques and strict adherence to guard bands.</p> <p><b>Phasing Out of Older Technologies:</b> As new bands are deployed, there might be a need to phase out legacy technologies like GSM or UMTS to free up spectrum for more efficient use. This could impact customers still relying on these older technologies, requiring them to upgrade their devices or services.</p> <p><b>Customer Migration:</b> Managing the migration of customers from legacy services to newer technologies is critical to avoid service disruptions. This might require targeted communication campaigns and possibly incentives for customers to switch to newer devices.</p>

**ICTA views with respect to questions Q18 to Q24**

*The information submitted provides an insight on the future spectrum interests from MNOs. The ICTA notes that interest from MNOs in the higher bands is subject to further development in technology and business opportunity and will evolve according to market needs. The constraints identified will help to establish technical parameters for co-existence of IMT with existing services operating in the same and adjacent frequency bands.*