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Per mail: rmakgotlho@icasa.org.za.

Dear Mr Makgotlho

Mobile Telephone Network ("MTN") thanks the Authority for the opportunity to make written representation on the Long-term spectrum outlook as published on Notice 738 of Government Gazette No. 45690 published on 24 December 2021.

MTN commends the Authority for consulting industry players on the spectrum outlook for the future in South Africa. MTN would like to emphasize that whilst the Long-term spectrum outlook studies are important for future planning, timely implementation of spectrum allocations is crucial for stimulating technological advances and economic growth in South Africa.

In this written representation, MTN provides answers to the questionnaire in the Long-term spectrum outlook document in Notice 738 of Government Gazette No. 45690 published on 24 December 2021.

We remain committed in supporting the Authority in ensuring that the radio frequency spectrum is managed more effectively and efficiently, and beneficial to the overall growth of the South African economy.

Yours sincerely,

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Thobela Frans
Manager: Technical Regulations and Mandated Provisioning
Mobile Telephone Networks (Pty) Ltd

MTN'S COMMENTS ON THE NOTICE REGARDING THE FINDINGS ON THE INQUIRY ON THE LONG-TERM SPECTRUM OUTLOOK PUBLISHED ON NOTICE 738 OF GOVERNMENT GAZETTE 45690 DATED 24 DECEMBER 2021

Section1: Introduction

MTN is pleased to submit its answers to ICASA requests on the Long-term spectrum outlook in South Africa.

Long-term planning of the radio frequency spectrum usage is a very important step of effective spectrum management to ensure that South Africa remains competitive to other nations, both in terms of technological advances and economic status. For South Africa, more detailed and recent research of the ecosystem readiness and market studies that are conducted with industry players would give more insights on the current market and the future estimates of the demand for technologies and consequently the future demand for spectrum. Fast execution of migration plans, and allocation of new spectrum will determine the effectiveness of Long-term spectrum plans.

Ultimately, the facilitation of an enabling regulatory environment will allow operators to rapidly roll out advanced technologies and further stimulate broadband connectivity in South Africa to the benefit of consumers and world class connectivity.

Section 2: Long Term Spectrum Outlook Questions

Consultation questions:

Question 1.

Please comment on whether the above captures the relevant regulatory and policy aspects of long-term spectrum planning.

MTN Response:

The document captures the relevant regulatory and policy aspects of long-term spectrum planning. The Authority needs to ensure that there is alignment and consistency between the Long-term spectrum outlook for South Africa, the NRFP, Migration plans and IMT Roadmap. It is imperative that while ensuring alignment that the Authority provide regulatory certainty to ensure continued investment in this capital extensive sector. A clear articulation of the process is required by the Authority on how it intends to address instances were previous assignments/licences have been issued to entities but the allocation has subsequently (or in the future) been changed at an ITU level that identifies the band as high demand, or where secondary assignments have been by the Authority to entities for future high demand spectrum without following a competitive process as required by the radio frequency spectrum regulations. Without a clear understanding the Authority creates an environment where secondary users believe that their assignment will be promoted to primary with all the rights and protection and creating an environment that cannot be considered fair or transparent.

Question 2.

Are there services, in addition to broadband, that ought to be considered as important for economic growth? If so, please explain what these services might be and what the trade-offs are between using spectrum for broadband and alternative services. Please provide any evidence from other countries that may be relevant.

MTN Response:

Internet of Things (IoT) services have grown in importance over the past few years and will become a important element for economic growth. Smart city applications, smart grid applications, smart home, manufacturing applications are example of IoT applications that will be important for economic growth. These applications will require further frequency replanning and migrations since most will be using frequency bands that are already in use currently in South Africa. Even though there is a strong demand for mobile services spectrum, it is strongly advised that 450-470MHz be explored since South African operators are currently using the existing licensed bands (such as 900MHz) to deploy IoT technology and to cater for thousands of devices in spectrum constrained environment.

IoT requirements are also a reason why the reduction of spectrum in IMT900 harmonisation process with the intention to aligning to 5MHz blocks suitable for 3G/LTE MBB doesn't align with the bigger picture including IoT requirements. The IMT900 harmonisation only considers broadband services without taking the long-term requirements for IoT services into consideration. The NB-IoT service is based on narrow-band channels (much like GSM) and hence the 2x1MHz spectrum that the Authority is requiring operator's with 900MHz spectrum to relinquish (from 2x11MHz to 2x10MHz reduction) is actually required by these operators for the deployment of narrowband IoT services in parallel with the need for a contiguous 2x10MHz for broadband services.

Additionally, the development within artificial intelligence-based systems in recent years has focused on Machine Learning (ML). Nowhere is this more relevant than in Mobility and Transportation where navigation is provided through real-time guidance in metropolitan areas.

Question 3.

Please comment on the above assessment of the status quo on broadband penetration in South Africa, and what role spectrum may play in addressing the gaps identified.

MTN Response:

In large swarths od South Africa and Africa in general broadband connectivity is mobile first, mobile only, largely due to the lack of "fixed line" infrastructure and even where this is deployed it is often being replace for wireless access due to theft of copper lines. While the proportion of connected individuals continue to grow, there is still a huge gap between the people who have access to broadband services and those who do not. Access to new technologies can be accelerated by the rapid assignment of the relevant spectrum supporting these technologies, without access to the necessary spectrum resources networks remain constrained and newer technology is not deployed as widespread as possible. Therefore, it is incumbent upon the Regulator to identify appropriate radio frequency bands in a timely manner, initiate the necessary migration plans and assign the spectrum in a manner that is most beneficial for South Africa.

Question 4.

What future changes, if any, should ICASA examine with regard to the existing licensing regime to better plan for innovative new technologies and applications and allow for benefits that new technology can offer, such as improved spectrum efficiency?

MTN Response:

While the Authority has adopted a technology neutral environment, the question of Service-Neutrality licensing mechanisms should be taken into account considering recommendations that are developed at the World Radio Conferences. The growth in broadband services continues to grow at a rapid rate and the need for additional IMT spectrum resources needed to support this growth remains especially for mobile spectrum. If the regulator where to consider the impact of post decision that have created an imbalance in assignment, for example when the Authority sanctioned the repurpose of Telkom's assignment of the 2300MHz spectrum which was originally assigned for fixed links. When this spectrum was identified for IMT use at WRC-07, and enacted in South Africa in 2010, the Authority in MTN's view should have initiated a migration of the incumbent out of the band to enable the licencing of IMT services within this band through a competitive process. If the Authority does not amend the existing licensing regime operators that have previously been assigned massive amounts on "mmWave spectrum" that has now been allocated for IMT will have an unassailable advantage compared to others. Bands n257 and n258 have already proven to be critical for 5G networks to address low-latency and eMBB service requirements as part of 4IR, so the regulator urged to initiate harmonisation processes to speed up deployment of 5G on these bands as discussed at WRC'19. Sanctioning this once may be considered an oversight, enabling this again would be a travesty. That said, MTN fully supports a technology neutral environment which enables operators to implement their own methods to ensure that they

use spectrum efficiently (e.g., deploying multiple technologies that can co-exist without causing interference in their allocated frequency blocks).

Question 5.

What future emerging technologies are to be taken into consideration and which technologies will have a significant impact? When are these technologies expected to become available?

MTN Response:

Artificial Intelligence technologies (machine learning, visual recognition, and robotics) already prevalent around the world, these developments in technologies will have a significant impact on the future usage of spectrum in South Africa. Moreover, AR (augmented reality) and VR (virtual reality) will become more prevalent across industries demanding low network latency and high broadband speeds. Additionally, Satellite broadband services which already exist should be taken into consideration as well as this technology overcomes terrestrial and topological challenges and has the ability to improve broadband penetration in remote rural areas. This means that more appropriate radio frequency spectrum will be required in the satellite frequency bands.

Question 6.

What and how will technology developments and/or usage trends aid in relieving traffic pressures? When are these technologies expected to become available?

MTN Response:

It is critical for network operators to deploy more spectrally efficient technologies (such as LTE and NR) to address high-demand service needs, however, the appropriate spectrum resources would need to be in place for this and regulator can assist in making new IMT spectrum available. Furthermore, deployment of advanced Satellite technologies (e.g., Satellite IoT will also assist in relieving traffic in the near future). By 2025, some 30.3 million Satellite IoT devices are expected to be deployed globally[1].

Question 7.

Are there any IoT applications that will have a large impact on the existing licence-exempt bands? If so, what bands will see the most impact from these applications?

[1] http://satellitemarkets.com/satellite-iot-game-changer-industry

MTN Response:

Real-Time Locating Systems, Indoor Positioning and Sensing Systems will have significant impact and can be deployed on ISM bands[2] (e.g. 868 MHz) the and 5GHz bands (e.g. 5150 – 5350 MHz

Question 8.

Please provide your views regarding the standardization of the naming of applications in the NRFP in accordance with CEPT ECC decision 1(03) approved 15 November 2001 and its subsequent revisions.

MTN Response:

It is MTN's understanding that the Authority is already required to provide a radio frequency database that is to be updated on a periodic basis.

Administrations shall enter and maintain the following mandatory data into EFIS:

a) Spectrum allocations on a national level according to the List of Radio Services in the ITU RR in Annex.

b) Spectrum applications on a national level according to the List of Searchable Applications in Annex 2;

c) A Contact Person within the Administration who will be responsible for the maintenance of the national frequency information related to EFIS.

Question 9.

What are your forecasts for data traffic and radio frequency spectrum needed over the next 5, 10 and 20 years for each of the EFIS application layers?

MTN Response:

In general, MTN expects data traffic to exceed 6000 PB on its network by 2027 utilising existing IMT licensed and temporary spectrum resources.

Question 10.

How much spectrum is allocated to each of the EFIS application layers, and what is the economic value of spectrum used in each of the above EFIS application layers? What are the opportunity costs for current spectrum allocations for EFIS these application layers (what is the value to alternative users of these allocations)?

MTN Response:

This is an exercise that regulator can undertake since external consultants will be required by MTN to perform such an in-depth calculation. MTN has already provided financial detail and economic impact within recent Spectrum ITA bid book submitted to the authority at the of end January 2022.

[2] https://build.sigfox.com/sigfox-radio-configurations-rc

Question 11.

How should demand for commercial mobile services and IMT in the next few years be determined? What traffic model should be used in South Africa for traffic demand expectations? What are your comments on the spectrum requirements set out on Table 2? What are your views on using the Recommendation ITU-R M.1768-1 methodology to forecast IMT spectrum demand in South Africa? Please complete the input parameters in the attached spreadsheet for the market study information needed to apply the Recommendation ITU-R M.1768-1.

MTN Response:

Market forecasts should be the first step in determining the demand for future commercial mobile services and IMT in South Africa. Future spectrum requirements estimates for terrestrial IMT presented in Table 2 will have to be reviewed with the most recent market forecasts data for South Africa. Recommendation ITU-R M.1768-1 methodology is still relevant to forecast IMT spectrum demand in South Africa.

Question 12.

Provide your support or reasons for objections on the bands being considered internationally for 5G commercial mobile allocations.

MTN Response:

We support the bands being considered internationally for 5G commercial mobile allocations. These bands are in line with ITU and other telecommunications standardisation bodies recommendations.

Question 13.

Are the spectrum allocations comprehensive enough for spectrum demand projections for commercial mobile services in South Africa for the next 10 to 20 years?

MTN Response:

Spectrum allocations are comprehensive for spectrum demand projections for commercial mobile services in South Africa. However, there are uncertainties about the spectrum management framework in South Africa, particularly the transparency regarding the allocation processes (i.e., spectrum occupancy, migration plans and timelines)

Question 14.

Is there a demand for more flexible frequency licensing and frequency assignment/allotments processes on a regional basis required to complement the national frequency licensing and frequency assignments/allotments in the next 10 to 20 years?

MTN Response:

Whilst spectrum allotments based on regional basis may assist in bridging the digital divide in South Africa in future, it may impede innovative spectrum management initiatives by users of spectrum. Focus should be on spectrum licensing conditions, on certain frequency bands, with broadband connectivity target to address socio-economic issues in South Africa.

Question 15.

Are there any other frequency bands that should be considered for release in the next 10 to 20 years for commercial mobile that are not discussed? Provide motivations for your proposal.

MTN Response:

5925 - 6425 MHz

Wifi 6E can be deployed in 6GHz to enhance Wifi experience as part of 4IR

Both 5G and Wi-Fi (on 6Ghz or 60Ghz) are complementary technologies achieving gigabit speeds, lower latencies and increased capacity over their predecessors.

5G and Wi-Fi 6 will provide an advancement in performance for new and existing networks for the next generation of advanced applications.

Other frequency band that should be considered 4.33GHz, 2.4GHz to 5GHz. Encourage re-farming of the 900MHz for NB-IoT services provisioning. And other sub 1GHz frequencies such will be required for long range IoT services[3].

66 - 71 GHz

Can be used for 60GHz WiGig deployments[4].

Question 16.

Which vertical markets will require the most secured licensed spectrum to overcome their current interference and congestion issues?

MTN Response:

Rail, Aeronautical, Astronomical and PPDR radio communication services.

Question 17.

Assuming that South Africa follows the ITU's recommendations to assign up to 1,940 MHz of spectrum for IMT-2000 and IMT-advanced services, and that South Africa follows trends in Europe for potentially another 2,000 MHz of spectrum for IMT-2020, what bands would need to be freed up?

MTN Response:

6GHz,31.8 – 33.4 GHz, 37-43.5 GHz (40 GHz band), 66-71 GHz, 47.2-50.2 GHz and 50.4-52.6 GHz.

[3] https://www.wi-fi.org/countries-enabling-wi-fi-6e

[4] https://www.wi-fi.org/discover-wi-fi/wi-fi-certified-wigig

Question 18.

What are your views on reallocating the following bands for IMT over the next years? 44 Table 3: List of possible future IMT bands (please supplement or delete as your organisation considers reasonable)

- 450-470 (20 MHz)
- 617-698 (70 MHz)
- 1 427-1 518 (91 MHz)
- 1 710-2 025 (315 MHz)
- 3 300-3 400 (100 MHz)
- 3 400-3 600 (200 MHz)
- 3 600-3 800 (200 MHz)
- 4 800-4 990 (190 MHz)
- 24 250-27 500 (3250 MHz)
- 37 000-43 500 (6500 MHz)
- 45 500-47 000 (1500 MHz)
- 47 200-48 200 (1000 MHz)
- 66 000-71 000 (5000 MHz)

MTN Response:

MTN supports the consideration of the listed bands for IMT. The 700 & 800MHz bands will also be vital for long-range 5G coverage. Spectrum in mid-bands such as 2300MHz and 3300-3400MHz that have already been allocated for IMT should be assigned through a competitive licencing process as soon as reasonably possible.

MTN is aware of the recent assignments of spectrum within the sub-band 3 600-3 800 MHz for BFWA on a secondary basis where frequency sharing with FS PTP and/or FSS is feasible, and that these assignments for BFWA to different parties overlap with each other. Hence coordination is required not only between BFWA, FS PTP and FSS services, but also between BWFA service providers with overlapping allocations. MTN is aware that there have been instances of BFWA systems interfering with satellite ground stations and would urge the Authority to make available a central database of FSS ground station locations in order that the BFWA licensees of this spectrum are able to design their networks to avoid interference with the FSS ground stations.

It would be expected that the entities/organisations with FSS ground stations that wish to be protected from the BFWA systems would be willing to provide such information in order to protect their satellite systems from interference. MTN also notes that some countries have identified the 3600-3800 MHz band for IMT, and that WRC-19 resolved to conduct sharing and compatibility studies in preparation for WRC-23 to consider possible allocation of the 3600-3800 MHz band to mobile, except aeronautical mobile, service on a primary basis within Region 1 which would pave the way for this band to be identified for IMT services within Region 1 (and hence South Africa). MTN believes that the current overlapping allocations for secondary use would not

be conducive to IMT services, and that harmonisation of the band would be required. Therefore, should the band be identified for IMT in Region 1, MTN proposes that this should trigger a high demand spectrum process whereby all secondary users could only acquire/retain spectrum in this band via a competitive process as defined in Regulation 7 of the radio frequency spectrum regulations of 2015. Any subjectivity between shall, as stated in the Radio Frequency Migration Plan 2019 section 5 and may as described in the ECA section 34(16) in relation to migration must be clarified as a matter of urgency.

For ease of reference both aforementioned sections are provided below.

Radio Frequency Migration Plan 2019

The Authority shall initiate a process of radio frequency migration in the following circumstances:

(a) As specified in the Frequency Migration Plan.

(b) Where a change in the use of a radio frequency band is required to bring

the South African National Radio Frequency Plan in line with the final acts of the latest WRC and in turn, the latest ITU Radio-Regulations;

whereas Section 34(16) of the ECA states that:

The Authority may, where the national radio frequency plan identifies radio frequency spectrum that is occupied and requires the migration of the users of such radio frequency spectrum to other radio frequency bands, migrate the users to such other radio frequency bands in accordance with the national radio frequency plan, except where such migration involves governmental entities or organisations, in which case the Authority—

(a) must refer the matter to the Minister; and

(b) may migrate the users after consultation with the Minister

Question 19.

Provide your support or reasons for objections on the bands being considered internationally for 5G commercial mobile, fixed, satellite, or licence-exempt allocations.

MTN Response:

MTN supports the bands be considered for 5G Commercial mobile, fixed, satellite and licence-exempt allocations. However, careful migration plans must still be developed to ensure that the spectrum is used efficiently, minimise the migration costs on incumbents and interference is also avoided.

Question 20.

Provide your support or reasons for objections on the bands being considered internationally for fixed applications. Please provide a list of such bands for potential fixed use.

MTN Response:

Table 4: List of possible future fixed bands

- 8GHz- more block allocations needed for fixed links in South Africa
- 10.5GHz should remain for fixed backhaul links,
- 11GHz should remain for fixed backhaul links – Replanning of channels and migration needed to avoid interference with existing satellite operations in Ka-Band.
- 13GHz – more block spectrum allocations will be necessary to cater for high 5G traffic demand.
- 15GHz should remain for fixed backhaul links. More block spectrum allocations if possible.
- 18GHz – more block spectrum allocations will be necessary to cater for high 5G traffic demand.

Question 21.

Are the spectrum allocations comprehensive enough for spectrum demand projections for fixed services in South Africa for the next 10 to 20 years?

MTN Response:

Even though the correct bands have been allocated, the current allocations are not comprehensive enough for spectrum demand projections for fixed services in South Africa for the next 10 to 20 years. The is a need for renewal of channel allocations, a shift from individual channel allocations to clock allocations for operators. Efficient frequency planning and effective migration plans still need to be developed in bands above 20GHz since these bands are more attractive for 5G services.

Question 22.

Is there a demand for more flexible frequency licensing and frequency assignment/allotments processes for fixed services on a regional basis required to complement the national frequency licensing and frequency assignments/allotments in the next 10 to 20 years?

MTN Response:

There is a need for a more flexible licensing process that will allow licensees to use the spectrum either for IMT mobile services or fixed services. For example, allocating block spectrum in mmWave bands identified for 5G use and allow operators to either use this band either IMT mobile service or fixed (PTP links) depending on the operator's demand or regional basis.

Question 23.

Are there any other frequency bands that should be considered for release in the next 10 to 20 years for fixed services that are not discussed? Provide motivations for your proposal.

MTN Response:

There should be block allocations in the E-band (71 to 76 GHz, 81 to 86 GHz) for fixed PTP services. Consider 92 to 95 GHz for high-capacity fixed services as well.

Question 24.

Will the demand for commercial mobile, licence-exempt, satellite, or fixed wireless services/applications impact the demand for backhaul spectrum? If so, how and which of these

MTN Response:

Yes. Any rise in demand for commercial mobile, licence-exempt, satellite, or fixed wireless services/applications results in increased traffic and congestion in terrestrial backhaul networks. Therefore, more transmission channels, with wider bandwidth are required. It is expected that additional channels will be required on all existing frequency bands which are currently allocated for fixed backhaul. Bands affected include 7GHz, 8GHz, 10GHz, 13GHZ, 15GHz, 18GHz and 23GHz.

Question 25.

Are there adequate spectrum allocations for video backhaul for broadcast and security services in South Africa? What is the realistic demand for these services in the next 10 to 20 years?

MTN Response:

Question 26.

How much will transmission technology improve the volume of traffic in the next 10 to 20 years?

MTN Response:

Satellite backhaul technology for cellular mobile services is becoming a necessity in South Africa to ease traffic volumes in terrestrial fixed transmission networks. The main limitation of this technology is high costs of deployment as well as latency. Newer modulation schemes and configurations (MIMO and multi band technologies) in PTP transmission also becoming crucial to improve the traffic carrying capacity in transmission networks while conserving spectrum. Innovation in the use of the E-band (distance and reliability) will also be important. However, it has to be stated that this will not realistically compare to an increase in spectrum resources as these technologies usual involve dependencies and trade-offs.

Question 27.

What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for backhaul services? When are these technologies expected to become available?

MTN Response:

MIMO and Multi-Carrier Bonding are new technology developments aimed at increasing capacity of microwave links. These technologies are now available.

Question 28.

How much bandwidth for backhaul will be saved due to the deployment of fibre networks in South Africa for the next 5, 10 to 20 years?

MTN Response:

Spectrum that is no longer used for fixed backhaul due to fibre deployment should be reused to provision other services and technologies. Hence the need for flexible licensing approaches (service -neutral, technology-neutral) to enable spectrum to be redeployed immediately to address real traffic demands instead of "saving" and returning it to the regulator before it can be re-allocated for another use.

Question 29.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Aeronautical services in South Africa?

MTN Response:

Question 30.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Broadcasting services in South Africa?

MTN Response:

Question 31.

How much spectrum should be maintained for terrestrial broadcasting in the band 470 MHz to 694 MHz in the next 10 to 20 years?

MTN Response:

Question 32.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Defence services in South Africa?

MTN Response:

The demand for PPDR service will grow in the next 10 to 20 years in South Africa, however the market is still low now for these services. In South Africa there is no clear spectrum allocations for these services. These services will need to be protected from interference, and so there is a need to replan and reserve contiguous blocks of spectrum on the 380-470MHz for PPDR services.

Question 36.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for PPDR services in South Africa?

MTN Response:

The growing demand for PPDR communications can be addressed by opening up more spectrum in the 380MHz-470MHz. There will be a need to replan the current PDDR frequencies to avoid interference with other SDR applications in this band, and the possible future NB-IoT in the 450-470MHz range.

Question 37.

Can mobile broadband currently be used for PPDR purposes? If not, will this be possible in the future with better quality of service and lower prices?

MTN Response:

PPDR must be allocated its own separate frequency bands according to WRC -15 RESOLUTION 646. However, the IMT spectrum in the 700MHz and 800MHz should not be considered for PPDR purposes in South Africa.

Question 38.

Are there any reasons to consider further spectrum from broadcasting in the band 470 MHz to 694 MHz to public protection and disaster relief (PPDR) services in the next 10 to 20 years?

MTN Response:

The 470MHz -694MHz spectrum has already been allocated for DTT in South Africa and attempting to allow PPDR services to co-exist with Digital TV broadcasting may induce unwanted interference.

Question 39.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Satellite services in South Africa?

MTN Response:

The high cost of satellite deployment will impact the demand for satellite broadband services. There is no adequate spectrum allocations for satellite in South Africa as many cases of interference have been reported on the Ku-band (12 to 18 GHz). Part of the Ka-band (26.5 to 40 GHz), the 26, 28 and 38GHz has already been allocated for fixed backhaul services and is attracting attention for IMT.

Question 40.

Which applications and allocations will require the most frequency spectrum demand in the following frequency bands? □ C-band □ Ku-band □ Ka-band

MTN Response:

Ka-band: is the most attractive band for 5G services (specifically mobile broadband services) and will require more spectrum. C-band: 3GPP release 15 identified three bands n77, n78, and n79 for 5G.

Ku-band: Sufficient for satellite TV. There will be a need to open -up more spectrum for fixed (PTP) backhaul services.

Question 41.

What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for satellite services? When are these technologies expected to become available?

MTN Response:

MIMO and Multi-Carrier Bonding are new technology developments aimed at increasing capacity of microwave links. These will ease the demand for more spectrum especially in Ku-band.

Question 42.

What will impact on the demand for these services/applications in the coming 10-20 years? What is the realistic demand for these services in the next 10 to 20 years? Are there adequate spectrum allocations for Astronomy services in South Africa?

MTN Response:

There are no adequate spectrum allocations for Astronomy services in South Africa because there is no clear estimate on the future demand. Mobile backhaul services have been affected and forced to vacate critical bands.

Question 44. Which vertical markets will require most secured licensed spectrum to overcome their current interference and congestion issues?

MTN Response:

Security, defence, rail industry, mining industries, smart cities will require most secured licensed spectrum.

Question 45.

How much will spectrum management and orderly frequency planning improve the interference situations in certain frequency bands?

MTN Response:

Frequency planning is very critical to avoid interference cases. Authority-block coordinated allocations will also assist to minimise interference.

Question 46.

Please provide input on future spectrum requirements for the different service allocations as well as the urgency for such additional frequency allocations for such a service.

MTN Response:

The demand for additional bandwidths on allocated spectrum is high, requiring the regulator to allocate more frequency channels for existing services. For example, mobile broadband services require higher bandwidth channels now even on the 900,1800 and 2100MHz bands. Also, additional channels on existing frequency bands for fixed backhaul services are needed now. New applications (IoT) will require regulators to open new frequency bands regularly, instead of waiting for 5 -10 years before new bands can be allocated.

Question 47.

Which Service allocations require RFSAPs and for which frequency bands. Also specify the urgency for the creation of such RFSAPs.

MTN Response:

For effective spectrum management, all telecommunications service allocations require RFSAPs urgently. RFSAPs can then be amended as and when required for specific services.

Question 48. Please provide your organisations strategy and suggestions on how the Authority can ensure that spectrum outlook and demand studies can contribute to stimulation of the South African economy.

MTN Response:

The Authority must consult regularly with industry players when conducting demanding studies, focusing on the South African ecosystem and focus on implementation of spectrum plans. So far, the Authority is over-analysing the future of spectrum and no migration plans or new spectrum band allocations are executed to stimulate the economy. The Authority should now consider more licensing approaches like allocating blocks of spectrum and allow operators to decide which technologies and services can be deployed. For example, mobile operators have successfully refarmed their GSM spectrum

and deployed 3G and LTE on the same spectrum. Demands studies and feasibility studies should be focused on South African ecosystem and not be based on European use cases if spectrum allocations are to stimulate growth in South Africa.

Question 49.

The spectrum outlook described above in Section 4, and in particular the substantial additional requirements for IMT and fixed-wireless spectrum, suggest that a number of additional bands will need to be assigned for the purposes of internet access, and incumbent users will need to be migrated out of the bands mentioned in the list on Table 3 and on any bands your organisation suggests on Table 4. What are the costs of migrating these users so that radio frequency spectrum is allocated to its highest value use?

MTN Response:

The costs of migrating incumbents from one band to another is huge. Rushed migration of users out of certain bands may be too costly for operators who have invested huge amounts of Capex on band-specific hardware infrastructure that cannot be used in the new allocated band.

Question 50.

What would the costs of freeing up spectrum for commercial fixed and mobile use be (considering the bands mentioned above on Table 3 and Table 4)? What would the economic benefits of doing so be, in respect of increase consumer surplus, and increased producer surplus?

MTN Response:

Question 51.

Assuming that South Africa follows the ITU's recommendations to assign up to 1,940 MHz of spectrum for IMT-2000 and IMT-advanced services, and that South Africa follows trends in Europe for potentially another 2,000 MHz of spectrum for IMT-2020, what would the costs of freeing up the various spectrum bands be? In this regard, please refer to Table 3 and Table 4, as explained above.

MTN Response:

Most of the cost for mobile operators would be on migrating out of the 26GHz and 38GHz. For MTN, backhaul fixed PTP hardware on 7066 will have to be decommissioned as it cannot be used in any other frequency band.

Question 52.

Due to the scarcity of high demand spectrum and the consequential fact that Spectrum Sharing in certain bands are non-negotiable, how shall you describe the best sharing conditions for the South African scenario?

MTN Response:

In the South African scenario, the best sharing technique can be Interweave where the secondary user knows the spectral holes in space, time, or frequency. However, secondary users must also incur the cost of using the spectrum (by paying the primary user for access) and not use it for free.

Question 53.

Due to the convergence of technologies and the changes in regulatory licensing environment do you believe that certain service allocations categories will or need to change?

MTN Response:

Satellite allocations may have to change as the demand for satellite broadband backhaul service increases. Fixed (e.g. mobile backhaul) allocations will have to change since more of the traditional microwave transmission spectrum bands are attracting more interest for 5G or IMT applications

Question 54.

What existing licence-exempt frequency bands will see the most evolution in the next five years?

MTN Response:

5150 – 5350 MHz, 5470 – 5725 MHz will see the most evolution due to the advances in Artificial Intelligence, IoT for both for indoor and outdoor services

Question 55.

How much spectrum, and in which bands, should be made available for licence-exempt purposes (such as Wi-Fi) over the 5, 10 and 20 years? What would the costs of freeing up these bands for IMT be? What would the economic benefits of doing so be, in respect of increase consumer surplus, and increased producer surplus? Which vertical markets will require most secured licensed spectrum to overcome their current interference and congestion issues?

MTN Response:

There is a need for South Africa to start re-planning the 6GHz spectrum for Wifi-6E, the 5.925 to 7.125 GHz spectrum. Currently, this spectrum is allocated for long-range fixed PTP backhauling services. Because this spectrum is mostly used for transmission in remote rural areas, it can be allocated for WiFi-6E in suburban environments where most of the fixed backhaul services are in the bands above 20GHz. Allowing incumbents in the 6GHz to use this spectrum on a "service and technology neutrality basis" will ensure that the spectrum is utilised more efficiently nationally.

Question 56.

How much spectrum, and in which bands, should be made available for dynamic spectrum access over the next 5, 10 and 20 years? What would the cost of freeing up these bands for IMT be? What would the economic benefits of doing so be, in respect of increase consumer surplus and increase producer surplus?

MTN Response:

DTT spectrum should be used for dynamic access by mobile broadband service providers.

Question 57.

What existing licence-exempt frequency bands will see the most evolution in the next 5 years?

MTN Response:

2400 – 2483.5 MHz , 5150 – 5350 MHz, 5725 – 5850 MHz, 57.00 – 66 GHz will see the most evolution due to the expected increase in IoT applications and huge demand to Wi-Fi services

Question 58.

Are there any IoT applications that will have a large impact on licence-exempt bands? If so, what bands will see the most impact from these applications?

MTN Response:

Robotics, Artificial intelligence and smart cities will have huge impact on licence-exempt bands (e.g., 2.4GHz, 5.8GHz)

Question 59.

Will the trend for offering carrier-grade or managed Wi-Fi services continue to increase over the next five years? If so, will this impact congestion in Wi-Fi bands and which bands would be most affected.

MTN Response: The demand for carrier-grade Wi-Fi services will continue to increase with 5G services penetration in the next five years and this will result in congestion in traditional Wi-Fi bands. The 2.4GHz and 5.8GHz band will see increased traffic. Wi-Fi6 has shown globally to compliment 5G technology. Hence the call for consideration of WI-Fi6E in the 6GHz spectrum. The availability of the 60GHz spectrum band should be further analysed as it has the potential to ease the increasing Wi-Fi networks traffic.

Section 3: Conclusion

Mobile broadband services will continue to have a huge impact on the adoption of telecommunications technologies in South Africa. An increasing demand in Wi-Fi, indoor networks, private networks, IoT applications and satellite applications eventually results in increasing demand for more radio frequency spectrum for mobile networks. Therefore, mobile networks will continue to require huge amounts of spectrum and a more flexible regulatory environment to ensure that South Africa does not lag in technology adoption and benefit from global technology advancements.

The increasing demand for commercial mobile services results in huge demand for more fixed backhaul services spectrum channels to carry traffic. Therefore, a strong balance must be maintained between IMT spectrum demands and fixed backhauling spectrum demands to avoid congestion on traditional backhaul spectrum bands. Block allocations and Authority-coordinated spectrum allocations are critical to minimise interference in telecommunications operations. Flexible licensing methods like service-neutral and technology are necessary to ensure that the allocated spectrum is used efficiently by licensees.