May 30, 2018

Ms. Marlene Dortch

Secretary

Federal Communications Commission

445 12th Street, SW

Washington, DC 20554

**Re: *Expanding Flexible Use of the 3.7 GHz to 4.2 GHz Band* - GN Docket No. 18-122**

Dear Ms. Dortch,

In assessing the implications of changes to the 3.7-4.2 GHz band, Delta Air Lines recommends the Commission consider both in-band, and adjacent band systems, directly supporting aviation safety. The aviation industry is a heavy user of both the 3.7-4.2, and 4.2-4.4 GHz bands, using the C-band satellite system for the distribution of aviation data, and the adjacent band (4.2-4.4 GHz) radio altimeter system for avoiding terrain. Therefore, any interference from new terrestrial systems within the 3.7-4.2 GHz band to aviation systems should be fully assessed technically and operationally for the safety of the general public before any decision is made by the Commission.

**Delta Air Lines** serves more than 180 million customers each year. In 2017, Delta was named to Fortune’s top 50 Most Admired Companies in addition to being named the most admired airline for the sixth time in seven years. Additionally, Delta has ranked No.1 in the Business Travel News Annual Airline survey for an unprecedented six consecutive years. With an industry-leading [global network](http://news.delta.com/global-network), Delta and the [Delta Connection](http://www.delta.com/content/www/en_US/traveling-with-us/where-we-fly/flight-partners.html#connection) carriers offer service to 306 destinations in 52 countries on six continents. Headquartered in Atlanta, Delta employs more than 80,000 employees worldwide and operates a mainline fleet of more than 800 aircraft

The C-band satellite system operating in the 3.7-4.2 GHz band is essential for aviation data requiring high reliability. Unlike higher frequency satellite communications, the C-band frequencies used experience little rain fade, and continuously operate through almost all-weather conditions. This attribute is a key factor in the distribution of aviation data to remote areas or as redundant links to avoid single points of network failure. Networks using this capability include remote stations providing coverage for VHF Air Traffic Control networks, and NOAA weather data used by aviation operators to make flight routing decisions. There are no alternative satellite systems providing the same capability and capacity as the C-band satellite networks.

The 4.2-4.4 GHz ARNS allocation has been used globally by the airborne radio altimeter system for over 40 years to improve safety and is an essential part of in ground proximity warning systems ([GPWS](https://en.wikipedia.org/wiki/GPWS)), warning the pilot if the aircraft is flying too low or descending too quickly. Additionally, the airborne radio altimeter is used for precision approaches under limited visibility conditions (CAT II/CAT III landings) for the purpose of determining the aircraft position in relation to the applicable decision height. The altimeter’s improvements to aviation safety worldwide have made it required equipment onboard almost all medium to large scale commercial airframes as part of the Ground Proximity Warning System (“GPWS”) for operation during all phases of flight. Delta Air Lines has altimeters fitted on all of its aircraft fleet (867 mainline aircraft and 425 aircraft in the regional fleet, operating domestically and internationally.

The radio altimeter radar system sweeps or pulses through almost all of the 200 MHz ARNS allocation to achieve the necessary altitude resolution needed for precise navigation. Preliminary studies submitted to the International Civil Aviation Organization (“ICAO”) based on generic altimeter performance metrics have shown potential interference from new adjacent terrestrial services in the 3.7-4.2 GHz band during low level operations such as landing and takeoff.[[1]](#footnote-1) Combined with the Global Positioning System (“GPS”) location data, the radio altimeter is one of the main aircraft sensor systems used during the critical phases of flight such as landing and takeoff in low/zero visibility weather. Any interference that compromises the altimeters receiver performance can immediately affect aircraft safety systems such as the autopilot function or the GPWS. Therefore, all interference to the radio altimeter, no matter how brief, should be considered a safety of flight issue.

Finally, Aerospace Vehicle Systems Institute explained that the possible introduction of mobile systems in the 3.7-4.2 GHz band was already studied in the ITU process in advance of WRC-15 and was rejected because of conclusions “that the interference characteristics of International Mobile Telecommunications (“IMT”) use of adjacent bands cannot be adequately predicted to ensure continued safe operation of the radio altimeters.”[[2]](#footnote-2)

Given the above, Delta Air Lines requests the Commission seriously consider any potential actions in the 3.7-4.2 GHz band that could affect aviation safety, especially the protection of the radio altimeter in the adjacent band. It is recommended that the Federal Aviation Administration (FAA) be involved to fully assess such altimeter interference for both commercial and federal aircraft.

Respectfully Submitted,

Kevin M Heffernan Delta Air Lines, Flight Operations

1. *See* ICAO studies to WG-Frequency: [Preliminary Study into Radio Altimeter Adjacent Band Compatibility](https://www.icao.int/safety/acp/ACPWGF/ACP-WG-F-30/ACP-WGF30-WP14%20Radio%20Altimeter%20Adjacent%20Bands%20Compatibility%20Study%20with%20IMT-FINAL%20Rev1.docx), dated 13 March 2014 [↑](#footnote-ref-1)
2. Comments of Aerospace Vehicle Systems Institute, GN Docket No. 17-183, at 1 (Oct. 2, 2017). Referenced from Boeing Company reply, GN Docket No. 17-183 [↑](#footnote-ref-2)