

12 October 2018

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Attention:

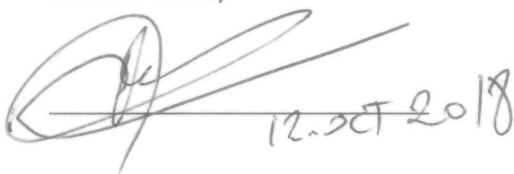
Mr Manyapelolo Richard Makgotlho

Dear Mr Makgotlho,

The Draft Frequency Migration Plan is of tremendous importance for the South African telecommunications industry, and we thank you for providing the opportunity for Nokia to comment on this important topic. Nokia is pleased to provide comments to the proposed Frequency Migration Plan published under the Independent Communication Authority of South Africa Notice 494 of 2018.

We welcome also the opportunity to take part in the public hearings planned for 25 and 26 October 2018 and we look forward to receiving the invitation.

Yours Sincerely



12 OCT 2018

Dr. Brahim Ghribi

Nokia Head of Government Relations Middle East and Africa

Comments regarding the draft radio frequency migration plan 2018



Brahim Gharibi

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1 Introduction

Nokia is pleased to provide comments to the proposed Frequency Migration Plan published under the Independent Communication Authority of South Africa Notice 494 of 2018.

The mobile communication networks are facing tremendous increase in data traffic. Together with the evolving mobile technologies such as LTE and 5G, spectrum is of outmost importance to address the increasing demand for coverage and capacity of the mobile broadband networks globally.

For operators to cope with usage predictions, securing sufficient suitable spectrum for mobile services in the future is mandatory; this include existing bands as well as new bands.

The 'traditional' range of spectrum better suited for mobile applications – between 400 MHz and 6 GHz – is historically allocated to various services and technologies such as broadcast, aeronautical, satellite, defense and public safety along with mobile, utilizing this spectrum at different intensity. As such, getting more spectrum for mobile networks is a long tail process: spectrum allocation, identification and availability requires advanced planning and coordination – it can take more than ten years for compatibility studies and administrative processes – and eventually assignments of the respective bands.

Bearing in mind that the frequency migration is a lengthy process, Nokia draws attention that changes proposed should have as objective of releasing new spectrum for the existing mobile broadband technologies like IMT (LTE) and create conditions to make available suitable spectrum in the near future for IMT-2020 (5G).

Nokia considers that the Draft Frequency Migration Plan is of tremendous importance for the South African telecommunications industry to identify and make available additional spectrum for mobile broadband, and also to pursue a harmonized approach in the context of WRC-19.

We welcome also the opportunity to take part in the public hearings and we look forward to receiving the invitation.

2 Comments on selected bands

This section provides Nokia's comments to selected parts of the draft Migration Plan 2018 document focusing on specific bands.

2.1 694 – 790 MHz / 790 – 862 MHz (Sections 4.10.14 and 4.10.15)

694 – 790 MHz

Migration in this band is to be implemented in accordance with the Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013) and the ongoing efforts within the 700 MHz Band as defined in Government Gazette Number 40145 (Notice Number 438 of 2016)

790 – 862 MHz

This band has been allocated for IMT (Terrestrial) for Region 1 countries at WRC-07) and is often termed as Digital Dividend 1. Currently this band is occupied by UHF TV. Migration is currently underway.

It is proposed that:

- The migration plan is aligned with the on-going efforts within the 800 MHz band as defined in Government Gazette 40145.
- With respect to the small number of Studio to Transmitter Links (STL's) in this band; these must be migrated out and given point to point fixed assignments.
- Self Help stations must be migrated out into the broadcast bands below 692 MHz
- Migration in this band is to be implemented in accordance with the Terrestrial Broadcasting Frequency Plan, published in Government Gazette 36321 (Notice 298 of 2013).

Nokia Comments:

Frequency bands **790 – 862 MHz** and **694 – 790 MHz**, referred in the ITU Region 1 as the Digital Dividend 1 and 2, respectively, are essential bands to provide mobile broadband. Their excellent propagation characteristics make these frequency bands a primary choice for assuring wide area coverage in rural areas and provides good in-building penetration.

Nokia supports the efforts to make these both bands available for mobile broadband communications.

The 800 MHz is largely deployed in Region 1 in Europe for LTE and a solid ecosystem of equipment is already available for the band. The 700 MHz is equally deployed in some countries for LTE; it is also part of the spectrum bands identified as one of the European Pioneer band for the 5G deployments.

Moreover, considering that in Europe the 700 MHz band has been identified as one of the 5G “pioneer bands” and EU states must release it no later than June 30, 2020, the ecosystem will develop rapidly to provide both consumer and network equipment. As such, South African operators will be able to take advantage of a solid ecosystem for both 700 and 800 MHz bands.

2.2 862 - 890 MHz (Section 4.10.16)

This band currently has several users including:

- Wireless audio (863-865 MHz).
- Fixed links (868.1-876 MHz).
- RFID (865 - 868 MHz), RFID (869.4- 869.65 MHz).
- Alarms (868.6 - 868.7 MHz, 860.25 - 869.3 MHz, 869.65 - 869.7 MHz).
- Wireless Access Services (824-849 MHz paired with 869-894 MHz).
- Mobile (880-890 MHz paired with 925-935 MHz) - currently assigned to Liquid Telecom (Neotel).

It is essential to note that alarms were not part of the SABRE proposed allocations and may need to be consolidated within designated alarm bands. Additionally, there is some level of confusion with regards to the Wireless Access Service (824-849 MHz paired with 869-894 MHz) as part of the NRFP - given that such an assignment would interfere with the Mobile band assigned to Liquid Telecom (Neotel). It is proposed to:

- Align re-planning efforts within the 800 MHz band as defined in Government Gazette Number 40145 (Notice Number 438 of 2016).
- Remove the assignment for Wireless Access Services in this band.
- Re-plan the entire band to accommodate IMT (terrestrial) as per SADC FAP proposed common sub-allocation/ utilization.
- Migrate existing users out of this band.

NOTE;

The migration plan as contained in Government Gazette number 36334 (Notices Number (352 and 353 of 2013) were implemented through the following notices;

- a) Radio Frequency Assignment Plan for the Band 825 to 830 MHz and 870 to 875 MHz was published in Government Gazette Number 38640 (Notice 274 of 2015) and
- b) Government Gazette Number 41082 (Notice 648 of 2017) for public consultation in accordance with the Frequency Migration Plan published in Government Gazette Number 36334 (Notice 352 and 353 of 2013) and
- c) the Final International Mobile Telecommunications Roadmap 2014, published in Government Gazette Number 38146 (Notice 1009 of 2014)

Nokia Comments:

Nokia is aligned with ICASA's analysis of the situation and the proposed plan to make the band available for IMT.

2.3 1350 - 1375 (1492- 1517)/ 1375 - 1400 (1427 - 1452) MHz and 1452 - 1492 MHz (Sections 4.10.19 and 4.10.20)

1350 - 1375 (1492- 1517)/ 1375 – 1400 (1427 – 1452) MHz

This band is currently allocated to low capacity PTP / DF links. Spectrum is available on a radio coordinated basis. Based upon availability of equipment as well as user demand, ICASA proposes that:

- Maintain existing links where required (too expensive to migrate etc.)
- Allocation to rural broadband (BFWA) due to good propagation characteristics.
- Feasibility Study was delayed until after WRC-15 decision (enabling harmonization, equipment availability etc.).
- Plan to develop the Radio Frequency Assignment Plan in line with the studies within ITU-R WP 5D in respect of L-Band.

1452 - 1492 MHz

This band is currently allocated to T-DAB and S-DAB due to the current South African allocations of BROADCASTING and BROADCASTING-SATELLITE. Given the allocation of DAB+ in the VHF band (from 214 – 230 MHz) it is important to determine whether the frequency allocation is sufficient or additional spectrum in the L-band needs to be allocated for the purpose. Consideration of this depends upon:

- Whether there is sufficient and adequate demand for DAB services to require assignment in two bands
- Whether equipment is readily available encompassing both bands.

Under the present and forecasted situation, it is believed that the DAB+ allocation in the VHF band is sufficient to meet the requirements of T-DAB. This would also result in lower equipment costs since any receiver would have to be designed to cover only a single band rather than two distinct bands. In addition, S-DAB may have only very limited potential within South Africa and this spectrum may be better utilized for other purposes. It is there proposed by ICASA to:

- Modify the allocation in this band and align it with the ITU Region 1 to include FIXED, MOBILE except aeronautical mobile, BROADCASTING and BROADCASTINGSATELLITE.
- Allocate this band to PTP/ PMP/ BFWA depending upon the availability of equipment. Communal/ private repeaters could also operate in this band.
- Feasibility Study to be conducted.

Nokia Comments:

Unless there is a rational for explicitly referring to 1517MHz instead of 1518MHz, we suggest to make a correction to section 4.10.19.

The overall 1427 – 1518 MHz band also referred as the extended L-band is considered a potential band for future IMT-2020 developments as SDL band. In combination (CA) with other low

frequency bands (B20, B28) it can be used to successfully address the imbalance UL/DL traffic in assuring additional DL capacity.

In WRC-15 the bands 1427-1452 MHz, 1492-1518 and 1452- 1492 were identified for IMT use. These bands are suitable for providing wide area and deep indoor coverage. Minimum bandwidths of 20 (2 x 10) MHz per network are needed for 5G NR in this range of spectrum, which could also be aggregated with other bands within the bands below 2 GHz. Hence Nokia sees great opportunity for future development of this band and its entire availability for IMT use.

In addition, aligning on this band within Region 1 would allow to take advantage of the future economies of scale as the extended L-band has the potential to become a global band.

2.4 2300 - 2450 MHz (Section 4.10.28)

The band is currently in use for several services including:

- Fixed links – 2307 – 2387 MHz paired with 2401 – 2481 MHz
- Outside broadcasting links (28 MHz) – primary basis at (2377, 2471 MHz), secondary basis at (2321, 2349 MHz, 2415, 2443 MHz).
- ISM – 2400 – 2483.5 MHz

As per SADC FAP proposed common sub-allocation/ utilization, it is proposed to:

- Allocate 2300 – 2400 MHz for IMT (Terrestrial)
- Continue to retain allocation of 2400 – 2483.5 MHz for ISM
- Existing Fixed links could be migrated above 3 GHz.
- Migrate outside-broadcasting links in line with the DTT migration (potentially to 1518 – 1559 MHz band).

The Authority decided that;

- A feasibility study is to be conducted

Nokia Comments:

Nokia supports this band allocation for IMT.

The 2300 – 2400 MHz band, 3GPP LTE band 40 is benefitting of a large ecosystem of equipment available on the market (73.7% of the TDD terminals). Its size (100 MHz) and its propagation characteristics make the band an interesting opportunity for operators to consider it for future LTE operations.

Moreover, the 2300 MHz frequency range provides an optimal compromise between coverage on one hand and capacity on the other. Bands within this mid-range are well suited for a range of deployments from small cell uses through to macro cell coverage, including city-wide continuous coverage, and also provides coverage and capacity beyond city boundaries. With a future view

towards 5G, this band is suitable for using applications such as eMBB and Ultra Reliable Low Latency Communications (URLLC).

2.5 2500 - 2690 MHz (Section 4.10.29)

- The RFSAP was developed and is contained in Government Gazette number 38640 (Notice Number 277 of 2015)

This frequency range is providing an optimal compromise between coverage and capacity. While this arrangement is the most common one, considering the imminent arrival of the 5G technology, Nokia is of view that such frequency arrangements should be reviewed and revised, to assure that the regulatory conditions for this band will allow operators sufficient flexibility to transition to 5G NR. CEPT is in the process of revising its Decision to facilitate the use of the band by 5G NR

Considering that contiguous bandwidths of at least 40 MHz per network are recommended for unpaired schemes, the full TDD arrangement in this band (3 GPP Band 41) would virtually offer wider bandwidths as it is the case in the US and China.

2.6 3400 - 3600 MHz /3600 - 4200 MHz (Sections 4.10.30 and 4.10.31)

3400 - 3600 MHz

The RFSAP was developed and is contained in Government Gazette number 38640 (Notice Number 277 of 2015)

3600 - 4200 MHz

This band (C-band) is currently being utilized for PTP links (terrestrial backhaul) and Satellite links including VSAT, Satellite downlink and tracking. The proposed allocation as per SADC proposed common sub-allocation/ utilization is:

- (3600-4200 MHz) Fixed services (PTP).
- (3600-4200 MHz) Fixed-satellite (space-to-Earth) (PTP/VSAT/SNG).
- (3600-3800 MHz) Broadband Fixed Wireless Access (BFWA).

The sub-band 3600-3800 MHz could be used for BFWA where frequency sharing with FS PTP and/or FSS is feasible. The channeling arrangement for PTP links in this band is based on ITU-R Recommendation F.635. The sub-band 3600-4200 is used for medium and high capacity PTP links and FSS. In the band 3600-3800 MHz, BFWA, FS PTP and FSS applications will have to operate on coordinated basis. However, considering the difficulty in coordinating ubiquitous user terminals used for BFWA and VSAT,

The Authority has decided that:

- VSAT systems should be migrated to the Ku-band (ref: 4.10.36).
- RFSAP to be developed.

Nokia Comments:

The 3400-3600 MHz band, identified for IMT at WRC-07 and WRC-15 in almost all countries of the world, is likely to become the global kick-start band for 5G. Nokia encourages a TDD-only arrangement in the band as, combined with its possible extensions down to 3300 MHz and up to 4200 MHz, it creates an excellent and extensive band allowing operators to have access to up to 100 MHz of contiguous bandwidth per operator.

The deployment of 5G New Radio (NR) technology, building upon gradually proliferating Gigabit LTE networks, will bring significant advances in wireless network performance to the benefit of consumers as well will serve the needs of the networked society of Africa. The timely availability of new spectrum, in sufficient amounts of contiguous blocks, in the 3400-3800 MHz band is the key to benefit from the full potential of 5G. 3.4-3.8 GHz band is globally seen as one of the primary 5G bands for early eMBB, enhanced mobile broadband. 5G NR equipment supporting the 3.4-3.8 GHz bands that is fully 3GPP standards compliant will be available in 2019 for these frequency bands.

Some countries are considering extending spectrum access for 5G to include up to 4200 MHz, which represents a significant market opportunity for 5G. Additionally, the range 4.4 GHz to 5 GHz is targeted for the initial 5G NR rollouts in some countries.

Nokia is supporting the global effort of refarming and defragmenting the spectrum in this band in order to make it available for the deployment of 5G networks. As one step making this band available for 5G, Nokia welcomes the decision of VSAT migration, as the availability of 3400-3800/4200 MHz can occur in multiple steps over time.

2.7 40000 MHz and above (Section 4.10.38)

Although out-migration is not an issue above 40GHz, the following comment should be made:

- Frequency bands above 40 GHz are relatively under-utilized. Equipment is available off the shelf for high bandwidth PTP links over distances of up to 5km. It is proposed that in the spectrum above 40GHz, allocations are made for Fixed Services such as PTP links – which would be useful especially in metropolitan areas for line-of-sight (LoS) high capacity data links.
- It is planned to carry out studies regarding the use of the high frequency band in accordance with WRC 19 Agenda Item 1.13

Nokia Comments:

Frequency above 40 GHz, the 37-43.5 GHz band (that is under study for WRC-19 AI.13) presents an excellent opportunity for global harmonization and implementation for IMT-2020, via use of a tuning range in some regions. Some parts, e.g. the 40.5-43.5 GHz band, are not extensively used by incumbents as stated above, and provide large additional 5G capacity in subsequent upgrade steps to 5G networks as more and more services will be put onto 5G networks.

NOKIA

The 40 GHz (37-43.5 GHz) is one of the priority bands in Africa for 5G, the preliminary African position is to identify this range for IMT. A number of administrations are considering licensing spectrum within this range by 2020.

Nokia would recommend a minimum contiguous bandwidth of at least 1 GHz per network in this frequency range.