

## Summary of the FCC's White Spaces Order

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November 18, 2008

The FCC's November 14, 2008 Order closely tracks the Commission's November 4 Public Notice and the feedback we received during our rounds of meetings with Commission staff and legal advisors leading up to the FCC's vote on this item. You can see many provisions that Shure argued for embedded in this order, *e.g.*, no immediate acceptance of spectrum sensing devices, procedural protections in the future testing and certification process for pure spectrum sensing devices, broad availability of geolocation/database protections, adjacent channel protections and certain reserve channels for itinerant wireless microphones in channels under channel 21, the need to accommodate transitioning 700 MHz users, mandated network sensing, certain specified DFS parameters, etc. The FCC also promises that it will take strong action in response to interference complaints by incumbent users, including wireless microphone users. *While this order restructures how wireless microphones will be able to operate in the TV bands and there may be specific provisions that must be changed, the varied and detailed protections appear to reflect a real commitment on the part of the Commission to protect wireless microphones going forward.*

### Key Points

- All devices (except sensing only devices) require both geolocation/database *and* sensing functions
- Sensing-only devices may be submitted for future certification, but will be held to a higher "proof of performance" standard with lab and field testing open to the public. We will get a chance to comment on the equipment application, the test procedures, and the test report.
- Broad access to the geolocation database is specified to protect wireless microphones.
- Fixed operations with power levels up to 4 W EIRP are permitted in channels throughout the TV band (*i.e.*, channels 2, 5-51, except channel 37).
- First adjacent channel operations are prohibited for fixed devices; however, the "record remains open" for later review.
- Personal/portable operations are restricted to channels 21-51, regardless of whether they are tethered or have direct access to the geolocation database.
- Two channels centered around 37 are protected for microphones in the 13 major metro areas where public safety has access to channels 14-20.
- -114 dBm is the sensing level for all incumbent signals. The -114 dBm sensing threshold may be adjusted (presumably made tougher) for sensing-only devices.
- Power levels track with OET's earlier statements, although output of sensing-only devices cannot exceed 50 mW EIRP, regardless of the channel.
- Network sensing is mandated.
- The FCC lab, not a commercial contractor, will scrutinize all new equipment in the certification process.
- The beacon was rejected after being deemed unnecessary and an inefficient use of spectrum.

- To the extent that unlicensed devices create interference problems, the Commission indicates it will take action, including amending its rules, and triggering a “kill switch” for interference-causing devices by requiring the database administrator to be able to send an “all channels occupied” message to particular devices it has determined to be causing problems

Specifics regarding database and unlicensed device parameters follow below.

### **Database Parameters**

- The database creates a 1 km protected zone around a wireless microphone location where unlicensed operations are prohibited.
- Large venues using wireless microphones (*e.g.* race tracks, golf courses) may register multiple geographic points.
- The database only needs to update once daily.
- Untethered personal/portable devices must query the database each time they are "activated," powered on, or moved. Fixed devices must query the database at least once daily. Transmissions must cease if the device cannot determine its location.
- Fixed unlicensed devices must register with the database.

Using the database to protect itinerant wireless microphone operations is clearly not a priority for the Commission, and the Order states that such users are expected to migrate below Channel 21 (where adjacent channels are off limits to even new fixed operations.)

### **Third Party Database Administrator; FCC Contemplating Parallel Databases**

- The database will be administered by a third party. Alternatively, the Commission is open to multiple third parties running parallel databases.
- The Commission will issue a Public Notice requesting proposals from potential database administrators.
- Potential administrators must agree to a minimum five-year term.
- If multiple administrators are approved, information must be exchanged daily to ensure that each database remains current.
- The database administrator may charge fees for providing lists of available channels (*e.g.* to TVBDs), and for registering fixed TVBDs and temporary BAS links in the database. The Administrator may not charge a fee to incumbent users including wireless microphones for registering.

Google, MSTV and others have expressed interest in managing a database(s).

### **Database Eligibility and Registration**

During recent meetings OET repeatedly asserted that database access will be liberally available to microphone users and venues. The Order is consistent with this message.

- A Part 74 license is not a prerequisite for registration in the database.
- With regard to venue eligibility, the FCC states "protection of wireless microphone registered sites will be limited to facilities with wireless microphone use at well defined time and locations." However, the FCC then elaborates that "[s]ignificant wireless microphone use includes instances where one or more microphones are in operation for a period of time not less than one hour and can include single events at a site."
- Registrations must be renewed annually or risk deletion from the database(s).
- Registration requires basic biographical information, coordinates, channels requiring protection, and times of operation.
- Registration entries can be removed from the database at the Commission's request.

## Unlicensed Device Performance

### Limited DFS Parameters adopted:

- Channel availability check time: 30 seconds
- Channel move time: 2 seconds
- Scans of the channel in use must occur in intervals not to exceed 1 minute

### Permitted Power Levels:

- 4 W EIRP for fixed devices
- Personal portable devices are restricted to 100 mW, and 40 mW on first adjacent channels
- Sensing-only devices are restricted to 50 mW, regardless of the channel

### Sensing:

- -114 dBm is the universal sensing level for all protected incumbent signals.

### Out-of-band Emissions:

- Out-of-band emissions must roll off 55 dB from peak levels at band edge during adjacent channel operations.

### Transmit Power Control:

- The Order mandates transmit power control ("TPC"), but does not establish a specific TPC range.

In addition to the above parameters, to aid in responding to interference complaints an unlicensed device must also be able to provide a list of channels deemed available to the user.

The Commission has not established measurement procedures to evaluate compliance with spectrum sensing and "other technical requirements" adopted in the Order have not been developed. The Commission will release measurement procedures "as expeditiously as possible." There is no discussion regarding a notice and comment period for "measurement procedures."

### Fixed-only Requirements:

- Fixed antenna height cannot exceed 30 meters.
- In addition to registering with the database(s), fixed devices must also transmit identifying information.

### Network Sensing Mandated:

Devices communicating with each other in local network configuration must pass information on signals they sense back to the hub/master device. The hub must then "take appropriate steps with respect to its list of available channels to avoid the channel sensed by the [tethered] device."

With regard to wireless microphones, only devices in direct contact with each other must share sensing data.

## Sensing-Only Certification Process

- Manufacturers must submit an application with a "full explanation of how the [sensing-only] device will protect incumbent radio services. A pre-production sample device for "laboratory and field testing" must accompany the application.
- A public notice with draft test procedures and methodologies will be released for a comment period lasting a minimum of 30 days. Interested parties will have an additional 15 days to file reply comments.
- Testing will be open to the public.
- -114 dBm "may or may not be the appropriate sensing threshold for [sensing-only] devices." Certification will "rest on [the sample's] performance in avoiding interference, not any particular sensing level."
- Proof-of-performance requires "an extremely high degree of confidence that [devices] will not cause harmful interference to incumbent radio services."

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