Interoperability in the 700 MHz Commercial Spectrum

Communications
Liberty *and*
Innovation Project

The Communications Liberty and Innovation Project[1] submits these comments in response to the Notice of Proposed Rulemaking released on March 21, 2012.[2]

The Commission says that the "core" issue in this proceeding is whether a unified technical standard would result in harmful interference to lower 700 MHz licensees in the B and C Blocks. By framing the issue in technical terms, the Commission is attempting to bypass the threshold policy issues raised by its proposed interoperability mandate: Should the Commission abandon its flexible use policies in the mobile bands? Should the Commission impose a technology mandate *after* licensees have purchased spectrum at auction and begun deployment in reliance on the Commission's assurances that it would "look to them to consider potential interference situations when designing and developing their systems."[3] The answer is "No." Imposing technology mandates only after the deployment of systems based on consensus-based industry standards that are in full compliance with the Commission's rules would be manifestly unjust, deter investment in mobile infrastructure, and inhibit innovation.

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[1] The Communications Liberty and Innovation Project (CLIP) is a project of the Competitive Enterprise Institute. CLIP supports 21st Century policies that promote boundless innovation, private investment, and sustainable economic growth through free markets and entrepreneurship in America's technology industries.

[2] Promoting Interoperability in the 700 MHz Commercial Spectrum, *Notice of Proposed Rulemaking*, FCC 12-31 at ¶¶ 3-5 (2012) (*700 MHz Interoperability NPRM*).

[3] Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), *Report and Order*, FCC 01-364 at ¶ 23 (2001) (*Lower 700 MHz Report and Order*).

A. An interoperability mandate would be inconsistent with the Commission's rules and expectations for the 700 MHz Band

The Commission attempts to avoid a policy discussion by implying that the deployment of non-interoperable services in the 700 MHz band was unexpected and inconsistent with Commission policy. This implication is revisionist history. The Commission not only expected that different technology standards would be deployed, it *encouraged* them. It should be no surprise that licensees accepted the Commission's invitation.

From the band's very inception, the Commission envisioned that it would be used for a "wide range" of fixed, mobile, and broadcast services employing a variety of technology standards,[4] including "stand-alone technologies."[5] Based on its "own review of technical issues," the Commission found "that a flexible, market-based approach is the most appropriate method for determining service rules in this band."[6] The Commission thus allowed "licensees to make determinations respecting the services provided and technologies to be used . . . so long as those services comply with our technical rules."[7] It expected that such services "could include mobile and other digital new broadcast operations, fixed and mobile wireless commercial services (including FDD- and TDD-

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[4] *See* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, First Report and Order, FCC 00-5 at ¶ 1 (2000) (*Upper 700 MHz First Report and Order*).

[5] *See id*. at ¶ 18.

[6] *See id*. at ¶ 2.

[7] *See id*. at ¶ 15.

based services), as well as fixed and mobile wireless uses for private, internal radio needs."[8]

The Commission's flexible use rules are inconsistent with an expectation that licensees would deploy interoperable technologies across the band, let alone an interoperability mandate. The services and technologies permitted by the Commission in the 700 MHz band typically are not interoperable. If the Commission were to mandate interoperability among otherwise non-interoperable services and technologies, it would in effect be abandoning its long-standing policy in favor of flexible use in spectrum bands suitable for fixed and mobile wireless technologies. To the extent licensees were to deploy incompatible technologies in their own spectrum, an interoperability mandate would require them to waste resources ensuring that their unique technology is capable of operating on other blocks even if other licensees had no intention of deploying the same technology. The licensee that deployed first would also risk exposing its system to harmful interference from subsequently deployed, incompatible systems that the licensee may be unable to anticipate. And, to the extent the first deployed system would itself pose a risk of harmful interference to other licensees, it may dictate a *de facto* technology standard for the band, which would limit experimentation and innovation.

The inability to predict in advance how spectrum may ultimately be used is why the Commission permitted flexibility in the lower 700 MHz band.[9] Hindsight is 20/20. Now that licensees in the lower band are converging on LTE, a technology standard that

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[8] *Lower 700 MHz Report and Order*, *supra* note 1, ¶ 70.

[9] *Lower 700 MHz Report and Order*, *supra* note 1, ¶ 67.

did not exist when the Commission adopted its flexible approach, the Commission wants to second-guess technical decisions made by a global, consensus-based standards body. The Commission attempts to justify its post hoc micromanaging by noting that, in the absence of harmful interference, interoperability may yield benefits for all licensees.[10] Even if that were true, it would be manifestly unjust to mandate interoperability now.

The appropriate time to impose mandates based on interference analyses was *before* the 700 MHz band licenses were auctioned. Interference analyses often rely on predictive judgments regarding future deployment scenarios and make value judgments regarding the appropriate level of interference protection. For example, commenters seeking an interoperability mandate recently submitted a test report asserting that such mandate would not pose an interference threat to B and C Block licensees.[11] In actuality, the report acknowledges the potential for interference, but considers it non-harmful.[12] Judgments regarding tolerable levels of radiofrequency interference are appropriate when the Commission is developing the initial service rules for a band. When judgments are made before licenses are auctioned and deployment commences, all bidders have fair, transparent notice of the Commission's expectations and can plan accordingly. If the Commission changes its mind after the fact, all pretense of transparency is lost and some form of unjust enrichment is all but a certainty.

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[10] *700 MHz Interoperability NPRM*, *supra* note 2, ¶¶ 3-5.

[11] *See* Cavalier Wireless, LLC, et al., *Notice of Ex Parte Presentation*, WT Docket No. 12-69 (filed May 29, 2012).

[12] *See id*.

Technology mandates can also result in technological stagnation. When the Commission established rules governing the Part 22 Cellular band in 1981, it required that all licensees provide interoperable analog cellular services using the AMPS standard.[13] The requirement remained in place for *twenty-seven years*, long after the technology had ceased being commercially viable. Mobile providers were finally allowed to shut down their antiquated AMPS networks in 2008. The Commission's experience with the stagnation caused by its AMPS interoperability requirement in part prompted it to adopt the flexible use policies threatened by this proceeding.

The Commission's desire to promote mobile deployment in the 700 MHz band is understandable. But changing the rules midstream is more likely to cause harm than promote additional deployment. The market-based flexible use policies applied to the mobile bands have been critical to their success. The ability to respond to market demands has encouraged investor confidence in the sector and promoted incredible growth. An interoperability mandate would undermine investor confidence by signaling the Commission's willingness to reverse course in functioning markets.[14] The perception of regulatory instability created by such a signal would restrain investment and undermine the effectiveness of regulatory initiatives.[15] For example, bidders in the

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[13] Sunset of the Cellular Radiotelephone Service Analog Service Requirement and Related Matters, *Memorandum Opinion and Order*, FCC 07-103 at ¶ 4 (2007).

[14] *See* discussion, *infra* at pp. 11-13 (noting that the mobile industry has produced a full range of A Block devices at competitive prices).

[15] Kira R. Fabrizio, *The Effect of Regulatory Uncertainty on Investment: Evidence from Renewable Energy Generation*, at p. 2 (available at http://www-management.wharton.upenn.edu/henisz/msbe/2011/4_2_Fabrizio.pdf).

planned incentive auction will have to consider the Commission's tendency to reverse course on fundamental issues when developing their bidding and deployment strategies. The result may be less participation in the auction, and ultimately, less competition. If the Commission wants to promote mobile deployment, it should stop treating its own policies like they were written at the water's edge during low tide.

B. The Commission expected that deployment of mobile systems in the A Block would be technically challenging

The real surprise in this proceeding is that the Commission is considering a technology mandate at all. The Commission has no basis for determining that the 3GPP's creation of Band 17 was unreasonable or anticompetitive. Since it first allocated the lower 700 MHz band in 2001, the Commission itself expected that deployment of mobile systems in the A Block would be challenging due to the need to protect television Channel 51 and the potential for Channel 51 to cause harmful interference to the A Block. When the Commission modified its technical rules prior to 700 MHz Auction 73, it recognized that high power operations in the E Block would also create challenges in the A Block. The Commission found that the ability to tailor technology standards to different blocks in the lower 700 MHz band would be beneficial in meeting these challenges and optimizing the use of the band as a whole, which is exactly what the 3GPP standards setting process did.

Exclusion Zones. When the Commission reallocated the lower 700 MHz band in 2001, it determined that television Channel 51 would remain adjacent to the A Block at the end of the DTV transition and required that A Block licensees protect Channel 51

from harmful interference.[16] The interference protection criteria adopted by the Commission created exclusion zones that inhibit A Block deployment in many markets.[17] After dealing extensively with the challenges posed by these exclusion zones during Qualcomm's MediaFLO deployment in 2006,[18] the Commission considered taking steps to reduce the impact of the exclusion zones on the A Block prior to 700 MHz Auction 73. However, to ensure it met the auction and DTV transition deadlines imposed by the Deficit Reduction Act of 2005,[19] the Commission decided to address Channel 51 issues once the DTV transition was complete.

Channel 51 Transmissions. The Commission also recognized the potential for Channel 51 to cause harmful interference to A Block licensees. The Commission did not consider imposing any obligations on broadcasters to protect A Block licensees. Instead, the Commission asked whether it should impose limitations on deployments in the A Block that would minimize the interference such deployments received. Specifically, the Commission asked whether it should limit the allocation for the A Block to fixed systems (which are generally less vulnerable to harmful interference than mobile systems) or place limitations on systems with "low immunity to high-powered signals" (e.g., mobile systems) to "best account for potential interference from adjacent-channel broadcast operations."[20] The Commission ultimately opted for a "flexible approach" that allowed A

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[16] *Lower 700 MHz Report and Order*, *supra* note 1, ¶ 21.

[17] *Id*. at ¶ 23.

[18] *See* Qualcomm Incorporated Petition for Declaratory Ruling, *Order*, FCC 06-155 (2006).

[19] Pub. L. No. 109-171, 120 Stat. 4 at §§ 3002-04 (2006).

[20] *Lower 700 MHz Report and Order*, *supra* note 1, ¶ 21.

Block licensees to consider potential interference situations when designing and developing their systems.[21] The Commission believed that bidders would take A Block interference issues into account and "develop their business plans, services, and facilities accordingly."[22] In other words, the Commission advised A Block licensees that they would be proceeding at their own risk.

E Block Transmissions. The Commission also understood the potential for interference to the A Block from high power operations from the E Block. When the lower 700 MHz band was created, there was an expectation that it would remain encumbered by analog broadcasters for much longer than the upper 700 MHz band.[23] As a result of this expectation, the Commission harmonized the blocks in the lower 700 MHz band with existing broadcast channels and permitted lower 700 MHz licensees to operate at higher power levels suitable for broadcasting – up to 50 kW ERP (50,000 watts). The Commission expected that some lower 700 MHz band licensees would choose to deploy higher power broadcast facilities while the transition was ongoing.[24]

The Deficit Reduction Act of 2005 established firm deadlines for the 700 MHz auction and the end of the DTV transition. This legislative change dashed the expectation of an earlier transition in the upper 700 MHz band and prompted a reexamination of the

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[21] *Id*. at ¶ 125.

[22] *Id*. at ¶ 21.

[23] Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Notice of Proposed Rulemaking, Fourth Further Notice of Proposed Rulemaking, and Second Further Notice of Proposed Rulemaking*, FCC 06-114 at ¶ 1, n.4 (2006).

[24] *See* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 07-72 at ¶¶ 95-96 (2007) (*First Combined 700 MHz Order*).

whole band's rules beginning in 2006. During the rulemaking proceeding, it became apparent that the mobile industry was focusing its attention almost exclusively on the upper 700 MHz band. When Commission staff asked why, it learned that the 50 kW ERP limit in the lower 700 MHz band – which was intended to accommodate broadcast services – was a source of significant concern for the mobile industry. Sprint, who had experienced similar issues in the 800 MHz band, believed that high-site, 50 kW ERP transmissions in the lower 700 MHz band could cause interference to adjacent band, low-site, low power operations.[25] Others shared Sprint's concern.[26] Because bidders could not know in advance of the auction whether high power systems would be deployed on adjacent blocks, many viewed the lower 700 MHz band as undesirable for mobile services.

To promote mobile deployments in the lower 700 MHz band, the Commission eliminated the ability to operate at 50 kW ERP in the paired A and B Blocks.[27] This modification ensured that each of these blocks would share at least one band edge with a low power system, while preserving "the flexibility the Commission originally envisioned for the Lower 700 MHz Band, i.e., the use of both broadcast and mobile services in the band."[28] The Commission retained the 50 kW ERP limit for the C and D Blocks, which had been auctioned pursuant to an earlier legislative directive, and the E Block. The Commission concluded that it would be inappropriate to reduce the power limits of the C and D Block licensees, who acquired their spectrum with the expectation that they would

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[25] *See First Combined 700 MHz Order*, *supra* note 24, ¶ 90.

[26] *Id*. at ¶ 94.

[27] *Id*.

[28] *Id*. at ¶ 95.

be able to employ 50 kW ERP transmissions in the band.[29] With regard to the unpaired E Block, the Commission retained the higher power limit because "unpaired blocks are conducive to the provision of broadcast-type operations."[30]

The behavior of bidders in the 2007 auction indicates that A Block licensees were well aware of the deployment challenges they faced. The A and B Blocks are both 12 MHz in bandwidth but differ in geographic area. The A Block is licensed on an Economic Area (EA) basis and the B Block is licensed on a Cellular Market Area (CMA) basis. Blocks licensed on an EA basis typically sell at a higher MHz-pop price than CMA blocks. For example, in the AWS-1 Auction 66, both EA blocks sold for $0.52 per MHz-pop while the CMA block sold for $0.40 per MHz-pop. In the 700 MHz Auction 73, however, the EA-based A Block sold for $1.16 per MHz-pop while the CMA-based B Block sold for $2.67 per MHz-pop, more than double the price for the same amount of bandwidth. The obvious explanation: the price of the A Block was discounted due to the interference concerns identified by the Commission.

C. A Block licensees are deploying devices in their spectrum

This proceeding is particularly troubling now that competitive deployment in the A Block is ongoing. When the Commission first sought comment on this issue, A Block licensees claimed that they had "no practical way of obtaining for their customers non-interfering mobile devices that operate in different paired commercial blocks in the 700

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[29] *See id*. at ¶ 96.

[30] *See id*. at ¶ 95.

MHz band."[31] This prediction has already been proved wrong. Since the initial interoperability petition was filed, the mobile industry has produced a full range of A Block devices at competitive prices.

In 2011, U.S. Cellular and its indirect subsidiary, King Street Wireless (a petitioner in this proceeding), began deploying an LTE network in the A Block using Band Class 12,[32] and plans to "bring 4G LTE access to at least 50 percent of customers and introduce at least six new LTE-enabled devices."[33] In May 2012, after the Commission initiated this proceeding, U.S. Cellular told the FCC that its 4G LTE network already covers approximately 25% of the U.S. Cellular customer base, and indicated that it would consider acquiring additional A Block licenses from Verizon. U.S. Cellular is offering its Band Class 12 devices to consumers at competitive prices:

- In March 2012, U.S. Cellular introduced its first LTE tablet, the Samsung Galaxy Tab 10.1, at a price of $499.99 after rebate;[34]
- In April 2012, U.S. Cellular introduced its first LTE smartphone, the Samsung Galaxy S Aviator, at a price of $99.99 after rebate;[35] and

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[31] Comments of Rural Cellular Association, RM No. 11592 at p. 20 (filed Mar. 31, 2010).

[32] *See* U.S. Cellular 2001 Annual Report at p. 2 (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-irhome); News Release, U.S. Cellular to Launch 4G LTE Service and Devices in Time for the Holidays (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-newsArticle&ID=1560901&highlight=).

[33] U.S. Cellular 2001 Annual Report, *supra* note 30, p. 2.

[34] News Release, Samsung Galaxy Tab 10.1 Available on U.S. Cellular Online and in Stores Today (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-newsArticle&ID=1675433&highlight=).

[35] News Release, U.S. Cellular Launches First 4G LTE Smartphone: Samsung Galaxy S Aviator (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-newsArticle&ID=1680599&highlight=).

- In May 2012, U.S. Cellular introduced its first LTE mobile hotspot, the LTE Samsung SCH-LC11 Mobile Hotspot, at a price of $49.99 after rebate.[36]

Based on its sworn statements to the Securities and Exchange Commission and shareholder reports, U.S. Cellular is able to obtain these devices from manufacturers at reasonable prices as well. At its 2012 annual meeting, U.S. Cellular said its service revenue grew 3.6 percent in part due to its "competitive portfolio" of devices and "effective management of device subsidies and cost control."[37] In its most recent annual report, U.S. Cellular said it would introduce at least 20 devices in 2012, including 700 MHz devices, while continuing to manage costs.

Another petitioner, C Spire Wireless (formerly Cellular South), has announced plans to deploy an LTE network in the 700 MHz band this year.[38] The initial roll out will include 20 markets with a population of 1.2 million and cover 2,700 square miles. C Spire has confirmed that it has access to a number of LTE devices capable of operating in its 700 MHz spectrum. During a recent analyst call, C Spire CEO Hu Meena said, "We fully expect to have a good availability of devices when we roll out 4G."[39]

There is no reasonable justification for an interoperability mandate now that A Block licensees are offering, or planning to offer, a full range of 700 MHz devices at

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[36] News Release, U.S. Cellular Launches 4G LTE Mobile Hotspot (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-newsArticle&ID=1697172&highlight=).

[37] U.S. Cellular Shareholders Meeting Presentation (available at http://phx.corporate-ir.net/phoenix.zhtml?c=106793&p=irol-presentations).

[38] *See* C Spire Wireless 4G LTE Fact Sheet (available at http://www.cspire.com/resources/docs/news/C_Spire_4G_LTE_fact_sheet.pdf).

[39] See http://www.wirelessweek.com/News/2012/03/carriers-after-delay-CSpire-sets-LTE-Launch-Date-networks/.

competitive prices. Despite having bought their spectrum at a significant discount, A Block licensees have been successful in deploying mobile services in the band. There simply is no consumer or competitive harm that an interoperability mandate would address.

Respectfully submitted,

COMMUNICATIONS LIBERTY AND INNOVATION PROJECT

By: /s/ Fred Campbell
Fred B. Campbell, Jr.
Director

Competitive Enterprise Institute
1899 L ST NW Floor 12
Washington, DC 20036
202-331-1010

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