



What's the FCC Doing to My Wireless Microphones?

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Introduction

In recent discussions with clients, I've been asked about the "buzz" concerning FCC actions that are affecting wireless microphone equipment. Probably those reading this article have some of the same questions that others have been asking me. There are several issues that you may be hearing about. I'll try to give you a summary of the 2 main issues in this paper, and tell you where to find more information if you're interested.

Issue 1: FCC Reallocation of the 700 MHz spectrum

The RF spectrum between 698 to 806 MHz, often referred to as the 700 MHz spectrum, has already been auctioned off by the FCC, and implementation for other usages was originally scheduled to take effect in February 2009. (At the time of this latest writing, the transition was been delayed 4 months beyond the original date). This part of the RF spectrum in the USA will no longer be used for TV broadcasting after the transition to digital, and the rights to use it have been purchased by others, or reallocated to public safety communications.

See the following:

http://www.shure.com/ProAudio/TechLibrary/TechLibrary/us_tech_lib_dtv

http://en.wikipedia.org/wiki/700_MHz_wireless_spectrum_auction

http://www.sennheiserusa.com/spectrumreallocation/includes/Sennheiser_Spectrum.pdf

http://www.audio-technica.com/cms/resource_library/literature/9c025c49103583fc/white_spaces_fact_sheet_09152008.pdf

To make matters worse for wireless pro audio users, the FCC in 2008 seems to have ruled that any use of the 700 MHz band by wireless microphones or similar devices will be illegal after the transition to digital. Previously it was thought that perhaps some type of "grandfathering" arrangement, or grace period, might be allowed for users of existing equipment. Even in some current articles on the topic, it is assumed that existing equipment can continue to be used for now (e.g. see the article in the preceding Sennheiser link). However, some in the industry interpret the FCC's rulings to explicitly disallow any "grandfathering." See the following:

<http://www.broadcastingcable.com/index.asp?layout=article&articleid=CA6589511&industryid=48696>

Important Point: This issue with the 700MHz spectrum does NOT affect all wireless microphones! Many, many existing units operate in a different RF band. The band at which any given unit operates is labeled somewhere on the equipment, usually in the nameplate area on the bottom or back of the unit. Check the label if you're not sure whether this issue affects your existing equipment. You only have a problem if the unit is labeled with a frequency between 698 MHz to 806 MHz.

Bottom Line for Issue 1:

All new purchases of wireless microphone and IEM equipment should avoid the 700 MHz RF band (698 - 806 MHz). Manufacturers and reputable suppliers will not offer anything in this band in the USA, but make very sure you stay away from eBay auctions and liquidators selling old stock that uses the 700 MHz band. Buyer beware! In addition, it is best to stop using any existing equipment you have that operates in this range. To make this situation a little easier, Sennheiser, Shure, Audio-Technica, and perhaps other manufacturers are offering trade-in programs for equipment that uses the now-illegal band. For many of these programs, you first need to buy the replacement equipment, and then following that you apply for a rebate. The amount of the rebate depends on various factors, and the details are different for each program. You need to check the specific manufacturer's rebate form or other type of program form to determine their specific details. These forms are typically posted on the manufacturer's website.

Both the Sennheiser & Shure rebate programs allow you to purchase replacement equipment for a period of time after February 2009. Please check the rebate forms for exact details (see the following links).

Rebate Forms:

http://www.sennheiserusa.com/media/pdfFiles/Pro_700MHz_Range_Rebate.pdf

http://www.shure.com/stellent/groups/public/@gms_gmi_web_us_pro/documents/web_resource/us_pro_700mhz_rebate_r2.pdf

http://www.audio-technica.com/cms/resource_library/files/714a05455102e247/700mhz_sub_form.pdf

Issue 2: Proposal for FCC to Allow Usage of White Space by Other Devices

There is also another related issue in the public and political arenas of debate, concerning the planned use of "white space" in the 150 - 700 MHz spectrum bands by unlicensed devices that will compete with wireless microphone systems & wireless IEM systems. Such unlicensed devices may include a new breed of cordless telephones, wireless multimedia systems, PDA devices or accessories, and similar equipment. The discussion of this proposal includes the possibility of "spectrum sensing" features within such devices to check for competing transmissions before they use a particular carrier frequency, and/or the devices might "geo-locate" to determine if white space is available in the particular geographical location, based on TV broadcast assignments. However, wireless system manufacturers, including Shure, are basically advocating for more study of the proposed use of white space by other devices, and/or fighting for better sensing technologies by the device manufacturers. Recent practical tests of sensing methodologies, including a "heat of battle" test at an NFL pro

football game, have highlighted the inadequacy of current spectrum sensing schemes. For now, it looks like the white space proposal is being delayed until more study can be done.

It is not clear to me how this issue will turn out in the end. I think the most likely outcome is some kind of workable accommodation for the continued reliable use of the 150 - 700 MHz spectrum by wireless audio equipment. Even so, I think there is a strong probability that white space use will eventually expand to other devices, and the space will become busier, and some degree of possible intermittent interference from unlicensed white space devices may become a problem unless or until the spectrum sensing technology is optimized.

Shure has recently introduced a -X1 (944-952 MHz) option for the RF range, now available for their ULX wireless systems. This is above the range of the white space proposal and above the range of the 700 MHz spectrum reallocation. In addition, it is above the 902-928 MHz band allocated to cordless phones and other portable and consumer RF devices. However, the 928-960 MHz range does include mobile 2-way paging and "mixed studio-transmitter links." It is not clear to me that the 944-952 MHz will be a better range for wireless microphones. Shure is obviously giving us an option outside the white space under discussion, perhaps (at least in part) aimed at customers who are more nervous about the white space proposal. At the same time they seem to be reassuring users that they expect some kind of workable accommodation in the white space final solution.

The following link provides a good podcast on this issue by Shure:

http://shure.libsyn.com/index.php?post_id=256777

See also:

http://news.cnet.com/8301-1035_3-10014456-94.html?tag=mncol;title

http://www.shure.com/ProAudio/PressRoom/PressReleaseArchive/2008PressReleases/us_pro_pr_ws_2008_sets_record

http://www.shure.com/ProAudio/PressRoom/WhiteSpaces/us_pro_pr_whitespacespage

<http://www.shure.com/ProAudio/PressRoom/WhiteSpaces/index.htm>

Some manufacturers are advocating alternate RF ranges, e.g. 2.4 GHz, with different transmission methodologies, but these can have other problems, such as congestion from wireless data networks that operate in this range. However, advocates claim these issues can be managed with good results. One such manufacturer is Sabine:

<http://www.sabine.com/>

Then there are those advocating for an UWB (Ultra Wide-Band) technology, operating in the 3.1 – 10.6 GHz range. This approach is purported to avoid all of the white space and other congestion issues we encounter with other technologies, but at this time there are limited products available with this technology. See the end of the article by Audio-Technica in the following link:

http://www.audio-technica.com/cms/resource_library/literature/9c025c49103583fc/white_spaces_fact_sheet_09152008.pdf

Even with all the discussion of new RF ranges, there are many who feel that UHF is not obsolete for wireless mics. Along this line of thought, some suggest that we will benefit if our “best practices” are updated to include consideration of new factors such as “Reserved Channels” and operating techniques that make it easier to coexist with other devices that attempt to use the same RF space. See the end of the article by Sennheiser in the following link:

http://www.sennheiserusa.com/spectrumreallocation/includes/Sennheiser_Spectrum.pdf

Bottom Line for Issue 2:

Seriously consider writing your senators and congressman (the Shure links above have info to help you do this) to let them know that you are a concerned user of wireless microphone equipment. For new purchases of wireless systems in the near future, if you're nervous about what's happening with the white space issue, you may want to consider a system with a higher RF range such as the Shure - X1 range for the ULX series. (Be prepared for the possibility of some degree of competing usage by other existing devices, or perhaps the future addition of new usages for this space). Or you may want to consider a 2.4 GHz product, if you feel you can live with the associated issues of that technology. On the other hand, if you're moderately optimistic that the white space issue will eventually turn out favorably for wireless microphone systems in the broadcast TV spectrum, then you may want to stay with units operating within the UHF 470 - 698 MHz range. If you tend to think this later approach is the way to go, then you should stay informed on evolving best practices by reviewing industry literature on the topic.

Whatever approach you tend to favor, take the time to understand the issues involved, and make an informed decision for yourself. Even so, the "right answer" (or answers) won't be completely clear until the issue settles out at some point in the future.

Conclusion

I hope the foregoing information helps you understand what's happening with the RF spectrum used for wireless microphone & IEM systems, and allows you to make informed decisions about how to best proceed with new equipment.