

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Federal Communications Commission)	
Invites Comment on LightSquared)	IB Docket No. 12-340
Request to Modify its ATC Authorization)	
)	
LightSquared Subsidiary LLC)	
Petition for Rulemaking to Revise the)	RM-11683
Commission's Technical Rules)	
)	
LightSquared Subsidiary LLC)	File No. SAT-MOD-20120928-00160
Request for Modification of its)	File No. SAT-MOD-20120928-00161
Ancillary Terrestrial Component Authority)	File No. SES-MOD-20121001-00872

COMMENTS OF THE COALITION TO SAVE OUR GPS

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Dated: December 17, 2012

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SUMMARY

The Coalition to Save Our GPS (the “Coalition”) urges the Commission to address any unresolved issues regarding interference to GPS before it allows LightSquared Subsidiary LLC (“LightSquared”) to launch the terrestrial services contemplated by its application for modification and Petition for Rulemaking. While the Coalition fully supports the Commission’s goal to make more spectrum available for wireless broadband services and remains committed to working with all relevant stakeholders to achieve this goal, such an objective must not come at the expense of critical GPS services. The Commission must ensure that any action it takes in these proceedings represents sound spectrum management.

First, consistent with the findings of the Commission’s International Bureau and the National Telecommunications and Information Administration, LightSquared should be required to relinquish terrestrial authority in the upper 10 megahertz of the L-Band at 1545-1555 MHz due to the potential for harmful “overload” interference to GPS receivers from operations in that band. *Second*, the Commission should initiate a rulemaking proceeding to address the potential use of the lower 10 megahertz of the L-Band at 1526-1536 MHz as well as the 1627.5-1637 MHz and the 1646.7-1656.7 MHz bands for terrestrial operations and continue its ongoing rulemaking proceeding to determine the feasibility of using the 1675-1680 MHz band for terrestrial operations. *Third*, in evaluating the deployment of high-powered terrestrial operations in the Mobile Satellite Service band generally, the Commission should consider the costs and benefits, and therefore, the overall public interest of authorizing such services in the historically “quiet neighborhood” adjacent to GPS. *Finally*, the Commission should recognize that it has no obligation to provide LightSquared with alternative spectrum and that it can act expeditiously to

modify LightSquared's license to delete terrestrial use of the upper 10 megahertz of the L-Band regardless of whether it finds alternative spectrum to deploy its terrestrial network.

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COMMENTS OF THE COALITION TO SAVE OUR GPS

The Coalition to Save Our GPS, along with its members Trimble Navigation Limited and Garmin International, Inc. (collectively referred to herein as the “Coalition”), pursuant to Section 1.405 of the Commission’s rules and the Public Notices issued by the Commission on November 16, 2012,^{1/} submits these comments in response to the above-referenced application for modification (“Modification Application”) and Petition for Rulemaking (“Petition”) filed by LightSquared Subsidiary LLC (“LightSquared”).^{2/} LightSquared’s Modification Application seeks to modify the Ancillary Terrestrial Component (“ATC”) authorization associated with its license which otherwise allows it to provide Mobile Satellite Service (“MSS”) in L-Band spectrum. In particular, LightSquared proposes to permanently relinquish its authority to

^{1/} See *Federal Communications Commission Invites Comment on LightSquared Request to Modify its ATC Authorization*, Public Notice, DA 12-1863 (rel. Nov. 16, 2012); *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemaking Filed*, Public Notice, Report No. 2968 (rel. Nov. 16, 2012).

^{2/} See Modification Application of LightSquared Subsidiary LLC, IBFS File Nos. SAT-MOD-20120928-00160, SAT-MOD-20120928-00161, SES-MOD-20121001-00872 (filed Sept. 28, 2012 and Oct. 1, 2012) (“Modification Application”); Petition for Rulemaking of LightSquared Subsidiary LLC, RM-11681 (filed Nov. 2, 2012) (“Petition”).

conduct terrestrial operations in the upper 10 megahertz of the L-Band at 1545-1555 MHz (“Upper L-Band”), unilaterally defer any terrestrial deployment on the lower 10 megahertz of the L-Band at 1526-1536 MHz (“Lower L-Band”), and relocate terrestrial operations to the 1675-1680 MHz band,^{3/} the reallocation of which is the subject of a separate proceeding.^{4/} Consistent with the Modification Application, the Petition requests that the Commission initiate a rulemaking proceeding to develop operating parameters that would allow LightSquared to use the Lower L-Band for terrestrial services.^{5/} The Coalition urges the Commission to act on LightSquared’s requests by: permanently revoking LightSquared’s ATC authority in the Upper L-Band; initiating a rulemaking proceeding to address the potential use of the Lower L-Band as well as the 1627.5-1637 MHz and the 1646.7-1656.7 MHz bands (the “Uplink Bands”) for terrestrial operations; and continuing, consistent with the Coalition’s already-stated views, the ongoing rulemaking proceeding to determine the feasibility of using the 1675-1680 MHz band for terrestrial operations.

I. INTRODUCTION

The Coalition, which consists of representatives from a broad range of industries, including aviation, agriculture, transportation, construction, engineering, and surveying, as well as GPS-based equipment manufacturers and service providers, was formed in March 2011 to safeguard the reliability and viability of GPS. It has over 70 major members and 130 associate members representing more than 100,000 companies and millions of employees.^{6/} The Coalition

^{3/} See Modification Application at Response to Question 43 at 2-3.

^{4/} See Petition for Rulemaking of LightSquared Subsidiary LLC, RM-11681 (filed Nov. 2, 2012) (“November Petition”); *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemaking Filed*, Public Notice, Report No. 2967 (rel. Nov. 9, 2012).

^{5/} See Petition at 1.

^{6/} A full list of members and associate members can be found on the Coalition’s website at <http://www.saveourgps.org/coalition-members.aspx>, and a description of certain of the Coalition’s most

and its members have actively engaged in every step of the proceedings designed to evaluate whether LightSquared should be permitted to proceed with its planned nationwide terrestrial network using L-Band MSS spectrum that is directly adjacent to the spectrum used by GPS.

As the Coalition has demonstrated before, GPS technology has become a vital resource affecting nearly every facet of modern-day life.^{7/} It is utilized by Federal agencies, state and local governments, first responders, airlines, farmers, pilots, boaters, surveyors, construction workers, and everyday consumers to do their jobs and conduct their everyday activities. GPS technologies have transformed government operations, commercial industries, and personal lifestyles, creating efficiencies and reducing operating costs. The Federal government has invested \$35 billion in the GPS satellite constellation alone and much more in critical systems, such as those employed by the Department of Defense and other Federal agencies, which use GPS.^{8/} Businesses and consumers have also spent billions on GPS-based technologies and devices. Studies have shown that the direct economic benefits of GPS technology on commercial GPS users alone are estimated to be between \$68 billion to \$123 billion annually.^{9/} Moreover, more than 3.3 million U.S. jobs in agriculture and related industries rely heavily on

active members can be found in the Coalition's comments responding to the report of the FCC-mandated technical working group. *See* Comments of the Coalition to Save Our GPS, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 3-7 (filed Aug. 1, 2011) ("Coalition TWG Comments").

^{7/} *See, e.g., id.* at 8-10; Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, ET Docket No. 10-142, at 46-49, 65 (filed Mar. 30, 2012) ("Coalition NTIA Reply Comments"); Reply Comments of the Coalition to Save Our GPS, WT Docket No. 11-186, at 11 (filed Dec. 20, 2011).

^{8/} *See* Coalition TWG Comments at 7-9.

^{9/} *See, e.g.,* Nam D. Pham, Ph.D., *The Economic Benefits of Commercial GPS Use in the U.S. and the Costs of Potential Disruption*, NDP Consulting, at 1 (June 2011), *attached to* Comments of Trimble Navigation Limited, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239 (filed Aug. 1, 2011).

GPS technology,^{10/} and “an estimated \$3 trillion worth of commerce relies on GPS for tracking, timing and navigation” worldwide.^{11/}

The Coalition fully supports the Commission’s goal to evaluate how it may better employ underutilized spectrum where technically feasible and to make more spectrum available for wireless broadband services. As the Coalition has often expressed, its prime concern with LightSquared’s proposed provision of terrestrial services is the impact that it may have on the reception of satellite signals by GPS devices.^{12/} The Coalition has no desire to unnecessarily impede the further deployment of spectrum for wireless broadband, and, indeed, is willing to work with all relevant stakeholders to pursue that goal. The Commission, however, must ensure that any conversion of spectrum for terrestrial broadband use represents sound spectrum management, does not jeopardize critical GPS services, and that any unresolved issues regarding interference to GPS are fully evaluated before terrestrial service is launched.

The Commission’s International Bureau, based in part on findings of the National Telecommunications and Information Administration (“NTIA”), tentatively confirmed the GPS community’s concerns and, as a result, LightSquared is not yet permitted to provide terrestrial services using its L-Band spectrum.^{13/} In light of the International Bureau’s tentative conclusion, LightSquared submitted a number of filings that constitute a plan of how it proposes to provide

^{10/} *See id.*

^{11/} *See GPS Reliability: A Review of Aviation Industry Performance, Safety Issues and Avoiding Potential New and Costly Government Burdens Before the Subcomms. on Aviation and Coast Guard and Maritime Transportation of the H. Comm. On Transportation and Infrastructure, 112th Cong. at 1 (June 23, 2011).*

^{12/} *See, e.g.,* Coalition TWG Comments at 12-19; Coalition NTIA Reply Comments at 26-33; Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109, ET Docket No. 10-142, at 2-8 (filed Mar. 13, 2012) (“Coalition Receiver Petition Reply Comments”).

^{13/} *See International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver, Public Notice, 27 FCC Rcd 1596 (2012) (“February 2012 Public Notice”);* Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dep’t of Commerce, to the Honorable Julius Genachowski, Chairman, FCC, at 1 (Feb. 14, 2012) (“NTIA Letter”).

terrestrial services in the future. *First*, it proposes to “[p]ermanently relinquish its authority to conduct terrestrial operations in its upper 10 MHz downlink band at 1545-1555 MHz – the part of LightSquared’s downlink band that is closest to the GPS band.”^{14/} *Second*, it would unilaterally defer any terrestrial deployment on the Lower L-Band while the Commission determines whether to permit terrestrial use of that band.^{15/} *Third*, LightSquared proposes to “permanently relocat[e] those terrestrial operations [from the 1545-1555 MHz band] instead to 1670-1680 MHz.”^{16/} LightSquared would use the 1670-1680 MHz band with its existing Uplink Bands to provide terrestrial services while the FCC considers the use of the Lower L-Band.^{17/}

Due to the overwhelming technical evidence that LightSquared’s originally proposed operation in the 1545-1555 MHz band will produce harmful “overload” interference to GPS receivers, the Coalition agrees that LightSquared should relinquish the Upper L-Band spectrum. The Coalition does not object to the FCC initiating a proceeding to more fully examine whether it is feasible to use the Lower L-Band and the Uplink Bands for wireless terrestrial services; indeed, a rulemaking proceeding is required to authorize a fundamentally different use of the bands than currently permitted.

^{14/} Modification Application at Response to Question 43 at 2.

^{15/} *See id.* LightSquared’s Petition, in turn, would modify the regulations governing the L-Band MSS in a manner that would permit LightSquared to provide terrestrial wireless services using, among others, the 1526-1536 MHz band. *See* Petition at 1.

^{16/} Modification Application at Response to Question 43 at 3, 11. LightSquared already has authority to use the 1670-1675 MHz band and has submitted a separate Petition for Rulemaking requesting that the Commission amend the U.S. Table of Allocations to add a primary allocation permitting non-Federal terrestrial mobile use of the band 1675-1680 MHz (and presumably license it to LightSquared). *See* November Petition at 1.

^{17/} *See* Modification Application at Response to Question 43 at 4. The Coalition’s position on the use of the 1675-1680 MHz band for mobile terrestrial operations is addressed in its comments in a separate proceeding. *See* Comments of the Coalition to Save Our GPS, RM-11681 (filed Dec. 10, 2012) (“Coalition 1.6 GHz Comments”). As explained there, the Coalition takes no position on the potential use of the 1675-1680 MHz band for terrestrial operations generally.

In this rulemaking, however, it is critical that the Commission undertake a comprehensive consideration of all relevant public policy issues and carefully consider the overall public interest, not simply the immediate exigencies surrounding the proposed business plan of a private party. As the Coalition and, previously, the U.S. GPS Industry Council, have consistently pointed out,^{18/} the MSS spectrum which LightSquared proposes to repurpose for ubiquitous high-power terrestrial use is satellite spectrum in a band historically reserved for satellite use. Revisionist history and misperceptions of prior decisions aside, the Commission has previously authorized only limited “fill in” terrestrial use of the MSS band by MSS license holders to enhance a satellite-based communications service.^{19/} The Commission should only modify the policies and rules that limited terrestrial operations in the MSS band after considering in depth the costs and benefits, and therefore, the overall public interest, in authorizing more extensive high-powered terrestrial operations in satellite spectrum closely adjacent to a critical public utility, GPS.

II. DISCUSSION

A. The Commission Should Move Beyond the Unfounded Claims about Prior MSS Proceedings.

In the Modification Application, LightSquared submits that there is a growing need for additional spectrum to be made available to support mobile broadband services and that it is in the best position to deploy a broadband network to meet this demand.^{20/} It adds that “despite its

^{18/} See, e.g., Comments of the U.S. GPS Industry Council in Response to Notice of Proposed Rulemaking and Notice of Inquiry, ET Docket No. 10-142, at 8-10 (filed Sept. 15, 2010); Comments of the Coalition to Save Our GPS, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, ET Docket No. 10-142, at 23-28 (filed Mar. 16, 2012) (“Coalition NTIA Comments”).

^{19/} See Letter from James A. Kirkland, Trimble Navigation Limited, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 3 (Oct. 11, 2012) (“Trimble Letter”); see also *id.* at Appendix at 1-6, 13-15.

^{20/} See Modification Application at Response to Question 43 at 7-11.

best efforts, LightSquared has been thwarted and delayed in implementing its plan [for a mobile broadband network using MSS L-Band spectrum] because of concerns about the compatibility between LightSquared’s terrestrial base stations and GPS receivers.”^{21/} It similarly complains that Commission approval of its proposals is necessary to “remove obstacles” that have prevented it from proceeding with deploying its network.^{22/} LightSquared argues, citing the report released on July 20, 2012, by the President’s Council of Advisors on Science and Technology (“PCAST”), that it “designed its network following authorizations granted to it from 2003-2005,” but “the problem of overload interference to GPS receivers is caused by the inability of those receivers to reject signals operating outside the GPS band” and “the lack of transparency regarding GPS receiver susceptibility to overload interference meant that . . . [such] interference did not emerge until after [LightSquared] had invested billions of dollars in its network.”^{23/}

As an initial matter, the Commission need not consider LightSquared’s oft-repeated claim that the GPS industry is to blame for LightSquared’s inability to provide service to date, which is not relevant to any prospective rulemaking. These claims are in any case wrong. The fact of the matter is that the FCC did not engage in sound spectrum management when it conditionally permitted LightSquared’s terrestrial services in the “quiet neighborhood” in which GPS receivers exist, a decision that the Commission has correctly proposed to reverse. The Coalition and others have fully documented that the problem of overload interference to GPS receivers is not caused by a lack of transparency or poor receiver design. As the Coalition has explained on

^{21/} *Id.* at 11.

^{22/} *See id.* at 1.

^{23/} Petition at 6 (*internal citations omitted*); *see also id.* at 7 (reporting that a White Paper by the Information Technology and Innovation Foundation, a Washington, D.C.-based think tank, found that “the GPS receiver overload interference issue arose because of design choices made by GPS receiver manufacturers”).

numerous occasions, GPS receivers are designed using state-of-the-art technologies and perform precisely as intended.^{24/} They are capable of picking up very distant, faint satellite signals, and the most sensitive precision GPS devices also typically include advanced filtering technologies that can resist outside signals tens of thousands or even millions of times more powerful.

Further, the issue of widespread “overload” interference to GPS was not squarely presented to the GPS community until July 2010, when the FCC proposed new rules that could have significantly expanded terrestrial use of MSS spectrum. As explained extensively by various members of the GPS industry, the ATC authority granted to LightSquared’s predecessor, Mobile Satellite Ventures Subsidiary LLC (“MSV”) in 2001 was limited to “fill in” services that were meant to be ancillary and used to supplement MSV’s primary satellite operations.^{25/} Both the government and the industry relied on and premised their analyses on this limited authorization and therefore raised what they believed to be the main risk of interference from MSV’s proposed operations at the time – the risk of “out-of-band emissions” from terrestrial fixed transmitters and mobile terminals to GPS operations.^{26/} The FCC subsequently imposed a number of interference restrictions on these terrestrial operations to ensure that MSS would remain “first and foremost a satellite service” and to protect GPS operations from harmful interference.^{27/} In July 2010, the Commission considered, for the first time, in a rulemaking proceeding whether ubiquitous terrestrial use of MSS spectrum should be permitted.^{28/}

^{24/} See Coalition NTIA Reply Comments at v, 18; Coalition to Save Our GPS Opposition to LightSquared Petition for Declaratory Ruling, IB Docket No. 11-109, ET Docket No. 10-142, at 24 (filed Feb. 27, 2012) (“Coalition Receiver Petition Opposition”); Coalition Receiver Petition Reply Comments at 12-13.

^{25/} See Trimble Letter at 3; *see also id.* at Appendix at 1-6, 13-15.

^{26/} See *id.*

^{27/} See *id.*

^{28/} See *id.* at 3, Appendix at 18-21.

In response, members of the GPS industry promptly raised their concerns that such expanded use of MSS spectrum could result in substantial widespread “overload” interference to GPS devices.^{29/} The GPS community raised these concerns again when LightSquared disclosed its plans in November 2010 to provide ubiquitous, terrestrial-only services using its ATC authorization in the MSS L-Band, as did NTIA on behalf of affected government users.^{30/} The GPS industry was fully transparent about its concerns with “overload” interference the moment the problem presented itself. The FCC was well aware of these limitations on the use of spectrum near GPS receivers. The FCC therefore neglected to adequately take into consideration the existence of, and need to protect, GPS when it conditionally authorized LightSquared’s terrestrial operations.

Against this overwhelming record evidence and the repeated plain language of the FCC’s own decisions, neither LightSquared, the Commission, nor PCAST has provided anything other than empty assertions that LightSquared was previously authorized to build a nationwide, high-powered terrestrial network in MSS spectrum, much less provided a thorough and reasoned assessment of the Commission’s prior decisions that substantiates these assertions. Repetition does not make it so. Notwithstanding LightSquared’s assertions and mischaracterizations, the Coalition does not object to a more complete examination of the issues that LightSquared raises to determine if additional wireless broadband services can be authorized, subject to the conditions discussed in further detail below.

^{29/} *See id.*

^{30/} *See id.* at 3-5.

B. Commission Action on LightSquared's Proposals Must Consider Existing Conclusions and Outstanding Issues Related to LightSquared's Ability to Use the L-Band for Terrestrial Operations.

Commission action on LightSquared's proposals must recognize and consider all of the conclusions already drawn with respect to LightSquared's ability to use the L-Band for terrestrial operations. As the Coalition and others previously explained, substantial testing has conclusively demonstrated that LightSquared's terrestrial operations in the Upper L-Band will cause harmful interference to GPS devices and that mitigation is not possible at this time.^{31/} No party, not even LightSquared, has expressed any doubt that its proposed operations in the Upper L-Band would cause massive interference to millions of GPS receivers.^{32/} Accordingly, LightSquared must be required to relinquish its terrestrial rights in that spectrum and the Commission should proceed with that element of LightSquared's proposed plan.

Similarly, the Commission must recognize, as LightSquared's requests apparently do, that issues raised in the International Bureau's February 2012 Public Notice and NTIA Letter regarding interference from LightSquared's proposed terrestrial use of the Lower L-Band to GPS devices are not yet resolved. NTIA has concluded that "[b]ased on the testing and analyses conducted to date, as well as numerous discussions with LightSquared, it is clear that LightSquared's proposed implementation plans, including operations in the lower 10 MHz only, would impact both general/personal navigation and certified aviation GPS receivers" and that "at

^{31/} See Coalition NTIA Comments at ii ("NTIA and nearly all parties that have evaluated LightSquared's original and modified plans have found that LightSquared's proposed operations will cause devastating interference to GPS."); Coalition NTIA Reply Comments at 53; see also Letter from Paul Scolese, Coalition to Save our GPS, to Ms. Marlene H. Dortch, Secretary, FCC, IB Docket No. 11-109, IBFS File No. IBFS File No. SAT-MOD-20101118-00239 (filed Nov. 8, 2011).

^{32/} See Reply Comments of the Coalition to Save Our GPS, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 5 (filed Aug. 15, 2011); see also Comments of LightSquared Subsidiary LLC, IB Docket No. 11-109, at 9 (filed Aug. 1, 2011) (conceding that "a significant number of legacy GPS receivers would be susceptible to overload in the presence of LightSquared operations in the upper 10 MHz of its downlink frequencies").

this time . . . there are no mitigation strategies that both solve the interference issues and provide LightSquared with an adequate commercial network deployment.”^{33/} NTIA further noted that “while GPS equipment developers may be able to mitigate [interference] issues via new technology in the future, the time and money required for federal, commercial, and private sector users to replace technology in the field and the marketplace, on aircraft, and in integrated national security systems cannot support the scheduled deployment of terrestrial services proposed by LightSquared.”^{34/}

Commercial GPS users should not bear the costs of any changes needed to accommodate LightSquared’s operations,^{35/} and issues regarding the time, effort, and costs associated with implementing any changes necessary to allow LightSquared to proceed with terrestrial operations in the Lower L-Band are still pending. Indeed, even LightSquared acknowledges that “scant consideration has been given to solutions over time that would take advantage of mitigation techniques and operating parameters that would permit compatible operations on LightSquared’s 1526-1536 MHz band for a transitional period.”^{36/} LightSquared’s Petition also suggests that there are a number of technical issues including power limits and geographic separation that must be addressed.^{37/}

A rulemaking proceeding is, therefore, an appropriate mechanism to resolve these issues, including who should bear the costs for any changes needed to accommodate LightSquared’s

^{33/} NTIA Letter at 8.

^{34/} Coalition NTIA Comments at 8 (citing NTIA Letter at 1).

^{35/} See Coalition Receiver Petition Opposition at 27-36.

^{36/} Petition at 10.

^{37/} See *id.* at 5.

operations.^{38/} A rulemaking proceeding is also an appropriate vehicle for determining appropriate power limits and other technical parameters necessary for protecting GPS devices. As LightSquared's Petition recognizes, "the initiation of such a rulemaking process would create an inclusive and transparent public forum, in which federal agencies, the GPS industry, LightSquared, user groups, scientists, and spectrum management experts from all fields can address all relevant issues and determine a way forward that satisfies dual public interest goals of fostering broadband while ensuring the compatibility of GPS receivers."^{39/} Until these important matters are resolved, no terrestrial operations on the Lower L-Band spectrum should be permitted.

In addition, LightSquared's proposal to use its Uplink Bands in combination with the 1670-1680 MHz band to provide terrestrial services warrants additional analysis and testing. Most of the testing conducted on LightSquared's proposed network to date has focused on the threat of interference to GPS devices from LightSquared's base stations operating on the Lower L-Band.^{40/} As several members of the GPS community have noted, however, LightSquared's

^{38/} Indeed, as members of the GPS industry have pointed out in the past, the provision of a ubiquitous, terrestrial wireless broadband service is beyond the scope of the current ATC rules. Accordingly, a rulemaking proceeding is appropriate to address the fundamental question of whether ATC authority should be expanded to cover the type of service LightSquared proposes. *See, e.g.*, Coalition Receiver Petition Opposition at ii, 1; Reply Comments of the U.S. GPS Industry Council, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 6 (filed Mar. 30, 2012) ("LightSquared's proposal would, in fact, de-couple terrestrial use entirely from the primary allocated MSS service. . . . This was precisely the type of spectrum use that the Commission concluded was unworkable when it established the MSS ATC rules, and that it expressly prohibited. Any reversal of this policy to permit such a service would require, in the first instance, a change in the allocation table and service rules governing the band.").

^{39/} Petition at 4.

^{40/} *See* Reply Comments of Deere & Co., IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 24 (filed Aug. 15, 2011) ("Deere TWG Reply Comments") (observing that "this proceeding has largely focused on the interference threat that proposed LTE base stations operating in the 1525-1559 MHz band present to GPS"); Reply Comments of Trimble Navigation Limited, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at iii (filed Aug. 15, 2011) ("Trimble TWG Reply Comments") ("[T]he analyses to date have not included consideration of LightSquared's handsets.").

handsets operating in the Uplink Bands could create an additional interference concern.^{41/} In fact, independent analyses and initial estimates have indicated that LightSquared's handsets cause interference to GPS devices.^{42/} Unfortunately, no prototypes of LightSquared's handsets were available for testing during the prior rounds of live technical testing.^{43/} Members of the Coalition look forward to working with LightSquared to further evaluate this interference risk, which should be thoroughly considered in the rulemaking.^{44/}

As the Coalition has demonstrated elsewhere, there are several matters that must also be addressed before the FCC can permit LightSquared to operate in the 1675-1680 MHz band. The Commission must, for instance, assess the impact that the use of the 1675-1680 MHz band for

^{41/} See Trimble TWG Reply Comments at iii; Comments of Garmin International, Inc., IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 49-50 (filed Aug. 1, 2011) (“Garmin TWG Comments”) (“If LightSquared is permitted to proceed now . . . that approach guarantees use of the handset (or uplink) frequencies closest to those used by GPS, raising additional serious concerns that have not been studied.”).

^{42/} See National Space-Based Positioning, Navigation, and Timing Systems Engineering Forum, *Follow-on Assessment of LightSquared Ancillary Terrestrial Component Effects on GPS Receivers*, at iii-iv (Jan. 6, 2012), attached to Letter from Teri M. Takai, Dep't of Defense, and Joel M. Szabat, Dep't of Transportation, Co-Chairs of the Executive Steering Group of EXCOM, to Administrator, NTIA (Jan. 18, 2012) (noting that tests show GPS receiver susceptibility to interference from LightSquared handsets); see also, e.g., Trimble TWG Reply Comments at 9-10; Consolidated Reply Comments of the U.S. GPS Industry Council, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 7-8 (filed Aug. 15, 2011) (reporting that “Garmin International’s analysis showed service degradations to GPS receivers from LightSquared’s handsets at distances of over one meter”); Deere TWG Reply Comments at 24-25 (explaining that Deere & Company, as well as others, “examined the significant harmful interference that LightSquared handsets operating in the 1626.5-1660.5 MHz band will create for GPS receivers” and found that they would “present a serious problem”); Comments of Stansell Consulting, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 4 (filed Aug. 1, 2011) (“LightSquared handsets are likely to harm GPS reception even more than the already damaging ATC transmitters.”).

^{43/} See Comments of the U.S. GPS Industry Council, IB Docket No. 11-109, IBFS File No. SAT-MOD-20101118-00239, at 11 (filed Aug. 1, 2011) (noting the “unavailability of any prototype handsets for testing”); Garmin TWG Comments at 49-50 (reporting on the “absence of prototypes available for testing”).

^{44/} Like the scope of ATC authority using the Lower L-Band, the Commission must also address the fundamental question of whether ATC authority should include the provision of a ubiquitous terrestrial wireless service using the Uplink Bands.

terrestrial services has on incumbent services before it is reallocated for such operations.^{45/} Moreover, the Commission should consider whether it has the authority to award the 1675-1680 MHz band to LightSquared without an auction.^{46/} As explained separately by the Coalition, Section 309(j)(1) of the Communications Act generally requires the auction of spectrum that will be used to provide terrestrial wireless services for profit.^{47/} However, LightSquared did not originally secure its spectrum through auction. The Commission must therefore consider whether it may allow LightSquared to exchange spectrum it acquired without an auction for spectrum that the Commission would have otherwise been required to auction.^{48/} Finally, in any case, the Commission should consider the use of the 1675-1680 MHz band for LightSquared in the context of the February 2012 Public Notice and the instant proceeding.^{49/}

C. Commission Evaluation of LightSquared’s Request Must Take into Consideration Fundamental Spectrum Management Decisions.

Any action to achieve the goals that LightSquared champions – more spectrum for wireless broadband – must include a more complete evaluation of the costs and benefits than the Commission has undertaken to date. On the cost side, the results of extensive technical studies have shown that high-powered operations in any portion of the MSS band adjacent to GPS will produce widespread harmful interference to millions of GPS devices and have highlighted the difficulty of designing devices that can simultaneously receive extremely weak satellite signals while also blocking out much higher powered terrestrial signals.

^{45/} See Coalition 1.6 GHz Comments at 3-4.

^{46/} See *id.* at 3.

^{47/} See *id.* at 5.

^{48/} See *id.* at 5-6.

^{49/} See *id.* at 3.

There are at least 500 million GPS devices already in use in the United States, and hundreds of millions more will be sold in the next few years alone.^{50/} As location-based applications – particularly in wireless broadband devices – become more important, devices with GPS technology will become more numerous and more central to the lives and work of the U.S. population.^{51/} It is easy to imagine that truly ubiquitous delivery of location-based information and other data will become even more critical with the advent of emerging technologies such as autonomous vehicles (*e.g.* “self-driving” cars), which require extremely precise location data for proper and safe operation. Given the tremendous success of GPS technology, the Commission must carefully consider the feasibility of and costs associated with forcing modifications of GPS receivers to accommodate high-powered terrestrial operations in spectrum in close proximity to GPS and other satellite uses. Costs include not just the expense of replacing devices in the field, which might be addressed through a sufficiently long transition period, but also the impact of engineering changes on the costs of such a large number of devices and the performance penalties that would result from re-engineering the incredible variety of GPS receivers to filter out signals billions of times stronger than GPS signals as received on Earth. Given the tremendous and exponentially increasing success and penetration of GPS technology, as currently designed, in virtually every significant business and consumer activity, the

^{50/} See Coalition TWG Comments at 12, 42; see also Ludovic Privat, *10 Million GPS Cameras Sold Next Year*, GPS BUSINESS NEWS (Nov. 19, 2012), available at http://www.gpsbusinessnews.com/10-Million-GPS-Cameras-Sold-Next-Year_a3952.html (reporting that “there will be 10 Million digital cameras sold next year that embed a GPS chipset”); *Dramatic Increase in GPS Tracker Sales*, ROCKY MOUNTAIN TRACKING (Jan. 27, 2012), available at <http://www.rmtracking.com/blog/2012/01/27/dramatic-increase-in-gps-tracker-sales/>.

^{51/} See, *e.g.*, ABI Research, *Location Applications for Tablets, eReaders, Digital Cameras & Handheld Gaming* (last visited Dec. 16, 2012), <http://www.abiresearch.com/research/product/1013601-location-applications-for-tablets-ereaders/> (“The location-based services market has been one of the major location successes of the past 3 years, with ABI Research forecasting the total smartphone market to break US\$4 Billion in 2012.”); *LBS industry Undergoing \$5 Billion Shift, Says ABI Research*, BUSINESS WIRE (Dec. 5, 2012), available at <http://www.businesswire.com/news/home/20121205006104/en/LBS-industry-Undergoing-5-Billion-Shift-ABI>.

Commission should set the bar very high for those who would alter the development of GPS technology to force accommodation of high-powered terrestrial operations in nearby spectrum, even if such accommodation is believed to be “technically feasible” in some narrow sense by some proponents. The Commission has not evaluated this fundamental issue, and it must carefully make any predictive judgments.^{52/}

It is against these costs that the Commission must carefully weigh its consideration of the benefits of deploying dense high-powered terrestrial networks in spectrum that may affect the use of GPS devices. It is not sufficient or appropriate to authorize terrestrial networks to the detriment of GPS based on the unexamined claim that high-powered terrestrial networks are the “highest and best use” of spectrum in general, or the MSS spectrum adjacent to GPS in particular. The Coalition respectfully submits that the relative value of terrestrial use of this spectrum must be thoroughly and critically tested, rather than accepted as an article of faith. The goal of more terrestrial mobile broadband should not be allowed to undermine the viability and growth of GPS. Consumers, businesses, and government users in remote areas using GPS or other location-based services to navigate from one point to another or perform high-precision activities require the ubiquity and reliability that satellite services provide – but terrestrial networks cannot offer. The Commission’s analysis of the issues raised in LightSquared’s Petition must weigh the costs and benefits of placing terrestrial use adjacent to one of the most

^{52/} In fact, the limitations of the FCC’s ability to make predictive judgments are highlighted by the fact that an earlier set of technological predictions created the current spectrum conundrum. It is clear, but only in hindsight, that when the FCC first allocated spectrum for satellite use, it overestimated the need for satellite-based services. As a result, very successful and efficient satellite based uses (GPS) sit side-by-side with satellite services that currently meet mainly niche market needs (MSS). For the reasons set forth above, the Coalition respectfully submits that it is equally dangerous to swing the pendulum to the opposite extreme and assume that new high-value satellite services will not develop in the coming decades.

successful examples of satellite communications, without any preconceived notions about the relative value of satellite and terrestrial uses.

The Commission cannot fully address LightSquared's Petition without also examining the broader questions about the future use of the MSS band, any transition in the use of this band, or any implicit or explicit requirements for changes in GPS technology that result from such a transition. Decisions on these issues will affect innovation not only in the next five or ten years, but could well determine the fundamental nature and mix of spectrum uses well beyond that. Basing those decisions on current technology may not stand the test of time. For instance, PCAST itself recently noted the trend toward "'small cell' operations that provide services for very small geographic areas," in lieu of the traditional "tall cell towers" approach proposed by LightSquared.^{53/} It would be a grave error for the Commission to prescribe a protracted transition involving a fundamental redesign of hundreds of millions of GPS devices to accommodate high-powered operations in MSS spectrum only to have technology and market conditions render this transition unnecessary or ill-advised.

Similarly, without a careful examination, the FCC should avoid concluding that more compatible satellite uses of the MSS band have no future based solely on current evidence of utilization of satellite-based services. The Coalition does not question the importance of making more spectrum available for wireless broadband use. It does not follow from this, however, that all underutilized spectrum, or MSS spectrum in particular, must be repurposed for mobile broadband now or in the future. GPS is a uniquely successful use of satellite spectrum that is

^{53/} *Report to the President Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth*, Executive Office of the President, President's Council of Advisors on Science and Technology, at vi (July 2012) (noting an "important" trend that "instead of just the tall cell towers that provide coverage for very large geographic areas, many wireless services are already moving to 'small cell' operations that provide services for very small geographic areas, reducing the potential for interference so that other services may operate much closer to them. The huge explosion of Wi-Fi services is one example of this evolution.").

ubiquitous in everyday life, and uniquely requires geographic ubiquity to support location-based applications and services. If the Commission, considering all the facts, retains the current MSS allocation, this does not mean that surrounding spectrum will be left “fallow” – in fact, compatible mobile satellite services, including critical public safety and defense communications, and data services that correct GPS-based locations to centimeter level accuracies are currently provided in adjacent mobile satellite spectrum. The Commission could accommodate future satellite uses in this band, or relocate other satellite services to free up mobile broadband spectrum elsewhere. The Commission should not prejudge any of these issues, or make spectrum decisions looking only in the “rearview mirror.”

D. Certain of the FCC’s Actions Need Not Rely on LightSquared’s Relocation to the 1675-1680 MHz Band.

LightSquared suggests that the relinquishment of its authority to conduct terrestrial operations in the Upper L-Band and the suspension of its operations in the Lower L-Band are “dependent” on relocating its operations to the 1675-1680 MHz band and using it along with its Uplink Bands.^{54/} However, LightSquared’s proposals to relinquish its ATC authority in the Upper L-Band and to suspend its operations in the Lower L-Band should not depend on either its use of the 1675-1680 MHz band or its ultimate ability to use the Lower L-Band or Uplink Bands for terrestrial operations.

LightSquared’s use of alternative spectrum to deploy its terrestrial network is unrelated to the significant GPS interference concerns that are well documented in the record before the Commission. As noted above, ample evidence exists today, confirmed by NTIA, that LightSquared’s proposed operations in the Upper L-Band and Lower L-Band would cause harmful interference to GPS and that no feasible mitigation measures exist at this time.

^{54/} See Modification Application at Response to Question 43 at 2, 11.

Relocation of LightSquared's operations or its potential use of the Lower L-Band or Uplink Bands would not change this result. Moreover, the Commission has already found that LightSquared's planned terrestrial operations and services were not consistent with its prior authorization and the Commission's mandatory "gating criteria" applicable to this authorization.

Since LightSquared has failed to satisfy the non-interference condition in the Commission's waiver of its gating criteria, and has expressed no intention to exercise its prior authorization to provide ATC subject to the gating criteria, its ATC authorization is a legal and practical nullity, no matter what the FCC does with its proposed operations at 1675-1680 MHz. The Commission should therefore modify LightSquared's license to delete terrestrial use of the Upper L-Band spectrum and separately clarify that while the Commission considers modifications of its rules regarding terrestrial use of MSS spectrum, it has no authority to provide terrestrial wireless services using its Lower L-Band or Uplink Bands spectrum. Separate rulemaking proceedings to address terrestrial use of the Lower L-Band, the Uplink Bands, and the 1675-1680 MHz band can proceed independently of a Commission finding that the Upper L-Band cannot be used for terrestrial purposes. The issues raised by the February 2012 Public Notice and NTIA Letter, including mitigation solutions for LightSquared's use of the Lower L-Band, have no bearing on LightSquared's operations on the Upper L-Band. Nor do the interference concerns implicated by LightSquared's handsets operating on the Uplink Bands affect the Commission's assessment of LightSquared's use of the Upper L-Band. Similarly, LightSquared's ability to use the 1675-1680 MHz band has no impact on its ability to relinquish its rights to the Upper L-Band.

LightSquared argues that “[w]ithout this relocation [and presumably the other changes it requests], LightSquared would not be able to deploy its broadband network.”^{55/} The Commission, however, has no obligation to provide LightSquared with alternative spectrum. As the Coalition previously explained, “[t]he Commission should vigorously pursue its goal of making additional wireless broadband spectrum available, but it has no obligation to ensure that a particular private party participates in this process.”^{56/} The Commission need not enable LightSquared to “deploy its broadband network” because LightSquared never had the authority it now claims. The bottom line is that LightSquared cannot deploy terrestrial services on the Upper L-Band due to GPS interference concerns regardless of whether it is ultimately permitted to operate on the Lower L-Band or receives alternate spectrum.

The GPS industry remains committed to working with LightSquared to determine the feasibility of its proposed operations. However, the FCC must engage in sound spectrum management and GPS operations must be protected in the interim. There is no need to link future relief for LightSquared or the deployment of terrestrial services in other bands in general to a current determination that licenses should be modified now to delete use of the Upper L-Band spectrum.

III. CONCLUSION

The Coalition recognizes the need for additional spectrum to support the growth of the mobile broadband market and the mobile wireless industry and strongly supports the Commission’s efforts to make such spectrum available when it engages in sound spectrum management and determines that the technical bases for doing so are sound. The FCC must continue to ensure that GPS operations are not disturbed by the conversion of spectrum for

^{55/} *Id.* at 11.

^{56/} Coalition NTIA Reply Comments at 44.

terrestrial operations. The Commission should modify LightSquared's license expeditiously to remove its ATC authority in the Upper L-Band. However, the proposed use of the other bands that LightSquared targets – the Lower L-Band spectrum, the Uplink Bands and the 1675-1680 MHz band – all require additional study.

Respectfully submitted,

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Dated: December 17, 2012

Certificate of Service

I, Angela Y. Kung, do hereby certify that on this 17th day of December, 2012, I caused a copy of the foregoing Comments of The Coalition to Save Our GPS, to be served via electronic mail on the following:^{1/}

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^{1/} Pursuant to Section 1.47(d) of the FCC's rules, "[d]ocuments that are required to be served must be served in paper form, even if documents are filed in electronic form with the Commission, unless the party to be served agrees to accept service in some other form." 47 C.F.R. § 1.47(d). Mr. Carlisle agreed by telephone on December 17, 2012, to accept a copy of the foregoing Comments of The Coalition to Save Our GPS by electronic mail.