

# Presentation to DOT Workshop

March 12, 2015

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# LightSquared Comments on Testing Program

- The FCC has Exclusive Jurisdiction to Regulate Spectrum Emissions
- The Established Process is for Agencies to Ask the FCC to Conduct Such Studies
- The Only Purpose of Any Such Study is to Inform FCC Regulatory Action
  - If DOT does enter into an agreement with Volpe to perform a study, it should make sure the work is useful to the FCC
- In Order for a Study to be Useful
  - It must be based on a published, detailed test plan
  - Testing should inform the FCC's consideration of economic and social issues
  - The study's conclusions must be capable of being proved true or false by a competing study
  - The evidence used must be available for LightSquared or others to study
  - The study must begin and end in 2015
  - The study should adduce evidence relevant to "actual harm"
  - The study should identify the gold standard of GPS resiliency

# Appropriate Elements of Study

- Overall Roles and Responsibilities
  - DOT to gather all relevant datasets, position and timing error for widely used GPS devices
  - Full dataset, along with DOT perspective, shall be submitted to NTIA and FCC for review, public comment and action
  - Subject to confidentiality protection for proprietary elements, dataset should be capable of testing by LightSquared
- Scope
  - Downlink spectrum band only
- Focus of Assessment
  - Position / timing error
  - Change in  $C/N_0$
  - Providing detailed test results for both elements is essential
    - Positional and timing variance is what matters to determine “actual harm”
    - Signal/noise is a very poor proxy.
- All Testing to be Performed by Volpe or Qualified Independent Laboratories

# Devices for Testing

- The Devices Tested Should Cover:
  - Top selling devices for 2014 by SKU and seller
  - Top selling devices 2004-2013 that manufacturers believe are still in widespread use
    - Supporting information to DOT
    - Ability to provide test samples to DOT
  - Devices that are newly released in 2015 or ready for release with test devices available
- For Each Model Provided To DOT for Testing; Volpe Will Test two Identical Units
  - If units fail to achieve consistent results in confirmational testing; an additional two units will be provided
- Manufacturers to Make Identical Devices, “Test Mode” Software Codes, and Any Necessary Data Collection Cables Available to 3<sup>rd</sup> Parties For Parallel Testing
  - DOT can use confidentiality agreements to protect proprietary elements
- GPS Receive Antenna Patterns to be Made Available in Order to Perform Subsequent Use-Case Analyses
- The Frequency Selectivity Curve and Linearity of the Receiver Front-End for all Devices to be Provided to DOT (and FCC)
- Manufacturers to Provide Description of Typical Use Cases for Devices Submitted
- LightSquared to Have Same Information and Access in Order to Perform its Own Tests

# Testing Process and Output

- Conducted Testing Will be Performed When Feasible; Otherwise Over-the-Air Testing Will be Performed
- Adjacent Band Power Will be Measured at the GPS Antenna Connector (or Immediately Adjacent to the Antenna for Over-the-Air Testing)
  - Eliminates need for propagation model assumptions in the analysis process
- All Test Results, Including Full Device Identities, to be Publicly Released on a Rolling Basis as Testing is Completed
- In Order to Provide a Complete Data Set to NTIA and the FCC, DOT to Create a Series of Receiver Masks to Illustrate the Impact of the Adjacent Band on Different Classes of Devices
  - Mask representing all devices within a category
  - Mask which eliminates the 15% of devices with the poorest rejection of adjacent band signals
  - Mask which shows the top 50% of devices with respect to rejection of adjacent band signals
- Multi-GNSS Receivers Will not be Tested Since There is Currently no Authorization for Non-GPS Satellite Receivers to Be Used in the United States
- “Gold Standard” to be Assessed

# Openness and Transparency

- Creation of an “Issues Log” to Track All Items Raised at Workshops and Private Meetings; Updated and Released Weekly
  - Date
  - Description
  - Status
  - Resolution
  - Responsible Party
- Public Availability of Information
- Confidentiality Would be Afforded to Proprietary Information Only
  - Specific sales volumes for devices
  - Device front-end information (such as frequency selectivity and linearity of devices submitted for testing)
- All Communications and Materials Presented at Meetings Between DOT and Study Participants Outside of Workshops to be Posted to the DOT ABC Website
- Audio Recording of Future Workshops to be Available at the DOT ABC Website in Addition to the Meeting Materials

# Key Milestones

Redraft of Current Test Plan, Public Comment and Final Draft Released	5/4/2015
Devices to be Tested Provided to Volpe by Manufacturers	5/18/2015
Lab Setup Complete / Final Test Plan Issued	5/25/2015
Device Testing Begins	5/25/2015
Test Results Released	Rolling
Device Testing Complete	8/26/15
Final Results Submitted to NTIA/FCC (No Interference Standards to be Recommended)	9/30/2015