Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Wireless Operations in the 3650-3700 MHz Band	)	ET Docket No. 04-151
	)	
	)	WT Docket No. 05-96
Rules for Wireless Broadband Services in the 3650-3700 MHz Band	)	
	)	
	)	ET Docket No. 02-380
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	
	)	
	)	ET Docket No. 98-237
Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band	)	

OPPOSITION OF TROPOS NETWORKS TO PETITIONS FOR RECONSIDERATION

Tropos Networks, headquartered in Sunnyvale, California, submits this opposition to Petitions for Reconsiderations filed in the above proceedings.

Tropos technology delivers city-wide fixed and mobile broadband access via a scalable, reliable and secure Wi-Fi mesh infrastructure. The Tropos solution is a new class of product called a MetroMesh router, which layers patented routing intelligence on top of standard 802.11 to form an economical, self-configuring and self-healing wireless broadband data network that forwards client data through a mesh along the highest throughput path to a wired network. The result is a high performance, large scale Wi-Fi deployment with high throughput that does not require wired backhaul to each access point, installer truck rolls nor expensive and complex client devices and software. A Tropos system can be deployed at a multi-square-mile scale in a matter of days, providing fixed and mobile broadband connectivity with a user experience

indistinguishable from wired networks. Tropos technology is providing real facilities based broadband competition across large geographic areas.

Background

In its March 16, 2005 *Report and Order*[1] the Commission adopted licensing, service and technical rules governing the 3650-3700 MHz (3650 MHz) band. The rules allow for nationwide, non-exclusive licensing of fixed and base-station-enabled mobile terrestrial operations using technology with a contention-based protocol. The non-exclusive licensing approach requires users to share the 3650 MHz band. In its decision, the Commission emphasized that the streamlined licensing mechanism encompassing minimal regulatory requirements encourages multiple entrants and seeks to stimulate the rapid expansion of wireless broadband services -- especially in rural America.

Several interests have filed Petitions for Reconsideration of the *Report and Order*, including Intel Corporation, Redline Communications, Inc., and Alvarion, Inc., which filed a joint petition, Motorola, Inc. and the Wireless Communications Association, International, Inc. (Petitioners). Redline Communications, Inc. also filed a separate petition. Tropos' Opposition responds to these petitions.

These interests urge the Commission, as they did throughout the proceeding, that the 3650 MHz band be allocated and administered on a licensed basis, particularly in urban and suburban areas and not on the non exclusive shared basis for which the Report and Order is premised. It is the fundamental choice between licensed and shared

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[1] *In the Matter of Wireless Operations in the 3650-3700 MHz Band Rule for Wireless Broadband Service in the 3650-3700 MHz Band, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band Amendment of the Commission's rules with regard to the 3650-3700 MHz Government Transfer Band,* 20 FCC Rcd 6502, FCC 05-56 (March 16,2005)

spectrum management that is again presented to the Commission. The Petitioners renew their contention that a licensed approach will enhance quality of service that will otherwise be substandard because of interference and overcrowding in the shared environment. The Petitioners argue that exclusive licensing and specific interference protections are necessary to provide incentives to investment in the 3650 MHz band. In its *Report and Order*, the Commission made the correct and better decision by providing for a shared environment using contention based protocols where proven technology is already delivering quality broadband at reduced costs from incumbent providers.

The Commission's Decision Relating to Non Exclusive Use of 3650 MHz is Correct

The Petitioners' advocacy for licensed spectrum in the 3650 MHz band remains the core debate in this proceeding. Their position reflects the bias that the exclusive licensee as the first in time holder of the spectrum will determine how the band is used and who will use it. It will require the Commission's auction processes to be engaged for urban and suburban areas where the license holder is determined by the highest bidder. Petitioners challenge the capability of unlicensed networks to thwart interference and deliver quality of service, proclaiming that the "tragedy of commons" where the number of users overwhelm the networks, will erupt.

Petitioners ignore, yet do not challenge, the benefits of the shared spectrum environment and how combined with a deregulatory structure will compel innovation and make broadband more affordable and accessible. In shared spectrum, having no exclusive usage right and interference protection places a responsibility to pursue and ensure adequate interference management. Instead of being ensured of freedom from interference that pervades the historic spectrum management model, shared users must

confront it. The benefits gained, which underlie the Commission's decision, are that users are free from the costly licensing process involving logistics, buying spectrum at auction and the accompanying delays associated with such processes. The result is more rapid deployment of affordable broadband by a facilities based provider.

Tropos technology, operating in unlicensed shared spectrum at 2.4 GHz, delivers broadband at speeds and quality of services exceeding incumbent providers at substantially reduced costs. Its experience demonstrates the validity of the Commission's decision. Within the last year, Tropos technology has been put to work in more than 200 metro-scale Wi-Fi mesh networks around the world. Alexandria, Virginia has launched "Wireless Alexandria" using Tropos technology. These networks are today providing individuals and businesses low-cost broadband access. Tropos and its customers show that contention-based technologies facilitate sharing and when combined with low entry barriers, will promote investment ensuring robust and efficient use of the 3650 MHz band at significantly lower prices.

Petitioners' advocacy for a licensed environment essentially claims that a shared environment is not capable of providing meaningful broadband. Their premise is that that expense and costs of the licensed environment are inevitable. The Petitioners make no case that the licensed environment will make broadband more available and affordable. Petitioners seemingly ignore the challenge the Commission is facing - the lack of competitive broadband services reflected by the dearth of providers and its high costs.

Broadband access in the United States lags considerably behind others services. The Commission's own data indicates exceedingly higher penetration rates for wireline and wireless telephone service. Globally, the US lags considerably behind 15 other

countries in affordable broadband access. In the mobile telephone service, the pervasive cell phone relates directly to the competitive market where several providers, in concentrated population areas as many as five, compete on both price and offerings. In broadband, consumers have at most 2 providers, many have none. Prices are high and service indistinguishable.

The Commission embraced an environment with low entry barriers and a proven record of innovation delivering quality broadband service over one encompassing exclusive use/interference protected licensed regime. Unlicensed spectrum at the 2.4 GHz range, is providing broadband at > 1 Mbps, symmetrical, throughout the entire coverage area, exceeding incumbent offering and meeting quality of service demands of users. The investment and innovation has accommodated and reacted to the shared band in 2.4 GHz to provide levels of service surpassing incumbent wireline providers at lower costs.

Petitioners do not confront the underlying goal of promoting broadband access. Instead they argue the other extreme, that too many users vying for limited capacity will result in the "tragedy of the commons" where quality service will be substandard. Petitioners also assert that license holders will "squat" on spectrum, blocking other users. Aside from the irony that that the present environment is one of too few consumers with too little broadband access, Petitioners ignore how investment and technology in the shared environment maintains a discipline that will not squander the spectrum or deny its use to other providers.

To use the spectrum, licensed or unlicensed, investment is committed. Once committed, the investment in technology and service must provide a return or it will be lost. This is particularly true in the unlicensed environment where, as the Commission recognizes, investment and technology is directed toward compatibility with other users

and interference management. Expeditious deployment and commencing service is critical. It is incongruous to postulate that investment, which must compete in urban and rural areas with wireline providers, will engage in conduct whose purpose is not to build customers and revenue but to block other providers. In the shared environment a provider must commence operations expeditiously. There are no moratoriums of service as in a licensed regime build out period. Investment earns its return by providing better service.

Petitioners also ignore the history of wireless broadband in the unlicensed environment by asserting that the shared spectrum regime will spawn low quality service. Unlicensed broadband has emerged as a competitive choice in price and quality in the broadband market. It is a response to the lack of alternatives in the market. A system is not going to be deployed if it is incapable of meeting user expectations nor will it continue to exist if it fails to meet customer standards. The history of the unlicensed broadband environment is its ability to confront shared and mixed use to deliver higher and more quality service.

In contrast, the licensed environment holds great promise to thwart roll out. It is controlled by one user. The intended licensee must navigate and finance the auction process. The build out provides for further delay yet accrues to the benefit of the license holder as no other entity can use the spectrum. There is no assurance that broadband will be delivered at an affordable price. It blocks providers with confined resources for license spectrum and limits multiple entrants.

The Commission made the right choice in structuring the 3650 MHz band for shared use. It will lead to more affordable broadband access.

The Petitioners Description of Wi-Fi Mesh is Incorrect as is Their Critique of Contention Based Protocols

Petitioners' characterize contention based unlicensed devices as usable only over very short distances with low power ranges and inherently creating interference challenges for larger distances. In asserting that contention based listen before talk (LBT) protocols only work with shorter distances, within the bounds of a home or office, they claim that the "tragedy of commons" will occur when numerous users overwhelm the networks. Petitioners forecast that dozens or hundreds of user interference problems will emerge. Petitioners are incorrect, contention based unlicensed devices are capable of providing quality broadband over substantial distances.

Tropos Wi-Fi mesh technology enables coverage of large areas with shorter-range transmissions that avoid the tragedy of the commons problems. Users extend beyond the public safety agency sector characterized by Petitioners and include residents and businesses. Tropos experience with mesh technology in the 2.4 GHz band serves as evidence that broadband can be delivered over large areas using contention based protocols. Moreover, transmissions in the 3650 MHz band tend not to travel as far as 2.4 GHz providing further credibility that there will be no commons tragedy.

Petitioners' characterization appears more applicable to point-to-multipoint but not mesh communications. Tropos customers routinely operate unlicensed links in urban and rural areas that use LBT at the street level outside the home. The links are up to ½ mile in urban areas and 1 or more miles in flat, treeless areas. Customers include ISPs with thousands of subscribers on these networks at the same time. Mesh networks provide uniform coverage across a city using LBT based radios in unlicensed bands. The result is quality broadband choice at lower cost.

The Commission's direction in requiring contention based protocols for the 3650 MHz band parallels its decision regarding the non exclusive shared licensing environment. It represents a deliberate decision to promote broadband through more affordable wireless networks. Licensees in the band will have the incentive to develop spectrum sharing practices based on the use of contention-based technologies that will promote efficient use of the band. Combined with the obligation to facilitate voluntary interference avoidance and mitigation efforts, high power broadband operations using contention-based technologies that facilitate sharing can be a reality in the 3650 MHz band. Investment will result because the regulatory entrance barriers are low.

Petitioners also complain regarding the length of time it will take industry to determine flexible and efficient methods to address contention-based protocols and base-station enabled mobile operations. Yet it is the license regime, where frequencies must be auctioned, that will cause a substantial time delay to intrude and will defeat the goal of affordable access. Contention-based protocols are a reasonable, cost effective method for ensuring the ability of any user to access the spectrum and are embodied in products that are available in the market today. The efficiencies will accrue directly to the user.

Summary

The Commission's *Report and Order* addressing the 3650 MHz band is supported by the reality of what shared wireless broadband currently delivers. The decision promotes affordable broadband access. The technology has brought meaningful facilities based competition to the broadband market. Petitioners confined view of contention

protocols and Wi-Fi capability is contradicted by the reality that these formats are delivering broadband throughout substantial geographic areas at affordable prices. The Commission made the correct choice in pursuing the shared spectrum environment. The Petitions for Reconsideration should be rejected.

Respectfully submitted,

Tropos Networks

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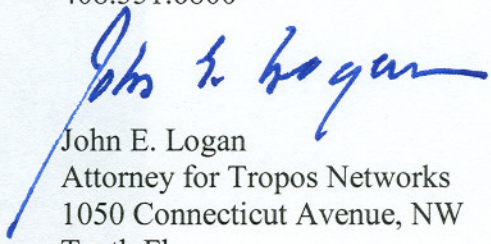

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Certificate of Service

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