

## The LightSquared Issue: A Short History

### Background – Mobile Satellite Service spectrum and GPS

- The radiofrequency band (the “L-Band”) where the Mobile Satellite Service (MSS) is placed has long been reserved for earth to satellite communications due to its unique physical characteristics. At these frequencies, radio signals propagate better through the Earth’s atmosphere, improving performance and cost effectiveness of earth satellite communications.
- Under pre-existing MSS rules, licensees were authorized in 2003 to conduct terrestrial operations that were “ancillary” to mobile satellite communications services – the original authorized purpose of the band – to fill in coverage gaps in urban canyons and other areas where a signal was blocked (indoors, for example). No terrestrial deployment in the L-Band occurred, however, nor has there been any terrestrial deployment through the present.
- The MSS L-Band is directly adjacent to the GPS “L1” band.

### LightSquared’s Proposal

- In March 2010, the Federal Communications Commission (FCC) approved transfer of ownership of a company holding an MSS license to new hedge fund owners who renamed the company “LightSquared.”
- In November 2010, LightSquared proposed a new business model, where customers would buy terrestrial-only handsets and terrestrial-only services, which FCC rules did not allow. The plan called for building 40,000 high-powered (roughly 1,500 watts each), ground-based stations throughout the U.S. No such stations currently exist, nor did they at the time of LightSquared’s proposal

### Interference Concerns

- A 1,500 watt transmission from a nearby ground transmitter in the immediately neighboring frequency to GPS would be billions of times more powerful than the GPS signals reaching the receiver. The result would be widespread “jamming” of the GPS signal.
- There are currently 500 million GPS receivers in use in the U.S.
- The U.S. government has invested \$35 billion in the GPS constellation alone, and continues to invest \$1.7 billion each year.
- GPS is embedded in critical government systems and commercial activities and is central to future critical infrastructure upgrades such as the Federal Rail Administration's Positive Train Control (PTC) and Federal Aviation Administration’s Next Generation Air Transportation System, known as “NextGen.”

- An industry-commissioned economic study estimated that GPS dependent industries provide more than 3 million jobs and GPS contributes nearly \$100 billion in economic benefits to industry *annually*.

### **FCC Waiver and Interference Study Process**

- GPS industry experts briefed the FCC on the potential for harmful GPS interference in 2010 and early 2011. The National Telecommunications and Information Administration (NTIA), which represents federal government spectrum users, sent a letter to the FCC expressing concern over interference from LightSquared's planned network.
- In January 2011, the FCC International Bureau granted LightSquared a conditional waiver that specified that LightSquared would not be permitted to commence operations until studies had demonstrated non-interference. Technical studies for interference were required.
- More than 100 technical experts from many companies and organizations participated in the Technical Working Group (TWG). Many affected government agencies conducted independent tests.
- LightSquared's submitted deployment scenarios for analysis at the start of the study group process involved use of both the "upper" block of the MSS band immediately adjacent to GPS as well as the "lower" block which is approximately 25 MHz away from GPS.

### **Interference Study Results**

- The final TWG June 2011 report clearly and conclusively demonstrated that LightSquared's planned network would cause devastating interference from both upper and lower band operations.
- Based on early results, LightSquared asked for testing of a lower band only deployment scenario. Limited tests in the initial round showed that LightSquared's revised deployment scenario reduced but did not eliminate interference for mass market receivers, including cellphones and personal navigation devices.
- Lower band only operations did not reduce interference for many precision GPS receivers in part because they are designed to use "augmentation" signals transmitted in the MSS band, making them vulnerable to terrestrial signals anywhere in the band.
- The FCC received extensive public comments on LightSquared's proposals. Due to interference concerns, the proposals were opposed by a wide range of interested private parties representing industries and businesses such as aviation, manufacturing, agriculture, construction, transportation, surveying and mapping, GPS manufacturers, and recreational users of GPS such as boaters. Also opposing the proposals were a wide range of government users, including first responders, public safety authorities, state and local governments and key agencies such as the National Telecommunications and Information Administration (NTIA).
- In a key development, the deputy secretaries of Defense and Transportation – the co-chairs of the PNT National Executive Committee – wrote the NTIA in January 2012, stating it was the

PNT's unanimous conclusion that both LightSquared's original and modified plans "would cause harmful interference to many GPS receivers" and that "there appears to be no practical solutions or mitigations" that would solve the interference problem.

- In February 2012, the NTIA wrote the FCC to state that its "independent evaluation of the testing and analysis" of LightSquared's proposed plans concludes that "LightSquared's proposed mobile broadband network will impact GPS services and that there is no practical way to mitigate the potential interference at this time."
- The next day, the FCC's International Bureau released a Public Notice seeking comment on the NTIA's letter and proposed that it would 1) withdraw the January 2011 waiver that allowed LightSquared to proceed with its planned network; and 2) modify LightSquared's satellite license to prohibit LightSquared from building any ground-based wireless network.

###