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Our reference: 201901/07/30

28 January 2019

Mr Manyaapelo Richard Makgotlho
Independent Communications Authority of South Africa
350 Witch-Hazel Avenue
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Via email: RMakgotlho@icasa.org.za

Dear Mr Makgotlho

RE: Draft International Mobile Telecommunications (IMT) Roadmap for consultation

Mobile Telephone Networks ("MTN") would like to thank the Independent Communications Authority of South Africa ("Authority") for the opportunity to make comment on the draft International Mobile Telecommunications (IMT) Roadmap.

Please find herewith our submission which comprises three main sections: introduction, general comments and specific comments on the draft IMT Roadmap.

MTN hereby requests an opportunity to make oral representations should the Authority proceed with the public hearings as planned.

Kind regards,

Geoff Blake
Senior Manager: Technical Regulations & Mandated Provisioning
Mobile Telephone Networks (Pty) Ltd

MTN'S COMMENTS ON THE DRAFT INTERNATIONAL MOBILE TELECOMMUNICATIONS (IMT) ROADMAP FOR CONSULTATION AS PUBLISHED IN GOVERNMENT GAZETTE NO 42021 DATED 9 NOVEMBER 2018

28 January 2019

1. INTRODUCTION

On 9 November 2018, the Independent Communications Authority of South Africa ("Authority") published the draft International Mobile Telecommunications (IMT) Roadmap ("draft IMT Roadmap") in Government Gazette No. 42021 (Notice No. 683 of 2018), in terms of sections 2 and 4, read with sections 30, 31(4) and 33 of the Electronic Communications Act, 2005 (Act No 36 of 2005) ("EC Act") .

The draft IMT Roadmap invited interested persons to submit written representations by Friday, 18 January 2019. The Authority subsequently extended the deadline for written representations to Monday, 28 January 2019 by way of a notice published on 11 January (Notice No. 10 of 2019) in Government Gazette No. 42156.

MTN welcomes the Authority's initiative to review the IMT Roadmap to communicate new spectrum bands that have been identified for IMT, and to ensure that existing spectrum allocations are harmonised and optimised to cater for the ever-increasing data service driven demand for spectrum resources.

The IMT Roadmap is an important document in that it creates certainty regarding the future availability of the scarce natural resource: radio frequency spectrum.

MTN's submission in respect of the draft IMT Road Map is structured as follows:

- Section 1: This introduction;
- Section 2: General Comments on the draft IMT Road Map; and
- Section 3: Specific Comments on the draft IMT Road Map.

2. GENERAL COMMENTS ON THE DRAFT IMT ROAD MAP

2.1. Regulatory Certainty

It is MTN's opinion that for the telecommunications sector to thrive and flourish, regulatory certainty is paramount. Without this regulatory certainty, the large amounts of capital investment required to grow the sector will not necessarily flow into this sector. Indeed, should investors perceive interventions that seem not to protect their investment, such investors may divert the required capital expenditure to other jurisdictions that are more investor friendly.

Faced with the scale of the challenge of providing universal availability of broadband services, MTN seeks clarity on how the Authority intends to licence future spectrum that may become allocated to IMT at WRC-19. Certain key bands have been identified for 5G, some of which are already allocated to IMT. A case in point is the 3.5GHz band which has been assigned to some entities with technical specifications contained within their licence that do not align with 5G specifications. Additionally, certain key bands such as the 26GHz band have never previously been allocated for IMT but was previously allocated for a different service and assigned accordingly. There is, however, a great likelihood that the 26GHz band will be allocated to IMT at WRC-19.

In essence, the clarity MTN requires is whether the Authority intends to reclaim the spectrum in bands that are newly allocated to IMT services by migrating the existing users to more suitable bands and then licence the sanitised IMT band through an ITA, thereby creating financial benefit to the national fiscus, or whether the existing licensees would retain the spectrum holdings. Secondly, where the spectrum has been allocated to IMT and the remaining available spectrum is licenced via an ITA, how does the Authority intend to address the competitive issue of some licensees paying auction prices and others not, for the same spectrum bands?

2.2. Incorrect references and outdated data

MTN understands that the structure and some of the contents of the IMT Roadmap will generally remain the same when the IMT Roadmap is revised; however, MTN is of the view that the contents of the IMT Roadmap that are no longer relevant should be removed or revised accordingly.

MTN is concerned that the draft IMT Roadmap makes reference to and relies on a national band plan that has been repealed. Furthermore, the draft IMT Roadmap cites and relies on some data that is outdated. Some of the studies cited in the draft IMT Roadmap provide forecasts for years past as opposed to future years. Consequently, the inappropriate references and outdated data render the draft IMT Roadmap unreliable for planning for future demands for IMT spectrum. MTN addresses these issues in the specific comments section below.

2.3. Additional bands for IMT2020 studies

MTN would like to request the Authority to propose two additional bands for IMT2020 studies at the World Radiocommunication Conference 2019 (WRC-19) with the hope that the bands will be identified and allocated to IMT services at the next World Radiocommunication Conference.

The first proposed band is the 3GPP N78 band which incorporates spectrum from 3.6 to 3.8 GHz. This band is expected to significantly increase the amount of spectrum available for IMT2020 services and to enable licensees to achieve multi-gigabit speeds that would be required in delivering advanced 5G services.

Although this spectrum band is currently allocated to fixed and fixed satellite services, MTN believes that the availability of IMT services across Africa and the proliferation of microwave and fibre backhaul infrastructure negates the need for satellite access and backhaul, and that the availability of an additional 200MHz IMT2020 spectrum will provide significant impetus towards South Africa's journey to the fourth industrial revolution. A study may be necessary to enable the Authority to determine the need for IMT versus satellite services within this band.

The second proposed band is the 3GPP N257 mmWave band (28GHz) which is being considered for IMT2020 services in Regions 2 and 3. MTN would like to propose for the spectrum to be made available for IMT services in Region 1, considering that several South African operators have already conducted extensive trials using this spectrum for 5G Fixed Wireless Access (FWA), and the widespread availability of 5G network equipment and devices supporting band therefore making the band an ideal candidate for IMT services in South Africa.

3. SPECIFIC COMMENTS ON THE DRAFT IMT ROAD MAP

3.1. Executive Summary (section 2)

The following is stated in subsection 2.1 which deals with the purpose of the IMT Roadmap:

"The Radio Frequency Migration Plan 2013 has since been replaced by the draft Frequency Migration Plan 2018 and the National Radio Frequency Plan (NRFP) 2013 has been replaced by the National Radio Frequency Plan (NRFP) 2018."

At the time of making this submission MTN notes that it is correct that the National Radio Frequency Plan (NRFP) 2013 ("2013 band plan") has indeed been replaced by the National Radio Frequency Plan 2018 ("2018 band plan") and that it is not correct, however, that the Radio Frequency Migration Plan 2013 has been replaced by the draft Migration Plan 2018 as stated by the Authority. The draft Migration Plan is yet to be finalised by the Authority.

3.2. International Telecommunications Union (ITU) and IMT (section 3)

Subsection 3.2 states the following with regards to Bands designated for IMT:

"The table below describes the ITU definition of IMT bands which were mostly addressed by the publication of the Final Radio Frequency Spectrum Assignment Plans."

Band (MHz)	Frequency band	BW[Note1]	RR FN	Channel Plan	WRC Resolution/s
450	450-470 MHz	<20 MHz	5.286AA	(Note 2)	224 (Rev. WRC-12)
700	694-790 MHz	<96 MHz	5.312A	(Note 3)	232 (WRC-12) and 224 (WRC-12)
800	791-821 MHz // 832-862 MHz	2×30 MHz	5.317A	M.1036 (A3) (Note 3)	224 (Rev. WRC-12) and 749 (Rev. WRC-12)
850	824-849 MHz // 869-894 MHz	<2×8 MHz (Note 4)	5.317A	M.1036 (A1)	224 (Rev. WRC-12) and 749 (Rev. WRC-12)
900	880-915 MHz // 925-960 MHz	2×35 MHz	5.317A	M.1036 (A2)	224 (Rev. WRC-12) and 749 (Rev. WRC-12)
1800	1710-1785 MHz // 1805-1880 MHz	2×75 MHz	5.384A	M.1036 (B2)	223 (Rev. WRC-12)
2100	1920-1980 MHz // 2110-2170 MHz	2×60 MHz	5.388	M.1036 (B1)	212 (Rev. WRC-07) and 223 (Rev. WRC-12)
2100 (TDD)	1900-1920 MHz, 2010-2025 MHz	35 MHz (Note 5)	5.388	M.1036 (B1)	212 (Rev. WRC-07) and 223 (Rev. WRC-12)
2300	2300-2400 MHz	100 MHz	5.384A	M.1036 (E1)	223 (Rev. WRC-12) (Note 6)

2600	2500-2690 MHz	2×70 MHz 50 MHz	5.384A	M.1036 (C1)	223 (Rev. WRC-12) (Note 7)
3500	**3400-3600 MHz**	**2×80 MHz (Note 8)**	**5.430A**	**M.1036 (F2)**	**NA**

Table 1: ITU definition of IMT bands (source: ICASA)

MTN notes that most of the IMT bands in the table have indeed been addressed in their respective published Final Radio Frequency Spectrum Assignment Plans ("Assignment Plans"). A case in point is the Assignment Plan for the band 3400 to 3600 MHz (3.5GHz)[1].

MTN is concerned, however, that the information contained in the table above regarding the 3.5 GHz band is not aligned to the information in the corresponding Assignment Plan. For example, the final frequency arrangement that has been chosen for the band in South Africa is F1 as opposed to F2. Consequently, the bandwidth should be 200 MHz (unpaired) as opposed to 2x80MHz paired.

MTN is concerned by the following statements which are associated with the above-mentioned table:

> *"The notes are taken from the (South African) National Radio Frequency Plan 2013 (NRFP-13) ...*
>
> ***Note 8:** ... The channel configuration is based on 2×100 MHz plan with no guard bands or centre gap (Tx-Rx = 100 MHz). When using this band for IMT systems, a new channelling plan is required. ITU-R Recommendation M.1036 (section 6) recommends two options namely: F1 (unpaired, 3400-3600 MHz); and F2 (3410-3490 MHz paired with 3510-3590 MHz). Considering that the current SA plan using Tx-Rx of 100 MHz, option F2 is recommended for SA. Refarming of current licensees may be required to align with this option."*

It is immediately evident that the above statements are misplaced: The 2013 band plan has been repealed and replaced with the 2018 band plan. MTN recommends that all references to the 2013 band plan be removed and that any references to the

[1] General Notice 278 in Government Gazette No. 38640 (30 March 2015) read with associated erratum: General Notice 394 in Government Gazette No. 38755 (4 May 2015).

national band plan be made to the 2018 band plan. Consequently, the table above should be replaced with the latest one which is contained in National Footnote 9 (NF9) of the 2018 band plan. The table in the 2018 band plan does not have any associated notes.

"The following IMT bands were assigned by the publication of the Final Radio Frequency Spectrum Assignment Plans.

- *IMT 450*
- *IMT 700*
- *IMT 800*
- *IMT 900*
- *IMT 2300*
- *IMT 2600*
- *IMT 3500*

The IMT 850 band's is still under discussion and the 2nd Draft Radio Frequency Spectrum Assignment Plan was published"

Although a Radio Frequency Spectrum Assignment Plan includes information on how a radio frequency spectrum band will be assigned, it is, however, in itself not a tool for assignment of radio frequency spectrum. MTN is therefore of the view that it is incorrect to state that the above IMT bands were assigned by the publication of the Final Radio Frequency Spectrum Assignment Plans.

The purpose of a Radio Frequency Assignment Plan is to provide information on the requirements attached to the use of a frequency band in line with the National Radio Frequency Plan.

MTN therefore proposes a redrafting of the Authority's statement as follows:

"Subsequent to the publication of the Final International Mobile Telecommunications Roadmap 2014 the Final Radio Frequency Assignment Plans for the following IMT bands were published:

- *IMT 450*

- *IMT 700*
- *IMT 800*
- *IMT 900*
- *IMT 2300*
- *IMT 2600*
- *IMT 3500*

The Radio Frequency Assignment Plan for IMT 850 band is still under discussion. A second draft of the Assignment Plan was published on 1 September 2017"

3.3. South Africa (section 5)

The following statement from subsection 5.7.1 regarding FDD and TDD trends in South Africa relates to a past date as a future date and is therefore outdated. The prediction therein has already been realised.

"...It is expected that during 2014, LTE TDD smart phones will be available commercially on a large scale."

Subsection 5.7.2 states the following regarding flexible spectrum utilisation:

"Capacity benefits of unpaired spectrum are realised in the size of available TDD spectrum bands often allocated in large blocks. From a capacity perspective, this is an advantage over the typical 2×10 MHz configuration found in paired FDD spectrum. The current LTE bandwidth limit is 20 MHz and most equipment could spread power of ~80 W over ~40 MHz bandwidth depending on the frequency range. Therefore, 40 MHz assignments per operator might be cost-efficient, but this would be hard to assign in multi-operator environments. Therefore, it might be advantageous to have one wholesale operator or active Radio Access Network (RAN) sharing involving a number of mobile network operators in TDD spectrum."

MTN agrees that TDD Spectrum is more appealing than FDD spectrum especially as it relates to the associated efficiencies that may be realised, for example, with TDD spectrum fewer guard bands are required thereby minimising the wastage of spectrum. Furthermore, MTN welcomes the idea of *'active Radio Access Network*

(RAN) sharing involving a number of mobile network operators in TDD spectrum' on condition that the sharing is allowed to take place on a commercial basis.

MTN, however, does not agree with a statement that *'it might be advantageous to have one wholesale operator'*, due to the fact that infrastructure competition is still relevant in South Africa.

MTN is of the view that the prediction below from subsection 5.7.3 is out dated and should therefore be deleted.

> *"Cisco predicts a dramatic increase in the downlink-centric applications. Based on this prediction, the downlink-centric application will generate more than 90% of the mobile traffic in 2017."*

MTN notes the authority's proposal below for spectrum parks with separate uplink and downlink oriented unpaired TDD assignments.

> *"In South Africa, the Authority is evaluating the concept of managed spectrum parks, which as a whole have to cater for protection with neighbour bands...The Authority intends to assign special uplink or downlink configurations to minimize guard bands. The operators might decide on their individual business cases."*

MTN is open to the creation of such spectrum parks provided that assignments are open to all interested parties. The parties, however, are to use their assignments strictly for specific geographically limited applications. MTN recommends that a use-it-or-lose-it principle be applicable to the assignments.

MTN appreciates the Authority's intention to minimise guard bands between neighbouring spectrum allocations by mandating specific uplink/downlink configurations. However, MTN wishes to make the Authority aware that 5G systems are capable of dynamically changing their uplink/downlink configurations. MTN therefore proposes that the Authority takes the dynamic configuration mechanism into consideration in making assignments.

Furthermore, MTN recommends that the Authority rather mandate that licensees synchronise their networks to achieve the same minimised guard bands as envisaged

in the proposal, and that it be left to the licensees to agree on uplink/downlink configuration between themselves with the Authority playing an oversight role. MTN appreciates that there is, however, a possibility that licensees may opt not to synchronise their networks to those of adjacent licensees by accommodating guard bands within the spectrum assigned to them.

3.4. IMT Demand for South Africa (section 6)

Subsection 6.2 of the draft IMT Roadmap relies on a 2014 Analysis Mason study titled *'Economist Intelligence Unit for nominal GDP per capital'*. Although the data that has been referenced from the study was relevant at the time of the publication of the 2014 Roadmap, it has since become outdated and cannot be relied upon in the planning for future IMT demand for South Africa.

3.5. IMT Roadmap (section 7)

Subsection 7.1.2 which details the rationale for alignment with IMT in South Africa contains the two highlighted paragraphs below. MTN is of the view that the paragraphs are very similar and therefore proposes that they be merged.

South Africa stands to gain from adhering to a globally harmonised framework in the following areas:

- *Economies of scale for standardised products (terminals and network equipment);*
- *Interoperability in the form of easy roaming and smooth, cross-border co-ordination;*
- *Predictability and stability for the mobile communication industry.*

South Africa stands to gain from adhering to a globally harmonised framework for radio spectrum usage as is the case with the IMT framework. Spectrum harmonisation ensures:

- *economies of scale for standardised products;*
- *smoother cross-border co-ordination; and*
- *easy roaming within the region where harmonisation is implemented.*

MTN notes that the ITU position on 1700-2290 MHz in subsection 7.3.1 refers to ITU Recommendation ITU-R M.1036-4 (03/2012). MTN, however, is aware that an updated version of the recommendation is available, i.e. Recommendation ITU-R M.1036-5 (10/2015). The new Recommendation has included two new frequency assignments (B6 and B7) which further optimise the band. MTN therefore recommends that the Authority reference the latest ITU position on the band 1700-2290MHz.

Subsection 7.3.5 deals with proposal for extension of IMT2100 as follows

'The IMT2100 band currently consists of 2×60 MHz of spectrum in 1920-1980 MHz paired with 2110-2170 MHz. The Authority proposes to extend this band by 2x30 MHz at the top end of the current IMT2100 band...this extension of the IMT2100 band would push the paired portion of IMT2100 right against the unpaired portion of the band that extends from 2010 MHz to 2025 MHz. A guard band of 5 MHz is typically required between adjacent paired and unpaired IMT bands. Therefore, the first 5 MHz of the 10 MHz assigned to MTN from 2010 MHz to 2015 MHz could be used as a guard band. The band 2015-2025 MHz could remain usable for IMT TDD, but might be reassigned to 10 MHz for one user. MTN and Vodacom might be willing to change unused TDD spectrum for new FDD spectrum. These new TDD bands from 1885-1915 MHz plus guard bands and 2015-2025 MHz might be assigned to a TDD wholesale operator/consortium.'

MTN notes the Authority's proposal to extend the IMT2100 band to include an additional 2x30MHz block and supports this initiative.

MTN has notes a comment that "MTN and Vodacom might be willing to change unused [IMT2100] TDD spectrum for new FDD spectrum". MTN is open for discussion an exchange of IMT2100 TDD for IMT2100 FDD spectrum, such an exchange will, however, have an impact on the existing ecosystem. MTN would therefore need to carefully consider the impact of such discussion and consequences thereof.

Subsection 7.5 deals with IMT2020 proposed actions for identified IMT frequency bands.

MTN is supportive of any efforts by the Authority to introduce new bands for IMT services, and therefore supports the proposal regarding 1.427-1.518 GHz band.

In addition, MTN supports the proposal to enable the 3.3-3.4GHz band for IMT services, especially as this band is part of the 3GPP N78 band that is widely considered to be the first globally supported band for the deployment of 5G NR connectivity.

MTN implores the authority to commence immediately with preparations to licence this band as soon as it is allocated to IMT services. MTN recommends that any unlicensed spectrum in the 3.4-3.6GHz range be incorporated in the licensing process to enable licensees to begin with the deployment of 5G services in South Africa, and thereby enable support for the numerous innovative 5G services envisaged in ITU-R M.2083-1.

3.6. IMT spectrum and Universal Service Obligations (section 9)

Subsection 9.4 deals with the assignment obligations for licensees. The Radio Frequency Spectrum Assignment Plans for IMT450[2], IMT700[3], IMT800[4], IMT2600 FDD[5] and IMT3500[6] state that the bands will be licensed through an Invitation to Apply (ITA). An ITA is expected to be used in the licencing of IMT2300 and IMT850 also, that is, once the feasibility study on the licensing of IMT2300[7] has been concluded and the Radio Frequency Assignment Plant for IMT850 has been finalised.

MTN is therefore of the view that matters relating to obligations and lots would in general be better placed in an ITA as opposed to the IMT Roadmap.

3.7. Considerations Arising out of IMT Roadmap 2014 & 2018 (section 10)

The Radio Frequency Spectrum Assignment Plan for IMT900[8] states that an optimisation and harmonisation of existing IMT900 assignments involving the

[2] Notice 270 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[3] Notice 271 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[4] Notice 273 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[5] Notice 277 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[6] Notice 278 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[7] Notice 276 of 2015 in Government Gazette No. 38640 dated 30 March 2015
[8] Notice 275 of 2015 in Government Gazette No. 38640 dated 30 March 2015

potential in-band migration of one or more licensees is to be achieved by 31 March 2020.

MTN welcomes the Authority's proposal to harmonise the IMT900 band. However, the envisaged optimisation of the band which will in fact result in diminished spectrum assignments is of concern to MTN in that will it have a negative impact on the quality of the services MTN provides to its customers, particularly when considering the spectrum crunch that MTN is currently experiencing.

While the optimisation of the band assignments to align to 5MHz blocks is suitable for 3G and LTE in the scenario where legacy 2G technology no longer needs to be supported, the situation is that there is still significant 2G traffic that needs to be carried on the network and this will still be the case in 2020.

The 2x11MHz of IMT900 spectrum assigned to MTN is highly utilised such that the reduction of MTN's assignment from 2x11MHz to 2x10MHz to facilitate the creation a new 2x5MHz block will negatively impact customers using 2G, 3G and LTE.

MTN supports the harmonisation of IMT900, however, MTN would like to urge the Authority to delay the IMT900 band harmonisation and optimisation planned for 2020 until the IMT700 and IMT800 spectrum is available for use. MTN would also like some clarity as to how the new 2x5MHz spectrum block will be assigned.