

BEFORE THE  
**Federal Communications Commission**  
WASHINGTON, D.C. 20554

In the Matter of )  
)  
**LightSquared Subsidiary LLC** ) IB Docket No. 11-109  
)  
NTIA Letter Regarding LightSquared )  
Conditional Waiver )  
)  
To: The Commission

**COMMENTS OF LOCKHEED MARTIN CORPORATION**

Lockheed Martin Corporation (“Lockheed Martin”) hereby provides its Comments in response to the Commission’s February 15, 2012 Public Notice in IB Docket No. 11-109.<sup>1</sup> The *Public Notice* seeks input on proposed Commission responses to the February 14, 2012 National Telecommunications and Information Administration (“NTIA”) letter<sup>2</sup> that pertains to the conditional waiver the International Bureau granted to LightSquared Subsidiary LLC (“LightSquared”) in January 2011 for potential use of the mobile-satellite service (“MSS”) downlink band licensed to LightSquared at 1525-1559 MHz for non-integrated terrestrial mobile broadband operations.<sup>3</sup> The NTIA Letter comes after a series of intensive testing efforts over the last twelve months – including the Commission-initiated LightSquared Technical Working Group (“TWG”) – of the effects of LightSquared’s proposed terrestrial mobile broadband

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<sup>1</sup> See FCC Public Notice, “International Bureau Invited Comment on NTIA Letter Regarding LightSquared Conditional Waiver,” DA 12-214, IB Docket No. 11-109, released February 15, 2012 (“*February 15 Public Notice*”). The initial response deadline of March 1, 2012 was later extended to March 16, 2012 in *LightSquared Technical Working Group Report*, DA 12-320 (Int’l. Bur., released February 29, 2012).

<sup>2</sup> See Letter from Lawrence E. Strickling, Assistant Secretary for Communications and Information, U.S. Dept. of Commerce, to Julius Genachowski, Chairman, FCC (dated Feb. 14, 2012) (“*NTIA Letter*”).

<sup>3</sup> See *LightSquared Subsidiary LLC*, 26 FCC Rcd 566 (Int’l Bur. 2011) (“*2011 Waiver Order*”).

offering on radionavigation-satellite service (“RNSS”) systems in the upper adjacent 1559-1610 MHz band.

Lockheed Martin is the only Commission licensee of space stations operating in the 1559-1610 MHz (or “L1”) RNSS band. Since 2005, Lockheed Martin has operated the Regional Positioning System (“RPS”) using two geostationary-orbit satellites.<sup>4</sup> The two Lockheed Martin RPS satellites and their associated earth stations provide a service integral to the Federal Aviation Administration’s (“FAA”) overall Wide Area Augmentation System (“WAAS”). The WAAS provides augmentation of Global Positioning System (“GPS”) signals throughout the entire National Airspace System (“NAS”) to improve the accuracy, availability, and integrity of the GPS space-based positioning, navigation, and timing (“PNT”) service.

Lockheed Martin has worked as a member of the TWG to address harmful interference issues to RNSS receivers, including GPS-dependent systems and applications such as the WAAS, from LightSquared’s proposed non-integrated terrestrial mobile broadband network in portions of the 1525-1559 MHz band. As the Commission is aware, the TWG Report concluded that LightSquared’s proposed terrestrial mobile broadband operations will cause harmful interference to GPS receivers and applications.

In its *February 15 Public Notice*, the Bureau reports that “NTIA has concluded that LightSquared’s proposed mobile broadband network will impact GPS services and there is currently no practical way to mitigate the potential harmful interference from LightSquared’s planned terrestrial operations in the 1525-1559 MHz band.”<sup>5</sup> Noting the *NTIA Letter* and the record of the LightSquared waiver proceeding as compiled to date, the Bureau observes that “it is highly unlikely that LightSquared will, in any reasonable period of time, be able to satisfy the

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<sup>4</sup> The RPS satellites also operate in the “L5” RNSS band at 1164-1215 MHz.

<sup>5</sup> *February 15 Public Notice* at 3. GPS is the Global Positioning System, which operates in the radionavigation-satellite service band at 1559-1610 MHz – immediately adjacent to the MSS band licensed to LightSquared.

requirements of the [2011] Waiver Order for providing commercial Ancillary Terrestrial Component (“ATC”) service in the 1525-1559 MHz band.”<sup>6</sup>

As a consequence, the Bureau proposes two actions. First, the Bureau proposes to vacate the terms of the 2011 Waiver Order, due to LightSquared’s inability to resolve satisfactorily the interference caused by its planned terrestrial operations and the absence of any realistic prospect that such interference concerns could be resolved in a reasonable period of time.<sup>7</sup> Second, the Bureau proposes to modify LightSquared’s license pursuant to Section 316 of the Communications Act to suspend indefinitely LightSquared’s underlying ATC authorization “to an extent consistent with the *NTIA Letter*.”<sup>8</sup>

Lockheed Martin supports both proposals in the *February 15 Public Notice*, and finds that both proposals are technically justified. In January of this year, NTIA received additional testing reports from two government organizations: the National Space-Based Positioning, Navigation, and Timing Systems Engineering Forum (“NPEF”) and from the FAA. NPEF’s 2011 study concluded that “[n]o additional testing is required to determine that terrestrial high-power transmission in the [LightSquared MSS downlink] band impacts general navigation receivers” and that “[i]mmediate use of the Mobile Satellite Spectrum (MSS) for terrestrial service is not viable due to significant systems engineering and integration challenges.”<sup>9</sup> In its study, the FAA concluded that terrestrial mobile service of any kind is unlikely in the LightSquared MSS bands. It stated that “[w]hen using even the most optimistic propagation models, the safety of low-altitude operations (below 300’ above ground level, or AGL) in the

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<sup>6</sup> *Id.* at 4.

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> See NPEF Study, *Follow-on Assessment of LightSquared Ancillary Terrestrial Component Effects on GPS Receivers*, at 35 (January 18, 2012) (“NPEF 2012 Study”).

vicinity of LightSquared ATC transmitters *cannot* be assured.”<sup>10</sup> It went on to observe that “[e]ither LightSquared must significantly change their operating conditions (e.g., transmit power, antenna deployment, antenna down tilt, etc) or the FAA must change the avionics specifications and all GPS-equipped aircraft[,] re-equip, or both.”<sup>11</sup>

These studies follow on the heels of earlier comprehensive and detailed studies by the TWG and an earlier NPEF study. The comprehensive testing over the last year utilized GPS equipment – including receivers used by the FAA in conjunction with the RPS system and WAAS – in carefully established operating environments in the presence of LightSquared-generated terrestrial mobile service base station transmissions.<sup>12</sup>

The additional government testing performed and the conclusions provided in the *NTIA Letter* reinforce the conclusions of the TWG that the proposed operation by LightSquared of a terrestrial mobile broadband network will cause harmful interference to most GPS receivers – including those required for the functioning of the WAAS to which Lockheed Martin’s RPS system contributes. Indeed, all of these studies revealed harmful interference issues with respect to GPS and GPS-dependent applications that have no imminent solution.<sup>13</sup>

On the advice of NTIA, the Commission is proposing to conclude that LightSquared cannot achieve its obligation to offer a high-power mobile service under its ATC authorization. Given the record before the Commission and the requirements of the *2011 Waiver Order*, the

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<sup>10</sup> Federal Aviation Administration, *Status Report: Assessment of Compatibility of Planned LightSquared Ancillary Terrestrial Component Transmissions in the 1526-1536 MHz Band with Certified Aviation GPS Receivers*, at 70 (January 25, 2012) (“FAA Study”).

<sup>11</sup> *Id.*

<sup>12</sup> The FAA Study specifically recited the importance of continuity of WAAS as integral to and dependent upon the availability of GPS. *See* FAA Study at 12 & n.3.

<sup>13</sup> On the lack of reasonable alternative, the FAA observed in its Study that “[a] change to receiver standards – though untested – could be feasible for all aviation receivers, but would take more than 10 years to design, standardize, implement and field, and would result in significant cost to the United States Government and to current GPS aviation users.” *Id.* at 70.

Commission is not able to conclude that “harmful interference concerns have been resolved.”<sup>14</sup> This circumstance necessarily means that the RNSS protection condition placed upon LightSquared’s authorization in the *2011 Waiver Order* has not been met, and further that there is “no practical way”<sup>15</sup> that such condition could be satisfied within any reasonable period of time. Accordingly, Lockheed Martin supports the Commission’s first proposed action without qualification. The proposal to vacate the *2011 Waiver Order* is both appropriate and fully justified.

With respect to the Commission’s proposal to suspend indefinitely LightSquared’s ATC authority to the extent consistent with the *NTIA Letter*,<sup>16</sup> Lockheed Martin agrees with the proposal. The results of the multiple, independent comprehensive tests reveal that operation of terrestrial mobile broadband base station transmitters anywhere in the 1525-1559 MHz band will cause harmful interference to GPS and GPS-dependent applications such as the WAAS service to which Lockheed Martin’s RPS system contributes. The harmful interference would result whether LightSquared’s “ATC” offering were made on an unintegrated basis as conditionally authorized in the *2011 Waiver Order* or on an integrated basis as apparently authorized sometime earlier. Given the uncertainty that exists with respect to what LightSquared may or may not be authorized to provide in the way of ATC following vacatur of the *2011 Waiver Order*,<sup>17</sup> the

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<sup>14</sup> *2011 Waiver Order*, 26 FCC Rcd at 587 (¶ 43).

<sup>15</sup> *NTIA Letter* at 1.

<sup>16</sup> *February 15 Public Notice*, at 4.

<sup>17</sup> In this regard, Lockheed Martin notes that LightSquared has stated that the 2011 waiver did not change the operational characteristics of LightSquared’s terrestrial mobile broadband network; “LightSquared’s pre-waiver base station operations and its post-waiver base station operations are indistinguishable.” Reply Comments of LightSquared Subsidiary LLC, IB Docket No. 11-109 and File No. SAT-MOD-20101118-00239, at 12 (August 15, 2011).

Commission's proposal to suspend indefinitely ATC authority is a welcome proactive step.<sup>18</sup>

The Commission should thus adopt its second proposal.

For all of the foregoing provided above, Lockheed Martin respectfully urges the Commission to take the actions it proposes to take in its *February 15 Public Notice*. LightSquared has failed to satisfy the GPS non-interference condition imposed in the *2011 Waiver Order* and has no reasonably foreseeable prospect of being able to do so. The Commission should thus vacate the *2011 Conditional Waiver* it granted to LightSquared and suspend indefinitely LightSquared's authority to provide ATC (clarified as Lockheed Martin suggests here).

Respectfully submitted,

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<sup>18</sup> Lockheed Martin notes that there is some ambiguity in the intent of the Commission's second proposal itself, as the explanation of what is meant by the phrase "to the extent consistent with the *NTIA Letter*." Lockheed Martin is interpreting this phrase to mean LightSquared ATC authority to operate base stations at power levels and other technical parameters that have been shown in the comprehensive testing to cause harmful interference to GPS and RNSS operations. There may be some types of ATC operation – e.g., where the terrestrial component operates with satellite-like power to fill in coverage gaps, and thus does not preclude simultaneous provision of MSS on the same frequencies in the same location – that may still be permitted subject to applicable limitations on out-of-band emissions and other conditions not at issue in the LightSquared waiver proceeding. Lockheed Martin requests that the Commission clarify its intent in the action it takes to modify LightSquared's authorization.