1. Status of Rules for Operation of Unlicensed Devices in the TV Bands in the U.S., Canada and Mexico

Introduction

Broadcasting continues to be an important public service. Broadcast television stations entertain, inform and provide information and video programming that is responsive to the needs and interests of the communities they serve. The importance of broadcasting particularly in times of emergencies has been recognized internationally:[1]

> "Television broadcasting is a critically important medium for information dissemination to the public in times of emergencies. The intrinsic one-to-many broadcast architecture and the geographic diversity of terrestrial broadcast transmission facilities provide high service reliability during crises of all types. … The case studies in this report represent only a few of countless examples that attest to the global importance of terrestrial broadcasting, helping to protect and save lives during local, national and international emergencies." [2]

Today, frequency bands allocated for television broadcasting in North America include 54-72 MHz (channels 2-4), 76-88 MHz (channels 5-6), 174-216 MHz (channels 7-13) and 470-608 MHz (channels 14-36) and 614-698 MHz (channels 38-51). Channels 2-13 are in the VHF band, and channel 14-51 are in the UHF band. Sharing frequencies with other services is not a new phenomenon for broadcast television; in addition to broadcasting, some UHF television channels in the 470 MHz band have been shared with land mobile operations in the United States for many years. More recent, however, is the concept of sharing with unlicensed operations. With unlicensed operations, a transmitter is allowed to legally operate without an individual license from a country or administration. Unlicensed devices are usually low power devices. There is no designated allocation for unlicensed devices although traditionally they have operated predominantly in spectrum allocated for Industrial, Scientific and Medical (ISM) use. Recently, however, unlicensed devices have been permitted to operate in the broadcast television spectrum.

In the United States, broadcast spectrum is now shared with unlicensed devices that are used principally (but not exclusively) for broadband Internet service. Sharing is accomplished through the use of a database that determines the channels that could be used by an unlicensed device at a particular location without causing interference to TV operations and viewers. Specifically, an unlicensed device is supposed to operate only on a TV channel that is not being used for television at a particular location. These areas are called "TV white spaces" and the unlicensed devices are called "TV white space" (TVWS) devices.

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[1] www.itu.int/go/ITU-R/RWP6A-2013

[2] See, ITU Report BT.2299, "Broadcasting for public warning, disaster mitigation and relief" at 13.

The United States TVWS Experience Has Not Been Satisfactory

The so-called TV White Space rules in the United States were adopted nine years ago in 2006. Currently, a total of six TVWS devices from five manufacturers have been approved for use by the Federal Communications Commission (FCC). At least five companies have been approved by the FCC to operate and provide a TVWS database service, although the TVWS devices have only been approved to operate with three of these companies. As of August 13, 2015, there were a total 577 TVWS devices (including several test devices) registered in the TVWS database.

The TVWS concept is that the device will register with an approved database (from an approved Database Administrator) via the Internet and provide the database with its transmitter power, antenna height and location, and identification information. The database will then provide the device with a TV channel for operation that will not cause interference to TV service. If interference does occur, the identification information can be used to locate the offending operator and device and contact the operator and have the device stop transmitting on that channel.

Accuracy of the registration information provided to the Database Administrator is critical to making the TVWS concept work. With only about 500 devices and three active Administrators this wouldn't appear to be a difficult task. However, a broadcast industry review of the TVWS Database was undertaken in May and June of 2014 and showed extensive data problems. Those reviews showed that more than 35% of the devices failed to provide all required registration information.[3] Even more concerning was the fact that in many instances where information was supplied, the information was incorrect. This included TVWS registered locations in the middle of oceans, lakes or foreign countries, and locations without electricity or people – locations certainly without the capability of a TVWS device to contact a database over the Internet. Eventually, over 60 obviously false TVWS devices registrations were purged from the database in response to these broadcast industry reviews.

Clearly, the most critical information needed to ensure that a device won't cause harmful interference is the device's location. However, the database continues to contain numerous data errors with regard to device locations. This is due to the fact that devices can be "professionally installed" and all location data simply entered into the database manually. The current database lists tens of devices at suspect locations. For example, tens of devices are registered to the same location that is provided as an example registration in a manufacturer's device operating manual. As another example, devices are registered to companies in locations hundreds of miles from where that company does business.

The database management of potential interference between broadcasting and unlicensed operations is all based on the location of the TVWS device. The potential for harmful interference from unlicensed devices is substantial and needs to be taken into account. TVWS devices can operate at up to 10 Watts with antenna heights above average terrain of 250 meters. To avoid interference, the database must ensure that a TVWS device operating at this antenna height and power level must be 39.5 km (or more than 24 miles) from the protected contour of a TV broadcast station on that channel. Without accurate TVWS device location information, interference from TVWS devices is certainly a domestic problem but

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[3] There were 416 devices registered in the May 21, 2014 database. Seven devices did not have a valid FCC ID; 150 devices failed to list a contact name; 59 devices failed to list a device owner; 57 devices failed to list a valid email address, and 42 devices failed to list a working telephone number.

because the distances are substantial, it can also be an international problem along common borders.

Canadian Update on TV White Space Devices

TVWS device deployment in Canada is still in its early stages. According to Industry Canada, the database operator(s) is/are still to be found. Industry Canada has stated, however, that it could potentially approve a TVWS device to be activated for testing or experimental purposes. As CBC/Radio-Canada owns and operates 27 DTV stations, it is a priority for CBC/Radio-Canada to protect those stations' coverage.

The TVWS database problems in the US are well known in Canada. Canadian broadcasters would support efforts to address interference problems, as these devices will eventually be used in Canada.

CBC/Radio-Canada agrees with the proposed solution below. Some of the companies listed are Canadian and we support any action taken toward better managing information amongst TVWS device manufacturers, the database and broadcasters as this will hopefully preclude interference in the future.

Mexican update on TV White Space Devices

The deployment of TVWS in Mexico is not regulated yet. The Mexican government is now working on the recovery of the 700 MHz and the 600 MHz bands and has not mentioned or programmed or indicated any action.

As seen by the Mexican broadcasting industry (CIRT), the Mexican regulator "Instituto Federal de Telecomunicaciones (IFT)" would follow the FCC plans not only in this matter (unlicensed devices) but also in other like attribution of TV frequency bands to other services.

The IFT is about to release some rules regarding the attributions of the bands including studio-plant links. The idea is to launch a new plan to assign frequencies to broadcasters and telecommunication companies based on a "Pay-Per MHz plan" and leave "open" slots as TVWS.

The Mexican broadcasting industry is working closely with the government in some working groups trying to explain the risks of having unlicensed devices transmitting in the TV bands, but I personally believe that the bilateral agreements between the two countries are all set and the Mexican authorities will move forward with the plan.[4]

US Broadcasters Offer a Solution

Several TV White Space device manufacturers also have recognized the potential problems that can arise from inaccurate information submitted to the database. In a cooperative effort with the National Association of Broadcasters (NAB), four TV White Space device

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[4] If necessary, the CIRT can help with some field trials or participation in a task force to show how these new devices and the TVWS plan may affect the broadcasting service. During the last NAB Show, CIRT's president met NAB's president and a cooperation plan was discussed for the ATSC 3.0 project. It would be very easy to integrate this new item in the bilateral agenda of both Associations.

manufacturers (Adaptrum, Inc., Carlson Wireless Technologies, KTS Wireless and MELD Technology) representing well over 95% of all deployed TVWS devices, have proposed a solution to vastly improve the accuracy of the TVWS database and eliminate many of the problems that have been identified. NAB and the device manufacturers have agreed that the TVWS concept needs to transition to a system that does not require or that minimizes human intervention with regard to the determination of geolocation information for TVWS devices. Including automatic geolocation capability embedded in TVWS devices will ensure, to the extent practical and possible, that valid location information is reported to the TVWS database. This in turn will ensure that the database provides the device with appropriate channels that minimize the potential for harmful interference to TV broadcasting. This agreement to include geolocation capability in TVWS devices was submitted to the FCC in July 2015. In the most recent FCC Report and Order on the subject of white space device operation, the FCC stated they will commence a proceeding by the end of 2015 to address whether the white space rules need to be modified to ensure that location information for white space devices is accurate and to address the recent agreement between NAB and TVWS device manufacturers.[5]

Broadcasters understand the need to use spectrum effectively and efficiently, have a long history of sharing with other services and do not oppose sharing with unlicensed services provided adequate safeguards are in place. To date, that is not the case with TVWS. Broadcasters have proposed a cooperative solution that is supported by both broadcasters and the unlicensed device manufacturers. The problem should be fixed now before it becomes too big a problem to fix later.

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[5] See FCC Report and Order on "Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the TV Bands," ET Docket 14-165, released August 11, 2015, at footnote 37, page 10.