

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

In the Matter of)	
)	
LightSquared Request to Modify Its ATC Authorization)	IB Docket No. 12-340
)	
)	IBFS File Nos. SAT-MOD-20120928-00160; SAT-MOD-20120928-00161; SAT-MOD-20101118-00239; SES-MOD-20121001-00872
)	
LightSquared Technical Working Group Report)	IB Docket No. 11-109
)	
LightSquared Petition for Rulemaking to Allocate the 1675-1680 MHz Band for Terrestrial Mobile Use)	RM-11681
)	
)	
Request by OP LLC for Extension or Waiver of the Construction Deadline Concerning its 1670-1675 MHz Band License)	WT Docket No. 12-327
)	

COMMENTS OF LIGHTSQUARED INC.

LightSquared Inc., on behalf of its subsidiary, LightSquared Subsidiary LLC (collectively, “LightSquared”), submits these comments in response to the public notice issued by the Commission on August 7, 2013 in the above-referenced proceeding.¹ That public notice seeks comment on technical analysis presented by LightSquared in the submission it filed on July 15, 2013 (the “LightSquared Uplink Assessment”).

I. INTRODUCTION AND BACKGROUND

In early 2012, LightSquared began to seek a path forward to resolve the GPS issue and create a new deployment plan in cooperation with government and military stakeholders. As part of that process, the company sought feedback so that it could construct a plan that dealt effectively with the important issues raised by those stakeholders. Specifically, LightSquared committed to move portions of its operations to alternate frequencies and

¹ See Comments Sought on LightSquared Subsidiary LLC *Ex Parte* Filing, DA 13-1717 (Aug. 7, 2013).

committed to even stricter power limits in the remaining spectrum. In fact, the new power limits that LightSquared unilaterally has committed to comply with are stricter—and therefore offer greater protection—than the limits that have satisfied stakeholder concerns in the past. The company included all feedback in its analysis and addressed all questions raised by federal agencies. This process concluded in the LightSquared Uplink Assessment, which was presented to the Commission by the company on July 15, 2013.

The LightSquared Uplink Assessment demonstrates conclusively that operation of terrestrial wireless handsets in the uplink portion of the L Band at 1626.5-1660.5 MHz would not pose any risk to the operation of GPS receivers in the adjacent 1559-1610 MHz band.² Specifically, LightSquared’s analysis demonstrates that LightSquared’s uplink transmissions in the L-band would be compatible with:

- Handheld general location-navigation (GLN) equipment in close proximity to LightSquared devices;
- In-car GLN equipment in close proximity to LightSquared devices;
- High-precision survey equipment in close proximity to LightSquared devices;
- High-precision agriculture equipment in close proximity to LightSquared devices;
- Certified aviation devices with LightSquared devices operating in-cabin while airborne;
- Certified aviation devices with LightSquared devices operating at ground level with aircraft overhead;
- Certified aviation devices on aircraft parked at the gate with LightSquared devices in the terminal and on the jetway; and
- Certified aviation devices on commuter jets parked on a tarmac with LightSquared devices operating at the top of a set of aircraft stairs.

² See LightSquared Assessment of Uplinks in the 1626.5-1660.5 MHz Band, *attached to* Letter from LightSquared Subsidiary LLC to FCC, IB Docket No. 12-340 (Jul. 15, 2013) (“LightSquared Uplink Assessment”).

While the technical analysis presented in the Assessment speaks for itself, LightSquared takes this opportunity to stress two critical points.

First, hundreds of millions of other handsets and even larger end-user devices, some mounted in safety-of-life applications, currently coexist operationally in close proximity to GPS receivers. These devices have transmitted without any interference issues for decades at power levels significantly higher than those to be used by handsets transmitting in the L Band on LightSquared's terrestrial 4G wireless network. Thus, the Assessment is only the latest part of an extensive record and history that supports the compatibility with GPS receivers of terrestrial wireless handsets in the uplink portion of the L Band.

Second, while both the Assessment and current use of the radio spectrum provide sufficient evidence that L-Band terrestrial uplink operations are compatible with the operation of GPS receivers, LightSquared has also committed to ensure that its handsets operate within technical constraints that are more stringent than its current licenses long have authorized. Specifically, LightSquared unilaterally has committed to accelerate by five years its observance of strict OOB limits to which the GPS industry had previously agreed and the Commission had approved—limits long deemed adequate to address the GPS industry's concerns. LightSquared also unilaterally has committed to ensure that its terrestrial handsets transmitting in L-Band spectrum would operate at power levels that are 7 dB lower than those permitted by the Commission under LightSquared's longstanding ATC authorizations.

II. THE LIGHTSQUARED UPLINK ASSESSMENT—AND OTHER RECORD EVIDENCE—ESTABLISH THAT L-BAND TERRESTRIAL UPLINK OPERATIONS ARE COMPATIBLE WITH GPS RECEIVERS

The LightSquared Uplink Assessment presents, in a single document, convincing evidence that L-Band uplink operations would not pose any risk of harmful interference to GPS receivers. The Assessment is the compilation of extensive analysis and review conducted in

cooperation with numerous stakeholders, including federal agencies. Accordingly, the use cases constructed by LightSquared are both extensive in their breadth and conservative in their assumptions. For example, the use cases assume worst-case-scenario power levels, never using power levels below the 90th percentile value of simulations adopted by the Commerce Spectrum Management Advisory Committee (CSMAC). Additionally, the analysis does not account for significant LightSquared signal attenuation that could be caused by factors commonly recognized by the wireless industry such as body loss, duty cycle or low-bandwidth applications. By excluding these types of factors, the analysis overstates the real-world levels of transmit power used by LightSquared's handsets, thus giving added confidence that GPS devices can operate compatibly with nearby LightSquared end-user devices. Given the strength of this evidence, there can be no serious contention that LightSquared should not be permitted to use its licensed spectrum in the 1626.5-1660.5 MHz band to support terrestrial uplink operations.

A. Hundreds of millions of earth terminals and terrestrial wireless devices operate throughout the U.S. in and around 1626.5-1660.5 MHz at significantly higher power levels.

While the Commission would be justified in relying on the Assessment alone in allowing LightSquared to move forward with its plans, it bears emphasis that the Assessment is far from the only record evidence supporting the conclusion that terrestrial uplink operations in the 1626.5-1660.5 MHz band would not pose any threat to GPS receivers. Perhaps the best indication that L-Band terrestrial network operations would not pose any threat to GPS receivers extends from real-world experience with other mobile transmitters operating in the vicinity of such receivers. As LightSquared detailed nine months ago,³ hundreds of millions of MSS earth terminals ("METs") and terrestrial wireless devices have operated throughout the United States

³ See Reply Comments of LightSquared, IB Docket No. 12-340, at 19-24 (Jan. 4, 2013) ("LightSquared Reply Comments").

in and around the 1626.5-1660.5 MHz band for decades, and at significantly higher power levels than those with which LightSquared has agreed to comply. Those METs and wireless devices operate successfully today without creating any issues for GPS receivers.

Today, over one-million METs are authorized to operate in the United States⁴ and already successfully transmit to satellites in the very same 1626.2-1660.5 MHz uplink band that LightSquared is authorized to use for terrestrial mobile uplinks. These L-Band METs, which typically operate at substantially higher transmit power levels than terrestrial mobile handsets, have been used successfully for decades in close proximity to GPS receivers without any known reports of interference.⁵ Significantly, these L-Band METs include *handheld devices*, vehicular-mounted devices, and notebook-sized portable units. In many cases, these terminals are built to incorporate both L-Band transmitters and GPS receivers within the same unit—as is the case with IsatPhone handsets.⁶ Another example is the L-Band Inmarsat D+ MET, which the

⁴ See, e.g., Licenses for Call Signs E980179 and E930367 (authorizing LightSquared to operate a total of 200,000 L-Band METs), E040249 (authorizing Inmarsat Solutions to operate 120,000 L-Band BGAN METs), E090032 (authorizing ISAT US Inc. to operate up to 520,000 L-Band METs of various types), E050276 (authorizing Astrium Services Government, Inc. to operate up to 40,000 L-Band BGAN METs), E020074 (authorizing LXE Inc. to operate up to 25,000 L-Band Inmarsat D+ METs), E100192 (authorizing SkyWave Mobile Communications, Corp. to operate up to 100,000 L-Band Inmarsat Half-Duplex METs), E030055 (authorizing SkyWave to operate up to 25,000 L-Band Inmarsat D+ METs), E030120 (authorizing AmTech Systems LLC to operate up to 100,000 L-Band Inmarsat Half-Duplex METs), E070006 (authorizing Horizon Mobile Communications, Inc. to operate up to 20,000 L-Band BGAN METs), and E990083 (authorizing National Systems & Research Co. to operate up to 40,000 L-Band Inmarsat Full-Duplex METs).

⁵ See LightSquared Reply Comments at 19-24.

⁶ See, e.g., ISAT US, Inc., IBFS File No. SES-MOD-20111228-01505 (Call Sign E090032) (authorizing over 500,000 portable L-Band land mobile terminals, including 100,000 handheld devices).

Commission has acknowledged utilizes a design that “enables very compact METs to be built with an integrated Global Positioning System (GPS) receiver antenna.”⁷

Importantly, and as LightSquared previously detailed nine months ago, these METs operate under out-of-band emission (“OOBE”) limits with respect to the GPS band at 1559-1610 MHz that are significantly less restrictive than the limits by which LightSquared has committed to abide for its terrestrial handsets.⁸ Many of these L-Band METs are mounted in “safety-of-life” applications where their antennas are located in immediate proximity to GPS antennas. In other words, “mission critical” uses of GPS technology successfully operate right next to powerful L-Band METS that are allowed to emit *higher* levels of OOBE than L-Band terrestrial mobile handsets.

B. AWS-1 band mobile handsets with GPS capabilities operate in nearby spectrum without any known GPS compatibility issue.

Just 50 MHz away from the 1626.2-1660.5 MHz uplink is the AWS-1 band, which wireless carriers are using (or are preparing to use) to serve the hundreds of millions of wireless devices that currently are deployed (or will be deployed) in the United States in close proximity to GPS receivers. The AWS-1 band (1710-1755 MHz) is subject to even less restrictive OOBE limits with respect to the GPS band than L-Band METs, and far less restrictive OOBE limits than L-Band terrestrial mobile terminals.⁹ Even so, these AWS-1 band mobile transmitters, including mobile handsets that contain GPS capabilities for E911 compliance and

⁷ *Richtec Incorporated*, 18 FCC Rcd 3295, at ¶¶ 3, 12 (2003).

⁸ See Letter to FCC from LightSquared, IB Docket No. 12-340, Exh. 1 (Jan. 10, 1013) (presenting table entitled “Less Restrictive OOBE Limits into the GPS Band for Other Services Adequately Protect GPS Receivers”) (“GPS Band OOBE Comparison”). For example, L-Band METs currently being manufactured—including LightSquared and Inmarsat METs—are required to suppress OOBE generally by -70 dBW/MHz in the 1559-1605 MHz band. See 47 C.F.R. § 25.216. As discussed herein, LightSquared has committed to even more stringently suppress OOBE from its terrestrial mobile terminals.

⁹ See GPS Band OOBE Comparison.

other applications, work reliably and without creating any known GPS compatibility issue. As CTIA has noted, “Section 27.53(h), which limits the power of any emission outside the licensed frequency block to . . . $43 + 10 \log_{10}(P)$ dB,” ensures that while “the AWS-1 band begins at 1710 MHz . . . there has not been a single complaint of interference from AWS operations into GPS receivers.”¹⁰ The same analysis also applies to the PCS band, just another 100 MHz away at 1850-1910 MHz, which successfully is used even more intensively today than the AWS-1 band for wireless transmissions from countless wireless communications devices that also contain GPS functionality, and operate in close proximity to other GPS receivers.¹¹

In sum, the longstanding and interference-free operations of *hundreds of millions* of transmitters in and around the L Band, under far less restrictive power limits than those with which LightSquared has agreed to comply, demonstrate that no basis exists for suggesting that LightSquared’s already-authorized terrestrial uplink operations pose any risk to GPS receivers.¹²

III. LIGHTSQUARED HAS MADE SPECIFIC FURTHER COMMITMENTS TO ENSURE COMPATIBILITY

Notwithstanding existing record evidence that establishes the compatibility of L-Band terrestrial uplink operations with GPS receivers, LightSquared recently committed to lower handset power significantly and accelerate implementation of strict OOB limits by five years—in both cases, providing far greater protection for GPS receivers than had previously been negotiated with the GPS industry and approved by the Commission. More specifically, on August 7, 2013 LightSquared unilaterally committed to ensure *immediately* upon launch of

¹⁰ See Letter of Christopher Guttman-McCabe, CTIA—The Wireless Association, WT Docket No. 12-70, at 2 (Oct. 25, 2012) (footnotes omitted).

¹¹ See GPS Band OOB Comparison.

¹² Moreover, before being marketed and sold within the United States, LightSquared mobile terminals would have to undergo a rigorous testing and equipment authorization process under Part 2 of the Commission’s rules, which would include testing of compliance with applicable limits.

commercial service (instead of after five years) that terrestrial mobile wireless handsets operating on its network: (i) limit transmit EIRP to no more than 23 dBm—a level that is 7 dB below the power levels permitted by LightSquared’s longstanding ATC authorizations; (ii) limit OOB into the 1559-1605 MHz band to no more than -95 dBW/MHz for wideband emissions and -105 dBW/kHz for narrowband emissions; and (iii) limit OOB for wideband emissions to no more than -95 dBW/MHz at 1605 MHz and -71 dBW/MHz at 1610 MHz (and in between as determined by linear interpolation) and limit OOB for narrowband emissions to no more than -105 dBW/MHz at 1605 MHz and -81 dBW/MHz at 1610 MHz (and in between as determined by linear interpolation).

As discussed above, these limits are more restrictive than those governing the operation of *hundreds of millions* of mobile transmitters that already operate in the vicinity of GPS receivers without issue. These limits also are more restrictive than those reflected in the agreement reached between LightSquared and the GPS industry over a decade ago, *in 2002*. That agreement was intended to “protect the GPS service’s present and future operations and to provide a stable environment for the development and operation of [LightSquared’s] proposed system.”¹³ 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.”¹⁴

Finally, these limits are consistent with the GPS protection criteria that very recently were (i) agreed between the GPS industry and DISH regarding the AWS-4 band;¹⁵ and (ii) ultimately approved by the Commission (after due analysis by and concurrence of a variety

¹³ See Petition for Reconsideration of the U.S. GPS Industry Council, IB Docket No. 01-185, at 2 (June 11, 2003).

¹⁴ *Id.* at 4.

¹⁵ See Letter from DISH Network Corporation and the U.S. GPS Industry Council to FCC, WT Docket Nos. 12-70 (Sep. 27, 2012).

of federal agencies, including NTIA) when the Commission created the regulatory regime that allows the AWS-4 band to be used for ubiquitous wireless service.¹⁶

In short, the OOB limits with which LightSquared has committed to comply demonstrably are more than adequate.

IV. CONCLUSION

The LightSquared Uplink Assessment demonstrates conclusively that operation of terrestrial wireless handsets in the uplink portion of the L Band at 1626.5-1660.5 MHz would not pose any risk to GPS receivers in the adjacent 1559-1610 MHz band. This conclusion is reinforced by the extensive record in this proceeding—including real-world experience with *hundreds of millions* of other mobile devices that long have operated in the vicinity of GPS receivers without issue—as well as the strict transmit power and OOB limits within which LightSquared has agreed to operate, based on longstanding agreements with the GPS industry, and its recent further unilateral commitments. Accordingly, there no need for the Commission to evaluate further the expected impact of L-Band terrestrial uplink operations on GPS receivers and LightSquared urges the Commission to find that: (i) the conditions set forth in the *Conditional Waiver Order* are fully satisfied with respect to that band, and (ii) LightSquared can commence terrestrial uplink operations in the L Band.

Respectfully submitted,

/s/ Jeffrey J. Carlisle
Jeffrey J. Carlisle
Executive Vice President, Regulatory Affairs
and Public Policy
LIGHTSQUARED INC.
10802 Parkridge Boulevard
Reston, VA 20191
703-390-2001

¹⁶ See *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, 27 FCC Rcd 16102 (Dec. 11, 2012).