



1200 EIGHTEENTH STREET, NW  
WASHINGTON, DC 20036

TEL 202.730.1300 FAX 202.730.1301  
WWW.HARRISWILTSHIRE.COM

ATTORNEYS AT LAW

September 5, 2008

**Ex Parte**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

*Re: Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Doc. Nos. 04-186 and 02-380*

Dear Ms. Dortch:

As the Commission is well aware, this proceeding began by recognizing the need to address the “significant growth of and consumer demand for unlicensed wireless broadband applications and services.”<sup>1</sup> Indeed, the record amply reflects the benefits unlicensed uses of the white space will provide, including affordable broadband access, wireless mesh networking, telemedicine applications, and numerous innovations yet to come—uses that the phenomenal success of the Wi-Fi industry has only hinted at. Thus, the White Spaces Coalition<sup>2</sup> is particularly troubled by eleventh-hour calls to deny the public access to any TV band spectrum on an unlicensed basis.<sup>3</sup>

There is no dispute that spectrum below 1 GHz is uniquely desirable, and this is why the Commission must ensure that the public benefits from both licensed uses of this spectrum (through the 700 MHz auction) as well as unlicensed uses (through the white spaces proceeding). But while technical operating parameters for unlicensed uses have already been discussed at length, there is only one detailed technical proposal for licensed white space use: fixed point-to-

---

<sup>1</sup> *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Notice of Proposed Rulemaking, ET Doc. Nos. 04-186, 02-380, 19 FCC Rcd 10018 (¶ 7) (2004).

<sup>2</sup> The White Spaces Coalition’s members include Dell, Inc., Google, Inc., Hewlett-Packard Co., Microsoft Corp., Palm, Inc., Philips Electronics North America Corp., and TDK Corp.

<sup>3</sup> *See, e.g.*, Ex Parte Letter from Michele Farquhar, Counsel to Sprint Nextel Corp., Special Counsel to FiberTower Corp. and Rural Telecommunications Group, Inc. to Marlene H. Dortch, ET Doc. Nos. 04-186, 02-380 (filed Jul. 24, 2008) (“Jul. 24 FiberTower Ex Parte”); letter from FiberTower Corp. *et al.* to Marlene H. Dortch, ET Doc. Nos. 04-186, 02-380 (filed Jun. 25, 2008) (“Jun. 25 FiberTower Ex Parte”); Ex Parte Letter from Michele Farquhar, Counsel to Sprint Nextel Corp., Special Counsel to FiberTower Corp. and Rural Telecommunications Group, Inc. to Marlene H. Dortch, ET Doc. Nos. 04-186, 02-380 (filed Apr. 30, 2008).

Ms. Marlene H. Dortch  
September 5, 2008  
Page 2

point wireless backhaul (the “FiberTower Plan”).<sup>4</sup> Licensing the white spaces based on the FiberTower Plan would foreclose a number of innovative white space spectrum uses with little to show in return. The proposed licensed use by FiberTower also poses a far greater risk to incumbent operations than the low power unlicensed devices contemplated by the Coalition.

Critically, many of the communities that would benefit the most from unlicensed access to the white spaces reside in urban areas, where high power operations proposed by the FiberTower Plan are infeasible.<sup>5</sup> Thus, were the Commission to allocate the spectrum on a licensed basis per FiberTower’s proposal, much white spaces spectrum would continue to lie fallow in numerous densely populated areas, denying the benefits of white spaces access to large segments of the population. Moreover, even if companies are allowed to use the white spaces for backhaul in less populated areas, individuals there would likewise be denied access to innovative unlicensed applications and services. The benefits of white spaces use should not be restricted only to a few corporations in areas where most Americans would not benefit. Rather, the Commission should ensure that white spaces spectrum is available for everyone. This simply will not happen if the white spaces are restricted to licensed, fixed point-to-point operations.

As Google already has explained in detail, wireless backhaul is not an efficient—or even desirable—use of the white spaces.<sup>6</sup> There is also already other spectrum available for backhaul that is better suited to fixed point-to-point operations.<sup>7</sup> The bottleneck for wireless backhaul deployment is not spectrum availability, it is the need for infrastructure deployment, which would remain no matter what spectrum is used. Indeed, as proponents of the FiberTower Plan recognize, implementing their plan in its entirety still “would not eliminate the need for special access circuits, fixed microwave links, and other existing fixed communications methods.”<sup>8</sup>

Finally, licensed operations such as those proposed by FiberTower would dramatically impact existing TV band operations. This is because the FiberTower Plan isn’t really about locating and using vacant white spaces. Rather, as the summary of proposed rules filed by FiberTower and others acknowledge, high power white space operations would need to be elevated to “co-secondary” status with a number of existing TV band uses, including Low Power TV and authorized wireless microphones.<sup>9</sup> In fact, under certain situations, even full power broadcasters

---

<sup>4</sup> See Discussion Draft: Proposed Technical Rules for Licensed, Fixed Use of TV White Spaces (“FiberTower Proposed Rules”), attached to Jun. 25 FiberTower Ex Parte.

<sup>5</sup> See generally FiberTower Proposed Rules (describing high power operations and confirming that operation will not take place in adjacent channels).

<sup>6</sup> See generally Ex Parte Letter from Richard S. Whitt, Google Inc., to Marlene H. Dortch, ET Doc. Nos. 04-186, 02-380, WC Doc. No. 05-25, RM-10593 (filed Jan. 22, 2008).

<sup>7</sup> *Id.* at 2.

<sup>8</sup> Jul. 24 FiberTower Ex Parte at 1.

<sup>9</sup> See FiberTower Proposed Rules at 1-2.

Ms. Marlene H. Dortch  
September 5, 2008  
Page 3

would be required to provide several months' advance notice to a white space licensee before commencing operations.<sup>10</sup>

To underscore the extent to which the FiberTower Plan would impact existing authorized uses, one need only look at the technical consequences for wireless microphones. Although the proposed rules would require fixed white space operations to coordinate with wireless microphone installations operating at previously-registered locations prior to buildout,<sup>11</sup> there are no protection guarantees for wireless microphones that would operate in channels proposed for backhaul once those operations commence. And unlike personal/portable operations, FiberTower's proposed rules contemplate high power operations of up to 3,160 Watts in 6 MHz.<sup>12</sup> As the attached analysis demonstrates, operations at each tower could effectively block out 350 square kilometers—an area roughly twice the size of Washington, DC.<sup>13</sup> Such operations could significantly impair news reporting and other Part 74 broadcast auxiliary activities in these locations, to say nothing of the illegal, yet still socially beneficial, applications such as wireless microphone use in houses of worship.

Simply put, licensing the white spaces would eliminate the possibility of providing numerous innovations to the American public—including for rural and other unserved areas—while at the same time restricting existing uses of TV band spectrum. The white spaces is the last opportunity for unlicensed use below 1 GHz. Failure to allocate it solely on an unlicensed basis will foreclose the emergence the availability to consumers of tremendously innovative broadband services. The Commission should reject these proposed limitations when it creates final rules for white space operations.

Pursuant to the Commission's rules, a copy of this notice is being filed electronically in the above-referenced dockets. If you require any additional information please contact the undersigned.

Sincerely yours,



Edmond J. Thomas  
Senior Technology Policy Advisor

Enc.

---

<sup>10</sup> See *id.* at 2-3.

<sup>11</sup> See *id.* at 4.

<sup>12</sup> See *id.* at 1.

<sup>13</sup> See generally Analysis of Proposed Technical Rules for Wireless Backhaul, attached as Exhibit A.

# **Analysis of Proposed Technical Rules for Wireless Backhaul**

## **Introduction**

The purpose of this note is to explore the technical consequences for wireless microphones of the proposed rules recently filed by FiberTower Corp., *et al.* for high power fixed use of the television white spaces.<sup>1</sup> Specifically, we analyze the effects of the transmit power and antenna parameters they propose.

## **FiberTower Proposal**

The technical rules propose a transmit power (EIRP) of 24 dBW/6MHz per polarization (251 watts) in urban areas and 35dBW/6MHz per polarization (3162 watts) in rural areas. In addition, the rules propose an antenna with azimuth and elevation of 25 degrees.

## **Analysis**

In order to analyze the interference caused by this proposal, we will apply a modified version of the Friis model given by equation 1 below:

$$P_r = P_t + G_t + G_r - 32.4 - 20 \log(F) - 10N \log(D) \quad (1)$$

$P_r$  is the power at distance  $D$  from the transmitter in dBm.

$P_t$  is the transmitter power into the antenna in dBm.

$G_t$  is the transmit antenna gain in dB.

$G_r$  is the receiver antenna gain in dB.

$F$  is the transmitted frequency in MHz.

$N$  is an empirically derived constant base on topology (see Table 1 below).

$D$  is the distance between the receiver and transmitter in km and is less than or equal to the distance to the radio horizon.

---

<sup>1</sup> See generally FiberTower Corp. *et al.* Discussion Draft: Proposed Technical Rules for Licensed, Fixed Use of TV White Spaces, ET Doc. Nos. 04-186, 02-380 (filed Jun. 25, 2008).

**Table 1: Path Loss Constant values**

<b>Environment</b>	<b>Path loss constant N</b>
Free Space/Line of Sight	2.0
Urban/Suburban	2.5 to 3.7
Rural	2.0

From the FiberTower Proposal the Friss model parameters are as follows:

$P_t + G_t = 54$  dBm for urban use and 65 dBm for rural use.

$G_r = 0$ .

$F =$  We choose the center frequency of 600 MHz suggested by the Proposal

Therefore equation 1 above becomes

$$P_{ru} = 54 - 32.4 - 20\log(600) - 10N\log(D) = -34 - 10N\log(D) \quad (2)$$

for urban propagation.

$$P_{rs} = 65 - 32.4 - 20\log(600) - 10N\log(D) = -23 - 10N\log(D) \quad (3)$$

for suburban propagation.

$$P_{rr} = 65 - 32.4 - 20\log(600) - 10N\log(D) = -23 - 10N\log(D) \quad (4)$$

for rural propagation.

In addition, with the proposed antenna beam width of 25 degrees, the area for which the power at victim receivers is equal to or greater than the powers given by equations 2, 3, and 4 is given by

$$S = (25 \times 3.14 \times D^2) / 360 = .22 D^2 \quad (5)$$

The radio horizon in km. is given by:

$$\text{Radio Horizon} = 4.124(H_t^{1/2} + H_r^{1/2}) \quad (6)$$

Where  $H_t$  is the height of the transmitter antenna in meters and  $H_r$  is the receiver antenna height in meters.

We make the following additional assumptions:

For densely populated metro area we will use  $N = 3.7$

For a suburban area we will chose  $N = 3.0$

For a rural area we will chose  $N = 2.0$

$H_t = 75$  meters

$H_r = 1$  meter

Therefore equations 2, 3 and 4 become

$$P_{ru} = -34 - 37 \log(D) \quad \text{for urban propagation.} \quad (8)$$

$$P_{rs} = -23 - 30 \log(D) \quad \text{for suburban propagation} \quad (9)$$

$$P_{rr} = -23 - 20 \log(D) \quad \text{for rural propagation} \quad (10)$$

From equation 6 using antenna heights of 75 m for the transmitter, 1 meter for the victim receiver antenna respectively we find the radio horizon to be 40 km.

We use equations 5, 8, 9, and 10 to populate Table 2 below

**Table 2: Interference Power vs. Distance at a Victim Receiver Antenna**

Distance from Xmitter In km	Power @ Victim Receiver Antenna in dBm (Urban) $P_{ru}$	Power @ Victim Receiver in dBm (Suburban) $P_{rs}$	Power @ Victim Receiver in dBm (Rural) $P_{rr}$	Area Where Power at the Victim receivers exceeds $P_{ru}$ , $P_{rs}$ or $P_{rr}$ in $Km^2$
1	-34	-23	-23	.22
10	-71	-53	-43	22
20	-82	-62	-49	88
30	-89	-67	-52	198
40	-93	-71	-55	352

Therefore, the values in Table 2 represent a lower limit of the effective sensitivity that a wireless microphone system can achieve in the covered area. This sensitivity represents a substantial degradation from the values achieved in typical wireless microphone receivers.<sup>2</sup>

<sup>2</sup> For example, Shure's ULX Wireless Microphone System claims roughly -105 dBm sensitivity. See Shure ULX Wireless Microphone System Specification Sheet, available at [http://www.shure.com/stellent/groups/public/@gms\\_gmi\\_web\\_ug/documents/web\\_resource/uls\\_pro\\_ulx-specsheet.pdf](http://www.shure.com/stellent/groups/public/@gms_gmi_web_ug/documents/web_resource/uls_pro_ulx-specsheet.pdf).