May 26, 2017

Nnake Nweke, Ph.D. (Engr.), Esq.
Chief, Experimental Licensing Branch
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20510

Nokia Solutions and Networks
US LLC

Address:
600 Mountain Ave
Murray Hill, NJ 07974

RE: Antenna Registration: Directional Antenna Information
License Service Application, File No. 0398-EX-CN-2017

Dear Chief Nweke,

This is the exhibit for the directional antenna Fixed/Base Stations:

Access Point (phase 1):
- 26 dBi gain, lens array
- Width of beam:
  - Azimuth: 9 degree HPBW, steerable +/- 30 degree. Elevation: 9 degree HPBW, steerable +/- 7 degree
- Orientation in horizontal plane:
  - AP will mounted in several test scenarios up to 360 degrees
- Orientation in vertical plane:
  - AP will have a downtilt from 5 to 20 degrees

Access Point (phase 2):
- 29 dBi gain, phased-array
- Width of beam:
  - Azimuth: 6.5 degree HPBW, steerable +/- 45 degree. Elevation: 5.5 degree HPBW, steerable +/- 11 degree
- Orientation in horizontal plane:
  - AP will mounted in several test scenarios up to 360 degrees
- Orientation in vertical plane:
  - AP will have a downtilt from 5 to 20 degrees

User Device:
- 25 dBi gain phased-array
- Width of beam in degrees at the half power point
  - ~11 degree HPBW, steerable range TBD
- Orientation in horizontal plane (degrees):
  - UD will be portable with a full 360 degree rotation
- Orientation in vertical plane (degrees):
  - UD will be pointed at the AP

Nokia proposes to operate initially using QPSK, 16QAM, and 64QAM modulation.
BPSK and 256QAM modulation may be used in later phases.

Yours Sincerely,

Glenn A. Steitz
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