

C-Band Alliance

FCC Reply Technical Annex Summary

December 7, 2018

U.S. Federal Communications Commission Proceeding GN Docket No. 18-122 and GN Docket No. 17-183

In the technical annex to its reply comments, the CBA proposes rules to be adopted by the FCC that will ensure that FSS operations in 3900-4200 MHz are being protected from terrestrial 5G operations in the adjacent 3700-3880 MHz band. The proposed rules are based upon further review and extensive analysis of key technical issues raised in the opening round of comments and discussions of those issues with customers, mobile network operators and 5G equipment providers.

These protections include limiting aggregate 5G in-band and out-of-band levels at satellite earth stations in order to avoid the potential for earth station LNB saturation and interference within the remaining C-band satellite spectrum. Based upon analysis of the revised Nokia technical submission on out-of-band emission levels, the CBA accepts Nokia's new proposed level.

What will be protected?

- The CBA proposes that protection is based on the location of:
 - o all FSS earth stations registered before the freeze
 - o additional FSS earth stations to be registered during a period of 30 days following publication of the Report and Order in the Federal Register
- For each location, an area of 150 m radius is to be protected
- Within this area, antennas with a diameter of between 3 m and 13 m and with an elevation angle of 5 degrees or more, are protected in the entire 3900-4200 MHz band and across the accessible geostationary arc

How will protection of operations in the band 3900-4200 MHz be achieved?

- LNB Saturation

Each 5G licensee will have to comply with an aggregate power density limit of -81.6 dBm/MHz to be met in the band 3700-3900 MHz at the input of a LNB, taking into account the above parameters and all 5G base stations within 40 km of an earth station. The calculation takes into account a reference antenna pattern and a reference filter attenuation. In addition, there is a guard band of 20 MHz limiting 5G operations to 3700-3880 MHz. The aggregate power density limit of -81.6 dBm/MHz summed over the entire 3700-3880 MHz 5G transmission band ensures that a maximum LNB input does not exceed -59 dBm

- C-band Signal Interference

Each 5G licensee will have to comply with an aggregate power density limit of -128 dBm/MHz to be met in the band 3900-4200 MHz at the input of an LNB, taking into account the above parameters and all 5G base stations within 40 km of an earth station. The calculation takes into account a reference antenna pattern and a reference filter insertion loss. The aggregate power density limit of -128 dBm/MHz ensures that the contributed interference to C-band signals is at a level at least 10 dB below the noise floor.

What other items are considered in the Technical Annex?

- Maximum 5G Base Station Power Levels

Given that the proposed rules outlined above – specifying power levels at the earth station LNB input as power spectral density – would provide the necessary protection of C-band earth stations, then assuming adoption of such rules, the CBA would not require 5G base station power levels to be limited to 46 dBm/MHz or to 75 dBm total power.

- 5G Out-of-Band Emission Levels: CBA is Aligned with the Nokia Proposal

Upon analysis of Nokia's proposed OOBE level of -3 dBm/MHz from the 5G band edge to 20 MHz from the band edge, the CBA determined that this level does not result in any appreciable increase in power over the previously proposed -13 dBm/MHz level as it pertains to potential earth station LNB saturation. Therefore, the CBA accepts Nokia's new proposed level.



The C-Band Alliance (CBA) was formed in October 2018 by the four leading global satellite operators – Intelsat (NYSE: I), SES (Euronext Paris: SESG), Eutelsat (Euronext Paris: ETL) and Telesat. The role of the CBA is to implement the safe and efficient clearing and repurposing of mid-band spectrum in the U.S., accelerating the deployment of 5G services and innovation, serving all Americans.

The CBA is designed to act as a facilitator as described in the companies' breakthrough, market-based proposal to clear a portion of C-band spectrum under a U.S. Federal Communications Commission (FCC) proceeding. Follow our mission...visit www.C-BandAlliance.com