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Response to “Notice inviting comments regarding the Draft Spectrum Assignment Notice 911, Government Gazette 34872, on 15 December 2011

Submitted by: Telecommunications Department
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Date: 22 February 2012

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1 Introduction

The City of Cape Town welcomes the notice of intention for the award of licenses in high demand parts of the radio spectrum, and the invitation to comment on it.

The Telecommunications Department of the City of Cape Town ('the City') welcomes any measures to expand the availability of broadband access. We therefore broadly support the intentions as laid out in Notice 898 dated December 2011.

The City of Cape Town is responding because it is engaged in the development of an open access fibre optic network infrastructure across the Cape Town metropolitan area, that will be used by licensed electronic communication network service (ECNS) operators and electronic communication service (ECS) providers to establish electronic communications networks capable of offering competing, commercial electronic communications services for the City's own use and at the retail level. The operating model adopted by the City is summarized in section 2 of this document. The City also operates a wireless network for its internal requirements and believes that spectrum allocation is critical to the successful operation of municipal wireless networks.

However, as proposed, the measures outlined in Notice 911 would appear to not deal adequately with the issues of spectrum allocation. We are concerned that the policy proposals may be counterproductive to achieving the objectives laid out in Section 2.1.1 of the Notice 898 of the Department of Communications, namely:

- Universal Access and Broadband for all
- Introduction of new entrants
- Economic empowerment

In order to comment appropriately on Notice 911, we have provided contextual background on the City of Cape Town's Open Access fibre network. We have then attempted to comment on the relevant issues of Notice 911.

We have taken cognizance of the presentation by ICASA titled "ITA and Spectrum Assignment Plan for 2.6Ghz and 800Mhz bands" dated 14 December 2011 and Notice 898 of the Department of Communications. Where possible, we have attempted to highlight the inconsistencies between the documents.

2 Cape Town's optic fibre infrastructure project

This section summarises the model that has been adopted for building an optic fibre cable infrastructure that spans Cape Town. It has been extracted from the City of Cape Town's Municipal Optic Fibre Infrastructure Business Plan. It is included to provide context to the concerns and recommendations.

This infrastructure (which is a "collection of electronic communications facilities" in the terminology of the ECA¹) has been designed so that it can also be used by licensed companies to offer electronic communications network services (ECNS) and competing electronic communications services (ECS) and ancillary services (e.g. voice telecommunications, internet access, data services) to the City, and other third party

¹ Electronic Communications Act No 36 of 2005

customers. The result will be that the City will enjoy reduced telecommunications costs as well as an improved standard of service, and that electronic communications service provider companies will be in a better position to offer competing services to the businesses and residents of Cape Town.

2.1 Background

The City's fibre optic infrastructure project has its origins in endeavors by the Information Systems & Technology Directorate of the City of Cape Town to reduce the cost of telecommunications services used by the City administration, provide a better internal service, and contribute towards the economic development of Cape Town by expanding the availability of computer and internet access to the public.

Like all South African cities, Cape Town currently suffers from a lack of competition in fixed line broadband services. If this situation remains unchanged then Cape Town is ever more likely to lose out to other cities around the world that are better positioned to compete in the global, knowledge based economy.

Within the municipal administration itself, the demand for bandwidth between key locations is growing exponentially, yet remains unaffordable.

2.2 The Cape Town strategy

The City's strategy is to address this situation by building its own physical electronic communications facilities (infrastructure), consisting primarily of fibre optic cables and switching centre buildings. No transmission or electronic services equipment (including routers) is included in this infrastructure. This infrastructure is conceptually separate from the electronic communications networks that they support. The infrastructure has been designed so that it can also be used on an equal, non-discriminatory basis by licensed companies to offer electronic communications network services (ENCS) and electronic communications services (ECS). This design and management approach is known as 'open access'.

2.3 Managing open access networks

The best practice approach to managing a network such as this is to adopt the 'open access' model. This approach is itself referred to in the ECA as one of the potential licensing conditions to be applied to licenses², and has been proposed and recommended by the World Bank sponsored Information For Development Program (InfoDev).³

This management approach depends upon a separation of three essential features of optic fibre telecommunications networks. These are:

- The physical infrastructure – the so-called 'dark fibre'⁴. In the open access model, this is provided by a neutral entity (such as the state, or on a local basis a

² The ECA section 8 states: "The Authority must prescribe standard terms and conditions to be applied to individual licences and class licences. The terms and conditions may vary according to the different types of individual licences and ... different types of class licenses. Such standard terms and conditions may take into account ... the public interest in ensuring service interoperability, non-discrimination and open access, interconnection and facilities leasing".

³ See, for example InfoDev 'Study on Local Open Access Networks for Communities and Municipalities' World Bank 2006.

⁴ 'Dark fibre' can be thought of as optic fibre that has been installed but which does not carry a signal. Strictly speaking it is optical fibre which you have no access to (so there is no way of knowing if it is carrying a signal or

municipality) that leases use of the fibre to electronic communications service providers on a non-discriminatory basis (in the same way that any licensed vehicle is allowed to travel on a state-owned, provincial or municipal road). In the language of the ECA, this is a collection of electronic communications facilities that together constitute part of an electronic communications network (ECN). In making these electronic communications facilities available for others to use, the City will not be directly offering electronic communications network services (ECNS). However, the City has understood the ECA to mean that electronic communications facilities leasing requires it to have a license – presumably an ECNS license.

- The provision of network services, that is, the passing of signals across the fibre in a managed manner, which enables the transfer and routing of packets of data. This is done by the electronic communications network service providers that lease use of the fibre from the municipality, using their own transmission equipment that they install at exchange points and end user premises.
- The applications and services (ECS) that are delivered to end users using the network. Examples are providing voice calls, Internet access, email and other ‘online’ services, or data transfer between two points of, for example, closed circuit television pictures.

This is illustrated in figure 1.

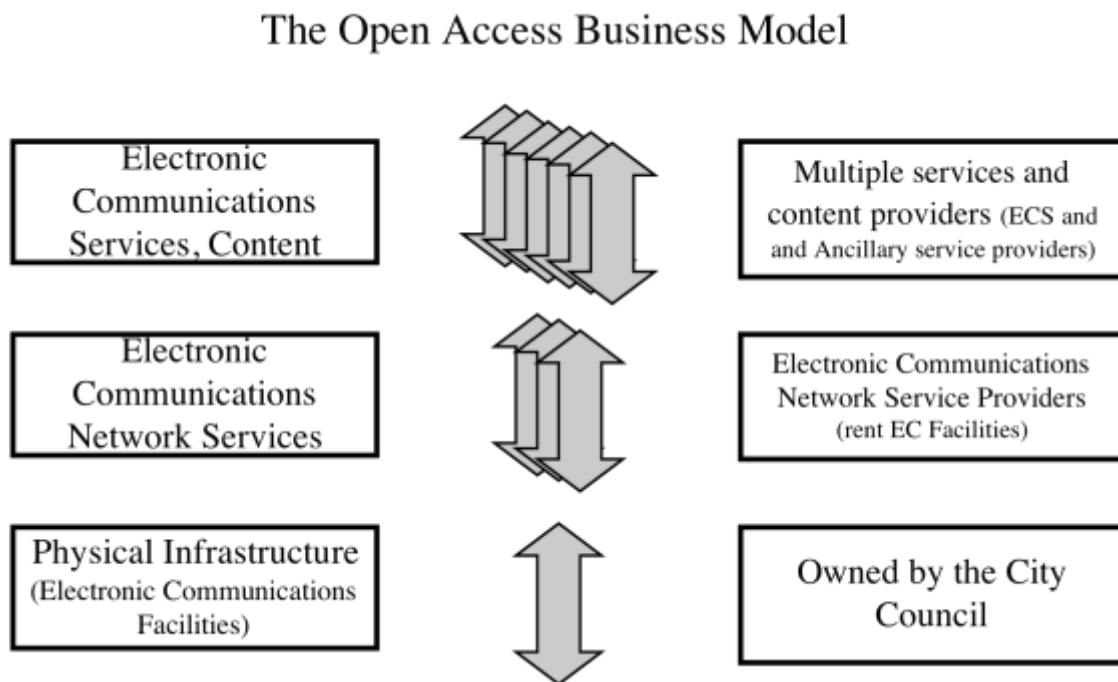


Figure 1: Diagrammatic separation of the infrastructure, network services, and content layers for the purposes of operating network infrastructure using the open access model

In the open access model adopted by the City, the optic fibre infrastructure (facilities) are considered to be ‘public infrastructure’, that is, available for use by anybody licensed to do so (viz. electronic communications service licensees). They must be managed in an operator-neutral manner; the owner (i.e. the City) acts as:

not); so whether fibre is ‘dark’ or not depends on your perspective. Correctly, fibre, which does not carry a signal, is ‘inactive fibre’.

- An infrastructure development project manager which manages the building of the network facilities
- An infrastructure owner, which manages the leasing of these facilities to electronic communications network service providers on a neutral 'wholesale' basis
- A enabler of economic development, ensuring that physical infrastructure is available where ever it is needed; encouraging a wide range of different and/or competing service providers to make use of the network infrastructure to offer market-driven services; and ensuring that no single provider monopolises the infrastructure

Importantly, the City - as the infrastructure owner - should not itself provide electronic communications services to end-users. This would result in the City acting as an electronic communications service provider, competing with the private sector companies who are also its 'customers'.

2.4 Products to be offered by the City

Once the network infrastructure described above has been constructed and its own internal needs have been met, then in terms of its current Private ECNS license, the City is in a position to offer wholesale use of the optic fibre pairs to ECNS and ECS licensees, and allow them to install the necessary transmission equipment to create a unique light path⁵ between any two points. Each light path can originate on any connection or point on the core network infrastructure, and terminate at any point on any other similar connection or point. Any managed set of such connections technically constitutes an electronic communications network.⁶

The optic fibre pairs owned by the City are not by themselves capable of carrying a digital signal. They are merely physical infrastructure.

These optic fibre pairs can only carry a digital signal (capable of supporting electronic network communications services) once an ECNS licensee has rented the use of a pair of fibres between two points, and has installed its own transmission or services equipment.

3 Comments on Spectrum Allocation

3.1 Licensing of 800Mhz based on a wholesale open access method

The City welcomes the intention to increase the availability of 800Mhz spectrum by adopting a wholesale open access model. However, we are concerned that ICASA may

⁵ A 'light path' is the path traveled by a beam of light from the point of origin to its destination along an optic fibre cable. Pulses in this light beam equate to packets of digital data. The volume of such data is measured in Megabits per second (Mbps). The capacity of a fibre optic link is the maximum number of Megabits per second that it can carry. This is a function of the transmission equipment used to create the light beam, and not the optic fibre itself.

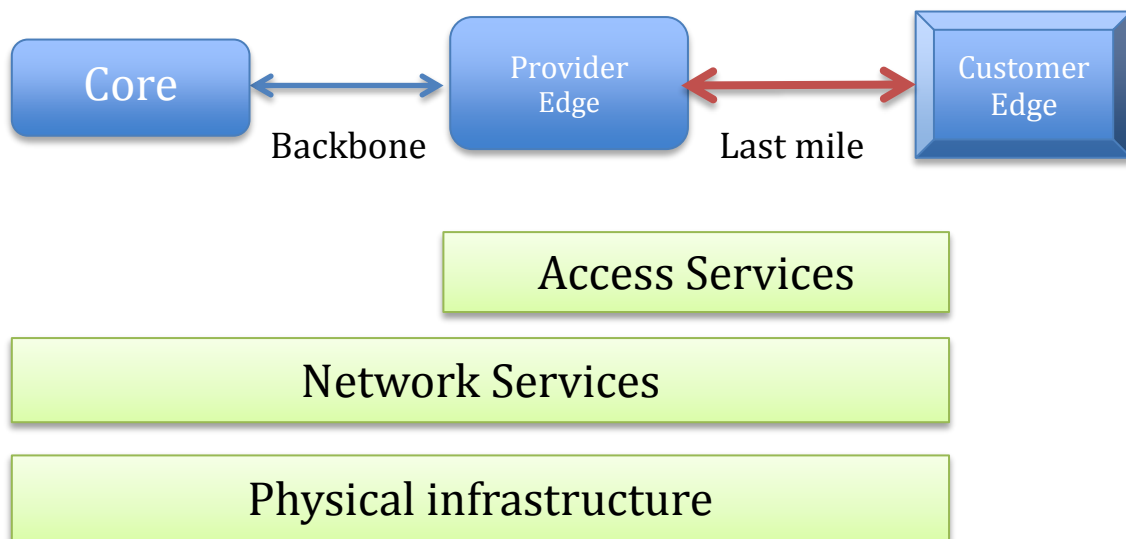
⁶ The terminology of the ECA refers to an "electronic communications network" as being "a system of electronic communications facilities". In this way the ECA implicitly recognises the separation between the network infrastructure components and the resulting active network; the infrastructure only becomes a 'network' once it carries a managed signal. This separation – as well as that between the network service and end user services - is at the heart of the open access model.

not fully appreciate the difficulties associated with a Wireless Open Access model, which differ quite fundamentally from a Wired Open Access model. We hope to illustrate that difference in the following section:

3.1.1 The Wired Open Access Model

Figure 2 demonstrates the generic offerings from a wired open access operator. These include physical infrastructure, network services and access services up to and including the customer edge. Wired open access operators do not generally offer retail services to the customer.

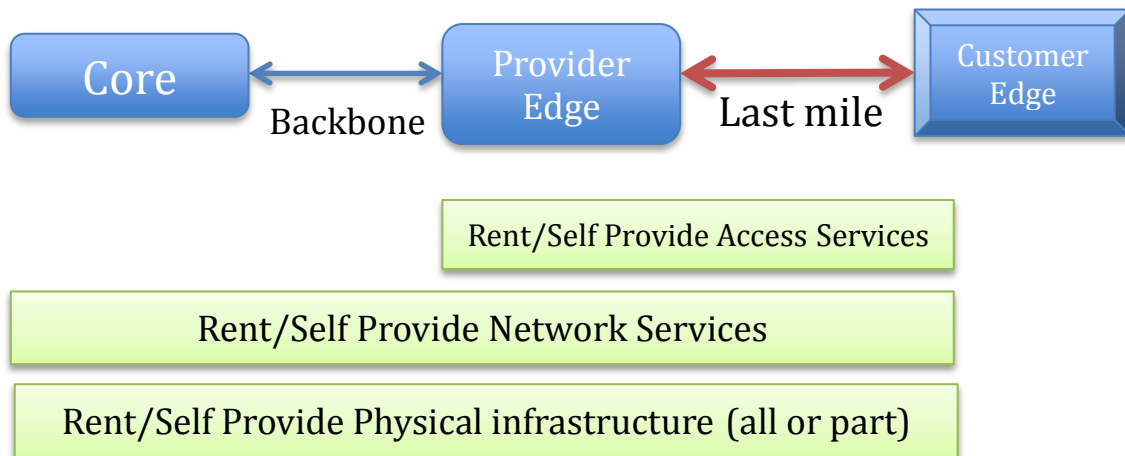
Figure 2: Wired Open Access Operator Offerings



3.1.1.1 Third Party Options

Third Party Service providers who want to provide services to their customers using the offering of the Open Access Operator then have several options about what services they can rent. Often they will mix Open Access offerings with their own self-provided offerings to be able to serve a customer.

Figure 3: Third Party Options for Service Provision



Third parties who rent all three layers of the Open Access Operators offerings are merely content providers. In the terminology of the Electronic Communications Act (2005), such parties are Electronic Communication Services (ECS) providers and not Electronic Communication Network Services (ECNS) providers. ECNS licensees should have to self-provide some portion of the 3 layer offerings.

3.1.1.2 The Telkom ADSL Model

The Business Model that Telkom uses for third party ADSL services is NOT an Open Access model. It is a reseller model suited to ECS licensees and not ECNS licensees as ECNS licensees cannot do any meaningful self-provisioning or product and service innovation outside of content services as Telkom controls all aspects of the 3 layers shown in Figure 3.

We must caution against developing a Wireless Open Access model that mimics the Telkom ADSL model as that will be counterproductive and prevent ICASA from achieving the Department of Communications stated objectives as per Section 2.1.1 of Notice 898.

3.1.2 The Wireless Open Access Model

The challenge for Wireless Open Access and the fundamental difference with Wired Open Access is that in the case of Wireless, the Provider Edge and the last mile connection are tied together because of the spectrum and technology used.

In Wired Open Access, the last mile – typically copper or optic fibre – is a passive connection. In the case of fibre, multiple service providers can be accommodated on the provider and the customer side, without interference and largely technology independent.

With wireless services, however, the provider edge technology has a fundamental impact on last mile access and multiple service providers cannot share spectrum allocation at the provider edge if there is to be any quality of service provision. Best effort services, in which service providers share provider edge spectrum on an as-

available basis, increase the complexity of the Wireless Open Access Operator and reduce customer experience significantly.

The only other option available is that the Open Access Provider owns and manages the spectrum that underpins the last mile connection. The potential to repeat the downfalls of the Telkom ADSL model are high in such a scenario.

3.1.2.1 Full Service versus Provider Edge Open Access

Although the Spectrum Allocation policy directions do not go into detail, we would like ICASA to consider the option of whether the Wireless Open Access Operator is going to be licensed to have only a Provider Edge network (also referred to as the Radio Access Network or RAN), or if it will be licensed as a Full Service wholesale wireless operator. Although there are technical issues that arise, it is possible to have an Open Access Provider Edge network, with meet-me or co-location facilities for third parties to interconnect with the Provider Edge network.

The benefits of having only a Provider Edge Open Access network is that a full service network adds costs to the provision of services and often duplicates much of the network infrastructure of 3rd party operators, taking investment away from increasing the number and reach of the provider edge (and hence reducing the availability of broadband for all). Additionally, only ECNS licensees will be able to use the Provider Edge as they will have to self provide to interconnect their networks.

Provider Edge Open Access works best when the billing for wholesale services provided is simple, e.g. a flat fee per MHz per base station per month.

The key principle underlying a Provider Edge network is that it addresses directly the reason for a Wireless Open Access system i.e. that last-mile spectrum is scarce and must be shared. Backhaul, long haul and extensive and complex networks that are best covered by other technologies and network infrastructure should not be bundled into the operations of a Wireless Open Access Provider.

3.1.2.2 Last Mile Self Provisioning

A critical aspect of Open Access is the ability of 3rd party operators to use the last mile connection for self-provisioning. If the Wireless Open Access Operator is going to allow self provisioning for the last mile, it would mean allocating spectrum on the last mile to 3rd parties and allowing 3rd parties to provide their own provider edge equipment for the allocated spectrum.

In the above scenario, the critical question is: How is the Open Access Operator going to allocate last mile spectrum? It is crucial that ICASA address this issue, as the licensing of the Open Access Operator must not be seen as an abdication of ICASA's responsibility for spectrum management to the Open Access Operator. Scarcity of spectrum means that the mechanism for allocation of spectrum to wireless retailers must be well-defined otherwise economic power, coercion and profiteering will be the determining factor as to who gets Spectrum in high value- urban areas. As last mile spectrum is scarce, the potential for profiteering and a focus on lucrative urban markets by the Open Access Operator is a distinct possibility, which again runs counter to the objectives of Notice 898. Transparency in spectrum allocation is critical and ICASA needs to ensure that the Open Access Operator is bound to such transparency.

If the Open Access Operator does not allow self-provisioning on the last mile, then it becomes the gatekeeper of the last mile connection. If this is the case, then we do not have true Open Access, but network sharing on the last mile.

The danger is that the Open Access Operator then has to make technology and business standards decisions that can determine how 3rd parties provide service, and indeed which 3rd parties use the last mile, as this is not a technology neutral solution. We must also be wary of the Open Access operator replicating the monopolistic ADSL access model (see earlier), thereby creating a new monopoly in wireless provision.

3.2 Efficient Spectrum utilization, new entrants and combinational awards

We have an understanding as to why ICASA is considering combinational awards. However, we are concerned as to the methods proposed and we believe that the set-asides for Sentech and the Spectrum Park and the Open Access Operator muddy the waters when it comes to combinational awards.

We note that ICASA is following the spectrum band allocation pattern of the European Community. It should be pointed out that most countries of the EC have designated the 2.6GHz and the 800MHz for **Mobile Broadband** usage, to be allocated to mobile operators and potential new entrants.

In addition these bands have been specifically allocated to LTE.

Although ICASA have issued a license-independent and technology-independent set of draft spectrum allocation guidelines, the issues of mobile broadband and LTE unpin allocation of the specified bands.

The 800MHz band is very beneficial for the delivery of broadband services in rural and less densely populated areas. It therefore makes sense to combine a national allocation of the 2.6GHz band with a NON-URBAN allocation of the 800MHz band. This will free up the 800MHz band in the high-density urban areas to be allocated to regional and local operators, thereby promoting market entry by new licensees.

4 General Comments on the ICASA document

The ICASA document (Notice 911) seems to interpret the Policy Directions of the Department of Communications (Notice 898) with a very narrow viewpoint. We are concerned with the following proposals laid out in that document:

- Spectrum licensing is done primarily for “Individual ECNS” licensees. This has a national limitation that restricts local allocation of spectrum to ECNS licensees and prevents re-use of spectrum bands in non-overlapping zones by different licensees. This also limits the number of new entrants.
- The idea of the Spectrum Park is not well thought through. The Spectrum Park is used in New Zealand on a local basis and its application to South Africa and a national basis must be clearly laid out. The business model for a Spectrum

Park relies on a complex collaboration model that has to be well monitored and regulated and therefore places additional burden on ICASA as a regulator.

- The “deemed” spectrum allocated to Sentech. The history of Sentech’s role in the provision of wireless services in the open market is well known. The intention to create a preferred position for Sentech as the Open Access Wholesale Operator is at best misguided, and could conflict with the fact that Sentech is currently involved in retail provision of wireless services.
- Set asides or deemed allocations are typically made to promote competition and reduce the possibility of market dominance. There is no evidence anywhere in the world that set asides for State owned entities in scarce spectrum ranges have had any positive effects on market behavior or consumer choice.
- There is no clarity as to whether the Open Access Wholesale Operator(s), including Sentech, will be prevented from offering ANY retail services in ANY spectrum band. Ideally, this should be the case, as it would prevent any possible conflict of interest. However, this needs to be indicated early in the process to allow applicants to factor in such pre-conditions.
- The allocation of the guard bands to WBS. These represent valuable spectrum that can be allocated to another party with suitable technical measures in place to prevent interference. Ideally WBS should be allocated spectrum in another band range and the 2.6GHz band should be freed up for mobile broadband services.
- The allocation of Low power 2.6GHz or 800MHz licenses for localized use. The campus deployment of low power devices can drive down costs and provide innovative solutions for customers. Low power licenses increase the number of entrants and the range allocated can allow for local licenses so that the same range can be re-used in a non-overlapping fashion in a multitude of regions. The allocation can be as small as 2 x 5MHz per licensee per region.
- Imposing wholesale mobile network resale obligations on mobile communication providers. The large number of innovative virtual mobile Network operator’s in many parts of the world is testimony to the competition and innovation they can bring to the market. Current regulations do not force operators to offer wholesale services. We are of the opinion that competition at a wholesale level will maximize consumer benefits. We believe that current operators have sufficient spectrum at a national level (see below) to be able to run a national network of their own AND offer wholesale services. We are concerned that allocating additional spectrum to existing operators without imposing wholesale obligations will prevent future competition. We believe wholesale obligations are better at promoting competition than the proposed open access model.
- A comprehensive competitive market analysis looking at full spectrum breakdown and possible spectrum relinquishment. We are proposing that Licensees be analyzed to look at their full allocation of spectrum and that the regulator enable current licensees to relinquish spectrum if they are successful in the scarce spectrum auction. The idea of full spectrum allocation is needed to demonstrate if bidders can compete with their current spectrum allocations, and what spectrum they should be willing to release if they are keen on the new spectrum allocations. Spectrum relinquishment can allow re-licensing and new entrants to enter the market. Liberalising spectrum in other bands (900MHz,

1800MHz, 2.1GHz and 3.5GHz) will also enable other entrants into the market, but this can only be done if a full picture of current allocations and future plans for spectrum are laid out by ICASA.

- There is an artificial barrier between current mobile operators and other ECNS licensees based on legacy awarding of mobile communications licenses. The draft document does little to clear up this confusion. Are those to be licensed in the 2.6GHz and 800MHz band, including the set asides for WBS, Sentech and the Open Access and Spectrum Park operators, effectively allowed to provide mobile voice and data network services?