HOUSE OF REPRESENTATIVES
STANDING COMMITTEE

On

COMMUNICATIONS, INFORMATION TECHNOLOGY and the ARTS

INQUIRY

into

WIRELESS BROADBAND TECHNOLOGIES

Submission by

Motorola Australia
Telecommunications Government Relations

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Introduction

Motorola Australia is pleased to have the opportunity to submit our comments on the Committee's Inquiry into Wireless Broadband Technologies. This Inquiry comes at a time when these technologies are evolving rapidly and demonstrating great potential. As a leader in the fields of radiocommunications and telecommunications on a global basis Motorola has given much consideration to the issues the Inquiry will consider. In addition to our direct involvement in many of these technologies through research and development, manufacturing and marketing, Motorola's participation in a number of Standards organizations and other industry bodies has given us considerable exposure to these issues. Consequently we feel well qualified to make this submission.

Specific Broadband Service Provision Issues

Our submission begins by addressing the specific issues noted in the Terms of Reference.

Current Technologies and Inter-relationships

The Terms of Reference identify a number of common wireless broadband technologies and Motorola has invested considerable resources into most of them. We believe there is a role for each of these technologies in Australia and note that although there is some overlap in their application each has been developed with specific goals in mind.

It is not our intention to perform an exhaustive comparison of the technologies here but to illustrate this point we have chosen Bluetooth and LMDS as examples. Bluetooth is a very short range broadband technology that is intended to be used on mainly a personal or small group basis. It would for instance enable a cellular phone and a Personal Digital Assistant (PDA) to communicate automatically over a distance of up to a few meters to exchange telephone number and address details. In this mode the user of the phone could maintain a detailed list of contacts in a comprehensive data base in his PDA and extract from it easily a contact's name and phone number to use in his cellular phone. The PDA could be in the user's brief case and the phone held in his hand with the two communicating by Bluetooth connection. The transmissions are in band shared with many other users and the antennas are insignificantly small without any aiming requirements.

At the other extreme a company might elect to handle its complete voice and data requirements through an LMDS link transmitted over a distance of many kilometers and maintained continuously. However in this instance the link would have to operate on a dedicated channel, be carefully engineered over a line of sight and utilize external antennas carefully aimed and set up. Data rates of the same order as that obtained from fiber optic links can be obtained.

Both these technologies could be classified as "Broadband" but on the one hand we have with Bluetooth, a very short range link established intermittently with a low data rate and on the other hand with LMDS, a long range link carefully set up and carrying very large date rates on a continuous basis.

Appendix A shows the characteristics of a range of popular broadband technologies which illustrates our point.

> Recommendation 1: *No one technology does it all – a choice must be made for the task at hand.*

Wireless versus Copper and Cable

Each of these technologies has its distinctive characteristics that give it advantages in some situations and disadvantages in others.

The most significant advantage of copper telephone pairs is the very large installed base into every home. For voice and low speed data it is relatively low in cost and coupled with the simplicity of the equipment at both the subscriber end and the head end this makes it a very low cost and reliable solution. There are several digital technologies that enable higher bandwidths to be transmitted over the established copper network but it is difficult to achieve high bandwidth over any distance with ordinary copper telephone pairs.

Cable offers much higher bandwidths and if it has been deployed already for cable television can provide a reasonably economical vehicle for the transmission of high bandwidth. However the cost of rolling it out is significant and needs to be done on a street by street basis. It needs a good take up rate of services connected to houses passed to become economical.

Wireless Local Loop has the advantage that it can be deployed rapidly with good bandwidth. It can also offer an advantage when the terrain is difficult and expensive to cover with cable ducting. However there are significant equipment costs to be met at the head end and at the subscriber's premises. Line of sight is required and heavy rain or severe precipitation can cause outages.

Broadband for the 'last mile'

Because of the rapid deployment possible with wireless technologies they offer considerable appeal for the final connection to the subscriber's residence or workplace from the network. The network can be brought into the customers' service area by fiber or cable and then distributed to the individual customers over a relatively short distance by wireless means. As the wireless network will have a short range in this method the spectrum can be re-used again at a relatively short distance away and the amount of spectrum required to service the customer base can be much less.

Current Regulatory Regime and Possible Changes

The interference management provisions and licensing arrangements provided in the Radiocommunications Act have evolved over the years from the practical application of radiocommunications to a variety of every day communications tasks both mobile and fixed. The tools that this Act provides are on the whole adequate for the task of dealing with the characteristics of wireless broadband technologies. Adequate provisions are in place to deal with changes in technology as they develop.

The Telecommunications Act and its associated regulatory provisions on the other hand have evolved from a basis of voice communications over a fixed network delivered for much of it history by one supplier. Regulatory provisions of this Act may not necessarily make sense when applied to the provision of services by wireless means.

The provision of broadband services by wireless means brings into play the regulations regimes of both Acts and regulatory provisions from both may overlap. Under these circumstances there is a danger of over-regulation or mis-regulation and the regulations need to be applied thoughtfully and there should be readiness to change them if necessary.

Recommendation 2 – *In regulating wireless broadband services the existing regulation under the Radiocommunications Act and the Telecommunications Act should not be applied automatically without due consideration.*

Future Trends

Motorola believes that with the pressure of growing markets the price competitiveness of wireless broadband technologies relative to cable based technologies will continue to improve. Because of the "un-tethered" nature of wireless there is more scope for innovation in the provision of services and we can expect to see a steady stream of innovations with market appeal and improvements in productivity and business efficiency.

To minimize the chance of stifling these innovative developments Motorola believes that regulatory provisions in this area should be minimal and applied with a light hand.

Recommendation 3 – *Regulatory provisions should be applied with a light hand.*

Some Relevant Motorola Technologies

Bluetooth

Bluetooth is a short-range technology for connecting divergent devices in a personal area network. Motorola has been actively involved in the Bluetooth Special Interest Group at the highest level of participation. Motorola played a leading part in the establishment of a uniform regulatory regime for Bluetooth products around the world.

With 25 Bluetooth products released at this writing Motorola is a leader in the application of this sophisticated and very useful technology. Bluetooth has the ability to connect divergent wireless devices from multiple manufacturers and so can add a great deal of utility and user convenience to a wide range of products. Motorola believes that the number of Bluetooth devices in service will grow steadily over the forthcoming years as costs and prices decrease and new an innovative applications are developed.

Bluetooth operates in the 2.4 GHz ISM band and in Australia the use of Bluetooth devices is authorised through a Class Licence regime.

3rd Generation

UMTS and CDMA 2000 are mobile cellular technologies intended to provide complete coverage over city, urban and rural areas. Motorola is a leading player in the race to provide 3rd generation mobile services. Motorola has established expertise in both UMTS and CDMA2000 3G services. Our semiconductor sector has released a chipset specifically intended to be the basis of 3G handsets for both UMTS and CDMA2000.

These 3G services have been designed to handle much high data rates than the present second generation services. However the broadband data rates, of the order 2Mb/s, often attributed to them can only be realized on a short-range indoor basis.

In Australia the spectrum and regulatory arrangements have been set in place well in advance of the market need and can be regarded as satisfactory for the establishment phase of the 3G networks.

RLANs

RLANs are wireless networking systems intended for short-range data or data and voice communications. Motorola is participating actively in the RLAN markets operating in the 2.4 GHz and 5 GHz RLAN bands using the 802.11, 802.11a and 802.11b technologies. They use spread spectrum techniques to share the same frequency bands on an uncoordinated basis. Sophisticated coding techniques enable

many units to operate in the same area in the same spectrum without interfering with each other. However if there are too many units operating in the same area or if other services are using the same spectrum data rates may be severely inhibited.

Home RF

Home RF is a robust technology particularly designed for extending wirelessly the broadband services brought to the home by cable to anywhere in the home. This enables the home owner to gain broadband access to the Internet from a PC anywhere in his house or yard. It operates in the 2.4 GHz band and has been designed to be particularly immune to interference. It has been designed to be compliant with the FCC Rules for operation in this band.

Canopy

Canopy is the brand name for a wireless technology that Motorola markets that operates in the 5 GHz RLAN band and that has indoor and outdoor variants.
In its outdoor form it is a readily deployable system that has wide appeal because of this fact. Using robust but low cost equipment it is designed to provide broadband services to individual homes, apartment buildings or offices economically. It is ideal for last mile applications. It has been designed to be compliant with the FCC Rules for operation in this band. See http://www.motorola.com/canopy/

General Comments

Take up of Broadband Services

In Motorola's opinion for a review of these technologies to be realistic it must consider their take up by households and businesses. It could hardly be said that in either area is there a danger of the market getting out of control. It seems that most households have yet to see the benefits that broadband services could give them. They do not think it is worth the extra cost. On the other hand there has been an enthusiastic take up of the RLAN technology in public places such as coffee shops and airline lounges where computers can wirelessly connect to the Internet. There is a great variation in the demand and corresponding take up rate across the range of wireless broadband technologies.

> Recommendation 4 – *In dealing with Broadband Wireless regulators must be prepared to expect wide variations in demand and take up rates across the various technologies.*

Standards and Spectrum Sharing

As noted above equipment the RLAN technologies operate using spread spectrum modulation in the 2.4 GHz or 5 GHz shared bands and rely on coding techniques to avoid mutual interference. This absence of a need to coordinate can lead to the conclusion that "anything goes" and that there is no need for any discipline at all. However if standards are not set and respected this sharing of spectrum becomes very inefficient and the carrying capacity of the bands is greatly diminished. If equipment using these shared bands does not operate to agreed standards and limits then inefficiencies arise to the detriment of all and loss of utility to the user community.
In Australia the Australian Communications Authority (ACA) has selected standards from North American and European Standard setting bodies and set appropriate limits to ensure that mutual interference is controlled to a reasonable extent. Motorola supports this use of Standards from both the European and North American continents

and believes that this improves competition and offers the user community an increased range of benefits.

> **Recommendation 5** – *Standards for Wireless Broadband should make adequate provision for the use of equipment from European and North American sources.*

Motorola recognizes that it takes more effort to establish and maintain such a flexible regulatory system but believes that it is very much in the interests of the community to do so.

Interaction/Relationship with Industry

It is Motorola's invariable observation that the more industry is involved in establishing the spectrum an regulatory arrangements of a technology the more successful it is in terms of its performance in the market and in the services it provides to the community. Broadband wireless technologies are no exception to this rule and given the rapid speed of their development it is even more essential that the regulators and industry work together to achieve the smooth introduction of these technologies for the benefit of the community.

> **Recommendation 6** – *Regulators of Wireless Broadband should consult extensively with industry.*

Improvements to Processes

In the implementation of both the Radiocommunications Act and the Telecommunications Act the Australian Communications Authority has been consistent in adopting a policy of technology neutrality wherever possible. The benefits to Australia have been more rapid introduction of new technologies and market innovations and increased competitiveness. Motorola strongly supports this policy of technology neutrality and believes it is essential that it be applied in this case as wireless broadband technologies of great value to Australia are available from both European and North American sources.

> **Recommendation 7** – *The regulation of Wireless Broadband should be within a framework of technology neutrality.*

Summary

In summary Motorola's recommendations are:

1. No one technology does it all – a choice must be made for the task at hand.

2. In regulating wireless broadband services the existing regulation under the Radiocommunications Act and the Telecommunications Act should not be applied automatically without due consideration.

3. Regulatory provisions should be applied with a light hand.

4. In dealing with Broadband Wireless regulators must be prepared to expect wide variations in demand and take up rates across the various technologies.

5. Standards for Wireless Broadband should make adequate provision for the use of equipment from European and North American sources.

6. Regulators of Wireless Broadband should consult extensively with industry.

7. The regulation of Wireless Broadband should be within a framework of technology neutrality.

Motorola has been pleased to make this contribution and is very willing to provide any further information that may be desired.

APPENDIX A

CHARACTERISTICS OF BROADBAND TECHNOLOGIES

PERSONAL & LOCAL AREA TECHNOLOGY MATRIX

Description	Bluetooth Personal LAN	802.11	802.11b	802.11a	Home RF	HiperLAN1	HiperLAN2
Range (Metres)	10	60-90	60-90	50-70	50	50	40
Band (GHz)	2.4	2.4	2.4	5	2.4	5	5
Data Rate (Mbps)	1.0	2	11	54	10	20	54
Availability	Now	Now	Now	Now	Now	Uncertain	12 months

WIDE AREA MATRIX

Description	LMDS	WLL	802.16
Range (KM)	<3	50	several
Band (GHz)	28	3.5	10-66
Data Rate (Mbps)	1.5-622 [6]	< 10 Mbps	>120 Mbps
Availability	Now	Now	Soon