Feasibility Study

3600 MHz to 3800 MHz

1 Glossary of Terms, Abbreviations, and Acronyms

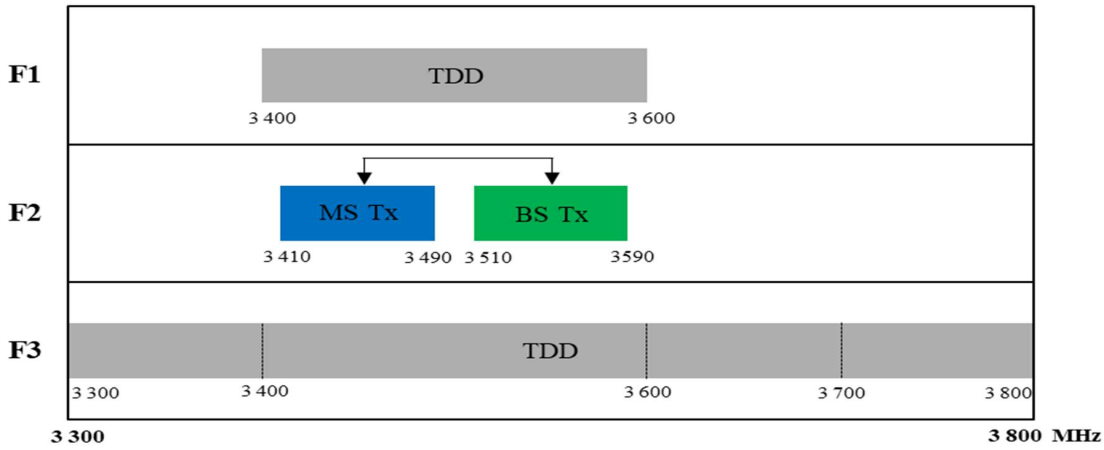
Acronym	Explanation
3G	Third generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunication relating to the ITU-R IMT-2000 specifications.
4G	Fourth Generation Network Technology relating to ITU-R IMT-Advanced specifications.
5G	Fifth Generation Network Technology, relating to the ITU-R IMT-2020 specifications.
6G	Sixth Generation Network Technology, relating to the ITU-R IMT-2030 specifications.
Act	Electronic Communications Act, 2005 (Act No. 36 of 2005).
AAS	Active antennae systems.
Administration	Members States of the International Telecommunications Union.
Allocation	Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space *radiocommunication services* or the *radio astronomy service* under specified conditions.
Assignment	The authorisation given by the authority to a licensee to use a radio frequency or radio frequency channel under specified conditions.
ATU	African Telecommunications Union.
Authority	The Independent Communications Authority of South Africa.
BFWA	Broadband Fixed Wireless Access.
CEPT	Conference of European Posts and Telecommunications Authorities.
CRASA	Communications Regulators' Association of Southern Africa.
DC-MSS-IMT	Direct Connectivity between Mobile-Satellite Service space station and IMT UEs.
DECT	Digital Enhanced Cordless Telecommunications 1880 - 1900 MHz which is a digital communication standard, primarily used for creating cordless phone systems.
ECA	The Electronic Communications Act of South Africa, Act No 36 of 2005.
EIRP	Effective isotropically radiated power.
ERP	Effective radiated power, which is the product of the power supplied to an antenna and its gain relative to a half wave dipole in a given direction.
FDD	Frequency Division Duplex.
FWA	Fixed Wireless Access.
FS	Fixed Service.
FSS	Fixed Satellite Service.
Gbps	Gigabits per second.
GHz	Gigahertz of Radio Frequency Spectrum.
GSM	Global System for Mobile Communications, (originally Groupe Spécial Mobile), and is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second generation (2G) digital cellular networks.
GSMA	Global System for Mobile Communications Association.
IMT	The name that encompasses IMT-2000, IMT-Advanced, IMT-2020 and IMT-2030 collectively known as International Mobile Telecommunications.
IMT-2000	The International Mobile Telecommunications, as envisioned in ITU-R Recommendation ITU-R M.687 and M.816.
IMT-Advanced	The International Mobile Telecommunications, as envisioned in Recommendation ITU-R M.1645.
IMT-2020	The International Mobile Telecommunications, as envisioned in Recommendation ITU-R M.2083.

Acronym	Explanation
IMT-2030	The International Mobile Telecommunications, as envisioned in Recommendation ITU-R M.2160.
IoT	Internet of Things.
ITU	International Telecommunication Union.
ITU RR	International Telecommunication Union Radio Regulations.
kHz	Kilohertz of Radio Frequency Spectrum.
LTE	Long Term Evolution and is a standard for wireless communication of high-speed data for mobile phones and data terminals. It is based on the GSM/EDGE and UMTS/HSPA network technologies.
M2M	Machine to Machine.
MHz	Megahertz of Radio Frequency Spectrum.
MIMO	Multiple-Input and Multiple-Output and is the use of multiple antennas at both the transmitter and receiver to improve communication performance.
NRFP	The National Radio Frequency Plan for South Africa.
NTN	Non-terrestrial Network
PMSE	Programme making and special events applications (PMSE)
PRASA	Passenger Rail Agency of South Africa.
PTM	Point to Multipoint.
PTP	Point to Point.
Radio-communication	All electronic communication by means of radio waves.
RATG	Radio Access Technology Group.
Revocation Period	A period of transition during which incumbent users are migrated out of the band in question to clear sufficient spectrum for new service providers.
RFSAP	Radio Frequency Spectrum Assignment Plan.
RLAN	Radio Local Access Network and is the high data rate two-way (duplex) wireless data communications network.
SABRE	South African Band Re-Planning Exercise.
SADC	Southern African Development Community.
SADC RFSAP	Southern African Development Community Frequency Allocation Plan.
SAPS	South African Police Service.
Service licence	BS, ECS or ECNS licence.
SF	Single Frequency.
SFN	Single Frequency Network.
TDD	Time Division Duplex.
VSAT	Very small aperture terminal used for fixed satellite services.
WAS	Wireless Access Systems and is end-user radio connections to public or private core networks.

2 Introduction

2.1 This band forms part of Band F3 for the overall range between 3300-3800MHz. F3 has a Time Division Duplex ("TDD") band plan (see Figure 2).[2] There are other uses of this band, such as for Fixed Services ("FS"), Fixed-Satellite Services ("FSS"), and Broadband Fixed Wireless Access ("BFWA").

Figure 2: Frequency arrangements between 3300MHz-3800MHz



Source: ITU-R M.1036-7

3 Regulatory context

3.1 The 3600-3800MHz band has been allocated to IMT in Region 1.[3] The band is allocated to mobile services (excluding aeronautical mobile services) on a co-primary basis with FS and FSS in the NRFP. There is provision for IMT in the entire 3600-3800MHz band. Within F3, spectrum can be allocated either wholly or partially to IMT.

[2] See Section 8 of ITU-R M.1036-7.

[3] See WRC-19 Resolution 223: Footnotes 5.343A and 5.343B.

4 Economic feasibility

4.1 The indications are that the highest value use for this band is for IMT services. Auction results in Australia[4], Croatia[5], Nigeria[6], Tanzania[7], and the UK[8], suggest that the band is highly valued for IMT. While there are other users of this band, including BFWA, FS, and FSS, various approaches to shared use of this band ensure encouraged investment into mobile communications.[9] The aforementioned auction results are as follows, expressed in 2025 Rands:

4.1.1 In Australia, 1035 MHz of spectrum were awarded within the 3600-3800 MHz range to three licensees during the 2018 auction, with an approximate value of R62.06 million per 10 MHz.[10]

4.1.2 In Croatia, 200 MHz of spectrum were awarded within the 3600-3800 MHz range to two licensees during the 2021 auction, with an approximate value of R15.22 million per 10 MHz.[11]

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[4] Australia Communications and Media Authority Auction summary - 3.6 GHz band (2018), available at: https://www.acma.gov.au/auction-summary-36-ghz-band-2018

[5] See HAKOM awarded radio frequency spectrum for the fifth-generation mobile communications, available at: https://www.hakom.hr/en/hakom-awarded-radio-frequency-spectrum-for-the-fifth-generation-mobile-communications/9081

[6] See: 5G: Mafab, MTN Emerge Winners in Nigeria's 3.5GHz Spectrum Auction, available at: https://ncc.gov.ng/media-centre/press-releases/breaking-press-statement-35ghz-spectrum-mtn-mafab-pay-licences

[7] See Tanzania Communications Regulatory Authority Public Notice: Results of the auction of radio frequency spectrum in IMT band (3600-3800 MHz), available at: https://tcra.go.tz/uploads/documents/en-1752158214-Public_Notice_Spectrum_Auction_1032107643381814476641029946369102376331752154874696.pdf

[8] See Ofcom Award of the 700 MHz and 3.6-3.8 GHz spectrum bands, available at: https://www.ofcom.org.uk/spectrum/spectrum-awards/700-mhz-and-3.6-3.8-ghz-auction

[9] See GSMA Spectrum Policy Trends 2023, available at: https://www.gsma.com/connectivity-for-good/spectrum/wp-content/uploads/2023/02/Spectrum-Policy-Trends-2023-1.pdf

[10] In Australia's 2018 auction, 1035 MHz of spectrum were awarded for the value of AUD 4.51 million per 10 MHz. This figure is converted to 2018 rands using an exchange rate of AUD 0.0996/R and subsequently inflated to 2025 Rands. For exchange rate data, see: https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates ; for CPI data see: https://www.statssa.gov.za/publications/P0141/CPIHistory.pdf

[11] In Croatia's 2021 auction, 200 MHz of spectrum were awarded for the value of HRK 5.37 million per 10 MHz. This figure is converted to 2021 USD using an exchange rate of HRK 6.4/USD, then from USD to Rands using R14.8/USD and subsequently inflated to 2025 Rands. For exchange rate data, see: https://data.worldbank.org/indicator/PA.NUS.FCRF ; for CPI data see: https://www.statssa.gov.za/publications/P0141/CPIHistory.pdf

4.1.3 In Nigeria, 200 MHz of spectrum in the 3700-3800 MHz range were awarded to two licensees during the 2022 auction, with an approximate value of R476.75 million per 10 MHz.[12]

4.1.4 In Tanzania, 200 MHz of spectrum were awarded to three licensees during the 2025 auction, with an approximate value of R81.06 million per 10 MHz.[13]

4.1.5 In the UK, Ofcom awarded 120 MHz of spectrum within the 3600-3800 MHz range to three licensees during the 2021 auction, with an approximate value of R1.07 billion per 10 MHz.[14]

4.1.6 These assignments reflect the potential high value of this band for IMT services in South Africa.

4.2 In the United States of America (the "US"), satellite operators Intelstat and SES received 4.9 billion USD[15] and 3.99 billion USD[16], respectively, from 2021 to 2023 to clear spectrum in the 3.7-4.0GHz range for IMT deployment. This translates to R0.84/MHz per person in South Africa for Intelstat (approximately R16 billion) and R0.68/MHz per person in South Africa for SES (approximately R13 billion)[17]. At the same time, the true valuation of the spectrum in South Africa in the hands of satellite operators is not clear, since:

4.2.1 The US example related to 300MHz rather than the 200MHz being considered here,

4.2.2 The US has significantly higher demand for data services given the substantially higher gross domestic product per capita.

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[12] In Nigeria's 2022 auction, 200 MHz of spectrum were awarded for the value of USD 27.36 million per 10MHz. This figure is converted to 2022 Rands using an exchange rate of R15.27/USD and subsequently inflated to 2025 Rands. For exchange rate data, see: https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates ; for CPI data see: https://www.statssa.gov.za/publications/P0141/CPIHistory.pdf

[13] In Tanzania's 2025 auction, 200 MHz were awarded for the value of TZS 11.79 billion per 10 MHz. This figure is converted to 2025 Rands using an exchange rate of TZS149.37/R. For exchange rate data, see: https://ws15.standardbank.co.za/finSnapShot/GetforexServlet

[14] In the UK's 2021 action, the 3720-3760 MHz range was awarded for the value of £176.4 million, equivalent to £44.1 million per 10 MHz. This figure is converted to 2021 Rands using an exchange rate of R19.81/£ and subsequently inflated to 2025 Rands. For exchange rate data, see: https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates ; for CPI data see: https://www.statssa.gov.za/publications/P0141/CPIHistory.pdf

[15] See https://www.intelsat.com/newsroom/intelsat-completes-c-band-spectrum-clearing-for-5g-deployment/

[16] See https://www.ses.com/press-release/ses-completes-fccs-c-band-transition-clearing-and-relocation-plan-us

[17] These amounts were calculated by dividing the USD amount by the amount of spectrum (300MHz) and the 2023 US population (roughly 333 million) and converting to South African Rands (ZAR) at an exchange rate of R17.11 to the USD. These amounts were then multiplied by the amount of spectrum (300MHz) and the South African population (64 million).

4.3 It is also important to note that there are three broadband fixed wireless access ("BWFA") licensees in the band, licensed on a secondary basis, that have rolled out IMT systems in the band. These stakeholders, including rain, Mthinte, and One Telecom, provided information to the effect that they have invested large sums of money in innovative network infrastructure that services large numbers of consumers. Changing the primary allocation to IMT may trigger a need for them to migrate out of the band, unless they were to bid for and successfully win radio frequency spectrum through a competitive assignment process. Their rollout of IMT infrastructure in the band provides further evidence that the band's highest value use is for IMT.

4.4 Overall, while there is some uncertainty on the valuation of 200MHz of 3.6GHz spectrum in South Africa, given the auctions of the spectrum to IMT providers in other African countries, it is likely that its highest value use is for IMT.

5 Technical feasibility

5.1 There may be concerns of interference or incompatibility between IMT services and incumbent users, particularly with FS and FSS. The ITU has identified measures that can be implemented to mitigate interference.[18] Techniques that can be implemented include:

5.1.1 Sector pointing to reduce emission power towards FSS earth station;

5.1.2 Multiple input, multiple output (“MIMO”) technique;

5.1.3 Antenna downtilting;

5.1.4 Low/medium power networks for local coverage;

5.1.5 Filtering of unwanted emissions of IMT transmitting stations;

5.1.6 Inter-service frequency separation; and

5.1.7 Distance-based mitigation.

5.2 The ITU also suggests the compilation of a registry of all FSS earth stations to gather information regarding geographical location and radio frequency allocations. This will ensure that regulators are aware of incumbent users and can implement appropriate

[18] See ITU Radiocommunication Study Groups. 2024. Mitigation measures between FSS and IMT in the frequency band 3 400-3 600 MHz. Document 4/28-E, available at: https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-S.2546-2025-PDF-E.pdf

coordination strategies[19]. The Global Satellite Operators' Association supports this recommendation.[20]

5.3 Alternatively, incumbent users may be migrated from the band to allocate more spectrum to IMT. This transition may be difficult in some African countries, where satellite service providers are reliant on C-band frequencies (3400-4200MHz).[21]

5.4 There have been different approaches to shared use of this band, including for private networks in Finland and Germany. For instance, mobile operators were permitted to deploy a private network on request, or sub-license the spectrum for that area, which has ensured efficient spectrum use.[22] In Tanzania, the 3600-3800MHz range has been reserved for mobile services, while other ranges of the C-band have been assigned to FS and FSS[23]. In South Africa, incumbent users may need to be migrated from the band to clear more spectrum for IMT.[24]

6 Maturity of the IMT ecosystem

6.1 The 3600-3800MHz has been allocated to mobile on a co-primary basis in all three ITU Regions. There are already many devices that support C-band frequencies.[25] As more countries allocate the band to IMT, either on a primary or secondary basis, the ecosystem is likely to continue growing.

7 International considerations

7.1 The band has been harmonised for mobile services in Europe since 2008[26]. Other non-African countries in Region 1 that have already allocated the band to IMT include the

[19] See ITU Radiocommunication Study Groups. 2024. Mitigation measures between FSS and IMT in the frequency band 3 400-3 600 MHz. Document 4/28-E, available at: https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-S.2546-2025-PDF-E.pdf

[20] See GSOA Adjacent band sharing 5G and FSS receiving stations in C-band, available at: https://www.icasa.org.za/uploads/files/GSOA-supplementary-submission-on-Draft-Consultation-Document-on-Spectrum-Outlook.pdf

[21] See WRC-19 Resolution 246.

[22] See GSMA Spectrum Policy Trends 2023, available at: https://www.gsma.com/connectivity-for-good/spectrum/wp-content/uploads/2023/02/Spectrum-Policy-Trends-2023-1.pdf

[23] See https://tcra.go.tz/uploads/text-editor/files/NATIONAL%20FREQUENCY%20ALLOCATION%20CHART,%202024_1717745723.pdf

[24] See Miller et al. 2021, available at: https://www.gsma.com/connectivity-for-good/spectrum/wp-content/uploads/2023/07/Sub-Saharan-Africa-Roadmaps-for-5G-Spectrum.pdf

[25] See ATU-R recommendation relating to International Mobile Telecommunications (IMT) Spectrum Roadmap For Africa. 2025, available at: https://atuuat.africa/wp-content/uploads/2025/08/Project-4-IMT-Spectrum-Roadmap-for-Africa-Final.pdf

[26] See CEPT Decision 2008/411/EC.

United Arab Emirates, Qatar, and Kuwait[27]. In Africa, Tanzania[28] and Nigeria[29] have auctioned spectrum to mobile service providers. South Africa has an obligation, as per the Act, to harmonise its allocations of spectrum with other countries in Region 1.

8 Stakeholder comments

8.1 Refer to Table 2 for a summary of stakeholders' comments on the Draft IMT Roadmap 2024, Second Draft IMT Roadmap 2025, and Draft Radio Frequency Migration Plan 2024, alongside the Authority's response.

Table 2: Stakeholder comments and the Authority's responses for the 3600 – 3800 MHz band

Stakeholder comments	Authority's comment
Vodacom, Comsol, Cell C, Huawei, MTN, Qualcomm, rain, and Telkom support the allocation of this band for IMT. MTN explains that the band is adjacent to the 3500MHz band which was sold at high values at auction by the Authority. Huawei considers that allocating this band to IMT will complete the 3300-3800MHz corridor of IMT spectrum.	The Authority is in the process of developing an RFSAP for IMT services in this band.
Rain previously suggested, in their comment on the Draft IMT Roadmap 2024, that due to their deployment of the latest compatible 5G equipment, licensees such as themselves, Mthinte, and One Telecom, do not need to be migrated from this band. rain further requests their direct participation in the feasibility study for this band, as they currently control 80MHz within this band. Rain's submission regarding the Second Draft IMT Roadmap 2025 contains similar comments.	It is not possible for coexistence between BFWA licensee incumbents and IMT within this band. Thus, incumbents licensed for BFWA in this band may need to migrate their services outside of the band.
MTN and Vodacom support the migration of incumbents from this band. Vodacom proposes that this should take place because some BWFA incumbents have small numbers of users, and the band is being denied to mass-market users. MTN proposes that migration recommendations take into account the life of the equipment deployed by licensees in this band.	
MTN, Telkom, and Comsol note that this band is allocated for BFWA use on a secondary basis, and that there are also FS PTP and/or FSS. Comsol explained that the European Conference of Postal and Telecommunications Regulators ("CEPT") supports allocation of the band to IMT, with the same conditions applying across the 3400-3800MHz band, and provided that there are no undue constraints on existing services. There is a PFD-limit and coordination procedures that protect fixed-satellite services. If the PFD limit at the border is exceeded, then coordination under no. 9.21 applies.	Stakeholders are encouraged to comment on coexistence with FS PTP and FSS in this band.

[27] See Kirtay et al. 2020. Upgrading mobile service allocation in 3600-3800 MHz, available at: https://plumconsulting.co.uk/upgrading-mobile-service-allocation-in-3600-3800-mhz/

[28] See https://tcra.go.tz/uploads/documents/en-1752158214-Public_Notice_Spectrum_Auction_1032107643381814476641029946369102376331752154874696.pdf

[29] See https://www.ncc.gov.ng/media-centre/press-releases/5g-mafab-mtn-emerge-winners-nigerias-35ghz-spectrum-auction?utm_source=chatgpt.com

Stakeholder comments	Authority's comment
GSOA previously expressed concern, in its response to the 2024 Draft IMT Roadmap, that deploying IMT services could create incompatibility issues for satellite uses, potentially resulting in the displacement of the latter from this band. The GSOA requested information on what protection would be put in place for satellite operators in this band. Further, C-band currently comprises 31% of satellite capacity in Africa. MTN notes that where allocations to different BFWA operators overlap, coordination is required between these operators, as well as FS PTP and FSS systems. Cell C urges the importance of setting out co-existence guidelines.	
Huawei has advised against the use of this band for private networks.	Private network licenses are currently being considered only a limited geographic basis. Stakeholders are encouraged to comment on this question.

9 Considerations in favour of and against IMT allocation

9.1 There are a number of advantages to allocating this band to IMT:

9.1.1 The NRFP proposed the allocation of the 3600-3800 MHz to IMT;

9.1.2 The allocation of this band to IMT is economically feasible;

9.1.3 The IMT ecosystem is likely to continue growing;

9.1.4 Other countries in Region 1 have already or are in the process of allocating this band to mobile services;

9.1.5 While some stakeholders voice concern, several stakeholders consider that the band should be allocated to IMT;

9.1.6 However, there are some disadvantages:

9.1.7 There is risk of interference when the band is shared amongst IMT and other users;

9.1.8 Other African countries are reliant on FS and FSS that operate within this band;

9.1.9 Incompatibility with satellite users is likely;

9.1.10 Incumbent users will potentially need to migrate outside of this band.

9.2 Despite the risk of interference with other users and likely incompatibility with satellite incumbents which means migration of incumbent users is probable, as well as the reliance of African countries on FS and FSS, auction results from other countries clearly indicate that the band is valuable for IMT which is supported by allocations in other Region 1 countries and stakeholder backing. The considerations in favour of the allocation of this band for IMT, therefore, outweigh those against doing so.