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22 January 2016

Chairperson
ICASA
Pinmill Farm, Block A
164 Katherine Street
Sandton

Via Email : Chairperson@icasa.org.za
Via Email : rmakgotlho@icasa.org.za

Dear Sir,

Re: Draft Discussion Paper on Framework for Dynamic and Opportunistic Spectrum Management 2015.

MTN (Pty) Ltd hereby submits to the Authority our written representation on the draft Discussion Paper on Framework for Dynamic and Opportunistic Spectrum Management 2015.

Yours faithfully,

Moses Mashisane
General Manager: Regulatory Affairs
MTN (PTY) Ltd

MTN'S SUBMISSION ON THE DISCUSSION PAPER REGARDING "THE DRAFT FRAMEWORK FOR DYNAMIC AND OPPORTUNISTIC SPECTRUM MANAGEMENT".

22 January 2016

1. INTRODUCTION

On 19 October 2015, (by way of Notice Number 1001 of 2015) in Government Gazette No: 39302, ICASA ("the Authority") published a Discussion Paper regarding "the draft framework for dynamic and opportunistic spectrum management.

MTN welcomes the publication of the Discussion Paper. We believe that the regulatory framework for the utilisation of what is commonly referred to as TV white spaces represents a significant opportunity to achieve ubiquitous broadband connectivity and the National Broadband targets. MTN believes that if TV white spaces are regulated in an effective manner it will provide alternative solutions to the current frequency spectrum scarcity environment.

MTN's submission does not address each and every question posed by the Authority, as a number of the questions seem to be similar either in structure or in content. However, our submission attempts to provide commentary on MTN's position on the subject matter as a whole.

MTN confirms its willingness to participate in any oral hearings which may be scheduled in regard to the Discussion Paper.

2. GENERAL COMMENTS

In response to the whether the Authority has the legislative mandate to address the issue of dynamic and opportunistic spectrum management, MTN's opinion is that the Discussion Paper must be guided broadly by the provisions set out in the two following pieces of legislation: firstly the Independent Communications Authority of South Africa Act 13 of 2000 (ICASA Act), and secondly the Electronic Communications Act, Act 36 of 2005 (ECA).

MTN is also of a view that the following regulations may give guidance to the Authority in providing a framework for dynamic and opportunistic spectrum management namely, National Radio Frequency Plan 2013 (NRFP) and the Radio Frequency Spectrum Regulations 2015 (RFSR).

In addition the Authority is required to take cognisance of the broader policy objectives of South Africa as set out in amongst other documents the National Development Plan and

South Africa Connect (National Broadband Policy) when formulating the framework for dynamic and opportunistic spectrum management.

The RFSR, applies generally to all areas of radio frequency spectrum and to all types of Radio communication services. The RFSR seeks to ensure transparent, fair and efficient procedures for radio frequency spectrum license applications.

Section 192 of the Constitution of the Republic of South Africa, 1996 gives the Authority the sole mandate to regulate broadcasting [and Electronic Communications] in the public interest. Furthermore, Section 30(2) of the ECA, mandates the Authority to control, plan, administer, manage, license and assign the use of radio frequency spectrum. In executing the aforementioned mandate, the Authority must ensure compliance with applicable standards and requirements of the International Telecommunications Union's (ITU) Radio Regulations, and the National Radio Frequency Plan.

As such, MTN agrees that the Authority has the appropriate mandate to address the issue of dynamic and opportunistic spectrum management and TV White Spaces as mentioned in the Discussion Paper.

2.1 Licensing Approaches

The Authority has undertaken the following comprehensive licensing approaches to date:

- self-coordination approach (coordination done by the user);
- regulator-coordinated approach;
- approach of regulator-coordinated with fixed channel assignments;
- License-exempt approach

MTN provides the following commentary as it relates to the four areas mentioned above:

1) Spectrum above 50GHz: MTN agrees that the current pricing for spectrum above 50GHz would be prohibitive. The Authority recently released a discussion document on specific bands above 50GHz namely, E-Band and V-Band, Government Gazette No 39180 on 8 September 2015 to which MTN has made a comprehensive submission. MTN would like to refer the Authority to our submission paper on E-Band and V-Band spectrum dated 27 November 2015.

There is however one aspect not included in our E-Band and V-Bad spectrum submission that requires mentioning as it relates to bands above 50GHz. MTN believes that there is some near certainty that spectrum from these bands will be used in 5G. However it is still unclear at this stage which specific bands will be identified and MTN predicts that this will be a critical agenda item for WRC-19. Therefore MTN submits that the Authority be cognisant of future endeavours in this realm.

2) Dynamic Spectrum Allocation: This is the subject of this discussion paper, and although much research has been applied in the development of this paper, regulations regarding TVWS have already been developed by regulatory authorities such as the FCC and Ofcom with reasonable success. Therefore, given the amount of time taken by these regulators, (the FCC took more than 10 years) and the detailed reports available (with testing methodologies and general processes) by Ofcom, MTN suggests that South Africa has the opportunity to circumvent this timely process by adopting and adapting these models to the South African market without the need to re-invent the wheel. Attempting to draft all these regulations from scratch will simply delay the introduction of TVWS technologies in South Africa.
3) MTN fully supports the need to regulate power line communications and believes that this particular area of reform should be on the Authority's roadmap.
4) Finally, on the last point of spectrum reform, (i.e. licence exemption), MTN has argued that for specific bands licence exemption is the preferred choice of licencing, such as spectrum in the V-Band.

2.2 Dynamic Spectrum Assignment

MTN is of the opinion that dynamic spectrum assignment is a viable approach to ensure the efficient use of currently underutilised spectrum, provided that the Authority ensures that the following requirements are met:

- Clearly defined regulations in order to ensure that the primary spectrum licensees' rights are protected.
- Development of a certification and testing process to ensure that DSA devices adhere to the regulations, this may require a review of the type approval regulations.
- Development of a framework to reliably and frequently test locations around South Africa for interference generated by DSA devices.

- It is paramount that the Authority is able to rapidly respond to, and resolve, complaints of interference generated by DSA devices. The turn-around should be in hours and days as opposed to weeks.
- Manage the geospatial spectrum database administrators and ensure that each database adheres to the regulations – this would also require regular testing and audits of each database.
- Ensure that the regulations prevent any one company or organisation from gaining a monopoly, while simultaneously ensuring that spectrum leases for each device are of a sufficiently lengthy period to enable reliable and stable communications.
- Continuous enhancement of the DSA regulations in line with the rapid development of DSA technologies.
- Foster and encourage the standardisation of DSA, so as to minimise the chance of interference, while simultaneously lowering the cost of DSA devices
- Recognise that in order for DSA to generate a significant increase in broadband connectivity in South Africa, DSA devices will need to be deployed in large networks by companies in the private or public sector, as well as individuals in homes and SME's.

In order to achieve the above, accurate data regarding the TV broadcast transmitters will be required in order to accurately model the propagation. Currently this information is not widely available, but as these transmitters utilise standardised equipment, the ability to model the propagation is achievable but the critical factor will remain the ability to access this necessary information.

2.3 Spectrum Flexibility

In this section, questions raised ranges from whether TVWS, which utilises spectrum within the 470MHz – 694 MHz on a secondary user assignment basis will contribute the objective of ensuring efficient use of radio frequency spectrum, or whether this will promote investment and innovation and the benefits and risks of such assignments as well as the impact the digital migration will have on the usability of the spectrum.

While these are all pertinent questions, there are no clear cut answers. MTN believes that enabling the operation of TVWS will undoubtedly contribute to the objective of ensuring efficient use of radio frequency spectrum, especially in areas where the spectrum is currently underutilised by TV broadcasters. This enablement by consequence will have the potential

to encourage innovation and even investment within the electronic communications sector. However, other factors must be taken into consideration such as the further standardisation of TVWS devices, and ensuring that there is sufficient demand for broadband services in the areas where this radio access technology will be deployed. MTN submits that TVWS has the ability to meet SA Connect goals regarding the deployment of broadband, the adoption of broadband can only be determined based on the demand for broadband in the areas deployed and on the availability of the TVWS devices themselves.

If the demand for such services are there and further standardisation of TVWS devices occurs, the potential benefits could extend to niche applications such as the Internet of Things (IoT)and the Machine to Machine (M2M) domain and in (rural) areas that are not sufficiently serviced due to a lack of focus/cost effectiveness from current commercial offerings.

The critical aspect to the success of TVWS will be in the development and implementation of the general processes and testing methodologies, in order to guarantee that primary licensees are protected from interference from TVWS devices. Therefore the capability of the Authority to effectively regulate and monitor the TVWS impact on the primary spectrum holder is paramount to any possible success. It will therefore be necessary to have robust TVWS device certification and to ensure that only ICASA type approved TVWS devices are used within the country.

In order to mitigate any foreseeable risks, the Authority should address the nine points mentioned in paragraph 2.2 above.

Within the discussion paper, the question is posed regarding what mechanisms should be put in place for dynamic spectrum assignment in meeting future demand for spectrum. This question is considered to be incorrect as DSA is a mere subset of future demand of spectrum. Thus, a holistic approach encompassing all available spectrum and technologies is required. It is expected that the DSA concept will form part of 5G, and that these concepts will be incorporated into 3GPP's 5G standards. Hence any mechanisms in place should conform to these standards going forward which will ensure spectrum efficiency to meet future spectrum demand.

TVWS alone will not completely remove the existing "spectrum scarcity". Mobile operators will still be in desperate need of access to additional spectrum to meet consumer demands for increasing data consumption. The impact of TVWS will alleviate spectrum scarcity for some scenarios, nonetheless the impact of TVWS devices will depend on the scale of the deployment of this technology. In order to maximise the impact, it is strongly recommended

that the regulator encourage the public and private sector to deploy such devices in networks, rather than focusing on individual deployments.

It is entirely feasible that TVWS could increase consumer value and/or improved social and economic inclusion, provided that in areas that previously would not have been economically feasible cheaper TVWS devices can be deployed. However to drive down the costs of devices further standardisation is required to achieve economies of scale for manufactures.

It is reassuring to note that the main subject of this discussion document, namely DSA and in particular TVWS has taken into account the digital switchover and have limited the enablement of services to spectrum within the 470MHz – 694 MHz band.

Any change in the nature of the coverage objectives of the broadcasting service would then require further assessment. For instance, Digital Terrestrial Television (DTT) in the UHF bands has been implemented fully in some countries, but in others the implementation process has been slower or has not started yet. For a country such as South Africa where channel utilization by the primary DTT service is still undergoing planning and coordination, there is still a degree of uncertainty with regard to the "final" DTT coverage footprint as regional coordination of digital broadcasting still needs to be completed.

It is worthwhile to note that, as broadcasting services through the digital migration are being forced to increase their spectrum efficiency, thereby utilising smaller chunks of spectrum and releasing the much needed digital dividend for mobile services, the use of Single Frequency Networks (SFNs) making more intensive use of the same channels, reduce the availability of white spaces.

Similarly, as the benefits of digital television are still being explored and more value-added applications arise, it would not be inconceivable that DTT service providers attempt to maximise more consumer alternatives through their available spectrum, which may require using more of the vacant broadcasting channels. This would result in the long-term availability of TVWS not being guaranteed in such cases and may rise to the potential situation of service disruption of TVWS devices and possibly or permanent unavailability.

With due consideration to licencing of white spaces, it is acknowledged that the possibility of appropriate coordination, achieved through a combination of database-managed channel assignment, geo-location and a compatible set of technical specifications, where TVWS operating on secondary basis in the bands identified, should not necessarily represent an unmanageable hurdle in terms of licensing.

As there is a risk that TVWS devices will interfere with the primary licensee and each TVWS device will be required to detect which channels are not being used in its immediate area, the license exempt managed access model using geo-location spectrum databases (as used by the FCC in the USA and OFCOM in the UK) is the recommended model to use in order to protect the primary spectrum licensee from interference. The afore-mentioned technical specifications should include EIRP limits, spectrum sensing requirements and mandate that all TVWS devices must be tested and certified to ensure that they adhere to the regulations.

2.4 Licencing Models

2.4.1 Mixed Regime

MTN would recommend that the Authority utilise a mixed regime to licence TVWS, where it can differentiate between Client and Master TVWSDs.

Master TVWSDs (which are primarily fixed wide area "base-station" type deployments or short-range access points) should register with a TVWS database. Spectrum sensing would be optional (although preferred), so that the TVWS database can obtain measurements to detect interference, and GPS modules should be mandatory to ensure that the location of each Master TVWSD is accurate. The Authority would be required to authorise TVWS database administrators, which would need to be audited on a frequent basis, and all TVWS databases would need to be synchronised.

Commercial deployment of any Master TVWSDs should require an ECNS license and the TVWS database owners could charge a fee to TVWS network operators. To prevent uncompetitive pricing ICASA could set maximum pricing limits for these services. ICASA in turn could charge the TVWS database administrators an annual fee. The TVWS database could automatically license channels, but leases must be reasonably lengthy to avoid TVWS network operators' equipment from ceasing to function in the event that too many devices are deployed in an area. MTN further suggests that no single network operator be allowed to use the entire spectrum within an area, in order to avoid a monopoly within that region.

Client TVWSDs (which would be any fixed or portable terminals belonging to users) would likewise need to register with a TVWS database via their Master TVWSD, but these devices should be able to do so at no cost (provided that the number of TVWS database access rate is kept below a reasonable threshold, e.g. once per hour).

Furthermore, it should be possible to support a Relay TVWSD, which registers with a TVWS database and backhauls the users' data, via a Master TVWSD, but which also provides connectivity to Client TVWSDs. Relay TVWSDs could optionally support spectrum sensing and GPS modules should be mandatory to ensure that the location of each Relay TVWSD is accurate. Commercial deployment of any Relay TVWSDs should be treated in the same manner as Master TVWSDs and should require an ECNS license and would be required to pay TVWS database providers for access to their databases.

The Authority will need to constantly evolve these regulations based on technology advances and obviously all devices should be tested and certified (i.e. type approved) by the Authority.

MTN is in agreement with the proposed central concept behind the operation of a geo-location database for dynamic spectrum assignment. It is our opinion that the protocol developed by the Internet Engineering Task Force (IETF), namely PAWS (Protocol to Access White Space database) should facilitate an automated licensing process. This automated licencing process for WSD will improve upon the current licencing framework in that licensing will be in near real time. In this licenced exempted assignment approach, the registration requirements (if the PAWS protocol is adopted) should be based on OFCOMs "Draft Wireless Telegraphy (White Space Devices) (Exemption) Regulations 2015".

Additionally, MTN supports the adoption of a white spaces database approach where in the future this can be enhanced with RF sensing information to improve accuracy in minimising interference (which could be an optional inclusion initially).To increase greater accuracy WSDs could optionally support spectrum sampling to detect primary or interfering signals within a channel which could be used to improve the accuracy of the geospatial databases and further improve spectral efficiency.

2.5 Information Regarding Incumbent Operations

In order to ensure that database providers obtain information required to protect incumbent operations such as location of TV transmitters, the information must be publically available via an interface determined by the Authority. Additionally database providers must synchronise their databases. It would further be beneficial if the ability to test/retrieve a response from the database provider with operational parameters for a simulated WSD where made publically available. This would enable both the incumbent operators as well as the regulator to validate the accuracy of the database providers' service.

If the database providers' information is incorrect, which could result in interference with the broadcasters' services, then the responsibility for resolving the interference lies initially with

the database providers. If the database provider has not corrected or resolved the interference within a given timeframe this matter should be escalated to the Authority. The Authority in turn, should have a process in place to resolve the matter which may include the ability to impose sanctions upon the offending database provider for interference issues reported by the broadcasters. Repeated infringements should result in the suspension of a database provider's license.

The same or similar process is true if the broadcasters' information is incorrect, which result in interference with the broadcasters' services. It stands to reason that the responsibility for resolving the issue of incorrect information would then lie with the broadcaster.

The Authority in resolving issues relating to the management of White Spaces Databases, which includes but is not limited to:

- The parameters set for TVWS databases.
- The criteria used to certify, recognise, or authorise TVWS databases.

The approach on issues such as non-discrimination, security, and quality of service should utilise best-practices adopted in other jurisdictions, specifically the aforementioned OFCOM's regulations. The benefit of which would include the ability to achieve global harmonisation of standards thereby facilitating economies of scale. This would require operating parameters to differ by device type, as per the OFCOM regulations.

MTN discourages regulating specific requirements per radio access technology standard, but encourages regulation for ancillary technologies/algorithms (e.g. spectrum sensing capabilities) could be included in the regulations to facilitate technology innovation by enhancing interoperability, spectral efficiency, etc.

By differentiating on device types as opposed to technology, there is a requirement that transmit power levels vary depending to the type of WSD classes (defined in ETSI EN 301 598).

The database provider would be required to communicate the power limit to the WSD, taking into account the WSD class as per regulatory requirements. This will minimise interference while maximising spectral efficiency.

The database provider in communicating the power limit must determine the maximum power that a device may use in accordance with the algorithm specified in the regulations.

2.6 Channels Available for Use

Recognising that allowing adjacent channel use would significantly improve spectrum utilisation and increase the amount of spectrum available for use by TVWS devices, the Authority could permit TVWS devices to operate in channels adjacent to incumbent operations, but it can be dynamically determined by the database provider whether this is feasible taking into account each WSD's class and power (as per ETSI EN 301 598 which also addresses out of band emissions).

The risk regarding utilising adjacent channel operation is if the adjacent channel leakage (ACL) is too high resulting in harmful interference, hence the WSD's class and power must be taken into account.

MTN has previously suggested that the Authority should adopt the OFCOMs "Draft Wireless Telegraphy (White Space Devices) (Exemption) Regulations 2015, which specifies the entire algorithm to be used by database providers including the propagation model. The benefit of this approach includes improved industry standardisation as well as far more rapid finalisation of TVWS regulations, which in turn brings to fruition the economic benefits to the country sooner rather than later

Finally, in response to the general questions posed in paragraph 5.10 of the Discussion Document, MTN recommends that the WSD height be an optional parameter when registering with the WSDB. MTN is resolute that all WSD devices provide the location information, without the need for human intervention.

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