



December 8, 2021

**Comments to the Federal Communications Commission Public Notice (WT Docket No. 20-133)
Regarding Wireless Telecommunications Bureau Seeks to Supplement the Record on
70/80/90 GHz Bands Notice of Proposed Rulemaking**

NSF indicates our serious concerns with the proposed operation of elevated (stratospheric) broadband platforms operating at all noted frequencies (71-76 GHz, 81-86 GHz, 92-94 GHz, 94.1-95 GHz) and are exceedingly concerned with the use of the 92-94 GHz and 94.1 – 95 GHz ranges within the United States as envisioned in the NPRM and note that usage of 71 – 76 GHz and 81-86 GHz may be possible, but only after careful coordination. We further note the United States has invested on the order of \$1 billion in the ALMA radio telescope in Chile, which was specifically located at an altitude of ~18,000 feet to enable observations in the 71 – 76 GHz and 81 – 86 GHz range (ALMA Band 2: 65 – 90 GHz). Hence, there are both domestic and international implications to such operation within the United States if it were to be adopted more broadly.

NSF fully supports the enhancement of broadband services. We note, however, that the subject frequency bands include multiple ranges (81-86 GHz, 92-94 GHz, 94.1-96 GHz) allocated on a co-primary basis to the radio astronomy service and protected by footnote US342, which recognizes that “Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service”. Additionally, Footnote US161 indicates the necessity for coordination with specified radio astronomy facilities in these frequency bands. These bands are critical for U.S. radio astronomy, as many molecular spectral lines can be observed in the particular atmospheric “window” where these bands fall, and there are important broadband continuum observations conducted in these bands. Additionally, the power levels for emissions at these frequencies may physically harm receivers, and coordination and/or no-transmit zones directly overhead of radio astronomy sites should be considered.

Elevated platforms operating within line-of-sight of the stations enumerated in Footnote US161 may present significant sources of interference beyond the distances listed in the Footnote, as the vantage point of the elevated platforms results in illumination of larger areas (due to Earth curvature) than possible with ground-based systems. Radio horizons from systems operating at an altitude of 50,000 feet may be greater than 500 km, for example.¹ In a simple analysis, to avoid exceeding radio astronomy service protection criteria stated in Recommendation ITU-R RA.769-2, and given “standard atmosphere” conditions, such elevated platform systems would need to limit EIRP emissions illuminating radio astronomy sites (either main beam or sidelobe) to approximately –45 dBW into 300 MHz for non-VLBA systems, and 10 dBW for VLBA systems listed in US161, at 500 km line-of-sight distance. Aggregate interference may impact these calculations. We note the

¹ See line-of-sight calculator, URL: <https://www.southwestantennas.com/calculator/line-of-sight>

slightly less stringent protection requirements for very long baseline interferometry (VLBI) than single dish radio telescopes.

NSF requests that prior to the authorization of elevated platforms contemplated in the NPRM, analysis be conducted of potential interference to the radio astronomy systems specified in footnote US161, and appropriate geographic exclusion or coordination requirements, along with power limits, be established for the licensing of such platforms, in order to maintain the protection of the radio astronomy systems operating in this frequency range.

Based both upon the primary allocations to the radio astronomy service and the particularly serious challenges with interference from elevated transmitting platforms described in footnote US342, we would request the 92-94 and 94.1 – 95 GHz bands be eliminated from consideration, or a coordination distance of 500km be established around sites enumerated in Footnote US161 to allow careful case-by-case calculations of impacts and means of coexistence. Additionally, coordination should be required for usage at any of the noted frequencies, and endpoints in motion should not be considered at this time.

Best regards

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