

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

In the Matter of)	
)	
LightSquared Subsidiary LLC)	IB Docket No. 12-340
)	SAT-MOD-20120928-00160
Applications for Modification of Ancillary)	SAT-MOD-20120928-00161
Terrestrial Authority Associated With Its)	SES-MOD-20121001-00872
Mobile-Satellite Service L-Band Licenses)	

To: Chief, Satellite Division
International Bureau

COMMENTS OF LOCKHEED MARTIN CORPORATION

Lockheed Martin Corporation (“Lockheed Martin”), pursuant to Section 25.154 of the Commission’s Rules, 47 C.F.R. § 25.154 and the Commission’s November 16, 2012 public notice in Report No. SPB-245,¹ hereby provides its comments upon the above-captioned applications of LightSquared Subsidiary, LLC (“LightSquared”). In the Modification Applications, LightSquared “proposes to vacate the 10 MHz of its terrestrially-licensed spectrum closest to GPS, which will provide GPS receivers a permanent guardband from terrestrial services, and to gain access to 5 MHz of alternate spectrum, so that it can begin to build a mobile broadband network”² In these Comments, Lockheed Martin addresses both elements of LightSquared’s Modification Applications.

¹ See Public Notice, Report No. SPB-245 (released November 16, 2012), inviting comments and petitions to deny on the modification of license applications LightSquared filed in File Nos. SAT-MOD-20120928-00160, *et seq.* (“Modification Applications”), with respect to the ancillary terrestrial component (“ATC”) of its mobile-satellite service (“MSS”) system in the 1525-1559 MHz and 1626.5-1660.5 MHz bands.

² Modification Applications, Narrative Exhibit at 4. “GPS” is the Global Positioning System, a radionavigation-satellite service system operated by the U.S. Government in, *inter alia*, the 1559-1610 MHz band immediately adjacent to LightSquared’s MSS downlink band at 1525-1559 MHz. The spectrum LightSquared proposes to access as an alternate to terrestrial mobile service in the upper portion of the 1525-1559 MHz band is in the 1675-1680 MHz band. LightSquared petitioned the Commission to allocate this band to the terrestrial mobile service in RM-11681, and Lockheed Martin filed an opposition to this petition for rulemaking on December 10, 2012. See

I. Introduction

Lockheed Martin is a party in interest in the above-captioned Modification Applications. Lockheed Martin is engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services across a broad range of areas for both commercial and government customers. Lockheed Martin is the only Commission licensee of space stations operating in the 1559-1610 MHz (or “L1”) RNSS band.³ 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 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.

The LM RPS System is an integral part of the WAAS developed by the FAA to augment the GPS, in order to improve the accuracy, integrity, and availability of space-based radio-navigation for enhanced safety of flight throughout the NAS. WAAS uses a network of ground-based reference stations to measure small variations in the GPS satellites' signals. Measurements from the reference stations are then routed to master stations, which generate and send the WAAS signal to the RPS satellites that broadcast messages to WAAS-enabled GPS receivers on end-user aircraft that improves the GPS service performance, which is required for the use of GPS throughout in the NAS providing increased data accuracy.

As the service Lockheed Martin provides over the RPS satellites incorporates the GPS signals in the 1559-1610 MHz band, disruption of the GPS L1 signal has the potential to cause

Opposition of Lockheed Martin Corporation to LightSquared Petition for Rulemaking in RM-11681 (filed December 10, 2012) (“Lockheed Martin Opposition”).

³ The RPS satellites also operate in the “L5” RNSS band at 1164-1215 MHz.

harmful interference to the RPS system – and beyond. The RPS satellites broadcast a WAAS signal in the 1559-1610 MHz band that is used by GPS aviation receivers and specially-enabled WAAS receivers on aircraft for use in air navigation and air traffic control. The earth stations that uplink the signals to the RPS satellites include a very sensitive GPS/WAAS receiver with a much higher gain antenna than is found in the typical GPS receiver. As such, these receivers are very sensitive to interference. If signal reception is disrupted, these antennas are unable to perform a safety critical function to uplink the proper signal for broadcast from the WAAS RPS satellites on the L1 signals. Interference to this L1 signal on Lockheed Martin's RPS satellites would cause the feedback control loop – utilized in the ground station, which very closely controls the uplink signal – to produce erroneous data. This erroneous data would then be operated upon by the feedback control loop and result in an incorrect uplink signal that would be broadcast from the Lockheed Martin RPS satellite.

The main issue arises from the fact that an RPS broadcast of erroneous data would not be immediately detected by Lockheed Martin, by the FAA's WAAS monitor, or by the end-user aircraft, and would thus likely result in the introduction of a substantial safety hazard to a significant portion of the, and potentially the entire, National Airspace System. Once the interference situation is detected, the uplink transmission to the satellite would be terminated immediately, and unless a backup ground station is available, the broadcast transmissions that are required to enable use of GPS in the National Airspace System would also cease.

This means that any disruption in the reception and use by aircraft in flight of the signals broadcast by the Lockheed Martin RPS satellites, without question, significantly reduces the efficiency of the National Airspace System and quite possibly endangers safety of life and property.

Lockheed Martin also manufactures military aircraft that are tested using the aeronautical mobile telemetry (“AMT”) spectrum in the 1435-1525 MHz band at several test ranges around the country. Interference to or disruption of AMT signals during testing presents a risk of grievous damage to life and property – both on and off the test range.

For more than two years, the Commission has been considering LightSquared proposals to provide high-powered terrestrial mobile service using base stations that would operate in the 1525-1559 MHz band. Earlier this year, following an unprecedented course of thorough testing that was carried out in 2011 by the Commission-established Technical Working Group, the Commission proposed to vacate a controversial 2011 decision that conditionally granted LightSquared access to the 1525-1559 MHz band.⁴ The Commission cited the inability to resolve satisfactorily the interference to GPS operations that would be caused by LightSquared’s planned terrestrial operations, and the absence of any realistic prospect that such interference concerns could be resolved in a reasonable period of time.⁵

Although a Commission ruling on its proposal to relieve LightSquared of authority to operate a terrestrial mobile service anywhere in the 1525-1559 MHz band remains forthcoming, LightSquared now returns to the Commission with a new set of rulemaking and application proposals to use spectrum in the 1525-1559 MHz band for terrestrial mobile base station operations.⁶ The Modification Applications are part of a “comprehensive approach”

⁴ See FCC Public Notice, “International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver,” DA 12-214, IB Docket No. 11-109, released February 15, 2012 (“*February 15 Public Notice*”), at 3.

⁵ *Id.*

⁶ In addition to the LightSquared Modification Applications, LightSquared has petitioned the Commission to allocate spectrum for terrestrial mobile service in the 1675-1680 MHz band for LightSquared’s use as “an alternative” to the provision of mobile service in the upper part of the 1525-1559 MHz band (RM-11681), and has petitioned the Commission for rules that would, “for a transition period, allow terrestrial use of the lower 10 MHz of LightSquared’s L-Band downlink spectrum at 1526-36 MHz in a manner to ensure further compatibility with GPS receivers[,]” and “establish a timetable that, based explicitly on the record in this proceeding, would

that LightSquared has put forward “to resolve the issues that to date have precluded the deployment of its terrestrial [mobile broadband]network.”⁷ Lockheed Martin’s comments on the Modification Applications must thus be considered in conjunction with its statements in opposition to the two most recent LightSquared petitions for rulemaking.

II. Discussion

Although the interrelationships with the other recent LightSquared filings is discussed at length in the Modification Applications, LightSquared specifically seeks only two things in the applications themselves: it seeks first to relinquish its ATC authority to operate mobile base stations in any portion of the 1525-1559 MHz MSS downlink band other than 1526-1536 MHz, and it proposes that the Commission modify its MSS/ATC licenses to specify operation of mobile base stations in the 1675-1680 MHz band proposed for allocation to mobile service in the LightSquared RM-11681 Petition (which LightSquared plans to couple with existing mobile-service spectrum at 1670-1675 MHz under separate authority).

Lockheed Martin has no objection to LightSquared’s proposal to relinquish or surrender its ATC authority in the portion of the 1525-1559 MHz band above 1536 MHz. This action is not inconsistent with the Commission’s February 2012 proposal to vacate LightSquared’s terrestrial mobile authority.⁸ Lockheed Martin emphasizes, however, that any such relinquishment, is without prejudice to confirmation of the Commission’s proposed

ultimately permit LightSquared robust commercial terrestrial use of this band.” *See* LightSquared Subsidiary LLC Petition for Rulemaking to Allocate the 1675-1680 MHz Band for Terrestrial Mobile Use, RM-11681, filed November 2, 2012 (“LightSquared RM-11681 Petition”), and LightSquared Subsidiary LLC Petition for Rulemaking to Revise the Commission’s Technical Rules, RM-11683, filed September 28, 2012 (“LightSquared RM-11683 Petition”). Lockheed Martin filed a statement in opposition to the petition for rulemaking in RM-11681 on December 10, 2012, and is filing a statement in opposition of the petition for rulemaking in RM-11683 contemporaneously with the instant comments.

⁷ Modification Applications, Narrative Exhibit at 15.

⁸ *See February 15 Public Notice*, at 3.

determination in the *February 15 Public Notice* that terrestrial mobile service is not feasible anywhere in the 1525-1559 MHz band.

With respect to LightSquared's proposal that the Commission modify LightSquared's space station and earth station licenses to provide LightSquared with access to spectrum in the 1675-1680 MHz band for its mobile broadband network, Lockheed Martin must observe that such an action would be premature pending the outcome of the rulemaking petition LightSquared has filed in RM-11681. Lockheed Martin, in its Opposition to the LightSquared RM-11681 Petition, expressed concern about LightSquared's attempt to link the proposed new allocation to anything having to do with LightSquared's terrestrial objectives in the 1525-1559 MHz band. Lockheed Martin argued that the Commission should "only consider an allocation to the mobile service at 1675-1680 MHz if the Commission determines that such an allocation is compatible with existing users of the band; that sharing conditions can reliably be identified and imposed on the eventual non-Federal licensee(s); and that the allocation independently advances the public interest, convenience, and necessity."⁹ The Modification Applications' request for access to 1675-1680 MHz cannot be allowed to move forward until the issues raised by the LightSquared RM-11681 Petition are resolved.¹⁰

⁹ Lockheed Martin Opposition at 3.

¹⁰ As an additional observation on the 1675-1680 MHz aspect of the Modification Applications, Lockheed Martin is skeptical that the terrestrial mobile authority LightSquared seeks can even be granted in applications to modify space-station and earth station licenses. LightSquared is no longer seeking ATC authority and it does not request a waiver of ATC rules; it is seeking Part 27-like terrestrial mobile authority that has no connection with space services or Part 25 of the Commission's rules. This issue is not addressed at all in the Modification Applications.

III. Conclusion

For all of the reasons provided above, Lockheed Martin believes that there are some very compelling reasons for the Commission to at least defer consideration of the Modification Applications. At the very least, there is no present basis for the Commission to do more than accept LightSquared's relinquishment of all terrestrial authority for the 1536-1559 MHz portion of the 1525-1559 MHz band – without prejudice to the pending confirmation of the *February 15 Public Notice's* proposal to confirm NTIA's determination that terrestrial mobile broadband service cannot be feasibly provided at all in the 1525-1559 MHz band.

Respectfully submitted,

LOCKHEED MARTIN CORPORATION

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December 17, 2012

CERTIFICATE OF SERVICE

I, Jennifer Warren, hereby certify that on this 17th day of December, 2012, a copy of the foregoing Comments of Lockheed Martin Corporation is being sent via first class, U.S. Mail, postage prepaid, to the following:

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s/ Jennifer Warren