Before the
Federal Communications Commission
Washington, D.C.

In the matter of	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	GN Docket No. 14-177
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	IB Docket No. 15-256
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	RM-11664
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	WT Docket No. 10-112
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0- 38.0 GHz and 40.0-40.5 GHz for Government Operations	IB Docket No. 97-95

REPLY COMMENTS OF THE COMPUTER & COMMUNICATIONS INDUSTRY ASSOCIATION (CCIA)[1]

CCIA respectfully submits these reply comments in the above-referenced proceedings regarding the Commission's *Spectrum Frontiers FNPRM*.[2] This summer, the Commission took

[1] CCIA represents large, medium, and small companies in the high technology products and services sectors, including computer hardware and software, electronic commerce, telecommunications, and Internet products and services. Our members employ more than 750,000 workers and generate annual revenues in excess of $540 billion. A list of CCIA's members is available online at http://www.ccianet.org/members.

[2] *In the Matter of Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Dkt. No. 14-177, Report and Order and Further Notice of Proposed Rulemaking (rel. July 14, 2016) ("*Spectrum Frontiers FNPRM*").

assertive action to lead the United States toward a 5G future. By approving the *Spectrum Frontiers Report & Order*, the Commission established a framework and identified certain high bands of spectrum that will support the deployment of 5G mobile broadband technologies. However, the Commission must not, and indeed, the Commission has stated it will not rest on its laurels. The *Spectrum Frontiers Report & Order* also included an *FNPRM* through which the Commission seeks "new opportunities to make additional bands available".[3] CCIA encourages the Commission to act on a pending petition for rulemaking and update its rules for the 12.2-12.7 GHz band, enabling sharing for two-way mobile broadband 5G services.[4]

I. The Commission Should Promote Sharing in Bands Beyond Those Identified in the *Spectrum Frontiers FNPRM*.

The *Spectrum Frontiers Report & Order* focused on spectrum above 24 GHz for wireless broadband, opening up close to four GHz for licensed use and about seven GHz for unlicensed use. The Commission has blazed a trail for 5G with spectrum above 24 GHz; however, it should not lose sight of the utility of spectrum below that threshold. 5G will not require just a few higher bands of spectrum, for as the MVDDS 5G Coalition noted, "(the Commission) will need to continue to identify additional spectrum to meet market demand and to ensure consumers realize the high throughput, low latency and other benefits possible from 5G."[5] In the *Spectrum Frontiers NPRM*, the Commission said that it "may consider additional bands in the future, and the fact that a particular band or bands are not considered in this NPRM does not foreclose future Commission action on the band or bands."[6] The MVDDS petition presents a great opportunity for the Commission to update its rules for the 12.2-12.7 GHz band and facilitate the development

[3] *Id.* at ¶ 1.
[4] *In the Matter of MVDDS 5G Coalition Petition for Rulemaking to Permit MVDDS Use of the 12.2-12.7 GHz Band for Two-Way Mobile Broadband Service* (filed April 26, 2016) ("MVDDS 5G Coalition Petition").
[5] Comments of MVDDS 5G Coalition, GN Dkt. No. 14-177 at 1 (filed Sept. 30, 2016).
[6] *In the Matter of Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Dkt. No. 14-177, Notice of Proposed Rulemaking at ¶ 20 (rel. Oct. 23, 2015) ("*Spectrum Frontiers NPRM*").

and deployment of 5G.

A. The Commission's Current Rules for the 12.2-12.7 GHz Band are Antiquated and Should be Reformed for More Effective Use.

The mobile landscape looked very different fifteen years ago when the Commission issued technical and service rules for MVDDS in this band.[7] The iPhone was five years away. There were close to 129 million wireless subscribers by the middle of 2002.[8] Wireless carriers were using 3G technology. The Commission considered "high speed" to be connections of more than 200 kbps in at least one direction.[9] A lot has changed since then. While the Commission has been proactive auctioning off some bands and identifying others for shared use, the 12.2-12.7 GHz band has been "underutilized" due to the regulatory restrictions and the fact that the equipment necessary for using this band has not developed.[10]

B. The 12.2-12.7 GHz Band Will Help Facilitate a 5G Future.

Chairman Wheeler recently framed the importance of 5G to our nation's global competitiveness and the challenges of deploying that technology during a speech on his vision for a 5G future.[11] Many different bands will be required for the high-throughput and low-latency

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[7] *See generally Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range; Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates; and Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide a Fixed Service in the 12.2-12.7 GHz Band*, Memorandum Opinion and Order and Second Report and Order (rel. May 23, 2002), https://apps.fcc.gov/edocs_public/attachmatch/FCC-02-116A1.pdf.

[8] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act of 1996; Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking at ¶ 53 (rel. Aug. 21, 2003), https://apps.fcc.gov/edocs_public/attachmatch/FCC-03-36A1.pdf.

[9] *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable And Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, Third Report at 7 (rel. Feb. 6, 2002), https://apps.fcc.gov/edocs_public/attachmatch/FCC-02-33A1.pdf.

[10] MVDDS 5G Coalition Petition at 5-6.

[11] Tom Wheeler, Chairman, Fed. Commc'ns Comm'n, Prepared Remarks of FCC Chairman Tom Wheeler at National Press Club: "The Future of Wireless: A Vision for U.S. Leadership in a 5G World" (June 20, 2016),

service that will be characteristic of 5G networks, so identifying additional bands of spectrum that can facilitate 5G will be key to maintaining the United States' global competitiveness. Although the Commission focused on millimeter wave bands in the *Spectrum Frontiers Report & Order*, the Commission should also focus on the role that centimeter wave spectrum can play in a 5G future.

The 12.2-12.7 GHz band has characteristics that will help facilitate 5G technologies. Compared to millimeter wave spectrum, centimeter wave spectrum is markedly better in terms of propagation, which "will reduce risk and initial deployment expenses and complement higher band deployments for wireless operators."[12] This spectrum will also be advantageous because it "experiences less path loss than higher-frequency bands, passes through rain and foliage with less loss, and is less susceptible to the signal attenuation caused in higher frequencies by atmospheric conditions."[13]

Next generation networks will require additional facilities in closer proximity to account for the greater amount of data and shorter propagation distances in higher bands.[14] Utilizing the 12.2-12.7 GHz band could provide advantages for mobile service, as bands above 24 GHz will have limited range, by comparison. Moreover, deployment in the bands above 24 GHz will be more limited by the facilities that can be used. The MVDDS 5G Coalition argues that the 12.2-12.7 GHz band presents significant cost, siting, and implementation advantages that will help

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http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0620/DOC-339920A1.pdf ("[I]f the United States is going to continue to be a world leader in wireless, we need to speed the deployment of 5G, here, on our shores.").

[12] Comments of the MVDDS 5G Coalition at 6.

[13] *Id.* at 7-8.

[14] *See* Richard Adler, *Preparing for a 5G World*, THE ASPEN INSTITUTE at 38 (2016), *available at* http://csreports.aspeninstitute.org/documents/PreparingFor5G.pdf ("One of the most distinctive challenges of building out 5G networks will involve extending the current practice of 'densifying' 4G networks by deploying much small cells. With 5G, there will be a need to deploy an unprecedented number of small cells in addition to deploying additional cellular towers that provide wide area wireless coverage. Network providers will need greater access to individual buildings, and very likely to multiple locations within buildings—to install high performance network points of presence which will need to be supported by high capacity backhaul facilities.").

speed the deployment of 5G.[15] A provider utilizing the 12.2-12.7 GHz band would need significantly fewer sites for deployments compared to bands above 24 GHz: "a 12 GHz deployment would require 10 sites; a 24 GHz deployment would require 19 sites; and a 42 GHz deployment would require 32 sites."[16] The fewer facilities necessary for deployment in the 12.2-12.7 band will free up capital for upgrading or adding capacity to existing facilities.

II. The 12 GHz Band Meets the Commission's Criteria for 5G Spectrum.

The MVDDS petition presents a great opportunity for the Commission to facilitate the development and deployment of 5G. In the *Spectrum Frontiers NPRM*, the Commission laid out criteria for evaluating bands that would be suitable for 5G:

1. "[Focusing] on bands with at least 500 megahertz of contiguous spectrum";
2. Identifying "bands that are being considered internationally for mmW mobile service";
3. "[M]obile use in mmW bands should be compatible with existing incumbent license assignments and uses";
4. "[Establishing] a flexible regulatory framework that accommodates as wide a variety of services as possible."[17]

The 12.2-12.7 GHz band meets those criteria.[18] The first factor would be met because currently licensees receive one contiguous block of 500 MHz spectrum per geographic area. Regarding the second factor, use in this band "would be consistent with current international frequency allocations."[19] The third factor would be met because the Commission could establish rules to ensure compatibility with existing uses. In addition, the fourth factor would be met

[15] Comments of the MVDDS 5G Coalition at 13 ("The efficiencies include: lower costs of equipment components, reduced production costs, and numerous operational efficiencies through reduced site-acquisition count, consolidated backhaul, and streamlined base operations.")
[16] *Id*. at 11.
[17] *Id*.
[18] *See id*. at 19 ("The 12 GHz band also satisfies each of four criteria the Commission has identified as making spectrum especially suitable for 5G broadband deployment.").
[19] MVDDS 5G Coalition Petition at 6.

based on the five principles that petitioners proposed for a flexible, regulatory framework that would enhance private sector development.[20]

III. Conclusion.

Communications networks and Internet access are significant drivers of prosperity and growth for the U.S. economy. With global IP traffic projected to grow at an annual rate of twenty-two percent from 2015 to 2020, and mobile data traffic projected to grow at an annual rate of fifty-three percent over the same time period,[21] network operators, particularly wireless carriers, are facing increasing pressure to add capacity to their networks and deploy 5G technologies. The Commission took an important step toward facilitating these networks in the *Spectrum Frontiers Report & Order*; however, the Commission must continue to identify more bands, which will be crucial to ensuring the United States' leadership in 5G. CCIA agrees with Commissioner O'Rielly that "the Commission needs to look even further and target additional bandwidth between 6 and 24 GHz and even in lower bands."[22] In response to the *Spectrum Frontiers FNPRM*, CCIA urges the Commission to act on the petition of the MVDDS 5G Coalition and initiate a rulemaking to update its rules for the 12.2-12.7 GHz band and to enable sharing for two-way mobile broadband 5G services.

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Respectfully submitted,

/s/ John A. Howes, Jr.
Policy Counsel
Computer & Communications
Industry Association (CCIA)
900 17th Street, NW Suite 1100
Washington, DC 20006
(202) 783-0070
jhowes@ccianet.org

[20] *See id*. at 7 (proposing five principles in an NPRM that would facilitate a "flexible regulatory environment").
[21] VNI Forecast Highlights, CISCO.com, http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html (last visited Aug. 9, 2016).
[22] *Spectrum Frontiers NPRM* at 137 (Statement of Commissioner Michael O'Rielly).