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21 January 2016

**BROADBAND INFRACO - SUBMISSION TO THE DISCUSSION PAPER ON THE DRAFT
FRAMEWORK FOR DYNAMIC AND OPPORTUNISTIC SPECTRUM MANAGEMENT 2015**

Dear Mr Makgotlho,

Broadband Infraco SOC Limited ("Broadband Infraco") would like to thank the Authority for providing it with the opportunity to make this written submission regarding the Discussion paper on the Draft Framework for Dynamic and Opportunistic Spectrum Management ("the Discussion Document").

1. Specific Responses

- 1.1 ***Q1. Do you agree that ICASA has the appropriate legislative mandate to address the issues of dynamic and opportunistic spectrum management and TV White Spaces and to build a suitable framework? If the answer is no, please elaborate.***

Yes. The *Background* section of the Discussion Document provides sufficient statutory justification for the Authority's endeavour to address issues of dynamic and opportunistic spectrum management and TV White Spaces and to build a suitable framework? If the answer is no, please elaborate.

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1.2 **Q2. Are there any existing licensing models overlooked here?**

Broadband Infraco believes that all relevant licensing models have been canvassed in the Discussion Document.

1.3 **Q3. Do you have any comments about these four areas of spectrum reform?**

1.3.1 Powerline Communications and additional Licence-exempt spectrum appear to be “low-hanging” fruits in terms of spectrum availability for increasing broadband connectivity and coverage.

1.3.2 As a backhaul provider, Broadband Infraco would be extremely interested in participating in regulatory licensing developments geared towards introducing additional access providers into the broadband market.

1.3.3 Broadband Infraco also has interest in providing wholesale broadband capacity to Radio Access Network providers in urban and under-serviced areas. To this extent, the Company would be interested in regulatory developments regarding the 5 GHz frequency band.

1.4 **Q4. Do you favour making more licence exempt spectrum available in the 5 GHz band?**

In keeping with our response to Question 3 above, Broadband Infraco would welcome additional licence-exempt spectrum being made available in the 5 GHz frequency band.

1.5 **Q5. And in any other bands? Be specific, please, and support your recommendations.**

No response.

1.6 **Q6. Do you believe that the Dynamic Spectrum Assignment approach is viable and worthwhile?**

Based upon the comprehensive analysis and substantiation of Dynamic Spectrum Assignment (“DSA”) provided in the Discussion Document, Broadband Infraco believes that DSA is a feasible and noteworthy process by which to licence additional radio frequency spectrum.

1.7 **Q7. Do we have enough data about the TV broadcast transmitters to be able to model their propagation accurately?**

No.

1.8 ***Q8. Does enabling the operation of TVWS contribute to the objective of ensuring efficient use of radio frequency spectrum?***

In paragraph 3.3.2 (iv), the Authority asserts that, under Licence-exempt spectrum, there are strong arguments that one of the candidate bands is the balance of the 5 GHz frequency band where it is possible to create 700 contiguous MHz of spectrum – ranging from 5.150 MHz to 5.850 MHz. Therefore, provided that additional spectrum can be made available in the 5.150 MHz to 5.850 MHz and that the Authority can adequately manage the licensing and management of the frequency band, the operation of TVWS can contribute to efficient use of the radio frequency spectrum.

1.9 ***Q9. Do you believe that it will also further objectives of encouraging investment and innovation in the electronic communications sector?***

One of the principal drivers of investment in the Information Communications and Technology (“ICT”) sector is the desire for additional spectrum. Vodacom said as much in its justification for attempting to acquire Neotel. And investment without innovative services and product offerings will not distinguish Radio Access Network (“RAN”) operators from their competition.

1.10 ***Q10. What are the benefits that could be expected from making TVWS available?***

Much needed additional bandwidth in selected radio frequencies.

1.11 ***Q11. What are the disadvantages that could be expected from making TVWS available?***

To the extent that the licensing process of additional frequencies is not managed appropriately, this could be a disincentive to attracting investment and innovation.

1.12 ***Q12. Do you foresee any risks?***

The principal risks that Broadband Infraco foresees are those associated with managing the plethora of additional operators that may be licensed in the TVWS frequency bands. The Authority should, in conjunction with licensees, devise an appropriate frequency management framework.

1.13 ***Q13. Does it support SA Connect goals regarding the deployment and adoption of broadband?***

From all appearances, the proposed DSA seems as if it will buttress SA Connect’s policy objective of increasing broadband connectivity. This can be the case even more so if the RAN services using licence-exempt frequencies are provided at either no cost or on a cost plus basis.

1.14 Q14. What mechanisms should be put in place for dynamic spectrum assignment in meeting future demand for spectrum?

An adequate spectrum management framework should consider how best to handle interference between licensees. To this end, Broadband Infraco endorses the proposal that spectrum assigned on a shared basis be licensed and managed according to the wording on page 19 of the Discussion Document; namely that:

... spectrum may be assigned on a "shared" basis within a specific geographical area. In this case the licensees are obliged to coordinate between themselves to avoid interfering with each other. If they are at the same time secondary users, for example, they would also be obliged to avoid causing interference to the primary user, but would be afforded protection by the Authority against other users. Their annual spectrum fees are reduced by 50% in terms of the AIP formula as a result of the sharing.

1.15 Q15. Could TVWS provide increased consumer value and/or improved social and economic inclusion?

To the extent that TVWS supports SA Connect's policy objectives, yes it can provide increased consumer value and improved social and economic inclusion.

1.16 Q16. What impact is the digital switchover expected to have on the use and availability of TVWS?

The Discussion Document "*proposes the adoption of dynamic spectrum assignment on a geolocation basis as one of the techniques to achieve the stated priorities of SA Connect. In particular, it proposes regulations that would enable broadband service on a secondary user assignment basis in the 470 - 694 MHz band (TVWS) currently utilized exclusively for terrestrial broadcasting service, as the first phase of dynamic spectrum assignment in South Africa. This proposal would make upto 168 Megahertz of spectrum available for innovative wireless communication services such as broadband and machine-to-machine services without displacing incumbent services*".

To the extent that the above is accurate, then perhaps the digital switchover will make more bandwidth available for wireless access services.

1.17 Q17. Do you believe white spaces should be utilised without authorisation or licensing?

Broadband Infraco supports the notion that TVWS spectrum used for access in under-serviced and rural communities should be made available on a licence-exempt basis.

1.18 **Q18. Should there be rules for such usage?**

Broadband Infraco supports the licensing framework for shared spectrum which sets the rules for spectrum usage.

1.19 **Q19. Does the advent of TVWS have the potential to remove the existing “spectrum scarcity”, at least in some bands?**

Yes it does.

1.20 **Q21. Is there a space for license-exempt, unmanaged use of TVWS?**

A licence-exempt unmanaged use of TVWS is preferred.

1.21 **Q22. Is there a space for license-exempt, managed use of TVWS?**

As interference mitigation with existing broadcasters and no protection of TVWS devices are hallmarks of this licensing model, it is preferred.

1.22 **Q23. Is there a space for licensed use of TVWS?**

The Discussion Document explains the pros and cons of the various licensing models quite well. One key difference between licence-exempt and licensed use of TVWS is the extent of regulatory compliance licensees will have to undertake coupled with the role of the Authority in managing the compliance.

As it is possible that TVWS may offer a boon of new operators, investment and innovation in the RAN space. The qualitative question that arises is to whether the Authority wants to play a more interventionist role versus one of *laissez faire* or light touch regulation or one of self-regulation or one in which the industry self-regulates itself.

Broadband Infraco favours a self-regulation approach by the Authority instead of a licensed one.

1.23 **Q24. If so, should licensed users pay the minimum annual fee, or a fee proportionate to use?**

A free proportionate to use of spectrum is a better means of regulating access. For one reason, it reduces the barrier to entry for new licensees. Secondly, it provides a more accurate measure of the value of the TVWS spectrum by allowing market forces to determine the spectrum fee.

1.24 Q25. Does the combination give us the best of both worlds?

Broadband Infraco favours a licensing model for TVWS that:

1. Reduces the barriers to entry for new licensees;
2. Encourages investment, innovation and new technology into the RAN space;
3. Allows the market to determine the value / price of spectrum; and
4. Encourages self-regulation by licensees.

1.25 Q26. Which of the licensing regimes do you favour? Why?

Broadband Infraco favours a licensing model for TVWS that:

1. Reduces the barriers to entry for new licensees;
2. Encourages investment, innovation and new technology into the RAN space;
3. Allows the market to determine the value / price of spectrum; and
4. Encourages self-regulation by licensees.

1.26 Q27. Rank the licensing regimes in order of preference with reasons for your preferred order.

Broadband Infraco favours a licensing model for TVWS that:

1. Reduces the barriers to entry for new licensees;
2. Encourages investment, innovation and new technology into the RAN space;
3. Allows the market to determine the value / price of spectrum; and
4. Encourages self-regulation by licensees.

1.27 Q28. Do you see this as possible? Why / why not?

Yes. The reasons mentioned on page 30 of the Discussion Document warrant Automated Licensing.

1.28 Q29. Does this provide a significant improvement on the status quo?

Yes it does because it allows for licensing to be fast-tracked and simplified while managing interference through automated self-regulation.

1.29 Q30. If some form of this approach is adopted, how should TVWS databases and TVWS database service providers be managed?

As the reasons in support of Automated Licensing on page 30 of the Discussion Document explain:

When WSDs are deployed in the field, they are matched with the pre-existing registration data and provide their locations and bandwidth requirements. The database carries out the appropriate calculations and authorises the WSDs to operate on specific channels, as a fully automatic process, ensuring that no interference is caused by the WSD to any higher priority uses.

Thus, there is no need for human intervention during the normal running of the system. ***Spectrum is assigned dynamically and automatically, as needed.*** (emphasis added) The database records the locations of all WSDs for which locations are provided, and if WSDs without geo-location capability are allowed, the Master Devices to which they are attached, provides an indication of their approximate location. The database has full information about which devices are where, what their operating range is, and for what durations they are operating on which channels. It is then a simple matter for the database to also calculate the AIP spectrum fees that would be due, if any.

In the event that interference is experienced, whether by a TV viewer or by a licensed WSD, the Interference Protocol is invoked, and the offending WSD may be located via the database and instructed, again via the database, to cease transmitting on the offending channel. The WSD can, of course, request an alternative channel.

In Broadband Infraco's view, the above explanation provides a comprehensive methodology for managing both TVWS databases and TVWS operators.

1.30 Q31. From a South African perspective what will be the socio-economic benefits of TVWS?

Bridging the Digital Divide by extending broadband and Internet reach and connectivity will be the principal socio-economic benefit. TVWS will also give a boost to realising the policy objectives of SA Connect, such as universal broadband coverage.

1.31 Q32. Will TVWS be of the most benefit to rural or urban areas? Please provide reasons – technical and socio-economic.

Rural areas perhaps due to the propagation characteristics of the TVWS frequencies in the UHF DTT broadcast bands.

1.32 **Q33. Please provide proposals on the regulatory framework (including none at all) for TVWS**

Broadband Infraco endorses the regulatory licensing model set out on page 33 of the Discussion Document.

1.33 **Q34. What are the advantages and disadvantages of different methods?**

The only disadvantages that Broadband Infraco can envisage are associated with implementing the regulatory framework for the first time. Like any similar process, the learning process will be steep as the “bugs” will have to be worked out over time. However, provided sufficient stakeholder buy-in is generated, the implementation process should be less strenuous.

The advantages are transparency, simplicity and regulatory certainty.

1.34 **Q35. How should South Africa define TVWS?**

The definition proposed in the Discussion Document is adequate.

1.35 **Q36. How will the rules for non-compliance apply?**

To the extent that self-regulation will apply to licence-exempt TVWS bands, licensees will have to ensure compliance. Repeated acts or omissions which result in non-compliance should lead to service suspension, which in this case of White Space Devices (“WDSs”) can lead to their de-activation from the geo-location database.

1.36 **Q37. On what basis should white space use in the 474 – 694 MHz band be authorised?**

To the extent that white space use in the 474 – 694 MHz band meets multiple policy objectives of SA Connect by availing much needed broadband spectrum to bridge the Digital Divide, its assignment for TVWS should be permitted.

1.37 **Q38. Do the benefits of adopting a licence-exempt managed assignment approach apply?**

If such an approach lends itself to the improvement of the TVWS licensing process, without derogating from its integrity, the process should not be discounted.

The Discussion Document makes the point that “An argument is advanced above be (*the basis upon which TVWS usage should be allowed*) for adopting a mixed licensing model / managed assignment approach (i.e., licensed and licence-exempt assignment managed by a database that provides information on which channels are available in a given location) on the basis that this could have significant benefits to the economy, business and consumers by allowing the development fo new and innovative types of WSDs”.

1.38 Q39. If a licence-exempt managed assignment approach is adopted, what registration requirements, if any, might apply?

As the Discussion Document points out, WSDs will need to be type-approved, even if the TVWS bands will be licence exempt. During the type-approval process, the WSDs will then need to be “tagged” or registered to their specific geo-location database. These measures appear to be sufficient for a registration process.

1.39 Q40. Do you think that licensed use of TVWS requires the operator to have an ECNS licence?

Yes it would. Section 31 of the Electronic Communications Act of 2005, as amended, requires users of radio frequency spectrum to be hold a licence and an ECNS license is the appropriate one in this regard.

1.40 Q41. Should white spaces database approach be adopted and / or is ther an alternative system?

The White Space database approach appears to be sufficient for the designated purpose. The emphasis here being light-touch or self-regulation.

1.41 Q42. What additional measurements should be adopted for greater accuracy?

The measurements proposed in the Discussion Document appear to be sufficient.

1.42 Q43. Should the Authority allow – or require - sensing as an option at this time?

The Discussion Document provides that *dynamic spectrum sensing is another dynamic spectrum management tool that may enable more efficient use of TVWS – these techniques use sensing to determine whether or not a channel is vacant and available for use.*

For the above reason, Broadband Infraco supports the use of sensing as a means of improved spectrum management.

1.43 ***Q44. What mechanisms should be put in place to ensure that database providers obtain information required to protect incumbent operations (e.g. location of TV transmitters)?***

Page 35 of the Discussion Document mentions that *the success of databases will necessarily depend on receiving sufficient and accurate information regarding the entities that need to be protected*. Presumably the entities that need to be protected, include among others, broadcasters. To this end, the Authority should ensure that broadcasters' Annual Compliance filings include locations of their transmitters to enable TVWS operators to avoid interfering with the transmitters.

1.44 ***Q45. What mechanisms should be put in place to ensure that broadcasters and/or signal distributors provide the Authority and database operators with accurate updated information?***

See the answer to Question 44 above.

1.45 ***Q46. What parameters should the Authority set forth for TVWS databases?***

Assuming that the premise for parameters for TVWS databases is *the Authority retaining ultimate authority and responsibility for the operation of TVWS databases in order to protect licensed users against harmful interference*, then Broadband Infraco endorses the management options for white space databases set forth in page 35 of the Discussion Document.

1.46 ***Q47. What criteria should be used to certify, recognise, or authorise TVWS databases?***

Each of:

- Certifying a TVWS device in conjunction with the database, or databases, in which it will operate, rather than certifying the device in isolation;
- Requiring that the database restrict the operation of a device causing harmful interference; and
- Requiring data retention to allow auditing of interference complaints.

are reasonable criterion by which to certify, recognise or authorise TVWS databases.

1.47 Q48. How should the Authority approach issues such as non-discrimination, security, and quality of service?

To the extent that existing regulatory instruments do not bring licence-exempt TVWS operators within the ambit of the Authority to regulate on matters dealing with non-discrimination, security, and quality of service and the like, then the Authority should promulgate new regulations to achieve this objective.

1.48 Q49. Should the Authority require the registration of some or all devices? If only some, which devices?

With incidences of cyber crime being on the rise and in an effort to combat WDSs being used for criminal or other irregular activities, it may be prudent to require registration of all devices.

1.49 Q50. Should mobile devices be obliged to have geo-location determination capability? How should the regulatory framework differentiate among device types?

Yes, mobile devices should be obliged to have geo-location determination capability.

Broadband Infraco fails to understand the need to differentiate among device types for geo-location purposes. Isn't it sufficient that WSDs are registered to a specific database during the type-approval process?

1.50 Q51. What rules should be attached to each type of device?

The same rules as the used for other wireless access equipment, such as limits on power levels and electro-magnetic emissions.

1.51 Q52. Should operating parameters differ by device type or technology?

If different operating parameters for different types of devices are necessary for the devices optimal functionality, then perhaps the parameters should differ. For example, some devices may require more storage capacity to enable greater functionality of Apps and the like. This may require that their power levels be higher and their batteries be stronger.

1.52 Q53. Should transmit power levels be different for different device types?

Yes, for the same reasons as mentioned in our response to Question 52.

1.53 ***Q54. Should the Authority consider a variable power limit which could increase the utility of spectrum for devices?***

It appears that the Authority will have to strike a reasonable balance between power levels for devices that require greater functionality and such devices amount of spectrum utilisation. The Authority will therefore have to consult with licensees and equipment manufacturers to determine the appropriate balance.

1.54 ***Q55. Should there be a maximum power output and what maximum power level should the Authority consider?***

As mentioned in our response to Question 54, the Authority should consult with wireless access licensees and equipment manufacturers to answer this question.

1.55 ***Q56. Should licensed devices be allowed a higher power limit than licence-exempt devices?***

Yes, because the licensed devices will be more stringently regulated to avoid their engendering harmful interference. The operators of licensed devices will also have to pay higher spectrum fees. There should therefore be reasonable and proportionate benefits for the increased regulatory burden of licensed devices compared to licence-exempt devices.

1.56 ***Q57. Recognising that allowing adjacent channel use would significantly improve spectrum utilisation and increase the amount of spectrum available for use by TVWS devices, should the Authority permit TVWS devices to operate in channels adjacent to incumbent operations? Please substantiate***

No response.

1.57 ***Q58. Are there any substantiated concerns regarding harmful interference associated with adjacent channel operation?***

No response.

1.58 ***Q59. Should the Authority establish out of band emissions limits in order to improve spectral efficiency? If so, what are your recommendations to protect incumbent operators? What out-of-band emissions rules will best improve spectral efficiency and protect incumbent operations?***

No response.

1.59 ***Q60. Should the Authority mandate a particular propagation model for database providers?***

No response.

1.60 **Q61. Which propagation model or models are most accurate for this application?**

No response.

1.61 **Q62. Which model or models maximise spectral efficiency?**

No response.

1.62 **Q63. Which models best protect incumbent operations?**

No response.

1.63 **Q64. Overall, what is the appropriate method of determining the required protection from authorised users in the TV bands?**

No response.

1.64 **Q65. On balance, do the potential benefits of permitting licence-exempt managed assignment TVWS devices outweigh any potential risks?**

Yes for reasons mentioned earlier in this submission.

1.65 **Q66. Do the techniques discussed above adequately mitigate any interference potential?**

No response.

1.66 **Q67. Should we oblige every device to have GPS location capability?**

Privacy rights of users need to be considered against such a blanket requirement.

Perhaps enabling users to disable the GPS location functionality may balance the need for licensees to determine the location of a device that causes harmful interference.

1.67 **Q68. In the US model, only latitude and longitude was required of GPS location. Is there any reason why we shouldn't demand full 3D location?**

The US model's limitation may be due to the need to protect users' privacy. Perhaps the same restriction should apply in South Africa.

1.68 **Q69. What about the situation where a fixed device is professionally installed with an external antenna and an internal unit. Should we accept the location details provided by the installer? Using what mechanism?**

No response.

1.69 **Q70. Do you believe that Dynamic Spectrum Assignment should be applied to other bands, beyond the proposed TVWS operation? Please provide reasons?**

No response.

1.70 **Q71. If so, which bands should be considered next?**

No response.

1.71 **Q72. Are the study questions above the most relevant?**

They are comprehensive and provide an expansive consideration of the pertinent issues governing the introduction of DSA and TVWS.

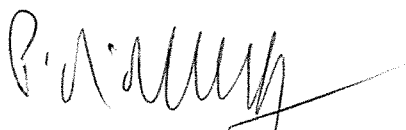
1.72 **Q73. Are there additional study questions that you would propose?**

No.

1.73 ***Q74. Are there any additional devices or services in the 470-698 MHz UHF DTT band that should be considered in authorising use of TVWS?***

No response.

Yours sincerely,



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