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)

Original Plan

- Power well over a billion times stronger than GNSS signals*
- Augmentation only; no power specified

Updated Plan

- Minimal details included
- Not currently mentioned in the updated LSQ plan

Concerns over 10L power level remain

*Power at a distance of 100 meters from a LSQ tower on or near earth’s surface
• 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.
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?