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May 20, 2009

VIA ELECTRONIC FILING

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

Re: ***EX PARTE NOTICE***
ET Docket No. 04-186; Unlicensed Operation in the TV Broadcast Bands
WT Docket Nos. 08-166 and 08-167; Revision to Rules Authorizing the
Operation of Low Power Auxiliary Stations in the 698-806 MHz Band

Dear Ms. Dortch:

On May 19th, 2009, Shure Incorporated (“Shure”) met with Paul Murray, Legal Advisor to Chairman Copps, to discuss WT Docket Nos. 08-166 and 08-167, and ET Docket No. 04-186. Attending this meeting on behalf of Shure were Mark Brunner, Senior Director, Global Public Relations, and Edgar Reihl, Principal Engineer, along with Catherine Wang and Tim Bransford of Bingham McCutchen LLP, outside counsel to Shure.

During this meeting Shure applauded the Commission’s recognition of the broad public benefits provided by wireless microphones in the Second Report and Order (“Order”) in ET Docket No. 04-186, and discussed how the combination of safeguards set forth in the Order are necessary to protect wireless microphones from interference from unlicensed Part 15 devices allowed to operate in the core television frequencies. Shure reiterated several of the positions raised in its Petition for Reconsideration in ET Docket No. 04-186, including that the protections in the Order are complementary and must be retained and introduced collectively to offer wireless microphones meaningful protection. Shure emphasized that several protections -- including: spectrum sensing, geolocation database protocols, TVBD behavioral obligations, protective zone boundaries and certifications procedures -- require strengthening or modest adjustment to satisfy the Commission’s obligation to protect wireless microphones from interference and to meet the Commission’s renewed commitment to open and transparent procedures. We also urged the Commission to reject requests to roll back critical protections in the Order.

With respect to WT Docket Nos. 08-166 and 08-167, we reiterated Shure’s position as set forth in its Comments and Reply Comments. We also discussed Shure’s view that the Commission can issue an order appropriately addressing the principal issue

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in the proceeding -- that is, whether and on what terms and conditions secondary low power auxiliary service devices, including wireless microphone systems, should migrate out of the 700 MHz band -- without addressing other issues collateral to the proposed migration including whether and how to reclassify various uses of wireless microphones under the Commission's Part 74 rules. We also provided an update on Shure's ongoing voluntary efforts to educate wireless microphone users and dealers about the Commission's proposed changes to rules permitting secondary low power auxiliary service in the 700 MHz band and to encourage use in other spectrum.

Shure left behind a copy of the attached slides describing the existing rules concerning the introduction of TVBDs in the core television frequencies and certain issues in ET Docket No. 04-186. If you have any questions regarding this meeting, please do not hesitate to contact the undersigned.

Very truly yours,

/s/

Catherine Wang
Tim Bransford

cc (by email): Paul Murray

Wireless Microphones and the White Spaces

May 19, 2009

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- Perspective on FCC Order
- Use Cases and User Expectations
- Interference protection mechanisms:
database and spectrum sensing
- Database requirements
- Spectrum sensing requirements



- Perspective on FCC Order
 - Commission should incorporate rigorous and transparent testing for hybrid geolocation/sensing devices
 - Commission should reject attempts to roll back wireless microphone protections (requirements for database use, sensing, power ceilings, adjacent channel conditions, exempt channels, channel designation for personal/portable devices)
 - Geolocation Database requirements must be tightened



Wireless Microphone Use Cases

- Electronic News Gathering (ENG), Sports, Entertainment Venues, Movie Making, Theaters, Schools, Houses of Worship, Meeting Rooms in Corporate, Government, and Public Facilities, and Law Enforcement Activities
- Additional Uses: Interruptible Fold Back (IFB) Monitors, In Ear Monitors, Wireless, Intercoms, and Wireless Assist Video Devices (WAVDs)





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The Majestic Theatre – New York City

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Hope Church – Memphis, TN

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User Expectations

- Wireless microphones are at the “front end” of the audio chain, so user expectations are very high
- Noise and dropouts are not tolerated
- Audiences demand crystal clear, real time, uninterrupted audio



More User Expectations

- The number of systems in simultaneous operation can exceed 200 for large productions (e.g., the Super Bowl™)
- Battery life: >8 Hours
- Transmitter antenna: Internal
- Mechanically rugged and reliable
- Operational lifetime: 5-10 years



Coexistence with TV Band Devices

4 Watts
BROADBAND



100 milliWatts
BROADBAND



“Fixed”



“Personal/Portable”

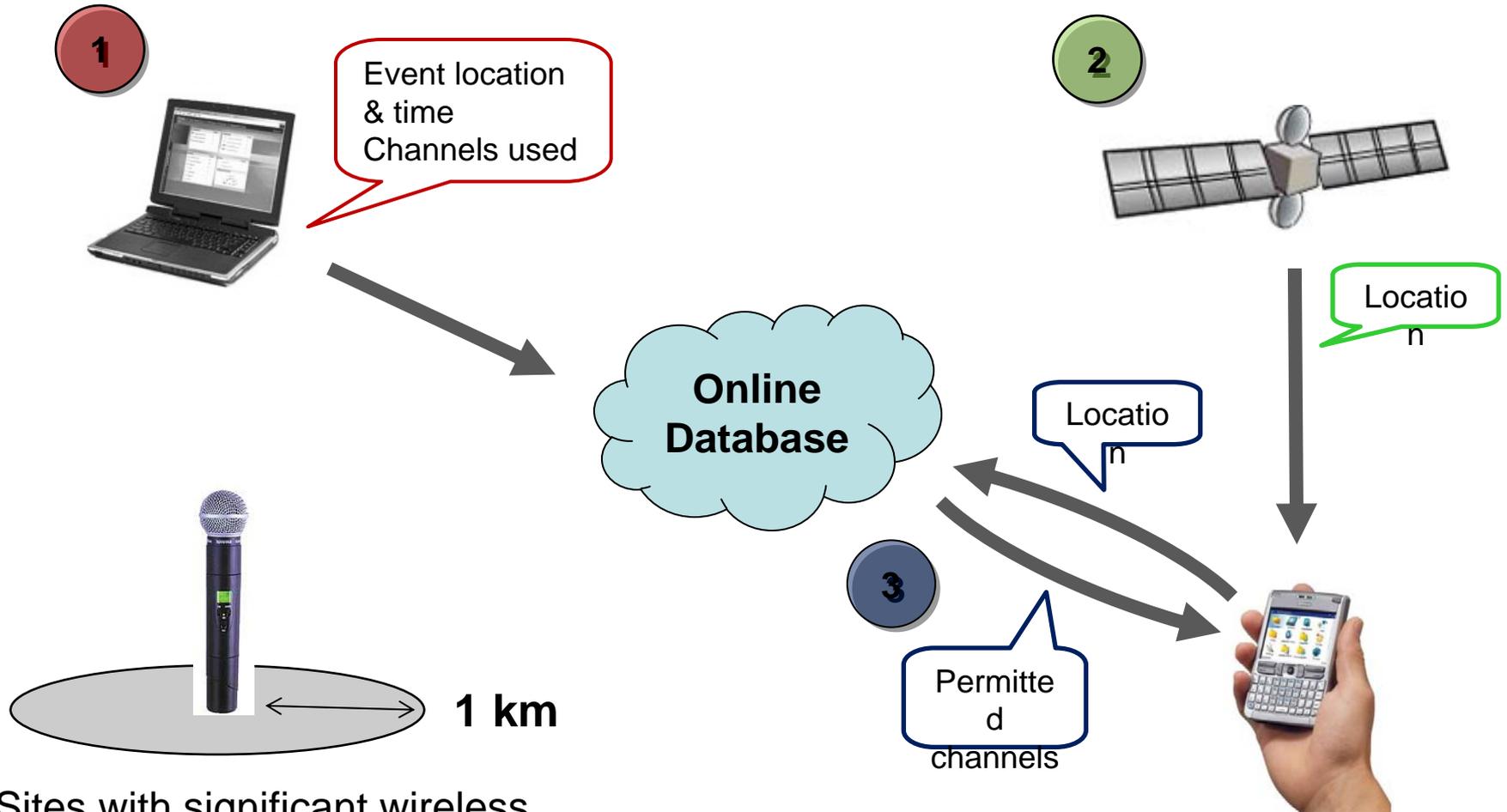


Interference Protection Techniques

- Geolocation + database
- Spectrum sensing
- Protected Channels
- Benefits from power limits, channel scheme, etc.



Geolocation + Database



“Sites with significant wireless mic use at well-defined times and locations”

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Database Concerns

- The database must protect all wireless microphone users without discrimination
- The database must be accurate and up to date!
 - If there are multiple databases, they must be synchronized frequently
- TVBDs must query the database at least once an hour or whenever there are changes
- TVBDs must shut down if they lose connectivity to the database



Geolocation Concerns

- Geolocation accuracy must be significantly better than 100m
 - An uncertainty of 100m is comparable to the working range of most wireless microphones
- TVBDs must shut down if they don't know where they are
 - Geolocation devices typically do not work indoors
 - “A man walks into a theater wearing a TVBD...”



Spectrum Sensing

- A TVBD scans spectrum at its location; detects and avoids TV & wireless mics
 - Must check TV channel for 30 seconds before transmitting
 - Must re-check TV channel once/minute
 - When a wireless mic is detected, the TVBD must vacate the channel within 2 seconds
- Future TVBDs could use spectrum sensing only, IF they pass more rigorous performance tests



Making Spectrum Sensing Work

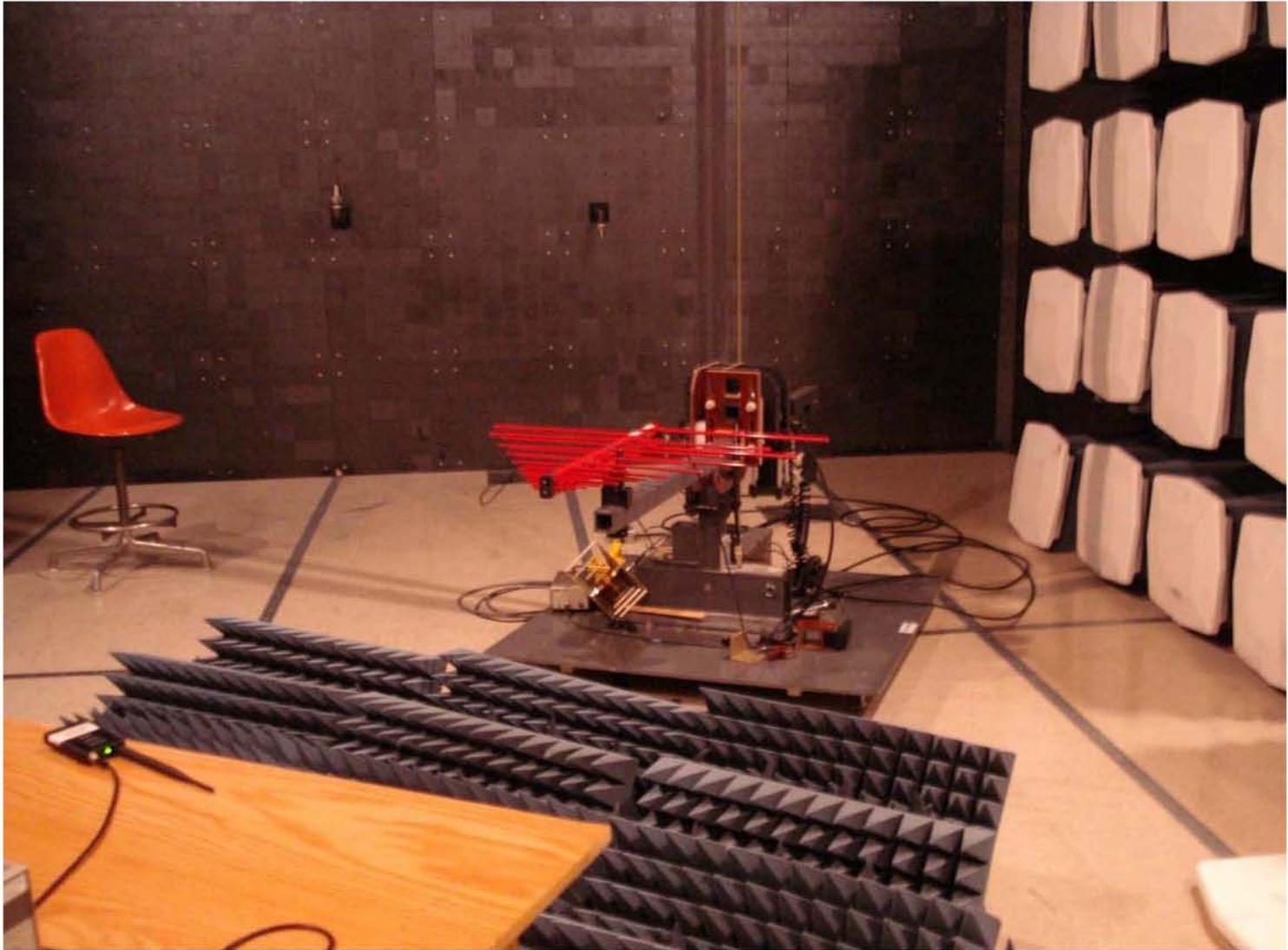
- Required sensing threshold: -114 dBm
- Appropriate sensing bandwidth: 200 kHz
- The sensing threshold requirement is determined by:
 - The required D/U ratio at wireless microphone *receiver*
 - The ERP of the TVBD in comparison to the wireless microphone
 - The ability of the TVBD to sense correctly in a channel that is adjacent to a strong DTV signal



Making Spectrum Sensing Work

- “Network” (cooperative) sensing is required to mitigate “hidden node” problems
 - The path between the wireless microphone and the TVBD is *not* reciprocal!
 - The wireless microphone transmitter and receiver are physically in different locations
 - The path from the wireless microphone transmitter to the TVBD may be obstructed





Making it work here in the lab is one thing...

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Making it work here in the real world is another!

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Protected Channels

- 'Protected Channel' = TVBD operation
 - Channels adjacent to occupied TV in lower VHF and 14-20
 - Two additional channels in 13 11 cities where Public Safety uses channels 14-20
- Some wireless microphone use will migrate to these protected channels when feasible BUT, these channels are entirely inadequate to support all existing uses



Summary

- Making use of the TV “White Spaces” is a noble goal, *but*
- It’s tricky to implement without causing interference to important incumbent services!
- The FCC has adopted a reasonable framework that requires the use of both Geolocation/database and spectrum sensing techniques

