Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

the Matter of

Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands	WT Docket No. 12-70;
Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz	ET Docket No. 10-142;
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands	WT Docket No. 04-356.

To: The Commission

COMMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION

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The Telecommunications Industry Association submits these comments on the *Public Notice* (PN) in the above captioned proceeding.[1] TIA represents the global information and communications technology ("ICT") industry through standards development, advocacy, trade shows, business opportunities, market intelligence and world-wide environmental regulatory analysis. For over 80 years, TIA has worked to expand access to information and communications technologies, including broadband, mobile wireless, cable, satellite, and unified

[1] Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands; Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5- 1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands, *Notice of Proposed Rulemaking, Notice of Inquiry*, FCC 12-32, WT Docket No. 12-70, ET Docket No. 10-142, WT Docket No. 04-356 (Mar. 21, 2012) ("Notice").

communications networks. TIA members manufacture the equipment used for the deployment of broadband services, as well as the devices used by consumers to access these services. TIA is accredited by the American National Standards Institute (ANSI). As discussed below, TIA offers its supportive input regarding the Commission's examination of the 2 GHz range.

I. INTRODUCTION AND SUMMARY

TIA, a leading trade association for the ICT industry, is a strong supporter of the Commission's efforts to fully realize the potential mobile communications. With America's use of mobile connectivity growing exponentially, TIA shares the concerns expressed by many of a looming "spectrum crunch," as the demand for mobile application out strips available capacity.

In the Commission's evaluation of spectrum, TIA recommends the careful incorporation of several technical factors into the consideration of technical characteristic required for next generation broadband network design. These include the use of wide and contiguous bandwidth, contiguous spectrum blocks and appropriate separation for uplink and downlink frequency bands.

Regarding effective sharing technologies to be used with broadband services, TIA believes that regulatory focus is needed on meeting the spectrum demands of industry in the designated timeframe, and should not be reliant upon as-yet unproven technical capabilities. Greater investment certainty will result from licensed spectrum allocations rather than a case-by-

case, multi-factor basis, sharing efforts by the Commission. Commercial adoption of sharing models will be more responsive to economic, technological, operational and regulatory realities.

TIA embraces the Commission's "goal of global harmonization of spectrum usage by enabling innovations that can be used both here and abroad, lessening the overall developmental costs of new and innovative technologies." Such spectrum allocations dramatically increase broadband service access and roaming capabilities, reduce manufacturing and consumer costs, and provide increased regulatory certainty regarding the future value of investments.

II. SPECTRUM SHORTAGE

A. AMERICA FACES A SPECTRUM SHORTAGE

America's use of mobile connectivity is growing exponentially. This increased demand for capacity-intensive access to the Internet is visible with the rapid growth of smartphone adoption. These devices are essentially handheld computers integrated with a mobile telephone, allowing consumers to use them in much the same manner as their home computers. Smartphones are replacing feature phones. Nearly half of all wireless phones sold in 2011 were smartphones, a share that is expected to increase to more than two-thirds by 2015. Spending on data services will overtake the voice services market in 2013, and by 2015, data services will be

89 percent greater than voice services.[2] The growth in the smartphone universe is straining available wireless spectrum. T-Mobile reports that users of its G1 Android™ phone download 50 times as much data as the average T-Mobile subscriber.[3] Innovation and growth have also gone well beyond the smartphones. Demand for bandwidth consuming devices such as netbooks and tablets are skyrocketing. The market for tablets has experienced dramatic growth as well.[4]

A Commission staff technical paper on mobile broadband analyzed three separate studies, and noted that the average projection for wireless data growth by 2014 was 3,506%.[5] The Commission also has noted that the number of wireless transmitters authorized *annually* has increased fourfold in the last 10 years, and that the number of devices with three or more transmitters has grown by 700% since 2008.[6] This growth, fueled by consumer demand, cannot be sustained without adequate spectrum. As Chairman Genachowski has aptly stated: "Spectrum is the oxygen of our mobile networks. . . . In fact, I believe that the biggest threat to the future of mobile in America is the looming spectrum crisis."[7]

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2 *See* 2012 TIA Market Review & Forecast ("TIA Market Review") at 4-2.

3 *See* 2012 TIA Market Review & Forecast ("TIA Market Review") at 1-42.

4 *See* Steven M. Sears, *A Research in Motion Tablet Play*, Barron's (Feb. 23, 2011) *available at* http://online.barrons.com/article/SB50001424052970204395804576162343528105956.html?mod=BOL_da_spd.

5 *Mobile Broadband: The Benefits of Additional Spectrum, OBI Technical Paper Series*, Federal Communications Commission (Oct. 2010) at 18, *available at* http://download.broadband.gov/plan/fcc-staff-technical-paper-mobilebroadband-benefits-of-additional-spectrum.pdf.

6 *From the FCC Lab: Report on Trends in Wireless Devices*, Federal Communications Commission (Jan. 2011), *available at* http://www.fcc.gov/oet/info/documents/reports/wirelessdevices.pdf.

7 Julius Genachowski, Chairman, Federal Communications Commission, Remarks at CTIA Wireless IT & Entertainment: America's Mobile Broadband Future, 1-2 (Oct. 7, 2009) ("Chairman Genachowski CTIA Remarks").

B. REPURPOSING SPECTRUM BENEFITS THE ECONOMY

Repurposing spectrum to wireless broadband will not just satisfy consumer demands, but also will net significant economic benefits. Past efforts to make spectrum available for wireless services reflect the job-creating potential of repurposing spectrum. Spectrum reallocations between 1994 and 2000 led to a 250% increase in investment and a 300% increase in jobs in the mobile market.[8] It also has been noted that a mere 1% increase in broadband deployment –could mean the creation of as many as 300,000 new jobs.[9] Further, it has been estimated that new wireless broadband investments of $17.4 billion will increase U.S. gross domestic product (GDP) by between $126.3 billion and $184.1 billion and create between 4.5 million and 6.3 million jobs within twenty-four months of making the investment.[10] Such investments, and associated GDP and job growth, would be facilitated by the repurposing of spectrum for wireless broadband. It has been forecasted that accelerated deployment of wireless broadband technologies and applications will generate productivity gains of almost $860 billion by 2016.[11]

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[8] *See* Wendy Wigen, Betting on Wireless Broadband Access to Push the U.S. Forward, *available at* http://www.educause.edu/blog/wwigen/BettingonWirelessBroadbandAcce/207128.

[9] *See* Brookings Institute, *The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data* at 2, 12 (July 2007) *available at* http://www.brookings.edu/views/papers/crandall/200706litan.pdf.

[10] *See* Alan Pearce and Michael S. Pagano, *Accelerated Wireless Broadband Infrastructure Deployment: The Impact on GDP and Employment*, New York Law School, Media Law and Policy Law Journal, vol. 18 at 11-12 (Spring 2009) *available at* http://www.nyls.edu/user_files/1/3/4/30/84/187/245/Pearce%20&%20Pagano,%20SPRING%202009%20&%20Pagano,%2018%20MEDIA%20L.%20&%20POL%E2%80%99Y.pdf.

[11] Roger Entner, *The Increasingly Important Impact of Wireless Broadband Technology and Services on the U.S.Economy* at 4 (2008), *available at* http://files.ctia.org/pdf/Final_OvumEconomicImpact_Report_5_21_08.pdf ("Entner Paper").

III. SPECTRUM ALLOCATION PRINCIPLES FOR 2 GHZ FREQUENCIES

TIA recommends the careful incorporation of several technical factors into the consideration of spectrum characteristic required for next generation broadband network design. This analysis should include the technical criteria of band location (high versus low band location), subscriber demographics, network topology (*e.g.*, cell densities, degree of utilization of offloading via femtocells and/or WiFi, etc.), and radio access technology (*e.g.*, EDGE, HSPA, HSPA+, LTE, etc.). Such an evaluation will ensure that key spectrum characteristics are fully reflected in this process. Consideration must also be given to the ability of handsets to incorporate various band configurations. In addition, planning now, for how the AWS and AWS extension bands can ultimately be organized to improve performance and efficiencies will provide significant benefits in the future.

A. WIDE AND CONTIGUOUS BANDWIDTH

Wireless broadband services are best provided utilizing wide and contiguous spectrum. Previous allocations by the Commission in 5 and 10 MHz blocks raises product development costs by requiring separate efforts in each portion of the spectrum.[12] Narrower allocation schemes result in non-technology neutral polices, lead to limited product availability for

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[12] *See, e.g.*, 47 C.F.R. § 24.229 (identifying some Broadband PCS blocks of 5 MHz); *Id.* at § 27.5 (listing various frequency blocks in the WCS band of 5 and 10 MHz, in the AWS band of 5 and 10 MHz, and in the 700 MHz band of 5 MHz).

consumers, and increase the time-to-market period. In short, the adverse consequences reduce innovation to the detriment of the consumer and limit quality of service.

However, TIA recommends that the Commission allocate separate 10 MHz carriers to allow for the possibility of multiple carriers, but with the potential for aggregation for a 20 MHz carrier. Bands of this size or larger will encourage technologies that utilize wider bandwidth by accommodating more bits and allowing for resource pooling among users. Additionally, it will encourage the adoption and use of next generation technologies that require more capacity and will be demanded by consumers.

High data rates need wider bandwidth. The most proficient performance of LTE requires wider bandwidth channels because larger and wider channels will result in more efficient and effective networks, and will facilitate heightened deployment of Long Term Evolution (LTE).[13] The Commission should prioritize the allocation of wide, contiguous blocks of spectrum. Such provisions help avoid the difficulties associated with fragmentation and encourage the use of wide-bandwidth technologies.

The Commission often allocates spectrum in 5 and 10 MHz blocks[14] – an allocation size insufficient to support future wireless broadband networks. Wider bandwidth allocations are

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[13] *See* ITU-R, Report M.2134, Requirements related to technical performance for IMT-Advanced radio interface(s), Approved in Nov 2008 http://www.itu.int/pub/R-REP-M.2134-2008/en.

[14] *See, e.g.*, 47 C.F.R. § 24.229 (identifying some Broadband PCS blocks of 5 MHz); *Id.* § 27.5 (listing various frequency blocks in the WCS band of 5 and 10 MHz, in the AWS band of 5 and 10 MHz, and in the 700 MHz band of 5 MHz).

needed for future data-intensive wireless broadband services and will offer performance advantages that will allow resources to be pooled among users. This, in turn, will enable service providers to support faster bandwidth-intensive services for more users. Accordingly, the Commission should create a spectrum band plan that allocates new spectrum in contiguous and larger blocks to support deployment of next-generation wireless broadband networks. The 2 GHz MSS bands form a critical part of enabling larger contiguous spectrum in the AWS bands.

B. CONTIGUOUS SPECTRUM BLOCKS AND ADJACENCY TO LIKE SERVICES.

When two similar wireless broadband services are adjacent to each other, they experience the benefits of contiguous bands noted above. Furthermore, adjacency to like services reduces interference concerns to or from services allocated in adjacent bands. The allowance of wider bandwidth technologies can more effectively maximize potential uses, especially in areas where 20 MHz blocks are used. Further, there is a reduction in deployment costs for networks and equipment providers. Moreover, the standard development process is accelerated, as existing equipment can be modified rather than requiring new technology developments to support other bands; this acceleration speeds products to market.

Consequently, TIA advocates avoiding reliance on aggregating widely separated blocks of spectrum through technological means, because large contiguous blocks make radio implementations tractable and ensure that a majority of customers can be covered with practical

deployments.[15] Using widely separated spectrum blocks may require extensive filtration, adding cost, size, and complexity.

C. SEPARATION FOR UPLINK AND DOWNLINK FREQUENCY BANDS

A lack of separation between the uplink and downlink frequency bands can pose significant interference issues,[16] and the potential for harmful interference to the services in these bands would also create considerable uncertainty in the marketplace. Including 1995-2000 MHz (H Block) as a downlink band will place the downlink allocation directly adjacent to the AWS-4 uplink band. This will result in mobile transmissions in the AWS-4 band having the potential to cause significant harmful interference in the PCS downlink mobile receiver band.

Furthermore, additional restrictive technical rules on the PCS community will certainly raise equipment costs, and potentially decrease battery life. If the bands above 2000 MHz are allocated for uplink, TIA believes that the 1995-2000 MHz should be allocated as a guard band between MSS and PCS, leaving the 1915-1920 MHz portion of the H block between the duplex gap available for unlicensed PCS services.

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[15] *See, e.g.*, Comments of TIA, ET Docket No. 10-123 (filed Apr. 22, 2011) at 4-6 ("TIA Broadband Spectrum Comments").

[16] *See, e.g.*, Janis, Pekka, et al, *Adjacent channel interference between asynchronous TDD cellular networks* (Sept. 2004), *available at* http://202.194.20.8/proc/VTC09Spring/DATA/09-04-04.PDF (noting that "the interference between the uplink and downlink transmissions within each operator band as well as among the operators can generate extremely high interference…").

As the Commission notes, the AWS-4 uplink band at 2000-2020 MHz is 5 megahertz from the broadband PCS downlink band at 1930-1995 MHz. To protect PCS mobile receivers from harmful electromagnetic interference from mobile stations transmitting in the 2000-2020 MHz band, the ATC rules specify an attenuation of 70+10*log10 (P) dB below 1995 MHz. The Commission proposes " that this emission limit should continue to apply to terrestrial operations in the 2000-2020 MHz band, and that a rule should be added to Part 27 that fixed and mobile transmitters operating in 2000-2020 MHz must attenuate emissions below 1995 MHz by 70+10*log10(P) dB. [17]

Meeting this limit 70+10*log10(P) dB below the transmit power has a negative impact on mobile transmitters in 2000-2020 MHz, as the mobile station components, such as power amplifiers and filters, do not have sharp enough roll off characteristics to meet this limit when operating in the lower parts of the band, particularly when operating at the maximum power level supported. In this regard, we observe that, in standardizing the 2000-2020 MHz and 2180-2200 MHz bands as Band 23, 3GPP has allowed for up to 12 dB of additional power reduction below the maximum transmit power for mobile stations in 2000-2010 MHz to meet the Commission's current rules.[18] An MSS uplink path loss of -12 dB allowed in the Band 23 standard to meet the Commission's current OOBE rules of -40 dBm at 1995 MHz would impact UL coverage and would result in a reduction of the cell radius by 60%, therefore requiring many additional sites to maintain coverage.

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[17] *See* Notice at ¶ 35.

[18] Specifically, the standard specifies less than or equal to 12 dB of "A-MPR", additional maximum power reduction, *see LTE RF standard for UE* at 33.

In order to maintain the same coverage by reducing the back-off, smaller LTE carrier options are specified in the 3GPP Band 23 standard. For instance achieving -1 dB instead of -12dB of transmit power attenuation would require a 5 MHz carrier instead of a 10 MHz carrier, essentially an additional 5 MHz guard band besides 1995-2000 MHz. Therefore maintaining a guard band between MSS uplink and PCS downlink is critical in mitigating further reduction in the cell coverage and possible impacts to uplink throughput, and ultimately the usability of this spectrum to support multiple carriers.

Allocation of 1995-2000 MHz as a guard band will help mitigate interference that is introduced by placing the PCS G Block Base Station transmitter at 1990-1995MHz, adjacent to the ATC Base Station receiver at 2000-2020 MHz. Furthermore, additional precautions may be necessary if a 5 MHz guard band does not provide sufficient separation between PCS and MSS ATC operations. [19]

In addition, the 3GPP standards body has approved a change request to include 2000-2020 and 2180-2200 MHz for the ancillary Terrestrial Component (ATC) of Mobile Satellite Systems (MSS) in North America as Band Class 23 in release-10 of their standards, and considering this possibility would lend to global harmonization principles.[20] However in

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[19] *See, e.g.*, Comments of TIA, ET Docket No. 10-142 ,WT Docket No. 07-195 , WT Docket No. 04-356, filed July 7, 2011.

[20] *See* 3GPP, RP-110812 - CRs for Adding 2 GHz band LTE for ATC of MSS in North America, Core part (May 30, 2011), available at http://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_52//Docs/RP-110812.zip.

examining possibilities for reallocation of these frequencies, the Commission is strongly encouraged to ensure protection for existing uses from harmful interference, particularly between uplink and downlink bands.

D. INCENTIVE AUCTION FOR THE MSS UPLINK BAND

The Commission seeks input on how to best assign licenses under a new 2 GHz band plan, including the use of voluntary incentive auctions, as well as the voluntary return of some Mobile Satellite Service (MSS) spectrum rights in return for terrestrial rights in remaining 2 GHz MSS spectrum.[21] TIA has long supported Congress granting the Commission the authority needed to conduct voluntary incentive auctions,[22] and supports the proposed approaches in the PN to implement a 2 GHz band plan. The Commission should also ensure that any planned incentive auctions fully take into consideration the Commission's recent allowance of mobile and fixed allocations in MSS band.[23] TIA agrees that existing licensees could, on a voluntary basis, relinquish their licenses for certain bandwidth in exchange for a portion of the proceeds from an auction for the new licenses authorizing terrestrial only services. Utilizing voluntary incentive auctions as an enticement may lead to more efficient use of spectrum by providing an appropriate mechanism for incumbent 2 GHz MSS licensees to vacate the band in favor of mobile broadband providers operating on new licenses.

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[21] *See* Notice at ¶ 137.

[22] *See* Comments of TIA, ET Docket No. 10-235 (filed Mar. 18, 2011) at 4.

[23] See Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1625.5-1660.5 MHz, 1610-1625.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, *Report and Order*, ET Docket No. 10-142, 26 FCC Rcd 5710 (rel. April 6, 2011).

However, TIA strongly urges the Commission to ensure that any public interest conditions attached to ceded 2 GHz spectrum for auction do not overly devalue the spectrum. This could derail auctions and buildouts.

E. 1915-1920 MHZ AWS H BLOCK

The 1915-1920 MHz AWS H Block has presented challenges because of interference concerns that a guard band of 5 MHz is likely insufficient protection to avoid interference. The lower part of the H Block, at 1915-1920 MHz, has posed a potential interference threat to unlicensed PCS (UPCS) devices (e.g. cordless phones) operating at 1920-1930 MHz, and as a result concerns about interference from H Block devices to UPCS devices were raised.[24] Partly in response to these concerns, the Commission modified Part 15 of its rules governing the operation of UPCS devices to both avoid interference and to make more efficient use of this spectrum, as well as permit new advanced applications such as Voice over Internet Protocol (VoIP) and other Internet-based services. [25] In addition, there have long been serious concerns

[24] *See, e.g.*, DECT Forum Petition for Rulemaking, WT Docket Nos. 07–195, 04–356, at 2 (filed Oct. 15, 2008).

[25] *See*, Report & Order, Amendment of Part 15 of the Commission's Rules Regarding Unlicensed Personal Communications Service Devices in the 1920-1930 MHz Band ET Docket No. 10-97 (COMMISSION 12-33) released: March 23, 2012.

about interference from lower H Block devices to PCS devices in the PCS downlink bands from 1930-1990 MHz.[26]

TIA applauds the Commission's proposed solution for 1915-1920 MHz band, to convert it to unlicensed use, by adding it to the existing UPCS band.[27] Unlicensed spectrum has proven to be extremely valuable for consumers, and the deployment of unlicensed spectrum has demonstrated great economic benefits.[28] Additional unlicensed spectrum for the UPCS band would provide new capacity for devices using the ETSI DECT standard, not only for cordless phones and wireless microphones, but also for new innovative applications such as HD voice, VOIP and other Internet Protocol-based services.[29] In addition, new unlicensed spectrum is badly needed for rapidly growing market segments beyond traditional telephony, such as the wireless Machine-to-Machine (M2M) communications.[30]

Instead of proceeding to license the AWS–2 H Block and potentially creating widespread interference with both cordless phones and PCS devices, TIA submits that the public interest

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[26] *See*, Comments of Ericsson Inc. and Sony Ericsson Mobile Communications (USA) Inc., WT Docket Nos. 07–195, 04–356, at 12-13 (filed July 25, 2008); *see also* Comments of CTIA–The Wireless Association, WT Docket Nos. 04–356, 02–353, at Attachments A-C (filed Dec. 8, 2004).

[27] *See* Notice at ¶ 147.

[28] In Chairman Genachowski's Remarks at the GSMA Mobile World Congress (February 27, 2012), he noted that the "economic benefit created by applications on unlicensed spectrum is estimated at up to $37 billion a year."

[29] Operating in unlicensed spectrum has enabled DECT to continuously evolve and introduce new versions of its core technology to, such as Cordless Advanced Technology – Internet & Quality ("CAT-iq"). CAT-iq is a registered trademark owned by the DECT Forum. See: DECT Forum White Paper CAT-iq Part 1 Voice & Part 2 Data (2011) at: http://www.dect.org/documents.aspx (visited May 10, 2012)

[30] *See* DECT Forum ULE Applications White Paper (2011-01-26) at: http://www.dect.org/documents.aspx (visited May 10, 2012) citing potential M2M applications for health monitoring, home security, home & enterprise automation, and smart metering.

would be best served by considering the use of the upper H Block, from 1995-2000 MHz, as a guard band between MSS uplink transmissions and the upper end of the PCS downlink spectrum. As a variant on this, it may be possible to utilize this as a guard band while also using it to support low-powered devices operating over a short range.

TIA recommends, that in order to maximize MSS spectrum use, the Commission evaluate if incentive auctions would be an appropriate means to establish an additional guard band between the PCS downlink spectrum and the MSS uplink spectrum beginning at 2000 MHz. In the evaluation, the Commission should decide if the 5 MHz of guard band using the upper H Block will be sufficient protection between PCS and MSS uplink operation and if sufficient protection can be provided to MSS uplink operations without a guard band to broadcast auxiliary operation in the 2025-2110 MHz bands. If the Commission does decide to move forward with incentive auctions, the MSS downlink band would shift from 2000-2020 MHz to 2005-2025 MHz thus creating additional spectrum for a guard band between uplink operations in the MSS band and PCS downlink.

Assuming that the MSS uplink is shifted by 5 MHz from 2000-2020 MHz to 2005-2025 MHz to increase the guard band spectrum between MSS and PCS, cell coverage could improve, larger carriers can be supported and PCS could be protected with larger separation distances. The additional 5 MHz frequency separation together with the 3GPP specifications can limit interference from MSS UL (3GPP band 23) into PCS DL (3GPP band 25) and reduce the impact of unwanted emissions from PCS (band 2) and PCS+G-block (band 25) into the MSS UL at 2000-2010 MHz which is set to -30 dBm/MHz while 2010-2020 MHz would be -49 dBm/MHz.

F. 1695-1710 MHZ BAND

The Commission seeks comment on how incumbent users might affect implementation of the 2 GHz Extension Band Concept and what steps, if any, might be taken to expedite availability of the 1695-1710 MHz band.[31]

As the Commission observes, the 1695-1710 megahertz band has incumbent Federal and non-Federal users and the Spectrum Act requires (1) that the Administration, within three years, "begin the process of withdrawing or modifying the assignment" to Federal stations operating within 15 megahertz between 1675 and 1710 MHz and (2) that the Secretary of Commerce, within one year, "submit to the President a report identifying 15 megahertz of spectrum between 1675 megahertz and 1710 megahertz for reallocation from Federal use to non-Federal use."[32]

TIA agrees that this band has traits that are encouraging to commercial uses. It is adjacent to the AWS-1 band, which could create opportunities for like uses as service providers and equipment manufacturers may be able to adapt existing AWS-1 equipment for use in this band. In addition, similar uses between adjacent bands will likely reduce interference between licensees. While this band may have limited benefits for wide bandwidth technologies and resource pooling possibilities, TIA supports its repurposing to addressing the need for additional

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[31] *See* Notice at ¶ 142.

[32] *See* Middle Class Tax Relief and Job Creation Act of 2012, "Spectrum Act," Pub. Law 112-96, § 6401(a)(1)(A). *See id.* at § 6401(a)(3).

spectrum for broadband with the view that this spectrum should be paired with spectrum from 2075-2110 MHz. Additionally, the Commission should ensure that the maximum potential of this band is not hampered by over-expansive exclusion zones.

IV. TIA SUPPORTS USES THAT MAXIMIZE SPECTRUM VALUE AND EFFECIENCY

In the Notice, the Commission requests information on effective sharing technologies to be used with broadband services.[33] In a previous filing on dynamic use of spectrum, TIA believes that regulatory focus is needed on meeting the spectrum demands of industry in the designated timeframe, and should not be reliant upon as-yet unproven technical capabilities. Greater investment certainty will result from licensed spectrum allocations rather than a case-by-case, multi-factor basis, sharing efforts by the Commission. Commercial adoption of sharing models will be more responsive to economic, technological, operational and regulatory realities. Thus, comprehensive and rounded band plans will need to be developed.

A. SPECTRAL EFFICIENCY

With scarce spectrum resources, it is essential that spectrum use rules ensure the greatest spectral efficiency for licensees. Thus, the Commission should issue technology neutral licenses that enable existing and new licensees more flexibility to use innovative technologies and offer new services subject to appropriate interference regulations. Additionally, TIA urges the

[33] *See* Notice at ¶ 100.

Commission to allocate and auction a steady stream of licensed spectrum (and acknowledges that unencumbered spectrum provides the most freedom and flexibility to deploy wireless broadband networks).[34]

TIA also urges the Commission to consider adopting market-based mechanisms – such as two-sided auctions and auction vouchers – and allow licensees to assign, transfer, or lease spectrum rights based on economic and technical considerations. Additionally, TIA urges the Commission to consider using combinatorial (package bidding) auctions to facilitate optimal aggregation of spectrum. These initiatives will drive innovative wireless broadband technologies to market through effective spectrum management tools.

B. AUCTION CONDITIONS

The Commission has found in other proceedings that market-based spectrum bidding is an effective way to ensure that spectrum pricing reflects market, investment, and economic conditions, promotes economic growth, and increases access to communications services by awarding spectrum to the bidders that value it the most.[35]

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[34] TIA notes that, while auction based mechanisms are efficient tools for assignment of spectrum, the assignment process can take into account the public benefits that would result in spectrum being assigned via other mechanisms.

[35] *See* Implementation of Section 309(j) of the Communications Act - Competitive Bidding, PP Docket No. 93-253, Second Report and Order, 9 FCC Rcd 2348, 2349-50 ¶¶ 3-5 (1994) ("Because firms have different views of the value of the licenses to be awarded, a firm that expects to be able to offer new or much lower cost services might be willing to pay more for a license than another firm that does not believe it can offer services as competitively.")

Regarding economic incentives for deployment associated with maximized bid price, TIA believes that artificial floors to auction bidding will simply limit the ability for commercial entities to bid on and build out a network. This approach is also consistent with the Commission's long-standing policy of favoring market forces over inflexible government mandates.[36]

C. FLEXIBILITY FOR SECONDARY USES

TIA supports the application of secondary market spectrum leasing policies and rules for wireless terrestrial services to spectrum leasing agreements between MSS operators and third parties to provide terrestrial services.[37] Consistency with leasing rules that apply to other terrestrial spectrum is a virtue, and helps ensure that future transactions can proceed with greater predictability and transparency. This policy will create regulatory certainty and encourage innovative arrangements that can speed wireless broadband to rural and other areas through innovative partnerships for expansion of wireless broadband coverage areas.

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[36] *See* Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144, Memorandum Opinion and Order on Recon., 14 FCC Rcd 17556, 17567 ¶ 16 (1999) ("[M]arket forces, not government regulation**,** will ensure the provision of services to the public."); Implementation of Sections 3(n) and 332 of the Communications Act Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Second Report and Order, 9 FCC Rcd 1411**,** 1420 ¶ 19 (1994) ("Success in the marketplace . . . should be driven by technological innovation, service quality, competition-based pricing.").

[37] *See* Notice at ¶ 116.

D. FUTURE BAND PLANS

The Commission often allocates spectrum in 5 and 10 MHz blocks. However wider bandwidth allocations – in at least 10 MHz blocks – may advance future data-intensive wireless broadband services by offering performance advantages that will allow resources to be pooled among users. This, in turn, will enable service providers to support faster bandwidth-intensive services for more users. Accordingly, the Commission should create a spectrum band plan that allocate new spectrum in contiguous and larger blocks to support deployment of next-generation wireless broadband networks.

While there are some significant obstacles to overcome, there is an opportunity to eventually make the AWS extension bands part of a contiguous AWS band plan that includes a constant duplex spacing. This would provide a much better opportunity for handset vendors to incorporate, with reasonable complexity, more spectrum in a single handset, and allow for larger contiguous bandwidths to provide improved broadband services. For example pairing the 1695-1710 MHz with 2095-2110 MHz and eventually 1780-1800 MHz with 2180-2200 MHz would be a major step in this direction. It would provide 105+105 MHz of spectrum.

V. GLOBAL HARMONIZATION: GEOGRPHIC AND CANADIAN & MEXICAN COORDINATION

TIA embraces the Commission's "goal of global harmonization of spectrum usage by enabling innovations that can be used both here and abroad, lessening the overall developmental costs of new and innovative technologies."[38] The effort to identify spectrum that can be repurposed for wireless broadband should go hand-in-hand with the Commission's ongoing efforts toward globally harmonized spectrum. Such spectrum allocations dramatically increase broadband service access and roaming capabilities, reduce manufacturing and consumer costs, and provide increased regulatory certainty regarding the future value of investments.

A. GLOBALLY HARMONIZED AND TECHNOLOGY NEUTRAL ALLOCATIONS.

TIA further endorses the use of bands that are globally harmonized. In many cases, international studies are developed for specific bands, taking adjacent uses into account. This aids in regulatory compliance, allows for easier management of cross-border interference with U.S. neighbors, and encourages global roaming. TIA has long been a strong advocate for policies that promote technology neutrality, in which standards and products are developed by market-driven dynamics and open, transparent processes. As the United States moves forward in

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[38] *See* Amendment of Part 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands, *Report and Order*, 15 FCC Rcd 25264 ¶ 36 (2000).

promoting the allocation of more mobile spectrum on a global basis, it should build upon the belief that technology neutral policies are critical in promoting competition and ensuring that consumers are empowered to choose technologies that best suit their needs.

B. WRC-15 AGENDA.

TIA commends the National Telecommunications and Information Administration (NTIA) for successfully obtaining an agenda item for potential new mobile broadband spectrum at the WRC-15. This conference in 2015 will consider spectrum requirements for uses ranging from mobile service allocations for broadband applications to controlling unmanned aircraft from space. Efforts at harmonization can help ensure that manufacturers have sufficient harmonized international spectrum to realize economies of scale for emerging technologies.

VII. CONCLUSION

For the foregoing reasons, we urge the Commission to adopt policies consistent with the above recommendations.

Respectfully submitted,
TELECOMMUNICATIONS INDUSTRY ASSOCIATION

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