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Subject: Consultation on the Second Draft National Radio Frequency Plan 2025

Dear Mr. Moshweunyane & Mr. Makgotlho,

Viasat appreciates the opportunity to comment on the second draft National Radio Frequency Plan. We commend the Authority for incorporating the outcomes of World Radiocommunication Conference 2023 and for facilitating this important public consultation.

Our submission addresses the identification of International Telecommunication Mobile (IMT) in the 1427-1518 MHz band, particularly the 1492-1518 MHz range, which poses significant interference risks to L-band Mobile-Satellite Service (MSS) networks operating in neighbouring spectrum above 1518 MHz. These MSS networks support the delivery of critical applications such as Global Maritime Distress and Safety, Global Aeronautical Distress and Safety System, environmental monitoring, disaster response coordination, and secure Government communications. South Africa, with its expansive maritime jurisdiction, critical aviation corridors, and vulnerability to natural hazards, is particularly dependent on the uninterrupted operation of MSS services across the country. Beyond these established MSS applications, advanced MSS services such as Direct-to-Device, promise to bridge the digital and catalyse economic growth by enabling connectivity for conventional mobile handsets and IoT devices in remote and underserved areas

As detailed in our comments, the Authority's rationale for the IMT identification across the 1427-1518 MHz band rests on three considerations, which upon review are insufficient for the following reasons:

1. The Radio Frequency Spectrum Assignment Plan: This plan was developed without the mandated feasibility studies for 1492–1518 MHz explicitly required by the 2019 Frequency Migration Plan and the 2021 Inquiry on Implementing the Frequency Migration Plan and IMT Roadmap.
2. International Telecommunication Union recommendation M.1036-7: This recommendation explicitly calls for national compatibility studies that have not been conducted and highlights high-risk scenarios at seaports and airports - none of which has been studied for South Africa.
3. Electronic Communications Committee (ECC) Report 263: This Report employs technical assumptions and interference scenarios that do not reflect South African realities and it is well understood that this report proposes insufficient measures for the protection of L-Band MSS networks

In light of these facts Viasat respectfully recommends:

- Establishing an upper limit for IMT Identification at 1492 MHz by removing the IMT identification spanning 1492-1518 MHz. This would ensure MSS protection given the absence of mandated studies and otherwise appropriate protection parameters.
- Conducting comprehensive South African-specific compatibility studies before any future consideration of IMT operation in the 1492-1518 MHz frequency range. These studies should model IMT time division duplex systems, all MSS use cases (land-mobile, aeronautical, maritime, IoT, D2D), and aggregated interference.

The consequences of L-Band MSS network degradation protection are severe: loss of life during maritime and aviation emergencies, compromised disaster response capabilities, weakened national security communications, and foregone economic opportunities from advanced satellite services. Viasat therefore urges the Authority to prioritize these critical services by creating an interference-free environment for the operation of MSS networks.

Viasat remains available to provide additional information or technical support as required.

Yours Sincerely,

Nigel Naidoo
Senior Director: Regulatory Affairs and Market Access, Africa

1. Introduction

Viasat appreciates the opportunity to provide comments on the second draft of the National Radio Frequency Plan (NRFP). This submission builds on Viasat's previous filing on the first draft NRFP and aims to advance constructive dialogue on spectrum management matters of national importance. While the second draft NRFP appropriately incorporates the International Telecommunication Union (ITU) World Radiocommunication Conference 2023 (WRC-23) outcomes, it also presents an opportunity to reassess existing spectrum allocations that may no longer serve the public interest optimally. Specifically, the mobile allocation and International Mobile Telecommunication (IMT) identification in the frequency range 1427-1518 MHz warrants reassessment given the significant risk posed to L-band[1] mobile satellite service (MSS) networks delivering essential and critical services, as well as the emerging advanced L-band MSS use cases.

As mentioned in Viasat's previous filing, the interference-free operation of L-band MSS is of high importance because these networks support the delivery of critical applications such as Global Maritime Distress and Safety (GMDSS), Global Aeronautical Distress and Safety System (GADSS), environmental monitoring, disaster response coordination, and secure Government communications. South Africa, with its expansive maritime jurisdiction, critical aviation corridors, and vulnerability to natural hazards, is particularly dependent on the uninterrupted operation of MSS services nationwide. Moreover, advanced MSS services deployed in the L-band, including Direct-to-Device (D2D) communications between satellite and conventional terrestrial mobile handsets and other end-user devices, could play a crucial role in digitalising the economy and bridging the digital divide, acting as a catalyst for national economic development.

Motivated by the above, Viasat's submission on the first draft of the NRFP recommended maintaining IMT identification only up to 1492 MHz to mitigate potential IMT interference into L-band MSS networks. While the Authority considered Viasat's proposal, it ultimately opted to retain the legacy mobile allocation and IMT identification in the 1427 to 1518 MHz frequency range. The Authority's decision appears to rest on three principal justifications:

- Publication of a Radio Frequency Spectrum Assignment Plan (RFSAP) for IMT operation in the 1427-1518 MHz frequency range.
- ITU Recommendation M.1036-7, which contains several options, one of which is for IMT channel arrangements across the full frequency range 1427-1518 MHz.

[1] 1518-1559 MHz (Space-to-Earth)

- Electronic Communications Commission (ECC) Report 263, which studies the adjacent band coexistence of IMT and L-band MSS.

Viasat respectfully submits that the above considerations do not fully address concerns regarding harmful interference to L-Band MSS systems. The sections below demonstrate why each of these considerations is insufficient to provide MSS protection and why the Authority's decision warrants reconsideration.

2. Analysis of the Authority's Rationale for extending IMT Identification up to 1518 MHz

2.1 Radio Frequency Spectrum Assignment Plan

The Authority justifies IMT identification in the 1427-1518 MHz frequency range based on a RFSAP (Government Gazette 48353), which is currently in force. The RFSAP establishes technical and operational requirements for IMT in this band, including measures purportedly designed to protect L-band MSS networks. However, the Authority's reliance on this RFSAP is not warranted because the regulatory process underpinning its development was incomplete for a critical portion of this spectrum. Specifically, ***the mandated feasibility study for the 1492–1518 MHz frequency range, which would assess compatibility with MSS networks operating above 1518 MHz, was never conducted.***

The timeline below illustrates this fundamental procedural deficiency:

- 29 March 2019 - The Frequency Migration Plan 2019 (Government Gazette No. 42337) mandated that feasibility studies, including sharing and compatibility studies with incumbent services, be conducted to evaluate the suitability of IMT operations in 1452–1492 MHz before developing an RFSAP.
- 24 December 2021 – The Inquiry on Implementing the Frequency Migration Plan and IMT Roadmap (Government Gazette No. 45690) stated that the Authority has "less confidence" regarding the identification of the 1492-1518 MHz band for IMT. Critically, the Inquiry mandated a feasibility study to evaluate, among other factors, the compatibility between IMT systems and MSS networks operating above 1518 MHz, as a prerequisite for developing an RFSAP.
- 31 March 2022 – Following feasibility studies for 1452-1492 MHz, a draft RFSAP (Government Gazette 46160) was published for IMT use in 1427-1492 MHz.
- 20 February 2023 – In a significant departure from the established regulatory process, a second draft RFSAP (Government Gazette 48078) expanded the scope to cover IMT

operation in 1427-1518 MHz, even though the mandated feasibility study for the 1492–1518 MHz band had not been conducted.

- 31 March 2023 – The final RFSAP (Government Gazette 48353) upheld IMT implementation across the entire 1427-1518 MHz frequency range and introduced operational conditions based on ECC/DEC/(17)06 for the coexistence of IMT and L-band MSS networks. These conditions include IMT effective isotropic radiated power (EIRP) limits and a 1 MHz guard band.

Therefore, Viasat submits that the RFSAP cannot serve as a valid justification for IMT identification across the entire 1427-1518 MHz range, as the regulatory process underpinning its development was incomplete. Furthermore, Viasat emphasizes that the IMT operational conditions set out in the RFSAP do not ensure adequate protection for MSS networks - this issue is examined in detail in Section 2.3 below.

2.2 ITU Recommendation M.1036-7

As part of its rationale for IMT identification in the 1427-1518 MHz frequency range, the Authority cites ITU-R Recommendation M.1036-7, which contains various options for IMT channel arrangements spanning the frequency range in question. Viasat respectfully submits that the mere existence of an IMT channel arrangement option in ITU-R Recommendation M.1036-7 does not, in itself, constitute a sufficient basis for ensuring coexistence between IMT systems operating in 1427-1518 MHz and MSS networks operating above 1518 MHz. In this regard, ITU-R Recommendation M.1036-7 explicitly acknowledges the incomplete nature of coexistence provisions, in note 1 to table 3:

> "When implementing these frequency arrangements, administrations are also encouraged to take into account the results of the compatibility studies, e.g. in order to address IMT-MSS coexistence in certain areas (around seaports and airports, etc.)"

This cautionary language is highly significant and reveals several important points:

i. **The Recommendation explicitly defers to national compatibility studies**: The phrase "encouraged to take into account the results of compatibility studies" clearly indicates that the channel arrangement itself does not incorporate adequate coexistence measures. National administrations are expected to conduct their own studies tailored to local deployment scenarios before authorizing IMT operations in this band.

ii. **High-risk scenarios are specifically identified**: The explicit reference to "seaports and airports" is not incidental. These environments present elevated interference risks due to:

- High concentrations of MSS terminals serving safety-of-life communications (maritime GMDSS, aeronautical GADSS)
- Critical communications that cannot tolerate any degradation without compromising safety

South Africa's major ports (Durban, Richards Bay, Cape Town, Port Elizabeth, Saldanha Bay, Mossel Bay) and international airports (OR Tambo, Cape Town International, King Shaka, Lanseria) would be particularly vulnerable to IMT interference. Yet no South African-specific compatibility studies addressing these critical zones have been conducted, nor has the Authority established protection measures for these high-risk areas.

iii. **The Recommendation provides a technical framework, not operational authorization**: ITU-R M.1036-7 does not provide ready-to-implement coexistence parameters or guarantee interference-free operation. Instead, it signals that substantial additional work, including compatibility studies, interference modeling, and development of operational constraints, is required before safe deployment can proceed, and that work has not been done for South Africa.

It is therefore evident that ITU-R Recommendation M.1036-7 does not address coexistence with MSS operations and cannot serve as a sufficient justification for IMT identification in the full frequency range 1427-1518 MHz.

2.3 ECC Report 263

The Authority asserts that ECC Report 263 sufficiently addresses adjacent-band compatibility between IMT systems operating in 1427-1518 MHz and L-band MSS networks above. Viasat respectfully disagrees. ECC Report 263, while valuable as a preliminary technical assessment, contains significant limitations that render it insufficient as a basis for permitting IMT operations in proximity to critical L-band MSS services. These limitations include:

- **Underlying Assumptions and Gaps**: ECC Report 263 was developed under constrained assumptions that do not fully capture the diversity of MSS deployment scenarios and terminal types. Furthermore, the report includes multiple studies that reach differing conclusions, underscoring the need for additional work to fully assess the feasibility of adjacent-band IMT and MSS operations. In this context, the European

Conference of Postal and Telecommunications (CEPT) subsequently conducted further studies, culminating in ECC Report 299, which provided more stringent protection measures for aeronautical and maritime L-band MSS terminals. It is noteworthy that the CEPT recognized the insufficiency of ECC Report 263 and commissioned additional work specifically to address gaps in the original analysis. Critically, the additional protection requirements for land mobile L-band MSS terminals have yet to be examined by CEPT**,** leaving a significant portion of the MSS use cases unprotected by validated technical criteria. In response to these uncertainties, several ECC countries, including Germany, Romania, and Italy have opted to retain IMT identification only up to 1492 MHz.

- **Insufficient Mitigation Measures:** The ECC Report 263 mitigation measures, namely a 1 MHz guard band and 58 dBm/5 MHz IMT EIRP limit in 1512-1517 MHz result in out-of-band emissions of -0.8 dBm in the 1518-1520 MHz range. This is 29.2 dB higher (nearly 1,000 times greater in linear power terms) than the emission limit applicable above 1520 MHz, representing a fundamental flaw in the MSS protection regime. MSS terminals operating in 1518-1520 MHz would experience interference levels sufficient to block signal reception entirely. Furthermore, since IMT out-of-band emissions decay gradually rather than instantaneously, emissions above 1520 MHz will likely exceed applicable limits, causing harmful interference throughout the MSS band. The ECC Report 263 measures therefore fail to protect MSS operations in 1518-1520 MHz or beyond. Adequate protection requires a sufficiently wide guard band below 1518 MHz to ensure out-of-band emissions into the range 1518 MHz and above remain at acceptable levels.

- **Outdated Technical Basis**: ECC Report 263 was developed in 2017 under assumptions that no longer reflect current MSS advancements. Since then, MSS services and technology have evolved considerably. Modern MSS services now support advanced uses cases such as D2D communications between satellite and conventional terrestrial mobile handsets, as well as other end-user devices. Moreover, MSS services are evolving to be 3GPP standards based. These developments, which were not contemplated in the 2017 study, would dramatically change the interference environment, rendering Report ECC 263 outdated.

- **Applicability of MSS Protection Measures:** The technical studies in ECC Report 263, which informed the MSS protection criteria prescribed in ECC/DEC(17)06, assumed that IMT would be configured in supplementary downlink (SDL) mode, and not time division duplex (TDD) as proposed by the Authority. This is a critical distinction

that fundamentally undermines the relevance of ECC Report 263 to South Africa's proposed IMT deployment. In fact, neither the ECC Report nor the Decision concluded that an IMT TDD system with a 1 MHz guard band could coexist with L-band MSS.

Therefore, Viasat respectfully submits that ECC Report 263 cannot serve as a sound basis for IMT identification across the 1427-1518 MHz range and the reliance on this analysis would subject L-band MSS systems to significant risk of interference.

3. Recommendations

In light of the analysis presented above, which demonstrates that each of the Authority's three principal justifications to extend IMT identification up to 1518 MHz is fundamentally unwarranted, Viasat respectfully recommends that the Authority adopt the following measures:

3.1 Establish an upper limit for IMT Identification at 1492 MHz

As a first step, the Authority should remove the mobile allocation and IMT identification from 1492-1518 MHz, effectively implementing this range as a guardband to protect L band MSS systems operating above 1518 MHz. This represents the most prudent and technically sound approach given:

- **The absence of required feasibility studies**: The mandated feasibility study for 1492-1518 MHz has never been conducted, violating the Authority's own regulatory framework established in the 2019 Frequency Migration Plan and 2021 Inquiry.
- **The insufficiency of European protection parameters**: ECC Report 263 and ECC/DEC(17)06 were developed for SDL deployments under European assumptions and have not been validated for South African TDD deployments, MSS terminal diversity or D2D services.
- **The critical importance of MSS for safety-of-life communications:** South Africa's maritime jurisdiction, aviation corridors, and disaster vulnerability require absolute reliability for GMDSS, GADSS, and emergency MSS services and thus appropriate interference protection from IMT in neighboring spectrum. The consequences of MSS degradation could include loss of life, compromised national security and economic disruption.

3.2 Conduct Comprehensive Compatibility Studies Before Any Future Allocation Decisions

Should the Authority, at some future date, wish to consider IMT's use of the 1492-1518 MHz band in future years, it must first complete the comprehensive feasibility studies originally mandated by the 2019 Frequency Migration Plan and the 2021 Inquiry. These studies must:

- **Model South African deployment scenarios**: Including urban dense deployments, peri-urban mixed environments, rural macro-cell networks, and coastal zones with maritime MSS activity.
- **Account for all MSS use cases**: Including land-mobile terminals (emergency services, mining, agriculture, smart grid and utility protection and government operations), aeronautical MSS (GADSS, passenger connectivity), maritime MSS (GMDSS, vessel tracking, offshore communications), IoT devices with varying technical characteristics, and emerging D2D handsets.
- **Consider aggregated interference**: Modeling must account for cumulative interference from multiple IMT sources, not just single-source scenarios.
- **Evaluate TDD-specific considerations**: Since the Authority proposes TDD mode (not the SDL mode studied in ECC Report 263), studies must specifically address TDD interference characteristics, including user equipment transmissions and temporal interference patterns.

4. Conclusion

Viasat respectfully urges the Authority to establish an upper limit for IMT identification at 1492 MHz. This approach acknowledges the incomplete regulatory foundation for IMT operations in 1492–1518 MHz while ensuring the continued reliability of essential and critical L-band MSS services that safeguard maritime safety, aviation security, disaster response, and national communications infrastructure. Should the Authority wish to revisit this spectrum allocation in the future, comprehensive South African-specific compatibility studies must first be conducted to ensure that any deployment protects these vital L-Band MSS services. Viasat appreciates the Authority's consideration of these important matters and remains available to provide additional technical information or support as required.