

Before the  
Federal Communications Commission  
Washington DC 20544

In the Matter of )  
Additional Spectrum for Unlicensed Devices ) ET Docket No. 02-380  
Below 900 MHz and in the 3 GHz Band ) FCC 02-328 )

April 17, 2003

Comments of Thomas C. Smith

I am writing these comments in opposition to the proposed changes in allocations to allow unlicensed devices to share the television broadcast band. I am not commenting on the use of unlicensed devices in the 3650-3700 MHz band as I am not familiar with its current uses. These comments are based on 34 years experience as a broadcast technician and eleven years serving as a frequency coordinator for my local Society of Broadcast Engineers Chapter. The view expressed are mine alone and do not represent the views of my employer or those of the SBE.

I believe that the allowing of all types of unlicensed devices in the television broadcast band can only cause severe interference problems to both TV reception and the usefulness of any unlicensed devices. In this proposal, the Commission is placing its faith in the use of technology that may work in only certain ideal conditions (radios that search for open spectrum) or requires constant updates by the user (database and GPS use). The Commission would also need to rely on users following FCC rules and operating the equipment on open channels only. Past experience has proven that when transmitting equipment is available to the general public, FCC rules are normally not followed, either by lack of knowledge, laziness or contempt for the rules. The list starts with the old Citizen Band rules, and continues today with the use of wireless microphones in the TV Band by non Part 74 users, Family Radio Service radios used by business users, and 2.4 GHz unlicensed band equipment modified for greater range. Finally, I believe that the Commission underestimates how crowded the TV band currently is and how it may limit the usefulness of the proposed unlicensed devices.

#### Interference to TV Reception

Interference to TV reception and Part 74 users and licensee is my main concern. The Commission proposes a number of schemes to solve the potential of interference, all in my opinion unworkable. They rely on complex technology and constant updating.

The Commission asks if there should be required mileage separations or signal strength requirements to existing TV transmitters used. I believe that both are unworkable. To figure desired to undesired signal ratios is beyond the ability of the average consumer to do and they would not do it anyway. Neither would they find the location of Broadcast transmitter and figure the distance. Remember that these are the same people that cannot program a VCR, do not read instructions and originally signed up for 12 channels of cable to get their local TV stations because they could not point an antenna.

Another proposal was the use of GPS and a database to find a open channel. My question with this idea is who will update the database when new stations come on the air. If, this are used for some fixed system such as a wireless LAN, it will be installed and forgotten unless it causes problems. Also, who currently does all of their software updates for their personal computers or other software based devices. It works, people tend to leave it alone.

This proposal was joined with another proposal for a smart radio that would search for an open channel. That is fine if both the unlicensed device and the TV set next store would receive the same signal, but the device may have a six inch whip, and the neighbor next store a high gain antenna with amplifier. If the station is of any distance, the unlicensed device won't pick it up the TV signal, but the neighbor will receive the TV signal along with the signal from the unlicensed device. Also, who would be willing to pay extra for the device with extra circuits and added cost, if you could get a similar device in 900 MHz, 2.4GHz or 5.8 GHz unlicensed bands for less because it does not need the circuitry.

Another interference concern is interference to TV's by signal leakage. Besides direct interference to off-air reception, there is the issue of interference to TV's operating on cable or with set-top boxes. If these unlicensed devices have any amount of power output and a close enough, they will cause interference to a TV, either on-channel interference if tuned both units are to the same channel or IF or intermod interference if operating on different channels. I have seen two-way radios get into sets in which the cable channel they were tuned to was on the same frequency as the two-way radio and have seen IF interference from a TV two rooms away. The reason the engineers left all the taboo channels in UHF and the band separations in VHF is that they knew that a small signal at the right frequency could cause big problems. What's to keep someone from selecting a "open" channel and still causing other kinds of interference, such as intermod or IF beats beside co-channel interference.

The final concern is the protection of Part 74 equipment such as wireless mikes. The Rules allow for broadcasters, video producers, cablecasters and Motion picture producers to use the band along with medical Services under another part of the rules. There use has been coordinated and licensed in most cases. Would the new unlicensed users be required to seek out this information. I doubt that they would even if required by the rules. Under the current rules, ineligible users such as churches, bands, theaters, hotels and schools all have part 74 wireless mikes and none of it is coordinated nor do they attempt to coordinate. The manufacturers and dealers do not inform the purchasers of the FCC limitations to using the band and they do not in many cases attempt to insure that their equipment is not tuned to TV channel in the user's local area. I have seen expensive wireless equipment tuned to a frequency which is in a local TV channel.

#### Crowding in the Band

I believe that the Commission under estimates how crowded the TV bands are. Currently for part 74 use, the device must be 70 miles away from a full power TV transmitter on the same channel. Using that criteria, I found 45 full power analog and digital transmitters or construction permits for DTV transmitters within 70 miles of my home. Some were very near the 70 mile limit, but most could be received with a large roof-top antenna. There were also 4 LPTV stations within 35 miles with 2 duplicating full power frequencies. Of the full power stations, 39 stations were in the channel 2-51 core with 4 analog and 2 DTV's in the out-of-core band. Two of the unused core channels were VHF low-

band and 2 were VHF high band and 4 were uhf which would be more desirable for data transmission. I am located in a suburb of Madison, WI about 10 miles East of downtown Madison. I believe that I am more of the norm for most areas outside of the center city, particularly on the East Coast and in the Midwest. In fact, I have done interference searches for a Coach-Com system for a collage football team when they travel and between analog, DTV and low-power TV stations, there are always conflicts with their radios. In many cities, the majority of channels have conflicts. I use the FCCInfo.com search site with a 70 mile radius and it returns to me 8 to 10 pages with average of 12 listing per page. Up to half the listing may be applications and construction permits for upgrades and LPTV, but with four or five pages worth of usable listing and with average of 12 listings per page, there is 45 to 60 transmitters including the LPTV in most areas. I have been amazed at the number of stations that are returned in the search. I thought that must cities were more spread out from each other a lot more then they are.

Commissioner Kevin Martin's statement on this notice described many of the same spectrum issues much better than I have and the rest of the Commission should heed his remarks.

#### Current and Future use of TV Spectrum.

Another thing about TV spectrum that I feel the FCC underestimates is the use of the TV spectrum for off-the-air reception. The Commission likes to quote that 85% of the home subscribe to some form of multi-channel TV distribution system and only 15% rely on over-the-air for their television viewing. I believe homes that rely on off-the-air usage for local TV station viewing is much higher then 15%. I would guess that at least 30% use off-the-air reception for some of their TV viewing. First, DirectTV and Dish TV do not have local station carriage in most of the TV markets. While the majority of markets that the satellite providers carry local TV from are the largest markets, how many decide to save the 5 or 6 dollars and view local TV with an roof-top or indoor antenna. More people are moving from cable to a dish as cable prices rise which increases the need for off-the air reception for local TV. Satellite may also never provide HDTV in the local station packages.

Some MMDS (wireless cable) do not provide local stations in their transmissions. Our local service mounts a UHF antenna with the MMDS antenna. The satellite master antenna system uses off-air with the dish in most places to receiver their product. Many hotels along with apartments houses use this system. Then there are all the RV's, vacation homes, dorm rooms and businesses that are not counted as TV homes, but have TV's that rely on off-air. Finally many cable systems still pick their local signals off-the-air.

In the future, the number of stations may not decrease as the transition ends and the analog stations leave the air. There could be a pent-up demand for new stations either because of growth of advertising in markets with large population growth or because of a need to diversify ownership because of the effect of consolidation due to ownership rules. What would be the effect on unlicensed equipment owners, if they suddenly could not use their equipment one day. We have already had to deal with this issue when new DTV stations interfered with medical telemetry units.

#### Summary

I ask the Commission to reject the use of unlicensed devices in the TV band. The band is currently too crowded during the DTV transition to have enough

spectrum to accommodate the proposed devices. Despite the desires of the Commission, the transition is not going to end on December 31, 2006. Not enough digital receivers have reached the market to make an impact and too many issues are just getting sorted out, such as the tuner mandate, cable tuners and copy protection. Because of the DTV transition, this proposal is premature at the very least. If it were possible to share the band with low-power unlicensed devices and high powered TV transmitters, the whole action should be brought up closer to the end of the DTV transition.

This proposal is based on the belief that the consumer of the equipment can make some judgments on frequency selection, or that the device has smarts to make that judgment for the owner. Both theories are unrealistic, people don't read manuals or even care if they cause problems. Adding extra cost for a smart transmitter and receiver that searches for open spectrum is only cost effective for big ticket electronics.

If, the commission wishes to do anything with unlicensed devices in the TV broadcast band, come up with a system to deal with the unlicensed wireless mikes and cueing devices in theaters, churches, hotels and audio rental stores.

The reason that the current group of unlicensed devices work as well as they do is that they have frequency bands that were allocated to devices of similar use. The proposed use of unlicensed devices would have low-power consumer and commercial devices operating with high-power TV transmitters and with every type consumer TV installation from simple rabbit ears to small attic antennas to complex reception systems consisting of high-gain antennas with amplification. There are too many variables to have reliable TV reception or interference free use of the unlicensed devices.

Please heed Mr. Martins comments and reject this proposal. The potential damage to the TV broadcast band is too great and once the genie is out of the bottle with rules allowing unlicensed devices, it will be impossible to put back,

Respectfully submitted

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