

PAWS WG

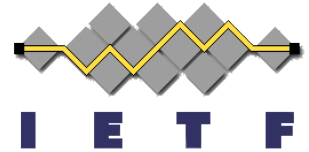
IETF-81

Overview of Current FCC TV White
Space Work Efforts

July, 2011

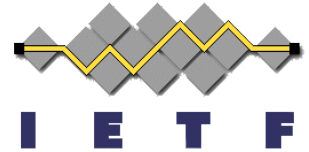
John Malyar, Subir Das
Telcordia Technologies Inc





Overview

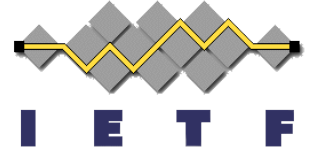
- US Regulatory Time line
- FCC Rules High Level Summary
- Database Administrators Group
- Calculation Sub-Team
- Database Interoperability Sub-Team
- Ofcom Rules Overview



US Regulatory Timeline

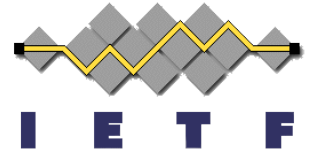
- Dec 04 - Unlicensed Operation in the TV Broadcast Bands, (Docket No. 04-186)
- Nov 08 - FCC “Adopts Rules”: Second Report and Order and Memorandum Opinion and Order (08-260)
- Jun 2009 - Digital TV Transition
- Nov 2009 - FCC OET Invites Proposals from Entities Seeking to be Designated TV Band Device Database Managers
- Sept 2010 - FCC “Finalizes Rules” - Second Memorandum Opinion and Order (10-174)
- Jan 2011 - Order to conditionally designate nine Database Management entities
- OET TV White Space Database Administrator’s Workshops
 - Mar 10, 2011
 - Apr 20, 2011
 - May 25, 2011

FCC High Level Rules Summary



- TVWS devices required to use geo-location to obtain channel list
 - TVWS devices provide location to database and database returns available channel list
- Spectrum sensing can be performed, but is not required
- Devices cannot radiate in “protection zones” of “protected entities”
 - Digital television stations, and digital and analog Class A TV, low power TV, TV translator and TV booster stations
 - TV translator and Multi-channel Video Programming Distributor (MVPD/cable head end) receive sites.
 - Fixed Broadcast Auxiliary Service (BAS)
 - PLMRS/CMRS operations (trunked radio)
 - Offshore Radiotelephone Service
 - Low power auxiliary services, including wireless microphones
 - Radio astronomy services
 - Special attention to border areas near Canada and Mexico

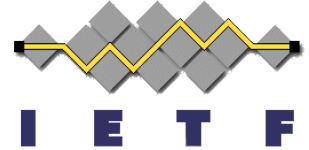
FCC High Level Rules Summary



- Three types of devices designated
 - Fixed – Access point/base station type of operation, 4 W EIRP limit, no GPS, professionally installed, location entered by installer, operation on TV channels 2-51
 - 30 m tower height restriction
 - 76 m Height Above Average Terrain (HAAT) restriction
 - Personal/Portable Mode II – Access point type operation, 100 mW EIRP limit, must have GPS, consumer grade, operation on TV channels 21-51
 - Personal/Portable Mode I – Client-type operation, attaches to Mode II device by scanning channels for a Mode II, 100 mW EIRP limit, does not need to report location
- Communications with the database
 - Devices must contact database at least once in every 24 hours for new channel list
 - All devices must report location, type of device, FCC ID, and so on..
 - Fixed device must report height to verify <30 m
 - P/P Mode II must get new channel list if it moves more than 100 m or loses power
 - P/P Mode II must signal attached Mode I devices when channel list changes

FCC High Level Rules Summary

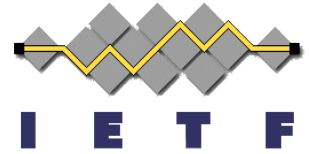
Geo-location Database



- Data is obtained from
 - FCC
 - CDBS (Consolidated Database System)
 - ULS (Universal Licensing System)
 - EAS (Equipment Authorization System) (“white” list)
 - “black” list (TBD)
 - Registrations
 - Fixed TVBD
 - LP Auxiliary (Wireless Microphones)
 - MVPD (Cable Head-ends)
 - TV Receive Sites / TV Translators
 - Temporary BAS (Broadcast Auxiliary Service) links

Interference Protection

Contour types, examples



TV stations



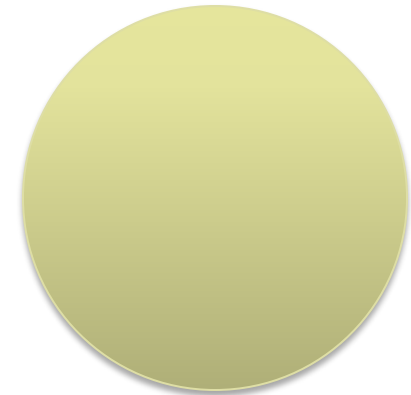
Irregular, determined by terrain height, antenna pattern

MVPD, BAS, TVRS



Determined by FCC to protect directional antennas

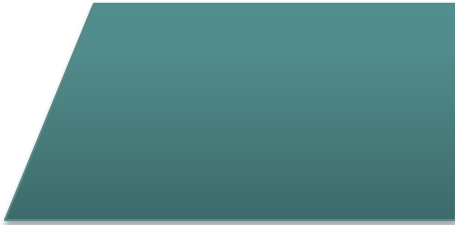
Radio astronomy,
PLMRS/CMRS,
wireless mics



Determined by FCC to protect services with varying size circles

Contour types, examples

Offshore radio telephone service



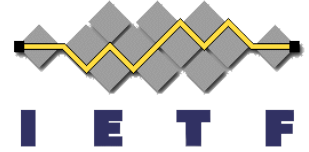
Determined by ORTS service areas on channels 15-18 in Gulf of Mexico area

Border areas



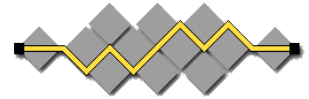
Special protection for border areas

White Space Database Administrators Group



- Purpose
 - To establish and maintain a database interoperability specification
 - To support development of a device to database API specification
 - To address technical and operation issues that affect the operation of database administrators
- Secretary - Neeraj Srivastava (Spectrum Bridge)
- Technical Subgroups
 - Database Interoperability
 - Channel Calculation

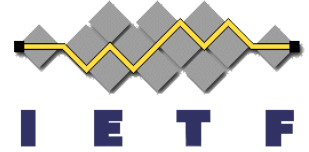
White Space DBA Group: Database Interoperability Subgroup



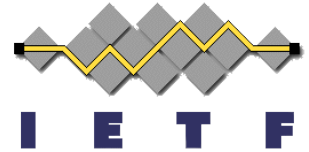
I E T F

- Subgroup Scope
 - Develop an interoperability specification that
 - supports specified rules governing interchange of registration among WSDBAs,
 - defines message definition and
 - provides transport between DB to DB
- Chair – John Malyar (Telcordia)
- Vice-Chair – Alan Norman (Google)
- Editor – Brian Rosen (Neustar)

White Space DBA Group: Channel Calculation Subgroup



- Subgroup Scope
 - Develop an interoperability specification that
 - covers precise implementation of calculations of protection contours and distances to these contours
 - Establish, ensure and validate consistency between all nine WSDBA members
- Chair – Peter Moncure (Radiosoft)
- Vice-chair – Peter Stanforth (Spectrum Bridge)
- Editor – Voy Grohman (Arity)



OFCOM Rules Overview

- In the UK, channel width is 8 MHz (versus 6 MHz in the US)
- OFCOM does not rely on protected contours and buffers to avoid interference with television transmissions
 - Signal strength prediction from broadcast transmitters is modeled on behalf of the broadcasters by Arqiva and will be available to the database providers
 - This signal strength information is available on a grid, or pixel-by-pixel basis across the UK
 - This information can be used to predict the maximum allowable power that a white space device can transmit before interfering with a television transmission on that frequency (33 dB Carrier-to-interference (C/I) level for co-channel and -17 dB for adjacent channel)
 - Available spectrum results can be returned as a start and stop frequency, to allow use of multiple adjacent channels.
- PMSE (Programme Making Special Events) (wireless mics)
 - OFCOM suggests that databases perform signal strength predictions for PMSE devices and provide 38 dB co-channel and -55 dB adjacent-channel protection
- Result of these rules: Instead of a “no channels available” result where many television stations are operating, a white space device might be told it can use a channel (or frequency range), but only if it keeps its transmit power below a certain level.

Questions?

