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

In the Matter of	)	
	)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz	)	GN Docket No. 17-183
	)	
	)	

REPLY COMMENTS OF NCTA – THE INTERNET & TELEVISION ASSOCIATION

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I. INTRODUCTION AND SUMMARY

The Commission's Notice of Inquiry (NOI) generated a great deal of interest among industry. The more than seventy-five commenters who filed tell a compelling story about both the important existing uses of C-band satellite spectrum and the need for additional terrestrial wireless spectrum to support growing demand and new use cases. Although early in the proceeding, the Commission can take away two important points from these comments: (1) proposals for expanding terrestrial wireless use of the 3.7-4.2 GHz band remain poorly defined and provide little assurance that incumbent C-band satellite operations will be fully protected from expanded licensed use; and (2) provided that incumbent operations can be fully protected, the 6 GHz band could play an important part in ameliorating the unlicensed spectrum crunch.

Although these two bands—3.7-4.2 GHz and 6 GHz—both constitute core C-band satellite spectrum, comments filed to date make clear that the Commission should think about these bands differently. First, proponents of expanded terrestrial mobile use in 3.7-4.2 GHz seek interference-protected, licensed use of the band. In order to achieve this goal, proponents of mobile use in particular have suggested a variety of measures, including relocating C-band users, repacking them into less spectrum, or enabling shared use. These proposals are, as yet, only vaguely defined, rendering it very difficult to know whether any option will protect incumbent C-band operations. In contrast, most proponents of expanded terrestrial wireless use of the 6 GHz band ask the Commission to authorize unlicensed use, which would require new entrants to demonstrate that they can fully protect incumbent uses from harmful interference, would impose no new coordination burdens on incumbents, and would enable the future growth of incumbent services. Second, the satellite use case in each of the bands is different—downlink at 3.7-4.2 GHz and uplink at 6 GHz. Opening comments suggest that fully protecting C-band earth

stations in the 3.7-4.2 GHz band from terrestrial wireless users will be more challenging as a technical matter than protecting uplink operations at 6 GHz. If it moves forward with a Notice of Proposed Rulemaking (NPRM), the Commission should insist on detailed interference analyses and testing, if appropriate, demonstrating protection from harmful interference for C-band incumbents before enabling expanded terrestrial use of either band.

Provided that incumbent operations can be fully protected, NCTA and a wide variety of technology and telecommunications companies, from chipmakers to equipment suppliers, to network operators, support unlicensed use of the 6 GHz band. Comments demonstrate that, due to its proximity to existing unlicensed bands widely used by Wi-Fi and ongoing standards development, 6 GHz is well-placed to help alleviate the unlicensed spectrum crunch. 6 GHz is potentially even more valuable for unlicensed use if the Commission also authorizes unlicensed use of the adjacent 5.9 GHz band. As Commissioner O'Rielly has highlighted, "the Commission could combine the 5.9 and 6 GHz bands to expand current unlicensed operations and promote continued growth."[1] Because different incumbents operate in different portions of the 6 GHz band, the Commission could consider whether different coexistence solutions may prove to be appropriate for different frequency ranges and whether such differences enable it to move forward more quickly in certain parts of the band. It can also establish an appropriate out-of-band emissions (OOBE) limit to protect adjacent incumbents at the lower band edge.

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[1] Michael O'Rielly, Commissioner, FCC, Remarks Before the 6th Annual Americas Spectrum Management Conference (Oct. 13, 2017), http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db1013/DOC-347222A1.pdf (O'Rielly Remarks).

II. MORE DETAIL IS REQUIRED TO DETERMINE WHETHER PROPOSALS FOR EXPANDED TERRESTRIAL USE OF 3.7-4.2 GHZ WOULD PROTECT INCUMBENT SATELLITE OPERATIONS

The Commission inquired in its NOI whether the 3.7-4.2 GHz band could be more intensively used for wireless broadband.[2] Commenters offered a myriad of views on whether or how this band could be shared. Although early in this process, the Commission can draw two conclusions from the opening comments: (1) no commenter has yet offered sufficiently detailed proposals or technical analysis to establish that, despite the technical challenges of expanding wireless access to the band, they could fully protect incumbent C-band satellite operations; and (2) before taking any next steps, the Commission would need a more complete picture of existing incumbent operations than what is currently available in its licensing database. NCTA provides preliminary reactions below to the high-level proposals advanced in initial comments.

A. Neither Relocation Nor Repacking Would Sufficiently Protect Incumbent C- Band Uses

Some commenters favor heavy-handed measures to enable expanded mobile wireless use, including relocating satellite operations to other frequency bands or to fiber, or repacking such operations into less spectrum. As presently described, these proposals would not adequately protect the operations of NCTA's members, who, as detailed in our initial comments, rely on C-band spectrum to deliver high-quality television service to tens of millions of cable customers.[3] CTIA, Verizon, and others have suggested that satellite operations could be

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[2] *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373, 6379 ¶ 16 (2017) (NOI).

[3] Comments of NCTA – The Internet & Television Association at 2-3 (NCTA Comments). Unless otherwise noted, all comment citations herein are to comments filed in GN Docket No. 17-183 on October 2, 2017.

relocated to new frequencies such as the Ku-band.[4] However, as C-band licensees and content companies have made clear in their filings, this band likely would not prove to be a suitable home for current C-band operations.[5] First, the Ku band is more susceptible to rain fade than C-band frequencies. This poses particular concerns for the delivery of television content, as subscribers demand very high levels of reliability in their programming, no matter the weather. Second, demand appears to exceed supply already for Ku-band transponders, rendering it unlikely that the Ku-band could accommodate the full complement of services that use C-band spectrum today.[6]

CTIA, T-Mobile, Verizon, and other mobile wireless proponents also suggest that at least a portion of the existing C-band earth stations could be relocated or transitioned to fiber.[7] As an initial matter, economic realities make remote and hard-to-reach locations non-viable candidates for fiber buildout[8] and the Commission should recognize that satellite operations are attractive for the delivery of television programming precisely because they do not require costly fiber deployment to remote areas of the country. As SIA puts it, "unlike terrestrial services, the costs of providing C-band satellite services are distance-insensitive. . . .The C-band satellite network

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4 Comments of CTIA at 10 (CTIA Comments); Comments of Verizon at 17-18 (Verizon Comments); Comments of Ericsson at 7 (Ericsson Comments).

5 Comments of AT&T Services, Inc. at 5, 7 (AT&T Comments); Comments of the Content Companies at 4 (Content Companies Comments); Comments of the Satellite Industry Association at 15 (SIA Comments); Comments of SES Americom Inc. at 3 (SES Comments); Comments of the American Cable Association at 16 (ACA Comments).

6 ACA Comments at 16; *see also* AT&T Comments at 8.

7 CTIA Comments at 11-12; Ericsson Comments at 7; Comments of T-Mobile USA, Inc. at 15 (T-Mobile Comments); Verizon Comments at 18.

8 Comments of General Communication, Inc. at 2-3 (GCI Comments).

ensures that a family-owned regional cable operator in a rural area has access to programming choices comparable to those available in the largest cities."[9] It simply would not be economically viable to transition all or significant portions of C-band satellite receive facilities to rural areas and rely on fiber instead. Moreover, the record is replete with examples of other C-band uses that could not be effectively transitioned to fiber. For instance, companies that already rely heavily on fiber today to deliver content often use C-band satellites as back-up capacity when the fiber network is cut or otherwise damaged, including during natural disasters.[10] Proponents of enabling mobile use through a transition to fiber fail to identify any solution for adequate back-up facilities in the case of a massive transition from C-band satellite to fiber. In addition, as NCTA described in its initial comments, programming networks rely on C-band spectrum for itinerant use in order to transmit live sporting events and breaking news.[11] These services, similarly, cannot be transitioned to fiber. To be clear, if proponents of expanded wireless use are serious about accessing this spectrum, they will have to come up with a better proposal that details how they will ensure no disruptions to ongoing operations in the band.

Several representatives of the mobile industry also suggest repacking as a viable strategy to facilitate terrestrial mobile broadband use.[12] CTIA suggests that by doing away with its full-band, full-arc licensing policy, the Commission could (after an incentive auction) repack "remaining satellite operations into the upper edges of the 3.7-4.2 GHz band," and "mov[e]

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9 SIA Comments at 15-16.

10 *Id.* at 13.

11 NCTA Comments at 3.

12 CTIA Comments at 12-14; Ericsson Comments at 8-9; Comments of Qualcomm Incorporated at 6 (Qualcomm Comments); Verizon Comments at 18-19.

remaining satellite traffic to satellites in orbital slots that are higher in the geostationary arc" to narrow the arc to be protected.[13] As NCTA and many others have articulated in response to repeated requests to revisit this issue, reducing access to the full frequency band and full geostationary arc could impair the delivery of television programming and use of the C-band to meet itinerant programming needs, such as covering sporting and breaking news events.[14] Repacking in a manner that would limit the frequencies, azimuths, and elevation angles currently available for C-band satellite use would not adequately protect C-band users.[15]

CTIA also states that "[a]pplication of compression technologies could allow satellite traffic to be combined into a smaller number of transponders, thus freeing up a portion of the band for use by broadband service providers."[16] CTIA suggests, without citation, that it might be possible to compress content carried on two separate 36 MHz transponders into a single transponder.[17] The comments make clear that the satellite industry has taken steps over time to improve spectrum utilization. Today, the industry can fit 16-20 standard definition channels on a single transponder that, in the early days of analog transmission, could carry only one video

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13 CTIA Comments at 13-14; *see also* Verizon Comments at 18.

14 NCTA Comments at 4-5; Letter from Danielle J. Piñeres, Associate General Counsel, NCTA, to Marlene H. Dortch, Secretary, FCC, RM-11778, at 1-2 (filed Feb. 3, 2017) (NCTA Letter); SIA Comments at 25-31; Content Companies Comments at 3-5.

15 NCTA Comments at 4-5; NCTA Letter at 1-2; SIA Comments at 25-31; Content Companies Comments at 3-5.

16 CTIA Comments at 12.

17 *Id.*

channel.[18] Although compression technologies will continue to improve over time,[19] CTIA provides no support for its claim that additional technological advances are available that would permit the industry to double its compression efficiency in the near term. CTIA also does not provide any description of how industry could do so while ensuring backward compatibility with the existing installed base of receivers.

B. Sharing Proponents Have Not Demonstrated How New Entrants Would Protect C-Band Uses In a Shared Environment

A variety of commenters also express optimism that new terrestrial fixed or mobile wireless licensees could share 3.7-4.2 GHz with C-band satellite operations.[20] Proponents of shared use have not yet adequately demonstrated how such sharing mechanisms would fully protect C-band operations from harmful interference. Instead, even proponents of mobile use appear not to agree on the viability of certain sharing options. For example, Qualcomm states that "incumbent satellite ground receivers can be protected by new flexible use licensees through geographic separation."[21] Ericsson, on the other hand, claims that in order to share geographically, separation distances of between 30 and 70 km would be required between

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18 SIA Comments at 20.

19 *Id.*

20 AT&T Comments at 9-10; Comments of Comsearch at 3-4 (Comsearch Comments); Comments of Federated Wireless, Inc. at 3-4 (Federated Wireless Comments); Verizon Comments at 19; *see also* Comments of the Mid-Band Spectrum Coalition at 12, 14 (Mid-Band Spectrum Coalition Comments).

21 Qualcomm Comments at 6; *see also* Verizon Comments at 19.

terrestrial mobile operations and satellite earth stations, making geographic sharing impossible or highly undesirable.[22]

Several commenters suggest extending the Spectrum Access System (SAS) database approach that the Commission adopted for 3.5 GHz to the 3.7-4.2 GHz range.[23] Proponents have not yet described whether or how the database could accommodate the far larger number of C-band earth stations in 3.7-4.2 GHz, or considered how protection could be extended to earth stations that, consistent with the Commission's rules, are not registered. NCTA and its operator members remain confident in the SAS approach at 3.5 GHz and look forward to bringing this band quickly online for American consumers once the Commission finalizes its review of the rules. However, we agree with many others in the industry that it would be prudent to observe how 3.5 GHz deployments work in practice[24] before exploring whether this new framework could be extended to the C-band in a way that would fully protect incumbents from harmful interference.[25]

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[22] Ericsson Comments at 8, Attachment A at 1, 3; *see also* Comments of Nokia at 11-12 (concluding that "the required exclusion zones around [earth stations] could be a limiting factor for 5G deployments when the 5G and FSS systems are deployed co-channel, especially in dense urban ones where [earth stations] are present" and recommending that the FCC clear the band of satellite operations). Ericsson's filing is not sufficiently detailed to understand how it arrived at 30-70 km protection zones when the Commission has previously determined that exclusion zones of 150 km are necessary to protect satellite incumbents in the neighboring 3650-3700 MHz band, absent mutually agreed coordination. *See* 47 C.F.R. § 90.1331.

[23] *See, e.g.*, Federated Wireless Comments at 3-4; Comsearch Comments at 3; Comments of Dynamic Spectrum Alliance at 10 (DSA Comments).

[24] Reply Comments of CTIA, GN Docket No. 14-177, IB Docket No. 15-256, RM-11664, WT Docket No. 10-112, IB Docket No. 97-95, at 20-21 (filed Feb. 26, 2016).

[25] *See, e.g.*, SIA Comments at 41.

A different set of commenters urges the Commission to adopt changes to the part 101 rules to facilitate expanded use of the 3.7-4.2 GHz band for fixed point-to-multipoint (P2MP) operations.[26] According to the Broadband Access Coalition (BAC), expanding fixed P2MP use would require the Commission to throw out its full-band, full-arc licensing policy.[27] As described above, however, full-band, full-arc licensing provides important flexibility for C-band satellite operations. Proponents of fixed P2MP service have not yet adequately addressed the concerns raised by C-band users separately in response to BAC's Petition for Rulemaking,[28] or proposed an alternative to full-band, full-arc licensing that would meet the needs of C-band users.

Vague proposals for sharing will not provide sufficient assurances that C-band operations will be protected. Efforts to come up with ideas and see what sticks should not substitute for real engineering-based solutions that will demonstrably protect incumbent operations. As GCI explained, "3.7 GHz sharing proposals thus far have not adequately addressed the need for a rigorously defined and executed interference mitigation plan that ensures continuity of service" for C-band users.[29] If the Commission moves forward to a NPRM, it must demand more rigor from advocates for expanded terrestrial wireless use. At a minimum, it should expect detailed

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[26] Broadband Access Coalition Comments at 5-8 (BAC Comments); Comments of Google LLC and Alphabet Access at 2 (Google Comments); Comments of Microsoft at 6-9.

[27] BAC Comments at 8.

[28] *See generally* Comments of General Communication, Inc., RM-11791 (filed Aug 7, 2017); Opposition of the Satellite Industry Association, RM-11791 (filed Aug. 7, 2017).

[29] GCI Comments at 4.

sharing analyses and test results, if appropriate, indicating that shared operations will fully protect existing satellite users from harmful interference.

C. The Intel and Intelsat Proposal Lacks Sufficient Detail

Intelsat and Intel also have not adequately described how their proposed voluntary relinquishment solution would protect the television transmissions of C-band customers. Intelsat and Intel propose that the Commission allow co-primary terrestrial mobile operations in the 3.7-4.2 GHz band, and authorize mobile network operators to compensate FSS satellite licensees to voluntarily clear portions of the C-band for terrestrial use in certain geographic areas.[30] Intel and Intelsat casually claim that "[s]atellite operators would establish alternative arrangements to serve satellite customers" who rely on vendors like Intelsat and SES to provide the reliable capacity needed to deliver television programming.[31]

Intel and Intelsat suggest that, to free up C-band spectrum for mobile use, satellite operators could: (1) "coordinate the relocation of certain customers on a geographic area-by-geographic area basis to a subset of frequencies"; (2) "relocate antennas outside the geographic area and make use of wired or wireless alternatives"; or (3) protect earth stations through "negotiated exclusion zones and/or shielding."[32] This very high level description—mirroring many of the relocation, repacking, and sharing proposals described above—does not provide sufficient detail to the Commission or to potentially affected C-band users to evaluate what impact this proposal might have on the delivery of television programming. Specifically, the

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[30] Joint Comments of Intelsat License LLC and Intel Corporation at 2 (Intelsat & Intel Comments).

[31] *Id.* at 7.

[32] *Id.* at 16-17.

proposal does not provide any analysis of how owners and operators of registered and unregistered earth stations might be impacted. Would new equipment or relocation be required for earth station antennas at cable headends, which are not owned or operated by Intelsat or SES? Would participation, voluntary or involuntary, by earth station operators be compensated? Intelsat and Intel also have not described how the needs of programming networks—which rely on satellite capacity provisioned primarily by Intelsat and SES to transmit television content—would continue to be met in the case of reduced spectral or geographic satellite use of 3.7-4.2 GHz.

Finally, and critically, the proposal contains no analysis regarding whether there would be sufficient interest among the satellite community in participating in a voluntary, market-driven solution to clear enough terrestrial mobile wireless spectrum to make the band an interesting investment proposition for mobile wireless proponents. The Commission and existing users of the 3.7-4.2 GHz band require significantly more detail about this proposal in order to properly evaluate it.

D. The Commission Should Update the Licensing Database

The NOI asks whether incumbent users of 3.7-4.2 GHz should "update information about their operations," and whether there are "further steps that the Commission needs to take to ensure that it has the needed information about incumbent operations."[33] NCTA agrees with the many commenters who expressed that, in order to make a well-informed policy decision regarding the 3.7-4.2 GHz band, the Commission requires access to robust and accurate

[33] NOI ¶ 12.

information about existing C-band operations.[34] The Commission should take steps to ensure that its IBFS records regarding C-band usage are complete and up-to-date, including: (1) providing a reasonable time period for licensees to review and update information regarding their existing licenses/registrations; and (2) streamlining the process for registering the large number of earth stations that have not previously been registered. Adopting this approach will improve the Commission's understanding of deployed C-band operations while limiting the information collection burden on C-band users.

III. THE RECORD REFLECTS SIGNIFICANT SUPPORT FOR UNLICENSED USE OF 6 GHZ, PROVIDED THAT INCUMBENT OPERATIONS ARE FULLY PROTECTED

A. Comments Reflect Substantial Support for Unlicensed Use of 6 GHz

A wide variety of technology and telecommunications companies, from chipmakers to equipment suppliers, to network operators, express support for authorizing unlicensed operations in part or all of the 6 GHz band.[35] These commenters agree with NCTA that, provided incumbent operations can be fully protected, 6 GHz presents a unique opportunity to alleviate the

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[34] *See*, *e.g.*, ACA Comments at 20; AT&T Comments at 9-10; BAC Comments at 8-9; Google Comments at 4-7; Intelsat & Intel Comments at 10 n.16; SIA Comments at 23-24; Qualcomm Comments at 6.

[35] *See*, *e.g.*, Comments of All Points Broadband, Amplex Internet, Apple, Blaze Broadband, Broadcom, Cambium Networks, Cisco Systems, Cypress Semiconductor, Dell, Extreme Networks, Facebook, Fire2Wire, Google, Hewlett-Packard Enterprise, HP, Intel, Joink, Mediatek, Metalink Technologies, Microsoft, New Wave Net, Pixius Communications, Qualcomm, Rise Broadband, Ruckus, A Unit of Brocade, Snappy Internet, Sony Electronics, Western Broadband, Wireless Internet Service Provider Association, Wisper ISP, at 5-7 (6 GHz Coalition Comments); Comments of Charter Communications at 3; DSA Comments at 11-12; Ericsson Comments at 9; Comments of Huawei Technologies Co., Ltd. at 9; Mid-Band Spectrum Coalition Comments at 9; T-Mobile Comments at 16-17; Verizon Comments at 21; Comments of Wi-Fi Alliance at 5-6 (Wi-Fi Alliance Comments).

unlicensed spectrum crunch quickly and efficiently. As Commissioner O'Rielly has highlighted, if the Commission also moves forward with its proceeding to authorize unlicensed operations in the 5.9 GHz band, this would create a wide swath of spectrum "to expand current unlicensed operations and promote continued growth."[36]

Many commenters highlight the need for additional mid-band unlicensed spectrum to support growing demand for Wi-Fi and to accommodate new unlicensed services.[37] These commenters also note that because 6 GHz is located in close spectral proximity to a widely-used existing Wi-Fi band, "the wireless components used to support unlicensed broadband operations at 5 GHz can readily be extended to or reused for 6 GHz band operations," leading to lower device costs and consumer benefit.[38] In addition, commenters state that standards development is already underway "to accommodate potential 6 GHz operations, meaning that there would also be no need for a lengthy new standards setting process before 6 GHz Wi-Fi could reach the market."[39] In other words, the record to date reflects an urgent need for more unlicensed spectrum, and—so long as incumbents can be fully protected—broad support for looking to the 6 GHz band to help address that need.

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[36] *See* O'Rielly Remarks.

[37] *See, e.g.*, 6 GHz Coalition Comments at 5-7; DSA Comments at 11-12; Mid-Band Spectrum Coalition Comments at 9; Wi-Fi Alliance Comments at 5-6.

[38] Qualcomm Comments at 9-10; *see also* Comments of Broadcom Ltd at 9 (Broadcom Comments) ("Wi-Fi throughout the 6 GHz band could be integrated into unified 5/6 GHz chipsets, much as Broadcom and other manufacturers today integrate UNII-1 and U-NII-3 capabilities. This would quickly allow unlicensed 6 GHz chipset manufacturers to leverage the massive economies of scale that characterize the 5 GHz Wi-Fi ecosystem, and which keep costs very low for both operators and consumers.").

[39] Broadcom Comments at 9 (footnote omitted).

The commenters who support unlicensed use of 6 GHz recognize that incumbents will need to be fully protected, including C-band satellite and Broadcast Auxiliary Service (BAS) and Cable Television Relay Service (CARS) operations.[40] Many commenters note that different sharing solutions may be appropriate for different portions of the 6 GHz band, depending upon the nature of the existing incumbent operations.[41] Such differences could allow the Commission to move forward quickly to authorize unlicensed access to portions of the 6 GHz band where incumbent protection proves easier to tackle, understanding that the details of sharing in other portions of the band may take longer to address.

As commenters also recognize, detailed sharing proposals and technical analyses, like those we expect for the 3.7-4.2 GHz band—including testing, if appropriate—will be required before opening up the band to unlicensed use.[42] From a satellite perspective, 6 GHz FSS uplinks would, as a technical matter, likely prove easier to protect than the corresponding downlinks at 3.7-4.2 GHz.[43] NCTA looks forward to reviewing more detailed sharing proposals and technical analyses as they are filed in the docket.

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[40] *See, e.g.*, 6 GHz Coalition Comments at 10-13; Mid-Band Spectrum Coalition Comments at 4 (recommending unlicensed use of at least a part of the 6 GHz band, "subject to the requirement for a detailed engineering analysis and mitigation proposals" to protect incumbents); Comments of Cisco Systems, Inc. at 2 ("Because 5.925-7.125 GHz is populated with licensed incumbents, the first step in considering whether to open the band to unlicensed transmitters is to determine the incumbent emissions environment, and project how new transmitters could be introduced without harming those superior rights. That engineering analysis and modeling must come first in order to engage the core of the debate.").

[41] Broadcom Comments at 11-13; 6 GHz Coalition Comments at 11; Comments of IEEE 802 at 4.

[42] *See, e.g.*, Mid-Band Spectrum Coalition Comments at 4.

[43] *See* SES Comments at 6; SIA Comments at 5, 41.

B. The Commission Should Not License the Upper Part of the 6 GHz Band or Displace or Discontinue BAS or CARS Operations

While most commenters seeking expanded terrestrial wireless use support an unlicensed approach to 6 GHz, a few companies have suggested that the Commission license at least a portion of the band. To enable licensed use, some of these companies suggest relocating or discontinuing BAS and CARS operations at 6 GHz.[44] T-Mobile, in particular, suggests that BAS and CARS "can be eliminated or accommodated for potential mobile wireless broadband use," arguing that the cable and broadcast industries can simply find alternatives such as "using aggregated licensed and unlicensed spectrum" or using other BAS/CARS frequencies.[45]

BAS and CARS operations located in the 6425-6525 MHz band and 6875-7125 MHz bands continue to serve an important function in the delivery of television programming, including for electronic newsgathering activities.[46] T-Mobile provides no persuasive reason why these important services should be discontinued in favor of licensed mobile operations. Instead, as discussed above, the Commission should examine the possibility of shared unlicensed operations following detailed technical analyses, including testing if appropriate, which would both protect existing BAS/CARS operations and allow for future growth of these services.[47]

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[44] T-Mobile Comments at 19; *see also* Ericsson Comments at 10 ("[T]he Commission should consider market-based remedies to transition incumbent operations out of the [6.425-7.125 GHz] band, either to another band or to fiber, with a particular focus transitioning uses in more urban and suburban areas.").

[45] T-Mobile Comments at 19.

[46] Comments of the National Association of Broadcasters at 8-10.

[47] *See* 6 GHz Coalition Comments at 13-14.

C. Out of Band Emissions Limits at the Lower 6 GHz Band Edge Will Adequately Protect Any Future Adjacent Services

As they have done in the Commission's 5 GHz docket, proponents of Dedicated Short Range Communications (DSRC) systems urge the Commission to take drastic measures to protect adjacent operations that have not yet been—and may never be—deployed. The Commission should conclude, as it has done with respect to adjacent emissions from the unlicensed band at 5725-5850 MHz into the 5.9 GHz band, that an appropriate out of band emissions (OOBE) limit for unlicensed operations at the 5925 MHz band edge will sufficiently protect adjacent DSRC services.

The Alliance of Automobile Manufacturers (AAM) urges the Commission to consider technical measures beyond OOBE limits for unlicensed devices to protect adjacent DSRC services.[48] If the Commission decides to rechannelize the 5.9 GHz band, AAM argues that the Commission should not allow unlicensed devices in the adjacent band at all.[49] The Association of Global Automakers (AGA) claims that in order to protect adjacent DSRC services, the Commission should adopt a 20 MHz guard band between 5925 MHz and 5945 MHz.[50]

The Commission should not adopt any of these drastic measures to protect a service that, after eighteen years of access to prime mid-band spectrum, has failed to materialize in any meaningful way. The band lays essentially fallow, with only a handful of individual pilot projects and no widespread commercial deployment. The record established in response to the

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[48] Comments of The Alliance of Automobile Manufacturers at 2.

[49] *Id.* at 1.

[50] Comments of Association of Global Automakers, Inc. at 2-3.

Department of Transportation's proposal to mandate DSRC radios in all new light vehicles makes clear that such a mandate would not serve the public interest.[51] In this environment, it is uncertain whether even the few DSRC services that have been tested will ever be widely deployed. Even less certain are future high power safety operations envisioned for Channel 184 (adjacent to 6 GHz), which to NCTA's knowledge have not yet been fully developed.

Even if DSRC operations at 5.9 GHz did become widespread, the FCC would not need to take the heavy-handed approach requested by AAM and AGA to protect licensees from adjacent-band harmful interference. First, DSRC operations must already be engineered to tolerate adjacent band interference from 6 GHz, where DSRC manufactures know many thousands of high-power fixed links reside.[52] If DSRC can tolerate the emissions from adjacent high-powered fixed links, the introduction of low-power unlicensed devices with an OOBE mask, most of which operate indoors,[53] will not cause harmful interference. Second, the Commission has

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[51] *See*, *e.g.*, Letter from David Tait, General Manager, Engineering Services, Mercedes-Benz USA, LLC, to Elaine L. Chao, Secretary, U.S. Dep't of Transp., Docket No. NHTSA-2016-0126, at 2 (filed Apr. 12, 2017); Waymo Comments on NHTSA's V2V NPRM, Docket No. NHTSA-2016-0126, at 2-3 (filed Apr. 17, 2017); *see also* Letter from Ryan Hagemann, Dir. of Tech. Policy, The Niskanen Center, to Elaine L. Chao, Secretary, U.S. Dep't of Transp., and Ajit Pai, Chairman, FCC, Docket No. 13-49, at 2 (filed June 12, 2017) (noting that numerous automakers (including the 5G Automotive Association, BMW, Fiat Chrysler, Mercedes-Benz, and Tesla), technology organizations (including Broadcom, NGMN Alliance, and Verizon), and policy groups oppose the proposed DSRC mandate).

[52] NOI ¶ 35; *see also* 47 C.F.R. § 101.113 (noting that the maximum allowable EIRP for fixed links in the 5925-6425 and 6525-7125 MHz bands is 55 dBW).

[53] Broadcom Comments at 11; Mary Brown, Cisco, *Mid-Band Spectrum: the Goldilocks Bands* (Aug. 3, 2017), https://blogs.cisco.com/gov/mid-band-spectrum-the-goldilocks-bands (noting that "[m]ost of the data we generate from our devices is generated when we are indoors, at home (especially during peak hours in the evenings) or at work . . . [a]nd that evening peak is supported in the main by home Wi-Fi networks").

already determined that OOBE masks are the appropriate interference-protection approach for Wi-Fi operating adjacent to potential future DSRC operations. The Commission reviewed a full record in considering OOBE from today's 5725-5850 MHz band into the 5.9 GHz band, including comment from DSRC interests, and it concluded that an emission mask was sufficient.[54] AAM's and AGA's proposals are inconsistent with those recent findings.

The Commission therefore should reject the drastic measures proposed by AAM and AGA in favor of an appropriate OOBE limit, as it has done at the lower edge of the 5.9 GHz band, to facilitate coexistence between adjacent unlicensed operations and DSRC. Filings in the Commission's 5 GHz docket regarding U-NII-3 out of band emissions demonstrate that, if required, an appropriate emissions limit at the lower 6 GHz band edge would be sufficient to protect future DSRC transmissions.[55]

IV. CONCLUSION

NCTA supports the Commission's efforts to identify additional spectrum for terrestrial mobile broadband use. As it considers comments in response to this NOI and any eventual NPRM, however, the Commission should closely examine proposals for expanded use of the C-band, particularly the 3.7-4.2 GHz band, to ensure that they would adequately protect incumbent satellite operations, which remain essential to the delivery of television programming. NCTA agrees with many commenters that, as a result of close spectral proximity to the existing 5 GHz unlicensed band and ongoing standards development work, the 6 GHz band is uniquely

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[54] *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Memorandum Opinion and Order, 31 FCC Rcd 2317, 2324-25 ¶ 23 (2016).

[55] *See id.* ¶¶ 20-21 (describing the comments filed in opposition to the automakers' request to revisit the OOBE limit at the lower 5.9 GHz band edge).

situated to help alleviate the unlicensed spectrum crunch, provided that incumbent operations can be fully protected. When it comes to protection for services in the adjacent 5.9 GHz band, the FCC's existing rules demonstrate that an appropriate OOBE limit would prevent harmful interference.

Respectfully submitted,

/s/ Rick Chessen

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