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February 25, 2011

**ELECTRONIC FILING**

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

**Re: SAT-MOD-20101118-00239**

Dear Ms. Dortch:

In its Order dated January 26, 2011 ("*LightSquared Order*"), the Federal Communications Commission ("Commission") required LightSquared Subsidiary LLC ("*LightSquared*") to submit, by February 25, 2011, an initial report that includes "a work plan outlining key milestones for the overall analyses" of "potential for overload interference to GPS devices."<sup>1</sup> A copy of the initial report ("*Report*"), prepared jointly with the United States Global Positioning System ("GPS") Industry Council ("*USGIC*"), is attached.

Over the past several weeks, LightSquared has been working cooperatively with USGIC to co-chair a Working Group to study the GPS overload/desensitization issue as discussed in the *LightSquared Order*. These cooperative efforts have focused on defining the structure and governance of the

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<sup>1</sup> *LightSquared Subsidiary LLC; Request for Modification of its Authority for an Ancillary Terrestrial Component*, SAT-MOD-20101118-00239, DA 11-133, ¶ 41, 43 (rel. Jan. 26, 2011).

Working Group and identifying key milestones, as discussed in greater detail in the Report.

Please do not hesitate to contact me with any questions.

Respectfully,

A handwritten signature in black ink that reads "Henry Goldberg". The signature is written in a cursive style with a large, prominent "H" and "G".

Henry Goldberg  
*Counsel for LightSquared Subsidiary LLC*

cc: Julius Knapp, FCC  
Mindel De La Torre, FCC  
Ruth Milkman, FCC  
Ron Repasi, FCC  
Karl Nebbia, NTIA  
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## LIGHTSQUARED FEBRUARY 25, 2011 REPORT TO THE FCC

### Prepared Jointly with the USGIC

#### **Introduction**

LightSquared and the United States Global Positioning System (GPS) Industry Council (“USGIC”) have been working cooperatively to form a Working Group (“WG”) to study the GPS overload/desensitization issue as described by the Commission in DA 11-133. This cooperative effort has focused on defining the structure and governance of the WG and identifying key milestones, which are detailed herein.

In addition to these activities, LightSquared has begun identifying lab space/test chambers that are available to perform the testing that will be undertaken by the working group. The test plan, oversight of the testing, and the test laboratories will be mutually agreed with the USGIC as detailed later in this document.

#### **Working Group Structure and Governance**

LightSquared and the USGIC have agreed that, in order for the WG to study fully the potential for overload interference/desensitization to GPS receivers, systems, and networks, it is essential that its activities be objective, transparent, and reproducible. By following these key principles, the WG will be able to produce results that are timely, accurate and trusted.

Consistent with the objectives outlined above, the WG structure and working methods will be aligned in order to achieve the following outcomes:

- Collection of a representative, accurate dataset (sufficient to allow evaluation of operational impacts) within the timeframe set out by the Commission
- Creation of a transparent, inclusive process
- Determination of operational impacts on installed GPS users
- Identification of mitigation techniques that aim to “prevent harmful interference to GPS.”<sup>1</sup>
- Recommendations

#### *Organization*

The WG will be comprised of (1) two Co-Chairs, (2) a Technical Working Group (“TWG”) and (3) Advisors. The roles and responsibilities of each are detailed below. The participation by any individual or company in the WG does not preclude or limit their ability to submit comments in writing to the FCC under ex parte in this proceeding (SAT-MOD-020101118-00239).

#### *Co-Chairs*

The WG will be co-chaired by designated representatives of LightSquared and the USGIC. The USGIC designee is Charles R. Trimble, Chairman of the USGIC. The LightSquared designee is Jeffrey Carlisle, its Executive Vice President of Regulatory Affairs and Public Policy.

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<sup>1</sup> See SAT-MOD-020101118-00239, Order and Authorization, DA 11-133, para. 41.

The Co-Chairs will be responsible for reviewing and approving the results of the WG, and will provide direction for the WG based on input received from its members. All matters within the responsibility of the WG generally require the approval of both Co-Chairs (with the exception of two members each of the TWG, the appointment of technical observers of the testing process, and the selection of Advisors as discussed below). The Co-Chairs will also be responsible for preparing the monthly status reports to be filed by the WG.

#### *Technical Working Group (TWG)*

The TWG will be comprised of GPS industry experts and will provide guidance and recommendations for the WG on critical elements of the interference study. It is expected that the TWG will be made up of individuals numbering 14-20 who will bring strong technical and/or use-case expertise to the working group and represent a diversity of receiver categories and installed user groups. Among the responsibilities of the TWG are to define/recommend:

- Pertinent analytical and test methodologies and assumptions underlying the test regime;
- Neutral test facilities, field test sites, independent laboratories, and objective third parties for laboratory and field testing of the work plan;
- Which receivers, systems, networks are to be tested;
- Analysis of the test results pursuant to agreed-upon methodologies;
- Operational scenarios that represent the installed GPS base
- Test results criteria for interpreting the dataset for operational impact; and
- Mitigation strategies, if feasible, “to prevent harmful interference to GPS” installed operations.

Each of the Co-Chairs will appoint two members of the TWG. The remaining TWG participants will be selected by agreement of the two Co-Chairs. Additional members may be added by agreement of the Co-Chairs. Should the Co-Chairs not be able to agree on sufficient members to reach the minimum membership of 14, each Co-Chair shall have the right to appoint equal numbers of members until there are 14 members. To facilitate the study process and to comply with the FCC reporting timeline, it is anticipated that the TWG members will have direct technical expertise in the subject, including GPS/Global Navigation Satellite System (GNSS)/Augmentations/L-band systems. After selection, TWG members will provide a written statement on their expertise including disclosure of any apparent conflict of interest to the Co-Chairs.

#### *Advisors*

Advisors will represent the full range of stakeholders and other affected entities, including interested manufacturers, user groups and experts in the GPS field. Advisors will be encouraged to provide their feedback to the TWG and Co-Chairs on the WG’s work plan and receivers to be tested. Advisors will be able to assist the TWG and Co-Chairs by providing specific technical expertise and identification of specific use case scenarios that should be considered.

Advisors may submit comments or views in writing to the points of contacts for the Co-Chairs. Advisors’ comments or views may be taken under consideration by the TWG. Additionally, the Co-Chairs may seek Advisor input through conference calls.

This category of participation will be broad and the number of Advisors in the WG is not limited. Interested companies, organizations, and individuals may email membership requests to [info@gpsworkinggroup.org](mailto:info@gpsworkinggroup.org). Requests should include the name of the individual and company or organization represented, if applicable; and a brief biography covering applicable expertise. Because of

the “work in progress” nature of information that may be shared with Advisors, it will not be possible to accommodate requests from the media for membership. Requests to be an Advisor will be evaluated by the Co-Chairs, either of which will be able to grant requests without consent of the other. As with TWG members, after selection Advisors will submit to the Co-Chairs disclosure of any potential conflict of interest.

### ***Working Group Participation***

All participants in the WG are expected to cover their own costs associated with their participation. For TWG members and Co-Chairs, this will include any travel expenses that may be incurred with the attendance of meetings and/or testing observation. It is not expected that Advisors will be required to travel as part of their participation in the working group.

The reasonable costs of the testing process itself will be borne by LightSquared. All vendor selection associated with the testing process is subject to the joint approval of both Co-Chairs to avoid any potential conflicts of interest.

### **WG Milestones**

The Commission specifically requires LightSquared to set out the key milestones of the WG in this work plan filing. These milestones are as follows:

#### *Define the WG structure*

The structure of the WG is detailed in this work plan filing and provides the Commission and interested parties insight into the planned operation of the WG. It is also intended to inform interested parties of how they may participate in the WG and to provide a means for formally expressing that interest to the Co-Chairs. This task is complete as of the filing of this work plan.

#### *Form the TWG*

The formation of the TWG is now underway, with the Co-Chairs working jointly to identify, contact and approve TWG participants. LightSquared and the USGIC have agreed that the TWG will include representatives from a broad cross-section of constituencies using the positioning, navigation, and timing (PNT) information broadcast by GPS/GNSS/augmentations/L-band systems. These applications include, but are not limited to: public safety; aviation (commercial, business, and general); electric power and utilities; engineering and construction; environmental protection; law enforcement and legal services; maritime and waterways; transportation (most modes); agriculture; surveying, mapping, and land management; weather, scientific, and space; precision timing, consumer devices, and cellular handsets. Also to be included are constituencies using augmentation systems which include space-based such as: Wide Area Augmentation System (WAAS); Ground-based Augmentation Systems (GBAS); Nationwide Differential GPS System (NDGPS); Continuously Operating Reference Stations (CORS); Global Differential GPS (GDGPS); International GNSS service (IGS); wide-area differential GPS corrections service using satellite broadcast techniques; and commercial virtual reference stations providing high-accuracy, real-time kinematic (RTK) GNSS positioning for wider areas. Candidate constituencies use the following types of GPS receivers, systems, and networks consisting of single frequency receivers; multi-frequency GPS receivers; multi-frequency GNSS receivers; and may include one or more augmentation(s) and corrections streams.

LightSquared and USGIC are jointly discussing participation by government agencies in the TWG with the National Telecommunications and Information Administration (NTIA). It is necessary that government agencies participate in the TWG.

The Co-Chairs are currently working to complete formation of the TWG by the time the WG's first progress report is due on March 15, 2011. Additional members may be added subsequent to this filing as warranted. The WG will provide updated membership information in each of its monthly progress reports.

*Announce the Advisor application process*

This work plan contains email contact information for interested parties to request to be an Advisor for the WG and discusses the process for Advisor selection (see Advisors section above). This task is complete as of the filing of this work plan, though outreach efforts will continue.

**Work Plan Key Milestones for the Overall Analysis:**

From FCC Order (DA 11-133):

“42. The working group shall focus on analyzing a variety of types of GPS devices for their susceptibility to overload interference from LightSquared's terrestrial network of base stations, identifying near-term technical and operational measures that can be implemented to reduce the risk of overload interference to GPS devices.”

**1. *Establish pertinent analytical and test methodologies and assumptions underlying the test regime***

The TWG will establish underlying definitions, including:

- Defining harmful interference criteria at the GPS/GNSS/Augmentations/L-band receiver, including what constitutes harmful interference in terms of receiver parameters with reference to relevant international standards, immediate effects, and effects that may persist over time, such as receiver desensitization.
- Identifying relevant information regarding the broadband terrestrial radiation, including power levels, bandwidth, modulation, antenna pattern, and other technical characteristics that govern the signal(s) to be emitted; average and peak transmit equivalent isotropic radiated power (EIRP) for base stations and handsets; modulation, including cycle and multiple access schemes, for both base stations and handsets which are planned to operate in the 1626.5 MHz-1660.5 MHz band; transmit signal envelope data over the range 1525 MHz – 1559 MHz, including channelization and allowed operating frequencies; transmit antenna gain contours both azimuth and elevation (-90° to +90° patterns); deployment plans (cities to be covered, transmit sites per city and, if known, site locations in each city covered);
- Identifying and agreeing upon interference analysis assumptions; choosing assumptions suitable for interference testing and analysis, including those for the signal propagation path loss, receiver antenna gain, and other assumptions that would affect power transfer from transmitter to receiver; use of receiver signal quality metrics such as C/N<sub>0</sub>; and agreement on baseline noise floor;

- Evaluating potential test methodologies for accomplishing the work for which the WG has been formed, consistent with the key tenets outlined earlier in this work plan. Specifically, the test methodology that is adopted must be objective, transparent, and reproducible. The TWG will also recommend appropriate operational assumptions that are key to the implementation of the test plan. This task will begin upon the completion of the TWG formation.

## **2. *Select the categories of receivers and receivers to be tested***

The TWG, with input from the Advisors, will recommend to the Co-Chairs the specific receivers, systems, networks that should be tested by the TWG. The TWG will ensure that the receivers, systems, and networks tested are representative of the broad range of installed GPS/GNSS/Augmentation/L-band applications, to the extent practical. Categories will include safety-of-life and public safety services, including Federal, state, and local government use of GPS. This task will begin upon the completion of the TWG formation.

## **3. *Develop operational scenarios***

Identify and define operational scenarios in urban and other areas to facilitate a better understanding of the potential impact of LightSquared's Ancillary Terrestrial Component (ATC) base stations and mobile handsets on GPS receiver desensitization characteristic. Identify conditions under which the receivers will be used, including both their physical situations, receiver dynamics, and types and strengths of the signals that they are expected to receive at the antenna front end. Scenarios will be identified and developed by the TWG with input from the Advisors. This task will begin upon the completion of the TWG formation.

## **4. *Establish the methodology for analyzing test results***

The TWG will establish methodologies under which the test results will be evaluated. These methodologies are important in understanding and interpreting test results.

## **5. *Derive the test conditions based on the established operational scenarios***

## **6. *Write the test plan and procedures***

Write the plan to conduct testing that ensures conditions previously established will be observed, result in comprehensive data, and be reproducible.

## **7. *Identify and engage appropriate neutral test facility(ies) for the testing portion of the work plan***

It is anticipated that some or all receivers, systems and networks that are laboratory tested will also be tested in a field environment. It is agreed that field testing cannot substitute for laboratory testing as it cannot replicate all conditions and is not repeatable. However, field testing has the advantage of avoiding assumptions about propagation models.

The TWG will recommend testing facilities, field test sites, independent laboratories, and objective third parties that are able to conduct the testing according to the adopted test methodologies and tenets described in this work plan. It is expected that several test

facilities/chambers and test sites will be engaged in the testing process in order to evaluate a meaningful number of receivers. The selection of the test facilities, field test sites, independent laboratories, and objective third parties will require the concurrence of Co-Chairs.

**First Work Plan Key Milestone for the Overall Analysis:**

Complete elements of items 1 through 7 as defined in the Work Plan for inclusion in the FCC Order First Progress Report (see attached FCC Order Reporting Milestones).

**8. Perform testing**

Have independent laboratories perform laboratory testing according to the work plan with participation and technical observation by TWG members or relevant Advisors, who are not to interfere with or otherwise delay the testing process. Each Co-Chair will appoint one or more TWG members or Advisors as technical observers.

All testing conducted in the field environment will be performed by an objective third-party selected jointly by the Co-Chairs with participation and technical observation by TWG members or relevant Advisors, who are not to interfere with or otherwise delay the testing process. Each Co-Chair will appoint one or more TWG members or Advisors as technical observers.

LightSquared has already begun inquiring about the availability of test facilities, but no selection will occur until the TWG has been formed.

**Second Work Plan Key Milestone for the Overall Analysis:**

Complete elements of item 8 as defined in the Work Plan for inclusion in the FCC Order Second Progress Report

**9. Analyze test results based on established methodology**

Using the methodology established earlier in the work plan, analyze the results to determine the proposed terrestrial signal transmissions effect on GPS operations.

**10. Assess operational scenarios using analytics and test results**

The TWG will analyze the test results in the context of the operational scenarios in order to assess the practical impact of receiver desensitization / overload conditions on the installed user base. This will allow for the identification of areas of concern. This task will begin after test results have been evaluated and scenarios identified and defined.

**Third Work Plan Key Milestone for the Overall Analysis:**

Complete elements of items 9 through 10 as defined in the Work Plan for inclusion in the FCC Order Third Progress Report.

**11. Assess whether any mitigation measures are feasible and appropriate**

The TWG will identify mitigation options, if feasible, including LightSquared design considerations, types of components, transmit power, and/or operational frequency



modifications that, along with the OOB restrictions previously agreed to between LightSquared and the USGIC, will prevent receiver desensitization/overload from occurring in installed GPS operations. Any mitigation recommendations mutually acceptable to the Co-Chairs will be provided to the Commission in LightSquared's final report which is due on June 15, 2011.

**Fourth Work Plan Key Milestone for the Overall Analysis:**

Complete elements of item 11 as defined in the Work Plan for inclusion in the FCC Order Final Report.

**FCC Order Reporting**

It is LightSquared's obligation to submit FCC Reports; however, when Co-Chairs cannot reach consensus on the text of Reports, Co-Chairs will provide bracketed text indicating alternate language.

**Conclusion**

This report shows the seriousness with which both LightSquared and the USGIC have taken organization and planning, and their commitment to an objective and transparent process to ensure reproducible results. We are moving together quickly and cooperatively to commence the activities described, and look forward to providing details regarding completion of items 1 through 8 identified in the first milestone in the Work Plan, including base station transmitter characteristics, categories of GPS devices and their representative performance characteristics, and test plans and procedures as the FCC has requested for our next report, due March 15, 2011.

Jeffrey Carlisle  
Executive Vice President, Regulatory Affairs &  
Public Policy  
LightSquared

Charles R. Trimble  
Chairman  
US GPS Industry Council