Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding the Economic and Innovation	)	Docket No. 12-268
Opportunities of Spectrum Through Incentive	)	
Auctions	)	

SUPPLEMENTAL REPLY COMMENTS OF CELLULAR SOUTH, INC. REGARDING THE 600 MHZ BAND PLAN

Cellular South, Inc. (d/b/a C Spire Wireless) ("C Spire") submits these supplemental reply comments in response to the Public Notice ("PN")[1] issued by the Wireless Telecommunications Bureau seeking input on 600 MHz Band Plan proposals put forward since the issuance of the Notice of Proposed Rulemaking ("NPRM") in the above-referenced proceeding.[2]

INTRODUCTION

The record in this proceeding reflects that there is no consensus band plan among the incentive auction stakeholders. Each of the band plans proposed by the PN, NPRM and various parties would have significant influence on the competitive outcome of the incentive auction. And, it is appropriate for the Commission to continue its careful evaluation of each of the

[1] *Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, Public Notice, Docket No. 12-268 (rel. May 17, 2013) ("PN").

[2] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357 (2012) ("NPRM").

proposed plans to assure that it selects the path that optimizes increased flexibility, efficiency, and competition.

With these goals in mind, C Spire believes the Commission should adopt a TDD band plan for the 600 MHz spectrum. The record reflects that the complexity of the broadcast incentive auction and the reality of today's downlink-heavy data traffic patterns can be best addressed by a TDD band plan.

DISCUSSION

I. THERE IS NO CONSUS ON A 600 MHZ BAND PLAN

The record in this proceeding makes clear that there is no consensus 600 MHz band plan among the stakeholders. Some operators have expressed support for a particular band plan while others have endorsed the various iterations of proposed FDD plans. Still other operators and most equipment manufacturers have detailed the various options and filed comments that provide an explanation of the risks and benefits they believe may be associated with each potential plan. As a result, no consensus position exists for any single band plan and the Commission's effort to continue to evaluate the several proposed band plans is appropriate.[3]

In particular, the Commission is right to continue to weigh the viable band plan options carefully. The Commission must work to identify a band plan that provides the best opportunity for competition by minimizing the risk of further wireless industry consolidation through the

[3] The record does, however, demonstrate that regardless of band plan, wireless operators uniformly support the clearing of Channel 51. In particular, C Spire agrees with Leap Wireless' view: an effective way to guarantee the clearing of Channel 51 is to implement an auction rule requiring that the very first spectrum to be licensed in any market include Channel 51. *See*, Leap Wireless NPRM Comments, pp. 10-12. By pursuing this path, the Commission would ensure the incentive auction will clear Channel 51 nationwide. Alternatively, C Spire would support mandatory clearing of Channel 51 to protect the adjacent 700 MHz A Block uplink.

concentration of low band spectrum holdings. Having evaluated the potential options, C Spire has concluded that a TDD band plan has the greatest potential to overcome the challenges posed by the complexity of the 600 MHz auction, lead to successful mobile broadband deployments on the 600 MHz spectrum, and mitigate the consumer harms resulting from the current, consolidated state of the nation's wireless industry.

II. AN FDD BAND PLAN AT 600 MHZ IS LIKELY TO ISOLATE THE U.S.

The Commission should not pursue a band plan that is likely to leave the U.S. market isolated from the rest of the world. And, TDD, not FDD, band plans are increasingly favored globally. As C Spire pointed out in its Comments on the PN:

> TDD is a widely-accepted and utilized technology. As mobile communications usage has increasingly shifted away from circuit-switched voice services toward today's data-centric communications, TDD has become the preferred technology of many mobile broadband operators around the world – especially where new spectrum is being made available for deployment.[4]

The U.S.'s adoption of a one-off band plan at 600 MHz would cause significant harm to the U.S. wireless market and would cripple opportunities for international standards harmonization, forego the opportunity to leverage global scale for devices and device components, and complicate consumers' ability to roam across borders. We need only look to the 700 MHz band for examples of the real and immediately visible harms that would result.

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[4] C Spire PN Comments, pp. 3-4.

A. The U.S.'s unique 700 MHz band plan demonstrates the harm.

The U.S. band plan for the 700 MHz spectrum is a one-off from the rest of the world. With the exception of Canada, which is following a modified U.S. 700 MHz band plan, most of the rest of the world is following a 700 MHz band plan called the Asia-Pacific Telecommunity (APT) band plan or "APAC 700", for either FDD (Band 28) or TDD (Band 44).[5] The U.S. 700 MHz band plan will never be compatible with the rest of the world, so U.S. carriers using 700 MHz will never have global economies of scale.[6] This results in a significant disadvantage for competitive carriers who, unlike the wireless Bells, typically do not have the scale to demand custom device configurations from manufacturers.

If the Commission again adopts a band plan that is a one-off from the rest of the world – this time at 600 MHz – then the U.S. 600 MHz operations will be permanently incompatible with the rest of the world and carriers (particularly competitive carriers) using 600 MHz will never benefit from global economies of scale in this band.

B. TDD is the consensus solution to the downlink-heavy data traffic patterns.

Again, TDD is increasingly seen as the future of LTE.[7] In fact, recognizing that legacy deployments have been FDD, but in anticipation of increasing TDD deployments in the future,

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[5] The APT, which is completely incompatible with the U.S.'s 700 MHz band plan, has been adopted by at least 18 countries – China, Japan, India, Mexico, South Korea, Taiwan, Australia, Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, New Zealand, Panama, Papua New Guinea, Tonga, United Arab Emirates. (http://goo.gl/tbJd0)

[6] *See*, "Different Band Plans for Harmonized Wireless Spectrum Will Affect Global Interoperability, Roaming," *Communications Daily*, Vol. 33, No. 124, June 27, 2013.

[7] *See*, Motorola, "TD-LTE: Exciting Alternative, Global Momentum," White Paper (2010), p. 2. ("In TD-LTE, operators have a very intriguing [technology], with global momentum that matches its FDD counterpart.") (Exhibit A to C Spire PN Comments); Qualcomm, "LTE TDD, The Global Solution for Unpaired Spectrum", Presentation Deck (September 2011), p. 14 (Exhibit B to C Spire PN Comments).

Nokia proposed a work item on Carrier Aggregation of FDD and TDD bands at the most recent 3GPP RAN Plenary meeting in June.[8]

There is a global recognition that current and future data traffic is and will be asymmetric with significantly more downlink traffic than uplink. This traffic phenomenon is driving the twin Bells to pursue aggregation of substantial amounts of supplemental downlink spectrum. For example, at the RAN Plenary meeting cited above, AT&T began a work item on three downlink carrier aggregation.[9] Likewise, Verizon has begun work items on three downlink carrier aggregation.[10]

However, the designation of supplemental downlink spectrum – particularly in newly auctioned spectrum – creates a tangible harm to competition. New entrants and smaller operators cannot compete in markets without uplink spectrum – particularly, low band uplink spectrum.

A TDD band plan would eliminate the risk to spectrum efficiency and competition created by a downlink-only spectrum allocation in the 600 MHz spectrum. As noted by Alcatel-Lucent, an "FDD approach to the 600 MHz band plan [could] result in an inordinate amount of downlink-only spectrum blocks being made available at auction."[11] The auctioning of high-

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[8] *See*, "New WI: LTE TDD – FDD Carrier Aggregation," 3GPP Document RP-130707, Submitted by Nokia Seimens Networks to TSG-RAN Meeting #60, Oranjestad, Aruba, June 11-14, 2013 (available here: http://goo.gl/Zz8xc).

[9] *See,* "Proposed WID: LTE Advanced 3 Band Carrier Aggregation," 3GPP Document RP-130676, Submitted by AT&T to TSG-RAN Meeting #60, Oranjestad, Aruba, June 11-14, 2013. (Proposing three downlink bands with one uplink band) (available here: http://goo.gl/2O1nU).

[10] *See,* "New Work Item proposal: LTE Advanced 3 Band Carrier Aggregation of Band 4, Band 4, and Band 13," 3GPP Document RP-130699, Submitted to TSG-RAN Meeting #60, Oranjetad, Aruba, June 11-14, 2013. (Proposing three downlink bands with one uplink band) (available here: http://goo.gl/gLTrr)

[11] *See*, Alcatel-Lucent NPRM Comments, p. 12.

quality 600 MHz spectrum in downlink-only blocks would be a disaster for wireless competition in the U.S. because in order for an operator to compete effectively, "having both uplink and downlink spectrum is an obvious necessity."[12]

A TDD band plan would provide current and future flexibility because TDD at 600 MHz would allow that spectrum to be allocated between uplink and downlink in a manner that closely tracks trends in network traffic. An FDD band plan is inflexible in this regard because it either equally divides spectrum between uplink and downlink, or it requires supplemental downlink spectrum that is inefficient and harms competition as discussed above.

III. TDD OPPONENTS' CONCERNS ARE NOT CREDIBLE

FDD proponents' concerns regarding interference and synchronization are not a credible basis for opposing use of a TDD band plan for the 600 MHz spectrum.

A. A TDD band plan would not pose interference problems with incumbent FDD operations.

There is no basis to some FDD proponents' claim that a TDD band plan in the 600 MHz spectrum would pose unique or insurmountable interference challenges. As Sprint has noted repeatedly in this proceeding, there is always a "mathematical possibility of unwanted interference from third, fourth, and even fifth order harmonics, virtually any frequency in use today, divided by 2, 3, 4, or 5, corresponds to a core wireless frequency currently used by a

[12] *See*, Metro PCS NPRM Comments, p. 21.

wireless service."[13] But, the mere fact that potential harmonic scenarios exist is common and routinely overcome in other bands.[14]

Should these issues arise, ordinary rulemakings can resolve these common harmonic issues in the same way they have been used to address out-of-band emissions and other items requiring industry coordination that was routine in earlier, more competitive times in the wireless industry.[15]

B. TDD coordination is routinely accomplished in other large markets.

Adopting a TDD band plan does of course mean that 600 MHz operators will have to adopt a common asymmetry ratio to prevent interference between blocks. But this practice is common and easily accomplished. Sprint, for example, notes that in the 2.5 GHz band "four operators adopted a common synchronization plan in 2008 after only a few months of consultations, committing to GPS-locked synchronization and shared signaling periods."[16] That agreement remains in place today.[17]

Moreover, because all of today's operators are experiencing similar asymmetric data traffic patterns, they have a strong incentive toward resolving synchronization and could easily reach an agreement on TDD coordination at 600 MHz. As discussed above, the two largest operators are trying to address this with carrier aggregation for ***three*** downlink bands.[18] This

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13 Sprint Nextel PN Comments, p. 15.

14 *See*, id.

15 *See*, id.

16 Sprint Nextel PN Comments, p. 14.

17 *See,* id.

18 *See, infra*, p. 5.

phenomenon stems directly from a common need to satisfy consistently heavy downlink traffic patterns. Given the commonality of these patterns, 600 MHz operators have every incentive to agree on uplink/downlink ratios for TDD deployments.

IV. A TDD BAND PLAN IS THE BEST MEANS OF SUCCESSFULLY DEALING WITH THE DISSIMILAR DISTRIBUTION OF 600 MHZ SPECTRUM ACROSS MARKETS

The incentive auction is likely to result in varying amounts of available spectrum in each market. The availability of spectrum in each market will be determined by the current amount of unused spectrum in the TV channels as well as any spectrum voluntarily relinquished by broadcasters. Given that there are significant variances among markets with respect to unused spectrum in the TV band, and given the near-certainty that broadcasters will not vacate the TV band in a manner that creates uniformity of available spectrum, individual markets may vary widely in the amount of 600 MHz spectrum available to be auctioned for mobile use.

While commenters generally agree that the Commission should limit the amount of market variation of spectrum, the Commission must nevertheless utilize a band plan that will permit it to successfully accommodate market variation. A TDD band plan provides the necessary flexibility the Commission will require and is the primary reason TDD, and not an FDD-based plan, should be used.

All TDD spectrum provides both uplink and downlink capability. As a result, by utilizing a TDD band plan, the Commission would enable the licensee of any portion of spectrum to make effective and competitive use of it. Moreover, because a TDD band plan does not need to accommodate a duplex gap or to match uplink and downlink pairs, it would be very easy for

the Commission to match the amount of spectrum to be auctioned with the amount of spectrum cleared in the incentive auction process.[19] This flexibility available from a TDD band plan is essential to the success of the incentive auction and the level of competitiveness within the nation's wireless industry as a result of the auction.

CONCLUSION

Successfully clearing and auctioning the 600 MHz spectrum will be complex. And, any future mobile broadband deployment on the spectrum must be flexible enough to accommodate today's and tomorrow's downlink-heavy data traffic patterns. In order to reduce auction complexity and provide operators with the best opportunity to cope with asymmetric data traffic, C Spire urges the Commission to look beyond historical, voice-centric FDD band plans for the 600 MHz spectrum and adopt a TDD band plan that will promote flexibility, efficiency and competition in both the auction and in future mobile broadband deployments on this spectrum.

Respectfully submitted,

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[19] *See, e.g.,* T-Mobile NPRM Reply Comments, p. 37.