

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands)	WT Docket No. 06-150
)	
Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules)	WT Docket No. 06-169
)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band)	PS Docket No. 06-229
)	
Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010)	WT Docket No. 96-86
)	

To: The Commission

REPLY COMMENTS OF ALCATEL-LUCENT

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REPLY COMMENTS OF ALCATEL-LUCENT

Pursuant to Section 1.415(b) of the Commission’s rules, 47 C.F.R. § 1.415(b), Alcatel-Lucent (“ALU”) respectfully submits these reply comments concerning the Further Notice of Proposed Rulemaking (“*FNPRM*”) in the above-captioned proceedings.¹

I. INTRODUCTION AND SUMMARY

Numerous parties joined ALU in strongly supporting the Commission’s tentative decision to adopt a broadband-only designation for two 6 MHz-wide blocks (including an internal guard band at the top of the broadband allocation) in the 700 MHz public safety spectrum to meet the

¹ Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, et al. *Report and Order and Further Notice of Proposed Rulemaking*, FCC 07-72 (April 27, 2007) (“*FNPRM*”).

current and future homeland security needs of the nation.² The Commission should stand firm and retain the prohibition against operating wideband in the broadband-only blocks. Permitting operation of wideband technologies in these blocks will only perpetuate the current shortcomings of today's public safety systems: lower bandwidth applications, high cost of user devices, and limited interoperability. Commercial broadband technologies are simply more capable and cost-effective than wideband technologies. Contrary to views expressed by several public safety agencies, broadband is available today for public safety use and is not conditioned on the existence of a future national licensee or operator.

The Commission should act quickly to adopt a single commercial broadband technology as the nationwide interoperable standard. If it does so, regional and local agencies will be able to move just as rapidly to deploy and utilize interoperable broadband wireless communications systems in the 700 MHz spectrum as they would to deploy wideband systems. If the FCC, however, chooses to permit individual public safety agencies to utilize wideband technologies, wideband should be permitted only in the internal public safety guard band at the top of the broadband allocation or in the public safety narrowband spectrum.

The Commission's proposal to consolidate the narrowband channels in the upper portion of the public safety band, and thereby reduce the need for internal guard bands, has received wide support and should be adopted.³

² See Comments of Alcatel-Lucent, May 23, 2007, "*ALU Initial Comments*") at 3-12; Comments of Qualcomm Incorporated, May 23, 2007 ("*Qualcomm Initial Comments*") at 17-31; Comments of Ericsson Inc., May 23, 2007, "*Ericsson Initial Comments*") at 10-11; Comments of Northrop Grumman Information Technology, Inc., May 23, 2007 ("*Northrop Grumman Initial Comments*") at 2-3.

³ *ALU Initial Comments* at 3-12; Comments of M/A COM, Inc., May 23, 2007, at 4; Comments of National Emergency Number Association ("NENA"), May 23, 2007, at 2; *Qualcomm Initial Comments* at 38; Comments of Telecommunications Industry Association, May 23, 2007, at 3-4; *Ericsson Initial Comments* at 10-11; *Northrop Grumman Initial Comments* at 2-3. Because of this widespread support, this proposal will not be addressed further in these reply comments.

Finally, Motorola's proposal to establish a power flux density ("PFD") to protect narrowband receivers must be rejected because its assertion lacks technical support.

II. THE COMMISSION SHOULD ADOPT THE PUBLIC SAFETY BROADBAND-ONLY DESIGNATION

The Commission should seize this historic opportunity to provide our nation's first responders with access to a nationwide, interoperable broadband wireless communications network. To accomplish this, the Commission needs to hold to its tentative conclusion to redesignate two 6 MHz-wide blocks exclusively for public safety broadband services (including an internal guard band at the top of the broadband allocation) and to prohibit wideband operations in those blocks. To do otherwise, as the Commission observed, would "perpetuat[e] a balkanization of public safety spectrum licenses, networks, and technology deployment."⁴ The future lies with broadband, not wideband. To achieve the nationwide broadband interoperability that the public interest demands, the Commission must take decisive action, make choices, and set standards.

In their initial comments, both ALU and Qualcomm provided technical data and supporting analysis demonstrating that broadband is *more cost effective* and provides the *same or better coverage than wideband*.⁵ For example, Qualcomm provides extensive technical analysis showing that commercially available EV-DO broadband technology not only delivers data faster than SAM wideband technology by several orders of magnitude but, assuming comparable throughput and capacity, provides better coverage also.⁶ Moreover, Qualcomm shows that for

⁴ FNPRM ¶ 253.

⁵ See Comments of Alcatel-Lucent, May 23, 2007, "(ALU Initial Comments)" at 3-12; Comments of Qualcomm Incorporated, May 23, 2007 ("Qualcomm Initial Comments") at 17-31.

⁶ Qualcomm Initial Comments, at 17.

comparable edge data rates, EV-DO has vastly superior capacity than SAM.⁷ Additionally, ALU provided detailed technical analysis in its initial comments that demonstrates that broadband technologies offer equivalent or superior range compared to wideband while supporting higher throughput within the coverage area.⁸

Motorola attempts to discredit the Commission's tentative conclusion that a broadband-only designation better serves the public interest. First, Motorola has not addressed the technical showings demonstrating the significant benefits that broadband systems provide. Rather, Motorola resorts to straw-man arguments, mischaracterizing the Commission's tentative conclusion as tantamount to findings that "states, regions and localities are ... incapable of deploying interoperable networks on their own [and] that a nationwide network should be the *only* solution to meet *all* of public safety's needs."⁹ The Commission made no such findings. Instead, the Commission recognized the value that a nationwide approach will bring but certainly did not undercut the concept that state and local agencies could, would, and should make local decisions to deploy interoperable broadband networks based on an appropriate national technical standard. This compromise was deemed preferable to repeating the mistakes of the past that have resulted in various public safety agencies deploying incompatible, proprietary technologies at high cost and with limited functionalities.

If wideband technologies are allowed to be deployed in the broadband block, it will be very difficult to require their later relocation or removal (in the absence of a reimbursement program) in order to capture the full benefits that the aggregation of a 6 MHz broadband-only designation can bring. Thus, Motorola's suggestion that wideband "can provide a transitional

⁷ *Id.* at 27.

⁸ *ALU Initial Comments*, at 5.

⁹ Comments of Motorola, Inc., May 23, 2007 ("*Motorola Initial Comments*"), at 6 (emphasis added).

solution” for certain areas of the country is ill conceived.¹⁰ As ALU discussed previously, granting “flexibility” to deploy wideband technologies in the broadband block would significantly hamper interoperability because it would allow the proliferation of “islands” of wideband deployments that would need to be worked around by regional and national networks and would negate the benefits of broadband-only aggregation.¹¹

Some parties claim that broadband may not be economically feasible in non-urban areas.¹² This is wrong. ALU, Qualcomm and Northrop Grumman described in their respective initial comments that broadband is *more* cost-effective than wideband and provides equivalent or superior coverage.¹³ Acceptance of Motorola’s insinuation that broadband is only effectively deployed in urban areas would set up a “public safety digital divide” characterized by robust broadband technologies in urban areas but only limited wideband capabilities in rural areas. The Commission must reject this, as it would deprive rural areas of the life-saving capabilities, innovations, and economies of scale that characterize the commercial broadband market. The Commission would never contemplate relegating rural commercial customers to less robust networks than their urban counterparts – public safety deserves nothing less.

Further, in response to record evidence demonstrating that broadband user devices are less expensive than wideband user devices, it is erroneously claimed that the significantly higher cost of public safety devices today is driven primarily by the specialized requirements for

¹⁰ *Id.* at 4.

¹¹ *ALU Initial Comments* at 14.

¹² *Motorola Initial Comments*, at 18; Comments of the Region 22 (Minnesota) 700 MHz Public Safety Regional Planning Committee, May 23, 2007 (“*Initial Comments of Region 22*”) at 4..

¹³ *ALU Initial Comments* at 5; *Qualcomm Initial Comments* at 17-27; *Northrop Grumman Initial Comments* at 3.

“ruggedized” devices that must operate for extended amounts of time in harsh environments.¹⁴

This comparison is faulty. The dramatic difference in price and functionality between commercial and public safety user devices cannot simply be explained away by differences in reliability and endurance. Much of the significant cost discrepancy is due to relegating public safety to a niche market and depriving public safety from continuing innovations and price competition because there are no economies of scale to drive them.

To achieve even some of the FCC’s interoperability goals while permitting the use of wideband technologies in the broadband block would require the deployment of expensive and burdensome multi-mode terminals. At least one vendor apparently welcomes this prospect and argues that the Commission simply could require wideband devices to be interoperable with whatever standard ultimately is selected for public safety broadband.¹⁵ It claims this could be accomplished via devices that incorporate multiple technologies including the national broadband standard in a single handset or devices with a slot for PCMCIA cards to support not only the nationwide broadband standard but also other technologies.¹⁶ This wideband/broadband dual-mode “solution” would only add to the complexity and expense of deploying an interoperable broadband network because no such solution exists today and broadband uses a variety of form factors, rather than being limited to PCMCIA cards. Thus, a “solution” that relies on PCMCIA cards will unduly limit the broadband part of the device.

Moreover, the market for equipment that is compatible with both wideband and broadband technologies not only would be limited to the relatively small public safety market but to the subset of public safety agencies that choose to deploy wideband. Such a small market may

¹⁴ *Motorola Initial Comments* at 22.

¹⁵ *Motorola Initial Comments* at 20.

¹⁶ *Id.*

support only one vendor, that is, the wideband supplier, with the result that it would place public safety back in the same technological backwater that this proceeding is designed to extract it from -- the lack of a large potential customer base and economies of scale necessary to support independently the extensive research and development necessary to drive continuing innovation, price reductions, and backward compatibility that characterizes the commercial wireless equipment market. The proposed requirement for wideband/broadband dual-mode compatibility would also strain the battery life of user devices and result in greatly diminished range. In sum, wideband/broadband dual-mode handsets would only be a step back from the goals of this proceeding.

In effect, a decision to permit the use of wideband technologies in the broadband blocks would allow the current public safety experience of high-cost/low-functionality equipment to be extended into the greenfield 700 MHz band. To break this cycle, the Commission needs to stand firm with its tentative conclusion to exclude wideband from the public safety broadband-only blocks. As stated by Ericsson, the Commission must oppose any attempt to create another environment of fragmentation.¹⁷

III. A BROADBAND-ONLY DESIGNATION WILL FOSTER RAPID DEPLOYMENT UNDER REGIONAL AND LOCAL CONTROL

A broadband-only designation will create synergies with existing public safety infrastructure, provide for rapid adoption of a new standard, and allow for significant state and local control. For instance, broadband technologies can collocate on the same transmitter locations as existing narrowband systems.¹⁸ In comparison to wideband in a one-to-one overlay

¹⁷ *Ericsson Initial Comments* at 11.

¹⁸ Motorola's claim that wideband systems can share narrowband controllers and "other network elements" is limited to undefined "newer" digital voice narrowband systems and otherwise is unsubstantiated. *Motorola Initial Comments* at 17. Note that Motorola's claims rely on proprietary

of existing narrowband transmitter locations, broadband can also provide the same data rate at the cell edge as a wideband system and can offer higher throughput than wideband within the coverage area.¹⁹

Despite the claims of wideband proponents, the only potential for delay of broadband deployment arises from the FCC's decision-making process in selecting a broadband standard. Thus, the Commission, (as urged by ALU in its initial comments) should act quickly to adopt a single commercial broadband technology as the nationwide interoperable standard.²⁰ If the Commission acts quickly, by the time the 700 MHz broadband spectrum becomes widely available in February 2009, regional and local public safety agencies will be able to deploy broadband technologies right away. Once the FCC adopts a standard, state and local jurisdictions can build regional networks, forming a "network of networks" in order to speed nationwide interoperability. These regional networks would interoperate through roaming agreements with the national licensee and other regional public safety broadband networks, and possibly commercially deployed wireless operators using similar technology. This approach also has the advantage of enabling extended coverage and redundancy capabilities through roaming agreements with existing commercial networks.

Moreover, public safety agencies can retain autonomous operations even within a shared broadband network context. In a shared broadband network (or network of networks), public safety agencies will have the ability to control and monitor network assets, accept or deny network access based on user identity or roles, and provide other levels of logical control that is

information that makes it impossible for others to rebut with technical detail. This is another example of the lack of transparency of Motorola's technical claims.

¹⁹ *ALU Initial Comments*, at 9-11; *Qualcomm Initial Comments* at 17-27.

²⁰ *See ALU Initial Comments*, at 16-18.

today provided through deployment of stove-piped single-agency networks in physically separate spectrum. Thus a broadband-only deployment will not diminish and could enhance local control.

With the local control inherent in a broadband-only system, Motorola's proposal to create a new 700 MHz public safety band plan with a local wideband segment is unneeded and adds only rigidity and complexity.²¹ Adoption of Motorola's proposal would codify the fragmentation of the public safety band that the Commission is seeking to avoid and would deprive public safety of the exact broadband capacity needed for advanced data-intensive applications such as high-quality video streams, transmission of multiple, high resolution images, and rich multi-media communications.

Similarly, Region 22 (Minnesota) also proposes a band plan that basically splits the broadband block between broadband and wideband, and it suggests a migration plan that calls for an initial, temporary wideband deployment anticipated to last a number of years.²² Moreover, it is suggested that wideband is good enough for urban areas.²³ As noted previously, however, concerns regarding broadband availability, coverage, and cost are misplaced. Today, broadband systems can serve the interests of both rural and urban communities – immediately, with the same or better coverage and in a more cost-effective manner. In contrast, there is no evidence that a wideband allocation would serve both rural and urban needs.

To the extent the Commission chooses to allow the use of wideband in some portion of the public safety spectrum, it should continue to prohibit it from the broadband-only spectrum.

²¹ See *Motorola Initial Comments* at 23. Motorola proposes 2.25 to 2.50 MHz for local and regional broadband/wideband, with the remainder of the 5 MHz block for nationwide broadband.

²² *Initial Comments of Region 22* at 2-4.

²³ *Id.* See also *Ex Parte* Letter from Steve B. Sharkey, Motorola, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 96-86, Attachment at 5 (April 19, 2007) ("*Motorola April 19 Ex Parte*").

Instead, the Commission could allow throughout most of the country a limited number of 50 kHz wideband channels on a secondary basis in the internal guard band between the public safety broadband-only block and the public safety narrowband block.²⁴ Alternatively, as some commenters have suggested, the Commission could permit the aggregation of channels for wideband technologies in the public safety narrowband block.²⁵ Indeed, the claim by many that rural agencies will require few resources is an indication that the narrowband block will be sparsely used in those regions, in which case the narrowband block could be used simultaneously for wideband operations as well as narrowband.²⁶

Although ALU does not strongly support either of these proposals to allow wideband in the public safety spectrum, they are vastly superior to infringing upon the broadband-only public safety blocks.

IV. THE COMMISSION MUST REJECT MOTOROLA'S PROPOSED POWER FLUX DENSITY LIMIT

Motorola proposes the adoption of a power flux density ("PFD") limit of 300 $\mu\text{w}/\text{m}^2$ for

²⁴ For the reasons discussed in ALU's initial comments at 21-24, such wideband use of the internal public safety guard band may not be available in regions bordering Canada. *See also Motorola Initial Comments* at 24 and Letter from Russ K. Saito, State of Hawaii, Department of Accounting and General Services, to Marlene H. Dortch, Secretary, FCC, May 23, 2007, at 2.

²⁵ Comments of Cyren Call Communications Corp., May 23, 2007, at 24; Comments of Frontline Wireless, Inc., May 23, 2007, at 55. *See also* Comments of the State of California, May 23, 2007, at 8 ("The State requests that the Commission consider waivers allowing wideband channel usage within the 700 MHz public safety narrowband block . . . based upon a recommendation from the appropriate regional planning committee(s)."). Hennepin County, Minnesota also intends to use the narrowband block for 'wideband' services.

²⁶ *See, e.g.,* Reply Comments of the Missouri State Highway Patrol, WT Docket No. 06-150 *et al.*, June 1, 2007 ("Further, since the Commission will be required to reconfigure the public safety narrowband 700 MHz block due to the shifting of the two (2) 3 MHz narrowband channel blocks into one (1) 6 MHz channel block, they should explore the possibility of permitting wideband data aggregation within the 700 MHz narrowband allocations on a regional basis, with sufficient input from the user community and the support of the respective regional planning committee.").

deployments in the public safety broadband spectrum.²⁷ Motorola states that PFD levels above this limit have the potential to cause narrowband receivers to overload even in areas of strong desired narrowband signal levels.²⁸

The Commission should not act on PFD issues until it has a more complete record on which to act. First, additional narrowband manufacturers need to provide their assessment of expected PFD limits based on their manufactured narrowband receivers. Secondly, there needs to be consensus among narrowband manufacturers on how to estimate the interference ring, *i.e.*, the area where PFD level(s) could be exceeded. This entails agreeing on potential system losses and a propagation model, including shadowing. Thirdly, guaranteeing an outage-free communications environment is not a realistic option. Designing public safety systems to a 95 - 97% coverage reliability criterion as suggested by Region 22 (Minnesota) (*e.g.*, accounting for fading and interference margins) already recognizes that outage-free wireless systems are difficult to achieve.²⁹ For a given broadband site, the size of the interference ring is expected to be a (very) small fraction of the narrowband cell footprint.³⁰ Finally, narrowband receivers present a very wide front-end filter characteristic, which leaves narrowband reception prone to significant (in-band) interference. While PFD can be controlled to some extent via the choice of antenna, antenna down-tilting and antenna height, ALU suggests that narrowband manufacturers need to develop a plan to improve on the RF selectivity of their radios. Until these issues are addressed, the Commission must not adopt Motorola's PFD proposal.

²⁷ *Motorola Initial Comments* at 27.

²⁸ *Id.*

²⁹ *See Initial Comments of Region 22* at 5.

³⁰ For example, assuming a 20 W broadband site with an antenna at 15 m above ground, 3 dB for all cabling and connector losses, and using a mix of free-space and COST-231 Hata formulas (*i.e.* excluding shadowing and clutter), the size of the area for a threshold of 300 uW/m² is about <0.2% for a (relatively small) P25 cell radius of 3 Km.

V. CONCLUSION

The Commission has an historic opportunity to provide our Nation's first responders with a nationwide interoperable wireless broadband system. The Commission should not backtrack and allow wideband technologies to be used in the broadband-only spectrum blocks. Instead, the Commission should move swiftly to adopt a nationwide broadband standard, move forward with the auction, and encourage rapid deployment of new interoperable public safety networks throughout the country.

Respectfully Submitted,

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