

700 MHz TV Clearing and its Impact on TV Viewership

by

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November 11, 2003

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Executive Summary

Effective mobile and portable communications are essential to public safety operations. Police officers, firefighters, emergency medical personnel and their departments use mobile and portable communications to exchange information that saves lives, their own as well as those of the public they all serve. Traditionally, this information was mostly by voice. Increasingly, as public safety entities strive to increase efficiency and effectiveness in today's world, they also need the capability to transmit and receive high performance data, still images and video reliably. Spectrum is the road upon which such communications travel and increased communications requirements lead to the need for more spectrum.

Based on a thorough justification of need, Congress and the Federal Communications Commission dedicated 24 MHz of spectrum in the 700 MHz band to public safety in 1997. However, six years later, incumbent television stations operating on channels 62, 63, 64, 65, 67, 68 and 69 prevent public safety access of this essential resource in most major urban areas where the demand for more spectrum is the greatest. The recent focus on increased interoperability and Homeland Security make availability of this public safety spectrum nationwide even more critical. Current law and policies set December 31, 2006 as the date for clearing television from the band. However, this is not a firm date. Broadcasters do not have to clear the band until 85% of the households in their service areas have the capability to receive digital TV, an environment unlikely to be met in most markets by yearend 2006.

In hearings on the public safety spectrum issue, some members of Congress expressed concern that a firm clearing date would impact the viewing public. As shown in this paper, the potential harm to the viewing public is minimal, compared to the public safety need for this spectrum which Congress and the FCC already confirmed. First, only 75 stations, i.e., 5% of the 1500 U.S. TV stations, impact public safety's availability of its 700 MHz band spectrum. Second, Motorola's analysis of independent television industry data shows that on average, only 14% of the households who have the option to view these stations actually do so at all and that of those viewing, 82% watch by cable. The analysis also shows that on average, only 3% of the households within these stations' coverage areas tune to these stations over the air sometime during an average week. Therefore, the public interest benefits of clearing the 700 MHz spectrum for public safety access nationwide no later than December 31, 2006, far outweigh those of allowing it to stay encumbered by television.

1 Introduction

Wireless communications is a critical tool for state, local and federal governments, as well as critical infrastructure, transportation and private industries, especially in view of today's heightened security concerns. This is particularly true for our nation's public safety first responders, where having the right information immediately available at the point of decision, wherever needed, may be the difference between life and death for themselves and the citizens they serve. Simply put, public safety's uncompromising mission critical communication requirement is to have the right information, to the right people, at the right point in time, whether that information is transferred via voice, data or images. Public safety users best state this requirement as:

“The first priority must be to provide public safety with mission critical radio communication systems that provide reliable agency-specific – police, fire, EMS – communications. (Mission critical radio communications are those required when life or property is at stake.)”¹

Any discussion of wireless communications must begin with an explanation of radio spectrum. Communications systems use electromagnetic waves to send voice and data information across the airwaves. While the engineering and physics may be complicated, the most important point is that wireless communications cannot take place without users having access to sufficient spectrum in which to operate their communications systems. Spectrum designated for exclusive use by public safety is the lifeline to their emergency response, detection and prevention capabilities. The bottom line is that without access to adequate spectrum, wireless communications cannot take place, effectively and ubiquitously.

Spectrum is a finite resource for which more and more users of ever-growing wireless technologies are increasingly competing, especially in metropolitan and even suburban areas. Non-federal use is regulated by the Federal Communications Commission (FCC or Commission).² As state and local governments are also experiencing growth in number of users, agency jurisdictional coverage areas, and introduction of new technologies, existing public safety radio channels are becoming extremely crowded in these dense population centers.

Recognizing this urgent need for additional spectrum, the public safety community through the Public Safety Wireless Advisory Committee (PSWAC), issued a report on September 11, 1996 that documented the need for 97.5 MHz of additional spectrum to meet their communications needs

¹ “When They Can't Talk, Lives Are Lost” brochure, February 2003, developed by The National Task Force on Interoperability (NTFI), page 7. NTFI is comprised of members from 18 major national associations for local and State elected and appointed officials and public safety officers.

² The National Telecommunications and Information Administration regulates spectrum for federal government users and in many cases works jointly to with the Commission to address spectrum related issues of interest to both users.

through 2010.³ The greatest amount of this spectrum is needed for emerging advanced wireless wideband and broadband technologies, adapted for mission critical public safety applications. These include high-speed data, intranet access, imaging and video transfers and on-scene multi-media mobile command communications. The need for additional spectrum continues to exist and is even more critical today given the nationwide public safety focus to improve Homeland Security.

Recognizing public safety's need for spectrum, in 1997 Congress and the FCC reallocated 24 MHz of spectrum from TV channels in the 746-806 MHz band (TV channels 60-69) to support mission critical public safety communications. This band is generically called the 700 MHz band. Specific band segments within 700 MHz allocated to public safety are 764-776 MHz (TV channels 63 and 64) paired with 794-806 MHz (TV channels 68 and 69). Television stations within channels 60-69 are expected to vacate this spectrum as part of the transition from analog to digital television.

Notably, access to the 700 MHz band essentially doubles the spectrum public safety has to support wide area operation. The 700 MHz band is critical to public safety for two key reasons:

- (1) Together, the new 700 MHz and current 800 MHz bands provide the best opportunity to integrate interoperable communications. The 700 MHz band's close proximity to the 800 MHz band allows public safety agencies to expand their current 800 MHz narrowband voice and data systems for interoperability and regional coordination on an "intra" as well as "inter" agency basis. New portable and mobile radios, as well as infrastructure equipment, capable of operating in both the 700 and 800 MHz frequency bands in one radio are commercially available today. The Commission adopted Project 25 Phase 1 as the interoperability standard for narrowband voice and data communications in the 700 MHz band.⁴ Further, the Commission last year granted each state a license to operate such narrowband communications in the 700 MHz band. At the local level, public safety users are completing regional plans required by the Commission to start implementing local and regional systems.
- (2) 700 MHz is the only dedicated spectrum allocation where public safety can implement advanced mobile wide area systems that bring high-speed access to databases, the internet/intranet, imaging and video to first responders in the field.

The wideband technology to deliver high-speed data in the 700 MHz band offers a whole new level of mobile communications capabilities, which is far beyond today's voice and low speed data applications. For example:

- a. An officer or agent could transmit video of a potential bomb, or biological weapon and get real time counsel from an expert in another location.

³ Final Report of the Public Safety Wireless Advisory Committee to the Federal Communications Commission and the National Telecommunications and Information Administration, September 11, 1996, p3.

⁴ FCC Fourth Report and Order and Fifth Notice of Proposed Rulemaking, "The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010", WT Docket No. 96-86, released January 17, 2001.

- b. Local or state police could instantly send or receive a photograph of a missing or abducted child.
- c. Crime scene investigators can transmit live video of footprints, fingerprints and evidence to speed analysis and apprehension of perpetrators.
- d. Firefighters can access building blueprints, hydrant locations hazardous material data and other critical information.
- e. Paramedics can transmit live video of the patient to doctors at the hospital that would help save lives.

Motorola and Pinellas County, Florida, conducted a successful trial of technology that can provide all of the above capabilities as part of what we refer to as the Greenhouse Project. A subsequent Greenhouse Project is being finalized with another major metropolitan public safety department. The capabilities demonstrated are the emerging powerful multi-media applications that will bring public safety communications into the Twenty-First Century. Public safety users have completed the wideband interoperability standard through the Telecommunications Industry Association (TIA). In turn, TIA recommended this standard, identified as TIA-902, to the Public Safety National Coordination Committee (NCC), the Advisory Committee created by the Commission to provide recommendations on the use of the 700 MHz. As it did with the Project 25 narrowband standard, the NCC recommended the TIA-902 standard to the Commission for subsequent endorsement as the wideband interoperability standard in the 700 MHz band.⁵

Unfortunately, because of incumbent broadcast television use, most of this nation's largest metropolitan area public safety agencies cannot use this spectrum today, nor can they predict with any certainty when they might have access to these frequencies. Therefore, they cannot deploy, nor plan for the deployment of, the interoperability and advanced technology that will improve their effectiveness and safety. Under current law, while TV incumbents are required to vacate this spectrum at the end of 2006, they can receive an unlimited extension of this deadline based on the state of the transition in their particular market. Specifically, the Balanced Budget Act of 1997 set the guidelines for determining the end of the transition to digital television in a given market. The law set a conditional deadline of December 31, 2006 for broadcasters to complete the transition to digital broadcasting, stating that the Commission may not renew a television broadcast license that authorizes analog television service for a period that extends beyond that date. However, an analog broadcaster may request an extension of the deadline if it can demonstrate any one or more of the following are not met in that market area:⁶

1. Fewer than 85% of the households in the broadcaster's market are capable of receiving digital broadcasts. To be counted as broadcasts, households must be able to receive any one digital broadcast over the air using a digital TV set or analog set equipped with a digital-to-analog set-top converter box or be able to receive at least one digital programming channel of each broadcaster in the market from a multi-channel video programming distributor (MVPD) such as a cable system.

⁵ NCC Final Report to FCC Chairman, Michael Powell, by NCC Chair, Kathleen M.H. Wallman, July 25, 2003, filed as ExParte under WT Docket No. 96086.

⁶ Congressional Budget Office Paper, "Completing the Transition to Digital Television", September 1999.

2. One or more of the four largest networks has an affiliate in the broadcaster's market that, despite the "due diligence" required by the law, is not broadcasting a digital signal.
3. Digital to analog converter technology is not readily available in the broadcaster's market.

The law leaves most of the details of the market penetration test to the Commission's discretion.⁷

Many experts seem to accept that the 2006 date is not likely to be met in any television market. As a result, there is no "hard date" by which TV stations must vacate this spectrum to allow for public safety access, a situation that leaves the public safety community and those who support its efforts and needs unsure of the future.

In order for any public safety agency to use the spectrum it has been assigned in the 700 MHz band, any TV stations operating on those public safety transmit and receive frequencies (referred to as the co-TV channels) must have ceased operations. In addition, any TV stations in that market that are operating one TV channel up or down from the co-TV channel (referred to as the adjacent TV channels) also must have ceased operations. In effect, as many as seven TV channels (62-65 and 67-69) must be cleared before first responders in that market will be able to access the 24 MHz of new spectrum and deploy the equipment that uses this spectrum.

The purpose of this paper is to share Motorola's market and engineering analysis into this TV clearing issue. Motorola provides the results to date of this effort.

2 Incumbent TV Stations in 700 MHz Band

Before addressing the impact on TV viewers, it is necessary to understand why TV must be cleared to provide public safety access to its 700 MHz band spectrum. Sections 2 and 3 of this paper offer information to help provide that understanding.

Motorola has developed maps that identify the areas of blockage caused by TV broadcasters that are operating today on the public safety co-channels and adjacent channels throughout the country.⁸ As shown in the following Figure 1, public safety systems operate in a pairing of transmit and receive channels, in previous TV channels 63 and 68, and 64 and 69.⁹ In addition, adjacent channels would impact their operations. For the TV channels pairing of 63 and 68, the adjacent TV channels are 62, 64, 67 and 69. For the TV channels pairing of 64 and 69, the adjacent TV channels are 63, 65 and 69. The spectrum above TV channel 69 is already allocated to and used by land mobile radios (starting at 806 MHz), so there is no upper adjacent TV channel above channel 69.

⁷ ID.

⁸ Based on FCC current TV license data. These maps do not include Canadian and Mexican stations that border the U.S. Access to the 700 MHz public safety spectrum in the border areas is also dependent on negotiations with Canada and Mexico to facilitate clearing of any TV operations they have on channels 62-65 and 67-69. Canadian and Mexican regulatory agencies are also evaluating the benefits of making 700 MHz band spectrum available to public safety.

⁹ Figure 1 legend: PS = public safety, CMRS = Commercial Mobile Radio Service

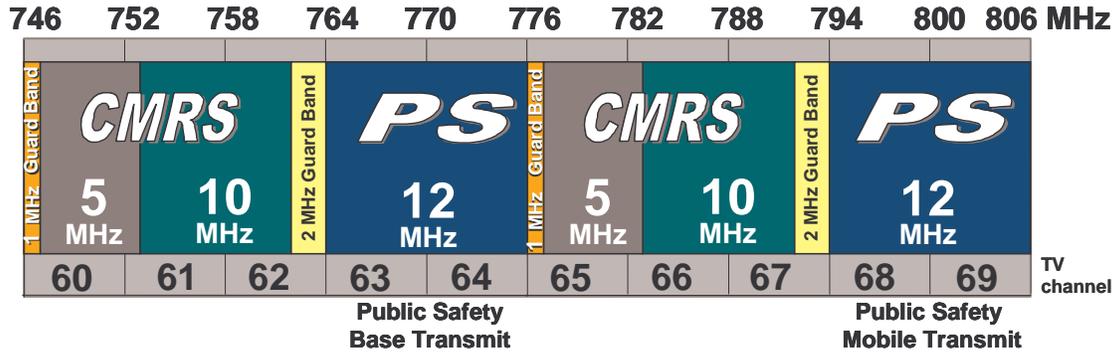
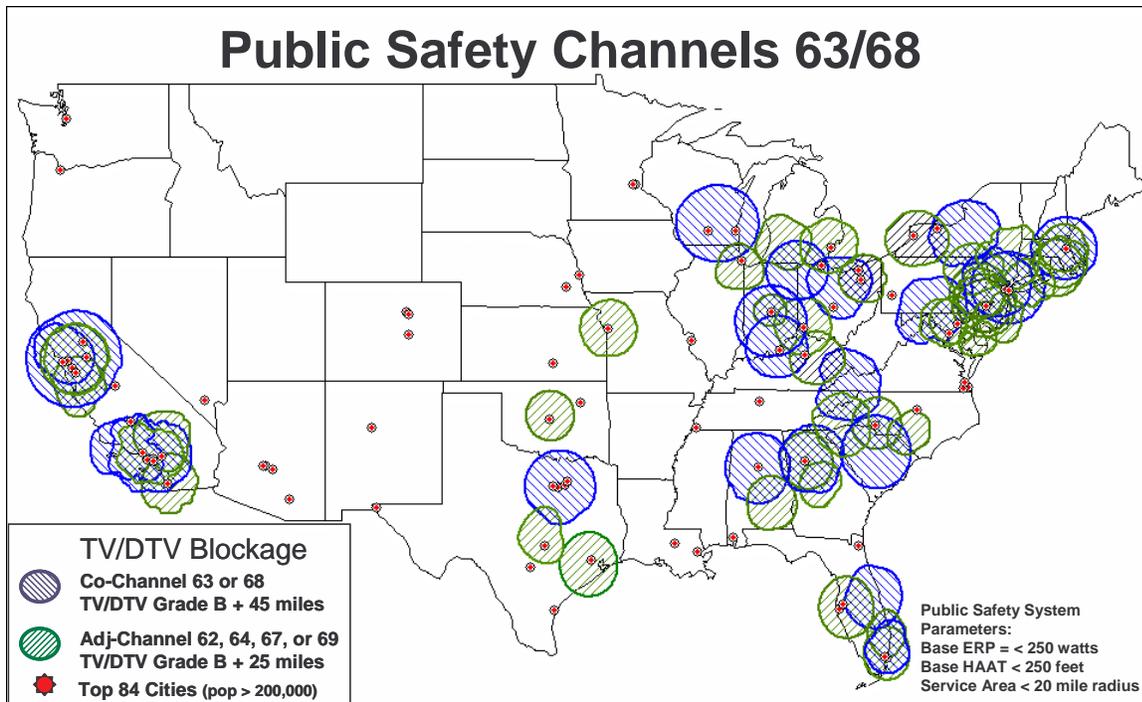
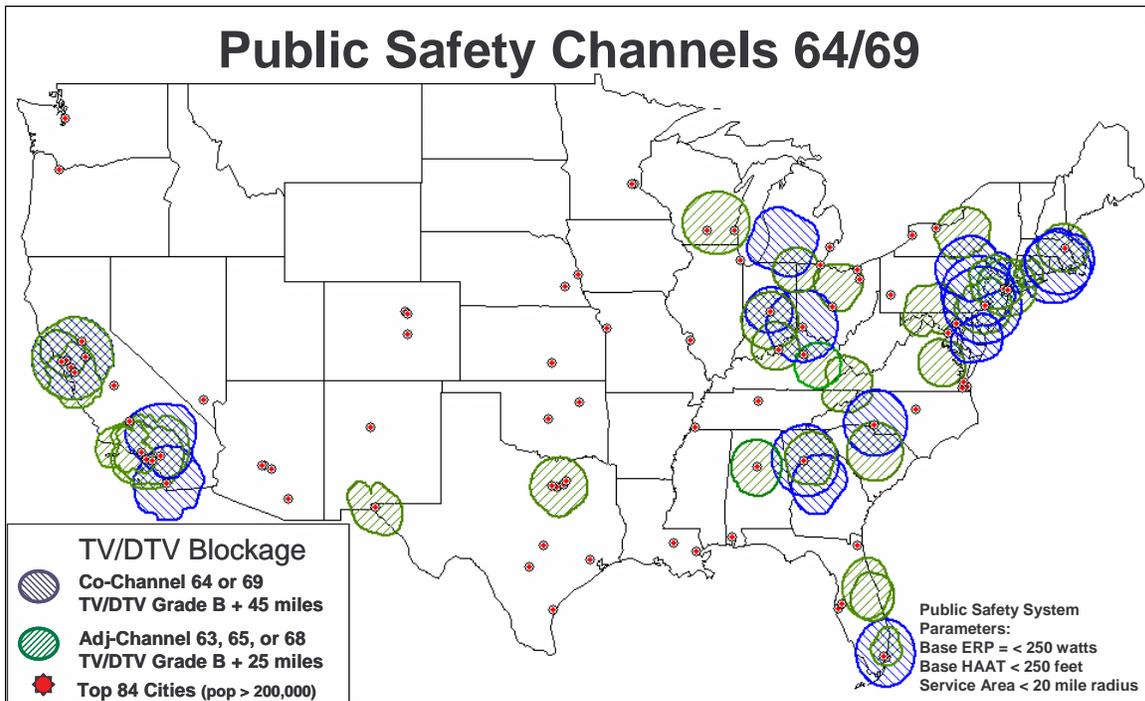


Figure 1: Current 746-806 MHz Band Plan

The following Map 1 and Map 2 show the implications of existing operations on each of the two pairings. The shaded circles indicate those areas where public safety agencies are currently blocked from using this spectrum by TV incumbents operating on the co-channels and/or the adjacent channels. The "blockage" areas, referred to as preclusion zones, are approximately 100 mile radius around TV stations operating on a co-channel basis and approximately 80 mile radius for TV stations operating on an adjacent channel. See the following Section 3 for a detailed explanation of preclusion zones.



Map 1: Areas where public safety is prevented from accessing Channel pair 63/68 due to existing TV stations.



Map 2: Areas where public safety is prevented from accessing Channel pair 64/69 due to existing TV stations.

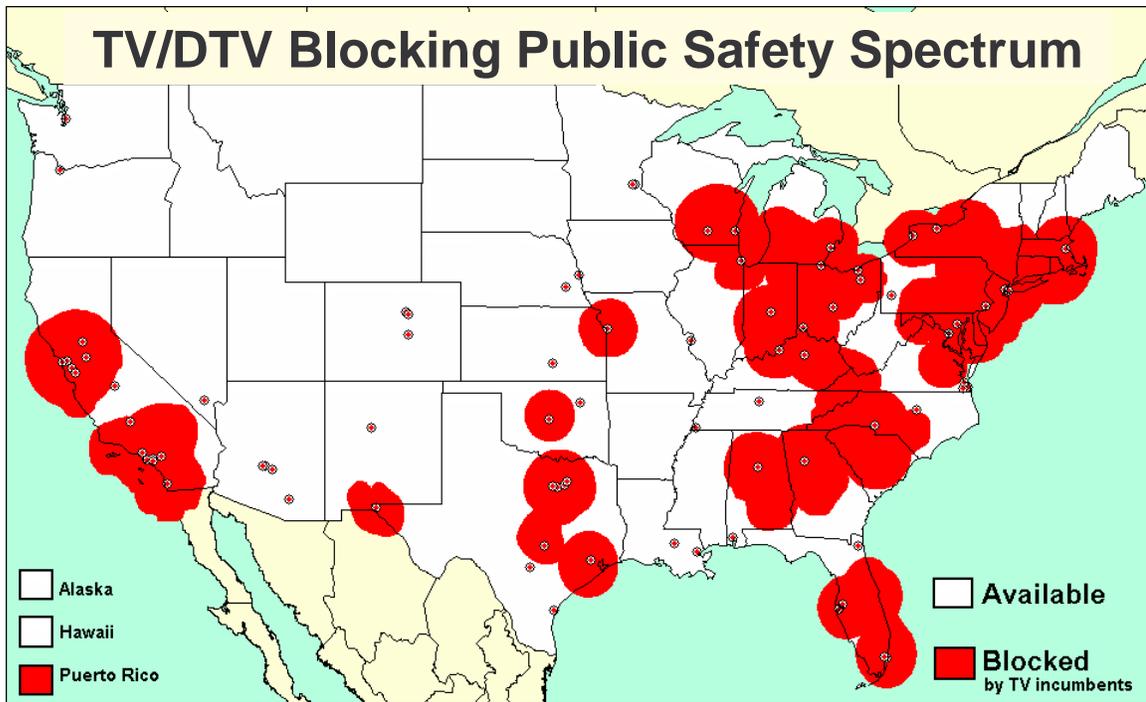
Combining the preclusion zones shown in the above Maps 1 and 2 provides a total view of the impact TV broadcasters have today on public safety access to the spectrum that was allocated to them six years ago. Out of approximately 1500 TV stations operating in this country today, there are currently a total of 75 analog and digital TV stations operating on channels 62-65 and 67-69 in the 50 States and Puerto Rico that are causing this blockage.¹⁰ We have created two combined view maps that show this impact.

Map 3 shows those areas where existing TV stations either completely or partially block public safety communications in the 700 MHz band. That is, these are the areas where the full 24 MHz of spectrum allocated to public safety is not available to public safety. It is no surprise that these blocked areas are in our nation's densest population centers, where public safety urgently needs access to the spectrum. 70% of the country's population lives in these blocked areas.¹¹ In most of these areas, TV stations totally block access to public safety, while in a few metropolitan areas, TV

¹⁰ See Appendix A for listing of TV stations, based on FCC TV Engineering Database – August 2003.

¹¹ Population data was analyzed for every county within each of the preclusion zones (the red areas within which public safety access to spectrum is impacted) on Map 3, then compared to the total U.S. population. The ratio is 70% of the population falls under these blocked areas.

stations block access to one half of the public safety spectrum. See Appendix B for detailed spectrum availability to public safety in each of the top 84 cities.¹²

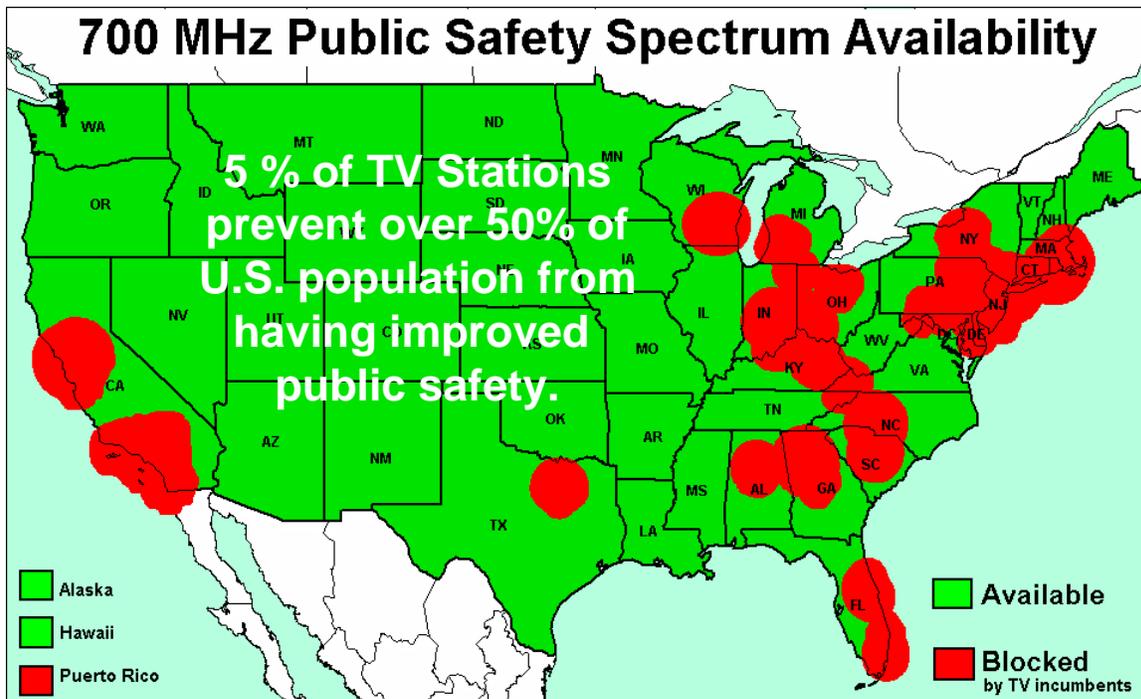


Map 3: Areas where co-channel or adjacent channel TV stations block public safety access to its 24 MHz spectrum allocation, either fully or partially.

Map 4 shows those areas where these existing TV stations totally block access to public safety. That is, neither TV pairings of 63 and 68 nor 64 and 69, along with their respective adjacent channels, are available for access by public safety. Over 50% of the country's population lives in a region where public safety has no access to 700 MHz spectrum.¹³ These are the U.S. citizens that live under the blocked (red) areas shown on Map 4. Comparison of Maps 3 and 4 shows that the difficulty of clearing only half the 700 MHz Public safety spectrum allocation is almost as great as that needed to clear the entire public safety 700 MHz band allocation.

¹² Top 84 cities represent those cities having populations over 200,000. City population based on 1994 Census data.

¹³ Population data was analyzed for every county within each of the preclusion zones (the red areas within which public safety has zero access to spectrum) on Map 4, then compared to the total U.S. population. The ratio is 54% of the population falls under these blocked areas.



Map 4: Areas where co-channel or adjacent channel TV stations fully block public safety access to 700 MHz spectrum

A review of all of these maps and the underlying information used to create them yields the following main conclusions:

1. *Only 5 percent of TV stations operating in the U.S. today prevent over half the U.S. citizens from receiving any benefits of improved public safety communications in this new 700 MHz public safety band.*
2. *Clearing both co-channel and adjacent channel TV stations from this band is critical to provide public safety access to its spectrum allocation.*
3. *The clearing initiative should ensure that the entire 24 MHz of spectrum is made available nationwide.*

3 Preclusion zones

The presence of a television transmitter on channels 62, 63, 64, 65, 67, 68 or 69 will preclude public safety use of the 700 MHz band spectrum within an area that is approximately 2 to 3 times the coverage area of the TV station. Therefore, it is possible for a television station to preclude public safety use in both its own market and in adjacent markets.

The FCC Rules (47 CFR §§ 90.309 & 90.545) that define the spacing between new, primary public safety land mobile services and incumbent TV broadcast services are designed to minimize the interference to television reception throughout the television station's Grade B viewing area.. The Grade B contour predicts a television station's coverage based on the station's power, antenna height and the height of surrounding terrain and the Commission's historical experience and models for predicting coverage. While each station's actual coverage varies, a typical predicted Grade B Service Area contour covers an average radius of about 55 miles.

Similarly, the FCC relies primarily on predicted coverage of public safety systems. A typical public safety Land Mobile Radio (LMR) service area contour is about 20 to 25 miles in radius. That is, mobile radios will communicate 20-25 miles to and from their associated base station(s). The following typical suburban land mobile base station parameters were used in our analysis of the areas blocked by incumbent TV stations: 250 watts effective radiated power (ERP) with 250 feet height above average terrain (HAAT).

An additional 20 to 25 mile spacing is required between the outer edges of the television and public safety coverage contours to minimize interference to fringe area TV receivers. As shown in Figure 2, this brings the total separation between a TV transmitter site and a co-channel land mobile base station site to about 100 miles (55 miles for TV Grade B coverage, plus 20 miles for LMR coverage, plus 25 miles interference protection). Therefore, the typical television station precludes co-channel public safety base stations over an area of about almost 7900 square miles, over three times the area of the TV station's predicted coverage. It precludes mobile use associated with those base stations over an area of approximately 5000 square miles, over twice that of its own predicted Grade B coverage area. For channels that support mobile operation, the preclusion area is further expanded when control stations are also used on those channels.¹⁴

LMR services operating on an adjacent TV channel can be spaced somewhat closer because the interference is attenuated by the TV receiver's selectivity. The FCC Rules basically allow the mobiles to operate within 5 miles of the TV Grade B contour. As shown in Figure 3, this brings the total separation between a TV transmitter site and an adjacent channel land mobile base station site

¹⁴ Control stations are routinely used in the operation of public safety systems.

to about 80 miles (55 miles for TV Grade B coverage, plus 20 miles for LMR coverage, plus 5 miles interference protection).

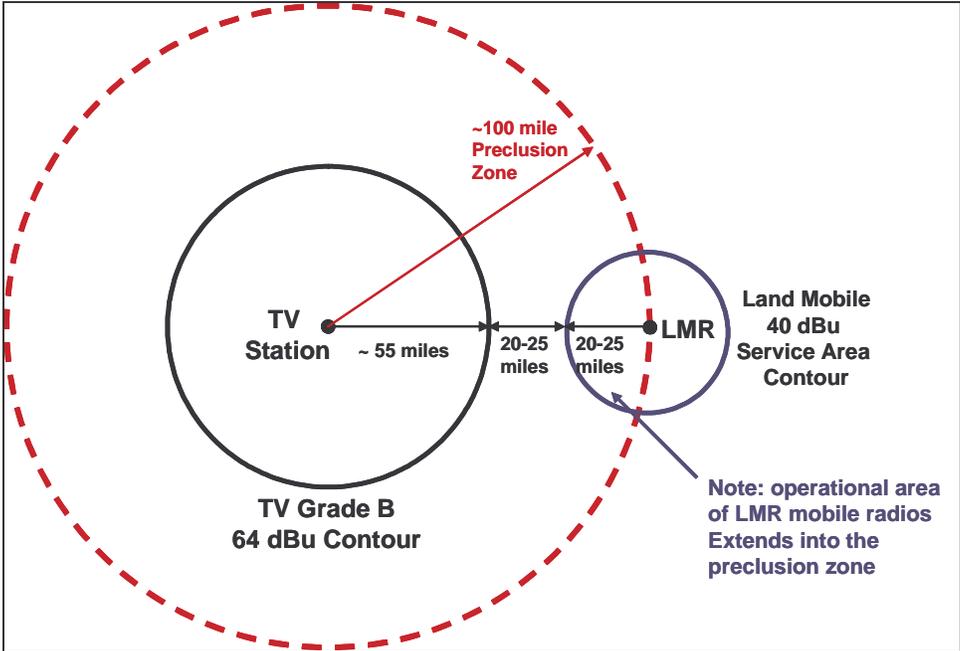


Figure 2: 100 mile Co-Channel Preclusion Zone

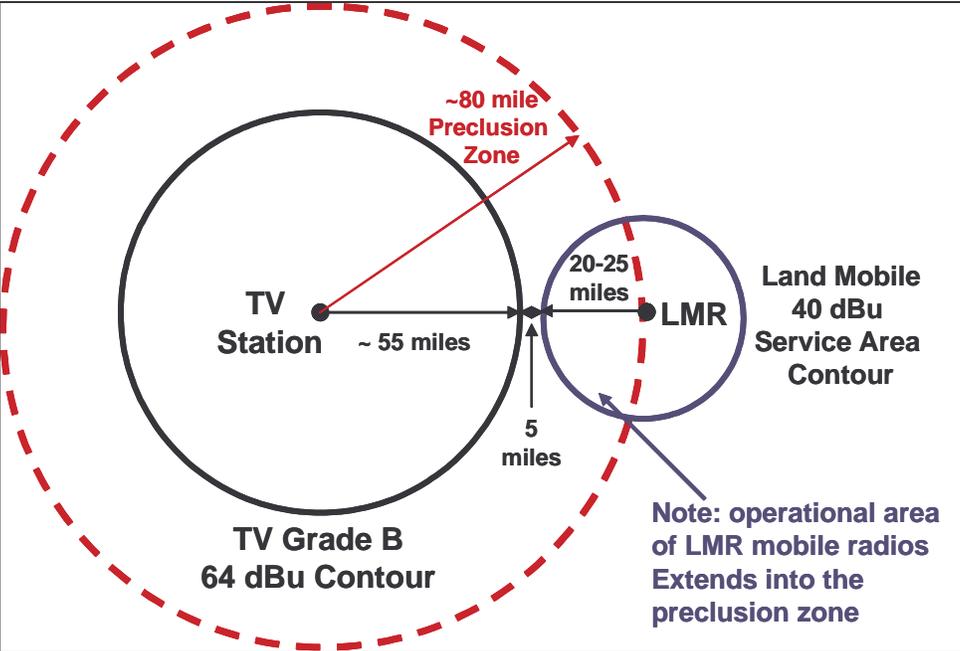


Figure 3: 80 mile Adjacent-Channel Preclusion Zone

Pending television clearing, it may be possible, on a case-by-case basis, to space some new public safety land mobile systems closer to incumbent TV broadcast services than the tables in the FCC rules (47 CFR § 90.309) normally allow. While potentially useful for some specific public safety users, this provides only marginal improvement for potential public safety access on a nationwide basis to the 700 MHz spectrum prior to television clearing, as discussed below.

The FCC rules (47 CFR § 90.545) allow terrain based engineering analysis to be conducted using the actual parameters of TV and land mobile stations. Actual parameters (terrain barriers, antenna patterns, lower radiated power) may be used to show that the land mobile base station could be located closer to the theoretical TV Grade B contour without causing interference. These actual parameters may mean that the TV station’s Grade B contour does not extend out to the theoretical 55 miles. In addition, mobile radios for a specific public safety agency normally don’t operate very far outside of their jurisdictional boundaries. To maximize frequency re-use and spectrum efficiency, public safety systems usually restrict the coverage of their land mobile system to the jurisdictional boundary or the boundary plus some small additional distance (typically 3 to 5 miles). Therefore, as shown in Figure 4, the radius of coverage of a public safety system site may be less than the 20-25 miles assumed by the tables in the FCC rules (47 CFR § 90.309). However, where multiple jurisdictions throughout an area need 700 MHz for interoperability, the reduced coverage area of any single jurisdiction may have little impact on the ability of public safety to use the spectrum.

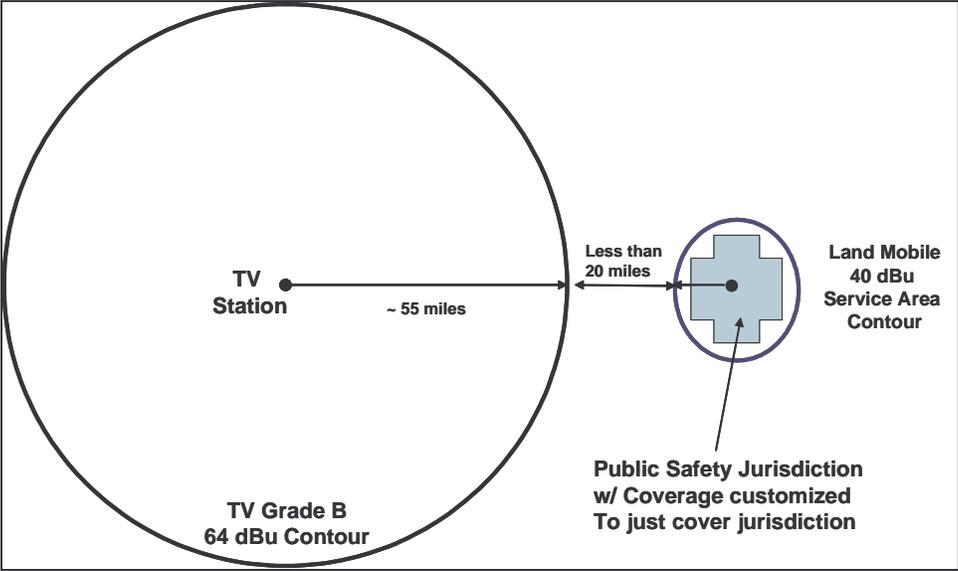


Figure 4: Customized coverage of specific public safety system may allow it to be spaced closer to TV Grade B contour

The 700 MHz public safety spectrum is divided into 2 types of services; narrowband (mainly for voice) and wideband (data and multi-media). Each 6 MHz block of spectrum (one TV channel) is split into a 3 MHz block of narrowband spectrum and a 3 MHz block of wideband spectrum. As shown in Figure 5, if a public safety agency is designing a system using narrowband on the channel adjacent to a TV station, and the narrowband spectrum block is located 3 to 6 MHz away from the edge of the TV channel, then it may be possible to place base stations closer to the TV Grade B contour or at limited locations inside the Grade B contour. Previous FCC Reports have shown that typical NTSC TV receivers have 20 to 40 dB additional protection (selectivity) in the range from 3 to 6 MHz from the channel edge, than in the range 0 to 3 MHz from the channel edge.¹⁵ This additional 20 to 40 dB of protection may allow mobiles to operate up to the TV Grade B contour or at limited locations inside the Grade B contour. Public safety systems must generally be located outside the adjacent channel's TV Grade B contour or in strong TV signal areas to avoid base stations and/or mobiles from interfering with TV reception in fringe or weak TV signal areas. However, there may be interference to land mobile base station and mobile receivers if public safety systems are located in very strong TV signal areas near the TV transmitter site. Terrain based engineering and interference analysis must be conducted using the actual parameters of TV and land mobile stations to determine the limited locations inside the adjacent channel's Grade B contour where public safety systems could be placed without causing or receiving interference.

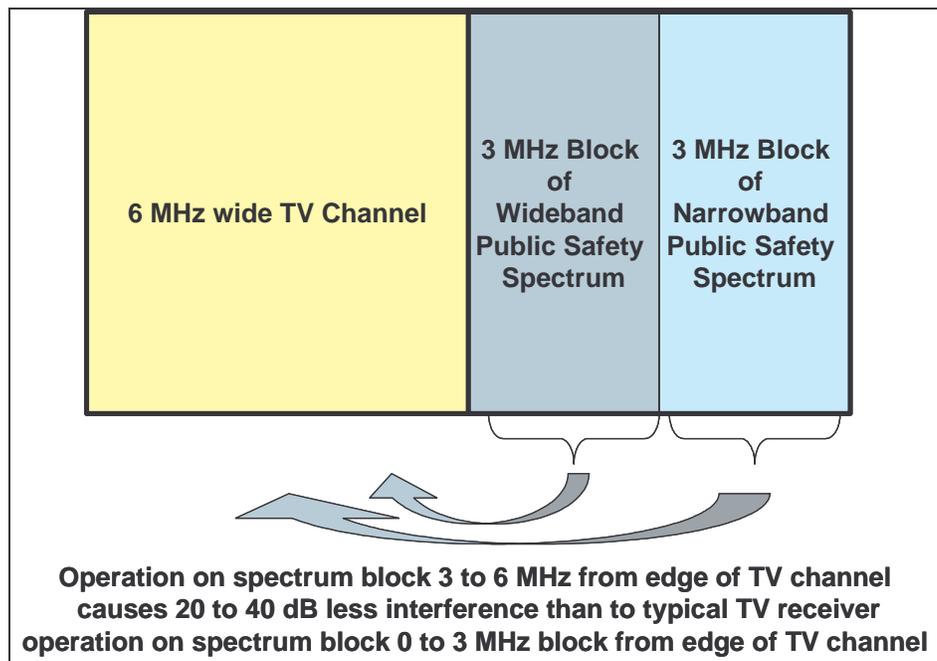


Figure 5

¹⁵ FCC/OET TM87-1 (April 1986) Receiver Susceptibility Measurements Relating to Interference Between UHF Television and Land Mobile Radio Services (Project No. EEB-84-4) by Daniel J. Stanks

Therefore, we conclude the following:

- 1. Case-by-case engineering considering actual TV or land mobile parameters and/or use of partial TV channels may provide some marginal relief in markets near those which contain co-channel or adjacent channel TV stations; but*
- 2. Such steps provide almost no relief for the same market in which a co-channel or adjacent channel TV station is located.*

4 Potential Impact on Channel 62-65/67-69 Viewers

As shown in the previous sections, incumbent television use of the 700 MHz band precludes use of the spectrum by public safety in the majority of densely populated areas, precluding deployment of vitally needed new wideband technology, as well as precluding the ability to expand capacity with 700 MHz systems that can interoperate with their existing 800 MHz systems. Providing a date certain by which broadcasters must vacate this spectrum is the best way to ensure its availability for public safety and to provide public safety with the certainty necessary to effectively plan for deployment of new systems. Given the current state of the transition to digital television, the original December 31, 2006 target date for completion of the transition appears unrealistic. However, providing a date certain for clearing channels 62, 63, 64, 65, 67, 68 and 69 to make this spectrum fully available for use by public safety could be reasonable when one looks at that the actual limited impact to viewers given available options.

Key elements for public safety to begin using this spectrum are in place, if the incumbent broadcasters were moved. The spectrum is allocated, states have already received licenses to use the 700 MHz band and local jurisdictions are engaged in regional planning needed to get a license. The FCC has adopted a 700 MHz narrowband interoperability standard and 700 MHz narrowband portable, mobile and base station equipment which meets that standard is available today. Available 700 MHz mobiles and portables also cover the 800 MHz band, supporting improved interoperability across multiple departments or jurisdictions. A 700 MHz wideband interoperability standard has been published by TIA. The public safety community has already recommended that standard to the FCC. Wideband technology consistent with this standard has been trialed in the public safety environment.

To better understand the potential impact on TV viewers currently tuning into these channels, we reviewed independent industry viewership data available for all of the 75 analog and digital TV stations currently operating in channels 62-65 and 67-69 in the 50 States and Puerto Rico. These are the stations that impact public safety use of the 700 MHz band. Appendix C shows the results of our analysis for all TV stations reporting viewership.¹⁶ It shows the total number of TV households within a TV station's viewing area, identified as the Grade B contour, for that station's Designated Market Area (DMA) and adjacent DMA's that fall within that viewing area. We then

¹⁶ Based on Warren Communications Television and Cable Factbook - Online. About 35% of the TV stations did not report viewership data. Generally these are public broadcasting and other non-commercial stations, which are not required to do so. No data is reported for the 5 stations in Puerto Rico.

compared that to the average number of TV households who actually watch that particular TV station on channels 62-65 or 67-69, at least once during the week. The number of TV households actually watching a channel 62-65 or 67-69 station is further separated into those who watch via cable versus non-cable (over the air or satellite).¹⁷

Results of our analysis show the following:

1. On average, only 14% of the TV households within these stations' viewing areas actually watch at least once during the week.¹⁸ That is, of the households who have the option to watch the TV stations on channels 62-65 and 67-69, on average fewer than 1 out of 7 actually do so at least once a week.
2. 82% of the households, over 4 out of 5, who actually watch channels 62-65 or 67-69 do so over cable. The remainder of the households watch either over the air or via satellite.
3. Of the total TV households within a channel 62-65 or 67-69 station's coverage area, the median number of households watching that station over the air (or via satellite receiver) is only 3%.¹⁹ That is, on average, fewer than 1 out of 30 households in the viewing areas actually watch these stations over the air at least once per week.

The analysis points to two important conclusions: (1) there is an overall low percent of TV households who view the TV channel 62 through 69 stations, except for a few mainly major network stations (2) Of those viewers who do watch channels 62 through 69, a very high percent watch over cable. As a result, if TV channel 62 through 69 stations were required to turn off all over the air broadcasts today, an average of only 3 % of the TV viewing households in each station's viewing area would be adversely affected.

To show the minimal impact on TV viewing households compared to the realizable benefits of improved 700 MHz public safety communications for the entire population in a major metropolitan area, we further analyzed four metropolitan areas. See Appendix D. Highlights of metro analysis show the following:

1. BOSTON – Out of 22 TV stations serving the market, 2 stations (plus another 2 stations that don't serve the Boston market) prevent improved public safety communications for about 7.4 million people. Only an average 3% of the TV households would be impacted if these stations no longer transmitted over the air.
2. CHICAGO - Out of 16 TV stations serving the Chicago Market, 1 station (plus 1 other station that doesn't serve the Chicago market) prevent improved public safety

¹⁷ Data to further separate over the air and satellite use was not provided. The assumption can be made that the over the air viewership is somewhat less than the non-cable totals.

¹⁸ This statistic is the median, meaning that one half of the stations have greater than 14% and half have lower than 14% viewership.

¹⁹ Only 4 stations exceeded 10%, none exceeded 20%.

communications for about 9.3 million people. The Chicago market station is reported to have 100% cable viewership. Data was not reported for the other station, in Fond du Lac, Wisconsin.

3. DALLAS/FT. WORTH - Out of 18 TV stations serving the market, 1 station (plus 1 other station that doesn't serve the Dallas market) prevent improved public safety communications for about 6.2 million people. An average 6% of the TV households would be impacted if these stations no longer transmitted over the air.
4. DETROIT - Out of 10 TV stations serving the market, 1 station (plus 2 that don't serve the Detroit market) prevent improved public safety communications for about 7.4 million people. An average 15% of the TV households would be impacted if these stations no longer transmitted over the air. This statistic is high relative to most cities, because the Detroit station on channel 62 is CBS, which 15% of TV households watch over the air.

Conclusions:

1. *The major pieces are in place to allow public safety to begin using the 700 MHz band. Essentially all that remains is for Congress and the FCC to clear TV incumbents out of the band. Doing so no later than December 31, 2006 would provide public safety with timely access on a nationwide basis.*
2. *Independent television industry data shows that clearing TV from the 700 MHz band will impact only a small percentage of the viewing public.*

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Appendix A

Listing of TV Stations on Channels 62-65 and 67-69

FCC TV Engineering Database - 29 August, 2003						
channel	state	city	callsign	service	analog channel	party_name
62	CA	RIVERSIDE	KRCA	TV		KRCA LICENSE CORP.
62	CA	STOCKTON	KFTL	DT	64	FAMILY STATIONS, INC.
62	FL	VENICE	WVEA-TV	TV		ENTRAVISION HOLDINGS, LLC
62	IN	HAMMOND	WJYS	TV		JOVON BROADCASTING CORPORATION
62	MA	LAWRENCE	WMFP	TV		WSAH LICENSE, INC.
62	MD	FREDERICK	WFPT	TV		MARYLAND PUBLIC BROADCASTING COMMISSION
62	MI	DETROIT	WWJ-TV	TV		CBS BROADCASTING INC.
62	MO	KANSAS CITY	KSMO-TV	TV		KSMO LICENSEE, INC.
62	NC	ASHEVILLE	WASV-TV	TV		MEDIA GENERAL BROADCASTING OF SOUTH CAROLINA HOLDINGS, INC.
62	NC	FAYETTEVILLE	WFPX	TV		PAXSON COMMUNICATIONS LICENSE COMPANY, LLC
62	NJ	ATLANTIC CITY	WWSI	TV		HISPANIC BROADCASTERS OF PHILADELPHIA, L.L.C.
62	NY	KINGSTON	WRNN-TV	TV		WRNN-TV ASSOCIATES LIMITED PARTNERSHIP
62	OK	OKLAHOMA CITY	KOPX	TV		PAXSON OKLAHOMA CITY LICENSE, INC.
62	PA	ALLENTOWN	WLVTV	DT	39	LEHIGH VALLEY PUBLIC TELECOMMUNICATIONS CORP.
62	TX	KILLEEN	KAKW	TV		KAKW LICENSE PARTNERSHIP, L.P.
63	CA	CONCORD	KTNC-TV	DT	42	KTNC LICENSE, LLC
63	CA	OXNARD	KADY-TV	TV		BILTMORE BROADCASTING, L.L.C.
63	FL	BOCA RATON	WPPB-TV	TV		THE SCHOOL BOARD OF BROWARD COUNTY, FLORIDA
63	GA	MONROE	WHSG	TV		TRINITY BROADCASTING NETWORK
63	IN	ANGOLA	WINM	TV		TRI-STATE CHRISTIAN TV, INC.
63	IN	BLOOMINGTON	WIPX	TV		PAXSON INDIANAPOLIS LICENSE, INC.
63	NJ	NEWTON	WMBC-TV	TV		MOUNTAIN BROADCASTING CORPORATION
63	SC	SUMTER	WBHQ	TV		COLUMBIA BROADCASTING, INC.
64	CA	BARSTOW	KHIZ	TV		SUNBELT TELEVISION, INC.
64	CA	STOCKTON	KFTL	TV		FAMILY STATIONS, INC.
64	DE	SEAFORD	WDPB	TV		WHYY, INC.
64	GA	MACON	WGNM	TV		GOOD NEWS TELEVISION
64	MI	KALAMAZOO	WLLA	TV		CHRISTIAN FAITH BROADCAST, INC.
64	NC	KANNAPOLIS	WAXN	TV		WSOC-TV HOLDINGS, INC.
64	OH	CINCINNATI	WSTR-TV	TV		WSTR LICENSEE, INC.
64	PA	PHILADELPHIA	WPVI-TV	DT	6	ABC, INC.
64	PA	SCRANTON	WQPX	TV		PAXSON SCRANTON LICENSE, INC.
64	RI	PROVIDENCE	WNAC-TV	TV		WNAC, LLC
65	CA	LOS ANGELES	KTTV	DT	11	FOX TELEVISION STATIONS, INC.
65	CA	SAN JOSE	KKPX	TV		PAXSON SAN JOSE LICENSE, INC.
65	CT	NEW HAVEN	WEDY	TV		CONNECTICUT PUBLIC BROADCASTING, INC.
65	FL	ORLANDO	WRBW	TV		FOX TELEVISION STATIONS, INC.
65	KY	BEATTYVILLE	WLJC-TV	TV		HOUR OF HARVEST, INC.
65	NJ	VINELAND	WUVP	TV		UNIVISION PHILADELPHIA LLC
65	TX	EL PASO	KTFN	TV		ENTRAVISION HOLDINGS, LLC
65	VA	ASHLAND	WUPV	TV		BELL BROADCASTING, L.L.C.

FCC TV Engineering Database - 29 August, 2003						
channel	state	city	callsign	service	analog_channel	party_name
67	FL	LAKE WORTH	WPXP	TV		PAXSON WEST PALM BEACH LICENSE, INC.
67	KY	MOREHEAD	WUPX-TV	TV		PAXSON LEXINGTON LICENSE, INC.
67	MD	BALTIMORE	WMPB	TV		MARYLAND PUBLIC BROADCASTING COMMISSION
67	NY	SMITHTOWN	WFTY	TV		UNIVISION NEW YORK LLC
67	NY	SPRINGVILLE	WNGS	TV		CAROLINE K. POWLEY D/B/A UNICORN/SPRINGVILLE
67	OH	CANTON	WOAC	TV		WRAY, INC.
67	PA	PHILADELPHIA	WCAU	DT	10	NBC SUBSIDIARY (WCAU-TV), L.P.
67	TX	ALVIN	KFTH	TV		TELEFUTURA HOUSTON LLC
68	AL	BIRMINGHAM	WABM	TV		BIRMINGHAM (WABM-TV) LICENSEE, INC.
68	CA	NOVATO	KTLN-TV	TV		CHRISTIAN COMMUNICATIONS CHICAGOLAND
68	CA	RIVERSIDE	KRCA	DS	62	KRCA LICENSE CORP.
68	FL	COCOA	WBCC	TV		BREVARD COMMUNITY COLLEGE
68	KY	LOUISVILLE	WKMJ-TV	TV		KENTUCKY AUTHORITY FOR EDUCATIONAL TV
68	MA	BOSTON	WPX	TV		PAXSON BOSTON-68 LICENSE, INC.
68	MD	HAGERSTOWN	WJAL	TV		ENTRAVISION HOLDINGS, LLC
68	NJ	NEWARK	WFUT	TV		UNIVISION NEW YORK LLC
68	NY	SYRACUSE	WSYT	TV		WSYT LICENSEE L.P.
68	OH	MANSFIELD	WMFD-TV	TV		MID-STATE TELEVISION, INC.
68	TX	ARLINGTON	KPXD	TV		PAXSON DALLAS LICENSE, INC.
68	VA	GRUNDY	WLFG	TV		LIVING FAITH MINISTRIES, INC.
68	WI	FOND DU LAC	WMMF-TV	TV		PAPPAS TELECASTING OF WISCONSIN, A CALIFORNIA LTD PARTNRSHP
69	CA	SAN DIEGO	KSWB-TV	TV		KSWB INC.
69	FL	HOLLYWOOD	WAMI-TV	TV		TELEFUTURA MIAMI LLC
69	GA	ATLANTA	WUPA	TV		VIACOM STATIONS GROUP OF ATLANTA INC.
69	IN	INDIANAPOLIS	WTBU-TV	TV		BUTLER UNIVERSITY
69	PA	ALLENTOWN	WFMZ-TV	TV		MARANATHA BROADCASTING COMPANY, INC.
69	RI	BLOCK ISLAND	WPXQ	TV		OCEAN STATE TELEVISION, L.L.C.
62	PR	AGUADA	WQHA	DT	50	CONCILIO MISION CRISTIANA FUENTE DE AGUA VIVA, INC.
64	PR	NARANJITO	WECN	TV		ENCUENTRO CHRISTIAN NETWORK
65	PR	NARANJITO	WECN	DT	64	ENCUENTRO CHRISTIAN NETWORK
68	PR	HUMACAO	WVSN	TV		LA CADENA DEL MILAGRO, INC.
69	PR	AQUADILLA	WOLE-TV	DS		WESTERN BROADCASTING CORP. OF PUERTO RICO

Appendix B

Public Safety Spectrum Availability for Top 84 Cities

CITY ²⁰	STATE	AVAILABILITY	CH.63/68 ²¹	CH.64/69 ²¹
New York	NY	BLOCKED	4	4
Los Angeles	CA	BLOCKED	4	4
Chicago	IL	50% BLOCKED	1	0
Houston	TX	50% BLOCKED	1	0
Philadelphia	PA	BLOCKED	7	3
San Diego	CA	BLOCKED	2	5
Phoenix	AZ	OPEN	0	0
San Antonio	TX	OPEN	0	0
Dallas	TX	BLOCKED	1	1
Detroit	MI	BLOCKED	5	5
San Jose	CA	BLOCKED	5	4
San Francisco	CA	BLOCKED	4	4
Indianapolis	IN	BLOCKED	2	3
Jacksonville	FL	OPEN	0	0
Columbus	OH	BLOCKED	1	2
Baltimore	MD	BLOCKED	3	1
El Paso	TX	50% BLOCKED	0	1
Memphis	TN	OPEN	0	0
Austin	TX	50% BLOCKED	1	0
Milwaukee	WI	BLOCKED	1	1
Boston	MA	BLOCKED	4	3
Seattle	WA	OPEN	0	0
Charlotte	NC	BLOCKED	2	2
Washington	DC	50% BLOCKED	3	0
Nashville	TN	OPEN	0	0
Portland	OR	OPEN	0	0
Fort Worth	TX	BLOCKED	1	1
Cleveland	OH	BLOCKED	2	3
Denver	CO	OPEN	0	0
Oklahoma City	OK	50% BLOCKED	1	0
Tucson	AZ	OPEN	0	0
New Orleans	LA	OPEN	0	0
Kansas City	MO	50% BLOCKED	1	0
Long Beach	CA	BLOCKED	3	5
Virginia Beach	VA	OPEN	0	0
Albuquerque	NM	OPEN	0	0
Las Vegas	NV	OPEN	0	0
Sacramento	CA	BLOCKED	4	2
Fresno	CA	OPEN	0	0
Atlanta	GA	BLOCKED	2	3

²⁰ Cities listed by population size

²¹ Number of TV stations blocking Public Safety Access

CITY ²⁰	STATE	AVAILABILITY	CH.63/68 ²¹	CH.64/69 ²¹
Honolulu	HI	OPEN	0	0
Omaha	NE	OPEN	0	0
Tulsa	OK	OPEN	0	0
Miami	FL	BLOCKED	2	2
Mesa	AZ	OPEN	0	0
Oakland	CA	BLOCKED	5	4
Minneapolis	MN	OPEN	0	0
Colorado Springs	CO	OPEN	0	0
Pittsburgh	PA	OPEN	0	0
Wichita	KS	OPEN	0	0
St. Louis	MO	OPEN	0	0
Cincinnati	OH	BLOCKED	2	1
Arlington	TX	BLOCKED	1	1
Santa Ana	CA	BLOCKED	4	5
Toledo	OH	BLOCKED	4	2
Anaheim	CA	BLOCKED	4	5
Buffalo	NY	BLOCKED	2	2
Tampa	FL	50% BLOCKED	1	0
Corpus Christi	TX	OPEN	0	0
Riverside	CA	BLOCKED	4	4
Newark	NJ	BLOCKED	7	5
Raleigh	NC	OPEN	0	0
Anchorage	AK	OPEN	0	0
St. Paul	MN	OPEN	0	0
Louisville	KY	BLOCKED	2	2
Aurora	CO	OPEN	0	0
Birmingham	AL	BLOCKED	1	1
Stockton	CA	BLOCKED	4	4
Lexington	KY	BLOCKED	3	2
St. Petersburg	FL	50% BLOCKED	1	0
Plano	TX	BLOCKED	1	1
Jersey City	NJ	BLOCKED	6	5
Norfolk	VA	OPEN	0	0
Bakersfield	CA	BLOCKED	1	2
Lincoln	NE	OPEN	0	0
Rochester	NY	BLOCKED	2	2
Hialeah	FL	BLOCKED	3	2
Akron	OH	BLOCKED	2	1
Madison	WI	BLOCKED	1	1
Baton Rouge	LA	OPEN	0	0
Fremont	CA	BLOCKED	5	4
Chesapeake	VA	OPEN	0	0
Glendale	AZ	OPEN	0	0
Mobile	AL	OPEN	0	0

	Number of Cities	Percent of top 84 Cities
OPEN	34	40%
50% Blocked	9	11%
100% Blocked	41	49%

Appendix C

Analysis of TV Channels 62-69 Household Viewership²²

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
62	Allentown	PA	DT	Primary	Philadelphia	Total TV Households (HHs)										
62	Asheville	NC	TV	Primary	Greenville-Ashvl	Total TV Households (HHs)	741,990	695,380	46,610	452,620	452,620	0	289,370	242,760	46,610	
				Secondary	Charlotte	HHs Watching Station (wk.avg)	165,228	161,935	3,393	109,312	109,312	0	55,916	52,523	3,393	
				Other DMA	Atlanta		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							22.27%	23.29%	7.28%	66.16%	67.50%		33.84%	32.43%	100.00%	7.54%
62	Atlantic City	NJ	TV	Primary	Philadelphia	Total TV Households (HHs)										
62	Detroit	MI	TV	Primary	Detroit	Total TV Households (HHs)	1,907,040	1,878,670	28,370	1,419,260	1,878,670	6,230	487,780	465,640	22,140	
				Secondary	Flint	HHs Watching Station (wk.avg)	1,100,172	1,097,545	2,627	809,833	808,948	885	290,339	288,597	1,742	
				Other DMA	Toledo		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							57.69%	58.42%	9.26%	73.61%	73.71%	33.69%	26.39%	26.29%	66.31%	15.22%
62	Fayetteville	NC	TV	Primary	Raleigh-Durham	Total TV Households (HHs)	215,840	156,330	59,510	166,360	131,850	34,510	49,480	24,480	25,000	
				Secondary	Greensboro	HHs Watching Station (wk.avg)	37,343	26,475	10,868	30,198	23,359	6,839	7,145	3,116	4,029	
				Other DMA	Greenvl-New Bern		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							17.30%	16.94%	18.26%	80.87%	88.23%	62.93%	19.13%	11.77%	37.07%	3.31%
62	Frederick	MD	TV	Primary	Washington, DC	Total TV Households (HHs)										
62	Hammond	IN	TV	Primary	Chicago	Total TV Households (HHs)	19,960	19,960	0	19,960	19,960	0	0	0	0	
				Secondary		HHs Watching Station (wk.avg)	1,178	1,178	0	1,178	1,178	0	0	0	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							5.90%	5.90%		100.00%	100.00%		0.00%	0.00%		0.00%

²² Based on Warren Communications Television and Cable Factbook - Online. About 35% of the TV stations did not report viewership data. Generally these are public broadcasting and other non-commercial stations, which are not required to do so. No data is reported for the 5 stations in Puerto Rico.

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
62	Kansas City	MO	TV	Primary	Kansas City	Total TV Households (HHs)	837,510	792,080	45,430	570,200	546,760	23,440	267,310	245,320	21,990	
				Secondary	St Joseph, MO	HHs Watching Station (wk.avg)	256,689	250,119	6,570	173,538	169,300	4,238	83,151	80,819	2,332	
				Other DMA	Topeka, KS		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						30.65%	31.58%	14.46%	67.61%	67.69%	64.51%	32.39%	32.31%	35.49%	9.93%	
62	Killeen	TX	TV	Primary	Waco	Total TV Households (HHs)	265,640	255,390	10,250	187,800	187,800	0	77,840	67,590	10,250	
				Secondary	Austin	HHs Watching Station (wk.avg)	64,623	64,100	523	50,004	50,004	0	14,619	14,096	523	
				Other DMA	Dallas		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						24.33%	25.10%	5.10%	77.38%	78.01%		22.62%	21.99%	100.00%	5.50%	
62	Kingston	NY	TV	Primary	New York City	Total TV Households (HHs)										
62	Lawrence	MA	TV	Primary	Boston	Total TV Households (HHs)										
62	Oklahoma City	OK	TV	Primary	Oklahoma City	Total TV Households (HHs)	534,390	533,250	1,140	364,250	364,250	0	170,140	169,000	1,140	
				Secondary	Tulsa	HHs Watching Station (wk.avg)	78,783	78,716	67	47,126	47,126	0	31,657	31,590	67	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						14.74%	14.76%	5.88%	59.82%	59.87%		40.18%	40.13%	100.00%	5.92%	
62	Riverside	CA	TV	Primary	Los Angeles	Total TV Households (HHs)	307,710	307,710		0	0		307,710	307,710		
				Secondary		HHs Watching Station (wk.avg)	15,693	15,693		0	0		15,693	15,693		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						5.10%	5.10%		0.00%	0.00%		100.00%	100.00%		5.10%	
62	Stockton	CA	DT	Primary	Sacramento	Total TV Households (HHs)										
62	Venice	FL	TV	Primary	Tampa	Total TV Households (HHs)	301,090	301,090		301,090	301,090		0	0		
				Secondary		HHs Watching Station (wk.avg)	17,570	17,570		17,570	17,570		0	0		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						5.84%	5.84%		100.00%	100.00%		0.00%	0.00%		0.00%	

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
63	Angola	IN	TV	Primary	Ft Wayne	Total TV Households (HHs)	18,590	18,590		12,280	12,280		6,310	6,310		
				Secondary	Toledo	HHs Watching Station (wk.avg)	1,111	1,111		783	783		328	328		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						5.98%	5.98%		70.48%	70.48%		29.52%	29.52%		1.76%	
63	Bloomington	IN	TV	Primary	Indianapolis	Total TV Households (HHs)	814,840	808,540	6,300	602,090	602,090	0	212,750	206,450	6,300	
				Secondary	Terre Haute	HHs Watching Station (wk.avg)	105,335	103,955	1,380	80,212	80,212	0	25,123	23,743	1,380	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						12.93%	12.86%	21.90%	76.15%	77.16%		23.85%	22.84%	100.00%	3.08%	
63	Boca raton	FL	TV	Primary	Miami	Total TV Households (HHs)										
63	Concord	CA	DT	Primary	San Francisco	Total TV Households (HHs)	31,070	31,070	0	31,070	31,070	0	0	0	0	
				Secondary	Sacramento	HHs Watching Station (wk.avg)	2,113	2,113	0	2,113	2,113	0	0	0	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						6.80%	6.80%		100.00%	100.00%		0.00%	0.00%		0.00%	
63	Monroe	GA	TV	Primary	Atlanta	Total TV Households (HHs)	443,410	438,950	4,460	321,180	321,180	0	122,230	117,770	4,460	
				Secondary	Greenville-Spartnbrg	HHs Watching Station (wk.avg)	30,755	30,340	415	22,193	22,193	0	8,562	8,147	415	
				Other DMA	Macon		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						6.94%	6.91%	9.30%	72.16%	73.15%		27.84%	26.85%	100.00%	1.93%	
63	Newton	NJ	TV	Primary	New York City	Total TV Households (HHs)										
63	Oxnard	CA	TV	Primary	Los Angeles	Total TV Households (HHs)	324,880	123,620	201,260	324,880	123,620	201,260	0	0	0	
				Secondary	Santa Barbara	HHs Watching Station (wk.avg)	40,004	17,060	22,944	40,004	17,060	22,944	0	0	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						12.31%	13.80%	11.40%	100.00%	100.00%	100.00%	0.00%	0.00%		0.00%	
63	Sumter	SC	TV	Primary	Columbia, SC	Total TV Households (HHs)	264,890	264,890		188,170	188,170		76,720	76,720		
				Secondary	Charlotte, NC	HHs Watching Station (wk.avg)	51,113	51,113		46,263	46,263		4,850	4,850		
				Other DMA	Florence, SC		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						19.30%	19.30%		90.51%	90.51%		9.49%	9.49%		1.83%	

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
64	Barstow	CA	TV	Primary	Los Angeles	Total TV Households (HHs)										
64	Cincinnati	OH	TV	Primary	Cincinnati	Total TV Households (HHs)	840,710	806,520	34,190	537,410	537,410	0	303,300	269,110	34,190	
				Secondary	Dayton	HHs Watching Station (wk.avg)	313,084	309,678	3,406	202,925	202,925	0	110,159	106,753	3,406	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							37.24%	38.40%	9.96%	64.81%	65.53%		35.19%	34.47%	100.00%	13.10%
64	Kalamazoo	MI	TV	Primary	Grand Rapids	Total TV Households (HHs)	13,900	13,900		13,900	13,900		0	0		
				Secondary		HHs Watching Station (wk.avg)	1,056	1,056		1,056	1,056		0	0		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							7.60%	7.60%		100.00%	100.00%		0.00%	0.00%		0.00%
64	Kannapolis	NC	TV	Primary	Charlotte	Total TV Households (HHs)	899,560	888,830	10,730	641,640	641,640	0	257,920	247,190	10,730	
				Secondary	Greensboro	HHs Watching Station (wk.avg)	238,533	237,977	556	190,189	190,189	0	48,344	47,788	556	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							26.52%	26.77%	5.18%	79.73%	79.92%		20.27%	20.08%	100.00%	5.37%
64	Macon	GA	TV	Primary	Macon	Total TV Households (HHs)	136,750	136,750		110,610	110,610		26,140	26,140		
				Secondary		HHs Watching Station (wk.avg)	26,267	26,267		22,952	22,952		3,315	3,315		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							19.21%	19.21%		87.38%	87.38%		12.62%	12.62%		2.42%
64	Philadelphia	PA	DT	Primary	Philadelphia	Total TV Households (HHs)	3,350,660	2,660,220	690,440	2,758,880	2,165,890	592,990	591,780	494,330	97,450	
				Secondary	New York City	HHs Watching Station (wk.avg)	2,204,706	2,045,723	158,983	1,801,239	1,658,988	142,251	403,467	386,735	16732	
				Other DMA	Harrisburg, PA		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							65.80%	76.90%	23.03%	81.70%	81.10%	89.48%	18.30%	18.90%	10.52%	12.04%
64	Providence	RI	TV	Primary	Providence, RI	Total TV Households (HHs)	795,420	600,730	194,690	637,420	491,990	145,430	158,000	108,740	49,260	
				Secondary	Boston	HHs Watching Station (wk.avg)	256,824	242,199	14,625	211,659	200,170	11,489	45,165	42,029	3,136	
				Other DMA	Hartford, CT		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							32.29%	40.32%	7.51%	82.41%	82.65%	78.56%	17.59%	17.35%	21.44%	5.68%

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
64	Scranton	PA	TV	Primary	Scranton, PA	Total TV Households (HHs)	437,340	437,340		381,320	381,320		56,020	56,020		
				Secondary		HHs Watching Station (wk.avg)	58,169	58,169		52,355	52,355		5,814	5,814		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							13.30%	13.30%		90.00%	90.00%		10.00%	10.00%		1.33%
64	Seaford	DE	TV	Primary	Salisbury, MD	Total TV Households (HHs)										
64	Stockton	CA	TV	Primary	Sacramento	Total TV Households (HHs)	11,450	11,450		11,450	11,450		0	0		
				Secondary	San Francisco	HHs Watching Station (wk.avg)	572	572		572	572		0	0		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							5.00%	5.00%		100.00%	100.00%		0.00%	0.00%		0.00%
65	Ashland	VA	TV	Primary	Richmond, VA	Total TV Households (HHs)	408,550	405,570	2,980	316,980	314,000	2,980	91,570	91,570	0	
				Secondary	Washington, DC	HHs Watching Station (wk.avg)	120,291	119,999	292	99,249	98,957	292	21,042	21,042	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							29.44%	29.59%	9.80%	82.51%	82.46%	100.00%	17.49%	17.54%		5.15%
65	Beattyville	KY	TV	Primary	Lexington, KY	Total TV Households (HHs)	43,660	43,660		42,360	42,360		1,300	1,300		
				Secondary		HHs Watching Station (wk.avg)	5,217	5,217		5,122	5,122		95	95		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							11.95%	11.95%		98.18%	98.18%		1.82%	1.82%		0.22%
65	El Paso	TX	TV	Primary	El Paso	Total TV Households (HHs)										
65	Los Angeles	CA	DT	Primary	Los Angeles	Total TV Households (HHs)										
65	New Haven	CT	TV	Primary	New Haven	Total TV Households (HHs)										
65	Orlando	FL	TV	Primary	Orlando	Total TV Households (HHs)	1,137,460	1,137,460		888,030	888,030		249,430	249,430		
				Secondary	Tampa	HHs Watching Station (wk.avg)	299,308	299,308		243,466	243,466		55,842	55,842		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							26.31%	26.31%		81.34%	81.34%		18.66%	18.66%		4.91%

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
65	San Jose	CA	TV	Primary	San Francisco	Total TV Households (HHs)	2,205,890	1,985,900	219,990	1,996,560	1,835,880	160,680	209,330	150,020	59,310	
				Secondary	Sacramento	HHs Watching Station (wk.avg)	177,690	157,678	20,012	163,163	148,077	15,086	14,527	9,601	4,926	
				Other DMA	Monterey		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							8.06%	7.94%	9.10%	91.82%	93.91%	75.38%	8.18%	6.09%	24.62%	0.66%
65	Vineland	NJ	TV	Primary	Philadelphia	Total TV Households (HHs)										
67	Alvin	TX	TV	Primary	Houston	Total TV Households (HHs)										
67	Baltimore	MD	TV	Primary	Baltimore	Total TV Households (HHs)										
67	Canton	OH	TV	Primary	Cleveland	Total TV Households (HHs)										
67	Lake worth	FL	TV	Primary	West Palm Beach	Total TV Households (HHs)	645,200	645,200		586,320	586,320		58,880	58,880		
				Secondary		HHs Watching Station (wk.avg)	97,712	97,712		90,279	90,279		7,433	7,433		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							15.14%	15.14%		92.39%	92.39%		7.61%	7.61%		1.15%
67	Monterey	CA	TV	Primary	Monterey	Total TV Households (HHs)	229,450	229,450		170,140	170,140		59,310	59,310		
				Secondary		HHs Watching Station (wk.avg)	31,499	31,499		20,726	20,726		10,773	10,773		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							13.73%	13.73%		65.80%	65.80%		34.20%	34.20%		4.70%
67	Morehead	KY	TV	Primary	Lexington	Total TV Households (HHs)										
67	Philadelphia	PA	DT	Primary	Philadelphia	Total TV Households (HHs)	3,747,300	2,660,220	1,087,080	3,156,460	2,165,890	990,570	590,840	494,330	96,510	
				Secondary	New York City	HHs Watching Station (wk.avg)	2,097,665	1,930,360	167,305	1,700,848	1,550,971	149,877	396,817	379,389	17,428	
				Other DMA	Harrisburg, PA		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							55.98%	72.56%	15.39%	81.08%	80.35%	89.58%	18.92%	19.65%	10.42%	10.59%
67	Smithtown	NY	TV	Primary	New York City	Total TV Households (HHs)										
67	Springville	NY	TV	Primary	Buffalo	Total TV Households (HHs)	372,970	372,970		372,970	372,970		0	0		
				Secondary		HHs Watching Station (wk.avg)	53,445	53,445		53,445	53,445		0	0		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
						14.33%	14.33%		100.00%	100.00%		0.00%	0.00%		0.00%	

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
67	Troy	AL	TV	Primary	Montgomery	Total TV Households (HHs)										
68	Arlington	TX	TV	Primary	Dallas	Total TV Households (HHs)	2,025,630	1,973,870	51,760	1,091,230	1,039,470	51,760	934,400	934,400	0	
				Secondary		HHs Watching Station (wk.avg)	243,057	237,363	5,694	118,704	113,010	5,694	124,353	124,353	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							12.00%	12.03%	11.00%	48.84%	47.61%	100.00%	51.16%	52.39%		6.14%
68	Birmingham	AL	TV	Primary	Birmingham	Total TV Households (HHs)	605,490	605,490		443,050	443,050		162,440	162,440		
				Secondary		HHs Watching Station (wk.avg)	175,015	175,015		141,439	141,439		33,576	33,576		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							28.90%	28.90%		80.82%	80.82%		19.18%	19.18%		5.55%
68	Boston	MA	TV	Primary	Boston	Total TV Households (HHs)	1,786,790	1,786,790		1,493,840	1,493,840		292,950	292,950		
				Secondary	Providence, RI	HHs Watching Station (wk.avg)	203,657	203,657		162,064	162,064		41,593	41,593		
				Other DMA	Nartford		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							11.40%	11.40%		79.58%	79.58%		20.42%	20.42%		2.33%
68	Cocoa	FL	TV	Primary	Orlando	Total TV Households (HHs)										
68	Fond du Lac	WI	TV	Primary	Green Bay, WI	Total TV Households (HHs)										
68	Grundy	VA	TV	Primary	Tri-Cities, TN-VA	Total TV Households (HHs)	254,310	215,720	38,590	252,160	213,570	38,590	2,150	2,150	0	
				Secondary	Charleston	HHs Watching Station (wk.avg)	20,469	17,687	2,782	20,224	17,442	2,782	245	245	0	
				Other DMA	Blue Field		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							8.05%	8.20%	7.21%	98.80%	98.61%	100.00%	1.20%	1.39%		0.10%
68	Hagerstown	MD	TV	Primary	Washington, DC	Total TV Households (HHs)	266,110	229,620	36,490	215,120	193,290	21,830	50,990	36,330	14,660	
				Secondary	Johnstown, PA	HHs Watching Station (wk.avg)	38,347	35,664	2,683	32,956	31,035	1,921	5,391	4,629	762	
				Other DMA	Harrisburg, PA		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							14.41%	15.53%	7.35%	85.94%	87.02%	71.60%	14.06%	12.98%	28.40%	2.03%
68	Louisville	KY	TV	Primary	Louisville	Total TV Households (HHs)										

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
68	Mansfield	OH	TV	Primary	Cleveland	Total TV Households (HHs)	79,450	56,680	22,770	54,890	38,100	16,790	24,560	18,580	5,980	
				Secondary	Columbus	HHs Watching Station (wk.avg)	12,328	9,973	2,355	8,568	6,972	1,596	3,760	3,001	759	
				Other DMA	Toledo		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							15.52%	17.60%	10.34%	69.50%	69.91%	67.77%	30.50%	30.09%	32.23%	4.73%
68	Newark	NJ	TV	Primary	New York City	Total TV Households (HHs)										
68	Novato	CA	TV	Primary	San Francisco	Total TV Households (HHs)										
68	Riverside	CA	DT	Primary	Los Angeles	Total TV Households (HHs)	307,710	307,710		0	0		307,710	307,710		
				Secondary		HHs Watching Station (wk.avg)	15,693	15,693		0	0		15,693	15,693		
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							5.10%	5.10%		0.00%	0.00%		100.00%	100.00%		5.10%
68	Syracuse	NY	TV	Primary	Syracuse	Total TV Households (HHs)	408,330	358,280	50,050	291,360	283,230	8,130	116,970	75,050	41,920	
				Secondary	Utica	HHs Watching Station (wk.avg)	184,884	180,234	4,650	153,855	152,933	922	31,029	27,301	3,728	
				Other DMA	Rochester		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							45.28%	50.31%	9.29%	83.22%	84.85%	19.83%	16.78%	15.15%	80.17%	7.60%
69	Allentown	PA	TV	Primary	Philadelphia	Total TV Households (HHs)	1,468,920	1,371,020	97,900	1,359,770	1,284,640	75,130	109,150	86,380	22,770	
				Secondary	New York City	HHs Watching Station (wk.avg)	160,179	148,703	11,476	148,992	140,343	8,649	11,187	8,360	2,827	
				Other DMA	Scranton, PA		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							10.90%	10.85%	11.72%	93.02%	94.38%		6.98%	5.62%	24.63%	0.76%
69	Atlanta	GA	TV	Primary	Atlanta	Total TV Households (HHs)	1,712,010	1,698,540	13,470	1,333,360	1,323,560	9,800	378,650	374,980	3,670	
				Secondary		HHs Watching Station (wk.avg)	523,237	520,439	2,798	421,713	419,139	2,574	101,524	101,300	224	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							30.56%	30.64%	20.77%	80.60%	80.54%	91.99%	19.40%	19.46%	8.01%	5.93%
69	Block Island	RI	TV	Primary	Providence, RI	Total TV Households (HHs)	519,520	519,520	0	491,990	491,990	0	27,530	27,530	0	
				Secondary	Boston	HHs Watching Station (wk.avg)	68,144	68,144	0	64,048	64,048	0	4,096	4,096	0	
				Other DMA	Hartford, CT		% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							13.12%	13.12%		93.99%	93.99%		6.01%	6.01%		0.79%

Channel	City	State	TV vs. DTV	Station's Nielsen Designated Market Area's (DMA)			Total TV Households within Grade B contour			Cable TV Households within Grade B contour			Non-Cable TV Households within Grade B Contour			Percentage of Total Households Watching Station over Non-cable
							Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	Total	Within Station's DMA	Other DMA	
69	Hollywood	FL	TV	Primary	Miami	Total TV Households (HHs)	1,546,680	1,546,680	0	1,171,610	1,171,610	0	375,070	375,070	0	
				Secondary	West Palm Beach	HHs Watching Station (wk.avg)	179,752	179,752	0	136,437	136,437	0	43,315	43,315	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							11.62%	11.62%		75.90%	75.90%		24.10%	24.10%		2.80%
69	Indianapolis	IN	TV	Primary	Indianapolis	Total TV Households (HHs)										
69	San Diego	CA	TV	Primary	San Diego	Total TV Households (HHs)	975,690	975,690	0	826,160	826,160	0	149,530	149,530	0	
				Secondary		HHs Watching Station (wk.avg)	375,963	375,963	0	323,029	323,029	0	52,934	52,934	0	
				Other DMA			% HHs watching station			% Watching Station via Cable			% Watching Station via Non-cable			
							38.53%	38.53%		85.92%	85.92%		14.08%	14.08%		5.43%
62	Aguada	PR	DT	Primary		Total TV Households (HHs)										
64	Naranjito	PR	TV	Primary		Total TV Households (HHs)										
65	Naranjito	PR	DT	Primary		Total TV Households (HHs)										
68	Humaco	PR	TV	Primary		Total TV Households (HHs)										
69	Aquadilla	PR	DT	Primary		Total TV Households (HHs)										

Appendix D

Major Metropolitan Metro Impact Analysis

Channel	TV Station	TV City	Affiliation	Total TV Households in Viewing Area (in station's Grade B contour)	Households watching station (average weekly)	% of Total TV Households watching station (average weekly)	Households watching station by cable (average weekly)	% of Viewing Households watching by cable (average weekly)	Households watching station over non-cable (average weekly)	% of Total TV Households watching over non-cable (average weekly)
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Boston

62	WMFP	Lawrence, MA	Homeshop	Data not reported		Data not reported		Data not reported		Data not reported
64	WNAC	Providence, RI	FOX	795,420	256,824	32%	211,659	82%	45,165	6.00%
68	WBPX	Boston, MA	PAX	1,786,790	203,657	11%	162,064	80%	41,593	2.00%
69	WPXQ	Block Island, RI	PAX	519,520	68,144	13%	64,048	94%	4,096	1.00%
Total				3,101,730	528,625	17%	437,771	83%	90,854	2.93%

Chicago

62	WJYS	Hammond IN/Chicago IL	Independent	19,960	1,178	6%	1,178	100%	0	0.00%
68	WMMF	Fond du Lac, WI	Family Net	Data not reported		Data not reported		Data not reported		Data not reported
Total				19,960	1,178	6%	1,178	100%	0	0.00%

Dallas/Fort Worth

62	KAKW	Waco/Killeen, TX	UPN/WB	265,640	64,100	24%	50,004	77%	14,619	6.00%
68	KPXD	Arlington, TX	PAX	2,025,630	243,057	12%	118,704	49%	124,353	6.00%
Total				2,291,270	307,157	13%	168,708	55%	138,972	6.07%

Detroit

62	WWJ	Detroit	CBS	1,907,040	1,100,172	58%	809,833	74%	290,339	15.00%
63	WINM	Angola, IN	TBN	18,590	1,111	6%	783	70%	328	2.00%
68	WMFD	Mansfield, OH	ANC	79,450	12,328	16%	8,568	70%	3,760	5.00%
Total				1,986,490	1,113,611	56%	819,184	74%	294,427	14.82%

Note: Canadian stations also impact Public Safety use in Detroit