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June 17, 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
RM-11592; WT Docket No. 11-18

Dear Ms. Dortch:

On June 15, 2011, Vulcan Wireless LLC ("Vulcan") representatives Scott Wills, Paul Nagle, Paul Kolodzy, and Michele Farquhar met with Tom Peters from the Wireless Telecommunications Bureau. Today, the same representatives met with Paul de Sa, Chief of the Office of Strategic Planning & Policy Analysis.

The Vulcan representatives discussed Vulcan's concerns as a Lower 700 MHz A Block licensee, as described in the attached presentation. Specifically, they highlighted the benefits of nationwide 700 MHz interoperability and the conditions proposed in Vulcan's reply comments regarding the AT&T-Qualcomm transaction pending before the Commission. They also provided Tom Peters with a copy of the attached 700 MHz Lower Band Interference Briefing.

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

Respectfully submitted,

/s/ Michele C. Farquhar

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cc: Tom Peters
Paul de Sa

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Analysis and Recommendation Regarding the Proposed AT&T-Qualcomm D and E Block License Transfer

June 15, 2011

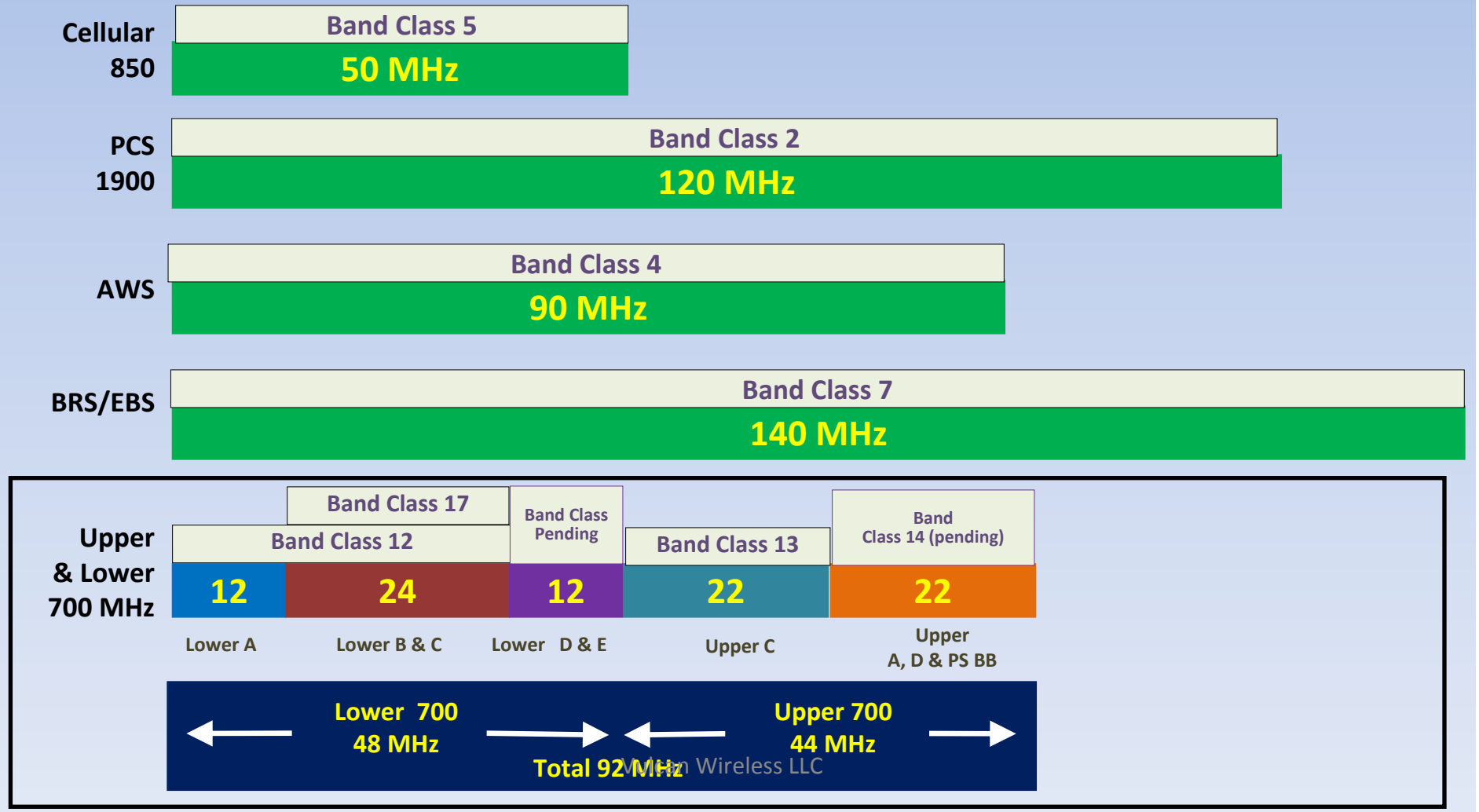
The AT&T Acquisition Creates New Interference Obstacles for Lower A Block Holders, Threatens their Ability to Achieve Interoperability, and Could Allow AT&T to Technically Circumvent the Roaming Order

This Transaction Magnifies AT&T Market Power in the Lower 700 MHz Band, Furthers their Undue Influence and Worsens Interoperability Problems

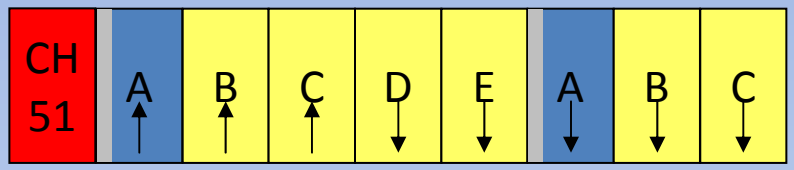
The Commission Should Not Approve the Proposed AT&T-Qualcomm License Transfer without Transaction Specific Conditions

Wireless Frequencies & 3GPP Band Classes

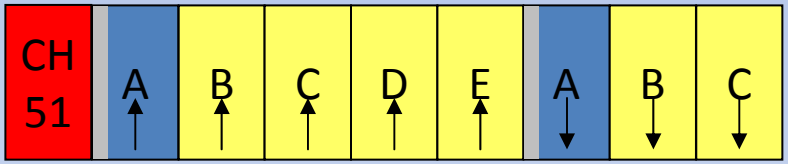
- Unified Band Plans contributed significantly to ecosystem development, industry growth & consumer choice.
- The unique use of 700 MHz wireless frequencies exclusively in the US has given Verizon and AT&T (the dominant 700 MHz spectrum holders) excessive influence. This undue influence has led to constrained & unprecedented standards fragmentation, delays in 700 MHz standards completion, slowed ecosystem development & less consumer choice and value.
- This US-only band provides the FCC with an opportunity to take corrective measures to address exploitation concerns and remedy the problem before the next major iteration of LTE devices is introduced in the market and new spectrum auctions.



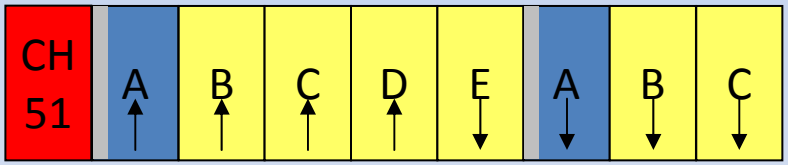
Several D&E Block Configurations Can Negatively Impact A Block License Holders



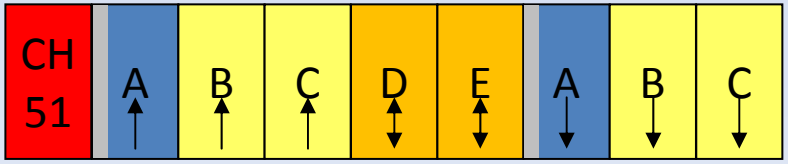
D & E CMRS Downlink and Combined with B & C: half-duplex operations on B&C Blocks uplink to address potential interference which would be incompatible with A Block full-duplex uplink thus precluding interoperability.



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.

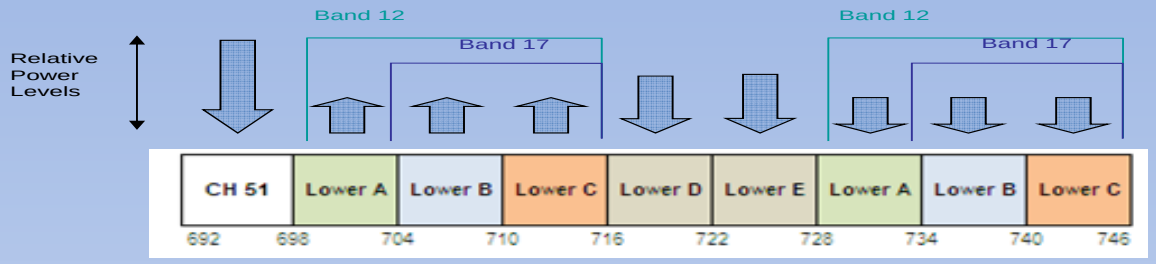


D as CMRS Uplink and E as CMRS downlink and Combined with B &C: half-duplex operations on B, C, D Blocks uplink to address potential interference which would be incompatible with A Block full-duplex uplink thus precluding interoperability.



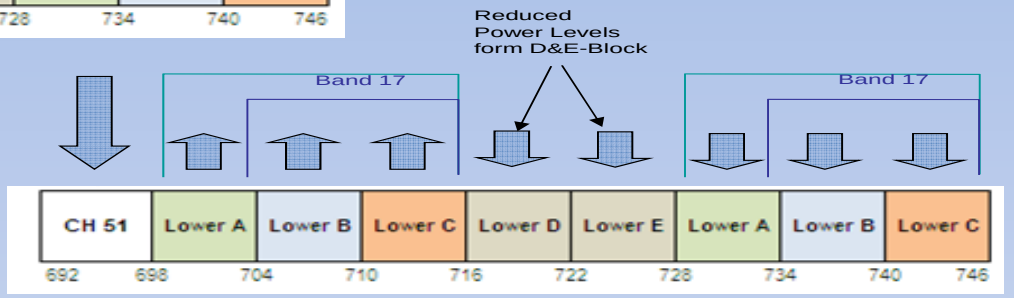
D & E as CMRS TDD: A Block would need to address mobile-to-mobile interference that may require different technical requirements than B & C Block thus precluding interoperability.

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

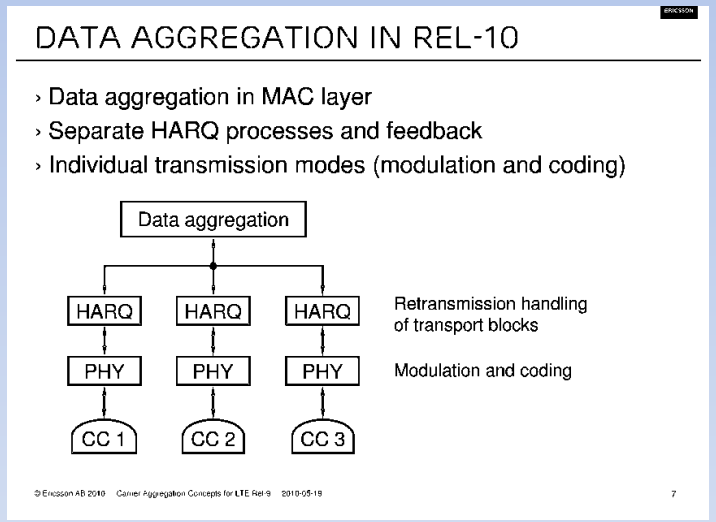
After Transaction:
Cellular Power Level (<12 kW) Transmissions from Lower D&E Blocks



	Band 12/17 Before Transaction	Band 12/17 After 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 unlikely 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
Summary	**No differences** except to address a low probability interference case that can be addressed by deployment / component choices	**No Differences**

3GPP is developing standards for Asymmetric Carrier Aggregation of D & E Blocks with other paired Spectrum Blocks

- Federated Implementation
  - Separate Transceivers - aggregation above the PHY (MAC and above)
  - Appears to be choice for REL-10, 3GPP
  - Interference within one spectrum segment should not impact the other spectrum segments
- Integrated Implementation
  - Spectrum segments are combined (made contiguous) in RF
  - Single Transceiver across the entire band(s) - aggregation at the carrier level
  - Some interference conditions (i.e., blocking) within one spectrum segment can impact all other spectrum segments



Impact of Carrier Aggregation

- Integrated Implementation
  - Potential interference from E-Block into D-Block would impact the entire aggregated band
  - The E-Block interference impact to D-Block + aggregated band would be the same as to A-Block
  - If potential D-Block interference is tolerable, then the potential Band-12 interference should also be tolerable → Band 17 is not necessary
- Federated Implementation
  - Potential interference from E-Block into D-Block would be isolated to just D-Block
  - Carrier aggregation of Band-12 with non-700 MHz spectrum would limit the impact of an unlikely interference event from E-Block into Band 12
  - Federated carrier aggregation enables the radio to tolerate localized, intermittent interference events → eliminates the need for a separate Band 17

Integrated and Federated implementations provide for the same conclusion: Lack of technical need for a separate Band 17

The Solution - Interoperability

Any mobile wireless device that is manufactured after ***June 2013*** and operates on paired spectrum in the lower 700 MHz band must operate on all paired spectrum in the lower 700 MHz band.

Narrowly tailored and transaction specific

- Doesn't apply outside the lower 700 MHz band
- Flows from the concerns around the acquisition of the new spectrum

Not an onerous condition

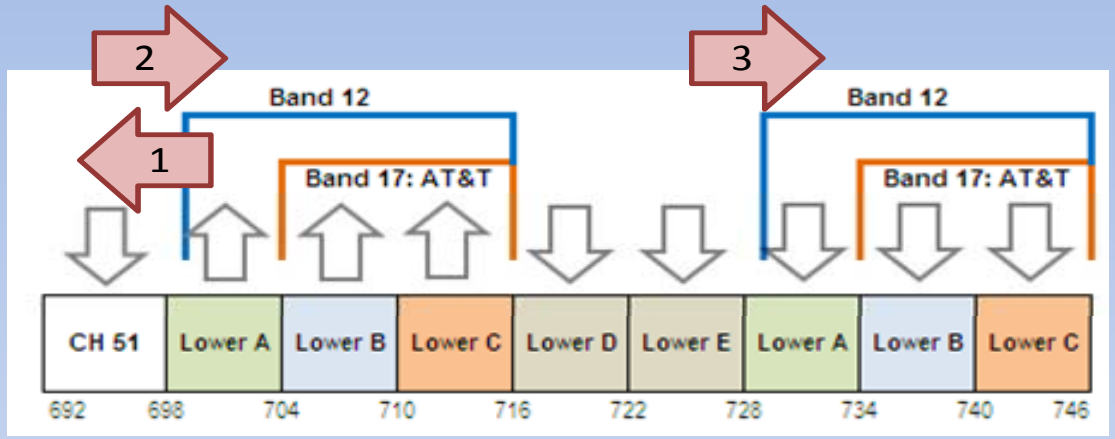
- No stranded investment because no impact on current handset sales
- New phones are constantly developed and deployed
- New phone technology will be necessary to make use of Qualcomm spectrum if the acquisition is approved

It's an organic solution that will evolve as wireless services evolve

- Doesn't force AT&T into a single configuration, but imposes a service condition. Allows them to innovate and evolve just as is the case in other bands

Other

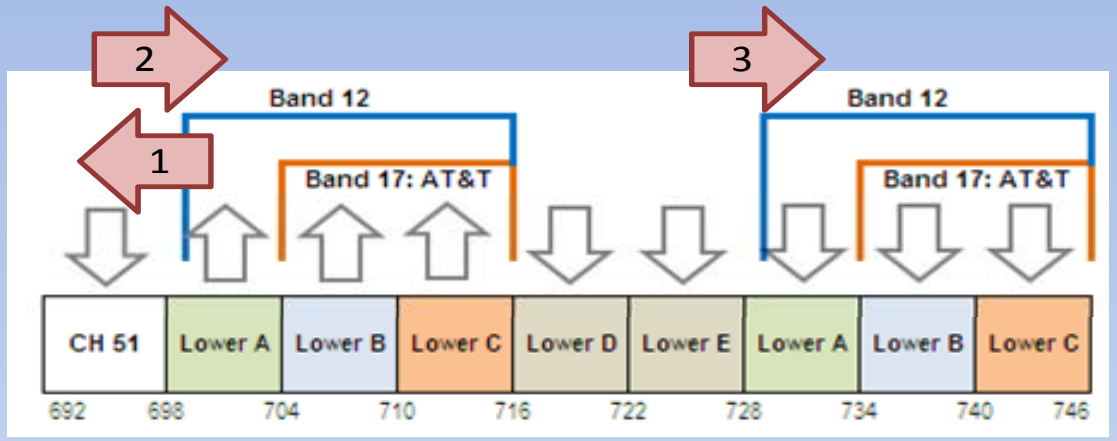
There are *No Interference Issues* that Technically Justify a Different Band Class for Lower B and C Blocks



1

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 without harming lower B or C deployment.***

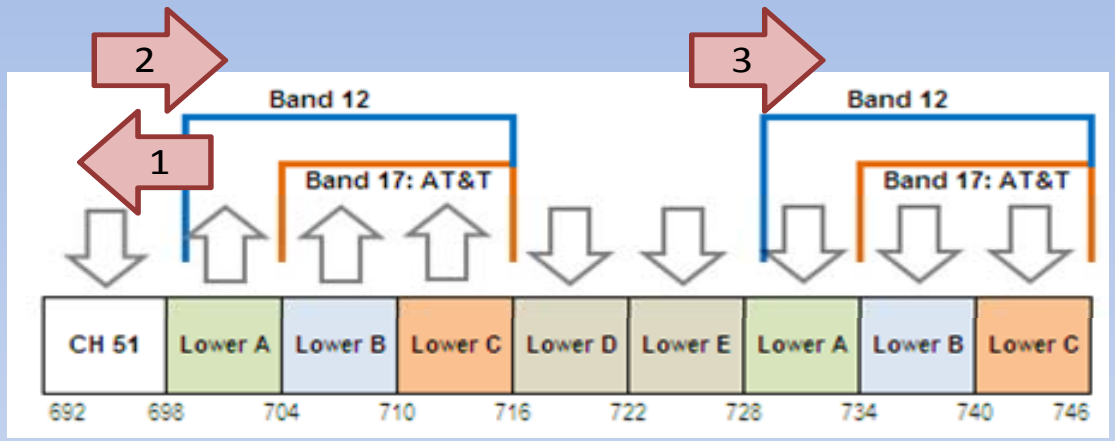
There are *No Interference Issues* that Technically Justify a Different Band Class for Lower B and C Blocks



2

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 <u>interference case 2</u> is not an issue which should impact device component design; Band 12 should be used.***

There are *No Interference Issues* that Technically Justify a Different Band Class for Lower B and C Blocks



3

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.***

Activity Timeline for 700 MHz Band Class

Pre and Post Auction 73

December 2007

- The 3GPP Standard Body had only used Band Class 12 to develop standards for all Lower 700 MHz A, B & 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.

January 24, 2008

- Auction 73 opens

March 18, 2008

- Auction 73 closes

April 5 - 9, 2008

- 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 .

June 16 - 20, 2008

- Ericsson presents discussion paper arguing against Band 17 and raises concerns *"which goes against economies of scales and may lead to market fragmentation".*
- AT&T presents discussion paper arguing in favor of Band 17.
- Ericsson eventually withdrawals their protests, clearing the path for Band 17.

September 18 - 22, 2008

- (6 months after the close of Auction 73) – 3GPP ratifies Release 8 with new Band Classes for LTE:
- Bands include:
  - 17 - Lower B/C (primarily for AT&T owned Spectrum)
  - 13 - Upper C (exclusively for Verizon Spectrum Block)
  - 12 - Lower A/B/C (loosing support from AT&T for B &C)
  - 14 - for Upper D & Public Safety Broadband

September 2009 (still pending)

- 700 MHz Block A Good Faith Purchasers Alliance Petitions for Rulemaking on Interoperability

December 2010

- 3GPP modifies Releases 8 & 9 to include 1 MHz Guard Band within Band 12 to address potential interference issues and gains some limited manufacturer support.

Interoperability is Clearly in the Public Interest

Prerequisite to Competition. An interoperability requirement will ensure that AT&T, 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.

Economies of Scale. The 700 MHz band is unique in that it does not match other international allocations, so no global economies of scale can be leveraged. This makes it more difficult for smaller providers when the biggest U.S. holders of the spectrum use the standards bodies to facilitate creating equipment that only works for their portions of the band, thus orphaning bands of smaller providers. As a result, Lower A Block holders face far higher costs than those associated with other spectrum bands.

Time to Market. In first serving the needs of the unique band class that is dominated by AT&T, the Lower A Block holders are significantly disadvantaged through the lack of access to new devices and delays in the development of standards, chip sets, and equipment. For example, AT&T developed a new band class and has completed product development in the time it has taken lower A block licensees to get their band class approved. VZW had its LTE network deployed covering 100+ million US POPs before Band Class 12 was even fully ratified in the LTE standards body. An interoperability requirement is therefore needed to create a competitive marketplace and a robust ecosystem, much like a number portability requirement was needed to ensure that customers could have meaningful choices.

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. The Congressional Research Service predicts that carriers with common radio interfaces are expected to put the cost of public safety radios within the same price range as commercial high-end mobile devices ($500). By contrast, non-interoperable radios for 700 MHz narrowband networks cost $3,000 and up each.

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.

Yuhan Wireless LLC

700 MHz Lower Band Interference Briefing

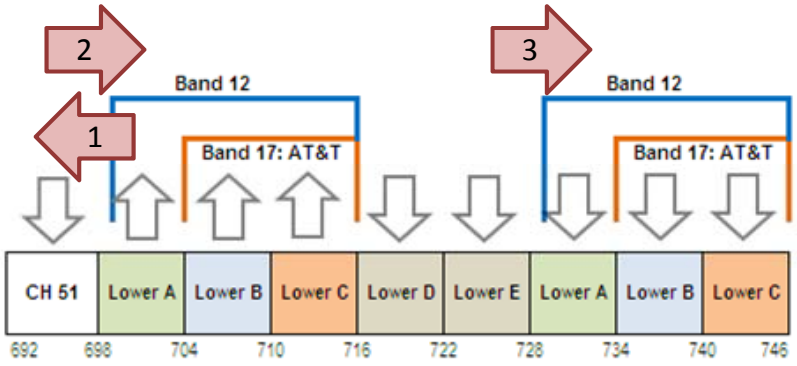
We are at a critical inflection point in how our telecommunications industry will evolve over the next decade. Through a healthy competitive market, both domestically and internationally, standards bodies created highly interoperable standards to connect 100's of millions of users and thus opened up 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.[1] 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

[1] 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 promotes competition and consumer choice.