



# Power Measurement Overview: TV Band (White Space) Devices

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# TV Band (White Space) Rules

- TV band devices (TVBD) designed for operation on unoccupied channels within the television broadcast bands are authorized under Subpart H of the Part 15 rules
- The rules require implementation of an interference avoidance methodology to determine channels available for operation:
  - Geo-location and database access
  - Spectrum Sensing



# TV Band (White Space) Rules (continued)

- First generation of TVBDs expected to implement geo-location and database access methods
- Requires a geo-location capability (e.g., GPS)
- Requires access via Internet connection to a database of records depicting location and other technical information relative to licensed stations operating within proximity of the TVBD's reported geographic coordinates
  - See §15.711 for complete description of geo-location and database requirements



# TV Band (White Space) Rules (continued)

- The database will cull the list of TV channels authorized for use by TVBDs (see §15.707) by applying the interference protection requirements defined in §15.712, culminating in a list of channels available for TVBD operation at the reported location which is then returned to the TVBD via Internet connection
- FCC currently holding workshops with prospective database administrators in an attempt to ensure accuracy and consistency across the various databases as they are being developed



## §15.709 General Technical Requirements

### ● Power Limits:

#### – Fixed TVBDs:

- Maximum conducted output power  $\leq 1$  watt (30 dBm) in a 6-MHz TV channel and  $\leq 12.2$  dBm in any 100 kHz bandwidth during any time interval of continuous transmission
- If directional gain of transmitting antenna exceeds 6 dBi, the maximum conducted output power must be reduced by the amount in dB that the directional antenna gain exceeds 6 dBi



## §15.709 General Technical Requirements (continued)

- Personal/Portable TVBDs
  - When separation distances from occupied adjacent channels specified in §15.712(a) are realized:
    - Maximum EIRP  $\leq$  100 milliwatts (20 dBm) in a 6-MHz TV channel and  $\leq$  2.2 dBm in any 100 kHz bandwidth
  - When specified separation distances are not realized:
    - Maximum EIRP  $\leq$  40 milliwatts (16 dBm)
  - Power is to be measured during a time interval of continuous transmission



## §15.709 General Technical Requirements (continued)

### ● Antenna Requirements

- Personal/portable TVBD antenna(s) shall be permanently attached
- Fixed TVBD antenna may not be more than 30 meters above the ground
- Fixed TVBDs may not be located at sites where the height above average terrain (HAAT) at ground level is more than 76 meters



## §15.709 General Technical Requirements (continued)

### ● Emission Limits

- Undesired emissions into the TV channels immediately adjacent to the channel in which a TVBD is operating shall be at least 72.8 dB below the highest average power in the TV channel in which the device is operating
  - Emission measurements in the channel of operation shall be performed over a reference bandwidth of 6 MHz
  - Emission measurements in the adjacent channel shall be performed using a minimum resolution bandwidth of 100 kHz
- Beyond the immediately adjacent TV channels, the undesired emissions from a TVBD shall meet the requirements of §15.209



# Compliance Measurements

- FCC Lab currently developing measurement procedures for TV band devices
- This effort is being undertaken in two parts
  - Part 1 will provide measurement procedures for demonstrating compliance to the relevant RF limits specified in §15.709, independent of the database
  - Part 2 will provide measurement procedures for demonstrating compliance to the interference avoidance and interference protection requirements specified in §§15.711 and 15.712, respectively
- A draft of the Part 1 effort will be published as a draft KDB in the very near future
- The Part 2 effort will be undertaken when the features and functions of the eventual databases are more fully developed and understood
- TVBD testing is currently on the Exclusion list, so initially, compliance testing will be performed by the FCC



# Questions and Answers

**Thanks!**