

July 27, 2011

**VIA ELECTRONIC DELIVERY**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street, SW  
Room TWA325  
Washington, DC 20554

**Re: Notice of *Ex Parte* Presentations  
WT Docket No. 11-18; RM-11592; RM-11626**

Dear Ms. Dortch:

On July 25, 2011, Vulcan Wireless LLC (“Vulcan”) representatives Scott Wills, Paul Nagle, Paul Kolodzy, and Michele Farquhar met with Amy Levine, Senior Counsel & Legal Advisor to Chairman Genachowski; and Commissioner Clyburn, her legal advisor Louis Peraertz, and Nathaniel Brown, an intern in Commissioner Clyburn’s office. Separately, the Vulcan team (except for Mr. Kolodzy) met with Angela Giancarlo, Chief of Staff & Senior Legal Advisor to Commissioner McDowell; Mark Stone, Chief of Staff to Commissioner Copps; and Rick Kaplan, Chief of the Wireless Telecommunications Bureau, supporting (1) the need for a 700 MHz interoperability condition on the AT&T-Qualcomm acquisition and (2) the Channel 51 freeze petition filed by CTIA and RCA.

The Vulcan representatives discussed Vulcan’s concerns as a Lower 700 MHz A Block licensee and the circumstances that are dramatically impeding A Block broadband deployment, as described in the attached detailed presentation. In particular, they noted the lack of interoperable equipment for the Lower 700 MHz band and the absence of any 4G mobile devices that can operate on the A Block, as well as the problems posed by the ongoing licensing activity regarding Channel 51 broadcast stations. They also stressed the need for the FCC to take action expeditiously, noting that unlike incumbent carriers, new entrants without existing operations and base stations require at least 23 months to deploy services and must start now to meet the June 2013 interim build-out requirement.

Specifically, they discussed how the unique nature of the 700 MHz band and market consolidation have led to a skewed 3GPP process, which has resulted in fractured and disaggregated spectrum, a captive vendor community, isolated and orphaned spectrum holders, and harm to competition and consumers. They also explained that the AT&T-Qualcomm transaction would substantially threaten interoperability by magnifying AT&T’s market power in the Lower 700 MHz band and creating new interference obstacles for Lower 700 MHz A Block licensees. As shown in the attached slide, they discussed potential interference scenarios created by AT&T’s proposed acquisition of the 700 MHz D & E Block licenses, which could negatively impact A Block license holders. They also explained that there would be no significant technical differences separating Band Class 12 and Band Class 17 post-transaction, as described in the attached slide and technical white paper. As a result, they encouraged the Commission to adopt a narrowly

tailored, transaction-specific condition that would require any mobile device manufactured after June 2013 that is operating on paired Lower 700 MHz band spectrum to operate on all Lower 700 MHz band paired spectrum.

In addition, the representatives discussed the need for a freeze on further broadcast applications and licensing on Channel 51, noting the sharply escalated Channel 51 licensing activity that has occurred since Auction 73 closed and how it is complicating interference issues and impeding A Block network planning and design. A Block licensees cannot plan effectively for unknown future broadcast operations that either need to be protected or that they need to be protected from, and having to accommodate such operations makes A Block mobile broadband deployments unfairly cost-prohibitive.

The representatives also discussed how the Commission's broadcast spectrum repacking and incentive auction proposals, which emerged well after Auction 73 closed, have had the unintended effect of creating business uncertainty for Channel 51 broadcasters and have disincentivized Channel 51 broadcasters from relocating. For example, the potential for Channel 51 broadcasters to receive future incentive auction payments has made it much more difficult, if not impossible, for A Block licensees to enter into voluntary relocation agreements with Channel 51 broadcasters. It has also imposed unnecessary additional costs on A Block licensees and created damaging uncertainty that prevents A Block licensees from conducting the business and network planning needed to deploy broadband in their licensed areas (or even from garnering the full and timely ecosystem support that is essential for equipment development).

If not addressed, these interoperability problems and Channel 51 licensing and interference concerns will cause even further harm to A Block licensees and consumers and negatively impact participation in, as well as revenues from, future spectrum auctions. Therefore, the Commission should take action immediately to: (1) impose an interoperability condition on the AT&T-Qualcomm acquisition; (2) follow-up on its 700 MHz interoperability workshop; (3) grant the pending freeze petition for Channel 51 and facilitate clearing the channel; and (4) defer the build-out deadlines for A Block licensees until these problems are resolved.

Pursuant to Section 1.1206(b) of the Commission's rules, I am filing this notice electronically in the above-referenced docket. Please contact me directly with any questions.

Respectfully submitted,

*/s/ Michele C. Farquhar*

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# **Recommendations to Ensure 700 MHz A-Block Deployment**

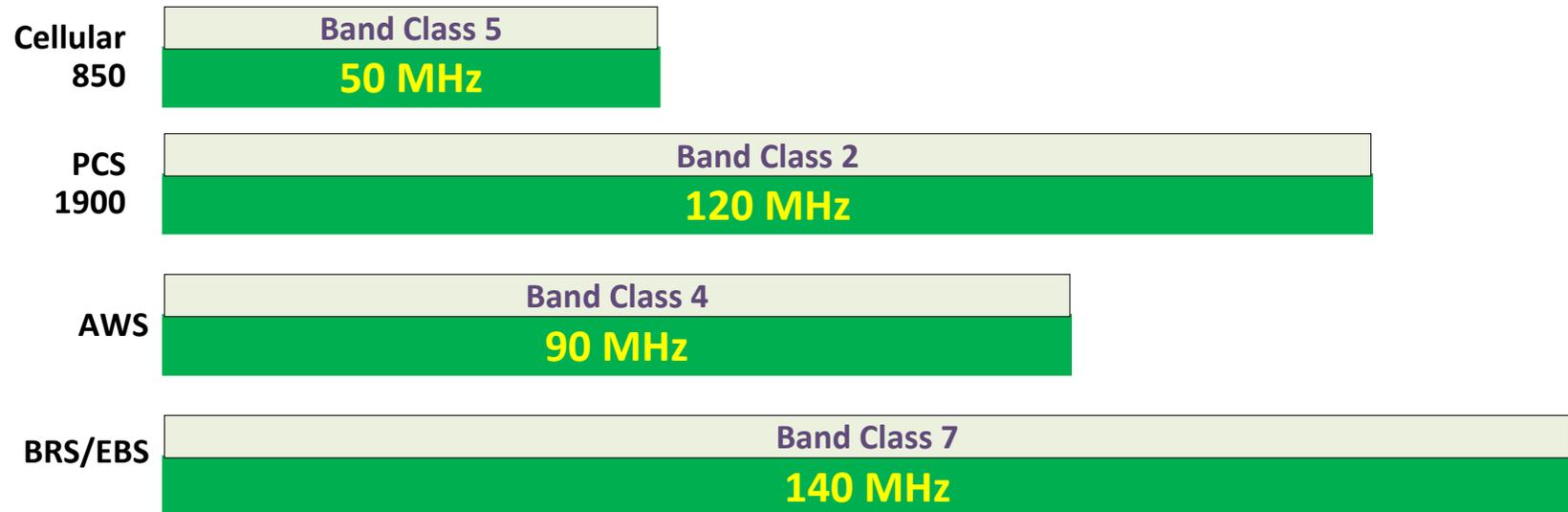
Vulcan Wireless

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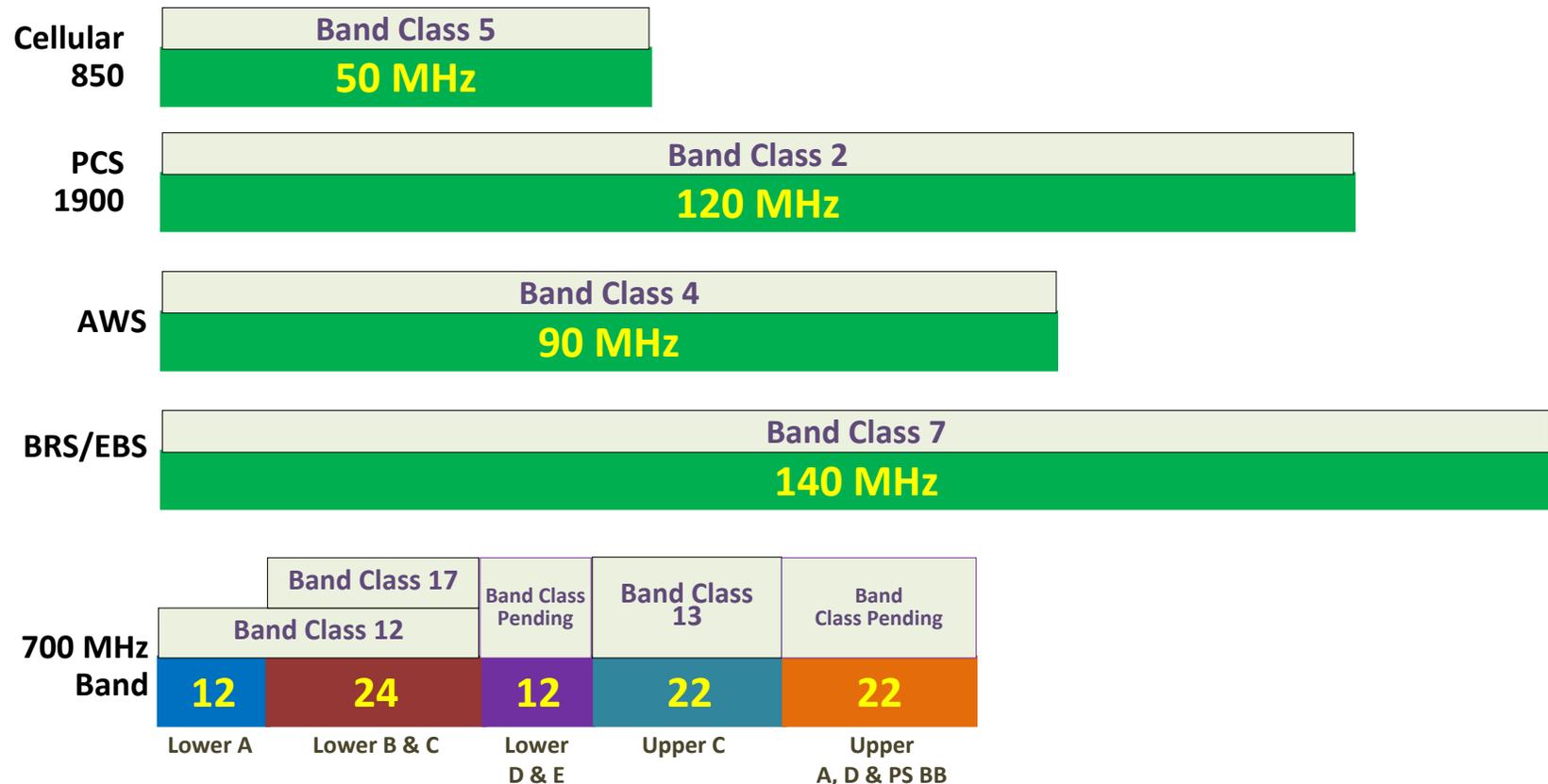
# Overview

- **There are two major impediments to 700 MHz A-Block licensees to provide competitive wireless services:**
  - Lack of interoperable equipment and no 4G mobile devices
  - Channel 51 broadcast stations (ever-shifting environment thwarts deployment)
- **The FCC can, and should, take action immediately to solve these problems**
  - The FCC should impose interoperability as a license acquisition condition of the AT&T-Qualcomm acquisition
  - The FCC should follow-up on its 700 MHz interoperability workshop
  - The FCC should grant the freeze petition for Channel 51 and facilitate clearing the channel
  - The FCC should also defer the build-out deadlines for A-Block licensees until these problems are resolved

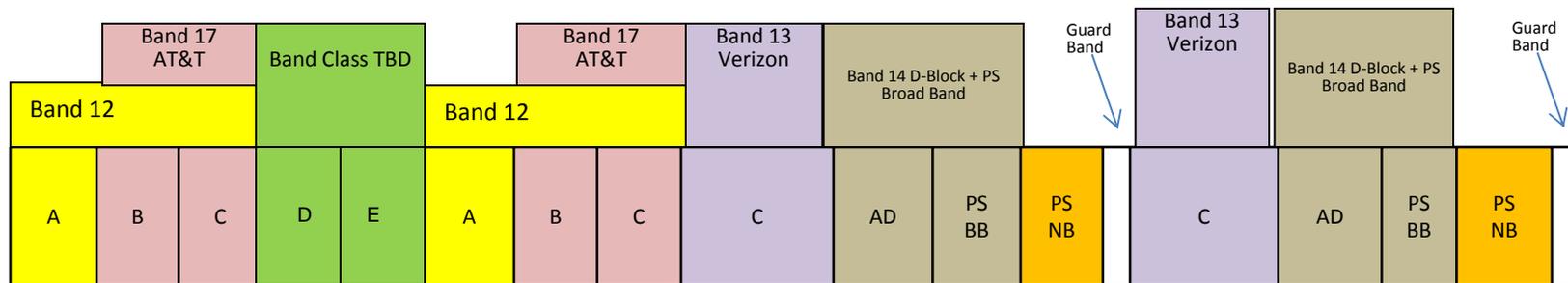
# The Need for Interoperable 700 MHz Devices



- **Every historical mobile wireless band class in the US has a unified band plan.** Traditionally, vendors came together in 3GPP to establish a single band class across individual spectrum allocations as a common technical foundation for all service providers within the band, driving economies of scale and interoperability.
- **Unified Band Plans have contributed significantly to ecosystem development, industry growth and consumer choice.** Without a common band plan, consumers can never switch carriers with a phone and data roaming is not possible.



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- **Unified Band Plans have contributed significantly to ecosystem development, industry growth and consumer choice.** Without a common band plan, consumers can never switch carriers with a phone and data roaming is not possible.
- **The 3GPP process has always been used to aggregate uses, but with 700 MHz, it has been used to force disaggregation.** The unique use of 700 MHz frequencies exclusively in the US has given Verizon and AT&T (the dominant 700 MHz spectrum holders) excessive influence, as there are no large international carriers using the same spectrum. This has led to unprecedented band class fragmentation and delays, slower ecosystem development and less consumer choice.



**The Problem:** The unique nature of the 700 MHz band (with no matching international allocation) and market consolidation have led to a skewed 3GPP process, which has resulted in:

- 1: Fractured and disaggregated spectrum
- 2: A captive vendor community
- 3: Isolated/orphaned spectrum holders
- 4: Harm to competition and consumers

# Activity Timeline for 700 MHz Band Class

## Pre- and Post- Auction 73

December 2007	January 24, 2008	March 18, 2008	April 5 - 9, 2008	June 16 - 20, 2008	September 18 - 22, 2008	September 2009 (still pending)	December 2010
<ul style="list-style-type: none"> <li>The 3GPP Standards Body had only used Band Class 12 to develop standards for all Lower 700 MHz A, B &amp; C spectrum blocks. No other band class had ever been used in 3GPP to set standards for any deployed wireless technology governing those spectrum blocks.</li> </ul>	<ul style="list-style-type: none"> <li>Auction 73 opens</li> </ul>	<ul style="list-style-type: none"> <li>Auction 73 closes</li> </ul>	<ul style="list-style-type: none"> <li>Motorola submits paper to 3GPP to evaluate the need for a new Band 17. It eliminates the Lower 700 MHz A Block and only includes Blocks B and C, which orphans A Block, significantly curtails manufacturer support for A Block and eliminates interoperability.</li> </ul>	<ul style="list-style-type: none"> <li>Ericsson presents discussion paper arguing against Band 17 and raises concerns <i>"which goes against economies of scales and may lead to market fragmentation"</i>.</li> <li>AT&amp;T presents discussion paper arguing in favor of Band 17.</li> <li>Ericsson eventually withdraws their protests, clearing the path for Band 17.</li> </ul>	<ul style="list-style-type: none"> <li>(6 months after the close of Auction 73) – 3GPP ratifies Release 8 with new Band Classes for LTE:</li> <li>Bands include: <ul style="list-style-type: none"> <li>17 - Lower B/C (primarily for AT&amp;T owned Spectrum)</li> <li>13 - Upper C (exclusively for Verizon Spectrum Block)</li> <li>12 - Lower A/B/C (loosing support from AT&amp;T for B &amp; C)</li> <li>14 - for Upper D &amp; Public Safety Broadband</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>700 MHz Block A Good Faith Purchasers Alliance Petitions for Rulemaking on Interoperability</li> </ul>	<ul style="list-style-type: none"> <li>3GPP modifies Releases 8 &amp; 9 to include 1 MHz Guard Band within Band 12 to address potential interference issues and gains some limited manufacturer support.</li> </ul> <p>This same month Verizon announces deployment of their LTE 4G network covering over 110,000,000 pops.</p>

➤ Heading into Auction 73, there was no indication that there would not be interoperability. Prior to the auction, the focus had been on Band Class 12.

➤ This timeline shows how quickly AT&T moved post-auction (only 3 weeks) to establish its own band class. And how a major vendor, which had argued against fragmenting the marketplace, changed positions.

➤ It has taken a long time for the marginalized A-Block licensees to get vendors to develop devices for its stand-alone band class. By the end of this year, both VZ and AT&T will have deployed 700 MHz spectrum to their customers, while the A-Block licensees are still waiting for a workable prototype.

## **The AT&T-Qualcomm License Transfer Would Substantially Threaten Interoperability:**

- The AT&T-Qualcomm acquisition magnifies AT&T's market power in the Lower 700 MHz band and furthers its undue influence within the 3GPP process.
- The transaction also creates new interference obstacles for lower A-Block licensees, threatens their ability to achieve interoperability, and could enable AT&T to circumvent the FCC's roaming decisions.
- The FCC should not approve the proposed license transfer without transaction-specific conditions to remedy these related interoperability concerns.

## The Solution – 700 MHz Interoperability

***AT&T-Qualcomm Transaction-Specific Condition – Any mobile device manufactured after June 2013 operating on paired lower 700 MHz band spectrum must operate on all lower 700 MHz band paired spectrum.***

***Not onerous, and could also be adopted through a rulemaking proceeding***

- No stranded investment because no impact on current handset sales
- New phones are constantly developed and deployed

***A solution that will evolve as mobile wireless services evolve***

- Doesn't force AT&T or VZ into a single configuration, but imposes a service condition. Allows them to innovate and develop new handsets just as in other mobile bands (which all have a uniform band class).
- Ensures that A-Block licensees can get devices, and that their customers can roam across the lower 700 MHz band.

***Interference is not an impediment to Interoperability***

- The FCC workshop demonstrated that there is no technical barrier to interoperability – only business decisions prevent it
- Post-transaction there are no significant technical differences between Band Class 12 (lower A,B&C Blocks) vs. Band Class 17 (lower B&C)
- Band Class 12 could be substituted for Band Class 17 without impacting the number of bands on a chip

## Interoperability is Clearly in the Public Interest

**Prerequisite to Competition.** An interoperability requirement will ensure that AT&T and Verizon, which will hold the vast majority of Lower 700 MHz spectrum and disproportionate influence over the vendor ecosystem, will not hold the vendor community captive, to the detriment of A Block licensees.

**Prerequisite to Data Roaming.** Without an interoperability requirement, AT&T can easily use the standards body process to render the FCC's new data roaming requirements technically infeasible.

**911 and Public Safety Interoperability.** Some 911 calls could fail without an interoperability requirement. The 700 MHz spectrum provides a different footprint than other bands currently used for mobile. In a geographic (likely rural) location only served by a 700 MHz footprint, it is possible that a phone operating on the Lower 700 MHz A Block could only reach a Lower 700 MHz B and C Block tower but not be able to communicate due to differing standards or a lack of interoperability. In addition, commercial interoperability should offer cost savings for public safety.

**Jobs and Deployment.** Smaller wireless carriers and new entrants hold all of the A Block licenses beyond the top 25 markets, which are held by VZW. Whether they are competitive providers or the only provider, A Block licensees bring jobs and economic opportunities to their communities. The President's broadband deployment goal of reaching 98% of Americans cannot be met without the participation of all wireless carriers.

**Less \$ Needed for USF Subsidy in Rural Areas.** The cost needed to serve these areas will only go up and ultimately be paid for through USF.

**More \$ at Future Auctions/Diversity.** A major reason for the success of recent auctions is multiple bidders. Multiple bidders/entrants provide an opportunity for marketplace diversity and auction competition. These entities will not bid if they can simply be driven out of the marketplace through standards bodies practices. The overall pool of auctions monies will be reduced and the larger carriers will see less competition for markets, further reducing revenues.

# The Need to Freeze Further Channel 51 Broadcast Station Licensing and Applications

# Channel 51 Impediments

- Hundreds of Channel 51 station applications since the 700 MHz A-Block 2008 Auction, many for new stations, higher power levels, and ongoing FCC grants
- Channel 51 DTV stations are protected by FCC technical rules (67-mile protected contour)
- Changed circumstances (possibility of incentive auctions) have diminished interest in relocation and encourage regulatory arbitrage
- Changes regarding new stations, changes in power, changes in transmitter locations, etc. create an ever-shifting interference environment, impacting A-Block licensees' ability to plan or deploy

# 500 New Channel 51 Actions Since 2008 Auction

## These Actions Present Opportunities to Alleviate Problems and Encourage Relocation

- **New Construction Permits (94)**
  - Accepted 72 Applications (1 in Vulcan Market)
  - Granted 22 Permits
- **Special Temporary Authority Granted (27)**
  - 12 Extensions
  - 15 New
- **Digital Companion Licenses (2)**
- **Digital Flash Cut Conversions Applications (51)**
- **License To Cover Granted (79)**
- **Other Applications (247)**
  - 99 Applications Granted related to broadcast operations
  - 148 Applications accepted for filing

## 177 Current Operationally Licensed High Power and LPTV Stations Assigned to Channel 51

- **DTV**
  - 35 in US using Channel 51 (1 in Vulcan Market)
  - Average Effective Radiated Power is 500 kW but as low as 4 kW and as high as 1,000 kW
- **Class A TV**
  - 6 in US using Channel 51 (1 in Vulcan Market, silent)
  - Average Effective Radiated Power is 36 kW
- **LPTV (includes repeaters and translators)**
  - 136 in US using Channel 51 (3 in Vulcan Market)
  - As low as 10 W and high as 150 kW with the average of 20 kW
- **New LPTV Construction Permit accepted for filing in Vulcan Market**
  - FCC action on Port Townsend LPTV displacement construction permit application within the past 20 days
  - New FCC LPTV decision released July 15, 2011 (2<sup>nd</sup> R&O MB 03-185) continues to allow displacement applications on Channel 51

# Changed Circumstances Are Impeding Incentive Auctions and A-Block Deployments

- **Economic and business uncertainty for broadcasters is an unintended consequence of the incentive auction and repacking recommendations within National Broadband Plan**
  - Disincentivizes relocation
  - Encourages regulatory arbitrage, which will:
    - Reduce potential auction proceeds
    - Impair repacking
    - Hold A-Block licensees captive

## Changed Circumstances Are Impeding Incentive Auctions and A-Block Deployments (cont.)

- Stringent 700 MHz build-out requirements and filing of deployment plans motivate Channel 51 broadcasters to delay relocation
- Dramatically escalated Channel 51 licensing activity has complicated interference issues and impeded A-Block network planning, continually changing the deployment landscape and delaying new wireless broadband services
- These new circumstances have limited the ability of A-Block licensees to deploy in high density areas

## Disincentives to Relocation Already Emerging

- An Augusta, GA TV station licensee (Southeastern Media) recently requested that the FCC allow it to remain on Channel 51 instead of acting on its request to relocate to Channel 31
- Despite the benefits cited in its earlier relocation request (such as lower costs and improved service), the licensee stated that:
  - “With the uncertainty created by the broadband proceeding and proposed television spectrum reallocation, infusion of a large amount of capital into particular TV spectrum would be a risky venture at this time.”

## The Solution: Immediate Requested Actions

- Prohibit new licensing of all TV broadcast stations on Channel 51 (full power DTV, Class A, and LPTV)
- Impose an immediate freeze on the acceptance, processing, and grant of applications for any current full power DTV, Class A, and LPTV broadcast facilities on Channel 51
- Accelerate the clearance of any Channel 51 relocation requests and encourage / facilitate the voluntary clearance of full-power Channel 51 broadcast operations
- Improve the transparency and accuracy of the CDBS database and create a new centralized Channel 51 database
- Wireless Bureau and A-Block licensee involvement in decision-making process when A-Block licensees affected

## Benefits of a Freeze

- **Benefits the Incentive Auction Process**
  - Preserves auction proceeds for public safety and Treasury: eliminates arbitrage of auctions
  - Aids repacking efforts
  - Frees up Commission staff to address the many other auction issues that will require attention
- **Provides needed certainty to A-Block licensees**
  - Accelerates A-Block ecosystem development and deployments by addressing broadcaster holding pattern
  - Prevents arbitrage of A-Block licensees

# Build-out Deadline Looms



## Problems:

- Need 23 months to deploy, so must start now to meet June 2013 deadline
- There is no interoperable LTE equipment to deploy and no interoperable LTE handsets available to consumers
- Uncertainty affecting Channel 51 broadcasters and ongoing licensing of more Channel 51 stations block or impair the ability to build-out
- Any network deployed now would have to be replaced once the issues around Channel 51 and interoperability are resolved
- Therefore, an extension will be needed, but until interoperability and Channel 51 issues are resolved, it is difficult to set a reasonable new deadline

# Market Build-out Schedule For Vulcan

LTE Implementation Schedule																								
Task	Month																							
	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Planning Phase			Implementation Phase																				
Technology & Service Selection	█																							
Systems Integrator Contract	█	█																						
System Integrator Plan & Budget Finalized		█	█																					
RF Design				█	█	█																		
Data Center Acquisition for LTE						█	█	█																
Site Acquisition							█	█	█	█	█	█	█											
Backhaul Design & Procurement								█	█	█	█	█	█	█	█									
Vendor Contract Negotiations								█	█	█														
Equipment Procurement										█	█	█	█											
Permitting											█	█	█	█	█	█								
Construction															█	█	█	█	█	█				
Site Testing																				█	█	█		
Full System Acceptance for LTE System																						█	█	

# Overview

- **There are two major impediments to 700 MHz A-Block licensees to provide competitive wireless services:**
  - Lack of interoperable equipment and no 4G mobile devices
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  - The FCC should follow-up on its 700 MHz interoperability workshop
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## 700 MHz Lower Band Interference Briefing

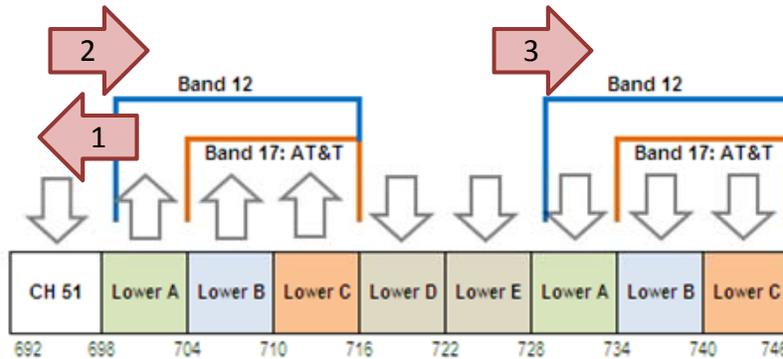
*We are at a critical inflection point in how our telecommunications industry will evolve over the next decade. Through a healthy competitive market, both domestically and internationally, standards bodies created highly interoperable standards to connect 100's of millions of users and thus opened up a rich ecosystem of applications and services to the consumer. The standards process was driven by the need to aggregate many service providers' needs into a common standard to obtain the economies of scale that have brought the consumer cost effective devices. Therefore, the manner in which standards are developed is critical in attracting the much-needed vendor community ecosystem of chip fabricators, equipment manufacturers and wireless device makers to commit their limited and valuable R&D and manufacturing resources to support a particular standard. This vendor community first and foremost evaluates the number of wireless operators/consumer base (i.e. the Market) that any standard serves.*

*The consolidation of the wireless telecommunication service providers, combined with a unique availability of a US-only 700 MHz spectrum band have created a "perfect storm", allowing an individual, top wireless carrier to wield an unusual amount of influence in the development of standards. For the first time in 3GPP history, a relatively small amount of wireless spectrum bandwidth has seen the creation of highly fragmented standards, with some standards primarily serving the needs of individual wireless carriers that dominate a particular spectrum band. Portions of the 700 MHz spectrum have been marginalized in the standards process, and are not capable of providing the needed interoperability and thus harm consumers by significantly disadvantaging competition.*

*The Third Generation Partnership Project (3GPP) standards process has contributed significantly to the rapid growth of wireless telecommunications in the US and throughout the world and has been a major success in developing the international standards for many of the cellular systems including GSM, GPRS, HSPA, and most recently LTE. LTE, and its successor LTE-Advanced, are widely considered the de facto 4G standard for wireless broadband worldwide. LTE is the technology which the recently deployed Verizon Wireless 4G service has implemented. To create these systems, the standards bodies address many issues including technical features to enable specific services (i.e. SMS/texting) and equipment specifications to manage radio interference.*

Currently the Lower 700 MHz spectrum (shown below) has two band classes defined by the 3GPP: The original Band Class 12, which historically covered all Lower A, B and C-Blocks, and the newly created Band Class 17, which eliminated the A-Block spectrum from its Band Class and only applies to the Lower B and C-Blocks. The creation of Band Class 17 was initiated just weeks after the close of Auction 73 and serves spectrum blocks primarily owned by AT&T. Moreover, this is the first time in 3GPP standards process where 2 band classes are defined for the same frequencies allocated within the same region. The location and size of a 3GPP band class drives the technical requirements and thus the selection of the handset's electronic components. The band class definitions also determine which wireless carriers are available for consumers to receive on the devices they purchase. Most of the dominant regional wireless carriers primarily own licenses in the Lower A-Block. Splitting the lower 700 MHz paired spectrum band, which is only 36 MHz in total, is both unprecedented and burdensome to the standards body process. Such artificial fragmentation greatly restricts consumer

choice in wireless carriers, and consequently limits consumer access to advanced wireless services and devices.



One of the primary issues that all standards body activities undertake are to address inherent interference issues that exist in all spectrum bands. Similar to commonly used wireless carrier spectrum bands such as for the cellular (850 MHz), PCS (1.8 GHz), AWS (2.1 GHz) and WiMAX (2.5 GHz), the 700 MHz spectrum bands also have their particular forms of interference that need to be addressed in the standards so that manufacturers can optimize their equipment with respect to device cost, the services provided (i.e. speed), deployment complexity, etc. This process is traditionally an optimization and thus some level of interference is inherent in all deployed systems utilizing the various wireless spectrum bands.

The specific interference scenarios for the Lower 700 MHz band are depicted in the chart above. The gray arrows denote the direction of wireless transmission, with up arrows representing device transmit blocks (uplink), and down arrows representing base station transmit blocks (downlink). The interference cases are numbered in the figure with red arrows pointing in the direction of potential interference.

Below 698 MHz, DTV Channel 51 is still deployed in some markets, transmitting at up to 1 MW. The Lower D and E-Blocks are unpaired, with an allowed FCC transmission power up to 50 kW. Interference concerns with these higher-power wireless licenses prompted the formation of Band 17, a subset of Band 12. A closer look at the interference cases demonstrates that Band 12 device performance is satisfactory in these conditions.<sup>1</sup> In addition, the FCC is considering the license sale to AT&T of D&E Block spectrum currently licensed to Qualcomm. If the FCC allows this transaction to be completed, the only difference in Band 17, receiver blocking, will no longer be necessary because AT&T's ownership and stated intended use of the D&E Block spectrum eliminate the interference that

<sup>1</sup> In addition to standard body's activities, there are other significant activities that have taken place or are currently under scrutiny at the FCC that further minimize inherent interference issues. One of the activities undertaken by 700 MHz A-Block license holders was the decision to create 1 MHz guard band intervals on both the uplink and downlink paired spectrum bands to minimize potential out of band interference from potential neighboring one-way delivery of broadcast media services and/or other wireless services.

was previously being created by Qualcomm through the delivery of its now defunct MediaFLO services.



The first case is interference from Band 12 device transmissions to Channel 51 DTV receivers. The Band 12 devices fully comply with the FCC emissions criteria into Channel 51. Adjacent channel protection from the Lower A-Block to Channel 51 is handled through the typical planning process for base station deployment, and does not impact device specifications or performance. Lower A-Block licensees have recently requested a freeze on new Channel 51 stations, and would benefit from an eventual clearing of the Channel 51 stations to ease deployment planning and allow full use of the A-Block. ***The interference case 1 is not an issue for device component selection; Band 12 may be used.***



The second case is Channel 51 transmission interacting with device transmission in Lower B and C-Blocks (704-716 MHz) within a device to create an unintended intermodulation interference signal in the Lower B-Block (734-740 MHz). Three circumstances would prevent this interference mechanism from impacting device performance: 1) the chance of radio signal conditions aligning to create intermodulation is low; 2) should the unlikely radio conditions occur, the device must be transmitting over a large bandwidth (>5 MHz), which is also very unlikely as LTE shares spectrum among many users and limits spectrum assignments; and 3) a simple mitigation scheme could be used such as programming the base station schedulers to avoid uplink assignments of > 5 MHz at the small number of base stations near Ch 51 towers (only needed for a few dozen LTE sites nationwide). ***The interference case 2 is not an issue which should impact device component design; Band 12 should be used.***



The third case is from Lower D and E-Block base station transmission which are permitted to operate at higher power levels (50 kW) than the base station downlinks of A, B and C-Blocks (5 kW in 5 MHz and up to 20 kW in 10 MHz). The interference concern is that a device receiving the combined A, B and C Blocks would be desensitized or "blocked" due to the somewhat higher D and E-Block transmissions. The device reception may be affected when closely approaching an E-Block tower while the device's desired signal strength is low. The D-Block is not a concern, since A-Block is sufficiently far away from the edge of the D-Block to adequately filter the D Block signal. The E-Block signal, based on its FCC allowed power level, may be stronger than an LTE base station transmission. However, receiver blocking is unlikely to occur for several reasons: 1) typical components performance within current devices is sufficient to prevent blocking – so a typical device would not have a receiver blocking issue from E-Block; 2) there are few if any commercially deployed E-Block systems transmitting at 50 kW today and with the ATT-Qualcomm spectrum sale there would be fewer systems; 3) recent filter technologies provide improved protection from any high-power E-Block

transmissions. *The interference case 3 is not an issue since there are many device component designs to address any concerns; Band 12 should be used.*

### **MediaFLO Acquisition Bid Affirms No E-Block Interference**

In December 2010, AT&T placed an acquisition bid for Qualcomm's 700 MHz spectrum (D-Block nationwide and E-Block in five markets). AT&T has begun work in 3GPP to standardize a new LTE device receive band which would use the Lower D and E-Blocks as supplemental downlink paired with other frequency bands, such as cellular, PCS, or AWS. In January, 2011, AT&T submitted a declaration to the FCC outlining its intended use of the spectrum. AT&T's proposed use of the Lower D and E Block spectrum implies that the Lower D and E-Block will be operating at typical cellular power levels and not the 50W power levels assumed in the above interference case. Moreover, AT&T's new D/E Block device receiver would need to handle any non-AT&T E Block transmissions. By introducing such a plan, AT&T implicitly agrees that high-power E Block transmissions do not pose a significant interference threat. Band 12 should be used for devices operating in the Lower A, B and C Blocks.

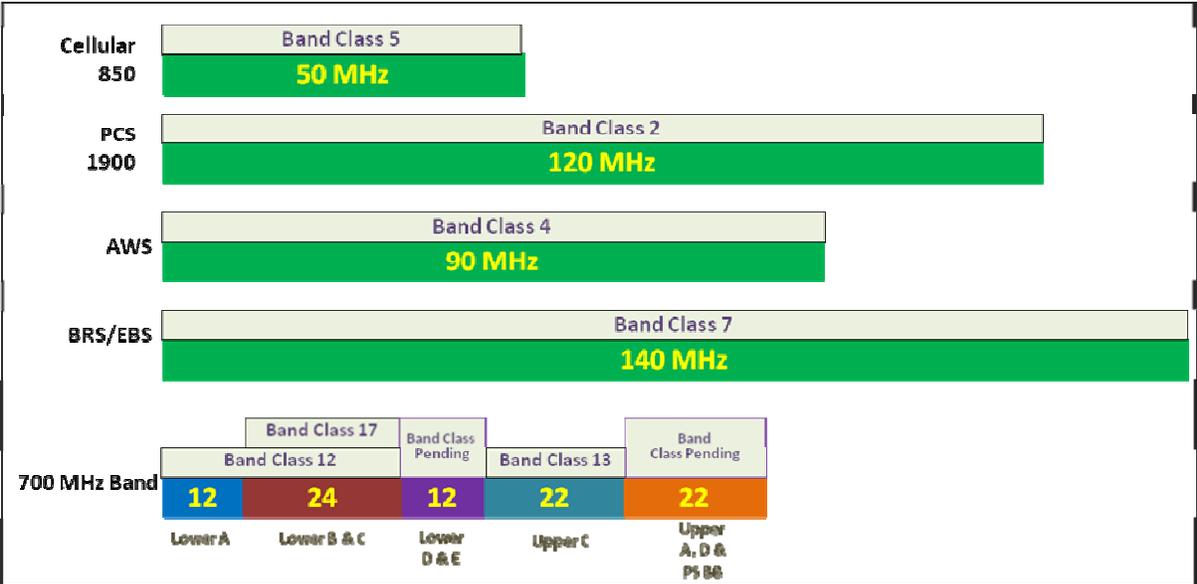
**Band 12 versus Band 17 3GPP Differences:** The only technical difference between the Band 12 and Band 17 3GPP specifications is the device receiver blocking specification for the Lower E-Block. Interference Case 1 and Interference Case 2 have been discarded by the LTE standards body. Therefore Interference Case 3 is the driving force in forming a separate Band 17. The vendors assumed that a more stringent device specification was needed to protect devices from the possibility of MediaFLO 50 kW broadcast tower transmissions in the E-Block. As noted above, E-Block receiver blocking is unlikely to occur today, and is no longer a concern based on ATT's recent bid for the MediaFLO spectrum and future device plan.

Since the Lower E Block is no longer an interference threat, the need for a more stringent device receiver blocking specification in Band 17 has become obsolete. There are no technical reasons to continue using Band 17 versus Band 12. All LTE devices being built to work in Lower 700 MHz A, B and C-Block spectrum could switch over to using Band 12, when RF components for Band 12 become commercially available.

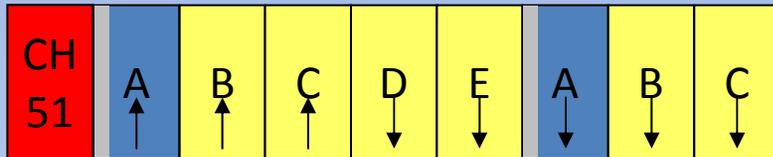
**Summary:** Interference related issues are not the determining factor for the lack of interoperability across the 700 MHz spectrum band nor the primary reason for its fragmented band classes. Undue influence arising from business related issues, as opposed to any critical technical issues, remain the primary and underlying obstacle in achieving interoperability. The unique US allocation of 700 MHz for wireless operators has created historical levels of fragmentation within the spectrum band that does not exist in any other major wireless spectrum band (see chart below). The 700 MHz band poses only a few interference challenges and those challenges can be addressed through equipment specifications and common network coordination practices.

For the first time in 3GPP history, the two largest US wireless operators have separately benefited from the segregation of the 700 MHz band into multiple band classes (see chart below). This

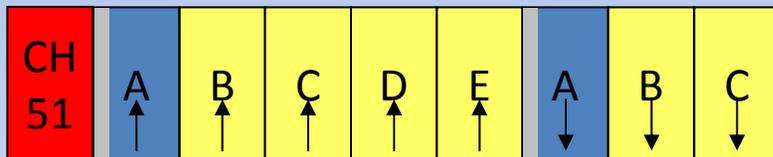
segregation creates harmful equipment and device fragmentation that does not serve competition or the consumer fairly. The 700 MHz band is unique in that no other wireless spectrum band could have been so easily influenced by the presence of single wireless operators since all other wireless spectrum bands used in the US have matching international allocations that must serve the needs of multiple, wireless operators both in the US and elsewhere. Since the unique 700 MHz US wireless spectrum allocation must only serve the needs of US wireless operators, no broad ecosystem of influential global wireless operators could ensure that historical 3GPP practices would continue. Interoperability requirements would create harmonized equipment standards for the 700 MHz band, which in turn would promote competition and consumer choice.



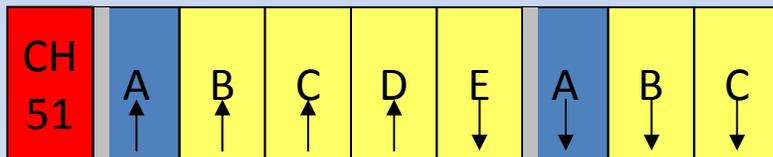
# Several D&E Block Configurations Can Negatively Impact A Block License Holders



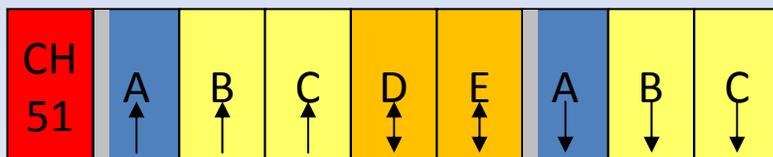
**D & E CMRS Downlink and Combined with B & C:** half-duplex operations on B&C Blocks uplink to address potential interference which would be incompatible with A Block full-duplex uplink thus precluding interoperability.



**D & E CMRS Uplink and Combined with B & C:** use A Block downlink as the duplex spacing and thus precluding interoperability. This removes FCC allocated channel spacing between A Block uplink and downlink channels.

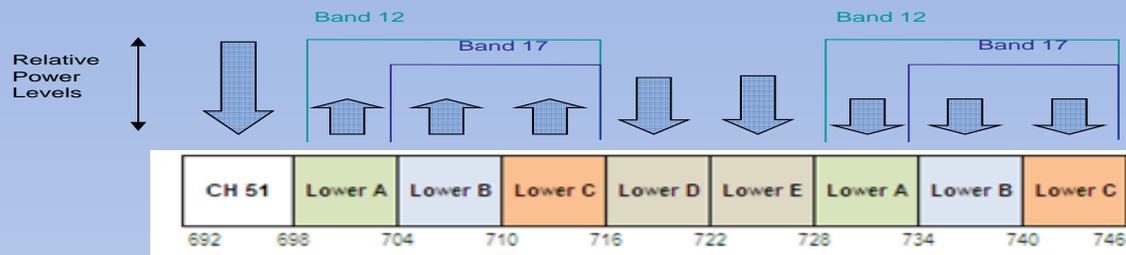


**D as CMRS Uplink and E as CMRS downlink and Combined with B & C:** half-duplex operations on B, C, D Blocks uplink to address potential interference which would be incompatible with A Block full-duplex uplink thus precluding interoperability.



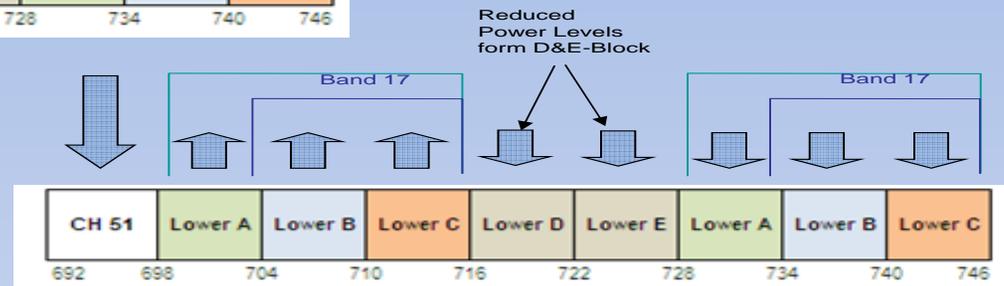
**D & E as CMRS TDD:** A Block would need to address mobile-to-mobile interference that may require different technical requirements than B & C Block thus precluding interoperability.

# There Are No Significant Technical Differences Separating Band Class 12 and Band Class 17 Post-Transaction



Before Transaction:  
Up to 50 kW Transmissions  
from Lower D&E Blocks

After Transaction:  
Cellular Power Level (<12 kW)  
Transmissions from Lower D&E Blocks



	Band 12/17 <u>Before</u> Transaction	Band 12/17 <u>After</u> Transaction
Channel Bandwidths	1.4, 3, 5, & 10 MHz (Band 12) 5 & 10 MHz (Band 17)	1.4, 3, 5, & 10 MHz (Band 12) 5 & 10 MHz (Band 17)
Impact of Channel 51	No Differences: No Impact, addressed by A-Block Guard Band	No Differences: No Impact, addressed by A-Block Guard Band
Impact of High Power D-Block on Downlink	No Differences: No impact, both Bands address identically	No Differences: Not an issue
Impact of High Power E-Block on Downlink	Band 17 has more rejection for E-Block signals though <u>unlikely</u> interference event	High power E-Block transmissions have same impact on D-Block and A-Block: Not an issue for D-Block and thus not an issue for Band 12
Impact of High Power D-Block on Uplink	No Difference: Base-to-Base Interference for both Bands	No Difference: Base-to-Base Interference for both Bands
Impact of High Power E-Block on Uplink	No Differences	No Differences
<b>Summary</b>	<b>No differences</b> except to address a low probability interference case that can be addressed by deployment / component choices	<b>No Differences</b>