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VIA ELECTRONIC FILING

Chairman Kevin J. Martin
Commissioner Jonathan S. Adelstein
Commissioner Michael J. Copps
Commissioner Robert M. McDowell
Commissioner Deborah Taylor Tate
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte* Comments of **SPORTS TECHNOLOGY ALLIANCE**

ET Docket No. 04-186

Marcus Spectrum Solutions, LLC (MSS) is pleased to address the points raised by the Sports Technology Alliance (STA) in their letter of May 1, 2008. MSS was one of the first parties to file in this proceeding in comments filed on September 2, 2004. Since then, MSS has both participated *pro se* and has assisted clients in preparation of comments in this proceeding.

No one wants massive disruption of the sport programming that STA alleges will result from any form of the unlicensed proposals in this docket. This can be avoided with a reasonable transition plan and a new policy for wireless microphones that reflects both modern wireless technology and contemporary spectrum policy.

The focus of this filing is to examine the implications of the *status quo* that STA is advocating and pointing out that independent of the outcome of this proceeding the wireless microphone provisions of Part 74, Subpart H needs urgent corrective action.

I. Wireless Microphones in US Use Obsolescent Inefficient Technology

The usual wireless microphone in the US uses frequency modulation (FM) technology and frequency division multiple access (FDMA), similar to the first generation of cellular radiotelephones in the early 1980s, except without the cellular architecture and high frequency reuse used in the early cellular systems. Thus the system STA says

> "The ESPN Monday Night Football ("MNF") broadcast alone requires 145 wireless frequencies for microphones, talkback and communications."

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The implication is that they need 145 widely spaced frequencies using up most of TV spectrum because they are not using contemporary wireless technology that would allow more efficient spectrum use. While the voice compression used in consumer cellular handsets is not appropriate for some over-the-air broadcast uses, the high frequency reuse of cellular systems is. The high data rates of Advance Wireless Systems (AWS) means that AWS systems could readily carry higher quality voice than is used in cellular systems if the STA members would invest in wireless microphones with well understood high quality digital speech processing and couple them with AWS digital transport technology. Of course, they would also have to buy access to AWS spectrum from AWS licensees rather than continue their no cost, often illegal, spectrum access. Why don't they want to do this?

For low capacity wireless microphone users (less than 10 microphones), SpectraPulse™ ultra wideband (UWB) wireless microphone Part 15 technology technology is already available from Audio-Technica. (See http://www.audio-technica.com/cms/resource_library/literature/9398c060aadd718a/spectrapulse_brochure.pdf) While the present model has limited audio frequency range, there is no fundamental limit to extending it.

In the UK market, Sony is already selling digital wireless microphones (see http://www.sonybiz.net/res/attachment/file/95/1193315636495.pdf) that allows a 60% capacity increase.

The Commission has already "refarmed" other radio services in other bands to increase their efficiency by significant factors. The wireless microphone community stands out as an exception to this general policy as it clings to old technology and old spectrum policy models. There is new technology readily at hand to replace the FM FDMA systems if FCC had a policy environment that encouraged efficiency.

II. Wireless Microphone Use is Based on an Anachronistic Policy for Spectrum Access

Since the 1990s legislation and Commission policy has made economics and market place forces key factors in determining spectrum access. Adam Smith's "invisible hand" has generally replaced "command and control" set asides for chosen industries. The policies of Part 74, Subpart H made sense in another era:

- NTSC technology and early TV receiver technology resulted in the UHS "taboos" of §73.698 so only 1 out of every 6 UHF channels could be used in a given city.
- Demand for wireless use was small.
- UHF was an exotic band and technology for it was expensive.

In this context it made sense to just let the TV broadcasters manage the inevitable white spaces for their own internal uses. However, the recent 700 MHz auction results show

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that this spectrum is now more than worthless scraps, but STA wants continued free access to it for themselves and also for the vast majority of wireless microphone users who happen be involved in criminal violation of §301. (STA does not explicitly state whether their members are legally eligible under the terms of §74.832, nor do they state that the scope of service for the hundreds of microphones they use at events all comply with the restrictions of §74.831, but for now I will give them the benefit of the doubt on these points.)

It is ironic that at this time of a national debate on immigration policy and "amnesty", that large numbers of illegal wireless microphone users, presumably not the STA members in this case, not only want continuation of their illegal spectrum access with obsolescent technology but rejection of new possible spectrum use that may have a high social and economic value. They want both amnesty for their past violations and to be first in line, possibly the only people in line, for continued inefficient spectrum use.

III. Continuation of the *status quo* Will Perpetuate Inefficient Spectrum Use

Let us suppose that the Commission grants the requests of STA and the other wireless microphone advocates for the *status quo*. This would earmark all the white space for the present legal and illegal users. So how efficiently would they be using this spectrum? STA and the other wireless microphone users have been silent on this issue in their filings in this proceeding.

If viewed over the whole country, the spectrum use they advocate would be very inefficient. Use of hundreds of channels for a few hours a week at a few sports venues and at other entertainment locations like the Las Vegas Strip and the New York Theatre District does not add up to much spectrum use at all if averaged over time and space. The positions advocated by STA and others in the wireless microphone community will result in vast amounts of spectrum lying fallow but being available for this narrow community for instant access with obsolescent technology independent of marketplace forces.

This inefficient use of spectrum may have been acceptable 20 years ago when spectrum demand was less and there were fewer technical options. The wireless microphone proponents have never addressed the issue of how efficient their use is if it precludes vast numbers of other users.

IV. Even Absent the Docket 04-186 Controversy, Part 74, Subpart H Needs Urgent Commission Attention

Even in the case of the Commission totally rejecting the proposals in this rulemaking, the *status quo* for wireless microphones in Part 74, Subpart H needs timely policy attention. The mere fact that the overwhelming majority of wireless users microphone users are illegal should be a clue that something is very wrong here.

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A. The Commission Needs to Update Subpart H to Reflect the DTV Transition

Figure 1, below shows the current text of 74.802. Note that 614-806 MHz are still allowed for wireless microphones and there is no sun setting indicated. Apparently the Commission staff forgot to reference the DTV transition as late as the last major update to this section in Docket 01-75 in 2003. Thus there is an urgent need to formally put both the legal and illegal users of TV channels 52-69 on notice that they must vacate the band next February. Otherwise the turn-on of the new 700 MHz systems will result in chaos for both the auction winners and existing wireless microphones users who were misled by manufacturers into believing that they had long term "rights" to their frequencies.

While STA paints a horror story of the Super Bowl being interrupted by Part 15 devices, a more likely near term scenario is a church audio system being interrupted by a new legally licensed and operated Verizon or AT&T 700 MHz system!

Electronic Code of Federal Regulations
e-CFR ™

e-CFR Data is current as of May 1, 2008

Title 47: Telecommunication
PART 74—EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTIONAL SERVICES
Subpart H—Low Power Auxiliary Stations

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§ 74.802 Frequency assignment.

(a) Frequencies within the following bands may be assigned for use by low power auxiliary stations:

26.100–26.480 MHz

54.000–72.000 MHz

76.000–88.000 MHz

161.625–161.775 MHz (except in Puerto Rico or the Virgin Islands)

174.000–216.000 MHz

450.000–451.000 MHz

455.000–456.000 MHz

470.000–488.000 MHz

488.000–494.000 MHz (except Hawaii)

494.000–608.000 MHz

614.000–806.000 MHz

944.000–952.000 MHz

Figure 1: Current Text of 74.802

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B. The Commission Needs to Protect Public Safety Spectrum Users from Wireless Microphone Spectrum Squatters

Another oversight in the current rules is no clear prohibition or even restriction on the use of wireless microphones on shared TV/Land Mobile Channels used by public safety users pursuant to §90.303. While there have been few if any reported cases of interference here, the Commission's long standing policy in the case of public safety has been to prevent interference, not respond to it. The current §74.802 has no limitation on the use of this public safety spectrum. Informal discussions with Society of Broadcast Engineers frequency coordinators for Part 74 indicate that they condone wireless microphone use of public safety channels unless they have an actual interference complaint. So if the legal wireless microphone users have no restriction, why should the much larger number of illegal users feel inhibited? The venues where wireless microphones are used are plausible locations of public safety transient use in responding to emergencies. If the venue also has marginal public safety signal strength – as was the case at the World Trade Center, interference is likely on public safety downlink channels.

§74.802 should be revised promptly to limit wireless microphone use on §90.303 channels. Several options are possible: 1) total prohibition; 2) requiring coordination with all public safety licensees in the area before use; and 3) prohibition only on public safety downlink bands where the interference risk is greatest.

In addition the Commission should admonish, or take enforcement action against, wireless microphone manufacturers like Shure, Inc. who actually recommend public safety spectrum for their customers' illegal use. Figure 2, below show an page from Shure's "Wireless Spectrum Finder", http://www.shure.com/ProAudio/TechLibrary/WirelessFrequencyFinder/index.htm ,

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Shure – Wireless Frequency Finder 4/17/08 5:45 PI

Change city/zip code Show Frequencies

City: **WASHINGTON**
Series: **UHF-R**

Local Television Channels (50 mile radius):

Call Letters	City, State	Channel	Distance	Active
WFDC-TV	ARLINGTON, VA	14 analog	2 miles	On Air
WFDC-TV	ARLINGTON, VA	15 digital	2 miles	Future
WDCA	WASHINGTON, DC	20 analog	4 miles	On Air
WMPT	ANNAPOLIS, MD	22 analog	24 miles	On Air
WUTB	BALTIMORE, MD	24 analog	29 miles	On Air
WETA-TV	WASHINGTON, DC	26 analog	4 miles	On Air
WETA-TV	WASHINGTON, DC	27 digital	3 miles	On Air
WFPT	FREDERICK, MD	28 digital	27 miles	On Air
WMPB	BALTIMORE, MD	29 digital	39 miles	On Air
WNVT	GOLDVEIN, VA	30 digital	29 miles	On Air
WHUT-TV	WASHINGTON, DC	32 analog	4 miles	On Air
WHUT-TV	WASHINGTON, DC	33 digital	3 miles	Future
WUSA	WASHINGTON, DC	34 digital	3 miles	On Air
WDCA	WASHINGTON, DC	35 digital	3 miles	On Air
WTTG	WASHINGTON, DC	36 digital	3 miles	On Air
WJZ-TV	BALTIMORE, MD	38 digital	35 miles	On Air
WJLA-TV	WASHINGTON, DC	39 digital	3 miles	On Air
WNUV	BALTIMORE, MD	40 digital	35 miles	On Air
WUTB	BALTIMORE, MD	41 digital	29 miles	On Air
WMPT	ANNAPOLIS, MD	42 digital	24 miles	On Air
WPXW	MANASSAS, VA	43 digital	17 miles	On Air
WBFF	BALTIMORE, MD	45 analog	35 miles	On Air
WBFF	BALTIMORE, MD	46 digital	35 miles	On Air
WRC-TV	WASHINGTON, DC	48 digital	2 miles	On Air
WDCW	WASHINGTON, DC	50 analog	3 miles	On Air
WDCW	WASHINGTON, DC	51 digital	3 miles	On Air

Shure recommends TV channels 17 &18

Use these recommended Groups/Channels:

Band	Max # of transmitters	Recommended Group	Recommended Channels
G1	23	Group: 10	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30, 31, 32, 39, 40, 41, 42, 43
H4	13	Group: 6	4, 5, 6, 7, 8, 9, 10, 11, 20, 29, 30, 33, 34

Band J5 is not recommended in WASHINGTON, .
If you are trying to select a group/channel for a system that you already own in band J5.

Figure 2: Shure recommendations for wireless microphone frequencies in Washington, DC

When asked for spectrum in the Washington DC area, the "spectrum finder" *"recommends"* channels 16 and 17 - which have 28 public safety licenses! (See http://spectrumtalk.blogspot.com/2008/04/wireless-microphone-manufacturers.html for more detailed discussion.)

C. Wireless Microphones are a Legitimate Use for Spectrum – Policies that Reduce Most Such Users to Illegal Spectrum Squatters are not Rational and Should be Revised

Present FCC wireless microphone regulations are out of touch with reality. As a result the vast majority of users have had no choice other than to result to illegal squatting on Part 74, Subpart H spectrum that they are not eligible to use. Many of the wireless

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microphone manufacturers have aided and abetted their clients in this illegal use of spectrum. Analogous to the immigration debate, it seems odd that they should be rewarded for this outrageous behavior.

But time has come for FCC to develop a long term framework for wireless microphone use since most uses are basically consistent with societal goals. While such a policy must have a reasonable transition plan, it does not necessarily have to involve the same FM FDMA technology, the same UHF-TV bands, and the same cost free access to spectrum in the long run.

The UK policy environment for PMSE, wireless microphones and analogous equipment in British jargon, (see http://www.ofcom.org.uk/radiocomms/ifi/licensing/classes/pmse/) might be considered as one model. In this model there is mandatory coordination and mandatory fees for all PMSE users. The UK regulator, Ofcom, has suggested that the wireless microphone community and its coordinator might buy additional spectrum at auction of it feels that the one 8 MHz TV channel dedicated to PMSE after the UK's digital transition is not adequate.

In a coordinator arrangement in the US, small capacity users, such as churches, might be accommodated in existing Part 15 and Part 90 regulations, but the large scale use envisioned by STA and live performances would be subject to control by a paid coordinator with appropriate fees as in the UK.

As mentioned earlier, AWS spectrum could also be used to meet high density transient demands. The cellular industry has great experience in frequency reuse and temporary high density venues. While the needed hardware is not available off the shelf, it would be straightforward to develop if there was a market incentive to do so.

With the increased use of UHF TV spectrum, other bands should be considered for wireless microphone use if it can be controlled as in the UK – as opposed to the uncontrolled squatting that comes from the current ineffective policies. Since most wireless microphones are used indoors, satellite uplink spectrum might be a new area to consider. With a shift to more efficient technology that FM FDMA adequate secondary use spectrum might be available.

A transition strategy is needed pending a move to new technology. STA dismisses the beacon proposal, saying:

> "Simply put, the beacon proposal is just not practical for use in sporting events. For example, beacons are not suited to work with roving camera crews such as those used to cover PGA TOUR events like THE PLAYERS Championship, or for electronic news gathering crews who perform on- and off-site interviews with athletes before, during, and after sporting events. Given the extensive use of wireless microphones in many sports, this proposal would result in significant additional expense to acquire new equipment merely to enable existing equipment to continue to function."

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Finding distant DTV signals at power levels less than 1/1000 of what is needed or TV reception is a technical challenge – although one that has been demonstrated in the ongoing FCC Laboratory tests by both the Philips and Adaptrum units.

But finding a well placed beacon emulating a DTV pilot tone in the area of a sporting event is a much simpler problem. Indoor venues normally have high spots that can be used to beacon antenna placement. Outdoor venues, such as sports stadia, similarly have high spots. Golf courses used in high profile events would normally have temporary or permanent antenna towers used for video distribution and possibly camera placement. These could be used for beacon antenna location with good coverage of the area that needs to be protected..

If STA chose to spend it money on considering technological solutions instead of hiring public relations firms it could see this also. Given the magnitude of the revenues of the STA members from telecasts of sporting events, Major League Baseball alone had revenue of over $6 billion (http://www.usatoday.com/sports/baseball/2007-11-15-mlb-revenue_N.htm), it is hard to see that the marginal cost would be burdensome for the STA members. Furthermore, their continued access to spectrum at zero cost is a policy anachronism and is out of touch with over a decade of spectrum policy and legislation.

Sincerely,

Michael J. Marcus, Sc.D., F-IEEE
Director

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