Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Promoting Interoperability in the 700 MHz Commercial Spectrum	)	WT Docket No. 12-69
	)	
Interoperability of Mobile User Equipment Across Paired Commercial Spectrum Blocks in the 700 MHz Band	)	RM-11592 (Terminated)

COMMENTS OF T-MOBILE USA, INC.

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SUMMARY

T-Mobile USA, Inc. ("T-Mobile") applauds the Commission for taking steps to increase interoperability in the 700 MHz band and urges it to adopt its proposal to mandate interoperability across the lower portion of the band. Interoperability is critical to the future of mobile services. In the 700 MHz band, it will reduce the cost of commercial equipment, thereby enhancing competition and facilitating consumer choice, and expedite the deployment of advanced broadband services in rural and unserved areas. Interoperability will also facilitate roaming among wireless carriers both outside and inside the 700 MHz band and enhance public safety services.

While some parties assert that an interoperability mandate would be detrimental to Lower 700 MHz B and C Block licensees due to potential interference to 3GPP Band Class 12 devices from adjacent television Channel 51 and high-power Lower 700 MHz E Block operations, these concerns are overstated and can be resolved. While the Lower 700 MHz A Block will not be usable in areas where television Channel 51 operates because of requirements to protect broadcast operations, this does not impact the use of Band Class 12 equipment operating on Lower 700 MHz B and C Blocks. Moreover, an interoperability mandate would not impose unreasonable technical burdens on Lower 700 MHz B and C Block licensees or result in network build-out delays. Those licensees would not be required to modify their base stations and would be provided with a sufficient transition period to develop and implement new handsets.

The Commission should also require interoperability throughout the entire 700 MHz band. Such a mandate will further maximize the benefits of interoperability for consumers, public safety entities, commercial providers, and the competitive marketplace. T-Mobile recognizes that there may be matters that require resolution prior to full 700 MHz

interoperability. The Commission should explore these issues by promptly initiating a Further Notice of Proposed Rulemaking to resolve any remaining technical impediments to achieving interoperability throughout the entire 700 MHz band.

The Commission has ample authority under its past precedent and under the Communications Act to impose an interoperability requirement. Although T-Mobile does not generally support increased regulation or the imposition of technical mandates, an interoperability mandate is necessary in this case because the marketplace simply has not demonstrated that the industry will be able to achieve interoperability absent Commission action.

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COMMENTS OF T-MOBILE USA, INC.

T-Mobile USA, Inc. ("T-Mobile") submits these comments in response to the March 21, 2012, Notice of Proposed Rulemaking issued by the Federal Communications Commission ("FCC" or "Commission") in the above-referenced proceeding.[1/] T-Mobile applauds the Commission for taking the initial steps towards increasing interoperability in the 700 MHz band and supports the Commission's proposal to mandate interoperability across the lower portion of the band. Among other things, interoperability will facilitate wireless competition, increase equipment availability, promote the build out of the National Public Safety Broadband Network, and enhance data roaming. In order to further maximize these benefits, T-Mobile also urges the Commission to initiate the steps necessary to mandate interoperability throughout the *entire* 700 MHz band.

I. INTRODUCTION AND BACKGROUND

T-Mobile, a wholly-owned subsidiary of Deutsche Telekom AG, is headquartered in Bellevue, Washington, and offers nationwide wireless voice and data services to individual,

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[1/] *See Promoting Interoperability in the 700 MHz Commercial Spectrum; Interoperability of Mobile User Equipment Across Aired Commercial Spectrum Blocks in the 700 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 12-69 and RM-11592 (Terminated), FCC 12-31 (rel. March 21, 2012) ("*NPRM*").

business and government customers. It is the fourth largest wireless carrier in the United States and serves approximately 33 million subscribers. T-Mobile's spectrum holdings are in the Personal Communications Service ("PCS") and Advanced Wireless Service ("AWS") bands.

The Commission initiated this proceeding to promote interoperability in the Lower 700 MHz band and to explore next steps, should it find that such interoperability is technically feasible.[2/] The *NPRM* is responsive to several earlier requests that the FCC impose interoperability in the 700 MHz bands. In particular, an alliance of Lower 700 MHz A Block licensees filed a petition for rulemaking in 2009 asking the FCC to adopt a requirement that all mobile units for the 700 MHz band be capable of operating over all frequencies in the band.[3/] The Commission sought comment on this petition in 2010,[4/] and T-Mobile, with other national, regional, and rural providers, submitted filings in support of the petition.[5/]

In December 2011, the Commission issued an order approving the assignment of eleven of Qualcomm's Lower 700 MHz D and E Block licenses to AT&T.[6/] While several parties commenting on the proceeding requested that the FCC impose device interoperability requirements as a condition of its approval, the Commission declined to take such action. The

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[2/] *See id.* ¶ 5.

[3/] *See* 700 MHz Block A Good Faith Purchaser Alliance Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks, RM-11592 (filed Sept. 29, 2009) ("Alliance Petition"); *NPRM* ¶ 11.

[4/] *See Wireless Telecommunications Bureau Seeks Comment on Petition for Rulemaking Regarding 700 MHz Band Mobile Equipment Design and Procurement Practices*, Public Notice, 25 FCC Rcd 1464 (2010).

[5/] The group, known at the time as the Coalition for 4G in America, submitted a number of *ex parte* letters in response to the Public Notice. *See, e.g.*, Letter from Trey Hanbury, Coalition for 4G in America, to Marlene H. Dortch, Secretary, FCC, RM-11592, *et al*. (filed May 26, 2010), *amended by* Letter from Trey Hanbury, Coalition for 4G in America, to Marlene H. Dortch, Secretary, FCC, RM-11592, *et al.* (filed May 27, 2010); Letter from Thomas J. Sugrue, Vice President Government Affairs, T-Mobile USA, Inc., *et al.*, to Marlene H. Dortch, Secretary, FCC, RM-11592, *et al*. (filed June 22, 2010).

[6/] *See Application of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations*, Order, 26 FCC Rcd 17589 (2011) ("*AT&T/Qualcomm Order*").

Commission instead determined to address interoperability and its associated technical issues in a separate proceeding, which resulted in the current *NPRM*.[7/]

These requests stem from the existence of four 3rd Generation Partnership Project ("3GPP") band "classes" in the 700 MHz band. Band Class 12 covers operations in the Lower A Block (698-704 MHz and 728-734 MHz), the Lower B Block (704-710 MHz and 734-740 MHz), and the Lower C Block (710-716 MHz and 740-746 MHz). Band Class 17 includes a subset of Band Class 12, covering the Lower B and C Blocks but not the Lower A Block. In the Upper 700 MHz band, Band Class 13 covers operations in the Upper C Block (746-757 MHz and 776-787 MHz), and Band Class 14 covers operations in the Upper 700 MHz public safety broadband spectrum, including the Upper D Block (758-763 MHz and 788-793 MHz).

Even though T-Mobile does not hold 700 MHz spectrum, it is also affected by the multiple band classes at 700 MHz and the resulting lack of interoperability. T-Mobile has already urged the Commission "to examine more broadly the requirement of interoperability throughout the 700 MHz band instead of focusing on the potential for harmful interference to Lower 700 MHz B and C Block licensees," and has noted that "[r]equiring interoperability throughout the band will promote roaming among commercial wireless providers and enhance public safety use of the 700 MHz broadband spectrum."[8/] T-Mobile is investing in a "$4 billion network modernization and 4G evolution effort that will pave the way for [long-term evolution ("LTE")] service for its customers in 2013."[9/] It is expected that all commercial and public safety licensees providing wireless broadband services in the 700 MHz band will use LTE

7/ *See id.* ¶ 7.

8/ Letter from Kathleen O'Brien Ham, Vice President, Federal Regulatory Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, RM-11592 and WT Docket No. 06-150 (filed March 13, 2012).

9/ T-Mobile Release, *T-Mobile USA Announces Reinvigorated Challenger Strategy* (Feb. 23, 2012), *available at* http://newsroom.t-mobile.com/articles/ReinvigoratedChallengerStrategy.

technology. Because T-Mobile will share the same air interface as these licensees, its customers could potentially roam onto 700 MHz systems, customers of 700 MHz providers could roam onto T-Mobile's systems, and both could support 700 MHz public safety operations *if the mobile units of each system incorporate the frequencies used by the other*. However, as noted below, cost-competitive handsets can only accommodate a limited number of 3GPP band classes, which would potentially require non-700 MHz providers like T-Mobile to choose a subset of 700 MHz band classes to include in customer units. T-Mobile customers would be unable to use systems that operate on the excluded band classes.[10/]

As described below, interoperability will promote several important Commission goals. Therefore, the Commission should take action in this proceeding to promote interoperability, first in the Lower 700 MHz band and then throughout the entire 700 MHz band.

II. INTEROPERABILITY WOULD BE IN THE PUBLIC INTEREST.

The *NPRM* seeks comment on whether there is likely to be a timely industry solution to interoperability in the Lower 700 MHz band, or whether additional regulatory measures will be necessary to promote interoperability.[11/] While T-Mobile does not support increased regulation in general or technical mandates in particular, regulatory intervention is sometimes required to enable cost effective solutions for consumers. In this case, the largest providers have manipulated the international standards-setting process in order to cause the establishment of the current band classes. In particular, AT&T and Verizon urged the 3GPP to create separate band

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[10/] Inclusion of additional chipsets or front end componentry in a handset, in order to accommodate additional band classes, is not a practical solution. These may increase the size and cost of a handset, potentially interfering with desirable form factors and/or reducing cost competitiveness.

[11/] *See NPRM* ¶ 47.

classes for the Lower 700 MHz B and C Block.[12/] Now, the dominant carriers seek to leverage this result domestically to further entrench their market dominance to the detriment of their competitors and consumers.[13/]

As the *NPRM* notes, "[t]he Commission historically has been interested in promoting interoperability" due to the significant benefits it delivers to the competitive marketplace and consumers.[14/] Specifically, promoting interoperability in the 700 MHz band will bring "substantial public interest benefits, such as encouraging the affordability and availability of 4G equipment, enhancing competition by facilitating consumer choice, . . . facilitating the widespread deployment of broadband services and competition, including access to broadband in

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[12/] *See, e.g.*, Alliance Petition at 2-7 (demonstrating how the "nation's two largest wireless carriers are collaborating with 3GPP to establish self-serving 'band classes' for 700 MHz mobile equipment"); Paul Barbagallo, *FCC Working on Device Interoperability Rules, Girding for Another Battle with Verizon, AT&T*, BLOOMBERG BNA, Feb. 1, 2012 (reporting Ben Moncrief, director of government relations at C Spire Wireless, as stating that Verizon and AT&T "have used their monopsony control over the lower 700 MHz band to create separate 'band classes' and leverage their scale over vendors to procure devices and network equipment that are exclusive to that band class"); *see also NPRM* ¶ 10 (noting that standards for separate band classes were created by 3GPP at the urging of AT&T, among others).

[13/] The FCC previously has expressed its concern regarding the market control exercised by the largest carriers. *See, e.g.*, *AT&T/Qualcomm Order* ¶ 66 ("That AT&T currently holds Lower 700 MHz C Block licenses that cover more than 80 percent of the U.S. population only accentuates our concern that individual private negotiations with other Lower 700 MHz licensees may not be able to successfully resolve these [interference] concerns in a timely and consistent manner that allows other parties holding Lower 700 MHz A, B, and C Block licenses a full opportunity to use those licenses to compete.").

[14/] *See NPRM* ¶ 17; *Inquiry into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; Amendment of Parts 2 and 22 of the Commission's Rules to Cellular Communications Systems*, Report and Order, 86 FCC 2d 469 (1981) ("*Cellular Report & Order*") (adopting interoperability requirements for cellular service because consumer equipment should be interoperable to "insure full coverage in all markets and compatibility on a nationwide basis"); *Amendment of the Commission's Rules to Establish New Personal Communications Services*, Memorandum Opinion and Order, 9 FCC Rcd 4957, ¶¶ 163-64 (1994) ("The availability of interoperability standards will deliver important benefits to consumers and help achieve our objectives of universality, competitive delivery of PCS, that includes the ability of consumers to switch between PCS systems at low cost, and competitive markets for PCS equipment.").

rural and underserved areas" and facilitating greater roaming opportunities between 700 MHz licensees.[15/]

The marketplace simply has not produced the beneficial conditions identified by the Commission and further described below, and based on the stated positions of some 700 MHz licensees, it does not appear likely that the industry will be able to achieve 700 MHz interoperability absent Commission action.[16/] As a result, there is wide agreement that the "lack of interoperability in the 700 MHz band raises important public interest concerns," and therefore FCC intervention is necessary in this circumstance under existing Commission authority in furtherance of the public interest.[17/]

A. Interoperability Will Promote Economies of Scale and Scope in the Commercial Equipment Market.

The record contains substantial evidence that a lack of interoperability in the Lower 700 MHz band has deprived carriers (other than the largest two) with access to equipment.[18/] Absent an interoperability requirement, A Block licensees will be the only carriers purchasing handsets that include Band Class 12. Without the economies of scale created by a nationwide carrier with over 100 million customers, manufacturers have little incentive to develop and provide at reasonable prices handsets and other equipment for the A Block. The lack of access to interoperable devices harms these carriers' ability to compete, acquire and maintain customers, and invest in their networks and devices. Further, as the Commission has noted, "a significant number of Lower A Block licenses are held by smaller, rural, and regional licensees," and

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15/ *AT&T/Qualcomm Order* ¶ 70.

16/ *See NPRM* ¶¶ 47-49 (discussing whether the industry might be able to achieve interoperability in the Lower 700 MHz band without regulatory intervention).

17/ *AT&T/Qualcomm Order* ¶ 70; *see also NPRM* ¶ 4 ("There is express agreement . . . that a unified band class across the Lower 700 MHz band has the potential to yield significant benefits for all licensees.").

therefore "unless mobile user equipment is capable of operating on all paired commercial Lower 700 MHz spectrum, the deployment of competitive facilities-based mobile broadband networks could be hampered, particularly in rural and unserved areas."[19/]

Conversely, an interoperability requirement would promote economies of scale and scope and alleviate inequities among 700 MHz licensees by enabling the formation of a robust device market serving all 700 MHz licensees.[20/] Not only would an interoperability mandate benefit consumers by providing them with a greater choice of higher quality mobile devices at more affordable prices, it would also benefit consumers in rural and unserved areas in particular by facilitating access to equipment for A Block licensees, thus speeding the deployment of advanced broadband services in such areas.[21/]

B. Interoperability Will Encourage Roaming Among Commercial Wireless Providers.

As the Commission has recognized, roaming delivers important benefits to consumers and is critical to a carrier's ability to compete, particularly given the trend toward increased consolidation in the wireless industry.[22/] Given the importance of roaming to a healthy

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18/ *See, e.g.*, *NPRM* ¶¶ 18-19.

19/ *Id.* ¶ 22.

20/ *See id.* ¶ 21 (seeking comment on whether an interoperability requirement would help enable Lower A Block licensees to benefit from economies of scale with respect to mobile devices, on the benefits that interoperability would bring to consumers, and on the effect of an interoperability mandate in rural areas).

21/ *See id.* ¶¶ 24-25, 53 (seeking comment on the effects of an interoperability requirement on, among other things, competition, consumers, deployment, and rural areas).

22/ *See, e.g.*, *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services*, Second Report and Order, 26 FCC Rcd 5411, ¶ 20 (2011) (finding that the "availability of roaming arrangements helps provide consumers with greater competitive choices in mobile broadband by encouraging investment and network deployments and ensuring that providers wanting to invest in their networks or to enter into a new market can offer subscribers a competitive level of mobile network coverage and service"); *id.* ¶ 31 (discussing that roaming enables carriers to be more competitive, resulting in lower prices and better services for consumers and estimating that the competitive benefits of imposing a data roaming rule "would be in the billions of dollars per

competitive marketplace, the *NPRM* seeks comment "on whether interoperability would promote reasonable roaming arrangements among 700 MHz providers and would increase the number of providers that are technologically compatible for roaming partnership."[23/] The answer is unequivocally yes – an interoperability requirement would facilitate roaming both outside and inside the 700 MHz band.

As an initial matter, the roaming market is currently undergoing significant changes due to the industry migration to LTE. While roaming in the past generally has been limited to carriers using the same air interface to provide voice services, recent announcements of LTE adoption by more wireless carriers to meet growing demands for high throughput, data-centric applications and the resulting emergence of LTE as the technology used throughout the 700 MHz band have the potential to create new roaming possibilities.[24/]

This positive market development will be hindered, however, if the Lower 700 MHz band remains fractured into exclusive band classes. Currently, LTE devices can accommodate only a limited number of band classes – usually two band classes of spectrum below 1 GHz and

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year"); *Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Fifteenth Report, 26 FCC Rcd 9664, ¶¶ 77-78, 81-82, 126 (2011) (discussing industry consolidation within the wireless industry and finding that "roaming can be particularly important for small and regional providers with limited network population coverage to remain competitive").

[23/] *NPRM* ¶ 29.

[24/] *See, e.g.*, Phil Goldstein, *C Spire, Dish Network Ink Retail Partnership*, FIERCE WIRELESS, May 2, 2012, *available a*t http://www.fiercewireless.com/story/c-spire-dish-network-ink-retail-partnership/2012-05-02 ("C Spire has said it will launch LTE service in 20 markets in Mississippi in September. . . . C Spire said it will invest $60 million to begin the deployment in Mississippi."); Phil Goldstein, *Leap to Expand LTE Coverage to Up to 65M POPs by 2014*, FIERCE WIRELESS, May 15, 2012, *available at* http://www.fiercewireless.com/story/leap-expand-lte-coverage-65m-pops-2014/2012-05-15 ("Leap Wireless (NASDAQ:LEAP) plans to expand its LTE network coverage from 20-25 million POPs by the end of this year to 60-65 million POPs by the end of 2013 or early 2014.").

three above.[25/] While technology is advancing and may be able to address these limitations in the future, an interoperability requirement is important in the interim to account for these equipment limitations now. As a practical matter, a lack of interoperability would mean carriers operating outside the 700 MHz band would not be able to accommodate multiple Lower 700 MHz band classes in their devices absent an interoperability mandate. If, because of the reasons of scale and scope noted above, multiple-band devices contain only Band Class 17, carriers outside the 700 MHz band would not be able to offer roaming onto systems using the Lower 700 MHz A Block. If 700 MHz interoperability was required and there was a single Lower 700 MHz band class, a T-Mobile customer with Lower 700 MHz band class radios in his or her handset could roam onto all Lower 700 MHz systems. As a result, interoperability would permit mobile wireless customers operating in bands outside of 700 MHz to roam onto more 700 MHz carrier systems by providing carriers outside the 700 MHz band with more options for potential roaming partners inside the 700 MHz band. Similarly, if customers of systems in the Lower 700 MHz band operated with single band class handsets, they would be able to roam onto more non-700 MHz networks, like T-Mobile's. Accordingly, roaming to and from systems outside the 700 MHz band would be expanded further if there was a single band class covering the entire 700 MHz band, increasing coverage areas for consumers.

Similarly, an interoperability requirement will promote roaming *within* the Lower 700 MHz band because carriers will not be required to choose between supporting other Lower 700 MHz systems or systems in other bands. Instead, Lower 700 MHz devices could be designed with the ability to operate within the entire interoperable Lower 700 MHz band as well as roam

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[25/] *See, e.g.*, Presentation of Gene Fong, Senior Staff Engineer, Qualcomm CDMA Technologies at FCC 700 MHz Interoperability Workshop, at 3 (Apr. 26, 2011), *available at* http://transition.fcc.gov/presentations/04262011/gene-fong.pdf.

in other bands, particularly below 1 GHz. For example, operators of Lower 700 MHz B and C Block systems may be required to choose between adding Band Class 12 to their handsets (assuming the lack of technical impediments) or adding 800 MHz frequencies to their handsets. If they choose not to add Band Class 12 to their handsets, their customers will be unable to roam onto Lower 700 MHz A Block systems, providing a disincentive for Lower 700 MHz B and C Block carriers to enter into roaming agreements with Lower 700 MHz A Block carriers. Therefore, as the *NPRM* notes, interoperability would be particularly beneficial to the smaller carriers holding A Block licenses, as many of these carriers are unable to provide their customers with nationwide service absent sufficient roaming arrangements and capabilities.[26/] As with carriers operating outside the 700 MHz band, roaming within the 700 MHz band will be further promoted if there is a single 700 MHz band class covering both the Lower and Upper 700 MHz bands.

C. Interoperability Will Enhance Public Safety Services and Equipment.

Interoperability, first in the Lower 700 MHz band and then across the entire 700 MHz band, will have important benefits for public safety entities. Ensuring that public safety entities are able to access as many commercial systems as possible is in the public interest and consistent with the recently enacted Middle Class Tax Relief and Job Creation Act (the "Spectrum Act"). Specifically, the Spectrum Act allocated an additional 10 megahertz of 700 MHz spectrum to public safety's existing spectrum holdings for the creation of an interoperable public safety

[26/] *See NPRM* ¶ 28. These roaming benefits would be further enhanced – for carriers within and outside the 700 MHz band – if there was full 700 MHz band interoperability, and not just interoperability within the Lower 700 MHz band. By reducing the number of band classes at 700 MHz, carriers may be able to offer handsets with the entire 700 MHz band, allowing, for example, roaming across all 700 MHz systems.

broadband network,[27/] and requires the 700 MHz public safety broadband licensee, FirstNet, to make use of commercial networks and equipment.[28/] The Spectrum Act also instructs FirstNet to enter into roaming agreements with commercial carriers to expand the public safety network's coverage and ensure ready access to commercial networks in times of emergency, and to support itself through the collection of usage and lease fees.[29/]

Like commercial licensees operating outside the Lower 700 MHz band, FirstNet may not be able to accommodate multiple 700 MHz band classes in its handsets, and therefore, in the absence of an interoperability requirement establishing a single Lower 700 MHz band class, would be forced to choose between including in its handsets one of the Lower 700 MHz band classes or other bands, such as the AWS or cellular bands. A lack of interoperability will limit the number of carriers with which public safety entities can enter into roaming, usage, and lease agreements, which in turn will impede first responders' ability to respond to emergencies by limiting the number of commercial systems onto which they can roam. Limited choices of roaming partners will also drive up public safety roaming costs. This is especially problematic because, based on the lack of scale and scope noted above, it is likely 700 MHz A Block (Band

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[27/] Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, § 6101 (2012).

[28/] *Id.* § 6209(c)(3) (requiring FirstNet to enter into agreements to utilize, "to the maximum extent economically desirable, existing commercial or other communications infrastructure"); *id.* § 6206(b)(1)(C) (requiring FirstNet to take all actions necessary to encourage requests for proposals to leverage existing commercial wireless infrastructure to speed deployment of the network); *id.* § 6206(b)(2) (requiring equipment for use on the public safety network to be built on open, non-proprietary, commercially available standards and be capable of being "used by any public safety entity and by multiple vendors across all public safety broadband networks operating in the 700 MHz band").

[29/] *Id.* § 6206(c)(5) (requiring FirstNet to negotiate and enter into, as it deems appropriate, "roaming agreements with commercial network providers to allow the nationwide public safety broadband network to roam onto commercial networks and gain prioritization of public safety communications over such networks in times of emergency"); *id.* § 6208(a)(1)-(2) (authorizing FirstNet to assess and collect network user fees from any entities seeking access or use of the public safety network, and to enter into covered leasing agreements with secondary users to permit access to network capacity on a secondary basis for non-public safety services).

Class 12) would be excluded from handsets. However, A Block licensees include many rural carriers and their service areas are exactly where public safety may most need to roam onto commercial networks.

A report recently prepared for Congress by the Congressional Research Service confirms the importance of interoperability to FirstNet and the objectives of the Spectrum Act. The report states that "[a]s a consequence of incompatibility among the band classes . . . interoperability for public safety communications may be at risk."[30/] If, for instance, FirstNet and any statewide network deployed in Band Class 14 choose different commercial partners, roaming and priority access may be limited.[31/] As the report notes, "[a] radio that only works on Band Class 14 and one other band class, may be cut off from roaming in areas where that other band class has no coverage."[32/] The Congressional Research Service report also observes that public safety network users are likely to incur higher costs for equipment, as well as for roaming and priority access on commercial channels, without an interoperability requirement.[33/]

Although the *NPRM* focuses on Lower 700 MHz band interoperability, a single 700 MHz band class – covering the entire 700 MHz band – would be particularly beneficial for public safety. Indeed, as the Congressional Research Service notes "[f]ull-spectrum roaming is considered by many to provide advantages for public safety and also for the public at large."[34/] First, like commercial carriers, FirstNet would be able to offer handsets with multiple other band classes because those handsets would not be required to support several 700 MHz band classes.

30/ Linda K. Moore, Specialist in Telecommunications Policy, *The First Responder Network and Next-Generation Communications for Public Safety: Issues for Congress*, Congressional Research Service, at 21 (May 23, 2012).

31/ *See id.* at 22.

32/ *Id.*

33/ *See id.*

34/ *Id.* at 21.

Second, with a unified 700 MHz band class, public safety equipment would avoid becoming a 700 MHz Band Class 14 "island," in which manufacturers would produce Band Class 14 devices only for FirstNet. Instead, public safety systems could take advantage of the scope and scale of equipment produced for a single 700 MHz band class. The contrary result – of Band Class 14-only devices – would result in expensive equipment lacking the features and functionality typically available in commercial systems, contrary to the Spectrum Act's goals and the public interest. While establishing a single band class in the Lower 700 MHz band would facilitate public safety use of multiple commercial networks, if the FCC takes the next logical step of requiring full 700 MHz band interoperability by mandating a single 700 MHz band class, it would provide the public safety community with better access to the full range of cutting-edge equipment that would become available throughout the 700 MHz band for commercial systems.

III. THE TECHNICAL IMPEDIMENTS TO INTEROPERABILITY THE FCC IDENTIFIES CAN BE RESOLVED.

The *NPRM* states that the two main concerns asserted by Lower 700 MHz B and C Block licensee AT&T and its vendors regarding an interoperability mandate are interference from Channel 51 operations and high-power Lower E Block transmissions.[35/] In addition, AT&T asserts that an interoperability mandate would impose unreasonable burdens on its ability to build out its Lower 700 MHz spectrum.[36/] As demonstrated below, however, these concerns are overstated and can be readily mitigated or eliminated.[37/]

35/ *See NPRM* ¶ 33.

36/ *See id.* ¶ 23 (noting that AT&T claims that an interoperability requirement would create "substantial disruption and delay to [its] current LTE deployment plans and significant additional costs") (internal citation omitted).

37/ While the concerns regarding television Channel 51 interference into Lower 700 MHz B and C Block when using Band Class 12 equipment are overstated and can be addressed, this does not mean that Lower 700 MHz A Block is usable in those areas where television Channel 51 operates. As T-Mobile has made clear, Lower 700 MHz A Block is not currently usable in those areas where television Channel 51

A. Channel 51 Reverse Intermodulation Concerns Are Overstated and Will Eventually Become Non-Existent.

Motorola asserts that "reverse intermodulation interference could happen when Band Class 12 devices are close to high-powered Channel 51 transmission towers . . . because of the limited radio frequency (RF) filtering capability of Band Class 12 filters."[38/] As Vulcan and other parties have pointed out, however, "[t]he real world data confirms that the use of Band Class 12 would not lead to degraded service for Lower 700 MHz B & C Block users."[39/]

Recent test results submitted by several 700 MHz carriers confirm that interference from television Channel 51 to Band Class 12 base stations can be managed and that handsets are not affected by Channel 51 operations.[40/] That test report noted that "3GPP provided operators with flexibility in controlling base station interference from the high-power broadcasts. For instance, an operator deploying LTE in the Lower B and C Blocks could employ a base station receive filter which only passes 704-716 MHz. This base station filter would provide considerable

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operates because of requirements to protect Channel 51 operations from interference from Lower 700 MHz A Block operations. *See* Letter from Jean L. Kiddoo, Bingham McCutchen LLP, Counsel to T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-4 (filed Apr. 20, 2012). Accordingly, there are large zones, including in 10 of the top 20 markets where Lower 700 MHz A Block operation is not possible until television Channel 51 is cleared in those areas. This does not, however, impact licensees operating on Lower 700 MHz B and C Blocks from operating with Band Class 12 equipment that is capable of, but is not currently, operating on Lower 700 MHz A Block in those impacted areas.

38/ *NPRM* ¶ 34.

39/ Letter from Michele C. Farquhar, Hogan Lovells US LLP, Counsel to Vulcan Wireless LLC, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 11-18 and RM-11592, at 1 (filed Nov. 30, 2011) ("Vulcan Study"); *see also* Letter from Thomas Gutierrez, Lukas, Nace, Gutierrez & Sachs, LLP, Counsel for Cellular South, Inc. and King Street Wireless, L.P., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 11-18 and RM-11592, at Attachment at 4 (filed May 27, 2011) ("Band 12 devices will not experience Ch 51-700 intermodulation interference.").

40/ However, rules protecting television Channel 51 prevent use of Lower 700 MHz A Block in areas around Channel 51 operations. *See* 47 C.F.R. § 27.60.

rejection of the DTV 51 signal."[41/] Accordingly, "OOBE is not an interference concern to Lower B and C base station operation" and "Band Class 12 could be employed with no impact to Lower B and C performance."[42/] Moreover, tests regarding reverse power amplifier intermodulation have demonstrated that commercial LTE devices are capable of normal operation in the presence of very strong nearby signals, such as from Channel 51 operations, and that the circumstances under which intermodulation interference could be generated, even if the signal could reach unrealistically high levels, would be substantially limited.[43/]

Indeed, the data demonstrates that different operators *within* the Lower B and C Blocks actually pose a greater threat of interference than any interference that would be introduced from B and C Block licensees offering either Band Class 12 devices or handsets based on a unified Lower 700 MHz band class, and that AT&T LTE devices have been able to successfully manage these greater disparities in signal levels from within their B and C Blocks.[44/]

Moreover, as reported in the *NPRM*, the FCC's Media Bureau has imposed a freeze on the filing of certain applications with respect to operations on Channel 51.[45/] Specifically, in order to provide a stable interference environment and facilitate the deployment of wireless broadband services in the adjacent Lower 700 MHz A Block, the Media Bureau announced a general freeze on the filing of new applications – and the processing of pending applications – on Channel 51, lifted the existing freeze on petitions for rulemaking filed by full power television

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41/ Doug Hyslop and Paul Kolodzy, *Lower 700 MHz Test Report: Laboratory and Field Testing of LTE Performance near Lower E Block and Channel 51 Broadcast Stations*, at 43 (Apr. 11, 2012) ("Lower 700 MHz Test Report"), *attached to* Letter from R. Nash Neyland, Cavalier Wireless, LLC, *et al.*, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-69 (filed May 29, 2012).

42/ Lower 700 MHz Test Report at 43.

43/ *See id.* at 44.

44/ *See* Vulcan Study at 1-2.

45/ *See NPRM* ¶ 15.

stations seeking to relocate from Channel 51 pursuant to voluntary relocation agreements, and opened a 60-day window for parties with pending low power television station applications on Channel 51 to amend their applications to request an alternate channel assignment.[46/] This has effectively suspended further use of the channel and made management of any interference impact more achievable.[47/] The Spectrum Act also envisions the potential repacking of the broadcast band to help make it available for mobile broadband pursuant to incentive auctions.[48/] This repacking will eliminate forever television operations at Channel 51 in favor of compatible wireless broadband operations. The FCC can and should mandate phased-in Lower 700 MHz band interoperability today that takes into account the likely elimination of television use of Channel 51 in the near future.

B. Interference from Lower E Block Operations Can Be Mitigated Through Reasonable Technical Limitations.

Motorola also asserts that if Lower B and C Block licensees use Band Class 12 devices, they will experience interference from high-powered Lower E Block transmissions because of limited Band Class 12 out-of-band blocking rejection capabilities.[49/] AT&T similarly says that Band Class 12 has "sub-optimal filtering due to the lack of sufficient frequency separation between the Lower E block (Channel 56) and the Band 12 frequencies (starting with Channel 57)," and asserts that Band Class 17, in contrast, with a six megahertz separation from the Lower

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46/ *See General Freeze on the Filing and Processing of Applications for Channel 51 Effective Immediately and Sixty (60) Day Amendment Window for Pending Channel 51 Low Power Television Translator and Class A Applications*, Public Notice, 26 FCC Rcd 11409 (2011).

47/ It does not, however, allow use of Lower 700 MHz A Block in those areas currently impacted by existing television Channel 51 operations. *See* 47 C.F.R. § 27.60.

48/ *See* Spectrum Act § 6403.

49/ *See NPRM* ¶ 37.

E Block (since Band 17 starts at Channel 58) will "provide sufficient attenuation of the E block interference."[50/]

Recent testing, however, has shown that a Band Class 12 device operating in the Lower 700 MHz B and C Blocks would tolerate a Lower E Block signal better than a device operating in the Lower A Block.[51/] The Lower 700 MHz Test Report notes that "[l]ower 700 MHz interoperability may be granted without interference to Lower B and C Block device reception" and that "[a]ny E Block power modifications to manage A Block interference would be a separate issue unrelated to interoperability."[52/] It adds that while Lower 700 MHz E Block interference to Band Class 12 base station reception may require additional protection or conditions similar to those imposed by the FCC on AT&T's Lower D and E Block licenses discussed below, these interference concerns are specific to base station deployment only, and are not in any way related to the topic of Lower 700 MHz device interoperability.[53/]

As the FCC observes, the Lower E Block interference issue has already been addressed in the *AT&T/Qualcomm Order*.[54/] Through the acquisition by AT&T of certain Lower D and E Block licenses held by Qualcomm, AT&T has become the holder of the D and E Block spectrum covering most of the population of the country. This transaction was approved by the Commission on the condition that AT&T's operations in the D and E Block conform to the technical limits for the A and B Block licenses, and that AT&T's use of the spectrum is limited

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50/ Letter from Michael Goggin, General Attorney, AT&T, to Marlene H. Dortch, FCC, RM-11592, at 3 (filed July 29, 2011).

51/ *See* Lower 700 MHz Test Report at 25.

52/ *Id.*

53/ *See id.* at 4.

54/ *See NPRM* ¶ 42.

to downlink only transmissions.[55/] There is only one other E Block licensee in the country today, besides AT&T, and that is Manifest Wireless L.L.C. f/k/a Frontier Wireless LLC, a subsidiary of DISH Network Corporation. However, the type of service that Manifest Wireless proposes to offer can be accommodated under the limitations that the Commission imposed on AT&T in the *AT&T/Qualcomm Order*.

In particular, Manifest Wireless contemplates using its licenses for a broadcast mobile video service.[56/] In this regard, Manifest Wireless has been in the process of testing various broadcast mobile video technologies, monitoring new technical developments that will allow the combination of mobile video broadcasting with LTE networks, and participating in 3GPP's development of mobile video standards.[57/] Manifest Wireless has also entered into spectrum manager leases with Fanvision Entertainment LLC for several of its licenses, pursuant to which mobile sports content is being provided at particular sports venues to spectators that have rented handheld devices at such venues.

Manifest Wireless and its lessee are already operating under one of the conditions the FCC specified in the *AT&T/Qualcomm Order* – the use of downlink only. Manifest will therefore not be affected by the required use of downlink transmissions. The other material condition that the FCC imposed in the *AT&T/Qualcomm Order* was operation at lower power – a condition the Commission imposed specifically to reduce the potential for harmful interference to other Lower 700 MHz licensees. The same rationale that prompted the Commission to impose that condition on AT&T in the *AT&T/Qualcomm Order* supports a change in the rule for the

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55/ *See id.* ¶¶ 62-63, 65.

56/ *See* 700 MHz Interim Performance Status Report of Manifest Wireless L.L.C. (filed via the FCC's Universal Licensing System for all applicable call signs on Jan. 13, 2012).

57/ *See id.* at 4-6.

remaining Lower 700 MHz E Block licensee. Therefore, to eliminate concerns about the need to retain Band Class 12 to prevent interference from remaining E Block operations, the FCC should impose the restrictions on Manifest that it imposed on AT&T in the *AT&T/Qualcomm Order*.

C. Implementation of an Interoperability Mandate Will Not Be Burdensome on Lower 700 MHz Licensees.

Finally, AT&T asserts that an interoperability requirement would force the company to upgrade its LTE base stations and develop new handsets to accommodate a Band Class 12 network, which will result in substantial delay to its current LTE deployment plans.[58/] However, an interoperability mandate will not be technically burdensome or result in delay as AT&T suggests. As an initial matter, there would be no need to require licensees to modify their base stations to accommodate interoperability. As noted above, the alleged interference into B and C Block base stations from Channel 51 and Lower E Block operations will or can be eliminated without any need for licensees to modify their base stations.[59/] Further, licensees can continue to operate with existing *base stations* indefinitely. The Commission would only need to mandate Band Class 12 in *handset* devices for the Lower 700 MHz band. Band Class 12 handsets will operate with base stations using the Lower 700 MHz A, B, or C Blocks. Therefore, AT&T's existing base stations will be able to support its new customers using Band Class 12 handsets, as well as customers of other carriers and public safety systems that incorporate Band Class 12.

While manufacturers may require some time to develop such Band Class 12 handsets, a reasonable transition period would provide ample time for Band Class 12 handset development.[60/] Indeed, the Commission has routinely imposed a reasonable transition period

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58/ *See NPRM* ¶ 23.

59/ *See also id.* ("We observe . . . that a transition from Band Class 17 to Band Class 12 does not necessitate a change to base station filtering.").

60/ *See id.* ¶ 50.

for manufacturers to develop devices to meet new FCC requirements.[61/] Further, as the Commission has recommended, Band Class 17 handsets could continue to be manufactured for a reasonable period and their use could be grandfathered indefinitely.[62/] Accordingly, these safeguards ensure that there will be no added delay to network deployment.

Importantly, once developed, only Band Class 12 devices would be approved for use and sale. There would be no need to have handsets with *both* Band Classes 12 and 17 since all Band Class 12 devices could communicate with networks using any frequencies in the Lower 700 MHz band.[63/] To the extent a licensee chooses to continue supporting its existing grandfathered Band Class 17 devices, networks could, as the Commission suggests, handle both Band Class 12 and 17 devices.[64/]

IV. THE COMMISSION SHOULD EXTEND INTEROPERABILITY ACROSS THE ENTIRE 700 MHZ BAND.

Given the significant benefits that interoperability delivers to consumers, public safety entities, commercial providers, and the competitive marketplace, the Commission should require

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61/ *See, e.g.*, *Amendment of the Commission's Rules Governing Hearing Aid-Compatible Mobile Handsets*, Third Report and Order, DA 12-550 (rel. Apr. 9, 2012) ("[A] two-year transition period for applying hearing aid compatibility benchmarks and other requirements is consistent with the Commission's proposals for wireless handsets that fall outside the subset of CMRS. . . . While we expect manufacturers and service providers to begin offering hearing aid-compatible handsets over the newly covered air interfaces and frequency bands well before the end of the transition period, we agree with most of the commenters that a two-year period will appropriately accommodate their design, engineering, and marketing needs as they adjust their inventories to offer enough of these handset models to meet the benchmarks."); *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, Report and Order, 15 FCC Rcd 11206 (2000) ("Two years is a reasonable timetable for requiring manufacturers to produce equipment to operate in the [Wireless Medical Telemetry Service].").

62/ *See NPRM* ¶ 50.

63/ As noted above, since both Band Class 12 and Band Class 17 cover the Lower B and C Blocks, Band Class 12 devices could communicate with 700 MHz Lower B or C Block base stations.

64/ *See NPRM* ¶ 41 ("Since the two Band Classes overlap in frequencies, we think it is likely that there are relatively simple, cost effective solutions that will allow a single network to accommodate devices from both band classes.").

interoperability throughout the entire 700 MHz band, and not just the Lower 700 MHz band for the reasons discussed above.[65/] As the Commission noted in the *NPRM*, "[t]he 700 MHz band, at 70 megahertz, is the only non-interoperable commercial mobile service band."[66/] Consequently, the Commission should take steps to achieve interoperability throughout the 700 MHz spectrum.

While interoperability throughout the 700 MHz band should be the goal, T-Mobile recognizes that there are additional challenges to full 700 MHz interoperability.[67/] For instance, the Commission must explore interoperability within the Upper 700 MHz band. While this issue merits further consideration in a subsequent phase of this proceeding, there is evidence that cost-competitive interoperability in the Upper 700 MHz band can be achieved through advances in filter technology.[68/] In addition to fully exploring this issue, the Commission also should address any additional technical considerations created by having one band class spanning the entire 700 MHz band.

Accordingly, when the Commission adopts rules governing Lower 700 MHz interoperability in this proceeding, it should initiate a Further Notice of Proposed Rulemaking to resolve any technical impediments to achieving interoperability throughout the entire 700 MHz band. The Report and Order should also make clear the Commission's intent to impose an

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65/ *See id.* ¶ 46 (seeking comment on whether the Commission's efforts "should be focused exclusively . . . on interoperability in the Lower 700 MHz band, as opposed to the entire band"); *see also* Letter from Kathleen O'Brien Ham, Vice President, Federal Regulatory Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, RM-11592, WT Docket No. 06-150 (filed March 13, 2012).

66/ *NPRM* ¶ 2.

67/ *See id.* ¶ 46 ("We note that there are unique interference environments and different technology-related issues, including the ability of equipment to accommodate multi-band interoperability, that are specific to the Lower versus Upper 700 MHz bands, as well as additional issues pertaining to consideration of requiring equipment to accommodate multi-band interoperability.").

68/ *See, e.g.*, Presentation of Doug Hyslop, Partner, Wireless Strategy at FCC 700 MHz Interoperability Workshop, at 5 (Apr. 26, 2011), *available at* http://transition.fcc.gov/presentations/04262011/doug-hyslop.pdf.

interoperability mandate throughout the entire 700 MHz band, contingent upon the resolution of any remaining technical issues.

V. THE COMMISSION HAS AMPLE AUTHORITY TO IMPOSE AN INTEROPERABILITY REQUIREMENT.

The *NPRM* seeks comment on the Commission's authority to mandate a device interoperability requirement.[69/] First, requiring interoperability at 700 MHz is no different than the Commission's imposition of similar interoperability obligations when cellular service was initiated.[70/] Just as the Commission was justified in requiring interoperability in the cellular context, it is justified here, particularly in light of the fact that the 700 MHz band is the only non-interoperable commercial mobile service band.[71/]

Second, the Commission's Title III authority covers device interoperability. For example, Section 301 provides the Commission with wide latitude in managing the use of spectrum.[72/] As stated in the *NPRM*, this "authority includes the power and obligation to condition our licensing actions on compliance with requirements that we deem consistent with the public interest, convenience, and necessity, including operational requirements, if the condition or obligations will further the goals of the Communications Act without contradicting any basic parameters of the agency's authority."[73/] As discussed above, imposing an

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69/ *See NPRM* ¶ 59.

70/ *See Cellular Report & Order* ¶ 26 (requiring interoperability to "insure full coverage in all markets and compatibility on a nationwide basis"); *see also NPRM* ¶ 49. The Commission relied on its Title III authority to impose nationwide interoperability standards for the public safety broadband network. *Implementing a Nationwide, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, Second Report and Order, 22 FCC Rcd. 15289 (2007) (*citing* 47 C.F.R. § 303(r), among other provisions).

71/ *See NPRM* ¶ 2.

72/ *See* 47 U.S.C. § 301.

73/ *NPRM* ¶ 58 (*citing* 47 U.S.C. §§ 301, 304, 307(a), 309(j)(3); 303(r)); *see also* 47 U.S.C. § 316(a)(1) ("Any station license or construction permit may be modified by the Commission either for a

interoperability requirement would further the public interest by bolstering competition, facilitating roaming, assisting public safety, and providing consumers with a wider range of device options at more affordable prices.

In addition to these provisions, Section 303(b) allows the Commission to "prescribe the nature of the service to be rendered by each class of licensed stations and each station within any class,"[74/] Section 303(e) provides the Commission with the authority to regulate licensees and the equipment they use,[75/] and Sections 302(a) and 303(f) empower the Commission to regulate and prevent interference among licensees.[76/] The Commission also has broad powers to "generally encourage the larger and more effective use of radio in the public interest"[77/] and make available to all people of the United States a rapid, efficient, nationwide and world-wide communication service with adequate facilities at reasonable prices.[78/] In addition, any interoperability mandate would facilitate the provision of roaming services, which were adopted under Title II (for voice roaming) and Title III (for data roaming).[79/] Any of these provisions, standing alone or in combination, amply justify the Commission's adoption of an interoperability requirement.[80/]

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limited time or for the duration of the term thereof, if in the judgment of the Commission such action will promote the public interest, convenience, and necessity").

74/ 47 U.S.C. § 303(b).

75/ *Id.* § 303(e).

76/ *Id.* §§ 302(a), 303(f).

77/ *Id.* § 303(g).

78/ *Id.* § 151.

79/ *Id.* § 303(r) (finding that if "the public convenience, interest, or necessity requires [the Commission] shall . . . prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this Act"); *see also NPRM* ¶ 59.

80/ While the Commission has authority to impose an interoperability mandate in this instance, the Commission's Title III authority is not limitless. With respect to the imposition of an interoperability requirement in the 700 MHz band, the Commission's express statutory duties and the public interest provide solid grounding for such requirement in order to ensure the larger and more effective use of radio

As noted above, although the Commission generally and correctly disfavors technical mandates, one is required in this instance. The dominant carriers have exercised their influence to cause international standards-setting bodies to create exclusive band classes that fragment the market, precluding their customers from being able to port devices to other networks, even if they are unlocked. While, as also noted above, T-Mobile favors an industry resolution to interoperability,[81/] the marketplace simply has not moved quickly enough (and indeed there is no indication that it will at all) to achieve full interoperability either in the Lower 700 MHz band or throughout the 700 MHz band generally. T-Mobile is concerned that without Commission direction, movement towards interoperability will not occur, at least not in a timely fashion, resulting in further market concentration by the nation's two largest providers. As the Commission recognizes, if the industry fails to move timely toward interoperability, additional regulatory steps may be appropriate.[82/] T-Mobile agrees and thus urges the Commission to exercise its authority and take the appropriate actions outlined herein.

VI. CONCLUSION

Facilitating interoperability is an important goal that will promote, among other things, roaming, lower cost handsets, and enhanced public safety services and devices. As an initial step towards achieving these benefits, the Commission should require interoperability across the Lower 700 MHz band. The Commission should also propose rules that would require interoperability across the entire 700 MHz band, pending the resolution of any additional technical roadblocks.

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communications under the provisions referenced herein. Adoption of an interoperability mandate does not, however, offer support for other regulation of wireless services. Each proposed requirement must be evaluated on its own merits and on whether it is necessary for the Commission's discharge of its statutory obligations.

81/ *See NPRM* ¶ 49.

82/ *See id.*

Respectfully submitted,

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