AEROSPACE INDUSTRIES ASSOCIATION

December 21, 2012

Chairman Julius Genachowski
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

RE: Docket RM-11681; Reply Comment on LightSquared Petition for Rulemaking to Allocate the 1675-1680 MHz Band for Terrestrial Mobile Use

Dear Chairman Genachowski:

Earlier this year the Aerospace Industries Association (AIA) supported the Federal Communications Commission's (FCC) proposed (1) vacatur of the Conditional Waiver Order of the Ancillary Terrestrial Component (ATC) granted in 2011 to LightSquared Subsidiary LLC (LightSquared) and (2) the indefinite suspension LightSquared's underlying ATC authorization which would have allowed it to operate a terrestrial network in the 1545-1555 MHz portion of the L Band.[1] We took this position to safeguard the ongoing investments the American public has made in the global positioning satellite (GPS) system as well as the safety of system dependents domestic and abroad.

LightSquared now requests that the FCC amend the U.S. Table of Frequency Allocations to add a primary allocation permitting non-Federal terrestrial mobile use of the 1675-1680 MHz band.[2] Several parties filed in response to the Commission's request for public comment on November 9, 2012. Lockheed Martin stated that "the Commission [should] only consider an allocation to the mobile service at 1675-1680 MHz if the Commission determines that such an allocation is compatible with existing users of the band [and] that sharing conditions can reliably be identified and imposed on the eventual non-Federal licensee(s)," among other conditions identified by Lockheed Martin.[3] The U.S. GPS Industry Council (GPS Council) expressed similar concerns.[4] In its comments, the Coalition to Save our GPS (GPS Coalition) states its expectation "that the Commission will fully evaluate the impact that the use of the 1675-1680 MHz band has on incumbent services before it modifies the U.S. Table of Allocations."[5]

AIA concurs in these concerns raised by Lockheed Martin, the GPS Council, and the GPS Coalition. While we understand LightSquared's desire to protect the interests of its investors by

[1] *Comments of the Aerospace Industries Association* IB Docket No. 11-109 filed March 16, 2012.

[2] LightSquared Petition for Rulemaking to Allocate the 1675-1680 MHz Band for Terrestrial Mobile Use, RM-11681 (filed. Nov. 2, 2012)("LightSquared Allocation Petition")

[3] Opposition of Lockheed Martin to LightSquared Allocation Petition, RM-11681, filed Dec. 10, 2012, at 3.

[4] Comments of the U.S. GPS Industry Council on the LightSquared Allocation Petition, RM-11681, filed Dec. 10, 2012, at 4.

[5] Comments of the Coalition to Save Our GPS on the LightSquared Allocation Petition, RM-11681, filed Dec. 10, 2012, at 4.

finding alternative spectrum for which it can compete, we must note the absence of any mention in the Petition of the risks to which sharing the allocation will expose operations of the National Oceanic and Atmospheric Administration (NOAA), its Meteorological-Satellite service, it's Meteorological Aids (radiosondes) service and those entities which rely on those Services. In short, allowing LightSquared to use its high-powered signals in this band will likely pose many of the same issues as it did with regard to GPS and has the potential to jeopardize aviation safety and the efficient functioning of the national airspace system.

We are concerned that LightSquared's LTE characteristics may pose a threat to the reliability of the Meteorological-Satellite and Meteorological-Aids (radiosondes) Services. It is important that as a petitioner for a new shared allocation, LightSquared undertake a thorough risk assessment, with NOAA's cooperation, to include analysis and testing so FCC makes a well-informed decision whether to proceed to the rulemaking stage. As the GPS Council noted, "[a]mong the issues that would need to be addressed in considering a new co-primary terrestrial mobile allocation in the 1675-1680 MHz band are the potential for increased out-of-band emissions ('OOBE') from more widely-deployed terrestrial transmitters and the potential for larger numbers of such transmitters to overload receivers in adjacent bands."[6]

The 1675-1680 MHz band and adjacent bands today are used for the reception of Sensor Data (SD) and Multi-use Data (MDL) from the GOES geostationary satellites and for radiosondes or rawinsondes. Future uses include the Data Collection Platform Report (DCPR) for domestic and international users on the GOES-R satellites and the band will be adjacent to the GOES Rebroadcast (GRB) downlink on GOES-R.

As the Federal agency focused on understanding and predicting changes in weather, the ocean, and the atmosphere, NOAA provides critical meteorological and atmospheric data for the United States and, in particular, for the national airspace system. This information is used by the Federal Aviation Administration (FAA) to determine safe and efficient airspace accessibility for commercial, business, and general aviation aircraft. This data is critical for the safety and capacity of the air transportation system. The FAA and pilots use this data to determine critical parameters for flight including routes, flight altitude and takeoff performance data. According to the Bureau of Transportation Statistics, "During 2011, seventy five and one-half (75.5) percent of [National Airspace System] NAS delays were due to weather", and extreme weather was the reported cause of 4.1 percent of airline delays. We estimate that these percentages could be higher without the atmospheric forecasts and warnings provided by NOAA.

The importance of the meteorological services in the 1675-1680 MHz band for the safety and welfare of American people was most recently clearly demonstrated before, during, and after landfall of Hurricane Sandy and must not be ignored. Harmful interference to operations in and near the 1675-1680 MHz would have degraded NOAA and the private sector's ability to accurately forecast and report the track, intensity and storm surge from Hurricane Sandy, potentially causing more loss of life, injuries, property damage and other costs.

NOAA's National Weather Service launches instruments via weather balloon from nearly one hundred locations within the United States and Possessions several times per day. These instrument sensors measure profiles of pressure, temperature, winds aloft, and relative humidity. A battery-powered 300 milliwatt (or less) transmitter sends this measured data to sensitive ground antennas/receivers. Data collected is used for weather forecasts and products (including aviation) and serves as input for supercomputers that perform numerical weather prediction to create forecasts and products.

---

[6] Comments of the GPS Council at 4.

For example, 615 additional radiosonde observations were launched over eight days before landfall of Hurricane Sandy. These radiosonde measurements, which used spectrum overlapping the1675-1680 MHz requested by LightSquared, were used as additional data input to NOAA's numerical weather prediction models to enhance the accuracy of the landfall prediction for the hurricane.[7] A NOAA factsheet on Hurricane Sandy indicated "Before, during and after Sandy and other hurricanes, NOAA's agency-wide response includes a range of major assets, **including geostationary and polar-orbiting weather satellites** [emphasis added], ocean observing and coastal water-level monitoring systems, a fleet of ships and aircraft, and potentially lifesaving information collected by NOAA scientists on land and water, **in the air** [emphasis added] – and in the eye of the hurricane itself."[8] Satellite data from current polar-orbiting and geostationary weather satellites are received and distributed via the 1675-1710 MHz band. Appendix One shows the specific services that are within or adjacent to spectrum requested for sharing by LightSquared and describes them in more detail.

The 1675-1680 MHz band is part of the band which the National Telecommunications and Information Administration (NTIA) examined for potential near-term repurposing for commercial broadband use in its 2010 Fast Track Report. The Report concluded "Having considered options to reallocate the entire 1675-1710 MHz band or to reallocate a portion, NTIA has concluded that the range of 1695-1710 MHz offers opportunity for wireless broadband while minimizing overall disruption of operations upon which the domestic and international public safety and weather prediction communities depend. ... Because of the anticipated user impacts, costs, and schedule needs, NTIA concluded not to recommend the spectrum below 1695 MHz for sharing as part of the fast track process."[9]

We suggest that the Commission follow the NTIA's conclusion that sharing of the spectrum below 1695 (which would include the 1675-1680 MHz band) is not recommended. Even if AIA supported the proposed alternative use of 1675-1680 MHz, which it does not, the LightSquared petition does not even touch on the important subject of how the spectrum could be simply allocated and licensed to LightSquared without competitive bidding.

AIA does not take a position on the viability of sharing the 1675-1680 MHz spectrum between incumbents and terrestrial wireless services because relevant data is not available at this time. Certainly, the LightSquared Allocation Petition does not offer such data or any supportive technical analysis, for that matter. However, AIA recommends that significant analysis, validated by LightSquared-funded testing between federal receivers and terrestrial wireless equipment, be employed to determine if such sharing with federal systems is viable in 1675-1680 MHz (AIA recommends that the same analysis and testing process be followed for future sharing in the 1695-1710 MHz band).

As a separate concern, consideration of the petition by LightSquared should not jeopardize the reallocation of the 1695-1710 MHz band.[10] Evaluations that contemplated compatible

---

[7] Dr. Louis W. Uccellini, "A First Look at Hurricane Sandy", NOAA Science Advisory Board briefing on November 15, 2012, page 27. http://www.sab.noaa.gov/Meetings/2012/november/november_14-15_2012.html Links: NOAA and Hurricane Sandy; Presentation

[8] http://www.sab.noaa.gov/Meetings/2012/november/november_14-15_2012.html Links: NOAA and Hurricane Sandy; Hurricane Sandy Response Factsheet

[9] NTIA, "An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1850 MHz, 3500-3650 MHz, and 4200-4220, 4380-4400 MHz Bands", October 2010, page 1-5, 1-6.

[10] *See* Appendix One; *see also* Comments of T-Mobile on the LightSquared Allocation Petition, IB Docket No. 11-109, filed Dec. 10, 2012, at 3-7.

alternatives likely considered the entire 1675-1710 MHz band when searching for a 15 MHz wide segment to share. AIA assumes that GOES-R satellite spectrum changes contemplated having the balance of the band (e.g., 1675 – 1695 MHz) unencumbered by in-band terrestrial wireless systems. AIA asks whether changes contemplated to support spectrum sharing in the upper portion of the 1675-1710 MHz band would be compromised in any way by the LightSquared request. The GOES-R spectrum changes were clearly made in support of the band that may be designated for auction pursuant to the Middle Class Tax Relief and Job Creation Act of 2012.

AIA will continue to monitor this most recent LightSquared proposal as well as other efforts related to the National Broadband Plan. To support this, AIA's members are available to provide you the relevant expertise to inform any decision germane to the spectrum discussion. Please do not hesitate to call upon us as you reach out to the spectrum stakeholder community.

Best regards,

Daniel K. Elwell
Vice-President, Civil Aviation

APPENDIX ONE: Meteorological Systems

The 1675-1700 MHz band, (of which the 1675-1680 MHz band requested by LightSquared is a portion), is allocated within the United States for Meteorological Aids (radiosondes) and Meteorological-Satellite (space-to-Earth). Radiosonde data is a vital part of the overall weather picture of this country.

NOAA operates geostationary satellites, positioned over portions of the continent, to provide coverage from the Atlantic to the Pacific Ocean regions, within much, but not all of the planet's latitudes. The current generation Geostationary Operational Environmental Satellites (GOES) has services which range from center frequencies of 1676 to 1694.5 MHz. Figure 1 illustrates the services in the 1675-1710 MHz band as presented to users in 2011.

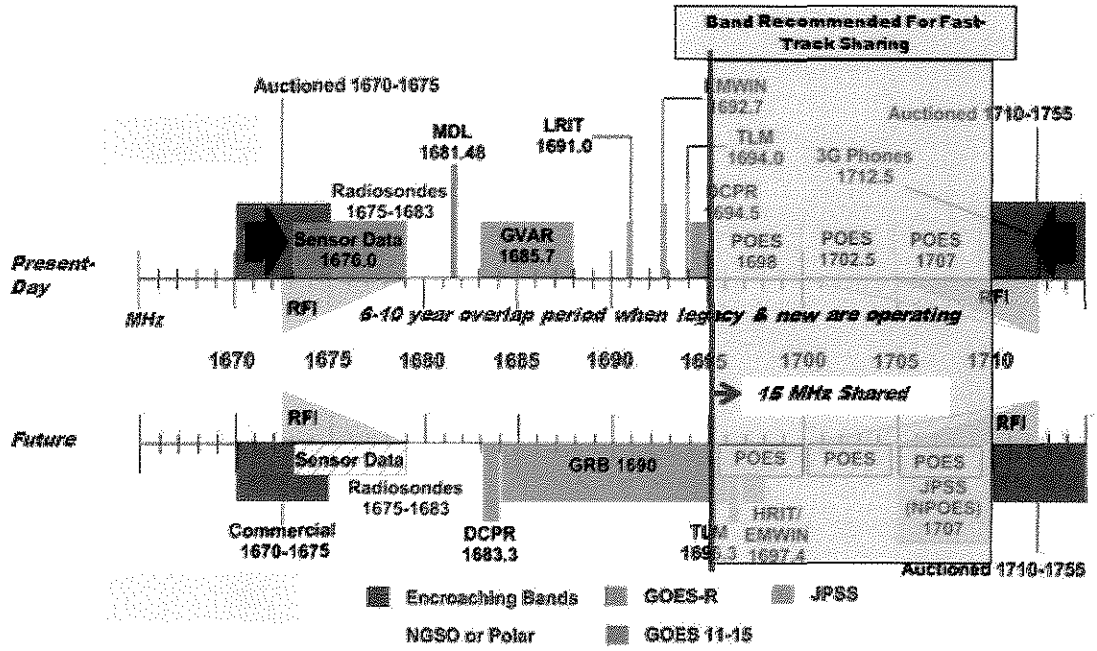

Figure 1: Meteorological Spectrum Usage in 1675-1710 MHz Band, Prior to GOES-R Redesign

Current generation satellite services which utilize 1675-1680 MHz or are directly adjacent are as follows:

- Sensor Data downlink (1673.4-1678.6 MHz)
- Multi-use Data Link (1681.48 MHz)

The Sensor Data downlink contains the raw Imager and Sounder data collected by sensors onboard the spacecraft. Without this data, there would be no images to track hurricanes or monitor the rapid development of severe storms that may develop into destructive tornados. This data stream is the basis of many of the satellite products produced continuously and available for public use and by private companies for weather prediction and warning.

The Multi-use Data Link is processed by the NOAA Spacecraft Support Ground System and is used for diagnosing dynamic interactions among the payload instruments and the spacecraft. The MDL is also received by NOAA's Space Weather Prediction Center in Boulder, Colorado, for data inputs necessary to issue critical warning products from the Solar X-ray Imager and four other spacecraft instruments. Real time products dealing with Space Weather Scales, Solar Radiation Storms, Radio Blackouts and Geomagnetic Storms are derived from this data. The Space Weather events, for which this data is collected, can impact satellites, power grids, communications, navigation, aviation and many other technological systems.

A new generation of NOAA satellites, named Geostationary Operational Environmental Satellite-R Series (GOES-R) is under development. The Fast-Track report recognized that a reallocation [of a 15 MHz portion of the 1675-1710 MHz band] would require NOAA to take "immediate steps to redesign the future Geostationary Operational Environmental Satellite-R Series (GOES-R) satellite." Subsequent to the publishing of the Fast-Track report, the GOES-R satellite was

redesigned to utilize a different downlink spectrum design. This redesign has satellite downlinks that fall within or directly adjacent to the 1675-1680 MHz band.

The GOES-R downlink spectrum was changed for the following services:

- Data Collection Platform Report - DCPR (domestic) from 1683.3 to 1679.9 MHz Center Frequency
- Data Collection Platform Report (international)from 1683.6 to 1680.2 MHz Center Frequency
- GOES-R Broadcast (GRB) from 1690.0 to 1686.6 MHz Center Frequency
- High Rate Information Transmission / Emergency Weather Managers Weather Information Network (HRIT / EMWIN) (broadcast) from 1697.4 to 1694.1 MHz Center Frequency

Some of these design changes move the new GOES-R downlinks further into the proposed spectrum that LightSquared is requesting for sharing.

NOAA's National Weather Service also has radiosondes in this portion of the 1675-1710 MHz band. Radiosonde data is used to understand and accurately predict changes in the atmosphere. As radiosondes (or rawinsondes, if upper wind measurements are included in the data collection) are launched several times daily from 92 locations in the US and Possessions, the current systems use 1668.4-1700.0 MHz to send the balloon-based sensor measurements to sensitive ground stations. Such systems would be difficult to analyze and predict radio frequency interference levels between wind-carried balloons and terrestrial wireless systems because the typical weather balloon sounding can last in excess of two hours, ascending to over 35 kilometers (about 115,000 feet) and drift more than 300 kilometers (about 180 miles) from the release point.[11]

[11] http://www.ua.nws.noaa.gov/factsheet.htm