Adjacent Band Compatibility Update

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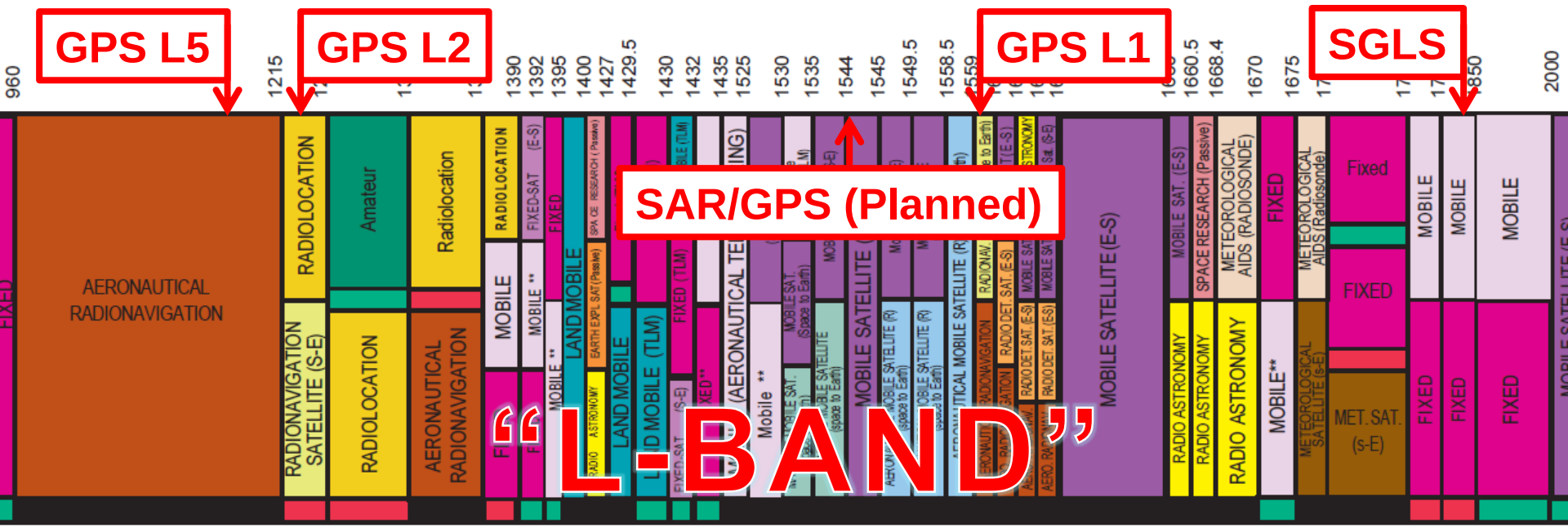
Overview

- **Adjacent-Band Compatibility**
  - DOT GPS Adjacent Band Compatibility Assessment
- **Spectrum Reallocation/Sharing**
  - Joint Task Group 4-5-6-7

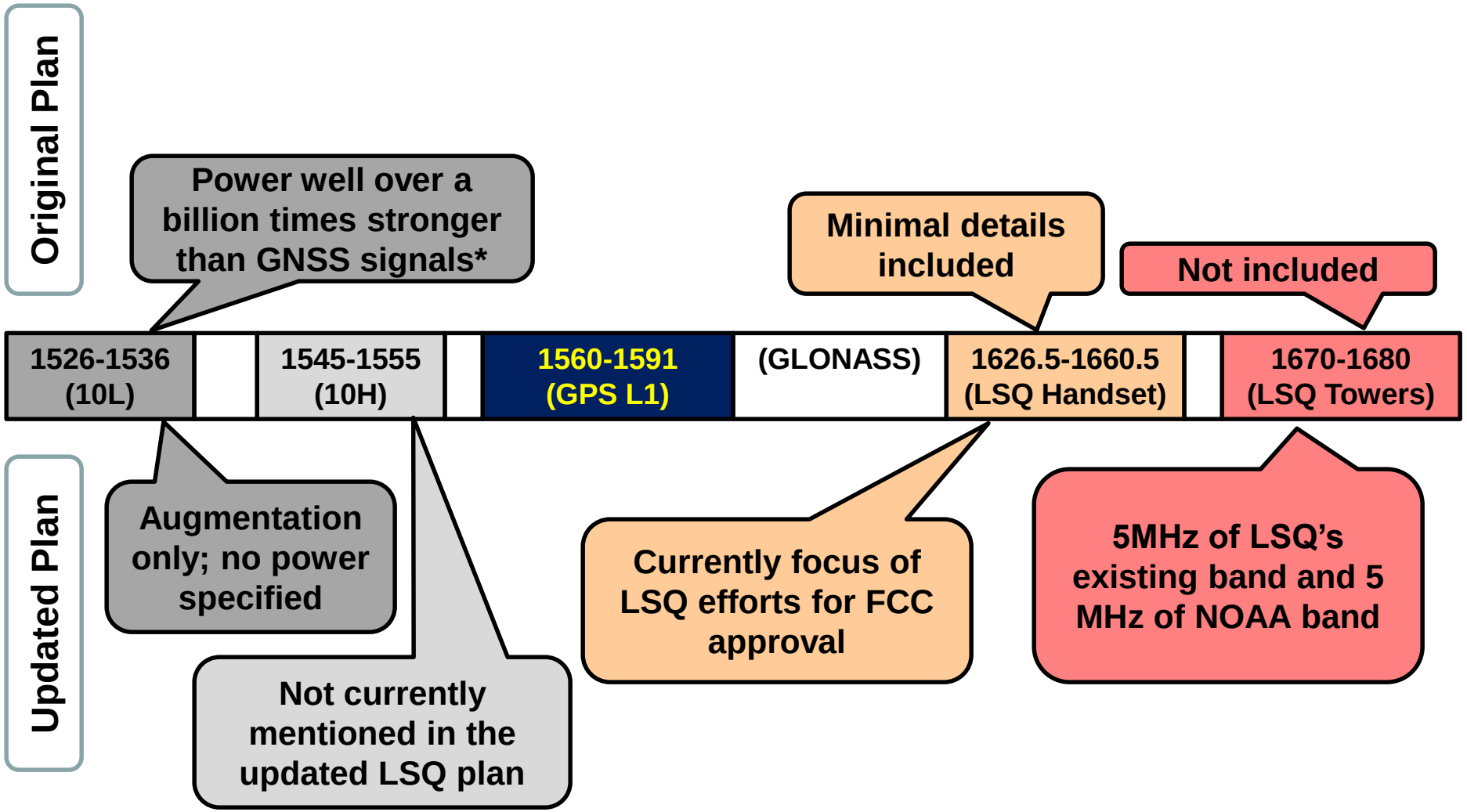
Adjacent-Band Compatibility (ABC)

- **A signal's ability to operate free of harmful degradation (interference) from other transmissions in the nearby areas of the electromagnetic spectrum**
- **Adjacent-band interference (ABI) can occur as the result of an adjacent band's power and proximity to a signal as well as inadequate filtering and/or tuning**



*National Telecommunications and Information Administration (NTIA) Table of Allocations in the L-Band (1-2GHz, IEEE)

Real World Example: LightSquared (LSQ)

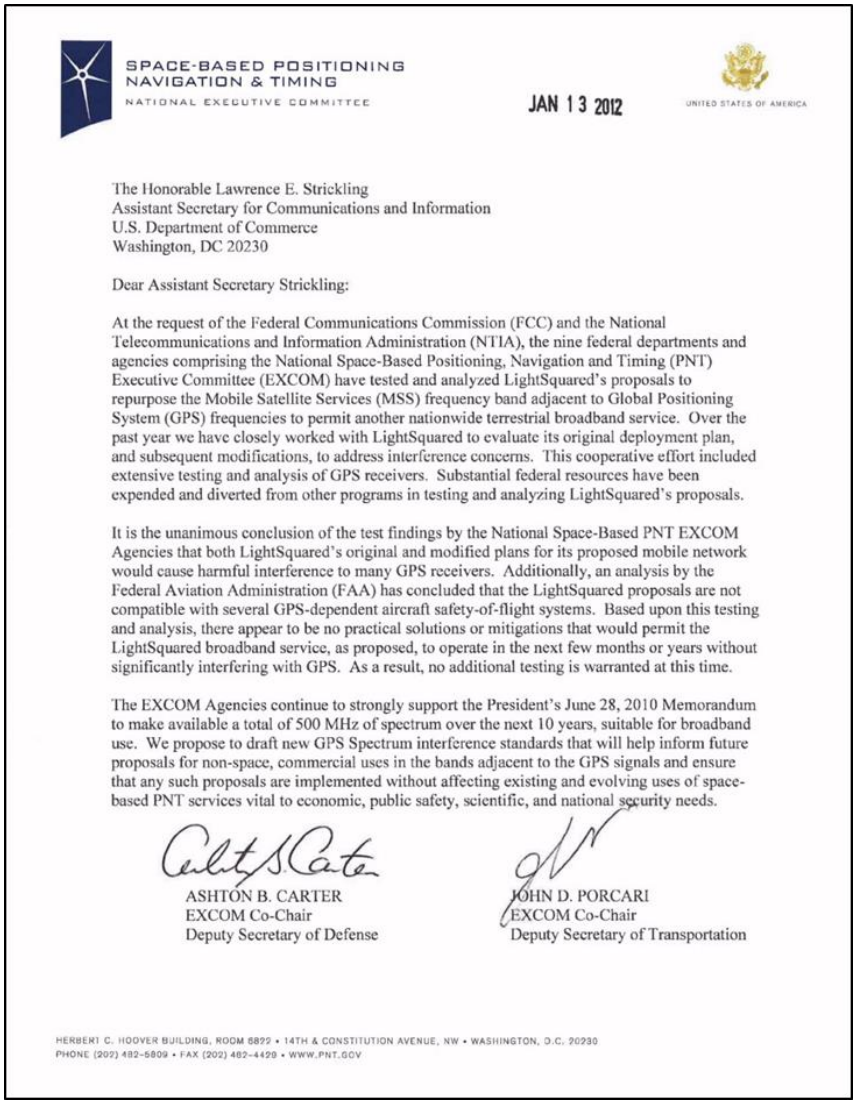


Concerns over 10L power level remain

*Power at a distance of 100 meters from a LSQ tower on or near earth's surface

DoT GPS ABC Assessment Goals

- **January 13, 2012 National Space-Based Positioning, Navigation, and Timing (PNT) Executive Committee (EXCOM) co-chair letter to National Telecommunications and Information Administration (NTIA) proposed to draft new Global Positioning System (GPS) spectrum interference standards:**
  - Inform future proposals for non-space, commercial uses in the bands adjacent to the GPS signals.
  - Ensure such proposals are implemented without affecting existing and evolving uses of space-based PNT that are vital to economic, public safety, scientific, and national security needs.



SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL EXECUTIVE COMMITTEE

JAN 13 2012

UNITED STATES OF AMERICA

The Honorable Lawrence E. Strickling
Assistant Secretary for Communications and Information
U.S. Department of Commerce
Washington, DC 20230

Dear Assistant Secretary Strickling:

At the request of the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA), the nine federal departments and agencies comprising the National Space-Based Positioning, Navigation and Timing (PNT) Executive Committee (EXCOM) have tested and analyzed LightSquared's proposals to repurpose the Mobile Satellite Services (MSS) frequency band adjacent to Global Positioning System (GPS) frequencies to permit another nationwide terrestrial broadband service. Over the past year we have closely worked with LightSquared to evaluate its original deployment plan, and subsequent modifications, to address interference concerns. This cooperative effort included extensive testing and analysis of GPS receivers. Substantial federal resources have been expended and diverted from other programs in testing and analyzing LightSquared's proposals.

It is the unanimous conclusion of the test findings by the National Space-Based PNT EXCOM Agencies that both LightSquared's original and modified plans for its proposed mobile network would cause harmful interference to many GPS receivers. Additionally, an analysis by the Federal Aviation Administration (FAA) has concluded that the LightSquared proposals are not compatible with several GPS-dependent aircraft safety-of-flight systems. Based upon this testing and analysis, there appear to be no practical solutions or mitigations that would permit the LightSquared broadband service, as proposed, to operate in the next few months or years without significantly interfering with GPS. As a result, no additional testing is warranted at this time.

The EXCOM Agencies continue to strongly support the President's June 28, 2010 Memorandum to make available a total of 500 MHz of spectrum over the next 10 years, suitable for broadband use. We propose to draft new GPS Spectrum interference standards that will help inform future proposals for non-space, commercial uses in the bands adjacent to the GPS signals and ensure that any such proposals are implemented without affecting existing and evolving uses of space-based PNT services vital to economic, public safety, scientific, and national security needs.

ASHTON B. CARTER
EXCOM Co-Chair
Deputy Secretary of Defense

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DoT GPS ABC Assessment Objectives

- **Derive adjacent-band power limits, as a function of offset frequency, necessary to ensure continued operation of all applications of GPS services.**
- **Determine similar levels for future GPS receivers utilizing modernized GPS and interoperable Global Navigation Satellite System (GNSS) signals.**

Near-Term Focus

- **Frequency Bands Adjacent to GPS L1**
- **Leverage Receiver Categories from TWG**
  - **Aviation**
  - **Cellular**
  - **General Location/Navigation**
  - **High Precision**
  - **Timing**
  - **Networks**
  - **Space**
- **Develop a set of curves demonstrating the maximum aggregate power level as a function of frequency offset from GPS**

Recommended Path Forward

Do:

- **Codify GPS Adjacent Band Transmitter Power Limit Criteria Based on Results of Compatibility Assessment**

Do Not:

- **Adopt New Interference Rejection Regulations and/or Standards for Civil GPS Receivers**
  - **Receiver interference rejection standards alone are insufficient to ensure protection of GPS receivers**
  - **In-depth analysis is required to evaluate GPS use-case specific interaction and interference scenarios**

Joint Task Group (JTG) 4-5-6-7

Background:

- Established by the 2012 World Radiocommunication Conference (WRC-12) to consider additional spectrum allocations for the mobile service on a primary basis and identify additional frequency bands for International Mobile Telecommunications (IMT) operations
- GPS Directorate Goal: monitor all GPS bands and adjacent bands being proposed as candidate bands for reallocation or sharing with IMT; various US agencies and international GNSS providers share this interest to help protect GPS

Current Status:

- Completed 5th JTG Meeting in Feb 14, one meeting left before JTG finalizes inputs to the conference preparatory meeting for WRC-15
- Next meeting: 21-31 July; Geneva, Switzerland
- Watch items: 1300-1400 MHz, 2025-2110 MHz and 2200-2290 MHz, 1525-1559 MHz, and any new submissions

Summary

- **GNSS providers have mutual interests in working together in order to protect GNSS bands from systems that would interfere with satellite navigation messages**
- **Spectrum management arenas that impact GNSS:**
  - International Committee on GNSS (ICG)
  - International Telecommunication Union (ITU)
    - WP-4C (RNSS)
    - JTG 4-5-6-7
  - The regulatory body of each provider
- **The US encourages continued dialogue on how to work together through these venues to protect GNSS signals**

Questions?