



**FILED VIA ECFS**

September 21, 2021

Marlene H. Dortch, Secretary  
Federal Communications Commission  
45 L Street, NE  
Washington, DC 20510

Jeffrey Marks  
Vice President  
Regulatory Affairs

Address:  
1200 G Street, NW  
Suite 800  
Washington, DC 20005

Email:  
jeffrey.marks@nokia.com

**Re: Notice of Ex Parte Presentation**

*Expanding Flexible Use of the 3.7-4.2 GHz Band*, GN Docket 18-122

Dear Ms. Dortch:

On September 17, 2021, Fabiano Chaves, Jaimeen Kamdar, Grace Koh, Amit Mukhopadhyay, and the undersigned, all of Nokia, met via teleconference with Commission staff from the International Bureau, the Wireless Telecommunications Bureau, and the Office of Engineering and Technology. Commission meeting attendees are listed below.

The meeting was requested by Commission staff to respond to technical questions regarding Nokia's products to be deployed in the 3.7-3.98 GHz band. Key information conveyed by Nokia to Commission staff in the meeting was as follows:

- Commercial base stations in C-band are meant to provide wideband coverage for macro-cells. Nokia base stations operating in the 3.7-3.98 GHz band operate close to the Commission regulatory power limits to meet customer demand for robust 5G services throughout the applicable service area.
- Nokia base stations operating in the 3.7-3.98 GHz band have Out of Band emissions considerably lower than 3GPP specification levels for Category B (-30 dBm/MHz).
- The typical antenna array configuration of Nokia base stations operating in the 3.7-3.98 GHz band is 12 x 8 radiating elements per polarization. These antenna panels are

designed with sub-array or logical element structures, where each logical element is composed of 3 radiating elements in the vertical plane, resulting in 4 rows and 8 columns of logical elements. The design of the antenna, including the number of antenna elements and separation distance between them, is the outcome of optimization of several technical aspects.

- Commercial base stations in the C-Band typically have a pre-set downtilt in their antennas. Additionally, Adaptive Antenna Systems (AAS) antennas are designed to support electrical beam steering in a certain vertical and horizontal plane range. Macro-cell deployment characteristics, including optimized mechanical downtilts, usually lead to a reduced range of operational vertical steering angles.
- Technical characteristics and the antenna pattern model for AAS antennas with sub-array structures operating below 4990 MHz were recently developed in 3GPP and agreed in ITU-R WP5D in its 38th meeting as representative and appropriate for use in sharing and compatibility studies towards WRC-23. These technical characteristics developed in this forum are very similar to the Nokia AAS base station antennas operating in the 3.7-3.98 GHz band. The 3GPP/ITU antenna pattern model for AAS antennas with sub-array structures has been shown to represent well the radiation pattern measured from commercial base stations of that type.

Please contact the undersigned with any questions in connection with this submission.

Respectfully submitted,

*/s/ Jeffrey A. Marks*

Jeffrey A. Marks  
Vice President, Regulatory Affairs  
North America

cc: **Commission Attendees**

International Bureau

Louis Bell  
Greg Baker

Wireless Telecommunications Bureau

Janet Young  
Ken Baker  
Kambiz Rahnavardy

Office of Engineering and  
Technology

Ira Keltz  
Robert Pavlak  
Barbara Pavon  
Bahman Badipour  
Corey Cahill