In the Matter of
LightSquared Subsidiary LLC
Request for Modification of Authority for an Ancillary Terrestrial Component

In re Application of
LightSquared Subsidiary LLC
Request for Modification of its Authority for an Ancillary Terrestrial Component

IB Docket No. 11-109

File No. SAT-MOD-20101118-00239

REPLY COMMENTS OF TRUEPOSITION, INC.

TruePosition, Inc., submits these Reply Comments to the Commissions’ Public Notice\(^1\) requesting comment addressing the Technical Working Group (TWG) report examining the interference environment associated with LightSquared Subsidiary LLC (LightSquared) proposed operations in the 1525-1559 MHz and 1626.5-1660.5 MHz bands (L-Band).

The TWG report results from the International Bureau’s January 26, 2011 Order and Authorization granting LightSquared, a Mobile Satellite Service (“MSS”) licensee in the L-Band, a waiver of the Commission’s ancillary terrestrial component (“ATC”) integrated service rules.\(^2\) The waiver allows LightSquared to deploy a proposed stand-alone, non-integrated, high-power terrestrial network. The Order and Authorization conditioned the waiver on a TWG testing process intended to determine whether LightSquared’s proposed terrestrial network would cause harmful interference to Global Positioning System (“GPS”) receivers. The TWG was co-chaired


\(^2\) LightSquared Subsidiary LLC request for Modification of its Authority for an Ancillary Terrestrial Component, Order and Authorization, 26 FCC Red 566 (January 26, 2011).
by Lightsquared and the United States Global Positioning System Industry Council. TruePosition participated in the TWG and through this Reply Comment provides its analysis.

TruePosition is a leading provider of wireless location solutions and technology. Its Uplink Time Difference of Arrival ("U-TDOA") system is the principal network based location technology deployed in the United States. U-TDOA is a geolocation technique measuring the time radio waves travel. The location of the mobile device is determined by the period it takes the radio wave to travel from the handset to Location Measurement Units (LMUs). LMUs are collocated with the network’s base stations and are synchronized with each other. The radio wave LMUs measure is the same signal the handset uses for signaling and communications on the network.

**TruePosition’s Participation in the TWG**

Over the past few months, TruePosition participated in a TWG working group to determine the impacts of the proposed LightSquared downlink signal to currently deployed LMUs. These LMUs are critical components of the TruePosition system that is actively locating wireless callers that make emergency 911 calls. These units rely on an accurate and uninterrupted GPS signal to obtain precise timing. Should the GPS signal become compromised or blocked in any way, the LMUs being affected will become inoperable and mobile devices making emergency calls may not be located accurately.

This Reply Comment details both the chamber testing and live field testing that TruePosition participated in. Analysis of the data and results has shown that the LightSquared LTE downlink signal causes interference in deployed GPS systems including the GPS receiver in the TruePosition LMU.
Chamber Testing- NAVAIR Station Patuxent River

For one week in May, interference testing was performed at the Naval Air Station Patuxent River (NavAir) anechoic chamber in St. Mary’s County, Maryland. As part of that testing, four specific areas were concentrated on:

- Tracking
- Sensitivity
- Acquisition
- Re-Acquisition

Each of the four areas were tested with the carrier transmission of the upper 5 MHz (5H), lower 10 MHz (10L), upper 10 MHz (10H) or a combination thereof. The “Tracking” test also included the lower 5 MHz (5L) transmission. Further, in each of the four tests, the maximum power at the antenna was -15dBm, while the minimum power was -85dBm.

Analysis of the results from the chamber testing shows that the GPS unit in the LMU is less sensitive to the 5L and 10L signal. At the power level transmitted during the testing, there should be no impact to operation in this lower band. Conversely, the 5H and 10H upper band showed significant effects to the GPS unit during each of the four tests being conducted. Issues such as loss of satellite visibility and degraded ability to acquire/re-acquire satellites after reset were clear at the upper band.

Las Vegas Field Testing

A second set of tests to quantify the scope of the LightSquared/GPS interference was performed in Las Vegas. During that testing in a live market, a set of deployed LMUs were monitored for impact while the LightSquared signal was broadcast in various parts of the area. Over the course of twelve days, various combinations of the 5L and 5H bands were transmitted in 15-minute bursts by four LightSquared LTE sites at power levels of either +59dBm or +62dBm. These power levels were much higher than those seen in the chamber testing.
Similar to the chamber testing, analysis of the Las Vegas data shows that the 5H upper band causes the LMU to lose satellite visibility. If this condition persists, the LMU will transition to an operational state of down until satellite visibility is restored.

The 5L signal did not interfere with LMUs that were at least 400m from the transmitting antenna. There was one LMU that was co-located with a LightSquared site. This LMU was affected by the 5L transmission and lost satellite visibility during the 15-minute burst of the signal. Unlike the chamber testing, this shows that LMUs can be adversely affected by the 5L band transmission.

**Conclusions**

Based on what was observed during both the chamber testing and the live market testing in Las Vegas, TruePosition concluded that LightSquared transmitting on the upper 5 MHz or 10 MHz will sufficiently interfere with the TruePosition LMU, causing it to become inoperable. Further, should the LMU be co-located with a LightSquared site, the lower 5 MHz band will also cause the LMU to no longer participate in location processing.

TruePosition recommends further testing be performed in a live environment that includes the entire 10L band, particularly since:

LightSquared is proposing a middle ground that would permit it to commence operations on the lower 10 MHz portion of its spectrum that poses no risk to the users of over 99 percent of GPS devices and to coordinate and share the cost of underwriting a workable solution for the small number of precision measurement and other devices that may be at risk.³

This scenario was not performed in the Las Vegas test; it should be pursued prior to LightSquared transmitting in this frequency range. The Las Vegas results show that only co-located sites are affected by the signal, but it is possible that other sites closer to the transmitting

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³ Recommendations of LightSquared, IB Docket No. 11-109 at page 4 (June 30, 2011).
antenna, not available in Las Vegas, can also be affected. Only further testing can provide clarity.

LightSquared is also proposing:

LightSquared hereby commits to operate its L-Band spectrum terrestrially at a power level significantly below the level permitted by the FCC in 2010. Specifically, consistent with the formula specified in Section 25.253(d)(1) of the rules that the FCC adopted in 2005, LightSquared’s maximum base station EIRP per sector for the single carrier it is proposing to operate in its lower 10 MHz block will be 32 dBW.\(^4\)

Assuming an overall resolution is secured, it is imperative that the Commission mandate LightSquared to maintain this lower power transmission for the life of their product/service. Should LightSquared increase to the maximum allowable power level, the transmitted power density in this increased bandwidth (10 MHz vs. 5 MHz) could cause the TruePosition GPS antennas to see double the overall power. Doubling the power will drive the front end amplifiers of the GPS antennas into compression and cause significant challenges in the TruePosition network.

Respectfully submitted,

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\(^4\) Recommendations of LightSquared, IB Docket No. 11-109 at page 25 (June 30, 2011).