



## Summary

By this petition, LightSquared asks the Commission to resolve the regulatory status of unlicensed commercial Global Positioning System (“GPS”) receivers vis-à-vis LightSquared’s licensed operations in the 1525-1559 MHz Mobile-Satellite Service (“MSS”) band. After years of planning and billions of dollars in investment, LightSquared is preparing to commence commercial service over an integrated satellite and terrestrial 4G LTE wireless network using this MSS spectrum—consistent with Commission-mandated milestones requiring LightSquared to provide a competitive 4G LTE broadband capability to 100 million Americans by the end of 2012 and 260 million Americans by the end of 2015.

It recently has become apparent that the commercial GPS industry has manufactured, and sold to unsuspecting consumers, unlicensed and poorly designed GPS receivers that “listen” for radio signals both in the “RNSS” frequency band in which the U.S. GPS system is intended to operate, as well as across the adjacent “MSS” frequency band that is *not* intended for GPS use, and in which LightSquared is licensed. The commercial GPS industry claims, without justification, that these GPS receivers somehow are entitled to “protection” from the LightSquared authorized operations that occur entirely within the MSS band. The GPS industry also claims that LightSquared must alter its plans in order to accommodate these commercial GPS receivers, and has demanded that LightSquared abandon the use of large segments of the MSS band in which LightSquared is licensed.

It does not matter whether the Commission characterizes commercial GPS receivers as unlicensed receive-only earth stations that operate under Part 25 of the Commission’s rules, or as unlicensed devices that operate under Part 15 of the Commission’s rules. The relevant precedent under either analysis reaches the same inescapable result: unlicensed commercial GPS receivers simply are not entitled to interference protection from LightSquared’s licensed operations in the MSS band. Moreover, the commercial GPS

industry is mistaken that LightSquared must bear the financial burden resulting from the failure of the commercial GPS industry, for almost a decade, to account for the deployment of LightSquared's network in the design and manufacture of commercial GPS receivers.

LightSquared's planned operations in the MSS band are fully consistent not only with its longstanding license, but also with the U.S. Table of Frequency Allocations, the Commission's service rules, and the technical standards developed over the past decade with the cooperation and support of the commercial GPS industry itself (including applicable limits on LightSquared's out-of-band emissions into the RNSS band). In contrast, commercial GPS receivers are not licensed, do not operate under any service rules, and thus are not entitled to any interference protection whatsoever. Moreover, a commercial GPS receiver that "listens" in the MSS band represents a nonconforming (and doubly unprotected) use of spectrum that is inconsistent with the U.S. Table of Frequency Allocations. The commercial GPS industry therefore has *no* basis for claiming "protection" for its unlicensed receivers, or for asserting that LightSquared's operations would cause cognizable "harmful interference" to commercial GPS receivers.

To the extent that commercial GPS receivers are not fully compatible with LightSquared's planned operations in the MSS band (which is adjacent to the RNSS band), it should be apparent that the GPS industry simply has failed to prepare itself for ATC deployment. As the Commission has long recognized, the type of receiver "desensitization" or "overload" concerns that give rise to this petition—the inability of GPS receivers to adequately "reject" the reception of signals in the adjacent MSS band—should not be blamed on the licensee in the adjacent band (LightSquared), because "overload" is "basically a . . . receiver design problem" that is within the control of the commercial GPS industry.

While the deployment of terrestrial transmitters in the MSS band has been expected for almost a decade, the commercial GPS industry has failed to take that eventuality

into account in designing and selling GPS receivers. Namely, the commercial GPS industry has failed to heed the Commission's requirement for "manufacturers to design receivers reflecting the state of the art," and also has failed to factor into its receiver design the proximity and "high power" of terrestrial land mobile transmitters "so as to reduce the susceptibility" of unlicensed receivers to incompatibilities in such an environment. The commercial GPS industry also has failed to meet U.S. Government specifications stating that civilian GPS receivers should use sharp filters to eliminate the impact of energy transmitted in adjacent frequency bands.

That LightSquared was able to develop appropriate filtering technologies for GPS receivers in less than six months, at its own expense, shows that the commercial GPS industry readily could have done the same. Worse, evidence submitted by commercial GPS interests themselves demonstrates that the industry has done the opposite—in the recent past, commercial GPS manufacturers have "opened up" their receivers to make them even more sensitive to the energy that is permissibly emitted by licensed MSS/ATC operators in adjacent frequency bands.

These issues must be resolved in order to clear up any misperceptions in the marketplace about the scope of LightSquared's authority to deploy its network in all of its licensed spectrum. LightSquared therefore respectfully asks the Commission to declare that:

- (i) Manufacturers and users of unlicensed commercial GPS receivers lack standing to file complaints or other pleadings seeking "protection" from allegedly incompatible operations in adjacent MSS bands—including ATC operations—that are permitted by the Commission's rules and the U. S. Table of Frequency Allocations;
- (ii) Commercial GPS receivers have no independent right to "protection" from operations in adjacent MSS bands, independent of the license conditions that limit the out-of-band power that may be emitted by MSS band transmitters into the RNSS band, and other than the benefit afforded by the guard band that should separate LightSquared's terrestrial operations in the MSS band from commercial GPS operations in the RNSS band;

- (iii) Commercial GPS devices that receive GPS signals in the MSS band are “nonconforming” and inconsistent with the MSS allocation in that band, and as such are not entitled to any “protection” regardless of whether they are licensed; and
- (iv) The costs of ensuring that GPS devices are compatible with adjacent band operations—including any costs necessary to retrofit legacy devices—are the responsibility of GPS manufacturers—or, at a minimum, are not the obligation of MSS/ATC licensees.

LightSquared respectfully requests that the Commission issue the requested declaratory ruling on an expedited basis to ensure that consumers can benefit from the competitive retail services to be offered over LightSquared’s network as soon as possible.

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

In the Matter of )  
 )  
LightSquared Inc. ) IB Docket No. \_\_\_\_\_  
 )  
Petition for Declaratory Ruling )  
 )

**PETITION FOR DECLARATORY RULING**

LightSquared Inc., together with its affiliates (collectively, “LightSquared”), hereby petitions the Commission for a declaratory ruling regarding the regulatory status of commercial Global Positioning System (“GPS”) receivers vis-à-vis LightSquared’s authorized operations in the 1525-1559 MHz Mobile-Satellite Service (“MSS”) band.

**I. INTRODUCTION**

After years of planning and billions of dollars in investment, LightSquared is preparing to: (i) commence commercial service over an integrated satellite and terrestrial 4G LTE wireless network using portions of the MSS band in which LightSquared is licensed to operate; (ii) provide mobile voice and broadband services to hundreds of millions of American consumers, including in rural and underserved areas, and thereby advance the goals of the *National Broadband Plan*; and (iii) satisfy the network system deployment milestones that the Commission imposed on LightSquared in March 2010.

It recently has become apparent that the commercial GPS industry has manufactured, and sold to unsuspecting consumers, unlicensed and poorly designed GPS receivers that “listen” for radio signals both in the 1559-1610 MHz “RNSS” frequency band in which the U.S. GPS system is intended to operate,<sup>1</sup> as well as in the adjacent 1525-1559

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<sup>1</sup> “RNSS” is an acronym for the “radionavigation-satellite service.”

MHz “MSS” frequency band that is licensed for LightSquared’s operations.<sup>2</sup> The commercial GPS industry claims, without justification, that these unlicensed receivers somehow are entitled to “protection” from the LightSquared authorized operations that occur entirely within the MSS band. The GPS industry also claims that LightSquared must alter its plans in order to accommodate unlicensed GPS receivers, and has demanded that LightSquared abandon the use of large segments of the MSS band in which LightSquared is licensed.

As detailed below, the commercial GPS industry is mistaken in its assertions that unlicensed GPS receivers are entitled to interference protection from LightSquared’s licensed operations in the MSS band. The commercial GPS industry also is mistaken that LightSquared must bear the financial burden resulting from the failure of the commercial GPS industry, for almost a decade, to plan for the deployment of LightSquared’s network in the design and manufacture of commercial GPS receivers.

These issues must be resolved in order to remove uncertainty and clear up any misperceptions in the marketplace about the scope of LightSquared’s authority to deploy its network in all of its licensed spectrum. LightSquared therefore asks the Commission to declare that:

- (i) Manufacturers and users of unlicensed commercial GPS receivers lack standing to file complaints or other pleadings seeking “protection” from allegedly incompatible operations in adjacent MSS bands—including ATC operations—that are permitted by the Commission’s rules and the U. S. Table of Frequency Allocations;
- (ii) Commercial GPS receivers have no independent right to “protection” from operations in adjacent MSS bands, independent of the license conditions that limit the out-of-band power that may be emitted by MSS band transmitters into the RNSS band, and other than the benefit afforded by the guard band that

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<sup>2</sup> “MSS” is an acronym for the “mobile-satellite service,” which, as described below, is distinct from RNSS. *See* Section III.C, *infra*. The U.S. Table of Frequency Allocations and the Commission’s rules allow both satellite transmissions as well as terrestrial wireless operations in 1525-1559 MHz MSS band. *See* 47 C.F.R. § 2.106 n.US380; 47 C.F.R. § 25.253.

should separate LightSquared's terrestrial operations in the MSS band from commercial GPS operations in the RNSS band;

- (iii) Commercial GPS devices that receive GPS signals in the MSS band are “nonconforming” and inconsistent with the MSS allocation in that band, and as such are not entitled to any “protection” regardless of whether they are licensed; and
- (iv) The costs of ensuring that GPS devices are compatible with adjacent band operations—including any costs necessary to retrofit legacy devices—are the responsibility of GPS manufacturers—or, at a minimum, are not the obligation of MSS/ATC licensees.

LightSquared respectfully requests that the Commission issue the requested declaratory ruling on an expedited basis to ensure that consumers can benefit from the competitive retail services to be offered over LightSquared's network as soon as possible.

## II. BACKGROUND

### A. LightSquared's History

LightSquared<sup>3</sup> was first authorized in 1989 to provide MSS in the L Band.<sup>4</sup> Since the mid-1990s, the company has operated across North America using the capacity of two satellites—MSAT-1 and MSAT-2. More recently, LightSquared has procured replacement spacecraft that are among the most sophisticated commercial communications spacecraft ever built. The first, SkyTerra 1, was placed into service earlier this year. The construction of the second, SkyTerra 2, is substantially complete; the satellite is undergoing testing and otherwise is being readied for launch. The advanced design of the new

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<sup>3</sup> LightSquared is the successor-in-interest to SkyTerra, Mobile Satellite Ventures, Motient, and the American Mobile Satellite Corporation. For simplicity, each of these companies is referred to, individually and collectively, as “LightSquared.”

<sup>4</sup> *Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services*, 4 FCC Rcd 6041 (1989); *remanded by Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991); *on remand, Ridgely Communications, Inc.*, 7 FCC Rcd 266 (1992); *aff'd, Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir. 1993); *see also AMSC Subsidiary Corporation*, 8 FCC Rcd 4040 (1993).

LightSquared satellites enables communication with smartphones and tablets that have the same form factor as the terrestrial wireless devices that consumers use today.

LightSquared's new spacecraft are part of the Commission-authorized, integrated satellite and terrestrial network that LightSquared is building, consistent with the Commission's mandate to provide competitive 4G LTE broadband capability to 100 million Americans by the end of 2012, and 260 million Americans by the end of 2015.<sup>5</sup> Specifically, LightSquared has been authorized to deploy a complementary terrestrial infrastructure in any part of the 66 MHz of the L Band where its satellites may operate.<sup>6</sup> LightSquared has made significant strides in constructing this terrestrial network, which, coupled with its satellite network, will enable the provision of seamless broadband connectivity across the United States.<sup>7</sup> The deployment of this network has been fully coordinated with Inmarsat, the other L Band MSS operator that serves the United States.

Thus, LightSquared's 4G LTE network promises to be a competitive alternative to the commercial mobile wireless networks of companies like AT&T and Verizon, and will continue the long tradition of LightSquared and its predecessors as a positive competitive force.<sup>8</sup> LightSquared's network also will advance the Commission's goals in the areas of broadband access, spectrum efficiency, and public safety. LightSquared

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<sup>5</sup> See *SkyTerra Communications, Inc. and Harbinger Capital Partners Funds*, 25 FCC Rcd 3059, Att. 2 Condition 2 (2010).

<sup>6</sup> See *Mobile Satellite Ventures Subsidiary LLC*, 19 FCC Rcd 22144, at ¶¶ 18-26 (2004) (“*MSV ATC Order*”); *SkyTerra Subsidiary LLC*, Order and Authorization, 25 FCC Rcd 3043 (2010) (“*2010 SkyTerra ATC Modification Order*”); *LightSquared Subsidiary LLC*, 26 FCC Rcd 566 (2011) (“*2011 Waiver Order*”). For these purposes, the L Band consists of the 1525-1544/1545-1559 MHz and the 1626.5-1645.5/1646.5-1660.5 MHz bands.

<sup>7</sup> See Letter to FCC from LightSquared, IB Docket No. 08-184 (Oct. 31, 2011) (detailing progress in meeting construction and terrestrial service requirements).

<sup>8</sup> See, e.g., *FCC Report to Congress as Required by the ORBIT Act*, Twelfth Annual Report, 26 FCC Rcd 8998 (2011) (noting that LightSquared contributes to “substantial competition”).

currently is not able to commence the deployment of terrestrial-only devices on this 4G LTE network because of the objections of the commercial GPS industry.<sup>9</sup>

**B. LightSquared’s Negotiations with the Commercial GPS Industry**

The concept of using MSS spectrum for combined satellite and terrestrial purposes, and LightSquared’s authority to conduct such operations, have evolved with the active participation *and support* of the commercial GPS industry for almost a decade. Indeed, LightSquared has worked with the commercial GPS industry to ensure that GPS receivers would remain compatible with LightSquared’s forthcoming terrestrial broadband network in the L Band. During this time, the GPS industry *repeatedly* supported the evolving technical parameters of LightSquared’s network—and, in particular, supported LightSquared in proceedings in which the Commission relaxed the numerical limits applicable to LightSquared’s terrestrial transmitters and significantly increased the power level at which LightSquared’s terrestrial base stations may transmit within its authorized MSS spectrum.

For example, LightSquared’s initial application for ATC authority prompted discussions between LightSquared and the commercial GPS industry, and helped resolve some of the objections that had been filed to that application, including objections that commercial GPS receivers might not work properly in the presence of (*i.e.*, could experience “overload” near) a terrestrial base station transmitting in the adjacent MSS band.<sup>10</sup> In fact, the commercial GPS industry drove the adoption of the out-of-band power limits that were

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<sup>9</sup> See 2011 Waiver Order ¶¶ 42-43.

<sup>10</sup> See Comments of Deere & Company, IBFS File No. SAT-ASG-20010302-00017, at 6 (May 7, 2001) (claiming that power from base stations could be sufficient to overload the “sensitive receiving amplifiers of the GPS terminals”); Inmarsat Ventures plc, Partial Petition to Deny, IBFS File No. SAT-ASG-20010302-00017, at 9-10 (Apr. 18, 2001) (expressing concern that power from base stations could “overload” Inmarsat METs and GPS receivers); Comments of Inmarsat Ventures plc, IB Docket No. 01-185, at 17-18 and Technical Annex at 8-9 (filed Oct. 22, 2001) (asserting that base station operations could overload GPS receivers).

adopted in the Commission's ATC rulemaking<sup>11</sup> and that have always applied to LightSquared's authorization for its terrestrial network.<sup>12</sup> Those terrestrial power limits were intended to minimize the impact of LightSquared's ATC operations on commercial GPS receivers,<sup>13</sup> after taking into account the "increased user density from *potentially millions of MSS mobile terminals operating in ATC mode*" and "*tens of thousands of ATC wireless base stations . . .*"<sup>14</sup>

A joint industry agreement memorialized those technical limits in order to "protect the GPS service's present and future operations and to provide a stable environment for the development and operation of [LightSquared's] system."<sup>15</sup> The analysis that led to that agreement "considered all relevant issues concerning potential interference to GPS," and reflected the agreement of "[a]ll relevant stakeholders," as identified by the commercial GPS industry.<sup>16</sup> In particular, those limits were adopted with the express expectation of "GPS receivers operating in the vicinity of [LightSquared terrestrial base] stations."<sup>17</sup> The limits, which are far more stringent than the limits contained in the Commission's rules, also have formed the basis for the out-of-band power limits imposed on Globalstar and TerreStar as

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<sup>11</sup> See *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, 18 FCC Rcd 1962 ("2003 ATC Order"), recon. granted in part, 18 FCC Rcd 13590 (2003), recon. granted in part 20 FCC Rcd 4616, at ¶ 53 (2005) ("2005 ATC Order").

<sup>12</sup> See *MSV ATC Order* ¶ 80 (subsequent history omitted).

<sup>13</sup> See Letter to FCC from Mobile Satellite Ventures L.P. and the U.S. GPS Industry Council, IB Docket No. 01-185 (July 17, 2002).

<sup>14</sup> See Reply Comments of U.S. GPS Industry Council, IB Docket No. 01-185, at 2 (Sep. 4, 2003) (emphasis added). NTIA subsequently identified the agreement with the commercial GPS industry as evidence that effective technical solutions "are attainable by the MSS ATC communities and agreeable with the GPS community." See Letter to FCC from NTIA, IB Docket No. 01-185, at 3 (Feb. 10, 2003).

<sup>15</sup> See Petition for Reconsideration of the U.S. GPS Industry Council, IB Docket No. 01-185, at 2 (Jun. 11, 2003).

<sup>16</sup> *Id.* at 4.

<sup>17</sup> See Letter to FCC from U.S. GPS Industry Council, IBFS File No. SAT-MOD-20031118-00333 (Mar. 24, 2004).

conditions to their ATC authorizations.<sup>18</sup> The commercial GPS industry also endorsed the LightSquared network in the very same proceedings in which the Commission relaxed, and then eliminated, limits on the number of terrestrial transmitters in the MSS band, and in which the Commission authorized a substantial increase in the power level that could be emitted by terrestrial base stations within the MSS band.<sup>19</sup>

A similar pattern emerged following LightSquared's 2009 request that the Commission modify the application of certain of its technical rules following the execution of the LightSquared-Inmarsat Cooperation Agreement to facilitate the deployment of 4G LTE wireless service, including another increase in the power level that could be emitted by terrestrial base stations within the MSS band.<sup>20</sup> In response to that license modification request, the commercial GPS industry raised certain concerns about whether the planned operation of LightSquared's "femtocells" would be compatible with indoor GPS operations.<sup>21</sup> Those concerns about indoor transmitters similarly were resolved through the adoption of negotiated out-of-band power limits.<sup>22</sup> Notably, the commercial GPS industry did not object to *any* other aspect of LightSquared's proposed terrestrial network license modification, nor did the commercial GPS industry raise any new concerns with respect to potential receiver "desensitization" or "overload."

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<sup>18</sup> See *Globalstar LLC*, 21 FCC Rcd 398, at ¶¶ 23-24 (2006); *TerreStar Networks Inc.*, 25 FCC Rcd 228, at ¶ 28 (2010).

<sup>19</sup> See *MSV ATC Order* ¶ 90 (relaxing numerical limit on L Band ATC base stations); *2005 ATC Order* ¶¶ 46-48, 55 (eliminating the numerical limit on L Band ATC base stations and increasing permitted base station EIRP from 23.9 dBW per sector to 31.9 dBW per sector).

<sup>20</sup> See *2010 SkyTerra ATC Modification Order* ¶¶ 10, 46 (increasing permitted base station EIRP from 31.9 dBW per sector to 42 dBW per sector).

<sup>21</sup> See Comments of the U.S. GPS Industry Council, IBFS File No. SAT-MOD-20090429-00047 (Jul. 10, 2009).

<sup>22</sup> See Letter to FCC from SkyTerra Subsidiary LLC and U.S. GPS Industry Council, IBFS File No. SAT-MOD-20090429-00047 (Aug. 13, 2009).

In short, the commercial GPS industry participated actively in the rulemaking and licensing proceedings that underlie LightSquared's existing authority, and the industry supported the development of LightSquared's network. In particular, the GPS industry worked with LightSquared to develop mutually-acceptable power limits that would ensure, according to the GPS industry itself, a suitable level of protection for commercial GPS devices. Moreover, the GPS industry described the Commission's initial grant of LightSquared's ATC authority as validation of LightSquared's "adherence to best commercial practices" with respect to protecting commercial GPS interests.<sup>23</sup>

### C. Evolution of LightSquared's ATC Authority

The Commission adopted its initial rules authorizing terrestrial use of MSS spectrum in 2003, and granted LightSquared the authorization to conduct such operations the following year.<sup>24</sup> On several subsequent occasions, LightSquared sought, and the Commission granted, modifications of that authority. Significantly, though, LightSquared plans to operate its network at power levels that have been permitted since 2005, when the Commission, on reconsideration, eliminated any numerical limit on LightSquared's terrestrial base stations, and generally relaxed the "in-band" base station power limits applicable to the L Band.<sup>25</sup> Even in the context of that reconsideration proceeding, the commercial GPS industry stood by the out-of-band power limits approved by the Commission, explaining that

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<sup>23</sup> See Letter to FCC from U.S. GPS Industry Council, IBFS File No. SAT-MOD-20031118-00333 (Mar. 24, 2004).

<sup>24</sup> See generally *2003 ATC Order*; *MSV ATC Order* (subsequent history omitted).

<sup>25</sup> Although the Commission authorized LightSquared to employ higher base station power in 2010, see *2010 SkyTerra ATC Modification Order* ¶¶ 10, 46 (2010) (approving base station EIRP of 42 dBW per sector), LightSquared has proposed to operate its ATC base stations at the lower EIRP approved in 2005, see *Recommendation of LightSquared Subsidiary LLC*, IB Docket No. 11-109, at 13 n.17, 24-25 (June 30, 2011), and also has offered to limit the "power on the ground" that results from the operation of its base stations in a portion of its licensed spectrum to no more than -30 dBm until January 1, 2016, and -27 dBm thereafter. See Letter to FCC from LightSquared Subsidiary LLC, IB Docket No. 11-109 (Dec. 12, 2011).

those limits were “the product of careful industry negotiations that ‘considered all relevant issues’” and were adequate notwithstanding the “increased user density from potentially millions of MSS mobile terminals operating in ATC mode” and “tens of thousands of ATC wireless base stations.”<sup>26</sup>

#### **D. 2011 Waiver Order**

In 2011, LightSquared sought and obtained from the Commission a waiver to afford LightSquared’s customers additional flexibility to provide retail ATC service through “terrestrial-only” mobile handsets. The grant of the waiver, and the underlying license modification application, did not effect any change in the number of LightSquared’s terrestrial base stations, or the power that would be emitted by those base stations.<sup>27</sup>

Notwithstanding these facts, certain members of the commercial GPS industry have used the underlying proceeding to raise concerns that the in-band power levels from LightSquared’s licensed terrestrial base stations could “overload” GPS receivers—concerns entirely unrelated to the waiver relief sought by LightSquared (which did not affect those power levels in any manner whatsoever).

In the spirit of cooperation and to facilitate grant of the requested waiver, LightSquared agreed to participate in a process intended to examine the concerns raised by the commercial GPS industry.<sup>28</sup> Critically, however, nothing in the *2011 Waiver Order* altered the relative substantive rights and obligations of the parties. In other words, the *Order* did not in any way alter the interference protection or status of unlicensed commercial GPS receivers under Commission rules and precedent.

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<sup>26</sup> See Reply Comments of the U.S. GPS Industry Council, IB Docket No. 01-185, at 2 (Sep. 4, 2003).

<sup>27</sup> See *2011 Waiver Order*.

<sup>28</sup> Letter to FCC from LightSquared Subsidiary LLC, IBFS File No. SAT-MOD-20101118-00239 (Jan. 21, 2011).

### III. DISCUSSION

As noted above, LightSquared is poised to implement a wireless 4G LTE network that will extend the benefits of broadband to hundreds of millions of American consumers—consistent with the objectives of the *National Broadband Plan*. However, LightSquared’s efforts to commence operations of the terrestrial component of this network have been frustrated by the objections of the commercial GPS industry.

LightSquared recognizes that a great deal of controversy exists regarding its rights and obligations vis-à-vis commercial GPS receivers. Much of this confusion stems from the apparent misunderstandings of the commercial GPS industry about the regulatory status of commercial GPS receivers under longstanding Commission precedent.

Commercial GPS receivers that are not licensed could be characterized as unlicensed receive-only earth stations that operate under Part 25 of the FCC’s rules (at least to the extent they communicate with U.S. GPS spacecraft).<sup>29</sup> Alternatively, such commercial GPS receivers could be treated as unlicensed devices that operate under Part 15 of the FCC’s

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<sup>29</sup> On a few occasions, the Commission has treated GPS receivers as subject to the regulatory framework that governs unlicensed receive-only earth stations, which is codified in Section 25.131 of the Commission’s rules. *See Public Notice: National Telecommunications and Information Administration Provides Information Concerning Executive Branch Recommendations for Waiver of Part 25 Rules Concerning Licensing of Receive-Only Earth Stations Operating with Non-U.S. Radionavigation Satellites*, DA 11-498 (Mar. 15, 2011) (noting that the FCC’s rules require licensing of “receive-only earth stations operating with non-U.S. licensed [RNSS] satellites.”) (“March 15 Public Notice”); *see also* Inmarsat Hawaii Inc., IBFS File No. SES-MS-20100415-00483 (Jul. 7, 2010) (granting waiver of Section 25.131(j) to permit unlicensed GPS (RNSS) terminals to receive transmissions from a U.K.-licensed Inmarsat satellite); *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements*, Second Report and Order, 18 FCC Rcd 24423, at ¶ 30 (2003) (GPS receivers among the list of receive-only earth stations exempt from compliance with equipment certification procedures because of the absence of applicable performance standards in the Commission’s rules). NTIA has viewed GPS receivers in a similar fashion. *See* Letter to FCC from NTIA (Mar. 2, 2001), attached to the March 15 Public Notice (observing that the FCC’s rules “require licensing of . . . receive-only earth stations operating with non-U.S. licensed [RNSS] satellites,” including GPS (RNSS) receivers, and citing Section 25.131).

rules. In fact, the commercial GPS industry itself characterizes many of its devices as “Part 15” devices.<sup>30</sup> In any event, manufacturers and users of commercial GPS receivers that are not licensed have simply no legal right to interference protection vis-à-vis LightSquared, or any other licensed user of radio spectrum for that matter.

For the reasons set forth below, LightSquared submits that the Commission can and should declare that: (i) manufacturers and users of unlicensed commercial GPS receivers lack standing to file complaints or other pleadings seeking “protection” from allegedly incompatible operations in adjacent MSS bands—including ATC operations—that are permitted by the Commission’s rules and the U. S. Table of Frequency Allocations; (ii) commercial GPS receivers have no independent right to “protection” from operations in adjacent MSS bands, independent of the license conditions that limit the out-of-band power that may be emitted by MSS band transmitters into the RNSS band, and other than the benefit afforded by the guard band that should separate LightSquared’s terrestrial operations in the MSS band from commercial GPS operations in the RNSS band; (iii) commercial GPS devices that receive GPS signals in the MSS band are “nonconforming” and inconsistent with the MSS allocation in that band, and as such are not entitled to any “protection” regardless of whether they are licensed; and (iv) the costs of ensuring that GPS devices are compatible with adjacent band operations—including any costs necessary to retrofit legacy devices—are the responsibility of GPS manufacturers—or, at a minimum, are not the obligation of MSS/ATC licensees.

**A. Users and Manufacturers of Unlicensed Commercial GPS Receivers Lack Standing to Complain about Alleged “Interference”**

Prior to 1979, the Commission required that all “receive-only” earth stations (*i.e.*, facilities that receive transmissions from satellites but not transmit to them) be licensed.

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<sup>30</sup> See, *e.g.*, Garmin nüvi 200 Series Manual at 13; Magellan eXplorist 310 User Manual at 3 (both attached as Exhibit 1 hereto).

In 1979, the Commission relaxed this requirement for receive-only earth stations communicating with U.S.-authorized spacecraft, and allowed those earth stations to operate without a license “in those situations where the interference protection afforded by coordination and licensing is not desired or needed.”<sup>31</sup>

Critically, the Commission gave users of receive-only earth stations the option of bypassing the licensing requirement and operating on an unlicensed basis *only* if they were willing to operate on a *completely unprotected basis*, and also forgo the benefit of any interference protection otherwise potentially available to them. In addition, the Commission recognized explicitly that there could be “no assurances that an unlicensed facility would be able to maintain the level of interference-free reception which it initially enjoys.”<sup>32</sup> In other words, the Commission anticipated that the introduction of a new terrestrial service (*e.g.*, the introduction of LightSquared’s ATC service in the MSS band) could change the interference environment, and cautioned unlicensed users that they would not be permitted to block such change.

Further, the Commission emphasized that it would not tolerate petitions to deny license applications “or other forms of complaint or relief filed by unlicensed facility operators [or end users] on the basis of experienced or anticipated interference.”<sup>33</sup> This is consistent with the notion that unlicensed receive-only earth stations have no substantive rights to protect—and thus no standing to assert those rights. In short, to the extent that GPS receivers are deemed to be earth stations that are regulated by Part 25, users of unlicensed commercial GPS receivers not only lack the substantive right to “protection” from adjacent

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<sup>31</sup> *Regulation of Domestic Receive-Only Satellite Earth Stations*, 74 FCC 2d 205, at ¶ 27 (1979) (“1979 Receive-Only Earth Station Order”); see also *Deregulation of Domestic Receive-Only Satellite Earth Stations*, 2 FCC Rcd 200 (1987); *Earth Station Application Procedures*, 6 FCC Rcd 2806 (1991); 47 C.F.R. § 25.131.

<sup>32</sup> *1979 Receive-Only Earth Station Order* ¶ 28.

<sup>33</sup> *Id.*

operations, but also lack the procedural right (*i.e.*, standing) to bring any complaint to the Commission with respect to the alleged incompatibility of LightSquared’s ATC operations and commercial GPS devices.

The same result would lie if commercial GPS receivers were deemed to be subject to regulation under Part 15. As Commission staff appropriately have recognized, “[t]he basic premise of all Part 15 unlicensed operation is that unlicensed devices cannot cause interference to licensed operations nor are they protected from any interference received.”<sup>34</sup> More specifically, Part 15 unlicensed devices lack “any vested or recognizable right to continued use of any given frequency . . . .”<sup>35</sup> Moreover, such devices must operate subject to the condition that “interference must be accepted that may be caused by the operation” of another radio station, whether licensed or unlicensed.<sup>36</sup> In other words, Part 15 users are effectively tertiary in all analyses of relative spectrum rights—their rights are subordinate to all other spectrum users, primary or secondary.<sup>37</sup> As such, a Part 15 user has no legitimate right to complain if its unlicensed device does not function properly, or if that device must be used in a suboptimal operating environment.

**B. Commercial GPS Receivers Have No General “Protection” from LightSquared’s Operations**

As detailed above, Commission precedent makes clear that unlicensed commercial GPS operations must proceed on an unprotected basis vis-à-vis other spectrum

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<sup>34</sup> See FCC Spectrum Policy Task Force, *Report of the Unlicensed Devices and Experimental Licenses Working Group*, at 5 (Nov. 15, 2002).

<sup>35</sup> 47 C.F.R. § 15.5(a).

<sup>36</sup> 47 C.F.R. § 15.5(b).

<sup>37</sup> See, e.g., 47 C.F.R. § 2.105(c) (primary services have protection against secondary services; a given secondary service has protection against lower priority services). See also *Unlicensed Operation in the TV Broadcast Bands, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, 23 FCC Rcd 16807, at ¶ 50 (2008) (Part 15 devices do not enjoy interference protection vis-à-vis licensed primary or secondary spectrum users).

uses—whether licensed or unlicensed. Specifically, an unlicensed receive-only earth station user has “no assurances” that it will be able to “maintain the level of interference-free reception which it initially enjoys.”<sup>38</sup> Thus, unlicensed commercial GPS receivers enjoy no independent right to protection from operations in the adjacent MSS band—including terrestrial operations—even where an adjacent service evolves in a manner that results in an incompatibility with existing commercial GPS operations.

That said, the commercial GPS industry *does* benefit from: (i) the technical limits that it has negotiated with LightSquared and other MSS licensees—and which are reflected in the ATC authorizations held by those operators; and (ii) the frequency separation that should exist between LightSquared’s operations and the intended use of civilian GPS signals.

In particular, the out-of-band emission (“OOBE”) limits reflected in LightSquared’s license protect commercial GPS users that operate in the 1559-1610 MHz band that is allocated on a primary basis for RNSS. The commercial GPS industry has acknowledged that those negotiated limits “represent[] a ‘win-win’ for [LightSquared], for the Commission’s increased reliance on OOBE to limit interference, and for GPS safety of life and public safety use.”<sup>39</sup> Similarly, the Commission has long recognized that such out-of-band power limits are sufficient to allow GPS devices to operate alongside adjacent MSS operations.<sup>40</sup>

For example, in establishing service rules for MSS operations in the Big LEO Band in 1994, the Commission found that such out-of-band power limits were sufficient to

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<sup>38</sup> 1979 *Receive Only Earth Station Order* ¶ 28.

<sup>39</sup> See Reply Comments of U.S. GPS Industry Council, IB Docket No. 01-185, at 4 (Sep. 4, 2003).

<sup>40</sup> See, e.g., *Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands*, 9 FCC Rcd 5936, at ¶ 133 (1994). See also *AMSC Subsidiary Corp.*, 10 FCC Rcd 10458, at ¶ 28 (1995).

protect GPS operations in the adjacent RNSS band, and rejected the suggestion that “additional protection bandwidth”—*i.e.*, a guard band—also was necessary for this purpose.<sup>41</sup> The following year, when the Commission authorized LightSquared to operate mobile earth terminals (“METs”) in connection with its first satellite, the Commission found that out-of-band power limits were sufficient to “resolve any concern with regard to [LightSquared’s] data METs causing harmful interference to GPS receivers from [LightSquared’s] METs operating in bands near the frequency bands used by GPS and GLONASS receivers.”<sup>42</sup> These cases are consistent with: (i) the Commission’s reliance on out-of-band power limits to protect aeronautical GPS receivers from MSS operations in the Big LEO Band;<sup>43</sup> and (ii) the Commission’s observation, in initially granting LightSquared’s ATC authorization, that such out-of-band power limits constitute “equivalent RNSS-protection requirements for ATC transmitters.”<sup>44</sup>

Notably, the Commission has found that the use of out-of-band power limits to protect the commercial GPS industry from operations in adjacent MSS bands is appropriate only where the commercial GPS industry cannot otherwise protect itself. Thus, the Commission has suggested that it would be appropriate to *relax* applicable out-of-band power limits to the extent that the commercial GPS industry can provide equivalent protection through reasonable changes in GPS receiver design.<sup>45</sup> This petition does not ask the Commission to modify the out-of-band power limits applicable to LightSquared’s terrestrial

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<sup>41</sup> See *Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands*, 9 FCC Rcd 5936, at ¶ 133 (1994).

<sup>42</sup> See *AMSC Subsidiary Corp.*, 10 FCC Rcd 10458, at ¶ 28 (1995).

<sup>43</sup> See *Emission Limits for Mobile and Portable Earth Stations Operating in the 1610-1660.5 MHz Band*, 17 FCC Rcd 8903 (2002).

<sup>44</sup> *MSV ATC Order* ¶ 34.

<sup>45</sup> See *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS)*, Notice of Proposed Rulemaking, 14 FCC Rcd 5871, at ¶¶ 75-76 (1999).

operations in the MSS band. However, ample evidence that the commercial GPS industry could have designed more robust receivers, but chose not to do so, reinforces the need for the Commission to clarify that LightSquared need not bear the burden of correcting the deficiencies in commercial GPS receivers.

In addition to the protection afforded by out-of-band power limits, commercial GPS receivers are able to benefit from the protection afforded by the implicit ~8.5 MHz “guard band” that *should* separate LightSquared’s terrestrial operations in the MSS band from commercial GPS operations in the RNSS band that use the GPS C/A code. LightSquared intends to provide much of this separation by ending its planned operations in the MSS band almost 4 MHz from the edge of the adjacent RNSS band.<sup>46</sup> The remaining separation would be provided if commercial GPS receivers met U.S. Government specifications calling for the use of sharp filters to limit reception of adjacent signals.<sup>47</sup> That commercial GPS receivers do not provide for such separation, resulting in a heightened potential for “overload,” can hardly be blamed on LightSquared.

Apart from applicable out-of-band power limits and the benefit of the implicit guard band that should separate LightSquared’s terrestrial operations in the MSS band from commercial GPS operations in the RNSS band, there is no independent basis upon which the commercial GPS industry can assert a right to protection from “desensitization” or

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<sup>46</sup> LightSquared intends to operate in the so-called “Upper 10 MHz” at 1545.2-1555.2 MHz. Thus, its operations will be separated from the edge of the RNSS band by at least 3.8 MHz.

<sup>47</sup> See United States Air Force Global Positioning Systems Wing, *Navstar GPS Space Segment/Navigation User Interfaces*, IS-GPS-200E, at §§ 3.3.1.1, 3.3.1.2 (Jun. 8, 2010) (“*USG GPS Interface Standard*”) (calling for commercial GPS reception to be “contained within” 12 MHz of the L1 center frequency at 1575.42 MHz); United States Department of Defense, *Global Positioning System Standard Positioning Service Performance Standard*, at § 2.4.2 (4th Ed., Sep. 2008).

“overload” allegedly caused by LightSquared.<sup>48</sup> For this reason, and because (as discussed below) commercial GPS users have no rights in the MSS band, the “desensitization” or “overload” effects experienced by GPS receivers that are “listening” in the MSS band cannot be construed as cognizable “harmful interference” under the Commission’s rules, notwithstanding the liberal (and improper) use of that term by GPS interests.<sup>49</sup>

Similarly, there is no reasonable basis for the commercial GPS industry’s demand that LightSquared surrender its rights to operate in an additional 10 MHz (or more) of spectrum in order to increase the size of the existing guard band. Notably, in establishing rules for the ATC use of MSS spectrum, the Commission declined to establish a 15 MHz guard band to supplement the existing out-of-band power limits that were adopted to protect primary, licensed PCS operations from terrestrial operations in the 2 GHz MSS band.<sup>50</sup> Even though those PCS operations were licensed (unlike commercial GPS operations), the Commission emphasized that “PCS carriers similarly were aware of potential interference

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<sup>48</sup> Section 25.255 merely provides a procedural vehicle for addressing cognizable “harmful interference” otherwise arising as the result of MSS/ATC operations. *See* 47 C.F.R. § 25.255. It does not provide substantive rights or interference protection that otherwise does not exist for unlicensed or non-conforming uses of spectrum under applicable law.

<sup>49</sup> Thus, Section 25.255 of the FCC’s rules does not apply in such cases, because it is triggered only in the event of cognizable “harmful interference.” *See* 47 C.F.R. §25.255. Moreover, in the case of inter-service issues (*i.e.*, concerns about MSS/ATC impact on adjacent frequency band systems), the procedures of Section 25.255 apply *only in the event that concerns about out-of-band emissions exist* (which is not the case here), and not in the case of receiver “desensitization” or “overload.” *See* 2003 ATC Order at ¶ 103 (“For the intra-service analyses, we evaluate the amount of interference that would be caused to another operator’s system that is sharing the same MSS allocation. . . . This interference could be . . . interference caused to the mobile earth terminals (METs) operating with the other MSS system. *For the inter-service case, we evaluate the impact of out-of-band emissions* from ATC operations on adjacent band systems.”) (emphasis added); *id.* at ¶¶ 119, 120 (unresolved concerns about out-of-band emissions are subject to Section 25.255 procedures; concerns about receiver “desensitization” or “overload” of adjacent band systems are to be mitigated by future receiver design modifications and through a cooperative effort among those involved.).

<sup>50</sup> 2003 ATC Order ¶ 118.

from MSS systems in adjacent spectrum, and could have taken this into account in the design of their equipment.”<sup>51</sup> The *unlicensed, nonconforming* GPS operations at issue here are entitled to far less protection than those licensed PCS operations—particularly where evidence exists that the commercial GPS industry could have taken ATC operations in MSS bands into account in designing GPS receivers over the course of the last decade, but chose not to do so.

**C. Commercial GPS Operations in the MSS Band Represent a Nonconforming Use that Is Not Entitled to “Protection”**

The commercial GPS industry has manufactured and sold many GPS receivers that employ inadequate filtering and frequency discrimination, and thus render themselves incompatible with long-planned uses of adjacent spectrum bands. Among other things, these commercial GPS receivers do not adequately filter out the energy that is emitted in adjacent frequency bands, largely because they fail to meet standards set forth in relevant U.S. Government specifications for civilian GPS use. Those specifications call for commercial GPS signal reception to be “contained within” 12 MHz of the L1 center frequency at 1575.42 MHz, and for commercial GPS receivers to use sharp filters to limit the reception of signals from adjacent bands that contain unwanted energy, and, thus, manage the potential for “overload.”<sup>52</sup> While these standards are not “mandatory,” they were promulgated and are conveyed to manufacturers with the explicit representation that failure to meet them would compromise a receiver’s ability to function properly and use the civilian GPS signal as intended. Because they do not meet this specification, many commercial GPS receivers effectively “listen” to transmissions in the adjacent MSS band. As Deere explains, wideband GPS receivers “have filters that are open to a wider band around each GNSS frequency . . . to

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<sup>51</sup> *Id.*

<sup>52</sup> See n.47, *supra*. Civilian users may access the course/acquisition, or “C/A” code, within the “L1” GPS signal. See *USG GPS Interface Standard* at § 3.2.1.3.

capture additional GNSS signal energy . . . .”<sup>53</sup> As a result, “if there are high powered LightSquared signals *in the adjacent MSS band*, more of the unwanted LightSquared energy will also be captured.”<sup>54</sup>

This is consistent with the findings of the technical working group (“TWG”) that the GPS industry and LightSquared jointly established following the issuance of the *2011 Waiver Order*. The TWG found, in short order, that the “overload” issue emanates from the possibility that the operation of a GPS receiver could be affected by “strong signals *outside the GPS band*” (*i.e.*, in the MSS band).<sup>55</sup> Similarly, a recent presentation by the National Coordination Office for Space-Based Positioning, Navigation, and Timing (“PNT”) indicates that GPS concerns stem from the inability of GPS devices “listening” in the adjacent MSS band to filter out the energy from authorized transmissions in that adjacent band.<sup>56</sup>

Commercial GPS “listening” activities, like other commercial uses of the radiofrequency spectrum in the United States, must be conducted in accordance with the Communications Act of 1934, as amended, and the Commission’s rules. Among other things, such operations must be consistent with the U.S. Table of Frequency Allocations, absent an appropriate waiver of the Table to permit a “nonconforming” use.<sup>57</sup> When the Commission does grant such a waiver, the nonconforming use must proceed on an

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<sup>53</sup> See Petition for Reconsideration of Deere & Company, IBFS File No. SAT-MOD-20101118-00239, at 6 (Feb. 25, 2011) (emphasis added).

<sup>54</sup> *Id.* (emphasis added).

<sup>55</sup> See *GPS Technical Working Group Progress Report # 1*, at 1 (emphasis added), attached to Letter to FCC from LightSquared Subsidiary LLC, IBFS File No. SAT-MOD-20101118-00239 (Mar. 15, 2011).

<sup>56</sup> See National Coordination Office for Space-Based Positioning, Navigation, and Timing, *U.S. Space-Based Positioning, Navigation & Timing (PNT) Policy Update*, at 10 (Oct. 2010), available at <http://www.pnt.gov/public/2011/09/CGSIC/hessin.pdf> (chart attached as Exhibit 2 hereto) (showing that “concerns” with LightSquared stem from the fact that the “GNSS receiver filter response” in the 1525-1559 MHz band is inadequate with respect to LightSquared’s currently authorized power levels).

<sup>57</sup> See 47 C.F.R. §§ 2.102(a); 2.106.