

Radio-Frequency Interference from Digital Television

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Digital television (DTV) signals have intermittently been observed during measurements of radio-frequency interference (RFI) obtained to evaluate possible sites for stations of the Long Wavelength Array (LWA). Such signals are recognizable because their flat-topped profiles fill the entire 6-MHz channel allocations; unlike analog signals there are no useful gaps between the video and audio carriers at offsets of 1.25 and 4.75 MHz within each channel. The potential operational band for the LWA covers 10-88 MHz and includes the VHF television channels 2-6 (54-60, 60-66, 66-72, 76-82, and 82-88 MHz); for example, in Albuquerque channels 2, 4, and 5 are currently used by high-power analog television stations. After the transition to DTV on 19 February 2009, all the high-power analog television stations in New Mexico will switch to DTV at frequencies much higher than the LWA operational band.

We attributed the visibility of the DTV signals to "anomalous propagation" of stations located outside New Mexico but were unable to further identify them. However, the FCC released the current "near-final" version of the DTV Table of Allocations on 6 March. As listed in the Table, there will be only 40 DTV stations in the entire United States that will be using channels 2-6. The only ones that should be of concern to the LWA under normal propagation conditions are channel 2 in Flagstaff, AZ, channel 2 in Grand Junction, CO, channel 6 in Ensign, KS (about 250 miles ENE of Raton, NM), channel 2 in Las Vegas, NV, and channel 5 in Fredericksburg, TX (north of San Antonio). The effective radiated powers (ERPs) are 11.2, 0.8, 20, 27.7, and 10.2 kW, respectively. The distances from Albuquerque are approximately 282, 294, 590, 576, and 700 miles, respectively. Since channel 2 in Grand Junction is low power and very well shielded by the San Juan Mountains, channel 2 in Flagstaff is probably the only one we need to be concerned about for now.

There are two other issues that may affect channels 2-6 in the future. The first is the question of "white space" in which companies like Microsoft, Google, etc. want to sell unlicensed devices to support wireless networks (like WiFi) on unused television channels. So far the hardware that they have supplied the FCC for testing has produced RFI and failed.

The second issue is the conversion of low-power television stations and translators to DTV. As yet, there is no proposal on the agenda of the FCC but in February Chairman Martin aired a proposal that would offer such stations new channels for the conversion and some LPTV stations would be allowed to upgrade to full power by 2013. So we should anticipate encouraging and assisting the existing stations to leave channels 2-6 and ensure that no one moves into channels 2-6.

DTV Table of Allocations (6 March 2008)

City	Channel	ERP (kW)
Anchorage, AK	5	45
Bethel, AK	3	1
Tuscaloosa, AL	6	1
Flagstaff, AZ	2	11.2
Eureka, CA	3	8.39
Grand Junction, CO	2	0.8
New Haven, CT	6	0.4
Key West, FL	3	1
Pelham, GA	6	3.8
Wrens, GA	6	30
Ames, IA	5	3.91
Sun Valley, ID	5	6.09
Rock Island, IL	4	3.88
Ensign, KS	6	20
Danville, KY	5	26.5
Bangor, ME	2	3.02
Calumet, MI	5	6.89
Kalamazoo, MI	5	10
Butte, MT	5	10.7
Butte, MT	6	11.2

Miles City, MT	3	1.03
Hastings, NE	5	6.78
North Platte, NE	2	6.75
Ely, NV	3	1
Las Vegas, NV	2	27.7
Schenectady, NY	6	4.46
Toledo, OH	5	10
Medford, OR	4	6.35
Philadelphia, PA	6	6.22
Florence, SD	3	3.7
Lead, SD	5	6.71
Rapid City, SD	2	7.1
Memphis, TN	5	7.26
Nashville, TN	5	10.3
Fredericksburg, TX	5	10.2
Bristol, VA	5	8.93
Roanoke, VA	3	7.25
Weston, WV	5	7.09
Casper, WY	6	1
Jackson, WY	2	1