

Overall GPS Interference from LightSquared

Every sector and applications area of the Global Positioning System (GPS) industry experienced significant levels of interference from LightSquared signals emanating from the broadband communications system proposed by the company, according to a report filed on 30th June 2011 by the Technical Working Group (USA). TWG was formed to study the interference issue at the request of the Federal Communication Commission.

The report also does not give solutions to the interference effects that can work across the broad range of GPS receiver designs and applications areas. The TWG was co-chaired by Chairman of the United States GPS Industry Council Charles R. Trimble, and LightSquared Executive Vice President for Regulatory Affairs and Public Policy Jeff Carlisle.

Regarding possible effective solutions, Trimble offered the view that "greater separation of the LightSquared signals and those of GPS are necessary if the value of GPS is to be protected and broadband communications can grow to its potential over the long term."

Seven categories of receivers that are representative of the non-military use of GPS in the United States are identified: aviation, cellular, general location/navigation, high precision, timing, networks, and space-based receivers. The report said significant interference effects were experienced in each of the categories.

In the area of high-precision receivers used for precision agriculture, survey, construction, machine control, mining, Geographic Information Systems (GIS), structural deformation monitoring, and science, it was found that damaging interference existed at times at very long distances for the LightSquared transmitters. NovAtel Inc. President and CEO Michael Ritter said, "Allowing LightSquared to interfere with the utilisation of these high precision receivers would eliminate the productivity improvements provided to these industries and applications during the past 20 years and will result in significantly higher prices for goods and services from these industries to the consumer."

Damaging interference also occurred with GPS timing receivers, which are widely used to provide precise time synchronisation in applications such as wireless, wireline, fiber optic telecommunications networks, electric power grids, paging systems, public safety radio systems, and financial networks.

The report concluded that for high-precision and timing receivers, "We know of no currently available receiver, filter, antenna or other mitigation technology that would enable the construction of future wideband High Precision, Timing or Network GPS receivers that are compatible with the Phase 0, 1, or 2 LightSquared rollout plans." The report also stated, "We know of nothing feasible that can be done to make currently fielded High Precision, Timing, and Network receivers operate properly when in the vicinity of a LightSquared base station, with respect to either GPS or augmentation systems."

Regarding general navigation receivers, the report concluded that all phases of the LightSquared deployment plan will result in widespread harmful interference to GPS signals and service and that mitigation is not possible. The report noted that lab testing revealed that many devices suffered from harmful interference from the lower 10MHz channel (the use of which LightSquared has proposed as a "solution" to the GPS interference problem); specifically, the report stated that 20 out of 29 devices tested experienced harmful interference from that channel.

The report also studied possible mitigation options that could be adopted by GPS receiver manufacturers and/or LightSquared. Said Trimble, "There were no magic bullets that emerged despite some very creative thinking on both sides of the question." Currently available filters to screen GPS receivers from the LightSquared signals were found to be inadequate in meeting the

stringent demands of current receiver designs for size, power consumption and other technical parameters. Even proposed filter designs for future generations GPS receivers were found to be uncertain in terms of actual performance and delivery times and could take years to be made available and integrated into new products.

Trimble also raised the issue of the already-installed base of several hundred million GPS devices that cannot be retrofitted. These devices are not simply or easily replaced either, with consumer GPS products lasting over eight years, and even longer life spans for more sophisticated and expensive aviation products.

The report also considered modifications to LightSquared's deployment plan for its system that proposed a partial initial deployment using only a portion of the original proposed spectrum. Here, too, the results were largely unsatisfactory. Trimble noted, "While we appreciate the flexibility and creativity shown by LightSquared in the proposed modifications to their deployment scenario, in the end this is little more than a temporary band-aid to the larger question of trying to find ample separation of the GPS and LightSquared signals. There simply is not enough room in the spectrum adjacent to GPS for safe and reliable operation of both services together."

Regarding future GPS and broadband developments, Trimble stated, "We hope that the FCC will understand and appreciate the comprehensive work that the TWG has done to define the interference effects of the LightSquared signals in scientific and engineering fact. GPS and broadband are two very valuable elements of today's information infrastructure, but the report shows clearly that they cannot operate in adjacent spectrum. Finding new areas of spectrum where sharing is possible to accommodate the LightSquared requirements is a difficult regulatory question. However, the FCC needs to consider other options for the LightSquared signals where they do not run up against the laws of physics."

<https://www.gim-international.com/content/news/overall-gps-interference-from-lightsquared>
