

Questions and Concerns on Unlicensed Operation in the TV Broadcast Bands

NPRM FCC 04-186



General Information

- CEA is developing its position through a working group involving TV manufacturers and communications/networking companies
- Fundamental position remains supportive of the NPRM, as long as protection of TV services is assured.

General Information

- Dialog beginning with broadcaster organizations and related standards groups
- CEA plans to test a number of the areas of concern where more data is needed
- May request an extension to allow more time for affected groups to collect data and share ideas

NPRM Framework

- Lower power “personal/portable” devices
 - 100 mW peak transmitter power, (6 dBi antenna)
 - Transmission governed by a control signal from a TV Broadcast station, an FM Broadcast station, or an unlicensed transmitter
- Higher power “fixed/access” devices
 - 1 W peak transmitter power, (6 dBi antenna)
 - Must include a GPS receiver and means of determining vacant TV channels in the area –OR–
 - Be installed by professionals to operate only on unused channels and periodically update unused channel list

Unused Channel Detection

- Known location and database
 - Allowed for fixed access
 - Not yet studied by CEA
- Control signal reception
 - Allowed for personal/portable
 - Do not understand how signal can be expected to map to protection contour

Control Signal Concerns

- What guarantees that a control signal stays contained in the protection contour?
- If a control signal is received by a personal/portable device outside the contour and within a neighboring contour, interference will necessarily result
- Device location must be known to avoid interference

Unused Channel Detection

- Spectrum sensing (Autonomous)
 - NPRM asks questions about using this technique for fixed access
 - CEA members more interested in autonomous operation for personal/portable devices
 - Spectrum sensing related to this NPRM is an area of active discussion and testing for CEA

Protection Contours

- NPRM attempts to provide protection in Grade B contour
- CEA television manufacturers do not believe protection should be limited to Grade B



Interference Protection

- Allowance to ignore interference within 10 meters of the unlicensed device (fn 50)
- Adjacent Channel Interference
- De-sensitization of receivers
- Direct pickup



ASSUMED DISTANCES

- The NPRM suggests that there will be more than 10 meters between unlicensed devices and “victim” TV receivers.
- This 10 meter assumption is unrealistic in urban settings, in apartments, in condominiums, and even in many suburban homes.

Adjacent Channel Issues

- Our position on ACI is in flux. I believe that the interference case previously posted, based on out of band being 44 dB down in the adjacent channel, assumes that the unlicensed device only has to be down 20 dB in the adjacent channel. This does not match Rob's posting that says the device must meet 15.209a in the adjacent channel

Adjacent Channel Issues

- Tentative position for discussion Tuesday
- Work on ATSC A/74 Recommended Practice on Receiver Performance indicates that “splatter” permitted by the FCC transmitter mask is a limiting factor for adjacent channel performance
- Rules must ensure that out of band emissions from an unlicensed device in an adjacent channel are substantially less than the FCC mask

RECEIVER DE-SENSITIZATION

- Presence of strong unlicensed signals on channels near the desired TV channel can cause the TV's AGC to reduce tuner gain, impairing reception of weak TV signals.
- Field strength of 100 mW unlicensed device is x V/m (x dBm) at 3 meters or y V/m (y dBm) at 10 meters

DIRECT PICK-UP (DPU)

- At the proposed power of 100 mW for unlicensed devices, field strengths at TV receivers a few meters away can exceed the direct pickup requirements of 15.118 (100 mV/m).
- This is a potential interference issue for any legacy device connected to a cable system

ON AIR
STAND BY

Testing

- CEA has outlined a test plan to collect data on specific aspects of the NPRM
- Welcome FCC input and participation in testing
- Virtually impossible to make reasonable measurements in the comment filing period

Test Outline

- Environmental Noise
 - Measure ambient noise around a PC and other CE devices to guide work on spectrum sensing
- Reception Diversity
 - Record spectral plots of ATSC and NTSC reception with outside antenna at 30 feet and compare to indoor reception with dipole
 - Difference affects ability to detect an occupied channel or receive a control signal

Test Outline

- Adjacent Channel and Out of Band
 - Record actual NTSC and ATSC out of band emissions
 - Record mock-up unlicensed device out of band emissions
 - Affects unlicensed device's ability to detect occupied channels and affects operating range
 - Determines interference into adjacent TV channels

Test Outline

- Direct Pickup
 - Measure field strength from mock unlicensed device to confirm field strength calculation
- Tuner Overload and de-sensitization
 - Measure the effect of filling the band with relatively strong unlicensed signals in a weak TV signal reception environment
 - Measure worst case field strength from unlicensed device for tuner overload