

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

In the Matter of)	
)	
Unlicensed Operation in the TV Broadcast Bands)	ET Docket No. 04-186
)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band)	ET Docket No. 02-380
)	

To: The Commission

**PETITION FOR RECONSIDERATION OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

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Summary of Petition for Reconsideration

The Wireless Internet Service Providers Association (“WISPA”) seeks reconsideration of certain rules adopted in this proceeding to promote delivery of fixed wireless services to consumers.¹

While well-intended, the rules for TV white space use impose barriers that are so substantial that wireless Internet service may never be deployed in the band. The most troubling of these are the rules requiring fixed TVBDs to employ unproven, unreliable and unnecessary spectrum sensing techniques. The Commission gave little, if any, consideration to the significant – if not prohibitive – additional costs and burdens inherent in complying with sensing. In so doing, the Commission has neglected the legitimate interests of wireless Internet service providers (“WISPs”) and consumers in rural and underserved areas. The Commission itself has acknowledged the inadequacy of sensing but the reality is even worse. As written, the sensing rules render white spaces unusable for fixed broadband. Further, sensing is totally unnecessary because the Commission’s geolocation and database access mechanisms will ensure protection to incumbents. The Commission should strike its spectrum sensing rules.

If the Commission does not eliminate its sensing rules altogether, it should amend four of its sensing requirements that are most onerous. *First*, the Commission should lower the minimum height of sensing and receive antennas to three meters above ground so that WISPs can avoid the additional costs – approximately \$400 per location – for a mast, supports, cabling and labor associated with the 10-meter antenna mandated by existing rules. Lowering the height to three meters would afford WISPs flexibility to install antennas at the roofline. *Second*, it is unnecessary for the Commission to require sensing antennas to be omnidirectional when the antenna will only need to sense protected signals in the path between the base station and the CPE. *Third*, the Commission should eliminate the rule requiring TVBDs to vacate a channel within two seconds of detecting a protected signal. This requirement ignores the unproven nature of dynamic frequency selection and the differing propagation characteristics across the TV white space spectrum that would make other channels unusable, even if they are available. *Fourth*, the Commission should eliminate its distributed sensing rules that would require all TVBDs in a network to take remedial action – including shutting down – if a single device in the network detects a protected signal. Under this rule, a single hacker using a rogue device could breach network security and require the shutdown of an entire wireless public safety or local government network. A better outcome would be to require only the affected device to shut down.

In addition to eliminating the sensing rules that create unnecessary substantial costs and burdens, the Commission should adopt rules to promote WISP deployment. The Commission should increase the maximum height of transmit antennas from 30 to

¹ See *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807 (2008) (“*Second R&O/MO&O*”).

100 meters to afford WISPs greater flexibility to cover larger populations, particularly in rural areas where towers are less available. The Commission can raise the maximum antenna height using its existing distance separation criteria designed to ensure interference protection at television contours. The Commission also should allow fixed TVBDs to operate at up to 20 watts transmitter power. By increasing power, while maintaining protection of incumbents, the Commission would promote wide-area WISPs, backhaul, connectivity and public safety services.

The Commission should require each fixed TVBD to examine the geolocation database before commencing service so that it may choose a channel that will not interfere with nearby existing fixed TVBDs. With this simple spectrum management device, the Commission can mitigate the potential for WISP-to-WISP interference.

In sum, by mandating unproven spectrum sensing requirements, the Commission has essentially banished WISPs from the TV white spaces, leaving consumers behind. The Commission should expeditiously eliminate its sensing requirements, increase the permissible height and power of TVBD base stations, and adopt other rules that will increase flexibility and promote responsible spectrum management.

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**PETITION FOR RECONSIDERATION OF
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The Wireless Internet Service Providers Association (“WISPA”), pursuant to Section 1.429(a) of the Commission’s Rules, hereby files this Petition for Reconsideration (“Petition”) of certain rules adopted in the Commission’s Second Report and Order and Memorandum Opinion and Order in the above-captioned proceeding.² WISPA applauds the Commission’s efforts to help enable wireless Internet service providers (“WISPs”), communities, public safety and others to develop innovative uses and new opportunities for television white spaces, but these efforts fall woefully short.

The Commission should strike its spectrum sensing rules which, if allowed to stand, would convert the promise of the white spaces into the reality of a white elephant – a valuable resource unused because of unnecessary, unproven, costly and burdensome requirements. When considered alongside the proven realities of the WISP business and

² See *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807 (2008) (“*Second R&O/MO&O*”). The rules adopted in this proceeding were published in the Federal Register on February 17, 2009. See 74 Fed.Reg. 7314 (Feb. 17, 2009). Accordingly, this Petition is timely filed pursuant to Section 1.429(d).

the public's interest in receiving wireless broadband services, the sensing rules do not support the stated purposes of this proceeding and therefore must be overturned.

If the Commission does not repudiate sensing, then it must, at a minimum, eliminate certain onerous sensing requirements. Specifically, WISPA requests that the Commission:

- Reduce the height minimum for sensing antennas to three (3) meters to reduce installation costs, decrease the potential for interference and afford greater flexibility;
- Eliminate the requirement that sensing antennas be omnidirectional.
- Eliminate the requirement that TVBDs vacate occupied channels within two seconds; and
- Eliminate the requirement that all TVBDs in a network take remedial action when only one TVBD in the network detects a protected signal.

To further promote WISP use of the TV white spaces, the Commission also should:

- Eliminate unnecessary height restrictions for transmission antennas because such restrictions would, if maintained, stand as a prohibitive barrier to deployment of fixed TV white space networks and devices to the public, with little corresponding benefit;
- Require fixed operators to access and review the geolocation database *prior to* installing base stations and to select channels that do not cause interference to nearby registered unlicensed fixed TVBDs; and
- Increase the maximum power limit for fixed wireless devices based on established distance separation criteria that would both protect incumbent stations entitled to interference protection and permit fixed wireless operators to serve larger areas from a transmit site.

If adopted, these rule changes would lessen the acknowledged “significant economic impact on a substantial number of small entities” cited by the Commission in its Final Regulatory Flexibility Analysis,³ and would facilitate widespread use of the TV white spaces for fixed wireless broadband access services – acknowledged as the “best and

³ See *Second R&O/M&O* at 16923 (Appendix C, Section E).

highest use” of unused TV spectrum⁴ – in areas where availability of such services may be lacking.

Background

Founded in 2004, WISPA is a trade association of more than 350 WISPs, vendors and others dedicated to promoting, improving and expanding wireless broadband service nationwide. WISPs serve more than two million residences and businesses and operate in every state. Many WISPs operate in license-exempt bands (*e.g.*, 900 MHz, 2.4 GHz and 5.8 GHz) and the 3650-3700 MHz “licensed-lite” band to serve rural communities and other areas that would otherwise be unserved, and where few if any broadband alternatives exist. The vast majority of WISPs are “small businesses,” as defined in the Small Business Act.⁵

In this proceeding, WISPA has filed comments⁶ and *ex parte* presentations⁷ urging the Commission to adopt rules that would promote investment and use of available television spectrum and offering detailed proposals to enable responsible, interference-free operation in TV white spaces. In particular, WISPA advocated a “licensed-lite” approach for fixed TVBDs modeled on rules that have generated rapid deployment of WISP operations in the 3650-3700 MHz band. WISPA also asked the

⁴ Comments of IEEE 802.18, ET Docket Nos. 04-186 and 02-380, filed Jan. 31, 2007 (“IEEE 802.18 Comments”), at 2-3.

⁵ See *Second R&O/M&O* at 16920-21.

⁶ See WISPA Comments filed Feb. 20, 2007 in *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, First Report and Order and Further Notice of Proposed Rulemaking, ET Docket Nos. 04-186, 02-380, 21 FCC Rcd 12266 (rel. Oct. 18, 2006) (“WISPA First R&O Comments”).

⁷ See, *e.g.*, Notices of Ex Parte Presentations from Stephen E. Coran, Counsel to WISPA, to Marlene H. Dortch, FCC Secretary, ET Docket Nos. 04-186 and 02-380, dated August 1, 2008; Letter from Jack Unger, WISPA Secretary and FCC Committee Chair, to Marlene H. Dortch, FCC Secretary, ET Docket Nos. 04-186 and 02-380, dated October 22, 2008; Notices of Ex Parte Presentations and Letters from Stephen E. Coran, Counsel to WISPA, to Marlene H. Dortch, FCC Secretary, ET Docket Nos. 04-186 and 02-380, dated October 28, 2008.

Commission to authorize higher power limits so that WISPs could more efficiently serve communities in rural and remote areas at lower infrastructure and deployment costs, thereby making broadband service more affordable to consumers. In addition to seeking adoption of these proposals, WISPA also requests elimination of spectrum sensing requirements, which present a serious threat to deployment of fixed TVBDs.

Discussion

I. The Commission's Spectrum Sensing Requirements Are Burdensome And Unnecessary And, If Permitted To Stand, Would Discourage The Deployment Of Fixed Wireless Networks.

In the *Second R&O/MO&O*, the Commission adopted rules requiring fixed TVBDs to employ spectrum sensing to detect incumbent users in the TV broadcast bands, such as DTV stations, analog TV stations and wireless microphones.⁸ The Commission readily admitted that sensing devices “were not able to sense with a high degree of accuracy both TV and wireless microphone signals on a channel in different real world environments.”⁹ The Commission further found that:

In particular, our measurement studies found that while the prototype devices were generally able to detect “clean” TV and wireless microphone signals on a channel with no other signals present, their ability to reliably detect unoccupied channels degraded to levels we consider unsatisfactory when the test signals included multipath and other fading effects and when signals were present on other channels. The performance of the devices was observed to degrade substantially and at increasing levels as the level of the signals on adjacent channels was raised. Both fading and relatively stronger signals on adjacent channels are a normal part of the signal conditions in the environment of the TV bands and any device that uses spectrum sensing to determine whether a channel is occupied will have to be able to perform reliably when such conditions are present.¹⁰

⁸ See *Second R&O/MO&O* at 16889-93.

⁹ *Id.* at 16890.

¹⁰ *Id.*

Yet, notwithstanding these serious questions about the reliability of “nascent” sensing technology,¹¹ the Commission nevertheless imposed a series of burdensome and costly sensing obligations on fixed TVBDs. In so doing, the Commission failed to consider the adverse effect that complying with sensing obligations would place on WISPs and the very real possibility that sensing could make the band entirely unsuitable for fixed deployment.

Moreover, the spectrum sensing requirements are unnecessary. The geolocation and database access mechanism would adequately protect incumbents.¹² The database will contain the relevant operating parameters for all television stations and other incumbents entitled to protection, including low power auxiliary devices such as wireless microphones.¹³ In almost every instance, the sensing requirements would not be necessary because the geolocation and database access provisions of the rules will ensure that incumbents are protected.

In some cases, unregistered itinerant wireless microphones may transmit from areas where TVBDs are located. Without sensing capabilities, such wireless microphones could receive interference from a TVBD. While WISPA believes that the instances of interference would be extremely rare given the relative abundance of white space spectrum in rural and remote areas of the country, the Commission can, as it has in some urban areas,¹⁴ designate specific white space channels for wireless microphone use. Although the Commission notes that this approach “would restrict the availability of

¹¹ *Id.*

¹² WISPA’s acceptance of geolocation, as first articulated in its October 2008 *ex parte* presentations, represents a departure from the WISPA First R&O Comments, where WISPA supported sensing, in light of the development of the record in this proceeding and improvements in technological capabilities.

¹³ See Section 15.713(h).

¹⁴ See Section 15.712(f)(2).

spectrum for TVBDs . . . at locations and times where there are no microphone operations,”¹⁵ WISPA believes that designating specific channels for low power auxiliary devices would be preferable to sensing. Simply stated, WISPA would prefer to “lose” white space spectrum to accommodate wireless microphones than suffer the burdens of complying with onerous and expensive sensing requirements that could force WISPs to avoid the TV white spaces altogether.

The Commission has hung a “Do Not Enter - Sensing in Use” sign in front of WISPs to deny them access to TV white spaces on reasonable terms in favor of unnecessary, unproven and unreliable sensing technologies. On reconsideration, the Commission should eliminate its sensing requirements to promote service to subscribers, many of whom may have no other affordable broadband access alternative, consistent with the objectives of this proceeding.

II. If The Commission Does Not Entirely Eliminate Spectrum Sensing Requirements, It Should Eliminate Certain Sensing Rules That Would Be Especially Burdensome To WISPs.

If the Commission does not reconsider and eliminate its sensing requirements altogether, it should amend or eliminate four sensing requirements that impose substantial burdens on WISPs. In light of these difficulties, many would-be WISPs may reasonably determine that the additional costs would be prohibitive and would simply abandon plans to deploy service altogether – a result that would certainly be contrary to the public interest.

¹⁵ *Second R&O/MO&O* at 16877.

A. **The Commission Should Amend Its Rules To Permit The Sensing Antenna And The User Terminal To Be Located Three Meters Above Ground.**

Section 15.709(b)(2) requires “receive antennas”¹⁶ to be located at least 10 meters – more than 30 feet – above ground level. To support this minimum height requirement, the Commission relied on statements of the IEEE 802.18 Radio Regulatory Technical Advisory Group (“IEEE 802.18”) in concluding that “the receive antenna used with fixed devices be located at least 10 meters above the ground to maximize the likelihood that it’s [sic] reception is not blocked from receiving signals originating from any direction.”¹⁷ Although the Commission is justifiably concerned that sensing antennas could be shadowed by terrain or by manmade structures and that transmit/receive antennas could cause interference to poorly-shielded indoor TV receivers, the inflexible 10-meter minimum height unnecessarily stands in the way of wide-area fixed TVBD deployment.

To afford WISPs the reasonable opportunity to offer service without having to absorb the additional significant costs associated with an over-restrictive height minimum, WISPA proposes that sensing antennas and CPE be permitted to be installed as low as three meters above ground. With this modest change, WISPs will avoid unnecessary costs and obtain the flexibility to locate the antenna in a suitable location and, in so doing, may actually *decrease* the potential for interference to TV receivers.

¹⁶ Although both Section 15.709(b)(2) and the *Second R&O/M&O* refer to a “receive antenna,” the context suggests that the Commission intends to limit the height of both the sensing antenna and the user terminal (“CPE”). See, e.g., IEEE 802.18 Comments at 16. While it may be ultimately be true that the sensing and transmit/receive portions of a unified antenna system mounted at a customer location will be integrated, WISPA cannot presume that such will be the case. However, for purposes of this Petition, WISPA will assume that the Commission intended to establish a 10-meter minimum height for both sensing antennas and CPE. On reconsideration, the Commission may wish to clarify Section 15.709(b)(2) so that the antenna references are clear.

¹⁷ See *Second R&O/MO&O* at 16890.

The Commission failed to consider the costs inherent in requiring sensing antennas and CPE to be placed at or above the 10-meter threshold. WISPs provide service to residences, most of which are one- or two-story dwellings that are several feet less than 10 meters above ground level and, to satisfy the height minimum, would require an estimated \$400 per location for a mast, guy wires or other supports, extra cabling and additional installation labor costs, without adding anything to the level of protection provided to incumbent spectrum users. In many cases, these costs could be entirely avoided because the best place to locate the fixed TVBD antenna system would be three meters above ground level at the roofline for a one-story residence and between three and 10 meters above ground for a two-story residence. Moreover, the Commission did not consider that homeowners are likely to object (as they already do today) if wireless antennas are not mounted as unobtrusively and invisibly as possible near or below the rooflines of their homes.

In relying on the IEEE 802.18 Comments, the Commission also concluded that TVBD antennas should be located outdoors to mitigate the potential for interference to televisions indoors.¹⁸ However, many TV antennas are and will continue to be located outdoors on the TV viewer's rooftop. In those cases, co-locating a TVBD and a sensing antenna 10 meters above ground near the TV antennas may actually *increase* the potential for interference to TV receivers. In the unlikely event that interference is present, this can be quickly eradicated by simply relocating the antenna to another location on the roof at the time of installation – a much easier task than relocating an antenna system mounted on a 30-foot mast.

¹⁸ See IEEE 802.18 Comments at 11-12.

To lower costs, decrease the potential for interference and afford WISPs greater flexibility, the Commission should amend Section 15.709(b)(2) and should allow antennas to be located three meters above ground. With this change, debilitating, overprotective and unproven sensing theories will be replaced with a practical “real world” solution that will promote the “best and highest use” of the TV white spaces.

B. The Requirement That TVBDs Utilize An Omnidirectional (Or Equivalent) Sensing Antenna Is Overprotective And Should Be Eliminated.

Section 15.711(c)(1)(ii) states that detection thresholds are referenced to an omnidirectional antenna with 0 dBi gain, and allows for alternative approaches that can demonstrate at least the same performance.¹⁹ Also rooted in the IEEE 802.18 Comments, this requirement is unnecessary and has no basis in reality.²⁰ In the real world, WISPs will deploy service using directional antennas at the subscriber’s location to communicate with the base station. In this architecture, to the extent sensing is required, it will only be necessary for the sensing antenna to be able to detect a protected signal in the path between the base station and the CPE. As stated by IEEE 802.18, “the use of directional transmit antennas at the user terminals will have the effect of minimizing the area of potential interference by directing the transmitted signal power toward the base station and away from the protected contour of co-channel and first adjacent channel TV stations.”²¹

¹⁹ See also Section 15.709(b)(2) (stating that the antenna system “shall be capable of receiving protected signals equally in all directions”).

²⁰ See IEEE 802.18 Comments at 12.

²¹ *Id.* (footnote omitted). See also *id.* at 16.

C. The Requirement To Vacate Occupied Channels Within Two Seconds Is Unduly Restrictive.

Section 15.711(c)(5), which requires TVBDs to vacate a channel within two seconds of finding a channel occupied subsequent to a device's "initial sensing operation,"²² would further endanger every fixed TVBD wide-area network. The Commission imposed this requirement without even determining whether dynamic frequency selection ("DFS") technology is viable. Even if it is, every fixed TVBD already will be operating on an unoccupied, database-confirmed clear frequency, and sudden switches within two seconds to an available clear frequency are impractical for several reasons.

First, DFS has proven to be infeasible in the real world and it therefore should not be imposed here. In the 5.2 GHz and 5.4 GHz bands -- the only bands where DFS is mandated -- more and more WISPs have discovered that they cannot use the bands because the DFS-mandated frequency changes at best make network operation unreliable and at worst completely disallow use of any frequency within the band. Moreover, wherever radar is present, the 5.4 GHz band becomes almost worthless for outdoor use because DFS forces unpredictable frequency changes and often complete network shutdowns because no frequencies are sensed as being available. .

Second, even if DFS was proven to be a viable technology ready for use in the TV white spaces, in some congested areas there may be no other available clear frequencies, and switching to another channel would be impossible. The unavailability of channels

²² See *Second R&O/MO&O* at 16891. The Commission cited the IEEE 802.18 Comments, which noted the "itinerant and intermittent nature of wireless microphone use" as the basis for a two-second channel change. IEEE 802.18 Comments at 13.

provides the WISP with the dilemma of either risking service interruptions to subscribers or not offering service in the first place. Either way, the public goes unserved, despite the presence of a geolocation database that will protect incumbents.

Third, assuming new channels are available, channel switching will be limited by the practical realities and physical characteristics of antenna systems. Only large, expensive high-gain, directional, broadband antennas are capable of operating at uniform gain across the entire frequency range occupied by the TV white spaces – 54 MHz to 698 MHz. Such antennas were prevalent in the early days of VHF-UHF television service, but end users would resist such installations today in favor of smaller antennas that are capable of receiving a narrower range of channels that do not support unlimited channel switching. Antennas covering the entire band also would be costly for WISPs to install and mount (even more so if the 10-meter height minimum is maintained), and WISPs and other network operators would be discouraged from deploying such systems.

Fourth, even where a clear channel is available and the network operator and end-user can bear the costs of installing large, rooftop-mounted, high-gain broadband directional antennas, RF propagation characteristics differ very substantially from channel to channel such that a forced channel change may well cause a complete loss of network connectivity. RF propagation characteristics in the VHF range (for example, at 54 MHz) are significantly better than RF propagation characteristics in the UHF range (for example, at 698 MHz). Sudden switching from a lower-frequency channel to a higher-frequency channel will often cause signal deterioration with a resulting loss of wide-area network connectivity.

D. The Commission Should Eliminate The Requirement For All Fixed TVBDs To Take Remedial Action If Only One Fixed TVBD In The Network Senses A Protected Signal.

As written, Section 15.711(c)(7) would require *all* devices in the network to take remedial action or turn off even if *only one* device senses the presence of a protected signal.²³ Once again, the Commission has promulgated a rule without considering the negative impact the rules would impose on the ability of WISPs to reliably provide service to subscribers. Like the other overprotective sensing requirements, the Commission should eliminate this requirement.²⁴

In a WISP network with perhaps thousands of subscribers, the mere detection of one signal by just one TVBD would result in the entire network being shut down. That would be like imposing the death penalty for a parking meter violation. This result proves even more draconian when considering that network users may include public safety sites, homeland security installations and government locations that provide lifeline and critical infrastructure services, and that the basis for the remedy may be a single hacker with an unregistered wireless microphone that maliciously causes its device to be detected. Without overstating this serious threat, a disruption of this nature clearly would be widespread, despite the requirement that only directly connected stations must shut down, because wide-area networks employ a point-to multipoint network architecture whereby each station is in direct contact with the base station. Shutdown of

²³ See *id.* at 16892.

²⁴ In the *Second R&O/M&O*, the Commission cited the WISPA First R&O Comments WISPA's earlier comments from February 2007 favoring so-called "distributed sensing." See *Second R&O/M&O* at 16819. However, the *Second R&O/M&O* ignores WISPA's subsequent *ex parte* presentations where it favored a "licensed-lite" approach and a geolocation database as means to manage interference that a TVBD might cause. See n.6, *supra*. Accordingly, the Commission should not rely on the earlier-filed and superseded WISPA First R&O Comments, and should instead acknowledge WISPA's later-filed submissions in this proceeding.

any station would cause the base station to shut down, and base station shutdown would cause shutdown of the entire network.

The Commission's rules mandate a result that could cause a serious intentional or unintentional security threat, an outcome that is wholly disproportionate to the harm it is trying to prevent. A far better result would be to require only the affected TVBDs – the ones that actually detected the presence of a protected signal – to take remedial action. This would be a far less restrictive and more reasonable approach than the overreaching requirement currently contained in Section 15.711(c)(7).

III. The Commission Should Permit Fixed Transmit Antennas To Exceed 30 Meters With Appropriate Distance Separation Requirements.

Section 15.709(b)(2) limits TVBDs to a maximum antenna height of 30 meters above ground level (“AGL”) and Section 15.712(a)(2) establishes a distance separation approach to ensure that incumbent television stations are protected from harmful interference.²⁵ WISPA believes that these rules are unduly restrictive and should be modified to allow WISPs to transmit from heights up to 100 meters AGL to more efficiently and economically serve larger areas, without increasing the potential for interference to protected contours.

The *Second R&O/MO&O* employs a sliding scale approach to interference protection based on antenna height and distance from a protected contour, but prohibits TVBDs from operating transmit antennas above 30 meters AGL to “appropriately balance the needs of unlicensed fixed TVBDs to achieve adequate service range while minimizing the range at which those operations could impact licensed services.”²⁶ The

²⁵ See *Second R&O/MO&O* at 16870.

²⁶ *Id.*

Commission’s proposed table of required minimum distances between TVBDs and TV service contours sets a level of protection at the protected television contour. The Commission can apply the same underlying standards and protection ratios to allow TVBDs to operate at heights exceeding 30 meters AGL. The table below describes how Section 15.712(a)(2) should be revised to authorize higher transmission antennas:²⁷

Antenna Height of Unlicensed Device	Required separation distance (km) from Digital or Analog TV (Full Service or Low Power) Protected Contour	
	Co-Channel	Adjacent Channel
Less than 3 m	6.0 km	0.1 km
3 m – Less than 10 m	8.0 km	0.1 km
10 m – Less than 30 m	14.4 km	0.74 km
30 m – Less than 50 m	20.0 km	1.3 km
50 m – Less than 75 m	24.6 km	1.7 km
More than 75m – 100m	28.1 km	1.9 km

Allowing antennas to exceed 30 meters will provide additional benefits to broadband subscribers. Operators will gain flexibility in network deployment and can better tailor the designs of their particular networks to the local geography and marketplace. Such flexibility could result in fewer transmit antennas, which will increase base station coverage area to improve service in rural areas where existing towers are less prevalent and population is sparse. Perhaps most importantly, network start-up costs could be significantly reduced and may well represent the difference between network deployment or no network deployment.

There are numerous benefits to allowing base stations to transmit from higher antennas, and no reason for capping the height at an artificial level so long as the distance

²⁷ Co-Channel separation distances computed using F(50,10) propagation curves with 27.3 dBu interference level at approximately 16 dB C/I with 3 dB polarization mismatch, computations do not include TV receiver antenna pattern discrimination, which when considered would further reduce the potential for interference to TV reception. Adjacent channel separation distances computed using simple two-ray propagation model (K=1) with -33 dB adjacent channel D/U for a -91 dBm DTV signal.

separation criteria are adjusted to afford the same interference protection standards to television stations. The Commission therefore should amend Sections 15.709(b)(2) and 15.712(a)(2) to permit fixed TVBD base stations to operate at a height of up to 100 meters AGL consistent with values in the above table.

IV. The Commission Should Adopt A Scale That Permits Operation Of Fixed Devices At Increased Power As The Distance From Protected Signals Increases.

Stating that higher power levels would “increase the risk of interference in congested areas and thus could make sharing spectrum between TV band devices more difficult” and that it wants to take a “cautious approach” in setting power limits to minimize risk of interference to protected stations,²⁸ the Commission adopted a 4 Watt EIRP power limit equivalent for fixed services operating in TV white spaces.²⁹ WISPA believes that this power limit can be increased to 20 Watts of transmitter power to facilitate more efficient and economical use of TV white space, especially in uncongested rural areas, without increasing the potential for harmful interference as determined by existing Commission standards.

The Commission adopted its standards based on power, height and the Section 73.699 curves. These standards can be extended to provide a similar level of protection based on variations in power (*i.e.*, allowing higher power operations would not increase potential for interference if appropriate distance separation criteria are in place) so that fixed TVBD service can be more economically and efficiently provided to rural areas where there are fewer incumbent broadcasters and television station contours are further apart.

²⁸ See *Second R&O/MO&O* at 16847.

²⁹ See Section 15.709(a)(1).

Interference to congested areas would not be increased because, based on increased distance separation requirements, higher power would only be available in uncongested rural areas. Operation at higher power (based on a sliding scale up to 20 watts of transmitter power) would benefit consumers, especially those in rural and underserved areas that are more costly to serve. In this way, a larger area could be served from fewer sites, thereby reducing site acquisition and infrastructure costs and enabling reliable and economical delivery of broadband services. Increasing power also would enable point-to-point interconnection of rural networks, including WISP, public safety, private, local government and grassroots community networks, with no increase in predicted interference. While the Commission has promised a notice of inquiry process to address these concerns,³⁰ that process has not yet begun and would be time consuming and inadequate to meet pent-up consumer demand in rural and underserved communities, even assuming the Commission initiates a rule making proceeding and ultimately adopts rules authorizing higher power. For these reasons, WISPA respectfully requests that the Commission increase the fixed TVBD transmitter power limit as described herein.

V. The Commission Should Require Fixed TVBD Operators to Access And Review the Geolocation Database Prior To Network Deployment And To Choose An Available Channel That Does Not Cause Interference To Existing Nearby Fixed TV White Space Networks.

In its *ex parte* presentations that preceded adoption of the *Second R&O/M&O*, WISPA proposed a detailed plan by which the Commission could authorize fixed use of the TV white spaces pursuant to a “licensed-lite” approach similar to the non-exclusive licensing procedures used in the 3650 MHz Service.³¹ Although the Commission

³⁰ See *Second R&O/MO&O* at 16847.

³¹ See n.6, *supra*. See also *Second R&O/MO&O* at 16825, n.62.

incorporated the geolocation aspects of the “licensed-lite” model into its rules to help protect television stations and other incumbents entitled to interference protection and also required fixed TVBD operators to register with the database,³² it oddly did not require fixed TVBD operators to review the database to determine the presence of existing fixed TVBD operators. WISPA asks the Commission to reconsider this decision.

A model for this approach exists in the 3650 MHz Service, which obligates registrants to take simple proactive, cooperative steps to avoid interference. In the *3650 MHz Order*, the Commission defined this duty of cooperation as follows:³³

All applicants and licensees shall cooperate in the selection and use of frequencies in the 3650-3700 MHz band in order to minimize the potential for interference and make the most effective use of the authorized facilities. A database identifying the locations of registered stations will be available at <<http://wireless.fcc.gov/uls>>. Licensees should examine this database before seeking station authorization, and make every effort to ensure that their fixed and base stations operate at a location, and with technical parameters, that will minimize the potential to cause and receive interference. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements.

If the Commission adopted similar requirements for fixed TVBD operators, the potential for interference among unlicensed networks would be reduced, at no additional cost to the Commission or the private sector. By first examining the geolocation database, prospective TVBD operators will be able to identify existing fixed TVBD networks, avoid interference with those networks, and if necessary, coordinate facilities with those networks. This simple requirement would benefit consumers, who would experience more reliable broadband wireless service, thereby avoiding a repeat of the overcrowded, interference-limited operation that exists in bands such as the 2.4 GHz band today.

³² See Section 15.713(f).

³³ *Wireless Operations in the 3650-3700 MHz Band*, ET Docket No. 04-151, Report & Order, 20 FCC Rcd 6502, 6512-13 (2005) (“*3650 MHz Order*”).

The requirement to examine the geolocation database prior to registration would encourage investment in TVBD networks that would otherwise be deterred in the absence of a means to manage interference. Without investment, fixed networks may not be able to be constructed, to the detriment of consumers in unserved and underserved areas who have few, if any, options. Accordingly, as is the case in the 3650 MHz Service, WISPA urges the Commission to require prospective TVBD registrants to “make every effort to ensure that their fixed and base stations operate at a location, and with technical parameters, that will minimize the potential to cause and receive interference.”³⁴

Conclusion

In the Commission’s efforts to promote broadband connectivity, time is of the essence, yet the Commission’s rules constitute a profound deterrent to deployment of fixed wireless systems. By mandating unproven spectrum sensing requirements, the Commission has essentially banished WISPs from the TV white spaces. Broadband connectivity, especially to rural and underserved residences and homes will continue to be unavailable.

³⁴ *Id.*

But all is not lost. The Commission can revise its sensing requirements, modify its antenna-height, power and interference-avoidance requirements and thus improve the ability of WISPs to serve the public with reliable and affordable broadband service. The Commission should act quickly to amend the rules as advocated herein.

Respectfully submitted,

**THE WIRELESS INTERNET SERVICE
PROVIDERS ASSOCIATION**

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By: */s/ Richard Harnish, President*
/s/ Jack Unger, Chair of FCC Committee
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