Trinidad and Tobago Computer Society,
112A Edward Street,
Port of Spain,Trinidad.
Email : ttcs@opus.co.tt
Website : http://www.ttcsweb.org/

28th May 2004

Permanent Secretary,
Ministry of Public Administration & Information
7th Floor, Corner Hart & Abercromby Streets
Port of Spain

Re : **Comments on the Proposed Policy for Exemption of Licensing of Systems operating in the 2.4GHz and 5.8GHz ISM Bands.**

For the attention of the Permanent Secretary,

The Trinidad and Tobago Computer Society (TTCS) is writing to express our concerns on the proposed policy for exemption of licensing of systems operating in the 2.4GHz and 5.8GHz bands available at http://www.fastforward.tt/downloads/Policy_on_License_Exemptions.pdf

Definition of terms used :

- **"GOTT"** - Government of the Republic of Trinidad and Tobago
- **"IISP"** - Independent Internet Service Provider – any individual, group or company other than the Telecommunications Services of Trinidad and Tobago (TSTT) who provides internet access to a third party

- **"high speed Internet access"** - internet access which is measurably faster than the *theoretical* maximum 56 Kilo**bits**/s (Kbps) of dial-up modems using the regular telephone system.

- **"802.11a"** - a wireless standard in the IEEE 802.11 series which provides up to 54Mbps using the 5Ghz band. 802.11a can co-exist but is not compatible with other wireless network standards such as 802.11b or 802.11g.

- **"802.11b"** or **"Wi-Fi"** - a wireless standard in the IEEE 802.11 series which provides up to 11Mbps in the 2.4Ghz band.

- **"802.11g"** - wireless standard in the IEEE 802.11 series which provides up to 54Mbps using the 2.4GHz and offers backward compatibility with 802.11b.

- **"PDA"** - Personal Digital Assistant which is a computer small enough to be held in your hand and runs operating systems like PalmOS, PocketPC and Linux.

- **"HotSpot"** - a location where users with wireless devices such as PDAs or laptops can access a wireless network using wireless standards (802.11b/802.11g/802.11a) to share internet access. HotSpot owners can charge such wireless users a fee for such access or offer wireless Internet access for free.

- **"FreeSpot"** - a location where users with wireless devices such as PDAs or laptops can access the Internet for free. Also called Public Access HotSpots or CoolSpots.

"It is precisely in places where no infrastructure exists that Wi-Fi can be particularly effective, helping countries to leapfrog generations of telecommunications technology and infrastructure and empower their people."

Kofi Annan, UN secretary-general

Introduction

Wireless communications in the Industrial, Scientific and Medical (ISM) Bands. (as designated by the International Telecommunications Union) holds great potential for domestic, business and government users in nations such as Trinidad and Tobago. Other nations, most notably in North America and Europe, have already taken steps to ensure that their citizens are able to benefit from the economical communication services and by extension, the enhanced productivity that is facilitated by wireless technologies. The Government of the Republic of Trinidad and Tobago (GOTT) must be commended for its foresight in advocating the exemption of licensing of systems and/or equipment (and by extension, services) utilising the 2.4GHz and 5.8GHz bands.

The proposed draft "Policy on License Exemption of Systems in the 2.4 GHz and 5.8GHz Bands" makes some sound proposals but there are issues which GOTT should take into account. These issues are outlined in the following paragraphs:

". . . specifications have been developed to restrict the operation of 2.4GHz systems to the user's premises such as buildings and campuses or between such premises, and the operation of 5.8GHz systems for wide area network communications systems . . ."

GOTT has stated that the reason for this decision is to **"promote a congestion-free environment in these exempted bands"**. But this an attainable goal? Most of the wireless activity currently taking place throughout the world (notably in Canada, Europe and the U.S.A.) occurs in the 2.4GHz band (using either 80211.b or the newer/more robust 80211.g).

The 2.4GHz band should be given the same privileges as the 5.8GHz band and let users/market forces decide which band is more appropriate for their needs. In other words, 2.4GHz systems should be allowed to be deployed for both public and private network services, just like 5.8GHz systems. The key issues of congestion and interference hold true for both the 2.4GHz and 5.8GHz bands. At this time, the 5.8Ghz band is under utilised in most countries where Wi-Fi has become popular (due in part to lack of devices operating at that frequency and delays in legislation approving the band/frequency for unlicensed use). This situation creates the illusion that it is less congested and thus is the more desirable of the two bands. However it is quite possible that as soon as 802.11a equipment becomes less expensive (and the band/frequency is approved for unlicensed use), more users will begin to use the 5.8GHz and the congestion that currently occurs at 2.4GHz, will also occur at 5.8GHz. It must be noted that the 80211.b specification was designed to operate in a crowded/congested environment because the creators were aware that the frequency is used by other devices e.g. cordless phones and microwave ovens.

Use of readily available (and less expensive) 802.11b equipment helps to level the playing field and allows the achievement of the "universal access" goal. Take for example this scenario: a rural community desirous of sharing Internet access amongst its residents. It would be faster and less expensive for them to set up a wireless network using 802.11b (or 802.11g) network instead of 802.11a or a wired network because:

1) they have to spend less money on equipment

2) potential donors would quicker spend money on the less expensive 802.11b/g devices
3) money saved from the initial set-up can be used to purchase computers and other supplementary materials
4) It may be possible for them to source used 802.11b equipment with the assistance of overseas charity groups.

In section 10, GOTT is aware that **"the selection of license-free bands must be guided by the availability of and accessibility to appropriate equipment that operates in these bands"**.

802.11a equipment is more expensive and not as popular as either 802.11b or 802.11g. The initial expense of (the not common) 802.11a equipment can discourage small operators from offering services in rural areas. This could lead to potential monopolies from the providers who currently service the larger (more profitable?) markets. Larger operators may even ignore these small markets all together. This could easily escalate into a situation whereby GOTT has to "provide incentives" or "pass laws" to encourage service in these areas, a contradiction of the aims and objectives of this policy.

Through out the Draft Policy, there is regular reference to the sale of Internet access. In Section 2, GOTT stated: **"it is hoped that wider access to network services, greater productivity and development of innovative applications and transactions will be stimulated, bringing Trinidad & Tobago closer to realizing the goal of an information society"**. By emphasising (and indirectly encouraging) reselling of Internet access, GOTT is pre-empting one of the main uses and benefits of Wi-Fi: the **"freenet"**. One of the easiest ways to realise the goal of wider access to network services is to encourage the formation of open community networks or "freenets". These networks can be a collection of privately "owned"/operated FreeSpots which service a specific area e.g. a residential neighbourhood. Freenets can be a community effort servicing a specific region of a country. In this case, the

freenet is often funded by a combination of fund-raising activities, charitable donations, volunteer assistance from civic-minded individuals, etc. In North America, some freenets are even funded by local universities.

Wi-Fi and similar technologies have great potential to assist Trinidad and Tobago to become an "Information Society". Unfortunately, there are obstacles to the achievement of this goal:

- Threats from incumbent industries:
  Existing operators facing new competition from service providers using unlicensed frequencies may attempt various scare tactics and legal manoeuvres to prevent unlicensed services from "encroaching" on "their" market share. GOTT must be vigilant that such selfish tactics do not undermine the future potential of unlicensed technologies.

- Telecommunications Services of Trinidad and Tobago (TSTT): If TSTT perceives unlicensed wireless services (in the 2.4GHz and 5.8GHz bands) as a threat to its current or future plans for its own Internet service, it may seek to prevent users (via scare tactics, legal threats, outrageously high prices, lobbying GOTT to "enact legislation", etc.) from interconnecting to its network. GOTT must be aware of the potential harm from such a short-sighted attitude and take appropriate steps to ensure that it does not interfere with Wi-Fi use in the nation.

Comments on specific Sections

Section 8

"the requirement . . . to employ an appropriate scheme to ensure interference-free transmission noise immunity, and the associated transmission levels to be used by these systems."

All wireless systems (including but not limited to: cellular telephones, pagers, trunked radio, commercial television, commercial radio, "HAM" radio, citizen's band (CB) radio, etc) are subject to natural and man-made interference and transmission noise, so the goals of this section are admirable, but futile.

Section 12

"If systems operating in the band are exempted from licensing, there is substantial inducement for a service provider to sell services to its customers using this band, for example, broadband Internet access, due to the minimal cost of administration and licensing. However, administrations around the world have restricted the deployment of commercial services to subscribers using this band, emphasizing the use of the band for private use, industrial and medical applications, and scientific research and development. Conversely, many administrations have allowed provision of both public and private network services with the understanding that quality of service is not guaranteed and no protection can be provided in the event of an operator experiencing harmful interference. Both approaches have their advantages and benefits, with the former approach protecting users deploying such services from interference from public network services offered by carriers and ultimate congestion of the bands, while the latter has promoted growth of public Internet access, usage, affordability and availability."

As of May 2004, broadband Internet access in Trinidad and Tobago is limited to these options: ADSL from TSTT, cable modems from Fiberline (a subsidiary of

the Cable Company of Trinidad and Tobago), and "high speed" wireless (using proprietary technology) from Carib-link and LISA Networks. The high cost and limited availability of these services have ensured that only a select few are able to partake of broadband Internet access.

Wireless Internet access utilising Wi-Fi (in the 2.4GHz band) has the ability to address this issue by enabling more persons to receive broadband Internet access re: **"here is substantial inducement for a service provider to sell services to its customers using this band, for example, broadband Internet access, due to the minimal cost of administration and licensing"**. GOTT is apparently aware of the benefits of allowing commercial services as shown by this quote: **"the latter has promoted growth of public Internet access, usage, affordability and availability"**. Restricting the deployment of commercial services in this band, will nullify such benefits.

Section 15

"This policy conforms to the prescription made in the proposed National Broadband Policy for systems in the 2.4GHz and 5.8GHz ISM bands to be made license-exempt in order to facilitate access and encourage greater use of broadband services. In addition, it ensures that bodies that can recognize productivity gains from mobile access to network resources can benefit fully without the associated administrative overhead of licensing. This policy recommends the use of 2.4GHz systems to be deployed within the constraints of or between the user's premises for non-third party applications and 5.8GHz systems to be deployed for both public and private network services, and discusses the conditions of operation that owners and users of systems within the band must recognize and observe."

GOTT would be better served in its goal of **"wider access to network services, greater productivity and development of innovative applications and transactions"** if third party applications are allowed in the 2.4GHz band.

Equipment utilising the 2.4GHz band is available now; this includes: laptops, PDAs, some cellular phones, routers/hubs, etc. Users/owners of such devices would be forced to spend valuable time seeking out and installing compatible 802.11a peripherals not to mention having to endure the expense of purchasing these peripherals to replace existing 802.11b and 802.11g devices.

Section 16

"This policy prescribes that systems operating in the 2.4GHz band offer non-commercial or commercial applications within the premises owned, leased or borrowed by the system operator, and solely private connectivity between locations. This was adopted to protect the subscriber and prevent congestion in the 2.4GHz band."

Congestion can take place at any frequency/band, even the 5.8GHz band (being promoted as an alternative) thus GOTT is needlessly concerned about the 2.4GHz band.

Section 17

"This paper recommends against the use of the 2.4 GHz ISM band for these purposes, as this represents an opportunity for the ISP to sell a service at virtually no access cost, and to create an environment that may degenerate rapidly to a congested nature. Similarly, a service provider cannot lease dedicated or switched site-to-site connectivity to end users, provide telephony services for its customers, or offer any other communication service to its subscribers."

This recommendation suggests that GOTT is seeking to restrict the business operations of independent Internet service providers: **"a service provider cannot lease dedicated or switched site-to-site connectivity to end users, provide telephony services for its customers, or offer any other communication service to its subscribers".**

As stated in the comments for Section 16, congestion can take place at any frequency/in any band, thus denying the ISPs the ability to sell services in the 2.4GHz band while encouraging them to sell such service in the 5.8GHz band does not make sense. The "congestion" that GOTT fears will take place in the 2.4GHz band can just as easily take place in the 5.8GHz band when ISPs (current and future) seek to provide dedicated or switched site-to-site connectivity or any other form of high speed Internet access to their customers. Denying the service provider the ability to **"provide telephony services for its customers, or offer any other communication service to its subscribers"** maybe a short sighted policy. Incumbent providers are afforded "protection" at the expense of the competition, innovation and lowered costs to the consumer.

By allowing service providers to provide telephony services for their customers or any other communication service to their subscribers GOTT achieves these benefits:

1) competition that forces both incumbents and newcomers alike to operate efficiently.
2) new services for citizens.
3) reduced costs for customers
4) additional revenue streams via licences, corporate tax, V.A.T. (from both the purchasing of equipment and on the bill paid by the customer)
5) encourages both small and large service providers to service non-traditional areas such as rural communities since they can offer a much wider variety of services (at competitive rates) to attract customers.

Section 18 ii.

"The entity can however, allow users located on his premises access to the Internet at a fee, such as the case of Internet cafes and hot spots offered by coffee houses, airports and hotels."

The popularity of Wi-Fi is due to the fact that persons can have Internet access

anywhere and at anytime. The restriction of the 2.4GHz frequency to indoor use only will nullify any advantages of devices using 802.11b and 802.11g (e.g laptops and PDAs). If the end user has to be located on "a premises" in order to use the 2.4GHz frequency, then they might as well use a wired solution for their Internet access.

This section also emphasises the act of persons charging fees for wireless Internet access. This sends an improper message because one of the main uses of Wi-Fi (in North America and Europe) is for the provision of "free" or community/charity/company sponsored Internet access via "freenets" ; a collection of privately "owned"/operated FreeSpots.

Section 19

"In essence, users must not be allowed to gain access to the network, unless they are located on the premises of operation of the subscriber."

An unnecessary restriction since one of the main advantages of wireless communications is to be mobile. Why should someone using a wireless enabled-mobile device e.g. a PDA (personal digital assistant) or cellular phone have to be " on a premises" in order to gain access to the network?

Most of the existing mobile devices use either 802.11b or 802.11g ; very few (if any) use 802.11a. By promoting the 5.8GHz band as the only band for outdoor use, GOTT is encouraging a situation of incompatibility amongst end users and service providers.

Sections 20

"A third application that is proposed to exist in the 2.4GHz band is the connection of distant offices for private use."

There are many "distant offices" in this country and allowing the use of the 2.4GHz band for this application (while restricting the band to "premises only use" for all other purposes) can easily result in the very situation GOTT is trying to prevent, namely: **"the potential for abuse, uncontrolled and undesirable interference and existence of disruptive systems"**. End users should be allowed to select the Wi-Fi band (and equipment) which best suits their needs.

Section 24

"Examples of uses of dedicated connections in the 2.4GHz band that are not supported are:
i. Providing access to the Internet to a subscriber or third party;
ii. Providing point-to-point carriage for third parties for a recurring fee. This includes a carrier providing access services from its backbone to its subscribers using spectrum in the 2.4GHz band."

The provision of Internet access to a subscriber or third party is one of, if not the main reason for the popularity of Wi-Fi. By discouraging the 2.4GHz service GOTT will contradict its stated intention of **"bringing Trinidad & Tobago closer to realizing the goal of an information society"** via **"wider access to network services, greater productivity and development of innovative applications and transactions"**. Since 2.4GHz equipment is readily available and inexpensive (as compared to 5.8GHz equipment) GOTT would quicker achieve its goals by encouraging 2.4GHz service.

Sections 26 and 27

"26. By permitting public service access in this band, the cost of providing wireless Internet access to homes will be substantially lowered, and hence it can be foreseen that lower Internet access costs will be available.

27. Furthermore, due to the lower cost of service provision, it is foreseeable that affordable access can be provided to remote and rural areas, hence promoting the universal access thrust of the Government of Trinidad & Tobago."

5.8GHz equipment is less common/popular and more expensive than comparable 2.4GHz equipment. This mean that wireless Internet access to homes will NOT be substantially lowered because expensive (5.8GHz) equipment will have to be purchased instead of (relatively) inexpensive 2.4GHz equipment. End users will be forced to purchase 5.8GHz devices (to replace existing 2.4GHz devices) if they wish to enjoy wireless Internet access.

The **"universal access thrust of the Government of Trinidad & Tobago"** to provide affordable Internet access to remote and rural areas would be in jeopardy due to these factors:

1) cost of initial purchase and setup of 5.8GHz equipment by service providers.
2) Cost for end users in rural areas. Rural users can ill afford to spend unnecessary amounts of money to acquire 802.11a devices.
3) Incompatibility. Rural users may use 802.11a exclusively but they may not be able to use their computers, PDAs, etc in urban areas because 802.11b and 802.11g is the dominant "standard" in these areas. A strange twist on the "digital divide" issue.

Section 32

"In this case, third party users must be located within these premises in order to use the services offered upon the systems. In the event where the owner of a system operating in the 2.4GHz leases a portion of his premises, the owner cannot provide access to the lessee for commercial fees, as this constitutes a third party commercial application."

Why? The lessee will be on the same "premises" as the owner thus (given the draft proposals to restrict the range of 2.4GHz usage) it will be perfectly

acceptable to receive Wi-Fi access (either for a fee or gratis). How different is this to the examples outlined in

Section 18 ii : The entity can however, allow users located on his premises access to the Internet at a fee, such as the case of Internet cafes and hot spots offered by coffee houses, airports and hotels.

In this case, the owner can be compared to a Internet cafe offering "hot spot" access to the lessee. If GOTT is concerned that the owner may take advantage of the lessee, it must be noted that there are existing (non-telecom) laws that protect lessees from such action and that the lessee can always acquire Internet access from another source.

Section 39

"All transmitting equipment must be inspected by the Authority to determine their frequency of transmission . . ."

39 i : FCC or Wi-Fi certification is acceptable as a substitute for the above information;

It is recommended that GOTT adopt the standards, certification and regulations, (as related to Wi-Fi) used by the Federal Communications Commission (FCC) and/or Industry Canada. This is because equipment for use in Trinidad and Tobago is usually purchased from North America so, by default, this country is following the standards approved and enforced by these 2 regulatory agencies.

Section 40

"If it is determined that the system is operating outside the specifications defined, the Authority has the right to request the owner of the system to turn off their system."

This section should be adjusted to state: **"If it is determined that the system is operating outside the specifications defined, the Authority has the right to request the owner of the system to *alter/adjust their system so that it operates within specification*"**. Only if the system cannot be altered or adjusted should the Authority insist that the owner turn off the system.

Section 41

"Parties selling a range of equipment, or providing commercial services are required to register their equipment with the Authority to ensure that the equipment or systems they are selling conforms to the specifications defined for operation in the 2.4GHz band and 5.8GHz bands prior to market sales."

Registration of transmission equipment is a tedious and unnecessary task. Wireless equipment is manufactured abroad and must pass stringent certification to conform with the relevant regulations and standards in these countries (e.g. North America and Europe). Parties desirous of selling such equipment (in Trinidad and Tobago) must conform to these standards in order for their equipment to be compatible with systems that are already installed in the country. Consumers are unlikely to purchase proprietary/non-standard equipment that is incompatible with their installed based of wireless devices or those of their service providers. In other words, market forces (and word of mouth) will quickly and efficiently deal with parties who try to sell non-standard equipment.

Section 42 iii.

"The Telecommunications Authority has the right to ensure that . . . the band is not being used to provide commercial services outside of the premises of the operations of the owner in accordance with the conditions stated within this instrument."

This section is dependent upon the policies outlined in previous sections. The

need to restrict unlicensed devices to certain technical standards to avoid interference with users on adjacent licensed bands, does not justify forbidding the use of 2.4GHz for commercial use outside of the users' premises. The Telecom Authority would not have to waste time and resources investigating commercial usage if GOTT were to allow the use of the 2.4GHz band for **"commercial services outside of the premises of the operations of the owner".**

Conclusion:

Incumbent "wired" service providers must commit enormous capital expenditure to provide copper and/or fibre (and related high speed Internet access) to the majority of citizens in the country. Then there is the cost for end users as the service providers seek to recover the money invested in the (wired) infrastructure. A Wi-Fi network (in particular one based on 802.11b) lowers the cost of both infrastructure and communications and therefore benefits all citizens within a community and the country as a whole.

GOTT has to realise that policies enacted today can have negative consequences in the long run, therefore, allowing poor telecom regulation and laws or ill-conceived policy to hinder or otherwise ruin the potential benefits of Wi-Fi would be in direct contradiction of GOTT's:

- public commitment to telecommunications liberalisation and deregulation.
- publicly stated goal of **"bringing Trinidad & Tobago closer to realising the goal of an information society"**.