Ex Parte Presentation:
Impact of Unlicensed Devices on Wireless Microphones

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Shure Incorporated

Niles, Illinois

Today's Presenters

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Who We Are

- ***Shure is the leading manufacturer of wired and wireless microphones in the U.S.***

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  - 75+ year reputation for quality products
  - Shure's CQE Division maintains a full EMC lab; building new anechoic RF test facility that will be A2LA/NVLAP accredited
  - Actively participates in FCC rule-making issues
  - Member of ETSI, USCEL; ISO certified

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Wireless Microphones at Work -

Where's the microphone?

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Answer: It's hidden under second base!

Fox Sports patented this concept in 1999 to enhance the audio experience of sports broadcasting

Wireless Microphones are classed as Part 74, Low Power Auxiliary Stations, and successfully share the TV spectrum as secondary users

Some wireless microphone uses --

- Broadcast operations
- Houses of worship
- Businesses
- Theatres
- Government
- Movie making
- Program production
- Sports

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Wireless Microphone Technical Overview

- Professional audio quality: 15 kHz BW, 100+ dB dynamic range, no dropouts
- Primarily analog FM
- Occupied bandwidth: 200 kHz
- Typical power: <50 mW ERP
- Working range: 100 meters
- Antenna diversity reception

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Why Are We Here?

- ***Shure is concerned with the proposal to allow unlicensed devices to operate in the TV bands***
  - Unlicensed devices in the TV bands will interfere with wireless microphones
- ***Harmful interference will cause widespread havoc to wireless microphones users and audiences***

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Why is Shure Interested?

- ***Wireless Microphones are essential to today's dynamic Radio and TV programming...***
  - Large productions like the Super Bowl, or a major political convention, require 50 –100 wireless channels to operate simultaneously
- ***... And require a known, stable spectrum environment to operate well***
  - Professional users expect the highest sound quality from their wireless microphones
  - They cannot tolerate harmful interference from unlicensed devices

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Why is Shure Interested?

- ***Sources of interference to wireless microphones are hard to find and correct, even for professionals***
  - It would be extremely difficult to resolve wide-scale harmful interference problems once millions of unlicensed devices are in the hands of the public
  - Imagine a hotel's unlicensed WLAN-based computer network interfering with a film production crew's wireless microphones...

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"Listen Before Talk" Technology is not the Answer

- ***Proposed "Listen Before Talk" technology will not alleviate harmful interference from unlicensed devices to wireless microphones***
  - The previous hotel WLAN computer network scenario is not solved by "Listen Before Talk"
  - Unlicensed devices don't "know" about wireless microphones making it impossible to avoid interference

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"Listen Before Talk" Technology is not the Answer

- ***Consider another example***
  - The singer of the National Anthem at the Super Bowl performs a rehearsal, the microphone is then turned off to change the battery
  - A nearby unlicensed device listens for the now open channel and begins transmitting
  - When the singer switches the microphone on and begins, the unlicensed device is now interfering with the microphone
  - Singer's voice is garbled and intermittent before millions of people

"Listen Before Talk" does not prevent this from happening.

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Challenges to the DTV Transition

- ***The DTV transition is at a critical point, and could be further threatened if unlicensed devices cause harmful interference***
  - The presence of even a small amount of additional RF "smog" from nearby unlicensed devices could mean the difference between acceptable DTV reception and no reception at all

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What's the Solution?

- ***Shure recommends locating all new wireless unlicensed devices together outside the TV bands***
  - Unlicensed devices should use the 3.65-3.70 GHz band

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Why 3.65-3.70 GHz?

- Unlicensed devices at 3.65 GHz will be more controlled, reducing interference to neighboring devices
  - Easier to make smart, directional antennas
  - Propagation loss promotes efficient frequency reuse - 3.65 GHz less apt to penetrate brick and concrete than UHF

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Benefits of Recommendation

- ***Wireless microphones continue enabling dynamic Radio and TV broadcast programming without interference***
- ***FCC succeeds in establishing new unlicensed spectrum outside TV bands***
- ***Avoids complaints from existing licensed wireless users about unlicensed devices***
- ***Avoids unnecessary threats to a successful DTV rollout***

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Concluding

- Shure fully supports the need for the Commission to establish new unlicensed spectrum, but not at the expense of the established and licensed broadcast TV and wireless microphone users
  - **Unlicensed devices in the TV bands will interfere with wireless microphones**
- **Shure recommends allocating new unlicensed device spectrum outside the TV bands**

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